FAO-BASED RESPONSIBLE FISHERIES MANAGEMENT CERTIFICATION FULL ASSESSMENT AND CERTIFICATION REPORT

For The

Icelandic Haddock Commercial Fishery

Applicant Group

The Federation of Icelandic Fishing Vessel Owners (LÍÚ)

The Federation of Icelandic Fish Processing Plants (SF)

The National Association of Small Boat Owners, Iceland (NASBO)

Facilitated by

Fisheries Association of Iceland

Published in April 2015

SAI Global/Global Trust Certification Ltd.

Head Office – 3rd Floor, Block 3
Quayside Business Park,
Mill Street, Dundalk, Co. Louth Ireland
T: +353 42 9320912
F: +353 42 9386864
web: www.GTCert.com

Table of Contents

I. Summary and Recommendations

The Fisheries Association of Iceland on behalf of the organisations named [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 commercial fishery to the FAO-Based Icelandic Responsible Fisheries Management (IRFM) Certification Program.

The initial application for Full Assessment was made in June 2014. Assessment commenced in July 2014 with the fishery review before proceeding to Full Assessment in August 2014 and final certification determination on the 23rd January 2015.

The certification covers the Icelandic Haddock (*Melanogrammus aeglefinus*) commercial fishery employing demersal otter trawl, longline, Danish seine net, gillnet, hook and line, and gears from other Iceland fisheries also landing haddock (indirectly) under the management of the Icelandic Ministry of Industries and Innovation and by international agreement, a very small number of Faroese and Norwegian vessels.

The full assessment (**report code ICE/HAD/001/2014**) was conducted according to the Global Trust Certification procedures for FAO – Based Icelandic Responsible Fisheries Management (IRFM) Certification using the FAO – Based IRFM Specification (version 1, revision 1) as the standard for assessment.

The assessment was conducted by a team of Global Trust appointed Assessors comprising three externally contracted fishery expert and Global Trust internal staff. Details of the assessment team are provided in Appendix 1. Peer Reviewer details are provided in Appendix 2.

The main key outcomes have been summarized in **Section 6 "Assessment Outcome Summary".**

Recommendation of the Assessment Team

The assessment team recommends that the management system of the applicant fishery, the Icelandic Haddock (*Melanogrammus aeglefinus*) commercial fishery, fished within the 200 mile Icelandic Exclusive Economic Zone (EEZ) by all Icelandic registered vessels using all gear types directly (demersal trawl, long-line, Danish seine net, gill net, hook and line) and indirectly (Nephrops trawl, shrimp trawl and pelagic trawl) under the management of the Icelandic Ministry of Industries and Innovation, is awarded certification to the FAO-Based Icelandic Responsible Fisheries Management (IRFM) Certification Programme.

Peer Reviewer A Comments and Recommendations

The assessment report is well researched, and presents a comprehensive review of the haddock fishery. Adequate information is provided on the stock status and trends, fishery management, compliance and monitoring, and ecosystem considerations. It is evident that the haddock fishery is well-managed by effective institutions, management plans are based on high quality scientific advice, monitoring and enforcement activities are using state of the art equipment, and fishers appear to act responsibly. I thus agree with the judgements made in assessing the haddock fishery, and the overall outcome of the assessment that the fishery is in conformance with the requirements of the FAO-based Icelandic Responsible Fisheries Management Specification. There are however some instances where more detailed information should be added to the assessment report, or where concerns with the management system should be given more prominence. For instance concerns that TACs have in the past been set above the scientific advice, and the lack of proposed remedial actions to address unexpected stock developments in the haddock management plan should be stressed. Clarifications and further details should be provided on several issues such as for example the actual implementation of the temporary sudden closures described in the management plan / assessment report to protect juvenile haddock, the degree to which haddock catches are processed at sea, or the process followed by the Icelandic authorities to determine whether to implement area closures for the protection of hydrothermal vent systems. Besides the amendment of the assessment report to address these relatively minor issues, it is recommended that the need for future annual surveillance audits to scrutinise several aspects of the effectiveness of the management system is highlighted.

Peer Reviewer B Comments and Recommendations

The report on the Icelandic Haddock Commercial Fishery is well written and describes in detail the fisheries assessment and management processes, relevant institutions and their roles in the system, the compliance and enforcement measures in place and their effectiveness, and, where they can be identified or hypothesised, the ways in which this fishery will interact with the wider ecosystem and the means by which these impacts can be mitigated. The report paints a picture of a fishery with a robust management system in place, delivering demonstrably high levels of compliance. A comprehensive stock assessment is has been adopted and used to produce a risk analysis for the way ahead. There are suites of measures in place to reduce discarding through incentives, spatial closures and technical measures. Stakeholders are involved in the management process through consultations and the system of individual transferable quotas fosters stewardship among fishers and rewards long-term thinking. There is evidence of historic catches in excess of scientific advice and agreed quotas, while it is still too soon to properly evaluate the effects of the management plan. Furthermore, there is a lack of catch data at sufficient granularity to properly study species interactions and bycatch. While the stock is currently declining due to recent poor recruitment, it seems to be in good health overall, subjected to sustainable levels of fishing mortality by a well regulated fishery with a plan for how fishing mortality should be managed, and with limited impacts on the wider ecosystem. I concur with the assessment team that the certification be awarded.

II. Schedule of Key Assessment Activities

Assessment Activities	Date (s)
Application Date	June 2014
Appointment of Full Assessment Team	August 2014
On-site Witnessed Assessment and Consultation Meetings	August 2014
Draft Assessment Report	November 2014
External Peer Review	December 2014 - January 2015
Final Assessment Report	January 2015
Certification Review/Decision	23rd January 2015

III. Assessment Team Details

Assessment Team Members:

Vito Ciccia Romito, Lead Assessor
SAI Global/Global Trust Certification Ltd.
Quayside Business Centre,
Dundalk, Co. Louth,
Ireland.
T: +353 (0)42 9320912
F: +353 (0)42 9386864
E-mail: vito.romito@saiglobal.com

Dave Garforth, Assessor
SAI Global/Global Trust Certification Ltd.
Quayside Business Centre,
Dundalk, Co. Louth,
Ireland.
T: +353 (0)87 7978480
F: +353 (0)42 9386864
E-mail: david.garforth@saiglobal.com

Birgir Thor Runolfsson, PhD, Assessor
Fisheries Science Consultant
University of Iceland, Department of Economics
Iceland.
E-mail: bthru@hi.is

Dankert Skagen, MD, Assessor
Fisheries Science Consultant
Fjellveien 96, 5019 Bergen,
Norway
Website: www.dwsk.net

Norman Graham, PhD, Assessor
Fisheries Scientist
Marine Institute, Galway,
Ireland
E-mail: Norman.Graham@Marine.ie

IV. Acronyms

B_{Lim}	The biomass limit reference point below which there is a high risk that recruitment will be impaired and that the stock could collapse.
B_{Loss}	The biomass below which there is no historical record of recruitment
B_{MSY}	The biomass that can produce the maximum sustainable yield
B4+	Biomass of 4 years and older fish
EEZ	Exclusive Economic Zone
EU	European Union
FAO	United Nations Food and Agriculture Organization
FMP	Fishery Management Plan
HCR	Harvest Control rule
ICES	International Council for the Exploitation of the Sea
ICG	Icelandic Coast Guard
ITQ	Individual Transferable Quota
IWC	International Whaling Commission
kt	kilo tonnes
MII	Ministry of Industries and Innovation
MRI	Marine Research Institute
MSY	Maximum Sustainable Yield
NAFO	North Atlantic Fisheries Organization
NAMMCO	North Atlantic Marine Mammal Commission
NEAFC	North-East Atlantic Fisheries Commission
NPA	National Program Action
NWWG	North-Western Working Group (within ICES)
SSB	Spawning stock biomass
$SSB_{trigger}$	The spawning stock biomass level that acts as a trigger when the stock fall below a certain level
TAC	Total Allowable Catch
VMS	Vessel monitoring system
VMEs	Vulnerable Marine Ecosystems

1. Introduction

The Icelandic haddock commercial fishery [defined as the Icelandic haddock fishery pursued within the 200 mile Icelandic Exclusive Economic Zone (EEZ), fished by all Icelandic registered vessels using all gear types directly (with demersal otter trawl, long-line, Danish seine net, gill net, hook and line) and indirectly (Nephrops trawl, shrimp trawl and pelagic trawl), under the management of the Icelandic Ministry of Industries and Innovation] was assessed against the requirements of the FAO-Based Icelandic Responsible Fisheries Management (IRFM) Certification Programme. The application was made by the Fisheries Association of Iceland and representative organisations on behalf of the fishery and was validated as appropriate representative bodies on behalf of fishery management organisations and interests.

The assessment was conducted according to the Global Trust procedures for FAO – Based IRFM certification using the Icelandic Responsible Fisheries Management Specification (Version 1, Revision 1, March 2014). 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 recognition 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 comprised of application, application review, assessment planning, full assessment reporting, peer review and certification committee verification. One site visit was made to the fishery during full assessment in August 2014. Assessors comprised of both external contracted fishery consultants and Global Trust internal staff. This report is the final report of the assessment and documents each step in the assessment process. It contains the proposed recommendation made by the assessment team and verified by the peer review team, to the certification committee

of Global Trust who presides over the certification decision according to the requirements of ISO65 accredited certification. The assessment team has confirmed the recommendation post the peer review stage in the assessment. Any omissions/comments/critique noted by the peer reviewers and certification committee were rectified by the final version of the full assessment report. Responses to the peer reviewer's comments are detailed in the peer review reports in section 8.

1.1 Recommendations of the Assessment Team

The assessment team recommends that the management system of the applicant fishery, the Icelandic Haddock (*Melanogrammus aeglefinus*) commercial fishery, fished within the 200 mile Icelandic Exclusive Economic Zone (EEZ) by all Icelandic registered vessels using all gear types directly (demersal trawl, long-line, Danish seine net, gill net, hook and line) and indirectly (Nephrops trawl, shrimp trawl and pelagic trawl) under the management of the Icelandic Ministry of Industries and Innovation, is awarded certification to the FAO-Based Icelandic Responsible Fisheries Management (IRFM) Certification Programme.

2. Fishery Applicant Details

Applicant Contact Information			
Organization/ Company Name:	**The Federation of Icelandic Fishing Vessel Owners (LÍÚ)**	Date:	**June 2014**
Correspondence Address:	**Landssamband íslenskra útvegsmanna**		
Street :	**Borgartuni 35**		
Country:	**Iceland**		
State:	N/A	Postal Code:	**IS-105**
Phone:	(354) 591 0300	**E-mail Address:**	**ss@liu.is**
Organization/ 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		
State:	N/A	Postal Code:	**IS-105**
Phone:	**(354) 591 0350**	**E-mail Address:**	***sf@sf.is***
Organization/ 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		
State:	N/A	Postal Code:	**IS-101**
Phone:	**(354) 552 7922**	**E-mail Address:**	***ls@smabatar.is***

3. Background to the Fishery

3.1 Species Biology

The haddock *(Melanogrammus aeglefinus)* is a rather large codfish, usual size in catches is between 50 and 65 cm long, but the largest individual caught in Icelandic waters measured 112 cm. It is found in abundance all around Iceland. During cold periods it is rather rare in the colder waters off the north coast, but in warmer periods it can be more common in the north than in the south. Mostly it occurs over soft bottoms at depths between 10 and 200 m. It is found in European waters from Spitsbergen and the White Sea in the north to the Bay of Biscay in the south. It also occurs around the Faroe Islands, in southern Greenlandic waters and from Labrador to Cape Cod in North America.

Haddock is primarily a benthic feeder as opposed to the pelagic feeding habits of its close relative, the saithe (*Pollachius virens*). Its main food is polychaetes and small bivalves that live buried in the sediments and capelin or sandeels when available. The life history of haddock is very similar to that of the cod. The main spawning takes place along the south and southwest coasts, from April to May. The eggs and larvae drift with the waters west, north and sometimes east of Iceland where they settle to the bottom and spend the first years of their life. Growth is rather fast during the first two years, considerably faster than for the cod, but sexual maturity is reached at the age of 3 to 4, a year or two earlier than cod. Fishes usually grow slower after sexual maturity and therefore the cod grows faster than the haddock after the age of 3. The oldest recorded haddock in Icelandic waters was 18 years old.

Figure 1. Haddock[1]

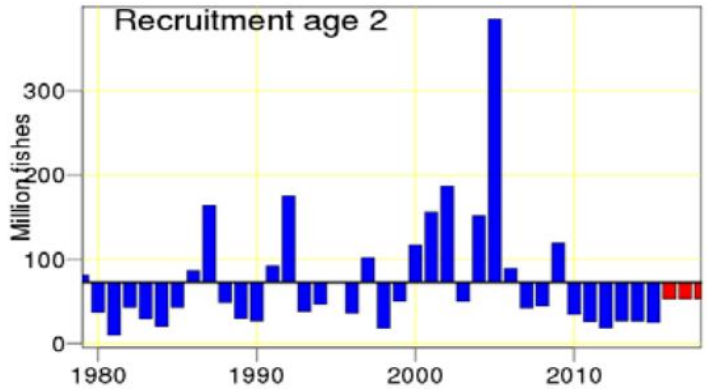
[1] http://www.fisheries.is/main-species/codfishes/haddock/

Distribution, growth and reproduction

Haddock is a boreal species occurring in the eastern Atlantic from the Celtic Sea to Spitsbergen (Svalbard), the Barents Sea, and around Iceland. The species is also found in shelf waters of the Northwest Atlantic, from the Georges Bank to Newfoundland. Haddock has a demersal life style and shoals in colder waters at depths from 40-300 m, with a preference for depths between 75 and 125 m. in North Sea, the bulk of both immature (<30 cm) and mature haddock (>30 cm) is found in the northerly areas, with the southern distribution border extending from north-east England, along the Dogger Bank, to the Skagerrak and Kattegat, closely following the 50 m depth contour. The distributions of these two groups fully overlaps, although juveniles tend to be more abundant in the Skagerrak than adults.

Icelandic haddock is mostly limited to the Icelandic continental shelf but 0-group and juveniles from the stock are occasionally found in East Greenland waters. Apart from this, larval drifts links with other areas have not been found. The species is found all around the Icelandic coast, principally in the relatively warm waters off the west and south coast, in fairly shallow waters (50-200 m depth). Haddock is also found off the North coast and in warm periods a large part of the immature fish were found north of Iceland. Recently, large part of the fishable stock has also been found off the north coast (NWWG, 2011)[2].

A common characteristic of haddock is the irregularity of recruitment irrespective of stock size. Whereas the inter-annual variation in recruitment for many fish stocks may fluctuate by a factor of three or four, fluctuations between peaks and troughs exceeding an order of magnitude appears to be the norm for haddock. Associated with these fluctuations in numerical abundance are variations in growth rates. Strong year classes invariably have lower weights at age than are found during periods of poor to average recruitment. Inevitably these fluctuations in abundance and weights at age result in periods of glut and famine in haddock fisheries. The 2003 year class (age 2 in 2005) was outstanding and is still well represented in the catches. Since then, recruitment has been poor, except for the 2006 year class. The reason for the recruitment fluctuations is poorly known.



2 http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2012/NWWG/Sec%2010%20Icelandic%20haddock.pdf

Figure 2. Recruitment according to the 2013 stock assessment. From Section 10 - Icelandic Haddock in ICES NWWG report 2013

Growth of haddock is considered density dependent. The stock was large in 2003–2009 and growth very slow. Since 2009 the stock size has decreased and growth gradually improved. In 2013 growth is estimated to be above the average of the last 30 years. In 2014, mean weight-at-age is high for the youngest age groups, but around average for the older fish that contribute most to the spawning stock and the fishable stock[3]. Mean weight at age has varied over time (Figure 3). It was low in the first decade after 2000, but is close to average at present. There may be some effect of density dependence, but in general the cause of the weight at age fluctuations is unknown.

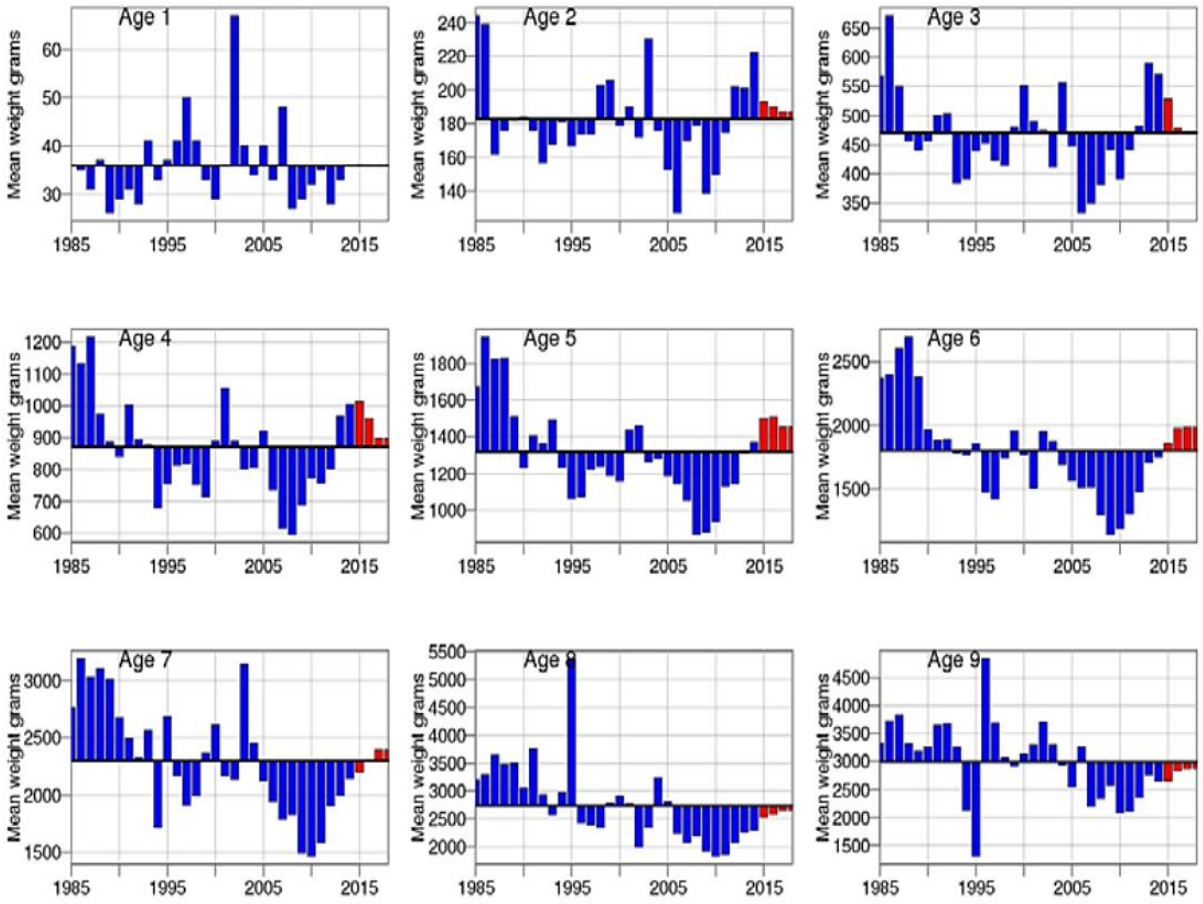


Figure 3. Mean weight at age in the March survey. Red is predicted weight at age in the stock. From Section 10 - Icelandic Haddock in ICES NWWG report 2013.

Spawning takes place from March to May, mostly in the South, although in warm periods, spawning may occur in the North as well, at depths of 100-150 m. A four-year-old female carries on average 500 eggs per gram body weight, equivalent to 300,000 eggs for a 40 cm (630 g) female. The pelagic eggs are 1.2-1.7 mm in diameter and take one to three weeks to hatch. After metamorphosis, the 0-group remain pelagic until they reach a size of approximately 7 cm, after which they settle to a

[3] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2014/2014/had-iceg.pdf

demersal life style. Most haddock mature from 4-7 years age and 50% of age 4 haddock are mature on the average.

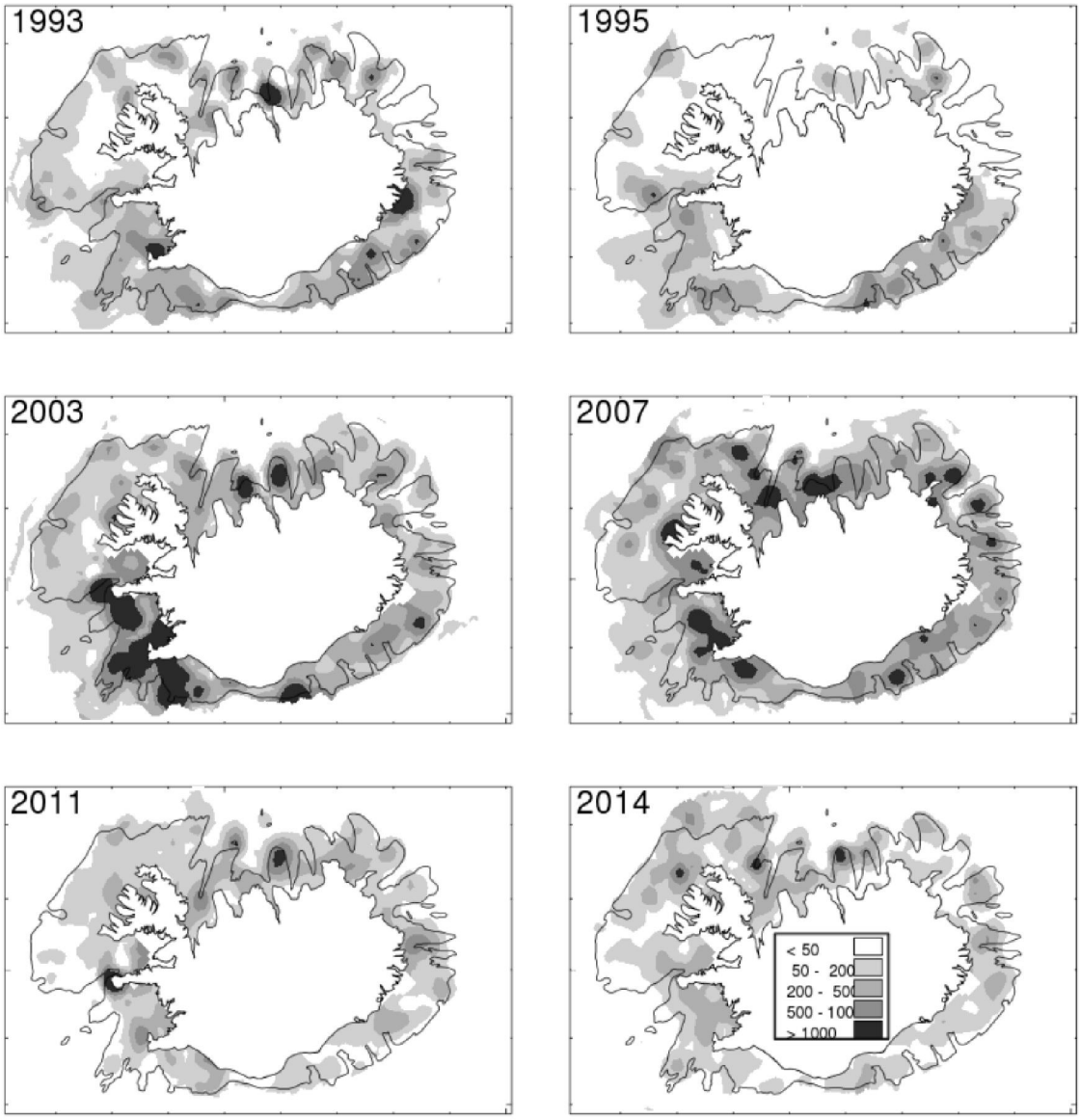


Figure 3. Spatial distribution of haddock in the March groundfish survey. Shading indicates mean catch in kg/tow. From Section 10 - Icelandic Haddock in ICES NWWG report 2013[4]

Systematic studies of possible migrations are sparse, but here are no indications of mixing with other haddock stocks, except that 0-group and juveniles of Icelandic origin may occur in Greenland waters. It is considered that the deep water separating the Icelandic shelf from other areas is an effective barrier to migrations, and no haddock has been recorded there in fishery or surveys. The stock structure within Icelandic waters is also poorly known, but there are no indications of haddock being part of a meta-population.

4

http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2013/NWWG/Sec%2010%20Icelandic%20haddock.pdf

Migration, feeding habits and predation

Migration patterns are in general poorly documented. Judging from the IBTS data, haddock does not appear to display seasonal long-distance migrations. However, the haddock of the Norwegian Deeps shows a seasonal migration between relatively shallow areas in summer and deeper parts in winter. Mature specimens are even migrating out of the area in winter.

The larval stages feed mainly on immature stages of copepods, while the pelagic post-larvae (0-group) (310 cm) predate on euphausiids, appendicularians, decapod larvae, copepods and small fish. Once 0-group have settled to the demersal, post-larval stage, they still feed to some extent on pelagic organisms such as euphausiids, but benthic invertebrates become increasingly more important as they grow. Larger haddock also eat fish such as sandeel, Norway pout, long rough dab, gobies, sprat, and herring. The majority of stomachs at any given sampling station at any given time contain similar prey, suggesting that they feed in shoals rather than individually. However, temporal and spatial variation is large. Especially the haddock juveniles are an important prey for larger gadoids and other demersal fishes. Seals also predate on the larger ones[5].

Environmental influence on the stock

Haddock in Icelandic waters is near the northern boundary of its distribution. In cold periods the area north and east of Iceland is probably too cold for haddock, but in warmer periods the temperature in this area is suitable for haddock. The areas north and east of Iceland constitute a large part of the Icelandic continental shelf, so in warm periods much larger areas are available for haddock. Landing figures from the early 1960s support the observation that the stock can become very large in warm periods. The groundfish surveys show that the proportion of the haddock stock inhabiting the waters north of Iceland has increased from 2000 to 2006 and has remained high since then.[6]

[5] http://www.ices.dk/explore-us/projects/EU-RFP/EU%20Repository/ICES%20FIshMap/ICES%20FishMap%20species%20factsheet-haddock.pdf
[6] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2014/2014/had-iceg.pdf

3.2 Fishery Location and Method

History of the fishery

Historically, the dominant demersal fishery in Icelandic waters has always been the cod fishery. The haddock fishery, is more often regarded as a secondary target species in the cod fishery. This is still very much the case today although haddock tend to be the dominant species in the Danish seine fishery and may be targeted seasonally, e.g. during the haddock spawning season (when cod condition may be poor following their own spawning a month or so earlier), as part of a vessel's strategy to manage its cod quota efficiently. With each extension to the fishery limits, Iceland has accounted for an increasing proportion of the total annual landings of haddock from Icelandic waters and now accounts for all but *c.* 1000 t, mostly taken by Faroe Islands at the Iceland–Faroe median line (NWWG, 2014[7]).

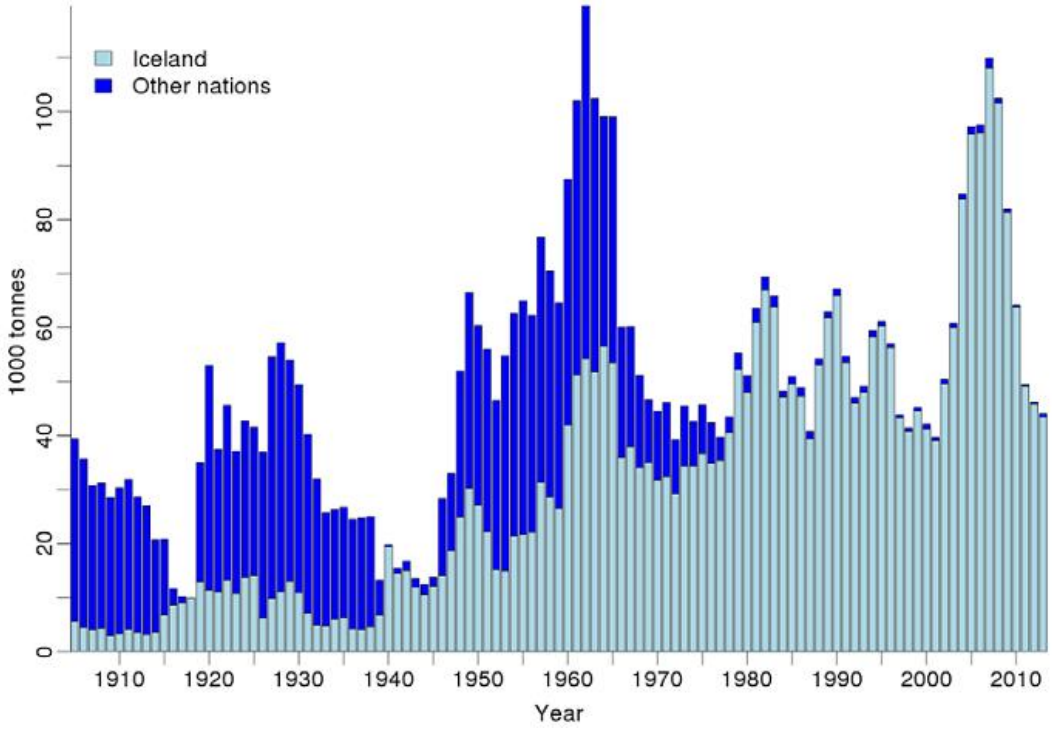


Figure 4. Nominal catch (kilo tonnes) of haddock from Icelandic waters 1905–2013 (NWWG 2014).

Haddock is caught all around Iceland with the exception of closed areas and throughout the year. The best grounds are off the west coast and fishing is presently best in the winter months. The fishery is mainly carried out on the shelf and the shelf break.

[7] http://link.springer.com/article/10.1007%2FBF00058520#page-1
http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2014/NWWG/12%20NWWG%20Report%20-%20Sec%2010%20Icelandic%20Haddock.pdf

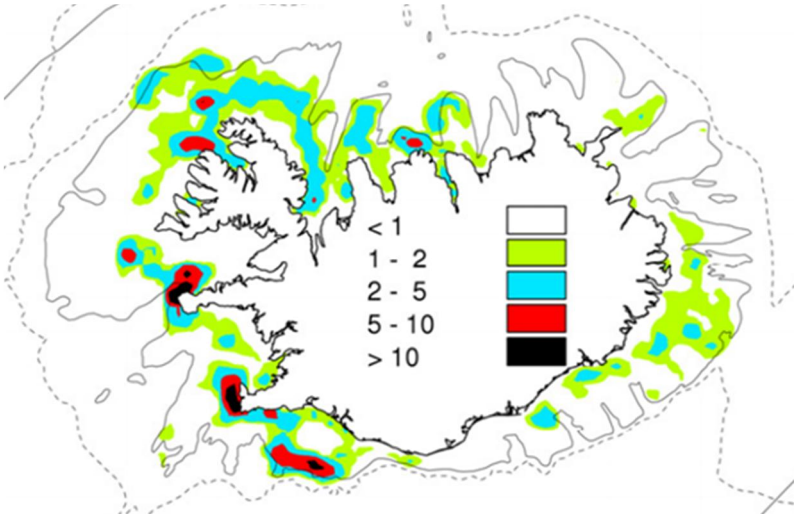


Figure 5. Haddock fishing grounds in 2011 (t/nm^2), all gear combined. Dark areas indicate highest catches.[8]

Historically, haddock catches have varied from 30,000 to 70,000 tonnes annually by the Icelandic fleet. A similar amount was taken by foreign fleets when they fished around Iceland, mostly by English trawlers. Recently, the catches have increased sharply to the current level of about 100 thousand tonnes annually, the highest for 40 years (Figure 6).[9]

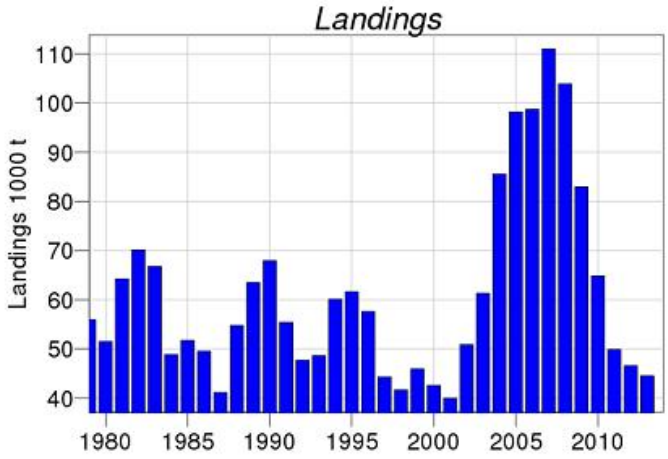


Figure 6. Haddock in Division Va. Landings from 1979 to 2013.

Haddock is caught in directed haddock fisheries, as well as in mixed demersal fisheries targeting cod. Recent changes in seawater temperature have had considerable effects on the spatial distribution and the distribution of the catches. Since 2000, an increasing proportion of haddock has been caught by longliners. Currently, bottom trawl and longlines gear constitute almost 90% of total catches and are even in term of haddock volume caught per gear. Haddock typically enters the fishery at a length of approximately 45 cm, corresponding roughly to 0.6 - 1 kilo or age 3-5.

[8] http://www.fisheries.is/main-species/codfishes/haddock/
[9] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2014/2014/had-iceg.pdf

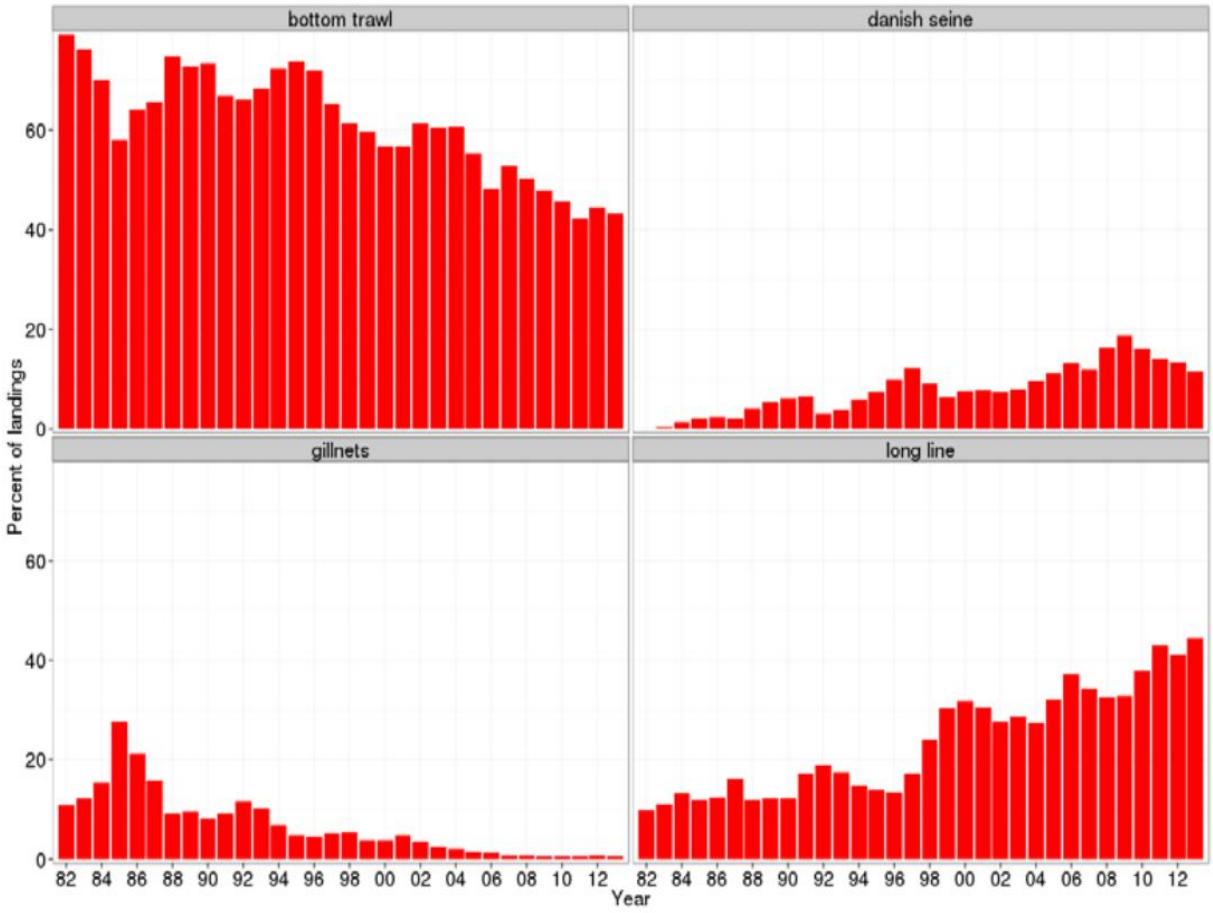


Figure 7. Annual catches by gear. From Section 10 - Icelandic Haddock in ICES NWWG report 2013.

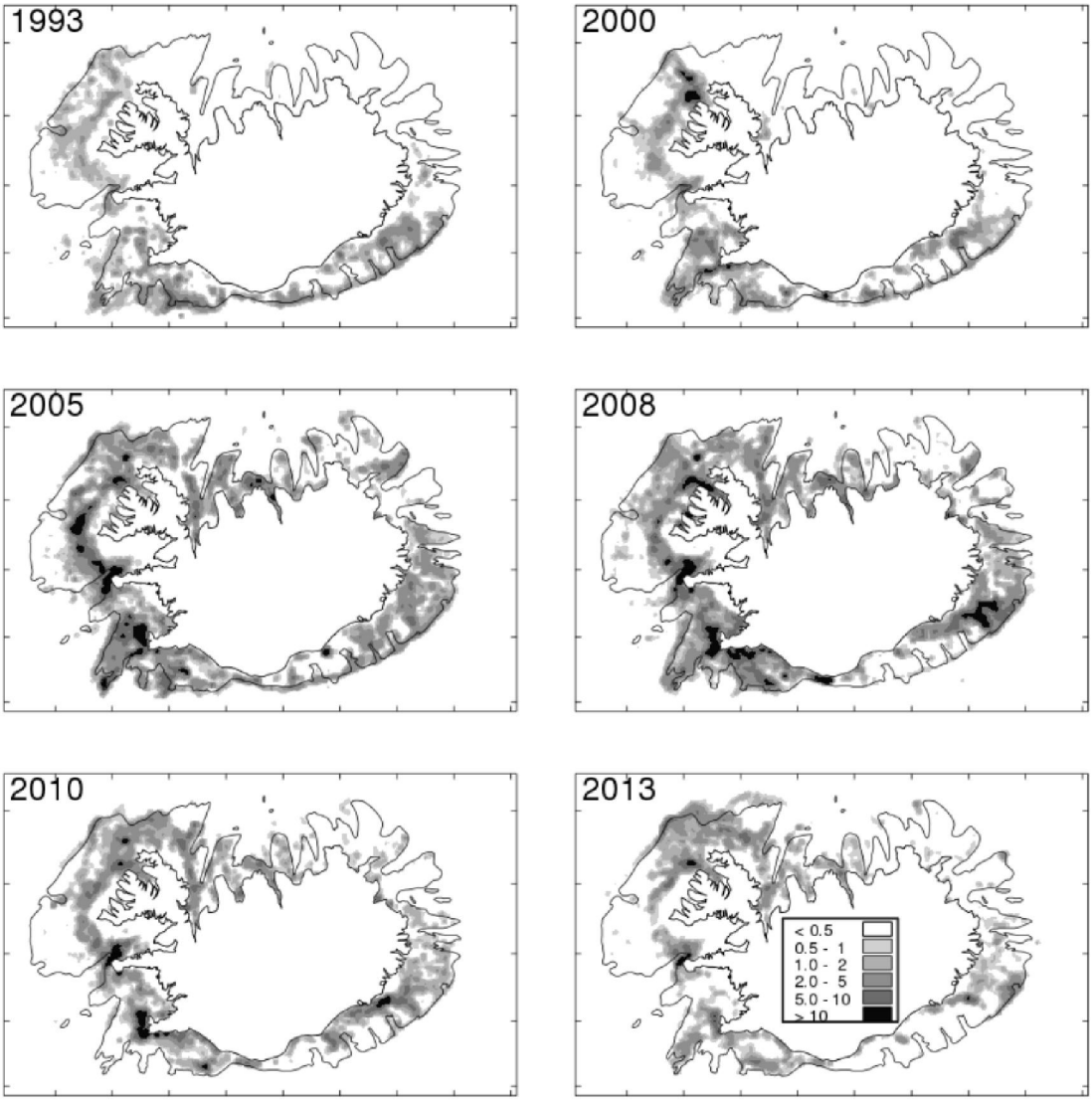


Figure 8. Spatial distribution of landings. From Section 10 - Icelandic Haddock in ICES NWWG report 2013.

The discard estimates for haddock have been ranging between 0.7% and 5% by weight since 2001. In 2013 the Icelandic haddock catch distribution between gear types has been the following: 44.1 kt, with 44% taken by bottom trawl, 44% by longlines, 11% by Danish seine, and 2% by other gear. The discards have been between 0.04% and 4.4% by weight since 2001, less than 2% in recent years.[10]

The fishery is regulated by TACs, in an ITQ system. The TAC year runs from September to August. In addition, closed areas (temporary or permanent) are used extensively. Access limitations imply that that vessels have to be licensed to be allowed to take part in the fishery. Landing is only allowed in designated ports (about 70 around the coast) and are controlled by weighers formally appointed by port authorities. (Regulation No. 224, 14 March 2006, on Weighing and Recording of Catch (http://eng.atvinnuvegaraduneyti.is/laws-and-regulations/fisheries/).

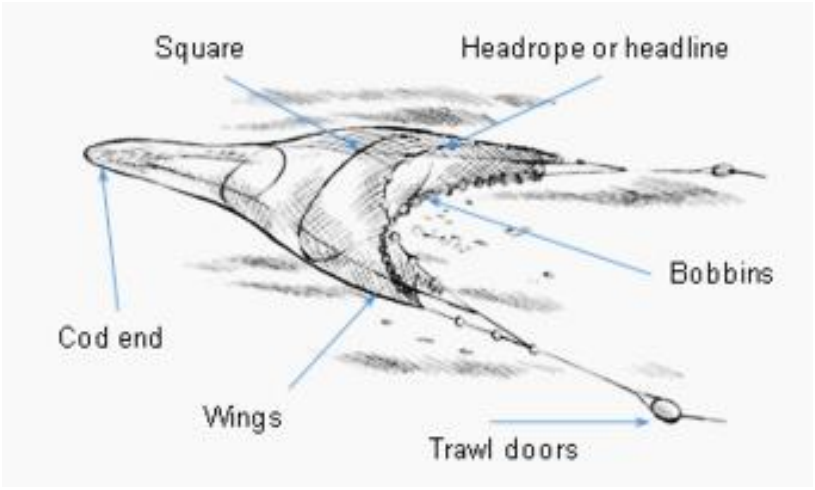
[10] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2014/2014/had-iceg.pdf

Discards of marketable fish is prohibited, and all haddock (and other commercial species) has to be brought ashore. Discards are monitored by MRI by comparing length distributions in landings from otherwise comparable trips with and without inspectors on board.

Control of the fishery is largely done through the landings, by the Coast Guard at sea and by remote control and by inspectors from the Directorate of fisheries, both in ports and as observers at sea. VMS is compulsory for all vessels and continuously monitored by the Coast Guard. Other involved institutions also have ample access to the VMS data. Logbooks are compulsory and there is an electronic logbook system in operation that the MRI uses in conjunction with approved landing data. The primary source of catch statistics is the landings data from the certified weighing ports.

Gear Description

Bottom trawl



The bottom trawl or otter trawl is the most important gear used in the Icelandic fisheries and has been adapted to suit various conditions of different fisheries. In 2013, 44% of haddock catches in Iceland were taken with demersal otter trawl gear. This gear is used at varying depths, ranging from 80 m to 1500 m, although the most common grounds include virtually just the shelf waters. Trawls are used throughout the year, but the catch composition may vary depending on the season. Aside from haddock, the fish species most often caught by bottom trawl are cod, demersal redfish, saithe and Greenland halibut but trawls also catch large amounts of plaice, Atlantic catfish, spotted catfish, ling, blue ling, tusk, great silver smelt and lemon sole. In the groundfish fisheries, the minimum mesh size is 135 mm and selectivity devices are also required in some fishing areas. In order to overcome bycatch issues, a range of selectivity devices have been developed that exclude the by catch from the square part of the trawl. The devices are usually grids that will exclude the bycatch which may be either larger than the target species in case of immature small fish in the shrimp fisheries or it may be smaller than the target species such as small fry and immature shrimp in the shrimp fisheries. Various sensors are also attached to the trawl to measure how much fish is entering the trawl and how much is in the cod end. Trawling is generally not allowed within 12 nm from the coast, except off the south coast during part of the year, outside the 12 nm limit certain areas are permanently closed to trawlers due to abundance of juvenile cod and haddock.

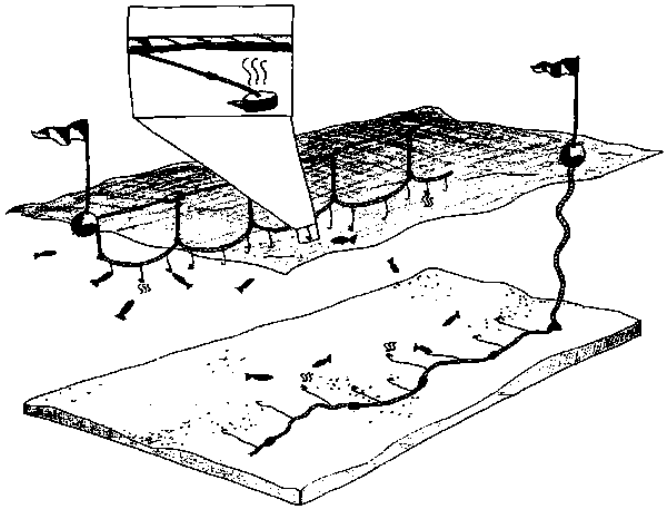
Longline

The longlines used in Iceland are almost exclusively bottom longlines which originally developed from handlines. They are much more effective, but more difficult and expensive to operate. Bait is required for this gear and is therefore used on larger boats, mainly decked vessels. Long lines are used throughout the year, but catches are lowest during the summer.

As for most other fishing gear, the long-line fishery has become increasingly mechanized in recent years. Baiting and other parts of the long-lining process are now commonly done automatically at sea by machines. The long-line fishery can be split into traditional shallow and recent deep-water fisheries. Cod and haddock are the primary targets in shallow water fisheries.

The deep-water boats are much fewer, larger and more mechanized than those involved in shallow-water fisheries. The long lines may be as long as 20 km and have up to 16,000 hooks. The longline is usually left on the bottom for one to four hours. The bait is most often herring, mackerel, capelin, imported saury (*Cololabis saira*), sandeels or squid pieces and lately artificial bait.

One of the major benefits of using the long-line is that it can be used on rough ground where other types of fishing gear cannot be operated. Another benefit from using long lines versus many other types of fishing gear is that the fish are usually alive when the line is hauled into the boat and delivers a better quality product.

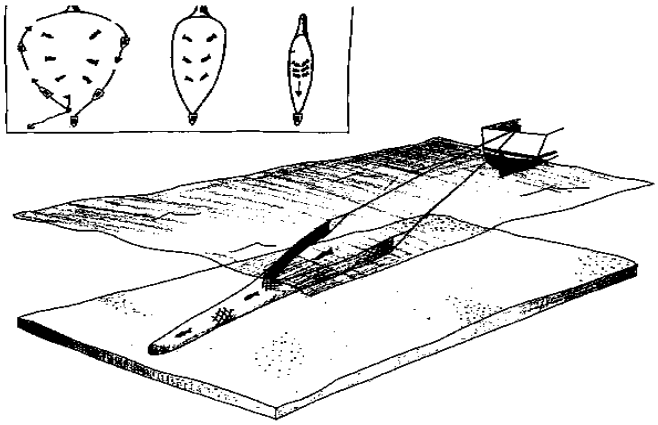


Source: http://www.fao.org/docrep/005/y3427e/y3427e04.htm

Danish seine

Danish seine is used chiefly to target flatfishes but also to catch large quantities of cod and haddock. It is used in the fisheries all around Iceland, but the bulk of the effort is southwest and west of the country. It is mostly used in shallow waters at depths of 40-60 m. Minimum mesh size for Danish seine is 135-155 mm depending on fishing areas. The boats using Danish seines are similar in size to long-liners and gillnetters. In fact many boats switch between gear types seasonally. Danish seine are similar to bottom trawls and are made up of wings, belly, and a codend, but are operated

differently, particularly as trawl doors (otter boards) are not used to keep the Danish seine open. The Danish seine is operated with a set of warps (towing-lines, drag-lines), one on each side, usually kept on large drums. The procedure of Danish seining (fly dragging) is first to set out the end of a warp on a buoy, usually the starboard warp. While the warp is set out, the boat sails in a half circle. The wing of the seine is then set out, followed by the net bag and the other wing, followed by the backboard warp when the boat heads back to the buoy. The track of the boat during this procedure forms either a circular, pear shaped, or triangular pattern. Once the buoy has been taken aboard, the towing lines made equal and fastened, the boat starts to pull the gear at a certain speed. During towing the warps are gradually pulled together, herding the fish in front of the seine. As the warps are pulled together the seine moves over the bottom, capturing the herded fish. Once the warps have come together, they are hauled in on the warping drums and the seine is taken aboard using a power block. The Danish seine has certain disadvantages compared to trawls. It cannot work on such rough grounds as otter trawls, it demands relatively calm weathers and low currents, it is difficult to use during the night or in fog and the workload of the fishers is higher. Finally, it demands better navigational skills, since when it is set out it cannot be moved to another ground except by hauling it in first. The advantages of the Danish seine are, however, that it does not need much power to operate (low fuel consumption per catch); it is much cheaper and less bulky than a trawl and can, therefore, be used on much smaller boats. If good navigational equipment is available and the grounds are well known, the seine can be used very efficiently, for example on very rough grounds interspersed with small patches of good grounds; trawlers cannot operate there but Danish seiners can.



Hand lines (jig)

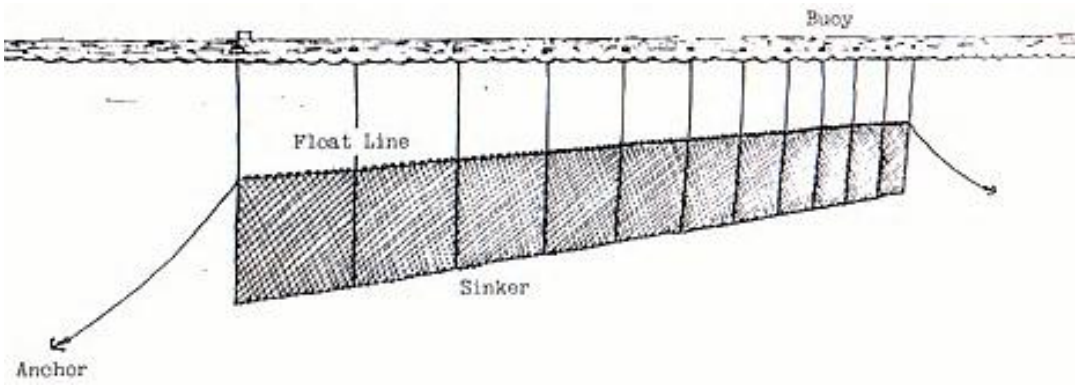
The hand line is the oldest type of fishing gear in Iceland and the line itself has changed from wool, to hemp, to nylon and the hook has also evolved to become more effective. The use of computer controlled electronic jigging reel by most hand line boats and have made the fishery easier and much more efficient. The reels are attached to the ship's side. The line is often 50-200 m long with a 6-8 m extension of fine twine containing four to eight hooks. The hooks are often 10 cm long containing rubber bait to mimic prey. The line is let out and the reel automatically senses the

bottom. The hook is moved up and down by the automatic reel and is reeled in when the reel senses the set minimum weight of fish on the line.

By having a computer control the jigging activity, one man can now easily operate many hand lines as the fisherman only has to release the fish from the hook and then push a button for the reel to start fishing again. The number of hand lines per boat can be up to 12 in larger boats but are usually 3 to 5. If the reels are too many, and therefore too close together, the lines can get entangled. In addition, many modern small boats are equipped with fish finders, radar and GPS linked to a computer. Hand lines are used by the small open boats usually of less than 6 grt. capacity in inshore waters all around Iceland. The hand line is primarily a summertime fishing gear as more than 90% of the catch is from May to August. Hand line fishermen have increasingly been using bait on the hooks. The bait is most often herring, mackerel, capelin, imported saury (*Cololabis saira*), sandeels or squid pieces and lately artificial bait.

Gillnets

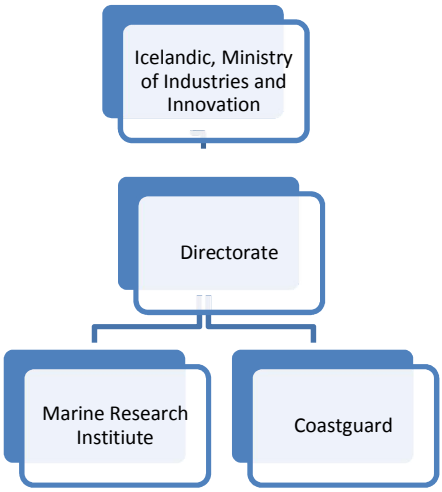
Gillnets are mainly used by small to intermediate sized boats. Nets are rectangular and kept vertical by floaters on top and lead-weights at the bottom. Each net is approximately 50 m long, but a few nets are tied together and a number of such units placed by each ship. The nets are soaked overnight or longer to maintain the quality of caught fish. Gillnets are fished all around Iceland but particularly in the South and Southwest where the main spawning grounds are. There are nets optimized for haddock (140-150 mm mesh size), but these are not in large scale use. Nylon has made the nets stronger in recent years, thinner and much lighter. New synthetic fibres have also been used recently. Lead weights sinkers were introduced in 1979 which replaced the use of stones.



Source: http://www.fao.org/docrep/005/y3427e/y3427e04.htm

3.3 Fishery Management History and Organization

The organizational structure of the fisheries management system can be described as well-structured and effective, with the Ministry of Industries and Innovation, the Directorate of Fisheries, the Marine Research Institute and Coast Guard having central functions. There are other government departments linked to the management system for a range of purposes; the Ministry of Justice and Human Rights responsible for judicial proceedings, the Central Statistics Office for collation of fishery statistics supplied by the Directorate, the Port Authority who play a supporting role in monitoring and recording fish landings, overland transported fish and exports. Their role is quite seamless, in that they inspect, record and enter data on landing directly into the central database through official Port Controllers. The food safety control of fishery products is under the jurisdiction of the Department of Health, and all fish processing vessels and plants must be approved under the Icelandic Hygiene Regulations.



Basic Organizational Structure of the Icelandic Fishery Management (within 200 mile EEZ) system.

Ministry of Industries and Innovation

The Ministry of Industries and Innovation in Iceland is the principal management organization responsible for Icelandic fisheries. Overall responsibilities include[11]:

- Fisheries Management
- Research, conservation and utilization of fish stocks, other living marine resources of the ocean and the seabed and management of areas where these resources can be harvested
- Research and control of production and import of fisheries products
- Mariculture of marine species
- Supporting the research, development and innovation in the fisheries sector

The Marine Research Institute

The Marine Research Institute (MRI) role is to acquire knowledge of the marine environment around Iceland and its living resources to provide advice to the government on catch levels and conservation measures. To inform the government, the fishery sector and the public about the marine environment and its living resources, the MRI undertakes research into marine climate and environmental monitoring, marine geology and bottom topography, plankton distribution and production, reproduction and recruitment, assessment of fish stocks, multi-species interactions, marine mammals, fishing gear, fishing impact on the ecosystem, and potentially exploitable species[12].

MRI is organized into three main research sections.

- The Marine Environment Section deals with environmental conditions, geology, and the ecology of algae, zooplankton, fish larvae and benthos.
- The Marine Resources Section undertakes research on the exploited stocks of fish, crustaceans, molluscs and marine mammals.
- The Fisheries Advisory Section scrutinizes stock assessments and prepares formal advice on the total allowable catch (TAC) and sustainable fishing strategies for the government. The three sections work in close co-operation and also they make use of the work carried out by the Electronic Department and the services provided by the Fisheries Library. MRI has an experimental mariculture station and operates five branch laboratories in fishing communities in different parts of Iceland.

Two ocean-going research vessels are currently operated by the MRI. The MRI is an active participant in the work of the International Council for the Exploration of the Sea (ICES) and its advisory Committee on Fisheries Management. The stock assessment findings of the MRI are

[11] http://eng.sjavarutvegsraduneyti.is/ministry/role-and-function/

[12] http://www.althingi.is/lagas/143b/2006116.html

subject to review by ICES before the TAC recommendations are made. The MRI is also represented in several other organizations, such as the Northeast Atlantic Fisheries Commission (NEAFC), the Northwest Atlantic Fisheries Organization (NAFO), the North Atlantic Marine Mammal Commission (NAMMCO) and the International Whaling Commission (IWC).

The Directorate[13]

The Directorate has a HQ in Hafnarfjörður, just outside of Rejkjavik and offices at 6 locations in the country where the staff are in the field of fisheries management and monitoring of fisheries and secretariat, as necessary. During the August 2014 site visits, it was communicated that the headquarters will be moved soon to Akuyreri, in the North of Iceland. A total staff of 70 are involved in fisheries management. They note (in consultation meetings) that the strategy of local, area 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. 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:

- 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 weighted 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 receives copies of the data for the production of statistics regarding the economy.

The Icelandic Coast Guard[14]

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

[13] http://www.fiskistofa.is/

[14] http://www.lhg.is/english

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 SW, S and East of Iceland. The Coast Guard is also responsible for 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. All hydro graphic surveys in Icelandic waters are undertaken by them, including the preparation of nautical charts (http://www.fisheries.is/management/ Institutes/the-icelandic-coast-guard/). The Coast Guard received a new flagship vessel named Thor and became active in November 2011 Thor was specially designed for Icelandic conditions, particularly for protection of resources, fisheries monitoring, law enforcement and search & rescue. The ship was designed for rescue and salvaging of much larger ships (which are expected to start traversing the Arctic as ice melts). Thor is also capable of pollution clean-up, fire-fighting and multi-beam underwater research. (http://www.icenews.is/index.php/2011/10/27/new-icelandic-coastguard-cruiser-welcomed-in-reykjavik/)

Important dates relevant to Icelandic haddock management

In 1901 Iceland declared a fishing limit of three nautical miles which remained in effect until this was extended to four miles in 1952. As scientific knowledge of the fisheries resources increased it became clear that some of the most important fish stocks, most notably the cod stock, were under severe pressure by a multinational fleet and that strict fisheries management was needed and hence Iceland pursued the objective of achieving a 200 mile EEZ. Important milestones on that path were the extension of Iceland's economic zone to 12 miles in 1958 and further to 50 miles in 1972. The 200 miles Exclusive Economic Zone was fully effective from May 1976.

A very important landmark in the campaign for jurisdiction was the national law set in 1948 (No. 44/1948) for the scientific conservation of the continental shelf fisheries. The law is very brief. It states that the Icelandic Ministry of Industries and Innovation will issue regulations concerning areas protected against fishing within the Icelandic continental shelf. Also, that these areas will be subject to Icelandic control with the main aim of scientifically based protection of fish stocks. All the extensions of the fishing limits after 1948 were based on this law. The United Nations Convention on the Law of the Sea *inter alia* codified this extension of costal State national jurisdiction. It entered into force in 1994, one year after being ratified by 60 nations.

In 1975 foreign fleets were catching over 100,000 tonnes of cod annually from the Icelandic stock. The foreign fleets were then taking about a third of the total cod catch, a quarter of the total haddock catch and around half of the total catches of saithe and redfish. It was considered that no effective fisheries management for groundfish would be possible under those circumstances. When the 200 mile limit became effective the foreign share of the catches declined rapidly and fishing was strictly controlled by agreements with other nations.

Soon after gaining control over Iceland's Exclusive Economic Zone in 1976, serious concerns were raised that the most valuable fish stocks were being overfished. Various forms of fisheries restrictions have been applied and there has been an intensive political debate on different systems of management ever since Icelanders gained control of their 200 miles Exclusive Economic Zone. In Autumn of 1983 a conclusion was made that effort limitations in the demersal (cod) fishery, which had been in force since 1977, had proved unsuccessful and that the cod stock was in decline. [15] The Althing, Iceland's national parliament, adopted a management system of individual vessel quotas (IQs) based on each vessel's catch performance from 1981–1983. The first year of allocating vessel quotas was 1984, with quotas for 5 demersal species. However, from 1985 until 1990 there was an effort option built-in the system that made it difficult to limit total catches.[16] In 1991 a fairly comprehensive individual transferable quota system was instituted for most of the Icelandic commercial fisheries, for all vessels larger than 6 GRT, and in 2004 a separate ITQ system for the small vessel fleet came into effect.[17]

Current Management

The current management system has been in place, with some refinements, since 1991. There seems to be consensus among informants that a shift of attitude has taken place over the last 25 years, form emphasis on catching as much as possible to maximizing the long term yield, leading to emphasis on quality, stability of the catches, and a strong internal discipline in the fishing sector.

The key legislation is the Fisheries Management Act no. 116-2006 (which is really a re-issue of the 1990 Act, but including all changes during those 16 years)[18],[19] This legislation provides the fundamental rules to base the fisheries management upon. The Department of Fisheries within the Ministry of Industries and Innovation is responsible for the overall management of the fisheries, the issuing of regulations and long term planning. Eight organisations are based under Department.[20] They are The Marine Research Institute, Icelandic Food Research, The Icelandic Food and Veterinary Authority, The Directorate of Fisheries, Institute of Freshwater Fisheries, Agricultural Economics Institute, Central Bureau of Applied Research and the Fresh-fish Price Directorate.

The fishery is regulated through a system of Individual Transferable Quotas (ITQs). The Directorate of Fisheries issues *annual catch quotas* (metric tonnes) to individual vessels based on a share (percentage) in the total allowable catch (TAC) of each quota species, which the Ministry sets every year for each species. The annual allowable catch quota is based on the individual vessels *quota share* (%). All major commercial stocks are now subject to quotas (35 species) and they represent approx. 95-97% of the total annual catch value. Quotas can be transferred between vessels subject to some limitations, under surveillance and approval of the Directorate. There are specific rules for

[15] http://www.althingi.is/altext/123/s/1225.html
[16] http://www.fao.org/docrep/005/y2684e/y2684e05.htm
[17] http://www.ejsd.co/docs/ICELANDS_ITQ_SYSTEM_CREATES_NEW_WEALTH.pdf
[18] http://www.althingi.is/lagas/143b/2006116.html

[19] http://eng.atvinnuvegaraduneyti.is/laws-and-regulations/fisheries/
[20] http://www.atvinnuvegaraduneyti.is/sjavarutvegs-og-landbunadarmal/raduneyti/stofnanir/

landing of fish without having a quota - either a quota can be leased/bought or the value of the catch goes into a fund for supporting research. The flexibility in the ITQ system is designed both to reduce incentives for discarding of catch and to allow a rational use of the vessels.[17] The advice on the TAC is now given according to the adopted management plan. This TAC is divided into individual tradable quotas for every vessel. When fishing, the skipper has to ensure that he has sufficient quotas for the catches he may get. If the catch exceeds the quota, he will have to buy enough quota immediately. Catches by species by each vessel is monitored by the Directorate of Fisheries based on full census of weighing of fish by authorized persons on the dock when landed or in fish processing factories prior to processing. Information on the landings of each trip are stored in a centralized database. These are the official landings used in the ITQ system. Skippers/captains are also required to keep up-to-date logbooks that contain information about timing (day and time), location (latitude and longitude), fishing gear and amount of each species in each fishing operation. These logbooks are submitted electronically, except for some of the small vessels.

The fishery is strictly controlled by the Directorate and the Coastguard. Landings take place at authorized ports, which have approved staff. A substantial portion of landings are sold through an electronic fish auction system and there is an efficient system for transport of fish from the landing site to the customer. The Directory of Fisheries and the Coastguard can during each fishing trip check if the amount of fish stored aboard the vessel matches what has been recorded in the logbooks, in part to act as a deterrent for potential black landings. Inspectors can be placed on board, but that covers only a minor fraction of the trips. Catches are mostly recorded as gutted weight, and translated to round weight with a standard factor of 0.84 for most demersal species. In addition to TACs, the regulations include mesh size regulations and extensive area closures, both temporary and permanent. The temporary area closures are managed by the MRI. They can be introduced over-night and are valid for 3 weeks. They are mostly to protect spawning areas and areas with undersized fish. Permanent closures are decided by the Ministry. There is no minimum landing size, but areas maybe closed when there is a high percentage of undersized haddock.

Discards are prohibited, and seem to be minor according to research by the Marine Resource Institute.[21] The control of the fishery, both at sea and ashore is extensive, and there seems to be a general acceptance in the industry for responsible fisheries practices (see e.g. http://m.visir.is/umraedan/grein/?ArticleID=2014706209983). Several stakeholders met at the site visits emphasized the shift in attitude in this respect over the last 2-3 decades. Discards are monitored by comparing length distributions of landings from trips with and without inspectors. The Ministry of Industry and Innovation (Department of fisheries) is ultimately responsible for managing the fishery. The overall TACs are set by the Minister based on advice from the Marine Research Institute (MRI), which is state owned and the dominating fisheries research institution. For most of the important stocks, including haddock, TACs are derived according to a harvest rule from the assessment estimate of stock abundance. These harvest rules have been approved by ICES (The International Council for Exploration of the Sea) in 2013 as being in accordance with the Precautionary Approach.[22]

[21] http://www.hafro.is/Bokasafn/Timarit/fjolr.htm

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

3.4 Stock Assessment Activities

The MRI is the dominant institution for fisheries science in Iceland. TAC advice is provided by the MRI to the Ministry. The advice is based on applying the results of an analytic stock assessment, done within the ICES North Western Working Group, to an adopted harvest rule. The assessment method is an ADAPT type virtual population analysis (VPA), using catches in numbers at age and tuned with two extensive age-disaggregated bottom trawl surveys, one in the spring, the other in the autumn. Data from these surveys are used in the assessment also for cod and saithe. The calculation of catch numbers at age and the catch weights at age is by extensive length measurements and age-length keys specific for each fleet, area and season (see Stock annex for haddock, pp. 896-916 in the ICES North Western Working Group report 2013 for details[23]). A VPA type assessment is preferred over separable models because the selection at age varies with variations in growth and with the year class variation. The assessment method was approved by ICES in 2013. The estimates are quite consistent from year to year. (Figure 9 below). The main uncertainty relates to a conflict in the abundance signal from the two surveys. The assessment is a compromise between these. Catch per unit of effort data exist, but are not used in the assessment as they are not considered to be reliably related to stock abundance.

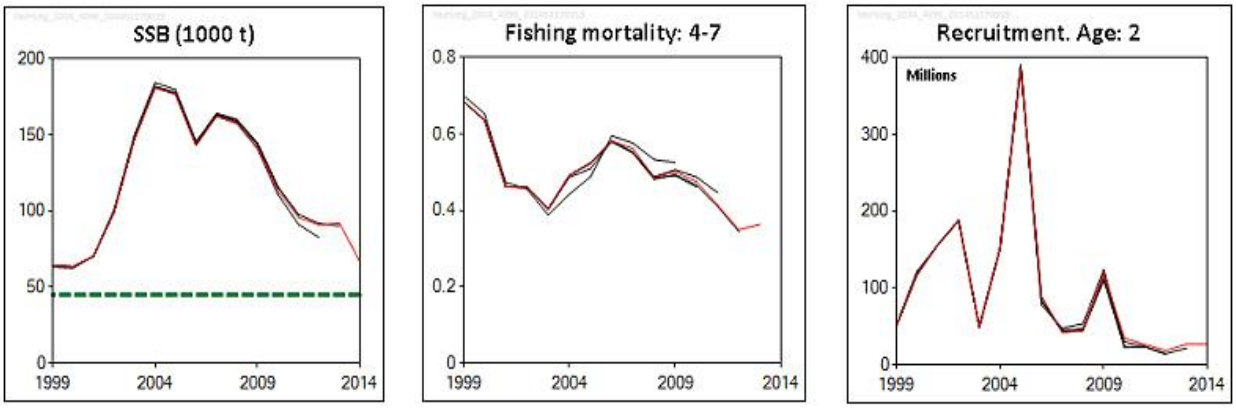


Figure 9. Retrospective errors in stock assessment. Taken from the ICES advice for 2014[24]

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

[24] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2014/2014/had-iceg.pdf

3.5. Historic Biomass and Removals in the Fishery

As typical for haddock, recruitment is irregular with occasional very large or very small year classes. The last outstanding year class was in 2003, and the recruitment in recent years has been below average. The reason for the present low recruitment is not known. There is no convincing evidence that the year class strength is related to the spawning stock biomass (SSB), within the range experienced historically (Figure 10).

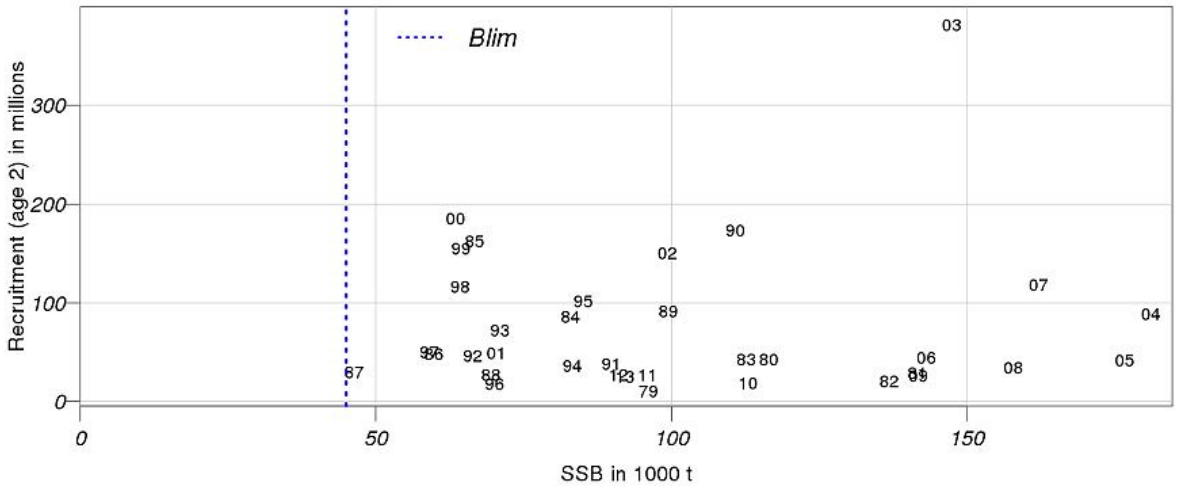


Figure 10. Plot of stock recruit pairs according to the 2014 assessment. From 2014 ICES Advice.

The spawning biomass peaked in 2003-4 after a series of good recruitments and a reduction in the fishing mortality. Since then it has declined and is expected to continue to do so due to a series of poor year classes. The fishing mortality was high (around 0.6 - 0.7) until 2000, since then it has been between 0.4 and 0.6. With the introduction of the current management rule, it should be further reduced. The time course of these measures can be seen in Figure 10.

The current management rule, which was approved and introduced in 2013, sets the TAC as a fraction (HR) of the biomass of fish > 45 cm (B45+). If the SSB is above a trigger value, the HR is 0.4; if the SSB is below the trigger, the HR is reduced proportionally. The biomass is that at the start of the year after the assessment year, and the stock numbers are projected through the assessment year to get that value. B45+, is on the average close to the spawning stock biomass, but is not affected by changes in proportion mature by size/age. The reason for basing reference biomass on size rather than age is large variability in size at age. Very roughly, a HR=0.4 would lead to an F4-7 at about 0.34 on average (Figure 11). As shown in Figure 12, an HR=0.52 would give MSY if recruitment is independent on stock size, but the risk to Blim starts to rise at HR=0.46.

