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IMPORTED FISH: A MAJOR NEW ENGLAND PROBLEM[1/]

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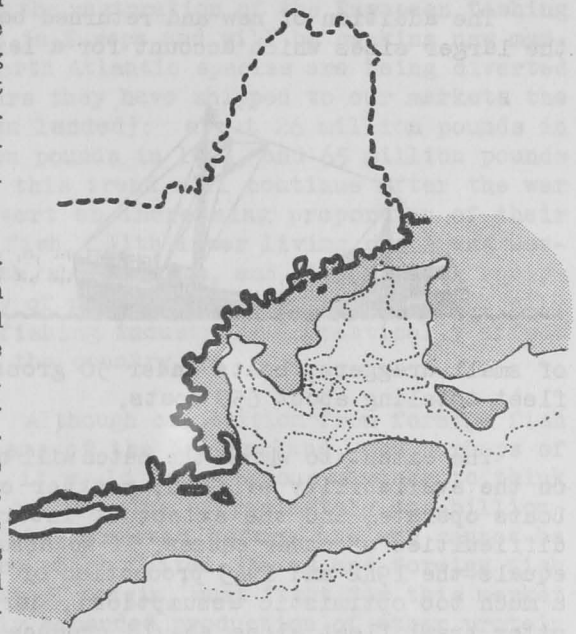
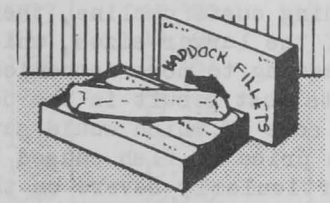
The New England fishing industry during the last three years has experienced numerous dislocations and restraints as the result of war-created shortages and regulations. In spite of these difficulties, production has been restored to and beyond the pre-war peak. Many of these shortages and regulations now are being eased, and it should not be long before most of their accompanying headaches are eliminated. Price ceilings, the source of possibly the biggest headaches, probably will remain for some time.



When the general food situation improves to the point where the supply of fish equals or exceeds demand, we should be rid of price ceilings; but with this change from a shortage economy the industry will enter a new period, with problems as serious as those faced during the war. Probably the greatest of these problems will be the readjustments within the industry that will be required when fish must once more face the competition of adequate supplies of other foods, such as meat, cheese, and eggs, as well as greatly increased competition from foreign fish. Before discussing this problem in greater detail, it will be well to review some of the relevant developments in the New England industry.

PRODUCTION OF NEW ENGLAND FISH: The New England fishing industry supplies a large proportion of the fresh and frozen fish produced in the United States. In 1944, New England ports accounted for over 500 million pounds of fresh and frozen finny fish, about 50 percent of the country's total production. Prior to 1938, the bulk of the production was landed at Boston, but since that date, Gloucester and New Bedford landings have increased spectacularly. By 1941, the combined landings at Boston, Gloucester, New Bedford, and Portland had reached 520 million pounds, which made up about 80 percent of the New England total of fresh fish (omitting herring, alewives, and shellfish). This was about 75 million pounds more than was produced in any previous year and was made possible by the increase in the fleet of otter trawlers and the expanded markets resulting from the European war.



1/ This article, which represents the author's personal viewpoint, is published because of the current interest in problems associated with importation of fresh and frozen fishery products. It is not intended as a statement of the official policies of the United States Government.

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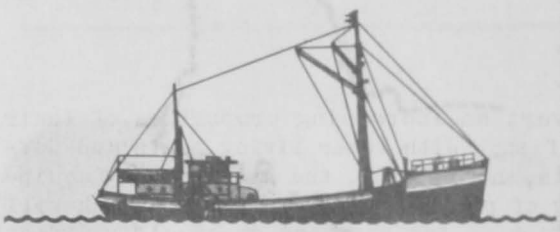
During the next two years (1942 and 1943), the catch dropped about 25 percent from the 1941 level, primarily because of reductions in the fishing fleet, resulting from the leasing and sale of many of the best boats to the Government. Curtailed operations resulting from strikes against price ceilings combined with the reduction in the size of the fleet, caused production during the winter of 1943-44 to drop to the lowest level since 1934.

The expanded boat-building program administered by the Office of the Coordinator of Fisheries began turning out medium and small draggers in considerable numbers during the latter part of 1943, and by the summer of 1944 these boats, together with boats returned by the Armed Forces, had increased the fleet's potential producing capacity to a level approaching the record 1941 production. However, these medium and small boats were not capable of maintaining production during the stormy winter months or of fishing the more distant grounds. Consequently, although the summer landings rose to within about 10 million pounds of the 1941 level, the total for the year was about 80 million pounds below the record 1941 catch.

The addition of new and returned boats to the New England fleet, particularly the larger sizes which account for a large share of the production, has continued at an increasing rate since the summer of 1944. By midsummer of 1945, the fleet of large trawlers, boats over 150 gross tons, totaled about 50, compared to 24 during the summer of 1943 and an average of about 40 in 1941. The fleet of medium draggers, boats between 50 and 150 gross tons, had increased to nearly 190 boats, compared to about 100 in the summer of 1943 and less than 125 in 1941. The increase in the fleet of small draggers, boats under 50 gross tons, was equally spectacular, the 1945 fleet totaling about 650 boats.



The extent to which the catch will be increased by this enlarged fleet depends on the availability of fish, weather conditions, the regularity with which the boats operate, and the extent of interruptions in fishing resulting from labor difficulties or other causes. If we assume that the production of individual boats equals the 1942 and 1943 production of boats of similar sizes (in all probability a much too optimistic assumption), during the 12 months from July 1945 on, the otter trawl fleet alone should produce nearly 600 million pounds of fish. This would be an increase of about 250 million pounds over the reduced catch in 1943 and would even exceed, by a considerable margin, the record landings in 1941.

The above summary covers only the New England boats which will be available by midsummer of 1945. Although the boat-building program has slackened considerably in the last few months, some activity continues; and it can be expected that as the demands for war materials decrease and boat-building costs decline, there will be increased building of new boats, particularly of the larger sizes, which will make use of new ideas in design and construction leading to more economical and efficient operation. The competition from these boats must result in the decommissioning of many of the older semi-obsolete boats, some of which would have been retired long before except for the abnormally high price of fish caused by war-created food shortages. The "squeeze" will be particularly severe on the smaller boats which are not able to shift their fishing operations to the more distant fishing grounds when competition for fish becomes increasingly severe on the nearby banks. This greatly increased fishing intensity also will reduce the stocks of spawning fish and young fish to much less productive levels, thus making the situation of the dragger fisherman even worse, unless the industry makes sure that suitable measures are taken to safeguard these stocks of fish.

The developments which have been outlined above are bound to result in greatly increased competition within the industry, and this should stimulate the development of more efficient and economical producing and processing methods. If high natural reproduction of the stocks of fish, particularly of those on the nearby

grounds, can be maintained by intelligent conservation measures, the result of these developments during the post-war period of readjustment would be that the fishing industry will be in a favorable position to compete with other food-producing industries for the housewife's favor. However, it is not necessary to look very far ahead to see that another element, imported fish, is entering the competitive picture on a scale which, insofar as the fresh and frozen fish trade is concerned, may make competition within the industry for markets a matter of secondary importance.

