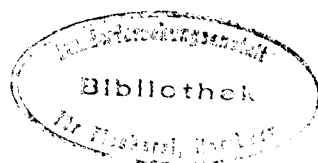


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REPORT ON THE 0-GROUP FISH SURVEY IN
ICELAND AND EAST GREENLAND WATERS, AUG.-SEPT. 1992

by

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This paper not to be cited without prior reference to the authors.

1. Abstract

This paper is a continuation of annual reports on routine investigations on hydrography and the distribution and abundance of 0-group fish in Icelandic and East Greenland waters in August-September.

The 1992 indices of cod and haddock were very low. The capelin 0-group index was somewhat higher than average for the last 11 years and that of redfish was moderate.

2. Introduction

Annual surveys of the distribution and abundance of 0-group fish in the Iceland - East Greenland area have been carried out since 1970. The main aim has been to obtain a first index of the year class strength of the most important commercial species, i.e. cod, haddock, capelin and redfish. Methods and data handling have been described by Vilhjálmsón and Friðgeirsson (1976).

In 1992 two vessels covered the survey area as follows:

Vessel	Period	Area
Bjarni Sæmundsson	7.8.-28.8.	The Irminger Sea and East Greenland shelf area to 59°30'N and north of it. The Dohrnbank area and the shelf area and adjacent waters off NW-Iceland.
Árni Friðriksson	5.8.11.9.	The shelf area off E-, NE-, N-, and W-Iceland and adjacent waters.

Survey routes and stations are shown in Figure 1. Acoustic records of 0-group fish were obtained and the density assessed by a 38 kHz Simrad EK 500 split-beam sounder/integrator system. Species composition as well as abundance was, however, primarily assessed by trawling in the scattering layer for a set distance at a time. An attempt to determine the target strength of 0-group redfish was done by sampling single echo data while towing.

For the 0-group capelin an abundance index purely based on echo-integration was also obtained.

Hydrographic observations were carried out on a standard grid of stations in Icelandic waters, supplemented with XBT observations. In the East Greenland-Irminger Sea - Dohrn Bank area, XBT observations were made at approx. 40 n.m. intervals.

Greenland authorities kindly granted permission for carrying out the survey in East Greenland waters.

Scientists in charge were Jutta V. Magnússon, Sveinn Sveinbjörnsson, Jón Jónsson, Jón Benjamínsson, Ástþór Gíslason, Kristín Valsdóttir and Magnús Daníelsen. Sv.A. Malmberg compiled and commented upon the hydrographic data.

3. Hydrography

In August 1992 the main features of the hydrographic conditions (Figs. 2-4) in the Irminger Sea and in Icelandic waters were as follows:

The flow of the Irminger Current westwards to Greenland and into North Icelandic waters was relatively strongly expressed by distinct high temperatures in the 50 m and 100 m levels. In the Central Irminger Sea and south of Iceland temperatures were unusually low including a very weak upwarming in the surface layer. The boundary between the North Icelandic warm water and the cold water of the East Icelandic current was located relatively far north and the temperatures east of Iceland were also relatively high expressing the general favourable hydrographic conditions found in Icelandic waters in 1992 as in 1991.

Drift ice was only observed in the survey area around Cape Farewell but farther north scattered icebergs were found as usual along the East Greenland shelf area.

4. Distribution and abundance of 0-group fish

In the Icelandic area the distribution of 0-group cod, haddock and capelin was more or less normal. Thus, the greatest abundance of these species were recorded off North- and West-Iceland. Some drift of 0-group capelin was observed westwards to the Dohrn Bank area and the Irminger Sea but none of cod and haddock.

The 0-group redfish were most abundant in the Central Irminger Sea and on the East Greenland shelf in the Fylkir Bank - Bille Bank area.

In comparative terms the 1992 0-group index of cod was low and that of haddock was very low but the capelin 0-group index was above average for the last 11 years. The 0-group index of redfish was moderate.

4.1. Cod

The 1992 distribution and relative abundance of 0-group cod is shown in Figure 5 and abundance indices are given in Table 1.

Table 1. Abundance indices of 0-group cod.

East Greenland		Iceland				Total
Dohrn Bank	SW	W	N	E		
0	+	15	21	5	42	

This index is comparable to the poor indices obtained in latter years. Furthermore the mean length of the 1992 0-group cod is the third lowest on record (Fig. 6).

4.2. Haddock

The distribution and relative abundance of 0-group haddock is shown in Figure 7 and abundance indices in Table 2.

Table 2. Abundance indices of 0-group haddock

E-Greenland		Iceland			Total
Dohrn Bank	SW	W	N	E	
0	+	2	3	+	5

The total abundance index of the 0-group haddock in 1992 is the same as in 1991 which was the third lowest on record. The average length (Fig. 6) is somewhat below the long term mean.

4.3. Capelin

The distribution of 0-group capelin is shown in Figure 8. The highest numbers were recorded off N-Iceland and some larval drift was observed towards East Greenland (about 9% of the total number of 0-group capelin). The abundance indices in different areas are given in Table 3. The abundance index of the 0-group capelin is above the average since 1981.

Table 3. Abundance indices of 0-group capelin

East Greenland		Iceland			Total
Dohrn Bank	SW	W	N	E	
3	1	10	20	+	35

The size of the 0-group capelin was somewhat below the long term average (Figure 9).

The acoustic abundance index of 0-group capelin (Reynisson and Vilhjálmsón, 1983) was about 57 which is the second highest on record. It should be noted, however, that due to considerable admixture of 0-group capelin and 0-group sand eel it was difficult at times, to separate the echo intensities of the two species.

The acoustic abundance indices in the period 1981-1992 are given together with the corresponding Cpue indices in Table 4.

Table 4. Abundance indices of 0-group capelin 1981-1992

Year	Acoustic index ($m^2 \times 10^3$)	Cpue index
1981	15.2	29
1982	2.8	13
1983	7.8	22
1984	3.5	28
1985	5.6	33
1986	37.1	37
1987	21.2	14
1988	91.8	52
1989	33.3	40
1990	24.7	21
1991	40.2	54
1992	56.8	35

4.4. Redfish

In 1992, the area covered in the Irminger Sea extended from 59°N to 66°N and in the southernmost part of the survey area from 32°W west to Cape Farewell which is a slight extension of the area covered in 1991. Although 0-group redfish were widely distributed in the Irminger Sea, the area with greatest abundance was mainly in the southern part i.e. south of 63°30'N but also on the East Greenland shelf in the Fylkir Bank - Bille Bank area (Fig. 10). The abundance of 0-group redfish north of 63°30'N was rather low especially in the Dohrn Bank area and, in fact, it has not been that low in August for the past ten years. The 0-group redfish were also much less abundant in the East Greenland shelf region apart from the above mentioned area. Noteworthy are the areas with greatest densities at the latitude 59°N, between 33°W and 39°W.

In the Icelandic area, very few 0-group redfish were observed and only in the W and SW-areas. The total absence of 0-group redfish off N-Iceland is rather unusual.

The abundance index for the Irminger Sea/East Greenland shelf area was 11.6×10^6 fish per $n.m.^2$ in 1992 which is less than half of the 1991 index (26.4×10^6 fish per $n.m.^2$). However, in 1991, the index figure was exceptionally high. Compared to the indices of the years 1981-1983 which were much lower but derived from a similar coverage of the investigated area, the 1992 year class of redfish classifies as moderate.

Generally, 0-group redfish were smaller in 1992 than in the preceding year (Fig. 11) sometimes considerably smaller, e.g. in the Dohrn Bank area where the average length was 14 mm less compared to 1991 and in the Sub-area SW Iceland it was more than 18 mm less in August (av. length 36.9 mm). It is interesting to note that 0-group redfish recorded in that particular area, in September, had an average length of 49.3 mm.