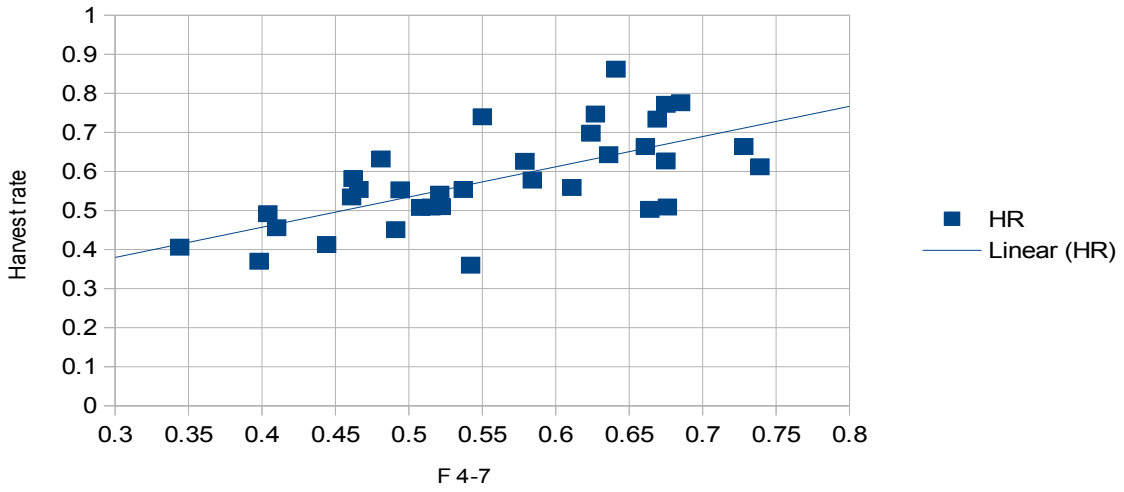


Figure 11. Historic relation between harvest rate (HR) and F4-7. Made with data taken from the ICES advice for 2013 (http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2013/2013/had-iceg.pdf)

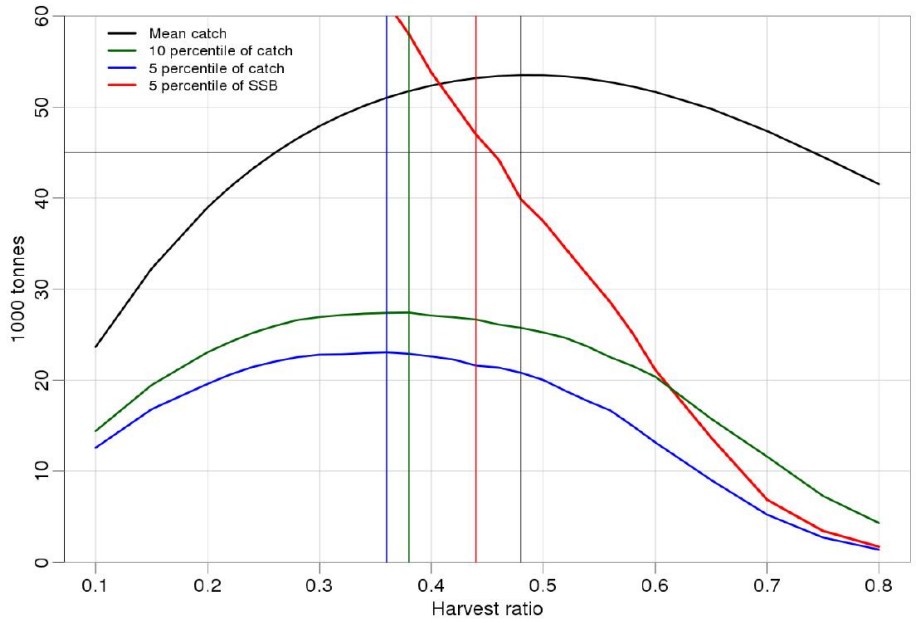


Figure 12. Yield and the 5-percentile of SSB as function of the harvest ratio (Catch relative to biomass of fish 45 cm and larger), according to stochastic simulations. Taken from Bjørnsson 2013, ICES CM 2013/ACOM:59.

http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2013/ADHOC/IntroAndHad.pdf

3.5 Economic Value of the Fishery

The seafood industry is one of the key industries in Iceland, contributing 11% to the GDP directly (25% if account is taken of the indirect effects of the ocean cluster) and employs around 9.000 people, or 5.3% of the total workforce in Iceland. In 2012 the export value of marine products amounted to ISK 269 billion (€ 1.7 billion) a total of 749 thousand tonnes. Export value of marine products has never been higher than in 2012. Marine products account for approx. 42% of the value of exported goods. In 2012 frozen products generated 53% of the value of exported marine products, fresh (iced) products 16.5% and meal and oil 14%. Cod is the most valuable fish species, accounting for approximately 31% of total seafood industry exports in 2012. Thereafter comes the pelagic species: capelin (11.1%), herring (9,5%) and mackerel (7,3%). In 2012, haddock made up 2.8% of the total fisheries exports in weight and 6.1% in value (Table 1). In 2012 the share of demersal species accounted for 58% of the export value and the pelagic species reached 29% (17% in 2009). Increased share of pelagic species the recent years in the total export value is mainly based on increased export of capelin and mackerel.[25] Also reported below is the quantity and value of exported haddock by product categories for 2011 and 2012 (Table 2) and the Icelandic haddock catch by fishing gear from 2000 to 2012 by gear type (Table 3 and Figure 13).

Table 1. Total export volume and value of Icelandic species in 2012

Species	Volume in Tonnes	% volume	Species	Value in mill. ISK	% value
Capelin	177.709	23,7%	Cod	82.961	30,9%
Herring	114.701	15,3%	Capelin	29.719	11,1%
Mackerel	106.720	14,3%	Herring	25.551	9,5%
Cod	100.508	13,4%	Mackerel	19.568	7,3%
Redfish	37.519	5,0%	Redfish	19.252	7,2%
Blue whiting	27.114	3,6%	Haddock	16.404	6,1%
Saithe	23.203	3,1%	Saithe	12.476	4,6%
Haddock	20.942	2,8%	Shrimp	11.092	4,1%
Greenland halibut	11.271	1,5%	Greenland halibut	9.459	3,5%
Shrimp	10.497	1,4%	Atlantic catfish	4.271	1,6%
Ling	6.305	0,8%	Ling	3.644	1,4%
Atlantic catfish	5.551	0,7%	Blue whiting	2.844	1,1%
Other species	106.580	14,2%	Other species	31.392	11,7%
Total	**748.620**	**100,0%**	**Total**	**268.632**	**100,0%**

[25] http://www.statice.is/lisalib/getfile.aspx?ItemID=16008

Table 2. Quantity and value of exported marine products by product categories 2011 and 2012.

Magn í tonnum *Quantity in tonnes*	2011		2012	
Verðmæti í milljónum króna (fob) á verðlagi hvors árs	Magn	Verðmæti	Magn	Verðmæti
Value in million ISK (fob) at year prices	*Quantity*	*Value*	*Quantity*	*Value*
Ýsa alls *Haddock, total*	**22.867**	**16.130**	**20.942**	**16.404**
Nýr, kældur eða ísvarinn heill fiskur *Whole fish, fresh, chilled or on ice*	5.588	1.619	5.425	1.665
Ný, kæld eða ísvarin fiskflök *Fish fillets, fresh, chilled or on ice*	2.809	3.002	3.187	3.653
Annað ferskt, kælt sjávarfang *Other marine products, fresh or chilled*	1.336	1.777	1.014	1.408
Sjófrystur heill fiskur *Sea frozen fish, whole*	250	58	181	44
Sjófryst, blokkfryst flök *Sea frozen fish fillets, in blocks*	425	402	810	724
Sjófryst flök ót.a.s. *Sea frozen fish fillets, n.e.s.*	2.589	1.924	2.340	1.967
Heilfrystur fiskur ót.a.s. *Whole frozen fish, n.e.s.*	4	2	0	0
Landfryst, blokkfryst flök *Frozen fish fillets, in blocks*	919	606	1.051	820
Landfryst flök ót.a.s. *Frozen fish fillets n.e.s.*	3.111	2.703	2.030	1.948
Fiskmarningur, frystur *Minced or strained fish, frozen*	599	145	599	133
Annað fryst sjávarfang *Other frozen marine products*	2.713	2.446	2.594	2.665
Þurrkaður saltfiskur *Dried-salted fish*	8	8	24	16
Blautverkaður saltfiskur *Uncured salted fish*	39	20	45	24
Saltfiskflök, bitar o.fl. *Salted fish fillets, bits etc.*	33	19	39	33
Skreið *Stock fish*	18	10	8	6
Þurrkaðir hausar *Dried fish heads*	2.374	1.093	1.532	928
Annar hertur, þurrkaður, saltaður fiskur *Other dried, salted* fish	50	296	61	371

Table 3. Icelandic haddock catch by fishing gear 2000 to 2012 by gear type. Source Statistics Iceland.

Catch by fishing gear and species 2000-2012												
		Total	**Bottom longline**	**Bottom gillnet**	**Handline**	**Danish seine**	**Bottom trawl**	**Pelagic trawl**	**Nephrops trawl**	**Purse seine**	**Shrimp trawl**	**Other**
Haddock	**2000**	41698	13591	1499	74	3090	23271	-	163	-	8	1
	2001	39825	12435	1732	119	3116	22138	64	199	-	11	11
	2002	49951	14114	1610	101	3638	30067	-	386	-	22	11
	2003	60330	17291	1539	84	4801	36094	-	476	-	17	28
	2004	84563	23172	1710	79	8106	51025	3	422	-	25	22
	2005	96580	30568	1572	131	10487	53279	10	479	0	47	5
	2006	96591	36215	1169	67	12687	46120	-	281	1	37	16
	2007	109313	37220	1003	42	12870	57922	-	210	6	35	4
	2008	102326	33000	911	38	16428	51672	0	219	2	35	20
	2009	81832	26477	557	77	14972	39482	1	145	25	28	67
	2010	64948	23760	412	200	10114	30169	-	212	-	30	51
	2011	51299	21067	380	144	6910	22610	2	123	-	25	37
	2012	47676	18545	403	133	6141	22250	0	154	0	32	18

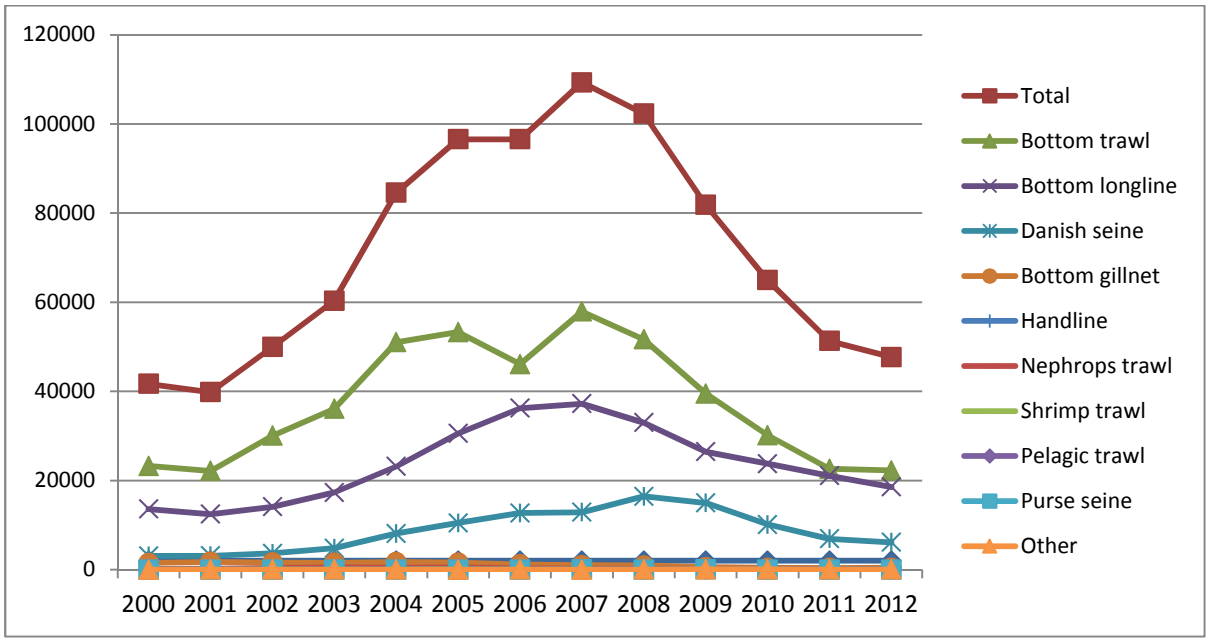


Figure 13. Icelandic haddock catch by fishing gear 2000 to 2012 by gear type. Source Statistics Iceland[26]

[26] http://www.statice.is/Statistics/Fisheries-and-agriculture/Catch-and-value-of-catch

4. Proposed Units of Assessment

	Fish Species (Common & Scientific Name)	Geographical Location of Fishery	Gear Type	Principal Management Authority
1.	Atlantic haddock (*Melanogrammus aeglefinus*)	Icelandic Exclusive Economic Zone (200 nm)	Demersal trawl	Ministry of Industries and Innovation (formerly the Ministry of Fisheries and Agriculture)
2.	Atlantic haddock (*Melanogrammus aeglefinus*)	Icelandic Exclusive Economic Zone (200 nm)	Long-line	Ministry of Industries and Innovation
3.	Atlantic haddock (*Melanogrammus aeglefinus*)	Icelandic Exclusive Economic Zone (200 nm)	Danish Seine net	Ministry of Industries and Innovation
4.	Atlantic haddock (*Melanogrammus aeglefinus*)	Icelandic Exclusive Economic Zone (200 nm)	Gill net	Ministry of Industries and Innovation
5.	Atlantic haddock (*Melanogrammus aeglefinus*)	Icelandic Exclusive Economic Zone (200 nm)	Hook and line by small vessels	Ministry of Industries and Innovation
6.	Atlantic haddock (*Melanogrammus aeglefinus*)	Icelandic Exclusive Economic Zone (200 nm)	Nephrops Trawl[1]	Ministry of Industries and Innovation
7	Atlantic haddock (*Melanogrammus aeglefinus*)	Icelandic Exclusive Economic Zone (200 nm)	Shrimp Trawl[1]	Ministry of Industries and Innovation
8.	Atlantic haddock (*Melanogrammus aeglefinus*)	Icelandic Exclusive Economic Zone (200 nm)	Pelagic Trawl[1]	Ministry of Industries and Innovation
9.	Atlantic haddock (*Melanogrammus aeglefinus*)	Icelandic Exclusive Economic Zone (200 nm)	Purse Seine[1]	Ministry of Industries and Innovation

[1] Indirect gears, significant minority of catches.

5. Consultation Meetings

5.1 On-Site Witnessed Assessment and Consultation Meetings

On-site visits for the full assessment took place in August 2014. The schedule of on-site activities is provided in the table below with a summary of the activity, meeting and discussion. Meetings were used to document information that both confirmed clarified or substantiated aspects of the assessment and provided an opportunity for organizations to contribute information to support the assessment. The on-site witnessed assessment and consultation meetings were conducted by Dave Garforth and Dankert Skagen.

Table 4. On Site Witnessed Assessment and Consultation Meetings

Date	Organization	Summary of Meeting
12th August 2014, 10.00 am – 1.00 pm	Fisheries Association of Iceland - Kristján Tórarinsson, Population Ecologist – Chair, Fisheries Association of Iceland	The role of the FAI is to be a common venue for organisations within the fisheries and seafood sector in Iceland for the benefit of the fishing industry. The main objectives are to promote progress in the Icelandic fishing industry, and to offer services requested to governmental bodies and other stakeholders as appropriate. The objectives are pursued by carrying out tasks that involve the fishing industry as a whole based on general agreement among its members. The following points were discussed. The unit of certification. The assessment timelines and the procedure to address non-conformances if these are issued. Review of the 2013/14 haddock and saithe season. Review of the stock assessment/TAC allocation for the 2014/15 haddock and saithe fishery season. Review of any legislation changes.
12th August 2014, **2.00 pm -5.00 pm**	Directorate of Fisheries Dalshrauni 1 220 Hafnarfjordur. Eyþór Björnsson Director of Fisheries/ Directorate of Fisheries	The following points were discussed. The unit of certification. TAC allocation for the 2014/15 haddock and saithe fishery season. Review of any legislation changes. Overview of the key differences between cod and saithe/haddock management. How directed are saithe and haddock fisheries. Catch composition by gear types for haddock and saithe. Use of semi-pelagic gear to target haddock and saithe. Logbook reporting. Directorate collection of data on catch composition by gear type, specifically where saithe and haddock are taken as the target species and taken as a non target catch in other demersal fisheries (e.g. cod). Foreign vessels fishing for haddock and saithe. Spawning closures aimed specifically at protecting haddock and saithe during spawning periods. Recording of non-commercial (non landed) catches.
13th August 2014, 09.00 - 09.45 am.	Fish Auction Market, Reykjavik's port.	There is one central electronic auction system operated in Iceland. The process was reviewed. Witnessed fish landing, transfer to the auction, weighing, tipping and re-icing and sales of fish across the electronic auction system. Labelling of catch for traceability reviewed. All tubs

	Örn Smárason - General Manager	labelled by vessel number (Auction No.), species, fish age (days at sea), weight. This information is transferred to the auction system.
13th August 2014, **2.00 pm-05.30 pm**	Marine Research Institute. Jóhann Sigurjónsson, Director General/Marine Research Institute	The meeting focused upon HCR evaluation for haddock and saithe, accounting of retrospective error, performance near Blim and mean recruitment assumptions, haddock Btrigger vicinity to Blim value, haddock HCR behaviour with continuous poor recruitment, saithe status with the migration issue and migration as a parameter in assessment, surveys, stock assessment for the two stocks and rationale for different methods used for haddock and saithe, use of ecosystem models in the management of the haddock and saithe fisheries, discards in the fisheries, not commercial catches, marine mammals and seabird interaction data, habitat effects of trawl gear, endangered species food web interactions.
14th August 2014, 10.00 am 12.30 pm	National Association of Small Boat Owners (NASBO). Orn Pallson, CEO	The following points were discussed. Unit of Certification, coastal fisheries, NASBO fished quota for cod, haddock, catfish, saithe, mackerel and lumpfish, ITQ hand line system, larger ITQ system, rule, regulations and allowances within those systems and recreational fisheries.
14th **August 2014,** **02.00 pm -04.30 pm**	Icelandic Coast Guard. Ásgrímur L. Ásgrímsson, Chief of Operations	The meeting focused on the inspections carried out by the Icelandic Coast Guard, the overall level of compliance, the methods for control and surveillance, electronic monitoring of the fleet, monitoring of foreign vessels in Icelandic waters, monetary and operational penalties for serious infractions and surveillance and enforcement of close areas. Further verification of the information gathered on the level of discarding reported in the fishery (recent estimates) and the method of monitoring of discards were discussed.

6. Assessment Outcome Summary

Section 1: Fisheries Management

The Fisheries Management System

There is a structured fisheries management system adopted within Iceland for the management of ground fish species including haddock. The management of the fishery is supported in law by the principal fisheries management Act (No 116/2006) and a number of supporting Acts and Regulations. There are a number of inter-related government agencies within the system; under the direction of the Ministry of Fisheries and Innovation which has ultimate responsibility. 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. Policy and objectives are directed toward responsible utilization of the haddock resource and allocation and control of fishing opportunities is undertaken via a structured system of rights based entitlement. The system has built in controls to allow equitable use and flexibility which supports compliance to management measures and regulations.

The annual catch is limited by a Total Allowable Catch (TAC) derived from a Harvest Control Rule. The Marine Research Institute (MRI) advises the Ministry of the TAC based on scientific evidence collected through survey and fishing logbook data. The Ministry through consultation with the various agencies and fishing associations sets the TAC which forms the basis of the quota allocation to each of the registered vessels according to individual quota shares.

Management measures can be divided into the following categories:

- Total Allowable Catch based on scientific advice and individual vessel quotas.
- Fishery access is limited by license per vessel and allocated via an ITQ system for each vessel.
- Technical measures are implemented by regulation including gear specifications (mesh size and technical conservation measures such as square mesh panels), seasonal, permanent and temporary closed areas.

Measures are implemented via regulations. The Directorate is the principal implementation agency and is supported by the Coast Guard through monitoring and enforcement and also by the Port Authority by recording of landings. The MRI plays the lead role in the implementation of temporary closed areas (fast shut downs) which can be implemented virtually instantaneously on the results of a set proportions of undersized catches in landings. The principal objectives of Icelandic policy on the ocean are to maintain the ocean's health, biodiversity and productive capacity, in order that its living resources can continue to be utilised sustainably.

Legal instruments are in force which specify 'legal gears' for each method of fishing. Act 57/1996 also requires the regulation of fishing gear to reduce damage to catch and also to allow confiscation of gear not retrieved in a proper manner, found in closed areas, fishing illegally or being illegal. Also Article 9 of Act No. 79 states that the Minister shall take the necessary measures to prevent fishing practices which can be regarded as harmful to the efficient utilisation of the commercial stocks and preservation of sensitive ocean areas.

The Fisheries Management Plan

There is an established Fisheries Management Plan for Icelandic Haddock. The Plan is documented and available on the Icelandic Ministry of Fisheries and Innovation website. The Fisheries management plan details relevant information including the management unit, specification of stock or component stocks for the "stock under consideration", jurisdiction areas and the respective competent authorities for the entire range of component stock(s) of "stock under consideration", the long-term harvesting policy consistent with achieving optimum utilization, including the means for assurance of its consistency with the precautionary approach to fisheries management.

The Fisheries Management Plan for Icelandic Haddock details a long-term harvesting policy, and ICES have evaluated the plan for consistency with the precautionary approach to fisheries management.

The fisheries management plan has been developed with due consideration to managing the input, output controls for the fishery. The evidence presented throughout the assessment has provided a high level of confidence in the ability of the management system to ensure that the effective harvest rate does not deviate significantly from the harvest control rule and evidenced by a robust vessel catch allocation, monitoring and recording system (ITQ). There is a high level of reporting apparent within the Icelandic fleet.

The Fisheries Management Plan for Icelandic Haddock considers specific management methods, supporting measures, details the institutions responsible for providing stock assessment and advice, describes the decision making process for TACs, describes the consultation process with the fishing industry, describes the provisions for monitoring, control, and enforcement and describes the management measures relevant to ecosystem effects of the fishery.

Research and assessment

The Marine Research Institute of Iceland, reporting directly to the Ministry of Fisheries and Agriculture is the principle research agency that collects and compiles the necessary data and carries out scientific research and assessment of the state of fish stocks and the condition of the ecosystem. The MRI is supported in its research by the Directorate of Fisheries. There is effective data collection/compilation for successful execution of stock assessment for stock management purposes. These are adequate to ensure that sufficient internal expertise and external expert consultation is present within the system to ensure the integrity of scientific assessment for fishery stock management purposes and that it continues to be scrutinised, challenged and improved.

Provisions are in place for integration of traditional fisherman's information into research and stock assessment processes.

There are several approaches. Formal consultation is undertaken annually between management organizations and fishery associations prior to the TAC being set. There is also a special consultation group between MRI and industry (fleet managers/skippers) that considers industry knowledge and information in tandem with the fishery independent survey operations. Fishermen contribute information on an on-going basis with respect to providing location of juvenile fish when encountered and also comments of fishermen contributing with location of hard corals. Log book data, transmitted electronically and through manual means is continually supplied and provides a major component of fishery dependent data used by the MRI. The MRI also undertake field sampling onboard vessels and are supported through Directorate observer programming which provides further points of information and data exchange.

The most prominent international scientific work collaboration for the Icelandic haddock stocks occurs with ICES. Evidence is available that demonstrates on-going and formal interactions between the MRI/Icelandic Management System and a variety of ICES Committees. Whilst assessment methods and interpretations are subject to scientific debate, there is sufficient evidence presented to verify active collaboration with international scientific organisations, with the aim of ensuring that the focus is on internationally acknowledged research and assessment methods that provide the best available information on the condition of the stock under consideration at any time. Icelandic haddock is largely found within the 200 mile EEZ (Va) and is not described as straddling or shared.

Estimates for discarding

Icelandic fishery law prohibits the discarding of all commercial stocks. All fishing vessels are obliged to report catch and bycatch in log books. MRI undertakes annual assessment of discard estimates for the major species including haddock. Since 2001, annual haddock discards are in the range of 0.04% and 4% in weight landed.

The Precautionary Approach

The Precautionary approach is implemented through the harvest strategy for haddock which the Ministry uses to set annual TAC's. Precautionary reference points, representing landmarks where action should be taken to avoid reaching the limit points are defined and are appropriate. There is international evidence that this meets the requirements of the precautionary approach such as is qualified in documentation provided by ICES. The Icelandic haddock stock is not considered to be overfished to a level causing recruitment overfishing nor is it considered that overfishing is occurring. As of 2013/2014, the stock is estimated to be above the limit biomass reference point.

Management Targets and Limits

Management targets and limits are defined by the management rules in the haddock management plan. The harvest control rule is applied to calculate the annual total allowable catch (TAC) based on 40% of the biomass of 45 cm and larger haddock in the advisory year. If the estimated spawning

stock biomass (SSB) in the advisory year falls below 45000 tonnes ($B_{trigger}$), the 40% multiplier is reduced linearly to zero based on the ratio of the SSB estimated and $SSBB_{trigger}$.

In accordance with this general aim the harvest control rule below was formally adopted by Icelandic authorities in April 2013 for the next period of 5 fishing years, starting from 2013/14. The harvest control rule will be reviewed by the end of this period. In the advice given by the MRI account is taken of fishing mortality in the calculation. On the one hand as catch as a proportion of reference stock size (B_{45cm+}) and on the other hand as fishing mortality of 4-7 year old fish in numbers. Uncertainty in the estimation of current stock size is the foundation of the precautionary approach to fisheries management. According to ICES the Icelandic haddock SSB has been above B_{lim} since 1988.

Stock Biomass

The management strategy for Iceland haddock is to maintain the exploitation rate at the rate which is consistent with the precautionary approach and that generates maximum sustainable yield (MSY) in the long term. There is a very high probability that Blim will not be reached under the current Fishery Management Plan (FMP) and management system.

Stock Biology and life-cycle

The stock assessment approach focuses directly on the structure and composition of the haddock stock. Management measures are in place in the form of temporary and permanent closures and mesh size restrictions to protect spawning components of the stock. A comprehensive and strategically allocated set of gear specific regulations are available to support the protection of juvenile haddock within the stock.

External scientific review

ICES have developed routines for in-depth review of assessment methods and data that go into the assessment (benchmark assessments). Ideally, these should be done approximately every 5 years, or if there are reasons to alter the assessment practices. The initiative may come from ICES itself, from the assessment Working Group responsible for the stock, or from fishery managers/scientists.

Advice and Decisions on TAC

Fisheries research is undertaken by the Marine Research Institute (MRI) of Iceland. The MRI together with ICES provide the fisheries management authority with fisheries advice on the harvesting of the stock under consideration. ICES advice includes the appropriate values for precautionary reference points.

The TAC is set by the Minister of Fisheries and Agriculture according to the management plan which covers the Icelandic EEZ. The stock is largely, but not exclusively, confined to that area. There is consideration by research and management organizations of the minor catches of haddock taken by Faroese and Norwegian fishing vessels.

Management measures for conservation and sustainable use of the stock under consideration are specified in laws and regulations. The Directorate of Fisheries is responsible for the implementation of the Act on Fisheries Management and related legislation, and for day-to-day management of fisheries and for supervising the enforcement of fisheries management rules.

Section 2: Compliance and Monitoring

Implementation, compliance, monitoring, surveillance and control

There is a clearly established legal framework, with regulations and rules that give powers to the Ministry, the Directorate, the Coast Guard and the MRI. These are enforced principally by the Directorate on a day to day basis through powers to collect levies, monitor, inspect, report and gather evidence for prosecution purposes where violations are expected.

Concordance between actual and allowable catch

The system of recording catch is controlled and includes both at sea (e-logbook records), standard paper based log-books and verification of catch through physical weighing at accredited landing stations registered by the Directorate. The Coast Guard also carries out 24-7 surveillance of all vessels in Iceland's EEZ. There are requirements for transmitting position, VMS transmitting, and for reporting catch for vessels entering/leaving Icelandic waters. The ITQ system has rules and flexibilities to allow for corrective management measures and adjustments to be incorporated. Resources of the Icelandic Coast Guard include two vessels Tyr and Ægir and a new vessel Þór, taken into service in 2011, and also the vessel Baldur that is used for hydrographic surveying during the summer time. The Coast Guard also operates helicopters and the maritime surveillance aircraft TF-SIF which can take off from short airfields giving maximum flexibility with regards to coastline coverage. There are over 140 staff at the Coast Guard.

Monitoring , Control and Penalties

Quotas conform to the current decision on TAC, through the individual vessel quota share system. All commercial fishing operations are subject to a permit from the Directorate of Fisheries. There is a system for recording the catch quota of each vessel for each species within the central database held by the Directorate. A register of permitted vessels is maintained by the The Minister of Transport and Communications and the Icelandic Maritime Administation (IMA). By regulation only Icelandic licensed vessels (including a few from Norway and the Faroese under specific agreement) are permitted to fish in Iceland EEZ. Information on number, size, composition of the fleet is available.

Monitoring and control of fishing vessel activities by the Icelandic Coastguard is in place to prevent fishing by unauthorised vessels. The Act on the Icelandic Coast Guard No. 52, June 14th 2006 defines the legal, mandated roles and responsibilities of the Coast Guard. Fishing gear can be inspected by the Coast Guard, as well as the composition of the catch and its handling onboard the fishing

vessels. Vessels of all description entering, leaving and transitting through Icelandic waters must report to the Coast Guard. At the operational centre of the Coast Guard, surveillance continues 24-7 based on VMS satellite and radio technology. Areas closed from fishing are monitored by the Coast Guard.

Catch amounts by species and fishing area are recorded in fishing logbooks on-board the fishing vessels. Fishing logbooks are subject to unannounced inspection. The correct recording of catches in fishing logbooks are monitored by comparing the recorded catch amounts with the catch stored aboard the vessel at time of inspection. Discarding of catch is prohibited by Icelandic fishery law except for damaged or fish in poor health. Monitoring and control measures are in place. Authorised landing Ports are designated by the Ministry and landings controlled by the Directorate. Harbour officials and fisheries inspectors monitor the correct weighing and registration of all the catch. Discrepancies/deviations during weighing are recorded. The reasons for deviations are analysed and corrections made to reduce the likelihood of recurrence. Deviations can be typographical errors as well as anomilies relating to yield calculation discrepencies of reported figures between fishery participants and export figures. These are investigated through inspection and yield observation/calucation by Directorate staff both at sea and ashore.

Landed catches are subtracted from the relevant quotas (allowable catch) of the vessel or the vessel group. Limited allowance is 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. When a vessel's quota is used up, additional quota must be transferred to the vessel from other vessels or the vessel stops fishing. Transfer of quota between vessels takes effect only after it has been authorised and recorded to the official central data base. Information on each vessels catch quota and quota is regularly updated and made public and accessible to all on the official web-site. Analysis includes the comparison of catch figures with figures for the amounts of sold or exported products in order to ensure independent checking of the accuracy of information about the catches that are 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 when this is deemed appropriate.

Traceability can be demonstrated using logbook data. This information can be fully transmitted to the Directorate's website and also with the fish products to the buyer.

Breaches of the law and regulations on fisheries management are subject to fines or revoking of the fishing permit, irrespective of whether such conduct is by intent or negligence. Major or repeated intentional offenses are subject to up to six years imprisonment.

If the catch of a vessel exceeds the allowable catch of the said vessel of individual species, the relevant fishing company must obtain an additional catch quota for the relevant species. If this is not done within a certain timeframe, the fishing permit may be revoked as well as a charge having to be paid for the illegal catch.

Section 3: Ecosystems Considerations

Guiding Principle

The MRI is the principle marine research agency that monitors and researches the marine environment including the ecosystem components. There is a clear programme of monitoring and research into the changes in physical parameters within the waters of Iceland as the basis of understanding the effects of these changes on the productive fisheries in Iceland. The MRI is also developing expertise and understanding of the ecosystems approach to fisheries management.

Specific Criteria
Information gathering and advice

There is information available on the legal specification of fishing gear for haddock for each fishing method. Highly selective gear may result in lower impact on certain aspects of the ecosystem such as lower incidence of bycatch. Commonly caught species such in the haddock fisheries are also subject to ITQ management and hence are recorded and landed as part of the vessel catch in the logbook and through the reporting structure in the Directorate's databases.

Long-liners are reported to use protective devices to shield baited hooks as gears are shot in order to prevent encounters with seabirds. Bycatch avoidance methods are employed on a voluntary basis although no data was available to determine the absolute use and effectiveness in Iceland. The results of research in Norway have demonstrated effective reduction in bycatch of seabirds. Requests for further clarification on the substantiation of considered effectiveness in Iceland has been made.

Reporting of seabirds and marine mammal bycatch in the Icelandic fishery is now mandatory as for logbook regulation issued in 2014. Data is currently been collected and a report on the effects of the groundfish fisheries on marine mammals and seabirds bycatch is expected in 2015/2016. The MRI continues to conduct research into the distribution, population and feeding ecology, of important whale species. Major survey work commenced in 1989 and a formal research plan involving international collaboration continues today. This information is being used to continue the development of multi-species modelling in the support of development of ecosystems based management of groundfish fisheries. The observation/inspector scheme carried out by the Directorate covers roughly 20% of the larger trawler fleet.

Most non-target species landed in haddock fisheries are themselves subject to survey, stock assessment and TAC limitations as part of the management of Icelandic fisheries. There are a number of species noted of lower abundance including Atlantic halibut, atlantic wolffish and grey skate. Non target catches are landed and hence there is good knowledge of frequency and location of catches. Closure rules are available to the Ministry to limit impacts on non target species and habitat if deemed appropriate through scientific evaluation by MRI. There is no evidence of serious risk of extinction of bycatch species resulting from the activities of haddock fisheries.

Area closures are a commonly employed management tool to protect spawning grounds, essential fish habitat, stony coral areas and thermal vents. In the past 27 years, about 2000 temporary closures have come into effect, mostly off the Westfjords. Most of the closures concern cod fishing with direct effects on haddock protection and often they have been limited to bans on bottom trawling or long lining.

Habitat Considerations

Studies are undertaken, principally by the MRI on both the identification and measurement of abundance/species diversity of sensitive habitats such as corals and also the effects of fishing on the benthic environment. The MRI is carrying out mapping research aimed at identifying all the habitats present on the Icelandic shelf. More than 50% of the entire Icelandic shelf is closed to trawl gear.

6.1 Conformity Statement

The assessment team recommends that the management system of the applicant fishery, the Icelandic Haddock (*Melanogrammus aeglefinus*) commercial fishery, fished within the 200 mile Icelandic Exclusive Economic Zone (EEZ) by all Icelandic registered vessels using all gear types directly (demersal trawl, long-line, Danish seine net, gill net, hook and line) and indirectly (Nephrops trawl, shrimp trawl and pelagic trawl) under the management of the Icelandic Ministry of Industries and Innovation, is awarded certification to the FAO-Based Icelandic Responsible Fisheries Management (IRFM) Certification Programme.

FAO-Based Icelandic Responsible Fisheries Management Program

7. Fishery Assessment Evidence

Section 1: Fishery Management

1.1 Fisheries Management System and Plan for stock assessment, research, advice and harvest controls

CLAUSE: 1.1.1 A structured fisheries management system, sufficient to fulfil the management tasks specified in this Specification, shall be adopted and implemented.				
EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**

SUMMARY EVIDENCE:

There is a structured fisheries management system adopted within Iceland for the management of ground fish species such as haddock. There is a principal Act *(last amended No 116/2006)*[27] and a number of supporting Acts and Regulations for the management of the fishery. There are a number of inter-related government agencies within the system; under the direction of the Ministry of Industries and Innovation which has ultimate responsibility. 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. Policy and objectives are directed toward responsible utilization of the haddock resource and allocation and control of fishing opportunities is undertaken via a structured system of rights based entitlement. The system has built in controls to allow equitable use and flexibility which supports compliance to management measures and regulations.[28]

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

[28] http://eng.atvinnuvegaraduneyti.is/laws-and-regulations/fisheries/

EVIDENCE

The Management System[29] is operated by the government in close consultation with the Industry, predominantly via the Industry Associations. The Government Agencies that have primary responsibility over fisheries governance include the Ministry of Industries and Innovation with ultimate responsibility through the Icelandic Fisheries Minister; the Directorate of Fisheries (Fiskistofa) with the principle responsibility for implementation of Policy, Regulations on fisheries management and for reporting on a day to day operational basis; the Icelandic Marine Research Institute (MRI) which is the Government Research Organisation tasked with the collection and scientific assessment of fishery data from survey and fishing data and the provision of advice to the Ministry for the management of fishery resources. The MRI also has responsibility for some day to day fishery management and regulatory roles for the closure of fishing areas.

Monitoring and enforcement happens at sea, under the Icelandic Marine Coast Guard and ashore, under the remit of the Directorate through a network of regional offices and fishery control staff. The Directorate also manages an at sea observer program. Observers form part of the information gathering and reporting for decisions on temporary closures. Strict rules are in place for adherence to closures and vessels can be spot fined if found to infringe on the boundaries of such areas.
Iceland has developed a Marine Policy, which identified four Ministries with responsibilities for the Marine environment; Minister of Industries and Innovation, Minister of Environment, Minister of the Interior, Minister for Foreign Affairs. Principally the Minister of Industries and Innovation is responsible for the management of fisheries. The Policy acknowledges and has been developed in accordance with key International Agreements including; the UN Convention of the Law of the Sea, Agenda 21 of the Rio Declaration, FAO Code of Conduct for Responsible Fisheries and the International Action Plans for Management of Sharks, Fishing Capacity, the International Plan of Action to prevent, deter and eliminate Illegal, Unregulated and Unreported Fishing and reducing incidental catch of Seabirds in Long-line Fisheries. The UN Fish Stocks Agreement, The Ecosystems Approach and the Precautionary Approach to fisheries management are also cited 'as policy' within the document.

There is a legal basis to the structure of fisheries management under the Fisheries Management Act No 116, August 2006 which superseded much of the Fisheries Management Act 1990. The Icelandic fishing season is set from Sept 1 to August 31 for most species, including haddock. The fisheries are managed by a catch quota system. The annual quota is allocated to individual vessels (in accordance to the vessel's fixed quota share of the species subject to TAC, these can be large and small vessels) or vessel groups (coastal fisheries, that only fish in the summer) so that the sum of quotas for individual vessels and vessel groups equals the TAC according to the HCR. Within the system there are various measures to make the fisheries economically viable, together with measures to coordinate catch composition and the TAC and to reduce discard; discarding is prohibited by law.[30]

The Icelandic Fisheries Management System abides to International Agreements (although not

[29] http://www.fisheries.is/management/fisheries-management/the-fisheries-management-act/

[30] According to law no 57/1996 all catch has to be landed and provisions on discard are also in regulation no 601/2003.

required for the Icelandic haddock stocks) including participation in the North East Atlantic Fisheries Commission and the Northwest Atlantic Fisheries Organisation. The agreement allows bycatch of other species, as the Barents Sea fishery is a multi-species fishery. For 2014 the agreement allocates up to 7.9% of haddock as bycatch to a vessels cod quota (the specific maximum may be different in Norwegian and Russian jurisdiction and the maximum proportion of other demersal species allowed as bycatch may range up to 30% in some areas).[31]

Procedurally, the coastal fisheries quota is subtracted from the overall TAC, with the remaining TAC being distributed to the small and large ITQ vessels. The coastal fisheries quota for 2014 has been set to 8600 tonnes of demersal species (of which cod should be no more than 7500 tonnes; the actual catch of haddock in the coastal fishery in 2014 was 34 tonnes).

The small boat ITQ system fishes year round, and part of them fishes for specific species with handline (cod, haddock, saithe and redfish). Single vessels participating in the coastal fisheries are allowed to fish no more than 650 kg of cod equivalents a day. Haddock, saithe and other species are translated into cod equivalents. The cod equivalent value is calculated by the MRI based on a number of parameters including export value of the fish resource. The small boat ITQ system can also fish in the coastal fisheries in the summer if properly permitted.

Many of the vessels taking part in coastal fisheries have also ITQs, but they are not allowed to fish in both systems simultaneously. In 2014, 648 boats took part in the costal fisheries.[32] In 2013, 674 boats had participate, of which 486 also had quota and where engaged in other fisheries during the rest of the year.[33] To be able to participate in coastal fisheries a special license is needed; coastal fisheries are only allowed during the summer. A quota is issued and distributed between four defined regional areas and the four summer months. Detailed regulations (daily allowance of catches, cod equivalents, days and daily hours allowed, number and type of gear in each fishing trip, permits and authorizations) are issued for the management of coastal fisheries.[34]

The catch fished in these fisheries is not counted against the vessel's ITQ but against the coastal fisheries overall quota. In the coastal fisheries everybody is fishing from the same quota and when that quota is finished everybody has to stop fishing at the same time (an Olympic fishery in each Summer month in each region). This differs from the ITQ system, where each vessel has an individual vessel quota (which is tradable).[35]

[31] http://www.reglugerd.is/interpro/dkm/WebGuard.nsf/b7fd33650490f8cf00256a07003476bb/f8718114090f03f300257c6e000584d2?OpenDocument

[32] http://www.fiskistofa.is/veidar/aflastada/strandveidi/

[33] http://www.fiskistofa.is/media/utgefid_efni/aflahefti2012_2013.pdf

[34] http://www.fiskistofa.is/fiskveidistjorn/umfiskveidistjornunarkerfid/strandveidar/

[35] http://www.fiskistofa.is/media/utgefid_efni/aflahefti2012_2013.pdf

Financing for the System

The Icelandic fisheries management program collects fishing fees from all individuals and firms that harvest and have commercial permits issued by the Directorate. There are two kinds of fishing fees.[36] 1. General fishing fee. The amount of the General fishing fee varies with species. In 2014-2015 it ranges from 1.00 to 26.98 kr., depending on species (12.28 kr. for haddock), for each kilo of allocated vessel quota or landed catch. 2. Special fishing fee. The amount of Special fee also varies with species and it ranges from 0 to 12.99 kr. each kilo (5.91 kr. for Haddock).[37] The law states that the fishing fees are to be calculated on the basis of profitability in the harvesting of the various in the previous calendar year (in addition a vessel has to pay several other fees: for a permit, harbour use, weighing of catch, etc.). Revenue from the fishing fee accrues to the State Treasury. (These fishing fees have been increasing in recent years and now amount to some 10 billion's Icelandic krónur in 2014.) [38]

CLAUSE: 1.1.2 The fisheries management system objective shall be to limit the total annual catch from the fish stocks so that catches are in conformity with amounts allowed by the competent authorities.

EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**

SUMMARY EVIDENCE:

The annual catch is limited by a TAC derived from a Harvest Control Rule. The MRI advises the Ministry of the TAC based on scientific evidence collected through survey and fishing logbook data. The Ministry through consultation with the various agencies and fishing associations sets the TAC which forms the basis of the quota allocation to each of the registered vessels according to individual quota shares. Catches are limited closely to the TAC. The Directorate is primarily tasked with monitoring of catches with support from Port Authorities, registered weighers and electronic logbooks. The Icelandic Coastguard also plays a major role in ensuring catches are recorded accurately at sea and reported according to location.

EVIDENCE

The Management system is based on the Individual Transfer Quota System (ITQ).[39] The Fisheries Management Act is the principal legislative instrument that defines how the ITQ system is administered for vessels and how the quota can be transferred and purchased by other vessels (the

[36] http://www.althingi.is/lagas/143a/2012074.html
[37] http://stjornartidindi.is/Advert.aspx?ID=c02c6b3c-532e-4691-8e12-f37065c7f490

[38] http://www.fjarmalaraduneyti.is/frettir/2013/09/11/nr/17178

[39] http://www.fisheries.is/management/fisheries-management/individual-transferable-quotas/

transfer). There are well defined rules and requirements for quota allocation, transfer and reporting that must be met. The Act sets the fishing year from September 1 to August 31st of the following year.

The Directorate is principally responsible for the physical recording of catch and registering this information against the allocated ITQ per vessel for each species. All vessels are legally obliged to have their landings officially declared and verified. Declaration is principally via the electronic logbook which is automatically transmitted to the Directorate. The smaller segment of the fleet (skippers on vessels <10 GT are exempt, as well as older vessels <15GT which received certification before May 1, 2002) are not required to report via the electronic logbook, principally since some do not carry the necessary electronic infrastructure at this time, although they are obliged to report catch information in written logbook format from each fishing trip to the Directorate.[40] Logbook information must be reported to the Directorate at least on a monthly basis.

This information collected on the logbook is collected in the central database and is an important tool for measuring the quota allocation to each and every vessel. N.B. The final weighing of catch is the value that is used in the central database. The recording of catch and transfer of quota is recorded and monitored by the Directorate. The reporting system is transparent and allows anyone to view the quota allocation via the Directorate website, catch against that quota at any point in the fishing season and also transfers of quota for each vessel individually.

Catch recording system

Catches are recorded by the vessel skipper at the end of each fishing event in the electronic logbook. Data is transmitted from the logbook automatically and is received by the Directorate for recording in the central database. Trackwell is the service provider of the technology. During the site visit in April 2014, a meeting with Trackwell, who are contracted to manage the technical operation of the IT system, was held. The system was described and the support measures for server storage and support.

Businesses engaged in purchasing and/or selling catches are obligated to present reports to the Directorate of Fisheries, containing information on the purchase, sale and other disposition of fish catches. The Directorate has the authority to obtain information and access the premises and data bases of those involved in fish trading. If discrepancy materialises in the database of the Directorate of Fisheries between the information stated in the reports and the information received from the harbour weighing, corrective or enforcement measures are taken when this is deemed appropriate.

Should a fishing vessel catch less than 50% of its total catch quota, measured in cod equivalents, during two consecutive fishing years its quota share shall be cancelled and the quota shares of other vessels in the species concerned increased accordingly. There is also a requirement that within the year, the net transfer of quota from any vessel must not exceed 50%. A fishing company cannot own

[40] http://www.reglugerd.is/interpro/dkm/WebGuard.nsf/key2/EE55A2CB9D1FA78F002576E400469C0E?OpenDocument

more than 12% of the total cod quota share but the limit is on individual species; this is 20% for haddock.[41]

There is a separate small boat quota (<30GT and <30 meters in length) only allowed to fish using hand-lines or long-lines. [42] The system contains many other rules. There is a legal obligation for all vessel landings of fresh fish to be separately weighed on landing by officials authorised by the Directorate. These can include harbour officials, accredited staff of processing establishments and Directorate staff, directly. The official catch weight is cross compared with the e-logbook recorded weights entered at the time (or within a period) after capture for verification. Information is stored in a central database held on servers operated by the Directorate and access is also provided to the Ministry and the Marine Research Institute. For vessels landing processed fish prepared and frozen at sea, the Directorate undertakes analysis of the nominated yield factors proposed by the operator and verifies these by sample weighing at sea during observer trips to ensure that accurate conversion of filleted fish to live weight equivalent can be made. In the case of factory freezer vessels, the logbook entry is for final processed weights and not round weight/live weight values. For official purposes, the official weight is the weight registered on landings by the official of the Directorate.

The official landing weights for each species are subtracted from the ITQ for the catching vessel and the remaining quota available for each species is electronically up-dated. The Directorate's website allows open access to third parties to view this information.[43] Normally, the information presented is up-dated continually and within 24 hours of landing declarations. There is a statement that information is subject to change allowing the Directorate to correct any data where necessary allowing for checking and removal of errors before the numbers are finally registered. The system can be described as highly effective at providing near real time situation of the landed proportion of the quota.

Historical comparisons of catches (Table 5 below) give an overview of the accuracy of official landings against the allocated quota. If a vessel has overfished its quota for a species it must engage in transferring quota within a maximum of 3 days in order to re-address the imbalance. The Directorate is principally responsible for the administration, allocation, recording and the day to day monitoring of ITQ, (and directing where necessary) the ITQ trade and rent system. Monitoring oversight is provided and the Directorate has the authority to intervene in cases were quota is not transferred to the vessel. Vessels can rent haddock quota from other vessels and can trade haddock for other species (and this applies to all quota species). They can also convert a limited portion of other species for haddock quota, and vice versa, in cases where they fish beyond quota of an individual species (this does not apply to cod).[44]

[41] http://www.fisheries.is/management/fisheries-management/the-fisheries-management-act/

[42] http://www.althingi.is/lagas/nuna/2006116.html
[43] http://www.fiskistofa.is/veidar/aflastada/einstokskip/
[44] Article 11 of the Fisheries Management Act of 2006

The profits from fish caught beyond quota go to fund fisheries projects termed 'Verkefnasjóður sjávarútvegsins' within limitations set out in the Fisheries Management Act. No 116/2006. These fund are channelled towards fisheries research. The Ministry manages the regulatory framework for adequacy and advises the Minister on any amendments to the regulations and for the initial setting of TAC's for each species at the beginning of the fishing year. Iceland sets the quota allocation commencing from 1st September for a 12 month period.

Table 5. Haddock. TAC recommended by the Marine Research Institute, national TAC and landings (thousand tonnes).[45]

HADDOCK. *TAC recommended by the Marine Research Institute, national TAC, and landings (thous. tonnes).*

Ár *Year*	Tillaga *Rec. TAC*	Aflamark *National TAC*	Afli Íslendinga *Landings (Iceland)*	Afli annarra *Landings (others)*	Afli alls *Total landings*
1984	55	60	47	1	48
1985	45	60	50	1	51
1986	50	60	47	1	48
1987	50	60	40	1	41
1988	60	65	53	1	54
1989	60	65	62	1	63
1990	60	65	66	1	67
1991[1)]	38	48	40	1	41
1991/92	50	50	47	1	48
1992/93	60	65	47	1	48
1993/94	65	65	56	1	57
1994/95	65	65	60	1	61
1995/96	55	60	53	1	54
1996/97	40	45	50	1	51
1997/98	40	45	37	1	38
1998/99	35	35	45	1	46
1999/00	35	35	41	1	40
2000/01	30	30	39	1	40
2001/02	30	41	44	1	45
2002/03	55	55	55	1	56
2003/04	75	75	78	1	79
2004/05	90	90	96	1	97
2005/06	105	105	97	1	98
2006/07	95	105	100	2	102
2007/08	95	100	110	1	111
2008/09	83	93	89	1	90
2009/10	57	63	68	1	69
2010/11	45	50	50	0	51
2011/12	37	45	49	0	50
2012/13	32	36	40	1	41
2013/14	38[2)]	38			
2014/15	30.4[2)]				

[1)] Tímabilið janúar–ágúst 1991. *January–August 1991.*
[2)] 40% aflaregla. *40% harvest control rule.*

Scientific advice and TAC for the 2014/2015 seasons match at 30'400 tons.

http://www.responsiblefisheries.is/seafood-industry/supply---tac/

[45] http://www.hafro.is/Astand/2014/02-ysa.PDF

CLAUSE: 1.1.3 Appropriate measures for the conservation and sustainable use of the "stock under consideration" shall be adopted and effectively implemented by the competent authorities.

EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**

SUMMARY EVIDENCE:

Management measures can be divided into the following categories:

- **Total Allowable Catch based on scientific advice and Individual Vessel Quotas (large and small vessels);**
- **Fishery access is limited by license per vessel and allocated via an ITQ system for each vessel and a quota shared among the hand line hook vessels with restrictions on daily catch (650 kgs/day);**
- **Technical measures are implemented by Regulation including; gear specifications (mesh size and technical conservation measures such as square mesh panels), seasonal, permanent and temporary closed areas).**

The Directorate is the principal implementation agency and is supported by the Coast Guard through monitoring and enforcement and also by the Port Authority by recording of landings. The MRI plays the lead role in the implementation of temporary closed areas (fast shut downs) which can be implemented virtually instantaneously on the results of undersized catches in landings.

EVIDENCE:

Total Allowable Catch based on scientific advice and Individual vessel quotas:

The catch limitation system is at the basis of the Icelandic fisheries management system. The system is intended to limit the total catch and to prevent more fishing from the fish stocks than the authorities allow at any given time. The TAC is based on scientific advice. Scientific advice is provided by the Marine Research Institute which carries out research on the ocean's commercial stocks and provides the authorities with fisheries advice. The Marine Research Institute is an independent institution that falls under the auspices of the Ministry of Fisheries and is the main research body in Iceland conducting marine and fisheries research.

Stock assessments are based on systematic research of the size and productivity of the fish stocks and the marine ecosystem. Active collaboration with international scientific organisations (principally ICES) is undertaken and provides feedback and collaboration on research methods that provide the best available information on the condition of the fish stocks around Iceland. The ITQ management has three pillars, the general individual transferable quota system (ITQ), secondly the small vessels ITQ, where there are restrictions on use of gear and selling of quota is limited to that part. Thirdly, there are regional policy instruments, where a limited quantity of quota is allocated to vessels in communities that are dependent on fisheries and have been adversely affected by national fluctuations or other stocks. There is a high level of compliance to the TAC and substantial tracking and reporting on compliance in a transparent manner, noticeably via the website of the

Directorate. The catch limitation system is based on the catch share allocated to individual vessels. Each vessel is allocated a certain share of the total allowable catch (TAC) of the relevant species. The catch limit of each vessel during the fishing year is thus determined on basis of the TAC of the relevant species and the vessel's share in the total catch. The catch share may be divided and transferred to other vessels, with certain limitations.

Fishery Access Licenses

All commercial fishing operations are subject to a permit from the Directorate of Fisheries. The total registered number of vessels reported by the Directorate in their 2013 Report for 2012/2013 fishing season lists 1292 vessels and smaller boats.[46] Certain fisheries require special permits, such as Danish seining, inshore shrimping, specific fisheries by Icelandic vessels in distant waters as well as the fishing of foreign vessels within the Icelandic exclusive economic zone (EEZ). Article 4 of the Fisheries Management Act 2006[47] states that 'No one may pursue commercial fishing in Icelandic waters without having a general fishing permit'. General fishing permits are of two types, i.e. a general fishing permit with a catch quota and a general fishing permit with a hook-and-line catch quota. A vessel may only hold one type of fishing permit each fishing year. A commercial fishing permit shall be cancelled if a fishing vessel has not been fishing commercially for 12 months. A fishing permit shall also be cancelled if a fishing vessel is removed from the registry of the Icelandic Maritime Administration or if its owners or operators do not satisfy the conditions of Article 5.

Catch per gear type

In 2012/13 - 44% of haddock was caught with Demersal trawl, 43% on Long line, 1% in Gill net, 11% in Danish seine and 1% on Handline.[48]

Technical Measures (gear, season, permanent and temporary closed areas)

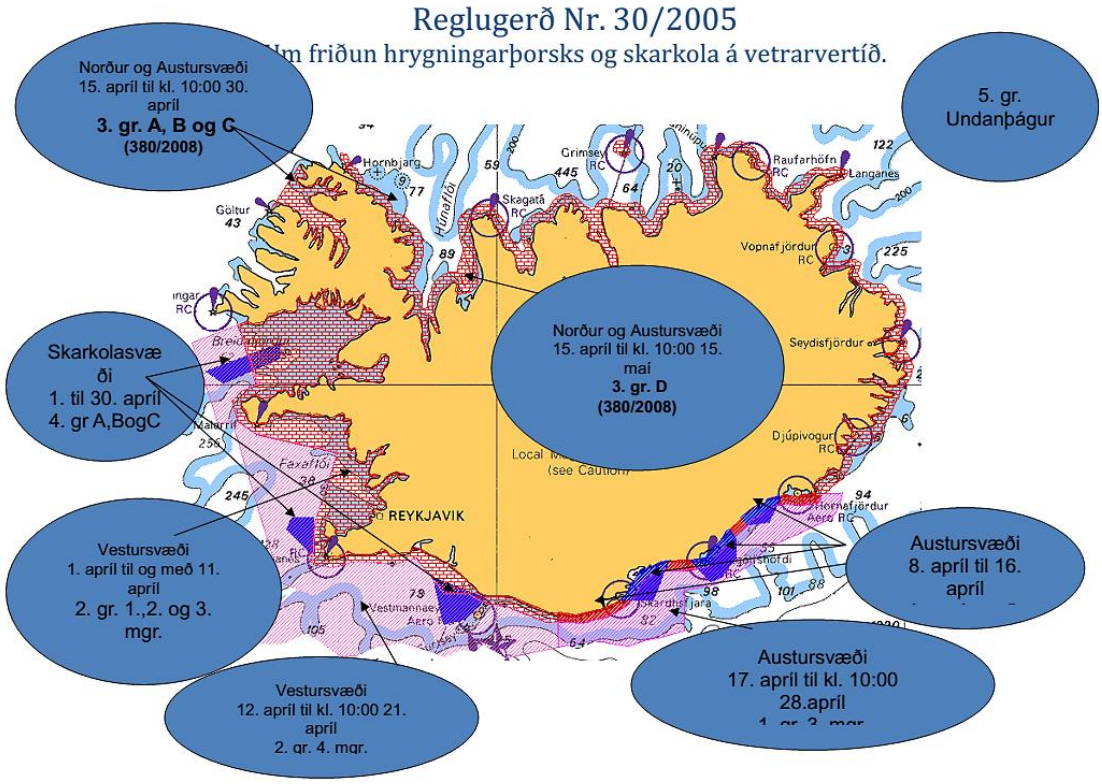
Effort is restricted through a number of technical measures. There are regulations concerning the type of fishing gear permitted, e.g., the minimum mesh size for trawlers fishing demersal species is 135 mm. Fishing with trawls is prohibited in large areas near the coast which serve as spawning and nursery areas. The following chart is available on the Directorate website and illustrates the extent of area closures in the Icelandic Fishery. Since 2005 each area has different closure-days because the spawning occurs at different times in different areas. The red areas tend to be largely for cod protection while the blue ones on the bottom left to protect spawning plaice. These areas also overlap with haddock spawning habitat and therefore serve a dual purpose.

http://www.fisheries.is/management/fisheries-management/area-closures/

[46] http://www.fiskistofa.is/media/arsskyrslur/veidileyfi_uthlutanir_2013.pdf

[47] http://www.fisheries.is/management/fisheries-management/the-fisheries-management-act/

[48] http://www.fiskistofa.is/media/utgefid_efni/aflahefti2012_2013.pdf



49

Figure 14. Spawning closures in Iceland. Reg. on closure for all demersal fisheries in spawning areas for cod (red and pink areas) and (restricted by gear type) plaice (blue areas). Period 1.-30. April every year. The time of the closures varies depending on areas. As of May 2014.

On top left Norður og Austursvæði closed between 15 April and 30 April
Below on left Skarkolasvæði/ Plaice-areas (pointing at blue areas) closed 1 to 30 April
Below Vestursvæði West-area 1 April to 21 April
Bottom left Vestursvæði(the most important) West-area 12 April to 21 April
Bottom right Austursvæði East-area 17. April 28 April
Above Austursvæði East-area 8 April to 16 April
Middle Norður og Austursvæði North and East-areas 15 April to 15 May

Sorting grids in fishing gear are mandatory to avoid bycatch of juvenile fish in the shrimp fisheries. Extensive provisions are made for scheduled, routine and temporary closures of fishing areas to protect spawning fish from all fishing. In addition, the Marine Research Institute (MRI) has the authority to close fishing areas temporarily without prior notice if the proportion of small fish in the catch exceeds certain limits (25% or more of <55 cm cod and saithe, 25% or more of <45 cm haddock and 20% or more of <33 cm redfish). There are a number of Regulations which form the basis to the implementation of Policy and providing powers of enforcement to the Directorate. These are published each year in a booklet made available to all registered vessels.

[49] http://www.fiskistofa.is/fiskveidistjorn/veidibann/hrygningarstopp/

CLAUSE: 1.1.4 The Specification does not recognise fishing practices that are prohibited such as dynamiting, poisoning and other comparable destructive fishing practices.

EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**

SUMMARY: The principal objectives of Icelandic policy on the ocean are to maintain the ocean's health, biodiversity and productive capacity, in order that it's living resources can continue to be utilised sustainably. Whilst regulations do not specifically state that certain fishing practices are prohibited, only legal gears are allowed. Legal Instruments are in force which specifies 'legal gears' for each method of fishing. (Act 57/1996) also requires the regulation of fishing gear so as to reduce damage to catch and also to allow confiscation of gear not retrieved in a proper manner, found in closed areas, fishing illegally or being illegal. Also Article 9 of Act No. 79 states that the Minister shall take the necessary measures to prevent fishing practices which can be regarded as harmful to the efficient utilisation of the commercial stocks and preservation of sensitive ocean areas.

EVIDENCE:

Legal Instruments are in force which specifies 'legal gears' for each method of fishing. (Act 57/1996) also requires the regulation of fishing gear so as to reduce damage to catch and also to allow confiscation of gear not retrieved in a proper manner, found in closed areas, fishing illegally or being illegal. Also Article 9 of Act No. 79[50] states that the Minister shall take the necessary measures to prevent fishing practices which can be regarded as harmful to the efficient utilisation of the commercial stocks and preservation of sensitive ocean areas. Fishing gears in operation for haddock fishing include: demersal trawl, Danish seine, gill netting, automatic lining and hand lining. Dynamiting, poisoning and other comparable destructive fishing practices are illegal in Iceland.

[50] http://eng.atvinnuvegaraduneyti.is/media/acts/Act-no-79-1997-Fishing-in-Iceland-Exclusive-Fishign-Zone.pdf

The Fisheries Management Plan

CLAUSE: 1.1.5 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:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**

SUMMARY EVIDENCE: Fishing for haddock in the Icelandic EEZ is regulated by law. There is an established Fisheries Management Plan for Icelandic haddock, documented and endorsed by the Minister of Fisheries. It is publicly available at the Icelandic Ministry of Industries and Innovation website.

EVIDENCE

There is an established Fisheries Management Plan (FMP) for Icelandic haddock, documented and endorsed by the Minister of Fisheries. The FMP is documented and publicly available on the Icelandic Ministry of Industries and Innovation website[51]

Also, primary laws and regulations regarding Icelandic fisheries management include[52]:

- The Act on Fisheries Management as subsequently amended No 116/2006.
- The Act concerning the Treatment of Commercial Marine Stocks as subsequently amended No 57/1996.
- The Act on Fishing in Iceland's Exclusive Fishing Zone as subsequently amended No 79/1997. Regulations are issued annually with amendments.

Regulations are issued annually with amendments. Primary regulations are:

- Regulation no 698/2012 on commercial fisheries, which is issued every year with amendments.
- Regulation no 810/2011 on utilisation of catch and by-products.
- Regulation no 557/2007 on logbooks.
- Regulation no 224/2006 on weighing of catch as subsequently amended.

The haddock fishery management plan (FMP) [53]contains specifications about the following items:

- Management unit;
- Harvesting Policy which includes a harvest control rule for setting TACs;
- Limits with respect to precautionary management;

[51] http://www.fisheries.is/main-species/codfishes/haddock/management-plan/
[52] http://eng.atvinnuvegaraduneyti.is/laws-and-regulations/fisheries/
[53] http://www.fisheries.is/main-species/codfishes/haddock/management-plan/

- Fisheries management system, which is based on individual transferable quotas (ITQ) and support measures ;
- Support measures. These are area closures (temporary and permanent) with the aim of protecting juveniles and vulnerable marine ecosystems, e.g. coldwater corals. In addition there are gear and mesh size restrictions in place and trawl grids are mandatory in certain areas. These restrictions are mainly to protect juvenile fish.;
- Scientific advice;
- Process for making decisions on TAC;
- Consultation with stakeholders in fisheries;
- The means of implementing the management approach; including main provisions for monitoring; control; surveillance and enforcement and management measures relevant to ecosystem effects of the fishery.

The FMP includes a Harvest Control Rule, by which a total TAC is derived from an assessment of the state of the stock. It also includes precautionary limit reference points, the management system based on individual transferable quotas (ITQ) and support measures. The TAC is decided based on scientific advice from the Marine Research Institute (MRI)[54], in collaboration with ICES.

The Ministry has the authority to deviate from the scientific advice, which implicitly means deviation from the management plan. This has not happened since implementation of the current management plan.

CLAUSE: 1.1.6 The Fisheries Management Plan developed and adopted by the competent authorities shall be formulated with due consideration to the following:

- 1.1.6.1 The management unit;
- 1.1.6.2 Specification of stock or component stocks of "stock under consideration";
- 1.1.6.3 Jurisdiction areas and the respective competent authorities for the entire range of component stock(s) of "stock under consideration";
- 1.1.6.4 The long-term harvesting policy, consistent with achieving optimum utilization, including the means for assurance of its consistency with the precautionary approach to fisheries management.

The Fisheries Management Plan shall specify:

- 1.1.7.1 The long term objective(s) of the fisheries management, including target(s) for stock biomass and target value(s) or range(s) for fishing mortality or its proxy;
- 1.1.7.2 Limits with respect to precautionary management, including the limit reference point

[54] http://www.hafro.is/Astand/2014/english/02-haddock-14.pdf

for stock size or its proxy and the limit reference point for fishing mortality or its proxy (e.g. harvest as a proportion of stock size, etc.)[55], as well as remedial action to be taken if limits are approached or exceeded;

- 1.1.7.3 The Specification of the applicable harvest control framework or harvest control rule, as appropriate.

- 1.1.7.4 The primary approach applied to managing the fisheries (e.g. input controls, output controls, etc.).

EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**

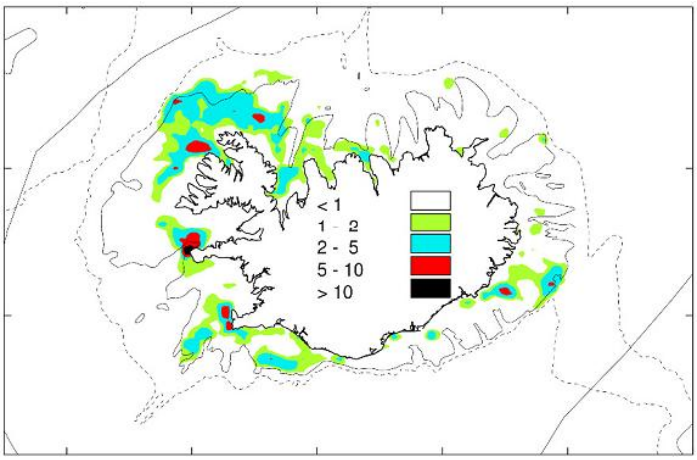
SUMMARY EVIDENCE 1.1.6 and 1.1.7: There is a management plan in place that specifies management units, stock under consideration, harvesting policy, objectives and reference points. The primary approach to managing fisheries is a yearly TAC, distributed as individual transferable quotas. Supporting measures include area closures, gear restrictions, discard ban and extensive control of landings.

EVIDENCE

1.1.6.1 The management unit;

The Fisheries Management Plan for Icelandic haddock[56] describes the Management Unit of Icelandic Haddock as:

'Management unit: Haddock (*Melanogrammus aeglefinus*) fishing in the Icelandic Exclusive Economic Zone (EEZ). Icelandic authorities (Minister of Industries and Innovation) manage fisheries within the Icelandic EEZ, which is mainly within ICES area Va. Current distribution of the stock is within the Icelandic EEZ as shown below (EEZ is solid line visible in North-West and South-East). This is under the sole control of Iceland, under the Management System with ultimate responsibility held by the Ministry of Industries and Innovation but with devolved powers to other Ministries and Agencies.



Haddock fishing grounds in 2013. Dark areas indicate highest catch (tonnes/nmi^2).

[55] [F_{lim}can be explicit, or implicit in cases where harvest rate is set annually to a precautionary Ftarget (or its proxy)]
[56] http://www.fisheries.is/main-species/codfishes/haddock/management-plan/

1.1.6.2. Specification of stock or component stocks of "stock under consideration";

The Icelandic Haddock Fisheries Management Plan states that the current distribution of the stock is within the Icelandic Exclusive Economic Zone (EEZ). According to the ICES NWWG[57], the Icelandic haddock stock is distributed all around Iceland. In the assessment haddock within Icelandic EEZ waters is assumed to be a single homogenous unit. The main spawning grounds are off the Southwest coast. The pelagic eggs and larvae drift clockwise around the island to the main nursery grounds off the North coast.

The haddock stock in Icelandic waters is regarded as a distinct separate stock unit for management purposes. The migrations of Icelandic haddock have not been extensively studied, but, apart from some larval drift into Greenland waters, there is no evidence that the Icelandic haddock mixes with other haddock stocks, or of immigration to or emigration from Icelandic waters[58]. On the contrary, the deep waters surrounding the Icelandic shelf are regarded as effective obstacles to exchange between stocks. There no evidence for distinct stock components as is the case for cod.

1.1.6.3 Jurisdiction areas and the respective competent authorities for the entire range of component stock(s) of "stock under consideration";

The stock is confined to the Icelandic shelf, which for practical purposes coincides with the 200 mile EEZ of Iceland under the jurisdiction of the Ministry of Industries and Innovation, and also with ICES Division Va. The haddock in ICES area Va is regarded as a unit stock, separate from other haddock stocks. It is distributed in all parts of the Icelandic zone, and is restricted to that area, as outlined under clause 1.1.6.2.

1.1.6.4. The long-term harvesting policy, consistent with achieving optimum utilization, including the means for assurance of its consistency with the precautionary approach to fisheries management.

A Harvest Control Rule has been developed for the annual TAC for Icelandic Haddock. This rule is an adaptation of the cod harvest control rule to haddock.

In mathematical terms the rule is as follows[59] :

1. When spawning stock biomass in the year following the assessment year (SSB_{y+1}) is equal to or greater than $SSB_{trigger}$:

$TAC_{y/y+1} = \hat{I} \pm B_{45+,y+l}$

[57] http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2014/NWWG/12%20NWWG%20Report%20-%20Sec%2010%20Icelandic%20Haddock.pdf

[58] http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2013/NWWG/Annex%2002%20Stock%20Annexes.pdf pp 896 ff.

[59] http://www.fisheries.is/main-species/codfishes/haddock/management-plan/

2. When SSB_{y+1} is below $SSB_{trigger}$:

$TAC_{y/y+1} = \hat{I}\pm\ SSB_{y+1/}\ SSB_{trigger}\ B_{45+,y+l}$

Where:

y the assessment year,

y/y+1 the fishing year starting 1 September in year y and ending 31 August in year

y+1 y-1/y the fishing year starting 1 September in year y-1 and ending 31 August in year y

$B_{45+,y+1}$ *the reference biomass of 45cm and larger haddock in the year following the assessment year and were* $\hat{I}\pm=0.40$ *and* $SSB_{trigger}$ *=45000 t.*

ICES evaluated the management plan in 2013[60] and advised that *'the harvest control rule for Icelandic haddock in the request is precautionary and in accordance with the ICES MSY approach*'.

The evaluation of the HCR is fully documented in Björnsson, H. 2013 Report of the evaluation of the Icelandic haddock management plan. ICES CM2013/ACOM:59[61]. The following summary of this document is taken from the ICES advice on the plan[62] :

A Management Strategy Evaluation (MSE) was conducted for the Icelandic haddock stock. The operating model (which generates the "true" future populations in the simulations) was the same as used in the annual assessment. Mean weights-at-age and maturity were based on the same procedures used in the assessment.

The selection pattern used is a function of stock weights and is the same as observed in the fisheries. Recruitment and weights were simulated stochastically, with autocorrelated noise. The assessment error of the reference and spawning biomass in the assessment year were based on estimates from empirical and analytical retrospective patterns. The error was autocorrelated in time to emulate observed sequential periods of over-or underestimation of stock biomass.

A short-term forecast is required when applying the HCR, the TAC being based on the harvest rate as a proportion of the B45+ biomass (biomass of haddock at 45 cm and larger) in the advice year, which is the year after the assessment year. The spawning-stock biomass in the advice year is used as a trigger to modify the harvest rate to modify the harvest rate.

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

[61] Björnsson, H. 2013. Evaluation of the Icelandic haddock management plan. ICES CM 2013/ACOM:59. http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2013/ADHOC/IntroAndHad.pdf

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

1.1.7.1. The long term objective(s) of the fisheries management, including target(s) for stock biomass and target value(s) or range(s) for fishing mortality or its proxy;

The management strategy for Iceland haddock [63] is to maintain the exploitation rate at the rate which is consistent with the precautionary approach and that generates maximum sustainable yield (MSY) in the long term. Included in the HCR is a harvest rate which is a proxy for a target fishing mortality. The plan has no explicit target biomass, but has been controlled by simulations to ensure that the biomass will remain large enough to avoid recruitment impairment.

The harvest control rule (HCR) calculates the TAC in the next as:

$$TAC_{y/y+1} = \alpha * B_{45+,y+l}$$

where *y* refers to the assessment year, B_{45+} refers to biomass of haddock 45 cm or larger. The standard catch rate α is set as 0.4. If the SSB_{y+1} is below a $B_{trigger}$ = 45 000 tonnes, the TAC is calculated as $0.4*SSB_{y+1}/B_{trigger} * B_{45+,y+l}$

This HCR has been evaluated by ICES[64] and found to be consistent with the precautionary approach and in accordance with the ICES MSY approach. ICES notes that the harvest rate that in itself is associated with maximum yield (HR=0.52) implies an unacceptable risk of SSB falling below Blim. The adopted HR = 0.40 is slightly below the highest HR where this risk is acceptable (Figure 15 below).