COMPETITION FROM FOREIGN FISH: Our neighboring countries to the North and East, traditionally are great producers of fish. Nova Scotia produces annually over 200 million pounds of cod, in addition to millions of pounds of haddock and other species; Newfoundland produces annually over 500 million pounds of cod and other species, while Iceland, Greenland, and other North Atlantic countries have produced and can produce billions of pounds of fish. In the past, much of their catch has been salted and disposed of in markets outside of the United States. Since the beginning of the war, these countries have greatly expanded their production of frozen fillets to feed English and other European populations deprived of their normal supply of fresh fish. With the restoration of the European fishing fleets, this fish no longer will be needed in Europe and will be seeking new markets. Already, increasing quantities of North Atlantic species are being diverted to this country. During the last four years they have shipped to our markets the following amounts (in terms of weight when landed): about 26 million pounds in 1941, 45 million pounds in 1942, 48 million pounds in 1943, and 65 million pounds in 1944. It is reasonable to expect that this trend will continue after the war and that these countries will seek to divert an increasing proportion of their total production to our markets as frozen fish. With lower living costs and Government-assisted production (subsidized boats, shore plants, and distributing equipment), they can produce an enormous quantity of processed fish at prices which will completely demoralize the North Atlantic fishing industry and drastically affect the fishing industry in other sections of the country.

COMPETITION FROM OTHER PROTEIN FOODS: Although competition from foreign fish will be one of the biggest post-war problems of the New England, and perhaps of the entire United States fishing industry, it would be a serious mistake to think of the post-war situation solely in these terms. The approximately one-billion-pound market for fresh and frozen fish which existed before the war cannot be considered in any way as a fixed market for which United States and foreign fish must compete. Fish as a product, regardless of origin, must fight for this market against strong competition from the greatly expanded production of other protein

Table 1 - U. S. Production of Meats, Cheese, and Eggs[1/]
(In millions of pounds)

Year	Cattle and Calves	Hogs	Sheep and Lambs	Chickens	Eggs[2/]	Cheese	Total
1930	13,262	15,176	1,965	2,643	4,780	567	38,393
1931	13,401	16,541	2,050	2,457	4,710	555	39,714
1932	14,191	16,368	1,831	2,576	4,440	545	39,951
1933	15,370	16,566	1,863	2,616	4,340	565	41,320
1934	14,504	12,386	1,921	2,215	4,210	612	35,848
1935	13,651	10,673	1,835	2,313	4,110	669	33,251
1936	14,438	12,976	1,849	2,410	4,220	687	36,580
1937	13,746	12,506	1,938	2,042	4,590	712	35,534
1938	14,047	14,372	2,042	2,185	4,570	759	37,975
1939	15,098	17,082	2,041	2,338	4,750	774	42,083
1940	15,583	17,043	2,112	2,093	4,840	791	42,462
1941	16,718	17,473	2,267	2,477	5,100	790	44,825
1942	17,967	21,054	2,332	2,807	5,910	837	50,907
1943	18,419	25,544	2,136	3,410	6,630	663	56,802

1/From 1944 Agricultural Statistics.
2/Egg production converted to pounds on the basis of 1-1/3 lb. per dozen.

foods such as meat, cheese, and eggs. Production of these products in 1943 was more than 14 billion pounds greater than in 1940. (See Table 1 above and Figure 1, p. 4.) Under favorable conditions, the one-billion-pound market for fresh and frozen fish might be expanded until it was great enough to absorb the growing United States production, in addition to large quantities of foreign fish. Under un-

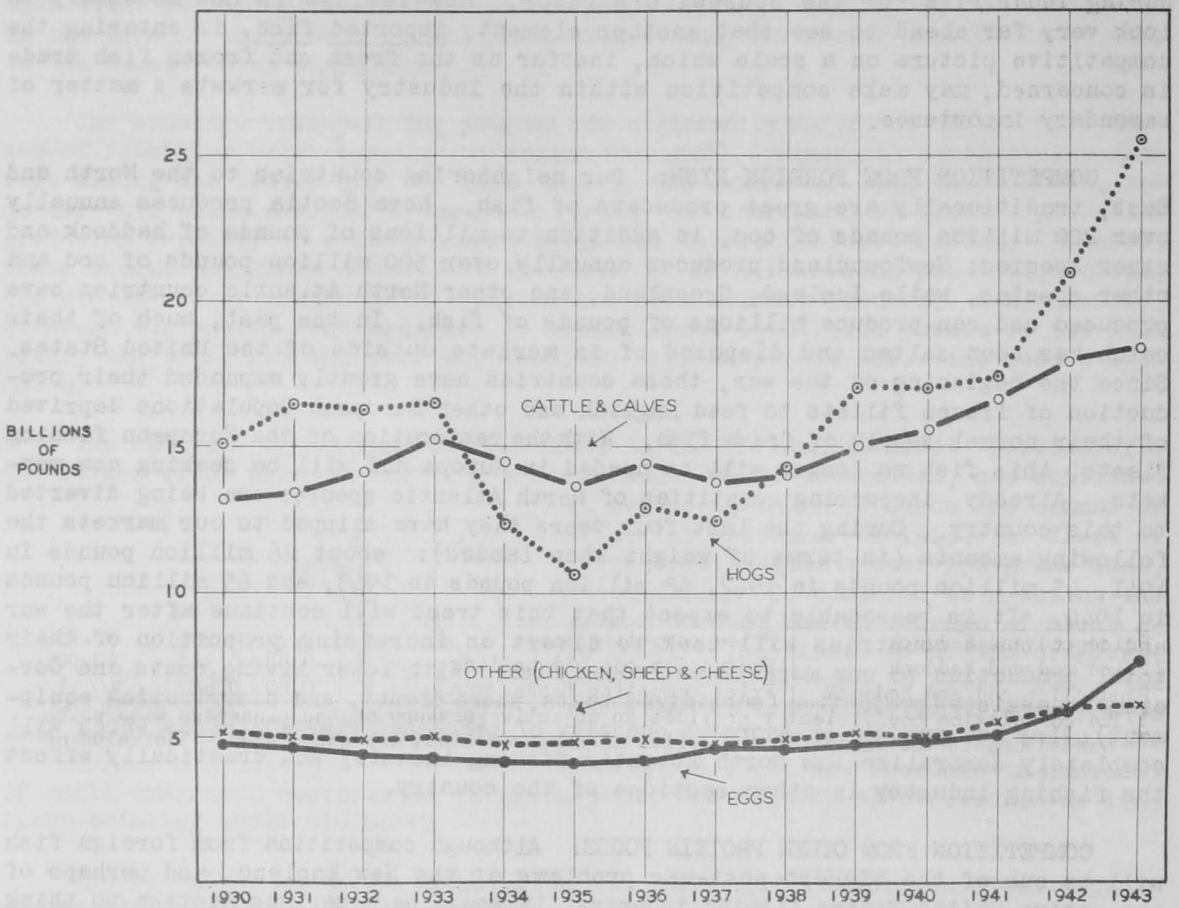


FIGURE 1 - TOTAL U.S. PRODUCTION IN POUNDS OF VARIOUS ANIMAL PROTEIN FOODS COMPETING WITH FISH.

favorable conditions, it may shrink until any sale of foreign fish is directly at the expense of long established fish producers in the United States. It is the business of the United States industry to see that conditions do not force the last alternative.

The amount of fresh and frozen fish that will be marketed in this country during the next decade will depend on many things, but probably, most of all, on the quality and price. With many other kinds of food competing for the consumer's dollar in the post-war markets, the quality of the fish must be high and the price reasonable if we are to market the quantity of fish which will be available after the war.

The importance of price (relative price) on the volume marketed can be shown by comparing the price as well as the production of fish during past years, with the price of competing protein foods. Those foods generally thought to compete most directly with fish are meat, cheese, and eggs. In order to determine the relationship between the price of these competing foods and the price and production of fish, the prices of beef cattle, hogs, and eggs were obtained from various Government reports, and compared with the price and production of cod and haddock. The degree of relationship was measured statistically by the correlation coefficient r. A summary of the results is given in Table 2 (see p. 5), while the data used are given in Table 3 (see p. 13) in the APPENDIX. The r values simply represent the closeness with which the variations in the compared items are associated, with

r = 1.00 representing perfect positive correlation, r = 0.00 representing no correlation, and r = -1.00 indicating a perfect negative correlation. A more complete discussion of the methods and data used is given in the APPENDIX.

