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CURRENT HADDOCK SITUATION ON GEORGE'S BANK[1/]

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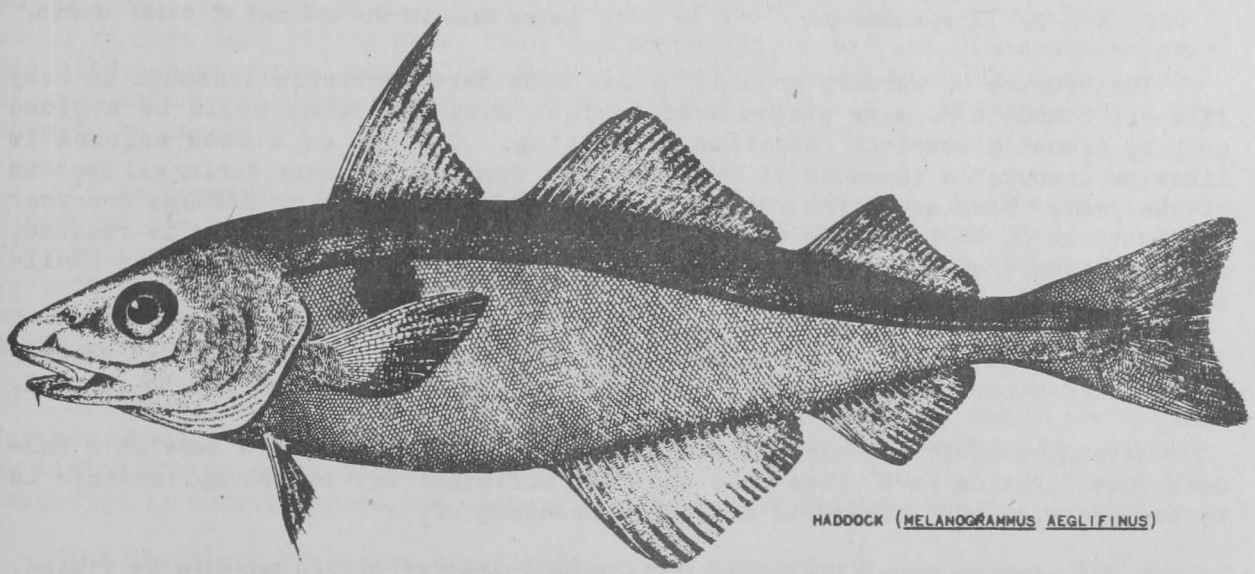
The haddock fishery is New England's most valuable fishery resource, but the production of haddock in recent years has declined considerably, from a high of 260,000,000 pounds in 1929 to averages of less than 150,000,000 pounds in the past few years.

The primary object of the Haddock Investigation of the Fish and Wildlife Service has been to determine what factors have caused this decline and to determine what measures, if any, would serve to restore production to the highest possible sustained level. Such an investigation has necessitated an understanding of the factors concerning birth and death rates, age and growth, migrations, spawning habits, the extent of the commercial catch, the size of the population, and other important factors. At the present time, these studies are being summarized for the Georges Bank area, the most important haddock area insofar as United States fishermen are concerned.

The catch on Georges Bank has declined in a large measure, owing to an actual decline in the size of the stock on the bank. At present, there are only one-quarter to one-third as many haddock on the bank as in earlier years.

The increased use of small-meshed trawls and the decreased use of line trawls has been a prominent feature in this decline. Line trawls which originally accounted for the bulk of the haddock catch caught only good-sized fish, most of which were mature.



HADDOCK (MELANOGRAMMUS AEGLIFINUS)

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1/ A paper presented at the North Atlantic Section Meeting of the Atlantic States Marine Fisheries Commission in New York City on February 20, 1948.