[63] http://www.fisheries.is/main-species/codfishes/haddock/management-plan/

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

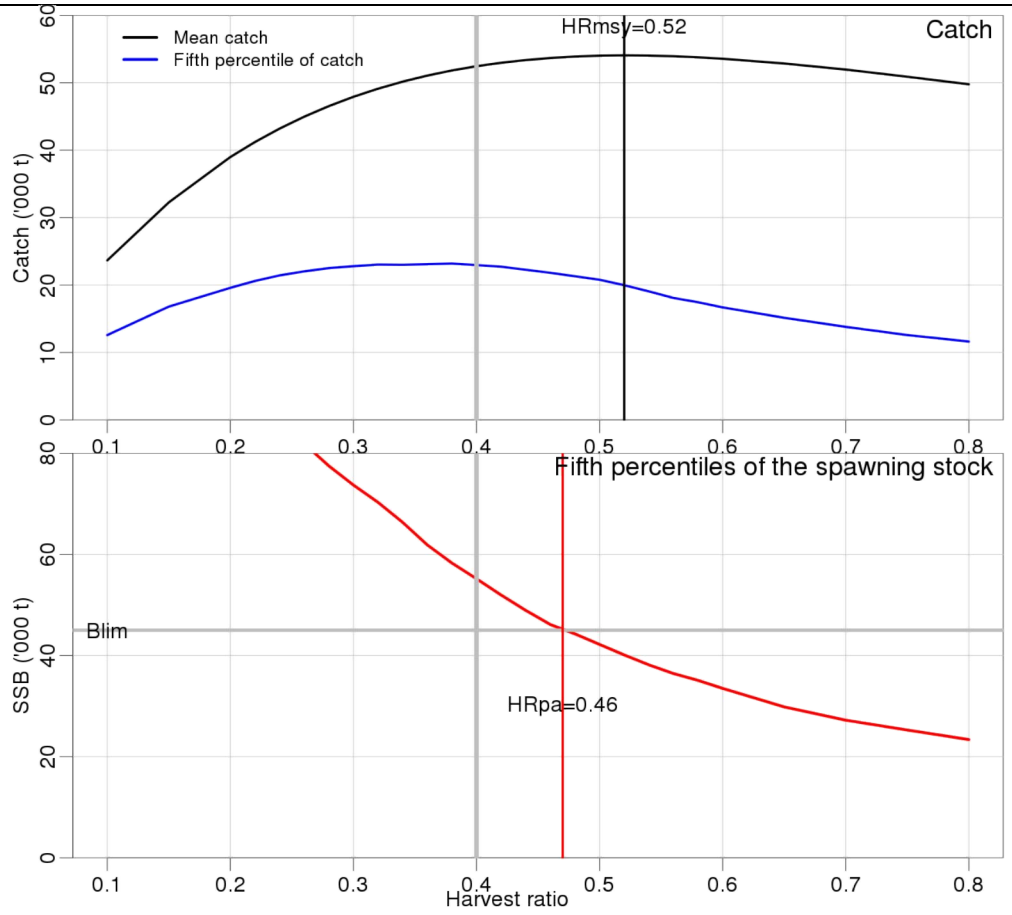


Figure 15: Long term yield and SSB as function of the harvest rate.

1.1.7.2 Limits with respect to precautionary management, including the limit reference point for stock size or its proxy and the limit reference point for fishing mortality or its proxy (e.g. harvest as a proportion of stock size, etc.), as well as remedial action to be taken if limits are approached or exceeded.

A limit point for spawning stock biomass (Blim) is in place, at 45000 tonnes[65]. This is based on the lowest observed biomass (in 1987 as estimated in 2010). No limit value for the fishing mortality has been defined. A precautionary harvest rate HR_{pa} = 0,46 has been defined by ICES as a substitute for the former F_{pa}. The target HR in the HCR is slightly below the HR_{pa}. A target biomass is not defined explicitly, as it is considered redundant with the harvest rule in place.

The trigger biomass in the harvest rule, below which the harvest rate shall be reduced, is identical to the Blim. This was done to avoid undue reductions in the TAC[66], and would, according to the

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

66 Clarified at site visit at MRI 13/8-2014

valuation of the rule, have a low probability of coming into effect. In the evaluation, the recovery where the rule was applied in a scenario where the initial biomass was very low was tested, and found satisfactory (Figure 16 below).

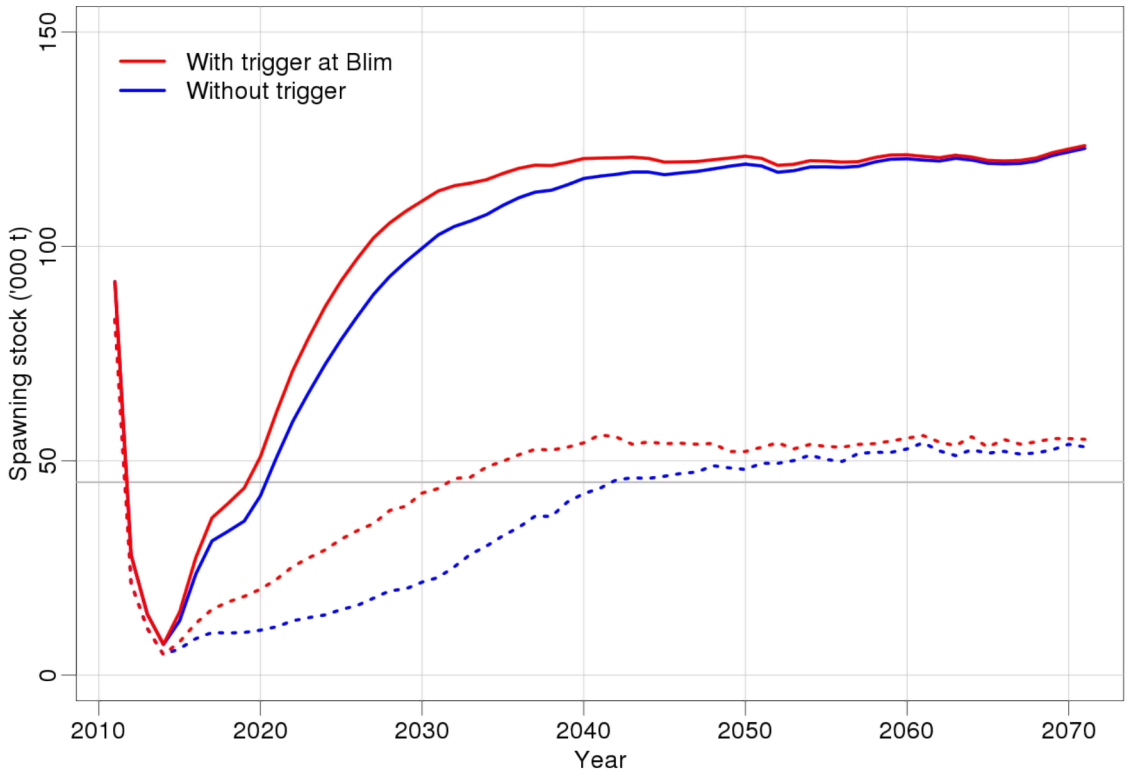


Figure 16 (**Figure 2.3.3.1.4 in [67]).** Recovery from low biomass. Spawning-stock biomass trajectory (5th percentiles and mean) when the starting biomass in the beginning of the simulations is set at a very low level (20% of Blim). Two harvest control rules are tested with reduced HR below Btrigger (red) and without reduction (blue). The actual harvest rule is the red line. For the harvest control rule without a reduction below Btrigger it takes ten years longer before the 5th percentile recovers above Blim.

Apart from a rule for reducing the HR at low SSB, the management plan does not describe explicit measures to be taken if limits are approached. According to the evaluation of the plan such events would be very unlikely unless natural conditions change or the fishery gets out of control, in which case measures would have to be adopted to the prevailing situation. The Ministry has the authority to take strong remedial actions using legislative processes to cease fishing activity for any stock in danger of collapse[68].

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

68 http://eng.atvinnuvegaraduneyti.is/laws-and-regulations/fisheries/

1.1.7.3 The Specification of the applicable harvest control framework or harvest control rule, as appropriate.

The key instrument to regulate removals from the stock in the management plan is the harvest control rule, which is explicitly stated in the management plan and approved by ICES, and is described in detail under clauses 1.1.6.4 and 1.1.7.2.

1.1.7.4. The primary approach applied to managing the fisheries (e.g. input controls, output controls, etc.).

The primary approach to manage the haddock fishery is by annual TACs, decided ultimately by the Minister of Industries and Innovation based on advice from MRI.[69] The TAC is distributed on the individual vessels in an ITQ system. The evidence presented throughout the assessment has provided a high level of confidence in the ability of the management system to ensure that the effective harvest rate does not deviate significantly from the harvest control rule as evidenced by the robustness of the vessel catch allocation, monitoring and recording system (ITQ), the reduction of discarding and high level of reporting - that would appear to be present within the Icelandic fleet.

Prior to the introduction of the management plan, the decided TAC was frequently slightly above the advised TAC, and the final catch in some years exceed the TAC with up to 16% (in the fishing year 2009/2010). There are also reasonably small differences between reported official catch and the TAC over recent years according to management and science based sources[70] . There is a high level of reporting in the Icelandic haddock fishery and official statistics indicate that compliance to the TAC set for haddock, based on this HCR is high. The reporting system is transparent, verified through Directorate shore side weighing stations, and allows for very near time monitoring of landed volumes and hence the management measures can be pre-emptive with respect to haddock quota management. To support reporting the system has built in features:

- No discards policy (discards of haddock and all other commercial species) are prohibited except for diseased/damaged fish).
- Reported bycatch and bycatch reduction measures (e.g. Nordmøre grids).
- Min. mesh size in codend for bottom trawl (135mm) in general, with some exceptions for shrimp trawl and Nephrops trawl.
- Min. reference size for haddock of 45 cm .
- Undersized haddock is counted at 50% quota (to encourage landing and hence reporting).[71]
- As part of the closed area system, the MRI can close temporarily on short notice areas where undersized haddock is caught[72].

[69] Article 3 in http://eng.atvinnuvegaraduneyti.is/media/acts/Act-no-116-2006-on-Fisheirs-Management.pdf

[70] http://www.hafro.is/Astand/2014/english/02-haddock-14.pdf

[71] But see also Paragraph 9 of Article 11 of the Fisheries Management Act of 2006 that allows value of undersized catch to be paid in to the VS-Fund.

[72] Article 10 in http://eng.atvinnuvegaraduneyti.is/media/acts/Act-no-79-1997-Fishing-in-Iceland-Exclusive-Fishign-Zone.pdf

CLAUSE: 1.1.8 The fisheries management plan shall also consider the following:

- 1.1.8.1 The specific management method/approach or measures, according to fleet or jurisdiction or other relevant variables as appropriate;
- 1.1.8.2 Any further measures which support meeting the management objectives;
- 1.1.8.3 The institution(s) or arrangement(s) responsible for providing stock assessment and advice;
- 1.1.8.4 A description of the process for making decisions on Total Allowable Catch (TAC) – how and on what basis management decisions are made;
- 1.1.8.5 Provisions for considerations and consultation with the fishing industry;
- 1.1.8.6 The means of implementing the management approach, including main provisions for monitoring, control, surveillance and enforcement;
- 1.1.8.7 The objectives and management measures relevant to ecosystem effects of the fishery.

EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**

SUMMARY EVIDENCE: The management plan and the legal and organizational framework has specifications corresponding to all clauses 1.1.8.1-7

EVIDENCE

1.1.8.1 The specific management method/approach or measures, according to fleet or jurisdiction or other relevant variables as appropriate;

The fisheries are managed by a catch quota system[73]. The Directorate of Fisheries allocates quotas to individual vessels (in accordance to the vessel's fixed quota share of the species subject to TAC) or vessel groups (coastal fisheries) so that the sum of quotas for individual vessels and vessel groups equals the TAC according to the HCR. Within the system there are various measures to make the fisheries economically viable, together with measures to coordinate catch composition and the TAC and to reduce discard. Discarding is prohibited by law.[74]

Special coastal fisheries are allowed. To be able to participate in coastal fisheries a special license is needed; coastal fisheries are only allowed during the summer. A quota is issued and distributed

[73] http://eng.atvinnuvegaraduneyti.is/media/acts/Act-no-79-1997-Fishing-in-Iceland-Exclusive-Fishign-Zone.pdf

[74] According to law no 57/1997 all catch has to be landed and provisions on discard are also in regulation no 601/2003. See also http://www.fisheries.is/management/government-policy/responsible-fisheries

between four defined areas and months. Detailed regulations are issued on number of gear, fishing days and allowable catch in each fishing trip[75]. The catch fished in these fisheries is accounted against a common quota for these fisheries, not against individual vessel quotas.

1.1.8.2 Any further measures which support meeting the management objectives;

Real time area closures: A short-term sudden closure system has been in force since 1976 with the objective to protect juvenile fish. Such closures are decided by the MRI, are valid for 3 weeks and can be prolonged. Such closures apply to all species in the area. If, in a given area, there are several consecutive sudden closures, the minister of Fisheries can issue a regulation to close the area for a longer time period, thus directing the fleet to other areas. The Directorate of Fisheries and the Coast Guard supervises these closures in collaboration with the MRI.

Temporary area closures: The major spawning grounds of cod are closed during the main spawning season. To a considerable extend, such measures will also protect haddock spawning grounds. In addition there are gear and mesh size restrictions in place. The restrictions are mainly to protect juvenile fish but also to decrease the effort towards bigger spawners. Permanent area closures: Many areas have been closed permanently. These closures are based on knowledge of the biology of various stocks with the aim of protecting juveniles and vulnerable marine ecosystems, e.g. coldwater corals.

Also, to support reporting the system has built in features:

- No discards policy: Discards of all commercial species are prohibited except for diseased/damaged fish.
- Bycatch reduction measures (e.g. Nordmøre grids).
- Min. mesh size in codend for bottom trawl (135mm) in general, with some exceptions for shrimp trawl and Nephrops trawl.
- Landings of undersized or low quality fish is paid for by special rules, designed to reduce incentives for discarding.

1.1.8.3 The institution(s) or arrangement(s) responsible for providing stock assessment and advice;

Scientific advice, including advice on the TAC is provided by the MRI[76]. Stock assessments are done within the framework of ICES by the ICES North Western Working Group[77]. ICES Advisory Committee

[75] http://stjornartidindi.is/Advert.aspx?ID=3e5ec436-49f6-4a4a-9a14-4b5fa654118c

[76] http://www.hafro.is/Astand/2014/english/02-haddock-14.pdf

(ACOM) formulates the formal ICES advice based calculations made by the ICES North Western Working Group (NWWG)[78]. In its advice, MRI generally follows the ICES advice, unless they see good reasons to deviate from it. Both ICES and the MRI also advise on research and harvesting policy in general.

NWWG is one of many assessment working groups in ICES, and covers Icelandic, Faroese and Greenland waters. The members are scientists from the relevant countries. NWWG meets once a year and performs assessments of the major stocks in the area. The data that go into the assessment of Icelandic haddock are catches in numbers at age and survey indices at age from the spring and autumn surveys, as well as weights and maturities at age. The age structured data are provided by MRI, by combining catch statistics from the Directorate and samples from the fishery supervised and analysed by MRI. Supplementary data from other nations are included as appropriate. The data are used in an Adapt type model using catch numbers at age and calibrated with indices from both the groundfish surveys in March and October. The model is written in AD Model Builder. It was developed and is maintained by MRI, and approved by ICES in a benchmark evaluation in 2013[79]. This type of methods is widely used and accepted. An ADAPT type method was preferred over methods with stronger assumption on stable selectivity because selectivity at age is known to vary due to highly variable recruitment (clarified at site visit to MRI 13/8-2014). This method is used by the ICES North Western Working Group, and is quality checked through the standard advisory process in ICES. The calculations are reviewed by external reviewers before they are presented to ACOM. The comments by the reviewers are attached to the NWWG report[80]. The result of the analysis is an estimate of the stock reference biomass (biomass of fish larger than 45 cm, projected to the year after the assessment year). The corresponding advised TAC is then derived according to the harvest rule.

1.1.8.4 A description of the process for making decisions on Total Allowable Catch (TAC) – how and on what basis management decisions are made

A total TAC is set by the Ministry. The Ministry is advised by MRI. The MRI advice is based on the advice from ICES' Advisory Committee (ACOM). The ACOM advice[81] includes a prediction of the catch in the coming fishing year according to the HCR, based on a stock assessment performed by

77

http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2014/NWWG/12%20NWWG%20Report%20-%20Sec%2010%20Icelandic%20Haddock.pdf

78

http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2014/2014/had-iceg.pdf

79

http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2013/NWWG/Annex%2002%20Stock%20Annexes.pdf pp 896.

80

http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2014/NWWG/28%20NWWG%20Report%20-%20Annex%2004%20List%20of%20Audits%20for%20NWWG%202014.pdf

81 http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2014/2014/had-iceg.pdf

the ICES North-Western Working Group NWWG.

MRI will largely follow the ACOM advice, unless there are good reasons to deviate from it. Such reasons can be errors in the calculations or new information that has arrived after the NWWG meeting took place.

The Ministry will when setting the TAC take into account input from the fishing industry and other relevant input, and has the legal right to deviate from the scientific advice. Last year, after the management plan was introduced, the advice was followed very closely. In the past, this has not always been the case, as shown in Figure 17 below.

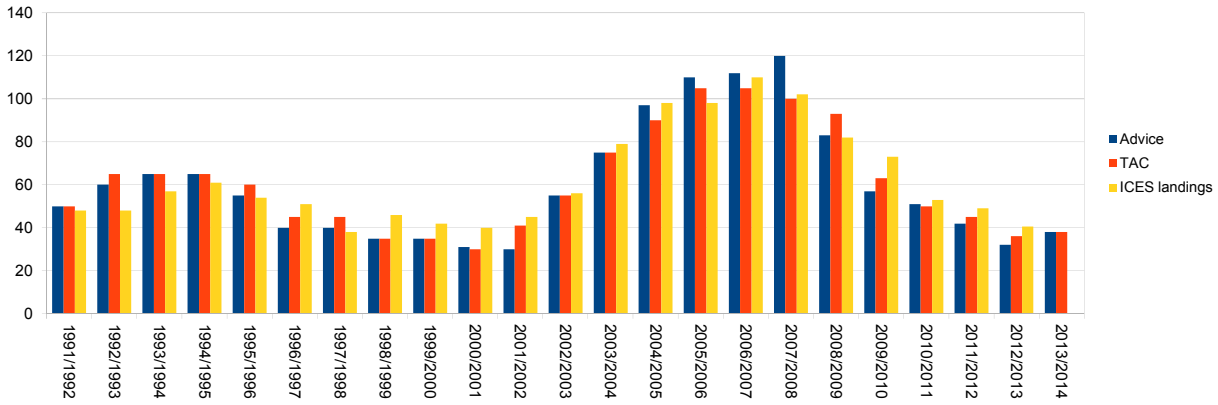


Figure 17. Comparison of advised TAC, decided TAC and landings according to ICES. Made with data from Table 2.3.6.1 in [82]

Some of the legislation/regulation of the ITQs are supposed to offer some flexibility for vessels in terms of not fishing in excess of their quotas. As the Icelandic demersal fisheries are multi-species there is always some likelihood that the quotas for the various species that a particular vessel will not match their catch in a particular fishing year. Some of the rules are therefore designed to offer some flexibility, while others are designed to incentivise the landing of all catch, or in other words to prevent discarding and/or high-grading. (The description below applies to the demersal ITQ fisheries in Icelandic waters). One rule allows vessels to fish in excess of their catch quota for individual demersal species but resulting in that their catch quota for other demersal species will be reduced in proportion to the relative value (cod equivalent) of each species. This authorisation is limited to 5% of the total value of the demersal quota of that vessel, and the excess catch of each demersal species may not exceed 1.5% of the total value of the demersal quota of that vessel. This authorisation does not, however, apply to fishing in excess of the allocated catch quota of cod.

Another rule allows up to 20% of catch quotas for each demersal species to be transferred from one fishing year to the next. It also authorizes vessels to fish up to 5% in excess of the catch quota for each demersal species but resulting in that the excess catch will be deducted from their allocated catch quota for the following fishing year. There is also a rule on juvenile or undersized fish, which

[82] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2014/2014/had-iceg.pdf

are defined in the regulations. To provide incentives to vessels to bring ashore undesized fish, instead of them disarding it at sea, only half (50%) of the weight of the juvenile fish are counted towards their quota.

Yet anoter provision applies to fishing in excess of quotas and is primarily intended to incentivise the landing of all catch or minimize discarding and high-grading. The Fisheries Act allows catches of up to 5% in excess of quotas in addition or separate from the above. The value of this excess catch goes, for the most part, goes to the VS-Fund and does not count against the vessel quota (Paragraph 9 of Article 11 of the Fisheries Management Act of 2006.) A skipper a fishing vessel may decide that part of the vessel's catch shall not be included in its catch quota. Such portion which is excluded from the vessel's catch quota shall not exceed 5% of catch caught by the vessel each fishing year and is subject to the following conditions: that the catch is kept separate from the vessel's other catch and weighed and recorded separately; that the catch is sold at an approved fish auction market and the value obtained deposited in to the VS-Fund (Act No. 37/1992, Concerning a Special Levy on Illegal Marine Catches). If this authorisation is exercised, the fish auction market where the catch is sold shall be responsible for submitting the value of the sold catch net of port fees and auction costs, and 20% of the value of the catch sold shall be divided between the vessel operator and the crew in accordance with relevant agreements thereto. The proceeds from this auctioned catch is paid into a special fund under the direction/control of the Ministry in charge of fisheries. The fund, named Verkefnasjóður sjávarútvegsins, or VS-fund (the fund for fisheries projects), has the purpose of supporting financially research projects relating to the fisheries and in particular projects on fisheries biology and ecology, but also on the development of marine related products.

Vessels also have up to 3 days to acquiring (loan/lease/buy) quota to match landings of species that are in excess of their quota status on the day of landing that catch.

1.1.8.5 Provisions for considerations and consultation with the fishing industry;

A special consultation group of the MRI meets every year and reviews different sources and information regarding the major stocks and fisheries in the Icelandic EEZ. One of the more important sources of information used by MRI in its research is logbooks from skippers which are sent to the MRI. Account is taken of these sources and information in research, quantification and advice as appropriate. The consultation group consists of experts from the MRI and fleet managers and skippers from many places around the country which conduct fisheries on small and large vessels with different gears. When the advice has been made available the Minister consults with representatives from the main stakeholders before decision is taken and regulation on commercial fisheries is issued.

Provisions for consultation with the fishing industry are set out both by legislative measures – for example, Article 8 of Act No 79 Fishing in Iceland's Exclusive Fishing Zone[83] states that 'Before decisions on such distribution of fishing regions (referring to the proposal by the Minister to prohibit fishing by certain gears in certain areas for a specific period) shall seek the opinion of those

[83] http://eng.atvinnuvegaraduneyti.is/media/acts/Act-no-79-1997-Fishing-in-Iceland-Exclusive-Fishign-Zone.pdf

associations of vessel operators and fishermen who can be expected to be primarily affected by the distribution of fishing regions. There are specific consultation groups that meet annually in December allowing fishermen (captains) to describe the fishing experience of the year and make comparisons with those previously. MRI also publishes short newsletters regularly providing up-dates on stock analysis and related research outcomes[84].

1.1.8.6 The means of implementing the management approach, including main provisions for monitoring, control, surveillance and enforcement;

The Icelandic Directorate of Fisheries[85] is an independent administrative body responsible to the Minister. The Directorate is responsible for the implementation of the Act on Fisheries Management and related legislation, for day-to-day management of fisheries and for supervising the enforcement of fisheries management rules. The Directorate of Fisheries works in accordance to law no 36/1992, no 116/2006 and no 57/1996. Accordingly, the Directorate of Fisheries issues fishing permits to vessels and allocates catch quotas. Other duties include imposing penalties for illegal catches. The Directorate supervises the transfer of quotas and quota shares between fishing vessels, controls the reporting of data on the landings of individual vessels and monitors the weighing of catches. The Directorate provides supervision on board fishing vessels and in ports of landing, which involves inspecting the composition of catches, fishing equipment and handling methods.

The Icelandic Coast Guard´s[86] main tasks are fisheries inspection at sea and monitoring of the EEZ and reception of required notifications from vessels.

All catches have to be landed in authorized ports[87]. There are approximately 60 such ports around the island. The catches are sorted and weighted by species by authorized staff, appointed by the port authorities. Most of the catch is sold through a common auction system, and there is an efficient transport system in place to bring the fish from port to buyer. The system is very transparent, the landings database, disaggregated by date, species, harbour and gear is directly accessible on the internet, see [88] .

Discards are prohibited[89]. Landings of undersized or low quality fish is paid for by special rules, designed to reduce incentives for discarding. Part of the payment goes to the fisher for costs, and part funds MRI research.

[84] http://www.hafro.is/undir.php?ID=19&REF=3
[85] http://www.fiskistofa.is

[86] http://www.lhg.is/

[87] http://eng.atvinnuvegaraduneyti.is/media/reglugerdir/Regulation-224-2006-on-weighing-and-recoding-of-catch.pdf
[88] http://www.fiskistofa.is/english/quotas-and-catches/total-catches-by-harbours-months-and-vessel-type/bbt.jsp?lang=en

[89] http://eng.atvinnuvegaraduneyti.is/media/acts/Act-no-57-1996-Treatment-of-Commercial-Marine-Stocks.pdf

During the site visits, Eythor Bjornsson (Director of Fisheries at the Directorate) confirmed that it fishermen are required to record all the vessel's catch in the fishing logbook, including the "non commercial" species they might encounter.

1.1.8.7 The objectives and management measures relevant to ecosystem effects of the fishery.

Management measures relevant to ecosystem effects of the fishery that are described in the management plan for haddock[90] include the following.

Large areas within the Icelandic EEZ are closed for fishing, either temporarily or permanently. These closures are aimed at protecting juveniles and spawning fish and protecting vulnerable marine ecosystems. Restrictions on the use of gear are also in effect. Thus the use of bottom trawl and pelagic trawl is not permitted inside a 12-mile limit measured from low-water line along the northern coast of Iceland. Similar restrictions are implemented elsewhere based on engine size and size of vessels and large bottom trawlers are not permitted to fish closer than 12 nautical miles to the shore.

In many areas special rules regarding fishing gear apply, e.g. a requirement of using a sorting grid when fishing for shrimp to avoid juveniles and small fish and an obligation to use bycatch- or juvenile grid when fishing for pelagic species in certain areas to protect other species and juveniles.

It is the policy of the Icelandic government[91] 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 Industries and Innovation. An amendment to Act No 79/1997 on Fishing in Iceland Exclusive Economic Zone provides for the prohibition of fishing activities with bottom-contacting gear to especially protect vulnerable benthic habitats.

[90] http://www.fisheries.is/main-species/codfishes/haddock/management-plan/
[91] http://www.fisheries.is/management/government-policy/responsible-fisheries/nr/62

1.2 Research and Assessment

CLAUSE: 1.2.1 A competent research institute or arrangement shall collect and/or compile the necessary data and carry out scientific research and assessment of the state of fish stocks and the condition of the ecosystem.				
EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**
SUMMARY EVIDENCE: There is evidence that the MRI is a research institute with competence to carry out the required tasks with a high scientific standard.				

EVIDENCE

The Marine Research Institute of Iceland (MRI), reporting directly to the Ministry of Industries and Innovation is the principle research institute that collects and compiles the necessary data and carries out scientific research and assessment of the state of fish stocks and the condition of the ecosystem[92]. The Directorate of Fisheries and the Coast Guard have supporting roles in data collection, research and assessment.

MRI's activities are organized into three main sections: Environment Section, Resources Section and Advisory Section. The Environment Section's work deals with environmental conditions (nutrients, temperature, salinity in the sea, marine geology, and the ecology of algae, zooplankton, fish larvae, fish juveniles, and benthos). The Marine Resources Section undertakes investigations on the exploited stocks of fish, crustaceans, mollusks and marine mammals. The major part of the work involves estimating stock sizes and the total allowable catch (TAC) for each stock. The Fisheries Advisory Section scrutinizes stock assessments and prepares the formal advice on TACs and sustainable fishing strategies for the government. The advice is assembled in an annual report (in Icelandic and translation into English), the most recent is found at[93]

Among projects undertaken within the Environmental Section are investigations on surface currents using satellite monitored drifters, assessment of primary productivity, overwintering and spring spawning of zooplankton, studies on spawning of the most important exploited fish stocks. The Marine Resources Section performs annual ground fish surveys covering the shelf area around Iceland and surveys for assessing inshore and deep-water shrimp, lobster, and scallop stocks. The pelagic stocks of capelin and herring are also monitored annually in extensive research surveys using acoustic methods. Further, in recent years an extensive program concentrating on multi-species interactions of exploited stocks in Icelandic waters has also been carried out.

[92] http://www.hafro.is
[93] http://www.hafro.is/Astand/2014/02-ysa.PDF

MRI undertakes both spring and fall surveys in addition to an on-going discard assessment programme. The groundfish survey was started over 20 years ago. Four trawlers are hired in spring and autumn for a systematic survey of all species on the fishing grounds, with main emphasis on cod and haddock. A wide range of physical, oceanographic and bathymetric data is collected on a routine basis to support the broader understanding of environmental changes.

Important supporting departments are the Modelling Department, the Electronic Department and the Fisheries Library. The Modelling Department deals with fisheries and ecologically related mathematical models and is also involved in projects concerning methodological problems in fish stock assessment.

There have been regular surveys since the mid-1950's including transects for temperature, salinity and phytoplankton monitoring (4 times per year) and reported by the MRI through Condition of the Environment Reports. Evidence is available of the MRI research activities into the ecosystem and wider environmental/climatic monitoring and changes. The monitoring of the marine environment is extensive, and assembled in annual reports since 1994. These reports cover the hydrography and plankton communities around Iceland, as well as selected topics over a wide range. Measurement of ocean temperatures is also undertaken during stock surveys where bottom sea temperature data is monitored for trends and correlation with spatial abundance of commercial stocks.
MRI has a good publication record in the field of marine environment. An overview (publications list) can be found at [94]
The MRI is involved in several research projects in the EU 7th Framework Programme on various aspects of ecosystem management.

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 otter trawl effort around Iceland. Over the next few years priority will be given to map the distribution of benthic assemblages and habitats which are considered to be sensitive to trawling disturbances. Such information will be important in order to predict which species and habitats are being at risk of being damaged by fishing activities and for protection of important marine habitats in the future [95].

The Directorate of Fisheries [96] has an HQ in Hafnarfjörður, just outside of Reykjavik and offices at 6 locations in the country, where the staff are in the field of fisheries management and monitoring of Fisheries and secretariat, as necessary. A total staff of 70 are involved in fisheries management. They note (in consultation meetings) that the strategy of local, area 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. 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

[94] http://www.hafro.is/undir.php?REFID=20&ID=35&REF=3

[95] http://www.hafro.is/undir_eng.php?ID=16&REF=2
[96] http://www.fiskistofa.is/

surveillance falls directly under the responsibility of the Icelandic Coast Guard. Key functions for the Directorate 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 the 60 ports where landings occur 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 exceeded their quotas. Excess catches can result in a revocation of fishing licenses and fines. The Statistics Iceland then receives copies of the data for the production of economic statistics.

The Icelandic Coast Guard [97]performs sea and air patrols of Iceland's 200-mile exclusive economic zone and 12-mile territorial waters, and monitors fishing within the zone in consultation with the Marine Research Institute and Ministry of Fisheries. 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 SW, S and East of Iceland. The Coast Guard is also responsible for 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. All hydrographic surveys in Icelandic waters are undertaken by them, including the preparation of nautical charts.

[97] http://www.lhg.is

CLAUSE: 1.2.2 The relevant data collected/compiled shall be appropriate to the chosen method of stock assessment for stock under consideration and sufficient for its execution.				
EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**

SUMMARY EVIDENCE: Assessment is done with state of the art model tools. The data required for the analysis are available and of good standard.

EVIDENCE

The assessment of the stock is a synthesis of data from two sources: catches, expressed as numbers caught at age, and relative measures of stock abundance over time, here measured as abundance at age by regular scientific surveys of the stock. In addition, measurements of weight and maturity at age are needed to convert numbers of fish to biomass and vice versa. All these data are of high quality, based on extensive systematic sampling and extensive surveys. The assessment method is adapted to such data, and the data are considered sufficient for a reliable assessment.

Catch data. Data on landings are provided by the Directorate of Fisheries. The primary source of information is the landings as recorded by the authorized weighers in the ports. Other sources include buyers reports and logbooks. These data are used by the Directorate as supplement and for cross-checking.

Nearly all haddock is landed gutted and converted to ungutted using the conversion factor 0.84. The real gutting factor is on the average lower so the amount of haddock landed is overestimated. That does though not matter as all the book-keeping of catch is in terms of gutted fish and the reference to ungutted catch is just gutted divided by 0.84[98].

Biological samples:[99] The sampling protocol by the staff of the Marine Research Institute has in the last years been linked to the progression of landings within the year. The system is fully computerized (referred to as “Sýnó” by the natives) and directly linked to the daily landings statistics available from the Directorate of Fisheries. For each species, each fleet/gear and each landing strata a certain target of landings value behind each sample is pre-specified. Once the cumulative daily landings value pass the target value an automatic request is made to the sampling team for a specific sample to be taken.

Length measurements are converted to age using representative age-length keys. Weights at age

[98] Clarified at site visit at MRI 13/8-2014

[99] http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2013/NWWG/Annex%2002%20Stock%20Annexes.pdf p.896ff

are calculated from length distributions and a Fulton condition factor with parameters estimated for each area, season and fleet. For haddock, over 200 000 fish were length measured and about 11 700 aged in 2013 (HAFRANNSÓKNASTOFNUN ÁRSSKÝRSLA 2013, (MRI Annual report)[100]:

Scientific surveys. MRI has extensive survey activities. Two major surveys are relevant for assessing the haddock, a bottom trawl survey in the spring, and one in the autumn. Both surveys cover the whole Icelandic shelf, and are conducted by research vessels and commercial trawlers in cooperation, as outlined in Clause 1.2.3. below.

CLAUSE: 1.2.3 Stock assessments shall be based on systematic research of the size and/or productivity of the fish stock(s).				
EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**

SUMMARY EVIDENCE: There is a well organized and controlled system for recording commercial catches. Two very extensive and well standardized bottom trawl surveys are conduced each year that provide input to the stock assessment. Biological sampling is extensive in both the commercial and survey catches.

EVIDENCE

Assessment of stock structure and productivity is based on annual (on-going) data collection and survey activities. These relate to both fishery independent methods (research vessel surveys) and fishery dependent methods (sampling catches and landings). The combination of these activities is used to assess population size, dynamics and structure and provide advice to management on fishing rates and forecasts.

To be adequate for stock assessment, the catch data must cover all removals from the stock due to the fishery, including discards and other loss due to fishing operations. This is discussed under clause 1.2.4, where it is concluded that the deviations are minor. Minor deviations will have minor effect, but large deviations, in particular if they vary from year to year, will be detrimental to the quality of the assessment and TAC advice. Sampling must be adequate to provide a realistic estimate of the age distribution of the catches in the whole fishery.

Catches are sampled regularly according to a protocol that automatically selects catches to be sampled, linked to the day-to-day reporting of catches. For haddock, over 200 000 fish were length

[100] http://www.hafro.is/images/flokkar/2014/arsskyrsla2013_netutgafa.pdf

measured and about 11 700 aged in 2013 (HAFRANNSÓKNASTOFNUN ÁRSSKÝRSLA 2013, (MRI Annual report)[101]:

Discards are prohibited in all Icelandic fisheries. Discards have been estimated annually since around 2000 [102]. Discards of haddock are presently very small, but have been larger in periods where a strong year class entered the fishery.

There is 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 map below (Figure 18).

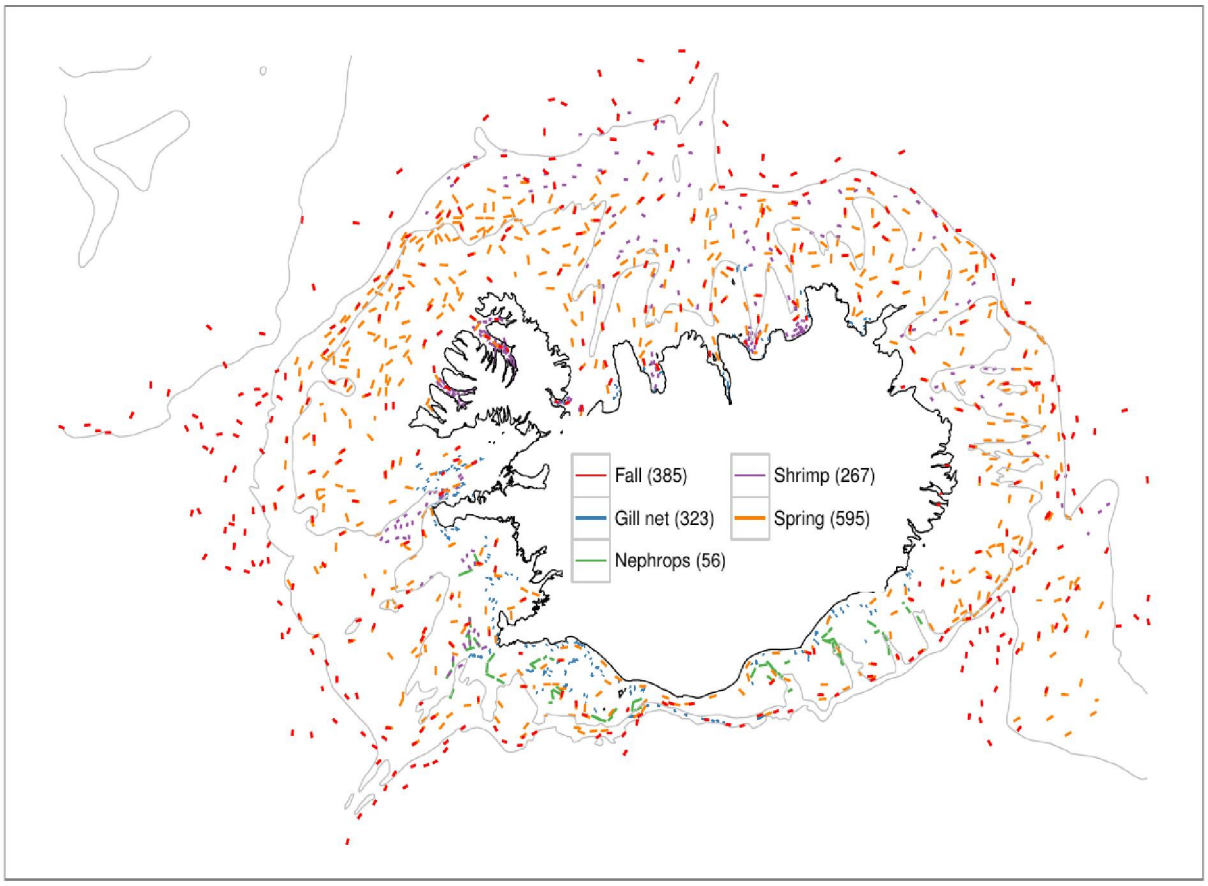


Figure 18. Map provided by MRI showing all hauls in the trawl surveys in 2013. The relevant surveys for haddock are Fall and Spring.

An extensive survey protocol is available[103]. A spawning survey is also carried out and smaller surveys for some specific species such as lobster and shrimp. The groundfish surveys are used to

[101] http://www.hafro.is/images/flokkar/2014/arsskyrsla2013_netutgafa.pdf

[102] Pálsson & al, 2012: Ólafur K. Pálsson, Höskuldur Björnsson, Hrefna Gísladóttir, Guðmundur Jóhannesson and Þórhallur Ottesen. (2012) Discards of cod and haddock in demersal Icelandic fisheries 2001-2010. Marine Research in Iceland, 160; Ólafur K. Pálsson, Höskuldur Björnsson, Hrefna Gísladóttir, Sævar Guðmundsson and Þórhallur Ottesen (2013). Mælingar á brottkasti þorsks og ýsu 2012 Hafrannsóknir nr. 171, both available at http://www.hafro.is/undir_eng.php?ID=20&REF=3

determine the abundance of the year classes present in the stock relative to previous year classes.

The sampling protocol for the surveys require that at least 5 and at most 25 haddock are randomly sampled for age determination from each haul. A larger number is length measured, basically 4 times the length range in cm in each haul. The information about incoming year classes (in particular ages 3-4) are strongly dependent on the quality of the surveys. The perception of the strength of a year class later on is modified in subsequent assessments, when more information about the year class is collected as the fish gets older. The consistency in early and subsequent estimates of abundance ('retrospective error') is widely used as a quality measure. The figure 19 below (from the NWWG report 2014)[104] shows the retrospective error in biomass and recruitment. The biomass is the biomass as projected one year beyond the assessment year. Since 2012, the error has been quite small.

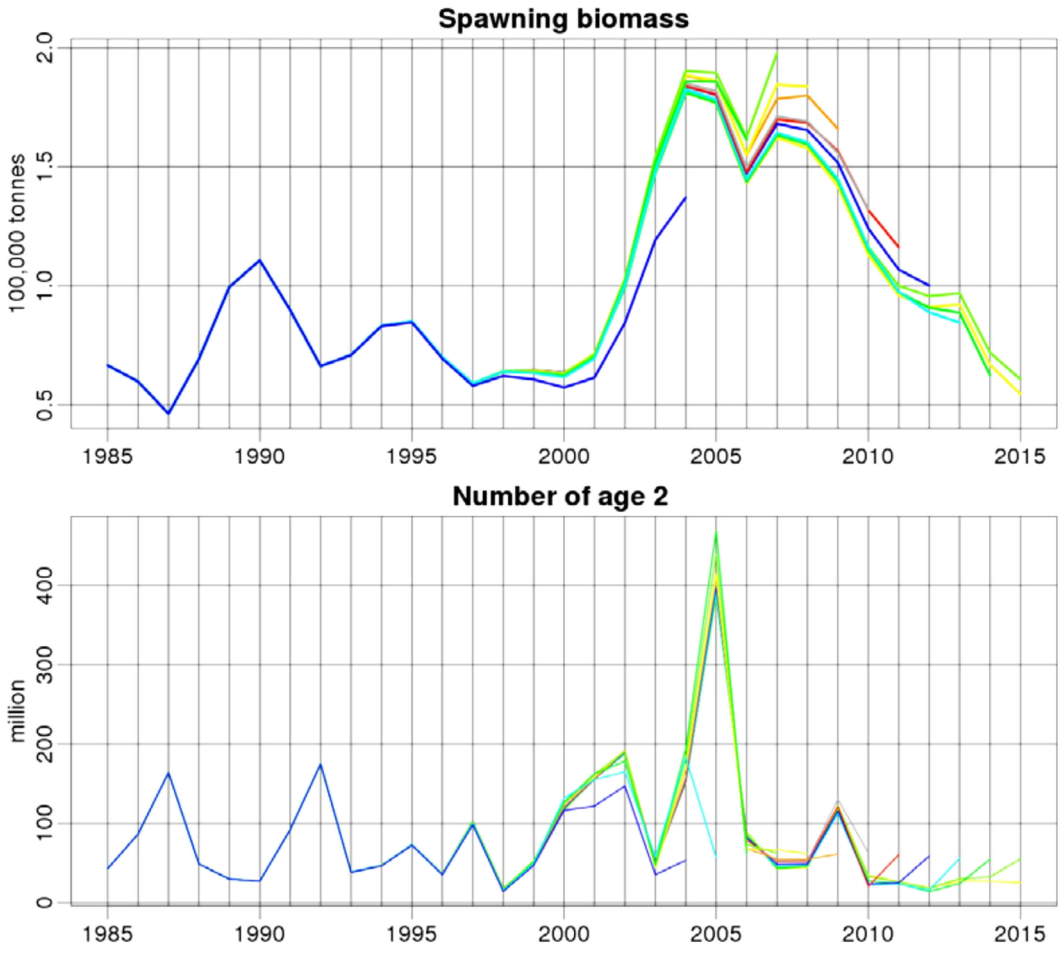


Figure 19. Retrospective errors in the most recent assessment of Icelandic haddock.

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

[104] http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2014/NWWG/12%20NWWG%20Report%20-%20Sec%2010%20Icelandic%20Haddock.pdf

CLAUSE: 1.2.4 For the stock under consideration, the determination of suitable conservation and management measures shall include or take account of total fishing mortality from all sources in assessing the state of the stock under consideration, including:

1.2.4.1 Estimates of discards;
1.2.4.2 Unobserved and incidental mortality,
1.2.4.3 Unreported catches and catches in other fisheries.

EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**

SUMMARY EVIDENCE: Discards of marketable fish is prohibited. The amount discarded is estimated regularly, and is at present <1% by weight for haddock. The legislative framework for fisheries governance, the management system in place with built-in flexibility as well as the transparency of the system discourages unrecorded landings, and the evidence indicates that this is a minor problem. Landings in foreign ports is only permitted if it is sold at an official fish auction market whose weighing practices and surveillance are recognised by the Directorate of Fisheries.

EVIDENCE

1.2.4.1 Estimates of discards.

Discards of marketable fish is prohibited, and all marketable fish has to be brought ashore. Discards are monitored by MRI by comparing length distributions in landings from otherwise comparable trips with and without inspectors on board[105]. Discards of haddock are presently very small (<1% by weight) but was close to 5% in 2002-2004 when a strong year class entered the fishery.

These relatively low discard rates compared to what is generally assumed to be a side effect of a TAC system may be a result of the various measures, including the flexibility within the Icelandic ITQ system. Since the time series of discards is relatively short, and the discards are small, they are not included in the assessments.

1.2.4.2. Unobserved and incidental mortality & 1.2.4.3. Unreported catches and catches in other fisheries.

Unreported catches: The fishery is tightly controlled, and there is nothing to indicate significant non-reporting of catches, hence the estimates used are small. The legislative framework for fisheries governance and the management system in place supports this[106]. The management system is conducive to encouraging reporting of landings through certain built in tolerances for landings small haddock, landing over quota and bycatch allowances.

[105] Pálsson & al, 2012: Ólafur K. Pálsson, Höskuldur Björnsson, Hrefna Gísladóttir, Guðmundur Jóhannesson and Þórhallur Ottesen. (2012) http://www.hafro.is/Bokasafn/Timarit/fjolrit-160.pdf ;
Ólafur K. Pálsson, Höskuldur Björnsson, Hrefna Gísladóttir, Sævar Guðmundsson and Þórhallur Ottesen (2013). Mælingar á brottkasti þorsks og ýsu 2012 Hafrannsóknir nr. 171, http://www.hafro.is/Bokasafn/Timarit/fjolrit-171.pdf

[106] http://www.fisheries.is/management/government-policy/responsible-fisheries/

Haddock size <45cm should not be targeted but it is compulsory to land and there are upper limits of the percentage of fish that can be landed below min. size - these account for 50% of quota by weight, again to encourage reporting through landing. The fisherman generally only gets 20% of the value of catch that is over quota. The rest goes to the VS research fund. [107]

From a fishery management/regulatory perspective there are key Articles within the suite of Fisheries Acts which reduce through limiting their discard the level of unobserved fishing mortality. Article 2 Chapter II of Act No. 57/1996 and amended by Act no. 144/2008 states that '*All catch obtained by the fishing gear of a vessel must be retained-- and landed. The Minister may, in a Regulation, decide that live catch which is under a specific length or weight, or which is caught using certain types of fishing gear, must be released.*

There are some exceptions possible (Act No. 57/1996): '*The Minister may also decide, in a Regulation[1] that fish of no value, together with entrails, heads and other waste resulting from processing aboard fishing vessels, may be discarded at sea*'. If fish is discarded because it cannot be sold, the burden of proof is on the captain (clarified at site visit to the Directorate). However, the intention of this Act and others is focused upon a clear strategy to eliminate discarding and hence unaccounted fishing mortality and promote a high level of reporting and declaration of catches.
The same Act (57/1996) also regulates fishing gear so as to reduce damage to catch and also to allow confiscation of gear not retrieved in a proper manner, found in closed areas, fishing illegally or being illegal.

The Weighing of Marine Catch Article 5 also regulates the landing place of catches. 'All catch which Icelandic vessels harvest from stocks which are found partly or fully within Iceland's exclusive economic zone must be landed in Iceland and weighed in a domestic port. The Minister may, in a Regulation, authorise that iced catch be landed in foreign ports, provided it is sold at an official fish auction market whose weighing practices and surveillance are recognised by the Directorate of Fisheries.

Landing in Foreign Ports

Under Act No 65/2004, Article 1, the Minister may authorise, in a Regulation, that catch from stocks which are found partly within Iceland's exclusive economic zone be landed abroad, provided that surveillance of its landing and weighing is considered satisfactory.

Several foreign Ports have been governed by the Directorate as to having a suitable, equivalent catch landing, weighing and recording system in place as required by Icelandic Fisheries Acts. Articles 6-12 of Act 57/1996 also provides for the weighing of all catch at landing on designated

[107] See Paragraph 9 of Article 11 of the Fisheries Management Act of 2006 that provides directives on the allowable share of undersized catch and that the proceeds of the ex-vessel value should go into the VS-Fund.

accredited scales by accredited scale operators. According to the statistics of the Fisheries Directorate[108], 455 tonnes of haddock were recorded as landed in Foreign ports (Norway and Canada), which is about 0.1% of the Icelandic haddock landed.

With respect to catches in other fisheries, Icelandic vessels fishing under a party agreement with other Nations such as Norway are subject to the conditions and regulations of that fishery management system.

Fishery by foreign vessels

Act No. 79/1997 Article 3 prohibits the foreign vessels fishing within Iceland's exclusive fishing zone unless specifically allowed by International Agreement. Act No. 22/1988[109] Article 1 legislates for the eligibility of Icelandic and non Icelandic vessels to fish in Icelandic territorial waters.

'Only the following parties may pursue fishing and process marine catch aboard vessels in Iceland's exclusive fishing zone, as defined in Act No. 79/1997, concerning fishing in Iceland's exclusive fishing zone:

1. Icelandic nationals and other Icelandic parties;
2. Icelandic legal entities, fully owned by Icelandic parties or legal entities which fulfil the following requirements:

a. are under the control of Icelandic parties;
b. ownership by foreign parties does not exceed 25% of share capital or initial capital. If the holding of an Icelandic legal entity in a legal entity pursuing fishing or processing in Iceland's exclusive fishing zone does not exceed 5%, the holding of foreign parties may amount to up to 33%;
c. are in other respects owned by Icelandic nationals or Icelandic legal entities under the control of Icelandic parties.'

Foreign vessels must also notify the Icelandic Coast Guard 6 hours prior and post entering and leaving Icelandic waters and during their time within Icelandic waters. Article 5, 6 and 7 also legislates for foreign vessels allowed by International Agreement through permitting by the Directorate and regulating fishing activity in the same way as for Icelandic vessels with regard to fishing gear, catch recording, weighing at landing. Hence, discarding and unreported catches by foreign vessels should be minimised in the same way as for the National Fleet. Articles 8-15 legislate for the withdrawal of permits and the penalties and fines associated with violations of the fishery acts.

It used to be rather common in the 20th century, up until the 1980s, for Icelandic vessels to sail to (mainly) England (Hull, Grimsby, Fleetwood) and Germany (Bremerhaven, Cuxhaven) and sell the

[108] http://www.fiskistofa.is/english/quotas-and-catches/total-catches-by-harbours-months-and-vessel-type/bbt.jsp?lang=en
[109] http://eng.atvinnuvegaraduneyti.is/media/acts/Act-no-22-1998-Fishing-and-Processing-by-Foreign-Vessels-in-Iceland.pdf

catch there at the fresh fish auction markets. From the 1980s putting the catch in containers that then shipped with ocean-liners to various European ports replaced this and increased the tonnage of catch that was shipped. One response of the Icelandic authorities, after the ITQs came into being, was to penalize the shipping/sailing of unprocessed catch. Penalties varied, both between years and especially between species. A typical penalty was up to 20% for cod and haddock, and up to 15% for other demersal species. The two main reasons for penalizing this were the decreasing catches in some species (cod) and the claims of inaccurate weighing of catch in foreign ports. All fresh catch that vessels sailed with and the fresh catch in containers shipped abroad was counted towards the vessels quota by the final weight reported by the foreign fish markets. This weight, it was claimed, was anywhere from 5%-15% lower than had it been weighed in an Icelandic port before sailing. In the new century there was a further decline in this activity and from 2013 all catch by Icelandic vessels from fish stocks in Icelandic waters has to be weighed in Iceland if and before it is shipped unprocessed abroad. See Regulation 224/2006 as amended by Regulation change 238/2013, effective as of September 1, 2013.

Haddock as bycatch in other fisheries:

In general, Icelandic management and fisheries do not consider target and bycatch species, but rather regard their demersal fisheries mixed fisheries where all fish that they may catch has to be covered by a quota within the ITQ system. Targeting of a certain species is therefore largely motivated by the quota portfolio that the vessel has available. However, the system has some flexibility built into it. The Fisheries Management Act (§11) prescribes that haddock outside quota, in the event that quota for haddock is not available, has to be landed and can be sold at full price at the auction but the fishermen only gets 20% of the value, with the rest going to a VS research fund.

Within fisheries where juvenile haddock may form part of the bycatch (e.g. prawns fisheries), it is mandatory to include devices that allow for escapement of juvenile fish. Prawn fisheries utilise technical conservation devices/selective fishing gears including grids (Nordmøre Grids) to support juvenile fish escapement.

It is permitted to fish up to 5% in excess of a vessels catch quota in demersal species, except cod. The excess catch is in such instances withdrawn from the vessel quota in the following year. Juvenile fish is only partially withdrawn from catch quotas (50% of quota for haddock). Additionally, it is permitted to land undersized haddock in the catch (max 5%) in excess of quota as long as the catch is auctioned and the bulk (80%) of the value of the catch goes to the VS-Fund, which finances some of the research of the Marine Research Institute.

Some of the legislation/regulation of the ITQs are supposed to offer some flexibility for vessels in terms of not fishing in excess of their quotas. As the Icelandic demersal fisheries are multi-species there is always some likelihood that the quotas for the various species that a particular vessel has will not match their catch in a particular fishing year. Some of the rules are therefore designed to offer some flexibility, while others are designed to incentivise the landing of all catch, or in other words to prevent discarding and/or high-grading. (The description below applies to the demersal ITQ fisheries in Icelandic waters).

One rule allows vessels to fish in excess of their catch quota for individual demersal species but resulting in that their catch quota for other demersal species will be reduced in proportion to the relative value (cod equivalent) of each species. This authorisation is limited to 5% of the total value of the demersal quota of that vessel, and the excess catch of each demersal species may not exceed 1.5% of the total value of the demersal quota of that vessel. This authorisation does not, however, apply to fishing in excess of the allocated catch quota of cod.

Another rule allows up to 20% of catch quotas for each demersal species to be transferred from one fishing year to the next. It also authorizes vessels to fish up to 5% in excess of the catch quota for each demersal species but resulting in that the excess catch will be deducted from their allocated catch quota for the following fishing year.

There is also a rule on juvenile or undersized fish, defined in the regulations. To provide incentives to vessels to bring ashore undesized fish, instead of them disarding it at sea, only half (50%) of the weight of the juvenile fish are counted towards their quota.

Yet anoter provision applies to fishing in excess of quotas and is primarily intended to incentivize the landing of all catch or minimize discarding and high-grading. The Fisheries Act allows catches of up to 5% in excess of quotas in addition or sperate from the above. The value of this excess catch goes, for the most part, the VS-Fund and does not count against the vessel quota (Paragraph 9 of Article 11 of the Fisheries Management Act of 2006.) A skipper a fishing vessel may decide that part of the vessel's catch shall not be included in its catch quota. Such portion which is excluded from the vessel's catch quota shall not exceed 5% of catch caught by the vessel each fishing year and is subject to the following conditions: that the catch is kept separate from the vessel's other catch and weighed and recorded separately; that the catch is sold at an approved fish auction market and the value obtained deposited in to the VS-Fund (Act No. 37/1992, Concerning a Special Levy on Illegal Marine Catches). If this authorisation is exercised, the fish auction market where the catch is sold shall be responsible for submitting the value of the sold catch net of port fees and auction costs, and 20% of the value of the catch sold shall be divided between the vessel operator and the crew in accordance with relevant agreements thereto. The proceeds from this auctioned catch is paid into a special fund under the direction/control of the Ministry in charge of fisheries. The fund, named Verkefnasjóður sjávarútvegsins, or VS-fund (the fund for fisheries projects), has the purpose of supporting financially research projects relating to the fisheries and in particular projects on fisheries biology and ecology, but also on the development of marine related products. A division within the VS-fund is the AVS-fund.

Vessels also have up to 3 days to acquiring (loan/lease/buy) quota to match landings of species that are in excess of their quota status on the day of landing that catch. Rules on fishing gear selectivity properties are described in Clause 1.3.2.3.3

Icelandic haddock is confined to Icelandic waters. Hence, catches of haddock in other waters should not have any impact on Icelandic haddock.

CLAUSE: 1.2.5 In the course of research and stock assessment, relevant traditional, fisher and/or community information and/or knowledge shall be sought by the researchers through appropriate means/fora.

EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**

SUMMARY EVIDENCE: MRI has annual regular consultations with the fishing industry. Regulations made by MRI (closed areas and some gear restriction) are decided in communications with involved fishermen. When the advice has been made available the Minister consults with representatives from the main stakeholders before decision is taken and regulation on commercial fisheries is issued.

EVIDENCE

A special consultation group of the MRI meets every year and reviews different sources and information regarding the major stocks and fisheries (including haddock) in the Icelandic EEZ. One of the more important sources of information used by MRI in its research is logbooks from skippers which are sent to the MRI. Account is taken of these sources and information in research, quantification and advice as appropriate. The consultation group consists of experts from the MRI and fleet managers and skippers from many places around the country which conduct fisheries on small and large vessels with different gears. When the advice has been made available the Minister consults with representatives from the main stakeholders before decision is taken and regulation on commercial fisheries is issued.

The MRI may invoke a temporary closure based on the information provided by at least 3 skippers (Article 10-11 of Act No. 79/1997) that harmful fishing is taking place (fish in the catch exceeds reference levels for undersized limits determined by Minister upon receipt of the proposals from MRI). Article 8 of Act No 79 1997 also requires that the Minister seeks the opinion of vessel operators and fishermen on decisions prohibiting certain types of fishing gear.

Legislation on the fisheries management does not provide for any direct input from stakeholders into policy development and implementation. In the past there has, for the most part, been close cooperation and consultation with major stakeholders. The structure of the Icelandic administration is in many respects simle and small and makes for shorter channels of communication and facilitates better accessibility for stakeholders.

Governments have generally taken account of stakeholders' points of view in policy development and implementation in the field of fisheries. Before major decisions are made, the stakeholders are usually consulted. Before the MRI commences assessment work, they consult with stakeholders in the industry. This takes place mainly through task forces directed towards the most important species (e.g. cod, flatfishes, pelagic fish). At these meetings, scientists present the outlook for a given stock while stakeholders present their experience and views. Contradicting views and

interpretations are also discussed in an attempt to reach a common understanding and solutions.

A number of administrative committees operate at any given time on the various issues of the fisheries, among other things they prepare new laws and regulations. Stakeholders are, more often than not, given the opportunity to comment on and even participate in forming any legislation and regulations which are in the pipeline.[110]

CLAUSE: 1.2.6 There shall be active collaboration with international scientific organisations, with the aim of ensuring that the focus is on internationally acknowledged research and assessment methods that provide the best available information on the condition of the stock under consideration at any time.

EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**

SUMMARY EVIDENCE:

Assessment and advice is provided by close cooperation between MRI and ICES. Methods and procedures are reviewed and approved by ICES.

EVIDENCE

The assessment of Icelandic haddock is done by the ICES North-Western Working Group[111] where Iceland participates. The MRI advice to managers is based on the advice provided by the ICES advisory system[112]. The research methods utilised by Iceland are acknowledged and interrogated through the ICES advisory system. Additionally, since much of the Icelandic stock research and assessment activities and outcomes are published it is subject to scrutiny internationally. Iceland is also a member of NAFO and NEAFC for other stocks. Iceland also participates in numerous other ICES Working Groups.

[110] http://www.vidraedur2009-2013.is/media/esb_svor/13_-_Fisheries/Ch._13_-_Fisheries-FINAL.pdf

[111] http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2014/NWWG/12%20NWWG%20Report%20-%20Sec%2010%20Icelandic%20Haddock.pdf

[112] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2014/2014/had-iceg.pdf

CLAUSE: 1.2.7 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:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**
Summary evidence: Icelandic haddock is not a shared stock.				
EVIDENCE Icelandic haddock within the 200 mile EEZ (Va) is not described as straddling or shared. Haddock in Icelandic water is confined to those waters, and there is no evidence of significant immigration or emigration[113].				

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

1.3 Stock under consideration, harvesting policy and the precautionary approach

1.3.1 The precautionary approach

CLAUSE: 1.3.1.1 The precautionary approach[114] shall be implemented to protect the stock under consideration.				
EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**
SUMMARY EVIDENCE: The precautionary approach is implemented through a recently adopted harvest rule, which has been shown to carry a low risk of reducing the stock below the set biomass limit. There is international evidence that this meets the requirements of the precautionary approach such as is qualified in documentation provided by ICES. There is a past record of good management performance. The experience after the harvest rule was adopted is so far limited, but the TAC has been set according to the rule.				
EVIDENCE The Precautionary approach is implemented through the harvest strategy for haddock which the Ministry now uses to set annual TAC's. There is international evidence that this meets the requirements of the precautionary approach such as is qualified in documentation provided by ICES[115]: *ICES concludes that the harvest control rule for Icelandic haddock in the request is precautionary and in accordance with the ICES MSY approach.* A past record of good management performance is available and forms supporting evidence of the adequacy of the management measures and the management system. There is an appropriate scientific assessment, up-dated annually through fishery dependent/independent methods using accepted modelling tools and effectively managed by suitably qualified professionals, as detailed in Clause 1.2.3.				

[114] Referring to clause 29.6 of the FAO Eco-labelling Guidelines for Fish and Fishery Products from Marine Capture Fisheries

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

CLAUSE: 1.3.1.2 The stock under consideration shall not be overfished to a level causing recruitment overfishing[116].

EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**

SUMMARY EVIDENCE: The biomass limit is set at the lowest observed level. The recruitment has not been impaired at that level. The exploitation when applying the harvest rule implies a low risk of reducing the stock below the limit.

EVIDENCE

In connection with the evaluation of the current management plan, ICES re-evaluated the precautionary reference points[117] ICES has evaluated the current biological precautionary reference points and considers that the current Blim = 45 000 t based on Bloss, the lowest observed biomass (in 1987 as estimated in 2010), is appropriate. Currently, ICES advice for this stock is based on the precautionary approach Fpa = 0.47, evaluated in 2000. In 2010 Fpa was changed to 0.35 to account for slow growth and this value has been used as the basis for ICES advice since then. The new proposed precautionary harvest rate (HRpa) = 0.46, which is based not on F but on a Harvest Rate (HR), leads on average to F4–7 = 0.45, close to the value of 0.47 proposed in 2000. Modification of this HRpa for slow growth is not required because the reference biomass B45+ used in the HR calculation is a function of fish size, both length and weight. Thus, at a constant HR the fishing mortality-at-age decreases automatically when growth is slower. This takes into account growth changes accounted for in the provision of advice in recent years, when Fpa was lowered to 0.35 in a period of poor growth. The biomass limit reference point B_{lim} as defined by ICES represents the spawning biomass below which recruitment is impaired or recruitment dynamics are unknown. For Icelandic haddock, the B_{lim} value is set at the lowest observed spawning biomass. There is no evidence that the recruitment is reduced towards the low end of the historical range of SSB (Figure 20). Hence, for Icelandic haddock the B_{lim} represents a biomass below which recruitment dynamics are unknown. At present (2014) the SSB is 48% above that value, but declining due to a series of relatively small year classes in recent years.

[116] The stock under consideration' is not overfished if it is above the associated limit reference point(or its proxy). FAO Guidelines (2009), par. 30.1.

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

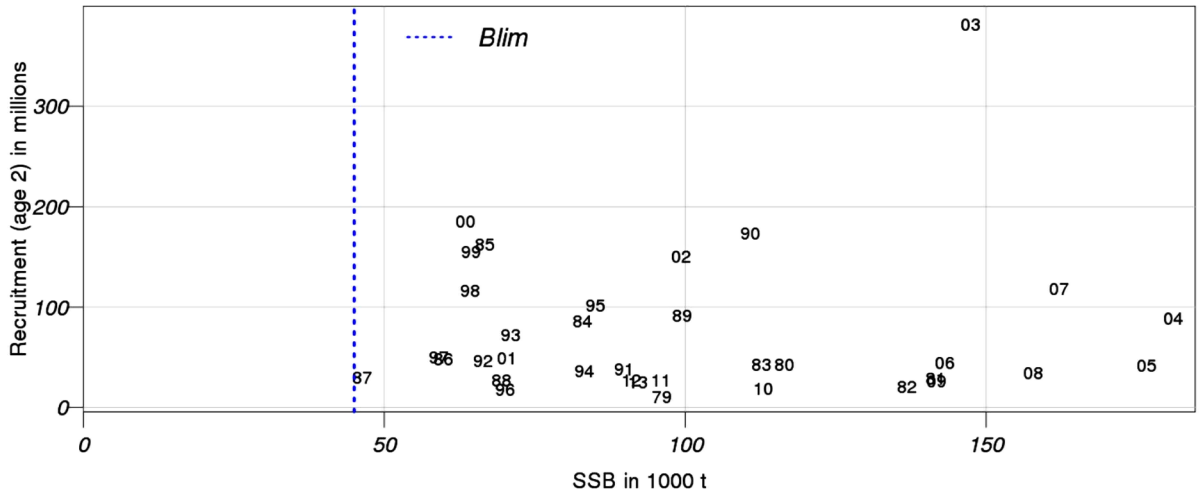


Figure 20. Haddock in Division Va Stock-recruit plot.
(Figure 2.3.6.3 in http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2014/2014/had-iceg.pdf)

The adopted harvest rate (0.4) is below the precautionary harvest rate of 0.46, and has been shown by extensive simulations to imply a very low probability of bringing the SSB below Blim[118].

CLAUSE: 1.3.1.3 Relevant uncertainties shall be taken into account through a suitable method of risk assessment.				
EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**
SUMMARY EVIDENCE: Such uncertainties were taken into account when designing and evaluating the harvest rule. The uncertainty in the stock assessment is low.				
EVIDENCE In the evaluation of the harvest rule, uncertainty with respect to future recruitment, weight at age, maturity at age and future assessments was included, and the basis for evaluation of the harvest rule was the probability that the stock will remain above Blim taking these uncertainties into account. Natural mortality was assumed at 0.2, weight at age and maturation at age were stochastic variables taking stock size into account. Selection at age in the fishery as made dependent on weight at age, in a function fitted with data from 2000 to 2014. Retrospective error in the assessment (which is not severe for the haddock) was accounted for. [119]				

[118] Björnsson, H. 2013. Evaluation of the Icelandic haddock management plan. ICES CM 2013/ACOM:59. http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2013/ADHOC/IntroAndHad.pdf
[119] Björnsson, H. 2013. Evaluation of the Icelandic haddock management plan. ICES CM 2013/ACOM:59. http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2013/ADHOC/IntroAndHad.pdf

CLAUSE: 1.3.1.4 Appropriate reference points shall be determined and remedial actions to be taken if reference points are approached or exceeded shall be specified[120].

EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**

SUMMARY EVIDENCE: A limit biomass has been defined. A limit fishing mortality is considered unnecessary, as the harvest rule sets a harvest rate, which is equivalent to a fishing mortality. Remedial actions include a reduction in harvest rate starting at 45000 tonnes SSB. The Minister has legal authority to take further remedial action if needed.

EVIDENCE

A limit reference point B_{lim} at 45 kt has been defined by ICES[121] for the spawning stock biomass of Icelandic haddock. A limit reference has not been formally defined for fishing mortality, but may be considered redundant as its function is superseded by the rules in the management plan. Following ICES standards, a limit fishing mortality should represent the exploitation level that will lead the SSB to B_{lim} in the long term. Scientifically, defining a precise limit value for the fishing mortality (or harvest rate) for the Icelandic haddock according to this criterion is problematic, as it is sensitive to assumptions about recruitment dynamics below the lowest observed. However, the evaluation of the management plan provides strong evidence that such levels of SSB will not be reached when the plan is followed. ICES has defined a precautionary harvest rate HRpa which is higher than the HR in the management plan. Thus, under the current management plan, the harvest rate will not be set deliberately above any realistic candidate level for a harvest rate limit. The management plan has a rule to reduce the harvest rate if the SSB is below 45 000 tonnes (Blim), and simulations of 'worst case' scenarios suggest that the stock will recover rapidly should it reach that level (see Clause 1.1.7.2). If even that fails, the Minister has legal authority to take drastic action as needed.

Target reference points are embedded in the management plan, as a harvest rate of 0.4 is equivalent to a fishing mortality target. There is a biomass limit reference but no explicit equivalent to a biomass target, since haddock abundance must be expected to vary substantially over time for natural reasons, and there is nothing to gain by stabilizing it at a certain level.

Precautionary reference points, representing landmarks where action should be taken have been defined as a function of the HCR, in terms of a reduction in the harvest rate if SSB < 45 kt. This is not a reference biomass intended to reduce the risk of reaching Blim, but rather the action to be taken should Blim be reached. According to the simulation studies, the risk of reaching Blim is considered to be very low.

[120] FAO Code of Conduct for Responsible Fisheries, Article 7.5.2.
[121] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2014/2014/had-iceg.pdf

CLAUSE: 1.3.1.5 The long-term harvesting policy shall be stated in the Fisheries Management Plan.				
EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**
SUMMARY EVIDENCE: The management strategy for Iceland haddock is to maintain the exploitation rate at the rate which is consistent with the precautionary approach and that generates maximum sustainable yield (MSY) in the long term.				
The Icelandic policy on ocean issues is based on maintaining the future health, biodiversity and sustainability of the ocean surrounding Iceland, in order that it may continue to provide resources that sustains and promotes the nation's welfare. This means sustainable utilisation, conservation and management of the resource based on scientific information and applied expertise guided by respect for the marine ecosystem as a whole. The health of the ocean and sustainable utilisation of its living resources provides the main basis for Iceland's economic welfare. In view of the importance of the waters surrounding Iceland, the government considers ocean issues to be central to its activities for the foreseeable future[122]. **Objectives stated in the FMP.** The management strategy for Iceland haddock is to maintain the exploitation rate at the rate which is consistent with the precautionary approach and that generates maximum sustainable yield (MSY) in the long term[123].				

CLAUSE: 1.3.1.6 The Fisheries Management Plan shall specify how the precautionary approach shall be implemented for the stock under consideration.				
EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**
SUMMARY EVIDENCE: **The precautionary approach is implemented by adopting a management plan that has been evaluated by ICES to be in accordance with the precautionary approach.**				
EVIDENCE The Minister of Fisheries, having obtained the recommendations of the Marine Research Institute, shall issue a regulation determining the total allowable catch (TAC) to be caught for a designated				

[122] http://www.fisheries.is/management/government-policy/
[123] http://www.fisheries.is/main-species/codfishes/haddock/management-plan/

period or fishing season from the individual exploitable marine stocks in Icelandic waters for which it is deemed necessary to limit the catch. Harvest rights provided for by law 116/2006 are calculated on the basis of this amount.

The precautionary approach is implemented through the adoption of the HCR which is the basis for the MRI advice to the Minister. This rule has been evaluated by ICES and found to be in accordance with the precautionary approach, as it implies a low risk of stock depletion and is expected to lead to a fishing mortality rate and spawning stock biomass within the likely levels corresponding to a maximum sustainable yield. The HCR has been evaluated to be in accordance with the Precautionary approach, and the stock and mortality are at present safely within precautionary limits.

1.3.2 Management targets and limits

1.3.2.1 Harvesting rate and fishing mortality

CLAUSE: 1.3.2.1.1 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[124].				
EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**
SUMMARY EVIDENCE: The management plan specifies a target harvest rate. No limit point for fishing mortality has been defined, but it is assured through simulations that the target harvest rate implies a low risk of reaching biomass limits.				
EVIDENCE The management plan has a target harvest rate that is equivalent to a target fishing mortality. This harvest rate was evaluated by ICES to be precautionary. The ICES guideline is to set the limit fishing mortality to a level which would lead to an SSB at Blim. If the plan works as expected, a limit fishing mortality is functionally redundant, because such levels would not be reached. If the behaviour of stock dynamics, the fishery, or the stock assessments providing input to the harvest rule in the future deviate substantially from the ranges that were considered plausible when the plan was evaluated, action needs to be taken, including a revision of the plan. There is the legal framework and suite of control measures available to management to take further action if needed.				

[124] F_{lim} can be explicit, or implicit in cases where harvest rate is set annually to a precautionary F_{target} (or its proxy)

CLAUSE: 1.3.2.1.2 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[125].

EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**

SUMMARY EVIDENCE: There is no limit fishing mortality defined, as a safe fishing mortality is set by the harvest rule. There is the legal framework and suite of control measures available to management to take further action if needed.