The percentage of 0-group *Sebastes marinus* in 1992 was 35.1 of a total of 6583 0-group redfish identified to species (Magnússon, 1981) and thus, had decreased about 9% compared to the preceding year. Contrary to 1991, no *S. marinus* were observed in the Dohrn Bank region and the relative abundance was highest in the Central Irminger Sea (77.5%). 0-group *S. mentella* were most abundant in the southern East Greenland Sub-area (94.5%). Since about two thirds of the total no. of 0-group redfish identified to species were *S. mentella* which are usually smaller than 0-group *S. marinus* it might explain the lower average lengths in the Sub-areas compared to 1991. The overall length of *S. mentella* was 31.31 mm in 1992 and 42.33 mm of *S. marinus*, resp.

51% of the stations with 0-group redfish catches were taken during the hours 2000-0759 but the percentage of the total no. of redfish per n.m. trawled during that time interval only amounted to 35 which is in agreement with the observation of the preceding year when 0-group catches were also higher during the day time.

4.5. Other species

In the 0-group catches, in 1992, 20 other species were recorded.

The fry and the juveniles of the sand eel species *Ammodytes marinus* and *A. tobianus* were widely distributed and they were also most abundant of all "other" species. In fact, they have not been that abundant for more than a decade. Sand eel were recorded at 95 stations in the Icelandic region mainly off N, NW and W. In the Irminger Sea/East Greenland region, they were recorded at 15 stations mainly in the northern part of the East Greenland shelf and in the Dohrn Bank area. At several locations off N and NW Iceland, the catch per n.m.tr. exceeded 10 000 specimens, the total catch being about 65 000 specimens. The length range of 33-159 mm (av. 68.11 mm) was wider in the Icelandic region than in the Irminger Sea/East Greenland region where it was 47-119 mm (av. length 89.87 mm).

The distribution and abundance of 0-group Greenland halibut varies considerably from year to year. They were abundant in 1982 and 1983 (Vilhjálmsón & Magnússon, 1982 and 1983) but few were recorded during the time when the annual survey area was restricted to the area north of 63°30'N. However, whether this was caused by poor year-classes or by omitting an essential part of the distribution area of 0-group Greenland halibut (the fry is mainly distributed south of 64°N during August) is not known.

0-group Greenland halibut were distributed over a wider area than in 1991 when they were almost exclusively recorded over and along the East Greenland shelf. In 1992, they were distributed on the East Greenland bands as well as offshore and in the Central Irminger Sea as far east as 32°25'W. Almost all of them were found south of 63°N (Fig. 12). The length range was rather wide, 54-82 mm, the smallest specimens being recorded south of 60°N. The average length of 69.33 mm was similar to that in 1991 (70.57 mm). In the Icelandic area, no 0-group Greenland halibut were observed.

0-group long rough dab were also most numerous in the Icelandic region, in 1992, but surprisingly scarce off East Greenland where they were only observed in the Dohrn Bank region. Off Iceland, they were recorded at 52 stations mainly off the NE and N coasts, in a length range of 19-43 mm. The average length was 29.87 mm.

0-group megrim which have not been recorded since 1981 were observed off N Iceland. the length range was 27-42 mm, av. length 36.40 mm.

Blue ling which have appeared in the 0-group catches every second year since 1986, were recorded off SW Iceland as single specimens, in a length of 71-71 mm.

Whiting were even less numerous than in the preceding year. They were observed in the Breidafjord area and in the Faxa Bay, in a length range of 49-107 mm, av. 75.0 mm.

Polar cod were recorded at 7 stations off E and NW Iceland and in the northern part of the East Greenland/Irminger Sea region. The length range was 22-117 mm, av. length 50.60 mm.

A single specimen of Greater forkbeard was recorded at 59°50'N 34°28'W in a length of 78 mm.

Like in 1991, the five bearded rockling were rather abundant. They were observed at 10 stations in the Irminger Sea/East Greenland region and at 1 station off E Iceland. The length range was 28-65 mm, av. length 45.84 mm.

0-group and juvenile herring which were absent in the 1991 catches were recorded at 6 stations in some northern and north-western Icelandic fjords, in a length range of 45-83 mm (av. 57.59 mm).

The abundance of young stages and adults of lumpsucker was about the same as in 1991, the distribution being mainly in the northern Icelandic region, from the eastern area to the northwestern one. Only one adult female, length 33 cm, was recorded in the Irminger Sea, at 59°00'N 37°22'W. In the Icelandic area, the length range was 37-101 mm (av. 70.57 mm) and 10.1-37.0 cm (av. 24.0 cm), resp.

0-group catfish were also fairly abundant mainly in the Icelandic region, at 15 stations and at 6 stations in the Irminger Sea/East Greenland shelf area. The length range was 57-88 mm, av. length 73.05 mm. Also, spotted catfish were recorded mainly on the East Greenland shelf, none in the Icelandic area. The length range was 59-76 mm and the average length 69.67 mm.

Hooknose were entirely recorded in the Icelandic survey part, i.e. off the E, NE and N coasts. They were widely and abundantly distributed like in the preceding year. The max. catch was 112 specimens at one station off North Iceland. The length range was 22-50 mm, av. 34.80 mm.

Eelpout were also only observed in the Icelandic part of the survey area. At one station (Eyjafjord) the abundance was >300 specimens per n.m.tr.. The total catch was 935 specimens, in a length range of 46-93 mm, av. length 63.31 mm.

At one station off NW Iceland, 12 sea snails, length range 21-36 mm (av. length 27.17 mm) were observed. One Norway bullhead was recorded at a station in a northeastern Icelandic fjord, length 24 mm.

No Norway pout were recorded in 1992, like in the preceding year.

Myctophidae are an essential part of the layer of deep-sea species in the Irminger Sea that ascend close to the surface during the night and descend again with dawn. In the 0-group catches especially in the central and southern Irminger Sea during the night time Myctophidae often provide the greater part of the total catch, and can exceed 5 000 specimens per n.m.tr.. The most common species is *Benthoosema glaciale*. The length range is similar to that of redfish fry, i.e. 25-53 mm (av. 37.2 mm). Several other species like *Myctophum punctatum* (av. length ca 104 mm) as well as *Protomyctophum arcticum* (av. lengt ca 67 mm) are not uncommon though not as frequent as *Benthoosema*.

Finally, it should be noted that at 2 stations (61°07'N 29°56'W and 61°30'N 39°08'W), 3 adult specimens of daggertooshs (*Anotopteridae*) were recorded in the 0-group catches, one specimen 79 cm and two 86 cm in length. These species are supposed to be bathypelagic (i.e. habitate 500 m > 2 000 m depth) but the maximal depth of the 0-group hauls was 25 m.

Further, an adult specimen of sea lamprey (*Petromyzon marinus*) 58 cm in length was recorded at 64°45'N, 28°40'W, trawling depth ca 10 m.