With the use of small-meshed otter trawls, which at present account for over 90 percent of all haddock caught, haddock as young as one year old are brought up to the deck and sluiced or dumped overboard dead. Millions of these fish less than a pound in weight are caught and discarded, a total loss. If these fish of one year of age were not caught until they were three years of age, they would each weigh about ten times as much. The foolishness of destroying such small fish thus appears quite evident. From what investment can one get such a high rate of interest?

The extent of this loss is illustrated by the following figures. Beginning with a stock of 70,000,000 one-year-old haddock on Georges Bank (a reasonable number), we estimate that about 63,000,000 would be left on the bank at the end of their second year of life, and 56,700,000 at the end of their third year of life, if not destroyed by otter trawls (not more than 10 percent die from natural causes each year). The weight of these fish when they were only one year old would be in the neighborhood of a paltry 13,177,000 pounds, worth only about $414,000. The same fish at two years of age would weigh over 59,294,000 pounds, valued at $1,862,000, and the same fish at three years of age would reach the considerable total of 88,452,000 pounds, worth $6,484,000.

Another advantage in protecting haddock until an age of three years is reached is that a much greater number would be allowed to spawn at least once before being caught. Haddock on Georges Bank spawn for the first time at the age of three years.

The protection of baby scrod on Georges Bank, and possibly on the Nova Scotian Banks also, offers a method of considerably increasing the productivity of the New England haddock fishery. In these critical times, when food production is of national and worldwide importance, it is vital to prevent the destroying and wasting of such quantities of high-quality, protein food.

Several methods for protecting baby haddock have been considered, among them the following:

1. Closed nursery grounds.
2. Closed seasons.
3. A minimum market size.
4. Large mesh in the cod end of otter trawls.

The closure of nursery grounds is not considered workable inasmuch as baby fish are found in so many places over Georges Bank that they could be avoided only by almost a complete cessation of fishing. The use of closed seasons is likewise unworkable inasmuch as baby scrod are found on the Bank during all seasons of the year. They are first retained in cod ends at an age of perhaps one year and continue to be taken and discarded until an age of $2\frac{1}{2}$ to 3 years is reached, at which time they are all of marketable size and are brought to port as small-sized scrod.

The destruction of potentially-valuable baby scrod is not an essential characteristic of otter trawls, however. The waste of these small haddock can be stopped.

Extensive study and experimentation by the Fish and Wildlife Service's Haddock Investigation have shown that the most efficient way to accomplish this is by the adoption of a threefold measure consisting of:

1. A minimum mesh size of 4-5/8" inside knots, stretched measure as fished, in all parts of the trawl with the exception of the lower belly, cod end belly, and 3' of the rear end of the cod end top, in which parts mesh as small as 3-1/4"

could be used in order to reduce tear-ups. No restrictions as to weight of twine, single or double, have been recommended.

In studying whether such large mesh actually would release baby haddock, a large number of experimental tows were made by the Fish and Wildlife Service with large and with standard mesh. All fish taken in each type cod end were counted and measured.

COD END (FISH BAG)

The results of this study were very definite. Only one-fifth as many baby scrod were taken in the large mesh as in the small-meshed cod ends. Therefore, four-fifths of those ordinarily taken were actually released by the use of the larger-meshed cod ends. Thus, although it is undoubtedly true that all meshes pull together somewhat, it is certain that the use of the larger mesh succeeds in releasing most baby scrod.

In addition, the tests proved that the large-meshed cod ends caught the same number of scrod ($1\frac{1}{2}$ to $2\frac{1}{2}$ pounds) and an even greater number of large haddock than the small-meshed cod end. Further advantages of such cod ends over those now in use are:

(a) the decreased cost of the net;
(b) ease of handling due to relative absence of trash;
(c) ease of mending due to fewer knots; and
(d) increased towing speeds due to its lightness.

The necessary strength can be assured by the use of heavier twine.