EVIDENCE

The function of a limit point would be to provide a safeguard in such situations. The requirement to define an upper limit for the fishing mortality would be met if proper criteria for deviating from the harvest control rule and for revising it were established. There is the legal framework and suite of control measures available to management to take further action if needed. The stock is currently well above the established limit biomass reference point (Figure 21). In the unlikely event that SSB falls below the limit, the Minister has the authority to take drastic action and there is the legal framework and suite of control measures available to management if needed.[126]

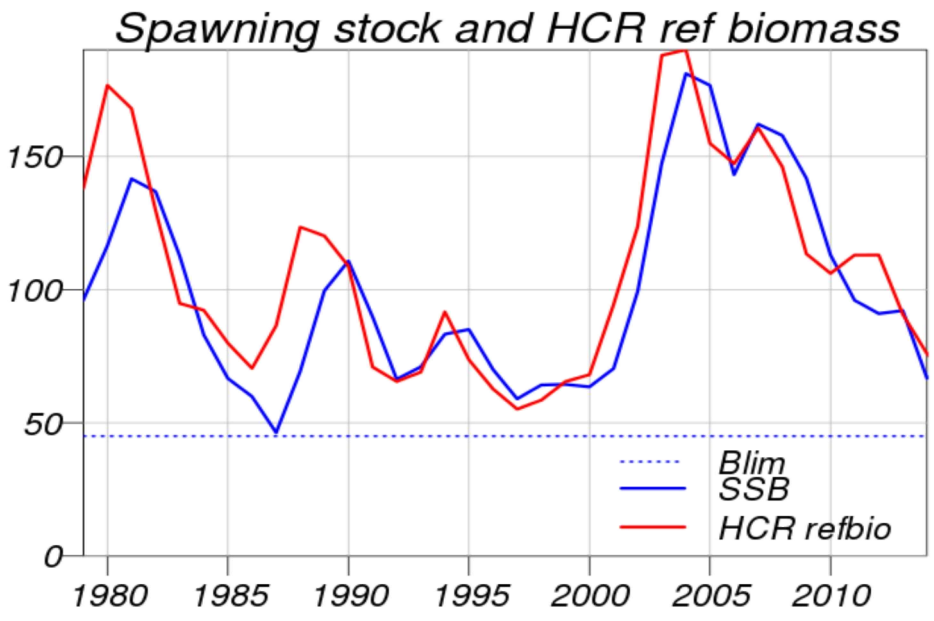


Figure 21. Spawning stock and reference biomass in the harvest rule, according to the 2014 ICES advice[127]

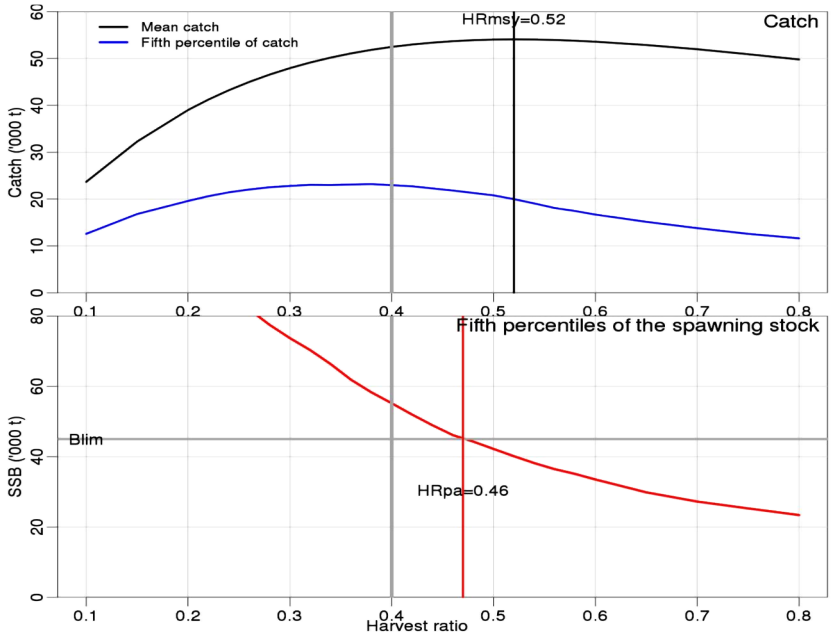
[125] FAO Guidelines (2009), par. 30.2. See also previous footnote.
[126] http://eng.atvinnuvegaraduneyti.is/media/acts/Act-no-79-1997-Fishing-in-Iceland-Exclusive-Fishign-Zone.pdf
[127] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2014/2014/had-iceg.pdf

1.3.2.2 Stock biomass

CLAUSE: 1.3.2.2.1 The long term management target for stock size (biomass), either explicit or implicit depending on management approach, consistent with the objective of promoting optimum utilization, shall be specified.				
EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**
SUMMARY EVIDENCE: The harvest rule has been shown by simulations to lead to long term yield near the maximum, and to imply a low risk of reaching the biomass limit where recruitment is unknown or can be impaired.				

EVIDENCE

The Management plan does not specify a long term target. However, the management plan states the following: *The management strategy for Iceland saithe and haddock is to maintain the exploitation rate at the rate which is consistent with the precautionary approach and that generates maximum sustainable yield (MSY) in the long term.*



According to the simulations done when evaluating the management plan, it has been demonstrated that at the adopted harvest rate of 0.4, the long term yield will be near its maximum. The harvest rate was chosen at the lower end of the range giving near maximum yield, to promote safety and stability. At this harvest rate, the probability of reaching the limit biomass is well below 5%.[128]

[128] Björnsson, H. 2013. Evaluation of the Icelandic haddock management plan. ICES CM 2013/ACOM:59. http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2013/ADHOC/IntroAndHad.pdf

CLAUSE: 1.3.2.2.2 Limits or directions for stock size (or its proxy) with respect to precautionary management, consistent with avoiding recruitment overfishing, shall be specified.

EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**

SUMMARY EVIDENCE: There is no indication that recruitment is impaired at the limit level of SSB. The target harvest rate in the harvest rule implies a low risk of reaching the limit biomass.

EVIDENCE

The limit reference spawning stock biomass is defined as the lowest observed in the time series (45000 tonnes). There is no indication in the time series that recruitment is impaired at that level of SSB. As described under clause 1.3.2.2.1, the target harvest rate implies a low risk of reaching the limit biomass.

CLAUSE: 1.3.2.2.3 The stock (biomass) limit reference point (B_{lim}) shall be developed in accordance with internationally accepted practice.

EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**

SUMMARY EVIDENCE: The B_{lim} represents the lowest observed biomass. This is common practice in ICES, for stocks where no recruitment impairment has been observed historically.

EVIDENCE

The limit reference spawning stock biomass is defined as the lowest observed in the time series (45000 tonnes). Common practise by ICES is to use that value as a Blim if there is no indication in the time series that recruitment is impaired at that level of biomass[129]. For Icelandic haddock, that is the case.

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

[129] http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acfm/2003/Sgpa/sgpa2003.pdf, Section 2.2

CLAUSE: 1.3.2.2.4 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:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**
SUMMARY EVIDENCE: The harvest rule prescribes a reduction in harvest rate if the spawning stock becomes less than Blim = 45 000 tonnes. There is the legal framework and suite of control measures available to management to take further action if needed, which will depend on the reasons for the decline in biomass.				
EVIDENCE The action stated in the management plan is to reduce harvest rate if the SSB goes below 45 000 tonnes. According to the evaluation of the harvest control rule, the likelihood of reaching this value is low. 'Worst case simulations', where the initial stock was set blow Blim, indicated that the stock nevertheless would recover rapidly[130]. Furthermore, there is a legal framework and suite of control measures available to management to take further action if needed which will depend on the reasons for the decline in biomass. Such measures can include, inter alia: • Reduction in TAC through a revision of the HCR; • Area closures (short and long-term) for juvenile fish and other grounds; • Further spawning area closures during spawning season; • Gear modifications (e.g. Gill nets and trawl mesh sizes); • Fleet restructuring.				

1.3.2.3 Stock biology and life-cycle (Structure and resilience)

CLAUSE: 1.3.2.3.1 Information on the biology, life-cycle and structure of the stock shall be taken into account when designing management measures to promote optimal utilisation of the stock with respect to resilience to natural variability and fishing[131].			
EVIDENCE RATING:	**High ☑**	**Medium ☐**	**Low ☐**

[130] Björnsson, H. 2013. Evaluation of the Icelandic haddock management plan. ICES CM 2013/ACOM:59. http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2013/ADHOC/IntroAndHad.pdf

[131] From FAO Guidelines (2009), para 30.3 The structure and composition of the "stock under consideration" which contribute to its resilience are taken into account.

NON CONFORMANCE:	High ☑	Minor NC ☐	Major NC ☐	Critical ☐

SUMMARY EVIDENCE: Resilience of the stock is achieved by keeping the fishing mortality low. The current harvest rule has led to a reduction in fishing mortality and an increased proportion of older fish in the stock.

EVIDENCE

Resilience of the stock is achieved by keeping the fishing mortality low. That allows year classes to stay longer in the stock, changing the age composition towards older ages. This may also be advantageous for the recruitment. The reduction in fishing mortality expected with the introduction of the current management plan should result in such shift in age composition. Figure 22 below shows that in the annual catch in numbers at age, the older ages have become more prominent in the catches in recent years. This is partly due to the occurrence of some strong year classes after 2000, but can also be attributed to the reduced fishing mortality in recent years.

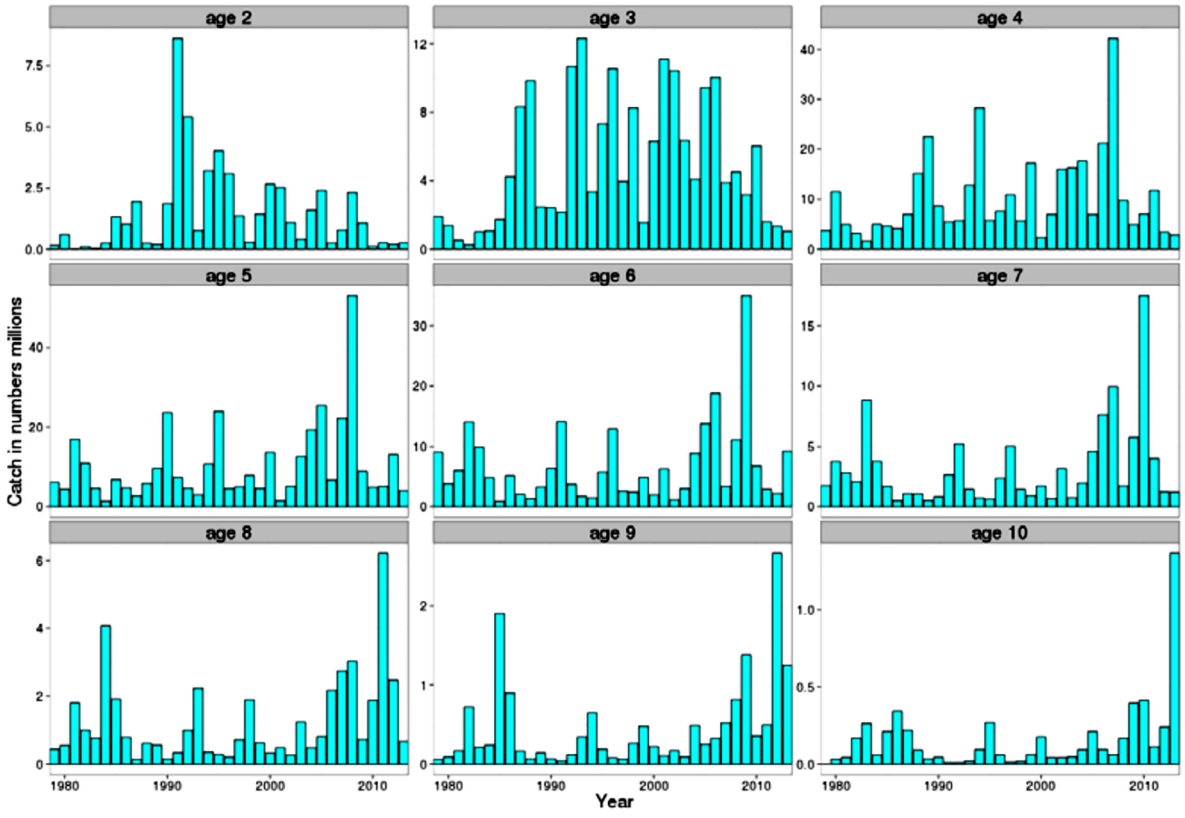


Figure 22. Age composition in catches. Catch is in millions. [132]

[132] Copied from http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2014/NWWG/12%20NWWG%20Report%20-%20Sec%2010%20Icelandic%20Haddock.pdf

CLAUSE: 1.3.2.3.2 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}).[133]

EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**

SUMMARY EVIDENCE:

There are no indications of specific spawning components. Protection of spawners is achieved by temporary closure of spawning grounds. Spawning stock biomass is well above the limit reference point.

EVIDENCE

Information about stock structure (metapopulation) of haddock in Icelandic waters is limited, but it is unlikely to be as diverse as observed for cod[134]. The fishery is spread all around Iceland. Hence, it is unlikely that there is unbalanced exploitation of specific spawning component.

The harvesting policy in place for Icelandic haddock is designed explicitly to avoid the stock from falling towards the limit reference point, by keeping the harvest rate sufficiently low.

Protection of spawners is achieved by temporary closure of spawning grounds. These closures to some extent are directed towards cod, but as cod and haddock largely spawn at the same time and place, they have a substantial effect on spawning haddock as well.

There are rules within Act No 127, 1997 (Article 8) which prohibit the use of certain types of fishing gear in a certain area for a specific time. Article 9 refers to taking measures to prevent fishing practices which can be regarded as harmful to the efficient utilisation of the commercial stocks.
The mesh size in the codend in the trawling fishery was increased from 120 mm to 155 mm in 1977. Since 1998 the minimum codend mesh size allowed is 135 mm, provided that a so-called Polish cover is not used. Mesh size and gear restrictions are also mandated to protect both juvenile stocks (trawl mesh size 135 mm with separator panel) and spawners (gill net mesh size 8 inches). A number of regulations concerning gear design and specification are enforced. In relation to haddock fisheries:

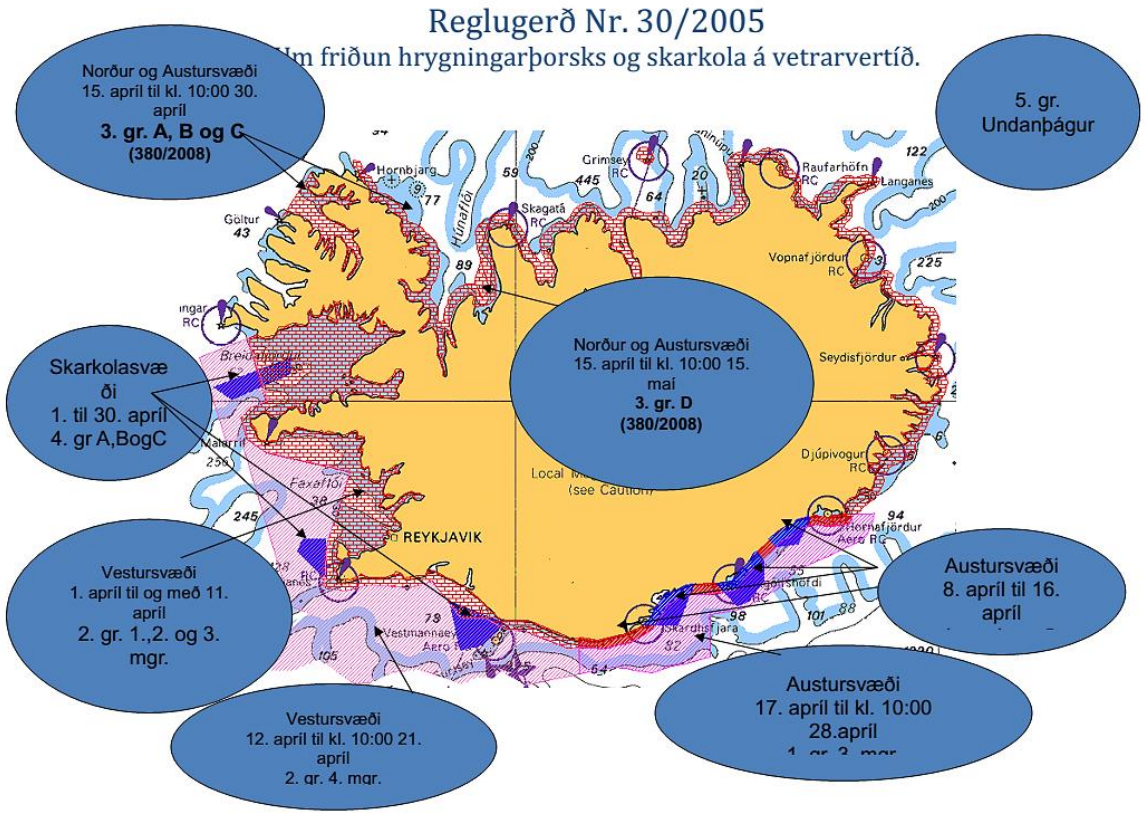
Regulation No. 881/2009
Regulation of specific line and nets.

[133] FAO Guidelines (2009), par. 30.3.
[134] http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2013/NWWG/Annex%2002%20Stock%20Annexes.pdf p.896ff

Regulation. no. 724, 28 August 2006
Regulation of construction and sorting grids/meshes and use of 155 mm mesh in the trawl bag.
Regulation. no. 115, 13 February 2006
Regulation. no. 543, 22 July 2002, the escape panels for the demersal fish, in shrimp nets.
Regulation. no. 739, 13 October 2000, the preparation and construction of small fish escape panels.
Regulation. no. 24, 15 January 1998, the mesh and measuring the implementation of mesh measurement.

http://wortschatz.uni-leipzig.de/cgi-isl/isl_web_2010/wort_www_ny?site=22&Wort_id=5249386&blocknr=2&bl=208 provides full access to all Regulations currently applicable to Icelandic fisheries.

Fishing with trawls is prohibited in large areas near the coast which serve as spawning and nursery areas. The following chart is available on the Directorate website and illustrates the extent of area closures in the Icelandic Fishery. Since 2005 each area has different closure-days because the spawning occurs at different times in different areas. The red areas tend to be largely for cod protection while the blue ones on the bottom left to protect spawning plaice.



135

Figure 23. Spawning closures in Iceland. Reg. on closure for all demersal fisheries in spawning areas for cod (red and pink areas) and plaice (blue areas). Period 1.-30. April every year. The time of the closures varies depending on areas. As of May 2014.

On top left Norður og Austursvæði closed between 15 april and 30 April

[135] http://www.fiskistofa.is/fiskveidistjorn/veidibann/hrygningarstopp/

Below on left Skarkolasvæði/ Plaice-areas (pointing at blue areas) closed 1 to 30 April
Below Vestursvæði West-area 1 April to 11 April
Bottom left Vestursvæði(the most important) West-area 12 April to 21 April
Bottom right Austursvæði East-area 17. April 28 April
Above Austursvæði East-area 8 April to 16 April
Middle Norður og Austursvæði North- and East-areas

Sorting grids in fishing gear are mandatory to avoid bycatch of juvenile fish in the shrimp fisheries. Extensive provisions are made for scheduled, routine and temporary closures of fishing areas to protect spawning fish from all fishing. In addition, the Marine Research Institute (MRI) has the authority to close fishing areas temporarily without prior notice if the proportion of small fish in the catch exceeds certain limits (25% or more of <55 cm cod and saithe, 25% or more of <45 cm haddock and 20% or more of <33 cm redfish). There are a number of Regulations which form the basis to the implementation of Policy and providing powers of enforcement to the Directorate. These are published each year in a booklet made available to all registered vessels.

It is not clear to what extent designing these regulations has been based on actual measurements of selectivity. However, measures like large mesh size clearly will reduce the catch of small fish, and can be regarded as a supplement to area closures which also aim at protecting juveniles.

CLAUSE: 1.3.2.3.3 Rules on fishing gear used in fishing for stock under consideration shall specify relevant selectivity properties for the protection of juvenile fish of stock under consideration, as appropriate.

EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**

SUMMARY EVIDENCE: There are numerous rules and regulations concerning gear design and specification, aiming *inter alia* at avoiding catching juvenile fish. It is not clear to what extent designing these regulations has been based on actual measurements of selectivity of juveniles.

MRI communications indicate that over the last decades, several surveys for assessing selectivity of bottom trawl codends have been conducted in Icelandic waters and results never gave reasons to worry about poor codend selection. However, the authors note that changes in the type of materials used to construct trawls and cod-ends has changed over time with a switch to materials that are heavy and stiff. A study is currently ongoing potentially indicating less than ideal selectivity performance, the results of which may well change current management measures. However it is worth noting that mesh size is only one of the management measures in force in Iceland to avoid excessive exploitation of the haddock resource. The stock is currently well above Blim.

See also Clause 1.3.2.3.2 for evidence

CLAUSE: 1.3.2.3.4 Consideration shall 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 to reducing the likelihood of growth overfishing and increasing the contribution of year classes to the spawning stock.				
EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**
SUMMARY EVIDENCE: Area closures (temporary and permanent) are used extensively to protect juveniles.				

EVIDENCE

The management system utilizes a series of closures, temporary for spawning season and additionally in a reactive sense for short term area closures when juvenile fish in catches are reported (legally landed within the ITQ system). Mesh size and gear restrictions are also mandated to protect both juvenile stocks (trawl mesh size 135 mm with separator panel) and spawners (gill net mesh size 8 inches). MRI can close areas temporarily on short notice if there are indications of too much juvenile fish in the catches. Such closures occur frequently. Temporary closures in recent years where either haddock or saithe is mentioned specifically are as following:

Year	Haddock	Saithe
2013	0	14
2012	0	9
2011	3	2
2010	23	11
2009	24	1

Besides these it is possible that other closures may also have been related to juvenile haddock or saithe but the main concern for the stated is another species (temporary closure for using long-line is sometimes related to both juvenile cod and haddock).

Regulatory (permanent, long-term) closures may be less frequent in recent years and this could be explained with the fact that more areas are now permanently closed or may only be fished during restricted periods or only with certain gears or selective methods. Some of these areas may originally have been closed because of concern for haddock or saithe, although the species most often mentioned is cod which is of course the most economically important of the demersal species.

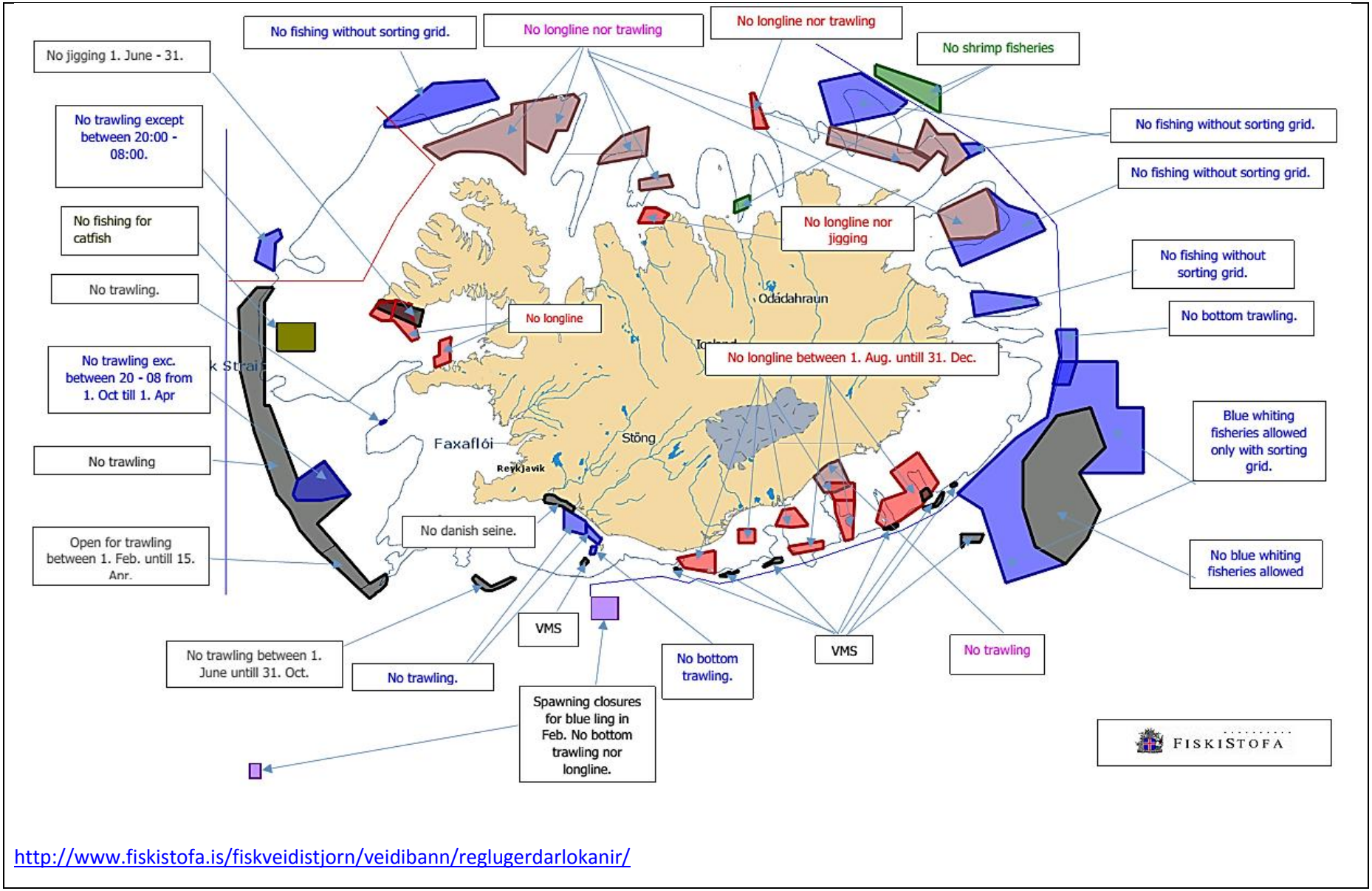
A very detailed report covering the fisheries in the 20th century and up till 2006 is Friðun svæða og skyndilokanir á Íslandsmiðum; sögulegt yfirlit, which was published in 2007. That report specifically mentions two permanent (long-term) area closures because of juvenile haddock in the period 1994-1997 (see http://www.hafro.is/Bokasafn/Timarit/fjolrit-133.pdf, has abstract in English). (Some other studies related to this topic are: http://icesjms.oxfordjournals.org/content/early/2014/09/30/icesjms.fsu162.abstract; http://icesjms.oxfordjournals.org/content/63/5/897.abstract; http://icesjms.oxfordjournals.org/content/67/5/1024.abstract; http://www.avs.is/media/avs/Skyrsla_R_022-07__beita_og_krokar.pdf.

Areas that are closed regularly are turned into regulation areas, with permanent full or partial closure administered by the Directorate of Fisheries. The figure below gives an overview of the closures as May 2014. Shadings indicate different levels of restriction and type of gear involved, ranging from temporary (e.g. time of day, season) to permanent closure.

Regulations and conserved areas in Icelandic waters, from top to bottom (Reglugerðir og friðunarsvæði við Ísland)

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 (coastal)

Line and handline Rgl. 742/2009
Blue area east of Iceland
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 off 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 for trawling from 20.00-8.00 o´clock from 1.10 – 1.4 incl. both days



http://www.fiskistofa.is/fiskveidistjorn/veidibann/reglugerdarlokanir/

1.4. External scientific review

CLAUSE: 1.4.1 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.

EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**

SUMMARY EVIDENCE: Annual stock assessments and calculation of TAC according to the harvest rule is done within ICES. These calculations are reviewed within ICES. The assessment method is reviewed at benchmark workshops at 3-5 years intervals. The last benchmark for Icelandic haddock was in 2013. The evaluation work for the current management plan for Icelandic haddock was carried out by the MRI, and reviewed by ICES.

EVIDENCE

ICES 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[136]. 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 practices. The initiative may come from ICES itself, from the assessment Working Group responsible for the stock, or from managers. The last benchmark for haddock was in 2013, where the current assessment practise was approved. The procedures are documented in[137]

Evaluation of management plans are done at the request of responsible managers. ICES has no permanent staff to do such work, but relies on scientists from its member nations. Depending on what is feasible, evaluation work may be done by an *ad hoc* group appointed by ICES, scientific institutions under supervision of scientists appointed by ICES, or evaluations may be done by scientific institutes or others and presented for review to ICES.

[136] http://www.ices.dk/explore-us/Documents/Cooperation%20agreements/NEAFC/MoU%20NEAFC%20and%20ICES%202007.pdf

[137] http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2013/NWWG/Annex%2002%20Stock%20Annexes.pdf p.896ff

The evaluation work for the current management plan for Icelandic haddock was done by the MRI[138], and reviewed by ICES. The ICES Committee on Management Advice (ACOM) provided the advice based on the work by MRI[139]. The reviews were undertaken with respect to its consistency with the precautionary approach and its consistency with MSY.

CLAUSE: 1.4.2 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:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**
SUMMARY EVIDENCE: There is a formalized system of reviewing ICES reports and requests to examine the assessment reports undertaken by the MRI of Iceland. The review process has an inclusive approach regarding the management organisations and an industry/participant consultation process.				

EVIDENCE

The initiative for an external review of the harvesting policy was directed to ICES, officially from the Ministry although with significant interaction from MRI. Criteria for triggering a review process have not been explicitly prescribed.

The MRI advises the Minister of Fisheries on the exploitation of the haddock stock in June each year; ICES provides advice as well; both ICES and the MRI advise on research and harvesting policy in general.

There is a formalized system of reviewing ICES reports and requests to examine the assessment reports undertaken by the MRI of Iceland[140]. The review process has an inclusive approach regarding the management organisations and an industry/participant consultation process.

[138] Björnsson, H. 2013. Evaluation of the Icelandic haddock management plan. ICES CM 2013/ACOM:59. http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2013/ADHOC/IntroAndHad.pdf)

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

[140] http://www.hafro.is/undir_eng.php?ID=25&REF=4

1.5 Advice and Decisions on TAC

CLAUSE: 1.5.1 A competent scientific body, research institute, designated advisory body or arrangement shall provide the competent fisheries management authority with fisheries advice on the harvesting of the stock under consideration.				
EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**
SUMMARY EVIDENCE: The formal adviser to the government is the MRI. MRI is mandated by the Ministry of Industries and Innovation and this is specified in the Icelandic legal framework for fisheries management.				

EVIDENCE

Fisheries research is undertaken by the Marine Research Institute (MRI) of Iceland[141]. MRI is mandated by the Ministry of Industries and Innovation and this is specified in the Icelandic legal framework for fisheries management. The Marine Research Institute (MRI), established in 1965, is a government institute under the auspices of the Ministry of Fisheries. The institute has around 170 employees, 2 research vessels, 5 branches around Iceland and a mariculture laboratory. MRI runs two research vessels: Bjarni Sæmundsson (55 m) and Árni Friðriksson (70 m).

Management has previously set the annual TAC higher that that recommended by the scientific advice which formed the point of discussion in meetings. The Fisheries Management Plan for haddock has defined in a public form, the harvest control rule mechanism for setting the TAC which is based on advice from the MRI.

[141] http://www.hafro.is

CLAUSE: 1.5.2 Advice shall include the appropriate value(s) for precautionary reference points.

EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**

SUMMARY EVIDENCE: Relevant precautionary reference points have been set by ICES. Fishing mortality reference points are substituted by the specifications of harvest rate in the HCR.

EVIDENCE

The routine ICES advice[142] has the following table of reference points for the Icelandic haddock stock:

Reference points

Type	*Value*		*Technical basis*
MSY	HCR $B_{trigger}$	45 000 t.	Stochastic simulations (Björnsson, 2013).
approach	HMSY	0.52	Stochastic simulations (Björnsson 2013).
Precautionary	Blim	45 000 t.	Bloss (ICES, 2012).
approach	Hpa	0.46	Stochastic simulations (Björnsson, 2013).
Management plan	Htarget	0.40	Management plan.

Fishing mortality reference points are not defined because the harvest rate (Htarget) is specified in the HCR.

CLAUSE: 1.5.3 Decisions on TAC shall be taken by the competent fisheries management authority taking into consideration the entire distribution range of the stock under consideration, as appropriate.

EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**

SUMMARY EVIDENCE: The management plan and the TAC set according to that plan cover the Icelandic EEZ. The stock is confined to that area.

EVIDENCE

The management plan and the TAC set according to that plan cover the Icelandic EEZ. The stock is confined to that area (see Clause 1.1.6.2).

[142] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2014/2014/had-iceg.pdf

CLAUSE: 1.5.4 For Shared Stocks the setting of TAC shall take into consideration international agreements and scientific advice.				
EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**
SUMMARY EVIDENCE: Icelandic haddock is not considered a shared stock				
EVIDENCE Icelandic haddock is not considered a shared stock in that the management zone – the Icelandic EEZ - is within the exclusive management of Iceland and under the full control of the Icelandic management system. Iceland takes part in International fora on fisheries management. Inter alia, it has an agreement with Norway and Russia which includes a small quota on cod in the Barents sea, with allowance for bycatch of haddock[143]. Iceland also has access through a quota arrangement by Agreement for Norwegian cod and Russia for Barents Sea cod. The agreement allows bycatch of other species, as the Barents Sea fishery is a multi-species fishery. For 2014 the agreement allocates up to 7.9% of haddock as bycatch to a vessels cod quota (the specific maximum may be different in Norwegian and Russian jurisdiction and the maximum proportion of other demersal species allowed as bycatch may range up to 30% in some areas).[144]				

CLAUSE: 1.5.5 The competent fisheries management authority shall decide on TAC within the boundaries set by the adopted harvesting policy.				
EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**
SUMMARY EVIDENCE: The Minister of Fisheries decides on the TAC of the haddock stock for each fishing year (Sept-Aug) in accordance to law (Fisheries Management Act 116), based on, but not bound by the current HCR and relative scientific advice.				

[143] http://www.regjeringen.no/nb/dep/nfd/tema/fiske-og-havbruk/rydde-internasjonalt/fiskerisamarbeidet-med-island.html?id=437336
http://www.regjeringen.no/nb/dep/nfd/dok/regpubl/stmeld/2013-2014/Meld-St-26-20132014/4/3.html?id=762652
Both only available in Norwegian.

[144] http://www.reglugerd.is/interpro/dkm/WebGuard.nsf/b7fd33650490f8cf00256a07003476bb/f8718114090f03f300257c6e000584d2?OpenDocument

EVIDENCE

Process for making decisions on TAC

The Minister of Fisheries decides on the TAC of the haddock stock for each fishing year (Sept-Aug) in accordance to law [145] based on HCR and the advice mentioned below. Since the introduction of the HCR in 2013, the scientific advice has been according to the rule, and the TAC set equal to the advice, see Clause 1.5.8.

Scientific advice

The MRI advises the Minister of Fisheries on the exploitation of the haddock stock in June each year; ICES provides advice as well; 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.

CLAUSE: 1.5.6 Management measures for conservation and sustainable use of the stock under consideration shall be specified in laws and regulations.

EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**

SUMMARY EVIDENCE: There are numerous laws and regulations in effect, that altogether cover the management measures for conservation and sustainable use of the stock.

EVIDENCE

Primary laws and regulations regarding fisheries management:

The **Act on Fisheries Management as subsequently amended N***o 116/2006***.**

The Act concerning the Treatment of Commercial Marine Stocks **as subsequently amended** *No 57/1996.*

Regulation No 57/1997 all catch has to be landed and provisions on discard are also in regulation no 601/2003.

The Act on Fishing in Iceland's Exclusive Fishing Zone **as subsequently amended** *No 797/1997.*

Regulations are issued annually with amendments. Primary regulations are:

Regulation no 742/2008 on commercial fisheries, which is issued every year with amendments.

Regulation no 601/2003 on utilisation of catch and by-products.

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

Regulation no 557/2007 on logbooks (and updated in early 2014 for recording marine mammal and seabird interactions/bycatch).

Regulation no 224/2006 on weighing of catch as **subsequently amended.**

Regulation No 384/2010 on coastal fishing 2009/10.

Fisheries management system

The fisheries are managed by a catch quota system. The annual quota is allocated to individual vessels (in accordance to the vessel's fixed quota share of the species subject to TAC) or vessel groups (coastal fisheries) so that the sum of quotas for individual vessels and vessel groups equals the TAC according to the HCR. Within the system there are various measures to make the fisheries economically viable, together with measures to coordinate catch composition and the TAC and to reduce discard; discarding is prohibited by law.[146]

Special coastal fisheries are allowed. To be able to participate in coastal fisheries a special license is needed; coastal fisheries are only allowed during the summer. A quota is issued and distributed between four defined areas and months. Detailed regulations are issued on number of gear, fishing days and allowable catch in each fishing trip. The catch fished in these fisheries is not counted against the vessel's individual quota.

Support measures

Real time area closures: A short-term sudden closure system has been in force since 1976 with the objective to protect juvenile fish. If, in a given area, there are several consecutive sudden closures, the minister of Fisheries can issue a regulation to close the area for a longer time period, thus directing the fleet to other areas. The Directorate of Fisheries and the Coast Guard supervises these closures in collaboration with the MRI.

Temporary area closures: The major spawning grounds of cod are closed during the main spawning season. That also offers substantial protection to spawning haddock. In addition there are gear and mesh size restrictions in place. The restrictions are mainly to protect juvenile fish but also to decrease the effort towards bigger spawners.

Permanent area closures: Many areas have been closed permanently. These closures are based on knowledge of the biology of various stocks with the aim of protecting juveniles and vulnerable marine ecosystems, e.g. coldwater corals.

[146] http://eng.atvinnuvegaraduneyti.is/media/acts/Act-no-57-1996-Treatment-of-Commercial-Marine-Stocks.pdf

CLAUSE: 1.5.7 Practical implementation shall be the task of (a) designated competent institution(s).				
EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**

SUMMARY EVIDENCE: The operational implementation of the fisheries legislation is done by the Directorate of Fisheries and the Coast Guard. MRI has a supervising role on some aspects of the regulations.

EVIDENCE

The means of implementing the management approach, including main provisions for monitoring, control, surveillance and enforcement

The Icelandic Directorate of Fisheries[147] is an independent administrative body responsible to the Minister. The Directorate is responsible for the implementation of the Act on Fisheries Management and related legislation, for day-to-day management of fisheries and for supervising the enforcement of fisheries management rules. The Directorate of Fisheries works in accordance to law no 36/1992, no 116/2006 and no 57/1996. Accordingly, the Directorate of Fisheries issues fishing permits to vessels and allocates catch quotas. Other duties include imposing penalties for illegal catches. The Directorate supervises the transfer of quotas and quota shares between fishing vessels, controls the reporting of data on the landings of individual vessels and monitors the weighing of catches. The Directorate provides supervision on board fishing vessels and in ports of landing, which involves inspecting the composition of catches, fishing equipment and handling methods.

The Icelandic Coast Guard´s main tasks[148] are fisheries inspection at sea and monitoring of the EEZ and reception of required notifications from vessels.

MRI keeps track of catch composition and can close areas with juvenile fish on short notice if needed.

[147] http://www.fiskistofa.is/
[148] www.lhg.is

CLAUSE: 1.5.8 Decisions on TAC in the appropriate units 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:	**High ☑**	**Minor NC x**	**Major NC ☐**	**Critical ☐**

SUMMARY EVIDENCE: Since the introduction of the present management plan, the TAC has been set close to the scientific advice.

EVIDENCE

The figure below is made from table 2.3.6.1 in the ICES advice for 2014[149], and shows the ICES advice, the actual TAC and the landings as reported to ICES. In recent years, the TAC has exceeded the ICES advice and landings have exceeded the TAC. For 2013/2014, which is the first year where the advice is according to the harvest rule, the TAC has been set according to the advice. The catch, according to the Directorate, was 41.8 kt, which is 10% above the TAC.

Article 11 of the Fisheries Act allows for some flexibility from the "fixed level" of the TAC: "vessels may fish in excess of their catch quota for individual demersal species, with the result that their catch quota for other demersal species will be reduced in proportion to the relative value of each species, cf. Article 19. This authorisation is limited to 5% of the total value of the demersal quota, and the excess catch of each demersal species may not exceed 1.5% of the total value of the demersal quota. The authorisation of this paragraph does not, however, apply to fishing in excess of the allocated catch quota of cod."

And also: "Up to 20% of catch quotas for each demersal species and catch quotas for deepwater shrimp, nephrops and herring, 10% of catch quotas for scallops and 5% of catch quotas for deep water shrimp may be transferred from one fishing year to the next. Vessels may also fish up to 5% in excess of the catch quota for each demersal species, herring and deepwater shrimp and 3% in excess of their catch quota for offshore shrimp and scallops with the result that the excess catch will be deducted from their allocated catch quota for the following fishing year." Additionally, it allows for the juvenile catch of 5% that counts 50% to quota + 5% that goes to the VS-Fund and not against quota. Further, it states that: „Day-trip longline vessels, which bait their lines on shore, may land 16% in excess of the catch of cod, haddock and wolffish calculated as part of their catch quotas."

All the above, plus the fact that Norwegian and Faroese vessles are allowed to catch some amount of demersal species in Icelandic waters, including haddock, makes the yearly TAC for a particular species less „fixed" than it may seem. In fact, together they easily explain a 5%-10% excess over a „flexible" TAC. Nonetheless, it would be desirable the TAC issued by the Ministry took account of all these, at least to as much as it is possible.

[149] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2014/2014/had-iceg.pdf

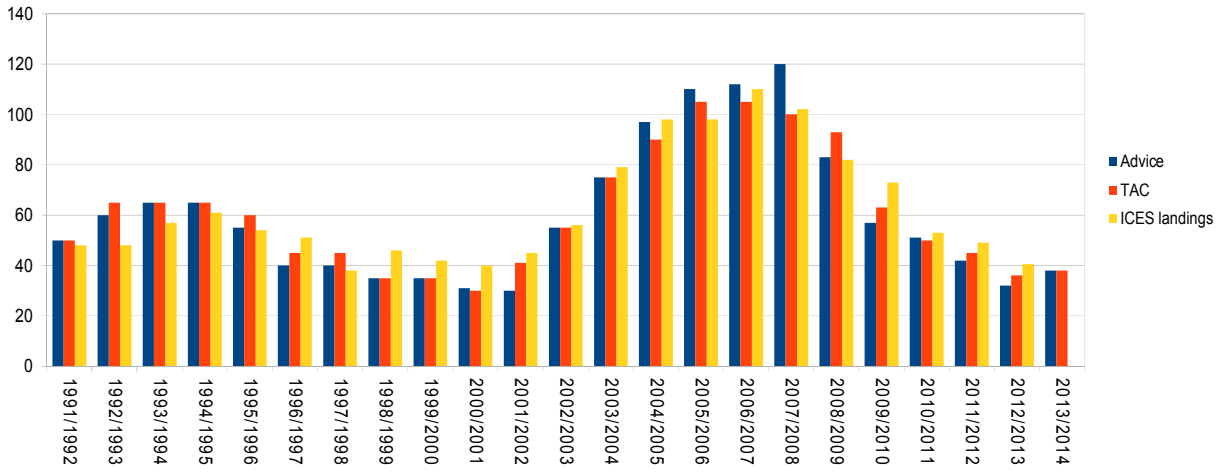


Figure 24. Icelandic haddock ICES advice (in blue), actual TAC (in red) and the landings (in yellow) as reported to ICES.

CLAUSE: 1.5.9 Management agreements reached in the competent Regional Fisheries Management Organization (RFMO) (s) or arrangements, relevant to the stock under consideration, shall be implemented by states and effectively and uniformly executed.				
EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**
SUMMARY EVIDENCE: Icelandic haddock is regarded as a national stock, managed by Iceland.				

EVIDENCE

Icelandic haddock is regarded as a national stock, managed by Iceland. Foreign vessels can be allowed to operate in Icelandic waters with permission from Icelandic authorities. The Fisheries Advisory Section of the MRI is responsible for the presentation of stock assessments and prepares the formal advice on TAC´s and sustainable fishing strategies for the Ministry of Industries and Innovation. The Ministry sets an annual TAC based on the advice of the MRI in accordance with the HCR. Practical implementation is tasked to principally, the Directorate of Fisheries, The Icelandic Coast Guard and the MRI for the direction of temporary area closures.

<table>
<tr><td colspan="5">CLAUSE: 1.5.10 In the absence of specific information on the stock under consideration, generic evidence based on similar stocks may be used for fisheries with low risk to that stock under consideration. However, the greater the risk the more specific evidence is necessary to ascertain the sustainability of intensive fisheries[150].</td></tr>
<tr><td>EVIDENCE RATING:</td><td>High ☑</td><td colspan="2">Medium ☐</td><td>Low ☐</td></tr>
<tr><td>NON CONFORMANCE:</td><td>High ☑</td><td>Minor NC ☐</td><td>Major NC ☐</td><td>Critical ☐</td></tr>
<tr><td colspan="5">SUMMARY EVIDENCE: Not needed for Icelandic haddock.</td></tr>
<tr><td colspan="5">EVIDENCE The data available for the Icelandic haddock are fully sufficient for assessment and advice. Generic data from other stocks are not used in a management context[151].</td></tr>
</table>

[150] FAO Guidelines (2009), para. 30.4.
[151] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2014/2014/had-iceg.pdf

SECTION 2: COMPLIANCE AND MONITORING

2.1 Implementation, compliance, monitoring, surveillance and control

CLAUSE:	**2.1.1 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:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**

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 principal Act (**Fisheries Management Act No.116/2006**)[152] which supersedes the Fisheries Management Act 1990 establishes the requirements for vessel permits (the initial legal requirement) without which a vessel is not entitled to obtain quota to fish for Icelandic stocks. Two permits are possible; general permit with quota and a general permit with a hook-and-line quota.

The Maritime Division of the Icelandic Transport Authority maintains a Register of Vessels. Principle requirements to obtain a permit refer to the Act on Investment by Foreign Parties in Industrial Operations and on the Act on Fishing and Processing by Foreign Vessels in Iceland's EEZ (Act No 22 1998).

The Act on Fishing in Iceland's Exclusive Fishing Zone No. 79/1997[153] establishes the Icelandic ITQ system giving powers to the Minister for its administration, fees, provision of powers to the Directorate, penalties for violations and temporary provisions. This Act also provides for the efficient utilisation of commercial stocks, specifies the Icelandic EEZ and prohibits foreign vessels from fishing within Iceland's EEZ (unless by Agreement). Vessels are classified under 3 classes. The Act among other things, makes provisions for the Minister to limit certain gear types, fishing areas, fishing for certain stocks, prevent harmful fishing (fishing where undersize fish in the catch exceeds the reference levels determined by the Minister), set rules for min. size of marine animals. The Act also specifies the sanctions for violations against the Act including imprisonment for up to 6 months, gear and catch confiscation, suspension of licenses and fines for violations (ISK 4,000,000) and repeat violations (>ISK 400,000 < ISK 8,000,000).

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

[153] http://eng.atvinnuvegaraduneyti.is/media/acts/Act-no-79-1997-Fishing-in-Iceland-Exclusive-Fishign-Zone.pdf

The Act concerning the Treatment of Commercial Marine Stocks No 57/1996 establishes the principle requirement of no discarding and that fishing cannot take place unless the vessel has sufficient quota. Also the Act establishes the requirement for the landing of fish from Iceland EEZ (or in part thereof) at Icelandic ports and for official weighing or in foreign ports officially recognised by the Directorate. Act No. 55 respecting Control and Inspection of Fish and Fish Produce 1968, establishes the hygiene conditions for The provisions for catch separation, recording, tracking of quota allocations, accredited weighing stations within 2 hours of landing (**Regulation No 224/2006** on Weighing and Recording of Catch)[154], exemptions for in house and auction weighing permission, processing at sea weight registration, and transfer of quotas is included in the Act.[155]

During the on-site visit assessors witnessed fish landing, transfer to the auction, weighing, tipping and re-icing and sales of fish across the electronic auction system. Labelling of catch for traceability was also reviewed. Sold and registered weights are the official weights across the calibrated scales which are submitted to the central database.

Each vessel weighing generates a weighing receipt containing the following information:

- Name of Vessels, registration number and district number;
- Port of landing and date of landing;
- Name of seller, buyer and recipient of the catch or fish auction;
- Weighted quantity of catch by species;
- Undersize in catch;
- Number, type and weight of tubs, boxes, barrels;
- Fishing gear;
- Total number of Pallets of platforms;
- Registration number and tare of transport vehicle;
- Whether catch is to be re-weighted;
- Whether any un-gutted catch will be weighed after gutting or converted using coefficients provided by Directorate.

The scale operator must enter the information within the Directorates catch registration system without delay. Operationally, the Directorate of Fisheries is responsible for the implementation of Fishery Regulations although a large part of the at sea surveillance falls directly under the responsibility of the Icelandic Coast Guard.

The Directorate has a HQ in Hafnarfjörður and offices at 6 locations in the country. Where the staff are in the field of fisheries management and monitoring of Fisheries and secretariat, as necessary. A total staff of 70 are involved in fisheries management.

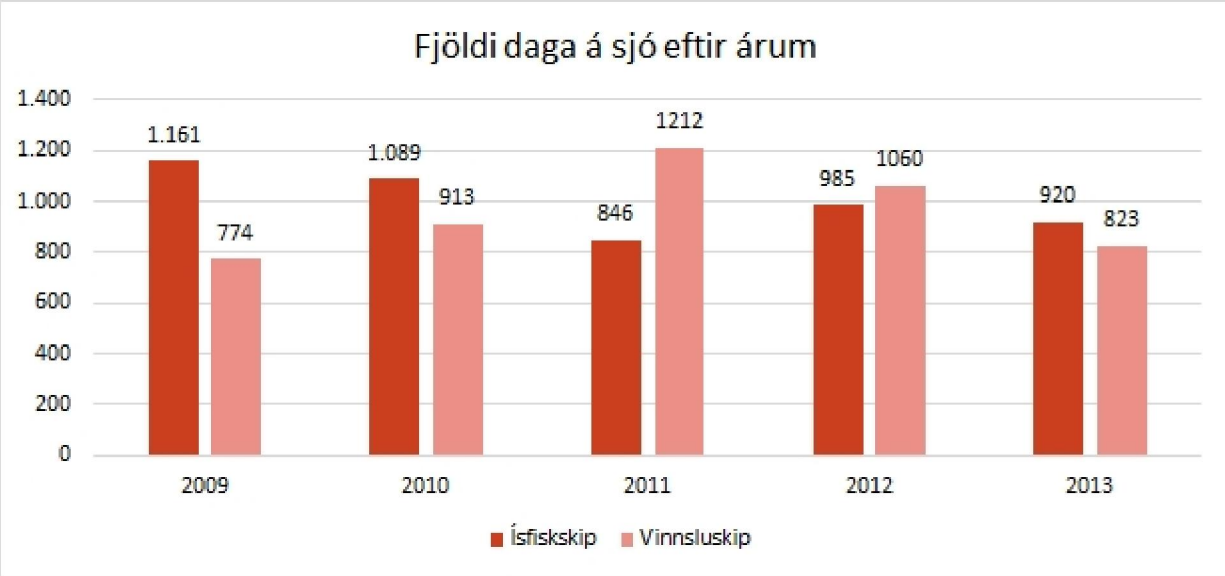
[154] http://eng.atvinnuvegaraduneyti.is/laws-and-regulations/fisheries/

[155] http://www.fisheries.is/management/fisheries-management/the-fisheries-management-act/

Surveillance is a big part of the Directorate works and play key role in monitoring fisheries. The project is a comprehensive and includes the monitoring of fishing, processing fish on board, quotas position of ships, weighing and recording of catch, fish, whales, salmon and trout fishing and gravel income. Monitoring takes place either on the ground, sea and land, or electronically at the Directorate.

Last year (2013), inspectors took a total of 395 (405 in 2012) trips, stayed 1743 (2045 in 2012) days on-board fishing vessels. Inspectors took 40 trips with processing vessels a total of 823 days and 355 trips on-board other ships lasting a total of 920 days.

Directorate inspectors: Number of days at sea 2009-2013



Directory Inspectors days at sea per vessel type - Fresh fish vessels (red) - Processing vessels (pink)

...

156

[156] http://www.fiskistofa.is/umfiskistofu/arsskyrsla-2013/eftirlit/

2.2 Concordance between actual catch and allowable catch

CLAUSE:

2.2.1 Concordance between the Total Allowable Catch (TAC) and actual total catch from stock under consideration shall be ensured through control, enforcement, documentation, correction and verification[157].

2.2.2 Monitoring, surveillance and information feedback shall be used to collate information on actual catch.

2.2.3 Corrective management measures and/or appropriate adjustments in management decisions shall be implemented when the need is indicated by the relevant information.

2.2.4 Participating companies shall:

2.2.4.1 Ensure that they have been issued with all the required permits;

2.2.4.2 Operate in compliance with the relevant rules and regulations;

2.2.4.3 Limit the catches of their vessels in accordance with their catch quota.

EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**

SUMMARY EVIDENCE: Evidence available demonstrated a high level of compliance between TAC and actual catch of haddock based on official landings. The role of the Directorate of Fisheries is to implement laws and regulations on fisheries management and to control all aspects of fishing[158]

EVIDENCE:

2.2.1

The system of recording catch is controlled and includes both at sea (e-logbook records), standard paper based log-books and verification of catch through physical weighing at accredited landing stations registered by the Directorate.

[157] For long-lived species, this can include flexibility provisions such as legal allowance and adjustment for limited transfer of vessel quotas between adjacent management periods (years) as well as provisions providing incentives against discards.

[158] http://www.fisheries.is/management/fisheries-management/the-fisheries-management-act/

2.2.2

Trackwell, an electronic systems based service company, developed and service the Directorate and Industry with a number of IT based monitoring, reporting and recording systems including:

- Vessel monitoring systems and Electronic Reporting System (legal requirements) which were developed in close cooperation with the Coastguard and Fisheries Authorities.
- Electronic logbook and Reporting System, which generates mandatory reports to the Directorate as well as providing a valuable management reporting system for fleet management.

The vessel log book system requires that the operator of a vessel registers the following information:

Haul no., fishing date, time of fishing, lat/long at haul, fishing zone, depth, wind direction, m/s, wind speed, seafloor, twin trawls, name of person registering information, and other information on transmitting to the Directorate. The system has other components- Fleet Manager, analysis tools and a labelling/traceability component allowing catch to be linked to fishing zone for labelling purposes.

The distribution of information is managed by a central server which transmits to the Directorate (and MRI), fleet managers and a traceability system. The server enables secure data encryption protocol and backup server of the transmitted data. The distribution server integrates with other database systems using XML via web services.

Information from fresh fish landings is collected through the portside official weighing system which is carried out by official staff and calibrated systems. Vessels must weigh catch within two hours of landing on the quay. The system is developed to standardise 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. The reporting system is not real time but is very near real time (circa. 24 hours).[159]

In some cases, an approved in house company or auction weighing system is used which has been verified by Directorate staff. The system works for all official Icelandic weighing stations and auctions and also for foreign ports with an official designation from the Directorate [Toftum (Faroe Islands), Grimsby (UK), Hull (UK) and Bremerhaven (Germany)].

Processed at sea catch are registered as processed weights using an officially approved yield. This is

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

monitored and verified by the Directorate staff. Weights at landing are checked at the processing base by Directorate staff. Processed weights are converted to live weight equivalents for deduction from each vessels quota and management purposes by staff at the Directorate.

2.2.3

Adjustments can be made by the Directorate to correct for errors – the system is transparent in so far that anyone can enter a vessel registration number on the Directorates website and obtain the catch, species, quota, remaining quota, quota rents for any vessel. The Directorate notes on the website that the information may be corrected by staff at later time post original posting of the information.

The Coast Guard also undertakes at sea boarding to confirm that registrations are made correctly and for the correct fishing zones.

The Coast Guard also carries out 24-7 surveillance of all vessels in Iceland's EEZ. There are requirements for transmitting position, VMS transmitting, and for reporting catch for vessels entering/leaving Icelandic waters. Based on the visit to the HQ of the Coastguard by the assessors and a tour and review of the monitoring system it can be described as comprehensive and effective.

The ITQ system has rules and flexibilities to allow for corrective management measures and adjustments to be incorporated. These include:

A vessel can transfer some of its quota between fishing years but its quota is lost if it catches less than 50% of its total quota, measured in "cod equivalents", in two subsequent years. There is also a requirement that within the year, the net transfer of quota from any vessel must not exceed 50%.

A separate small boat quota system (krókaaflamarkskerfi) is available for boats less than 30 GT. These are only allowed to fish with handlines or longlines. These boats get quotas for all the major demersal species and can freely transfer the quota within this system. However to prevent consolidation of fishing rights these quotas cannot be transferred to the common quota system (which is usually referred to as the "big system"). Currently 393 boats were issued quotas within the small boat system (in 2014/15).[160]

Each fishing year the Minister shall have available harvest rights amounting to up to 12,000 tonnes of ungutted demersal species, which he may use:

1. to offset major disturbances which are anticipated because of sizeable fluctuations in the catch quotas of individual species;

2. for regional support, in consultation with the Regional Development Institute, through allocations;

a. to smaller communities which are facing difficulties due to downturns in fisheries and which are

[160] http://www.fiskistofa.is/umfiskistofu/frettir/nr/1156

dependent upon demersal fishing or processing;

b. to communities which have suffered unexpected cutbacks in the total catch quotas of fishing vessels operating from and landing their catch in the communities in question, which has had a substantial impact on the employment situation in these communities.

Vessels may fish in excess of their catch quota for individual demersal species, with the result that their catch quota for other demersal species will be reduced in proportion to the relative value of each species. This authorisation is limited to 5% of the total value of the demersal quota, and the excess catch of each demersal species may not exceed 2% of the total value of the demersal quota. This authorisation does not, however, apply to fishing in excess of the allocated catch quota of cod.

Vessels may also fish up to 5% in excess of the catch quota for each demersal species, herring and deepwater shrimp and 3% in excess of their catch quota for offshore shrimp and scallops with the result that the excess catch will be deducted from their allocated catch quota for the following fishing year.

2.2.4

There are specific rules for allowance of fisheries (e.g ITQ system) and for limiting the combined quota share of fishing vessels owned by individual parties, whether natural or legal persons, or owned by connected parties. The limit of share of the haddock quota for any such combination of quota entitlements is 20% of the total. [161]

[161] http://www.fisheries.is/management/fisheries-management/the-fisheries-management-act/

2.3 Monitoring and Control

2.3.1 Vessel registration and catch quotas

CLAUSE:

2.3.1.1 Allocated catch quotas by species are assigned in such a way that the combined quotas conform with the currently effective decision on TAC.

2.3.1.2 Commercial fishing shall be solely conducted with registered vessels authorised to participate in the fishery by competent authorities.

2.3.1.3 The catch quota of each vessel or vessel group for each fish species and fishing year shall be recorded in the official central data base in a transparent manner.

2.3.1.4 Information on the size and composition of the fleet of fishing vessels shall be available, documented and include the following provisions:

1) An officially maintained fishing vessel registry;

2) Participation in the fishery must be subject to licence;

3) Only vessels on the fishing vessel registry shall be authorised to participate in the fishery[162];

4) For the stock under consideration, the allowed catch by species for each vessel or vessel group shall be specified.

EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**

SUMMARY EVIDENCE: Quotas conform with the current decision on TAC, through the individual vessel quota share. All commercial fishing operations are subject to a permit from the Directorate of Fisheries. There is a system for recording the catch quota of each vessel for each species within the central database held by the Directorate. 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 are permitted to fish in Iceland EEZ. Information on size, composition of the fleet is available by vessel.[163]

2.3.1.1

Quotas conform with the current decision on TAC, through the individual vessel quota share.

[162] Foreign registered vessels may be allowed to fish in Icelandic waters by international agreement; such vessels require specific permit from the Icelandic authorities and their catches are strictly monitored.

[163] http://eng.atvinnuvegaraduneyti.is/media/acts/Act-no-22-1998-Fishing-and-Processing-by-Foreign-Vessels-in-Iceland.pdf

2.3.1.2
All commercial fishing operations are subject to a permit from the Directorate of Fisheries.

2.3.1.3
There is a system for recording the catch quota of each vessel for each species within the central database held by the Directorate.

2.3.1.4

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 cod and other demersal species, including haddock, in the Icelandic EEZ, with strict regulations in place. Information on size, composition of the fleet is available by vessel.[164]

2.3.2 Fishing vessel monitoring and control systems

CLAUSE:
2.3.2.1 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.

2.3.2.2 The fishing gear shall be subject to inspection, as well as the composition of the catch and its handling onboard the fishing vessels.

2.3.2.3 Areas closed from fishing shall be monitored by the Authorities.

2.3.2.4 Catch amounts by species and fishing area shall be estimated and continually recorded in fishing logbooks on-board the fishing vessels.

2.3.2.5 Fishing logbooks shall be subject to unannounced inspection.

2.3.2.6 The timely and correct recording of catches in fishing logbooks shall be monitored by comparing the recorded catch amounts with the catch stored aboard the vessel at time of inspection.

2.3.2.7 Discarding of catch from stock under consideration shall be prohibited. Discarding that may occur shall be monitored, e.g. by estimating amount of catch discarded due to size based high grading by species, season, gear type and area as feasible. The method for the

[164] http://eng.atvinnuvegaraduneyti.is/media/acts/Act-no-22-1998-Fishing-and-Processing-by-Foreign-Vessels-in-Iceland.pdf

monitoring of discards shall be specified.

2.3.2.8 Vessels must comply with relevant National Fishery Management measures, which may include; TAC and quota allocations, effort management measures (e.g. days at sea, access limitation, gear restrictions, maximum allowable proportion of undersized fish, closure of areas with a high proportion of fish recruiting to the fishery, etc.), and technical conservation measures (e.g. mesh size and other gear selectivity measures).

2.3.2.9 Monitoring and control measures shall be in place and shall be conducted in a manner to encourage and demonstrate compliance (and deter unreported landings).

2.3.2.10 Catches shall be landed in authorised fishing ports. Authorised fishing ports provide the necessary facilities for handling and weighing of the catch.

2.3.2.11 In cases of mixed species catches, all commercial species shall be landed.

2.3.2.12 Landings shall be monitored. Harbor officials and fisheries inspectors shall monitor the correct weighing and registration of the catch.

2.3.2.13 Catch shall be weighed by species at landing.

2.3.2.14 The weight (whole weight or gutted weight) by species of all catches of "stock under consideration" and bycatch species *shall be* measured by authorised harbour officials at landing and recorded in the official central data base (date, vessel, gear type, location, species, quantity).

2.3.2.15 There is systematic monitoring of landing, weighing and registration of catches and discrepancies/deviations shall be recorded.

2.3.2.16 Reasons for deviations shall be analysed and corrections made to reduce the likelihood of recurrence.

EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**

SUMMARY EVIDENCE: Monitoring and control of fishing vessel activities by the Icelandic Coastguard is in place to prevent fishing by unauthorised vessels. Fishing gear can be inspected by the Coast Guard, as well as the composition of the catch and its handling onboard the fishing vessels. Areas closed from fishing shall be monitored by the Coast Guard. Catch amounts by species and fishing area are recorded in fishing logbooks on-board the fishing vessels. Fishing logbooks are subject to unannounced inspection by the Coast Guard. The correct recording of catches in fishing logbooks are monitored by comparing the recorded catch amounts with the catch stored aboard the vessel at time of inspection. Discarding of catch is prohibited by Icelandic fishery law except for damaged or fish in poor health. There is a bycatch allowance for haddock in

other fisheries. Monitoring and control measures are in place and are conducted in a manner to encourage compliance. Authorised landing Ports are designated by the Ministry and landings controlled by the Directorate. Landings are monitored. Harbour officials and fisheries inspectors monitor the correct weighing and registration of the catch. Discrepancies/deviations during weighing are recorded. The reasons for deviations are analysed and corrections made to reduce the likelihood of recurrence.

EVIDENCE:

2.3.2.1

The Icelandic Coastguard administers the VMS for all Icelandic vessels and for all foreign vessels (including fishing vessels) that enter Icelandic waters.

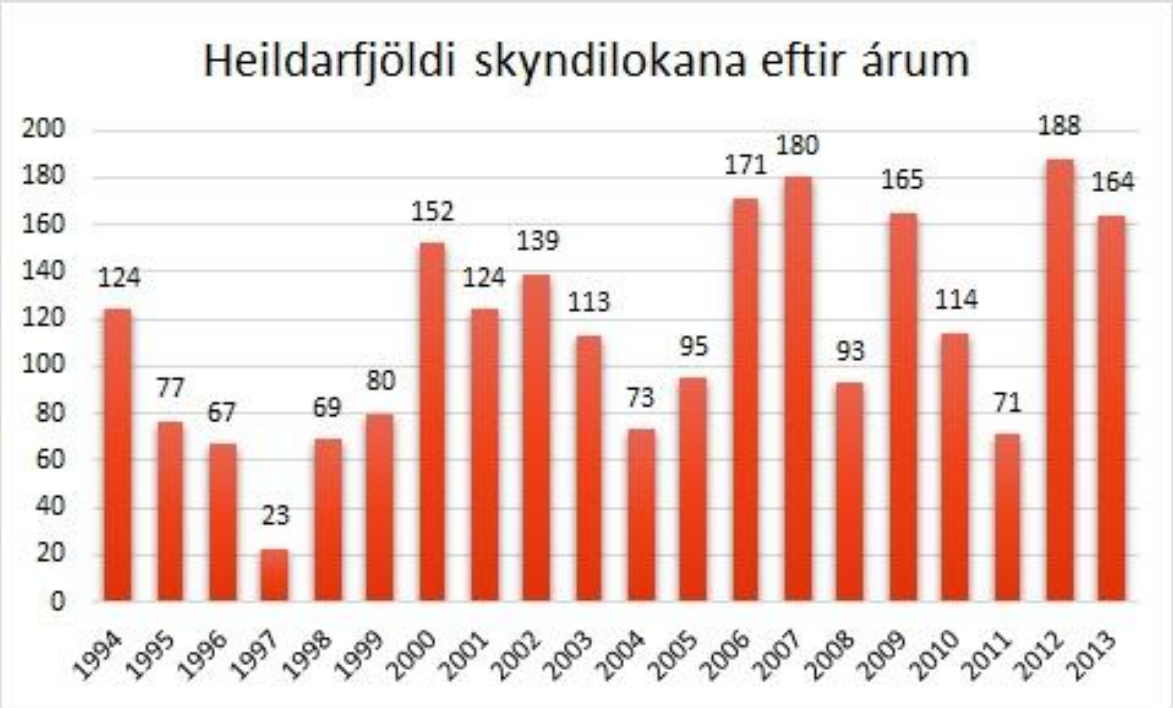
2.3.2.2

The Coastguard conduct vessel boarding's in order to inspect gear, catch and catch records.

2.3.2.3

Short term closures are established by the MRI and monitored by the ICG. No closures were implemented specific to haddock in 2013 and 2012. In 2011 there were 3 and 23 in 2010.

Total number of Fast Shutdown by year[165]



[165] http://www.fiskistofa.is/umfiskistofu/arsskyrsla-2013/eftirlit/

Cod – saithe – tusk – herring – shrimp

Information on temporary closures are available online for access by fishermen.[166] The Coast Guard receives immediate notification of closures and can direct attention from patrol vessels to these areas when vessels are present. The system was reviewed during the site visit.

2.3.2.4

Vessel operators are required by law to up-date and transmit data on fishing activity after each haul (fishing event occasion). For small vessels that operate without an electronic logbook (below 6GRT) a report of catches must be submitted on landing.

2.3.2.5/6

Log books are subject to unannounced vessel boarding inspections by Coast Guard and at port boarding's by the Directorate. The table below shows targeted vessel boarding activity by the Coast Guard in 2012 and 2013. Boarding of vessels by Coast Guard and Directorate staff includes a review of catch compared to logbook information.

Number of targeted inspections by the LGH 2012-2013[167]		
	2012	**2013**
Control, number of vessels / inspections	185	182

[166] http://www.hafro.is/undir.php?ID=18&REF=3

[167] http://www.lhg.is/media/arsskyrslur/LHG_Arsyfirlit_2013_LWR.PDF

Comments, number of vessels	94	73
Equipment, number of vessels	30	29
Catch	16	9
Logbook	12	20
Fishing permit	22	22
Fishing gear/seaworthiness	14	14
Muster, registration	18	11
Lack of right to practice	12	14
Number of prosecutions against the master	15	33
Number of reprimands against the master	28	98

Comments:

Coast Guard Vessels	47
Leiftur (other vessels not employed by ICG)	26
Baldur (other vessels not employed by ICG)	0
Total	**73**

Reprimands:

Coast Guard Vessels	12
Analysis departm. and FMC	86
Total	**98**

Prosecutions:

Fisheries	6
Out of communication range	6
Muster, registration	9
AIS not shining	5
Fishing permit	2
Certificate of seaworthiness	2

Fishing logbook	2
Rest regulations	1
Total	**33**

(A. L. Ásgrimsson, ICG Chief of operations, April 2014 *pers. comm.*).

The Act on the Icelandic Coast Guard No. 52, June 14th 2006, enables the current operations of the ICG.

http://www.fisheries.is/management/fisheries-management/enforcement/

http://www.lhg.is/media/LHG80/Landhelgisgasla_Islands_enska2_.pdf

http://eng.innanrikisraduneyti.is/laws-and-regulations/nr/6612

2.3.2.7

Discarding of catch is prohibited by Icelandic fishery law except for damaged or fish in poor health. There is a bycatch allowance for cod in other fisheries.

Mean annual discard of haddock over the period 2001-2008 was around 1.5 kt, or just over 2% of landings. In 2010 estimates of haddock discards amounted to 0.7 kt, 1.17% of landings, the third lowest value in the period 2001-2010.[168] Discards rate are estimated by the MRI by comparing the size composition of catches between vessels with and without Directorate inspectors, fishing on same days and sites to minimise variability. The method used for deriving these estimates assumes that discarding only occurs for high grading reasons since larger fish is usually (but not always) higher priced. In recent years misreporting has not been regarded as a major problem in the fishery of this stock.

The MRI report on discard report NO. 154 2010[169] and the MRI report on discard NO.160 2012[170] "Discards of cod and haddock in demersal Icelandic fisheries 2001-2010" also provides qualification of very low discarding estimates derived through the annual assessment- described in the MRI report NO. 171 2013.[171]

New Regulation for Recording of Marine Mammals and Sea Birds

A new amendment to existing regulations requiring that data submitted in logbooks include seabirds and marine mammal's number and species was issued in February 4 2014.

[168] http://www.hafro.is/images/frettir/2012/fjolrit-160.pdf
[169] http://www.hafro.is/Bokasafn/Timarit/fjolrit-154.pdf

[170] http://www.hafro.is/Bokasafn/Timarit/fjolrit-160.pdf

[171] http://www.hafro.is/Bokasafn/Timarit/fjolrit-171.pdf

Nr. 126/2014	4 February 2014

REGULATION

Amending Regulation no. 557, 6 June 2007 on logbooks, as amended.[172]

Article 1.

First paragraph. Article 6. added two paragraphs which read as follows:

1. Seabirds on the number and species.
2. Marine mammals on the number and species.

Article 2.

This Regulation is issued under the provisions of Act no. 116, 10 August 2006, the Fisheries Management as amended, and Act. 151, 27 December 1996, for fisheries under the jurisdiction of Iceland, to take effect immediately.

Industries and Innovation Ministry, 4 February 2014.

F. h. Ministry of Fisheries and Agriculture,

Johann Gudmundsson.

[173]

2.3.2.8/9

The Icelandic 'management model' has been designed to promote compliance through reporting. The system is transparent in that it is very public with respect to performance of vessels in the fleet. A rapid reporting system also encourages transparency- near real time information of catch for each vessel, quota allocation, transfers. Also price at market information of fish is available. The system has a number of features that support reporting of landings which relate to the ITQ system structure. In addition to permits, vessel ITQ, effort is controlled using gear restrictions and also through the fishing area closure system administered by MRI. ICES NWWG (2009) reported that whilst there may be opportunity for discrepancies, unpublished reports from the Directorate of Fisheries, partly based on investigation comparing export from fish processing plants with the amount of fish weighed in the landing process indicate that this bias may be of the order of single digit percentages and not in double digits.

[172] http://www.reglugerd.is/interpro/dkm/WebGuard.nsf/key2/557-2007

[173] http://www.stjornartidindi.is/Advert.aspx?ID=9bc42c49-4617-4fa3-a4f5-424936339ff0

2.3.2.10/12

Authorised Ports are designated by the Ministry and landings controlled by the Directorate. Ports must have official designations for catch weighing by the Directorate staff or one of the other approved systems in place - Auctions, in-house for fresh fish/processed at sea fish using approved yields and at Fish Auctions. A number of foreign ports also have approved status where there is an official weighing and reporting structure that meets the requirements of the Directorate.[174] All commercial species are separated and declared by logbook and landed weight. During the on-site assessment activities at the landings to auctions and to the processing factories, and registrations by the accredited weighers at auction, Port Authorities and individual company official weighers was observed.

2.3.2.13/14

The weight (whole weight or gutted weight) by species of all catches of "stock under consideratior and bycatch species is measured by accredited harbour officials at landing and recorded in th official central data base (date, vessel, location, species, and amount).

