

ANNUAL MEETING - JUNE 1955UNITED STATES RESEARCH IN THE CONVENTION AREA DURING 1954SUBAREA 5Haddock (*Melanogrammus aeglefinus* (L.))

Georges Bank Population in 1954. Scrod haddock dominated the fishery during 1954 for the fifth successive year. Earlier indications that the 1952 year class would be a strong one proved true, these fish entering the catches as two-year olds during the spring and summer in unusual numbers. The abundance of scrod depressed the price to a point where the Boston fleet tied up from August 11 to September 15. Because of the large mesh net now in use, practically all of the fish caught were landed and marketed, in sharp contrast to the heavy discard at sea which prevailed under similar conditions in the years prior to mesh regulation.

Total haddock landings from Georges Bank during 1954 were 88 million pounds, which is 17 million pounds more than was landed in 1953. This increase is due to several causes, among which are an increased amount of fishing on Georges Bank and the abundance of scrod from the 1952 year class. Analysis of the 1954 landings is being conducted to determine what part of the increase may be attributed to the application of the mesh regulation during 1953.

Effects of Mesh Regulation. The first opportunity for a critical test of the mesh regulation adopted in June, 1953, will be its effect on the yield of the 1952 year class. The immediate effects are already apparent in the savings of young, unmarketable haddock which would ordinarily have been discarded in large quantities but which appeared in the catches of the large mesh nets in negligible amounts. The predominance of scrod in the landings during the summer months, however, gave the licensed study group of small mesh vessels an advantage in landings over the regulated vessels for the first time since the mesh regulation was effected. The small mesh vessels landed about 20 percent more haddock per trip during the summer months than the vessels using the large mesh. By November and December, however, these fish had increased in size to a point where they were being caught in quantities by the large mesh nets, resulting in a definite advantage to the vessels using the regulation mesh.

Effects of Exemptions. The possibility that an economic problem resulting from the mesh regulation has arisen along the Maine coast is receiving close study. A small fleet of redfish trawlers between 50 and 100 gross tons operating out of Maine ports has been accustomed to augment catches of redfish by catches of haddock on the same trip. In many cases the haddock catches exceed the limits of exemption allowed by the mesh regulation. Although the amounts of haddock involved are small (the total catch of haddock by these vessels amounts to less than two million pounds out of a total catch of all species of about 24 million pounds), the problem is being carefully investigated to determine the normal fishing practices of these vessels, the extent of loss to the fishermen, if any, and if the situation can be alleviated within the scope of the present regulation or by suitable modifications which will not jeopardize its purposes.

Certification of Nets. The practice of certifying new cod ends constructed of 45 yard doubled twine measuring 5-5/8 inches between knot centres continued during 1954. This size has been found to stabilize at 4-1/2 inches inside dimensions at the half life of the average cod end.

Food Habits. Crustaceans were found to be the major food of Georges Bank haddock. Mollusks, echinoderms, and annelids were of secondary importance as food items; fish were of minor importance.

Browns Bank haddock were found to subsist primarily upon echinoderms and crustaceans. Mollusks, annelids, and fish constituted a relatively small portion of the diet. Compared with haddock from the Northeast Peak of Georges Bank, the Browns Bank specimens contained noticeably smaller amounts of amphipods and pelecypods, and a much greater quantity of brittle-stars.

The average volume of stomach contents of haddock from Browns Bank was 39 percent less than Georges Bank specimens (all samples), and 28 percent less than comparable specimens from the Northeast Peak of Georges Bank.

Drift of Eggs and Larvae. The results of the early life history studies of haddock undertaken in the spring and fall of 1953 in an effort to predict year class strength and to determine the causes of fluctuations in year class strength are now being compiled. These results show that the non-tidal drift pattern was such that the majority of larvae hatched from eggs spawned on Georges Bank were swept off the southern edge of the bank and lost. The larvae hatched from eggs spawned on Browns Bank were carried into the Gulf of Maine where conditions were favourable for survival. The distribution of zero-group haddock determined from sampling in the fall of 1953 confirms the above conclusions. All evidence indicates that the 1953 year class of haddock on both Georges and Browns Banks was dependent upon the success of spawning and survival of haddock from the latter area.

