THE ICELANDIC FISHERIES

MANAGEMENT, PRODUCTION AND MARKETS

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1 FISHERIES STRUCTURE AND MANAGEMENT

1.1 HIGHLIGHTS FROM THIS SECTION

- Transferability of allocated quotas and quota shares is a cornerstone in the fisheries management system. Quotas may be transferred within the year (renting) or permanent quota shares can be sold or exchanged (permanent sales). The ability to transfer fishing rights from one vessel to another has facilitated considerable consolidation in the industry.

- It is well known that the highest prices for quotas through the years have been paid by speculators with inadequate quota who have tended to stretch their quota-buying beyond their means. This group of people has now more or less disappeared from the industry. The fact remains that the price paid for cod quotas is very high compared to its landed value.

- Resource fee has been levied from Sept 1 2004. The fee is expected to be close to 900 million ISK in total for the current fishing year.

- There are 71 trawlers in the fleet, including 35 freezer trawlers and 36 wetfish trawlers. Freezer trawlers are active in the groundfish fishery (29 vessels), shrimp fishery (one vessel) and the herring and capelin fishery (4 vessels). Most of the largest trawlers in the fleet are freezer vessels.

- The fishing fleet is owned by Icelandic companies. Vertical integration of fishing and processing capacities is a special feature of the largest fishing companies, as shown by the fact that most of the 50 largest quota share holders operate their own processing plants or freezer trawlers.

- The ten largest companies controlled over 50% of the total quota in the 2003/04 fishing year. All of these companies are the results of mergers, and in some cases multiple mergers, in recent years. On the other hand, the allocations to the 50 largest enterprises reach only 75% of the total quota, indicating also that there is a considerable spread in fishing rights among medium and small-size companies and individual boat owners.

- There are three methods for determining the price for landed fresh fish:
  1) By direct sales, which is the usual practice in integrated companies that own vessels and processing plants,
  2) On auction markets in Iceland, when buyers and sellers most often are unrelated companies,
  3) On auction markets abroad or in direct sales abroad, when wetfish is sold by container loads or from the fishing vessels.

- A minimum reference price is in effect for landed cod (gutted and ungutted), haddock (gutted and ungutted) and redfish (ungutted). This price represents a convergence of prices in direct trade on the one hand and prices on auction markets on the other hand and it is calculated from the weighted average of prices in direct trade and auction prices.

- The flexibility in calculating crew shares directly from product value for each landing can be considered to be one of the advantages for the economic performance of the frozen-at-sea industry, not least in the pelagic fishery where product prices have fluctuated significantly in the past years.

1.2 FISHERIES MANAGEMENT SYSTEM

The author of this report is responsible for writing and updating the website: **www.fisheries.is** - Information Centre for Responsible Fisheries of the Ministry of Fisheries. The website describes the development of the Icelandic fisheries management system and the present laws and legislation. An account of the historical development of the system is also found on the website.

Scientific assessment of marine resources and recommendations for stock utilization are the basis for the annual allocation of the total allowable catch (TAC) from the stocks. An increasing number of stocks have been managed by this process but a few are not subject to fishing restrictions or are not fished.

The Fisheries Management Act of 1990 (L.38/1990) is the cornerstone of the present fisheries management system. By this Act, the system of individual transferable quotas (ITQ) was established for the fisheries. The quotas represent shares in the total allowable catch and are allocated to fishing vessels. The quotas are permanent and fairly freely transferable, either within the year (temporary transfer by renting) or permanently, when quota shares are sold from one vessel to another.

The overall aim of the Act is to protect marine resources and effect an economic and efficient utilization of stocks, thereby underpinning the seafood industry and securing employment in the country. The law also specifically states that exploitable marine stocks are the common property of the Icelandic nation.

The Ministry of Fisheries is responsible for management of the Icelandic fisheries and implementation of legislation to this effect. The Ministry issues regulations for commercial fishing for each fishing year, including an allocation of the TAC from each of the stocks that are subject to such limitations.

The Marine Research Institute is the centre of scientific research for marine resources and responsible for recommendations of the annual TACs.

The Directorate of Fisheries and the Coast Guard are responsible for ensuring compliance with the Fisheries Management Act.

1.2.1 Allocation of quota

The allocation of quota shares for each vessel was originally based on its share in the landings from each stock in the three years leading up to the establishment of individual vessel quotas. This was the period 1981-83 for the major groundfish stocks,. Quota shares are calculated on an annual basis and have changed significantly since 1990 due to permanent transfers.

By the 1990 Fisheries Management Act the fishing year was set from Sept 1 to Aug 31 in the following year but prior to that it had been based on the calendar year. This was an effort to channel fishing of the groundfish stocks away from the summer months, when quality suffers more quickly and trained factory workers are on vacation.

There are a few exceptions to the fishing year spanning 12 months. The fishing year for Iceland herring is presently set from Sept 1 to May 1 and for inshore shrimp it is Oct 1 to May 1. In the capelin fishery, the TAC applies from June 20 to April 30. Fishing of herring from the Atlanto-Scandian stock, oceanic redfish in the Irminger Sea and northern shrimp on the Flemish Cap is also subject to special regulations by international agreements and in this case the TAC is set for the calendar year.

Since 1991 there have been a number of adjustments to the fisheries management system. The greatest number of such changes apply to the smallest vessels but the most significant and general adjustments have been made to limit quota speculation and prevent undue consolidation of fishing rights by a few fishing companies.

For the most important stocks, upper limits have been set for the holding of quota shares by a fishing company or a group of companies that are closely linked by ownership. The upper limit is 12% of the quota shares for cod, 20% for haddock, saithe and Greenland halibut, 35% for redfish, 20% for herring and capelin and 20% for offshore shrimp. A further measure stipulates that each fishing company or a group of companies is not permitted to hold more than 12% of the value of the combined quota shares for the stocks utilized by TAC allocations.

In order to limit quota transfers by vessels that make little use of their quota allocation except for financial gains, a vessel will lose its quota if it uses less than 50% of its allocation, measured in cod equivalents (see section 1.2.7), in two subsequent years. There is also a requirement that within the year, the net transfer of quota from any vessel must not exceed 50% of the allocation.

1.2.2 Quota transfers

Transferability of allocated quotas and quota shares is a cornerstone in the management system. Quotas may be transferred within the year (renting) or permanent quota shares can be sold or exchanged (permanent sales). The ability to transfer fishing rights from one vessel to another is seen as a powerful tool for increasing the economic performance in the fisheries and it has facilitated considerable consolidation in the industry. At the same time, the issue has been debated from the standpoint of job security for fishermen and processing workers and indeed with a view of sustainability for many local communities. The issue is a profound one and most certainly the allocated rights have great value. The debate has

been most active when vessels have been decommissioned or sold away from local processing plants or their quota share diminished by transfers to such an extent that it has made their operation unprofitable.

A detailed discussion on fishing rights transferability is considered to be outside the scope of this report, but some salient features will be outlined and the development of transfers in recent years for cod, haddock, shrimp and herring will be shown.

1.2.3 Transfer of groundfish quotas and permanent quota shares

There is extensive transfer of quotas (renting) for most species of groundfish. The following table shows the turnover as proportion of the allocated quotas in three fishing years, but also the transfers in 2002/2003 split up into two groups – firstly the transfers between vessels of the same company, and secondly the transfers between vessels in different companies. It should be noted, since the figures indicate turnover, and hence include transfers back and forth, that the net transfers may be much lower. By most standards the rate of transfers is high, especially considering the transfers that involve transactions between different companies - over 30% for both cod and haddock.

TABLE: Quota transfers for cod and haddock as % of TAC

	2002/03 Same comp.	**2002/03 Diff. comp.**	**2002/03 Overall**	**2001/02 Overall**	**2000/01 Overall**
Cod	17	31	48	51	45
Haddock	23	32	55	75	59

Source: Calculations based on original data from the Directorate of Fisheries

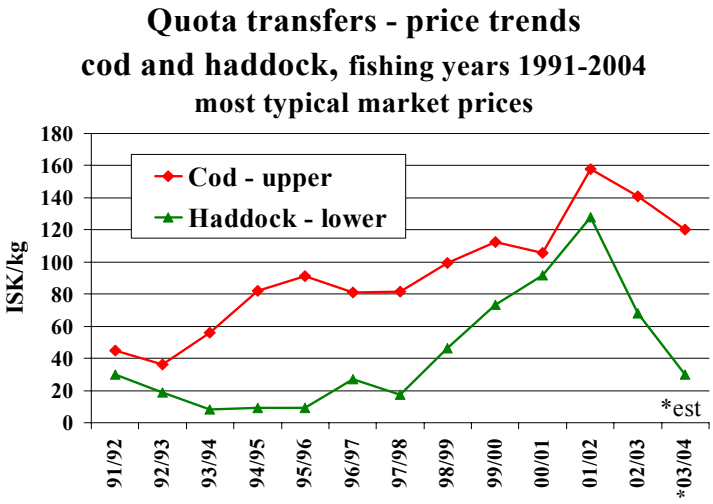
The second table shows the market for transfers of permanent quota shares, again as turnover, which is likely to exaggerate net transfers considerably. The figures include transfers within companies but also between companies and it is very likely that the former have a significant impact on total transfers. It seems that figures showing only transfers between (unrelated) companies are not available. It can be assumed, however, that the market for transfer of permanent quota shares is still quite active.

TABLE: Permanent quota share transfers for cod and haddock as % of TAC

	2002/03	**2001/02**	**2000/01**	**2000/1999**
Cod	21	23	24	13
Haddock	23	25	17	12

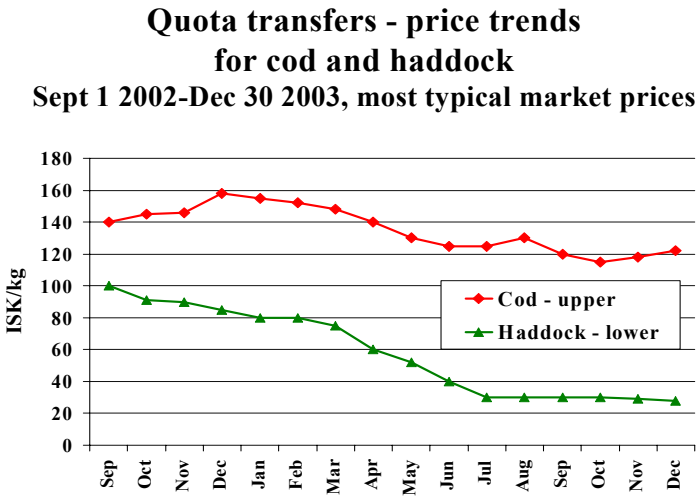
Source: Directorate of Fisheries

Prices for renting groundfish quotas within a fishing year continued to increase throughout the 1990s and until 2002 when they started falling sharply. The following figure shows the development for cod and haddock quotas in this period.



Source: Federation of Icelandic Fishing Vessel Owners –personal communication

The second diagram shows clearly the price developments for cod and haddock quotas month by month in 2003. The price for cod quota was close to 120 ISK/kg at the end of the year, while the weighted average price for landed cod in direct sales from vessels to processors was132 ISK/kg at the same time, or just 12 ISK/kg higher. The price for haddock quota was close to 30 ISK/kg at the end of 2003, but the landed price was 63 ISK/kg (Industry sources and Directorate of Fisheries).



Source: Federation of Icelandic Fishing Vessel Owners

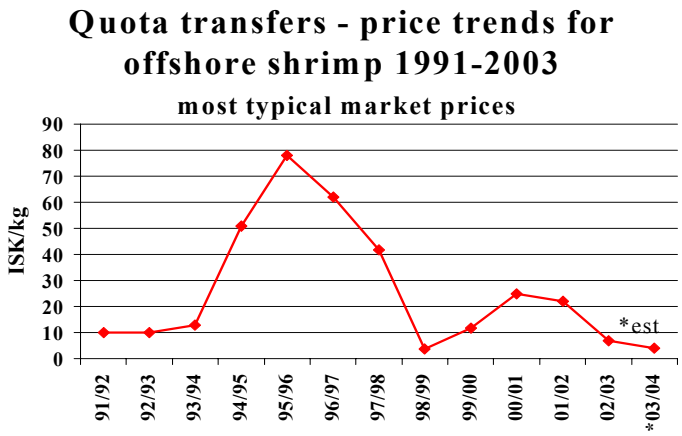
It is well known that the highest prices for quotas through the years have been paid by speculators with inadequate quota who have tended to stretch their quota-buying beyond their means. This group of people has now more or less disappeared from the industry and hence the recent fall in quota prices can be considered to be the result of increased stability in the industry. The high value of the ISK together with lower market prices for fishery products also plays a part. The fact remains that the price paid for cod quotas is very high compared to its landed value.

The transfer of permanent quota shares for cod continues to have a very high value. The price for cod quota shares in the 2003/04 fishing year was close to 1,100 ISK/kg but the price for permanent shares in the haddock fishery was about 330 ISK/kg, which, by comparison, must be considered low.

1.2.4 Transfer of shrimp quotas and permanent quota shares

Directorate of Fisheries data indicate that shrimp quotas are transferred very actively, as witnessed by the fact that 35,000 mt of offshore shrimp changed hands in the 2002/03 fishing year against a quota of just 30,000 mt, indicating multiple transfers of the same quantities – within companies and between companies. Similarly, the figures for transfer of permanent quota shares seem high, or close to 30% in the 2002/03 fishing year, but they are likely to indicate efforts to rationalise shrimp fishing in times of poor economic performance.

Prices for transferred shrimp quotas increased until 1996 but then fell sharply and have remained low since, as is shown in the following figure. The decrease reflects the economic difficulties in the shrimp industry and the fact that most often in recent years the offshore shrimp quota has not been caught fully. In 2003, offshore shrimp quotas varied in price from almost nil to 8 ISK/kg, and in the first months of 2004, quotas were transferred at 4 ISK/kg while fresh shrimp was landed at 90 ISK/kg. Not surprisingly, the market for permanent quota shares in shrimp is quite inactive. (Industry sources and Directorate of Fisheries).

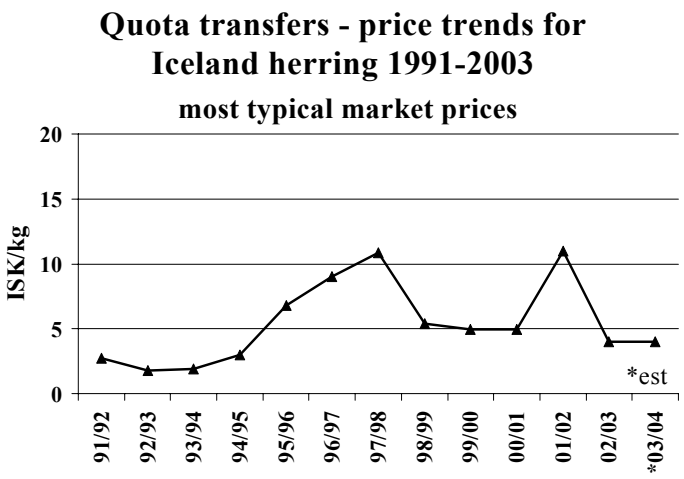


Source: Federation of Icelandic Fishing Vessel Owners

1.2.5 Transfer of herring quotas and permanent quota shares

According to Directorate of Fisheries data, Iceland herring quotas are also transferred very actively. About 65,000 mt were transferred in 2002/2003, against a quota of 105,000 mt, strongly suggesting multiple transfers of quotas. The transfer rate of permanent quota shares was 17% at the same time and also seems fairly high, but indicates rationalisation and consolidation of fishing rights.

Prices for Iceland herring quotas increased until 1998 but have tended to be low since, as is shown in the following figure. The price increase in 2001/02 is probably not significant because the quota was far from fully caught that year and transfers were frequent within companies. In 2003, herring quotas varied in price from almost nil to 4 ISK/kg and in the first months of 2004, quotas were transferred at 4 ISK/kg while fresh herring was landed at 9.30 ISK/kg.



Source: Federation of Icelandic Fishing Vessel Owners

Permanent quota shares for Iceland herring were traded at close to 120 ISK/kg in early 2004, which must be considered a high price. (Industry sources and Directorate of Fisheries).

1.2.6 Catch rule for cod

The catch rule for cod was adopted by a government decision and became effective in 1995. It states that the annual TAC for cod is to be set at 25% of the fishable biomass. This implies that the TAC is automatically set after the annual stock assessment. A further clause in the catch rule for cod states that the total TAC should not vary by more than 30,000 mt from one fishing year to the next. This clause was added in 2000.

1.2.7 Cod equivalents

The term cod equivalent is a measure of weight and implies the relative value of different fish species on the market. This is set by a regulation every year. For each vessel having an allocation for several species, the total quota can therefore be calculated as cod equivalents. Quota transfers between vessels are most often based on cod equivalents.

Examples of cod equivalents, valid in the 2004/05 fishing year are shown in the following table.

TABLE: Cod equivalents for selected stocks, 1 Sept 2004 – 31Aug 2005

	Cod	Haddock	Saithe	Herring	Off-shore shrimp
Cod equivalents	1.00	0.68	0.36	0.09	0.68

Source: Regulation 669/2004

1.2.8 Special allocations and reserves

The Minister of Fisheries allocates each year up to 12,000 mt of groundfish (based on cod equivalents) in order to counteract the effects of diminished allocations in individual fisheries (Decreased TACs for shrimp and scallops in recent years are

examples). Part of this allocation (1,500 mt) is for vessels in villages where there has been a significant decrease in fisheries revenue. This allocation is subject to a specific regulation each year. Included also in the Minister's direct allocation are about 1,000 mt of haddock, 1,000 mt of catfish and 300 mt of saithe to hook-and-line boats in villages that depend to a large extent on fishing by the smaller boats.

The ITQ system has undergone a series of changes in the past decade, chiefly to accommodate small boats that have gradually accepted quota allocations. The system is now quite established as far as allocation by types of vessels are concerned and it is expected that changes will be only gradual in years to come.

The fleet of effort-based small boats (less than 6 grt and fishing only with hook-and-line) can be considered to be the remnants of effort-based fisheries management. In the 2003/2004 fishing year there were close to 300 boats involved and each was allowed to fish for 19 days, with an upper limit for the group of 2,100 mt of cod. However, the reference volume was always greatly exceeded. The result, according to the law, was a gradual decrease in the number of fishing days. A new legislation was passed by Althingi in 2004 that will assimilate the day boats in the general quota system over the next two years.

1.2.9 Resource fee

A new chapter in the Fisheries Management Act was passed by Althingi in 2002. This includes a levy on fishing rights allocation and is payable by fishing companies. Fishing rights for the Icelandic fleet within and outside the EEZ will be levied from Sept 1 2004.

The resource fee each year will be based on the total value of landed catch in the period May 1 (previous year) to April 30 (current year) from which major running costs and fishermen shares are deducted. Salaries will be calculated as being 39.8% of the landed catch value in the period. The cost of oil for the fleet as a whole are based on the average cost in 2000 and linked to later changes on the world market. Other running costs are also index linked to the average cost in 2000. This approximation for the net landed value will be divided by the figure for total allocated cod equivalents (kg) in the new fishing year and will lead to net landed value per cod equivalent (kr/kg). From September 1 2004 the fee will be 6% of this value but gradually increasing to 9.5% by Sept.1 2009. The fee is expected to be close to 900 million ISK in total in the 2004/2005 fishing year.

The Directorate of Fisheries will be responsible for levying and due payment of the resource fee.

1.2.10 Special protective measures

The Icelandic fisheries management system has many supporting measures designed for specific fisheries.

Extensive nursery areas are permanently closed for fishing and spawning areas of cod are closed for a few weeks in late winter during the spawning period. The Marine Research Institute has the right of immediate, temporary closure of areas with excess juveniles.

There is a 12-mile limit for large trawlers in most areas and there are several selectivity measures in effect, such as regarding mesh size in fishing gear. A sorting grid is mandatory to avoid by-catch of juvenile fish in the shrimp fisheries and devices for excluding juveniles in the groundfish fisheries are also mandatory in certain areas.

There are requirements that small fish, i.e. cod and saithe less than 50 cm, haddock less than 45 cm and redfish shorter than 33 cm must be kept separate in the catch and must not exceed 10% of the cod, saithe, haddock and redfish catch. In compensation, and since this fish has rather low value, it does not count fully in calculations of the vessels' quota when it is landed.

There are also strict requirements for the keeping of logbooks on-board all fishing vessels and they must be made available for fishery inspectors.

1.2.11 Recent TACs

The current and recent quota allocations for some of the important stocks are shown in the following table.

TABLE: TAC allocations for selected stocks in three fishing years

	TAC 2002/2003 mt	**TAC 2003/2004 mt**	**TAC 2004/2005 mt**
Cod	179,000	209,000	205,000
Haddock	55,000	75,000	90,000
Saithe	45,000	50,000	70,000
Redfish –Iceland waters	60,000	57,000	57,000*
Greenland halibut	23,000	23,000	15,000
Iceland herring	105,000	110,000	110,000
Offshore shrimp	30,000	20,000	20,000

*Allocation for redfish is the combined allocation for golden redfish and deepsea redfish. Separate allocations for the two stocks may be made after further research on the deepsea stock.

The fisheries management has been very focused on returning the cod stock to levels of acceptable biomass and spawning stock. This effort has met with various setbacks. Information on the status of stocks can be viewed on: www.hafro.is.

1.2.12 Management by international agreements

Fishing from the Atlanto-Scandian herring stock in the Northeast Atlantic is controlled by an international agreement. Iceland, Faroe Islands, Norway, the Russian Federation and the EU all fish from this stock. The annual total TAC is decided by the Northeast Atlantic Fisheries Commission (NEAFC).

The Icelandic Ministry of Fisheries announced that the TAC for Icelandic vessels in the Atlanto-Scandian herring fishery was 128,205 mt in the 2004 season, starting May 5. The TAC is allocated to individual vessels.

Fishing of the oceanic redfish stock in the international area of the Irminger Sea is also controlled internationally by NEAFC. This stock is fished by Iceland, Russia,

Faroe Islands, Greenland and some EU countries. The Icelandic share is allocated to individual vessels. The Icelandic TAC set in 2004 was 55,000 mt.

The capelin stock is also trans-boundary by nature but most of it is found within the Icelandic EEZ. It is fished mainly by Iceland, but a proportion of the TAC is fished by other nations in accordance with an agreement between Iceland, Norway and Greenland. The total quota in Icelandic waters was set at 875,000 mt in the 2003-04 season.

The 1999 agreement between Iceland, Norway and Russia settled a dispute involving Icelandic fishing in the international area of the Barents Sea. According to this, some rights for fishing within the respective EEZs were agreed on, but subject to stock conditions. In 2004, Icelandic vessels are allowed to fish 7,300 mt of cod in the Barents Sea and 2,200 mt of other species as by-catch. In 2005 the cod allocation is 7,100 mt and for other species 2,100 mt.

