



**Environment and
Natural Resources**

June 2008

Environmental labelling in the seafood industry

Iceland's perspective

Jónas Rúnar Viðarsson



Instructors:

Þórhallur Örn Guðlaugsson, Associate Professor at the Faculty of Economics and Business Administration, University of Iceland.

Dr. Brynhildur Davíðsdóttir, Associate Professor at the Faculty of Environment and Natural Resources, University of Iceland.

University of Iceland
Business- and Economics Department
Odda v/Sturlugötu, 101 Reykjavík
www.vidskipti.hi.is
www.umhverfi.hi.is

Abstract

Increased global environmental awareness, in combination with the poor conditions of the world's marine living resources, has initiated the use of environmental labelling in the seafood industry. This relatively new alternative is a market-based approach that allows consumers to favour environmentally friendly products, which then acts as an incentive for resource managers to produce environmentally friendly seafood.

This thesis looks at environmental labels from the perspective of the Icelandic fishing industry; accounts for available alternatives and identifies which are best suited to meet with the needs of environmentally responsible companies. This is done by studying the most relevant labels, measuring the Icelandic fishing industry against their standards, and by analysing Iceland's biggest market areas from that viewpoint.

There are various environmental labels available but third party ecolabels are considered to be the best alternative, in the light of their enhanced credibility. There are presently three available third party labelling schemes around for Icelandic seafood products, but only one that has adequate recognition inside the most important market areas for Icelandic seafood. This market leader, the Marine Stewardship Council (MSC), has become a household name in the seafood industry in some of the world's largest seafood markets in the past few years. The Icelandic seafood industry has however rejected the MSC and is instead implementing its own label, which is going to be based on FAO Guidelines. It is the conclusion of this thesis that this new label is going to be measured up against the market leader at the international front and is undoubtedly going to struggle in the competition, especially because of its limited scope. It is therefore suggested that Icelandic fishing companies devoted to environmentally friendly fisheries should either consider applying for MSC certification; or take the new Icelandic label to the next level, making it more strenuous than MSC, but that option is probably economically unpractical.

Keywords:

Fisheries, Seafood, Ecolabels, Environmentally friendly, Sustainability.

Foreword

This Masters of Science (MSc) thesis was written as the final thesis qualifying as 15 credits toward a degree in Environment and Natural Resources from the Business- and Economics Department at the University of Iceland.

I would like to use this opportunity to thank my instructors, Þórhallur Örn Guðlaugsson and Dr. Brynhildur Davíðsdóttir for their valuable help concerning the thesis. I would also like to thank Mátis ohf. (Icelandic food research) for all its help concerning funding, facilities and access to various experts. Dr. Sveinn Margeirsson, which is the head of the Traceability and Markets department at Matis ohf., was particularly helpful. Last but not least I would like to thank my wife, Inger Jóhanna Daníelsdóttir, for her patience during the writing of the thesis.

Table of contents

Table of figures	6
Table of tables	6
Abbreviations	7
1. Introduction	8
2. Environmental labelling	11
2.1. Regular consumer products	17
2.1.1. <i>The Blue angel</i>	17
2.1.2. <i>The Nordic swan</i>	18
2.1.3. <i>The EU flower</i>	19
2.1.4. <i>The Forest Stewardship Council</i>	19
2.1.5. <i>The International Federation of Organic Agriculture Movements</i>	20
2.1.6. <i>The Green globe</i>	20
2.2. Environmental labelling for seafood products.....	21
2.2.1. <i>First party labels</i>	23
2.2.2. <i>Second party labels</i>	26
2.2.3. <i>Third party labels</i>	27
3. Available alternatives for the Icelandic seafood industry	35
3.1. The Marine Stewardship Council	36
3.1.1. <i>History</i>	36
3.1.2. <i>Methodology and standards</i>	38
3.1.3. <i>Governance</i>	39
3.1.4. <i>Effectiveness</i>	40
3.1.5. <i>Costs and funding</i>	44
3.1.6. <i>Criticism</i>	45
3.2. Friend of the sea	46
3.2.1. <i>History</i>	46
3.2.2. <i>Methodology and standards</i>	47
3.2.3. <i>Governance</i>	48
3.2.4. <i>Effectiveness</i>	49
3.2.5. <i>Costs and funding</i>	50
3.2.6. <i>Criticism</i>	50
3.3. KRAV	51
3.3.1. <i>Methodology and standards</i>	51
3.3.2. <i>Governance</i>	52
3.3.3. <i>Effectiveness</i>	53
3.3.4. <i>Cost and funding</i>	53
3.3.5. <i>Criticism</i>	53
3.4. Joint Scandinavian label	54
3.5. The Icelandic label.....	55
4. The Icelandic fishing industry	57
4.1. History and current situation	57
4.2. Performance regarding various ecolabelling issues.....	62
4.2.1. <i>Stock status</i>	62
4.2.2. <i>Efficient management system</i>	65
4.2.3. <i>Bycatch and discards</i>	67
4.2.4. <i>Seabed disturbance</i>	69
4.2.5. <i>Pirate fisheries</i>	71

4.2.6.	<i>Fuel consumption</i>	73
4.2.7.	<i>Food miles</i>	74
4.2.8.	<i>Social- and human rights issues</i>	75
4.2.9.	<i>Other issues</i>	76
5.	Markets for Icelandic seafood	78
5.1.	The global seafood market	78
5.2.	United Kingdom	83
5.2.1.	<i>Consumption</i>	83
5.2.2.	<i>Markets</i>	84
5.2.3.	<i>Environmental concerns</i>	96
5.2.4.	<i>UK and Iceland</i>	97
5.2.5.	<i>Summation</i>	101
5.3.	Spain	101
5.3.1.	<i>Consumption</i>	102
5.3.2.	<i>Markets and environmental concerns</i>	102
5.3.3.	<i>Spain and Iceland</i>	103
5.3.4.	<i>Summation</i>	103
5.4.	Germany	104
5.4.1.	<i>Consumption</i>	104
5.4.2.	<i>Markets and environmental concerns</i>	105
5.4.3.	<i>Germany and Iceland</i>	105
5.4.4.	<i>Summation</i>	106
5.5.	USA	106
5.5.1.	<i>Consumption</i>	106
5.5.2.	<i>Markets and environmental concerns</i>	107
5.5.3.	<i>US and Iceland</i>	109
5.5.4.	<i>Summation</i>	109
5.6.	Scandinavia.....	110
5.6.1.	<i>Consumption</i>	110
5.6.2.	<i>Markets and environmental concerns</i>	111
5.6.3.	<i>Scandinavia and Iceland</i>	112
5.6.4.	<i>Summation</i>	112
6.	Iceland's perspective	114
6.1.	Issues to consider.....	114
6.1.1.	<i>Stock status</i>	114
6.1.2.	<i>Fisheries management</i>	115
6.1.3.	<i>Fishing method</i>	115
6.1.4.	<i>Transportation</i>	117
6.1.5.	<i>Social issues</i>	117
6.1.6.	<i>Other issues</i>	118
6.2.	Available alternatives	118
6.2.1.	<i>Do nothing</i>	118
6.2.2.	<i>First party labels</i>	119
6.2.3.	<i>Second party labels</i>	119
6.2.4.	<i>Third party labels</i>	120
7.	Conclusion and discussion	125
	Appendices	127
	References	142

Table of figures

Figure 3-1:	The three focal points of Sustainable Development.....	36
Figure 3-2:	MSC's revenues and expenditures in 2006.....	45
Figure 4-1:	ITQ as a tool to induce optimal effort in fisheries.....	59
Figure 4-2:	Development of the Icelandic cod stock since the 1950's.....	61
Figure 4-3:	World capture fisheries production since the 1950's.....	63
Figure 4-4:	IUU fishing as portion of the world catch.....	72
Figure 5-1:	Global seafood supply since the 1970's.....	78
Figure 5-2:	World's biggest supplying nations of seafood in 2005.....	79
Figure 5-3:	World's seafood consumption divided by countries.....	79
Figure 5-4:	Seafood consumption in European countries in 2005.....	80
Figure 5-5:	Portion of meals consumed in- and out of home in UK.....	84
Figure 5-6:	Market share of the largest retail chains in the UK.....	88
Figure 5-7:	Seafood market share of UK's largest retail chains.....	89
Figure 5-8:	UK retailers ranked according to sustainable seafood sourcing.....	94
Figure 5-9:	UK seafood purchase decision criteria.....	96
Figure 5-10:	The value of Icelandic seafood exports to the UK.....	98
Figure 6-1:	Ratio of each fishing gear in catches of Icelandic vessels.....	116

Table of tables

Figure 3-1:	MSC's pricelist for logo licensing.....	44
Figure 4-1:	Compliance with IMRI's recommendations 2005/06.....	67
Figure 5-1:	Division of the EU seafood market by countries.....	81
Figure 5-2:	Ratio of chilled, frozen and canned seafood in UK retail.....	86
Figure 5-3:	Top ten species in UK retail.....	87
Figure 5-4:	Imports of cod to the UK by country of despatch in 2006.....	98
Figure 5-5:	Imports of haddock to the UK by country of despatch.....	99
Figure 5-6:	Icelandic seafood exports to the UK in 2006.....	100
Figure 5-7:	USA fisheries taking part in the MSC labelling scheme.....	108

Abbreviations

ASI	Accreditation Service International
ASMI	Alaskan Seafood Marketing Institute
EEZ	Exclusive Economic Zone
FAO	Food and Agriculture Organisation (of the United Nations)
FOS	Friend Of the Sea
FSC	Forest Stewardship Council
GBP	Great Britain Pound
GRT	Gross Registered Tonnage
ICES	International Council for the Exploration of the Seas
IFOAM	International Federation of Organic Agriculture Movements
IKR	Icelandic kronas
IMRI	Icelandic Marine Research Institute
IQ	Individual Quota
ITQ	Individual Transferable Quota
IUCN	the World Conservation Union
IUU	Illegal, Unregulated and Unreported (fishing)
LCA	Life Cycle Assessment
LIU	The Federation of Icelandic Fishing Vessel Owners
MCS	Marine Conservation Society
MSC	Marine Stewardship Council
NASBO	National Association of Small Boat Owners
NGO	None Governmental Organisation
NOAA	The National Oceanic and Atmospheric Administration
PPMs	Processes and Production Methods
RFB	Regional Fishery Bodies
SCA	Seafood Choices Alliance
SEK	Swedish kronas
TAC	Total Allowable Catch
UN	United Nations
USD	United States Dollar
WTO	World Trade Organisation
WWF	World Wide Fund for Nature

1. Introduction

Environmental labels have been used for decades in various industries to signal to consumer's information on products environmental impact, whether on a single attribute or on overall performance (U.S. EPA, 1993). These labels have also been used in the seafood industry, but have until recently mainly been restricted to vague or dubious "environmentally friendly" claims made by producers themselves or from certifiers financially linked to the producers (Valentini, 2005; ICTSD, 2006). In an attempt to enhance the credibility and reliability of environmental claims in the seafood industry WWF, world's largest environmental conservation organisation, and Unilever, which at that time was the world's largest buyer of seafood, initiated a third party ecolabelling scheme in 1996, called MSC, or the Marine Stewardship Council (MSC, 2007a). But third party labelling schemes are designed to secure unbiased and reliable certification procedures by placing the assessment in the hands of an independent third party that has no interests in either approving or rejecting the product for certification (Wessels *et al.*, 2001). After a three-year adaptation process MSC became independent, and the first MSC certified product came on the market in 2000 (MSC, 2007a). MSC struggled in the beginning on the account of limited recognition amongst producers, retailers, consumers and other stakeholder groups. But after having certified the US Alaskan pollock fishery, the world's largest white fish fishery, in 2005 the MSC has become a household name in the industry.

Following the MSC's success, governments, industry associations and independent parties have initiated other third party seafood ecolabelling programs, either on a global scale or on a domestic level, but MSC remains the market leader.

By conveying the consumer otherwise unobservable information concerning the product's environmental impact, ecolabels are supposed to provide a market-based signal to producers and retailers, creating an incentive to produce environmentally friendly products (Roheim, Johnston, Greer & Konath, 2004). The international seafood industry has responded variably to these labels, as the average consumer has been relatively oblivious to their existence, but retailers in countries such as the UK, USA and Germany have acted very favourable towards them. Other outlets have not successfully incorporated these labels into their purchasing decision criteria on a significant level, but "high-end" restaurants are however increasingly adopting them into their seafood procurement (Intrafish, 2007a).

Producers were not very interested in third party ecolabels before 2005, but after having established a demand for ecolabelled seafood, fisheries in various locations, primarily though in Europe, Australia and northern America have increasingly applied for certification (MSC, 2008a).

The Icelandic seafood sector has responded to this development by rejecting foreign labels, but is instead establishing a label that is basically meant to certify all Icelandic seafood products, according to Mr. Þórarinnsson the labels main creator (2008). This is an initiative that is solely driven by economical reasons, as it is not going to discriminate between fisheries, depending on target-species, fishing gear, fuel efficiency, carbon emissions or other issues that are typically relevant to seafood ecolabels. This approach is debatable, since it neglects to take into account the basic idea that ecolabels are supposed to discriminate between the environmentally best alternatives. But the industry's response to that criticism is to highlight that the label is meant to project that Icelandic fisheries as a whole are relatively more environmentally friendly than most other fisheries.

In the light of this development it is the objective of this thesis to account for available alternatives regarding environmental labelling of Icelandic seafood products and to identify which options are best suited to meet with the needs of environmentally responsible Icelandic seafood companies. This is done by presenting various seafood environmental labels and by using published data to reflect on how the Icelandic fishing industry would measure up against their standards. Costs are accounted for where possible and benefits reflected on from the viewpoint of Sustainable Development, where economical-, environmental- and social objectives are taken into consideration.

The second chapter of the thesis is a general introduction on environmental labels, which focuses on labels especially created for seafood products and narrows down the best available alternatives for the Icelandic seafood industry. The third chapter is an analysis on the alternatives identified in chapter one, establishing detailed information on the pros and cons of the available alternatives. The fourth chapter studies the performance of the Icelandic fishing industry against various parameters that are relevant to environmental labelling, in order to identify how the Icelandic fishing industry measures up against the standards of the available alternatives. The fifth chapter is a market analysis, where the largest markets for Icelandic seafood products are accounted for and possible impacts caused by environmental labelling evaluated. The UK market is especially focused on, in the light of it being Iceland's most important market area for seafood and a global leader in the "sustainable seafood movement", which is a term adopted for the recent attention that

sustainable seafood sourcing issues have attained. The sixth chapter summarises the already presented information from the perspective of the Icelandic seafood industry and identifies the best ecolabelling alternative for environmentally conscious Icelandic seafood companies. The final chapter is a brief discussion, further rationalising the conclusion.

2. Environmental labelling

This chapter is going to present environmental labels in general, focusing on labels created specifically for seafood products. The first part of the chapter explains the role of environmental labels and accounts for their pros and cons. It also explains the different types of environmental labels that are available, and presents few of the better-known labels as an example on how they operate. Some of these labels have been available for almost 30 years, but third party labels for seafood products have only been in use for few years; these labels do therefore form a president for the seafood industry. The latter part of the chapter focuses specifically on environmental labels for seafood products. Different types of labels are presented and explained with examples from each labelling type. The main objective of the chapter is to narrow down the best environmental labelling alternatives available for the Icelandic seafood industry.

Environmental labelling was first initiated because of increased environmental awareness in the 70's, when producers started to label their products with messages about their environmental impact. These labels where often based on vague, or even dubious, criteria, where undefined "environmentally friendly" claims where used (ICTSD, 2006). Realising that independent and standardised labelling schemes were needed to prevent confusion amongst consumers and misleading claims by producers, the West German government founded the world's first independent third party labelling scheme in 1977. Other governments and Non-Governmental Organizations (NGOs) soon followed, implementing standardised labelling schemes for various consumer products and services. Regular food products were however generally not a part of these labels, except for organically grown- and few other highly specific labels, until 2000 when the Marine Stewardship Council (MSC) accredited its first fishery. Various other labelling schemes have followed their example, but the MSC has remained the market leader for sustainably harvested wild captured seafood products.

Environmental labels can be highly diverse and may be conveyed in several forms, including seals-of-approval, single attribute certification, report cards, information disclosures, hazard warnings etc. (U.S. EPA, 1993). But the basic ideology behind most environmental labelling schemes is to evaluate a production process with regard to established environmental standards, usually set by an independent third party. If the process meets these standards, the producer or marketer may buy a license to use a specific

label in its marketing. The label conveys to the consumer otherwise unobservable information concerning the product's environmental impact. Consumers who prefer environmentally friendly products provide therefore a market-based signal to producers and retailers, creating an incentive to produce environmentally friendly products (Roheim *et al.*, 2004).

Environmental labels often have multilateral impacts on various stakeholders, providing a number of major benefits for everyone concerned. Some of these benefits being for example better-informed consumer choice, increased economic efficiency, stimulated market development, continuous environmental improvements of products, better availability of education for consumers, increased competition between producers to provide environmentally friendly products, facilitated monitoring of environmental claims etc. Further clarifications on these benefits are as follows (IISD, 2007a):

- + Informed consumer choice: Environmental labelling is an effective way of informing customers about the environmental impacts of selected products. It empowers people to discriminate between products that are harmful to the environment and those who are more compatible with environmental objectives. Environmental labels make the customer more aware of the benefits of certain products, for example recycled paper, toxic-free cleaning agents, organically grown vegetables, sustainably harvested seafood etc. Ecolabels often take into account the whole live cycle of the product, which then incorporates factors that consumers would generally not consider, such as energy efficiency, waste minimisation, product stewardship, carbon emissions etc.
- + Economic efficiency: Environmental labels are generally cheaper than regulatory controls, and therefore promote economic efficiency. Empowering customers and manufacturers to make environmentally supportive decisions keeps the need for regulation to a minimum, which is beneficial to both government and industry.
- + Market development: Customers that choose environmentally labelled products have a direct impact on supply and demand in the marketplace. This is a signal that guides the market towards greater environmental awareness, and therefore stimulates market development.
- + Continuous improvements: A dynamic market for environmentally labelled products encourages a corporate commitment to continuous environmental improvement. Customers can therefore expect to see the environmental impacts of products to decrease over time.

- + Promoting certification: An environmental certification program is a seal of approval that shows that a product meets a certain ecolabels standard. It provides customers with visible evidence of the product's desirability from an environmental perspective. Certification therefore has an educational role for customers, and promotes competition among manufacturers. Since certified products have a prominent logo to help inform customer choices, the product stands out more readily on store shelves. Coveting the logo may induce manufacturers to re-engineer products so that they are less harmful to the environment.
- + Facilitates monitoring of environmental claims: Official environmental labelling programs make it easier to monitor environmental claims. Competitors and customers are in a better position to judge the validity of a claim, and will have an incentive to do so should a claim appear dubious.

These examples show that there are potentially numerous benefits that environmental labelling can provide for most stakeholders on all levels of a products life cycle. But there are also numerous challenges associated with this sort of labelling that need to be considered. For example problems caused by misleading or fraudulent claims, existence of uninformative claims, divergent methodologies used for certifying, creation of unfair competition, feasibility questions regarding various products and finally questions whether "green consumerism" is not in fact a contradiction in terms etc. Following are further clarifications on these challenges (IISD, 2007b):

- Misleading or fraudulent claims: Environmental label has no value to the environmentally conscious customer if it is misleading or fraudulent. Trust is a major component of labelling schemes credibility, and the label must be above suspicion. Terms such as "sustainable", "recyclable", "biodegradable" and "ozone friendly" must be used accurately. When claims are used arbitrarily in advertising and labelling, customers will become confused, discouraged, and sceptical - even of legitimate claims.
- Uninformative claims: Labels that provide trivial or irrelevant "green" information do nothing to reduce environmental impacts.
- Divergent methodologies: Differences in testing and certification methods create difficulties in the application of environmental labels to a particular product category. For example, should the label represent an overall assessment of a product's

environmental burden over its entire life cycle, or some subset of it? What techniques can be used to measure environmental impact? Who determines what specific environmental impacts are the most important? And what criteria are appropriate in rating impacts?

- Unfair competition: Some companies are reluctant to rely on the assurance of an overseas ecolabelling program that specific environmental criteria are being met. Companies might therefore intentionally misrepresent their products as “environmentally friendly” in order to bolster profits. This causes unfair competition for the companies that must spend their time and money to follow regulations.
- Feasibility: Many stakeholders consider that only a small number of products can realistically be labelled as “green”, for example on the account of economical feasibility, as the cost involved can not be added to the products price. Since ecolabelling programs will therefore doubtfully cover the vast majority of goods, some critics point to regulation as a more effective tool than the development of voluntary standards.
- Is “green consumerism” a contradiction in terms? Many environmentalists are critical of consumerism. They argue that “green consumerism” is a self-contradicting term, and believe that the goal should be to reduce consumption, not merely redefine it. “Green shopping” will do little to bring about the more fundamental economic and social changes that are required to protect the planet, they claim. Indeed, consumer preference and market forces cannot, by themselves, guarantee environmental protection.

These examples show that environmental labels provide not only advantages, but also numerous challenges for most stakeholders. These pros and cones however differ between various types of labels, because labelling programs can be highly diverse, ranging from single attribute self-declarations to extensive third party labelling schemes. Environmental labelling schemes are generally divided into three basic categories, depending on how many parties are involved in the certification process. These categories are as follows (Wessels *et al.*, 2001):

1. **First party labelling schemes**: Programs that are established by individual companies based on their own product standards. This form of ecolabelling can also be referred to as “self-declaration”.

2. **Second party labelling schemes:** Programs that are established by someone other than the actual producer, for example industry associations that create labelling schemes for their members' products. Verification of compliance is typically achieved through internal certification procedures within the industry, but can also be carried out by external certifying companies.
3. **Third party labelling schemes:** Programs that are usually established by an initiator (public or private) independent from the producers, distributors and sellers of the labelled products. The initiator generally constructs and publishes a standard, which an independent accredited certification body uses then to measure the product against. The separation between the producer, label owner and the certifier is intended to secure that private commercial interests will not compromise the integrity of the scheme (Wessels *et al.*, 2001).

Environmental labels can be either mandatory or voluntary. Mandatory labels are government-backed and do therefore often act as trade restrictions for foreign producers, where imports may be rejected if they do not have a particular label (WTO, 1997). Imports of products that have not been certified by voluntary labels are on the other hand not restricted. It is therefore entirely up to the manufacturer to decide whether or not to apply for certification by voluntary labels, and the consumer's choice whether or not to buy the product.

The World Trade Organisation (WTO) has discussed environmental labelling from various sides and has recognised their numerous benefits, but they have also expressed some concerns for their impact on free trade, especially regarding developing countries and small businesses ability to export (WTO, 2008). There are presently two WTO comities that are grappling with this issue, focusing on fairness, technical barriers, compliance with current agreements, and processes and production method problems.

Concerns have been raised about the growing complexity and diversity of environmental labelling schemes, especially if the labelling is based on life-cycle analysis (LCA), which looks at a product's environmental effects from the first stages of its production to its final disposal. These requirements could create difficulties for developing countries, and particularly small and medium-sized enterprises in export markets, because they require considerable amount of expertise to carry out and developing countries often lack resources concerning various factors that are taken into consideration in LCA, such as accessibility to renewable power sources or adequate disposal of garbage and other

material coming from the production. Environmental labels could therefore be described as technical barriers to trade. WTO members generally agree that labelling schemes can be economically efficient and useful for informing consumers, and tend to restrict trade less than other methods. But this is only the case if the schemes are voluntary, transparent and allowing all sides to participate in their design. However, these same schemes could be misused to protect domestic producers. WTO has therefore stated that the schemes should not discriminate between countries and should not create unnecessary barriers or disguised restrictions on international trade.

A particularly thorny issue in the ecolabelling debate has been the use of criteria linked to processes and production methods (PPMs). WTO members agree that countries are within their rights under WTO rules to set criteria for the way products are produced, if the production method leaves a trace in the final product, for example cotton grown using pesticides leaving pesticide residue in the cotton itself. However, they disagree about measures based on “non-product related PPMs” i.e. process and production methods that leave no trace in the final product. Wood is for example exactly the same whether it is produced from sustainably managed forests or not. The key question is: are these measures consistent with WTO agreements? Many developing countries argue that measures that discriminate between products based on “non-product related PPMs”, such as some environmental labels, should be considered inconsistent with WTO agreements. WTO members are therefore not in agreement on environmental labels, but have in general looked favourably towards voluntary labels that are transparent, allow all stakeholders to participate in their design and are consistent with existing WTO agreements on technical barriers.

Environmental labelling can theoretically be applied for all kinds of products and services, but has most commonly been used for various everyday manufactured products. It is also widely used for organic food, in the travel industry and in the energy sector. Chapter 2.1 is a short introduction on some of the best-recognised environmental labels in Europe and North America. Some of these labels have been operated for decades and might therefore set a precedent for the seafood industry. Chapter 2.2 on the other hand focuses solely on environmental labels for seafood products; accounts for the various labelling types that are available and presents the most relevant and interesting labels from each type.

2.1. Regular consumer products

Environmental labels for regular consumer products can be mandatory or voluntary and may refer to different kinds of product characteristics or attributes including the product's composition or contents, product quality or form, as well as environmental or social aspects of the product's production process or method. Some labels may only focus on a particular aspect of a products production, while other examine in detail the whole life cycle of the product. Ecolabels are therefore extremely divergent; but have in the past mainly focused on manufactured everyday products, exclusive of food. Certain niche markets have however successfully implemented ecolabels into their operation, such as the organic food sector, parts of the travel industry and the energy industry. The most generally recognised labels are third party labels such as the Blue Angel, the Nordic Swan, the EU flower, the Forest Stewardship Council, IFOAM and Green globe. Following is a short introduction on these labels, which is meant to clarify the overall function of ecolabels in general.

2.1.1. *The Blue angel*

The German Blue Angel is the first and oldest third party ecolabel in the world (The Blue Angel, 2008). It was created in 1977 by the V-German authorities, in order to standardise and heighten credibility of environmental claims from suppliers of various manufactured products and services. The label promotes the concerns of both environmental protection and consumer protection. It is therefore only awarded to products and services that are particularly beneficial for the environment in an all-round consideration, whilst also fulfilling high standards of occupational health, safety and fitness for use. Economical use of raw materials, production, usage, service life and disposal – all these factors are assigned a high importance.



The German Federal Environmental Agency is the owner of the label, but it appoints numerous experts from all stakeholder groups on the “environmental label jury”, which is the decision making body of the labelling scheme. The German Institute for Quality Assurance and Certification is the independent certification body, which carries out the actual assessment.

There are almost four thousand products and services in 80 product categories that are certified today, but requirements for each product are revised every third year. Applications for certification are voluntary and the cost involved is 250 Euro initial fee

when first applying and a annual fee that correlates with the turnover of the product e.g. 270 Euros for a product that generates less than 250 thousand Euro income a year, 540 Euros for a product that generates 0,25-1,0 million Euros income a year, 1.080 Euros for a product that generates 1,0-2,5 million Euros income a year etc.

2.1.2. The Nordic swan

The Nordic Council of Ministers decided in 1989 to introduce a common, official environmental label for all the Nordic countries, which could act as an impartial environmental symbol that would be relied upon equally by all member nations (Svanen, 2008). A certain sets of criteria were adopted for each product group, where rigorous standards for the product's impact on the environment from raw material to waste are considered. It also sets criteria with regard to quality and performance of the product, as it needs to offer features that are at least as good as other similar products. The label is usually valid for three years, after which the criteria are revised and the company must reapply for a licence. This is to ensure that products are constantly being developed and redesigned to better suite the environment. Requirements are meant to be rigorous enough that only 30% of products in each group can comply at any given time.



The Nordic Council of Ministries is the official owner the label. But the “Nordic Ecolabelling Board” is responsible for its supervision, ensures its day-to-day operation and sets the criteria, in cooperation with various stakeholders. National offices in each of the Nordic countries manage licence applications and grant licences, in accordance with the published standards of the scheme. Companies applying for the Swan-label must provide results from accredited independent testing to prove that the criteria have been met.

The Swan-label is available for roughly 60 product groups, representing all kinds of consumer products and services, but it does not accredit food, beverages or pharmaceuticals. There are over 800 products that carry the label worldwide, but only little over 100 are available in Iceland, with only 7 of them being domestic.

The Swan is financed through parliamentary subsidies, and fees from companies that have ecolabelled products i.e. 0.3% of the product's annual turnover. The organisation is run completely without commercial or profit interest.

2.1.3. The EU flower

The European Union established its own third party ecolabel in 1993, which basically works the same as the Blue angel and the Nordic Swan (EU, 2007). It sets the criteria for environmentally safer products and services, whilst also ensuring their performance quality. The European Commission owns the voluntary label, but the EUEB (European Union Eco-labelling Board) is the main implementing body that is responsible for day-to-day operation and sets the criteria, in cooperation with various stakeholders. National offices called “Competent Bodies” are responsible for implementing the scheme at national level, including drafting ecolabel criteria; assessing applications and awarding the label to companies that apply.



There are 7 main categories of products and services that can be accredited, none of which are food related. The initial cost of application runs between 300 and 1.300 Euros, plus an annual fee for the use of the label, which amounts 0,15% of the revenues from the product. But there is a maximum of 25.000 Euros that can be collected for each product group per applicant.

2.1.4. The Forest Stewardship Council

Some ecolabels are established to address specific, well-defined problems. The FSC (Forest Stewardship Council) is an example of such a labelling scheme. FSC was founded in 1990 by various stakeholders in the timber industry, such as timber users, traders and representatives of environmental and human-rights organisations that had identified the need for an honest and credible system for identifying well-managed forests as acceptable sources of forest products (FSC, 2007). The labelling program is a typical third party labelling scheme, where the label owner sets the criteria, and independent accredited certification bodies assess whether the project meets criteria or not.



The General Assembly of FSC is the highest decision-making body of the labelling scheme and is made up by all members of the program. It is supposed to incorporate the basic ideology of Sustainable Development into its policymaking, applying equal attention to environmental-, social- and economical objectives.

Over 100 million hectares in more than 70 countries have been certified according to FSC standards and several thousand products are produced using FSC-certified wood and carrying the FSC trademark.

2.1.5. *The International Federation of Organic Agriculture Movements*

The organic “industry” has been becoming increasingly popular for the past decade, improving its market share consistently from one year to another. Annual growth rate in the industry has been 17-20% while it has only been 2-3% in the conventional food industry (Hansen, 2004; OTS, 2007; Eurofood, 2002). The organic industry relies on verifiable information coming from the producer, proving that the product was produced according to certain production standards (IFOAM, 2007). For crops, it means they are grown without the use of conventional pesticides, artificial fertilizers, human waste, or sewage sludge, and that they are processed without adding preservatives or other additives, or applying ionising radiation. For animals, it means they are raised without the routine use of antibiotics and without the use of growth hormones. In most countries, organic products must not be genetically modified.

Customers that prefer organically grown products rely on credible environmental labels to convey whether they have met the criteria for such products. Like with other ecolabels, most stakeholders favour third party labelling schemes, because of their heightened credibility.

In the early 1970s various stakeholders in the organic agriculture movement established the IFOAM (The International Federation of Organic Agriculture Movements), which has evolved into a worldwide umbrella organisation for the organic movement, uniting more than 750 member organisations in 108 countries. Most credible labelling schemes that certify organic products are a part of IFOAM and therefore obey their standards. Today total land under certified organic production worldwide has reached over 26 million hectares and IFOAM is at the centre of this development (IFOAM, 2007).



2.1.6. *The Green globe*

The travel industry has taken advantage of the environmental movement and has therefore applied environmental labels in various sectors of the industry. There has for example been developed a special marketing strategy targeting environmentally conscious customers, called eco-truism. These customers are usually well informed and are therefore insisting on reliable third party labelling of products and services that satisfy their requirements of environmental protection. Various programmes are available for certification of products and services in the travel industry. But some labels have earned themselves more recognition amongst consumers than others.



Amongst them are for example the Green globe, which accredits products and services in the travel industry on a very broad basis, covering for example airlines, airports, hotels, trailer parks, rental vehicles, vineries etc. (Greenglobe, 2007). Other labels are more specific in their coverage, focusing on special branches of tourism, like for example the Blue flag that certifies beaches and marinas (Blueflag, 2007).

These are just few examples of how ecolabels are being used in various industries, but there is almost no limit on what kind of products and services are being labelled with this type of labels, ranging from computers, office appliances, electronic equipment, paper products, oils and lubricants etc. Food products, apart from organic foods, were however until recently generally not subjected to this kind of labelling. But growing environmental concerns have now also contributed to the introduction of ecolabels in the food industry. The seafood industry has been affected by this development, as various types of environmental labelling have been adopted into the industry.

2.2. Environmental labelling for seafood products

In the past decade, significant resources have been used worldwide in the seafood industry to promote the purchase of seafood from sustainable sources, and several major corporations have built comprehensive food-sourcing campaigns around sustainable seafood initiatives (FAO, 2007a). These initiatives aim to tap into growing consumer demand for environmentally preferable products; channelling purchasing power towards seafood products from sustainably managed fisheries. Consequently, a number of environmental labelling initiatives have been introduced in the fisheries sector as market-based incentives to improve fisheries management systems and the supply chain of seafood products.

The most noteworthy labelling schemes are typically founded on already established criteria that are derived from international agreements. There are three milestones that are particularly worth mentioning in that regard. They are the “United Nations Convention on the Law of the Sea” (UNCLOS) from 1982, which established some basic rights and responsibilities of nations in their use of the world’s oceans (UN, 1982); FAO’s “Code of Conduct for responsible fisheries” from 1995, which provides voluntary principles and standards that are applicable to the conservation, management and development of all fisheries (FAO, 1995); and FAO’s “guidelines for the ecolabelling of fish and fishery

products from marine capture fisheries” from 2005, which provides guidelines for voluntary ecolabelling schemes that are designed to certify and promote labels for products from well-managed marine capture fisheries and focus on issues related to the sustainable use of fisheries resources (FAO, 2005a). But some labelling enterprises are however founded on less strenuous standards, often focusing on single attribute or few selected variables.

The first environmental labelling initiatives for seafood products were in the form of self-declarations from producers, and report cards or other types of recommendations from environmental NGOs. Report cards and recommendations are however strictly speaking not classified as ecolabels, but they were nevertheless an important first step that later led to the introduction of more conventional labelling schemes.

Ecolabels, as one type of environmental labelling, are certifications given to products that are deemed to have lower negative impact on the environment than other similar products (FAO, 2007a). By appealing to consumer preferences, the ecolabelled products may generate higher returns than those that either do not qualify for ecolabelling or those whose producers do not seek to obtain such labelling. Several national, international, industry-sponsored, NGO-led and consumer–supplier partnership certification and standards schemes in the fisheries sector already exist; each with distinct criteria and assessment methods that have variable levels of transparency. The claims made by ecolabels also vary widely, as some indicate that a product is not overfished, others focus on the absence of marine mammal bycatch and still others promise that their product is “ecosystem friendly”. Some schemes focus on ensuring that a management system or process is “sustainable”, while others focus on the performance or outcome of the management system. Schemes that set standards for processes or systems without prescribing sustainable outcomes are not necessarily comparable with schemes that seek to grade performance or ensure sustainable production. A related issue is how to maintain sustainable results. On the implementation side, for example, monitoring and data collection pose significant problems in many countries and there are particular challenges related to traceability (FAO, 2007a). It is therefore safe to say that environmental labelling of seafood products in general varies tremendously, but the labels can nevertheless, in theory at least, be classified into the three basic categories that were explained earlier i.e. first-, second- and third party labels.

2.2.1. First party labels

Published recommendations, self-declarations, commercial white papers and other first party environmental labels are quite common in the seafood industry. They are however of various nature and their credibility varies significantly. Some of them are obviously meant to mislead and confuse the consumer, while others are attempting to get reliable and verifiable message across. Following is a short overview, covering some of these “labelling” methods.

Recommendations/Information services

Recommendations or guides aimed at consumers are strictly speaking not environmental labels because they generally do not appear on, or in the proximity of, the actual product. They do however have the same objective as conventional environmental labels, which is to inform the consumer of the best available choices for his or her seafood sourcing.

These recommendations were at first in the form of leaflets or report cards, but have lately evolved into online search engines on the Internet. Two of the first NGOs to produce information on sustainable seafood were the US based Audubon Society which published “What is a fish lover to eat?” in the late 1990s and Monterey Bay Aquarium in California which produced a list of sustainable seafood as part of their “Fishing for Solutions” exhibit in 1997 –1999 (MCS, 2007a). In Europe the UK based MCS (Marine Conservation Society) led the way with the publication of the “Good Fish Guide” in 2002, and SCA (Seafood Choice Alliance) in collaboration with WWF soon followed with “a global outreach” (WWF, 2007a).

Today there are quite a lot of sources that provide this type information, recommendations and guidance on sustainable seafood sourcing for consumers. However, only a handful of them have managed to reach consumers on a large scale and are therefore considered to be noteworthy. Credibility is a deciding factor concerning the effectiveness of these “labels”. The most recognised organisations providing sustainable seafood information’s on this form are for example the Audubon Society, which has distributed its seafood wallet card for number of years (Audubon, 2008); the Monterey Bay Aquarium that distributes pocket guides and operates an online search engine called “Seafood WATCH” (MBA, 2007); the Marine Conservation Society that keeps out an online search engine called “Fishonline” (MCS, 2007b); the Seafood Choices Alliance that operates an online database called “Smart Choices” (SCA, 2007a); Greenpeace and WWF that publish on their homepages lists of species to buy and to avoid (Greenpeace, 2007; WWF, 2007b); and the US National

Oceanic and Atmospheric Agency that provides consumers with detailed information on various fish stocks as a part of the “FishWatch” project (NOAA, 2008).

Self-declarations

Private labels or self-declarations are made by the producer himself to provide some favourable information on his product. The producer sets the standards and accredits his own products according to some criteria, which he chooses himself. The credibility of these labels varies, as some of them are unsubstantiated flattery but others are verifiable and thus reliable (Valentini, 2005). One of the problems associated with this sort of labelling is that there is no common definition for many environmental concepts, like “environmentally friendly” or “sustainably harvested”, and it is therefore easy for consumers to get confused (Wessells, Donath & Johnston, 1999). Probably the most public example of first-party labelling in the seafood industry is “dolphin friendly tuna”, where vague definitions and extremely variable criteria are typically used (ICTSD, 2006). Self-declarations can be an inexpensive and an effective method to get environmental information to consumers; but producers have been caught trying to misuse these labels by getting across false information, thus undermining the credibility of legitimate claims (Picher, 2003). Some studies have shown that more than half of environmental advertising is deceptive or misleading, consumers are therefore sceptical towards this kind of labelling (Kangun, Carlson & Grove, 1991). The effectiveness of this type of labelling is therefore debatable.

A good example of a first party environmental label used in fisheries is the Eco-peche label that the French originated shrimp processor Gel-peche recently started to use for their Madagascan wild-caught shrimp (Gelpeche,



2007). Gel-peche owns shrimp boats and processing plants all over the world, but they are only adopting the Eco-peche label for the Madagascan part of their operation for now. They claim to use only responsible fishing methods with equipment that allows smaller shrimp and other bycatch, such as fish and sea turtles, to escape. They also try to give the stocks some opportunity to regenerate, by only trawling through each location every three to four months. The company has unilaterally adopted the standards for the label and there is no outside accreditation or monitoring. They do however give fairly good information and rationalisation on the standards on their home page, which allows the customer to get information on what the label stands for. But the customer ultimately must trust the

company to respect these standards, since there is no outside verification for their compliance. The label also implies that the company is devoted to fair-trade, but there is no information to be found on the label, or on the firm's home page, on what they mean by that. The fair-trade claim is therefore unsubstantiated.

Self-declarations are very common in the tuna industry, where companies award themselves "dolphin safe" or "dolphin friendly" labels based on questionable standards. The Australian tuna producer Greenpeace for example uses its own dolphin safe label, and claims to use a standard based on those set by the Earth Island Institute, but without any outside monitoring (ANF, 2007). The Australian tuna producer John West uses a dolphin friendly label, where they claim to exclusively use line caught tunas, but it is not substantiated or monitored by an independent party (John West, 2007). The European tuna producer Princes Foods does also have its own dolphin friendly label, which they say is based on the standards set by the Earth Islands Institute, but it is also not monitored by an independent party (Princes Foods, 2007).

Commercial white papers

White papers are originally authoritative reports, where governments outline policy, or proposed action, on a topic of current concern (Wikipedia, 2008a). But more recently, the term white paper has also come to refer to documents that argue non-governmental positions as well, and today many white papers expose the benefits of particular products or technologies. These white papers are referred to as commercial white papers, as they are generally marketing communications documents that are designed to inform the consumer. But as a marketing tool, it is important to note that these papers generally highlight information favourable to those authoring or sponsoring the paper while minimising any negative aspects. Today the commercial white paper is the most common type of white paper. Such white papers are often used to generate sales leads, establish thought leadership, or educate customers. It is debatable whether or not commercial white papers should be classified as environmental labels, because they do generally not appear on the actual product. But they have the same objective as conventional ecolabels. Efficiency of these "labels" depends on their credibility, as retailers and consumers have become increasingly sceptic on messages coming from sources that they do not recognise. In the summer of 2007 various stakeholders in the Icelandic fishing industry published a white paper on how responsible Icelandic fisheries are (Ministry of Fisheries, 2007a). It is called "Statement on responsible fisheries in Iceland" (see appendix 1) and is signed by the

Minister of Fisheries, the Marine Research Institute, the Directorate of Fisheries and the Fisheries Association of Iceland. The statement is basically a commercial white paper that is intended to provide information on the Icelandic fishing industry and explain how measures have been taken to ensure responsible fisheries and the proper treatment of the marine ecosystem around Iceland. The statement is intended for everyone concerned about the status of the fish stocks and responsible fisheries, particularly the numerous parties that purchase and consume Icelandic seafood products. All Icelandic seafood companies are permitted to use this two-page statement as a marketing tool.

Most first party labels face a major dilemma in establishing credibility. Even though majority of them are undoubtedly implemented with the best of intentions, they lack verification from an independent party. Naturally, some companies and NGOs have earned themselves more trust from the general public than others, which means that people rather believe them when they claim that something is “environmentally friendly”, but the bottom line is that customers want reassurance that these claims are legitimate.

2.2.2. Second party labels

Second party environmental labels that are used in the seafood industry are generally enterprises where independent NGOs or industry associations set the standards and also accredit individual products. The producer usually pays the owner of the label a logo-licensing fee, which makes the two implementing parties financially dependent on one another. Credibility of these labels is therefore jeopardised, as consumers ultimately must trust the certifier, without any outside monitoring. Some companies and NGOs have however earned themselves recognition amongst consumers, which enhances the efficiency of their labels. But credibility is nevertheless generally lacking when applying second party environmental labels.

The Flipper Seal of Approval dolphin safe label is an example of how these second party labels work. It is an enterprise by the NGO EarthTrust, which owns the label, sets the standard and criteria, and also evaluates if a product meets the standard (EarthTrust, 2007). It does not allow the label on tuna fish caught using driftnets or gillnets, or by the intentional setting of purse seine nets on dolphins, or any tuna caught in the Eastern Tropical Pacific Ocean except for hook and line fisheries. Like with other “dolphin safe” labels, the Flipper Seal of Approval is a single attribute label that focuses solely on the impact on dolphins from the fishery. The



sustainability of the tuna fishery itself is not apart of the scope. The only parties that are involved in the deployment of this label are therefore EarthTrust and the fishery that applies for certification.

Second party labels struggle with the same dilemma as first party labels, which is lack of credibility. Even though most of them are probably implemented with the best of intentions, they lack verification from an independent third party. Companies and NGOs that have earned themselves recognition from the general public have more latitude to use these labels, but scepticism is nevertheless always in place when second party labels are being used.

It is irrefutable that those involved in first- and second party labels are financially dependant on the outcome from the accreditation, and their credibility can therefore be questioned. That is why third party ecolabelling schemes have been gaining ground in recent years.

2.2.3. Third party labels

Independent third party ecolabels are superior to other ecolabels because of the heightened confidence that private commercial interests will not compromise the integrity of the scheme. The three parties that are involved in this kind of labelling schemes are the producer, the label owner and the certification body. The producer's roll in the certification process is simply to apply for the accreditation and to pay for it. The label owner sets the standard and criteria, which the certification body uses to evaluate the fishery against. The label owner then awards (or denies) the label to the producer, based on the certification body's judgement. The producer usually pays the certification body for the evaluation regardless of the outcome. The certification body has therefore no financial interests in the outcome of the evaluation. Payment to the label owner is usually in the form of a logo-licensing fee that generally is linked to the annual turnover of the product.

The first labels of this sort in the seafood industry were the single attribute dolphin safe- or friendly tuna labels, but multi-attribute labels focusing on sustainability have been becoming increasingly popular in recent years. These labels vary in scope and have different objectives, as some of them are consumer facing, while others are not; some are domestic, while others are global; some are implemented solely as marketing tools, while others are focusing on environmental objectives etc. Following is a short overview of

some of these labels, where available alternatives for the Icelandic seafood industry will be identified for further analysis.

Dolphin safe

Dolphins are a common bycatch in tuna fisheries, as they can often be found swimming together with schools of tuna, specifically yellowfin tuna. Not only do the dolphins end up as accidental bycatch, the dolphins themselves may also be used as a way to find the tuna, as they are easier to spot. The dolphins are then sometimes knowingly being netted together with the tuna. Dolphin safe labels were first seen in the beginning of the '90s and have since then changed consumer preference considerably (Teisl, Roe & Hicks, 2002). The labels have in some cases acted as an entry barrier to certain markets, overall market share has risen and there is a noticeable willingness to pay extra for labelled tuna. There are even examples available where authorities have placed embargos on producers that are unable to provide such labels.