Table 2

A - Correlations Between the Annual Price and Production of Certain Animal Protein Foods, 1930 - 1941

ITEMS COMPARED		Correlation coefficient[1]		
First	Second	r	r^2	s_r
Price cod and haddock	Cost of living index for food	0.45	0.20	±0.24
Price cod and haddock	Price competing foods (beef cattle, hogs, eggs)	0.48	0.23	±0.23
Price cod and haddock	Price eggs	0.41	0.17	±0.25
Price cod and haddock	Production cod and haddock	-0.05	0.0025	±0.30
Production cod and haddock	Price competing foods	0.68	0.46	±0.16
Production cod and haddock	Price eggs	0.87	0.76	±0.07
Total value cod and haddock	Cost of living index for food	0.76	0.58	±0.13
Total value cod and haddock	Price competing food	0.77	0.59	±0.12
Relative price cod and haddock	Production cod and haddock	-0.77	0.59	±0.12

B - Partial Correlations Among Price Cod and Haddock, Production Cod and Haddock, and Price of Competing Foods

ITEMS COMPARED		Correlation coefficient[1]		
First	Second	r	r^2	s_r
Price cod and haddock	Price competing foods	0.76	0.58	±0.13
Price cod and haddock	Production cod and haddock	-0.58	0.34	±0.20
Production cod and haddock	Price competing foods	0.80	0.64	±0.11

[1] The correlation coefficient r provides an objective measure of the closeness with which variations in the values of two series of compared items are associated. The value of r varies between +1.0 and -1.0, with r = +1.0 indicating perfect positive correlation, r = -1.0, perfect negative correlation, and r = 0, no correlation whatsoever. Intermediate values indicate varying degrees of positive and negative correlation. However, the degree of correlation is not directly proportional to the r value; that is, r = +0.40 does not indicate that the correlation is one-half as good as r = +0.80. In order to show this relationship r^2 can be used since it is approximately proportional to the degree of correlation. If variable 1 influences variable 2, and r equals 0.80, then r^2 or 0.64 represents the approximate fraction of the changes in variable 2 which result from changes in variable 1.

The standard errors of r, which are represented by the symbol s_r, also are given in Table 2 to provide a measure of the reliability of the calculated r values. The magnitudes of s_r in Table 2 indicate that in this series, r values of less than about +0.50 do not carry very much significance. Neither do small differences between r values at higher levels.

For a more complete discussion of r, r^2, and s_r, see any recent standard text on statistics.

These records show that the average price of fish for the year as a whole did not increase and decrease in agreement with decreases and increases in production (Figure 2, see p. 6) although the seasonal prices did change with seasonal increases and decreases in production (Figure 5, see p. 9). Changes in the prices of competing foods were accompanied by limited changes in the yearly average price of fish but much greater changes in production of fish (Figure 2). As a result, most of the changes in the annual value of the fish produced (production times price) were associated with changes in the price of competing foods (Figure 3, see p. 7). Another important fact demonstrated by this study was that the production (consumption) of fish was strongly influenced by the relative price of fish. That is, when the price of fish was high in relation to the price of competing foods, the production of fish declined, while when the price was low in relation to other foods, production increased (Figure 4, see p. 8). The APPENDIX includes a fuller discussion of these relationships.

POST-WAR DEVELOPMENTS: In the foregoing, we have discussed the recent strong upward trends in the New England production of fresh and frozen fish and in the importation of foreign fish. We have examined also the close relationship between

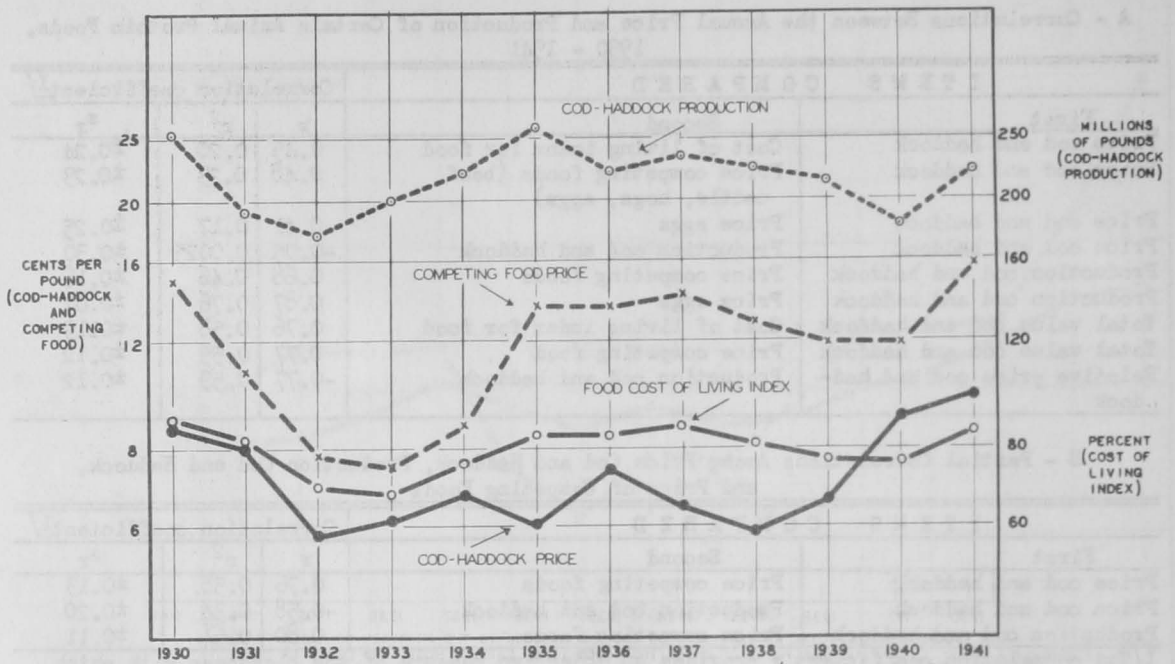


FIGURE 2 - THE PRODUCERS' ANNUAL AVERAGE PRICE OF COD AND HADDOCK (IN TERMS OF FILLET WEIGHT), COMPARED TO THE ANNUAL PRODUCTION OF COD AND HADDOCK; THE AVERAGE PRICE OF COMPETING FOODS (BEEF CATTLE, HOGS, AND EGGS) IN TERMS OF DRESSED WEIGHT AND POUNDS; AND THE COST OF LIVING INDEX FOR FOOD. PLOTTED TO LOGARITHMIC SCALES IN ORDER TO PROVIDE AN ACCURATE COMPARISON OF THE RELATIVE CHANGES IN VALUES.

the price of competing foods and the production and value of fish. What post-war future do these developments spell out for the New England fishing industry?

As long as shortages of meat, cheese, and eggs exist, there is little doubt but that our markets can absorb at present prices all of the fish that our industry can produce and process and, in addition, all that foreign countries are likely to be able to supply us under present conditions. However, as our food production program is revised and stepped up, as manpower and material shortages decline, and as the food demands from other countries decline as their own food production increases, the shortage of protein foods will disappear and the upward pressure on their prices end. This should occur for fish considerably earlier than for other protein foods. Domestic production and importation of fish is expanding much more rapidly than is the production of competing foods. Present fish prices, in relation to competing foods, are about 35 percent[1/] higher than

1/The dollar price of cod and haddock in 1944 was 150 percent above their 1930-41 average, while the average dollar prices of competing foods were about 85 percent higher than their 1930-41 average (Table 3, p. 13). Consequently, in terms of other foods, fish prices were about 35 percent above the 1930-41 average $\left(\frac{250}{185}\right)$.

