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Pelagic Fish (Northern) Committe
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Hydrography Committee

Preliminary Report of the International O-group fish survey in the Barents Sea and adjacent waters in August-September 1971

INTRODUCTION

This was the seventh in a series of international surveys to study the abundance and distribution of O-group fish in the Barents Sea and the Svalbard region.

The following vessels and scientists took part in the survey:

USSR:	R/V "Akademik Knipovich"	A.S. Seliverstov, V.V.Penin,
	R/V "Fritjof Nansen"	V.N.Schleinik, V.D.Tesler,
		A.I.Lysota
Norway:	R/V "G.O.Sars"	O.Dragesund, P.T.Hognestad,
		O.M.Nakken
	R/V "Johan Hjort"	A.Hylen, O.M.Smedstad, R.Sætre,
England:	R/V "Cirolana"	B.W.Jones, J.H.Nichols,
		J.G.Pope, T.C.Doddington,

Preliminary plans for the survey were made at a meeting in Bergen in May 1971, and final arrangements for coordination were made in Tromsø and Murmansk immediately before the commencement of the survey. The main part of the survey was carried out between 25 August and 9 September, but "Akademik Knipovich" commenced on 20 August. The survey was followed by a meeting in Tromsø during 10-13 September arranged for the exchange and analysis of data.

MATERIAL AND METHODS

As in previous years the distribution and density of the pelagic scattering layers were estimated from the echo sounder paper records, and the organisms forming the scattering layers were identified by sampling with small meshed pelagic trawls. Various depth metering devices on the trawls were used for the accurate control of the depth of trawling. Echo Integrators were used in conjunction with the echo sounders on board R/V "G.O.Sars", R/V "Johan Hjort", R/V "Cirolana" and R/V "Fritjof Nansen".

It was thought that the different trawls used on the various ships probably had different fishing characteristics and it was recommended that for the future surveys a standard net should be selected and used by all ships in order to make quantitative comparisons of the catches more reliable.

Fig.1 shows the area surveyed and the ships' tracks together with the trawl and hydrographic stations worked.

RESULTS

Hydrography

Hydrographic observations were conducted on the standard sections: along the Kola meridian (33°30'E), along the 43°15'E (north of the Cape Kanin), between Kolguyev Island and south-west part of Novaya Zemlya, between North Cape and Bear Island and west of Bear Island (74°30'N) and also on other hydrographic sections and at trawl stations, as shown in Fig. 1.

A preliminary analysis of data made it possible to conclude the following (Figs. 2-8):

In early September the temperature of the 0-200 m layer in the eastern branch of the Spitsbergen Current in the section west of Bear Island was only 0.1° higher than the normal. Compared to the temperature in 1970, it was 0.4° lower. The temperature of the 0-200 m layer in the middle branch of the Spitsbergen Current in this section was found to be close to the normal, but it was 0.7° lower than that of 1970 observed at the same period. The degree of the surface warming in these waters was similar to the long-term mean, but a little lower than in 1970.

In early September 1971 the temperature of the 0-200 m layer in the North Cape Current in the section North Cape-Bear Island was found to be the highest during all the 0-group fish surveys; it was 0.6° higher than the normal and 0.2° higher than that of 1970.

At the end of August 1971 the temperature of the 0-200 m layer in the northern branch of the North Cape Current in the section eastward of Bear Island was found to be close to the normal, but was 0.4° less than in 1970. At 33°30'E and north of 76°00'N the water temperature of this current was 0.3° below the normal and 0.7° below that of early September 1970.

In late August 1971 the temperature of the 0-200 m layer in the Murmansk Current in the section along the 33°30'E was 0.1° below the normal, but 0.5° below that of 1970 observed in the same period. Surface temperature in this current was found to be 1.9° below that of 1970, which was characterized by considerable warming up.

At the end of August 1971 in the section north of Cape Kanin the temperature of the whole water column in the Murmansk Current was found to be close to the normal and its value in previous years, whereas the surface temperature was 0.7° below the normal and 2.6° below that of 1970.

The temperature from the surface to the bottom in the warm Kanin-Kolguyev Current was also close to the normal and its value observed in 1970; but in the surface layers it was found to be 1° below the normal and 2° below that of 1970.

Distribution and abundance of 0-group fish

The variation in the total density of the scattering layers is shown in Fig. 9. The echo recordings include, as well as 0-group fish, contributions from fish of older age-groups, notably capelin, polar cod and blue whiting, and also include any echos which may come from invertebrate organisms. The total echo abundance has been expressed on a subjective scale from 0-4.

In addition to the species listed below a few other species were also recorded in the catches as catfish, lumpsucker, Agonus, Leptagonus, Cottidae, Liparis, Lumpenus and Triglops. No saithe were recorded this year.

Percentage length compositions of the main species caught are given in Fig. 10.

Herring

No 0-group herring were recorded this year and this is the seventh year in succession of very low abundance of the species.

Cod

0-group cod were distributed over a wide area in the central Barents Sea from Norwegian coast to 77° N, with an extension from Bear Island along the western coast of Spitsbergen to 80°N (Fig. 11). The area of distribution was somewhat less extensive than in 1970. Although the abundance was lower than was recorded in 1970 when cod were very abundant the 1971 year class can be described as being of above average abundance and more numerous than were recorded for the year classes 1965-1969.

Haddock

The distribution of 0-group haddock was similar to that of cod being distributed over a wide area in the central Barents Sea with an extension northwards along the west coast of Spitsbergen (Fig. 12). The abundance of haddock was about average for the years covered by the International surveys, the 1971 year class being less abundant than the 1969 and 1970 year classes, but more abundant than the poor year classes of 1965-1968.

Redfish

The 0-group redfish had a more westerly distribution than cod and haddock and the area covered was very similar to that observed in 1970, covering the western part of the Barents Sea and extending northwards along the west coast of Spitsbergen to 81°N (Fig. 13). The 1971 year class appeared to be less abundant than the year classes of 1970 and 1969.

Capelin

The abundace of 0-group capelin this year was not so great as was observed in the years 1966-1969, but was more abundant than in 1970 which was relatively poor year. It should be noted however, that the 1970 year class seems to be somewhat stronger than indicated by the last years 0-group fish survey, probably due to a contribution from summer spawned capelin. The area of distribution (Fig. 14) was more widespread than in 1970 and more similar to that observed in earlier years

Long rough dab

0-group long rough dab were distributed in an area around Bear Island and west of Spitsbergen and also in the eastern Barents Sea (Fig. 15). The abundance was greater than in the previous two years, but possibly not as abundant as in 1965-1967.

Polar cod

There were two areas of distribution of 0-group Polar cod, one in the eastern Barents Sea and the other in an area extending from Hope Island t Bear Island and west of Spitsbergen (Fig. 16). The 1971 year class appears to be of average abundance.

Greenland halibut

0-group Greenland halibut were recorded from eight trawl hauls indicated in Fig. 17. The numbers caught were small, but the average size of the fish was larger than in previous years.

Distribution of adult fish

During the survey fairly abundant concentrations of adult Polar cod and capelin were observed in the northeast Barents Sea. Adult blue whiting were widely distributed over the western part of the survey area and extended eastward to the region between South Cape Bear Island-Fugløy.

