



## **DEEPFISHMAN**

### **Case Study 4 – Part II** **Pelagic Beaked redfish (*S. mentella*) in the Irminger Sea and adjacent waters (ICES areas V, XII, and XIV and NAFO Areas 1 and 2)**

#### **Socio-economic study**

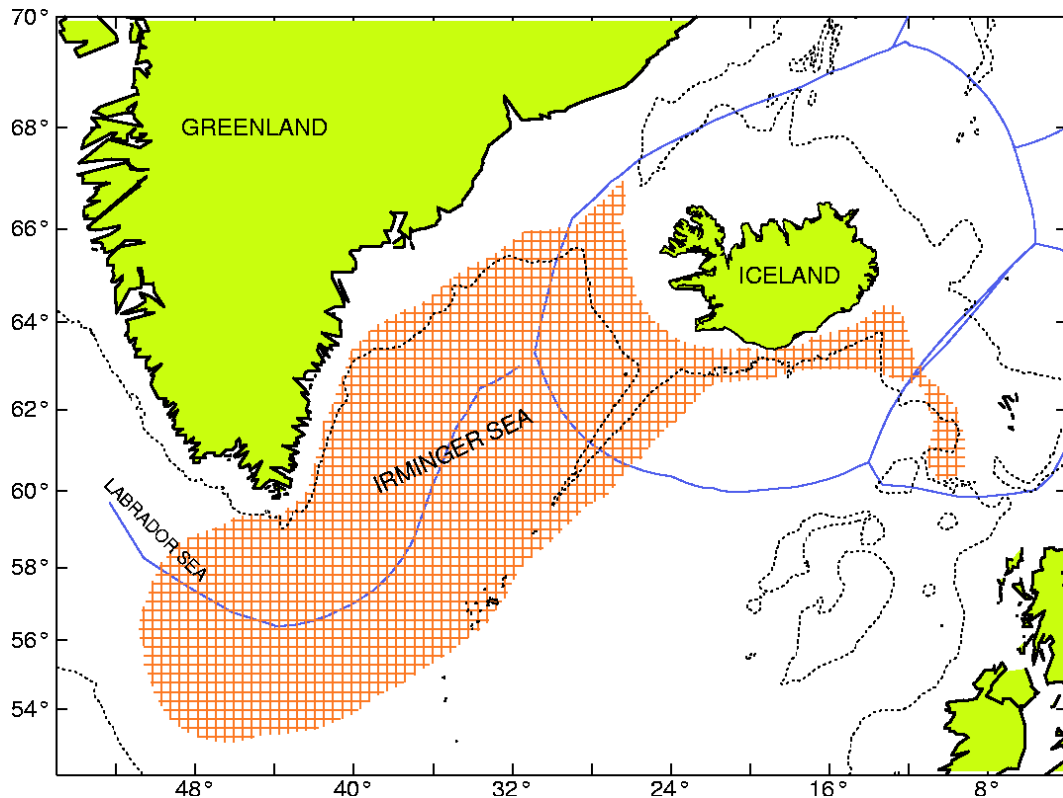
**Institute of Economic Studies  
University of Iceland**