There are various dolphin safe labels available for canned tuna, to show that the fish has been caught without harming or killing dolphins. The variability consists for example in different restrictions imposed on the capture of tuna in order for it to deserve the related dolphin safe label. Some labels imposing stricter requirements than others, but consumers should realise that these labels only reflect on whether the fishery affected dolphins or not, and has nothing to do with other environmental issues. Few of these labels are certified by an independent third party, like for example the renowned labels of the U.S. Department of Commerce and the Earth Island Institute.

The most commonly recognised third party dolphin safe label is probably the label of the U.S. Department of Commerce, which has been in use since 1990 (DOC/NOAA, 2007).



Its standards are that tuna caught using purse seine fishing methods within Eastern Tropical Pacific Ocean that do not involve the deliberate netting or circling of any dolphins are allowed to use the label. A third party observer from the National Marine Fisheries Service has to verify that the fishery has met the standard. Tuna caught using a different method or in most places outside of this area may be given this label without any outside observation having been made, which has been heavily criticised by environmentalists (GreenerChoices, 2007).

The dolphin safe label of the Earth Island Institute is also fairly well known to consumers of canned tuna (Earth Island, 2007). The requirements that



need to be met are that dolphins may not intentionally be chased, circled or netted during any fishing trip. Drift- or gillnets cannot be used and no accidental dolphin death or serious injury may result from the fishing operation. Fish from a dolphin unfriendly source may not be mixed in at any stage. Each trip in the Eastern Tropical Pacific Ocean by vessels 400 GRT and above must have an independent observer onboard attesting to the compliance of the standards.

Dolphin safe labels are naturally not going to be considered as available alternatives for the Icelandic fishing industry. But they do however provide valuable information on the effectiveness of these labels, as studies have shown that they have changed consumer preference and contributed to protection of dolphins (Teisl, Roe & Hicks, 2002; Lazaroff, 2003). Dolphin safe labels do therefore prove that seafood ecolabels can work.

Marine Stewardship Council

Led by increasing consumer awareness of issues related to fisheries exploitation and seafood consumption, the international conservation organisation WWF and the world's largest buyer of seafood at that time, Unilever, united in 1996 to establish the MSC (Marine Stewardship Council), a global ecolabelling scheme for wild caught seafood (MSC, 2007a). In 1999 MSC became independent and has since then been able to offer a credible third party ecolabel that has become a household name in the seafood industry. Fisheries certified by the MSC record annual catches of over 5 million tonnes, representing 42% of the world's wild salmon catch, 40% of the world's prime whitefish catch, and 18% of the world's lobster catches. More than 1.100 seafood products resulting from certified fisheries bear the MSC ecolabel worldwide (Fishupdate, 2008a).



MSC is the market leader in third party ecolabels for wild captured seafood products and one of the available alternatives that the Icelandic fishing industry has regarding labelling of their products. The labelling scheme is therefore going to be analysed in detail in chapter 3.

Friend of the sea

Following the MSC's success Italian environmentalists founded a new third party ecolabelling program for wild captured and farmed seafood in 2005, called Friend of the Sea (Palmer, 2007; Holland, 2007). The labelling



scheme is meant to be a simpler, cheaper and less time-consuming alternative to MSC, by using only existing data for its certification process. The program has succeeded, despite of its young age, to establish recognition in some important market areas for seafood, especially in southern Europe. Application for certification is open for everyone irrespective of size or location, which makes the label one of the alternatives that are available for the Icelandic seafood industry, and it is therefore going to be analysed in detail in chapter 3.

KRAV

The Swedish ecolabelling scheme KRAV has been engaged in certifying wild captured seafood since 2004 (KRAV, 2008a). KRAV is originally an organic certifier, but has recently devoted a small part of its operation to other range of ecolabels, including labelling of wild captured and farmed seafood products. There are presently very few seafood products that bear the KRAV label, which might be explained by the fact that KRAV applies a very strenuous set of standards and criteria that very few fisheries are able to measure up to. The KRAV label is also not very well recognised outside of Scandinavia.



All fisheries are free to apply for certification from KRAV, irrespective of size or location, which makes the label one of the available alternatives for the Icelandic seafood industry. It is therefore going to be analysed in detail in chapter 3.

The Responsible Fishing Scheme-UK

The Sea Fish Industry Authority (Seafish) is a governmental agency that works across all sectors of the UK seafood industry to promote good quality, sustainable seafood (Seafish, 2008a). One of its projects is the Responsible Fishing Scheme, which is a labelling program that has been developed to raise standards in the catching sector (Seafish, 2008b). It was created in response to the needs of the seafood supply chain to demonstrate their commitment to the responsible sourcing of seafood. It focuses on four key areas, which are fishing practices, vessel criteria, crew competence and environmental considerations. The standards are originated from the British Standards Institution and employees of Seafish audit the vessels against those standards. The program does therefore qualify as a third party labelling scheme.



The Responsible Fishing Scheme demonstrates that a vessel operates according to the industry's good practice guidelines. The scheme gives an assurance to the supply chain

that fish from the vessel has been caught responsibly. It will also give the vessel operators a tool to allow them to positively position themselves in the global marketplace. There are over 470 vessels that have applied for certification, of which nearly 200 have already been awarded certification (Seafish, 2008c). Certified vessels are mostly small vessels, mainly consisting of 10-meter long shellfish boats using pots and 20-meter long whitefish vessels using bottom trawls or Danish seine. But there are also a few larger vessels that have been certified, like for example the 71-meter long pelagic trawler Chris Andra.

The cost involved for vessel owners to become certified by the Responsible Fishing Scheme is at a minimum because the project is largely funded by the European Union. Seafish charges a small fee for the audit itself, but there is no licence fee collected for using the logo.

The Responsible Fishing Scheme is solely designed for the UK domestic market and only UK vessels are able to apply for it. But other countries are considering adopting it for their fisheries, according to Mr. Michael Bacon (2008) the programs project manager. The Responsible Fishing Scheme is therefore a localised label for a localised market, but it has proven to be very successful as such, according to Mr. Bacon. There are examples where the certification has increased market share and value for participants in the scheme, although specific figures are difficult to quote due the widely varying supply and demand dynamics of the fish trade.

The Responsible Fishing Scheme is a localised label for UK vessels. It is therefore not an available alternative for the Icelandic fishing industry, but nevertheless an interesting approach.

The Marine Ecolabel - Japan

Japan's largest fisheries association (JFA) is in the process of creating the Marine Ecolabel Japan (MEL), which will be a third



party ecolabel for use in domestic markets, but with standards similar to those of MSC (Intrafish, 2007b). JFA says it has huge support for the label from the seafood industry in Japan and has consequently established a committee formed by major suppliers, distributors, researchers and the Japan Ministry of Agriculture, Forestry and Fisheries. The label will be designed to meet the FAO's "guidelines for the ecolabelling of fish and fishery products from marine capture fisheries". JFA says it plans on offering the ecolabel at lower cost than the MSC ecolabel, which some in the sector view as costly. JFA plans on canvassing the public for input on the ecolabel prior to launch, but people in Japan are

in general highly concerned with issues relating to dwindling quotas, particularly on tuna, and are aware of the significance of preserving seafood resources.

The MEL is solely designed as a localised label designed for Japanese producers, retailers and consumers (JFA, 2008). It is therefore not an available alternative for the Icelandic fishing industry.

The Alaska Seafood Marketing Institute

The Alaskan wild salmon fishery and the Alaskan Pollock fishery were amongst the first major fisheries to become certified by the MSC, but there has nevertheless been some debate amongst stakeholders in the Alaskan seafood industry on whether there is a need for a foreign label on their products (Bauman, 2007). The Alaska Seafood Marketing Institute (ASMI) has suggested that the logo “Alaskan Seafood” is in itself the epitome for wild, natural and sustainable in the eyes of consumers; possibly making the MSC label unnecessary. They point out that surveys have shown that majority of US consumers already recognise Alaskan seafood as being sustainable, which then makes a third party label redundant as a marketing tool in front of the final consumer (Welch, 2004). Retailers are however more demanding on verification regarding the sustainability of the products they sell, and that is where ASMI believes they can come in by either implementing its own label or simply by getting their message across to the retailers that the Alaskan seafood industry is sustainable (Bauman, 2007).

The ASMI is still just considering this alternative and has been working with some of the major stakeholders in the Alaskan seafood industry on the groundwork, but actual implementation is however uncertain at this point. The Alaska salmon fishery is at least not going to discontinue using the MSC label in the nearest future, as they are up for re-certification in the summer of 2008 and have been working on the reassessment with Moody Marine Ltd. since 2005 (MSC, 2008c). The Alaskan Pollock fishery has also started to work on their reassessment, as they come up for re-certification in 2009 (MSC, 2008d). The ASMI is nevertheless going to proceed exploring the possibility of implementing an Alaskan ecolabel and continues to argue that Alaskan seafood does not need the MSC (Fiorillo, 2007).

A label specially adapted for Alaskan seafood would of course not be an available alternative for Icelandic producers. But the ASMI makes an interesting point in questioning the need for a third party label in front of the final consumer if the product is already recognised as environmentally friendly. They believe that a domestic label could

be sufficient enough to meet their needs, especially if the label is primarily intended to persuade retailers on buying their products.

A future French label

The French government is developing its own third party ecolabel that is supposed to be founded on similar standards as MSC (Evans, 2008). No definitive time scale has been put on the launch of the label, but they have decided to invest 490 million USD in the project over the next three years. News on the initiative is still scarce, as this is a fairly new development, but governmental agents and MSC officers have implied that implementation will be a cooperative effort. The label is at first meant to be adopted on a domestic level and is therefore not going to be available for Icelandic producers.

Scandinavian label or a specific Icelandic label

At times there have been talks of implementing a joint Scandinavian ecolabel for seafood products, but even though the Scandinavian countries have a lot in common they also have very different set-ups for their fisheries that make it difficult for them to unite under one set of standards (Wessels, 2000). The Nordic council has for example addressed this option, but without coming to a conclusion. It has instead chosen to work closely with FAO on the adaptation of its “guidelines on ecolabelling of fish and fishery products from marine capture” with the notion that private initiatives could use it to establish their own labels (Norden, 2005). The possibility of establishing a joint label for the Icelandic and the Faroese fishing industry has also been explored, but without any success (Matís, 2007).

Implementing a specially adapted Icelandic label is also an option that has been explored by various stakeholders in the industry for the past two or three years. The outcome is going to be presented next autumn, according to Mr. Þórarinnsson (2008) LÍÚ's (The Federation of Icelandic Fishing Vessel Owners) leading expert on ecolabels, when a new Icelandic label is going to be introduced. This label is going to be adopted in accordance with FOA guidelines and focus on the sustainability of the Icelandic fisheries management system.

Implementing a new label, whether it is a label intended for Scandinavia as a whole, Iceland in collaboration with other countries, or solely an Icelandic initiative, is an available alternative for the Icelandic seafood industry. These options are therefore going to be analysed further in chapter 3.

Environmental labels have now been introduced in general. The ideology behind them, their methodology, advantages and disadvantages have been explained. Some of the better-known labels for various product groups have been briefly presented and labels created for the certification of seafood products examined in order to identify available alternatives for the Icelandic fishing industry. The main conclusion that can be drawn from the chapter is that first- and second party environmental labels lack credibility and are therefore not a good option. Third party ecolabels are however widely accepted by most stakeholders, because independent verification and transparency on every level insures that private commercial interest will not compromise the integrity of the label (Wessels *et al.*, 2001). There are three different independent third party ecolabelling schemes available for the Icelandic seafood industry, but they are the UK based Marine Stewardship Council, the Italian based Friend of the Sea and the Swedish organic certifier KRAV. There is also an option to initiate a new third party label, either in cooperation with other nations or solely for the purpose of certifying Icelandic seafood products. These alternatives will be examined further in the next chapter.

3. Available alternatives for the Icelandic seafood industry

The objective of this chapter is to analyse the available alternatives that Icelandic seafood producers have, regarding environmental labelling of their products. The analysis is divided into six parts, where the first part reviews the history of the label. The second part explains the methodology and the standards that are applied. The third part accounts for the governance structure of the scheme, explaining the regulatory framework that is applied in its employment and clarifying the roll of everyone involved. The fourth part accounts for the effectiveness of the scheme as a whole, where the three interlinking parameters of sustainable development are used to evaluate the scheme. These three parameters of sustainable development are the environmental-, economical- and social objectives that need to be taken into consideration when evaluating the sustainability of the program (WCED, 1987). The environmental objectives are set to protect the nature as a whole, and not just a specific subset of it. The economical objectives are meant to insure that the overall employment of the scheme is economically practical, since monetary gain is an important driving force behind the deployment of such a scheme. Environmental label that is economically impractical is not going to survive, because producers and other suppliers are not going to participate in it for long if they are going to lose money on it. Social objectives are to take human impacts into consideration; because natural resources, such as fish stocks, are in essence common property that everyone is entitled to benefit from. Social objectives take into consideration numerous variables that are difficult to list up in accordance to importance, as the objectives often collide. An example of the complex issues that social objectives need to address is how to meet the needs of present generations, whilst looking out for the interest of future generations. Other social issues that need to be taken into consideration are for example various human rights issues. Ideally all of these objectives should be considered equally important, as demonstrated in figure 3-1, in order to ensure long-term sustainability. The fifth part of the analysis accounts for costs involved for producers to become certified; and explains revenues and expenditures of the labelling program. The final part accounts for some of the main criticism that the scheme has received.

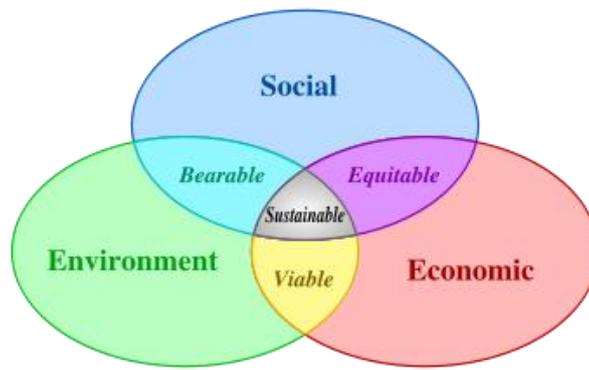


Figure 3-1: The three focal points of Sustainable Development
(Source: Wikipedia, 2008)

There are three labelling schemes presently in operation that are available for Icelandic seafood producers, but they are the Marine Stewardship Council, the Friend of the Sea and KRAV. There is also a new label being prepared that is solely going to be adapted for the Icelandic fishing industry. This label is still being designed and there is therefore limited information available on it. The possibility of implementing a Scandinavian label has also been explored, but without much success. Following is an analysis on these five alternatives.

3.1. The Marine Stewardship Council

Led by increasing consumer awareness of issues related to fisheries exploitation and seafood consumption, the international conservation organisation WWF and the world’s largest buyer of seafood at that time, Unilever, united in 1996 to establish the MSC (Marine Stewardship Council), a global ecolabelling scheme for wild caught seafood (MSC, 2007a). In 1999 MSC became independent and has since then been able to offer a credible third party ecolabel that has become a household name in the seafood industry.



3.1.1. History

The MSC is a non-profit, non-governmental, international third party ecolabelling scheme, created to promote sustainable fisheries and responsible fishing practices worldwide. Its creation was based on the model and experience of the FSC (Forest Stewardship Council), where various stakeholders were consulted on the development and implementation of the scheme. But unlike FSC the implementation and actual ownership in the beginning were solely WWF’s and Unilever’s, because the diversified ownership of FSC in the beginning

had created all sorts of problems, which got highlighted when Greenpeace and Friends of the Earth left the council (Humphreys, 1996).

In 1997 MSC became legally ratified and started a two-year extensive, global consultation process with stakeholders around the world to establish an environmental standard, based on FAO's "code of conduct for responsible fisheries" (MSC, 2007b). This included eight workshops and two expert drafting sessions resulting in MSC's "principles and criteria for sustainable fishing", which is the standard for the labelling scheme (see appendix 2). In 1999 MSC became fully independent and could therefore start the process of accrediting specific fisheries and in 2000 West Australian Rack Lobster became the first fishery to be certified.

The MSC encountered some growing pains in the first years of their operation, as they needed to brake out of the vicious circle of being too small and unknown to be interesting for both consumers and suppliers. This changed when larger fisheries became certified, beginning with the New Zealand hoki fishery in 2001 with its then 200.000 ton yearly catch and further confirmed its position when the largest whitefish fishery in the world, the U.S. Alaskan Pollock fishery with then 2 million ton yearly catch, became certified in 2005.

When the supply of accredited seafood became large enough, retailers got more involved, consumers became interested and MSC became a household name in the industry. As of February 2008 there are in total over 90 fisheries that are engaged in the MSC programme with 26 certified, 64 under assessment and another 20 to 30 in confidential pre-assessment (see appendix 3). Together the fisheries in the MSC programme record annual catches of over 5 million tonnes of seafood, representing 42% of the world's wild salmon catch, 40% of the world's prime whitefish catch, and 18% of the world's lobster catches. Worldwide, over 1.100 seafood products resulting from the certified fisheries bear the blue MSC ecolabel (Fishupdate, 2008a).

Numerous retailers and other stakeholders in the supply chain have responded favourably towards the MSC, using it to promote and publicise their "green" values. An example of retailers that have been especially efficient in promoting the label are Sainsbury's, which was the first retailer to sign up with the MSC program, Whole foods market, Marks&Spencer, Tesco, ASDA, Wall-Mart, Waitrose, Carrefour, Metro and many others (MSC, 2007c). Wall-Mart, Metro, Carrefour and Tesco have even gone so far as to declare that all its seafood in the future will have an ecolabel (MSC, 2006). Producers have also promised to favour certified fisheries and some of them have stated that they will in the

future only use MSC labelled seafood for their production; these are producers such as Unilever, Frosta, Findus, Iglo and Young's Blucrest (MSC, 2003).

3.1.2. Methodology and standards

The published methodology of MSC is to incorporate the three basic focal points of sustainable development into their evaluation. Even though environmental issues are at its core, social- and economical factors are also meant to be considered. The MSC believes that development and maintenance of effective fisheries management systems should take into account all relevant biological-, technological-, economic-, social-, environmental- and commercial aspects (MSC, 2002). The MSC places emphasis on equal and voluntary access to its certification program, irrespective of the size, scale, type, location or intensity of the fishery. It also recognises the need to observe and respect the long-term interests of people dependent on fishing for food and livelihood.

The MSC describes a well-managed and sustainable fishery as one who “protects the fish and the environment in which they live whilst allowing responsible use of the species that come from it. When a fishery is sustainable it means that target fish populations are at healthy levels, sometimes having recovered from being depleted in the past. A well-managed fishery will ensure that there is a future for the industry and all those who depend on the fisheries for their livelihoods” (MSC, 2007d).

The ecological integrity of a fishery is most important when being evaluated for accreditation and MSC has implemented three principles that a fishery needs to fulfil in order to become certified, they are: (MSC, 2002).

1. The condition of the fish stocks: This examines if there are enough fish to ensure that the fishery is sustainable.
2. The impact of the fishery on the marine environment: This examines the effect that fishing has on the immediate marine environment, including other non-target fish species, marine mammals and seabirds.
3. The fishery management systems: This principle evaluates the rules and procedures that are in place, as well as how they are implemented, to maintain a sustainable fishery and to ensure that the impact on the marine environment is minimised.

The social- and economical factors in the MSC standard are not as well defined as the environmental factors. They are in fact only commonly worded statements that are relatively open to interpretation, such as: the fishery shall “maintain present and future

economic and social options and benefits” and “be conducted in a socially and economically fair and responsible manner” (MSC, 2002).

In short, the methodology behind the MSC labelling scheme is equal and voluntary access to accreditation that is founded on sustainable development, but with emphasis on the preservation of healthy fish stocks, evaluated according to the three principles of the MSC.

3.1.3. Governance

The MSC’s governance is structured around three key units, which are: the Board of Trustees, the Technical Advisory Board and the Stakeholder Council (MSC, 2007e).

The Board of Trustees is its primary decision making body. It is made up by 13 individuals that are nominated in a personal capacity for a three-year term, along with the chairpersons of the Technical Advisory Board and the Stakeholder Council, in all 15 persons. The Technical Advisory Board is an independent group of fisheries experts from around the world, made up by 13 individuals that bring a diverse degree of expertise to the table. Its function is to advise the Board of Trustees on all relevant matters, including the setting and reviewing of the MSC Standard. The Stakeholder Council is an indirect participant in the process, giving the Board and the Technical Advisory Board feedback on relevant matters. The actual day-to-day operation is in the hands of the 30 employees of the MSC, which are located in London (24), Seattle (4) and Sydney (2).

In order for the MSC to be a fully fledged third party labelling scheme it needs to ensure that the certification of the fisheries is conducted by parties that are independent from both the MSC and the applicant for the label. MSC’s job is to set the standard, not to evaluate if a certain fishery meets with the standards or not. The MSC has therefore made a list of Independent Certification Bodies that are authorised to carry out the actual assessment. These Independent Certification Bodies have all been independently accredited by ASI (Accreditation Services International), and are therefore qualified to perform the MSC assessments in an independent and objective manner. This ensures that evaluations are unbiased, credible and open to transparent stakeholder involvement.

There are currently 5 Independent Certification Bodies that are allowed to carry out a MSC fisheries certification, but there are 6 more that are undergoing accreditation from ASI, in order to be able to certify fisheries (MSC, 2008a). There is also a need to accredit the “chain of custody” i.e. to make sure that seafood that is coming from certified fisheries is not mixed with uncertified seafood. This process is considerably simpler than accrediting fisheries, but is nevertheless a necessary part of the scheme, as it makes sure that only

authentic certified seafood is sold as MSC labelled. There are currently 14 Independent Certification Bodies that are allowed to carry out the MSC chain of custody certifications, but one more is undergoing accreditation from ASI (MSC, 2008a).

The accreditation process is extensive and rigorous, but can be described in simple terms in these few stages (see appendix 4). The interested fishery starts by choosing an Independent Certification Body from a list provided by MSC and asks it to perform a confidential pre-assessment, and to make a budget for full assessment. If the fishery is satisfied with the results, it proceeds with a full assessment, which then a special certification body that the Board of Trustees nominates, based on relevant expertise, reviews and gets feedback on from various stakeholders. If there are no objections, then the Certification Body recommends the fishery for certification. Once certified, companies wishing to use the MSC products undergo a Chain of Custody certification that guarantees tractability of MSC-labelled seafood, ensuring that it has been separated from non-certified products at every stage of the production. The Independent Certification Body and the staff of MSC then monitor compliance, making sure that everything is in accordance with the standard. Certified fisheries and chain of custody need to be reevaluated every fifth year (MSC, 2008b).

3.1.4. Effectiveness

Measuring effectiveness of the labelling scheme is complicated because it can be evaluated in so many different ways. MSC itself claims to take into consideration the three interconnecting focal points of sustainable development, because one cannot exist without the other. It is therefore logical to examine their effectiveness in these three key areas.

Environmental effectiveness

Studies of MSC's effectiveness regarding actual protection of fish stocks and their environment are somewhat lacking. It is very difficult to evaluate whether their work is resulting in better condition of the environment, since cause and effect is something that is almost impossible to prove under these conditions.

Fisheries that become certified are most likely already harvested in a sustainable manner, it is therefore unlikely that one would see any drastic changes in stock size in the few years that MSC has been operating, but there are however indications that the program is providing some environmental gains (Agnew *et al.*, 2006; Hough, 2006; Busch & Benton,

2005). Many of the changes that MSC has incorporated into certified fisheries are likely to affect the stocks and their environment in the long run, even though immediate large-scale improvements have not been apparent. Following are a few examples where changes associated with MSC certification are likely to affect the environment in a positive way:

- ✓ In order to become certified, MSC ordered the use of an escape panel for small lobsters in the Lock Torridon Creel fishery in Scotland. It allows younger lobsters to escape from the creels (baited traps) and they are therefore able to become mature enough to reproduce before they can be harvested. This helps to maintain a healthy stock size as fishermen only catch the largest and most valuable lobster (Hough, 2006).
- ✓ The New Zealand hoki fishery had to implement a spatially explicit management in order to become MSC certified, which has resulted in 70% reduction in catch of juvenile hoki (Agnew *et al.*, 2006). They also had to perform a spatial mapping of the seabed and condition future trawling to existing trawl-paths i.e. in order to minimise seabed disturbance. MSC has also recommended that mid-water-trawls should be used when possible. Research into seal- and bird exclusion devices for the hoki trawls was also mandated by the MSC, which has resulted in drastic reduction of seal- and seabird bycatch.
- ✓ The South Georgia toothfish fishery, which is subject to an international (RFMO) management regime as well as a coastal state management regime, needed to strengthen its surveillance for IUU fishing in order to get certified (Agnew *et al.*, 2006). As consequences estimated actual catch is now close to the issued TAC, as agreed on by the RFMO. They were also ordered to stop discarding fish heads with hooks attached to, which were killing seabirds. The result was severe reduction in deaths of seabirds like the albatross, caused by fishhooks.
- ✓ MSC implemented limits on bycatch of Monkfish and kingklip into the South African hake fishery, which had been substantial in the past (MSC, 2007g).

These examples show that MSC certification reduces environmental impacts caused by the fisheries, but critics have pointed out that some of these changes would probably have been made anyway (Busch & Benton, 2005). The evidence though shows that MSC certification does not automatically guarantee that the stock will improve. There are many other factors that affect stock size than just fishing mortality, and the requirements set by MSC are not necessarily enough to strengthen all certified stocks, at least not in the limited time that the MSC has been operating. The New Zealand hoki has for example shown

little change in its stock size since it was certified in 2001 and re-certified in 2007 (NZ Ministry of Fisheries, 2007). The stock is divided into two regions i.e. west and south, where the western stock is less than 1/4th of its original size and the south stock less than half of its original size. Recruitment has been very poor since 1995 and changes made on the fisheries as requirements for certification do not appear to be adequate in order to rebuild the stock. As consequences of the poor condition of the stock, quotas have been consistently lowered from 250.000 tons in the quota-year 2000-2001, down to 90.000 tons for the quota-year 2007-2008.

The US Alaskan pollock fishery is another example of a fishery where MSC certification does not appear to be having a significant affect on the stock. It was certified in 2005 after having gone through rigorous accreditation process that took four years, costing 500.000 USD (MSC, 2007g). Alaskan pollock is the largest food fish resource in the world with more than 3 million tons caught each year, in the North Pacific from Alaska to northern Japan (Ianelli *et al.*, 2006). It is however only the U.S. fishery in the Bering Sea and the Gulf of Alaska that is certified by MSC and they have been relatively consistent in their catch at about 1,5 million tons a year. Catches have been in accordance with scientific advice and the fishery has made some changes that they were required to implement in order to attain the MSC certification. The spawning stock biomass has nevertheless consistently kept on declining for the past few years. There may be several explanations for this, but the MSC certification alone has at least not been able to reverse this development.

These are examples of results from MSC certification on single stocks, but it does not suggest how the labelling scheme is affecting the utilisation of marine resources on a global level? It is interesting to speculate if MSC is really affecting the fisheries that are in the biggest need for reformation regarding their environmental performance, since the fisheries that are managed the best are the ones that generally apply for accreditation. Even though the idea is that customers would buy ecolabelled products instead of environmentally “unfriendly” ones, in this case reducing the demand for unlabeled seafood. The problem is that demand drastically exceeds supply in today’s seafood markets and it is therefore highly unlikely that MSC will have much affect on fish stocks that are being harvested in an unsustainable manner. IUU fisheries are for example clearly not going to apply for MSC certification, but they are probably the most destructive fishing fleet in the world, allegedly accounting for 1/4th of the total world catch, primarily fishing from stocks that are already overexploited (Pauly *et al.*, 2002).

Social effectiveness

The social impact of MSC has not been studied in any detail and is consequently only open for speculations. Social issues have never become a factor when accrediting fisheries and the MSC standard on social performance is in addition very vague. It is therefore interesting to see that almost all certified fisheries are located in the developed world and overall social impacts are therefore rather insignificant, as fisheries in industrialised countries represent only a very small part of their GNP. There is for example only one certified fishery in the whole continent of Africa. The MSC has however been trying to change this by especially targeting the developing world in its “global outreach” program. It has not yet had any apparent success, but it is likely that certification of a native fishery in the developing world could have a substantial positive social impact, where factors such as human rights issues might play a major role.

Economical effectiveness

Studies on the effectiveness of ecolabelling in fisheries have almost entirely focused on economical benefits of the labelling scheme itself, where the profitability of becoming certified has been examined. These studies are however not very conclusive and might even be considered misleading. Most studies have looked at consumer preference and the willingness to pay a premium for ecolabelled seafood in hypothetical markets. They show that consumers generally prefer ecolabelled products to unlabeled ones, as long as they are otherwise the same and the premium of the ecolabelled product is not too high (Wessells, Johnston & Donath, 1999; Johnston, *et al.*, 2000). Other studies have shown that consumers are general not willing to change between fish species just because of a label (Johnston, 2008; Jaffry *et al.*, 2000; Donath *et al.*, 2000). The trouble with these studies is that they are based on hypothetical scenarios (stated preference) and we can't be sure that costumers will actually do as they have stated in a survey, when it comes to real life situation. Studies have in fact shown that consumers do quite often not act on their stated preference (Fliess, 2007)

Past experience from MSC certified fisheries has for the most parts reflected favourably on the economical performance of the scheme, but measurability and compatibility is however very difficult. Most producers guaranty that their certification has paid of, but some however claim that the costs have been higher than the benefits (Busch and Benton, 2005). It is still evident that the label can open up new markets for producers, or act as an entrance barrier for those who are not certified (Roheim, 2003).

To conclude on the effectiveness of MSC, there are no obvious proofs of the scheme generating concrete environmental gains, but it is nevertheless highly likely that at least some of the projects are creating environmental benefits. The social effectiveness of the MSC is unknown, since it has never become a factor in the fisheries that have already been certified. Economical effectiveness is debatable, but stated preferences researches have shown that consumers are generally willing to pay a premium for ecolabelled seafood, as long as other attributes are the same and the premium is moderate. But resource managers disagree on whether the costs exceed the benefits of becoming certified.

3.1.5. Costs and funding

The cost of an MSC certification is mostly dependant on the scope and complexity of the fishery assessment, which is conducted by an Independent Certification Body (MSC, 2007h). The fishery pays the Certification Body for its assessment, which evidence show can cost anywhere between 35.000 USD for small scale, well-defined, localised fisheries and 500.000 USD for large scale industrialised fisheries. So far the most expensive assessment was done for the US Alaskan pollock fishery, which is the world's largest whitefish fishery (Eurofish, 2003). The fishing ground covers large proportion of the Gulf of Alaska and the Bering Sea, and the stock is co-managed with the Russians, which made the assessment extremely complex.

The level of controversy surrounding the fishery can also raise the cost of the assessment, as additional research can be needed if objections are submitted during the objection period.

The only fee that is paid directly to MSC is the logo licence fee, which is a 0,5% volume royalty and an annual fee of 250-2.000 USD, depending on the turnover of the product, as can be seen in table 3-1. However, if the logo does not face the consumer directly, like for example in bulk packaging for, foodservice, caterer, price lists, websites etc. then there is no volume royalty charged (MSC, 2007i).

Table 3-1: MSC's pricelist for logo licensing

Sales of MSC-labelled products	Consumer facing (Annual Fee + Volume)	Non-consumer facing
0 USD – 200 000 USD	250 USD + 0.5% of sales	250 USD
200 001 – 500 000 USD	1000 USD + 0.5% of sales	1000 USD
> 500 000 USD	2000 USD + 0.5% of sales	2000 USD

Source: MSC, 2008

The volume royalty used to be 0,1% but was, because of financial difficulties, quintupled in April 2007. This increase, along with the rising numbers of clients, is going to multiply the schemes cash flow in the future. The logo licence fees only accounted for approximately 8% of MSC's 3 million GBP income for the fiscal year 2006/07 (April-March), but charitable grants provided 79% and the rest came from government agencies, companies, individual donations etc. as can be seen in figure 3-2 (MSC, 2007j).

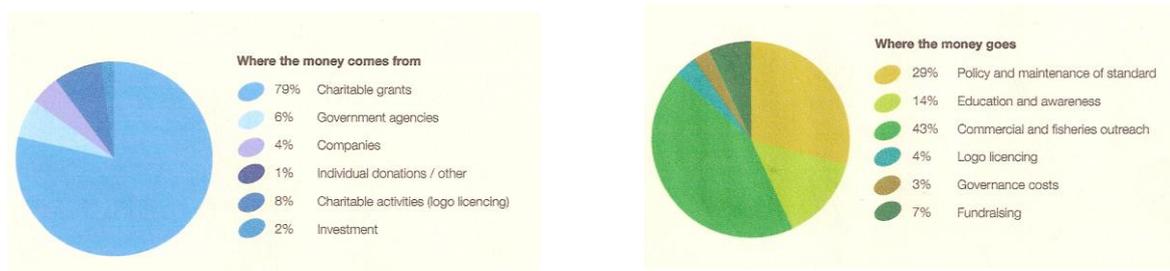


Figure 3-2: MSC's revenues and expenditures in 2006
(Source: MSC, 2007)

These numbers are however unboundedly going to change considerably for the fiscal year 2007/08, in the light of the rise in volume royalties and increase in number of accredited products. The Packard foundation has been by far the biggest contributor to MSC, it did for example donate 1,75 million USD in 2005, 1,6 million USD in 2006 and 1,5 million USD in 2007 (Fiorillo, 2008). But that is approximately 25% of MSC's total income. MSC devotes 43% of its expenditures to commercial- and fisheries outreach and 29% to policy and maintenance of standards, but only 4% of the cost derives directly from the logo licensing.

3.1.6. Criticism

The MSC has received some criticism in past years on almost every aspect of their operation. They have for example been accused of being unfavourable for smaller fisheries that can't afford the accreditation process by limiting their market access (Steinberg, 1999). Bigger and more efficient fisheries benefit while keeping total supply down and thereby driving prices up. This means that greater profits will rest in fewer hands as demand for seafood grows.

They have also been heavily criticised for accrediting fisheries that some stakeholders are doubtful of being sustainably harvested, according to the MSC's principles (Pearce, 2003). An example is the New Zealand hoki fishery that uses bottom trawling for their fisheries, which damages the seabed and also leads to depletion of other stocks because of considerable amount of bycatch that is associated with bottom trawling. This debate got

highlighted again when the fishery got re-certified in 2007, as environmentalists argued that the certified fishery was in fact not sustainable (Burton, 2007). The hoki stock was in worse condition than when it was originally certified in 2001, and attempts to reduce fur seal and seabird bycatch had proven to be insufficient.

MSC's methodology behind the accreditation process has been criticised because separation between the MSC and the Independent Certification Body is not clear enough (Þórarinnsson, 2006). Sceptics have implied that the Certification Body more or less invents the criteria as they go along, because the MSC's standards are too vague. The objection procedure is also not inline with ISO's standards for third party labels, since the label owner is the one that determines how objections are handled.

Stakeholders from the fishing industry have expressed their concerns that the MSC might be overly influenced by environmental NGOs that could make "unreasonable demands" in the future (Loftsson, 2004). They think that the MSC is becoming far too powerful in its field, almost having a monopoly in certification for wild captured seafood products (Bjarnason, 2006). They also believe the MSC to be is far too complex, expensive and time-consuming.

3.2. Friend of the sea

Following the MSC's success Dr. Paolo Bray, the European director of the Earth Island Institute, founded a new ecolabelling scheme for seafood in 2005, called Friend of the Sea (Palmer, 2007). His vision was to provide an inexpensive, but reliable, third party ecolabel for seafood originated from sustainable fisheries and aquaculture, using only secondary data.



3.2.1. History

Friend of the Sea is originally founded in Italy with financial backing from the European Union and the Earth Island Institute (Evans, 2007a). It is thought of as an alternative to the MSC label, focusing on being simpler, cheaper and less time-consuming (Holland, 2007). The main idea is therefore to use only data already in the public domain and not to insist on expensive primary research that can take years to complete. Friend of the Sea is therefore able to offer its services for a fixed price, which in the beginning was a 1.000 Euro yearly fee per product with same origin, but got raised up to 2.000 Euro in 2007, with an additional 2.000 Euro fee for the first year (FOS, 2007a). The yearly fee covers audit

costs, logo licensing and promotion of products during Friend of the Sea events. Friend of the Sea products are audited and certified by accredited third party certifiers according guidelines set by FAO.

When Friend of the Sea first started its operation in 2005 it got good response from two large retailer chains in Europe; Carrefour, which is the second largest retail chain in the world, and Coop Italia, which is the main Italian retailer chain and the largest consumers' cooperative in Europe (Palmer, 2007). These retail chains created a demand for the label amongst producers and distributors. Soon after its creation, Friend of the Sea had fairly large portfolio of clients, including the US distributor Black Pearl, the organic aquaculture producers Johnson Seafarms and Framford in the UK, No-Catch seafarms in the Shetland Islands, and the Canadian salmon fishery in British Columbia (FOS, 2007b).

Friend of the Sea has now 10 employees working in its offices in Italy, UK and USA. In the short time that the labelling scheme has been in operation it has been quite successful in specific market areas, namely in Italy, Portugal and Switzerland. The labels management team is very optimistic about the schemes future and even predicted in 2007 that Friend of the Sea would become the main international certification scheme for sustainable seafood within a year 2008 (Evans, 2007a).

3.2.2. Methodology and standards

Friend of the Sea methodology is to use existing data to certify seafood (wild caught or aquaculture) against published Friend of the Sea criteria, through accredited third party. The certification is voluntary and open for everyone, irrespective of size or intensity. The requirements for certification are focused on 5 main topics, where four of them are listed as essential and one as recommended. Following are these five requirements (FOS, 2007c):

1. Species and stock status criteria (Essential):
 - ✓ The targeted and by-caught species cannot be included in the IUCN Redlist of endangered species.
 - ✓ The targeted and by-caught species cannot be overexploited nor depleted or recovering, based on the most recent FAO and Regional Fishery Bodies assessment. An exception is made for those traditional fisheries which a) respect all other criteria; b) represent not more than 10% of the total catch of the overexploited stock; c) should be taken as a positive example of well managed low impact fisheries and thus be promoted.
 - ✓ The targeted and by-caught species cannot be data deficient. Sufficient information on species and stock status from reliable sources e.g. FAO and Regional Fishery Bodies are required for certification i.e. precautionary principle applied.

2. Seabed impact criteria (Essential):
 - ✓ The targeted species cannot be fished by gears that impact the seabed, unless evidence is provided that the impact on the seabed is negligible.
3. Selectivity criteria (Essential):
 - ✓ The targeted species cannot be fished by gears that have discard levels higher than 8%, considered by FAO 2005 to be the average discard level worldwide.
4. Legal criteria (Essential):
 - ✓ The fleet fishing the audited product must respect TACs (Total Allowable Catches), if in place.
 - ✓ The fleet fishing the audited product must include no IUU (Illegal, Unreported, Unregulated) fishing vessels in order to allow companies and stakeholders to monitor their suppliers and the origin of their raw material.
 - ✓ The fleet fishing the audited product must include no FOC (Flags Of Convenience) fishing vessels in order to allow companies and stakeholder to monitor their suppliers and the origin of their raw material.
 - ✓ The fleet fishing the audited product must respect national and international legislation.
5. Management criteria (Recommended):
 - ✓ The fishery should be managed accordingly to its size and cultural context.
 - ✓ The Fishery should operate according to the precautionary principle.
 - ✓ The fishery should incorporate a monitoring and research process.

In addition to these requirements, a traceability system must be in place in order to demonstrate that the product audited respects all requirements of the Friend of the Sea standard. The Friend of the Sea solely addresses sustainable harvesting of fish stocks and does not take into account social-, economical- or technological issues

In short, the methodology behind the Friend of the Sea labelling scheme is equal and voluntary access to inexpensive third party accreditation that is founded solely on sustainable harvesting of marine living resources, evaluated according to the requirements of the Friend of the Sea using existing information provided by FAO and Regional Fishery Bodies.

3.2.3. Governance

A two-man board of directors manages day-to-day operation of the labelling scheme and a six-person advisory board oversees project development in various marketplaces, where each person on the board is responsible for his or her area (FOS, 2008a). . A Technical committee, made up by roughly 30 stakeholders from various governmental- and non-

governmental organisations, scientific institutions and the fishing industry are responsible for constructing and maintaining the standard. Finally there is one person that takes care of objections, but that person is theoretically independent from Friend of the Sea, in order to fulfil ISO's requirements for a third party labelling scheme.

There are currently only two accredited certification bodies that are allowed to audit products' chain of custody and fisheries conformance, according to Friend of the Sea criteria (FOS, 2008b). However, other certification bodies have applied for the role and will have their auditors trained in the next few months.

The accreditation process is very simple. Interested clients contact an accredited certification body, which audits the fishery according to Friend of the Sea standards. If the fishery measures up to the standards, the certification body presents the audit before the Friend of the Sea, which publicises the findings on its home page for a specific objection period. If that period surpasses without any objections being submitted, the fishery becomes Friend of the Sea certified.

3.2.4. Effectiveness

Friend of the Sea has only been in operation for little over two years and it is therefore difficult to evaluate its effectiveness, especially since the measures applied generally take longer time periods to have an affect on the environment. Economical- and social-effectiveness of the program is also difficult to evaluate, since it is not a part of its defined scope. It is however apparent that the scheme is more important in some areas than others, as majority of certified fisheries are for example located in Italy, Senegal and Portugal (FOS, 2008c). Also, majority of retailers selling Friend of the Sea labelled products are located in just three countries; Italy, Portugal and Switzerland. Other areas are therefore scarcely affected by the labelling scheme.

The economic efficiency of the scheme depends on acceptance from retailers and consumers. Some large retail chains in southern Europe have supported the initiative, by favouring Friend of the Sea certified products, which has created a market based incentive for producers with interests in those markets to apply for certification (Palmer, 2007). The Swiss retail chain Manor has for example declared that they will only sell Friend of the Sea certified cod, salmon and halibut in the future (Fishupdate, 2007a) and Italian retailers have promised to reserved space on their shelves for Friend of the Sea certified products (Fishupdate, 2007b). But a detailed study on the economic benefits of the program is however missing.

3.2.5. Costs and funding

Certification cost per product with same origin is 2.000 Euros per year, which covers audit costs, logo licensing and promotion of products during Friend of the Sea events. There is also an additional 2.000 Euro initial fee collected the first year. These are very moderate fees in comparison with the MSC, and it is therefore apparent that the labelling scheme needs some outside funding. Various governmental agencies, IGOs, NGOs, individuals, companies and charitably funds have supported the scheme, but information regarding the schemes funding is scarce, which is particularly awkward for this sort of an enterprise, where transparency is vital.

3.2.6. Criticism

Friend of the Sea has received a great deal of criticism from all directions ever since it was first introduced. The loudest complaints have primarily come from environmental NGOs, which claim that this is a “low cost, low standard scheme” (Evans, 2007a). Some environmentalists claim that the standards are often vague and unsustainable, especially concerning farmed seafood (Food and water watch, 2007). The fishing industry on the other hand has accused Friend of the Sea for being inaccurate and unreliable, which for example represents in them outlawing species that are in fact harvested sustainably, such as haddock (NASBO, 2007).

The labelling scheme can also be criticised for providing little information on its managerial procedures, funding and day-to-day operation. An annual report is for example not presented on its home page, and there is no information available on who are their main financial contributors. Mr. Bray appears to be almost solely responsible for the program. The collection of “experts” represented on the Technical committee represents a very narrow portion of stakeholders. A major player from the wild-catch fishing sector is for example missing from the committee, whilst there are 8 representatives there from environmental NGOs (FOS, 2007d). Representatives from the scientific community on the Technical committee represents a similar imbalance between stakeholders, as the three scientific experts on the committee do all come from a single university in the Azores. Governmental organisations with representatives on the committee come from countries that do not rely heavily on fisheries i.e. Costa Rica, Belgium and Australia. NGOs with representatives on the committee are a homogeneous group of environmentalists i.e. 3 representatives from Earth Island institute, 2 from Friend of the Sea itself, 2 from the Swiss-based Fair-Fish and Ocean care, and one from an Italian forest certification scheme.

3.3. KRAV

The Swedish ecolabelling scheme KRAV has been engaged in a project to develop standards, inspection and certification for sustainable fisheries in Scandinavian waters since 2001 (KRAV, 2008a). KRAV had before mainly focused on organic certification, but after having developed a criteria for organic aquaculture, they also decided to look at wild capture fisheries. It took them four years to finalise the standards and in 2004 they began to certify individual fisheries. However, only a handful of fisheries have applied for certification, but that is probably caused by the fact that the KRAV label is mainly developed for the Swedish market and is relatively unknown in other countries.



3.3.1. Methodology and standards

KRAV's standards include all parts of the chain of custody from the fishery to the retailers; in order to verify that products sold as KRAV-certified have not been mixed with non-certified products (KRAV, 2008a). The standards focus on three main parameters, which are the condition of the stock, application of the vessel and the fishing method, but in addition there are some very specific conditions that the product needs to meet throughout all of its life cycle i.e. production, transportation, waste management etc.

The basic principles and standards for assessing the stocks are set to ensure that certified fisheries are operated on stocks that are sustainable in the long-term, which means that the collective fishing pressure on a stock may not exceed its production capacity or endanger the balance in the marine ecosystem. Assessments of the size of the stock shall apply the precautionary approach, meaning for example that a fishery can be refused a certification due to insufficient knowledge. ICES advice on the stock shall be considered and the Fishing committee shall demonstrate how it has considered the ICES advice in its own recommended decision.

In order for a fishing vessel to be certified its operations must be planned and run to cause as little environmental impact as possible. KRAV does for example stipulate what kind of gasoline, hydraulic oils, lubricating greases and cleaning agents it is allowed to use, and waste disposal needs to meet certain criteria. KRAV refuses to certify vessels using two stroke engines and vessels that are painted on the bottom with paints containing tin.

