

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

By

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1) 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 and Germany have in recent years been major participants in the fishery in recent years and Norway has participated for many years. These three nations have, on average fished 53% of the total catches during the last 10 years. 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.

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 2000). 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 describes briefly the structure of the prototype of a fishery-related database for pelagic redfish fishery in the Irminger Sea and adjacent waters and gives also first results for the data already within 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 it is our purpose in the future to do so.

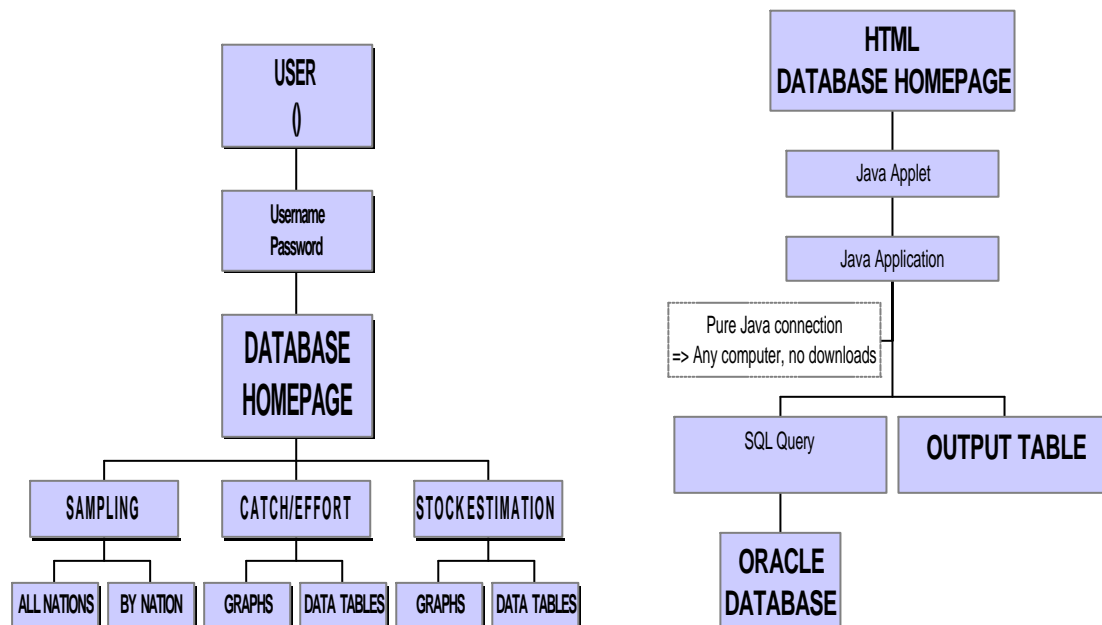
2) Structure of the database

During the preparation, we discussed in detail the possible structure of the database. As the information for different fleets were different, the data could not be adjusted to

one existing database. Therefore it was decided to create new database, keeping the format according to the text table below. The data are stored in ORACLE and the columns are described below. In this prototype, the data is given at 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)

The database is currently located in MRI, Reykjavík and at present the user must be logged on to the computer system there. In the future, the database will be available via the Internet. The Internet user front of has not been finalised, but the first ideas is that after the user has entered the database homepage, a username and password must be given. Thereafter a different SQL query might be activated, depending of which data are requested. The results out of the query will be given in tables/figures, which could be downloaded by the requester. Data on individual hauls will not be given via the Internet.



3) Results

Overview of data currently within the database

Following texttable gives the overview of the database as it is now. A total of 24534 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) and hauls from selected Norwegian vessels since 1995.

Nation	Period	number of hauls	total catch reported (t)
Iceland*	1989-2000	16.092	303.934
Norway	1990-1999	2.085	30.393
Germany	1995-2000	6.357	107.641

- Including the Greenland data in 1999-2000, 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
	6	0	0	0	0	0	1125	1251	1201	949	1013	818
	46	139	365	454	804	806	1859	1393	2260	2202	1993	1883
	58	0	483	130	293	505	211	173	57	39	52	142

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

Name	Type	Germany	Iceland	Greenland	Norway
NATION	NUMBER(2)	x	x	x	x
VESSEL	NUMBER(4)	x	x	x	x
GROUP	NUMBER(3)			x	
DAY	NUMBER(2)	x	x	x	x
MONTH	NUMBER(2)	x	x	x	x
YEAR	NUMBER(4)	x	x	x	x
LATTITUDE	NUMBER(4)	x	x	x	x
LONGITUTE	NUMBER(4)	x	x	x	x
GEAR_TYPE	VARCHAR2(10)	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	
TRAWLING	NUMBER(4)	x	x	x	x
DURATION(MIN)					
CATCH (KG)	NUMBER(7)	x	x	x	x

Location of the fishing activity.

Figures 1-6 gives the locations of the fishery, year by year and by month for the years 1995-2000. 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 or early April when the next fishing season starts.