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# 1 Introduction

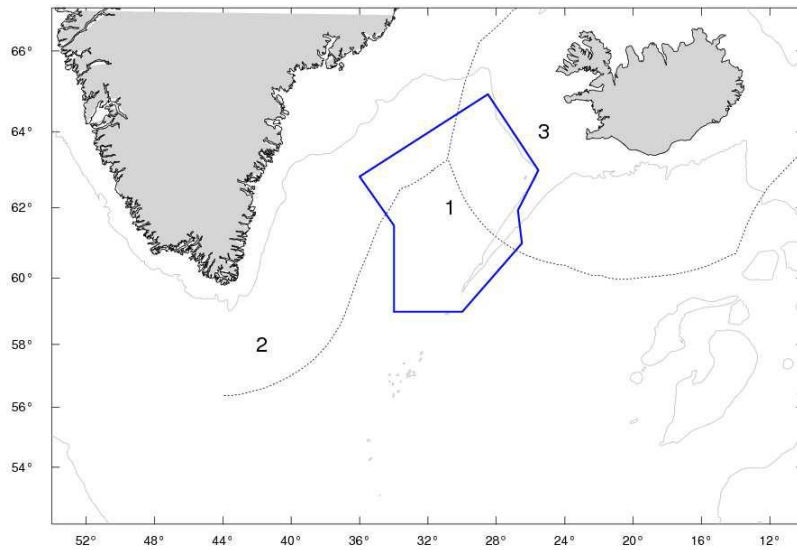
Recent results have shown that the pelagic beaked redfish, *Sebastes mentella*, in the Irminger Sea forms two stocks: deep pelagic stock and shallow pelagic stock (Cadrin et al., 2009). The shallow pelagic component of the Irminger Sea is thought to be related to the ‘shallow pelagic’ in the Norwegian Sea. The beaked redfish can therefore be considered as forming a complex stock structure, which is not yet completely understood in the North Atlantic. In the Irminger Sea, the shallow pelagic inhabits above 500 m while the deep pelagic is below 500 m and down to 1000 m but is most abundant between 600 and 900 m. Figure 1 shows the geographical distribution of the stock in the Irminger Sea.



**Figure 1** Geographical distribution of *S. mentella* in the Irminger Sea and adjacent waters. (from Sigurdsson et al. 2006).

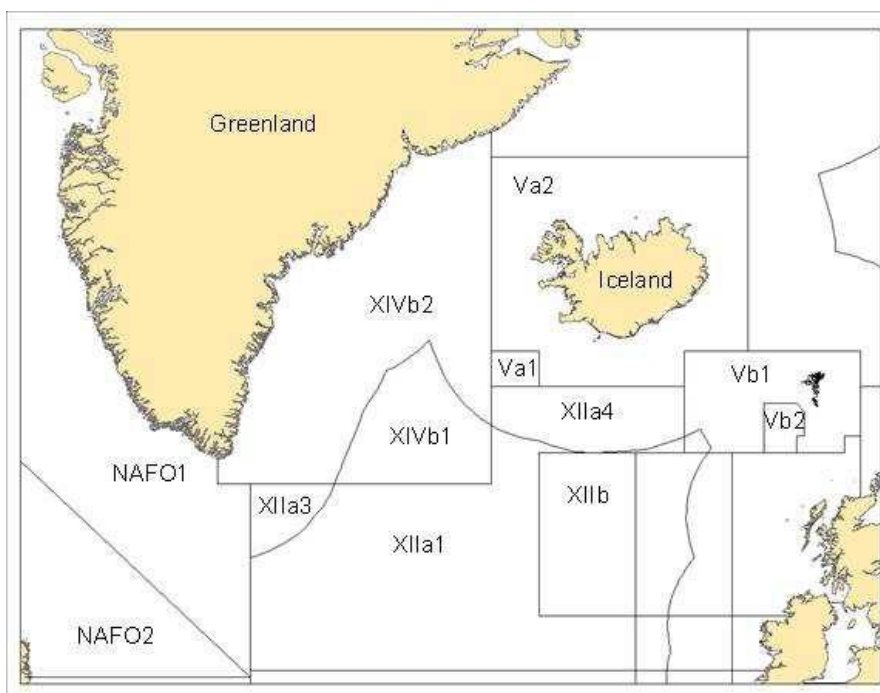
Source: DEEPFISHMAN. Case Study Report 4 – Part II (2010).

Because of impracticality of managing and monitoring the two stocks by depth there have been geographical proxies set up to minimize mixed stock catches. The management unit boundaries can be seen in figure 2. The polygon bounded by the blue lines indicates the region for the deep pelagic management while the number 2 indicates the shallow management (Cadrin et al 2009, ICES 2009a).



