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Report on the Faroese fisheries regulation

the Faroe model

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Report on the Faroese Fisheries Regulation

The Faroe Model

Jørgen Løkkegaard, Jesper Andersen, Jesper Boje, Hans Frost and Holger Hovgård

Copenhagen 2007

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Preface

In the light of a request from the Danish Ministry of Food, Agriculture and Fisheries, the Danish Institute of Food and Resource Economics (FOI) in cooperation with the Danish Institute for Fisheries Research (DIFRES) have drawn up a report on the Faroese Fisheries management. The investigation is carried out as a biological-economic analysis on basis of data collection and information by direct contact to the Faroese institutes and persons with knowledge of the development in Faroese fisheries and management. The information is worked up and constitutes a basis for the conclusions. However, no information is included of the above institutes or persons opinion on fisheries management. Hence, the contents of the report, data application and conclusions are the responsibility of FOI and DIFRES.

In order to secure that the report does not include contradictory information the report has been checked subsequently by Director, cand. oecon. Òli Samró, FAREC international and chairman of the Faroese Committee on Fishing Days, senior scientist, cand. scient. Jákub Reinert, Head of the Faroese Fisheries Laboratory. In this connection, attention is drawn to the fact that the present data set used in this report on certain fields is of a character which means that a more detailed (and time consuming) data collection and analysis might have been able to vary the conclusions of the report. This applies for, among other things, the development of fishing fleet, catch composition and catch rates of the fleet, used days at sea, effective fishing effort, and the economic results of the individual vessels. The data in this study only cover the period from 1994 and onwards for which reason the amendments before 1994 have not been discussed.

The investigation is carried out by research assistant Jesper Andersen and senior adviser Hans Frost, Fisheries Economics and Management Division, Institute of Food and Resource Economics and senior scientist Holger Hovgård and senior scientist Jesper Boje, Department of Marine Fisheries, Danish Institute for Fisheries Research. Research Director Jørgen Løkkegaard, Institute of Food and Resource Economics has chaired the investigation, and secretary Elsebeth Vidø has been editing the report.

Director General Søren E. Frandsen
Institute of Food and Resource Economics
Copenhagen, May 2004.

Second preface

In 2004, the Institute of Food and Resource Economics (FOI) in cooperation with the Danish Institute for Fisheries Research (DIFRES) produced a report on the Faroese Fisheries management in Danish. The report caused significant interest in Denmark from managers and fishing industry.

It has therefore been decided to translate the report into English in order to give those not familiar with the Danish language a chance to read it. The translation has been made as a part of the EU-project "Comparative Evaluations of Innovative Solutions in European fisheries management (CEVIS)" – EU Contract no.: 022686 within the Sixth Framework programme.

No amendments have been made in this report compared to the edition addressed to the Ministry of Food, Agriculture and Fisheries at the end of April 2004.

The authors wish to thank Grethe Hedeager for making the draft translation. The authors have read the translated version in order to secure consistency between the Danish and English version.

Director General Søren E. Frandsen
Institute of Food and Resource Economics
Copenhagen, November 2007

1. Introduction

The purpose of this report is to describe the Faroese fisheries regulation and to evaluate the applicability of a 'Faroese model' in Danish fisheries including the importance of the EU framework of regulation on the application.

The primary objectives of the report concerning the Faroese fisheries regulation are that the Faroese regulation system includes the use of effort regulation in the shape of days at sea regulation. In relation to the Danish 'Parliament Committee on Food, Agriculture and Fisheries ('Folketingets Fødevareudvalg') this type of regulation has been pointed out as a possible alternative to the present regulations of the Danish fishery. Therefore, the report contributes to the considerations of the future regulation of the Danish fishery. The report is drawn up on the request of the Danish Ministry for Food, Agriculture and Fisheries.

This report is based on available material concerning the legal foundation for the regulation, the resource basis for the Faroese fisheries, the Faroese fleet, and the Faroese fisheries, including information on catch and economic performance. The procurement of material as basis for the report is carried out through direct contact to persons who are familiar with advising, the fisheries administration, the Faroese Statistics, and the Faroese banks[1].

The report includes the following elements:

- Description of regulation system
- Description of resource foundation
- Description of fishing fleet and fisheries
- Description of fleet profitability
- Assessment of regulation model used
- Description of Danish regulation and assessment of applicability of the regulation model in Danish Fisheries
- Evaluation of EU frame in relation to the application of a 'Faroe model' in Danish fisheries

[1] In Annex 6 there is a complete list of the persons who have been contacted in connection with the preparation of this report.

The purpose of this report is 1) to establish an objective basis for the evaluation of the 'Faroese model' as a regulation system and 2) to relate the 'Faroese model' to Danish fisheries within the frames of the EU common fisheries policy.

This report is drawn up by the Institute of Food and Research Economics and the Danish Institute for Fisheries Research. The investigation was initiated in the middle of February 2004 and concluded at the end of April 2004. In connection with the preparation of this report a trip to the Faroe Islands was made in the period 15-19 February, 2004.

The report consists of a main report and a number of annexes. The main report comprises a review of the elements mentioned above, while the individual annexes 1-6 describe matters in detail of importance for the report.

The evaluation of the Faroese days at sea regulation is described in chapter 6, and the conclusions of the report are described in chapter 9.

2. An outline of the Faroese fisheries regulation

On the Faroese, the access to resources are in principle based on the use of individual transferable rights, and the fisheries legislation is constructed in a way which makes it possible to regulate the fishery of the fleets very directly. The background is a classification of the fleet into different groups regulated according to their *capacity* (number and size of vessel), their *activity* (number of days at sea) and their *fishing pattern* (selection of areas and catch composition). The regulation is fine-tuned using a number of different technical regulations, primarily managing the fishing pattern by means of closed areas.

The keystones in the Faroese fisheries regulation are:

1. A capacity policy which sets the size of the fishing fleet on the existing level.

2. A classification of the Faroese fishing fleet into vessel groups based on vessel size and main types (trawlers, long-line vessels and gillnet vessels). The grouping of vessels constitutes a central element in management of capacity and fishing patterns.

3. Allocation of individual and transferable rights to the shipping companies by means of a dual licence system and implementation by means of

   3.1 Catch permits (f. *vediloyvi*) which follow the individual vessels and outline the capacity for the vessel groups.

   3.2 Fishing permits (f. *fiskiloyvi*) used for management of fishing patterns and extent of fishing in vessel groups. The fishing permits give permission to participate in specific fisheries and shall be renewed annually. For fisheries subjected to the days at sea regulation, the fishing permits include the number of annual days at sea.

4. A number of technical regulations such as gear regulation and minimum size limit, and particularly a relative complex system of closed areas regulating the admittance of fisheries for the different groups of vessels.

5. The regulation of the Faroese fisheries outside the Faroese and the international fisheries around the Faroe Islands is based on agreements negotiated by the

Faroese on the annual fisheries negotiations where the parties exchange fishing rights. These fisheries are regulated through total allowable catch per stock (TAC) and quotas.

In the beginning of the early 1990's the Faroese community experienced a decline in fishery for the most important demersal stocks, and the catches between 1991 and 1993 were on a historical low level. As the regulation of the Faroese fishery previously was based only on the use of technical regulations, particularly closed areas, and mesh size regulations, a claim was laid that the Faroese should introduce a better fishing regulation.

As agreed upon between the Faroese Government (Landsstyret) and the Danish Government, the Faroese Government appointed a committee with the terms of reference to invest how the resources could be optimally and sustainable utilized and which could be effective under market terms. The recommendations[2] of the Committee resulted in the drafting of the Faroese Act on Commercial Fisheries of 10 March 1994. The central instrument comprised introduction of individual transferable quotas (ITQ) for a number of vessel groups (vessels of 20 GT and above), while smaller coastal fishing vessels should be fishing on a general annual quota.

The quota regulation which was introduced in 1994 was met with reluctance from both the fishing industry and a number of politicians. Amongst others, it was criticized for leading to an extensive discard when the respective quota ceilings were met. The disappointment resulted in that the Faroese Government on the 9 November 1995 appointed a committee made up of government officials and representatives from the fishing industry with the following terms of reference:

To evaluate the use of technical regulations within the frames of the fisheries political objectives on biological and economic sustainability including the assessment of the advantages and disadvantages of different regulation methods from both biological, economic and controllable criteria.

The committee recommended[3] application of effort regulation to a number of the most important vessel groups supplemented with closed fishing areas. The recommendations of the report as regards effort regulation and closed areas were complied

[2] Frágreiðing frá Bygnaðanevndini. Torshavn 1 July 1993.
[3] Frágreiðing frá Skipanarnendini, Torshavn 8 February 1996.

with and caused a substantial revision of the Commercial Fisheries Act to take effect from the fishing year 1996-97.

Assessment of the annual resource exploitation is conducted fundamentally by using four regulation measures:

- Days at sea (*f. fiskidagaskipan*) is used to regulate the catch of demersal species on the Faroe Plateau. A similar regulation is established for the Faroe Bank, but limited to hook and line fishery. The regulation sets the number of days at sea that each individual vessel is allocated for a specified fishery.

- By-catch quotas (*f. hjaveiðuskipan*) is used to regulate the fishery in the Faroese zone outside the plateau, on the deeper parts of the plateau as well as upper parts of the continental shelf. In 2003, 13 large single trawlers were included. The regulation specifies the maximum by-catch proportion of cod, saithe and haddock in a targeted fishery for redfish.

- Quotas (*f. kvotuskipan*). This regulation is used in the Faroese fishery outside the Faroese territorial area.

- Technical regulations are used to fine-tune the regulations. A single fishery carried out by nine large gillnet vessels is regulated exclusively by number of vessels (limitation of fleet capacity) and technical regulations.

The Commercial Fisheries Act is drawn up as a framework Act. This means that the Faroese Minister of Fisheries and Maritime Affairs in a number of cases is authorized to issue complementary provisions (*f. kundgerð*).

Only a part of the Faroese fisheries is thus regulated by use of days at sea (effort regulation). In Table 2.1, the number of vessels is seen for the individual vessel groups as well as the groups subjected to days at sea regulation.

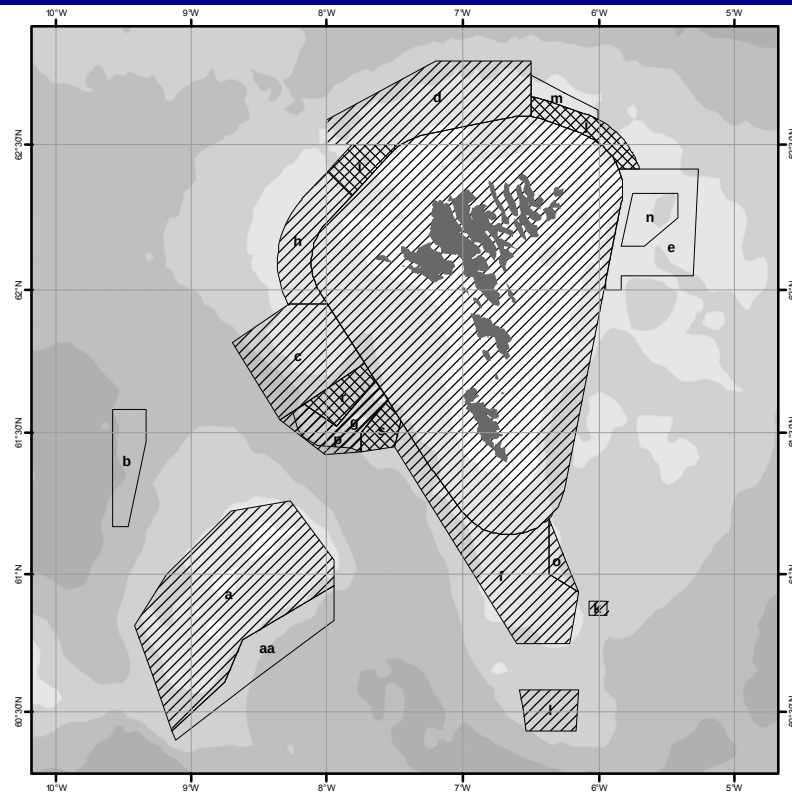
Table 2.1. Vessel groups, types, regulation form, and number of vessels, 2003

Group	Type	Gear	Regulation system	Number of vessels
1	Trawlers > 400 HP	Trawl	By-catch quota	14
2	Pair trawlers > 400 HP	Trawl	Days at sea	33
3	Long-line vessels > 110 GT	Line (hook)	Days at sea	18
4A-line	Coastal fishing vessels 15-40 GT-line	Line	Days at sea	41
4A-trawl	Coastal fishing vessels 15-40 GT-trawl	Trawl	Days at sea	3
4B-line	Coastal fishing vessels > 40 GT-line	Line	Days at sea	33
4B-trawl	Coastal fishing vessels > 40 GT-trawl	Trawl	Days at sea	15
5A	Coastal fishing vessels < 15 GT	Line	Days at sea	
5B	Coastal fishing vessels < 15 GT-part-time fisheries	Line	Days at sea	2,101
6	Gillnet vessels	Gillnet	Capacity	6
7	High sea trawlers	Trawl	Quotas	6
8	Seiners/multipurpose vessels	Seine/trawl	Quotas	15
9	Shrimp trawlers	Trawl	Quotas	10
10	Other vessels	Trawl	Quotas	22
Total				2,317

The Faroese days at sea regulation is particularly applied to the fisheries on cod, haddock and saithe. The regulation includes pair trawlers above 400 HP, long-line vessels above 110 GT, and coastal fishing vessels below 110 GT. The pair trawlers and the larger long-line vessels correspond to the size of the largest Danish trawlers which however, fish for pelagic species (e.g. sand eel, sprat, herring, and mackerel). The coastal fishing vessels correspond broadly speaking in size to the Danish vessels fishing for demersal species (e.g. cod, haddock and plaice).

The access of the fleet segment to the fishing grounds is very tightly regulated in the Faroese management. The fishing areas closest to the Faroe Islands covering depths down to about 150-200 m (the Plateau) are generally reserved to hook and line fishery. The hook and line fishery in coastal waters, defined as the area within the 6 nautical miles limit, is furthermore reserved to the coastal fishing vessels below 110 GT. Trawl fishery is generally only allowed in the deeper waters on the edge of the plateau (Figure 2.1) except for a limited summer fishery with trawl for flatfishes open to 15 coastal vessels. The gillnet fishery is only allowed on deep water (>380 m).

Figure 2.1. Closed areas for trawl fisheries



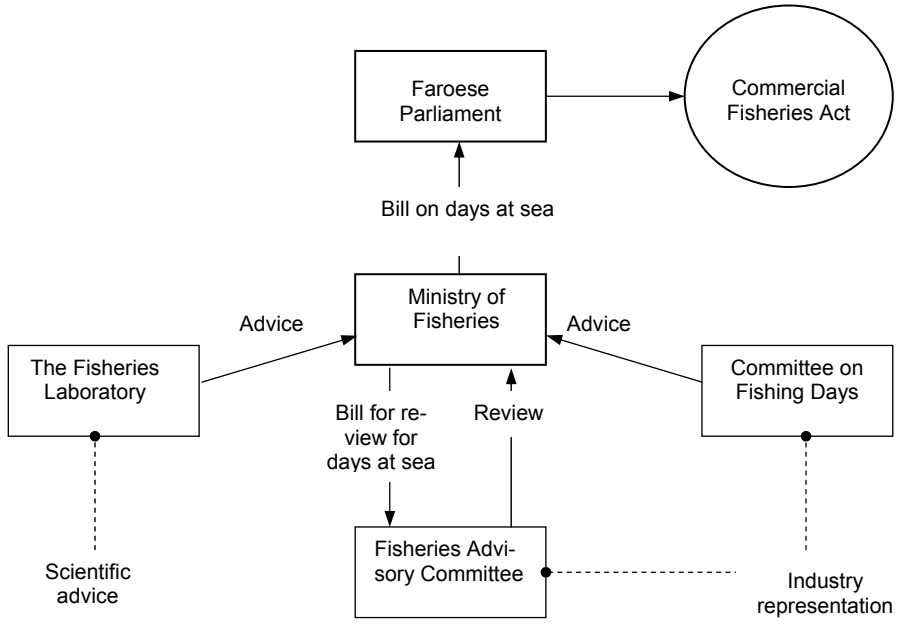
Note: The closed areas are described in details in annex 1 with an overview stating the areas where demersal fishery is possible during the summer period.

The most important trawl fisheries are directed against saithe and redfish and are subjected to a minimum mesh size regulation of 135 mm. When fishing with such a mesh size, the number of undersized fish of cod, haddock and saithe is estimated to be very limited.

The vessels fishing outside the Faroese waters and not subjected to days at sea regulation are very large compared to Danish conditions.

The number of days is regulated each year in a process including both scientific advice and advice from the industry. The process is illustrated in Figure 2.2.

Figure 2.2. Allocation of days at sea



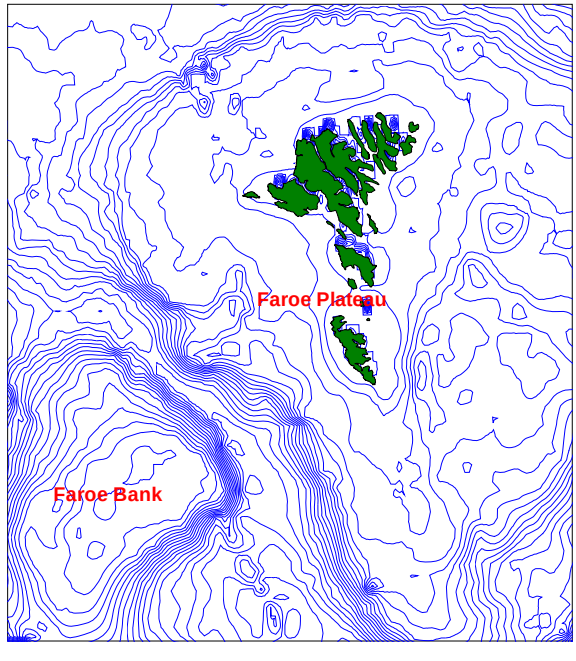
The Faroese Fisheries Laboratory provides advice on stock size and fishing mortalities, and makes on this basis an assessment of the number of days at sea. The advice is presented to the Ministry of Fisheries and Maritime Affairs. The Committee on Fishing Days is exclusively made up of representatives from the industry. However, there the chairman is independent from the industry. Each year the Committee on Fishing Days is analysing the fishing situation, and on this background the Committee presents its proposals for the number of days at sea to the Ministry of Fisheries and Maritime Affairs. The Ministry prepares a bill, specifying the number of days at sea, which is introduced to the Faroese Parliament by the Minister of Fisheries and Maritime Affairs.

3. The resource basis

Around the Faroe Islands three important gadoid stocks are fished, cod, haddock and saithe. The fisheries for these stocks are subjected to days at sea regulation, and basis of catch also consists of many other species. Fisheries for redfish, Greenland halibut and monkfish take place in deeper waters. These fisheries are not subjected to days at sea regulation.

Until 1959, all nationalities were allowed to fish in the Faroese waters outside a limit of 3 nautical miles. Through the 1960s the Faroese fishery zone was gradually expanded. After establishment of a limit of 200 nautical miles in 1977, the Faroese vessels were dominating the fishery. From 1987 a fisheries licenses were introduced, and since then the fishery has been regulated by technical regulations, from 1996 in combination with days at sea. From 1994 to 1996, the fishery was regulated through individual transferable quotas and revised by the amendment in 1996 to the present days at sea regulation. The most important fishing grounds are situated on the Faroe Plateau and to smaller extent on the Faroe Bank, see Figure 3.1.

Figure 3.1. Waters around the Faroes



3.1. Cod

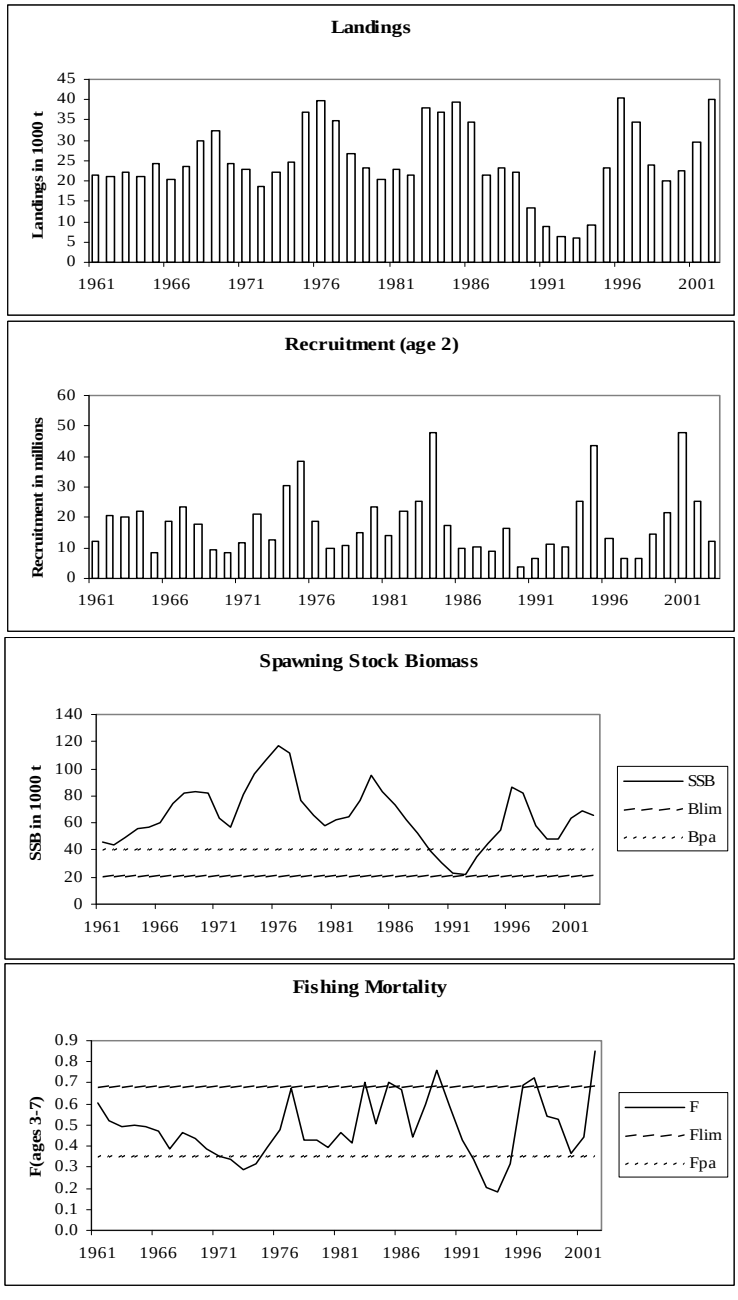
In the Faroese waters, there are two well-defined cod populations: the Faroe Plateau cod and the Faroe Bank cod. Tagging experiments have shown that the two populations are quite separated and seldom mix. Faroe Plateau cod is by far the largest population of the two.

For *Faroe Plateau cod* reliable catch information exists back to the beginning of the 20th century. The data shows that fisheries during the whole period have had annual landings of between 20,000 and 40,000 tonnes, interrupted only by the 2nd World War, and a few years in the 1990s where the fish stock was very low. The *spawning biomass* (the stock) was in 2003 assessed to be within safe biological limits. Since the crisis in 1993-1995, the spawning biomass has exceeded the recommended minimum level (cf. precautionary approach). In 1999, *recruitment* was among the four highest since 1960 and contributed essentially to the fisheries since 2001 and will do so for two-three more years.

Fishing mortality was in 2003 and in the preceding years above safe biological limits.

The development in catch, spawning biomass, recruitment as well as fishing mortality for Faroe Plateau cod stock is summarized in Figure 3.2.

Figure 3.2. Development in landings, fishing mortality, spawning biomass, and recruitment of Faroe Plateau cod, 1961-2002



The International Council for the Exploration of the Sea (ICES) recommends for 2004 to reduce fishing effort with at least 25% compared to the levels for the previous years in order to reduce fishing mortality to the recommended level on basis of the precautionary approach.

The advice also points out that the spawning biomass is far above the recommended minimum value, and that it is expected to stay at this level in a near future due to the strong 1999 year class provided a moderate exploitation. In addition, it is demonstrated that the assessment of the population year after year overestimates the fishing mortality in the last year and consequently underestimates the last years spawning biomass. This should be taken into consideration when last year's estimate of spawning biomass and fishing mortality is assessed.

When introducing the days at sea regulation, the Faroese agreed upon objectives for the management of the cod stock corresponding to a fishing mortality of 0.45. This target has t generally not been achieved, cf. Figure 3.2.

The *Faroe bank cod* has been fished for centuries. Up to 1960, the exact landings are not known as the catches were included in the catch statistics for all cod landings around the Faroe Islands, but it is assumed that catches of Faroe Bank cod constituted 8% of the total landings. Since the mid 1960s, the annual catches have been irregular between some few hundred tonnes to more than 5,000 tonnes. From the late 1980s to the beginning of the 1990s, there was a decline in catches and the fisheries were subjected to restrictions, and only long-line vessels fishing with hook and line were admitted to the area in 1992-93. Since the introduction of days at sea regulation in 1996, the access has been restricted to long-line vessels and jiggers, while trawlers are referred to deeper parts of the bank (>200 m).

The development of the *spawning biomass* and status on the Faroe Bank is not known with certainty, but was for 2003 assessed to be on a relatively high level. Like previous years, *the advice* for 2004 was that effort must not exceed the average effort since 1996.

3.2. Haddock

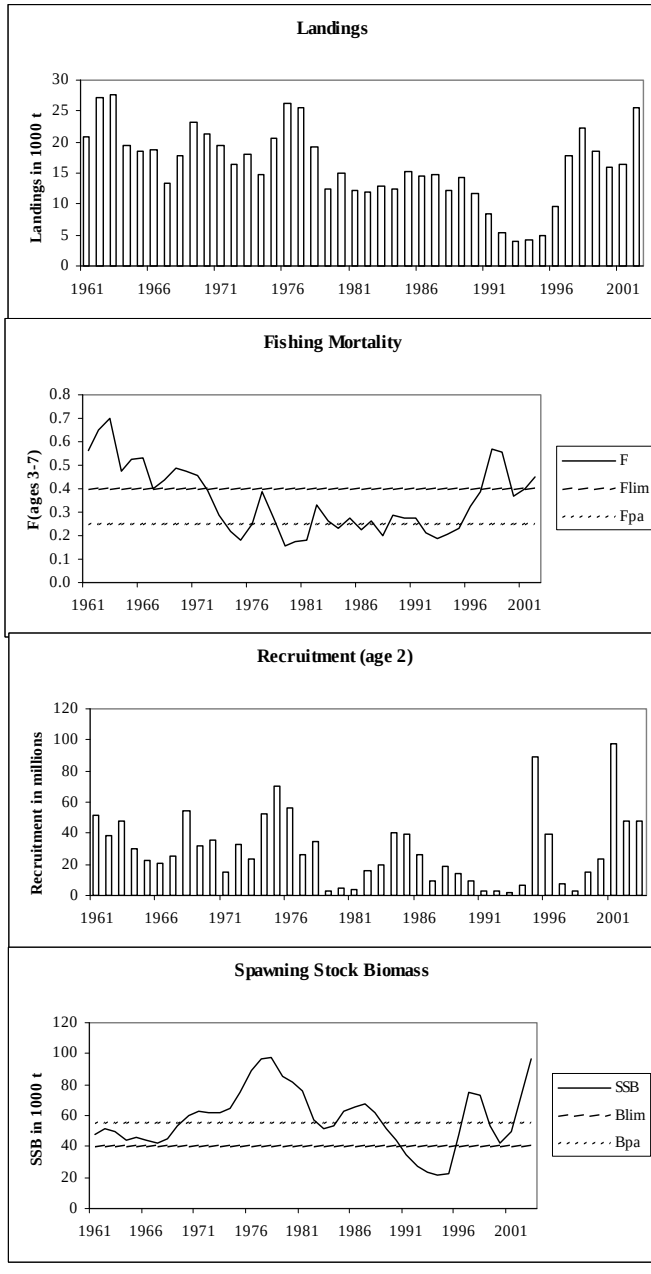
Haddock is widespread all over the Faroese waters, from coastal areas to open areas down to 450m depth. Since the beginning of the 20th century the annual haddock landings have varied between 10,000 and 27,000 tonnes, Until the 1950s only Eng-

land and Scotland fished for haddock in Faroese waters. Subsequently, the Faroese have increased their share, and since the 200 nautical mile limit was introduced in 1977 only Faroese fisheries have taken place. In the beginning of the 1990s, landings fell to 4,000 tonnes in 1994, but have since then increased to the historical levels. The catches are taken partly on the Faroe Plateau and partly on the Faroe Bank. Today the fisheries are predominately conducted by long-line vessels and pair trawlers.

On basis of fishing mortality, the haddock stock is assessed as being exploited outside safe biological limits. In 2002, *fishing mortality* is estimated to be above the precautionary approach limit and close to the critical limits. In 2003, the spawning biomass is, however, above the recommended minimum level (see the section on the precautionary approach in appendix 2). Since 1995, the biomass has increased considerably, mainly caused by the good year classes in 1993-94. The following recruitment in the years 1997-2000 is below average, but in 2001 that is the 1999 year class, the biggest year class ever registered appears. The ICES advice for haddock for 2004 recommends that fishing effort should be reduced corresponding to a fishing mortality below 0.25 which corresponds to a reduction of fishing effort of approximately 36%.

The development in catch, spawning biomass, recruitment, and fishing mortality of the haddock stock is summarized in Figure 3.3.

Figure 3.3. Development in landings, fishing mortality, spawning biomass and recruitment for haddock around the Faroes, 1961-2002



When introducing the days at sea regulation, the Faroese agreed upon objectives for the management of the haddock stock, corresponding to a fishing mortality of 0.45. This goal has generally been achieved, cf. Figure 3.3.

Haddock is mainly fished by long-line vessels and pair trawlers. In the present regulation there are areas closed for trawling, and this combined with a relatively large mesh size in the gears implies that juvenile fish are effectively protected in the trawl fishery, but this is not the case for the long-line fishery.

3.3. Saithe

Saithe is widespread all over the Faroese territory, from shallow coastal waters to waters on the Bank and the Plateau with depths down to 350 m. Saithe is both demersal and pelagic. The stock structure is not well known, but tagging experiments have shown that saithe migrate long distances and mix with the neighbouring stocks at Iceland, west of Scotland and the North Sea. Different investigations indicate that emigration and immigration are fairly equal in size. The spawning area of saithe is found at depths of 150-250 m in a broad belt from west, northwards to an extensive area east of the Faroe Islands.

The fishing of saithe was negligible before the 1960s, but landings have since generally increased, however, with large variations (from 9,000 tonnes in 1961 to 62,000 tonnes in 1990). After 1991, catches were reduced until 1996, but have since then increased to a historic high level in 2000 and 2001. After establishment of the 200 nautical mile limit, saithe has mainly been fished by Faroese vessels. Large pair trawlers conduct targeted fisheries on saithe. The smaller pair trawlers conduct mixed fisheries on saithe, haddock and cod.

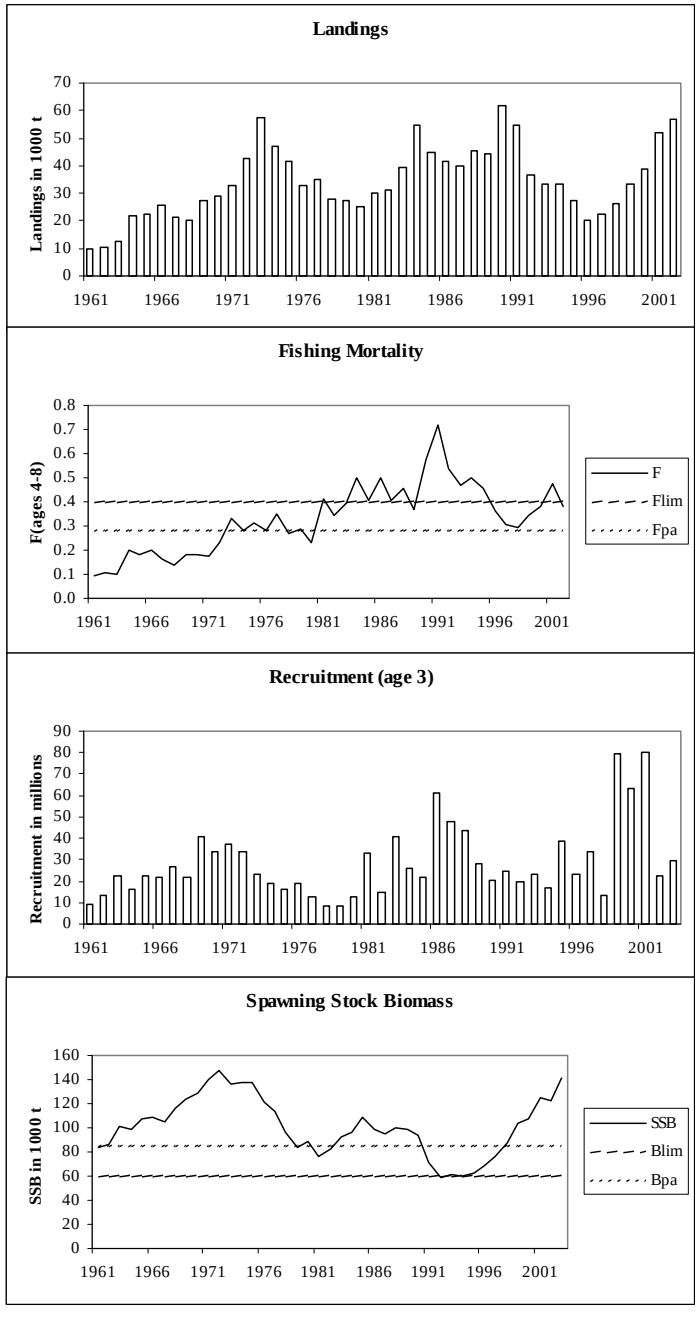
For 2003, the saithe stock is assessed to be exploited outside safe biological limits. In 2002, the *fishing mortality* is estimated to be close to the precautionary approach limit above the critical limit. In 2003, the spawning biomass is, however, above the recommended minimum level, cf. the precautionary approach. The year classes 1996-98 are all historically large year classes. For 2004, it is recommended that the fishing effort should be reduced corresponding to a fishing mortality rate below 0.28 which corresponds to a reduction in effort of approximately 30%. In addition, it is recommended that the present regulation practice should be suspended in which it is allowed to increase the number of days at sea, if fisheries are moved to deeper waters,

until the fishing mortality is reduced to a level of below 0.28. The present restrictions for the spawning areas should be maintained.

