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Summary of Canadian Research in the Convention Area

by A. W. H. Needler

Canadian research in the fields of particular interest to the International Commission for the Northwest Atlantic Fisheries (ICNAF) -- hydrography and fisheries for the demersal species -- is carried on by the Atlantic Biological Station, St. Andrews, N. B., and the Newfoundland Fisheries Research Station, St. John's, Newfoundland, of the Fisheries Research Board of Canada and the Atlantic Oceanographic Group of the Joint Committee on Oceanography.

Organization. The Atlantic Biological Station established just over fifty years ago was at first a summer station only, dependent very largely on seasonal work by university personnel. During this period the Station did a great deal of exploration and general biological investigation which laid the background for the more intensive work on fisheries problems to which attention was turned when a year-round scientific staff was built up starting about twenty-five years ago.

The Newfoundland Fisheries Research Station was established, as the Newfoundland Fisheries Institute, in 1931. After a period of great activity, during which a steam trawler was operated on fisheries and oceanographic exploration, its building at Bay Bulls burned in 1937, and its work was carried on less actively as part of the Newfoundland Government Laboratory at St. John's until 1944 when it again became more active, operating a small vessel in deep-sea exploration since 1946. It became one of the Fisheries Research Board's stations when Newfoundland became part of Canada in 1949, being known first as the Newfoundland Biological Station and now as the Newfoundland Fisheries Research Station.

The Joint Committee on Oceanography was organized in 1944 for co-operation in hydrographic investigations between Navy, Fisheries Research Board, National Research Council and other government bodies, its scientific personnel being contributed largely by the Board and its vessels by the Navy. Its Atlantic Oceanographic Group was established in 1944 with headquarters at the Atlantic Biological Station.

In 1951 the Newfoundland station spent about two thirds of its efforts on hydrographic and groundfish investigations, with sixteen scientists and technicians working in these fields and an 84-foot wooden motor vessel operating in offshore work; the Atlantic Biological Station spent about one fifth of its efforts in these fields with eight scientists and technicians and the use of small inshore boats only. The Atlantic Oceanographic Group employed eight scientists and technicians and operated a 205-foot steel vessel (a former corvette).

General nature of work. In its first twenty-five years, with very limited personnel and facilities (especially boats), the Atlantic Biological Station carried out a great deal of hydrographic and biological exploration. Augmented by such efforts as the Canadian Fisheries Expedition, 1914-15, and by more recent work this has revealed the main features of the hydrographic and biological picture in Sub-Area 4. Similarly in Sub-Area 3 the picture has been sketched in to quite a degree by the work of the Newfoundland station. Work by other countries has contributed in both. It is still true, however, that much general hydrographic and biological investigation is needed before we know the basic conditions in the region; still less do we know how these conditions change and how these changes affect fisheries productivity. This basic knowledge of the region is far behind that of European waters and investigations are hampered by lack of suitable sea-going research vessels and the scientific personnel to use them. The development of an adequate general program of oceanographic exploration is one of the main problems facing ICNAF. Canada's part in such a program now includes the exploratory work by the Newfoundland station and that of the Atlantic Oceanographic Group but needs to be expanded.

The Canadian investigations more directly concerned with the demersal fisheries have been pursued along two rather different, though related, lines. Canada's fisheries being under-developed, a good deal of effort has been placed on problems of how to find and catch fish. Of more interest to ICNAF is the effort to follow changes in abundance and composition of the fish stocks and to relate these to changes in the fishery. Based on earlier work on fish life histories, migrations and major divisions of stocks, intensive quantitative work in this field is comparatively new and being expanded. It is, of course, directly applicable to the main purposes of the Commission.

Work by Sub-Areas. In Sub-Area 1 Canada has done no work and none is planned.

In Sub-Area 2 very limited hydrographic and biological exploration has been done as an extension of the work in Sub-Area 3. Expansion of work in Sub-Area 2 is planned but worthwhile progress must await availability of better facilities both in ships and personnel.

The work in Sub-Areas 3 and 4 is outlined below.

In Sub-Area 5 Canada has done no work recently and none is planned in the immediate future.

List of Publications and Appendices. To make detail of earlier work more readily available a list of publications is attached. Appendices, enclosed with this summary, include the following:

- A. A summary report of the Maritime Groundfish Investigation. W. R. Martin. December, 1949.
- B. Excerpts from the Report of the Atlantic Biological Station for 1950. A. W. H. Needler.
- C. Excerpts from the Report of the Atlantic Biological Station for 1951. A. W. H. Needler.
- D. Excerpts from the Report for 1949 of the Newfoundland Biological Station. W. Templeman.
- E. Excerpts from the Report for 1950 of the Newfoundland Biological Station. W. Templeman.
- F. Some migrations of Cod on the Atlantic Coast of Canada. W. Templeman. (Presented to Fisheries Research Board, January, 1951).
- G. Excerpts from Report of the Newfoundland Fisheries Research Station for 1951. W. Templeman.