Additional observations

During the course of the survey there were indications that the small trawl used by "Cirolana" was not catching representative catches of the larger 0-group fish, particulary cod and haddock. Earlier this year this net had proved to be very satisfactory for gadoid fish, but

during this survey it was suspected that the gadoids, having reached a larger size, were able to escape capture to some degree. This suspicion was confirmed with comparative hauls with an Engels trawl.

During a period of 24 hours fishing by R/V "Cirolana" and R/V "Johan Hjort" in the same position considerable haul to haul variation was observed in species composition and the quantities of fish caught. Some evindance was obtained that for redfish the larger fish have a deeper distribution than the smaller ones.

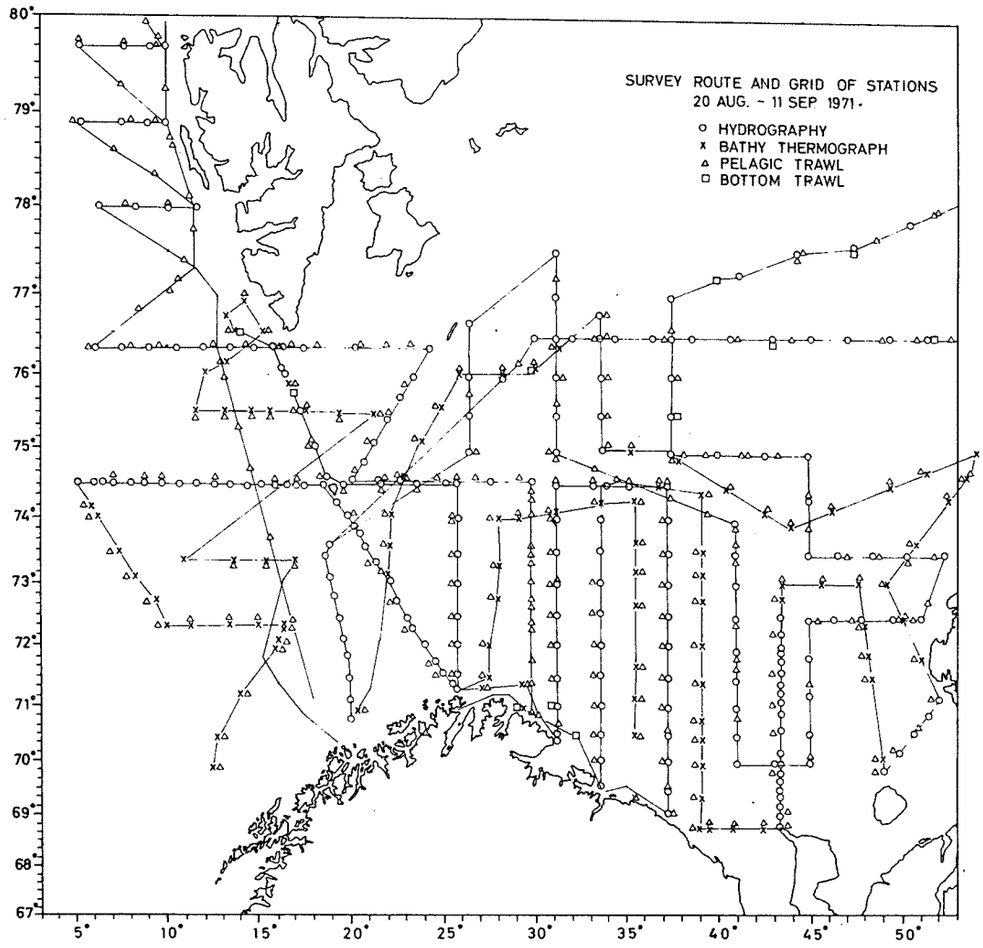

Figure 1. Survey routes and grid of stations.

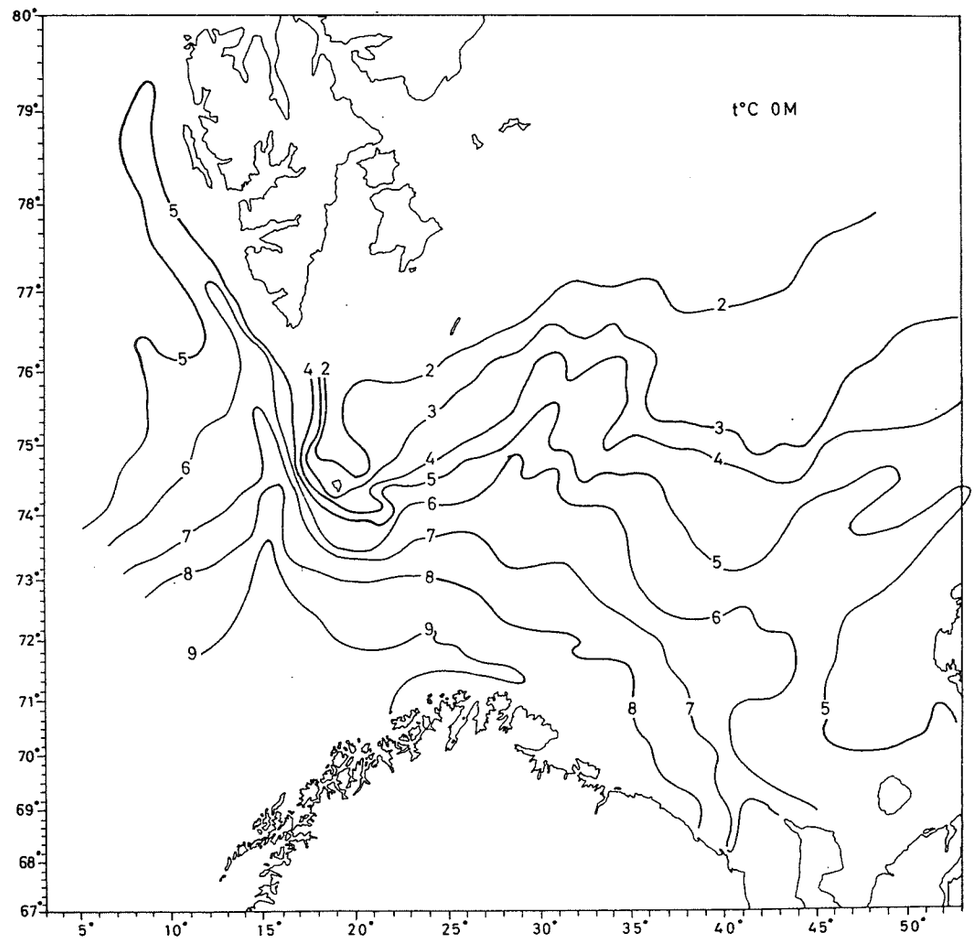

Figure 2. Isotherms at 0 m.