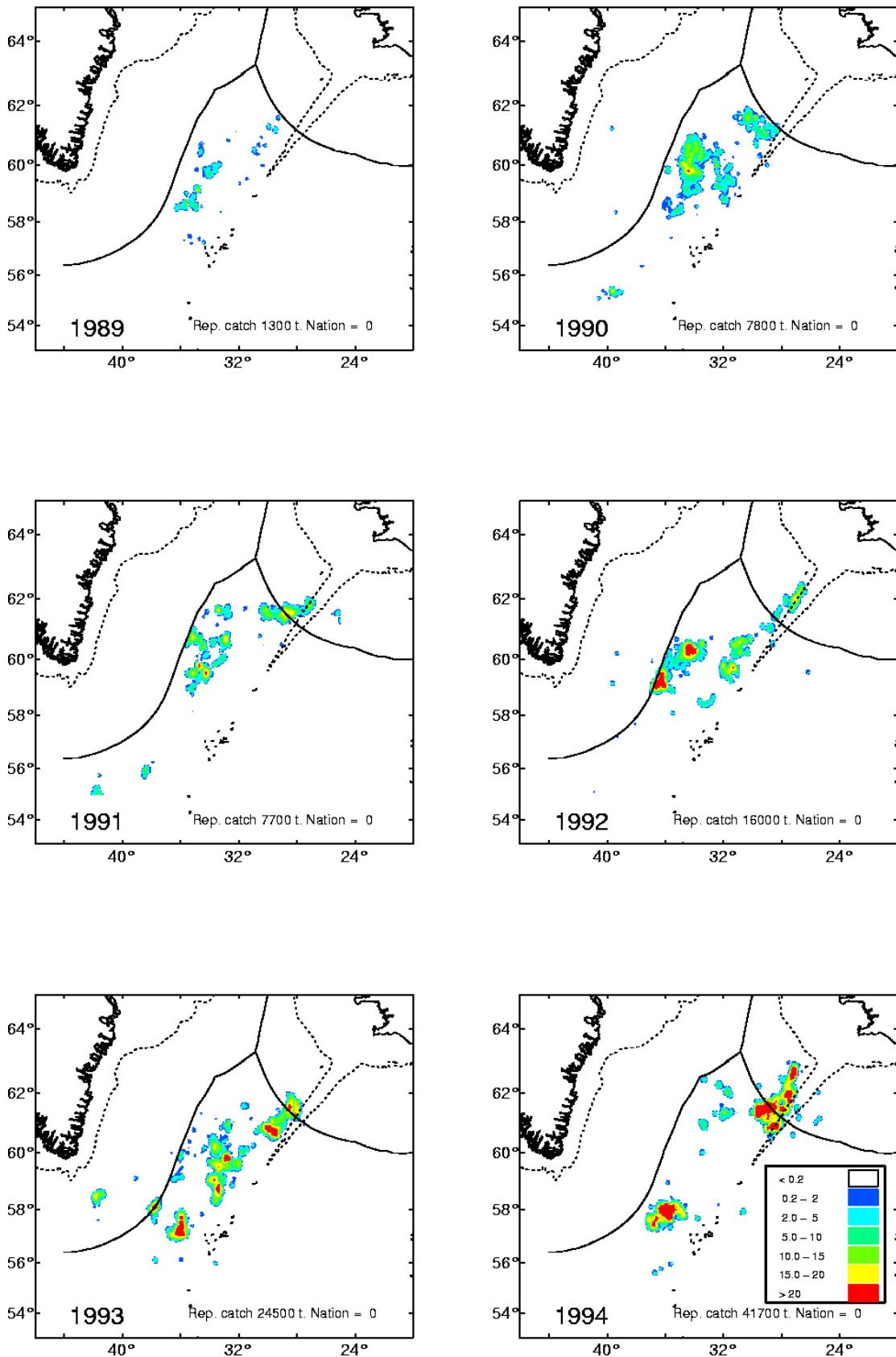


Figure 1a. Fishing areas of the pelagic redfish by year from 1995-2000. Data from Germany (1995-2000), Norway (1995-1999) Greenland (1999-2000) and Iceland (1995-2000). The scale given on the pictures indicates the catches in tonnes per square nautical mile.

