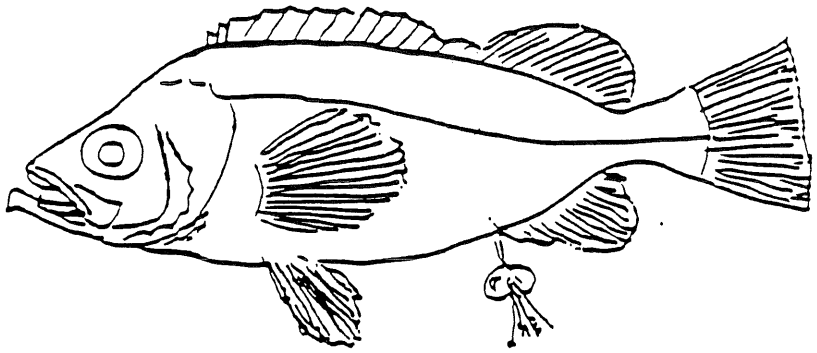
Demersal Fish Committee

ICES CM 1995/G:1. Ref.: Assess

REPORT OF THE STUDY GROUP ON REDFISH STOCKS

ICES Headquarters, Copenhagen,
1–2 May 1995



International Council for the Exploration of the Sea
Conseil International pour l'Exploration de la Mer

Palægade 2–4 DK-1261 Copenhagen K Denmark

TABLE OF CONTENTS

1 INTRODUCTION

1.1 Participants

Engelstoft, J.J.	Greenland
Magnusson, J. (Chairman)	Iceland
Magnusson, J.V.	Iceland
Nedreaas, K.H.	Norway
Pedersen, S.A.	Denmark
Rätz, H.-J.	Germany
Shibanov, V.N.	Russia
Sigurdsson, Th.	Iceland

1.2 Terms of Reference

At the 1994 ICES Annual Science Conference (82nd Statutory Meeting) it was decided (C.Res.1994/2:34) that the Study Group on Redfish Stocks should meet at ICES Headquarters from 1–2 May 1995 to:

- Explore the possibility of carrying out a joint international survey on oceanic redfish in the Irminger Sea and adjacent waters in 1996 and, if appropriate, plan the necessary co-ordination.

2 RECENT INFORMATION ON THE FISHERY AND FUTURE STOCK MONITORING

There was a decline in the oceanic redfish fishery from 1989 to 1991. Since 1992, there has been a rapid increase and the fishery has now again reached the high historical level of 1986. The fishing season has been prolonged and there are examples for vessels fishing during the winter time. Also, the fishing technology has developed rapidly. The participation in the fishery has increased again and vessels from at least 10 nations participated in 1994.

Some fleets which used to fish in other areas intend to or have already started in 1995 to fish for oceanic redfish in the Irminger Sea because of the depletion of stocks in their former fishing areas. This might lead to a great increase in the total catch of oceanic redfish, in 1995 and possibly in the future.

Although trajectories on future stock development have been carried out by the North Western Working Group, taking into account different catch levels, the reaction of the stock to the recent increase in the fishing effort is questionable. The Study Group is of the opinion that the monitoring of the stock during the survey in 1996 is needed considering the increased effort and that the total distribution area has never been covered. Future time scaling of the monitoring is dependant on the results of the 1996 survey and on the impact of the fishery.

3 JOINT SURVEY IN 1996

3.1 Participation in a joint survey

Around the table inquiry showed, that at this stage only two countries (Iceland and Russia) were prepared to make commitments for vessel time for a joint survey in June/July, 1996. Other countries were working on that matter. The group discussed the possibilities of broader participation and timing. In order for the countries to plan their survey activities in 1996, the Study Group agreed upon having **1 September 1995** as deadline for the countries to make a final decision about participating in the 1996 survey or not. The decision, positive or negative, should be reported to the chairman of the Study Group, Dr Jakob Magnusson.

The final decision of a joint international survey in 1996 should be taken at the 1995 ICES Annual Science Conference (83rd Statutory Meeting) in Aalborg, and will be reported to the Demersal Fish Committee. The Group agreed that with tentative participation of only two vessels, a joint survey could not be conducted.

