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Comm.

PRELIMINARY REPORT ON THE INTERNATIONAL O-GROUP FISH  
SURVEY IN ICELANDIC AND GREENLAND WATERS IN JUNE -  
AUGUST 1971

Introduction

An international survey was carried out during the period late June - 18 August in order to investigate the distribution and density of O-group fish in the waters around Iceland and between Iceland and Greenland. Participating were Britain, Germany, Iceland and Norway with vessels and staff respectively as follows;

R/V "CIROLANA", 18-29 July, D. Garrod, J.F. Wickins, C.L. Whiting, M. MacDonald, T. Watson, A.J. Burridge, A. Houghton, J.E. Howlett.

R/V "ANTON DOHRN", 28 June - 10 July, H.H. Reinsch, K. Kosswig, E. Kretzler.

R/V "ÁRNI FRIDRIKSSON", 5-18 August, H. Vilhjálmsson, S. Lýðsson, E. Jónsson, E. Friðgeirsson.

R/V "BJARNI SÆMUNDSSON", 5-18 August, S. Schopka, S.Aa. Malmberg, H. Holsvik, Ó.V. Sigurðsson, Ó.K. Pálsson.

R/V "G.O. SARS", 5-18 August, O. Dragesund, V. Blindheim, G. Nævdal, A. Storler, K. Hansen, J.E. Klæt, P. Eide, S. Lygren, O. Alvheim, M. Aasdal, J.E. Steen.

Due to different timing of the various cruises a joint meeting of the participants was impossible. The data collected were therefore, after some preliminary discussions between individual scientists, left with the Marine Research Institute, Reykjavík, where the following preliminary report was prepared.

### Program and methods

The area covered by each participating vessel is shown in Figure 1. Obviously there is a fair degree of overlapping particularly in the area to the north and west of Iceland but this was thought necessary in this instance due to the unfortunate but inescapable difference in timing of the cruises. The technique and methods applied was a combination of echo sounding and fishing with pelagic trawl (Dragesund, Mittun and Olsen 1970).

It should be pointed out here that only the British, Norwegian and Icelandic vessels carried on exactly comparable detection gear and that the "Cirolana" and "Anton Dohrn" used a pelagic trawl of the I.K.M.T. type while an ordinary Norwegian capelin trawl with a fine meshed cod end was used on board the Icelandic and Norwegian vessels.

The length distribution of 0-group fish was calculated separately for the following areas;

area 1) From East Iceland to a line drawn due west from the southernmost tip of the Reykjanes Peninsula.

area 2) The area to the west of Iceland to a line drawn due north of Cape Horn.

area 3) The area off North Iceland from Cape Horn to Langanes.

### Results

#### General

Most of the echo-recordings are due to 0-group fish but in addition medusae and other planktonic organisms contributed to the echo-abundance. The echo-abundance is shown in Figure 1, but recordings off East and Northeast Iceland, which were classified as plankton, were however omitted from the picture since practically no 0-group fish were caught there either. Due to the difference in detection gear and time an attempt to classify the strength of the "Anton Dohrn" echo-records in relation to that obtained by other ships has been thought unadvisable. It can be stated, however, that these were of a considerable magnitude. Echo-traces definitely identified as arising from adult fish have, for the most part, been omitted in Figure 1.

This report is of a very preliminary character since a mass of data has still to be attended to and due to difficulties in interpreting some of the information. Since this is only for the second time that investigations of this kind are carried out in Icelandic

and Greenland waters and some of the area is now indeed surveyed for the first time, it is not possible to reach any firm conclusions on the abundance of 0-group fish. At the very best we consider us to be able only to give some indications as to the abundance of some of the species in the survey area

### Hydrography

In the area off the western north coast of Iceland and the North-West Peninsula unusually high concentrations of drift ice were encountered for this time of the year. Survey work in this area was, therefore, considerably hampered. The main ice edge was however situated much further to the north. The approximate limit of drift ice is shown in Figure 1.

So far it has only been possible to work up a limited amount of the hydrographic data collected. Figure 2 shows the temperature distribution at 50 m depth and illustrates the approximate distribution of the different watermasses in the survey area and the boundaries between them.

Thus, deep to the northeast and north of Iceland the Arctic water of the East Icelandic Current is located whereas in shallower waters off the Icelandic north coast an Atlantic influx from the west is observed. Farther to the west, over the East Greenland Shelf we again find polar waters of the East Greenland Current.

Southeast of Iceland the boundary between Atlantic and Arctic waters closely follow the Iceland-Faroe Ridge with a northward intrusion of Atlantic water near 11°W as usual.

### Cod

The 0-group Cod had a fairly wide distribution ranging from Cape Portland in the south, over most of the shelf area to the west of Iceland and eastwards along the Northcoast as far as Melrakkaslétta. The general distribution is shown in Figure 3, apparently following the 200 m depth line except to the west of Iceland where it reaches considerably further out.

Quantitative distribution of 0-group cod is shown in Figure 8 and is based on hauls from Icelandic and Norwegian ships.

Although cod were found off South and Southwest Iceland it is only in the northernmore regions that their numbers become substantial. There is also a substantial increase in numbers towards the coast with by far the richest hauls being taken inside the northernmost fjords on the Northwest Peninsula as well as in the fjords along the Northcoast. In these localities hauls of 1 nautical mile yielding from 500-5000 individuals were not infrequent.

Apart from the area off Southwest and West Iceland, where practically no cod were taken last year its distribution pattern and probably amount is similar to what it was then. It is a tentative conclusion, that the yearclass 1971 will be of some importance without being rich.

The length distribution of 0-group cod is shown in Figure 12.

#### Haddock

It is difficult to compare the 0-group haddock to last years findings since the area off the Icelandic south- and southeast coast was not surveyed then.

Off the Northwest Peninsula and the Northcoast its distribution seems rather similar to 1970 although somewhat more restricted. As last year, haddock was not found in any appreciable numbers there except in some fjords. This, together with the comparatively large size of the 0-group haddock suggests that it has to some extent reached the bottom stage already by early August.

Of the Icelandic south coast haddock was located in two main regions i.e., in the vicinity of Ingólfshöfði and in the area from Portland to the Reykjanes Peninsula. The richest hauls were taken in Selvogsbanki, just offshore, but hauls taken elsewhere produced only moderate to few numbers of individuals.

A few 0-group haddock were caught along the Iceland-Faroe ridge but these may have drifted to that region from the Faroes.

The general and quantitative distribution of 0group haddock is shown in Figures 4 and 9.

Judging by the length distribution of 0-group haddock spawning has occurred in two different localities namely off the South Coast and off the Northwest Peninsula. The fish caught in area 2 seem to be a mixture from both spawning grounds. The length distribution is shown in Figure 13.

Herring. (no Figure)

Only 3 specimen of 0-group herring from the spring spawning were caught at one trawl station in Ísafjarðardjúp on the Northwest Peninsula. Contrary to last year when some herring from the 1969 summer spawning (?) were located in odd fjords and bays from Faxabey to Eyjafjörður no herring from the 1970 summer spawning were found. The above yearclasses, therefore, seem to have failed.

Capelin

The total distribution of 0-group capelin is shown in Figure 5. Apart from the Southcoast its area of distribution is similar in magnitude to last year with a limited region to the southeast of Cape Dan as well. In addition 0-group capelin were found off the Icelandic south coast as far east as 16°W.

Considering Figure 10, which illustrates the quantitative distribution as indicated by catch/effort data in the same way in the case of cod and haddock it is seen that the highest densities are located in 4 main regions;

- 1) To the southeast of Ingólfshöfði,
- 2) Off the Southwestcoast from Cape Portland to some to 60 n.m. west of the Reykjanes Peninsula,
- 3) In a wide region from southwest to northwest off the Northwest Peninsula, 30-110 nautical miles offshore,
- 4) In the Cape Horn - Siglunes area from the coast out to the ice-edge.