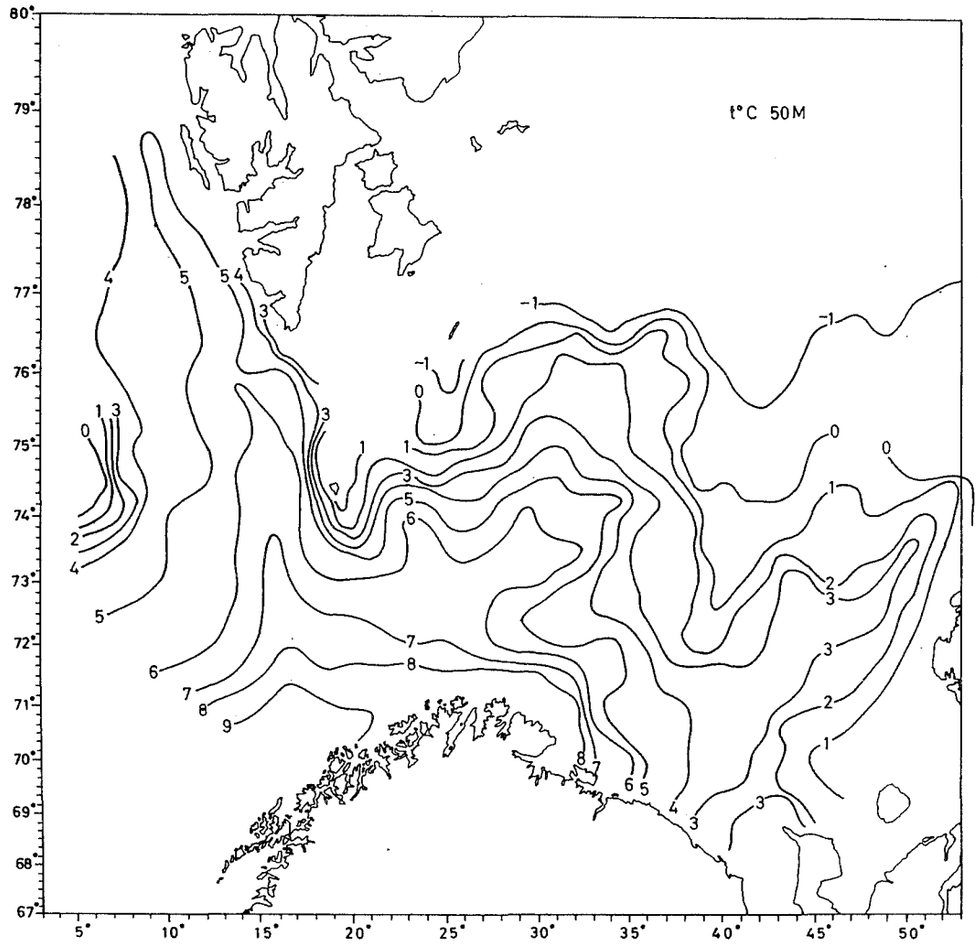

Figure 3. Isotherms at 50 m. 1971

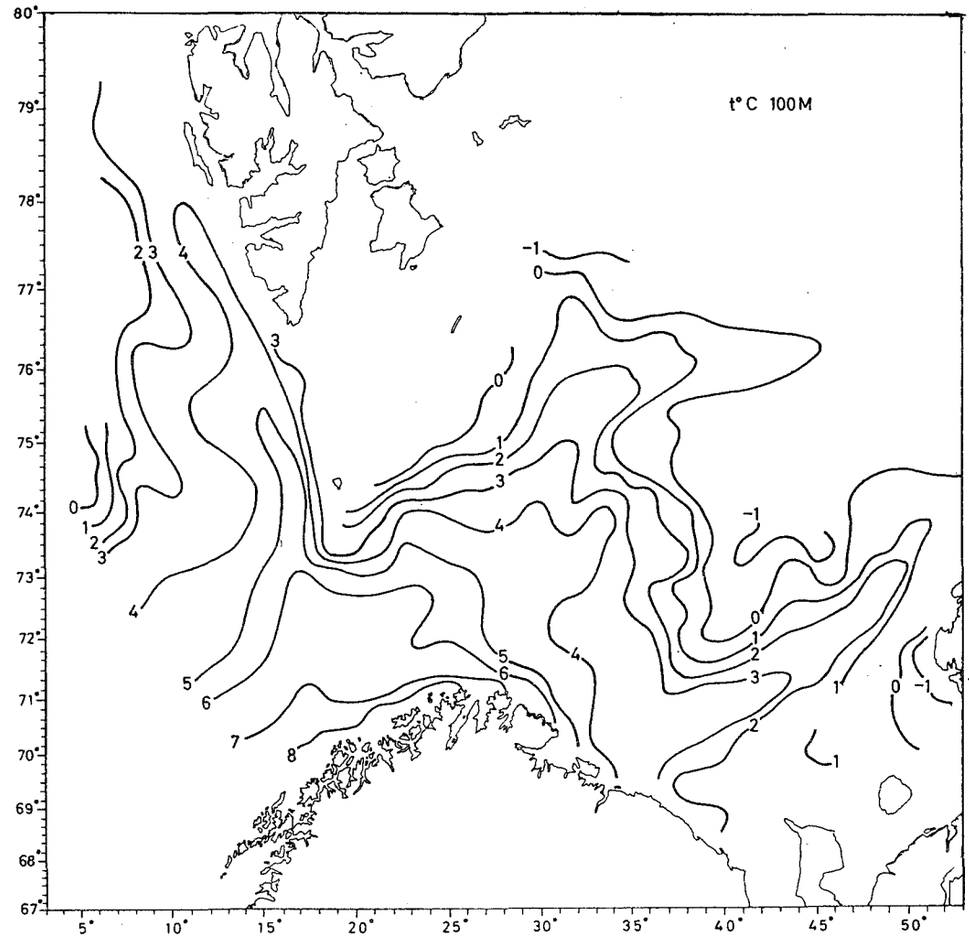

Figure 4. Isotherms at 100 m.