The development in catch, spawning biomass, fishing mortality, and recruitment for the saithe stock are summarized in Figure 3.4.

When introducing the days at sea regulation, the Faroese agreed upon objectives for the management of the saithe stock, corresponding to a fishing mortality of 0.45. This objective has generally been achieved, cf. Figure 3.4.

Figure 3.4. Development in landings, fishing mortality, spawning stock biomass and recruitment for saithe around the Faroes, 1961-2002



4. Vessels and catches

Structure and development of the Faroese fishing fleet will be described in three steps. 1) Development of the size of the fleet on basis of number of vessels, tonnage, engine power, and length. 2) Fleet activity in the form of days at sea. 3) Catch quantity and the catch value obtained.

In general, the number of vessels in the different vessel groups has been stable since 1993, cf. Table 4.1. The significant increase in the number of small coastal fishing vessels in groups 5A and B express that an increasing number of part-time fishermen apply for and are granted fishing permits which does not reflect an increase in real number of vessels. Finally, a relative substantial increase in the number of seiners and shrimp trawlers is seen.

Table 4.1. Number of vessels, 1994-2003

Group	Type	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
1	Trawlers > 400 HP	15	13	13	12	12	12	13	12	12	14
2	Pair trawlers > 400 HP	32	36	36	35	33	34	34	34	35	33
3	Long-line vessels > 110 GT	19	19	19	19	19	19	19	19	20	18
4A-long-line	Coastal fishing vessels 15-40 GT	51	51	52	51	49	50	47	46	48	41
4A-trawl	Coastal fishing vessels 15-40 GT	1	1	1	1	1	2	2	2	3	3
4B-long-line	Coastal fishing vessels > 40 GT	37	35	36	32	29	31	30	31	31	33
4B-trawl	Coastal fishing vessels > 40 GT	12	12	13	14	14	13	13	13	14	15
5A and B	Coastal fishing vessels < 15 GT	1,092	1,211	1,339	1,445	1,590	1,680	1,728	1,833	1,967	2,101
6	Gillnet vessels	5	6	6	6	6	7	7	6	6	6
7	High sea trawlers	5	6	6	6	6	6	5	5	5	6
8	Seiners/multipurpose vessels	10	9	10	9	11	13	13	13	15	15
9	Shrimp trawlers	7	7	8	8	8	8	10	11	10	10
10	Other vessels	18	19	15	19	14	12	11	17	17	22
Total		1,304	1,425	1,554	1,657	1,792	1,887	1,932	2,042	2,183	2,317

Source: The Fishing Industry Office, the Ministry of Fisheries and Maritime Affairs (f. *Fiskivinnustovan*, *Fiskimálaráðið*)

Tonnage, engine power, and length have been the three accessible physical indicators for the Faroese fishing fleet. The development in tonnage and engine power is shown in Table 4.2 and Table 4.3. In the tables, the groups subjected to days at sea regulation are separated, while the remaining groups are collected in one group.

Total tonnage for the fishing vessels subjected to days at sea regulation has developed moderately except for the coastal fishing vessels below 15 GT. The increase in the coastal fishing vessels below 15 GT is assumed to have taken place primarily because of the increased number of vessels registered in that group. For the group of other vessels an almost doubling in the tonnage is seen due to an increased number of seiners/multipurpose vessels and shrimp trawlers.

Table 4.2. Total tonnage, 1994-2003 (GT)

Type	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Pair trawlers > 400 HP	9,929	10,765	10,765	10,493	10,094	10,458	10,458	10,458	10,182	9,979
Long-line vessels > 110 GT	5,031	5,031	5,031	5,031	5,031	5,031	5,031	5,176	5,642	5,268
Coastal fishing vessels 15-40 GT-long-line	1,574	1,554	1,572	1,549	1,157	1,183	1,099	1,064	1,119	1,020
Coastal fishing vessels 15-40 GT-trawl	30	30	30	30	30	62	62	62	129	126
Coastal fishing vessels > 40 GT-long-line	2,519	2,424	2,510	2,245	2,093	2,700	2,658	2,701	2,708	3,066
Coastal fishing vessels > 40 GT-trawl	580	612	667	761	761	723	723	723	766	898
Coastal fishing vessels < 15 GT	4,767	5,431	6,005	6,495	7,055	7,847	7,561	7,645	7,853	8,257
Other vessels	33,209	34,911	34,481	38,356	39,397	46,175	52,849	56,301	58,033	64,330
Total	57,638	60,757	61,060	64,959	65,616	74,179	80,441	84,129	86,431	92,944

Source: The Fishing Industry Office, the Ministry of Fisheries and Maritime Affairs (f. *Fiskivinnustovan*, *Fiskimálaráðið*)

A corresponding development is observed for the total engine power, cf. Table 4.3.

Table 4.3. Total engine power, 1994-2003 (HP)

Group*	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
2	35,524	39,221	39,221	38,056	35,866	37,195	37,195	36,927	37,130	35,799
3	11,412	11,412	11,412	11,412	11,412	11,412	11,412	11,462	12,314	11,494
4A-long-line	10,804	10,667	10,829	10,480	9,950	10,041	9,579	9,506	10,108	8,873
4A-trawl	240	240	240	240	240	500	500	500	982	925
4B-long-line	12,709	12,207	12,361	10,995	9,808	10,778	10,565	10,955	11,105	12,374
4B-trawl	4,667	4,897	5,297	5,898	5,898	5,624	5,624	5,624	6,226	6,171
5A and B	75,925	83,947	91,459	97,345	102,656	105,573	106,390	114,042	131,166	147,743
1 + 6-10	118,003	121,708	118,694	131,220	130,493	139,653	154,032	161,278	162,797	182,472
Total	269,284	284,299	289,513	305,645	306,323	320,776	335,297	350,295	371,829	405,851

Source: The Fishing Industry Office, the Ministry of Fisheries and Maritime Affairs (f. *Fiskivinnustovan, Fiskimálaráðið*)
Note: * The classification of groups is identical to the type classification in Table 4.2

Despite the fact that the number of vessels in groups 2-4 have not increased, it is shown in Table 4.4 that the mean tonnage and engine power have increased during the entire period with 10% and 7%, respectively. For the vessels in group 5 tonnage and engine power are, however, almost unchanged, while a significant increase of 59% in tonnage and 27% in engine power is observed in groups 1 and 6-10.

Table 4.4. Average tonnage and engine power, 1994-2003

		1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Tonnage (GT)	Groups 2-4	129	133	131	132	132	135	138	139	136	142
	Group 5	4	4	4	4	4	5	4	4	4	4
	Groups 1 + 6-10	553	582	595	639	691	796	896	880	893	881
Engine power (HP)	Groups 2-4	496	511	505	507	505	507	516	517	516	529
	Group 5	70	69	68	67	65	63	62	62	67	70
	Groups 1 + 6-10	1,967	2,028	2,046	2,187	2,289	2,408	2,611	2,520	2,505	2,500

Although there is no information on fleet size before 1993, it is smaller in the period after 1994. Hence, it has been possible to allocate a higher number of days at sea for each individual vessel than they would normally have been allocated.

Regarding activity of the vessels the interest is concentrated primarily on the vessels subjected to the days at sea regulation. Table 4.5 shows how many days at sea these groups have been allocated, and the share that is used during the period from 1997 to

2003. Attention has not been drawn to the fact that the number of days at sea can be changed from inner to outer area and shift in gear from long-line to jigs.

Table 4.5. Days at sea allocated and exploited

		1997/1998	1998/1999	1999/2000	2000/2001	2001/2002	2002/2003
Group 2	Allocated	7,199	6,839	6,839	6,839	6,839	6,636
	Exploited (%)	90	86	94	88	82	74
Group 3	Allocated	2,660	2,527	2,527	2,527	2,527	2,452
	Exploited (%)	95	88	85	94	98	100
Group 4A	Allocated	4,696	4,461	4,461	4,461	4,461	4,328
	Exploited (%)	54	50	54	61	55	49
Group 4B	Allocated	4,632	4,400	4,400	4,400	4,400	4,269
	Exploited (%)	91	86	90	100	98	115
Group 5	Allocated	23,625	22,444	22,444	22,444	22,444	21,776
	Exploited (%)	70	60	61	109	92	97
Total	Allocated	42,812	40,671	40,671	40,671	40,671	39,461
	Exploited (%)	75	68	71	98	87	90

Source: The Faroese Fisheries Inspection, the Ministry of fisheries and Maritime Affairs (f. *Fiskiveiðieftirlitið, Fiskimálaráðið*)

The number of allocated days at sea has slightly deceased during the period. Hence, the total number of regulated days at sea in 2002/2003 is approximately 8% lower than in 1997/1998. The number of days at sea exploited (allocated x exploitation) vary more over time. An increase from 32,159 days at sea is observed in 1997/1998 to 40,020 days at sea in 2000/2001 after which a decrease to 35,560 in 2002/2003 is seen.

Exploitation of the allocated days at sea is shown in Table 4.5. It can be seen that the vessel groups 2 and 4A do not generally exploit their allocated days at sea. As a starting point these vessels are not expected to have been limited by effort regulation though it could have been the case for individual vessels in the respective groups. The groups 3, 4B and 5 are lying close to full exploitation of the allocated days at sea in the last three periods. Therefore, these vessels may, to a considerable extent, be assumed to be limited by effort regulation.

The number of bought and sold days at sea in the different vessel groups is shown in Table 4.6. On buying and selling between vessels, different characteristics are paid attention to by way of a so-called conversion factor. This explains the difference between the numbers of bought and sold days at seas. All in all, an increase in buying

and selling up to 2001/2002 are seen after which a considerably smaller number of days at sea change vessel.

Table 4.6. Buying and selling of days at sea

		1999/2000	2000/2001	2001/2002	2002/2003
Group 2	Bought	669	406	419	502
	Sold	674	610	634	418
Group 3	Bought	196	188	384	243
	Sold	106	143	191	179
Group 4A	Bought	346	200	237	228
	Sold	276	370	538	414
Group 4B	Bought	264	651	797	203
	Sold	93	345	641	294
Total	Bought	1,475	1,445	1,837	1,176
	Sold	1,149	1,468	2,004	1,305

Source: The Faroese Fisheries Inspection, the Ministry of Fisheries and Maritime Affairs (f. *Fiskiveiðieftirlitið, Fiskimálaráðið*)

A total of a little below 10% of the days at sea are sold annually, however, with variations within the individual groups. It appears that the groups not using their days at sea, all sell more days at sea in percentage than they buy, while on the contrary, those using their days at sea buy more than they sell.

Catch composition measured in value for the individual vessels in the Faroese fleet in 2003 is shown in Table 4.7. The vast majority of vessel groups subjected to days at sea regulation (groups 2-5) are highly dependent on cod. Saithe is seen to be of importance for the pair trawlers. Trawlers in groups 4A and 4B are conducting fishery for flatfish, including particularly lemon sole which is classified in the group 'others'.

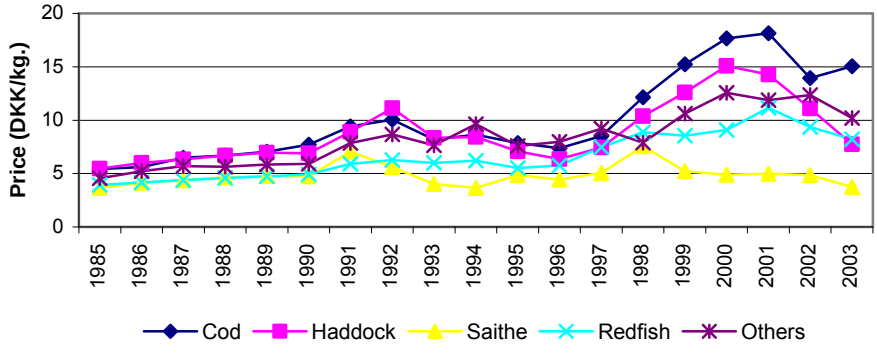
Table 4.7. Catch composition in value, 2003 (%)

Group	Type	Cod	Haddock	Saithe	Redfish	Others	Total (1,000 DKK)
2	Pair trawlers > 400 HP	24	8	51	2	15	247,537
3	Long-line vessels over 110 GT	57	27	0	0	15	278,484
4A-long-line	Coastal fishing vessels15-40 GT, line	67	26	0	0	7	48,746
4A-trawl	Coastal fishing vessels15-40 GT, trawl	28	3	0	0	68	8,716
4B-long-line	Coastal fishing vessels > 40 GT, line	60	30	1	0	9	150,020
4B-trawl	Coastal fishing vessels> 40 GT, trawl	38	10	0	0	52	81,113
5A	Coastal fishing vessels < 15 GT	77	18	0	0	4	86,396
5B	Coastal fishing vessels < 15 GT part-time fisheries	80	15	0	0	5	35,837
1+6-10	Other vessels	24	1	3	6	67	1,137,276
Total		36	10	8	3	44	2,074,125

The development in catch amounts, prices, and catch value during the period 1985 to 2003 for vessel groups 1-5 are shown in Figure 4.1 and Figure 4.2.

The prices for cod, haddock, redfish and other species caught in fisheries around the Faroe Islands have doubled during the period 1996 to 2001, but since then decreased to some extent. On the contrary, the price for saithe has been relatively stable.

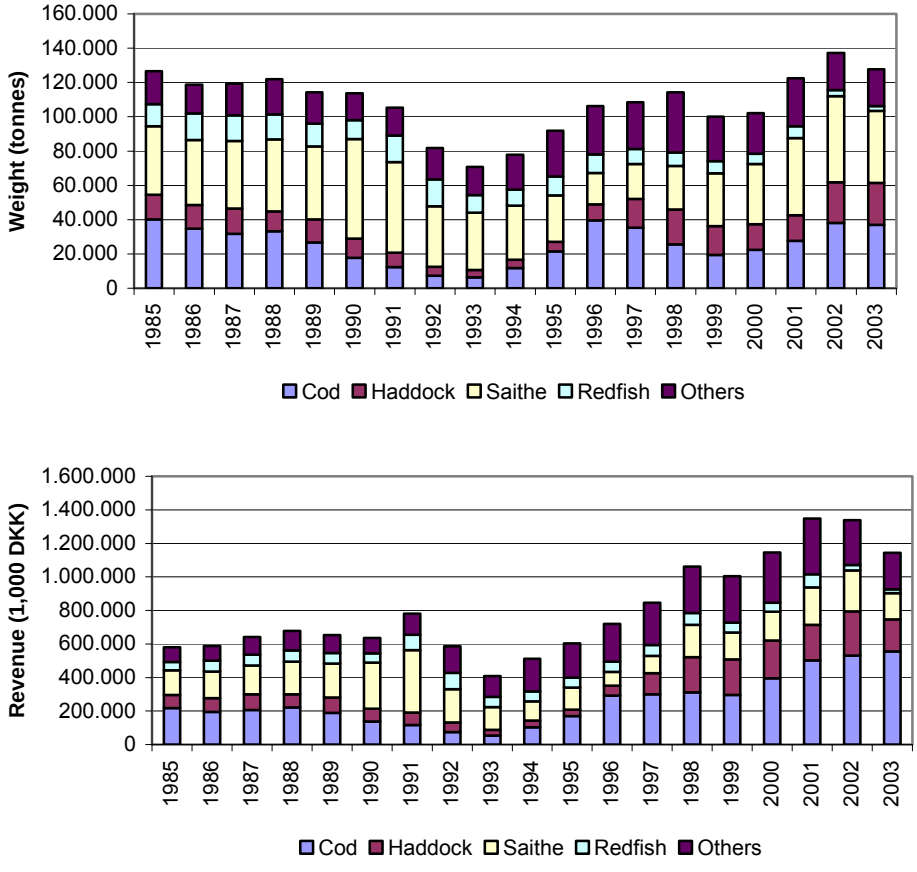
Figure 4.1. Price movement distributed on species for vessel groups 1-5



The catches of demersal fish around the Faroe Islands have decreased almost constantly from 1985 to 1993, particularly due to failing occurrence of cod and haddock, see Figure 4.2. Since then the catch has increased, thus the catch quantities in 2003 were at the same level as in 1985. The increase is observed for cod, saithe and haddock, whereas catch of redfish has been reduced to almost nothing.

Along with the favourable development in prices and quantities, the Faroese fishery has experienced a positive development since the bottom out in 1993/1994. The absolute smallest catch value was achieved in 1993, approximately 400 million DKK. Since that time the development has been positive, and in 2001 the catch value was on its maximum level of 1,348 million DKK in the period analysed. The catch value decreased, however to 1,145 million DKK in 2003.

Figure 4.2. Development in catch distributed on species for vessel groups 1-5



It can be seen from Figure 4.2 that catch value for cod around the Faroe Islands has increased since 1993. In 1993 the catch value was 53 million DKK, but increased to 555 million DKK in 2003, and thus more than twofold as high as in 1985. A similar favourable development in catch value has been seen for haddock and for the group 'other fish'. However, the development in catch value for saithe and redfish has been more miscellaneous. For saithe, the level in 2003 is unchanged in comparison to 1985, while redfish is almost reduced to nothing.

5. Economic results for the Faroese vessels

5.1. The extent of the analysis

A comprehensive accountancy material exist for the Faroese vessels. The material is at disposal from Rasmussen and Weihe, state authorized accountancy firm. The accountancy statistics comprise approximately 90 vessels, cf. Table 5.1. Seiners, shrimp trawlers, high sea trawlers, and other vessels (industrial trawlers for consumption fish) are fishing in the waters outside the Faroese territorial waters. These vessels are not subjected to effort regulation, but are incorporated in this report. Generally, there is a high coverage in the accountancy analysis, particularly for pair trawlers and long-line trawlers subjected to the days at sea regulation. The coastal fishing vessels in groups 4 and 5 are primarily catching gadoids, but are not included in the accountancy statistics.

Table 5.1. Number of vessels and types in the accountancy statistics

Group	Type (Danish)	Type (Faroese)	1998	1999	2000	2001	2002
1	Trawlers > 400 HP	Lemmatrolarar	12	12	12	11	10
2	Pair trawlers > 400 HP	Partrolarar	28	28	30	30	28
3	Long-Line vessels >110 GT	Línuskip	15	16	18	20	21
6	Gillnet vessels	Garnaskip	8	8	8	8	8
7	High sea trawlers	Verksmiðjutrolarar	6	6	5	5	5
8	Seiners/multipurpose vessels	Pelagisk skip	8	8	8	8	8
9	Shrimp trawlers	Rækjuskip	7	8	8	8	6
10	Other vessels	Onnur skip			3	3	3
Total			84	86	92	93	89

Source: Rasmussen and Weihe, state authorized accountancy firm

Approximately 90% of all Faroese vessels are subjected to effort regulation. If measured in amounts of landings, approximately 80% of the fishery for gadoids and redfish, in total about 100,000 tonnes is subjected to effort regulation. Fishery for shrimps and other fish (particularly blue whiting), 'industrial' (filet of consumption fish) as well as herring and mackerel of altogether approximately 400,000 tonnes is subjected to regulation through agreements with third-party countries. Trawlers fishing for redfish with by-catch quotas of cod and haddock are not subjected to effort regulation. These trawlers catch approximately 20,000 tonnes in the cod and redfish group.

5.2. Results

During recent years, the economic progress in the Faroese fishery has particularly been within the following groups a) seiners/multipurpose vessels fishing for herring and mackerel with seines and blue whiting and other industrial fish with trawl, b) the high sea trawlers fishing in the waters outside the Faroe Islands and c) vessel groups fishing for haddock and saithe around the Faroe Islands (cf. chapter 3).

Vessels subjected to effort regulation are emphasized in Table 5.2 showing the average turnover per vessel. Turnover *per vessel* is used in the table which means that although the accountancy statistics include surveys of which vessels that are included from year to year, it is not possible to correct for the number of vessels in these groups where changes are seen from year to year.

Table 5.2. Turnover per vessel (million DKK)

Group	Type	1998	1999	2000	2001	2002
1	Trawlers > 400 HP	12.8	12.6	14.9	16.7	18.7
2	Pair trawlers > 400 HP	8.6	8.6	10.1	10.6	11.0
3	Long-line vessels >110 GT	12.8	11.9	10.4	12.3	13.6
6	Gillnet vessels	6.4	10.4	13.6	11.3	8.1
7	High sea trawlers	43.9	43.3	48.3	52.8	58.0
8	Seiners/multipurpose vessels	34.4	18.6	34.1	58.9	55.8
9	Shrimp trawlers	30.5	30.3	25.2	31.8	25.7
10	Other vessels	-	-	21.6	38.5	39.3
Total		16.6	15.3	16.9	20.9	20.8

Source: Rasmussen and Weihe, State authorized accountancy firm

Pair trawlers and long-line vessels have the highest relative payment to crew of all groups apart from gillnet vessels. Payment to crew constitutes 44% of the turnover for pair trawlers and 57% for long-line vessels.

The gross profit is defined as the amount left to payment of interest and depreciation of the invested capital. This is approximately 2 million DKK for pair trawlers per vessel and approximately 1.5 million DKK for long-line vessels, cf. Table 5.3. Gross profit should be evaluated in relation to the size of the invested capital, where larger investments require higher gross profit. Due to uncertainties on statement of invested capital not least in connection with comparisons between vessel groups, it has not been possible to make such an evaluation. Instead, the size of the gross profit is evaluated from an assumption that the gross profit has to be sufficient in order to fi-

nance a new vessel when the old vessel is to be renewed. If a time frame of 25 years is chosen, and if it is assumed that interest and depreciation are approximately 12% (8% interest and 4% depreciation) with an annual gross profit of 2 million DKK, investment in a vessel to approximately 17 million DKK can be made. An annual gross profit of 1.5 million DKK could form the basis for interest and depreciation of a vessel at a price of approximately 12 million DKK. It is assumed that this is less than these vessels can be built to.

Table 5.3. Gross profit per vessel (million DKK)

Group	Type	1998	1999	2000	2001	2002
1	Trawlers > 400 HP	2.1	1.5	1.9	2.0	2.7
2	Pair trawlers > 400 HP	2.0	1.9	1.9	1.9	2.2
3	Long-line vessels > 110 GT	1.6	1.5	1.1	1.6	1.3
6	Gillnet vessels	0.5	0.7	2.2	1.0	-0.3
7	High sea trawlers	9.9	8.0	9.4	11.9	13.2
8	Seiners/multipurpose vessels	12.6	1.5	8.9	21.8	19.4
9	Shrimp trawlers	3.8	5.7	0.8	-0.2	-0.4
10	Other vessels	.	.	-9.8	-8.0	-5.2
Total		3.5	2.4	2.3	3.5	3.6

Source: Rasmussen and Weihe, State authorized accountancy firm

5.3. Assessment

Different criteria can be used when assessing a regulation system. Relevant economic criteria are the wish for economic yield of the fish stock. An economic indicator for the efficiency of the effort management is then if the gross profit is higher for the vessels subjected to days at sea regulation than for comparable vessels subjected to another regulation, e.g. quota regulation.

As regards the Faeroese, it is most obvious to compare pair trawlers and long-line vessels with trawlers which are not subjected to days at sea regulation. There seem to be no immediate pronounced difference in gross profit, cf. Table 5.3. The comparison is however not ideal. On one hand, trawlers are considerably bigger than pair trawlers and long-line vessels, and therefore have a greater gross profit. On the other hand, trawlers are subjected to a number of restrictions regarding fishing grounds and catch composition.

For comparison, trawlers fishing for redfish as target species have by-catch quota on cod and haddock of a total of 200 tonnes annually per vessel. It has been mentioned

that an important cause for the favourable economic results of the trawlers are the permission to fish cod and haddock. The by-catch quota of cod and haddock constitute approximately 10% of the total amount of catch of the individual trawler, but as prices on at least cod are higher than for redfish, the by-catch contributes with a larger part in value. According to information, it has been discussed on the Faroe Islands if trawlers, approximately 13 vessels, should be subjected directly to days at sea regulation. The inclusion of these vessels means that all cod, haddock and saithe fisheries would be subjected to the effort regulation. It has further been specified that there is a tendency that pair trawlers with the largest engines (above 1,000 kW) are in progress at the expense of pair trawlers with smaller engines. The large pair trawlers have higher turnover and better profitability than the small ones. The same development has not been seen for trawlers fishing for redfish.

The result of the Faroese vessels can thus be compared to similar Danish vessel groups. An obvious comparison would be between the Faroese vessels in groups 4 and 5 and Danish trawl and long-line vessels fishing for cod and demersal fish. These vessels are roughly of the same size and fish on fairly the same species. Such a comparison is, however, not possible as there is no accountancy information on the Faroese vessels in that group.

Another comparison might comprise the Faroese pair trawlers and the corresponding Danish trawlers measured in size. However, this comparison should be made with caution as the Faroese vessels are fishing for gadoids, and the corresponding Danish trawlers of the same size are fishing for herring and mackerel as well as industrial fish. The two relevant Danish groups would be trawlers 24-40 m (approximately 100 GT – approximately 300 GT) and trawlers of 40 m and above (approximately 300 GT and above). In the period 2000-2002, the average gross profit for the Danish trawlers 24-40 m is 1.2 million DKK, while the gross profit for vessels above 40 m is 4.6 million DKK inclusive of seiners.

Another element which makes comparison difficult is that the value of the Danish vessels seems to be higher than the value of the corresponding size of the Faroese vessels. The value is, however, extraordinarily problematic and should be compared with caution. The total assets in a Faroese shipping company with a long-line vessel or a pair trawler are not significantly different from the total assets in a corresponding Danish vessel (shipping company). However, the share of own equity is significantly

higher in the Faroese vessels than in the Danish vessels which indicates a higher level of economic consolidation in the Faroese fleet.

If the development in gross profit is used as an economic criterion, it can be concluded with caution that the days at sea regulation have not (yet) resulted in an increase in the gross profit.

6. Assessment of the Faroese days at sea regulation

In the introduction, some qualitative differences between quota and effort regulation were evaluated including the respective strengths and weaknesses of these regulation schemes. The concrete assessment of the Faroese effort regulation has subsequently been examined in relation to how substantial problems have been addressed within the days at sea regulation.

6.1. Quota regulation

The quota regulations are based on fish stocks. The regulation has been criticized in particular within the so-called mixed fisheries dominating many demersal fisheries. The criticism can be summarized by:

An efficient quota regulation calls for exact stock assessments based on reliable data of the fisheries. The stock assessments are most uncertain for the previous year which is exactly the background for the advice. In addition, the quality of the fishery based data is generally assessed to be decreasing due to an increasing discard and growing irregularities with compliance to the fisheries rules.

The scientific single species advice does not specifically pay attention to that different species of fish are caught in the same fishery. The advice is not elaborated in a way that is suitable for being used in mixed fisheries as for instance the demersal fisheries in the North Sea.

In mixed fisheries quota ceilings imply that it can be necessary to discard catches suitable for consumption when the quota of a species is utilised. In this situation, discarding is statutory in the EU and is used with the purpose of influencing fisherman's choice of gear rigging and fishing area. This behavioural effect is uncertain and may thus leave an unchanged fishery which is merely characterized by an increasing discard. In such situations the fishing industry regards discarding as meaningless which weakens the management legitimacy.

The quota regulation may cause strong incentives to evade the regulation by misreporting catches (misinformation of species, catch time, place and vessel). Unreliable fishery data affect back on the stock assessment in the form of unreliable assessment of the stocks.

When quota regulation is not elaborated as individual allotments there is an economic incentive to increased investments and fishery and thus increased costs compared to a system with individual assignments.

It is difficult to control regulation compliance as what is being caught is not the same as what is being landed.

6.2. Effort regulation

The Faroese effort regulation is based on fishing fleets instead of stocks and emphasis of such a regulation should be put on the management of fishing mortalities contrary to quota management. The practical linking of fishing effort to fishing mortality may involve difficulties. When stock assessment is made attention is paid to the efficiency of the individual types of vessels and that a large vessel generates a higher fishing mortality per day than a small vessel.

Introduction of an effort regulation will meet a number of disadvantages with the existing quota regulation system.

The number of days at sea has been determined from calculations averaged over years between effort and fishing mortality. This was also the case for the Faroese prior to the introduction of the regulation in 1996. Determination of the effort levels will be less dependent on the exact annual stock assessments than in quota regulation.

At the same time, determination of effort level is less dependent on the general ecological changes, which through their influence on the productivity of the sea, may change the level for recruitment.

The total effect is that scientific advice based on effort regulation may be expected to be relatively robust except for the situations where a stock caught in a mixed fishery is below the sustainable level. In this case, there will still be a need for a reliable stock assessment.

The effort regulation is designed to regulate vessel groups and need to be outlined directly towards regulating mixed fisheries.

In general, the effort regulation will limit incentives for discard of fish suitable for consumption, in particular when it is not linked to quotas as well as by-catch and target species regulations.

An effort regulation will change the incentive to evade the regulations. Hence, it will not be the catches which will be in focus, but the number and the use of days at sea.

An effort regulation will be easier to control not least by satellite monitoring.

As far as an effort regulation is built upon well-defined homogenous groups of vessels which is the case in most instances on the Faroe Islands, these groups will constitute a natural classification for the description of the economic development of the fleets and the socioeconomic effects of the regulation.

The Faroese committee work which formed the basis of the fisheries legislation describes the advantages of an effort regulation and specifically emphasizes compliance, reduction of discard as well as the more robust scientific advice[4]. Recent Faroese experience indicates that the industry perceives the regulation with a high level of legitimacy[5] that the catch figures are reliable and that the extent of discard is low[6].

6.3. Transferability of days at sea

The terms of reference for the Faroese committee work resulting in the present regulation explicitly mention that the fisheries should be sustainable economically. The introduction of individual transferable days at sea is seen here as a means of fleet adjustments by accumulating days with the fishermen who are most effective.

The individual allotment will secure that the fishermen know how many days at sea they have at their disposal. Economic adaptation may then take place by the fishermen organizing their fisheries to maximizing their catch value without the increasing costs associated with the 'race for fish' which is seen in the general quotas or open access fishery systems.

An effort regulation creates incentives for the individual fisherman to develop his production potential in order to be able to catch more per allocated day at sea. Typi-

[4] Frágreiðing frá Skipanarnendini, Torshavn 8 February 1996.
[5] See for example Tilmæli frá Fiskidaganevndini 2002/2003.
[6] Reinert, J. (2002). Faroese fisheries: Discards and non-mandated catches.

cally this is done by an increased capital input, e.g. by way of upgrading engine and gear, and by introduction of new technology and working procedures. This 'technological' development implies that the number of days at sea continuously need be reduced if the regulation aims at maintaining a sustainable fishery pressure.

If the transferability of the individual effort is not limited, there is a basis for an exchange between the vessel groups within the entire fishing industry. By such a complete transferability between all groups, there is a risk that the effort is moved to certain species so that catch quantities for certain species are increased beyond sustainability of the stock. For this reason, the Faroese regulation clarifies limitations how the effort can be transferred. The principal rule is that the effort can only be transferred within the same types of vessels, i.e. in between trawlers and in between the long-line vessels. The Faroese regulation also distinguishes between the coastal fisheries of the small vessels which, to a large extent, are characterized by part-time fisheries, and the true commercial fisheries. The regulation prevents that effort and capacity can be transferred from the smallest coastal fishing vessels in vessel group 5 to the other vessel groups.

The introduction of days at sea regulation does not seem to have caused major changes in the Faroese fleet structure. The most important indications seem to be that days at sea are transferred from small to large long-line vessels. Thus the number of large long-line vessels has increased. The limited structural change is probably due to the improved stock situation as well as the abundance of available days at sea implying a limited external pressure for such changes.

6.4. The main problems with effort regulations

In an effort regulation, the total sustainable fishing mortalities of the affected stocks are determined. Subsequently, the fishing mortalities need to be allocated to the vessel groups, taking into consideration that fleets fish the relevant species/stocks with different effectiveness. There are a number of known problems with setting the effort levels.

Fishing mortality

Calculations of the correlation between fishing mortality and days at sea (catch rates) are based on historic data and rely on a number of assumptions, which are not necessarily fulfilled in practice. Therefore, the days at sea allocated may cause a fishing mortality deviating from the objective.

The allocation aspect
The allocation of days at sea between vessel groups is not a technical problem, but requires an explicit political allocation decision as to who is having what.

The multispecies problem
In mixed fisheries, it is difficult to control fishing mortality in all stocks concurrently affected. The problems are intensified when some of the stocks are in a critical state which advocates for targeted restoration initiatives.

Technological development
The fishing efficiency is continuously improved due to the technological development implying that catch rates will increase over time. Hence, an effort regulation trying to maintain a certain fishing mortality must include the contribution of technological development.

Behavioural changes
The catch rates depend on the fishermen's choice of target species, gear rigging and fishing ground. The historically fishing pattern which forms the basis for determining the catch rates reflects, amongst others, the possibilities and limitations present in the specific management situation. If pronounced changes in the management regime are made, including a shift from quota to effort regulation the fishing pattern may change significantly.

6.5. The Faroese experiences with effort regulation

The implementation of effort regulation on the Faroe Islands can be evaluated by how it addresses the problems typically found in an effort regulation. The Faroese attitude to the problems is stated below point by point.

The objectives for fishing mortality
In connection with the establishment of effort regulation an objective was made that the annual catch from the three most important stocks: cod, haddock and saithe should constitute maximum 33% of the stocks corresponding to a fishing mortality of 0.45. Since 1996, the catch for haddock and saithe has generally been below that limit, whereas the catch for cod has exceeded that limit. In total there is a reasonable compliance with the posed objective.

Based on precautionary approach, ICES recommended lower limits of fishing mortality of about 0.30 (see chapter 3), and these limits have been exceeded for all three species. In this case, the necessary reduction in effort should be of approximately 25-30%.

The allocation aspect

The allocation of access to resources between vessel groups is very specific in the Faroese regulation. Overall, the resource allocation between the vessel groups is provided in the form of a) objectives of catch shares, b) independent allocation of days at sea to each vessel group and c) restrictive access rules to the fishing grounds that differs between vessel groups. Within the groups, and to a smaller extent between the groups, the access to resources is regulated through the individual transferable rights.