The northern shrimp fisheries in the international area of the Northwest Atlantic (Flemish Cap) are subject to management by the Northwest Atlantic Fisheries Organization (NAFO). The fisheries are subject to management by effort restriction but Iceland has objected to this system of management and allocated individual vessel quotas. Icelandic observers are placed on-board all Icelandic fishing vessels for various assessment including shrimp size, maturity and by-catch. The allocation for 2004 was 13,500 mt.

1.2.13 Directorate of Fisheries

The Directorate of Fisheries is a government body under the Minister of Fisheries and is responsible for enforcement of fisheries legislation and continuous monitoring of compliance with legislation.

It should also be noted that the Icelandic Coast Guard, responsible to the Minister of Justice, monitors fishing activities in Icelandic waters, including surveillance of areas closed for fishing, and inspection of mesh sizes and other gear-related practices.

The Directorate of Fisheries has an extensive mandate. In addition to its responsibilities in the area of fisheries management, it is also responsible for enforcement of laws and regulations relating to the handling, processing and distribution of marine products, and for collating and publishing data and other information on fishing and processing activities.

The Directorate issues commercial fishing permits, allocates catch quotas to Icelandic vessels and maintains records of those rights. It also records quota transfers between vessels and checks that vessels do not fish in excess of their quotas. The department collects data on fishing and landings by the Icelandic fleet and monitors compliance with rules on the weighing and recording of catches.

All landings in Iceland by the Icelandic fishing fleet must be weighed and reported in Iceland. Port authorities are responsible for the correct weighing and recording of the catch and for transmitting this information to the Directorate. All landed catch is weighed on certified scales by licensed operators who are employed by the local port authorities or sometimes by a plant that is approved for this purpose. A computer

system links all the ports of landings to the Directorate and catch data is transmitted twice a day. The fishing by on-board processing vessels is monitored by weighing the landed products in a similar way and by conversion to catch weight by means of yield factors, calculated for each type of product from each fish species and for each vessel.

To some degree, Icelandic fishing vessels sail directly from the fisheries to markets in Europe. In those instances, the catches are monitored by records of sales transmitted from the importing country to the Directorate of Fisheries.

1.3 STRUCTURE OF THE FISHING FLEET

The capacity of the fishing fleet decreased significantly in the late 1990s but it has remained fairly constant since.

According to the Icelandic Maritime Administration, the size of the Icelandic fishing fleet at the end of 2003 was close to 184,000 gross register tons (grt) – a decrease of 4% from the previous year. The fleet is traditionally divided into three classes, i.e. trawlers, decked vessels and undecked vessels.

The following two tables show the development for the fishing fleet in the past five years.

A few trends for the fishing fleet can be seen in the past few years. The number of boats in each class varies but the overall tonnage has not changed markedly. The increase in 2001 and 2002 is due to the arrival of large processing vessels, chiefly in the pelagic fisheries. The most noticeable trend in the past few years is, however, the decrease in the number of trawlers, which is due to consolidation in the industry and poor results in the shrimp fishery. At the same time, a few freezer trawlers have been renovated and now operate with multiple gear but chiefly in the herring fishery.

TABLE: Number of vessels in the Icelandic fishing fleet

	1999	**2000**	**2001**	**2002**	**2003**
Decked vessels	751	808	875	871	860
Trawlers	91	84	80	76	71
Undecked vessels	1,134	1,101	1,057	988	927

Source: Fisheries Statistics 1999-2002, table 4.1 and Icelandic Maritime Administration, personal information for 2003

TABLE: Capacity of vessels in the Icelandic fishing fleet in grt

	1999	**2000**	**2001**	**2002**	**2003**
Decked vessels	88,100	92,200	107,200	106,300	102,200
Trawlers	87,500	82,900	79,400	80,700	77,100
Undecked vessels	5,200	5,100	4,800	4,600	4,300
Total	**180,800**	**180,200**	**191,400**	**191,600**	**183,600**

Source: Fisheries Statistics 1999-2002, table 4.1 and Icelandic Maritime Administration, personal information for 2003

The following is a brief overview of the fleet by vessel capacity and age.
(The analysis is based on Fisheries Statistics 2002, but unpublished data for 2003 were supplied by the Directorate of Fisheries and the Icelandic Maritime Administration).

1.3.1 Decked vessels

The greatest number of decked vessels (close to 650) is under 100 grt but they contribute only about 10% to the gross tonnage in this class of vessels.

Grouped together, all the decked vessels under 1,000 grt contribute nearly two thirds to the gross tonnage in the class and hence the decked vessels over 1,000 grt represent a third of the capacity in this class. In 2002, there were 23 decked vessels with capacity over 1,000 grt in the fishing fleet.

Many of the boats in this class are fairly old, since close to two thirds of the capacity is in vessels that are 20 years or older. New vessels (4 years or less), on the other hand, also represent a significant share (15%) of the capacity.

1.3.2 Trawlers

There were 42 trawlers under 1,000 grt in the fleet in 2002 and they contributed about a third to the capacity in this class. Large trawlers (over 1,000 grt) were 34 and represented about two thirds of the trawler fleet capacity in 2002.

The trawler fleet is mixed as regards age. Just over half of the capacity is in vessels that are 20 years or older and just 10% of the capacity is in trawlers that are 4 year or less.

The trawler fleet can be divided into freezer trawlers and wetfish trawlers. The most recent data are for the year 2003, when there were 71 trawlers in the fleet (five less than in 2002), including 35 freezer trawlers and 36 wetfish trawlers. Some of vessels classified as freezer trawlers operate partly as wetfish trawlers.

Most of the largest trawlers in the fleet are freezer vessels. In the group of large trawlers (over 1,000 grt), there were 30 freezer vessels and just three wetfish trawlers (2003 data - industry information).

Freezer trawlers are active in the groundfish fishery (29 vessels), shrimp fishery (two vessels until late 2004, but one since) and the herring and capelin fishery (4 vessels). It should also be noted that in addition to the freezer trawlers there are three large-capacity freezer vessels (purse seiners/pelagic trawl vessels) active in the herring fishery and one freezer vessel (gillnetter) in the Greenland halibut fishery.

It is especially noteworthy that of the two shrimp freezer trawlers, one fishes off the Flemish Cap, while the other operated in Icelandic waters until recently but has now been converted for fisheries other than shrimp. In the mid and late 1990s there were up to 15 Icelandic shrimp trawlers freezing their catch on-board.

1.3.3 Undecked vessels

There are about. 930 undecked vessels in this fleet and most of them are less than 7 grt. Their number and capacity seem to be decreasing. Most of these boats fish by hook-and-line and close to half of the fleet is 20 year-old boats or older.

1.3.4 The fleet and landings

The following table shows the proportional landings of groundfish in 2002 by the different vessel types. It is clear that trawlers, including freezer-trawlers, are the most important for the overall groundfish landings and as regards redfish and Greenland halibut almost all the fishing is by the trawler fleet.

TABLE: Groundfish landings by vessel type, % by landed quantity 2002

	%
Undecked vessels	5
Decked vessels < 100 grt	15
Vessels > 100 grt	26
Wetfish trawlers	22
Freezer trawlers	32
Total groundfish	**100**

Source: Fisheries Statistics 2002, tables 5.9 and 6.3

1.4 OWNERSHIP OF THE FLEET – QUOTAS AND SIZE OF OPERATIONS

The fishing fleet is owned by Icelandic companies, both large and small. Vertical integration of fishing and processing capacities is a special feature of the largest fishing companies, as shown by the fact that most of the 50 largest quota-share holders operate their own processing plants or freezer trawlers, and all of the 20 largest are focused on own production. Considerable consolidation of quota shares has occurred with the result that the ten largest companies control over 50% of the quota (expressed in cod equivalents) in the 2003/2004 fishing year. All of these companies are the results of mergers, and in some cases multiple mergers, in recent years.

The following are presently the ten largest fishing companies in Iceland, based on fishing rights in Icelandic and distant waters, i.e. the 2003/2004 quota, measured in cod equivalents. It should be noted that at the time of the analysis, only the initially allocated capelin quota had been announced (close to 50% of the final quota).

TABLE: Largest fishing companies 2003/2004 based on fishing rights allocation

	Alloc. in cod equiv.	% of total
HB Grandi*	45,000	10.1
Samherji	38,000	8.6
Brim Group**	30,200	6.8
Thorbjörn Fiskanes	20,700	4.7
Fiskidjan Skagfirdingur	20,200	4.5
Thormodur rammi -Saeberg	19,500	4.4
Sildarvinnslan	17,900	4.0
Hradfrystihusid Gunnvör	13,300	3.0
Visir	12,900	2.9
Vinnslustödin	12,100	2.7
Ten largest in combination	**229,800**	**51.7**

Magazine Fiskifrettir, adapted from the Directorate of Fisheries
* Merger of HB and Grandi in April 2004, ** Refers to the new Brim Group, UA and Tjaldur

Further study shows that the next five companies in the ranking order bring the 15 largest companies to just over 60% of the quota allocated in the 2003/2004 fishing year. On the other hand, the allocations to the 50 largest enterprises reach only 75% of the total quota, indicating also that there is a considerable spread in fishing rights among medium and small-size companies and individual boat owners.

As discussed earlier, limits have been imposed for the ownership of quota shares by individual companies. Directory of Fisheries information indicates that some of the large companies are close to this limit in the present quota allocation for individual species, such as for redfish, saithe, Greenland halibut and herring. The largest cod quota that is allocated to one company is presently close to 9%, whereas the max. quota share allowed is 12%. None of the top-ten companies are close to the overall limit of 12% quota share ownership, judging from the combined allocated quotas in 2003/2004.

1.4.1 Ownership limitations

Law 34/1991 (Investments by foreign entities in Icelandic businesses) limits ownership of fishing operations in the Icelandic EEZ and ownership of fish processing plants in Iceland. Only Icelandic citizens and Icelandic enterprises are permitted to own and operate fishing and processing companies. Icelandic enterprises are defined as those registered in Iceland and Icelandic owned and controlled to the extent that foreign ownership of shares does not exceed 25%. In the case of minority owners in fishing and processing (5% or less ownership), that in turn are partly owned by foreign entities, the foreign ownership of the minority owner may be up to 33%. Ownership of plants for further processing is not limited in this way.

1.5 RAW MATERIAL DELIVERY AND PRICES

The vertical integration by ownership of fishing vessels and processing plants is very traditional and through the decades meant that vessels, especially trawlers and larger boats, landed their fish at same-company plants and at predetermined and uniform prices. Smaller boats were often owned by individual fishermen but they were also

obliged to sell the catch to the local freezing plants, simply because the plants were the only buyers. Disputes between vessel owners and crews were settled in trade union agreements and minimum fish prices were decided for a set period of time, often only a few months, by the Fisheries Price Setting Board, whose members represented fishermen, vessel owners and processing plants. The minimum set price was in effect a fixed price for all landed fish.

The Fisheries Price Setting Board was abandoned in 1993 as new legislation (L.84/1991) took effect, stating that raw material prices were to be the subject of free agreements between sellers and buyers. Three years earlier, the first auction markets had been established, and they had effectively starting an upward trend for fish prices for those vessels that were not owned by processing companies.

Earlier legislation (L.24/1986) had stipulated how landed value was to be divided between vessel owners and the crew. This legislation is still in effect and states that a minimum of 70% of the landed value of fresh fish is to be divided between the crew and for the running and maintenance of the vessel. The remaining 30% are the maximum reserved for paying of fuel oil. In effect, about 40% of the landed value is paid directly to crew members as their salaries.

There are three methods for determining the price for landed fresh fish:

1. By direct sales - usual practice in integrated companies owning vessels and processing plants,
2. On auction markets in Iceland - buyers and sellers are most often unrelated companies,
3. On auction markets abroad or in direct sales abroad - wetfish is sold by container loads or from the fishing vessels.

Direct sales may be somewhat of a misnomer, because the fishing and processing operations are seldom run on separate financial accounts, and fish pricing is therefore primarily a way of determining the crew shares by the regulations outlined above.

The same may be said for raw material prices for frozen-at-sea fish products. In those cases, 72% of the FOB landed value of frozen fillets and 69% of the FOB value of frozen shrimp are divided between the crew and for the running and maintenance of the vessel. The above percentages are the minimum prescribed by law, as a result of very high fuel oil prices in recent months.

It should be noted as a significant factor that the flexibility in calculating crew shares directly from product value for each landing can be considered to be one of the advantages for the economics of the frozen-at-sea industry, not least in the pelagic fishery where product prices have fluctuated significantly in the past years.

In the following sections, some important aspects of direct sales of fresh fish and the Icelandic auction markets will be discussed but the sales on auction markets abroad will only be described briefly.

1.5.1 Direct sales

Given that fresh raw material prices are negotiated freely, they are subject to supervision of 'fair play' by the Fresh Fish Prices Directorate, that was established by Law 13/1998. The function of the Directorate is to monitor raw material prices and to effect that fair price shares are paid to fishermen. All price agreements must be sent to the Directorate for scrutiny. The Directorate publishes fish prices in direct sales on a monthly basis (data from the Directorate of Fisheries) and the average fish prices on the auction markets on a weekly basis. It may at any time also request information from individual fishing companies and all other parties involved in handling fresh fish. For added transparency, export price trends for major product groups are also published.

In cases of disputes or suspected illegal practices, the Directorate may demand relevant information from vessel owners and effect correction of price agreements or crew shares. The Directorate also documents information for the Price Settlement Committee which is an arbitration body that was set up in 1998 for settling disputes that arise within fishing companies and usually relate to raw material prices or fishermen's share of fish prices.

It should be noted in this context that it is illegal for a vessel owner to involve the crew in the cost of quota transfer. The owner must carry in full the cost of renting quota and he must settle with the crew according to general rules.

Finally, an important provision has been made for reference prices (in effect minimum prices) for fresh landed cod, haddock and redfish. An Arbitrament was passed in 2001 as a result of a long-standing wage dispute between the fishermen's unions and the Vessel Owners' Association. Part of this settlement was the agreement that fish prices in direct sales should approach the prices obtained on the auction markets. Historically, auction prices have most often been considerably higher, leading to the contention held by fishermen's unions that a fair price could best be obtained if all fish (at least groundfish) was sold on auction markets. A formula for this convergence of prices was developed and based on the weighted average of prices in direct trade and prices on auction markets (minus 5% auction costs). This particular clause applies to cod (gutted and ungutted), haddock (gutted and ungutted) and redfish (ungutted). In effect, the formula defines the minimum reference price for cod and haddock in direct sales. Cases of disputes between vessel owners and fishermen are settled by the Price Settlement Committee that was mentioned above.

Convergence of prices in direct sales compared to auction markets has indeed been the outcome, as will be described more fully in the chapter on cod production.

The Fresh Fish Prices Directorate has the website: www.verdlagsstofa.is.

1.5.2 Auction markets

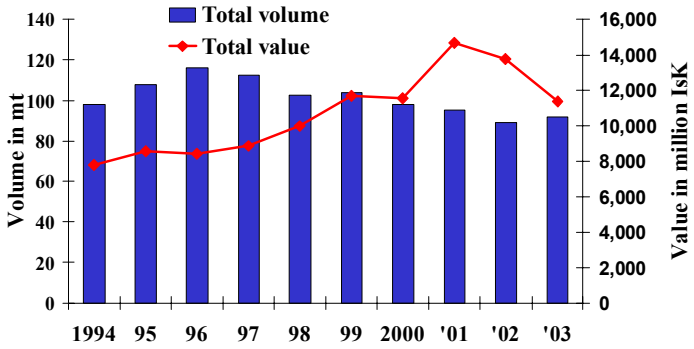
Auction markets in Iceland sell close to 90,000 mt of fish annually, mostly groundfish and flatfish species. The following figure shows the total sales volume and value for the period 1994-2003 and indicates that the volume of sales has been in decline for

most of this period, while sales revenues increased up to and including 2001, but have decreased significantly since.

The first auction markets were established in 1987. There are presently over 30 auction markets in Iceland. They are all linked via the Internet and co-ordinated as regards time and information on available raw material. Websites for the markets include: www.islmark.is, www.fms.is and www.fmis.is.

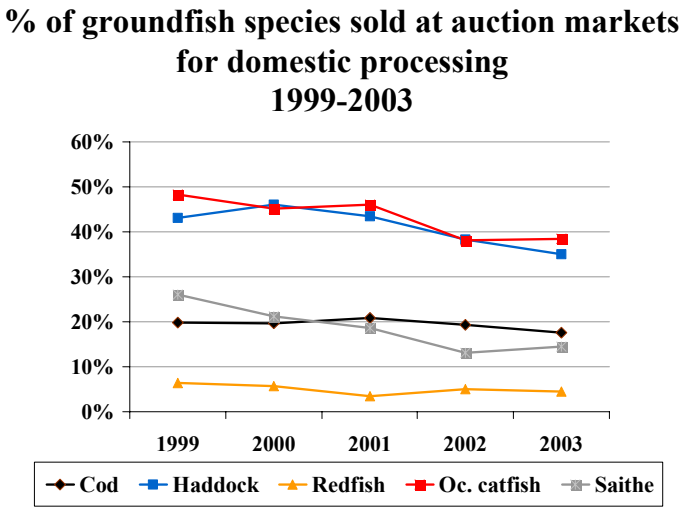
Activity of the auction markets is concentrated in the Southwest, West and Northwest of Iceland and there is extensive transport of fish within that area. Smaller boats are historically the most important for fish supply to the markets, while trawlers are not significant in this trade. Interestingly, the processing of fresh fillets for the European and US markets started to develop when raw material at auction markets became available to small processors that were not involved in fishing. In the 1990s most of the processors were located close to Keflavik international airport but in recent years the larger vertically integrated companies have actively engaged in fresh fillet processing. This development is described more fully in the chapter on cod processing.

Sales at Icelandic auction markets 1994-2003



Source: www.islmark.is and personal communication

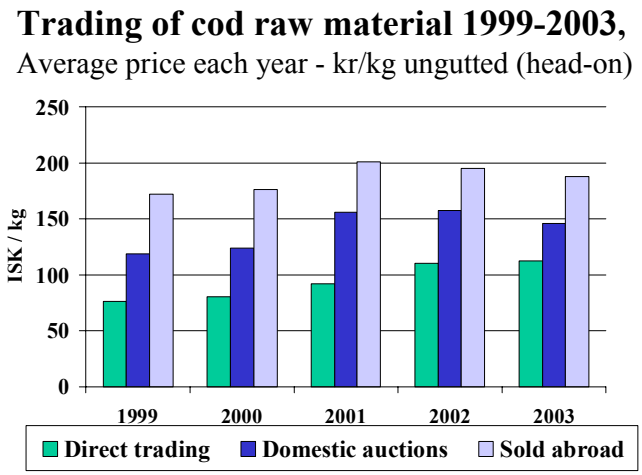
Cod is the most important species on the markets and cod sales account for about 50% of total groundfish volumes sold. It may be noted that only about 18% of landed cod is sold at the auctions and that this proportion has been declining in recent years. On the other hand, a higher proportion of haddock and catfish landings are sold at the auctions - close to 35% in each case. Very little of redfish landings are sold by auctioning (4%) and a fairly small proportion of the saithe catch (14%). The trends for the auction sales of groundfish are shown in the following figure.



Source: Fisheries Statistics, table 5.7

The auction markets have been 'sellers markets' for most of their brief history and the highest raw material prices in Iceland have been obtained at the auctions. This is illustrated as the case for cod in the following figure. The 1999-2003 time series shows the price pr. kg of landed cod (calculated back to catch weight). Prices are the weighted average for each year without regard to size-grading. In this five-year period, cod prices at the auction markets increased by 23%, but included at significant 7% fall in 2003.

Service cost at the auction markets is estimated at close to 5% of sales value. About 4% are direct sales cost charged to the sellers but other cost include the renting of fish tubs and harbour transport.



Source: Directorate of Fisheries

1.5.3 Raw material sales abroad

Historically, Icelandic vessels have sold their groundfish catch abroad in the UK and Germany on basis of higher raw material prices. Main species exported as wetfish are redfish, haddock and cod, and transport to the market is by container loads. In the past, fishing vessels also carried fish directly to the market but this is a minor practice in recent years.

In 2003, 32,000 mt of groundfish were exported as wetfish, while in 2002 the volume was 27,000 mt. Most of the increase is due to haddock exports. Wetfish exports in 2003 included close to 6,500 mt of cod, 10,000 mt of haddock and 10,000 mt of redfish.

Service and sales cost at the auction markets in the UK and Germany is estimated at 6-8% of landed value, while transport from Iceland to the market is a minimum of 25 ISK/kg.

The following table shows the weighted average prices for major wetfish at foreign auction markets in 2002 and the volumes sold. Prices at the domestic auction markets are shown for comparison. All prices are based on catch weight. Sales and transport costs have not been subtracted and it should also be noted that prices have not been corrected for fish size and difference in price that may result from that. It is clear, taking into account the transport cost of ca. 25 ISK/kg to markets abroad, that somewhat better prices are obtained for cod on the UK market and much better prices for redfish on the German market, but clearly there was no advantage on the UK market for haddock in 2002. It is also clear that the foreign auction markets are important for redfish but relatively unimportant for cod and haddock in terms of volume.

TABLE: Groundfish volume and prices at foreign and domestic auctions in 2002

	Auction in Iceland		**Auction abroad**	
Cod	158 kr/kg	41,200 mt	185 kr/kg	5,000 mt
Haddock	149 kr/kg	19,100 mt	161 kr/kg	4,000 mt
Redfish	79 kr/kg	3,300 mt	151 kr/kg	9,500 mt

Source: Fisheries Statistics 2002, tables 5.7 and 5.8. Note: 2003 not available.

2 FISHERIES PRODUCTION OVERVIEW

2.1 HIGHLIGHTS FROM THIS SECTION

- All the largest fisheries companies of Iceland are vertically integrated companies that operate in both fishing and processing. Many have a wide scope of operations and some of the largest now operate their own sales departments, primarily for exports to Europe.

- For many decades the major form of company cooperation in the fisheries was through four large sales and marketing corporations that were owned by the fishing and processing companies. They sold by far the largest proportion of products, and in fact monopolised seafood exports for most of this period. Two of these corporations remain as major exporting companies, but their cooperation with producers is now on contract basis and they are no longer owned directly by fishing and processing companies.

- The recent poor economic performance in the fisheries is the result of at least three major factors, i.e.
  1) Strengthening of the krona relative to most major currencies,
  2) Gradual lowering of market prices, and
  3) High fuel oil prices in recent months.

- Employment in the fisheries has decreased significantly in recent years. This is in line with the consolidation and increased automation in the fishing and processing industries. The fisheries also show a long-term downward trend in employment as regards proportion of the total workforce.

- The freezer vessels brought a new era of speed and efficiency into the fisheries. Production was streamlined for the processing of interleaved and size-graded frozen fillets and gradually extended to fully trimmed fillets.

- In combination, the land-based processing sectors - i.e. the freezing plants, saltfish processing plants, fresh fillet processing for export, and the small domestic usage - control just over 60% of the total groundfish catch, while frozen-at-sea processing takes close to 30% and wetfish exports less than 10%. The recent shift towards land-based freezing is most probably due to versatility in processing and hence marketing opportunities. The increase in fresh groundfish fillet production is quite significant. In 2003, well over 30,000 mt of groundfish were processed in Iceland for the fresh fillet markets in Europe and the US.

