

**Fishery on pelagic redfish (*S. mentella*, Travin):
Information based on log-book data from Faroe Island,
Germany, Greenland, Iceland, Norway and Russia.**

By

Thorsteinn Sigurdsson, Hajo Rätz, Kjell Nedreaas, Sergei P. Melnikov
and Jákup Reinert

Introduction

The pelagic fishery for redfish in the Irminger sea and adjacent waters is a multinational fishery, with vessels from up to 15 different nations participating in some years. Iceland, Germany and Russia have in recent years been major participants in the fishery in recent years and Faroe Island and Norway have participated for many years. These nations have, on average fished over 80% of the total catches in 1999-2001. In addition, Greenland has recently started to participate in the fishery and we have access to the whole logbook series from the Greenland vessel participating since 1999. Therefore, in 1999-2001 logbooks are available representing nearly 80% of the catches.

Most nations that have participated in the fishery have collected various fishery related data from different stocks and made some of these available to ICES in reports as figures and tables (i.a. ICES 2002). However, we think that it is important to make the raw data available in electronic format in one location for detailed comparisons vessel types, nations etc.

Catch data and catch composition are some of the most important input elements for assessments of fish stocks. Therefore, the objectives with the work presented here is to establish a database for fishery related data of the oceanic redfish fishery in the Irminger Sea and adjacent waters. This is done in order to improve fishery related data in the assessment work. Taking the uncertainty in stock structures of redfish stocks into account, detailed information on exploitation activities for as many fleets as possible is an important step forward in improving the assessment of the stock or each possible stock component.

This paper is a continuation of a paper presented at the NWWG meetings since 2001. It describes briefly the structure of a fishery-related database for pelagic redfish fishery in the Irminger Sea and adjacent waters and we are presenting results for the based on data already in the database. This database will, in future allow an appropriate annual analysis of the trend in catch rates standardised and corrected for national, vessel, area and seasonal effects. The results will therefore hopefully contribute significantly to the estimation of the quantitative reaction of the redfish stocks to the removed biomass by the fishing fleet of many nationalities.

At this stage the database does not include biological information, but work is in process to include biological informations.

Structure of the database

The data in the database is on haul by haul basis, but data on individual vessels have been coded so they can not be recognised.

Name	Descr	Type (no of char)
NATION	ICES code of Nation	NUMBER(2)
VESSEL	ID for vessel	NUMBER(4)
GROUP	Type of vessel	NUMBER(3)
DAY	no. of day within the month	NUMBER(2)
MONTH	number of the month	NUMBER(2)
YEAR		NUMBER(4)
LATTITUDE		NUMBER(4)
LONGITUDE		NUMBER(4)
GEAR_TYPE	Name of the gear	VARCHAR2(10)
CIRCUMPERENCE	Circumference of the trawl in m	NUMBER(4)
DEPTH OF HEADLINE	Trawling depth as registered by depth sensor on the headrope of the trawl (in m)	NUMBER(4)
BOTTOM_DEPTH	in m	NUMBER(4)
TIME	Time of day	NUMBER(4)
TRAWLING DURATION(MIN)		NUMBER(4)
CATCH (KG)		NUMBER(7)

Results

Overview of data currently within the database

Following texttable gives the overview of the database as it is now. A total of 31 thous hauls have been inserted to it, including all log-books the German activity since 1995, from the Icelandic fishery since Iceland started its fishery in 1989, all the activity of the Greenland vessel (since 1999), hauls from selected Norwegian vessels since 1995 and Russian fleet in 199-2000.

Nation	Period	Hauls	Catch
Faroese	1995-2001	1607	23.946
Germany	1995-2002	7883	130.954
Iceland*	1989-2002	19872	392.176
Norway	1990-2002	3424	52.156
Russia	1997-2001	9346	130.402
Grand Total		42132	729.634

- Including the Greenland data in 1999-2002, as there is only one vessel from Greenland.

The table below gives more detailed information on the number of hauls by year and nation.

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Faroese	0	0	0	0	0	0	1783	2612	1669	3236	3751	2853	8041	0
Germany	0	0	0	0	0	0	18856	21263	20446	17984	16065	12487	10662	13191
Iceland*	1318	3997	6603	12207	16544	36135	25523	45126	32233	37196	41734	46360	40660	46539
Norway	0	3785	1053	3572	7871	5445	3865	1298	500	674	2002	10315	6586	5192
Russia	0	0	0	0	0	0	0	0	27923	26012	15340	26032	35095	0
Grand Total	1318	7782	7656	15779	24414	41580	50027	70299	82772	85102	78892	98047	101044	64922

*Including the Greenland data in 1999-2002, as there is only one vessel from Greenland.

