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United States Research in the Convention Area during 1959

A. by Herbert W. Graham
Laboratory Director, Bureau of Commercial Fisheries
Biological Laboratory, Woods Hole, Mass.

SUBAREA 5^a)

Haddock (Melanogrammus aeglefinus (L.))

The Fishery. U.S. haddock landings were lower again this year, continuing the trend begun in 1957 (see Table 1). There was an increase in effort but a slight decrease in the catch per unit of effort. As had been anticipated, there was not a strong recruitment of 1956 year-class fish (about 29% of the total catch) and the large 1954 year class was still contributing significantly (about 13% of the total catch).

Table 1. Trends in the Subarea 5 haddock fishery¹⁾

Year	Large	Scrod	Total	Days fished ^c	Catch/Day
1956	55.6	52.3	107.9	7763	13.9
1957	51.4	49.5	100.9	9090	11.1
1958	43.1	38.4	81.5	9261	8.8
1959 ²⁾	42.2	36.0	78.2	9455	8.3

1) Landings in millions of pounds.

2) Based on a preliminary analysis.

Evaluation of the Mesh Regulation. The 1952 year class of haddock has now virtually passed through the fishery, making possible a new evaluation of the Subarea 5 mesh regulation. The 1952 year class was fished almost entirely with the regulation (4½-inch) cod end mesh. Through age 5, the 1948 year class (fished with small mesh nets) and the 1952 year class yielded nearly equal numbers of fish. However, landings from the 1952 year class weighed almost 20 percent more than landings from the 1948 year class. This difference is considered to be the result of mesh regulation.

Young-of-the-Year Survey. Surveys of young-of-the-year (or pre-recruit haddock) have been made for several years now. These surveys are concerned with Subarea 5 and Subdivision 4X. Approximately one month of sea time is devoted to surveying the banks to assess the strength of young-of-the-year and 1-year-old haddock. In general these surveys have yielded data on pre-recruit abundance that has subsequently been verified, in magnitude at least, by the landings of the commercial fleet. Although no unusually large year class has yet been detected, some amelioration of the downward trend of the past few years is expected on the basis of the surveys made in 1958 and 1959.

a) Most of U.S. research was restricted to Subarea 5. Studies conducted in other subareas are included in this report with appropriate reference to region concerned.

Age Determination. The techniques and validity of aging haddock, using scales, have been carefully re-examined and a report on this study will soon be ready for publication. The validity of the scale aging method through the first years of life for Georges Bank haddock is now regarded as being established beyond a reasonable doubt. Further studies on the aging problem using techniques other than the scale method are progressing satisfactorily.

Ecology. The study of the haddock's ecology on particular grounds, mentioned in last year's research report (1958), is progressing satisfactorily. Studies of the seasonal changes in gonads and other organs are also under way. Of particular interest is the seasonal change in liver weight and its inverse relationship to gonad weight. There is evidence that the developing gonads depend largely on reserves held in the liver, as well as material from other parts of the body.

Cod (Gadus morhua L.)

The Fishery. Total U.S. landings for 1959 were up about 2 million pounds over the 1958 total of 27 million pounds. This was principally due to an increase in the abundance of market cod (fish from 2½ to 10 pounds). The 1958 increase was due to the presence of unusually large numbers of scrod fish (fish of less than 2½ pounds).

Research. In collaboration with the Woods Hole Biological Laboratory, two U.S. Navy airships (blimps) dropped drift bottles over an area of more than 10,000 square miles of ocean surface in one night (February 1959). The resulting drift data will help to clarify the nature of surface currents off the coast of New Jersey and the effect of these currents on the fate of eggs and larvae of the codfish that spawn here.

Further analysis of tag returns has yielded some valuable comparative data on the types of tags that have been used. Petersen disc tags with the pin applied through the dorsal musculature give better results in terms of returns than the modified Lea tags previously used, regardless of the time at large.

A study of the emigration of the larger cod to colder waters in Subareas 4 and 5 has been completed.

Redfish (Sebastes marinus (L.))

The U.S. redfish landings in 1959 were about 137 million pounds, 10 million pounds less than 1958 and the second lowest amount since 1946. This continues the trend of gradual decline in redfish landings since reaching a peak in 1951. About 29 million pounds of this year's total were caught in the Gulf of Maine, 50 million on the Nova Scotian banks, 38 million on the Grand Bank, and 20 million in the Gulf of St. Lawrence. The Labrador coast fishery that was opened in 1958 did not develop as anticipated this year.

The Gulf of Maine redfish fishery remains fairly constant in abundance with an average catch of close to 10 thousand pounds per day in 1959. On the Grand Bank and Nova Scotian banks fishing effort increased slightly while catch-per-day decreased about 10 percent from the 1958 values, ranging between 21 and 33 thousand pounds per day on different grounds. Fishing effort decreased in the Gulf of St. Lawrence while the catch-per-day rose slightly to 21 thousand pounds.

Research. Field work was concentrated on the inshore stock of redfish at Eastport, Maine. Routine sampling of the commercial landings at the four major redfish ports was continued for length, age and abundance analysis, and for spawning, racial, and parasite studies.

Kelly reported on three aspects of his work at the Redfish Symposium at Copenhagen in October.

The measurement of a long series of meristic and morphometric characters designed to clarify the status of subspecies of Sebastes marinus did not show a clear separation between marinus-type and mentella-type redfish. Diameter of orbit was the most variable morphometric characteristic, but the measurements did not separate the fish into two groups of large-eyed and small-eyed fish. Instead, at least four modal peaks of eye size were present in the combined sample from all areas studied, suggesting that more comprehensive sampling may disclose a normal distribution of eye size for the whole Sebastes population.

