

International Council for the  
Exploration of the Sea

C.M. 1998/D: ~~11~~14



**REPORT ON THE 0-GROUP FISH SURVEY IN  
ICELANDIC WATERS, AUGUST 1998**

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.

Temperatures were relatively high with high salinity especially in North Icelandic Waters. Warming up of the surface layers was strong south and west of Iceland but weaker north of Iceland.

The 1998 abundance index of cod was extremely high. The abundance index of haddock was very high but that of capelin was slightly below long term average.

## 2. Introduction

Annual surveys on 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 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 1998 only one vessel covered the survey area as follows:

Árni Friðriksson	4.-28. 8.	The shelf area off W-, N-, NE-, E-, S-Iceland.
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Survey routes and stations are shown in Figure 1. The East Greenland - Irminger Sea and the Dohrn Bank areas were not surveyed this year. 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. For 0-group capelin echo abundance was obtained and an index based purely on echo integration was calculated for the 0-group capelin as in previous years.

Hydrographic stations were worked on standard hydrographic sections in Icelandic waters using CTD-sonde.

A total of 232 pelagic trawl stations, and 83 hydrographic stations and 15 Tucker net stations were worked and juvenile lumpsuckers were tagged during the cruise.

Scientific staff on RV Árne Friðriksson was: Sveinn Sveinbjörnsson, Sigurður Þ. Jónsson, Björn Sigurðsson, Gísli Ólafsson, Páll Svavarsson, Sigurborg Jóhannsdóttir, Anna Rósa Böðvarsdóttir, Héðinn Valdimarsson, John Mortenssen and Sigurður Gunnarsson.

Svend-Aage Malmberg compiled and commented on the hydrographic data.

### 3. Hydrography

In August 1998 the main features of the hydrographic conditions (Figs. 2-4) in Icelandic waters were as follows:

South and west of Iceland temperatures were relatively high (7-9°C) with a strong warming up in the surface layers. The salinity in the Atlantic waters was high as since 1997 (35.1-35.2‰) after decades of lower salinities. The Atlantic inflow into North Icelandic waters was also very pronounced (5-6°C) with higher salinities (35.0-35.1‰) than observed for years as far east as off Melrakkaslétta. This inflow of Atlantic waters into North Icelandic waters was though overlain by a warm but low saline surface layer. Noteworthy is the cyclonic distribution of temperature in the western part of North Icelandic waters bringing warm and saline water northwards along the Kolbeinsey Ridge. Thus the cold watermasses from the north are quite far off in the area.

Off the East coast of Iceland temperatures were also relatively high below the near-surface layer (3-4°C), with a moderate heating-up to 5-6°C in the layer itself. In deep waters northeast and east of Iceland the cold East Icelandic Current was as earlier in the year 1998 relatively far off and rather weak both as regards hydrographic conditions and in its extension south-eastwards.

It is concluded that in the summer of 1998 temperatures as well as salinity, especially in North Icelandic waters, were relatively high in the survey area. Warming up in surface layers was quite strong south and west of Iceland but less so north of Iceland, contrary to 1997, reflecting the climatic conditions in Iceland in summer 1998.

### 4. Distribution and abundance of 0-group fish

In the Icelandic area as usual the greatest abundance of 0-group cod (65% of the total index) was recorded off N-Iceland and the highest densities were observed in the inshore areas. In other areas the distribution differed from normal years in that relatively high proportion of the 0-group was recorded off W-Iceland. The distribution of 0-group haddock was normal and the greatest abundance was

recorded off W- and N-Iceland as in 1997. The distribution of 0-group capelin was quite extensive.

In comparative terms the 0-group index of cod was extremely high, that of haddock was very high whereas the abundance index of capelin was slightly below the long term average.

Figure 5 shows subareas used in the calculation of abundance indices and for aggregated length distributions.

#### 4.1 Cod

The 1998 distribution and relative abundance of 0-group cod is shown in Figure 6 and the total abundance index as well as the contribution by the various subareas in Table 1.

Table 1. Abundance indices of 0-group cod.

SE	SW	W	Iceland		Total
			N	E	
+	2	814	1799	137	2752

As usual most of the 0-group cod were recorded off North Iceland although considerable proportion was registered elsewhere especially at West Iceland. The total abundance index is the highest in the series. The size of the distribution area of the 0-group cod is normal for rich years. The condition of the 1998 cod brood as judged by the length distribution was slightly below the long term average. (Fig. 7).

#### 4.2 Haddock

The distribution and relative abundance of 0-group haddock is shown in Figure 8 and the indices by subareas and the total index is given in Table 2.

Table 2. Abundance indices of 0-group haddock.

SE	SW	Iceland			Total
		W	N	E	
+	3	71	21	+	26

Almost all the 0-group haddock was recorded off W- and N-Iceland. The abundance index is the third highest on record. The overall mean length of the 0-group haddock (Fig. 9) was somewhat below the long term average.

### 4.3 Capelin

The distribution of 0-group capelin is shown in Figure 10. The highest numbers were recorded off N-Iceland but on the whole the 0-group capelin distribution was normal.

The abundance indices in different areas are given in Table 3.

Table 3. Abundance indices of 0-group capelin

SE	SW	Iceland			Total
		W	N	E	
+	+	7	34	5	46

The abundance index is close to the long term average but the overall mean length of the 0-group was above average (Fig. 11).

The acoustic abundance index of 0-group capelin (Reynisson and Vilhjálmsón, 1983) was about 82 which is among highest obtained.

The acoustic abundance indices in the period 1981-1998 are given together with the corresponding CPUE indices in Table 4.

Table 4. Abundance indices of 0-group capelin in 1981-1998.

Year	Acoustic index ( $\text{m}^2 * 10^{-5}$ )	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
1993	44.9	51
1994	50.5	94
1995	23.0	24
1996	145.0	82
1997	97.8	61
1998	81.9	46

#### 4.4 Time series

As mentioned before the Icelandic 0-group survey series began in 1970. In the beginning several nations participated and there was no standardisation of timing of the survey, survey tracks and trawl stations but after 1975 Iceland alone did the surveys and gradually the time, survey tracks and trawl stations became more or less fixed in the Icelandic region. In the main distribution area of the 0-group redfish in East Greenland waters and the Irminger Sea the extent of coverage has varied and in 1996 - 1998 the area was not surveyed at all.

In table 5 the 0-group indices for cod, haddock and capelin for the whole series are given.

Table 5. Abundance indices and mean length (m m) of 0-group cod, haddock and capelin 1970-1998.

