



Serial No. 2943
(D.c.1)

ICNAF Res.Doc. 73/21

ANNUAL MEETING - JUNE 1973

Environmental conditions in the region of Georges Bank, Gulf-of Maine, Nantucket Shoal,
and the western part of the Nova Scotia Shelf, 2-28 October 1972

by

A. Furtak
Sea Fisheries Institute
Gdynia, Poland

Introduction

Environmental investigations in conjunction with the ICNAF Larval Herring Survey Program were initiated in 1971 when the participating countries were USA, France, Fed. Rep. Germany and USSR. Poland participated in the program in 1972. Investigations were carried out from the research vessel *Wleczno* of the Sea Fisheries Institute at Gdynia during the period 2-28 October 1972. The environmental studies consisted of measurements of water temperature and sampling water for determination of salinity, dissolved oxygen content and phosphate content.

Methods

Figure 1 represents the distribution of hydrographic stations. The observations were made at so-called "full stations", *i.e.* stations foreseen for working out the hydrological profiles of vertical distribution of salinity, oxygen and phosphate content, as well as at "not full stations" where only surface and bottom samples were taken. Nevertheless, at each of these stations the temperature was additionally measured by means of bathythermograph in order to complete and check on the results of measurements made with deep-sea reversible thermometers (the latter from the surface down to 200 m depth).

The collected samples of sea water were destined for determination of (a) salinity by means of salinometer (MK III) with an accuracy of 0.001‰, (b) phosphate content (the samples were conserved by addition of CHCl_3 and stored until they were analysed in the laboratory on land by means of spectrophotometer), and (c) dissolved oxygen content by Winkler's method.

Short summary of investigation results

The investigations during 2-28 October 1972 covered the regions of Georges Bank, Gulf of Maine, Nantucket Shoal and the western part of the Nova Scotia Shelf. In 1971 Polish hydrographers also investigated the areas during 4-24 October 1971.

The results obtained in October 1972 (Fig. 2 to 6) showed that the particular hydrological elements were much different from those found in October 1971, temperatures during the month of October 1972 being lower than those of the previous year. Temperature measurements indicated a strong transgression of cold water of Labrador current origin. The surface water was colder than at the same time in the previous year, the differences being as follows: in the Gulf of Maine temperatures were 1.0 to 2.5°C lower, whereas in the central part of Georges Bank the surface temperature was 0.5 to 1.0°C lower; on the western part of Georges Bank the deviation was 2.5°C; differences were also found in the western part of the Nova Scotia Shelf where the surface water was 0.5 to 0.9°C colder than in 1971. Similar differences were demonstrated in bottom temperatures: in the western part of Georges Bank the temperatures were 1.0 to 1.5°C lower; in other regions of the bank the bottom temperatures ranged from 0.5 to 2.0°C lower; except for the eastern part of the Gulf of Maine where the difference was about 0.9°C, the bottom temperatures in the areas, situated to the north from the South Channel and to the north-east from Boston, were as much as 2.5°C lower; in the western part of the Nova Scotia Shelf the analogous differences were 1.0 to 1.4°C.

As regards the salinity no significant differences were found. The western part of the Nova Scotia Shelf exhibited an increase in salinity of the surface water by 0.6‰ and an appreciable increase in extension of the 32‰ isohaline to the east from Cape Cod. On the southern slope of Georges Bank the bottom

salinity was higher by about 1‰, whereas it was lower by 0.5 to 1.5‰ in the western part of this bank. A salinity decrease at the bottom by 0.5‰ was also observed at the top of Browns Bank. In the Gulf of Maine no essential differences were detected as regards the bottom salinity except for the 33.5‰ isohaline which in 1972 ran along the meridian of 69°30'W, whereas in the previous October such an isohaline did not exist at all.

Conclusions

1. On the whole the area under investigation was covered in 1972 by colder water than in 1971. This was related to a stronger inflow of transformed Labrador water. The minimal temperature noted was lower by about 1°C than in October 1971.

2. On the north-western slope the hydrologic front was steeper than in 1971 and the range of bottom temperatures therein was found to be from 6 to 14°C, whereas in 1971 the front was more blurred.

The range of the values of the horizontal temperature gradient within the front zone on the north-western slope in 1972 was 0.69 to 1.00°C per sea-mile, whereas on the northern slope in 1971 the front gradient values ranged from 0.5 to 1.14°C per sea-mile.