Overview of available information by nation is given below. Except for the depth, the information given are very similar.

Name	Type	German	Iceland	Greenland	Norway	Faroese	Russia
NATION	NUMBER(2)	X	x	x	x	X	x
VESSEL	NUMBER(4)	X	x	x	x	X	x
GROUP	NUMBER(3)			x		X	x
DAY	NUMBER(2)	X	x	x	x	X	x
MONTH	NUMBER(2)	X	x	x	x	X	x
YEAR	NUMBER(4)	X	x	x	x	X	x
LATTITUDE	NUMBER(4)	X	x	x	x	X	x
LONGITUTE	NUMBER(4)	X	x	x	x	X	x
GEAR_TYPE	VARCHAR2(10)	X	x	x	x	X	x
CIRCUMPERENCE	NUMBER(4)	X	x	x			
DEPTH OF HEADLINE	NUMBER(4)		x	x	x		
BOTTOM_DEPTH	NUMBER(4)		x	x	x		
TIME	NUMBER(4)	X	x	x	x		
Discard	NUMBER(7)	x	incl. in C	incl. in C			incl. in C
TRAWLING DURATION(MIN)	NUMBER(4)	x	x	x	x	X	x
CATCH (KG)	NUMBER(7)	x	x	x	x	X	x

Location of the fishing activity.

Figures 1 gives the locations of the fishery, year by year since 1995 and figures 2-4 by month for the years 2000-2002. As can be seen from the figures, the fishing pattern has changed during the last years towards a two areas fishing areas.

In the first months of the fishing season (which usually starts in early April) the fishery is conducted in area west of 32°W and north of 61°N. In May and June the fishery is more or less at same areas, but in July-August, the fleet moves to areas south of 60°N and west of about 32°W where the fishery continues until October. There is very little fishing activity in the period from November until late March/early April when the next fishing season starts.