Fishing methods that are certified by KRAV must be adapted to minimise bycatch. The fishing methods do also have to create as little impact on the surroundings as possible and cause the least possible suffering to the animals prior to death. Documentation needs to be

extensive, as vessels greater in length than 15 meters do for example have to be equipped with a “Vessel Monitoring System” that reports information on the position, course and speed to an organisation that gathers data at least once every hour. The only fishing gear that is absolutely forbidden according to the KRAV standard is the beam trawl, but other gear is subject to some provisions. Bottom trawling is for example only allowed in predetermined locations in order to minimise benthic disturbance, and the gear must be equipped with devices such as Bacoma window in order to increase its selectiveness.

It is not enough to fish from a sustainable stock using environmentally friendly methods, in order to be allowed to label the final product with the KRAV label. Other issues in the products life cycle do also have to be in accordance with the KRAV standard. Processing does for example have to use minimum amounts of energy and choose the best available fuels. Additives and other raw material used in the processing must come from natural sources. Using cheap processing labour with unsatisfactory conditions is not consistent with KRAV certified processing. Transportation shall be kept at a minimum and the means of transportation needs to be as environmentally friendly as possible. Waste management does also have to be taken into consideration on each stage of the production process and the final product has to be predominantly packed in recyclable packaging that is produced by a company affiliated with REPA (Swedish company). It is therefore apparent that KRAV labelled products need to fulfil rigorous conditions that apply not only to the fishery itself but also to the products whole life cycle.

3.3.2. Governance

KRAV is a typical third party labelling scheme and is governed as such, but because the label is used to accredit a very wide range of products against quite divergent criteria it needs to be split up into several departments, which are collectively governed by the board of directors (KRAV, 2008a). The Fishing committee, which consists of various competent stakeholders, is responsible for coming up with the standards and to monitor compliance, following the board’s approval.

Consistent with standards set for third party labelling schemes, there is an impartial third party that needs to evaluate the products against KRAV’s standards. There are presently only four certification bodies that have been accredited by KRAV and are therefore qualified to evaluate products against its standards. These four accredited certification bodies are all located in Sweden, but are nevertheless able to provide their services all around the world (KRAV, 2008b).

3.3.3. Effectiveness

KRAV has been certifying fisheries since 2004 and has in that time been unable to raise general interests amongst producers or consumers, which is probably caused by the fact that the label is almost solely recognised in Scandinavian (mainly in Sweden). Only a handful of producers have applied for the label and it is therefore difficult to comment on its effectiveness. But the lack of interest from producers suggests that it is not very economically effective. Evaluating social- and environmental effectiveness based on already certified fisheries is also difficult, because of the lack of certified fisheries. But the potentials are however there, since the standards are more extensive than of other similar labelling schemes. The standards are for example designed to take human rights issues into consideration and the scope of the label covers the whole life cycle of the product, whilst other similar labels only look at a specific subset of a products life cycle.

3.3.4. Cost and funding

The cost involved in acquiring the KRAV label for a seafood product is mostly dependant on the complexity of the assessment (KRAV, 2008c). These fees are paid directly to the Independent Certification Body and are according to Mr. Pálsson (2008) generally not very high, at least in comparison with the MSC label. The certification is valid for three years and is then up for re-certification. The fee that is paid directly to KRAV is a licence fee that is a proportion of the total sales value of the product, ranging from 0,2% to 0,5% depending on the turnover. The fee is 0,5% as long as the turnover is between 1 and 80 million SEK, but they charge a fixed price of 400 SEK if the turnover is below 1 million SEK. In addition KRAV charges 10.000 SEK for each application.

KRAV's income in 2006 was close to 51 million SEK, of which only 1,8 million came from grants and subsidies. The labelling scheme therefore, unlike most other similar initiatives, pays for itself and does even return a small profit (KRAV, 2007d). Almost all of the revenues coming from logo licensing are originated from the organic sector, where dairy products contribute 1/3rd of the income, but other product groups trail far behind with less than 10% each.

3.3.5. Criticism

KRAV's problem is that it is not very well known amongst regular consumers. It is however very well known amongst consumers that are into buying organic products in Scandinavia. It could therefore be worthwhile for producers that think they have a product

that would fit in with that consumer group to explore this option. Abba Seafood AB did for example get the KRAV label for some of its herring that is sold in Scandinavia, with favourable results (Abba, 2008).

KRAV is also a part of the International Federation of Organic Agriculture Movement (IFOAM), which could help certified seafood producers to market their products alongside organic products. But the bottom-line is that KRAV needs to get more seafood products accredited in order to raise interest for producers, retailers and consumers.

3.4. Joint Scandinavian label

At times there have been talks of implementing a special joint Scandinavian ecolabel for seafood products, but even though these countries have a lot in common they also have quite different set-ups for their fisheries that make it difficult for them to unite under one set of standards (Bjarnason, 2005; Wessels, 2000). The Scandinavian countries as a whole have therefore been unable to implement a joint labelling scheme, but the Nordic Council has instead worked rigorously on adapting a criteria for voluntary ecolabelling programs that private initiatives could use to implement their own labelling schemes (Norden, 2000). They have also worked closely with FAO on constructing its “guidelines on ecolabelling of fish and fishery products from marine capture” (Norden, 2005).

The possibility of establishing a label designed especially for Iceland, Norway and Faroe Islands has also been explored (Bjarnason, 2005). But the Norwegian seafood sector decided to prefer the MSC label. There have already at least four Norwegian fisheries applied for MSC certification and few others are interested to follow their lead (MSC, 2008e).

Iceland and Faroe Islands have also explored the possibility of establishing a joint label for their fisheries. This option was for example discussed in a workshop held in the summer of 2007, where various stakeholders from these two countries convened to discuss sustainability issues and fisheries (Matís, 2007). The workshop however revealed that there is a large difference between how the industry is operated in these two countries, as catching, processing and marketing is generally controlled by the same company in Iceland, while it is run by separate companies in the Faroe Islands. It is therefore much simpler to implement an ecolabelling scheme in Iceland than in the Faroe Islands. The difference could discourage these countries from working together, because they do not look at the supply chain from the same perspective.

3.5. The Icelandic label

Various stakeholders in the Icelandic fishing industry, with LÍÚ (The Federation of Icelandic Fishing Vessel Owners) at the forefront, are presently working on a standard for an Icelandic third party ecolabel, according to Mr. Þórarinsson (2008), LÍÚ's population ecologist and the chief designer of the forthcoming label. The label is going to be in accordance with FAO's "guidelines for the ecolabelling of fish and fishery products from marine capture fisheries" and international certification companies are going to be responsible for the assessment. The label is still being developed and information on it is therefore very limited. The standard and its criteria have not been published yet, but they are going to be especially adapted for the Icelandic fishing industry as a whole, according to Mr. Þórarinsson. The standard is going to focus on responsible and sustainable utilisation of fish stocks, highlighting the "numerous advantages" of the Icelandic fisheries management system. Other variables, such as seabed disturbance, fuel efficiency, GHG emissions, social impacts, recycling and other issues that might be considered relevant are not going to be taken into account, since the creators of the scheme believe that these issues will not be required by retailers and consumers, at least for the next decade, according to Mr. Þórarinsson.

The standard is going to be ready in the fall of 2008 and is supposed to be "considerably" less expensive than the MSC label, but costs and funding is not yet finalised. The labelling scheme is meant to be designed in such a manner that the entire Icelandic seafood industry is easily going to be able to attain certification.

This chapter has attempted to analyse the available alternatives that Icelandic seafood producers have regarding third party environmental labelling of their products. The analysis has revealed that the available alternatives differ considerably. The MSC label is for example the market leader, with widespread acceptance amongst most stakeholder groups, large portfolio of participants and a logo that has become a household trademark in the industry. The Friend of the Sea label is more controversial, since it uses the bare minimum of information for their assessment. But the label is very inexpensive and is well recognised in specific market areas; namely in Italy, Portugal and Switzerland. The KRAV label is relatively unknown in the seafood industry, as its portfolio of certified fisheries is almost non-existent, but the logo itself is well known amongst organic consumers in Scandinavia. The possibility of implementing a joint Scandinavian label has

been explored, but without any success. The likelihood of such a label being developed, whether by the Scandinavian countries as a whole or in a cooperation of individual countries, is very remote. A future Icelandic label is presently being developed and is expected to be available in the autumn of 2008. Its standards are still unknown, but the label is supposed to be designed so that the entire Icelandic seafood industry is going to be eligible for certification.

These are the available alternatives, but in order to evaluate how compatible they are with the Icelandic seafood industry there is a need to analyse the industry, focusing on issues that are relevant regarding environmental labelling of its products. That is the objective of the next chapter.

4. The Icelandic fishing industry

The objective of this chapter is to introduce the Icelandic fishing industry and to analyse it in issues related to environmental labelling. This is done in order to clarify the compatibility of the Icelandic seafood industry against the labelling alternatives that are available.

The Icelandic fishing industry is first introduced in general where the history and current situation of the fisheries management system is accounted for. Relevant ecolabelling issues are then analysed in more detail, where the issues are first explained in a global context and Iceland's performance in addressing them is then accounted for.

4.1. History and current situation

Iceland's position in the middle of the North-Atlantic provides almost a unique opportunity regarding management of the nation's marine resources, because Icelanders for the most parts do not share their fish stocks with other nations. This was however not the case before 1976, when the country obtained sovereignty over its 200 nautical mile fisheries jurisdiction, as fishing fleets from all over Europe had in great extent fished from the rich fishing grounds around Iceland (The Resource Committee, 2000). But the Icelandic government had nevertheless started to implement various management mechanisms way before it was awarded sole custody of its fishing grounds and had for example implemented a catch-quota system for localised lobster, shrimp and scallop stocks as early as 1973 (Ministry of Fisheries, 2007b). But after having obtained sole custody over the entire fishing ground, they began to implement a more comprehensive management system.

At first they solely focused on the cod stock, because it was economically their most important stock and in biggest need for protection (The Resource Committee, 2000). In 1977 they implemented an effort control system that limited the number of days that boats were allowed to target cod. But that did not turn out to be a success. Cod catch increased enormously, partly because vessel owners invested heavily in better gear to be able to use the time that they were allowed to target cod more efficiently, thus resulting in overinvestment and overexploitation. In 1981 cod catch of Icelandic vessels had reached 470 thousand tons and had then increased by 35% under the effort limiting system (IMRI, 2007). It was evident that the system was not working as expected and it was therefore

abandoned in 1984. Instead a mixed system of catch-quota and effort-quota was introduced, where at first larger vessels were allowed to choose whether they were allocated a fixed IQ (Individual Quota) or a specific number of days allowed at sea. But gradually all boats over 15 GRT were incorporated in the IQ system and smaller boats were allowed to stay in the effort-quota system.

The catch-quota system turned out to be quite effective, as vessels in that system more or less kept to their quotas (The Resource Committee, 2000; Anonymous, 1997). The effort-quota system however did not manage to regulate the amount of fish caught, as vessels in that system grew in numbers from about 800 to 2.200 in just a few years. They also became much more efficient as they applied new technology in vessel design and fishing gear design. In the beginning of the quota system these boats were expected to catch 3,3% of the TAC of cod, but they went far above that and were for example responsible for 27% of the total cod catch in 1995. The effort-quota system was therefore gradually abandoned and as of 2006 all fisheries in Icelandic waters are managed under a catch-quota system (Directorate of Fisheries, 2006).

Important change was made 1990, when the quota was made transferable, opening up for consolidation and economical optimisation in the industry. It seems like that change has enhanced the economic performance of the system, as quota-shares have accumulated in the hands of some while others have decided to sell their quota-share and leave the industry. Suggesting that “better run” companies have been acquiring quota shares at the expense of those not returning enough profits (Árnason & Gissurarson, 1999). The biggest companies have in general been acquiring a larger part of the quota-share, while the smaller ones have been leaving the industry. It therefore looks like the principle of economics of scale applies in this industry. The twenty largest quota holders for example, who owned 36% of the quota in 1992, own now 66,5% of the overall quota. The ten largest companies own 51%, and the largest one owns almost 12%. Roughly 82% of the entire quota share is in the possession of only 50 companies (Directorate of Fisheries, 2007a). The government was however concerned that if left unregulated, the entire quota share would gradually be bought up by a handful of companies, which does not fit the government’s regional development policy. A 12% limit was therefore established on how much a single company can own of the overall quota-share (The Resource Committee, 2000).

Iceland has been developing its fisheries management system since before it got custody of its fishing grounds (The Resource Committee, 2000). The system that is now in place is a comprehensive Individual Transferable Quota (ITQ) system that is constantly being adapted. ITQ systems are in essence very economically driven, as the objective of turning the quota into “private property” is to encourage quota owners to think about the fish stocks as a long-term investment and to focus on their marginal benefit. The ITQ system is superior to other management systems because it makes it easier for quota holders to plan ahead, specialise, consolidate and optimise in their operation. They are for example able to invest in new technology that suits their quota-share, knowing fairly accurately how much of each species they will be able to fish in the future. They are also able to increase their quota according to their production capacity by investing in more quota-share. They can specialise in catching and processing specific species of fish, as the ITQ makes it possible for them to trade quotas in one species for another. Consolidation of smaller companies can be favourable, as the principle of economy of scale generally seems to be in effect in the industry. It for example appears obvious that economic optimisation can be attained by using fewer and better-equipped vessels to catch a fixed amount of catches (Árnason & Gissurarson, 1999).

Economists emphasize that the ITQ system is the best method available to maximise (economic) utility of the resource for everyone, as it gradually optimises the profits arriving from each kilogram caught, as can be seen on figure 4-1 (Hilborn, 2007; Árnason & Gissurarson, 1999; Shotton, 2000). This ensures not only maximum profitability for quota holders, but also for the nation as a whole, since the resource is being utilised as (economically) efficiently as possible. But it needs to be taken into account that this is a process that takes time, especially if there is an overcapacity in the industry when the system is first implemented.

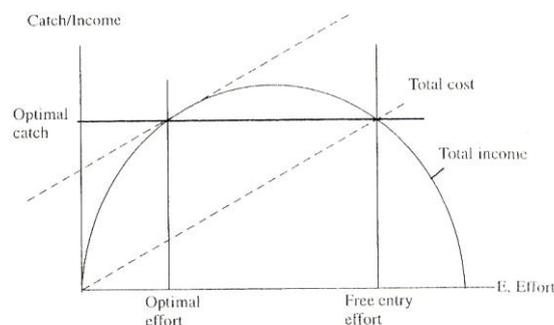


Figure 4-1: ITQ as a tool to induce optimal effort in a fishery
Theoretically economic benefits of the ITQ system are obvious, as it should with time ensure optimal utilisation of the stock by minimizing cost per each kilogram caught (Source: Árnason, 1999).

If an ITQ system works according to plan, economical considerations should automatically make sure that environmental objectives are being met, or at least being taken into consideration. Because keeping the stocks at healthy levels, which includes treating their ecosystem with respect, is economically practical.

As a downside, the system does not take into account fairness or human aspects (Haraldsson, 2001). Monetary values solely decide who survives in the industry, which can be devastating for stakeholders that get stuck in-between. Whole communities can for example be left without a quota because a single quota holder has decided to sell his quota-share. The system can also act as a severe entrance barrier, since those who want to buy a boat and start fishing have to buy expensive quotas in addition to the necessary equipment. This is considered to be unfair by some, because those who were awarded quota when the system was originally implemented got it for free. This opinion is shared by the Human Rights Committee of the United Nations, which in 2007 ruled that initial implementation of the system had been discriminating, as the fishing rights had been donated to a privileged group of stakeholders (CCPR, 2004).

Some mitigating measures have been considered to address these problems, but they generally have the unfortunate side effect of reducing the economical efficiency of the system, by constricting possible optimisation in the industry (The Resource Committee, 2000). Community quotas have been tried as a part of a regional development policy, to keep fishing villages alive. But that generally only keeps uneconomic businesses afloat and is therefore unpractical for the nation as a whole. Other means of distributing the quota have also been considered, where authorities for example would auction off the quotas, each year, or on a broader time scale. But that could prevent necessary investment in the industry since companies could not be sure of attaining necessary quota-share in the future.

The quota system's success in protecting the fish stocks is debatable, as some stocks have consistently increased while others have shown little signs of recovery (see appendix 5). The haddock stock has for example increased threefold since the initial implementation of the system in 1984, whilst the cod stock has declined by 25% (IMRI, 2007).

The cod stock is economically by far the most important stock in Icelandic waters, representing for example 39% of total seafood export value in 2006, which makes it particularly important that management measures concerning the stock return a successful outcome (Statistics Iceland, 2008a). But as can be seen on figure 4-2, more than two decades after initial implementation of the quota system, condition of the stock has not

improved, even though quotas have been drastically reduced, cutting the national TAC by half since the initial implementation of the system (IMRI, 2007).

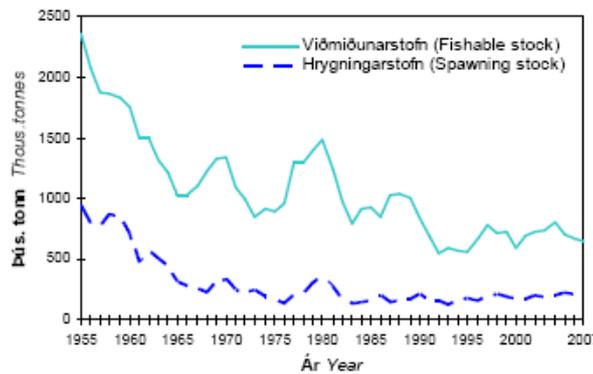


Figure 4-2: Development of the Icelandic cod stock since the 1950's.

(Source: IMRI, 2007)

Condition of the cod stock has been used on numerous occasions to criticise the efficiency of the management system. But there might be several explanations for this disappointing performance of the ITQ system regarding the stock so far. Actual catch has for example gone far beyond the recommendations of the IMRI. The reasons for that may partly be defined as growing pains of the system, as for example represented in the huge underestimation of the small boats fishing capability. But it could also be blamed on politics, because TAC decided by the Ministry of Fisheries has frequently surpassed the IMRI's recommendations. Since the quota system was first implemented in 1984 the Ministry of Fisheries has issued a TAC in cod that surpasses the IMRI's recommendation by 14% and the actual catch has been 26% over the IMRI's recommendations, which amounts to roughly 1.200 thousand tons of cod in little over two decades (IMRI, 2007).

Since 1995 the IMRI and the Ministry of Fisheries have applied a so-called "catch rule" to determine how large a proportion of the cod stock should be caught each year. Until 2007 that rule stated that cod quotas should be 25% of the fishable stock size, but that proportion was lowered down to 20% for the 2007/2008 quota-year, based on recommendations from IMRI and ICES (IMRI, 2007; ICES, 2007a).

Another possible explanation for the poor success of the ITQ system in rebuilding the cod stock might be found in the fact that bigger and older individuals of cod have been especially targeted, for economical reasons. But research show that offspring's of older and bigger cods have a better survival rate than offspring's of smaller individuals (Herbertsson *et al.*, 2004). Consequently, recruitment could be affected by the age distribution of the spawning stock. The government therefore limited the allowable size of

gillnets down to 8 inches in 2006, in order to protect the older cod (Ministry of Fisheries, 2004).

Discards have also been suggested as a possible culprit, especially in the '90s when many vessel owners were trying to run their business with a very limited quota-share. They consequently had to lease the quota at very high prices, which encouraged discards of the lesser valued catch i.e. highgrading. This problem has probably diminished by now, because most vessel owners with limited quota-share have gone out of business. Those who own vessels today do therefore not need to discard because of a lack of quota. The IMRI estimated in 2006 discards of cod to be 1,27% of the total catch (Pálsson *et al.*, 2006).

Alongside the ITQ system itself, some other regulatory measures are applied in order to protect vulnerable areas, younglings and important spawning grounds. But the Icelandic ITQ system is constantly being adapted, by taking all relevant issues into consideration. Following is an analysis on how various issues that are relevant to environmental labelling have been addressed.

4.2. Performance regarding various ecolabelling issues

Iceland is the world's eleventh largest supplier of seafood, catching 1,5 – 2.0 million tons of fish a year (Glitnir, 2007). The export value of Icelandic seafood products in 2006 was 124 billion IKR, representing 73% of total value of exported goods and 7% of the GNP (Statistics Iceland, 2008a). Roughly 4% of the workforce is directly employed by the seafood industry and related jobs represent an even larger portion of the population. Iceland is therefore economically and socially very dependent on the seafood sector, which makes it even more important that the resource is utilised sustainably. The same issues that are relevant to environmental labelling should therefore also be of particular interest for the Icelandic nation as a whole. Following is an analysis on how Iceland addresses these issues; first explaining them on a global scale and then reviewing Iceland's performance in resolving them.

4.2.1. Stock status

The world's total fish production in 2005 was approximately 140 million tons, of which 106 million tons were used for human consumption, providing an apparent per capita supply of 16,6 kg (FAO, 2007a). Aquaculture accounted for 43% of the total production

and wild capture for 57%, as marine capture fisheries amounted to almost 85 million tonnes and inland capture to roughly 10 million tonnes.

The global wild capture fisheries production has been relatively stable for the past two decades at around 90 million tons, despite of increased efforts being applied; and would in fact have declined since early 90's if it were not for increasing catches of China, worlds largest fishing nation. But if a longer time period is examined, one can see that world capture fisheries production has almost quintupled in the last 50 years, as can be seen in figure 4-3.

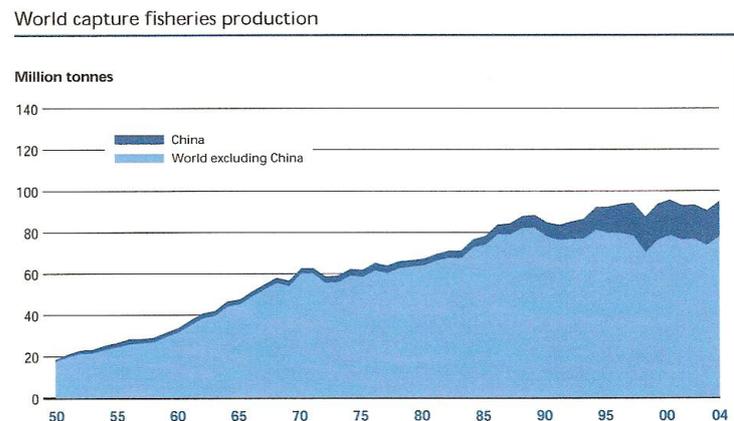


Figure 4-3: World capture fisheries production since the 1950's. World capture fisheries have increased fivefold in the past five decades (Source: FAO, 2007a)

This increasing pressure on the world's fish stocks appears to be resulting in poorer conditions of the stocks, as most of them have severally declined over the past few decades. Almost 1/3rd of all stocks are currently presumed overfished, roughly half fully exploited, 1/5th moderately exploited and only 3% under exploited (FAO, 2007a). Fishing fleets with tremendous overcapacity are fishing from ever dwindling stocks, as the worldwide fishing fleet is thought to be up to 250% larger than what is needed to fish at sustainable levels (Oceana, 2007). This development has raised concerns amongst stakeholders all across the globe and scientists have warned that stocks could collapse if fishing pressures are not reduced. Some of the more pessimistic scientists have even predicted total extinction of all major fish stocks within the next fifty years, if current trends continue (Worm *et al.*, 2006). Environmental labels top priority should therefore be to ensure that stocks are not being overfished.

For a labelling scheme to be able to reliably assess if a particular stock is being harvested sustainably, there is a need for extensive and reliable information to be available on how

the stock has prevailed in the past. Labelling schemes typically have the precautionary principle as a core philosophy in their assessment, emphasising that lack of available information cannot be interpreted favourably for the fishery; the environment is always entitled to the benefit of a doubt. The available data on stocks in Icelandic waters are very extensive, as they have systematically been researched since the beginning of last century, which makes assessment of present stock sizes in comparison with historic data relatively easy (IMRI, 2008a). Iceland has also a big advantage in assessing and managing its fish stocks compared to most other fisheries, because most of its stocks are solely located inside its fisheries jurisdiction. Fish stocks in other locations are generally co-managed by several nations, as the same stock is typically located inside the jurisdiction of more than one country. Management of mutually owned stocks, particularly straddling- or migratory stocks, is generally very difficult and typically leads to mismanagement (UN, 1995).

The available data on Iceland's most important stocks show that their condition varies considerably (see appendix 5). Cod, Greenland halibut, scrimp and plaice are for example struggling; whilst pollock, catfish and redfish are at healthy levels; and haddock, herring and blue whiting are in very good condition. Information on the capelin stock is however conflicting as IMRI's measurements in 2007 suggested that the stock was in a relatively healthy condition, but the volume of capelin that arrived at the spawning ground in 2008 did not support those measurements.

The conditions of the most important stocks in Icelandic waters are as follows (IMRI, 2007):

- **Cod:** The cod stock is only a third of what it was fifty years ago. Implementation of the ITQ system resulting in severe reductions in catches has not improved the condition of the stock.
- **Haddock:** The haddock stock is in a very good condition and has tripled in size since the quota system was first implemented in 1984. Catches have consequently doubled and are expected to remain stable at around 100 thousand tons.
- **Pollock:** The pollock stock is characterised by severe natural fluctuations, but the overall trend for the past three decades suggests that the stock is in a healthy condition.
- **Redfish:** There are two different redfish stocks utilised in Icelandic waters. They are both recovering after having been overfished in the 80's and appear to be improving, but they need more time because the species grows very slowly and does for example not become mature until 14-16 years of age.
- **Greenland halibut:** The Greenland halibut is in a critical condition. The stock is transboundary, living inside the EEZ of Iceland, Greenland and Faroe Islands. These countries have not agreed on a cooperative management scheme, which has resulted in a severe overfishing; particularly on the Faroese side. Iceland has attempted to address the problem by reducing quotas, but lack of compliance from Faroe Islands and Greenland suggest that the fishery will remain unsustainable.

- **Plaice:** Plaice was severally overfished in the late 80's and early 90's. The stock has not recovered despite quotas being cut in half. The stock is believed to be less than a third of what it was when the quota system was first implemented in 1984.
- **Catfish:** The catfish stock has been relatively stable for the past two decades and catches have also remained stable between 13 and 16 thousand tons a year, in accordance with scientific advice. The IMRI has though revised its advice in the light of disappointing recruitments for past few years and the quota for 2007/08 was therefore set at 12.500 tons. But the IMRI had wanted to reduce catches down to 11.000 tons, as precaution because the stock is slow growing. Catfish does not become mature until 6-8 years of age.
- **Tusk:** The tusk stock is in a good condition and catches have been stable for the past few years at 4-6.000 tons.
- **Monkfish:** The monkfish stock is in a very good condition despite of severe increase in catches for the past few years. Increased distribution caused by higher sea temperature might be the main explanation for this development.
- **Herring:** There are two separate herring stocks that are utilised by Icelandic vessels. The Icelandic summer spawning herring that lives solely in Icelandic waters and the Norwegian spring spawning herring, which is a migratory stock. Both of these stocks are in a very good condition and have not been this large since in the 60's.
- **Capelin:** Size of the capelin stock is characterised by severe fluctuations, explained by the fact that the capelin dies after having spawned for the first time, at the age of three. The stock is very unpredictable, which makes it difficult to predict the condition of the stock.
- **Blue whiting:** Blue whiting is a migratory stock that is spread all across the North Atlantic. Numerous countries utilise the stock, but Iceland accounts for about 15% of the catches. The stock is in a good condition despite of being harvested far above scientific advice, but lack of cooperation caused by lowest common denominator problems have caused TAC's to be set at double the recommended volumes.
- **Lobster:** The lobster stock has been in a stable condition for the past three decades and catches have been relatively stable for the past few years.
- **Shrimp:** There are many shrimp stocks located in Icelandic waters, but they are all in a critical condition as represented by diminishing catch numbers. Total catch in 2006 was for example only 2% of what it was ten years ago.

This list shows that other issues aside, haddock, pollock, catfish, tusk, monkfish, herring, blue whiting and lobster should be eligible for ecolabelling, based solely on the condition of the stocks.

4.2.2. Efficient management system

Vital factor that needs to be in place for a fishery to be able to implement a reliable and credible environmental labelling scheme is an efficient management system that ensures that the stocks are being harvested in accordance with best available scientific knowledge. There are numerous management systems available, but the most generally accepted methods are transferable catch-quotas that are applied in combination with other types of

restrictions, such as area closures, gear restrictions, vessel restrictions etc. (Shotton, 2001; Gissurason, 2004; Emerson, 1998). If applied correctly ITQ's make sure that all stocks are harvested in accordance with scientific advice. Non-transferrable fishing rights on the other hand typically cause that fisheries in one species need to be suspended when quotas in another have been exhausted. Fishing effort quotas have also been used in various fisheries, but they are generally unable to regulate with any certainty the amount of fish being caught, as demonstrated by the Icelandic effort quota system applied for small vessels. The ideology behind an effort quota system is that by keeping a fixed effort the catch will also be a fixed portion of the stock size. Although this looks practical in theory experience has shown that it is almost impossible to keep a fixed effort when new technology is constantly being incorporated into the industry.

Responsible allocation of quotas is essential in order for the management system to work correctly. Whether using catch-quotas or effort-quotas, authorities have to decide how much quota is allocated, either in the form of TAC or effort units, and they must also make sure that these quotas are honoured. Efficiency of a quota system is severally jeopardised if quotas are decided too high or if TAC's are not honoured. This is a common problem in many fisheries where politics frequently cause TAC's to be decided higher than recommended by scientists, either because politicians are looking out for short time interests of their constituents, or because the lowest common denominator is agreed upon when quotas for transboundary stocks are decided (Mikalsen & Jentoft, 2003; Reuters, 2007). Many countries are in addition "unable" to enforce the agreed quotas, due to lack of available resources or insufficient firmness from authorities (FAO, 2007a; ICES, 2007a).

Iceland is in the forefront of nations that use ITQ systems to regulate their fisheries. But like most other nations in the Northern Atlantic, Iceland has been doing rather poorly in allocating quotas in accordance with the best available scientific knowledge and even worse, vessel owners have consistently managed to fish beyond TAC levels for numerous years, as demonstrated earlier in this chapter, in the case of the cod stock. The system has though been getting better as authorities have increasingly complied with recommendations of scientists and most loopholes that were allowing vessel owners to fish beyond the TAC have now been closed. But table 4-1 nevertheless shows that compliance with IMRI's recommendations are still lacking for most stocks (IMRI, 2007).

Table 4-1: Compliance with IMRI's recommendations 2005/06

	IMRI	TAC	Catch	IMRI/catch
Cod	*198.000	198.000	209.000	106%
Haddock	105.000	105.000	98.000	93%
Pollock	80.000	80.000	78.000	98%
Redfish	57.000	57.000	59.000	104%
Greenl. halib.	15.000	15.000	22.200	148%
Plaice	4.000	5.000	5.700	143%
Catfish	13.000	13.000	16.473	127%
Tusk	5.000	5.500	6.281	126%
Monkfish	2.200	2.500	2.590	118%
Icel. Herring	130.000	130.000	135.000	104%
Norw. herring		153.800	157.474	
Capelin	370.000	385.000	377.000	102%
Blue whiting		320.000	309.508	
Lobster	1.600	1.800	1.946	122%
Shrimp (inshore)	200	200	240	120%
Shrimp (offshore)	10.000	10.000	800	8%

(Source: IMRI, 2007)

The Icelandic fisheries management system should meet requirements of the available labelling schemes if it would better compile with recommendations from scientists. TAC's are too often decided above IMRI's recommendations and compliance with allocated TAC's is also often lacking. Surpassing scientific advice by 18-48%, as is the case for Greenland halibut, plaice, catfish, tusk, and monkfish, is unacceptable according to the standards of every available ecolabelling program.

4.2.3. Bycatch and discards

Most fishing gear attracts some level of bycatch; it is an unavoidable side effect in almost all fisheries. Undesired catch is then often thrown back into the sea, usually dead or dying, which leads to waste of resources and unnecessary burden on non-target species. There are basically three main reasons for discarding at sea i.e. economic reasons, as it just does not pay to land the catch; because of management measures, as landing of certain catch is forbidden; and because of technical reasons, as in some cases a part of the catch is lost or severely damaged before arriving on board (Morizur, Caillart & Tingley, 1999).

In 1994 scientists estimated that 1/3rd of the global catch were being thrown back into the sea as discards (Alverson *et al.*, 1994). Global discards in commercial fisheries were thought to be between 17,9 and 39,5 million tons (average 27,0 million tons) per year.

* According to 25% catch-rule, but the IMRI had recommended that the catch-rule should be lowered down to 18-23%

This problem has however been decreasing as most species have become more valuable, selectiveness of fishing gear has increased, the intensity of fishing for some species that have high bycatch rates has declined, and various management actions that prohibit discarding have been adopted. Recent studies show therefore that approximately 8% of global fish catch, or 7,3 million tones, is being discarded each year on average (Kellehr, 2005). Discards vary between the type of fishing gear being used and species being targeted. Bottom trawling is for example especially unselective, while mid-water trawling and purse seine targeting pelagic species are particularly selective. Small-scale fisheries generally have lower discard rates than industrial fisheries and fishing gear like purse seine, hand-line, jig, trap and pots have the lowest discard rates. In geographical terms the highest discards are in the Northeast Atlantic and Northwest Pacific, which jointly account for 40% of global discards i.e. FAO areas 27 and 61.

Discarding induced by the fisheries management systems in use has been highlighted in recent years, as “Highgrading” has been suggested to be a considerable problem that might especially be associated with catch-quota systems (Árnason, 2000). But “highgrading” is defined as the practise of selectively harvesting fish so that only the best quality fish are brought ashore. There is a high economic incentive for the fisherman to discard lower valued species or individuals to increase the value of landings. This happens most commonly where IQ- or ITQ systems are being used, where a fixed volume of catches is allocated to each vessel. Larger individuals are for example generally worth more than smaller ones and fishermen are therefore tempted to discard the smaller ones. Also, when the quota for certain species has been reached but the species continues to be caught as bycatch in the fishing for other species, one alternative is to discard the species for which the quota has been filled.

It has been attempted to assess discards caused by highgrading in various ITQ systems, but the level differs between countries, species and fishing gear. There are reported discards of certain species in Australian trawl fisheries that have reached 70%, but the average proportion is thought to be around 5% (Kaufman, Green& Sen, 1999).

The IMRI has monitored discards in Icelandic waters for the past several years (Pálsson *et al.*, 2007). The discards vary between species and fishing gear, but appear to be on average below 2% for groundfish. For the year 2006 it was for example 1,45% for cod; 2,60% for haddock; 0,13% for pollock and undetectable for redfish. The Icelandic fishing

industry does therefore meet the requirements set by the labelling programs that are available.

Bycatch of birds and marine mammals is a part of the scope for the labels in question, but that is an issue that does probably not apply to Iceland, since it is not a problem in its fisheries.

4.2.4. Seabed disturbance

Many fishing practices cause serious negative impacts on not just the targeted species, but also the ecosystem as a whole. Some extremely destructive methods have been used in the past, such as dynamiting and poisoning, but these practices have been fast retreating, as people have become more aware of their effect on the environment (Horrill & Makoloweka, 1998). The attention of scientists, environmentalists and other stakeholders has in recent years shifted towards more commonly practised fishing methods that cause negative impacts on fish stocks and their habitats. Mobile fishing gears that are towed or dredged after the bottom are especially controversial, because they disrupt the whole benthic community, not just the animals that live on the bottom but also the ones that live in the bottom, such as invertebrates and microorganisms that are extremely important for all life in the world's oceans (Løkkeborg, 2005). They can also destroy rock formations and corals that provide habitat and shelter for various species.

The otter trawls design; with its large trawl doors weighing as much as 6 tones, heavy rollers and numerous chains and wires makes it capable of causing devastating damage to vulnerable benthic communities. Studies have shown that trawling can have long-term effects on the seabed and its inhabitants, especially if the bottom is particularly delicate, for example a coral area (Thrush *et al.*, 1998). Trawling has therefore in some cases been compared to forest clearcutting (Watling & Norse, 1998). But it has also been shown that the effects of trawling is mostly dependant on the type of bottom being towed and can in some cases have no apparent effects on certain areas (DeAlteris, Skobe & Lipsky, 1998).

Beam trawls and dredges that are used to scrape or plough the seabed for prawns, flatfish, scallops, sea urchins and other types of clams or crustaceans are also considered to be quite destructive (UN, 2006a). Even though almost solely used on soft bottoms, thus not destroying corals or rock formations, they still remove organisms, rocks and sediments, reducing habitat complexity and stirring up sediment that can smother bottom-dwelling communities.

Even though stationary fishing gears are usually considered to be more environmentally friendly than mobile fishing gear, they are still able to cause some disturbance for benthic communities (UN, 2006b). Bottom-set longlines, bottom-set gillnets, pots and traps are often used to fish in vulnerable areas where mobile fishing gear can not be operated, for example in coral- or rocky areas. The lines and nets themselves get tangled in the corals or in rock formations, thus breaking them off when hauling. Weights and anchors used to keep the gear in place can also cause damage to the benthic community.

Although an increasing number of impact studies have been carried out over the last two decades, knowledge of how towed fishing gears affect different habitat types is still rather rudimentary (Løkkeborg, 2005). The main reasons for this lack of scientifically based knowledge is that such studies are very complicated and demanding to conduct, because benthic communities show large natural variability that is not well understood. Furthermore, comparable areas are often not available (Auster & Langton, 1999).

In 2006 the United Nations general assembly addressed the problem of habitat disturbance associated with bottom trawling on the high seas. Various environmental NGOs and other stakeholders were calling for a moratorium based on the precautionary principle (Gianni, 2004), but the resolution that came out of the meeting laid the responsibility on individual countries and regional regimes, urging them to protect vulnerable areas (UN, 2006a).

Benthic disturbance is mainly associated with bottom trawling and use of other mobile fishing gear that are towed along the seabed. Fishing gear used large scale in Icelandic waters that fit that description are bottom trawls and Danish seine, but they collectively accounted for 43,6% of total catches, cod equivalent, in the fishing year 2006/07. Bottom trawls with 40,0% and Danish seine with 3,6% (Directorate of Fisheries, 2007b).

Icelandic authorities have addressed the problem of habitat disturbance caused by mobile fishing gear in recent years, both on a domestic and international level. They have for example established marine protected areas (MPA's), where vulnerable areas have been closed off to bottom trawling and use of other gear severally restricted (Directorate of Fisheries, 2007d). The Ministry of Fisheries authorised a committee in 2004 with the mandate to analyse the problem and recommend solutions. It turned in its report a year later, where it suggested some additional closures and recommended that further mapping of the seabed around Iceland would be continued (Ministry of Fisheries, 2005a). These recommendations have either already been met, or are presently being worked on (IMRI, 2008b).

The IMRI has also been working on the problem, addressing it from several angles. It has for example been working in collaboration with other Nordic countries on the effects of bottom trawling and scallop dredging in the arctic. This study gives a new perspective on the problem, highlighting the special characteristics of benthic communities in the north Atlantic i.e. around Iceland, Greenland and in the Baltic Sea, where corals for example grow much slower and become considerably older than the ones found in warmer surroundings (Garcia *et al.* 2007).

There seems to be a global consensus to deem bottom trawling as environmentally unfriendly, on the account of it destroying the seabed. Icelandic authorities have been doing what they can to address the problem, but those attempts are unlikely to matter to consumers and other stakeholders in the supply chain. Bottom trawling has become an image for unsustainable fishing practises and it does not really matter from a marketing point of view if it is founded on fact or fiction.

The ecolabelling program Friend of the Sea does not certify fisheries that use bottom trawling, and both MSC and KRAV put severe limitations on the use of bottom trawls in their standards. There are presently four bottom trawl fisheries certified by MSC, but they are all subjected to spatial restrictions; and their initial assessment required expensive impact assessment and spatial mapping (Busch & Benton, 2005). MSC has received widespread criticism for certifying these bottom trawl fisheries, despite of the harsh limitations that they are subjected to (Burton, 2007; Brown, 2004). It is therefore unlikely that Icelandic bottom trawl fisheries could attain an ecolabel. If it however would manage to become certified, it would have to be subjected to spatial constrictions and extensive environmental impact assessment would have to be carried out.

4.2.5. Pirate fisheries

Illegal, Unreported and Unregulated (IUU) fishing, which is sometimes referred to as pirated fishing, is a problem that causes major difficulties in managing fish stocks all around the world (Bours, Gianni & Mather, 2001). Illegal fishing takes place where vessels operate in violation of the laws of a fishery, and can apply to fisheries that are under the jurisdiction of a coastal state or to international waters fisheries regulated by regional organisations. Illegal fishing is conducted by vessels of countries that are parties to a fisheries organisation or arrangement, but operate in contravention of its rules; or in a country's waters without permission from the country; or on the high seas without showing

a flag or other markings. Unreported fishing is fishing that has been unreported or misreported to the relevant national authority or regional organisation, in contravention of applicable laws and regulations. Unregulated fishing generally refers to fishing by vessels without nationality, or vessels flying the flag of a country not party to the regional organisation governing that fishing area or species.

Pirate fishers have a strong economic incentive, as they generally focus on species that have been over-exploited and are therefore in short supply (Bray, 2000). IUU fisheries are possible because governments fail to regulate fishing grounds adequately, for example because of inadequate coverage of international agreements, or because they are unable to enforce national or international laws e.g. because of lack of capacity or poor levels of governance. A particular driver behind IUU fishing is the failure of a number of flag states to exercise any effective regulation over ships on their registers - which in turn creates an incentive for ships to register under these flags of convenience (FOC).

IUU fishing is thought to represent as much as a quarter of the world catch, as can be seen in figure 4-4. It is however understandably difficult to estimate with any accuracy how large these fisheries actually are (Pauly *et al.*, 2002).

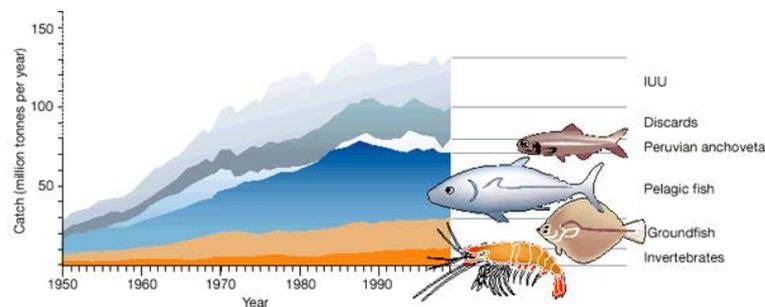


Figure 4-4: IUU fishing as portion of the world catch.

IUU fishing represents a large proportion of the total world catch and is particularly destructive as they typically focus on stocks that are already over-exploited and undermine current conservation and management measures (Source: Pauly *et al.* 2002).

IUU fisheries are particularly destructive for the oceans living resources, not just because of their size in volume, but also because they undermine current conservation and management actions taken by responsible parties (Bray, 2000). Furthermore, pirate fishing is typically conducted from stocks that are already over-exploited and are therefore especially vulnerable.

Icelandic waters are almost entirely free from IUU fishing. The Coast guard has sufficient resources to guard its jurisdiction and management measures make it very difficult to

misreport landings. IUU fishing is therefore not an issue that could prevent Icelandic seafood products from being certified by ecolabelling programs.

4.2.6. Fuel consumption

In the year 2000, global fisheries burned almost 50 billion litres of fuel in the process of landing just over 80 million tons of seafood, for an average rate of 620 litres of fuel per ton of seafood (Tyedmers, Watson & Pauly. 2005). Consequently, fisheries account for approximately 1,2% of global oil consumption, an amount equivalent to that burned by the Netherlands, the 18th-ranked oil consumption country worldwide, directly emitting more than 130 million tons of CO₂ into the atmosphere. From an efficiency perspective, the energy content of the fuel burned by global fisheries is 12,5 times greater than the edible protein energy content of the resulting catch, which is a very poor Energy Return on Investment (EROI-ratio) compared to other food sources (Tyedmers, 2000).

Fuel consumption behind each unit of fish caught varies considerably, depending on vessel type, gear type, target species, age of the fleet etc. Purse seine fisheries for small pelagic species, such as herring and capelin, which are often destined for reduction to fishmeal and oil, typically use under 50 litres of fuel per ton of fish landed, while fisheries targeting high value species like shrimp, tuna or swordfish frequently consume in excess of 2.000 litres per ton of landings (Tyedmers, 2001).

Fuel consumption typically becomes an issue for retailers and consumers when there is an opportunity for them to choose between similar products that require different amounts of fuel for their fisheries. This is for example obvious in most groundfish fisheries, where different types of vessels, using variable fishing gear, harvest the same stocks. But in some fisheries there is actually no alternative, like in the north Atlantic shrimp fishery for example, where everyone uses the same kind of gear and similar vessels to catch seafood that is quite unique and cannot easily be replaced with anything similar. The fishery is very energy intensive, using on average 850 litres of fuel per ton of landed shrimp, and if consumers want to reject it they need to choose a product that is very different from the one they initially wanted (Tyedmers, 2001).

Energy efficiency of the Icelandic fleet varies tremendously depending on target species, vessel type and fishing gear. Icelandic groundfish stocks are for example fished by trawlers that use on average almost 500 litres of fuel for each ton landed, while longliners and gillnetters use around 200 litres and jiggers little over 100 litres (Björnsson, 2004;

Eyjólfsdóttir, Jónsdóttir, Yngvadóttir & Skúladóttir, 2003; Rúnarsson, 2001). Pelagic stocks are fished by purse seines and mid-water trawlers that use less than 100 litres of fuel for each ton landed. Fuel efficiency is not yet a part of the scope for MSC and Friend of the Sea certification, but KRAV addresses the issue. It is however likely that this issue will become increasingly important when applying for environmental labelling in the future, particularly because of increasing awareness of greenhouse gases emissions. Icelandic fishing vessels are responsible for a quarter of CO₂ emissions of the entire nation (Eyjólfsdóttir *et al.*, 2003).

