

THIRD ANNUAL MEETINGSUMMARY OF CANADIAN GROUND FISH RESEARCH IN THE  
CONVENTION AREA DURING 1952Subarea 2

W. Templeman

In late September, 1952, the "Investigator II" carried out, as in September, 1951, explorations on Hamilton Inlet Bank, Labrador. A No. 36 net was used and many good catches of cod were obtained, the highest catches being at the rate of 5,000, 6,000, 9,000 and 20,000 pounds per hour's dragging. These good catches were at the centre and southern tip of the bank in 89 fathoms and at  $-0.93^{\circ}\text{C}$ . and on the central eastern bulge of the bank where the largest catch was obtained in 132 to 134 fathoms and a temperature of  $1.23^{\circ}\text{C}$ . At latitude  $54^{\circ}21'\text{N}$ . and longitude  $54^{\circ}35'\text{W}$ . in 100 fathoms and  $-0.30^{\circ}\text{C}$ ., American plaice were obtained at the rate of 10,000 pounds per hour's dragging and in the same catch cod were taken at the rate of 6,000 pounds per hour's dragging.

The plaice on this bank were considerably smaller than on the eastern edge of the Grand Bank but could be readily utilized commercially, being mostly between 32 and 50 cm. ( $12\frac{1}{2}$ -20 in.) in length with peak sizes at about 38 cm. (15 in.) and average sizes of about 40 cm. (16 in.). The cod were of moderate size, almost all being between 40 and 70 cm. (16 and  $27\frac{1}{2}$  in.); approximately one-third to one-quarter were between  $1\frac{1}{2}$  and  $2\frac{1}{2}$  pounds and two-thirds to three-quarters were above  $2\frac{1}{2}$  pounds.

A hydrographic section across the Labrador current immediately south of Hamilton Inlet Bank was taken between July 26 and August 3.

Subarea 3

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Haddock - Location of haddock catches and catches of haddock per unit effort by St. John's trawlers were investigated. Haddock landings at St. John's and trawler and "Investigator II" catches were sampled for size and scale and otolith collections. Surveys of haddock populations by otter-trawl with shrimp netting in the cod-end were carried out by the "Investigator II". Measurements were made at sea of haddock caught by commercial trawlers and on shore for haddock sizes landed from the same trips so as to obtain the sizes and numbers discarded. Age readings from scales and otoliths were carried out. Vertebral studies and observations of sex and stage of maturity of haddock were continued. Some work was done on factors for converting gutted to round weight.

Cod - Sampling of cod was continued throughout the area with otolith collections and reading for age and growth, measurements of large numbers of fish, vertebral counts, studies of stomach contents, Porrocaecum and Lernaeocera parasites, and observations on stage of maturity. A large amount of exploration using four 55-foot long-lining boats resulted in the discovery of new fishing

grounds several hundred miles in extent and of largely unused populations of large cod in deep water off the north-east coast of Newfoundland. Large cod were numerous in deep water near and below the border of the below-zero centigrade intermediate cold layer. Studies on age and growth of cod showed great differences in growth in the Newfoundland area. The cod of the Labrador coast at 59 cm. length were 13 years of age compared with an age of 6 years at this size on the southern part of the Grand Bank, while the Newfoundland east coast cod were intermediate in their state of growth. No cod tagging has been done since 1950 when 4,715 cod were tagged at St. John's and Fogo. Of these, 3.6% of the Fogo tags and 3.2% of the St. John's tags were returned in 1952. Of the tagged cod recaptured in 1952, 67 of the Fogo recaptures were from inshore Newfoundland areas and 3 from the northern half of the Grand Bank, while of the St. John's 1952 recaptures 75 were recaptured in inshore Newfoundland areas, one in southern Labrador and 12 from the northern half of the Grand Bank. Information was obtained on conversion factors from gutted to round weight. Studies were made of yield and vitamin A values of oil from cod livers.

Redfish - Explorations of redfish populations by the "Investigator II" were continued with large numbers of measurements and sampling of the populations for vertebral number, age and growth as determined from otoliths, sex and stage of maturity and distribution of the redfish parasite Sphyrion lumpi. Investigations on the south-west edge of the Grand Bank in June showed, as in 1951, redfish increasing considerably in size and the percentage of females gradually increasing proceeding deeper from 100 to 200 fathoms. Researches were continued on the yield and vitamin A values of the oil from redfish livers and redfish waste.

American plaice and witch flounder - Large numbers of measurements of these species were made in catches of the "Investigator II" and by commercial trawlers. Samples were taken throughout the year and in many areas for vertebral number, fin ray count, sex and stage of maturity, and otoliths were taken for age determination.

A rough comparison was made between catches of witch flounder in otter-trawling by the "Investigator II" and those by a smaller Danish seiner in the same area. The advantage lay with the seiner.

Hydrography - Hydrographic sections from the 47° latitude line southward on the Grand Bank and St. Pierre Bank were covered by the "Investigator II" in March and April. In July-August sections were taken across the Labrador current off Bonavista, and all the spring stations from the 47° latitude line southward were repeated. The general hydrographic picture showed high spring temperatures on the Grand Bank as a hold-over from the high summer temperatures of the previous year. Meanwhile north of the Grand Bank and particularly in Labrador more and colder low temperature water existed and this gradually flowed southward during at least the early summer. Thus the bottom water on the Grand Bank was at most stations colder in July-August than in March-April.

