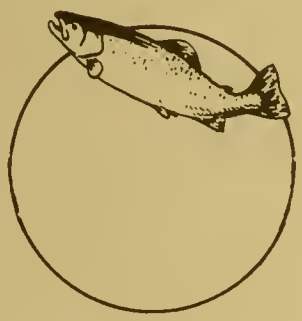
THE GROUNDFISH INDUSTRIES OF NEW ENGLAND AND CANADA

A Comparative Economic Analysis



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THE GROUNDFISH INDUSTRIES OF NEW ENGLAND AND CANADA

A Comparative Economic Analysis *

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PREFACE

The American groundfish industry, centered in New England, far from participating in the general prosperity which has characterized the national economy in the post-World War II period, has been in a continual stage of decline during these years. The growing unprofitability of the groundfish industry and its effects on new investment, employment, and vessel construction, are matters of grave concern not only to those whose livelihood depends on the industry, but also to those concerned with the preservation, development, and utilization of the fishery in an area notably short of resource - based enterprises.

The major reasons usually assigned for this decline are the decline of fish populations in local waters to lower but stable levels and the consequent high unit costs of operating, the costs and difficulties of marketing the product in competition with other food items, and the impact of foreign competition, principally from the Canadian Atlantic Provinces.

This report is an attempt to qualify and quantify these and other causes, both internal and external, of the decline of the New England groundfish industry. In doing so, it will focus on the comparative performances of the industries of New England and its chief competitor, the Canadian Atlantic Provinces. It deals with the economic, social, and biological factors which have affected both.

The study was performed by the Bureau of Business Research of Boston College, under contract to the Bureau of Commercial Fisheries of the United States Department of the Interior. It was financed with funds made available under the Saltonstall-Kennedy Act, approved July 1, 1954. (68 Stat. 376).

The Bureau of Business Research, Boston College, is indebted to many individuals, government agencies, and private firms in this country and Canada, which aided in the study. Among these are Dr. Donald J. White, Associate Dean of the College of Business Administration of Boston College, and a recognized authority on the New England fishing industry; the various trawler owners in New England and Canada who made their records available to us; the New England Fish Exchange; the Atlantic Fishermen's Union; the Massachusetts Department of Labor and Industry; the Massachusetts Division of Employment Security; the insurance brokers and repair yard owners who gave freely of their time and knowledge; the Fisheries Research Board of Canada; the Newfoundland Fisheries Development Commission; the Department of Trade and Industry of Nova Scotia; and the Atlantic Provinces Economic Council.

Finally, the Bureau of Business Research wishes to acknowledge the continuing guidance and counsel, throughout the study, of Mr. Walter H. Stolting, Chief, and Mr. Alton T. Murray, Commodity Industry Economist, of the Branch of Economics, Division of Industrial Research, in the Bureau of Commercial Fisheries and the assistance furnished by the Director, Dr. Herbert W. Graham and staff members of the Woods Hole Laboratory, Bureau of Commercial Fisheries.

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CHAPTER I

BACKGROUND AND THE PROBLEM AREAS

Introduction

The economic vitality of the New England fishing fleet depends primarily on its major product--groundfish. These are fish that live on or near the sea floor, or on the "ground" of the fishing banks. The broad definition of the species includes a wide variety of bottom fishes, rockfishes, and flatfishes. In this report, however, the term "groundfish" is used in a narrower sense, for it is restricted to the following species, upon which the New England seafishery is principally founded: haddock, ocean perch (redfish), cod, pollock, hake, and cusk. 1/

The groundfish fleet operates mainly on a 260,000 square mile continental shelf extending for 1,000 miles from Long Island, New York to Newfoundland. 2/ The principal fishing method employed is the otter trawl. This is a large conical net that is dragged across the fishing banks by large steel trawlers and smaller wooden vessels.

Historical Importance of the New England Fishery

Fishing is New England's oldest industry and was once its most important one. The region's export trade began with the shipment of salted and dried codfish to Europe. This industry later developed into the famous triangular trade of the 18th century, whereby fish was sent to Europe in exchange for Mediterranean products which were brought to the West Indies for sugar, molasses, and rum which were carried to New England.

The growing fishery of the 17th and 18th centuries laid the base for early New England's export trade and the manufacturing complex that characterizes modern-day New England:

-"With the sugar that was brought back in payment for fish, the refining and distilling industries were started; with cacao, the confectionary industry; with hides, the shoe factories; with the gold and silver that occasionally returned, the southern New England jewelry manufacture." 3/

-The brass industry's origin was the market for ship chandlery.

-Capital accumulated in fishing and shipping was used to establish the textile industry, New England's bellwether manufacturing industry for decades.

The growth of manufacturing in New England after the Industrial Revolution resulted in the relative decline of the fisheries in the area's economic base. Commercial fishing, once the region's largest single industry, by 1880 employed only 37,000 men out of a labor force of 1.5 million. 4/

The Decline of the New England Groundfish Industry

Prior to 1918 cod accounted for the major share of United States groundfish landings. Between 1918 and 1947 haddock was the leading species, and since 1947 ocean perch has usually been the species landed in greatest quantity. The ocean perch fishery was established in the mid-1930's and showed a marked upward trend in landings until 1952. After 1952 catches declined precipitously, with 1957 landings 48 percent below those of 1951. The cod catch also declined markedly, with 1957

1/ This definition of "groundfish" is also used by the United States Tariff Commission in its investigations. (Cf. United States Tariff Commission Groundfish: Fishing and Filleting, Washington 25, D. C., 1957)

2/ Fishery Resources of the United States. Senate Document No. 51, 79th Congress, 1st Session, March, 1945. p. 48.

3/ Ackerman, Edward A., New England Fishing Industry. Chicago: University of Chicago Press, 1941. p. 3.

4/ Ibid, p. 4. See also, Tenth Census of the United States, Washington 1885 Compendium. pp. 1360-61, 1366-67.

landings 77 percent below those of 1945 and 57 percent less than the average annual landings of the 1946-48 postwar period.

Between 1922 and 1948 the long-run trend in landings of all species of groundfish was upward. In the latter year over half a billion pounds of groundfish were landed in New England ports. The downward trend began in 1949, however, and by 1957 landings were down to a third of a billion pounds. The trend in aggregate landings of groundfish since 1939 followed the trend of landings of ocean perch and cod. Haddock landings have been relatively stable, while there has been a substantial decline in the aggregate landings of pollock, hake and cusk; (table I-1 in the Appendix which contains all tables for this report.)

Landed values of groundfish have likewise declined, especially in the post-World War II period. Landed values in 1957 were $10 million below those of 1948, (table I-1). Lower ocean perch revenues accounted for 46 percent of the loss; cod for about 24 percent of it; and haddock 21 percent.5/ During this same period, when groundfish values declined 35 percent, the value of fish other than groundfish landed in New England declined only 10 percent, and the landed value of shellfish actually increased 21 percent, (chart I-1). Thus the depression in the groundfish industry was responsible for the resultant decline of 11 percent in the value of all New England fishery landings over this period. This decline occurred in a decade when wholesale prices were rising 17 percent and when the cost of gear and equipment as reflected by prices paid by fishermen was advancing sharply. If landed values are deflated by the wholesale price index (chart I-2), it is seen that, in real terms, New England groundfish revenues dropped by 42 percent over the 1948 to 1957 period, and that of all fish and shellfish by 21 percent. This serves to point up the fact that the absolute decline of the New England fishing industry is due principally to the decline of its groundfish component.

This postwar crisis has been marked by both a diminishing catch and a price structure that has been inadequate to compensate for the lower domestic supply and the higher costs of vessel operation. In the 1948-57 decade landings and values of groundfish declined by the same proportion, indicating little change in unit catch prices, despite the severe change in quantities available for sale. Thus, per unit prices remained relatively stable until 1958 when the unit price rose in response to an international scarcity of groundfish, (table I-2).

Significantly, the decline in domestic landings was paralleled by a sharp upward trend in imported groundfish products, including ocean perch fillets, (tables I-15 and I-16). This rapid growth in the volume of imported groundfish products, principally from Canada, has had a serious competitive impact upon the domestic industry. The organization of the Canadian groundfish industry is examined in Chapter II.

The groundfish industry is of varying importance to the prosperity of the five leading New England ports, (table I-3). The Boston fishing fleet is almost completely dependent on groundfish for its livelihood; in New Bedford less than 10 percent of fishing revenues comes from groundfish (61 percent from scallops and 25 percent from flounder fishing). Over 50 percent of Gloucester's primary fishery values are derived from groundfish. In Portland and Rockland, groundfish are the most valuable category of seafish landed. The lower values of groundfish in relation to all fish and shellfish landed in these latter

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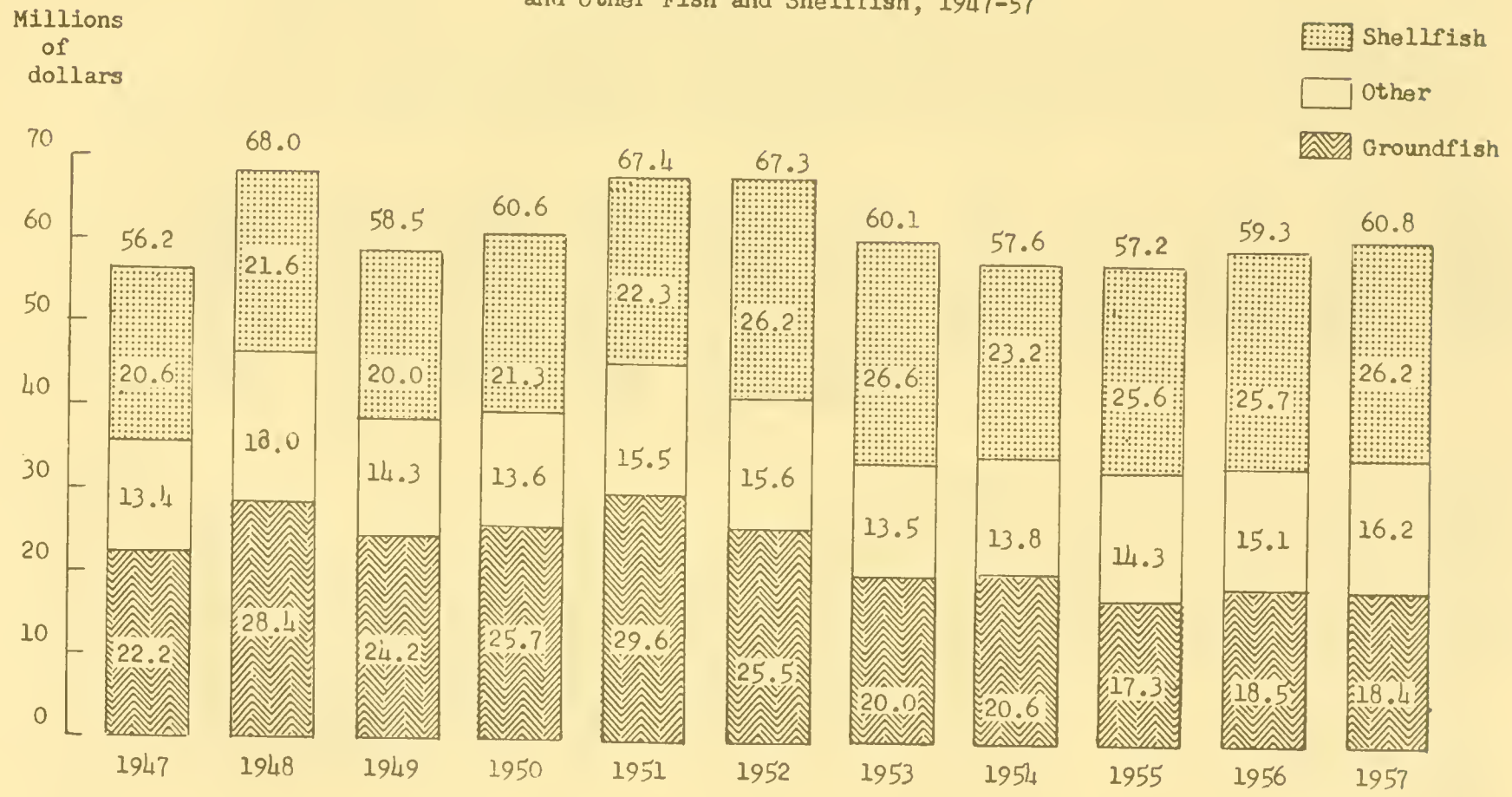
5/ The relation between the trend in ocean perch landings and values and total groundfish landings and values is even more evident if analysis is made of the decline in revenues between 1951, the postwar peak, and 1957. In this period, total groundfish values were off $11.2 million, of which 67 percent is accounted for by lower ocean perch sales.

Chart I-1

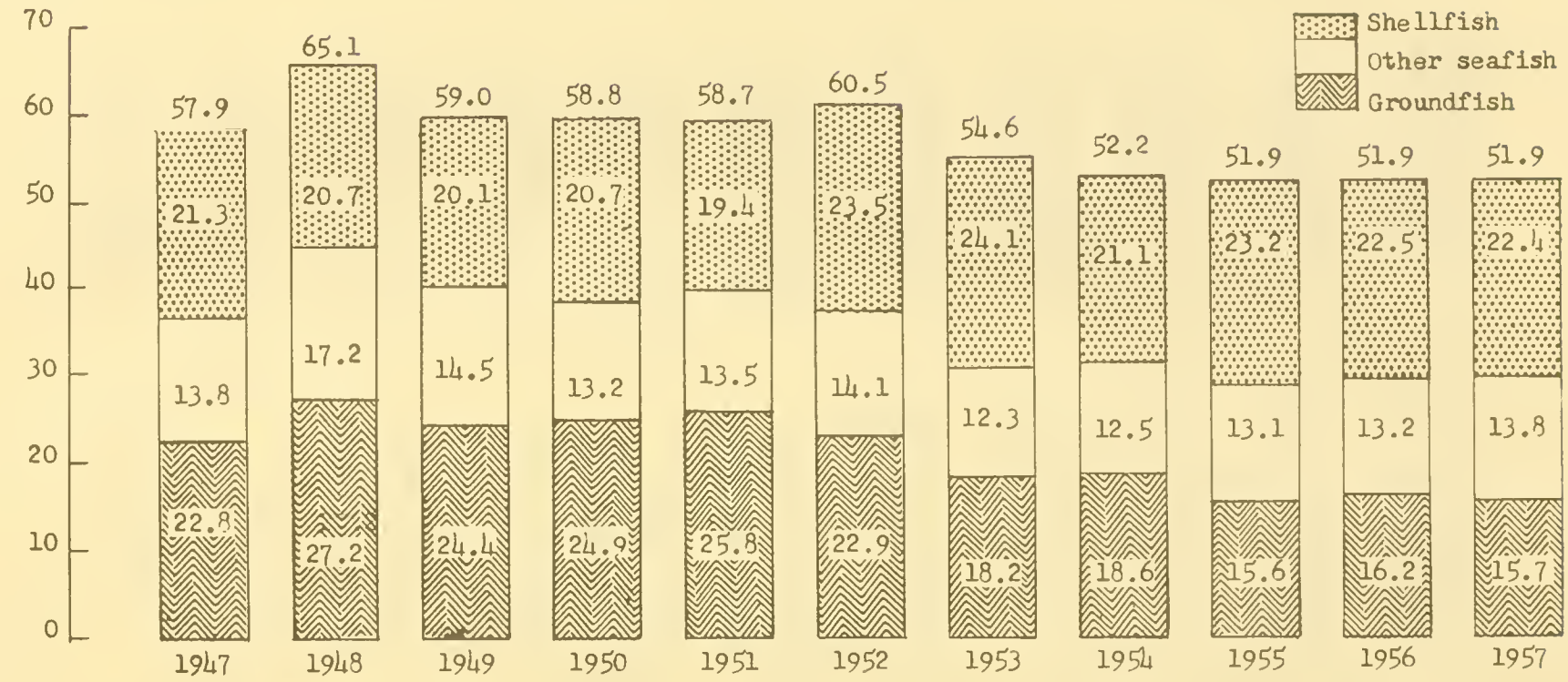
Value of Landings, New England Groundfish,
and Other Fish and Shellfish, 1947-57



Source: Fishery Statistics of the United States, years 1947 to 1956, Fish and Wildlife Service, United States Department of the Interior. New England Fisheries - 1957, C.F. S. No. 1909, Bureau of Commercial Fisheries.

Chart I-2

Value Constant Dollars 1/ of Landings, New England Groundfish, Other Seafish, and Shellfish, 1947-1957



Source: Values, Fishery Statistics of the United States, Years 1947-1956, Fish and Wildlife Service, United States Department of the Interior, New England Fisheries - 1957, C.F.S. No. 1909, Bureau of Commercial Fisheries. Index of Wholesale Prices compiled from United States Bureau of Labor Statistics, Wholesale (primary market) Price Index, "Price Relative All Commodities".

1/ Values for each year are in terms of average purchasing power of the dollar for the period 1947-49.

two ports is due to the higher values for lobster landings, particularly in the Rockland area.

The fishing ports most dependent on groundfish landings have not experienced postwar prosperity, (table I-4). The average value of the Boston catch in the 1955-57 period was 29 percent below that of the 1947-49 average. Comparing the same periods, Gloucester's catch value was down 24 percent from the 1947-49 average and off 29 percent from the 1950-52 peak years. New Bedford's landed values have shown a long-term upward trend because of its prosperous scallop fishery.