4.2.7. Food miles

People are becoming more aware of environmental problems that are caused by the commodities they buy. Life Cycle Assessment (LCA) is therefore increasingly being used to evaluate the overall impact of goods on the environment (UNEP, 2003). An important factor in LCA of seafood is transportation, as it often needs to be transferred considerable distances before reaching the consumer. Consumption of fossil fuels used in transportation causes various problems, but emissions of so-called greenhouse gases (GHG), particularly carbon dioxide, are probably the most important ones and have become highlighted in recent years because of discussions on global warming (US EPA, 2007). In order to quantify environmental impacts of transportation on commodities, measurements like “food miles” and “carbon footprints” have been adopted. A food mile is a concept that uses the travelling distance of food before it reaches the consumer as an indicator for the environmental impact of the food and its components. It is however misleading to look only at the distances alone, because the method of transportation is just as important. Transportation by air uses for example fifty times more fuel per kilogram than transportation by ocean shipping (Evans & Fiorillo, 2007). It is therefore more reliable to talk about products carbon footprint, when evaluating its environmental impact of its transportation.

Icelandic seafood products need to be transported considerable distances and the method of transportation is therefore an important factor in deciding their carbon footprints. Air transport is however the only available option when transporting processed fresh fish, because the products shelf life does not support it being transported by sea. Unprocessed fresh fish is however transported to UK in containers, because it is not as vulnerable to bacteria and does therefore have a longer shelf life.

Carbon footprints are not yet a part of MSC or Friend of the Sea scope, but KRAV addresses the issue. It is likely that carbon footprints will be incorporated into the scope of most ecolabels in the future, as retail chains are already insisting on products being rated by their CO₂ emissions (Reynolds, 2007).

4.2.8. Social- and human rights issues

Globalisation has resulted in companies increasingly moving their operation to countries where environmental- and social requirements are not as “inflicting” as in their home countries, cheap labour and lower operational costs are the main drivers behind this development. Globalisation raises various issues, but one of its disadvantages is that “Dirty businesses” have increasingly moved their operations to lesser-developed countries where they are able to disregard numerous social- and human rights issues. They for example often employ underage children, do not provide their employees with satisfactory working conditions and do not pay fair wages. They are also often able to use environmentally damaging processes that would not be allowed in their home countries, for example by using dangerous chemicals, or by releasing runoffs into nature without making sure that it will not cause problems. Foreign (and domestic) companies are also often able to exploit natural resources without returning a fair resource rent to its rightful owners.

The seafood industry has been affected by this development in numerous ways. Processing has for example increasingly been moving to countries in Asia where labour costs are very low and fisheries inside EEZ of lesser-developed countries have become highlighted.

Icelandic seafood producers are bound by labour laws that insure that workers are treated fairly. Satisfactory working conditions, competent workforce and fair wages are therefore not an issue that could interfere with Icelandic seafood products becoming ecolabelled. There is however a disagreement on the fairness of how the resource has been distributed as smaller villages around the country have been severally hit by reduction in the quota and condensation in the industry (Haraldsson, 2001, The Resource Committee, 2000). These villages were built up around the fishing industry, often strategically located in regards to harbour conditions and closeness to fishing grounds. When the quota has been sold from these villages there are no other opportunities for work and people are forced to move. The ITQ system has therefore been responsible (partly at least) for a mass relocation of the population in the countryside, where people have had to leave their properties worthless.

Unfair original distribution of the quota and difficulties in establishing new entry into the industry has also raised concerns amongst stakeholders. The United Nations Human Rights Committee has even ruled that initial implementation of the system had been discriminating, as the fishing rights had been donated to a privileged group of stakeholders (CCPR, 2004). The question whether the industry is paying a fair resource rent for using a common property has also been raised (The Resource Committee, 2000).

The Friend of the Sea ecolabel does not incorporate social objectives into its standards. The MSC and KRAV do on the other hand address the issue in a very vague manner, where these issues are in general terms asked to be taken into account, but are in fact relatively open for interpretation. Social issues have never prevented fisheries from being certified by these labels. It is therefore unlikely that social issues could interfere with Icelandic seafood products getting ecolabelled, especially since the hierarchy of the standards assigns a much more importance on environmental objectives, which could be jeopardized if the Icelandic social dilemma would be corrected.

4.2.9. Other issues

There are numerous other issues that are relevant to environmental labelling of seafood products such as recycling, usage of renewable energy, waste management, use of chemicals, and various technological issues. These issues are however not assigned a high prorate in the grand scheme of things, but Iceland could nevertheless use them to its advantage by for example highlighting that they use renewable energy in their land-processing. Potentials for improvement are also considerable, as the Icelandic seafood industry could for example easily do better in waste management and use more recyclable packaging. The country is also very technologically advanced, which could present the industry with further opportunities in the future, such as hydrogen engines for their vessels.

This chapter has analysed Iceland's performance in various issues related to seafood environmental labelling. It has revealed that Icelandic fish stocks are in a variable condition, where some are at healthy levels while others are in a critical condition. The efficiency of the management system is debatable, but its main flaws in the past has been that TAC's have generally been decided too high and those TAC's have then in addition not been honoured, as overshooting of quotas has been quite common. This problem has been diminishing, but needs to be firmly addressed before the Icelandic industry can expect

to be eligible for certification. Bycatch, discards and IUU fisheries are not a problem in Icelandic waters, but benthic disturbance presumably is, as almost half of the catch (cod equivalent) is caught in bottom trawl or Danish seine, which can cause serious damages to the seabed. Fuel consumption differs considerably between target species, vessel type and fishing gear, as longliners for example use on average less than half the fuel that bottom trawlers use to catch each kilogram of fish. Environmental concerns regarding transportation of seafood products are mostly dependent on the mode of transportation, because air transport is not very environmentally friendly, but nevertheless the only available option to transport processed fresh fish out of the country. Social issues linked with the Icelandic ITQ system, such as fair allocation of quotas and appropriate resource rents, have been debated for a long time but are not likely to prevent Icelandic seafood products from being ecolabelled. Other issues, such as recycling, usage of renewable energy, waste management, use of chemicals, and various technological issues are also not likely to interfere with Icelandic seafood products being certified. It is therefore possible that Icelandic seafood products that are derived from stocks that are at healthy levels and caught in an environmentally preferable manner, such as longline, could attain an ecolabel. But where are those products going to be sold? That is going to be discussed in the next chapter.

5. Markets for Icelandic seafood

The objective of this chapter is to account for Iceland’s most important markets for seafood and to identify where opportunities lie for ecolabelled Icelandic seafood products. The UK market is going to be particularly focused on, because it is Iceland’s most important market area and a leader in the “sustainable seafood movement”. Spain, Germany, USA and Scandinavia are then also analysed, but not as thoroughly.

The chapter first accounts briefly for the global seafood market, with an emphasis on Europe, where the largest suppliers and consumers are identified, and environmental concerns reflected on. The UK seafood market is then analysed by identifying how the market is divided into sectors that are differently concerned about their sustainable seafood sourcing. Iceland’s place on the UK seafood market is then reflected on with the objective to establish how ecolabels could affect its seafood exports. Spain, Germany, USA and Scandinavia are then briefly accounted for with the same objective.

5.1. The global seafood market

The world’s total fish supply in 2005 was 141,6 million tons, of which 107 million tons were used for human consumption (FAO, 2007a). Wild capture fisheries accounted for 66% of the supply and aquaculture for 34%, but aquaculture is almost entirely responsible for increasing fish supplies in the past two decades as can be seen in figure 5-1.

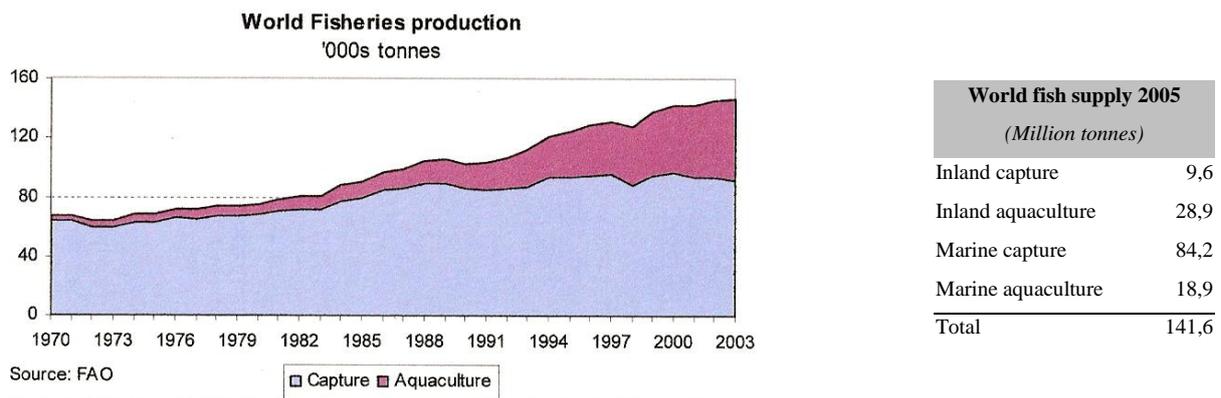


Figure 5-1: Global seafood supply since 1970
Global fish supply has doubled since 1970, mostly because of increased aquaculture
(Source: FAO, 2007)

China alone was responsible for more than 40% of global seafood supplies in 2005, with 18 million tons arriving from wild capture fisheries and 42 million tons from aquaculture (Glitnir, 2007). Other countries trail far behind, as can be seen in figure 5-2.

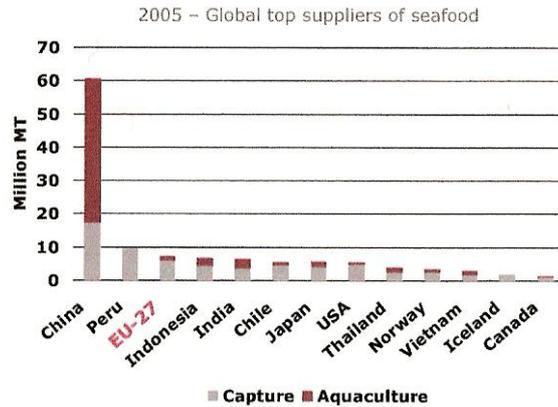


Figure 5-2: World's biggest supplying nations of seafood in 2005 (Source: Glitnir, 2007)

Global per capita seafood consumption in 2005 was 16,6 kg, but consumption differs considerably between countries (SCA, 2007b). China, Japan and USA were for example responsible for half of the global consumption and China alone accounted for one third, as can be seen in figure 5-3. China's per capita seafood consumption was close to 25 kg, whilst Americans consumed 21,3 kg on average and the Japanese consumed an impressive 65,6 kg per capita. Other individual countries barely registered as having an affect on total seafood consumption, as whole continents collectively only account for 10% of the global seafood consumption.

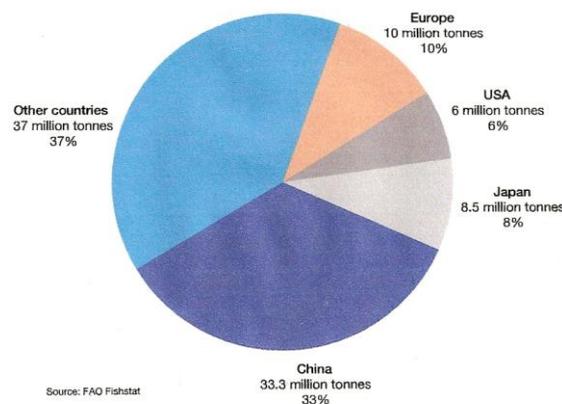


Figure 5-3: World's seafood consumption divided by countries (Source: SCA, 2007c)

The estimated first-hand value of global capture fisheries production in 2004 amounted to some 84,9 billion USD, representing a 3,6% growth from the year before (FAO, 2007a).

The international fish trade was at the same time estimated to be worth 71 billion USD. But the international seafood market is a diverse market where large portion of consumers only look at fish as a good and convenient source of protein, while others consider it to be a high quality delicacy.

Europeans consumed 10 million tons of seafood in 2005, representing a 26 kg average per capita consumption (Failler *et al.*, 2007). This consumption however varies a great deal between countries, depending on location, demography and culture. Figure 7-4 demonstrates how people living in southern Europe and in Scandinavia generally have a high per capita consumption, whilst people living in central Europe are closer to the European average, and people living in many countries in Eastern Europe hardly consume any seafood at all.

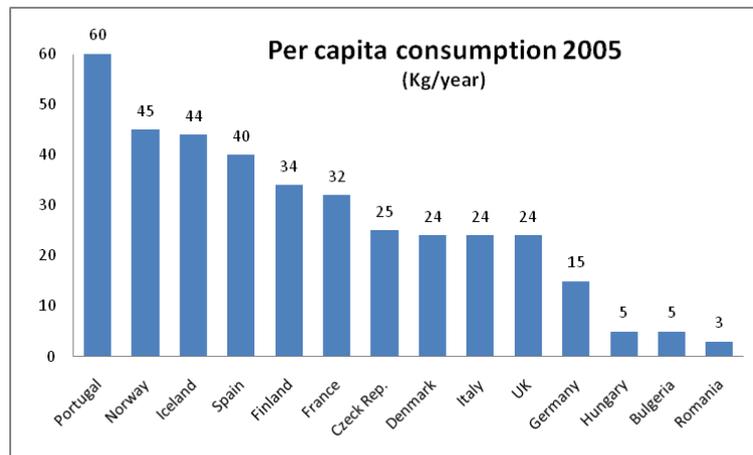


Figure 5-4: Seafood consumption in various European countries in 2005
(Source: Failler et al, 2007)

France is Europe’s largest seafood market, followed by Spain, Italy, UK and Germany, but these five countries account for 70% of EU’s seafood consumption, as can be seen in table 5-1 (Glitnir, 2007).

Table 5-1: Division of the EU seafood market by countries

EU-27 Seafood Market size in 2005 ('000 MT)*					
France	2,119	Sweden	255	Lithuania	61
Spain	1,786	Belgium	229	Hungary	50
Italy	1,453	Finland	180	Bulgaria	37
The UK	1,220	Denmark	127	Slovakia	33
Germany	1,193	Czech Republic	103	Cyprus	20
Portugal	603	Austria	90	Estonia	18
Netherlands	373	Latvia	85	Slovenia	14
Poland	332	Ireland	84	Malta	12
Greece	278	Romania	67	Luxembourg	10
Total EU-27 Market size					10,832

(Source: Glitnir, 2007)

Environmental concerns' regarding seafood consumption varies a great deal between the European countries, which explains why environmental marketing has developed faster in some countries than others. In general, countries located in Central Europe, UK and Scandinavia appear to be further along in the "sustainable seafood movement" than countries located in Eastern and Southern Europe. This might be explained by cultural differences rather than difference in interest, as studies have shown that people living in Southern Europe are just as concerned about the environmental condition of the oceans as people living in Northern Europe (SCA, 2005). These cultural differences are for example represented in different shopping habits, as majority of seafood consumers in Northern Europe buy their seafood in supermarkets, whilst people living in Southern Europe buy their seafood primarily in market stalls and from small retailers. But supermarkets are generally better suited to insist on sustainable seafood sourcing and have easier access to encourage responsible seafood consumption. The difference in availability of ecolabelled seafood products between Northern and Southern Europe confirms that countries in Northern Europe have come further along in the "sustainable seafood movement" (MSC 2008f; FOS, 2008c). UK retailers provide their consumers with the widest range of ecolabelled seafood, followed by German and Scandinavian retailers, but French retailers are for example not as efficient. Dutch retailers however recently took the lead in sustainable seafood sourcing when the Dutch Association of Food Retail, which is a consortium of 4.500 stores representing 99% of Dutch retailers, committed to selling only MSC- and GlobalGap-certified wild-caught and farmed fish by the year 2011 (Cherry, 2008).

Numerous market researches have been done in Europe on consumers demand for environmental information, their preference for environmentally friendly products and

their willingness to pay a premium for such products (OECD, 2002; SCA, 2005; Roheim *et al.* 2004). These researches give conflicting information, which in addition are not necessarily reliable since results at the retail level suggest that environmental criteria is often not reflected in actual consumer purchases. Even though consumers state in a survey that they would favour environmentally friendly products and would be willing to pay a premium for them, it does not necessarily mean that they will do so when faced with that decision in reality (Seafish, 2007a). It is for example interesting to contemplate that as much as 50% of consumers say they consider ethical factors when buying food, when only 5% of food products are in fact ethical (Edwards, 2008).

Some studies show that high portions of consumers are willing to pay a premium for environmentally friendly products (SCA, 2005; Donath, Wessells, Johnston & Asche, 2000; Wessels, Donathe & Johnston 1999). Other suggest that consumers are highly interested in environmental activism, but not prepared to pay for it out of their own pocket and/or rank other attributes higher in their order of priorities (Roheim & Donathe, 2003; Roheim *et al.* 2004, Jeffry *et al.* 2000). And some studies show that consumers in general are not really thinking about environmental issues when they buy seafood (Seafish, 2007a). These surveys are variable in scope and criteria, covering all sorts of environmental issues related to seafood sourcing, and do therefore return divergent results.

Seafood Choices Alliance released in April 2007 a market survey about the European marketplace for sustainable seafood (SCA, 2007b). Its main findings were that 85% of European consumers are concerned about the current state of the oceans, 79% feel that environmental considerations are more important than price or convenience, and 95% want more information about how to make sustainable seafood choices and how to avoid seafood that is harmful to the environment. But answers in a marketing research and actual purchasing behaviour are often quite different and that is why the “sustainable seafood movement” has had difficulties in many countries despite these claims.

United Kingdom has been a world leader in incorporating environmental thinking into seafood marketing. It is also Iceland’s biggest client; representing 25% of the countries total seafood exports value in 2006 (Ministry of Fisheries, 2006). It is therefore interesting to analyse the UK seafood market and Iceland’s place in it, in order to get a clearer picture of how environmental issues are affecting the market and to identify how ecolabelled Icelandic seafood products would be received. Spain is Iceland’s second largest seafood market, followed by USA and Germany. These countries have approached the

“sustainable seafood movement” in a different manner and are therefore also studied with the same objective. Finally, Scandinavians have been renowned for devoting a great deal of interest to environmental issues. The Scandinavian seafood market is therefore also studied from Iceland’s viewpoint.

5.2. United Kingdom

United Kingdom is Iceland’s most important market area for seafood and a world leader in incorporating environmental thinking into seafood purchasing decisions. The UK Seafood industry is a five billion-pound industry that is equally divided between the retail sector and the foodservice sector. The British seafood market is therefore going to be analysed by identifying how environmental awareness affects various sectors of the industry and assessing how ecolabels could affect the Icelandic seafood industry on the UK market.

5.2.1. Consumption

Each of the roughly 60 million residents of the UK consumed on average 24 kg of seafood in 2006, as four out of five households consumed seafood at least once a month and 39% of consumers had seafood at least twice a week as recommended by the Food Standard Agency (Seafish, 2007b). The UK seafood market in 2006 was estimated to be worth 5,2 billion GBP in total and had then steadily been increasing at the rate of 2-5% for the past few years, but the volume had been relatively stable, increasing at the rate of 0-1,5% per year (Seafish, 2007c). The UK consumer appears at to be rather conservative when it comes to seafood, as 10 the most popular species account for $\frac{3}{4}$ of the total value and four of the most popular account for roughly half of the total value i.e. cod, haddock, prawns and salmon (Seafish, 2007d). But there has been a definite shift in consumption within these top species for the past few years, as the conventional wild-caught cod, haddock and cold-water prawns have been losing market share over to farmed salmon and warm-water prawns. Species like sea bass, pollock, hake and squid have also been gaining ground, but the market share of halibut, monkfish, tuna and sole have diminished. This shift in consumer preferences is largely fuelled by changing demographics in fish purchase, which is being driven by the under 44-year old age group and particularly by the under 28-year age group (Seafish, 2007e). This is a major change in the market, which has traditionally been driven by consumers over the age of 45. Predictions into the future development in

age distribution amongst UK seafood consumers imply that this trend will continue as younger consumers increasingly think about healthy diets.

5.2.2. Markets

The five billion pound UK seafood market is broken into two almost equal parts when it comes to value, the foodservice sector and the retail sector. The volumes are however not equal, as 80% of seafood meals are consumed at home and only 20% out of home. This ratio is consistent with other food products and even greater than for poultry, beef, lamb and pork, as can be seen in figure 5-5 (Seafish, 2004a).

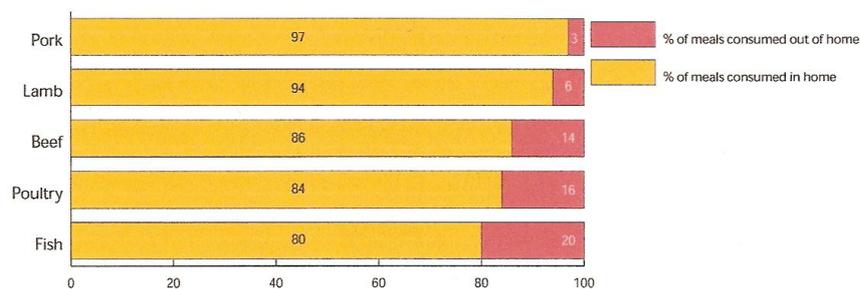


Figure 5-5: Proportion of meals consumed in- and out of home
(Source: Seafish 2004a)

The foodservice sector covers a range of outlets but can basically be broken into the restaurant sector, the fish and chips sector and the non-profit sector. The retail sector is divided between grocery stores and independent fishmongers. Following is an analysis on these sectors.

The foodservice sector

The UK foodservice sector is estimated to be worth about 30 billion GBP per year, as the value of the sector has continued to grow at the rate of 1-2% a year, whilst volumes have reduced by up to 5% between years (Seafish, 2007f). This basically means that less are eating out, but they are spending more. Seafood sold in the foodservice sector was in 2006 worth 2,8 billion GBP, representing 9,3% of the total value and 8% of the total volume in the sector. This was a 3% reduction in “out of home” seafood consumption from the year before, which was generated by the biggest consumer age group, 45-64 year-olds, but other age groups increased their “out of home” seafood consumption slightly at the same time. The 45-64 year-old age group accounted for 37% of the market in 2006, 17-34 year-olds for 20%, 35-44 for 25%, and 65+ for 13% (Seafish, 2007f).

The UK foodservice sector is generally broken into three sub-sectors; they are the restaurant sector, accounting for 43% of the value of seafood products sold in the sector; the fish and chips sector, accounting for 39% and the non-profit sector that accounts for 18% (Seafish, 2007g).

Restaurants

The restaurant sector sold 190 million meals of seafood in 2006, worth 1,2 billion GBP (Seafish, 2007g). The sector is diverse, as it covers everything from cafés and pubs to first class restaurants and hotels (Seafish, 2007f). Outlets that sell inexpensive and smaller portioned meals sell the most volume, measured in number of meals. Pubs and bars sold for example 30% of meals in the sector in 2006 and cafés 14%, whilst Hotels accounted for 8% and fish restaurants for 7%. Fresh salmon is the most popular seafood in pubs and cafés, but battered fish is preferred in more upscale outlets. Sustainable seafood sourcing has not been a major issue in the restaurant sector until now, but some of the “better” more expensive restaurants are now starting to put the MSC ecolabel on their menus (Intrafish, 2007b). Experience will however only tell if that is going to become a common practise.

Fish and chips shops

There are over 11.500 fish and chip shops all over the UK that in 2006 collectively sold more than 400 million meals and about 265 million portions thereof were fish and chips worth 1,1 billion GBP (Seafish, 2007h). Fish and chips shops have been increasing their share on the market, as their sales for example grew in volume by 8% in 2005 and by 4% in 2006. Fish and chips are more popular in the UK than hamburgers, pizzas and fried chickens, as one in every 100 “food-pounds” are being spent at a fish and chip shop. The average fish and chips consumer does not come from any particular socio-economic group, as consumers represent a healthy cross-section of society. Environmental concerns are not a priority in the fish and chips sector, as shopkeepers are generally more interested in choosing the least expensive option, especially since the final product does not have a consumer-facing label.

The non-profit sector

The “non profit” sector covers outlets such as school lunchrooms, hospitals and workplace cantinas. It accounted for 60 million meals in 2006 worth 500 million GBP (Seafish, 2007f). The sector has been increasing its share in recent years, as authorities attempt to

comply with the recommendations of the Food Standard Agency, which include consuming seafood twice a week. The sector grew for example by 15% in volume between 2005 and 2006. The non-profit sector is run on a tight budget that generally does not make room for sustainable seafood sourcing.

The retail sector

The four hundred thousand ton 2,4 billion pound UK retail market for seafood is mostly controlled by a handful of retail chains, as consumers primarily buy their seafood along with other groceries (Seafish, 2007c). Consolidation and optimisation in the grocery market has created gigantic retail chains that have transformed the market in a relatively short time, were the largest chain now accounts for almost one third of the grocery market and the six largest control three quarters of the market. Grocery stores accounted for 90% of seafood sales in retail in 2006, whilst independent fishmongers had a 10% market share.

The retail market for seafood is often broken into three main categories, which are chilled, frozen and canned. The chilled part of the U.K. retail market in 2006 represented 54% of the value and 37% of the volume, whilst frozen products accounted for 30% of the value and 37% of the volume, and canned seafood accounted for 15% of the value and 27% of the volume, as can be seen in table 5-2 (Seafish, 2007i).

Table 5-2: Ratio of chilled, frozen and canned seafood in the UK retail market

	<u>Value/£000s</u>			<u>Volume/tonnes</u>		
	2005*	2006*	Change	2005*	2006*	Change
Chilled	1.222.109	1.265.413	4%	155.633	149.491	-4%
Frozen	698.916	729.300	4%	145.974	146.483	0%
Canned	368.218	366.979	0%	111.659	109.762	-2%
<u>Total market</u>	<u>2.289.243</u>	<u>2.361.692</u>	<u>3%</u>	<u>413.266</u>	<u>405.736</u>	<u>-2%</u>

*2005 represents May 2005 - April 2006. 2006 represents May 2006 - April 2007

(Source: Seafish, 2007k)

Salmon is the most popular species on the UK retail market, with over a 40 thousand ton yearly consumption worth almost 500 million GBP, which is 20% of the total value of seafood products in retail (Seafish, 2007d). Cod, haddock and prawns are also very popular, as can be seen in table 5-3, but other species trail far behind, as these four species account for roughly 60% of the total value in seafood retail.

Table 5-3: Top ten species in UK retail

Top species in retail (value/£ millions)	2005* 2006* 2007*		
	2005*	2006*	2007*
Salmon	400	455	483
Cod	358	367	374
Haddock	191	193	201
Cold water prawns	183	193	186
Warm water prawns	99	130	166
Other	89	82	98
Mackerel	47	63	66
Tuna	43	48	48
Trout	44	42	43
Plaice	35	33	34

* 52 weeks (Des-Nov)

(Source: Seafish, 2007f)

Salmon has consistently increased its market share by 6-10% in value for the past few years (Seafish, 2007j). The increase is largely fuelled by younger consumers, which to favour salmon over conventional wild-caught fish like cod and haddock (Seafish, 2007e). About half of the salmon sold in retail in 2006 was chilled “natural”, 20% frozen, 20% was used in added value such as “ready meals” and breaded or coated portions and 10% was smoked (Seafish, 2007l).

Cod used to be UK’s favourite fish, but the volume sold in retail has consistently gone down in recent years, due to scarce supply (Seafish, 2007k). Domestic catch is small and the Brits do therefore have to import almost all of their cod; mainly from Icelandic, Faroese and Russian sources. Over 90% of the UK’s cod supply is imported from these three countries. Despite the diminishing supply, total value has remained relatively the same and even slightly increased as prices have continued to rise. About 75% of all cod sold in retail is frozen, half of which is breaded, 20% battered, 16% natural and the rest is in added value meals. The 25% that is sold chilled is generally sold natural.

Over 35 thousand tonnes of haddock are sold in the UK retail market every year, making it Britain’s third most popular fish species (Seafish, 2007l). Volumes have been decreasing in recent years, as some of UK’s biggest suppliers have had to reduce their catches, but almost 80% of UK’s haddock supply is imported from Iceland, the Faroe Islands, Norway and China. The total value has however remained the same, as prices have continued to rise. Similar volumes of fresh and frozen haddock are sold on the UK retail market, but fresh haddock accounts for 60% of the value. Roughly 25% of the haddock sold in retail is breaded, 20% smoked, 20% is natural, 20% is battered and the rest is used in added value such as “ready meals”.

Cold water prawns have been popular in the UK for a long time, staying in fourth place as Britain's favourite seafood, with a stable volume around 20 thousand tons and worth almost 200 million pounds a year (Seafish, 2007m). These prawns are wild-caught in the North Atlantic and mostly sold frozen in retail stores. But the cold water prawns have recently received some competition, as warm water prawns have increased their market share significantly in a very short time and have by now almost reached the cold water prawns both in volume and value. These prawns are generally farmed in tropical countries and sold in similar fashion as their cold water relative (Seafish, 2004c).

Grocery stores accounted for 90% of seafood retail sales in the UK in 2006, whilst independent fishmongers had a 10% market share (Seafish, 2007c). Following is an overview of these two sectors.

Grocery stores

Roughly 2,2 billion pounds worth of seafood were sold in U.K. grocery stores in 2006, half of which were chilled, one third frozen and the rest canned (Seafish, 2007g). There are just a handful of retail chains that basically control the entire retail sector, as six of the largest chains control three quarters of the market, with the largest one having almost 30% market share (Seafish, 2007n). These retail chains have different market strategies, as they have differentiated themselves on the market. ASDA for example focuses on low prices; Tesco is also concerned about low prices but focus more on value for money; and Marks&Spenser is mainly concerned about quality. The retail chains that have situated themselves at the high-end of the market generally appear to have higher proportion of their sales generated from seafood, as can be seen in figure 5-6.

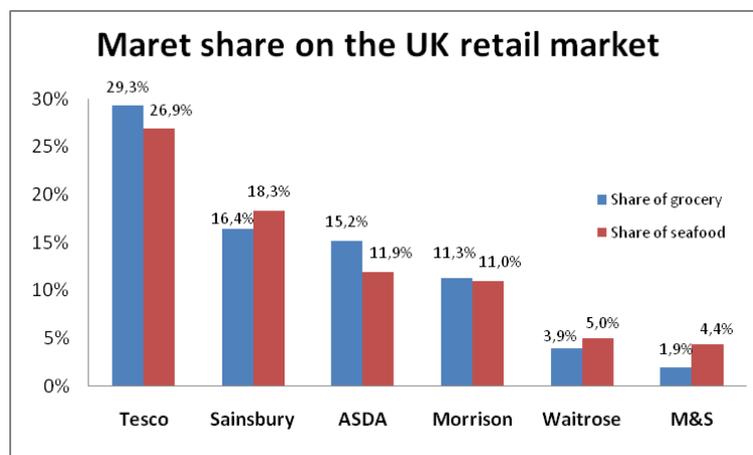


Figure 5-6: Market share of the six largest retail chains in the UK
(Source: Seafish, 2007n)

This difference becomes even more apparent when the ratio of fresh and frozen seafood is examined, as demonstrated in figure 5-7. Fresh seafood is generally more expensive than frozen and it is therefore only natural that the ratio of fresh seafood in sales becomes higher as the retailer specializes more on the high end of the market, and vice versa.

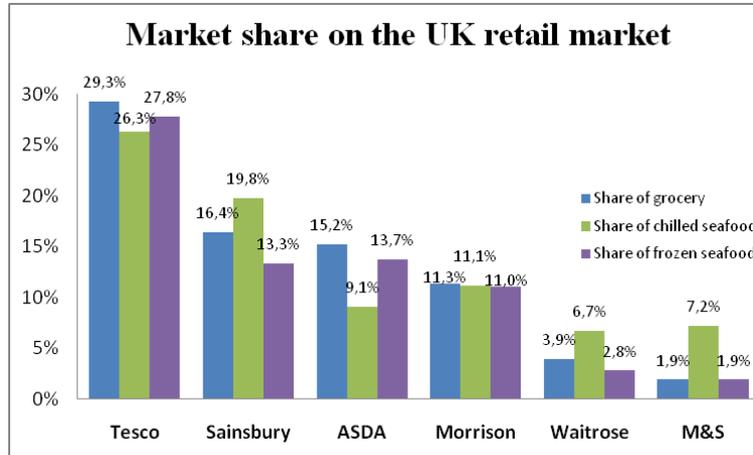


Figure 5-7: Market share of the six largest retail chains in the UK in chilled- and frozen seafood (Source: Seafish, 2007n)

The largest retail chains have all increased their environmental awareness when it comes to seafood sourcing in recent years (Greenpeace, 2006). The success however differs considerably, as chains like M&S, Waitrose and Sainsbury’s have taken the lead, while others have struggled or even gotten left behind. Following is a short overview of the largest retail chains and how they have chosen to source their seafood:



Tesco is by far the largest player on the UK retail market with control over almost 30% of the total market (Tesco, 2007). It has a 26,9% market share in retail of seafood in grocery stores, but that still only accounts for about 2% of the company’s total sales. Seachill in Grimsby, which is a part of Icelandic Group Plc., supplies the bulk of Tesco’s fresh fish, and has been active in the development of Tesco’s sustainable seafood policies (Greenpeace, 2006). Each species is passed through a simple fish sourcing decision tree to decide firstly if it is commercially viable, and then to determine a sustainability rating for each of the various fisheries from which Tesco might source it. Tesco claims to insist on fishing methods and gear that minimise harm to non-target species and juvenile fish. Their fresh and pre-packed lines of cod and haddock are sourced mainly from Iceland and Norway. Tesco prefers line-fishing to trawling, but due to instability in supply, caused by quota restrictions and adverse weather conditions, about 30% of its cod and haddock is still trawled.

Seafood labels in Tesco stores generally only provide details required by UK labelling laws, not giving any information on the environmental impact of the product. Tesco does however offer a limited selection of ecolabelled seafood certified by MSC and Friend of the Sea (MSC, 2008f; FOS, 2008c). They also recently started to label their products with CO2 markings and have declared that all of its products will be labelled with their carbon footprint in the future (BBC, 2007).

Sainsbury's Sainsbury's is UK's second largest grocer with a 16,4% market share (Sainsbury, 2007). It pledged in March 2003 that all its wild fish would be sourced from sustainable fisheries by 2010, but it has been unable to achieve the interim levels required to meet this goal. Sainsbury's attributes this partly to the fact that so few fisheries have been certified to MSC standard and partly to the difficulty of changing the buying habits of consumers.

Sainsbury's has a particularly large market share in chilled seafood, which is primarily sourced through national suppliers such as Young's Bluecrest and New England Seafood, but cod and haddock sold in Sainsbury's fish counters are sourced from Icelandic waters (Greenpeace, 2006). The company is planning to move the fresh range to 100% line-caught, but that might be difficult since supply of line caught cod and haddock can be insecure, especially because they need a steady supply of 10 thousand tons a year (Stromsta & Evans, 2007). Sainsbury's other ranges still include cod from other less sustainable European stocks. Sainsbury's currently offers a wide variety of MSC certified seafood in their stores and also a few products certified by FOS (MSC, 2008f; FOS, 2008c).

ASDA Britain's third largest retail chain, with a 15,2% market share, is ASDA, which is the UK branch of the Wal-Mart family, the world's largest retailer chain and the largest private employer in the world (ASDA, 2007). ASDA focuses on low prices but has nevertheless made a series of commitments to sustainable seafood sourcing (Greenpeace, 2006). It for example de-listed North Sea cod from their stores in 2006. Young's Bluecrest supplies the majority of ASDA's seafood, but cod is sourced from Iceland, Norway, the Baltic and Russia.

In January 2006, Wal-Mart pledged that within three years, all its fresh and frozen wild-caught fish would be sourced from MSC-certified fisheries. ASDA followed its parent company in March with a similar commitment to source all its fresh wild-caught fish from

MSC-certified fisheries within three to five years. The MSC is advising ASDA on its sourcing to ensure this objective can be achieved. ASDA already has a good selection of MSC certified seafood, available for their customers (MSC, 2008f).

 **MORRISONS** Morrisons is UK's fourth-largest supermarket chain with a 11,3% market share (Morrison, 2007). Its fresh fish is primarily sourced directly from a small number of UK-based processors and specialist suppliers, which buy fish from markets that are supplied directly by UK boats (Greenpeace, 2006). Major suppliers include Young's Bluecrest and New England Seafood, but their fresh and pre-packed cod is all line-caught from Icelandic waters. The majority of haddock is also sourced from Iceland, of which 85% is line-caught and the remainder is caught in Danish seine. Morrisons offers limited range of MSC certified seafood in their stores and no Friend of the Sea certified products (MSC, 2008f; FOS, 2008c). The retailer intends soon to launch an improved labelling system for all wild-caught fish on all fish counters and on pre-packed chilled seafood. The labels will show the species common and scientific name, the method of capture, and the precise region where caught, as well as the broader FAO region (Greenpeace, 2006).

Waitrose Waitrose is UK's fifth largest retail chain and is targeted at a middle class market, emphasising on quality food and customer service rather than low prices. It has a 3,9% share of the food market, but is especially strong in organic food, where they account for 15% of the market (Wikipedia, 2008b). The company has also promoted ethical and fair trade issues and has managed to build an image around those issues. Waitrose has been a leader promoting only sustainable seafood in its stores and it is the supermarket's policy to source all its fish from well-managed fisheries using responsible fishing methods (Greenpeace, 2006). Full traceability from catch to consumer is of vital importance, which forms part of their conditions of supply, as all suppliers must demonstrate a full traceability if they want to stay in business with Waitrose. Sealord and New England Seafood are Waitrose's main suppliers, but cod and haddock are however solely line caught sourced from Icelandic waters.

Waitrose offers a diverse range of MSC certified seafood in its stores, and their other seafood products are whenever possible labelled with information that exceeds UK seafood labelling laws. For example in cases where the seafood is from a single source, fish counter labels tend to show details of country or region of catch and the fishing method

used, for example line-caught Icelandic cod or rope-grown Scottish mussels (Greenpeace, 2006).



Marks & Spencer is Britain's sixth largest retail chain, with a 1.9% market share; targeting middle class consumers, offering quality products and diverse product range, which is equally divided between clothing and groceries (M&S, 2007). M&S have always been particularly environmentally conscious, which can clearly be seen in their seafood sourcing strategy (Greenpeace, 2006). All seafood must for example be traceable back to the vessel that caught it, in order to authenticate that it was caught in a sustainable manner. That is why M&S does for example not sell seafood that has been shipped to China for reprocessing before being returned to Europe. M&S's main seafood supplier is Coldwater Seafood in Grimsby, which is owned by Icelandic Group. Coldwater is a global sourcing company that is able to supply its customers with seafood from all over the world and is therefore in a position to select the environmentally best alternative for each species. M&S's chilled cod and haddock is for example solely line-caught in Icelandic waters, and the plan is to source their entire cod and haddock range from line-fishing in the future. M&S recently announced that by 2012 it would sell only ecolabelled seafood certified by the MSC or other independently certified sources (Evans, 2007b). M&S does not offer a very diverse selection of MSC or Friend of the Sea certified products, which is mainly caused by the fact that M&S almost solely sells its own brand of seafood. It instead labels its seafood with more extensive information than is generally practiced in the UK, including information on catch location and fishing method. M&S has also recently introduced photographs and short biographies of individual suppliers to its labels. For example, labels reveal that the fresh uncoated haddock is supplied by Ólafur Björnsson, and is line-caught in Icelandic waters (Greenpeace, 2006).



UK's seventh largest retail chain is the Co-operative Group, which is a consumers' co-operative that makes up the world's largest consumer-owned business (Co-Op, 2007). It is an umbrella for a diverse collection of stores, which many are located in communities not served by other retailers. Co-op stores are mainly small community-based outlets that have limited opportunities to offer a diverse range of seafood, fresh fish counters are for example only located within a relatively limited number of the larger stores. The majority of the seafood sold by the Co-op is pre-

packed chilled seafood from Young's Bluecrest, and own-label frozen products (Greenpeace, 2006).

The Co-op recognises the decline in stocks of cod and haddock, and is therefore increasingly sourcing these species from the relatively sustainably managed Icelandic waters. The remaining supply is from Norwegian or Faroese waters. The Co-op has been selling MSC certified seafood since 1998 and stocks a diverse range of their products (MSC, 2008f).

 Somersetfield is a chain of small to medium-sized supermarkets operating solely in the UK that have marketed themselves as Britain's favourite local grocery shop (Somersetfield, 2006). The majority of Somersetfield's seafood supply is fresh from local day-boats based in southwest England (Greenpeace, 2006). It is the company's intention that all own-label wild fish be sourced from managed fisheries, de-listing the most unsustainable species, but further explanations on the implementation of that plan is missing. Somersetfield's fresh and own-brand seafood is only labelled according to UK seafood labelling laws and other suppliers are not asked to label their products any differently. They offer a very limited range of certified seafood, due to bad experience in the past. The company did on two separate occasions try to promote and sell MSC certified New Zealand hoki, but discontinued both lines as they were not selling. Somersetfield is not planning to develop a more comprehensive sustainable seafood policy, and indeed considers itself too small a player in the grocery market to lead on sustainable seafood procurement. Greenpeace has on numerous occasions expressed its frustration on how uninterested Somersetfield is in developing a more comprehensive sustainable seafood procurement policy (Greenpeace, 2006).

 Iceland is a privately owned retail chain that specialises in frozen food. It offers a very limited range of seafood, but sells more volume of frozen seafood than each of the other supermarkets, except Tesco (Greenpeace, 2006). These sales are primarily of popular and unsustainable stocks, and it only offers a single MSC labeled product (MSC, 2008f). Greenpeace has on occasion's ranked Iceland as the worst seafood retailer in the UK.

These nine retail chains account for almost the entire seafood sales in the UK grocery market. Independent retailers and smaller retail chains such as Lidl, Aldi and Farmfoods

have a very small market-share in the market for seafood in the UK, and are therefore not very important when examining the sustainable seafood market.

Greenpeace published a report in 2005 where they ranked these nine retail chains according to their performance regarding their sustainable seafood procurement (Greenpeace, 2005), and then followed it up a year later with a similar report (Greenpeace, 2006). Only two retailers, M&S and Waitrose, scored high in the earlier report and six retailers got a fail-grade. A year later five of these retailers scored a considerably higher as can be seen in figure 5-8. The same two retailers were still highest, but Sainsbury's, Co-op, ASDA, Morrisons and Tesco had all improved. Somerfield and Iceland are though still on the bottom, as they had done very little to improve their seafood sourcing.

Ranking of the sustainability of supermarkets' seafood

Supermarket	Sustainability of wild-caught seafood	Sustainability of farmed seafood	General issues*	Rank and grade 2006	Rank and grade 2005
M&S	A	A	A	1	1
Waitrose	A	A	B	2	2
Sainsbury's	B	B	B	3	3
Co-op	C	B	C	4	4
ASDA	C	D	C	5	9
Morrisons	C	D	C	5	8
Tesco	C	D	C	5	6
Somerfield	D	D	D	8	5
Iceland	E	E	E	9	7

*General issues: the brands and ranges of seafood covered by seafood procurement policies; transparency of policies and their implementation; and promotion of sustainable seafood.

● excellent ● good ● pass ● fail

Figure 5-8: UK retailers ranked according to sustainable seafood sourcing
Greenpeace's sustainable seafood sourcing ranking of the nine largest retail chains in UK
(Source: Greenpeace, 2006)

When examining the seafood procurement strategy of these retail chains it becomes apparent that Icelandic line-caught cod and haddock are very often sourced as the best available option for those species. That shows that Iceland is regarded as an environmentally responsible source for seafood and also highlights that retailers are favouring line-caught fish to bottom trawled. A number of these retailers have committed to sourcing solely ecolabelled seafood in the future and ASDA is even more specific, as it plans to only offer MSC certified seafood by the year 2011. Some of these retailers have also broadened the scope of their seafood procurement policy by incorporating issues such as CO₂ emissions.

Independent fishmongers

The independent fishmonger is a diverse group of seafood outlets that primarily sell seafood (Seafish, 2005a). These are highly trained professionals specialised in handling seafood. This is an old-rooted industry in the U.K. that primarily supplies its customers

with fresh fish, which they buy directly from the fisherman through an auction market. Their market share has declined slightly in recent years, as their sales values have remained stagnant despite of the growth in the seafood retail sector. Independent fishmongers accounted for 10% of the value of seafood in the UK retail market in 2006, but that amount is almost solely derived from fresh fish, as these outlets rarely offer frozen products.

Independent fishmonger outlets can basically be broken into four main groups, which are fishmongers' shops, permanent markets, transient markets and fish vans. Fishmongers' shops are dominant in this sector with an 80% market share, but they usually provide the best service and the highest prices (Seafish, 2005a). Market stalls, whether permanent or transient, are competing on a different level where prices are more important than quality. People generally shop in these stalls in order to make a bargain, but these stalls are often badly equipped to store fresh fish. These outlets account for 13% of the independent fishmonger sector. The fish vans provide a unique service, as they generally set up their business in locations that are convenient for their customers. These vans are custom built to store and transport fresh seafood long distances. The owners of these vans buy their fish in auction markets and then transport it to locations where seafood supply is scarce. Fish sold in these vans are usually very fresh and of the highest quality. Consequently, prices are also quite high.

The independent fishmonger sector is not very environmentally driven, caused by the fact that the fish is entirely sourced locally and generally not labelled, since it is sold across a counter.

The major players on the UK seafood market have now been introduced and their seafood sourcing strategy's analysed. It is apparent that environmental concerns are primarily affecting the retail grocery stores and possibly also some of the more expensive restaurants, other outlets appear to be relatively untouched by the "sustainable seafood movement". This brings us to the consumer, as his role in creating a demand for ecolabelled seafood is necessary if the concept is supposed to work. Do British consumers take the environmental impact of their seafood products into account when buying fish? And if so, to what extent?