5. References

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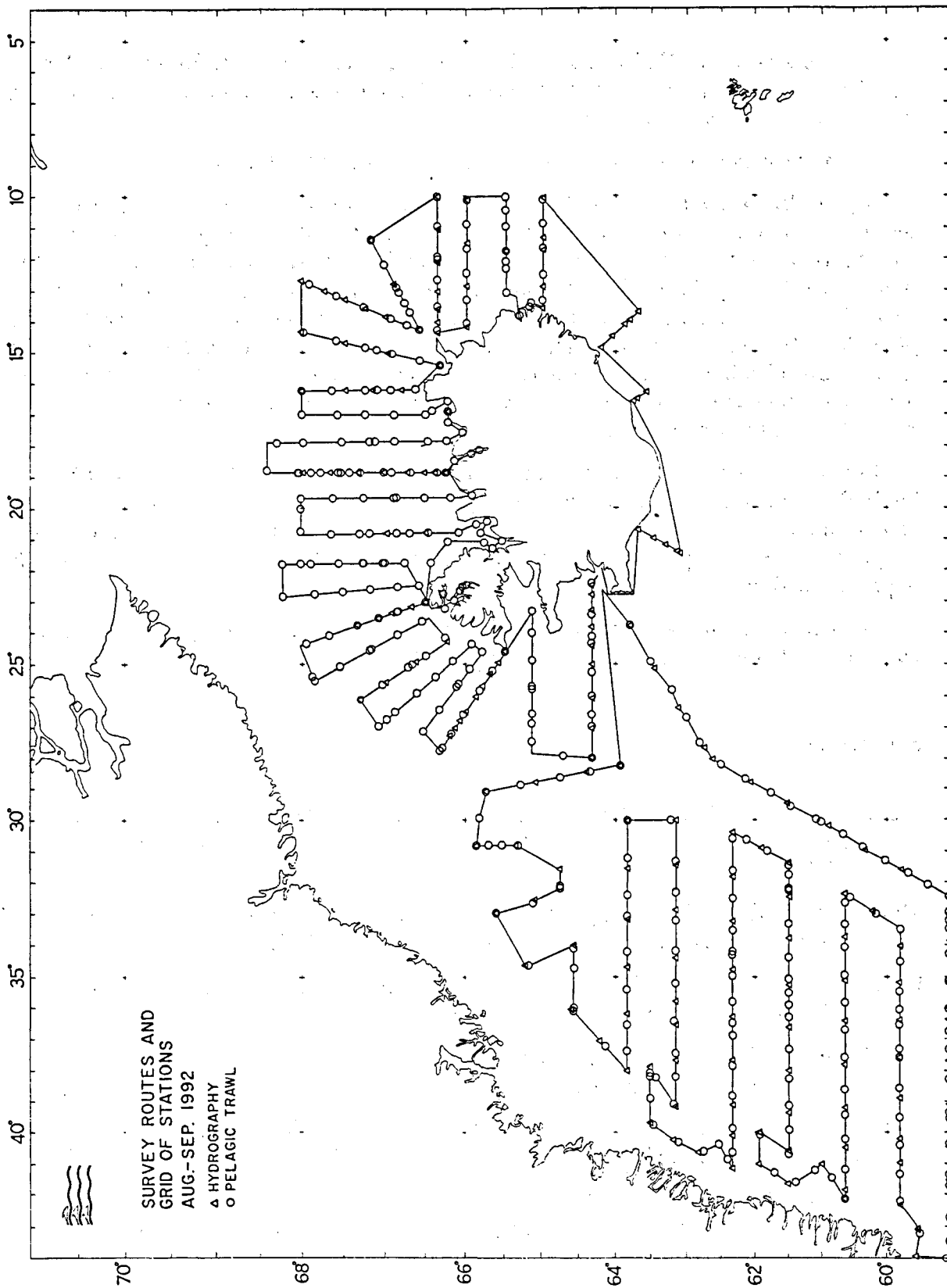


Figure 1. Survey routes and grid of stations, August/September 1992.

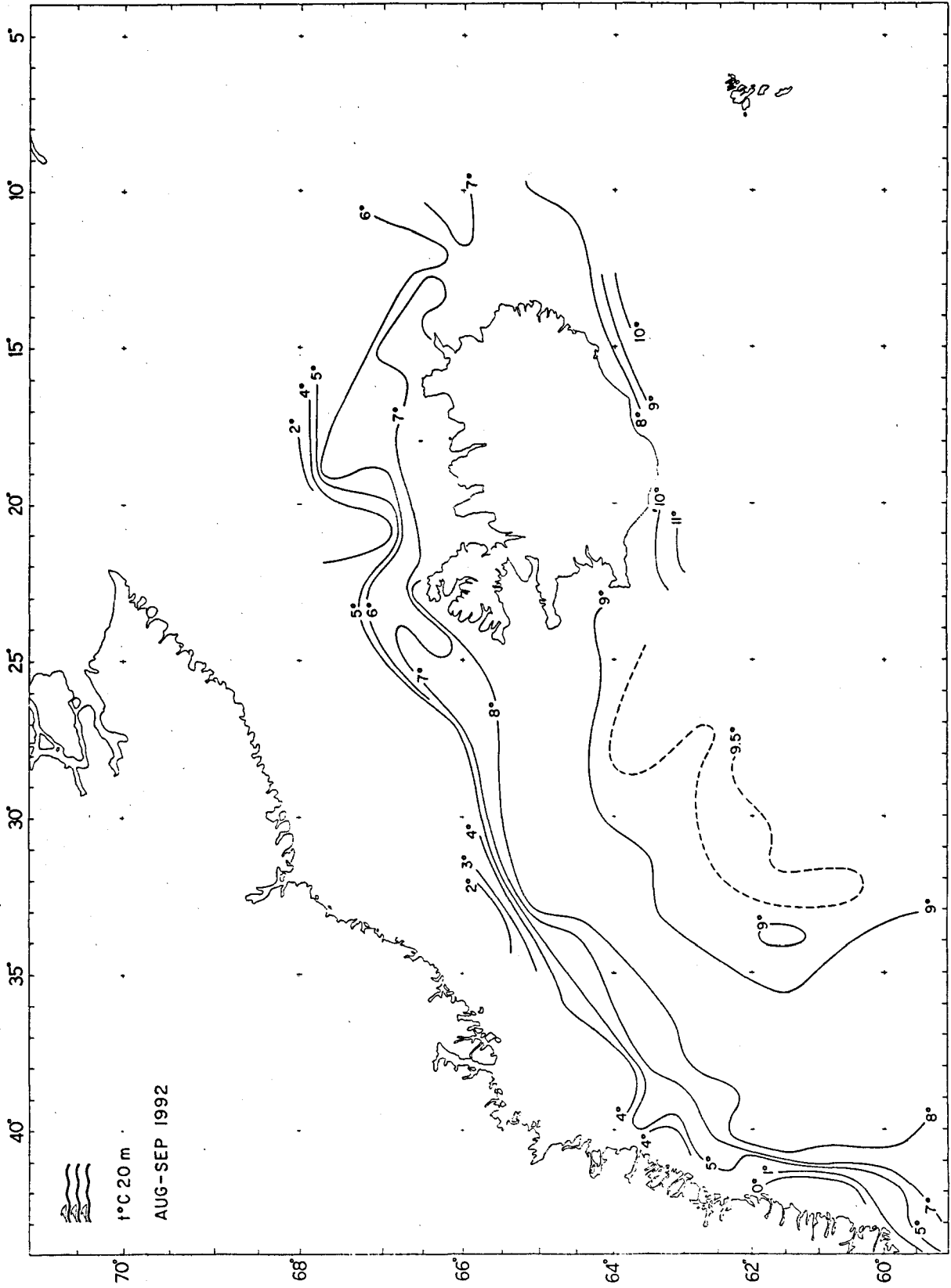


Figure 2. Temperature at 20 m depth, August/September 1992.