The objectives of allocation of catch quantities between the vessel groups was determined through an allocation key established in connection with the scheme based on individual transferable quotas in 1994, cf. Table 6.1. In 1994-1996, this allocation key was crucial as the regulation was managed by quotas at that time. When revised in 1996 and effort regulation introduced, the allocation key lost its practical importance for the regulation. Since that time there has not been an allocation on total quotas for the catch of demersal fish around the Faroe Islands. The allocation key is still there as an overall objective in the Faroese Act on Commercial Fisheries. Catch data for the calendar years 1997-2003 indicate that the objectives of the Act are generally realized though there is a tendency that individual trawlers catch more cod than stipulated, and that coastal vessels catch less saithe.

Table 6.1. The allocation key to the four most important species of fish (%)

Group	Type	Quota of cod	Quota of haddock	Quota of saithe	Quota of redfish
1	Trawlers > 400 HP	4	1.75	13	90.5
2	Pair trawlers > 400 HP	21	10.25	69	8.5
3	Long-line vessels > 110 GT	23	28		
4	Coastal fishing vessels >15 GT	31	34.5	11.5	0.5
5	Coastal fishing vessels < 15 GT	20	23.5	6	
	Other vessels	1	2	0.5	0.5

Source: The Faroese Act on Commercial Fisheries

The regulation of the access rights to the fishing grounds is very explicit. The central elements are that the coastal areas are reserved for coastal fisheries using trawl, long-

line or jigs, and that gillnet and trawl fisheries from large vessels are not allowed in areas with depths below approximately 200 m.

The multispecies problem

The Faroese fisheries are characterized by catches consisting of relatively few species of which only three (cod, haddock and saithe) are of importance for the fisheries that are covered by the effort regulation. It has been argued that the regulation contains a certain encapsulated protection effect in the situations where one or two of the stocks are getting critically low. Obviously, for economic reasons, the fisheries in such situations are expected to concentrate on those species which are still frequent. The multispecies problem have not been of significant importance for the period described since the introduction of the effort regulation as the stocks of cod, haddock and saithe generally have been within the Faroese regulation objectives due to good recruitments during recent years.

Technological development

The preliminary work for the Faroese effort regulation indicates that the catch rates may be expected to increase over time due to the technological development. Calculations of changes in catch rates are technically complicated, and the number of allocated days at sea is not corrected for this effect in the Faroese regulation.

7. An outline of the Danish fisheries management

7.1. The basis of the regulation

The regulation of the Danish fisheries is primarily based on two regulations 1) Regulation order[7] determines quota regulations etc. and 2) Capacity regulation order[8] determines rules for the fishing vessels. The code of practice is based on a number of EU regulations. Admittance to conduct fisheries according to this code of practice is limited by measures which can be divided into four main groups:

1. Quota regulations
2. Effort regulations
3. Technical regulations
4. Capacity regulations

Quota, effort and capacity regulations are examined in the following. The technical regulations include mesh size, minimum size, closed areas etc. and are based on an EU regulation.

7.2. Quota regulations

The quota limitations in the Regulation order are changed from year to year in agreement with the EU annual quota assessment. In addition, the detailed assessment of quota exploitation is regulated during the year through the so-called 'annex 6 information, which determines changes in quota allocation dependent on how the fisheries develop through the years as well as fisheries stop. The Danish Directorate of Fisheries may thus after hearing of the Committee on Commercial Fisheries, (Act, §6) and in light of catch, supply and marketing, determine amended rules for quotas in the fishery.

Fishing permits are required in order to carry out fisheries on the most 'exposed' species. This applies to most species which are caught as target species, while other species being of less economic importance and caught as by-catch are often not included in the requirement of a permit. Management of the quotas when issuing fishing per-

[7] Regulation order no. 1028 of 11.12.2003.
[8] Regulation order no. 124 27.2. 2004.

mits means that this regulation is complicated as a fisherman may hold more fishing permits without necessarily using them all.

The regulation may be divided into three levels, comprising species, areas and vessels.

Every year quotas for more than 35 species are determined within the EU, and of these 30 species are effective for Denmark. When quotas for these species are divided into marine waters there are more than 120 quotas each year. The quotas are thus determined for management areas comprising a combination of species and marine waters. For Denmark, 66 quotas are in force of which 51 for consumption species and 15 for industrial species. Subsequently, the Danish quotas are allocated to vessels after different criteria. When the vessel dimension is included it actually means that several hundred quotas are incorporated in the Danish fishery. The classification of quotas into types, etc. is simplified schematically in Table 7.1

Table 7.1. Classification of quota regulation

Quota model	Species	Marine areas	Vessels	Remarks
Rations	Cod	All	All	
Annual quantity	Cod	The Baltic	All	
Annual quantity	Cod, sole, plaice	The North Sea, Skagerrak, Kattegat	< 15 m	Coastal fish regime
Individual transferable quotas	Herring	The North Atlantic, the North Sea, Skagerrak, Kattegat	All with historical rights	Runs for 5 years from 2003. Possible extension for further 3 years
Rations	Herring	The Baltic, the Belt Sea	All	
Annual quantity	Mackerel	The North Sea, Skagerrak	All with historical rights	Alteration to IQ under consideration
Rations	Cod and flatfishes	The North Sea, Skagerrak, Kattegat	All	
Free	Industrial fish, plaice and certain cod fish	The North Sea, Skagerrak, Kattegat	All	Up to 50% or 70% of the quota has been fished, rations subsequently. Alteration to IQ for the industrial fish are under consideration

Note: IQ indicates individual quotas.

The Danish quota regulation is generally complex. Differentiation is made on species, marine area, vessel type/gear, and vessel size at the same time using different quota models, comprising individual transferable quotas (ITQ), individual quotas (IQ), annual quantities, rations as well as free fishery.

7.3. Effort regulations

Effort regulation in the form of regulation of days at sea has been decided as part of establishing measures for the recovery of cod (EC Council Regulation No. 423/2004). The regulation applies to vessels of 10 m and above, fishing in the North Sea, Skagerrak, Kattegat, the water west of Scotland, the eastern part of the English Channel, and the Irish Sea. The new effort regulation which is due from 1st February 2004 replaces the effort regulation which was in force in 2003 and continued in 2004.

However, the landings are not only decided on number of days at sea but also of capacity in the form of length of vessels, tonnage and engine power. This is seen in the conversion rules for transfer of days at sea.

The access problem is also crucial in the regulation of days at sea. According to the implementation of the effort regulation, this is illustrated through the regulation of days at sea which is only valid for certain marine waters and is differentiated on type of vessel/use of gear and hence unambiguous as regards the vessels.

7.4. Capacity regulations

The capacity regulation in the Danish fishery is based on the regulation of vessels used for commercial fishery (the capacity regulation order). The capacity regulation order is brief compared to the regulation order.

The capacity regulation is seen in connection with the EU fleet policy, including the ceilings which have been decided for each member country. Through many years Denmark has maintained a strong fleet capacity limitation which has resulted in that if new capacity is to be introduced in the fisheries, discharge of corresponding capacity is required. A consequence of this policy means that capacity discharged from a vessel has become valuable in itself. If a vessel is emptied for capacity it does not necessarily mean that the vessel is physically removed, but that it cannot be used for fishery. This means that capacity may exist, but a vessel without capacity to fish shall be removed from the vessel register.

The capacity regulation lays down the rules as to who has the disposal of capacity, what is meant by capacity, how it can be transferred, as well as within which time limits it shall apply. Change of vessel, renewal, increase etc. thus requires that an owner of a vessel possesses the necessary capacity both with respect to tonnage and

engine power. If a new smaller vessel is built the additional capacity from the old vessel can be sold, and if a bigger vessel is to be built, additional capacity has to be bought. For beam trawlers and mussel vessels there are special rules. In addition, there are no limitations of fleet capacity between the vessels groups.

7.5. Assessment

Where the regulation order is based on regulation of fish stocks in the sense that specified quotas is not to be exceeded, the capacity and days at sea regulation are based on that a given 'fishing effort' is not to be exceeded.

If the statutory instrument on technical regulations is considered in connection with the regulation order, it serves the purpose to reduce 'interaction effects' between the quotas for the individual species. These interaction effects are present, because fishery cannot be conducted completely selective on the individual species – and because it will be economically unprofitable to try to do so. However, these interaction effects cannot quite be avoided which partly results in discard and partly that the production factors (vessels and crew) are not properly used economically.

If the regulation order on technical regulations are perceived in connection with the capacity directive and the days at sea regulation, some interaction efforts could be minimized, but the result will be that certain 'quotas' are exceeded at the same time as other quotas will not be quite depleted. Alternatively, the total quota exploitation will be substantially reduced.

The Danish regulation of the demersal fishery is a complicated interaction between quota regulation, gear regulation and days at sea regulation. The regulation can be illustrated as follows:

Quota regulation
The quotas for the individual species is not to be exceeded, and fishing on the individual species is only to take place with the gear mentioned in the code of practice under allowed type of gear and mesh size. The effort is the product of number of vessels and days at sea by gear, determining what and how much is to be caught. As the quotas and use of gears are fixed, it means that the number of days at sea, including the number of vessels have to be adjusted so that the landings do not exceed the quotas. At the same time, this will imply that when more species are involved in a catch

of a vessel group, problems easily arise in the organization of the fisheries so that no quotas are exceeded. In this connection discard problems may arise.

Effort regulation
As mentioned, the effort is the product of number of vessels and days at sea by gear. Regulation on the number of days at sea for each group is made, in principle corresponding to the quota regulation of the individual species. As the catch to a high degree is determined by the gear used, the catch may, to a large extent, be controlled by establishing the number of days at sea for each type of gear. However, the catch of each species cannot be controlled so precisely that no quotas are exceeded. Therefore, the quotas need to a certain extent 'adapt' in an effort regulation similar to days at sea adapting with quota regulation. This implies also that the incentive to discard is reduced if it is no longer demanded that all quotas should be complied with.

Quota and effort regulation
If the two means of regulations are combined which is not actually the case at the moment, landings of the individual species must not be exceeded and nor must the number of allocated days at sea. Hence, the fisheries are very inflexible, the incentive to discard is maintained because of the quota restriction, and if discard should be reduced by setting a suitably small number of days at sea on the most exposed species, this will have as a result that catches of other species are reduced, the quotas of these are not depleted, and the fisheries economy is deteriorated. This problem has been subject to a further analysis in 'Fiskeriets Økonomi' (Economic Situation of the Danish Fishery) in 2003 and 2004, where the importance of the days at sea regulation in combination with quota regulation have been analysed.

In conclusion it should be mentioned that if quota regulation is used then the number of days at sea must be adapted by the fishermen so that quotas are not exceeded. This is the flexibility in the system. If the number of days at sea is regulated then catches of the individual species have to be adapted in order that the days at sea are not exceeded in the attempt to deplete all quotas. Using both systems at the same time is inappropriate and will only lead to economic adaptation problems which will be counteracted by the fishermen in different ways.

An effort regulation system based on the complex Danish regulation system will require a fleet segmentation comprising fish species/marine waters, vessel type/gear/mesh size and vessel size. At the same time, the system would have to be supported by area regulation (see the Faroese area regulation).

8. An outline of the EU fisheries management

8.1. Resource management

The common fisheries policy of the EU was revised in 2002 and is valid from 1 January 2003 for the following ten years. In this connection a new 'basis regulation' on resource management was passed[9] in December 2002. The regulation on the resource management provides that further rules are elaborated for the capacity management[10] which were passed in August 2003.

The regulation on resource management assigns those means which may be used to regulate catches.

1. Recovery measures
2. Management schemes
3. Measurement for sustainable exploitation of fish stocks (e.g. fishing mortality rates)
4. Catch reduction (e.g. quotas)
5. Determination of number and types of vessels allowed to fish
6. Reduction of fishing effort (e.g. number of days at sea)
7. Technical regulations
    a. Gear regulations
    b. Closed areas, etc.
    c. Minimum size of fish
    d. Special measures to protection of non target species (e.g. marine mammals)
8. Economic incentives to encourage selective fisheries
9. Pilot projects on fishery techniques

Recovery measures are directed towards fish stocks. The measures shall secure that stocks are recovered within safe biological limits. Reference points shall be decided as to which exploitation of the stock(s) shall be measured. Consideration should be made to stock size, characteristics as well as the character of those fisheries in which

[9] Council regulation (EC) no. 2371/02 of 20. December 2002, EØF-Tidende no. L: 358 of 31/12/2002 and Council regulation (EC) no. 1434/03 of 12. August 2003, EØF-Tidende no. L. 203 of 12/08/2003.
[10] Council regulation no. 850/98 of 30. March 1998, EØF-Tidende no. L. 125 of 27/4/1998.

the species concerned are exploited. Finally attention should be made to the economic consequences for the fisheries mentioned.

Management schemes follow the same principles, but are initiated for those stocks that are within safe biological limits with special reference to keep the stocks at an acceptable level.

The regulation does not prescribe that quotas shall be used and that other means are subordinated the quotas. However, the allocation of quotas between the member states plays an important role. This allocation is determined by the so-called relative stability showing the quotas each country receives of a given stock, determined as the fishery in a specified management area. The share is stable from year to year, whereas the physical amount of fish a country receives depends on the total EU quota for the respective stocks. The use of the relative stability has resulted in the quota regulation in fact superior to other means.

Article 20 in the regulation deals with these matters. The full text in article 20 (1) reads:

> *The Council, acting by qualified majority on a proposal from the Commission, shall decide on catch and/or fishing efforts limits and on the allocation on fishing opportunities among Member States as well as the conditions associated with these limits. Fishing opportunities shall be distributed among Members States in such a way as to assure each Member State relative stability of fishing activities for each stock and fishery.*

In article 20 (3) furthermore reads:

> *Each Member State shall decide, for vessels flying its flag, on the method of allocating the fishing opportunities assigned to that Member State in accordance with the Community law.*

Hence there are no doubt that a Member State is free to chose regulation measures for its own fishermen as long as these measures are within the quotas allocated for the Members state. This means that if a Members State wishes to use effort regulation there is nothing to prevent this, but the requirement is that the quotas are not exceeded.

However, the structure of effort regulation contradicts the structure of quota regulation as effort regulation is based on vessels, while quota regulation is based on fish stocks. If the quotas should be depleted in multispecies fisheries such as the Danish, it means interaction problems between quotas, discards and reduced profitability for the vessels. If the effort regulation is used in the multispecies fisheries it means that discard due to the problems with quota interaction may be avoided, the profitability can be improved, but this will result in that certain quotas are exceeded. On the other hand, a restrictive effort regulation will imply a reduced profitability due to lower quota exploitation in order to assure that the quotas can be complied with. If quota regulation is used there is no need to use effort regulation. If both are used simultaneously this will only lead to increased costs for the fishery and lower catches.

By means of effort regulation it will not be possible to avoid exceeding 'quotas' on certain species, if all species are to be exploited as close to maximum as possible. To a certain extent the problem can be solved by using multi-annual quotas, e.g. that the quota for a five-year period may not be exceeded. This should be seen in relation to the statutory instrument that prescribes both recovery plans and management plans should be multi-annual which may result in the use of multi-annual quotas.

8.2. EU capacity rules

As to capacity the new EU capacity regulation prescribes that reference levels shall be determined for the fleet capacity measured in gross tonnage and kW. The reference level is made up as the target of the previous Multi-annual Guidance Programmes (MAGP) per 31 December 2002. The Danish fleet has already been reduced below this reference level. If public subsidies are given for withdrawal of the fleet, the reference level shall be depreciated with the capacity which has been withdrawn. This applies irrespective of the actual fleet size are larger, equal to or less than the reference ceiling.

In connection with the use of a regulation system within the frames of the EU common fishery policy an interpretation of 'the relative stability' could be based on the EU capacity rules. However, this is attended with both technical as well as political difficulties to make a transformation of quota parts to effort parts, reflecting the present quota allocations between Members States (cf. article 20 (1)) in the regulations on resource management.

9. Conclusions

In the following, an evaluation is presented on whether the Faroese effort regulation has fulfilled a number of criteria that that reflect whether the system is efficient. In addition, an evaluation is made on the possibilities to implement this regulation system into the Danish fishery. Finally, a schematic comparison of the development at the Faroe Islands and in Denmark is presented to illustrate similarities and differences, cf. Figure 9.1.

9.1. Assessment of the Faroese system

It should be mentioned that the Faroese days at sea regulation system cannot be evaluated independently of the other elements in the Faroese regulation system. In the basic foundation for the regulation, the capacity and area regulation are crucial conditions in order to make the days at sea regulation work.

In the assessment of the Faroese effort regulation three main problems are put into focus:

1. The ability to meet the biological requirements of sustainability (biological objectives).
2. The ability to meet the economic requirements (economic objectives)
3. Acceptance in the fishing industry

9.1.1. Biological aspects

The objectives for fishing mortality

In connection with the establishment of the effort regulation an objective was set that the annually catch of the three most important stocks: cod, haddock and saithe should not exceed 33% of the stocks corresponding to a fishing mortality of 0.45. The management is based on these objectives since the introduction of effort regulation.

Since 1996, the catch of haddock and saithe has generally been below that objective, whereas the catch of cod has generally exceeded the limit. Overall, there is a reasonable compliance of the posed objective.

ICES has recommended lower limits for fishing mortality, about 0.30 based on the precautionary approach, and these limits have been exceeded for all three species. If

the Faroese have chosen to follow the ICES advice the effort should have been reduced by 25-30%.

Spawning stock and recruitment
Despite higher fishing mortality than recommended by ICES the spawning biomass for cod, haddock and saithe are by 2004 higher than the limit decided on basis of the sustainability principle. In general, recruitment has been high in the years before 2004 with a good recruitment of cod for the years 2000-2001, a good recruitment of haddock in the years 2001-2002, with the 1999 year class being the biggest observed and a very high saithe recruitment in the period 1999-2002.

Discard
In the Faroese fisheries regulated only by effort regulation there are very limited incentives to discard fish suitable for the market. In the fisheries regulated through bycatch quotas that is large trawlers (group 1) or through target species decisions for summer trawl fishery for flatfish and gillnet fishery for Greenland halibut or monk, there can be incentives to discard the least valuable sizes. For these fisheries, a low level of undersized fish is secured through mesh size and sorting grid regulations.

The assessment from the Faroese Fisheries Laboratory based on observers on board the vessels as well as knowledge of the fisheries is that the discard problem is limited in the fisheries for gadoids regulated through the effort management system.

The multispecies problem
The Faroese fisheries are characterized by catches consisting of relative few species of which only cod, haddock and saithe are of importance to the fisheries included in the effort regulation system. The stock situation for these species has generally been positive since the introduction of effort regulation, and hence it has not been necessary to introduce regulations protecting the individual species.

The Faroese sovereignty in relation to stocks, the small number of species in combination with closed areas, gear regulations and discard ban implies that an effort regulation will work better in conserving stocks than in fisheries – like the Danish – where these conditions are not present to the same extent.

9.1.2. Economic aspects

Profitability

An economic indicator to evaluate if effort regulation is economically efficient is whether the surplus is larger than during quota regulation or free fishery. Accountancy statistics have not been procured for vessels below 110 GT on the Faroe Islands. For large vessels subjected to effort regulation, yet, no significantly better profitability can be seen than for those vessels which are not subjected to effort regulation. It can be explained in the limitations which have been made for the transferability of days at sea, and that adaptation time for assets such as fishing vessels are long because of the long life of the vessels.

Capacity adaptation

Pair trawlers and larger long-line vessels, about 50 vessels, catch approximately 70% of the amounts subjected to effort regulation. The coastal fishing vessels of 15 GT and above, about 90 vessels catch approximately 20%, while small coastal fishing vessels below 15 GT, including part-time fishermen, catch the remaining, approx. 10%. The capacity for the vessels above 15 GT have by and large been constant since 1993. For the coastal fishing vessels less than 15 GT a registration of vessels has taken place since the introduction of days at sea regulation resulting in an increasing number of registered vessels. The introduction of effort regulation, including the possibility to negotiate effort rights, has not had any remarkable effect on the fleet structure, and there are no significant indications that the economic efficiency has increased. A major reason may be that both catch quantity and prices have been on the way up and, therefore there has not been an external pressure for developing economic efficiency.

Number of days at sea (effort adaptation)

The number of days at sea has generally been constant since the introduction in 1996, and several vessel groups have not been restricted by effort limitations.

Distribution aspect

Distribution of resource access between the vessel groups is very explicit in the Faroese regulation in the form of a) objectives of share of catches, b) distribution of days at sea and c) restrictive admission rules for the different groups to the fishing grounds.

The distribution aspect is reflected in the reductions introduced in order to negotiate days at sea between the vessel groups. Therefore, less than 10% of the total number of days at sea is realized annually. These limitations may be the cause of adaptation is moving slowly.

Technological development
The preliminary work to the Faroese effort regulation indicates that catch rates may be expected to increase over time due to the technological development. Calculations of changes in catch rates are technically complicated, and the number of allocated days at sea is not corrected for this effect in the Faroese regulation.

Behavioural changes
There are no real investigations on behavioural changes when modifying regulation measures. The scope of behavioural changes is, however very limited in the Faroese fisheries as a result of the detailed management of admittance to the fishing grounds.

9.1.3. Acceptance in the fishing industry

In general, the fishing industry have accepted the effort system, and the Committee on Fishing Days composed of representatives from the fishing industry, suggest in its latest report that all fisheries around the Faroe Islands should be regulated through days at sea regulation. This acceptance is contradictory to the regulation with individual transferable quotas in 1994-96. The two regulation systems have been used, however, in two completely different situations. In 1994-1996, the stock situation was critical and the quotas for distribution were historically low. In the following period where the effort regulation was used the stock development has been extremely positive, concurrently with prices on cod and haddock having almost doubled. The acceptance of the regulation system may thus be influenced by that fisheries and prices have developed positively, and that it has not been necessary to introduce significant fishery restrictions.

In particular, through the Committee on Fishing Days, the fishing industry has a well-defined part in providing advice to the Ministry of Fisheries and Maritime Affairs and to the Minister for Fisheries on the setting the number of days at sea which probably contributes to the acceptance of the system.

Finally it should be stated that the days-at-sea regulation on the Faroe Islands have not until now been under pressure. No reduction in number of days at sea or in number of vessels has been made, in spite of the scientific advice that has recommended substantial reductions. The strong recruitments to the stocks during recent years are an important explanation that the regulation system has not worked restrictively.

9.2. Application of effort regulation in Danish fisheries

Since 2003, the days at sea regulation has been an integrated part of EU's resource management in parallel with the TAC/quota regulation, see section 7.3 and annex 5. Within the frames of EU's common fisheries policy it is possible, in principle, on a national scale to use effort regulation in the form of days at sea. The EU fisheries management, however, requests that quotas are respected, for which reason it is not possible directly to replace the national quota regulation with a days at sea regulation corresponding to the Faroese system.

According to the EU system regarding use of days at sea regulation, the alteration would either include a transformation of the relative stability based on quotas to a relative stability based on capacity/fishing effort or demand an extended use of a management system based on multi-annual quotas.

A third possibility would be to accomplish the use of days at sea regulation within limited management areas, after negotiation with the other member states involved, for instance in Kattegat and Skagerrak.

In relation to the present Danish regulation system characterized by a great deal of complexity but a high degree of flexibility for the individual vessels, the demand of an effort regulation system would be establishment of restricted admittance related to a segmentation of the Danish fleet.

The days at sea regulation are based on fleets and not on fish stocks. It is impeded by the fact that several of the central fish stocks within the Danish fishery are on a critical level, and that the stocks are exploited by several other countries contrary to the situation in the Faroese fishery.

In addition, it appears from the description of the Danish regulation in annex 5 that the use of an effort regulation system will demand a fleet segmentation based on fish

species/marine waters, vessel type/gear/mesh sizes and vessel size supported by restricted admittance.

In the short run, it will be difficult, to establish the necessary conditions in order to change the regulation system based on quotas to an effort regulation system, but in principle the use of a days at sea regulation in Danish fishery is a possibility in the long run.

Figure 9.1. Comparison of conditions in Faroese and Danish fisheries	
The Faroes	Denmark
Sovereignty of own stocks	Subordinated EU common fisheries policy (CFP). Share stocks with other countries
Agreement with third-party countries (Iceland, Norway, Russia, EU)	Agreement with third-party countries via EU (Norway and countries around the Baltic)
Effort regulation includes demersal fisheries of approximately 100,000 tonnes distributed on few species, cod, haddock and saithe	Demersal fisheries approximately 100,000 tonnes on many species Cod and plaice make about half. About 15 other species constitutes the rest
Some 50 large vessels catch approx. 80,000 tonnes Some 100 vessels15 – 100 GT and a larger number of vessels < 15 GT catch approx. 20,000 tonnes	Some 700 vessels under 100 GT participate in the demersal fisheries, besides a large number of vessels with smaller amount of catches
Outside effort regulation. Some 13 trawlers catch approx. 10,000 tonnes redfish with by-catch of cod and haddock, but have also catch of other species. Some 8 vessels catch Greenland halibut and monk with gillnet. Other fisheries outside the effort regulation: Some 25 large vessels catch approx. 400,000 tonnes in waters of third-party countries	Other important fisheries: Some 90 vessels catch herring and mackerel; approx. 200 vessels mainly catch industrial fish; approx. 60 vessels catch mussels
Regulation	*Regulation*
Before 1977 (before 200 nautical miles) Gear regulation (NEAFC) 1977-1987 Regulation with gears, minimum size limit, closed areas. 1987 Introduction of fishing permits 1994 Recommendations for regulation with ITQ are rejected 1996 Effort regulation for coastal demersal fisheries	Before 1977 (before 200 nautical miles) Gear regulation (NEAFC) 1977-1983 Quotas, by catch, demand of discard of minimum size fish. No CFP approved, but consultative 'rolling' regulation for member states, if non-acceptance 1983 CFP adopted Increasing extent of the quota regulation. Now total in EU more than 120 quota management areas. DK is subjected to 66. Measurement for fleet size in GT and kW. Fleet adaptation via MAGP 1993 – 2002. Increasing use in DK of rations (individual allotments) 2003 Effort regulation for recovery of cod. Individual transferable quotas for herring
Ban on discard. If content of small fish are big the area will be closed	EU demand on discard. Discard ban in DK from 2003, if fish above minimum size level
By and large the fleet has not been reduced since 1996. No immediate information of fleet reduction is available in connection with the fishery crisis in the beginning of the 1990s	The fleet has been reduced by ca. 40 % measured in GT since 1987

Annex 1. The Faroese fisheries legislation

1.1. An outline of the regulation

The regulation of the Faroese fisheries around the Faroe Islands differs from the fisheries regulation in EU/Denmark. On the Faroe Islands the access to resources is based on the use of individual transferable rights, and the fisheries legislation is constructed in a way which makes it possible to regulate the fleet fishery very directly. The basic feature is a classification of the fleet into different groups of vessels that are regulated by capacity (number and vessel size), activity (number of days at sea), and fishing pattern (choice of areas and catch composition). The regulation is adjusted using different technical regulations where priority is given to management of the fishing pattern by means of closed areas.

The key stones in the regulation of the Faroese fisheries around the Faroe Islands are:

1. A capacity policy freezing the size of the fishing fleet on the existing level.

2. A separation of the Faroese fishing fleet into vessel groups based on size of the vessels and main types (trawlers, long-line vessels, and gillnet vessels). This split of vessels into groups constitutes a central element in the management of capacity and fishing pattern.

3. A resource allocation between the shipping companies organized through allocation of individual and transferable rights.

4. A dual licence system. Through so-called catch permits (f. *vediloyvi*), following the individual vessels, the capacity of the vessel groups are determined. In addition, the so-called fishing permits (f. *fiskiloyvi*) used for managing the fishing pattern of the vessel groups. The fishing permits give permission to participate in specific fisheries and must be renewed annually.

5. An effort regulation system specifying a) the total annual fishing effort (measured in days-at-sea), b) the distribution of the fishing effort between vessels and c) rules on how the days at sea can be transferred between fishing vessels.

6. Technical regulations, including in particular a relatively complex system of closed areas which regulate the access to fishing areas for different vessel groups.

The regulation of the international fisheries taking place around the Faroe Islands and the Faroese fisheries taking place outside the Faroe Islands are based on international agreements negotiated annually where the parties mutually exchange fishing rights. The mutual fishing rights are normally in terms of catch amounts and thus similar to the present EU regulation.

1.2. Background for the regulation

The Faroese society experienced from the end of the 1980s until the mid 1990s a strong economic decline resulting in a deep recession. The general social crisis was aggravated by a decline in the fishery of the most important demersal fish stocks, and catches between 1991 and 1993 were on a historical low level. As the regulation of the Faroese fisheries was until then based only on the use of technical regulations (in particular closed areas and mesh size regulations), it was demanded that the Faroese established an effective fisheries regulation.

As agreed between the Government of the Faroe Islands (Landstyret) and the Danish Government, the Faroese Government appointed a committee with the terms of reference to examine how the resources could be exploited optimally and sustainable and to make the fisheries work under market terms. The Committee recommendation resulted in the Commercial Fisheries Act of 10 March 1994. The central new instrument was individual transferable quotas for a number of specified vessel groups with tonnage above 20 GT, whereas the smaller coastal fishing vessels were to fish on a common annual quota.

The quota regulation was received with massive animosity from both the fishing industry and from a number of politicians, as it for the traditional fishery for miscellaneous demersal species was criticized for leading to extensive discard when the respective quota limitations were met. The discontent resulted in that the Faroese Government appointed a committee on 9 November 1995, composed of government officials and representatives of the industry with the terms of reference:

> *To evaluate the use of technical regulations within the frames of the fishery political objectives of biological and economic sustainability, and to evaluate the*

advantages and disadvantages of the different regulation methods from both biologically and economically controllable criteria.

The Committee[11] recommended application of an effort regulation on a number of the most important vessel groups, complementary with a restrictive and fleet based closure of fishing areas. The recommendations regarding effort regulation and closed areas were complied with and resulted in a considerable revision of the fisheries legislation to take effect as from the fishing year 1996-1997.

1.3. Main elements of the Commercial Fisheries Act

The basis of the Faroese fisheries regulation is enshrined in the Faroese Commercial Fisheries Act no. 28 of 10 March 1994. The Act include: a) the Faroese fishery on the Faroese fisheries territory, b) international fishery within the Faroese fisheries territory and c) the Faroese fishery outside the Faroese fisheries territory.

The regulation implies an explicit capacity regulation where the objective is to set the capacity on the level existing in 1995. The capacity regulation is implemented through licence rules, mainly through the so-called catch permits.

The establishment of the annual resource exploitation is carried out basically by using one of the following three regulation types:

The days at sea regulation (f. *fiskidagaskipan*). This regulation is directed against the catch of demersal species on the Faroe Plateau comprising most vessel groups. A similar regulation has been adapted for the Faroe Bank, but limited to hook and line fishery. Under these regulations, the individual vessel is allocated a certain number of days at sea for a specified fishery. The days at sea are measured in days and nights calculated as determined by the Minister for Fisheries and Maritime Affairs.

By-catch quota regulation (f. *hjaveiðuskipan*). This regulation is directed against fisheries in the Faroese zone outside the plateau and includes the larger trawlers. The regulation indicates how big a part of the by-catch may consist of cod and haddock.

[11] Frágreiðing frá Skipanarnendini, Torshavn 8 February 1996.

Quota regulation (f. *kvotuskipan*). This regulation is used in the Faroese fishery outside the Faroese area. The regulation allows catch of a certain amount of specified species.

In addition, there are a number of technical regulations including closed areas, minimum mesh sizes, target species, and by-catch measures that are used to adjust the regulations. Some fisheries, e.g. gillnet fishery is only regulated through capacity regulations and technical regulations.

The Commercial Fisheries Act is drawn up as a framework law. This means that the Minister of Fisheries and Maritime Affairs in a number of instances is authorized to issue additional provisions in the form of regulation orders (f. *kundgerð*).

1.4. Vessel groups

A central element in the Commercial Fisheries Act is a division of the Faroese fishing fleet into vessel groups. The division is based on the tonnage of the vessels and main type (trawlers, long-line vessels and gillnet vessels). The vessel groups are mentioned explicitly in the Commercial Fisheries Act and constitute a central element in the management of fisheries.

Vessels fishing in the Faroese fisheries territory are divided into six main groups, cf. Table 1.1. However, with an exception for trawlers with engine power below 500 HP, which are placed in main group 4 irrespective of tonnage.

Going through the provisions of the Act as well as supplementary provisions, it is, moreover, reasonable to subdivide some of the groups illustrated as subgroups in Table 1.1.

Table 1.1. Grouping of vessels used in regulating the Faroese fisheries

Group	Type	Subgroup		Regulation	Marine waters
1	Trawlers > 400 HP			By-catch quota	Faroese waters
2	Pair trawlers > 400 HP			Days-at-sea	Faroese waters
3	Long-Line vessels > 110 GT			Days-at-sea	Faroese waters
4	Coastal fishing vessels > 15 GT			Days-at-sea	Faroese waters
		4B	Trawlers> 40 GT		
		4B	Long-line vessels > 40 GT	Days-at-sea	Faroese waters
		4A	Trawlers < 40 BT	Days-at-sea	Faroese waters
		4A	Long-line vessels < 40 GT	Days-at-sea	Faroese waters
5	Coastal fishing vessels < 15 GT			Days-at-sea	Faroese waters
		5A	Full-time fishermen		
		5B	Part-time fishermen	Days-at-sea	Faroese waters
6	Gillnet vessels			Capacity and technical regulations	Faroese waters
7	High-sea trawlers			Quotas	Other waters
8	Seiners/multipurpose vessels			Quotas	Other waters
9	Shrimp trawlers			Quotas	Other waters
10	Other vessels			Quotas	Other waters

1.5. Licence system

The Faroese licence system includes two licence types:

- **Catch permits** (f. *vediloyvi*) used to manage fleet capacity (number of vessels and their tonnage).

- **Fishing permits** (f. *fiskiloyvi*) used to manage fishing patterns of the fleet (defined from gears, catch areas) and fleet activity (number of days at sea).

1.5.1. Catch permit

Only owners of vessels with a catch permit may participate in commercial fisheries. Hence, the catch permits define a ceiling for the total fleet capacity.