Year	COD		HADDOCK		CAPELIN	
	index	mean length	index	mean length	index	mean length
1970	873	55.7	43	90	11	53.7
1971	283	40.4	40	82.8	19	51.1
1972	79	43.7	32	85	89	45.7
1973	1191	61	39	104	116	42.6
1974	54	46	15	58.3	134	46
1975	130	42.4	11	60	89	38.3
1976	2743	52.6	323	63.5	32	38.7
1977	435	44.5	35	61.4	43	44.2
1978	552	50.2	116	61.9	31	63.5
1979	370	36	11	59.6	49	42
1980	558	49.3	64	52.7	41	44.9
1981	78	55.9	12	75.9	29	55
1982	10	44.6	2	44.2	13	51.4
1983	153	55.2	25	67.3	22	43.2
1984	1772	56.1	71	66.4	28	42.5
1985	812	54	51	84.3	33	38.2
1986	50	52.2	19	74.9	37	41.1
1987	81	48.4	4	81.1	14	41.4
1988	20	48.7	19	70.3	51	49.9
1989	42	51.2	23	75	40	52.8
1990	37	53.3	21	81.3	21	55.3
1991	6	41.6	5	53.9	54	46
1992	42	41.4	5	60.8	35	42.4
1993	155	47.6	20	67.8	51	38.5
1994	74	37.8	11	77.8	94	37.4
1995	163	39.3	22	73	24	37.9
1996	40	37.9	12	57.9	82	39.9
1997	1152	48.3	26	81.5	61	41.8
1998	2752	43.8	95	65.6	46	52.1

#### 4.5 Other species

During the 0-group survey in 1998 fish and juveniles belonging to 25 species or species groups other than those already mentioned were recorded.

**Redfish**, *Sebastes marinus*, were observed at 15 stations mainly south and west of Iceland. Southeast of Iceland one specimen of **rosefish**, *Sebastes fasciatus*, was observed.

As in previous years the fry and juveniles of the **sandeel** species *Ammodytes marinus* and *A. tobianus* were among the most numerous in the catches of 0-group and juvenile fish. They were observed at 109 stations all around Iceland. **Greater sandeel**, *Hyperoplus lanceolatus*, was recorded at one station close to the northeast coast.

The young stages of **lumpsucker**, *Cyclopterus lumpus*, were recorded at 32 stations, off W-, N-, E-Iceland. Adults and juveniles of this species occurred also, in lower numbers, and were tagged when their condition permitted.

**Whiting**, *Merlangius merlangus*, were caught at 18 stations to the west and south of Iceland and **Norway pout**, *Trisopterus esmarki*, were abundant at one station in the Breiðafjörður region west of Iceland. **Blue whiting**, *Micromesistius poutassou*, were caught on two stations off SW and SE-Iceland. **Polar cod**, *Boreogadus saida*, was recorded at one station in the Dohrn bank area. **Tusk**, *Brosme brosme*, was caught at one station close to the southeast coast, and **greater forkbeard**, *Phycis blennoides*, was observed at one station southeast of Iceland.

**Long rough dab**, *Hippoglossoides platessoides*, occurred widely in 1998, at 71 stations or more than twice as frequently as in 1997. **Greenland halibut**, *Reinhardtius hippoglossoides*, was recorded at 4 stations far west and north of Iceland. **Witch**, *Glyptocephalus cynoglossus*, was observed at 2 stations off SE-Iceland and **lemon sole**, *Microstomus kitt*, at 2 stations off W-Iceland and 1 station off the southeast coast.

Young stages of **herring**, *Clupea harengus*, were present at 14 stations close to the south, west and, where they occurred most frequently, the northeast coast of Iceland.

**Greater silver smelt**, *Argentina silus*, were caught at 3 stations off W-Iceland. **Eelpouts**, *Lycodes* sp., were recorded at 9 stations and **snake blennies**, Lumpenidae, at 9 stations, mainly off N- and E-Iceland.

**Grey gurnard**, *Eutrigla gurnardus*, was caught at 11 stations off SE- and SW-Iceland. One specimen of **mailed sculpin**, *Triglops murrayi*, was observed north of Iceland. **Anglerfish**, *Lophius piscatorius*, was observed at 5 stations west of Iceland.

**Muellers pearl side**, *Maurolicus muelleri*, were recorded at 14 stations off SW, W, N and E-Iceland.

Two individuals of **mackerel**, *Scomber scombrus*, were recorded at two stations off SE-Iceland.



Two **sea lampreys**, *Petromyzon marinus*, were caught south of Iceland. Invertebrates caught during the 1998 0-group survey were jellyfish, krill, amphipods, pteropods, comb jellies, and south of Iceland salps were found in great quantities.

## 5. References

Reynisson, P. and H. Vilhjálmsson, 1983. Acoustic index of 0-group capelin in the Iceland-Greenland area. ICES, C.M. 1983/B:3.

Vilhjálmsson, H. and Friðgeirsson, E, 1976. A review of 0-group surveys in the Iceland-East Greenland area in the years 1970-1975. Coop. Res. Rep. 54 ICES.