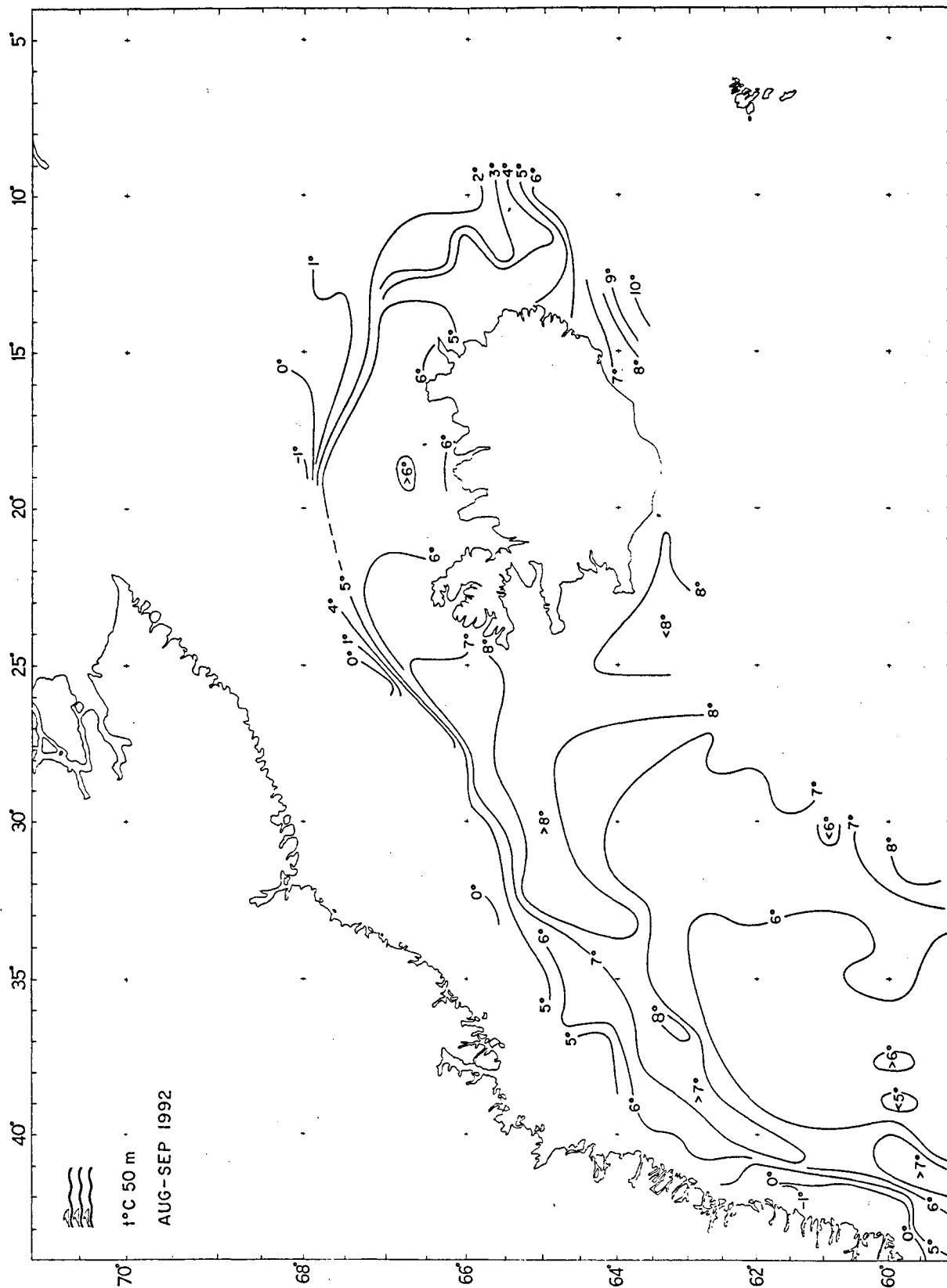


Figure 3. Temperature at 50 m depth, August/September 1992.

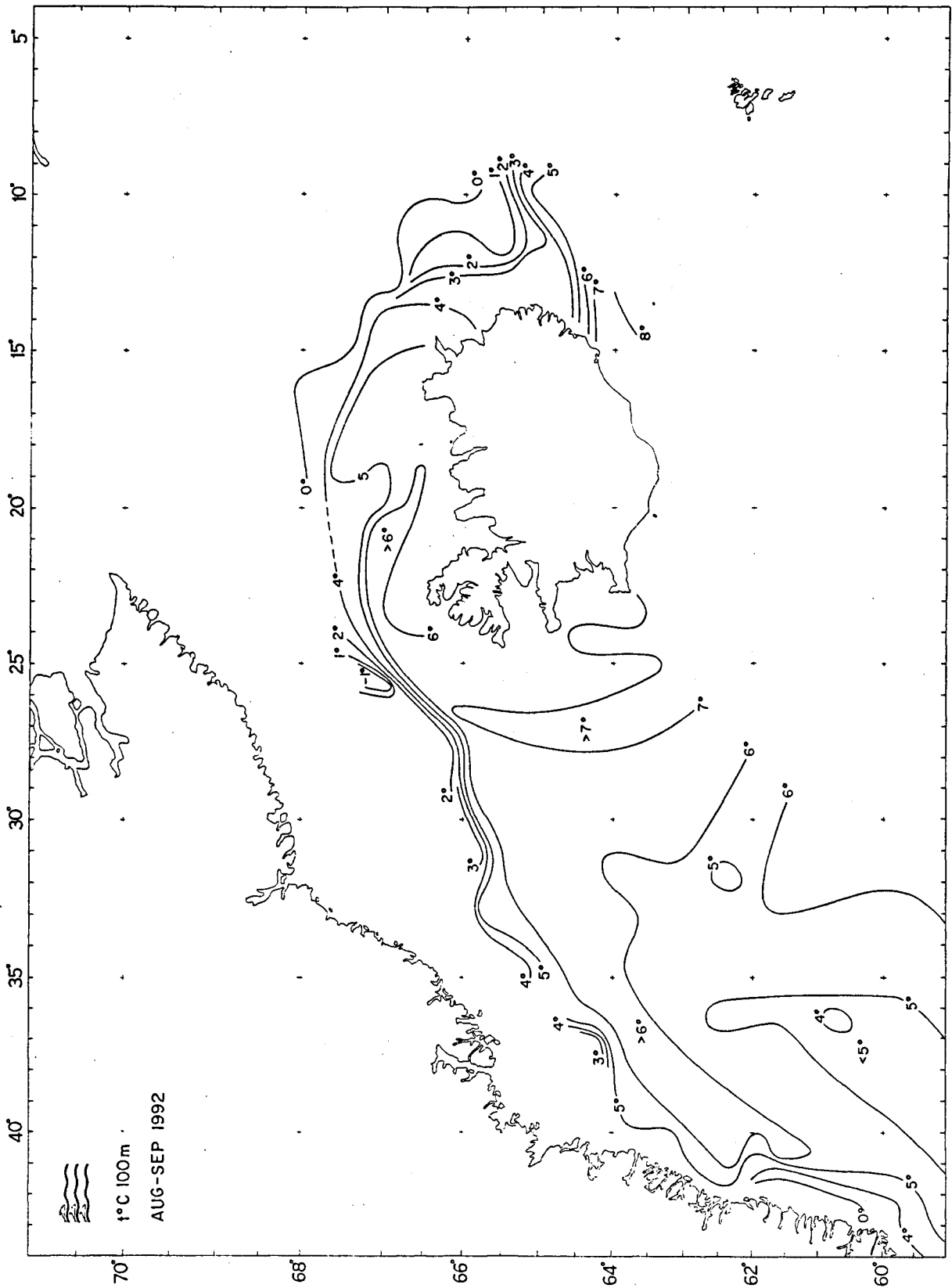


Figure 4. Temperature at 100 m depth, August/September 1992.