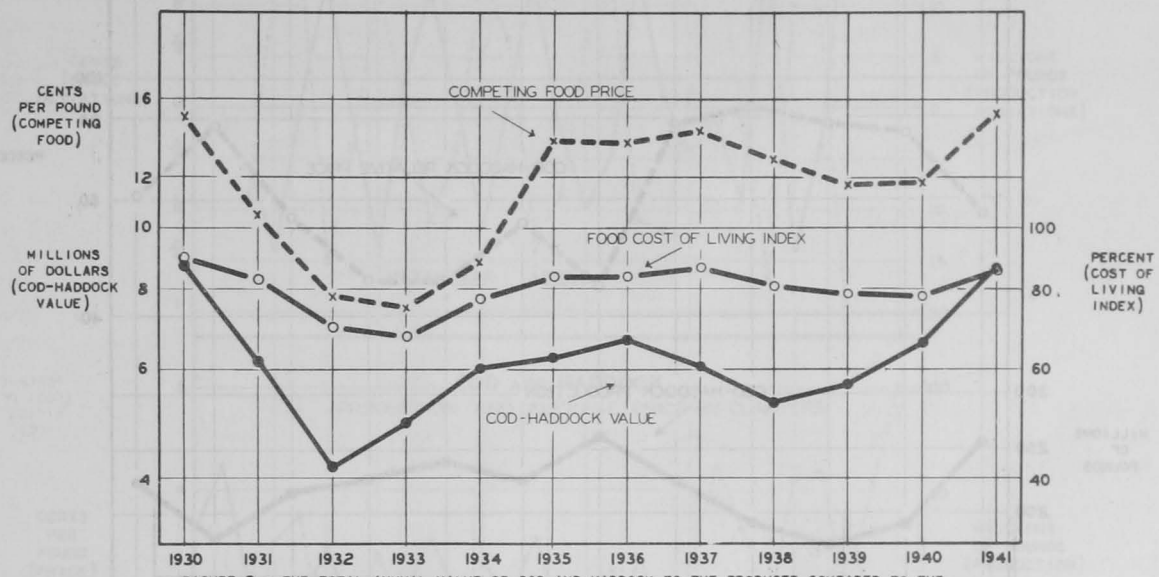


FIGURE 3 - THE TOTAL ANNUAL VALUE OF COD AND HADDOCK TO THE PRODUCER COMPARED TO THE AVERAGE PRICE OF COMPETING FOODS (BEEF CATTLE, HOGS, AND EGGS) IN TERMS OF DRESSED WEIGHT AND POUNDS, AND THE COST OF LIVING INDEX FOR FOOD. PLOTTED TO LOGARITHMIC SCALES IN ORDER TO PROVIDE AN ACCURATE COMPARISON OF THE RELATIVE CHANGE IN VALUES.

they were in 1941, or higher than they averaged from 1930 to 1941 (Table 3, see p. 13). This indicates that as over-all protein food shortages disappear, fish prices either must drop some 30 percent or more, even though there is no considerable decline in the price of competing foods, or consumption will be reduced materially.

When supplies of meat, eggs, and cheese again are abundant, people will eat fish because they want to rather than because they must. Under these conditions, sales again will depend on quality and price. By taking advantage of new developments in processing, distribution, and marketing, it should be possible to provide the American public with fish of a quality which few of them heretofore have enjoyed. If this can be done at a relative price which is reasonably comparable to that of pre-war years, the amount of fish consumed should increase tremendously. What proportion of this consumption United States fishermen will supply is the principal long-range problem facing United States producers and processors.

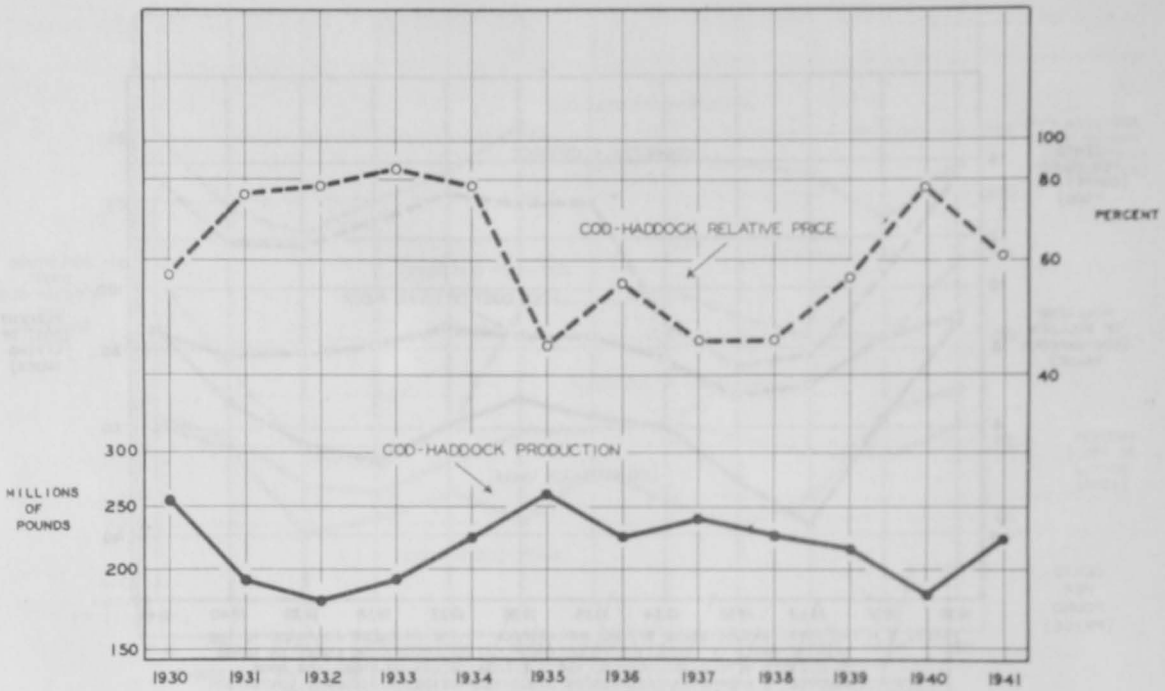


FIGURE 4 - THE RELATIVE PRICE OF COD AND HADDOCK (PRODUCERS' PRICE OF COD AND HADDOCK DIVIDED BY THE PRODUCERS' PRICE OF COMPETING FOODS), COMPARED TO THE PRODUCTION OF COD AND HADDOCK. PLOTTED TO LOGARITHMIC SCALES IN ORDER TO SHOW THE RELATIVE CHANGE IN VALUES.

A PLAN FOR THE EQUITABLE HANDLING OF THE FOREIGN FISH PROBLEM[1]: A drastic increase in tariff rates has been the traditional answer in this country to threats of destructive competition from foreign products produced by labor having much lower living standards than those which we expect for our people. However, in view of the growing international consciousness of the voters of the country, there is little likelihood of obtaining acceptance of a proposal designed primarily to exclude products of our neighbor nations. The problem then is to develop

1/ The ideas suggested in this plan have been discussed at length with Congressman Christian A. Herter, New England member of the Committee on Merchant Marine and Fisheries, with leaders of the New England and Middle Atlantic fishing industry representing fishermen, shoreworkers, boat owners, and processors, and with officials of the Fish and Wildlife Service. The author wishes to express his appreciation for their assistance in clarifying the ideas incorporated in the proposal. This brief outline is presented for the purpose of stimulating more thinking on this important problem to the end that the most satisfactory solution can be worked out and agreed upon. To be successful this, or any other agreed upon plan, must have the support of the entire fishing industry and be acceptable to the country at large.

Members of the staff of North Atlantic Fishery Investigations, Fish and Wildlife Service, have provided assistance on some of the work involved in this report, particularly Howard A. Schuck, who carried out many of the correlation calculations.