5.2.3. Environmental concerns

Studies amongst regular UK seafood consumers on their seafood sourcing habits and how environmental concerns influence their preference return a divergent results. They show that when asked specifically about environmental issues they appear generally concerned about environmental conditions of the oceans (SCA, 2007c). Half of them even express their willingness to pay a 5-10% premium for sustainably harvested seafood and a quarter is prepared to pay even more. But when asked in other studies about what factors they take into account when buying seafood, environmental issues score very low, as only 10% of British consumers identify environmental issues as a factor in their seafood procurement (Seafish, 2007a). The main seafood purchase decision criteria are appearance, freshness, price and value for money, which more than half of consumers state as an important factor, but less than 10% mention environmental factors like country of origin and fishing method (Seafish, 2005bc).

There is a big difference between purchase decision criteria for fresh and frozen seafood, as can be seen in figure 5-9. Appearance, professional advice and environmental concerns are much more important for consumers when buying chilled seafood, but value for money, special offers and brand recognition are more decisive factors when buying frozen seafood.

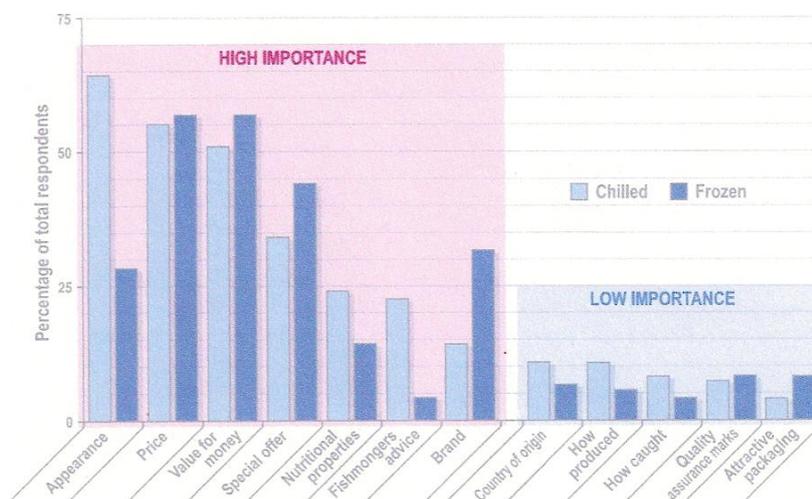


Figure 5-9: UK seafood purchase decision criteria
(Source: Seafish, 2005b)

The chilled seafood sector appears to involve a more emotionally driven mind-set and a less structured decision process, with the decision often being made at the point of purchase. The frozen seafood sector however is characterised by a strong tendency for repeat purchasing, with a narrow sphere of product consideration (Seafish, 2005b).

Polls and surveys are only able to give an indication on how consumers will act when faced with purchasing decisions in reality. Surveys that show the highest concern for environmental factors amongst regular consumers and a decisive willingness to pay a premium for environmentally friendly seafood are generally tainted by the fact that the questions are leading the respondents towards more sustainable thinking. It is only logical to expect a high level of concerns for the environmental impact from fishing when the questioner has beforehand made the respondent aware of the problem. A report published by SCA in 2005 highlights this dilemma, as it indicated that 80% of UK consumers considered environmental factors to be more important than price (SCA, 2005). This conclusion is however questionable, as respondents had before answering that question been asked a set of questions that focused on environmental conditions of the oceans and sustainable seafood issues, which could have influenced their response.

Surveys that simply ask what attributes consumers look for when buying seafood, without any preamble or introduction, do probably give the most reliable information on consumer behaviour when faced with the real purchase decision. Such surveys show that only one out of 10 think about environmental issues when buying seafood (Seafish, 2007a). It is therefore questionable to claim that UK consumers are primarily fuelling the increasing attention that environmental issues are having on the UK seafood market. That credit should rather be awarded to retailers and environmental NGOs according to Mr. Þórarinnsson (2007), as they have primarily motivated various players in the supply chain to produce more environmentally friendly seafood. NGOs like Greenpeace have successively “pressured” the largest retail chains to revise their seafood sourcing and urged them to implement sustainable seafood procurement policies (Greenpeace, 2005; Greenpeace, 2006). The next step for these NGOs will probably be to lobby in similar way a more sustainable seafood sourcing for restaurants and other companies in the food service sector, since it is their believe that consumers will buy sustainable seafood if it is available (Intrafish, 2007a).

5.2.4. UK and Iceland

UK is by far the most important market for Icelandic seafood products, generating for example 25% of the total seafood export value in 2006, which was more than double the value of seafood exported to Spain that same year, Iceland’s second most important market (Statistics Iceland, 2008a). In 2006 Iceland exported 110 thousand tons of seafood to the UK worth roughly 31 billion IKR. The bulk of that value came from cod, haddock and

shrimp, as these three species accounted for more than 80% of the total value, as can be seen in figure 5-10.

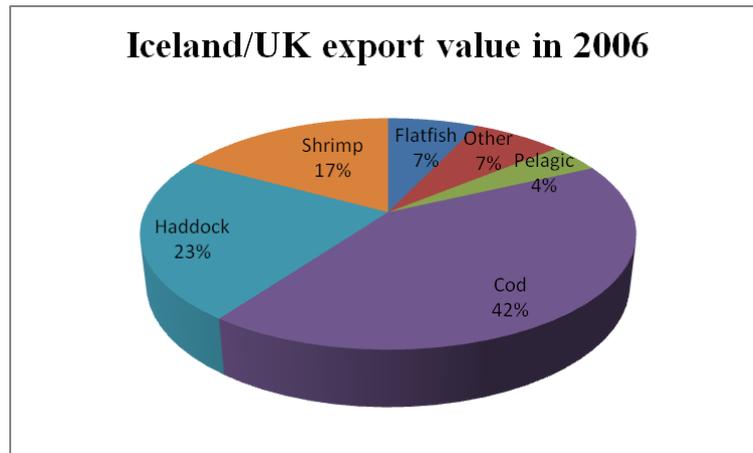


Figure 5-10: The value of Icelandic seafood exports to the UK in 2006
Value of Icelandic seafood exports into the UK is mostly generated by cod, haddock and shrimp, but other species trail far behind
(Source: Statistics Iceland, 2008a)

Cod

Cod is the most valuable species, with similar volumes as the haddock, but double its value (Statistics Iceland, 2008b). The cod that is exported to UK is divided into four main categories, as 36% of the value comes from fillets frozen at sea, 30% from chilled fillets exported by air cargo, 18% from fillets frozen in land based processing plants and 12% from chilled whole fish exported in containers. The land-frozen fillets and the “container fish” have had a stable market share for the past few years, but the chilled “air cargo fillets” have gained market share on the account of the frozen at sea fillets.

Iceland is UK’s main supplier of cod, accounting for 21% of cod imports in 2006, as can be seen in table 5-4 (Seafish, 2007p).

Table 5-4: Import of cod to UK by country of despatch in 2006

	Tonnes	%	£ 000	%	£/kg
Iceland	28.829	21%	122.926	28%	4,26
Denmark	23.215	17%	77.602	17%	3,34
China	23.594	17%	59.942	14%	2,54
Russia	17.682	13%	45.845	10%	2,59
Faroe islands	9.608	7%	30.804	7%	3,21
Other	42.559	31%	137.329	31%	3,23
	135.879	100%	443.644	100%	3,26

Source: Seafish, 2007q

Iceland exceeds its main competitors in volumes, total values and average values. It is for example interesting to see that Icelandic cod is on average 30% more valuable per kg than cod from Denmark and the Faroe Islands, which is difficult to explain. Russian and

Chinese cod collects relatively lower prices because it consists almost entirely of frozen products, which are generally not as valuable as fresh products.

Haddock

The Icelandic haddock is in greater volumes exported chilled compared to the cod, which can largely be explained by a high portion of haddock being exported whole in containers to Humberside auction markets. This “container fish” accounted for 34% of the value in 2006 and had then been stable around that percentage for many years (Statistics Iceland, 2008b). Chilled haddock fillets transported by air freight have been increasing its market share for the past few years and accounted for 25% of the total value in 2006, compared to 10% in 1999. The increased market share of chilled fillets has mainly been on the account of land-frozen fillets, which were in 2006 down to 14% from 24% in 1999. Fillets frozen at sea have kept its 25% market share since 1999.

Iceland is UK’s main supplier of haddock, accounting for 40% of the imports in 2006, as can be seen in table 5-5 (Seafish, 2007p).

Table 5-5: Import of haddock to UK by country of despatch in 2006

	Tonnes	%	£ 000	%	£/kg
Iceland	26.134	40%	68.145	44%	2,61
Faroe islands	11.438	17%	24.482	16%	2,14
Norway	8.338	13%	21.314	14%	2,56
China	6.108	9%	11.643	7%	1,91
Russia	5.901	9%	10.512	7%	1,78
Other	7.547	12%	19.881	13%	2,63
	65.466	100%	155.977	100%	2,38

Source: Seafish, 2007p

Other suppliers trail far behind in volume and total value, but Norwegian haddock collects a similar average price as the Icelandic haddock. The Faroese haddock however collects almost 20% lower average prices than the Icelandic haddock, which is difficult to explain. Chinese and Russian haddock consists entirely of frozen products, and is therefore not as valuable.

Shrimp

The Icelandic shrimp, which is usually defined in the UK as a coldwater prawn, is solely exported frozen. Iceland is one of the largest importers of coldwater prawns into the UK market, with a 20% market share, but other important suppliers are Greenland, Denmark and the Faroe Islands (Seafish, 2007d; Statistics Iceland, 2008b). Market conditions have been unfavourable for the past few years, which is partly due to rising imports of

competing warm water-prawns. Iceland has therefore reduced its shrimp export to the UK from 22 thousand tons in 2003 down to 14 thousand in 2006 (Statistics Iceland, 2008b).

Other species are not very important considering their value, as can be seen in table 5-6. The flatfish species that are represented collectively in the table are mainly plaice, sole and halibut; and the pelagic species are mostly exported in the form of fishmeal or fish oil to the UK.

Table 5-6: Icelandic seafood exports to UK in 2006

	Value (mill. IKR)	Volume (tons)	Average price (IKR/kg)
Cod	13.059	28.092	465
Haddock	7.063	27.662	255
Shrimp	5.395	14.329	377
Flatfish	2.102	6.029	349
Pelagic	1.340	21.399	63
Redfish	601	3.380	178
Monk	390	1.342	291
Catfish	252	1.833	137
Pollock	229	1.209	189
Other	712	3.011	236
	31.148	108.286	288

Source: Seafish, 2007q

The supply of Icelandic seafood into the UK market is not just important for the Icelandic exporters. British importers also rely heavily on it, as Iceland for example accounted for 20% of the volume and 33% of the value of UK seafood imports in 2006 (Seafish, 2007p). Iceland's ratio in imported fresh fish is especially noteworthy, as it accounts for almost half of the value in the category. Iceland's supply has been relatively stable from year to year, compared to its main competitors on the market, which are the Faroe Islands, Denmark and Norway in fresh fish; and Russia, Denmark, Norway and China in frozen products. The most noteworthy development in the market over the past few years is the arrival of China on the market, as they have increased their market share in volume of frozen seafood from 6% in 2002 to 17% in 2006 (Seafish, 2004b; Seafish, 2007p). China's increasing market share is likely to continue, as they are able to supply the market with much cheaper seafood than other suppliers, which is explained by low labour costs and expanding low-cost aquaculture.

5.2.5. *Summation*

It is evident that Iceland and UK depend heavily upon one another regarding exports and imports of seafood. It is also quite clear that volumes of fresh or chilled seafood from Iceland have been increasing on the account of frozen ones. It is highly likely that this development will continue, as Asian producers using cheap labour and aquaculture whitefish will be able to supply the UK market with frozen products at prizes that Icelandic producers are unable to compete with.

Environmental issues are likely to become even more relevant on the UK market in the future, and environmental labelling is probably going to play an important roll in that development. Britain is already in the forefront of the “sustainable seafood movement”, as the largest retail chains take environmental issues seriously into account in their seafood procurement. It is therefore almost certain that large retail chains such as Waitrose, M&S and Sainsbury’s would favour environmentally labelled seafood from Iceland, if it were available. Other outlets, besides grocery stores, have not been as demanding in their seafood sourcing, but that is likely to change in the nearest future as environmental NGOs, such as Greenpeace, have announced that they are going to start a campaign to encourage outlets in the foodservice sector to favour ecolabelled seafood (Aldred, 2008). It is therefore very likely that demand for Icelandic ecolabelled seafood from the foodservice sector could be quite substantial in the future, especially in outlets where the consumer is faced with a product label and is able to choose between different alternatives. This particularly applies to the more expensive restaurants that are already starting to incorporate ecolabels into their menus; but is probably not going to matter in sectors where consumers are oblivious to the origin the fish they consume, as is typically the case in fish and chips shops, school- and company canteens, and most fast food outlets.

5.3. *Spain*

Spain is Iceland’s second most important seafood market, representing 12% of Iceland’s seafood export values in 2006 (Statistics Iceland, 2008b). The Spanish market is therefore going to be reviewed with the objective to identify Iceland’s place on the market and to assess how ecolabels could impact their interests.

5.3.1. Consumption

Spaniards are one of the world's biggest fish consumers, with an average seafood consumption of 40 kg per capita a year (Failler *et al.*, 2007). That makes Spain the second largest marketplace for Seafood in Europe; with a total volume of 1,8 million tons consumed every year (Glitnir, 2007). Like other southern European countries they enjoy a diverse selection of seafood, contrary to people living in northern Europe, which are not as open minded in their seafood sourcing, usually always sticking to the same three or four species (SCA, 2007b). Spaniards spend on average 15% of their grocery budget on seafood, ranking second to meat on their list of groceries (Jensen, 2006). Fish consumption is widespread in Spain and not as restricted to certain age groups, areas or consumer habits as in most other countries. The whole family enjoys seafood regardless of age or social standing and it is just as well consumed at home as when dining out. It is also interesting that seafood consumption is not just restricted to areas close to the sea; in fact the second largest seafood market in the world, next to the Tokyo market, is the MercaMadrid market in Madrid that is located hundreds of km from the nearest ocean.

Spain is EU's largest seafood producer, with almost 1.100 thousand tons produced in 2005, where little over 900 thousand tons came from wild capture and almost 300 thousand tons from aquaculture (Glitnir, 2007). Spain is nevertheless far from being self-sufficient with their seafood supply and do therefore need to import 30% of the seafood they consume (Jensen, 2006), which makes them the world's third largest importer of seafood after Japan and USA. China is however likely to surpass them soon (FAO, 2007b).

5.3.2. Markets and environmental concerns

Studies show that Spaniards are worried about the condition of the ocean, where 92% of respondents say they are either "quite concerned" or "very concerned" about the environmental condition of the oceans (SCA, 2007c). They have however not incorporated that into their buying habits and do not appear to think much about sustainability issues when they purchase seafood. Ecolabels like MSC and Friend of the Sea have not created much attention and are rarely seen in Spanish stores. There are for example no MSC certified fisheries (MSC, 2008g) or certified suppliers (MSC, 2008h) in Spain, and only a handful of products bearing the label are available in Spanish stores (MSC, 2008f). There is one company in Spain certified by Friend of the Sea, which is an aquaculture company, and there are very few products available in Spain bearing the Friend of the Sea label (FOS, 2008c).

There might be several explanations why environmental labels have not acquired more momentum in Spain. A plausible explanation is that much smaller ratio of Spanish seafood sales occur in supermarkets compared to countries in northern Europe, Spaniards are instead more focused on market stalls when sourcing their seafood (SCA, 2005). Surveys show that 35% of Spanish consumers most often buy their seafood in supermarkets compared to 69% in the UK, and 36% most often buy seafood in market stalls compared to 12% in the UK. Application of environmental labels is much more common in supermarkets than in other venues, because traceability is easier and they have better opportunity to publicise their labelled products. It would however be difficult to verify the chain of custody in the traditional market stalls that are operated all across Spain, where myriad of merchants sell a diverse selection of seafood. But this does not explain why large international retail chains choose not to market ecolabelled seafood products in Spain, even though they might do so in other countries. The largest retail chain in Spain, Carrefour, does for example sell Friend of the Sea labelled seafood in Italy and Portugal, but not in Spain (FOS, 2008c). Carrefour is the largest retail chain in Spain, operating 2.300 stores in the country (Carrefour, 2008), and Mercadona is the second largest with 1.140 stores (Mercadona, 2008). Neither of these companies are attempting to market sustainable seafood in their stores in Spain.

5.3.3. Spain and Iceland

Spain is Iceland's second most important seafood market after UK; representing 12% of Iceland's total seafood exports values in 2006, when Spaniards bought almost 37 thousand tons of fish products from Iceland worth 14,2 billion IKR (Statistics Iceland, 2008b). . These were mostly either frozen cod fillets or salted cod. Frozen products accounted for 48% of the volume and 44% of the value, salted products for 41% of the volume and 54% of the value.

5.3.4. Summation

Ecolabels are not commonly used in the Spanish seafood sector, neither by producers nor retailers, and are therefore unknown to the public. Consumers are however concerned about the condition of the oceans, but do not have the opportunity to select their seafood accordingly, caused by the lack of verifiable labelling.

Cod accounted for more than 75% of the value of seafood products exported to Spain from Iceland in 2006 (Statistics Iceland, 2008b). That might raise some problems if

sustainability issues become highlighted in the Spanish market, since Atlantic cod is generally thought to be utilised unsustainably in the world today. But it could also be a market opportunity if Iceland manages to differentiate Icelandic cod from other cod stocks in the Atlantic Ocean, and present it as sustainable seafood (or at least more environmentally friendly than other competing options).

5.4. Germany

Germany is Iceland's fourth most important market for seafood, representing 5% of Iceland's seafood export values in 2006 (Statistics Iceland, 2008b). . The German market is therefore going to be reviewed with the objective to identify Iceland's place on the market and to assess how ecolabels could impact their interests.

5.4.1. Consumption

Germans consume on average 15 kg of seafood per capita a year, which is far behind most other large European countries (Failler *et al.*, 2007). They are even behind countries in central Europe that are located hundreds of kilometres from the nearest ocean, such as the Czech Republic which has for example almost 70% higher per capita seafood consumption. Germany is however, apart from Russia, the most populated country in Europe with 82 million inhabitants, which makes the German seafood market the fifth largest inside the EU with 1,2 million tons consumed every year (Glitnir, 2007).

German seafood consumers are not very open minded towards trying new species, as the top four species represent 60% of total volume in seafood sales. They are Alaskan pollock with 18% market share, herring with 18%, salmon with 13%, and tuna with 11% (Glitnir, 2007). They are also quite particular regarding how their seafood is processed, as only 11% of their seafood is fresh, whilst 32% are frozen, 30% canned and 14% are crustaceans. Germany and UK separate themselves from other countries in Europe, as they particularly favour breaded and battered seafood products (SCA, 2007b). German seafood consumers resemble most consumers in the northern Europe, as they want their seafood fully-processed, which means that it is supposed to be filleted, skinned, boneless and preferably portioned into convenient portions. Consumers in southern Europe however are more interested in buying their seafood unprocessed i.e. whole fish complete with head and scales.

Germany used to be a big fishing nation, as the former East Germany operated a large fleet of factory trawlers. But they have severally reduced their fisheries over the past few decades and are now catching less than 300 thousand tons a year. They are therefore far from being self-sufficient regarding their seafood sourcing, as they are now only able to produce 20% of their consumption themselves. Frozen fillets, Germany's main seafood import, worth close to half a billion dollars in 2002, consists mainly (80%) of Alaska pollock, which is imported either from N-America or Russia (Rung, 2003).

5.4.2. Markets and environmental concerns

Germans are generally well aware of most environmental problems and are typically willing to adapt their preferences to the least environmentally inflicting option. They were for example the first nation to adapt an ecolabel for regular consumer products, namely the Blue angel, and that label is very well known amongst German consumers and popular amongst producers, indicating that the label is working. Studies have shown that majority of German consumers are concerned about the environmental condition of the Oceans and it is therefore probable that they would be willing to change their consumer habits in order to source their seafood sustainably (SCA, 2007b). Majority of German consumers (52%) buy their seafood in supermarkets, whilst 22% source their seafood from smaller retailers and 17% go to market stalls. This suggests that ecolabels could be ideal for the German seafood market, because application is much easier large retail chains, than in smaller outlets.

German producers and retail chains have tapped into this resource and offer now a wide variety of environmentally labelled seafood products from MSC and Friend of the Sea (MSC, 2008f; FOS, 2008c).

5.4.3. Germany and Iceland

Germany is Iceland's fourth most important market for seafood, together with France and Holland; each representing roughly 5% of Iceland's total seafood exports values (Statistics Iceland, 2008b). They bought in 2006 almost 36 thousand tons of seafood products from Iceland worth 6,3 billion IKR. These were mostly either frozen or chilled pollock and redfish fillets, or chilled whole redfish. Frozen products accounted for 65% of the volume and 69% of the value, fresh/chilled products for 28% of the volume and 26% of the value. Germany is Iceland's main marketplace for redfish and pollock, but other products have

not a significant market share, as redfish accounted for almost 40% of the value in 2006, pollock for 30%, cod for 6% and haddock for 3% (Statistics Iceland, 2008b).

5.4.4. *Summation*

Germany has quite efficiently adopted environmental labelling into seafood retail in the past few years. Some of the larger supermarkets have for example a fairly good selection of frozen products that are ecolabelled by a third party labelling schemes (MSC, 2008f). These products are however all quite similar as most of them are produced from either Alaskan pollock or New Zealand hoki. More than half of the value coming from Icelandic seafood exports into Germany is from frozen redfish- and pollock fillets, which are often sold next to ecolabelled Alaskan pollock or New Zealand hoki in the frozen seafood section of supermarkets. It is therefore likely that ecolabelled seafood is already competing with Icelandic seafood in Germany and it is highly probable that this competition will only become fiercer as environmental labelling becomes more common and more products become certified, giving consumers alternatives of wider variety of labelled products.

5.5. USA

The US is Iceland's third most important market for seafood, after the UK and Spain. The US seafood market is therefore going to be reviewed with the objective to identify Iceland's place on the market and to assess how ecolabels could impact their interests.

5.5.1. *Consumption*

Americans consume on average 21,3 kg of seafood per capita a year, which in combination with the nations large population and the markets price range makes the US seafood market probably the most important seafood market in the world (SCA, 2007b). The US is the third most populated nation in the world with roughly 300 million inhabitants and a fairly large portion of them are willing and able to paying high prices for their seafood (US census bureau, 2008).

USA is the seventh largest fishing nations in the world, catching almost 5 million tons of wild seafood per year and producing half a million tons in aquaculture (NOAA, 2007a). But they nevertheless import large quantities of seafood, as U.S. imports of edible fishery products in 2006 amounted to some 2,5 million tons, valued at 13,4 billion USD; where shrimp accounted for 31% of the value and salmon for 11%, but other species were far less

important. In addition, US imported 14,4 billion USD worth of non-edible seafood (NOAA, 2007b). The largest importing countries in 2006 were China with 21%, Thailand with 15% and Canada with 13% of the volume, but the whole continent of Europe only accounted for 5% of the volume.

5.5.2. Markets and environmental concerns

The retail grocery market in the US has developed similarly as in Europe, where a handful of large chains have basically taken over the market. The largest chains focus on low prices and massive turnover, few high-end chains have also secured themselves a favourable market share, but the middle class retailers have been left behind in the competition. The top five chains have almost a 50% market share; where the largest one, Wal-Mart, controls 20% of the market and the other four, Korger, Costco, Supervalu and Safeway have a roughly 5% market share each (MPA, 2005; SN, 2008). Consumers generally buy their seafood along with other groceries, which means that the supply in these larger retail chains has a profound impact on consumption. The retail chains typically use their own brands to force down prices and do usually put the main emphasis on frozen products, only offering fresh seafood in selected outlets. But there is also a growing high-end market place for seafood that focuses on quality and good service. Chains such as the Whole Foods Market that specialises in organic, environmentally- and socially responsible products have gained quite a good momentum in recent years. Whole Foods Market is for example the 22nd largest US retailer, with an estimated 10 billion USD turnover for 2008 (SN, 2008). It is therefore evident that the US retail market for seafood is divided into two growing parts i.e. low price supermarkets and high-end speciality outlets, whilst traditional corner shops and fishmongers are fast becoming extinct.

Studies show that one third of US seafood consumers (claim to) take environmental factors into consideration when sourcing seafood, and two thirds are interested in getting more information about the environmental impacts associated with the seafood they buy (SCA, 2003). Other studies have shown that US consumers are not as well informed about conditions of certain fish stocks as European consumers, but they are in general interested in receiving information on sustainable seafood sourcing (Donath, Wessells, Johnston & Asche, 2000). Consumers typically prefer ecolabelled seafood, but they are however generally not prepared to change their consumer habits for a label, which means that the label does not matter unless the product is otherwise the same. Consumers are willing to pay a small premium for ecolabelled products, but they are very price sensitive.

Ecolabels have not been very well known amongst US seafood consumers, but after Wal-Mart started in 2006 its project to source all of its wild caught seafood from sources that are certified by MSC; they have received increasing recognition (MSC, 2008j). Outlets at both ends of the market carry now MSC labelled products, but Wal-Mart and Whole Foods Market are the market leaders, Wal-Mart representing the low-price sector and Whole Foods the high-end market (MSC, 2008f).

US consumers in general have not come as far in the “sustainable seafood movement” as N-European consumers, but the niche US consumer-group that is likely to look for environmental labelling on their products is nevertheless very large and growing fast. Consumers that buy organic food for example are thought to be more likely to favour ecolabelled seafood, because they are better aware of what they eat and are generally more environmentally conscious than other consumer-groups (OTS, 2007). The organic market is the fastest growing market in the US, as sales of organic food grew for example in 2006 by 22,1%, to reach 16,9 billion USD, representing 3% of all retail sales of food and beverage. Organic foods’ share of total food sales is up from 1.9% in 2003 and 2.5% in 2005.

North American producers have been very receptive towards the MSC label, especially on the west coast, as can be seen on table 5-7. There are already eight different fisheries that have been certified, nine more that are currently undergoing full-assessment and there are probably more undergoing confidential pre-assessment (MSC, 2008i).

Table 5-7: USA fisheries taking part in the MSC labelling scheme

Certified fisheries	Fishing method	Fisheries undergoing full assessment	Fishing method
AAFA Pacific Albacore Tuna fisheries	Pole and longline	BS/AI flatfish fishery	Bottom trawl
BS/AI Alaskan pollock fishery	Mid-water trawl	BS/AI Pacific cod fisheries	Trawl, jig, line, pot
GoA Alaskan pollock fishery	Mid-water trawl	Californian salmon fishery	Hook, line
Alaskan salmon fishery	Various methods	Californian crab fishery	Pots (traps)
BS/AI Alaskan (Pacific) cod fishery	Longline	GoA flatfish fishery	Bottom trawl
Oregon Pink Shrimp fishery	Bottom trawl	GoA cod fishery	Trawl, jig, line, pot
US North Pacific Halibut fishery	Longline	Maryland striped bass fishery	Net, hook, line
US North Pacific Sablefish fishery	Longline	Oregon crab fishery	Pots (traps)
		Pacific hake fishery	Mid-water trawl

(Source: MSC, 2008)

The Friend of the Sea label can also be found in the US, but its main market area is in Southern Europe, and it is therefore not very well known amongst consumers or producers in America (FOS, 2008c).

Greenpeace is currently working on ranking all major retailer chains in US on their seafood sourcing (Dipietro & Evans, 2008). It is similar initiative as they carried out in the UK in

2005, when they graded and reported on how the nine largest retail chains in Britain were doing regarding their seafood sourcing (Greenpeace, 2005). The UK initiative attracted great publicity and had a profound influence on how these retail chains sourced their seafood (Greenpeace, 2006).

5.5.3. US and Iceland

The US market is Iceland's third most valuable seafood market after UK and Spain, representing 7% of seafood export revenues (Statistics Iceland, 2008b). In 2006 Iceland exported 20 thousand tons of seafood to the US, worth 8,8 billion IKR. Almost 77% of the volume was frozen products, representing 70% of the value. Roughly 18% were fresh products, representing 27% of the value. Haddock and cod were dominant in this market; haddock with 45% of the volume and 51% of the value, cod with 27% of the volume and 35% of the value. But Iceland is a very small player on the US seafood market, as they only accounted for 1% of the total value of edible fish products imported into US in 2006 (NOAA, 2007b).

5.5.4. Summation

It is likely that Icelandic cod and haddock will be competing with ecolabelled Pacific cod, Alaskan pollock, Pacific haddock and other species on the US market in the future. Frozen products arriving from Iceland are typically used for further processing in the US, where they are mainly breaded or battered and then either packaged in consumer packaging to be sold in retail stores, or packaged in larger packaging for the foodservice sector. Both of these venues are subject to fierce competition and it is more than likely that producers that can offer ecolabelled products will have a competitive advantage on the market.

Similar development could be seen on the market for fresh cod and haddock fillets in the next few years. There are not many ecolabelled products that are available at the moment that can compete with these products, but they will probably surface soon. Almost 30% of the Icelandic haddock and 20% of the cod that is imported into US is transported fresh by air. This method of transportation is not very environmentally friendly and that is a factor that Icelandic producers are probably going to have to take into account, as environmental labelling will almost certainly include carbon footprints along with other sustainability factors in the future.

5.6. Scandinavia

Scandinavian consumers are not very important for the Icelandic seafood industry, but they are however renowned for being very environmentally conscious. The Scandinavian seafood market is therefore going to be reviewed with the objective to identify Iceland's place on the market and assess how ecolabels could impact their interests.

5.6.1. Consumption

Seafood consumption in Scandinavia differs quite considerably between countries. Denmark and Sweden are close to the EU average of 26 kg per capita a year, while Finland and Norway are way above with 34 and 45 kg per capita (Failler *et al.*, 2007). But since Sweden is by far the most populated country in Scandinavia, with 9 million inhabitants, it is also the largest Scandinavian marketplace for seafood, as Swedes consume more than 250 thousand tons of fish and other seafood products each year (Glitnir, 2007). Norwegians who are 4,7 million follow close behind, consuming roughly 210 thousand tons of seafood a year. Finland with its 5,2 million inhabitants consume in total 180 thousand tons of seafood a year and the Danes who are 5,4 million trail far behind consuming only 127 thousand tons of seafood a year.

The Scandinavian countries are differently situated towards sourcing their seafood since some of them are traditional fishing nations, ideally located close to rich fishing grounds, while others have little or no opportunities to be self sufficient in their seafood sourcing. Finland is for example not a major fishing nation, despite of having one of the world's highest seafood consumption per capita (FGFRI, 2007a). They do therefore need to import most of the seafood they consume and majority of it comes from Norway (FGFRI, 2007b). Sweden is in a similar position, catching almost solely sprat and herring themselves, thus being dependant on import for sourcing other types of seafood (Glitnir, 2007). Norway and Denmark are by far their most important suppliers of seafood with 75% of the total import (BIM, 2002). Danish fishermen catch almost 1 million tons of fish per year, which makes them more than able to be self-sufficient in their seafood sourcing (Glitnir, 2007). The Danes do nevertheless import large quantities of seafood from other countries, which they process further and re-export the EU-countries. This advanced processing of imported seafood, which is then re-exported, accounts for 80% of all seafood exports from Denmark and has acquired Denmark the fourth place as the world's largest fishery products supplier (Berry, 2006). Norwegians catch more than 2,5 million tons of wild fish each year and produce around 800 thousand tons in aquaculture, making them a very large

seafood exporting country (Ulrikssen, 2008). They are therefore more than capable to source most or all of their seafood from local sources. Imported seafood into Norway is mostly fishmeal and fish-oil used as feed in aquaculture.

5.6.2. Markets and environmental concerns

Regular consumer habits in Scandinavia have evolved similarly to what has been going on in other parts of Europe in the past decade, where convenience and price has driven the larger part of the grocery market. The high-end market where quality is the main issue has also increased its market share, leaving the middle class market declining. Scandinavian seafood shopping habits have developed in similar fashion, as consumers are increasingly incorporating their seafood purchasing into their regular grocery shopping. For example in 2005, supermarket's share of total seafood sales in Denmark was estimated to be around 50%, which was then up from 15% just a few years earlier, and in the next five years their share is predicted to increase to 80% (Glitnir, 2007).

A handful of large retail chains are controlling the bulk of all retail in Scandinavia, focusing on low prices and massive turnover, often using their own brands to force down prices. ICA Sverige AB, Coop Norden Sverige AB and Axfood AB are the giants in Sweden (Euromonitor International, 2008); Coop Denmark and Dansk Supermarked comprise over half of the entire food retail market in Denmark (Berry, 2006); Coop NKL BA, REMA1000 and Rimi are dominant in the Norwegian market (Coop, 2007; REMA, 2007; Rimi, 2008); and Kesko, S-Group, Tradeka and SPAR more or less rule the Finish retail market (Kesko, 2008; S-kanava, 2008; Tradeka, 2008, SPAR, 2008).

Scandinavian companies are generally very environmentally conscious and try their best to conduct their business in an environmentally friendly manner. Most of the above mentioned retail chains have for example written environmental policies and strive to favour products that are environmentally- and socially responsible. Scandinavian consumers; especially Swedes, Danes and Fins; are very well aware of environmental labels such as the Nordic Swan, the EU flower, the Blue angel and the Bra Miljøval label (Neytendasamtökin, 2007). Organically grown and labelled products are also very popular in Scandinavia, where their market share has increased dramatically in the last decade (Dimiti & Oberholtzer, 2006; Eurofood, 2002). Environmental labels for seafood are also quite popular in these countries, both on behalf of consumers and producers. Swedish and Danish retailers offer for example a wide-range of MSC certified products in their outlets, but Finish and Norwegian storeowners are not as efficient (MSC, 2008f). Other ecolabels

for seafood, such as the KRAV label, are also available in Scandinavian supermarkets (Abba, 2008).

Scandinavian producers have been very interested in becoming MSC certified in the past one or two years. There are already two Swedish fisheries that are certified (MSC, 2008g), but there are in addition at least sixteen Scandinavian fisheries that are undergoing full-assessment i.e. two Swedish herring fisheries in the North Sea, one Swedish herring fishery in the Baltic, one Swedish sprat fishery in the Baltic, two Norwegian cod and haddock longline fisheries, three Norwegian mackerel fisheries, two Norwegian pollock fisheries and five Norwegian herring fisheries (MSC, 2008a, Intrafish, 2008). There could also be a few fisheries undertaking a confidential pre-assessment, but it is impossible to say how many.

5.6.3. Scandinavia and Iceland

Iceland's seafood exports to Scandinavia consist almost solely of fishmeal and fish-oil that are used for aquaculture (Statistics Iceland, 2008b). Norway for example bought 6,0 billion IKR. worth of seafood from Iceland in 2006, 92% of which was fishmeal and fish-oil. Denmark bought at the same time 4,7 billion IKR. worth of seafood, 55% of which was fishmeal and fish-oil and 17% prawns that were primarily intended for further processing. Sweden's and Finland's share in Iceland's seafood exports are however trivial, as Sweden for example bought only 600 million IKR. worth of seafood from Iceland in 2006, 64% of which were salted roes and Finland bought 400 million IKR. worth of seafood that was almost entirely fishmeal and fish-oil.

5.6.4. Summation

Scandinavian consumers and producers are very interested in ecolabels for seafood, but their impact on the Icelandic seafood industry is probably only indirect. Meaning that Scandinavian producers, competing with Icelandic producers, are increasingly applying for certification. But seafood products that are imported into Scandinavia from Iceland are generally not affected by ecolabels, since fishmeal and fish-oil are typically not subject to such labelling. The only foreseeable "major" impact that ecolabels could have on Icelandic seafood products in Scandinavia is in the market for prawns, as one of Iceland's biggest competitors on the market, the West Greenland coldwater prawn trawl fishery, is currently undergoing full assessment for the MSC ecolabel (MSC, 2008j).

This chapter has analysed Iceland's most important seafood markets with the objective to identify how environmental issues impact those markets. It has revealed that seafood ecolabels have different standing in these countries, where the UK has taken the lead in incorporating them into their seafood sourcing; Germany and Scandinavia have also applied them successively, but Spain and the US have not yet implemented them on a significant level. It is apparent that environmental issues, including ecolabels, have impacted the retail market the most, whilst other sectors of the seafood market have been relatively untouched. There are however indications that restaurants, especially at the "high-end" of the market, will be increasingly incorporating seafood ecolabels into their purchasing decisions in the nearest future.

Environmental issues have a big impact on how some of the largest retail chains in the UK source their seafood. The supply of ecolabelled seafood is however limited, which has prevented these retail chains from sourcing their seafood from certified sources at a significant level. They have however committed to favour ecolabelled products when available and declared that their seafood will be sourced from certified sources in the future. Meanwhile, the more environmentally responsible retailers have incorporated environmental considerations into their seafood procurement, which often include a more extensive scope than is required for the seafood ecolabels that are presently available. It is for example noticeable that carbon emissions and seabed disturbance are becoming more of an issue, as many retailers have started to label their products with their "carbon footprint" and committed to sell only line-caught fish. These factors could be problematic for the Icelandic seafood industry, since a large part of Iceland's seafood exports are fresh cod- and haddock fillets that are transported by air on a day-to-day basis, emitting high volumes of CO₂; and because only 35% of Iceland's cod- and haddock catch in 2006 was line-caught (Directorate of Fisheries, 2007b).

6. Iceland's perspective

The objective of this chapter is to use the information already presented in this thesis to rationalise which ecolabelling alternatives are best suited to meet with the needs of environmentally responsible Icelandic seafood companies. The former part of the chapter is a quick review over the most important environmental issues that need to be taken into account when assessing the environmental impact of seafood, and an assessment on Iceland's performance on these issues. The latter part of the chapter accounts for the available alternatives and identifies the best option.

6.1. Issues to consider

There are a number of issues that need to be taken into account when assessing the environmental impact caused by the fishing industry. There are however few issues that are more relevant than others, as has been demonstrated in this thesis. Some of these issues are already a part of the scope of the available ecolabelling alternatives, but other issues are presently being addressed by other means.

6.1.1. Stock status

Depletion of fish stocks is the main reason behind the adoption of ecolabels in the seafood industry, and healthy stock status is therefore a basic requirement for certification. Relative stock size is generally used to determine the condition of a stock, where its present size is compared to its size in the past. The available data shows that Icelandic fish stocks are in a variable condition, as haddock, herring and blue whiting are well above average; and pollock, redfish, catfish, tusk, monkfish, and lobster are close to their average, therefore being considered in a healthy condition. Cod, Greenland halibut, plaice and shrimp are however far below average and condition of the capelin stock is uncertain, these stocks are therefore not considered in a healthy condition. The stocks that are considered to be in a healthy condition should be able to attain certification by available ecolabelling schemes; such as MSC, Friend of the Sea and KRAV; based solely on stock status.

The condition of the Icelandic cod stock in comparison with other cod stocks in the north Atlantic has been highlighted by stakeholders inside the Icelandic fishing industry; indicating that Icelandic cod should be regarded environmentally friendly because it is not

as bad as the rest. This sort of reasoning is however generally not taken into account by ecolabelling schemes.

6.1.2. Fisheries management

Effective fisheries management system is a basic requirement that needs to be in place in order to implement ecolabelling into a fishery. The Icelandic fisheries management system appears to possess the regulatory framework required by labelling schemes, but the application has been lacking. Quotas have generally been decided too large and fishermen have typically been able to fish beyond the issued TAC. This is however a problem that has severely diminished in the past few years, but further improvements are needed in order to comply with requirements set by ecolabelling schemes.

6.1.3. Fishing method

The fishing method is a part of the scope for most seafood ecolabels and comes next to stock status and the efficiency of the management system in the hierarchy of issues taken into consideration. Bycatch, discards, seabed disturbance and fuel efficiency are all issues that are affected by the fishing method, as has been demonstrated earlier.

There are basically seven different types of fishing gear being used by Icelandic vessels today, as can be seen in figure 6-1 (Directorate of Fisheries, 2007b). Bottom trawls are used to catch various types of groundfish and were responsible for 40% of total catches in cod equivalent in the fishing year 2006/07. Longlines are mainly used to catch round fish, such as cod, haddock, catfish and tusk; and were responsible for roughly 35% of catches in cod and haddock in 2006/07. Purse seine and mid-water trawls are used for catching pelagic species such as herring, capelin and blue whiting. (Mid-water trawls are ranked with “other” gear in figure 6-1, but were in fact responsible for 20% of total catches in 2006/07. The remaining 4% were catches from ploughs, traps, poles etc.). Gillnets are mainly used to catch various types of round fish, mostly cod, but have also in recent years been used to catch monkfish and Greenland halibut. Danish seine is used to catch all kinds of ground fish, but is especially efficient in targeting various flatfish species and was for example responsible for 64% of the plaice catch in 2006/07. Jigging is used to target round fish species like cod, haddock and pollock. Jiggers were in 2003 responsible for more than 3% of the total catch, but had fallen below 1% in 2006/07; mainly caused by changes in the fisheries management system where jiggers were gradually taken from an effort quota system and put under an ITQ system.

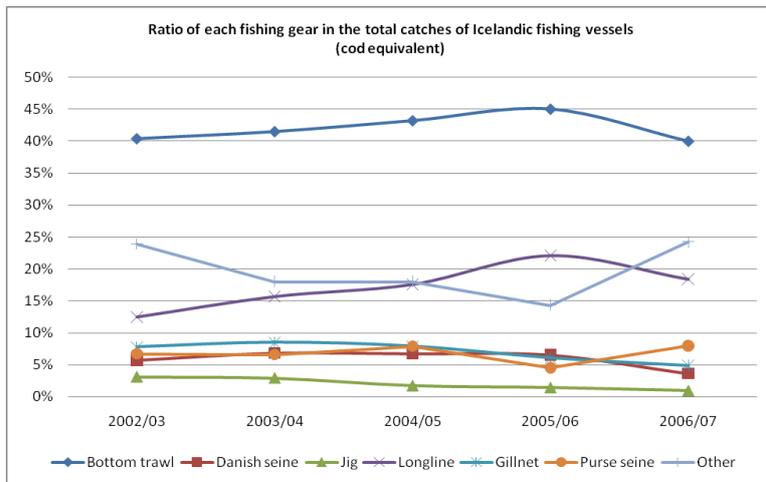
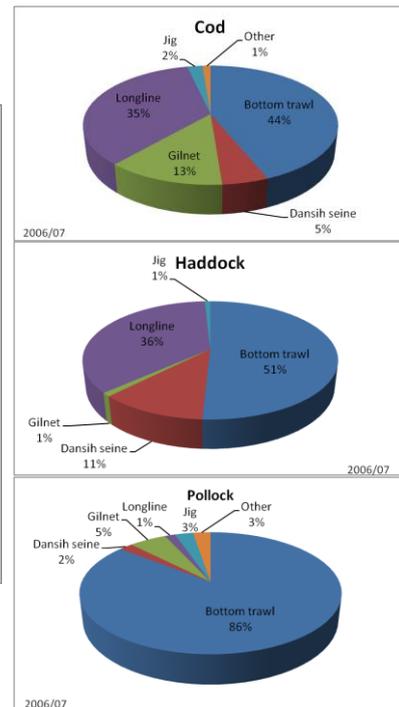


Figure 6-1: Ratio of each fishing gear in catches of Icelandic vessels (Source: Directorate of fisheries, 2007c)



Bottom trawls and Danish seine are by far the worst alternatives of the fishing gears most commonly used by Icelandic vessels; considering environmental issues. They are not very selective, destructive for the seabed and their energy efficiency is seriously lacking compared to other fishing methods. Line fishing is thought to be much more environmentally friendly, because it is highly selective, causes minimum disturbance to the seabed and uses at least 50% less fuel to catch each kg of fish than bottom trawlers. Gillnets are thought to be relatively environmentally friendly. They are for example much more selective than bottom trawls, but there have been some concerns amongst Icelandic scientists that they might be used to especially target the oldest and largest fish, which could be bad for recruitment. This problem has though already been addressed by the authorities, which have put a limit on the mesh size of the nets. Gillnets cause minimum disturbance to the seabed, but the anchors and the net itself can nevertheless cause damage to vulnerable areas, especially coral areas. Gillnet fisheries are generally very fuel-efficient. Jiggers are very environmentally friendly because they are highly selective, cause no damage to the seabed and are exceptionally fuel-efficient. Jiggers are without a doubt the most environmentally friendly fishing method used in Icelandic waters to catch round fish.

Purse seine and mid-water trawls differ from the above-mentioned fishing gears, because they are used to catch pelagic species. Both of these fishing methods are highly selective, since they are used to catch stocks that travel in schools. They do not cause damage to the seabed, and are very fuel-efficient compared to other fishing methods i.e. considering

volume of fuel per catch unit. The purse seine is though generally considered more environmentally friendly, because it catches all the fish that gets trapped inside it, whilst large amounts of fish can escape through the mid-water trawls larger meshes, and some of that fish is either dead or dying.

All the above-mentioned fishing methods, except bottom trawling and Danish seine, meet with requirements set by available seafood ecolabelling programs. Bottom trawling and Danish seine are however more controversial, as Friend of the Sea automatically rejects all fisheries that cause damage to the seabed; but MSC and KRAV impose serious restrictions on the use of such gear. It has to be considered highly likely that restrictions on the use of bottom trawls in certified fisheries will increase in the future, as concerns for issues such as seabed disturbance, fuel efficiency increase.