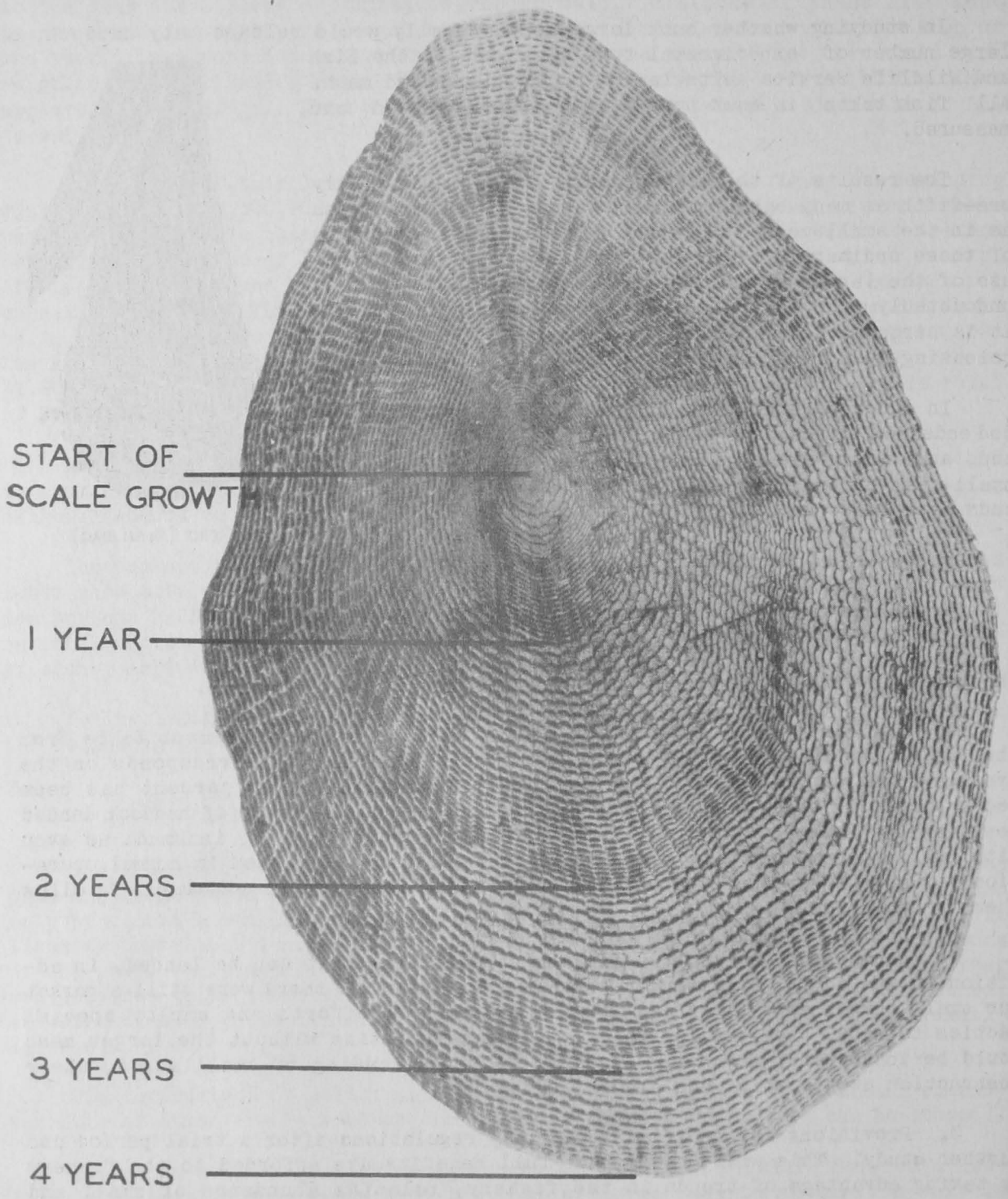
2. A minimum legal market size of $16\frac{1}{2}$ inches, such measurement to be from the tip of the snout to the fork in the tail. This length corresponds on the average to about $1\frac{1}{2}$ pounds, gutted weight. A tolerance of 5 percent has been recommended; in other words, up to 5 percent of the total number of haddock landed could be less than $16\frac{1}{2}$ inches. This allowance should be made, inasmuch as even with the larger-meshed net, a few small fish will still be taken in normal operations. Rather than dump these fish back (a total loss), it is economical to allow them to be landed.