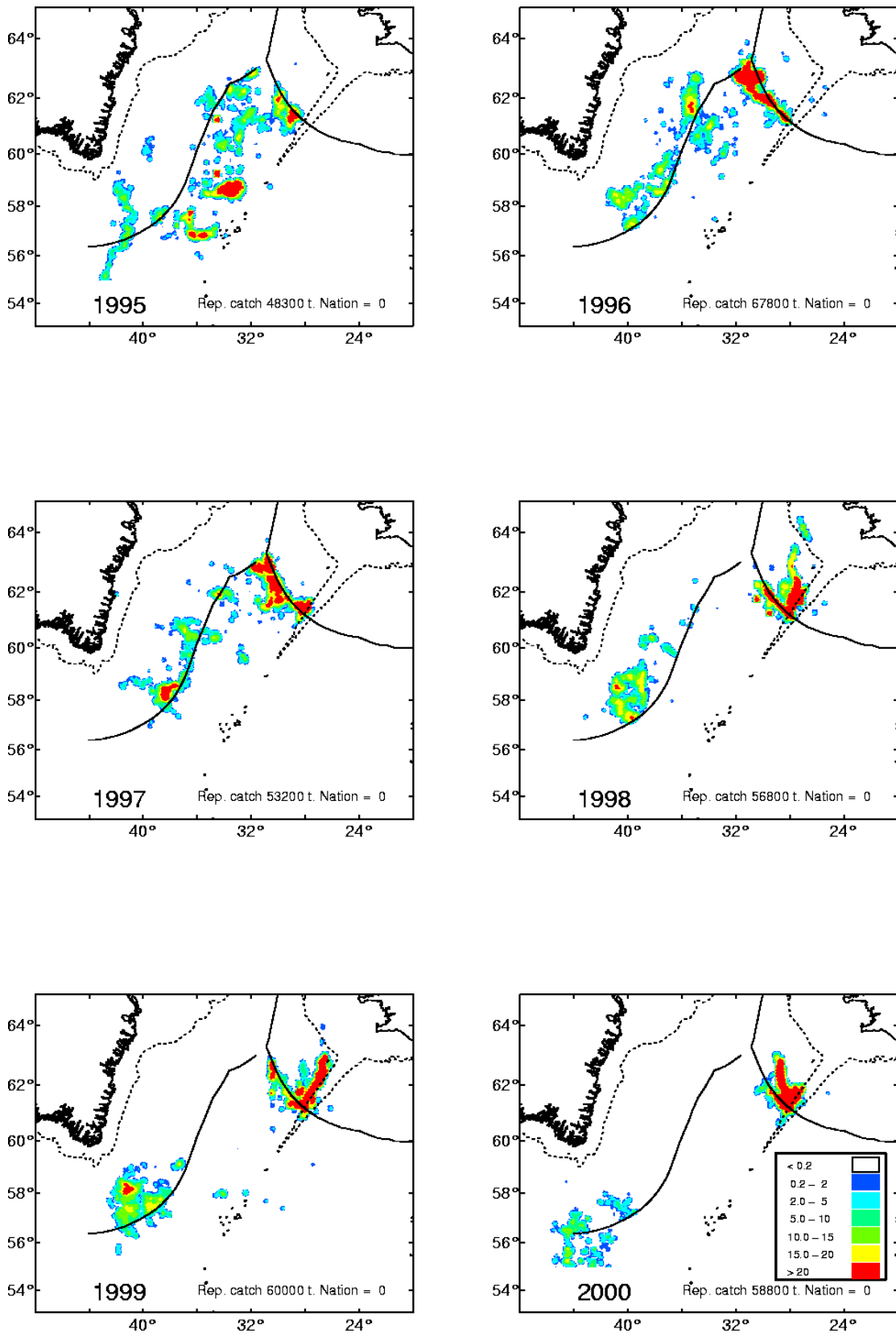


Figure 1b. Fishing areas of the pelagic redfish by year from 1995-2000. Data from Germany (1995-2000), Norway (1995-1999) Greenland (1999-2000) and Iceland (1995-2000). The scale given on the pictures indicates the catches in tonnes per square nautical mile.

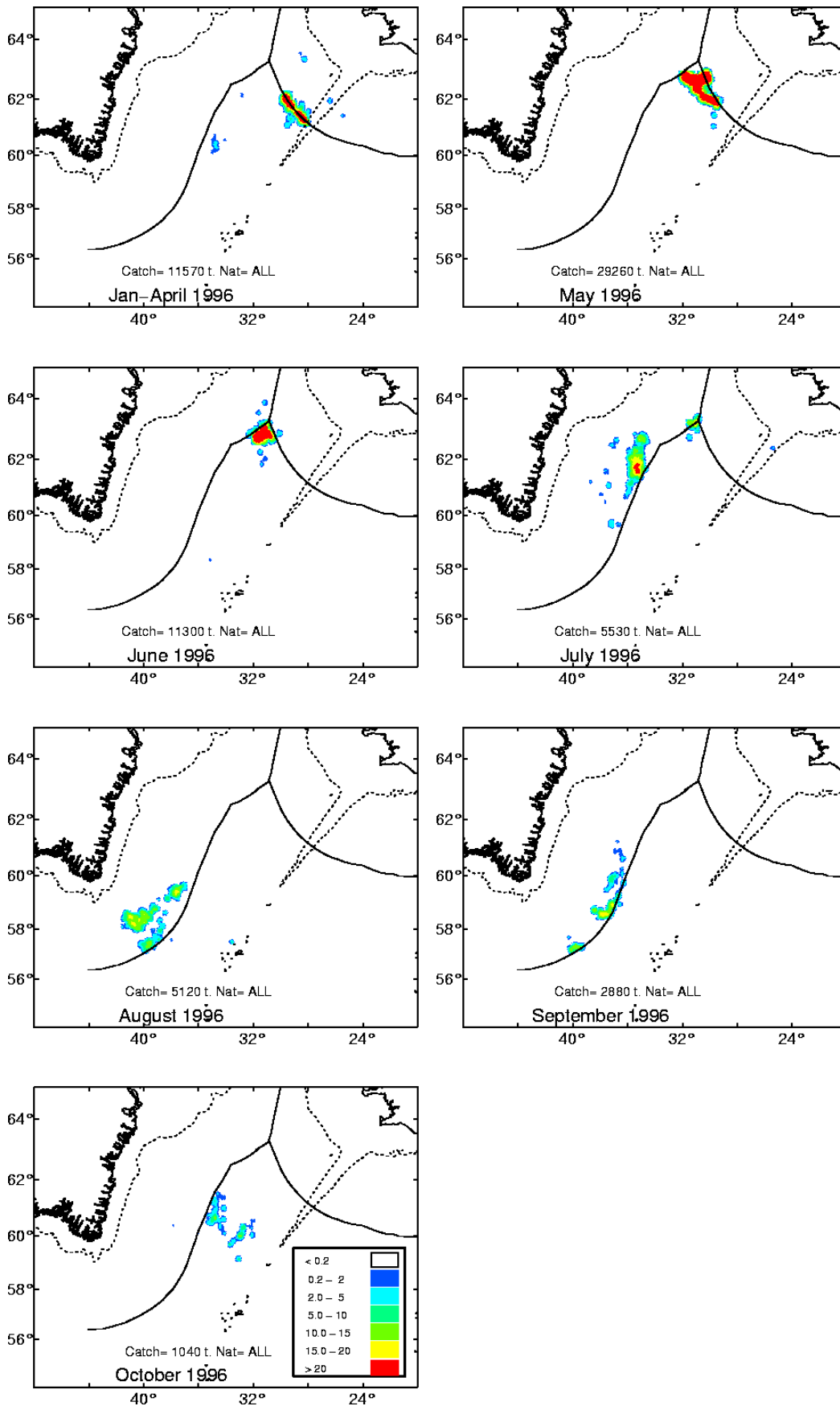


Figure 2 Fishing areas of the pelagic redfish by periods in 1995, including data from Germany, Iceland, Greenland and Norway. The scale given on the pictures indicates the catches in tonnes per square nautical mile. Total catch registered for each period is also shown on the figures.