2.3.2.15

All catches of Icelandic fishing vessels must be weighted and recorded at the port of landing by an official weigher (who is certified and has signed an oath). The port authorities record the catch in a computer that is directly linked to a centrally located database at the Directorate of Fisheries. Thus 70 ports of landings in Iceland send electronic data daily to the Directorate. A total of approximately 50.000 landings are registered in the system every year.

2.3.2.16

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 are approaching the end of their quotas. Excess catches can result in a revocation of fishing licenses and fines. The Statistics Iceland then receives copies of the data for the production of statistics of the economy. There is a specific factor used to translate gutted to ungutted weight. This factor is calculated by the MRI.

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

2.3.3 Catches are subtracted from relevant quotas

CLAUSE:

2.3.3.1 Landed catches shall be subtracted from the relevant quotas (allowable catch) of the vessel or the vessel group.

2.3.3.2 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.

2.3.3.3 When a vessel's quota is used up, additional quota must be transferred to the vessel from other vessels or the vessel stops fishing.

2.3.3.4 Transfer of quota between vessels must take effect only after it has been authorised and recorded to the official central data base.

2.3.3.5 Information on each vessels catch quota and quota use shall regularly updated and made public and accessible to all on the official web-site, thus ensuring transparency.

EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**

SUMMARY EVIDENCE: Landed catches are subtracted from the relevant quotas (allowable catch) of the vessel or the vessel group. Limited allowance is 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. When a vessel's quota is used up, additional quota must be transferred to the vessel from other vessels or the vessel stops fishing. Transfer of quota between vessels takes effect only after it has been authorized and recorded to the official central data base. Information on each vessels catch quota and quota is regularly updated and made public and accessible to all on the official web-site.

EVIDENCE: Principally, each vessel is assigned a quota share (%) in each stock, initially based primarily on catch history over a reference period. The annual allowable catch for each vessel from each stock is obtained by multiplying the TAC of the year and the vessel's quota share (as a proportion). Quotas can be transferred between vessels; this applies both to quota shares and annual catch allotments. Quota transfer is mainly intended to promote rationalisation and thus increase profitability in the industry.[175] Exceptions include: Community quotas (not based on vessel's quota share, all other provisions apply; limited amount); summer inshore hand line

[175] http://eng.atvinnuvegaraduneyti.is/laws-and-regulations/fisheries/

(jigging) fishery so called Costal fisheries (Strandveiðar). The quota for Costal fisheries is 8,600 tons the fishing year 2013/2014, of which no more than 7,500 may be cod.[176]

2.3.3.1

The Directorate controls the administration of the ITQ system. Examples of the forms that vessel owners are obliged to complete to register and transfer quotas are available on the Directorate's website and were reviewed during the onsite meeting with the Directorate. Information is received into the database in several ways. The electronic logbook system allows automated entry although there is continuous checking of consistency by staff. Manual entry is also possible as in the case for non-electronic logbook carrying vessels such as the hand lining fleet. In this case each trip must be manually recorded in the vessel log and recorded at landing, again using official, calibrated scales. The catches for small boats and liners that are permitted to fish from the common (community) quota allocation are subtracted on an on-going basis in the system.

2.3.3.2

Vessels must have available quota in order to continue fishing once quota is used up. The system is monitored by the Directorate. It is possible to transfer from quota of one species to another species and vice versa, except for cod.

2.3.3.3

In order to facilitate 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. In addition to quota transfer, are the following: a provision allowing the use of catch quota for one species to count against a limited catch amount of another species although it is prohibited to exchange other species for cod quota which instead must be obtained directly through the quota renting system.

Other items allowing flexibility: It is permitted for the year's catch to exceed the year's quota by 5% in most demersal species; the excess is then deducted from the following year's quota. This is permitted to each vessel. It is permitted to postpone fishing for part of the quota and to transfer up to 15% of the year's quota of individual demersal to the following fishing year; postponement of fishing in considered beneficial to the growth of long-lived fish stocks. This is permitted to each vessel.

2.3.3.4/2.3.3.5

Current quota share, allocation and remaining quota can be obtained from the Directorates website for any vessels. The system is very transparent. Documentation that must be submitted for quota share transfers is available on the website and must be transmitted directly to the Directorate for authorization of the transfer. Except if fishing company has two or more vessels they can transfer directly between their vessels (of cause within all laws and regulations)[177] .

[176] http://www.atvinnuvegaraduneyti.is/media/Skyrslur/Stjorn-fiskveida-2013-2014_4prof.pdf Article 2 page 51

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

2.3.4 Rules are enforced

CLAUSE:	2.3.4.1 Rules shall be enforced. There shall be penalties for serious infractions.			
EVIDENCE RATING:	High ☑	Medium ☐		Low ☐
NON CONFORMANCE:	High ☑	Minor NC ☐	Major NC ☐	Critical ☐

SUMMARY EVIDENCE:

There is a clearly established legal framework, with regulations and rules that give powers to the Ministry, the Directorate, the Coast Guard and the MRI. These are enforced by principally the Directorate on a day to day basis through powers to collect levies, monitor, inspect, report and gather evidence for prosecution purposes where violations are expected.

EVIDENCE

There is a clearly established legal framework, with regulations and rules that give powers to the Ministry, the Directorate, the Coast Guard and the MRI. These are enforced by principally the Directorate on a day to day basis through powers to collect levies, monitor, inspect, report and gather evidence for prosecution purposes where violations are expected. All prosecutions are carried out through the Icelandic legal process (Ministry of Justice and Human Rights). Other at sea monitoring and inspection duties preside with the Coastguard. The MRI also has legal powers to close fishing grounds within the remit of the overall Ministry of Industries and innovation.

The following information was submitted by the Icelandic Coast Guard on the number of vessel inspections which took place in 2013. Out of a total of 182 boardings, the Inspector made comments on a total of 73 observations (note that these inspections were targeted towards vessels were infringements were suspected). Out of this activity, a total of 33 (18%) of inspections resulted in a prosecution of the master of the vessel with respect to a violation of Icelandic fishery laws.

Number of targeted inspections by the LGH 2013		
Eftirlit, fjöldi skipa /skoðana	Control, number of vessels / inspections	182
Athugasemdir, fjöldi skipa	Comments, number of vessels	73
Búnaður, fjöldi skipa	Equipment, number of vessels	29
Afli	Catch	9

Fiskidagbók	Logbook	20
Veiðileyfi	Fishing permit	22
Veiðarfæri/haffæri	Fishing gear/seaworthiness	14
Lögskráning/vöntun atv.skírt.	Muster, registration	11
Vöntun réttindamanna/réttindi	Lack of right to practice	14
Fjöldi kæra á skipstjóra	Number of prosecutions against the master	33

(A. L. Ásgrimsson, ICG Chief of operations, April 2014, *pers. comm.*).

The Act on the Icelandic Coast Guard No. 52, June 14th 2006, enables the current operations of the ICG.

2.3.5 Analysis is carried out

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 adopted when indicated.

2.3.5.2 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.

2.3.5.3 There shall be full traceability from catch, through processing, export and delivery on the market.

EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**

SUMMARY EVIDENCE:

There is an integrated and systematic procedure in place for analysing catch records. It commences with a comprehensive recording system using a combination of vessel generated data and official landing data, supported by verification audits at processing plants for yield confirmation. All purchases must be made by registered buyers (Directorate) and also processors

must be approved for hygienic handling and processing. Permanent records of purchases and sales must be available and periodically submitted (monthly) to the Directorate for official registration purposes. The Directorate compares data on official landings, with purchase information, sales and exports and cross compares data with information collected on a vessel by vessel basis from official reports and boardings made by the Icelandic Coast Guard.

EVIDENCE

2.3.5.1

Export documentation provides an independent comparative check on catch quantities for different species. 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 catches that are 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.

2.3.5.2

All processors making purchases of fish (at auction, or directly) are obliged to report purchases on a monthly basis to the Directorate. The Fish Market also reports directly into the Directorate for fish catches.

2.3.5.3

There are effective systems in place that can manage the traceability of catch through processing, export and delivery to market. Traceability can be demonstrated using electronic logbook data – which, unless mixing of fish occurs on landing will allow for species by catch area by vessel for date of capture. This information is transmitted to the Directorates website and also with the fish to the buyer. Essentially, there is an official registration of landed weight in all cases which also registers vessel, species, quantity using identifiers that allow traceability to vessel. 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. This full traceability is possible but not all buyers require the full traceability report from the boat to the final product.

SECTION 3: ECOSYSTEM CONSIDERATIONS

3.1 Guiding principle

CLAUSE: 3.1.1 Adverse impacts of the fishery on the ecosystem shall be considered and appropriately assessed and effectively addressed[178].				
EVIDENCE RATING:	**High ☐**	**Medium ☑**		**Low ☐**
NON CONFORMANCE:	**High ☐**	**Minor NC ☑**	**Major NC ☐**	**Critical ☐**

SUMMARY EVIDENCE:

The MRI is the principle marine research agency that monitors and researches the marine environment including the ecosystem components. There is a well established and extensive science programme of both monitoring and research into the changes in physical parameters within the waters of Iceland. Direct and indirect impacts of fisheries are assessed and effectively address through conservation measures.

EVIDENCE

Iceland has developed a comprehensive Marine Policy 'The Ocean, Iceland's Policy'. The document has been developed and ratified through the Ministry's of Environment, Fisheries and Foreign Affairs (2005). Iceland's policy on sustainable development, 'Welfare for the Future' Iceland's National Strategy for Sustainable Development 2002–2020', lays down the principles and general policy for sustainable development in Iceland. It discusses the sustainable utilisation of living marine resources and preservation of biodiversity.

Gathering knowledge of the marine ecosystem is a key role that has been assigned to the Marine Research Institute (http://www.fisheries.is/ecosystem/). 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. There is a clear programme of monitoring and research:

- **Oceanographic and physical data** recording and analysis to support improved understanding of the effects of oceanographic and climatic changes on the haddock commercial and ecosystems.
- Direct measurement of **retained catches** of other species within the haddock fishery. To the most part, other retained commercial species are quota species and all vessels have a specific ITQ for these species. Information on all catches is maintained. Discarding is illegal and the MRI undertakes ongoing assessments of potential discard rate to provide

[178] FAO Code of Conduct for Responsible Fisheries, Article 7.2.

quantification and level of compliance. Discards are not included in the assessment. Discards in 2013 were low, as they have been in most years since 2001. (ICES, 2014[179])

- **Bycatch** and interactions of fishing operations of non ETP species and birds.
- **Habitat interactions** in demersal fisheries can be physical interaction of gear on the seabed or interaction of other gears in the water column; hook and line, gill nets and seine nets. As described there are measures in place for the protection of inshore grounds important for nursery areas of fish stocks. Additional closed areas (permanent, seasonal, short notice is also in place for a variety of conservation measures).
- **Endangered, Threatened and Protected Species** with gear interactions.
- **Ecosystem interactions** of the haddock fishery- important prey items and food items.

Oceanographic and physical data

The Marine Research Institute has as one of its duties to improve knowledge on the physical - and chemical oceanography of Icelandic waters, particularly in relation to biological resources. The oceanography group at MRI runs various projects that conform with these duties. Among these are some research projects that are monitoring the environment and climate. Since 1950 there have been annual observations of temperature and salinity in spring at a number of fixed positions or stations on the Icelandic shelf in order to trace climatic variations.

After 1970 the institute started to conduct measurements on these fixed stations four times a year, in February/March, May/June, August/September and October/November. Most often this is done in connection with other surveys such as the acoustic capelin assessment in Autumn. (http://www.fisheries.is/ecosystem/research/oceanography/).

The MRI biological oceanographic research is carried out during the annual spring survey and produces environmental monitoring data, the most recent for 2013. Long-term trends in hydrography and zooplankton abundance and marine ecological work carried out are recorded in the report **Environmental conditions of Icelandic waters in 2013 by the MRI** (Hafrannsóknir nr. 175) in Icelandic with English summaries). Results showed that in 2013 temperature and salinity in surface waters was close to the long term normal or slightly above the long term average to the south and west of Iceland. Similar to 2011-2012, salinity continued to decrease in 2013. Bottom temperature at station Siglunes 3 remained very stable, but the other monitored stations were relatively high, as it had been since the turn of this century. Overall, the total zooplankton biomass was below the long term average in May. In the waters to the west of Iceland it was close to the average, but well below the long term average elsewhere around Iceland.

http://www.hafro.is/Bokasafn/Timarit/vist2013.pdf

ICES released the Status Report on Climate Change in the North Atlantic in September 2011 (http://www.ices.dk/pubs/crr/crr310/CRR%20310%20Climate%20Change.pdf), which reviews the range of climate-change impacts that have been reported from the North Atlantic and discusses potential future changes to the ecological processes of marine systems. The different hydrographic

[179] ICES. 2014. Report of the North-Western Working Group (NWWG), 24 April–1 May 2014, ICES Headquarters, Copenhagen, Denmark. ICES CM 2014/ACOM:07. 902 pp.

conditions in Icelandic waters are also reflected in the atmospheric or climatic conditions in and over the country and the surrounding seas. These conditions in sea and air have their impact on biological conditions, expressed through the food chain in the waters including recruitment and catches of commercial fishes.

Oceanographic and physical data is comprehensively documented for the waters around Iceland. The marine climatic conditions north of Iceland have been monitored for over 50 years at a hydrographic section across the shelf north of Iceland. South of Iceland, regular monitoring of the hydrographic conditions started in 1970 and during the past decade record high temperatures and salinities have been observed.

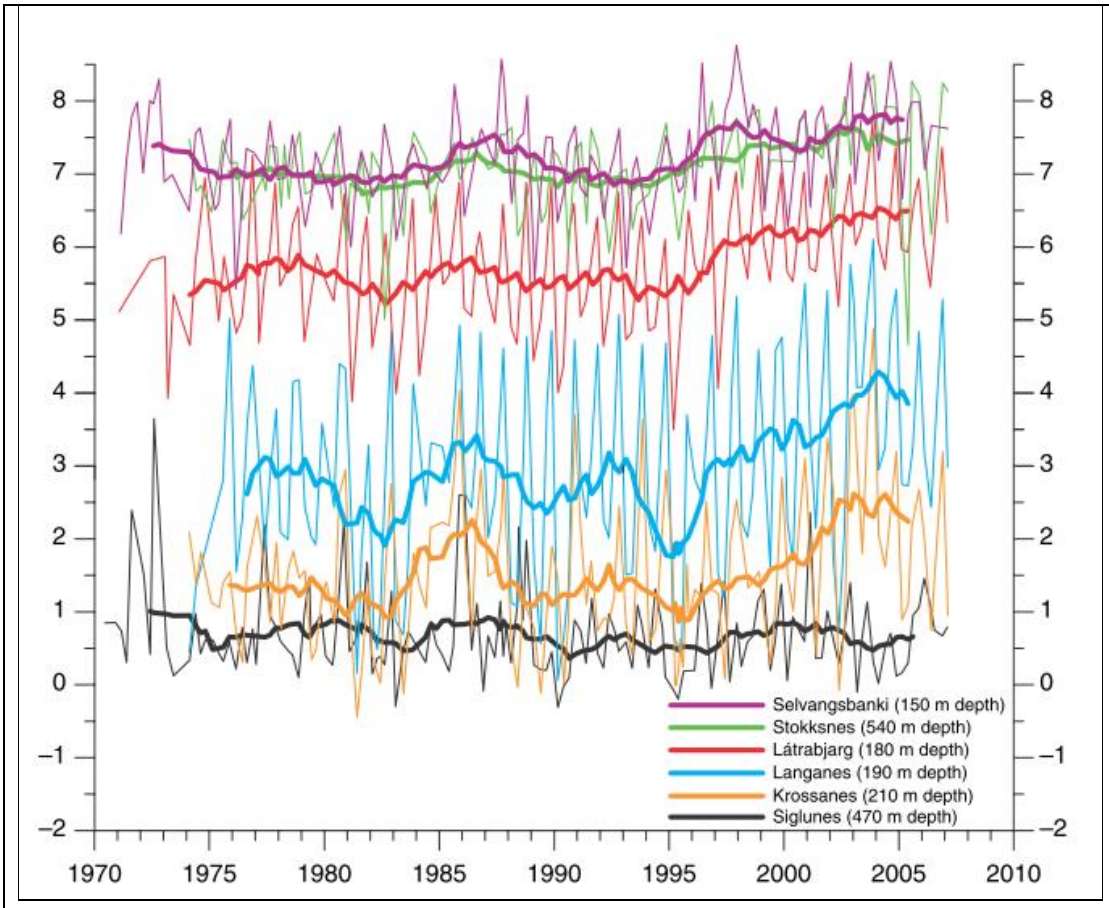
http://www.sigling.is/English

http://vs.en.sigling.is/

Annual observations of temperature and salinity in spring at a number of fixed positions or stations on the Icelandic shelf have been recorded since 1950 to record climatic trends. From 1970 the MRI started to conduct measurements on the fixed stations four times a year in unison with other surveys such as capelin assessment in Autumn and then used to support studies on the biology of other species. Temperature and salinity are also recorded at other stations. As part of the spring cruise measurements taken on nutrients, primary production of phytoplankton and abundance and species of zooplankton to name a few. Continuous monitoring of the inflow of Atlantic water into the area north of Iceland is also carried out by MRI using moored current meters. Many of the tasks and others are linked to international research projects and climate studies in the North Atlantic.
Http://www.fisheries.is/ecosystem/oceanography/Temperature-and-salinity/

Impact of Sea Temperature on Fish Community Structures

While Stefansdottir, *et al* (2010) note that while the overall trends in fish community structures are stable, recent increases in the sea bottom temperatures have resulted in observed changes in species richness in the waters to the southwest and northeast of Iceland. While species diversity in the southwest of Iceland has shown a general increase in species associated with warmer waters temperatures, in the northeast species richness declined. The authors note that abundance of species such as capelin and herring have varied with temperature. Capelin recruitment has fallen to levels since peak levels throughout the 1990's and is now on average around 1/3 of the levels, interspaced with periodic peaks in recruitment.



STEFANSDOTTIR, L., SOLMUNDSSON, J., MARTEINSDOTTIR, G., KRISTINSSON, K. and JONASSON, J. P. (2010), Groundfish species diversity and assemblage structure in Icelandic waters during recent years of warming. Fisheries Oceanography, 19: 42–62.

Retained Catch

Haddock catches are predominately associated with trawl (44%) and longlines (44%); and to a lesser extent Danish seine (10%). There is also a range of other species caught as bycatch. The species composition varies across gear type and metiers.

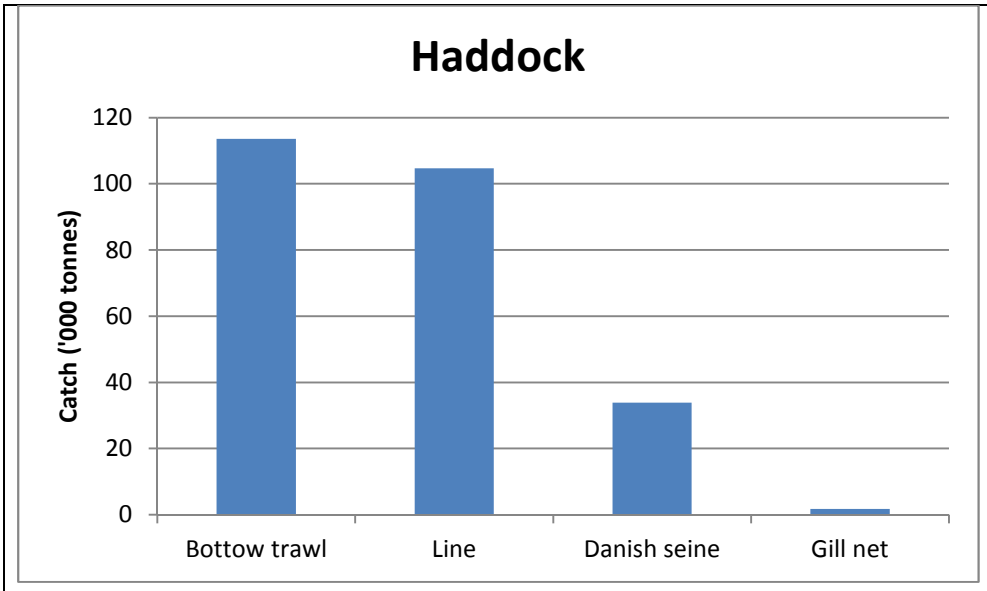


Figure 25. Breakdown of total haddock landings for fishing years 2009/2010 - 2013/2014 (thousands of tonnes) by gear type. (source: Icelandic Ministry of Fisheries).

Table 6. Relative catch composition of TAC regulated species (to haddock) associated for each of the main gear types targeting haddock (2013-2014).

Gear	**Longline**		**Bottom Trawl**		**Danish Seine**		**Gillnet**	
Species	Catch (t)	% Contribution to longline catches	Catch (t)	% Contribution to bottom trawl catches	Catch (t)	% Contribution to Danish Seine catches	Catch (t)	% Contribution to Gillnet catches
Haddock	18405	15.22%	18593	7.00%	4261	17.56%	260	1.10%
Cod	78617	65.01%	114259	43.01%	10553	43.48%	18751	79.03%
Saithe	929	0.77%	47027	17.70%	946	3.90%	2462	10.38%
whiting	242	0.20%	507	0.19%	70	0.29%	2	0.01%
Golden redfish	1545	1.28%	48306	18.18%	537	2.21%	113	0.48%
Ling	8054	6.66%	1686	0.63%	210	0.87%	697	2.94%
Blue ling	579	0.48%	866	0.33%	29	0.12%	12	0.05%
Tusk	4735	3.92%	86	0.03%	0	0.00%	15	0.06%

Catfish	4463	3.69%	1960	0.74%	975	4.02%	9	0.04%
roundnose grenadier	0	0.00%	39	0.01%	0	0.00%	0	0.00%
Ocean redfish	0	0.00%	501	0.19%	0	0.00%	0	0.00%
torny skate	1247	1.03%	139	0.05%	146	0.60%	3	0.01%
spotted catfish	1418	1.17%	859	0.32%	2	0.01%	3	0.01%
Monk fish	32	0.03%	135	0.05%	104	0.43%	29	0.12%
Common skate	154	0.13%	30	0.01%	22	0.09%	3	0.01%
Spiny dogfish	3	0.00%	7	0.00%	1	0.00%	0	0.00%
Greenland shark	41	0.03%	15	0.01%	0	0.00%	1	0.00%
greater argentine	0	0.00%	7107	2.68%	0	0.00%	0	0.00%
Halibut	18	0.01%	36	0.01%	2	0.01%	1	0.00%
Greenland halibut	150	0.12%	10202	3.84%	0	0.00%	472	1.99%
European plaice	178	0.15%	1649	0.62%	4046	16.67%	118	0.50%
lemon sole	0	0.00%	315	0.12%	1037	4.27%	3	0.01%
witch flounder	0	0.00%	60	0.02%	625	2.57%	1	0.00%
megrim	0	0.00%	84	0.03%	89	0.37%	0	0.00%
common dab	6	0.00%	10	0.00%	576	2.37%	1	0.00%
American	12	0.01%	57	0.02%	41	0.17%	2	0.01%

plaice								
Herring	0	0.00%	6	0.00%	0	0.00%	767	3.23%
Blue whiting	0	0.00%	34	0.01%	0	0.00%	0	0.00%
Mackerel	1	0.00%	193	0.07%	0	0.00%	0	0.00%
Shrimp	0	0.00%	40	0.02%	0	0.00%	0	0.00%
arctic wolffish	0	0.00%	18	0.01%	0	0.00%	0	0.00%
Orange roughy	0	0.00%	13	0.00%	0	0.00%	0	0.00%
Norway haddock	1	0.00%	663	0.25%	0	0.00%	0	0.00%
Deep redfish	5	0.00%	9689	3.65%	0	0.00%	0	0.00%
roughhead grenadier	0	0.00%	25	0.01%	0	0.00%	0	0.00%
shagreen skate	22	0.02%	0	0.00%	0	0.00%	0	0.00%
white hake	14	0.01%	0	0.00%	0	0.00%	0	0.00%
Baird's smooth-head	0	0.00%	32	0.01%	0	0.00%	0	0.00%
Black scabbard fish	0	0.00%	420	0.16%	0	0.00%	0	0.00%
Bluefin tuna	5	0.00%	0	0.00%	0	0.00%	0	0.00%
Common hake	52	0.04%	0	0.00%	0	0.00%	0	0.00%

Retained Catch Species

The table above and the figures below show the percentage contribution each species makes to the main gears associated with haddock landings. In all cases, haddock landings form only a small or moderate component of the overall catches for all gears. For example, haddock comprised 15% (by weight) of the total catch made by longline, with cod being the most important species. For bottom trawl, haddock comprised only 7% of the overall catch, again with cod dominating catches for that gear type. Haddock makes up a larger proportion of the overall catches associated with the Danish Seine (17%), but catches are still dominated by cod, which accounts for 44% of landings attributed to this gear type. This table shows that for longlines, only a few species dominate the total catch, while for trawls and Danish seine, catches are generally more diverse. However, it should be noted that each gear type will contain a number of discrete metiers targeting particular species, meaning that in practice, the species diversity for a given metier would be narrower than implied by the table.

The following figures show the relative breakdown by species for each of the key gears associated with haddock catches.

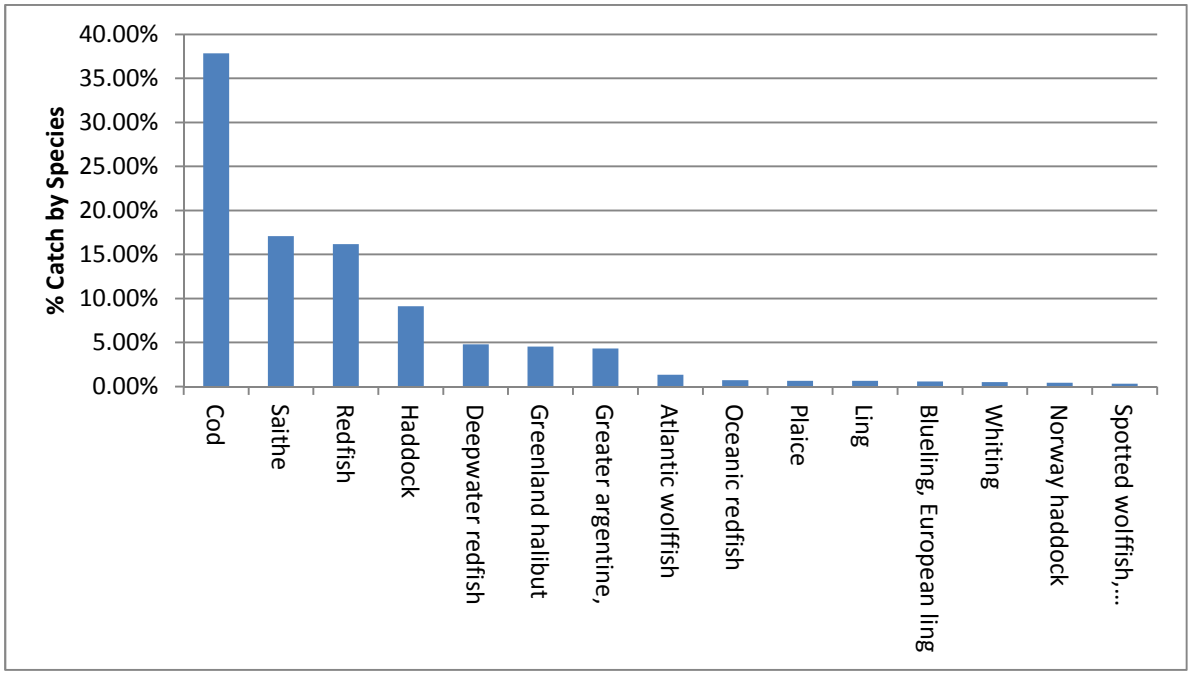


Figure 26. Composition of retained species caught using bottom trawl for fishing years 2009/2010 – 2013/2014. Comprises 99% of total catches by this gear type (source: Directorate)

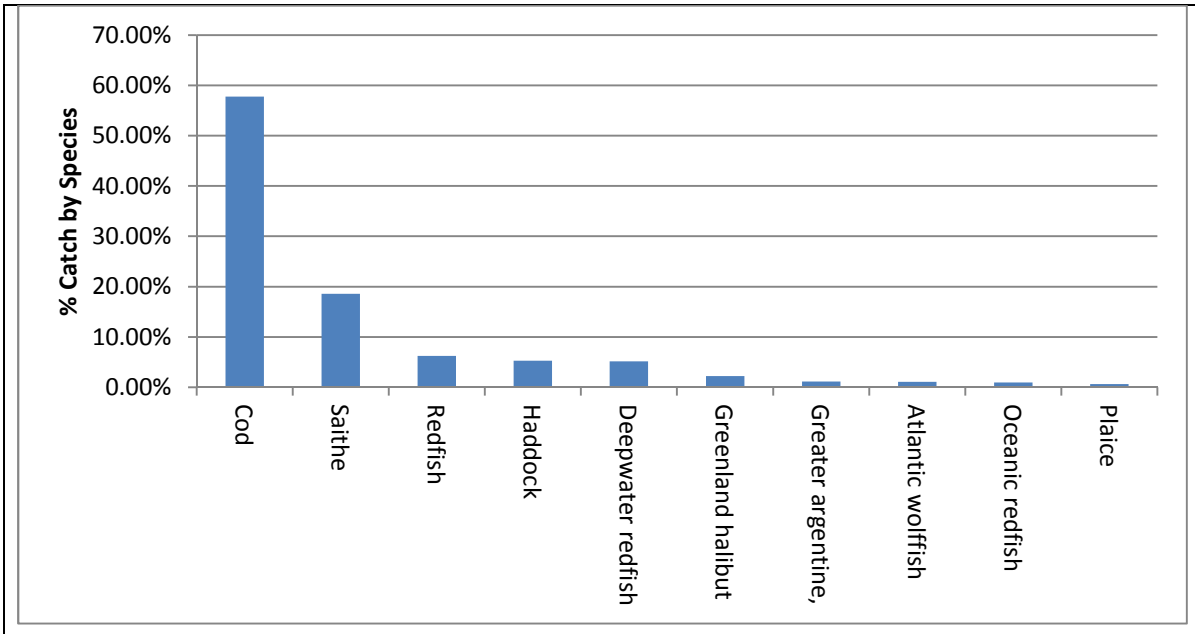


Figure 27. Composition of retained species caught using longline for fishing years 2009/2010 – 2013/2014. Comprises 99% of total catches by this gear type (source: Directorate).

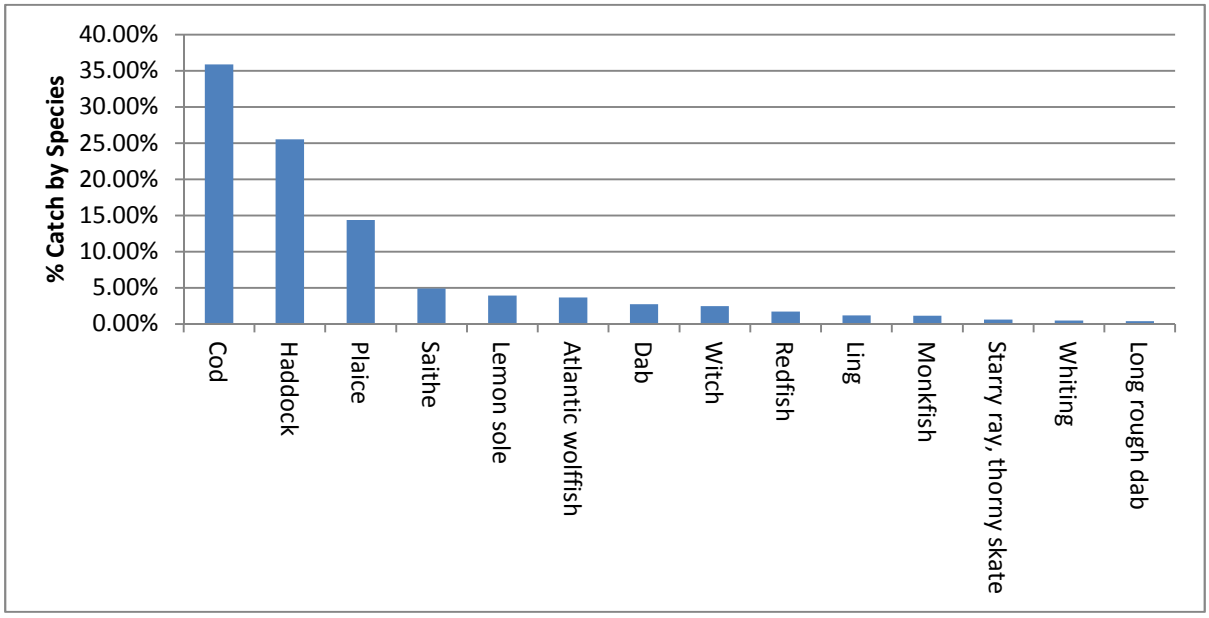


Figure 28. Composition of retained species caught using Danish Seine for fishing years 2009/2010 – 2013/2014. Comprises 99% of total catches by this gear type (source: Directorate)

Status of key retained species associated with the haddock fishery

The information above provides landings data on the species caught with various gear types. It is not possible however, to determine the technical interactions between species with given gear type due to the absence of haul specific data. As an example, while golden redfish and haddock are caught using bottom trawls, it is not possible to determine whether they are actually caught together and therefore whether the fisheries (rather than gears) associated with haddock have a direct impact on golden redfish or vice versa. This would require a more detailed analysis using data at an individual haul level, therefore the list of species below are assumed to have some degree of technical interaction with haddock based on expert judgement.

To provide a qualitative evaluation of the degree of association between haddock and the demersal species listed below, the spatial distribution maps of haddock catches (all gear types) are compared with each of the species listed. This provides visual evidence of the degree of spatial overlap and therefore the potential technical interaction with haddock i.e. if they are observed in the same area then there is a possibility that they are caught together. However, given that the map show catches aggregated across gear types it is not possible to definitively state whether the particular species were actually caught together with haddock, only that there is some degree of spatial overlap. For some species such as deep sea redfish, golden redfish and blue ling for example there is no evidence of spatial overlap and it can therefore be concluded that there is little or no technical interaction between these species and haddock and therefore the management of fisheries catching haddock will have little impact on these stocks.

It's important now to keep in mind that the species reported here below are associated with haddock catches, virtually all of which are quota species. These retained species are categorised as major retained species (larger catches), minor retained species (smaller catches) and as vulnerable species, when their biomass or status shows some sort of conservation concern.

Major retained species

Cod

Landings of Icelandic cod in 2013 were 223 thousand tonnes (kt), as compared to 196 kt in 2012. TAC for quota year 2012/2013 was set by the catch rule at 196 kt but total catch was 212 kt. Probably, the landings exceeding the catch rule will be of similar size in the current quota year. In order to calculate the annual Total Allowable Catch (TAC) a harvest control rule (HCR) is used based on the mean of the TAC in the current year and 20% of the biomass of 4 year and older cod in the assessment year according to the current stock estimate a 20% HCR, in which the current year's TAC is considered, leads to a TAC of 218 kt in the quota year 2014/2015. There appears to be strong spatial overlap between haddock (right) and cod (left), in particular in areas to the west and south west of Iceland.

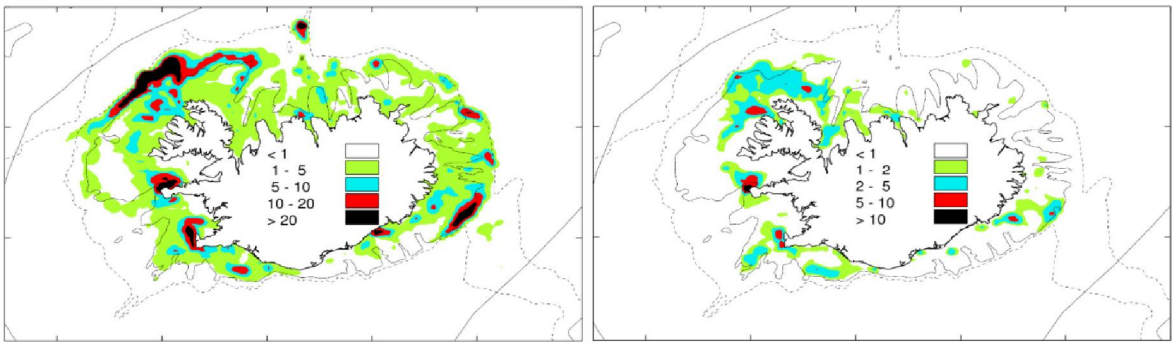


Figure 29. Spatial distribution of haddock (right) and cod (left) catches in 2013. Darkest areas indicate highest densities in tonnes/nmi^2.

Source: http://www.hafro.is/Astand/2014/english/01-cod-14.pdf;
http://www.hafro.is/Astand/2014/english/02-haddock-14.pdf

Saithe

In 2013, landings of saithe (*Pollachius virens*) were 58 000 t, a 6000 t increase from 2012. The advice for the quota year 2012/2013 was 49 000 t and the TAC was set at 50 000 t. The reference biomass of age 4 and older was estimated as 296 000 t at the beginning of 2014, with a harvest rate of 19% in 2013, and a fishing mortality of 0.22. 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). According to the HCR, the saithe TAC for the quota year 2014/2015 will be 58 000 t. Visual inspection of the distribution of haddock (right) and saithe (left) suggests very limited technical interaction between the two stocks.

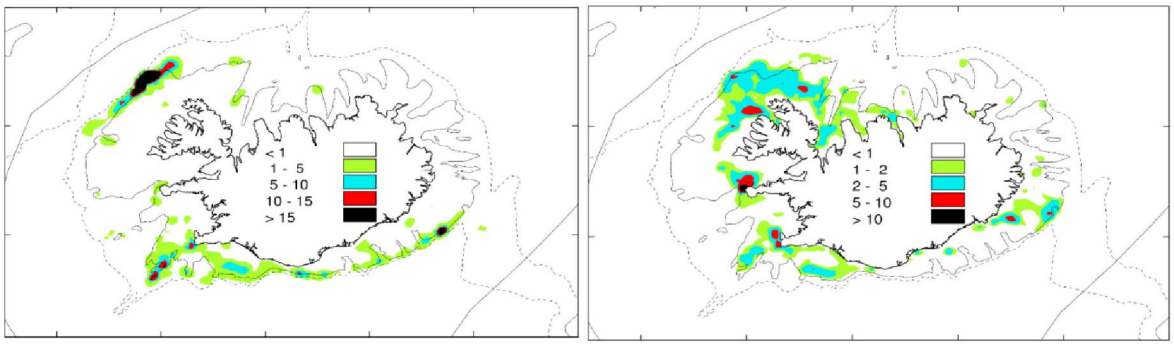


Figure 30. Spatial distribution of haddock (right) and saithe (left) catches in 2013. Darkest areas indicate highest densities in tonnes/nmi^2.

Source: http://www.hafro.is/Astand/2014/english/03-saithe-14.pdf;
http://www.hafro.is/Astand/2014/english/02-haddock-14.pdf

Whiting

During the period 1984-2013 the landed catches of whiting in Icelandic waters ranged between 100-3000 tons. The catch in 2013 was around 1000 tons. Whiting is mainly a bycatch of other fisheries (bottom trawl gear). Large cohort occurred in 2003 and another well above average in 2007. Fishable biomass index increased in the years 2002-2005 after having been low for a decade until the before. The index has since declined except from that in 2011, when it rose temporarily, seemingly when the 2007 year class came into fishing. The last three years fishable biomass index have been low and recruitment been poor since 2008. Catches decreased significantly in 2012 and 2013 with catches predicted to be the same in 2014. Abundance and productivity of the whiting stock is not known but the current catches are not considered to be significant and detrimental to the overall health of the stock (http://www.hafro.is/Astand/2014/english/20-whiting-14.pdf). Visual inspection of the distribution of haddock (right) and whiting (left) catches suggests very limited spatial or technical interaction between the two stocks.

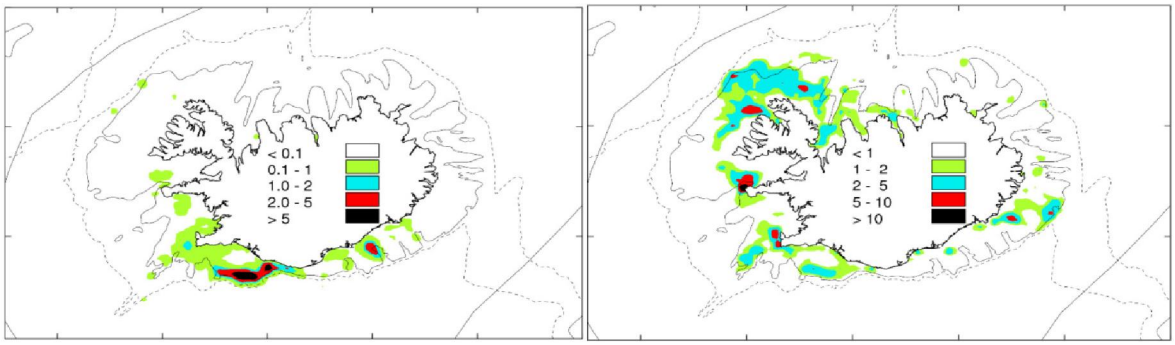


Figure 31. Spatial distribution of haddock (right) and whiting (left) catches in 2013. Darkest areas indicate highest densities in tonnes/nmi^2.

Source: http://www.hafro.is/Astand/2014/english/20-whiting-14.pdf ;
http://www.hafro.is/Astand/2014/english/02-haddock-14.pdf

Golden Redfish

In 2013, approximately 53 000 t of golden redfish (Sebastes norvegicus) were landed in Iceland, an increase of 8 000 t from 2012. The spring survey index of the fishable biomass in 2012 was the highest since 1985, although the index in 2013 is slightly lower but well above the long time average of the survey. Additionally, there are indications from the autumn survey that year classes 1997–2003 are above average. According to an age-length based model (Gadget) the fishable stock has increased since 2005 after a considerable reduction in 1985–1995. At the request of the Minister of Fisheries, the MRI has developed a management plan and harvest control rule (HCR) for golden redfish in the Greenland/Iceland/Faroe Islands region. This was completed in February of 2014 after ICES reviewed the proposal. The HCR is deemed in accordance with a precautionary approach and will lead to maximum sustainable yield. The HCR was formally adopted by the Icelandic government in March of 2014, but an agreement with Greenland and the Faroe Islands has not been confirmed.

Based on the HCR, the MRI recommends a TAC for the quota year 2014/2015 of no more than 48 000 tons. Visual inspection of the distribution of haddock (right) and golden redfish (left) catches suggests an absence of spatial and therefore technical interaction between the two stocks.

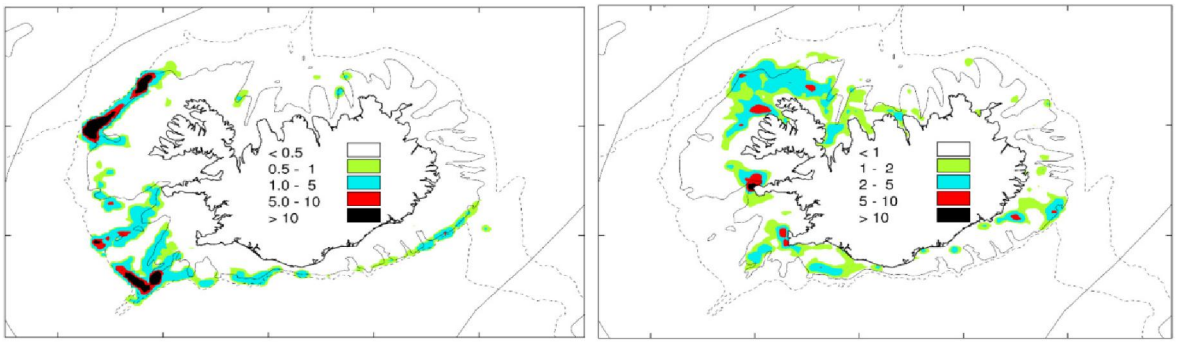


Figure 32. Spatial distribution of haddock (right) and golden redfish (left) catches in 2013. Darkest areas indicate highest densities in tonnes/nmi^2.

Source: http://www.hafro.is/Astand/2014/english/04-goldenredfish-14.pdf;
http://www.hafro.is/Astand/2014/english/02-haddock-14.pdf

Deep Sea Redfish

In 2013, 9 000 t of Icelandic demersal deep sea redfish were landed, a decline of 3 000 t on the previous year. 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 advice. The index of fishable biomass decreased between 2000 and 2003 and has since then been stable. ICES and the MRI recommended that effort should be kept low and the TAC in Icelandic waters not to exceed 10 000 t for the quota year 2014/2015. Visual inspection of the distribution of haddock (right) and deep sea redfish (left) catches suggests an absence of spatial and therefore technical interaction between the two stocks.

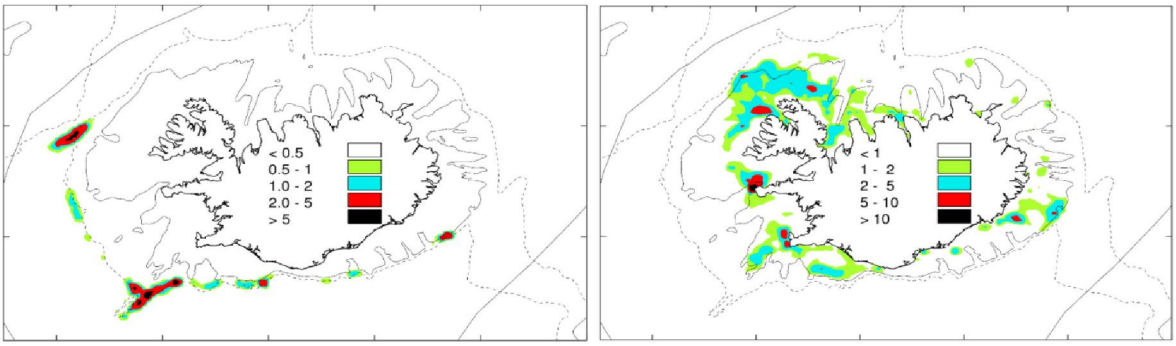


Figure 33. Spatial distribution of haddock (right) and deep sea redfish (left) catches in 2013. Darkest areas indicate highest densities in tonnes/nmi^2.

Source: http://www.hafro.is/Astand/2014/english/05-deepsearedfish-14.pdf ;
http://www.hafro.is/Astand/2014/english/02-haddock-14.pdf

Minor Retained Species

Ling

Landings of ling (*Molva molva*) in 2013 were about 11 000 t, having increased steadily since 2001. Survey indices of harvestable biomass have remained high since 2007, although the recruitment index has declined significantly since the high levels seen between 2004 and 2010 and is now at the lowest level in the time series. In 2013, the exploitation level had decreased further and is now at Fmsy, when survey indices were increasing rapidly. MRI recommended a TAC of no more than 14 300 t in the quota year 2014/2015, including catches of foreign fleets which have been about 1 100 t in recent years. Projections indicate that the stock will likely decrease considerably in the coming years because of poor recruitment and as a consequence, landings are expected to decrease to less than 10 kt. Visual inspection of the distribution of haddock (left) and ling (right) catches suggests only limited spatial or technical interaction between the two stocks.

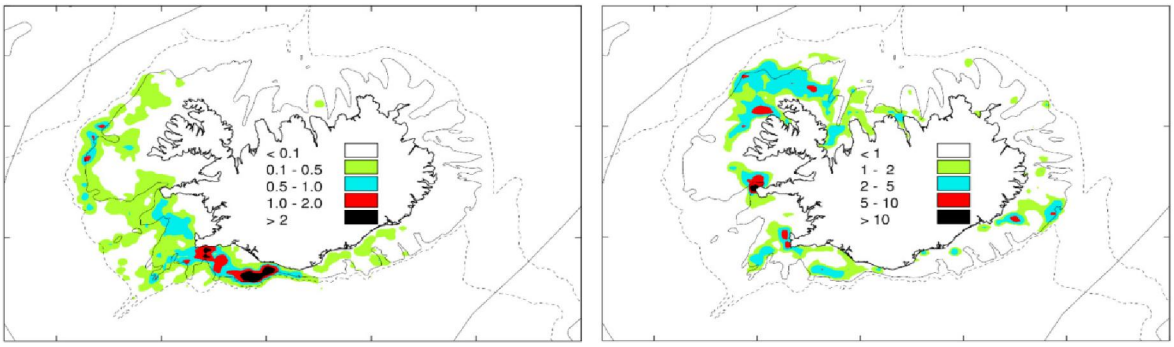


Figure 34. Spatial distribution of haddock (right) and ling (left) catches in 2013. Darkest areas indicate highest densities in tonnes/nmi^2.

Source: http://www.hafro.is/Astand/2014/english/18-ling-14.pdf ;
http://www.hafro.is/Astand/2014/english/02-haddock-14.pdf

Blue Ling

In 2013, 3100 t of blue ling (*Molva dypterygia*) were landed. In past decades, blue ling has mainly been taken as bycatch in the bottom trawl fishery. In 2008–2011, the proportion caught by longliners increased considerably as a result of targeting of blue ling by that fleet. This trend reversed in 2012 and longlines accounted for 51% of landings in 2013 compared to 70% in 2011. Indices from the autumn survey indicated an increase in biomass and recruitment between 2005 and 2009, but biomass indices from 2010 to 2012 indicate a sharp decrease in stock size although this has recovered somewhat in 2013. However, the recruitment index in 2013 is the lowest in the time series and has been extremely low since 2010.

The MRI considers the current exploitation level unsustainable and recommends that landings be constrained to no more than 3 100 t in the quota year 2014/2015. The advice is to bring the exploitation level down to similar levels as observed in 2002–2009 when the stock size was increasing. Continued closure of known spawning grounds from 15 February–30 April is also advised. Given the low recruitment observed since 2010 further declines in the stock can be expected in forthcoming years.

Visual inspection of the distribution of haddock (right) and blue ling (left) catches suggests an absence of spatial and therefore technical interaction between the two stocks.

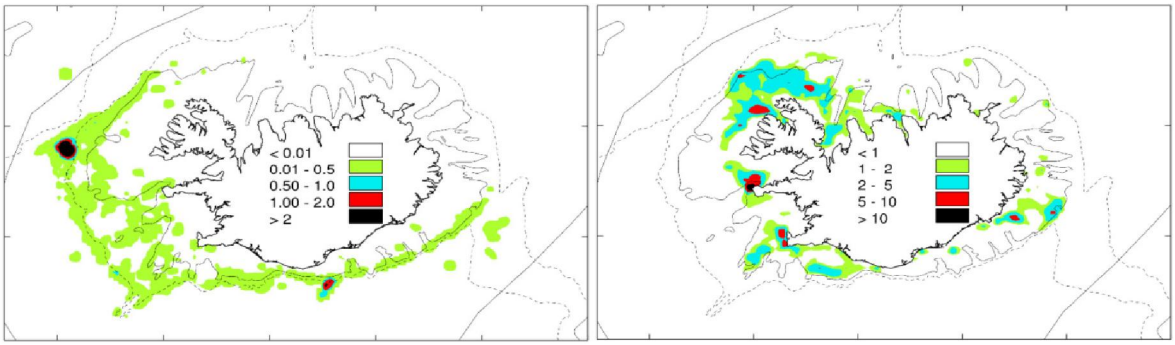


Figure 35. Spatial distribution of haddock (right) and blue ling (left) catches in 2013. Darkest areas indicate highest densities in tonnes/nmi^2.

Source: http://www.hafro.is/Astand/2014/english/17-blueling-14.pdf ;
http://www.hafro.is/Astand/2014/english/02-haddock-14.pdf

Tusk

Landings of tusk (*Brosme brosme*) from Icelandic waters were 6 300 t in 2013, 1 500 t lower than 2012. Indices of fishable biomass in the spring survey have increased considerably since 2001, but have declined since 2012. Recruitment indices peaked in 2006 but have declined rapidly since then, and were in 2013 at the lowest observed value with only a moderate increase in 2014. The tusk stock assessment is based on the Gadget model as recommended by ICES. However the advised catch in for 2014/2015 (4 000 t) is considerably lower than the previous 2013/214 advice of 6 300 t due to an overestimation of stock size in 2013 as well as a change in the fishing mortality reference target from F_{max} (0.24) to F_{msy} (0.2). It was furthermore recommended that the closure of nursery areas off the southeast and south coast be continued. Visual inspection of the distribution of haddock (right) and tusk (left) suggest that there is limited spatial and therefore technical interaction between these two species as tusk are caught in deeper waters to the west of Iceland whereas haddock are distributed mainly on the shelf area.

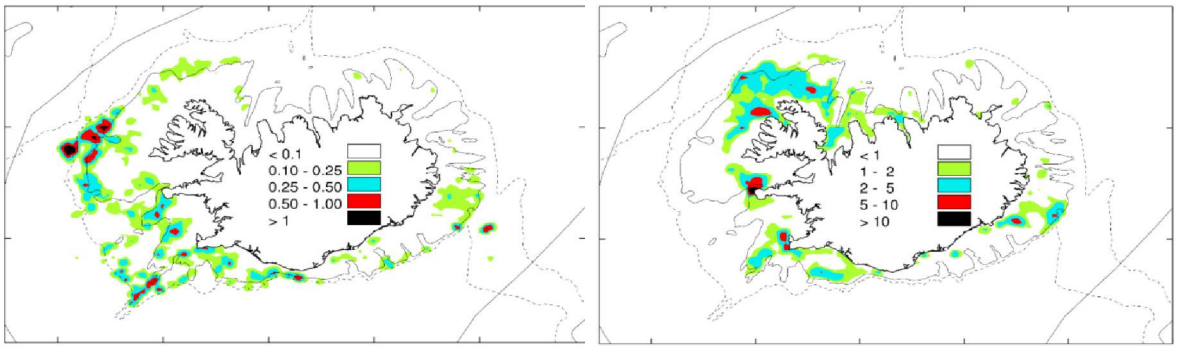


Figure 36. Spatial distribution of haddock (right) and tusk (left) catches in 2013. Darkest areas indicate highest densities in tonnes/nmi^2.

Source: http://www.hafro.is/Astand/2014/english/19-tusk-14.pdf ;
http://www.hafro.is/Astand/2014/english/02-haddock-14.pdf

Starry skate

The starry skate (*Amblyraja (Raja) radiata*) 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 1000 tonnes annually after 1995. Catches have declined again in recent years. The starry skate is fairly abundant all around Iceland, but no formal stock assessment is conducted on this species.

Rough Dab

In 2013, 80 t of long rough dab (*Hippoglossoides platessoides*) were landed, compared to the record high of 6 400 t in 1996. Survey indices and CPUE have been near a historical low in recent years. The MRI recommended that the TAC for the quota year 2014/2015 should not exceed what was expected to be landed as bycatch in other fisheries. There appears to be strong spatial overlap and therefore potential technical interaction between haddock (right) and rough dab (left) in limited area where rough dab are caught.

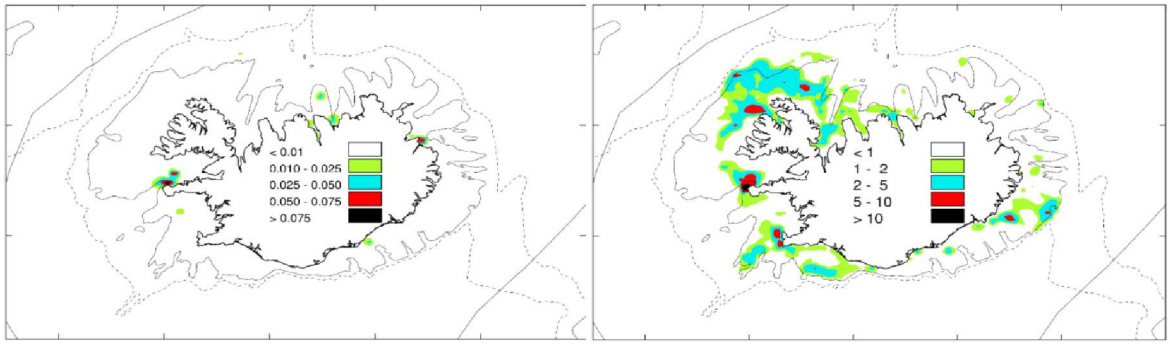


Figure 37. Spatial distribution of haddock (right) and long rough dab (left) catches in 2013. Darkest areas indicate highest densities in tonnes/nmi^2.

Source: http://www.hafro.is/Astand/2014/english/11-longroughdab-14.pdf ;
http://www.hafro.is/Astand/2014/english/02-haddock-14.pdf

Greater silver smelt

In 2013 about 7 200 t of greater silver smelt (*Argentina silus*) were landed compared to the historical maximum of 16 400 t in 2010. The stock is assessed with limited data and must therefore be harvested with caution. The MRI recommended a precautionary TAC of 8 000 t for the quota year 2014/2015. The basis of the advice is the index of fishable biomass from the Autumn survey and preliminary results of the Gadget model. MRI further reiterated last year's advice that the precautionary approach be adopted in the management of the greater silver smelt fishery in order to ensure sustainability of the resource. Visual inspection of the distribution of haddock (left) and greater silver smelt (right) catches suggests an absence of spatial and therefore technical interaction between the two stocks.

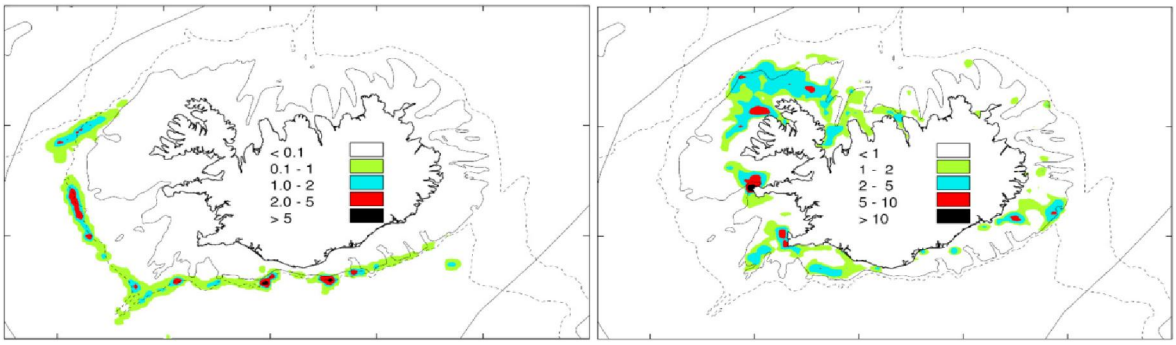


Figure 38. Spatial distribution of haddock (right) and great silver smelt (left) catches in 2013. Darkest areas indicate highest densities in tonnes/nmi^2.

Source: http://www.hafro.is/Astand/2014/english/28-greatersilversmelt-14.pdf ;
http://www.hafro.is/Astand/2014/english/02-haddock-14.pdf

Plaice

In 2013, 6 000 t of plaice (*Pleuronectes platessa*) were landed. Survey indices have increased somewhat in recent years, and recruitment measurements from the groundfish survey suggest some improvement in the last few years. Stock assessment results show increasing biomass since 2000 and fishing mortality has also been decreasing since then. The MRI recommended for the catch not exceed 7 000 t in the quota year 2014/2015, and to retain regulations regarding area closures on spawning grounds in effect. There appears to be strong spatial overlap and therefore potential technical interaction between haddock (right) and plaice (left) in all areas where haddock are caught.

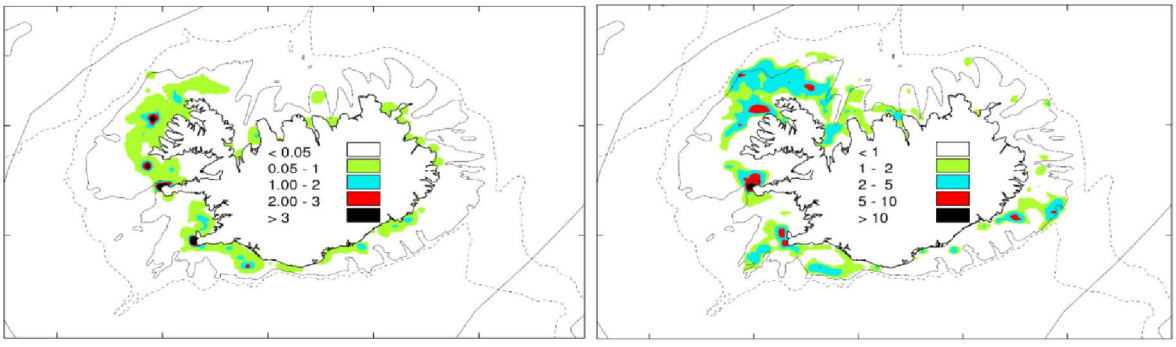


Figure 39. Spatial distribution of haddock (right) and plaice (left) catches in 2013. Darkest areas indicate highest densities in tonnes/nmi^2.

Source: http://www.hafro.is/Astand/2014/english/09-plaice-14.pdf ;
http://www.hafro.is/Astand/2014/english/02-haddock-14.pdf

Rock or roundnose grenadier

Roundnose grenadier (*Cyrophaenoides rupestris*) are fairly large and common enough in Iceland to

have sustained minor catches in the past. Catch in 2013 was minimal at 84 tonnes. ICES (2012) note that catches in ICES Subareas I, II, IV, VIII, and IX, Division XIVa, and Subdivisions Va2 and XIVb2 are minor relative to other areas and have declined to very low levels in recent years. This is a bycatch fishery so trends in landings may reflect changes in activity in other fisheries rather than stock abundance. Catches in early years may include an element of species misidentification. While there is no distribution maps available for this species, given that this species is normally targeted elsewhere in deep water trawl and longline fisheries in the North East Atlantic, spatial overlap with fisheries catching haddock is likely to be very low or absent. ICES (2014) note that the majority of catches in Iceland have been associated with the trawl fisheries for golden redfish and Greenland halibut. Given the spatial distribution of haddock (right) in comparison to Greenland halibut (middle) and golden redfish (left) it may be concluded that the interaction between fisheries catching haddock with roundnose grenadier is likely to be very low or absent.

Figure 40. Spatial distribution of haddock (right); halibut (middle) and; golden redfish (left) catches in 2013. Darkest areas indicate highest densities in tonnes/nmi^2.

Source: http://www.hafro.is/Astand/2014/english/04-goldenredfish-14.pdf;
http://www.hafro.is/Astand/2014/english/08-halibut-14.pdf
http://www.hafro.is/Astand/2014/english/02-haddock-14.pdf

http://ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2014/WGDEEP/wgdeep_Sec09_RoundnoseGrenadier_2014.pdf

Vulnerable Species

Wolffish (or catfish)

Landings of Atlantic wolffish (*Anarhichas lupus*) in 2013 were around 9000 t, the lowest landings since 1982, despite the MRI recommended setting the TAC as 7500 t for the quota year 2013/2014, based on Fmax=0.29. Despite a general decline in recruitment since the late 1990's, the stock has shown an increasing trend in biomass (survey index) which appears to be partially driven by the continued decline in fishing mortality. While F is still above Fmax is likely to be well below any potential PA level. Evidence from stock assessment shows the fishing mortality has been decreasing continuously since the past 5 years and appears to be close to reaching the target mortality. Based on this information the management of this stock appears to be improving although not ideal, but not posing significant threats to the stock. Notwithstanding, this stock and its management will be reassessed with attention in the coming years, given the low recruitment levels. Visual inspection of the distribution of haddock (right) and wolfish landings (left) show some small degree of spatial and therefore potential technical interaction between the two species particularly in waters to the north west of Iceland.

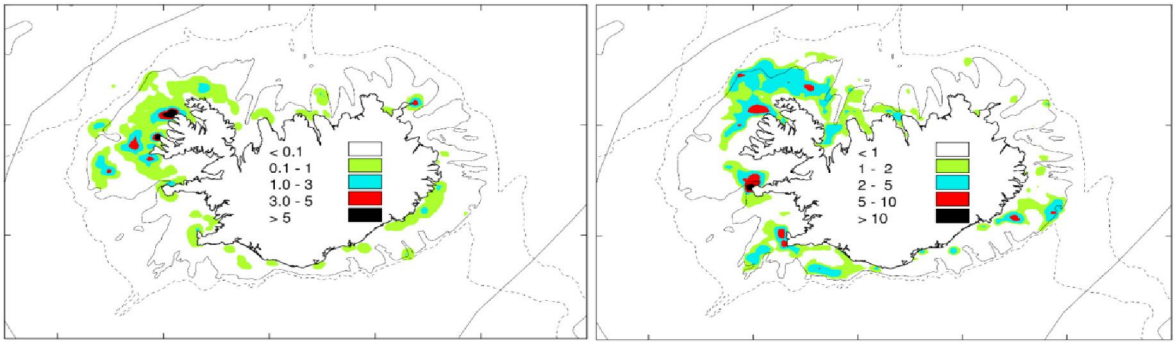
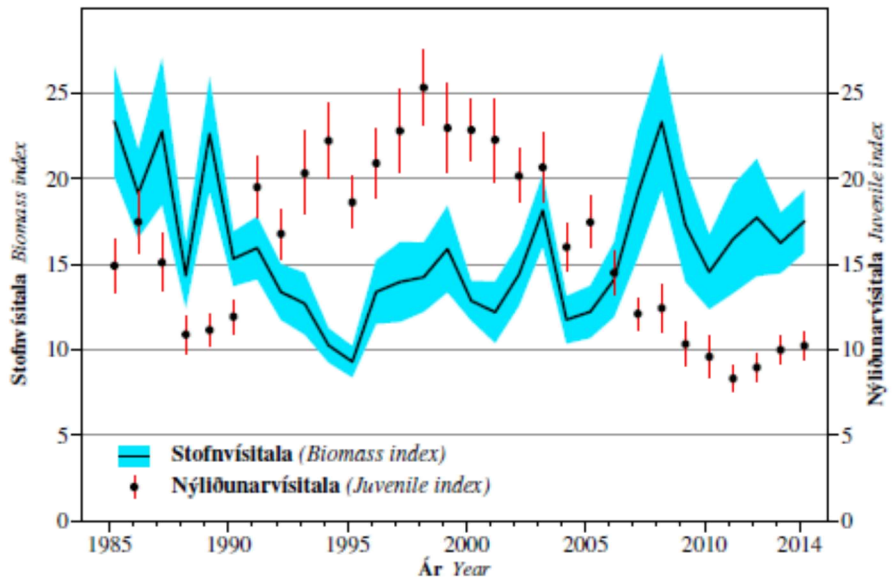


Figure 41. Spatial distribution of haddock (right) and wolfish (left) catches in 2013. Darkest areas indicate highest densities in tonnes/nmi^2.

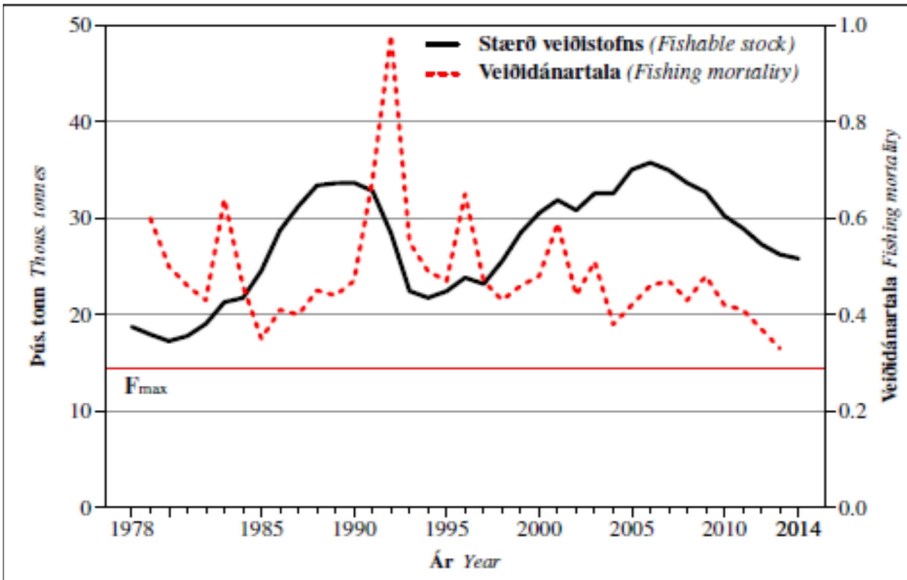
Source: http://www.hafro.is/Astand/2014/english/15-atlanticwolffish-14.pdf ;
http://www.hafro.is/Astand/2014/english/02-haddock-14.pdf

The two figures below show recruitment, biomass and fishing mortality for this stock. It can be seen that recruitment is very low, biomass is somewhat on the rise and fishing mortality has decreased significantly over the last 5 years. The decrease in fish mortality appears to show positive management measure taken in response to the expected reduced productivity of this stock, in future years.



Mynd 2.15.2. **STEINBÍTUR**. Vísitölur veiðistofns (þyngd, fiskar 60 cm og stærri) og nýliðunar (fjöldi, 20–40 cm) úr stofnmælingu botnfiska í mars, ásamt staðalfráviki.

Fig. 2.15.2. ***ATLANTIC WOLFFISH****. Fishable biomass indices (>60 cm) and juvenile abundance indices (20–40 cm) from the annual groundfish survey in March, along with the standard deviation.*



Mynd 2.15.3. **STEINBÍTUR**. Stærð veiðistofns (þús. tonna) 1978–2014 og veiðidánartala 70 cm og stærri steinbíts (F) 1979–2013 samkvæmt Gadget líkani.

Fig. 2.15.3. ***ATLANTIC WOLFFISH****. Fishable stock size (thous. tonnes) 1978–2014 and F of 70 cm and longer Atlantic wolffish 1979–2013 based on the Gadget model.*

http://www.hafro.is/Astand/2014/english/15-atlanticwolffish-14.pdf

Common Skate

In 2013 the total catch of common skate (*Dipturus batis*) in Icelandic waters was 121 t. No TAC is available for this species because there is no directed fishery for it. New studies suggest that the common skate *D. batis* is actually a species-complex, split into two nominal species, the blue skate (provisionally called *D. cf. flossada*) and the flapper skate (provisionally called *D. cf. intermedia*) with maximum lengths of 143.2 cm and 228.8 cm respectively (Iglesias et al. 2009). This classification confusion has resulted in the depletion of the flapper skate throughout European waters, the more endangered species of the two, being masked in the catch record.

From 2011 onwards, all *Dipturus* specimens caught in the annual lobster survey of the south coast have been carefully examined and compared to the criteria given by Iglesias et al. (2009) to differentiate between *Dipturus cf. flossada* and *Dipturus cf. intermedia*. All specimens morphologically examined hitherto belong to *Dipturus cf flossada*, not *intermedia*. This is also true for other specimens caught in the groundfish surveys. The largest individuals caught in these cruises was 152 cm long. Identification of sexual maturity stages revealed the onset of maturity at 100 cm length (males) and that all individuals larger than 120 cm were mature. This agrees with what Iglesias et al. (2009) found for *Dipturus cf. flossada*. *Dipturus cf. intermedia* is considerably larger when sexually mature.

In 2013, tissues samples for DNA analysis from these skates were sent to Dr Andrew Griffiths at the University of Salford, UK. By the end of the year the largest individuals of the batch were analysed and it was found that the sequences analysed were identical to others previously collected from D. flossada. Thus confirming the identification based on morphological characters (MRI and Griffiths, 2013, pers. comm.). Search for archived specimens in Iceland did not reveal a single Dipturus cf. intermedia. Thus, there is no indication of occurrence of *D. intermedia* in Icelandic waters.

MRI note that the bottom trawl spring survey will continue to report on incidences and distribution of skate (*Dipturus spp.)* as they have been doing since the start of the survey in 1985. Also, catches in commercial fisheries will continue to be collected and the MRI will monitor whether significant changes in quantities landed or in the survey results occur. Currently the catches are stable.

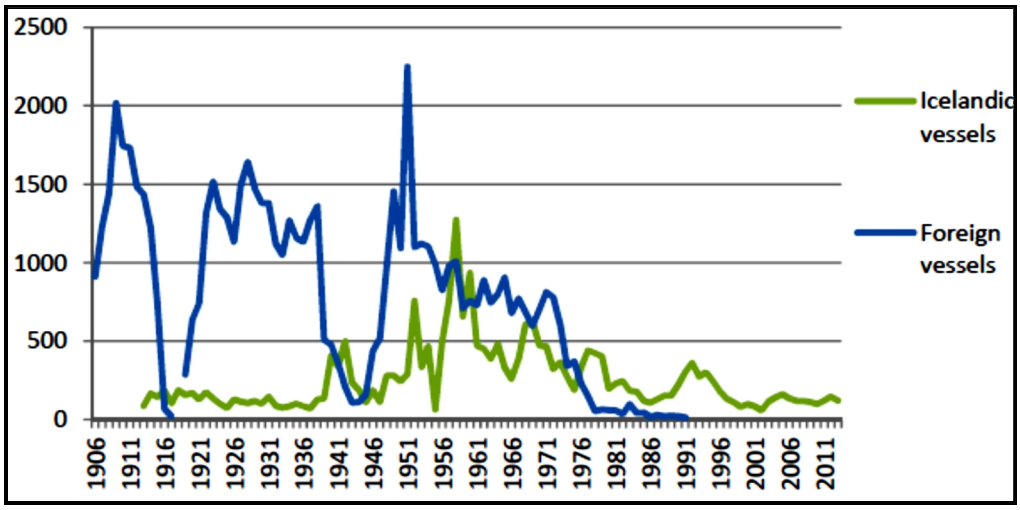


Figure 42. Landings of common skate by Icelandic and international vessels.