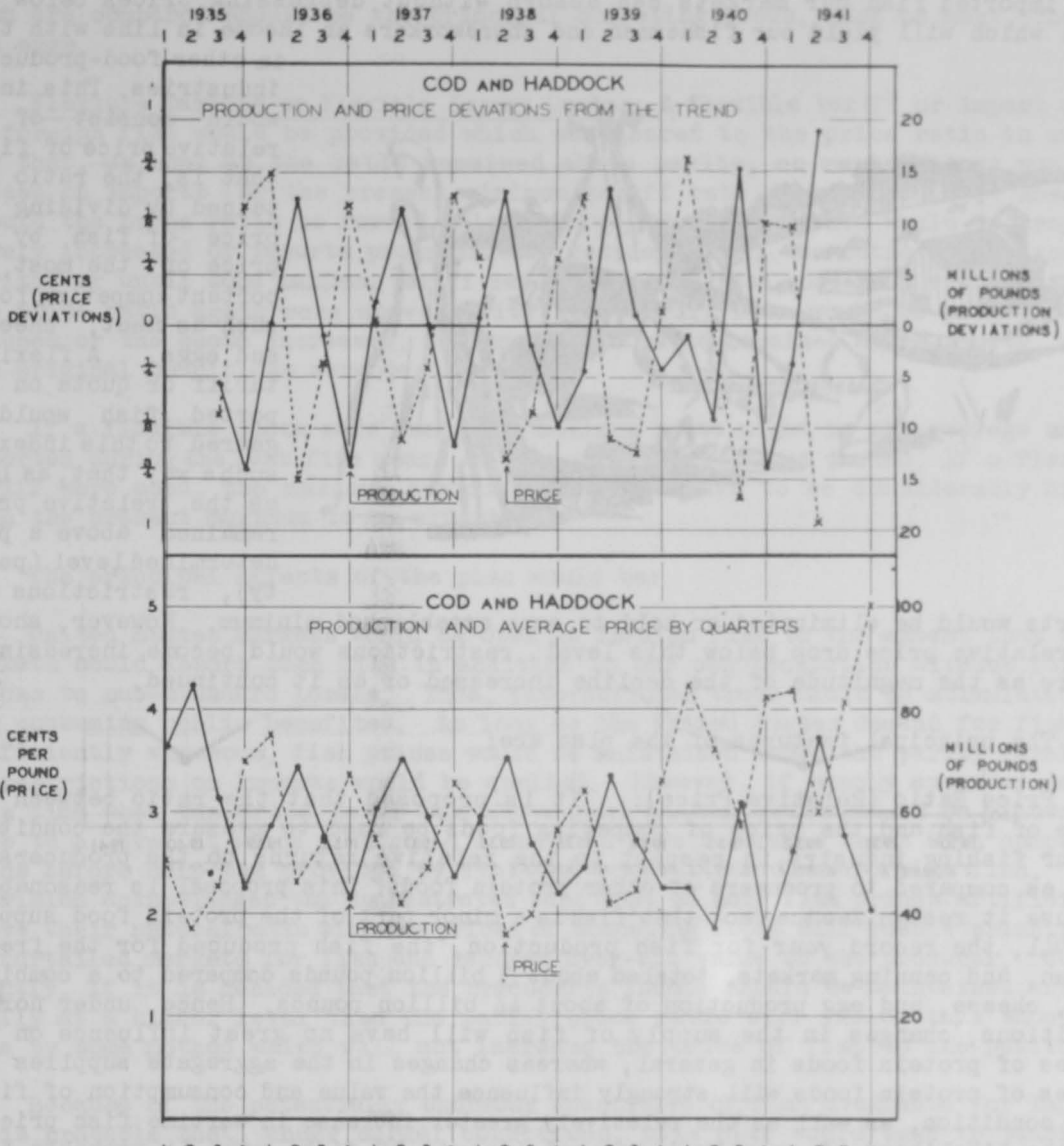


FIGURE 5 - LOWER: PRODUCTION AND AVERAGE PRODUCERS' PRICES OF COD AND HADDOCK, BY QUARTERS.

UPPER: DEVIATIONS IN THE PRODUCTION AND PRICE OF COD AND HADDOCK FROM THE ANNUAL TREND. THE TREND WAS OBTAINED BY SMOOTHING THE QUARTERLY FIGURES BY A MOVING AVERAGE OF FOUR AND TWO TO REMOVE THE EFFECT OF SEASONAL VARIATIONS. SEE TEXT FOR DISCUSSION.

a reasonable plan which will prevent unrestricted foreign competition from driving our prices to distress levels, while at the same time allowing our neighbors to participate in our markets, to the extent that these markets can be expanded to absorb their production in addition to our own.

To meet this problem a "parity-ratio import-control" plan has been proposed. The essence of this plan is to vary the amount of imports according to the parity-ratio price index of fish. Control of the amount of fish imported could be exercised (1) by imposing a flexible tariff, increasing in rate as the price index falls, and reducing as the index rises, or (2) by establishing a quota on the amounts that can be imported. At lower price indices, import quotas would be reduced; at higher indices, quotas would be raised or removed to permit increased importation.

The basic assumption behind this plan is that it is in the national interest to open our markets to the fish produced by our neighbor nations to as great an extent as is consistent with the continued prosperity of our own long established fishing industry. To do this it is proposed to establish an index to show how

much imported fish our markets can absorb without depressing prices below the level which will yield our fishermen and shoreworkers an income in line with that in other food-producing industries. This index would consist of the relative price of fish; that is, the ratio obtained by dividing the price of fish by the price of the most important competing foods such as meat, cheese, and eggs. A flexible tariff or quota on imported fish would be geared to this index in such a way that, as long as the relative price remained above a predetermined level (parity), restrictions on imports would be eliminated or held to some established minimum. However, should the relative price drop below this level, restrictions would become increasingly severe as the magnitude of the decline increased or as it continued.

The principal features of the plan are:

Price Ratio (Relative Price): It is proposed that the ratio between the price of fish and the price of competing foods be used to measure the condition of our fishing industry in respect to the relative returns to the producers of fish as compared to producers of other protein foods. This proposal is reasonable, because it recognizes the fact that fish is a minor part of the protein food supply. In 1941, the record year for fish production, the fish produced for the fresh, frozen, and canning markets, totaled about 3 billion pounds compared to a combined meat, cheese, and egg production of about 44 billion pounds. Hence, under normal conditions, changes in the supply of fish will have no great influence on the prices of protein foods in general, whereas changes in the aggregate supplies and prices of protein foods will strongly influence the value and consumption of fish. This condition, as well as the relatively greater increase in wartime fish prices, and the likelihood of greatly increased imports of fish, make it probable that there will be a greater downward readjustment of fish prices than of prices of competing products, when conditions become normal after the war. Finally, the Congress appears to be definitely committed to a policy which will maintain the price of agricultural products at a high level. All of these considerations indicate the desirability of using the price of competing foods as a standard for judging the status of fish prices. This tie-in also is desirable for reasons to be brought out later.

Parity Price Ratio: A "parity" price ratio would be adopted to provide a standard by which it could be determined at any time whether or not the United States market could absorb increased quantities of foreign fish. This ratio should acknowledge the normal differential between fish prices and the prices of competing foods which existed during periods when the fishing industry was enjoying normally prosperous conditions, competing foods were normally available, and the public was buying fish in large quantities. The price ratio during some one year, or series of years, might be adopted for this purpose.

Since the parity ratio is to be used primarily as a standard to determine the amount of foreign fish which can be absorbed, it should be based on the prices of those species of fish which are likely to be shipped into this country in large and increasing quantities, such as cod, haddock, and rosefish. To include species which are not likely to be imported in large quantities would serve principally to complicate the plan and decrease the probability of its acceptance without yielding any major advantage by their inclusion. The commodities with which the

fish are compared should be the principal competing foods, such as meat, cheese, and eggs.