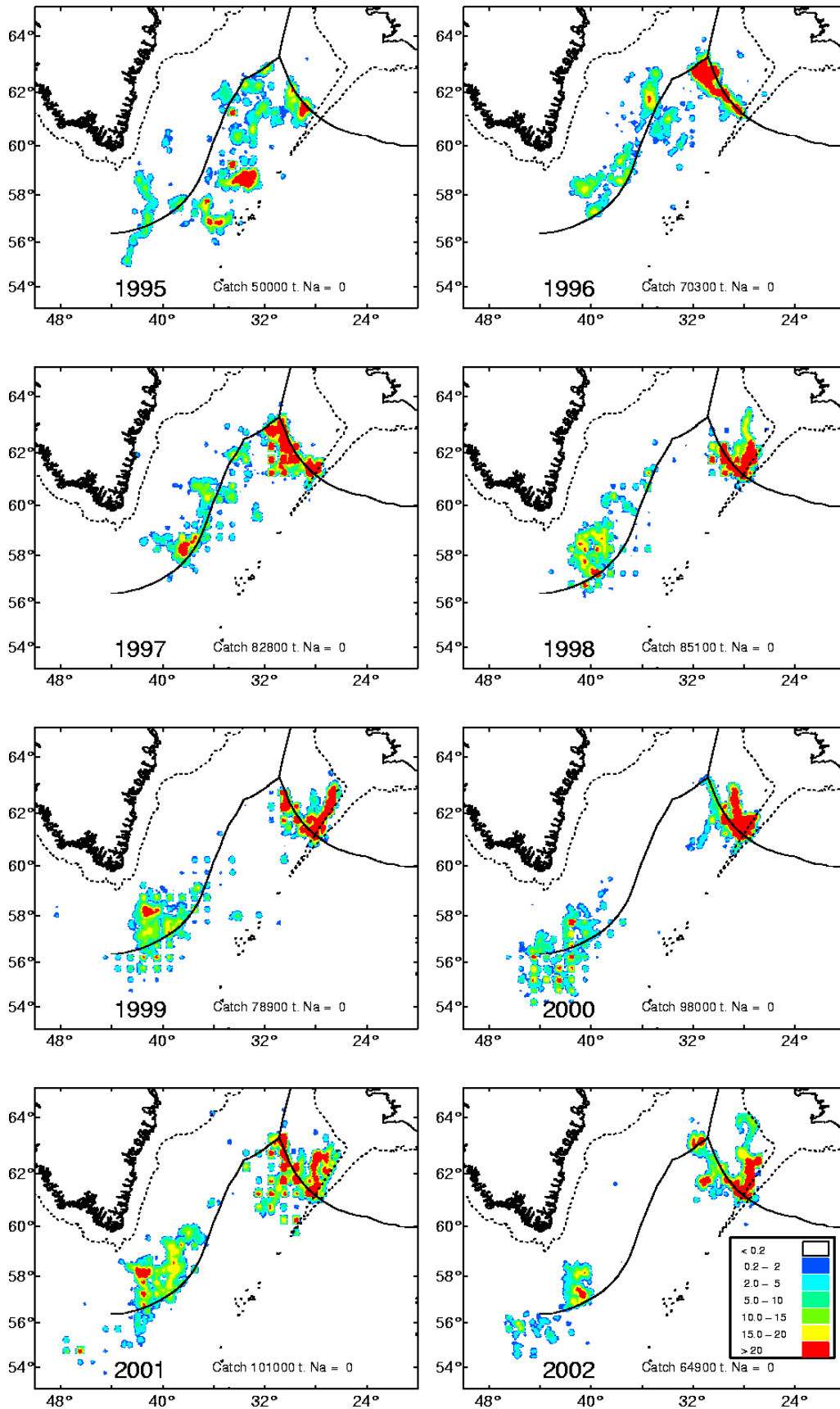


Figure 1. Fishing areas of the pelagic redfish by year from 1995-2002. Data from Germany (1995-2002), Norway (1995-2002) Greenland (1999-2002), Russia (1997-2001), Faroese (1995-2001) and Iceland (1995-2002). The scale given on the pictures indicates the catches in tonnes per square nautical mile.

