



**FAO-BASED ICELANDIC RESPONSIBLE FISHERY MANAGEMENT  
CERTIFICATION FULL ASSESSMENT REPORT**

*For The*

**Icelandic Golden Redfish 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)

Fisheries Association of Iceland (Facilitator)

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**Schedule of Key Assessment Activities:**

Assessment Activities	Date (s)
<b>Application Date</b>	May 2011
<b>Initial Review</b>	January 2012
<b>Initial Site Visit</b>	June 2012
<b>Validation Assessment Report</b>	February 2012
<b>Appointment of Full Assessment Team</b>	June 2012
<b>On-site Assessment Visit</b>	December 2012
<b>Draft Full Assessment Report</b>	August 2013*
<b>Client Review</b>	October 2013*
<b>External Peer Review</b>	March 2014**
<b>Final Assessment Report</b>	April 2014
<b>Certification Review/Decision</b>	May 1 <sup>st</sup> 2014

\*Report awaiting confirmation of outcome on ICES Redfish HCR Review

\*\*Report awaiting implementation of Icelandic Redfish Fisheries Management Plan HCR.

## Summary and Recommendation

The Icelandic golden redfish (*Sebastes norvegicus*)<sup>1</sup> commercial fishery, under state management by the Icelandic Ministry of Industries and Innovation, is fished with demersal trawl, long-line, Danish seine net, gill net, hook and line by small vessel gear within Iceland's 200 nautical miles (nm) Exclusive Economic Zone (EEZ).

The Fisheries Association of Iceland on behalf of the Federation of Icelandic Fishing Vessel Owners (LÍÚ), the Federation of Icelandic Fish Processing Plants (SF) and the National Association of Small Boat Owners, Iceland (NASBO) requested assessment of the Icelandic golden redfish fishery to the FAO Based Icelandic Responsible Fisheries Management Certification Programme.

The original application was made in May 2011. Assessment commenced in January 2012 with assessment validation before proceeding to full assessment in June 2012 and final certification determination April 2014.

The Icelandic golden redfish fishery takes place within the 200 mile EEZ and is fished by Icelandic registered vessels using all gear types directly (but mainly with bottom trawl gear) and indirectly under the management of the Icelandic Ministry of Industries and Innovation.

The assessment was conducted according to the Global Trust procedures for FAO-Based Icelandic Responsible Fisheries Management Certification using the Icelandic Responsible Fisheries Management Specification (Version 1, September 2010) to perform the assessment.

The assessment was conducted by a team of Global Trust appointed Assessors comprising of three external contracted fishery consultants and Global Trust internal staff. Details of the assessment team are provided in Appendix 2.

During the assessment process the key outcomes included:

### **Fisheries Management System**

A Fisheries Management Plan for Icelandic golden redfish was recently assessed by scientific bodies and implemented by the Icelandic government. The Plan is documented and available on the Icelandic Ministry of Industry and Innovation website. The Plan sets out a strategy of maintaining exploitation rate at a rate which is consistent with the

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<sup>1</sup> Until very recently *Sebastes norvegicus* was referred to as *Sebastes marinus*. (An Historical Review of *Sebastes* Taxonomy and Systematics efi, Arthur Kendell Jr 2000). Other reference to *Sebastes marinus* made in the report e.g by peer reviewers relates to earlier drafts prior to the final report text.

precautionary approach and that generates maximum sustainable yield (MSY) in the long term. A Harvest Control Rule has recently been adopted (March 2014) for the next 5 years after which it will be formally reviewed.

The management unit of golden redfish is in the Icelandic, Faroese and Greenland Exclusive Economic Zone (EEZ). The unit of certification for this assessment is within the Icelandic EEZ, mainly within ICES area Va, contributing to the majority (>95%) of total landings.

All commercial fishing operations are subject to a permit from the Directorate of Fisheries. The Ministry of Industries and Innovation issues regulations for commercial fishing for each fishing year, including an allocation of the Total Allowable Catch (TAC) from each of the stocks subject to such limitations.

The newly adopted FMP states that Icelandic authorities will set annual total allowable catch (TAC) in Icelandic waters in accordance with the HCR and states that this will also take into account estimated catches in Faroese and East-Greenland waters. There is a good track record in Iceland adopting similar and consistent policies across other groundfish fisheries; including cod, haddock and saithe. Annual TACs will be implemented by regulation issued by the Ministry of Industries and Innovation.

Allocation of quota is based on an Individual Transfer Quota (ITQ) system for each vessel (or group of vessels as is with the small boat fleet). The Directorate of Fisheries issues *annual catch quotas* (kgs) to individual vessels as a share in the total allowable catch (TAC) which the Minister of Fisheries sets every year for each species. The annual catch quota is based on the individual vessels *quota share* (%). All major commercial stocks are now subject to quotas (25 species) and they represent approximately 95-97% of the total annual catch value.

### **Fisheries Research**

There is effective data collection/compilation for successful execution of stock assessment for 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.

The Icelandic golden redfish stock is not considered to be overfished nor is it considered that overfishing is occurring. The biomass proxy is estimated to have been above the precautionary-approach-derived target reference point since 2010.

### **Monitoring and Control Systems**

There is an established legal framework, with regulations and rules that give powers to the Ministry, the Directorate of Fisheries, the Coast Guard and the Marine Research Institute

(MRI). The Directorate undertakes the day to day operational implementation of fishery regulations and has powers to collect levies, monitor, inspect, report and gather evidence for prosecution purposes where violations are expected.

The Marine Research Institute (MRI) deals with resource assessment, closure of areas, 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 fisheries productivity in Iceland. The MRI is also developing expertise and understanding of the ecosystems approach to fisheries management. Direct and indirect impacts of fisheries are assessed and effectively addressed through conservation measures.

### **Recommendation of the Assessment Team**

***The assessment team recommends that the management system of the applicant fishery, Icelandic Golden Redfish (*Sebastes norvegicus*) commercial fishery is awarded certification to the Icelandic Responsible Fisheries Management Certification Programme.***

### **Peer Reviewers Summaries and Recommendations**

The final report was reviewed by two external peer reviewers and their reports can be found in Section 8 of the document.

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## 1. Introduction

The Icelandic golden redfish (*Sebastes Norvegicus*) commercial fishery, under state management by the Icelandic Ministry of Industries and Innovation, fished with demersal trawl (main gear), long-line, Danish seine net, gill net, hook and line by small vessel gear (within Iceland's 200 nm EEZ) was assessed against the requirements of the Icelandic Responsible Fisheries Management Specifications version 1 September 2010. The application was made by the Federation of Icelandic Fishing Vessel Owners (LÍÚ) and facilitated by the Icelandic Responsible Fisheries Foundation on behalf of the Icelandic redfish commercial fishery and participants, and was validated by Global Trust Certification Ltd.

The assessment comprised of; application review, validation reporting, assessment planning, assessment and verification reporting. Two site visits were made to the fishery during the assessment. Communications that were presented on the Icelandic Responsible Fisheries website (<http://www.responsiblefisheries.is/>) on the assessment activities to fishery participants and stakeholders are presented in Appendix 2 including short resumes of the assessment team appointed to conduct the work. Assessors comprised of both external contracted fishery assessors 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 to the certification committee of Global Trust who presided 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 noted by the peer reviewers have been rectified in this version. Responses to the peer reviewer's comments are detailed in the peer review reports in section 8.

### 1.1 Recommendation of the Assessment Team

**The assessment team recommends that the management system of the applicant fishery, the Icelandic golden redfish (*Sebastes norvegicus*) commercial fishery within the 200 mile EEZ, and fished by all Icelandic registered vessels using all gear types directly and indirectly under the management of the Icelandic Ministry of Industries and Innovation is awarded certification to the Icelandic Responsible Fisheries Management Certification Programme.**

**Section 6 of this report contains summary evidence of the outcome of full assessment.**

**Section 7 contains the detailed evidence based rationales formulated by the assessment team in response to each of the clauses of the Icelandic Responsible Fisheries Management Specification.**

## 2. Fishery Applicant Details

<b>Applicant Contact Information</b>			
Organization/ Company Name:	<b>The Federation of Icelandic Fishing Vessel Owners (LÍÚ)</b>	Date:	<b>May 2011</b>
Correspondence Address:	<b>Landssamband íslenskra útvegsmanna</b>		
Street :	<b>Borgartuni 35</b>		
Country:	<b>Iceland</b>		
State:	N/A	Postal Code:	<b>IS-105</b>
Phone:	<b>(354) 591 0300</b>	E-mail Address:	<b>ss@liu.is</b>
Organization/ Company Name:	<b>The Federation of Icelandic Fish Processing Plants (SF)</b>	Date:	<b>8 February 2010</b>
Correspondence Address:	<b>Samtök fiskvinnslustöðva</b>		
Street :	<b>Borgartuni 35</b>		
City :	<b>105 Reykjavik</b>		
Country:	<b>Iceland</b>		
State:	N/A	Postal Code:	<b>IS-105</b>
Phone:	<b>(354) 591 0350</b>	E-mail Address:	<b>sf@sf.is</b>
Organization/ Company Name:	<b>The National Association of Small Boat Owners, Iceland (NASBO)</b>	Date:	<b>8 February 2010</b>
Correspondence Address:	<b>Landssamband smabataeigenda</b>		
Street :	<b>Hverfisgotu 105</b>		
City :	<b>101 Reykjavik</b>		
Country:	<b>Iceland</b>		
State:	N/A	Postal Code:	<b>IS-101</b>
Phone:	<b>(354) 552 7922</b>	E-mail Address:	<b>ls@smabatar.is</b>

**Note:** The Fisheries Association of Iceland on behalf of the Organisations named acted as the Applicant Group Facilitator.

### 3. Background to the Fishery

#### 3.1 Species Biology

The golden redfish (*Sebastes norvegicus*) has often been referred to as *Sebastes marinus* which has now generally been accepted as misinterpretation of *Perca scribea*, a Mediterranean serranid. Golden redfish is one of the most common and commercially important fish in Icelandic waters. The usual length in catches is 35 to 40 cm long, but exceptionally large individuals of up to 100 cm and 15 kg have been measured. These huge individuals are often called centennial redfishes as they are probably very old.

It is however possible that these very large redfishes belong to a different stock, or even species. In fact, recent analyses indicate that they are somewhat genetically different from normal sized golden redfish. Golden redfish is found all around Iceland on various bottom types, but off the north coast mainly juveniles are found. It is both found close to the bottom and in the water column (usually at night) and can therefore be classified as benthopelagic. The main fishing grounds, as well as the main adult grounds, are at the edge of the continental shelf at 200 to 400 m depth south and west of Iceland. The golden redfish is found along the coast of North America from Cape Cod to Newfoundland, in southern Greenlandic waters, around Iceland, the Faroe Islands, in the northern part of the North Sea, along the coast of Norway and in the southern part of the Barents Sea.<sup>2</sup> Redfish exhibit strong migrations between areas in the North Atlantic, related to oceanographic conditions, feeding and breeding places.<sup>3</sup>

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<sup>2</sup> <http://www.fisheries.is/main-species/redfishes/golden-redfish/>

<sup>3</sup> ICES. 2011. Report of the North-Western Working Group, 26 April–3 May 2011. ICES CM 2011/ACOM:07.



**Figure 1.** Golden Redfish<sup>4</sup>

### **Growth and maturity**

Golden redfish are long-lived, slow-growing and late-maturing fish species. Males mature at age 8-10 at size 31-34 cm whereas females mature at age 12-15 at size 35-37 cm. Golden redfish are ovoviviparous, in which eggs are fertilized, develop and hatch internally. The male and female mate several months before the female extrudes the larvae. The females carry sperm and non-fecundated eggs for months before fertilisation takes place in winter. Golden redfish produce many, small larvae (37-350 thousand larvae) that are extruded soon after they hatch from eggs and disperse widely as zooplankton. The extrusion of larvae may take place over several days or weeks in a number of batches.

The main nursery areas are off East-Greenland and Iceland. In Icelandic waters they are found all around the country, but are mainly located off the west and north coasts at depths between 50 m and 350 m. As they grow, the juveniles migrate along the north coast towards the most important fishing areas the off the west and southwest coast, but also to the Southeast fishing areas and to Faroese fishing grounds in ICES Division Vb.<sup>5</sup>

### **Feeding Ecology**

The food of golden redfish consists of dominant plankton crustaceans such as amphipods, copepods, calanoida, and euphausid. All the redfish species primarily feed on zooplankton, but also on small fishes such as capelin. The single most important food group, however, is krill (Pálsson, 1983).

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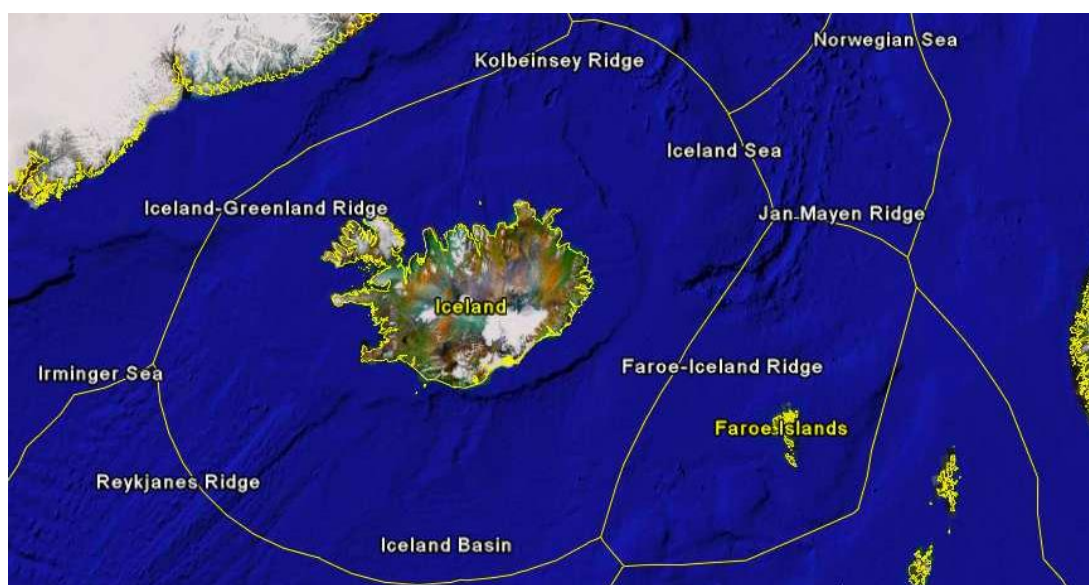
<sup>4</sup>[https://www.imr.no/radgivning/kvoterad/kvoterad\\_for\\_2011/ICES\\_rad\\_pa\\_arktiske\\_bestander/va\\_nlig\\_uer/en/](https://www.imr.no/radgivning/kvoterad/kvoterad_for_2011/ICES_rad_pa_arktiske_bestander/va_nlig_uer/en/)

<sup>5</sup> ICES. 2011. Report of the North-Western Working Group, 26 April–3 May 2011. ICES CM 2011/ACOM:07.

### 3.2 Fishery Location

Golden redfish (*S. norvegicus*) found on the continental shelves of East- and West-Greenland, Iceland and Faeroe Islands (ICES Subareas V and XIV) is considered one stock. Golden redfish is most abundant in Icelandic waters (ICES Division Va), where most of the commercial catches are taken.

Golden redfish in Icelandic waters is found all around Iceland, but is most common West-, Southwest-, South- and Southeast of Iceland at depth of 100-400 m. The main nursery areas are off East-Greenland and Iceland. In Icelandic waters they are found all around the country, but are mainly located off the west and north coasts at depths between 50 m and 350 m. As they grow, the juveniles migrate along the north coast towards the most important fishing areas the off the west and southwest coast, but also to the southeast fishing areas and to Faroese fishing grounds in ICES Division Vb. <sup>5</sup> Iceland's exclusive fisheries zone has an area of 760,000 square kilometres, seven times the area of Iceland itself (see Figure 2).

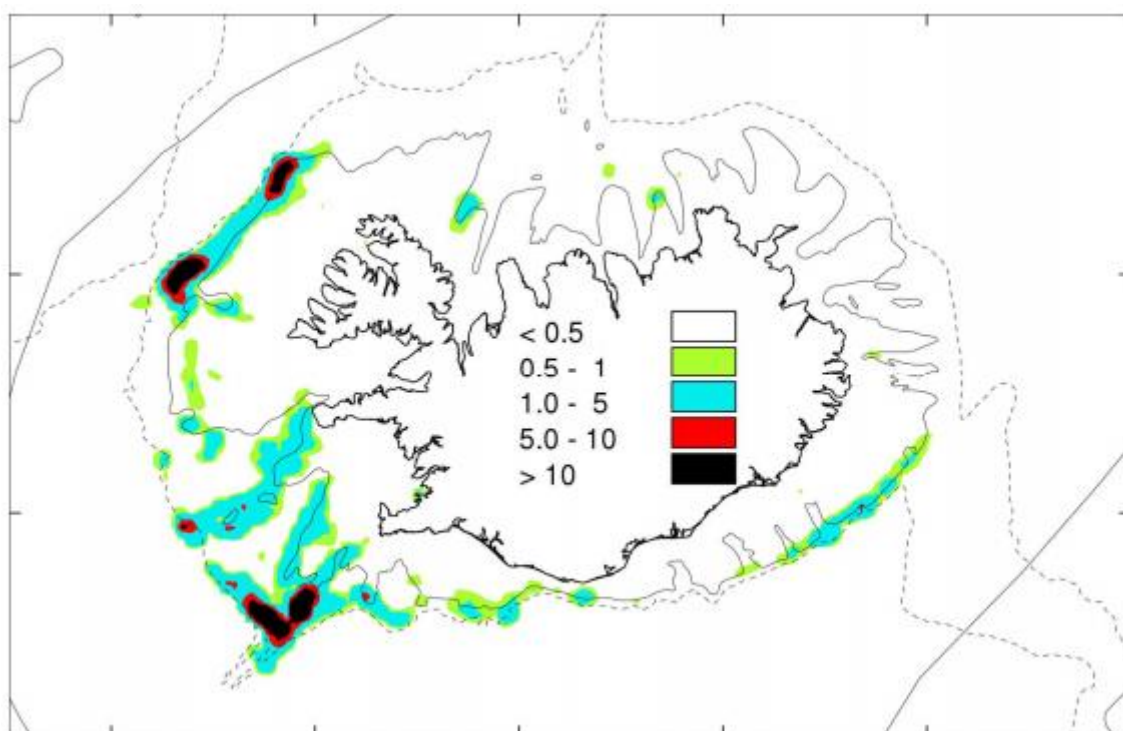


**Figure 2.** Iceland and surrounding waters, 200 mile EEZ shown. Map: Google earth.

The fishery for golden redfish is primarily along the shelf edge from southeast to northwest of Iceland. It is likely that redfish catches in Icelandic waters until around 1980 were predominantly golden redfish, since it is very common and lives in shallower waters than the other species. After 1950 the total catches in Icelandic waters were around 150,000 tonnes but declined to the level of 80,000 to 100,000 tonnes from about 1955 to 1988. Icelandic boats also caught a considerable quantity of redfish in distant waters, primarily off Eastern Greenland and Newfoundland. The catches of golden redfish in Icelandic waters have declined further to about 40,000 tonnes in recent years. However, this decline has been more than compensated for by increased catches of deep sea and oceanic redfish.

Until foreign fleets were expelled from Icelandic waters, the majority of the catches in Icelandic waters were by the West German fishing fleet, as the redfish is a popular food fish in Germany. After the expulsion of foreign fleets, the Icelandic boats increased their catch as markets for redfish opened up in Germany and this is still the largest single market for Icelandic redfish.

Golden redfish is fished all year round but the fishing is often best in late winter and almost exclusively carried out with bottom trawls. Fisheries in Icelandic waters are now characterized by the most sophisticated technological equipment available in this field. This applies to navigational techniques and fish-detection instruments as well as the development of more effective fishing gear. The most significant development in recent years has been the increasing size of midwater trawls, increasing engine power and improving the ability to fish deeper. There have also been substantial improvements with respect to technological aspects of other gears such as bottom trawl, longline, and handline.<sup>6</sup>

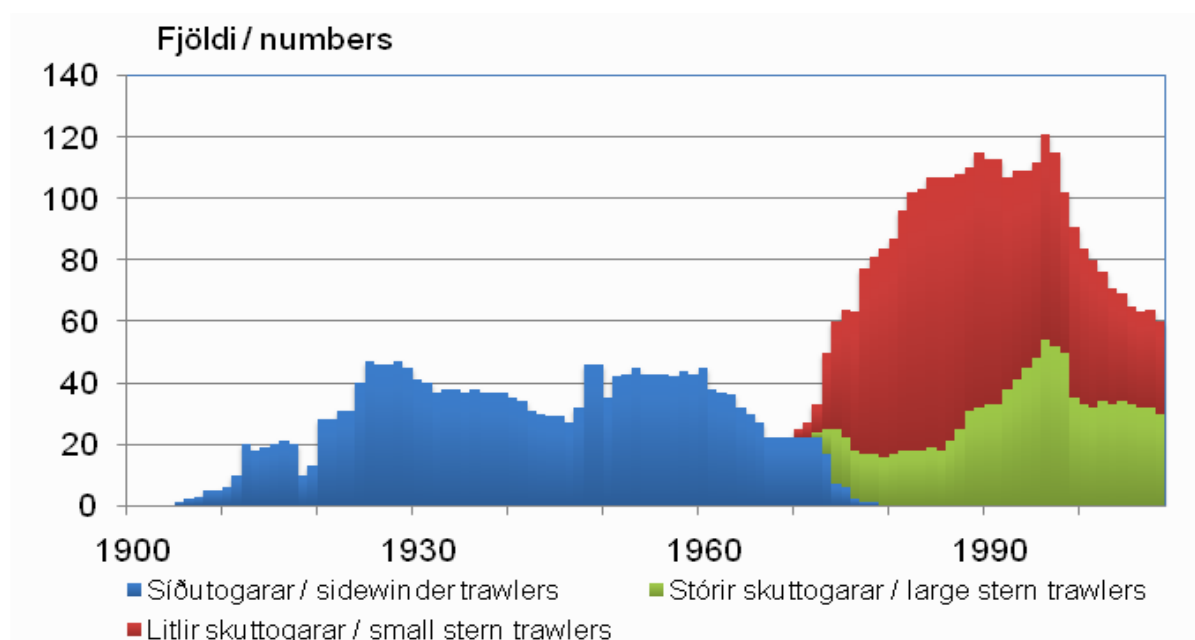


**Figure 3.** Golden redfish fishing grounds in 2012 (t/nm<sup>2</sup>), all gear combined, dark areas indicate highest catches.

<sup>6</sup> <http://www.fisheries.is/main-species/redfishes/golden-redfish/>

### 3.3 Fishery Management History and Organization

Fishery resources have been a strong influence on shaping the economy and social history of the country for centuries. In recent history they have provided valuable export commodities, and earlier became, in the 19<sup>th</sup> and 20<sup>th</sup> centuries, the foundation for an economic renaissance and development in Icelandic society. The introduction of motorized vessels, motor-boats and steam-trawlers during the first decade of the 20<sup>th</sup> century caused rapid expansion and changes in the Icelandic fisheries. The fishing effort was greatly enhanced as well as catches. Within a period of two decades the Icelanders acquired a modern fishing fleet which was technically second to none in northern Europe and could go fishing all the year round. The fishing capacity of the new fleet of motor- and steam-vessels was much greater than that of the earlier fleet of rowing boats and decked sailing vessels. For the first time, Icelanders were able to utilize practically *all* fish stocks of the fishing grounds off their coasts (Ministry of Industries and Innovation, Iceland).<sup>7</sup>



**Figure 4.** Development of the Icelandic bottom trawler fleet 1900-2010 (Ministry for Industries and Innovation)

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.

<sup>7</sup> <http://www.fisheries.is/fisheries/>

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 Fisheries 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 coastal State national jurisdiction. It entered into force in 1994, one year after being ratified by 60 nations. Much earlier, in 1985, Iceland was the first state to ratify this treaty.

In 1975 foreign fleets were catching about half of the total catches of redfish and saithe, a third of the total cod catch, and a quarter of the total haddock catch. It was considered that no effective fisheries management for groundfish would be possible under those circumstances. When the 200 mile EEZ 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 1983 the conclusion was made that effort limitations, which had been in force since 1973, had proved unsuccessful and that the cod stock was in decline. The Althing, Iceland's national parliament, adopted a management system of individual transferable quotas (ITQs) for individual vessels based on each vessel's catch performance from 1981–1983. The first year of allocating ITQs was 1984. However, until 1990 there was an effort option in the system that made it difficult to limit total catches.

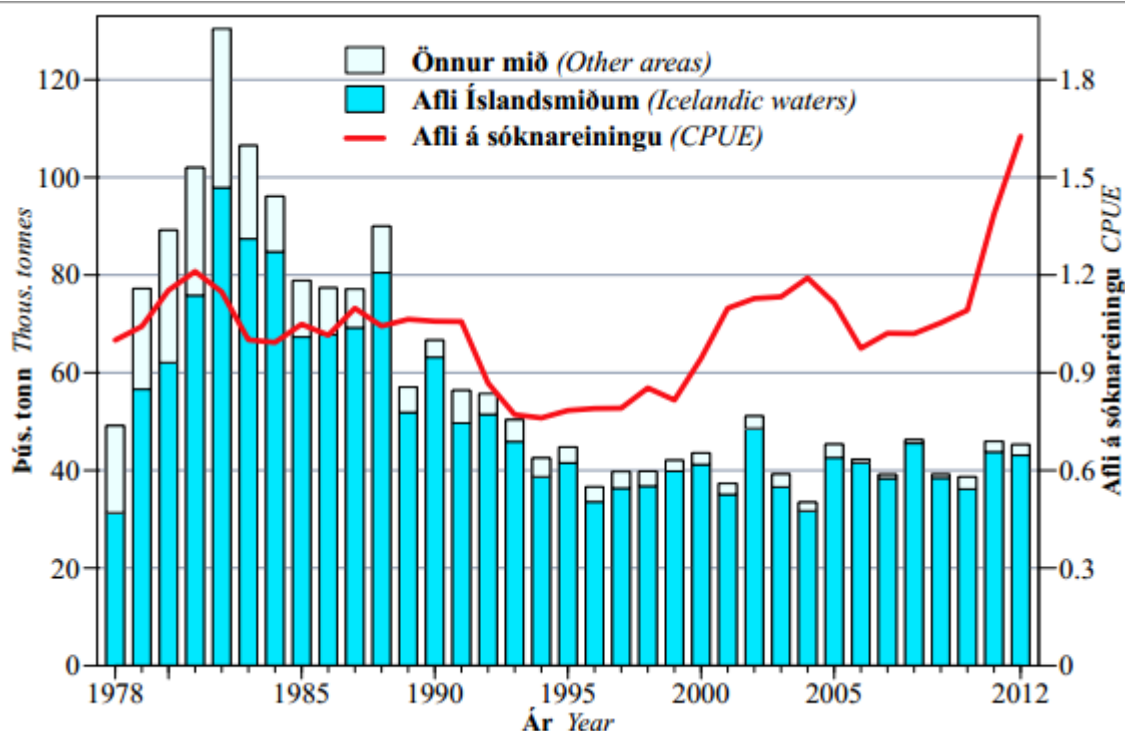
The fishery for golden redfish in Icelandic waters started in the early 1920s but landings were small until the late 1930s when annual landings started to increase. Annual landings in 1936-1939 varied between 40-65 thousand tonnes compared to an average of 10 thousand tonnes in 1922-1935. During the interwar period redfish was mainly caught by foreign vessels operating in Icelandic waters. A small redfish fishery was conducted in Icelandic waters during World War II but increased rapidly after the war to a record high of 167 thousand tonnes in 1951. Annual landings in 1956-1977 varied between 60-115 thousand tonnes. The majority of the catches were taken by foreign vessels, mainly from West-Germany. Since 1977, with the expansion of the EEZ to 200 nautical miles, mainly Icelandic vessels have fished for golden redfish in Icelandic waters. Landings declined from about



98,000 t in 1982 to 39,000 t in 1994. Since then, landings have varied between 32,000 and 49,000 t. Average annual landings in 2000- 2010 have been around 40,000 tonnes.

The modern Icelandic golden redfish fishery is predominantly (<90%) conducted by the Icelandic bottom trawl fleet directed towards the species. The remainder are partly caught as by-catch in gillnet, long-line, and lobster fishery. The most important fishing grounds are southwest and west of Iceland at depths from 200-400 m.

The fishing fleet operating in Icelandic waters consists of diverse boat types and sizes, operating various types of gear. Golden redfish is mostly caught by the same vessels that are fishing for the pelagic and Icelandic slope *S. mentella* stocks. These are trawlers larger than 40 BRT equipped with bottom trawls.



**Figure 5.** Golden redfish landings from Icelandic grounds, total landings from East Greenland, Icelandic and Faroese waters and CPUE index during 1978–2012

### 3.4 Origins of the Fisheries Management Act

- **1976-1983 Restrictions in TAC and effort**

By 1976, it was evident that fishing mortality in the cod fisheries was alarmingly high, that the spawning stock was threatened and that this level of catch could not be sustained. They advised a total allowable catch (TAC) of 230,000 MT for that year but the catch was 350,000 MT. From that point, effort restrictions were introduced. Trawlers were at first allowed to fish for 323 days a year, later only 215 days. The system was clearly very uneconomic. By 1983, the spawning stock of cod was estimated at an all time low, just over 200,000 tonnes and fishing mortality was very high. Catches were circa 100,000 tonnes in excess of recommendations.

- **1984 Individual vessel quotas**

A system of individual vessel quotas with some transfer rights was introduced in 1984. By this law, each fishing vessel received a fraction of the TACs in the beginning. The allocation of quota was based on the vessel's catches in the three previous years. TACs and individual vessel quotas were imposed for cod, haddock, saithe, redfish, Greenland halibut, plaice and ocean catfish.

- **1985-1990 Effort option**

In 1985 an effort based option in the demersal fisheries was introduced. More than half of the cod catch, even up to two thirds was effort based at the time and the vessels fishing under that option could periodically re-enter the catch quota system with a new track record. Furthermore, vessels of 10 GRT had free access to the fisheries until 1988 and boats under 6 GRT until 1990. TAC's were still above scientific recommendations in this period and catches were in excess of the TACs.

- **1990 The Fisheries Management Act**

In 1990 a comprehensive and uniform [Fisheries Management Act](#) was established. By this Act, the Individual Transfer Quota (ITQ) system was established for most of the commercial fisheries. They were all subject to vessel catch quotas and there was no effort option for trawlers and the larger boats. The quotas represent shares in the total allowable catch. They are permanent, perfectly divisible and transferable.

The fishing year for groundfish stocks was set from Sept 1 to Aug 31 in the following year rather than the calendar year. This was an effort to channel fishing away from the summer months, when quality suffers more quickly and regular factory workers are on vacation.

Since 1991, a number of amendments have been made to the fisheries management system. In August 2006 the legislation was re-issued as Law nr 116/2006, thus including all the changes made to the original 1990 legislation.

The present comprehensive fisheries management system is still based on ITQs. The objectives are described in the Fisheries Management Act including; to promote the conservation and efficient utilisation of the marine resources and thus to ensure stable employment and economic viability of fishing communities. Stated aims are to ensure the

sustainability of the fisheries while emphasising the economic benefits of the fisheries sector.

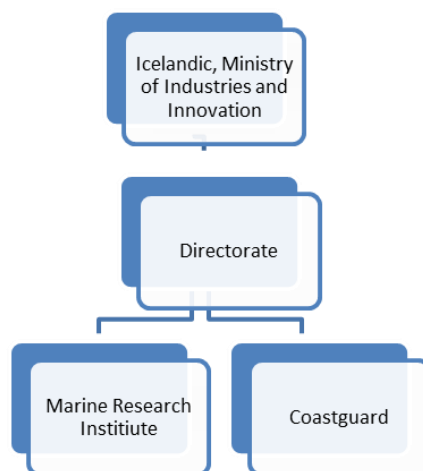
In addition to the ITQ system, Icelandic fisheries management includes many other management measures such as area restrictions, fishing gear restrictions, and the use of permanent and temporary closed areas to conserve important vulnerable habitats and juvenile fish stocks. Extensive provisions are made for temporary closures of fishing areas to protect spawning fish from all fishing. These measures are all meant to support and secure the sustainability of the fisheries.

Effective control and enforcement is an inseparable part of responsible fisheries management. The Directorate of Fisheries 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. According to Icelandic law, discards are prohibited. All catches must be landed.

Scientific research is essential for successful management as extensive knowledge of the ocean around Iceland and its ecosystem must be the foundation regarding decisions on sustainable fisheries and other utilization of the natural resources of the sea.

#### **Organisational Chart:**

The structure of the fisheries management system can be described as well organised, 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 plays 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.



**Figure 6.** Basic Organizational Structure of Icelandic Fishery Management.

### Ministry of Industries and Innovation

The Ministry of Industries and Innovation (MII) covers all sectors of ordinary business and economic activity. It opened on 1 September 2012 following the amalgamation of the Ministry of Industries and Innovation, the Ministry of Industry, Energy and Tourism and part of the Ministry of Economic Affairs. Overall responsibilities of the Industries and Innovation division within MII include:

- 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<sup>8</sup>.

### The Directorate (Fiskistofa)

The Directorate has a HQ in Hafnarfjörður, just outside of Reykjavik and offices at six locations in the country where the staff work in the field of fisheries management and monitoring. A total staff of 70 people 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

<sup>8</sup> <http://eng.sjavarutvegsraduneyti.is/ministry/role-and-function/>

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. This can be done by either Directorate staff at ports or by certified individuals where fish is landed directly to the processing sector. The official record of the catch is recorded on a computer system 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 before vessels overfish 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.<sup>9</sup>

### **The Marine Research Institute**

The Marine Research Institute (MRI) role is to acquire knowledge of the marine environment around Iceland and its living resources and 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 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. The 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

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<sup>9</sup> <http://www.fiskistofa.is/>

government. The three sections work in close co-operation and they also 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 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).<sup>10, 11</sup>

### **The Icelandic Coast Guard**

The Coast Guard performs sea and air patrols of Iceland's 200-mile exclusive economic zone and 12-mile territorial waters, and monitoring of fishing within the zone in consultation with the Marine Research Institute and Ministry of Industries and Innovation. In addition to patrolling the Icelandic EEZ, the Coast Guard performs surveillance and inspection duties in international areas, e.g. the NEAFC Regulatory Area which is the area outside the EEZ towards the South-West, South and East of Iceland. The Coast Guard is also responsible for rescue operations in the Icelandic Search and Rescue Region, 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<sup>12</sup>. A new vessel has been procured for the Coast Guard to perform its activities in 2012. The new flagship vessel of the Coast Guard named Thor has been delivered and is active in Reykjavik since November 2011. Thor was specially designed for Icelandic conditions, particularly for protection of resources, fisheries monitoring, law enforcement and search & rescue.<sup>13, 14</sup>

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<sup>10</sup> <http://www.hafro.is/>

<sup>11</sup> <http://www.fisheries.is/management/institutes/the-marine-research-insitute/>

<sup>12</sup> <http://www.fisheries.is/management/Institutes/the-icelandic-coast-guard/>

<sup>13</sup> <http://www.icenews.is/index.php/2011/10/27/new-icelandic-coastguard-cruiser-welcomed-in-reykjavik/>

<sup>14</sup> <http://www.lhg.is/english>

## Fishing permits

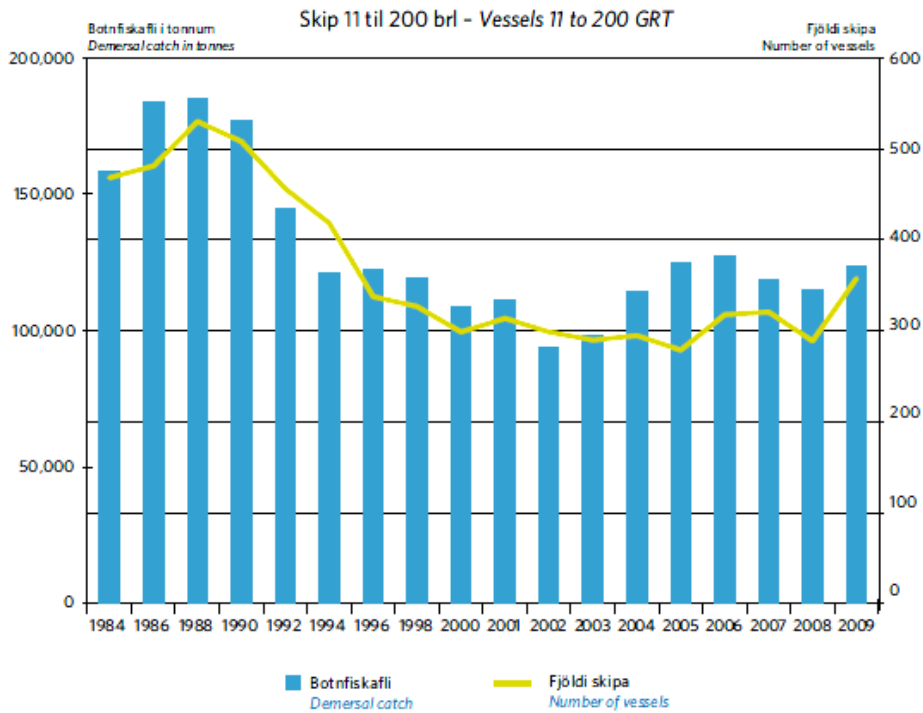
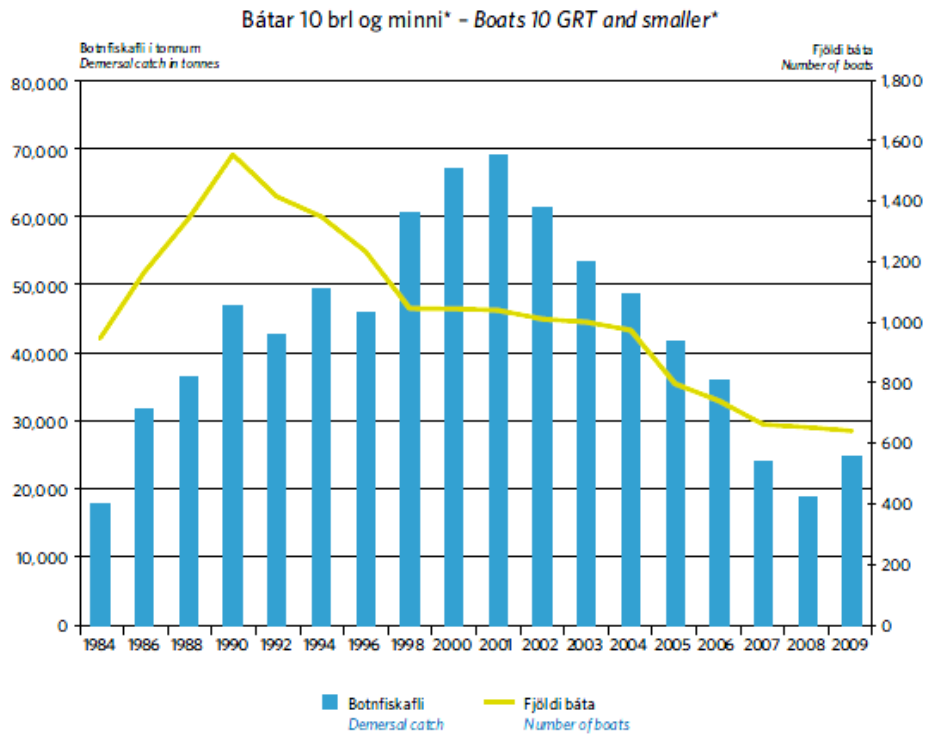
According to the Fisheries Management Act No 38/1990 no one can catch fish inside the Icelandic economic zone without permission from the Ministry of Fisheries, and licences are allocated for one year at a time. Due to this law, all major fisheries inside the Icelandic economic zone operate according to a uniform system with transferable quotas in all species and fisheries. Hence, nearly all fishing vessels have individual transferable quotas (ITQ), allowing ship owners to buy or sell quotas between ships. As has been pointed out earlier, the ITQ grants the right to catch the fish but not the ownership of the fish stock. In that way, the ITQ permits the owners of the fishing vessel to sell the right to catch the fish.

The Icelandic Parliament passed a new chapter in the Fisheries Management Act in the spring session 2002. This includes a levy on fishing rights allocation and is payable by fishing companies. Fishing rights for the Icelandic fleet within and outside the EEZ have been levied from Sept 1 2004. The Directorate of Fisheries reports (2010) that in 2009 a total of 1,584 licensed fishing vessels landed a total of 1,137,704 tonnes of fish, valued at 124,272 million ISK. (Icelandic Fisheries in Figures 2010). Certain fisheries require special permits, such as Danish seining, inshore shrimping, specific fisheries by Icelandic vessels in distant waters and the fishing of foreign vessels within the Icelandic exclusive economic zone (EEZ).