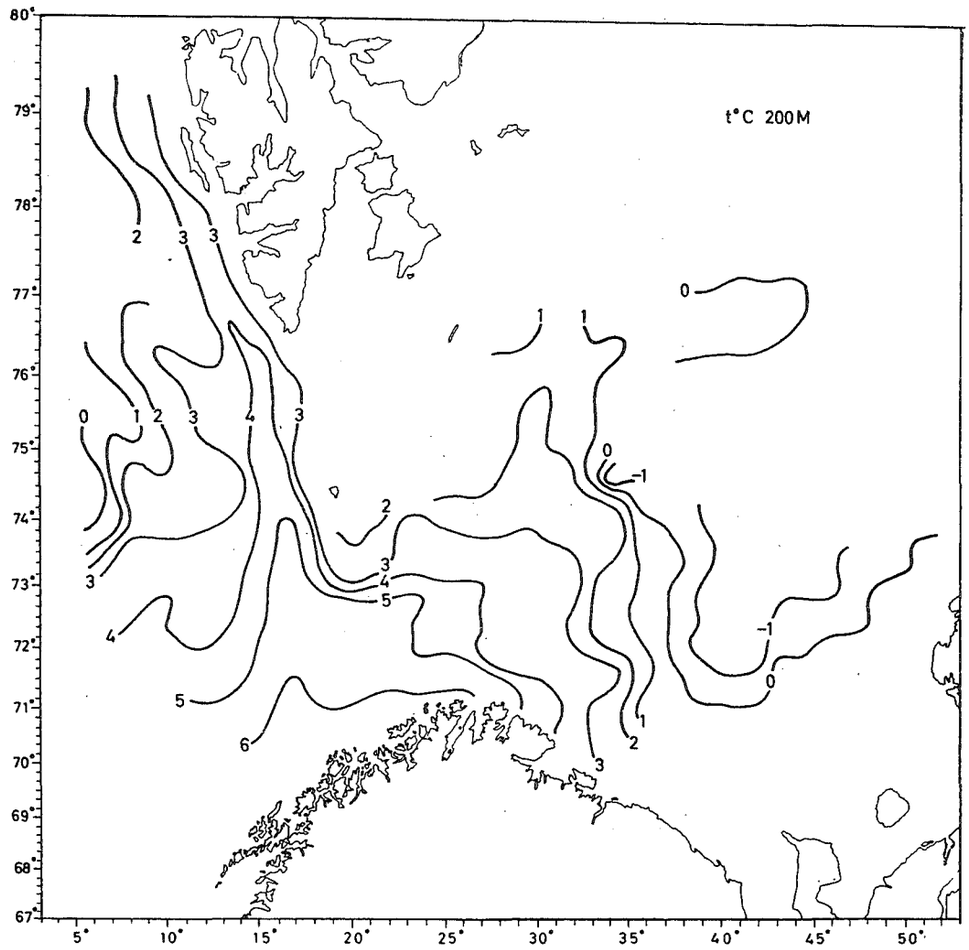

Figure 5. Isotherms at 200 m.

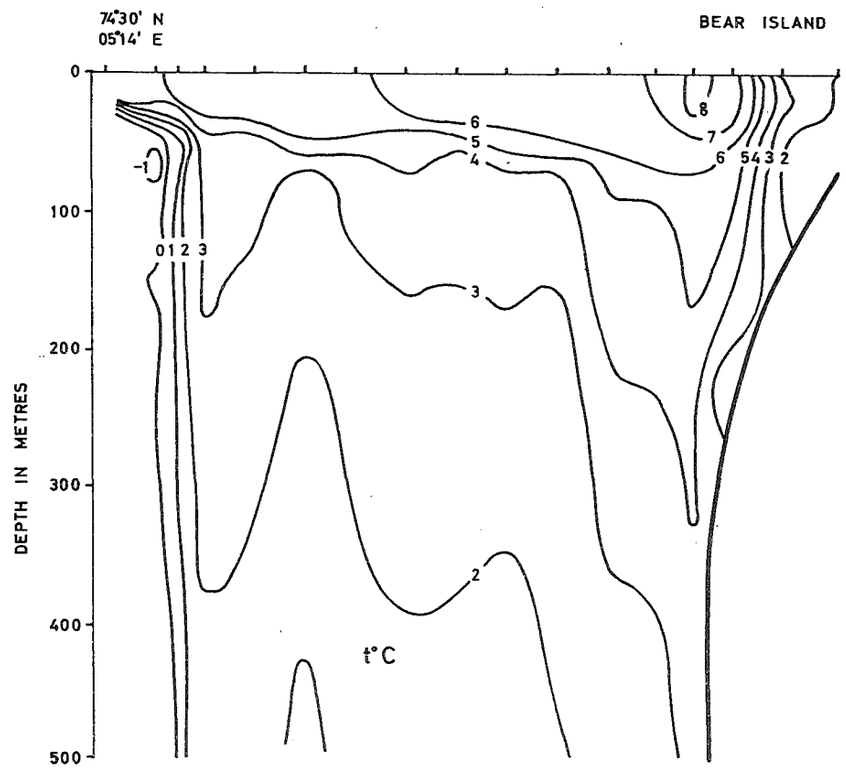

Figure 6. Temperature section Bear Island-west.
3-9 September 1971.

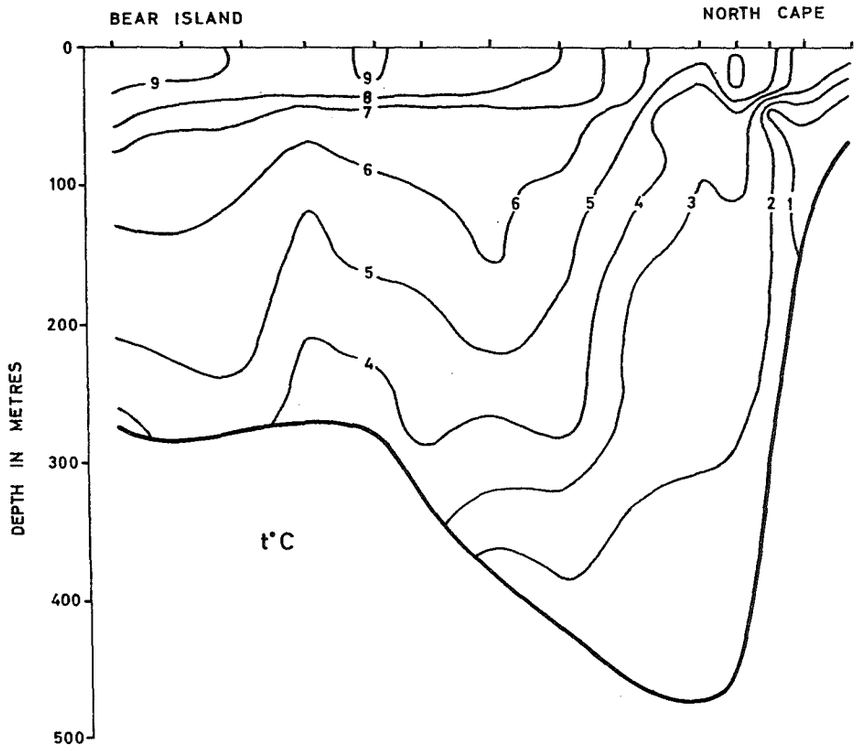

Figure 7. Temperature section Bear Island-North Cape. 1-3 September 1971.

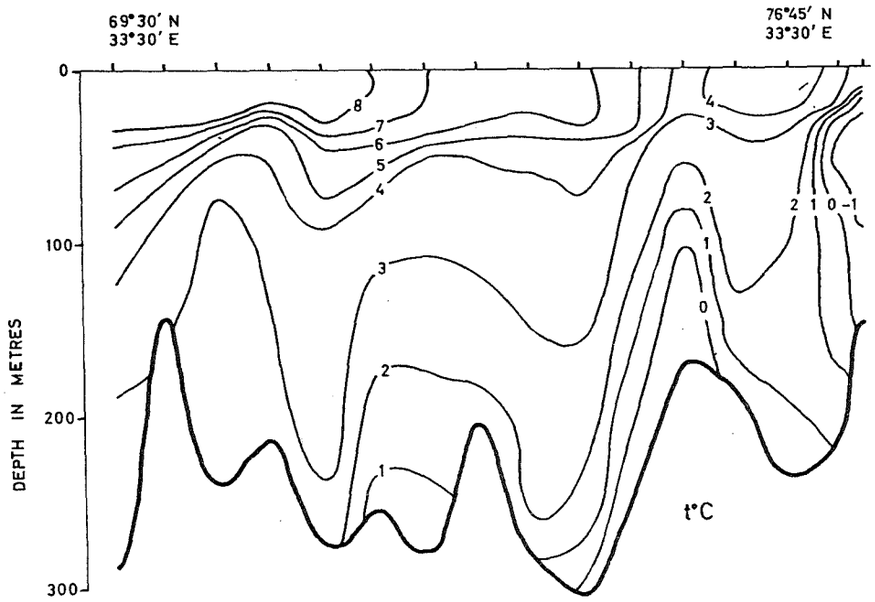

Figure 8. Temperature in the section along the Kola meridian, 33°30'E. 20 August - 6 September 1971.