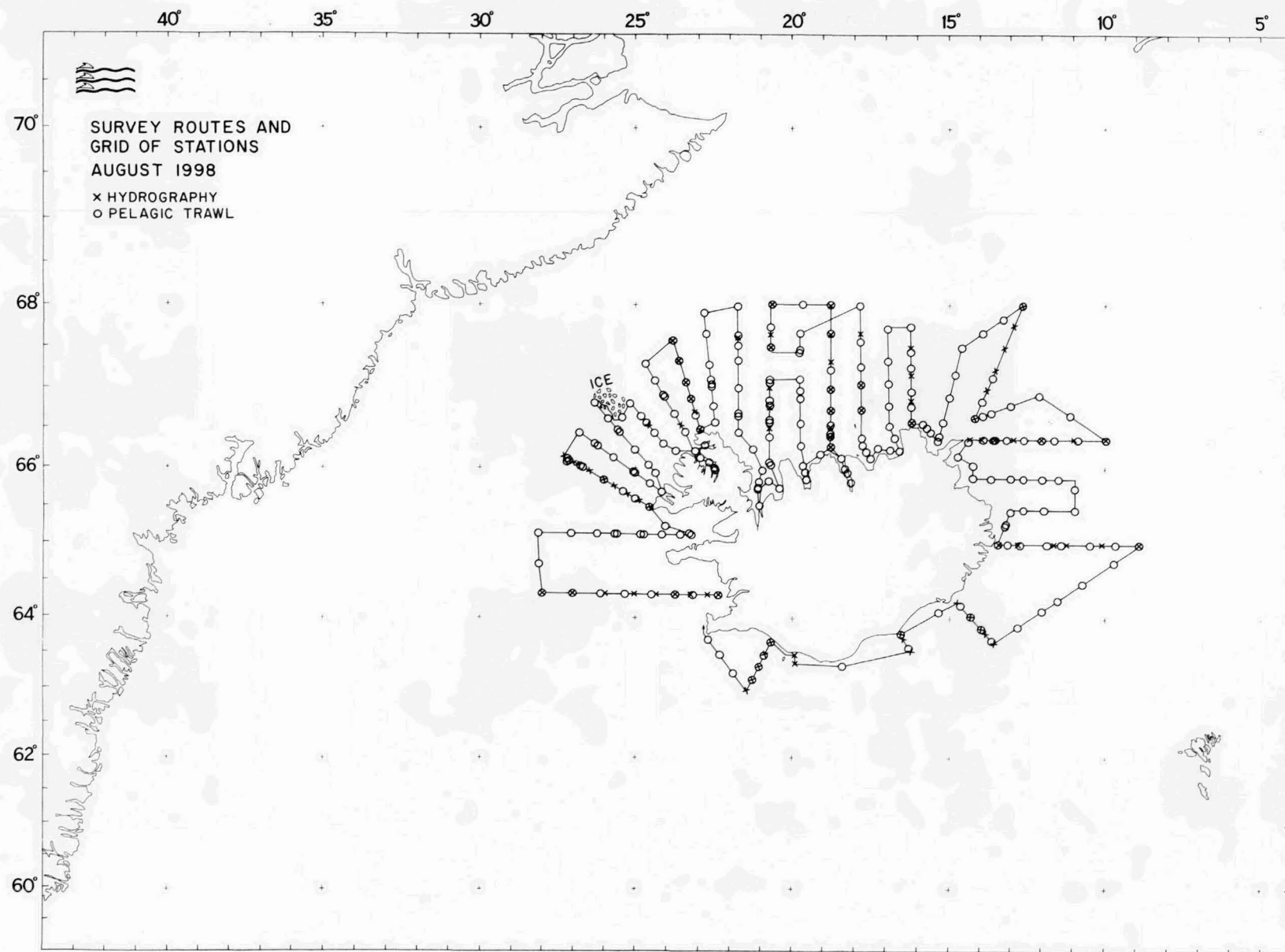


Figure 1. Survey routes and grid of stations, August 1998.

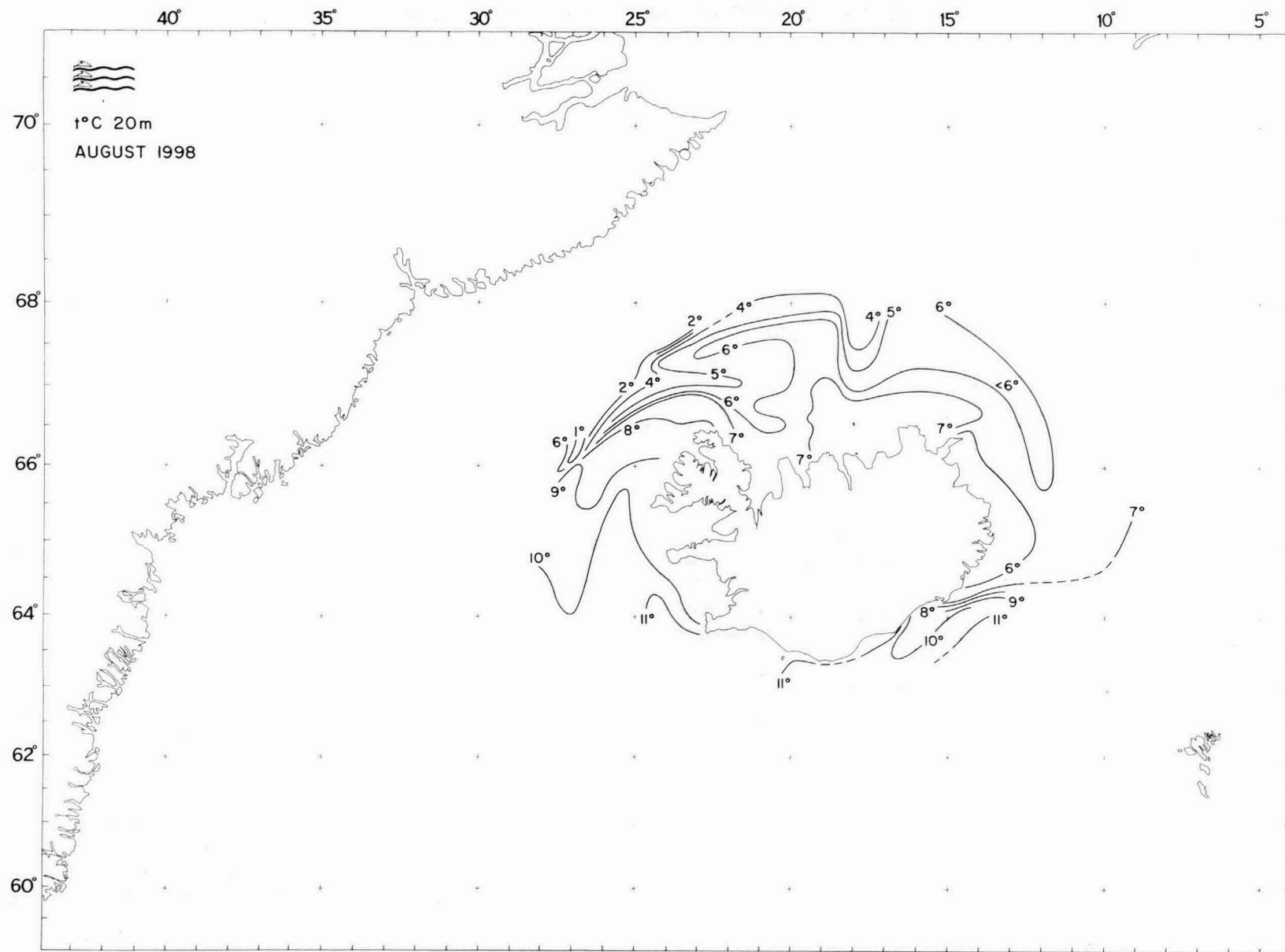


Figure 2. Temperature at 20 m depth, August 1998.