The Maine ports of Portland and Rockland present a less clear picture. In Portland average landed values for all fish and shellfish from 1955-57 were 23 percent above the 1947-49 average and 4 percent below the 1950-52 average. Further analysis indicates that the increase from 1947-49 to 1955-57 is primarily due to groundfish values, which increased 38 percent compared with a 13 percent increase in the value of shellfish, principally lobsters. Groundfish landings, primarily ocean perch, increased steadily in Portland from 1947 to 1951 and have declined since then, so that there has been a loss in average annual value between 1950-52 and 1955-57 of 12 percent.

In Rockland landed values for all fish and shellfish increased 16 percent between 1947-49 and 1955-57. At the same time, the value of the shellfish catch rose 26 percent and the groundfish catch only 9 percent. The influence of the groundfish values is more apparent if comparison is made of the 1950-52 and the 1955-57 periods. Despite a 20 percent increase in the value of shellfish between these two periods, total landed values of all fish and shellfish in Rockland showed only a negligible increase. The explanation is a 30 percent drop in groundfish values.

In retrospect, it can be seen that the depression in the primary groundfish industry made itself felt in the haddock and ocean perch ports at different times. Boston landings and values began to suffer in 1949, while it was not until 1952, when ocean perch became scarcer in local waters, that Gloucester, Portland, and Rockland became sore-pressed. It should be noted, too, that the loss in groundfish values in Maine landings is evident since 1952 despite groundfish fleet additions from Massachusetts ports.

The severity of the crisis in the groundfish industry has been manifested by many indicators. Declines in employment and earnings, lengthening average age of men and ships, and a drastic loss in the domestic industry's share of the United States groundfish fillet market are compelling signals that this industry is rapidly losing its competitive vitality.

1. Employment

The wartime prosperity of the industry increased employment between 1939 and 1947 by 81 percent; (table I-5). Since then there has been a fairly steady decline in New England's employment total, and this has been most striking in Massachusetts. From 1947 to 1957 total New England employment fell 25 percent, while that in Massachusetts declined 37 percent. Part of the decline in Massachusetts jobs created work opportunities in Maine, as a substantial number of vessels transferred operations from Massachusetts to Maine ports. Employment on Maine trawlers nearly tripled between 1947 and 1951. Jobs there have shrunk 61 percent, however, since 1951.

The marked increase in Rhode Island employment does not reflect greater activity in groundfishing, but rather a growth in the fishery for industrial (trash fish used for reduction purposes) fish and flounders. Only 2 percent of the value of Rhode Island otter trawl landings are accounted for by groundfish, whereas groundfish in Massachusetts represents 67 percent and in Maine 87 percent of total otter trawler landings.

Another index of employment in the groundfishery is the number of trips made annually by large otter trawlers, which land groundfish almost exclusively. The Bureau of Commercial Fisheries reports that the annual number of trips by such boats based in Massachusetts has fallen from 1,875 in 1947 to 1,101 in 1957. This represents a decrease in activity of 41 percent. 6/

6/ Fishery Statistics of the United States. 1947, p. 99; 1957, p. 121.

The Massachusetts Division of Employment Security has data showing total earnings paid to fishermen on vessels of 10 net tons and over. As shown in table I-6, total earnings in the fisheries have advanced only 3 percent in the 1948-57 period. It must be remembered, too, that this figure includes earnings in all fisheries employing vessels of over 10 net tons. If earnings from the relatively prosperous scallop industry are excluded, there is an absolute decrease in groundfish vessel earnings. This is verified by the experience of the groundfish ports of Boston and Gloucester where total earnings fell 8 percent and employment 25 percent in the period. Since the number of jobs in these two ports declined more than did total payments, average earnings for those still employed advanced 24 percent (versus a 17 percent increase in the cost of living). On the other hand, total wage payments in other Massachusetts ports advanced 20 percent, while the number employed fell 3 percent. In these ports average annual earnings advanced 24 percent in the period. These higher earnings figures reflect the influence of the scallop fishery in New Bedford.

The reduction in employment opportunities in the fisheries has had a marked effect on the composition of the fishermen labor force. Table I-7 surveys the age composition of the Atlantic Fishermen's Union in 1958. The data may be biased toward the older age groups, as there is no way of determining how active the older members are in fishing. A marked difference is seen, however, in the age distribution among the unionized ports. In Boston about 69 percent of the fishermen are 51 years or over and only 9 percent under 41 years. In Gloucester 44 percent are 51 or over and only 9 percent under 41 years. In New Bedford, where there is a prosperous scallop fishery but one requiring arduous work for deckhands, only 29 percent are 51 and over while 42 percent are under 41 years. Clearly, the problem of attracting young men into this industry is a major one for the groundfish ports of Boston and Gloucester. Detailed data were not obtained on the age of Maine groundfish fishermen, but the Commissioner of the Maine Department of Sea and Shore fisheries estimates that the average age of Maine trawler men is over 40 and that young men are standing clear of the industry. 7/

2. The Vessels

There has been a decline in the number of vessels and their size, and a deterioration in the quality and equipment of the vessels. In the period 1947-57 the number of New England otter trawlers declined 13 percent with a 14 percent loss in net tonnage. The number of trawlers operating out of Massachusetts ports declined 28 percent in number and 32 percent in tonnage. Maine ports experienced a 35 percent increase in numbers of trawlers and a 167 percent tonnage increase, but here, too, there has been a decline since 1954, (table I-8).

The number of active large and medium trawlers at Massachusetts ports has declined from 295 in 1947 to 203 in 1957, (table I-9). The shrinkage in the size and composition of the fleet is most evident in the case of the Boston groundfish fleet where the number of large trawlers has been halved; medium ones have shown an 18 percent increase; and the smaller ones have been reduced by two-thirds, (table I-10).

Not only has the number of vessels in service decreased, but many of the remaining ones have reached an age long past "normal" replacement. As of September 1, 1958 the average age of a Boston otter trawler was 20.8 years. Large Boston trawlers averaged 18 years, medium ones 19,

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7/ Fisheries Legislation, Hearings, Committee on Interstate and Foreign Commerce, United States Senate, 2nd Session, July 15-17, 1958, p. 150, Brief by Ronald W. Green, Commissioner, Department of Sea and Shore Fisheries, State of Maine. See also, Assistance to Depressed Segments of the Fishing Industries, Hearings, Subcommittee on Fisheries and Wildlife Conservation of the Committee on Merchant Marine and Fisheries, House of Representatives, 86th Congress, 1st session, April 28-30 and June 4 and 11, 1959, p. 61. Statement of Honorable Beatrice Corliss, Mayor, City of Gloucester, Massachusetts.

and smaller ones 39 years. 8/ Of 64 trawlers in Maine in 1957, 48 were over 11 years old, most of the large trawlers were over 20 years old, and the average age of the entire fleet was slightly more than 19 years. 9/ The useful life of a large trawler is reckoned at 25 years and that of a smaller craft at 12 to 15 years. When these standards are compared to the ages of the New England vessels, it is readily evident that the New England fleet has arrived at a crisis period.

3. Cost-Revenue Relationships

The declining employment and the diminishing fleet are not causes of the groundfish depression, but rather the effects of fundamentally inadequate cost-revenue relationships in the industry. As observed earlier, gross revenues and returns per pound of fish landed have declined in constant dollars in the postwar period. Costs, however, have advanced sharply.

While labor costs have remained at a fairly constant proportion of gross revenues, because of the nature of the share arrangement, there have been substantial increases in overhead costs. The average cost of hull insurance rose during the years 1950-54 by 27 percent, while there was a staggering 78 percent increase in the cost of the average protection and indemnity policy in the same period. 10/ One of the principal marine railways in the area audited its 1948 sales book and found that to perform exactly the same repair and maintenance work on six average trawlers in 1958 would cost 73 percent more. The majority of the increase was due to higher labor rates: the 1948 charge was $2.00 per hour, and the 1958 charge was $3.85 per hour. 11/

For the twenty-five New England trawlers in this study, for which complete cost data were available for each year 1953 through 1957, insurance expenses per boat advanced 28 percent; repair and maintenance expenditures were lower in 1955 and 1956 than in 1953, but were 17 percent higher in 1957 than in 1953; and gear and supply expenses followed a similar pattern, lower in 1955 and 1956, but 26 percent higher in 1957.

The decline of prices and revenues at a time of increasing costs has resulted in deficit operations for many vessels. A recent cost study showed that in each year from 1953 to 1957 aggregate losses outweighed aggregate profits. For the year 1953, 35 vessels lost money, 33 showed profits; in 1954, 40 had losses and 36 profits; in 1955, 44 had losses and 28 profits; in 1956, 33 had losses and 21 had profits; in 1957, 40 had losses and 22 showed profits.

The aggregate losses for each year were: 1953, $116,000; in 1954, $174,000; 1955, $175,000; 1956, $118,000; 1957, $188,000. On a per boat basis this was a deficit in 1953 of $1,706; in 1954, of $2,289; in 1955 of $2,431; in 1956 of $2,185; and in 1957 of $3,032. It is not to be wondered then that old vessels in the New England groundfish industry are not being replaced by newer units.

To gain a proper perspective of the situation in the groundfish industry, it is instructive to examine very briefly the postwar progress in other major New England fisheries. Have groundfish vessels and fishermen transferred activity to other fisheries? Have ports not as dependent on groundfish landings experienced growth or decline?

Shellfish values increased substantially in the postwar years, while the values of seafish other than groundfish were relatively stable in the 1948-57 decade, (chart I-1). A more detailed breakdown of landings and values in the significant components of the New England fishery appears in table I-11.

8/ Commercial Fisheries Review, Fish and Wildlife Service, United States Department of the Interior, November 1958, p. 29.

9/ Fisheries Legislation, op. cit., p. 151.

10/ Hull Insurance and Protection and Indemnity Insurance of Commercial Fishing Vessels, by Warner C. Danforth and Dr. Chris A. Theodore of Boston University, Special Scientific Report - Fisheries, 241, United States Department of the Interior, Fish and Wildlife Service, 1957, p. 3.

11/ Data submitted by a Gloucester marine railway, January 8, 1959.

The growth in shellfish landings and values to a limited degree represents alternative employment for groundfish vessels. The sea scallop fishery, concentrated in New Bedford, uses 70 to 80 boats whose construction and deck arrangement are similar to that of medium-sized groundfish trawlers. Many of the boats are converted from trawling to scalloping and back again in order to adapt the vessel to changing marketing conditions in groundfish, flounders, and scallops. 12/ This particular possibility of alternative employment is of some moment in New Bedford, but of little importance as a solution to the region's groundfish problem.

The whiting fishery is another industry showing definite growth possibilities. From 1947 to 1957 whiting landings doubled and value increased over 50 percent.

In summary it may be said that there have been distinct growth segments in the New England fisheries and, that of these, scallops and whiting present some alternative employment possibilities for groundfish vessels and men. Save for the scallop fishery in New Bedford, and to some extent the whiting fishery in Gloucester, these have not substantially alleviated the economic consequences of the decline of the groundfishery. The growth of industrial fishing has been remarkable, but it has been in ports not previously groundfish landing sites. In 1960, however, this fishery began to experience some economic difficulties.

The Modern Industry

The Director of the Bureau of Commercial Fisheries, Department of the Interior, estimated in 1958 that if shore workers and those employed in allied industries dependent on the fisheries are included, nearly 65,000 persons have their livelihood based on the industry. The value of the groundfish fleet alone is estimated at $40 million with another $30 million invested in processing plants. 13/ The landed value of the 1956 New England catch was nearly $60 million; fishery products manufactured in the area were valued at $108 million, and the retail value of the New England catch was about $184 million.

While the industry occupies a relatively minor position in the New England economy, it is of major importance in certain ports such as Gloucester, New Bedford, and Rockland. It is estimated that 70 percent of Gloucester's population is dependent on the fishery; in New Bedford it is the second largest industry, with employment provided for 10 percent of the labor force; in Rockland, it is the leading industry. The State of Maine found for the years 1955-57 that the fisheries segment of Maine manufacturing represented 2.9 percent of the total manufactured product value in the State, 1.9 percent of the total manufacturing gross wages paid and 2.9 percent of the total manufacturing average employment. 14/ In 1957, fishery products and byproducts accounted for 55 percent of the value of all primary production, 4.3 percent of gross wages, and 5.7 percent of employment. The 9,547 regular fishermen and processing workers represented 3.5 percent of the 1957 Maine labor force.

New England fishing vessels in 1957 landed 1,030,883,000 pounds valued at $60,810,000, or 22 percent of the poundage and 17 percent of the values of total United States fishery landings. Groundfish constituted about 30 percent of both the poundage and value of the New England total catch of all species.

New England accounts for about 95 percent of the United States landings of groundfish of which over 80 percent are converted to fresh and frozen fillets.

12/ Sea Scallops Boats and Gear, by J. A. Posgay, Fishery Leaflet 442, United States Department of the Interior, Fish and Wildlife Service, p. 3.

13/ Fisheries Legislation. Hearings, Committee on Interstate and Foreign Commerce. United States Senate, 85th Congress, 2d Session, July 15-17, 1958. Testimony of Donald L. McKernan, Director, Bureau of Commercial Fisheries. p. 217.

14/ Special Study: Value of the Fisheries in Maine Manufacturing Industries. State of Maine, Department of Labor and Industry, Division of Research and Statistics. July 3, 1958.

The production of groundfish fillets enabled the area to account for nearly 69 percent of the total United States output of packaged fish in 1957. 15/ In terms of value, haddock is the most important groundfish species. In 1957 it contributed 55 percent of the total value of the region's groundfish catch. The other two leading species are ocean perch and cod, which accounted for 28 percent and 11 percent respectively of landed values, (table I-12).

Groundfish landings are concentrated in five New England ports: Boston, Gloucester, New Bedford, Portland, and Rockland. Landings in these five represent 90 percent of the poundage and 99 percent of the value of groundfish landings of all New England ports. The New England fishery for all species shows somewhat less geographical concentration, although these five leading ports account for about two-thirds of the poundage and value of all fish and shellfish landed, (cf. table I-3).

The fisheries for New England haddock and ocean perch may be classified geographically in two ways. One is by port, and the other is by area fished. Boston has long been the home of the haddock fleet, while Gloucester, Portland, and Rockland are the centers of ocean perch operations. Eighty-two percent of the value of all haddock landed in major New England ports in 1957 was concentrated in Boston, (table I-13). Gloucester, Portland, and Rockland had 96 percent of the value of ocean perch landings, with Gloucester vessels alone landing about 50 percent of the total. In 1958 Boston-landed haddock represented 78 percent of the value of all groundfish sold in the port and 74 percent of the value of all fish and shellfish landed there. In the same year, ocean perch was the most valuable groundfish species landed in Gloucester, Portland, and Rockland and accounted for approximately 65 percent, 72 percent, and 93 percent, respectively, of the value of groundfish landings in these ports, (tables I-14 and I-14A).

New Bedford has a more diversified fishery than the other New England ports. Here is the center of the United States sea scallop fishery. Scallops in 1958 accounted for 53 percent of the value of all fish and shellfish landed at that port. The New Bedford fleet also produces a significant amount of flounders. Thus, in 1958, flounders represented 31 percent of the value of all New Bedford landings of fish and shellfish.

The causes of the disastrous cost-price squeeze in the groundfish industry are the subject of much controversy. Nearly all New England vessel owners lay the blame on a demoralized national market structure sapped by foreign imports of cheaply produced frozen groundfish fillets. 16/ Aggregate United States consumption of groundfish fillets has increased about 250 percent since 1940; on a per capita basis the increase is about 87.5 percent. Yet New England's production of such fillets in the 1956-58 period was slightly below the 1939-41 average.

In 1939, the region's share of the national market for groundfish fillets was about 91 percent; in 1957, it was only about 40 percent. (New England accounts for the bulk of United States production). From 1939 to 1957 imports went from 9,892,000 pounds to 141,180,000 pounds, an increase of 1,327 percent. In the postwar decade alone there was nearly a threefold increase, (table I-16).

The bulk of these imports have come from the Canadian Atlantic Provinces. Imports from this area represented 77 percent of all groundfish fillet imports in 1957 and 62 percent in 1958. In the latter year Iceland accounted for 18 percent of imports (table I-15).

15/ Packaged Fish - 1957, (F.S. No. 1753) United States Department of the Interior, Fish and Wildlife Service, Washington 25, D.C.

16/ This view is not shared by all segments of the United States fishing industry. Cf. testimony of importers and domestic distributors before United States Tariff Commission in recent years.

Domestic producers do not contend that they can presently supply all the United States demand for groundfish fillets. They do claim that their foreign competitors, particularly the Canadians, are such low-cost producers that they can sell in the United States at a price which is demoralizing. This price has to be met, and consequently New England processors are unable to pay the boat owners a price for unprocessed fish high enough to make vessel ownership profitable.

This report will attempt to investigate and evaluate the comparative costs of production of New England groundfish vessels and those in the Canadian Maritime Provinces. The research will be confined to the costs of procuring the raw material, i.e., of catching and landing the fish. It will not examine the processing costs.