Flexible Tariffs or Flexible Import Quotas: A flexible tariff or import quota on foreign fish would be provided which was geared to the price ratio in such a way that, as long as the ratio remained above parity, no restrictions would be placed on imports (or the present minimum tariff rate could prevail). However, should the price ratio be forced below parity, the tariff rate would be progressively increased or imports progressively reduced, until the ratio again exceeded parity, or until some maximum tariff rate or minimum base quota was reached. When the price ratio again rose above parity, the tariff rate would be progressively reduced or the quota increased, as long as the ratio remained above parity, until the original conditions were restored.

If a flexible quota were used, the minimum quota might be the average amount imported during the last five years or some other agreed-upon period. If a flexible tariff were used, the maximum tariff rate would have to be considerably higher than the present maximum to be effective.

The principal effects of the plan would be:

United States markets would be open to foreign fish to the extent that these markets could absorb such fish in addition to our own production without forcing prices to sub-standard levels. Thus, international trade would be stimulated and the consuming public benefited. As long as the United States demand for fish was sufficiently vigorous, fish prices would be maintained above the parity level and no restrictions on imports would be applied. However, if supply exceeded demand at a time when the price level was above parity, the price would be allowed to drop to a level at which fish could compete on more favorable terms with competing foods before help was provided by limiting competition from foreign fish. This provision acknowledges the demonstrated fact that to hold fish prices artificially above their natural ratio with the prices of competing foods will result principally in curtailed markets for fish and reduced over-all value to the producer. Consequently, if it is decided that the producer's income should be maintained artificially at a higher level than the parity price ratio will yield, this should be done by some method which will not increase the price of fish to the public.

Because of the potentially enormous quantities of fish available for import, it is probable that, under normal conditions, this plan would tend to stabilize fish prices near the parity level. If foreign countries desired to participate to a greater extent in our markets, it would be to their interest to help develop these markets so that increased quantities of their fish might be absorbed without depressing prices below parity. Their sales could increase as our markets increased and to the extent that demand was not satisfied by domestic production.

By establishing parity in relation to competing agricultural products, the United States fishing industry would be assured of helpful action which would serve to keep the price of its product in line with those of other food-producing industries, and it would benefit indirectly from any Government action serving to maintain or increase agricultural prices.

Since fish competes directly with agricultural products, particularly eggs, this plan will indirectly benefit the farmer by preventing the flooding of our markets with foreign fish at prices with which the farmer cannot compete without dropping the price of his products to correspondingly low levels.

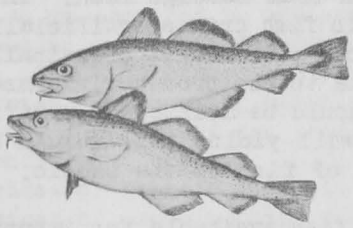
In spite of several years of unparalleled prosperity, the United States fishing industry now occupies a precarious and vulnerable position. The country as a whole is becoming increasingly conscious of the necessity of working out improved trade and economic relations with our neighbor nations. Yet it is obvious that, if we open our markets without restrictions to the fish produced by these countries under subsidies and labor conditions with which we cannot and do not wish to compete, our principal fisheries, at least those producing fresh and frozen fish, are doomed as

major industries. It is incumbent on the fishing industry to work out some program acceptable to the country at large, which will yield the industry reasonable protection while our markets are being expanded to absorb more fish, and the living standards of the fishermen of our neighbor nations are in transition from their present level to that which we now enjoy. It also would appear to be incumbent on our neighbor nations, who wish to profit from our markets, to cooperate with our industry in achieving a solution. Glutting of our markets during the next few years by a great influx of foreign fish, will not be conducive to the success of our hoped-for, post-war, full-employment program, neither will it help our international relations.

Appendix I– Relationship Between Fish Price and Production and the Prices of Competing Foods

The price of fish is determined by a complex of factors, among the most important being the supply of fish (amount produced), and the prices of various competing foods. In order to determine the actual and relative importance of these factors, a series of comparisons has been carried out with results as shown in Table 2, p. 5.

In making these comparisons, it appeared desirable to eliminate, insofar as possible, the effects of radical technological or marketing developments, such as filleting, development of new sources of supply, and greatly improved fishing methods, which would serve to mask the effects of the factors which it was desired to evaluate. (For example, rosefish jumped from a production of less than 2 million pounds and value of 1 cent a pound in 1934 to a production of about 140 million pounds and value of over 2 cents a pound in 1941, as the result of processing and marketing developments.) Consequently, cod and haddock were selected to represent fish, and the years from 1930 to 1941 were used, since during this entire period these species accounted for a large share of New England production, and they were an accepted product in the markets, from a fishery which underwent no radical changes technologically or biologically. Thus, the effects of changes in production or in the prices of competing foods would be least obscured. The years preceding 1930 were not used, because during the late 1920's the industry was in a condition of rapid change as a result of the development of filleting and packaging; and the war years from 1942 on were not used, since war shortages and regulations brought in a new set of factors which would obscure the effect of the factors which it was desired to measure.



Beef cattle, hogs, and eggs were used to represent the principal competing protein foods. Cheese was not used, since no price index was available for the full period from 1930 to 1941. The U.S. Bureau of Labor Statistics' cost-of-living index for food also was used for comparison.

In order to make the various prices reasonably comparable, in each case the producers' average price was adjusted so that it represented the value received for the marketable portion of the various products. The fishermen's price was multiplied by $2\frac{1}{2}$ (haddock and cod fillets normally equal about 40 percent of the landed weight of the fish), the farmers' price for beef cattle was multiplied by 1.85 (dressed weight equals about 54 percent of live weight), hog prices were multiplied by 1.47 (dressed weight equals about 68 percent of live weight), and egg prices per dozen by 0.75 (one dozen eggs weighs about 1-1/3 pounds), Table 3, p. 13.

fish are compared should be the principal competing foods, such as meat, cheese, and eggs.

Flexible Tariffs or Flexible Import Quotas: A flexible tariff or import quota on foreign fish would be provided which was geared to the price ratio in such a way that, as long as the ratio remained above parity, no restrictions would be placed on imports (or the present minimum tariff rate could prevail). However, should the price ratio be forced below parity, the tariff rate would be progressively increased or imports progressively reduced, until the ratio again exceeded parity, or until some maximum tariff rate or minimum base quota was reached. When the price ratio again rose above parity, the tariff rate would be progressively reduced or the quota increased, as long as the ratio remained above parity, until the original conditions were restored.

If a flexible quota were used, the minimum quota might be the average amount imported during the last five years or some other agreed-upon period. If a flexible tariff were used, the maximum tariff rate would have to be considerably higher than the present maximum to be effective.

The principal effects of the plan would be:

United States markets would be open to foreign fish to the extent that these markets could absorb such fish in addition to our own production without forcing prices to sub-standard levels. Thus, international trade would be stimulated and the consuming public benefited. As long as the United States demand for fish was sufficiently vigorous, fish prices would be maintained above the parity level and no restrictions on imports would be applied. However, if supply exceeded demand at a time when the price level was above parity, the price would be allowed to drop to a level at which fish could compete on more favorable terms with competing foods before help was provided by limiting competition from foreign fish. This provision acknowledges the demonstrated fact that to hold fish prices artificially above their natural ratio with the prices of competing foods will result principally in curtailed markets for fish and reduced over-all value to the producer. Consequently, if it is decided that the producer's income should be maintained artificially at a higher level than the parity price ratio will yield, this should be done by some method which will not increase the price of fish to the public.

