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The North Atlantic Herring Fishery

A report on the status of our knowledge, as presented to the Atlantic States Marine Fisheries Commission, New York City, N. Y. September 30, 1949

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With few exceptions, the attention of fisheries investigators has been directed towards studies of those fisheries which appeared to be either badly depleted or to be in near danger of depletion. Such North Atlantic fisheries are those for mackerel, haddock, lobster, salmon, rosefish, flounders, shad and clams. Whenever the catches declined markedly, reduced incomes or economic losses occurred among those dependent upon the fisheries. The greater the dependence, the more serious were the effects of the fluctuations.

It may seem strange that along our coast so little has been done to study the herring -- a species noted for its fluctuations in abundance or in availability. The principal reason for the lack of study is that there has never been a request for a thorough biological investigation. Those who have been intimately associated with the fishery are well aware of the erratic behavior of the herring populations. They are not unduly alarmed when the herring in many years fail to appear on some of the usual fishing grounds. Most of those who have had a long acquaintance with this species have developed a philosophical attitude towards the ups and downs of the fishery. They have considered such fluctuations as part of the accepted hazard of the herring industry.

Another reason for the lack of any intensive herring study is that even in relatively poor herring years there have usually been enough fish along the North Atlantic region to meet the major part of the demand. In most years, the available supply has been greater than the demand. For that reason, our statistics of the herring catch do not reflect the abundance or availability of the species. Instead they indicate what quantity was caught to satisfy the domestic and foreign needs.

It is not necessary here to discuss fully the economics of our North Atlantic herring industry, but some explanation is needed. The remarkable expansion and ensuing difficulties which have been so characteristic of other fisheries has not been so evident in the herring fishery. During the past several decades, we have witnessed the tremendous development of the fishery for rosefish and for yellowtail flounders. We have seen the increased effort devoted to the capture of haddock and other groundfish. By comparison the herring industry would seem to have lagged behind, yet we have been processing sardines during the past few years at a rate never before exceeded.

Our fishery is now concentrated on the smaller fish, for herring are at the present time utilized predominantly as canned sardines. Thus there has been a shift in the fishery since former years when great quantities of large herring were prepared in many ways and widely consumed. The larger fish, which were used

in earlier years as pickled, salted or smoked herring, are not now the object of a large organized fishery, for the taste of the American public has been changing. Although the population is increasing, the consumption of pickled, salted and smoked fish shows a downward trend. In addition, these types of prepared herring are imported to compete with the domestic product. Other uses for herring have also decreased. Formerly herring were used extensively for bait in the lobster fishery and in the hand line and longline fisheries for groundfish. In the lobster fishery, rosefish carcasses have been a welcome substitute for herring in much of Northern New England and the use of herring for bait has been reduced to less than half. The hook and line fishery for groundfish has been supplanted by the otter trawl gear which requires no bait.

What will be the future demands upon the herring stock in our region? It is difficult to predict whether the market for canned North Atlantic sardines will be expanded further. During the war years, the sardine canneries processed as much herring as was possible with a scarcity of help. The small fish were canned as sardines and the large herring were packed in round cans. Since the war, the high production of sardines has continued, although the large herring are now in as little demand as in the years immediately preceding the war. There seems to be some question as to whether the United States market can absorb any greatly increased domestic pack, together with the usual amounts of imported sardines. The prospect of establishing export markets for our sardines is not favorable under the existing financial conditions abroad. Therefore, the fishery will probably not be intensified for the purpose of catching and processing more sardines.

There may be attempts to increase the catch of herring for other purposes. The increased use of fish meal for animal feeding and the failure of the California pilchard fishery, which formerly produced large quantities of fish meal, have encouraged the reduction plants to utilize scrap fish and even edible species whenever their market price is low. Consequently, there has been a great increase in the number of fish meal producers in the North Atlantic area. If the fish meal industry continues to expand its operations, it may be anticipated that increased amounts of herring, particularly the larger fish, will be used. What effect an intensified fishery for herring may have on the herring populations cannot be predicted because of our lack of knowledge about this species.