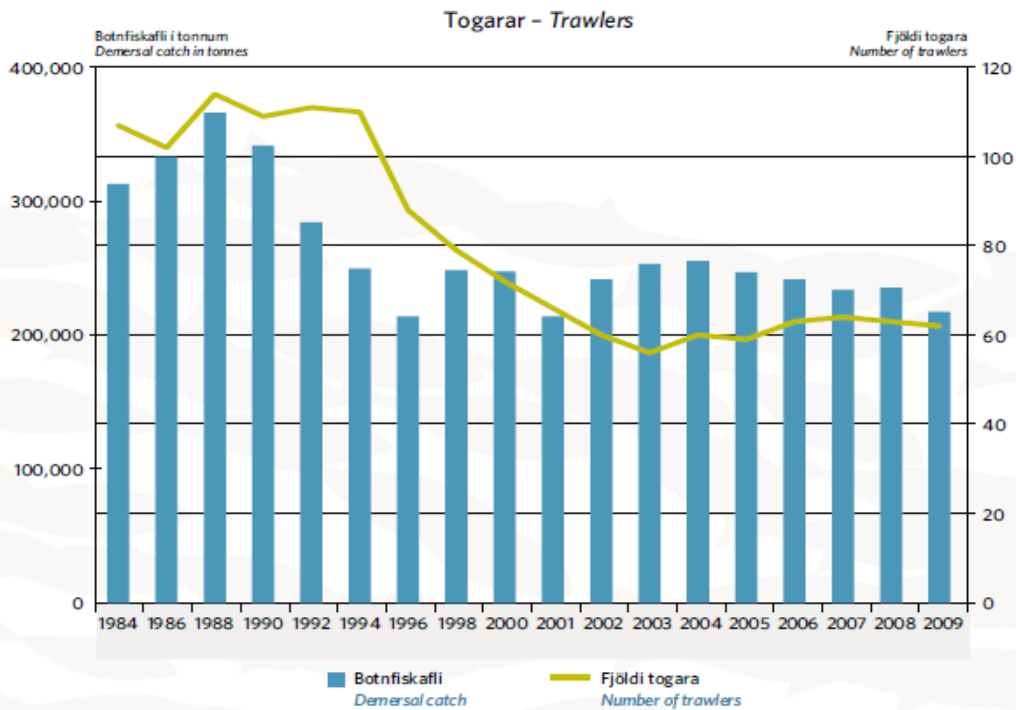
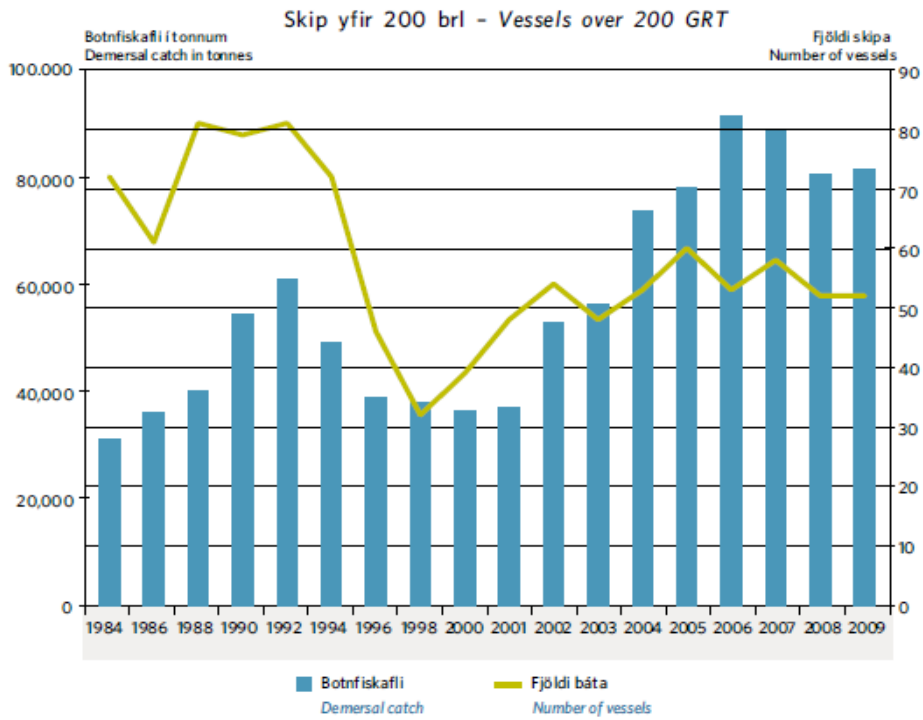
## Allocation of fishing rights

The Directorate of Fisheries issues *annual catch quotas* (kgs) to individual vessels as a share in the total allowable catch (TAC) which the Minister of Fisheries sets every year for each species. The annual catch quota is based on the individual vessels *quota share* (%). All major commercial stocks are now subject to quotas (25 species) and they represent approx. 95-97% of the total annual catch value. The TAC of most of the species is issued for each fishing year, the period being from the 1st of September to the 31st of August the following year. Fishing rights can be either general catch quotas, catch quotas for hook and line boats (max 15 GT) or fishing days. The system has been amended to adapt to new changing circumstances and support the allocation of fishing opportunities on an equitable basis. Of course, there are some disputes and concerns of cod quota consolidation among a fewer larger organizations. However, there are fundamental rules such as no one vessel can have more than 12% share of the cod quota.

A logbook reporting based monitoring system is in place to ensure vessels remain within the daily fishing time and catch allowance. Figures 7 below illustrate the progression in fleet segments and catches since 1993. Concentrating on the last decade, small boat usage has reduced and most other segments have remained stable or have shown modest increases (>200 GRT). However, the figures illustrate the substantial reduction in fleet size since the early 1990's.







**Figure 7:** Catches of demersal species by fleet segment.

From Directorate of Fisheries (2010 Report on Fishery).

### **Note on Transfer of Quota**

It is permitted, under given circumstances, to transfer both quota shares and annual catch quotas between vessels. However, it is not allowed to transfer more than 50% of the annual catch quota allocated to a vessel within a given fishing year. The quota shares can however be fully or partially transferred between vessels. Applications for transfer are submitted to The Directorate which verifies and registers the transfer.

There are specific limitations on how big a share of the quota share can be controlled by one individual, company or legal entity (12%) and related partners. These limitations take to both quota shares in individual species as well as total quota share, calculated into the so called *cod equivalent*. The term: "cod equivalent" refers to weight and implies the relative value of different fish species on the market. This is set by a regulation every year. For each vessel having a quota for several species the total quota may be calculated in kg as cod equivalents. Quota transfer between vessels is often measured in cod equivalents.

### **Flexibility in the ITQ system**

There is some flexibility built into the ITQ system, enabling the vessel owners and fishermen to control better the structure of their fishing pattern. Regardless of the fact that allocated catch quota can only be utilized within the fishing year in question, 20% of each vessels catch quota can be transferred to the following fishing year.

Undersized fish which if caught must be landed by law (no discards allowed by regulation) and is only partially withdrawn from catch quotas. Partial withdrawal encourages fishers to land any undersized fish encountered and actively avoid these in their catches. Undersized fish have little commercial value. It is permitted to land catch (max 5%) excessive to quotas as long as the catch is auctioned and the bulk of the value of the catch goes to the Marine Research Institute while a smaller proportion is apportioned to operational costs. The excess catch is in such instances withdrawn from next fishing year's quota of the vessel.

### 3.6 Stock Assessment Methods and Practices

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 institution responsible for providing stock assessment and advice is principally the Marine Research Institute of Iceland which carries out surveys using research and fishing vessels and sample programs for several thousand individual fish. ICES Advice 2011 and 2012 was reviewed as part of the full assessment.

There are three levels of research/advice that are central to the stock assessment for Icelandic golden redfish:

- Environmental factors affecting stock development;
- Stock Structure and productivity;
- Advice to Management on setting TAC and fishery management methods.

Assessment of Golden redfish was conducted using two different models.

- Gadget model (Globally applicable Area Disaggregated General Ecosystem Toolbox<sup>15</sup>)
- Time series analysis based on age disaggregated catch in numbers 1996-2011 and age disaggregated abundance indices from the autumn survey 1996-2011.

#### Benchmark Workshop

The Benchmark Workshop on Redfish (WKRED 2012) met from 1-8 February 2012 at ICES headquarters in Copenhagen, Denmark. The main objectives of the workshop for golden redfish was to agree upon and document the preferred method for evaluating stock status.

The Benchmark workshop was not able to reach consensus regarding the golden redfish assessment. The external review panel concluded that the GADGET model could not be accepted as the model used routinely as basis for advice because the model did not follow the increasing trend in the abundance indices for the intermediate length groups. Others at the meeting supported the use of the current GADGET model.

The external review panel considered the use of biomass dynamic (Schaefer) models that were specified to start at the beginning of the catch history as cross check on the GADGET model. The goal was to use the biomass dynamic model results as a cross check on advice obtained from the GADGET model. Some meeting participants did not support the use of biomass dynamics models because of lack of contrast in the survey data and unrealistic

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<sup>15</sup> [www.hafro.is/gadget](http://www.hafro.is/gadget).

estimates of production from the model given the biology of the redfish. NWWG-2012 supports this view.

The NWWG-2012 rejected the idea that the biomass dynamic model could be used as a reliable cross check on advice obtained from the GADGET model. Furthermore, the NWWG-2012 concluded that Gadget model (run 1) presented in the report is currently the best available method for assessing the state of the golden redfish in area V and XIVb.

ICES. 2012. Report of the Benchmark Workshop on Redfish (WKRED 2012), 1–8 February 2012, Copenhagen, Denmark. ICES CM 2012/ACOM:48. 291 pp.

### **Assessment model**

In the ICES 2014 Advice (Feb 2014) the stock assessment used as basis for the forecast of golden redfish in the Ecoregion Iceland and East Greenland was an extension of the assessment method used previously to evaluate trends (“GADGET: Globally applicable area-disaggregated general ecosystem toolbox”). The extension of the methodology encompasses three main issues:

- 1) There are indications that redfish has been growing faster in recent years. As selection in the survey and catches is based on size, faster growth will lead to cohorts recruiting earlier to the catches and fisheries and hence, lead to overestimation of cohort size if changed growth is not taken into account. To account for the change in growth, mean length-at-recruitment (age 5) was estimated separately for year classes 1996–2000 and for 2001–present.
- 2) The autumn German Greenland groundfish survey was added to the assessment. In order to allow the inclusion of the results of the German survey in the assessment model, the area for which the survey is considered indicative has been revised. This area is selected to avoid extrapolation to areas not covered by the survey. The area (now 22 500 km<sup>2</sup>) is about half the size of the area used previously, preventing each survey station to be given too much weight. Although the German Greenland survey only accounts for 10% of the total biomass of this stock, including it in the assessment model increases SSB by over 30% compared to the previous assessment. The reason for this relatively large increase is that the large fish observed in the German Greenland survey have not been observed in the Icelandic survey in recent years.
- 3) The weighting of the individual data sets in the GADGET model is now calculated using an iterative reweighting algorithm. This process essentially assigns weights to each input data set on the basis of the inverse variance of the fitted residuals. This is done to reduce the influence of lower quality input data.

[http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2014/Special%20Requests/Iceland Faroe Islands Greenland Evaluation of Itmp for golden redfish.pdf](http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2014/Special%20Requests/Iceland%20Faroe%20Islands%20Greenland%20Evaluation%20of%20Itmp%20for%20golden%20redfish.pdf)

## 4. Unit of Certification and Assessment Units

The proposed *Units of Assessment* submitted at the time of Application were reviewed with respect to their appropriateness for undertaking a full assessment. The assessors have reviewed the proposed units of assessment with respect to the application of management functions across all jurisdictions and an examination of the characteristics of each of the management regions to assess the similarities and potential differences during a full assessment of the Icelandic Golden Redfish fisheries.

**Table 1.** The proposed Units of Assessment within the Unit of Certification are listed below.

	<b>Fish Species (Common &amp; Scientific Name)</b>	<b>Geographical Location of Fishery</b>	<b>Gear Type</b>	<b>Principal Management Authority</b>
<b>1.</b>	Atlantic Golden Redfish <i>(Sebastes norvegicus)</i>	Icelandic Exclusive Economic Zone (200 nm)	Demersal otter trawl	Ministry of Industries and Innovation (formerly the Ministry of Industries and Innovation)
<b>2</b>	Atlantic Golden Redfish <i>(Sebastes norvegicus)</i>	Icelandic Exclusive Economic Zone (200 nm)	Long-line	Ministry of Industries and Innovation
<b>3</b>	Atlantic Golden Redfish <i>(Sebastes norvegicus)</i>	Icelandic Exclusive Economic Zone (200 nm)	Danish Seine net	Ministry of Industries and Innovation
<b>4</b>	Atlantic Golden Redfish <i>(Sebastes norvegicus)</i>	Icelandic Exclusive Economic Zone (200 nm)	Gill net	Ministry of Industries and Innovation
<b>5</b>	Atlantic Golden Redfish <i>(Sebastes norvegicus)</i>	Icelandic Exclusive Economic Zone (200 nm)	Hook and line by small vessels also termed jigger and hand line	Ministry of Industries and Innovation
<b>6</b>	Atlantic Golden Redfish <i>(Sebastes norvegicus)</i>	Icelandic Exclusive Economic Zone (200 nm)	Nephrops trawl	Ministry of Industries and Innovation
<b>7</b>	Atlantic Golden Redfish <i>(Sebastes norvegicus)</i>	Icelandic Exclusive Economic Zone (200 nm)	Shrimp trawl	Ministry of Industries and Innovation
<b>8</b>	Atlantic Golden Redfish <i>(Sebastes norvegicus)</i>	Icelandic Exclusive Economic Zone (200 nm)	Pelagic Trawl	Ministry of Industries and Innovation

## 5. Consultation Meetings

### 5.1 Assessment Validation Meetings

The objectives of the initial consultation meetings were to support information gathering and understanding of the role, functions and activities of the fishery management organizations responsible for Icelandic redfish resources and to further investigate the approach that a full assessment might undertake with respect to the Unit of Certification and the Assessment Units that are proposed.

Consultation meetings were planned based on an initial review identifying the key management organizations and participants. The initial consultation meetings were not designed to be inclusive of all organizations and representatives of the Icelandic redfish fisheries. However, the consultation plan was designed to strategically capture sufficient information to ensure understanding and confidence with respect to validation reporting.

There were other important functions that the on-site consultation also served. These included:

- The provision of an overview of the FAO-based assessment and certification process to management organizations and fishery representative organizations,
- To respond to any questions and comments raised at this initial stage in the assessment. An overview of the key criteria of the FAO Code of Conduct for Responsible Fisheries, and minimum substantive requirements for eco-labelling of fisheries (FAO Guidelines for the Eco-labelling of Fisheries and Fishery Products) was presented.

A summary of items included in the standard approach to each meeting were as follows:

- Introduction to the Certifying Body;
- Overview and confirmation of the assessment plan with a standard power point presentation was used which was also made available on Icelandic Responsible Fisheries website for all participants to review;
  - Units of Certification and Units of Assessment;
  - Initial site visit objectives and investigative approach;
  - Document information that would form part of the full assessment

All initial consultation meetings were conducted by Gisli Svan Einarsson and Vito Ciccia Romito.

**Summary of Consultation Meetings:**

Each meeting served as the primary purpose to introduce the Certification Body, Global Trust, and provide an overview of the FAO assessment approach and process. Key timelines for assessments and the specifics of the proposed assessment and certification units were presented. Immediate questions and concerns expressed by management and participatory organizations were addressed and some key areas which will form part of the full assessment were also addressed. Consultation meetings are intended to provide a briefing of the certification process and link to management organizations for the purposes of carrying out the fishery assessments and to support the next step in the assessment, the planning of full assessments for the fisheries in application.

The following summary Table 2 provides the background to each organization met, and a description of the specific key items discussed.

N.B. Icelandic haddock and saithe also discussed at these meetings due to mixed nature of fishery landings.

**Table 2:** Summary of Assessment Validation Consultation Meetings

Date and location	Organization	Staff Represented	Overview/Key Items
<p>Mon 6<sup>th</sup> June 2011.</p> <p>Reykjavík, Iceland.</p>	<p>Fisheries Association of Iceland (Fiskifélag Íslands)</p>	<p>Dr. Kristján Þórarinnsson</p> <p>Vice-chair, Fisheries Association of Iceland</p> <p>Assessment Team (GT):</p> <ul style="list-style-type: none"> <li>- Vito Ciccia Romito,</li> <li>- Gisli Svan Einarsson.</li> </ul>	<p>The FAI is a representative Association of fishery associations and fishery interests in Iceland. FAI is playing a key role in the repositioning of Iceland's seafood industry as a competitive market-driven food production industry. The Iceland Responsible Fisheries (IRF) Foundation owns and operates the brand of Iceland Responsible Fisheries. The Foundation was established in February 2011 and took over the operation and management of the IRF certification program from the Fisheries Association of Iceland. The foundation operates on a cost basis, as a non-profit organization. The founders are the following associations:</p> <ul style="list-style-type: none"> <li>• Federation of Icelandic Fishing Vessel Owners, <a href="#">LÍÚ</a></li> <li>• National Association of Small Boat Owners, <a href="#">LS</a></li> <li>• Federation of Icelandic Fish Processing Plants, <a href="#">SF</a></li> </ul> <p>The following key points have been discussed about the fishery. Haddock and saithe are part of a mixed fishery that primarily catches cod. The fishery is a combination of many fisheries using different gears and fishing in different areas. Redfish is targeted by bottom trawlers but also caught by all the gears identified as part of the unit of certification.</p> <p>The stock assessment for cod, haddock and saithe uses age based population analysis. Haddock is found in more inshore species than saithe and is fished shallower than golden Redfish and saithe. Saithe and cod are mostly caught together but saithe and haddock are caught quite separately as the two species occur naturally at different depths in the ocean. Haddock spawning grounds are situated towards South West Iceland. The formal harvest</p>



			policy document for haddock is being prepared.
Mon 6 <sup>th</sup> June 2011.  Reykjavík, Iceland.	Responsible Fisheries Iceland, Islandsstofa.	<a href="#">Guðný Káradóttir</a> , Marketing Manager.  Assessment Team (GT): - Vito Ciccía Romito, - Gisli Svan Einarsson.	Islandsstofa is a powerful cooperation between industry and Government and aims to improve the nation's foreign exchange earnings by promoting marketing activities abroad  Services at Islandsstofa are based on three main factors: <ul style="list-style-type: none"> <li>• General promotion aimed at enhancing the reputation and image of Iceland abroad, creating interest in the country as a destination and increasing demand, as Iceland is.</li> <li>• Education and support to organizations, companies and individuals that aim to improve their skills and performance in international trade.</li> <li>• To promote opportunities and attract foreign investors for direct investment in business and innovation in line with government policy.</li> </ul>
Mon 6 <sup>th</sup> June 2011.  Reykjavík, Iceland.	HB Grandi	Torfi Thorsteinsson Production Manager – Groundfish  Assessment Team (GT): - Vito Ciccía Romito, - Gisli Svan Einarsson	HB Grandi is one of the largest fishing companies in Iceland and a leader in its field. Great emphasis is placed on using the latest advances in technology for fishing and processing. The company takes pride in its production of quality seafood products from the fresh fish caught in Iceland. HB Grandi markets its products worldwide – products made from both groundfish (including haddock) and pelagic fish caught and processed by the company's 700 employees.  The following key points have been discussed about the fishery. Monitoring, surveillance and control for cod, haddock, saithe and redfish are essentially the same. Long term management plans for haddock, saithe and redfish need to be finalized. Ecosystem interactions of the fisheries for this species are similar to those of the cod fishery.
Mon 6 <sup>th</sup> June 2011.  Reykjavík, Iceland.	Faxamarkaður, the Fish Auction in Reykjavík	Fish Auction General Manager  Assessment Team (GT): - Vito Ciccía Romito,	Summary of information discussed. There are several fish markets around Iceland that in total handle around 100,000 t of landings in average. They can trace each fish product from each fishing vessel. Fishmarkets grade cod but do not grade haddock, saithe and redfish. Most of the Fishmarket clients are Icelandic clients. Foreign clients buy with the help of agents. Fish is weighed inside the Fishmarket and two agents are usually present, one from the Directorate and one from the harbour. Boats estimate the catch and if very different from the weighing of the fish market, the coast guard will check the vessel. This happens

		<p>- Gisli Svan Einarsson</p>	<p>around 200 times a year. All species weights are recorded and info is sent to the Directorate and shared with MRI and the Ministry. Clients of Fishmarket arrange to collect from different Fishmarkets to deliver to factories. Fish from longlines and handlines are always of very good quality, while fish from trawlers are not of such high quality at all times. This may be due to trawling, which tends to amass fish in a net resulting in pressure and cuts. Usually, the reduction of trawling time to around two hours produces better catches.</p>
<p>Tue 7<sup>th</sup> June 2011.  Reykjavík, Iceland.</p>	<p>Icelandic Coast Guard</p>	<p>Dagmar Sigurðardóttir's.  Layer, US Coast Guard Iceland  Assessment Team (GT):  - Vito Ciccia Romito,  - Gisli Svan Einarsson</p>	<p>In recent years, the work of the Icelandic Coast Guard (ICG) has undergone considerable changes. These changes have been due to economic factors, technological advances as well as altered conditions in the field. In addition to law enforcement issues and search and rescue (SAR), the ICG's main role consists of the general protection and conservation of natural resources in the broadest sense of the term. This includes pollution monitoring, environmental disasters, maritime safety and illegal fishing. Search and rescue activities, however, remain at the core of the ICG's work. Considerable effort has been invested in strengthening ICG capabilities in this area as much as circumstances have allowed. New equipment featuring the latest improvements in technology has already brought significant changes.  Further topics discussed. The Coast Guard takes care of closing fishing areas after advice from MRI, usually when they sample more than 10% juvenile fish in catches. They inspect mesh size, fishing logbooks, and measure fish in fishing vessels. They mainly operate as fishing surveillance and rescue. They use satellites for rescue and surveillance as all fishing vessels have satellite apparatus to give position to the Coast Guard, as well as for monitoring pollution (mainly oil spills). When the ICG fine captains for violations, they bring the vessels back to the harbour to issue fines or other penalties. The Coast Guard samples the catch for juveniles and reports this information to MRI. They usually sample 200 random fish on board of the vessels they board. In the summer there are more boardings on small vessels. Small boat captains sometimes tend to get fined because they don't know regulations. Small vessel owners have to report their activities daily. They have a maximum of 15 days to report their activities or they lose their license. The Coast Guard calls captains when their permits have expired. The ICG can board foreign vessels as they too have satellite receivers. These foreign vessels have to communicate entry, start fishing time and</p>

			exit from the Icelandic EEZ to allow for control of catch. The CG can confiscate cargo and fishing gear.
Tue 7 <sup>th</sup> June 2011.  Reykjavík, Iceland.	Ministry of Fisheries	Brynhildur Benediktsdóttir, SLR  Assessment Team (GT): - Vito Ciccia Romito, - Gisli Svan Einarsson	<p>The Ministry of Industries and Innovation in Iceland was founded in 2007. The Ministry is responsible for the following:</p> <ul style="list-style-type: none"> <li>• Fisheries;</li> <li>• 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;</li> <li>• Research and control of production and import of fisheries products;</li> <li>• Mariculture of marine species;</li> <li>• Supporting the research, development and innovation in the fisheries sector.</li> </ul> <p>The management of the Ministry of Fisheries is in the hands of the Permanent secretary Mr. Sigurgeir Thorgeirsson. Mr. Johann Gudmundsson coordinates the work within the Ministry in international affairs as regards regional fisheries agreements and supervises work in the field of fisheries management. Mrs. Arndis Steinhorsdottir is in charge of the economic office of the Ministry. Other items discussed. There is a process in course for the creation of a management plan for haddock and saithe. The cod management plan was formulated in 2-3 years. The MRI is working on the preparations of a harvest strategy for haddock, however this is difficult, as recruitment fluctuates greatly. At present the minister has asked for a general framework for creating management plans for the Icelandic fisheries.</p>
Tue 7 <sup>th</sup> June 2011, Reykjavík, Iceland.	Federation of Small Boat Owners	Örn Pálsson, Director  Assessment Team (GT): - Vito Ciccia Romito,	<p>Founded in December 5th 1985, the National Association of Small Boat Owners (National Association of Small Boat Owners, LS) is an association of 15 regional associations and associations of small boat owners in Iceland. Their objectives are to safeguard the collective interests of small boat owners in all fields, be their official representative, and lead to progress in fisheries, product advancement, safety, insurance related questions, and other issues concerning small boat owners.</p> <p>Other points discussed. 90% of SBO (Small Boat Organization) landings are from long-line</p>

		<p>- Gisli Svan Einarsson</p>	<p>gear, and haddock is a very important species. SBO fish 25% of the total haddock and 40% of the total catfish. Haddock is mainly caught in long-line, the same is for catfish. There is a bycatch of ling and blue ling. 1000 small boats around Iceland. 120 of them are in the quota system. 500-600 of them in the small quota system. In the new system there are 4 handline only allowed per boat. The fishing License is valid for 4 years and you can only fish in the area you are licensed for. Small boats fish mainly in the summer, largely because weather is more clement. SBO have GPS, electronic and paper logbooks. 60% of landings are sold to fish market and 40% directly to plants if they are happy with the price. Bycatch of birds is not an issue, some boats use flags and noise. Seals are not an issue either. Small boats write on logbook if something unusual happens (i.e. birds, marine mammals). No apparent issues with habitat interaction of fishing gear. No conflict for fishing space/area between small and bigger vessels. Quotas: cod 20% TAC but catch 21%. Haddock 15% TAC but catch 25% (long-line and handline using quota transfer from large boat owners).</p>
<p>Wed 8<sup>th</sup> June 2011, Reykjavík, Iceland.</p>	<p>Directorate of Fisheries</p>	<p>Eyþór Björnsson's. Director of Fisheries at Fiskistofa</p> <p>Assessment Team (GT):</p> <ul style="list-style-type: none"> <li>- Vito Ciccia Romito,</li> <li>- Gisli Svan Einarsson</li> </ul>	<p>The Directorate of Fisheries is an Icelandic Government institution under the ultimate responsibility of the Minister of Fisheries. The Directorate is responsible for implementing government policy on fisheries management and handling of seafood products. The Directorate enforces laws and regulations regarding fisheries management, monitoring of fishing activities and imposition of penalties for illegal catches. Collection, processing and publication of fisheries data is also the responsibility of the Directorate of Fisheries in collaboration with Statistics Iceland.</p> <p>Further topics discussed. Electronic logbook data must be submitted monthly (scientific purposes). Port of landing: Official certified person registers the data submitted, offering real time information, this serves to compare the harbour data with the logbook data.</p> <p>Fishmarket and processing plants must send the reports of catches by weight and species.</p> <p>Catch data is public. MRI uses these for scientific purposes. Statistics are carried out at the directorate. Cooperation with the Coast Guard for control. Whenever vessels lose their license, the directorate will communicate this to the CG. Directorate inspectors measure 600,000 fish a year. Inspectors of the directorate have to inspect catches and logbooks. The</p>

			Coast Guard job is more general (i.e. licences, mesh size etc...).
Wed 8 <sup>th</sup> June 2011	Matís	<p>Sveinn Margeirsson, Director.</p> <p>Assessment Team (GT):</p> <ul style="list-style-type: none"> <li>- Vito Ciccia Romito,</li> <li>- Gisli Svan Einarsson</li> </ul>	<p>Matis Ltd. is an Icelandic Food and Biotech R&amp;D institute founded in 2007 following the merger of three former public food research institutes: The Icelandic Fisheries Laboratories (IFL), an independent food research institute; MATRA, a joint venture of IceTec and the Agricultural Research Institute and the research division of the Environment and Food Agency. Matis is working in research and development for the food industry, fisheries and aquaculture. Matis focuses on innovation in food and biotechnology, various services in the food industry in Iceland and abroad and to increase safety and quality of food products.</p> <p>Matis is an independent research institute with 100 % governmental ownership. The total turnover in 2010 was about \$USD 10.4 million working capital, of which 38% comes from from the Icelandic Government. Matis is located in 9 cities or towns around Iceland. Matis has about 100 employees and about 21 have a Ph.D degree. Matis employees are many of Iceland's most competent scientists in the field of food technology, food research and biotechnology; food scientists, chemists, biologists, engineers and fisheries scientists. Several of Matis employees have a part-time position at universities in Iceland and about 14 PhD students and many M.Sc students are doing their research at Matis and working on their theses in cooperation with the industry in Iceland and abroad.</p> <p>Other topics discussed. Once MRI ends with stock assessment research in MATIS starts. They work on best utilization of the catch in terms of physiochemical aspects (i.e. quality and consistency of the flesh), deal with education on handling of the catch both on board fishing vessels and at processing. They also deal with logistics of post catch transport of fish and genetics of fish stocks. They lead the EcoFishMan project from the European Union. They work heavily with companies and the data from their electronic logbook to establish what fishing grounds and methods match with the best quality of fish. For example there are differences between cod in the south and the West due to genetics, nutrition and the catch method. They also do marker PCBs (pollution) and research of chemical agents in fish, of which concentration are extremely low in Icelandic waters compared to European waters.</p>
Thursday 9 <sup>th</sup> June 2011	Marine Research Institute	Johann Sigurjonsson, Director.	The Marine Research Institute (MRI), established in 1965, is a government institute under the auspices of the Ministry of Fisheries. MRI conducts various marine and environmental research projects and provides the Ministry with scientific advice based on its. The institute has around 170 employees, 2 research vessels, 5 branches around Iceland and

		<p>Assessment Team (GT):</p> <ul style="list-style-type: none"> <li>- Vito Ciccia Romito,</li> <li>- Gisli Svan Einarsson</li> </ul>	<p>a mariculture laboratory.</p> <p>The three main areas of activities of the MRI are the following:</p> <ul style="list-style-type: none"> <li>• to conduct research on the marine environment around Iceland and its living resources,</li> <li>• to provide advice to the government on catch levels and conservation measures,</li> <li>• to inform the government, the fishery sector and the public about the sea and its resources.</li> </ul> <p>Other topics discussed. Haddock harvest control rule is difficult because there is high recruitment variability. Nonetheless reference points are defined. Haddock HCR has not gone formally through ICES. 2003 brought a big year class to the haddock biomass. SSB is nonetheless bound to decrease. The 2011 TAC for haddock is set as 37.000 t equalling F 0.3. There is research being done between trawled and non-trawled bottoms. Deep sea coral are protected in the Central regions. There are permanent closed areas for redfish in the West of Iceland. Bottom trawls are forbidden in 28% of coastal shelf.</p>
<p>Thursday 9<sup>th</sup> June 2011</p>	<p>Trackwell</p>	<p>Kolbeinn Gunnarsson, Director of Sales and Service</p> <p>Assessment Team (GT):</p> <ul style="list-style-type: none"> <li>- Vito Ciccia Romito,</li> <li>- Gisli Svan Einarsson</li> </ul>	<p>TrackWell has a proven track record in developing mission-critical systems for telecom operators, governmental institutions and other organizations. An innovative team of professionals with vast experience has established the company as a leading provider of integrated solutions for Mobile Resource Management (MRM).</p> <p>TrackWell offers Mobile Resource Management (MRM) software as a service for enterprises. TrackWell MRM provides companies with the tools to manage their resources, employees, vehicles, vessels and other mobile assets including functionality such as time, task, and fleet management.</p> <p>Other topics. Since 1997, TrackWell has been developing Vessel Monitoring Systems (VMS) and later Electronic Reporting System (ERS) solutions in close cooperation with Fisheries Authorities and Coastguard. Electronic Reporting System TrackWell ERS is a catch information system for fishing vessels and companies, fish markets and fishing authorities. TrackWell ERS gives captains and fleet managers a valuable tool to keep track of catch and product registrations and generates mandatory reports to fishing authorities. Product information from the vessels can be transferred to fish auction markets or other</p>

			commercial organizations.
Friday 10 <sup>th</sup> June 2011	Vísir Grindavík	<p>Pétur H. Pálsson, Managing Director of Vísir hf Kristín E. Pálsdóttir</p> <p>Assessment Team (GT):</p> <ul style="list-style-type: none"> <li>- Vito Ciccia Romito,</li> <li>- Gisli Svan Einarsson</li> </ul>	<p>Vísir hf., is a fishing, processing and sales company. It has four work sites around the country; in Grindavík, Thingeyri, Húsavík and Djúpivogur. The Headquarters are in Grindavík.</p> <p>Other topics discussed. VISIR opened since 1965 and is 100% family owned. Five longliners, 4 processing plants, 300 employees, 100 at sea. The logbook system started for VISIR as a tool for management, then used for client traceability. These logbooks record location of the vessel, number of hooks, weather, temperature etc. Trackwell systems are used heavily.</p> <p>Bird bycatch does not seem an issue for VISIR longliners. They shot out lines in the dark and use tory lines. Sea lions bycatch is not an issue. Blue whales are known to pick halibut from longlines. There is no harm to blue whales and sea lions. Longlines are usually soaked for 22 hours.</p>

## 5.2 Full Assessment Meetings

On-site visits for the full assessment took place in November 2012. These were additional visits to the initial consultation meetings reported in the previous section. There are two types of on-site assessment activities; meetings with fishery management organizations to discuss various aspects of the assessment and witnessed assessment, which takes the form of witnessing specific management processes and functions, such as publically accessible Council meetings where possible.

The schedule of on-site activities is provided in Table 3 below with a summary of the activity, meeting and discussion. Meetings were used to document information that either 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 Mike Platt and Gisli Svann Einarsson.



### Summary of Site Visits for Full Assessment and Verification Activities

**Table 3.** Summary of onsite meetings for Icelandic Redfish, November 2012

Date	Organization	Summary of Meeting
<p>Mon 26<sup>th</sup> November 16.00</p>	<p>Directorate of Fisheries  Dalshrauni 1 220 Hafnarfjordur  Eypór Björnsson Director of Fisheries</p>	<p>Discussions involved; logbook information transfer, review, confirmation and management via the inspector programme both on board a vessel and on landing.</p> <p>The inspector programme was discussed at length and the Directorate confirmed that they did use a risk rating system to ascertain which vessels would receive a visit, either upon landing or to go and assess an entire fishing trip. The inspections of landings are unannounced and the inspectors will check to ensure that the officially weighed catch is completely accurate to that documented in the vessel's logbook. All this catch data is used to manage the vessels quota usage.</p> <p>The Golden redfish is targeted predominately by the freezer trawler fleet and the Directorate will inspect at sea up to 20% of the fleet twice per year. The trips usually last 30 days and a Directorate inspector will be on board the entire time. If a vessel is selected to be visited the skipper is informed prior to the trip and they cannot refuse access of the inspector.</p> <p>In addition, the Directorate do collaborate with the Icelandic Coast Guard and they do board vessels at sea to conduct on the spot unannounced checks to review the log book accuracy and catch separation by species compliance.</p> <p>In 2011 inspectors visited a total of 243 different boats</p> <p>In 2010 inspectors visited a total of 261 different boats</p> <p>The Directorate informed that the Golden Red fish and all species are landed individually and are officially weighed by a specifically trained operative, on calibrated scales, at the point of landing. Every boat's landings are then placed for all to view on the Directorate website.</p> <p>The Directorate review these catch statistics and the areas the vessels were fishing to ensure that consistent data is</p>

		<p>being recorded. E.G. if a vessel reports no mixed fish in a catch and another vessel does and they have been fishing in the same area, this will raise suspicion of the first vessel and will prioritise it for more scrutiny. The Directorate confirmed that all species have commercial value and must be landed by law.</p> <p>Discussion took place on the ITQ system and the fact that if a vessel lands a species for which it has no quota it can still land the fish, as long as it gets quota for the species within 3 days of the landing. If this does not happen the vessel will lose its licence.</p> <p>Further information on what the on board inspectors also review was discussed and this include the requirement to measure fish , which if it transpired had too many small fish this data would be transmitted directly to the MRI to decide if this data would warrant the fishing ground to be closed.</p> <p>Currently no foreign vessels have a licence to catch Golden Redfish within the Icelandic waters. Currently no Icelandic vessels are landing into foreign ports.</p>
Tues 27 <sup>th</sup> November 10.00	<p>Fisheries Association of Iceland</p> <p>Kristján Þórinsson, Vice-chair</p> <p>Finnur Garðars-son Project manager</p>	<p>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.</p> <p>Details of the proposed HCR for Golden Red Fish and how it is managed as a separate species from the Deep Sea Red Fish were explained.</p>
Tues 27 <sup>th</sup> November 13.00-15.00	<p>Marine Research Institute</p> <p>Jóhann Sigurjónsson, Director General</p>	<p>The meeting focused upon the role of the MRI in Icelandic Golden Red Fish fishery science: Stock survey and assessment; methods; species biology, stock status, application of precautionary approach; fishery dependent information/observation; scientific advice to management, fishery ecosystem interactions and concerns.</p> <p>Arising out of discussion, a number of questions/clarifications were also noted by the team. The MRI confirmed and provided references for information available in current publications from MRIs website, and through follow-up</p>

	<p>Porsteinn Sigurðsson Department Manager</p> <p>Kristján Kristinsson Redfish Specialist</p>	<p>requests to the Directorate which may be required.</p> <p>Regarding the HCR the MRI did state that this fishery had additional countries that were key stakeholder and will need to be consulted prior to this plan being submitted to ICES for evaluation. The MRI and the Ministry have written to Greenland and Faroes in September 2012 to give them the opportunity to discuss and participate in the formulation of the HCR. The MRI has estimated that their combined landing is very low circa 2500 t out of the 45,000 t approved TAC. As yet, no response has been forthcoming from these countries and the plan will only be submitted once they have their agreement. After this it will then go to ICES – it could take 6 months for ICES to evaluate it once they receive it.</p> <p>The last ICES benchmark was discussed and ICES has initially rejected the outcome of the Gadget Model -reason there is data missing and it is believed that the west coast stock is providing more juveniles than originally thought. A proposal to look at this area has been submitted and will, if approved, commence in 2013. The Gadget model in principle has been accepted by ICES, but Iceland will produce its own management plan for the stock which it will then get independently evaluated by ICES, but it will take advice on this plan if it is forthcoming from the ICES evaluations.</p> <p>In the 1990s juvenile golden redfish was captured in the shrimp fishery, this led to technical measures which were the inclusion of a sorting grid on the shrimp net and the fact that it had to be fitted as a mandatory requirement in certain areas where the instances of juvenile golden redfish was at its highest. This was the start of better research into the golden redfish and led to boats keeping the redfish species separate on landing and to development of individual quotas for each redfish species to be incorporated in 2009/10.</p> <p>The MRI confirmed that no research into gear selectivity for the golden redfish has been conducted as they believe it is a clean fishery.</p> <p>Discussion on the ecosystem management was held and the MRI confirmed that the fishermen themselves report if they catch coral from previously unmarked locations. If this occurs the MRI will consult with the industry and set up an immediate closure area with buffer zones to protect the ecosystem. The social impacts of all the closures are discussed with all interested stakeholder/ communities and if possible compromises can be made to the size of the buffer zones around coral reefs.</p>
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<p>Wed 28<sup>th</sup> November 10.00</p>	<p>Ministry of Industries and Innovation</p> <p>Jóhann Guðmundsson Director Department of Resource Management and Department of International Affairs</p> <p>Brynhildur Benediktsdottir, Adviser/Dep. of International Affairs</p> <p>Hrefna Karlsdóttir Special Adviser</p>	<p>Discussions with the Ministry of Industries and Innovation focused on the availability of the documented Fishery Management Plan for a number of fisheries including golden redfish. It was explained that the management plans are in the final stages, there is still not a clear timeline. Looks likely that the plans will be finalised in April 2013. The HRC plan for Golden Redfish was discussed and the fact that Iceland has not heard back from Greenland or the Faroes will delay the process, it is hoped that some communication from these countries will be back prior to the end of 2012. Once received the plan will be submitted to ICES for review. At this stage Iceland do not envisage agreement on the % allocation to each country as the landing for Greenland and Faroes total only 2500 t so this tonnage will just be taken off the 45,000 t aggregate leaving the Icelandic industry a quota of 42500 t.</p> <p>The amount of non-commercial species that can be discarded at sea was discussed and the Ministry have confirmed that the law on this discarding practice has been tightened and it now a requirement to land everything that is captured. The law is 810-26 from Aug 2011. The management – stakeholder consultation process was described. This ensures that social aspects of any management decision are discussed and considered. This is covered by a law of Governance.</p> <p>The biggest social impact study was conducted after the introduction of the ITQs in the 1990s as this resulted in a change of attitude and culture. University of Reykjavik are also looking at the industry to see how this affected communities around Iceland. In addition, other factors that have also been considered in the fishery management process a) how the technology in the industry has developed and the changes this will bring and b) the biological impacts of species coming into the Icelandic EEZ. The ministry did discuss that special quota arrangements totalling around 5% for coastal areas have been put in place. The longliners have been given support as well, but in the end all these measures must still ensure that all fish species captured are still done so in a commercially viable way.</p>

## 6. Assessment Outcome

The following sections provide a summary of the evidence that formed the rationales to the assessment outcome for each of the three main Sections of the Responsible Fisheries Management Specification used to evaluate fishery management conformity to the FAO criteria. Section 7 provides the outcome of the more detailed analysis of evidence and conformance of the applicant fishery to each individual clause of the Specification.

### Section 1: Fisheries Management

#### **The Fisheries Management System (clauses 1.1.1 – 1.1.4)**

There is a structured fisheries management system adopted within Iceland for the management of ground fish species such as golden redfish. There is a principal Act (*last amendment No 116/2006*) 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 utilisation of the golden redfish 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 TAC and as from 2014/15 fishery will be derived from the implementation of a new Harvest Control Rule adopted by the Ministry within the March 2014 Fishery Management Plan. 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 Coast Guard also plays a major role in ensuring catches are recorded accurately at sea and reported according to the location.

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 undersized catches in landings. Iceland prohibits dynamiting, poisoning and other comparable destructive fishing practices.

### **The Fisheries Management Plan (clauses 1.1.5-1.1.6)**

A formal Fisheries Management Plan has been established for Icelandic golden redfish. The Plan is documented and available on the Icelandic Directorate of Fisheries website. The fisheries management plan details all the relevant information required by this assessment. The plan for Icelandic golden redfish details a long-term harvesting objective. The implied medium term target of the management plan (5 years) is to maintain SSB above 220,000 t. The long term target is stated as: “to maintain the exploitation rate at the rate which is consistent with the precautionary approach and that generates maximum sustainable yield (MSY)”. ICES have evaluated the plan for consistency with achieving optimum utilisation, and with the precautionary approach to fisheries management. The plan also details the limit reference points for precautionary management, and specifies the HCR. This HCR has been evaluated by ICES and found to be consistent with the precautionary approach.<sup>16</sup>

The fisheries management plan has been developed with due consideration to managing the input, output controls etc. 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.

The Fisheries Management Plan for Icelandic golden redfish 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 (clauses 1.2.1-1.2.6)**

The Marine Research Institute of Iceland, reporting directly to the Ministry of Industries and Innovation is the principle research institute that collects and compiles the necessary data and

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<sup>16</sup> Fisheries Management Plan- Golden Redfish  
(<http://eng.atvinnuvegaraduneyti.is/publications/news/nr/8133>)

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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.

Based on the evidence presented and evaluated during on site consultation and the specifications in the ICES NWWG Quality Handbook (ICES 2010b) where current stock assessment methods are documented, the requirements of clause 1.2.3 are considered met, based on the measures that exist within the Icelandic fisheries management system framework. 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 such that there is effective data collection/compilation for successful execution of stock assessment for stock management purposes.