3.2 Survey strategy

The distribution area of oceanic redfish which had been discussed and agreed upon during the meeting is outlined between 52°N to 65°N and 28°W to 52°W (Figure 1). This area is an extension of the survey area which was planned for the joint international survey in 1994, as the knowledge of the distribution area has improved since then. By letting the survey tracks run parallel to lines of latitudes with 30 nm between the tracks, the length of the survey tracks are approximately 15,500 nm. Counting for station time (2 trawl stations per day of 3 hours duration each) and assuming a speed of 10 knots it will take approximately 90 vessel days to cover the outlined area provided the weather conditions are favourable. This corresponds to about 22 days with 4 vessels, or 30 days with 3 vessels. These calculations do not include the time sailing to and from the survey area.

Since it is unrealistic to expect more than 4 vessels participating for 3 weeks each, the Study Group agreed that it would be better to increase the distance between the track lines outside the main distribution area, instead of excluding some areas during the survey. The Study Group agreed that an area outlined between 56°N to 62°N and 34°W to 46°W is the main area of interest for the oceanic redfish stock (hatched in Figure 1). By letting the survey tracks run parallel to lines of latitudes with 30 nm distance between the tracks inside the main area and with 45 nm distance between the tracks outside this area (dotted in Figure 1), the length of the survey tracks will approximately be 12,000 nm. This corresponds to about 66 vessel days or about 16–17 days with 4 vessels, or about 22 days with 3 vessels.

However, to implement this plan within a reasonable time span, the Study Group agreed that at least 3 vessels have to participate.

Numerous surveys conducted in the time period March to September have shown that June–July will be the best time for conducting an acoustic survey with the main purpose to measure the biomass. The Study Group therefore agreed upon conducting the 1996 survey in the time period 15 June–25 July.

For more details concerning the survey, the Study Group refers to the 1994 Report of the Study Group on Redfish Stocks (Appendix 2 in: Anon, 1994). It is, however, important that countries participating in the international survey come together for more detailed planning. The way of scrutinising echograms should be standardised before the survey.

Each participating vessel should calibrate its acoustic equipment just before the survey. Intercalibration is highly recommended, and area and timing should also be agreed upon prior to the survey.

4 REPORTING ON SURVEYS IN 1994–1995

Report on the German Acoustic Survey on Oceanic Redfish in the Central Irminger Sea, April 1994. Rätz, H.-J. and Bethke, E., Working Paper No. 1

During the period 23–29 April 1994, a German trial survey on the oceanic redfish covering a limited area of the central region in the Irminger Sea was carried out in order to investigate the hydroacoustic conditions for the assessment of the abundance of that stock and the utility of the new research vessel „Walther Herwig III" for such projects, especially for taking responsibility of tasks within the frame of international surveys as requested by the ICES Study Group on Redfish Stocks. The survey catches were almost exclusively redfish (99%). The normalised catches (15 fishing stations) varied between 0 and 32.8 kg and between 0 and 51 individuals per trawling hour. Individual lengths varied between 24 cm and 47 cm with a mean of 35.97 cm corresponding to an average weight of 0.668 kg. Males dominated by 90% and were found to be at an early stage of ripening. The few females displayed running ovaries with larvae at the stage of extrusion. 68% of the redfish lacked any infestation by external parasites or melanoms. 23% were infested with *Sphyrion lumpi* and 12% showed black spots. Oceanographic measurements revealed homotherm conditions of the upper 800m. Hydroacoustic measurements were integrated over distance units of 5 nm (50–520m depth) at day and night using thresholds at -72dB and -63dB for low and high density zones (scattering layers), respectively. The total estimate amounted to 25.92 m^2/nm^2 corresponding to a redfish abundance of 23,802 individuals and a biomass of 15,900 kg per nm^2 ± 15% confidence interval calculated at the 95% level of significance. The mean integrator value for the low density layers (-72dB) amounted to 15.37 which indicates an abundance of 14,114 individuals and a biomass of 9,428 kg ± 14%. The redfish abundance within the scattering layers (-63dB) were estimated to be lower, more variable, and amounted to 9,688 individuals and 6,472 kg ± 34% based on a mean integrator value of 10.55 m^2/nm^2.

Report on the Joint Icelandic/Norwegian Survey on Oceanic Redfish in the Irminger Sea and Adjacent Waters, in June/July 1994. Magnusson, J. and K. H. Nedreaas, J. V. Magnusson, P. Reynisson and T. Sigurdsson 1994. ICES C.M./G:44, Working Paper No. 2.