The herring probably is the most numerous fish in the North Atlantic region. On the entire Atlantic coast, only the menhaden seems to be more abundant. In 1948, over 300 million pounds of herring were caught in the Gulf of Maine. In the state of Maine alone, almost 200 million pounds were taken by weirs and stop seines. About 100 million pounds were caught in those parts of New Brunswick and Nova Scotia bordering the Bay of Fundy. Great quantities of this fish are also caught in the remaining parts of the Maritime provinces and Newfoundland. Commercial quantities of herring are taken incidentally with other species between New Hampshire and New Jersey, but only local efforts have been made to develop the fisheries, as for example in Block Island Sound where for the past few winters otter trawlers

have caught several million of pounds of large herring. Pound nets off the New Jersey coast and off Cape Cod and Cape Ann, Massachusetts also take a few millions of pounds each year. However, there is little or no organized effort to establish a large scale herring fishery in any of the regions outside of Maine and the Maritime provinces.

What we know about the life history of our herring consequently must be based on the observations made in the Gulf of Maine where the fishery is well established and where a few studies have been carried on. The herring spawn during the summer and fall along the coasts in moderate depths. The eggs are adhesive and stick to various objects on the bottom. Within several weeks the eggs hatch and the fry begin to drift about. We do not know where or how long the fry drift with the current. We also do not know where all the spawning grounds are or which areas are the most productive. Lacking this information, we are unable to determine the source of the vast hordes of small herring which occur along the shores of the Gulf of Maine between Saint John, New Brunswick and Portland, Maine. Are they the product of local spawning or are they the progeny of some distant brood stock? Although oceanographic studies in the herring region have been rather scanty, there seems to be some indication that there is a westwardly current drift across the Bay of Fundy from Nova Scotia to the New Brunswick-Maine coasts. If so, then the one and two year old fish which are the backbone of the sardine industry, might be considered as merely migrants to our coasts. Furthermore, their abundance would partly depend upon successful spawning at a distant place. The comparative scarcity of small herring and the abundance of large herring along the Nova Scotia coasts seems to substantiate the theory of the drift of the fry over Fundian waters. However, more direct evidence is needed, particularly important are investigations at sea to determine the movements of the fry and the small herring in the first year of life.

On the other hand, the numerous schools of small herring may be the progeny of various local populations of adults. Then the success or failure of the fishery in particular regions in certain years may be caused by local conditions which adversely affected the survival and consequent growth of the fry.

The herring enters our fishery in the fall at an age of about one year and a size of about five or six inches. At the beginning of its second year of life and a size of about nine or ten inches, its numbers in the catch gradually diminish. Most of the fish spend their third year of life away from the coastal areas, although a few mature and appear on the spawning grounds at an age of three years. By the fourth year, most attain maturity and can be caught, together with the older mature fish, with comparative ease during the spawning season, or during the winter in certain places, as was demonstrated in Block Island Sound. The work of the Albatross III has shown that herring are found in varying quantities on the groundfish bottoms in most of the Gulf of Maine. The great herring fisheries of Europe are supported by the older fish and not by the one and two year olds, as in our North Atlantic area. While our herring fishery is carried out along the coast in shallow water, the European fishery is a large vessel operation effected at sea.

As one studies the extensive literature which has been published on the European herring — the same species as ours — it becomes evident that there are several basic questions still unanswered. First, and perhaps most important is the question of what causes the great fluctuations in the strength of the year classes. We also are unable to answer this question. Second, how can the available herring stock be best utilized or, in other words, what is the optimum catch. The objective of a thorough herring investigation would be to answer both these questions. A complete discussion of a program designed to yield the pertinent data would involve all the techniques which fishery biologists and oceanographers must use to discover the secrets which lie in the sea. Not only must the life histories, growth, migrations, etc., of the herring itself be studied, but we must also gain an understanding of the environment in which the herring lives. Such knowledge would be a safeguard against future unwise exploitation of the herring resource.

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