- All the large companies have specialized their production in some way but due to their size they need to pursue a degree of diversity together with the focus on specialization. Smaller companies have specialized to a great extent, chiefly in fresh fish and saltfish processing but also in freezing of a limited number of species that are usually bought at auction markets.

- One of the hallmarks of the Icelandic processing industry is an interest in labour saving technology but also in machinery that will increase yield and efficiency. A strong presence of companies, such as Baader and Marel has kept up the momentum of technical developments and in many cases the technical companies have responded to calls from the fisheries for new and improved technology.

- Land-based groundfish processing may be divided into four main categories,
  1) Traditional frozen fillet production,
  2) Processing of frozen size-graded fillet portions,
  3) Production of fresh fillets and/or fresh fillet portions,
  4) Saltfish production.

- There have been significant changes in the systems for quality assurance in the fisheries, especially as regards inspection of raw material and product quality. These changes are chiefly in the direction of increased responsibility of the industry itself for quality issues, while basic standards relating to good manufacturing practices and food safety standards are the responsibility of the Directorate of Fisheries.

- The practice of freezing whole fish for further processing in China has become widespread in the North Atlantic fisheries. This trend has not been observed in the Icelandic fisheries and whole-frozen cod, haddock and saithe are produced in insignificant volumes only. The effects of re-processed Atlantic fish from China are significant on the markets as cheaper products are brought into Europe and the US in direct competition with fish that has been processed fully at source.

- Processing of coated products and recipe dishes (meals) has never been a feature of the Icelandic processing industry, although a few companies have in recent years made some progress in the marketing of coated portions for the foodservice markets in Europe.

- Value addition in product development most often takes place through improved quality, wider selection of products and greater convenience in use. The quest for added convenience has been an especially strong feature of the industry and has been driving product development in recent years.

- Today's product development can be described as fairly low-key and taking place in the larger processing companies in cooperation with the marketing companies or directly with customers. Innovations in portion control technology and packaging have driven the changes in the processing plants, together with automation at various stages in traditional processing. Product development has chiefly taken place by process development and most often been the result of technical innovations.

2.2 SIZE OF COMPANIES AND VERTICAL INTEGRATION

The previous section described the structure of Icelandic fishing companies and size in terms of quota shares. This has become the definition for company size in the fisheries, just as much as the definition in terms of total income. The following table shows the 13 largest fishing and processing companies in Iceland in terms of income and net profit in 2003. It should be noted that all are vertically integrated companies that operate in both fishing and processing. Many have a wide scope of operations and some of the largest now operate their own sales departments, primarily for exports to Europe.

TABLE: Largest fishing/processing companies, ranked by turnover in 2003

	Total income in million ISK	**Net profit in million ISK**
Brim Group*	13,192	-684
Samherji	12,377	1,067
Sildarvinnslan**	8,973	429
Grandi	4,829	763
Thormodur rammi -Saeberg	4,766	502
Thorbjörn Fiskanes	3,853	299
Vinnslustödin	3,378	249
Isfelag Vestmannaeyja	3,327	193
Eskja	3,122	346
Visir	3,034	Not disclosed
Fiskidjan Skagfirdingur	2,670	539
Hradfrystihusid Gunnvör	2,670	333
Skinney-Thinganes	2,432	480

* Older Brim Group, owned by Eimskip in 2003 was UA, HB, Skagstrendingur
** Includes SR Mjöl
Source: www.icex.is and personal communication

The following are brief outlines for each company.

The older **Brim Group**, owned by Eimskip, has now been dissolved and its three pillars – UA, HB and Skagstrendingur, have been sold as separate entities. In March 2004, UA was bought by Tjaldur, which is a medium-sized company, mostly involved in frozen-at-sea processing. The new company is called Brim, has head office in Akureyri, and is considerably smaller than its predecessor. Main activities are fishing, land-based and frozen-at-sea processing of groundfish, flatfish and shrimp. Brim is also involved in drying of cod heads and saltfish processing through its subsidiaries and joint ownership companies. Before the complex turn of events that led to the Brim groups, UA had taken over a number of smaller fishing and processing companies in North Iceland. Website is www.brimhf.is.

Samherji in Akureyri has a large fishing fleet and operates land-based and frozen-at-sea processing plants for groundfish, shrimp and pelagics in addition to a fishmeal

processing plant. The company is a controlling owner of fishing companies in the Faroes, Scotland and Germany, a marketing company in England and a further processing company in Germany, just to name a few. The company is also involved in salmon farming in Iceland. Samherji is presently the largest Icelandic fishing company in terms of total income. It is listed on the Iceland Stock Exchange (SAMH) Website is www.samherji.is.

HB Grandi in Reykjavik is the result of a recent takeover by Grandi, following the dissolution of HB from Brim and sale by Eimskip. The consolidated company runs a fishing fleet and operates two large groundfish processing plants, a fleet of frozen-at-sea groundfish vessels and a fishmeal processing plant. It is listed on the Iceland Stock Exchange (GRND). For historical interest it may be mentioned that Grandi was established in 1985 by mergers of two of the three large fishing companies in Reykjavik, followed in 1990 by the third Reykjavik company. Grandi was thus the first large-scale merger in the modern fisheries. The website is www.grandi.is.

Sildarvinnslan in Neskaupstadur operates a large fishing fleet, together with land-based and frozen-at-sea processing of groundfish and pelagics. It controls most of the fishmeal processing capacity in Iceland and through its subsidiary, SR Mjöl, is the largest marketing company for fishmeal. Sildarvinnslan is also involved in fish farming and freezing of pelagic products through joint ownership. The company is a controlling shareholder of a number of fishing companies. Website is www.svn.is.

Thormodur rammi Saeberg in Siglufjördur operates frozen-at sea groundfish trawlers, fresh shrimp trawlers and a shrimp processing factory. The company is the result of mergers of three sizeable companies in North Iceland and is listed on the Iceland Stock Exchange (TRS). Website is www.rammi.is.

Thorbjörn Fiskanes in Grindavik is the outcome of mergers of three significant companies in the Southwest and the take-overs of three smaller companies. The present company is involved in fishing and processing of groundfish and pelagics, both land-based freezing and frozen-at-sea processing. The company is also a large-scale saltfish producer. Website is www.thorfish.is.

Vinnslustödin in Vestmannaeyjar stems from the mergers of three companies in the Westman Islands. The company runs trawlers and other fishing vessels and operates plants for freezing and salting groundfish and freezing pelagics. It also operates a fishmeal processing plant. The company is listed on the Iceland Stock Exchange (VNST). Website is www.vsv.is.

Isfelag Vestmannaeyja in Vestmannaeyjar operates chiefly in the fishing and processing of pelagics, but has recently acquired a freezer trawler to operate in the groundfish fisheries. The company website is www.isfelag.is.

Eskja in Eskifjördur operates in the fishing and land-based processing of groundfish and pelagics and also operates a fishmeal plant. The company website is www.eskja.is.

Visir in Grindavik operates fishing and processing of groundfish and pelagics and is a large-scale saltfish producer. Website is www.visirhf.is.

Fiskidjan Skagfirdingur in Saudarkrokur is the result of multiple mergers in recent years, with at least six companies being the foundation for present activities. The company is involved in fishing and processing of groundfish and shrimp. Groundfish processing is land-based and frozen-at-sea. Their website is www.fisk.is**.**

Hradfrystihusid Gunnvör in Isafjördur stems from mergers of three sizeable companies and a number of smaller take-overs. The company operates in the groundfish and shrimp fisheries and runs a land-based groundfish processing plant and a large-scale shrimp processing plant. Its website is www.frosti.is.

Skinney -Thinganes in Hornafjördur stems from mergers of three sizeable companies and is involved in the fishing and processing of groundfish, Norway lobster and pelagics. Processing is by freezing and large-scale salting of cod and herring. Their website is**:** www.sth.is.

2.3 COOPERATION BETWEEN COMPANIES

For many decades (ca 1932-1999) the major form of company cooperation in the fisheries was through four large sales and marketing corporations that were owned by the fishing and processing companies. They sold by far the largest proportion of products, and in fact monopolised seafood exports for most of this period. Two of these corporations (SH and SIF) remain as public limited companies, listed on the Iceland Stock Exchange. They are still the major exporting companies, but their cooperation with producers is now on contract basis and they are no longer owned directly by fishing and processing companies.

In March 2004, Samherji and Visir announced their intention to cooperate in fishing, processing, transport, product development and sales of seafood. The companies stated that the main reason for this move was consolidation on the major retail markets. The cooperation was seen as a way of reacting to the increasingly competitive marketing environment.

Interestingly, formation of the sales and marketing corporations 60-70 years ago was based on the same principles, i.e. the need for a united presence on the market and offering of a wide selection of product groups.

Apart from the above points and some remaining joint effort in sales and marketing, it may be concluded that cooperation between fishing companies mostly takes place in quota transfers and other transactions that are aimed at increasing efficiency in the industry.

2.4 ECONOMIC PERFORMANCE OF FISHING AND PROCESSING COMPANIES

The economic performance of major Icelandic fishing companies is relevant to this study in broad outlines. Many of the large and medium-sized companies were listed on the Icelandic Stock Exchange in recent years, but presently only four remain, i.e. HB-Grandi, Samherji, Thormodur rammi-Saeberg and Vinnslustödin. In most cases

the ownership has been consolidated in the hands of one or a few major shareholders after a brief period of public and dispersed ownership.

KBbank made an analysis of the economic performance of five listed companies in 2002, 2003 and a forecast for 2004. The following table shows the sum of the net profit for the group of five. It should be born in mind that three of the companies are chief operators in the pelagic fisheries and hence are not strictly representative for the industry as a whole.

TABLE: Turnover and net profit for five* listed fishing companies

In million ISK	2002	2003	Est. 2004
Turnover	38,049	38,990	39,078
Net profit	7,753	3,010	1,516

Source: KBbank April 27, 2004 (www.kbbanki.is)
* HB-Grandi, Samherji, Thormodur rammi-Saeberg, Vinnslustödin and Sildarvinnslan, which has since been deregistered.

The Icelandic Ministry of Finance estimated that the fishing sector would be run with a net profit of 5.5% on income, while the processing sector would suffer a loss of 4.5% on income in 2004. Recent fuel oil price increases are likely to lower this estimate for the fishing sector, with an average fuel oil price of USD 40/barrel expected to lead to a net loss of 2.5% on income.

This downturn will be discussed more fully in the sections on export and trade but it is clear that there are at least three major factors at work: i.e.

1) Strengthening of the Icelandic krona relative to most major currencies,
2) Gradual lowering of market prices in recent years, and
3) The very high fuel oil prices in recent months.

Other factors, such as an upward price trend for raw material (and hence crew shares), also play a part.

2.5 STABILITY IN PRODUCTION AND WORKFORCE

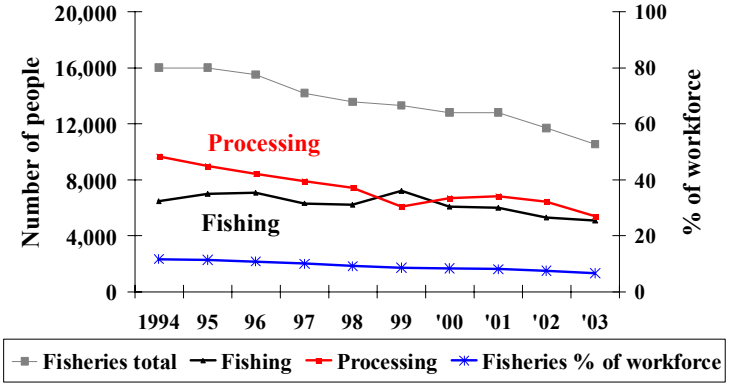
Stability in production seems to have increased in line with consolidation in the industry but the process has been turbulent in many cases as regards employment in many coastal villages.

Employment in the fisheries has decreased significantly in recent years in terms of the number of people in the fishing and processing sectors. This is in line with the consolidation and increased automation in the fishing and processing industries. As expected, the fisheries also show a long-term downward trend in employment as regards proportion of the total workforce.

The following figure shows the development for employment in the fishing and processing sectors in recent years. It appears that close to 10,500 people are currently employed directly in the fisheries, as opposed to over 16,000 people ten years ago. The decrease is shown in both the fishing and processing sectors and seems to be

continuing to date. The fisheries employment corresponds to 6.7% of the total workforce in Iceland but was close to 12% just ten years ago.

Employment in the fisheries 1994-2003



Sources: Statistical Bureau of Iceland, private communication and Fisheries Statistics

As regards the number of female and male workers, men clearly dominate the fishing sector (4,700 men, 400 women) while the processing sector is split almost equally between men and women (2,800 men, 2,600 women).

Contracts for long-term employment are now the norm in the industry. Job security and basic wage is supported by the Icelandic state because it is obliged by law to pay processing plants the equivalent of up to 45 days per year full unemployment benefits for each employee kept idle due to lack of raw material, while the employees receive basic wages from the company for the same period. This payment is far less than received for full-time work, since no 'bonus' or other incentives are paid for the idle days. The number of idle days in the industry as a whole, as recorded by the Directorate of Labour, is therefore one measure of instability in the processing sector.

The following table shows a five-year time series for total idle time in the processing sector. The number of people off work for 45 days each year has been calculated from these figures, which by comparison to the total number of processing workers gives an indication for the proportion of people off work for 45 days in any one of these years. For the industry as a whole, it appears that lack of raw material in the plants caused close to 15% of processing workers to be off work for 45 days in 2003.

TABLE: Idle days in fish processing 1999-2003

	Idle days*	Idle days divided by 45	People in industry**	% Idle for 45 days
1999	43,191	960	6,100	15.7%
2000	56,068	1250	6,700	18.6%
2001	62,374	1390	6,800	20.4%
2002	51,632	1150	6,400	17.9%
2003	37,011	820	5,400	15.2%

* Source: Directorate of Labour, private communication,
** Source: Stat. Bureau of Iceland, private communication,

From the short time series in the table it is difficult to conclude that stability in processing is increasing but the indications are in that direction. According to the Directorate of Labour the large processing plants have a very small share in the unemployment benefits paid to the industry. Small plants and others that depend largely on buying raw material at auctions have been the main recipients of such benefits.

Consolidation in the fishing sector has increased stability for full-time crewmembers. Most of the larger vessels have secured quota to last the full fishing year but others are idle towards the end of the quota year. Fishermen often leave the industry when their vessels are decommissioned but they are usually sought after as employees in other sectors. It seems that the fishing sector has settled down to some stability, although the number of fishermen continues to decrease.

2.6 LAND-BASED VS FROZEN-AT-SEA PROCESSING – AN OVERVIEW

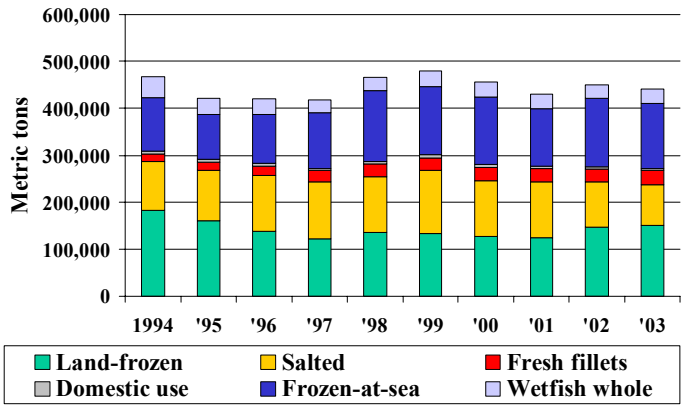
Processing and freezing on-board well equipped fishing vessels started in the late 1980s and developed rapidly in the 1990s but has been stable in the past few years. In the past months there has been a small but noticeable trend away from frozen-at-sea processing and back to land-based processing.

The freezer vessels brought a new era of speed and efficiency into the fisheries. Production was streamlined for the processing of interleaved and size-graded frozen fillets and gradually extended to fully trimmed (skinless and boneless) fillets. Frozen-at-sea products must, however, be considered a line of commodity products, i.e. limited in range as a product category and in direct competition with frozen-at-sea products from other North Atlantic fisheries.

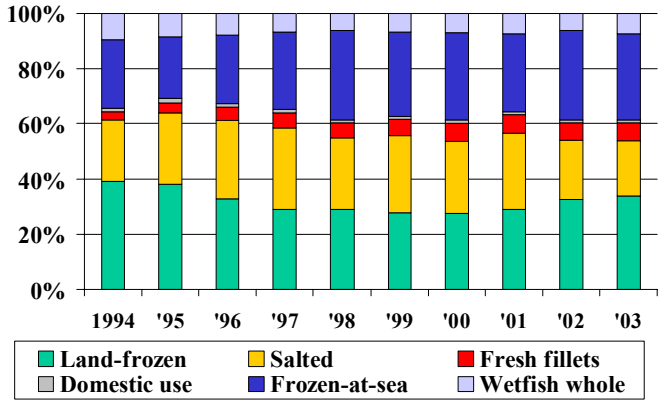
The following figures show the disposition of groundfish and flatfish for the period 1994-2003. The figures show the land-based processing sectors as the lower part of the columns and the frozen-at-sea and wetfish exports as the top part of the columns.

The first figure shows the total groundfish catch and its processing but the second figure shows the different utilization as proportional figures. It is clear that land-based processing sectors - i.e. the freezing plants, saltfish processing, fresh fillet processing for export, and the small domestic usage - in combination control just over 60% of the total groundfish catch, while frozen-at-sea processing takes close to 30% and wetfish exports less than 10%. Furthermore, it is clear that these overall proportions have been stable in the past years, with land-based freezing increasing its share while salting has decreased in the past few years. The shift towards land-based freezing is most probably due to versatility in processing and hence marketing opportunities, but it should also be noted that the proportion of large fish in the cod catch is now quite low, which is likely to decrease the quantity used for processing of saltfish. The increase in fresh groundfish fillet production is noteworthy. In 2003, well over 30,000 mt of groundfish were processed in Iceland for the fresh markets in Europe and the US.

Disposition of the Icelandic groundfish catch 1994-2003

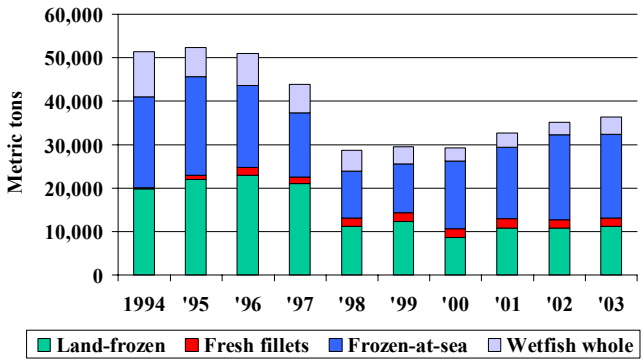


Proportional disposition of the Icelandic groundfish catch 1994-2003

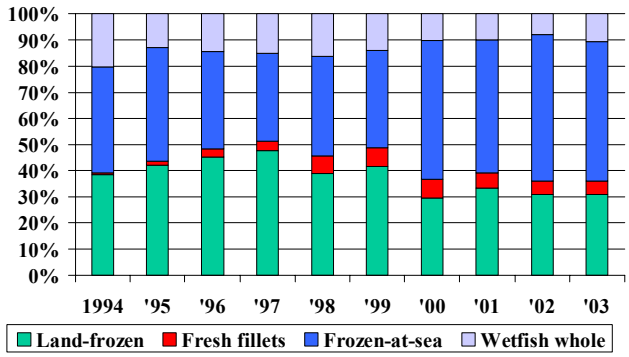


The flatfish catch and its disposition is shown in the following two figures. Clearly, the total landings have decreased significantly in the past years (chiefly due to lower Greenland halibut and plaice landings) but the dominance of frozen-at-sea processing, - over 50% of the catch - is also noteworthy. This is mainly due to the importance of Greenland halibut in the fishery and the fact that over 90% of the Greenland halibut catch is processed on-board. A variety of flatfish is processed in the freezing plants but the fresh flatfish export is chiefly plaice.

Disposition of the Icelandic flatfish catch 1994-2003



Proportional disposition of the Icelandic flatfish catch 1994-2003



2.7 SPECIALIZATION AND TECHNOLOGY

All the large fishing and processing companies have specialized their production in some way, whereas looking back 20 years or so, almost all would have been involved equally in the seasonal activities of the groundfish and pelagic fisheries, and most of them were processing fish in the same way and for the same markets as their neighbours and colleagues. Due to their size, however, all the major players need to pursue a degree of diversity together with the focus on specialization. This is evident from the description of their operations above. Common to them all is a high degree of technology in processing.

Smaller companies, however, have specialized to a great extent, chiefly in fresh fish and saltfish processing but also in freezing of a limited number of species that are usually bought at auction markets. Most of them have invested in computerised flow-lines

It may be noted as an interesting point that Samherji, which is the largest company in the fisheries, was established as a very specialized company with a focus on frozen-at-

sea groundfish products (1983). Through later acquisitions, the company gradually grew more diversified, turning to land-based groundfish processing, shrimp processing and fishmeal processing. In the past few years it has acquired multi-purpose vessels for frozen-at-sea pelagic products and just lately become involved in salmon farming. A sales and marketing function was also developed early on and later expanded to subsidiaries abroad.

Using Samherji as a further example and this time for investments in technology, their four main processing functions are all highly automated. The **land-based processing** of groundfish (in Dalvik) is highly specialized in the processing of fresh and frozen size-controlled portions using 'Marel' technology throughout. This includes computerised flow-lines that also monitor yield, efficiency and workmanship, a number of computer-vision portioning machines and size-grading machines, together with IQF freezers, size-graders and check-bin graders. The latest in such sophisticated machinery at this plant is a 'Carnitech' machine for removing pinbones from whitefish fillets, followed by X-ray bone detectors for the automatic checking of performance. The bone-removing unit is new on the market but is based on the technology used widely in salmon processing in other countries.

Samherji's **frozen-at-sea processing** of groundfish includes computerised flow-lines and a multitude of size graders in addition to the customary 'Baader' machinery for heading and filleting. **Frozen-at-sea processing of pelagics** (herring and blue whiting) includes filleting machines, computerised flow-lines, size graders, vertical plate freezers and IQF freezers. Lastly, the **shrimp processing** at Samherji is also highly automated, including the customary peeling machines, but the processing line also includes 'Pulsar' machines that detect colour and hardness deviations and remove shell fragments automatically by a stream of air.

According to information from Marel there are presently 25-30 'intelligent' portioning machines in use in Icelandic processing plants, including 3-4 in each of the largest plants. There are also over 80 size-grading machines in operation, including close to 40 in freezer vessels. There are computerised flow-lines in almost all plants, ranging from medium to large operations, and there is an increasing number of IQF freezers to complement the universal plate freezers.

In general, it can be stated that one of the hallmarks of the Icelandic processing industry is an interest in labour saving technology but also in machinery that will increase yield and efficiency. A strong presence of companies, such as Baader and Marel has withoout doubt kept up the momentum of technical developments and in many cases the technical companies have responded to calls from the fisheries for new and improved technology.