Basic to an intelligent comparison of the production cost structure of the two competitors is an understanding of the socio-economic nature of the fishery in the Maritime Provinces and of its relation to the general economy of the area. An analysis and development of the Maritime groundfishery in this light will be the task of Chapter II.

CHAPTER II

THE ATLANTIC PROVINCES OF CANADA

Economic Base

New England's greatest competition in the market for groundfish fillets comes from its nearest foreign neighbor, the Atlantic Provinces of Canada. These Provinces are Nova Scotia, New Brunswick, Prince Edward Island, and Newfoundland. The first three named have socio-economic characteristics somewhat different from those of Newfoundland and are often grouped together under the term "Maritime Provinces."

All four provinces border on the Atlantic Ocean and two (Prince Edward Island and Newfoundland) are islands. Their total land area, excluding Labrador, of 93 thousand square miles is about one-and-a-half times that of New England. Population is, however, much less concentrated than in New England. Dominion estimates as of July 1, 1959, place the Atlantic Provinces' population at 1,859,000, or 10.6 percent of Canada's total population of 17,482,000.17/ This is somewhat less than 20 percent of the 9.7 million people residing in the New England States. Indicative of low urbanization is the fact that only 27 communities in the four Provinces had a population of over 5,000 in 1956.

1. Atlantic Provinces And Canada

The economic base of the Atlantic Provinces is significantly different from that of the rest of Canada and that of New England. There is relatively greater dependence on the primary industries of forestry, mining, and fishing, with less employment proportionally in manufacturing and agriculture. Forestry, fisheries, and mining contributed 25.5 percent of the net value of production in the Atlantic Provinces in 1955, while the same industries furnished 11.5 percent of the net value of production nationally. In contrast, manufacturing, which accounted for 55 percent of the net value of production in all Canada, represented only 37 percent of the net value produced in the Atlantic Provinces, (table II-1).

Newfoundland is especially dependent on the extractive industries for its economic vitality. Forestry, fishing, and mining contributed 42.5 percent of the net value of production in the Province, while manufacturing was responsible for only 32 percent of product values.

Manufacturing in the Atlantic Provinces is largely based upon the processing of the raw material resources of the area. Considering the Atlantic Provinces as an economic unit, pulp and paper was the leading manufacturing industry in 1955, followed by fish processing, primary iron and steel, shipbuilding, and butter and cheese. These industries accounted for 54 percent of the total value of factory shipments of the Atlantic Region. 18/

The relative importance of the primary industries to the economic base of the Atlantic Provinces is emphasized in table II-2, in which the labor force is distributed by major industry groups. While nationally 26 percent of the labor force were engaged in manufacturing, only 14 to 18 percent of the labor force were so occupied in the Atlantic Provinces. In the Dominion, only 5.5 percent of the labor force were in non-agricultural extractive industries (forestry and logging; fishing and trapping; mining and quarrying, and oil wells), while in Nova Scotia and New Brunswick proportionally over twice as many were so employed, and in Newfoundland five-and-a-half times as many.

2. Atlantic Provinces And New England

The contrast between the economies of the Atlantic Provinces and that of New England is seen from a consideration of the non-agricultural labor force in the two areas as distributed by industry groups. In Maine and Massachusetts 39 and 38 percent

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17/ Parks, A. C. The Economy of the Atlantic Provinces, 1940-1957. Atlantic Provinces Economic Council, September, 1959. p.3.

18/ General Review of the Manufacturing Industries of Canada, 1955. Bureau of Statistics, Industry and Merchandising Division, Queen's Printer and Controller of Stationery, Ottawa, 1958. p. 123.

respectively of the labor force is absorbed by manufacturing. 19/ In the Atlantic Provinces, however, only 14 to 22 percent of the non-agricultural labor force is engaged in manufacturing. Proportionally more than two-and-one-half times as many workers are in manufacturing pursuits in Maine and Massachusetts as in Newfoundland. On the other hand, while only a statistically minute segment of the non-agricultural labor force in the two New England states have jobs in forestry, fishery, and mining, these industries provide employment for 15-16 percent of the labor force in Nova Scotia and New Brunswick and 32 percent in Newfoundland. 20/

The Atlantic Provinces, because of the dominance of their extractive industries, are dependent for their prosperity upon export sales of these resources primarily in raw or semi-processed forms. The possibilities of expansion in secondary manufacturing are severely restricted by the limited size of local markets, the transportation costs to the population centers in central Canada, and the tariff barriers to the nearby New England market.

The economists of the region feel that logically there should be more commerce with New England in terms of processed raw materials and secondary manufactured goods. They do not place the blame for lack of such trade on the United States alone. Many feel that Dominion policy since Confederation, e.g., in respect to Canadian tariffs and the transcontinental railroads, (perhaps now the Saint Lawrence Seaway), has shifted the direction of trade from a more natural north-south to a linear east-west orientation. 21/ As the result of extensive provincial financial aid, there has been some development of secondary manufacturing in Newfoundland since Confederation with Canada in 1949. In the other Atlantic Provinces, however, the net value of manufacturing production in constant dollars has not changed significantly in the postwar years.

The area has developed a definite resource-export based economy. This development stems fundamentally from the principle of comparative advantage. The Atlantic Provinces have been endowed with certain natural assets such as forest and mineral resources, highly productive fishing banks, and extensive hydroelectric potential. Add to this situation the area's seaboard location, and it is clear that such an economy must have a substantial export base.

There appear to be possibilities for further development of certain of the primary industries. The forest resource is exploited at a rate well below reproductive capacity and the long-run outlook for its pulp and paper products in world markets seems very promising. The discovery of vast iron ore and other metals deposits in Labrador, the extensive iron resources on Bell Island, Newfoundland, the large deposits of copper, lead, and zinc found in New Brunswick in 1953, and the possibilities of increased production of non-metallics such as gypsum, flurospar, limestone, and barites, make the long-term prospect for minerals encouraging. The important Nova Scotia coal mining industry, however, may suffer a decline because of high cost operations, competition from other fuels and transport costs to central Canadian markets. Coal mining is still the most valuable segment of the mining industry. Little change is seen in the role of agriculture due to the physiography of the region, transport costs, and exchange difficulties.

The economies of the Provinces have been subject to both seasonal and cyclical fluctuations because of their resource and export orientation. Fishing and woods operations are subject to seasonal variations in production while employment, payrolls, and production in mining and in forestry-connected activities have varied cyclically with demand in export markets. The result has been over-specialization, instability in employment, a situation of surplus labor, a reluctance, therefore,

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19/ Bureau of Labor Statistics. Employment and Earnings, Annual Supplement, April, 1958.

20/ Census of Canada, 1951.

21/ Paper by S. N. Branch, "A Look at the Economy of Canada's Atlantic Provinces", delivered at the Joint Economic Conference (NEC-APEC), Saint John, New Brunswick, August 4, 1958.

to substitute capital for labor, and a corresponding lag in income and living standards when compared with the rest of Canada and New England.

3. Employment And Income

The Atlantic Provinces have had chronic unemployment or disguised unemployment (i.e. - underemployment). Per capita net value of production in 1955 was less than 50 percent of the national average.[22] Average incomes in 1957 were 36 percent below the Dominion average. The greatest differences in average incomes occur among rural families. Persons with low incomes who are engaged in subsistence farming combined with part-time fishing and logging are found more commonly in the Atlantic Provinces than in the others. This organization of rural industry is one of the main reasons for the continued lag in per capita incomes in that area as compared with other parts of Canada. [23]

The lower standards of living in the Atlantic Provinces, are an important factor contributing to the lower costs of fishing in the fisheries of the Atlantic Provinces as compared with those in New England. The lower labor cost in the Canadian fishery is not peculiar to that industry but reflects the generally different level of income and living standard prevailing in the Atlantic Provinces.

Employment and earnings data for all industries in the Atlantic Provinces and for all Canada for 1950 through 1957 shows earnings in Nova Scotia and New Brunswick were 11 and 18 percent, respectively, below the Dominion average in 1957 while those in Newfoundland were 5 percent under the national figure in the same year, (table II-3). Over the entire period, earnings in Newfoundland averaged 8 percent, Nova Scotia 15 percent, and New Brunswick 14 percent below those of Canada as a whole. When earnings of production workers in manufacturing in the two areas are compared, weekly earnings in Massachusetts in 1956 ranged from 21 to 35 percent above those in the Atlantic Provinces; in Maine the range is from 6 to 18 percent, (table II-4 data is based on weekly averages. Annual earnings may vary to a greater extent in the Atlantic Provinces because of the greater seasonality of employment).

Living standards in the Atlantic Provinces would be lower still were it not for certain policies of the Federal Government. Dominion transfer payments have played a much more significant role in the increase in per capita personal income in the Atlantic region than has been the case elsewhere in Canada. Such payments have accounted for nearly 25 percent of the increase in income in the three Maritime Provinces since 1926. Conversely, the growth of per capita earned income in the Atlantic region has lagged behind the comparable growth in other parts of Canada. Lag in income growth is related to a corresponding lag in the role of new capital investment in the Atlantic region.

"The lag has been in the productive sections of the economy, notably the basic resource industries. Business investment per capita and per member of the labor force in the Atlantic region for the period 1954-1956 was substantially below the average for Canada, being one-half and three-fifths respectively of the Canadian figure. One of the main reasons for the prevalence of subsistence operations is the slow rate of new capital investment."[24]

Surplus labor and living standards lower than those in the rest of Canada and in New England historically have impelled the migration of labor to more favored areas. Between 1871-1956 there was a net emigration from the Maritime Provinces of 600,000 persons. This trend is a continuing one; between 1951 and 1956 about 40,000 persons left the area. Emigration has so reduced the labor force that there is a relatively smaller labor force in the Atlantic Provinces in relation to total population, than for Canada as a whole.[25] Proportionally more nonworkers are dependent upon workers earnings and

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22/ Canada Year Book, 1956.

23/ Royal Commission on Canada's Economic Prospects. Final Report. Queen's Printer and Controller of the Stationery, Ottawa, 1958. pp. 403-404.

24/ Ibid, p. 408.

25/ According to the 1951 Census of Canada, the labor force constituted 32.3 percent of the population in the Atlantic Provinces; for Canada as a whole the figure was 37.8 percent.

government aid than elsewhere. Moreover, the migrants have tended to be the younger more aggressive, and skilled members of the labor force.

Another implication of the long-term labor surplus in the Atlantic Provinces is that it places management in a stronger bargaining position in dealing with labor than in the more industrialized economy of New England where there is less unemployment and a greater range of available alternative jobs. Moreover, ownership is concentrated in one or a few producers, in some basic industries and consequently the opportunities for management to take a stronger position with labor are intensified.

The lower per capita income in the Atlantic Provinces has restricted the revenues available to the Provincial Governments for social and welfare services. For example, with the exception of Nova Scotia, educational levels have been substantially below the standard prevailing in other Canadian Provinces. In all Canada 45 percent of the male labor force have some secondary education but only 33 percent in New Brunswick and 28 percent in Newfoundland have achieved this level. 26/

In periods of cyclical or seasonal unemployment, Federal transfer payments are a crucially important source of family income. Early in 1959 in Newfoundland, after a fishery failure and a depression in the mining industry, 115,000 of the Province's 450,000 people were living on Government benefits, 60,000 were receiving unemployment insurance, and the rest were on the rolls for various kinds of social assistance. 27/

The deficit position of the Atlantic Provinces vis-a-vis the rest of the Dominion, their poorer living standards, and the higher per capita governmental welfare costs in the region, have been a source of concern to federal and provincial authorities. Economists have concluded that there are possibilities for only a relatively slight growth in secondary manufacturing. Accordingly, governmental efforts to aid the regional economy have been directed toward the resource-based industries. The object has been to increase living standards and income levels by encouraging greater capital investment per worker and thus achieve higher productivity per worker. The aid given has been in the form of outright subsidies, low-interest loans, tax concessions, quick depreciation write-offs, free technical schools, and technical consultation. Much progress has been made in substituting capital for labor in such basic industries as fishing and mining. Yet the Royal Commission on Canada's Economic Prospects concluded that some further special governmental assistance may be needed for continued economic development. 28/

Many of the leaders of the region accept the view that more governmental assistance is needed. In a speech before a meeting of the Atlantic Provinces Economic Counsul, Mr. A. B. Perlin, a Newfoundland director of A.P.E.C., stressed the need for more federal aid for provincial development and said:

"Where does Newfoundland stand today? Economically, the position is difficult. Even if there were not a mild recession in newsprint and logging we would still have to face up to the fact that the introduction of the chain-saw has revolutionized the logging industry. Once it took 17,000 men to complete our pulpwood cut. Today it is possible for half that number to cut the wood we want in much shorter time. Mechanization has deprived many thousands of their marginal earnings in the fall. The salt codfishery is still uncertain and unstable. Once 40,000 men drew their living from it. Today, save in exceptional circumstances, it cannot support 12,000. Our mining industry is doing fairly well. The American bases remain a large but uncertain support to the economy. Basic agriculture has suffered from our inability to produce as cheaply as we can buy root crops from the Maritimes. But population

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26/ Ibid.

27/ The New York Times, March 21, 1959.

28/ Final Report, Royal Commission on Canada's Economic Prospects, op. cit. p. 406.

has been increasing at a rapid rate. We have added 100,000 people since Confederation - the equivalent of the whole population of Prince Edward Island. What can we do to hold that population? That is our big problem. It is aggravated by the fact that our population increase is the result of the surplus of births over deaths. We have no adult immigration. Every year our potential working force rises by from three to four thousand and our basic resources cannot enable us to absorb so many .....

"....Our financial future, the future of our present inadequate services, our ability to maintain them at substandard levels now rests in the hands of the Federal Government." 29/

Mr. R. E. Tweeddale, General Manager of the New Brunswick Electric Power Commission, said in a September 1958 speech:

"There is no doubt that we in the region are justly entitled to national assistance to help balance the difficulties which have been thrust upon us in the past, and this assistance should not be looked upon by ourselves or other parts of Canada as handouts, but merely just compensation to a region which has been adversely affected by the creation of a Country that trades east and west rather than the logical and natural method of trade north and south." 30/

The Fisheries

1. Historial Importance

As in New England, the fishery is the oldest industry in the Atlantic Provinces. Unlike New England, however, where the industry is now of slight importance relative to the rest of the regional economy, the sea fishery of the Atlantic Provinces is a most important part of the area's economic base.

Canada was once called "Bacalaos". This was the name given to the mainland of North America by John Cabot in his exploratory voyage of 1497. "Bacalaos" was the Basque word for codfish and Cabot found Basque fishermen off the Atlantic Coast engaged in a cod fishery. 31/ The Canadian Atlantic fishing banks have long been a support of the Provincial economies, particularly Newfoundland's.

The political life of the area has been and continues to reflect the economic importance of the fishery. The settlement of Newfoundland was entirely dependent on the fisheries. Halifax was founded in 1749 to protect the fisheries. The Treaty of Versailles (1783) ending the American Revolution dealt sensitively with American fishery rights in waters off today's Atlantic Provinces. Disputes between the United States and Britain over American rights in inshore waters off Nova Scotia nearly led to armed conflict in 1852. Fear of American encroachment in the maritime fisheries was one of the forces impelling Canadian confederation in 1867. 32/ The Great Depression of the 1930's destroyed the Newfoundland salt cod market with such disastrous domestic consequences as to result in the collapse of responsible government and the substitution of a British royal governing commission. In 1959, the Provincial Government of Newfoundland was led to break a bitter strike of lumbermen. According to Premier Smallwood, the lumbermen's union was trying to establish "an elite corps" of about 5,000 professional loggers which would cut off winter work for upwards of 20,000 fishermen. The recent policy of Federal and Provincial aid to the fishing industry is founded on a long standing public interest in the sea fishery.

2. Relative Importance Of The Fishery

The modern-day dependence of the Atlantic Provinces' economics on the fishery

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29/ Speech delivered at the meeting of the Atlantic Provinces Economic Council, St. John's, Newfoundland, September 23, 1958.

30/ From an address delivered at the Newfoundland General Meeting of the Atlantic Provinces Economic Council, St. John's, Newfoundland, September 22, 1958.

31/ Canada's Fisheries, Department of Fisheries, Ottawa, King's Printer, 1946, p. 3.

32/ Esterbrook, W. M., and H. G. J. Aitken. Canadian Economic History. The Macmillan Company of Canada, Limited, Toronto, 1958. p. 377.

may be demonstrated by considering the fisheries contribution to the net value of total production in the area, its absorption of labor force, and its role in the manufacturing industries.

The primary fishery in the Atlantic Provinces contributes about 5 percent of the net value of commodity production in the area, (table II-5). In Newfoundland and Nova Scotia, its share is about 7 percent, in Prince Edward Island, about 8 percent. Fishing operations for Canada as a whole contribute only 0.6 percent of the net value of commodity production. Fish processing is a major part of the manufacturing complex of the Atlantic region. If the net value of production contributed by fish processing (i.e. the value added by manufacturing to the raw material) is combined with the net value contributed by the primary fishery, the sum represents nearly 9 percent of annual net product values. In Newfoundland, the fishery represents about one-eighth of the commodity base of the Province; in Nova Scotia, the figure is almost 11 percent.