In the above areas 1000 or more 0-groups capelin were caught per haul of 1 nautical mile. Over 10 thousand individuals per mile were caught off Látrabjarg. Cape Horn and inside Húnaflói the eastern half of which yielded up to 500 thousand 0-group capelin per haul of 1 nautical mile.

Judging by the extensive area of distribution and quantities caught it seems likely, that a good yearclass has been produced. Furthermore, apart from the heaviest spawning which took place in March in the Faxaflói region, it seems that additional spawning of considerable importance must have taken place off the south- and especially south-eastcoast of Iceland and that the capelin in area 2 and possibly 1 as above originate from there.

The length distribution of the capelin is shown in Figure 14. Apparently all the capelin in area 1 (south coast) are from the same spawning whereas the fish in areas 2 and 3 show a wider scatter indicating a mixture from 2 or more spawning.

Apart from 0-group capelin some 1-3 group fish were encountered, mainly just outside the shelf off the Northwest Peninsula and in a fairly wide area off North Iceland between 18 and 20°30'W from 20-60 nautical miles offshore. These concentrations were, however, rather scattered.

### Redfish

In more offshore regions off southwestern and western Iceland as well as between Iceland and Greenland, redfish is by far the most numerous species of 0-group fish except perhaps in limited areas where its distribution overlaps with that of the capelin. The present investigations by no means cover its area of distribution. For that a further extension to the southwest is needed.

Compared to last years survey the distribution of redfish is considerably wider, redfish now being found off the North coast as far as east as Tjörnes as well as in shelf waters off west and Southwest Iceland. Off the South Coast, which was not included in last years survey, it was found as far east as 16°W.

Due to drift ice the northern limit of distribution of the redfish could not be determined, but comparing Figure q to Figures 6 and 11 the main concentrations seem to be found in waters with a high Atlantic component. Where the cold waters of the East Greenland Current could be reached 0-group redfish was either not present or found in inferior numbers.

The quantitative distribution from the catch/effort data is shown in Figure 11. An extensive area of very high density (1-200 thousand fish per nautical mile) is situated to the southwest of the Reykjanes Peninsula, the quantity diminishing towards east and north. A more even distribution, but still fairly high concentrations are indicated over deep waters to the west and northwest of the Reykjanes Ridge.

In view of the high echo-abundance, wide area of distribution and catches obtained by all vessels, it seems more than likely that the 1971 yearclass of redfish is a good one.

The length distribution of 0-group redfish is shown in Figure 15. No suggestions as to the drift of the redfish brood can be inferred

from this treatment of the data. The low mean length in area 3 is invalid due to the few measurements.

To test the validity of the species Sebastes mentella Travin, blood was collected from juvenile and adult redfish from three bottom trawl stations worked by the "G.O. Sars". The specimen were separated into Sebastes marinus and S. mentella by morphological characteristics and the separation tested by analyzing the haemoglobins by agar gel electrophoresis. The results of these analyses will be treated in a separate report (Nævdal, in preparation).

#### Long rough dab.

The distribution of long rough dab is shown in Figure 7. This species was now commonly met with off the Icelandic North Coast as well as off the Northwest Peninsula. The highest density was off the central North Coast where considerable numbers were caught. Last year long rough dab only occurred as single specimen in a few hauls but that survey did not take place until September and possibly the dab had reached the bottom by then.

#### Lumpsucker (no figure)

The distribution of 0-group lumpsucker was rather similar to last year. It was taken occasionally off the Northwest Peninsula as well as off the North Coast with the richest hauls, however, being taken in various fjords and bays there.

#### Catfish (no figure)

Individual catfish were caught occasionally off the North- and Northwest Coasts. the richest haul yielded some 1600 individuals per 1 nautical mile and was made in the Húnaflói area. This species was now considerably more abundant than last year.

#### Blue whiting (no figure)

0-group Blue whiting was mainly caught off the south and south-east coasts of Iceland. The highest density occurred near position 64°10'N, 13°06'W where 2500 individuals were caught. Scattered

adult blue whiting were recorded east of Langanes and off Southeast Iceland and shoals provisionally identified as blue whiting were encountered some 120 n.m. off the Reykjanes Peninsula as well.

#### Other species

Some lemon sole were caught off the Reykjanes Peninsula, Faxa-bay and Vestmannaeyjar. Sand-eels occurred frequently in the catches in considerable numbers. A cursory look at their length distribution suggests that these were mostly 1 and 2 group fish. Myctophum sp. was mainly taken off the southeast coast of Iceland and Agonus sp. occasionally off the North Coast. Lumpenus sp. was very common on the North- and Northwest Coasts especially in more coastal waters.

Noteable is the total absence of Greenland halibut, halibut, coalfish and Norway pout.

#### References:

Dragesund, O., Mittun, L. and Olsen, S. 1970.

Methods for estimating distribution and abundance of 0-group fish. Coop.Res. Rep.Ser. A Int.Coun.Explor. Sea, 18: 25-34

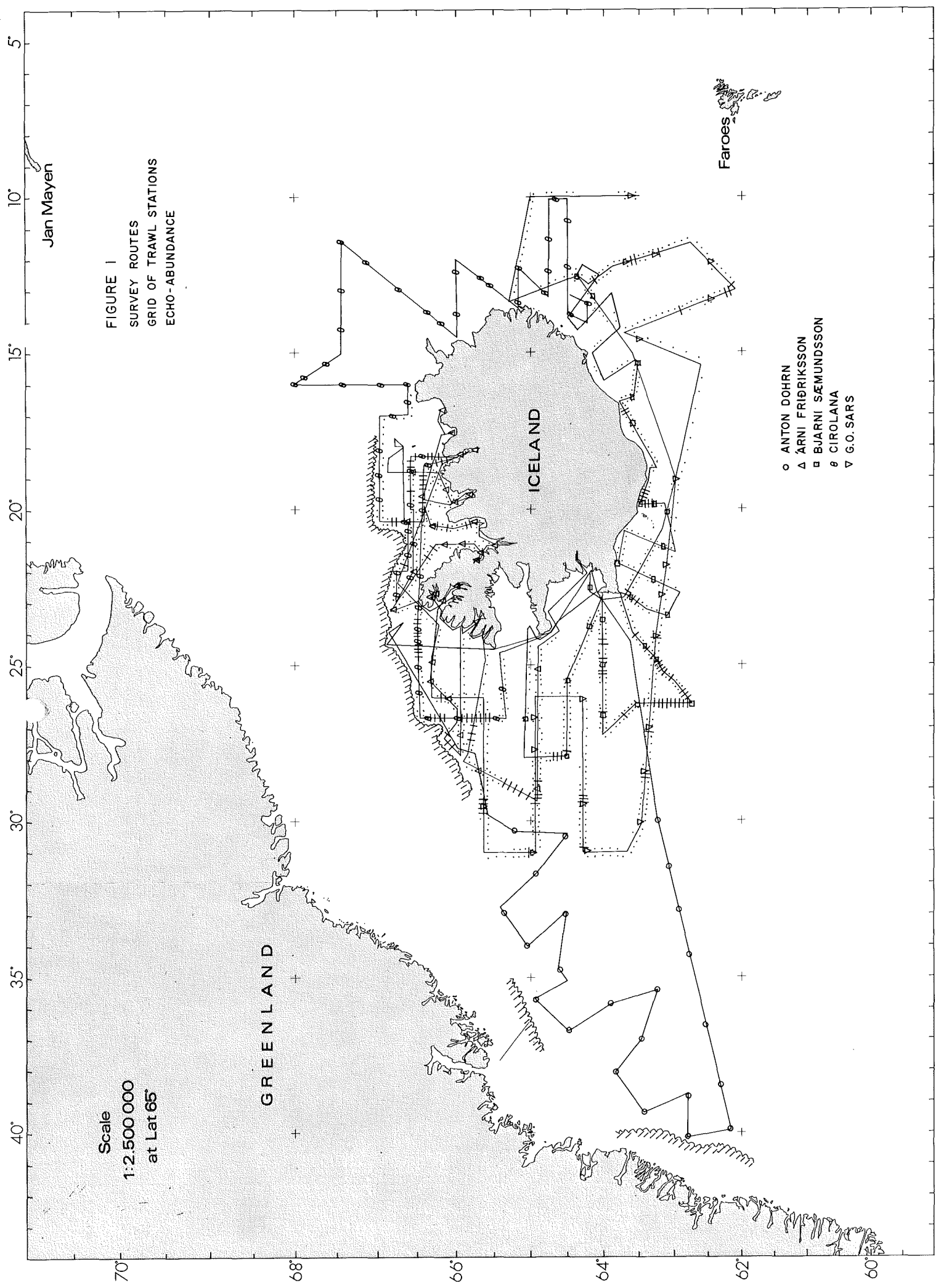
Anon. 1970. Preliminary report of joint Icelandic - Norwegian investigations in the area between Iceland and East-Greenland in August 1970. I.C.E.S., C.M. 1970/H:33.