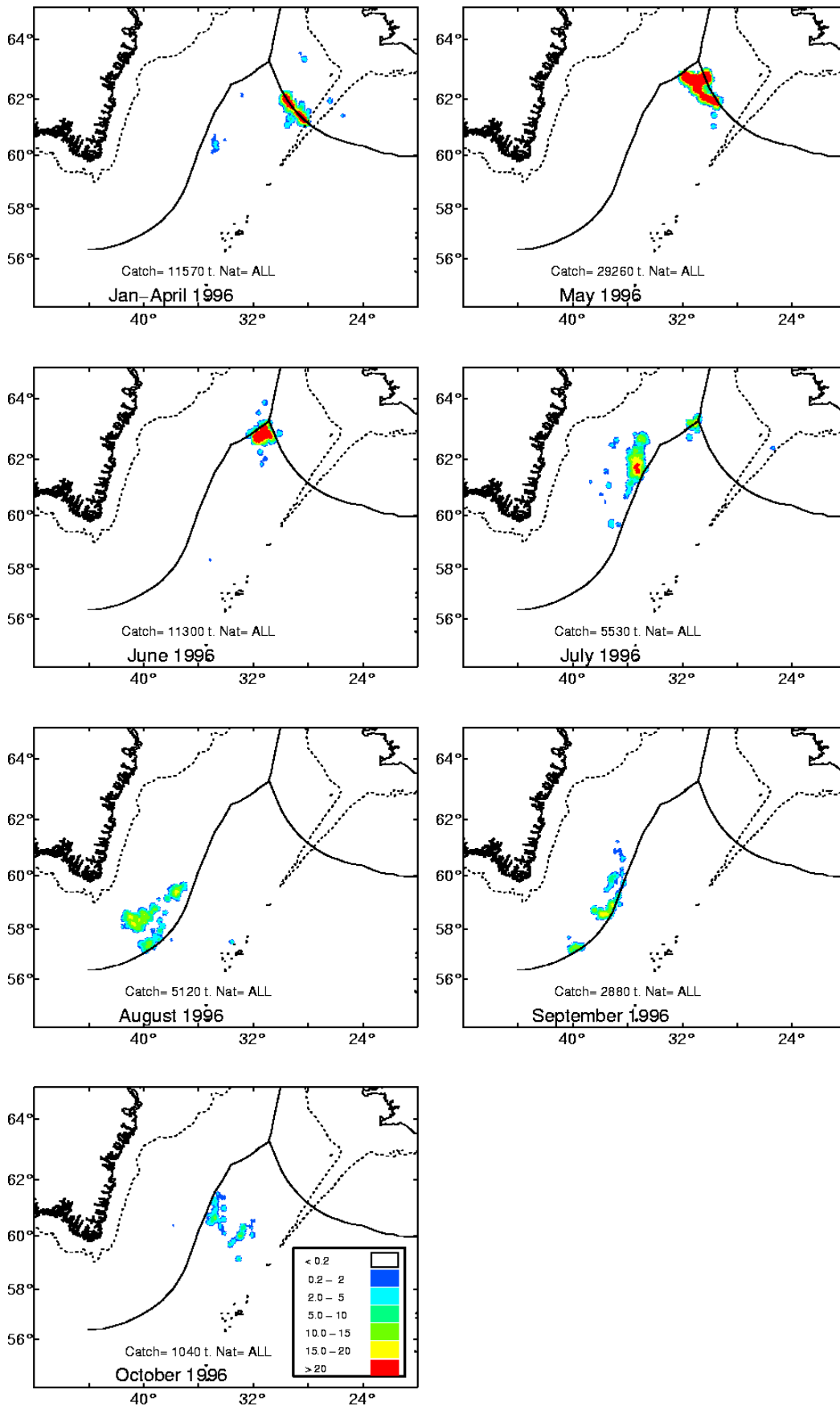


Figure 3 Fishing areas of the pelagic redfish by periods in 1996, including data from Germany, Iceland, Greenland and Norway. The scale given on the pictures indicates the catches in tonnes per square nautical mile. Total catch registered for each period is also shown on the figures.