Fishing and fish processing in the Maritime Provinces absorb proportionally ten times as much of the labor force as in New England. In Newfoundland, in 1950, fully 20 percent of the labor force was in the primary fishing industry, as contrasted to 0.6 percent in all New England, (table II-6). In New England, only 0.7 percent of manufacturing employment is based on fish processing; 15.6 percent, or proportionally twenty times more such employment, is so oriented in the Atlantic Provinces, (table II-7). In Newfoundland and Prince Edward Island over 25 percent of manufacturing employment is in fish processing.

In terms of manufacturing employment in 1955, fish processing was the leading industry in Prince Edward Island and Nova Scotia, second in Newfoundland, and third in New Brunswick. In salaries and wages paid, fishing processing was the leading industry in Prince Edward Island, second in Newfoundland, third in Nova Scotia, and fourth in New Brunswick. In sales value of factory shipments, it ranked first in Nova Scotia, second in Newfoundland and Prince Edward Island, and third in New Brunswick, (table II-8).

Clearly, fishing and fishery related activities play a prominent role in the economic life of the Atlantic Provinces. It is, moreover, an industry which, unlike the coal industry of Nova Scotia, continues to expand and to be one of the important assets of the region.

3. Structure Of The Fishing Industry

As in New England, the most valuable groundfish species landed on Canada's Atlantic Coast are cod, haddock, and ocean perch. Again as in New England, haddock, on a value per pound basis is the most important species, with cod and ocean perch following in that order. Unlike New England, however, in aggregate landings cod is the largest income contributor followed by haddock and ocean perch.

The Canadian Atlantic Coast (including Quebec) produced aggregate groundfish landings 2.7 times that of New England in 1957 with a landed value 1.2 times that of the latter. While in New England, cod accounted for only 10 percent of landings and 11 percent of value, in Canada it represented 73 percent of landings and 70 percent of value. Newfoundland fishermen are especially dependent upon cod. It has represented 60-65 percent of the value of their landings in recent years. Newfoundland cod landings comprise about two-thirds of the total for the Atlantic region. Haddock represented 55 percent of the total value of groundfish in New England but only 20 percent in Canada. Ocean perch amounted to 28 percent of New England's landed value but only 5 percent of Canada's. Haddock and ocean perch each represented 40 percent of New England landings; in Canada combined they accounted for only 20 percent of landings, (table II-9).

Cod landings by Canadians are over twenty times the amount caught by New England fishermen. The Atlantic Provinces land about as much haddock as New England, while New England vessels caught about three times as much ocean perch. Canadian fishermen caught 1.7 times as much pollock and 2.3 times as much hake and cusk as New Englanders.

While the postwar years in New England have been marked by declining landings and values of principal groundfish species, the Canadian groundfish industry has shown substantial vitality. Haddock landings in the Maritime Provinces increased from 35 million pounds in 1946 to a peak of 93 million pounds in 1956; catch values doubled in the same period. In Newfoundland haddock landings increased from 21 million pounds in 1949 to 62 million pounds in 1956. Canadians also augmented their ocean perch catch. In the Maritimes, only 2 million pounds were landed in 1949; by 1956, 36 million pounds of ocean perch were caught. Catch values of ocean perch in the Maritimes in 1958 were ten times those of a decade earlier. Newfoundland landings of ocean perch more than doubled from 18 million pounds in 1949 to 38 million pounds in 1951. After 1951, Newfoundland ocean perch landings declined to 16 million pounds in 1957 only to return to 25 million pounds in 1958, (table II-10).

The growth in landings and value for haddock and ocean perch reflects the increased postwar use of offshore otter trawlers. The catch is sold in the United States frozen fish market. The cod fishery has not received as much attention. Newfoundland cod production has been significantly lower since 1949 with 1958 landings 36 percent less than those in the earlier year. Cod landings in the Maritimes and Quebec have been relatively stable with little increase in catch values.

In each of the principal fishing provinces of Canada, cod is still the dominant species in both landings and value. In aggregate groundfish landings and values, Newfoundland is the Atlantic Province's leader followed by Nova Scotia and New Brunswick. 33/ If the Provinces are ranked according to cod landings, the same results are seen. Nova Scotia, however, is the leader in haddock and ocean perch landings. In 1957 it produced nearly two-thirds of haddock landings and over one-half of ocean perch landings, while Newfoundland caught about one-third of the total poundage landed of each species, (table II-11). Thus, when the New England industry talks about Canadian groundfish competition, it is primarily referring to that of the Provinces of Newfoundland and Nova Scotia.

a. The Inshore Fishery

The Atlantic fisheries have two distinct branches - the inshore fishery and the deep-sea fishery. The inshore fishery operates within 12 to 15 miles of land, while the deep-sea fishery is found on the offshore banks. The inshore fishery is more important. It has no exact counterpart in the commercial groundfish industry of New England. In 1957, 52 percent of total Atlantic Coast groundfish landings were made by inshore boats. The inshore fishery is primarily a cod fishery; in 1956, 96 percent of Newfoundland cod landings and 46 percent of those in the Maritimes and Quebec were from the inshore fishery. Inshore fishing is not a factor in ocean perch landings in either area. It does account for about 20 percent of haddock landings in the Maritimes and Quebec, but is of no significance in the Newfoundland haddock catch.

The inshore fishery is conducted by fishermen who, individually or in pairs fish near their homes, making daily trips in small row-boats, sailboats, or motorboats. The gear used consists principally of hand lines and trawl lines with individually baited hooks; in Newfoundland, however, most of the inshore cod is taken by cod-traps.

The inshore fishery, particularly in Newfoundland, is the source of the bulk of Canadian saltfish production. The inshore fishermen in Newfoundland live in small, often isolated settlements scattered along the coast. They dry and salt their landings and sell to middlemen who are often their source of credit during the off-season months. Although there has been generally a great growth in the Provinces of production for the fresh and frozen fish market, the inaccessibility of these

33/ Quebec, which is not part of this study, ranks third in Atlantic Coast groundfish production due to cod landings, which in 1957 amounted to 79,000,000 pounds.

fishing outports prevents their participation in this market.

b. The Offshore Fleet

The deep-sea fishery has a long history. Until recent years schooners of 70 to 125 tons were used mainly. The schooners were equipped with both sails and engines, and carried crews of from 14 to 25 men. The fishermen, when on the banks, fished in pairs from small dories and used long trawl lines with 500 to 600 short lines which carried live bait. Each day's catch was split, cleaned, washed, and salted. The day of the dory schooner is rapidly ending, however. None over 50 gross tons is left in Newfoundland and only 13 remain in the Maritimes and Quebec. Dory schooners in Newfoundland in 1937 employed 2,300 men and produced 28,000,000 pounds of salted codfish. Since 1952, none of the fish landed by the Newfoundland deep-sea fishery has been salted.

Since World War II the Canadian Atlantic seafisheries have witnessed a marked growth in more productive offshore fishing methods. For many years there was a ban in the Canadian Provinces on the use of otter trawlers similar to the ones used in New England since 1905. It was claimed that their dragging operations would destroy the inshore fishery which was the support of thousands of semi-subsistence fishermen. These fishermen were a political force which could not be discounted by government. After 1929, draggers were gradually eliminated from the fishing fleets, with the result that groundfish landings in the Maritime Provinces dropped from 250 million to 230 million pounds between 1920 and 1940. During the same period, the New England groundfish industry, through increased use of draggers, increased its catch from 200 million pounds to 400 million pounds.

In latter years, however, the governments have recognized the need to increase the fisherman's productivity in order to raise his level of income and, also, to enable the industry to take advantage of a rapidly expanding market for fresh and frozen groundfish. The growth of production for this market was possible only through the use of trawlers, as fresh and frozen fillet processors cannot rely on the production vagaries of a seasonal scattered inshore primary fishery. Moreover, frozen fillet processors need large supplies of fresh fish and cannot afford the time or the cost involved in getting such fish from the outport areas.

The need for a greater volume of fish for the expanding market for frozen groundfish fillets has been met in two principal ways. One has been to relax the restrictions on the acquisition and use of trawlers and draggers. The other has been to use governmental subsidies and loans for the construction of new fishing craft of approved types and sizes.

The growth in numbers of large otter trawlers in the Atlantic Provinces was substantial between 1947 and 1956. 34/ There were 26 vessels in the trawler fleet in 1947; by 1956 there were 57. In Nova Scotia, where there were only 6 such boats in 1949, there were 34 in 1955. The amount of otter trawling from Nova Scotian ports doubled between 1947 and 1952. Between 1952 and 1955, in the same area, otter trawler landings also doubled. Newfoundland had 22 otter trawlers in 1956 versus 11 in 1954. There are no large trawlers operating in the other Atlantic Provinces. Most of the increase in the otter trawler fleet resulted from imports of new or used vessels, particularly from Great Britain and New England. Although as of June 1960 plans exist for several new and large trawler additions to the fleet, no additional trawlers have appeared in Nova Scotia since 1956 and only one more in Newfoundland. One deterrent has been the recent "one-for-one" policy of the Dominion government. Under this plan a boat can be imported only if the operator builds another one in a Canadian yard.

34/ Small trawlers are those under 50 gross tons. Medium trawlers are those 50 gross tons up to 150. A large trawler is 150 gross tons or over.

High construction costs in Canada retard further growth of the trawler fleet.

In 1956 there were approximately 57 large otter trawlers in Nova Scotia and Newfoundland. There were only 50 in New England. The growth in the Canadian fleet occurred largely during the postwar decade. During the same period the New England fleet was declining substantially. In fact, only eight vessels of the present (June 1960) large-trawler fleet in New England were built in the postwar period.

The degree of concentration in ownership of large trawlers differs significantly between New England and Canada. The leading vessel operator in New England has but 14 percent of all the area's large trawlers. The leading operator in Nova Scotia has nearly 80 percent of that Province's trawlers; the leading Newfoundland company owns 35 percent of the trawlers in the Province. The three biggest operators in New England own 36 percent of the total fleet; the four biggest in Newfoundland own 83 percent; there are only three operators in Nova Scotia.

Another important difference between Canada and New England lies in the role that the large trawler plays in the business operations of their owners. Of the 50 New England trawlers only 9 (belonging to two fish processors) are used as raw material sources in vertically-integrated operations. In contrast, all Canadian trawlers are owned by vertically-integrated processors, who buy the catch of their own vessels. One large integrated firm and its subsidiary companies headquartered in Nova Scotia have been gaining control of an increasingly large part of the fisheries industry of the Maritime Provinces, particularly in fresh and frozen fish. This firm, in addition to having trawlers and processing facilities, owns wholesale and retail establishments in the central Canadian market into which move the bulk of the domestic fresh and frozen products. 35/

The Canadian fishery has substantially fewer medium trawlers than is the case in New England. In 1956 there were only 31 such vessels in the Maritimes and Quebec and 9 in Newfoundland. New England had about 150 fishing out of its groundfish ports in 1958. Unlike New England, where many medium trawlers are skippered by men who have an equity position in the vessels, there are not as yet in Canada enough fishermen-captains with sufficient capital to own a medium trawler. Such a vessel would not generally qualify for government subsidy. Not until 1957 were such grants available to boats over 60 feet in length, and most medium trawlers exceed this footage limitation.

Canadian large and medium trawlers in 1956 accounted for 27 percent of all Atlantic Coast groundfish landings and for 63 percent of landings by offshore vessels. In the Maritimes and Quebec they caught 94 percent of the ocean perch landed, 63 percent of the haddock landed, and 19 percent of cod landings. In Newfoundland, they accounted for 98 percent of all ocean perch landings, 100 percent of haddock landings, and 4 percent of cod landings.

The Canadian offshore fishery then, is divided into two classes of vessels: the large trawlers, similar to those found in New England, operated by large vertically-integrated fish processing companies, and the small subsidized long-liners and draggers operated by owner-skippers. Vessels of these two classes supply close to 90 percent of the fish for the fresh and frozen industry.

c. The Subsidized Fleet

Since 1947, the use of government subsidy incentive has resulted in a striking growth in deep-sea vessels of less than 65 gross tons. This has been a joint federal-provincial program for the modernization of the Atlantic Coast fishing fleets. Since its inception, 324 vessels have been built under the plan's grant assistance, (table II-12). The federal grant is $165 per gross ton for boats built to specification. 36/ The Province of Newfoundland, also, grants an additional $160 per gross ton on vessels built in that Province. 37/ As an integral part of the

35/ Report of the Royal Commission on Price Spreads of Food Products, Vol. I, Queen's Printer and Controller of Stationery, Ottawa. September, 1959. p. 76.

36/ P. C. 2490, SOR/51-227, dated May 24th, 1951, Ottawa, Ontario, Canada.

37/ The Fishing Ships (Bounties) Act and Regulations made under the Act, April 27, 1955, Department of Fisheries and Co-operatives, St. John's, Newfoundland, Canada.

plan, the provincial governments have set up loan funds for construction of fishing vessels at low interest rates.

> "The program had the following objectives:
>
> (1) to enable the small-boat fisherman to break away from his dependence on outmoded techniques;
>
> (2) to create a climate of opinion favorable to fleet modernization generally, including the expansion of dragger fleets;
>
> (3) to bring the primary fishing industry in the Atlantic region to a high level of efficiency to bolster the competitive position of the processing industry which primarily serves the export market.
>
> (4) to preserve ownership of fishing vessels by fishermen." 38/

The combination of subsidy and loan has enabled fishermen to build and own fishing craft with a relatively small equity position. Boat construction grants as a percentage of original costs, in provinces other than Newfoundland, have on the average ranged from 15 percent to 29 percent. In Newfoundland, government and federal subsidies are as high as 42 percent of original cost. Borrowed funds, for vessels other than for Newfoundland trap long-liners, range from 41 to 81 percent. For the same vessels, the cash down payments required of the fishermen have ranged from a low of 9 percent to a high of 37 percent of original costs. As much, however, as 90 percent of the cash down payment is also borrowed, so that the original out-of-pocket investment is minimized. Sometimes a source of the funds are fish processing companies owning their own large otter trawlers.

The subsidized vessels are not competitive with New England boats in the sense that there are only a few craft operating identically to them in New England. They are competitive in the sense that in the aggregate these vessels land considerable amounts of groundfish. Nearly all these landings are processed into fresh and frozen fillets, most of which eventually reach the United States consumer market as products competitive with those of the New England industry. It is desirable, therefore, to examine briefly the nature of and role played by the subsidized vessels.

Since the program began, construction of these fishing craft has been about equally divided into two types: long-liners and draggers. The draggers are roughly comparable to the small otter trawlers ("dragger") of the New England fleet and procure their catch through a dragging operation similar to that of any standard otter trawler. The Canadian draggers range from 50 to 66 feet in length, have a gross tonnage range of 26 to 64, have a crew size of 3 to 5, are diesel powered, run at 9 to 10 knots per hours, and generally are equipped with electronic fishing and navigational aids.

Long-liners generally use the hook and line live-bait method to get their catch.39/ Instead of setting the lines from small dories, however, all are handled from a single ship through the use of a powered gurdy. The long-liners, with the exception of the small Newfoundland trap long-liners, range in length from 49 to 57 feet, have a gross tonnage of 28 to 54, carry a crew of 4 to 6 men, cruise at 8 to 10 knots, and, in the case of the larger ones, are equipped with electronic navigational aids.

So far only 1,000 to 1,200 fishermen have been affected by the modernization program, although their aggregate landings of groundfish were about 150 million pounds in 1957. This was about 17 percent

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38/ Excerpt from paper "Purposes of Costs-and-Earnings Studies in Fisheries: The Government's Point of View", by W. G. MacKenzie, Department of Fisheries of Canada, Ottawa, Ontario, presented at F.A.O. meeting on Costs and Earnings of Fishing Enterprises, London, 8-13, September, 1958. Reprinted in Report of the Technical Meeting on Costs and Earnings of Fishing Enterprises, Food and Agricultural Organization of the United Nations. London: 1959, p. 13.

39/ Except when swordfishing where line gear is not required.

of all Atlantic Coast groundfish landings but was 37.5 percent of all offshore landings. Of the 150 million pounds, 87 million were landed by draggers. The importance of the subsidized vessels in the groundfish catch is greatest in New Brunswick, where 96 percent of total landings are made by draggers built with federal assistance. In Nova Scotia the assisted vessels land about 19 percent of the total groundfish catch; in Prince Edward Island and Quebec the proportion is 44 percent and 33 percent respectively. 40/

The long-liners are somewhat more versatile than the draggers, since they can fish on rough grounds on which the draggers would lose their gear. Moreover, they are able to move from one fishery to another as availability of fish and price dictate. Thus the Nova Scotia long-liners shift from fishing for cod to haddock to halibut to swordfish and back again to codfish. 41/ There have been more 50 to 60 feet Nova Scotia long-liners built than any other type of vessel under the subsidy plan. The long-liners have been profitable to operate and would appear to be a financially sound investment, since even without subsidy aid their return on investment payback time is attractive. Their versatility is shown by the fact that in 1956, 70 percent of their fishing time was spent in long-lining and 30 percent in swordfishing, with the latter effort producing 34 percent of catch values. 42/

Another popular long-liner is the 30 to 40 foot Newfoundland trap long-liner which because of the low initial cost and substantial operating profits, shows a 22 percent return on investment.

Returns on invested capital in the subsidized draggers have been low with the exception of the (50-60') New Brunswick Fundy draggers, (table II-13).