**Figure 2** Management unit boundaries for *Sebastes mentella* in the Irminger Sea and adjacent waters. The polygon bounded by blue lines, i.e. 1, indicates the region for the ‘deep pelagic’ management unit in the northwest Irminger Sea, 2 is the ‘shallow pelagic’ management unit in the southwest Irminger Sea, and 3 is the Icelandic slope management unit (not relevant here).  
 Source: DEEPFISHMAN. Case Study Report 4 – Part II (2010).

The ICES and NAFO areas where the Irminger Sea stock components of pelagic *S. mentella* spread can be seen in Figure 3.

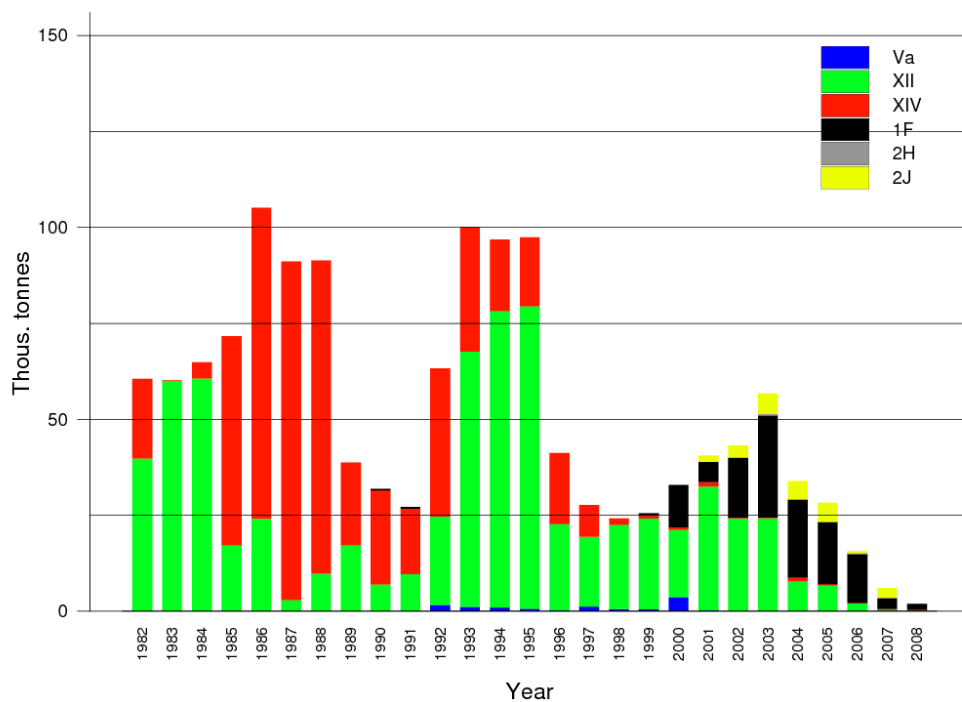


**Figure 3** ICES and NAFO areas.  
 Source: DEEPFISHMAN. Case Study Report 4 – Part II (2010).

## 2 History of the fisheries

Trawlers from the former USSR started fishing shallow pelagic *S. mentella* in 1982 in the Irminger Sea. In the late 1980's and early 1990's trawlers from the Faroe Islands, Iceland, and Norway also started fishing the stock in the area. The numbers of vessels from the main fishing nations for both stocks for the last decade are presented in table 3 in chapter 4.

The annual total landings of the shallow pelagic stock are shown in figure 4. During the period 1982-1992 the fishery was carried out mainly from April to August. Since then the fishery has been carried out from July to October. During the years 1992-1995 the landings reached a record high. The increase was mainly due to more nations participating in the fishery and also due to increased effort from Russia and Germany. Since 1996 the landings of the stock have decreased significantly and especially in recent years, with landings in 2008 only amounting to 2,000 tons. The fishing grounds have also moved further southwest and larger portions of the catches have been registered within the NAFO regulatory areas.