6.1.4. Transportation

Transportation from catch to consumer is an issue that is not yet included in the scope of seafood ecolabels, but increasing concerns over carbon emissions has already inspired retailers and producers to label products with their “carbon footprints”. It is therefore very likely that transportation is going to become an important issue in ecolabelling of seafood in the nearest future. This could create difficulties regarding ecolabelling of Icelandic seafood products, because the largest growing sector in the Icelandic fishing industry is in transporting fresh fillets by air to consumers in Europe and the US on a day-to-day basis. Airplanes use 50 times more fuel to transport each kg of freight than cargo vessels, which means that they emit a lot more of CO₂. Competing countries are generally able to use other means of transportation, such as trains and trucks, as that emit relatively low amounts of CO₂, but Iceland does not have that opportunity. Friend of the Sea and MSC do presently not include transportation in their standards, but KRAV addresses the issue by stating that transportation shall be kept at a minimum and the means of transportation needs to be as environmentally friendly as possible

6.1.5. Social issues

Social issues are included in the scope of MSC and Krav, but the criteria are very vague. These issues have never been raised when certifying fisheries in the past and the standards are quite open to interpretation. The main idea with incorporating social issues into ecolabelling of seafood is probably to prevent human rights violations such as slavery and mistreatment of labour, but not to preserve jobs in disperse settlements.

Recent ruling of the UN human rights court, declaring that implementation of the ITQ system had been discriminating, is not likely to prevent Icelandic seafood products from being certified by these labels, because the criteria is much too vague.

6.1.6. Other issues

Other issues that are (or could be) included in the scope of ecolabels are not likely to prevent Icelandic seafood products from being certified, but could create opportunities for producers in their competition in foreign markets. IUU fishing is for example a major global problem that Icelandic waters are relatively free from. Waste management, recyclable packaging, use of harmless chemicals and use of renewable energy are all issues that Icelandic producers are either already doing well in, or could easily improve in.

6.2. Available alternatives

There are several alternatives available for the Icelandic seafood industry regarding environmental labelling of their seafood. One is to do nothing, another to use already established labels and third to initiate its own label.

6.2.1. Do nothing

By doing nothing, the industry would risk getting alienated from important markets, as requirements for environmental responsibility increases. It has however been shown in this paper that these requirements have mostly been coming from the larger retailer chains, whilst the average consumer is more or less unaware of these issues. The labels are therefore acting more like an admittance ticket to certain markets, than informative message meant for the final consumer. Some of the largest retail chains in the UK have nevertheless chosen to source their seafood from Icelandic waters, partly because they believe it to be environmentally the best option available, regardless of any labelling. It is therefore debatable whether the Icelandic seafood industry needs environmental labels at present time. The “Statement on responsible fisheries in Iceland”, which was published in 2007 by several stakeholders in the Icelandic fishing industry, could be enough to convince retailers around the world to source Icelandic seafood because they are environmentally responsible. But the two-page statement is probably not going to be a consumer facing “label”, because average consumers need simpler solutions. It is however likely that ecolabels like the MSC label will become better known amongst regular consumers in the nearest future, at least in marketplaces like UK, Germany, Scandinavia and the US. It is

therefore possible that the most important market areas for Icelandic seafood will require some sort of environmental labelling in the future. The Icelandic seafood industry should therefore try to be prepared, and should in fact try to use ecolabels to its advantage by being proactive instead of reactive. There are definite marketing opportunities in environmental labelling, it is just a question whether some of the already established labels fit the Icelandic industry, or if it should rather initiate its own label. There is also a need to decide whether to focus on first-, second- or third party labels.

6.2.2. First party labels

First party labels are sometimes called self-declarations, because they are awarded by the producer himself, which measures his product against his own standard. There are several of these labels around in the global seafood industry, but they generally lack credibility and are therefore considered unreliable. They might be used in some cases to convince consumers of various environmental benefits that are associated with a particular product, but they would first need to get by the retailer, and retailers operating in the market areas for Icelandic seafood are likely to mistrust these labels. This type of labelling could therefore create bad publicity and discontentedness amongst retailers and environmentalists, regardless of whether the label is projecting true or false information.

First party labels are not a good alternative, due to lack of credibility.

6.2.3. Second party labels

Second party labels are labels that are awarded to a second party by a certifier who also creates the standard. These labels face the same dilemma as self-declarations, which is a lack of credibility, since both parties have a direct stake in awarding the label. The credibility of the label does rest on how credible the certifier is, but retailers and other stakeholders are usually defensive against these labels, as they typically smell of “greenwashing”. There are a few of these labels around in the seafood industry today, but none that would fit the Icelandic fishing industry. These labels are for example some of the “dolphin safe” labels in the tuna fish industry, labels that are awarded by environmental organisations, labels awarded by an industry to individual companies and recommendations of various stakeholders could also be considered as second party labels.

Second party labels are not a good alternative, due to lack of credibility.

6.2.4. Third party labels

Third party labels have been gaining increased momentum inside the seafood industry for the past few years and do now appear to be taking over as the only realistic alternative. The main reason for the success of these labels is credibility, because the certifier, which evaluates a particular fishery against a formal standard that has been developed by a label owner, is completely independent i.e. there is no financial gain for him to either approve or reject the fishery for certification. Choosing a third party label is therefore the only realistic alternative, it is just a question on whether to use already established foreign label or create a new Icelandic label.

Foreign labels

There are presently three of these labelling schemes available for Icelandic seafood producers, but they are the MSC, Friend of the Sea and KRAV. The MSC is by far the best known of these labels and could almost be described as having a monopoly on the market for third party labels for wild capture fisheries. It has a wide range of certified products, is accepted by most stakeholders and is relatively well known in important market areas. Friend of the Sea and KRAV have in comparison very limited range of certified product; environmentalists look on the Friend of the Sea as an inferior label and the KRAV label has an overly extensive scope in the opinion of many producers. They are in addition almost solely known in very specific market areas that are not very important for the Icelandic fishing industry, Friend of the Sea in Italy, Portugal and Switzerland; and KRAV in Scandinavia. It is therefore logical for the Icelandic fishing industry to look towards MSC if they are to use already established environmental labelling scheme to certify their fisheries. It could however be plausible for individual fisheries that have important markets (or spot new market opportunities) in the market areas where Friend of the Sea and KRAV are best established, to consider them as available alternatives. Some smaller producers could for example use the Friend of the Sea label to sell salted cod to Italy; and half of Iceland's production of salted lumpfish roes goes to Sweden, which is KRAV's strongest market area. These labels could also act as an admission ticket to marginal markets, like the organic market for example. This alternative is already being explored by The Icelandic National Association of Small Boat Owners (NASBO), which has been looking into getting their products certified by KRAV for the past two years (AVS, 2006). They have been working with Arenea Certifying AB, which is one of KRAV's accredited certification bodies, on a pilot project that involves getting four vessels

and one processing facility certified to produce KRAV labelled haddock- and catfish products. Arenea Certifiering AB is expected to complete its evaluation in the summer of 2008, according to Mr. Pálsson (2008), NASBO's managing director, and the plan is then to market the products in Sweden, where organic outlets have expressed "enormous" interest in sourcing these products at favourable prices.

The MSC label would however be more practical for larger companies that are focusing on mass production for larger markets. The label has though been highly criticised amongst stakeholders in the Icelandic fishing industry for being too powerful, too expensive and overly influenced by "environmentalists". This criticism is however based on a questionable reasoning. They for example fear that "environmentalists" might persuade the label operators to make "unreasonable" demands on certified fisheries in the future. Their main concern is that environmental NGOs will soon insist on rejecting all fisheries using bottom trawling and Danish seine, which would presently exclude 49% of the Icelandic cod catch, 62% of the haddock catch, 88% of the pollock catch and 96% of the plaice catch from getting certified (Directorate of Fisheries, 2007b). It is still mere speculations whether the MSC will comply with these demands, but there are however some already certified fisheries using these fishing methods and even more who are undergoing full assessment, which suggests that these worries might be unnecessary, at least for the time being. But there is however a reason for these concerns, because the reality is that these fishing practices are not as environmentally friendly as other alternatives. It is important not to overlook that environmental labels are supposed to convey the products environmental impact. It is therefore only logical to presume that bottom trawled fish will have more difficulties getting certified than line caught fish for example

Funding of the MSC has also raise some concerns amongst producers, because almost half of the label's budget until now has originated from the Packard foundation, which could influence how the MSC is operated. Proportion of funding coming from logo licensing is however going to multiply in the budget year 2007/08, because the licensing fee has quintupled and number of accredited fisheries has doubled. Most of the funding is therefore going to originate from the industry itself, which is going to make these concerns unnecessary.

The Industries concerns about how powerful the MSC is becoming is also debatable, because it is much simpler for everyone to have just one label that everybody understands. Different scope, criteria and definitions only confuse the consumer and environmental

efficiency of these labels could be jeopardised if producers are allowed to use vague “environmentally friendly” claims to mislead the public. One universal label is therefore an advantage, rather than a drawback.

There are numerous fisheries in Europe and northern America that are presently either fully certified or in the process of becoming certified by the MSC. The Icelandic fishing industry has however chosen to stay away from the labelling scheme and has in fact lobbied against it. There are nevertheless a number of fisheries that could probably become MSC certified without much difficulty. Herring caught in purse seine would for example be a good candidate, as a healthy and well-managed stock that is caught in a relatively environmentally friendly manner. Jigged and line-caught haddock should also be a good candidate for certification, because it is relatively the most environmentally friendly method used to catch a stock that is in a very good condition. Bycatch of cod could however make it more complicated to certify a haddock fishery. The blue whiting fishery could also be eligible for certification, but the products are generally not used for human consumption, which severely reduces the benefits from becoming certified, since the “sustainable seafood movement” has not yet reached the fishmeal industry.

It would probably be more difficult to get other Icelandic fisheries certified by the MSC. The condition of the cod stock would for example make it very difficult for it to attain certification, regardless of what fishing method is used, but line and hook fisheries could possibly be eligible because they cause the least environmental impact. Trawl fisheries on the other hand (regardless of target species) would almost certainly be rejected and the assessment would undoubtedly be very expensive, because it would involve assessing the environmental impact on the seabed. In the unlikely event of an Icelandic bottom trawl fishery becoming MSC certified, it would have to be subjected to strict spatial restrictions that would severely limit the fishery.

Line-caught, gillnetted and jigged groundfish; apart from cod, Greenland halibut and plaice; should be eligible for MSC certification if the management system secures that that catches are in accordance with scientific advice, but that has been lacking until now (see appendix 6).

Icelandic label

Establishing a new third party ecolabelling scheme is an interesting alternative that could either be entirely an Icelandic initiative or a cooperative of Nordic states. Such a label

would however automatically be measured up against the market leader (MSC) at the international front. A new label would therefore have to be more strenuous than the MSC if it would not want to risk being regarded as a second-class label, like the Friend of the Sea label. It would have to be a third party label, to project credibility and reliability; and it would also help if it would have a broader scope than MSC. Life Cycle Assessment would for example be an interesting point of view that could benefit Icelandic producers, especially if they would adapt their production to it. Line, hook, gillnet and purse seine fisheries would for example benefit because of fuel efficiency and low carbon emissions. Processing plants would benefit because they use “renewable energy” in their production. Producers could very easily improve in using more environmentally friendly materials in their production; they could recycle more and use recyclable packaging where possible. Bottom trawled and air transported fish would however risk being rejected for such a label, but since the largest retailers in UK are already beginning to insist on CO₂ labelling, which is going to project badly on them, environmentally conscious consumers are likely to avoid them anyhow.

It would probably be simplest if a new labelling scheme would be solely an Icelandic initiative, because it could be adapted in one way or another to the requirements of the Icelandic fishing industry. The Icelandic fishing industry is quite different from other Nordic fishing industries because it is generally fishing from local stocks, which are solely managed by Icelandic authorities; and because majority of Icelandic quota owners are involved in the whole supply chain, while the Norwegian and the Faroese fishing industry is for example typically divided into catching and processing companies. Getting various stakeholders to look at the whole picture and establishing traceability in the chain of custody is therefore much easier in Iceland.

An Icelandic labelling scheme would have to involve various stakeholders in order to display reliability and credibility. Representatives from the industry, scientific community, environmentalists, retailers, consumers and others would need to be consulted. Accreditation would have to be done by international certification companies, such as Bureau Veritas Certification and Moody Marine Ltd., in order to prevent any conflict of interests. The cost involved in implementing and running such a scheme would be quite considerable and funding would be very tricky, because of appearance i.e. it would for example not reflect favourable if most or all of the funding came from the industry itself, suggesting that the industry could excessively influence the standard. The accreditation process would also be quite expensive, especially if the scope were to be broader than

MSC's. It is therefore no reason to believe that an Icelandic or cooperative Nordic label could be any less expensive than MSC, if it is not going to run the risk of being regarded an inferior label.

Establishing a new label would involve creating a new brand that would have to be publicised in international markets, and that is an expensive task, which by itself does probably make an Icelandic label a bad idea. The French government has for example decided to invest 490 million USD over the next three years in establishing a French seafood ecolabel. An amount representing 30% of Iceland's total seafood export values in 2006. Such an initiative is therefore probably economically unpractical.

The label that is presently being developed by LIU and various other stakeholders in the Icelandic fishing industry is only supposed to focus on stock size and the management system; which might be enough to satisfy requirements of most retailers and consumers, for the time being. It does however neglect important factors that should preferably be incorporated into seafood ecolabelling, such as fishing method and carbon emissions. By focusing only at the mere necessity of variables, this label is only going to be a reactive answer to requirements that are undoubtedly going to intensify in the nearest future. The limited scope, dilemma regarding funding of the scheme, lack of stakeholder involvement might be interpreted as "greenwashing". There is also a fundamentally flawed methodology behind trying to come up with a scheme that almost automatically approves all fisheries of an entire nation. Environmental labels are supposed to signal to the consumer the best available alternative, because they are mainly meant to be used for environmental protection and not just as a marketing tool. Environmental efficiency of a labelling scheme should be the ultimate goal, because everything else is dependent on that.

7. Conclusion and discussion

It has been shown throughout this thesis that there is a growing demand in today's marketplace for seafood that is as environmentally friendly as possible. As a result stakeholders in the industry have started to label products to convey their relative impact on the environment, in order for retailers and consumers to be able to differentiate between environmentally responsible products and those who are not. These labels, who are generally referred to as environmental labels, are of various nature, with different criteria and scope, ranging from single attribute labels that are extended by the producer himself to labels that take numerous variables into account and are awarded by an independent third party.

Some market areas have come further along in this "sustainable seafood movement" than others. This thesis has for example shown that environmental issues are being taken very seriously in some of the most important marketplaces for Icelandic seafood. Some of the largest retail chains in the UK are for example applying strict seafood sourcing criteria for all of their seafood procurement, and retailers in Germany, USA and Scandinavia are also increasingly taking environmental factor into consideration in their seafood sourcing. It is therefore evident that there is a demand for ecolabelled seafood.

When considering what labelling alternatives are best suited to meet with the needs of environmentally responsible Icelandic seafood companies, it soon becomes apparent that third party labels are the only realistic alternative. Other options lack credibility and are therefore more or less useless. This thesis identifies five different approaches for seafood companies in attaining certification. They are as follows:

- A domestic label, which is already being created, but is apparently going to lack in scope. It therefore runs the risk of being regarded as an inferior label and is not going to provide any environmental gains, since it is meant to automatically certify the entire Icelandic seafood industry. There might however be an opportunity in taking this label to the next level, which would involve making it more strenuous than other similar alternatives. But this option is probably not viable because the Icelandic seafood industry would not be able to finance such an initiative.
- Scandinavian cooperative has been explored in the past, but the countries have not been able to unite on a single standard. A number of Norwegian and Swedish companies have now applied for MSC certification, which is probably going to discourage other stakeholders from further exploring this alternative.

- The KRAV label has a strenuous standard and does therefore project to consumers that certified fisheries are in fact environmentally friendly. But the label has a very limited market share and could therefore probably only be used by smaller producers, focusing on the Scandinavian market.
- Friend of the Sea is an inexpensive alternative, but the label is primarily recognised in market areas that are not important for vast majority of Icelandic seafood companies. It could however be an interesting option for smaller producers focusing on markets that recognise the label, such as Italy, Portugal or Switzerland.
- MSC is the only alternative that could be regarded as global. It is respected by most stakeholder groups and is particularly well known to seafood buyers in important market areas for Icelandic seafood. It therefore has to be identified as the best option.

The conclusion is that the Marine Stewardship Council is the best available alternative for environmentally responsible Icelandic seafood companies.

Appendices

Appendix 1

Statement on responsible fisheries in Iceland

About the statement

This statement is presented by several responsible parties in the Icelandic fishing industry, the minister of fisheries, the Marine Research Institute, the Directorate of Fisheries and the Fisheries Association of Iceland. This statement is a part of providing information about the Icelandic fishing industry and how measures are taken to ensure responsible fisheries and the proper treatment of the marine ecosystem around Iceland.

The statement is intended for everyone concerned about the status of the fish stocks and responsible fisheries, particularly the numerous parties that purchase and consume Icelandic fish products.

1 Icelandic fisheries are responsible fisheries

The fishing industry is one of the main pillars of the Icelandic economy. Responsible fisheries at the Icelandic fishing grounds are the prerequisite for the Icelandic fishing industry continuing being a solid part of the Icelandic economy and a principal pillar in Iceland's exports.

Icelanders have structured a fisheries management system to ensure responsible fisheries, focusing on the sustainable utilization of the fish stocks and good treatment of the marine ecosystem. The fisheries management in Iceland is primarily based on extensive research on the fish stocks and the marine ecosystem, decisions made on the conduct of fisheries and allowable catches on the basis of scientific advice, and effective monitoring and enforcement of the fisheries and the total catch. These are the main pillars of the Icelandic fisheries management intended to ensure responsible fisheries and the sustainability of the ocean's natural resources.

2 The catch limitation system is the cornerstone of the fisheries management system

The catch limitation system is the cornerstone 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 catch limitation system is based on the catch share allocated to individual vessels. Each vessel is allocated a certain share of the total allowable catch (TAC) of the relevant species. The catch limit of each vessel during the fishing year is thus determined on basis of the TAC of the relevant species and the vessel's share in the total catch.

The catch share may be divided and transferred to other vessels, with certain limitations.

3 Stock assessments and fisheries advice in conformity with international criteria

Stock assessments and scientific fisheries advice are the main foundations of the decisions made by the authorities on the TACs each year.

In Iceland the Marine Research Institute carries out research on the ocean's commercial stocks and provides the authorities with fisheries advice. The Marine Research Institute is an independent institution that falls under the auspices of the Ministry of Fisheries and is the main research body in Iceland conducting marine and fisheries research.

Stock assessments are based on systematic research of the size and productivity of the fish stocks and the marine ecosystem. Active collaboration with international scientific organisations ensures that the focus is on internationally acknowledged research methods that provide the best available information on the condition of the fish stocks around Iceland at any time.

Prior to the Marine Research Institute's advice on the total catch being published, the institute's assessment of the size and condition of the main fish stocks is presented to and evaluated by relevant committees of the International Council for the Exploration of the Sea (ICES). Additionally, there is collaboration with other

multi-national organizations, including NEAFC (Northeast Atlantic Fisheries Commission) and NAFO (Northwest Atlantic Fisheries Organization), when addressing stocks occurring beyond the Icelandic Exclusive Economic Zone. Collaboration with international organisations in this field ensures that the Marine Research Institute is working in conformity with demands that meet international criteria.

4 Deciding the total allowable catch (TAC) based on scientific grounds

The minister of fisheries determines the annual TAC of every species subject to quota regulation. A scientific assessment of the state of the fish stocks and the condition of the ecosystem constitutes the main basis of determining the TAC each year.

Conformity between the scientific fisheries advice and the authorities' decisions on the TAC is a principal factor for ensuring responsible fisheries management. The authorities' decisions on the maximum catch are based on social and economic factors, yet always focused on ensuring the long-term renewal of the fish stocks. The Icelandic authorities have implemented a utilization strategy with the long-term objective of ensuring sustainable fisheries.

5 Effective catch control and enforcement

Effective control is an inseparable part of the responsible fisheries management and ensures that the catches in Iceland are well in conformity with the TAC every fishing year.

The Directorate of Fisheries is responsible for the implementation of laws and regulations regarding fisheries management in Iceland and for monitoring and enforcement regarding the fisheries operation and the fish processing. The Directorate is a public institution that falls under the Ministry of Fisheries. All commercial fisheries are subject to authorization by the Directorate of Fisheries.

Any catch brought ashore is to be weighed by accredited harbour officials. Upon completion of weighing, the relevant harbour authorities register the catch in the central database of the Directorate of Fisheries, which ensures a steady overview of the status of the allowable catch of every vessel and how much has been taken from the fisheries quota. The fisheries inspectors of the Directorate of Fisheries monitor the correct weighing and registration of the catch. Information on each vessel's allowable catch and quota use is regularly updated and made public and accessible to all on the Directorate's web-site, as mandated by law, thus ensuring transparency.

The fishing gear is subject to effective monitoring, as well as the composition of the catch and its handling onboard the fishing vessels. The inspectors have access to the catch logs, which state the location of the fishing activity, the day of the catch, the type of fishing gear used and the catch quantity. If such control reveals the presence of much small fish or juveniles at the fishing grounds, the Marine Research Institute temporarily closes the relevant fishing grounds without delay.

The Iceland Coast Guard, which falls under the auspices of the Ministry of Justice, monitors the fisheries of vessels operating in Icelandic waters, as well as monitoring closed areas. Additionally, it inspects the fishing gear, for example the mesh size of the nets.

6 Reliability of catch information ensured

The effectiveness of monitoring of the fisheries and catch control is reflected, among other things, in the observed good conformity between the TAC and the real catch every year.

Anyone purchasing and/or selling catches is obligated to present reports to the Directorate of Fisheries, containing information on the purchase, sale and other disposition of fish catches. 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, measures are taken when this is deemed appropriate. This ensures independent

checking of the accuracy of information about the catches that are brought ashore.

Experience shows that there is good conformity between the catch information of the Directorate of Fisheries and the information about the total fish export as registered elsewhere. This conformity illustrates the reliability of the catch information.

7 Severe penalty for breaches of the fisheries management legislation

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

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

8 Extensive research of the impact of fisheries on the marine ecosystem

Extensive knowledge of the ocean around Iceland and its ecosystem is the foundation of decisions on sustainable fisheries and other utilization of the natural resources of the sea.

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 foundations of the advice on sustainable catch level of the fish stocks. Additionally, the institute investigates fishing gear and its impact on the ecosystem, including bottom trawl, line, net and mid-water trawl fisheries and the fishing gear's selectivity. Research on the impact of fishing gear is among other things aimed at minimizing to the extent possible such impact on the ocean's ecosystem.

9 Special measures for protecting small fish and the ecosystem

Various special measures are taken to ensure the protection of small fish and vulnerable habitats, such as regulations on the type of fishing gear allowed in different areas and the closing of fishing grounds. Such measures include rules on the minimum mesh size and the use of small-fish sorting grids.

If monitoring reveals that the percentage of small fish in the catch or the by-catch exceeds guideline limits, the Marine Research Institute may close the relevant fishing area for a short period of time. Such a fishing prohibition enters into force within a few hours. If small fish or by-catch repeatedly exceeds guideline limits, the relevant area is closed for a longer period of time.

Various area closures are in effect for longer periods of time and the Ministry of Fisheries enters the decisions on such long-term closures into force. The closures may apply to specific fishing gear, fishing-vessel size or all fishing for certain periods of time. Annually, such temporary closures of areas are in force to protect spawning grounds of cod and other demersal species. Additionally, in some areas the use of bottom fishing gear is totally prohibited, for example where there is coral and in other vulnerable areas.

10 Clear 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 and estimate discarded catches. The results indicate insignificant discards by the Icelandic fishing fleet.

11 Steady improvements

Fisheries management in Iceland has a long history and the fisheries management system has been under development for decades with a focus on the fisheries being both economical and sustainable with respect to the natural resources' utilization and renewal.

In recent years, measures have been taken in strengthening an ecosystem approach to the fisheries management in Iceland. Increasing emphasis is placed on research and development of methods in this field, and on fisheries advice that takes into account various interrelated factors in the ecosystem, such as the interaction of the species, environmental change and multi-species impacts. The focus is furthermore on strengthening research on the effects of fishing gear on the ecosystem, particularly on the seabed and the living bottom communities.

The Icelandic fishing industry and the authorities will continue to fully promote responsible fisheries management and to work against any illegal fisheries on the international scene.

Icelanders have the ambition to be in the forefront of responsible treatment of the natural resources of the ocean. Hence, steady improvements are made of the fisheries management in Iceland and its scientific basis and measures are taken to strengthen the dissemination of information on the Icelandic fisheries.

Reykjavík, August 7th 2007

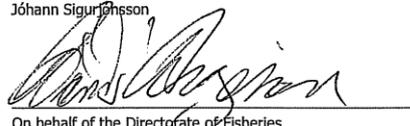
The parties to this statement guarantee that the information provided herein correctly illustrates the fisheries management in Iceland and in particular how firm measures are taken to secure sustainable utilization of the renewable natural resources in the ocean around Iceland.



The Minister of Fisheries
Einar K. Guðfinnsson



On behalf of the Marine Research Institute
Jóhann Sigurðsson



On behalf of the Directorate of Fisheries
Þórunn Ásgeirsson



On behalf of the Fisheries Association of Iceland
Pétur Bjarnason

Further information about the Icelandic fisheries and the fisheries management is available on the websites www.fisheries.is, www.hafro.is and www.fiskistofa.is

Appendix 2

MSC Principles and Criteria for Sustainable Fishing

At the centre of the MSC is a set of *Principles and Criteria for Sustainable Fishing* which are used as a standard in a third party, independent and voluntary certification programme. These were developed by means of an extensive, international consultative process through which the views of stakeholders in fisheries were gathered.

These Principles reflect a recognition that a sustainable fishery should be based upon:

- The maintenance and re-establishment of healthy populations of targeted species;
- The maintenance of the integrity of ecosystems;
- The development and maintenance of effective fisheries management systems, taking into account all relevant biological, technological, economic, social, environmental and commercial aspects; and
- Compliance with relevant local and national local laws and standards and international understandings and agreements

The Principles and Criteria are further designed to recognise and emphasise that management efforts are most likely to be successful in accomplishing the goals of conservation and sustainable use of marine resources when there is full co-operation among the full range of fisheries stakeholders, including those who are dependent on fishing for their food and livelihood.

On a voluntary basis, fisheries which conform to these Principles and Criteria will be eligible for certification by independent MSC-accredited certifiers. Fish processors, traders and retailers will be encouraged to make public commitments to purchase fish products only from certified sources. This will allow consumers to select fish products with the confidence that they come from sustainable, well managed sources. It will also benefit the fishers and the fishing industry who depend on the abundance of fish stocks, by providing market incentives to work towards sustainable practices. Fish processors, traders and retailers who buy from certified sustainable sources will in turn benefit from the assurance of continuity of future supply and hence sustainability of their own businesses.

The MSC promotes equal access to its certification programme irrespective of the scale of the fishing operation. The implications of the size, scale, type, location and intensity of the fishery, the uniqueness of the resources and the effects on other ecosystems will be considered in every certification.

The MSC further recognises the need to observe and respect the long-term interests of people dependent on fishing for food and livelihood to the extent that it is consistent with ecological sustainability, and also the importance of fisheries management and operations being conducted in a manner consistent with established local, national, and international rules and standards as well as in compliance with the MSC Principles and Criteria.

Preamble

The following Principles & Criteria are intended to guide the efforts of the Marine Stewardship Council towards the development of sustainable fisheries on a global basis. They were developed assuming that a sustainable fishery is defined, for the purposes of MSC certification, as one that is conducted in such a way that:

- it can be continued indefinitely at a reasonable level;
- it maintains and seeks to maximise, ecological health and abundance,
- it maintains the diversity, structure and function of the ecosystem on which it depends as well as the quality of its habitat, minimising the adverse effects that it causes;
- it is managed and operated in a responsible manner, in conformity with local, national and international laws and regulations;
- it maintains present and future economic and social options and benefits;
- it is conducted in a socially and economically fair and responsible manner.

The Principles represent the overarching philosophical basis for this initiative in stewardship of marine resources: the use of market forces to promote behaviour which helps achieve the goal of sustainable

fisheries. They form the basis for detailed Criteria which will be used to evaluate each fishery seeking certification under the MSC programme. Although the primary focus is the ecological integrity of world fisheries, the principles also embrace the human and social elements of fisheries. Their successful implementation depends upon a system which is open, fair, based upon the best information available and which incorporates all relevant legal obligations. The certification programme in which these principles will be applied is intended to give any fishery the opportunity to demonstrate its commitment to sustainable fishing and ultimately benefit from this commitment in the market place.

Scope

The scope of the MSC Principles and Criteria relates to marine fisheries activities up to but not beyond the point at which the fish are landed. However, MSC-accredited certifiers may be informed of serious concerns associated with post-landing practices.¹

The MSC Principles and Criteria apply at this stage only to wildcapture fisheries (including, but not limited to shellfish, crustaceans and cephalopods). Aquaculture and the harvest of other species are not currently included.

Issues involving allocation of quotas and access to marine resources are considered to be beyond the scope of these Principles and Criteria.

PRINCIPLE 1

A fishery must be conducted in a manner that does not lead to over-fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery²:

Intent:

The intent of this principle is to ensure that the productive capacities of resources are maintained at high levels and are not sacrificed in favour of short term interests. Thus, exploited populations would be maintained at high levels of abundance designed to retain their productivity, provide margins of safety for error and uncertainty, and restore and retain their capacities for yields over the long term.

Criteria:

1. The fishery shall be conducted at catch levels that continually maintain the high productivity of the target population(s) and associated ecological community relative to its potential productivity.
2. Where the exploited populations are depleted, the fishery will be executed such that recovery and rebuilding is allowed to occur to a specified level consistent with the precautionary approach and the ability of the populations to produce long-term potential yields within a specified time frame.
3. Fishing is conducted in a manner that does not alter the age or genetic structure or sex composition to a degree that impairs reproductive capacity.

¹ Other complementary certification programmes (e.g., ISO 14000) provide opportunities for documenting and evaluating impacts of post landing activities related to fisheries products certified to MSC standards. Constructive solutions to address these concerns through appropriate measures should be sought through dialogue with certification organisations and other relevant bodies.

² The sequence in which the Principles and Criteria appear does not represent a ranking of their significance, but is rather intended to provide a logical guide to certifiers when assessing a fishery. The criteria by which the MSC Principles will be implemented will be reviewed and revised as appropriate in light of relevant new information, technologies and additional consultations

PRINCIPLE 2:

Fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent and ecologically related species) on which the fishery depends.

Intent:

The intent of this principle is to encourage the management of fisheries from an ecosystem perspective under a system designed to assess and restrain the impacts of the fishery on the ecosystem.

Criteria:

1. The fishery is conducted in a way that maintains natural functional relationships among species and should not lead to trophic cascades or ecosystem state changes.
2. The fishery is conducted in a manner that does not threaten biological diversity at the genetic, species or population levels and avoids or minimises mortality of, or injuries to endangered, threatened or protected species.
3. Where exploited populations are depleted, the fishery will be executed such that recovery and rebuilding is allowed to occur to a specified level within specified time frames, consistent with the precautionary approach and considering the ability of the population to produce long-term potential yields.

PRINCIPLE 3:

The fishery is subject to an effective management system that respects local, national and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable.

Intent:

The intent of this principle is to ensure that there is an institutional and operational framework for implementing Principles 1 and 2, appropriate to the size and scale of the fishery.

A. Management System Criteria:

1. The fishery shall not be conducted under a controversial unilateral exemption to an international agreement.

The management system shall:

2. demonstrate clear long-term objectives consistent with MSC Principles and Criteria and contain a consultative process that is transparent and involves all interested and affected parties so as to consider all relevant information, including local knowledge. The impact of fishery management decisions on all those who depend on the fishery for their livelihoods, including, but not confined to subsistence, artisanal, and fishing-dependent communities shall be addressed as part of this process;
3. be appropriate to the cultural context, scale and intensity of the fishery – reflecting specific objectives, incorporating operational criteria, containing procedures for implementation and a process for monitoring and evaluating performance and acting on findings;
4. observe the legal and customary rights and long term interests of people dependent on fishing for food and livelihood, in a manner consistent with ecological sustainability;
5. incorporates an appropriate mechanism for the resolution of disputes arising within the system³;
6. provide economic and social incentives that contribute to sustainable fishing and shall not operate with subsidies that contribute to unsustainable fishing;
7. act in a timely and adaptive fashion on the basis of the best available information using a precautionary approach particularly when dealing with scientific uncertainty;
8. incorporate a research plan – appropriate to the scale and intensity of the fishery – that addresses the information needs of management and provides for the dissemination of research results to all interested parties in a timely fashion;

³ Outstanding disputes of substantial magnitude involving a significant number of interests will normally disqualify a fishery from certification.

9. require that assessments of the biological status of the resource and impacts of the fishery have been and are periodically conducted;
10. specify measures and strategies that demonstrably control the degree of exploitation of the resource, including, but not limited to:
 - a. setting catch levels that will maintain the target population and ecological community's high productivity relative to its potential productivity, and account for the non-target species (or size, age, sex) captured and landed in association with, or as a consequence of, fishing for target species;
 - b. identifying appropriate fishing methods that minimise adverse impacts on habitat, especially in critical or sensitive zones such as spawning and nursery areas;
 - c. providing for the recovery and rebuilding of depleted fish populations to specified levels within specified time frames;
 - d. mechanisms in place to limit or close fisheries when designated catch limits are reached;
 - e. establishing no-take zones where appropriate;
11. contains appropriate procedures for effective compliance, monitoring, control, surveillance and enforcement which ensure that established limits to exploitation are not exceeded and specifies corrective actions to be taken in the event that they are.

B. Operational Criteria

Fishing operation shall:

12. make use of fishing gear and practices designed to avoid the capture of non-target species (and non-target size, age, and/or sex of the target species); minimise mortality of this catch where it cannot be avoided, and reduce discards of what cannot be released alive;
13. implement appropriate fishing methods designed to minimise adverse impacts on habitat, especially in critical or sensitive zones such as spawning and nursery areas;
14. not use destructive fishing practices such as fishing with poisons or explosives;
15. minimise operational waste such as lost fishing gear, oil spills, on-board spoilage of catch, etc.;
16. be conducted in compliance with the fishery management system and all legal and administrative requirements; and
17. assist and co-operate with management authorities in the collection of catch, discard, and other information of importance to effective management of the resources and the fishery.

Engaged fisheries

From Alaska to New Zealand people are talking about the MSC as more fisheries, businesses and consumers look for evidence of sustainability.



Rank	Country	MSC status	Metric tonnes of fish
1	Alaska (USA)	Blue	1,000,000+
2	Alaska (USA)	Blue	1,000,000+
3	Alaska (USA)	Blue	1,000,000+
4	Alaska (USA)	Blue	1,000,000+
5	Alaska (USA)	Blue	1,000,000+
6	Alaska (USA)	Blue	1,000,000+
7	Alaska (USA)	Blue	1,000,000+
8	Alaska (USA)	Blue	1,000,000+
9	Alaska (USA)	Blue	1,000,000+
10	Alaska (USA)	Blue	1,000,000+
11	Alaska (USA)	Blue	1,000,000+
12	Alaska (USA)	Blue	1,000,000+
13	Alaska (USA)	Blue	1,000,000+
14	Alaska (USA)	Blue	1,000,000+
15	Alaska (USA)	Blue	1,000,000+
16	Alaska (USA)	Blue	1,000,000+
17	Alaska (USA)	Blue	1,000,000+
18	Alaska (USA)	Blue	1,000,000+
19	Alaska (USA)	Blue	1,000,000+
20	Alaska (USA)	Blue	1,000,000+
21	Alaska (USA)	Blue	1,000,000+
22	Alaska (USA)	Blue	1,000,000+
23	Alaska (USA)	Blue	1,000,000+
24	Alaska (USA)	Blue	1,000,000+
25	Alaska (USA)	Blue	1,000,000+
26	Alaska (USA)	Blue	1,000,000+
27	Alaska (USA)	Blue	1,000,000+
28	Alaska (USA)	Blue	1,000,000+
29	Alaska (USA)	Blue	1,000,000+
30	Alaska (USA)	Blue	1,000,000+
31	Alaska (USA)	Blue	1,000,000+
32	Alaska (USA)	Blue	1,000,000+
33	Alaska (USA)	Blue	1,000,000+
34	Alaska (USA)	Blue	1,000,000+
35	Alaska (USA)	Blue	1,000,000+
36	Alaska (USA)	Blue	1,000,000+
37	Alaska (USA)	Blue	1,000,000+
38	Alaska (USA)	Blue	1,000,000+
39	Alaska (USA)	Blue	1,000,000+
40	Alaska (USA)	Blue	1,000,000+
41	Alaska (USA)	Blue	1,000,000+
42	Alaska (USA)	Blue	1,000,000+
43	Alaska (USA)	Blue	1,000,000+
44	Alaska (USA)	Blue	1,000,000+
45	Alaska (USA)	Blue	1,000,000+
46	Alaska (USA)	Blue	1,000,000+
47	Alaska (USA)	Blue	1,000,000+
48	Alaska (USA)	Blue	1,000,000+
49	Alaska (USA)	Blue	1,000,000+
50	Alaska (USA)	Blue	1,000,000+



Koroishi (right) was appointed the MSC's Asia-Pacific Director in Japan. He soon started his outreach work with companies and fisheries.

With encouragement from the MSC's Asia-Pacific director Duncan Leachman (left), 29 companies have joined the MSC's China, Malaysia and Vietnam. Several fisheries in the Asia-Pacific region are undertaking pre-assessment against the MSC standards, with more progress expected in 2007/08.

The MSC's Developing World Programme, run by Dr Iwan Doremyl, has encouraged countries to also part in certification and access new markets. This year, more than 100 companies in the Gambia, Ghana, India, Kenya and Tanzania, resulting in more than 100,000 tonnes of MSC-certified fish.

Rank	Country	MSC status	Metric tonnes of fish
1	Alaska (USA)	Blue	1,000,000+
2	Alaska (USA)	Blue	1,000,000+
3	Alaska (USA)	Blue	1,000,000+
4	Alaska (USA)	Blue	1,000,000+
5	Alaska (USA)	Blue	1,000,000+
6	Alaska (USA)	Blue	1,000,000+
7	Alaska (USA)	Blue	1,000,000+
8	Alaska (USA)	Blue	1,000,000+
9	Alaska (USA)	Blue	1,000,000+
10	Alaska (USA)	Blue	1,000,000+
11	Alaska (USA)	Blue	1,000,000+
12	Alaska (USA)	Blue	1,000,000+
13	Alaska (USA)	Blue	1,000,000+
14	Alaska (USA)	Blue	1,000,000+
15	Alaska (USA)	Blue	1,000,000+
16	Alaska (USA)	Blue	1,000,000+
17	Alaska (USA)	Blue	1,000,000+
18	Alaska (USA)	Blue	1,000,000+
19	Alaska (USA)	Blue	1,000,000+
20	Alaska (USA)	Blue	1,000,000+
21	Alaska (USA)	Blue	1,000,000+
22	Alaska (USA)	Blue	1,000,000+
23	Alaska (USA)	Blue	1,000,000+
24	Alaska (USA)	Blue	1,000,000+
25	Alaska (USA)	Blue	1,000,000+
26	Alaska (USA)	Blue	1,000,000+
27	Alaska (USA)	Blue	1,000,000+
28	Alaska (USA)	Blue	1,000,000+
29	Alaska (USA)	Blue	1,000,000+
30	Alaska (USA)	Blue	1,000,000+
31	Alaska (USA)	Blue	1,000,000+
32	Alaska (USA)	Blue	1,000,000+
33	Alaska (USA)	Blue	1,000,000+
34	Alaska (USA)	Blue	1,000,000+
35	Alaska (USA)	Blue	1,000,000+
36	Alaska (USA)	Blue	1,000,000+
37	Alaska (USA)	Blue	1,000,000+
38	Alaska (USA)	Blue	1,000,000+
39	Alaska (USA)	Blue	1,000,000+
40	Alaska (USA)	Blue	1,000,000+
41	Alaska (USA)	Blue	1,000,000+
42	Alaska (USA)	Blue	1,000,000+
43	Alaska (USA)	Blue	1,000,000+
44	Alaska (USA)	Blue	1,000,000+
45	Alaska (USA)	Blue	1,000,000+
46	Alaska (USA)	Blue	1,000,000+
47	Alaska (USA)	Blue	1,000,000+
48	Alaska (USA)	Blue	1,000,000+
49	Alaska (USA)	Blue	1,000,000+
50	Alaska (USA)	Blue	1,000,000+



Fisheries certified in South America led by the MSC's consultant Enrique Espinosa. The year most fisheries throughout South and Central America and reports growing interest from the rest of the world.

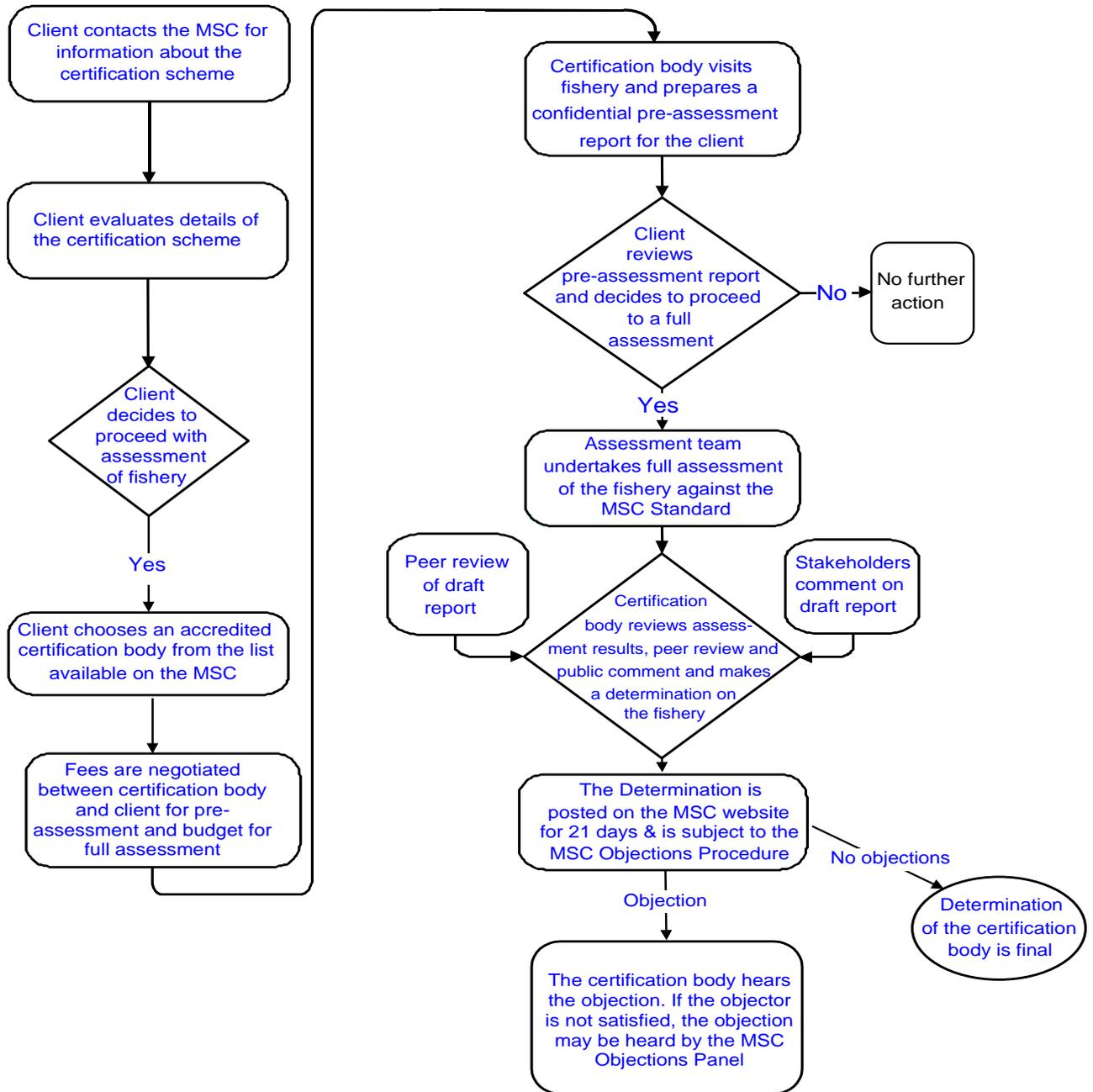
Rank	Country	MSC status	Metric tonnes of fish
1	Alaska (USA)	Blue	1,000,000+
2	Alaska (USA)	Blue	1,000,000+
3	Alaska (USA)	Blue	1,000,000+
4	Alaska (USA)	Blue	1,000,000+
5	Alaska (USA)	Blue	1,000,000+
6	Alaska (USA)	Blue	1,000,000+
7	Alaska (USA)	Blue	1,000,000+
8	Alaska (USA)	Blue	1,000,000+
9	Alaska (USA)	Blue	1,000,000+
10	Alaska (USA)	Blue	1,000,000+
11	Alaska (USA)	Blue	1,000,000+
12	Alaska (USA)	Blue	1,000,000+
13	Alaska (USA)	Blue	1,000,000+
14	Alaska (USA)	Blue	1,000,000+
15	Alaska (USA)	Blue	1,000,000+
16	Alaska (USA)	Blue	1,000,000+
17	Alaska (USA)	Blue	1,000,000+
18	Alaska (USA)	Blue	1,000,000+
19	Alaska (USA)	Blue	1,000,000+
20	Alaska (USA)	Blue	1,000,000+
21	Alaska (USA)	Blue	1,000,000+
22	Alaska (USA)	Blue	1,000,000+
23	Alaska (USA)	Blue	1,000,000+
24	Alaska (USA)	Blue	1,000,000+
25	Alaska (USA)	Blue	1,000,000+
26	Alaska (USA)	Blue	1,000,000+
27	Alaska (USA)	Blue	1,000,000+
28	Alaska (USA)	Blue	1,000,000+
29	Alaska (USA)	Blue	1,000,000+
30	Alaska (USA)	Blue	1,000,000+
31	Alaska (USA)	Blue	1,000,000+
32	Alaska (USA)	Blue	1,000,000+
33	Alaska (USA)	Blue	1,000,000+
34	Alaska (USA)	Blue	1,000,000+
35	Alaska (USA)	Blue	1,000,000+
36	Alaska (USA)	Blue	1,000,000+
37	Alaska (USA)	Blue	1,000,000+
38	Alaska (USA)	Blue	1,000,000+
39	Alaska (USA)	Blue	1,000,000+
40	Alaska (USA)	Blue	1,000,000+
41	Alaska (USA)	Blue	1,000,000+
42	Alaska (USA)	Blue	1,000,000+
43	Alaska (USA)	Blue	1,000,000+
44	Alaska (USA)	Blue	1,000,000+
45	Alaska (USA)	Blue	1,000,000+
46	Alaska (USA)	Blue	1,000,000+
47	Alaska (USA)	Blue	1,000,000+
48	Alaska (USA)	Blue	1,000,000+
49	Alaska (USA)	Blue	1,000,000+
50	Alaska (USA)	Blue	1,000,000+

MSC certified fisheries and fisheries undergoing full assessment, as shown in MSC's annual report in April 2007.