The stock is listed as Critically Endangered to Extinction on the IUCN Red list but not officially listed as a stock of concern in Iceland, while the catches and indices of abundance will, as for other stocks, be reviewed to consider if there are potential concerns to the stock status. In fact, the incidence of this species in the MRI surveys has been increasing in recent years (Figure 42). Icelandic catch reports, at present, still go with *Dipturus batis* in terms of nomenclature, as the accepted scientific name. The 'World Register of Marine Species' lists the names *Dipturus cf. flossada* and *Dipturus cf. intermedia* as "Status under discussion". It is still not clear if these will be the officially accepted names.

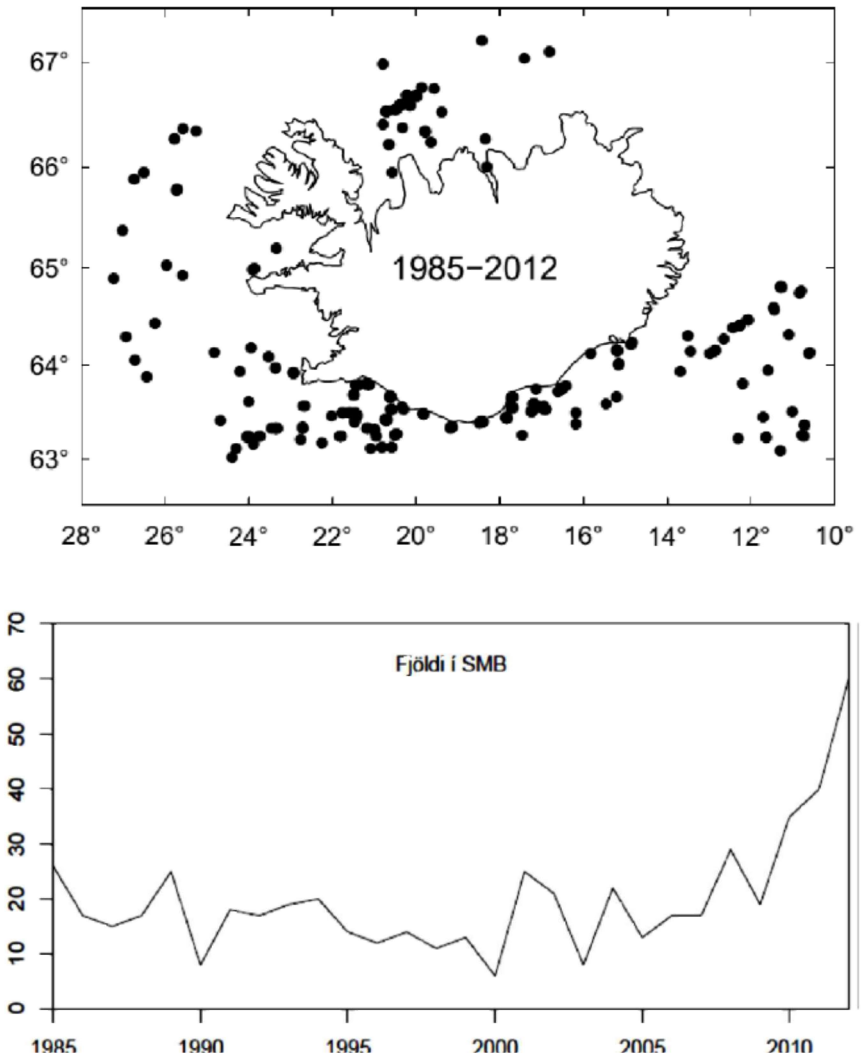


Figure 42. Spring groundfish survey incidence of skate (D. flossada) captures per year (1985-2012). The upper figure represents the survey catch locations for the species in question. In the lower figure the Y axis of the bottom graph represents the number of skate caught.

Source: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2871835/
http://www.sciencedaily.com/releases/2009/11/091117191048.htm
http://onlinelibrary.wiley.com/doi/10.1002/aqc.1083/abstract

Halibut

On the 1st January 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 landings of halibut dropped to 44 t in 2013, compared to 555 t in 2011. Historically, halibut has mainly been taken as bycatch in the bottom trawl and longline fisheries. In the last years before the regulations a longline fishery directed at 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, with very little recruitment into the spawning stock in recent years. The MRI recommended for these regulations to be maintained until clear indications of significant improvement in the stock are visible. Visual inspection of the distribution of haddock (right) and halibut (left) catches suggests very limited spatial and therefore technical interaction between the two stocks.

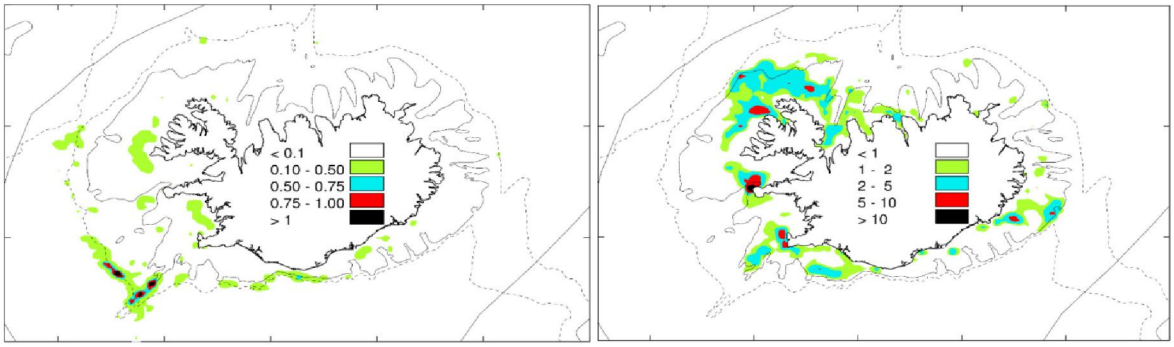


Figure 43. Spatial distribution of haddock (right) and halibut (left) catches in 2013. Darkest areas indicate highest densities in tonnes/nmi^2.

Source: http://www.hafro.is/Astand/2014/english/08-halibut-14.pdf ;
http://www.hafro.is/Astand/2014/english/02-haddock-14.pdf

Greenland shark

Greenland shark (*Somniosus microcephalus)* fisheries have probably been conducted in Icelandic waters from the time of settlement. They reached a large scale in the 18th century, and a zenith in 1867 when 13,100 barrels of shark oil were exported (each barrel is about 62 l). This was probably the most important marine resource in Icelandic waters at the time, and these were the only fisheries by Icelanders prior to the 20th century that can be described as deep-water fisheries. Despite this, they were first conducted in open rowing boats, but later they were the first Icelandic fisheries to use decked sailing boats extensively. Usually only the liver was retained, yielding valuable oil used for lighting up cities in Europe. When whale oil and fuel oil became more available the markets for the shark oil disappeared and direct fisheries for the Greenland shark were over by about 1910. Catches have been low since that time, or about 40 tonnes annually, mostly bycatch in bottom trawls but a few are caught each year in direct longline fisheries. Most of the catches are during spring and early summer (http://www.fisheries.is/main-species/cartilaginous-fishes/greenland-shark/). 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

In 1996, a total ban of discards was introduced and any discards are subject to penalty. Practically, this means that if vessels do not have sufficient catch quota for their bycatch, it is required that sufficient catch quota be transferred from other vessels. 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.

However, the discard ban has some 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 the VS catch is additional to the TAC), on the condition that catches are sold in public fish markets. Only 20% of the revenue of 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). Therefore, the fishing companies have limited incentives and financial motivation to land VS catch. But having the VS catch provisions within the fisheries management system enables the fishing companies with flexibility to land small catches which are outside their specific quota, prevents discards to some degree, improves the treatment of the fishery resource and promotes more responsible fishing practices.

Since 2001, annual haddock discards are in the range of 0.04% and 4% in weight landed (ICES, 2014). Haddock discards in 2010 amounted to 659 metric tons, 0.43% of landings, the second lowest proportion during the period 2001-2010. Over the period 2001-2010 haddock mean discards were highest in the Danish seine fishery (2.70%) and in the gill net fishery (1.34%) in terms of percentage of landings but lower in the demersal trawl fishery (0.77%), and in the long line fishery (0.38%). Discards for 2012 were in the range of 1.4–4.3%.

http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2014/NWWG/12%20NWWG%20Report%20-%20Sec%2010%20Icelandic%20Haddock.pdf

Interactions of gear with benthic ecosystem:

Effects of otter trawling have been investigated in Icelandic waters with a manipulative field experiment. A field experiment (Ragnarsson and Lindergarth, 2009 http://www.int-res.com/articles/meps2009/385/m385p051.pdf) was conducted to examine the short- and long-term effects of otter trawling on a macrobenthic infaunal community in shallow subtidal waters of Faxaflói Bay (SW Iceland) that had never been trawled before. The experimental design consisted of 4 sites trawled 10 times and 4 areas left undisturbed (controls). Sampling of fauna and sediments was carried out in June 1997, immediately after trawling, and subsequently 2 and 7 months later, in order to investigate longer term impacts of trawling.

A total of 160 taxa representing 138 577 individuals were recorded during the course of the study. Two taxa dominated in abundance, the tube-building polychaete *Myriochele oculata* and bivalves belonging to the genus Abra, accounting for 38 and 27% of the total abundance, respectively. The polychaetes Paraonissp., *Cossura longocirrata, Scoloplos armiger, Pholoe minuta, Sternaspis scutata* and *Eteone longa* contributed 25% to the total abundance. Polychaetes, bivalves, crustaceans and other groups comprised 69.6, 29.3, 0.7 and 0.3% of the total abundance, respectively.

Multivariate tests of hypotheses about effects of trawling on the whole benthic community found no significant persistent or temporary effects. The overall qualitative pattern of total abundance and diversity is that all variables increased during the experiment. In contrast to the measures of diversity, there were no persistent long-term effects of trawling on abundances of individual taxa. Furthermore, a significant short-term effect was found only for the bivalve *Thyasira flexuosa*, which was less abundant (70%) in trawled plots immediately after trawling but more abundant in trawled plots at subsequent sampling times (34 and 15%, respectively). Thus, significant long - or short-term effects on average abundance were found for only 1 out of 32 investigated taxa. No significant treatment effects could be detected on total abundance or on multivariate structure, and tests for individual species revealed only a single short-term effect (for the bivalve *Thyasira flexuosa*). However, trawling affected several aspects of diversity with significant short-term reduction in species richness and persistent effects on the Shannon-Wiener index. Power analysis revealed that larger changes were needed to detect changes in abundance compared to measures of diversity.

http://www.int-res.com/articles/meps2009/385/m385p051.pdf

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 otter trawl effort around Iceland (see below).

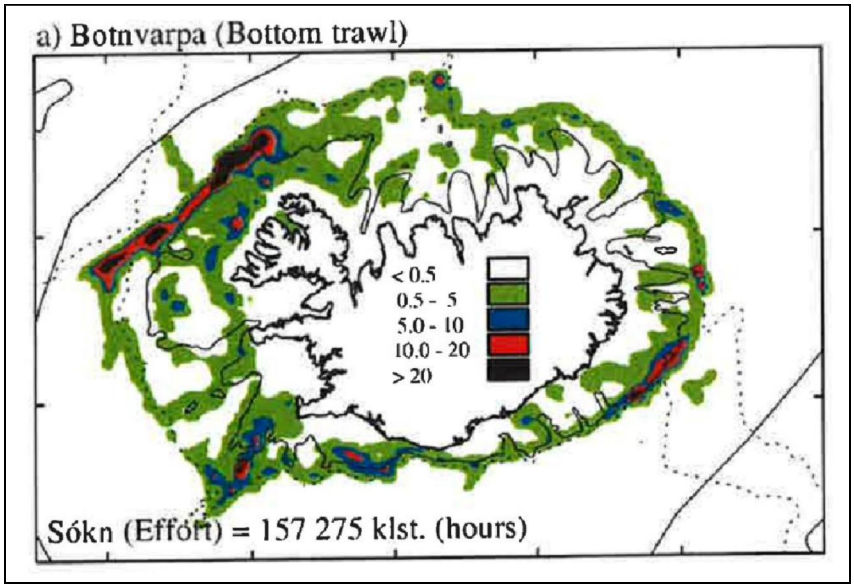


Figure 44. Otter trawl effort in Icelandic waters in 2013. Effort is given as hours travelled per nautical mile.

Source: http://www.fisheries.is/fisheries/fishing-gear/bottom-trawl/

Protection of VMEs

Seabed mapping is a one of the Marine Research Institute's projects which started with the launching of the research vessel, Awvni Fridriksson, in the year 2000. The vessel is equipped with a multibeam echo sounder which enables a detailed mapping of the seabed. Bathymetrical and backscatter data is used to make different kinds of maps, i.e. contour, sun-illuminated and three dimensional maps, and maps with information of the substrate. Emphasis has been on mapping fishing grounds and benthic communities and habitats. 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 otter trawl effort around Iceland. Over the next few years priority will be given to map the distribution of benthic assemblages and habitats which are considered to be sensitive to trawling disturbances. Such information will be important in order to predict which species and habitats are being at risk of being damaged by fishing activities and for protection of important marine habitats in the future.

The waters around Iceland, at least down to 500 m depth, are very rich in habitat forming sponge communities, “ostur“, dominated by *Geodia* spp. Klitgaard and Tendal (2004) describe the composition of “ostur“ from sampling sites all around Iceland, the community south of Iceland being comprising *Geodia atlantica*, *G. Mesotriaena* and *G. barretti* as well as *Geodia* (former *Isops*) *phlegraei*. Very large catches of sponges (up to >20000 kg) were reported to Klitgaard and Tendal (2004) from the eastern and western flanks of the northern part of Reykjanes Ridge at more than 1000 m depth in Atlantic water. 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). The authors suspected that sponge bycatch is lower in areas of high fishing effort as indicated in the Figure below.

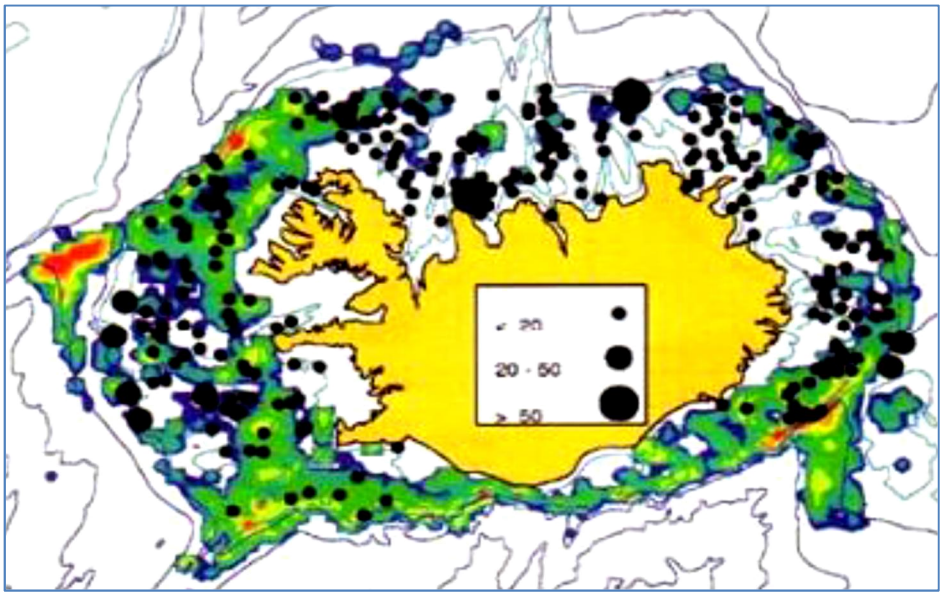


Figure 45. Biomass of sponge bycatch in 2002, superimposed on fishing effort as mean annual swept area (nm2 per 1° latitude x 1° longitude cell). Black dots indicate total biomass (kg/h otter trawl haul) of sponges in the 2002 groundfish survey by the Marine Research Institute.

http://qsr2010.ospar.org/media/assessments/Species/P00485_deep_sea_sponge_aggregations.pdf

Currently, there are no strategic conservation plans for sponges. However, within Icelandic water outside 12 nautical miles, several permanent regulatory fisheries closures (total area 13,094 km^2) have been established, where fishing with otter trawls and also in most cases long-lines, is banned.

The main aim of these closures is to protect nursery grounds of Atlantic cod (Gadus morhua) and redfish (Sebastes spp.). However, these closures do also de facto protect benthic organisms, including sponges. In addition, all coastal areas within 4-12 nautical miles are protected against bottom trawls (total area of 45,290 km^2), while Danish seine are permitted and the area thus practically protected with respect to sponges. Finally, ten closed areas have been established in Icelandic waters to protect cold water corals, (see map below) and some of these have considerable abundance of sponges. Within those areas, all activities (including fishing) that can affect the seabed are prohibited. All in all, aside from the coral closures, 58,384 km^2 are protected trough trawl closures, while the shelf area (within which fishing activities occur) is 109,010 km^2. Trawl closures make up more than half of the total fishable area. Furthermore, not all the fishable shelf areas outside closed areas are trawlable, as some parts are too rough or uneven for trawl gear to operate on. This can be seen in figure 46 which shows trawl effort in Iceland in 2013 (darker areas signify higher effort). Because of this, it appears that there is suitable protection for sponge communities within the Icelandic shelf area.

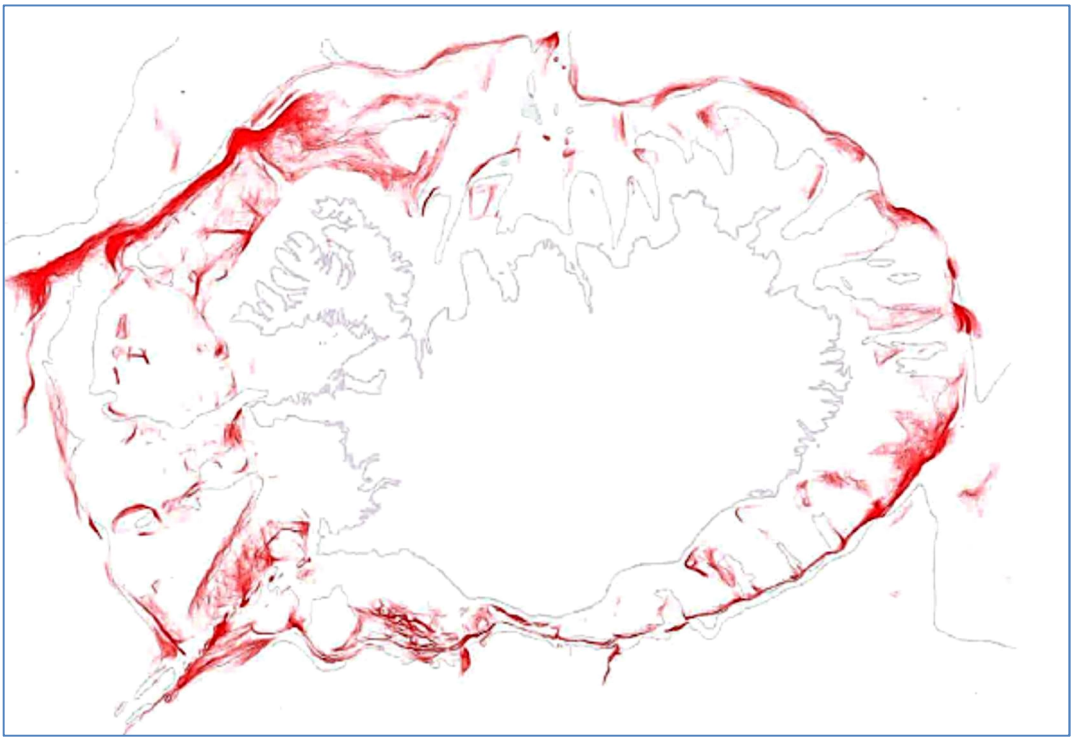


Figure 46. Trawl effort in Icelandic water during 2013. Darker areas show higher effort levels.

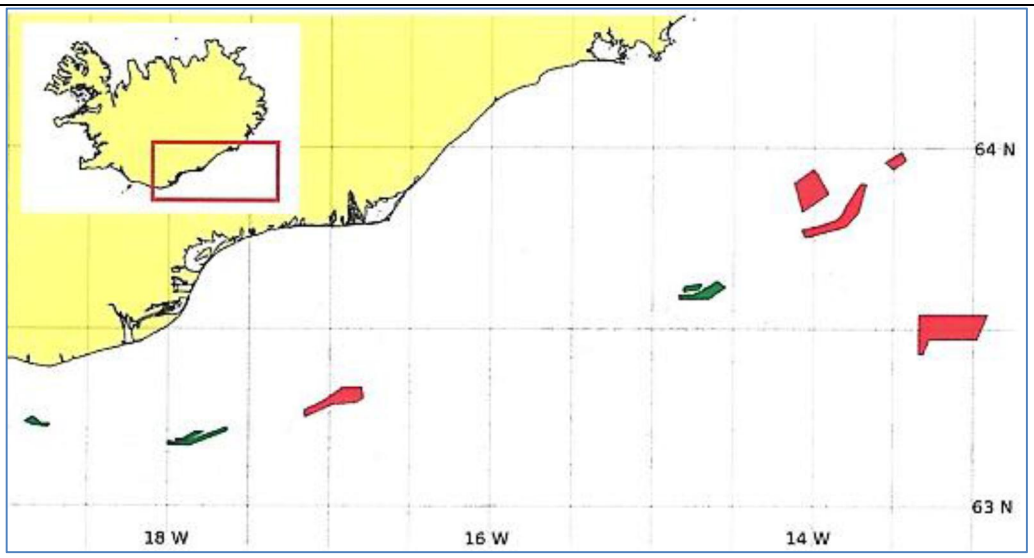


Figure 47. Location of closed areas for the protection of cold water corals in water to the South East of Iceland.

The coral (*Lophelia pertusa*) closures protect a species of cold-water coral which grows in the deep waters throughout the North Atlantic ocean. *L. pertusa* reefs are home to a diverse community, however the species is extremely slow growing and may be harmed by destructive fishing practices. In 2004 a research project was started on mapping coral areas off Iceland (using a Remote Operated Vehicle, ROV), based on the results from questionnaires to fishermen on occurrence of such areas. As a result several areas were permanently closed to fishing for protection of coldwater corals (see figure 47). Currently there are 10 coral closures in Southeast Iceland.

It is the policy of the Icelandic government to protect vulnerable marine ecosystems (VMEs; coldwater 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. Overall, large areas within the Icelandic EEZ are closed for fishing, either temporarily or permanently. These closures are aimed at protecting juveniles and spawning fish and protecting vulnerable marine ecosystems.

Other bottom contact gear landing haddock indirectly

Icelandic haddock is landed also by indirect fisheries targeting Nephrops lobster, shrimp and others using gillnets. The first two use a modified trawl net with a smaller mesh size. As shown below, these gears are responsible for a very small percentage of the overall caught Icelandic haddock. The total haddock catch by all gear types in 2013 was 48.8 thousand tonnes. Based on total, all gear catch, the percentage caught by Nephrops trawl, shrimp trawl, gillnet, handline and lumpfish net is reported below.

Gear	Tonnes	Percentage of haddock catches (all gears)
Gillnet	260	0.630%
Lobster trawl	166	0.402%
Shrimp trawl	74	0.179%
Handline	47	0.114%
Lumpfish net	3	0.007%

Of these gears, the ones with bottom impact are *Nephrops* and shrimp trawl. Figure 48 shows the footprint of these gears (Northern Shrimp on the left and Nephrops on the right) in 2011 (t/nm2). Clearly, the geographical impact of these is very limited. These would appear to be not significant, especially so when relative to overall haddock catches.

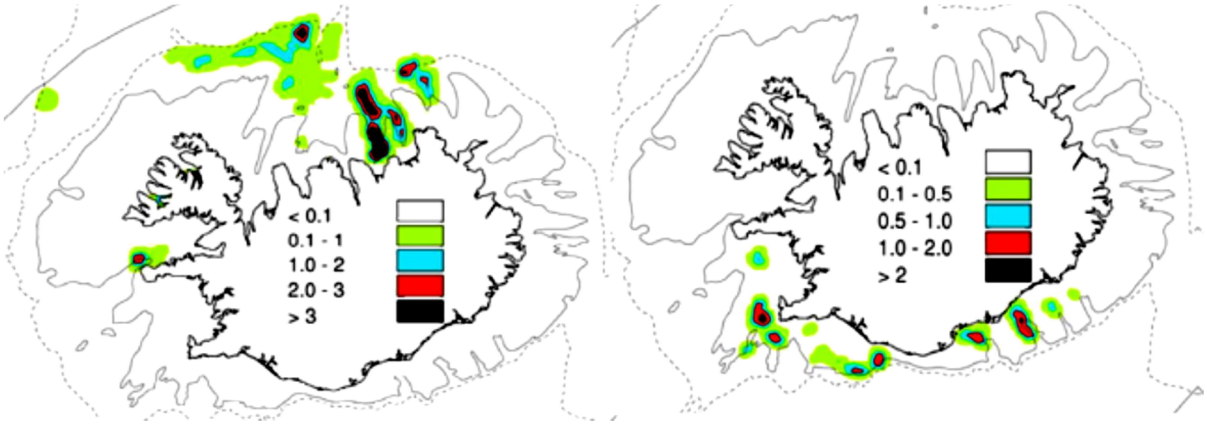


Figure 48. Footprint of Northern Shrimp gear on the left, and Nephrops gear on the right in 2011 (t/nm2).

Interactions with Seabirds and Marine Mammals

The Icelandic government is in the process of improving data collection relating to fisheries interactions and bycatch of marine mammals and seabird.

Measures taken to date. 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, issued by the Steering group.

Timetable as provided in 2013 by the Client

• 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.

• Fall 2013: bycatch data will be compiled and processed for final analysis of results.

• January 2014: evaluation of the 2013 bycatch data recording.

• Fall 2014: bycatch data will be compiled and processed for final analysis of results.

• January 2015: evaluation of the 2014 bycatch data recording.

• Fall 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.

A new amendment to existing regulations requiring that data submitted in logbooks includes seabirds and marine mammals number and species was issued in February 4 2014.

Nr. 126/2014	4 February 2014
REGULATION	
amending Regulation no. 557, 6 June 2007 on logbooks, as amended.	

Article 1.

First paragraph. Article 6. added two paragraphs which read as follows:

3. Seabirds on the number and species.
4. Marine mammals on the number and species.

Article 2.

This Regulation is issued under the provisions of Act no. 116, 10 August 2006, the Fisheries Management as amended, and Act. 151, 27 December 1996, for fisheries under the jurisdiction of Iceland, to take effect immediately.

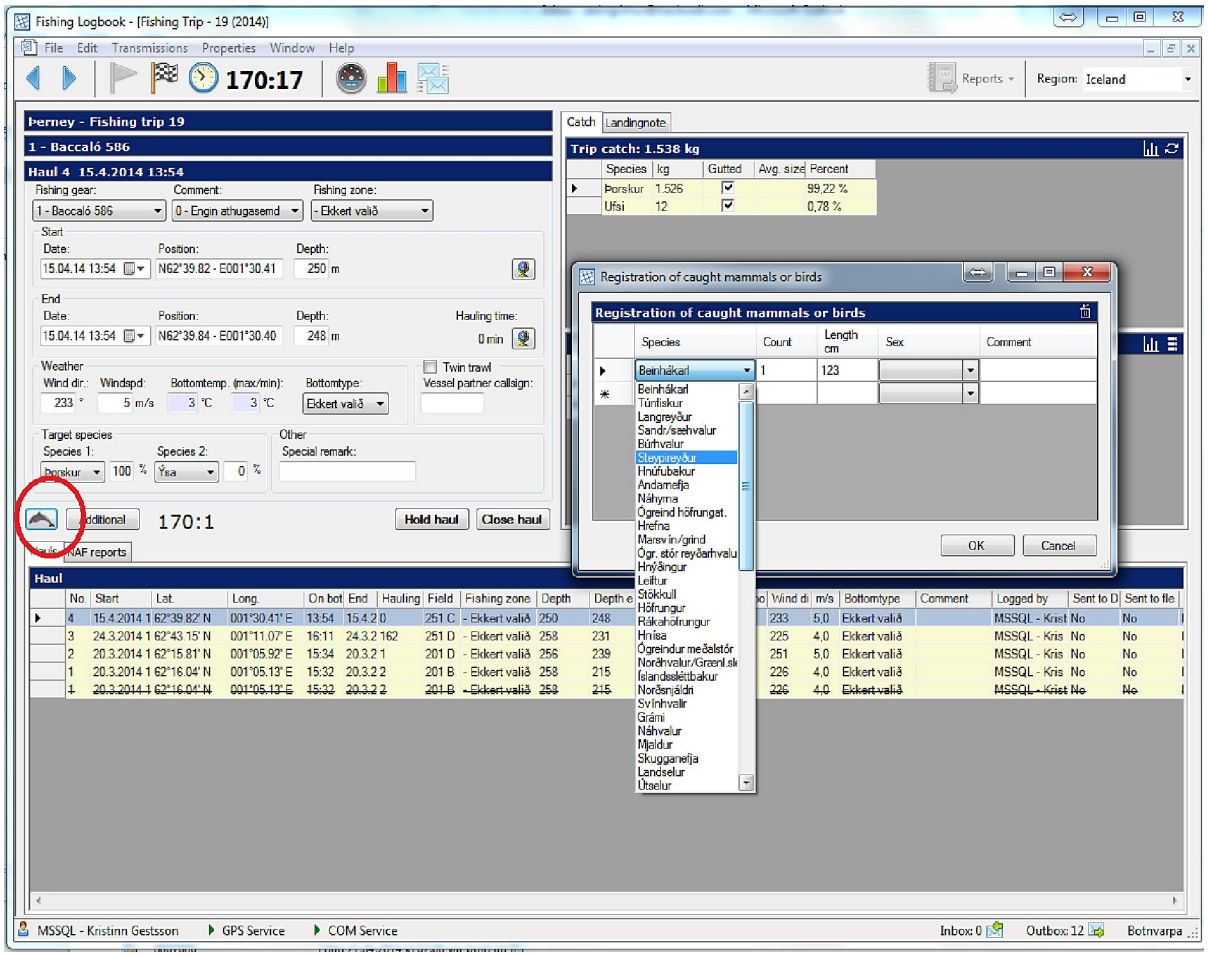
Industries and Innovation Ministry, 4 February 2014.

F. h. Ministry of Fisheries and Agriculture,

Johann Gudmundsson.

http://www.stjornartidindi.is/Advert.aspx?ID=9bc42c49-4617-4fa3-a4f5-424936339ff0

The E-logbook designed by trackwell allows for marine mammal and seabirds are recorded along with normal catch.



Here below the list of the marine mammals and seabirds programmed in the e-logbook system is presented for fisherman to log their interaction with.

ID Number	Icelandic common name	Species common English name
1	Langreyður	Fin whale
2	Sandreyður/sæhvalur	Sei whale
3	Búrhvalur	Sperm Whale
4	Steypireyður	Blue whale
5	Hnúfubakur	Humpback
6	Andarnefja	Northern Bottle-nosed Whale
7	Háhyrna	Killer whale
8	Ógreind Höfrungat.	Unrecognized type of dolphin
9	Hrefna	Minke whale
10	Marsvín/Grind	Pilot whale
20	Ógr. stór Reyðarhvalur	Unrecognized type of Balaenopteridae
21	Hnýðingur	White-beaked dolphin
22	Leiftur	Atlantic white-sided dolphin

23	Stökkull	Bottle-nosed dolphin
24	Höfrungur	Dolphin
25	Rákahöfrungur	Stenella dolphin
26	Hnísa	Sea hog dolphin
27	Ógreindur meðalstór	Unrecognized whale, medium size
31	Norðdhvalur/Grænl.sléttb.	Greenland right whale
32	Íslandssléttbakur	Icelandic right whale
33	Norðsnjáldri	North Sea beaked whale, Mesoplodon bidens
34	Svínhvalir	North Sea beaked whale, Mesoplodon bidens
35	Grámi	Grey
37	Náhvalur	Narwhal
38	Mjaldur	White whale
39	Skugganefja	Ziphius cavirostris
51	Landselur	Harbour seal
53	Útselur	Grey seal
55	Hringanóri	Ringed seal
57	Vöðuselur	Harp seal
59	Kampselur	Bearded seal
61	Blöðruselur	Bladdernose
63	Rostungur	Walrus
93	Sæskjaldbaka	Sea turtle
100	Svartfuglar	Guillemot; Auk
101	Langvía	Sea hen
102	Stuttnefja	Brunnich's guillemot
103	Álka	Razorbilled auk
104	Lundi	Puffin
105	Teista	Black guillemot
106	Haftyrðill	Little auk
110	Skarfar	Sea raven; Cormorant
111	Dílaskarfur	Great Cormorant
112	Toppskarfur	Shag
120	Súla	Northern Gannet, Sula bassana
130	Fýll (Múkki)	Fulmar
131	Skrofa	Manx Shearwater (Puffinus puffinus)
132	Gráskrofa	Grey Manx Shearwater
140	Endur	Duck
141	Æðarfugl	Eiderduck
142	Æðarkóngur	King Eider
143	Hávella	Long-tailed duck
144	Hrafnsönd	Common scoter

150	Máfar	Sea gull
151	Rita	Sea swallow
152	Sílamáfur	Lesser black-backed gull
153	Silfurmáfur	Herring gull
154	Svartbakur	Great black-backed gull
155	Hvítmáfur	Glaucous gull
160	Skúmur	Great skua
161	Kjói	Arctic skua
170	Lómur	Loon; Red-throated diver
171	Himbrimi	Great northern diver

Current knowledge of seabirds interactions with fisheries

The seabird community in Icelandic waters is composed of relatively few but abundant species, accounting for roughly ¼ of total number and biomass of seabirds within the ICES area (ICES 2002). Auks and petrel are most important groups comprising almost 3/5 and ¼ of both abundance and biomass in the area, respectively. The most abundant species are Atlantic puffin (*Fratercula arctica*), Northern Fulmar (*Fulmarus glacialis*), Common (*Uria aalge*) and Brunnich's (*Uria lomvia*) guillemot, Black-legged kittiwake (*Rissa tridactyla*) and Common eider (*Somateria mollissima*). There are static-gear closed areas in place to protect eider duck during the nesting season. Longline vessels are also required to employ bird scarers (gas cannons) or other similar methods to minimise bird bycatch when shooting their lines. During its most recent reviews of seabird–fishery interactions, neither of the ICES working groups covering this topic highlighted Icelandic fisheries as raising specific concerns above the universal wish to see all seabird bycatch minimised wherever possible (SGBYC, 2010; WGSE, 2010). While self-reporting of seabird bycatches are expected to have led to general underreporting of seabird/gear interactions, it is now mandatory to record all seabird (and mammal) events as part of normal logbook reporting requirements in Iceland.

Current knowledge of marine mammals interaction with fisheries

At least 12 species of cetaceans occur regularly in Icelandic waters, and additional 10 species have been recorded more sporadically. Reliable abundance estimates exist for most species of large whales while such estimates are not available for small cetaceans. In the continental shelf area minke whales (*Balaenoptera acutorostrata*) probably have the largest biomass. Reliable recent abundance estimates exist for the northeastern and central North Atlantic and off West Greenland; these total over 180,000 animals (Source: IWC, 2014). The Icelandic minke whale research programme undertakes studies into feeding ecology (stomach contents, stable isotope ratios, fatty acid profiles), energetics, multi-species modelling, biological parameters, satellite tagging, distribution and abundance, genetics, pollution, parasites and pathology (NAMMCO, 2013). The majority of seal/gear interactions are associated with the gill net fishery for lumpsucker fish, while there are more interactions with harbour porpoise associated with gillnet fishery for cod.

However, given that catches of haddock associated with gill nets are extremely low (0.6% of total haddock catches), the issue of marine mammal bycatch associated with gillnets is considered to be negligible. Furthermore, given the estimated population sizes (Stenson, 2003) and relatively low catch rates involved, it is unlikely that any bycatches associated with the haddock fishery have detectable impact on population size. Having said that, no evidence of specific mitigation measures to minimise bycatches of marine mammals has been identified.

Icelandic marine ecosystem and the fisheries catching haddock

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.

Haddock are mainly benthivores i.e. feeding mainly on 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. The larval stages feed mainly on immature stages of copepods, while the pelagic post-larvae (0-group) (3-10 cm) predate on euphausids, appendicularians, decapod larvae, copepods and small fish. Once 0-group have settled to the demersal, post-larval stage, they still feed to some extent on pelagic organisms such as euphausiids, but benthic invertebrates become increasingly more important as they grow. Larger haddock also eat fish such as sandeel, Norway pout, long rough dab, gobies, sprat, and herring.

Adlerstein, S. A., Temming, A., and Mergardt, N. 2002. Comparison of stomach contents of haddock (Melanogrammus aeglefinus) from the 1981 and 1991 North Sea International Stomach Sampling Projects. – ICES Journal of Marine Science, 59: 497–515.

CLAUSE: 3.1.2 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:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**

SUMMARY EVIDENCE: Those impacts that are likely to have serious impacts are addressed though the haddock management plan and wider Icelandic fisheries and marine legislation (see section 3.1.1)

EVIDENCE

Three types of impact have been considered under this clause

- Impact on retained species
- Impacts on habitats and benthos;
- Impacts on marine mammals, ETP species and seabirds;

Impact on retained species

Directed fishing of haddock as well as the bycatch of these species in all other multi species fisheries is assessed yearly, and corrected appropriately through quotas on the main commercial species. These are based on advice from the MRI and are rigorously enforced. There are 35 commercial TAC species and these cannot be discarded. Information is collated from logbooks at each trip and only non-commercial invertebrates and other small benthic species are discarded. Small fish usually less than 30 cm long such as gobies, rockling and dragonets can be discarded. Given that the size of demersal trawl gear is relatively large (set nets are 200 mm and demersal trawls cod-end are 135 mm) the likelihood of catching such species is considered very small. The longline fishery is also unlikely to catch these species given the size of the bait (i.e. generally considered too large). Catch of these non commercial species are is not considered significant but the burden of proof rest with the fishermen. See also the information about retained species provided in clause **3.1.1** above.

To minimise the levels of unwanted catch, managers increased the allowable mesh size for trawl gear to reduce the catch of smaller-sized fish. The Icelandic regulations require the retention of most fish specimens for which there are TACs or species for which a market value exists. There are however provisions within the legal framework for exceptions to be made. For instance it is a requirement that live haddock less than 45 cm long be released, and diseased or damaged fish can be discarded. In addition species for which there is no commercial value may be discarded. There are upper limits on the percentage weight of fish that can be landed below minimum landing size and any haddock, cod, saithe or redfish which is landed is counted against the individual quota at 50% of its weight. Fish kept on board under these no-discard rules may be marketed.

The State Marine Institute provides prognosis and advice for the fishing year 2014/2015. *State of*

Marine Stocks in Icelandic Waters 2013 /2014. Prospects for the quota year 2014/2015. Reykjavik 2013.

http://www.hafro.is/undir_eng.php?ID=26&REF=4

http://www.fao.org/docrep/W6602E/w6602E11.htm

Collecting and bringing ashore any catches of TAC species is obligatory meaning that catches of TAC species are fully documented. Discarding is prohibited and such conduct is subject to penalty according to law. If a vessel catches any species in excess of its fishing permit, the relevant fishing company has the option of obtaining additional quota within a certain period of time after landing the catch. Vessels are authorized to land a small percentage of the catch, usually bycatch, without the use of quota. The catch in question is sold at auction and the proceeds go to a research fund that supports marine research. The Directorate of Fisheries and the Marine Research Institute conduct research, assess and provide TAC recommendations and estimate discarded catches. The results indicate insignificant discards by the Icelandic fishing fleet. Overall, TAC species caught in Iceland must all be landed.

Icelandic trawl fisheries are also subject to a range of technical measures. While primarily aimed at minimising the catches of undersize TAC species, these measures also help minimise the catches of non-TAC bycatch species.

Impacts on habitats and benthos

Large areas within the Icelandic EEZ are closed for fishing, either temporarily or permanently. These closures are aimed at protecting juveniles and spawning fish and protecting vulnerable marine ecosystems. Restrictions on the use of gear are also in effect. Thus the use of bottom trawl and pelagic trawl is not permitted inside a 12-mile limit measured from low-water line along the northern coast of Iceland. Similar restrictions are implemented elsewhere based on engine size and size of vessels and large bottom trawlers are not permitted to fish closer than 12 nautical miles to the shore.

An amendment to Act No 79/1997 on Fishing in Iceland's Exclusive Economic Zone provides for the prohibition of fishing activities with bottom-contacting gear to especially protect vulnerable benthic habitats. In many areas special rules regarding fishing gear apply, e.g. a requirement of using a sorting grid when fishing for shrimp to avoid juveniles and small fish and an obligation to use bycatch- or juvenile grid when fishing for pelagic species in certain areas to protect other species and juveniles.

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 Fisheries and Agriculture.

Eight Marine Protected Areas have been designated around Iceland, of which dragged fishing gear is forbidden in Surtsey Nature Reserve, traditional fishing practices are permitted in Hornstrandir and Búdahraun Nature Reserves and no fishing restrictions operate in Breiðafjörður Conservation Area.

Since 2000, the Marine Research Institute maintains a programme mapping the seabed habitats and fishing grounds using multibeam echosounding in co-operation with other domestic organisations, such as Reykjavik Energy and the Science Institute of the University of Iceland; together, they contribute towards the BIOICE and IceAGE habitat mapping projects. The aim is to compile a comprehensive picture of the entire continental shelf. The Marine Research Institute is also investigating the effects of fishing gear on the seabed and there is a growing focus on habitat studies in keeping with the increased emphasis of the ecosystem approach to marine research (www.hafro.is).

The most commonly used bottom fishing gear in the N. Atlantic is the otter trawl. Between 1991 and 1997, around 72% of total landings of demersal fish in Icelandic waters were caught with otter trawl. Other types of bottom towed gears used during this period (ranked by total landings) were shrimp trawl, Danish seine, scallop dredge, Nephrops trawl and hydraulic dredge. During the first half of the 20th century, the otter trawling fishery around Iceland was confined to relatively shallow waters (<400 m) and targeted cod (*Gadus morhua*), haddock (*Melanogrammus aeglefinus*) and ocean perch (*Sebastes marinus*). Deep water fishing (>500 m) developed rapidly in the 1970s, with deep-sea redfish (*Sebastes mentella*) and Greenland halibut (*Reinhardtius hippoglossoides*) as the main target species (Magnusson, 1998).

The effects of trawling on the marine ecosystem have been a cause of concern in recent years (e.g. Auster and Langton, 1999; Hall, 1999; Kaiser et al., 2002). Such effects include changes in benthic communities as a result of direct mortality of individuals (e.g. Bergman and Hup, 1992; Collie *et al*., 1997) and damage of habitats (e.g. Auster et al., 1996; Fossa *et al*., 2002). Stock depletion in shallow waters coinciding with the development of larger and better equipped vessels has resulted in effort extending into deeper waters (e.g. Koslow *et al.,* 2000), deep-sea fauna is often characterised by fragile forms typical of low disturbance regimes, which can be more vulnerable to trawling (e.g. Fossa *et al*., 2002). Ragnarsson & Steingrimsson examined the spatial distribution of trawling effort from logbook data from all Icelandic vessels fishing for demersal fish between 1991 and 1997. The trawling effort was widely distributed but was intensive only in small and localised areas. Three measures of effort were compared; tow frequency, tow duration and separate estimates of swept area for otter boards and trawls. In each year, the area swept with otter trawl was 1.7 times greater than the total area in which fishing occurred over the 7 year period. In contrast, the area swept with otter boards was 4% of the total fishing area. Most of the fishing effort was confined to depths shallower than 400 m. Effort was highest off the south and NW coasts and lowest off the north and east coasts. Effort was most intensive at the 100–500 m depth in all zones but in some areas (such as off NW Iceland), effort extended to deeper waters. Knowledge of the distribution of fishing effort is important for predicting larger scale effects of fishing gears on benthic communities.

Several studies have been carried out in areas where habitat complexity is high, such as boulder

grounds, corals and seapen communities. These habitats are known to be vulnerable to physical disturbances caused by trawling (Auster *et al*., 1996; Turner et al., 1999; Fossa *et al*., 2002) and for biogenic structures in general the natural recovery following impact can be very long, especially in deep waters (Mortensen and Rapp, 1998; Turner et al., 1999; Fossa *et al*., 2002). In such habitats, the bridles and groundrope of the trawl can easily break down fragile structures rising above the seabed and only a few tows may be required to cause significant impacts. In contrast, on homogeneous soft bottoms the otter boards are likely to be the only component of the trawl causing an impact on the infauna. Data on the distribution of taxa known to be sensitive to physical disturbances and the information on otter trawl fishing effort are useful to identify those areas where benthic communities are impacted by fishing activities.

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 otter trawl, longline, gill nets and Danish seine effort around Iceland. Ongoing work is continuing on mapping the distribution of benthic assemblages and habitats which are considered to be sensitive to trawling disturbances, through programmes such as BIOCE which has already mapped many areas of coral distribution (ICES, 2010). Such information will be important in order to predict which species and habitats are being at risk of being damaged by fishing activities and for protection of important marine habitats in the future.

Also, research on the effects of bottom trawling on seabed communities specific to Iceland is provided in Ragnarsson and Lindergarth, 2009 (http://www.int-res.com/articles/meps2009/385/m385p051.pdf).

In addition to monitoring fisheries to assess their effect on the exploited stock, MRI has a research programme examining the effects of fishing on the seabed. Of particular relevance to demersal fisheries is the study of the effects of otter trawling. These effects were investigated with a manipulative field experiment over four areas that were intensively trawled and four areas left undisturbed. The results showed that only a few species were affected by trawling. In general, the effects of otter trawling in shallow areas with a soft seabed are relatively minor for most of the smaller species. Effects of trawling on large structural biota such as corals and sponges are considered to be more severe. Although little evidence exists on the effects of trawling on this group of animals, it is likely that their distribution is now more fragmented than prior to fishing.

http://www.hafro.is/undir_eng.php?ID=16&REF=2

Impacts on marine mammals, ETP species and seabirds;

Marine mammals bycatch

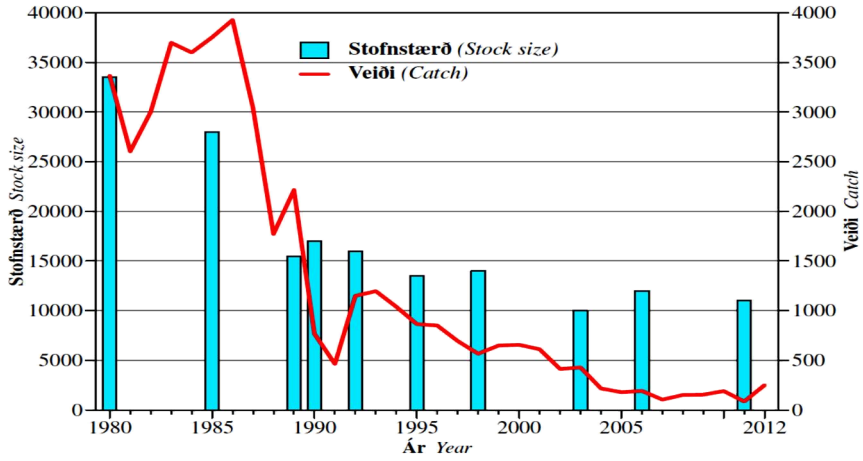
Reporting of marine mammal bycatch in the Icelandic fisheries is now mandatory. Two species of seal are permanent inhabitants of Icelandic waters: harbour seals and grey seals. In addition, there are a few migratory species that come regularly into Icelandic waters. Seal hunting occurs around the country, in addition to a good number that get caught accidentally in fishing nets. In 2012 (the

last available data year), the reported seal catch and bycatch in Iceland was 204 grey seals (*Halichoerus grypus*), 251 harbour seals (*Phoca vitulina*), 6 harp seals (*Phoca groenlandica*), and 171 seals of unidentified species. A grey seal survey was conducted in 2012, where 4 200 animals were estimated along the Icelandic coast. The stock was estimated as 12 000 animals in 1990. The adopted management plan is to maintain the harbour seal population around 12 000 animals. According to a survey conducted in 2011, the stock of harbour seals was around 11 000 animals. The stock was estimated as 34 000 seals in 1980 but has remained stable since 2003. The adopted management plan is to maintain the grey seal population around 4 100 animals.

(http://www.hafro.is/Astand/2014/english/37-seals-14.pdf).

There is no data describing the trends of number of seals as bycatch. In seal hunt data from previous years no distinction was made between purposefully hunted seals and numbers killed as bycatch. In addition, usually only seals that were sold or traded for bounty were recorded. Therefore, numbers of animals killed for personal use and bycatch that was not turned in for bounty were not recorded. All marine mammals that are killed in fishing operations are supposed to be recorded in statutory fishing logs. Since 2002 there has been a special emphasis placed on instructing the crews of gillnet boats about the recording of mammals killed but annually only 2–7% of them report seals in nets.

Digital recording of catch and bycatch became available in 2008 but recording of marine mammals is yet to improve to be defined efficient. In light of this, it is likely that the record of seals as bycatch is currently a bare minimum estimate. Harbour seals were last counted in July–September of 2011 with an improved method in which the researcher flies over large haul-outs three times and small haul-outs twice. This method is thought to give a more accurate count of harbor seals. The population was estimated at 11000 animals (95% confidence interval 8 000–16 000), which is unchanged from the summers of 2003 and 2006.

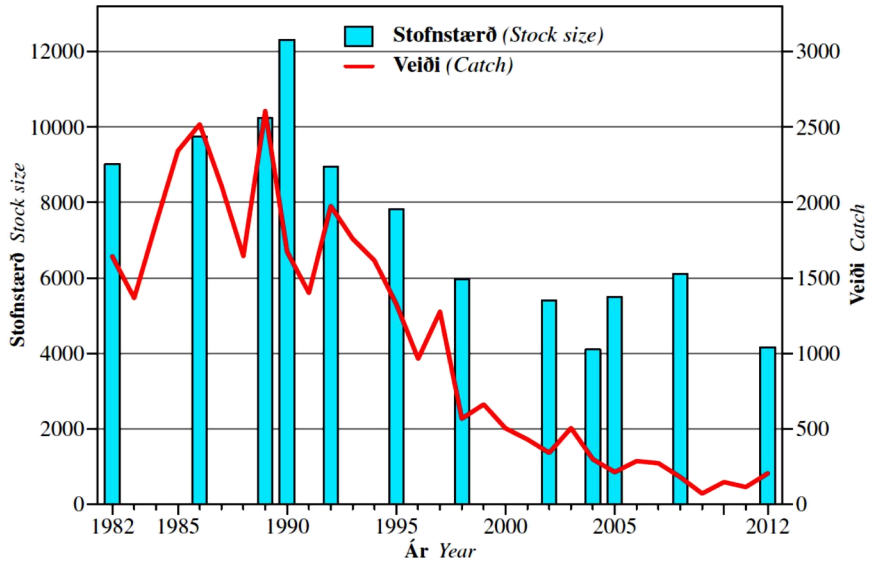


Mynd 2.37.1. LANDSELUR. Skráð veiði landsels og áætluð stærð landselastofnsins frá 1980.

Fig. 2.37.1. HARBOUR SEAL. Reported catch and estimated stock size since 1980.

Grey seal pups have not been counted since 2008 and 2009. The estimate calculated then was 1539 animals (95% confidence interval 4 600–7 600). The population reached an historical low in 2002

when the number of animals was estimated to be 5500 and it had decreased considerably since 1990 when the estimated population was about 12 000 animals. The method was improved and thus it is unsafe to read the 2002 results as an increase but there was an increase of about 6% (4.5–7.9) per year from 2005–2009. Most of the increase was observed in Breiðafjörður where the pup population went from 645 to 859 pups. It is clear that the harvest mortality in the 1990's was above the yield capacity of the population, but less hunting was conducted in recent years. In 2005 the government decided on a management policy for grey seals that aims at keeping the population to at least 4 100 animals, where it was in 2004. If the population drops below this level measures will be taken immediately to reverse the decline. A grey seal pup count was planned for the fall of 2014 but it is unknown whether this survey took place.



Mynd 2.37.2. ÚTSELUR. Skráð veiði og áætluð stofnstærð frá 1982.

Fig. 2.37.2. GREY SEAL. Reported catch and estimated stock size since 1982.

http://www.hafro.is/Astand/2013/36-engl-sum.PDF

Presently, data on marine mammal and seabird bycatch is collated from several sources including dedicated surveys, coastguard inspections and logbooks.

Reported bycatch of pinnipeds by the Icelandic fishing fleet in 2010 to 2012 (source: NAMMCO annual report 2013; www.nammco.no)

Species	Area	Count	Pups	Gear	Source
Harbour seal	Coastal Iceland	4		Gillnet	MRI survey
Harp seal	Coastal Iceland	3		Gillnet	MRI survey
Harbour seal	Coastal Iceland	6		Lumpsucker net	Inspector
Grey seal	Coastal Iceland	4		Lumpsucker net	Inspector
Harbour seal	Coastal Iceland	1		Lumpsucker net	Biopol
Gray seal	Coastal Iceland	1		Lumpsucker net	Biopol
Harp seal	Coastal Iceland	2		Lumpsucker net	Biopol
Harbour seal	Coastal Iceland	36	11	Lumpsucker net	Log books
Grey seal	Coastal Iceland	26		Lumpsucker net	Log books
Harp seal	Coastal Iceland	1		Lumpsucker net	Log books
Unspecified seal	Coastal Iceland	112		Lumpsucker net	Log books

Reported bycatch of cetaceans by the Icelandic fishing fleet in 2010 to 2012. (source: NAMMCO; www.nammco.no)

2010				
Harbour porpoise	Coastal Iceland	50	Gillnet	MRI survey
Harbour porpoise	Coastal Iceland	4	Gillnet	MRI survey
Harbour porpoise	Coastal Iceland	1	Lumpsucker net	MRI scientist
Harbour porpoise	Coastal Iceland	4	Lumpsucker net	Inspectors
Harbour porpoise	Coastal Iceland	65	Lumpsucker net	Log books
Unspecified dolphin	Coastal Iceland	3	Gillnet	MRI survey
2011				
Harbour porpoise	Coastal Iceland	28	Gillnet	MRI survey
Harbour porpoise	Coastal Iceland	6	Gillnet	Inspectors
Harbour porpoise	Coastal Iceland	1	Anglerfish net	Inspectors
Harbour porpoise	Coastal Iceland	149	Lumpsucker net	Log books
Unspecified dolphin	Coastal Iceland	3	Lumpsucker net	Inspectors
2012				
Harbour porpoise	Coastal Iceland	28	Gillnet	MRI survey
Harbour porpoise	Coastal Iceland	1	Lumpsucker net	Inspectors
Harbour porpoise	Coastal Iceland	1	Lumpsucker net	MRI scientist
Harbour porpoise	Coastal Iceland	113	Lumpsucker net	Log books
Unspecified dolphin	Coastal Iceland	1	Lumpsucker net	Log books

At least 12 species of cetaceans occur regularly in Icelandic waters, and additional 10 species have been recorded more sporadically (ICES, 2011b). Of the commonly recorded cetacean species, Blue whale *Balaenoptera musculus*, Sei whale *Balaenoptera borealis* and Fin whale *Balaenoptera physalus* are Endangered (2008 IUCN Red List), and the Sperm whale *Physeter macrocephalus* is Vulnerable (2008 IUCN Red List).

Seabirds bycatch

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 scarelines, 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.

See Regulation 456, 1994. REGLUGERÐ um fuglaveiðar og nýtingu hlunninda af villtum fuglum, nr. 456/1994. Regulation on bird hunting and utilization of wild birds, nr. 456/1994.

The MRI continues to monitor the distribution, population and feeding ecology, of important whale species and other marine mammals. Major survey work commenced in 1989 and a formal research plan involving international collaboration continues today. This information is being used to continue the development of multi-species modelling in the support of development of ecosystems based management of fisheries.

Regulation 557/2007 on logbook recording requirements applies to all Icelandic fishing vessels, whether they take place inside or outside Icelandic waters, unless otherwise specified in the rules of the relevant fishery. In short Skippers are required to record the following information in logbooks:

- Vessel name, call sign and registration letters.
- Fishing gear type and size.
- Positioning (width and length) and the time when the gear is placed in the sea.
- Catch by species and quantity.
- Harvesting.
- Landing.

Recently, public sector (business, Ministry of Innovation and the MRI), in collaboration with the Small Boat Owners Association worked to improve catch documentation. To this end, amendments have been made in the forms of logbooks to make registration easier. The aim is to provide more and more reliable data on catch, especially regarding marine mammals and seabirds.

http://www.fiskistofa.is/ymsaruppl/tilkynningar/nr/1033

A new amendment to the existing logbook regulation requires that data submitted in logbooks includes seabirds and marine mammals number and species was issued in February 4 2014. The amendment took effect immediately.

http://www.reglugerd.is/interpro/dkm/WebGuard.nsf/key2/557-2007

Vulnerable species

Iceland has ratified a number of conventions on species protection including the Convention on Biological Diversity, the OSPAR Convention and the CITES Convention. Vulnerable species known to occur in Icelandic waters include basking shark and the ocean quahog.

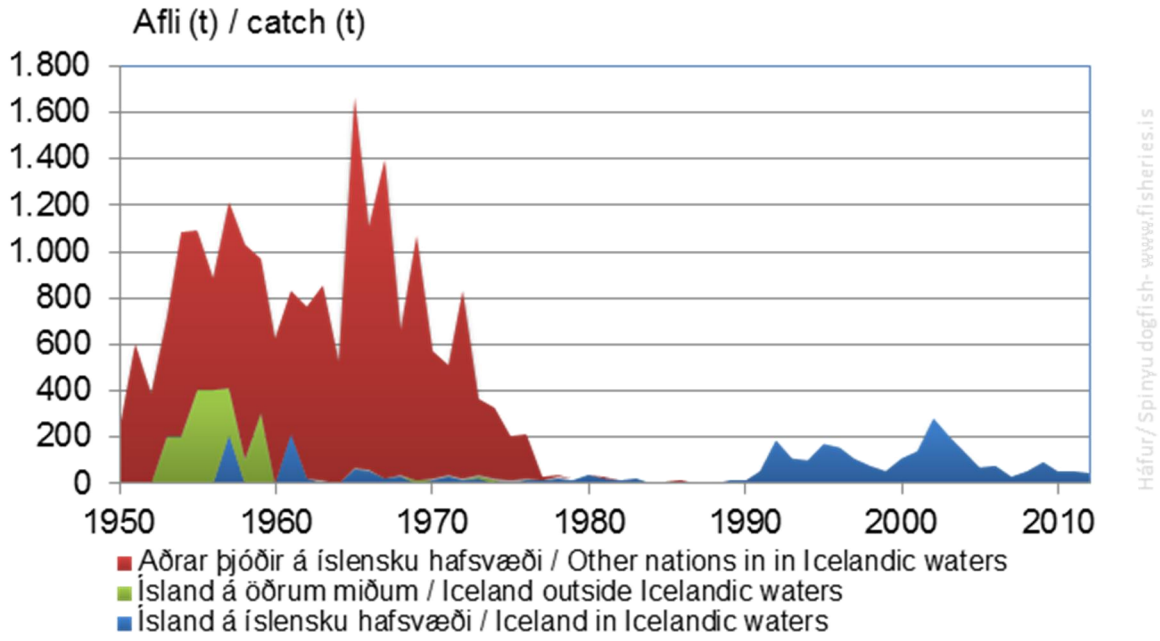
For specific details on grey skate, Atlantic wolfish and halibut please refer to clause 3.1.1. The information has not been repeated again here below.

Porbeagle shark

The porbeagle shark (*Lamna nasus*) is classified as vulnerable to extinction under the IUCN Red list framework. Bottom trawl catches in Iceland in 2013 were estimated at about 0.163 tonnes, therefore the catch rate appear to be insignificant.

Dogfish

The spiny dogfish or spurdog *Squalus acanthias* is a small demersal shark of temperate continental shelf seas worldwide. It is considered endangered to extinction on the IUCN Red list. A few hundred tonnes of spiny dogfishes were fished annually by foreign fleets when they operated in Icelandic waters. However, Icelandic catches have always been low, and less than 100 tonnes in recent years.



Dogfish in Iceland is at the edge of its distribution range, and appears to be migrant in Icelandic waters. Experience from the MRI surveys is that their numbers are highly variable from year to year and not ideal to inform an index of abundance - with most survey years catching a few individuals and others catching a larger number of individuals in a single haul, probably due to their schooling behaviour. The issue of spiny dogfish relating to the IUCN classification has mainly to do with Western Europe and the fisheries currently catching it directly and indirectly in those regions. In Iceland, there is no directed fishery for spiny dogfish and the current catches have been low in recent years as can be seen below.

Spiny dogfish catches by Icelandic vessels	
Fishing year	Catches by all gear types (tonnes)
2009/10	74.697
2010/11	65.218
2011/12	50.045
2012/13	14.088
2013/14	11.495

The decrease in catch rate is not thought to be related to actual stock status for this species, instead it is thought to be partly dependant by fishermen trying to avoid it as the presence of spiny dogfish tends to drive away other species from local waters. Although the abundance of spiny dogfish appears to be low in Icelandic waters compared to many other bony fishes, no specific information is available on the stock status of this species. The current catches are only bycatch in other fisheries, primarily gillnet fisheries off the southern coast during the summer months (http://www.fisheries.is/main-species/cartilaginous-fishes/spiny-dogfish/). The contribution of gillnet gear to haddock and saithe catches is minimal (0.6 and 7% respectively, in 2013) and is therefore considered that the contribution of these fisheries is not significant to the stock status of this shark species.

„The Coopertive Committee on better treatment of Marine Resources“ is appointed by the Ministry responsible for fisheries management. The Committee has representation from organisations representing fishing vessel owners, fishing captains, fishing vessel engineers, general crew members, small boat owners, the Ministry, the MRI and the Directorate of Fisheries. The committee deals with tasks by request from the ministry. Historically, since its establishment in 1994, the committee has been tasked with proposing rules/legislation dealing with with discards, catch in excess of quotas, weighing of all catches, closed areas, fishing gear and its use and selectivity, etc... More recently, in December 2014, the Committee has been tasked to review the situation of spiny dogfish and other sharks species in Iceland and evaluate whether or not there are issues with these and if specific management actions are required. As of January 2015 these items are under review.

Ocean quahog

This is a large stock not associated with haddock catches at all given that is caught with dredge gear in a small area of Iceland. Studies show the ocean quahogs are long-lived and slow-growing. The mainstay of the fishable stock is large old quahogs. Density of quahogs at 5–50 m depth has been studied from Garðskagi clockwise to Ingólfshöfði and the stock in the region is estimated at 1.3 million tonnes. In 2013 only 20 t of ocean quahog (*Arctica islandica*) was landed, compared to the maximum of 14 400 t in 2003. Since 1987 a fishery for human consumption has been developing, but annual landings have been variable due to variable effort related to the market. MRI

recommends a harvest rate of 2.5% of the estimated stock size corresponding to no more than 32 500 t in the quota year 2014/2015.

http://www.hafro.is/Astand/2014/39-engl-sum.PDF

3.2 Specific criteria

3.2.1 Information gathering and advice

CLAUSE: 3.2.1.1 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:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**

SUMMARY EVIDENCE: There is information available on the legal specification of fishing gear for haddock for each fishing method. MRI undertakes experiments to quantify the selective characteristics of the main haddock catching gears. Species selective gear may result in lower impact on certain aspects of the ecosystem such as lower incidence of bycatch. Commonly caught species such as bycatch in haddock fisheries are also subject to ITQ management and hence are recorded as part of the vessel catch.

EVIDENCE

Stocks of non-target species are meant as other stocks (i.e. commercial) caught together with Icelandic haddock (e.g. saithe, cod, and others) and do not include other benthic assemblages (e.g. starfish, large bivalves, hard-shelled gastropods, crabs etc…).

In terms of monitoring and assessment, these other main "non target" commercial stocks are monitored/assessed accordingly by Icelandic Authorities. The "may be" is therefore intended as shall for all the main stocks commonly caught together with haddock. The Marine Research Institute provides catch advice for 35 different species, while catch statistics for 2013 were collected for 72 species (source: Directorate, 2014). Note that for many of the species listed there is little or no spatial overlap with haddock catches and therefore the technical interaction between these species and haddock will be limited or absent (see section 3.1.1)

Species	Landed Weight (Kg)
Cod	115976507
Haddock	24739293
Saithe	8381669
Whiting	562182
Golden redfish	3967186
Ling	8580736
Blue ling	1655195
Tusk	4900359
Catfish	6356792
Rock grenadier	1003
Deep sea redfish	8137890
Starry skate	1546994
Spotted catfish	1615076
Monkfish	1354482
Common skate	120672
Dogfish	3973
Greenland shark	2904
Mackerel shark	542
Greater silver smelt	194863
not specified	0
Halibut	9576
Greenland halibut	2522709
Plaice	4410930
Lemon sole	1387470
Gray sole	1123790

Megrim	325845
Dab	712150
Rough dab	177455
Herring	157493000
Capelin	453836000
Norway pout	20328
Blue whiting	106998000
Mackerel	153641498
Rabbit-fish	703
European lobster	1723525
Deep water prawn	10928838
Common spider crab	130
Squid	14432
Common whelk	0
Iceland cyprine	0
Arctic wolffish	5491
Orange roughy	0
Redfish	2530
Deepwater redfish	96533
Onion eye	44
Esmark's eelpout	229
Forkbeard	395
Blue musse	0
Vahl's eelpout	1
Fuller's ray	36994
White hake	16298

Turbot	121
Black dogfish	750
Grey gurnard	2634
Eel	92
Deal fish	1442
Baird's smooth-head	0
Black scabbard-fish	1140
Portuguese dogfish	0
Sailray	6806
Sea-urchins	0
Sea cucumber	4052
Atlantic salmon	11
Bluefin tuna	3800
Flounder	40
Green pollack	283
Atlantic rock crab	8734
Lumpfish roe	168083
Lumpfish / male	51218
Lumpfish female	3992689
Minke whale	0
Harbour seal	48

Reported catches for 2013 (Source: Directorate)

There is information available on the legal specification of fishing gear for haddock for each fishing method. Fishing gear selectivity is intended primarily as size selectivity, and secondarily as species selectivity. Gears are regulated in several ways to regulate both size and species selectivity.

Key areas of specification include; 135/155 mm codend in trawl and seine nets; specifications for gill net construction and mesh size and; hook specifications in the longline fishery. MRI routinely undertakes selectivity experiments to assess the characteristics of the main gears used and to investigate measures to further enhance selectivity. Bycatches of haddock associated with the *Pandalus* shrimp and *Nephrops* fisheries are minimized through the mandatory use of sorting grids in the *Pandalus* fishery and large square mesh panels in the *Nephrops* fishery. Both of these devices are also expected to minimize the retention of other bycatch species associated with these fisheries.

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.

Regulation 456, 1994. REGLUGERÐ um fuglaveiðar og nýtingu hlunninda af villtum fuglum, nr. 456/1994. Regulation on bird hunting and utilization of wild birds, nr. 456/1994.

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).

(Source http://brage.bibsys.no/xmlui/bitstream/handle/11250/102430/WGFTFB11.pdf?sequence=1)

Generally, highly selective gear may result in lower impact on certain aspects of the ecosystem such as lower incidence of bycatch. Commonly caught species such as bycatch in haddock fisheries are also subject to ITQ management and hence are recorded as part of the vessel catch in the logbook and through the reporting structure to the database.

3.2.2 Bycatch and discards

<table>
<tr><td colspan="5">CLAUSE: 3.2.2.1 Discarding, including discarding of catches from non-target commercial stocks, is prohibited.</td></tr>
<tr><td>EVIDENCE RATING:</td><td>High ☑</td><td colspan="2">Medium ☐</td><td>Low ☐</td></tr>
<tr><td>NON CONFORMANCE:</td><td>High ☑</td><td>Minor NC ☐</td><td>Major NC ☐</td><td>Critical ☐</td></tr>
<tr><td colspan="5">SUMMARY EVIDENCE: Discarding of all commercial stocks is prohibited under national Icelandic law.</td></tr>
<tr><td colspan="5">EVIDENCE
Icelandic fishery law prohibits the discarding of all commercial stocks. Commercial species are listed yearly in documents such as the annual MRI advice. Catches of these species are subjected to a discard ban (regulation no. 57/1996).

Latest MRI advice: http://www.hafro.is/undir_eng.php?ID=26&REF=4

There is a minimum catch size for haddock (and other demersal species) with tolerances allowing for the landing of below minimum size fish which does not count as full quota – and hence, encourages vessel operators to report where undersized haddock may be encountered. Vessel catch inspections can be coordinated with areas where juvenile fish are reported (recent shut downs) to compare landings with vessel catches. This activity also forms part of the annual discard monitoring program to evaluate and confirm the estimates derived by gear type of discard percentage for haddock.

ICES 2009 reported that the ITQ system used in Icelandic fisheries has a build-in incentive for the fleet to direct effort to more valuable fish (high-grading). When juveniles are a high proportion of the fishable biomass or when the TAC is relatively low compared to the biomass, this may lead to increased discarding of the target species. However, the Iceland Coast Guard notes that ‘In recent years misreporting has not been regarded as a major problem in the fishery of this stock. No study is available to support that general perspective. Production figures from processing plants are in “good” agreement with landings figures according to the Fisheries Directorate (personal communication from Coast Guard).’

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 inspections.</td></tr>
</table>

CLAUSE: 3.2.2.2 Where relevant, appropriate steps shall be taken to avoid, minimize or mitigate encounters with seabirds and marine mammals.

EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**

SUMMARY EVIDENCE: Long-liners in Iceland utilize 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. Marine mammal interaction are minimised by the fleet by avoiding sites and adopting fishing and hauling techniques that minimise the interaction between fishing gear and these animals. It is now a mandatory requirement to report bird and marine mammals interaction/bycatch with fishing gears.

EVIDENCE

Seabird Interaction:

There has been research into the impact of cod (and other groundfish) long-line fisheries in Norway, Iceland, and the Faeroes on northern fulmars (*Fulmarus glacialis*). Mortality rates were as high as 1.75 birds/1000 hooks (95% of which were fulmars) recorded, but observers on trips where lines were set by night have reported levels as low as 0.02 birds/1000 hooks. When these figures were multiplied by the large numbers of hooks set (476 million in 1996 by the 63-vessel Norwegian autoline fleet alone), the annual mortality of fulmars was deemed high. However, as noted, because the breeding distribution and population size (which is in the millions) is expanding (perhaps helped by the availability of discards; Camphuysen *et al*., 1995), long-line mortality was not then regarded as a serious threat to the species (Tasker et. al 2000). FAO (1999) reported the longline fisheries of Norway, Iceland and the Faeroes in the North and Norwegian Seas take mainly fulmars as well as gannets, Great Skuas *Catharacta skua* and Glaucous, Great Black-backed, Lesser Black-backed and Herring Gulls *Larus hyperboreus*, *L. marinus*, *L. fuscus* and *L. argentatus.*

FAO (1999) International Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries. Food and Agriculture Organization of the United Nations. Rome.

Currently, long-liners in Iceland utilize 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. This is significant given the importance of longlines as a fishing method for haddock (44% of catches in 2013).

Marine mammal interaction are minimised by the fleet by avoiding sites and adopting fishing and hauling techniques that minimise the interaction between fishing gear and these animals. No other specific measure or practice is currently known to the assessment team. Having said that, the impact of the gillnets account for a very small (0.6% in 2013) proportion of haddock catches and therefore does not appear to be significant on pinnipeds and cetaceans.

Iceland has started with improving data collection systems for marine mammals and seabirds bycatch in the groundfish fisheries. Data collection is the first step in determining if a threat exist. Management measure should follow once information is available. While the bycatch of marine mammals raises important ethical issues, bycatches of seals are predominantly associated with the fishery for lumpsucker and while bycatches of cetaceans are relatively elevated in the gill net fishery, the incidence is mainly observed in the lumpsucker fishery.