The catch permit follows the individual vessel and is typically transferred with change of ownership. In principle, the Act sets the capacity for the fleet on the level which was in effect as from 1 January 1995. However, the Commercial Fisheries Act lay down rules on how the catch permits can be transferred from an existing vessel to a new vessel or from more vessels to a new (or existing) vessel. The fundamental principle in such transfers or combinations is that the total capacity may not be increased. In the Act, it is specifically stated that capacity means the fishing pressure carried out

by a vessel on a day at sea. However, this definition of capacity is not particularly operational in practice, and the Act gives the possibility that the Minister of Fisheries and Maritime Affairs, in regulation orders, may lay down specific rules on how capacity is calculated. There have been several codes of practice since the Act came into force. The present rules[12] calculate the capacity from the physical size of the vessels.

By combining capacity of more vessels the result may be that the new vessel has to be classified into a larger main group. It is, however, not possible to transfer capacity from vessels in group 5 to other vessel groups.

Hook and line vessels below 15 GT (main group 5) are excluded from the demand of catch permit. By administrative means, it is also secured that capacity in this main group is kept at the 1995 level.

1.5.2. Fishing Permits

The Commercial Fisheries Act § 6 states:

> *Persons, who wish to trade in fish, should apply for a fishing permit. Catch for domestic purpose does not require a fishing permit.*

Owners of vessels with catch permits may apply for fishing permits. Owners of vessels in main group 5 (the smaller coastal fishing vessels) which do require catch permits may also apply for fishing permits. The fishing permit, to be renewed each year, gives a more specified right to participate in a particular fishery for the present year. The format of the fishing permit depends on how the individual fisheries are regulated either as number of days at sea for fisheries within the days at sea regulation or as catch amounts in tonnes within the by-catch and quota regulations.

Further rules for fishing permits are determined through governmental orders[13], where the different types of fishing permits are mentioned. An overall differentiation is made between the fishing permits to the Faroese fishing territory and other marine waters.

[12] Kunngerd no. 51 á 11. mars 2003 um mannagongd og áseting av fiskiorku, tá veiduloyvi verda flutt millum fiskifør 15 tons og størri.
[13] Især Kunngerd nr. 54 frà 26. mars 1993 um veiduloyvi til færoysk fiskiskip.

For the Faroese fishing territory differentiation is made between fishing permits for the different demersal fisheries referring to the main groups in the fleet (Table 1.1) as well as more specific fisheries. The latter, e.g. in the form of fishery for industrial fish, blue whiting, salmon, deep-sea smelt, fisheries with seiners and gillnet for monkfish and Greenland halibut.

Often, the individual vessels have different fishing permits. For instance, it is common that in the same year long-line vessels have a fishing permit to fish on the Faroe Plateau and on the Faroe Bank and in Icelandic waters. Correspondingly, gillnet vessels will most often have fishing permits to fish for monkfish and Greenland halibut. The permits may run across the main groups (gillnet vessels may have long-line permit) or across gear types (a vessel may have both trawl and long-line permits).

Trawlers below 110 GT belonging to main group 4 may only get fishing permit to trawl if they were registered as trawlers as from 1 January 1995. The purpose of this is to limit trawl fisheries on the Plateau, where certain areas are open to trawl fisheries.

The small vessels in main group 5 are not allowed to fish on Sundays and Holidays.

In addition, the Act opens up the possibility for limited or preliminary fishing permits for vessels which do not have a catch permits. This exception is important when establishing new fisheries to be carried out through experimental fishing permits.

1.6. Allocation and transfer of days at sea, by-catches and quotas

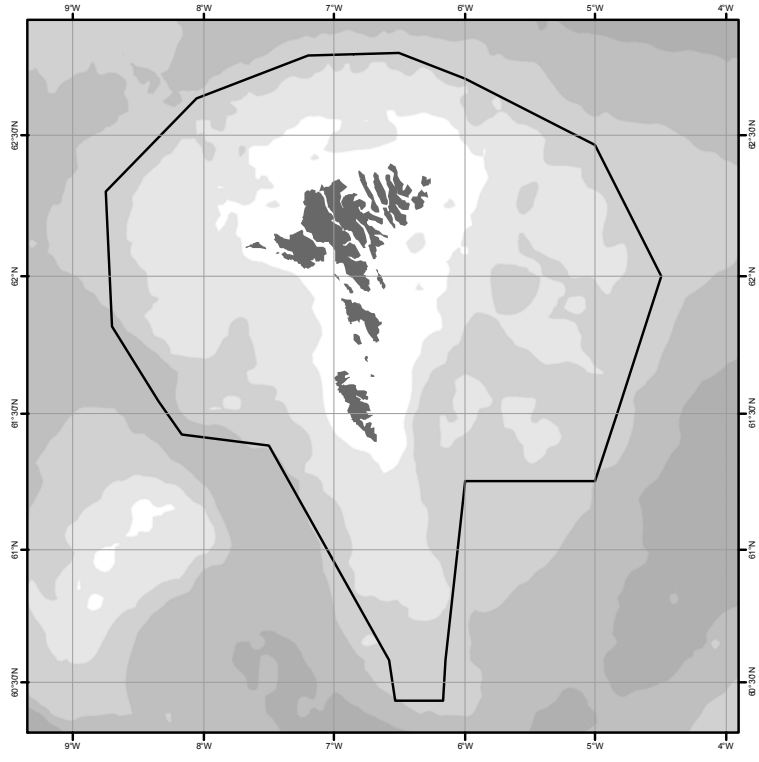
For the Faroese fishery in the Faroese fishing area, a fishing year is in effect as from 1 September to 31 August in the following year. The international fisheries in the Faroese fisheries territory and the Faroese fisheries outside the Faroese waters depend on mutual fisheries agreements, typically following the calendar year.

The allocation of days at sea, by-catch and catch quotas are valid for 10 years at a time except for provisional/temporary fishing permits, where fishing rights are only valid for one year. Individual quotas will typically be given in the form of quota allocations as a percentage of the specified quota in force.

1.6.1. Days at sea regulation

The number of days at sea for the fishery for demersal species on the Faroese Plateau is determined by the Commercial Fisheries Act for each fishing year. The days at sea are specified on fleet main groups 2-5, while group 4 is subdivided into vessels above and below 40 GT. The days at sea are valid for the so-called inner days at sea area, cf. Figure 1.1.

Figure 1.1. The inner days at sea area



For the main groups 2 to 4, the days at sea are distributed equally between the vessels which have fishing permits, and these are given for the whole fishing year. For main group 5 (the smallest coastal fishing vessels) a distinction is made between commercial fishermen (group 5A) who are allocated 60% of the days at sea of this group, and part-time fishermen (group 5B) who are allocated the remaining 40%. The commercial fishermen are allocated individual days at sea, whereas part-time fishermen are

fishing on a total amount of days at sea. Part-time fisheries are closed when the total amount of days at sea exceed the total allocation. Fishing permits to vessels in group 5 are given for six months at a time.

On the Faroe Bank the Minister of Fisheries and Maritime Affairs determines by administrative means the allocation of days at sea. The fishery is limited to hook and line fishery and fishing permits are given to those applying within the long-line vessels in main group 3 and 4. For the small coastal fishing vessels in main group 5 the permits are conditioned on a sea safety approval from the register of shipping.

The regulation specifies three particular provisions for the allocation of days at sea: 1) Provided the vessels choose to fish on the outer days at sea area, the days at sea only count with a third. 2) For coastal vessels in main group 4 with tonnage between 15 and 110 GT the number of days at sea are doubled when altering from trawl or line to jigging, and 3) when the pair trawlers in main group 2 are fishing as single trawlers the number of days are reduced by 30%.

The fishing permit no longer applies when the days at sea have been exploited by the individual vessel or group.

The days at sea cannot be transferred for vessels in group 5. For vessels in main groups 2, 3 and 4 the days at sea can be transferred according to two codes of practice.

1. Fishing permits can generally be transferred ***within*** the main groups, provided that days at sea intended for hook and line fishery cannot be allocated to trawl fisheries and vice versa. Transfer may take place permanently or for the running fishing year. For non-definitive transfer it is required that least 60% of the allocated number of days at sea in the previous fishing year has been used for fisheries.

2. When there is less than three months left of the fishing year, the rules are modified. It is then possible to transfer days-at-sea ***between*** the main groups except coastal fishing vessels in main group 4 which cannot transfer days from hook and line fishery to trawl fishery. The purpose of easier terms for transfer by the end of the fishing year is to aim at a full exploitation of the total effort.

Differences in fishing power are accounted for when effort is transferred between vessels. For instance, one day at sea is more valuable for a large vessel than for a small vessel. The management rules is provided in a governmental order that stipulates the conversion of days-at-sea between the vessels[14]. The rules are based on vessel dimensions and engine power.

Days at sea which are permanently transferred shall follow the proportional alteration in the total number of days at sea allocated to the main group as a whole. Thus, days at sea are as a right a share of the total allocated number of days at sea.

1.6.2. By-catch quota regulation

The by-catch quota regulation applies to the fisheries conducted by large individual trawlers in main group 1 on the inner days at sea area through an individual by-catch quota of cod, saithe, and haddock. The fisheries of these vessels are directed towards deep-sea species, particular redfish, and the regulation shall prevent targeted fishery on cod and haddock due to higher prices for these species. The by-catch quota, which is allocated biannually, has remained stable at 50 tonnes haddock and 50 tonnes cod biannually per vessel. The catch that these vessels have of cod and haddock outside the inner days at sea area is not regulated.

The fisheries shall stop when the by-catch quota has been used up. The Minister of Fisheries and Maritime Affairs may, however, lay down rules on how the fishery can be continued for these species which have not been fully exploited. The individual by-catch quotas can be transferred for one year at a time or definitively.

1.6.3. Quota regulations

The quota regulation includes particularly the Faroese fishery outside the Faroese area. The total quota available for the Faroese fishery is agreed through either a) bilateral agreements including the annual agreements with Iceland, Norway and EU, or b) through international fisheries commissions, especially the North East Atlantic Fisheries Commission (NEAFC) and the North West Atlantic Fisheries Organization (NAFO). The agreements include gadoids in the Barents Sea, redfish in the Irminger Sea, shrimps at the Flemmish Cap, and a number of pelagic fisheries (blue whiting,

[14] Kunngerd nr. 46 frà 9. aprìl 2003 um avhending av fiskidøgum.

herring and mackerel, among others). The Faroese fisheries shall stop when the total Faroese quota has been used.

The total Faroese quota is distributed between the shipping companies through individual annual quotas. The individual annual quotas may be transferred between the shipping companies for one year at a time or permanently. Quotas being transferred shall follow the annual alteration in the total quota and to be understood as quota shares.

There are specific rules for the quota fishery around Iceland which traditionally has been of great importance to the Faroese fisheries. Transfer of demersal fish quota which is not permanent, requires that at least 60% of the quota from the previous year has been caught.

1.6.4. Technical regulations

The technical regulations include as in EU/Denmark a number of different regulations comprising rules of general importance as well as various detail regulations of gear specifications for the individual fisheries. An important characteristic of the Faroese regulation is a comprehensive use of closed areas. This is therefore described relatively thoroughly in the following. The description of the other technical regulations is limited to the most important regulations.

Closed areas have been used in the Faroese regulation since the introduction of national 200 nautical mile zones in 1977, originally surviving the purpose of avoiding gear conflicts between long-line and trawl. Up to 1993, the number and extent of closures were gradually increased. The presently closed areas have been almost unchanged since 1996. Generally there is a distinction between the closing of ***spawning grounds*** and closing of ***areas for selected fisheries***.

The purpose of closing spawning areas is to prevent fishery on concentrations of spawning cod, haddock and saithe. The closings are restricted to the period around spawning. Jigging has historically been used frequently when fishing on concentrations of spawning fish. It is a very profitable fishery, and is often omitted from these closings. The location of the spawning grounds seen in Figure 1.2 includes the known spawning grounds for the demersal species (annex 2, *the Faroese stocks and their development*). Table 1.2 shows the period of closing of the respective areas and the fisheries that are excepted.

Figure 1.2. The position of closed areas in the spawning periods

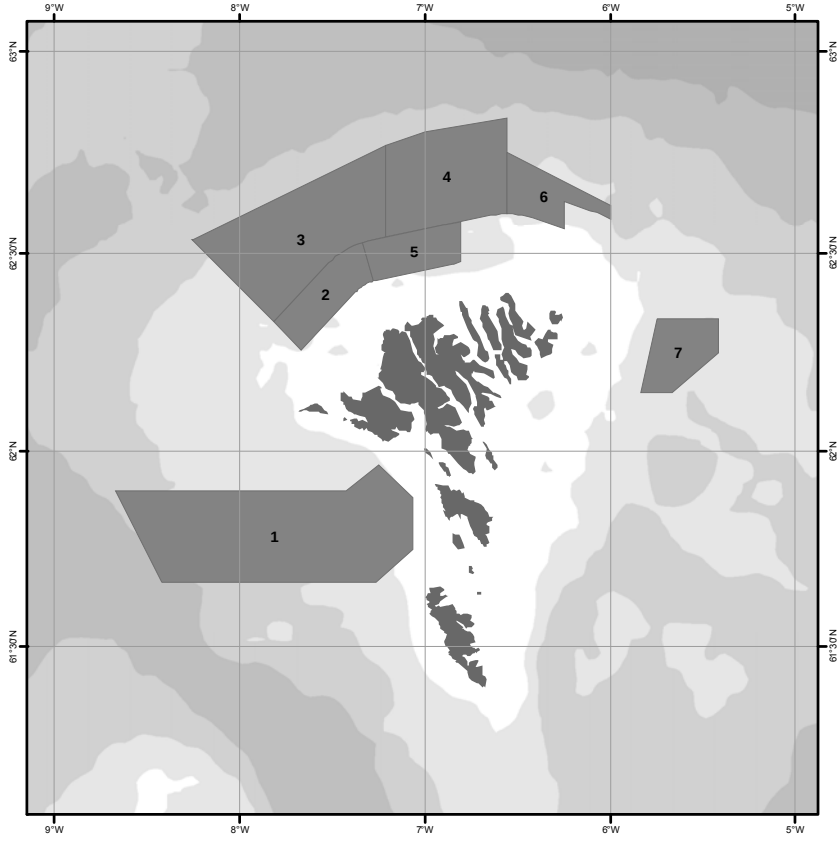


Table 1.2. Survey of areas closed to fishery in the spawning periods[15]

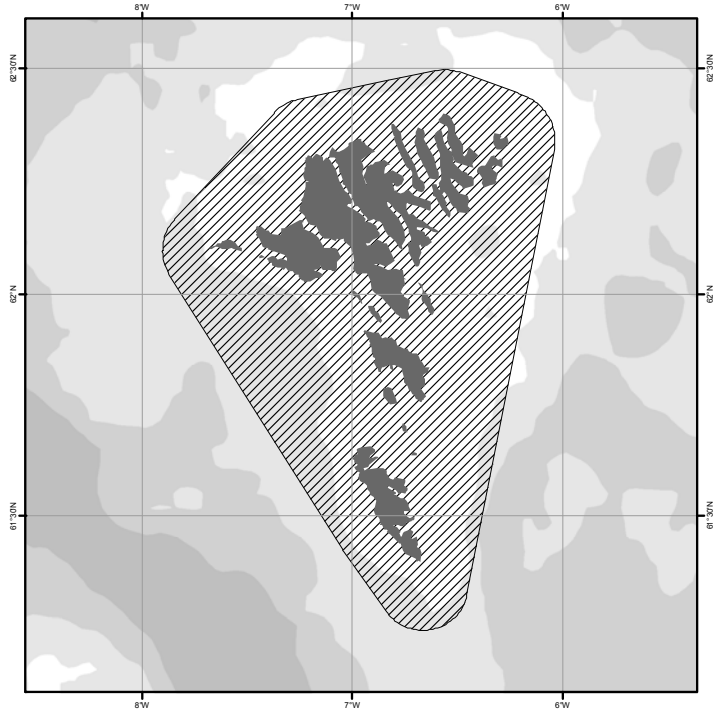
Area	Closed period	Excepted fisheries
1	15 February – 31 March	1) Jigging 2) Gillnet fishery for monk fish
2	15 February – 15 April	1) Jigging, 2) Smaller long-line vessels
3	1 February – 1 April	1) Jigging, 2) Gillnet fishery for monk fish
4	15 January – 15 May	1) Jigging, 2) Long-line fishery
5	15 February – 15 April	Jigging
6	15 February – 15 April	None
7	15 January – 1 April	Long-line fishery

Note: The numbering refers to areas in Figure 1.2.

[15] Kunngerd no. 11 frà 14. February 2002 um tidaravmarked veidiband á gýtingarleidum, sum broytt vid kunngerd nr. 22 frá 15. March 2002.

The areas closed for particular fisheries or vessel groups are specified in the Commercial Fisheries Act and the supplementary regulations are specified in accordance with the division of the fleet into main groups. The regulations also specify various important restrictions that generally refer to gear types. In the present review, the area restrictions are presented by gear types.

Figure 1.3. Area reserved to hook and line fishery (within the 6 nautical mile zone)

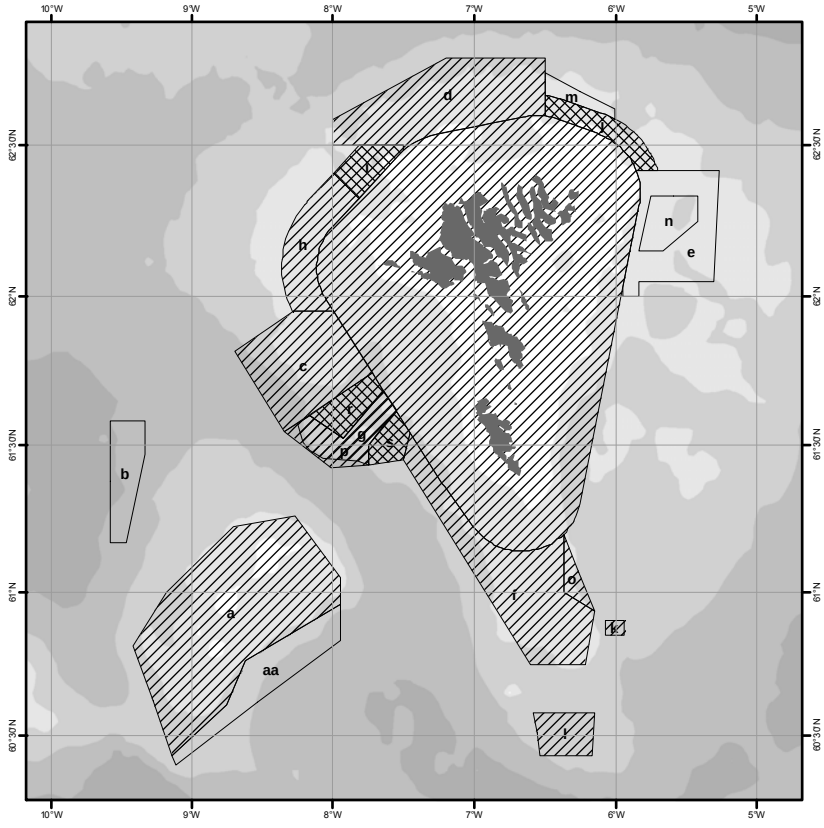


Vessels fishing with *long-line and jiggers*: The regulation[16] prohibits long-line fishery with vessels with a tonnage above 90 GT within 6 nautical miles from the basis line, see Figure 1.3. However, long-line vessels not using bait machines are excluded from this. The purpose of the regulation is to secure exclusive admittance to the most near-shore fishing grounds for the coastal fishing vessels in main groups 4 and 5.

[16] Kunngerd no. 97 frá 10. June 1996 um fiskiskapan á landleidunum vid fiskiføum, som eru skrásett í føroyum, sum seinast broytt vid kunngerd no. 26 frá 6. march 2001.

Vessels fishing with *trawl*: The principal rule is that it is not allowed to conduct fishery within the 12 nautical mile zone from the basis line and in a number of adjacent areas[17], see Figure 1.4. For several of the latter areas there are derogations which either allows fisheries in certain periods or which give special rights to the smaller trawlers in the coastal fishing fleet main group 4.

Figure 1.4. Closed areas trawl gears



Note: Areas closed the whole year for all vessels are hatched; areas closed part of the year is marked with open signature and areas closed for certain vessels are marked with cross hatching.

The regulation of the trawl fishery is supplemented with an exemption clause[18], allowing a summer fishery for flatfish in certain areas within the 12 nautical mile zone

[17] The Commercial Fisheries Act and kunngerd nr. 97, see footnote 8.
[18] Kunngerd no. 91 frá 30. May 2003 um trol veidi innan fyri 12 fjórdingar í 2003.

for smaller trawlers in main group 4 (see Figure 1.4 and a listing of open periods in Table 1.4). This flatfish trawl fishery is strictly regulated by a number of additional provisions: a) a maximum of 15 fishing permits are given to vessels with a tonnage below 110 GT, b) there are restrictions in mesh size and it is compulsory to use a sorting grid, c) there are by-catch provisions, stipulating a maximum by-catch of cod and haddock of 35% of landing weight and finally d) specific demands of keeping logbook.

Table 1.3. Closed areas for trawl fishery

Area	Closed period	Excepted trawl fisheries
a,c,d,f,g,h,k,l,o,p	The whole year	None
aa	1 June – 31 August	None
b	20 January – 1 March	None
e	1 January – 31 January and 1 April – 31 December	None
i	The whole year	Single trawlers with engine power < 500 HP
j	The whole year	Single trawlers with engine power < 500 HP
m	1 February – 1 June	Single trawlers with engine power < 500 HP
n	31 January – 1 April	None
r	The whole year	Single trawlers with engine power < 500 HP
s	The whole year	Single trawlers with engine power < 500 HP

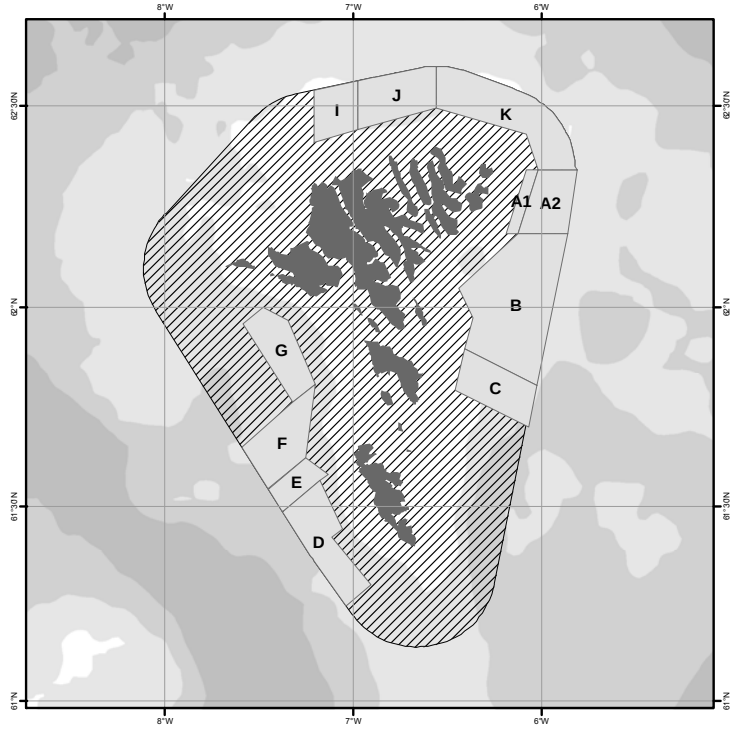
Note: The numbering refers to the areas in Figure 1.4.

Table 1.4. Areas within the 12 nautical mile zone open to fishery for flatfish

Area	Open period
A2,B,D,E,G,J,K	1 June – 31 August
A1	8 June – 31 August
C	1 June – 15 July
F	1 June – 8 July
I	1 June – 1 July

Note: The numbering refers to areas in Figure 1.5.

Figure 1.5. Areas open to fisheries for flatfish with trawl in the summer period



The fishing areas for vessels fishing with gillnets are limited to deep waters, and there is a differentiation between targeted fisheries for monk fish and Greenland halibut[19]. The targeting is regulated through by-catch provisions (cf. below).

Monk fishery is allowed during the whole year at depths below 380 m outside the 12 nautical mile zone south and west of the Faroe Islands, but the area around the Faroese Bank is closed. In addition, fishery is allowed in a small area east of the Faroe Islands.

Greenland halibut fishery is allowed during the whole year at depths below 500 m with the exception of a closed area around the Faroese Bank and an area adjacent to the Icelandic fisheries zone.

[19] Kunngerd nr. 89 frá 28 May 2003 um fiskiskap eftir havtasku og svartkalva vid gørnum á føroysku landleidunum.

Rules have been introduced for closing areas with large occurrence of juveniles[20], the so-called Real time closings. The shipmaster shall inform the Faroese Fisheries Inspection when the amount of juveniles exceeds the limits laid down. The Fisheries Inspection may subsequently get observers onboard in preparation for a closer evaluation. The Fisheries Inspection may immediately order those vessels fishing in the area to move to another fishing area. When sufficient information is available on distribution of juveniles, the Faroese Fisheries Inspection determines which geographic area that shall be closed to fisheries and determines the period for how long the ban shall be in force. The ban shall be broadcasted on the Faroese radio as soon as possible.

In addition, a number of mesh sizes and target species/by-catch provisions are applied in the Faroese fisheries regulation. The principal rule for trawl is that the mesh size must not be less than 145 mm. For a number of further specified fisheries it is, however, permitted to use smaller mesh sizes provided the catches are kept within further specified limits for the target species concerned, cf. Table 1.5.

Table 1.5. Target species, mesh size and target species limit for trawl fisheries for demersal species

Target species	Mesh size	Target species limit	Other provisions
Saithe	135 mm	At least 50% of the fishing weight in each haul shall originate from saithe	
Blue ling, round nose grenadier and sablefish	100 mm	The target species shall constitute at least 50% in each haul	Depth to be more than 500 m
Red fish	135 mm	At least 50% of the fishing weight in each haul shall constitute red fish	
Flatfish	100 mm, set use of sorting grid	Cod and haddock may not exceed 35% of the total landings per survey	Within the 12 nautical mile zone, fisheries is only allowed in certain periods in certain areas (see above)

For gillnet fishery, by-catch is regulated in order to prevent that gillnet fishery is targeted on other species than monk fish and Greenland halibut[21]. For both these fisheries, the regulation determines that maximum 7% of the annual catch, with a maximum

[20] Kunngerd nr. 56 frá 26. March 1993 um serlig tiltøk til vernd av ungfiski.
[21] Kunngerd nr. 89 frá 28 May 2003 um fiskiskap eftir havtasku og svartkalva vid gørnum á føroysku landleidunum.

of 15% on a single trip, consists of cod, haddock, saithe and red fish. Other species apart from the above and the target species, monk fish or Greenland halibut, may constitute maximum 7% per year and maximum 15% per trip.

Gillnet fishery is strictly regulated by a low number of fishing permits. In the fishing year 2003-2004, the number of vessels which could apply for permits were 9. In addition, the fishery is regulated through mesh size regulations which are 280 mm for monk fish and 200 mm for Greenland halibut. Furthermore, there are limits for the number of gillnets that can be used at the same time.

Minimum landing sizes have been determined for a number of species, including cod (40 cm), haddock (37 cm), saithe (45 cm), large red fish (30 cm), monk fish(50 cm), and Greenland halibut (35 cm).

The Faroese fisheries regulation includes a general ban on discard of fish.

1.7. Management of the days at sea regulation

The political management of the fishing areas is made up by the Faroese Minister of Fisheries (f. *Landsstýrismaður í fiski- and sjóvinnumálum*). The Ministry of Fisheries and Maritime Affairs (f. *Fiskimálaráðnum*) is organized with a department (f. *Aðalskrivstovan*), under which there are a number of specific offices, including among others commercial fishery (f. *Fiskivinnustovan*), the Faroese Fisheries Inspection (f. *Fiskiveiðieftirlitið*), Catch Statistics (f. *Lønjavningarstovan*) Shipping Register (f. *Skipaeftirlitið*), Vessel Register (f. *Skipaskrásetingin*), and Life-saving Service) (f. *Sjóbjargingarstøðin*).

1.7.1. Setting the number of days at sea and quota sizes for a fishing year

The number of days at sea for each of the main groups in this part of the fleet which is subjected to days at sea regulation are laid down by law at the latest on 18 august for the fishing year starting on 1 September.

The Commercial Fisheries Act determines that the minister when introducing a bill shall include recommendations from the Faroese Fisheries Laboratory (f. *Fiskirannsóknarstovan*) and from the Committee on Fishing Days (f.*Fiskidaganevndin*). Members of the Committee on Fishing Days are representatives from the fisheries and appointed by the Minister for Fisheries and Maritime Affairs. Recommendations given

by the committee shall among other things be based on securing a sustainable exploitation of fish stocks.

The number of days at sea for Faroe Bank and quotas and by-catch quotas sizes are determined administratively.

1.7.2. Monitoring of use of days at sea

The Faroese Fisheries Inspection controls continuously the 'balance' of days at sea for the individual vessels. Until 2003, the registration of days at sea for the larger vessels (main groups 2, 3 and 4) was based on telephone messages made on departure from and arrival to harbour. From 20 March 2003, these vessels are prescribed to continuously submit position reports via a satellite monitoring system (VMS)[22]. The use of days at sea by the coastal fishing vessels below 15 GT in main group 5 is registered only through sale slips.

Transfer of days-at-sea between vessels has to be approved by the Fisheries Inspection which verifies accordingly the days at sea assets on the balance of the vessels involved.

[22] Kunngerð nr. 96 frá 17. December 2002 um eftirlit við fiskiførum um fylgivein, sum broyt við kungerð nr. 29 frá 4. March 2003.

Annex 2. The Faroese fish stocks and their development

2.1. Extent and sources

The present section describes the biology, status and development of the Faroese fish stocks, especially bringing into focus the demersal species subjected to effort regulation: cod, haddock and saithe. For the other fish species where fisheries are conducted a short summary of stocks is given.

The official advice from the International Council for the Exploration of the Sea (ICES)[23] is used for stock assessment and fisheries statistics. Internationally published papers and several Faroese reports[24] [25] [26] [27] [28] are used in the biological description. For description of hydrographical conditions, ICES reports as well as internationally published papers have been used[29] [30] [31].

Section 2.9 includes a glossary of the most used terms within biology.

[23] International Council for the Exploration of the Sea ICES (2003). Report of the Advisory Committee on Fishery Management and ICES 2003. Report of the Northwestern Working Group. ICES CM2003/ACFM:24.

[24] Steingrund, P. and E. Gard (2004). Relationship between phytoplankton production and cod production on the Faroe shelf. ICES Journal of Marine Science: in press.

[25] Jakupsstovu, S.H. (1999). The Fisheries in Faroese Waters. Fleets, activities, distribution and potential conflicts of interest with an offshore oil industry. Fiskirannsóknarstovan. Internal Report.

[26] Fiskastovnar and Umhvørvi (1998). Fiskirannsóknarstovan. Internal Report.

[27] Nordi, G. and M. Poulsen (2000). Føde og fødevalg hos torske- og kulleryngel på Færøplateauet og Færøbanke. BS-opgave i Biologi 2000. In Danish.

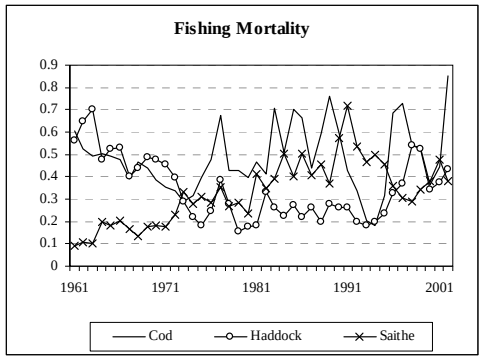
[28] Jakupsstovu, S.H., J. Reinert and P. Steingrund (2003). Cod in Faroese waters. Internal Report, Fiskirannsóknarstovan.

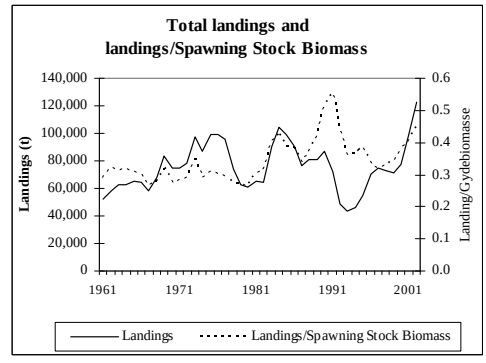
[29] Gaard, E. (2000). Seasonal abundance and development of *Calanus finmarchicus* in relation to phytoplankton and hydrography on the Faroe shelf. ICES Journal of Marine Science 57: 1605-1611.

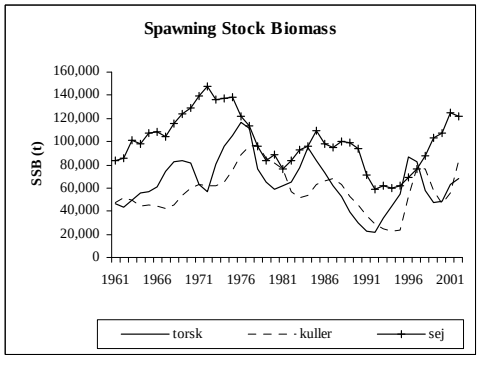
[30] Larsen, K.M.H., B. Hansen, H. Svendsen and K. Simonsen (2002). The front on the Faroe Shelf. ICES Annual Conference 2002 CM2002/P:10.

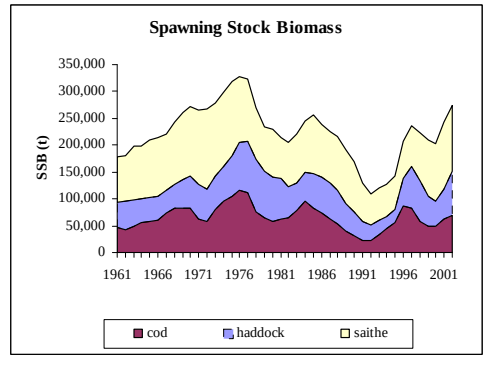
[31] Larsen, K.M.H., B. Hansen, R. Kristiansen and S. Østerhus (2000). Internal tides in the waters surrounding the Faroe Plateau. Annual Conference 2000 CM2000/L:09.