Table II-13 indicates clearly that the program of modernization could not have been effected without government subvention. The fishermen did not have the cash resources to build their vessels. This is demonstrated by the heavy borrowings described earlier, even after subsidies had further reduced the relatively small original cost of the craft. If subsidies had not been available, it is doubtful that the fishermen would have been able to obtain the debt financing needed. The vessels in the program have a useful life of about 13.3 years. An examination of table II-13 also reveals that without subsidy only 3 of the 16 classes of fishing boats surveyed would have been able to repay their total debt from net earnings in a period less than the life of the vessel. These three classes represent 47 percent of all vessels built under the subsidy scheme. Even with the subsidy, only 4 vessel classes representing 50 percent of those in the program could pay off their debt from earnings in a period less than the vessel's useful life.

It is evident then that from 50 percent to 55 percent of the vessels in the program will not earn enough to pay off their debt charges and build up a depreciation reserve large enough to replace their capital assets. In most instances the combination of net earnings and depreciation is enough, even without subsidy to pay the debt within the useful life of the boat. The risk margin, however, would be so high as to make lenders hesitate before making loan committments.

The net returns on invested capital in 75 percent of the cases are below 12 percent per annum. Clearly, if many of the present classes are to be replaced, continued government subvention must be obtained by their owners. It is more likely, however, that government subsidy will be directed toward vessel types such as the 50-60' Nova Scotia long-liners which do operate profitably and which can be replaced by their owners out of operating funds. Officials are not discouraged

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40/ Operations of Modern Long-Liners and Draggers, Atlantic Seaboard, 1952-1957, by John Proskie. Economics Service, Department of Fisheries of Canada. Ottawa, 1958. Volume 7 - Part 1. p. 10-11.

41/ Operations of Modern Long-Liners and Draggers Atlantic Seaboard, 1952-1956 by John Proskie. Economics Service, Department of Fisheries of Canada. Ottawa, 1957. Part 1. p. 25.

42/ Ibid., p. 27.

by the many vessel classes which have not been able to make satisfactory investment returns. The past few years have been exploratory ones "to determine the most efficient and profitable types and sizes of vessels suitable for the conditions found in the various fishing areas along the Atlantic Seaboard." 43/

The Director of the Economics Service of the Federal Department of Fisheries believes "that the objectives of the modernization program are being realized at least in part". He notes that the rise in construction costs in recent years has led to pressure for higher subsidies, and states that there appears to be a positive correlation between vessel size and operating returns. Of importance, too, is his conclusion that earnings of most fishermen on the vessels in the program now compare favorably with those of workers in industry in the same region. 44/

There is evidence that on a per week worked basis, fishermen earnings on the subsidized vessels compare well with those of workers in other industries in the Atlantic Provinces. This comparison does not, however, take into account the seasonality of their fishing efforts. If earnings are prorated over the entire year instead of only the fishing seasons, a less favorable picture develops, (table II-14). The severity of the winters, the icing up of many ports and the danger to small craft in the North Atlantic in winter, restrict the fishing period. Boat days-at-sea range from as low as 54 for the 50-60 foot Newfoundland long-liners to 184 for Nova Scotian draggers.

It would be misleading to make direct comparisons of the operating results of the subsidized vessels with those of craft in the New England fleet. The vessels are too dissimilar in types and sizes. The costs per pound of the groundfish landed by the subsidized vessels are relevant only to New England operations because of the ultimate competition in the consumer markets.

Many of these subsidized boats sell to processing plants which operate their own trawlers, also. The price at which they sell is the same as that at which the processors buy from their own boats. It is economical for the processors to buy much of their requirements from the independent operators. The overhead costs of additional trawlers are thereby saved.

To the extent, therefore, that the government subsidy is used to cover costs that the processor would otherwise have to incur, and to the extent that this subsidy permits the independent fishermen to accept a price lower than would otherwise be possible without it, the Canadian fish processor has a distinct and very real competitive cost advantage over his New England rival.

The Canadian trawler owner is always a processor. Hence, it is to his advantage to acquire his fish at the lowest price possible. The more he pays the more is his labor cost, as his crew gets 37 percent of his gross revenues. If subsidy keeps prices lower than would otherwise be the case, he has leverage which enables him, also, to pay a lower price for the fish caught by his own vessels. Again, this is a competitive cost saving vis-a-vis his New England counterpart.

The development of the subsidized fleet has probably not resulted in a net increase in the size of the combined Canadian Atlantic Coast fleets. The new vessels have replaced a larger number of small outmoded craft. The weakening of salt cod markets and the development of the frozen fish trade has resulted in lower cod landings and higher catches of haddock, ocean perch, and flounder. In the process, long-liners and draggers replaced the dory schooner and dories of history. 45/ Looking to the future, most industry and government observers do not believe that the offshore fleet will change radically from its present proportionate mix of trawlers, draggers, and long-liners. It is expected that there

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43/ Ibid., p. 76.
44/ MacKenzie, op. cit., p. 20.
45/ Proskie, Operations of Modern Longliners and Draggers, 1952-1957, op. cit., p. 12.

will be further expansion in the subsidized vessels, particularly a growth in the versatile and profitable long-liners and in the large draggers. Subsidy regulations have been eased so that boats over 65' in length can qualify for bounty aid. Larger per ton subsidies for the bigger craft may also be forthcoming. Continued experimentation on vessel types and sizes is likely.

Nevertheless, despite the somewhat greater emphasis on the subsidized craft, the larger trawler will still be the backbone of the industry. The seasonality of the fishing effort of the smaller boats and their inability to sail great distances demands large trawlers to assure continuity of supply. Trawler owners and government officials do not, however, expect any substantial increases in the trawler fleet because of government import restrictions on foreign-built vessels, local construction costs, and the greater role played by the smaller craft. Replacement rather than expansion is postulated for the trawler fleet in the next decade.

4. The Fishing Labor Force

There are about 48,000 fishermen on Canada's Atlantic Coast (table II-15). Approximately 16,000 are in Newfoundland, 14,000 in Nova Scotia, and 10,000 in New Brunswick. Despite the progress made in recent years in increasing labor productivity by encouraging capital development in the primary industry, the overwhelming majority of the fishermen are handicapped by the employment of primitive equipment. As noted earlier, only 1,000-1,200 fishermen have thus far been affected by the subsidy modernization program. Only about another 1,000 are employed on deep-sea trawlers. In 1956, out of 40,600 fishermen in Newfoundland, Nova Scotia, and New Brunswick, only 15 percent were on vessels, draggers, or trawlers.

The low productivity per man of the inshore fishermen is apparent if one considers that in 1956 the offshore fleet of the Atlantic Coast accounted for about 40 percent of all groundfish landings, using about 15 percent of the fishery labor force. In 1954, the Newfoundland dragger and trawler fleet alone employed less than 3 percent of the Provinces' fishermen, but landed 16 percent of the groundfish catch. In 1955, the trawler and dragger fleet in the Maritimes and Quebec employed about 4 percent of the fishermen in the area, but landed 31 percent of the groundfish catch.

It was shown earlier that it is possible to characterize the Atlantic Provinces generally as areas of labor surplus. This is particularly true in the case of the inshore fisheries. The fisheries problem is aggravated in times of depression and recession in that workers who have lost other employment return to fishing. This happened in 1957 and 1958 in Newfoundland and had the effect of seriously impairing the incomes of all those in the inshore fishery.

Except for those employed on offshore vessels, earnings from fishing are so low as to be a cause for governmental concern. The Royal Commission on Canada's Economic Prospects succinctly described the situation in these terms:

"....employment in fisheries is ordinarily marked by much seasonality, isolation, primitive equipment, uncertainty of catch and income, physical hardship and risk and limited social and other cultural opportunities. As a result, there is still much poverty and privation and these are ordinarily combined with concealed unemployment; productivity and incomes are low; education is limited; and opportunities for higher-paid employment are, commonly, either unavailable or unattainable owing to lack of training or experience." 46/

These problems are particularly acute in Newfoundland where isolation remains the greatest obstacle to labor mobility and to the transferral of surplus fishermen to other occupations.

"It appears....that, while there are some alternative occupations available in all areas of the Province, nearly 75 percent of those engaged in the fishing industry live in areas where that industry is predominant. A major shift of the

46/ Royal Commission on Canada's Economic Prospects, The Commercial Fisheries of Canada. Prepared by the Department of Fisheries of Canada and The Fisheries Board. September, 1956. p. 121.

labor force in these areas from the fisheries into other occupations can take place only if there are fundamental changes in the whole economic structure. Such changes are taking place in some areas, in fact, but by their nature they must be long-term changes....In any case, we have to acknowledge that in the areas where fishing remains the basic industry, it is hardly possible for sufficient numbers of fishermen to shift temporarily to other occupations in adverse times." 47/

A survey conducted by the South Coast Commission of Newfoundland in 1956 revealed that on the Province's South Coast earnings in the local inshore fishery averaged $626 per annum versus $1,362 in the local deep-sea fishery. It found that welfare payments averaging $460 per annum were made to 19 percent of the people and that about one-fifth of family incomes were made up of family allowances and welfare payments. 48/

Low earnings, isolation, and lack of alternative work nearby have an effect not only on living standards but also on educational and social service standards. On the same South Coast of Newfoundland, less than 8 percent of the school teachers had one year of university training. In 1951, 45 percent of the total Canadian male labor force had had some education beyond the eighth grade. Only 28 percent of the Newfoundland male labor force and only 33 percent of New Brunswick workers had attained this level. Of the fishery labor force, however, the equivalent proportions are appallingly low; 10 percent in Newfoundland; 19 percent in New Brunswick, and 21 percent in Nova Scotia. In Newfoundland, 44 percent of the fishermen had not gone beyond the fourth grade. 49/

The present situation and the unfavorable future prospects have induced many of the more enterprising fishermen to overcome the obstacles to mobility and to move to other jobs. This is particularly evident in Newfoundland where, from 1947 to 1957, about 38 percent of the fishermen took other jobs, 50/ (table II-13). As the Royal Commission on Canada's Economic Prospects observes, Newfoundland was a special case in that there was a rapid growth of new alternative jobs in the postwar years. 51/

In the Maritime Provinces, however, the movement out of the fisheries was less pronounced. If the postwar period (1947-1955) is compared with the war and immediate years (1937-1946), the number of fishermen dropped about 18 percent. After 1947, however, the rate of decrease was much more moderate, so that 1955 employment was only 4 percent below that of 1947.

The reserve of surplus fishing labor in the Atlantic Provinces would seem to have certain logical implications pertinent to a study of the comparative cost advantages of catching groundfish there as compared with New England. One would expect that the effect of many supplying units, as in the inshore fishery, selling to relatively few buying units would put buyers in a strong bargaining position in respect to prices. Canadian industry observers admit that this situation does occur and that such sellers are unable to present a united front to buyers who are much more knowledgeable of market conditions.

Are, then, the trawler owners in a position to benefit from the generally more abundant labor market in the Atlantic Provinces, particularly in the fisheries?

As indicated previously there is considerable concentration of ownership in the trawler fleets, and all are owned by fish processors. The largest single item of trip expense in operating a trawler is labor cost. Hence, it is to a trawler owner's advantage to keep this cost as low as possible. This is particularly true if he is also a processor, for every additional penny per pound he spends for

47/ Newfoundland Fisheries Development Committee Report, 1953. St. John's, Newfoundland, Canada, 1953. p. 12.

48/ Province of Newfoundland. Report of the South Coast Commission, 1957. St. John's Newfoundland, Canada, 1957. pp. 92-98.

49/ Table 19, Census of Canada, 1951, Volume IV, Labour Force, Queen's Printer and Controller of Stationery, Ottawa, Ontario, 1953.

50/ Many, however, returned to fishing in the 1957-1958 recession.

51/ The Commercial Fisheries of Canada, op. cit., p. 125.

labor will increase the cost of his fillets by 2.5 to 4.0 cents per pound. 52/ A condition of labor surplus both in and out of the fishery coupled with a situation where there are few buyers, would seem to put the trawler owner in a formidable position to bargain over wages, lays, layovers, and general working conditions. If he, also, paid a labor rate comparable to or better than that in other industries, this would seem to enable him to exercise discretion in hiring fishermen.

The limits of this study do not permit a definitive answer to the question of how strong is the bargaining power of the Canadian trawler owner. Ownership of large trawlers is highly concentrated. In addition, new trawler crewmen can be recruited from a larger fishing labor force than is available to a New England owner. Furthermore, as will be developed later, there are legal barriers to the unionization of crewmen in Canada.

A recent study by the Royal Commission on Price Spreads of Food Products implies very forcefully that the bargaining over prices is one-sided in favor of the buyers.

"....We have noted conditions and developments on the fish buying side of the industry, affecting the spread (of prices) which give cause for concern. The behaviour of prices at both the primary level and for fishery products sold in the domestic market indicates some measure of control maintained in past through ease in managing the relatively small volume through the narrow domestic marketing channels.

"If it appeared that effective competition in pricing could be achieved, our desire would be to recommend action appropriate to this end.

"We have noted the perishable nature of the products of the fisheries, which reduces the bargaining position of the primary producer. We have emphasized the problems which, in the fisheries, result from the relatively limited domestic disappearance of fishery products. We have called attention to the high degree of concentration and vertical integration in the marketing of fish products. These factors, and the view we have gained of the position of the fisherman, lead us to conclude that the primary producers in fisheries should be given the... opportunity to organize for the purpose of participating in the determination of the price received for his product through negotiation with the buyers." 53/

There are, of course, barriers to exploitation. One is the absence of any surplus of experienced trawler crewmen. The inexperienced inshore fishermen cannot, without training, acquire the skill needed for trawler employment. There is indeed a shortage of masters and engineers, and these officers are able to bargain vigorously and to obtain special employment premiums.

The other major barrier to exploitation rests on the alternative employment opportunities afforded by the growing number of subsidized long-liners and draggers. These are particularly attractive when they permit ownership shares and the fisherman becomes a true co-adventurer.

On balance, the Canadian trawler owner is in a more advantageous position with respect to his labor force than is his New England competitor. A job as a fisherman in the Atlantic Provinces while not one with social prestige, does not rank as low on the scale of desirable occupations as it does in New England. Earnings of trawler crewmen in the Atlantic Provinces, while low in relation to those on New England vessels, do compare favorably with those in the inshore fishery, and are showing long-term upward trends. Fishing for a living has relatively better monetary as well as social attractions in the Atlantic Provinces than it does in New England where earnings are not generally high enough to compensate for the rigors of vessel life.

While there is no indication that there is any over-abundance of trawler crewmen, there is a backlog of potential deep-sea crewmen in the Atlantic Provinces

52/ Fillet yields are 25 to 40 percent of the raw fish poundage.
53/ Report of the Royal Commission on Price Spreads of Food Products, Vol. I, Queen's Printer and Controller of Stationery. Ottawa, September, 1959. p. 76.

and especially in Newfoundland. Although much training is necessary before an unskilled hand can become a satisfactory crewman, the surplus labor in the inshore fishery, plus a family heritage of generations of fishing, affords access to a larger, younger, and more amenable human resource than is the case in New England.

It may be observed here that the average age of a deep-sea fisherman on the South Coast of Newfoundland in 1956 was 35 years. 54/ Contrast this with the age of Boston trawler men, where 69 percent are 51 years of age or over.

Surplus and underemployed fishery labor is most prevalent in Newfoundland. It is not surprising, therefore, that many Nova Scotian trawlers are manned by Newfoundlanders. This situation, incidentally, has its drawbacks, too. The Newfoundlander has not been used to continued year round work for a cash return. Many return periodically to their Newfoundland homes when they have amassed some cash. This instability hampers manning operations. To a lesser degree the New England trawler owner also has access to the Newfoundland labor reserve. Many of the Boston trawler crews are from the Atlantic Provinces with a large number of them Newfoundland natives.

The general underemployment in the fisheries with its deleterious effect on fisherman productivity, incomes, and living standards makes it likely that there will be continued governmental effort to raise per capita productivity by encouraging further capital expansion. Such subsidies and technical aids as are now given can be expected to continue in the foreseeable future.

There are elements of a vicious circle in the government's program to raise low incomes by raising productivity. The Royal Commission on Canada's Economic Prospects puts it this way.

"In the first place, the projections of future fish catches....indicate a relatively modest expansion of landings. On the other hand, there is much underemployment in the fisheries at present. Accentuating this has been the current expansion in the use of improved types of boats, gear and fishing techniques and this expansion of capital may be expected to continue during the next 25 years. The substitution of capital for labour should enable the marketable catch to be taken by a decreasing number of fishermen. Over-all it seems likely that the demand for labour in the primary industry may be significantly reduced during the next few decades. If, with the decrease in demand for labor, the supply of labour is maintained at present levels, there is likely to be much greater underemployment than there is now and incomes are likely to be correspondingly low." 55/

A significant difference in the structure of the groundfish industry in New England as compared with the Atlantic Provinces lies in the role of organized labor. All the New England groundfish ports have fisherman unions which organize and bargain collectively with the vessel owners. No such organizations exist in the Atlantic Provinces.

The unorganized status of the labor force is not surprising when one considers the large excess labor reserve in the inshore fishery. One economist pointed out that in Newfoundland the potential reserve of unorganized labor in the fishing industry, which can be drawn upon for semi-skilled work, was a drawback to organizing a united labor front in all industries.