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 (this was confirmed from a number of sources during the on-site consultation phase). Log book data, transmitted electronically and through manual means is continually supplied and provides for a major component of fishery dependent data used by MRI. MRI also undertake field sampling onboard vessels and supported through Directorate observer programming which provides further points of information and data exchange.

The most prominent International collaboration for Icelandic golden redfish 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 interpretation always 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.

#### **Estimates for discarding (1.2.4)**

The Icelandic Management System is seen as a model for developing a proactive approach to fishery reporting compliance as it has a zero discard policy and extensive measures are in place to account for fishing mortality and catches of redfish in other fisheries.

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### **The Precautionary Approach (clauses 1.1.6.4, 1.3.1)**

The Precautionary approach is implemented through the harvest strategy for golden redfish which the Ministry uses to set annual TACs. An ICES review of the harvest strategy concluded that it was consistent with the ICES precautionary approach<sup>17</sup>.

The Icelandic golden redfish stock is not considered to be overfished to a level causing recruitment overfishing. Nor is it considered that overfishing is occurring. Stock biomass is estimated to have been above the target and limit reference points ( $U_{pa}$ ,  $U_{lim}$ ) since around 2010 (ICES Advice June 2013). The precautionary approach is followed through the recent adoption of the HCR. 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 maximum sustainable yield.

### **Management Targets and Limits (clauses 1.3.1-1.3.2)**

Precautionary reference points, based on the maximum observed spring survey index, have been established and are used as the basis for ICES management advice. The implied medium term target of the management plan is to maintain SSB above 220,000 t. The long term target is stated as: “to maintain the exploitation rate at the rate which is consistent with the precautionary approach and that generates maximum sustainable yield (MSY)”.

### **External scientific review (clauses 1.4.1-1.4.2)**

ICES have developed routines for in-depth review of assessment methods and data that go into the assessment (benchmark assessments). ICES recommend scientific review 5 years after implementation of the management plan. Other suggestions were made regarding situations where SSB were to fall well below  $B_{lim}$  (160,000 t). Historically, the spawning stock biomass has been above the  $B_{trigger}$  (220,000 t) since 2007 and the strategy is based on a low risk of SSB falling below  $B_{lim}$ . The review initiative may come from ICES itself, from the assessment Working Group responsible for the stock, or from managers. There is a formalized system of reviewing ICES reports and requests to examine the assessment reports undertaken by the MRI of Iceland.

### **Advice and Decisions on TAC (1.5.1-1.5.10)**

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. The annual TAC is set by the Minister of Industries and Innovation based on advice provided by ICES and the MRI (and hence factoring in the entire distribution as assessed by those bodies). The HCR is recently introduced; however in other Icelandic fisheries, the Minister decides on the TAC of the stock for each fishing year (Sept-Aug) in accordance to law, based on the HCR and scientific advice.

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<sup>17</sup> ICES Advice 2014, Book 2 Iceland, Faroe Islands and Greenland request to ICES on evaluation of a proposed long-term management plan and harvest control rule for golden redfish (*Sebastes marinus*). (February 2014).



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## Section 2: Compliance and Monitoring

### **Implementation, compliance, monitoring, surveillance and control (2.1)**

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 Coast Guard.

### **Concordance between actual and allowable catch (2.2)**

Evidence available demonstrated a high level of compliance between TAC and actual catch of golden redfish 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.

### **Monitoring , Control and Penalties (2.3.2-2.3.5)**

Monitoring and control of fishing vessel activities by the Icelandic Coast Guard 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 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 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 fish in poor health. 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.

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 vessel's catch quota and quota is regularly updated and made public and accessible to all on the official web-site.

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## Section 3: Ecosystems Considerations

### **Guiding Principle (3.1)**

Iceland's fisheries management organizations assess the impacts of environmental factors on target stocks and species belonging to the same ecosystem or associated with or dependent upon the target stocks, and assess the relationship among the populations in the ecosystem. The MRI is the principle marine research agency that monitors and researches the marine environment including the ecosystem components. Direct and indirect impacts of fisheries are assessed and effectively addressed through conservation measures.

### **Specific Criteria (3.2)**

There is information available on the legal specification of fishing gear for golden redfish for each fishing method. Highly selective gear may result in lower impact on certain aspects of the ecosystem such as lower incidence of by-catch. Commonly caught species such as by-catch in golden redfish 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. Icelandic fishery law prohibits the discarding of all commercial stocks.

Long-liners are reported to use protective devices to shield baited hooks as gears are shot in order to prevent encounters with seabirds. By-catch avoidance methods are employed on a voluntary basis although no data was available to determine the absolute use and effectiveness in Iceland. Results of research in Norway have demonstrated effective reduction in by-catch of seabirds. Reporting of avian and mammalian bycatch in the Icelandic fishery is mandatory ([www.fisheries.is](http://www.fisheries.is)). All fishing vessels are obliged to report catch and by-catch in log books. The observation scheme carried out by the Directorate covers 20% of the larger trawler fleet and an objective of one observer visit per vessel per year.

### **Habitat Considerations (3.2.3)**

There is knowledge of the essential habitats for the "stock under consideration" and potential fishery impacts on them. Impacts on essential habitats and on habitats that are highly vulnerable to damage by the fishing gear involved are avoided, minimized or mitigated. In assessing fishery impacts, the full spatial range of the relevant habitat is considered. Area closures are a commonly employed management tool to protect spawning grounds, essential fish habitat, stony coral areas and thermal vents. 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.

## 6.1 Conformity Statement

**The assessment team has determined that the Icelandic golden redfish fishery (within 200 mile EEZ fished by all Icelandic registered vessels using all gear types directly and indirectly under the management of the Icelandic Ministry of Industries and Innovation) is in conformance with the Icelandic Responsible Fisheries Management Specification.**

A list of items which were deemed important by the assessment team for future surveillance and review activities was noted (refer to the table below). The assessment team was content that non conformities did not arise with respect to these items, as management organizations were both aware and were actively pursuing improvements within the management framework and system in this regard. If the application for certification is successful, the assessment team recommends that these items are included as part of the surveillance assessments on the fishery for continued compliance to the Icelandic Responsible Fisheries Management Certification.

## 6.2 Items recommended as important for future Surveillance Audits

To maintain certification, surveillance assessments are carried out on an annual basis with a full re-assessment taking place for the fifth anniversary of certification. The surveillance assessment will be carried out as outlined for Global Trust Certification quality procedure.

Clause	Clause	Summary of Surveillance Actions Proposed
1.1.2	<p><b>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.</b></p>	<p>Ensure that TAC for 2014-15 fishery is set in line with HCR and that catches are maintained consistent with the TAC.</p>

## 7. Fishery Assessment Evidence

### Section 1: Fishery Management

#### 1.1 Fisheries Management System and Plan

<b>CLAUSE:</b> 1.1.1 A structured fisheries management system shall be adopted and implemented.			
<b>EVIDENCE RATING:</b>	<b>High</b> <input checked="" type="checkbox"/>	<b>Medium</b> <input type="checkbox"/>	<b>Low</b> <input type="checkbox"/>
<p><b>SUMMARY:</b>                  There is a structured fisheries management system adopted within Iceland for the management of ground fish species such as golden redfish. There is a principal Act (<i>last amended No 116/2006</i>) 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 golden redfish 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.</p>			
<p><b>EVIDENCE</b>                  The Management System 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: 1) the Ministry for Industries and Innovation with ultimate responsibility through the Icelandic Fisheries Minister; 2) 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; and 3) 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.</p> <p>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 inspector program. Inspectors 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.</p>			

Iceland has developed a Marine Policy, which identified 5 Ministries with responsibilities for the Marine; Fisheries, Environment, Foreign Affairs, Industry and Justice. Principally, the Ministry of Industries and Innovation is responsible for the management of fisheries. The Marine Policy acknowledges and has been developed in accordance with key 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 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 fishing season is set from Sept 1 to August 31 for most species, including golden redfish.

The Icelandic Fisheries Management System includes International Agreements (although not required for the Icelandic golden redfish stock) including participation in North East Atlantic Fisheries Commission and Northwest Atlantic Fisheries Organisation.

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.<sup>18</sup>

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.

### **Financing for the System**

The Icelandic fisheries management program is based on a cost recovery approach to financing based on resource rent tax. The owners of vessels holding harvesting rights are required to pay a fishing fee. The amount of the fee for each fishing year is based on the earnings of the fishing sector as well as the allocation of the catch permit. Revenue from the fishing fee accrues to the State Treasury. (The fishing fee is calculated by subtracting the total cost of oil, labour costs and other operating costs from the total value of the catch. The contribution margin is multiplied by 9.5% and that figure is divided by the number of cod equivalents that are the basis of the catch value).

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<sup>18</sup> According to law no 57/1997 all catch has to be landed and provisions on discard are also in regulation no 601/2003.

<p><b>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.</b></p>			
<p><b>EVIDENCE RATING:</b></p>	<p><b>High</b> <input checked="" type="checkbox"/></p>	<p><b>Medium</b> <input type="checkbox"/></p>	<p><b>Low</b> <input type="checkbox"/></p>
<p><b>SUMMARY:</b> The annual catch previously has been limited by TAC set by the Ministry and following scientific advice. From the 2014/15 fishery onwards, the annual catch will be set 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 (refer to table below). 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 the location.</p>			
<p><b>EVIDENCE</b></p> <p>The Management system is based on the Individual Transfer Quota System (ITQ). 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 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 31<sup>st</sup> of the following year.</p> <p>The Directorate is principally responsible for the physical recording of catch and registering this information against the allocated ITQ per vessel for each species, including for golden redfish. 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 do not report via the electronic logbook, principally since they 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. Logbook information must be reported to the Directorate at least on a monthly basis.</p> <p>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 above 6GRT. Redfish is caught virtually entirely by large trawlers that operate outside 12 nautical miles, in separate areas from coastal fisheries. N.B The final weighing of catch is the value that is used in the central database.</p> <p>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.</p> <p><b>How the system operates:</b></p>			

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 stakeholder visits, a meeting with Trackwell, who are contracted to manage the technical operation of the IT system, was held. The system was described including 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 databases of those involved in fish trading. If discrepancy materializes 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 deemed appropriate.

Should a fishing vessel catch less than 50% of its total catch quota 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%. There is a separate small boat quota (<15GT) only allowed to fish using hand-lines or long-lines.

The hand liners did fish 86.825 kg of redfish in the year 2013. That is both the boats from the “small boat system” and the costal fisheries. The boats in the “small boat system” are allowed to fish in the costal fisheries, but not at the same time. Quota allocation for the small boats is based on experience and what they have bought, the same as in the “Big system”. But the handliners in the small system only get Quota in: Cod, Haddock, Saithe, Golden redfish, Ling, Catfish and Tusk.<sup>19</sup>

The system contains many other rules. There is a legal obligation for all vessels landings 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 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. For 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 Directorates web site

<sup>19</sup> <http://www.fiskistofa.is/umfiskistofu/frettir/nr/951>

allows access to third parties to view this information. Normally, the information presented is updated 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 figures are finally registered. The system can be described as highly effective at providing near real time situation of the landed proportion of the 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 where quota is not transferred to the vessel.

Vessels can rent golden redfish quota from other vessels, can trade golden redfish for other species but with the exception that vessels cannot convert any species for cod quota. There are built in tolerances within the overall system to allow fishing above quota to be landed and declared (rather than discarded).

However, 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.

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 1<sup>st</sup> September for a 12 month period.



**Table 4.** ICES advice, management, and landings from the June 2013 ICES advice for Golden redfish (*Sebastes norvegicus*) (and *S. mentella*) in Subareas V, VI, XII, and XIV.

Year	ICES Advice	Predicted catch corresp. to advice	Iceland TAC <sup>1,6</sup>	Greenland TAC <sup>7</sup>	<i>S. marinus</i> ICES landings
1987	No increase in F	83	95		77
1988	No increase in F	84	85		90
1989	TAC <sup>1</sup>	117 <sup>1</sup>	77		57
1990	TAC <sup>1</sup>	116 <sup>1</sup>	80		67
1991	Precautionary TAC	77 (117 <sup>1</sup> )	55 <sup>5</sup>		56
1992	Precautionary TAC	76 (116 <sup>1</sup> )	90		56
1993	Precautionary TAC <sup>1</sup>	120 <sup>1</sup>	104		50
1994	Precautionary TAC, if required	100 <sup>1</sup>	90		43
1995	TAC	90 <sup>1</sup>	77		45
1996	TAC for Division Va (28); precautionary TAC for Division Vb and Subarea XIV (4)	32 <sup>2</sup>	65		37
1997	Effort 75% of 1995 value	32 <sup>2</sup>	65		40
1998	Effort reduced in steps of 25% from the 1995 level	37.2 <sup>2</sup>	65		39
1999	Effort not increased compared to 1997	35 <sup>2</sup>	65		42
2000	Catch not increased compared to 1998	35 <sup>2</sup>	60		44
2001	Effort not increased compared to 1999	33 <sup>2,3</sup>	57		37
2002	25% reduction in effort	29 <sup>4</sup>	65		51
2003	25% reduction in effort(2001)	31 <sup>4</sup>	60		39
2004	25% reduction in effort(2002)	37.4 <sup>4</sup>	57		33.4
2005	Maintain fishable biomass above U <sub>pa</sub>	37 <sup>4</sup>	57		45.4
2006	Maintain fishable biomass above U <sub>pa</sub>	37 <sup>4</sup>	57		42.2
2007	Maintain fishable biomass above U <sub>pa</sub>	37 <sup>4</sup>	57	5	39.1
2008	Maintain fishable biomass above U <sub>pa</sub>	37 <sup>4</sup>	57	1	46.3
2009	Maintain fishable biomass above U <sub>pa</sub>	< 30	50		39.2
2010	Maintain fishable biomass above U <sub>pa</sub>	< 30	50	6	38.7
2011	Same advice as last year	< 30	37.5	8	46.0
2012	Maintain catches	< 40	40	8	45.3
2013	Maintain catches	< 40	45	8	
2014	20% increase in catches (rel. 2010–2012)	<52			

Weights in thousand tonnes.

<sup>1</sup> Deep-sea *S. mentella* and *S. marinus* combined.

<sup>2</sup> *S. marinus* only.

<sup>3</sup> In Division Va only.

<sup>4</sup> Both Divisions Va and Vb and Subarea XIV.

<sup>5</sup> Year ending 31 August.

<sup>6</sup> From 1992 onwards: Quota year September–August.

<sup>7</sup> Demersal redfish (*Sebastes marinus* and *S. mentella*).

<p><b>CLAUSE: 1.1.3</b>  <b>Appropriate measures for the conservation and sustainable use of the “stock under consideration” shall be adopted and effectively implemented by the competent authorities.</b></p>			
<p><b>EVIDENCE RATING:</b></p>	<p><b>High</b> <input checked="" type="checkbox"/></p>	<p><b>Medium</b> <input type="checkbox"/></p>	<p><b>Low</b> <input type="checkbox"/></p>
<p><b>SUMMARY:</b>  <b>Management measures can be divided into the following categories:</b></p> <ul style="list-style-type: none"> <li>• <b>Total Allowable Catch based on scientific advice and Individual vessel quotas</b></li> <li>• <b>Fishery access is limited by license per vessel and allocated via an ITQ system for each vessel</b></li> <li>• <b>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).</b></li> </ul> <p><b>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 undersized catches in landings.</b></p>			
<p><b>EVIDENCE:</b>  <b>Total Allowable Catch based on scientific advice and Individual vessel quotas:</b></p> <p>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.</p> <p>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 Industries and Innovation and is the main research body in Iceland conducting marine and fisheries research.</p> <p>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.</p> <p>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.</p> <p>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</p>			

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 2010 Report for 2009 fishing season lists 1,584 vessels and smaller boats. 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 1996 states that 'No one may pursue commercial fishing in Icelandic waters without having a general fishing permit'. General fishing permits are of two types, 1) a general fishing permit with a catch quota and 2) 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.

### **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. Fishing with trawls is prohibited in large areas near the coast which serve as spawning and nursery areas. Sorting grids in fishing gear are obligatory in certain fisheries to prevent catches of juvenile fish. 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 that form the basis to the implementation of Policy and provide powers of enforcement to the Directorate. These are published each year in a booklet made available to all registered vessels.

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

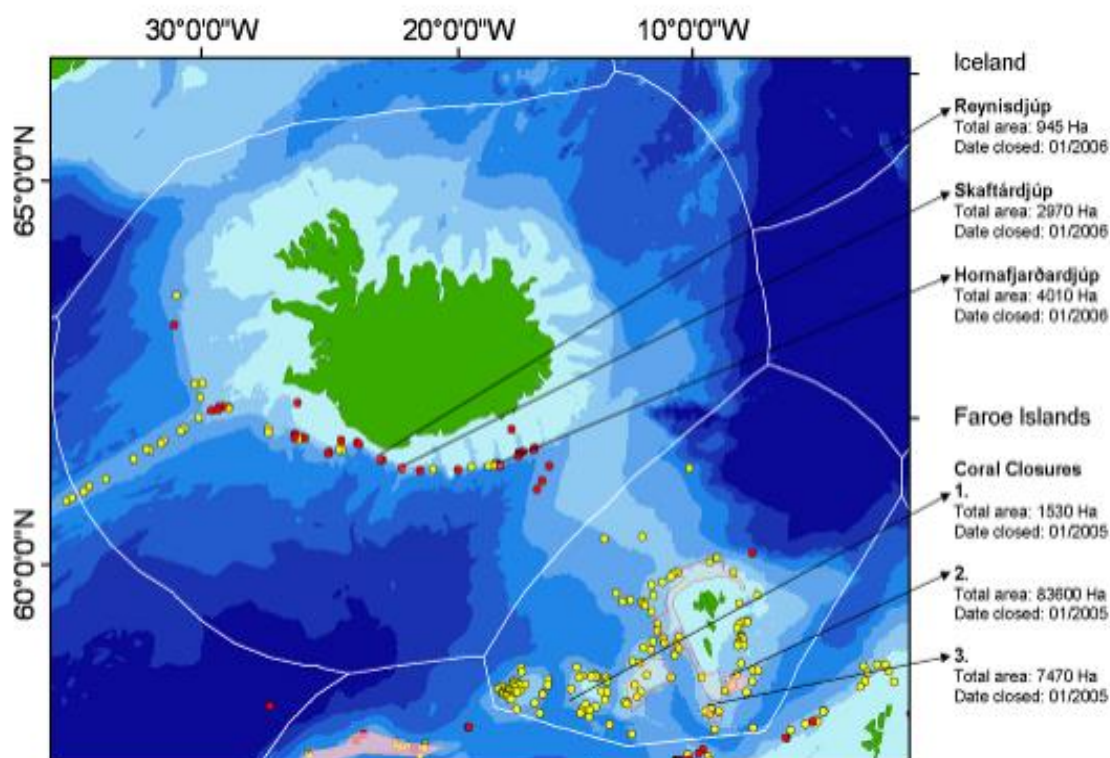
<b>EVIDENCE RATING:</b>	<b>High</b> <input checked="" type="checkbox"/>	<b>Medium</b> <input type="checkbox"/>	<b>Low</b> <input type="checkbox"/>
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**SUMMARY: Iceland prohibits dynamiting, poisoning and other comparable destructive fishing practices.**

**EVIDENCE:**

Only permitted gears (trawls, longlines, seine nets and gillnets) can be used to target commercial species in Iceland. The use of dynamiting, poisoning and other comparable destructive fishing practices are prohibited under law.

Iceland has ratified “The Convention for the Protection of the Marine Environment of the North-East Atlantic” (the “OSPAR Convention”). Annex V of the convention addresses the protection and conservation of the ecosystems and biological diversity of the maritime area, including the protection of species and habitats in the maritime area covered by the OSPAR Convention.



**Figure 8.** Distribution of deepwater corals around Iceland. Three areas along the southern coast of Iceland are closed to fishing to protect the reefs.

Protection of hydrothermal vents in Eyjafjor. In order to protect these coral fields the Ministry of Fisheries issued a regulation on the protection of five sensitive maritime areas off the southern coast of Iceland. The sites cover a total of 80 square kilometres in area. The areas are seabed coral fields and they are protected from all fishing. The regulation entered into effect in 2006. 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. The large majority of golden redfish are captured using demersal trawl gear, but other fishing gears which capture the species include longline, Danish seine, gill netting, pelagic trawl, automatic lining and hand lining.

**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.<sup>20</sup>**

<b>EVIDENCE RATING:</b>	<b>High</b> <input checked="" type="checkbox"/>	<b>Medium</b> <input type="checkbox"/>	<b>Low</b> <input type="checkbox"/>
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**SUMMARY: A Fisheries Management Plan for Icelandic golden redfish has been recently established. The Plan is documented and available on the Icelandic Directorate of Fisheries website. Although this will be the first year of implementation, there is consistency in effectiveness demonstrated through similar plans for cod, haddock and saithe. The assessment team concludes that the clause can be rated High once subsequent surveillance audits confirm that the FMP and associated TAC derived from the HCR have been implemented.**

**EVIDENCE**

A Fisheries Management Plan for Icelandic golden redfish was recently implemented and endorsed by the Minister subsequent to its analysis and recommendation by the MRI and ICES. The Plan is documented and available on the Icelandic Directorate of Fisheries website. The plan includes evidence of substantial fisheries planning for golden redfish which culminates in the Icelandic harvest control rule. The HCR for golden redfish is as follows:

“The annual TAC will be set consistent with the average fishing mortality<sup>21</sup> rate of 0.097 in the advisory year for age-groups 9-19, when the spawning stock biomass (SSB) in the assessment year ( $SSB_y$ ) is estimated to be above 220,000 tonnes ( $B_{trigger}$ ). When the SSB in the assessment year is estimated to be below 220,000 tonnes ( $B_{trigger}$ ), the TAC will be set consistent with a fishing mortality rate in the advisory year equal to  $0.097 * (SSB_y / B_{trigger})$ .”

The FMP describes the management strategy and measures for the Icelandic fishing zone but considers the total stock distribution from a scientific advice perspective (provided by MRI and ICES). Refer to 1.2.2

<sup>21</sup> F, fishing mortality. Instantaneous Rate of Fishing Mortality. When fishing and natural mortality act concurrently, F is equal to the instantaneous total mortality rate (Z), multiplied by the ratio of fishing deaths to all deaths. Expressed on an exponential scale: F=0.5 means that  $1 - \text{EXP}(-0.5) = 39\%$  are removed.

**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.**

<b>EVIDENCE RATING:</b>	<b>High</b> <input checked="" type="checkbox"/>	<b>Medium</b> <input type="checkbox"/>	<b>Low</b> <input type="checkbox"/>
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**SUMMARY: The Fisheries management plan details all the relevant information. (Refer to below).**

**1.1.6.1 The management unit;**

The Fisheries Management Plan for Icelandic golden redfish describes the Management Unit of Icelandic golden redfish as: ‘Golden Redfish (*Sebastes norvegicus*) in the Icelandic, Faroese and Greenlandic Exclusive Economic Zones (EEZ). Icelandic authorities (Minister of Industries and Innovation) manage the fisheries within the Icelandic EEZ, which is mainly within ICES area Va). (The latter consisting of the majority of catches 95-98%).

**1.1.6.2 Specification of stock or component stocks of “stock under consideration”;**

The Icelandic golden redfish Fisheries Management Plan states that the current distribution of the stock is primarily within the Icelandic EEZ (95-98% total landings).

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

In addition to Iceland, Golden Redfish is also distributed within Greenland and Faroese Islands EEZ’s. Catches in these regions are described in 1.2.2. Greenland operates a TAC for redfish and the Faroese Islands operate on a total allowable fishing effort control.

**CLAUSE: 1.1.6.4 The long-term harvesting policy, consistent with achieving optimum utilisation, including the means for assurance of its consistency with the precautionary approach to fisheries management. This includes:**

- 1.1.6.4.1 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;**
- 1.1.6.4.2 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.)<sup>22</sup>, as well as remedial action to be taken if limits are approached or exceeded;**
- 1.1.6.4.3 The Specification of the applicable harvest control framework or harvest control rule, as appropriate.**
- 1.1.6.4.4 The primary approach applied to managing the fisheries (e.g. input controls, output controls, etc.).**

<b>EVIDENCE RATING:</b>	High <input checked="" type="checkbox"/>	Medium <input type="checkbox"/>	Low <input type="checkbox"/>
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**SUMMARY: The Fisheries Management Plan for Icelandic golden redfish details a long-term harvesting objective and strategy to maintain the exploitation rate at a rate which is consistent with the precautionary approach and that generates maximum sustainable yield (MSY) in the long term. The medium term target of the management plan is to have SSB>220,000 t. The long term target is stated as: (Bmsy- currently set at >220,000 tonnes for 5 years). ICES have evaluated the plan for consistency with achieving optimum utilisation, and with the precautionary approach to fisheries management.**

**EVIDENCE**

A Harvest Control Rule has been developed for the annual TAC for Icelandic golden redfish. This plan was recently introduced after its analysis and recommendation by ICES and the MRI. (Also refer to 1.2.1)

**1.1.6.4.1 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 FMP for golden redfish states that the objective of the plan 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 associated HCR is designed to limit catches in accordance with a fishing mortality that is consistent with MSY.

<sup>22</sup> [F<sub>lim</sub> can be explicit, or implicit in cases where harvest rate is set annually to a precautionary F<sub>target</sub> (or its proxy)]



**Clause: 1.1.6.4.2** 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;

**Clause: 1.1.6.4.3** The Specification of the applicable harvest control framework or harvest control rule, as appropriate.

<b>EVIDENCE RATING:</b>	High <input checked="" type="checkbox"/>	Medium <input type="checkbox"/>	Low <input type="checkbox"/>
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**SUMMARY:** The Fisheries Management Plan details the limit reference points for precautionary management, and specifies the HCR. This HCR has been evaluated by ICES and found to be consistent with the precautionary approach.

**EVIDENCE**

**1.1.6.4.2**  
 The biomass limit reference point (Blim) in the management plan is based on the lowest observed biomass (Bloss) in the 2012 assessment. Its value is 160 thousand tonnes. The updated assessment results in a less than 10% lower Bloss. The Btrigger reference point is set in the management plan using the Blim as a basis and accounting for the assessment error, resulting in a Btrigger of 220 thousand tonnes. The spawning-stock biomass has been above Btrigger since 2007.

**1.1.6.4.3**  
 The annual TAC is set according to the following HCR:

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

**Clause 1.1.6.4.4 The primary approach applied to managing the fisheries (e.g. input controls, output controls, etc.).**

<b>EVIDENCE RATING:</b>	High <input checked="" type="checkbox"/>	Medium <input type="checkbox"/>	Low <input type="checkbox"/>
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**SUMMARY:** The fisheries management plan has been developed with due consideration to managing the input, output controls etc. 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, the reduction of discarding and high level of reporting - that appears to be present within the Icelandic fleet.

**EVIDENCE**

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, the reduction of discarding and high level of reporting - that appears to be present within the Icelandic fleet. There are also reasonably small differences between reported official catch and the TAC over recent years according to management and science based sources (MRI, Directorate). There are regulations and technical conservation measures in other fisheries that reduce and limit the incidence of golden redfish by-catch in those fisheries.

There is a high level of reporting in the Icelandic golden redfish fishery and official statistics indicate that compliance to the TAC set for golden redfish is high. The reporting system is transparent, verified through Directorate shore side weighing stations, current and allows for very near time monitoring of landed volumes and hence there management measures can be pre-emptive with respect to redfish quota management.

The newly implemented FMP provides further substantiation to this through both an explicit HCR and supporting input controls, supporting measures (real time closures, permanent closures, vessel size, gear/mesh specifications and engine capacity restrictions and the suite of supporting laws and regulations available for their effective implementation).

<b>Clause</b>	<b>1.1.7</b>	<b>The fisheries management plan shall also consider the following:</b>
	<b>1.1.7.1</b>	<b>The specific management method/approach or measures, according to fleet or jurisdiction or other relevant variables as appropriate;</b>
	<b>1.1.7.2</b>	<b>Any further measures which support meeting the management objectives;</b>
	<b>1.1.7.3</b>	<b>The institution(s) or arrangement(s) responsible for providing stock assessment and advice;</b>
	<b>1.1.7.4</b>	<b>A description of the process for making decisions on Total Allowable Catch (TAC) – how and on what basis management decisions are made;</b>
	<b>1.1.7.5</b>	<b>Provisions for considerations and consultation with the fishing industry;</b>
	<b>1.1.7.6</b>	<b>The means of implementing the management approach, including main provisions for monitoring, control, surveillance and enforcement;</b>
	<b>1.1.7.7</b>	<b>The objectives and management measures relevant to ecosystem effects of the fishery.</b>
<b>EVIDENCE RATING:</b>	High <input checked="" type="checkbox"/>	Medium <input type="checkbox"/> Low <input type="checkbox"/>
<p><b>SUMMARY:</b> The Fisheries Management Plan for Icelandic golden redfish 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.</p>		
<p><b>1.1.7.1</b> <i>Fisheries Management Plan - Icelandic golden redfish: Fisheries management system</i></p> <p>The fishery is managed using 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.<sup>23</sup></p> <p>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</p>		

<sup>23</sup> According to law no 57/1997 all catch has to be landed and provisions on discard are also in regulation no 601/2003.

days and allowable catch in each fishing trip. The catch fished in these fisheries is not counted against the vessel's individual quota.

#### **1.1.7.2**

##### *Fisheries Management Plan - Icelandic golden redfish: 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: 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.

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.

#### **1.1.7.3**

##### *Fisheries Management Plan - Icelandic golden redfish: Scientific advice*

The MRI advises the Minister of Industries and Innovation on the exploitation of the redfish 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.

#### **1.1.7.4**

##### *Fisheries Management Plan - Icelandic golden redfish: Process for making decisions on TAC*

The Minister decides on the TAC of the golden redfish stock for each fishing year (Sept-Aug) in accordance to law, based on HCR and the advice mentioned in 1.1.7.3.

#### **1.1.7.5**

##### *Fisheries Management Plan - Icelandic golden redfish: Consultation with stakeholders in fisheries*

A special consultation group of the MRI meets every year and reviews different sources and information regarding the golden redfish stock and cod 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 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 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 updates on stock analysis and related research outcomes.

#### **1.1.7.6**

*Fisheries Management Plan - Icelandic golden redfish: The means of implementing the management approach, including main provisions for monitoring, control, surveillance and enforcement*

The Icelandic Directorate of Fisheries 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 are fisheries inspection at sea and monitoring of the EEZ and reception of required notifications from vessels.

#### **1.1.7.7**

*Fisheries Management Plan - Icelandic golden redfish: Management measures relevant to ecosystem effects of the fishery*

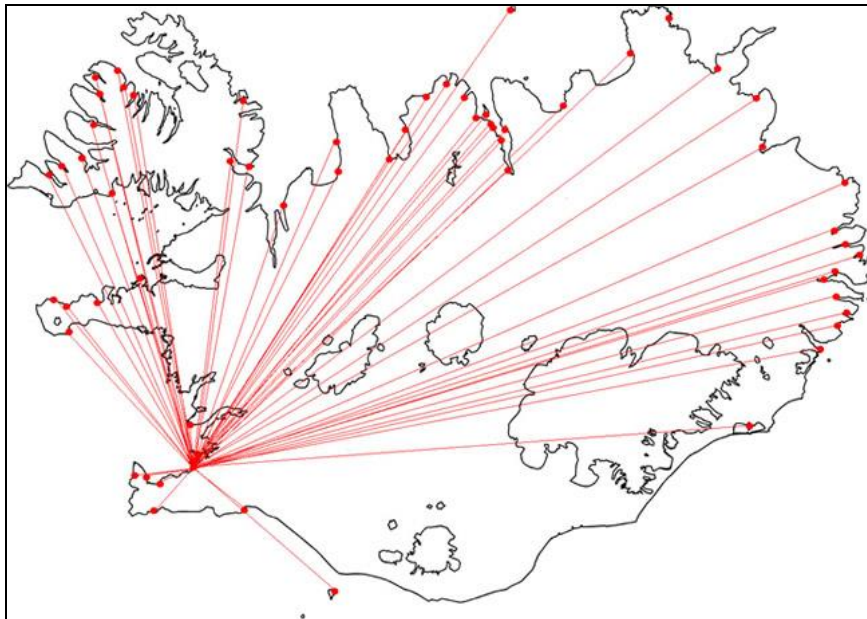
Large areas within the Icelandic EEZ are closed for fishing, either temporarily or permanently. These closures are aimed at protecting juveniles and spawning fish and protecting vulnerable marine ecosystems. Restrictions on the use of gear are also in effect. Thus the use of bottom trawl and pelagic 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.

## 1.2 Research and assessment

<p><b>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.</b></p>			
<p><b>EVIDENCE RATING:</b></p>	<p>High <input checked="" type="checkbox"/></p>	<p>Medium <input type="checkbox"/></p>	<p>Low <input type="checkbox"/></p>
<p><b>SUMMARY: The Marine Research Institute of Iceland, 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. The MRI is supported in its research by the Directorate of Fisheries.</b></p>			
<p><b>EVIDENCE:</b></p> <p>The Marine Research Institute of Iceland, 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. Other supporting roles are undertaken by the Directorate of Fisheries, principally with regard to the collection and compiling of fishery dependent data. In addition, the Staff of the Directorate also act as samplers for fish length/age data and inspectors on vessels for scientific purposes.</p> <p>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 stocks including golden redfish.</p> <p>MRI has a good publication record in the field of marine environment. An overview (publications list) can be found at: <a href="http://www.hafro.is/undir.php?REFID=20&amp;ID=35&amp;REF=3">http://www.hafro.is/undir.php?REFID=20&amp;ID=35&amp;REF=3</a></p> <p>Furthermore, the MRI is involved in a research project on climate change in collaboration with 20 research institutions in 9 countries, funded by the European Union's Seventh Framework Programme. The main purpose of the project is to develop and combine measurement systems and computational models that monitor and predict the stability and development of ocean currents that generate heat and currents within the North Atlantic circulation.</p>			

<p><b>CLAUSE: 1.2.2</b>  <b>The relevant data collected/compiled shall be appropriate to the chosen method of stock assessment for stock under consideration and sufficient for its execution.</b></p>			
<p><b>EVIDENCE RATING:</b></p>	<p>High <input checked="" type="checkbox"/></p>	<p>Medium <input type="checkbox"/></p>	<p>Low <input type="checkbox"/></p>
<p><b>SUMMARY: 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.</b></p>			
<p><b>EVIDENCE:</b></p> <p>It is considered by the MRI that sufficient catch and survey data are gathered and are appropriate as the basis of an analytical assessment of the golden redfish stock.</p> <p><i>Commercial Landings Data</i></p> <p>Reporting catch data in vessel specific logbooks is compulsory for all vessels &gt;12m fishing in Icelandic waters. However, up until the 2010/2011 fishing season, Iceland issued a combined quota for <i>S. mentella</i> and <i>S. norvegicus</i> and skippers were not required to log the catch of each species separately. For the purposes of determining the species specific catch numbers at age, fleet specific catch splitting ratios for the fresh and freezer operations were determined from a number of separate sources including onboard and onshore sampling by scientific and control personnel. It is now mandatory that separate landings statistics are generated for all species separately.</p> <p>Smaller catches of redfish are reported in Greenland and Faroese waters. Combined redfish catch (<i>S. Mentella</i> and <i>S. norvegicus</i>) data in tonnes by month, area and gear, are supplied by the Faroese Directorate of Fisheries. The geographical distribution of catches is obtained from the log-books, where location of each haul, effort, depth of trawling and total catch of redfish are recorded. The proportion of the two redfish species in the commercial catch data is determined from species specific catch composition data from the Faroese bottom trawl survey. Catch data from Greenland are more uncertain due to the high level of species mixing in the area and assumptions regarding species specificity of particular gear types. It is noted however, that removals from the Faroe (Vb) and Greenland areas (XIVb) are a small proportion of the overall catch, which is mainly taken in Va. Historically catches in XIV were substantially higher, but given the lack of species specific reporting requirements, it is unclear what proportion of the catch can be attributed to <i>S. norvegicus</i> although the catches are split based on national landing statistics and biological sampling.</p> <p>In 2011, landings of golden redfish were estimated at 44,875 t; 42,605 t in Vi, 493 t in Vb, 83 t in VI and 1,676 t in XIV. In Iceland, vessels &gt;12m are required complete a daily log-book which provides catch weights for the assessment. Vessels operators are required to maintain a record of catches from each individual haul. All data is made available to the Marine Research Institute for assessment purposes. Log-book data are generally available in a centralised database within one month after the day of the fishing operation. Landings are restricted to designated ports and all fish landed are weighed. The catch weights are stored on a central database system (GAFL) and updated daily on</p>			

the Icelandic Directorate of Fisheries website ([www.fiskistofa.is](http://www.fiskistofa.is)) allowing for the real time monitoring of quota uptake. This information is publically available.



**Figure 9.** Location of designated landings ports and centralised database (GAFL) [http://gafl.fiskistofa.is/index.php?option=com\\_content&view=article&id=53&Itemid=61](http://gafl.fiskistofa.is/index.php?option=com_content&view=article&id=53&Itemid=61)

Scientific sampling for determining the age structure of the landings is linked and triggered by landing reports uploaded onto the 'real time' database described above. Appropriate sampling levels for each strata (species/gear/landing location) are pre-defined and request to sampling teams are automatically triggered once landings in a given strata exceed a pre-defined threshold. Due to the real time nature of the sampling programme, by default it takes into consideration seasonal and temporal variation in landings. The provenance of individual (box) samples can be traced back to the individual log-book records therefore geo-referencing the sample at an appropriate scale.

International landing data, catch numbers and weights at age by year are presented annually (1979-2011) in the ICES assessment working group report (ICES North-Western Working Group).

#### *Commercial Discard Data*

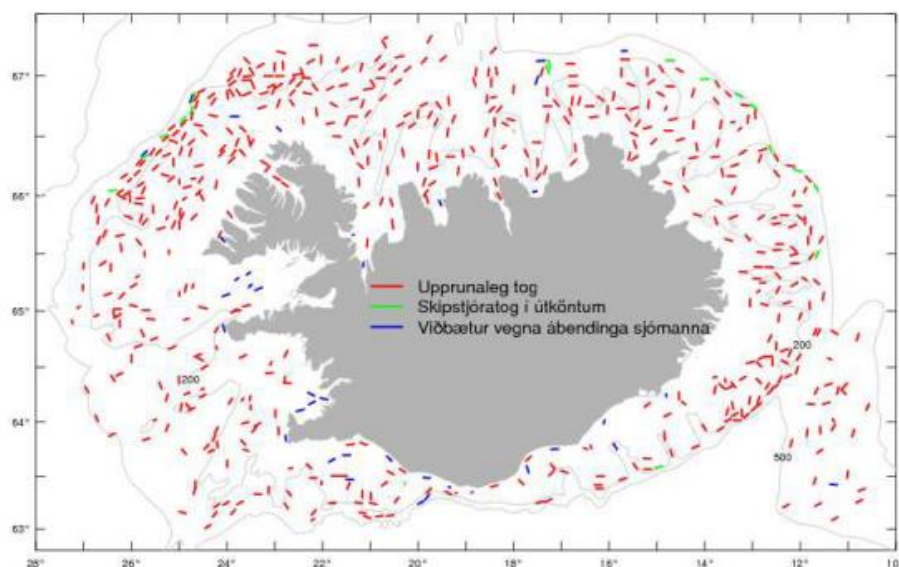
Comparison of sea and port samples from the Icelandic discard monitoring program does not indicate significant discarding due to high grading in recent years (Pálsson *et al* 2010). Systematic collection of discards of commercial fish species caught by Icelandic fleets (demersal trawl; demersal seine; longline) operating in national waters has been conducted since 1988 (Pálsson 2003). Pálsson (2003) provides annual estimates of discard numbers and weights at age from 1998 to 2000 and also describes the methodologies used in both data gathering and estimation procedures. More recent data, from 2000 onwards is presented in annual reports (latest e.g. Pálsson 2013) which provide estimates of discards by number and weight for the key commercially exploited stocks by gear type.

Discard data is reported annually e.g. <http://www.hafro.is/Bokasafn/Timarit/fjolrit-160.pdf> as well as other commercially important species caught in the fishery. However, there is no data on non-commercial species collected. This limits the ability to determine the impact of the fisheries for non-commercial fish species and other organisms.



### *Fishery Independent Data*

The Marine Research Institute undertakes two bottom trawl surveys each year, a spring survey in March and an autumn survey in October. The surveys have been undertaken since 1985 and 1996 for the spring and autumn surveys respectively. The surveys provide tuning indices and both the spring and autumn surveys are used as the basis of a trends-based assessment from ICES. The survey design follows a standard stratified approach. Individual strata are based pre-estimated fish density in different statistical squares. These are then clustered into individual strata with the number of stations within each strata proportional to strata area. Both industry and scientists select an equal number of stations within each stratum. Stations selected by scientific staff are randomly selected from a library of stations whereas fishermen selected based on practical experience. The survey trawl used is a 'Granton' style trawl. Survey coverage is substantial, with both research and commercial vessels participating in the survey. In 2011 five vessels, 3 commercial trawlers and 2 research vessels participated and undertook over 600 survey hauls. The figure below shows the location of the survey hauls. Red tows are original survey tows, half of which were positioned by skippers. Green tows shift locations between years on the outer edge of the survey area, and are positioned by skippers based on the current stock distribution. Blue tows have been added to the original survey layout based on comments from fishermen (<http://www.hafro.is/images/frettir/2011/fig1.pdf>).



**Figure 10.** Tracks of survey tows undertaken during the 2011 groundfish survey.

The survey design and data collection follows a predefined survey and sampling protocols. These are published annually and provide detailed information on survey gear standardisation, catch sampling protocols and targets. Fish are sampled for length, weight, age, liver weight, gender and maturity and in addition, stomach contents are also collected for golden redfish.