Haddock Tagging. Tagging of line-trawl caught haddock continued during 1953 on inshore grounds. During these experiments, various types of tags were tested. The highest percentage of returns was from a Lea capsule anchored internally to a plastic belly tag by a nickel-silver chain.

Conversion Factors. Groundfish were measured and weighed by observers at sea and then marked with numbered discs. These fish were gutted and iced down in the hold with the rest of the catch. Whenever possible, fish were distributed from top to bottom of the pens. Upon arrival at port, these marked fish were recovered by the observers and again measured and weighed. Results have been obtained for 1,260 haddock, 151 cod, and 127 pollock for four seasons of the year. Some information has been obtained for cusk and hake. This work is continuing.

Silver Hake (*Merluccius bilinearis* (Mitchill))

Silver Hake Mesh Selection. Cod end covers of shrimp netting were used to test the escape of the silver hake through cod end meshes. Nine cod ends differing in mesh size and material were tested. Manila, cotton, and nylon cod ends of 2-1/2 inch and 3-1/2 inch mesh size were compared in alternate tows. Significant differences in the selectivity of these materials were found.

By using covers on various forward parts of the trawl, it was found that good quantities of silver hake escape at these points but with very little selection by size, the 50 percent selectivity extending over a size range of about 20 centimetres.

Yellowtail (*Limanda ferruginea* (Storer))

General. A program for investigation of the yellowtail fishery was started in late 1954. This program will include investigation of the related industrial (trash) fishery, since the latter fishery is now followed on many fishing grounds which formerly were highly productive in yellowtail. Concurrently with the decline of yellowtail landings from the southern New England fishing grounds and the rise of the industrial fishery there, the abundance of this flounder on Georges Bank has increased.

Redfish (*Sebastes marinus* (L.))

Age and Growth. Field work was continued to obtain additional samples of small redfish in order to collect more evidence for the growth rate of redfish. The data from 1951-1954 were assembled and a manuscript was prepared on age and growth of redfish in the Gulf of Maine. Growth rate studies were begun for the Nova Scotia banks, the Gulf of St. Lawrence and the Grand Bank. Work was also started on estimating the mortality rate in the Gulf of Maine.

Abundance. The abundance of redfish in all areas was measured through market samples of the commercial catch. In the Gulf of Maine and along the Nova Scotian banks the catch per day remained about the same as in 1953. On the Grand Bank, the catch per day declined 10 percent from the 1953 value, whereas the catch per day in the Gulf of St. Lawrence increased 6 percent.

A manuscript is in preparation reviewing the variations in abundance of redfish since 1942, as measured from market samples.

Breeding Habits. Data on sex composition, size at maturity, time of spawning, fecundity and length of the gestation period of the redfish were routinely collected from the commercial catch. Some field work was devoted to investigation of the vertical distribution of redfish fry in the upper waters using plankton nets for sampling.

Racial Studies. Meristic counts on a small series of samples from ten different fishing areas were completed. The measurement of body proportions was begun on redfish from six regions as a study preliminary to more intensive work on racial characters.

SUBAREAS OTHER THAN 5

HADDOCK OF SUBAREA 4

Analysis of abundance data collected since 1930 from the fishing activities of U.S. vessels fishing in Subarea 4 has been completed for those areas and years in which sufficient data were available. Fifteen years records on trends in abundance in the Browns Bank area shows high abundance for the first and second quarters of each year, the only periods in which this area is fished to an appreciable extent by the United States fleet. The abundance since the war years has remained relatively constant. There is no evidence of depletion of the stock.

Growth rates determined from scale readings for the Browns Bank area are in good agreement with rates derived by other investigations for the same and adjacent areas in Subarea 4. The growth rate and length-frequency data indicate that the fish on Browns Bank do not become fully available until the age of six. The total mortality rate is estimated to be about 35 percent. Comparisons of the Browns Bank fish with the fish of the Lockeport area fished by the Canadian inshore fleet indicates the two fisheries are exploiting substantially the same stock.

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