Equally significant, however, are other barriers to the organization of fishermen. The Nova Scotia Supreme Court of 1947 unanimously concurred in the opinion that the relationship between the owner and the crew was not that of employer and employee but rather that of joint-adventurers. The Nova Scotia Labour Relations Board could not therefore make a certificate of bargaining representatives for the crew. 56/ The Court held that the co-adventurous partnership resulted from the trip-to-trip "lay" arrangement. The

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54/ Report of the South Coast Commission, op. cit., p. 99.
55/ The Commercial Fisheries of Canada. op. cit., p. 125.
56/ 21 Maritime Provinces Reports (Nova Scotia) 305, Justice J. Doull, 1947. Lunenberg Sea Products, Re: Application of; Re: Zwicker.

crew payments were not piece work, since the trip proceeds were shared.

The decision is binding on lower courts in Nova Scotia; and if a similar case came before the courts in another province, the Lunenberg decision would carry weight with them. Deep-sea fishing is considered to be within provincial jurisdiction and does not come under the scope of federal review.

As a result of this decision, the Nova Scotia Legislature the same year passed the Fishermen's Federation Act, now R.S.N. 1954, chapter 103, which provided for a form of collective bargaining for deep-sea fishermen provided the bargaining agent represented the majority of the fishermen resident in the country. No use has been made of the Act and no bargaining agent has ever been approved. The reasons advanced for this are: (1) the number of trawler fishermen in the total number of deep-sea fishermen is small; (2) the fishermen on the subsidized long-liners are often joint-adventurers in fact as well as in spirit and do not consider themselves wage earners, and; (3) many trawler men are from other provinces, particularly Newfoundland. Although there may be no theoretical legal barriers to organization, the Federation Act is likely to remain inoperative unless and until some legal distinction is made of the classes of deep-sea fishermen.

For whatever reasons, there are two differences in the work arrangements of fishermen on Canadian trawlers as compared to those on New England trawlers. One is the nature of the lay; the other is the layover time.

The lay or share arrangements differ radically, although perhaps not so much in the net results to the owner. In New England, the basis for sharing is as follows:

Out of gross receipts, certain trip expenses known as "joint" expenses are deducted. The balance is divided with 60 percent going to the crew (the gross crew share) and 40 percent to the owner (the owner's gross share). From the crew's share, the cost of the fuel, food, and ice (for 3 summer months, ice cost is a joint expense) used on the trip is deducted. The owner from his share sets aside 10-11 percent as a bonus to the ship's officers. The remainder is the contribution to vessel overhead.

In Nova Scotia and Newfoundland, after deduction of any joint expenses the balance is divided with 63 percent going to the owner and 37 percent to the crew. Out of the gross crew share is deducted the cost of the food. Out of the owner's share is deducted the cost of the fuel and ice consumed, plus a bonus to the ship's officers of about 12-13 percent of the owner's gross share.

One further variation between the two lays is that in Boston the crew are guaranteed earnings of $12 a day per man. When crew shares computed according to the formula are less than this minimum, the owner must make up the deficit from his share. On poor trips this has the effect of increasing the real share of labor in the catch proceeds. No such minimum payment system exists in the Atlantic Provinces.

It is difficult to assess the ultimate cost advantages or disadvantages of the two lay systems. Much depends on the cost of the fuel and ice paid for by the Canadian owner relative to his gross receipts. In Newfoundland, where the price per pound for fish on the boats surveyed averaged only 2 cents, the cost of fuel and ice as a proportion of gross revenue was high. Since these costs are deducted from the owner's share, the remaining contribution to overhead is lower than it would be if the Newfoundland operator had used the New England lay. (Compare the first two columns of table II-16). Similarly, in Nova Scotia, where the price of fish averaged 1 cent more per pound than in Newfoundland, fuel and ice costs as a proportion of revenue were lower than in Newfoundland. Consequently, the contribution to overhead on the Nova Scotia trawlers was somewhat better than it would have been on a New England lay, (table II-16).

On balance, however, it would not appear that the variations in the two lays work to the disadvantage of the New England owner. In fact, he would seem to have an advantage over the Newfoundland operator. The evidence is too limited to make any judgment in respect to Nova Scotia. It must be considered, however, that the variable determining the net difference in the two lays is the

proportional relationship between fuel and ice costs and total revenue. If the proportion is 23 percent or higher, the Canadian owner seems worse off under his lay.

The effect of the guaranteed minimum per diem labor share ("Broker payments") on Boston trawlers is not clearly seen in the average figures on revenue distribution shown in table II-16. If there were no "broker" the average gross owner's share would be 38.6 percent of revenue. The difference between that figure and the one actually shown can be attributed largely to the broker payments. Even with these, however, the contribution to vessel overhead does not appear to be too much different from that in Canada. If, however, attention is shifted to the poorer earning vessels on which the necessity for paying brokers is a more frequent occurrence, the comparison is less favorable, (table II-17).

The difference in layover systems results in a definite advantage to the Canadian vessel owner. By union rules in New England, vessels fishing for haddock must remain in port for three days between trips; those catching ocean perch must lay over four days. In the Atlantic Provinces no such mandatory requirements exist. The owners voluntarily keep their vessels in port 24 to 36 hours.

The difference in layover procedure enables a Nova Scotian trawler to make at least 2 more trips per year than a Boston vessel even if average trip lengths were the same. Boston haddock trawlers averaged 27 trips in 1956, 26 in 1957, and 27 in 1958. One Nova Scotian trawler owner said his vessels averaged 32 trips a year. Another put it this way, "Our trips must be over 30 a year or else we fire the captain."

The difference between the number of trips possible if New England ocean perch boats were not under a 4 day layover and what they do make is even more marked. One Gloucester owner asserts that his vessel could make 25 to 28 trips per year instead of only 17 to 20 made under the layover requirements.

This much shorter "down" time enables the Canadian's vessels to achieve higher annual capacity utilization with fixed overhead thus being spread proportionally over more units of production. This lowers the cost of fish per pound to the Canadian processor-vessel owner.

A sample of over 30 percent of the deep-sea trawlermen in Newfoundland shows annual berth earnings to be $2,300 in 1956, $2,100 in 1957, and $1,850 in 1958. Presented on a weekly basis, this is much below the average weekly earnings in all industries in the province, as shown in table II-14. All of the trawlermen surveyed, however, lived on the South Coast of Newfoundland. This is an area of few alternative occupations, and one in which the average income from all sources in 1956 was $1,237. 57/ Hence the trawler earnings compare advantageously with others in the immediate area.

There is not sufficient evidence to estimate precisely the earnings of crewmen on Nova Scotia trawlers. The Nova Scotia Fish Packers Association in 1957 estimated that "the average earnings of a deep-sea trawler fisherman based on a 12-month operation is presently about $3,000." 58/ There was no reason for these trawler owners to overstate the earnings, as the occasion for the statement was a hearing to determine among other things if the deemed earnings of fishermen were to be raised for the purpose of computing workmen's compensation benefits. The higher the income was raised, the higher the cost of insurance to the vessel owners.

The $3,000 per year earnings figure is roughly in line with field data collected in this study. In any event, it would seem to be comparable with earnings in other Nova Scotian industries, but not significantly higher. This may be due to the fact that the unionized iron and steel workers and coal miners in Nova Scotia pull up the base used for comparison. Trawler earnings are, of course, much higher and more stable (less seasonal) than in the inshore fisheries.

57/ Report of the South Coast Commission, op. cit., p. 94.
58/ Report of the Workmen's Compensation Commission, Halifax, Nova Scotia, December 18, 1958. pp. 144-145.

Labor earnings on the subsidized long-liners and draggers are not readily comparable to those derived from other occupations due to the seasonal nature of fishing operations. As shown in table II-14, on a per week worked basis, such fishermen's earnings are much better than those in other jobs. On an overall basis, if fishermen were dependent on fisheries income alone, they would in most cases be worse off. Their actual incomes, however, from all sources cannot be determined.

It would appear, then, that deep-sea fishermen in Nova Scotia neither earn significantly more than workers in alternative jobs, nor do their incomes reflect appreciably the hazardous nature of their duties. This is not surprising in view of the large reserve fishing labor force, the centuries-old tradition of going to sea, the lack of readily available alternative jobs, the strong bargaining power of vessel owners, the numbers of Newfoundlanders from low income backgrounds manning the trawlers in both their own province and in Nova Scotia, and the only recent positive encouragement given by the government to increasing fishermen productivity through capital investment.

The low incomes of fishermen in the Atlantic Provinces finds a parallel in the New England area where in several areas, real incomes have begun to lag behind those in other jobs. Whereas in Canada much of the reason for the relatively low incomes lies in the fishery labor surplus, in New England the attractiveness of better jobs combined with lowered landings and catch values offer approximate explanations. Of particular importance, however, is the fact that the earnings of fishermen in Canada are on an upward trend whereas in New England the long-run trend, in real terms, has been a declining one.

The Market for Groundfish

For centuries Canadian groundfish was processed and marketed only as salted or dried codfish. Principal markets were in the low-income, warm-climated Mediterranean and Caribbean countries. Other species were not exploited since they could not be preserved as well as cod. The fresh fish market was local in character and therefore limited in size.

The development in New England of filleting and quick-freezing techniques made it possible for Canadians to take advantage of the growing United States market for frozen groundfish fillets. The demand during World War II for fishery products facilitated large-scale expansion of Canadian frozen fillet production. During this period a filleting and freezing industry was first established in Newfoundland. While a considerable amount of the Atlantic Coast production of fillets during World War II was marketed in the British Isles, the principal sales area has always been the United States. Canadian shipments of fillets to the United States went up 433 percent between 1939 and 1945 and have increased over 1,000 percent from 1939 to 1958. The Canadian Atlantic production of fillets and blocks increased by 125 percent from 65 million pounds in 1949 to 147 million in 1957.

The salt fish market was prosperous during World War II. Since then, there has been a clear shift from fish curing to processing in other forms. The salt fish market would have been less attractive even without the burgeoning frozen market. Canadian saltfish is produced in an area with much higher costs and living standards than the underdeveloped countries that form its market. There are also retail ceiling prices in the major Caribbean market, and exchange barriers which set a limit on the prices the saltfish producers can obtain. Table II-18 indicates the decline of salted codfish production in Newfoundland in recent years. Newfoundland production in 1957 was half of what it was in 1935, and 1958 saw a drop of 35 percent from 1957 figures.

The development of the frozen fillet market meant more than a shift from dressed and salted codfish production to processing in other forms. It involved also exploitation of haddock and ocean perch in increasing quantities. This is seen in the growth of landings of these species in recent years; over the period 1948-1957, haddock landings in the Atlantic Provinces more than doubled, going from 57 million pounds to 132 million pounds; ocean perch landings showed a phenomenal increase, going from

1.3 million pounds to 45.7 million pounds. 59/ Of these landings, it is estimated that some 80 percent of the haddock is processed into fresh and frozen fillets, and that practically all of the ocean perch becomes frozen fillets for the export market. There has likewise been a marked growth in fresh and frozen cod fillet processing in comparison with the pre-war years. About one-third of Atlantic cod landings is processed into fresh and frozen fillets and frozen blocks or slabs.

Salted cod production is still important. Over 70 percent of Newfoundland's cod landings are destined for the salted market and most of the Province's fishing population are dependent on it for their livelihood. The Federal and Provincial governments have recognized that the returns of the salt-cod fishery are marginal and are trying to modernize the industry. Attempts are being made to shift the processing operation from small-boat crews, using manual methods, to centralized curing stations equipped with mechanical dryers and other modern processing implements. The Federal Government also subsidizes the industry by paying half the cost of the salt used.

Although there are many isolated outports, particularly in Newfoundland, where, local production of fresh and frozen products is not practicable in the immediate future, landings for saltfish, in general, represent a buffer supply to which fresh and frozen processors have turned as demand has warranted. Several Newfoundland firms processing fresh and frozen fish were forced out of business due to overexpansion and consequent price cutting. One industry leader in Nova Scotia commented that these plants could be brought back into production, sending another 3,000,000 pounds of fillets into Boston but it would break the New England market. Landings for saltfish therefore represent additional sources of supply for frozen fillets, but are sources which major producers use with restraint in times of normal abundance.

The development of a large market for fresh and frozen groundfish fillets has had several significant effects. Consumer demand during World War II led to a lessening of restrictions on deep-sea trawlers and draggers. The need to obtain a year-round supply of fresh fish for filleting and freezing to meet market needs occasioned further growth in the large number of offshore trawlers. Productivity of labor in the fishery was increased, particularly on Newfoundland's South Coast, by divorcing processing from procurement of the raw material. Where formerly fishermen in inshore vessels caught and cured their own fish, many now are employed only as deckhands on trawlers, and specialized shore labor handles the processing operations. There has been a greater geographical concentration of fishing activities.

"Because mechanized processing methods require plants of comparatively large size and a concentration of fishing activities - to insure some stability of supply - a movement from smaller to larger fishing ports, notably Halifax and Lunenberg was also involved." 60/

The expanding United States market for frozen groundfish fillets and frozen blocks or slabs enabled the Canadian industry to emerge from stagnacy and to become a growth factor in the provincial economies. Without this new market the softening in the Caribbean and Mediterranean saltfish markets might have led to severe economic dislocation. The possibilities of growth, much of it in terms of United States' consumption, have impelled governmental bodies to aid the industry to expand its capacity and productivity by means of subsidies, loans, and educational services. Finally, of course, it has made the Canadian groundfish industry directly competitive with that of New England's in the inland markets of the United States. This competition is largely in the frozen fillet and block market. Canadian exports of fresh fish to the United States are not a significant competitive factor. In fact, the fresh fish market, although confined to the northeastern United States, is one in which foreign competition as yet poses no serious threat.

Although many New England producers lay the blame for their economic distress on Canadian competition, almost all admit

59/ Canadian Fisheries Annual, 1959. pp. 71-72.
60/ The Commercial Fisheries of Canada, op. cit., p. 7.

the need for Canadians to supply at least some of the United States demand. Canadians would not be in a position to furnish such supplies were not the American market large enough and free enough to justify their investment in vessels and processing plants. Thus the growth in United States consumer demand for frozen groundfish fillets has made a vigorous Canadian industry possible and has enabled it to become a source of strength to the economies of the Atlantic Provinces.

In looking to the future it appears that the trend in the diversion of groundfish landings from saltfish processing to quick-freezing will continue. Mediterranean and Caribbean countries will supply more and more of their saltfish requirements through the further development of their own fleets. Moreover, higher incomes and living standards in these countries may also mean less consumer demand for such low income staples.

Canadians expect that their groundfish market will be more and more based on the United States and on their own domestic consumption. They believe that New England production will continue to decline relative to American demand and that there will be a corresponding need for increased imports. The Royal Commission on Canada's Economic Prospects postulated a 43 percent increase in the United States market for Canadian groundfish fillets by 1980. 61/ Therefore, they reason, production can be expanded and sold, and governmental aid has a rational basis.

1. The Primary Market And Price

In an earlier section certain hypotheses were made concerning the bargaining position of Canadian fishermen and the effect of this on price and the determination of the lay. It is well to focus attention explicitly on the subject of Canadian primary market prices, as here is an area in which there are significant contrasts with the price mechanisms found in New England.

In all the major New England groundfish ports with the exception of some in Maine, there exists an auction system whereby the daily ex-vessel price of fish is set by the interplay of free competition or the semi-free forces of supply and demand. This is most evident in Boston where the existence of a vigorous fresh fish market keeps daily prices sensitive to changes in supply and demand and especially volatile in periods of short supply. Daily prices fluctuate less in ports such as Gloucester where ocean perch landings are destined primarily for frozen fillet consumption. In 1958, the United States Department of Justice attempted, although unsuccessfully, to secure indictments alleging price-fixing in Gloucester.

In the principal Canadian ports, there are no auctions or exchanges and no fluctuations in daily prices. One reason, of course, is the absence of a fresh fish market similar to the Boston market. Daily prices to the fishermen remain unchanged for months in Canada and are usually expressed in quarter-cent multiples. In New England ports, it is a rare occasion when the day's prices are the same as yesterday's prices. Moreover, because of the vitality of the auction system, prices are often expressed in such odd multiples as 11 35/100 cents per pound.

Table II-19 contrasts monthly prices of cod, haddock, and ocean perch at major Canadian and New England ports. It is seen that in both areas there is a tendency for the price to rise in the winter months when supplies tighten. While in New England there is considerable month-to-month price variation, there is little such variation in Canada. The Canadian fresh fish trade establishes a winter and a summer price. The difference is from one-half to three-quarters of a cent per pound and is intended to encourage winter production. This differential is larger, or as large, as any changes which have appeared in the secular trend in prices since World War II.

A number of factors ultimately set Canadian primary prices. It is important to note the following factors: Canadian groundfish fishermen are not organized as bargaining units; they have more limited knowledge of their market than do the buyers; there is no fresh fish market of any significance where independent

61/ Ibid., p. 76.

immediate demand could raise prices when supplies tighten; there is considerable concentration of ownership in the processing end with price leadership a natural consequence. 62/ As noted earlier, the Royal Commission on Price Spreads of Food Products in a report issued in September of 1959 recommended legislation to enable fishermen to bargain more effectively over prices.