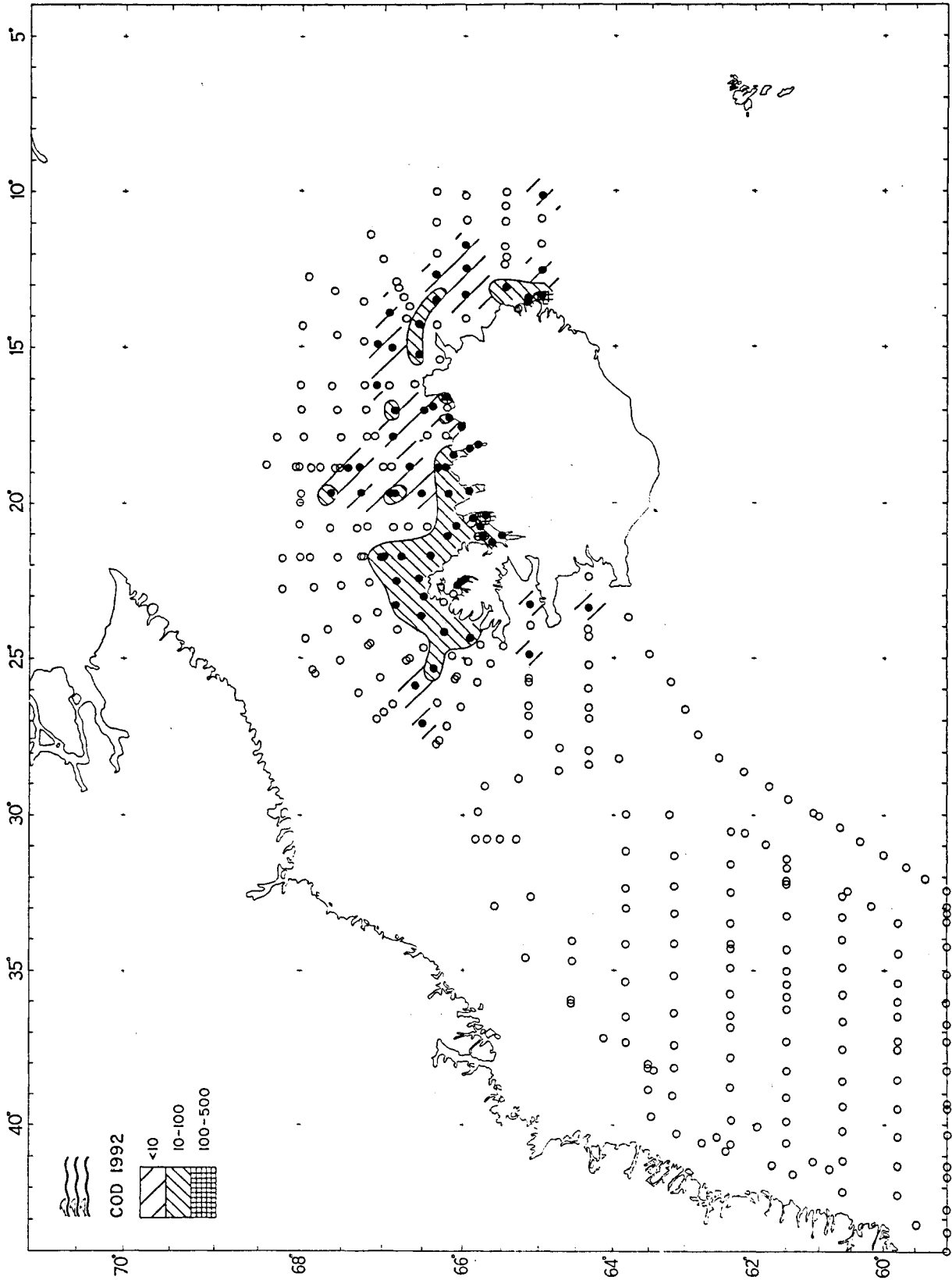
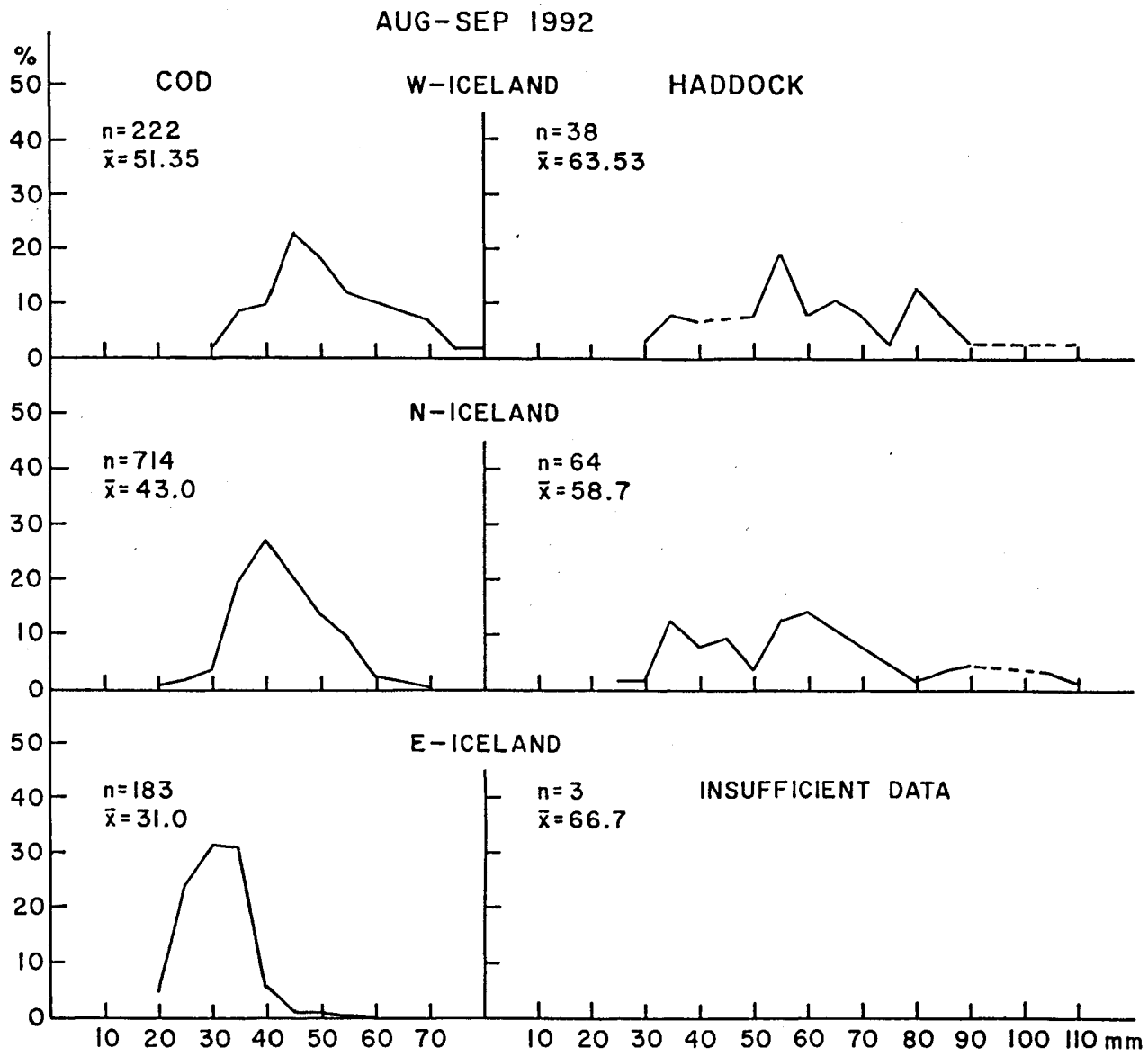


Figure 5. Distribution and density of 0-group cod (n/1 n.m.), August/September 1992.

Figure 6. Length distribution of cod and haddock, August/September 1992.