**Figure 4** Shallow pelagic *S. mentella* landings by ICES and NAFO areas.

Source: DEEPFISHMAN. Case Study Report 4 – Part II (2010).

In 2003, Lithuania and Russia accounted for two thirds of total landings which then amounted to 55,700 tons. Lithuanian catches tumbled in the following year to only 3,700 tons and had in

2008 dwindled down to only 8 tons. Russian catches have also declined, but in 2008 they still amounted to 1,600 tons, 80 per cent of total catches that year.

**Table 1** Catches of the shallow pelagic *S. mentella*.

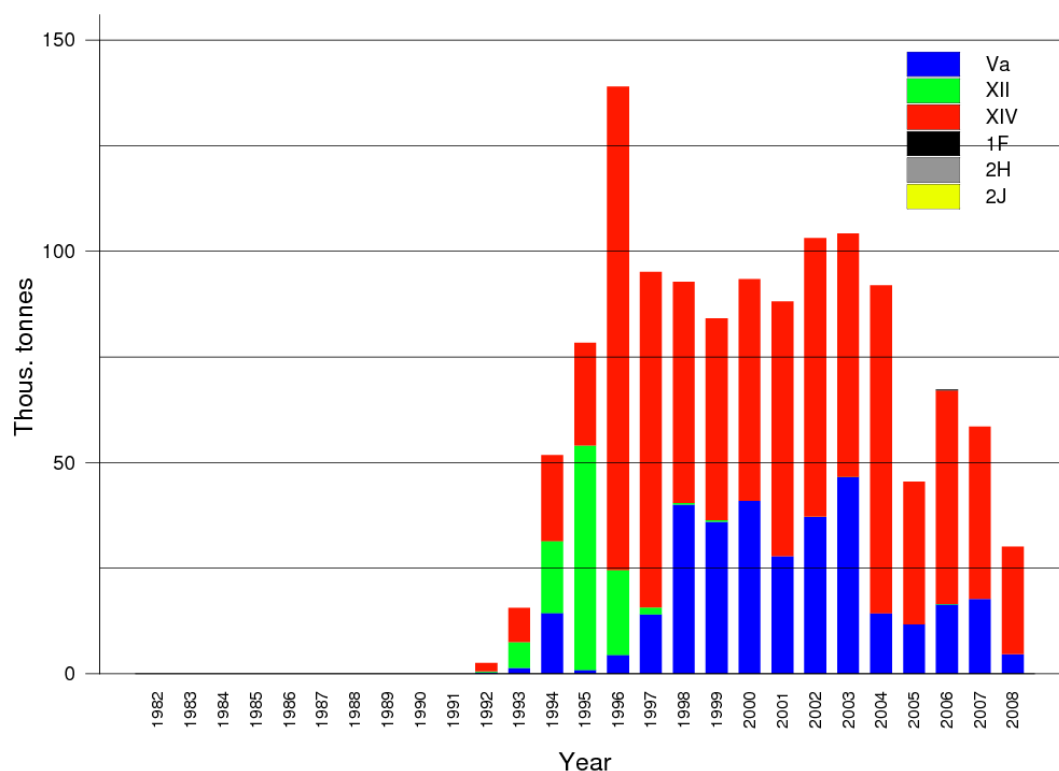
Source: DEEPFISHMAN. Case Study Report 4 – Part II (2010).

	2003	2004	2005	2006	2007	2008
Faroes	1.955	777	210	334	98	298
Germany	3.579	1.126	1.152	994		
Iceland	4.306	5.714	3.086	1.287	77	64
Latvia	1.269	1.114	919	1.803	186	
Lithuania	21.629	3.698	1.169	466	467	8
Norway	3.214	2.721	624	280		
Poland	917	1.018	1.17	663	189	
Portugal	1.926	2.133	2.78	1.372	529	
Russia	15.418	13.208	15.562	4.953	4.037	1.597
Spain	1.461	1.679	1.557	3.576	339	36
Total	55.674	33.188	28.229	15.728	5.922	2.003

The current stock of the shallow pelagic *S. mentella* is believed to be at a very low level. The biomass estimates from an acoustic survey in 2009 indicate that the stock currently only corresponds to less than 5% of estimates of the beginning of the survey time series in the early 1990s.