References

Collected work: Conditions of marine environment and estimation of the state of fish resources of the Northwest Atlantic (ICNAF), Sea Fisheries Institute, Gdynia, 1971 (manuscript).

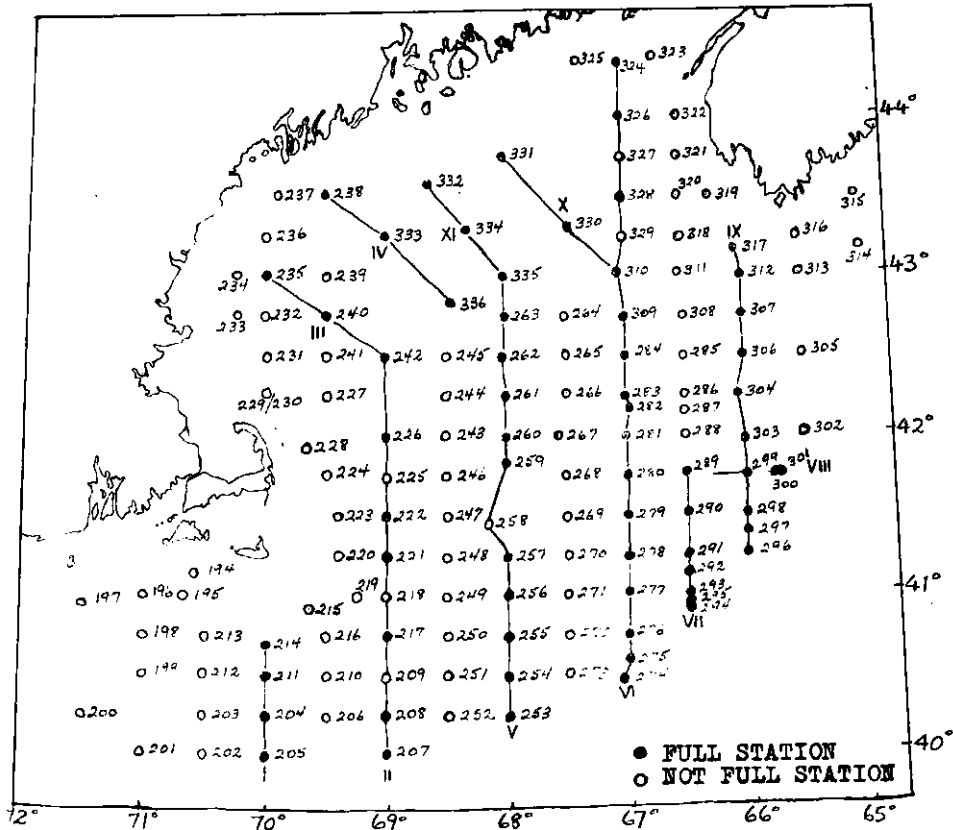


Fig. 1. Distribution of hydrological stations and profiles in the area of Georges Bank, Gulf of Maine, Nantucket Shoal and western part of the Nova Scotia Shelf, RV *Wicazo*, 2-28 October 1972.