MSC - the best environmental choice in seafood

Appendix 4

Flow Chart of Main Steps in Fishery Assessment Process

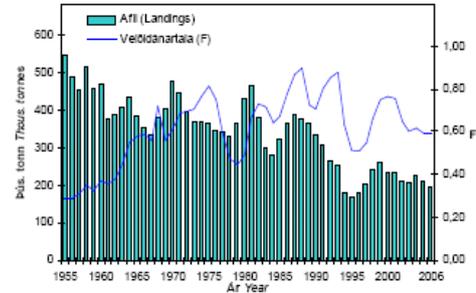
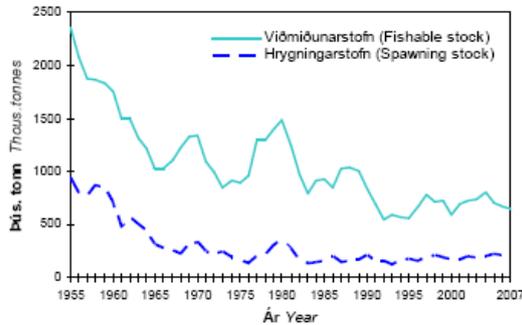


Following a favourable certification, the fishery earns the claim of being a **well-managed and sustainable fishery**.

Appendix 5

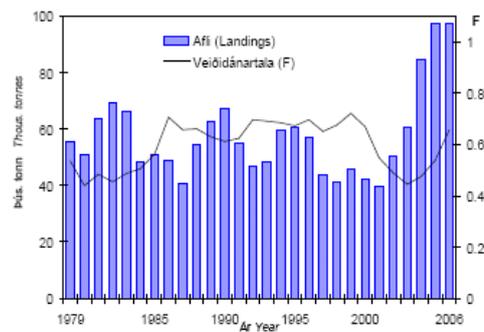
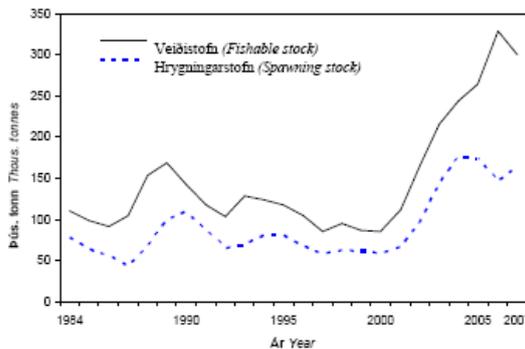
Condition of important Icelandic fish stocks

Cod



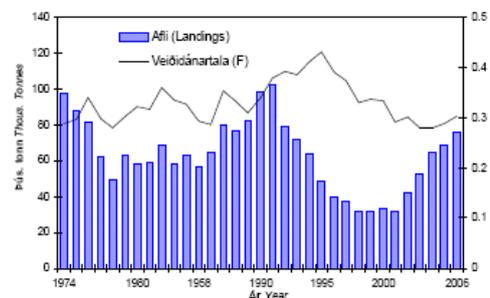
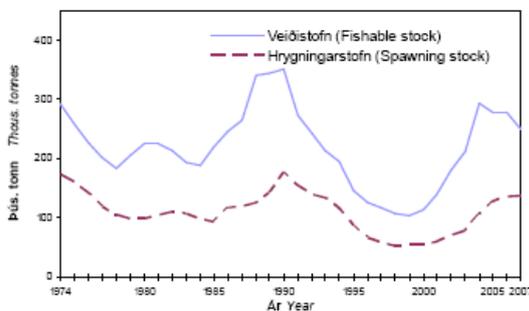
The cod stock is only a third of what it was fifty years ago. Implementation of the ITQ system resulting in severe reductions in catches has not improved the condition of the stock.

Haddock



The haddock stock is in a very good condition and has tripled in size since the quota system was first implemented in 1984. Catches have consequently doubled and are expected to remain at around 100 thousand tons.

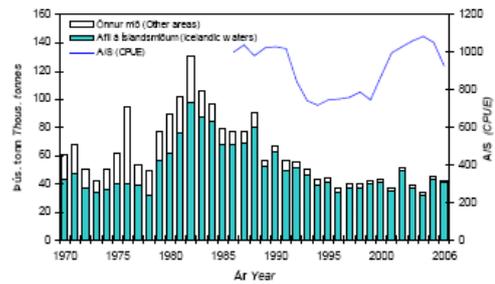
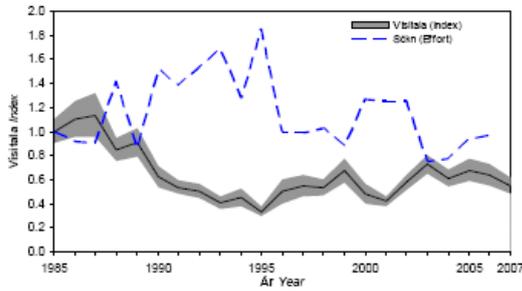
Pollock



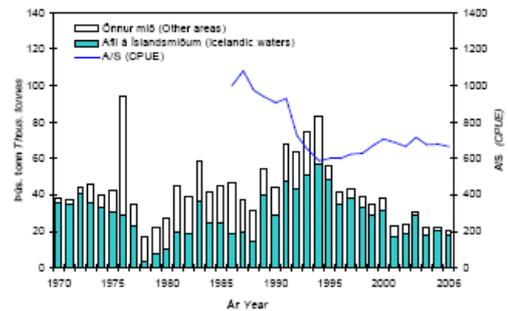
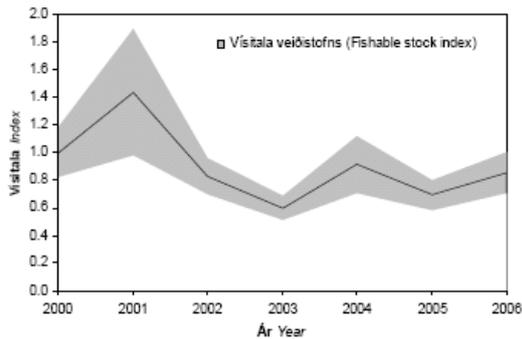
The pollock stock is characterised by severe natural fluctuations, but the overall trend for the past three decades suggests that the stock is in a healthy condition.

Redfish

Sebastes marinus

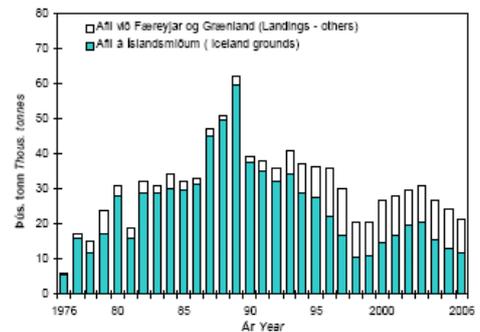
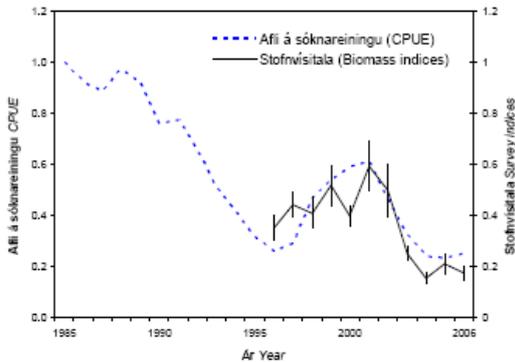


Sebastes mantella



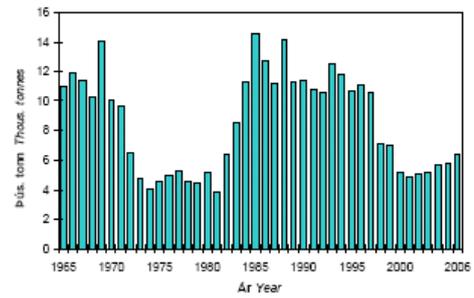
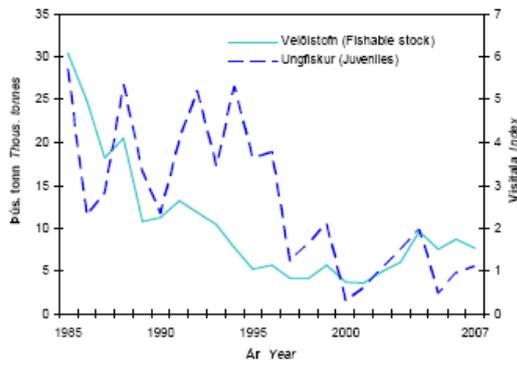
There are two different redfish stocks utilised in Icelandic waters. They are both recovering after having been overfished in the 80's and appear to be improving, but they need more time because the species grows very slowly and does for example not become mature until 14-16 years of age.

Greenland halibut



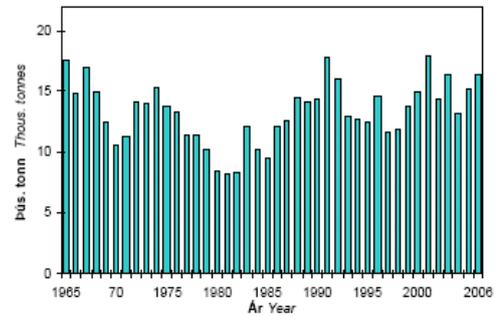
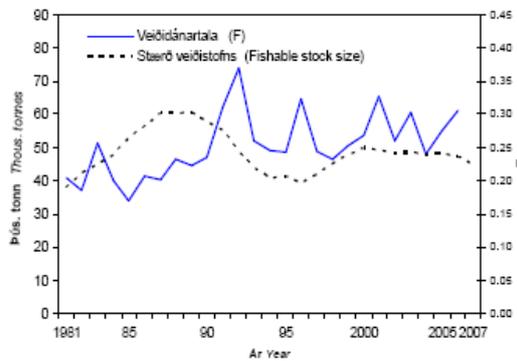
The Greenland halibut is in a critical condition. The stock is transboundary, living inside the EEZ of Iceland, Greenland and Faroe Islands. These countries have not agreed on a cooperative management scheme, which has resulted in a severe overfishing; particularly on the Faroese side. Iceland has attempted to address the problem by reducing quotas, but lack of compliance from Faroe Islands and Greenland suggest that the fishery will remain unsustainable.

Plaice



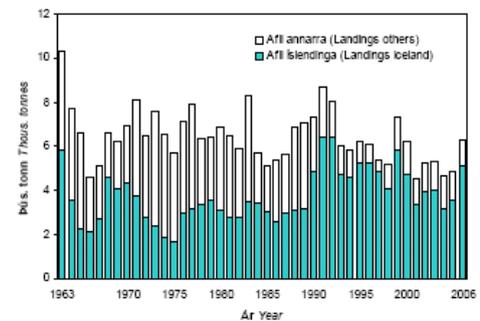
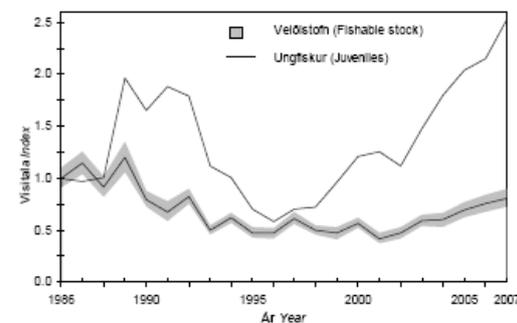
Plaice was severely overfished in the late 80's and early 90's. The stock has not recovered despite quotas being cut in half. The stock is believed to be less than a third of what it was when the quota system was first implemented in 1984.

Catfish (Wolffish)



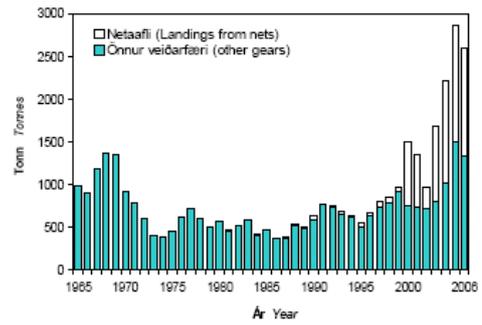
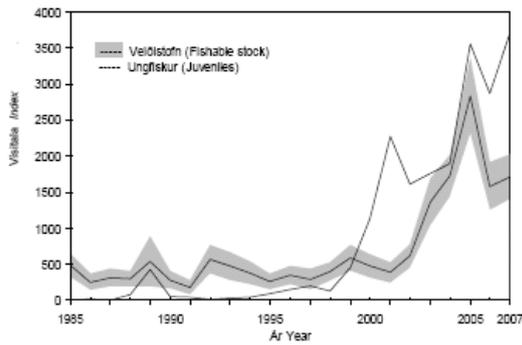
The catfish stock has been relatively stable for the past two decades and catches have also remained stable between 13 and 16 thousand tons a year, in accordance with scientific advice. The IMRI has though revised its advice in the light of disappointing recruitments for past few years and the quota for 2007/08 was therefore set at 12.500 tons. But the IMRI had wanted to reduce catches down to 11.000 tons, as precaution because the stock is slow growing. Catfish does not become mature until 6-8 years of age.

Tusk



The tusk stock is in a good condition and catches have been stable for the past few years at 4-6.000 tons.

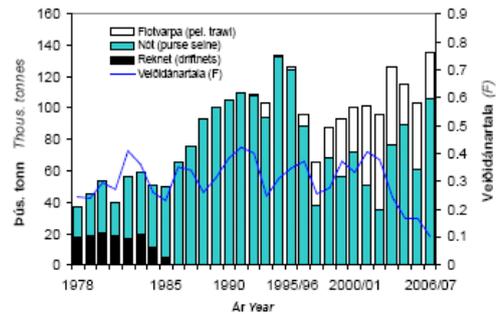
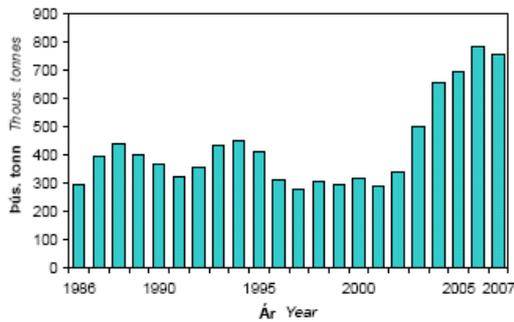
Monkfish



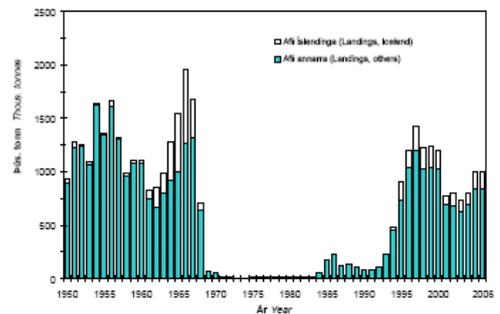
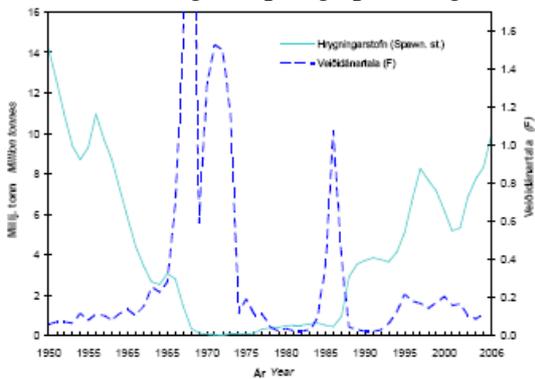
The monkfish stock is in a very good condition despite of severe increase in catches for the past few years. Increased distribution caused by higher sea temperature might be the main explanation for this development.

Herring

Icelandic summer spawning herring

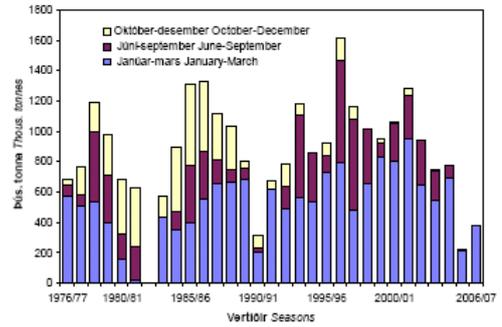
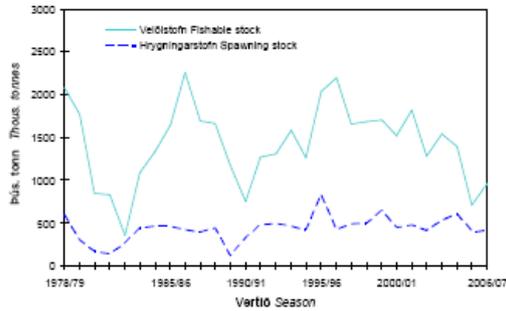


Norwegian spring spawning herring



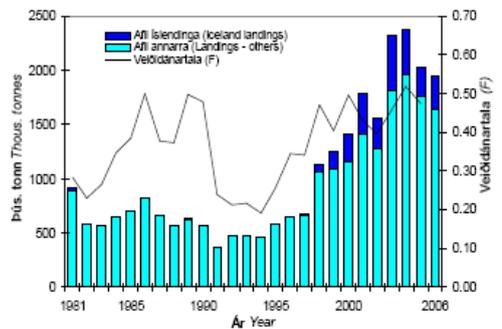
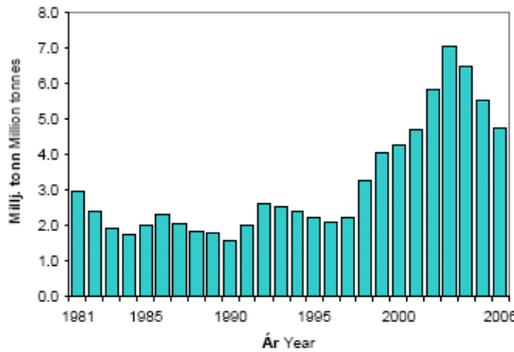
There are two separate herring stocks that are utilised by Icelandic vessels. The Icelandic summer spawning herring that lives solely in Icelandic waters and the Norwegian spring spawning herring, which is a migratory stock. Both of these stocks are in a very good condition and have not been this large since in the 60's.

Capelin



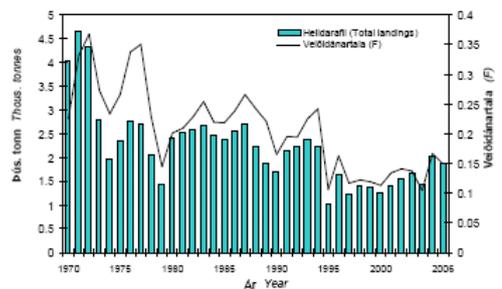
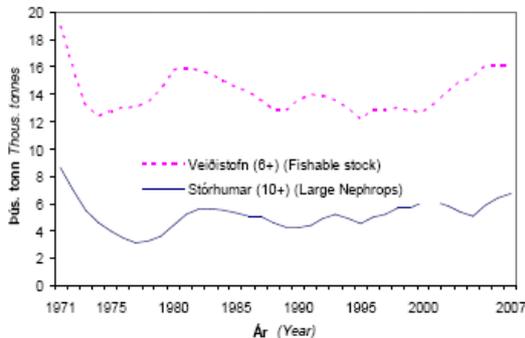
Size of the capelin stock is characterised by severe fluctuations, explained by the fact that the capelin dies after having spawned for the first time, at the age of three. The stock is very unpredictable, which makes it difficult to predict the condition of the stock.

Blue whiting



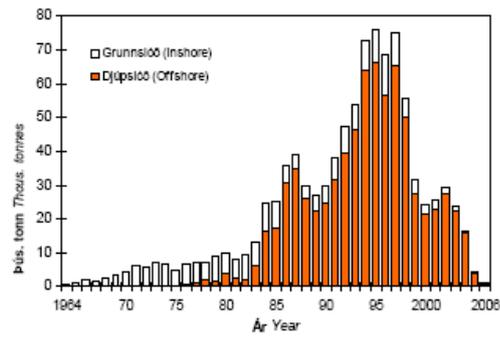
Blue whiting is a migratory stock that is spread all across the North Atlantic. Numerous countries utilise the stock, but Iceland accounts for about 15% of the catches. The stock is in a good condition despite of being harvested far above scientific advice, but lack of cooperation caused by lowest common denominator problems have caused TAC's to be set at double the recommended volumes.

Lobster



The lobster stock has been in a stable condition for the past three decades and catches have been relatively stable for the past few years.

Shrimp



There are many shrimp stocks located in Icelandic waters, but they are all in a critical condition as represented by diminishing catch numbers. Total catch in 2006 was for example only 2% of what it was ten years ago.

Appendix 6

Imaginary assessment of Icelandic fisheries according to the MSC standard

Assessment for MSC certification

Species	Stock status	Management	Fishing method						
			Bottom trawl	Longline	Danish seine	Gillnet	Jig	Mid-water trawl	Purse seine
Cod	-	Catch 6% above TAC	49.4%	34.7%	4.9%	12.5%	2.3%		
Haddock	+	ok	50.8%	35.6%	11.5%	1.0%	1.0%		
Pollock	±	ok	85.7%	1.5%	2.0%	5.5%	2.7%		
Redfish	±	Catch 4% above TAC	99.0%						
Greenl. halibut	-	Catch 48% above TAC	90.5%			5.0%			
Plaice	-	MRI (TAC catch)	32.3%			1.1%			
Catfish	±	Catch 27% above TAC	47.4%	43.3%	65.9%	0.5%	0.4%		
Tusk	±	MRI (TAC catch)							
Monkfish	±	MRI (TAC catch)							
Herring	+	Catch 4% above TAC							
Capelin	?	ok							
Blue whiting	+	ok							
Lobster	±	MRI (TAC catch)	100.0%						
Shrimp	-	ok	100.0%						

Cod
The cod stock is far below average and therefore not eligible for certification

Haddock
The haddock stock is above average, TAC's have been in accordance with scientific advice and catch in accordance with TAC's. Line-caught, gillnetted and jigged haddock should therefore be able to attain MSC certification

Pollock
The pollock stock is at its average size, TAC's have been in accordance with scientific advice and catch in accordance with TAC's. Line-caught, gillnetted and jigged pollock should therefore be able to attain MSC certification. But that however only applies to 10% of the pollock catch in 2006/07

Redfish
Redfish is solely caught in bottom trawls and is therefore not eligible for certification

Greenl. halibut
Stock size of the Greenland halibut is far below average and it is therefore not eligible for certification

Plaice
Stock size of plaice is far below average and it is therefore not eligible for certification

Catfish
The catfish stock is at its average size, TAC's have been in accordance with scientific advice but actual catch surpassed the issued TAC's by 26% in 2006/07. MSC would have to be reassured that TAC's are going to be honored if they are to certify line-caught, gillnetted and jigged catfish.

Tusk
Tusk is at its average size, but TAC's have not been in accordance with scientific advice and catch has surpassed issued TAC's

Monkfish
Monkfish is at its average size, but TAC's have not been in accordance with scientific advice and catch has surpassed issued TAC's

Herring
The herring stock is above average and TAC's in accordance with scientific advice. Herring caught in Mid-water trawl and purse seine should therefore be eligible for MSC certification

Capelin
purse seine is more environmentally friendly than mid-water trawl, and therefore likelier to attain certification

Blue whiting
Stock status of capelin is uncertain and certification therefore impossible because of the precautionary principle

Lobster
The blue whiting stock is above average and should therefore be eligible for MSC certification

Shrimp
Lobster is solely caught in bottom trawl in Icelandic waters, certification is therefore unlikely

The shrimp stock is far below average and therefore not eligible for certification

References

- Abba. (2008). KRAV. Abba Seafood AB. Retrieved February 8, 2008, from <http://abba.se/fisk/krav/>
- Agnew D., Grieve C., Orrl P., Parkes G. & Barker N. (2006). *Environmental benefits resulting from certification against MSC's principles & criteria for sustainable fishing*. MRAG UK Ltd & Marine Stewardship Council, London. Retrieved December 4, 2007, from http://www.msc.org/assets/docs/Resources/MSC_Environmental_Benefits_Report_Phase1_FINAL_4May2006.pdf
- Aldred J. (2008, January 30). Top chefs to lobby restaurants on sustainable fish menus. *Guardian*. Retrieved April 14, 2008, from <http://www.guardian.co.uk/environment/2008/jan/30/fishing.food>
- Alverson D.L., Freeberg M.H., Murawski S.A. & Pope J.G. (1994). *A global assessment of fisheries bycatch and discards*. FAO fisheries technical paper on. 339. FAO fisheries department, Rome, Italy. Retrieved October 1, 2007, from <http://www.fao.org/docrep/003/T4890E/T4890E00.HTM>
- ANF. (2007). *The dolphin safe symbol & Greenseas tuna*. The Australian Nutrition Foundation Inc. Retrieved December 2, 2007, from http://www.nutritionaustralia.org/Food_Facts/Symbols_Foodlabels/dolphinsafe.asp.
- Anonymous. (1997, June 25). "Ósætti um einyrkja". *Úr verinu*, Morgunblaðið. Retrieved November 29, 2007, from http://www.mbl.is/mm/gagnasafn/grein.html?grein_id=339041
- ASDA. (2007). *About ASDA*. Asda stores Ltd. Leeds, England. Retrieved February 20, 2008, from <http://www.asda-corporate.com/about-asda/>
- Audubon. (2008). *Seafood Lover's guide - Seafood wallet card*. Audubon. Society, NY, USA. Retrieved April 24, 2008, from <http://seafood.audubon.org/>
- Auster P.J. & Langton R.W. (1999). The effects of fishing on fish habitat. *American Fisheries Society Symposium*, 22:150–187. Retrieved October 5, 2007, from <http://www.nmfs.noaa.gov/habitat/habitatprotection/pdf/efh/Auster&Langton.pdf>
- AVS. (2006). Gæðavottun – aðferð til aukinna verðmæta – Sala sjávarfangs á markaði fyrir lífræn/vistvæn matvæli. Aukin Verðmæti Sjávarfangs.; Rannsóknarsjóður í Sjávarútvegi. Retrieved March 27, 2008, from <http://avs.rf.is/verkefni/rannverk/Listi//nr/1534>
- Árnason R. (2000). *Catch Management under ITQs: Enforcement, Bycatch and Discards*. University of Iceland, Reykjavik, Iceland. Retrieved October 1, 2007, from [www.hi.is/~ragnara/documents/Lectures/Catch%20Management%20under%20ITQs,%20Buenos%20Aires%20\(May%202001\).doc](http://www.hi.is/~ragnara/documents/Lectures/Catch%20Management%20under%20ITQs,%20Buenos%20Aires%20(May%202001).doc)
- Árnason R. & Gissurarson H.H. (1999). Individual transferable quotas in theory and practice. *Advances in ITQ fisheries management by Arnason R.* p.31-42. University of Iceland, Reykjavik, Iceland.
- Bauman M. (2007, August 5). ASMI takes steps to protect Alaska wild salmon brand. *Alaska journal of commerce*. Retrieved February 1, 2008, from http://www.alaskajournal.com/stories/080507/hom_20070805019.shtml
- BBC. (2007, January 18). *Tesco boss unveils green pledges*. British Broadcasting Corporation. Retrieved February 20, 2008, from <http://news.bbc.co.uk/2/hi/business/6276351.stm>
- Berry B. (2006). *Denmark: past present and future report*. Report by the Consulate of Canada in Copenhagen, Denmark. Retrieved March 15, 2008, from http://www.sea.agr.gc.ca/europe/4287_e.pdf
- BIM. (2002). *Overview of the Swedish seafood market*. Bord Iascaigh Mhara: Irish sea fisheries board. Retrieved March 9, 2008, from http://www.bim.ie/uploads/reports/Sweden_Summary.pdf

- Bjarnason P. (2005). Norrænt samstarf vegna umhverfismerkja. Slides from the 64th Fiskiping. Fisheries Association of Iceland. Retrieved April 28, 2008, from: <http://www.fiskifelag.is/files/pbfyrirlestur.ppt>
- Bjarnason P. (2006). *Fundur um "umhverfismerki" fyrir Íslenskar sjávarafurðir*. Slides from a conference on ecolabelling for Icelandic fisheries, held by the Fisheries association of Iceland. Retrieved August 7, 2007, from <http://www.fiskifelag.is/files/Inngangur%20PB.pdf>
- Björnsson E. (2004). *Olúnotkun íslenska fiskiskipaflotans og losun gróðurhúsalofttegunda frá honum*. University of Akureyri, Natural resource science, B.Sc. project. Retrieved December 4, 2007, from <http://www.landvernd.is/myndir/EythorRitgerd.pdf>
- Blueflag. (2007). *Blueflag*. Retrieved November 18, 2007, from www.blueflag.org
- Bours H., Gianni M. & Mather D. (2001). *Pirate fishing plundering the oceans*. Greenpeace International, Amsterdam, Nederland. Retrieved October 6, 2007, from <http://archive.greenpeace.org/oceans/reports/pirateen.pdf>
- Bray A. (2000). *Global review of illegal, unreported and unregulated (IUU) fishing*. FAO Rep. IUU/2000/6, 53. Food and Agriculture Organization of the United Nations, Rome, Italy. Retrieved October 6, 2007, from <http://www.fao.org/DOCREP/005/Y3274E/y3274e08.htm>
- Brown P. (2004, February 21). Crisis of credibility for "green" fisheries. *The Guardian*. Retrieved April 21, 2008, from: <http://www.flmnh.ufl.edu/fish/InNews/green2004.htm>
- Burton B. (2007). *Something fishy*. Abridged extract from Burtons book Inside Spin: The Dark Underbelly of the PR Industry. Allen & Unwin publishing, Sidney, Australia. Retrieved August 12, 2007, from <http://www.prwatch.org/node/6401/print>
- Busch F. & Benton J. (2005). *The marine stewardship council: exploring the potential of a private environmental governance mechanism*. Roskilde university center, Roskilde, Denmark. Retrieved August 4, 2007, from http://dspace.ruc.dk/bitstream/1800/404/1/The_Marine_Stewardship.pdf
- Carrefour. (2008). *Groupe Carrefour – Full year results 2007*. Carrefour SA, Levallois-perret, France. Retrieved February 29, 2008, from http://www.carrefour.com/docroot/groupe/C4com/Pieces_jointes/CA/CarrefourAnnualResults07GB.pdf
- CCPR. (2007, December 14). *CCPR/C/91/D/1306/2004*. The international Covenant on Civil and Political Rights. Retrieved April 30, 2008, from: http://www.fiskistofa.is/skjol/frettir/Alit_mannrettindanefndar_des_2007_isl.pdf
- Cherry D. (2008). Dutch retail sector takes a "colossal step" toward MSC-certified sustainable fish. *Intrafish*, 6(1), 23. Retrieved February 5, 2008, from http://www.intrafish.no/multimedia/archive/00022/pdf20080123_22161a.pdf
- Co-op (2007). *Annual report and financial statements 2006*. Co-operative group Ltd. Manchester, England. Retrieved February 25, 2008, from <http://www.co-operative.co.uk/EasysiteWeb/getresource.axd?AssetID=41825&type=Full&servicetype=Attachment>
- Coop NKL BA. (2007). *Annual report 2006*. Retrieved March 15, 2008, from <http://www.coop.no/bin/14548db0-4433-4ede-873a-7c3890e7b70e.pdf>
- DeAlteris J., Skrobe L. & Lipsky C. (1998). *The significance of seabed disturbance by mobile fishing gear relative to natural processes: Case study in Narraganset bay, RI*. Fish habitat: essential fish habitat and rehabilitation, American Fisheries Society, Bethesda USA. Retrieved October 5, 2007, from: <http://www.fishingnj.org/artdealer.htm>

- DFID. (2004). *Resource Rent*. Department For International Development. Retrieved October 6, 2007, from http://images.google.is/imgres?imgurl=http://www.keysheets.org/fisheries/gifs/Keysheet2_chart2_REV.gif&imgrefurl=http://www.keysheets.org/fisheries/fisheries_2_p2.html&h=267&w=450&sz=9&hl=en&start=55&um=1&tbnid=LeGRHWqyXWiKJM:&tbnh=75&tbnw=127&prev=/images%3Fq%3DMSY,%2Bvenue,%2Bcost,%2Beffort%26start%3D40%26ndsp%3D20%26um%3D1%26hl%3Den%26client%3Dfirefox-a%26rls%3Dcom.google:en-US:official%26sa%3DN
- Dimitri C. & Oberholtzer L. (2006). EU and US organic markets face strong demand under different policies. Amber waves, February 2006. Retrieved April 30, 2008, from: <http://www.ers.usda.gov/Amberwaves/February06/Features/Feature1.htm>
- Dipiedro B. (2008). A look at the world's seafood eating habits. *Intrafish*, 6(1), 18. Retrieved March 21, 2008, from http://www.intrafish.no/multimedia/archive/00022/pdf20080118_22151a.pdf
- Dipietro B. & Evans J. (2008). Greenpeace stalks U.S. seafood retailers. *Intrafish*, 6(3), 6. Retrieved March 25, 2008, from http://www.intrafish.no/multimedia/archive/00023/pdf20080306_23666a.pdf
- Directorate of Fisheries. (2006, August 31). *Úthlutaðar veiðiheimildir á fiskveiðiarinu 2006/2007*. Retrieved April 29, 2008, from: <http://fiskistofa.is/frettir.php?id=10517>
- Directorate of Fisheries. (2007a). *Úthlutað aflamark eftir fyrirtækjum í upphafi fiskveiðiársins 2007/2008*. Fiskistofa, Hafnafjörður, Iceland. Retrieved December 15, 2007, from http://www.fiskistofa.is/skjol/aflatolur/uthlutun/yfirlit_2007_2008.xls
- Directorate of Fisheries. (2007b). *Reglugerðar of fridunarsvæði við Ísland 2007*. Fiskistofa, Hafnarfjörður, Iceland. Retrieved December 22, 2007, from http://www.fiskistofa.is/skjol/Veidisvaedi/Reglugerd_&_fridunarsvaedi_island_2007.pdf
- Directorate of Fisheries. (2007c). *Aflaheftir fiskistofu 2007*. Retrieved March 25, 2008, from http://fiskistofa.is/skjol/utg_efni/aflahefti_2007.pdf
- DOC/NOAA. (2007). *Tuna tracking and verification program*. US Department of Comers and the National Oceanic and Atmospheric Administration. Retrieved December 3, 2007, from <http://www.dolphinsafe.gov/>.
- Donath H., Wessells C.R., Johnston R.J., Asche R. (2000). *Consumer Preferences for Ecolabeled Seafood in the United States and Norway: A Comparison*. The Norwegian Research Council, Oslo, Norway. Retrieved August 4, 2007, from <http://oregonstate.edu/dept/IIFET/2000/papers/donath.pdf>
- Earth Island. (2007). *Dolphin safe tuna – consumers*. Retrieved December 3, 2007, from <http://www.earthisland.org/dolphinSafeTuna/consumer/>.
- EarthTrust. (2007). *Flipper Seal of approval*. Retrieved December 3, 2007, from <http://www.earthtrust.org/fsareq.html>
- Edwards S. (2008). Shortcuts. *Intrafish*, 6(1), 8. Retrieved February 5, 2008, from http://www.intrafish.no/multimedia/archive/00022/pdf20080108_22131a.pdf
- Emerson W. (1998). *The evolution of fisheries management in New Zealand*. Food and Agriculture Organization of the United Nations, Rome, Italy. Retrieved May 2, 2008, from: <http://www.fao.org/fishery/topic/14755#container>
- EU. (2007). *The EU eco-label*. Retrieved November 16, 2007, from <http://www.eco-label.com/default.htm>
- Eurofish. (2003). *Pollock*. Fish info network market report. Eurofish, Copenhagen, Denmark. Retrieved November 10, 2007, from <http://www.eurofish.dk/indexSub.php?id=1713&easysitestatid=1340910565>
- Eurofood. (2002, July 4). *Organic fruit surges in Scandinavia*. Retrieved March 20, 2008, from http://findarticles.com/p/articles/mi_m0DQA/is_2002_July_4/ai_89077131

- Euromonitor International. (2008). *Retailing in Sweden*. Market status report by Euromonitor International. Retrieved March 15, 2008, from http://www.euromonitor.com/Retailing_in_Sweden
- Evans J. (2007a). New eco-label promises low-cost sustainability. *IntraFish*, 5(4), 18. Retrieved July 10, 2007, from http://www.intrafish.no/multimedia/archive/00016/pdf20070418_16889a.pdf
- Evans J. (2007b). All eco-label by 2012. *Intrafish*, 5(2), 8. Retrieved February 22, 2008, from http://www.intrafish.no/multimedia/archive/00015/pdf20070208_15355a.pdf
- Evans J. (2008). France gets serious about sustainability. *IntraFish*, 6(4), 14. Retrieved April 28, 2008, from: http://www.intrafish.no/multimedia/archive/00024/pdf200804_24708a.pdf
- Evans J. & Fiorillo J. (2007). Searching for food miles solutions. *Intrafish* 5(4):24-25. Retrieved October 20, 2007, from http://www.intrafish.no/multimedia/archive/00016/pdf200704_16856a.pdf
- Eyjólfssdóttir H., Jónsdóttir H., Yngvadóttir E. & Skúladóttir B. (2003). *Environmental effects of fish on the consumers dish – Life Cycle Assessment of Icelandic frozen cod products*. Icelandic Fisheries Laboratories and technological Institute of Iceland. Reykjavik, Iceland. Retrieved December 4, 2007, from <http://www.matis.is/media/utgafa//Verkefnaskýrsla0603.pdf>
- Failler P., de Walle G.V., Lecrivain N., Himbes A. & Lewins R. (2007). *Future prospects for fish and fishery products*. FAO fisheries circular No. 972/4. Food and agriculture Organization of the United Nations, Rome, Italy. Retrieved February 19, 2008, from <ftp://ftp.fao.org/docrep/fao/010/ah947e/ah947e00.pdf>
- FAO. (1995). *Code of conduct for responsible fisheries*. Food and Agriculture Organization of the United Nations, Rome, Italy. Retrieved November 10, 2007, from <ftp://ftp.fao.org/docrep/fao/005/v9878e/v9878e00.pdf>
- FAO. (2005a). *Guidelines for the ecolabelling of fish and fishery products from marine capture fisheries*. Food and Agriculture Organization of the United Nations, Rome, Italy. Retrieved November 10, 2007, from <ftp://ftp.fao.org/docrep/fao/008/a0116t/a0116t00.pdf>
- FAO. (2005b). *Report of the: FAO REGIONAL WORKSHOP ON THE ELABORATION OF NATIONAL PLANS OF ACTION TO PREVENT, DETER AND ELIMINATE ILLEGAL, UNREPORTED AND UNREGULATED FISHING – WEST AFRICAN SUBREGION*. Food and Agricultural Organization of the United Nations, Rome, Italy. Retrieved October 6, 2007, from <ftp://ftp.fao.org/docrep/fao/009/a0457e/a0457e00.pdf>
- FAO. (2007a). *The state of world fisheries and aquaculture 2006*. Food and Agriculture Organization of the United Nations, Fisheries and Aquaculture Department, Rome, Italy. Retrieved September 10, 2007, from <ftp://ftp.fao.org/docrep/fao/009/a0699e/a0699e.pdf>
- FAO. (2007b). *Food outlook: global market analysis*. Food and Agriculture Organisation of the United Nations, Rome, Italy. Retrieved February 28, 2008, from <ftp://ftp.fao.org/docrep/fao/010/ah876e/ah876e00.pdf>
- FGFRI. (2007a). *Commercial marine fishery*. Finish game and fisheries research institute. Retrieved March 9, 2008, from http://www.rktl.fi/english/statistics/fishing/commercial_marine_fishery/
- FGFRI. (2007b). *Foreign trade in fish 2006*. Finish game and fisheries research institute. Retrieved March 9, 2008, from <http://www.rktl.fi/en/julkaisut/j/402.html>
- Fiorillo J. (2007). Do we need the MSC? *Intrafish*, 5(9), 2. Retrieved February 1, 2008, from http://www.intrafish.no/multimedia/archive/00019/pdf20070902_19853a.pdf
- Fiorillo J. (2008). Superfunds. *Intrafish*, 6(3), 15. Retrieved March 14, 2008, from http://www.intrafish.no/multimedia/archive/00022/pdf20080115_22145a.pdf

- Fishupdate, (2007a, October 30). Swiss retailer joins sustainable seafood scheme. *Fishupdate*. Retrieved October 30, 2007, from http://www.fishupdate.com/news/fullstory.php/aid/9019/Swiss_retailer_joins_sustainable_seafood_scheme.html
- Fishupdate. (2007b, October 26). Sustainable seafood hits Italian supermarket shelves. *Fishupdate*. Retrieved October 30, 2007, from http://www.fishupdate.com/news/fullstory.php/aid/8995/Sustainable_seafood_hits_Italian_supermarket_shelves.html
- Fishupdate. (2008, February 27). West Greenland prawn fishery aims for MSC certification. *Fishupdate*. Retrieved February 28, 2008, from http://www.fishupdate.com/news/fullstory.php/aid/10166/West_Greenland_prawn_fishery_aims_for_MSC_certification.html
- Fliess, B. (2007). Informing consumers about social and environmental conditions of globalised production. OECD, The Hague, Netherlands. Retrieved April 28, 2008, from: <http://www.foodeconomy2007.org/NR/rdonlyres/6C1DDC4F-0FCF-4CCE-BD36-C5176CF6263A/50189/Workshop32BarbaraFliess.doc>
- Food and water watch. (2007, March 28). Sustainable seafood knowledge via text message. *Food and water watch*. Retrieved April 30, 2007, from. <http://www.foodandwaterwatch.org/blog/archive/2007/03>
- FOS. (2007a). *Certification and Promotion of Seafood from Sustainable Fisheries and Aquaculture*. Friend of the Sea. Retrieved September 5, 2007, from <http://www.friendofthesea.org/>
- FOS. (2007b). *Friend of the sea certified products*. Friend of the sea, Retrieved September 5, 2007, from. <http://www.friendofthesea.org/>
- FOS. (2007c). *Friend of the sea approval criteria for sustainable fisheries*. Friend of the sea, Retrieved September 5, 2007, from http://friendofthesea.org/photos/Friend_of_the_Sea_Fisheries_Approval_Criteria_090707.doc
- FOS. (2007d). *Governance structure*. Friend Of the Sea. Retrieved October 5, 2007, from <http://www.friendofthesea.org/>
- FOS. (2008a). *Governance structure*. Friend of the sea, Retrieved February 5, 2008, from <http://friendofthesea.org/news.php?viewStory=34>
- FOS. (2008b). *Accredited certifiers*. Retrieved February 5, 2008, from <http://friendofthesea.org/news.php?viewStory=28>
- FOS. (2008c). *Friend of the sea certified products*. Friend of the sea, Retrieved March 15, 2007, from. <http://www.friendofthesea.org/>
- FSC. (2007). *What is FSC*. Forest Stewardship Council, Bonn, Germany. Retrieved November 16, 2007, from <http://www.fsc.org/en/about>
- Garcia E.G., Ragnarsson S.A., Steingrímsson S.A., Nævestad D., Haraldsson H.P., Fossa J.H., Tendal O.S. & Eiriksson H. (2007). *Bottom trawling and scallop dredging in the arctic*. Nordic Council of Ministers, Copenhagen, Denmark. Retrieved December 28, 2007, from <http://norden.org/pub/miljo/miljo/sk/TN2006529.pdf>
- Gelpeche. (2007). *Sustainable commitments*. Retrieved November 28, 2007, from <http://www.gelpeche.fr/UK/responsible/>
- Gianni M. (2004). *High seas bottom fisheries and their impact on the biodiversity of vulnerable deep-Sea ecosystems*. IUCN, The world conservation union. Retrieved October 5, 2007, from <http://www.iucn.org/themes/marine/pdf/MattGianni-CBDCOP7-Impact-HS-BottomFisheries-Complete.pdf>

- Gissurarson H.H. (2004). Iceland's ITQ system and the problem of political acceptability. *Evolving property rights in marine fisheries* (ed: Leal D.). Roman & Littlefield. 171-193. Retrieved May 1, 2008, from: <http://books.google.com/books?hl=en&lr=&id=Ns-GLWpFyCoC&oi=fnd&pg=PA171&dq=advantages,+ITQ&ots=IXQgkpG-6p&sig=IH92YrnDt5jKUXCx9ILwv8IK3EY#PPA217,M1>
- Glitnir. (2007). *EU Seafood report*. Glitnir Bank, Glitnir Seafood team, April 2007. Retrieved February 4, 2008, from <https://www.glitnir.is/Markadir/Greining/BirtaSkjal.aspx?ID=49521&GreinID=619190>
- Greenglobe. (2007). *Greenglobe*. Retrieved November 15, 2007, from www.greenglobe21.com
- Greenpeace. (2005). *A recipe for disaster*. Greenpeace UK. Retrieved February 20, 2008, from http://www.seafoodchoices.com/resources/documents/RecipeForDisaster_GreenpeaceUK.pdf
- Greenpeace. (2006). *A recipe for change*. Greenpeace UK. Retrieved February 14, 2008, from <http://www.greenpeace.org.uk/files/images/migrated/MultimediaFiles/Live/FullReport/7988.pdf>
- Greenpeace. (2007). *Sustainable seafood*. Greenpeace UK, London, UK. Retrieved November 20, 2007, from <http://www.greenpeace.org.uk/oceans/what-we-are-doing/sustainable-seafood/sustainable-seafood-frequently-asked-questions#1>
- GreenerChoices. (2007). *Dolphin safe*. Retrieved December 3, 2007, from <http://www.greenerchoices.org/eco-labels/label.cfm?LabelID=98&searchType=Label&searchValue=dolphin%20safe&refpage=labelSearch&refqstr=label%3Ddolphin%2520safe>
- Hansen N. (2004). *Organic food sales see healthy growth*. MSNBC, CNBC Inc. USA. Retrieved November 17, 2007, from <http://www.msnbc.msn.com/id/6638417/>
- Haraldsson H.L. (2001). *Sjávarútvegur og byggðaðþróun á Íslandi*. Byggðastofnun, Sauðárkrúkur, Iceland. Retrieved April 18, 2008, from http://asa.is/index2.php?option=com_docman&task=doc_view&gid=77&Itemid=162
- Herbertsson T.Þ, Bjarnason Á., Steinarsson B.Æ., Magnúsdóttir E., Marteinsdóttir G., Þórarinnsson K. Sæmundsson O., Sigurgísladóttir S. & Tómasson T. (2004). *Áfangaskýrsla nefndar um líffræðilega fiskveiðistjórnun til sjávarútvegsráðherra* Ministry of Fisheries, Reykjavik, Iceland. Retrieved December 15, 2007, from www.hi.is/~runam/greinar/liffradileg_fiskvstjornun.doc
- Hilborn R. (2007). Defining success in fisheries and conflicts in objectives. *Marine Policy*, 31(3007), 153-158. Retrieved April 30, 2008, from: http://www.sciencedirect.com/science?_ob=MIimg&_imagekey=B6VCD-4KHC3GM-1-3&_cdi=5952&_user=5915182&_orig=search&_coverDate=03%2F31%2F2007&_sk=999689997&_view=c&_wchp=dGLbVIW-zSkzV&_md5=b65bc97e11c1ca5b891c920a9aa4baed&_ie=/sdarticle.pdf
- Holland J. (2007). Setting the sustainability bar. *Seafood International*, 23(2), 12. Highway-Infoma UK Ltd., London, UK.
- Horrill C. & Makoloweka S. (1998). *Silencing the Dynamite Fisheries along the Tanga Coast, Tanzania*. ITMEMS. Retrieved October 5, 2007, from <http://iodeweb1.vliz.be/odin/handle/1834/763>
- Hough A. (2006). *Loch Torridon Nephrops Creel Fishery: Surveillance Report 3 2006*. Moody Marine Ltd, Derby, UK. Retrieved December 4, 2007, from http://www.msc.org/assets/docs/Loch_Torridon_Nephrops/SurvRep3_2006.pdf
- Humphreys D. (1996). *Forest Politics: the Evolution of International Cooperation*. Earthscan Publications, London, England.