It is necessary to adopt a minimum size of fish that can be landed, in addition to the adoption of larger-meshed nets, because if there were still a market for small scrod, some fishermen would make special efforts and employ special tactics to catch them. Likewise, a minimum market size without the larger mesh would be inadequate, for while it would stop the landing of small scrod, their destruction at sea still would continue.

3. Provisions for modification of any regulations after a trial period and further study. This will insure that full benefits are afforded to the fishery by taking advantage of trends in the fishery, relative abundance of small and large fish in various years, and changes in the mode of fishing and net construction.

The abundance of market-sized haddock on Georges Bank in the last few years has declined to the lowest point in history. This condition has been the joint result of heavy annual removals of commercial-sized and undersized haddock by the

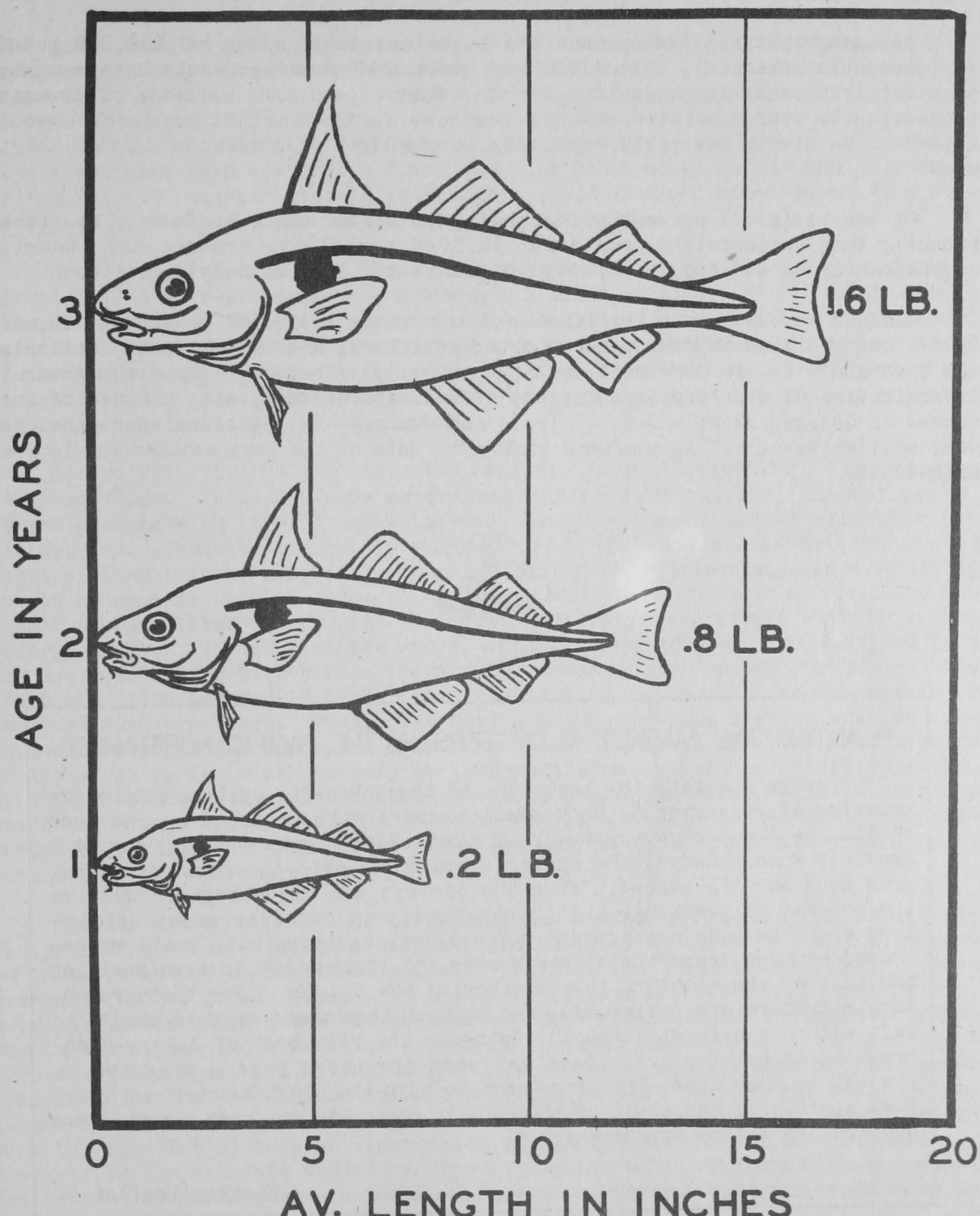
fishing fleet and extremely small additions to the commercial-sized stock from the spawnings of 1941, 1942, and 1943.



