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Subareas 1-5A. Status of the fisheries (cod)

Improved prospects for fishing in the north-east Atlantic led to a substantial redeployment of the U.K. fleet in the second half of the year, with a consequent decrease in fishing effort and nominal catches from north-west Atlantic grounds. Hitherto the fleet fishing in the ICNAF area has comprised wetfish side trawlers, stern freezer and factory trawlers. In 1968 fishing was restricted to the first two categories, and fishing by side trawlers fell to negligible proportions (13 trips compared with 71 in 1967). Fishing by freezer trawlers fell to 60 per cent and the total fishing effort by side and stern trawlers combined was reduced to 55 per cent of the 1967 level.

However, the diversion of U.K. effort has taken place mainly since the summer when catch rates for cod in the north-west Atlantic are tending toward a seasonally low level and, as a result, the average catch-per-unit-effort in 1968 was slightly higher than in 1967. Consequently the 40 per cent fall in nominal catches of cod (76,500 tons in 1967 to 46,000 tons in 1968) was slightly less than the proportional reduction in fishing effort.

The changed distribution of fishing had greatest effect on U.K. fisheries at West Greenland and Newfoundland which were both reduced by about one half. However, at Greenland the catch-per-unit-effort increased slightly in Divisions 1C and 1D and there were a number of outstanding voyages to Division 1F. At Newfoundland and Labrador the catch-per-unit-effort also increased slightly. Fishing in Division 3K was particularly successful early in the year but in general the improvements reflect seasonal change in the distribution of fishing, which in all areas tended to concentrate in the early part of the year when catch rates are highest, rather than to a real improvement in stock abundance. No fishing took place in Subareas 4, 5 or 6.

Routine length and age sampling of commercial landings has continued but no research or charter trips were carried out in the ICNAF area in 1968.

Inspection of the length compositions shows that at West Greenland the average length of cod caught in Divisions D and E was slightly lower than in 1967, but in Division 1F the proportion of cod longer than 60 cm increased considerably. At Newfoundland also, the proportion of small cod increased, particularly in Division 3L where 75 per cent of cod landed measured less than 50 cm. These may be associated with recruitment of the 1964 year class to the fishery. There was no change in the length composition of U.K. landings from Labrador.

B. Special research studies

I Environmental studies

Plankton studies

The survey with Continuous Plankton Recorders, operated from the Oceanographic Laboratory, Edinburgh, was continued in 1968 on the same basis as previous years in the ICNAF area. It was financed by the U.K. Natural Environment Research Council and by the Department of the United States Navy through contract F61052-67-C0091 between the Scottish Marine Biological Association and the Office of Naval Research, Department of the U.S. Navy.

Recorders, sampling at a depth of ten metres, were towed at monthly intervals along standard routes by cutters of the U.S. Coast Guard and merchant ships from Denmark, Iceland and the United Kingdom. During 1968, there were 1,954 miles of sampling in Subarea 1, 3,460 in Subarea 2, 14,630 in Subarea 3, 4,651 in Subarea 4 and 982 in Subarea 5, making a total of 25,677 miles in the ICNAF area. This sampling forms part of the laboratory's standard survey of the North Atlantic Ocean and the North Sea. Further details may be obtained on request from the Director, Oceanographic Laboratory, Craighall Road, Edinburgh, EH6 4RQ, Scotland.

As in 1967, the spring outbreak of phytoplankton was early in Subareas 2 and 3, with maxima in March in Subarea 3 and April in Subarea 2. Phytoplankton was abundant as usual over the Grand Banks from February until May, but numbers were low in the coastal regions of Subareas 4 and 5, where the highest numbers appeared from September onwards.

Young stages of Calanus finmarchicus (the dominant copepod in the ICNAF area) were abundant in April and May in Subareas 2 and 3, that is much earlier than usual. Numbers of adult Calanus were above average for most of the year in these areas. Copepods were more numerous than usual over the Grand Banks until June, but below average for the rest of the year.

Young stages of the population of Sebastes spp. found in American shelf and slope waters were scarcer in 1968 than any year since they were first found in Recorder samples in 1963. None were found in June and July to the north of the Grand Banks, a region where high numbers usually occur. These results are in sharp contrast with the sampling from the oceanic population of Sebastes south-west of Iceland, outside the ICNAF area, where the larvae were much more abundant than usual.

## II Biological studies

### North Atlantic salmon

The investigation of the West Greenland salmon fishery was continued in 1968. Four scientists from the United Kingdom took part in the programme, together with an English salmon netsman.

The main item in the inshore tagging programme was a fuller test of Northumbrian T-nets, which had been tested to some extent in 1967. Pelagic long lines were also fished. The results of this tagging programme were disappointing as, in all, only 220 fish were caught, of which 41 were tagged. The number of fish caught in a condition fit for tagging was higher in the T-nets (13 out of 23) and the floating long lines (5 out of 11) than in the gill-nets (23 out of 186); the fish caught on long lines were in particularly good condition. Salmon were scarcer on the West Greenland coast in 1968 than in the previous three years and this, no doubt, affected the research catches.

Investigations of the blood and other biochemical characteristics of West Greenland salmon were continued and salmon were collected for parasite studies. The results of the studies of blood groups and liver esterases suggest that the proportion of Scottish-type salmon in the West Greenland stock may be about 20 per cent. This is, however, a preliminary and tentative estimate which requires confirmation.

Four tags have been returned from salmon tagged in West Greenland in 1967. Of these, two were caught in Ireland and one each in Canada and Scotland. A report was received stating that three more fish, bearing Greenland tags, were seen in the Miramichi River (Canada) in 1968.

Investigations in home waters in connection with the Greenland problem have also been continued and, in particular, during the spring of 1968, 37,182 smolts (chiefly hatchery-reared) were tagged in England and Wales from ten river systems, and 21,033 smolts (chiefly wild) were tagged, from four river systems, in Scotland. So far, records have been received of the recapture in the West Greenland fishery in 1968 of twenty of the smolts tagged in the United Kingdom in 1967; five were tagged in England and Wales and fifteen in Scotland.