2.8 PRODUCT RANGE OUTLINES

The following is a brief overview for the production in the different processing sectors, based on personal communication with the processing industry.

2.8.1 Land-based groundfish processing

Land-based groundfish processing may be divided into four main categories, i.e.:

1. Traditional frozen fillet production,
2. Processing of frozen size-graded fillet portions, complemented by traditional frozen fillet products,
3. Production of fresh fillets and/or fresh fillet portions, often complemented by production of similar frozen products,
4. Saltfish production.

Traditional frozen fillet products are fully trimmed fillets, either plate frozen or IQF. Plate frozen products are most often 5 lbs. packs (US) or 2 kg packs (Europe), both of which have fillets and portions wrapped in plastic envelopes, six to the carton. IQF products are packed in 5 kg and 10 kg packs and retail units in 1 kg plastic bags.

Fillet blocks (cod, haddock, saithe) are processed as by-products in the freezing plants but are hardly ever the focus of production - with a few exceptions for special markets.

Size-graded fillet portions are most often cut on 'Marel' portioning machines. The IQF products are most often in 5 kg packs (Europe) or 10 lbs (US).

Fresh fillets and/or fresh fillet portions are either hand-cut or machine-cut, with a clear trend towards larger producers using 'Marel' portioning machines. Products are packed on ice in polystyrene boxes, usually 5 kg/10 kg (Europe) and 10 lbs/20 lbs (US). Most of the fresh fillets are airfreighted but there is a positive trend in container transport by sea.

Saltfish production is fairly traditional and consists of large-scale fillet production, mostly fully salted but lightly cured but also of fully cured fillets and traditional split fish. There is also a large-scale production of lightly salted IQF fillets that do not require desalting before use. Most of the saltfish production is for markets in southern Europe.

2.8.2 Frozen-at-sea groundfish processing

Processing of groundfish at sea is fairly traditional with the important new development that IQF is now used as a freezing method in a few vessels, thus providing much more versatility for buyers for repacking from the 20 kg packs. Most freezer vessels produce fully trimmed interleaved fillets in 9 kg cartons for Europe and 12 lbs cartons for the US market.

2.8.3 Note on production of whole-frozen groundfish

The practice of whole-freezing fish for further processing in China has become widespread in the North Atlantic fisheries, although the bulk of raw material for Chinese plants is still Alaska pollock.

This trend has not been observed in the Icelandic fisheries. Whole-frozen cod, haddock and saithe are produced in insignificant volumes only and less than 1,500 mt were exported in 2003. Traditionally, only the smallest fish in the catch is whole-frozen and it is likely that the economics of processing larger fish in this way have not been found favourable in plants with large capacities for fillet processing.

On the other hand, large volumes of redfish have traditionally been whole-frozen (headless) for markets in Japan and Germany. This export was 35,000 mt in 2003. It is known that further processing of this fish has now been transferred to China, for later import as fillets to markets in Germany and Japan.

The effects of re-processed Atlantic fish from China are significant on the markets as cheaper products are brought into Europe and the US in direct competition with fish that has been processed fully at source.

2.8.4 Shrimp processing

Shrimp processing is chiefly by land-based freezing. As mentioned earlier, there used to be a number of freezer vessels in the shrimp fishery but they have been directed to other fisheries or decommissioned due to poor performance, which in turn was the result of low fishing rates and poor market conditions.

The land-based shrimp plants process IQF products for markets in Europe, chiefly in the UK. Products are intended for the foodservice market, the retail market, and for re-packing (usually from bulk to retail packs). Pack sizes therefore vary from 10 kg to 200 g with main emphasis on production of 10 kg packs for re-packing, 2-2.5 kg packs for foodservice and 400 g for retail.

2.8.5 Pelagic processing

Most of the pelagic landings are for the fishmeal and fishoil industry. Practically all of the blue whiting catch is processed in this way and close to 95% of the capelin catch. Furthermore, 50% of the herring catch is reduced to meal and oil.

Herring processing for direct human consumption is by freezing and salting. Frozen products are mostly interleaved fillets and butterfly fillets (flaps) for repacking and curing in the market, chiefly in Poland and the Baltic countries. IQF fillet production is increasing in frozen-at-sea processing. Skinless frozen fillets are produced for Western Europe in 8 kg packs for smoking and retail packaging in the market, which is mainly France.

Salted herring products are mostly fillets but also some headed and gutted fish. Herring is brined and cured in plastic barrels (95 kg) ready for repacking into retail products in the market, especially Scandinavia.

2.9 QUALITY MANAGEMENT AND COMPLIANCE

Fish handling and processing is controlled by Law 55/1998 on the handling, processing and distribution of seafood, and Law 54/1992 that applies to processing vessels. A number of regulations issued by the Ministry of Fisheries also relate to quality assurance and product safety, most notably regulations 233/1999 on the safe handling, processing and distribution of seafood and regulation 558/1997 on in-house quality control during processing.

Quality of seafood is based on many attributes. Details of workmanship are built into specifications between processors and their customers but basic requirements relate to raw material quality, safety, hygiene and identity.

There have been significant changes in the systems for quality assurance in the fisheries, especially as regards inspection of raw material and product quality. These changes are chiefly in the direction of increased responsibility of the industry itself for quality issues, while basic standards relating to good manufacturing practices and food safety standards are the responsibility of the Directorate of Fisheries.

Today, every plant is required to have an HACCP-system in place (Hazard Analysis of Critical Control Points) and to have formal contracts with accredited inspection bodies that have also been approved by the Directorate of Fisheries. The inspection bodies are responsible for verifying that each processor has a system of quality management in place and fulfills the official requirements for seafood handling and housekeeping standards. They will regularly visit all processors to check compliance and report their findings to the Directorate. Inspectors of the Directorate will also periodically inspect the premises and assess compliance with the requirements for quality management.

Every land-based plant and on-board processor must hold a valid processing license. The licenses are issued by the Directorate, subject to approval of the premises by the health and safety authorities, and subject to a valid contract with an inspection body. Further to this, the Directorate of Fisheries must have approved the premises for seafood production and the processor must have qualified personnel in his employment for in-house quality management.

Websites to check for further information are www.fiskistofa.is and www.fisheries.is (processing page).

2.10 PRODUCT DEVELOPMENT

For many decades the producer-owned sales organizations were the main contacts with the market and product development can be said to have been directed and carried out by the organizations and their subsidiaries on the market. Both the Icelandic Freezing Plants Corporation and Iceland Seafood operated further processing plants in the United States and carried out continuous product development of value-added products, especially as regards cod products.

Processing of coated products and recipe dishes (meals) has never been a feature of the Icelandic processing industry, although a few companies have in recent years made some progress in the marketing of coated portions for the foodservice markets in Europe.

Generally speaking, product development is aimed at adding value to products. The value addition most often takes place through improved quality, wider selection of products and greater convenience in use. The quest for added convenience has been an especially strong feature of the industry and has been driving product development in recent years.

Today's product development can be described as fairly low-key and taking place in the larger processing companies in cooperation with the marketing companies

(formerly sales organizations) or directly with customers. Innovations in portion control technology and packaging, together with automation at various stages in traditional processing have driven the changes in processing plants. It may be concluded that product development has chiefly taken place by means of process development and as a result of technical innovations.

2.10.1 Groundfish processing development

Production for the foodservice market, especially in the United States, has always been of great importance for the Icelandic processing plants. Process innovations have greatly changed the product mix for this market in later years, with the results that IQF fillet portions have replaced former interleaved and 'cello-wrapped' fillets to a large extent. Production for the US retail market has, however, remained insignificant and it seems that it will remain unattractive to producers, on basis of price competition.

Land-based processing of groundfish products for the European market has followed similar trends towards size-controlled portions. Production is most often intended for foodservice or the portions are used as components in recipe-dishes for retail.

The above trend applies both to the freezing industry and the fresh processing industry. The fresh fillet industry has developed rapidly as outlined earlier and can be considered to be the most significant development in groundfish processing, transport and marketing in recent years.

The saltfish industry has changed and developed new products in recent years. Light curing (tender-cure) is fully accepted for fillets on the Spanish market, while more recently a large-scale production of lightly salted IQF fillets has taken place. These IQF products do not require desalting before use and therefore represent value addition as convenience products on the Spanish market.

2.10.2 Pelagic processing development

There have been processing developments in the pelagic sector. The most recent relate to frozen-at-sea processing of herring products on-board large dedicated freezer vessels. The emphasis is on automation and increased efficiency in production of fillets that are processed further in the marketing countries such as Poland.

Salted herring products have been developed to a significant extent in recent years. Most of the production is fillets and portions in specialty curing brines, for repacking into retail products in the market.

2.10.3 Shrimp processing development

Shrimp processing has developed in the past decade with increased automation, better yield and more accurate size grading. The most significant innovations are in automatic packaging of retail products, but this remains a small-scale production due to market constraints and price competition.

2.11 IMPORT FOR FURTHER PROCESSING

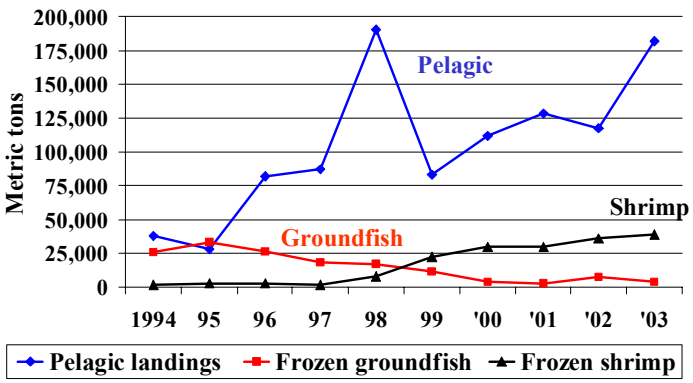
Foreign vessel landings in Iceland are listed as imports. It is traditional for vessels of neighbouring countries to land their pelagic catch to some extent in Iceland, especially when fishing close to Icelandic waters. In 2003, nearly 180,000 mt of capelin and blue whiting were landed for fishmeal and oil processing. Imports of whole-frozen shrimp were 39,000 mt and imports of whole-frozen groundfish were 4,100 mt. Total imported value in 2003 was 5.6 billion ISK.

The origin of imports in 2003 varied. Pelagic landings were mostly by vessels from the Faroes (93,000 mt), Greenland (34,000 mt), Norway (25,000 mt) and Denmark (20,000 mt). Shrimp imports were from Norway (18,000 mt), the Baltic countries (13,000 mt) and Canada (3,000 mt), with minor quantities imported from a few other countries. Groundfish imports were cod from Russia and saithe from the Faroes. In the past decade, the bulk of groundfish imports were headed and gutted Russian cod.

The following figure shows the fisheries imports in 1994-2003. Landings of capelin and blue whiting appear to be increasing, but are quite variable and depend in each season entirely on the economics of landing in Iceland. Imports of shrimp have been increasing steadily, while groundfish imports appear to be in decline and must be considered insignificant. As regards shrimp imports, it should be noted that the Baltic supply is mostly from Icelandic-owned vessels fishing on the Flemish Cap but registered in the Baltic countries.

In line with the decreased imports of groundfish, it seems that processing of Russian-origin cod in Icelandic plants has almost stopped. Frozen cod imports reached a high of 28,000 mt just nine years ago, when prices were close to 57 ISK/kg but imports were down to 2,000 mt last year when raw material prices had climbed to 110 ISK/kg. In this period, processing of imported cod was mostly for fillet blocks and it was used as reserve stock when fresh material supply was insufficient. Processing from frozen raw material was probably uneconomic for most of the period and the products were not readily accepted by some of the major marketing companies.

Imports of fisheries products for re-processing 1994-2003



3 FISHERIES TRADE AND MARKETS

3.1 HIGHLIGHTS FROM THIS SECTION

- It is clear that the EU is an expanding market and that all the increase in export value in recent years is due to this region. The North American market and the Asian market have decreased in export value in this period, but especially in 2003.

- Exports of frozen products are just over 50% of the total fisheries exports, exports of salted products are 20%, exports of iced and fresh products add another 13%, and fishmeal and fishoil exports are 15% of the fisheries export value. The rest is mostly dried products.

- It is clear that the increase in export value of fresh and iced products over the years is mostly due to the positive trend for fresh fillets, which have surpassed wetfish in overall export value. The wetfish markets in England and Germany remain strong for cod and redfish, but the primary processing capacity seems to be becoming more limited in these countries.

- Most fisheries products are transported by sea from Iceland, but fresh fillets are predominantly air freighted to the UK, continental Europe, and the US. Transport of fresh fillets by sea is increasing. The service is still rather limited as regards destination ports and frequency.

- It is clear that competition in sales and marketing of fisheries products has increased in past years but it is not possible to conclude that this has led to improved prices for processors. It may even be stated that a certain overview of prices and market trends has been lost as each company guards their performance. At the same time, there is consolidation on the major retail markets and increased price competition in the foodservice industry.

- Icelandic products are sold to most sectors on the major markets, i.e. in retail, foodservice, homeservice and for industrial purposes.

- It seems that most of the increase in product prices in 2001 was due to currency devaluation in that year, while the strengthening of the krona since then only partly explains the fall in fisheries product prices. The difference is due to some weakening of market prices that became significant in 2002 and has continued since for some product categories, such as a number of frozen-at-sea groundfish products.

- Three landmarks in better market access for Icelandic products to the EU are:
  1. Duty-free access for frozen fillets and shrimp,
  2. Duty-free access for fresh fillets, and
  3. Duty-free access for frozen butterfly-fillets of herring.

3.2 EXPORT TRADE

The Icelandic fisheries export volume in 2003 was 809,000 mt, valued at 113.7 billion ISK. The volume figure tends to vary with the pelagic catch but, in general, the value of exports has been increasing in recent years.

In 2003, close to 76% of the total value were exports to countries of the European Economic Area, while 10% were exports to North America, 7% to Asia and 7% to other regions. This is shown in more detail in the following table.

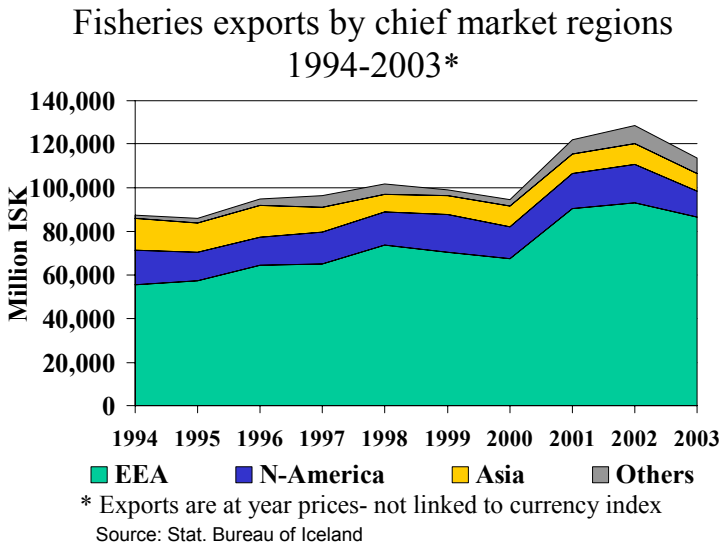
With the accession of Poland and the Baltic countries to the EU in 2004, the share of the EEA is expected to increase to close to 80%, due to the fact that Poland and Lithuania have become significant importers of herring products in the past few years. The share of Norway in fisheries trade from Iceland is mostly explained by large-scale exports of fishmeal and oil, together with Icelandic vessels' landings of frozen herring products in Norway for further transport to markets in Europe.

TABLE: Fisheries export value in 2003 by main market areas

Area	Value in mill. ISK	Value %
EEA	**86,600**	**76.2**
EU	81,000	71.3
Norway	5,600	4.9
Poland and the Baltic countries	**2,400**	**2.1**
North America	**11,700**	**10.3**
US	11,000	9.6
Canada	700	0.7
Asia	**8,000**	**7.0**
Japan	5,400	4.7
China mainland	1,300	1.1
Other Asian countries	1,300	1.2
Other areas	**5,000**	**4.4**

Source: Statistical Bureau of Iceland

The following graph shows the development of export value to the chief market regions in the past decade. It is clear that the EEA is an expanding market and that all the increase in export value in recent years is due to this region. Furthermore, both the North American market and the Asian market have decreased in export value in this period, but especially in 2003, due to the recent low value of the US dollar.



The following table shows the total fisheries export value in 2003 for the major markets in the EU. The UK is by far the most important market, which is due to the large variety of frozen and fresh products offered on that market. Denmark is a large importer and trading country for fishmeal and also imports a variety of frozen products. The countries of Southern Europe import salted fish, with Spain also a large importer of frozen products. Portugal is predominantly a saltfish importer, while France imports frozen, salted and fresh products for its very diverse market. In general, the EU market for Icelandic fisheries products appears to be stable and well established.

TABLE: Fisheries exports to countries in the EU in 2003

Country	Value in mill. ISK	Value %
UK	28,800	35.6
Spain	10,600	13.1
Denmark	7,200	8.9
Portugal	6,800	8.4
France	6,200	7.6
Others	21,400	26.4
Total EU	**81,000**	**100.0**

Source: Statistical Bureau of Iceland. All values are based on FOB prices

3.3 EXPORT BY PROCESS SECTORS AND PRODUCT GROUPS

The following graph shows the export by processing sectors over the past ten years. It should be noted that in 2001, changes in currency values were a large factor in increased export values.

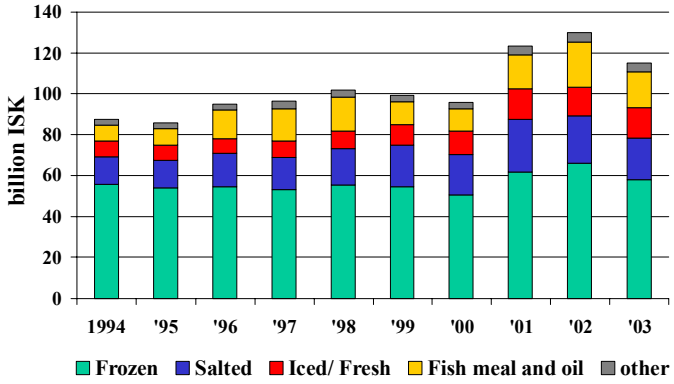
Starting at the bottom of the columns, it is shown that exports of frozen products have been worth nearly 60 billion ISK in recent years - just over 50% of the total fisheries exports.

Exports of salted products have been over 20 billion ISK in the past four years, which is 18-20% of total fisheries exports. Exports of iced and fresh products show an increase in this period. They were valued at almost 15 billion ISK in 2003 and were close to 13% of the total fisheries exports.

Finally, the fishmeal and fishoil exports were worth nearly 18 billion ISK, corresponding to 15% of the fisheries export value.

Overall, there is fair stability in this short period and the changes in the relative importance of the processing sectors can most often be traced back to changeable fishing, especially in the pelagic fisheries. The only consistent trend in the period is the increase in processing of fresh products as will be shown later.

Fisheries exports 1994-2003
Value by processing sectors*



Source: Stat. Bureau of Iceland

* FOB values at year's prices

The following is a brief overview for the exports of chief product groups in each processing sector in 2003. The overview is based on export value.

3.3.1 Frozen product groups

Cod products dominate the exports of frozen products and account for 30% of frozen export value. Other important groundfish, such as haddock, redfish and Greenland halibut account for almost 27%. Shrimp products are also very valuable in exports, and constitute nearly 21% the total frozen values. Frozen herring products are relatively minor, but still significant, with almost 3% of the total.

TABLE: Frozen products export value in 2003, by main product groups

Frozen products	Value in mill. ISK	Value %
Frozen cod products	17,400	30.1
Frozen haddock products	4,300	7.4
Frozen redfish products	7,200	12.5
Frozen. Grl. halibut products	3,900	6.7
Frozen shrimp products	12,000	20.8
Frozen herring products	1,600	2.8
Other frozen products	11,400	19.7
Total frozen products	**57,800**	**100.0**

Source: Stat. Bureau of Iceland. All values are based on FOB prices

3.3.2 Salted product groups

Salted cod products dominate the exports in this sector with close to 17 billion ISK export value in 2003, or over 82% of the total. Other salted groundfish include saithe, ling and tusk with a 6% share of salted exports. Herring products constituted another 4-5% of these exports in 2003.

TABLE: Salted products export value in 2003, by main product groups

Salted products	Value in mill. ISK	Value %
Salted cod products	16,900	82.4
Other salted groundfish.	1,300	6.3
Salted herring products	900	4.4
Other salted products (incl. roe)	1,400	6.8
Total salted products	**20,500**	**100.0**

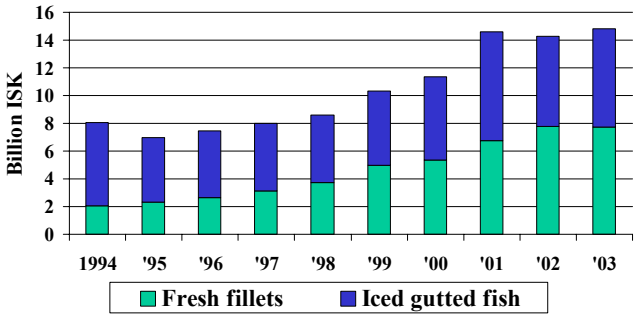
Source: Stat. Bureau of Iceland. All values are based on FOB prices

3.3.3 Iced and fresh product groups

A clear distinction should be made within this group between exports of iced whole fish (wetfish), on the one hand, and exports of fresh fillets and portions, on the other hand. In view of the growing importance of fresh fillet processing, this will be discussed in more detail than the more traditional sectors.

The following graph shows the developments in the past decade for exports of wetfish and fresh fillets. The increase in value over the years is mostly due to the positive trend for fresh fillets, which have surpassed wetfish in overall export value. In 2003, the export value for fillets was almost 8 billion ISK, while wetfish exports were worth 7 billion ISK. The wetfish markets in UK and Germany remain strong for cod and redfish, but the primary processing capacity seems to be becoming more limited in these countries. (Own conclusion, based on communication with industry experts).

Export value of fresh and iced products 1994-2003*

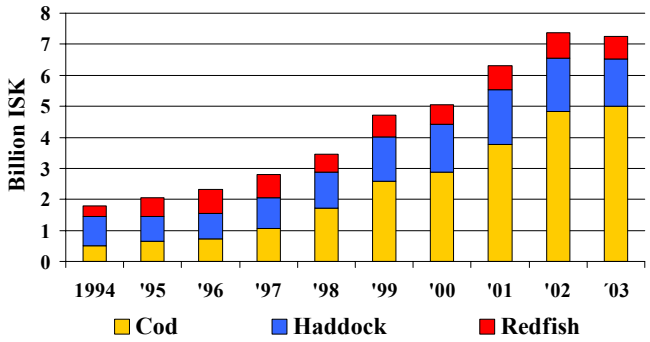


Source: Stat. Bureau of Iceland *FOB values at year's prices

The next figure shows the ten-year trend for exports of fresh fillets from the groundfish species that are most important for fresh processing. Clearly, the developments for cod fillets are the most significant, while exports of haddock fillets have been stable in the past few years and exports of redfish fillets also seem fairly constant throughout the period. The figure would be more complete with catfish data

included, but export statistics do not differentiate between whole iced catfish and fresh catfish fillets. On the basis of catfish disposition data, it appears that 1,000-1,5000 mt of fresh catfish fillets were processed in 2003.