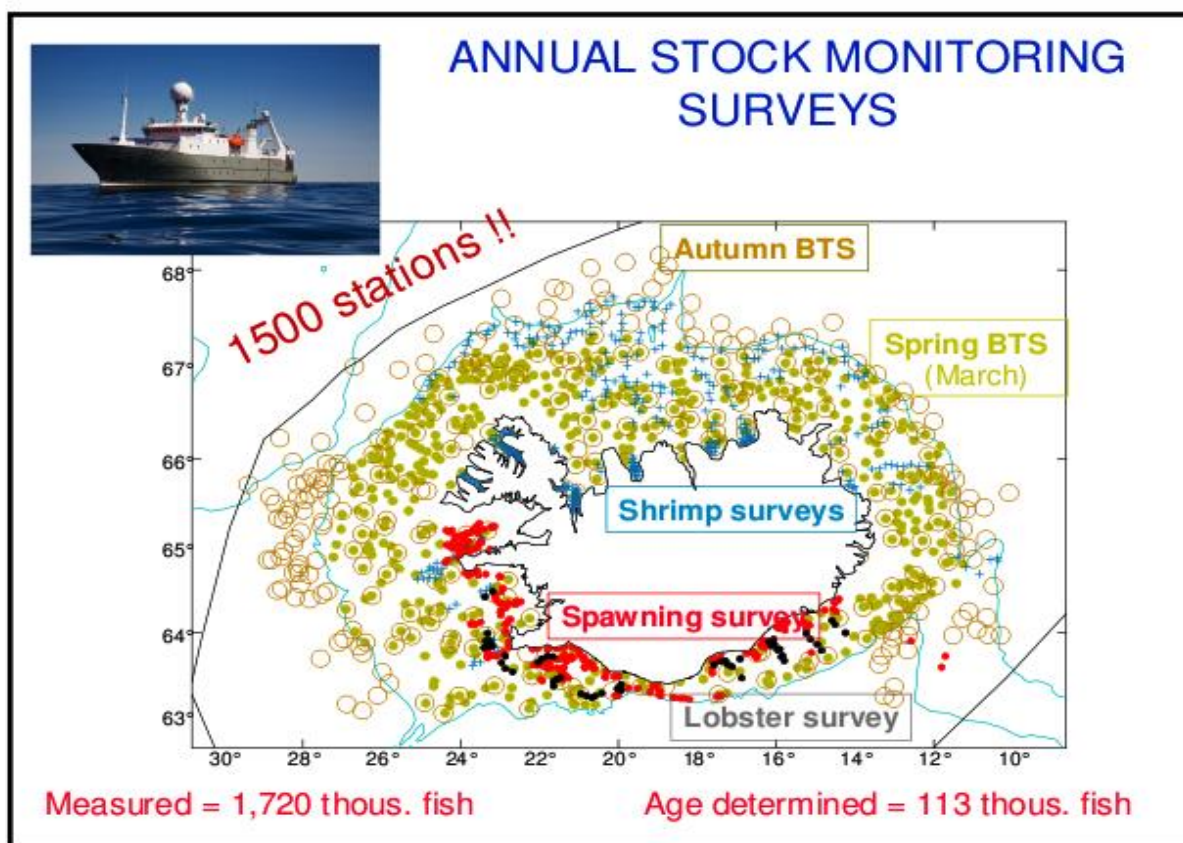
Two annual groundfish surveys are conducted on the Faroe Plateau by the Faroe Marine Research Institute, the Spring Survey carried out in February-March since 1994 (100 stations per year down to 500 m depth), and the Summer Survey in August-September since 1996 (200 stations per year down to 500 m depth).

The annual German groundfish survey (1982+) provides abundance, biomass estimates and length structures and covers the shelf areas and the continental slopes off West- and East-Greenland. The survey was primarily designed for the assessment of cod, but it covers the entire groundfish assemblage down to 400 m depth.

<p><b>CLAUSE: 1.2.3</b>  <b>Stock assessments shall be based on systematic research of the size and/or productivity of the fish stock(s).</b></p>			
<p><b>EVIDENCE RATING:</b></p>	<p>High <input checked="" type="checkbox"/></p>	<p>Medium <input type="checkbox"/></p>	<p>Low <input type="checkbox"/></p>
<p><b>SUMMARY: Based on the evidence presented and evaluated during on site consultation and the specifications in the ICES NWWG Quality Handbook (ICES 2010b) where current stock assessment methods are documented, the requirements of clause 1.2.3 are considered met, based on the measures that exist within the Icelandic fisheries management system framework. 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 such that there is effective data collection/compilation for successful execution of stock assessment for stock management purposes.</b></p>			
<p><b>EVIDENCE:</b></p> <p>Of relevance to the stocks of Golden Redfish, the Marine Living Resources and the Fisheries Advisory Services groups provide the infrastructure and capacity for the collation of fisheries data, stock assessment and provision of fisheries advice to the Ministry of Industries and Innovation. It is noted that presently there is no ICES agreed analytical assessment for Golden Redfish due to discrepancies between the assessment model and the underlying data. ICES advice is based on relative trends in the survey biomass index. MRI provides national advice on the basis of a provisional GADGET assessment.</p> <p>As part of MRI’s activities, the Living Resources group has the responsibility to collate all necessary biological information from the commercial fisheries and undertake annual surveys. Sampling staff are distributed across the main fishing ports. ICES 2014 review also notes updates to the stock assessment model; including the autumn German- Greenland groundfish survey data (with modifications to survey area to avoid extrapolation to areas not covered), change to mean length-at recruitment (age 5) for 1996-2000 year class and 2001-present to account for faster growth and modifications to the weighting of the individual data sets in GADGET model to reduce the influence of lower quality input data.</p> <p>While the national institute has the responsibility to collate relevant fishery independent and dependent data necessary to undertake stock assessments, the final assessments and advice is conducted under the auspices of ICES under the North-Western Working Group (NWWG). It is noted that given that &gt;90% of Golden Redfish are landed in Iceland by Icelandic vessels, there is little international dimension to these assessments. Iceland provides strong scientific support for NWWG, with 7 scientists participating in the 2012 working group. Notwithstanding the strong and internationally recognized capabilities of the Icelandic scientific resources, where many of the individual scientists have prominent roles in ICES, the benchmark process incorporated by ICES in 2007 provides a framework where individual assessments are exposed to stringent international peer review. This means that the assessment methodology is periodically scrutinized (ca. 3-5 year cycle) ensuring that the methods used are to the best international standard.</p>			

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. Of relevance to Golden Redfish, two annual groundfish (IGFS) surveys are undertaken each year (spring and autumn) using the national research vessels (RV Árni Friðriksson and RV Bjarni Sæmundsson) as well as the use of commercial vessels (three commercial vessels participated in the 2011 surveys).

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 (presentation by MRI March 2010). 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 determine the abundance of the year classes present in the stock relative to previous year classes.



(Provided by MRI, 2010).

<p><b>CLAUSE: 1.2.4</b>  <b>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 estimates of discards, unobserved mortality, incidental mortality, unreported catches and catches in other fisheries.</b></p>			
<p><b>EVIDENCE RATING:</b></p>	<p>High <input checked="" type="checkbox"/></p>	<p>Medium <input type="checkbox"/></p>	<p>Low <input type="checkbox"/></p>
<p><b>SUMMARY: Icelandic Management System is seen as a model for developing a proactive approach to fishery reporting compliance as it has a zero discard policy and extensive measures are in place to account for fishing mortality and catches in other fisheries.</b></p>			
<p><b>EVIDENCE:</b></p> <p>A zero discard policy is in place for commercial stocks. There is a very low level of discarding noted in the literature (Pálsson, 2010). Most emphasis is placed on cod and haddock. The discard rate for cod was reported at less than 1-2% of the reported landings over the time investigated (Pálsson, 2010). The discard estimates for haddock are somewhat higher ranging between 2-6% annually. Discarding of saithe and golden redfish is reported to have been negligible (&lt;1%) over time period of investigation. Estimates of discards of cod and haddock in 2008 by individual fleets have been estimated. 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.</p> <p>There is evidence that the level of non-reporting is very low, hence the estimates used are small. The legislative framework for fisheries governance and the management system in place supports this. The management system is conducive to encouraging reporting of landings through certain built in tolerances for landing small cod, landing over quota and by-catch allowances.</p> <p>Closed areas (permanent, seasonal, temporary) aiming inter alia at protecting juvenile fish, form a key component of the Icelandic Management System, the fact that the MRI is principally responsible for temporary closures demonstrates a strong link between scientific assessment and fishery management.</p> <p>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 and by Act No. 810/2011 states that <i>'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.'</i></p> <p>Other exceptions are possible: 'Regulation 810/2011 also states that It is allowed to cast overboard fish of no value, entrails, heads and so forth which is derived from processing fish on board fishing vessels which make the best use of the raw material as possible.</p> <p>However, the intention of this Act and others is focused upon a clear strategy to eliminate discarding</p>			

and hence unaccounted fishing mortality and promote a high level of reporting and declaration of catches.

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 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.

#### **Landings in Foreign Ports**

Also under Act No 65/2004, Article 1, the Minister may also 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 accredited scales by accredited scale operators.

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.

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 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

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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.

The ITQ system treats all fisheries as mixed fisheries therefore redfish as 'Bycatch' is accounted for in other fisheries.

The impact of catches of Icelandic redfish in the Faeroese and Greenland zones is negligible. The MRI has estimated that their combined landing is very low circa 2500 t out of the 45,000 t approved TAC.

**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.**

<b>EVIDENCE RATING:</b>	High <input checked="" type="checkbox"/>	Medium <input type="checkbox"/>	Low <input type="checkbox"/>
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**SUMMARY: 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 (this was confirmed from a number of sources during the on-site consultation phase). Log book data, transmitted electronically and through manual means is continually supplied and provides for a major component of fishery dependent data used by MRI. MRI also undertake field sampling onboard vessels and supported through Directorate observer programming which provides further points of information and data exchange.**

**EVIDENCE:**

A special consultation group of the MRI meets every year and reviews different sources and information regarding the 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.

**Consultative process**

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 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 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.



Since the ITQ was introduced in 1984, the system has been the focus of debates, both in the political arena and in the public one. Several committees, either appointed by Parliament or directly by a minister, have concluded and suggested reforms on the management system, trying to meet the demands of different opinions both from the industry and from the public.

An official committee (1991) appointed by the minister of Industries and Innovation concluded that the quota system should be maintained and made permanent and tusk, ling, halibut, catfish and blue ling should also be utilized in a quota system. The committee suggested several changes on the fisheries Act and gave its opinion to the minister and the public in a report.

The natural resource committee (1998) appointed by Parliament, had the task to discuss resources which may be public property. The committee's opinion was that it should be aspired to payment for the right to use all resources that are owned by the state or by the public. The committee gave two reasons for its opinion, that the payment should cover the expenses of the state for control and supervision and to give the nation a share in excess returns that might be created.

The next committee appointed was the Auditing committee (1999) appointed by the minister of Industries and Innovation and had the task of giving direct recommendations to the minister about changes on the existing law on Fisheries Management. The committee should take into account the interests of the industry, rural communities and the public. The committee concluded e.g. that a system of fishing-charges should be established, that it should be encouraged to bring all catch to landing to prevent discards and that rural communities, depending on fishing industry, should get its share of fishing charges to build its economic activity. Many of the committee's suggestions are reflected in the new Fisheries Management Act that was adopted in August 2006. The newest consultative group, now a workgroup, appointed in 2009 by the minister of Industries and Innovation has published its first written material (September 2010), where the workgroup publishes its issues, analysis, reports and features to changes in the fisheries management.

#### **Local level**

The MRI has a board, where the fishing industry, MRI staff and labour unions have their representatives. MRI also has advisory committee that gives proposals for project selection and the institute's practices. MRI holds regular seminars and conferences, where their scientists talk about research findings, the state of different fish stocks and discussing methods for assessing the condition of stocks. These events have shown to be a good platform for the public to present their speculations or critic. On the MRI's website, there is an interactive question and answer page concerning the activities of the MRI.

The minister of Industries and Innovation must demonstrate to all relevant parties that the fishing management system, controlled by the government, fulfils the needs of the fishing industry. The minister puts his decisions and his plans under the judgment of various important organizations such as the Federation of Icelandic Fish Processing Plants, the Federation of Icelandic Fishing Vessel Owners, and SA-Confederation of Icelandic Employers, National Association of Small Boat Owners, different labour Unions and the public. The minister meets with the parties on different occasions, where different opinions can be discussed; annual meetings of the most important associations are favourable for such consultation. Such meetings can play an important role in the policy making and a good opportunity for the minister to review his plans for the industry.

The Parliament, the Ministry of Industries and Innovation (formerly the Ministry of Industries and

Innovation) and the Ministry of Internal Affairs all play an important role in local consultation processes. The Fisheries ministry has recently established a consultation forum about the official harvest policy. The first task of this new forum was to evaluate the newly adopted harvest rule for cod and assess whether it is reasonable to propose an amendment in case of changing circumstances and stronger fish stock.

### **International level**

Iceland is a member of Organization for Economic Co-operation and Development (OECD). As such, the institute gives Icelandic authorities regular country notes with conclusions and recommendations. In 2001 OECD gave a detailed review on the Environmental Performance of Iceland, including the fisheries management system. OECD gives less detailed country notes on more frequent timescale, such as its inventory on financial support in Icelandic fisheries in 2005. OECD conclusions and recommendations have been in line with the official Icelandic committee's ones, mentioned in chapter 7.5. In the research field both the Icelandic government and MRI consult ICES with further development of the management system.<sup>24</sup>

During the site visits the Federation of small boat owners detailed how they always have access to the Minister to voice their concerns. 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.

All of the major organisations in the Icelandic fisheries nominate participants to Fiskiping (Parliament of Fisheries), being the supreme authority in all matters regarding Fiskifélag Íslands. Fiskiping are held each year.

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<sup>24</sup> Report to minister of Fisheries and Agriculture. Reykjavík. Apríl 1993.  
National resource report, 2000. Report from an official committee. 11pp. <http://www.forsaetisraduneyti.is/utgefing-efni/Audlindaskyrsla/nr/27>  
The Auditing committee's report, 2001. <http://www.sjavarutvegsraduneyti.is/utgefing-efni/sjreldra/nr/599>  
Review on the fisheries management system, 2010. Report from an official workgroup. <http://www.sjavarutvegsraduneyti.is/media/Skyrslur/Meginskyrsla.pdf>  
The report can be purchased online, but table of contents is available free of charge: <http://www.oecdbookshop.org/oecd/display.asp?K=5LMQCR2K7ZTB&DS=Iceland>  
Iceland: Inventory on financial support in fisheries. <http://www.oecd.org/dataoecd/5/27/35534038.pdf>  
Federation of Icelandic Fish Processing Plants website: [www.sf.is](http://www.sf.is)  
Federation of Icelandic Fishing Vessel Owners, website: [www.liu.is](http://www.liu.is)  
SA-Confederation of Icelandic Employers, website: [www.sa.is](http://www.sa.is)

**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.

<b>EVIDENCE RATING:</b>	High <input checked="" type="checkbox"/>	Medium <input type="checkbox"/>	Low <input type="checkbox"/>
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**SUMMARY:** The most prominent International collaboration for Icelandic golden redfish 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 interpretation always 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.

**EVIDENCE:**  
 The assessment of Icelandic golden redfish is conducted by the ICES North-Western Working Group, where Iceland participates. The MRI advice to managers is based on the advice provided by the ICES advisory system.  
  
 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 such as the Regional Ecosystem Description (WGRED).

**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.

<b>EVIDENCE RATING:</b>	High <input checked="" type="checkbox"/>	Medium <input type="checkbox"/>	Low <input type="checkbox"/>
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**SUMMARY:** The golden redfish stock is considered transboundary, as it extends into Faroese and Greenland waters. International scientific cooperation is achieved at the appropriate, regional level through ICES. ICES expert groups provide regular management advice on the golden redfish stock, among many others, and ICES also conducts ad-hoc workshops as requested by fishery managers.

**EVIDENCE:**

While the golden redfish fishery is mainly confined to the Icelandic EEZ, it can be considered a transboundary stock as its distribution extends into both the Faroese and Greenland EEZ's and is fished by all three states. Despite there being no formal agreement on the management of golden redfish, international scientific cooperation is achieved through ICES.

It is within the expert groups that the core of ICES work is accomplished. Expert groups are composed of nationally nominated experts, and may also include additional expertise to ensure the highest quality, peer-reviewed science. ICES products such as Cooperative Research Reports and Advice are based on the work of the scientists that belong to the network.

Expert group members work throughout the year and normally meet annually or bi-annually to address their assigned Terms of Reference and write their report. Expert group participants are nominated by national delegates, or invited by the Chair and are assigned Terms of Reference for their work assigned by their parent committee, either the Advisory Committee (ACOM) and/or Science Committee (SCICOM).

ICES provides advice on four redfish stocks in the North-East Atlantic, including “Golden redfish (*Sebastes norvegicus*) in Subareas V, VI, XII, and XIV” (the Icelandic stock). ICES has also conducted additional workshops on redfish as requested by national governments, such as the Workshop on Redfish Stock Structure (2009).<sup>25</sup>

<sup>25</sup> ICES. 2009. Report of the Workshop on Redfish Stock Structure (WKREDS), 22–23 January 2009, Copenhagen, Denmark. ICES CM 2009/ACOM:37. 71 pp.

### 1.3 Stock under consideration, harvesting policy and the precautionary approach

#### 1.3.1 The precautionary approach

<b>CLAUSE: 1.3.1.1 The precautionary approach<sup>26</sup> shall be implemented to protect the stock under consideration.</b>			
<b>EVIDENCE RATING:</b>	High <input checked="" type="checkbox"/>	Medium <input type="checkbox"/>	Low <input type="checkbox"/>
<p><b>SUMMARY: The Precautionary approach is implemented through the harvest strategy for golden redfish. The Ministry uses it to set annual TACs. An ICES review of the harvest strategy concluded that it was consistent with the ICES precautionary approach (ICES reference).</b></p>			
<p><b>EVIDENCE:</b></p> <p>The Precautionary approach is implemented through the harvest strategy for golden redfish which the Ministry uses to set annual TACs. Prior to the adoption of the current HCR, it was reviewed by ICES who concluded: <i>‘the proposed harvest control rule is considered to be consistent with the ICES MSY approach and the ICES precautionary approach’.</i></p> <p>A past record of good management performance is available and forms supporting evidence of the adequacy of the management measures and the management system.</p> <p>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 1.2.2-3.</p> <p>There is a high level of confidence in the assessment process and good evidence of proven effective control rules and monitoring that; there is a high degree of certainty that the reference points promulgated through the fishery stock assessment will bring about the expected outcome for the stock and that the precautionary approach forms an implicit function within this.</p> <p>A precautionary management approach should detail what actions will be taken if the fishery subsequently falls outside of the expected outcome for the established reference points- for standing stock and fishing mortality. The HCR includes a mechanism for the reduction of exploitation level.</p> <p>Additionally, the long term objective of the golden redfish FMP is “to maintain the exploitation rate at the rate which is consistent with the precautionary approach and that generates maximum sustainable yield (MSY)”.</p>			

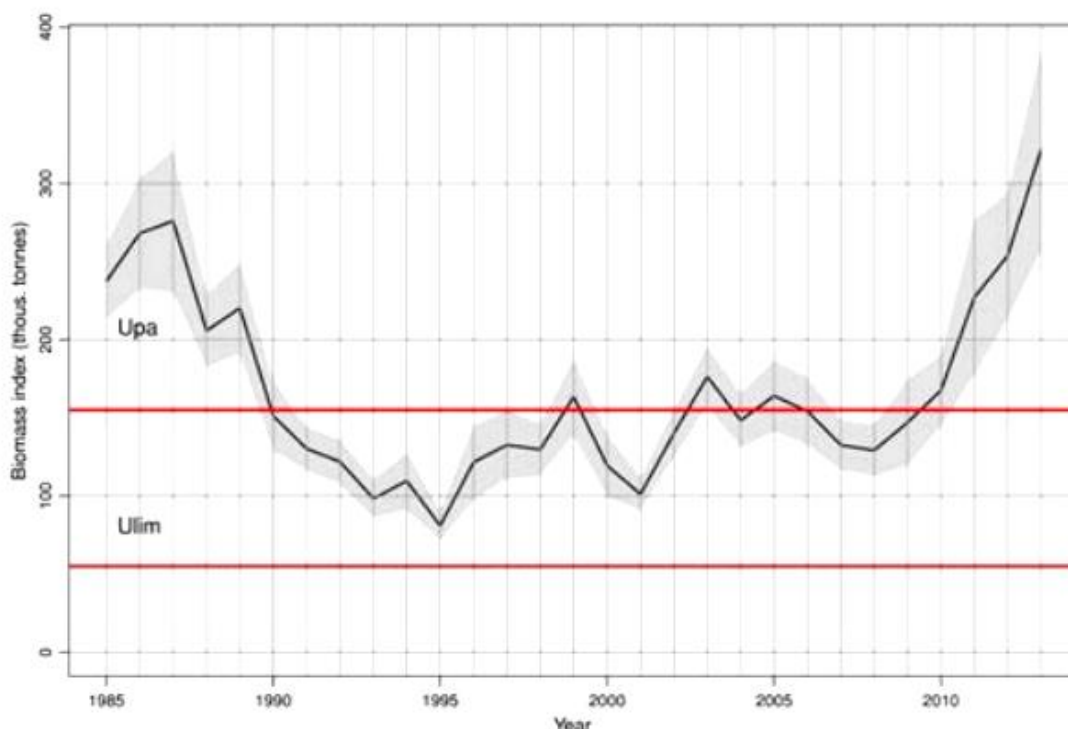
**CLAUSE: 1.3.1.2**  
**The stock under consideration shall not be overfished to a level causing recruitment overfishing.**

**EVIDENCE RATING:** High  Medium  Low

**SUMMARY:** The Icelandic golden redfish stock is not considered to be overfished to a level causing recruitment overfishing. Nor is it considered that overfishing is occurring although there is a history of overfishing occurring previously. Stock biomass is estimated to have been above the target and limit reference points ( $U_{pa}$ ,  $U_{lim}$ ) since around 2010 (ICES Advice June 2013). More recent estimates from the 2013 survey and ICES evaluation are also consistent with a stock status of not overfished and  $F$  below a level causing recruitment overfishing.

**EVIDENCE:**  
 Scientific advice (ICES) is provided in terms of the Precautionary Approach (PA). At the time of the site visit, there were no internationally (ICES) agreed reference points relative to MSY ( $F_{msy}/B_{trigger}$ ), or precautionary fishing mortality reference points ( $F_{pa}/F_{lim}$ ). Proxy precautionary approach biomass reference points based on the Icelandic spring survey index ( $U$ ) are utilised;  $U_{pa}$  and  $U_{lim}$  are 60% and 20% respectively of the maximum observed index ( $U_{max}$ ) over the time series. Although  $U$  is regarded as a proxy for SSB, it represents the fishable biomass.

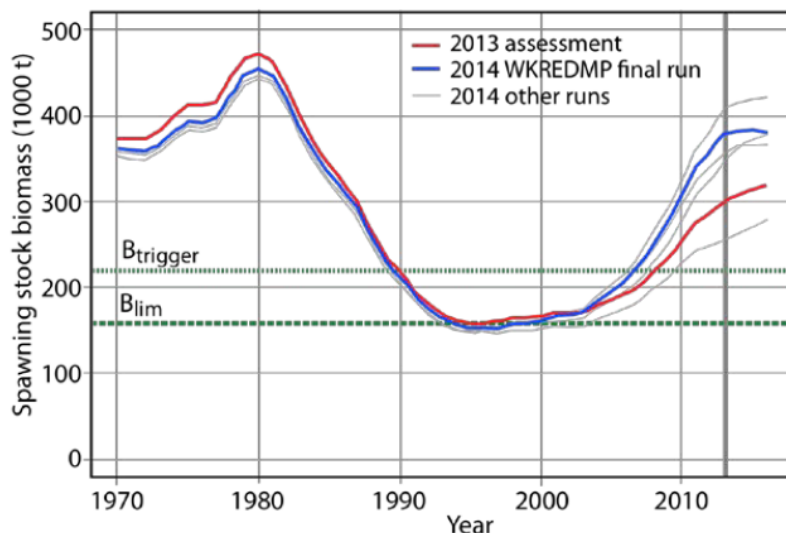
The most recent ICES advice at the time of report writing (June 2013) stated that the stock has “full reproductive capacity”. Figure 11, below, illustrates the historical trend of  $U$  (spring survey biomass) against the proxy reference points.



**Figure 11.** Spring survey biomass,  $U_{pa}$  and  $U_{lim}$  of golden redfish in Icelandic waters. From the ICES advice, June 2013.

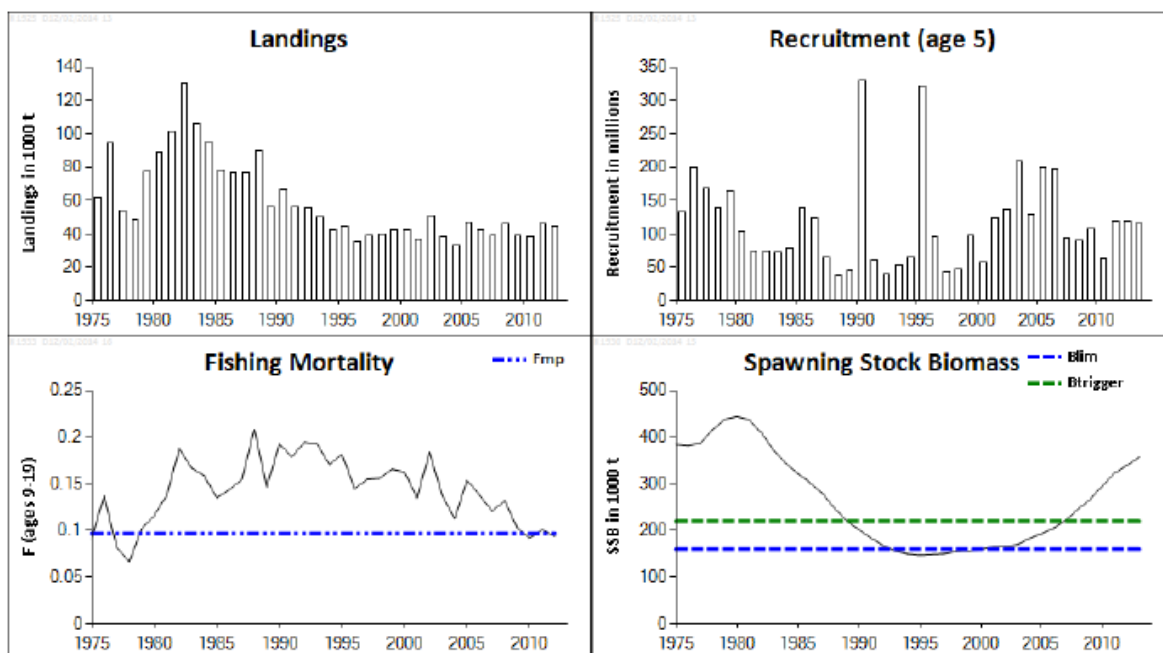
Most recently, (February 2014) Iceland has developed a Harvest Control Rule and has committed to implement this within a management plan. This has been formally adopted. The HCR and associated

stock assessment has been evaluated by ICES who note that the HCR is consistent with ICES MSY approach and ICES precautionary approach. Based on the current stock assessment outcomes and using the proposed reference points for  $B_{trigger}$ ,  $B_{lim}$  and  $F$  target, overfishing is not occurring and the golden redfish stock is not overfished.



Time-series of spawning-stock biomass under different assumptions in the model and input data. The red line indicates the result of the assessment done in 2013. The blue line indicates the assessment done in 2014 by WKREDMP and used as the basis for the evaluation of the management plan.

**Figure 12.** Up-date From the 2014 stock assessment model (extracted from ICES Advice February 2014)



- Current spawning stock biomass estimate – 360,000t (2013)

- SSB Btrigger – 220,000 t
- SSB lim- 160,000 t (set at Bloss)
- Fmax= 0.11
- Ftar=0.097.

**Figure 12.1.** Up-date from Stock Assessment Model 2013 (taken from ICES Advice, February 2014).

**CLAUSE: 1.3.1.3 Relevant uncertainties shall be taken into account through a suitable method of risk assessment.**

<b>EVIDENCE RATING:</b>	High <input checked="" type="checkbox"/>	Medium <input type="checkbox"/>	Low <input type="checkbox"/>
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**SUMMARY: The risk evaluations employed are described as suitable. ICES also noted that the harvest control rule meets the management objective and is precautionary.**

**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 objectives should be reached taking these uncertainties into account. The target reference point was set at 60,000 t higher than the limit and accounting for assessment error.

**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.**

<b>EVIDENCE RATING:</b>	High <input checked="" type="checkbox"/>	Medium <input type="checkbox"/>	Low <input type="checkbox"/>
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**SUMMARY: Precautionary reference points, based on 2012 observed biomass estimates, have been established and are used as the basis for setting the annual TAC. B<sub>trigger</sub> is set at 220,000 t.**

**EVIDENCE:**  
 Scientific advice (ICES) is provided in relation to the harvest control rules specified in the golden redfish fishery management plan. The biomass limit reference point ( $B_{lim}$ ) in the management plan is based on the lowest observed biomass ( $B_{loss}$ ) in the 2012 assessment. Its value is 160,000 t. The updated assessment results in a less than 10% lower  $B_{loss}$ . The  $B_{trigger}$  reference point is set in the management plan using the  $B_{lim}$  as a basis and accounting for the assessment error, resulting in a  $B_{trigger}$  of 220,000 t.  
 If SSB falls below 220,000 t, the HCR requires that the target fishing rate (0.097) be lowered proportionally to the difference. There is a very low risk of this occurring within the period to the 5 year review of the HCR.



<b>CLAUSE: 1.3.1.5 The long-term harvesting policy shall be stated in the Fisheries Management Plan</b>			
<b>EVIDENCE RATING:</b>	<b>High</b> <input checked="" type="checkbox"/>	<b>Medium</b> <input type="checkbox"/>	<b>Low</b> <input type="checkbox"/>
<p><b>SUMMARY:</b> The management strategy for golden redfish 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 implied medium term target of the management plan is to maintain SSB above 220,000 t. The long term target is stated as: “to maintain the exploitation rate at the rate which is consistent with the precautionary approach and that generates maximum sustainable yield (MSY)”. These objectives for policy are stated in the FMP.</p>			
<p><b>EVIDENCE:</b>  <i>Fisheries Management Plan – golden redfish: Harvesting Policy</i>                      The fishery management plan for golden redfish states: “The management strategy for golden redfish (<i>Sebastes norvegicus</i>) in Subareas V, VI, XII and XIV 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”.  <a href="http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2014/Special%20Requests/Iceland_Faeroe_Islands_Greenland_Evaluation_of_Itmp_for_golden_redfish.pdf">http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2014/Special%20Requests/Iceland Faeroe Islands Greenland Evaluation of Itmp for golden redfish.pdf</a></p> <p>The implied medium term target of the management plan is to maintain SSB above 220,000 t. The long term target is stated as: “to maintain the exploitation rate at the rate which is consistent with the precautionary approach and that generates maximum sustainable yield (MSY)”. These objectives for policy are stated in the FMP.</p>			

**CLAUSE: 1.3.1.6 The Fisheries Management Plan shall specify how the precautionary approach shall be implemented for the stock under consideration.**

<b>EVIDENCE RATING:</b>	High <input checked="" type="checkbox"/>	Medium <input type="checkbox"/>	Low <input type="checkbox"/>
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**SUMMARY:** The precautionary approach is followed through the recent adoption of the HCR. 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 maximum sustainable yield.

**EVIDENCE:**  
 The precautionary approach is implemented through the recent adoption of the HCR. 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 ICES review of the HCR prior to its adoption concluded that “the proposed HCR stabilises SSB above  $B_{trigger}$  until at least 2020 under a wide range of assumptions on recruitment, assessment errors and stock definitions”, and also that “the HCR sufficiently takes account of the uncertainties in the assessment model”.

**CLAUSE: 1.3.2 Management targets and limit**

**1.3.2.1 Harvesting rate and fishing mortality**

**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<sup>27</sup>.

**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.<sup>28</sup>

<b>EVIDENCE RATING:</b>	High <input checked="" type="checkbox"/>	Medium <input type="checkbox"/>	Low <input type="checkbox"/>
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**SUMMARY:** A target harvest of  $F=0.097$  has been elected when SSB is above 220,000 t as stated in the management plan. This harvest rate is equivalent to a target fishing mortality described by the HCR.

**EVIDENCE: 1.3.2.1 Harvesting rate and fishing mortality**

A target harvest rate is stated in the harvest control rule in the management plan. This harvest rate represents two target fishing mortalities as described below.

**1.3.2.1.1**

The target fishing mortality is set at 0.097 whenever the estimated SSB is above 220,000 t. There is a proportional reduction in target fishing mortality whenever stock SSB falls below this level. Target fishing mortality is reduced to zero if SSB falls below  $B_{lim}$  (160,000 t).

**1.3.2.1.2**

Fishing mortality is limited using an annual TAC, based on the target mortality described above. Remedial actions are not taken based on the fishing mortality, but rather on estimates of SSB. A defined limit reference point is redundant as there is a HCR with a defined F which works to reduce exploitation if biomass falls below the trigger.

<b>CLAUSE: 1.3.2.2 Stock biomass</b>			
<p><b>1.3.2.2.1</b> The long term <i>management target</i> for stock size (biomass), either explicit or implicit depending on management approach, consistent with the objective of promoting optimum utilization, shall be specified.</p> <p><b>1.3.2.2.2</b> <i>Limits</i> or directions for stock size (or its proxy) with respect to precautionary management, consistent with avoiding recruitment overfishing, shall be specified.</p>			
<b>EVIDENCE RATING:</b>	High <input checked="" type="checkbox"/>	Medium <input type="checkbox"/>	Low <input type="checkbox"/>
<p><b>SUMMARY:</b> The implied medium term target of the management plan is to maintain SSB above 220,000t. The long term target is stated as: “to maintain the exploitation rate at the rate which is consistent with the precautionary approach and that generates maximum sustainable yield (MSY)”. These objectives for policy are stated in the FMP.</p>			
<p><b>EVIDENCE:</b></p> <p>The Fisheries Management Plan for Icelandic golden redfish states:</p> <p><i>“The management strategy for golden redfish (Sebastes norvegicus) in Subareas V, VI, XII and XIV 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”.</i></p> <p>ICES concluded in an evaluation carried out before the adoption of the new FMP that “the proposed HCR stabilises SSB above <math>B_{trigger}</math> until at least 2020 under a wide range of assumptions on recruitment, assessment errors and stock definitions”.</p>			

<b>CLAUSE: 1.3.2.2.3 The stock (biomass) limit reference point (<math>B_{lim}</math>) shall be developed in accordance with internationally accepted practice.</b>			
<b>EVIDENCE RATING:</b>	High <input checked="" type="checkbox"/>	Medium <input type="checkbox"/>	Low <input type="checkbox"/>
<p><b>SUMMARY:</b> <math>B_{lim}</math> is set at the lowest observed spawning biomass in the 2012 assessment.</p>			
<p><b>EVIDENCE:</b></p> <p><math>B_{lim}</math> is set at the lowest observed spawning biomass in the 2012 assessment (160,000 t). ICES evaluated the validity of this value as a reference point prior to its adoption, and concluded that it was derived from an appropriate assessment model and analytical assessment.</p>			

**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.

<b>EVIDENCE RATING:</b>	High <input checked="" type="checkbox"/>	Medium <input type="checkbox"/>	Low <input type="checkbox"/>
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**SUMMARY:** There is a high probability that  $B_{lim}$  will not be reached under the new FMP, HCR and management system.

**EVIDENCE:**  
 There is a high probability that  $B_{lim}$  will not be reached under the current FMP and management system. The fishing mortality is precautionary and unlikely to result in SSB approaching  $B_{lim}$ . Then there are also a range of management actions that could be taken within the existing legal infrastructure of the Icelandic management system.

Alternatively, the choice of measures may depend on the prevailing conditions:

- 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)**

**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.<sup>29</sup>**

<b>EVIDENCE RATING:</b>	<b>High</b> <input checked="" type="checkbox"/>	<b>Medium</b> <input type="checkbox"/>	<b>Low</b> <input type="checkbox"/>
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**SUMMARY: The stock assessment approach takes the size and age structure and composition of the golden redfish stock into account and there is favourable exploitation at age pattern supporting good year class strength and optimal utilization of the stock. The fishery exploits mainly 10-15 age classes, fishing mortality is modest and precautionary.**

**EVIDENCE:**

Catches are length sampled in all three fishing zones, but only Iceland gathers age and maturation data. The international catch numbers at age are therefore based solely on age-length keys derived from Icelandic catches in Va (table 5).

**Table 5.** Summary of catch and biometric data for Golden Redfish collected by area and nationality (source: [Stock annexe, NWWG, 2012](#)).

Country/area	Kind of data				
	Caton (Catch in weight)	Canum (catch-at-age in numbers)	Weca (weight-at-age in the catch)	Matprop (proportion mature-by-age)	Length composition in catch
Iceland (Va)	x	x	x	x	x
Faroe Islands (Vb)	x				x
Greenland (XIV)	x				x

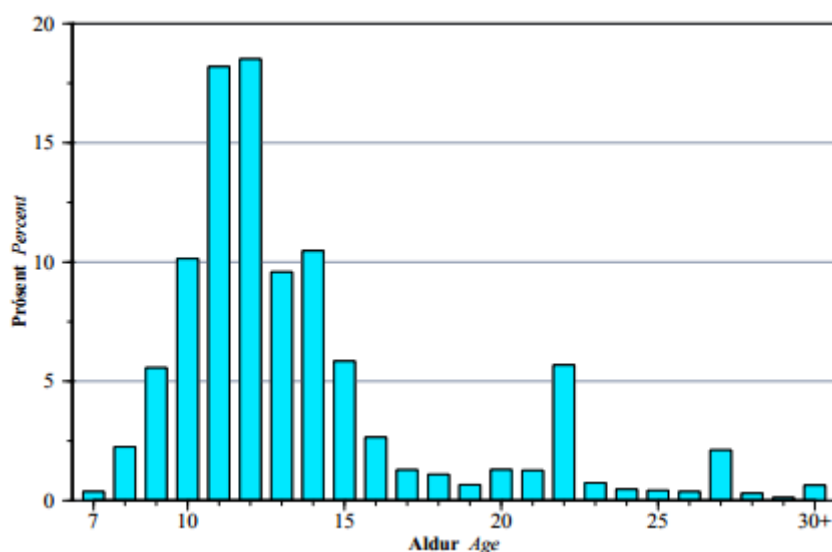
Sampling for age from commercial landings are collected by the Marine Research Institute (MRI) in Iceland and directly on board on the commercial vessels by the Directorate of Fisheries in Iceland, who mainly collect length data. The biological data collected are length (to the nearest cm), sex, maturity stage and otoliths for age reading.

In general, one sample for every 500 tonnes landed is taken by MRI. Each sample consists of 200 individuals: otoliths are extracted from 30 fishes which are also length measured, weighed, and sex and maturity determined; 70 fishes are length measured, weighed, sex and maturity

determined; the remaining 100 are length measured and sex and maturity determined (NWWG, 2012). A summary of sampling for length and age by country in 2011 is given in table 6.

**Table 6.** Sampling of Golden Redfish in Va, Vb and XIV by Iceland, Faeroe and Greenland in 2011. (source: [NWWG, 2012](#))

Area	Nation	Gear	Landings	Samples	No. length measured	No. Age read
Va	Iceland	Bottom trawl	42,605	221	39,892	1,640
Vb	Faeroe	Bottom trawl and gillnets	493		383	
XIV	Greenland	Bottom trawl	1,676			



**Figure 12.2.** Age distribution in the 2012 Icelandic golden redfish catch (% by number). From the MRI 'State of Stocks 2012/13' advice.

**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 ( $B_{lim}$ ).<sup>30</sup>**

<b>EVIDENCE RATING:</b>	High <input checked="" type="checkbox"/>	Medium <input type="checkbox"/>	Low <input type="checkbox"/>
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**SUMMARY: Management measures are in place in the form of temporary and permanent closures and mesh size restrictions to protect spawning components of the stock.**

**EVIDENCE:**

***Fish Size regulations***

There are minimum reference sizes for Golden Redfish (33 cm). As discarding is prohibited it is mandatory to land all specimens below these lengths. The minimum reference lengths are used to trigger area closures when catches comprise of 20% or greater of fish below the reference size. Where an area closure has been triggered, it remains closed for a minimum of two weeks and is subject to periodic monitoring.