Price movements in Canadian groundfish are fundamentally influenced by the United States market for frozen fillets and blocks. Prices paid Canadian fishermen are therefore to some extent influenced by present wholesale prices in the United States. New England producers assert that the price of Canadian imports has brought economic disaster to the New England industry. Canadian processors, on the other hand, claim that the prices they receive for their fish are the result of international marketing factors, which are reflected in the United States price. 63/

Canadian ex-vessel prices for cod, haddock, and ocean perch at key ports have shown greater stability over the years. Based on 1949=100, the index numbers of prices for cod, haddock and ocean perch to fishermen in the Maritimes and Quebec were:

Year	Cod	Haddock	Ocean perch
1956	98.3	75.6	72.2
1957	87.3	80.3	75.5
1958	99.0	101.8	87.7

Source: Economics Service, Department of Fisheries, Quebec.

Prices paid at the leading New England haddock and ocean perch ports in the same three years show the following relationship to 1949.

Year	Cod	Haddock	Ocean perch
1956	105	90	87
1957	104	110	90
1958	137	135	98

In 1957 in both countries prices showed little or no advance over 1949 levels. Cod and haddock prices were up somewhat in New England although ocean perch prices were 10 percent lower. In Canada, 1957 groundfish prices were well below 1949 levels. There were shortages of haddock in 1958 and this resulted in general price advances in both New England and Canada. Canadian prices for haddock and cod were still barely at 1949 levels and ocean perch prices were well below them. One explanation for the sharp price rise for haddock and cod in New England is the effect of a daily fresh fish demand reacting to lower supplies. The fresh fish market is not as important in Canada, where most fresh landings are destined for quick-freezing. In contrast with haddock, ocean perch prices are comparatively stable. In both countries ocean perch landings are sold as frozen fillets in the interior United States market.

The general stability of New England ex-vessel prices up to 1958 in the face of declining landings of major groundfish species meant depression in the industry. It adversely affected both fishermen and boat owners. Fishermen often had to be content with the minimum broker payment in Boston and with a stable share of declining catch values in other ports. Labor costs to the owner in Boston rose to the extent that "broker" trips raised labor's proportionate share of catch values.

The situation was somewhat different for the Canadian vessel operator. He saw his labor force take a stable per unit share of the catch value but did not have to contend with guaranteed minimum payments. More importantly, the fishermen's gross share and his own gross revenues advanced in spite of stable or even declining unit prices as total landings by deep-sea craft increased substantially. Canadian Atlantic Coast haddock landings nearly doubled between 1949 and 1957 while ocean perch landings rose from 2 million to 35.5 million pounds between 1949 and 1958.

Clearly, the ex-vessel price system is

62/ Ibid., p. 49.

63/ One Canadian processor stated that, because of the existence of these factors, the Canadians could lose the United States market if they were to raise their prices.

markedly different in New England and in Canada. Price leadership (by annual negotiation in the saltfish industry), buyer concentration, absence of fresh-fish market leverage, vertical integration, are all significant differences characterizing the Canadian market. The American vessel owner, faced with stable ex-vessel prices over the long-term and production records, which show a decline over the last several decades, and lacking processing possibilities, has been hurt. The Canadian vessel owner has had an expanding catch to offset lower prices over the long-term. Moreover, by combining fishing with fillet processing, lower prices have meant a lower labor share and, consequently, lower costs of procuring the raw fish for the processing plants. This situation gives the Canadian processor an opportunity to compete successfully in the United States market despite transportation and tariff costs.

Despite the apparently one-sided bargaining position, the Royal Commission on Price Spreads found that the profits of vertically integrated processing firms were not excessive, or were the salaries paid their key employees excessive. This finding supported the industry's contention that it is difficult to attract new capital investment in the industry. Despite apparently substantial price control, profits have not been high because of the number of old plants in operation and competition in the United States market for frozen fillets from northwestern European countries.

One other important conclusion that emerges, however, is that the New England ex-vessel price in fresh fish ports, notably Boston, is very dependent on fresh fish demand. To the extent that supplies and the number of vessels operating are adjusted to this demand, profitable vessel operations ensue. As a corollary, this adjustment creates difficulties for New England processors. High prices caused by fresh fish demand either force them to cease operations or to work at a high cost disadvantage with Canadian competitors. Unless New England landings increase substantially-and this is not foreseen in the relatively near future-this competitive dilemma between sales to the fresh and frozen market will remain and will be mitigated only by an expanding fresh fish demand occasioned by population growth in the Northeastern United States.

Governmental Aid to the Fisheries

There is a common conception among New England vessel owners that their Canadian competitors have unfair advantages resulting from allegedly substantial subsidization schemes on the part of the Dominion and Provincial Governments. Indeed it is no wonder that such a view is held, for the Federal Government alone programmed about $1.9 million for direct subsidies to the fishing industry in the fiscal year 1957-58 and budgeted another $9¼ million for research and market services. 64/ In addition the Newfoundland government had liberal subsidy provisions for construction and repair of vessels.

There are, of course, Canadian subsidies directed at smaller vessel operators, some of whom do represent a source of competitive groundfish supplies. Yet, with the possible exception of some rather generous Provincial loans made to establish large processing plants, there has been no direct subsidy aid to operators of the Canadian large-trawler fleet; and the landings of these large trawlers are the main source of competition for the New England groundfish catch.

In addition, in February of 1958, the Province of Newfoundland enacted "The Fishing and Coasting Vessels Rebuilding and Repairs (Bounties) Act" to give subsidies for the reconstruction and/or repair of wooden vessels over 15 years old. Rebuilding bounties range from $100 a ton on small vessels to $250 a ton on vessels from 100-400 tons, or 50 percent of the cost, whichever is smaller. On a 200 ton vessel this could amount to $50,000, a considerable sum. Repair subsidies are $100 a ton or 25 percent of cost, whichever is less, on vessels under 100 tons; on vessels from 100-400 tons, the bounty

64/ Hearings before the Subcommittee on Fisheries and Wildlife Conservation of the Committee on Merchant Marine and Fisheries. House of Representatives, 86th Congress. April 28, 29, 30, June 4 and 11, 1959, p. 169. Assistance to Depressed Segments of the Fishing Industries.

is $100 a ton or 35 percent of cost, whichever is less. Up until April 1959 bounty payments had been made on 19 vessels. These generous provisions could be of substantial aid to an owner of a large-sized wooden vessel. Their significance as a competitive advantage viz-a-viz New England is, however, limited. Wooden vessels over fifteen years of age are near the end of their useful life and subsidies merely prolong this a few years more. Progressive management would dictate replacement rather than reconstruction of such types.

An important Federal Canadian subsidy to a large segment of the groundfish industry consists in rebating about half of the cost of salt used in saltfish production. In the fiscal year 1958 budget, $550,000 was requested for this purpose. 65/ In the past the Fisheries Prices Support Board has also made substantial deficiency payments to saltfish producers and fishermen in Newfoundland and Quebec. No such subsidy payments have been made on fresh and frozen groundfish, although it would be within the power of the Board to do so should this market become demoralized. There is no present likelihood of such action occurring.

Another Dominion subsidy of particular significance to the saltfish industry is the construction of bait freezing and storage facilities and the providing of live bait to fishermen in isolated areas. Total net cost of these two programs in fiscal 1956-57 was about $225,000.

The subsidies paid to saltfish producers have no readily apparent short-run effect on the fresh and frozen groundfish primary market. Without such subsidies, however, there might well be severe economic dislocation and privation in isolated ports without facilities for other than saltfish processing. In such a depressed situation, there would be even greater fishing labor surpluses and more downward pressure on labor's return from both salt fish and fresh fish sales. This could result in lower prices for fresh fish and would give processors a greater price leverage in the export market. The maintenance of a saltfish industry by the use of subsidy helps to insure a continued supply of fishermen, albeit not trawler men. It also represents potential additional fresh fish supplies for the processing industry should rising consumer demand induce processors to establish the expensive collecting stations necessary to obtain supplies from the outports.

Canadian federal law has made some exemption in its domestic tariff structure which benefit the Canadian trawler owner. Certain items such as cottonseed oil, peanut and olive oil, and various fishhooks, lines, and cordage enter duty free. Engines and engine parts enter at one-half the regular duty rate. It is difficult to weigh the effect of these exemptions in terms of competitive advantage. Much depends on whether the vessel is of American or European origin. When a Canadian trawler owner has to buy parts from a United States or a Canadian concern, he probably has to pay more than his New England counterpart because of transportation and/or tariff costs. When he obtains parts from Europe, particularly England, he can buy them at substantially lower unit costs.

The so-called Halifax award, which annually amounts to $160,000, provides a small direct subsidy to deep-sea fishermen and vessel owners. These bounties have been paid since the 1880's and represent interest on an indemnity paid to Canada by the United States as the excess value of the Canadian inshore fisheries over those of the United States and as compensation for the loss of the United States market at that time by Canada. The actual awards per fishermen are about $10; each vessel owner gets $1 per registered ton up to $80, so that the largest owner with a 23 vessel fleet received about $830. 66/

In addition to the direct subsidies there are many Federal and Provincial services to the Canadian fishing industry, the results of which cannot be measured in terms of vessel operating costs but which in aggregate are significant. Foremost is

65/ Ibid., p. 170.

66/ Hearings before the Subcommittee on Fisheries and Wildlife Conservation, April and June, 1959. op. cit. p. 180.

the Dominion program for fisheries research and services which in fiscal 1957-1958 expended $9,250,000 against a total expenditure by the United States Fish and Wildlife Service of $9,644,000 for similar activities. There is no substantial difference in dollar amounts, but there is in terms of the relative size of the United States and Canadian fisheries. The United States catch of fish and shellfish is about 2.5 times annual Canadian production.

Of substantial aid in the post-war growth of the Canadian groundfish industry have been the provincial loan funds for vessel and plant construction. Plant construction loans have usually been made through industrial development loan agencies, while vessel construction loans have been made through specialized fishery loan boards. The vessel loans have been directed toward the construction of the smaller long-liners and draggers for which subsidy aid is also available. The larger trawlers have been built with private financing with one exception. In Newfoundland, from its inception in 1951 through 1958, $1,050,000 has been loaned to fishermen at 3½ percent interest. Of the total, $580,000 was for vessel construction and $470,000 for purchase of used vessels, engines, mechanical gear, etc. The low interest rate of 3½ percent indicates some subsidy in recent years, since it costs the Province more than that to borrow the loan funds.

Loan rates in Nova Scotia are a more realistic 4½-5 percent, and over $4,000,000 has been loaned since 1944 with a loss ratio of 2 percent. On the federally subsidized vessels, the Nova Scotia Fisheries Loan Board will loan up to 70 percent of the balance on a 5-year loan.

In the United States, Federal loans for vessel construction are also available but at higher interest rates which, when set against the generally poor economic outlook in the groundfisheries, have not acted to revitalize the industry. The loans have been of substantial aid, however, in preventing further deterioration.

The Dominion Government in Canada also insures loans to fishermen up to $4,000, and thus guarantees repayment to private lenders who make funds available under sound criteria for repayment.

Unlike any United States government program, the Dominion will furnish hull insurance for certain fishing vessels at a cost of 1 percent of appraised value. The plan, however, covers only small vessels valued between $250 and $10,000, and hence is not of direct competitive significance. Further, this is not particularly low cost hull insurance when compared with rates, paid by large trawlers. No private underwriter, however, could probably offer such rates because of the administrative costs involved in serving such small units.

One form of Federal and Provincial aid to the fisheries, which might well be pursued in New England, is a fairly extensive school program to train fishermen in navigation, engine maintenance, and the operation of the latest mechanical and electronic equipment now available to the medium-sized fishing vessel. Costs of such programs are usually shared by both the Dominion and the Provinces, although the latter may often finance it alone. Since 1946, in Nova Scotia, over 1,200 men have received this specialized training and have been paid a modest per diem allowance while attending such schools.

Although New England fishermen have been able to collect unemployment compensation for some time, this was extended to Canadian fishermen only on January 1, 1958. The Act is designed particularly to cover seasonal unemployment between January 1 and April 15 and will pay up to $30 a week for this period, the amount and extent of benefits depending on the quantities of fish landed in the previous season. Although benefits are considerably lower than in New England, they may reflect the difference in living standards. It is only recently that anything has been done to relieve the spectre of winter unemployment in the fisheries.

Summary and Conclusions

New England's greatest competitors in the groundfish industry are the Atlantic Provinces of Canada. The economy of the Provinces is a resource-based one in which the fishing industry is significant and substantially of greater relative importance than is the case in New England. Historically, fishermen and fishing interests in Canada have been able to influence

government policy and to obtain government aid. The prosperity of the major industries of the provinces, and especially of the fishing industry, is basically dependent on export sales.

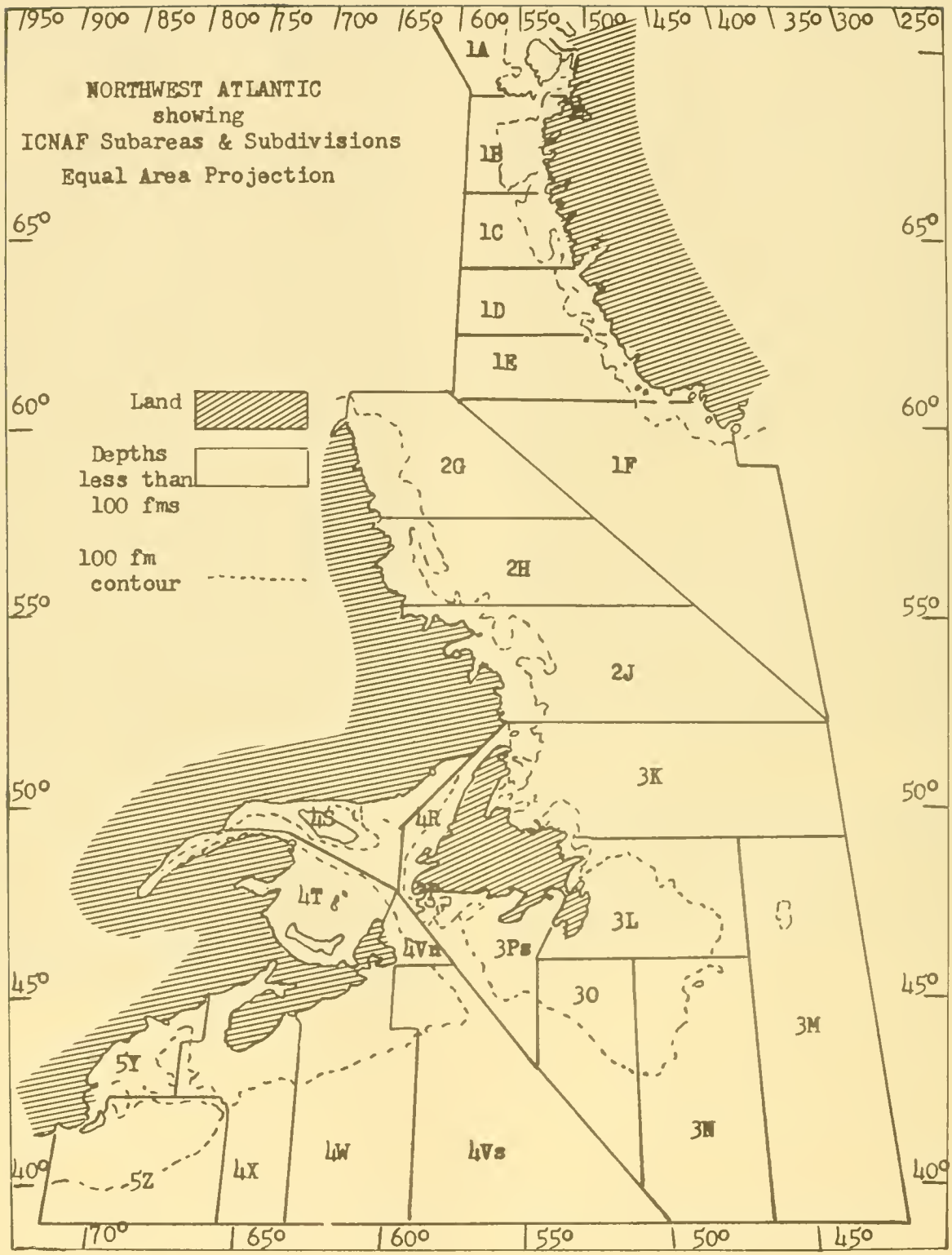
The Atlantic Provinces have lagged behind New England and the rest of Canada in economic development. There have long been conditions of surplus labor, underemployment, and low living standards. These have been particularly marked in the fishing industry, especially in the inshore segment, which is characterized by small operations of one or two man boats. The Government, recognizing these social conditions, has initiated and will continue schemes to raise incomes by increasing labor productivity. The most significant policies aimed at achieving this objective have been the subsidization of small (3 to 5 men) modern long-liners and draggers, loan funds for vessel construction, and rescission of a long-time ban against trawler use. The subsidy and loan plans, while not completely successful, have accomplished the limited immediate objectives set out for them and will continue in the future. A large trawler fleet has grown due to the needs of an expanding post-war market in the United States for frozen groundfish fillets. No significant increase in the number of such trawlers is expected in the next decade. The industry is prosperous enough, however, to replace the present fleet.