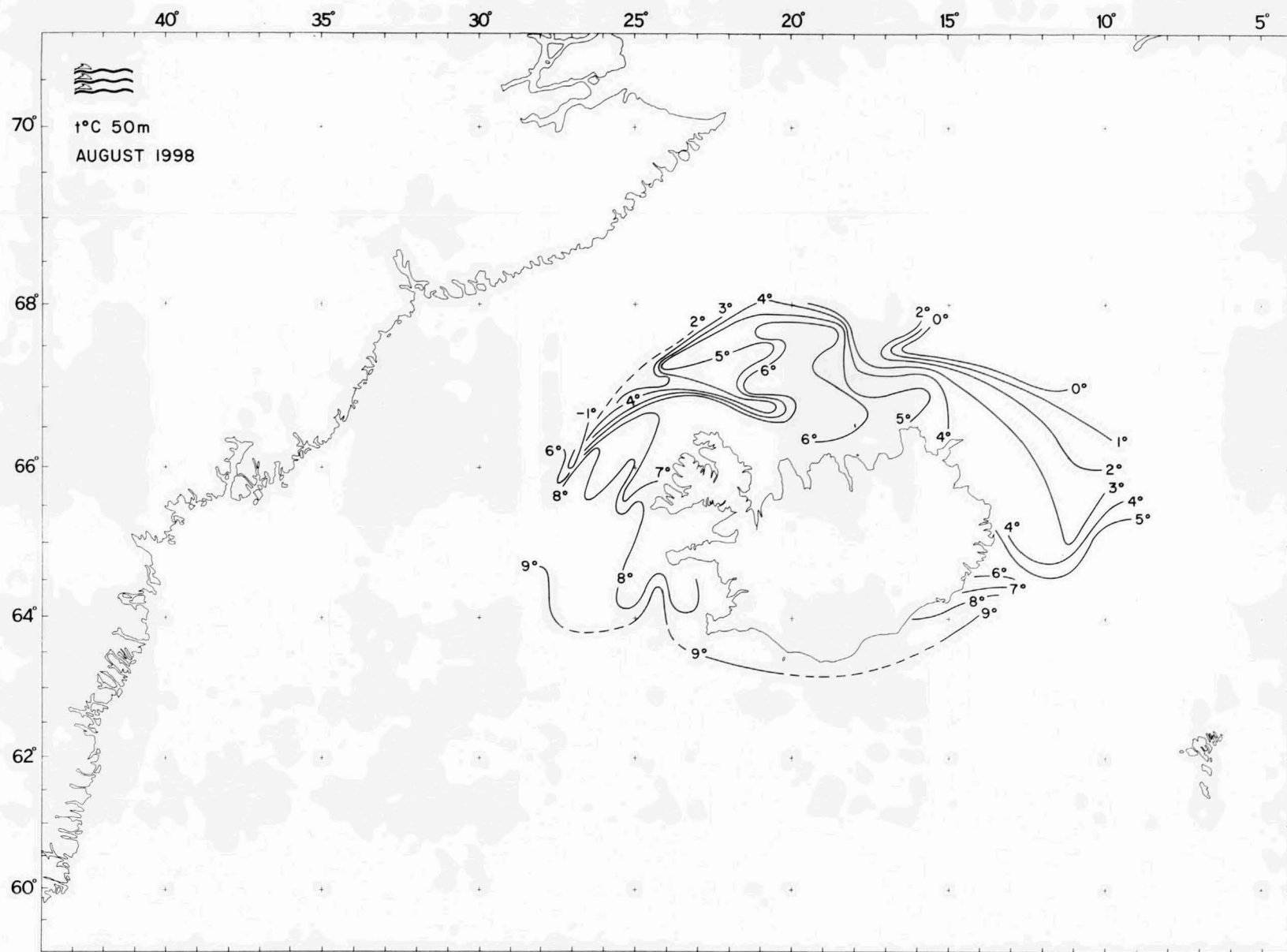


Figure 3. Temperature at 50 m depth, August 1998.

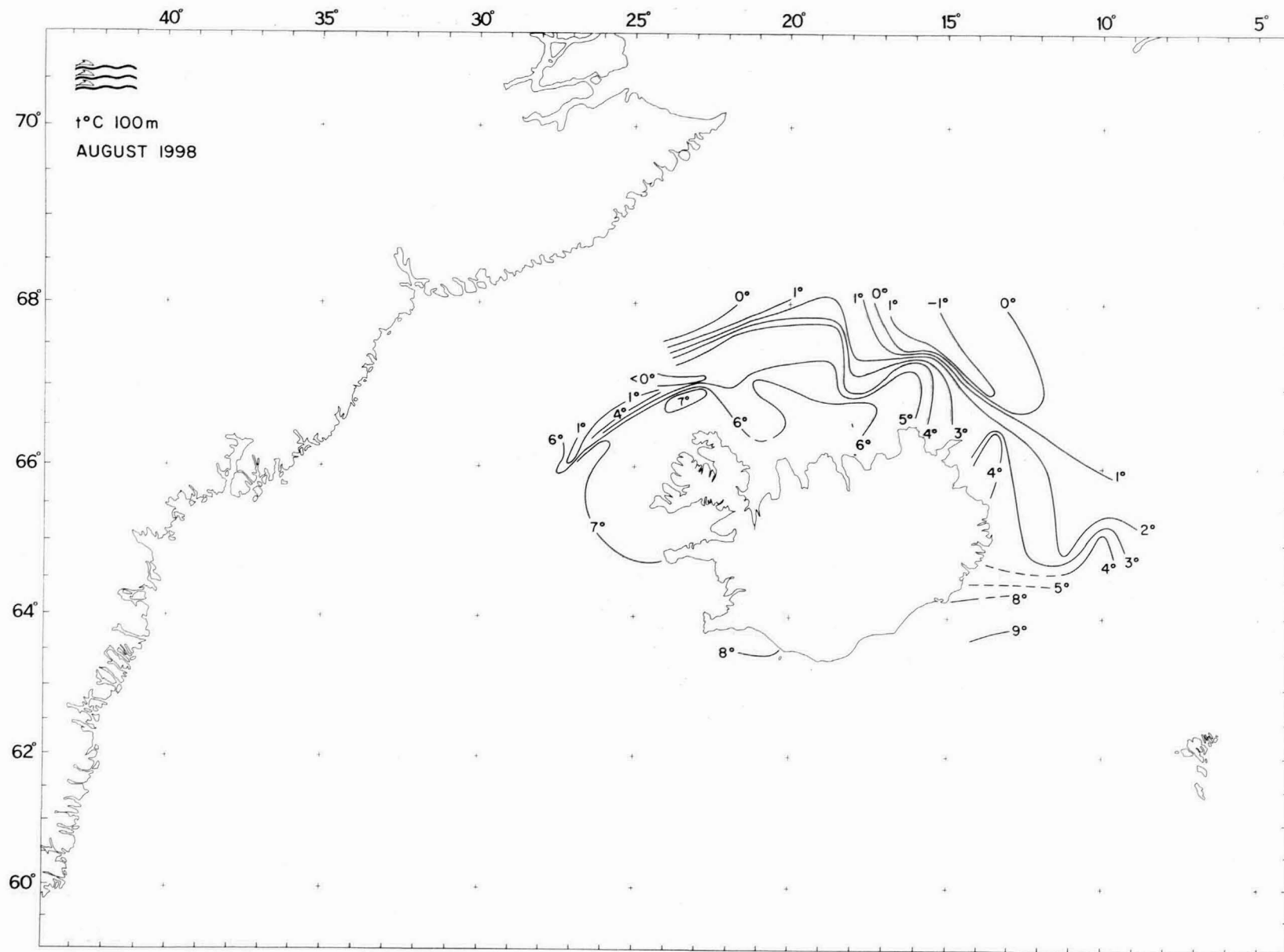


Figure 4. Temperature at 100 m depth, August 1998.