Fishing of the deep pelagic stock started a decade later than for the shallow pelagic stock started, i.e. in 1992. The landings gradually increased to about 140,000 tons in 1996 but were stable around 80,000 to 100,000 tons until 2004. However, total landings during this period are likely to be underestimated due to incomplete reporting of catches. Since 2005 the total landings have decreased and total landings in 2008 only amounted to about 30,000 tons.

Most of the catches have been taken in ICES divisions Va and XIV close to the Icelandic and Greenland Exclusive Economic Zone (EEZ). The fishery has been carried out from August to July.



**Figure 5** Deep pelagic *S. mentella* landings by ICES and NAFO areas.

Source: DEEPFISHMAN. Case Study Report 4 – Part II (2010).

Total catches in 2003 of the deep pelagic *S. mentella* amounted to 104,000 tons, with Iceland registering catches of 44,600 tons and Russia catches of 28,600 tons. In 2008, catches were down to 30,000 tons, whereof half was caught by Russian vessels. Icelandic catches were then down to 6,700 tons.

**Table 2** Catches of the deep pelagic *S. mentella*.

Source: DEEPFISHMAN. Case Study Report 4 – Part II (2010).

	2003	2004	2005	2006	2007	2008
Faroes	3.938	4.67	1.8	3.498	2.902	2.653
Germany	7.028	2.251	1.836	1.83	1.11	
Greenland	3.403	2.419	1.431	744	1.961	1.17
Iceland	44.588	31.112	12.919	20.948	18.091	6.721
Lithuania			1.027	1.294	1.394	749
Norway	5.185	6.277	3.95	5.968	4.628	571
Poland		1.889	1.24	1.356	636	219
Portugal	2.109	2.286	1.088	1.313	2.067	1.733
Russia	28.638	31.067	16.323	23.67	21.337	15.106
Spain	9.374	9.996	3.871	6.673	3.81	1.179
Total	104.263	91.967	45.485	67.294	57.936	30.101

Recent trawl survey estimates indicate a decreasing trend in biomass over time and the 2009 estimate is the lowest in the series. Catch-per-unit effort (CPUE) of the fishing fleet has been variable over the years but the recent CPUEs are lower than in the early part of the fisheries. The decrease in landings and less effort since 2004 suggest that the deep pelagic *S. mentella* stock has been reduced substantially in the past decade.

### 3 Management

North East Atlantic Fisheries Commission (NEAFC) is the management body for pelagic *S. mentella* in the Irminger Sea and sets the management policies for both stocks. NEAFC has managed pelagic *S. mentella* in the Irminger Sea and adjacent waters through TAC system since 1996, but Iceland is responsible for management of the Icelandic fishery within the Icelandic Economic Zone. Iceland also assists the surveillance of the fishery in international waters. Greenland is responsible for control of the fishery within the Greenland Economic Zone and the Faroe Islands for management within the Faroese Economic Zone.

The weakness is that there is no consensus on the management among contracting parties of NEAFC; the European Union (EU), Denmark (on behalf of Greenland and Faeroe Islands), Iceland, Norway and the Russian Federation. The parties disagree both on the stock structure, TACs and allocation keys. Opinions differ on whether pelagic *S. mentella* in the Irminger Sea and adjacent waters should be managed as one or two biological different stocks. ICES defines pelagic *S. mentella* in the Irminger Sea and adjacent waters as two different biological

stocks, but these are managed under one single management unit. Furthermore, there has been no agreement on the TAC and allocation key between contracting parties in NEAFC and some countries have set quotas unilaterally. The monitoring of the fishery, such as inspection at sea and reliable catch statistics from various nations, is poor. No management objectives have been agreed upon and no harvest control rules are in effect.