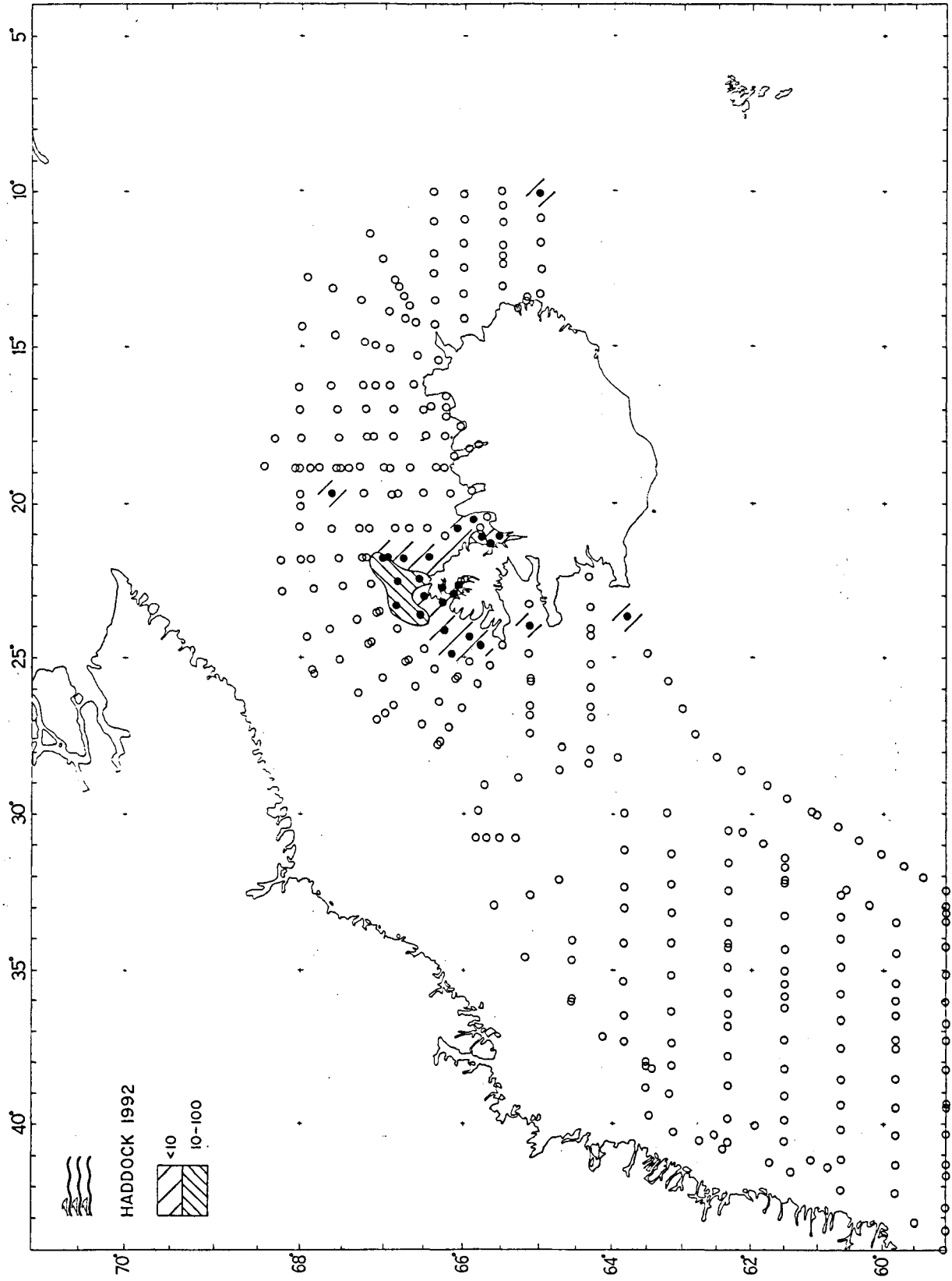


Figure 7. Distribution and density of 0-group haddock (n/1 n.m.), August/September 1992.

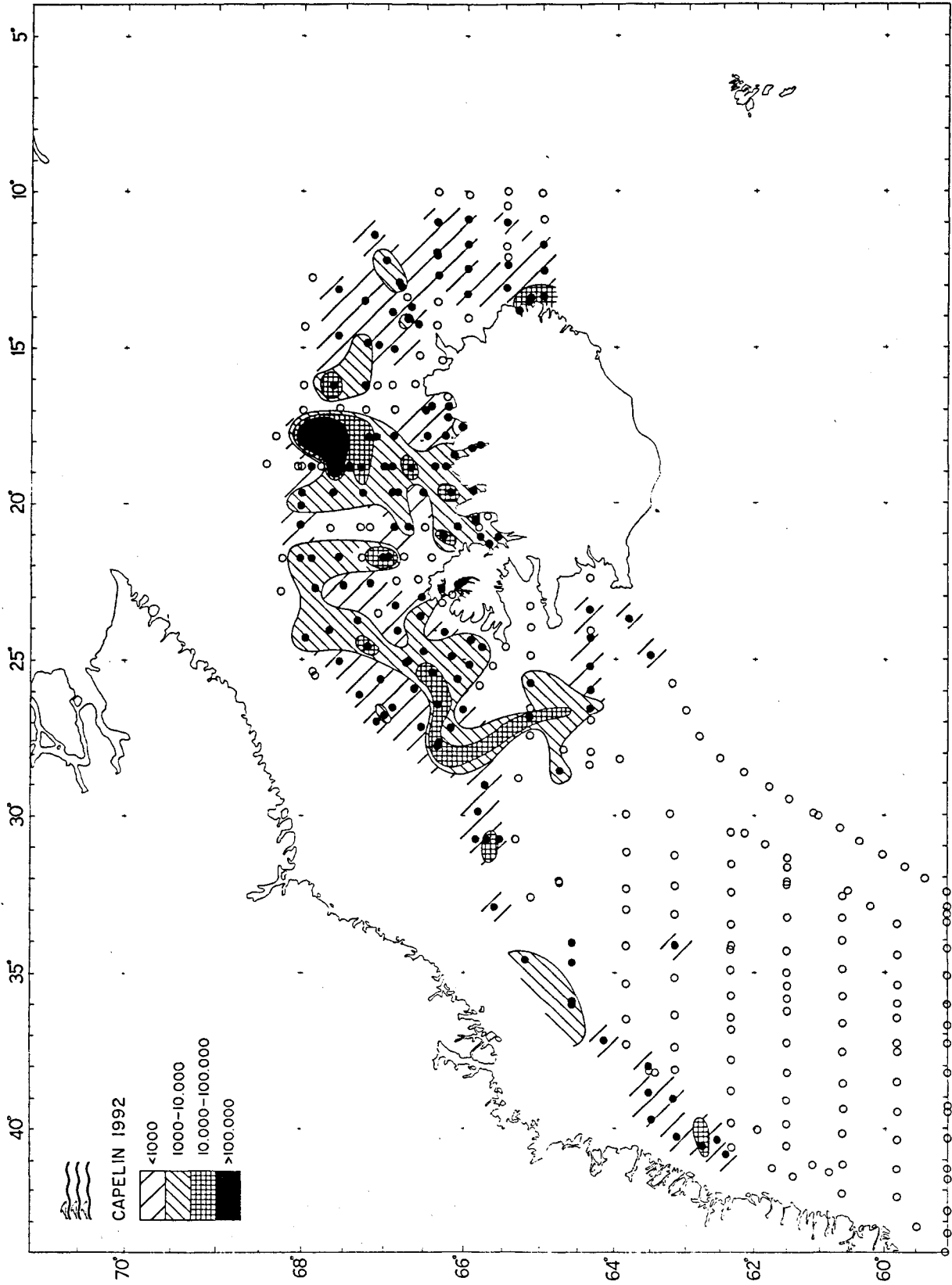


Figure 8. Distribution and density of 0-group capelin (n/1 n.m.), August/September 1992.