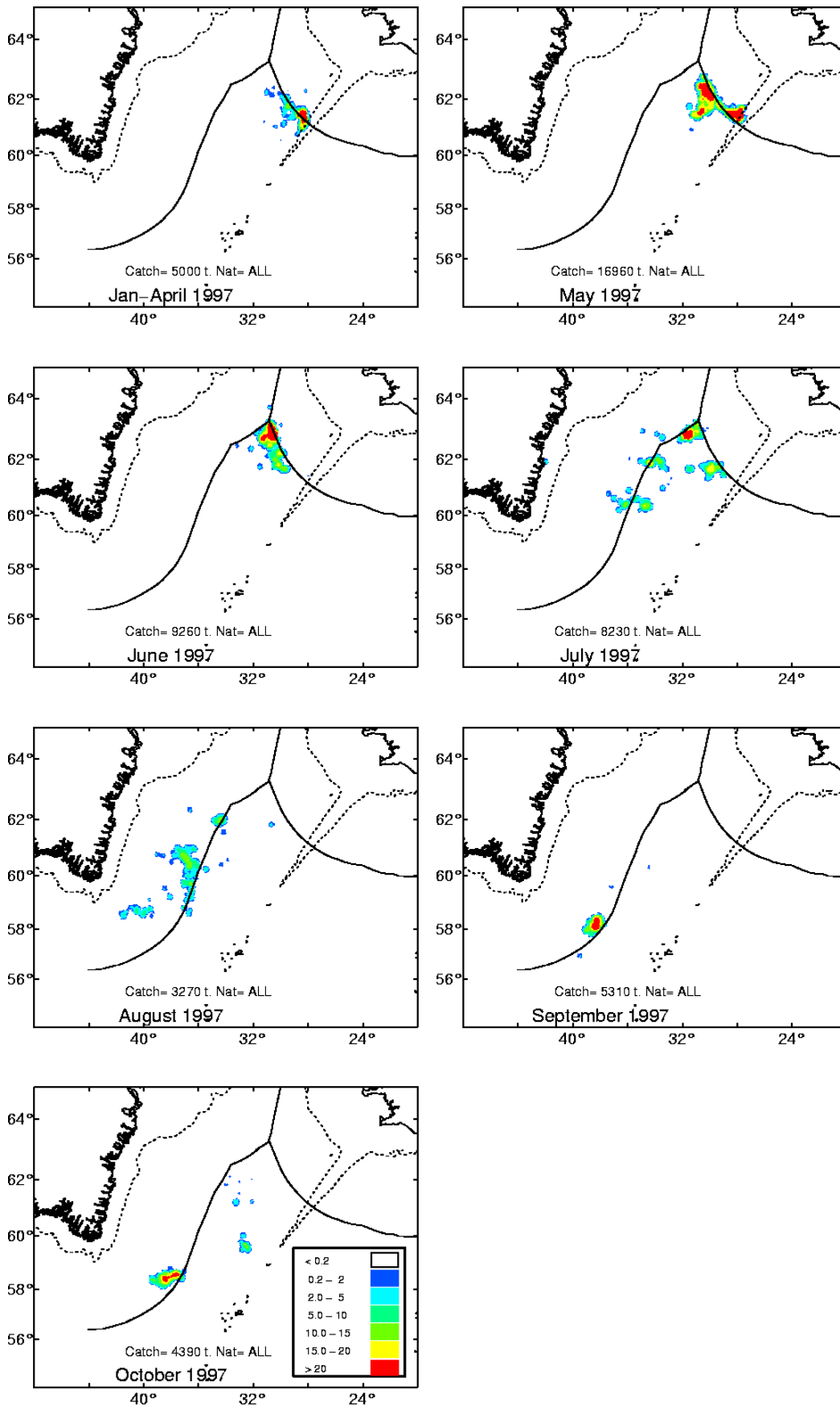


Figure 4 Fishing areas of the pelagic redfish by periods in 1997, including data from Germany, Iceland, Greenland and Norway. The scale given on the pictures indicates the catches in tonnes per square nautical mile. Total catch registered for each period is also shown on the figures.