Anon. 1970. Report on joint German-Icelandic investigations of the distribution of 0-group fish in East-Greenland and Iceland waters in August - September 1970. Annal.Biol. 1970.  
In print.



### Figure captions

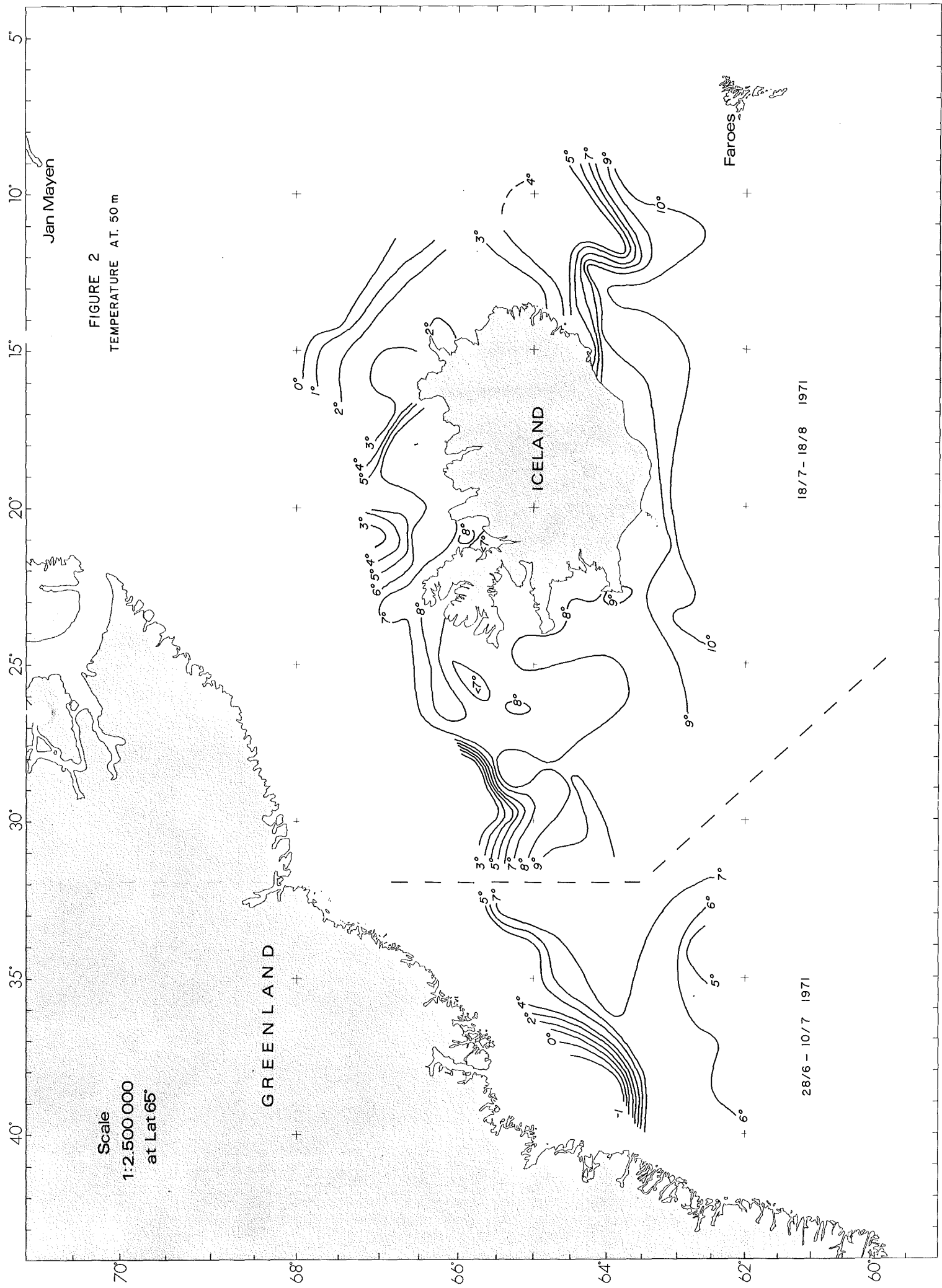
- Fig. 1. Survey routes, grid of stations and echo-abundance.
- Fig. 2. Temperature at 50 metres. 1-10 July and 18 July - 18 August, 1971.
- Fig. 3. Distribution of 0-group cod. Filled symbols are stations with catch.
- Fig. 4. Distribution of 0-group haddock. Filled symbols are stations with catch.
- Fig. 5. Distribution of 0-group capelin. Filled symbols are stations with catch.
- Fig. 6. Distribution of 0-group redfish. Filled symbols are stations with catch.
- Fig. 7. Distribution of long rough dab. Filled symbols are stations with catch.
- Fig. 8. Quantitative distribution of 0-group cod as indicated by catch/effort data. (Number of fish per 1 nautical mile trawled).
- Fig. 9. Quantitative distribution of 0-group haddock as indicated by catch/effort data. (Number of fish per 1 nautical mile trawled).
- Fig. 10. Quantitative distribution of 0-group capelin as indicated by catch/effort data. (Number of fish per 1 nautical mile trawled).
- Fig. 11. Quantitative distribution of 0-group redfish as indicated by catch/effort data. (number of fish per 1 nautical mile trawled).
- Fig. 12. Length distribution of 0-group cod by areas.
- Fig. 13. Length distribution of 0-group haddock by areas.
- Fig. 14. Length distribution of 0-group capelin by areas.
- Fig. 15. Length distribution of 0-group redfish by areas.