***Mesh size regulations.***

There are rules within Act No 127, 1997 (Article 8) which prohibits 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 trawl 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. In the Nephrops fishery, which has a by-catch of other finfish species, the use of two large (200 mm) mesh escape panels is mandatory (Regulation no. 543:2002.07.22)

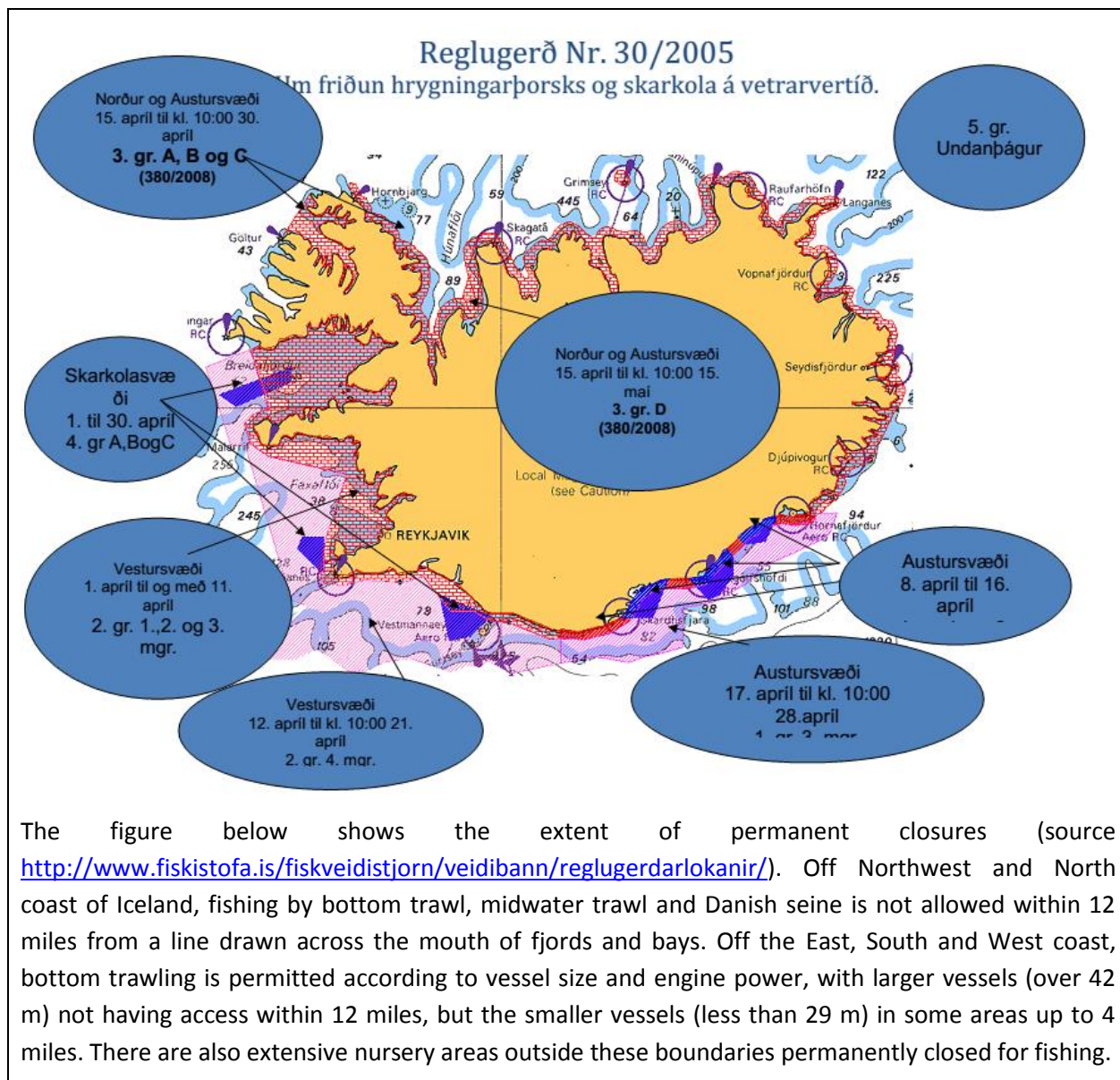
Mesh size and gear restrictions are also mandated to protect both juvenile stocks (trawl mesh size 135 mm with separator panel) and spawners (gill net mesh size 8 inches). Shrimp (*Pandalus*) fisheries are also associated with by-catches of juvenile finfish species. To minimise such by-catch, the use of sorting grids is mandatory.

***Area closures***

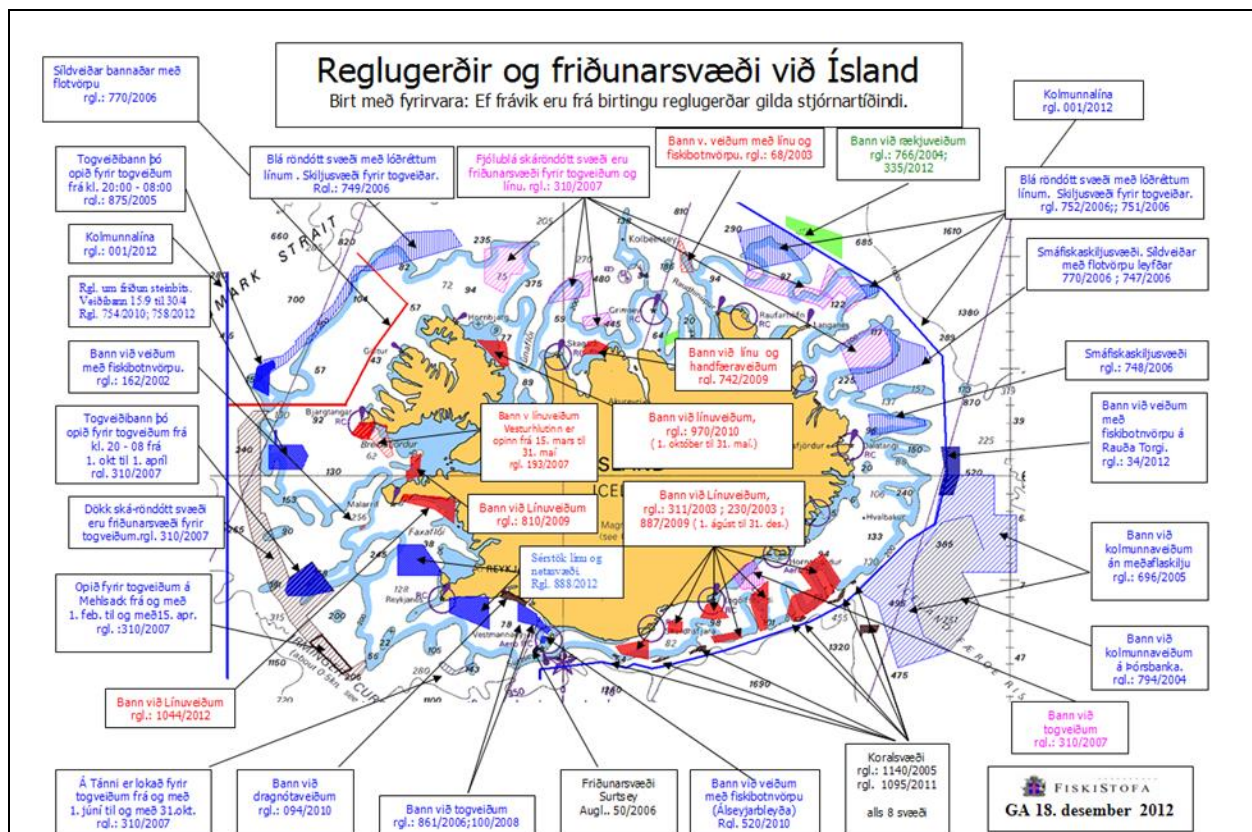
There is an extensive array of areas closures in place in Icelandic waters. These take the form of permanent, seasonal and periodic closures aimed at protecting both juvenile and spawning fish and are gear or fishery specific.

The figure below show closures to protect spawning fish aggregations. Most of these closures apply to cod while others to redfish, among other species such as haddock and saithe.





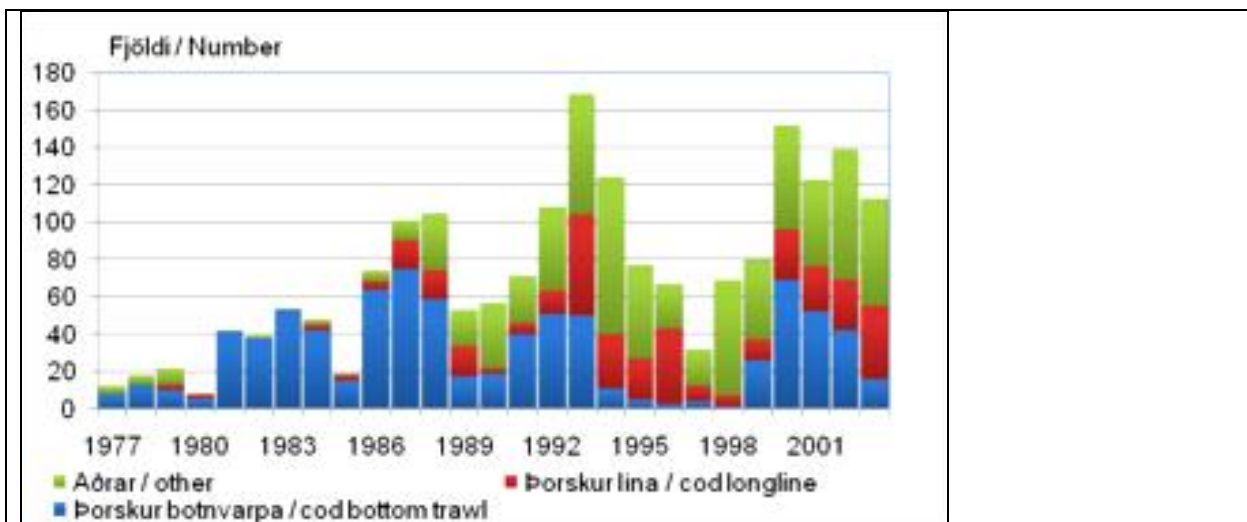
The figure below shows the extent of permanent closures (source <http://www.fiskistofa.is/fiskveidistjorn/veidibann/reglugerdarlokanir/>). Off Northwest and North coast of Iceland, fishing by bottom trawl, midwater trawl and Danish seine is not allowed within 12 miles from a line drawn across the mouth 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.



**Figure 13.** Extent of closed and protected areas (source <http://www.fiskistofa.is/fiskveidistjorn/veidibann/reglugerdarlokanir/>).

Many areas along the south shore are seasonally closed to trawlers and/or Danish seiners (figure below). Fjords and bays in other areas are as well, these seasonal closures usually last about half a year each, but are of course variable. The most extensive seasonal closure is the spawning time closures. All fisheries are closed within 12 miles along the south and west shore and within 6 miles along the north and east shore for two weeks during Easter to protect the spawning of cod.

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 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.



**Figure 4.** Numbers of temporary closures in Iceland between 1977 and 2003.

**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.**

<b>EVIDENCE RATING:</b>	High <input checked="" type="checkbox"/>	Medium <input type="checkbox"/>	Low <input type="checkbox"/>
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**SUMMARY:**

**A comprehensive and strategically allocated gear specific set of regulations are available to support the protection of juvenile fish stock. These are focused primarily on technical devices to allow small fish to avoid or escape capture.**

**EVIDENCE:**

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 groundfish fisheries:

- Regulation No. 881/2009
- Regulation of specific line and nets
- 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://www.sjavarutvegsraduneyti.is/log-og-reglugerdir/reglugerdir/Ymsar\\_veidar/](http://www.sjavarutvegsraduneyti.is/log-og-reglugerdir/reglugerdir/Ymsar_veidar/) provides full access to all Regulations currently applicable to Icelandic fisheries.

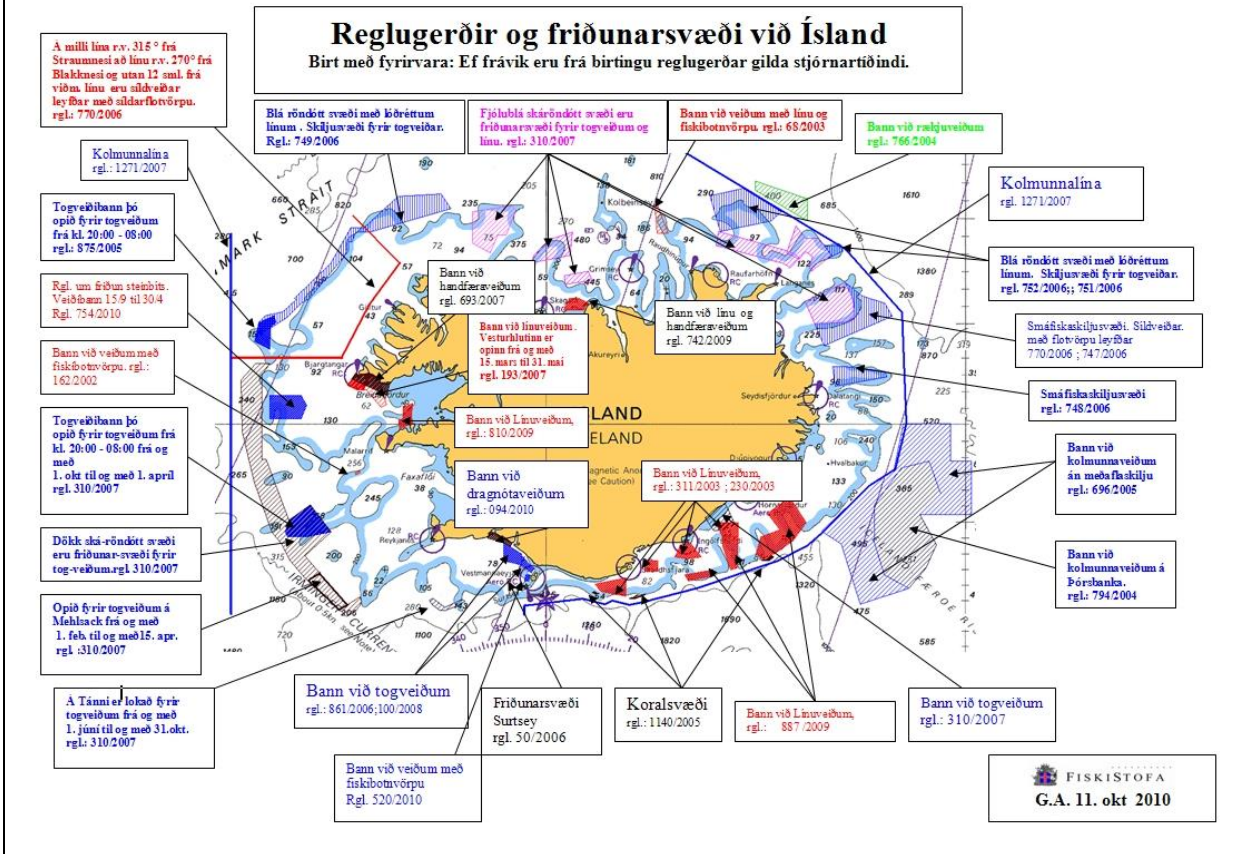
Clause: 1.3.2.3.4 Consideration shall be given to measures designed to limit fishing mortality of juvenile fish, e.g. through temporary closures to fishing of areas containing a high proportion of juveniles of stock under consideration, with the objective to reducing the likelihood of growth overfishing and increasing the contribution of year classes to the spawning stock.

<b>EVIDENCE RATING:</b>	High <input checked="" type="checkbox"/>	Medium <input type="checkbox"/>	Low <input type="checkbox"/>
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**SUMMARY:** As described under clause 1.3.2.3.2, temporary and permanent closures to fishing areas containing a high proportion of juveniles of stock under consideration are applied, with the objective to reducing the likelihood of growth overfishing and increase the contribution of year classes to the spawning stock.

**EVIDENCE:**  
 Red areas- coral closures- permanently closed  
 Blue areas- closed for all trawling (except for dates shown)  
 Grey blue shaded – no mid water trawling  
 Blue line- blue whiting line – no fishing inside line for blue whiting  
 Green – no shrimp fishing  
 Purple- closed for trawling- bottom trawling- (small cod and haddock)- protecting potential habitat.

**Black- ban on trawling except for 8pm to 8am to allow access to saithe and minimise redfish bycatch.**



## 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.**

<b>EVIDENCE RATING:</b>	High <input checked="" type="checkbox"/>	Medium <input type="checkbox"/>	Low <input type="checkbox"/>
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**SUMMARY: ICES has developed routines for in-depth review of assessment methods and data that go into the assessment (benchmark assessments). Ideally, this should be done approximately every 5 years, or if there are reasons to alter the assessment practises. The initiative may come from ICES itself, from the assessment Working Group responsible for the stock, or from managers.**

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

Evaluation of management plans are done at the request of responsible managers. ICES have 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.

The newly developed Harvest Control Rule has been externally reviewed by ICES on behalf of the governments of Iceland, Greenland and Faroe. This will be implemented for the Icelandic fisheries within the new Fishery Management Plan for golden redfish. Both the effectiveness of the FMP and redfish stock will be reviewed annually during the routine assessment of fishery performance and up-dates to include survey data in the assessment model. It is not anticipated that the HCR will be modified in the next 5 years since it is the intention of the Icelandic fisheries management agencies to maintain a low, precautionary fishing rate for the next 5 years. This has been externally reviewed by ICES and is considered to meet the ICES definitions of precautionary approach.

**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.**

<b>EVIDENCE RATING:</b>	High <input checked="" type="checkbox"/>	Medium <input type="checkbox"/>	Low <input type="checkbox"/>
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**SUMMARY: There is a formalized system for review identified within the FMP for Redfish. This includes internal, annual reviews including fishers and stakeholders. An external ICES review is also identified in 5 years time.**

**EVIDENCE:**

The FMP describes the annual review process: - the MRI advises the Minister on the exploitation of the Golden Redfish stock in June each year; ICES provides advice as well; both ICES and the MRI advice on research and harvesting policy in general. The assessment is conducted annually by the MRI and is peer reviewed by ICES. The Minister decides on the TAC of the Golden redfish stock for each fishing year (Sept-Aug) in accordance with law, based on HCR and above mentioned advice. A special consultation group of the MRI meets every year and reviews different sources and information regarding the main demersal stocks and fisheries in the Icelandic EEZ, including redfish. One of the more important sources of information used by the 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.

Furthermore: A 5 year review of the HCR with external review by ICES is identified, which is consistent with other groundfish FMP’s developed by Iceland.

### 1.5 Advice and Decisions on TAC

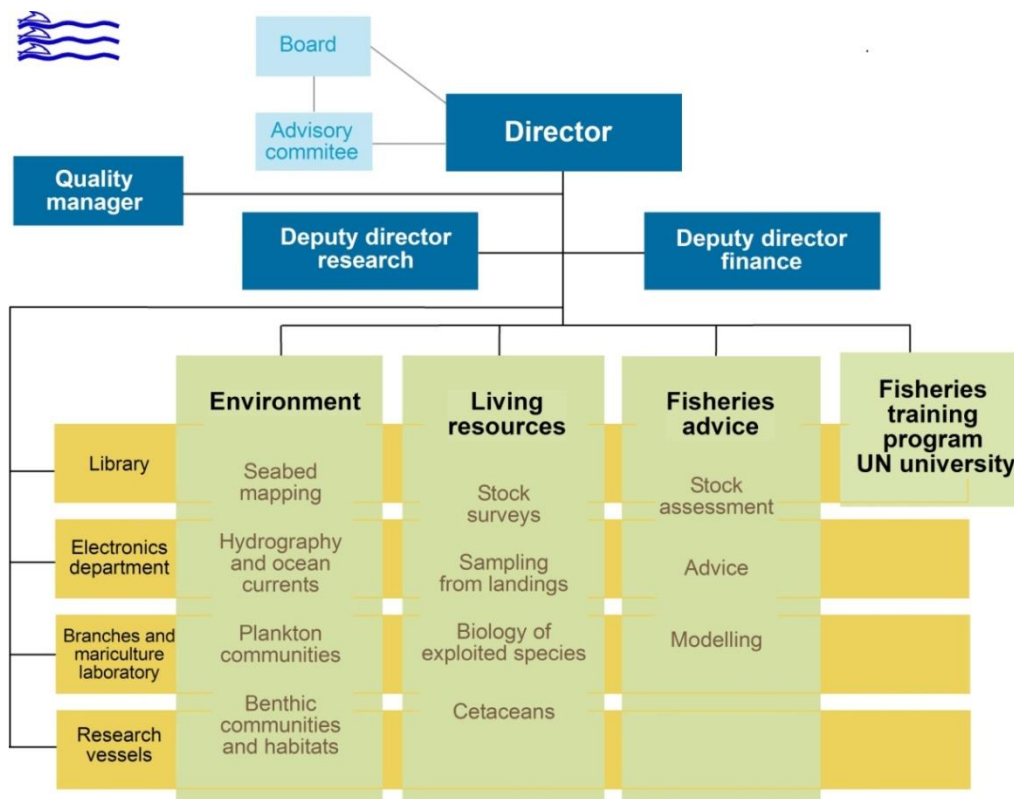
**CLAUSE: 1.5.1 A competent scientific body, research institute, designated advisory body or arrangement shall provide the competent fisheries management authority with fisheries advice on the harvesting of the stock under consideration.**

<b>EVIDENCE RATING:</b>	High <input checked="" type="checkbox"/>	Medium <input type="checkbox"/>	Low <input type="checkbox"/>
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**SUMMARY: 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.**

**EVIDENCE:**

Fisheries research is undertaken by the Marine Research Institute (MRI) of Iceland. MRI is mandated by the Ministry of Industries and Innovation, and is specified in the Icelandic legal framework for fisheries management. The MRI was established in 1965 and is a government institute with around 170 employees, 2 research vessels, 5 branches around Iceland and a mariculture laboratory. The MRI runs two research vessels: Bjarni Sæmundsson (55 m) and Árni Friðriksson (70 m). Figure 15, below, shows the organisational structure of the MRI.



**Figure 16.** Organizational structure of the Iceland Marine Research Institute (MRI). source



[http://www.hafro.is/index\\_eng.php](http://www.hafro.is/index_eng.php)

The MRI focuses on three main areas of activity:

- to conduct research on 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 sea and its living resources

Iceland is also a member of ICES. Iceland has delegates in many of ICES almost 150 Expert/Study Groups that address the many diverse issues of the marine ecosystem.

It is within the expert groups that the core of ICES work is accomplished. Expert groups are composed of nationally nominated experts, and may also include additional expertise to ensure the highest quality, peer-reviewed science. ICES products such as Cooperative Research Reports and Advice are based on the hard work of the scientists that belong to the network.

Expert group members work throughout the year and normally meet annually or bi-annually to address their assigned Terms of Reference and write their report. Expert group participants are nominated by national delegates, or invited by the Chair and are assigned Terms of Reference for their work assigned by their parent committee, either the Advisory Committee (ACOM) and/or Science Committee (SCICOM).

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

<b>EVIDENCE RATING:</b>	High <input checked="" type="checkbox"/>	Medium <input type="checkbox"/>	Low <input type="checkbox"/>
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**SUMMARY: The routine ICES advice includes the appropriate values for precautionary reference points.**

**EVIDENCE:**

The routine ICES advice includes the following information on reference points (ICES 2013):

**Reference points**

	Type	Value	Technical basis
MSY Approach	MSY $B_{trigger}$		
	$F_{MSY}$		
Precautionary approach	$U_{lim}$	55	20% of the highest observed survey index*.
	$U_{pa}$	155	60% of the highest observed survey index*.
	$F_{lim}$	Undefined.	
	$F_{pa}$	Undefined.	

*(unchanged since 1998)*

\* *Technical basis for the survey index:*

The basis for the calculation of the  $U_{pa}$  is the Icelandic spring groundfish survey index series starting in 1985. Since 1990 the average  $U$  has been around half of  $U_{max}$  – the highest observed index in the time-series (276 in 1987). This has not resulted in any strong year classes compared to higher  $U$ 's. A precautionary  $U_{pa}$  is therefore proposed at  $U_{max} \times 0.6$ , corresponding to the  $U$ 's associated with the most recent strong year class.  $U$  is regarded as a proxy for SSB but represents the fishable biomass.

Post the site visit, ICES has evaluated the most recent stock assessment, reference points and HCR now implemented in the FMP for Golden redfish. Scientific advice (ICES 2014) is provided in relation to the harvest control rules specified in the golden redfish fishery management plan. The biomass limit reference point ( $B_{lim}$ ) in the management plan is based on the lowest observed biomass ( $B_{loss}$ ) in the 2012 assessment. Its value is 160,000 t. The updated assessment results in a less than 10% lower  $B_{loss}$ . The  $B_{trigger}$  reference point is set in the management plan using the  $B_{lim}$  as a basis and accounting for the assessment error, resulting in a  $B_{trigger}$  of 220,000 t.

If SSB falls below 220,000 t, the HCR requires that the target fishing mortality (0.097) be lowered proportionally to the difference.

**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.**

<b>EVIDENCE RATING:</b>	High <input checked="" type="checkbox"/>	Medium <input type="checkbox"/>	Low <input type="checkbox"/>
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**SUMMARY:** The annual TAC is set by the Minister of Industries and Innovation based on advice provided by ICES and the MRI (and hence factoring in the entire distribution as assessed by those bodies). The recent advise from ICES, (Feb 2014) also notes that the request was submitted by *“The Governments of Iceland, Faroe Islands and Greenland propose the following management plan for golden redfish (Sebastes norvegicus) in Subareas V, VI, XII and XIV. Both Faroese and Greenland survey data as well as the autumn German-Greenland groundfish survey data was added to the assessment.*

**EVIDENCE:**

**Scientific advice**

The basis of the newly adopted HCR by Iceland has been formulated using data derived from the assessment methodology for *S. norvegicus* (in subareas V, VI, XII, and XIV) (including Iceland, East Greenland eco-region) and has been peer reviewed by ICES and accepted. On an annual basis, the MRI advises the Minister of Industries and Innovation on the exploitation of the redfish stock in June each year and from 2014 fishery, TAC is to be based on a fishing mortality derived from the HCR; (ICES also provides advice on the golden redfish stock management unit). The recommendation given by the MRI based on the stock assessment and HCR takes into consideration the entire distribution of the stock under consideration. The annual advice is also peer reviewed by the Advisory Committee (ACOM) of ICES every year. Within Iceland, the TAC review process has an inclusive approach regarding the management organisations and an industry/participant consultation process.

**Process for making decisions on TAC**

The Minister of Industries and Innovation decides on the TAC of the redfish stock for each fishing year (Sept-Aug) in accordance to law, based on the trend based assessment and above mentioned advice. The FMP also describes the consultation process.

**CLAUSE: 1.5.4 For Shared Stocks the setting of TAC shall take into consideration international agreements and scientific advice.**

<b>EVIDENCE RATING:</b>	High <input checked="" type="checkbox"/>	Medium <input type="checkbox"/>	Low <input type="checkbox"/>
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**SUMMARY: Icelandic golden redfish is considered a straddling stock as it is also prosecuted by Greenland and the Faroe Islands. There is no formal international agreement on the management of the stock, although international scientific advice is provided by ICES.**

**EVIDENCE:**

Although the golden redfish stock is subject to fisheries by Greenland, Iceland and the Faeroe Islands, no formal agreement on international management exists. In Greenland and Iceland the fishery is regulated by a TAC and in the Faeroe Islands by effort limitation. The regulation schemes of those states have previously resulted in catches well in excess of TACs advised by ICES. (ICES, 2011)

The regulation is based on TAC in Iceland and in Greenland, but through an effort system in the Faeroe Islands. The separation of golden redfish and Icelandic slope *S. mentella* in the quota was implemented in the 2010/2011 fishing season. The TAC in Greenland is set for redfish, with no distinction being made between *S. norvegicus* and *S. mentella*. (ICES, 2012)

Icelandic government authorities have proposed within NEAFC (North East Atlantic Fisheries Commission) that the same kind of management be adopted for managing redfish fisheries in international waters as applies to fisheries in Icelandic waters. The Icelandic proposals in this regard conform with the recommendations of international organizations concerning the application of the precautionary approach in the fishery.<sup>31</sup>

<sup>31</sup> <http://www.fisheries.is/management/government-policy/responsible-fisheries/redfish-fisheries/>

**CLAUSE: 1.5.5 The competent fisheries management authority shall decide on TAC within the boundaries set by the adopted harvesting policy.**

<b>EVIDENCE RATING:</b>	High <input checked="" type="checkbox"/>	Medium <input type="checkbox"/>	Low <input type="checkbox"/>
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**SUMMARY: The HCR was only introduced this year; however in other Icelandic fisheries, the Minister decides on the TAC of the stock for each fishing year (Sept-Aug) in accordance to law, based on the HCR and scientific advice. The HCR is consistent with other fisheries which have adopted this approach (cod, haddock, saithe). FMP adoption was confirmed in April 2014.**

**EVIDENCE:**

*Process for making decisions on TAC*

The HCR for golden redfish was introduced this year and so there is not yet any historical evidence that it is used to determine TACs. However, in other HCR-managed Icelandic fisheries, the Minister of Industries and Innovation decides on the TAC of stocks for each fishing year (Sept-Aug) in accordance to law (Fisheries Management Act 116), based on HCR and the advice mentioned below. There is evidence in other groundfish fisheries in Iceland of successful implementation of HCR that work on similar stock based trigger reference points (cod, haddock and saithe).

*Scientific advice*

The MRI advises the Minister on the exploitation of the golden redfish stock in June each year. ICES provides additional advice, and 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.

<b>CLAUSE: 1.5.6 Management measures for conservation and sustainable use of the stock under consideration shall be specified in laws and regulations.</b>			
<b>EVIDENCE RATING:</b>	High <input checked="" type="checkbox"/>	Medium	Low <input type="checkbox"/>
<b>SUMMARY: Management measures for conservation and sustainable use of the stock under consideration are specified in laws and regulations.</b>			
<b>EVIDENCE</b>			
<p>Primary laws and regulations regarding fisheries management:  <i>The Act on Fisheries Management as subsequently amended no. 116/2006.</i>  <i>The Act concerning the Treatment of Commercial Marine Stocks as subsequently amended no. 57/1996.</i>            Regulation No 57/1997 all catch has to be landed and provisions on discard are also in regulation no. 601/2003.</p> <p><i>The Act on Fishing in Iceland's Exclusive Fishing Zone as subsequently amended no. 797/1997.</i></p> <p>Regulations are issued annually with amendments. Primary regulations are:  <i>Regulation no. 742/2008 on commercial fisheries with amendments.</i>  <i>Regulation no. 601/2003 on utilisation of catch and by-products.</i>  <i>Regulation no. 557/2007 on logbooks.</i>  <i>Regulation no. 224/2006 on weighing of catch as subsequently amended.</i></p> <p><i>Regulation No 384/2010 on coastal fishing 2009/10.</i></p> <p><i>Fisheries management system</i>            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.<sup>32</sup></p> <p>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 allocated on an ITQ system but is subtracted from the total fishery TAC.</p>			

*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 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 and vulnerable marine ecosystems, e.g. coldwater corals.

**CLAUSE: 1.5.7 Practical implementation shall be the task of (a) designated competent institution(s).**

<b>EVIDENCE RATING:</b>	High <input checked="" type="checkbox"/>	Medium <input type="checkbox"/>	Low <input type="checkbox"/>
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**SUMMARY: The Directorate of Fisheries 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.**

**EVIDENCE:**

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

The Icelandic Directorate of Fisheries 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 are fisheries inspection at sea and monitoring of the EEZ and reception of required notifications from vessels. The Coast Guard also carries out 24-7 surveillance of all vessels in Iceland’s EEZ.

**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.**

<b>EVIDENCE RATING:</b>	High <input checked="" type="checkbox"/>	Medium <input type="checkbox"/>	Low <input type="checkbox"/>
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**SUMMARY: Historically, recorded catches have tended to fall slightly below the TAC, with some exceptions.**

**EVIDENCE:**

Each vessel is assigned an ITQ which is trackable and traceable within the overall management system using the vessel registration, permitting and e-logbook system. E-logbooks provide very up-to-date information on vessel landings of each species. The Directorate maintains an up-dated system for each vessels ITQ for each species on the central database and makes this information publicly available. A flexible system for ITQ is in place with boundaries which promotes high compliance of reporting and allows adjustments to be made through subsequent annual quota setting.

Some flexibility is built in the ITQ system. The main objective is to facilitate compliance with rules and promote the responsible use of fish stocks. Up to 20% of quota for most species can be transferred from one fishing year to the next. It is permitted to fish up to 5% above assigned individual fishing vessel quota but this reduces the quota by the same amount next year.

The Directorate undertakes official registration of weights of all fresh fish through landings at designated ports only. For processed at sea fish, there are agreed and established/verified yield factors in place.

The total catch of each vessel is weighed immediately during landing of the catch and registered in the system. In special cases, the Directorate of Fisheries may grant an exemption from the weighing system called a residence permit for selling fish at the auction.

The Directorate maintains a list of official weighing stations on ‘Skrá yfir heimavigtunar- og endurvigtunarleyfishafa Fiskistofa 08.01.2010’.  
[http://www.fiskistofa.is/media/tilkynningar/vigtunarleyfi\\_13102009.pdf](http://www.fiskistofa.is/media/tilkynningar/vigtunarleyfi_13102009.pdf)

Table 7 below compares the TACs and final landings data for golden redfish since 1987.

**Table 7.** Golden redfish (*Sebastes norvegicus*) in Subareas V, VI, XII, and XIV. ICES advice, management, and landings.

Year	ICES Advice	Predicted catch corresp. to advice	Iceland TAC <sup>1,6</sup>	Greenland TAC <sup>7</sup>	<i>S. marinus</i> ICES landings
1987	No increase in F	83	95		77
1988	No increase in F	84	85		90
1989	TAC <sup>1</sup>	117 <sup>1</sup>	77		57
1990	TAC <sup>1</sup>	116 <sup>1</sup>	80		67
1991	Precautionary TAC	77 (117 <sup>1</sup> )	55 <sup>5</sup>		56
1992	Precautionary TAC	76 (116 <sup>1</sup> )	90		56
1993	Precautionary TAC <sup>1</sup>	120 <sup>1</sup>	104		50
1994	Precautionary TAC, if required	100 <sup>1</sup>	90		43
1995	TAC	90 <sup>1</sup>	77		45
1996	TAC for Division Va (28); precautionary TAC for Division Vb and Subarea XIV (4)	32 <sup>2</sup>	65		37
1997	Effort 75% of 1995 value	32 <sup>2</sup>	65		40
1998	Effort reduced in steps of 25% from the 1995 level	37.2 <sup>2</sup>	65		39
1999	Effort not increased compared to 1997	35 <sup>2</sup>	65		42
2000	Catch not increased compared to 1998	35 <sup>2</sup>	60		44
2001	Effort not increased compared to 1999	33 <sup>2,3</sup>	57		37
2002	25% reduction in effort	29 <sup>4</sup>	65		51
2003	25% reduction in effort(2001)	31 <sup>4</sup>	60		39
2004	25% reduction in effort(2002)	37.4 <sup>4</sup>	57		33.4
2005	Maintain fishable biomass above U <sub>pa</sub>	37 <sup>4</sup>	57		45.4
2006	Maintain fishable biomass above U <sub>pa</sub>	37 <sup>4</sup>	57		42.2
2007	Maintain fishable biomass above U <sub>pa</sub>	37 <sup>4</sup>	57	5	39.1
2008	Maintain fishable biomass above U <sub>pa</sub>	37 <sup>4</sup>	57	1	46.3
2009	Maintain fishable biomass above U <sub>pa</sub>	< 30	50		39.2
2010	Maintain fishable biomass above U <sub>pa</sub>	< 30	50	6	38.7
2011	Same advice as last year	< 30	37.5	8	46.0
2012	Maintain catches	< 40	40	8	45.3
2013	Maintain catches	< 40	45	8	
2014	20% increase in catches (rel. 2010–2012)	<52			

Weights in thousand tonnes.

<sup>1</sup> Deep-sea *S. mentella* and *S. marinus* combined.<sup>2</sup> *S. marinus* only.<sup>3</sup> In Division Va only.<sup>4</sup> Both Divisions Va and Vb and Subarea XIV.<sup>5</sup> Year ending 31 August.<sup>6</sup> From 1992 onwards: Quota year September–August.<sup>7</sup> Demersal redfish (*Sebastes marinus* and *S. mentella*).



**CLAUSE: 1.5.9 Management agreements reached in the competent Regional Fisheries Management Organizations (RFMOs) or arrangements, relevant to the stock under consideration, shall be implemented by states and effectively and uniformly executed.**

<b>EVIDENCE RATING:</b>	High <input checked="" type="checkbox"/>	Medium <input type="checkbox"/>	Low <input type="checkbox"/>
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**SUMMARY:** Icelandic golden redfish is considered a straddling stock as it is also prosecuted by Greenland and the Faroe Islands. Whilst there is no formal international agreement on the management of the stock, international scientific advice is provided by ICES for all coastal States that have a fishery and Iceland is actively promoting the adoption of a uniform management approach. Further collaboration between the parties is planned and will be reported during surveillance audits.

**EVIDENCE:**  
 Although the golden redfish stock is subject to fisheries by Greenland, Iceland and the Faeroe Islands, no formal agreement on international management exists. In Greenland and Iceland the fishery is regulated by a TAC and in the Faeroe Islands by effort limitation. The regulation schemes of those states have previously resulted in catches well in excess of TACs advised by ICES. (ICES, 2011)  
 The regulation is based on TAC in Iceland and in Greenland, but through an effort system in the Faeroe Islands. The separation of golden redfish and Icelandic slope *S. mentella* in the quota was implemented in the 2010/2011 fishing season. The TAC in Greenland is set for redfish, with no distinction being made between *S. norvegicus* and *S. mentella* (ICES, 2012). Further collaboration between the parties is planned and will be reported during surveillance audits.  
 Icelandic government authorities have proposed within NEAFC (North East Atlantic Fisheries Commission) that the same kind of management be adopted for managing redfish fisheries in international waters as applies to fisheries in Icelandic waters. The Icelandic proposals in this regard conform with the recommendations of international organizations concerning the application of the precautionary approach in the fishery.<sup>33</sup>

<sup>33</sup> <http://www.fisheries.is/management/government-policy/responsible-fisheries/redfish-fisheries/>

**CLAUSE: 1.5.10 In the absence of specific information on the stock under consideration, generic evidence based on similar stocks shall 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.<sup>34</sup>**

<b>EVIDENCE RATING:</b>	High <input checked="" type="checkbox"/>	Medium <input type="checkbox"/>	Low <input type="checkbox"/>
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**SUMMARY: There is sufficient information available describing the Icelandic golden redfish stock to allow for full analytical assessment to be performed and MSY reference points derived. The assessment takes sufficient account of the uncertainties within the precautionary approach to exploitation rate and new data (German Greenland survey data) has been recently incorporated.**

**EVIDENCE:**

The scientific data used for assessing Icelandic redfish include sampling programs i.e. log books, surveys, sampling from landings etc...

**Sampling from the Icelandic fleet**

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. The system as such should thus take into account seasonal variability in the landings of any species. The sampling design is not per se linked to the geographical distribution of the fisheries. However the fishing location of the fish measured at harbour is known with reasonably accuracy, because fishing date is registered for each fish boxes and can hence be linked to geographic location of the fishing at that date, based on the captain’s log-book record.

**Surveys**

An account of the Icelandic March (Spring, 1985-onwards) and October (Fall, 1996-onwards) groundfish surveys were provided as a WD for the Benchmark 2010 (WD-03). The WD is a translation of a citable report ([http://www.hafro.is/Bokasafn/Timarit/rall\\_2007.pdf](http://www.hafro.is/Bokasafn/Timarit/rall_2007.pdf)) written in the native language. In summary, the surveys design is a classical random stratified design with fixed stations with time. With the caveat that experienced captains are given the freedom to choose particular stations within a certain predefined geographical constraint determined by the scientist. The number of stations in the spring survey are 530, the number of stations in the fall are 380. The spring survey covers depth to 500 meters, but the fall survey covers depths down to 1200 m.

**Commercial CPUE**

Catch per unit of effort are routinely calculated during the annual assessment process. ICES NWWG REPORT 2011 Stock Annexes

**Information from the fishing industry**

Since 2000 all vessels fishing in Icelandic waters have been required to fill out log-books where they list information about the location, catch and a number of other things for each tow (setting). Vessels larger than 12 tonnes have been required to return logbooks since 1991 and some trawlers started returning logbooks in the seventies. Since 2009 increasing number of vessels have used electronic logbooks where positions are recorded automatically and more and once during each setting.

ICES NWWG REPORT 2011

## Section 2: Compliance and Monitoring

### 2.1 Implementation, compliance, monitoring, surveillance and control

<p><b>CLAUSE:</b> 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.<sup>35</sup></p>			
<p><b>EVIDENCE RATING:</b></p>	<p>High <input checked="" type="checkbox"/></p>	<p>Medium <input type="checkbox"/></p>	<p>Low <input type="checkbox"/></p>
<p><b>SUMMARY:</b> 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.</p>			
<p><b>EVIDENCE:</b></p> <p>The principal Act (<b>Fisheries Management Act No.116/2006</b>) 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 Icelandic Maritime Administration 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).</p> <p>The Act on Fishing in Iceland’s Exclusive Fishing Zone No. 79/1997 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 (&gt;ISK 400,000 &lt; ISK 8,000,000).</p> <p>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</p>			

by the Directorate. Act No. 55 (1968) on control and inspection of fish and fish produce establishes the hygiene conditions and provisions for catch separation, recording, tracking of quota allocations, accredited weighing stations within 2 hours of landing (**Regulation No 224/2006**), exemptions for in house and auction weighing permission, processing at sea weight registration, and transfer of quotas.

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 info 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 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.



<p><b>2.2 Concordance between actual catch and allowable catch.</b></p> <p><b>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.<sup>36</sup></b></p> <p><b>2.2.2 Monitoring, surveillance and information feedback shall be used to collate information on actual catch.</b></p> <p><b>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.</b></p> <p><b>2.2.4 Participating companies shall:</b></p> <p style="padding-left: 40px;"><b>2.2.4.1 Ensure that they have been issued with all the required permits;</b></p> <p style="padding-left: 40px;"><b>2.2.4.2 Operate in compliance with the relevant rules and regulations;</b></p> <p style="padding-left: 40px;"><b>2.2.4.3 Limit the catches of their vessels in accordance with their catch quota</b></p>			
<b>EVIDENCE RATING:</b>	High <input checked="" type="checkbox"/>	Medium <input type="checkbox"/>	Low <input type="checkbox"/>
<p><b>SUMMARY: Evidence available demonstrated a high level of compliance between TAC and actual catch of golden redfish 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.</b></p>			
<p><b>EVIDENCE:</b></p> <p>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. 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:</p> <ul style="list-style-type: none"> <li>• Vessel monitoring systems and Electronic Reporting System (legal requirements) which were developed in close cooperation with the Coast Guard and Fisheries Authorities.</li> <li>• Electronic logbook and Reporting System, which generates mandatory reports to the Directorate as well as providing a valuable management reporting system for fleet management.</li> </ul>			

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, dept, wind direction, m/s, wind speed, seafloor, twin trawls, name of person registering information, and other information for later transmittance 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.

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 info within the Directorates catch registration system without delay.

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 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. During the site visit, traceability/documentation reviews were carried out on 4 occasions (2 processors and one group entity and a fish auction). Essentially, there is an official registration of landed weight in all cases which also registers vessel, species, and quantity using identifiers that allow traceability to vessel. In most cases, the unique vessel identifier remained 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.

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 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. 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).

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 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. 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 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. For example, 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 (krókaafllamarkskerfi) is available for boats less than 15 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. Currently about 700 boats are fishing within the small boat system.

Each fishing year the Minister shall have available harvest rights amounting to up to 12,000 tonnes of unguessed 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 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. However, this authorisation does not 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.

### **Clause: 2.3.2 Fishing vessel monitoring and control systems**

**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 high grading by species, season, gear type and area as feasible. The method for the 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 by-catch 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.**

<b>EVIDENCE RATING:</b>	High <input checked="" type="checkbox"/>	Medium <input type="checkbox"/>	Low <input type="checkbox"/>
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**SUMMARY: 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 fish in poor health. 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 Coast Guard conduct vessel boardings in order to inspect gear, catch and catch records.

