



Serial No. 363

Document No. 4

ANNUAL MEETING -- JUNE 1956

UNITED STATES RESEARCH IN THE CONVENTION AREA DURING 1955

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SUBAREA 5Haddock (Melanogrammus aeglefinus (L.))

Georges Bank Population in 1955. Scrod landings were considerably lower than in 1954 but still were dominant over large haddock landings as in the previous five years. The very successful 1952 year class was dominant again, as it had been in 1954, and was landed as large haddock and as large sized scrod.

Haddock were abundant but the total landings were lower than in 1954 due to decreased effort. The landings consisted of 81 million pounds, of which 46 million were scrod and 35 million were large haddock.

The 1953 and 1954 year classes appear to be relatively scarce. It is too early to measure the strength of the 1955 year class. A period of relatively low abundance is expected next year due to the poor contributions of the year classes entering since 1952.

Effects of Mesh Regulation. The study boat program was continued throughout the year. Six vessels were licensed to fish with the old small mesh nets to provide an index of abundance of incoming year classes comparable with that obtained before regulation. At the same time these vessels furnish valuable information on the sizes and quantities of fish saved by the larger mesh.

The sea sampling program was also continued throughout the year. Two observers were employed to make regular trips on the commercial trawlers, both regulation and licensed vessels, in order to record the numbers and sizes of fish discarded as well as to make other observations relevant to the assessment of the mesh regulation.

The nets with larger mesh cod ends continued to release under-sized haddock but caught more large fish than the nets with small mesh -- a continued indication of the greater efficiency of the large mesh gear as a fishing device.

A study of the effect of saving the small haddock, the conservation value of the regulation, was continued. The relative abundance of each incoming year class was determined, and the pounds landed per unit of effort throughout the life of each year class were recorded. The 1952 year class promises to provide information needed to give the first preliminary estimate of the values of saving the small fish. This is the first large year class to enter the fishery under the protection of the large mesh gear. The landings of three-year-old fish from this brood (1955 landings) compared with landings of three-year-old fish from earlier broods of similar initial strength should tell us whether the abundance of the 1952 year class is now greater than it would have been if subjected to small mesh fishing during its first two years of life. This test will by no means be conclusive. Some three-year-old fish are released by large mesh gear. Consequently,

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the full conservation effect is not observed until the fish are four or more years old. Furthermore, it will be necessary to follow several year classes completely through the fishery to obtain results which are statistically reliable.

The Problem of Exemptions: A small fleet of trawlers fishing primarily for species other than haddock do land some trips of haddock in excess of 5,000 pounds although their annual catch of haddock is less than ten percent. Since small mesh is alleged to be necessary for profitable trips of redfish this fleet has petitioned for relief in the form of an annual exemption. A study of the effects of such exemptions on the conservation of the Georges Bank haddock was initiated. A report will be submitted at the next annual meeting.

Certification of Nets: The practice of certifying new cod ends was continued during 1955. Under certain atmospheric conditions there is a shrinkage of twine during storage. For this reason some cod ends manufactured as 5- $\frac{3}{8}$ inches (between knot centers) were not passing the certification test. To insure certification of all nets shipped, most manufacturers voluntarily increased the mesh size of manila (4/50 double) to sizes between 5-11/16 and 6 inches. As a result the after use size (inside, wet) averaged 4-11/16 inches instead of the required 4-1/2 inches.

Certification of a few cod ends made of other materials such as lighter manila, cotton, certain synthetics, and treated twines was also carried out. A large share of this certification was experimental in order to provide information for conversion factors for these types of twine.

Food Habits: An examination of the diet of haddock on Georges Bank was continued. This year the studies were broadened to include collections of bottom fauna on haddock grounds as well as collections of material actually ingested by the fish. Present studies are designed to shed light on the problem of possible selectivity of the haddock in its feeding habits.

Fingerling haddock caught in an Isaacs-Kidd mid water trawl were feeding principally upon planktonic Calanus, not an important food for the bottom living adult haddock. Bottom stages on Georges Bank live almost entirely on bottom living invertebrates. The variety of species eaten would suggest that haddock are not selective feeders. Another important point to be investigated is the relative nutritive value of the common species in the diet. The prime question to be answered by the studies, however, is the extent to which distribution and abundance of food organisms influence the migrations and aggregating of haddock during non-spawning seasons.

Drift of Eggs and Larvae: The program of study of the relation of environmental conditions to year class strength of haddock initiated in 1953 was resumed in 1955. Four plankton-hydrographic cruises were conducted in the spring by the Albatross III over the general area of the Gulf of Maine and Georges Bank. Temperature, salinity, and wind observations were made and drift bottles released.

In the fall months collections were made on the bottom to determine the distribution of fingerlings resulting from the spring spawning. Comparison of all these observations with commercial landings over a five year period will shed light on the factors responsible for the fluctuations in year class strength on Georges Bank.

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Cod (*Gadus callarias* L.)