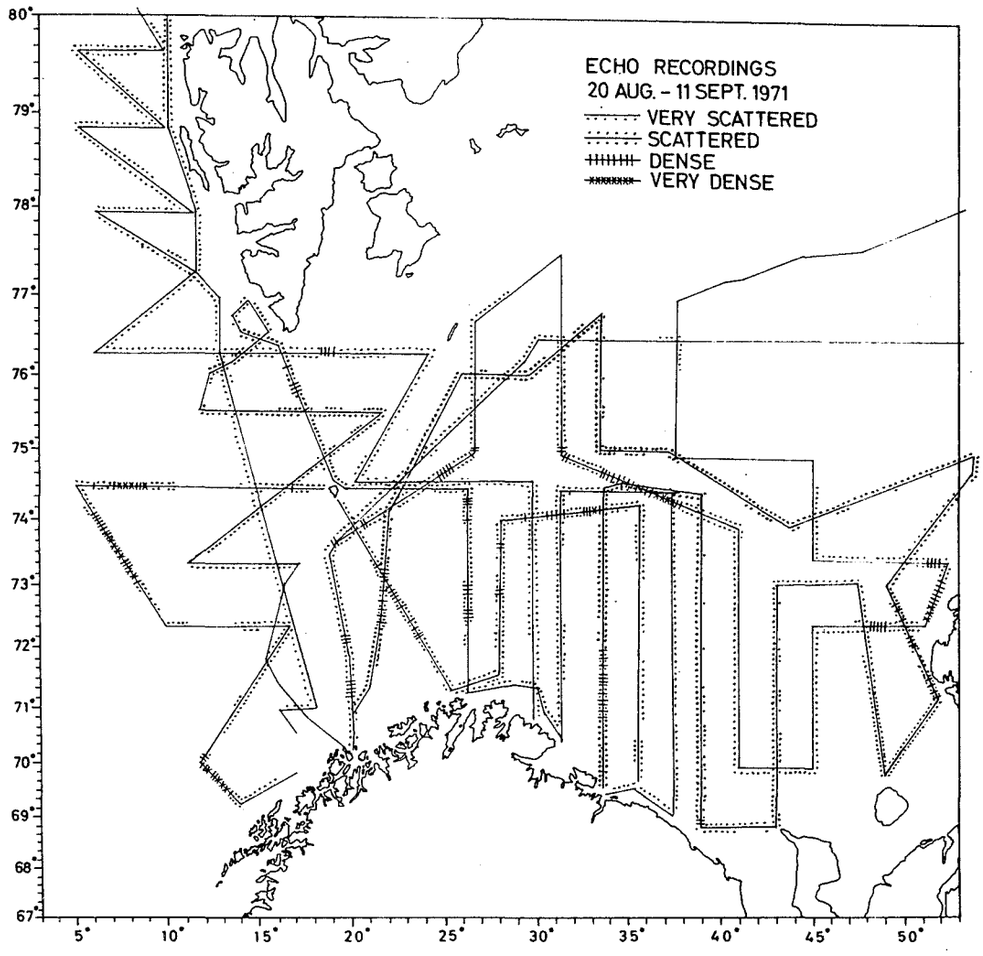

Figure 9. Courses and echo recordings.

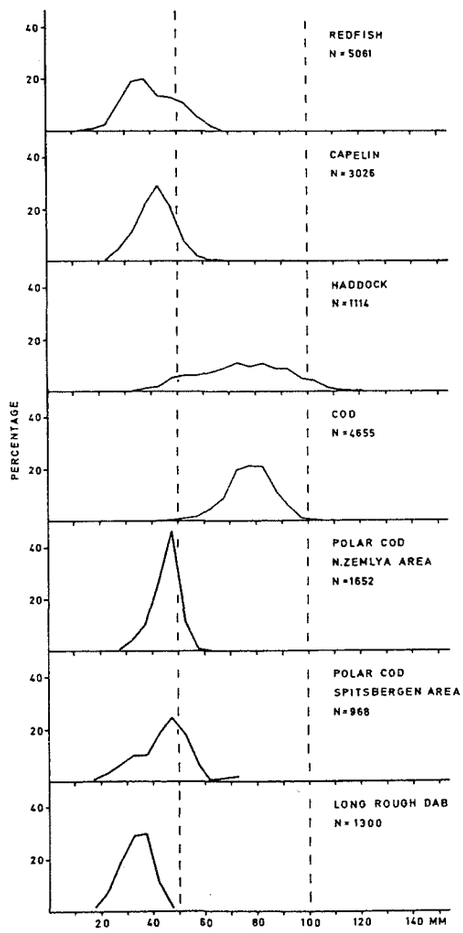

Figure 10. Length distribution of 0-group fish.