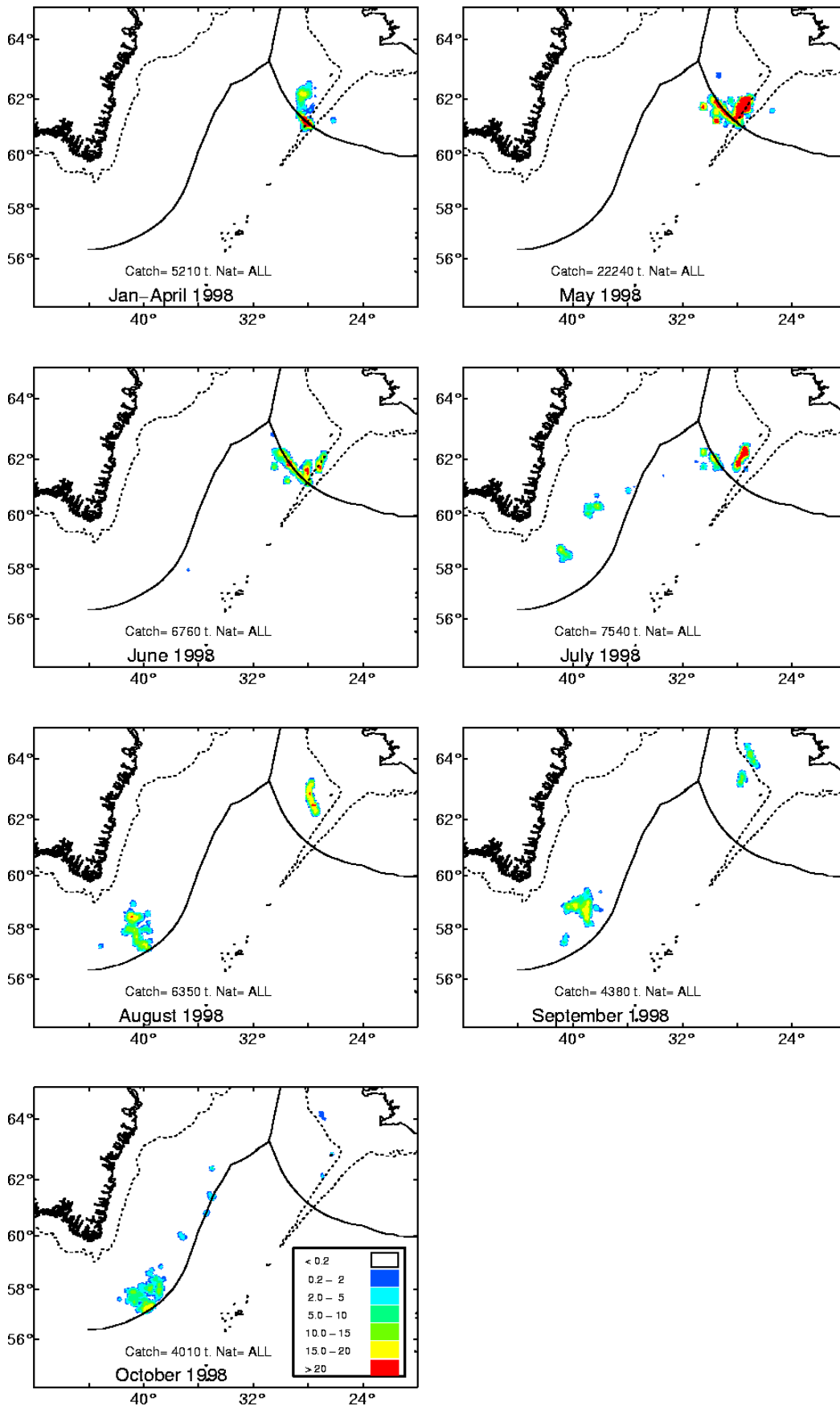


Figure 5 Fishing areas of the pelagic redfish by periods in 1998, including data from Germany, Iceland, Greenland and Norway. The scale given on the pictures indicates the catches in tonnes per square nautical mile. Total catch registered for each period is also shown on the figures.

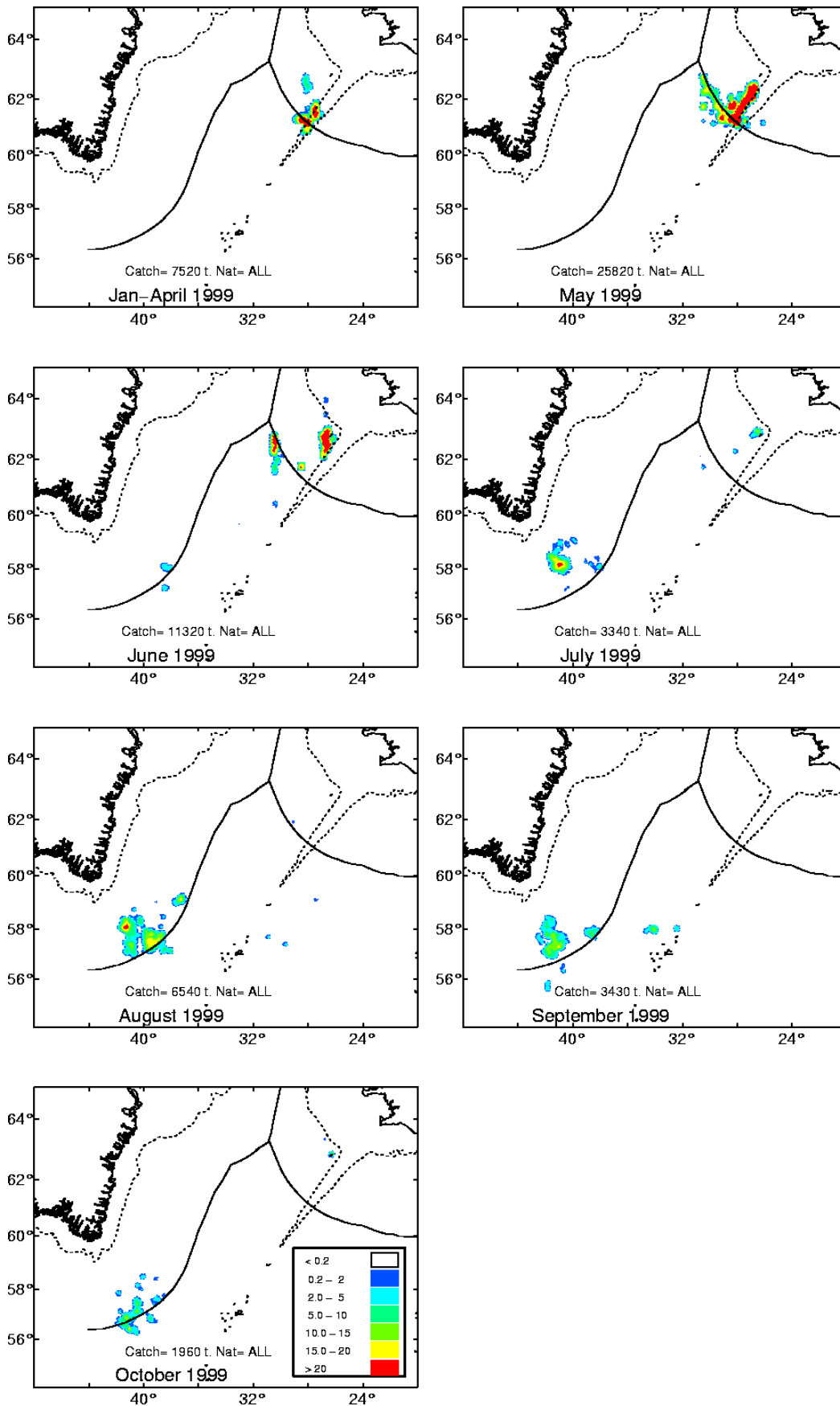


Figure 6 Fishing areas of the pelagic redfish by periods in 1999, including data from Germany, Iceland, Greenland and Norway. The scale given on the pictures indicates the catches in tonnes per square nautical mile. Total catch registered for each period is also shown on the figures.