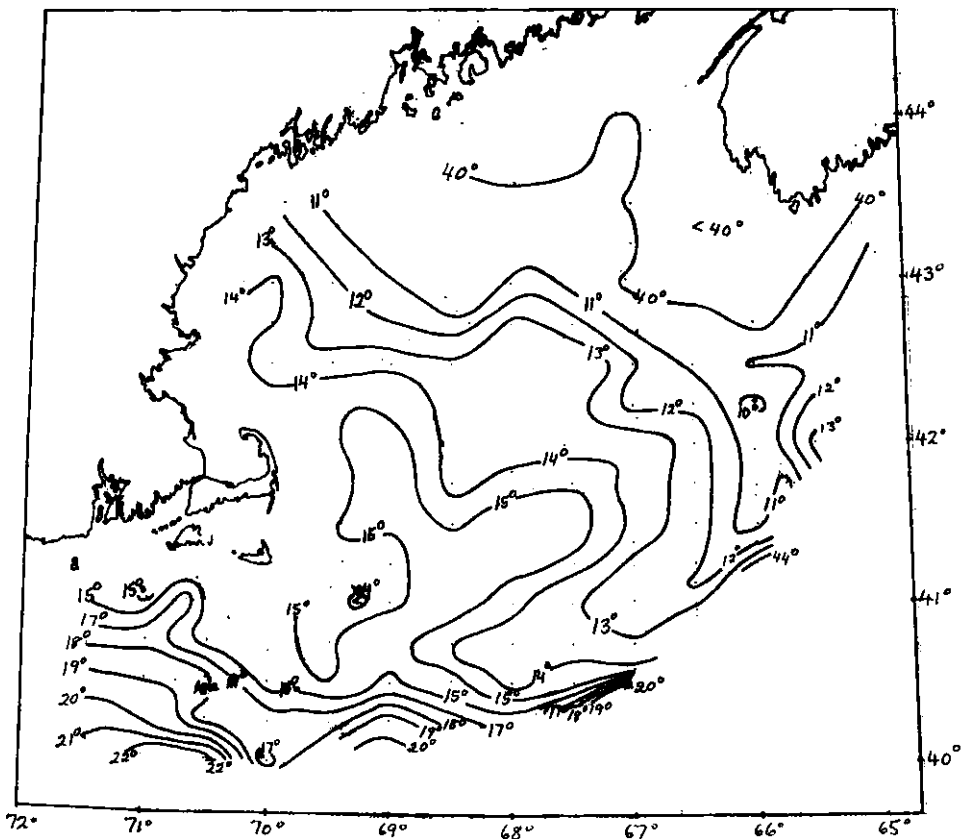


Fig. 2. Distribution of surface isotherms (°C) in the area of Georges Bank, Gulf of Maine and western part of the Nova Scotia Shelf, RV *Wicazo*, 2-28 October 1972.

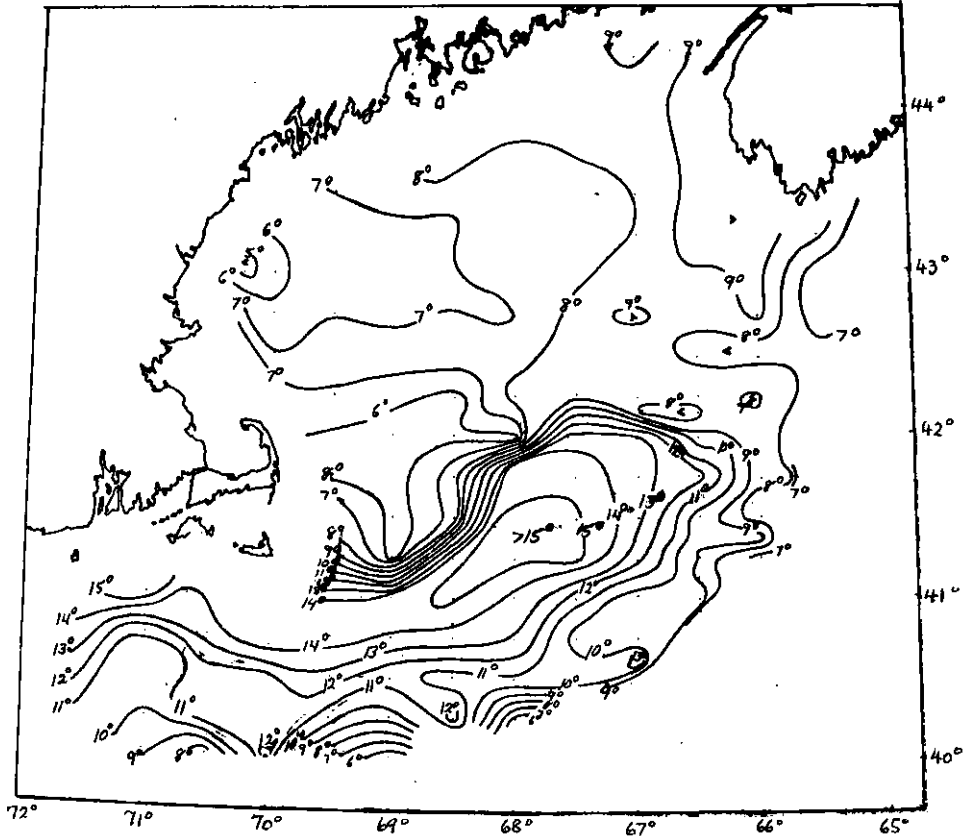


Fig. 3. Distribution of bottom isotherms (°C) in the area of Georges Bank, Gulf of Maine and western part of the Nova Scotia Shelf, RV *Wisconsin*, 2-28 October 1972.