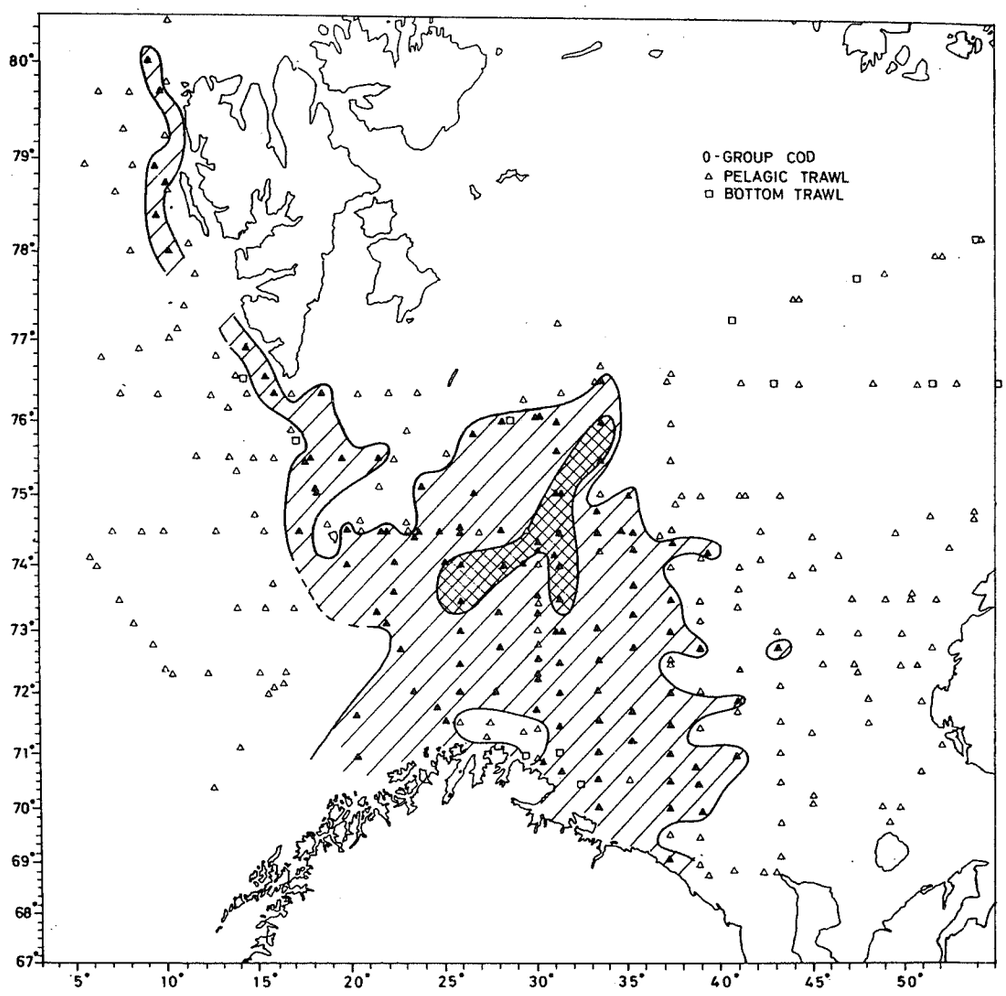

Figure 11. Distribution of 0-group cod.

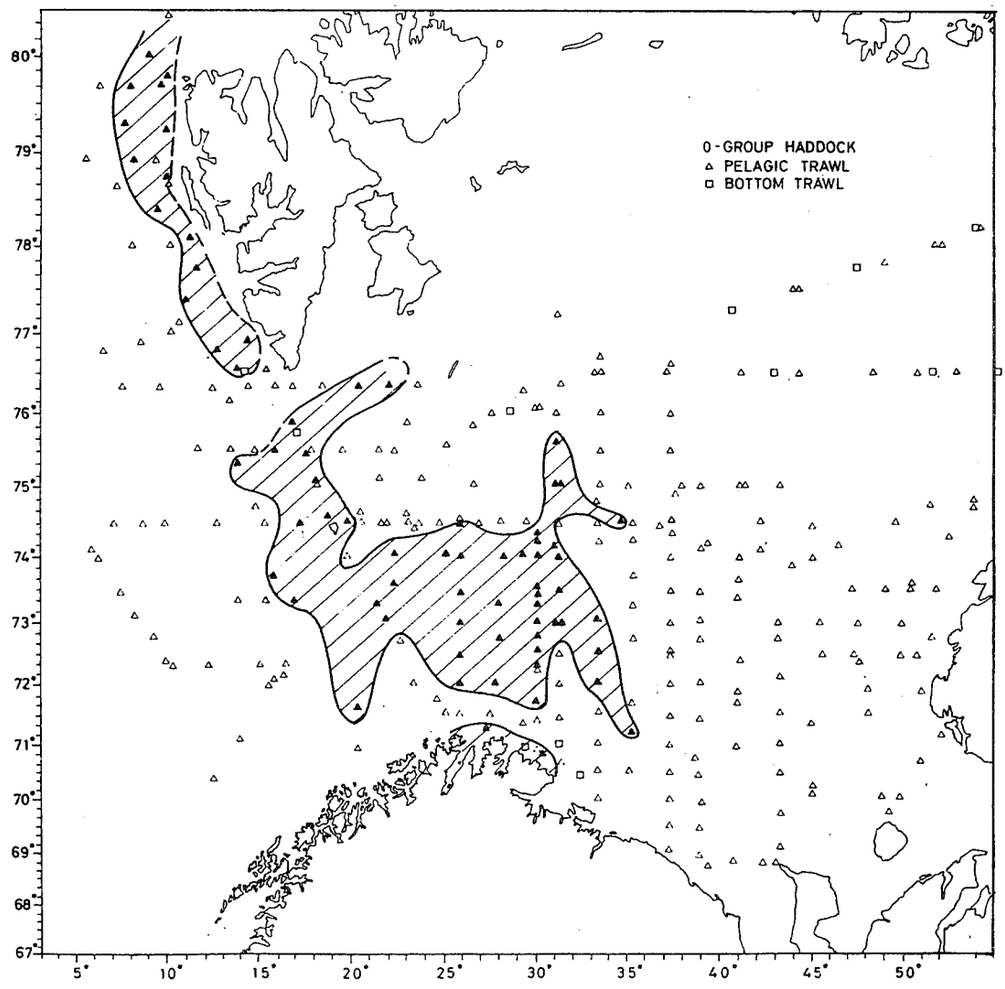

Figure 12. Distribution of 0-group haddock.

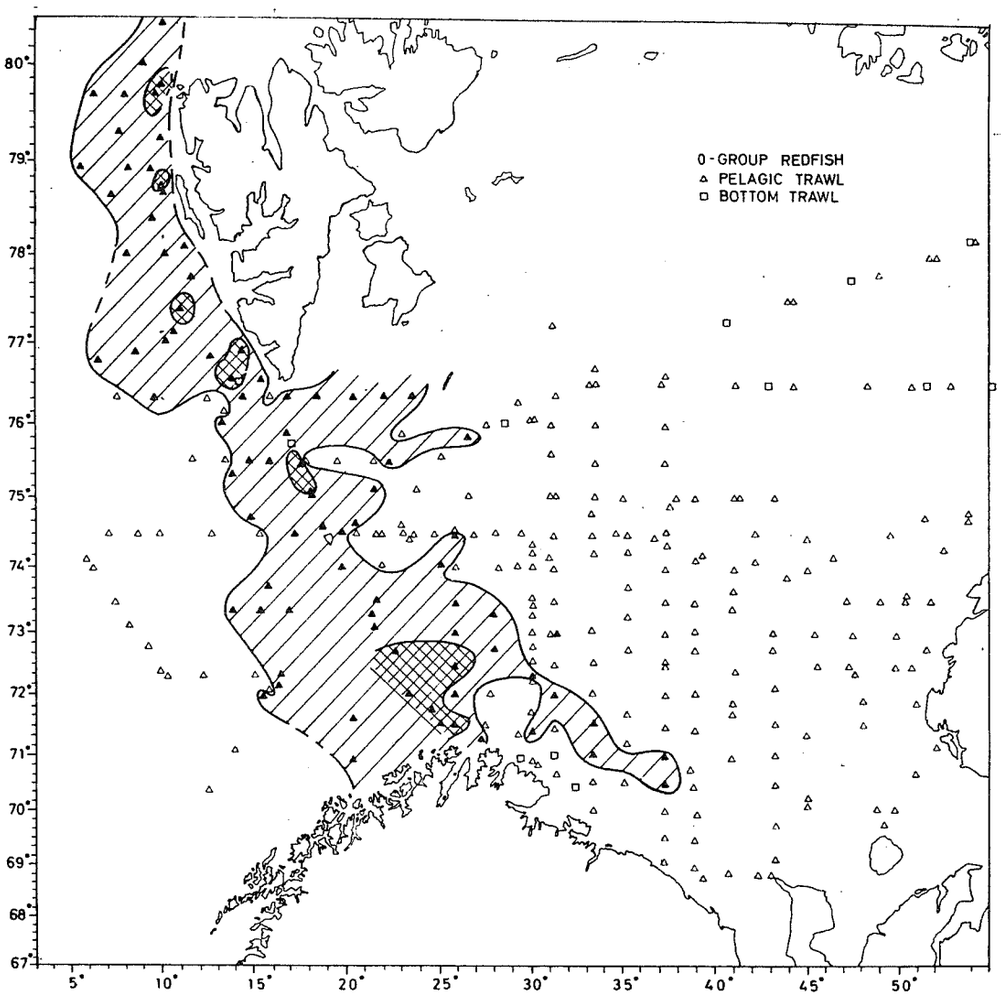

Figure 13. Distribution of 0-group redfish.