There was a wide range in the average length of redfish sampled from different areas. Despite the differences in length range and eye size, there was very little difference in meristic characteristics, the differences suggesting a possible clinal distribution of meristic characteristics in the whole North Atlantic population.

Mid-water sampling of young redfish (10 to 60 mm) in the Gulf of Maine has revealed some important information on the duration of the pelagic period and the growth and vertical distribution of the larvae during that time. Newly spawned young (5 to 6 mm) appear at the surface in the spring. As they grow to 10-15 mm the larvae move down into the thermocline, remaining there until about 25 mm in length. Beyond this size they move even deeper into cooler water where they live until they reach an average length of 50 mm and then move to the bottom. The pelagic period is about 5½ months in duration, long enough to permit the young fish to drift long distances in the water currents.

Study of the inshore stock of redfish at Eastport, Maine, has provided observation of the live fish in its natural environment. Recapture of a great many tagged fish at the tagging site reveals a rather strong territorial instinct and little tendency to migrate. Otolith studies show the growth rate of tagged fish to be much slower than the growth rate before tagging. Tagging altered the pattern of zone formation in the otolith so that virtually no opaque material was deposited for as long as 3 years after tagging.

Flounder Studies

The Fishery. Landings of yellowtail in 1959 were again high, about 28 million pounds, though slightly lower than in 1958 when about 32 million pounds were landed. Apparently the strong year classes from 1955 and 1956 are now passing out of the fishery. Approximately 24 million pounds of other species of flounders were also landed in 1959.

Research. An analysis of relative abundance (catch per unit of effort) of yellowtail flounder, Limanda ferruginea, has been completed for the three principal New England fishing grounds.

In addition, 3000 yellowtail were tagged in 1959 to further define movements and estimate fishing mortality.

Silver Hake

The Fishery. Total annual landings of silver hake from New England grounds was 85 million pounds, approximately the same as the previous year. The occurrence of smaller fish on the offshore grounds focused the fishing effort on to the larger silver hake located inshore.

Research. Data collected on cruises increased our knowledge of the seasonal distribution of this species. The deep water between 100 and 200 fathoms appears to be the wintering area for some if not most of the silver hake. Cruises made in Subarea 5Z shows that the silver hake intermingle with the deep-water species Merluccius albidus during the winter but separate and move inshore during the summer months. Specific collections are being made of both species to determine the biological and ecological relationship of the two species.

Industrial Fishery

The landings of non-food species of trawl fishes for reduction to meal stopped in September 1959 due to economic factors. As a result, a 4-year continuum of fishery data on certain mixed groundfish populations also came to an end. These data are now being analyzed.

Sea Scallops (Placopecten magellanicus Gmelin)

The Fishery. U.S. landings from the Convention Area in 1959 were 18.7 million pounds, an increase of 11 percent over the 1954-1958 average and an increase of 25 percent over 1958. Fishing effort was 8480 days, down 19 percent from the 1954-1958 average and down 3 percent from 1958. The newly recruited year class made up over 60 percent of the catch. The catch per tow was very high. Either the new year class was unusually abundant or was more densely aggregated than in previous years.

Research. Growth and mortality rates calculated during the year all reinforce the previous conclusion that postponement of first capture would result in a substantial increase in the yield of a year class.

Benthos Investigations

A report describing the Georges Bank groundfish food resources is now being prepared, the quantitative as well as the qualitative aspects being considered. Bottom sediments, which strongly influence many groundfish foods, are also being studied. A survey of Georges Bank bottom sediments has been completed, and this work is now being extended to include the southern Gulf of Maine and Browns Bank. Field work for part of this extended coverage was completed last August.

B. by Lionel A. Walford
The Washington Biological Laboratory

RESEARCH PROGRAM RELATING TO THE ICNAF AREA

The Washington Biological Laboratory is making an analysis by 5-day periods and one-half degree squares of surface temperature observations of commercial vessels as reported to the U.S. National Weather Records Center. Comparative studies are being made of bathythermograph records as reported to the Navy Hydrographic Office and classical hydrographic data obtained from various laboratories in Canada and the United States. A series of maps is being prepared showing in various ways that are likely to have significance to fishery problems, temperature characteristics of the western North Atlantic during 1953 and 1954. The study, begun as a pilot project, demonstrates how this extraordinary volume of material may be utilized to show, in detail, features of the annual temperature regime. These features vary greatly and irregularly from year to year and will be compared over a series of years in order to understand the significance of any one year's anomalies.

A similar analysis is being made of the distribution in time and space of catches per unit of fishing effort of several species of fishes. Maps will be prepared for study in conjunction with those showing temperature fields.

Past and present environmental researches on the continental shelf of eastern North America are being assessed in relation to commercial fishery problems. This study includes an analysis of fishery problems that must be attacked by environmental research; a statement of the necessities of an environmental research program, i.e., the kinds of data needed, their temporal and spacial distribution; a critique on the usefulness or adequacy of such data collected currently or in the past; alternate minimal and optimal plans of systematic field programs to collect adequate data in the future.

The American Geographical Society has made considerable progress in its preparation for launching the Journal of North Atlantic Biogeography, which was described at the last annual meeting of ICNAF. It is hoped that the first issue will be published within a few months. A working base map covering most of the ICNAF area is ready for distribution to scientists for use in preparing manuscripts reporting on geographic studies pertaining to species and their environments. It may be obtained by writing directly to the American Geographical Society, Broadway at 156th Street, New York 32, New York.

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