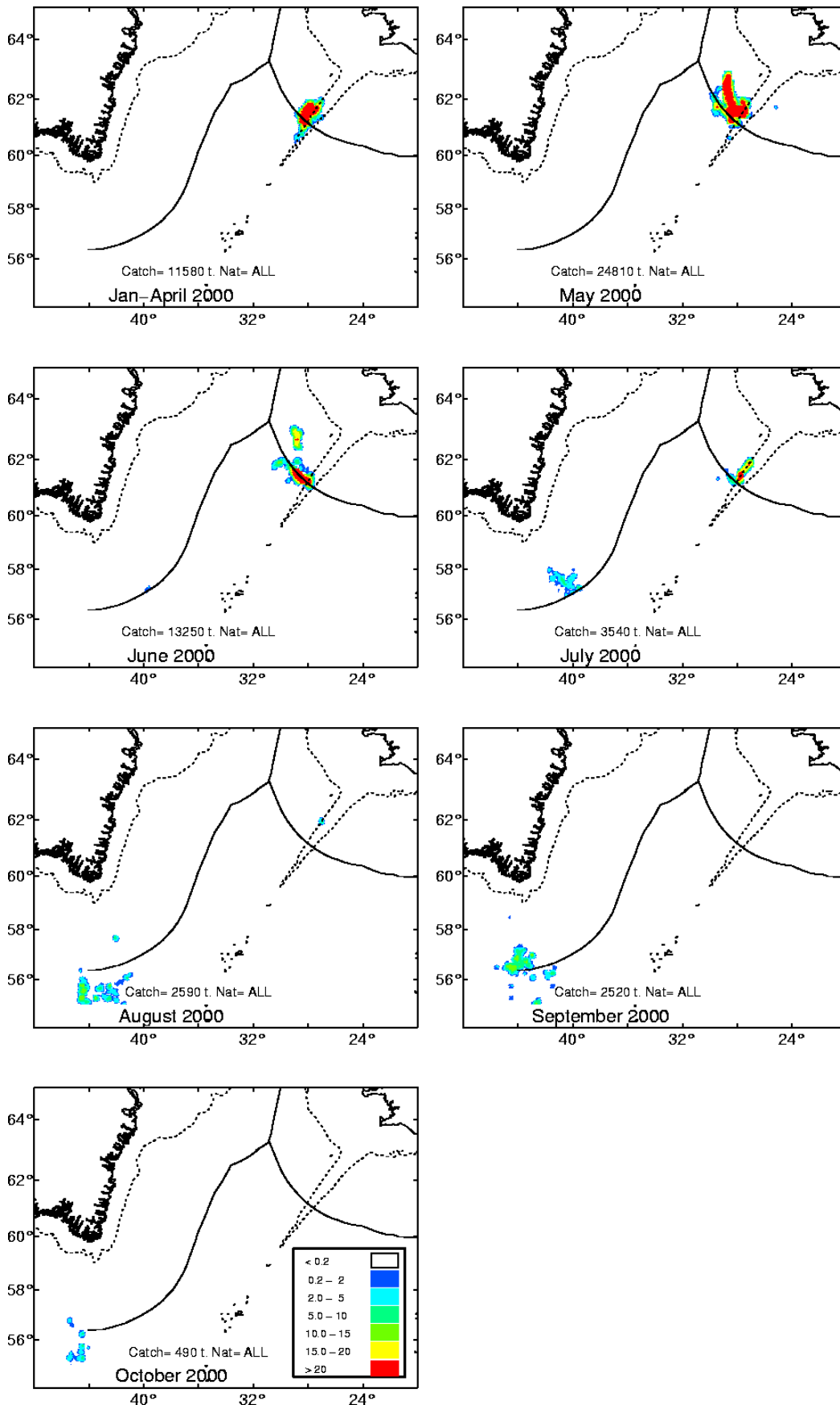


Figure 7. Fishing areas of the pelagic redfish by periods in 2000, including data from Germany, Iceland and Greenland. The scale given on the pictures indicates the catches in tonnes per square nautical mile. Total catch registered for each period is also shown on the figures.

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:

```
glm(formula = log(catch) ~ log(trawling_time) + factor(year) + factor(month) + factor(vessel)
+factor(square), family = gaussian(), data = tmp.data)
```

where square = ICES statistical square;
catch is total catch in each square by month, year, vessel;
trawling time is total trawling time by square by month year and vessel and;

The results are shown in Figure 8 for the whole period since 1989, combining all available data and in figure 9 for the period since 1995. Following figures (10-12) show the results for each country.

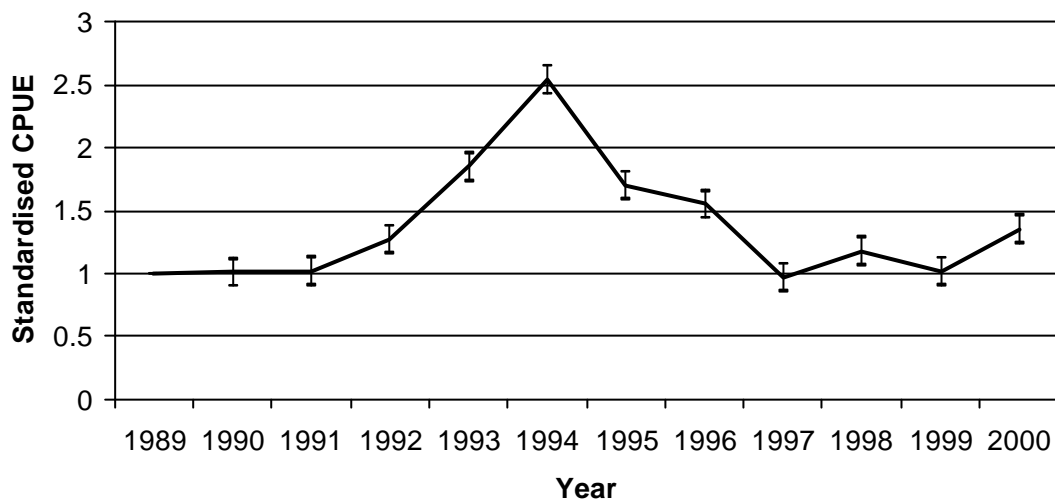


Figure 8. Standardised CPUE, as calculated by using data from Germany (1995-2000), Iceland (1989-2000), Greenland (1999-2000) and Norway (1995-1999).