Results of the joint Icelandic/Norwegian hydroacoustic survey on oceanic redfish in the Irminger Sea and adjacent waters carried out in June/July 1994 were presented. Redfish abundance was integrated within an area of approximately 190,000 nm^2 down to 500m, which was the most intensive stock coverage until now. Stock abundance in the area surveyed was assessed to be around 2.2 million tons or 3.5 billion individuals. Oceanic redfish was found to be densest at 100–250m depth, mainly within a temperature range of 3° to 4°C. Males were in majority in all areas (55–61%). The average length amounted to 36.7cm according to a mean weight of 640g. Females were on the average larger and heavier than males. The percentage of fish with external abnormalities (i.e., *Sphyrion lumpi* and spots) was much higher for females than for males. The average was 43.5% and the average for fish showing muscular pigmentation, 47.1%, respectively. Information on maturity stages and stomach contents were recorded.

Comparison of the Acoustic Assessments on Oceanic Redfish. P. Reynisson, Working Paper No. 3.

A comparison of the hydroacoustic stock abundance estimates for oceanic redfish was performed based on three surveys carried out in June/July 1991, 1992 and 1994. Differences in survey coverage were corrected by determination of the stock abundance of the areas covered during these surveys and raising to the area of 190,000 $n.m^2$ covered in 1994 assuming no changes in distribution and behaviour of the redfish. Results indicate a constant stock size varying between 2,165 and 2,235 thousand tons for the period 1991–94.

Report on a Research Survey on Oceanic Redfish in March 1995. Magnusson, J. and J. V. Magnusson 1995. Working Paper No. 4

Results derived from an Icelandic research survey on oceanic redfish carried out in March 1995 were reported. The survey area was limited to the south western part of the Icelandic Exclusive Economic Zone (EEZ). Acoustic abundance estimation was not performed due to very unfavourable conditions, i.e., (1) the vertical distribution

of the redfish was wider and deeper (only few specimens were detected above 350m) compared to summer time, and (2) the redfish were found to be almost constantly mingled with the scattering layer in depths of 350m to 700m. Although the survey catches were not big it was concluded that a considerable part of the oceanic redfish stock is situated within the Icelandic EEZ west and southwest of Iceland at depths of 300m to 650m during the winter period. Highest concentrations were located at the south-western boundary between the Icelandic EEZ and international waters around 61°N. Deep sea redfish were observed at almost all stations and in shallower waters in March compared to June/July.

5 OTHER RESEARCH

5.1 Stock identification

Genetic work (primarily DNA) to separate oceanic *S. mentella* from deep-sea *S. mentella* have already started in Iceland and Norway. This work should be co-ordinated so that the project would get the best possible chance to succeed in finding diagnostic criteria for the two types.

Iceland has started a project to separate the two *S. mentella* types in the commercial catches. They seem to be more mixed in March than e.g., in June–July. The most important criteria used for separation are the general morphological appearance (the deep-sea type is stouter with a thicker neck area), colour (deep-sea type is more clean red), the length-weight relationship, and length-at-maturity (oceanic type is smaller than the deep-sea type when first mature). At present it is only Iceland that has experience in separating these two types, and the Study Group therefore asks for a detailed description on this matter.

5.2 Age reading

An age reading workshop on *Sebastes* spp. will be held in Bremerhaven, Germany, 4–8 December 1995 under the co-chairmanship of Klaus Kosswig and Bruce Atkinson. The participants are requested to announce their participation as early as possible, and not later than 3 months in advance of the workshop. Examples of age reading of oceanic *S. mentella* based on otoliths were presented to the Study Group by Norway (Working Document no. 6). Although the length composition of oceanic *S. mentella* is rather uniform within the fishing area, the otolith readings show greater heterogeneity in the age distribution.

5.3 Nursery areas and recruitment

It is the opinion of the Study Group that next to the surveillance of the exploitable stock, knowledge about the nursery areas and the recruitment mechanisms to the oceanic *S. mentella* stock will be the most important area for research in the future. The Study Group sees the need for conducting an international young fish survey, including 0-group survey, similar to the present acoustic survey, in terms of international co-operation and coverage.