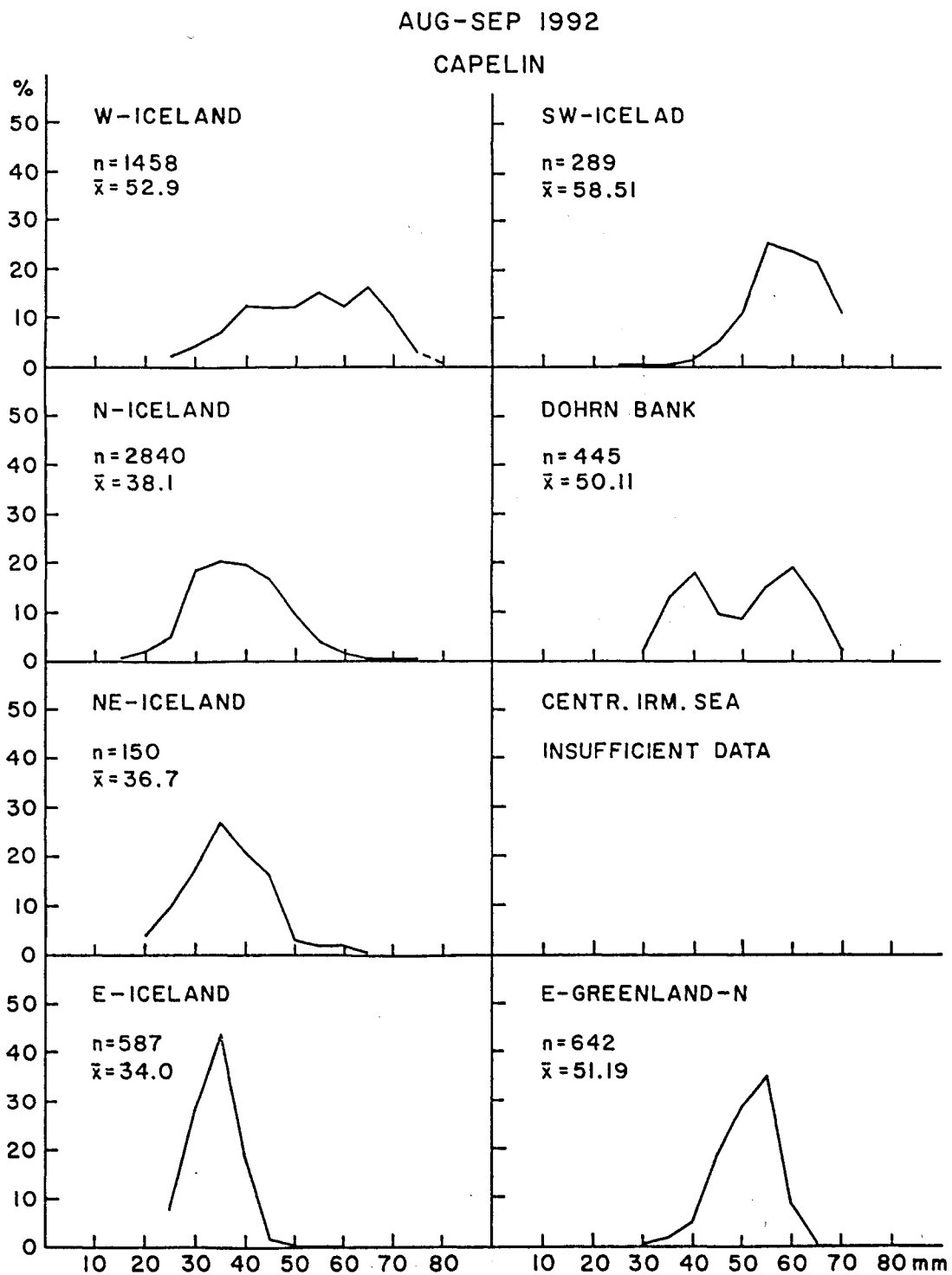


Figure 9. Length distribution of 0-group capelin, August/September 1992.

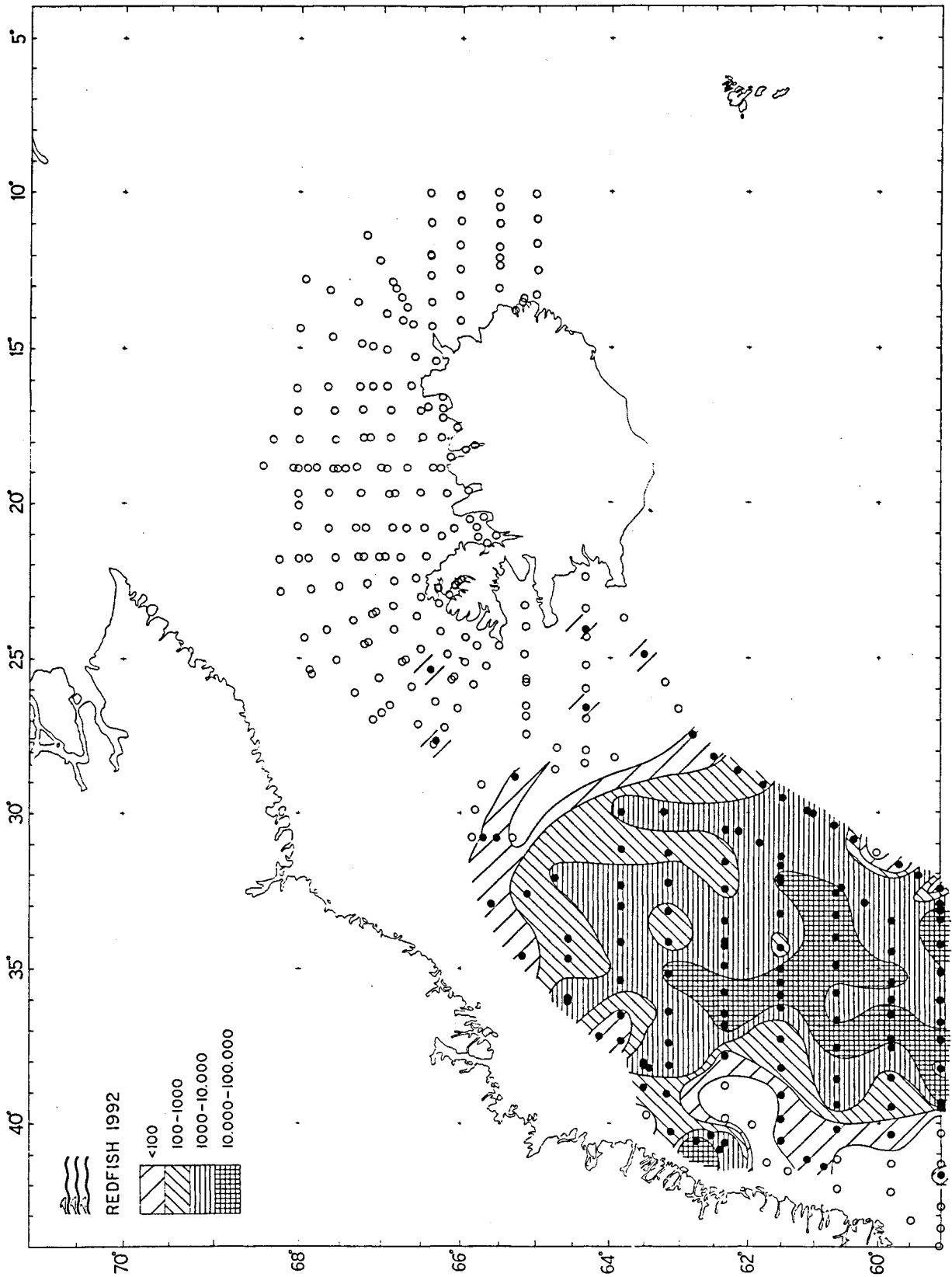


Figure 10. Distribution and density of 0-group redfish (n/1 n.m.), August/September 1992.