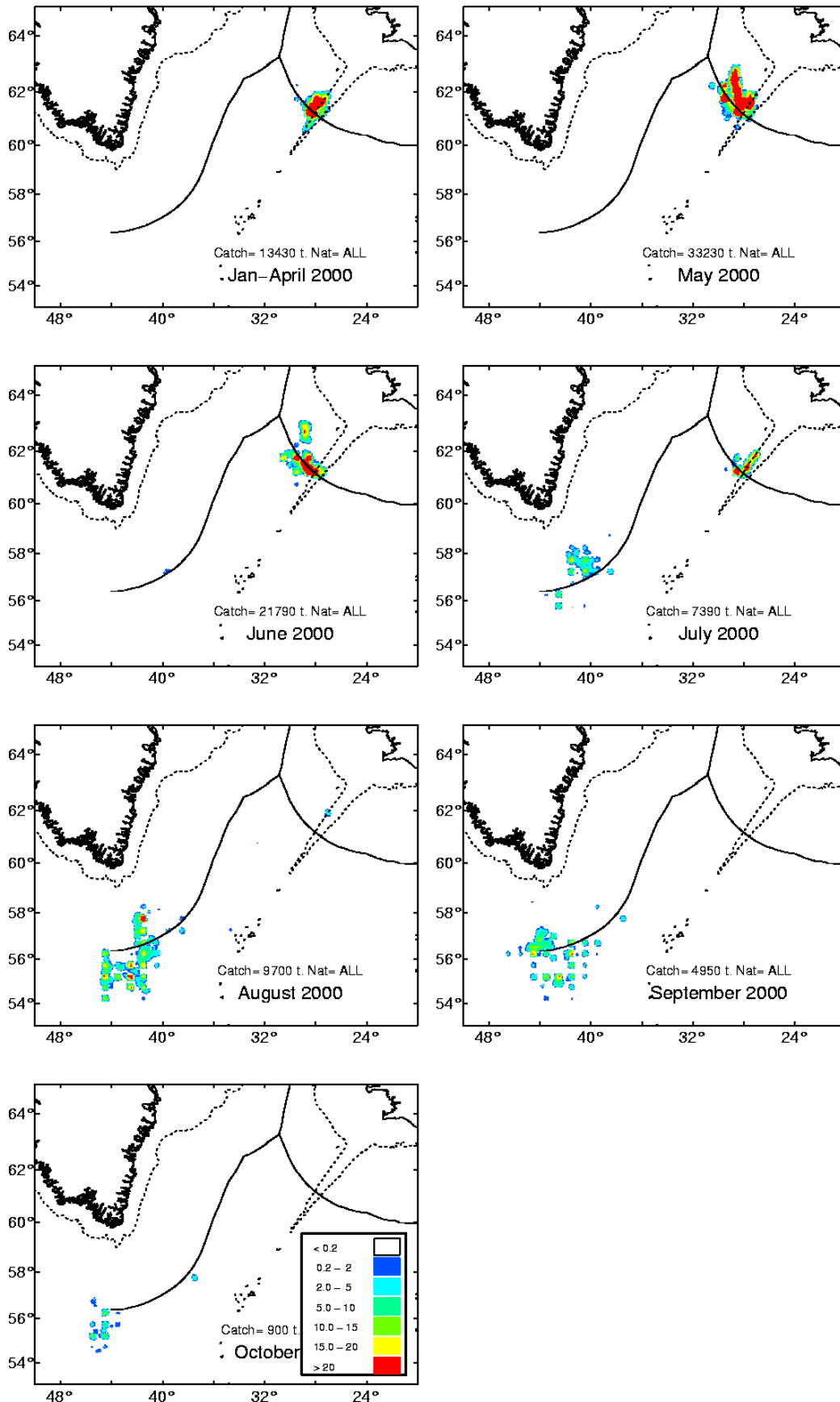


Figure 2 Fishing areas of the pelagic redfish by periods in 2000, including data from Germany, Iceland, Greenland, Fareose, Russia and Norway. The scale given on the pictures indicates the catches in tonnes per square nautical mile. Total catch registered for each period is also shown on the figures.