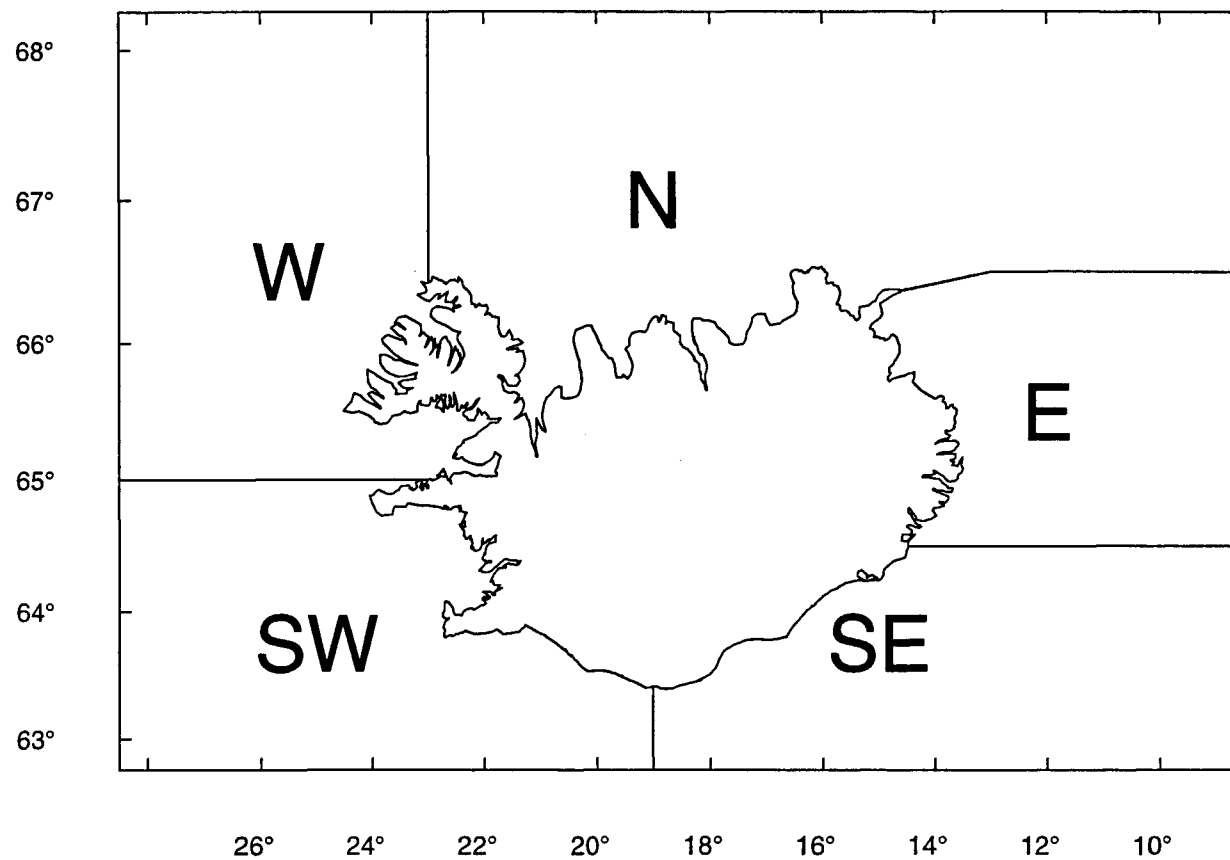


Figure 5. Subareas

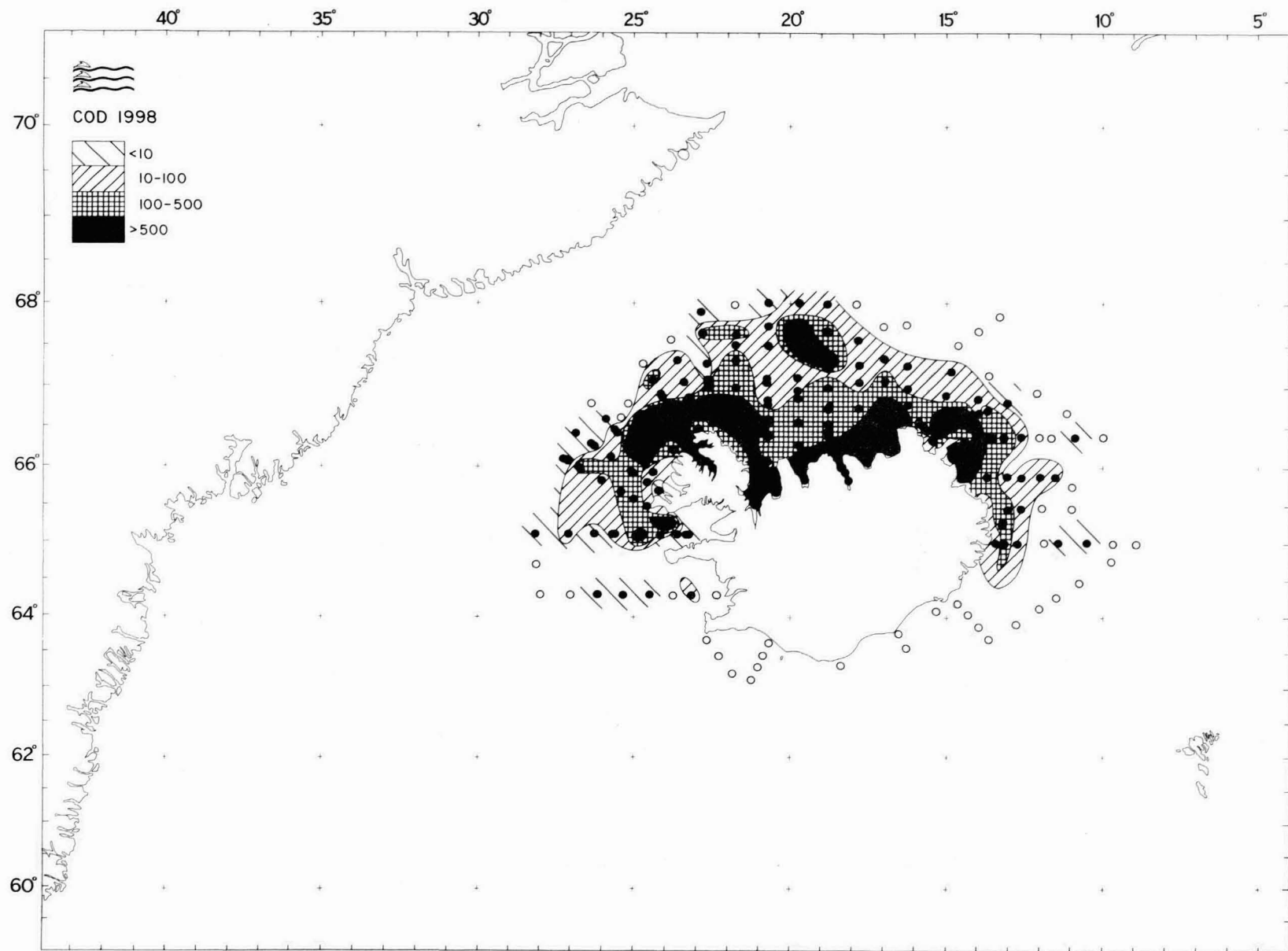