Sub-Area 4.

Hydrography. The general hydrographic features of the area have been explored. Extensive surveys of conditions in the Bay of Fundy and on the continental shelf off Nova Scotia were made many years ago. The Canadian Fisheries Expedition, 1914-15, surveyed the Gulf of St. Lawrence and special expeditions were made to the southern Gulf and Strait of Belle Isle areas about thirty years ago. Regular surface water temperatures have been taken at a number of points -- the oldest series at St. Andrews where they have been continuous for thirty years.

In order to obtain better information on changes in conditions a long-term hydrographic program was initiated by the Atlantic Oceanographic Group in 1950, including quarterly cruises during which important hydrographic sections are made throughout the Sub-Area. These are supplemented by daily observations at several points. Special surveys are made to meet the needs of biological investigations.

The value of this program will emerge as results become available over a long term. It has already revealed how great and sudden may be the changes in conditions on our fishing grounds as a result of the action of storms on stratified waters. A general upward trend in temperature has been shown over the past ten years, which is perhaps a factor in the increasing abundance of haddock and decreasing abundance of cod on banks off Nova Scotia during the same period.

Plans for 1952 include continuation of the long-term program, special surveys of conditions about the Gut of Canso which is to be closed by a causeway, in Grand Manan channel and the Bay of Fundy.

For further detail reference may be made to the later items in Appendix C.

Groundfish. Investigations before 1940 had revealed the growth rates of the principal commercial species of groundfish. Information on migrations had been obtained from tagging and the major divisions of the cod and haddock populations were indicated by differences in vertebral counts, growth, and size and age composition of the stocks. Investigation of general life histories, growth, migration, etc., are being continued on the minor commercial species, halibut, yellowtail (Limanda), winter flounders (Pseudopleuronectes) and others as time and resources permit.

In 1946 intensive sampling of the stocks of the principal commercial species for age and size composition and a special effort to obtain detailed records of where catches are made and with what effort were initiated as a long-term program. This information on the Canadian fishery in Sub-Area 3 can be combined with similar information on those of United States and other countries to give the Commission data on which to assess the need for regulation. To date there is no indication that the cod of Sub-Area 3 are subject to dangerously intensive fishing. The haddock stocks appear to have a somewhat lower total mortality rate than in Sub-Area 5 which, when combined with the slower growth, makes the prospect for benefit from a minimum mesh size poorer. Plans for 1952 include continuation and intensification of this work with more attention to discards of small fish at sea, net selectivity and other matters of direct concern to the Commission.

Further detail can be obtained from Appendices A, B and C.

Sub-Area 3.

Hydrography. Extensive hydrographic surveys have been made by the Newfoundland station in 1931-36 and again since 1946, especially in the region of Grand and St. Pierre Banks, with some extension to the north and into the Gulf. Recently some additional hydrographic work has been arranged by the Atlantic Oceanographic Group in this area and hydrographic data have also been obtained by other nations. The coverage of the Sub-Area from this point of view is, nevertheless, much poorer than it should be. Expansion of Canadian work is planned but progress in the immediate future is limited by lack of suitable sea-going craft. It is to be hoped that an adequate program of hydrographic investigations in this Sub-Area can be arranged by international co-operation through the Commission. Having the most extensive fishing grounds and the largest production of groundfish in the Convention area, and being fished by the majority of the participating countries, Sub-Area 3 deserves a high priority in the Commission's work both as regards hydrographic and groundfish investigations.

Further detail of the work in Sub-Area 3 can be found in Appendices D, E and G.

Groundfish. Extensive sampling of groundfish stocks in relation to hydrographic conditions have been conducted throughout Sub-Area 3 by the Newfoundland station using its 84-foot vessel. These, together with earlier work by the Newfoundland station in 1931-36 and sampling of the commercial fisheries, have revealed much of the pattern of groundfish distribution, migration and division into population units in the Sub-Area. Detail of this work can be found in Appendices D to G. Its continuance and intensification are planned as resources permit.

Since the initiation of such a program in Nova Scotia in 1946 information has been obtained on the areas, fishing effort, size composition and age composition of catches landed there from Sub-Area 3. Similar intensive sampling and detailed recording of places and effort is now being initiated for those catches landed in Newfoundland.

Both the fishery, being international, and the stocks themselves, being spread over a large area with varying conditions, show more diversity in Sub-Area 3 than in other Commission Sub-Areas and generalizations regarding the effects of the fishery on the stocks would now be premature. The detailed results of Canadian work in the Sub-Area in the past three years are given in Appendices D to G.

B I B L I O G R A P H Y

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A. GROUND FISH

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**Second Meeting
Document V e App.**

APPENDICES TO SUMMARY OF CANADIAN
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- A. A Summary Report of the Maritime Groundfish Investigation
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- F. Some Migrations of Cod on the Atlantic Coast of Canada
- by W. Templeman - January 1951
- G. Excerpts from Report of the Newfoundland Research Station
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Figure 1