Export value of fresh groundfish fillets 1994-2003



Source: Stat. Bureau of Iceland

The following table shows the wetfish exports and fresh fillet exports in 2003 by main product groups. It appears that the 5,000 million ISK exports of cod fillets were based on 7,800 mt of products while the 1,500 million ISK exports of wetfish were based on 6,600 mt of gutted cod. Taking into account the yield factors in processing of gutted fish into fillets (ca 45% yield) it seems that the price per kg calculated back to gutted weight is only slightly higher for fillets, leaving little margin for processing cost and underlining the fact that the wetfish markets pay high prices when supply is regulated. Similar calculations for haddock show a much better performance for fillets, with the 1,500 million ISK exports of fillets based on 2,600 mt, (equivalent to ca 6,500 mt of gutted fish), while the 900 million ISK wetfish exports were from 7,900 mt. This indicates that processing haddock into fresh fillets may easily double the export value, with resulting good contribution in processing.

The case of redfish is also an interesting one. The 700 million ISK exports of fillets were based on 1,800 mt of products, (ca 6,000 mt ungutted weight, assuming 30% fillet yield), while the 1,300 million ISK exports of wetfish were for 12,200 mt of whole redfish. In this case, processing in Iceland only results in marginally higher prices, but the markets are quite separate. Wetfish is primarily landed in Germany whereas the fillets are exported to France, Belgium and Germany.

TABLE: Iced / fresh products export value in 2003, by main product groups

Iced/fresh products	Volume in mt	Value in	Value %
Fresh cod fillets and portions	7,800	5,000	33.8
Iced whole cod	6,600	1,500	10.1
Fresh haddock fillets	2,600	1,500	10.1
Iced whole haddock	7,900	900	6.1
Fresh redfish fillets	1,800	700	4.7
Iced whole redfish	12,200	1,300	8.8
Other iced/fresh products*	66,400	3,900	26.4
Total iced/fresh products	**105,300**	**14,800**	**100.0**

Source: Stat. Bureau of Iceland. All values are based on FOB prices
* Mostly pelagic landings abroad

3.4 MARKETS

Coverage of the markets for Icelandic fisheries products is an extensive and complex subject, and perhaps more suitable in a separate report dedicated to that topic.

The markets for cod, herring and shrimp will be covered in some detail in later sections that describe these three important fisheries.

The following table shows the chief markets for fresh fillets, in view of the emergence of this market and growing importance.

TABLE: Markets for fresh fillets -% of export value

	Cod	Haddock	Redfish
EU total	**86.3**	**38.4**	**93.8**
UK	50.0	38.4	0.5
France/Belgium	32.1	-	53.6
Germany	0.8	-	30.8
Other	3.4	-	8.9
US	**13.7**	**61.6**	**6.2**

Source: Stat. Bureau of Iceland.

3.5 TRANSPORT TO MARKET

Three shipping companies operate out of Iceland, i.e. Eimskip and Samskip with regular and extensive liner transport services and Atlantsskip, with a more limited service. All three offer services to ports in Western Europe, including Scandinavia, and to the US East Coast. In addition, Smyril Line operates a weekly transport service for fresh fish to Hanstholm in Denmark.

All fisheries products apart from fresh fillets are transported by sea from Iceland, but fresh fillets are predominantly air freighted to the UK, continental Europe, and the US. Transport of fresh fillets by sea is increasing. With shipping time of 3 days to nearest ports in Europe, this service is still rather limited in destination ports and frequency but the demand for this service is expected to increase, due to the savings in transport costs relative to airfreight.

Two airlines are involved in freighting of fresh fillets on a daily basis. Icelandair transports fish to the US, UK and mainland Europe, while Bluecargo flies to Edinburgh in Scotland and Cologne in Germany.

Within Iceland, there is extensive transport of fish by trucks to the main ports of departure and Keflavik international airport. Large volumes are also transported from the auction markets to processing plants.

Websites for the shipping companies are: www.samskip.is, www.eimskip.is**,** www.atlantsskip.is and www.smyril-line.is. Websites for air freighting companies are www.icelandair.is and www.bluecargo.is.

Cost of containerised liner services is on contract basis and not freely available in detail. As an approximation, transport of 40 feet containers to Europe will cost 0.12-0.20 EUR / kg of products and transport to North America is in the range of 0.17-0.24 USD / kg. The lower figures apply to fully loaded containers (22 mt) while the higher figures are for IQF products (16 mt). These figures are for sea transport only and various cost factors for land transport and services need to be added for calculation of the final cost of transport (Industry sources).

The cost of air freight is close to 1.20 EUR / kg and extra cost of packaging also needs taking into account. This is frequently in the order of 0.25 –0.40 EUR / kg of products. It may be concluded that considerable reduction in air freighting costs would lead to further expansion in fresh fillet processing and exports (Industry sources).

3.6 SALES AND MARKETING

3.6.1 Overview

Sales and marketing of fisheries products were for decades under the auspices of processors' co-operatives that sold by far the largest proportion of products, and in fact monopolised seafood exports for most of this period. These co-operatives were Icelandic Freezing Plants Corporation (SH) and Samband of Iceland, both of which sold frozen products; and the third Union of Icelandic Fish Producers (SIF), selling salted and dried products. Iceland Herring Board was state-owned and represented producers of salted herring and the fishmeal industry operated sales in the state-owned SR for most of the large producers. There were also independent traders of fishmeal and oil.

Two of these corporations - SH and SIF, remain in operation and are now public limited companies, the latter having merged with the seafood arm of Samband and earlier also with the Iceland Herring Board. SH and SIF are still the major exporting companies, but their cooperation with producers is now on temporary contract basis. Both companies run an extensive network of subsidiaries in the major markets.

A number of sales agencies presently sell a significant share of exports, but most often they specialise in certain product categories. Furthermore, many of the large processing companies operate their own sales departments for sales to Icelandic exporters or directly to customers abroad. Only one fisheries company - Samherji, can, however, be described as fully integrated. It owns subsidiaries abroad and most of the sales are carried out by the company.

It is clear that competition in sales and marketing of fisheries products has increased in past years but it is not possible to conclude that this has led to improved prices for processors. With increased diversity, it may even be stated that a certain overview of prices and market trends has been lost, as each company guards their performance. At the same time, there is consolidation on the major retail markets and increased price competition in the foodservice industry. It is not unlikely that in the near future this will call for increased and renewed cooperation between processors as a way of reacting to the increasingly competitive marketing environment.

Informative websites on sales and marketing companies include: www.icelandic.is, www.sif.is, www.samherji.is, www.isa.is.

3.6.2 Market sectors

Icelandic products are sold to most sectors on the major markets, i.e. in retail, foodservice, homeservice and for industrial purposes. There is, however, no analysis available on the distribution of products to these various sectors so that the following must be considered a brief and qualitative overview.

On the **US market**, most Icelandic products are sold to the foodservice sector. This applies both to fillet products and further processed products that are marketed by subsidiaries of Icelandic companies. There are insignificant sales to the retail market, which is very price competitive. The US foodservice market is well developed and well over half of all seafood sales take place through this sector.

Most Icelandic products on the **Japanese market** are intended for further processing, i.e. they are whole-frozen products that mostly end up as fillets and portions, prepared for retail stores. Sales from Iceland are directly to processors or through a number of importers and traders.

The **EU market** is the most complex on basis of market diversity, but also because of the variety and volume of supplies. In the **United Kingdom**, the retail market is highly sophisticated and offers a wide variety of seafood. This is most likely the largest market sector for Icelandic products, although most of the products from Iceland are sold to this market via the industrial sector, i.e. for further processing and suitable packing for retail stores. A line of typical product might be fillet portions arranged in a fresh or frozen recipe dish by the major seafood producers - such as Young's Bluecrest, Icelandic or Lyon's Seafood, and sold to the major retail chains - such as Tesco, Sainsbury and Marks and Spencer. The foodservice sector is growing in importance. Icelandic products sold directly to this sector are frozen-at-sea fillets, shrimp and a variety of fillet portions.

Shrimp products are quite versatile as regards utilization by the UK market sectors. A small volume is sold directly from Iceland in retail units but a large quantity of size-graded IQF shrimp is used by the industrial sector for repacking into smaller retail units or further processed as an ingredient in recipe dishes for retail. Large volumes are used in prawn mayonnaise sandwiches and sold in retail. Finally, the foodservice market receives large volumes of Icelandic shrimp for restaurants, clubs and pubs, with prawn cocktail probably the best known and universally offered item on the seafood menu.

The seafood market in **France** is also very diverse with Icelandic products supplied to the retail, foodservice, industrial and homeservice sectors. Icelandic subsidiaries on this market offer fillet products directly from Iceland and further processed products in fresh, frozen and cured formats, especially groundfish products, herring and various roe products.

The market in **Spain** used to be supplied primarily with saltfish and saltfish fillets and this tradition is still the backbone of the operations of Icelandic companies on this market. In recent years a large variety of frozen fillet products and Norway lobster

have been marketed successfully on this very large and diverse market. The sectors served are primarily the foodservice and retail markets, the latter often via the industrial sector for re-packing and other preparation for retail.

The market in **Germany** is characterised by frozen products, with an exception in fresh redfish fillets. Large quantities of frozen groundfish products are supplied directly to discount chains and to the homeservice sector. Frozen fillet portions, coated fillets and a variety of further processed products are sold to the foodservice sector in small quantities. Large quantities of frozen fillets and blocks, especially saithe, are sold to the industrial sector for further processing.

The industrial sector is predominant for Icelandic products in **Scandinavia**. Cured herring products and roe are processed further for the domestic retail and foodservice markets.

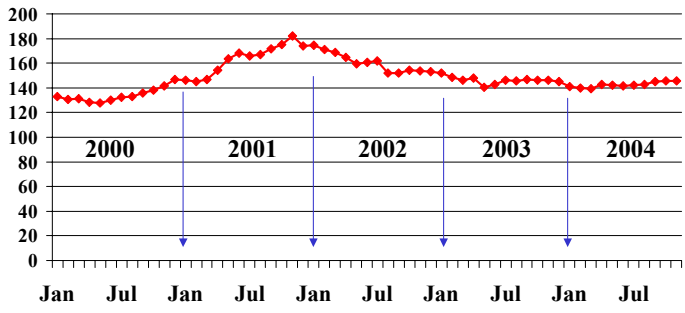
The chief East-European market is **Poland.** The industrial sector receives chiefly frozen herring fillets for curing and other processing, prior to placement on the retail market.

3.7 PRICE AND CURRENCY DEVELOPMENTS

3.7.1 Price trends for fisheries products

The major external factors presently affecting the economic performance of the industry are illustrated in the following figures. The first graph, showing the price index for all seafood since year 2000 indicates that prices increased significantly in 2000-2001, decreased in 2002-2003 and have remained stable this year, but with a slight positive trend. The price increases in 2000 were close to 10% and in 2001 they amounted to another 19%, but the price fall in 2002-2003 was 17%. Overall, the fisheries prices have therefore come back to the early 2001 prices, as a result of some slackening of prices on the market but chiefly as a result of the increasing strength of the Icelandic krona.

Price index for all seafood exports
2000-2003 & Jan/Nov 2004,
1990=100, ISK basis

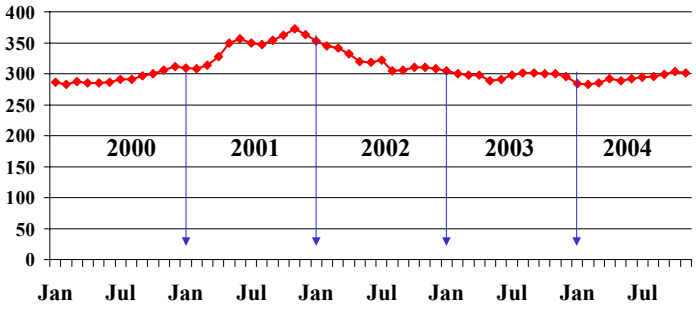


Source:Stat. Bureau of Iceland

The price index for groundfish in the next graph shows a similar trend, although some of the processing sectors, notably frozen-at-sea processing, have continued on a

downward price trend, while saltfish (not shown here) has shown a slightly positive price trend. Overall, groundfish prices increased by 18% in 2001, but fell by 16% in 2002-2003, and have increased slightly this year. Prices are presently back to the level they were at in late 2000, as indicated on the graph.

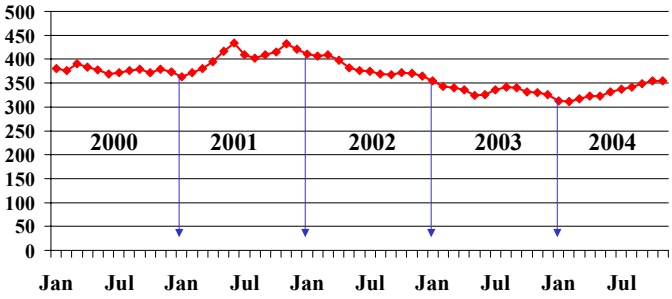
Price index for groundfish products 2000-2003 & Jan/Nov 2004, 1986=100, ISK basis



Source: Stat. Bureau of Iceland

At the same time, prices for frozen-at-sea groundfish products have decreased more sharply as shown on the next graph. Prices remained stable in 2000, increased by 16% in 2001 but fell by 21% in the following two years. In 2004, prices for frozen-at-sea products have shown a positive trend and increased by 14%. The poor performance in 2002-03 was due to market conditions, especially for redfish and Greenland halibut products.

Price index for frozen-at-sea groundfish products 2000-2003 & Jan/Nov 2004, 1986=100, ISK basis



Source: Stat. Bureau of Iceland

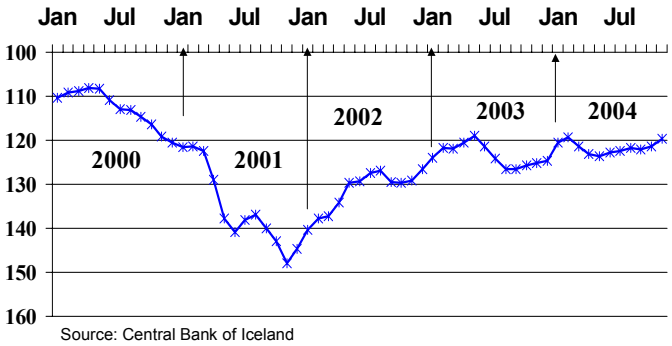
The price indices for major cod products, shrimp and herring products will be shown in later sections.

3.7.2 Currency trends

The exchange rate for the Icelandic krona is shown in the following two graphs. The first graph shows the currency index where the lower figures at the top indicate increased strength of the currency. The index shows a significant weakening of the ISK for most of 2000-2001, and gradual strengthening of the ISK after that. Calculations show that in 2000/01, the currency index increased by 30%, indicating

this level of devaluation while in 2002/03 the index decreased by 14%, showing that the krona strengthened to that extent. Since then, the currency has fluctuated somewhat but presently remains strong. The krona is expected to stay strong for the next few years as major foreign-funded industrial projects (aluminium) reach peak activity.

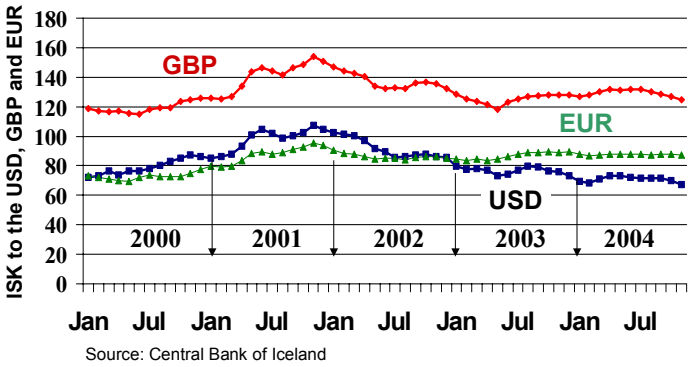
ISK Exchange rate index
monthly averages
Jan 2000 to Nov 2004



Comparing the above to the fisheries products price trends, it seems that most of the increases in product prices were due to currency devaluation in 2001, while the strengthening of the krona since then only partly explains the fall in fisheries product prices. The difference is due to some weakening of market prices that became significant in 2002 and has continued for most of the time since, with slight recovery in recent months for major product groups.

The next figure shows the rate of exchange for the krona against major export currencies, namely the EUR, GBP and USD. Overall, the krona has gained 15% against the GBP; 34% against the USD, and 4% against the EUR since the beginning of 2002 (Nov 2004 figures).

Exchange rates
ISK vs USD, GBP & EUR
Jan 2000-Nov 2004



3.8 CUSTOM DUTIES AND OTHER TRADE CONSIDERATIONS

Icelandic products carry no duty on imports to the US and to a large extent there is free trade with Japan, except for limitations by import quotas in some instances. The bulk of Iceland's exports to Japan are redfish and Geenland halibut products that are not subject to import quota limitations.

The situation for imports to the EU is rather more complex and depends on species and product forms, import quotas and even the time of year for the imports in certain instances. This will be described more fully in the following brief overview
(Source: Ministry for Foreign Affairs, 1992, with updates in 2003).

Before the general overview of EU custom duties, three landmarks in better market access for Icelandic products to the EEC/EU should be emphasised:

1. Duty-free access for frozen fillets and shrimp,
2. Duty-free access for fresh fillets, and
3. Duty-free access for frozen butterfly-fillets of herring.

3.8.1 Frozen fillets and frozen shrimp products

Most importantly, and as a result of a bilateral agreement made in 1976 between Iceland and the (then) EEC, Iceland no longer paid any duty on frozen fillets of any species and no duty on peeled or whole-frozen shrimp. Although the EEA agreement in 1992 granted Iceland better access to the EEC market in many respects, the agreement from 1976 must be considered of paramount importance for the Icelandic fisheries and the key to market access in Europe ever since.

3.8.2 Fresh fillets

Prior to the EEA agreement, there was an 18% duty on fresh groundfish fillets. The duty was abandoned in 1993 for cod, haddock and saithe, but gradually lowered for redfish and catfish, to the present 5.4%. Similarly for flatfish, the 18% duty on halibut and Greenland halibut fillets was abandoned under the EEA agreement. There is no dooubt that the lowering of import quotas is one of the chief factors in the development of fresh fillet exports from Iceland to the EU in the past decade.

3.8.3 Frozen herring butterfly fillets

In 2003, in preparation for the accession of ten new states to the EU, members of the EEA agreed on certain changes in the system of custom duties for fisheries products. The most important of these was the acceptance that herring butterfly fillets (flaps) should be placed in the fillet category, and hence would carry no duty. Earlier, these products were classed as whole herring, carrying 0-15% duty. In view of the expansion of the market for butterfly fillets in Poland and in the Baltic States, this change was most important in facilitating continued market access after these countries joined the EU in 2004.

3.8.4 Custom duties for groundfish and flatfish products

The following table shows the EU import duties for the major categories of groundfish and flatfish products. Most of the categories are self-explanatory, but it

should be noted that duties on mince products (minced off-cuts from fillets) are species related. Cod and haddock products are the bulk of exported mince and carry 1.1% duty.

TABLE: EU duties -groundfish and flatfish

	% duty
Fresh/frozen whole fish	
Cod, haddock, saithe	zero
Redfish	0.6
Catfish	4.5
Halibut and Grl. halibut	zero
Other flatfish	2.0-4.5
Frozen fillets	zero
Frozen mince (minced fish off-cuts)	0.6-4.5
Fresh fillets	
Cod, haddock, saithe	zero
Halibut and Grl. halibut	zero
Redfish, catfish, flatfish	5.4
Saltfish (wetsalted)	
Split fish - cod	zero
Split fish - other main species	3.6
Salted fillets	zero
Saltfish (salted and dried)	3.6
Dried cod	zero

Source: Ministry for Foreign Affairs, 1992

3.8.5 Custom duties for pelagic products

Whole-frozen herring carries 15% import duty in the period June 16 to February 14 but no duty at other times. Furthermore, Iceland has a custom-free annual quota of 950 mt. Exports to the EU in 2003 were close to 800 mt. but exports to countries that have now joined the EU (Poland and the Baltic countries) were 4,000 mt. It is therefore likely that the duty-free quota for these products will be exceeded in the future.

As mentioned before, imports of all frozen fillets are without duty and this also applies to salted fillets. Most fillet products are, however, marinated or cured with a mixture of salt, spices and sugar and in that instance the products have an EU import quota of 2,400 mt with no duty, followed by a 5,000 mt quota at 6% duty, which is shared with Norway. Once these quotas have been filled, an import duty of 12% applies. Exports have been below the level at which the higher rate of duty is applied.

Exports of whole or headless salted herring have a duty-free quota of 1,750 mt before the duty of 12% is applied. Exports in recent years have been in the order of 400-600 mt. per year.

The following table shows the EU import duties for the major pelagic products.

TABLE: EU duties - pelagic fish products

	%
Frozen fish	
Herring	0-15.0
Capelin, blue whiting	4.5
Frozen fillets, incl. butterfly fillets	zero
Salted whole fish and fillets	
Whole or headless herring	0-12.0
Herring fillets	zero
Sugar/salt cured or marinated fillets	0-12.0
Fishmeal, fishoil	zero

Source: Ministry for Foreign Affairs, 1992 and 2003

3.8.6 Custom duties for shrimp, Norway lobster and scallop

As mentioned earlier, Icelandic shrimp products have been exempt from custom duties since 1976, greatly facilitating the market access for shrimp on the EU markets. As regards Norway lobster, there is a 12.0% duty and for scallops the duty is 2.4%.

3.8.7 Custom duties for salmon and trout

There are small-scale exports of salmon and trout products from Iceland. The following table shows the duties imposed on imports to the EU.

TABLE: EU duties - salmon and trout products

	%
Fresh /frozen whole fish	
Trout	3.6
Salmon	2.0
Fresh/frozen fillets	
Trout	3.6
Salmon	2.0

Source: Ministry for Foreign Affairs, 1992

3.8.8 Minimum prices, anti-dumping actions

Iceland has not been the subject of anti-dumping actions, at least in later years. Fisheries products are subject to the minimum prices applicable within EU, but very rarely have they been an issue in exports from Iceland.

4 COD PRODUCTION

4.1 HIGHLIGHTS FROM THIS SECTION

- Cod landings in recent years have been in excess of scientific advice and TAC allocations. The 2004/2005 TAC for cod has been set at 205,000 mt.

- The pattern for cod fishing has changed significantly towards less summer fishing. The lowest fishing rate is observed in July and August and large processing factories are closed for a few weeks in summer. Fully trained staff is now manning the plants on permanent basis.

- Cod raw material prices in direct trade have increased by almost 48% in the past five years. At the same time, cod prices at the auction markets increased by 23% and prices in wetfish landings abroad increased by 9%.