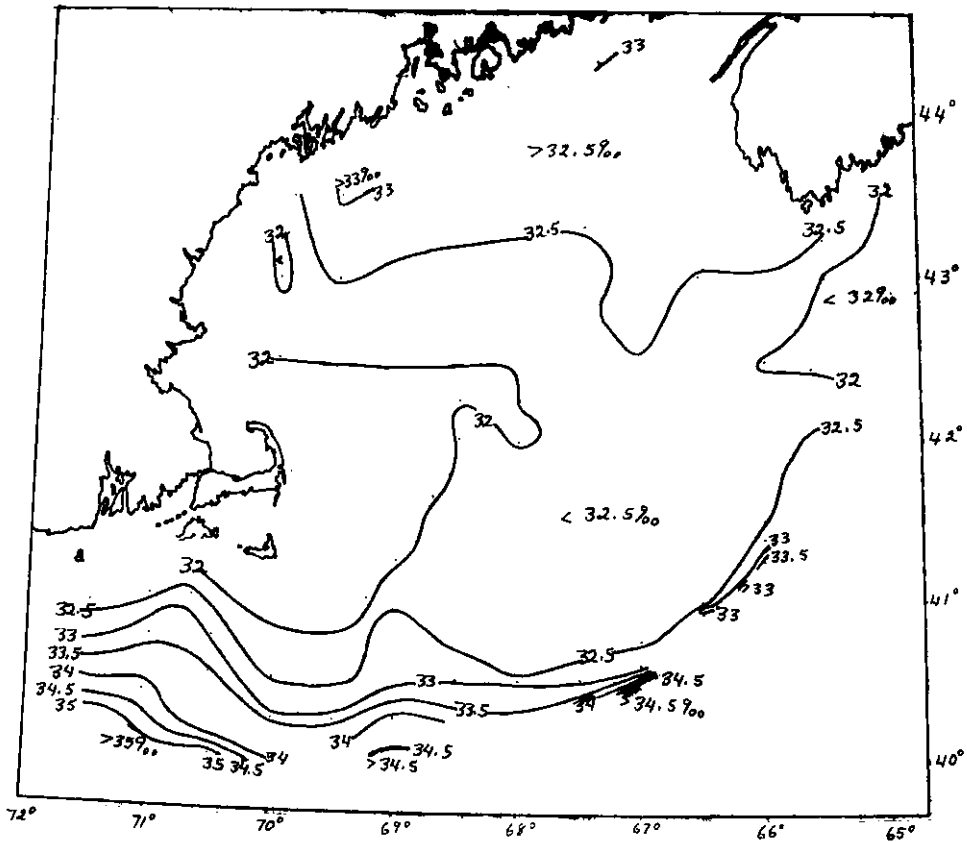


Fig. 4. Distribution of surface isohalines (‰) in the area of Georges Bank, Gulf of Maine and western part of the Nova Scotia Shelf, RV *Wisconsin*, 2-28 October 1972.