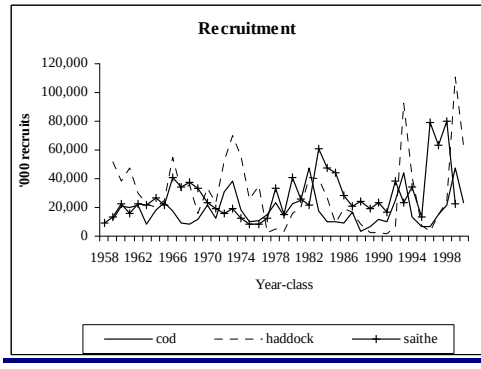
Figure 2.1. Diagrams of landings, fishing mortality, recruitment, and spawning biomass for cod, haddock and saithe











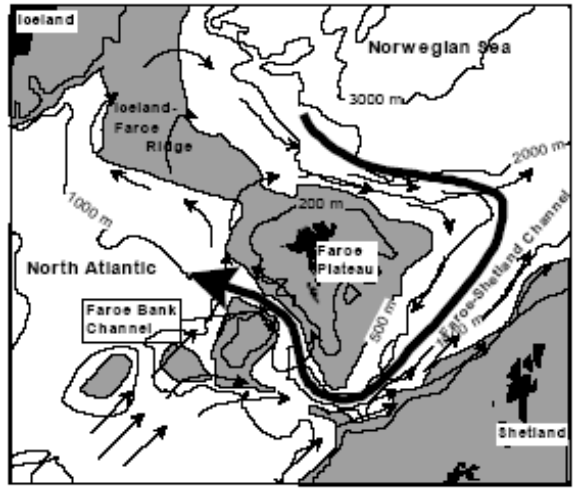
2.2. The Faroese bottom topography and sea currents

The Faroe Islands is situated in the northern Atlantic on a shelf with depths of approximately 150 m, connecting the continental shelf between Scotland, Iceland and Greenland, and which divides the Norwegian Sea and the Northern Atlantic. The cur-

rents around the Faroe Islands are in the upper 500 m characterized by warm and saline north Atlantic water, running northwards on both sides of the Faroe Islands and into the Norwegian Sea. This result in current movements around the Faroe Islands in clockwise direction, cf. Figure 2.2. In a period from the late 1980s, the North Atlantic current has been reduced which has been mentioned as an important factor for a declining productivity around the Faroe Islands, including low growth and recruitment of fish stocks. The Faroe Plateau is characterized by tidal movements, and this causes the water masses on the plateau to be up welled and homogeneous at all depths, while water masses outside the Faroe Plateau are strongly stratified and thus varies down through the water column. The strong upwelling of water masses on the Faroe Plateau is an important factor for a high biological production.

The current conditions in the deeper water masses consist of colder and less saline water coming from the Arctic Ocean and running southwards as part of a global circulation system. Therefore, there is a significant shift in nature of the water masses around the Faroe Islands at depths of 400-600 m.

Figure 2.2. Bottom topography and current conditions around the Faroes

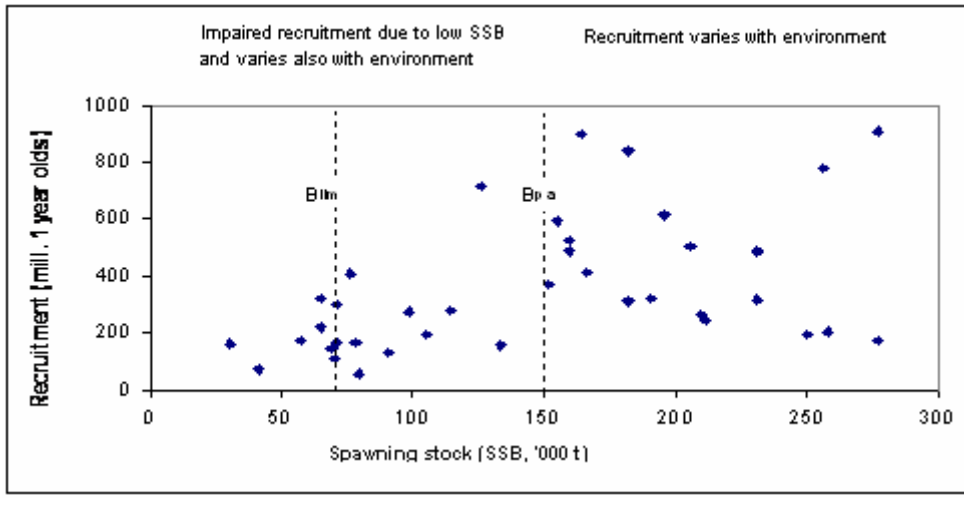


Note: The thin arrows shows the northbound surface current circulating clockwise around the Faroe Islands, while the thick arrow shows the deep-sea current from the Norwegian Sea down into the Northern Atlantic, in the same direction around the Faroe Islands.

2.3. Terms used in advising

The size of a fish stock is measured as **spawning stock**, often called **SSB** (Spawning Stock Biomass) and indicates the weight of the mature part of the stock. The reproduction of fish stocks varies considerably from nature as a result of variations in survival possibilities from the youngest life stages. This variation is seen as large fluctuations in the amount of juveniles added to the stock annually (**recruitment R**). When the spawning stock is over a certain size, the size of the recruitment will primarily vary with the environment. Under a certain level the size of the spawning stock may, however, be a limiting factor for recruitment, and thus it is probable that on average fewer recruits are produced from a small spawning stock, cf. Figure 2.3.

Figure 2.3. An example of historic relation between spawning stock and recruitment



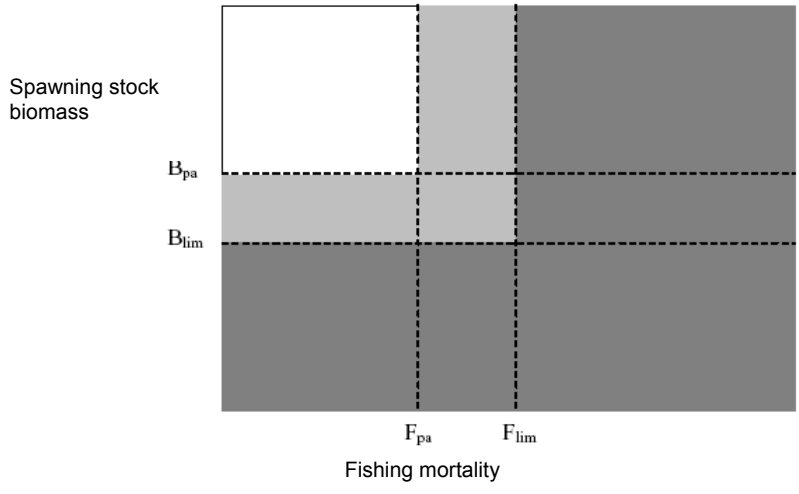
Note: Each dot represents a year-class with complete spawning mass.

From a historic relation it is attempted to find a level of the spawning stock with which recruitment is reduced. This critical limit is described as **Blim**, where **B** is biomass and '**lim**' is limit or boundary). Analogously, it is attempted from historic data to find a level for **fishing mortality** (see glossary) which in the long run only just will keep the stock on Blim. This fishing mortality is described as **Flim** (F is fishing mortality).

The estimates on spawning biomass and fishing mortality are not exact, as they are subject to some uncertainty. This uncertainty is taken into account by calculating a 'buffer' zone for each of the reference points B_{lim} and F_{lim}, securing that the critical limit is not exceeded. The new reference points with buffer zone are described as precautionary reference points, **B_{pa} and F_{pa}**, where 'pa' is 'precautionary approach'. In this way, a stock of a size of least B_{pa} with a fishing mortality of not more than F_{pa}, there is a high probability that the stock will stay above the critical limit B_{lim}. The distance between 'lim' and 'pa' points is specific for the individual stock and thus dependent of the uncertainty in the stock assessment or of the data that are part of it.

Figure 2.4 illustrates the correlation between biological reference points and the term safe biological limits. If stock and fishing mortality are within the non-hatched area defined by reference points B_{pa} and F_{pa}, the stock is within safe biological limits. In the grey area between B_{pa} and B_{lim} reference points, the stock is within the determined limits, but due to uncertainty in stock assessment it is very likely that the stock actually is below B_{lim}. Therefore, the stock is described as being outside safe biological limits. In the upper grey and the upper dark field the stock is above B_{pa}, while fishing mortality is above F_{pa}. In this case ICES uses the terminology that the stock is 'exploited outside safe biological limits'.

Figure 2.4. Reference points



The scientific advice from ICES is to a very large extent based on 'safe biological limits' for the individual stock as described above and is evident from the following reviews on the advice of the individual stocks. From a scientific point of view it must, however, be admitted that it has been difficult to procure data for definition of reference points for many stocks and thus determine these limits on a safe scientific basis.

2.4. Data

The biological scientific advice is based on data collected from the fisheries as well as data collected on research vessels.

The Faroese Fisheries laboratory, Fiskirannsoknarstovan in Torshavn, carries out two annual surveys with the research vessel *Magnus Heinason*. There is a cruise in spring February-March and a summer cruise in August-September, and both of these cover the Faroe Plateau. In addition, samples from the commercial fisheries are collected through quarterly harbour collections throughout the year and cover most categories of gears/fleets. During these harbour collections fish length and weight are measured, and otoliths are taken for determination of age in order to be able to assess how many fish that are taken from the fish population annually. In 2002, e.g. a total of 55,000 cod were length measured and from these 6,000 otoliths were taken for age determination. From every single vessel from the commercial fisheries information is given on fishing effort (days-at-sea) in combination with landings of catch. For individual fleets (certain long-line vessels and pair trawlers) there is logbook data specified on the individual fishery operation (trawling/long-line setting). Finally, fisheries statistics (catches disaggregated on species, area and time) from the Faroese authorities are included.

All available data are used in the total assessment and thus influence the results. The calculation methods used are to a certain extent able to reveal inconsistency in basic data and to put lesser emphasis on data which contradict all other information. In the nature of the case, there are no methods to change poor basic data into good basic data. The quality of all stock assessment is ultimately dependent on the quality of the basic data.

2.5. Cod (*Gadus morhua*)

Around the Faroe Islands there are two defined and self-reproducing cod stocks: Faroe Bank cod and Faroe Plateau cod. Tagging experiments have shown that the two

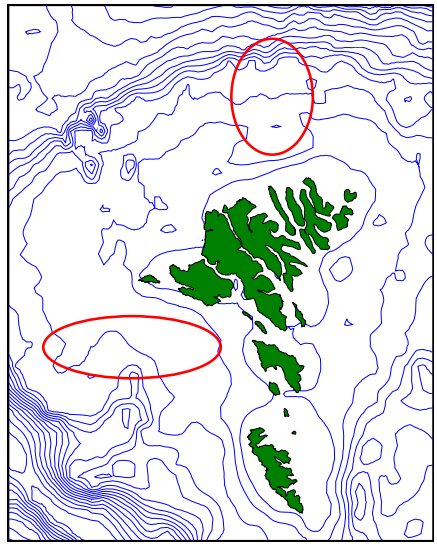
stocks are very resident and rarely mix (only 0.1% exchange between the stocks). Other studies on stock delineation such as morphometry, biometry and biochemistry (fatty acids) also support this assumption of two well separated stocks. The Faroe Plateau stock is by far the largest stock of the two.

2.5.1. Faroe Plateau cod

2.5.1.1. Biology and population characteristics

The plateau cod is widespread all over the continental shelf around the Faroe Islands down to approximately a depth of 500 m. The cod is sexually mature at an age of 3-4 years and spawns in February-March in two distinct areas north and west of the Faroe Islands on depths of about 90-120 m, cf. Figure 2.5. The pelagic eggs and subsequently larvae hatching in April are drifting along the water masses in the Faroese current on the continental shelf around the Faroe Islands clockwise. In June-July the larvae, now being 4-5 cm, leave the upper water masses, and in the following months they settle in coastal shallow areas with stand of sea-weed. The following autumn the juvenile fish (as 1-year-old) gradually begin to migrate to deeper waters on the Plateau (down to 200 m) and mix with the grown up part of the stock in the foraging area. The essential feed in this area consist of sand eel and demersal crustaceans. With age the cod prefer still deeper areas for foraging (down to 350 m) and here the preferred prey is primarily Norway pout, blue whiting and a few species of larger demersal crustaceans. When 2-years-old the cod is seen in the fisheries, and at the same time sexual maturity begins. The migration towards the spawning areas starts in December-January, and the cod leaves the spawning areas at the end of May. The grown up part of the stock are thus staying all over the continental shelf area outside the spawning. The spawning migration apparently takes place diffuse from the whole foraging area and does not follow specific routes. For the period that is back to the 1961, where estimates exist of spawning biomass and recruitment (2-year-old), there is no distinct correlation between the two sizes. That means that even when the spawning stock is at a low level it may produce good year-classes.

Figure 2.5. Spawning areas for cod on the plateau



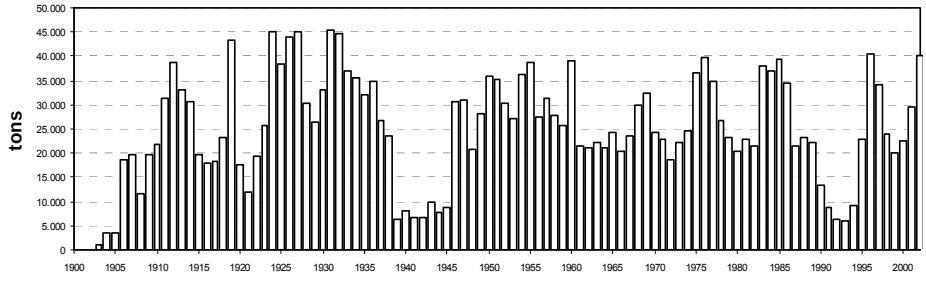
Note: Depth contour lines are shown for intervals of 50 m.

2.5.1.2 . Historic development of stock and fisheries

The cod stock around the Faroe Islands has been fished for centuries. The Faroese started early a fishery with dories in the coastal areas. Since the beginning of the 19th century the Faroese fleet specialized in a sea-going long-line fishery in order to be able to compete with the large international fleets, English and Scottish vessels, in particular, which were dominating the fisheries for cod in Faroese waters. Until 1959, all nationalities were allowed to fish in Faroese waters outside a 3 nautical mile zone. Through the 1960s the Faroese fishing zone was gradually extended, and only after the establishment of a 200 nautical mile zone in 1977, the Faroese vessels were dominating the cod fisheries. In 1987, a demand for fishing licences was introduced, and since then the fisheries have been regulated by technical regulations, such as mesh size and closed areas. In 1994, a new quota system was introduced based on individual transferable quotas (ITQ) in order to reduce annual catches and to protect the relatively low spawning stock. Reliable catch data exist back to the beginning of the 20th century and show that fisheries during the entire period have had annual landings between 20,000 and 40,000 tonnes, interrupted only by World War II and a few years in the 1990s where apparently the stock was very low, cf. Figure 2.6. Hence, the annual catch amounts have been relatively stable during the entire 20th century. Good year-

classes in 1980-1983 contributed to the presumably highest catches in the period 1983-1986.

Figure 2.6. Development in catch of Faroe Plateau cod



Note: The catches from 1903 to 1960 on the Faroe Bank corresponding to estimated 8% of annual catch.

2.5.1.3. Status of the stock

The stock (spawning biomass) is assessed to be within safe biological limits, cf. Table 2.1. Since the crisis in 1993-1995, the spawning biomass has exceeded the recommended minimum level (cf. precautionary approach) B_{pa} (40,000 tonnes) and was, latest in 2002, substantially above this level with 68,600 tonnes, cf. Figure 2.7. Since 1997, **recruitment** has increased, and the 1999 year-class is among the four biggest after 1960. This year-class has contributed considerably to the fisheries since 2001 and will do so for another 2-3 years. Through the recent years, **fishing mortality** is too high (0.36-0.53) (2002 estimate is too uncertain) and above both the recommended maximum mortality (cf. precautionary approach) F_{pa} (0.35). During the entire period with available data, fishing mortality has been greater than F_{pa}, except for two short periods in the 1970s and the beginning of the 1990s. Correlation between spawning biomass and recruitment can be seen in Figure 2.8.

Table 2.1. Summary of status of cod on the Faroe Plateau

	Stock (1,000 tonnes)	Fishing mortality	Recruitment of 2-year-old (million individuals)
Condition in 2002	68	0.85	25
Average 1961-2001	65	0.48	18
Ref. point cf. precautionary approach (pa)	40	0.35	
Critical limit (lim)	21	0.68	

Figure 2.7. Development in landings, fishing mortality, spawning biomass and recruitment of Faroe Plateau cod, 1961-2002

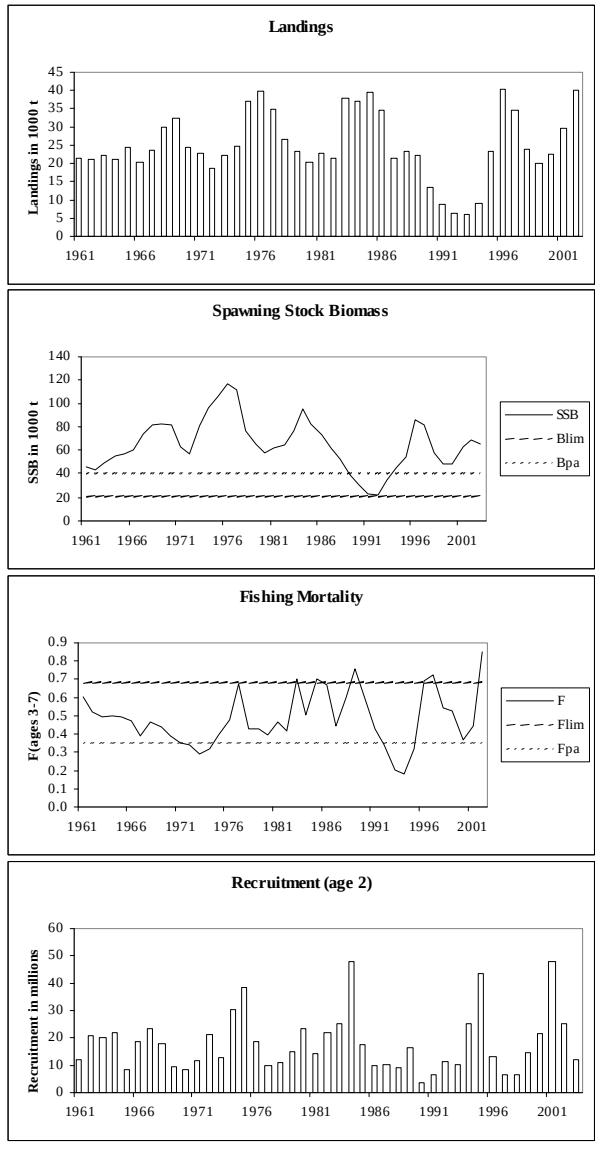
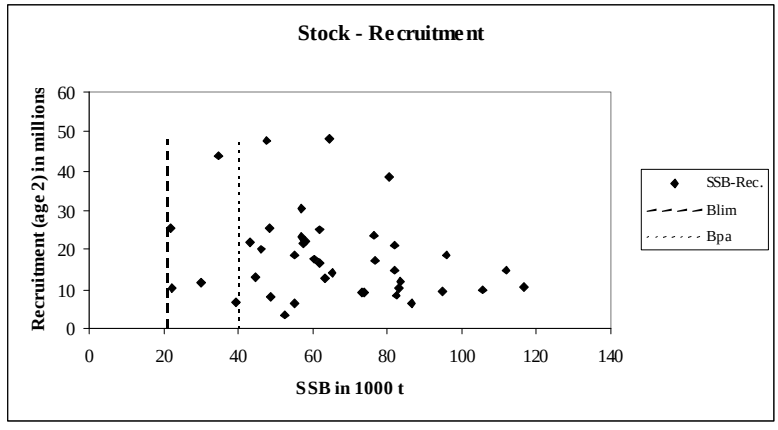


Figure 2.8. Relation between spawning biomass and recruitment with level lines for Blim and Bpa



The advice for 2004 is thus 'to reduce fishing effort with at least 25% compared to the level of last year in order to reduce fishing mortality to F_{pa}'. This is shown in Table 2.2 in where historic advice can be seen as well.

In the advice, attention is directed to the fact that the spawning biomass is far above the recommended minimum level, B_{pa}, and, provided moderate exploitation, it is expected to be on that level in a near future due to the strong 1999 year-class in the fisheries. In addition, it is demonstrated that assessment of the stock year after year overestimates fishing mortality the last year and underestimate the spawning stock the last year. The cause of this phenomenon is not known for certain, but should be taken into consideration when last year's estimates of spawning biomass and fishing mortality are assessed. In addition, the systematic deviation is an obstacle for an exact catch prognosis. For the present assessment it is, however, most likely that the fishing mortality through the last couple of years is bigger than F_{pa}.

The stock assessment is based on a so-called analytical assessment (VPA), where the summer survey is used together with commercial catch data.

Table 2.2. Historic advising of Faroe Plateau cod

Year of advising	Advice	Calculated catch (see advice) (1,000 tonnes)	Determined TAC (1,000 tonnes)	Official catch specified (1,000 tonnes)
1987	No increase in F	<31		21.4
1988	No increase in F (revised estimate)	<29 (23)		23.2
1989	No increase in F	<19		22.1
1990	No increase in F	<20		13.5
1991	TAC	<16		8.7
1992	No increase in F	<20		6.4
1993	No fisheries	0		6.1
1994	No fisheries	0	8.5/12.5*	9.0
1995	No fisheries	0		23.0
1996	F on lowest possible level	-		40.4
1997	80% of F(1995)	<24		34.3
1998	30% reduction in effort from the level in 1996/97	-		24.0
1999	F less than F_{pa} (0.35)	<19		19.9
2000	F less than F_{pa} (0.35)	<20		22.4
2001	F less than F_{pa} (0.35)	<16		29.0
2002	75% of F(2000)	<22		40.2
2003	75% of F(2001)	<32		-
2004	25% reduction in effort			

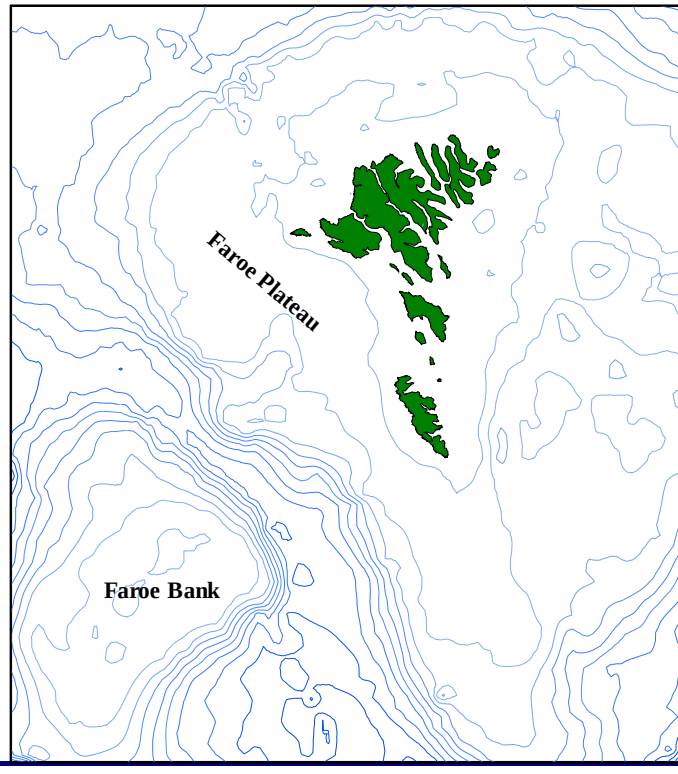
Note: * In force for the quota year 1 September - 31 August the following year. TAC was increased during the quota year.

2.5.2. Faroe Bank cod

2.5.2.1. Biology and stock characteristics

Faroe Bank cod spawns from March to May on the lower parts of the bank, cf. Figure 2.9. The pelagic eggs and later larvae drift in the water masses around the bank clockwise. In July, the juvenile fish settle on the bank. No habitat areas have been found for the Faroe Bank cod, but it is assumed that juvenile fish are scattered all over the bank in places hard to get at for fishery. All year-classes of the Faroe Bank cod is therefore attached to the bank itself, but like Faroe Plateau cod there is a positive connection between depth and size of cod. The growth of cod is faster than on the plateau, and apparently a result of the higher temperatures on the bank. Even if the Faroe Bank cod also spawns for the first time as three-year-old, the average size of these are 20 cm longer than three-year-old plateau cod.

Figure 2.9. Spawning area for Faroe Bank cod

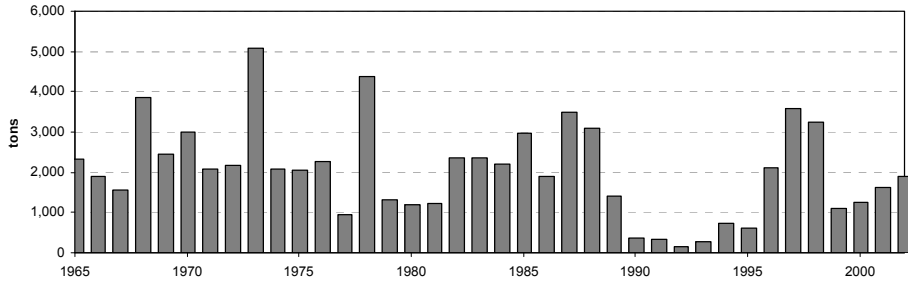


Note: Depth contour lines are shown for intervals of 100 m.

2.5.2.2 Historic development of stock and fishery

As for Faroe Plateau cod, the Faroe Bank cod have been fished for centuries. To 1960, the exact catches are not known, as the catches are included in the catch statistics for all cod catches at the Faroe Islands, but it is assumed that catches of Faroe Bank cod constituted 8% of the total catches. Since the middle of the 1960s the annual catches have been irregular with a few hundred tonnes to more than 5,000 tonnes, cf. Figure 2.10. From the end of the 1980s to the beginning of the 1990s the landings were drastically reduced, and the fishery was strongly restricted. Thus, only long-line vessels and jiggers were admitted to the area in 1992-1993. From 1995 a quota of 1,050 tonnes was set for the area. From introduction of the new effort regulation in 1996 there was still only admittance for long-line vessels and jiggers, while trawlers were limited to the deeper parts of the bank (>200 m).

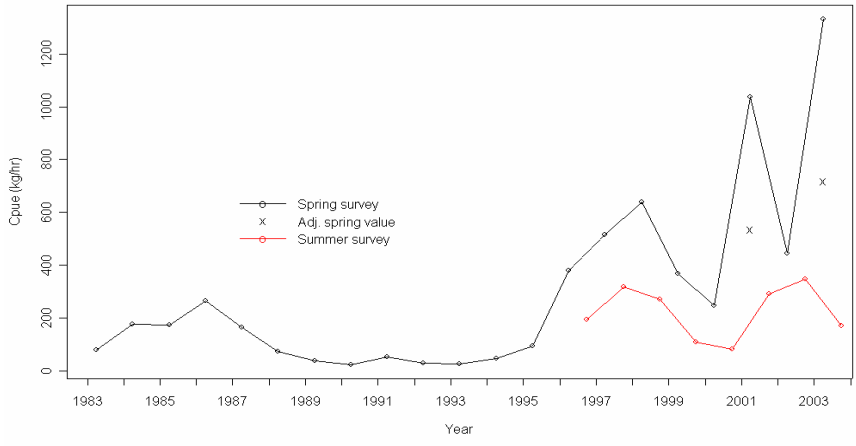
Figure 2.10. Development in catches of the Faroe Bank cod, 1965-2002



2.5.2.3. Status of the stock

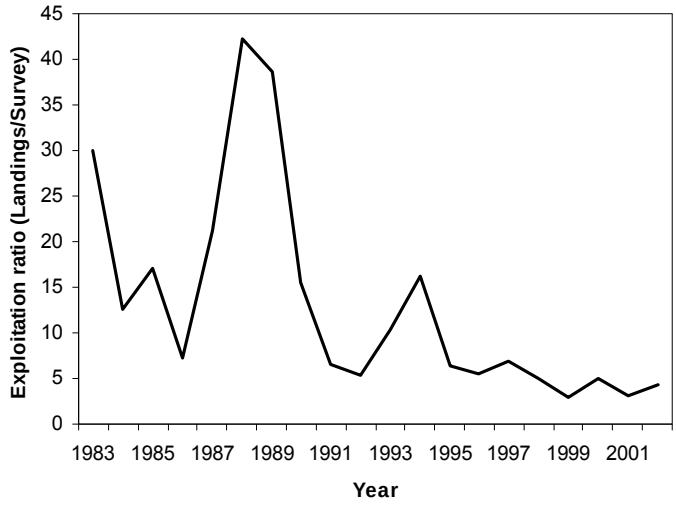
Development and status of the **spawning stock** is not known for certain. Survey catch rates indicate a significant increase in the stock in 1996-1998 compared to the previous period back to 1983, cf. Figure 2.11. In 1999-2000, the stock is apparently reduced, but is still at relatively high levels. Catch composition in the surveys indicates that strong year-classes have been frequent since 1995. Again in 2001-2003, the survey catch rates increase to the highest levels in the time series. As approximation on the exploitation rate the landings per catch rate are shown in Figure 2.12. In the 1980s the exploitation rate fluctuated significantly, but have been more stable since the beginning of the 1990s and reduced substantially to a minimum during recent years.

Figure 2.11. Catch rates from spring and summer surveys on the Faroe Bank



Note: Corrected values for spring survey refer to a few extreme hauls, not included in the corrected values.

Figure 2.12. Exploitation rate in terms of landings per survey catch rate



Advice for 2004 is like previous years that effort must not exceed the average effort since 1996. The historic advice appears from Table 2.3.

Table 2.3. Historic advising for Faroe Bank cod

Year of advising	Advice	Calculated catch cf. advice (1,000 tonnes)	Determined TAC (1,000 tonnes)	Official catch specified (1,000 tonnes)
1987	No assessment	-		3.5
1988	No assessment	-		3.1
1989	Amendment to the Faroe Plateau TAC	~2.0		1.4
1990	Limited access to the area required	-		0.6
1991	Limited access to the area required	-		0.4
1992	No fisheries	0.3		0.3
1993	TAC	0.5		0.4
1994	TAC	0.5		1.0
1995	Conservative TAC	0.5		1.2
1996	Conservative TAC	0.5	1.0	2.5
1997	Retention of present effort	0.7		3.9
1998	Retention of present effort	-		3.5
1999	Effort should not exceed level for 1996–1997	-		1.3
2000	Effort should not exceed level for 1996–1998	-		1.2
2001	Effort should not exceed level for 1996–1999	-		1.8
2002	Effort should not exceed level for 1996–2000	-		1.9
2003	Effort should not exceed level for 1996–2001	-		
2004	Effort should not exceed level for 1996-2002	-		

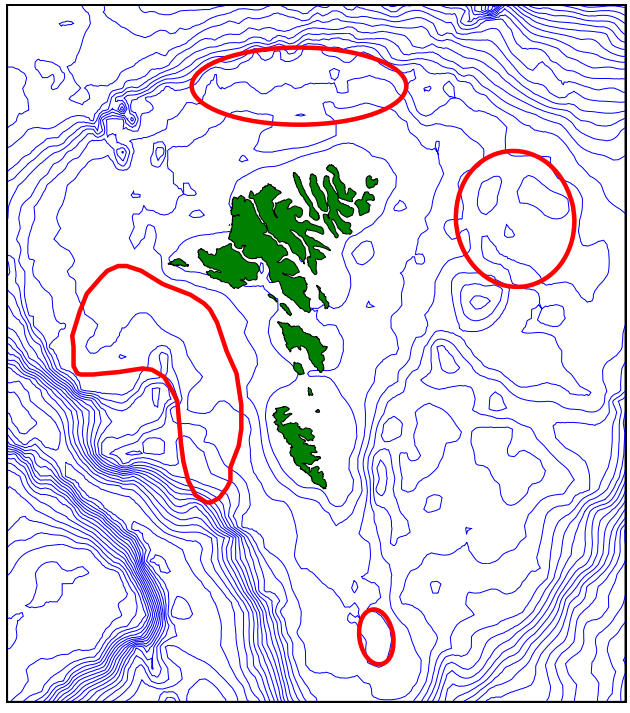
The stock assessment is not based on analytical assessment, but exclusively on catch rates from scientific surveys, and these in relation to landings as an approximation of exploitation rate. Allocation of catches from the plateau and bank are uncertain, since fishing vessels have had access to both areas during the same survey since 1996. Given the size of the two fisheries it means that uncertainty of catches is higher on the bank. This uncertainty is the contributory cause to that an analytical assessment cannot be carried out.

2.6. Haddock (*Melanogrammus aeglefinus*)

2.6.1. Biology and stock characteristics

Haddock are widespread all over the Faroese waters, from coastal areas to open areas down to 450 m depth. The haddock matures when 2-3 years of age. The spawning takes place in March to May on a major part of the Faroe Plateau at depths from 50 to more than 200 m. The habitat varies apparently from year to year, four permanent spawning areas have been observed on the plateau; cf. Figure 2.13. After 1-2 months of pelagic life they settle, and haddock juveniles are widely spread on the plateau from 90 m to 200 m depth. No general drifting patterns have been observed in connection with spawning. The mouth of the haddock is relatively small, and prey preference is therefore often smaller benthic animals, but adult haddock also eat fish, in particular sand eel.

Figure 2.13. Spawning areas on the Faroe Plateau for haddock

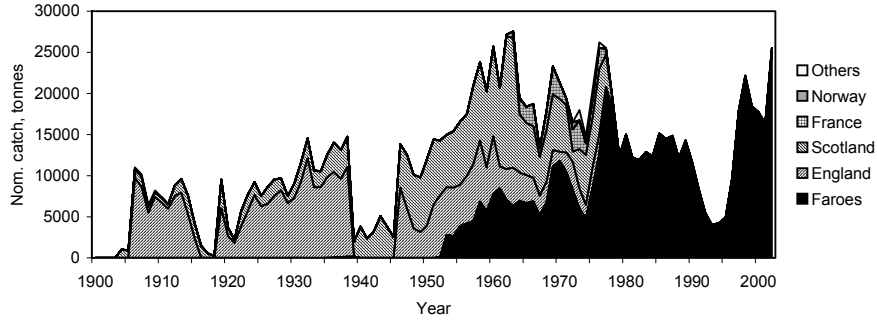


Note: Depth contour lines are shown for intervals of 50 m.