- Small and medium-sized companies that buy cod have decreased by 25% in number in the past five years, but large companies are still 11 in number as compared to 12 in 1999.

- Close to 80% of the cod catch is processed in land-based plants. This proportion has been stable in recent years, despite the generally held view that the plants are under pressure from freezer trawlers. About 43% of the cod catch is processed in the homeports of fishing vessels. This proportion has not declined in recent years.

- The freezing plants and salting plants continue to be the basis for land-based processing, and between them use just above 70% of the cod catch. Fresh fillet processors receive 10% of the cod catch.

- Cod imports are no longer significant for the processing industry. Imports of Russian-origin H&G frozen fish were just 2,000 mt in 2003.

- Cod products were exported for close to 44 billion ISK in 2003. It is clear that saltfish products were the single most important category, with an export value of almost 17 billion ISK, followed closely by frozen fillet products, valued at 16.5 billion ISK. Fresh and iced cod products were exported for 6.5 billion ISK and a variety of other products were worth 4 billion ISK.

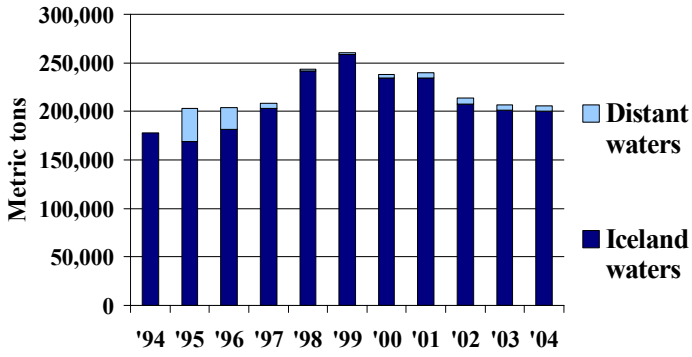
- The EU is the largest market for all major cod product categories. The importance of the US market has been declining over the years, especially as regards frozen fillet exports.

- In 2003, about 55,000 mt of cod heads were processed to yield close to 12,000 mt of dried heads. The heads are transported fresh from fillet plants to the drying plant or they are landed frozen from freezer vessels for drying.

4.2 COD LANDINGS

Cod landings by the Icelandic fleet were close to 206,000 mt in 2003, and included 201,600 mt from Icelandic waters and 4,700 mt from the Barents Sea. In the past decade, the total cod catch varied between 175,000 mt and 260,000 mt, as indicated in the following figure. Cod landings from distant waters have been a minor proportion of the total catch since the mid-90s when considerable fishing took place in 'Smutthullet'. In 1999, an agreement between Iceland, Norway and Russia put an end to this fishing. Since then, fishing by the Icelandic fleet in the Barents Sea has been 4,000-6,000 mt per year.

Cod landings by Icelandic vessels
1994-2004

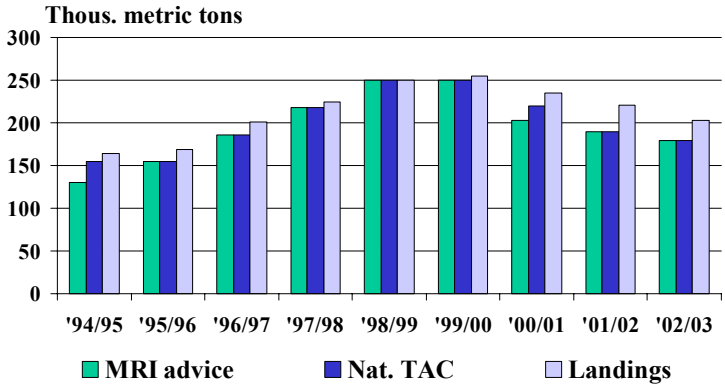


Source: Fisheries Statistics – 2004 estimate

Cod landings in recent years have been in excess of scientific advice and the TAC. Landings by the effort-based day-boats are the major contributory factor in landings above TAC. The 2004/2005 TAC for cod is 205,000 mt.

The next figure shows the development of the cod catch since 1994/95 together with the recommendations of the MRI and the set TAC. (Sources: MRI reports, Fisheries Stats.)

Cod fishing in Icelandic waters relative to scientific advice and allocated TAC



It should be noted that whilst most of the cod quota is allocated directly to vessels based on their established quota share, a small proportion (close to 6,000 mt) are allocated on the basis of various regional support systems. A total of three such

‘quota-funds’ apply to cod. They have been established to counteract to some extent the reduced allocations for cod but also in scallop and shrimp.

The day-boats have for a number of years exceeded their overall allocation. In the 2004/05 fishing year, this group of vessels has been allocated individual quotas and in two years’ time there will be no exemptions from the ITQ system.

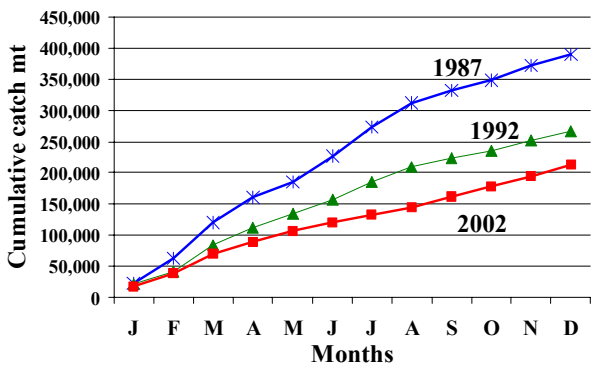
4.3 COD FISHING WITHIN THE YEAR

In years past there used to be the heaviest fishing for cod in the summer months due to natural availability of cod. This was problematic in many ways for the processing sector because the capacity of freezing plants was often stretched to the limit. The high-rate summer fishing was considered to lead to somewhat lower value of the product mix and was recognized as a risk with regard to quality. Shortage of manpower was solved by young people working in the freezing plants during the school holidays.

After the establishment of the ITQ system and with the fishing year running from September 1 to August 31 (from 1991), the pattern for cod fishing changed significantly towards less summer fishing. The lowest fishing rate is now generally in July and August and large processing factories are closed for a few weeks in summer. Trained staff is now manning the plants on permanent basis.

Fishing by months is shown below for three selected years: 1987, which was a record year for cod fishing (389,000 mt) and clearly shows the importance of summer fishing; 1992, which was a year of severe cut-back in overall cod fishing and in which the summer fishing was most affected; and finally 2002, which shows the present pattern of cod fishing with lower activity in summer.

Cumulative cod catch
years selected: 1987, 1992, 2002



Source: Fisheries statistics, Ch. 5

4.4 COD FISHING FLEET

The Icelandic fleet is traditionally divided into capacity classes by gross register tons (grt). Cod landings by the different vessel groups in 2002 and in 1992 are shown in the following table as proportions of the total catch. It seems that larger boats have

increased their share slightly, but otherwise there are no major changes in the cod fishing fleet in this period.

TABLE: Cod landings by groups of vessels, 1992 and 2002

	% of cod landings 2002	% of cod landings 1992
Undecked vessels	9	9
Decked vessels 0-100 grt	21	23
Vessels 101-1000 grt	33	28
Trawlers under 1000 grt	18	
Trawlers over 1000 grt	19	40
All vessels	**100**	**100**

Source: Fisheries Statistics 2002, table 5.9 and table 20-V

4.5 COD FISHING BY GEAR

Fishing according to the gear used is well documented in the Icelandic fisheries. The following table shows cod landings by gear in 2002 and 1992, presented as proportions of the total cod catch. The figures indicate that cod fishing by bottom trawl has decreased in the past decade, while fishing by longline and Danish seine has increased. Fishing by gillnet and handline seems to be stable as a proportion of the cod catch.

TABLE: Cod landings by fishing gear, 1992 and 2002

	% of cod landings 2002	% of cod landings 1992
Longline	21	16
Gillnet	21	23
Handline	9	8
Danish Seine	6	3
Bottom trawl	43	50
Total	**100**	**100**

Source: Fisheries Statistics 2002, table 5.13 and table 18-V

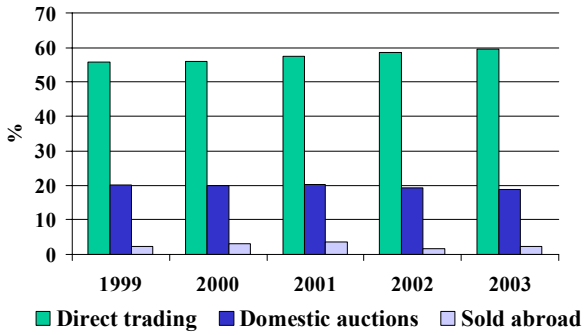
4.6 COD RAW MATERIAL PRICES

As indicated in section 1.5 there are a number of methods for raw material pricing of fresh landed cod. Prices may be determined in direct sales, on Icelandic auction markets or on auction markets abroad. It should be noted that prices for raw material processed at-sea are calculated back from the product value to the raw material, but for the sake of clarity this is omitted from the following discussion.

The price difference resulting from the various pricing methods has long been a source of disagreement between fishermen on the one hand and fish buyers on the other hand. A comparison for landed cod by each of the three methods is shown in the following two figures. The first shows the 1999-2003 time series as a proportion of the cod volume sold by each trading method. It appears that direct trading has been

increasing in the past five years while trading of cod on the domestic auction markets has been declining. In 2003, just about 60% of the landed volume of cod was sold in direct trade, while 19% of the landings were auctioned to the highest bidder. The time series also shows that landings of wetfish abroad are decreasing. Last year, they accounted for just 2.4% of landed cod volume. In combination, the three trading methods shown in the figure, accounted for just over 81% of landed cod. The remaining 19% correspond to the catch that was processed at-sea.

Trading of cod raw material 1999-2003, % of total cod landings (volume)

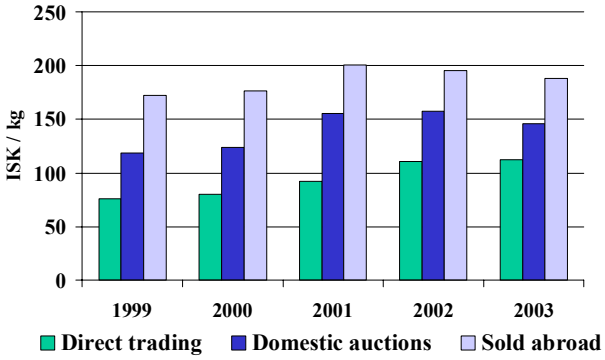


Source: Directorate of Fisheries

The following figure shows the 1999-2003 time series as the price pr. kg of landed cod (calculated back to catch weight). Prices are the weighted average for each year without regard to size grading. Evidently, prices in direct trade have increased most significantly in this period; the increase is close to 48% and includes a small increase in 2003. In this five-year period, cod prices at the auction markets increased by 23%. Prices in wetfish landings abroad increased by only 9% in 1999-2003 and included a slight decline in 2003 (4%). The overall convergence of prices in the most recent years should be noted and the fact that the auction markets at home and abroad were even showing a slight decline in cod prices, while prices in direct trade were still increasing.

In view of the high prices on the auction markets shown before, it is interesting to note that only about 20% of landed cod is sold at the auctions and that this proportion has declined significantly since the mid-90s. The reasons for this development are likely to include increased vertical integration in the industry and lower overall landed cod volume, but also that cod prices in direct trade have increased significantly.

Trading of cod raw material 1999-2003,
Average price each year - kr/kg ungutted (head-on)



Source: Directorate of Fisheries

4.6.1 Reference prices

As described earlier (section1.5.1) there are special provisions for ensuring convergence of prices in direct sales, on the one hand, and sales at the auction markets on the other hand. This applies to cod (gutted and ungutted), haddock (gutted and ungutted) and redfish. In effect, the formula defines the minimum reference price for cod and haddock in direct sales.

The following table shows the formula, which has been in effect for determining the minimum reference price for gutted and ungutted cod in direct trade.

Explanation: A figure of 92.7% means that at the indicated time, the price level in direct trade should have been at least 92.7% of the weighted average of prices in direct trade and at Icelandic auctions in the previous 12 months period.

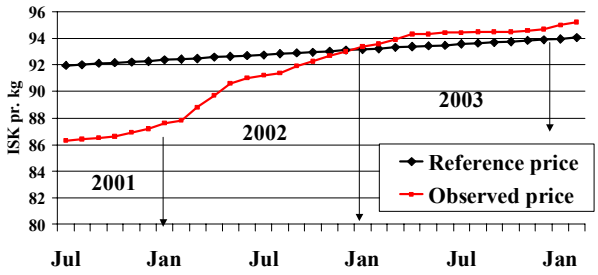
TABLE: Reference prices for cod in direct trade as % of weighted average prices

	Gutted cod %	Ungutted cod %
1.6. 2002	92.7	90.8
1.6. 2003	93.5	91.8
1.6. 2004	94.3	92.8
1.6. 2005	95.0	93.8
31.12.2005	95.4	94.4

Source: www.verdlagsstofa.is and personal communication

Interestingly, prices in direct trade have surpassed the convergence goals set up by the arbitrament, as shown in the following graph for gutted cod. Actual weighted average price has been higher than the reference price since the end of 2002 and has remained above this value since. For the time being, prices for gutted cod in direct trade are close to 95% of the weighted average price, and there are no disagreements reported between the traditional opponents - fishermen and vessel owners.

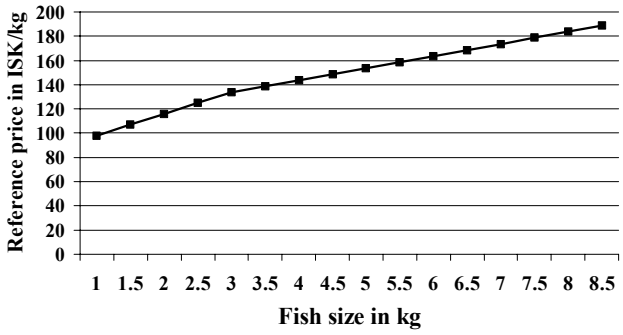
Observed price vs. reference price for gutted cod, July 2001-Feb 2004



Source: www.verdlagsstofa.is and personal communication

The Fresh Fish Prices Directorate is also required to compute the statistical relationship of cod prices vs. cod sizes (at auction markets and as reported to the Directorate of Fisheries). This relationship is taken into account when the minimum reference prices are computed, i.e. there are different reference prices for the different size grades. The following is the current observed reference price/size relationship for gutted cod, based on the formula for weighted averages that was discussed above.

Reference price vs. size relationship for gutted cod



Source: www.verdlagsstofa.is and personal communication

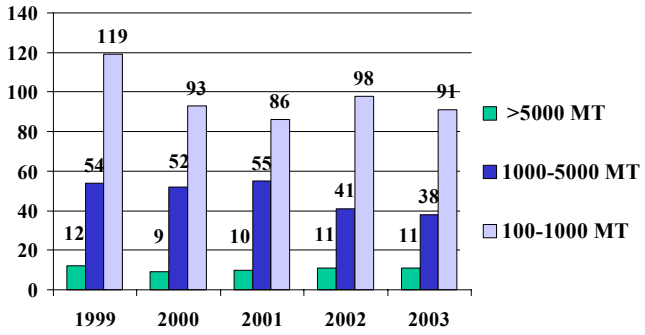
4.7 COD BUYERS

Cod buyers are the companies buying fresh raw material for processing, including freezer trawlers that operate without land-based processing. The following two figures are time series for 1999-2003 and show the changes that have taken place in the number and size of cod buying companies. The buyers have been grouped into large companies, buying over 5,000 mt on annual basis; medium-sized companies buying 1,000-5,000 mt; and small companies buying 100-1,000 mt.

The first figure shows that Icelandic cod buyers are presently around 140 in number, indicating that the average volume bought by each is close to 1,400 mt. In 1999, cod buyers were 185 in number, also buying on average about 1,400 mt. This fact reflects the decrease in total cod landings that were close to 260,000 mt in 1999 but 206,000 mt in 2003. The size distribution of buying companies has in this period changed

significantly. Small and medium-sized companies having decreased by 25% in number, but large companies are still 11 in number as compared to 12 in 1999.

Number of cod buyers in Iceland 1999-2003

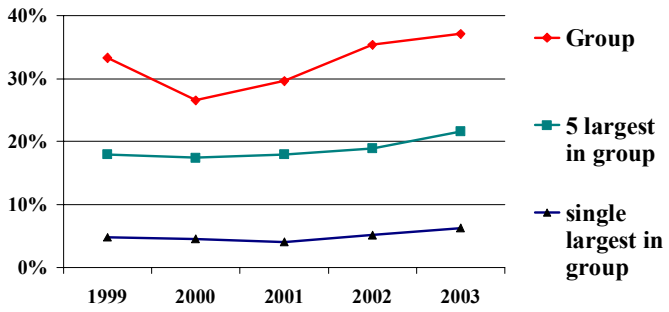


Source: Directorate of Fisheries. Volumes based on catch weight

The second figure shows a further analysis of the largest buying group. In 2003, the 11 largest companies bought 37% of the total cod volume. Within this group the five largest bought 22% of the cod catch and the single largest buyer bought 6% of the total catch, i.e. 12,600 mt. of raw material. The changes are more significant if the 'good cod-year' of 1999 is not considered.

It seems clear from these two figures that large-scale operators are becoming more significant as cod buyers and that within the group there is a trend towards the largest companies increasing their share of cod buying.

Large cod buyers (>5000 MT)
% of annual catch bought



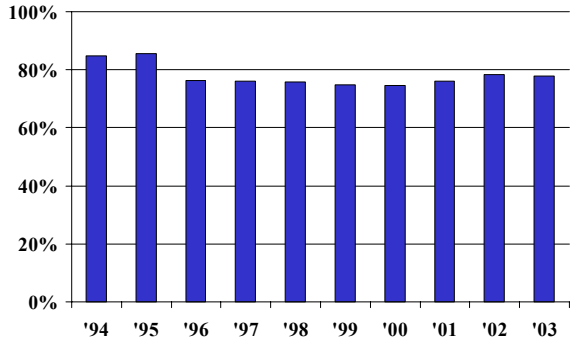
Source: Directorate of Fisheries

4.8 COD PROCESSING IN HOMEPORTS

Processing in homeports of vessels is an indication of vertical integration in fishing and processing but also shows the tradition for smaller independent fishermen in many ports to sell their catch to local processors, rather than on auction markets. The following two figures show the 1994-2003 time series for land-based processing of cod and processing in homeports as a proportion of the land-based processing.

The first figure shows that close to 80% of the cod catch is processed in land-based plants and that this proportion has remained stable in recent years, despite the generally held view that the plants are under pressure from freezer trawlers that process on-board. Land-based processing of cod has held is position for most of the past decade and is the mainstay of processing plants all around the country.

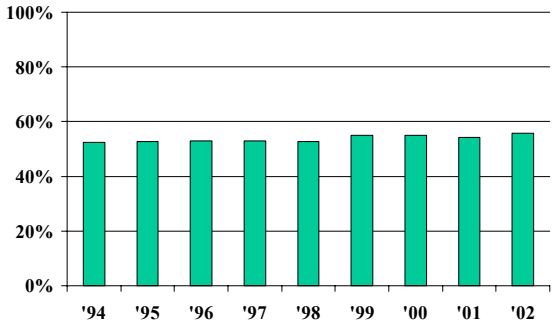
Cod - Land-based processing as % of landings 1994-2003



Source: Directorate of Fisheries

The following figure shows the proportion of land-based cod processing that takes place in the homeport of fishing vessels. In 2003, it was close to 55% and by referring to the previous figure it can be concluded that about 43% of the total catch is processed in homeports (78% x 55%). This proportion has not declined in recent years.

Cod - % of land-based processing in vessel's home port 1994-2003



Source: Directorate of Fisheries

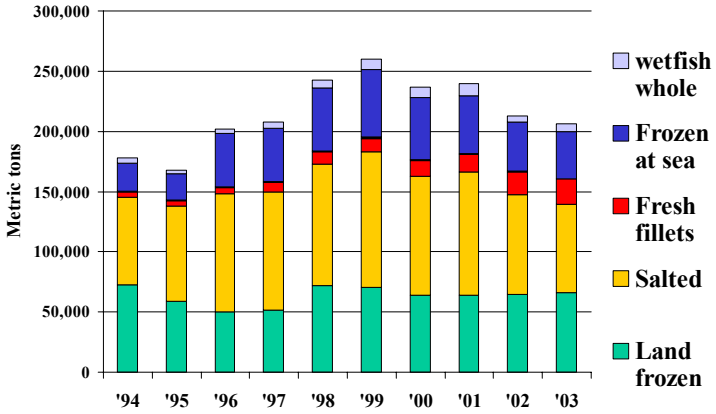
4.9 DISPOSITION OF COD – CHANGES IN PAST 10 YEARS

The term disposition refers to usage of the catch and is always calculated back to the catch weight. In Iceland, there are five main methods for cod disposition:

1. To land-based freezing plants (fillet and portion production),
2. For salting (split fish and fillets),
3. For fresh fillet production,
4. To freezer vessels for on-board fillet production,
5. For wetfish export (headed and gutted cod), most often in container loads.

The following two figures show the 1994-2003 time series for cod disposition. The most noticeable feature (apart from the variation in total catch) is the overall strong position of the land-based processing sectors, despite variations between freezing, salting and fresh fish disposition in the past 10 years. In 2003, about 66,000 mt were landed to the freezing plants, close to 73,600 mt were processed for saltfish and 20,600 mt were filleted for fresh fish export. At the same time, 39,000 mt were processed at-sea and 6,500 mt were exported as wetfish.

Disposition of the Icelandic cod catch
(all waters) 1994-2003



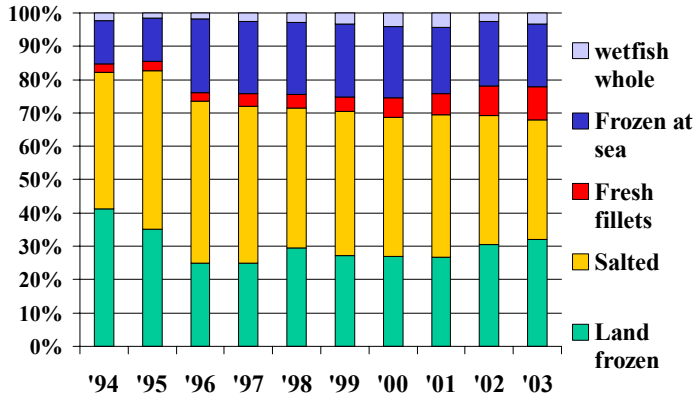
Source: Directorate of Fisheries

The second figure shows the proportional disposition as a time series. Clearly, the freezing plants and salting plants continue to be the basis for land-based processing, and between them use just above 70% of the cod catch.

Processing of cod for fresh fillet export is the fastest growing sector in the cod industry and represents a change in the operation of the cod industry in recent years. This adds another 10% share of the cod catch to land-based processing.

Freezer vessels seem to have a slightly declining share of the cod catch. Their share was 19% in 2003, but reached 22% in the period 1996-99. There was record production in 1999 when 56,000 mt of cod were processed at-sea. On the other hand, 39,000 mt of cod were fished by freezer vessels in 2003.