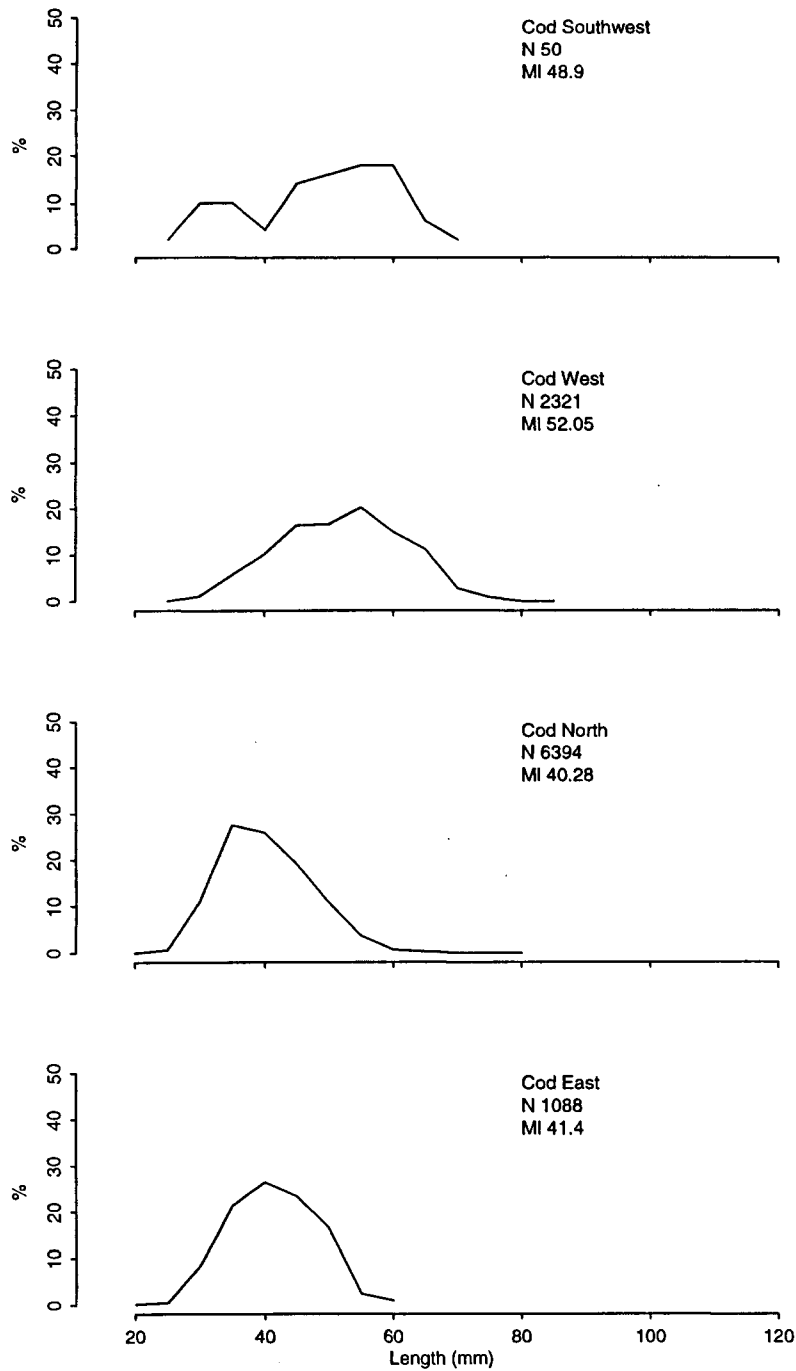


Figure 6. Distribution and density of 0-group cod (n/1 n.m.), August 1998.