2.6.2. Historic development of stock and fisheries

Since the beginning of the 20th century, the annual catches of haddock have varied between 10,000 and 27,000 tonnes except for interrupted fisheries during the two world wars, see Figure 2.14. Until the 1950s, it was solely England and Scotland fishing haddock in Faroe waters. The Faroese has subsequently increased their share, culminating with the introduction of the 200 nautical mile zone in 1977 whereupon it became exclusively Faroese fishery. In the early 1990, the catches were drastically reduced to 4,000 tonnes in 1994, but since then increased to the level of previous times with 25,600 tonnes in 2002. The catches have been made partly on the Faroe Bank and partly on the Faroe Plateau. During recent years the catches at the Faroe Bank amount to only about 1-2,000 tonnes. In the recent decades the fishery has been exclusively Faroese, and today carried out primarily by long-line vessels and pair trawlers. Stern trawlers above 1000 HP have since 1998-1999 been allocated individual quotas on both cod and haddock and their share of catches have increased.

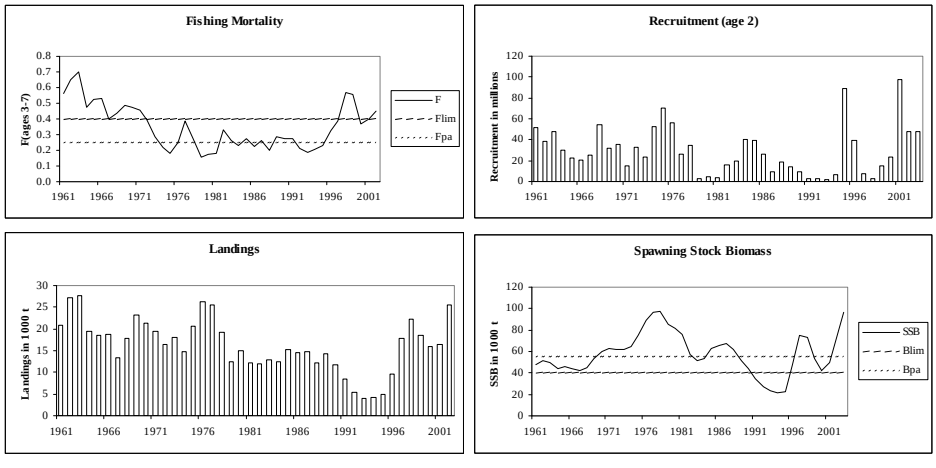
Figure 2.14. Development in catch of haddock



2.6.3. Status of the stock

Based on the present fishing mortality the stock is classified as being exploited outside safe biological limits. In 2003, the **spawning biomass** is well above the recommended minimum level (cf. precautionary approach) Bpa (55,000 tonnes), cf. Figure 2.15. In 2002, **fishing mortality** is calculated to be above Fpa and close to the critical limit value Flim. Since 1995, the spawning biomass has increased considerably, mainly due to the good year-classes 1993-1994, in particular the former. In 2001 and partly in 2002 the largest year-class ever seen appears in the time series.

Figure 2.15. Development in landings, fishing mortality, spawning biomass, and recruitment for haddock around the Faroes, 1961-2002



The advice for haddock for 2004 is that fishing effort should be reduced to a fishing mortality below 0.25 (F_{pa}), corresponding to an effort reduction of about 36%. This reduction of fishing effort corresponds to catches of about 21,000 tonnes in 2004.

Haddock is mainly caught by long-line vessels and pair trawlers. In the present regulation there are closed areas for trawling and this in combination with a relatively large mesh size render that juveniles are effectively protected in the trawl fisheries, while this is not the case in the long-line fisheries.

The stock assessment is based on a so-called analytical assessment (VPA) where both spring and summer surveys are used together with commercial catch data.

Table 2.4. Status of haddock stock

	Stock (1,000 tonnes)	Fishing mortality	Recruitment of 2-year-old (million pieces)
Condition in 2002	73	0.45	48
Average 1961-2001	57	0.35	29
Reference point (cf. precautionary approach (pa))	55	0.25	
Critical limit (lim)	40	0.40	

Table 2.5. Historic advising for haddock

Advising year	Advice	Calculated catch (cf. advice) (1,000 tonnes)	Continued TAC (1,000 tonnes)	Official catch specified (1,000 tonnes)
1987	No increase in F	17		14.9
1988	No increase in F	18		12.2
1989	No increase in F	11		14.3
1990	No increase in F	11		11.7
1991	TAC	11		8.4
1992	TAC	13-15		5.5
1993	Reduction in F	8		4.0
1994	No fishery	0	6.2	4.3
1995	No fishery	0	6.2	4.9
1996	TAC	8.3	12.6*	9.6
1997	F to be reduced to 1995 level	9.3		17.9
1998	F to be reduced to 1995 level	16		22.2
1999	F should be less than F_{pa} (0,25)	9		18.5
2000	F should be less than F_{pa} (0,25)	22		15.8
2001	F should be less than F_{pa} (0,25)	20		16.3
2002	No fisheries	0		25.6
2003	F should be less than F_{pa} (0,25)	12		
2004	F should be less than F_{pa}(0,25)	21		

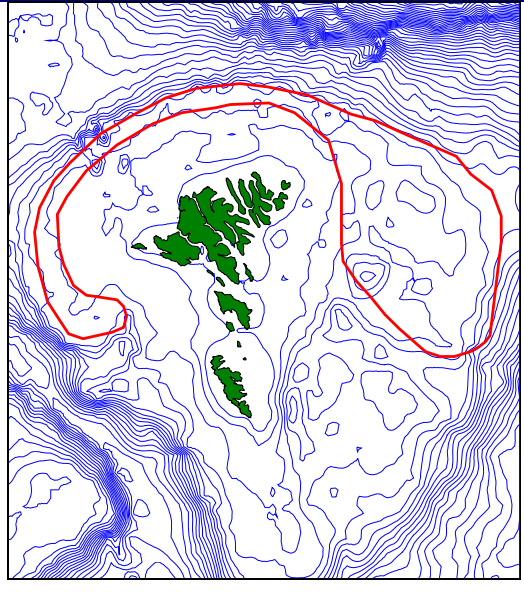
Note: * For the period 1 September 1995 to 31 May 1996.

2.7. Saithe (*Pollachius virens*)

2.7.1. Biology and stock characteristics

Saithe is widespread all over the Faroese area from shallow coastal waters to marine waters on bank and plateau with depths down to 350 m. Saithe is both demersal and pelagic. Stock structure is hardly known, and tagging experiments show that saithe migrates across long distances and mix with neighbouring stocks around Iceland, Norway, west of Scotland, and the North Sea. The spawning areas of saithe are found in a broad belt stretching from west, northward to a wide area east of the Faroe Islands at depths of 150-250 m, cf. Figure 2.16. Spawning takes place from January to April, but mainly at the end of February. Eggs and larvae drift along the sea currents around the plateau until May/June where juveniles migrate towards coasts and fjords, having a length of approximately 3 cm. During their first two years the juveniles are in these coastal, shallow habitats. In the following years, saithe migrates gradually to deeper waters in the coastal areas, and only mixes with the adult stock at an age of 3 or 4 years, and at then starts longer migrations outside the plateau. Saithe is sexually mature when 5 years of age.

Figure 2.16. Spawning areas on the Faroe Plateau for saithe

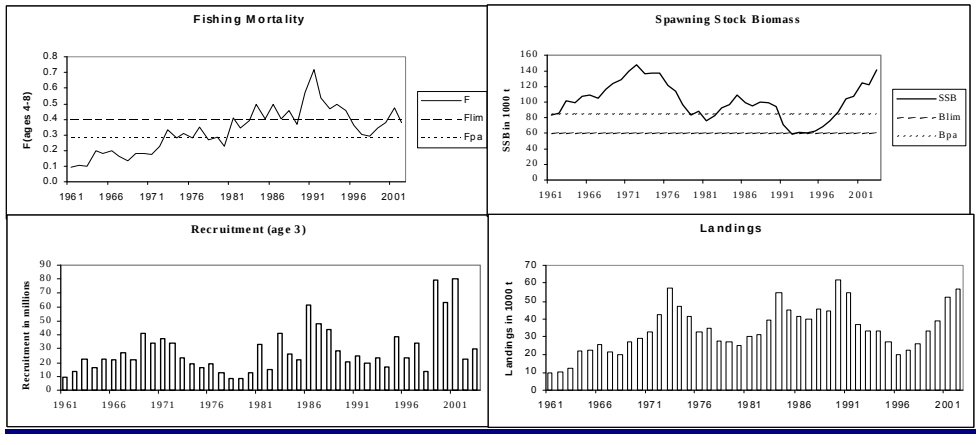


Note: Depth contour lines are shown for intervals of 50 m.

2.7.2. Historic development of stock and fishery

During the period from 1900 to the middle of the 1950s the fishery was insignificant with annual landings less than 10,000 tonnes, cf. Figure 2.17. Since the 1960s the landings have generally increased, but varied drastically from 9,000 tonnes in 1961 to 62,000 tonnes in 1990. After 1991 the catches decreased up to 1996, but have since then increased to historic high catches in both 2000 and 2001. After establishment of the 200 nautical mile fishing zone in 1977 saithe have mainly been caught by Faroese vessels. Through the last decade, 60% of the landings are caught by large pair trawlers (larger than 1000 HP) conducting a direct fishery on saithe. The smaller pair trawlers conduct a mixed fishery on saithe, haddock and cod, and these landings constitute 10-20% of the annual landings of saithe. Through the last decade, the amount of saithe in the catches has increased for the large vessels, but decreased for the smaller vessels, both trawlers and jiggers. Discard is not considered to be a problem in the fisheries.

Figure 2.17. Development in landings, fishing mortality, spawning biomass, and recruitment for saithe around the Faroes, 1961-2002



2.7.3. The status of the stock

Based on the present fishing mortality the stock is classified as being exploited outside safe biological limits. In 2003, **Spawning biomass** is well above the recommended minimum level, (cf. precautionary approach) B_{pa} (85,000 tonnes), cf. Figure 2.17. **Fishing mortality** is calculated close to F_{pa} in 2002 and above the critical limit. F_{lim}. The year-classes 1996-1998 are all historic large year-classes.

For 2004 the advice is that fishing effort should be reduced to a fishing mortality below 0.28 (F_{pa}) corresponding to an effort reduction of approximately 30%, cf. Table 2.6. The present regulation, where it is allowed to increase the number of days at sea if fishery is moved to deeper waters, should be suspended until fishing mortality is reduced to a level below F_{pa}. The present spawning area regulations should be maintained.

Stock assessment is based on a so-called analytical assessment (VPA) where logbooks from pair trawlers are used together with commercial catch data.

Table 2.6. Status of stock for saithe

	Stock (1,000 tonnes)	Fishing mortality	Recruitment of 3-year-old (million pieces)
Condition in 2002	122	0.38	29
Average 1961-2001	101	0.33	28
Reference point (cf. precautionary approach (pa)	85	0.28	
Critical limit (lim)	60	0.40	

Table 2.7. Historic advice for saithe

Year of Advising	Advice	Calculated catch cf. advice (1,000 tonnes)	Fixed TAC (1,000 tonnes)	Official catch specified (1,000 tonnes)
1987	No increase in fishing mortality	32		40
1988	No increase in fishing mortality	32		45
1989	Reduction in fishing mortality	<40		44
1990	Reduction in fishing mortality	41		62
1991	TAC	30		55
1992	Reduction in fishing mortality	27		36
1993	Reduction in fishing mortality	<37		34
1994	TAC	26	42*	33
1995	TAC	22	39*	27
1996	TAC	39	-	20
1997	20% reduction in fishing mortality from 1995 value	21	-	22
1998	30% reduction in effort from 1996/97 value	-	-	26
1999	F should be reduced to less than F_{pa} (0.28)	14		33
2000	F should be reduced to less than F_{pa} (0.28)	15		39
2001	Reduce fishing effort to generate F substantially below F_{pa} (0.28)	<17		52
2002	Reduce fishing effort to generate F below F_{pa} (0.28)	28		57
2003	Reduce fishing effort to generate F below F_{pa} (0.28)	47		
2004	Reduce fishing effort to generate F below F_{pa} (0.28)	48		

Note: * For the period 1 September 1995 to 31 May 1996.

2.8. Other species

Other important fisheries are on demersal species which live in deeper waters and on pelagic species, i.e. all fisheries outside the plateau and bank areas. With the exception of Greenland halibut and redfish, it is common for the other species that the data are too poor in order to make an exact status of stock. For most of the species the advice has thus been very ”soft” towards reducing fishing mortality or fishing effort. This advice has rarely been implemented in the management of stocks.

2.8.1. Greenland halibut *(Reinhardtius hippoglossoides)*

Greenland halibut is a deep sea fish which grows slowly. The Faroese stock constitutes a smaller part of a larger west Nordic stock reaching from Eastern Greenland towards Iceland to the Faroe Islands. Since the beginning of the 1990s the fishery of Greenland halibut has increased from approximately 1,000 tonnes annually to 4-5,000 tonnes annually in 2000-2001, especially with large trawlers (>1000 HP) and gillnet vessels at depths of 200-1600 m. The stock is exploited too hard, and the spawning biomass is too low, which historically has resulted in an advice that generally recommends reductions in catch or fishing mortality.

2.8.2. Golden redfish and deep sea redfish (*Sebastes marinus and Sebastes mentella*)

The demersal redfish (both species) belong to large stocks, widespread from the Faroe Islands towards Iceland to Greenland. The fishery is carried out with large trawlers and pair trawlers and takes place at depths of 200 m to 450 m for large redfish, while deep sea redfish is caught at depths between 450 m and 650 m. The fishery culminated in the middle of the 1980s and since it has decreased concurrently with the diminishing stock of redfish. In 2002, the total catches were approximately 4,000 tonnes.

2.8.3. Monkfish (*Lophius piscatorius*)

The stock conditions for monkfish around the Faroe Islands are unknown and stock/fishery is not assessed at ICES. The fishery of this species goes way back in time, but since 1995 the catches have increased and were in the mid 1990s about 4,000 tonnes annually. The fishery is conducted by small and medium sized trawlers, pair trawlers and gillnets vessels.

2.8.4. Tusk (*Brosme brosme*)

The stock conditions for tusk around the Faroe Islands are unknown. The stock is assessed at ICES as part of a large complex of stocks with a distribution from the Barents Sea to the North Sea across the Faroe Islands and Iceland to Eastern Greenland. Tusk is fished on the continental shelf in particular from 200-500 m by long-line vessels. The fishery culminated in 1980s with 7-8,000 tonnes, and has since then decreased to approximately 2,000 tonnes concurrently with the decreasing catch rates.

2.8.5. Ling *(Molva molva)*

The stock of ling is considered as relatively defined around the Faroe Islands. The stock is assessed at ICES as part of a larger complex of stocks with a distribution from the northern Norway to the North Sea, the western Baltic, and the waters around Great Britain across the Faroe Islands to Iceland. Like tusk, ling is found mainly on hard bottom at 100-400 m depth and is mostly fished in a long-line fishery and to a smaller extent by large pair trawlers. The fishery culminated in the 1970s with 7-8,000 tonnes, and since then decreased to approximately 4,500-5,500 tonnes.

2.8.6. Blue ling *(Molva dipterygia)*

The stock conditions for blue ling are unknown around the Faroe Islands, and the stock is assessed at ICES as a part of a larger complex of stocks from Norway across the Faroe Islands to Iceland. Blue ling is found in deep water at 125 m to 2,000 m, and it is the larger trawlers (>1000 HP) and gillnet vessels mainly fishing this species. The fishery culminated in the 1970s and the 1980s with annual catches of approximately 7,000 tonnes, and decreased in 2003 to approximately 2,000 tonnes.

2.9. Glossary

Assessment. The English word ‘assessment’ is now almost used internationally in fisheries biology in connection with stock assessment.

Stock assessment. Based on data from fisheries and from research vessels an analysis is made of the historic development of the stock and its current condition. The analysis results, among others, in a description of the development of the stock over time as regards *recruitment, fishing mortality,* and *spawning stock*. On basis of the history of the stock and its reaction to fisheries, it is assessed whether the present fishery is sustainable in the long term, and the expected catches for the coming year can be as-

sessed on different assumptions on how the fishery is conducted. Today, the word 'assessment' is used internationally by fisheries biologists as synonym for 'stock assessment'.

Biological reference points. Values of stock size and volume of fishing mortality used as reference points in the management advising. In 1998, ICES introduced the precautionary approach in the advice. The implementation of the precautionary approach is based on two sets of reference points. In order to secure that the stocks are within safe biological limits it must be likely that the spawning stock is above the lower limit where recruitment is negatively influenced, and that fishing mortality is less than the level, which on medium to long run will get the stock below the lower limit. These two limits for spawning biomass and fishing mortality, respectively, are designated by ICES as *limit* (limit reference points) and designated as B_{lim} and F_{lim} (B for biomass, F for fishing mortality and *lim* for *limit*). In order to secure that there is every probability that these limit reference points are not exceeded, it is necessary to insert a sort of precautionary zone. The size of the precautionary zone depends on the uncertainty. The bigger the uncertainty, the bigger precautionary zone is necessary. ICES defines B_{pa} (pa for 'precautionary') as the limit for spawning biomass for which it is necessary to react in order to secure that the spawning biomass is not getting below B_{lim}. The corresponding level for fishing mortality is designated F_{pa}.

Demersal. Description of organisms (e.g. fish) living at or close to the bottom (contrary to pelagic species).

Discards. Fish caught and thrown into the sea again. Discards may be due to fishing regulations (e.g., landings of a stock are limited by a quota or that the fish are undersized) or market conditions (that the fish is impossible to sell or that its value is so low that it would be better to bring other fish ashore.

Effort. Now used internationally in fisheries biology for fishing effort.

Fishing mortality. A measure for fishing intensity. For fish species in marine waters annual fishing mortalities are most often used. Fishing mortality, **F,** is then the part of the stock that are fished and can be expressed as the proportion between number of fish caught and the average number in the stock throughout the year. This way of defining fishing mortality is chosen for technical calculation reasons. The table below indicates how big a part of the stock, present at the beginning of the year, is removed

by fishery at different fishing mortalities assuming that the natural mortality is equal to 0.1.

Fishing mortality F	0.1	0.2	0.6	0.8	1.0	1.3
Annual catch as % of stock at the beginning of the year	9	16	41	51	58	67

It is seen that the values for fishing mortality can be > 1. This is the case if the annual catch (in number) exceeds the annual average number of the stock. F is directly proportional to fishing effort (effort): F = q x effort, where q often is named catchability coefficient.

Fisheries management. Regulation of the fisheries as regards, e.g. to maintain a future resource foundation, to maintain employment, profitability etc. The fisheries management uses a number of instruments including regulation of fleet size or of *fishing effort, technical regulations* or *quotas.*

Fishing effort. The fishing effort can, e.g. be number of days at sea, number of hauls or set or number of hours fished with a certain type of gear. The term 'effort' or 'fishing effort' is used internationally. Fishing effort is directly proportional to fishing mortality F.

Spawning stock. The amount of fish included in the annual spawning. The spawning stock is measured normally as the total weight of sexually mature individuals: the spawning biomass. In practice, the spawning biomass is calculated on basis of information on number of fish in the stock in different year-classes, individual weight per year-class, and the number of sexually mature individuals per year-class.

Natural mortality. The name for the mortality which is not caused by fishery. Natural mortality, **M**, is therefore a measure for that part of the stock which dies by being predated by other fish or, e.g. because of disease. The coefficient M is difficult to identify and in most stock assessments guessed values are used. For most stocks of commercial fish species values of 0.1-0.2 are used.

Pelagic. Designation for organisms living in the free water masses (contrary to demersal organisms).

Recruitment. The annual recruitment of new individuals to a fish stock due to reproduction of the *spawning stock*. For practical reasons, recruitment is measured neither as the amount of spawned eggs nor hatched larvae, but as the amount of juveniles at an age, where they start to get caught in the gears of the fishermen or the gears of the research vessels. In connection with recruitment ICES often refers to "year-classes" or 'recruitment as, e.g. one-year-old' which means that when, e.g. 1-year-old is recruited to a stock in 2001, then these recruits belong to the 2000 year-class.

Total Allowable Catch "TAC". A management instrument trying to set a ceiling of the fisheries removal of fish from the stock by regulating the total allowable catch. In many instances, advice is given on a certain *fishing mortality* – for example: 'Fishing mortality should be reduced by 20%'. From information on stock size it is then possible to assess what the expected catches at this fishing mortality will be, and this is then used to calculate a TAC. As stock size varies, i.a. because recruitment varies, a reduction in fishing mortality will not necessarily mean that the calculated TAC is reduced correspondingly. If the stock is on the way up a reduction in fishing mortality may correspond to a larger TAC. The term "quota" is sometimes used as synonymous with "TAC". More often this word is now used as a description of the agreed national quotas of a TAC.

Technical regulations. Management measures regulating the technical conduction of the fisheries, e.g. by determining minimum mesh size in the fishing gear, minimum landing size (minimum size), closed areas and upper limits for by-catch.

Annex 3. The Faroese fishing fleet and its development

3.1. Introduction

For the description of the structure of the Faroese fleet, the grouping on which the regulation is based (cf. annex 1, *The Faroese Commercial Fisheries Act*) is used as far as possible. In addition, the description will also include vessels which are not covered by the days at sea regulation. These vessels are gillnet vessels, high sea trawlers, seiners, and shrimp trawlers.

Status in 2003 for the Faroese fishing fleet measured in number of vessels and fishing permits are shown in Table 3.1 distributed on the respective vessel groups.

Table 3.1. Number of catch permits and vessels, 2003

Group	Type (Danish)	Type (Faroese)	Fishing area	Fishing permits	Vessels
1	Trawlers > 400 HP	Lemmatrolarar	Faroese waters	13	14
2	Pair trawlers > 400 HP	Partrolarar	Faroese waters	29	33
3	Long line vessels > 110 GT	Linuskip	Faroese waters	19	18
4A-line	Coastal fishing vessels 15-40 GT-line	Utrodrarbatar	Faroese waters	42	41
4A-trawl	Coastal fishing vessels 15-40 GT-trawl	Utrodrarbatar	Faroese waters	4	3
4B-line	Coastal fishing vessels > 40 GT-line	Utrodrarbatar	Faroese waters	34	33
4B-trawl	Coastal fishing vessels > 40 GT-trawl	Utrodrarbatar	Faroese waters	16	15
5A+B	Coastal fishing vessels < 15 GT	Utrodrarbatar	Faroese waters	1,709	2,101
6	Gillnet vessels	Garnaskip	Faroese waters	9	6
7	High sea trawlers	Verksmiddju-trolarar	Other waters	6	6
8	Seiners/multipurpose vessels	Pelagisk vinna	Other waters	19	15
9	Shrimp trawlers	Rækjuvinna	Other waters	8	10
10	Other vessels	Onnur skip	Other waters	.	22
Total				1,908	2,317

Source: The Commercial Fisheries Office, The Ministry of Fisheries and Maritime Affairs (f. *Fiskivinnustovan, Fiskimálaráðið*)

For the smaller coastal fishing vessels in group 5 fishing permits are not necessary. Hence, the statement in Table 3.2 is based on the number of vessels having fishing permits in 2003. The most important part of this group consists of part-time fishermen who do not participate in the fisheries every year. This is presumably the cause of the significant difference between the number of permits and the number of vessels in this group. For the other vessel groups, smaller discrepancies between the number of

fishing permits and the number of vessels are seen. It has not been possible to explain the cause for this, but part of the explanation may be found in connection with transactions of vessels and permits.

The development in number of vessels in the Faroese fishing fleet from 1994 to 2003 can be seen from Table 3.2. All in all, the development shows a continuous increase in number of vessels. This development is not, however, general for all vessel groups. Therefore, the increase is primarily seen in the smallest coastal fishing vessels in vessel groups 5A and B. The reason is that a number of vessels, existing before 1995, have been registered in the course of time in order to get a fishing permit. Minor increases are also seen in groups 8-10, fishing outside the Faroese area in particular. Looking distinctly on vessel groups 2-4 which are subjected to days at sea regulation, a decrease is seen, however, in the number of vessels from 147 to 133. The decrease is predominantly in group 4.

Table 3.2. Number of vessels, 1994-2003

Group	Type	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
1	Trawlers > 400 HP	15	13	13	12	12	12	13	12	12	14
2	Pair trawlers > 400 HP	32	36	36	35	33	34	34	34	35	33
3	Long-line vessels > 110 >GT	19	19	19	19	19	19	19	19	20	18
4A-line	Coastal fishing vessels 15-40 GT	51	51	52	51	49	50	47	46	48	41
4A-trawl	Coastal fishing vessels 15-40 GT	1	1	1	1	1	2	2	2	3	3
4B-line	Coastal fishing vessels > 40 GT	37	35	36	32	29	31	30	31	31	33
4B-trawl	Coastal fishing vessels > 40 GT	12	12	13	14	14	13	13	13	14	15
5A+B	Coastal fishing vessels < 15 GT	1,092	1,211	1,339	1,445	1,590	1,680	1,728	1,833	1,967	2,101
6	Gillnet vessels	5	6	6	6	6	7	7	6	6	6
7	High sea trawlers	5	6	6	6	6	6	5	5	5	6
8	Seiners/multi purpose vessels	10	9	10	9	11	13	13	13	15	15
9	Shrimp trawlers	7	7	8	8	8	8	10	11	10	10
10	Other vessels	18	19	15	19	14	12	11	17	17	22
Total		1,304	1,425	1,554	1,657	1,792	1,887	1,932	2,042	2,183	2,317

Source: The Commercial Fisheries Office, The Ministry of Fisheries and Maritime Affairs (f. *Fiskivinnustovan, Fiskimálaráðið*)

3.2. Fleet capacity and activity

A description of fleet structure and development besides the number of vessels can be accomplished by a division of capacity and fleet activity, respectively.

Description of capacity is based on either physical or economical characteristics. To the former should be added tonnage, engine power and length, while insurance value is an example of an economic description. Here, it has only been possible to get information on the physical characteristics. The development in total and average tonnage, engine power and length, respectively is seen in Table 3.3- 3.8.

Table 3.3. Total tonnage (GT)

Type	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Trawlers > 400 HP	6,505	5,444	5,444	5,444	5,444	5,444	6,186	5,938	5,938	7,335
Pair trawlers > 400 HP	9,929	10,765	10,765	10,493	10,094	10,458	10,458	10,458	10,182	9,979
Long-line vessels > 110 GT	5,031	5,031	5,031	5,031	5,031	5,031	5,031	5,176	5,642	5,268
Coastal fishing vessels 15-40 GT, line	1,574	1,554	1,572	1,549	1,157	1,183	1,099	1,064	1,119	1,020
Coastal fishing vessels 15-40 GT, trawl	30	30	30	30	30	62	62	62	129	126
Coastal fishing vessels > 40 GT, line	2,519	2,424	2,510	2,245	2,093	2,700	2,658	2,701	2,708	3,066
Coastal fishing vessels > 40 GT, trawl	580	612	667	761	761	723	723	723	766	898
Coastal fishing vessels < 15 GT	4,767	5,431	6,005	6,495	7,055	7,847	7,561	7,645	7,853	8,257
Gillnet vessels	1,566	1,859	1,859	1,859	1,859	2,224	2,224	1,998	1,998	1,998
High sea trawlers	8,184	9,989	9,989	9,989	9,989	9,989	7,604	7,604	7,604	11,311
Seiners/multipurpose vessels	6,556	6,306	6,976	7,265	9,757	13,945	18,146	18,146	19,989	23,411
Shrimp trawlers	6,636	6,636	7,501	7,501	7,501	8,806	14,009	14,835	13,408	13,408
Other vessels	3,762	4,677	2,713	6,299	4,847	5,767	4,681	7,780	9,096	6,868
Total	57,638	60,757	61,060	64,959	65,616	74,179	80,441	84,129	86,431	92,944

Source: The Commercial Fisheries Office, The Ministry of Fisheries and Maritime Affairs (f. *Fiskivinnustovan, Fiskimálaráðið*)

Table 3.4. Average tonnage (GT)

Group	Type	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
1	Trawlers > 400 HP	434	419	419	454	454	454	476	495	495	524
2	Pair trawlers > 400 HP	310	299	299	300	306	308	308	308	291	302
3	Long-line vessels > 110 BT	265	265	265	265	265	265	265	272	282	293
4A-line	Coastal fishing vessels 15-40 GT, line	31	30	30	30	24	24	23	23	23	25
4A-trawl	Coastal fishing vessels 15-40 GT, trawl	30	30	30	30	30	31	31	31	43	42
4B-line	Coastal fishing vessels > 40 GT, line	68	69	70	70	72	87	89	87	87	93
4B-trawl	Coastal fishing vessels > 40 GT, trawl	48	51	51	54	54	56	56	56	55	60
5A+B	Coastal fishing vessels < 15 GT	4	4	4	4	4	5	4	4	4	4
6	Gillnet vessels	313	310	310	310	310	318	318	333	333	333
7	High sea trawlers	1,637	1,665	1,665	1,665	1,665	1,665	1,521	1,521	1,521	1,885
8	Seiners/multipurpose vessels	656	701	698	807	887	1,073	1,396	1,396	1,333	1,561
9	Shrimp trawlers	948	948	938	938	938	1,101	1,401	1,349	1,341	1,341
10	Other vessels	209	246	181	332	346	481	426	458	535	312
Total		44	43	39	39	37	39	42	41	40	40

Source: The Commercial Fisheries Office, The Ministry of Fisheries and Maritime Affairs (f. *Fiskivinnustovan, Fiskimálaráðið*)

Table 3.5. Total engine power (HP)

Group	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
1	31,688	27,463	27,463	25,351	25,351	25,351	27,612	25,840	25,840	28,740
2	35,524	39,221	39,221	38,056	35,866	37,195	37,195	36,927	37,130	35,799
3	11,412	11,412	11,412	11,412	11,412	11,412	11,412	11,462	12,314	11,494
4A-line	10,804	10,667	10,829	10,480	9,950	10,041	9,579	9,506	10,108	8,873
4A-trawl	240	240	240	240	240	500	500	500	982	925
4B-line	12,709	12,207	12,361	10,995	9,808	10,778	10,565	10,955	11,105	12,374
4B-trawl	4,667	4,897	5,297	5,898	5,898	5,624	5,624	5,624	6,226	6,171
5A+B	75,925	83,947	91,459	97,345	102,656	105,573	106,390	114,042	131,166	147,743
6	3,631	4,231	4,231	4,231	4,231	4,863	4,863	4,463	4,463	4,456
7	22,323	26,908	26,908	26,908	26,908	26,908	22,008	22,008	22,008	32,878
8	18,011	17,451	19,101	18,908	27,727	40,265	47,063	47,063	52,519	63,027
9	23,419	23,419	25,194	25,194	25,194	26,541	37,966	39,466	37,290	37,290
10	18,931	22,236	15,797	30,628	21,082	15,725	14,520	22,438	20,677	16,081
Total	269,284	284,299	289,513	305,645	306,323	320,776	335,297	350,295	371,829	405,851

Source: The Commercial Fisheries Office, the Ministry of Fisheries and Maritime Affairs (f. *Fiskivinnustovan, Fiskimálaráðið*)

Table 3.6. Average engine power (HP)

Group	Type	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
1	Trawlers > 400 HP	2,113	2,113	2,113	2,113	2,113	2,113	2,124	2,153	2,153	2,053
2	Pair trawlers > 400 HP	1,110	1,089	1,089	1,087	1,087	1,094	1,094	1,086	1,061	1,085
3	Long-line vessels > 110 GT	601	601	601	601	601	601	601	603	616	639
4A-line	Coastal fishing vessels 15-40 GT, line	212	209	208	205	203	201	204	207	211	216
4A-trawl	Coastal fishing vessels 15-40 GT, trawl	240	240	240	240	240	250	250	250	327	308
4B-line	Coastal fishing vessels > 40 GT, line	343	349	343	344	338	348	352	353	358	375
4B-trawl	Coastal fishing vessels > 40 GT, trawl	389	408	407	421	421	433	433	433	445	411
5A+B	Coastal fishing vessels < 15 GT	70	69	68	67	65	63	62	62	67	70
6	Gillnet vessels	726	705	705	705	705	695	695	744	744	743
7	High sea trawlers	4,465	4,485	4,485	4,485	4,485	4,485	4,402	4,402	4,402	5,480
8	Seiners/ multipur-pose vessels	1,801	1,939	1,910	2,101	2,521	3,097	3,620	3,620	3,501	4,202
9	Shrimp trawlers	3,346	3,346	3,149	3,149	3,149	3,318	3,797	3,588	3,729	3,729
10	Other vessels	1,052	1,170	1,053	1,612	1,506	1,310	1,320	1,320	1,216	731
Total		207	200	186	184	171	170	174	172	170	175

Source: The Commercial Fisheries Office, the Ministry of Fisheries and Maritime Affairs (f. *Fiskivinnustovan, Fiskimálaráðið*)

Table 3.7. Total length (m)

Type	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Trawlers > 400 HK	586	513	513	502	502	502	544	504	504	586
Pair trawlers > 400 HK	1,062	1,193	1,193	1,156	1,087	1,109	1,109	1,109	1,117	1,068
Long-line vessels > 110 GT	608	608	608	608	608	608	608	607	637	579
Coastal fishing vessels 15-40 GT	726	717	730	712	675	696	651	634	665	579
Coastal fishing vessels 15-40 GT	15	15	15	15	15	33	33	33	52	47
Coastal fishing vessels > 40 GT	771	731	758	675	608	669	653	669	665	711
Coastal fishing vessels > 40 GT	208	218	235	265	265	248	248	248	265	272
Coastal fishing vessels < 15 GT	9,081	10,020	11,003	11,799	12,846	13,496	13,813	14,615	15,673	16,767
Gillnet vessels	173	206	206	206	206	246	246	214	214	211
High sea trawlers	295	348	348	348	348	348	288	288	288	353
Seiners/Multipurpose vessels	456	421	471	448	549	698	730	730	845	863
Shrimp trawlers	374	374	420	420	420	427	548	589	542	542
Other vessels	557	626	453	685	519	481	452	601	533	540
Total	14,912	15,990	16,954	17,839	18,648	19,561	19,922	20,841	22,000	23,118

Source: The Commercial Fisheries Office, the Ministry of Fisheries and Maritime Affairs (f. *Fiskivinnustovan, Fiskimálaráðið*)

Table 3.8. Average length (m)

Group	Type	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
1	Trawlers > 400 HP	39.09	39.47	39.47	41.83	41.83	41.83	41.88	42.03	42.03	41.89
2	Pair trawlers > 400 HK	33.20	33.15	33.15	33.04	32.94	32.61	32.61	32.61	31.91	32.36
3	Long-line vessels > 110 GT	31.98	31.98	31.98	31.98	31.98	31.98	31.98	31.96	31.85	32.15
4A-line	Coastal fishing vessels 15-40 GT, line	14.23	14.06	14.04	13.96	13.78	13.93	13.85	13.78	13.86	14.12
4A-trawl	Coastal fishing vessels 15-40 GT, trawl	15.38	15.38	15.38	15.38	15.38	16.47	16.47	16.47	17.19	15.58
4B-line	Coastal fishing vessels > 40 GT, line	20.82	20.89	21.05	21.11	20.97	21.60	21.77	21.59	21.45	21.55
4B-trawl	Coastal fishing vessels > 40 GT, trawl	17.36	18.15	18.11	18.91	18.91	19.05	19.05	19.05	18.91	18.14
5A+B	Coastal fishing vessels < 15 GT	8.32	8.27	8.22	8.17	8.08	8.03	7.99	7.97	7.97	7.98
6	Gillnet vessels	34.57	34.40	34.40	34.40	34.40	35.16	35.16	35.66	35.66	35.24
7	High sea trawlers	59.08	57.93	57.93	57.93	57.93	57.93	57.65	57.65	57.65	58.79
8	Seiners/ multipurpose vessels	45.56	46.77	47.13	49.77	49.90	53.72	56.14	56.14	56.31	57.51
9	Shrimp trawlers	53.37	53.37	52.48	52.48	52.48	53.36	54.82	53.53	54.22	54.22
10	Other vessels	30.95	32.93	30.23	36.03	37.06	40.06	41.06	35.34	31.36	24.53
Total		11.44	11.22	10.91	10.77	10.41	10.37	10.31	10.21	10.08	9.98

Source: The Commercial Fisheries Office, the Ministry of Fisheries and Maritime Affairs (f. *Fiskivinnustovan, Fiskimálaráðið*)

The description of the development is focused on the vessel groups subjected to days at sea regulation, however, with the exception of group 5, comprising both commercial and part-time vessels. A description of the development for vessel groups 2-4 is shown in Table 3.9.