**2.3.2.3**

Temporary closures are available for public and fishery review. 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 6 GRT) a report of catches must be submitted on landing.

**2.3.2.5/6**

Logbooks are subject to unannounced vessel boarding inspections by Coast Guard and at port boarding's by the Directorate. Boarding of vessels by Coast Guard and Directorate staff includes a review of catch compared to logbook information.

**2.3.2.7**

Discarding of catch is prohibited by Icelandic fishery law except for damaged fish in poor health.

The MRI report on discard report NO. 154 2010 also provides qualification of very low discarding estimates derived through the annual assessment.

**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. 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.

**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.

**2.3.2.11**

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, observation of vessel landings (logbooks) and registrations by the accredited weighers at auction, Port Authorities and individual company official weighers was observed.

**Table 2.** Inspections by the LGH in 2012 and 2013.

**Enforcement Actions**

	<b>2012</b>	<b>2013</b>
Control, number of vessels / inspections	185	182
Comments, number of vessels	94	73
Equipment, number of vessels	30	29
Catch, number of vessels	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

**Prosecution reasons (2013):**

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
<b>Total</b>	<b>33</b>

**2.3.2.13/14**

The weight (whole weight or gutted weight) by species of all catches of "stock under consideration" and by-catch species shall be measured by accredited harbour officials at landing and recorded in the official central data base (date, vessel, location, species, 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 certificated 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 60 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 have overfished 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.

**CLAUSE: 2.3.3 Catches are subtracted from relevant quotas**

**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.**

<b>EVIDENCE RATING:</b>	High <input checked="" type="checkbox"/>	Medium <input type="checkbox"/>	Low <input type="checkbox"/>
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**SUMMARY:** 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 website.

**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. Exceptions include Community quotas (not based on vessel’s quota share, all other provisions apply; and other minor experimental provisions.

**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. A working tour of database management with active examples was undertaken during the site visit to the Directorate and also examples of e-logbook entries and management at visits to Bjordon Grindavik. Also, entries

made by the Port Authorities were reviewed relating to overland arrivals of fish from other parts of Iceland. 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.

#### **2.3.3.2**

Vessels must available quota in order to continue fishing once quota is used up. The system is monitored by the Directorate.

#### **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.

Other items allowing flexibility:

It is permitted for the year's catch to exceed the year's quota by 5% in some species; the excess is then deducted from the following year's quota.

It is permitted to postpone fishing for part of the quota and to transfer up to 33% of the year's quota to the following fishing year; postponement of fishing is considered beneficial to the growth of long-lived fish stocks.

#### **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.



**CLAUSE: 2.3.4.1 Rules shall be enforced. There shall be penalties for serious infractions.**

<b>EVIDENCE RATING:</b>	<b>High</b> <input checked="" type="checkbox"/>	<b>Medium</b> <input type="checkbox"/>	<b>Low</b> <input type="checkbox"/>
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**SUMMARY:** 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 reside with the Coast Guard. The MRI also has legal powers to close fishing grounds within the remit of the overall Ministry of Fisheries.

**Table 3 – Number of targeted inspections by the LGH 2012-2013**

**Enforcement Actions**

	<b>2012</b>	<b>2013</b>
Control, number of vessels / inspections	185	182
Comments, number of vessels	94	73
Equipment, number of vessels	30	29
Catch, number of vessels	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

**CLAUSE: 2.3.5 Analysis is carried out**

**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). Appropriate 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.**

<b>EVIDENCE RATING:</b>	High <input checked="" type="checkbox"/>	Medium <input type="checkbox"/>	Low <input type="checkbox"/>
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**SUMMARY: 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 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 deemed appropriate.

**2.3.5.2**  
All persons making purchases of fish (at auction, or directly) are obliged to report purchases on a monthly basis to the Directorate.

**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 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 remained 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.

## Section 3: Ecosystems Considerations

### 3.1 Guiding principle

<p><b>CLAUSE:</b> 3.1.1 Adverse impacts of the fishery on the ecosystem shall be considered and appropriately assessed and effectively addressed<sup>19</sup>.</p>			
<p><b>EVIDENCE RATING:</b></p>	<p>High <input checked="" type="checkbox"/></p>	<p>Medium <input type="checkbox"/></p>	<p>Low <input type="checkbox"/></p>
<p><b>SUMMARY:</b> Iceland’s fisheries management organizations assess the impacts of environmental factors on target stocks and species belonging to the same ecosystem or associated with or dependent upon the target stocks, and assess the relationship among the populations in the ecosystem. The MRI is the principle marine research agency that monitors and researches the marine environment including the ecosystem components. Direct and indirect impacts of fisheries are assessed and effectively address through conservation measures.</p>			
<p><b>EVIDENCE:</b></p> <p>Gathering knowledge of the marine ecosystem is a key role that has been assigned to the Marine Research Institute (<a href="http://www.fisheries.is/ecosystem/">http://www.fisheries.is/ecosystem/</a>). 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 in:</p> <ul style="list-style-type: none"> <li>• Oceanographic and physical data recording and analysis to support improved understanding of the effects of oceanographic and climatic changes on the redfish fishery and ecosystems.</li> <li>• Direct measurement of retained catches of all commercial species within the redfish fishery.</li> <li>• Bycatch and interactions of fishing operations of non ETP species and birds.</li> <li>• Habitat interactions in demersal fisheries can be physical interaction of gear on the sea-bed 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).</li> <li>• Gear interactions with Endangered, Threatened and Protected Species.</li> <li>• Ecosystem interactions of the redfish fishery - important prey items and food items.</li> </ul>			

### **Oceanographic and physical data**

Changes in sea temperatures have considerable effects on the fish fauna of the Icelandic ecosystem. Species which are at or near their northern distribution limit in Icelandic waters have increased in abundance in recent years. The most notable examples of increased abundance of such species in the mixed water area north of Iceland are haddock, whiting, monkfish, lemon sole and witch. Pelagic mackerel and semi-pelagic blue whiting have been found and fished in east Icelandic water in far larger quantities than ever before. In contrast, cold water species like Greenland halibut has become scarcer. The larval drift and nursery areas of capelin have both shifted west to the colder waters off east Greenland. The arrival of adult capelin on the overwintering grounds on the outer shelf off north Iceland has been delayed; migration routes to the spawning grounds off south and west Iceland have been located farther off north and east Iceland and not reached as far west along the south coast as was the rule in most earlier years. The change in availability of capelin in the traditional grounds may have had an effect on the growth rate of some predators, principally cod but also redfish.<sup>37</sup>

The MRI biological oceanographic research is carried out during the annual spring survey and produces environmental monitoring data, the most recent for 2010. 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 2010 by the MRI (Hafrannsóknir nr. 158). Results showed temperature and salinity in surface waters in 2010 was generally above the long-term average. The zooplankton biomass in samples from Icelandic surface waters during the spring cruise was generally higher in 2010 compared to that in 2009.

ICES released the Status Report on Climate Change in the North Atlantic in September 2011<sup>38</sup>, 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 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.<sup>39</sup>

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

<sup>37</sup> NWWG report "Overview on ecosystem, fisheries and their management" – ICES, 2012

<sup>38</sup> <http://www.ices.dk/pubs/crr/crr310/CRR%20310%20Climate%20Change.pdf>

<sup>39</sup> <http://www.sigling.is/English> , <http://vs.en.sigling.is/>

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. There is continuous monitoring of the inflow of Atlantic water into the area north of Iceland. This is 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.<sup>40</sup>

### **Ecosystem**

There is a growing international focus on food web considerations in Icelandic 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'.

Evidence of research into foodweb/trophic considerations is also available in the MRI Report into Environmental conditions in Icelandic waters 2008 (Report No 145). For example, monitoring of sandeels off the south and west coast of Iceland that began in 2006. Results show that year-classes 2005 and 2006 were quite small and that year-class 2007 was larger, but the stock of sandeels has been declining. The causes for these changes in stock size of sandeels are largely unknown but can likely be explained by some combination of biological and environmental factors, such as predation, increased sea temperature or changes in sandeel larvae drift. The work also includes annual studies on sandeel abundance in the stomachs of cod and haddock.

The multi-species programme BORMICON (BOReal MIgration and CONsumption model) is a model for an ecosystem approach to fisheries and was developed in the 90's using information on the Icelandic marine ecosystems, such as feeding habits of demersal fish, migration patterns of predator and prey, predation, mortality and fish growth. The programme was developed for modelling marine ecosystems in a fisheries management and biology context. BORMICON is now developed under the name GADGET (Globally applicable Area-Disaggregated General Ecosystem Toolbox) (see: <http://www.hafro.is/gadget/>).

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<sup>40</sup> <http://www.fisheries.is/ecosystem/oceanography/Temperature-and-salinity/>

<p><b>CLAUSE: 3.1.2</b>  <b>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.<sup>41</sup></b></p>			
<p><b>EVIDENCE RATING:</b></p>	<p>High <input checked="" type="checkbox"/></p>	<p>Medium <input type="checkbox"/></p>	<p>Low <input type="checkbox"/></p>
<p><b>SUMMARY: The most probable adverse impacts of the fishery on the ecosystem/environment are considered, taking into account available scientific information, and local knowledge.</b></p>			
<p><b>Evidence</b></p> <p>Three types of impact have been considered under this clause</p> <ul style="list-style-type: none"> <li>• Impact on retained and bycatch species</li> <li>• Impacts on habitats and benthos;</li> <li>• Impacts on marine mammals, ETP species and seabirds;</li> </ul> <p>The main adverse impact of the fishery on the ecosystem and environment is the direct impact of the gears within the unit of certification on benthic habitats and marine mammals.</p> <p><b>Impact on retained species</b></p> <p>The main retained species in the golden redfish fishery are cod and saithe, the bulk of the remaining catch comprises haddock, ling, wolffish, tusk, greenland halibut, lemon sole and plaice. Beaked redfish <i>Sebastes mentella</i> is also captured and landed. Stock identity for the latter species in Icelandic waters is known to be complex and recent investigations in this regard have concluded that there are three separate stocks present, with some overlap in their occurrence. (ICES, 2008)</p> <p>Directed fishing for redfish as well as the by-catch of these species in all other fisheries multi species mixed 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. 35 commercial species have been given a TAC and cannot be discarded, which maintains biological based limits. Information is collated from logbooks at each trip and only non-commercial invertebrates and other species are discarded. Commercial stocks are mainly stocks for which there is a TAC. There are highlighted in the MRI Annual Advice (<a href="http://www.hafro.is/Astand/2012/36-english-sum.PDF">http://www.hafro.is/Astand/2012/36-english-sum.PDF</a>). A number of other stocks however have commercial value and as such are recorded and monitored the Icelandic authorities.</p> <p>Discards of non-commercial stocks occur to a much greater extent in the bottom trawl fishery than other types of redfish fishing in Iceland. To mitigate this level of discards, managers increased the allowable mesh size for trawl gear to reduce the catch of smaller-sized fish. Discard of redfish in bottom trawl fisheries directed towards other species are considered negligible (Pálsson, 2010). 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 cod less than 50 cm long be</p>			

released, haddock caught by hook and line and less than 45 cm must be released and diseased or damaged fish can be discarded. In addition, those species for which there is no quota system and have 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 cod, saithe, haddock or redfish which is landed. This is counted against the individual quota at 50% of its weight. Fish kept on board under these no-discard rules is usually marketed.<sup>42</sup>

Because the demersal fisheries in Iceland target a variety of quota species total catch is available for all the species and separation of fisheries may be not useful for some species groups (i.e. groundfish). Here below, from Statistic Iceland, is the catch in 2012 by species. The vast majority of golden redfish is caught by bottom trawl (>95%) with the remaining caught by longline and Nephrops trawl. The main species associated with catch of golden redfish are quota species and are listed within the species in the table below (data from the Directorate of fisheries).

**Table 10.** Icelandic catch in 2012 by species.

Catch by fishing area (Iceland) and species in 2012	Tonnes
Cod	193560
Haddock	45670
Saithe	50848
Golden redfish	55387
Oceanic redfish	5909
Catfish	10167
Spotted catfish	1950
Ling	10712
Blue ling	4118
Tusk	6342
Grenadier	81
Starry ray	1862
Monkfish	2650
Skate	127
Whiting	1468
Silver smelt	9289

<sup>42</sup> The State Marine 2010 /2011. Provides Outlook for fishing 2011/2012. *State of Marine Stocks in Icelandic Waters 2010 /2011. Prospects for the quota year 2011/2012.* Reykjavik 2011. <http://www.hafro.is/Bokasafn/Timarit/fjolr.htm>  
<http://www.fao.org/docrep/W6602E/w6602E11.htm>  
<http://www.fishsource.com/fishery/basics/Ecosystem?fishery=Haddock+-+Icelandic>



Spiny dogfish	44
Greenland shark	17
Other demersal	546
Halibut	35
Greenland halibut	13505
Plaice	5928
Lemon sole	1614
Witch	1313
Megrim	409
Dab	859
American plaice	136
Other flatfish	0
Miscellaneous catch	6340

In 2013, the following species catches were associated with bottom trawling, which lands more than 95% of all Icelandic golden redfish. More information is provided below for species for which there are some conservation concerns.

Heildarafli íslenskra skipa eftir fisktegundum og veiðarfærum  
Löndun frá: 01-JAN-2013 til 31-DES-2013

			267,882		
			Total Tonnes		
Fisktegund (Icelandic common name)	English and Latin name	Gear, demersal trawl	Catch in 2013 (t)	% of total	
Porskur	Cod ( <i>Gadus morhua</i> )	Botnvarpa	112'721.569	42.0788	
Ufsi	Saithe ( <i>Pollachius virens</i> )	Botnvarpa	47'841.366	17.8591	
Karfi / Gullkarfi	Golden Redfish ( <i>Sebastes norvegicus</i> )	Botnvarpa	46'989.135	17.5410	
Ýsa	Haddock ( <i>Melanogrammus aeglefinus</i> )	Botnvarpa	20'733.847	7.7399	
Grálúða	Greenland Halibut ( <i>Reinhardtius hippoglossoides</i> )	Botnvarpa	12'488.927	4.6621	
Djúpkarfi	deepwater redfish ( <i>Sebastes mentella</i> )	Botnvarpa	8'650.659	3.2293	
Gulllax / Stóri gulllax	Greater silver smelt ( <i>Argentina silus</i> )	Botnvarpa	7'138.734	2.6649	
Steinbítur	Atlantic wolffish ( <i>Anarhichas lupus</i> )	Botnvarpa	2'429.951	0.9071	

Langa	Ling ( <i>Molva molva</i> )	Botnvarpa	1'613.015	0.6021
Skarkoli	Plaice ( <i>Pleuronectes platessa</i> )	Botnvarpa	1'579.881	0.5898
Blálanga	Blue ling ( <i>Molva dypterygia</i> )	Botnvarpa	1'110.325	0.4145
Hlýri	Spotted wolffish ( <i>Anarhichas minor</i> )	Botnvarpa	815.295	0.3043
Makríll	Mackerel ( <i>Scomber scombrus</i> )	Botnvarpa	677.767	0.2530
Litli karfi	redfish ( <i>Sebastes viviparus</i> )	Botnvarpa	529.177	0.1975
Úthafskarfi	Dep sea redfish ( <i>Sebastes mentella</i> )	Botnvarpa	478.717	0.1787
Lýsa	Whiting ( <i>Merlangius merlangus</i> )	Botnvarpa	419.014	0.1564
Þykkvalúra / Sólkoli	lemon sole ( <i>Microstomus kitt</i> )	Botnvarpa	378.476	0.1413
Stinglax	black scabbard fish ( <i>Aphanopus carbo</i> )	Botnvarpa	323.053	0.1206
Tindaskata	Starry skate ( <i>Raja Amblyraja radiata</i> )	Botnvarpa	185.741	0.0693
Skötuselur	Monkfish ( <i>Lophius piscatorius</i> )	Botnvarpa	141.632	0.0529
Slétti langhali	Rock grenadier ( <i>Coryphaenoides rupestris</i> )	Botnvarpa	83.297	0.0311
Keila	Tusk ( <i>Brosme brosme</i> )	Botnvarpa	75.052	0.0280
Kolmunni	Blue whiting ( <i>Micromesistius poutassou</i> )	Botnvarpa	54	0.0202
Búrfiskur	Orange roughy ( <i>Hoplostethus islandicus</i> )	Botnvarpa	53.541	0.0200
Stórkjafra / Öfugkjafra	Megrim ( <i>Lepidorhombus whiffiagonis</i> )	Botnvarpa	49.725	0.0186
Rækja	Deep water prawn ( <i>Pandalus borealis</i> )	Botnvarpa	46.072	0.0172
Síld	Herring ( <i>Clupea harengus</i> )	Botnvarpa	44	0.0164
Langlúra	Grey sole ( <i>Glyptocephalus cynoglossus</i> )	Botnvarpa	38.816	0.0145
Gjölnir	Baird's smooth-head ( <i>Alepocephalus bairdii</i> )	Botnvarpa	34.98	0.0131
Lúða	Halibut ( <i>Hippoglossus hippoglossus</i> )	Botnvarpa	32.276	0.0120
Skata	Grey skate ( <i>Raja Dipturus batis</i> )	Botnvarpa	32.087	0.0120
Skráplúra	Rough dab ( <i>Hippoglossoides platessoides</i> )	Botnvarpa	31.518	0.0118

Blágóma	Arctic wolffish ( <i>Anarhichas denticulatus</i> )	Botnvarpa	19.732	0.0074
Snarphali	onion eye ( <i>Macrourus berglax</i> )	Botnvarpa	16.294	0.0061
Sandkoli	Dab ( <i>Limanda limanda</i> )	Botnvarpa	10.985	0.0041
'Ósundurliðað'	not specified	Botnvarpa	5.076	0.0019
Gljáháfur	Portugese dogfish ( <i>Centroscymnus coelolepis</i> )	Botnvarpa	2.173	0.0008
Grásleppa	lumpfish female ( <i>Cyclopterus lumpus</i> )	Botnvarpa	1.948	0.0007
Háfur	Dogfish ( <i>Squalus acanthias</i> )	Botnvarpa	1.876	0.0007
Geirnytt	Rabbitfish ( <i>Chimaera monstrosa</i> )	Botnvarpa	1.111	0.0004
Dílamjóri	Esmark's eelpout ( <i>Lycodes esmarki</i> )	Botnvarpa	0.75	0.0003
Náskata	Fuller's Ray ( <i>Raja Leucoraja fullonica</i> )	Botnvarpa	0.182	0.0001
Svartháfur	Black dogfish ( <i>Centroscyllium fabricii</i> )	Botnvarpa	0.171	0.0001
Hámeri	Mackerel shark ( <i>Lamna nasus</i> )	Botnvarpa	0.163	0.0001
Sandhverfa	Turbot ( <i>Psetta maxima</i> )	Botnvarpa	0.055	0.0000
Rauðmagi	lumpfish male ( <i>Cyclopterus lumpus</i> )	Botnvarpa	0.048	0.0000
Lýr	green pollack ( <i>Pollachius pollachius</i> )	Botnvarpa	0.01	0.0000
Stóra brosmá	White hake ( <i>Urophycis tenuis</i> )	Botnvarpa	0.007	0.0000
Litla brosmá	Forkbeard ( <i>Phycis blennoides</i> )	Botnvarpa	0.003	0.0000

### Impacts on vulnerable species, marine mammals and seabirds

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. There are also significant populations of seals and seabirds in Icelandic waters.

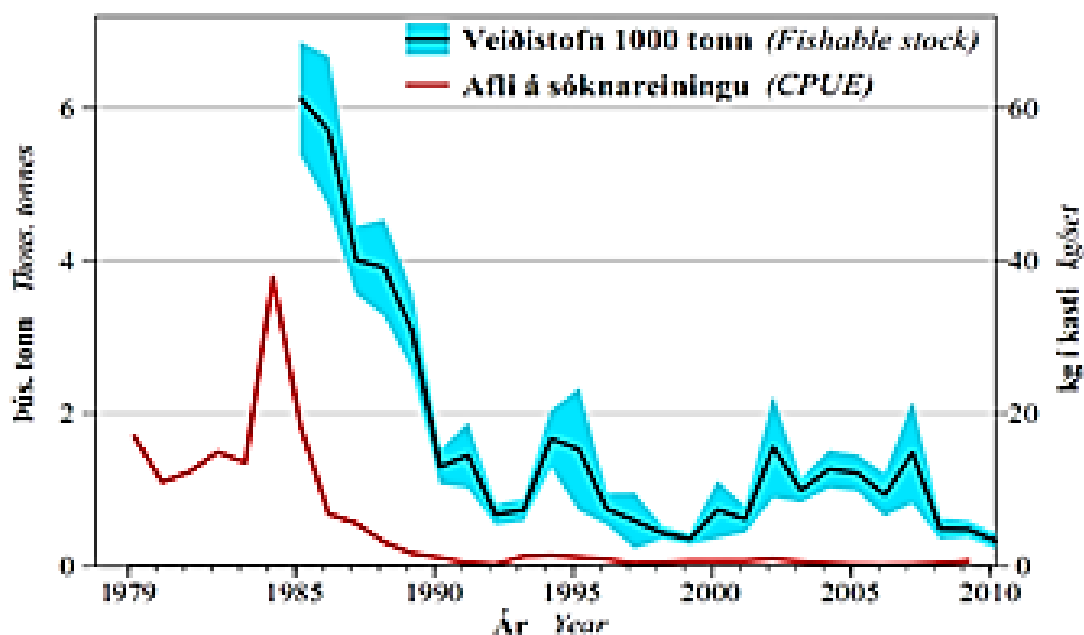
### Atlantic Wolffish

Landings of Atlantic wolffish (*Anarhichas lupus*) in 2012 were around 10 000 t, the lowest landings since 1985. The index of fishable biomass is close to average but recruitment indices are at a historical low level. According to the stock assessment, the fishable part of the stock has been decreasing since 2006 and further decline is foreseen, as recruitment to the fishable stock will be low in the coming years. MRI recommends setting the TAC as 7 500 t for the quota year 2013/2014, based on  $F_{max}=0.29$ . In addition, the MRI recommends a continued closure of the

major spawning area off West Iceland during the spawning and incubation season in autumn and winter.

### Atlantic halibut

Atlantic halibut (*Hippoglossus hippoglossus*) has also been identified by Icelandic authorities as vulnerable and is considered to be at an extremely low stock status. In 2011, 550 t of halibut (*Hippoglossus hippoglossus*) were landed. From 1996 onwards, annual landings have been less than 1 000 t, the lowest observed since 1905. Historically, Atlantic halibut has mainly been taken as bycatch in the bottom trawl and longline fisheries. In recent years a longline fishery has been developing, coinciding with a sharp decline in the survey biomass index. In recent years, the biomass indices from the groundfish survey have declined sharply. Currently, the halibut stock seems to be severely depleted, with very little recruitment into the spawning stock in recent years. Currently, there is no directed Atlantic halibut fishery and viable fish must be returned alive. Due to the poor state of the stock, the Ministry of Industries and Innovation has issued regulations where a ban is set on a directed fishery for halibut and that all viable halibut must be released in other fisheries. The MRI recommends that these regulations should be valid until clear indications of significant improvement in the stock are visible.<sup>43</sup>



**Figure 17.** Atlantic halibut biomass index in the groundfish survey in spring and CPUE from Danish seiners, the shaded area shows one standard deviation in the biomass estimate.

### Porbeagle shark

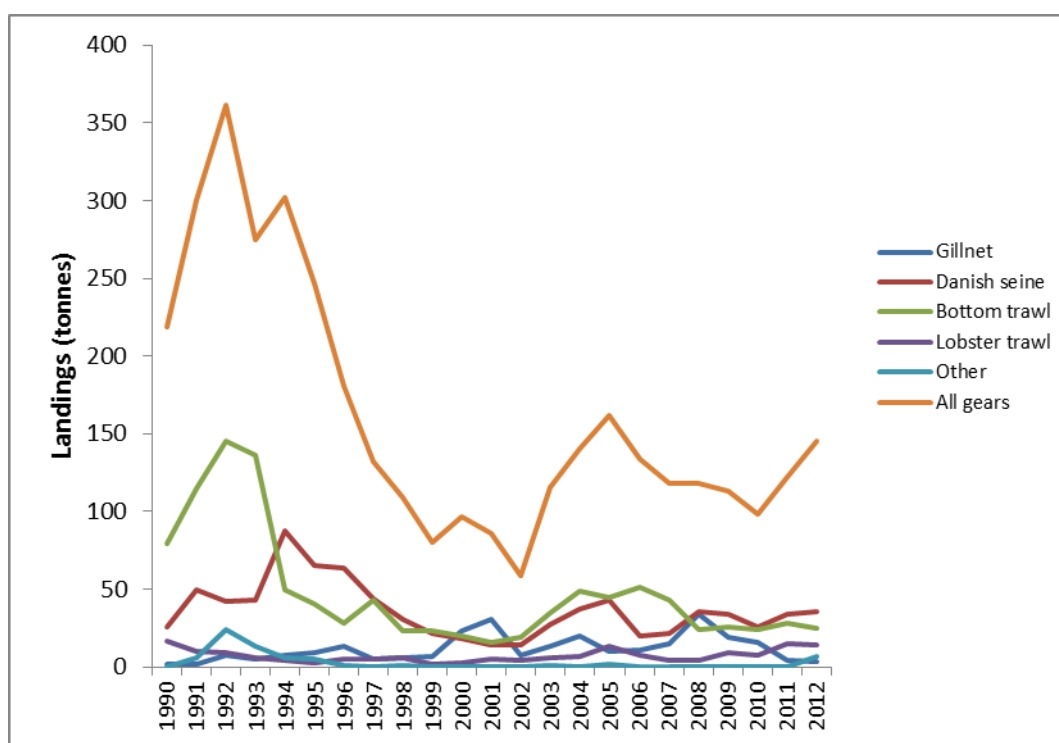
The porbeagle shark (*Lamna nasus*) is classified as vulnerable to extinction under the IUCN Red list framework. Bottom trawl catches in Iceland in 2013 were very small at about 0.163 tonnes.

<sup>43</sup> <http://www.fisheries.is/main-species/Flatfishes/atlantic-halibut/>

### Grey Skate

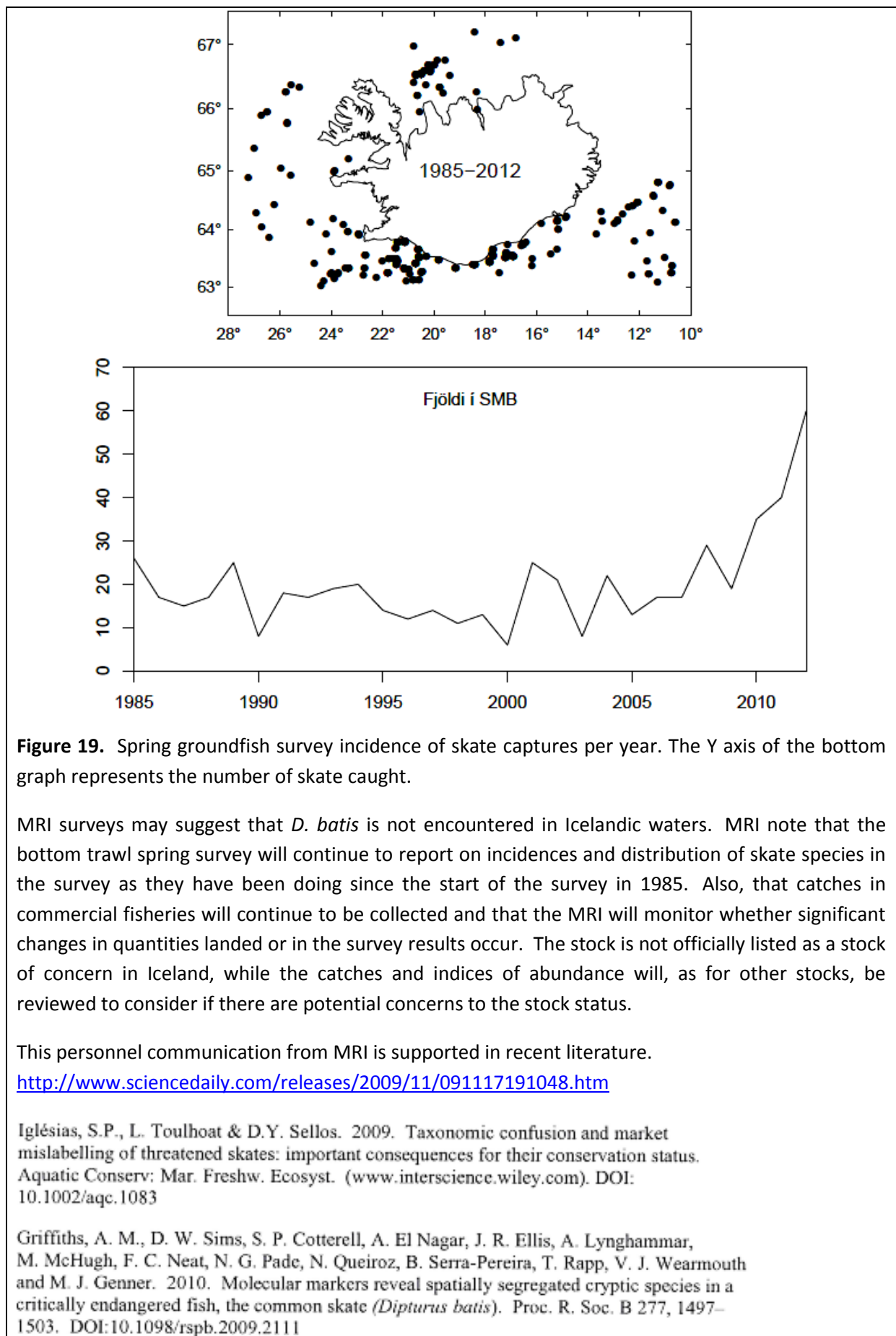
The grey skate (*Dipturus batis*) has been classified as critically endangered at the International level by IUCN Red List 2012<sup>44</sup>. However, there was recent evidence presented that considers that the species of skate encountered Iceland includes a different species, (*Dipturus flossada*), termed ‘blue skate’ which is consistent with the findings of Iglésias *et al.*, 2009. There are historical records of landings under *Dipturus batis* species classification in Iceland fisheries back over 30 years, although to the extent of species differentiation of *D. batis* and *D. flossada*, is not certain and the extent that these are represented in landings is currently not established. Currently, there is no directed fishery for skate species and all catches are recorded by gear.

There are more recent records (from 1990) available of landings per gear in the groundfish fisheries (59-361 t) (Figure 18) and MRI have also recorded incidences of catches in the spring groundfish survey since 1985 with incidence ranging from a few individuals to circa 60 individuals in any one year (Figure 19).



**Figure 18.** Skate landings in the Icelandic groundfish fisheries per fishing gear and per year, from 1990 to 2012 (Data source: MRI, 2013).

<sup>44</sup> <http://www.iucnredlist.org/details/39397/0>  
<http://www.fisheries.is/main-species/cartilaginous-fishes/grey-skate/>



**Figure 19.** Spring groundfish survey incidence of skate captures per year. The Y axis of the bottom graph represents the number of skate caught.

MRI surveys may suggest that *D. batis* is not encountered in Icelandic waters. MRI note that the bottom trawl spring survey will continue to report on incidences and distribution of skate species in the survey as they have been doing since the start of the survey in 1985. Also, that catches in commercial fisheries will continue to be collected and that the MRI will monitor whether significant changes in quantities landed or in the survey results occur. The stock is 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.

This personnel communication from MRI is supported in recent literature.

<http://www.sciencedaily.com/releases/2009/11/091117191048.htm>

Iglésias, S.P., L. Toulhoat & D.Y. Sellos. 2009. Taxonomic confusion and market mislabelling of threatened skates: important consequences for their conservation status. *Aquatic Conserv: Mar. Freshw. Ecosyst.* ([www.interscience.wiley.com](http://www.interscience.wiley.com)). DOI: 10.1002/aqc.1083

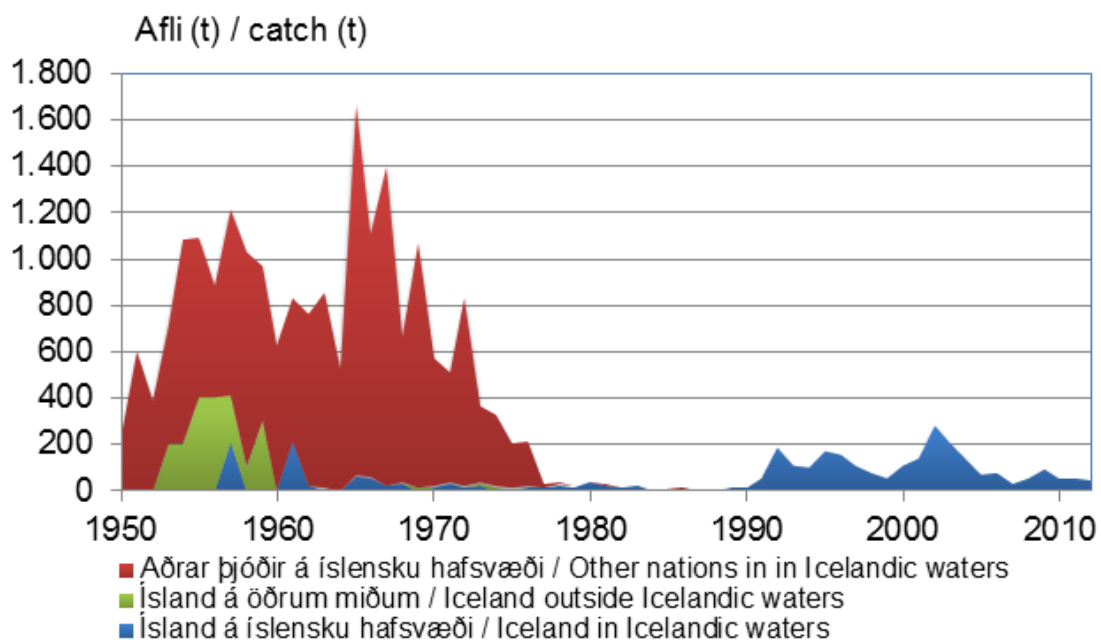
Griffiths, A. M., D. W. Sims, S. P. Cotterell, A. El Nagar, J. R. Ellis, A. Lynghammar, M. McHugh, F. C. Neat, N. G. Pade, N. Queiroz, B. Serra-Pereira, T. Rapp, V. J. Wearmouth and M. J. Genner. 2010. Molecular markers reveal spatially segregated cryptic species in a critically endangered fish, the common skate (*Dipturus batis*). *Proc. R. Soc. B* 277, 1497–1503. DOI:10.1098/rspb.2009.2111

## 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.

### Catch and fishing methods in Iceland

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, or around 100 tonnes in recent years.



The spiny dogfish was in fact considered a pest by Icelandic fishermen, as other more valuable fish species disappear from the fishing grounds when the dogfish appears. 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/>).

### Stock status

Although the abundance of spiny dogfish is low in Icelandic waters compared to many bony fishes, this is still the most common shark species there. However, no information is available on the stock status of this species. Dogfish (*Squalus acanthias*) catches in the Icelandic bottom trawl fleet in 2013 were less than 2 tonnes.

### Ocean quahog

In 2011 only 5 t of ocean quahog (*Arctica islandica*) was landed, compared to the maximum 14 400 t in 2003. Since 1987 a fishery for human consumption has been developing, but annual landings have been variable because of variable effort connected to the market. In 2009 the fishery for ocean quahog (*Arctica islandica*) with a hydraulic dredge stopped and since then a dry dredge has been used. MRI recommended a harvest policy of 2.5% of the estimated stock size corresponding to no

more than 31 500 t in the quota year 2012/2013.

### References and further information

Jónsson, G., & Pálsson, J. (2006). Íslenskir fiskar (Icelandic fishes). Reykjavík, Iceland. 336 p (in Icelandic).

<http://www.hafro.is/Astand/2012/36-engl-sum.PDF>

### Rules on discards and the disposition of by-catch

Collecting and bringing ashore any catches in the fishing gear of fishing vessels is obligatory. Discarding catch overboard 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 by-catch, 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, the species caught in Iceland must all be landed, with some minor exceptions.

### Other Species, 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 155 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). All in all, catches of these species are not considered to be significant. In terms of regulations, fishermen are required to record all the vessel's catch in the fishing logbook, including "non commercial" species catches.

### Impacts on habitats and benthos

#### Gear Effects:

Bottom trawling, the primary fishing method used to catch redfish in Iceland, can cause severe damage to the seafloor, impacting marine habitats that are important to the survival of groundfishes and other species. In general, the effects of otter trawling in shallow areas with a soft seabed are relatively minor for most of the smaller species. (S. A. Ragnarsson, 2003).

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 20<sup>th</sup> century, the otter trawling fishery around Iceland was confined to relatively shallow waters (<400 m) and targeted cod (*Gadus morhua*), haddock (*Melanogrammus aeglefinus*) and golden redfish (*Sebastes norvegicus*). 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 (Magnússon K. G. and Pálsson Ó. K., 1989).

Eight Marine Protected Areas have been designated around Iceland which are closed to bottom trawled fishing gear. Traditional fishing practices are permitted in Hornstrandir and Búdahraun Nature Reserves and 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](http://www.hafro.is)).

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. Pennatulaceans are relatively rare in waters shallower than 500 m but more common in deep waters, especially off southern Iceland (Guijarro, 2006). *Lophelia pertusa* was known to occur in 39 places in Icelandic waters mainly confined to the Reykjanes Ridge and near the shelf break off the southern coast of Iceland. Based on information from fishers (questionnaires), eleven coral areas were known to exist close to the shelf break off northwest and southeast Iceland 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.

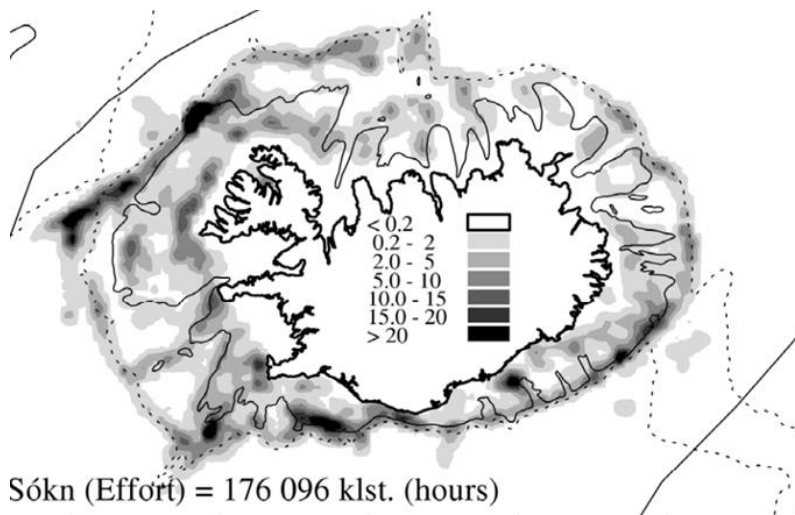
In 2004 a research project was initiated to map coral areas off Iceland (using a Remote Operated Vehicle, ROV), based on the results from questionnaires to fishers on the occurrence of such areas. The aim of the project is to assess the species composition (including *L. pertusa*), diversity, and the status of coral areas in relation to potential damages by fishing practices. In the first survey, intact *Lophelia* reefs were located in two places on the shelf slope off the southern coast of Iceland. North of Iceland, particularly in the Denmark Strait, “ostur” was found at several locations at depths of 300–750 m, some of which are classified as sponge grounds. Comprehensive “ostur” and sponge grounds occur off northern and southern Iceland and around the Reykjanes Ridge.

Earlier studies have also investigated the effects of bottom trawls. Ragnarsson & Steingrímsson 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.

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<sup>o</sup> 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<sup>o</sup> et al., 2002).

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. A report on the Icelandic Danish seine fisheries during the period 1988-2006 describes concerning annual total effort in number of sets and total catches of the main species of groundfish and flatfish and the possible detrimental effect of Danish seine fishing on the bottom substrate habitat, and the unavoidable use of this gear for fully exploiting some flatfish species and limitation within the fishery.<sup>45</sup>

More recently, 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. The assessment team were made aware of further plans to map 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, 2010d).

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 figure on the left for the 2011 effort). 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 at risk of being damaged by fishing activities and for the protection of important marine habitats in the future. Annual surveillance audits will review the progression of these research plans and outputs with respect to golden redfish (and other) Icelandic fisheries.

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

<sup>45</sup> <http://www.hafro.is/Bokasafn/Timarit/fjolrit-140.pdf>

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.

### **Marine Mammals and Seabirds**

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 such as cod.<sup>46</sup>

In 2009, information on marine mammal by-catch and fishing effort data was obtained from gill net research surveys conducted in April, Fishery Directorate observer programme (April-December), lumpsucker fishery log books and reports from contracted lumpsucker fishermen. Collated information from these sources revealed a total of 266 marine mammals reported from Icelandic fisheries in 2009.

Impacts of fishing on marine mammals and protected species, habitats and the ecosystems are closely monitored and restrictions are put in place such as the banning of commercial quota discards, gear restrictions, MPAs and closed areas to avoid further unnecessary impacts. Iceland operates a number of area closures: a quick closure system prohibits fishing for two weeks if juveniles exceed a set percentage of temporary or permanent closures protect juveniles including a large area south-west of Iceland protecting juvenile redfish; and closures of spawning grounds of cod, plaice and wolfish are also enforced.

It was concluded in the 2010 ICES Study Group on Bycatch of Protected Species (SGBYC) report that self-reporting of marine mammal and seabird captures in Icelandic commercial fisheries is not a reliable means to gathering data but fishery reports may be useful in identifying potential high risk fisheries and most frequent bycatch species. Fishery report data may also give indications of changes or trends in bycatch rates over longer periods. The ICES working group also concluded, however, that although any seabird and marine mammal bycatch is undesirable and should be avoided whenever possible, the numbers involved do not appear to pose any immediate threat to species' populations<sup>47</sup>.

### **Reporting**

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.