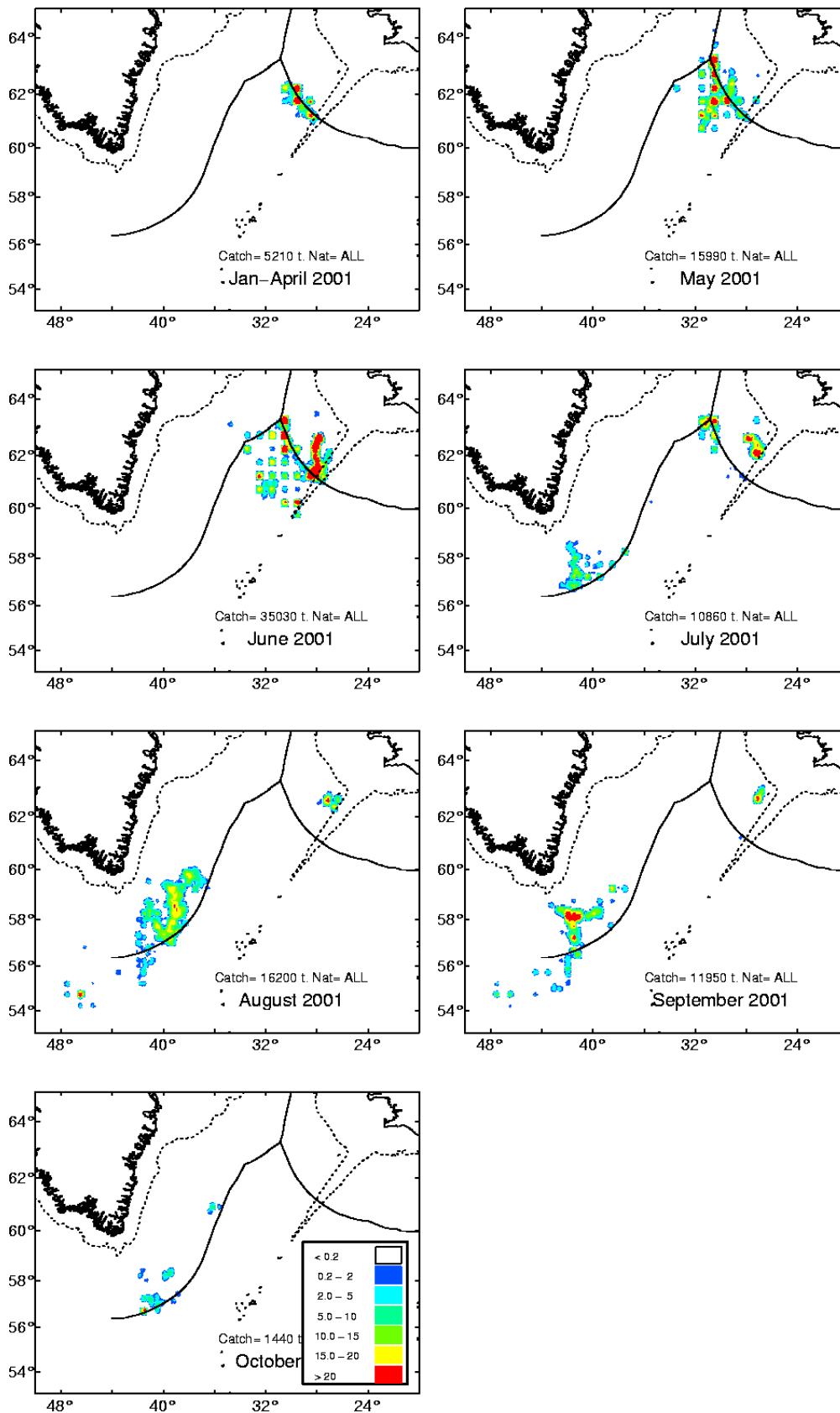


Figure 3. Fishing areas of the pelagic redfish by periods in 2001, including data from Germany, Iceland, Norway, Russia, Faroese and Greenland. The scale given on the pictures indicates the catches in tonnes per square nautical mile. Total catch registered for each period is also shown on the figures.