5.4 External infestation (*Sphyrion lumpi* and spots) and muscular abnormalities in oceanic *S. mentella*

Sampling and analyses of external and muscular infestations and abnormalities are routinely taken care of during surveys. Results have been presented in the survey reports. Two working papers on this subject were presented. In working paper no. 8 the development stages of the ectoparasite *Sphyrion lumpi* were described.

6 RECOMMENDATIONS

The Study Group recommends:

1. Conduct a joint international acoustic survey in June–July 1996 to estimate the exploitable biomass of oceanic *S. mentella*;

2. In order to achieve knowledge on location of the nursery areas and of the recruitment, a joint international synoptic trawl survey for 0-group and/or juvenile redfish covering the entire distribution area is necessary;

3. The Study Group encourages redfish scientists to participate in the ICES Workshop on Redfish Age Reading in Bremerhaven, 4–8 December 1995;

4. Research on stock identification of redfish should be promoted along the lines described in the 1993 Report of the Study Group on Redfish Stocks (Anon., 1993).

7 WORKING DOCUMENTS AND REFERENCES

Anon., 1993. Report of the Study Group on Redfish Stocks, Copenhagen, 12–14 May 1993, ICES, Doc. C.M. 1993/G:6. 12 pp.

Anon., 1994. Report of the Study Group on Redfish Stocks, Copenhagen, 2–3 May 1994, ICES, Doc. C.M. 1994/G:4. 8 pp

Bakay,Y.I., A.B.Karasev. Diagnostics and Registration of Ectolesions in Redfishes of the *Sebastes* Genus (Methodic Recommendations). Working paper No. 8. 16 pp.

Bech,G. Report of Catches of Redfish in the "Redfish Box" Taken During the Greenland Trawl Surveys 1992 to 1994. Working paper No. 5. 10 pp.

Magnusson, J.V. Infestation by *Sphyrion lumpi* on the Oceanic *Sebastes mentella* in the Irminger Sea.
Working Paper No. 7. 6 pp.

Magnusson, J.; Nedreaas, K.H.; Magnusson, J.V.; Reynisson, P.; Sigurdsson, T. Report on the Joint Icelandic/Norwegian Survey on Oceanic Redfish in the Irminger Sea and Adjacent Waters in June/July 1994.
ICES,C.M.1994/G:44. Working paper No. 2. 29 pp.

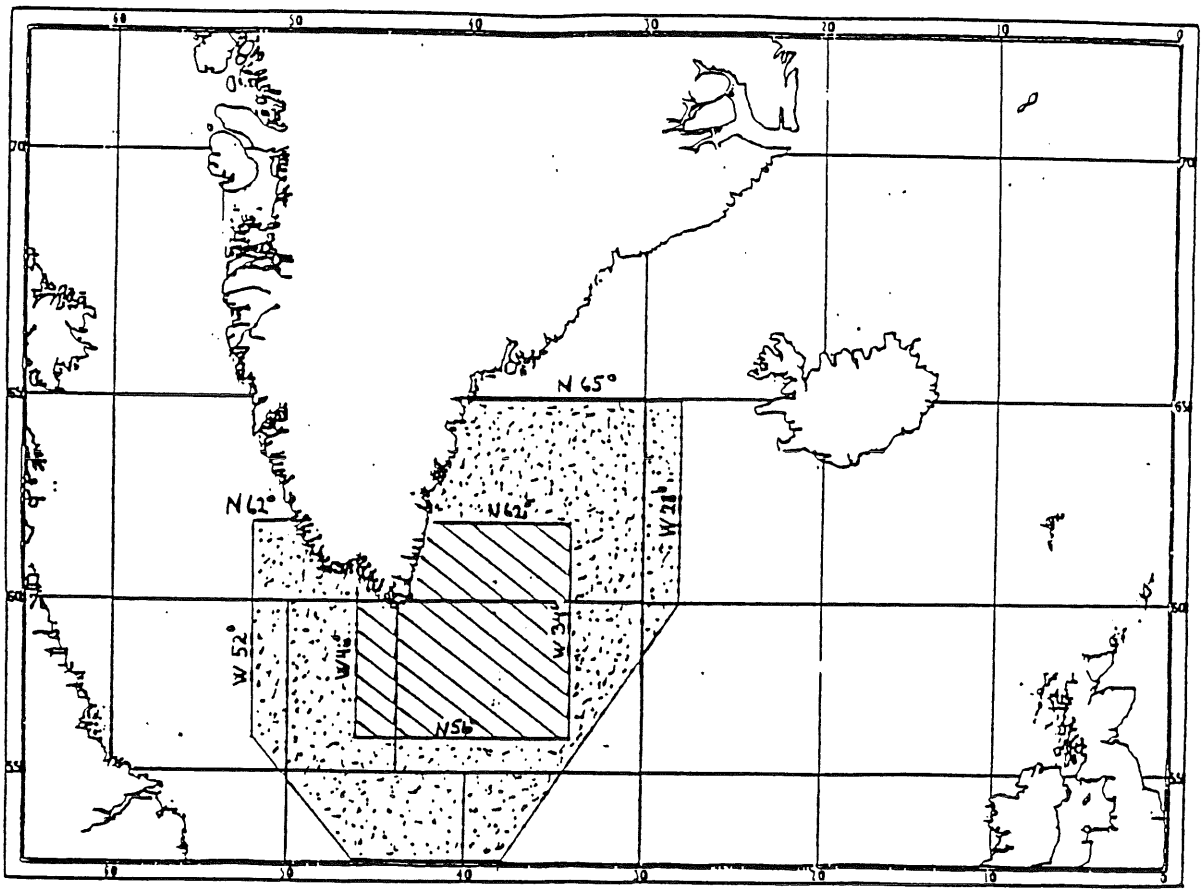
Magnusson,J.; Magnusson, J.V. Report on a Research Survey on Oceanic Redfish in March 1995.
Working paper No. 4. 10 pp.