- Ianelli J.N., Barbeaux S., Honkalehto T., Kotwicki S., Aydin K and Williamson N. (2006). *Assessment of Alaska Pollock Stock in the Eastern Bering Sea*. Alaska Fisheries Science Center, National Marine Fisheries Service, NOAA. Retrieved August 4, 2007, from <http://www.afsc.noaa.gov/refm/docs/2006/EBSpollock.pdf>
- ICES. (2007). Icelandic cod in division Va. International Council for the Exploration of the Sea, Copenhagen, Denmark. Retrieved November 7, 2007, from: <http://www.ices.dk/committe/acom/comwork/report/2007/may/cod-iceg.pdf>
- ICTSD. (2006). *Ecolabelling and other market-based consumer and industry incentives*. International Centre for Trade and Sustainable Development, Geneva, Switzerland. Retrieved November 15, 2007, from http://www.trade-environment.org/output/ictsd/resource/Fish_ecolabelling.pdf
- IFOAM. (2007). *FAQ*. International Federation of Organic Agriculture Movements, Bonn, Germany. Retrieved November 18, 2007, from <http://www.ifoam.org/sub/faq.html>
- IISD. (2007a). *Benefits of eco-labeling*. International Institute for Sustainable Development. Retrieved November 10, 2007, from http://www.bsdglob.com/markets/eco_label_benefits.asp
- IISD. (2007b). *Challenges to eco-labeling*. International Institute for Sustainable Development. Retrieved November 10, 2007, from http://www.bsdglob.com/markets/eco_label_challenges.asp
- IMRI. (2007). *State of marine stocks in Icelandic waters 2006/2007 – Prospects for the quota year 2007/2008*. Icelandic Marine Research Institute, Reykjavik, Iceland. Retrieved September 20, 2007, from http://www.hafro.is/Astand/2007/Astandskyrsla_2007.pdf
- IMRI. (2008a). *Sagan*. Icelandic Marine Research Institute. Retrieved March 25, 2008, from <http://www.hafro.is/undir.php?ID=2&REF=1>
- IMRI. (2008b). *Kortlagning hafsbontnsins*. Icelandic Marine Research Institute, Reykjavik, Iceland. Retrieved December 22, 2007, from <http://www.hafro.is/undir.php?ID=10&REF=2>
- Intrafish. (2007a). Short Cuts. *Intrafish*, 5(12), 8. Retrieved February 27, 2008, from http://www.intrafish.no/multimedia/archive/00021/pdf20071208_21663a.pdf
- Intrafish. (2007b). JFA eco-label. *Intrafish*, 5(9),12. Retrieved February 1, 2008, from http://www.intrafish.no/multimedia/archive/00019/pdf20070912_19873a.pdf
- Intrafish (2008, March 19). Three Swedish fisheries apply for MSC assessment. *Intrafish*, Retrieved March 20, 2008, from http://www.fishupdate.com/news/fullstory.php/aid/10380/Three_Swedish_fisheries_apply_for_MSC_assessment.html
- Jaffry S., Pickering H., Wattage P., Whitmarsh D., Frere J. (2000). *Consumer Choice for Quality and Sustainability in Seafood Products: Empirical Findings from United Kingdom*. University of Portsmouth, Portsmouth, United Kingdom. Retrieved February 7, 2008, from <http://oregonstate.edu/dept/iifet/2000/papers/jaffry.pdf>
- Jensen B.A. (2006, March 16). Spain. *Intrafish*. Retrieved February 27, 2008, from <http://www.intrafish.no/global/industryreports/article102795.ece>
- JFA. (2008). *MEL-Marine Eco-Label*. Japan Fisheries Association. Retrieved February 1, 2008, from <http://www.suisankai.or.jp/eco.html>
- John West. (2007). Fishing for the future. Retrieved December 2, 2007, from <http://www.johnwest.com.au/Environment/>.
- Johnston R.J. (2008). Fish ecolabels and consumer choices: weighing the factors. *Perspectives in Agriculture, Veterinary Science, Nutrition and Natural Resources*, 26(3), 7. Retrieved April 28, 2008, from <http://www.cababstractsplus.org/cabreviews/Reviews.asp?action=display&openMenu=relatedItems&ReviewID=79835&Year=2008#>

- Johnston R.J., Wessells, C.R, Donath H. & Asche F. (2000). *Measuring consumer preference for ecolabeled seafood: an international comparison*. SNF-report no.42/00. Bergen, Norway. Retrieved August 4, 2007, from http://bora.nhh.no/bitstream/2330/530/1/R42_00.pdf
- Kangun N., Carlson L. & Grove S.J. (1991). Environmental advertising claims: a preliminary investigation. *Journal of Public Policy and Marketing* **10**(2), 47–59. JPPM, NY, USA.
- Kaufmann B., Geen G. & Sen S. (1999). *Fish Futures: Individual Transferable Quotas in Fisheries*. Fisheries Economics, Research and Management Pty Ltd., Kiama, Australia.
- Kelleher K. (2005). *Discards in the world's marine fisheries*. FAO fisheries technical paper no. 470. FAO fisheries department, Rome, Italy. Retrieved October 1, 2007, from <ftp://ftp.fao.org/docrep/fao/008/y5936e/y5936e00.pdf>
- Kesko. (2008). *Annual report 2007*. Retrieved March 15, 2008, from <http://www.kesko.com/index.asp?id=9756F2EF68F84613AC726ED420EC4AE8&data=1.00308B787886459385F296A5AFD4FA74,1E1CEDEEB5514D3686060D8BFD510C61>
- KRAV. (2008a). *Standards for KRAV certified production – January 2008*. Retrieved February 8, 2008, from http://www.KRAV.se/Documents/Regler/englishEditions/KRAV_standards_january_2008.pdf
- KRAV. (2008b). *Ansökan*. Retrieved February 8, 2008, from <http://www.krav.se/sv/Foretag/Varfor-KRAV/Ansokan/>
- KRAV. (2008c). *KRAV's licenspriser*. Retrieved February 8, 2008, from <http://www.KRAV.se/Documents/Prislista/LicenspriserLantbruk2008.pdf>
- KRAV. (2007d). *Annual report 2006*. Retrieved February 8, 2008, from <http://www.KRAV.se/Documents/arsredovisning/Annualreport2006.pdf>
- Lazaroff C. (2003, January 6). U.S. changes meaning on dolphin safe tuna label. *Organic Consumer Association*. Retrieved April 25, 2008, from http://www.organicconsumers.org/toxic/012203_tuna_dolphins.cfm
- Loftsson K. (2004, July 8). Kristján Loftsson segir glæpamenn stjórna Marine Stewardship Council. *Skip.is* 8/7/2004. Retrieved August 7, 2007, from <http://www.skip.is/frettir/nr/4712/>
- Løkkeborg S. (2005). *Impacts of trawling and scallop dredging on benthic habitats and communities*. FAO fisheries technical paper no. 472, FAO fisheries department, Rome, Italy. Retrieved October 5, 2007, from <ftp://ftp.fao.org/docrep/fao/008/y7135e/y7135e01.pdf>
- Matís. (2007). *Sjálfbærni í sjávarútvegi*. Icelandic Food research. Retrieved February 4, 2008, from <http://www.matis.is/freadsla/radstefnur/nr/1872>
- MBA. (2007). *Seafood WATCH*. Monterey Bay Aquarium, CA, USA. Retrieved November 5, 2007, from <http://www.montereybayaquarium.org/cr/seafoodwatch.asp>
- MCS. (2007a). *Fishonline*. The Marine Conservation Society UK. Herefordshire, UK. Retrieved November 7, 2007, from <http://www.fishonline.org/information/>
- MCS. (2007b). *Fishonline – search*. Marine Conservation Society UK, Herefordshire, UK. Retrieved November 7, 2007, from <http://www.fishonline.org/search/simple/>
- Mercadona (2008). *What is Mercadona?* Retrieved February 29, 2008, from <http://www.mercadona.com/corp/ing-html/empresa.html>

- Mikalsen K.H. & Jentoft S. (2003). Limits to participation? On the history, structure and reform of Norwegian fisheries management. *Marine policy*, 27(5), 397-407. Retrieved November 10, 2007, from http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6VCD-48B00FC-2&_user=1829817&_coverDate=09%2F30%2F2003&_rdoc=1&_fmt=&_orig=search&_sort=d&view=c&_acct=C000039758&_version=1&_urlVersion=0&_userid=1829817&md5=b3572404ca41614d5b0fcc98fdb04367
- Ministry of Fisheries. (2004). *Aflaregla fyrir þorskveiðar á Íslandsmiðum*. Sjávarútvegsráðuneytið, Reykjavik, Iceland. Retrieved December 19, 2007, from http://72.14.209.104/search?q=cache:HYvrk72THhwJ:sjavarutvegsraduneyti.is/media/wordskjol/Nefndaralit_2004_lokaeint.doc+%22%C3%ADfsl%C3%ADkur+sei%C3%B0a%22&hl=en&gl=is&ct=clnk&cd=1
- Ministry of Fisheries. (2005). *Friðun viðkvæmra hafsvæða við Ísland*. Reykjavik, Iceland. Retrieved December 22, 2007, from http://www.sjavarutvegsraduneyti.is/media/Skyrslur/fridunskyrsla_2005.pdf
- Ministry of Fisheries. (2006). *Verðmæti útfluttra sjávarafurða 2005*. Retrieved February 10, 2008, from: http://www.sjavarutvegsraduneyti.is/media/sjavarutvegur_i_tolum/mynd_6-1_2006.pdf
- Ministry of Fisheries. (2007a). *Statement on responsible fisheries in Iceland*. Retrieved December 3, 2007, from http://eng.sjavarutvegsraduneyti.is/media/pdf-skjal/umhverfisyfirlising_agust_2007.pdf
- Ministry of Fisheries. (2007b). *Development of a fisheries management system*. Retrieved April 29, 2008, from: <http://www.fisheries.is/managem/system.htm>
- Morizur Y., Caillart B. & Tingley D. (2004). The problem of discards in fisheries, in “Fisheries and Aquaculture: Towards Sustainable Aquatic Living Resources Management” Eolss Publishers, Oxford, UK. Retrieved September 24, 2007, from <http://www.ifremer.fr/docelec/doc/1999/publication-1237.pdf>
- Morrison. (2007). *Annual report and financial statements 2007*. Wm Morrison Supermarkets Plc., Bradford, UK. Retrieved February 20, 2008, from http://www.morrisons.co.uk/Documents/Annual_Report2007.pdf
- MPA. (2005). *Grocery chain market share*. Magazine Publishers of America. Retrieved March 22, 2008, from http://www.magazine.org/Retail/educational_guides/1709.cfm
- MSC. (2002). *Principles and criteria for sustainable fishing*. Marine Stewardship Council. Retrieved December 4, 2007, from http://www.msc.org/assets/docs/fishery_certification/MSCPrinciples&Criteria.doc
- MSC. (2003). *Leading Swedish processor launches sustainable alternative to cod*. Marine Stewardship Council. Retrieved December 4, 2007, from http://www.msc.org/html/ni_86.htm
- MSC. (2006). *Wall-Mats sets 100% sustainable fish target for North America*. Marine Stewardship Council. Retrieved December 4, 2007, from http://www.msc.org/html/ni_203.htm
- MSC. (2007a). *About MSC*. Marine Stewardship Council. Retrieved December 4, 2007, from http://www.msc.org/html/content_462.htm
- MSC. (2007b). *History of MSC*. Marine Stewardship Council. Retrieved December 4, 2007, from http://www.msc.org/html/content_470.htm
- MSC. (2007c). *Where to buy*. Marine Stewardship Council. Retrieved December 4, 2007, from <http://eng.msc.org/>
- MSC. (2007d). *Fisheries - What is the MSC standard?* Marine Stewardship Council. Retrieved December 4, 2007, from www.msc.org
- MSC. (2007e). *Governance*. Marine Stewardship Council. Retrieved December 4, 2007, from http://www.msc.org/html/content_474.htm
- MSC. (2007f). *South African hake*. Marine Stewardship Council. Retrieved December 4, 2007, from http://www.msc.org/html/content_1092.htm

- MSC. (2007g). *Fisheries - Alaskan Pollock*. Marine Stewardship Council. Retrieved September 1, 2007, from http://www.msc.org/html/content_1176.htm
- MSC. (2007h). *Information sheet 4 – Cost explained*. Marine Stewardship Council. Retrieved December 7, 2007, from http://www.msc.org/assets/docs/fishery_certification/InfoSheet4_Costs.pdf
- MSC. (2007i). *Logo licensing systems-categories of logo use and charges*. Marine Stewardship Council. Retrieved August 7, 2007, from http://www.msc.org/assets/docs/The_MSC's_Logo_Licensing_System_categories_and_charges.doc
- MSC. (2007j). *MSC annual report 2006-07*. Marine Stewardship Council. Retrieved August 7, 2007, from http://www.msc.org/assets/docs/MSC_Annual_report_2006-07_EN.pdf
- MSC (2008a). *Certifiers*. Marine Stewardship Council. Retrieved March 6, 2008, from http://www.msc.org/html/content_501.htm
- MSC. (2008b). *Diagrammatic representation of main steps in fisheries assessment process*. Marine Stewardship Council. Retrieved March 8, 2008, from http://www.msc.org/assets/docs/fishery_certification/Flow%20chart%20of%20Fishery%20Assessment%20Process.doc
- MSC. (2008c). *Alaska Salmon*. Marine Stewardship Council. Retrieved February 1, 2008, from http://www.msc.org/html/content_485.htm
- MSC. (2008d). *Alaska Pollock*. Marine Stewardship Council. Retrieved February 1, 2008, from http://www.msc.org/html/content_1176.htm
- MSC. (2008e). *Fisheries undergoing assessment*. Marine Stewardship Council. Retrieved February 3, 2008, from http://www.msc.org/html/content_491.htm
- MSC. (2008f). *Where to buy*. Marine Stewardship Council. Retrieved February 6, 2008, from <http://eng.msc.org/>
- MSC. (2008g). *Certified fisheries*. The Sea Fish Industry Authority. Retrieved February 25, 2008, from http://www.msc.org/html/content_484.htm
- MSC. (2008h). *Certified suppliers*. The Sea Fish Industry Authority. Retrieved February 25, 2008, from http://www.msc.org/html/content_561.htm
- MSC. (2008i). *West Greenland Coldwater Prawn*. Marine Stewardship Council. Retrieved March 20, 2008, from http://www.msc.org/html/content_1468.htm
- MSC. (2008j). *Wal-Mart sets 100% sustainable fish target for North America*. Marine Stewardship Council. Retrieved March 22, 2008, from http://msc.org/html/ni_203.htm
- MSC. (2008k). *Fisheries*. Marine Stewardship Council. Retrieved March 22, 2008, from http://msc.org/html/content_463.htm
- M&S. (2007). *Annual report and financial statements 2007*. Marks & Spencer, London, England. Retrieved February 20, 2008, from <https://images-na.ssl-images-amazon.com/images/G/02/00/00/00/32/14/12/32141262.pdf?mnSBrand=core>
- NASBO. (2007, October 30). *Þorskur úr Atlantshafi úr hillum hjá Manor í Sviss*. National Association of Small Boat Owners. Retrieved October 30, 2007, from <http://www.smabatar.is/frettir/2007/10/31/1085.shtml>

- Neytendasamtökin. (2007). *Eru umhverfisvæn innkaup raunverulegur kostur?* Retrieved March 20, 2008, from <http://www.ns.is/ns/upload/files/pdf-skrar/umhverfismerki.pdf>
- NOAA. (2007a). *US commercial landings*. National Oceanic and Atmospheric Administration. Retrieved March 21, 2008, from http://www.st.nmfs.noaa.gov/st1/fus/fus06/02_commercial2006.pdf
- NOAA. (2007b). *Foreign trade 2006*. National Oceanic and Atmospheric Administration. Retrieved March 21, 2008, from http://www.st.nmfs.noaa.gov/st1/fus/fus06/06_trade2006.pdf
- NOAA. (2008). *FishWatch: US seafood facts*. National Oceanic and Atmospheric Administration. Retrieved March 15, 2008, from <http://www.nmfs.noaa.gov/fishwatch/#>
- Norden. (2000). *Nordic technical working group on fisheries ecolabelling criteria*. De Nordiska Landernas Officiella Samarbete. Retrieved February 2, 2008, from [http://host1.bondware.com/~friendofthesi/photos/Nordic Council - Nordic Council of Ministers.mht](http://host1.bondware.com/~friendofthesi/photos/Nordic_Council_-_Nordic_Council_of_Ministers.mht)
- Norden. (2005). *Alþjóðlegar reglur um umhverfismerkingar*. De Nordiska Landernas Officiella Samarbete. Retrieved February 2, 2008, from <http://www.norden.org/webb/news/news.asp?id=4941&lang=5>
- NZ Ministry of Fisheries. (2007). *Stock status*. New Zealand government, Ministry of Fisheries. Retrieved August 10, 2007, from <http://www.fish.govt.nz/en-nz/SOF/StockStatus.htm?DataDomain=Species&DataClass=HOK> and *status of fisheries* <http://www.fish.govt.nz/en-nz/SOF/Stock.htm?DataDomain=Fishstock&DataClass=HOK1&list=name>
- Oceana. (2007). *Fisheries Subsidies, Overcapacity, and Overfishing*. Washington, DC, USA. Retrieved September 20, 2007, from [http://oceana.org/fileadmin/oceana/uploads/reports/Media_Backgrounder UNITED STATES%20for Science_rollout_May07_FINAL.doc](http://oceana.org/fileadmin/oceana/uploads/reports/Media_Backgrounder_UNITED_STATES%20for_Science_rollout_May07_FINAL.doc)
- OECD. (2002). *Report of the OECD workshop on information and consumer decision-making for sustainable consumption*. Organisation for Economic Co-operation and Development, Paris, France. Retrieved February 5, 2008, from <http://www.oecd.org/dataoecd/32/20/32347696.pdf>
- OTS. (2007). *US organic sales show substantial growth*. Organic Trade Association, Chicago, Illinois, USA. Retrieved March 22, 2008, from http://www.organicnewsroom.com/2007/05/us_organic_sales_show_substant_1.html
- Palmer M.J. (2007). *New friend of the sea*. *Earth Island Journal*, 21(5). Retrieved August 7, 2007, from http://www.earthisland.org/eijournal/new_articles.cfm?articleID=1108&journalID=90
- Pálsson Ó., Karlsson G., Jóhannesson G., Arason A., Gísladóttir H. & Ottesen Þ. (2004). *Meðafli í Kolmunnaveiðum 2004*. Hafrannsóknarstofnun, Fjölrit nr. 116. Retrieved March 25, 2008, from http://www.hafro.is/Bokasafn/Timarit/medafli_2004.pdf
- Pálsson Ó.K., Arason A, Björnsson E., Jóhannesson G., Björnsson H. & Ottesen Þ. (2007). *Mælingar á brottkasti botnfiska árið 2006*. Hafrannsóknarstofnun, Fjölrit nr. 134. The Icelandic Marine Research Institute, Reykjavik, Iceland. Retrieved October 5, 2007, from <http://www.hafro.is/Bokasafn/Timarit/fjolr134.pdf>
- Pauly D., Christensen V., Guénette S., Pitcher T.J., Sumaila U.R., Walters C.J., Watson R. & Zeller D. (2002). *Towards sustainability in world fisheries*. *Nature*, 418, 689-695. Retrieved October 6, 2007, from <http://www.nature.com/nature/journal/v418/n6898/full/nature01017.html;jsessionid=AECED272CE72C9560668F29341DA4FDD>
- Pearce F. (2003). *Can ocean friendly labels save dwindling stocks?* *New Scientist*, 178(2395): 5.
- Pitcher T. (2003). *Selling the code of conduct*. *FishBytes*, Newsletter of the Fisheries centre-University of British Columbia, 2003; 9(4). Vancouver, BC, Canada. Retrieved November 14, 2007, from <http://www.fisheries.ubc.ca/publications/fishbytes/9-4.pdf>

- Princes foods. (2007). *Kwaliteit*. Retrieved December 3, 2007, from <http://www.princes-foods.nl/>.
- Reynolds G. (2007, February 6). Tesco carbon rating to force greener processing. *Food production daily*. Retrieved May 2, 2008, from: <http://www.foodproductiondaily.com/news/ng.asp?id=73962-tesco-airfreighting-greenhouse>
- REMA 1000 Norge AS. (2007). *Aarsrapport 2006*. Retrieved March 15, 2008, from [http://www.rema1000.no/web/webdoc.nsf/web/.aarsrapport/\\$file/Aarsrapport_REMA_2006.pdf](http://www.rema1000.no/web/webdoc.nsf/web/.aarsrapport/$file/Aarsrapport_REMA_2006.pdf)
- Reuters. (2007, December 19). EU countries strike deal on fishing quotas. Reuters Group Plc. London, UK. Retrieved November 9, 2007, from <http://uk.reuters.com/article/topNews/idUKL191867320071219?pageNumber=2&virtualBrandChannel=0>
- Rimi. (2008). *Om Rimi*. Retrieved March 15, 2008, from <http://www.rimi.no/>
- Roheim C.A. (2003). Early indicators of market impacts from the Marine Stewardship Council's ecolabelling of seafood. *Marine Resource Economics*, 18, 95–104. University of Rhode Island, RI, USA. Retrieved August 4, 2007, from <http://ageconsearch.umn.edu/bitstream/123456789/7117/1/18010095.pdf>
- Roheim C.A. & Donath H. (2003). *The Battle of Taste Buds and Environmental Convictions: Which One Wins?* University of Rhode Island, Kingston, RI, USA. Retrieved February 5, 2008, from <http://www.farmfoundation.org/projects/documents/Roheim.pdf>
- Roheim C.A., Johnston R.J., Greer J., Donath H. (2004). *Consumer Preferences for Ecolabeled Seafood: Results of a Connecticut Survey*. The University of Connecticut. Storrs, CT, USA. Retrieved February 6, 2008, from <http://www.fmpc.uconn.edu/research/other/Connecticut%20Final%20Ecolabel%20Report%2012%2020%2004.pdf>
- Rúnarsson G. (2001). *Orkunotkun og fiskveiðar*. Samorka, Prentsmiðjan Viðey, Kópavogur, Iceland. Retrieved December 5, 2007, from <http://www.samorka.is/Apps/WebObjects/Samorka.woa/1/swdocument/1000263/Orkunotkun+og+fiskvei%C3%B0ar++Gu%C3%B0bergur+R%C3%BAnarsson%2C+Fiskif%C3%A9lagi+%C3%8Dslands.pdf>
- Rung S. (2003). *Fish and seafood sector profile – Germany*. Report by the Consulate of Canada in Düsseldorf. Retrieved February 29, 2008, from http://www.ats.agr.gc.ca/europe/3907_e.htm
- Sainsbury. (2007). *J. Sainsbury Plc. Investors information*. J. Sainsbury Plc., London, England. Retrieved February 20, 2008, from <http://www.j-sainsbury.co.uk/?pageid=206>
- SCA. (2003). *The marketplace for sustainable seafood*. Seafood Choices Alliance. Retrieved March 20, 2008, from <http://www.seafoodchoices.org/resources/documents/MarketplaceforSustainableSeafood.pdf>
- SCA. (2005). *Constant cravings*. Seafood Choices Alliance. Retrieved February 4, 2008, from http://www.seaweb.org/resources/documents/reports_EUConsumer.pdf
- SCA. (2007a). *Seafoodchoices*. Seafood Choices Alliance, MD, USA. Retrieved November 11, 2007, from <http://www.seafoodchoices.org/home.php>
- SCA. (2007b). *The European marketplace for sustainable seafood*. Seafood Choices Alliance. Retrieved February 9, 2008, from http://www.seafoodchoices.com/resources/documents/SeafoodMarketplaceEurope_FULLApr07.pdf
- SCA. (2007c). *The UK marketplace for sustainable seafood*. Seafood Choices Alliance. Retrieved February 25, 2008, from <http://www.seafoodchoices.com/resources/documents/SCAUKMPReport.pdf>
- Seafish. (2004a). *Key features: Focus on foodservice*. The Sea Fish Industry Authority. Retrieved February 9, 2008, from http://www.seafish.org/upload/file/market_insight/Focus%20on%20Foodservice%20Key%20Feature.pdf

- Seafish. (2004b). *UK trade bulletin: January – December 2003*. The Sea Fish Industry Authority. Retrieved February 27, 2008, from http://www.seafish.org/upload/file/market_insight/UK%20Trade%20Bulletin%20Dec%202003.pdf
- Seafish. (2005a). *Independent fishmongers study*. The Sea Fish Industry Authority. Retrieved February 25, 2008, from http://www.seafish.org/upload/file/market_insight/Independentwebversion.pdf
- Seafish. (2005b). *Consumer attitudes to the environment and seafood*. The Sea Fish Industry Authority. Retrieved February 25, 2008, from http://www.seafish.org/upload/file/market_insight/Environmentwebversion.pdf
- Seafish. (2007a). *What is new*. The Sea Fish Industry Authority. Retrieved December 15, 2007, from <http://www.seafish.org/whatsnew/detail.asp?id=1603&p=ca>
- Seafish. (2007b). *UK seafood consumption trends*. The Sea Fish Industry Authority. Retrieved February 9, 2008, from http://www.seafish.org/upload/file/market_insight/Seafood_consumption.pdf
- Seafish. (2007c). *Seafood facts*. The Sea Fish Industry Authority. Retrieved February 9, 2008, from <http://www.seafish.org/plate/facts.asp>
- Seafish. (2007d). *Top species report*. The Sea Fish Industry Authority. Retrieved February 9, 2008, from http://www.seafish.org/upload/file/market_insight/Top%20Species%20Oct2007.pdf
- Seafish. (2007e). *Changing demographics in fish purchase*. The Sea Fish Industry Authority. Retrieved February 9, 2008, from http://www.seafish.org/upload/file/market_insight/ChangingDemos.pdf
- Seafish. (2007f). *Foodservice market overview*. The Sea Fish Industry Authority. Retrieved February 9, 2008, from http://www.seafish.org/upload/file/market_insight/FoodserviceMarketOverviewFeb2007.pdf
- Seafish. (2007g). *UK seafood industry supply chain-estimates for 2006*. The Sea Fish Industry Authority. Retrieved February 9, 2008, from http://www.seafish.org/upload/file/market_insight/2006_Supply_chart.pdf
- Seafish. (2007h). *Fish and chips: Now and the future*. The Sea Fish Industry Authority. Retrieved February 9, 2008, from http://www.seafish.org/upload/file/market_insight/fishchips.pdf
- Seafish. (2007i). *Market overview: year ending May 2007*. The Sea Fish Industry Authority. Retrieved February 12, 2008, from [http://www.seafish.org/upload/file/market_insight/RetailmarketOverview\(May2007\).pdf](http://www.seafish.org/upload/file/market_insight/RetailmarketOverview(May2007).pdf)
- Seafish. (2007j). *Salmon-Retail trends*. The Sea Fish Industry Authority. Retrieved February 12, 2008, from http://www.seafish.org/upload/file/market_insight/Salmon_species_sheet.pdf
- Seafish. (2007k). *Cod – Retail trends*. The Sea Fish Industry Authority. Retrieved February 12, 2008, from http://www.seafish.org/upload/file/market_insight/Cod_species_sheet.pdf
- Seafish. (2007l). *Haddock – Retail trends*. The Sea Fish Industry Authority. Retrieved February 12, 2008, from http://www.seafish.org/upload/file/market_insight/Haddock_species_sheet.pdf
- Seafish. (2007m). *UK trade bulletin, annual report for 2006*. The Sea Fish Industry Authority. Retrieved February 12, 2008, from http://www.seafish.org/upload/file/market_insight/TradeBulletinDecember2006.pdf
- Seafish. (2007n). *Share of trade*. The Sea Fish Industry Authority. Retrieved February 14, 2008, from http://www.seafish.org/upload/file/market_insight/share%20of%20trade%20analysis_0707.pdf
- Seafish. (2007p). *UK trade bulletin: January – December 2006*. The Sea Fish Industry Authority. Retrieved February 27, 2008, from http://www.seafish.org/upload/file/market_insight/TradeBulletinDecember2006.pdf

- Seafish. (2008a). *Introduction*. The Sea Fish Industry Authority. Retrieved February 9, 2008, from <http://www.seafish.org/about/default.asp>
- Seafish. (2008b). *Responsible Fishing Scheme*. The Sea Fish Industry Authority. Retrieved February 9, 2008, from <http://rfs.seafish.org/about>
- Seafish. (2008c). *Certified vessels*. The Sea Fish Industry Authority. Retrieved February 9, 2008, from <http://rfs.seafish.org/vessels>
- Shotton, R. (2000). *Use of Property Rights in Fisheries Management*. FAO Fisheries Technical Paper No. 404/1. Food and Agriculture Organisation of the United Nations, Rome, Italy. Retrieved April 30, 2008, from: <http://www.fao.org/fishery/topic/3281>
- Shotton, R. (2001). *Chase studies on the effectiveness of transferable fishing rights on fleet capacity and concentration on quota ownership*. Technical Paper No. 412. Food and Agriculture Organisation of the United Nations, Rome, Italy. Retrieved April 30, 2008, from: <ftp://ftp.fao.org/docrep/fao/005/y2498e/y2498e00.pdf>
- S-kanava. (2008). *S-kanava*. Retrieved March 20, 2008, from <http://www.s-kanava.net/>
- Somerfield. (2006). *Annual report and accounts 2004/05*. Somerfield, Bristol, England. Retrieved February 25, 2008, from <http://www.somerfieldgroup.co.uk/download/reports/report05.pdf>
- SN. (2008). *SN's top 75 retailers for 2008*. Supermarket News. Retrieved March 22, 2008, from <http://supermarketnews.com/profiles/2008-top-75/>
- SPAR. (2008). *Spar-international key figures*. Retrieved March 20, 2008, from <http://www.spar-international.com/spar-keyfigures-1-81-265-en-details.htm>
- Statistics Iceland. (2007). *Catch of Icelandic vessels from all fishing areas 1945-2005*. Retrieved September 20, 2007, from http://www.statice.is/?PageID=1214&src=/temp_en/Dialog/varval.asp?ma=SJA09005%26ti=Catch+of+Icelandic+vessels+from+all+fishing+areas+1945%2D2005+%26path=../Database/sjavarutvegur/af3Fisk/%26lang=1%26units=tonnes
- Statistics Iceland. (2008a). *Value of exported marine products by market area and country 1993-2006*. Retrieved February 27, 2008, from http://www.statice.is/?PageID=1218&src=/temp_en/Dialog/varval.asp?ma=SJA04902%26ti=Value+of+exported+marine+products+by+market+area+and+country+1993%2D2006%26path=../Database/sjavarutvegur/utf/%26lang=1%26units=Mill.ISK
- Statistics Iceland. (2008b). *Exported marine products by countries 1999-2006*. Retrieved February 27, 2008, from: http://www.statice.is/?PageID=1218&src=/temp_en/Dialog/varval.asp?ma=SJA04903%26ti=Exported+marine+products+by+countries+1999%2D2006+%26path=../Database/sjavarutvegur/utf/%26lang=1%26units=kg/ISK
- Steinberg P.E. (1999). *Fish or Foul: Investigating the Politics of the Marine Stewardship Council*. Florida State University, FL, USA. Retrieved August 7, 2007, from <http://globetrotter.berkeley.edu/macarthur/marine/papers/steinberg-1.html>
- Stromsta K.E. & Evans J. (2007). Sainsbury's to shift to line-caught cod, haddock. *Intrafish*, 5(5), 6. Retrieved February 20, 2008, from http://www.intrafish.no/multimedia/archive/00017/pdf20070506_17295a.pdf
- Svanen. (2008). *Svanen*. Retrieved April 24, 2008, from <http://svanen.nu/Default.aspx?tabName=aboutus&menuItemID=7069>

- Teisl M.F., Roe B. and Hicks R.L. (2002). Can eco-labels tune a market? Evidence from dolphin-safe labelling. *Journal of environmental economics and management* 42, 339-359. Elsevier Science, USA. Retrieved December 4, 2007, from http://www.sciencedirect.com/science?_ob=MIimg&_imagekey=B6WJ6-461K61C-1-1&_cdi=6870&_user=5915182&_orig=na&_coverDate=05%2F31%2F2002&_sk=999569996&_view=c&_wcp=dGLbVzW-zSkzV&_md5=a13e59eddca71e2968f08613262e7bcd&_ie=/sdarticle.pdf
- Tesco. (2007). *Annual review and summary financial statement 2007*. Tesco Plc. Cheshunt, UK. Retrieved February 15, 2008, from http://www.tescocorporate.com/images/annual_review_and_sfs_2007_0.pdf
- The Blue Angel. (2008). *The Blue Angel*. Retrieved April 24, 2008, from http://www.blauer-engel.de/englisch/navigation/body_blauer_engel.htm
- The Resource Committee (2000). *skýrsla auðlindanefndar*. Prime Ministry, Reykjavik, Iceland. Retrieved October 20, 2007, from http://forsætisraduneyti.is/media/Skyrslur/S%27kyrsla_Auðlindanefndar_final.pdf
- Thrush S.F., Hewitt J.E., Cummings V.J., Dayton P.K., Cryer M., Turner S.J., Funnell G.A., Budd R.G., Milburn C.J., Wilkinson M.R. (1998). Disturbance of the marine benthic habitat by commercial fishing: impacts at the scale of the fishery. *Ecological Applications*, 8(3): 866-879. Retrieved October 5, 2007, from [http://links.jstor.org/sici?sici=1051-0761\(199808\)8%3A3%3C866%3ADOTMBH%3E2.0.CO%3B2-C](http://links.jstor.org/sici?sici=1051-0761(199808)8%3A3%3C866%3ADOTMBH%3E2.0.CO%3B2-C)
- Tradeka. (2008). *Tradeka*. Retrieved March 20, 2008, from <http://www.tradeka.fi/tradeka/ipub.nsf/sivut/toimialapohja?OpenDocument&cid=euomarket>
- Tyedmers P. (2000). Fisheries and energy use. Dalhousie University, Halifax, Nova Scotia, Canada. Retrieved October 9, 2007, from http://www.seaturtle.org/PDF/Tyedmers_InPress_EE.pdf
- Tyedmers P. (2001). *Quantifying the energy consumed by north Atlantic fisheries*. University of British Columbia, Vancouver, Canada. Retrieved October 10, 2007, from <http://www.searounds.org/report/method/tyedmers10.pdf>
- Tyedmers P.H., Watson R. & Pauly D. (2005). Fueling global fishing fleets. *Ambio* 34(8):635-638. Royal Swedish academy of sciences, Stockholm, Sweden. Retrieved October 6, 2007, from <http://www.searounds.org/ecosystemsmaps/images/fuelingfleets.pdf>
- Ulriksen V. (2008). *State Secretary Vidar Ulriksen's speech at the aquaculture seminar, Puerto Montt – Chile*. The Norwegian Ministry of Fisheries and coastal affairs. Retrieved March 15, 2008, from <http://www.regjeringen.no/en/dep/fkd/The-Ministry-of-Fisheries-and-Coastal-Affairs/Other-political-staff/Vidar-Ulriksen--Secretary-of-State/Speeches-and-articles-by-other-political-staff/2008/State-Secretary-Vidar-Ulriksen-speech-a.html?id=497569>
- UN. (1982). *United Nations Convention on the Law of the Sea (UNCLOS)*. United Nations, NY, USA. Retrieved November 13, 2007, from http://www.un.org/Depts/los/convention_agreements/texts/unclos/unclos_e.pdf
- UN. (1995). *United Nations conference on straddling fish stocks and highly migratory fish stocks*. United Nations General Assembly. Retrieved May 1, 2008, from: <http://daccessdds.un.org/doc/UNDOC/GEN/N95/274/67/PDF/N9527467.pdf?OpenElement>
- UN. (2006a). *General assembly calls for "immediate action" to sustainably manage fish stocks, protect deep sea ecosystems from harmful fishing practices*. UN General Assembly, GA/10551, sixty-first GA, 71st meeting. UN, NY, USA. Retrieved October 5, 2007, from <http://www.un.org/News/Press/docs/2006/ga10551.doc.htm>
- UN. (2006b). *The Impacts of Fishing on Vulnerable Marine Ecosystems*. United Nations General Assembly, 14 July 2006, sixty-first session, item 69 (b): Oceans and the law of the sea. UN, NY, USA. Retrieved October 5, 2007, from http://www.un.org/Depts/los/general_assembly/documents/impact_of_fishing.pdf

- UNEP. (2004). *Evaluation of Environmental Impacts in Life Cycle Assessment*. United Nations Environment Program publications. Retrieved December 6, 2007, from http://lcinitiative.unep.fr/default.asp?site=lcinit&page_id=F511DC47-8407-41E9-AB5D-6493413088FB
- US census bureau. (2008). *United States fact sheet*. Retrieved March 20, 2008, from http://factfinder.census.gov/servlet/ACSSAFFacts?_submenuId=factsheet_0&_sse=on
- US EPA. (1993). *Status Report on the Use of Environmental Labels Worldwide*. United States Environmental Protection Agency. Office of Pollution Prevention and Toxics, EPA 742-R-9-93-001. September.
- US EPA. (2007). *Climate change*. US Environmental program Agency. Retrieved December 2, 2007, from <http://www.epa.gov/climatechange/>
- Valentini L. (2005). *Environmental quality provisions and Eco-labelling: Some issues*. World Trade Organisation, Geneva, Switzerland. Retrieved November 15, 2007, from http://64.233.183.104/search?q=cache:wKC2NZzb0gMJ:www.wto.org/english/res_e/reser_e/ersd200502_e.doc+self-declaration,+seafood&hl=en&ct=clnk&cd=2&gl=is&client=firefox-a
- Watling L. & Norse E.A. (1998). Disturbance of the seabed by mobile fishing gear: a comparison to forest clearcutting. *Conservation biology*, 12(6): 1180-1197.
- WCED. (1987). *Our common future*. United Nations World Commission on the Environment and Development. Oxford, Oxford university press. Retrieved April 18, 2008, from <http://www.un-documents.net/wced-ocf.htm>
- Welch L. (2004 July 26). After Oreo, Alaskan Seafood most recognised name in restaurants *Alaska journal of commerce*. Retrieved February 1, 2008, from http://www.alaskajournal.com/stories/072604/fis_20040726008.shtml
- Wessells C. (2000). Enlisting the consumer in sustainable fisheries production. *Maritimes*, 42(3). Retrieved February 1, 2008, from http://www.gso.uri.edu/maritimes/Text_Only/00fall/text/wessells.htm
- Wessells C.R., Cochrane K., Deere C., Wallis P. & Willmann R. (2001). *Product certification and ecolabelling for fisheries sustainability*. FAO fisheries technical paper 422. FAO fisheries department, Rome, Itali. Retrieved November 15, 2007, from <ftp://ftp.fao.org/docrep/fao/005/y2789e/y2789e00.pdf>
- Wessells C.R., Donath H. & Johnston R.J. (1999). *U.S. consumer preferences for ecolabeled seafood: Results of a consumer survey*. University of Rhode Island, RI, USA. Retrieved September 5, 2007, from http://www.uri.edu/cels/enre/docs_CRoheim/ecolabel.pdf
- Wessells, C.R., Johnston R., & Donath H. (1999). Assessing Consumer Preferences for Ecolabeled Seafood: The Influence of Species, Certifier and Household Attributes. *American Journal of Agricultural Economics* 81(5): 1084-1089. Retrieved August 4, 2007, from <http://www.allbusiness.com/marketing/market-research/384035-1.html>
- Wikipedia (2008a, February 5). White paper. Wikipedia contributors, "White paper," *Wikipedia, The Free Encyclopedia*. Retrieved February 5, 2007, from http://en.wikipedia.org/w/index.php?title=White_paper&oldid=203269242
- Wikipedia. (2008b, February 21). Waitrose. Wikipedia contributors, "Waitrose," *Wikipedia, The Free Encyclopedia*. Retrieved February 21, 2008, from <http://en.wikipedia.org/w/index.php?title=Waitrose&oldid=177039374>
- Worm B, Barbier EB, Beaumont N, Duffy JE, Folke C, Halpern BS, Jackson JBC, Lotze HK, Micheli F, Palumbi SR, Sala E, Selkoe K, Stachowicz JJ, Watson R. (2006). Impacts of biodiversity loss on ocean ecosystem services. *Science*, 314, 787-790. Retrieved September 5, 2007, from http://myweb.dal.ca/bworm/Worm_etal_2006Science.pdf

WTO. (1997). *Eco-labelling*. Overview of Current Work in Various International Fora, Note by the WTO Committee on Trade and Environment, WT/CTE/W/45, WTO: Geneva; OECD. 1997a. Processes and Production Methods (PPMs): Conceptual Framework and Considerations on use of PPM-based Trade Measures, OECD, Paris; OECD. 1997b. Eco-labelling: Actual Effects of Selected Programmes, OECD, Paris.

WTO. (2008). *Environment: Labelling*. World Trade Organisation, Paris, France. Retrieved March 15, 2008, from http://www.wto.org/english/tratop_e/envir_e/labelling_e.htm

WWF. (2007a). *Sustainable seafood: Consumer guides*. World Wide Fund, Gland, Switzerland. Retrieved November 5, 2007, from http://www.panda.org/about_wwf/what_we_do/marine/our_solutions/sustainable_fishing/sustainable_seafood/seafood_guides/index.cfm

WWF. (2007b). *Fiskeguiden*. World Wide Fund, Copenhagen, Denmark. Retrieved November 13, 2007, from <http://www.hvaforenfisk.dk/Menu/WWF%27s+fiskeguide>

Þórarinnsson K. (2006). *Því ekki MSC?* Slides from a conference on ecolabelling for Icelandic fisheries, held by the Fisheries association of Iceland. Retrieved August 7, 2007, from <http://www.fiskifelag.is/files/MSC%20K%C3%9E%20.pdf>

List of interlocutors

Bacon M. (2008, March 3). Personal e-mail. Bacon is RFS Project Manager at The Sea Fish Industry Authority.

Pálsson Ö. (2008). Personal interview 01.04.2008. Mr. Örn Pálsson is the managing director of NASBO (National association of Small Boat Owners).

Þórarinnsson K. (2007). Speech at a conference on sustainable development in the seafood industry held by Matís in Sauðárkrókur, Iceland, Jun 15, 2007.

Þórarinnsson K. (2008). Personal interview 10.04.2008. Mr. Kristján Þórarinnsson is a population ecologist and LIU's (The Federation of Icelandic Fishing Vessel Owners) leading expert on environmental labels.