Although cod is of secondary importance to the United States it is the most important species in the Convention Area from the standpoint of the Commission as a whole. Upon the insistence of the Commission the United States started a study of cod biology in Subarea 5. This is at present in a preliminary stage and no results can be reported. A tagging program was initiated designed to determine the relation of the cod stocks off New Jersey in winter (the southernmost limit of the species) with the stocks found in Subarea 5 in the summer. Over 500 fish were tagged in this initial phase of the program.

Silver Hake (*Merluccius bilinearis* (Mitchill))

An investigation of the biology of this species in Subarea 5 was initiated during the year. Attention was focused first on systematics. It was soon found that *M. bilinearis* is the only species now commercially exploited. The next problem was the division of stocks within this species. Material has now been collected from all the exploited stocks. Analysis of these collections is under way. A tagging technique has been developed which will afford a means of testing any conclusions regarding distribution of stocks within the area.

Data have been collected on growth, mortality, and abundance. A method of age determination has been developed. These studies are designed to determine the extent of the silver hake population in Subarea 5, the degree to which it is fished today, and the fishing pressure which the stocks can withstand.

Flounder Studies

Work is continuing on the biology of the yellowtail flounder (*Limanda ferruginea* (Storer)). Since this species is now less available than other species of flounders work was started on such others as the summer flounder (*Paralichthys dentatus* (L.)) and blackback flounder (*Pseudopleuronectes americanus* (Walbaum)).

Industrial Fishery

An investigation of the processing industry in New England reveals that the principal species now being exploited for meal and oil is the red hake (*Urophycis chuss* (Walbaum)). A study of the biology of this species has been initiated to determine how much pressure the population can withstand. This so-called "trash" fishery takes other species as well and all of these are receiving some attention.

Redfish (*Sebastes marinus* (L.))

Abundance Studies. The recording of landings and fishing effort for all areas fished (Commission Subareas 3, 4, and 5) was continued routinely at the three major U.S. redfish ports (Rockland and Portland, Maine; and Gloucester, Mass.). Catch per unit effort was computed for all areas.

Results of these studies are presented in the following table:

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Comparison of Preliminary 1955 Catch Per Day Estimates
With 1954 Data

	<u>1954</u>		<u>1955</u>	
	<u>Landings</u>	<u>C/D</u>	<u>Landings</u>	<u>C/D (Approx.)</u>
Gulf of Maine	28,622.0	7.42	26,770.7	8.1
Nova Scotia Banks	48,722.0	24.24	28,309.7	20 +
Gulf of St. Lawrence	40,652.4	25.00	77,412.1	26
Grand Banks	68,939.6	38.60	26,154.3	30

Much effort in the Gulf of St. Lawrence was on virgin stocks of redfish. The reduction in catch per day on the Grand Banks has been the most spectacular feature of the abundance study. It would appear that a level of equilibrium at 20-25 thousand pounds per day is likely in another two or three years. High was 67 thousand pounds per day in 1951.

Age and Growth. With the validity of age determinations accepted, the program was expanded to obtain age compositions of populations, especially of pre-commercial sizes. Age determination of fishes from the Grand Bank is more difficult than of fishes from the Gulf of Maine.

Breeding Habits. Sex ratios, sizes at maturity, time of spawning, fecundity, and lengths of gestation periods were routinely recorded from commercial landings. Essential knowledge of the breeding habits of stocks in the Northwest Atlantic is slowly accumulating.

Racial Studies. Important work on the problem of racial differentiation has been conducted. Only in the Gulf of St. Lawrence is there any indication of two groups of fish and this lead requires further testing.

SUBAREA 4

Haddock

The U.S. completed its study of the haddock in Subarea 4. Growth rates were determined for two stocks, Browns Bank and Sable Island, and provisional computations of population dynamics of these stocks were made. Further study of the haddock in Subarea 4 is now the responsibility of Canada.

Redfish

See under Subarea 5.

SUBAREA 3

Redfish

See under Subarea 5.

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Hydrography

U.S. Coast Guard participating in International Ice Patrol examined the Physical Oceanography of the Grand Banks Region and the Labrador Sea during April, May, June and July including one cruise from Flemish Cap to the tail of the Bank, two cruises over the N.E. slope of the Grand Banks north of the Latitude of Flemish Cap and the usual post season cruise from the Bonaventure triangle to Cape Farewell. This material is in press, and will be published in the U.S. Coast Guard Bulletin #41.

The U.S. Fish and Wildlife Service (N.A. section) in connection with surveys of haddock eggs and larvae has collected temperature (bathythermograph) and surface salinity data in Subarea 5 during the period, late February to end of May and again in September. Nearly 3,400 drift bottles were released in the course of the spring surveys. The results of the 1953 field season are nearly ready for publication.

The Woods Hole Oceanographic Institution commenced in July a three year study of the waters of the continental shelf south of New England. One cruise was made in August.

- THE END -

April 12, 1956.