% Disposition of the Icelandic cod catch (all waters) 1994-2003



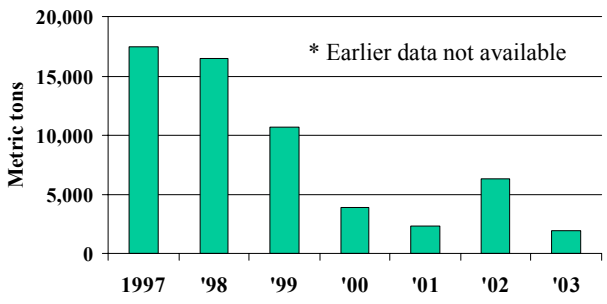
Source: Directorate of Fisheries

Wetfish exports have declined in recent years and are presently 3% of the cod catch (6,500 mt). In the late 1980's, up to 50,000 mt of cod were exported as wetfish, chiefly to auction markets in the UK.

4.10 COD IMPORTS

Cod imports are no longer significant in the processing industry. In 2003, imports of Russian-origin headed and gutted frozen fish were just 2,000 mt (product basis). Statistics on imports are available from 1997, when imports were close to 18,000 mt and quite significant for the freezing industry. High import prices and hence poor profitability in processing caused the decline. Fillet processing from frozen cod is now carried out in only a few plants.

Cod - Import of foreign-origin raw material 1997*-2003



Source: Directorate of Fisheries

4.11 COD PRODUCTION AND EXPORTS 2003

Cod processing follows the pattern described for groundfish in section 2.8.1. It can therefore be stated that cod processors operate one or more of the following:

1. Traditional frozen fillet production,

2. Processing of frozen size-graded fillet portions, complemented by traditional frozen fillet products,
3. Production of fresh fillets and/or fresh fillet portions, often complemented by production of similar frozen products,
4. Saltfish production, including salted fillets, portions and split fish,
5. Frozen-at-sea production of interleaved or IQF size-graded fillets.

The relative importance of the chief product categories can be seen from their export values, which have been compiled in the following table from the 2003 export statistics.

Cod products were exported for close to 44 billion ISK in 2003. It is clear that saltfish products were the single most important category, with an export value of almost 17 billion ISK, followed closely by frozen fillet products, valued at 16.5 billion ISK. Fresh and iced cod products were exported for 6.5 billion ISK and a variety of other products were worth 4 billion ISK.

TABLE: Cod product categories - export value in 2003

	Million ISK	%
Saltfish products	16,900	38.4
Land-based frozen fillet products	9,100	20.8
Frozen-at-sea fillet products	6,300	14.3
Frozen fillet blocks	1,100	2.6
Fresh fillet products	5,000	11.4
Wetfish	1,500	3.3
Other products	4,000	9.2
Total	**43,900**	**100.0**

Source: Stat. Bureau of Iceland

4.12 COD MARKETS

The EU is the largest market for all the major cod product categories, as shown in the following table. The importance of the US market has been declining over the years, especially as regards frozen fillet exports.

TABLE: Major market regions for cod products in 2003 – export value %

	EU %	N-Am. %	Other %
Saltfish products	98.0	0.9	1.1
Land-based frozen fillets	70.9	28.7	0.4
Frozen-at-sea fillet products	66.3	29.5	4.2
Fresh fillet products	86.3	13.7	nil
Wetfish	100.0		nil

Source: Stat. Bureau of Iceland

Saltfish products are exported almost exclusively to the EU. Portugal is the largest market, with 38% of all saltfish export value, followed by Spain with 34%, Italy with 10%, France and Greece, with 5% each, and various other markets with 8%.

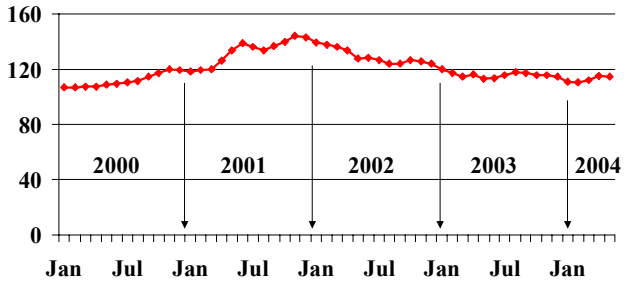
As regards frozen cod products, the UK and US are by far the largest cod fillet markets, with 24% of land-frozen fillets and 60% of frozen-at-sea fillets exported to the UK, while the US takes 30% of land-frozen fillets and 30% of the frozen-at-sea products.

Fresh cod fillet products are exported to the UK (50%), Belgium and France (32%) and the US (14%). Iced whole cod is mostly sold to the UK (71%), France and Belgium (24%).

4.13 COD MARKET PRICE DEVELOPMENTS

The following three diagrams show the developments for the chief cod product groups in recent years. The first figure for land-frozen products shows a gradual increase in prices in 2000 and a sharp increase in 2001, which in those two years amounted to 30%. Prices fell by 18% in 2002/03 but have been on a slow upward trend since. Referring to the currency value trends (section 3.7.2), it seems that most of the cod price changes can be traced back to changes in the value of the krona relative to major market currencies. (price index obtained up to May 2004 by personal communication with Stat. Bureau of Iceland)

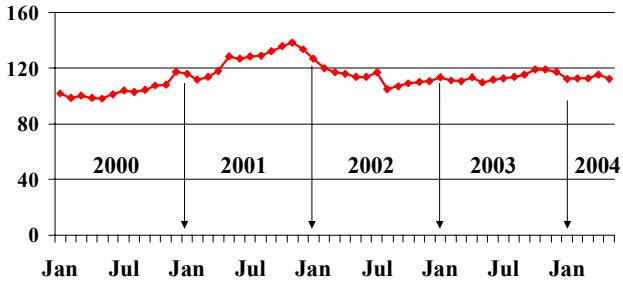
Price index for landfrozen cod products 2000-2003 & Jan/May 2004, 1986=100, ISK basis



Source: Stat. Bureau of Iceland

The next figure also shows an increase in salted cod prices in 2000/01 that amounted to over 20%, followed by decrease of 7% in 2002/03. Prices have been relatively stable since late 2002. Saltfish is mainly sold in EUR and the above price changes are mostly due to changes in that currency relative to ISK, although the price changes seem more moderate than the currency changes.

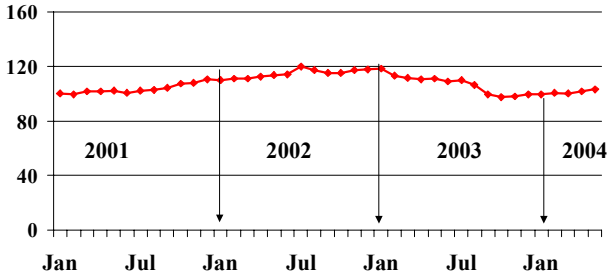
Price index for salted cod products 2000-2003 & Jan/May 2004, 1986=100, ISK basis



Source: Stat. Bureau of Iceland

The last figure shows the price developments for frozen-at-sea cod products, which show the familiar increase in 2001 but also an increase in 2002, followed by a sharper decline in 2003. The increase in 2001/2002 amounted to 18% whereas the decrease in 2003 was 16%. Overall, frozen-at-sea cod prices have held better than prices for other frozen-at-sea groundfish products.

Price index for frozen-at-sea cod products 2001*-2003 & Jan/May 2004, 2001 Jan =100, ISK basis



Source: Stat. Bureau of Iceland * Earlier data not available

4.14 BY-PRODUCTS IN COD PROCESSING

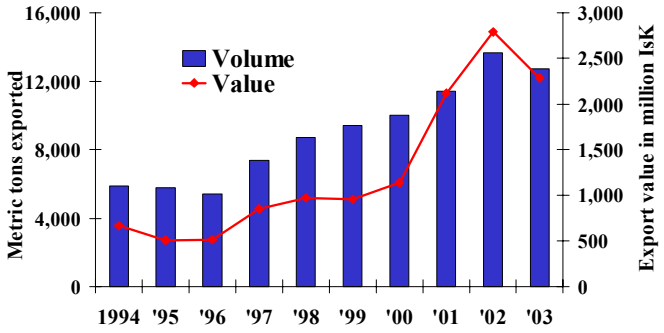
Cod heads, roes, fillet off-cuts and fish skins are defined as by-products although some, such as dried cod heads and salted or frozen cod roe, are of considerable value.

4.14.1 Dried cod heads

There are a number of companies that have specialized in the processing of dried cod heads and are not involved in production of fillet products. Most of them are either owned jointly by a few companies in fillet processing or they are subsidiaries of large fillet companies. In 2003, about 55,000 mt of cod heads were processed to yield close to 12,000 mt of dried heads. The heads are transported fresh from fillet plants to the drying plant or they are landed frozen from freezer vessels for drying. A considerable share of this raw material originates in frozen-at-sea processing.

The following figure shows the development in exports of dried cod heads since 1994. Export volume in 2003 was 12,700 mt and the value was 2,300 million ISK. By far the most important market for this type of products is Nigeria.

Export volume and value of dried cod heads
1994-2003

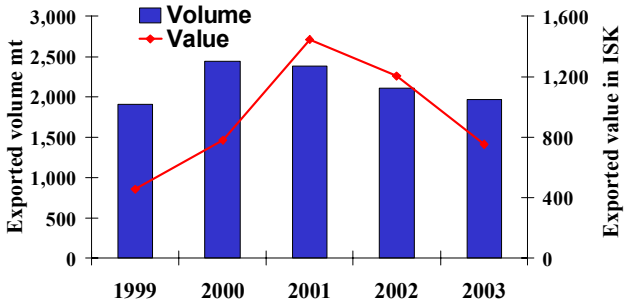


Source: Directorate of Fisheries

4.14.2 Salted or frozen roe

The following figure shows the development in exports of salted and frozen cod roe since 1999 but this export goes far back. Export volume in 2003 was 2,000 mt and the value was 750 million ISK. The most important markets for frozen cod roe are Japan and countries of the EU, while the most important markets for salted roe are Sweden and other EU countries. Chief producers are specialized companies.

Export volume and value of frozen and
salted cod roe 1999-2003



Source: Directorate of Fisheries

5 HERRING PRODUCTION

5.1 HIGHLIGHTS FROM THIS SECTION

- Herring landings by the Icelandic fleet were close to 250,000 mt in 2003. In the past decade, the total herring catch varied between 150,000 mt and 300,000 mt.

- The herring fishing fleet has changed significantly in recent years. Most of the herring is now fished by very large vessels, including large stern trawlers. Almost 60% of the fishing is by pelagic trawl, but the rest is fished by purse seiners.

- Most of herring landings are traded in direct sales for domestic processing or sold abroad. Raw material prices have decreased significantly since 2001.

- The Icelandic pelagic industry has become very consolidated and there are presently 6-10 companies that control herring fishing and processing. All of them operate in both fishing and processing and the largest also have their own sales departments.

- There are close to 40 vessels with quota allocations for Iceland herring and 42 vessels with quota in NSS herring. Most of the herring vessels have quota in both stocks, but some only in either of the two. Common for both groups is that the ten largest quota holders receive over 40% of the allocation.

- In 2003, about 45,500 mt were landed to the freezing plants, 68,400 mt were processed at-sea, close to 8,600 mt were processed for salted products and 122,400 mt were reduced for fishmeal and oil.

- There are 6-7 active freezing plants in the Eastfjords and Westman Islands. Their total capacity is ca 2,000 mt of frozen products per day. Capacity in freezing-on-board fishing vessels is close to 400 mt of fillets per day. There are 5-6 active vessels in the fishery, with the largest freezing 130 mt per day.

- Poland and Lithuania are the chief markets for frozen-at-sea butterfly fillets. Within the EU, the main markets for frozen-at-sea fillets are in the Netherlands and France, whereas land-frozen fillets are chiefly exported to France and Germany.

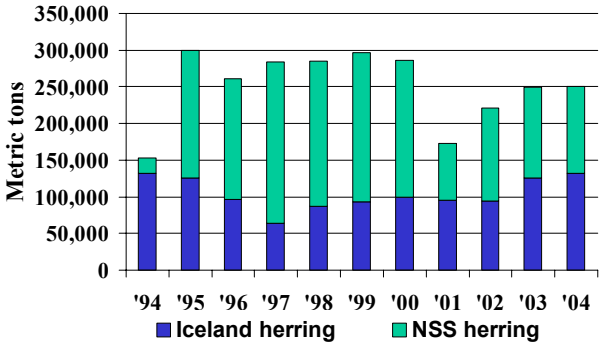
- Salted and cured herring fillets are mostly sold to Sweden, Finland and Denmark for repacking for the retail markets in those countries.

5.2 HERRING LANDINGS

There are two herring stocks fished by Iceland, i.e. the Iceland herring (summer-spawning herring) and the Atlanto-Scandian stock (Norwegian spring-spawning herring, which will be called NSS herring in this report.

Herring landings by the Icelandic fleet were close to 250,000 mt in 2003, and included 126,000 mt of Iceland herring and 124,000 mt of NSS herring. In the past decade, the total herring catch varied between 150,000 mt and 300,000 mt, as indicated in the following figure.

Herring landings, Icelandic vessels 1994-2004



Source: Fisheries Stats. –2004 estimate-

Herring landings have not exceeded allocations for a number of years and the quota has often not been fully caught.

5.3 HERRING FISHING FLEET

Herring landings by vessel groups in 2002, and in 1992 for comparison, are shown in the following table as proportions of the total catch. The fleet has changed significantly in this period. Most of the herring is now fished by very large vessels, including large stern trawlers.

TABLE: Herring landings by groups of vessels, 1992 and 2002

	% of herring landings 2002	% of herring landings 1992
Vessels 101-1000 grt	24	100
Vessels >1000 grt	65	nil
Trawlers, most over 1000 grt	11	nil
All vessels	**100**	**100**

Source: Fisheries Statistics 2002, table 5.9 and table 20-V

5.4 HERRING FISHING BY GEAR

The following table shows herring landings by gear in 2002, and in 1992 for comparison, presented as proportions of the total catch. Almost 60% of the fishing is now by pelagic trawl, which became common in this fishery just a few years ago, but the rest is fished by purse seiners.

TABLE: Herring landings by fishing gear, 1992 and 2002

	% of herring landings 2002	% of herring landings 1992
Purse seine	41	100
Pelagic trawl	59	nil
Total	**100**	**100**

Source: Fisheries Statistics 2002, table 5.13 and table 18-V

5.5 HERRING RAW MATERIAL PRICES

Most of herring landings are traded in direct sales for domestic processing or sold abroad. Raw material prices on-board freezer vessels are calculated from product value. Various cost factors in frozen-at-sea processing are not taken into account so that raw material prices should not be compared directly to domestic processing. Prices from one year to the next are, however, likely to be comparable and a time series may therefore indicates a trend in this processing sector.

It is clear from the table that raw material prices decreased significantly in the period 2001 to 2003. For Iceland herring, prices decreased by a third and for NSS herring by 40%. It seems that frozen-at-sea prices decreased the most - by close to 50%, reflecting the change in prices for frozen fillets on the European market and currency changes.

TABLE: Herring raw material prices 2001-2003

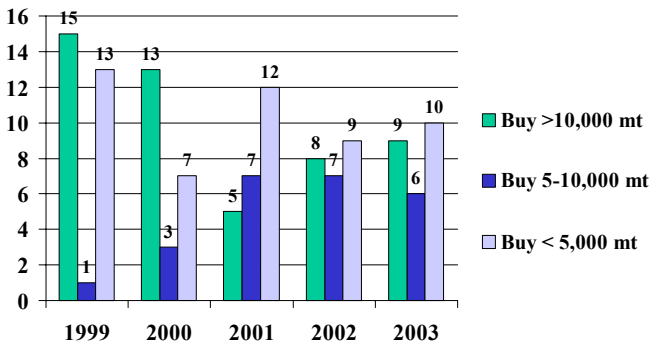
	2001	2002	2003
	ISK/kg	ISK/kg	ISK/kg
Iceland herring			
Total average	22.57	18.29	14.93
For domestic processing	16.12	12.41	11.44
For frozen-at-sea	58.61	38.06	29.81
NSS herring			
Total average	18.93	20.06	10.91
For domestic processing	12.55	11.78	8.14
For frozen-at-sea	59.62	37.97	29.89
Landed abroad	14.74	16.40	12.61

Source: Fisheries Stats. Tables 5.7 and 5.8. Figures for 2003 are provisional

5.6 HERRING BUYERS

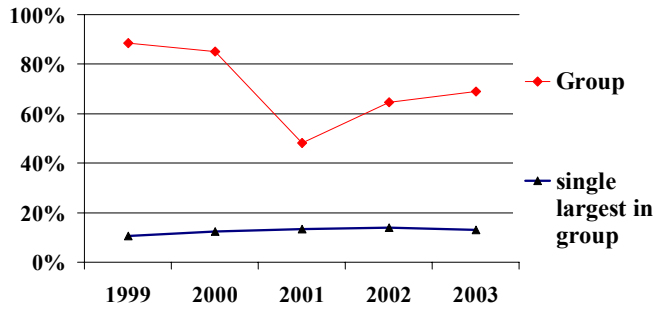
There are relatively few buyers of herring for processing, including freezer vessels, which are included in the category. The following figure shows that in 2003 there were 9 buyers with over 10.000 mt, another 6 buyers with 5-10,000 mt and 10 buyers with under 5,000 mt. There is no apparent pattern in the size distribution over the years, possibly because of the widely varying total catch, such as in 2001 when the landings decreased by 40% from the previous year.

Number of herring buyers in Iceland 1999-2003



The second figure shows that the 9 buyers with over 10,000 mt of raw material each account for the utilization of close to 70% of the herring catch and that the single largest buyer uses 13% of the total. It seems from this figure that the largest operators in herring processing are increasing their share of the catch in the past few years.

Herring buyers >10,000 mt % of total herring trade, 1999-2003



5.7 HERRING INDUSTRY CONSOLIDATION

The Icelandic pelagic industry has become very consolidated and there are presently 6-10 companies that control herring fishing and processing. All of them operate in fishing and processing and the largest also have their own sales departments. There are close to 40 vessels with quota allocations for Iceland herring and 42 vessels with quota in NSS herring. Most of the herring vessels have quota in both stocks, but some

only in either of the two. Common for both groups is that the ten largest quota holders receive over 40% of the allocation.

The following table shows the six largest companies in terms of quota holding, measured as proportion of the total allocation. The list is only an approximation, due to changes in ownership of vessels and companies in recent months.

TABLE: Largest quota holders in herring, % of total in 2003*

	Iceland herring	NSS herring
Sildarvinnslan (&	15	24
Samherji (& subsidiaries)	18	11
Isfelag Vestmannaeyja	7	11
Vinnslustodin	9	8
Skinney Thinganes	8	2
Eskja	-	10

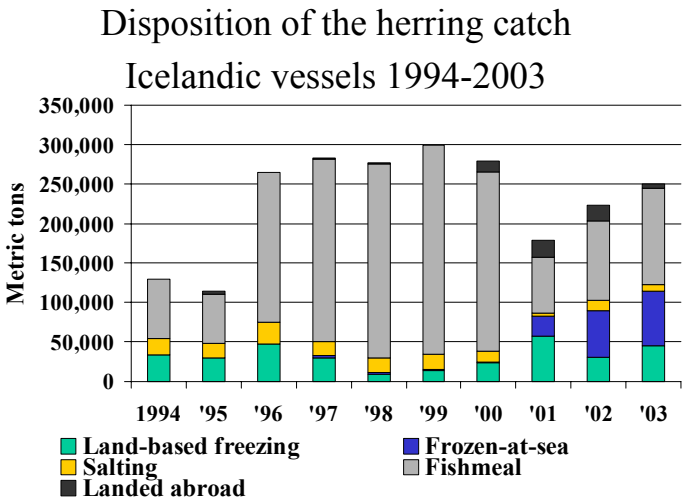
Source: Directorate of Fisheries, * Approx. figures

5.8 DISPOSITION OF HERRING – CHANGES IN PAST 10 YEARS

As mentioned before, the term disposition refers to usage of the catch, calculated back to the catch weight. For herring, there are five main disposition methods:

1. To land-based freezing plants, mostly for fillet production,
2. To freezer vessels, mostly for on-board fillet production,
3. To salting plants for salted and cured fillet and whole herring production,
4. For fishmeal and oil processing,
5. For wetfish export, most often by landing the catch abroad.

The following figure shows the 1994-2003 time series for herring disposition. Reduction to fishmeal and oil continues to be the most significant use of herring. Another noticeable feature is the increase in frozen-at-sea processing in the past few years. The land-based processing sectors seem to receive very variable proportion of the catch, but processing for direct human consumption is increasing as a proportion of the catch. In 2003, about 45,500 mt were landed to the freezing plants, 68,400 mt were processed at-sea, close to 8,600 mt were processed for salted products and 122,400 mt were reduced for fishmeal and oil. In 2003, landings abroad were 5,000 mt, mostly in Norway.



Source: Directorate of Fisheries

5.9 HERRING PRODUCTION AND EXPORTS 2003

5.9.1 Processing capacity

Capacity in fishmeal and oil processing is estimated at 16-17,000 mt of raw material per day in 19 factories. The Iceland herring season and the capelin season coincide in mid-winter and the NSS herring season and blue whiting season coincide in summer. The capacity of individual meal factories is sometimes exceeded at the height of the capelin season.

There are 6-7 active freezing plants in the Eastfjords and Westman Islands. Their total capacity is ca 2,000 mt of frozen products per day.

There are 6 salting stations in the Eastfjords and Southwest Iceland. Their combined capacity in salting is ca 130,000 barrels per season, which extends from October to December.

Capacity in freezing-on-board fishing vessels is close to 400 mt of fillets per day. There are 5-6 active vessels in the fishery, with the largest freezing 130 mt per day.

5.9.2 Exports

Herring products are exported as the following main categories:

1. Frozen fillets,
2. Whole-frozen herring,
3. Salted and cured fillets and fillet portions,
4. Salted whole herring,
5. Fishmeal and oil,
6. Whole herring landed abroad.

The relative importance of the chief product categories can be seen from their export values, which have been compiled in the following table from the 2002 export statistics. Values for fishmeal and oil from herring have been omitted, because export statistics are known to be inaccurate as regards species designation for these products.

They are most often exported in mixed lots under the general description of fishmeal and (body)oil. Export statistics are also inaccurate as regards product description and markets for frozen herring. Much of the frozen-at-sea production is landed in Norway in transit for Poland and Lithuania, but is designated as exports to Norway. On the other hand, reliable export figures were available for 2002 from the chief exporters.

TABLE: Chief herring product categories - export value in 2002*

	Million ISK
Whole-frozen herring	100
Frozen herring fillets	3,000
Salted /cured fillets	1,300
Salted whole herring	60
Wetfish - landed abroad	240

Source: Industry sources and Stat. Bureau of Iceland.
* Data not accurate for 2003

5.10 HERRING MARKETS

The following two tables show the exports of frozen products to Poland, Lithuania and Latvia in 2002. These countries are the chief markets for frozen-at-sea butterfly fillets and have expanded greatly in the past few years, as is shown in the second table.