#### Subarea 4

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Part of the Canadian groundfish research in Subarea 4 is particularly of national interest: development of fishing methods such as Danish seining; exploration for unexploited inshore resources such as the flounder, Pseudopleuronectes; and life history studies of groundfish parasites such as Porrocaecum. The greater part of the research program is of international interest: identification of stocks; relation of fishery to hydrography; and studies of abundance, recruitment, growth and mortalities. Research in the latter field during 1952 is summarized below.

#### Identification of Stocks

A summary of the current status of our knowledge of the principal groundfish stocks in Subarea 4 has been submitted to the Commission for consideration at the Third Annual Meeting. All four of the important groundfish species (cod, haddock, redfish and halibut) include a number of stocks distinct from one another and from stocks of adjacent subareas. Migratory populations of cod and haddock, living on both inshore and offshore fishing grounds, have been observed in the eastern part of Subarea 4.

A manuscript describing the results of cod tagging from 1930 to 1940 has been prepared for publication. Some 22,000 cod were tagged and about 2,500 of these recaptured. The resulting picture of cod populations includes information on divisions of stocks and their movements in relation to hydrographic conditions, sexual maturity and feeding, all of basic value to a consideration of conservation requirements.

Dr. Scott's forthcoming publication on the yellowtail flounder (Limanda) from three fishing areas shows the stocks of Subarea 4 to be distinct from those of Subarea 5.

Four field men carried out regular sampling of commercial landings of groundfish from both inshore and offshore grounds. The resulting observations on growth, year-class strength and infection with parasites are contributing more precise definitions of the large number of populations of each of the commercially-important groundfish species in Subarea 4.

#### Hydrography

The Atlantic Oceanographic Group carried out regular quarterly cruises in the Bay of Fundy, Scotian Shelf and Gulf of St. Lawrence areas. A long-term program of more frequent observations has been continued at nine coastal points.

Incursions of "slope water" during 1952 had a profound effect on the fishing areas of the Scotian Shelf. During the past few years surface water temperatures have reached the highest average values on record and this climatic change has had an important effect on certain fisheries. Such observations are helping to distinguish fisheries changes which are man-made, and possibly controllable, from those which are natural.

### Catch Statistics

The statistical data collected for Subarea 4 have improved during 1952 with the establishment of a statistical unit of the groundfish research group at Halifax, N.S. Statistics of offshore landings, area fished and fishing effort, from offshore landing records and captains' log books, are compiled on cards. These records of offshore fishing operations provide the basis for compilation of statistical reports, including those required by the Commission. The third of a series of statistical circulars, that for 1949, was distributed during the year. Statistics of small-boat landings are compiled monthly by officers of the Department of Fisheries and summaries by districts are available in annual published statistics. Representative districts are sampled by the groundfish research group for data on catch as related to fishing effort.

In 1952, cod landings continued to make up the bulk of groundfish landings from Subarea 4. Landings are again close to those observed in the 1930's, having declined gradually from the recent peak of about 400 million pounds (200 thousand metric tons) in 1945. Fishing activity was greatly curtailed during war years and the accumulated stocks, resulting from this reduced effort and from continued good recruitment and growth, provided good fishing; cod abundance as measured by catch-per-effort reached a maximum in 1944 and 1945. With increased fishing effort by otter trawlers in post-war years, cod abundance has declined and this is particularly apparent for large cod of 10 pounds and over. In 1952, the abundance of large cod was at a low level throughout the year and cod landings were reduced accordingly. Landings of scrod cod (1½ to 2½ lb.) continued to be small and the quantities of small cod discarded at sea were negligible.

Annual haddock landings from Subarea 4 fluctuate appreciably, now averaging about 80 million pounds (40 thousand metric tons). Regular observations at sea on commercial trawlers showed that about half the haddock caught during the months of May to September, 1952, were discarded at sea, being below marketable size.

Halibut landings from Subarea 4 average about four million pounds (two thousand metric tons). Greatly reduced halibut-fishing effort during war years resulted in an accumulated stock which was quickly exploited in post-war years. In 1952, landings were still above the long-term average.

### Vital Statistics

Commercial groundfish catches were again sampled regularly throughout the area for sizes and ages of fish landed. These data, together with catch and effort statistics, provide information on recruitment, growth and total mortalities. A laboratory technician made about 9,000 age determinations during 1952. A few preliminary observations on the 1952 data may be made.

Cod. Total mortality is highest off western Nova Scotia, relatively low in the Gulf of St. Lawrence and at an intermediate level on eastern and offshore Nova Scotian grounds. The 1939, 1941 and 1943 year-classes have made important contributions to offshore catches during recent years. Mortality rates appear to

have increased and relatively strong year-classes now make insignificant contributions to landings of large cod (over 10 pounds or 10 years).

Haddock growth is slower than in Subarea 5 but mortality rates are not appreciably different. Great variation is found in year-class strength; the 1943 year-class has been particularly important to the fishery. It is predicted that present recruitment will result in continued good availability of haddock in Subarea 4 during 1953.

March 17, 1953.