**FIGURE 1**  
 SURVEY ROUTES  
 GRID OF TRAWL STATIONS  
 ECHO-ABUNDANCE

Scale  
 1:2,500,000  
 at Lat 65°

- ANTON DOHRN
- △ ÁRNI FRÍÐRIKSSON
- BJARNI SÆMUNDSSON
- ⊙ CIROLANA
- ▽ G.O. SARS



Jan Mayen

FIGURE 2  
TEMPERATURE AT 50 m

Scale  
1:2,500,000  
at Lat 65°

GREENLAND

ICELAND

Faroes

18/7 - 18/8 1971

28/6 - 10/7 1971

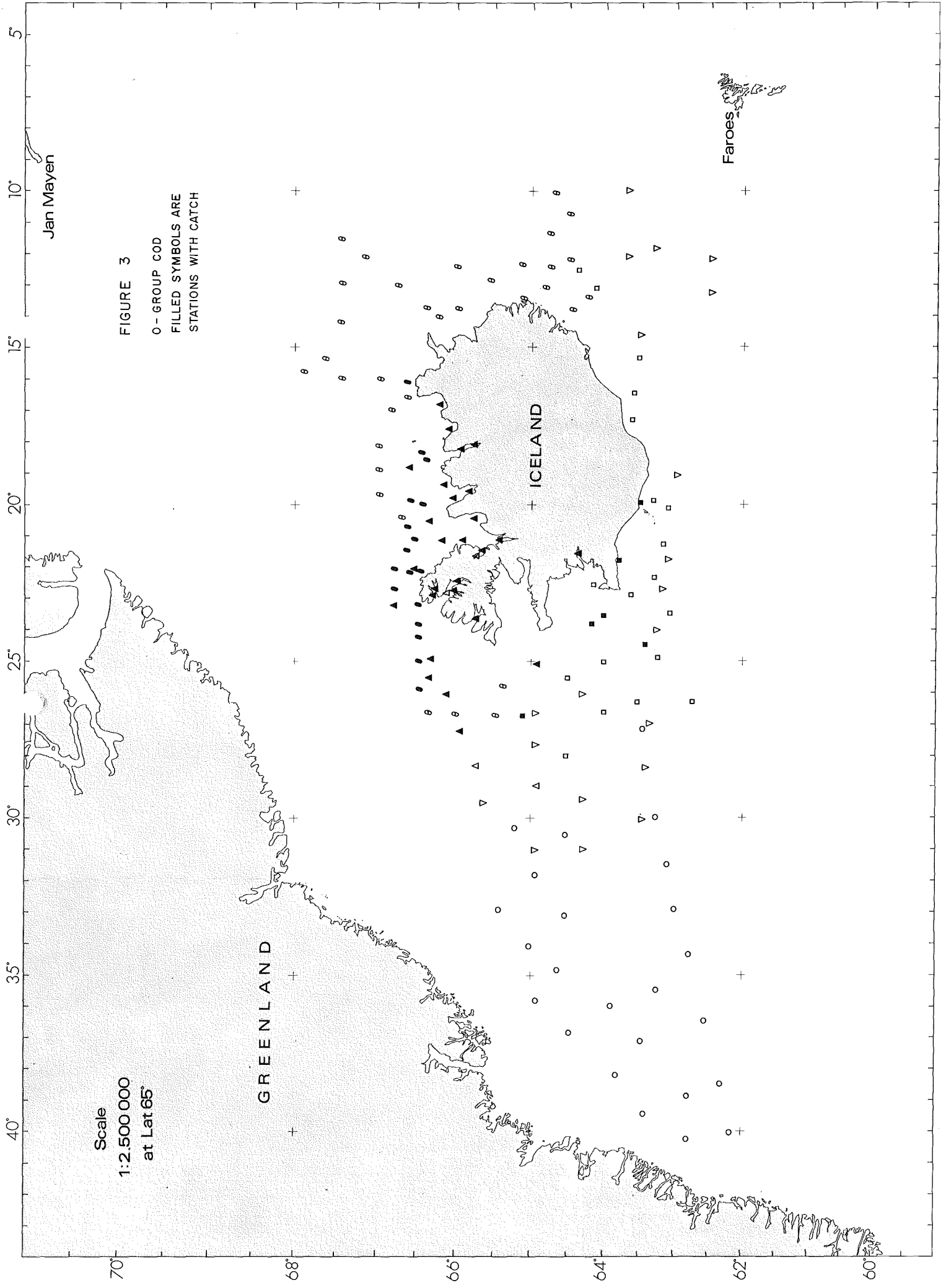


FIGURE 3