Because of the potentially enormous quantities of fish available for import, it is probable that, under normal conditions, this plan would tend to stabilize fish prices near the parity level. If foreign countries desired to participate to a greater extent in our markets, it would be to their interest to help develop these markets so that increased quantities of their fish might be absorbed without depressing prices below parity. Their sales could increase as our markets increased and to the extent that demand was not satisfied by domestic production.

By establishing parity in relation to competing agricultural products, the United States fishing industry would be assured of helpful action which would serve to keep the price of its product in line with those of other food-producing industries, and it would benefit indirectly from any Government action serving to maintain or increase agricultural prices.

Since fish competes directly with agricultural products, particularly eggs, this plan will indirectly benefit the farmer by preventing the flooding of our markets with foreign fish at prices with which the farmer cannot compete without dropping the price of his products to correspondingly low levels.

In spite of several years of unparalleled prosperity, the United States fishing industry now occupies a precarious and vulnerable position. The country as a whole is becoming increasingly conscious of the necessity of working out improved trade and economic relations with our neighbor nations. Yet it is obvious that, if we open our markets without restrictions to the fish produced by these countries under subsidies and labor conditions with which we cannot and do not wish to compete, our principal fisheries, at least those producing fresh and frozen fish, are doomed as

major industries. It is incumbent on the fishing industry to work out some program acceptable to the country at large, which will yield the industry reasonable protection while our markets are being expanded to absorb more fish, and the living standards of the fishermen of our neighbor nations are in transition from their present level to that which we now enjoy. It also would appear to be incumbent on our neighbor nations, who wish to profit from our markets, to cooperate with our industry in achieving a solution. Glutting of our markets during the next few years by a great influx of foreign fish, will not be conducive to the success of our hoped-for, post-war, full-employment program, neither will it help our international relations.

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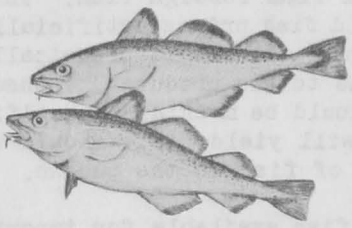

Beef cattle, hogs, and eggs were used to represent the principal competing protein foods. Cheese was not used, since no price index was available for the full period from 1930 to 1941. The U.S. Bureau of Labor Statistics' cost-of-living index for food also was used for comparison.

In order to make the various prices reasonably comparable, in each case the producers' average price was adjusted so that it represented the value received for the marketable portion of the various products. The fishermen's price was multiplied by $2\frac{1}{2}$ (haddock and cod fillets normally equal about 40 percent of the landed weight of the fish), the farmers' price for beef cattle was multiplied by 1.85 (dressed weight equals about 54 percent of live weight), hog prices were multiplied by 1.47 (dressed weight equals about 68 percent of live weight), and egg prices per dozen by 0.75 (one dozen eggs weighs about 1-1/3 pounds), Table 3, p. 13.

Table 3 - Producers Prices for Certain Animal Protein Foods and Related Data

Year	COD AND HADDOCK[1]				Cost of living food index[2]	COMPETING PROTEIN FOOD[2]							Price ratio fish/competing food
	Production	Value				Beef cattle		Hogs		Eggs		Average	
	Millions of pounds	Total in millions	Per Pound			Live, per pound	Dressed,[4] per pound	Live, per pound	Dressed,[5] per pound	Per dozen	Per pound[6]	Dressed meat and eggs, per pound	
		$	¢	¢	%	¢	¢	¢	¢	¢	¢	¢	%
			As landed	Fillet weight[3]									
1930	254	8.75	3.44	8.60	90	7.71	14.26	8.84	12.99	23.7	17.78	15.01	57
1931	192	6.15	3.20	8.00	83	5.53	10.23	5.73	8.42	17.6	13.20	10.62	75
1932	178	4.17	2.34	5.85	70	4.25	7.86	3.34	4.91	14.2	10.65	7.81	76
1933	201	4.94	2.46	6.15	68	3.75	6.94	3.53	5.19	13.8	10.35	7.49	82
1934	223	6.02	2.70	6.75	76	4.13	7.64	4.14	6.09	17.0	12.75	8.83	76
1935	260	6.30	2.42	6.05	84	6.04	11.17	8.65	12.72	23.4	17.55	13.81	44
1936	224	6.68	2.98	7.45	84	5.82	10.77	9.37	13.77	21.8	16.35	13.63	55
1937	237	6.10	2.58	6.45	87	7.00	12.95	9.50	13.97	21.3	15.98	14.30	45
1938	226	5.27	2.33	5.83	81	6.54	12.10	7.74	11.38	20.3	15.23	12.90	45
1939	216	5.67	2.63	6.58	79	7.14	13.21	6.23	9.16	17.4	13.05	11.81	56
1940	182	6.57	3.61	9.03	78	7.55	13.97	5.39	7.92	18.0	13.50	11.80	77
1941	222	8.65	3.90	9.75	85	8.80	16.28	9.09	13.36	23.5	17.63	15.76	62
1942	153	10.10	6.60	16.50	98	10.62	19.65	13.04	19.17	29.9	22.43	20.42	81
1943	133	12.12	9.11	22.78	103	11.80	21.83	13.70	20.14	37.0	27.75	23.24	98
1944	153	11.22	7.32	18.30	105	7/11.80	21.80	7/13.10	19.30	7/33.8	25.40	22.20	82
Average 1930-41				7.21			11.45		9.99		14.50	11.98	62.5

1/Fish and Wildlife Service reports "Landings at Boston, Gloucester, and Portland."
2/U.S. Department of Agriculture, Agricultural Statistics 1944, and U.S. Department of Commerce "Survey of Current Business."
3/Producers price for the fillet portion of the fish equals 2½ times the landed price. (Fillet weight equals 40 percent landed weight.)
4/Farmers price in terms of dressed weight equals 1.85 times the live price. (Dressed weight equals 54 percent live weight. Agricultural Statistics 1944)
5/Farmers price in terms of dressed weight equals 1.47 times the live price. (Dressed weight equals 68 percent live weight. Agricultural Statistics 1944)
6/Farmers price in terms of pounds. (One dozen eggs equals 1-1/3 pounds.)
7/Tentative.

From month to month there is a high negative correlation between the price of fish and the quantity produced. This is illustrated in Table 4, and Figure 5, p. 9, showing the average price and the total production of cod and haddock for each quarter of the year from 1935 to 1941. In order to eliminate the effects of

Table 4 - Production and Average Price of Cod and Haddock, 1935-1941, By Quarters

Year	Quarter	Total production	Average price	Deviations from the trend[1]	
				Production	Price
		Hundred thousand pounds	Cents	Hundred thousand pounds	Cents
1935	1	725	2.52	-	-
	2	848	1.89	-	-
	3	574	2.27	- 56	-.43
	4	449	3.49	-141	+.59
1936	1	570	3.76	+ 3	+.74
	2	687	2.31	+125	-.75
	3	551	2.73	- 11	-.18
	4	430	3.36	-138	+.60
1937	1	605	2.73	+ 24	+.03
	2	701	2.09	+115	-.56
	3	590	2.45	+ 1	-.21
	4	470	3.28	-118	+.63
1938	1	589	2.92	+ 8	+.36
	2	703	1.79	+133	-.65
	3	535	2.00	- 19	-.42
	4	437	2.82	-100	+.33
1939	1	491	3.19	- 44	+.63
	2	671	2.10	+133	-.55
	3	544	2.23	+ 10	-.61
	4	449	3.31	- 43	+.15
1940	1	451	4.23	- 12	+.81
	2	371	3.61	- 92	-.01
	3	617	2.87	+154	-.83
	4	379	4.11	-140	+.50
1941	1	520	4.16	- 37	+.48
	2	744	2.98	+191	-.96
	3	553	4.06	-	-
	4	406	5.01	-	-

1/ To obtain the trend, the values by quarters were smoothed by a moving average of 4, to remove the seasonal variation. The smoothed figures then were smoothed again by 2, to obtain trend values for the mid point of the quarters.

long-time trends in price and production, the quarterly data were smoothed by a moving average, and the deviations in price and production were obtained from these smoothed averages. The correlation between the price and production deviations was $r = -0.79$, $r^2 = 0.62$, $s_r = 0.08$. The only considerable departures from the high negative correlation were for the first quarter of the year, when fish prices were consistently higher than would be indicated by the associated production. Probably this arose because of the abnormally heavy demand for fish during the Lenten season.