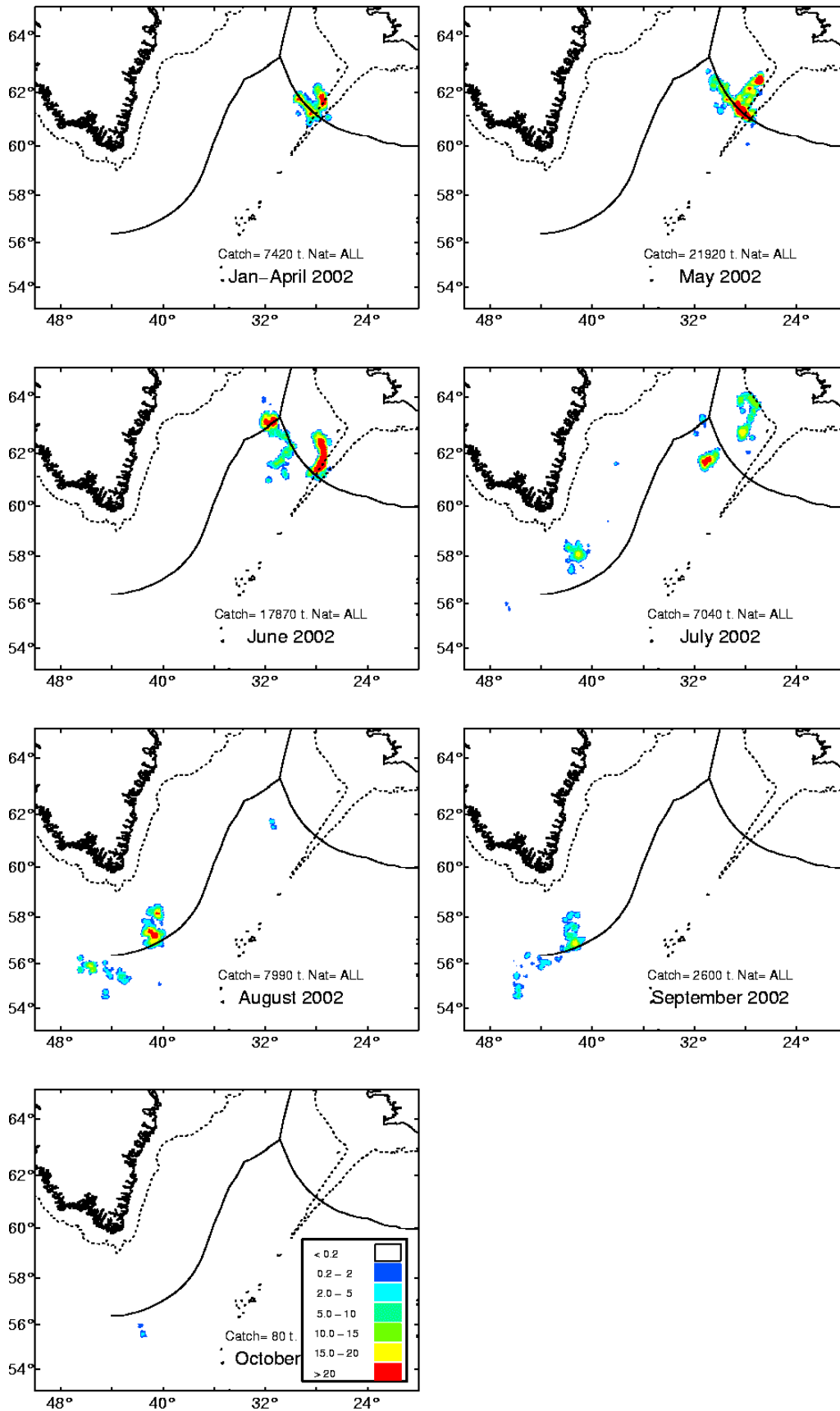


Figure 4. Fishing areas of the pelagic redfish by periods in 2002, including data from Germany, Norway, Iceland and Greenland. The scale given on the pictures indicates the catches in tonnes per square nautical mile. Total catch registered for each period is also shown on the figures.

Catch per unit of effort

Based on all data available in the database we have calculated standardised CPUE for the whole period, using the following formula:

$$\text{glm}(\text{formula} = \log(\text{catch}) \sim \log(\text{trawling_time}) + \text{factor}(\text{year}) + \text{factor}(\text{month}) + \text{factor}(\text{vessel}), \text{family} = \text{gaussian}(), \text{data} = \text{tmp.data})$$

In the NWWG report 2002, the model were run on the raw data. Figure 5 show the results based on same data set including data for 2002.

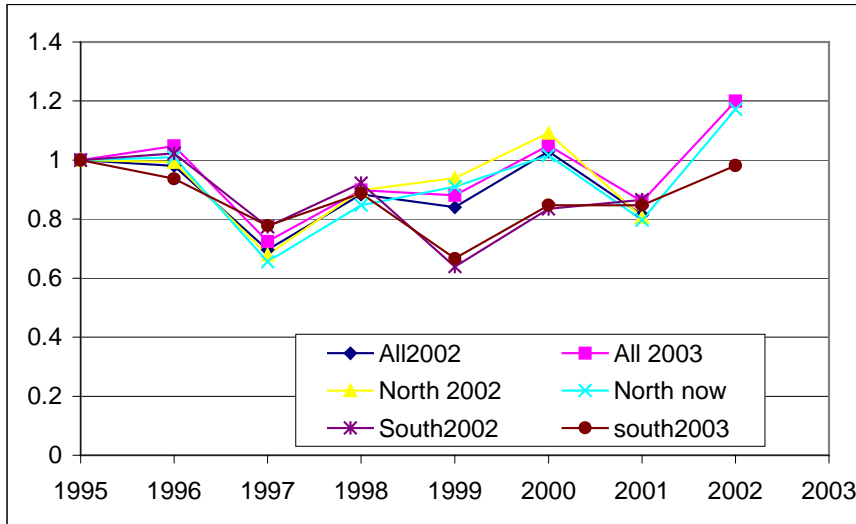


Figure 5. Standardised CPUE since 1985, as calculated by using data from Germany (1995-2002), Iceland (1989-2002), Greenland (1999-2002) and Norway (1995-2002). North means north of 60°N and south = south of 60°N.

By using the same model including also Russia (1997-2001) and Faroe Island (1995-2001), but in addition summing the data as follows; by ICES statistical by month, year and vessel, the results are as shown in Figure 6.

Another model was also fitted using data only from north/south of 60°N (area) The results are shown in Figure 6 for the period since 1995 Based on all the figures it is difficult to interpret the status of the stock(s).