○ - GROUP COD  
 FILLED SYMBOLS ARE  
 STATIONS WITH CATCH

Scale  
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 at Lat 65°

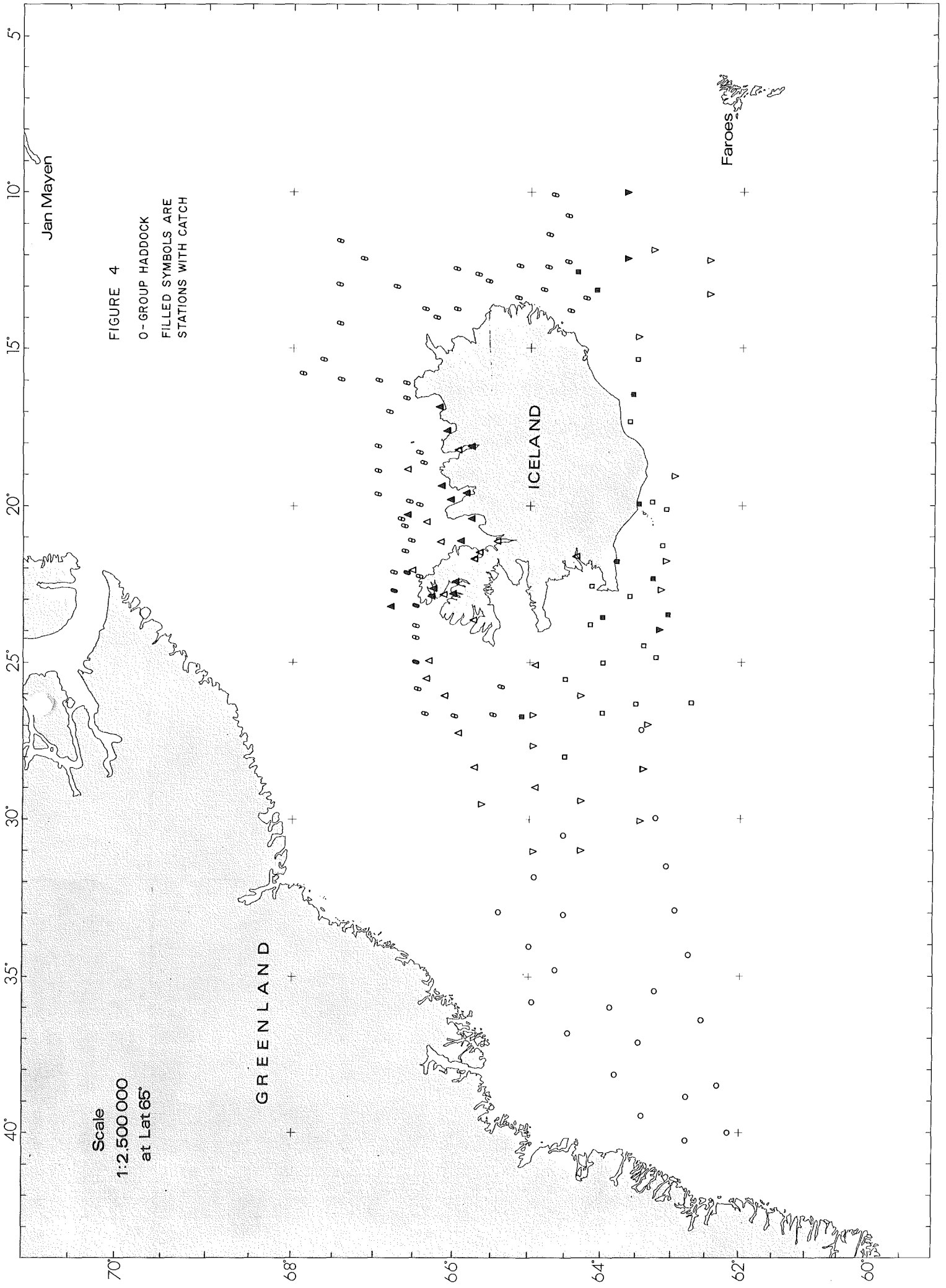


FIGURE 4

O - GROUP HADDOCK  
FILLED SYMBOLS ARE STATIONS WITH CATCH

Scale  
1:2,500,000  
at Lat 65°

Jan Mayen

Faroes

ICELAND

GREENLAND

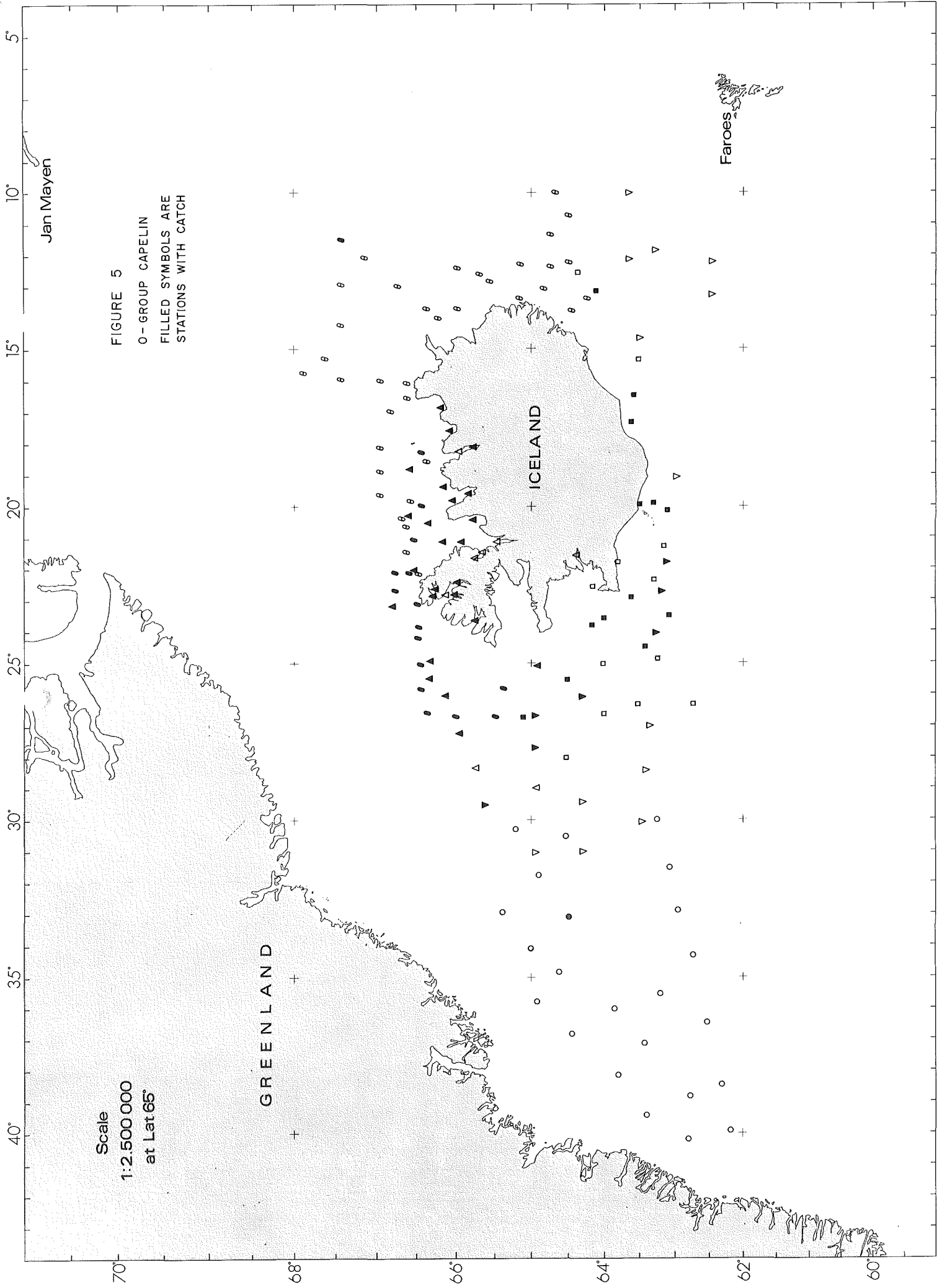


FIGURE 5

O - GROUP CAPELIN  