## 4 Fleet

Table 3 below shows the number of vessels involved in the fishery by nation for the years 1995-2008. The largest fleet has been the Russian in most years but a substantial number of Icelandic vessels have also taken part in the fishery and were even more numerous than the Russian vessels in some years. The number of vessels engaged in the fishery has though fallen by a half in recent years. Most trawlers use large pelagic trawls (“Gloria”-type) with vertical openings of 80-150 m.

**Table 3** Number of vessels by country (not separated by stock).

Source: DEEPFISHMAN. Case Study Report 4 – Part II (2010).

	Faroes	Germany	Greenland	Iceland	Norway	Poland	Portugal	Russia	Spain	Total
1995	3	9	NA	28	3		NA	41	4	88
1996	7	8	NA	32	3		NA	30	3	83
1997	7	10	NA	27	3	1	NA	40	4	92
1998	7	9	1	27	2		NA	25	6	77
1999	7	9	1	26	2		NA	20	6	71
2000	2	8	1	26	2		NA	25	6	70
2001	3	7	1	26	4		NA	28	6	75
2002	3	7	1	27	5	1	6	29	6	85
2003	4	6	1	22	5	1	5	27	6	77
2004	4	3	1	22	5	1	5	34	10	85
2005	4	4	1	18	3	1	5	35	11	82
2006	2	3	1	16	5	1	7	28	11	74
2007	3	1	1	15	5	1	6	26	9	67
2008	3		1	12	1	1	6	17	6	47

Table 4 presents an overview of the characteristics of the Icelandic fleet participating in the fisheries for the years 2003-2008. The vessels are relative old, the mean age of the fleet has increased from 20 years in 2003 to 25 years in 2008, and large. In 2003, the average vessel registered 1585 tons, with the largest vessel 3239 GRT.



**Table 4** Characteristics of the Icelandic fleet.

Source: Directorate of Fisheries in Iceland and the Icelandic Maritime Administration.

		2003	2004	2005	2006	2007	2008
Number of vessels		23	22	17	18	16	13
Age	Mean	20	20	23	22	23	25
	Max	29	32	33	34	35	36
	Min	3	4	7	6	7	10
	Std	9	9	9	10	10	9
Length	Mean	65	66	65	68	69	66
	Max	86	86	79	86	86	79
	Min	51	51	51	57	57	57
	Std	10	9	8	8	9	7
GRT	Mean	1585	1679	1502	1769	1792	1591
	Max	3239	3239	2157	3239	3239	1999
	Min	745	924	924	932	1141	1141
	Std	630	596	384	611	601	314
kW	Mean	2638	2750	2458	2902	2884	2529
	Max	5520	5520	3680	5520	5520	3680
	Min	1619	1691	1691	1691	2060	2060
	Std	944	907	511	1012	955	478

The most important home ports of the Icelandic fleet are Reykjavik and Hafnarfjordur in the southwest and Akureyri, Olafsfjordur and Saudarkrokur in the north. The distance from home port to the main fishing ground of deep pelagic redfish is 100-200 nautical miles. The distance from home port to the main fishing ground of shallow pelagic redfish is 500-600 nautical miles.

## 5 Labour

The average number of crew members has been approximated 26 for the Icelandic freezer trawlers. No other information is available on the number of workers in the fishery.

In the Icelandic pelagic redfish fisheries the wage structure is share wages. For other nations, this is not readily available. Icelandic fishermen are members of The Fishermen's Association of Iceland (Sjómannafélag Íslands) and skippers are members of The Association of Ship Captains (Félag Skipstjórnarmanna).