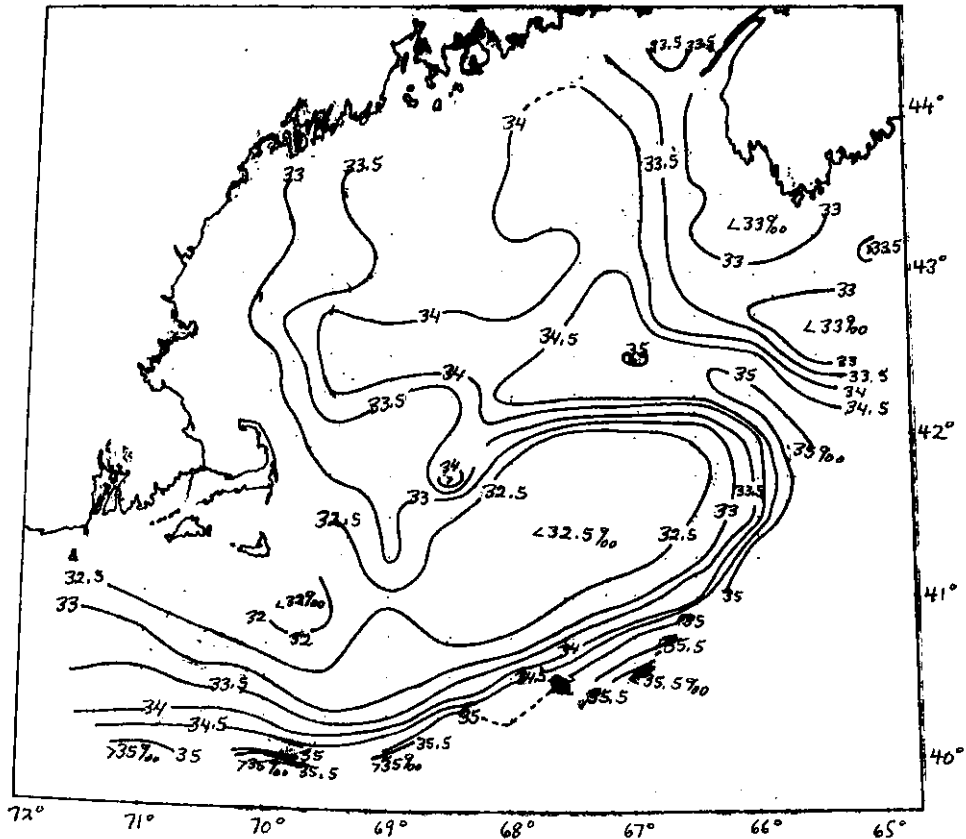


Fig. 5. Distribution of bottom isohalines (‰) in the area of Georges Bank, Gulf of Maine and western part of the Nova Scotia Shelf, RV *Wicazo*, 2-28 October 1972.

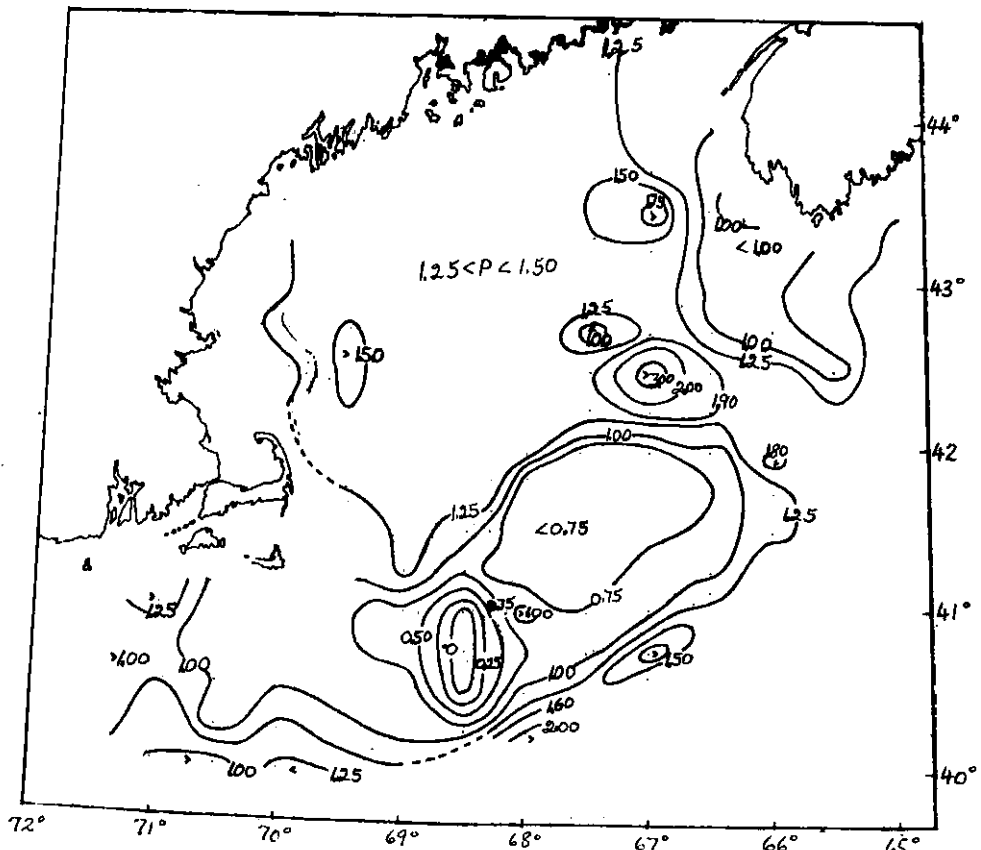


Fig. 6. Distribution of phosphate-phosphorus content (µg atom) of bottom waters in the area of Georges Bank, Gulf of Maine and western part of the Nova Scotia Shelf, RV *Wicazo*, 2-28 October 1972.