 FILLED SYMBOLS ARE  
 STATIONS WITH CATCH

Scale  
 1:2,500,000  
 at Lat 65°

Jan Mayen

Faroes

ICELAND

GREENLAND

5°  
10°  
15°  
20°  
25°  
30°  
35°  
40°

70°  
68°  
66°  
64°  
62°  
60°

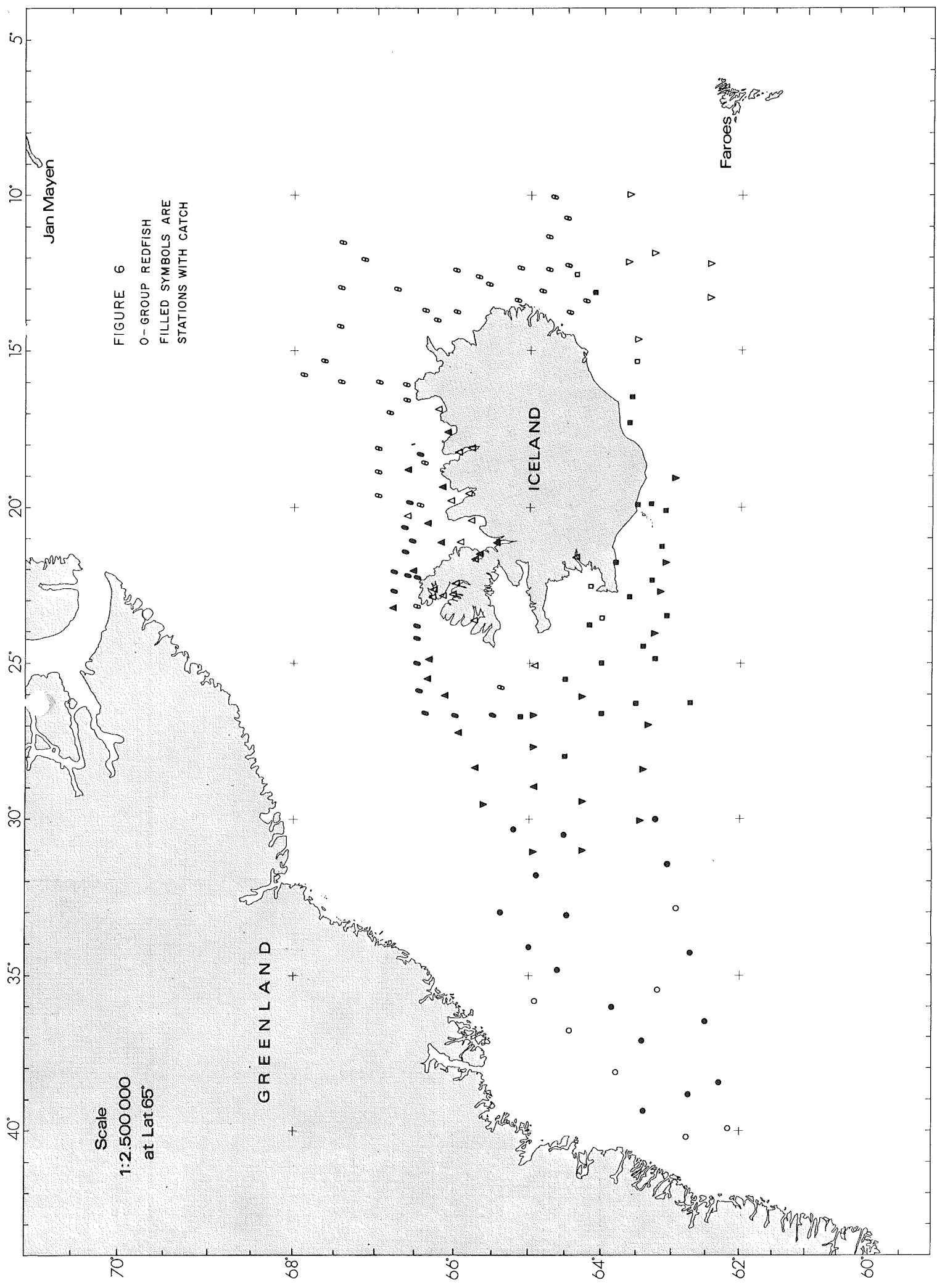


FIGURE 6  
O - GROUP REDFISH  
FILLED SYMBOLS ARE  
STATIONS WITH CATCH

Scale  
1:2,500,000  
at Lat 65°

Jan Mayen

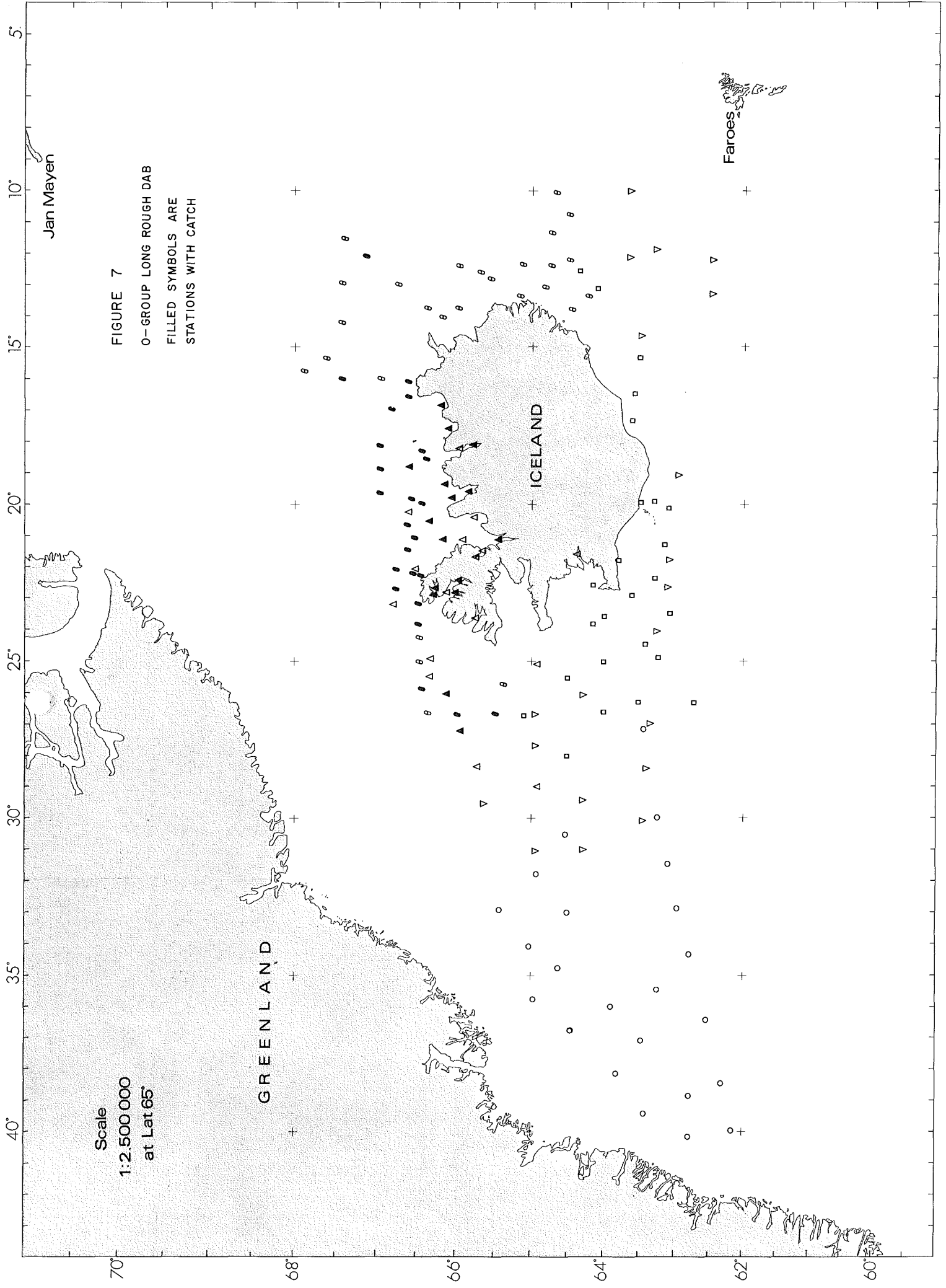