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Cod Southeast  
NO DATA

Figure 7. Length distribution of cod, August 1998



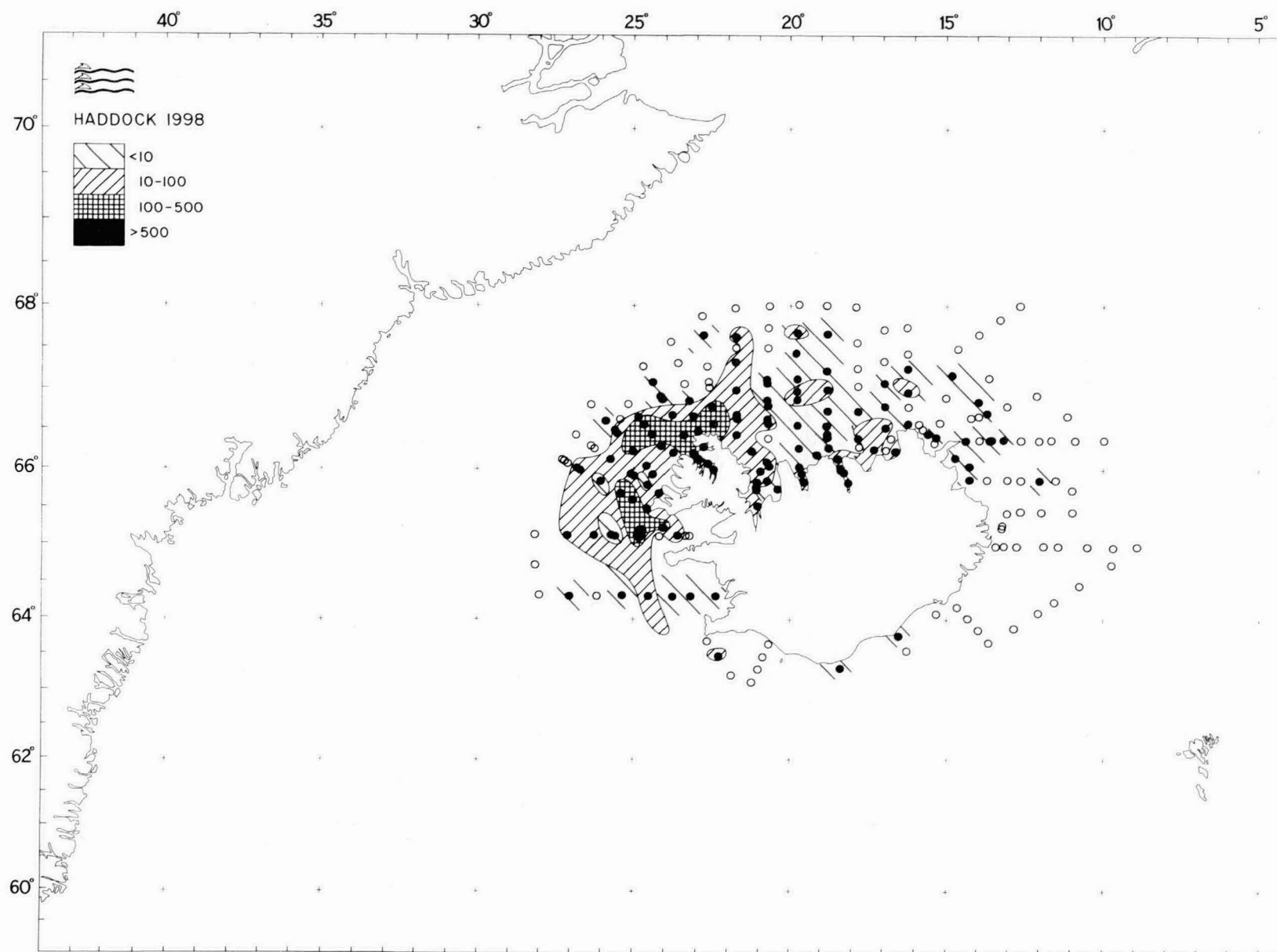


Figure 8. Distribution and density of 0-group haddock (n/1 n.m.), August 1998.

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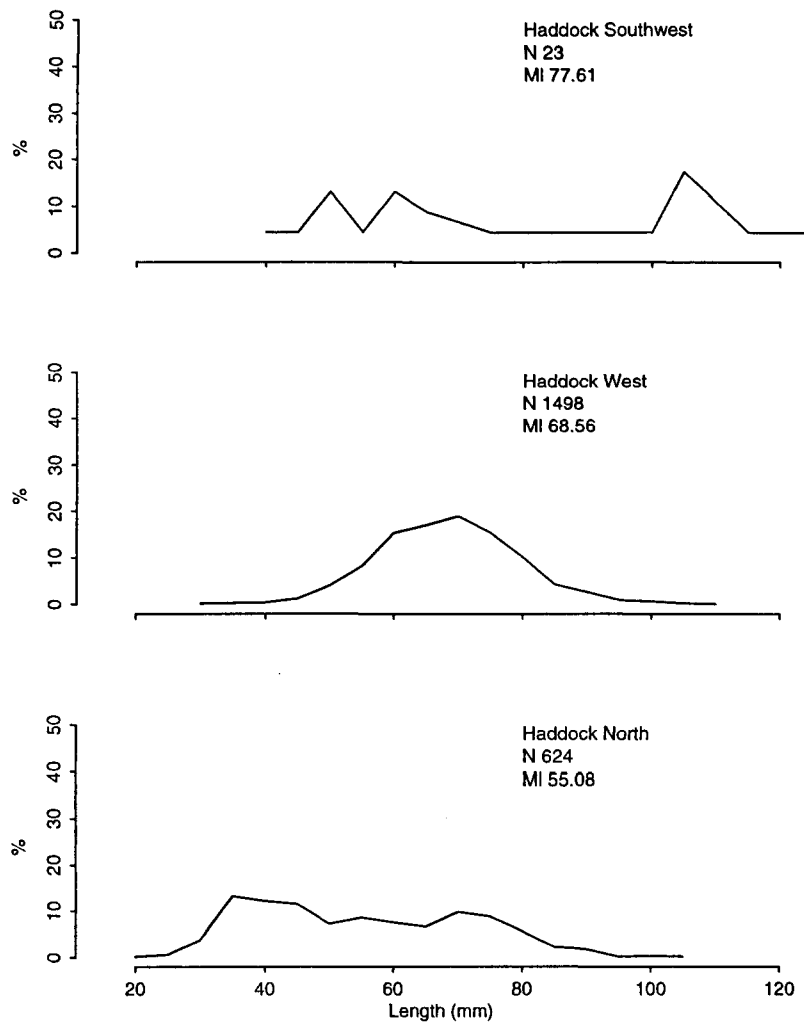


