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United States Research in the Convention Area During 1957

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SUBAREA 5

Haddock (Melanogrammus aeglefinus (L.))

The Fishery. U.S. haddock landings were considerably lower than in 1956. At Boston, the primary haddock port, landings were 12 percent below 1956 with a decline of 5 percent in effort. Scrod haddock were landed in slightly greater quantities than large.

Preliminary analysis of Georges Bank age composition shows the 1952 and 1954 year classes to be dominant--the former in the Western area, the latter in the Eastern part. The cycle of alternation of large and small year classes thus continues.

Tagging. A tagging program in Subdivisions 4X, 5Y and 5Z was carried out jointly by Canadian and U.S. biologists. Major taggings (500 or more fish) were conducted at eight widely separated points in spring and fall cruises. The expanded program was made possible by development of new tags. The most promising is a plastic tube ("spaghetti") type fastened dorsally. About 6,000 haddock were tagged by U.S. biologists. Returns have run as high as 6.3 percent at the end of the first year.

Age Determination. Special studies of otoliths and scales designed to refine the age readings are continuing. Fin rays show some promise in connection with age determination.

Effects of Mesh Regulation. Length frequency studies continue to show the selective effect of the  $4\frac{1}{2}$  inch regulation mesh. The average weight per fish of the 1952 year class continues high as reported last year.

An assessment of the benefits of saving the small fish is still confined to a study of the 1952 year class, the only large class available for this study since the regulation was brought into practice. The current year's data on this year class indicate the year class may have been larger than originally supposed.

Canadian and U.S. biologists are making an intensive joint study of the measure of the initial strength of the 1952 year class as compared with two large pre-regulation year classes, 1948 and 1950.

The licensing of small mesh study boats was discontinued in June 1957. The data obtained from these vessels is being used in the above study of initial brood strengths.

Cod (Gadus callarias L.)

Definition of Stocks. Over 3,000 fish have been tagged with recoveries running to 300 to date. The results have not yet been completely analyzed but preliminary study indicates four main stocks in the Subarea.

Effect of Large Mesh. Analysis of length frequencies show that the  $4\frac{1}{2}$  inch minimum mesh regulation in Subarea 5 has had no effect on landings of cod in the U.S. and that a mesh size of  $5\frac{1}{2}$  inches would have little or no effect. No small cod are caught by U.S. vessels.

Parasites. More than 5,000 cod were examined for the parasite Lernaecocera. Incidence of infection varies with locality, reaching as high as 30 percent in the northern part of the Gulf of Maine.

Relation to Hydrography. Correlation analysis of temperature and landings of different market categories shows some indication of a positive relationship between the recent warming trend and a decrease in abundance of large cod.

#### Silver Hake (Merluccius bilinearis (Mitchell))

The Fishery. This species continues to be an important one in the United States. Total landings for 1957 were about 25 percent higher than in 1956. Abundance is higher on the offshore banks than inshore. During the summer months landings by offshore medium otter trawlers exceeded 38 thousand tons as compared with 20 thousand tons in 1956.

Definition of Stocks. The hypothesis that two stocks are present in the general area is being tested by the use of spaghetti type tags which show promise of great usefulness. One fish was recaptured 44 miles from the tagging site 6½ months after release.

#### Flounder

Landings of most species of flounders were little changed over last year but yellowtail flounder (Limanda ferruginea (Storer)) was considerably more abundant than in the last few years due, apparently, to large year classes in 1954 and 1955. Yellowtail effort and abundance studies are being refined.

Tagging operations are clarifying the complex movements of yellowtail populations in the area, a movement which extends for at least 200 miles. Fish frequenting the southeast part of Georges Bank in August migrate as far south as Block Island (off Woods Hole) in the winter.

#### Redfish (Sebastes marinus (L.))

Landings of redfish for the calendar year have held fairly steady although there have been seasonal and local variations. Landings from Subarea 5 were somewhat less, due to diversion of some vessels to silver hake fishing. Abundance as shown by catch per day figures are about the same as last year.

Eastport Stock. Studies of this shallow water stock have continued. To date, 5185 fish have been tagged; 1388 have been recaptured and released, of which 3 have been recaptured four times. The following conclusions can be drawn from studies of this stock:

1. The fish are resistant to tagging.
2. They do not stray far from home.
3. Growth rate is slow (3.3 mm. in 17 months).

Racial Studies. An extensive series of dimensions has been described for use by ICNAF biologists in preparation for the coming Redfish Symposium.

#### Industrial Fishery

Landings of non-food species for meal and oil continue to expand, particularly in the Gloucester area. Species composition of the catch remains about the same, with Red Hake (Urophycis chuss (Walb.)) predominating.

Regular sampling of the catch continues. Data on lengths, numbers, pounds, and ages are collected for all principal species.

Sea Scallops (Placopecten magellanicus Gmelin)

Landings in 1957 increased about 20 percent over 1956 with abundance increasing from 1421 to 1623 pounds per day.

Current information on growth rate and mortality rates indicate desirability of advancing age of capture by increasing size of rings in dredges.

More refined measures of growth and mortality are being obtained through tagging experiments. About 6,000 scallops were tagged in one area. These are being recovered in large numbers by the commercial fleet.

Plankton Ecology

The study of relations of fish eggs and larvae to environmental conditions and water drift patterns is continuing. The accumulated data for 1953, 1955, 1956 and 1957 are being summarized.

There are indications that haddock larvae remain in the upper layers longer than previously suspected.

On one cruise, in May 1956, the lethal effect of warm water on larvae of cold water species was observed. In an area where Georges Bank water had mixed with Gulf Stream water, all the larvae of a number of Georges Bank species were dead whereas the larvae from more southern species were undamaged.

Bottom Ecology

A better understanding of the food habits of haddock and other bottom dwelling fish is developing from recent surveys of Georges Bank. This study was broadened to include a census of bottom invertebrates and a survey of sediment types. Emerging from these is a picture of sedimentary pattern over Georges Bank with a knowledge of physical and chemical properties. The invertebrate fauna is related to this, and the demersal fish in their turn to the faunal distribution. The study is based on 540 sediment samples and 200 bottom fauna samples as well as numerous fish stomach samples in addition to those already analyzed.

OTHER SUBAREAS

Most of the United States research was restricted to Subarea 5. The haddock tagging, however, extended into Subarea 4, and redfish abundance studies and racial studies included work on catches from Subareas 3 and 4, as in past years. All of these investigations are adequately covered in the summary of research for Subarea 5.

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