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

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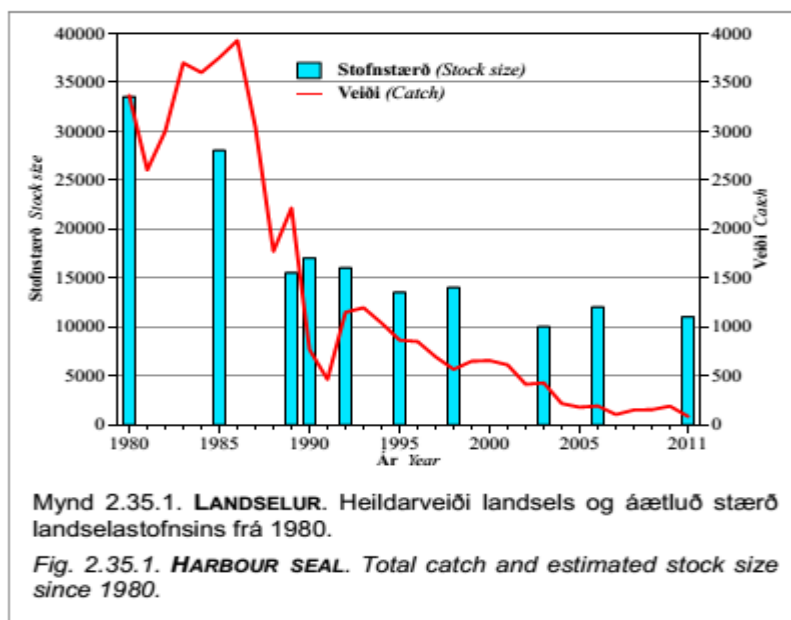
<sup>46</sup> <http://jncc.defra.gov.uk/pdf/UKSPA/UKSPA-A6-93.pdf>.

<sup>47</sup> [http://www.ascobans.org/pdf/ac19/AC19\\_4-11\\_ICES2010\\_SGBYC.pdf](http://www.ascobans.org/pdf/ac19/AC19_4-11_ICES2010_SGBYC.pdf)

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.

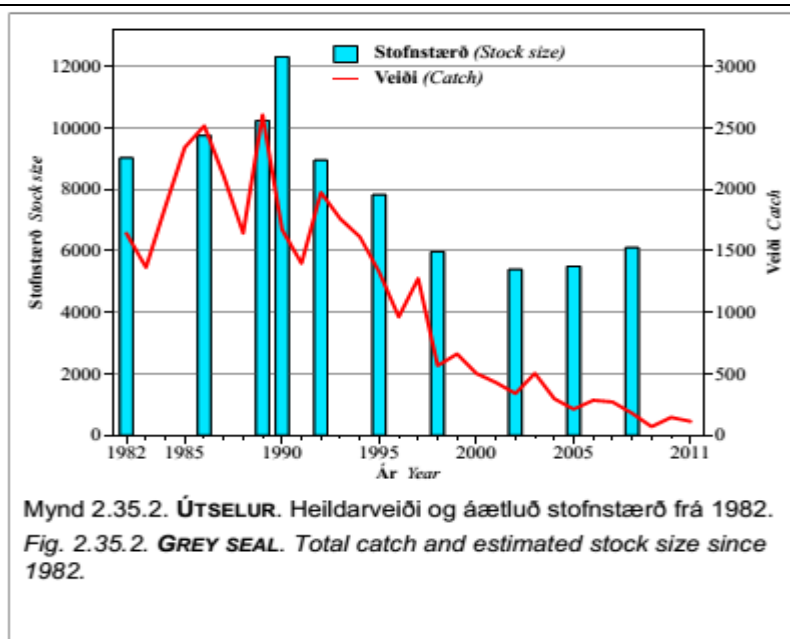
Digital recording of catch and bycatch became available in 2008 but recording of marine mammals is yet to improve to be defined efficient. In light of this, it is likely that the record of seals as bycatch is currently a bare minimum estimate.

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.



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 2012.



<http://www.hafro.is/Astand/2012/eng/35-seals-12.PDF>

The MRI has initiated efforts to estimate and improve reporting of bycatch of marine mammals and seabirds in Icelandic waters. An overview of the situation was given by Ólafsdóttir (2010).  
<http://www.nammco.no/webcronize/images/Nammco/976.pdf>

#### Seabirds bycatch

Long-liners in Iceland are reported 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. There was no documented evidence specific to Iceland available at the time that supported a detrimental or significant impact of fishing activities (especially longline) for any gear on seabirds.

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.

#### New Regulation for Recording of Marine Mammals and Sea Birds in logbooks

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>

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:	
<ol style="list-style-type: none"> <li>1. Seabirds on the number and species.</li> <li>2. Marine mammals on the number and species.</li> </ol>	
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.	
<i>Industries and Innovation Ministry, 4 February 2014.</i>	
F. h. Ministry of Fisheries and Agriculture,	
<b>Johann Gudmundsson.</b>	

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

*Marine mammals and seabirds bycatch data collection*

In recent years the MRI has participated in the development of software for electronic logbooks. Captains have to submit to the MRI information on catches and bycatch in all fisheries by electronic transmission. The software allows for submission of bycatch information of fish and other marine life, such as seabirds and marine mammals. It is in the hands of the staff of the Directorate to

enforce implementation, i.e. to seek that all catches and bycatch are entered correctly in the records.

The development of the software was near completion in 2009 and since then the MRI has received data as planned. The MRI has been in direct dialogue with the Directorate in order to encourage Directorate’s inspectors to make records of bycatch. There is an ongoing work aimed to increase the awareness of the inspectors to by-catch, both of birds and mammals.

In March 2014, a letter signed by the Directorate and Fisheries and the MRI provided details of the steps taken in 2013-14 to improve mammalian and avian bycatch/encounters data collection. In particular, the transfer of bycatch data from the Directorate to the MRI has been enabled; enforcement activities have been boosted in high risk areas; an amendment to regulation 557/2007 on logbooks has been issued in Feb 2014 making compulsory the recording of avian and mammalian encounters/bycatch in Icelandic commercial fisheries' logbooks. Finally, relevant bycatch data is been collected and a preliminary report/evaluation is expected for fall 2014.

**CLAUSE: 3.2.2.1 Discarding, including discarding of catches from non-target commercial stocks, is prohibited.**

<b>EVIDENCE RATING:</b>	High <input checked="" type="checkbox"/>	Medium <input type="checkbox"/>	Low <input type="checkbox"/>
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**SUMMARY: Icelandic fishery law prohibits the discarding of all commercial stocks.**

**Evidence**

Commercial species are listed yearly in documents such as the annual MRI advice (see <http://www.hafro.is/Astand/2012/36-engl-sum.PDF>). Catches of these species are subjected to a discard ban.

Icelandic fishery law prohibits the discarding of all commercial stocks. Article 2 Chapter II of Act No. 57/1996 and amended by Act no. 144/2008 and by Act No. 810/2011 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 is a minimum reference size for golden redfish (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 golden redfish may be encountered. Minimum mesh sizes are generally sufficiently large to minimize the capture of redfish below this reference size. Vessel catch inspections can be coordinated with areas where juvenile fish are reported (recent shut downs) to compare landings with vessel catches.

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.

**CLAUSE: 3.2.2.2 Where relevant, appropriate steps shall be taken to avoid, minimize or mitigate encounters with seabirds and marine mammals.**

<b>EVIDENCE RATING:</b>	High <input checked="" type="checkbox"/>	Medium <input type="checkbox"/>	Low <input type="checkbox"/>
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**SUMMARY:** Long-liners are reported to use protective devices to shield baited hooks as gears are shot in order to prevent encounters with seabirds. By-catch avoidance methods are employed on a voluntary basis although no data was available to determine the absolute use and effectiveness in Iceland. Results of research in Norway have demonstrated effective reduction in by-catch of seabirds.

Reporting of marine mammal by-catch in the Icelandic fishery is mandatory. Catches and by-catch data on whales and seals are made ([www.fisheries.is](http://www.fisheries.is)).

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 fisheries such as golden redfish.

All fishing vessels are obliged to report catch and by-catch in log books. A new regulation requiring compulsory recording of mammalian and avian encounters/bycatch has been published in February 2014.

The observation scheme carried out by the Directorate covers 20% of the larger trawler fleet and an objective of one observer visit per vessel per year. The observer program does not specifically cover seabird by-catches in order to evaluate the reliability of the system. The reporting is based on the cooperation of the fishermen and is therefore voluntary in practice.

**Evidence**

**Seabirds:**

Hunting for seabirds for human consumption is an established tradition in Iceland and is subject to strict regulation (Reg. 456, 1994). Information on birds entangled in fishing gear are now included in logbook returns although historically, it is likely uncertain of the estimates provided by voluntary returns.



Directorate of Fisheries has implemented monitoring programmes of marine mammal and seabird bycatch. In 2009, all were taken in static gear in the period April to December: 184 common guillemots, 2 razorbills, 2 European shag, 1 red-throated diver, 35 fulmar, 2 black-back gull, 3 Brünic's guillemot, 1 eider duck (SGBYC, 2010). There are static-gear closed areas in place to protect eider duck during the nesting season. Longline vessels are also expected to employ bird scarers (gas cannons) or other similar methods to minimise bird bycatch when shooting their lines.

Directorate of Fisheries observers do record bird and mammal bycatch and these data are reported to ICES (SGBYC, 2010; WGSE, 2010). These observations were not raised to fleet values but if the same raising factor is applied as for porpoise to total guillemot bycatch might be of the order 4500 birds per year, perhaps 0.5% the Icelandic breeding population.<sup>48</sup>

Long-liners in Iceland were reported to use protective devices to shield baited hooks as gears are shot in order to prevent encounters with seabirds. There was no documentary evidence specific to Iceland available at the time that supported a detrimental or significant impact of fishing activities for any gear on seabirds although estimates of actual incidence of bird capture and mortality and effectiveness of avoidance devices were not available. Evidence is expected from the electronic logbook reporting system.

#### **Marine Mammals:**

Information on marine mammals entangled in fishing gear are now required to be included in logbook returns (see also clause 3.1.2.).

In 2008 a system of electronic remote fishing reports via the Internet was launched and is today applied by most fishers. Complications in the new system resulted in a decline in reporting of marine mammals and a revised version is being developed for which reporting of marine mammals and birds are facilitated. Therefore the only preliminary bycatch data from fishery reports in 2009 are from the gillnet lump sucker fisheries (Olafsdóttir, Pers. Comm.). A total of 98 marine mammals were observed.

In April 2009 a programme of monitoring all marine mammal and bird bycatch in regular observations of the Fishery Directorate was implemented covering all types of fisheries. A total of eleven marine mammals and birds were observed in the period April to December, all in the lumpsucker fishery. Research surveys in cod gillnet fishery operated by the Marine Research Institute annually in April have been used as a platform to collect data on the bycatch of marine mammals since 2003. Additional monitoring of bird entanglements was initiated in 2009; in total 43 mammals were observed caught in the gillnet survey in 2009. The research area covers the main fishing area for cod in the coastal shelf waters and monitoring has been pre-stratified in proportion to the fishing effort by the entire fleet in the area. Bycatch data were then extrapolated in relation to relative fishing effort in the entire cod gillnet fishery in March and April within each of the Icelandic marine subareas (Taylor 2003). Confidence limits were calculated using a bootstrap resampling procedure. The most recently estimated number of harbour porpoises caught in March and April in 2009 was 374 animals (95% CI = 41–560). The results since 2003 demonstrate relatively stable rates of harbour porpoise entanglements in the gillnet fishery during spring between years. The estimated decline in bycaught harbour porpoises since the highest numbers were estimated in 2004 (958 animals 95% CL: 296–1472) follow a decrease in gillnet fishing effort over recent years.

It was concluded that self-reporting of marine mammal captures in commercial fisheries is not a reliable means to gathering data but fishery reports may be useful in identifying potential high risk fisheries and

<sup>48</sup> <http://jncc.defra.gov.uk/pdf/UKSPA/UKSPA-A6-93.pdf>

most frequent bycatch species. Fishery report data may also give indications of changes or trends in bycatch rates over longer periods. The ICES working group also concluded, however, that although any marine mammal bycatch is undesirable and should be avoided whenever possible, the numbers involved do not appear to pose any immediate threat to species' populations (SGBYC, 2010).

**New Regulation for Recording of Marine Mammals and Sea Birds in logbooks**

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>

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:	
<ul style="list-style-type: none"> <li>3. Seabirds on the number and species.</li> <li>4. Marine mammals on the number and species.</li> </ul>	
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>

### **Gear restrictions**

The fishery utilizes highly selective gears and a large codend mesh (135mm) size that minimizes retention of undersize fish. Use of selective gears is underpinned by the discarding ban that is in force in Iceland. The law on discarding practice has been tightened and it now a requirement to land everything that is captured. The law is 810-26 from Aug 2011.

The Directorate of Fisheries require long-liners to take all reasonable measures to avoid seabirds taking bait or catch. Icelandic vessels generally fish at night and set up scare lines to avoid bird interactions. The principle bird deterrents used on the larger long-line vessels are automatic gas guns (rarely used in the winter months). Long-liners are reported to use protective devices to shield baited hooks as gears are shot in order to prevent encounters with seabirds. By-catch avoidance methods are employed on a voluntary basis. Results of research in Norway have demonstrated effective reduction in by-catch of seabirds.<sup>49</sup>

The Danish seine is a lighter gear than the trawls and is only used on relatively flat sand or mud seabed without significant obstructions. The lightweight construction and method of hauling also means that the gear skims the seabed without digging in, thereby minimising abrasion or benthic disturbance (Thórarinsdóttir G.G., 2010).

The gillnet fishery is a highly selective. Some diving species, e.g. eider duck, are vulnerable to ensnarement in gill nets and the Fisheries Directorate and MRI encouraged the fleet to do all it can to minimise the risk. During the nesting season, there are some closed areas in which gillnetters cannot fish to safeguard nesting eider duck.<sup>50</sup>

Iceland is a signatory to a wide range of international conventions that embrace the conservation and protection of marine biota, their habitats and environment, e.g. OSPAR, NAMMCo, Bern, Bonn, Ramsar, Rio conventions. Reporting of marine mammal by-catch in the Icelandic fishery is mandatory.<sup>51</sup>

<sup>49</sup> Reg. 456, 1994. REGLUGERD um fuglaveidar og nytingu hlunninda af villtum fuglum, nr. 456/1994. Regulation on bird hunting and utilization of wild birds, nr. 456/1994

<sup>50</sup> <http://www.fisheries.is/fisheries/fishing-gear/midwater-trawl/>

<sup>51</sup> Source: SGBYC, 2010

**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.**

<b>EVIDENCE RATING:</b>	<b>High</b> <input checked="" type="checkbox"/>	<b>Medium</b> <input type="checkbox"/>	<b>Low</b> <input type="checkbox"/>
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**SUMMARY: Non target commercial fish catches, including discards, of stocks other than the “stock under consideration” are monitored (survey program) and do not threaten these non-target stocks with serious risk of extinction; if serious risks of extinction arise, effective remedial action are taken (fishery closure). There is no evidence of serious risk of extinction of by-catch species resulting from the activities of the golden redfish fishery. For species of fish stocks that have been designated as vulnerable (either by Icelandic designation (Atlantic halibut) or Internationally (Grey Skate), there are measures in place to limit the effects of the fishery on these stocks.**

**Evidence**

Stocks of non-target species are meant as other stocks (i.e. commercial) caught together with golden redfish (e.g. cod, saithe, haddock, and others) and do not include other benthic assemblages (e.g. starfish, large bivalves, hard-shelled gastropods, crabs etc.).

According to Icelandic law 810/2011, discards are prohibited, and all catches of commercial species must be landed. 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.

<http://www.reglugerd.is/interpro/dkm/WebGuard.nsf/58b439f05a7f412f00256a07003476bc/bf423d896e18e1340025790300033285?OpenDocument>

Landings are recorded in the Directorate database. All catches are landed including low-value and non quota-managed species.

**Clause: 3.2.3 Habitat Considerations**

**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.

**3.2.3.2** Management measures must take into account stony coral areas, identified through scientific and formal methods.

**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)

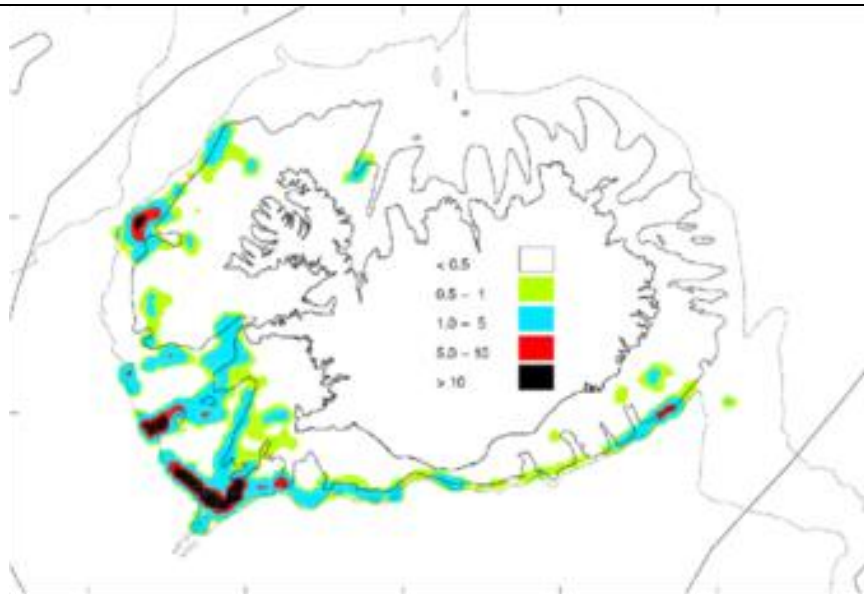
**3.2.3.4** Known thermal vents *shall be* protected through area closure to fishing activities with gear that has significant bottom impact during normal operation.

<b>EVIDENCE RATING:</b>	High <input checked="" type="checkbox"/>	Medium <input type="checkbox"/>	Low <input type="checkbox"/>
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**SUMMARY:** There is knowledge of the essential habitats for the “stock under consideration” and potential fishery impacts on them. Impacts on essential habitats and on habitats that are highly vulnerable to damage by the fishing gear involved are avoided, minimized or mitigated. In assessing fishery impacts, the full spatial range of the relevant habitat is considered. Area closures are a commonly employed management tool to protect spawning grounds, essential fish habitat, stony coral areas and thermal vents. 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.

**EVIDENCE:**

Descriptions of Icelandic redfish essential habitat can be found on the Icelandic Ministry of Fisheries website, and in the North Western Working Group report (NWWG, 2011). Golden redfish is found all around Iceland on various bottom types, but juveniles are found mainly off the north coast. They can be both found close to the bottom and in the water column (usually at night) and can therefore be classified as benthopelagic. The main fishing grounds, as well as the main adult grounds, are at the edge of the continental shelf at 200 to 400 m depth south and west of Iceland. Golden redfish is found along the coast of North America from Cape Cod to Newfoundland, in southern Greenlandic waters, around Iceland, the Faroe Islands, in the Northern part of the North Sea, along the coast of Norway and in the southern part of the Barents Sea. Redfish mate in early winter; the female carries the sperm and eggs, and later larvae that are hatched in April/May in remote areas in the southwest. The fry stays near the bottom off East Greenland and at the edge of the Icelandic continental shelf.



**Figure 20.** Golden redfish fishing grounds in 2011 (t/nm<sup>2</sup>), all gear combined. Dark areas indicate highest catches. Source: <http://www.fisheries.is/main-species/redfishes/golden-redfish/>

On-going research into benthic habitats is being carried out. On a national level the BIOICE programme has been in operation since 1992 with the aim to produce basic inventory of benthic fauna within the Icelandic territorial waters. Benthic samples have been collected from a variety of habitats, ranging widely in depth (<100 to 3100 m) and in temperature conditions (12° to -0.9°C). The Marine Research Institute (MRI) has also identified areas of vulnerable benthic habitats in Icelandic waters in relation to bottom trawl fishing activities.

MRI is currently carrying out research programmes in order to map benthic habitats in Icelandic waters (biology and geology, using multibeam echo sounder), including the mapping of cold water corals (*Lophelia pertusa*). Seabed mapping is one of the Marine Research Institute's research focuses which started with the launching of the research vessel, Arni Fridriksson, in the year 2000. The vessel is equipped with a multi-beam 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 on the substrate. The main emphasis of the project is to map selected areas on the outer part of the continental shelf and rise down to 1500 – 2500 m water-depth around Iceland, including the submarine ridges southwest and north of Iceland. The information is useful for the Institute's various research fields, such as exploring new and known fishing grounds, effects of fishing gears on seabed, benthic communities and habitats and the geology of the ocean floor.

The effects of towed fishing gear, including demersal trawls, is subject to ongoing research by the MRI ([http://www.hafro.is/undir\\_eng.php?ID=16&REF=2](http://www.hafro.is/undir_eng.php?ID=16&REF=2)) and has been subject to review for all Nordic Seas, including Iceland (Garcia, 2007). The most vulnerable habitats were identified as those with long-lived benthic structures such as corals, sponge communities and maerl (*Lithothamnion* spp.), all of which can act as keystone species for diverse benthic communities. Garcia (2007) also drew attention to the fact that trawling can alter the age, size and community structure of fish

populations and that to counter some of these adverse effects a variety of technical measures (minimum mesh sizes, sorting grids) and closed areas are in force.

The distribution of fishing efforts around Iceland by handline, long-line and Danish seine are well known. Handlines do not make any substantial contact with the seabed and therefore do not negatively affect benthic habitats. Static fishing gear, such as long-line, does not affect large areas of seabed and is not thought to cause serious or irreversible harm to habitat structures (Jennings S., 2001). Information on the assessed long-line and Danish seine fisheries indicate that discarded invertebrates are mainly echinoderms (e.g. sea cucumbers and starfishes) and gastropods. Recent study of the impact of the Danish seine on benthos showed that it has insignificant effect on benthic life on soft seabeds (Thórarinsdóttir G.G., 2010) has limited negative impact on benthic habitats.

Danish seine is normally operated on soft seabeds in coastal areas off Iceland. Areas with soft sediments have normally relatively simple habitat structure and where such habitats occur in coastal areas they are likely to be highly disturbed by natural events (storms).

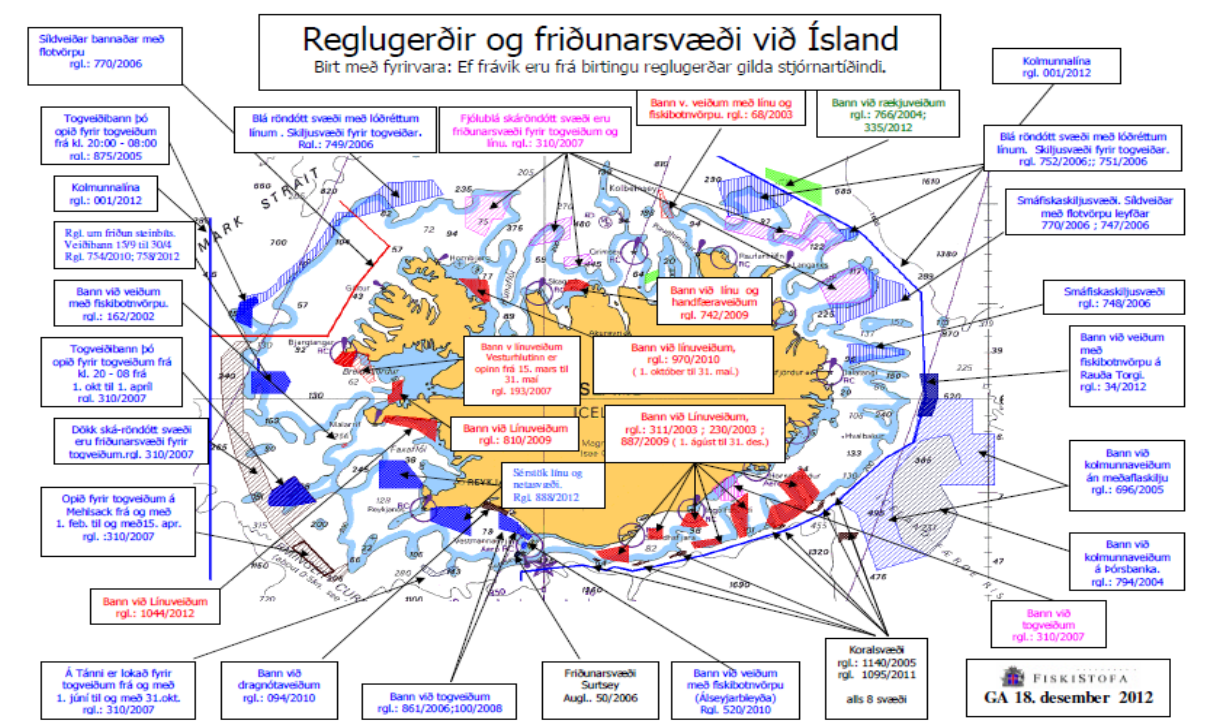
Through MRI, the Ministry of Industries and Innovation is maintaining a coral mapping programme with the possibility of increasing the number of no-fishing zones established already for their protection. "Preliminary results (from the mapping programme), from Hornafjarðadjúp, show that three different zones can be distinguished within the coral area, live coral zone, dead coral zone and coral rubble zone. The fauna composition is different between these zones. The diversity is high for the dead coral and coral rubble zones but lower for the live coral zone" (Ólafsdóttir, 2009). Based on information from fishermen, eleven coral areas were known to exist close to the shelf break off northwest and southeast Iceland around 1970. Since then more coral areas have been found, reflecting the development of the bottom trawling fisheries extending into deeper waters in the 1970s and 80s. At present considerably large coral areas exist on the Reykjanes Ridge and off southeast Iceland; other known coral areas are small (Steingrímsson, 2004).

The distribution of soft corals (Gorgonacea and Pennatulacea) off Iceland is not well-known, but several of the gorgonian species, e.g. *Paragorgia arborea* and *Primnoa resedaeformis*, are widely distributed associated with the *Lophelia* reefs. The soft corals do not form coral reefs, but where they occur they tend to be in high densities. Gorgonians are found in relatively high numbers in deeper waters (> 500 m) off south, west and north Iceland but are relatively uncommon on the shelf (< 500 m depth); i.e. their distribution tends not to overlap with typical groundfish distribution or that of its fisheries. Similarly, the pennatulaceans are relatively rare in water shallower than 500 m, but they are more common in deeper waters, especially south of Iceland. As with the hard-coral reef features such as *Lophelia*, the soft coral species are vulnerable to direct impact damage by trawling, not least from nephrops trawlers which work on mud grounds favoured by soft-coral species. Their vulnerability is tempered, however, by their ability to retract into the sediment or bend if the pressure applied is not too violent.

Very few species utilize the sponges as a food source; it is assumed, therefore, that the sponges act as keystone species providing associated species with habitat, refuge from predation or physical strain and enhanced food supply from the surrounding water. Juvenile redfish and other groundfish have been regularly observed in association with large sponges, suggesting that ostur is a suitable feeding ground for particular life-history stages of some fish species.

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. 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 a comprehensive report from Schopka et al. 2007 (<http://www.hafro.is/Bokasafn/Timarit/fjolrit-133.pdf>) report series 133, the Icelandic real-time area closure system is described by species and gear. As it turns out in Iceland, it is often the same areas are that are closed year after year. Therefore the real-time closures create the basis for the long term area closures. Results from the investigation of the effects of real-time closures and long term area closures show that protection of areas does reduce the catches of undersized fish, discards and reduces the fishing effort on spawning grounds and hence increases the yield on the long term. In order to achieve the best result the protected areas have to be large. Based on knowledge on the biology of various stocks, many areas have been closed temporarily or permanently, some for decades. The permanent closures are aimed primarily at protecting fish nursery areas while seasonal closures, many of which were introduced at the insistence of the fishing industry, are to protect mature fish on the spawning grounds. In addition, a quick-response (real-time) closure system has been in force since 1976 to protect juvenile fish on the fishing grounds. Fishing is prohibited for at least two weeks in areas where the number of small fish in the catches has been observed by inspectors to exceed threshold percentages (25% or more of <55 cm cod and saithe, 25% or more of <45 cm haddock and 20% or more of <33 cm redfish). If, in a given area, there are several consecutive quick closures the Minister of Fisheries can 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 MRI, 93 areas were closed in 2008.





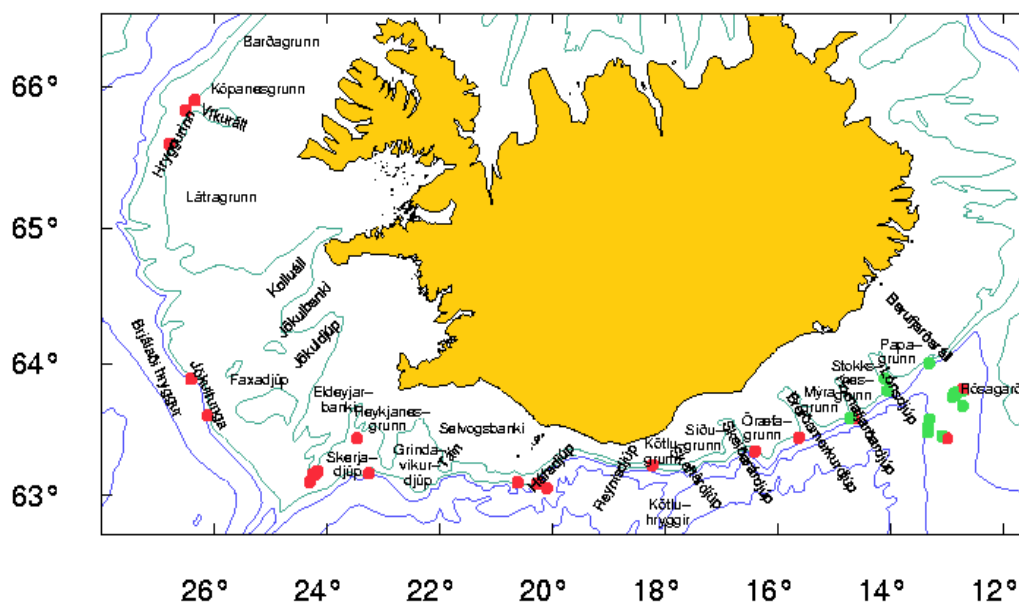
**Figure 21.** Closed areas <http://www.fiskistofa.is/fiskveidistjorn/veidibann/reglugerdarlokanir/>

### 3.2.3.2/3.2.3.3

MRI reports generally that, 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.

Seabed mapping is one of the Marine Research Institute’s research focuses which started with the launching of the research vessel, *Arni Fridriksson*, in the year 2000. The vessel is equipped with a multi-beam 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 on the substrate. The main emphasis of the project is to map selected areas on the outer part of the continental shelf and rise down to 1500 – 2500 m water-depth around Iceland, including the submarine ridges southwest and north of Iceland. The information is useful for the Institute’s various research fields, such as exploring new and known fishing grounds, effects of fishing gears on seabed, benthic communities and habitats and the geology of the ocean floor.

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.



*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. ● present 2003, ● not present 2003. From Steingrímsson and Einarsson (2004)*

**3.2.3.4**

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.

**3.2.4 Considerations**

<b>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.</b>			
<b>EVIDENCE RATING:</b>	<b>High</b> <input checked="" type="checkbox"/>	<b>Medium</b> <input type="checkbox"/>	<b>Low</b> <input type="checkbox"/>
<b>SUMMARY: The role of the stock under consideration in the food-web is considered – redfish is not considered a keystone species. Management measures are in place to avoid severe adverse impacts on dependent predators. There is a growing international focus on food web considerations in fisheries management and Iceland, largely through the activities of the Marine Research Institute is active in this area.</b>			
<b>EVIDENCE:</b>			
<p>The MRI has studied redfish, and its place in the ecosystem. Extensive studies on the feeding ecology of a large number of demersal fish species, marine mammals and seabirds have shown that capelin is a key prey species in the Icelandic waters ecosystems (Marine Research Institute 1997). All the redfish species primarily feed on zooplankton, but also on small fishes such as capelin. The single most important food group, however, is krill. Golden redfish are in turn prey to larger fish including cod, halibut and whales. There is no information to suggest that golden redfish are key species in the food web. It’s trophic level appears to be around <math>4.0 \pm 0.68</math> se, based on food items.</p> <p>The multi-species programme BORMICON is a model for an ecosystem approach to fisheries and was developed in the 90's using information on the Icelandic marine ecosystems, such as feeding habits of demersal fish, migration patterns of predator and prey, predation, mortality and fish growth. The programme was developed for modelling marine ecosystems in a fisheries management and biology context. BORMICON is now developed under the name GADGET (Globally applicable Area-Disaggregated General Ecosystem Toolbox). There is a comprehensive understanding about the key elements of the ecosystems of Icelandic waters, and this information is used in multi species modelling (GADGET models) for MRI assessments. The models have been used to evaluate interactions between fisheries and key ecosystem elements and information about these interactions have been taken into account for management purposes. The most important part of the ecosystem surrounding cod and redfish consists of two important prey species (shrimp and capelin) and marine mammals (mainly grey and harbour seals along with minke whales). Multispecies models have been used to evaluate these interactions and the findings have been taken into account in various ways for management purposes.</p> <p>There is a growing international focus on food web considerations in Icelandic fisheries management. This is evidenced by the Marine Research Institute's involvement in the development of ecosystem based understanding of the relationship between cod stocks and other ecosystem components – a so called ‘multi-species stock system and management approach’. The approach is outlined in the MRI presentation given during the assessment consultation meeting. Evidence of research into foodweb/trophic considerations is available in the MRI Report into Environmental conditions in Icelandic waters 2008 -2010 (Report No 145). Monitoring results of sandeels off the</p>			

south and west coast of Iceland that began in 2006 show that year-classes 2005 and 2006 were quite small and that year-class 2007 was larger, but the stock of sandeels has been declining. The causes for these changes in stock size of sandeels are largely unknown but can likely be explained by some combination of biological and environmental factors, such as predation, increased sea temperature or changes in sandeel larvae drift. The work also includes annual studies on sandeel abundance in the stomachs of cod and haddock.

Information on feeding habits has been used in studies on predator-prey interactions and multi-species and ecosystem modelling in reports by (Pálsson 1997, Stefánsson 2003, Barbaro *et al.* 2008). The gears within the UoC have no direct impact on the key species directly or as a bycatch. Redfish, saithe and haddock are not key stone species but mainly prey on the key species including capelin (*Mallotus villosus*) which have been identified as a key species in these ecosystems (ICES 2004 Gadget Model 2004, Dolgov, 2002). Information on feeding habits have been used in studies on predator-prey interaction and multi-species and ecosystem modelling (Pálsson, 1997, Barbaro et al., 2008, Stefánsson, 2003).

However, the importance of capelin in the foodweb, and as prey of cod in particular, varies from year to year as a result of fluctuations in capelin biomass and variability in hydrographic conditions (Zatsepin and Petrova, 1939; Grinkevich, 1957). Capelin were recorded in the food of 13 of the most abundant and commercial fish species during the 1980s and 1990s), an important prey item of saithe, Greenland halibut, redfish, haddock, blue whiting, and long rough dab, but it was extremely important as food for cod.

During the MRI multi species project data 1992-1995 (Marine Research Institute 1997) on the stomach contents of large number of fish species was collected. It has been used to assess the key factors that determine diet composition in some of the most important demersal fish species in Icelandic waters. These studies have shown that capelin (*Mallotus villosus*) is a key prey species and cod is a major fish predator in the marine ecosystem around Iceland. Cod prey mainly on capelin and shrimp (*Pandalus borealis*). The main components of redfish diet were zooplankton (with a large proportion of *Calanus hyperboreus*), euphausiids (mainly *M. norvegica* and *Thysanoessa inermis*), capelin, and other fish (Jaworski, 2006).

The cod has been seen to directly affect the biomass of (offshore) shrimp population. This is currently taken into account in the MRI assessments (using GADGET models) as has the effect of the capelin on cod growth (using regression models). All of these models indicate that the fishery for the cod as a whole has negligible negative effects on these species. The total landings of cod were 169.000 tonnes for the fishing year 2008/2009 (Marine Research Institute 2010). Considering that the Icelandic redfish fishery is considerably less than the fishery for cod, it can be concluded that the assessed redfish fishery is highly unlikely to disrupt any key elements of the ecosystem structure or function.

The Directorate of Fisheries database provides relatively good evidence that none of the assessed fisheries catch key ecosystem species. Bycatch/discard of (offshore) shrimps by a part of the Danish seine fishery (fishing west off the Snæfellsnes peninsula) cannot be ruled out. However, due to its small scale it is highly unlikely it will disrupt the ecosystem structure in Icelandic waters.

**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.**

<b>EVIDENCE RATING:</b>	High <input checked="" type="checkbox"/>	Medium <input type="checkbox"/>	Low <input type="checkbox"/>
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**SUMMARY: Icelandic government policy exists to protect vulnerable marine ecosystems (VMEs; cold-water corals and hydrothermal vents), from significant adverse impact from bottom contacting gear. 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.**

**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 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 and vulnerable marine ecosystems, e.g. coldwater corals. Most recently, Iceland has adopted a Fisheries Management Plan for Icelandic golden redfish which summarizes the measure in place relevant to ecosystem effects.

**Management measures relevant to ecosystem effects of the fishery**

As mentioned above, 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 (Fisheries department)

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## 8: External Peer Review

### 8.1 Peer Reviewers

#### **Erica Fruh**

Erica Fruh has been involved in commercial fisheries management for over 15 years. She earned her BSc in Marine Biology from Auburn University, and her MSc in Marine Resource Management from Oregon State University. Her MSc project focused on bycatch in trawl and longline fisheries. Previous experience includes fishery biologist roles with the Oregon Department of Fish and Wildlife, the Pacific States Marine Fisheries Commission and NOAA Fisheries. She has worked with most fishing gear types used along the U.S. west coast, spending numerous days at sea participating in tagging studies, population monitoring, bycatch monitoring and fishing mortality studies. She worked as a commercial fisheries observer in the U.S. west coast groundfish trawl fishery, the Oregon pink shrimp fishery and the seine sardine fishery. She spent 10 years contributing to the National Marine Fisheries Service U.S. west coast groundfish bottom trawl survey gathering data for stock assessments, and leading projects on marine debris, seabird sightings and age structure collection. She serves on the Board of Directors for the Newport Fishermen's Wives organization to promote safety at sea.

#### **Dankert Skagen (M.D)**

Dankert Skagen 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.

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## 8.2 Peer Review Report A

### Peer Review Report A

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**Peer Review Report for:** The Icelandic Redfish Fishery (200 mile EEZ)

**Applicant:** Fisheries Association of Iceland

**Assessment dates:**

**Peer Reviewers Name:** Reviewer A

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#### Summary and Recommendation

**General remark:**

At the time of review, there was a harvest rule proposed, but not formally adopted by Icelandic authorities. The rule was approved by ICES in February 2014, but with a suggestion to include a revision clause and to include actions to be taken if the stock biomass goes below the biomass limit reference point. The text in the draft assessment report that depends on such approval was marked. The review includes the marked text, and is made under the assumption that the harvest rule and the suggested additions are adopted.

**Reviewers recommendation:**

I find that the conclusion by the assessment team: 'The assessment team recommends that the management system of the applicant fishery, Icelandic Golden Redfish (*Sebastes marinus*) commercial fishery is awarded certification to the Icelandic Responsible Fisheries Management Certification Programme' is well justified.

**Some minor general points:**

- Some sections have ample references to the literature, which is very good, but the full references are missing.
- The numbering of figures and tables is sometimes inconsistent.

**Assessment team Response:** References and formatting of figures and tables have been added and corrected.

**Sections 1-3 of the Report**

This is a fine overview of the stock biology, the fishery and the management, well written and understandable. I see no points that require further clarification from the applicants, only points where there may be a scope for improving the text.

Both here and later, it is assumed that the assessment is only indicative of trends, and reference points were related to surveys. As part of the evaluation of the harvest rule, ICES approved an assessment method and corresponding reference points. Since there now is an analytic assessment



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with reference points in place, the text referring to the stock assessment and to reference points, which appears in several places, should be revised accordingly.

Some minor points:

- The management structure at the Ministry level, although described as straightforward, is slightly confusing for an outsider. The organisational chart on page 18 is informative, but some explanatory text would be useful.
- The fisheries management act Law nr 116/2006 is a key element in the legislation. Are there recent revisions/amendments to that law?
- The figure on page 23 may not be relevant.

**Assessment team Response:** Text revised to accommodate ICES review published in Feb 2014. Text that describes the organisational chart has been up-dated/extended and is contained in section 3. The key roles of each of the main agencies (Ministry, MRI, Directorate and Coast Guard) are described.

The most recent revision to the Fisheries Law was nr. 116/2006. There are annual regulations implemented for quota management, closing of areas and other measures used to facilitate the implementation of the Articles of the Fisheries Law.

#### **Section 4 of the Report**

No objections to the report. The stock distribution is wider than the Icelandic EEZ. The catches outside the Icelandic EEZ are presently small, but expansion of the fishery will require international cooperation to ensure sustainable exploitation of the stock as a whole.

#### **Section 5 of the Report**

No comments

#### **Section 6 of the Report**

- **Fisheries Management**

According to the legislation presented, the Minister formally has the authority to decide TACs that deviate from the TACs coming from the harvest rule. This has not been an issue in the recent past. My review and recommendation is under the assumption that the TAC is set according to the harvest rule, unless a situation appears where the harvest rule has to be revised or abandoned.

The stock is to some extent distributed outside Icelandic waters. The fishery there is presently small, but it has been larger in the past. There does not seem to be formal agreements between Iceland and other nations on TACs for Golden Redfish.

Under Research and assessment: The reference to the ICES Quality handbook 2010 is outdated. The revised assessment method will probably be incorporated in the Handbook in the future.

The section Management Targets and limits will have to be revised, see Clause 1.5.2

- **Compliance and Monitoring**

The control and enforcement system looks very convincing, but see note under clause 1.1.7.6.

- **Ecosystems Considerations**

The only concern I have is by-catch of endangered non-commercial species. It is not clear how severe that problem is, and how effective the implemented measures can be expected to be.