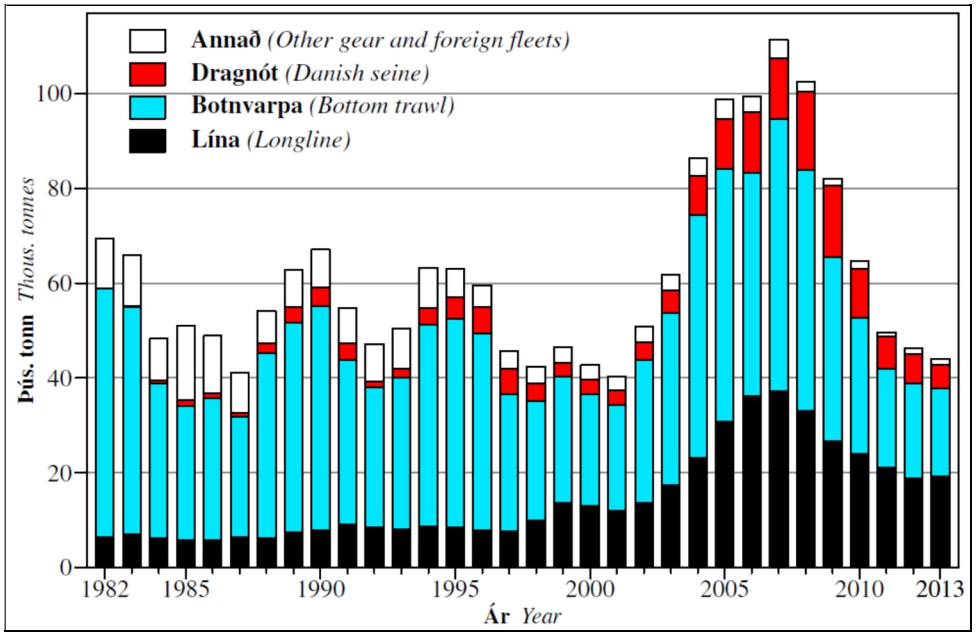


Figure 49. Landings of haddock by gear type since 1982.
Source: http://www.hafro.is/Astand/2014/english/02-haddock-14.pdf

As of February 2014, it is now mandatory requirement to report bird and marine mammals interaction/bycatch with fishing gears. A new amendment to the existing logbook regulation requires that data submitted in logbooks includes seabirds and marine mammals number and species was issued in February 4 2014. The amendment took effect immediately.

http://www.reglugerd.is/interpro/dkm/WebGuard.nsf/key2/557-2007

Víkingsson, G.A., Ólafsdóttir, D. and Sigurjónsson, J. 2003. Diet of harbour porpoises (Phocoena phocoena) in Icelandic coastal waters. NAMMCO Sci. Publ. 5:243-270.

http://septentrio.uit.no/index.php/NAMMCOSP/article/viewFile/2830/2683

CLAUSE: 3.2.2.3 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 should be taken.

EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**

SUMMARY EVIDENCE: Most non-target species landed in fisheries catching haddock are themselves subject to TACs based on scientific advice. There are some species of noted low abundance. Closure rules are available to the Ministry to limit impacts on bycatch species and habitat if deemed appropriate through scientific evaluation by MRI. There is no evidence of serious risk of extinction of bycatch species resulting from the activities of fisheries catching haddock.

EVIDENCE

According to Icelandic law, discards are prohibited, and all catches must be landed (see also clause 3.1.1. on retained species). The Marine Research Institute carries out wide ranging and extensive research on the status and productivity of the commercial stocks, and long-term research on the marine environment and the ecosystem around Iceland. The results of this research are the foundation of the advice on sustainable catch level of the fish stocks. The Directorate of Fisheries (*Fiskistofa*) undertakes monitoring of the Icelandic fisheries to ensure that all rules are being followed. Iceland operates a comprehensive enforcement regime, in particular regarding port control and weighing of all catches.

Landed catches are subtracted from the relevant quotas (allowable catch) of the vessel or the vessel group. Limited allowance is 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. When a vessel's quota is used up, additional quota must be transferred to the vessel from other vessels or the vessel stops fishing. Transfer of quota between vessels takes effect only after it has been authorised and recorded to the official central data base. Information on each vessels catch quota and quota is regularly updated and made public and accessible to all on the official web-site. Information from the database is immediately made available on the internet. It is open to everyone, all hours every day. It includes information on individual vessels and summarized data for all Icelandic vessels. The table for individual vessels includes information on all landings, detailed catch report, list of transferred quotas and quota status.

MRI is working on long term management strategy for the main marine stocks. This is in agreement with the United Nations conventions on conservation, sustainability and precautionary approach in the fisheries management. Long term management schemes (catch rules) for cod, capelin and summer spawning herring are already in force. http://www.hafro.is/undir_eng.php?REF=4

The English summary of the report of the Marine Research Institute headed: State of Marine Stocks in Icelandic Waters 2011/2012 and prospects for the Quota Year 2013/2014 details assessment results and recommendations for most commercial stocks. Out of the 35 species included in this report several this year have been found to have decreased in abundance and so TAC have been reduced accordingly e.g. halibut is severely depleted and now there is a ban on direct landings of this species. Many of these retained species however have not yet a defined management plan and directed stock assessment have not been performed on them, although the catches appear to be small.

There are also a number of other species which have been classified as vulnerable by MRI and/or IUCN (see clause 3.1.1 and 3.1.2 above for further details). These include the porbeagle shark, grey skate and spiny dogfish.

3.2.3 Habitat Considerations

CLAUSE: 3.2.3.1 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.

EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**

SUMMARY EVIDENCE: Area closures are a commonly employed management tool to protect spawning grounds, essential fish habitat, stony coral areas and thermal vents. Iceland operates an extensive array of area closures aimed at minimising catches of juvenile fish (permanent and temporary closures) and to protect vulnerable marine habitats (permanent closures).

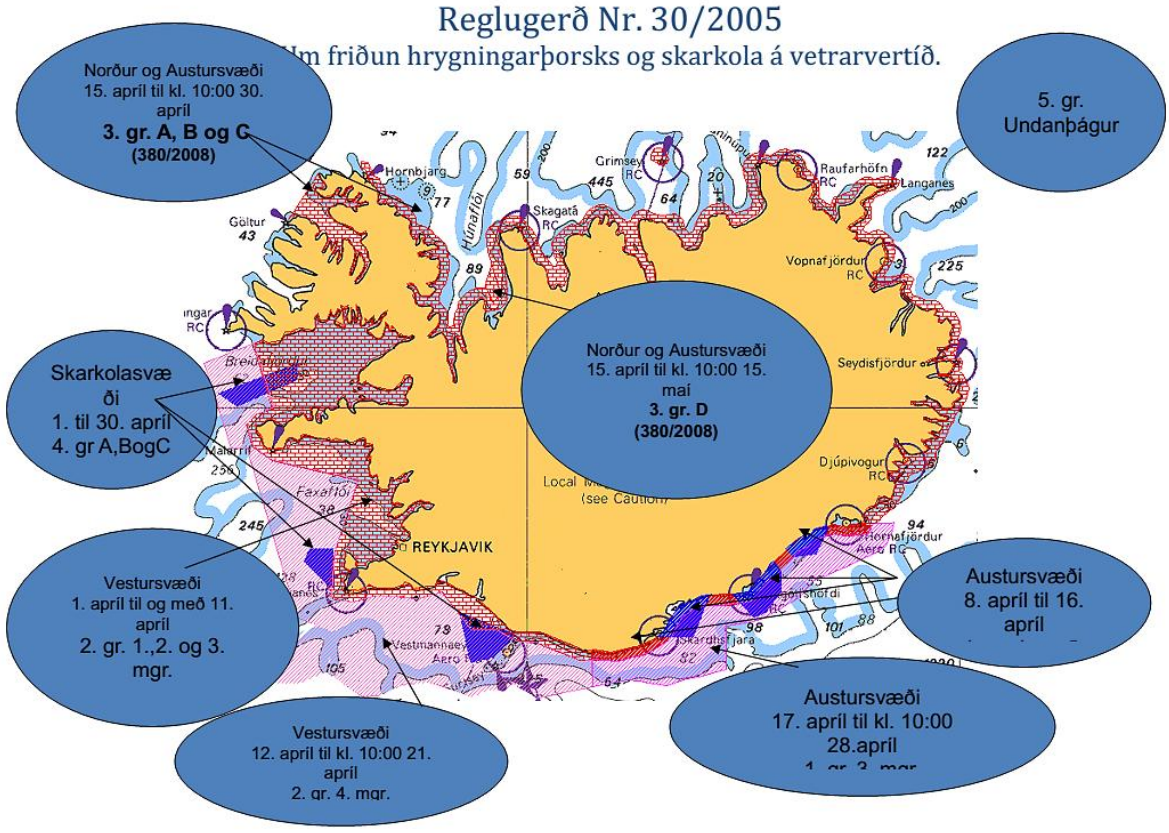
EVIDENCE

Descriptions of Icelandic haddock essential habitat can be found on the Icelandic Ministry of Fisheries website and in the report of the Working Group on North Western Waters (NWWG, 2012).

Icelandic haddock is mostly limited to the Icelandic continental shelf but 0-group and juveniles from the stock are occasionally found in East Greenland waters. Apart from this, larval drift links with other areas have not been found. The species is found all around the Icelandic coast, principally in the relatively warm waters off the west and south coast, in fairly shallow waters (50-200 m depth). Haddock is also found off the North coast and in warm periods a large part of the immature fish

were found north of Iceland. Recently, large part of the fishable stock has also been found off the north coast (NWWG, 2011)[180]. Haddock is caught all around Iceland with the exception of closed areas and throughout the year. The best grounds are off the west coast and fishing is presently best in the winter months. The fishery is mainly carried out on the shelf and the shelf break.

The Icelandic authorities have implemented an extensive array of areas closures in national waters. These take the form of permanent, seasonal and periodic closures aimed at protecting both juvenile and spawning fish and are gear or fishery specific. In particular, the permanent closures will also provide wider ecological benefits over and above their intended fisheries management objective. While the majority of temporary closures to protect juveniles are aimed at protecting cod given the spatial overlap with haddock, these closures are likely to have a conservation benefit to haddock also. The red areas shown in figure 50 are aimed as spawning and nursery areas for cod while the blue ones on the bottom left to protect spawning plaice http://www.fisheries.is/management/fisheries-management/area-closures/



181

Figure 50. Spawning closures in Iceland.

180 http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2012/NWWG/Sec%2010%20Icelandic%20haddock.pdf

181 http://www.fiskistofa.is/fiskveidistjorn/veidibann/hrygningarstopp/

Figure 51 shows the extent of permanent; seasonal and temporary closures (source http://www.fisheries.is/management/fisheries-management/area-closures). Off Northwest and North coast of Iceland, fishing by bottom trawl, midwater trawl and Danish seine is not allowed within 12 miles from a line drawn across the mouth of fjords and bays. Off the East, South and West coast, bottom trawling is permitted according to vessel size and engine power, with larger vessels (over 42 m) not having access within 12 miles, but the smaller vessels (less than 29 m) in some areas up to 4 miles.

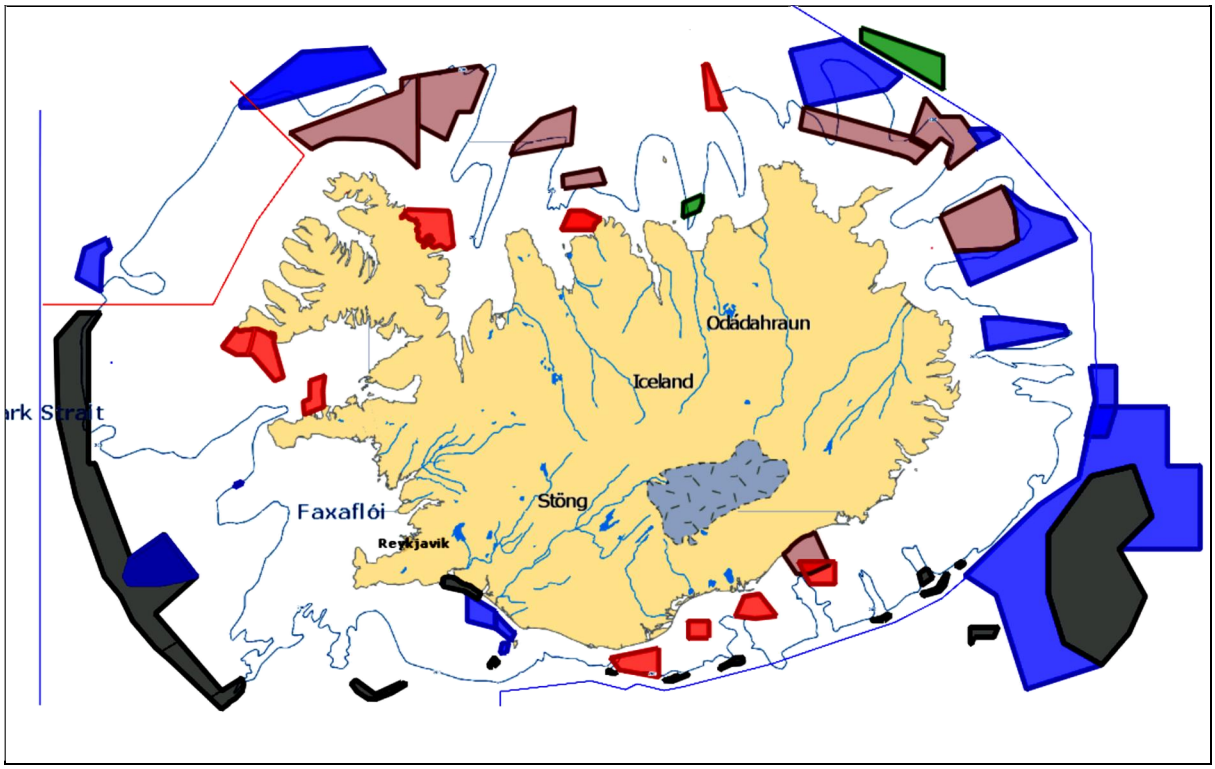


Figure 51. Areas with restricted fishing as of May 1st 2014. Shadings indicate different levels of restriction and type of gear involved, ranging from temporary (e.g. time of day, season) to permanent closure.

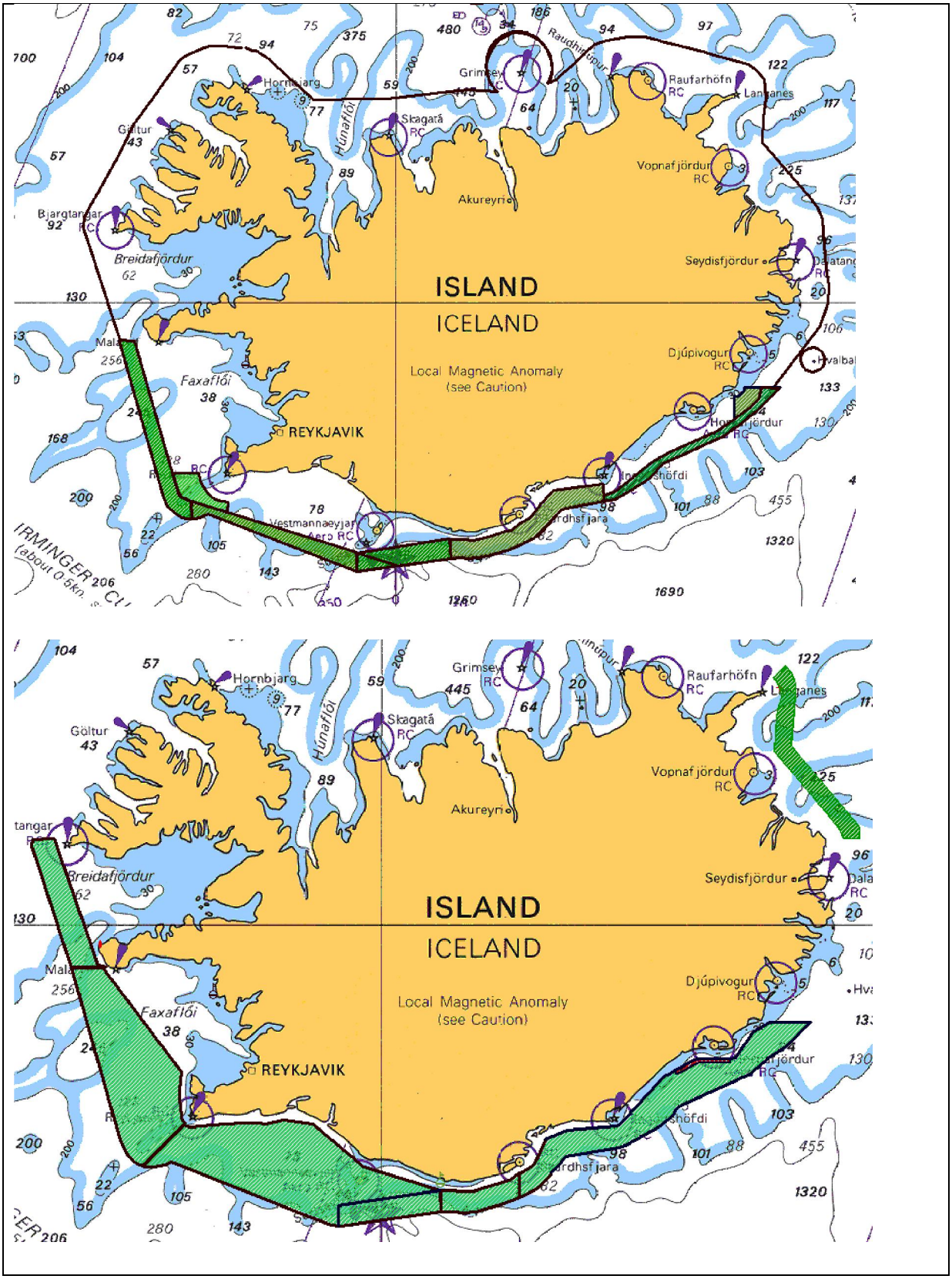
Table 7. Specific conservation objective for each of the permanent and seasonal closures with the relevant Icelandic regulation.

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 (coastal)
Line and handline Rgl. 742/2009
Blue area east of Iceland
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 off 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 foe trawling from 20.00-8.00 o´clock from 1.10 – 1.4 incl. both days

Furthermore, figure 52 below shows the extent of permanent; seasonal and temporary closures (source http://www.fisheries.is/management/fisheries-management/area-closures). Off Northwest and North coast of Iceland, fishing by bottom trawl, midwater trawl and Danish seine is not allowed within 12 miles from a line drawn across the mouth of fjords and bays. Off the East, South and West coast, bottom trawling is permitted according to vessel size and engine power, with larger vessels (over 42 m) not having access within 12 miles, but the smaller vessels (less than 29 m) in some areas up to 4 miles. There are also extensive nursery areas outside these boundaries permanently closed for fishing.

Also, according to law nr. 79/1997 all fisheries with danish seine, bottom trawl and pelagic trawl are forbidden within 12 nm (the black line). However there are temporary openings for vessels to fish with those gears within the 12 nm. These openings are both area- and time based. The ships are divided into 3 groups depending on their length and power. Group 1 (largest ships) are the largest ships. The green area represents the temporal allowance for fishing.


ISLAND
ICELAND
Local Magnetic Anomaly
(see Caution)
REYKJAVIK
Hornbjarg
Grimsey
Raufarhöfn
Skagatá
Akureyri
Vopnafjördur
Seydisfjördur
Djúpivogur
Breidafjördur
Faxaflói
Húnaflói
Vestmannaeyjar
IRMINGER
ISLAND
ICELAND
Local Magnetic Anomaly
(see Caution)
REYKJAVIK
Hornbjarg
Grimsey
Raufarhöfn
Skagatá
Akureyri
Vopnafjördur
Seydisfjördur
Djúpivogur
Breidafjördur
Faxaflói
Húnaflói

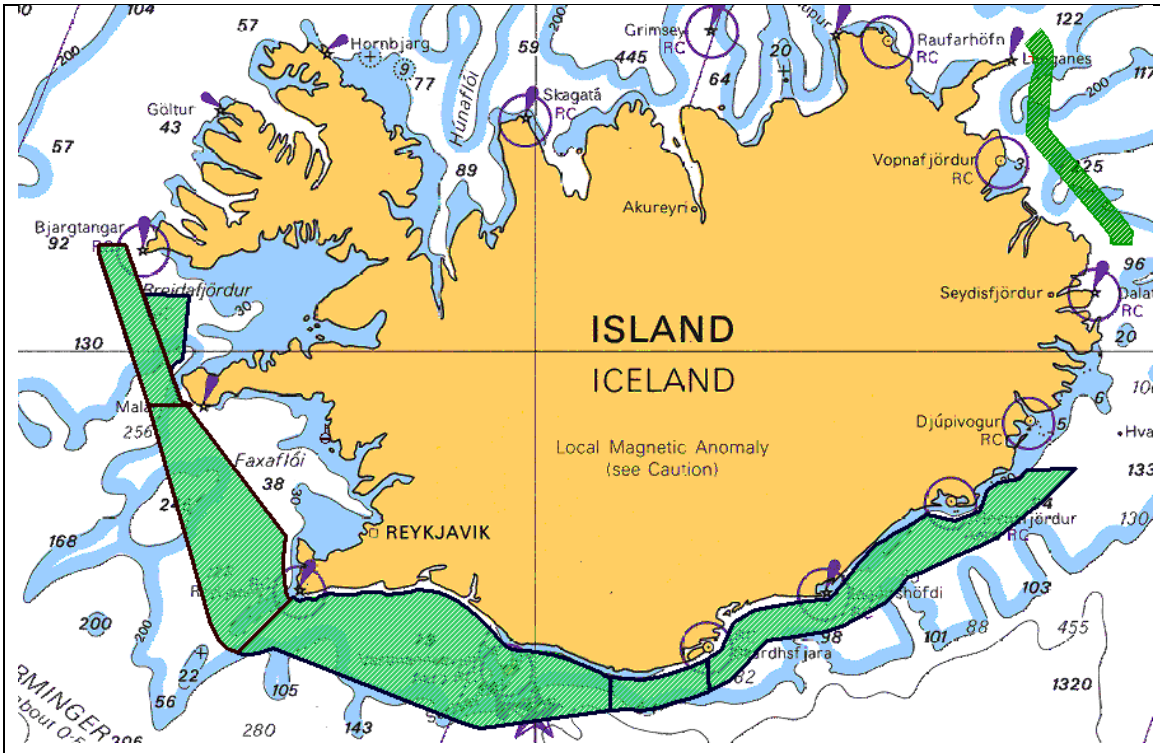


Figure 52. Temporary fishing areas for small-size vessels (bottom); mid-size vessels (middle) and large vessels (top).

A temporary closure system has been in force since 1976 with the objective to protect juvenile fish and reduce the incentives to discard. Fishing is prohibited for at least two weeks in areas where the number of undersized fish in the catches has been observed by inspectors to exceed a certain percentage. If, in a given area, there are several consecutive quick closures, the Minister of Fisheries can with regulations close the area for longer time, forcing the fleet to operate in other areas. Inspectors from the Directorate of Fisheries supervise these closures in collaboration with the Marine Research Institute, sometimes the Coast Guard raises the alert. In addition, the Marine Research Institute (MRI) has the authority to close fishing areas temporarily without prior notice if the proportion of small fish in the catch exceeds certain limits (25% or more of <55 cm cod and saithe, 25% or more of <45 cm haddock and 20% or more of <33 cm redfish).

In the past 27 years, about 2000 temporary closures have come into effect (figure below), mostly off the Westfjords. Most of the closures concern cod fishing (63%) and often they have been limited to bans on bottom trawling or longlining. However, given the extensive spatial overlap with haddock, closures aimed at protecting cod are also very likely to extend conservation benefit for haddock.

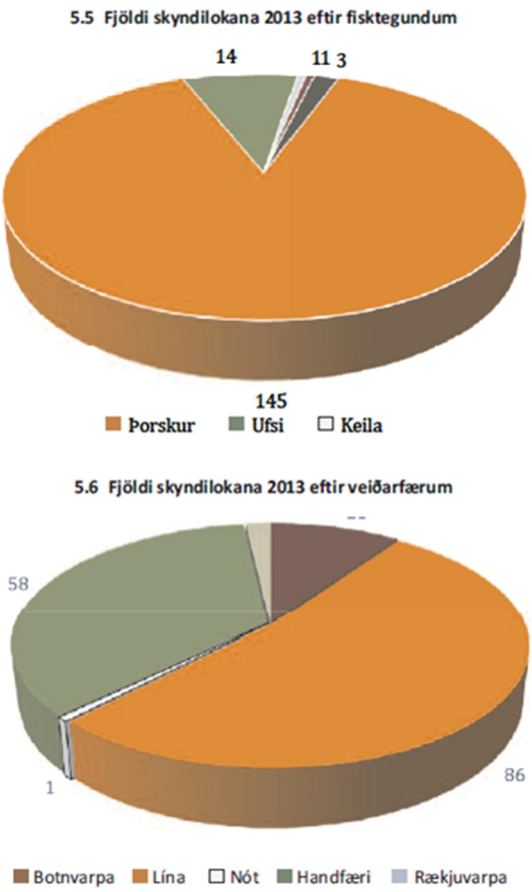


Figure 53. Temporary closures in effect in 2013 by species (top) and gear (below).

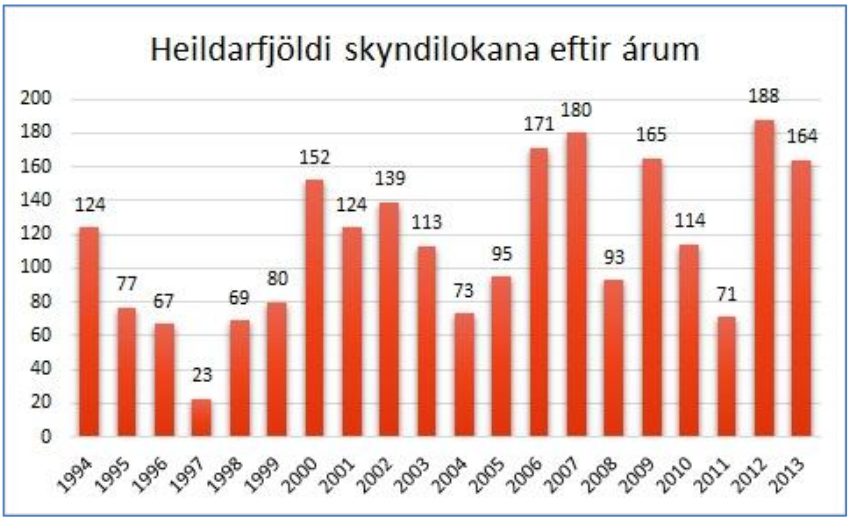


Figure 56. Total number of short term closures from 1994 to 2013**.**

http://www.fiskistofa.is/umfiskistofu/arsskyrsla-2013/eftirlit/

http://www.fiskistofa.is/media/arsskyrslur/Arsskyrsla_Fiskistofu_2013.pdf

CLAUSE: 3.2.3.2 Management measures must take into account significant continuous stony coral areas, identified through scientific and formal methods.

EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**

SUMMARY EVIDENCE: Permanent area closures are in place to protect cold water corals.

EVIDENCE

The database of the BIOICE programme provides information on the distribution of soft corals, based on sampling at 579 locations within the territorial waters of Iceland. The results show that gorgonian corals occur all around Iceland. They were relatively uncommon on the shelf (< 500 m depth) but are generally found in relatively high numbers in deep waters (> 500 m) off the South, West and North Iceland. Similar patterns were observed in the distribution of pennatulaceans off Iceland. *L. pertusa* was known to occur in 39 places in Icelandic waters (Carlgren 1939, Copley et al. 1996). The distribution was mainly confined to the Reykjanes Ridge and near the shelf break off the South coast of Iceland. The depth range was from 114 to 875 m with most occurrences between 500 and 600 m depth. A study by Steingrímsson and Einarsson (2004) examined coral reefs known to fishermen since at least 1970, and noted that a majority of these were absent in 2003. Since coral reefs are extremely slow growing, damage due to for example trawling are almost irreversible. The full extent of coral reefs around Iceland is not known. Systematic mapping of the seabed is in progress. Based on information from fishermen (questionnaires), eleven coral areas were known to exist close to the shelf break off NW- and SE-Iceland at around 1970. Since then more coral areas have been found, reflecting the development of the bottom trawling fisheries extending into deeper waters in the 70s and 80s.

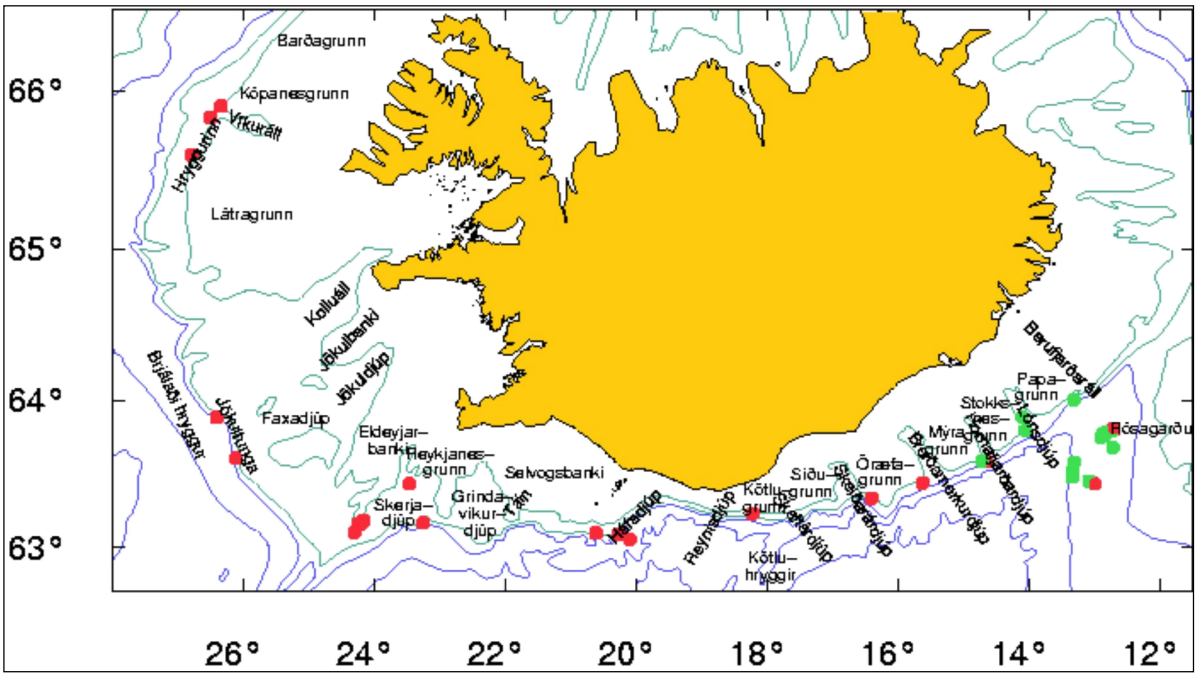


Figure 57. Occurrence of coral grounds off Iceland at around 1970, based on information from retired fishermen, and their occurrence in 2003, based on questionnaire from fishermen. Green dots - present in 2003, red-dots not present in 2003. From Steingrímsson and Einarsson (2004).

http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2013/NWWG/Sec%2007%20Overview%20on%20Ecosystem,%20fisheries%20and%20their%20management%20in%20Icelandic%20waters.pdf

The coral (*Lophelia pertusa*) closures protect a species of cold-water coral which grows in the deep waters throughout the North Atlantic ocean. *L. pertusa* reefs are home to a diverse community, however the species is extremely slow growing and may be harmed by destructive fishing practices. In 2004 a research project was started on mapping coral areas off Iceland (using a Remote Operated Vehicle, ROV), based on the results from questionnaires to fishermen on occurrence of such areas. As a result several areas were permanently closed to fishing for protection of coldwater corals. As of 2014, ten closed areas have been established in Icelandic waters to protect cold water corals (see figure 58).

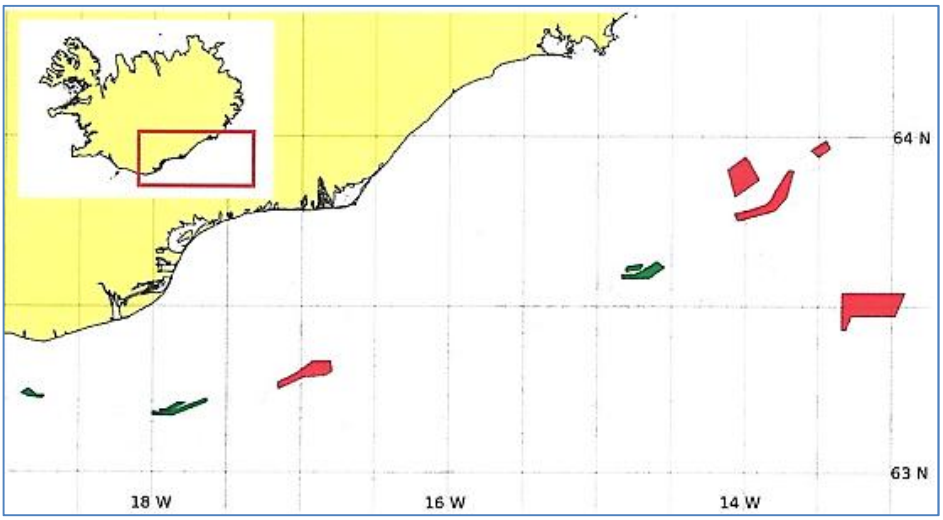
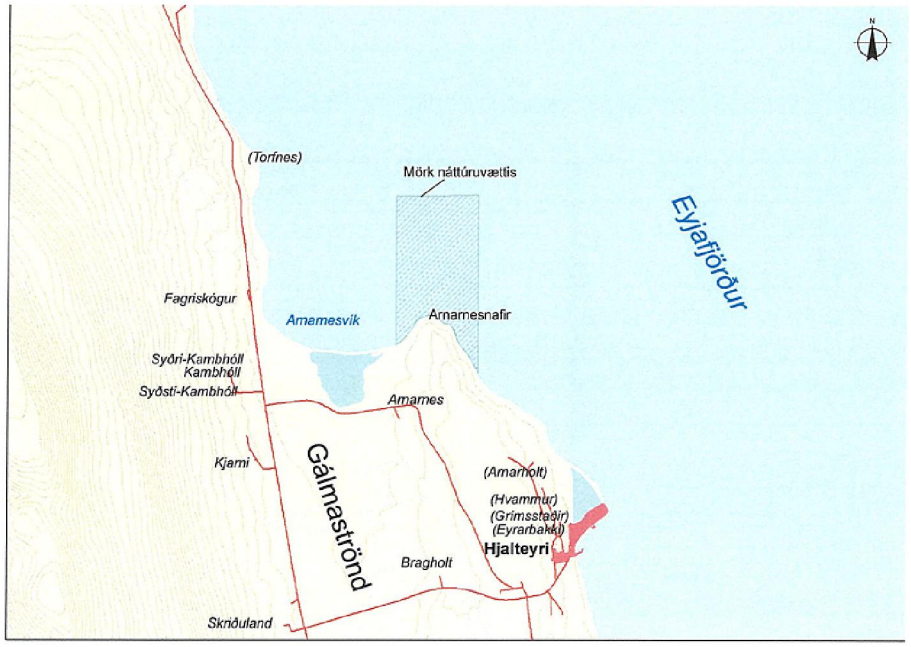


Figure 58. Location of cold water coral closures in waters to the south east of Iceland
Source (MRI 2014, pers. comm.).

CLAUSE: 3.2.3.3 Such areas shall be documented and protected through their closure to fishing, where appropriate, with gear that has significant bottom impact (established through 3.2.4.2).				
EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**
SUMMARY EVIDENCE: Permanent area closures, prohibiting the use of all fishing methods are in place to protect cold water corals.				
EVIDENCE Please see clause 3.2.3.2.				

CLAUSE: 3.2.3.4 Known thermal vents shall be protected through area closure to fishing activities with gear that has significant bottom impact during normal operation.				
EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**
SUMMARY EVIDENCE: Known cold-water coral reefs and hydrothermal vents are protected through permanent closures.				
EVIDENCE 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. There are two known hydrothermal vent areas on the Icelandic continental shelf with series of chimneys and fissures both inside Eyafjord, North Iceland (see map). 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 structures and have thus not been considered under serious threat by fishing activities (evidence received by the MRI, September 2014).

One example of a lesser surface structure hydrothermal vent is the Reykjanes Ridge. Detailed along-axis survey [German et al., 1994 *and* German and Parson, 1998] has found only one hydrothermal vent along the 600 km of the Reykjanes Ridge, which corresponds to a value of 0.014 for the "plume incidence" factor. The plume incidence is defined as the fraction of the ridge segment length overlain by hydrothermal plumes or vent fields. Therefore it represents an average assessment of the hydrothermal activity on a segment scale. German and Parson [1998] also reported that conventional black smoker plumes are almost completely absent, even directly above the recently imaged axial magma chamber at 57°45'N [Sinha et al., 1997]. For comparison, data collected at the 11°N–30°N area of the Mid-Atlantic Ridge (MAR), which was thought as a good representative of hydrothermal activities at the MAR, have yielded an along-axis average of at least one vent site for every 150 km [German et al., 1995]. This translates into a plume incidence factor of 0.053 for MAR. These observations suggested that the Reykjanes Ridge is associated with at least a factor of 4 less than normal hydrothermal activity at MAR.

http://onlinelibrary.wiley.com/doi/10.1029/2001JB000816/full

3.2.4 Considerations

CLAUSE: 3.2.4.1 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.				
EVIDENCE RATING:	**High ☑**	**Medium ☐**		**Low ☐**
NON CONFORMANCE:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**
SUMMARY EVIDENCE: Haddock is not a key prey species in the Icelandic marine ecosystem.				
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 is not a key prey species in the Icelandic marine ecosystem. 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. http://www.hafro.is/Bokasafn/Timarit/fjolrit-057_069.pdf 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 (http://firms.fao.org/firms/resource/10329/en).				

CLAUSE: 3.2.4.2 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:	**High ☑**	**Minor NC ☐**	**Major NC ☐**	**Critical ☐**

SUMMARY EVIDENCE: Icelandic haddock is subject to a dedicated management plan which includes wider ecosystem considerations including area closures and the use of size and species selective gears. Additionally, where vulnerable habitats e.g. cold water corals have been identified, area closures have been introduced.

EVIDENCE:

The MRI is responsible for scientific advice to the Ministry. There is a high level of interaction on scientific information such as the output from fishery surveys with the Ministry and associated departments and industry.

Real time area closures: A short-term sudden closure system has been in force since 1976 with the objective to protect juvenile fish. If, in a given area, there are several consecutive sudden closures, the minister of Fisheries can issue a regulation to close the area for a longer time period, thus directing the fleet to other areas. The Directorate of Fisheries and the Coast Guard supervises these closures in collaboration with the MRI. Temporary area closures: the major spawning grounds of cod are closed during the main spawning season. In addition there are gear and mesh size restrictions in place. The restrictions are mainly to protect juvenile fish but also to decrease the effort towards bigger spawners.

Permanent area closures: Many areas have been closed permanently. These closures are based on knowledge of the biology of various stocks with the aim of protecting juveniles (e.g. cod, haddock, saithe, redfish, flatfish) and vulnerable marine ecosystems, e.g. coldwater corals, deepwater sponges communities (indirectly), and hydrothermal vents.

Fisheries Management Plan- Icelandic Haddock: Management measures relevant to ecosystem effects of the fishery.
http://www.fisheries.is/main-species/codfishes/haddock/management-plan/

Large areas within the Icelandic EEZ are closed for fishing, either temporarily or permanently. These closures are aimed at protecting juveniles and spawning fish and protecting vulnerable marine ecosystems. Restrictions on the use of gear are also in effect. Thus the use of bottom trawl and pelagic trawl is not permitted inside a 12-mile limit measured from low-water line along the northern coast of Iceland. Similar restrictions are implemented elsewhere based on engine size and

size of vessels and large bottom trawlers are not permitted to fish closer than 12 nautical miles to the shore.

In many areas special rules regarding fishing gear apply, e.g. a requirement of using a sorting grid when fishing for shrimp to avoid juveniles and small fish and an obligation to use bycatch - or juvenile grid when fishing for pelagic species in certain areas to protect other species and juveniles.
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.

8. External Peer Review

Peer Reviewer A

Summary and Recommendation

The assessment report is well researched, and presents a comprehensive review of the haddock fishery. Adequate information is provided on the stock status and trends, fishery management, compliance and monitoring, and ecosystem considerations. It is evident that the haddock fishery is well-managed by effective institutions, management plans are based on high quality scientific advice, monitoring and enforcement activities are using state of the art equipment, and fishers appear to act responsibly. I thus agree with the judgements made in assessing the haddock fishery, and the overall outcome of the assessment that the fishery is in conformance with the requirements of the FAO-based Icelandic Responsible Fisheries Management Specification.

There are however some instances where more detailed information should be added to the assessment report, or where concerns with the management system should be given more prominence. For instance concerns that TACs have in the past been set above the scientific advice, and the lack of proposed remedial actions to address unexpected stock developments in the haddock management plan should be stressed. Clarifications and further details should be provided on several issues such as for example the actual implementation of the temporary sudden closures described in the management plan / assessment report to protect juvenile haddock, the degree to which haddock catches are processed at sea, or the process followed by the Icelandic authorities to determine whether to implement area closures for the protection of hydrothermal vent systems. Besides the amendment of the assessment report to address these relatively minor issues, the need for future annual surveillance audits to scrutinise several aspects of the effectiveness of the management system is highlighted.

Detailed Peer Review Comments

IRFM Specification Clauses	Comments
Section 1: Fisheries Management	Iceland has one of the most advanced fisheries management regimes in the world, supported by an effective legal framework and well established management practices implemented by competent institutions. Fisheries management policies are in line with international agreements, including the FAO Code of Conduct for Responsible Fisheries. A management plan based on a Harvest Control Rule was implemented for the Icelandic haddock fishery in April 2013, which has been confirmed to be in accordance with the precautionary approach and the MSY framework by ICES. In the past national Total Allowable Catches (TACs) as well as recorded landings have frequently exceeded recommended total catches based on scientific advice; when monitoring compliance of this fishery with FAO/ISO based criteria in future years it should be ensured that the national TAC and recorded landings do not exceed the scientifically recommended TAC based on the HCR of the management plan. **Assessment Team Response: Comments acknowledged. The Team is aware that in the past, national TAC for haddock has been set above recommended scientific advice. This has technically changed after the haddock FMP has been formally implemented in 2013. This can be seen in the table provided under clause 1.1.2. Scientific advice and TAC for the 2013/2014 season is the same at 38'000 tons. The values for the 2014/2015 seasons also match at 30'400 tons. Scientific advice versus National TAC will be verified at each yearly surveillance assessment to ensure the two values match and that TAC does not exceed scientific advice.** **http://www.responsiblefisheries.is/seafood-industry/supply---tac/** The haddock management plan does not specify a limit reference point for fishing mortality, and instead relies on a harvest rate; except for a reduction in the harvest rate at low SSB no remedial actions are foreseen if the stock does not develop as expected. Given the fact that the reason for the high recruitment fluctuations in the Icelandic haddock stock are poorly known, the management plan would have benefited from including more information on management responses to unexpected changes. However the strong management framework in place should be able to respond and revise the management plan if conditions change considerably; future monitoring of compliance with FAO/ISO based criteria will also serve to ensure the management plan is working as expected.

	Assessment Team Response: Comments acknowledged. With regards to the ecosystem approach to fisheries management it is noted that mapping the distribution of benthic assemblages and habitats which are considered to be sensitive to trawling disturbances is ongoing, and in particular maps of the distribution of sponges are currently based on a limited amount of data. Additional closed areas may thus need to be added to ensure an adequate coverage of all types of Vulnerable Marine Ecosystems (VMEs) in Icelandic waters as maps of benthic habitats improve in future years. Similarly data on seabird bycatch by Icelandic longliners is expected to improve shortly; recording all seabird and mammal bycatch in logbooks became mandatory in 2014. Future monitoring of compliance with FAO/ISO based criteria should assess whether such efforts will be translated into appropriate management actions to further improve the consideration of ecosystem effects in the Icelandic fisheries management in future years. **Assessment Team Response: Comments acknowledged. This is the plan for upcoming surveillance assessments, as the new information becomes available.** Finally some clarifications are required on the effective protection of spawning and juvenile haddock. In particular is not clear whether temporary sudden closures based on real time monitoring of catch length frequency distributions have in the past actually been implemented to protect juvenile haddock. **Assessment Team Response: Comments acknowledged. Temporary closures based on real time monitoring of catch length frequency distributions have in the past been implemented to protect juvenile haddock. In the past 27 years, about 2000 temporary closures have come into effect, mostly off the Westfjords. Most of the closures concern cod fishing (63%) and often they have been limited to bans on bottom trawling or longlining. However, given the extensive spatial overlap of haddock and cod catches, closures aimed at protecting cod are very likely to have conservation benefits for haddock. This can be seen in the figures provided below.**

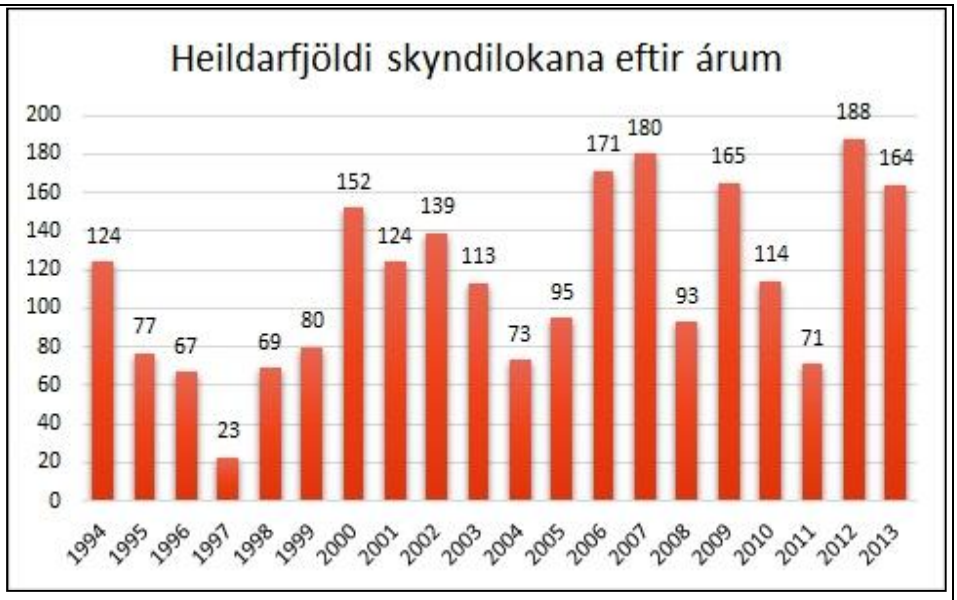
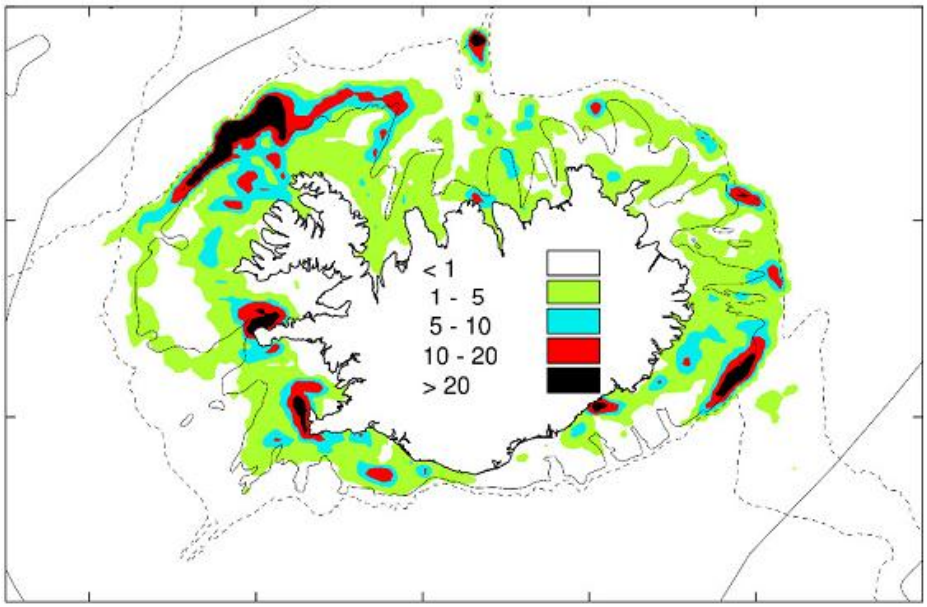


Figure 59. Total number of short term closures from 1994 to 2013.

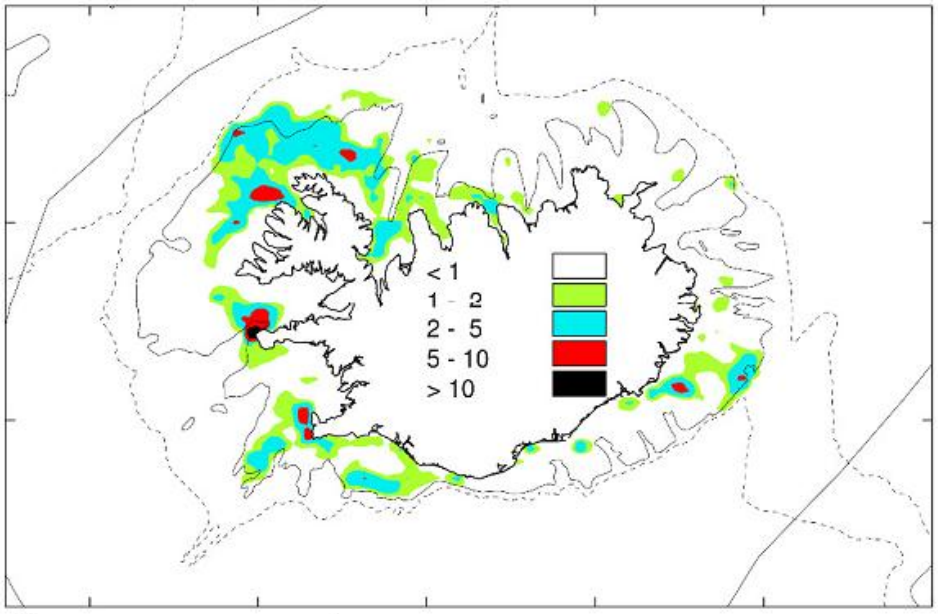
http://www.fiskistofa.is/umfiskistofu/arsskyrsla-2013/eftirlit/



ÞORSKUR. Veiðisvæði við Ísland árið 2013 (tonn/sjm^2). Veiðisvæði mismunandi veiðarfæra eru sýnd í viðauka 5.2.

COD. Fishing grounds in 2013 (tonnes/nmi^2). Information on fishing grounds by gear type are given in Appendix 5.2.

http://www.hafro.is/Astand/2014/english/01-cod-14.pdf

	 **Ýsa.** Veiðisvæði við Ísland árið 2013. Dekkstu svæðin sýna mestan afla (tonn/sjm^2). ***Haddock.** Fishing grounds in 2013. Dark areas indicate highest catch (tonnes/nmi^2).* http://www.hafro.is/Astand/2014/english/02-haddock-14.pdf
1.1.1	The Icelandic Fisheries Management Act No 116 (August 2006, as subsequently amended) provides the underlying legal framework for the fisheries management system in place in Iceland. Fisheries management policies are in line with international agreements, including the FAO Code of Conduct for Responsible Fisheries and the International Plan of Action to prevent, deter and eliminate Illegal, Unregulated and Unreported (IUU) fishing. The main public institutions which implement the fisheries management system in Iceland are: the Ministry of Industries and Innovation (MII), the Directorate of Fisheries (DF), the Marine Research Institute (MRI), and the Icelandic Coast Guard. The responsibilities of these entities are complementary, well-structured and defined, resulting in a highly effective management system. **Assessment Team Response: No comments.**
1.1.2	Haddock is managed by limiting catches through an Individual Transfer Quota System (ITQ) system in Iceland. There are well defined rules and requirements for quota allocation, transfer and reporting. A recommended TAC is issued annually by the MRI, and a national TAC is subsequently set by the Ministry following a process of stakeholder consultation. In 2006-2013 the national TAC always exceeded the recommended advice, and in 2007/2008, 2009/2010, 2011/2012 as well as 2012-2013 Icelandic landings exceeded the

	national TAC. In April 2013 a management plan for haddock was adopted. This management plan is based on a Harvest Control Rule (HCR) which according to ICES is in accordance with the precautionary approach and the ICES MSY framework[182]. The publication of a Fisheries Management Plan for haddock is an important positive step towards further improving the management system for this species. When monitoring compliance of this fishery with FAO/ISO based criteria in future years it should be ensured that the national TAC does not exceed the scientifically recommended TAC based on the HCR of the management plan. **Assessment Team Response: Comments acknowledged. Response provided above applies. The assessment team will verify through future surveillance assessments that the TAC does not exceed the scientifically recommended TAC based on the HCR of the management plan.**
1.1.3	Management measures adopted by the Icelandic authorities include input controls (e.g. limitations to fishery access), output controls (e.g. total allowable catch limits) as well as technical measures (e.g. gear specifications and closed areas), which are appropriate measures for the conservation and sustainable harvest of haddock. It is however not clear whether the minimum mesh size for trawlers is 135 mm or 155 mm (p. 35 '*the minimum mesh size is 135 mm and selectivity devices are also required in some fishing areas'*, but p. 50: '*the minimum mesh size for trawlers fishing demersal species is 155 mm'*)? **Assessment Team Response. The statement in page 50 has been corrected. The mesh size in the codend in the trawling fishery was increased from 120 mm to 155 mm in 1977. Since 1998 the minimum codend mesh size allowed is 135 mm, provided that a so-called Polish cover is not used.** The effective implementation of all these management measures, and in particular the setting of national TACs in line with the HCRs set out on in the haddock management plan need to scrutinized when monitoring compliance of this fishery with FAO/ISO based criteria in future years (see clause 1.1.2). **Assessment Team Response: Comments acknowledged. Response provided above applies.**
1.1.4	The Icelandic legal framework regulates the use of fishing gears in general and renders dynamiting, the use of poison and other destructive fishing practices illegal. Policy objectives of the Icelandic authorities include minimization of fishing impacts on the environment; quote from executive summary of the

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

	Icelandic Ocean Policy: '*The application and further development of the ecosystem approach lays the basis for achieving Iceland's objectives in ocean issues*'[183].
1.1.5	A management plan for Icelandic haddock was formally adopted by the Iceland in 2013. The management plan is well documented, publicly available and was evaluated by ICES following a relevant request by the Icelandic authorities; the results of the ICES evaluation is also publicly available[184].
1.1.6 and sub-clauses	There are several management units of haddock in the Northeast Atlantic, one of which is haddock in Icelandic waters. There is some larval drift into Greenland waters, but the deep waters surrounding the Icelandic shelf hinder any significant amount of migration of individuals between stocks. Accordingly the haddock fisheries management plan states that 'Current distribution of the stock is within the Icelandic EEZ'.
1.1.7 and sub-clauses	1.1.7.2. The management plan has the objective of generating MSY in the long term, and is based on a Harvest Control Rule (HCR) where the TAC for the next year is set based on the harvest rate as a proportion of the biomass of haddock measuring 45cm or more in the advice year (i.e. the year after the assessment year). Lower harvest rates are applied if the SSB goes below the reference point Btrigger, which was set at 45,000 t by the Icelandic authorities. Other than the application of lower harvest rates, the management plan does not give details on remedial action if Blim is unexpectedly approached or other sudden changes occur. Since there are much higher unexplained inter-annual variations in recruitment of haddock compared to many other fish stocks, and in fact ICES warn that: '*the spawning biomass will have a probability of around 0.16 of going below Blim at least once in the first ten years*', the management plan would benefit from the inclusion of further details on such potential remedial actions to be taken if limits with respect to precautionary management are approached. The fact that the Icelandic Ministry of Fisheries has the authority to take strong remedial actions using the legal framework in place (e.g. to cease fishing activity for any stock in danger of collapse) is however acknowledged. **Assessment Team Response: Comments acknowledged.**

[183] http://www.mfa.is/media/Efstabaugi/The_Ocean_Icelands_Policy.pdf
[184] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2013/Special%20requests/Iceland%20longterm%20MP%20for%20Icelandic%20haddock.pdf

	1.1.7.4 The primary management approach is the application of output controls in the form of annual TACs. The management system in place is capable of setting annual TACs in line with the HCR set out in the management plan and subsequently ensuring that catches are in line with the TAC since there is a robust catch monitoring and reporting system in place. However the fact that the national TAC has in the past exceeded the recommended advice, and in several years actual landings subsequently exceeded the national TAC, is a cause of concern (see clause 1.1.2). **Assessment Team Response: Comments acknowledged. Response provided earlier applies.**
1.1.8 and sub-clauses	1.1.8.7 The most important gears landing haddock in Iceland are bottom otter trawlers (44%) and bottom longliners (44% of catches each in 2013). Bottom trawling has considerable impacts on benthic habitats, in particular on large structural biota such as corals and sponges. The management plan states that it is the policy of the Icelandic government to protect vulnerable marine ecosystems (VMEs); and permanent closures are already in place to protect several areas with known VMEs. Mapping the distribution of benthic assemblages and habitats which are considered to be sensitive to trawling disturbances is however ongoing[185], and for instance existing maps on the distribution of sponges (Porifera) are based on the analysis of only a single year of MRI groundfish survey data (Ragnarsson and Steingrimsson 2003). Further closed areas may thus need to be added to existing ones as maps of benthic habitats improve in future years. This is however a minor issue since the management plan already makes reference to the mechanism by which emerging data on the location of VMEs will be processed: '*The MRI provides advice on closures to protect VMEs which are promptly processed within the Ministry Industries and Innovation*'. The appropriate consideration of new data on sensitive benthic biota should be monitored when assessing compliance of this fishery with FAO/ISO based criteria in future. **Assessment Team Response: Comments acknowledged.** The management plan as such does not mention any objectives/management measures to reduce incidental catches of seabirds by longliners. This is despite the fact that Icelandic longliners already use bird scaring devices and Icelandic

[185] http://www.hafro.is/undir_eng.php?ID=16&REF=2

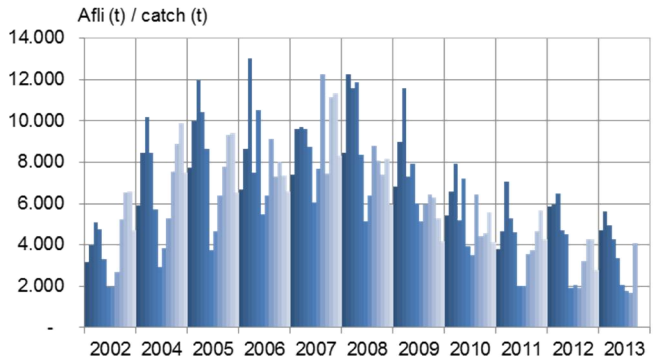
	authorities have recently improved data collection on seabird and mammal bycatch[186]. An appraisal of the data on seabird bycatch in the haddock fishery is planned for the end of 2015. **Assessment Team Response: Comments acknowledged. This is the case and the assessment team will assess this new information accordingly as soon as it is available.**
1.2	N/A
1.2.1	The Icelandic Marine Research Institute (MRI) is in charge of collecting/compiling data, carrying out scientific research and assessment, including on ecosystem impact of fisheries, with the support of the Directorate of Fisheries and the Coast Guard. The MRI is a very competent institute which employs highly respected and knowledgeable scientists, as evidenced by the long list of publications which is available in the 'Bibliography' section of the institute's website (www.hafro.is).
1.2.2	Icelandic haddock is a data-rich fishery, where high quality scientific survey data and catch at age information have been compiled in an extensive manner over several decades: the most recent stock assessment available is based on age disaggregated landings from 1979 to 2013 and on survey data from the March survey 1985-2014 and the October survey 1995-2013[187].
1.2.3	N/A
1.2.4 and sub-clauses	Discards are not currently included in haddock stock assessments, but this is unlikely to have an impact on total fishing mortality estimates due to the negligible amounts: it is mandatory to land all bycatch in Iceland, and discards of marketable fish are prohibited. Haddock discards have been estimated at ranging from 0.7% to 5% by weight since 2001, and in 2013 were <1% by weight.
1.2.5	N/A
1.2.6	The participation of Icelandic scientists at the ICES working groups, including at the ICES North-Western Working Group where the analytic haddock stock assessment is done, is exemplary.
1.2.7	N/A
1.3.1.1	The Icelandic haddock management plan is based on a policy of maintaining the exploitation rate at the rate which is consistent with the precautionary approach and that generates maximum sustainable yield (MSY) in the long

[186] Regulation no 557/2007 on logbooks was updated in early 2014 for recording marine mammal and seabird interactions/bycatch

[187] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2014/2014/had-iceg.pdf

	term. The manner in which the annual TAC is set was evaluated by ICES and found to be '*precautionary and in accordance with the ICES MSY approach'*.
1.3.1.2	The precautionary reference point Blim (set at 45 000 t) has been set at a level of SSB at which recruitment was not impaired by ICES; in 2014 the haddock SSB was 48% above Blim, but declining due to a series of relatively small year classes. In addition the harvest rate (0.4) applied when calculating TACs is below the precautionary harvest rate of 0.46, and has been shown by simulations carried out by ICES to imply a very low probability of bringing the SSB below Blim. The HCR adopted in the management plan thus protects the stock from being overfished to a level causing recruitment overfishing.
1.3.1.3	N/A
1.3.1.4	According to the haddock management plan the TAC is set as a fraction of the biomass of fish larger than 45 cm (B45+). If the SSB is above Btrigger (45000 t), the HR is 0.4; if the SSB is below the trigger, the HR is reduced proportionally. Additional remedial actions in the event that Btrigger/Blim is unexpectedly reached or other sudden changes take place are not specified. The management plan would benefit from specifying more clearly what steps will be taken if the stock does not develop as expected (see clause 1.1.7.2). Moreover, no limit reference point has been determined for fishing mortality (see clause 1.3.2.1.1). **Assessment Team Response: Comments acknowledged. Apart from a rule for reducing the HR at low SSB, the management plan does not describe explicit measures to be taken if limits are approached. According to the evaluation of the plan such events would be very unlikely unless natural conditions change or the fishery gets out of control, in which case measures would have to be adopted to the prevailing situation. The Ministry has the authority to take strong remedial actions using legislative processes to cease fishing activity for any stock in danger of collapse.** http://eng.atvinnuvegaraduneyti.is/laws-and-regulations/fisheries/
1.3.1.5	The long-term harvest policy stated in the haddock management plan is: '*The management strategy for Iceland haddock is to maintain the exploitation rate at the rate which is consistent with the precautionary approach and that generates maximum sustainable yield (MSY) in the long term*.'
1.3.1.6	The haddock management plan specifies limits with respect to precautionary management. These limits have been approved by ICES.

1.3.2.1.1	The management plan does not specify a limit reference point for fishing mortality. Instead a harvest rate is specified and simulations show that there is a low risk of reaching biomass limits if haddock is fished in line with the target harvest rate. As long as there are no significant changes in stock dynamics and hence the assumptions of the simulations done by ICES when evaluating the HCR, a limit fishing mortality rate is indeed functionally redundant. However some key aspects of stock dynamics are not completely understood; the reason for the high recruitment fluctuations in the Icelandic haddock stock are poorly known. The management plan would thus have benefited from outlining responses to unexpected changes, i.e. when conditions deviate from assumptions. There are strong management and legal frameworks in place which should be able to respond and revise the management plan if conditions change considerably. Nevertheless future monitoring of compliance with FAO/ISO based criteria will need to ensure the management plan is working as expected. **Assessment Team Response: Comments acknowledged.**
1.3.2.1.2	See clause 1.3.2.1.1.
1.3.2.2.1	The long term management target is not explicitly specified in terms of haddock stock biomass, but the stated aim of the harvest policy is to generate maximum sustainable yield in the long term. ICES found the HCR to be in accordance with MSY.
1.3.2.2.2	N/A
1.3.2.2.3	N/A
1.3.2.2.4	The management plan specifies how the harvest rate will be adjusted if SSB reaches Btrigger (45 000 t). The management plan does not specify remedial actions in the event that Blim is reached apart from a rule for reducing the HR at low SSB (see clauses 1.1.7.2 and 1.3.1.4). The strong management and legal frameworks nevertheless provide the necessary prerequisites for implementing appropriate response actions.
1.3.2.3.1	N/A
1.3.2.3.2	The assessment report states that '*haddock tend to be the dominant species in the Danish seine fishery and may be targeted seasonally, e.g. during the haddock spawning season'* (p. 17), which (at least for the Danish seine fishery) contradicts the statement '*The fishery is spread all around Iceland. Hence, it is unlikely that there is unbalanced exploitation of specific spawning component*' (p. 95). Indeed haddock catches tend to peak in spring, which is during the

	species' spawning season (Figure 1).  Figure 1. Haddock catches (t/month)[188] However as the assessment report also point out, there are temporary closures of spawning grounds in place for Icelandic cod, which will also offer protection to spawning haddock since haddock overlaps in spawning season (April–May) and depth (50–200 m) with Atlantic cod (Jónsson and Pálsson 2006, cited in Grabowski et al. 2012)[189]. **Assessment Team Response: Comments acknowledged.**
1.3.2.3.3	Protection of juvenile fish is achieved through the implementation of several fishing gear rules, including minimum trawl mesh sizes and the use of escape panels for demersal fish in shrimp nets.
1.3.2.3.4	The MRI has the authority to implement a temporary sudden closure system to protect juvenile fish based on near real time monitoring of the catch length frequency distributions. Moreover if there are several consecutive temporary closures, the minister of Fisheries can issue a regulation to close the area for a longer time period. It would be informative to know whether such measures have in the past actually been implemented for haddock. **Assessment Team Response: Comments acknowledged. Temporary closures in recent years where either haddock or saithe is mentioned specifically are as following:** Year / Haddock / Saithe 2013 / 0 / 14 2012 / 0 / 9 2011 / 3 / 2

[188] http://www.fisheries.is/main-species/codfishes/haddock/
[189] http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0051321#pone.0051321-Jnsson1

	<table><tr><td>2010</td><td>23</td><td>11</td></tr><tr><td>2009</td><td>24</td><td>1</td></tr></table> **Besides these it is possible that other closures may also have been related to juvenile haddock or saithe but the main concern for the stated is another species (temporary closure for using long-line is sometimes related to both juvenile cod and haddock).** **Regulatory (permanent, long-term) closures may be less frequent in recent years and this could be explained with the fact that more areas are now permanently closed or may only be fished during restricted periods or only with certain gears or selective methods. Some of these areas may originally have been close because of concern for haddock or saithe, although the species most often mentioned is cod which is of course the most economically important of the demersal species.** **A very detailed report covering the fisheries in the 20th century and up till 2006 is Friðun svæða og skyndilokanir á Íslandsmiðum; sögulegt yfirlit, which was published in 2007. That report specifically mentions two permanent (long-term) area closures because of juvenile haddock in the period 1994-1997 (see** http://www.hafro.is/Bokasafn/Timarit/fjolrit-133.pdf**, has abstract in English). (Some other studies related to this topic are:** http://icesjms.oxfordjournals.org/content/early/2014/09/30/icesjms.fsu162.abstract; http://icesjms.oxfordjournals.org/content/63/5/897.abstract; http://icesjms.oxfordjournals.org/content/67/5/1024.abstract; http://www.avs.is/media/avs/Skyrsla_R_022-07__beita_og_krokar.pdf.
1.4.1	The appropriate international scientific body which is involved in annual stock assessments, calculation of forecast scenarios and TACs, carrying out benchmark workshops and evaluating management plans is ICES.
1.4.2	The current system is based on assessment reports drafted by the Icelandic MRI, which are then peer reviewed by the ICES Advisory Committee (ACOM) on an annual basis. Following peer review MRI will finalize its advice to the Ministry taking into account ICES feedback. The Ministry sets the final TAC, based on MRI's advice but also taking into account input from the fishing industry, giving it a legal right to deviate from the scientific advice (see point 1.1.2). **Assessment Team Response: The Minister has the right to deviate from MRI and ICES advice but this is very unlikely to happen given that the Ministry has formally adopted FMP and relative HCR for the species.**

1.5.1	N/A
1.5.2	N/A
1.5.3	The fisheries management plan for Icelandic haddock describes the Management Unit as: '*Haddock (Melanogrammus aeglefinus) fishing in the Icelandic Exclusive Economic Zone (EEZ). Icelandic authorities (Minister of Industries and Innovation) manage fisheries within the Icelandic EEZ, which is mainly within ICES area Va. Current distribution of the stock is within the Icelandic EEZ*.'
1.5.4	Icelandic haddock is not considered to be a shared stock.
1.5.5	MRI together with ICES propose the TAC which are within the boundaries set by the harvest policy adopted as part of the haddock management plan. The Minister of Fisheries however has the final say in deciding on the TAC, which in the past has not always been in line with scientific advice (see clause 1.1.2).
1.5.6	N/A
1.5.7	The practical implementation of the fisheries management system including monitoring, control, surveillance and enforcement is done by the Icelandic Directorate of Fisheries, which reports directly to the Minister. The coast guard plays an important role in monitoring fishing activities at sea, including enforcing legislation on fishing gear and monitoring closed areas. These institutions are supported by the MRI which monitors catch composition.
1.5.8	In the past the TAC as well as actual catches have not always been in line with scientific advice, which is a cause of concern (see clause 1.1.2). Following the introduction of the haddock management plan in 2013 the TAC was in line with the harvest rule, but catches in 2013-2014 were 41.8 kt, which is 10% above the TAC. The flexibility of the TAC system as described in the assessment report is acknowledged, however more emphasis should be placed on the importance of managing the stock in such a manner that the TACs are based on scientific advice. This is particularly important since according to ICES advice issued in June 2014 the fishery is currently targeting weak year classes. **Assessment Team Response: Comments acknowledged. TAC setting versus scientific advice will be verified each year through the yearly surveillance assessment.**
1.5.9	N/A
1.5.10	N/A

Section 2: Compliance and Monitoring	The Icelandic Fisheries Management Act (No. 116/2006) and a number of supporting Acts and Regulations are comprehensive and efficiently implemented by the national authorities in charge of fisheries management. Overall the Icelandic haddock fishery is well managed, with high levels of monitoring, enforcement and compliance. In particular the Icelandic system of electronic catch reporting appears to be highly efficient and state of the art since it provides near real time information. Some minor clarification are requested with regards to: (i) the extent to which haddock catches are processed on board since the margin for error and risk of underreported catches is somewhat higher when monitoring processed catches, and (ii) whether there are any minimum weight thresholds for recording catches in logbooks. **Assessment Team Response: Comments acknowledged. i) Cod, haddock and saithe are almost exclusively filleted, while some other species are mostly headed/tail cut. In recent years 15% of the haddock catch in Icelandic waters is processed at sea, but the figure is 18% of the total haddock catch if distant waters catch (e.g. Norway can legally catch some Icelandic cod, haddock and saithe) is included. For saithe about 40% (in all areas) was processed at sea in 2011-2012, but increased to 49% with increased saithe catch in 2013. Conversion factors are provided yearly by the Directorate in connection with the MRI to ensure whole weight is in accordance with processed weight.** **ii) Regulation 557/2007 states that all catch shall be recorded in the logbook, there is no reference to a minimum weight. (see** http://www.reglugerd.is/interpro/dkm/WebGuard.nsf/aa0d47377abc977400256a090053ff91/e970b5a56c0e12020025730200441f20?OpenDocument)
2.1.1	The Icelandic legal and administrative fisheries management framework has been established through the Fisheries Management Act No. 116/2006 and a number of supporting Acts and Regulations for the management of the fishery. Competent national authorities take care of monitoring, control and enforcement. Overall the compliance with the legal framework appears to be high as a result of efficient implementation by the Icelandic authorities.
2.2.1	The main methods used to record catches are the use of logbooks and physical weighing at accredited landing stations; weighed recorded landings are the main source of catch documentation. It would be interesting to know to what extent are haddock catches processed on board; are fish only gutted or also headed and filleted at sea? What proportion of haddock landings comes from factory freezer vessels? Whilst it is clear that the Icelandic authorities have a system in place to monitor such

	processed catches, the margin for error and risk of underreported catches is clearly larger when monitoring processed catches based on a limited number of samples weighed at sea during observer trips / conversion factors. Some information on this aspect of the haddock fishery would thus be relevant. **Assessment Team Response: Comments acknowledged. See response above.**
2.2.2	See clause 2.2.1
2.2.3	N/A
2.2.4 and sub-clauses	Are participating companies usually engaged in both fishing and fish processing operations? Presumably the 'fish processing vessels' are simply large fishing vessels which have a license to process catches immediately? **Assessment Team Response: That is correct.**
2.3.1.1	N/A
2.3.1.2	N/A
2.3.1.3	N/A
2.3.1.4	N/A
2.3.2.1	N/A
2.3.2.2	N/A
2.3.2.3	N/A
2.3.2.4	N/A
2.3.2.5	N/A
2.3.2.6	See clause 2.2.1, were any targeted logbook inspections done on vessels processing catches at sea in 2012-2013? **Assessment Team Response: According to enforcement data, there have been 20 targeted boardings to check logbooks, but the number is not broken down in catcher and catcher processor vessel classes.**
2.3.2.7	Article 2 of the Icelandic Act concerning the Treatment of Commercial Marine Stocks (No. 57, June 1996) states that: *'All catch obtained by the fishing gear of a vessel must be retained and landed'*. In addition discards are monitored by the MRI by comparing length distributions in landings from otherwise comparable trips with and without inspectors on board. ICES estimated that discards of haddock have been less than 2% by weight in recent years (advice

	June 2014). Overall discarding seems to be a minor and well monitored issue in the Icelandic haddock fishery.
2.3.2.8	N/A
2.3.2.9	Small discrepancies in reported landings and exports of fish from processing plants have been reported by ICES NWWG in 2009; see clause 2.2.1 regarding a query on the extent to which haddock catches are processed at sea.
2.3.2.10	The Icelandic system of electronic catch reporting appears to be highly efficient and state of the art.
2.3.2.11	N/A
2.3.2.12	N/A
2.3.2.13	N/A
2.3.2.14	N/A
2.3.2.15	N/A
2.3.2.16	N/A
2.3.3.1	N/A
2.3.3.2	N/A
2.3.3.3	N/A
2.3.3.4	N/A
2.3.3.5	N/A
2.3.4.1	N/A
2.3.5.1	N/A
2.3.5.2	N/A
2.3.5.3	Are there any minimum weight thresholds for recording catches in logbooks or are all catches recorded in logbooks? **Assessment Team Response: All catches must be recorded in logbooks, there is no mention of minimum weights in regulations.**
Section 3: Ecosystem Considerations	The Icelandic ecosystem approach is based on a number of practical measures to protect critical habitats (i.e. spawning and nursery areas) and vulnerable marine ecosystems, and technical measures to enhance fishing gear selectivity. It is however not clear whether selectivity studies are available

	specifically on gears targeting haddock. Nevertheless, the implemented technical measures appear to be effective; discarding seems to be a minor and well monitored issue in the Icelandic haddock fishery. Recent efforts by the Icelandic authorities on improving data collection and reporting systems for marine mammals and seabird bycatch and the setting up of a steering group to oversee this process are commendable. Moreover efforts by Icelandic scientists are underway to improve existing maps of benthic habitats. Future monitoring of compliance with FAO/ISO based criteria should assess whether such efforts will be translated into appropriate management actions to further improve the consideration of ecosystem effects in the Icelandic fisheries management in future years. **Assessment Team Response: Comments acknowledged.** It is not clear whether all known hydrothermal vents are protected through permanent closures, or only hydrothermal vents with significant surface structures. In this context the assessment report should also provide more information on the amount of information available on hydrothermal vent structures/communities in Icelandic waters. **Assessment Team Response: Only hydrothermal vents with significant surface structures are formally protected. Others are not but may reside well below the reach of fishing gear at depths not usually fished by trawl gear.**
3.1.1	See clause 1.1.8.7 on appropriate consideration of emerging data on the spatial distribution of sensitive benthic biota in future years.
3.1.2	N/A
3.2.1.1	In the assessment report it is stated that '*MRI routinely undertakes selectivity experiments to assess the characteristics of the main gears used and to investigate measures to further enhance selectivity*', but it is not clear if such studies are available specifically on selectivity of gears targeting haddock? **Assessment Team Response. MRI communications indicate that over the last decades, several surveys for assessing selectivity of bottom trawl codends have been conducted in Icelandic waters and results never gave reasons to worry about poor codend selection. However, the authors note that changes in the type of materials used to construct trawls and cod-ends has changed over time with a switch to materials that are heavy and stiff. A study is currently ongoing potentially indicating less than ideal selectivity performance, the results of which may well change current management measures. However it is worth noting that mesh size is only one of the management measures in force in Iceland to avoid excessive exploitation of the haddock resource. The stock is currently well above Blim.**

3.2.2.1	Discarding catches of commercial fish (regardless of whether they are target and non-target species) is prohibited in Iceland.
3.2.2.2	Long-liners in Iceland utilize bird scaring devices such as acoustic cannons and scaring lines to shield baited hooks as gears are shot, and use night setting of longlines to minimise bird interactions. Moreover recent efforts by the Icelandic authorities on improving data collection and reporting systems for marine mammals and seabird bycatch and the setting up of a steering group to oversee this process are commendable. Future monitoring of compliance with FAO/ISO based criteria should assess whether the report on bycatch of seabirds and marine mammals in the haddock fishery expected at the end of 2015 will lead to appropriate management actions (if relevant). **Assessment Team Response: Comments acknowledged. This will be assessed accordingly as new information becomes available.**
3.2.2.3	N/A
3.2.3.1	See clause 1.3.2.3.2.
3.2.3.2	Several permanent area closures are in place to protect stony cold water corals in Icelandic waters.
3.2.3.3	N/A
3.2.3.4	The assessment report mentions several times that '*known hydrothermal vents are protected through permanent closures'*, yet it seems the focus of conservation efforts are on hydrothermal vents with significant seabed structures such as the chimneys found in the Evjafjord hydrothermal vent area? For example it seems the hydrothermal vents located on the Reyjkjanes ridge are not subject to permanent closures since conventional black smoker plumes are almost completely absent from this area (Chen, 2003)[190]? In this context it may be relevant to include (i) a brief overview of any relevant studies of Icelandic hydrothermal vent communities, and (ii) more details on how decisions on what constitutes surface structures which warrant protection are made.