O-GROUP REDFISH AUG-SEP 1992

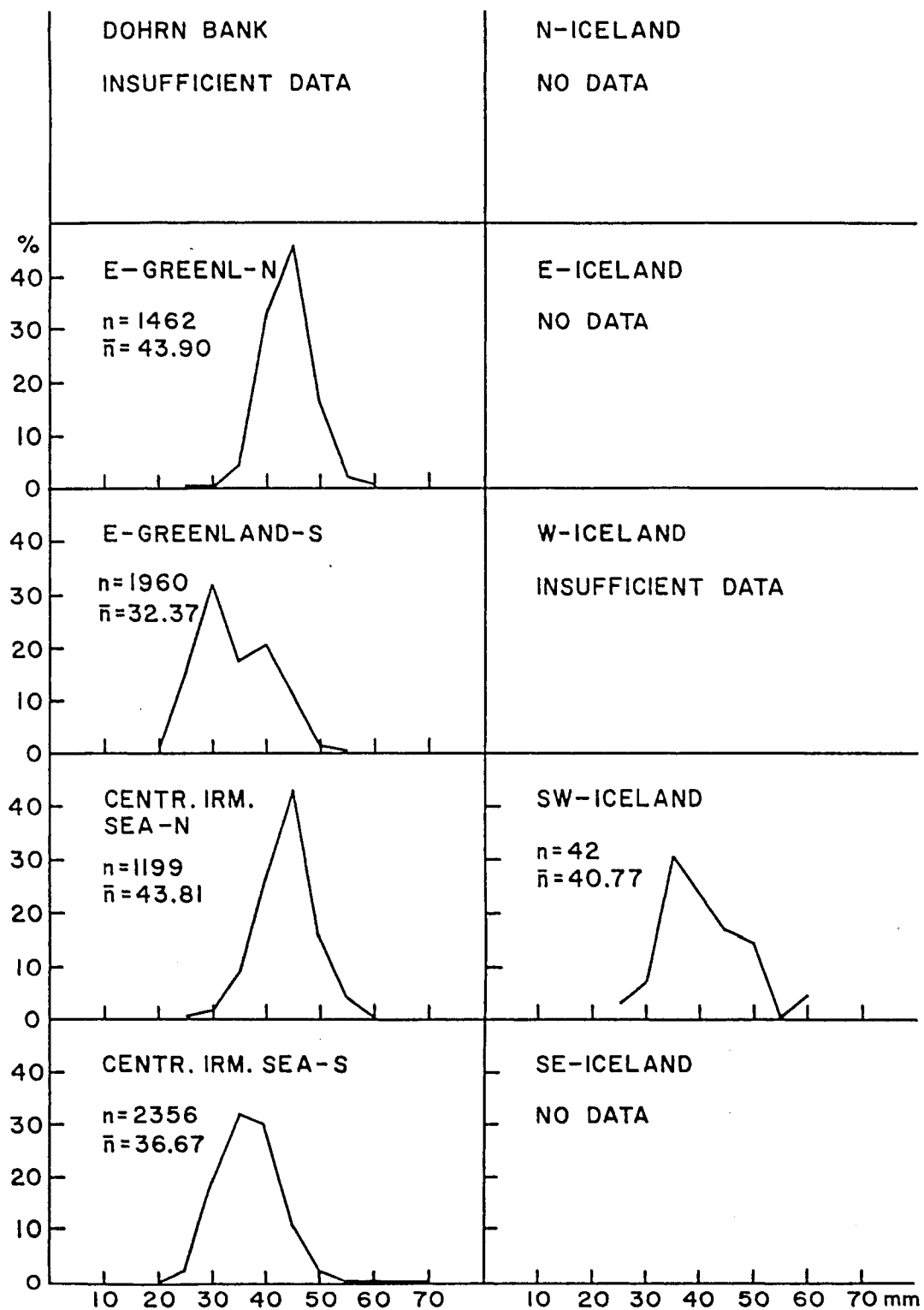


Figure 11. Length distribution of 0-group redfish, August/September 1992.

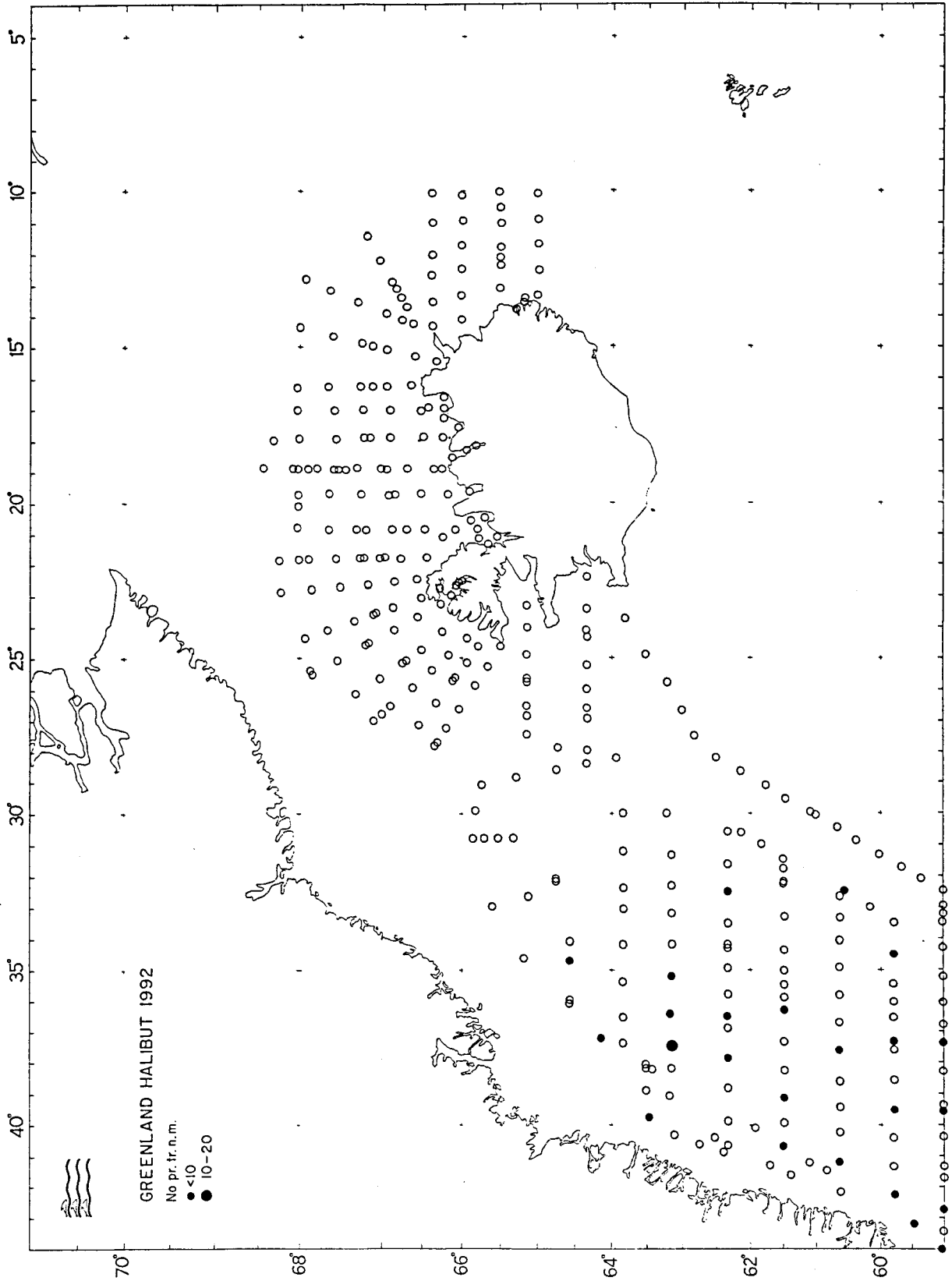


Figure 12. Distribution and abundance of 0-group Greenland halibut, August 1992.