Nedreaas, K.H. Some Information about the Norwegian Fishery for Oceanic *Sebastes mentella* in ICES Sub-Areas XII and XIV in 1993 (Revised) and 1994 (Incl. Landing Statistics of *S. marinus,* Deep-Sea *S. mentella* and Greenland halibut).
Working paper No. 6. 8 pp.

Rätz, H.-J.; Bethke, E. Report on the German Acoustic Survey on Oceanic Redfish in the Central Irminger Sea, April 1994.
Working paper No. 1. 8 pp.

Reynisson, P. Comparison of the Acoustic Assessments on Oceanic Redfish.
Working paper No. 3. 1 p.

Figure 1 Map showing the agreed total area to be covered during the 1996 international acoustic survey for oceanic *S. Mentella*. Within the hatched area (56°N–62°N, 34°W–46°W) the survey tracks should be 30 nm apart, while in the rest of the survey area (dotted) the distance between the tracks should be 45 nm.



APPENDIX 1

LIST OF PARTICIPANTS

Study Group on Redfish Stocks

1–2 May 1995

Name	Address	Telephone	Fax	E-mail
J. Magnusson (Chairman)	Marine Research Institute Skúlagata 4 121 Reykjavik Iceland	+354 55 20240	+354 55 623790	
J.J. Engelstoft	Grønlands Naturinstitut Box 570 3900 Nuuk Greenland	+299 21095	+299 25759	
J.V. Magnusson	Marine Research Institute Skúlagata 4 121 Reykjavik Iceland	+354 55 20240	+354 55 623790	jutta@hafro.is
K.H. Nedreaas	Institute of Marine Research P.O. Box 1870, Nordnes 5024 Bergen Norway	+47 55 238500	+47 55 238387	kjelln@imr.no
S.A. Pedersen	Grønlands Naturinstitut Tagensvej 135, 1.tv. 2200 Copenhagen N Denmark	+45 31 854444	+45 35 821850	
H.J. Rätz	Institut für Seefischerei Aussenstelle Bremerhaven Am Fischkai 35 27572 Bremerhaven Germany	+49 471 73473	+49 471 73127	
V.N. Shibanov	Knipovich Polar Research Institute of Marine Fisheries and Oceanography (PINRO) 6, Knipovich Street 183763 Murmansk Russia	+47 78 910423	+47 78 910518	pinro@imr.no
Th. Sigurdsson	Marine Research Institute Skúlagata 4 121 Reykjavik Iceland	+354 55 20240	+354 55 623790	steini@hafro.is