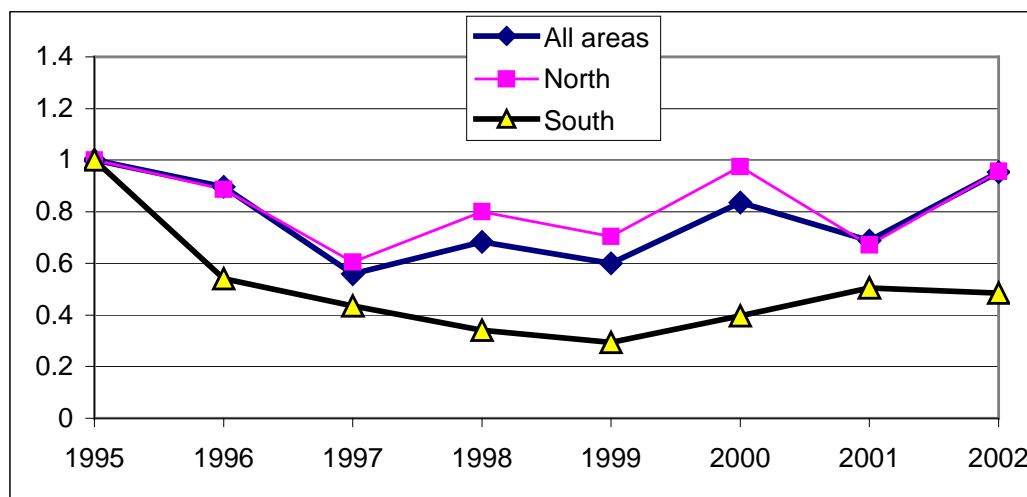


Figure 6. Standardised CPUE since 1995, as calculated by using data from Germany (1995-2002), Iceland (1995-2002), Greenland (1999-2002) and Norway (1995-2002), Russia (1997-2001) and Faroese (1995-2001).

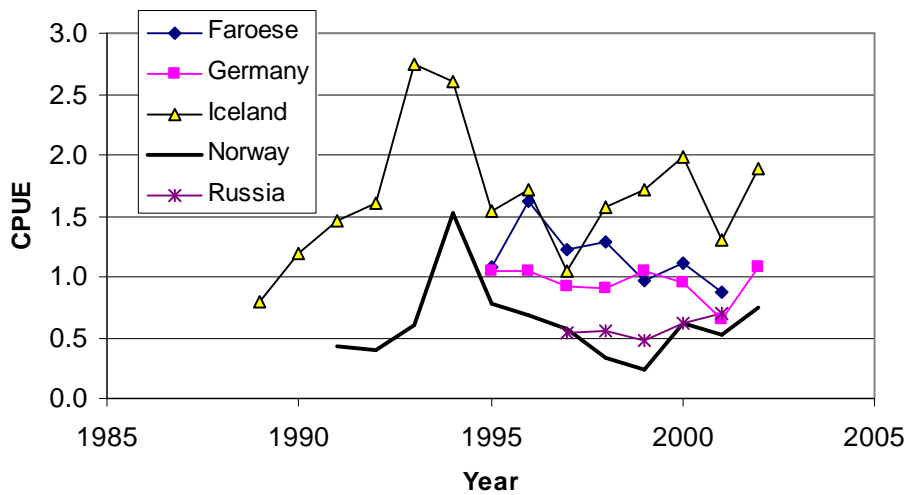


Figure 7. Unstandardised CPUE north of 60°N, based on information in the joint database.

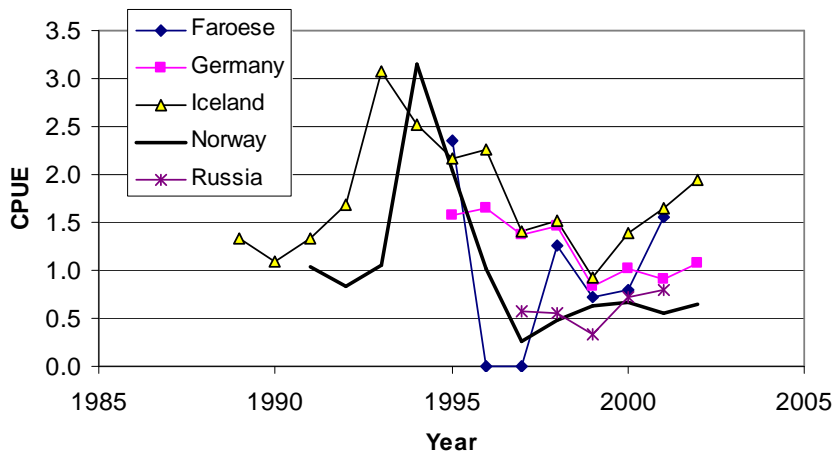


Figure 8. Unstandardised CPUE south of 60°N, based on information in the joint database

Further information and acknowledgement

More detailed information from the data are available www.hafro.is/~steini :The present study was realised within the REDFISH project (QLK5-CT1999-01222), financially supported by the European Commission within the research framework QUALITY OF LIFE AND MANAGEMENT OF LIVING RESOURCES, Key Action 5: Sustainable Agriculture, Fisheries and Forestry.