## 6 Landings and marketing

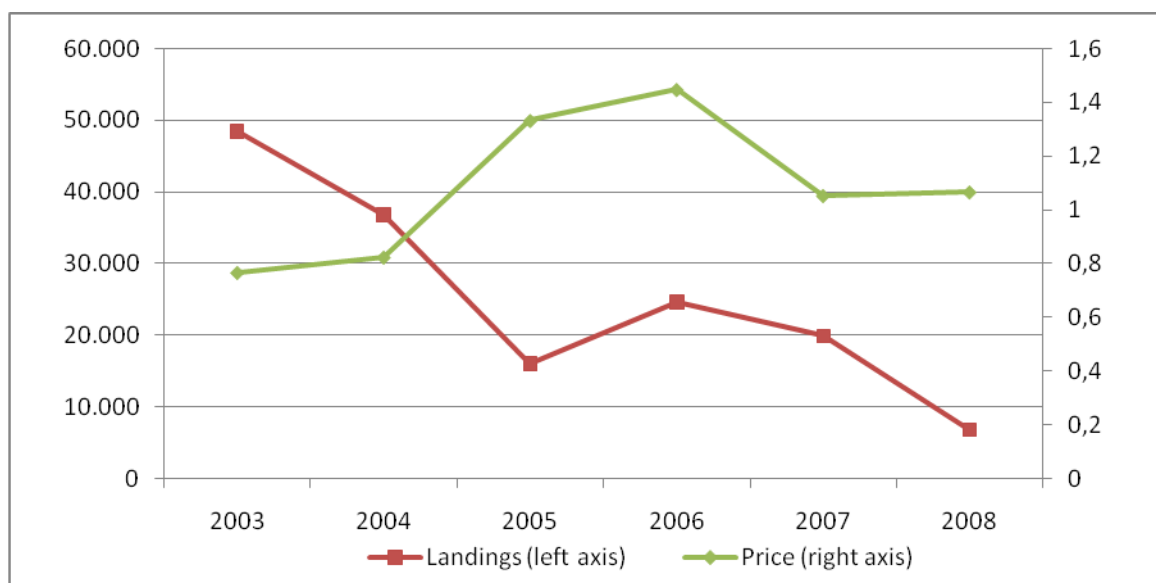
The Icelandic vessels are mainly freezer trawlers and the product is frozen at sea and landed as such. However, there are some fresh landings that are sold on local markets in Iceland as well as in Germany, Russia, and Japan. No information is available on landings for other fleets.

Table 5 below presents the total quantity landed in Iceland and the value of the catch both in Icelandic krona (ISK) and Euros (€).

**Table 5** Landings (tonnes) and value of beaked redfish in Iceland.  
Source: Statistics Iceland and Central bank of Iceland.

Year	Quantity	Value ISK million	Value € '000
2003	48.402	3,210	37,010
2004	36.826	2,637	30,264
2005	16.005	1,666	21,321
2006	24.646	3,130	35,680
2007	19.919	1,836	20,954
2008	6.786	921	7,228

Figure 6 below shows both the total quantity landed (left axis) and the average price in € per kilo (right axis) of the redfish for the Icelandic landings.



**Figure 6** Landings (left axis, in tons) and prices (right axis, in € per kg) for Icelandic catches.  
Source: Statistics Iceland

## 7 Financial performance

No separate statistics exist for the redfish fleet as such, but the economic performance of the Icelandic freezer trawler fleet is presented in Table 6. Although these trawlers catch other fish stock as well as the pelagic *S. mentella*, the results give an indication of the overall financial performance of these vessels. For the years considered here, the fleet as always operated with profits.

**Table 6** Financial performance of Icelandic freezer trawlers.  
Source: Statistics Iceland and Central bank of Iceland.

	2003	2004	2005	2006	2007	2008
ISK million						
Income	19.84	23.415	29.871	28.209	27.731	37.722
Costs	15.352	18.945	22.883	20.8	22.439	29.386
Profits	4.487	4.47	6.989	7.409	5.292	8.336
€ million						
Income	229	269	382	322	317	296
Costs	177	217	293	237	256	231
Profits	52	51	89	84	60	65

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