Table 3.9. Physical vessel characteristics for vessel groups 2-4

		1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Tonnage GT)	Total	19,662	20,415	20,574	20,108	19,164	20,157	20,031	20,184	20,545	20,356
	Average	129	133	131	132	132	135	138	139	136	142
Engine power (HP)	Total	75,356	78,644	79,360	77,081	73,174	75,550	74,875	74,974	77,865	75,636
	Average	496	511	505	507	505	507	516	517	516	529
Length (m)	Total	3,390	3,483	3,540	3,431	3,258	3,363	3,301	3,300	3,400	3,256
	Average	22	23	23	23	22	23	23	23	23	23

Source: The Commercial Fisheries Office, the Ministry of Fisheries and Maritime Affairs (f. *Fiskivinnustovan, Fiskimálaráðið*)

All in all, the capacity is maintained on the 1994 level as the total tonnage for the vessel groups 2-4 has increased with approximately 4%, the total length has decreased with 4%, while the total engine power is more or less unchanged. If focus is put on the development of an average vessel in vessel group 2-4, an increase is observed in the average tonnage of 10%, engine power of 7%, while the length is more or less unchanged.

The activity of the vessels is regulated through number of days at sea. The number of allocated and used days at sea for the different vessel groups subjected to days at sea regulation since 1997 are shown in Table 3.10. Days at sea on the Faroese Bank is indicated separately in Table 3.11.

Table 3.10. Allocated and used days at sea on the Faroese Plateau

		1997/1998	1998/1999	1999/2000	2000/2001	2001/2002	2002/2003
Group 2	Allocated	7,199	6,839	6,839	6,839	6,839	6,636
	Used	6,450	5,903	6,435	6,015	5,597	4,890
	Exploitation (%)	90	86	94	88	82	74
Group 3	Allocated	2,660	2,527	2,527	2,527	2,527	2,452
	Used	2,535	2,212	2,137	2,377	2,479	2,462
	Exploitation (%)	95	88	85	94	98	100
Group 4A	Allocated	4,696	4,461	4,461	4,461	4,461	4,328
	Used	2,523	2,238	2,396	2,742	2,438	2,113
	Exploitation (%)	54	50	54	61	55	49
Group 4B	Allocated	4,632	4,400	4,400	4,400	4,400	4,269
	Used	4,197	3,795	3,976	4,400	4,309	4,915
	Exploitation (%)	91	86	90	100	98	115
Group 5	Allocated	23,625	22,444	22,444	22,444	22,444	21,776
	Used	16,464	13,369	13,730	24,486	20,685	21,180
	Exploitation (%)	70	60	61	109	92	97
Total	Allocated	42,812	40,671	40,671	40,671	40,671	39,461
	Used	32,169	27,517	28,674	40,020	35,508	35,560
	Exploitation (%)	75	68	71	98	87	90

Source: The Faroese Fisheries Inspection, the Ministry of Fisheries and Maritime Affairs (f. *Fiskiveiðieftirlitið, Fiskimálaráðið*)

The number of allocated days at sea on the Faroese Plateau decreased from the fishing year 1997/1998 to 1998/1999 and stable until 2001/2002. From 2001/2002 to 2002/2003 another decline is seen so that the latest number of allocated days is now 8% lower than in 1997/1998. The number of used days at sea varies considerably over time. Thus there was an increase from 32,159 days at sea in 1997/1998 to 40,020 days at sea in 2000/2001, and then a decline is seen to 35,560 in 2002/2003. Within the individual vessel groups subjected to days at sea regulation; variations can be seen over time, cf. Table 3.10.

Table 3.11. Allocated and used days at sea on the Faroe Bank

		1998/1999	1999/2000	2000/2001	2001/2002	2002/2003
Group 2	Allocated	0	0	0	0	0
	Used	0	0	0	0	0
	Exploitation (%)	0	0	0	0	0
Group 3	Allocated	510	510	534	584	592
	Used	558	392	484	570	684
	Exploitation (%)	109	77	91	98	116
Group 4A	Allocated	690	570	690	810	960
	Used	170	91	74	104	257
	Exploitation (%)	25	16	11	13	27
Group 4B	Allocated	780	875	589	676	759
	Used	232	213	192	386	389
	Exploitation (%)	30	24	33	57	51
Group 5	Allocated	120			60	510
	Used	93	60	94	9	483
	Exploitation (%)	78	.	.	15	95
Total	Allocated	2,100	1,955	1,813	2,130	2,821
	Used	1,053	756	844	1,069	1,813
	Exploitation (%)	50	39	47	50	64

Source: The Faroese Fisheries Inspection, the Ministry of Fisheries and Maritime Affairs (f. *Fiskiveiðieftirlitið, Fiskimálaráðið*)

All in all, the vessel groups 2 and 4A do not use their allocated days at sea. Therefore, these vessels are generally not limited by the effort regulation, though some vessels within these groups can be limited. During the recent three periods, groups 3, 4B and 5 are close to full exploitation of the allocated days at sea. These vessels are assumed to be limited by the effort regulation.

As for the Faroe Bank, only a minor part of the allocated days at sea are used by vessel groups 4A and 4B, while vessel groups 3 and 5 are generally using the number of allocated days, cf. Table 3.11.

The individual vessel can oppose the limitations from the effort regulation by buying days at sea from other vessels. When buying and selling between the vessels, the catch potential of the involved vessels is taken into account so that there is no extended pressure on the stocks. Each vessel has a number of points, calculated on basis of its physical characteristics. Based on this, conversion factors can be found when dealing with another vessel, cf. Table 3.12. For instance, buying 18 days at sea from a coastal fishing vessel with 190 points to a long-line vessel with 650 points means that the latter will get 6 days at sea ($18 \times 0{,}35$) added to its permit.

Table 3.12. Conversion factor when buying/selling between the vessels in 2003

Seller/buyer	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)
(A) Pair trawler ≥1.500	1.00	1.17	1.40	1.56	1.87	1.40	2.33	3.11	4.00	5.60
(B) Pair trawler 1.100-1.499	0.86	1.00	1.20	1.33	1.60	1.20	2.00	2.67	3.43	4.80
(C) Pair trawler <1.100	0.71	0.83	1.00	1.11	1.33	1.00	1.67	2.22	2.86	4.00
(D) Trawler ≥300	0.64	0.75	0.90	1.00	1.20	0.90	1.50	2.00	2.57	3.60
(E) Trawler <300	0.54	0.63	0.75	0.83	1.00	0.75	1.25	1.67	2.14	3.00
(F) Long-line vessel ≥600	0.71	0.83	1.00	1.11	1.33	1.00	1.67	2.22	2.86	4.00
(G) Coastal fishing vessel 300-599	0.43	0.50	0.60	0.67	0.80	0.60	1.00	1.33	1.71	2.40
(H) Coastal fishing vessel 200-299	0.32	0.38	0.45	0.50	0.60	0.45	0.75	1.00	1.29	1.80
(I) Coastal fishing vessel 120-199	0.25	0.29	0.35	0.39	0.47	0.35	0.58	0.78	1.00	1.40
(J) Coastal fishing vessel <120	0.18	0.21	0.25	0.28	0.33	0.25	0.42	0.56	0.71	1.00

Note: Conversion points are calculated as follows:
Pair trawler: (length × width × depth) × engine power HP)/1000
Trawler: engine power (kW)
Long-line/coastal fishing vessel: length × width × depth

The calculation method and the size of the conversion factors are changed in the period with effort regulation.

The number of bought and sold days at sea in the different vessel groups is shown in Table 3.13. The difference between bought and sold days at sea is due to the conversion between the vessel groups, cf. Table 3.2. All in all, an increase in buying and selling is seen up to 2001/2002 where after a considerable smaller number of days at sea change vessel.

Table 3.13. Bought and sold days at sea

		1999/2000	2000/2001	2001/2002	2002/2003
Group 2	Bought	669	406	419	502
	Sold	674	610	634	418
Group 3	Bought	196	188	384	243
	Sold	106	143	191	179
Group 4A	Bought	346	200	237	228
	Sold	276	370	538	414
Group 4B	Bought	264	651	797	203
	Sold	93	345	641	294
Total	Bought	1,475	1,445	1,837	1,176
	Sold	1,149	1,468	2,004	1,305

Source: The Faroese Fisheries Inspection, the Ministry of Fisheries and Maritime Affairs (f. *Fiskiveiðieftirlitið, Fiskimálaráðið*)

The extent of trade with days at sea, i.e. transaction volume, is expressed by the number of bought and sold days at sea compared to the number of allocated days at sea

and shown in Table 3.14. In general, the annual turnover of days at sea is seen to be a little below 10%, however, this includes variations within the individual vessel groups. Thus the conversion volume for group 4B in 2001/2002 was almost amounting to 20%.

Table 3.14. Transaction volume (%)

		1999/2000	2000/2001	2001/2002	2002/2003	Average
Group 2	Bought	10	6	6	8	7
	Sold	10	9	9	6	9
Group 3	Bought	8	7	15	10	10
	Sold	4	6	8	7	6
Group 4A	Bought	8	4	5	5	6
	Sold	6	8	12	10	9
Group 4B	Bought	6	15	18	5	11
	Sold	2	8	15	7	8
Total	Bought	8	8	10	7	7
	Sold	6	8	11	7	9

Note: The transaction volume is defined as number of bought or sold days at sea divided by number of allocated days at sea.

It can be observed that groups 2 and 4A which are not using all the allocated days at sea (cf. Table 3.10) have a higher transaction volume through selling than through buying of number days at sea. Inversely with vessel groups 3 and 4B where both groups almost used all days at sea allocated.

3.3. Catches and prices

The size of the fleet capacity (capital assets) and regulation of capacity exploitation by, i.a. days at sea regulation are basis for the catch in the fisheries. In general, the Faroese fishery consists of a relatively clean fishery where the number of different species is small. The catch amounts in 2003 distributed on cod, haddock, saithe, redfish, and other species are shown in Table 3.15. Based on the obtained prices for the respective species, shown in Table 3.16, the catch value is calculated and shown in Table 3.17.

Table 3.15. Catch volumes distributed on species, 2003 (tonnes)

Group	Type	Cod	Haddock	Saithe	Redfish	Others	Total
1	Trawlers > 400 HP	5,285	631	6,894	2,056	5,475	20,340
2	Pair trawlers > 400 HP	3,519	3,024	34,675	552	7,558	49,327
3	Long-line vessels above 110 GT	9,163	8,717	42	58	3,940	21,919
4A-line	Coastal fishing vessels 15-40 GT, line	2,464	1,883	23	0	254	4,624
4A-trawl	Coastal fishing vessels 15-40 GT, trawl	181	54	2	0	310	547
4B-line	Coastal fishing vessels > 40 GT, line	5,996	5,778	273	20	1,123	13,190
4B-trawl	Coastal fishing vessels > 40 GT, trawl	2,160	1,126	113	52	2,128	5,578
5A	Coastal fishing vessels < 15 GT	5,638	2,483	22	0	558	8,703
5B	Coastal fishing vessels < 15 GT, part-time	2,481	868	15	0	107	3,471
6	Gillnet vessels	521	0	10	166	2,479	3,176
7	High sea trawlers	5,338	318	218	4,366	1,776	12,016
8	Seiners/multipurpose vessels	,	,	,	,	394,681	394,681
9	Shrimp trawlers	,	,	,	,	14,089	14,089
10	Other vessels	95	61	41	30	68	294
Total		42,840	24,942	42,328	7,300	434,546	551,956

Source: The Commercial Fisheries Office, the Ministry of Fisheries and Maritime Affairs (f. *Fiskivinnustovan, Fiskimálaráðið*)

Table 3.16. Average prices distributed on species, 2003 (DKK/kg)

Group	Type	Cod	Haddock	Saithe	Redfish	Others	Average
1	Trawlers > 400 HP	16.35	8.63	4.14	8.58	12.73	10.21
2	Pair trawlers > 400 HP	16.56	6.76	3.67	7.50	4.96	5.02
3	Long-line vessels above 110 GT	17.43	8.77	2.10	5.10	10.63	12.70
4A-line	Coastal fishing vessels 15-40 GT, line	13.21	6.84	3.70	3.60	12.65	10.54
4A-trawl	Coastal fishing vessels 15-40 GT, trawl	13.58	5.31	1.80	4.72	19.27	15.94
4B-line	Coastal fishing vessels > 40 GT, line	14.99	7.92	3.94	5.09	11.75	11.37
4B-trawl	Coastal fishing vessels > 40 GT, trawl	14.14	7.21	2.77	6.75	19.64	14.54
5A	Coastal fishing vessels < 15 GT	11.86	6.34	2.31	3.51	6.61	9.93
5B	Coastal fishing vessels < 15 GT, part-time	11.57	6.14	2.04	3.05	16.63	10.32
6	Gillnet vessels	14.84	2.40	2.33	7.09	21.35	19.47
7	High sea trawlers	33.00	22.81	12.41	10.24	10.29	20.73
8	Seiners/multipurpose vessels	.	.	.	.	1.15	1.15
9	Shrimp trawlers	.	.	.	.	11.43	11.43
10	Other vessels	17.15	5.83	2.90	8.06	15.81	11.61
Total		17,30	7.94	3.79	9.40	2.09	3.76

Source: The Commercial Fisheries Office, The Ministry of Fisheries and Maritime Affairs (f. *Fiskivinnustovan, Fiskimálaráðið*)

Table 3.17. Catch value distributed on species, 2003 (1,000 DKK)

Group	Type	Cod	Haddock	Saithe	Redfish	Others	Total
1	Trawlers > 400 HP	86,421	5,439	28,546	17,633	69,702	207,741
2	Pair trawlers > 400 HP	58,265	20,451	127,202	4,143	37,477	247,537
3	Long-line vessels above 110 GT	159,749	76,454	89	296	41,897	278,484
4A-line	Coastal fishing vessels 15-40 GT, line	32,561	12,885	84	0	3,216	48,746
4A-trawl	Coastal fishing vessels 15-40 GT, trawl	2,456	289	3	2	5,968	8,716
4B-line	Coastal fishing vessels > 40 GT, line	89,883	45,756	1,076	101	13,204	150,020
4B-trawl	Coastal fishing vessels > 40 GT, trawl	30,535	8,118	313	349	41,798	81,113
5A	Coastal fishing vessels < 15 GT	66,898	15,756	52	1	3,689	86,396
5B	Coastal fishing vessels < 15 GT part-time	28,698	5,324	31	0	1,785	35,837
6	Gillnet vessels	7,732	0	24	1,178	52,911	61,845
7	High sea trawlers	176,128	7,247	2,707	44,707	18,272	249,061
8	Seiners/multipurpose vessels	,	,	,	,	454,112	454,112
9	Shrimp trawlers	,	,	,	,	161,100	161,100
10	Other vessels	1,632	355	118	238	1,073	3,417
Total		740,958	198,073	160,244	68,647	906,204	2,074,126

Source: The Commercial Fisheries Office, the Ministry of Fisheries and Maritime Affairs (f. *Fiskivinnustovan, Fiskimálaráðið*)

Changes in catch composition for vessel groups 1-5 are seen in Table 3.18.

Table 3.18. Catch composition in value for vessel groups 1-5, 1998 and 2003 (%)

		Cod		Haddock		Saithe		Redfish		Others	
Group	Type	1998	2003	1998	2003	1998	2003	1998	2003	1998	2003
1	Trawlers > 400 HP	12	42	2	3	21	14	39	8	26	34
2	Pair trawlers > 400 HK	18	24	12	8	45	51	2	2	23	15
3	Long-line vessels above 110 GT	44	58	40	29	0	0	0	0	16	13
4A-line	Coastal fishing vessels 15-40 GT, line	39	67	34	26	15	0	0	0	12	7
4A-trawl	Coastal fishing vessels 15-40 GT, trawl	48	28	15	3	1	0	0	0	36	68
4B-line	Coastal fishing vessels > 40 GT, line	47	61	31	31	11	1	1	0	10	8
4B-trawl	Coastal fishing vessels > 40 GT, trawl	40	38	19	10	0	0	0	0	40	52
5A+B	Coastal fishing vessels < 15 GT	48	78	33	17	6	0	2	0	11	4
Total		31	49	22	17	20	14	6	2	20	19

Source: The Commercial Fisheries Office, the Ministry of Fisheries and Maritime Affairs (f. *Fiskivinnustovan, Fiskimálaráðið*)

For the majority of the vessel groups fishing around the Faroe Islands, cod constitute a considerably major part of the catch value in 2003 compared to 1998. At the same time the importance of haddock, saithe and redfish has increased. The catch of other species is, however, more or less unchanged from 1998 to 2003 although varying between the vessel groups.

The development in amounts of catch, prices and catch value during the period 1985 to 2003 for the vessel groups 1-5 are shown in Table 3.19, Table 3.20, and Table 3.21, respectively.

Table 3.19. Amount of catch distributed on species for vessel groups 1-5, 1985-2003 (tonnes)

	Cod	Haddock	Saithe	Redfish	Others	Total
1985	40,099	14,468	39,979	12,780	19,253	126,579
1986	34,814	13,686	37,928	15,525	16,828	118,781
1987	31,783	14,798	39,381	14,853	18,394	119,209
1988	33,259	11,597	41,961	14,502	20,597	121,916
1989	26,735	13,371	42,578	13,256	18,229	114,169
1990	17,773	11,104	58,114	11,018	15,782	113,791
1991	12,352	8,419	52,797	15,550	16,111	105,229
1992	7,345	5,223	35,198	15,767	18,176	81,709
1993	6,421	4,210	33,475	10,131	16,437	70,674
1994	11,844	4,768	31,580	9,385	20,340	77,917
1995	21,514	5,480	27,230	10,856	26,809	91,889
1996	39,654	9,263	18,370	10,732	28,244	106,263
1997	35,312	16,732	20,363	8,747	27,322	108,476
1998	25,621	20,264	25,486	7,840	35,067	114,278
1999	19,372	16,833	30,854	7,021	25,978	100,058
2000	22,409	14,930	35,097	5,967	23,789	102,192
2001	27,682	14,817	45,049	6,961	28,047	122,556
2002	38,114	23,713	50,235	3,498	21,628	137,188
2003*	36,886	24,563	42,059	2,738	21,454	127,700

Source: Statistics Faroe Islands (f. *Hagstova Føroya*), * from the Commercial Fisheries Office, the Ministry of Fisheries and Maritime Affairs (f. *Fiskivinnustovan, Fiskimálaráðið*)

From 1985 to 1993 a significant decrease is seen in the amount of catch of cod and haddock. Since then catches have increased, and in 2003 they were on the same level as in 1985, peaking in 2002. Primarily due to recurrence to catch level of former times of cod and saithe combined with a significant increase in catch of haddock in 2002 and 2003. The catch of redfish has, however, decreased considerably.

Apart from saithe, prices increase for all species during the period 1985 to 2003, cf. Table 3.20. The period began with low prices on almost every primary species. In the following years, the price development was favourable and peaked in 1991/1992 for

all species. Subsequently, a negative development took place and lasted until the end of 1996/1997. Since then prices have increased in particular for cod, haddock and redfish. The price for these species peaked in 2000/2001, but was still in 2002 and 2003 on a high level compared with previous years in this period. The price of saithe has also varied during the period, but in 2003 was back to the level from 1985.

Table 3.20. Prices distributed on species of vessel groups 1-5, 1985-2003 (DKK/kg)

	Cod	Haddock	Saithe	Redfish	Others	Total
1985	5.42	5.47	3.66	3.94	4.56	4.59
1986	5.61	6.01	4.15	4.17	5.23	4.95
1987	6.47	6.33	4.38	4.37	5.69	5.38
1988	6.68	6.70	4.64	4.59	5.63	5.55
1989	7.04	6.95	4.76	4.73	5.86	5.72
1990	7.72	6.91	4.74	4.91	5.90	5.59
1991	9.43	8.90	7.04	5.92	7.86	7.43
1992	10.03	11.11	5.62	6.28	8.67	7.17
1993	8.20	8.34	4.03	6.00	7.65	5.79
1994	8.65	8.43	3.65	6.22	9.64	6.58
1995	7.87	7.07	4.85	5.51	7.60	6.57
1996	7.38	6.35	4.45	5.75	7.97	6.77
1997	8.51	7.45	5.08	7.48	9.21	7.80
1998	12.14	10.38	7.56	8.89	7.90	9.28
1999	15.23	12.60	5.23	8.55	10.62	10.04
2000	17.65	15.08	4.89	9.10	12.57	11.21
2001	18.13	14.27	4.98	11.14	11.86	11.00
2002	13.94	11.08	4.86	9.35	12.34	9.75
2003	15.06	7.75	3.74	8.23	10.20	8.96

Based on the amount of catches and prices the catch value can be calculated for vessel groups 1-5 and is shown in Table 3.21.

Assessed on catch value the Faroese fishery has experienced a particularly favourable development since the lowest point in 1993/1994. As mentioned above, this is due to a positive development in amount of catch and not least the prices achieved. The absolutely lowest catch value was achieved in 1993 where the value was 409 million DKK. Mainly, this was the result of the negative development, primarily in amounts of cod and haddock. Since then the development has been positive. Increasing amounts and prices have altogether meant an improvement in the total catch value which reached its maximum in 2001 at a level of 1,348 million DKK in the period analysed. The catch value, however, decreases to 1,145 million DKK in 2003.

Table 3.21. Catch value distributed on species for vessel groups 1-5, 1985-2003 (1,000 DKK)

	Cod	Haddock	Saithe	Redfish	Others	Total
1985	217,389	79,073	146,370	50,330	87,823	580,985
1986	195,426	82,319	157,467	64,715	87,946	587,873
1987	205,526	93,638	172,344	64,852	104,705	641,065
1988	222,014	77,669	194,681	66,606	116,043	677,013
1989	188,084	92,967	202,708	62,695	106,886	653,340
1990	137,271	76,693	275,251	54,116	93,073	636,404
1991	116,481	74,888	371,574	91,989	126,689	781,621
1992	73,680	58,042	197,696	99,039	157,629	586,086
1993	52,622	35,097	135,003	60,829	125,739	409,290
1994	102,443	40,173	115,292	58,384	196,154	512,446
1995	169,340	38,728	131,999	59,864	203,681	603,612
1996	292,481	58,818	81,661	61,682	225,037	719,679
1997	300,594	124,662	103,453	65,408	251,770	845,887
1998	311,092	210,373	192,737	69,672	277,053	1,060,927
1999	295,051	212,086	161,263	59,998	275,761	1,004,159
2000	395,610	225,172	171,484	54,316	299,136	1,145,718
2001	501,889	211,383	224,298	77,558	332,571	1,347,699
2002	531,202	262,811	244,219	32,711	266,799	1,337,742
2003*	555,466	190,471	157,395	22,524	218,735	1,144,592

Source: Statistics Faroe Islands (f. *Hagstova Føroya*), * from the Commercial Fisheries Office, the Ministry of Fisheries and Maritime Affairs (f. *Fiskivinnustovan, Fiskimálaráðið*)

Based on Table 3.21 it can be seen that catch value for cod has increased almost continuously since 1993. From the lowest level in 1993 of 53 million DKK it increased to 555 million DKK in 2003 which is more than twofold as high as in 1985. The catch value for haddock also reached a low level in 1993. Subsequently, it increased to a maximum of 263 million DKK in 2002, and then declined to 190 million DKK in 2003, but it is still considerably higher than the values obtained before 1992.

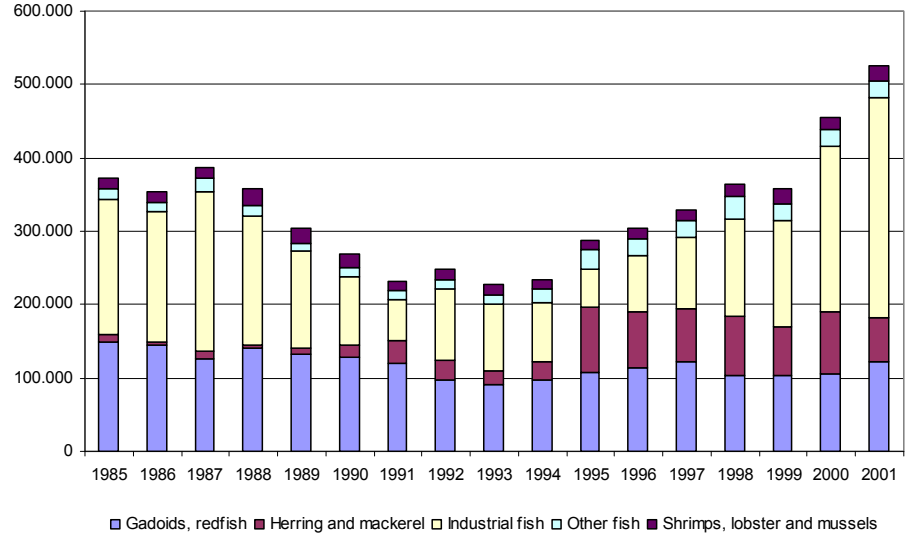
The catch value of saithe peaked in 1991 with 372 million DKK. Since then there has been a decrease, and in 2003 the value was 157 million DKK, by and large on level with the value from 1985. Since the highest catch value for redfish of 99 million DKK in 1992 the development has been negative. This is seen primarily in 2002/2003 where the value is reduced to 23 million DKK. Generally speaking, this development is solely due to decreasing amount of catch, cf. Table 3.19. The catch value of other fish has more than doubled in level, if the period before 1992/1993 is compared with the subsequent period.

Annex 4. Catch and earnings

4.1. Introduction

The total Faroese landings fished within and outside the Faroese fishing territory are almost doubled from approximately 250,000 tonnes to approximately 500,000 tonnes since the crisis in the beginning of the 1990s, cf. Figure 4.1. The growth has primarily been within herring and mackerel as well as industrial fish, especially blue whiting. Gadoids (cod, haddock and saithe) as well as redfish have all shown a weak decline during the period, but with moderate fluctuations since 1995. Considering landings only from the Faroese area of gadoids (cod and haddock), a significant increase is seen in the landings since the beginning of the 1990s, cf. annex 3, *The Faroese fishing fleet and its development.*

Figure 4.1 Faroese landings distributed on species groups



The effort regulation includes only fishery for gadoids in the Faroese waters and is not used for the industrial fishery, shrimp fishery or for herring and mackerel fisheries. The effort regulation is neither applied for the fishery for redfish in the Faroese waters as well as for the fishery of gadoids outside the Faroese territory.

Comprehensive accounting records exist for the Faroese fishing vessels. The records are made available by Rasmussen and Weihe, state-authorised public accountancy firm. The accounting statistics includes approximately 90 vessels, cf. Table 4.1. Seiners, shrimp trawlers, high sea trawlers, and other vessels, particularly commercial trawlers are fishing outside the Faroese territorial waters. Hence, these vessels are not subjected to effort regulation. This is also the case for gillnet vessels fishing in Faroese waters.

Table 4.1. Number of vessels in the accounting statistics

Group	Type	Type (Faroese)	1998	1999	2000	2001	2002
1	Trawlers > 400 HP	Lemmatrolarar	12	12	12	11	10
2	Pair trawlers > 400 HP	Partrolarar	28	28	30	30	28
3	Long-line vessels >110 >GT	Línuskip	15	16	18	20	21
6	Gillnet vessels	Garnaskip	8	8	8	8	8
7	High sea trawlers	Verksmiðjutrolarar	6	6	5	5	5
8	Seiners/ multipurpose vessels	Pelagisk skip	8	8	8	8	8
9	Shrimp trawlers	Rækjuskip	7	8	8	8	6
10	Other vessels	Onnur skip			3	3	3
Total			84	86	92	93	89

Source: Rasmussen and Weihe, state authorized public accountancy firm.

For the vessels from the accounting statistics (Table 4.1) some indicators for all vessels groups are extracted including the two pair trawler groups and long-line vessels which are subjected to effort regulation. This is shown in Table 4.2. The total landings from the vessels in the accounting statistics have made up approximately 400,000 tonnes per year in 2000-2002 which is more than 80% of the total registered landings shown in Figure 4.1. Hence the vessels included in the accounting statistics cover a very large part of the total Faroese landings. The vessels not included in the accounting statistics are the coastal vessels in groups 4 and 5, and they mainly catch gadoids around the Faroe Islands.

On a rough estimate, 90% of the Faroese vessels are subjected to effort regulation. If measured in amount of landings more than 80% of the fishery for gadoids and redfish are subjected to effort regulation, while fishery for shrimp, other fish (especially blue whiting), 'industry' (filet of consumption fish) as well as herring and mackerel are subjected to regulation through agreements with third-party countries. Trawlers fishing for redfish around the Faroe Islands with by-catch quotas of cod and haddock are not subjected to effort regulation. These trawlers catch approximately 20,000 tonnes.

Pair trawlers and long-line vessels constitute approximately 50% of the vessels in the accounting statistics, cf. Table 4.2. However, landing value of the vessels is only approximately one third of the total, and amount of catch is below 20%. The number of days at sea constitutes a total of approximately 50% of the total number of days for all vessels in the accounting statistics which means that catch per day is less for the vessels subjected to effort regulation than for those vessels that are not. The fact is that vessels subjected to effort regulation are smaller than vessels without effort regulation.

Table 4.2. Summary of vessels included in the accounting statistics

		1998	1999	2000	2001	2002
Total*	Number of vessels	84	86	89	90	86
	Catch value (million DKK)	1,389	1,314	1,492	1,827	1,734
	Amount of catch (1,000 tonnes)	317	281	403	416	392
	Days at sea (1,000)	22	23	23	24	22
Pair trawlers and long-line vessels	Number of vessels	43	44	48	50	49
	Catch value (million DKK)	434	430	490	562	592
	Amount of catch (1,000 tonnes)	48	48	53	61	69
	Days at sea (1,000)	10	11	12	12	12
Share for pair trawlers and long-line vessels	Number of vessels (%)	51	51	54	56	57
	Catch value (%)	31	33	33	31	34
	Amount of catch (%)	15	17	13	15	18
	Days at sea (%)	48	49	52	51	54

Note: * Other vessels are not listed as they do not represent the whole period. These landings are approximately 10,000 tonnes.

The vessels subjected to effort regulation are emphasized in Table 4.3 which shows the average turnover per vessel. Although the accounting statistics include reviews of which vessels are included from year to year, it is not possible to adjust for the number of vessels in the groups where changes are seen from year to year. For this reason it has been necessary to chose turnover per vessel as basis of evaluation. Looking at the development, the total turnover of these groups is influenced by the changes in the number of vessels.

Table 4.3. Turnover per vessel (million DKK)

Group	Type	1998	1999	2000	2001	2002
1	Trawlers > 400 HP	12.8	12.6	14.9	16.7	18.7
2	Pair trawlers > 400 HP	8.6	8.6	10.1	10.6	11.0
3	Long-line vessels >110 GT	12.8	11.9	10.4	12.3	13.6
6	Gillnet vessels	6.4	10.4	13.6	11.3	8.1
7	High sea trawlers	43.9	43.3	48.3	52.8	58.0
8	Seiners/ multipurpose vessels	34.4	18.6	34.1	58.9	55.8
9	Shrimp trawlers	30.5	30.3	25.2	31.8	25.7
10	Other vessels	-	-	21.6	38.5	39.3
Total		16.6	15.3	16.9	20.9	20.8

4.2. Economic analysis of the vessels subjected to effort regulation

As mentioned in section 4.1 the fisheries account statistics, drawn up by Rasmussen and Weihe include only information on two of the vessel groups which are subjected to effort regulation. Therefore, the economic analysis will only include these two groups, pair trawlers and long-line vessels.

For pair trawlers as a group, a number of indicators are seen in Table 4.4. The accounting analyses should include the same vessels throughout the entire period in order to give a true picture. That is the case for pair trawlers. The number of vessels has been rather stable, and the same vessels are included. It is seen that the amount of catch has increased with approximately 50% in the period. Especially the catch of saithe has increased, while the catches of cod and haddock constituted approximately 8,000 tonnes in 1998, decreasing to scarcely 7,000 tonnes in 2002. The number of days at sea has been fairly constant so that catch per day at sea has increased. As the price for saithe is lower than the price for cod and haddock, the result has been that the average price for all species has decreased.