Faroes

ICELAND

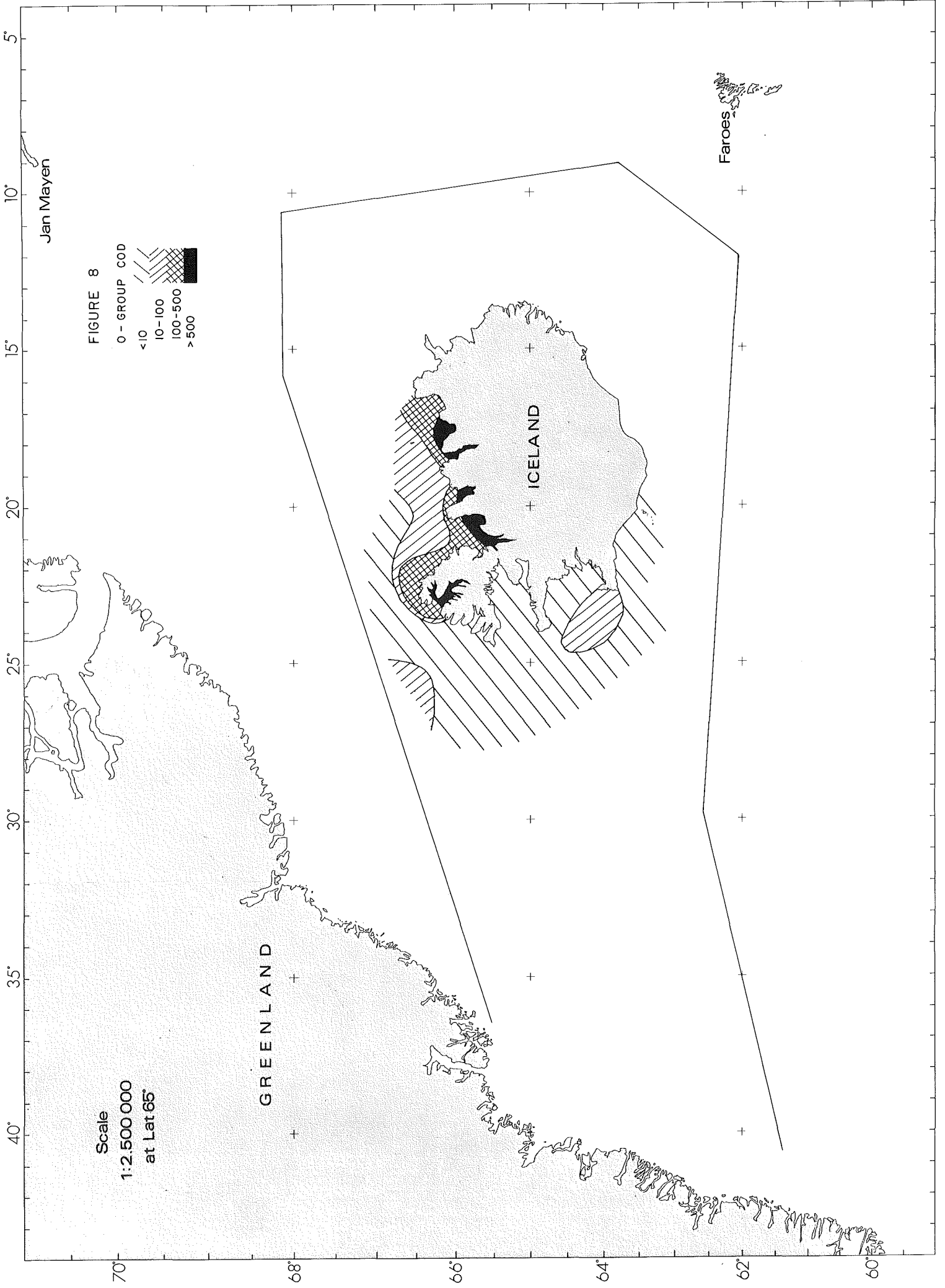
GREENLAND

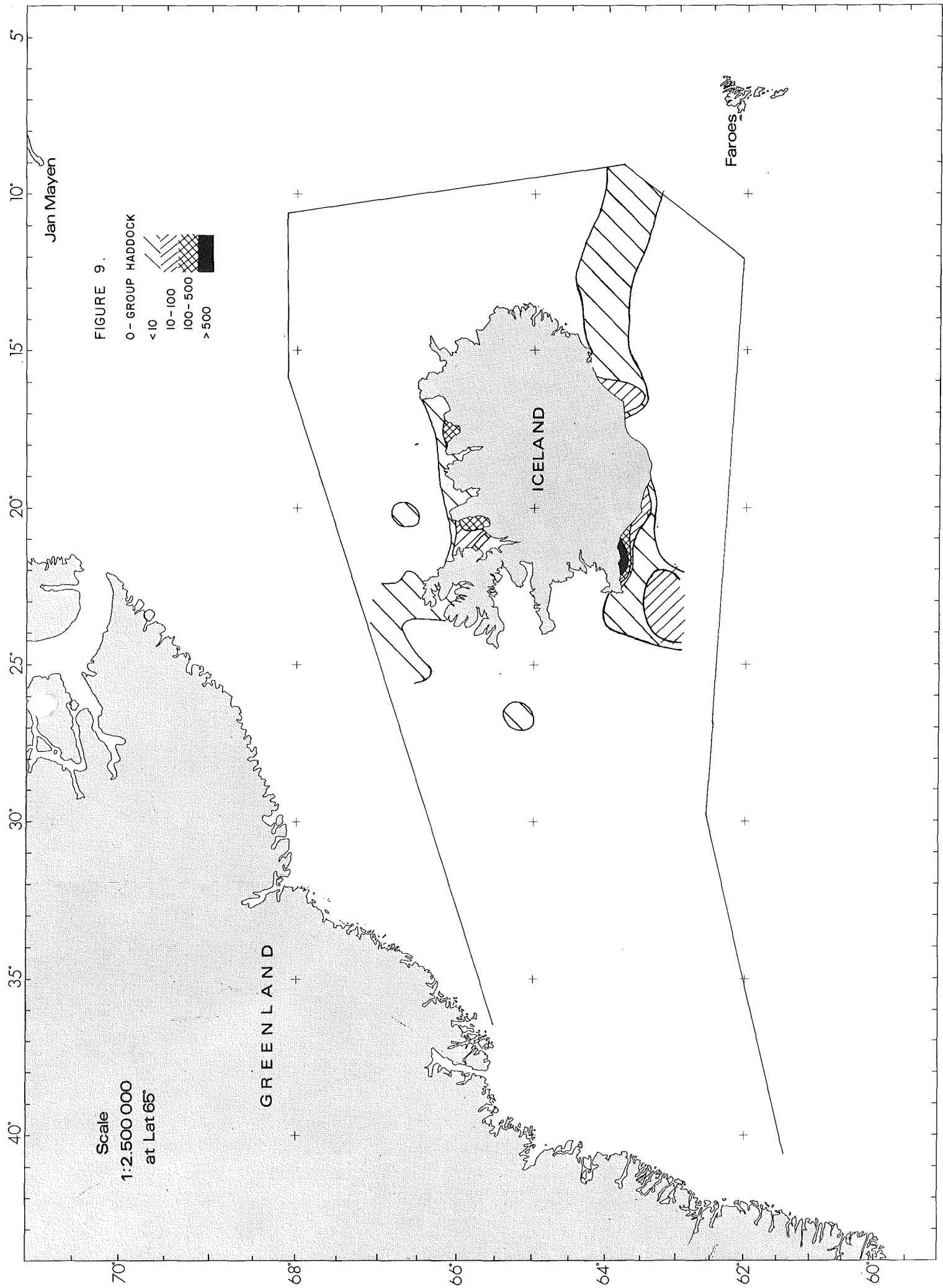
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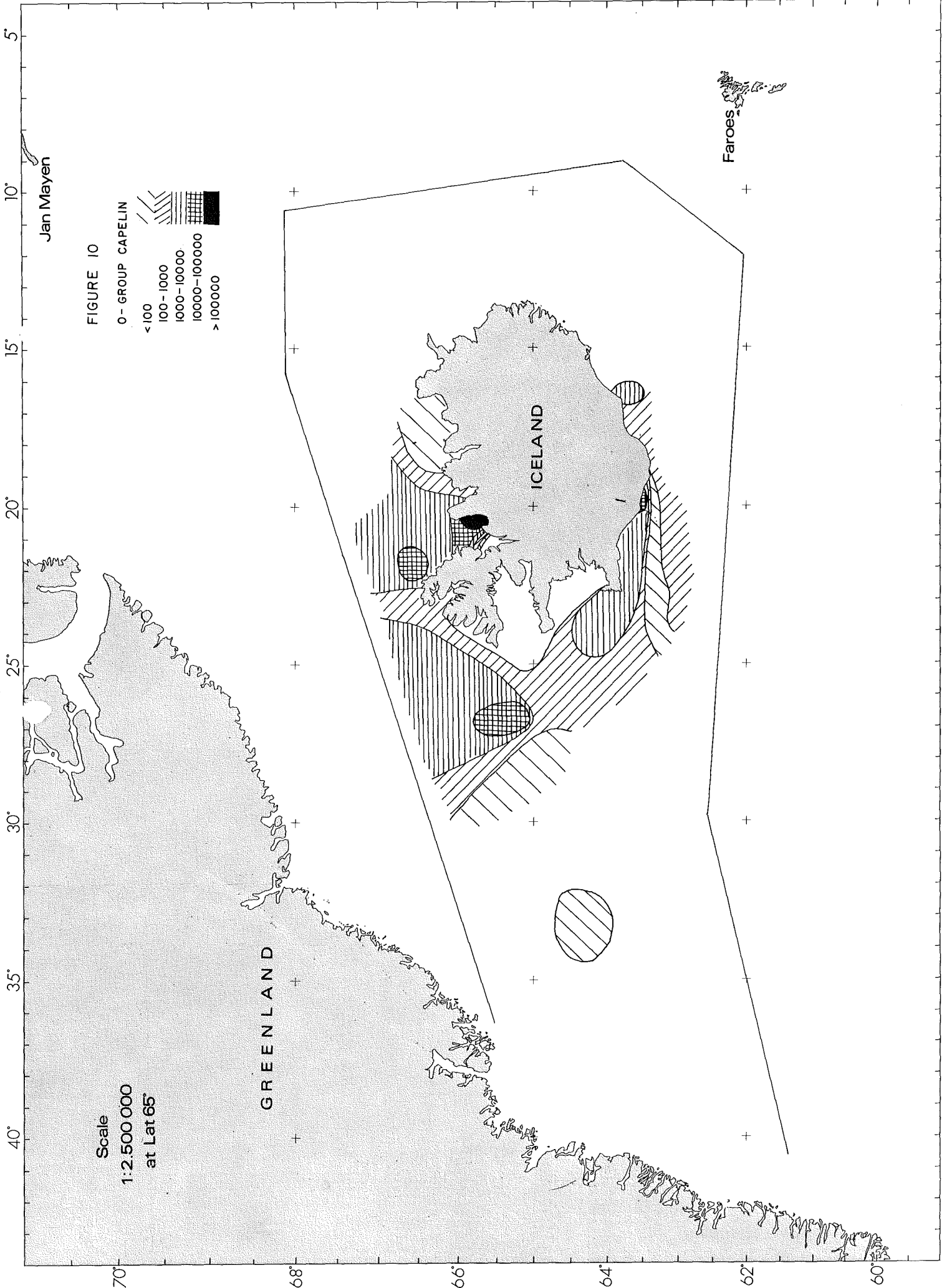


FIGURE 10

0 - GROUP CAPELIN

< 100	(diagonal lines)
100 - 1000	(horizontal lines)
1000 - 10000	(vertical lines)
10000 - 100000	(cross-hatch)
> 100000	(solid black)