TABLE: Frozen herring exports to Poland and the Baltic countries, 2002

Product / Market	Volume mt	Million ISK
Total whole-frozen	**1,300**	**80**
Whole-frozen Poland	300	20
Whole-frozen Lithuania	1,000	60
Total frozen fillets	**24,200**	**2,160**
Single fillets, mostly Poland	2,900	300
Butterfly fillets Poland	15,900	1,400
Butterfly fillets Lithuania	4,700	400
Butterfly fillets Latvia	700	60

Source: Industry sources, data not available for 2003

TABLE: Exports of herring 'flaps' to Poland and Lithuania, in mt, 2000-2002

	2000	2001	2002
Poland	900	8,400	15,900
Lithuania	200	1,500	4,700

The markets for frozen and salted products in **EU countries** seem stable but are not increasing. Within the EU, the main markets for frozen-at-sea fillets are in the Netherlands and France, whereas land-frozen fillets are chiefly exported to France and

Germany. The land-frozen products have the advantage of accurate size grading, but there is no significant price difference between the two categories.

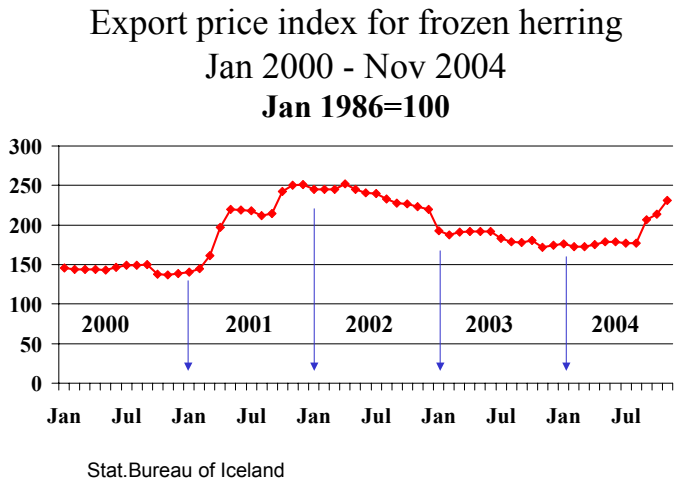
TABLE: Frozen and salted herring exports to the EU, 2002

Product / Market	Volume mt	Value million ISK
Whole-frozen	600	40
Total frozen fillets	7,700	800
Whole salted	600	60
Salted / cured fillets	7,600	1,200

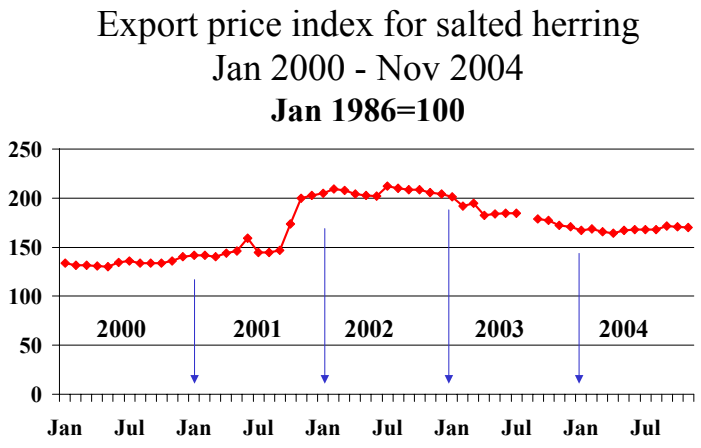
Industry sources, data not available for 2003

5.11 HERRING MARKET PRICE DEVELOPMENTS

The following two figures show the developments for frozen and salted herring products in recent years. The first, for frozen products, shows a sharp increase in 2001, which amounted to 75%. Prices fell by 30% in 2002/03, but most sharply in 2002. They have been fairly stable in the past year, but with clear increases in the second half of 2004. Referring to the currency value trends (section 3.7.2), it seems that they are only partly responsible for the price changes and it is clear that frozen products have increased in price in this period. It should, however, be taken into account that the shift in production towards frozen fillets and hence value addition may be partly responsible for this development.



The next figure shows the price developments for salted herring products. A sharp increase occurred in late 2001, which amounted to 43%. This was followed by a decrease of 17% in 2002/03 and price stability in 2004. Salted and cured herring fillets are mostly sold to Sweden, Finland and Denmark for repacking for the retail markets in those countries.



Stat.Bureau of Iceland

6 NORTHERN SHRIMP PRODUCTION

6.1 HIGHLIGHTS FROM THIS SECTION

- Shrimp landings by Icelandic vessels have been near 25-30,000 mt and from the Flemish Cap about 5,000 mt per year.

- The shrimp fishing fleet has changed significantly in the past 10 years. Boats under 100 grt have almost disappeared from the fishery and most of the landings are by large vessels, including stern trawlers.

- Most processing plants buy material from their own fishing vessels but it appears that raw material prices are presently a higher proportion of processing cost than a few years ago.

- Imports of frozen-at-sea whole shrimp for further processing have increased greatly in past years and are used to supplement the domestic raw material supply. Nearly 39,000 mt were imported in 2003.

- In 1990 there were close to 37 shrimp plants in operation, while in 2003 there were 14 plants, mostly in Northwest Iceland.

- In 2003, just 25% of the shrimp catch was processed on-board, as opposed to almost 50% a few years earlier.

- The United Kingdom is the most important market for coldwater shrimp products. The market is estimated at 33,000 mt per year. Icelandic processors supply two thirds of this volume.

- Market prices for shell-on shrimp have been on a downward trend for three years. Prices for cooked and peeled shrimp have also decreased in this period, but there has been a slight recovery in recent months.

6.2 SHRIMP LANDINGS

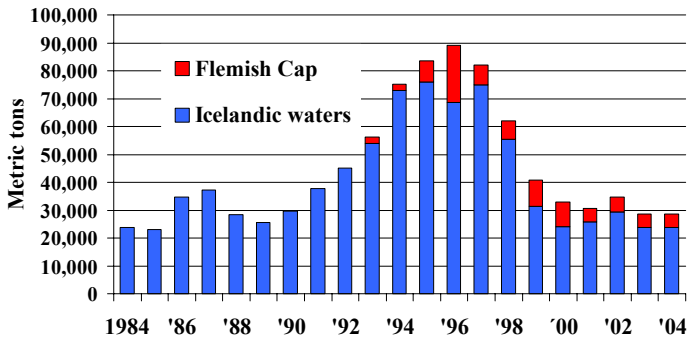
The shrimp stock fished by Iceland is one of the *Pandalus borealis* stocks that are fished by many countries in the North Atlantic but also in the Bering Sea. The global annual catch is close to 400,000 mt, with Iceland presently fishing 7.5% of the total. Northern shrimp is also commonly known as coldwater prawn, especially on its chief market in the UK.

Shrimp landings by the Icelandic fleet in 1984-2003 are shown in the following figure. A great increase in landings took place in the 1990s, with an equally rapid decline after 1997. In 1995-1997, the annual landings from Icelandic waters were 70-75,000 mt but in the past few years they have been near 25-30,000 mt, which was the

level of landings for many years prior to the increase in the 90s. It is well known that shrimp is important as feed for young cod, and to some extent there is an inverse relationship between the abundance of the shrimp stock on the one hand and the cod stock on the other hand. With young cod presently being the most abundant in the cod stock, it is expected that shrimp landings from Icelandic waters will remain rather low.

The figure also shows the landings by Icelandic vessels from the Flemish Cap. They have been in the order of 5,000 mt annually, well below the allocations of the Icelandic Ministry of Fisheries.

Shrimp catch by Icelandic vessels
1984-2004



Source: Fisheries Statistics – 2004 estimate

Shrimp landings in Icelandic waters have not exceeded allocations for a number of years and the quota has often not been fully caught.

6.3 SHRIMP FISHING FLEET AND GEAR

Shrimp landings by vessel groups in 2002, and in 1992 for comparison, are shown in the following table as proportions of the total catch. The fleet has changed significantly in this period. Boats under 100 grt have almost disappeared from the fishery and most of the landings are by large vessels, including stern trawlers. Shrimp fishing on the Flemish Cap is by trawlers only.

TABLE: Shrimp landings by groups of vessels, 1992 and 2002

	% of shrimp landings 2002	% of shrimp landings 1992
Vessels < 100 grt	7	27
Vessels >100 grt	40	59
Trawlers	53	14
All vessels	**100**	**100**

Source: Fisheries Statistics 2002, table 5.9 and table 20-V

All shrimp fishing is by shrimp trawl, which has been the gear used in the fishery since large-scale shrimp fishing started.

6.4 SHRIMP RAW MATERIAL PRICES

Most of the shrimp landings are traded in direct sales for domestic processing but raw material prices on-board freezer vessels are calculated from product value, as described earlier.

It is clear from the following table that raw material prices have changed to some extent. Raw material prices in frozen-at-sea processing are lower than in 2001, reflecting the trend for prices of the final product in each year. The decrease was 14% in the two-year period 2002/03. Prices for frozen-at-sea shrimp for further processing decreased in 2002/03 by 10%. On the other hand, prices for processing in land-based plants in 2003 were similar to the level in 2001, although they increased in 2002. Most processing plants buy material from their own fishing vessels, but in view of the overall decrease in product prices that will be shown later, it appears that raw material prices have recently been a higher proportion in the cost of processing than they were in 2001.

TABLE: Shrimp raw material prices 2001-2003

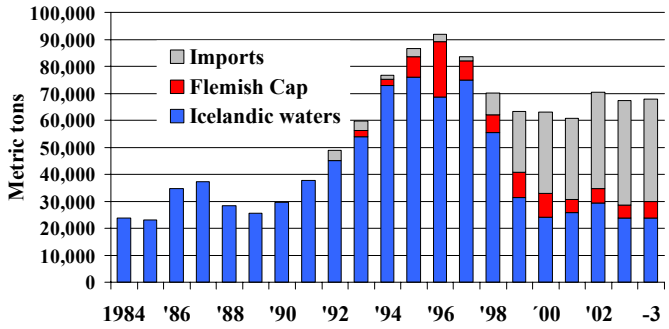
	2001	**2002**	**2003**
	ISK/kg	**ISK/kg**	**ISK/kg**
Total average	106.98	115.22	109.63
For domestic processing	93.45	100.38	92.93
Frozen for further processing	112.73	110.70	101.16
Frozen-at-sea products	244.34	231.23	210.58
Frozen landings abroad	69.02	-	-

Source: Fisheries Stats. Tables 5.7 and 5.8. Figures for 2003 are provisional

6.5 SHRIMP IMPORTS

Imports of frozen-at-sea whole shrimp for further processing have increased greatly in past years and are used to supplement the domestic raw material supply. The following figure shows this trend. Imports started to increase in 1999 and have outweighed the domestic catch since 2002. In 2003, nearly 39,000 mt were imported against the Icelandic catch of 28,000 mt.

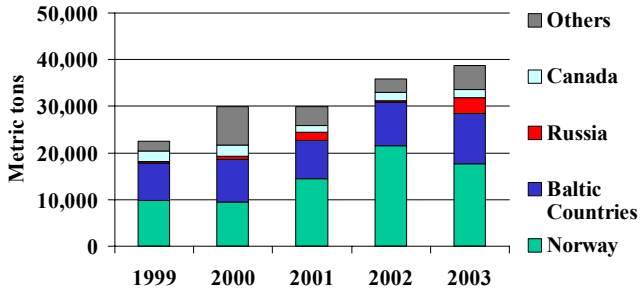
Shrimp catch by Icelandic vessels and shrimp imports 1984-2004



Source: Fisheries Statistics –2004 is estimate

The value of shrimp imports in 2003 was 4.0 billion ISK, which calculated back to import price per kg shows that the weighted average price was 102 ISK/kg, or very close to the price level of landings for further processing by Icelandic vessels. The origin of imports in 1999-2003 is shown in the following figure. The largest volume is imported from Norway, close to 45% of the total, followed by imports from the Baltic countries (30%), which is explained by the fact that some Icelandic-owned vessels are registered in those countries.

Origin of shrimp imports for further processing 1999-2003



Source: Fisheries Statistics

The economics of imports of raw material for re-processing are based on favourable market access for Icelandic shrimp, which is imported without duty to the EU. Industry sources also claim that higher yield in processing (37% on average) and a higher degree of automation makes Icelandic processing slightly more economic than processing in Norway and Canada.

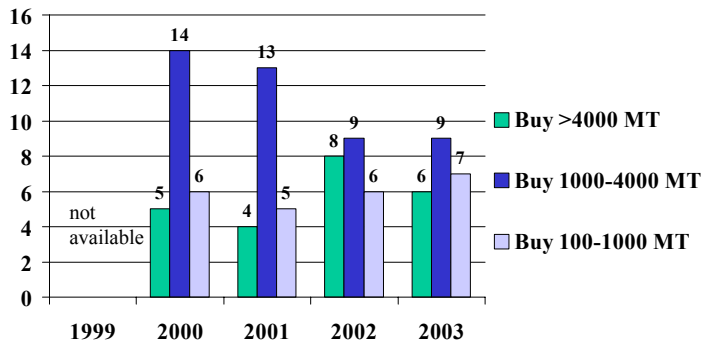
6.6 SHRIMP BUYERS

The following two figures show the number of shrimp buyers, including those buying imported frozen material. The first figure shows that there are relatively few buyers of shrimp for processing, including the freezer vessels that are included in the category. In 2003, there were 6 buyers with over 4.000 mt, another 9 buyers with 1- 4,000 mt and 7 buyers with less than 1,000 mt. It seems that over the years shown, the number

of large-scale buyers (processors) and smaller-scale buyers has been relatively stable but the number of medium-scale buyers has gone down.

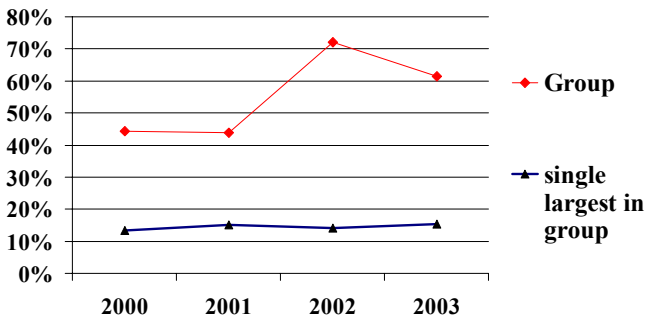
The second figure shows that the 6 buyers in the group with more than 4,000 mt each in 2003, account for the utilization of over 60% of the shrimp catch and that the single largest buyer uses 15% of the total.

Number of shrimp buyers in Iceland 2000-2003 (including imports)



Source: Directorate of Fisheries, private communication

Shrimp buyers >4000 MT % of total shrimp trade (including imports)

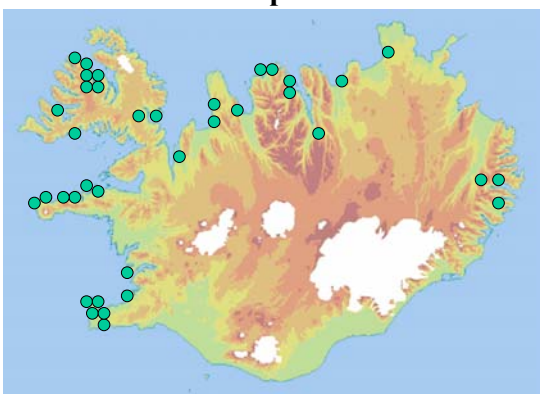


Source: Directorate of Fisheries, private communication

6.7 SHRIMP INDUSTRY CONSOLIDATION

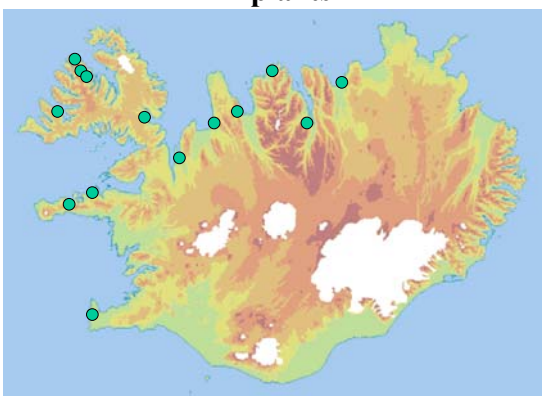
The following figures show the number of land-based shrimp plants in 1990 and in 2004. In 1990 there were close to 37 plants in operation spread over the the West, North and East Iceland, while in 2004 there were 14 plants, mostly in Northwest Iceland. Total raw material for the processing plants in 1990 was close to 20,000 mt while in 2004 it is estimated at 63,000 mt. By conclusion, the average raw material per plant was 4,500 mt in 2003 but in 1990 the average was 540 mt. Consolidation in processing is therefore quite significant.

Icelandic prawn processing plants 1990
ca 37 plants



Industry sources

Icelandic shrimp processing plants 2003
14 plants



Industry sources

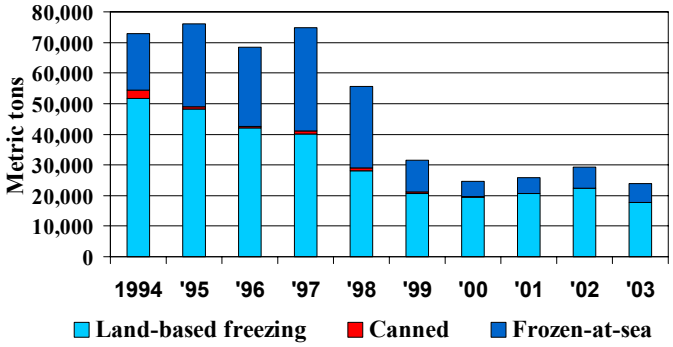
6.8 DISPOSITION OF SHRIMP – CHANGES IN PAST 10 YEARS

As mentioned before, the term disposition refers to usage of the catch by Icelandic vessels, calculated back to the catch weight. For shrimp, there are two main disposition methods:

1. To land-based freezing plants, for production of cooked and peeled shrimp,
2. To freezer vessels, for production of shell-on raw or cooked shrimp, either for direct export or for re-processing into cooked and peeled shrimp on land.

The following figure shows the 1994-2003 time series for shrimp disposition. Clearly, the proportion of frozen-at-sea processing has decreased significantly in this period. In 2003, just 25% of the shrimp catch was processed on-board, as opposed to almost 50% a few years earlier. In 2003, nearly 6,100 mt of shrimp were frozen at sea, including 4,700 mt from the Flemish Cap, leaving only 1,400 mt that are frozen-at-sea from Icelandic waters.

Disposition of the shrimp catch
Icelandic waters 1994-2003



6.9 SHRIMP PRODUCTION AND EXPORTS 2003

Shrimp products are exported as the following main categories:

1. IQF, size-graded, cooked and peeled shrimp,
2. IQF, size-graded, whole (shell-on) raw or cooked shrimp,

The relative importance of the chief product categories can be seen from their export values, which have been compiled in the following table from the 2003 export statistics.

TABLE: Shrimp product categories - export value in 2003

	Million ISK	%
IQF, shell-on shrimp	540	4.5
IQF, cooked and peeled shrimp	11,400	95.3
Other	20	0.2
Total	**11,960**	**100.0**

Source: Stat. Bureau of Iceland

6.10 SHRIMP MARKETS

The EU is the only significant market for cooked and peeled shrimp, while Japan, China and Thailand are the chief, but still rather limited, markets for shell-on shrimp. The following table is a breakdown of the export value in 2003.

TABLE: Market regions for shrimp products in 2003 – export value %

	EU %	N-Am. %	Asia %
IQF, shell-on shrimp	27.0	0.6	72.4
IQF, C&P shrimp peeled	98.9	0.1	1.0

Source: Stat. Bureau of Iceland

The UK is the most important market for coldwater shrimp products within the EU and this is clearly shown for Icelandic products in the following table.

TABLE: Cooked and peeled shrimp products to the EU – export value %

	%
United Kingdom	78.4
Denmark	12.0
Germany	4.9
Other EU	4.7
Total EU	**100.0**

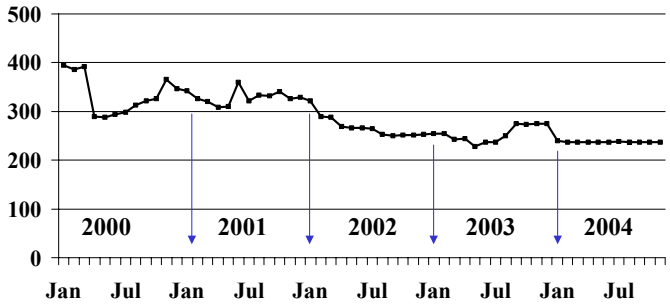
Source: Stat. Bureau of Iceland

Processors in Iceland are the chief suppliers of cooked and peeled shrimp to the UK market, which is estimated at 33,000 mt per year. Icelandic processors supply 22,000 mt of cooked and peeled shrimp to this market - or just about two thirds of the UK sales.

6.11 SHRIMP MARKET PRICE DEVELOPMENTS

Market prices for shell-on shrimp have been on a downward trend for most of the period shown in the following figure. It has been shown earlier that currency changes in 2001 resulted in price increases (in ISK) for most fisheries products but this did not apply to prices for shell-on shrimp, which remained stagnant that year, followed by significant decreases in 2002 and slightly variable prices since then. As discussed earlier, the overall price trends for shell-on shrimp have resulted in a significant decrease in frozen-at-sea production, relative to land-based production of cooked and peeled shrimp.

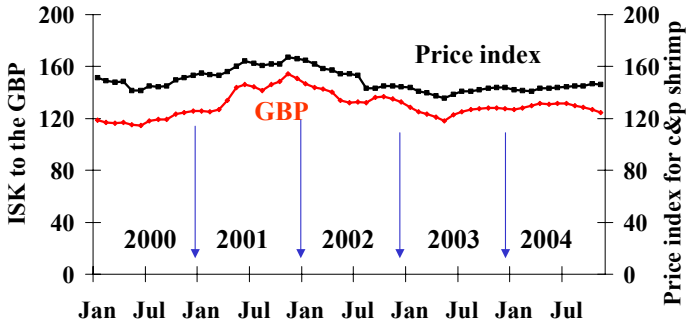
Export price index for shell-on shrimp products 2000-2003 & Jan/Nov 2004, 1986=100, ISK basis



Source: Stat. Bureau of Iceland

The last figure shows the price index for cooked and peeled shrimp from January 2000, together with the relative value of the GBP to the ISK in the same period and in view of the overriding importance of that market. It is shown that price levels follow the currency values closely but there is a convergence of the two lines in 2000-2001, which indicates that prices in GBP also decreased in that period. In recent months the price index showed a slight positive trend, which together with the strong krona means that the prices for cooked and peeled shrimp have recovered somewhat on the UK market.

Price index for c/p shrimp vs rate of ISK to the GBP, 2000-2003 & Jan/Nov 2004, index: 1986=100, ISK basis



Source: Stat. Bureau of Iceland and Central Bank of Iceland