Figure 9. Length distribution of haddock, August 1998

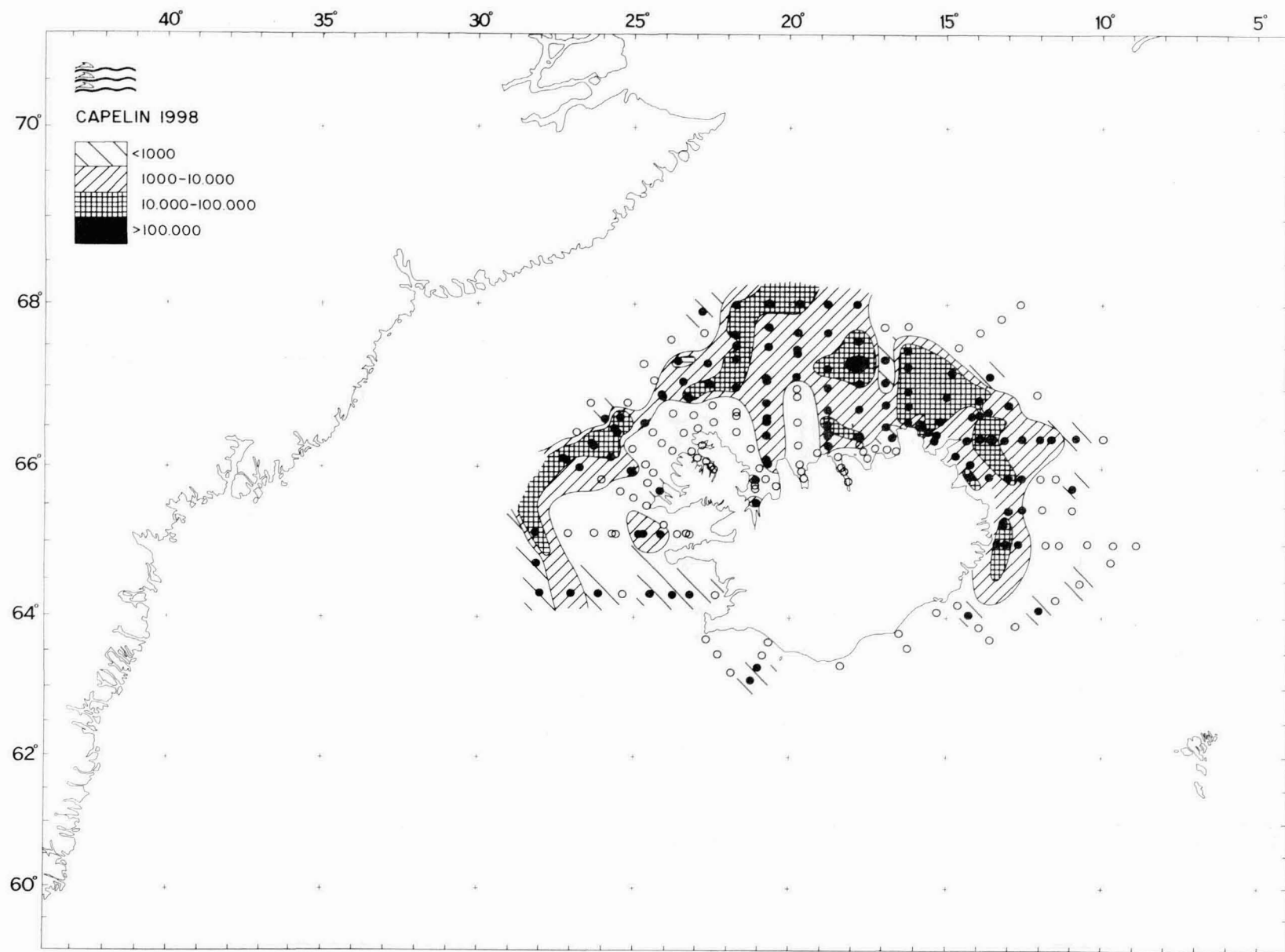


Figure 10. Distribution and density of 0-group capelin (n/1 n.m.), August 1998.

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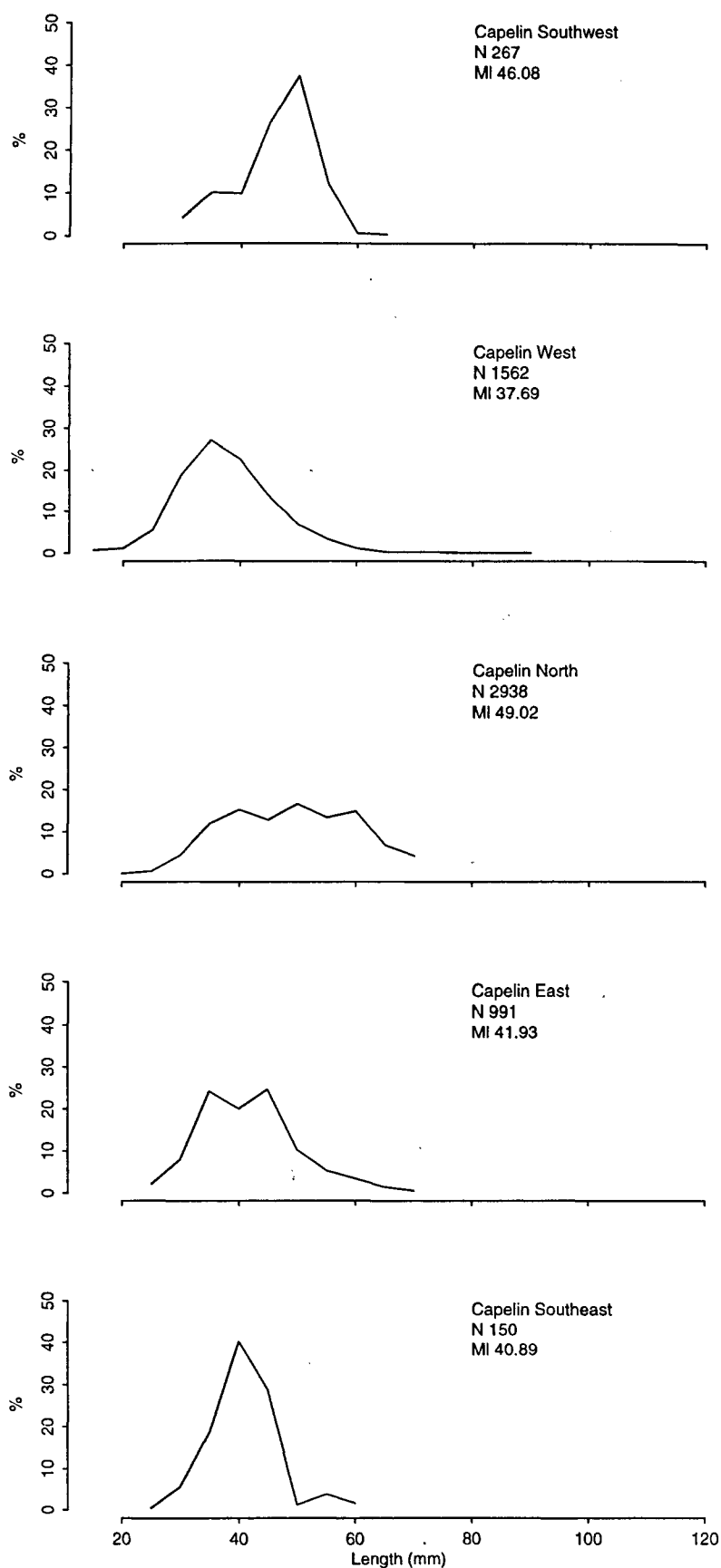


Figure 11. Length distribution of capelin, August 1998