Scale  
1:2,500,000  
at Lat 65°

Jan Mayen

Faroes

ICELAND

GREENLAND

5°  
10°  
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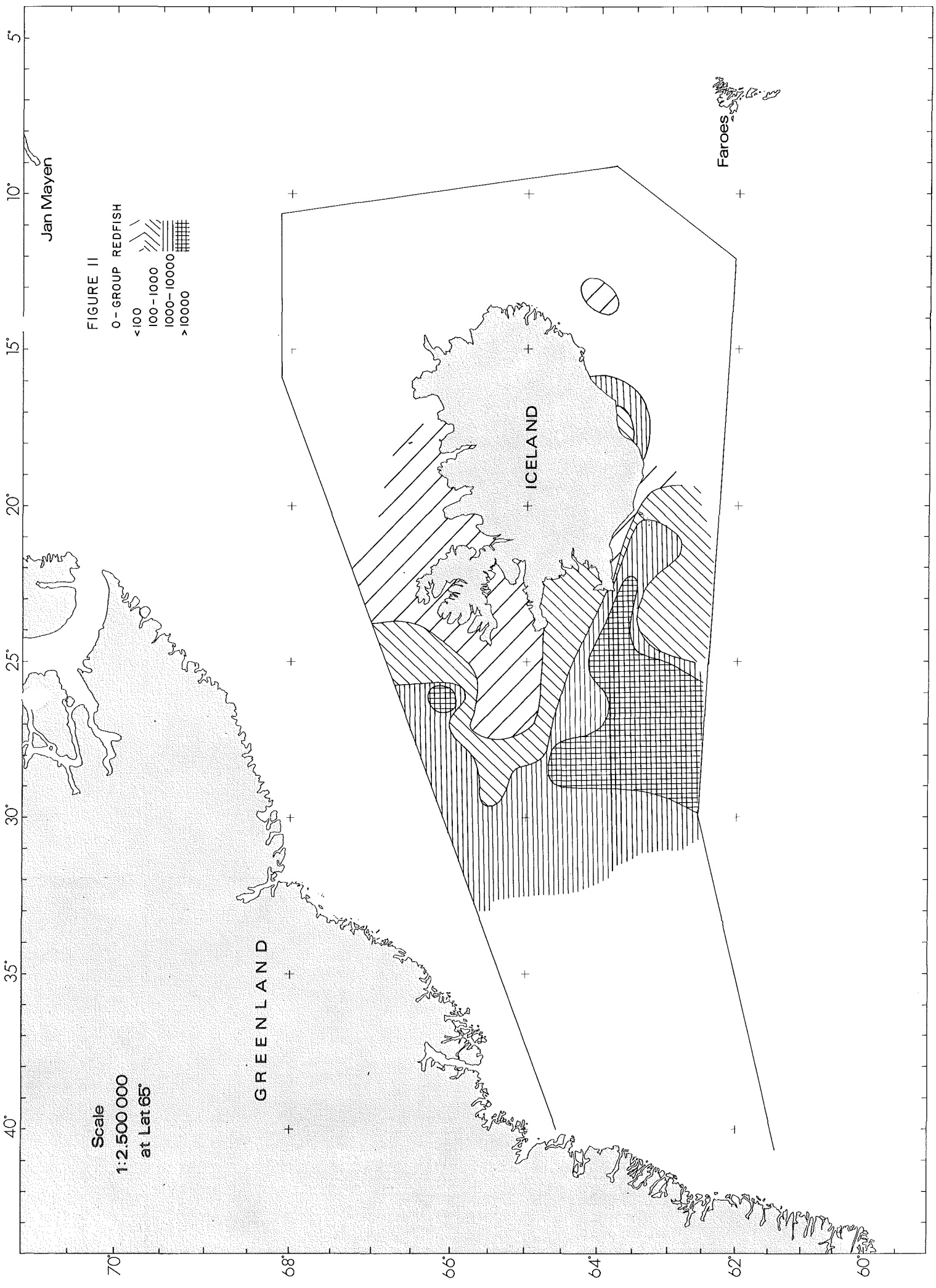


FIGURE 12

LENGTH DISTRIBUTION OF COD

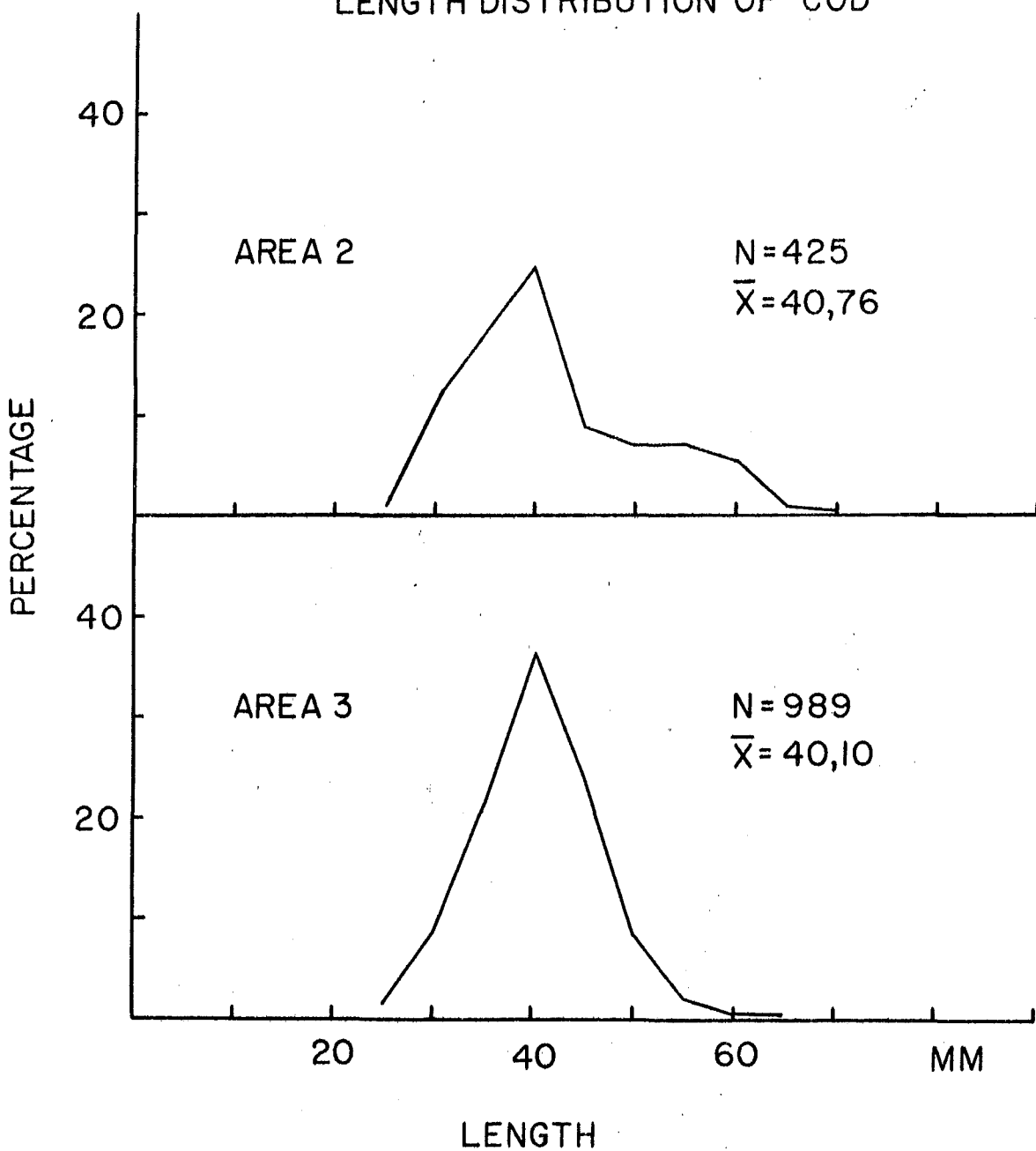


FIGURE 13  
LENGTH DISTRIBUTION OF HADDOCK