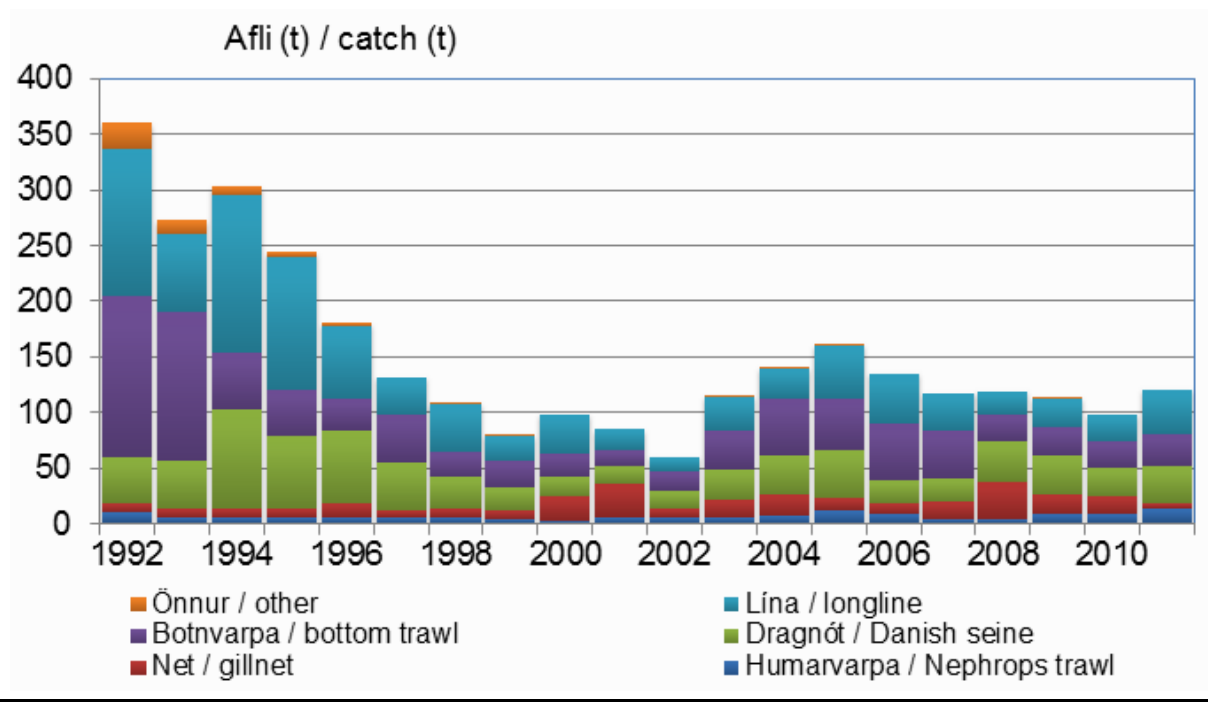
**Assessment team response:**

Revisions have been made to section 1.5.2 and related clauses to reflect on the now available Fisheries Management Plan and ICES reviewed Harvest Control Rule.

Whilst there is no formal arrangement between Greenland and Iceland with respect to Golden Redfish fisheries, there is collaboration on catches and consideration of the Greenland fishery takes by MRI when performing stock assessment up-dates.

Refer to 1.1.7.6 comment by Assessment Team.

Vessels are required to record catches of all commercial fish species and encounters with vulnerable species. Grey Skate (*Raja Dipturus batis*) used to be fairly common in Icelandic water, but has been overfished as catches are now only 10% of 50 years ago. There is no TAC on the grey skate as it is a bycatch in other gears. Grey Skate classification is also undergoing investigation and MRI sampled 201 specimens in 2011-12 nephrop survey which identified these as a different species *Dipturus flossa*, referred to as blue skate. Landings are recorded and it is unlikely that there is significant discarding based on the research survey and discard monitoring activities by MRI and Directorate. Longlines, Danish seine and trawl make up the majority of the 122t of the catch in 2011. (Refer to graph). This represents <0.15% total catches in all gears (Jónsson & Pálsson 2013).



MRI independent surveys (annually) report on all catches and their locations.

### **Section 7 of the Report**

Please add comments where deemed appropriate referencing the section and clause in the Report relevant to the comment. The table format below may be used for this purpose if desirable.

**N.B Peer Reviewers do not have to comment on each clause in the Report if deemed unnecessary.**

**Reviewers note:** Not all clauses are listed. I have no objections to the clauses that are not listed.

<b>Insert Section</b>	<b>Insert clause No.</b>	<b>Insert clause</b>
<b>Section 1</b>	<b>1.1.1</b>	<b>A structured fisheries management system shall be adopted..</b>
Peer Review comment: As mentioned previously, the text might clarify better the organisational structure on the top level (Minister of Industries and Innovation, Ministry of Industry and Innovation, the role of other ministries and of the Parliament) <b>Assessment Team Response:</b> Clarifications to text associated with the org. chart have been added.		
<b>Section 1</b>	<b>1.1.2</b>	<b>The fisheries management system objective shall be to limit the total annual catch form the fish stocks so that catches are in conformity with amounts allowed by the competent authorities</b>
Peer Review comment: Agree <b>Assessment Team Response: N/A</b>		
<b>Section 1</b>	<b>1.1.3</b>	<b>Appropriate measures for the conservation and sustainable use of the stock ...</b>
Peer Review comment: Agree <b>Assessment Team Response: N/A</b>		
<b>Section 1</b>	<b>1.1.6</b>	<b>The Fisheries Management Plan developed and adopted by the competent authorities shall list ...</b>
Peer Review comment: Agree <b>Assessment Team Response: N/A</b>		
<b>Section 1</b>	<b>1.1.6.4.1</b>	<b>The long term objectives of fisheries management, including targets ...</b>
Peer Review comment: Could add that the plan also states a target fishing mortality that is consistent with the MSY approach. <b>Assessment Team Response: Added accordingly to 1.1.6.4.1</b> The Fisheries Management Plan for Icelandic golden redfish details a long-term harvesting objective		

and strategy to maintain the exploitation rate at a rate which is consistent with the precautionary approach and that generates maximum sustainable yield (MSY) in the long term. The associated HCR is designed to limit catches in accordance with a fishing mortality that is consistent with MSY.

<b>Section 1</b>	<b>1.1.7.2</b>	<b>Fisheries Management Plan – Icelandic Golden redfish: Support measures</b>
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Peer Review comment: Agree

Assessment Team Response: N/A

<b>Section 1</b>	<b>1.1.7.4</b>	<b>Fisheries Management Plan – Icelandic Golden redfish: Process for making decisions on TAC</b>
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Peer Review comment:

Apparently, the Ministry has the authority to deviate from the plan if needed. That is their privilege, of course, but what consequences will that have for the certification?

**Assessment Team Response:** Annual surveillance audits are performed to confirm whether the management system remains consistent with the requirements for certification. In the event that the Ministry deviates from the Plan, a review of the causal factors etc. will be undertaken together with re-assessment of the certification decision.

<b>Section 1</b>	<b>1.1.7.6</b>	<b>Fisheries Management Plan – Icelandic Golden redfish: The means of implementing the management approach ...</b>
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Peer Review comment:

The evidence is that there are instruments in place to enforce regulations. How effective are they in practice – are there examples where offenders get away with it because of legal obstacles, or example of offenders that actually have been punished?

**Assessment Team Response:** There is ample evidence that demonstrates an effective system is in operation from records compiled by the Icelandic Coast Guard and the Directorate. Similarly, whilst there is evidence of an active enforcement arm (Coast Guard reviews annual performance of fishery) that raises offenses and issues sanctions in accordance with regulations, there is little evidence that suggests offenses go unresolved and that repeat offenses occur that would suggest a weak prosecution system.

<b>Section 1</b>	<b>1.1.7.7</b>	<b>Fisheries Management Plan – Icelandic Golden redfish: Management measures relevant to ecosystem effects of fishery</b>
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Peer Review comment:

Agree

**Assessment Team Response: N/A**

<b>Section 1</b>	<b>1.2.1</b>	<b>A competent research institute ...</b>
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Peer Review comment:

Agree

**Assessment Team Response: N/A**

<b>Section 1</b>	<b>1.2.2</b>	<b>The relevant data collected/compiled shall be appropriate to the chosen method of stock assessment ...</b>
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Peer Review comment:

1. The evidence on data sampling looks convincing. However, it would be helpful to have an overview, perhaps as a flow chart, of the data flow from the sources to the final use in stock assessment and in monitoring and control – where do the data come from and who does what. Such systems are typically complex with many parties involved, and the redfish is hardly an exception. That makes it is hard for a reviewer to spot possible flaws if there are any.

This will be constructed and added at the 1<sup>st</sup> surveillance audit report stage. Data is generated from two streams. Fishery independent surveys, dockside monitoring and from fishery dependent data – landings and log book data. This is supported by a range of environmental/physical and oceanographic data and economic data for the various fleet segments.

2. Vessels < 12m are not required to keep a log book – how important are such vessels in the *S. marinus* fishery?

Small boat classification (<15GRT) receive circa 10% of the quota. Small boats tend to catch no golden redfish given that the species is found at considerable depths, it is mainly caught by the large trawlers. All catches must be reported within 15 days although many report catches on return from each trip.

3. The system with designated ports and weighing by approved staff looks very good.

Also includes catches from small boats that land to the auctions and processing trade.

4. On commercial discards data: The discard is referred to as ‘ranging from X.X to Y.Y%’ – need the actual numbers.

Discard monitoring focuses cod and haddock and this has ranged from 1-2% for cod and 2-6% for haddock over the last 10 years. There is no evidence of discarding being an issue in redfish fisheries and estimates are considered lower than for cod.

**Assessment Team Response:** Included beneath each point raised by the peer reviewer.

<b>Section 1</b>	<b>1.2.3</b>	<b>Stock assessments ...</b>
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Peer Review comment:

ICES have now approved an assessment procedure with GADGET.

The German survey is now used in the assessment as it covers an important part of the distribution area. (source: ICES 2014 – response to HCR request)

**Assessment Team Response:** Statement added to clause 1.2.3 stating that fact.

ICES 2014 review has identified the up-dates to the stock assessment model; including the autumn German- Greenland groundfish survey data (with modifications to survey area to avoid extrapolation to areas not covered), change to mean length-at recruitment (age 5) for 1996-2000 year class and 2001-present to account for faster growth and modifications to the weighting of the individual data sets in GADGET model to reduce the influence of lower quality input data.

<b>Section 1</b>	<b>1.2.4</b>	<b>For the stock under consideration, the determination of suitable conservation ...</b>
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Peer Review comment:

The catch in other areas is small (about 5%) but hardly negligible. Previously, catches in East Greenland waters were quite large, and there does not seem to be any formal coordination of

quotas between Iceland and Greenland.

**Assessment Team Response:**

A formal regional management organization is not in place but since 2012, when the proposed HCR and management plan for redfish was developed there has been greater coordination. ICES also notes that that the Governments of Iceland, Faroe and Greenland propose the management plan for golden redfish and also jointly requested ICES to evaluate the proposed HCR (ICES, February 2014). Fishery data from Greenland and Faroe are available to the Agencies and have been included in the recent stock assessment for golden redfish. The FMP states that TAC in Icelandic waters will be set in accordance with the rule, taking into account estimated catches in Faroese and East-Greenland waters. To date, catches in Greenland and Faroe have been taken from the Icelandic TAC. As noted this has represented <5% of total Icelandic catch.

<b>Section 1</b>	<b>1.2.6</b>	<b>There shall be active collaboration with international scientific organizations ...</b>
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Peer Review comment:

Agree, but see 1.2.4.

**Assessment Team Response:** N/A

<b>Section 1</b>	<b>1.3.1.1</b>	<b>The precautionary approach ...</b>
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Peer Review comment:

The management strategy should have a clause to revise the harvest rule if natural conditions change outside the range that was assumed when testing the rule (for example sustained recruitment failure), or if it is not properly implemented. ICES also recommend a specification of what to do if SSB goes below Blim. That is actually implicitly stated in the rule, as the progressive reduction in F at low SSB also applies below the Blim. ICES did not investigate the effect of that measure in depth, since all scenarios presented implied a low risk of such low SSB.

**Assessment Team Response:** A 5 year review of the HCR and Management Plan has been defined forms the basis of incorporating these scenarios based on observed data at the time or test simulations of greater risk to low SSB occurring. The evaluation by ICES notes that, the HCR should result in a reduction in F below that observed in the last 30 years and there is low risk in SSB falling below Btarget within this time period. Latter would result from recruitment below the lowest observed level since 2006 and at the same time, F consistently underestimated over the next 5 years. ICES evaluates the suitability of management plans against the PA on the basis of appropriately conditioned simulations resulting in the long term risk of the SSB<Blim under the application of the HCR to be below 5%. Any management plan having consideration for yield stability or uncertainty in measurements, implementation or modelling will result in a compromised average long term harvest rate which will be below Fmsy. The Icelandic haddock HCR conforms to this expectation and output result; whereby ICES has evaluated it as being consistent with the PA, and the target harvest rate is set below Hmsy. As noted by the peer reviewer, should SSB fall below Btarget within the 5 year period, the HCR will reduce F linearly in subsequent years until the 2020 formal review. It is also noted that within the next 5 years, there will be significantly better knowledge of stock dynamics from age reading and catch in Subarea XIV and from further species separation from juvenile *Sebastes marinus* and *S.mentella*.

<b>Section 1</b>	<b>1.3.1.2</b>	<b>The stock under consideration shall not be overfished...</b>
Peer Review comment: The text should be revised, to take into account that revised reference points are now in place. The conclusion that there is no recruitment overfishing is still valid. <b>Assessment Team Response:</b> Text revised accordingly with the up-dates stock assessment and reference points defined in the FMP and HCR.		
<b>Section 1</b>	<b>1.3.1.3</b>	<b>Relevant uncertainties shall be taken into account ...</b>
Peer Review comment: Small correction: The trigger biomass is 37.5% above Blim, not 10% as stated in the text. <b>Assessment Team Response:</b> Text corrected.		
<b>Section 1</b>	<b>1.3.1.4</b>	<b>Appropriate reference points shall be determined ...</b>
Peer Review comment: Here the reference points are correctly updated. <b>Assessment Team Response:</b> N/A		
<b>Section 1</b>	<b>1.3.1.5</b>	<b>The long-term harvesting policy ...</b>
Peer Review comment: Agree <b>Assessment Team Response:</b> N/A		
<b>Section 1</b>	<b>1.3.2.1</b>	<b>Harvesting rate and fishing mortality</b>
Peer Review comment: The exploitation measure in the new harvest rule is a fishing mortality, not a harvest rate. 1.3.2.1.2.: There is no limit fishing mortality defined. It is substituted by the harvest rule, which requires that the TAC is set according to a defined fishing mortality, independent of the present fishing mortality. <b>Assessment Team Response:</b> No comment added but confirmed that there is no limit fishing mortality defined and there is low risk of SSB falling below Btrigger.		
<b>Section 1</b>	<b>1.3.2.2</b>	<b>Stock Biomass</b>
Peer Review comment: Agree <b>Assessment Team Response:</b> N/A		
<b>Section 1</b>	<b>1.3.2.3</b>	<b>Stock biology and life-cycle ...</b>
Peer Review comment: The evidence presented here does not quite hit the point. The figure, which is quite informative, indicates that the fishery mostly exploits ages 10-15., which probably (but that may be checked) is where the biomass of a year class is at its largest. Younger fish are not exploited to any large extent as the fishery is conducted at present. This, together with keeping the fishing mortality at the quite low level that is prescribed by the HCR, ensures that strong year classes can contribute both to the fishery and the spawning stock for many years. So, there is evidence for: <ol style="list-style-type: none"> <li>1. Favourable exploitation at age pattern</li> <li>2. Careful reduction of good year classes which are keys to an optimal utilisation of the stock.</li> </ol> <b>Assessment Team Response:</b> Amended text added to better reflect peer review comments.  The stock assessment approach takes the size and age structure and composition of the golden redfish stock into account and there is favourable exploitation at age pattern supporting good year		

class strength and optimal utilization of the stock. The fishery exploits mainly 10-15 age classes, fishing mortality is modest and precautionary.		
<b>Section 1</b>	<b>1.3.2.3 .2</b>	<b>Consideration shall be given to measures designed to avoid excessive exploitation of spawning components at spawning time ...</b>
Peer Review comment: Agree <b>Assessment Team Response: N/A</b>		
<b>Section 1</b>	<b>1.3.2.3 .4</b>	<b>Consideration shall be given to measures designed to limit fishing mortality of juvenile fish ...</b>
Peer Review comment: Agree <b>Assessment Team Response: N/A</b>		
<b>Section 1</b>	<b>1.5.2</b>	<b>Advice shall include the appropriate values for precautionary reference points</b>
Peer Review comment: The table needs to be updated according to the revised reference points. <b>Assessment Team Response: Updated.</b>		
<b>Section 1</b>	<b>1.5.3.4</b>	<b>Decisions on TAC ...</b>
Peer Review comment: The first paragraph (The initiative.....) seems redundant here. Further, my understanding is that the final advice from MRI to Icelandic managers is not peer reviewed by ICES. The material underlying the ICES advice is subject to review before the advice is formulated. The reference to trend based assessment is out-dated. The lack of international agreement on sharing the stock, although it is exploited also outside the Icelandic EEZ may be a matter of concern. <b>Assessment Team Response:</b> A revision to the text is added to clarify that the stock assessment methodology and HCR considers the entire stock unit for <i>S. marinus</i> and the TAC will be derived from the HCR from 2014 fishery onwards. A special consultation group of the MRI meets every year and considers information from fleet managers, skippers when quantifying advice to the Ministry. The Minister consults with representatives from the main stakeholders before decisions is taken and regulation of commercial fisheries is issued.		
<b>Section 1</b>	<b>1.5.8</b>	<b>Decisions on TAC ...</b>
Peer Review comment: Agree <b>Assessment Team Response: N/A</b>		
<b>Section 1</b>	<b>1.5.10</b>	<b>In the absence of specific information on the stock ...</b>
Peer Review comment: My understanding is that this clause primarily applies to stocks where the biology is largely unknown, where for example growth parameters have to be taken from the literature. Some of the data that go into the assessment are length disaggregated, but there is age data as well, so growth parameters do not have to be assumed. So, the clause is not really relevant for this stock. The justification here is perhaps not hitting that target. However, the summary of sources of information, including such that are not used directly in the assessment is still relevant. <b>Assessment Team Response:</b> Clarification to text added.		



<b>Section 2</b>		<b>Concordance between the TAC and actual total catch</b>
Peer Review comment: Agree <b>Assessment Team Response: N/A</b>		
<b>Section 3</b>	<b>3.1.1-2</b>	<b>Adverse effects of the fishery on the ecosystem shall be considered ...</b>
Peer Review comment: The evidence presented under 3.1.1 is largely on how the ecosystem is monitored rather than on the impact of the redfish fishery on the ecosystem. The issue is adequately covered under clause 3.1.2 and several of the subsequent clauses, however. <b>Assessment Team Response: N/A</b>		
<b>Section 3</b>	<b>3.2.2.1</b>	<b>Discarding...</b>
Peer Review comment: Agree <b>Assessment Team Response: N/A</b>		
<b>Section 3</b>	<b>3.2.2.2</b>	<b>Where relevant, appropriate steps shall be taken to avoid, minimize, or mitigate encounters with seabirds and marine mammals</b>
Peer Review comment: Agree <b>Assessment Team Response: N/A</b>		
<b>Section 3</b>	<b>3.2.2.3</b>	<b>Non-target catches ...</b>
Peer Review comment: It is stated categorically that „There is no evidence of serious risk of extinction of by-catch species resulting from the activities of the golden redfish fishery“. The evidence to support this quite strong statement is not fully convincing. Apparently, some species that may be caught (e.g. skates) are considered severely depleted, and evidence that these are effectively protected by the measures implemented at present is lacking. <b>Assessment Team Response:</b> Grey Skate stocks are considered overfished and there is no targeted fishery. Catches range from 100-150t per year (last 5 years data) and are reported. MRI records all catches in annual surveys and monitors stock distribution. Discarding is illegal and there is a traditional local market (special preparation of skate). MRI discard monitoring evidence suggests that discarding is not encountered. There is also evidence that records of grey stake ( <i>D. batis</i> ) may also include the closely related ‘blue’ skate <i>D. flossa</i> .		
<b>Section 3</b>	<b>3.2.3</b>	<b>Habitat considerations</b>
Peer Review comment: Agree <b>Assessment Team Response: N/A</b>		
<b>Section 3</b>	<b>3.2.4.1</b>	<b>Foodweb considerations ...</b>
Peer Review comment: Agree <b>Assessment Team Response: N/A</b>		
<b>Section 3</b>	<b>3.2.4.2</b>	<b>Management plans shall be developed.....</b>
Peer Review comment: Agree <b>Assessment Team Response: N/A</b>		

## 8.3 Peer Review Report B

### Peer Review Report B

**Peer Review Report for:** The Icelandic Redfish Fishery (200 mile EEZ)

**Applicant:** Fisheries Association of Iceland

**Peer Reviewers Name:** Reviewer B

#### Summary and Recommendation

##### Sections 1-3 of the Report

Are the stocks cross-boundary? If so, how are they managed in the other areas? Does the migration cross international boundaries? Pre-1980 there was no species composition information, only a “redfish” category? Are there management plans for the other two redfish species and are they all caught simultaneously? Can you explain the “only partially removed from catch quota” statement in the ITQ system section a little better. It does not sound like an incentive to not catch smaller fish. Also, if the “bulk” of the value goes to the MRI, where does the rest of it go?

##### **Assessment Team Response:**

Are the stocks cross-boundary? The stock management unit for *S. marinus* crosses ICES Subareas V, VI, XII and XIV and is considered one stock.

This includes the territorial fishing waters of Iceland, Greenland and the Faroe Islands.

If so, how are they managed in the other areas? The vast majority of catches occur in Icelandic water (Area Va) (>95-98%).

The regulation of *S. marinus* is based on TAC in Iceland and in Greenland, but through an effort system in the Faroe Islands.

Does the migration cross international boundaries?

There is some movement of juvenile *S. marinus* from East Greenland but are distributed throughout Iceland with main fishing grounds being off the west and south west and South East of Iceland. The majority of redfish remains in Icelandic waters.

Pre-1980 there was no species composition information, only a “redfish” category? Are there management plans for the other two redfish species and are they all caught simultaneously?

Iceland manages *S. marinus* separate to *S. mentella*. There is a separate management plan and TAC.

Can you explain the “only partially removed from catch quota” statement in the ITQ system section a little better. It does not sound like an incentive to not catch smaller fish. Also, if the “bulk” of the value goes to the MRI, where does the rest of it go?

Importantly, undersized catches do not achieve commercial prices, only a price set at a cost recovery nominated value. Other proceeds go to research. Undersized catches are not subtracted from quota at the full rate (only half of this). This allows a balance of incentives to both land undersized fish that

may be encountered but no economic incentive to target them. There is a thorough dockside monitoring programme and a short notice closure regulation that can be implemented in real time when undersized catches are encountered in catches. Vessels are obliged to leave the area where undersized catches are encountered. MRI informs the assessment team that vessel captains will contact the officials when they encounter undersized catches to promote effective regulation and protection of juveniles.

**Section 7 of the Report**

Please add comments where deemed appropriate referencing the section and clause in the Report relevant to the comment. The table format below may be used for this purpose if desirable.

**N.B Peer Reviewers do not have to comment on each clause in the Report if deemed unnecessary.**

Insert Section	Insert clause No.	Insert clause
Section 1	1.1.1	<b>A structured fisheries management system shall be adopted.</b>
Peer Review comment: Why is an international agreement not required for redfish, if the stock is fished by other nations? Just to clarify is the coastal summer fishery the same as the small boat fishery? <b>Assessment Team Response:</b> International agreement has not been concluded for golden redfish at this time although International collaboration is on-going. The most recent stock assessment includes data from Greenland (German survey) and the Faroese. The HCR has been developed and reviewed by ICES based on the entire stock unit (including Iceland, Greenland and Faroese). ICES also reviews the redfish stock across all fisheries and the recent advice from ICES notes that the HCR is presented by the Governments of Iceland, Faroe Islands and Greenland, again highlighting collaboration even if not through a formal arrangement. Coastal summer fishery is the same as the small boat fishery.		
Section 1	1.1.2	<b>The fisheries management system objective shall be to limit the total annual catch form the fish stocks so that catches are in conformity with amounts allowed by the competent authorities</b>
Peer Review comment: What is the table at the end of this section showing? Iceland is historically setting TAC above predicted catch and advice? <b>Assessment Team Response:</b> Table 5 shows ICES advice, predicted catch, Iceland TAC, Greenland TAC and total landings for <i>S.marinus</i> for the stock unit. There has been a history of advice and TAC's set for <i>S. marinus</i> and <i>mentella</i> combined. The adoption of the species/stock specific HCR and management plan is consistent with other fisheries in Iceland and is to be implemented for the 2014 fishery.		
Section 1	1.1.3	<b>Appropriate measures for the conservation and sustainable use of the stock ...</b>
Peer Review comment: <b>Assessment Team Response: N/A</b>		

<b>Section 1</b>	<b>1.1.6</b>	<b>The Fisheries Management Plan developed and adopted by the competent authorities shall list ...</b>
Peer Review comment: 1.1.6.1-What is the management unit? <b>Assessment Team Response:</b> The stock unit is defined as Golden redfish ( <i>Sebastes Marinus</i> ) in Subareas V, VI, XIV. The unit of certification is specific to the Icelandic 200 mile EEZ.		
<b>Section 1</b>	<b>1.1.6.4</b> <b>.1</b>	<b>The long term objectives of fisheries management, including targets ...</b>
Peer Review comment: Need the numbers in this section. And the HC rules. <b>Assessment Team Response:</b> The reference points associated with the HCR and FMP are now included in this section.		
<b>Section 1</b>	<b>1.1.7.2</b>	<b>Fisheries Management Plan – : Support measures</b>
Peer Review comment: Is there any specific information on reducing the redfish bycatch in other fisheries that could be mentioned here? <b>Assessment Team Response:</b> Support measures are described in the FMP. Additionally, The majority of redfish is caught by the bottom trawl fleet (>95%). Other gears take redfish and must land (zero discard regulation) catches and must obtain quota that for these catches. The quota is removed from the overall TAC. Bycatch reduction measures focus mainly on avoidance of juvenile catches including; temporary closures, permanent closed areas to larger vessels and all vessels in other areas, separator panels in prawn nets, square mesh panels.		

<b>Section 1</b>	<b>1.1.7.4</b>	<b>Fisheries Management Plan – Icelandic cod: Process for making decisions on TAC</b>
Peer Review comment: <b>Assessment Team Response: N/A</b>		
<b>Section 1</b>	<b>1.1.7.6</b>	<b>Fisheries Management Plan – Icelandic Redfish The means of implementing the management approach ...</b>
Peer Review comment: Observers or other at-sea monitoring? <b>Assessment Team Response:</b> There are a number of independent monitoring/other at sea monitoring processes: 1. Scientific observation. MRI staff (supported by Directorate staff) undertake observation onboard the entire Icelandic fishing fleet; including redfish fishery. Biological and associated data are collected during these observations for both fish and bycatches (e.g birds) and commercial data on processing yield. 2. Coast Guard regularly boards vessels for inspection/compliance purposes such as logbook v catch inspection. 3. All landed catch is observed at shore by Port inspection/weighing either by Directorate staff or appointed officials who are certified by the Directorate to carry out that function. Observation on vessels is circa 20% across the various fleets. It is highest for large factory vessels.		

Observation of the demersal factory freezer segment is circa 17-20% (circa 48 trips observed from 260). Inspectors remain on the vessel for the entire duration and also witness the landing. Vessels captains are required to report each haul on the e-logbook which must be submitted daily. If errors are made, the logbook can be corrected but the original entry remains.

The electronic logbook system can identify certain errors/anomalies automatically and the Directorate staff also monitor logbook reports routinely to support decisions on observation and to review discrepancies and anomalies. Yield factors are checked routinely for observed vessels and all scales are officially inspected/ calibrated. Since all landings are monitored on official scales and reported to the Directorate, there is quite a high external visibility of the fishery. This coupled with the fact that all quota allocations to fishing companies and progression with quota use is also reported on the Directorates website creates a high level of voluntary compliance.

<b>Section 1</b>	<b>1.1.7.7</b>	<b>Fisheries Management Plan – Icelandic Redfish: Management measures relevant to ecosystem effects of fishery</b>
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Peer Review comment: Is there any information on the bycatch within the redfish fishery? Are any other species encountered, especially any non-commercial? Can a non-target species shutdown the redfish fishery for the year if quotas are met/exceeded?

Assessment Team Response: Redfish fisheries can be quite selective but by-catch is encountered. Bycatch of all quota species (25 stocks) cannot be discarded and is landed and reported on the logbook of each vessel. A vessel must have quota for all species caught and this must be completed within a specific timeframe post landing for any catches that were not covered by quota prior to fishing. For species other than cod, the vessel can substitute between species at a rate determined by cod equivalents. Theoretically, a non target quota species can close another fishery. The ITQ mechanism has to date not led to any premature closure of the redfish fishery.

<b>Section 1</b>	<b>1.2.1</b>	<b>A competent research institute ...</b>
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Peer Review comment:  
**Assessment Team Response: N/A**

<b>Section 1</b>	<b>1.2.2</b>	<b>The relevant data collected/compiled shall be appropriate to the chosen method of stock assessment ...</b>
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Peer Review comment: Thank you, I had cross-boundary management questions that were answered here. What are the discard estimates for redfish?

Assessment Team Response: The main focus of discard monitoring is on cod and haddock, the most valuable of quota species which have reduced over the recent period to very low levels. Therefore, it is highly unlikely that discarding in the redfish fisheries is higher than the estimated average discard of cod or haddock (0.82% and 1.84% of total landings, respectively, for the period 2001-2011). There was no evidence presented of a discard issue with redfish. The onshore monitoring system also works to identify anomalies in vessel catches that may lead to specific observation of vessels as part of the at sea observation programme. This includes vessels targeting redfish.

<b>Section 1</b>	<b>1.2.3</b>	<b>Stock assessments ...</b>
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Peer Review comment: When is the next assessment due and when will the next ICES review take place? Is this an item for surveillance, since there is no ICES agreed upon analytical assessment

currently?		
<p><b>Assessment Team Response:</b> The stock assessment is up-dated annually. ICES also undertakes annual reviews of the biozone which includes the redfish stock fished by Iceland, Faroe and Greenland. The FMP has a 5 year major review clause for the HCR and measures and ICES will be invited to review and comment on this.</p>		
<b>Section 1</b>	<b>1.2.4</b>	<b>For the stock under consideration, the determination of suitable conservation ...</b>
Peer Review comment:		
<b>Assessment Team Response: N/A</b>		
<b>Section 1</b>	<b>1.2.6</b>	<b>There shall be active collaboration with international scientific organizations ...</b>
Peer Review comment: Mention Greenland and Faroe Islands, for redfish specifically (Faroese bottom trawl survey...).		
<b>Section 1</b>	<b>1.3.1.1</b>	<b>The precautionary approach ...</b>
Peer Review comment:		
<b>Assessment Team Response: N/A</b>		
<b>Section 1</b>	<b>1.3.1.2</b>	<b>The stock under consideration shall not be overfished...</b>
Peer Review comment:		
<b>Assessment Team Response: N/A</b>		
<b>Section 1</b>	<b>1.3.1.3</b>	<b>Relevant uncertainties shall be taken into account ...</b>
Peer Review comment:		
<b>Assessment Team Response: N/A</b>		
<b>Section 1</b>	<b>1.3.1.4</b>	<b>Appropriate reference points shall be determined ...</b>
Peer Review comment: add the information about fishing going to 0 when Blim is reached.		
<p><b>Assessment Team Response:</b> The HCR and FMP do not explicitly state that fishing will go to zero if Blim was reached. There are several considerations:</p> <ul style="list-style-type: none"> <li>- Fishing rate is very modest and set precautionary - there is low risk of falling below Btarget</li> <li>- If Btarget is reached, the HCR works to reduce F linearly.</li> <li>- Even if environmental regime shifts occur and there is some underestimation of true fishing mortality they are unlikely to take major effect to cause biomass to fall to Blim prior to the 5 year review period.</li> <li>- Annual stock assessment reviews take place .</li> </ul> <p>ICES evaluates the suitability of management plans against the PA on the basis of appropriately conditioned simulations resulting in the long term risk of the <math>SSB &lt; B_{lim}</math> under the application of the HCR to be below 5%. Any management plan having consideration for yield stability or uncertainty in measurements, implementation or modelling will result in a compromised average long term harvest rate which will be below <math>F_{msy}</math>. The Icelandic haddock HCR conforms to this expectation and output result; whereby ICES has evaluated it as being consistent with the PA, and the target harvest rate is set below <math>H_{msy}</math>.</p>		
<b>Section 1</b>	<b>1.3.1.5</b>	<b>The long-term harvesting policy ...</b>

Peer Review comment: <b>Assessment Team Response: N/A</b>		
<b>Section 1</b>	<b>1.3.2.1</b>	<b>Harvesting rate and fishing mortality</b>
Peer Review comment: <b>Assessment Team Response: N/A</b>		
<b>Section 1</b>	<b>1.3.2.2</b>	<b>Stock Biomass</b>
Peer Review comment: <b>Assessment Team Response: N/A</b>		
<b>Section 1</b>	<b>1.3.2.3</b>	<b>Stock biology and life-cycle ...</b>
Peer Review comment: What about fishery independent samples from the surveys? Are they included in the stock assessments? Are those ages read annually? Management needs to take into account that this is a long-lived, late maturing species. If anything like other <i>Sebastes</i> , the older, larger females are the more successful spawners. Older, larger fish seem to make up a very small portion of the catch, are there any protections in place for the larger fish? According to the figure the fishery targets age 15 and under fish, but some females are known to not mature until they are 15 years old. This could be a problem for future SSB.  <b>Assessment Team Response:</b> Fishery independent samples are used to up-date the stock assessment annually and include age disaggregated data. The fishery mostly exploits ages 10-15 for optimal utilization. Younger fish are not exploited to any large extent. This, together with keeping the fishing mortality at the quite low level that is prescribed by the precautionary HCR, is designed to support strong year classes that contribute to both the fishery and the spawning stock for future fisheries. Additionally, ICES expects that there will be significantly better information on stock dynamics within the next five years. This will mainly be achieved by increased age reading from the survey and catch in Subarea XIV, and from attempts to improve the species separation of juvenile <i>Sebastes marinus</i> and <i>S. mentella</i> in the German Greenland groundfish survey.		
<b>Section 1</b>	<b>1.3.2.3</b> <b>.2</b>	<b>Consideration shall be given to measures designed to avoid excessive exploitation of spawning components at spawning time ...</b>
Peer Review comment: <b>Assessment Team Response: N/A</b>		
<b>Section 1</b>	<b>1.3.2.3</b> <b>.4</b>	<b>Consideration shall be given to measures designed to limit fishing mortality of juvenile fish ...</b>
Peer Review comment: <b>Assessment Team Response: N/A</b>		
<b>Section 1</b>	<b>1.5.2</b>	<b>Advice shall include the appropriate values for precautionary reference points</b>
Peer Review comment: <b>Assessment Team Response: N/A</b>		
<b>Section 1</b>	<b>1.5.3</b>	<b>Decisions on TAC ...</b>
Peer Review comment: Mention the inclusion of Faroe Island and Greenland fishery and survey data. <b>Assessment Team Response: This note is added.</b>		

<b>Section 1</b>	<b>1.5.8</b>	<b>Decisions on TAC ...</b>
<p>Peer Review comment: I read this clause as asking about how the TAC is set. Just a paragraph on the subject of TAC is set by the Minister based on the annual stock assessment and the previous year's catch.</p> <p>According to the table there are several instances of the TAC exceeding the advised catch, sometimes by quite a bit and recently. Historically, this cannot be called precautionary. Can it be noted for surveillance in future reviews that the new HCR and FMP lead to more precautionary TAC setting?</p> <p><b>Assessment Team Response:</b> Annual surveillance audits will be undertaken to review the performance of the fishery at implementing the HCR precautionary F for setting TAC and reviewing total catch for <i>S. marinus</i> to confirm that it corresponds to this.</p>		
<b>Section 1</b>	<b>1.5.10</b>	<b>In the absence of specific information on the stock ...</b>
<p>Peer Review comment:</p> <p><b>Assessment Team Response:</b></p>		
<b>Section 2</b>	<b>2.2</b>	<b>Concordance between the TAC and actual total catch</b>
<p>In 2011 and 2012 total landings exceeded the TAC.</p> <p><b>Assessment Team Response:</b> There is some historical situations of harvests exceeding TAC although this had been recognized by the management authorities and landings were not illegal in nature. There is also more recent track record for ground fish catches now corresponding to TAC's set through HCR's for cod, haddock and saithe. Golden redfish will be managed by a complimentary HCR to these already existing HCR's and there is consistency in their implementation since 2010.</p>		
<b>Section 2</b>	<b>2.33</b>	<b>Catches are subtracted from relevant quotas</b>
<p>Peer Review comment: Do the at-sea observers have any enforcement role or reporting of violations?</p> <p><b>Assessment Team Response:</b> Directorate and Coast Guard staff has an enforcement role. MRI has responsibility over certain regulatory measures such as the temporary closure of fishing grounds where juvenile fish are encountered.</p>		
<b>Section 3</b>	<b>3.1.1</b>	<b>Adverse effects of the fishery on the ecosystem shall be considered ...</b>
<p>Peer Review comment: This would be a good place to re-paste the map of area closures for spawning areas and cold water corals.</p> <p>Are there any adaptations to the fishing gears used in the redfish fisheries to reduce bycatch, avoid birds and mammals, or increase selectivity?</p> <p>Is there currently any habitat mapping or evaluation in progress?</p> <p>I see most of these are addressed in 3.1.2.</p> <p><b>Assessment Team Response:</b> A comment has been added referring to the map and also to the evidence presented in 3.1.2 which addresses the comments raised by peer reviewers.</p>		
<b>Section 3</b>	<b>3.2.2.1</b>	<b>Discarding...</b>
<p>Peer Review comment: Is there any reporting on the level of discard of non-commercial species?</p> <p><b>Assessment Team Response:</b></p> <p>Reporting includes all quota species, non quota species which are listed as threatened, endangered and protected, marine mammals and under the more recent logbook additions in the last 12-24 months, bird encounters. Currently, smaller benthic habitat related flora and fauna are not recorded. Mesh size and gear restrictions are also mandated to protect both juvenile stocks (trawl</p>		



mesh size 135mm with separator panel) and spawners (gill net mesh size 8 inches). Shrimp (*Pandalus*) fisheries are also associated with by-catches of juvenile finfish species. To minimise such by-catch, the use of sorting grids is mandatory.

<b>Section 3</b>	<b>3.2.2.2</b>	<b>Where relevant, appropriate steps shall be taken to avoid, minimize, or mitigate encounters with seabirds and marine mammals</b>
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Peer Review comment:  
**Assessment Team Response: N/A**

<b>Section 3</b>	<b>3.2.2.3</b>	<b>Non-target catches ...</b>
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Peer Review comment: Are there assessments for the species without quota? Are they utilized in some manner, or just discarded after the landing?  
**Assessment Team Response:** Some non quota species may have commercial value and retained. Remaining associated smaller flora and fauna species are discarded. It is also noted that large mesh sizes (135mm) will reduce non target catches considerably. Also, if vulnerable species are encountered they are returned.

<b>Section 3</b>	<b>3.2.3</b>	<b>Habitat considerations</b>
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Peer Review comment:  
**Assessment Team Response: N/A**

<b>Section 3</b>	<b>3.2.4.1</b>	<b>Foodweb considerations ...</b>
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Peer Review comment:  
**Assessment Team Response: N/A**

## **Non-conformances and Corrective Actions**

Not Applicable.

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## Key Information and References

Primary laws and regulations regarding fisheries management:

*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 797/1997.*

Fisheries Management Act 1990

Act No. 22/1998. On Fishing and Processing by Foreign Vessels in Iceland's Exclusive Fishing Zone.

Act No 151/1996. Act on Fishing Outside of Icelandic Jurisdiction.

Regulations are issued annually with amendments. Primary regulations are:

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

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

*Regulation no 557/2007 on logbooks.*

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

### Websites:

Information Centre of the Icelandic Ministry for Fisheries: <http://www.fisheries.is>

Ministry for Fisheries: <http://eng.sjavarutvegsraduneyti.is>

Marine Research Institute: <http://www.hafro.is>

Directorate for Freshwater Fisheries: <http://www.veidimalastjori.is/EnglSuma.htm>

Institute for Freshwater Fisheries: <http://www.veidimal.is>

Icelandic Fisheries Laboratories: <http://www.rfisk.is>

Fisheries Association of Iceland: <http://www.fiskifelag.is>

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## Appendix 2

### Assessment Team Members

Based on the technical expertise required to carry out the above fishery assessment, Global Trust Certification Ltd. confirmed the assessment team members for this fishery as follows.

#### Gisli Svan Eirnasson, (Assessor)

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

#### Dr Norman Graham, (Assessor)

Norman started his working career as a commercial fisherman followed by a BSc in fishery studies and PhD in by-catch 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.

#### Deirdre Hoare (Assessor)

Deirdre Hoare, has a BSc and MSc in Marine Zoology. She has worked directly in fisheries stock assessment as an observer on international projects in NAFO and Ireland. She spent 5 years working as a Fisheries Assessment Analyst and as a Scientific and Technical Officer for the Marine Institute in Ireland. This work involved fisheries research and stock assessment for ICES working groups. The work also involved coordination and management of a Fisher Self sampling program in the Irish Sea, with particular emphasis on spatial and temporal discard measurement tools. Deirdre currently works as an independent consultant on a range of projects including fish stock assessments and evaluation and verification of fisheries management and sustainability against international standards.



**Clare Murray (Lead Assessor)**

Clare manages the technical and administrative functions of Global Trust's MSC Fishery Programme and is a trained ISO 9001 Lead Auditor. Clare has worked directly in fisheries stock assessment as an observer on national projects in Ireland with the Marine Institute of Ireland. This work involved fisheries research on Marine Institute national surveys and on the discard observer programme. For 2 years she has worked with an NGO, Irish Whale and Dolphin Group in Ireland. The work involved coordination of the ISCOPE program in the Irish Sea, with particular emphasis on the spatial and temporal abundance of cetaceans in the Irish Sea. Professional qualifications include a Masters Degree in Fisheries Technology (related to the development of new environmentally friendly pot based fishery techniques) and a degree in Marine Science from the National University of Ireland, Galway.