Because of the strong short-time influence of production on price deviations, the effect of competing food prices is obscured in any short-term comparison of fish prices and the prices of competing foods. Consequently, annual production and annual average prices have been used in a more extensive analysis of these factors.

The weighted annual prices for cod and haddock were compared with the corresponding cost-of-living index for food and with the average prices for beef cattle, hogs, and eggs, separately and combined (Table 3, p. 13, and Figure 2, p. 6). Except for the decided drop from 1930 to 1932, which was common for all of the indices, there is little correlation between fish prices and the other items. For the entire series from 1930 to 1941, the correlation coefficient between fish prices and the cost-of-living index for food was $r = 0.45$, $r^2 = 0.20$, while that between fish prices and the average price of competing foods (beef cattle, hogs, and eggs)

was $r = 0.48$, $r^2 = 0.23$. Apparently, neither the prices of other protein foods nor the general cost of food was the major factor in determining the average annual price of fish.

The annual average prices of cod and haddock also were compared with the annual production of these species for the same years (Figure 2, p. 6). The correlation coefficient was -0.05, a value so low as to indicate that there was no consistent direct relationship between these variables. The result is counter to the normally accepted belief regarding price and supply, and has some interesting implications for the fishing industry (see p. 16).

Another series of comparisons between the production of cod and haddock and the average price of competing foods yielded a much higher correlation, $r = 0.68$, $r^2 = 0.46$, suggesting that the prices of these foods had a considerably greater influence on the production of fish than on its price. The relationship of competing food prices to the value of the fish produced was even closer, with $r = 0.77$, $r^2 = 0.59$.

These relationships suggest a number of interesting conclusions concerning fish production and prices. First of all, they show that in this fishery the variations in the average annual price received by the fisherman are not related very closely to variations in either the price of competing protein foods ($r^2 = 0.23$) or in the production of fish ($r^2 = 0.0025$). However, the total value received by the fishermen is closely related to the price of competing foods ($r^2 = 0.59$).

The failure of the price of fish to respond very considerably to the price changes of competing protein foods, at first glance, is as surprising as is the fact that changes in fish prices showed no direct relationship to changes in fish production. The explanation lies in the interrelationships among the various items, competing food price, fish price, and fish production. For instance, using eggs as an example, the relationship between the price variations of eggs and those of fish was $r^2 = 0.17$, but the relationship between the price variations of eggs and production variations of fish was $r^2 = 0.76$; thus changes in the production of fish were associated very closely with changes in the price of eggs, but changes in the price of fish were only about one-fifth as close.

The absence of direct correlation between fish price and fish production ($r^2 = 0.0025$) also is the result of the interrelationships among fish prices, fish production, and the price of competing foods. Taken by individual pairs, the direct relationships are as follows: fish production and fish price, $r = -0.05$, $r^2 = 0.0025$; price of competing foods (beef cattle, hogs, and eggs) and fish price, $r = 0.48$, $r^2 = 0.23$; price of competing foods and fish production, $r = 0.68$, $r^2 = 0.46$. Thus, among these items the only considerable influence indicated by simple correlation analysis is that shown by the price of competing foods on fish production. The effect of these competing food prices on fish prices was only about one-half as great, while the direct effect of fish production on fish price appeared to be nil. However, if the same data are analyzed by partial correlation, the results are quite different. The correlation between the price of competing foods and price of fish, when the effect of changes in fish production is removed, is $r = 0.76$, $r^2 = 0.58$ (compared to 0.48 and 0.23 with simple correlation). The correlation between the price of competing foods and fish production, when the effect of changes in fish price is removed, is $r = 0.80$, $r^2 = 0.64$ (compared to 0.68 and 0.46 with simple correlation). But most striking is the partial correlation between fish production and fish price, when the effect of changes in the prices of competing foods is removed, which becomes $r = -0.58$, $r^2 = 0.34$ (compared to $r = -0.05$ and $r^2 = 0.0025$ with simple correlation).

These figures indicate the extent to which increases and decreases in the price of competing foods influence the price, production, and total value of fish. Increases in prices of competing foods would be paralleled closely by increases in fish prices, if production of fish did not increase. Similarly, decreases in the price of competing foods would be accompanied by corresponding declines in fish prices, if production remained constant. However, production of fish is highly flexible. Consequently, when an increase in the price of competing foods

causes a slight increase in fish prices, it becomes profitable to increase the production of fish. Thereafter, most of the upward pressure from the increased price of competing foods is expended in increasing the production of fish (by increasing the market) rather than the average price. Similarly, a generally-falling food price level results in decreases in the production of fish more than in decreases in price.

From these data it seems reasonable to conclude that, in fisheries where the fish populations are not exploited fully (as also with products obtained from other not fully exploited natural resources) and production can be increased or decreased with relative rapidity and with no great change in production costs, the price of the raw material never deviates greatly from some basic level which is closely related to cost of production as long as no artificial restraints are placed on expansion or contraction of the fishing effort. Thus, changes in the price of competing foods are reflected as changes in fish production to a much greater extent than as changes in fish prices. Under normal conditions, a decrease in other food prices results in the sale of a smaller amount of fish at about the same price rather than in a correspondingly lower price for the same production of fish, and conversely, for an increase in other food prices. As a consequence, it follows that, although changes in the prices of competing foods do not cause great changes in the average price received by the fish producer, they do cause considerable changes in the market for fish, with the result that the total value received by the producer is dependent to a large extent on the prices of competing foods.

The behavior of fish prices during the war years prior to Office of Price Administration ceilings, illustrates the operation of these relationships. The price of competing foods increased rapidly in 1941, 1942, and 1943. If fish production had been free to expand without limitation, most of the effect of the higher prices for competing foods would have been expended in greatly increased production. However, instead of fish production being free to expand, it was forced to contract as the result of the Government taking over many of the best fishing boats and the restrictions on new construction caused by the shortage of materials, shipbuilding facilities, and high costs. The upward pressure on fish prices from the combined effects of high prices for competing foods and contracted production caused fish prices to increase much more rapidly than did the prices of other foods for which production could and did increase. For instance, the average price of cod and haddock in 1943 was 134 percent above the 1941 average (in spite of price ceilings during the last six months of 1943), while the average price of competing foods in 1943 had risen only 47 percent above the 1941 average, partly as the result of earlier price control. Thus, during the first two war years cod and haddock prices increased nearly three times as much as did the prices of the foods with which they compete.

Before leaving this subject of fish versus competing foods, one other relationship should be discussed: that between the relative price of fish (the ratio of fish price to the price of competing foods) and consumption of fish. (Annual consumption of species used fresh and frozen approximates production.) The data are shown in Table 3, p. 13, and Figure 4, p. 8. The correlation is $r = -0.77$, $r^2 = 0.59$. Compare this with the direct correlation between fish price and fish production, $r = -0.05$, $r^2 = 0.0025$. This indicates that, although the price of fish has very little direct relation to the production (consumption) of fish, the relative price of fish does have a close inverse relation to consumption; that is, when fish is low priced in comparison with other foods, consumption is high, and when it is high priced in relation to other foods, consumption is low. According to these figures, nearly two-thirds of the changes in consumption of cod and haddock, from 1930 to 1941, were related to changes in the relative price of these species.