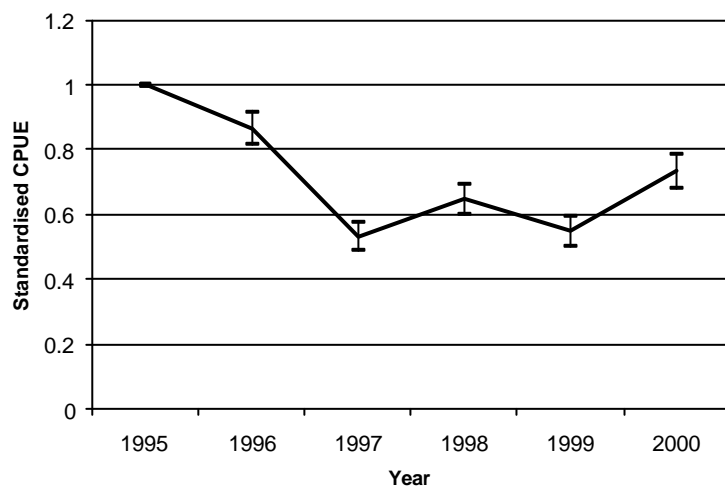


Figure 9. Standardised CPUE, as calculated by using data from Germany (1995-2000), Iceland (1995-2000), Greenland (1999-2000) and Norway (1995-1999).

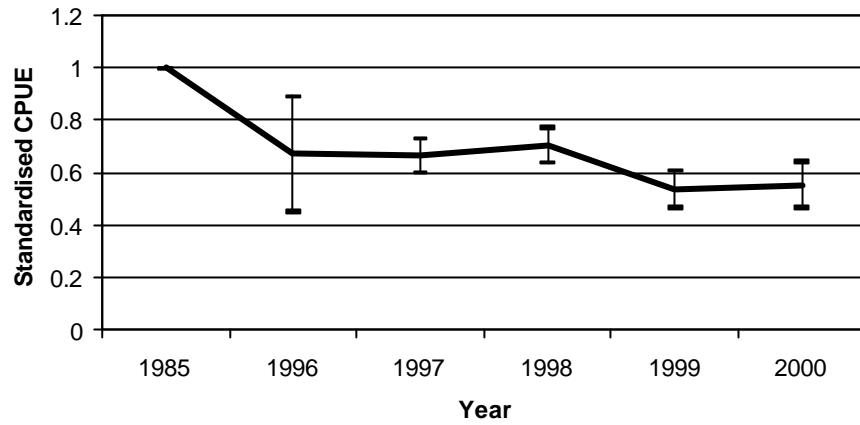


Figure 10. Standardised CPUE, as calculated by using data from Germany (1995-2000).

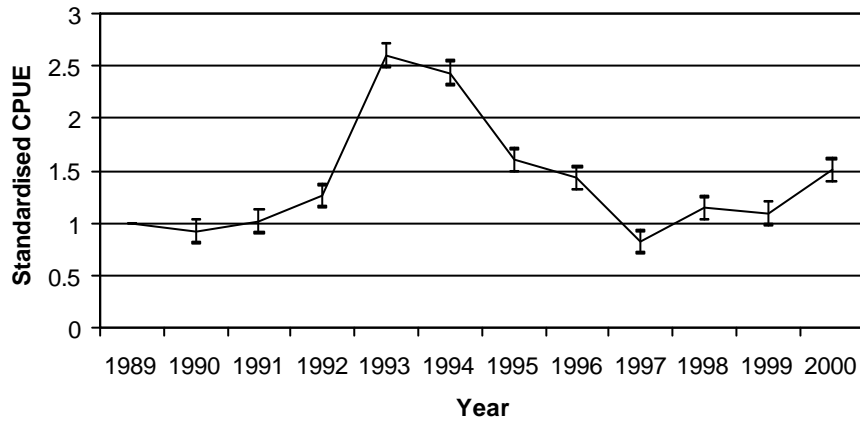


Figure 11. Standardised CPUE, as calculated by using data from Iceland (1989-2000) and Greenland (1999-2000).

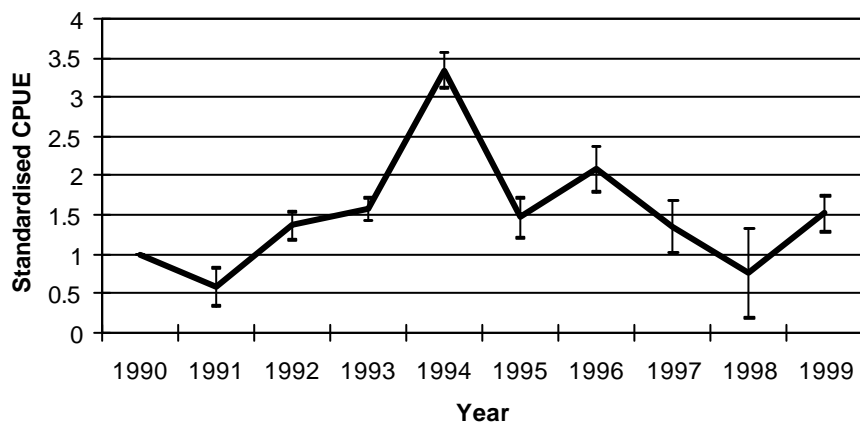


Figure 12. Standardised CPUE, as calculated by using data from Norway (1990-1999).

4) Acknowledgement

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