



Serial No. 1997  
(D. a. 67)

ICNAF Res. Doc. 68/16

ANNUAL MEETING - JUNE 1968

United Kingdom Research Report, 1967

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Subareas 1-5

A. Status of the Fisheries

The expansion in United Kingdom fishing activity in the northwest Atlantic continued in 1967 with an increase of 50 per cent in the overall level of fishing effort and a consequential but rather smaller increase in landings (25 per cent) from 60,000 tons to 75,000 tons. The increased fishing effort reflects further expansion of the freezer trawler fleet, which accounted for 85 per cent of the total effort in 1967. Fishing by side trawlers decreased, and the *Fairtry* factory trawlers were withdrawn from service in this area during the year.

The fishing by the side trawler fleet was restricted to Subareas 1 and 3, with the emphasis on the former, whereas the freezer trawlers fished all five Subareas, centered on Newfoundland. The increase in UK landings is almost entirely accounted for by this increase in fishing in Subarea 3, landings from elsewhere being much the same as in 1966. However, the average annual catch per 100 hours fishing declined by approximately 10 per cent in both Subareas 2 and 3. This index of stock abundance for Subarea 1 showed an improvement, largely due to a short period of very good fishing in the early summer. Catch rates during the latter part of the year were similar to those in 1966.

B. Special Research Studies

I. Sampling of Stocks

Routine length and age sampling of commercial catches has been continued.

In May 1967 a trip was made in a commercial trawler to West Greenland to observe whether codends made of heavier than normal twine were as durable as normal codends worked with a tight, topside chafer. The codend was made of 75s terylene instead of the normal 120s terylene, and was 120 mm mesh. The trawler worked mainly in Frederikshaab Gully; the maximum catch was 300 baskets and bags of 70 baskets were taken aboard in single lifts (1 basket = 30 kg approximately). The catch was almost entirely cod. One codend was used throughout the trip and proved entirely satisfactory, showing no exceptional wear.

In November the M.V. *Ross Renown* was chartered to make a survey of the Newfoundland Grand Bank. Apart from three hauls on Flemish Cap, and a few hauls on top of the bank south of St. John's, trawling was confined to the edge of the bank in 100-135 fathoms eastwards from a point due south of Cape Race, then northwards to the north-east corner, and finally westwards towards Cape Spear.

The catches consisted mainly of cod, haddock being caught in very small numbers. The maximum catch of cod was 90 baskets per two-hour tow. Stratified otolith samples were taken and preliminary examination of the data indicated that approximately 20 per cent, by numbers, of the catch of cod consisted of the 1964 year-class.

Four hundred and forty-three blood samples were also taken from cod for immunogenetical studies. Preliminary results from these show genetical differences in populations from different areas of the bank, with a notable distinction between cod at Flemish Cap and those in the Grand Banks area.

## II. Selectivity experiments

The selectivities of three types of codend were tested on this survey; an Ulstron codend, with and without a tight, topside chafer with the same mesh size as the codend, and a Nufil codend without a topside chafer. The chafer reduced the selection factor of the Ulstron codend for cod from 4.3 to 3.8 (50 per cent points = 495 mm and 440 mm). The Nufil codend had the same selection factor as that of the Ulstron codend (both these materials are forms of polypropylene).

## III. North Atlantic salmon

Investigations of the West Greenland salmon were continued during the autumn of 1967, along the same general lines as in 1966, with particular reference to tagging in the coastal area. No attempts were made in 1967 to catch salmon for tagging in the offshore area. Seven scientists from the United Kingdom took part in the programme with the assistance, over the first part of the inshore tagging programme, of an English netsman.

In 1965 and 1966, gill-nets had been used as the main method of catching fish for tagging but, in both years, only a small portion of the fish caught was in a condition suitable for tagging. Northumbrian T-nets (a form of trap net very similar to the Norwegian kilenot) were therefore fished in 1967, to see if they would produce a higher proportion of taggable fish. Though they were better than the gill-nets in this respect, they caught very few fish. In all 1,546 fish were caught (1,518 by gill-net and 28 by T-net) and, of these, 347 were tagged (332 from the gill-net catches and 15 from the T-net catches). Two of the tagged fish were recaptured in Greenland waters, both within the Godthåb area.

Four of the salmon tagged in Greenland in 1966 were recaptured in home waters during 1967, one in Canada (in the Miramichi estuary) and three in Scotland (two in the Tweed and one in a tributary of the Spey).

Investigations of the blood characteristics (particularly the blood groups) and other biochemical characteristics (e.g., the liver esterases) of West Greenland salmon were continued, and eye lenses were collected for later examination of their protein characteristics. In addition, a number of salmon were examined for parasites.

During the spring of 1967, 22,000 smolts were tagged in England and Wales from two river systems and, in Scotland, 25,444 smolts were tagged, from five river systems. So far, records have been received of the recapture of West Greenland in 1967 of eighteen of the smolts tagged in the United Kingdom in 1966 (three tagged in England and Wales and fifteen tagged in Scotland). Further, a kelt tagged in England and Wales in 1967 was recaptured at West Greenland later in the year.

## IV. Environmental Studies

UK research vessels made no environmental surveys in the ICNAF area in 1967, but members of the Lowestoft, Aberdeen and Edinburgh laboratories were engaged in completing the report of the NORWESTLANT Surveys.

The survey by the Continuous Plankton Recorder, operated from the Oceanographic Laboratory, Edinburgh, was continued in the ICNAF area in 1967, along the same general lines as in previous years. It was financed by H.M. Treasury through the Natural Environment Research Council and by the Department of the United States Navy through Contracts N62558-3612 and 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. The total mileage sampled was 24,000, made up of 2,900 miles in Subarea 1, 4,800 in Subarea 2, 12,700 in Subarea 3, 2,900 in Subarea 4, and 700 miles in Subarea 5.

This sampling forms part of an ecological survey of the North Atlantic Ocean and the North Sea, concerned particularly with the study of the abundance, distribution and composition of the plankton over a long period of years. Detailed information may be obtained on request from the Director, Oceanographic Laboratory, Craighall Road, Edinburgh 6, Scotland.

The spring outbreak of phytoplankton in 1967 was earlier and more abundant than usual in Subareas 1, 2 and 3; *Thalassiosira* spp. and *Chaetoceros* spp. being particularly numerous in May. In contrast, numbers of diatoms were low over the Grand Banks and in coastal waters in Subareas 4 and 5. *Calanus finmarchicus* is the dominant copepod in the ICNAF Area surveyed by the Plankton Recorder. Young stages of *Calanus* were abundant in May in the coastal waters west of Greenland (this is about a month earlier than usual) and numbers were extremely high in oceanic waters east of the Straits of Belle Isle in June. Adult *Calanus* were present in numbers close to the long term mean in oceanic waters, but, like the phytoplankton, were below average in the coastal waters of Areas 4 and 5 and over the Grand Banks. Euphausiacea (mostly *Thysanoessa longicaudata*) were close to or slightly below the average everywhere in 1967.

Young *Sebastes* spp. were abundant in the oceanic populations south and south-east of Greenland, but their numbers were slightly below average in the area east of Newfoundland. The populations of *Sebastes* in these two areas are thought to be separate stocks, identified as such by differences in their patterns of pigmentation.