Table 4.4. Characteristics of pair trawlers

	1998	1999	2000	2001	2002
Number of vessels	28	28	30	30	28
Catch value (1,000 DKK)	241,902	240,045	301,800	316,580	307,373
Amount of catch (tonnes)	31,173	33,386	40,133	44,905	47,581
Average price (DKK/kg)	7.76	7.19	7.52	7.05	6.46
Days at sea	6,961	7,378	7,929	7,370	7,208
Catch value per day at sea (1,000 DKK)	35	33	38	43	43
Days at sea per vessel	249	264	264	246	257

Similar information is shown in Table 4.5 for long-line vessels. Here, there is a crucial difference from pair trawlers as the number of vessels included in the statistics have increased since 1998. Consequently, the number of days at sea included in the statistics has also increased. Therefore, it is necessary to have a look at the development in catch value per day at sea as this indicator expresses an increase in turnover compared to the effort progress. Hence, it can be seen that during the whole period there has not been any significant increase in catch value per day. There has been opposite changes in amounts and prices as contributory factors to this development.

Table 4.5. Characteristics for long-line vessels

	1998	1999	2000	2001	2002
Number of vessels	15	16	18	20	21
Catch value (1,000 DKK)	192,148	189,830	187,800	245,674	284,849
Amount of catch (tonnes)	17,264	14,316	12,520	15,658	21,498
Average price (DKK/kg)	11.13	13.26	15.00	15.69	13.25
Days at sea	3,511	3,730	3,937	4,575	4,673
Catch value per day at sea (1,000 DKK)	55	51	48	54	61
Days at sea per vessel	234	233	219	229	223

Although certified in the accounting material which vessels are included in the statistics, the following tables are presented as average per vessel in order to reduce possible changes over time due to changes in number of vessels.

In the Danish account statistics *earnings* are used as indicator for what is left for payment of the inserted production factors, manpower and capital. Earnings are defined as the turnover deducted variable costs exclusive salary of manpower. Earning is an important indicator for small vessels which most often have not hired crew, and where payment to the ship master/owner and the invested capital in vessels can be difficult to differentiate. For larger vessels the gross profit is more relevant.

Pair trawlers and long-line vessels have the lowest costs in relation to turnover, but since they at the same time are the smallest, earnings measured in DKK also become less than for the other groups in the accounting material, cf. Table 4.6.

Table 4.6. Earning per vessel (million DKK)

Group	Type	1998	1999	2000	2001	2002
1	Trawlers > 400 HP	7.2	6.5	7.8	8.5	9.8
2	Pair trawlers > 400 HP	5.8	5.8	6.2	6.5	7.0
3	Long-line vessels > 110 GT	9.0	8.4	7.1	8.6	9.0
6	Gillnet vessels	5.0	7.0	9.9	7.5	5.1
7	High sea trawlers	28.5	24.8	28.3	32.6	38.5
8	Seiners/ multipurpose vessels	24.2	8.4	19.6	40.6	37.0
9	Shrimp trawlers	14.6	15.8	10.3	9.5	8.7
10	Other vessels	.	.	0.8	7.8	10.2
Total		10.6	9.0	9.5	11.9	12.3

The gross profit is also used in the Danish account statistics, and is defined as earnings deducted crew payment including shipmaster/owner. The gross profit is thus the amount that remains to rent of the invested capital.

Pair trawlers and long-line vessels have the highest relative payment of crew in all groups apart from gillnet vessels. Thus payment to crew amounts to 44% of the turnover for pair trawlers and 57% for long-line vessels. The gross profit is approximately 2 million DKK for pair trawlers and approximately 1.5 million DKK for long-line vessels, cf. Table 4.7.

Table 4.7. Gross profit per vessel (million DKK)

Group	Type	1998	1999	2000	2001	2002
1	Trawlers > 400 HP	2.1	1.5	1.9	2.0	2.7
2	Pair trawlers > 400 HP	2.0	1.9	1.9	1.9	2.2
3	Long-line vessels > 110 GT	1.6	1.5	1.1	1.6	1.3
6	Gillnet vessels	0.5	0.7	2.2	1.0	-0.3
7	High sea trawlers	9.9	8.0	9.4	11.9	13.2
8	Seiners/ multipurpose vessels	12.6	1.5	8.9	21.8	19.4
9	Shrimp trawlers	3.8	5.7	0.8	-0.2	-0.4
10	Other vessels	.	.	-9.8	-8.0	-5.2
Total		3.5	2.4	2.3	3.5	3.6

A way to estimate the size of the gross profit is to calculate the price with which it is possible to pay for a new vessel, if the old one is to be replaced. If a time frame of 25 years is chosen for the lifetime of a vessel (depreciation period), and if interest rates and depreciation are set to 12% (8% interest rates and 4% depreciation) there will be

accumulated approximately 17 million DKK with an annual gross turnover of 2 million DKK which is far less than the purchase price of a pair trawler or a long-line vessel.

In relation to assessment of the effort regulation a biological and an economic objective can be included. The biological objective is connected with the conservation of fish stocks while the economic objective is attached to meet the need of achieving economic yield of the fish stocks. A larger economic yield will then secure a high level of stock conservation. In order to see if effort regulation is working for the purpose as an economic indicator is then, whether earning capacity and gross profit are higher for vessels subjected to effort regulation than for comparative vessels subjected to quota regulation.

For the Faroese, it is most obvious to compare pair trawlers and long-line vessels with trawlers which are not subjected to days at sea regulation, cf. Table 4.7. No significant difference of the gross profit is seen. However, attention should be drawn to the fact that trawlers fishing for redfish as target species have by-catch quotas on cod and haddock of a total of 200 tonnes annually per vessel. It has been mentioned that an important cause for the favourable economic results of the trawlers is the admission to fish cod and haddock. The by-catch quota of cod and haddock constitutes approximately 10% of the total amount of catch of the individual trawlers, but as prices at least on cod are higher than for redfish, the by-catch contributes with a larger part in value. On the Faroe Islands, it has been discussed whether the trawlers, approximately 13 vessels should be included directly under the days at sea regulation (cf. reports of the Committee on Fishing Days). Inclusion of these vessels means that all cod, haddock and saithe fisheries will be subjected to effort regulation. In addition, it should be mentioned that according to information there is a tendency that pair trawlers with the largest engines (above 1,000 kW) are progressing at the expense of pair trawlers with smaller engines. The larger pair trawlers have a higher turnover and better profitability than the smaller. According to information received the same development has not been the case for trawlers fishing for redfish.

The economic result for the Faroese vessels could also be compared with the corresponding Danish vessel groups. A very likely comparison would comprise the Faroese vessels in groups 4 and 5, and the Danish trawlers and gillnet vessels fishing for cod and flatfish. These vessels are of fairly the same size and fish more or less on the same species. However, such a comparison is not possible as there is no accounting information for the Faroese vessels in this group.

Another comparison would include the Faroese pair trawlers and the corresponding Danish trawlers measured in size. However, this comparison should be taken with caution as the Faroese vessels are fishing for gadoids, while the corresponding Danish vessels of the same size are fishing for herring, mackerel, and industrial fish. There are two Danish groups which could be relevant, viz. trawlers of 24-40 m (approximately 100 GT - approximately 300 GT) and trawlers of 40 m and above (approximately 300 GT and above). In the period 2000-2002, the average gross profit for the Danish trawlers of 24-40 m was 1.2 million DKK, while the gross profit for vessels above 40 m was 4.6 million DKK (including seiners).

Another condition, which makes comparison difficult, is that the estimated value of Danish vessels seems to be higher than the value of the corresponding Faroese vessels of the same size. The estimate of value is, however, most problematic and should be compared with great caution. The total assets in a Faroese shipping company with a long-line vessel or a pair trawler are not significantly different from the total assets in a corresponding Danish vessel (shipping company). However, the share of owner equity is significantly higher in the Faroese vessels than in the Danish, indicating a considerably higher degree of economic consolidation in the Faroese fleet.

If gross profit is used as basis for an evaluation with the above discussed replacement criterion, it can be concluded with caution that the economic purpose with days at sea regulation has not (yet) been achieved.

The purpose of effort regulation may also be of biological character with regard to stock conservation by avoiding overfishing. This has been carried out in order to prevent new intake to the fleet in the form of more vessels and to lay down a limit for the number of days at sea. If comparison is made to Denmark at this point, it should be mentioned that the Danish fleet have been constantly decreasing in tonnage and numbers so that on this point there are parallels between the development in Denmark and on the Faroe Islands. The evaluation of the size of capacity should, however, be compared to catch possibilities, i.e. the resource basis.

Annex 5. An outline of the Danish fisheries management

5.1. Introduction

The regulation of Danish fisheries is primarily based on two directives: 1) Regulation Directive[32] determining quota limitations etc. and 2) Capacity Directive[33] determining the rules for fishing vessels. The code of practice is based on a number of EU directives on regulation of the fisheries of which should be emphasized, regulation on resource management[34], on fleet management[35] and on technical regulations[36]. Admittance to carry out fisheries in compliance with this code of practice is limited by measures which can be divided into four main groups:

1. Quota restrictions
2. Effort restrictions
3. Technical measures
4. Capacity restrictions

There is a difference in the way the used measures implement the limitations. Quota restrictions are implemented by direct prohibition of exceeding the quota as well as guide lines on how fishery should be conducted. Direct prohibition is also used in effort restrictions in the form of prohibition to exceed a certain number of days at sea. The technical measures lay down rules in the form of prohibition and order of how the fisheries should be carried out regarding type of gear and application, in which areas not to fish, demand on which fish could to be landed (discard) etc. However, the technical measures influence on the behaviour of the fishermen with the purpose that fisheries should be carried out in an appropriate way on the basis of a number of criteria including protection of small fish. The rules have a permanent character, and the code of practice must be characterized as very complicated. Capacity restrictions are encouraged by use of subsidies in anticipation of getting the capacity down to a determined size.

[32] Directive no. 1028 of 11 December 2003.
[33] Directive no. 124 of 27 February 2004.
[34] Regulation no. 2371/02 of 20 December 2002, EØF-Tidende no. L. 358 of 31/12/2002.
[35] Regulation no. 1434/03 of 12. August 2003, EØF-Tidende no. L. 203 of 12/08/2003.
[36] Regulation no. 850/98 of 30. March 1998, EØF-Tidende no. L. 125 of 27/4/1998.

Table 5.1. Catch composition in whole fish on vessel groups and species groups, 2003 (%)

Length	Type of gear/ fisheries	Gadoids	Flatfish	Other species	Lobster	Shrimps	Herring	Mack-erel	Indus-trial fish	Regula-tion*
< 12m	Gillnet/hook	12	6	8	0	0	0	0	0	DS,A
	Dory/trap	1	1	13	0	1	0	2	0	DS,A
	Seine/gillnet/ trawl	2	2	1	0	0	0	0	0	DS,A
	Trawl	1	1	1	1	0	1	0	0	DS,A
	All gears	16	10	23	1	1	1	2	0	DS,A
12-15m	Gillnet/hook	4	5	3	0	0	0	0	0	DS,A
	Seine/gillnet/ trawl	2	2	1	1	0	0	0	0	DS,A
	Seine	1	4	0	0	0	0	0	0	DS,A
	Trawl	10	6	1	17	0	2	0	2	DS,A
	All gears	17	15	5	18	0	2	0	2	DS,A
15-18m	Gillnet/hook	4	6	1	1	0	0	0	0	DS
	Seine/gillnet/ trawl	1	1	0	1	0	0	0	0	DS
	Seine	1	6	0	0	0	0	0	0	DS
	Trawl	11	7	5	21	5	5	0	4	DS
	All gears	17	20	5	23	5	5	0	4	DS
18-24m	Gillnet/hook	2	6	1	1	0	0	0	0	DS
	Seine/gillnet/ trawl	1	3	0	2	0	0	0	0	DS
	Seine	6	8	0	0	0	0	0	0	DS
	Trawl	18	16	4	30	11	3	0	7	DS
	All gears	27	32	5	33	11	3	0	7	DS
24-40m	Beam trawl	1	11	0	1	0	0	0	0	DS
	Seine /gillnet/ trawl	3	3	1	1	0	0	0	0	DS
	Trawl industry	0	0	0	0	0	2	0	36	F,R
	Trawl mixed	20	9	61	23	82	24	13	11	ITQ,A,R
	All gears	24	23	62	25	82	26	13	47	DS,ITQ
≥ 40m	Seine	0	0	0	0	0	31	58	6	ITQ,A
	Trawl industry	0	0	0	0	0	2	1	16	ITQ,R
	Trawl mixed	0	0	0	0	0	30	26	17	ITQ,A
	All gears	0	0	1	0	0	63	85	40	ITQ
Total		100	100	100	100	100	100	100	100	
Regulation		R,A	F,R	F	F	F	ITQ	A,R	F,R	

Note: * A indicates regulation with individual annual amounts, R indicates regulation with rations; F indicates that regulation permits free fisheries until approximately 70% of the quota has been fished, ITQ indicates regulation with individual transferable quotas; DS indicates regulation of days at sea.

While technical measures and capacity restrictions in principle affect all vessel groups and species, this is not the case with quota restrictions and effort restrictions. Tables 5.1 and 5.2 show in a simplified and brief form how the species and vessel groups are

regulated. Table 5.1 shows the share of landings of the individual species and species groups of the individual vessel groups. All vessel groups apart from vessels of or above 40 m participate in the fisheries for cod and gadoids.

Table 5.2. Catch composition in value distributed on vessel groups and species groups, 2003 (%)

Length	Type of gear/ fisheries	Gadoids	Flatfish	Other species	Lobster	Shrimps	Herring	Mack-erel	Indus-trial fish	Regula-tion*
< 12m	Gillnet/hook	58	29	13	0	0	0	0	0	DS,A
	Dory/trap	21	14	54	0	2	1	7	1	DS,A
	Seine/ gillnet/ trawl	43	39	13	4	0	1	0	0	DS,A
	Trawl	28	28	13	15	0	12	0	3	DS,A
	All gears	48	27	20	1	1	1	1	0	DS,A
12-15m	Gillnet/hook	47	44	7	1	0	0	0	0	DS,A
	Seine/gillnet/ trawl	52	32	3	12	0	1	0	0	DS,A
	Seine	25	74	1	0	0	0	0	0	DS,A
	Trawl	38	17	2	32	0	3	0	8	DS,A
	All gears	41	31	3	18	0	2	0	5	DS,A
15-18m	Gillnet/hook	39	56	2	2	0	0	0	1	DS
	Seine/gillnet/ trawl	43	28	1	19	0	0	0	9	DS
	Seine	23	77	0	0	0	0	0	0	DS
	Trawl	30	17	1	30	3	5	0	14	DS
	All gears	32	34	1	19	2	3	0	9	DS
18-24m	Gillnet/hook	30	62	3	5	0	0	0	0	DS
	Seine/gillnet/ trawl	24	52	1	22	0	0	0	0	DS
	Seine	48	52	0	0	0	0	0	0	DS
	Trawl	28	27	2	26	2	2	0	14	DS
	All gears	31	37	2	19	1	1	0	9	DS
24-40m	Beam trawl	8	89	0	3	0	0	0	0	DS
	Seine/gillnet/ trawl	46	47	3	4	0	0	0	0	DS
	Trawl industry	1	0	0	0	0	1	0	98	F,R
	Trawl mixed	24	14	1	18	12	11	3	17	ITQ,A,R
	All gears	16	18	1	10	6	6	2	40	DS,ITQ
≥ 40m	Seine	0	0	0	0	0	38	46	16	ITQ,A
	Trawl industry	1	0	0	0	0	2	1	96	R,F
	Trawl mixed	0	0	0	0	0	31	16	53	ITQ,A,R
	All gears	0	0	0	0	0	27	25	47	ITQ
Regulation		R,A	F,R	F	F	F	ITQ,R	A,R	F,R	

Note: * A indicates regulation with individual annual amounts, R indicates regulation with rations; F indicates that regulation permits free fisheries until approximately 70% of the quota has been fished, ITQ indicates regulation with individual transferable quotas; DS indicates regulation of days at sea.

Flatfish are fished by the same groups, especially Danish seine as well as beam trawl. Herring, mackerel and industrial fish are almost solely fished by vessels of 24 m or above, while lobster is fished by trawlers from 12 m and up to 40 m, and shrimps of trawlers from 18 and up to 40 m.

Table 5.2 shows the importance of the individual species and species groups for the vessel groups. Cod and flatfish are of great importance for vessels below 12 m and 12-15 m. When vessels are larger, the importance of lobster and shrimp increases. The very large vessels are dependent on herring, mackerel and industrial fish. Herring is subjected to regulation by use of individual transferable quotas, which implies that mackerel and industrial fisheries are influenced from this. The introduced days at sea regulation have an influence on the vessels up to 40 m. Vessels below 15 m have the possibility of annual amounts that are individual non transferable quotas. The annual amount is also a possibility for cod in the Baltic for all vessels.

5.2. Quota restrictions

In order to fish, a registration as fisherman is required first of all and is given to persons who fulfil certain criteria regarding experience and income obtained by fishery. Subsequently, the used fishing vessel shall be registered in the register of fishing vessels at the Danish Directorate of Fisheries.

The quota regulations in the Regulation Directive are changed from year to year according to the annual EU quota assessment. In addition, the detailed laying down of catch possibilities are changed during the year through the so-called 'annex 6 information' determining fisheries stop as well as changes in the allocation of catch amounts dependent on how the fishery develop throughout the year. Hence, the Danish Directorate of Fisheries may, after hearing of the Committee on Commercial Fisheries, (cf. the Fisheries Act § 6), and in light of catch, supply and market situation lay down modified rules for the fisheries.

Among others, changes can be laid down concerning the following:

1. Available amounts for certain periods
2. Rations or number of days at sea, etc. in certain specified fisheries
3. Transition to demand of permission in certain fisheries
4. Demand that fisheries are limited to further specified types or groups of vessels

5. Demand that landings take place under certain conditions, including specific geographic areas
6. Use of catch
7. Suspension of certain specific fisheries
8. Demand that landings in a period are limited as part of a fishing plan which should contribute to that the landed amounts can be sold currently
9. Changed terms for permits already issued

Hence, the basis for regulation of the fisheries is very comprehensive. There are provisions that apply to all nine areas, but it is in particular the provisions under the above item 1 and 2 that are elucidated in the following. These provisions regulate most directly that the quotas determined by the EU are complied with.

The right to fish on the most 'exploited' species demand a licence for this specific fishery. This is also due for most species that are fished as target species, while those species which are of less economic importance and caught as by-catch often are not protected by the need for a licence. The management of quotas when done via licence means that this regulation gets complicated, as a fisherman may possess more permits without necessarily using them all. On the contrary, only to a limited extent exclusivity is entered in the admittance to fish, i.e. the admittance criterion is in principle tied up on the registration as a fishing vessel.

The regulation can be divided into three levels:

1. Species
2. Areas
3. Vessels

The EU quotas are determined for more than 35 species each year, of which 30 species are of importance to Denmark. When the quotas for these species are divided into marine areas, there are more than 120 quotas each year. The quotas are thus laid down for management areas, determining the combination of species and waters. In Denmark, 66 quotas are in force, from which 51 are for consumption species, while 15 are for industrial species. The Danish quotas are then distributed on vessels after different criteria, elucidated below. When the vessel dimension is included, it actually means that more than several hundred quotas appear in Danish fisheries.
The used quota models in the Danish fisheries are shown in simplified schematic form in Table 5.3.

Table 5.3. Division of quota regulation

Quota model	Species	Waters	Vessel	Comments
Rations	Cod	All	All	
Annual amounts	Cod	The Baltic	All	
Annual amounts	Cod, sole, plaice	The North Sea, Skagerrak, Kattegat	< 15 m	Coastal fisheries agreement
Individual transferable quotas	Herring	The North Atlantic, The North Sea, Skagerrak, Kattegat	All with historic right	Runs for 5 years from 2003. Possible extension for further 3 yeas
Rations	Herring	The Baltic, the Belt Sea	All	
Annual amount	Mackerel	The North Sea, Skagerrak	All with historic right	Change to IQ is under consideration
Rations	Gadoids and flatfishes	The North Sea, Skagerrak, Kattegat	All	
Free	Industrial fish, plaice and certain gadoids	The North Sea, Skagerrak, Kattegat	All	Up to 50% or 70% of the quota is fished, thereafter rations. Change to IQ* for the industrial fisheries is under consideration

Note: * IQ indicates individual quotas

Generally, the Danish quota regulation is complex. There is a differentiation on species, waters, vessel type/gear and vessel size concurrently with use of different quota models including individual transferable quotas (ITQ), individual quotas (IQ), annual amounts, rations and free fisheries.

5.3. Effort regulations

Effort regulations in the form of days at sea regulation have been adopted as part of the restoration measures for cod. The regulation applies to vessels of 10 m and above, fishing in the North Sea, Skagerrak, Kattegat, and the waters west of Scotland, the eastern part of the English Channel, and the Irish Sea.

The new effort regulation, effective as from 1st February 2004, replaces the effort regulation in force in 2003 and which was continued in the month of January 2004. In Table 5.4, the maximal number of days at sea per gear group is shown. In group 4a the Danish vessels have been allocated 13 days against 10 days in the EU regulation.

Table 5.4. Maximum number of days at sea per fishing gear in Kattegat, Skagerrak, the North Sea, west of Scotland, the eastern part of the English Channel, and the Irish Sea

		Number of days per month
4a	Trawl, seine, and other hauled gears, except for beam trawl, with a mesh size of 100 mm or above	13 (10 + 3)
4b	Beam trawl with a mesh size of 80 mm or above	14
4c	Stationary gillnet	14
4d	Bottom lines	17
4e	Trawl, seine or other hauled gears, except for beam trawl, with a mesh size between 70 mm and 99 mm.	22
4f	Trawl, seine or other hauled gears, except for beam trawl, with a mesh size between 16 mm and 31 mm	20

Permission is given to transfer days at sea between the vessels under certain conditions. Hence, it is only allowed to transfer days at sea between vessels using gears within the same gear group (groups 4a to 4f) and which are enrolled in the days at sea scheme in the same managing period. This means, e.g. if transfer is made between two vessels in gear category 4a in October, the selling vessel may be registered for an 11 month managing period (1st February – 31st December), while the receiving vessel is enrolled for a five month period (1st June – 31st October).

A technical calculation is made of the days that can be transferred. The unused days of the purchasing vessel multiplied with the engine effect expressed in kilowatt (kW-days) should be equal to or larger than the product of the number of days which is transferred to the receiving vessel multiplied with the engine effect of this vessel expressed in kilowatt. This means, e.g. that 10 unused days at sea from a vessel of 200 kW are converted to 5 days at sea (200 x 10: 400 = 5) for a vessel at 400 kW. If the receiving vessel is at 1,000 kW the 10 days will be converted to only 2 days (200 x 10: 1,000 = 2).

There is a ceiling on the number of days the individual vessel may transfer. The total number of days at sea that can be transferred may not exceed the number of days which the vessel has had on average in the effort area for the years 2001, 2002 and 2003, documented with the EU log-book.

5.4. Technical conservation measures

Due to tying up of the days at sea regulation on gear categories, it is closely connected to the technical regulations. These regulations lay down rules for mesh size, minimum size of fish, closed areas for certain types of gears (e.g., the plaice box) and by-catch rules. These rules are rather complicated, and the aim is to manage the catch of different species through regulation of gears. The method can be illustrated by means of Table 5.5 which show a number of selected species as well as mesh sizes for trawl and minimum share of target species which applies for fisheries in the North Sea.

The table is read from right to left. If a mesh size of 100 mm or above is used there is no demand for target species that is fisheries within the ordinary rules in force. This is stated with an X in all sections. Cod, haddock and saithe are not included in the table as these species may only be caught with gears of 100 mm or above as target species.

If the gear is considered 80-99 mm, it may be used for sole, plaice, hake, and whiting if the catch constitutes 70% or above of these species. It may not be used to targeted cod, haddock or saithe fisheries. Furthermore, it is seen that mackerel may be fished with 55-69 mm, if 90% or more of the catch onboard are mackerel. Herring may be fished with 32-54 mm, if at least 90% consists of herring and the other marked species. It is also possible if at least 60% may consist of one of the marked species concurrently with that only 5% may be cod, haddock or saithe. Under certain conditions herring may also be fished with mesh sizes of 16-31 mm which is not shown in the table. Finally, it can be seen that sand eel may be fished with very small meshes, but then more than 95% must consists of sand eel.

Table 5.5. Correlation between gear and target species

Mesh size in mm for trawl	<16	---- 16-31 ----		---- 32-54 ---		55-69	70-79	--- 80-99 ---		>100
Least % -share of target species	95	90/60	60	30	90/60	90	35	30	70	none
Sand eel	X	X			X		X	X	X	X
Norway pout		X			X		X	X	X	X
Sprat		X			X		X	X	X	X
Mackerel					X	X	X	X	X	X
Herring					X		X	X	X	X
Common shrimp			X	X	X		X	X	X	X
Norway lobster							X	X	X	X
Sole									X	X
Plaice									X	X
Hake									X	X
Whiting									X	X

As mentioned, the gear regulation is very complicated. However, it is important to pay attention to that the gear combined with minimum share of target species aims at making the fisheries as selective as possible. An example is that even if the industrial species sand eel, Norway pout, and sprat can be fished together with herring and mackerel, a fishery addressed directly on the industrial species would be more likely using smaller meshes. There is, however, a demand of lower by-catches of all other species. Gears with a little larger mesh sizes will thus be used for mackerel and herring fisheries, in particular.

Minimum size for fish is also determined in the technical regulations. For Denmark there is furthermore a national directive prescribing higher minimum size limit for certain species than the EU regulations. Fish which do not comply with the minimum size limit must not be kept onboard, but shall be discarded immediately. The EU regulations on minimum size and discard are contrary to the regulations that apply to the Faroe Islands, Norway and Iceland. Here all fish caught should be brought ashore.

It has been mentioned that the minimum size regulation would give the fishermen economic incentive to avoid fishing undersized fish as the demand of discard means an increase in cost. Inversely, the rule has also resulted in that it is legal to catch small fish as long as they are discarded. If catch of small fish lead to a catch of larger fish in combination herewith, it is of big value to catch a lot of small fish without breaking any rules. While there is a demand that under-sized fish are discarded, it was not prohibited previously to discard fish above the minimum size limit. The correlation problems between quotas for the individual species have made it necessary. About two years ago a rule was laid down for quotas that if they are not depleted, it is prohibited to discard fish above the minimum size limit.

The days at sea regulation in combination with the above gear regulations are new in the sense that days at sea have been introduced only from 2003. When days at sea are combined with gear regulations it is possible to direct the fisheries at certain species and species combinations. The gear determines catch composition, and the number of days at sea determines the amount of catches.

5.5. Capacity restriction

However, the amount of catches is not only determined by number of days at sea, but also of capacity in the form of length, tonnage and engine power of the vessels. This is expressed in the conversion rules for transfer of days at sea.

Fleet capacity regulation in Danish fisheries is determined in the directive on vessels used for commercial fisheries (Capacity Directive). The directive is brief in comparison with the Regulation Directive and the technical regulations.

The Capacity Directive should be seen in connection with the EU fleet policy including the ceilings adopted for each member country. For many years Denmark has maintained a very restricted access which has resulted in that if new capacity is to be introduced in the fishery, dismissal of corresponding capacity is demanded. This policy means that capacity available from the vessel has got a value in itself. If a vessel is emptied for capacity it does not necessarily mean that the vessel is removed physically, but that it must not be used for fishery. This means that capacity may exist, but a vessel without capacity for fishery shall be removed from the Register of Fishing Vessels.

Hence, the Capacity Directive determines the rules for who can have the disposal of capacity, what is meant by capacity and how it can be handed over as well as within which time limits it should be used. Renewal of vessel, renovation, increase etc. thus demands that a vessel owner possesses the necessary capacity both in the form of tonnage and engine power. If a new smaller vessel is built, the additional capacity from the old vessel can be sold off, and if a larger vessel is built, additional capacity must be bought.

For beam trawlers and mussel vessels there are special rules. Besides there is no limitations in the use of capacity between the vessel groups.

5.6. Conclusion

Where the regulation directive is based on the regulation of fish stocks in the sense that determined quotas is not be exceeded, the capacity and days at sea regulation are based on that a specified ‘fishing effort’ is not to be exceeded.

If the rules on technical regulations are perceived in connection with the regulation directive, the technical rules are serving the purpose to diminish '***correlation effects***' between quotas for the individual species. These correlation effects appear because the fishery cannot be carried out completely selective on the individual species – and because to a certain extent it would be economically unprofitable to try to do so. These correlation effects cannot be avoided completely, causing partly discards and partly production factors (vessels and crew) not being used economically efficient.

If the rules on technical regulations are perceived in connection with the capacity directive and the days at sea regulation it is then possible to minimize a number of correlation effects, but the result will be that certain 'quotas' would be exceeded while others would not quite be depleted.

The Danish regulation of the demersal fishery can be schematically illustrated as done in Figure 5.1. The figure shows the rather complicated interaction between quota regulation, gear regulation, and the days at sea regulation. On the left side of the figure, an extract of the management areas is shown which is a combination of the species and waters for which there are determined quotas. On the right side of the table the quotas and landings are shown. At the top of the figure the vessel groups are shown with regard to number of vessels, number of days at sea as well as gear types and mesh sizes. This part is not complete either in consideration of clarity. In the inner part of the figure, X indicates the gear with which is allowed to fish the individual species. The fields marked with (X) mean that there are certain exceptions, e.g., a common quota for all waters for saithe is determined, while there are different gear regulations for the different waters. In addition, beam trawlers are allowed to catch all species if they use gears with 100 mm meshes or above, but due to gear technical reasons plaice and sole are fished as target species with by-catch of certain other species.

The figure can be read in the following way:

Quota regulation
Quotas for each individual species may not be exceeded, and only the individual species must be fished with the gear referred to under gear type and mesh size. From the effort side which should be read from the top of the figure, it is gear and the product of number of vessels and days at sea that determine what and how much is caught. As quotas and use of gear are fixed this means that number of days at sea, including number of vessels should be adapted so that landings do not exceed the quotas. At the same time it is suggested that when more species are comprised in the catch of a ves-

sel group, problems could easily arise in arranging the fishery so that no quotas are exceeded. In this connection problems with discard arise.

Effort regulation
As mentioned the effort is the product of number of vessels and days at sea distributed on gear. There are regulations on number of days at sea for each gear group (in principle corresponding to the quota regulation of the individual species). As the catch to a very large extent is determined by the gear used, the catch may substantially be controlled by the establishment of days at sea for each gear. The catch of each species, however, could not be controlled so accurate that no quotas are exceeded. Therefore the quotas must 'be adapted' in an effort regulation corresponding to adaption of days at sea as in quota regulation. At the same time it is suggested that incentive to discard is diminished, as there is no longer a demand that al quotas should be complied with.

Quota and effort regulation
If the two regulation types are combined which is actually the case at the moment, it can be seen from the figure that neither landings of the individual species nor the number of allocated days at sea must be exceeded. In this way the fishery is getting to a standstill, the incitement to discard is maintained due to quota restriction. If discard is to be reduced by establishing a suitable small number of days at sea on the most exposed species, it will result in that the catches for other species will be reduced, and the quotas on these species will not be depleted.

This problem has been subjected to a further analysis in 'Fiskeriets Økonomi' ('The Economic Situation of the Danish Fishery') in 2003 and 2004 where the importance of days at sea regulation in combination with quota regulations are assessed.

In conclusion it should be mentioned that if quota regulation is used then the number of days at sea are to be adapted by the fishermen so that the quotas are not exceeded. This is the flexibility of the system. If the number of days at sea is regulated then catches of the individual species have to be adapted in order that days at sea are not exceeded. The use of both systems at the same time is inappropriate and will only result in economic adaptation problems which will be attempted to be solved in different ways.

An effort regulation system used on basis of the complex Danish regulation system (Figure 5.1) will demand a fleet segmentation comprising fish species/waters, vessel

type/gear/mesh size, and vessel size. At the same time, the system would have to be supported by restrictive regulations (cf. the Faroese area regulation).

Provided these assumptions can be established it will be possible to implement a Danish regulation based on days at sea without necessarily exceeding the quotas profoundly (cf. the EU demand for quota regulation).

Figure 5.1. Regulation of the demersal fishery in Denmark

	Vessel group in length		< 12 m	12-15 m	15-18 m	18-24 m	24-40 m						
	Number of vessels		AA	BB	CC	DD	EE						
	Number of days at sea		aa	bb	cc	dd	ee						
			Total for distribution on mesh sizes		Total for distribution on mesh sizes				Total for distribution on mesh sizes				
	Type of gear		------- Gillnet -------		---------- Trawl ----------				----- Beam trawl -----				
	Mesh size (mm)		> 120	100 - 119	> 100	80 - 99	> 90	70 - 89	> 100	80 - 99			
Species	Catch area											Total landings	Quota
Whiting	The North Sea, the Norwegian Sea		X	X	X	X							
	Skagerrak, Kattegat		X	X	X		X	X					
Dab and flounder	The North Sea, the Norwegian Sea (EU)		X	X	X	X							
Norway lobster	The North Sea, the Norwegian Sea (EU)		X		X								
	Skagerrak, Kattegat, the Sound, the Belt Sea, the Baltic Sea (EU)		X		X		X	X					
Haddock	The North Sea, the Norwegian Sea		X	X	X								
	Skagerrak, Kattegat, the Sound, the Belt Sea, the Baltic Sea		X	X	X		X						
Hake	The North Sea, the Norwegian Sea (EU)		X	X	X	X							
	Skagerrak, Kattegat, the Sound, the Belt Sea, the Baltic Sea (EU)		X	X	X		X						
Saithe	All waters		X	X	X		(X)						
Turbot and brill	The North Sea, the Norwegian Sea (EU)		X		X								
Plaice	The North Sea, the Norwegian Sea (EU)		X	X	X	X			X	X			
	Skagerrak		X	X	X		X		X	X			
	Kattegat		X	X	X		X						
	The Sound, the Belt Sea, the Baltic Sea		X	X	X								
Lemon sole and witch flounder	The North Sea, the Norwegian Sea (EU)		X	X	X	X							
Cod	The North Sea, the Norwegian Sea		X	X	X				X	X			
	Skagerrak		X	X	X		X		X	X			
	Kattegat		X	X	X		X						
	The Sound, Belt Sea, the Baltic Sea		X	X	X								
Sole	The North Sea, the Norwegian Sea (EU)		X	X	X	X			X				
	Skagerrak, Kattegat, the Sound, the Belt Sea, the Baltic Sea		X	X	X		X		(X)				

Annex 6 Persons contacted

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