PHOTOGRAPH OF A HADDOCK SCALE. A FOUR YEAR OLD FISH FROM GEORGES BANK.

We are at present investigating the reasons why these succeeding spawnings proved to be relative failures. The appearance early in 1947 of large numbers of baby haddock on the Bank (most of the 1945 spawning) offered the possibility that if these fish would be allowed to reach commercial and spawning size, the

marketable stock could be rebuilt to somewhere near its former high level. These baby fish were destroyed, however, by small-meshed otter trawls and discarded by the millions on the Bank. During the complete year of 1947, almost 17,000,000 baby haddock, too small to market, were discarded dead on Georges Bank alone.



AVERAGE SIZE OF GEORGES BANK HADDOCK AT END OF 1, 2, AND 3 YEARS OF LIFE.

From our knowledge of the mortality and growth rates for Georges Bank haddock, we were able to estimate that if these fish--instead of being caught and killed in the small mesh of the otter trawl--had been left on the Bank until 1948, it would have been possible for the industry to have harvested at least an additional 30,400,000 pounds.

Assuming that the 1948 production turns out to be about 90,000,000 pounds (a reasonable estimate), this additional potential poundage would have amounted to a total increase in production for this Bank of about 34 percent. Increasing production by over one-third with no increase in the cost of production would appear to be highly desirable, especially in the light of present world food shortages.

On the basis of current prices being paid for scrod haddock ($1\frac{1}{2}$ to $2\frac{1}{2}$ pounds), such an increased production in 1948 would have brought the industry approximately an additional $3,000,000 (ex-vessel values only).

Haddock research that is planned for the future includes: a complete summary of all Georges Bank studies made to date; additional mesh experiments, utilizing the Fish and Wildlife Service's new research vessel, Albatross III; a more accurate determination of abundance and factors affecting abundance, with the use of this vessel on Georges Bank; and an analysis and summary--if additional personnel become available--of all accumulated biological data on the Nova Scotian populations of haddock.

PLANTING AND MARKETING OYSTERS IN THE PACIFIC NORTHWEST

Growers who take the best care of their Pacific oysters follow the practice of "breaking." Many small oysters will be found on one seed shell. As these grow, some will die but there may be too many for best growth. When crowded, the oysters, not being able to expand sideways, grow long and ill-shaped. When the oysters are old enough to survive the process of breaking, the grower sends men over the ground at low tide when the beds are exposed. These men, equipped with small wedge-shaped hammers, turn the clusters over and strike the old seed shell at the base of the cluster, thus shattering the cluster. For best growth, single oysters are preferable, and no more than three oysters should be left with a single attachment. Owing to the high cost of labor, hand-breaking is being discontinued and some operators pass a drag across the bed at high tide. The drag tends to turn the clusters over and break them apart. As the shell of the Pacific oyster is not very strong, some oysters are killed by "breaking."

—Fishery Leaflet 52