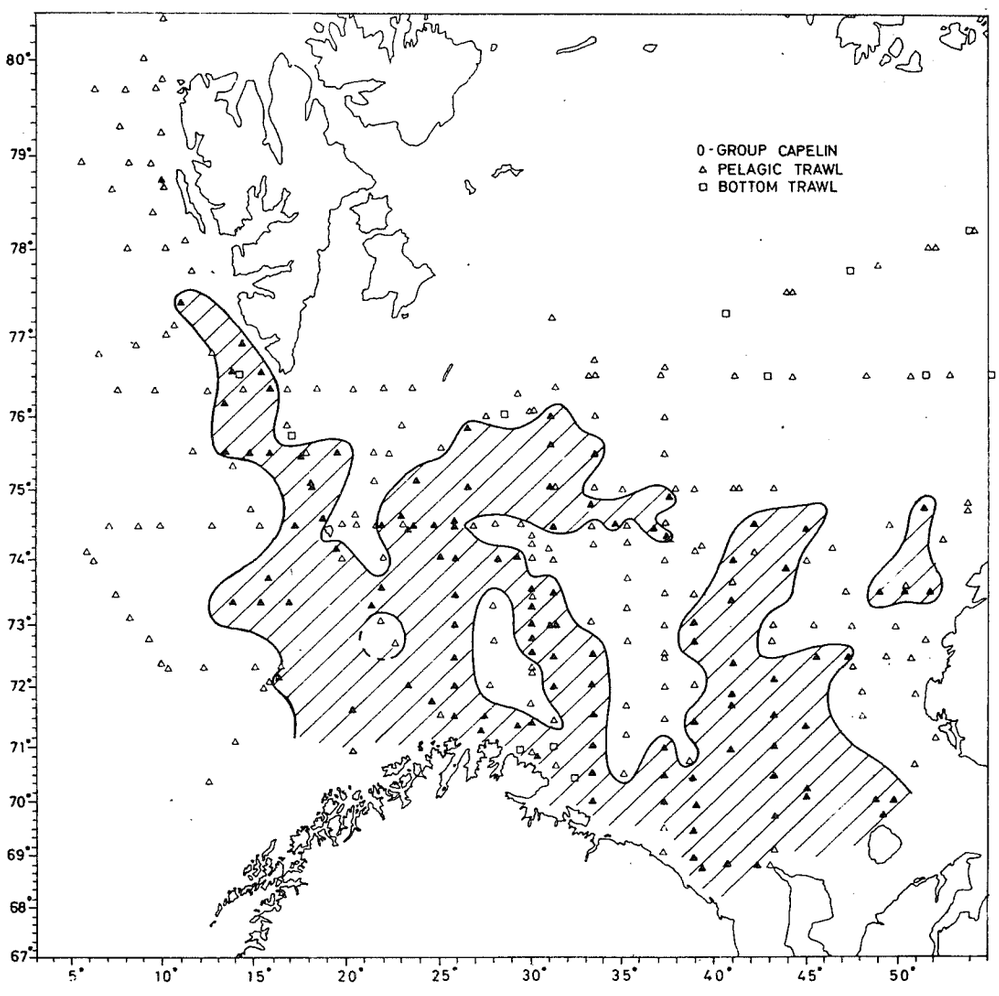

Figure 14. Distribution of 0-group capelin.

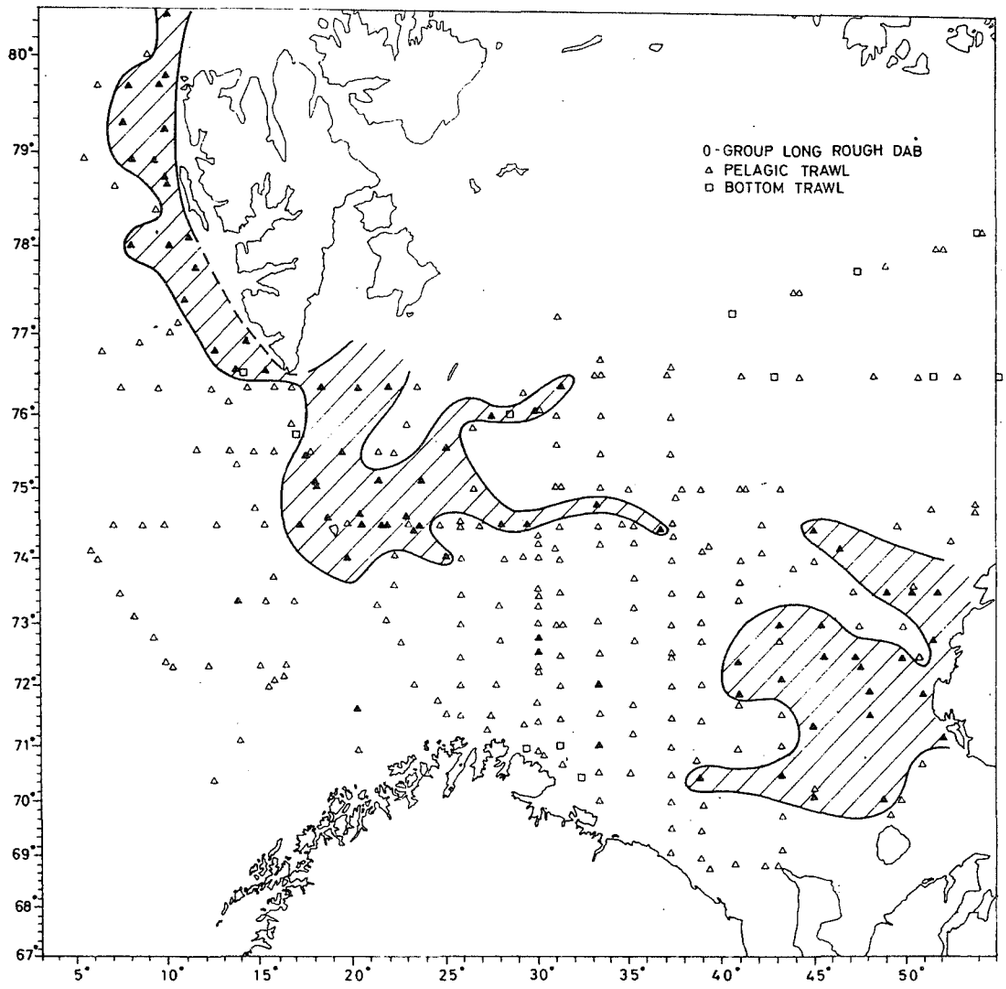

Figure 15. Distribution of 0-group long rough dab.