[190] http://onlinelibrary.wiley.com/doi/10.1029/2001JB000816/full

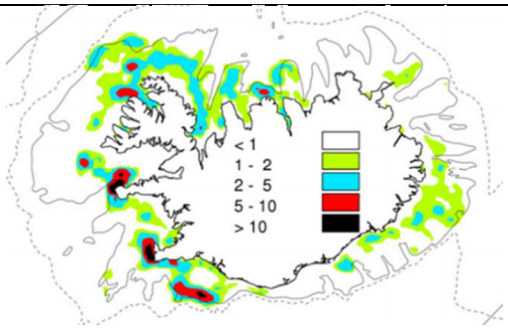


Figure 2. Haddock fishing grounds in 2011 (t/nm2), all gear combined. Dark areas indicate highest catches.

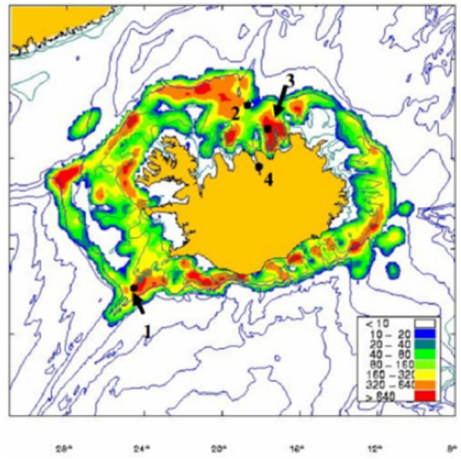


Figure 3. Location of areas of hydrothermal activity in Icelandic waters in relation to bottom trawling effort in 2003 (combined groundfish, shrimp and Nephrops fisheries). 1- (1) Steinahóll on the Reykjanes Ridge (2) Kolbeinsey vent fields, (3) Grímsey vent fields and (4) Eyjafjörður (Ragnarsson and Stefan, 2007)[191].

Comparing the location of haddock fishing grounds (Figure 2) to the location of areas with hydrothermal activity in Iceland (Figure 3) however shows that potential impacts of the haddock fishery on thermal vents are likely to be minimal.

Assessment Team Response: Comments acknowledged. Some clarification has been provided. The chimney areas in the Eyjafjord area are fully protected by environmental law/regulation. The other vents are in more remote areas and with less surface structures and have thus not been considered under serious threat by fishing activities. Furthermore non protected hydrothermal vents may reside well below the reach of fishing gear at depths not usually fished by trawl gear.

One example of a lesser surface structure hydrothermal vent not formally

[191] Ragnarsson, Stefán A. Bottom trawling and scallop dredging in the Arctic: impacts of fishing on non-target species, vulnerable habitats and cultural heritage. Ed. Elena Guijarro Garcia. Nordic Council of Ministers, 2007.

	protected by the Icelandic government is the Reykjanes Ridge. Detailed along-axis survey [*German et al.*, 1994 *and German and Parson*, 1998] *has* found only one hydrothermal vent along the 600 km of the Reykjanes Ridge, which corresponds to a value of 0.014 for the "plume incidence" factor. The plume incidence is defined as the fraction of the ridge segment length overlain by hydrothermal plumes or vent fields. Therefore it represents an average assessment of the hydrothermal activity on a segment scale. *German and Parson* [1998] also reported that conventional black smoker plumes are almost completely absent, even directly above the recently imaged axial magma chamber at 57°45'N [*Sinha et al.*, 1997]. For comparison, data collected at the 11°N–30°N area of the *Mid-Atlantic Ridge* (MAR), which was thought as a good representative of hydrothermal activities at the MAR, have yielded an along-axis average of at least one vent site for every 150 km [*German et al.*, 1995]. This translates into a plume incidence factor of 0.053 for MAR. These observations suggested that the Reykjanes Ridge is associated with at least a factor of 4 less than normal hydrothermal activity at MAR. http://onlinelibrary.wiley.com/doi/10.1029/2001JB000816/full
3.2.4.1	N/A
3.2.4.2	See queries on clauses 1.3.2.3.4 (implementation of temporary area closures to protect juvenile haddock), and 3.2.3.4 (protection of hydrothermal vents). **Assessment Team Response: Comments acknowledged and addressed.**

Peer Reviewer B Comments

Summary and Recommendation

The report on the Icelandic Haddock Commercial Fishery is well written and describes in detail the fisheries assessment and management processes, relevant institutions and their roles in the system, the compliance and enforcement measures in place and their effectiveness, and, where they can be identified or hypothesised, the ways in which this fishery will interact with the wider ecosystem and the means by which these impacts can be mitigated.

The report paints a picture of a fishery with a robust management system in place, delivering demonstrably high levels of compliance. A comprehensive stock assessment is has been adopted and used to produce a risk analysis for the way ahead. There are suites of measures in place to reduce discarding through incentives, spatial closures and technical measures. Stakeholders are involved in the management process through consultations and the system of individual transferable quotas fosters stewardship among fishers and rewards long-term thinking.

There is evidence of historic catches in excess of scientific advice and agreed quotas, while it is still too soon to properly evaluate the effects of the management plan. Furthermore, there is a lack of catch data at sufficient granularity to properly study species interactions and bycatch.

While the stock is currently declining due to recent poor recruitment, it seems to be in good health overall, subjected to sustainable levels of fishing mortality by a well regulated fishery with a plan for how fishing mortality should be managed, and with limited impacts on the wider ecosystem. I concur with the assessment team that the certification be awarded.

IRFM Specification Clauses	Insert Comments as Required
Section 1: Fisheries Management	The fisheries assessment and management system, as relates to the Icelandic haddock fishery is clearly laid out in these clauses, and demonstrably fit for purpose. It is unfortunate that the management plan under which we are carrying out this assessment is so recently adopted as it gives little opportunity to demonstrate the measures are functioning as intended, however the harvest control rule is clearly set out and strikes a good balance between conservation and fishery objectives.
1.1.1	Evidence is presented that the Fisheries Management Act is a comprehensive structured system, incorporating a number of international instruments and serves as a basis for the rational and sustainable management of the resources.
1.1.2	The Icelandic ITQ system is well known and well regarded in the fisheries community as an efficient and targeted system, and evidence of its functioning is presented clearly by the assessment team. The service provider used to facilitate the catch monitoring system is also well regarded, so there are no concerns here. Reading the table on p.48, between 2006 and 2013, the TAC was set roughly 10% above the scientific recommendation, and that declared landings were higher still, at a time when the stock was declining due to poor recruitment. Dealing with the landings in excess of quota, I presume this situation comes about either due to the conversion of quota for other species into haddock quota, or the requirement to land all commercial species, even if above quota. I see this topic is broached later in the report, but as this is the first time the catch data is presented, I think it would be helpful if it were acknowledged in this section of the report, as without this qualification the table as it stands seems contrary to the aims of this clause. **Assessment Team Response: Comments acknowledged. The Team is aware that in the past, national TAC for haddock has been set above recommended scientific advice. This has technically changed after the haddock FMP has been formally implemented in 2013. This can be seen in the table provided under clause 1.1.2. Scientific advice and TAC for the 2013/2014 season is the same at 38'000 tons. The values for the 2014/2015 seasons also match at 30'400 tons. Scientific advice versus National TAC will be verified at each yearly surveillance assessment to ensure the two values match and that TAC does not exceed scientific advice.** **http://www.responsiblefisheries.is/seafood-industry/supply---tac/**

1.1.3	Evidence for the adoption and implementation of appropriate measures by the competent authorities has been broken down into three sections; total allowable catches, fishery access regulations and technical measures. The implementation of technical measures and access regulations are clearly set out and reference the relevant legislation where appropriate. The Icelandic system of temporary spatial closures is also highly regarded as a means to reduce unintended mortality. The assessment routine used for this stock is a well-tested methodology and used in numerous other gadoid assessments. The peer-review offered by ICES NWW Working Group is of a high standard and I have full confidence in the assessments as presented here representing a true picture of stock status. As regards the discussion on TACs however, I think a line needs to be drawn between previous practice and the management plan adopted in 2013. As noted in my comment on clause 1.1.2, between 2006 and 2012, TACs were set consistently above the recommended levels, therefore I believe the sentence "The TAC is based on scientific advice" does not represent the whole story and needs some nuancing to make it clear that their setting was (and remains) a political decision, but that, presuming the harvest control rule is followed, catches in the future will be set in a manner which has been demonstrated to be consistent with the sustainable exploitation of the stock. Again, I see that this is mentioned later in the report, but feel it would be appropriate to discuss here. **Assessment Team Response: Comments acknowledged. Response provided above.**
1.1.4	Legislative instruments prohibiting the use of destructive gears are extensively referenced here. It may be worth pointing out that more than half the landings in this fishery come from gears with very light impacts on the seabed.
1.1.5	A comprehensive listing of the relevant legislation and regulations is presented, together with details of the management plan. This section acknowledges the ability of the Ministry to override the derived TAC, but states that "This has not happened in recent years". Given that the management plan was adopted for the 2013/14 season, and the TAC for 2012/13 was 12.5% above recommended levels, I think this statement is a bit strong and something like "This has not happened since implementation of the current management plan" might be more appropriate. **Assessment Team Response: Comments acknowledged. Text modified as proposed.**

1.1.6 and sub-clauses	The specification of the management unit and stock under consideration are both in line with statements of the recent ICES benchmark on Northern Haddock stocks (WKHAD, ICES CM 2014\ACOM:41) regarding stock identity of haddock in the north Atlantic. I think the responses to subclauses 1.1.6.1-3 could be best summed up by inclusion of a map demonstrating the distribution of the fishery, the depth contours which constrain it, and the extent of the Icelandic EEZ. The consistency of the implemented harvest control rule with the principles of the precautionary approach is extensively documented. **Assessment Team Response: Comments acknowledged. Map has been provided in the clause.**
1.1.7 and sub-clauses	The harvest control rule lacks a specified target for stock biomass, however given the difficulties in identifying and managing at a biomass which would support MSY in a stock where data suggests recruitment is virtually independent of biomass, I would say this is more a shortcoming of the phrasing of the clause than a problem with the management plan, and that treating $B_{trigger}$ as a state to be avoided is appropriate. The minimum cod-end mesh size given under sub-clause 1.1.7.4 (135mm) is not consistent with the value given under 3.2.1.1 (155mm). **Assessment Team Response: Comments acknowledged. Error corrected. The minimum mesh size of the cod end is 135 provided that a so-called Polish cover is not used.**
1.1.8 and sub-clauses	No comments.
1.2	
1.2.1	No comments.
1.2.2	Evidence of an extensive fishery dependent and independent data collection programme is presented. The stratification of sampling appears to be designed to be representative of the distribution of landings from the various fleet sectors and accommodates any temporal changes in the balance between them. The amount of length and age data collected appears to be within an appropriate range for the quantity of fish landed. It would be helpful to mention if there are specified targets for data collection (e.g. X measurements/ages per tonne) and is any quality assurance is carried out to validate the age reading process.

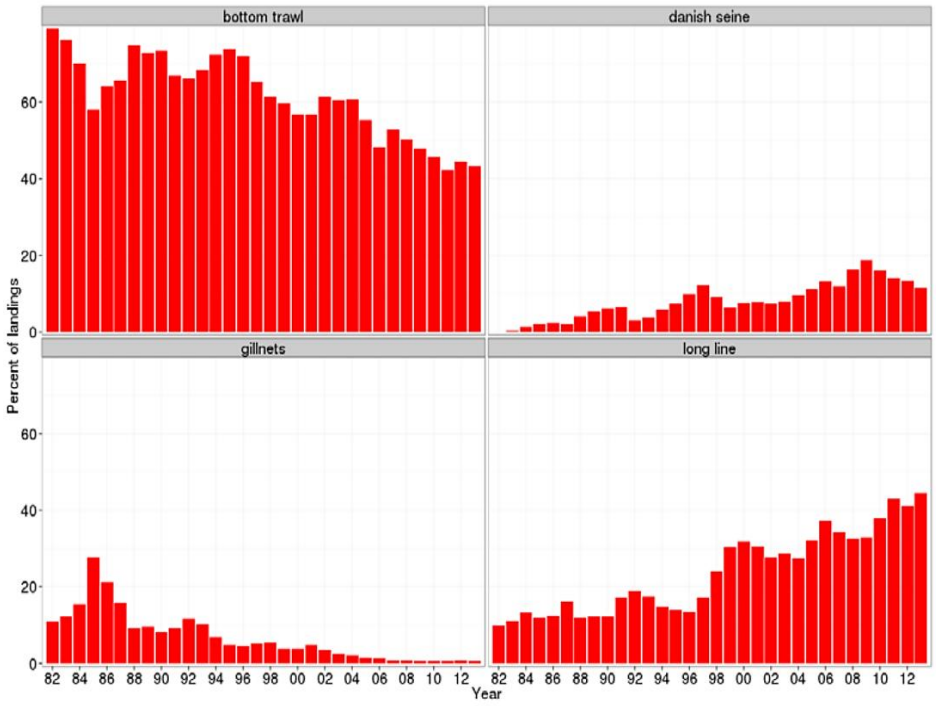
1.2.3	The pattern in the retrospective plot shows a recent tendency for the assessment method to overestimate recruitment in the last year. Although the absolute magnitude is small, it is a multiple of the point estimate. Do these recruits have any significant influence on the B_{45} value? **Assessment Team Response: Comments acknowledged. No, their influence is minimal.**
1.2.4 and sub-clauses	No comments.
1.2.5	No comments.
1.2.6	No comments.
1.2.7	No comments.
1.3.1.1	The harvest control rule, as evaluated is consistent with the precautionary approach.
1.3.1.2	This demonstrates the difficulty in establishing a threshold for reproductive impairment for a stock which hasn't been overfished in the past. Using the lowest observed biomass, and noting that there are few stock-recruit pairs around this level, is an acceptable approach.
1.3.1.3	The evaluation of the harvest control rule represents a comprehensive assessment of risk and uncertainty. Although M is fixed at 0.2, there is no evidence suggestive of significant changes in predation over the period considered, therefore this assumption can be considered valid. I am mindful of "known unknowns" and "unknown unknowns" reading this clause, and in a stock where the harvest rate is based on a proportion of the biomass of the population longer than a certain length, estimated from an age-based assessment model, in a stock where growth rates are strongly linked to cohort size, it would be almost impossible to conduct a full sensitivity analysis, however I think the team behind the MSE have done a the best job possible and I can see no obvious omissions.
1.3.1.4	The biomass reference point considered by the management plan is based on the lowest observed biomass in the time series. There is no evidence that reproductive potential was impaired at this level, therefore this can be thought of a relatively conservative threshold. As this is the level at which reductions in the harvest rate begin, rather than an absolute limit, I would consider it more a $B_{trigger}$ than a B_{lim} reference point.
1.3.1.5	No comments.

1.3.1.6	As noted above, I consider the 45 000 t value $B_{trigger}$ rather than a B_{lim} reference point, however the evaluation of the management plan suggests a low risk of transgressing this level, therefore the plan is consistent with the precautionary approach as the value of biomass at which reproductive impairment starts will be even less likely to be encountered.
1.3.2.1.1	No comments.
1.3.2.1.2	The letter of the clause cannot be addressed by the management plan due to the lack of a limit reference point for fishing mortality, however the spirit of the clause is met by the scaling of the TAC as a proportion of the stock.
1.3.2.2.1	Simulation testing of the harvest control rule suggests it is consistent with long-term objectives of sustainability. It could be argued that the objectives of the management plan themselves are not consistent, given the difference in assumptions about risk between the precautionary approach and fishing at MSY.
1.3.2.2.2	No comments.
1.3.2.2.3	No comments.
1.3.2.2.4	No comments.
1.3.2.3.1	No comments.
1.3.2.3.2	No comments.
1.3.2.3.3	Is it possible to provide more detail on the short-term closures here (Act 79/1997?). I see the lengths and thresholds are given in the response, but what is the actual process for enacting a closure, how quickly are they enacted and how does their duration and scale match with the behavior of the juvenile fish they are protecting. The closures are referenced extensively throughout the document and I think it would be helpful in understanding their contribution. **Assessment Team Response: Comments acknowledged and clarification provided.**
1.3.2.3.4	No comments.
1.4.1	The ICES benchmarking process provides a regular time interval at which the management plan can be properly reviewed in international fora.
1.4.2	No comments.
1.5.1	See previous comments on setting of TACs.

1.5.2	No comments.
1.5.3	No comments.
1.5.4	No comments.
1.5.5	No comments.
1.5.6	No comments.
1.5.7	No comments.
1.5.8	The bar-chart presented here does not correspond to the figures in the table presented in the response to clause 1.1.2. I note one is based on ICES advice while the other comes from MRI. Have these organizations produced consistently differing values? Maybe these could be included and discussed if so. **Assessment Team Response: Comments acknowledged. The bar-chart was derived by the assessment team using ICES data.**
1.5.9	No comments.
1.5.10	No comments.
Section 2: Compliance and Monitoring	The Icelandic compliance and monitoring system is clearly highly developed and serves to underpin the management effectively. Levels of compliance appear good and involvement of stakeholders in the decision making process provides an incentive towards this state.
2.1.1	A comprehensive monitoring, control and surveillance regime has been documented. The level of inspection and monitoring is notable.
2.2.1	The information presented under clause 1.5.8 also seems relevant here.
2.2.2	No comments
2.2.3	No comments
2.2.4 and sub-clauses	No comments
2.3.1.1	No comments.
2.3.1.2	No comments.
2.3.1.3	No comments.

2.3.1.4	I am confused by this section (and the corresponding text in the summary). "By regulation only Icelandic licensed vessels (with some exceptions) are allowed to fish in in Iceland EEZ. A small number of Norwegian and Faroese vessels are allowed to fish…". Are these Norwegian/Faroese vessels issued with an Icelandic license, or are they the "exceptions"? Perhaps these sentences could be clarified. **Assessment Team Response: Comments acknowledged. Yes, these foreign vessels that are allowed to fish in Icelandic waters are managed under strict rules, including a small quota, other retained species allowances, monitoring, weighing and landing, entry and exit requirements etc...**
2.3.2.1	The system of control and enforcement is comprehensive and meets all of the requirements set out in clause 2.3.2.
2.3.2.2	See 2.3.2.1.
2.3.2.3	See 2.3.2.1.
2.3.2.4	See 2.3.2.1.
2.3.2.5	See 2.3.2.1.
2.3.2.6	See 2.3.2.1.
2.3.2.7	See 2.3.2.1. Is any documentation available on what can be discarded and how that decision can be made – is "…damaged or fish in poor health" a judgment call of the skipper? (I note the response to 1.2.4.2, but I'm not clear what the "burden of proof" means in practical terms). **Assessment Team Response: Comments acknowledged. No there is no such documentation available. The judgment rest with the skipper.**
2.3.2.8	See 2.3.2.1.
2.3.2.9	See 2.3.2.1.
2.3.2.10	See 2.3.2.1.
2.3.2.11	See 2.3.2.1.
2.3.2.12	See 2.3.2.1.
2.3.2.13	See 2.3.2.1.
2.3.2.14	See 2.3.2.1.
2.3.2.15	See 2.3.2.1.

2.3.2.16	See 2.3.2.1.
2.3.3.1	The flexibility of the quota system to trade between vessels and to some degree, between species and across years, prevents the prohibition of discarding becoming too much of a burden.
2.3.3.2	See above.
2.3.3.3	See above.
2.3.3.4	See above.
2.3.3.5	See above.
2.3.4.1	From a stock management perspective, it is relatively encouraging that catch irregularities make up such a small proportion of the inspectors citations.
2.3.5.1	The integrated system for analyzing catch records and detecting anomalies, and cross-checking against sales and export information is a “belt and braces” approach to verifying catch statistics and leaves little room for misreporting.
2.3.5.2	See above.
2.3.5.3	See above.
Section 3: Ecosystem Considerations	Ecosystem factors have been given appropriate consideration in this assessment. While it may not be possible to link specific features to this fishery due to the resolution of data, it is clear that an overall ecosystem approach to fishery management is in place and that where issues arise they have been or will be promptly addressed.
3.1.1	A very comprehensive review of the interactions between the haddock fishery and other main ecosystem components is presented.
3.1.2	What is the difference between the gillnet and lumpsucker gear presented in the table taken from the NAMMCO annual report? Are the catches of haddock taken in gillnets (I can’t find an absolute quantity of landings, but looks to be only a few percent of the total) a bycatch from the lumpsucker fishery, or taken by this unspecified gillnet fishery. The lumpsucker gears look to take quite a high bycatch of marine mammals, particularly porpoises. **Assessment Team Response: Comments acknowledged. The lumpsucker net is different from gillnet gear and appears to be encountering more marine mammals than normal gillnets. The catches of haddock taken in gillnets is minimal (0.6% in 2013), see figure below.**

	 **Figure 1. Annual catches by gear. From Section 10 - Icelandic Haddock in ICES NWWG report 2013.**
3.2.1.1	The mesh size specified in the regulations for codends in trawl and seine nets (155mm) is large compared to other gadoid otter trawl fisheries in the north Atlantic, with presumably a positive effect on survival of younger/smaller fish. What codend mesh size is required for the *Nephrops* gears, and are there regulations specifying the dimensions of the square mesh panels and how they are rigged? **Assessment Team Response: Comments acknowledged. Mesh size is 135 mm, not 155 mm. Yes, there are technical specifications for the use and deployment of *Nephrops* gears.**
3.2.2.1	Is it possible to list the minimum landing sizes for haddock and other demersal species? I ask as the text on p.30 of the report states that there is no minimum landing size. **Assessment Team Response: Comments acknowledged. There is no minimum landing size, the Icelandic system has only a minimum reference size, which is 45 mm. This is to allow flexibility in the fleet and to avoid discards of juvenile haddock, when it is incidentally caught.**
3.2.2.2	Much of the information presented in this section relates to longline fisheries in general and I'm not clear if it is explicitly linked to the Icelandic haddock fishery. When and where was the figure of 1.75 seabirds/'000 hooks collected? When were the bird-scaring devices introduced to the Icelandic

	long-line fleet, and is there any evidence of their reducing seabird mortality? I see there is now a requirement to record encounters in the logbook, which is encouraging. Is any preliminary data available from this source? **Assessment Team Response: Comments acknowledged. The reference for the 1.75 birds/1000 hooks was taken from a publication by Tasker et al 2000** **http://www.avesmarinhas.com.br/4%20-%20Impacto%20das%20aves%20marinhas%20na%20pesca.pdf** **There is no formal requirement of using devices to scare away seabirds. But some lingline vessel have seen an advantage in using device for more than a decade now, the advantage being that the birds do not steal the bait from the hooks before it has a chance to catch fish. Gas guns have been in use since early 2000s and in 2014 a new laser device was introduced. The Assessment Team is not aware of proper research of the effectiveness of these devices.** **There is no data yet on the seabirds encounters as a result of the recording in the logbook that has been initiated recently. Results from the MRI Effort are expected at the end of 2015.**
3.2.2.3	No comments.
3.2.3.1	No comments.
3.2.3.2	Work appears to be ongoing to identify and delineate significant concentrations of VME indicators species through fishery independent and fishery based means. What are the significance of the different colours in Fig. 3.2.3.6? **Assessment Team Response: Comments acknowledged. The different colors have the following meaning: Green dots - present in 2003, red-dots not present in 2003**
3.2.3.3	No comments.
3.2.3.4	Am I correct in my understanding that the other locations (Reykjanes and Grimsey-Kolbeinsey Ridges) are in waters too deep to be of significance for the haddock fishery? If so, that could be made more clear. **Assessment Team Response: Comments acknowledged. The chimney areas in the Eyjafjord area are fully protected by environmental law/regulation. The other vents are in more remote areas and with less surface structures and have thus not been considered under serious threat by fishing activities. Furthermore non protected hydrothermal vents may reside well below the reach of fishing gear at depths not usually fished by trawl gear.**

3.2.4.1	No comments.
3.2.4.2	As previously discussed, the system of closures to protect juveniles is highly regarded, and I am satisfied that should other issues arise as being a serious concern to the fishery, management plans and measures would be developed and implemented in a timely fashion.

9. Non-Conformances and Corrective Actions

Non Conformance

A Minor Non Conformance is active for Clause 3.1.1. regarding the lack of clear data to assess the effects of the haddock fishery on seabirds and marine mammals.

Corrective Action

The Icelandic government is in the process of improving data collection relating to fisheries interactions and bycatch of marine mammals and seabirds.

Measures taken to date

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

• 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.

• Fall 2013: bycatch data will be compiled and processed for final analysis of results.

• January 2014: evaluation of the 2013 bycatch data recording.

• Fall 2014: bycatch data will be compiled and processed for final analysis of results.

• January 2015: evaluation of the 2014 bycatch data recording.

• Fall 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.

A new amendment to existing regulations requiring that data submitted in logbooks includes seabirds and marine mammals number and species was issued in February 4 2014.

Currently, the plan appears to have been implemented effectively and in a timely manner.

10. Recommendation and Determination

Assessment Team Recommendation

The assessment team recommends that the management system of the applicant fishery, the Icelandic Haddock (*melanogrammus aeglefinus*) commercial fishery, fished within the 200 mile Icelandic Exclusive Economic Zone (EEZ) by all Icelandic registered vessels using all gear types directly (demersal trawl, long-line, Danish seine net, gill net, hook and line) and indirectly (Nephrops trawl, shrimp trawl and pelagic trawl) under the management of the Icelandic Ministry of Industries and Innovation, is awarded certification to the FAO-Based Icelandic Responsible Fisheries Management (IRFM) Certification Programme.

Certification Committee Determination

Following the recommendations of the assessment team and peer review team, the certification committee recommends that the management system of the applicant fishery, the Icelandic Haddock (*melanogrammus aeglefinus*) commercial fishery, fished within the 200 mile Icelandic Exclusive Economic Zone (EEZ) by all Icelandic registered vessels using all gear types directly (demersal trawl, long-line, Danish seine net, gill net, hook and line) and indirectly (Nephrops trawl, shrimp trawl and pelagic trawl) under the management of the Icelandic Ministry of Industries and Innovation, is awarded certification to the FAO-Based Icelandic Responsible Fisheries Management (IRFM) Certification Programme.

11. References

Adlerstein, S. A., Temming, A., and Mergardt, N. 2002. Comparison of stomach contents of haddock (Melanogrammus aeglefinus) from the 1981 and 1991 North Sea International Stomach Sampling Projects. – ICES Journal of Marine Science, 59: 497–515.	https://pubs.er.usgs.gov/publication/70024473
Aflahefti. 2013. Fiskistofu - Aflahefti 2012, 2013. Dalshrauni 1. 220 Hafnarfirði.	http://www.fiskistofa.is/media/utgefid_efni/aflahefti2012_2013.pdf
Althingi. 2014. Fisheries Management Act 2006 nr. 116 August 10. Parliamentary Office. 150 Reykjavík	http://www.althingi.is/lagas/nuna/2006116.html
Althingi. 2014. Fishing Fees Bill 2012, no. 74 June 26. Parliamentary Office, 150 Reykjavík, Iceland.	http://www.althingi.is/lagas/143a/2012074.html
Althingi. 2014. Homepage. Parliamentary Office. 150 Reykjavík	http://www.althingi.is/english
Arnason R. 1996. On the ITQ fisheries management system in Iceland. Reviews in Fish Biology and Fisheries March 1996, Volume 6, Issue 1, pp 63-90	http://link.springer.com/article/10.1007%2FBF00058520#page-1
Arnason R. 2008. Iceland's ITQ system creates new wealth. The Electronic Journal of Sustainable Development 1(2)	http://www.ejsd.co/docs/ICELANDS_ITQ_SYSTEM_CREATES_NEW_WEALTH.pdf
Atvinnuvega. 2013. Stjórn fiskveiða 2013/2014 Lög og reglugerðir.	http://www.atvinnuvegaraduneyti.is/media/Skyrslur/Stjorn-fiskveida-2013-2014_4prof.pdf
Atvinnuvegaraduneyti. 1996. Act concerning the Treatment of Commercial Marine Stocks. No. 57, 3 June 1996 as amended by Act. No. 144/2008.	http://eng.atvinnuvegaraduneyti.is/media/acts/Act-no-57-1996-Treatment-of-Commercial-Marine-Stocks.pdf
Atvinnuvegaraduneyti. 2006. Regulation No. 224, 14 March 2006, on Weighing and Recording of Catch.	http://eng.atvinnuvegaraduneyti.is/media/reglugerdir/Regulation-224-2006-on-weighing-and-recoding-of-catch.pdf
Björnsson, B., Sólmundsson, J. and Pálsson O., K. Can permanent closures of nearshore areas reduce the proportions of undersized fish in the Icelandic longline fishery? ICES J. Mar. Sci. (2015) 72 (3): 841-850	http://icesjms.oxfordjournals.org/content/early/2014/09/30/icesjms.fsu162.abstract
Chen, Y. J. (2003), Influence of the Iceland mantle plume on crustal accretion at the inflated Reykjanes Ridge: Magma lens and low hydrothermal activity? J. Geophys. Res., 108, 2524, doi:10.1029/2001JB000816, B11.	http://onlinelibrary.wiley.com/doi/10.1029/2001JB000816/full
Clucas, I. A study of the options for utilization of bycatch and discards from marine capture fisheries. FAO Fisheries Circular. No. 928. Rome, FAO. 1997. 59p.	http://www.fao.org/docrep/W6602E/w6602E00.htm
Cochrane, K.L. (ed.) A fishery manager's guidebook. Management measures and their application. FAO Fisheries Technical Paper. No. 424. Rome, FAO. 2002. 231p.	http://www.fao.org/docrep/005/y3427e/y3427e02.htm#TopOfPage
FAO (1999) International Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries. Food and Agriculture Organization of the United Nations. Rome.	http://www.fao.org/3/a-x3170e.pdf

Finance and Economy Ministry. 2013. Revenues from hunting fees remain unchanged from last year homepage. Arnarhvoli the Fountain. 101 Reykjavík. Iceland.	http://www.fjarmalaraduneyti.is/frettir/2013/09/11/nr/17178
Fiskistofa. 2014. Find Vessels. Fiskistofa. Fisheries; Dalshrauni 1; 220 Boots	http://www.fiskistofa.is/veidar/aflastada/einstokskip/
Fiskistofa. 2013. About the Directorate. Fisheries; Dalshrauni 1; 220 Boots.	http://www.fiskistofa.is/umfiskistofu/arsskyrsla-2013/eftirlit/
Fiskistofa. 2013. Ársskýrsla 2013. Fiskistofa, Dalshrauni 1, 220 Hafnarfjörður	http://www.fiskistofa.is/media/arsskyrslur/Arsskyrsla_Fiskistofu_2013.pdf
Fiskistofa. 2013. Home, Forms, Transfer of fishing opportunities . Dalshrauni 1 220 Hafnarfirði. Iceland.	http://www.fiskistofa.is/eydublod/flutningurveidiheimilda/
Fiskistofa. 2013. Seabirds and mammals in fishing gear, Amendment to Regulation no. 557/2007 of log books, as amended. 06/02/2014. Dalshrauni 1 220 Hafnarfirði. Iceland.	http://www.fiskistofa.is/ymsaruppl/tilkynningar/nr/1033
Fiskistofa. 2014. Homepage. Dalshrauni 1 220 Hafnarfirði. Iceland.	http://www.fiskistofa.is/
Fiskistofa. 2014. Homepage. Dalshrauni 1 220 Hafnarfirði. Iceland. Quota, Coastal Catch. Fiskistofa - Dalshrauni 1 - 220 Hafnarfjörður.	http://www.fiskistofa.is/veidar/aflastada/strandveidi/
Fiskistofa. 2014. New fishing year 2014/2015. Fisheries; Dalshrauni 1; 220 Boots	http://www.fiskistofa.is/umfiskistofu/frettir/nr/1156
Fiskistofa. 2014. Quotas and catches. Total catches by harbours, months and vessel type. Fiskistofa; Dalshrauni 1; 220 Hafnarfjörður	http://www.fiskistofa.is/english/quotas-and-catches/total-catches-by-harbours-months-and-vessel-type/bbt.jsp?lang=en
Fiskistofa. 2014. Icelandic Regulatory Closures. Fiskistofa; Dalshrauni 1; 220 Hafnarfjörður.	http://www.fiskistofa.is/fiskveidistjorn/veidiban n/reglugerdarlokanir/
Fiskistofa. Spawning Areas and Closures in Iceland. Fisheries, Dalshrauni 1, 220 Boots	http://www.fiskistofa.is/fiskveidistjorn/veidiban n/hrygningarstopp/
Giffiths, A et al. 2010. Molecular markers reveal spatially segregated cryptic species in a critically endangered fish, the common skate (Dipturus batis). Proc. R. Soc. 277, 1407-1503.	http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2871835/
Icelandic Fisheries Management 2013/2014. Laws and Regulations.	http://www.atvinnuvegaraduneyti.is/media/Skyrslur/Stjorn-fiskveida-2013-2014_4prof.pdf
Icelandic Government. 2013. Regulation of fishing by Icelandic vessels in the North East Arctic in 2014, according to. agreement between Iceland, Norway and Russia. Official - Sölvhólsgötu 7-150 Reykjavík	http://www.reglugerd.is/interpro/dkm/WebGuard.nsf/b7fd33650490f8cf00256a07003476bb/f8718114090f03f300257c6e000584d2?OpenDocument
IceNews. 2011. New Icelandic Coastguard cruiser welcomed in Reykjavik.	http://www.icenews.is/2011/10/27/new-icelandic-coastguard-cruiser-welcomed-in-reykjavik/
ICES status report on climate change in the North Atlantic (English) Reid, P.C., (ed.) Valdes, L., (ed.) In: ICES Cooperative Research Report (ICES), no. 310 / International Council for the Exploration of the Sea, Copenhagen (Denmark) , 2011 , 262 p.	http://www4.fao.org/cgi-bin/faobib.exe?vq_query=A%3DReid,%20P.C.&database=faobib&search_type=view_query_search&table=mona&page_header=ephmon&lang=eng

ICES. 2011. Report of the ICES-FAO Working Group on Fishing Technology and Fish Behaviour (WGFTFB). SCICOM STEERING GROUP ON ECOSYSTEM SURVEYS SCIENCE AND TECHNOLOGY. ICES CM 011/SSGESST:11.	http://brage.bibsys.no/xmlui/bitstream/handle/11250/102430/WGFTFB11.pdf?sequence=1
ICES. 2012. Haddock - Barents Sea, Norwegian Sea, Spitzbergen and Bear Island Fact Sheet Citation Haddock in Subareas I and II (Northeast Arctic). International Council for the Exploration of the Sea, Copenhagen (Denmark) , 2011 , 262 p.	http://firms.fao.org/firms/resource/10329/en
ICES. 2012. ICES North Western Working Group Report 2012, Section 10, Icelandic Haddock. International Council for the Exploration of the Sea (ICES).	http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2012/NWWG/Sec%2010%20Icelandic%20haddock.pdf
ICES. 2013. Haddock in Division Va (Icelandic haddock), ECOREGION Iceland and East Greenland. Advice June 2013. International Council for the Exploration of the Sea (ICES). H. C. Andersens Boulevard 44-46, DK 1553 Copenhagen V, Denmark.	http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2013/2013/had-iceg.pdf
ICES. 2013. ICES North Western Working Group Report 2012, Section 10, Icelandic Haddock. International Council for the Exploration of the Sea (ICES).	http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2013/NWWG/Sec%2010%20Icelandic%20haddock.pdf
ICES. 2013. Report of the evaluation of the Icelandic haddock management plan. ICES Advisory Committee 2013. ICES CM 2013/ACOM:59	http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2013/ADHOC/IntroAndHad.pdf
ICES. 2013. Report of the North Western Working Group (NWWG), 25 April- 02 May 2013, ICES Headquarters, Copenhagen. ICES CM 2013/ACOM:07. 1577 pp.	http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2013/NWWG/NWWG%202013_updated.pdf
ICES. 2013. Report of the North Western Working Group (NWWG), Annex 2 - Stock Annexes. ICES Headquarters, Copenhagen. ICES CM 2013/ACOM:07. 1577 pp.	http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2013/NWWG/Annex%2002%20Stock%20Annexes.pdf
ICES. 2013. Special request, Advice April 2013. ECOREGION Iceland and East Greenland, Request from Iceland to ICES to evaluate the long-term management plan and harvest control rule for Icelandic haddock. International Council for the Exploration of the Sea (ICES). H. C. Andersens Boulevard 44-46, DK 1553 Copenhagen V, Denmark.	http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2013/Special%20requests/Iceland%20longterm%20MP%20for%20Icelandic%20haddock.pdf
ICES. 2014. 9 Roundnose grenadier (Coryphaenoides rupestris). International Council for the Exploration of the Sea WGDEEP REPORT 2014. International Council for the Exploration of the Sea, Copenhagen (Denmark) , 2011 , 262 p.	http://ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2014/WGDEEP/wgdeep_Sec09_RoundnoseGrenadier_2014.pdf
ICES. 2014. Haddock in Division Va (Icelandic haddock), ECOREGION Iceland and East Greenland. Advice June 2014. International Council for the Exploration of the Sea (ICES). H. C. Andersens Boulevard 44-46, DK 1553 Copenhagen V, Denmark.	http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2014/2014/had-iceg.pdf
ICES. 2014. ICES North Western Working Group Report 2014, Section 10, Icelandic Haddock. International Council for the Exploration of the Sea (ICES).	http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2014/NWWG/12%20NWWG%20Report%20-%20Sec%2010%20Icelandic%20Haddock.pdf

ICES. 2014. ICES NWWG REPORT 2014. Annex 04: List of Audits for NWWG 2014. Audit of Faroe Plateau Cod. International Council for the Exploration of the Sea (ICES). H. C. Andersens Boulevard 44-46, DK 1553 Copenhagen V, Denmark.	http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2014/NWWG/28%20NWWG%20Report%20-%20Annex%2004%20List%20of%20Audits%20for%20NWWG%202014.pdf
ICG. 2013. LANDHELGISGÆSLA ÍSLANDS - ÁRSYFIRLIT. Icelandic Coast Guard.	http://www.lhg.is/media/arsskyrslur/LHG_Arsyfirlit_2013_LWR.PDF
ICG. 2014. Icelandic Coast Guard webpage. Skógarhlíð 14, 105 Reykjavík	http://www.lhg.is/english
ICG. The Icelandic Coast Guard, Always Prepared. Icelandic Coast Guard. Skógarhlíð 14, 105 Reykjavík, Iceland.	http://www.lhg.is/media/LHG80/Landhelgisgasla_Islands_enska2_.pdf
ICG. The Icelandic Coast Guard. Icelandic Coast Guard. Skógarhlíð 14, 105 Reykjavík, Iceland.	http://www.lhg.is/media/LHG80/Landhelgisgasla_Islands_enska2_.pdf
Iglésias S.P., Toulhoat L., Sellos D.Y., 'Taxonomic confusion and market mislabelling of threatened skates: important consequences for their conservation status,' Aquatic Conservation: Marine and Freshwater Ecosystems, Wiley-Blackwell, 2009	http://www.sciencedaily.com/releases/2009/11/091117191048.htm
IHO. 2014. REGULATION amending Regulation no. 557, June 6, 2007, on the logbooks, as amended; No. 126/2014. Iceland Home Office.	http://www.stjornartidindi.is/Advert.aspx?ID=9bc42c49-4617-4fa3-a4f5-424936339ff0
IHO. 2014. REGULATION amending Regulation no. 557, June 6, 2007, on the logbooks, as amended; No. 126/2014. Iceland Home Office.	http://www.stjornartidindi.is/Advert.aspx?ID=9bc42c49-4617-4fa3-a4f5-424936339ff0
IMFA. 1998. Act on Fishing and Processing by Foreign Vessels in Iceland's Exclusive Fishing Zone No. 22, 8 April 1998. Icelandic Ministry of Fisheries and Agriculture. Skulagata 4, IS 150 Reykjavík, Iceland.	http://eng.atvinnuvegaraduneyti.is/media/acts/Act-no-22-1998-Fishing-and-Processing-by-Foreign-Vessels-in-Iceland.pdf
IMFA. 1998. Enforcement webpage. Icelandic Ministry of Fisheries and Agriculture. Skulagata 4, IS 150 Reykjavík, Iceland.	http://www.fisheries.is/management/fisheries-management/enforcement/
IMFA. 2006. REGULATION No. 224, 14 March 2006, on Weighing and Recording of Catch. Icelandic Ministry of Fisheries and Agriculture. Skulagata 4, IS 150 Reykjavík, Iceland.	http://eng.atvinnuvegaraduneyti.is/media/reglugerdir/Regulation-224-2006-on-weighing-and-recoding-of-catch.pdf
IMFA. 2006. REGULATION No. 224, 14 March 2006, on Weighing and Recording of Catch. Icelandic Ministry of Fisheries and Agriculture. Skulagata 4, IS 150 Reykjavík, Iceland.	http://eng.atvinnuvegaraduneyti.is/media/reglugerdir/Regulation-224-2006-on-weighing-and-recoding-of-catch.pdf
IMFA. 2011. Area closures homepage. Icelandic Ministry of Fisheries and Agriculture. Skulagata 4, IS 150 Reykjavík, Iceland.	http://www.fisheries.is/management/fisheries-management/area-closures/
IMFA. 2011. Fisheries Management homepage. Icelandic Ministry of Fisheries and Agriculture. Skulagata 4, IS 150 Reykjavík, Iceland.	http://www.fiskistofa.is/media/arsskyrslur/veidileyfi_uthlutanir_2013.pdf
IMFA. 2011. Government Policy. Icelandic Ministry of Fisheries and Agriculture. Skulagata 4, IS 150 Reykjavík, Iceland.	http://www.fisheries.is/management/government-policy/

IMFA. 2011. Individual transferable quotas homepage. Icelandic Ministry of Fisheries and Agriculture. Skulagata 4, IS 150 Reykjavík, Iceland.	http://www.fisheries.is/management/fisheries-management/individual-transferable-quotas/
IMFA. 2011. The Fisheries Management Act webpage. Icelandic Ministry of Fisheries and Agriculture. Skulagata 4, IS 150 Reykjavík, Iceland.	http://www.fisheries.is/management/fisheries-management/the-fisheries-management-act/
IMFA. 2014. Ecosystem, Temperature and salinity webpage. Icelandic Ministry of Fisheries and Agriculture. Skulagata 4, IS 150 Reykjavík, Iceland.	Http://www.fisheries.is/ecosystem/oceanography/Temperature-and-salinity/
IMFA. 2014. Main species, Greenland Shark webpage. Icelandic Ministry of Fisheries and Agriculture. Skulagata 4, IS 150 Reykjavík, Iceland.	http://www.fisheries.is/main-species/cartilaginous-fishes/greenland-shark/
IMFA. 2014. Main Species, Spiny Dogfish webpage. Icelandic Ministry of Fisheries and Agriculture. Skulagata 4, IS 150 Reykjavík, Iceland.	http://www.fisheries.is/main-species/cartilaginous-fishes/spiny-dogfish/
IMFA. Regulation of logbooks 557/2007. Ministry of Fisheries and Agriculture. Skulagata 4, IS 150 Reykjavík, Iceland.	http://www.reglugerd.is/interpro/dkm/WebGuard.nsf/key2/557-2007
ITA. 2014. Safe, Productive and Efficient Transport. Icelandic Transport Authority. Ármúla 2, 108 Reykjavík. Iceland	http://www.icetra.is/
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.	http://icesjms.oxfordjournals.org/content/63/9/1682.abstract
Jónsson G, Pálsson J (2006) Íslenskir fiskar [Icelandic fishes]. Vaka-Helgafel, Reykjavik, Iceland. 336 pp. [in Icelandic].	http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0051321#pone.0051321-Jnsson1
LHG. 2014. Iceland Coast Guard. Skógarhlíð 14, 105 Reykjavík, Iceland	http://www.lhg.is/
MFA. 2013. The Ocean Iceland's Policy. Ministry for the Enivironment. Vonarstraeti 4, 150 Reykjavik, Iceland.	http://www.mfa.is/media/Efstabaugi/The_Ocean_Icelands_Policy.pdf
MI. 2006. Act on the Icelandic Coast Guard No. 52, June 14th 2006. Entered into force 1 July 2006. Ministry of the Interior, Sölvhólsgata 7, 101 Reykjavik, Iceland.	http://eng.innanrikisraduneyti.is/laws-and-regulations/nr/6612
MII. 2007. Regulations on logbook. Official - Sölvhólsgötu 7-150 Reykjavík	http://www.reglugerd.is/interpro/dkm/WebGuard.nsf/aa0d47377abc977400256a090053ff91/e970b5a56c0e12020025730200441f20?OpenDocument
MII. 2013. Fisheries Management Plan - Icelandic Haddock. Ministry of Industries and Innovation, Skulagata 4, IS 150 Reykjavík, Iceland.	http://www.fisheries.is/main-species/codfishes/haddock/management-plan/
MII. 2013. Icelandic Fisheries - Main Species Haddock. Ministry of Industries and Innovation; Skulagata 4; IS 150 Reykjavík; Iceland.	http://www.fisheries.is/main-species/codfishes/haddock
MII. 2014. Act on Fisheries Management as subsequently amended No. 116, 10 August 2006 website. Skúlagata 4, 101 Reykjavík, Iceland	http://www.fisheries.is/management/fisheries-management/the-fisheries-management-act/
MII. 2014. Fishing Gear. Ministry of Industries and Innovation; Skulagata 4; IS 150 Reykjavík; Iceland	http://www.fisheries.is/fisheries/fishing-gear/

MII. 2014. Home - Fisheries and agriculture - Ministry - Companies. Ministry of Industry and Innovation - Skúlagata 4-101 Reykjavík	http://www.atvinnuvegaraduneyti.is/sjavarutvegs-og-landbunadarmal/raduneyti/stofnanir/
MII. 2014. Home; Ecosystem; Research. Oceanography. Ministry of Industries and Innovation; Skulagata 4; IS 150 Reykjavík; Iceland	http://www.fisheries.is/ecosystem/research/oceanography/
MII. 2014. Laws and Regulations homepage. Act on Fisheries. Ministry of Industries and Innovation, Skulagotu 4- 101, Reykjavik, Iceland.	http://eng.atvinnuvegaraduneyti.is/laws-and-regulations/fisheries/
MII. 2014. REGULATION amending Regulation No. 557, June 6, 2007, the logbooks, as amended. Ministry of the Interior - Official - Sölvhólsgötu 7, 150 Reykjavík.	http://www.stjornartidindi.is/Advert.aspx?ID=9bc42c49-4617-4fa3-a4f5-424936339ff0
MII. 2014. Statement on Responsible Fisheries in Iceland. Ministry of Industries and Innovation; Skulagata 4; IS 150 Reykjavík ; Iceland.	http://www.fisheries.is/management/government-policy/responsible-fisheries
Ministry of Fisheries. 1997. Act on Fishing in Iceland's Exclusive Fishing Zone No. 79/1997, as amended by Act No. 127, 22 December 1997.	http://eng.atvinnuvegaraduneyti.is/media/acts/Act-no-79-1997-Fishing-in-Iceland-Exclusive-Fishign-Zone.pdf
Ministry of Fisheries. 2006. Act on Fisheries Management as subsequently amended No. 116, 10 August 2006. Skúlagata 4, 101 Reykjavík, Iceland	http://eng.atvinnuvegaraduneyti.is/media/acts/Act-no-116-2006-on-Fisheirs-Management.pdf
Ministry of Iceland. 2014. Regulation Amending Regulation no. 557, June 6, 2007, the logbooks. Official - Sölvhólsgötu 7-150 Reykjavík	http://www.reglugerd.is/interpro/dkm/WebGuard.nsf/key2/EE55A2CB9D1FA78F002576E400469C0E?OpenDocument
Ministry of the Interior. 2014. REGULATION amount, assessment and collection of fishing fees 2014/2015 fishing. No. 588/2014. Ministry of the Interior - Official - Sölvhólsgötu 7, 150 Reykjavík	http://stjornartidindi.is/Advert.aspx?ID=c02c6b3c-532e-4691-8e12-f37065c7f490
Ministry of the Interior. 2014. REGULATION coastal fishing fishing 2013/2014. Ministry of the Interior - Official - Sölvhólsgötu 7, 150 Reykjavík	http://stjornartidindi.is/Advert.aspx?ID=3e5ec436-49f6-4a4a-9a14-4b5fa654118c
MRI. 2010. Manuals for the Icelandic bottom trawl surveys in spring and autumn. Hafrannsóknir nr. 156. Marine Research Institute, Skulagata 4, 121 Reykjavik, Iceland.	http://www.hafro.is/Bokasafn/Timarit/fjolrit-156.pdf
MRI. 2013. 4. English summary of the State of Marine Stocks in Icelandic Waters 2012/2013 – Prospects for the Quota Year 2013/2014. Marine Research Institute, Skulagata 4, 121 Reykjavik, Iceland.	http://www.hafro.is/Astand/2013/36-engl-sum.PDF
MRI. 2013. Environmental conditions in Icelandic waters 2013; Hafrannsóknir nr. 175. Marine Research Institute, Skulagata 4, 121 Reykjavik, Iceland.	http://www.hafro.is/Bokasafn/Timarit/vist2013.pdf
MRI. 2013. HAFRANNSÓKNASTOFNUN. ÁRSSKÝRSLA 2013	http://www.hafro.is/images/flokkar/2014/arsskyrsla2013_netutgafa.pdf
MRI. 2014. 2.2. HADDOCK Melanogrammus aeglefinus. Hafrannsóknir nr. 176. Ministry of Industries and Innovation, Skulagata 4, IS 150 Reykjavík, Iceland.	http://www.hafro.is/Astand/2014/english/02-haddock-14.pdf

MRI. 2014. 2.2. ÝSA Melanogrammus aeglefinus Marine Research Institute. Skulagata 4, 121 Reykjavik, Iceland	http://www.hafro.is/Astand/2014/02-ysa.PDF
MRI. 2014. 2.37. SEALS Phocidae. Marine Research Institute, Skulagata 4, 121 Reykjavik, Iceland.	http://www.hafro.is/Astand/2014/english/37-seals-14.pdf
MRI. 2014. 4. English summary of the State of Marine Stocks in Icelandic Waters 2013/2014 – Prospects for the Quota Year 2014/2015. Marine Research Institute, Skulagata 4, 121 Reykjavik, Iceland.	http://www.hafro.is/Astand/2014/39-engl-sum.PDF
MRI. 2014. Advice, State of stocks 2013/2014 Prospects 2014/2015. Marine Research Institute, Skulagata 4, 121 Reykjavik, Iceland.	http://www.hafro.is/undir_eng.php?ID=26&REF=4
MRI. 2014. Effects of fishing activities on benthic ecosystems webpage. Marine Research Institute, Skulagata 4, 121 Reykjavik, Iceland.	http://www.hafro.is/undir_eng.php?ID=16&REF=2
MRI. 2014. Marine Research in Iceland/ Reports of the Marine Research Institute. Skulagata 4, 121 Reykjavik, Iceland	http://www.hafro.is/undir_eng.php?ID=7&REF=1
MRI. 2014. Marine Research Institute Advice General. Marine Research Institute. Skulagata 4, 121 Reykjavik, Iceland	http://www.hafro.is/undir_eng.php?ID=25&REF=4
MRI. 2014. MRI Advice General. Marine Research Institute. Skulagata 4, 121 Reykjavik, Iceland.	http://www.hafro.is/undir_eng.php?REF=4
MRI. 2014. MRI Newspage. Marine Research Institute. Skúlagötu 4, 121 Reykjavik, Iceland.	http://www.hafro.is/undir.php?ID=19&REF=3
MRI. 2014. MRI Short Term Closures. Marine Research Institute. Skulagata 4, 121 Reykjavik, Iceland	http://www.hafro.is/undir.php?ID=18&REF=3
MRI. 2014. Recent Bibliography. Marine Research Institute. Skúlagötu 4, 121 Reykjavik, Iceland.	http://www.hafro.is/undir.php?REFID=20&ID=35&REF=3
MRI. 2014. State of Marine Stocks; 2.1. COD Gadus morhua. Marine Research Institute, Skulagata 4, 121 Reykjavik, Iceland.	http://www.hafro.is/Astand/2014/english/01-cod-14.pdf
MRI. 2014. State of Marine Stocks; 2.11. LONG ROUGH DAB Hippoglossoides platessoides. Marine Research Institute, Skulagata 4, 121 Reykjavik, Iceland.	http://www.hafro.is/Astand/2014/english/11-longroughdab-14.pdf
MRI. 2014. State of Marine Stocks; 2.15. ATLANTIC WOLFFISH Anarhichas lupus. Marine Research Institute, Skulagata 4, 121 Reykjavik, Iceland.	http://www.hafro.is/Astand/2014/english/15-atlanticwolffish-14.pdf
MRI. 2014. State of Marine Stocks; 2.17. BLUE LING Molva dypterygia. Marine Research Institute, Skulagata 4, 121 Reykjavik, Iceland.	http://www.hafro.is/Astand/2014/english/17-blueling-14.pdf
MRI. 2014. State of Marine Stocks; 2.19. TUSK Brosme brosme. Marine Research Institute, Skulagata 4, 121 Reykjavik, Iceland.	http://www.hafro.is/Astand/2014/english/19-tusk-14.pdf
MRI. 2014. State of Marine Stocks; 2.2. HADDOCK Melanogrammus aeglefinus. Marine Research Institute, Skulagata 4, 121 Reykjavik, Iceland.	http://www.hafro.is/Astand/2014/english/02-haddock-14.pdf
MRI. 2014. State of Marine Stocks; 2.20. WHITING Merlangius merlangus. Marine Research Institute, Skulagata 4, 121 Reykjavik, Iceland.	http://www.hafro.is/Astand/2014/english/20-whiting-14.pdf

MRI. 2014. State of Marine Stocks; 2.28. GREATER SILVER SMELT Argentina silus. Marine Research Institute, Skulagata 4, 121 Reykjavik, Iceland.	http://www.hafro.is/Astand/2014/english/28-greatersilversmelt-14.pdf
MRI. 2014. State of Marine Stocks; 2.3. SAITHE Pollachius virens. Marine Research Institute, Skulagata 4, 121 Reykjavik, Iceland.	http://www.hafro.is/Astand/2014/english/03-saithe-14.pdf
MRI. 2014. State of Marine Stocks; 2.4. GOLDEN REDFISH Sebastes norvegicus. Marine Research Institute, Skulagata 4, 121 Reykjavik, Iceland.	http://www.hafro.is/Astand/2014/english/04-goldenredfish-14.pdf
MRI. 2014. State of Marine Stocks; 2.5. DEEP SEA AND PELAGIC REDFISH Sebastes mentella. Marine Research Institute, Skulagata 4, 121 Reykjavik, Iceland.	http://www.hafro.is/Astand/2014/english/05-deepsearedfish-14.pdf
MRI. 2014. State of Marine Stocks; 2.8. ATLANTIC HALIBUT Hippoglossus hippoglossus. Marine Research Institute, Skulagata 4, 121 Reykjavik, Iceland.	http://www.hafro.is/Astand/2014/english/08-halibut-14.pdf
MRI. 2014. State of Marine Stocks; 2.9. PLAICE Pleuronectes platessa. Marine Research Institute, Skulagata 4, 121 Reykjavik, Iceland.	http://www.hafro.is/Astand/2014/english/09-plaice-14.pdf
MRI. Recent Short Term Closures. MRI | Skúlagötu 4, 121 Reykjavik. Iceland	http://www.hafro.is/undir.php?ID=18&REF=3
MRI. State of stocks 2013/2014 - Prospects 2014/2015, Hafrannsóknastofnunin Fjölrit nr. 176. Marine Research Institute. Skulagata 4, 121 Reykjavik, Iceland.	http://www.hafro.is/undir_eng.php?ID=26&REF=4
NAMMCO. 2014. The North Atlantic Marine Mammal Commission webpage. Tromsø Science Park, P.O. Box 6453, N-9294 Tromsø, Norway	http://www.nammco.no/
NEAFC-ICES. Memorandum of Understanding between the North-East Atlantic Fisheries Commission and the International Council for the Exploration of the Sea. NEAFC-ICES MoU 2007.	http://www.ices.dk/explore-us/Documents/Cooperation%20agreements/NEAFC/MoU%20NEAFC%20and%20ICES%202007.pdf
NWWG. 2013. Overview on ecosystem, fisheries and their management in Icelandic waters. Report of the North Western Working Group (NWWG). International Council for the Exploration of the Sea (ICES). H. C. Andersens Boulevard 44-46, DK 1553 Copenhagen V, Denmark	http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2013/NWWG/Sec%2007%20Overview%20on%20Ecosystem,%20fisheries%20and%20their%20management%20in%20Icelandic%20waters.pdf
Ólafur Arnar Ingólfsson og Haraldur Arnar Einarsson. 2009. Áhrif króka- og beitustærða á stærðarval við línuveiðar. Verkefni styrkt af AVS rannsóknasjóði, tilvísunarnr. R 022-07	http://www.avs.is/media/avs/Skyrsla_R_022-07__beita_og_krokar.pdf
Ólafur K. Pálsson, Höskuldur Björnsson, Eyþór Björnsson, Guðmundur Jóhannesson and Þórhallur Ottesen. Discards in demersal Icelandic fisheries 2009. Marine Research in Iceland 154. Marine Research in Iceland 154. Marine Research Institute, Skulagata 4, 121 Reykjavik, Iceland.	http://www.hafro.is/Bokasafn/Timarit/fjolrit-154.pdf
Ólafur K. Pálsson, Höskuldur Björnsson, Eyþór Björnsson, Guðmundur Jóhannesson and Þórhallur Ottesen. Discards of cod and haddock in demersal Icelandic fisheries 2012. Marine Research in Iceland 154. Marine Research in Iceland 154. Marine Research Institute, Skulagata 4, 121 Reykjavik, Iceland.	http://www.hafro.is/Bokasafn/Timarit/fjolrit-171.pdf

Ólafur K. Pálsson, Höskuldur Björnsson, Hrefna Gísladóttir, Guðmundur Jóhannesson and Þórhallur Ottesen. (2012). Discards of cod and haddock in demersal Icelandic fisheries 2001-2010. Marine Research in Iceland, 160.	http://www.hafro.is/Bokasafn/Timarit/fjolrit-160.pdf
OSPAR. 2010. Background Document for Deep-sea sponge aggregations. Biodiversity Series. ISBN 978-1-907390-26-5. OSPAR Commission, New Court, 48 Carey Street, London WC2A 2JQ, United Kingdom.	http://qsr2010.ospar.org/media/assessments/Species/P00485_deep_sea_sponge_aggregations.pdf
Palsson et al. 2012. Mælingar á brottkasti þorsks og ýsu 2001-2010. Hafrannsóknir nr. 160. Marine Research Institute, Skulagata 4, 121 Reykjavik, Iceland.	http://www.hafro.is/images/frettir/2012/fjolrit-160.pdf
Ragnarsson, S. A. & M. Lindegarth. 2009. Testing hypotheses about temporary and persistent effects of otter trawling on infauna: changes in diversity rather than abundance. Mar. Ecol. Prog. Ser. 385:51–64.	http://www.int-res.com/articles/meps2009/385/m385p051.pdf
Ragnarsson, Stefán A. Bottom trawling and scallop dredging in the Arctic: impacts of fishing on non-target species, vulnerable habitats and cultural heritage. Ed. Elena Guijarro Garcia. Nordic Council of Ministers, 2007	http://www.diva-portal.org/smash/get/diva2:702602/FULLTEXT01.pdf
Regjeringen. 2014. Fisheries Cooperation with Iceland. Industry and Fisheries Ministry	https://www.regjeringen.no/nb/tema/mat-fiske-og-landbruk/fiske-og-havbruk/rydde-internasjonalt/fiskerisamarbeidet-med-island/id437336/
RF. 2014. Supply - Total allowable catch. Responsible Fisheries. Borgartún 35. 105 Reykjavík. Iceland.	http://www.responsiblefisheries.is/seafood-industry/supply---tac/
Schopka, S. 2007. Friðun svæða og skyndilokanir á Íslandsmiðum. Hafrannsóknastofnunin.Fjölrit nr. 133. Marine Research Institute, Skulagata 4, 121 Reykjavik, Iceland.	http://www.hafro.is/Bokasafn/Timarit/fjolrit-133.pdf
Schopka, S. A., Solmundsson, J., Ragnarsson, S. A., and Thorsteinsson, V. 2010. Using tagging experiments to evaluate the potential of closed areas in protecting migratory Atlantic cod (Gadus morhua). – ICES Journal of Marine Science, 67: 1024–1035.	http://icesjms.oxfordjournals.org/content/67/5/1024.short
Shotton, R. (ed.) Case studies on the allocation of transferable quota rights in fisheries. FAO Fisheries Technical Paper. No. 411. Rome, FAO. 2001. 373p.	http://www.fao.org/docrep/005/y2684e/y2684e01.htm#P6_155
Statice. 2013. Profitability in fishing and fish processing 2012. Statistical Series. Fisheries and Agriculture.	http://www.statice.is/lisalib/getfile.aspx?ItemID=16008
Statistics Iceland. 2015. Statistics - Fisheries and agriculture - Catch and value of catch. Statistics Iceland; Borgartúni 21a; 150 Reykjavík.	http://www.statice.is/Statistics/Fisheries-and-agriculture/Catch-and-value-of-catch
STEFANSDOTTIR, L., SOLMUNDSSON, J., MARTEINSDOTTIR, G., KRISTINSSON, K. and JONASSON, J. P. (2010), Groundfish species diversity and assemblage structure in Icelandic waters during recent years of warming. Fisheries Oceanography, 19: 42–62.	

Tasker, M. L., Camphuysen, C. J., Cooper, J., Garthe, S., Montevecchi, W. A., and Blaber, S. J. M. 2000. The impacts of fishing on marine birds. – ICES Journal of Marine Science, 57: 531–547.	http://www.avesmarinhas.com.br/4%20-%20Impacto%20das%20aves%20marinhas%20na%20pesca.pdf
Vegagerdin. 2014. Icelandic Weather Maps. Vegagerðin; Borgartúni 5-7, 105 Reykjavík	http://www.vegagerdin.is/vs/Today.aspx
Vidraeur. 2013. Chapter 13 – Fisheries.	http://www.vidraedur2009-2013.is/media/esb_svor/13_-_Fisheries/Ch._13_-_Fisheries-FINAL.pdf
Víkingsson, G.A., Ólafsdóttir, D. and Sigurjónsson, J. 2003. Diet of harbour porpoises (Phocoena phocoena) in Icelandic coastal waters. NAMMCO Sci. Publ. 5:243-270.	http://septentrio.uit.no/index.php/NAMMCOSP/article/viewFile/2830/2683
Visir. 2014. Responsible Fisheries and performance of people. Visir	http://m.visir.is/umraedan/grein/?ArticleID=20014706209983
Wiley-Blackwell. "Is 80-year-old mistake leading to first species to be fished to extinction?." Science Daily, 19 November 2009.	www.sciencedaily.com/releases/2009/11/091117191048.htm
Wortschatz. 2010. Icelandic Fisheries Regulations. Deutscher Wort Schatz	http://wortschatz.uni-leipzig.de/cgi-isl/isl_web_2010/wort_www_ny?site=22&Wort_id=5249386&blocknr=2&bl=208

Appendix 1

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

Dankert Skagen

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.

Norman Graham

Norman started his working career as a commercial fisherman followed by a BSc in fishery studies and PhD in bycatch reduction in shrimp fisheries. Principal research has been on the development and testing of discard mitigation tools, ghost fishing, benthic impact of fishing gear, scientific diving including underwater observation of fishing gears and fish escape mortality. Current area of work relates to stock assessment, scientific advice for managers, interface between industry-science-policy, use of fishery dependent data and participation in a number of national and international scientific working groups and committees. Advice provided included that for the EU presidency on reform of the EU CFP; national and regional scientific adviser on implementation of the EU landings obligation (discard ban); participation in ICES assessment Working Groups and advice drafting groups; scientific adviser to Regional Advisory Committee (NWWRAC) and member of STECF plenary committee and chair of STECF expert groups on EU discard ban and role of technical measures.

Birgir Thor Runolfsson

Birgir graduated in economics from Lewis & Clark College and George Mason University before completing his Ph.D. in economics at George Mason University in 1991. He is an Associate Professor of Economics at the University of Iceland. His academic research has focused on the economics of the fisheries and he has published papers on that area and fisheries management. He also has written numerous reports for the Icelandic government with research and analysis on the

economics of fisheries and the fisheries management system. In addition he has participated in advisory and consultancy projects relating to fisheries and fisheries management and governance internationally.

Dave Garforth

Dave Garforth, BSC, HDip. (Applied Science), MSC has been involved in fisheries and aquatic resources for over 20 years. Currently, managing Global Trust FAO based Fishery Certification Program, with experience in the application of ISO/IEC Guide 65 based seafood certification systems and a professional background in numerous fishery assessments. Previous professional background includes; Development Officer in the Irish Sea Fisheries Board, supply chain and trade experience at Pan European Fish Auctions, the control and enforcement of fisheries regulations as a UK Fishery Officer. Dave is also a lead, third party IRCA approved auditor.

Vito Ciccia Romito, (Lead Assessor)

Vito Ciccia Romito holds a BSc in Ecology and an MSc in Tropical Coastal Management (Newcastle University, UK). His BSc studies focused on bycatch, discards, benthic impact of commercial fishing gear and relative technical solutions, after which he spent a year in Tanzania as a Marine Research officer at Mafia Island Marine Park carrying out biodiversity assessments and monitoring studies of coral reef, mangrove and seagrass ecosystems. Subsequently, for his MSc, he worked on fisheries assessment techniques, ecological dynamics of overexploited tropical marine ecosystems, and evaluation of low trophic aquaculture as a support to artisanal reef fisheries. Since 2010, he has been fully involved through Global Trust with the FAO-based RFM Assessment and Certification program covering all the main fisheries in Alaska and Iceland, as well as other preliminary assessments in other countries. Vito is also a lead, third party IRCA approved auditor.

Appendix 2

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

Dr. Leyla Knittweis

Dr. Leyla Knittweis holds a BSc in marine biology from the University of Wales, an MSc in coastal management from Newcastle University, and a PhD in biology with a focus on fisheries from the University of Bremen. After working as a postdoc at the Centre for Marine Ecology in Bremen, Leyla was employed as a fisheries advisor to the Government of Malta from 2008-2013. During this time she provided guidance for the Maltese national fisheries data collection programme, participated in work at sea, processed fisheries data in line with ICCAT, GFCM and EU requirements and contributed to numerous EU and FAO fisheries stock assessment working groups. Leyla has coordinated Malta's participation in several EU research projects on marine resource management topics, including marine spatial planning, the application of an ecosystem approach to fisheries management, and mapping of sensitive and critical habitats such as nursery and spawning areas. She is currently affiliated to the University of Malta as a research associate and acts as a visiting expert for the European Commission on an ad hoc basis. As part of her work for the EU Commission's Scientific, Technical and Economic Committee for Fisheries (STECF) Leyla chairs the expert working group on assessing the balance between fishing capacity and fishing opportunities for the European fishing fleet.

Dr. Neil Campbell

Neil Campbell is the Scientific Council Coordinator for the Northwest Atlantic Fisheries Organization (NAFO). After graduating in Marine Biology from Newcastle University, Neil moved to Aberdeen to study for a master's degree, before being employed as a researcher on a number of EU-funded fisheries research projects, the results of which formed the basis of his doctoral thesis. In 2005 he moved across Aberdeen to work for the Fisheries Research Service of the Scottish Government. During this time he performed a number of roles, including fish and shellfish stock assessment, deepwater fisheries, bioeconomic modelling, bycatch and discards reduction and analysis of VMS data. In 2011 Neil moved to Canada and took up a job with NAFO. This involves the coordination of the advisory process for fisheries targeting straddling and high-seas stocks of the northwestern Atlantic; working in close cooperation with scientists and managers from national governments, international organizations such as the FAO, academia, industry bodies and environmental NGOs.