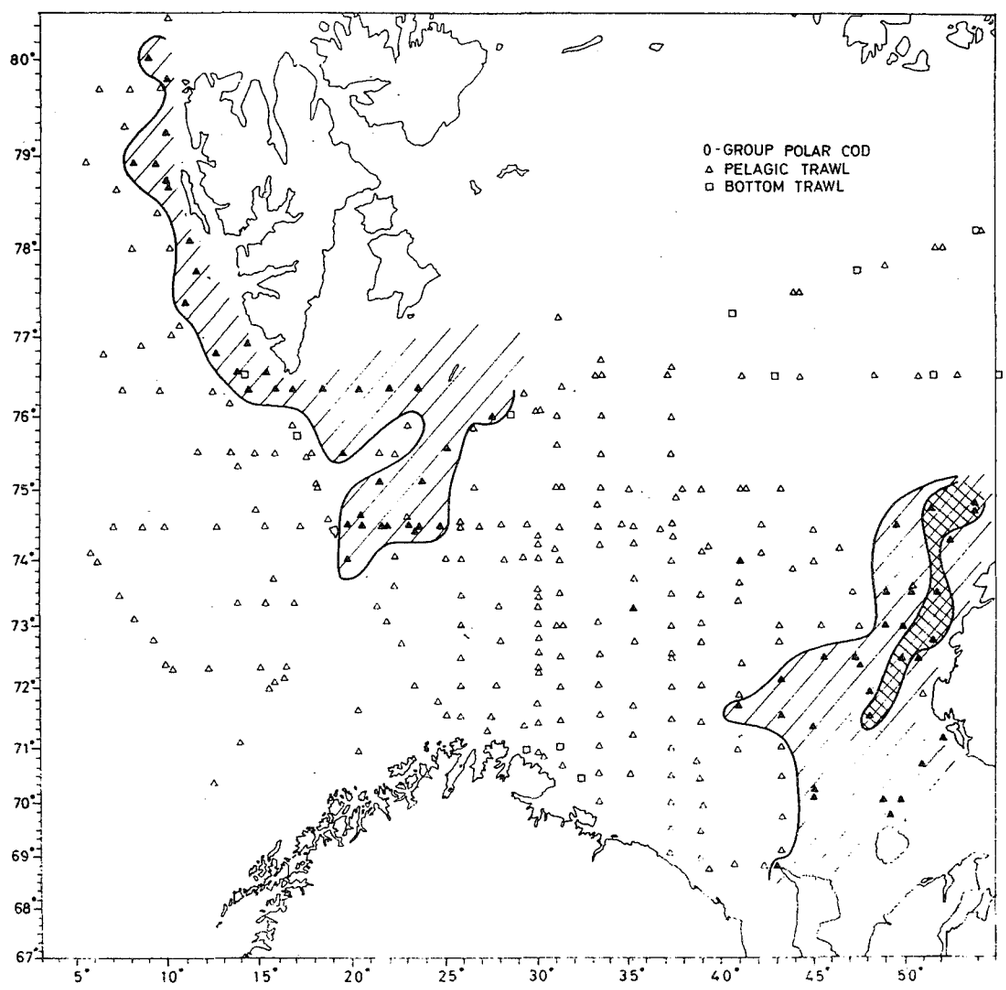

Figure 16. Distribution of 0-group polar cod.

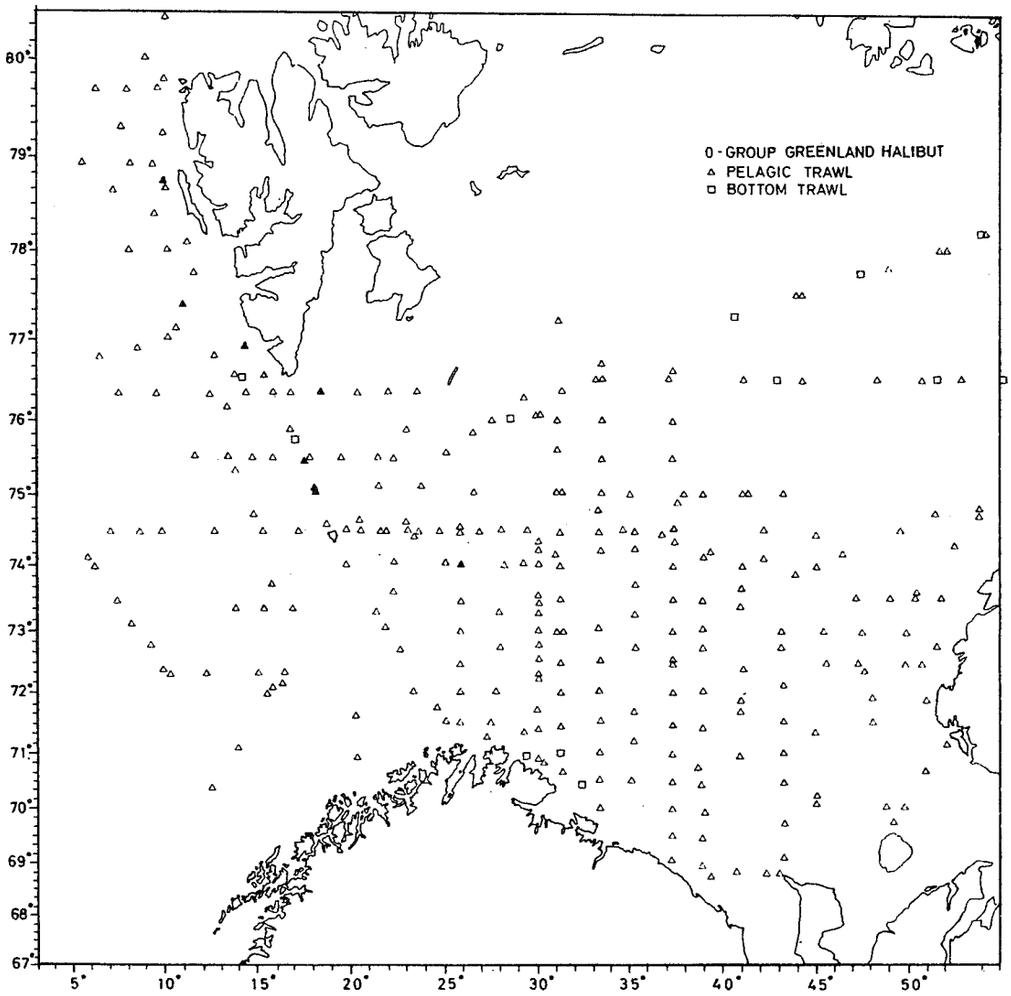

Figure 17. Distribution of 0-group greenland halibut.