The Canadian groundfish industry processes and sells two basic products: saltfish and frozen fillets. The latter market has been a growth one and the former a declining one. Saltfish still takes about 70 percent of the large-cod landings in Newfoundland. Haddock and ocean perch landings in all Provinces, and the bulk of cod landings in Nova Scotia, are processed in fresh and frozen forms.

Canadian fishermen are legally unable to organize and bargain collectively. They face greater ownership interest concentration than is the case in New England, and work in an area where there is surplus labor and fewer alternative job opportunities. The Canadian trawler-owner has a stronger bargaining position with fishermen than his New England counterpart. A governmental commission feels legislation is needed to equalize the price bargaining processes. Barriers to this labor exploitation are the relatively limited number of experienced trawler crewmen and the job opportunities available on the increasing number of subsidized vessels. More flexible layover practices permit Canadian owners to obtain greater vessel usage annually.

Prices paid to Canadian fishermen for their catch show both short- and long-run stability. Prices are established by the policies of the leading firms, allow only for seasonal supply variation, and are generally based on the expected United States market price for groundfish fillets. Canadian processors assert that the United States price is the result of the interaction of international forces of supply and demand.

Direct government subsidy to the Canadian fishery has not been significant, except in the cases of the modern draggers and long-liner building programs. The Dominion, however, spends in relation to annual catches about 2.5 times the United States budget for research and allied services.



An Equal Area Map of the ICNAF Convention Area

CHAPTER III

THE HADDOCK RESOURCE

Introduction

The New England groundfish fleet obtains its catch principally from a 260,000 square mile continental shelf extending from Long Island to Newfoundland. Recently some New England ocean perch vessels have ranged north of the Newfoundland banks.

Fishing on the offshore banks in the North Atlantic is subject to regulation by the International Commission for the Northwest Atlantic Fisheries (ICNAF). This Commission classifies the fishing grounds as follows: New England grounds, Nova Scotia and Gulf of St. Lawrence grounds, and Newfoundland grounds, (map on p.38). The United States accounts for nearly all groundfish caught in New England waters. Canadian fishermen land about two-thirds of the groundfish caught in the Nova Scotia-Gulf of St. Lawrence area, (table III-1). Less than 20 percent of landings in the latter area were by American vessels, primarily ocean perch boats. Americans account for only 3 percent of the catch taken in Newfoundland waters.

The major part of the analysis of New England's groundfish resource potential and the effects of this on fishing costs will be devoted to two species, haddock and ocean perch. These accounted in 1957 for approximately 83 percent of the value of all the region's groundfish landings. Furthermore, the available biological evidence indicates that while other groundfish species could be utilized more than they are at present, they still must be considered of minor importance with respect to the staples of haddock and ocean perch.

The haddock fleet is centered in Boston and fishes principally on the grounds off New England and on the more southerly Nova Scotian banks. A study of the period from 1938-49 reveals that 82 percent of the total fishing effort was concentrated on Georges Bank off New England and the remainder on the Canadian banks. 67/

Analysis of 1957 haddock landings at Massachusetts ports indicates that Georges Bank continued to furnish the bulk of the catch (78.9 percent) with other New England waters supplying 6.7 percent and Canadian waters 14.4 percent, (table III-2). Trips from Massachusetts ports to Canadian waters are, also, mainly short runs, since the greater part of the catch from Canadian waters comes from Brown's Bank. The latter is separated from the most heavily fished area of Georges Bank, the Northern Edge, by but a 30-mile channel. 68/ Both banks are from 1 to 1½ days steaming time from Boston, and together in 1956 accounted for 87.4 percent of all haddock landed in Boston.

The Economic Implications of the Haddock Resource Available to the New England Groundfish Fleet

One of the determinants of the cost of any good is its relative scarcity or abundance. Only a few goods such as sunshine, air, and water are so plentiful as to be of little or no cost. Indeed, economics has been defined as "the administration or use of scarce resources." 69/ Much of the cost of production difficulties that have plagued the New England groundfishery may be attributed to the adjustments that have been necessitated by the relative abundance or scarcity of the raw product, the fish.

67/ Schuck, Howard A. Offshore Grounds Important to the United States Haddock Fishery, Research Report 32, United States Department of the Interior, Fish and Wildlife Service, Washington, D. C., 1952.

68/ Until 1932 the Bureau of Fisheries classified Brown's Bank as being in New England waters, instead of Canadian.

69/ Harriss, C. Lowell, The American Economy, 1956, Irwin, Homewood, Illinois. p. 3.

The economic implications of the resource potential available to the fishery must be appreciated clearly if sagacious action is to be taken to aid the industry. An examination of the history and present status of the haddock resource may contribute to an understanding of this basic problem. Haddock, as indicated previously, is New England's most valuable groundfish. For nearly thirty years, it has been the subject of intense biological investigation by United States Fish and Wildlife Service specialists. Today, it is possible to predict the following year's catch with substantial accuracy. While much remains to be studied, enough has been done to make possible a cost of production analyses based upon biological fact.

There are two varieties of marketable haddock in the fishery. One is large haddock or haddock weighing over 2½ pounds. The other is small haddock, more commonly known as "scrod," which weighs from 1½ to 2½ pounds.

1. History Of The Resource Utilization

During the nineteenth century the New England fisherman always found haddock in abundance on Georges Bank. His interest was, however, primarily to seek cod. Haddock was not as well suited to preserving methods as cod, and the haddock fresh-fish market was limited to seacoast areas. The introduction of the filleting process in 1921 and of the quick-freezing techniques in 1925 occasioned a tremendous increase in the market demand for haddock. 70/

From 1891 to 1903 annual United States haddock landings averaged about 55 million pounds annually, (table III-3). These increased to an annual average of about 77 million pounds in the 1904 to 1918 period. The growth of a national market for haddock fillets led to greater fishing intensity, and landings in New England jumped from 93.5 million pounds in 1924 to nearly 256 million pounds in 1929. 71/ Landings at the principal haddock port, Boston, increased from 74 million pounds in 1920 to 190 million pounds in 1930. The fishery, however, could not sustain the increased catch, and since 1931 landings from the base resource area, Georges Bank, have stabilized between 85 and 96 million pounds annually.

Striking changes have occurred in the Georges Bank haddock fishery since 1914. The history of the fishery may be divided into three periods: 1914-26; 1927-30; 1931 to the present. The first and last are relatively stable periods in terms of annual landings, catch per day in pounds, in numbers of fish caught and in effort expended. The 1927-30 fishery, however, witnessed significant and short-lived changes in both catch and effort. The catch reached an all-time high in 1929, when 223 million pounds were landed, and the effort reached an all-time high in 1930 when 16,000 days were used.

The modern fishery is substantially different from that of the two earlier periods in terms of annual landings, catch per day, effort expended, and size of fish caught, (tables III-4 and III-5). In the 1917-26 period annual landings averaged around 66,130,000 pounds, catch per day fished was around 30,000 pounds, fishing effort averaged 2,200 days, and the great proportion of fish landed was large haddock. In the 1927-30 expansion of the fishery, annual landings from Georges Bank averaged about 185 million pounds, catch per day declined precipitously from 44,000 pounds in 1927 to 11,500 pounds in 1930, while fishing effort increased sharply from 2,400 days in 1926 to 16,000 days in 1930. Scrod haddock was still an insignificant segment of total landings, as the effort spent was reducing a more adult stock.

Since 1931, annual landings from

70/ Herrington, William C. Decline in Haddock Abundance on Georges Bank and a Practical Remedy. United States Department of the Interior, Fish and Wildlife Service, Washington, D. C.,1936. p.2.

71/ Fishery Statistics of the United States, 1956. p. 95.

Georges Bank have averaged approximately 91 million pounds, catch per day has averaged 13,400 pounds while effort has been at an annual level of 6,964 days. A comparison of the 1917-26 and 1931-57 eras shows that in the latter period total annual landings are 35 percent higher but at a cost of 212 percent more effort and a reduction of 57 percent in the catch per day. Here, then, is a fact of basic importance: the present fishery is a much higher cost one.

The modern fishery, with stabilized landings, entails a much greater dependence on scrod haddock than in earlier years. Fishery Research Biologist John R. Clark declares that Georges Bank has become a scrod haddock fishing ground during recent years. 72/ With the exception of the World War II years, there had been from 1931 to 1954 a continued decline in the proportion of large haddock in the catch, (table III-5). In 1931, about 85 percent of the landings were large; in 1954 only about a third were. Only 11.5 percent of Boston landings were scrod in the 1914-30 period, from 1950-57 over half were scrod, and in 1958 the proportion was about even, (table III-6).

Another indication of the dependence on scrod is the annual catch in numbers (not pounds) of fish. In the 1931-40 years this averaged 35,477,000 annually. In the 1947-57 period there was an actual increase in the number of fish taken compared to the former period. The fact that poundage did not increase in a corresponding manner was not due to a scarcity of haddock in general, but to a decline in the relative numbers of large haddock. This is also clear from consideration of the average weight per fish caught in the 1931-57 period, (cf. table III-4). Again, if the influence of the World War II fishery is discounted, the average weight dropped fairly steadily from 1931 until 1955.

Before 1954, the age of first capture of haddock was 1½ years. A new mesh net ruling, adopted in 1953 has had the effect of raising this minimum to 2½ years. The net regulation has resulted in a reversal of the average weight trend, and in 1958, for the first time since 1949, more large haddock than scrod were caught on Georges Bank. Despite the larger unit weight of the fish landed, however, the success of the fishery is still largely dependent upon the success of scrod reproduction.

"The stocks of Georges Bank haddock have been fished down to the point where the catches depend upon large numbers of comparatively small fish....In terms of age, the fishery was once supported in large part by fish 5-9 years old but in recent years 2-4 year old fish have dominated the catches. The depletion of the large fish has placed the fishery in a precarious position." 73/

As fillets of scrod have less consumer demand and involve a higher labor cost, scrod usually sells ex-vessel at a discount from the price for large haddock. Analysis of the differentials gives a 10-year average discount of $2.28 per hundred weight in the 1948-57 period, (table III-7). The narrowing of the differential since 1954 can be attributed to the effects of the 1953 mesh regulation. The larger mesh has not only increased the proportion of large haddock in the catch but has also increased the average size of the scrod caught.

If the 1957 Boston landings of 94 million pounds had been 88.5 percent large haddock (as in the 1914-26 period) instead of only 49.5 percent, as was the case, the additional revenue at 1957 price differential for large and scrod haddock would have amounted to over a half million dollars ($551,000) to the primary industry. This

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72/ Sep No. 450, "Georges Bank Haddock Fishery - Changes in Scrod Abundance in Recent Years." United States Fish and Wildlife Service, October, 1956.

73/ Commercial Fisheries Review, October, 1958. p. 29 (quoting recent release from Woods Hole Laboratory, United States Fish and Wildlife Service).

is an amount equivalent to 6.5 percent of the value of 1957 haddock landings in Boston. 74/ The point is that the striking increase in effort since 1927 has increased catch values even less than the 36 percent poundage increase would indicate because scrod comprised a large part of the catch.

The actual decrease in the abundance of larger sizes of haddock may in part be attributed to the situation obtaining in recent years: small scrod haddock were caught before they reached fuller growth. Since 1931 abundance of total haddock has tended to follow abundance of scrod with little time lag. Moreover, there has not been the reserve stock of large haddock to fall back on as in the 1920's.

Most biologists believe that the abundance of haddock depends principally upon recruitment, which varies greatly with changes in environmental conditions. The effects of changes in the environment upon abundance in any one year are probably much more important than is fishing effort. It is impossible at present, however, to predict the course of such environmental changes.

In a long-term analysis of the resources, it is necessary that averages based on experience be used, and in the case of numbers of fish caught there is no substantial sustained deviation from the 38 million average obtaining since 1931, (cf. table III-4). With a series of favorable brood years, biologists feel that the stock might yield 20 to 80 percent more poundage with the same effort per vessel. Since 1935, however, the poundage caught by five year periods has varied by only 46 percent. In the 1948-57 decade, maximum deviation in any one year from average landings for the period was only 11 percent. Hence, in looking to the future, it is possible with successively favorable brood years, that landings at present effort could increase substantially above the 91 million pounds averaged since 1931.

From 1948 to 1958 there was a pattern of alternating good and bad brood years rather than a sustained trend in either direction. The stocks resulting from the good years were large enough to sustain landings over the poorer years. It had long been feared, however, that two or three consecutively poor brood years (biological recruitment) would seriously reduce the catch. This dire result occurred in the latter half of 1958 and was expected to continue into early 1960. Such failures in scrod abundance are due to short-run and still unpredictable environmental factors.

The dependence on a scrod fishery is dangerous for the fishing industry because of its marginal operating position since World War II. Should successive brood failures occur again the effect will be to widen the existing gap between effort and catch per day and to increase per pound costs further. Whether this event will act to drive additional marginal operators out of business will depend on whether prices can increase proportional to costs.

The 1958 haddock landings were down sharply, yet prices advanced, alleviating much of the higher costs of fishing effort. Whether prices would have advanced as much, were there not an international scarcity of North Atlantic groundfish, is a matter for conjecture. Table III-7, a review of haddock prices paid ex-vessel in Boston since World War II, gives little basis for optimism concerning the possibilities of higher prices covering the increased costs of fishing in years when the catch is reduced because of successive failures in scrod abundance.

Given brood recruitment similar to that experienced in the years prior to

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74/ Preliminary figures for 1958 indicate that the high prices resulting from a condition of fish scarcity reduced the differential to $0.83 per hundred weight. In this case, the increased revenue from landings of 88.5 percent large haddock instead of 50.5 percent would have been $179,000 or 1.9 percent of the value of haddock landings. It would not be prudent, however, to call 1958 a "normal" year.

the adoption of the wider mesh in 1953, the annual catch would increase 25 to 30 percent over the average yield before adoption of the new mesh. This has not in fact yet taken place. The reason has been a poorer brood recruitment following the adoption of the mesh. No definitive reasons have been advanced for the lower broods. Biologists have no reason to expect that environmental conditions will return to a more favorable situation which would provide average or above average recruitment.

2. Maximum Annual Yield On Georges Bank And Its Effect On Fishing Costs

Basic to an understanding of the cost of fishing in terms of effort and production, is appreciation of a principle well accepted by fishery biologists. This principle is that there is a maximum sustained annual yield (catch) in any fishery, such as the Georges Bank haddock fishery. Further, this total equilibrium or sustained yield in any year can be taken within a wide range of fishing effort. If the average annual effort expended for haddock on Georges Bank between 1931 and 1958 is called normal or 100 percent, then total fleet landings in normal brood years will not vary significantly between a fishing effort level ranging between 75 and 200 percent of normal. That is, the maximum annual sustained yield can be expected whether fishing effort is 5,000 or 15,000 trawler days. The catch per vessel may, of course, vary substantially. Any effort by the fleet, however, above the minimum necessary to obtain the equilibrium yield becomes surplus higher cost fishing.

In the case in point, biologists have determined that with brood years similar to those experienced between 1931 and 1948, the equilibrium yield of Georges Bank haddock should be about 120 million pounds. Before adoption of the mesh regulation the equilibrium yield was about 94 million pounds, again based on the average brood recruitment between 1931 and 1948.

It must be kept in mind that the principle of a sustained yield over a wide range of effort is based upon an average yield which assumes a given or "normal" level of recruitment and normal brood years. The declining yields in recent years do not weaken this principle. The poor catch has been due to successively poor brood years resulting from as yet unknown environmental factors. If the decline in brood recruitment continues, there will still be an equilibrium yield attainable over a wide range of effort. The maximum yield will, however, be at a lower figure than that formulated on the basis of the "normal" 1931-48 brood years.

The idea of a maximum annual yield may be clearer if one considers that "the numbers of fish added to the stock set a limit to the total landings which can be taken from the banks. As soon as enough days are put in to catch this limit, any additional fishing effort does not increase landings...." 75/ The total merely must be shared by more units.

The principle is formulated by Dr. William F. Thompson in the following excerpt from "The Effect of Fishing on Stocks of Halibut in the Pacific."

"The evidence of the halibut fishery is strongly supported by the history of fisheries in general. Those of such areas as the North Sea have shown a tendency toward relative constancy in total yield throughout the period of great technological improvement and expansion of the fishery. It is a tendency shared by the fisheries of the North Atlantic as a whole and of other regions.

"It has given rise to prolonged argument as to whether production has fallen as a result of heavy fishing. It was, indeed, assumed that this would be the case by those who in early times urged conservation. This decline, if existent, has not been of a magnitude to be obvious without careful analysis of extensive statistics covering many years.

75/ Statement of Robert A. Nesbitt before the United States Tariff Commission, 1954, pp. 12-13.

It has been confused with changes in the accumulated stock.

"But the opposite side of the picture ----that production has failed to rise proportionately to the increased intensity of fishing----has not been given the attention it deserves. From this failure to rise, it has become obvious that production has a ceiling or limit that is approached during the relatively early stages of increase in fishing. The only argument has been whether this limit has fallen, not as to its reality.

"The existence of this limit means that when a fishery expands its effort the annual catch is divided among more units of effort. That is simply another way of saying that as the limit is approached the relationship between number of units of effort (f) and catch per unit (c) approaches a reciprocal one (f x c = constant). This is the basic relationship shown by the history of the halibut fishery in this report." 76/

The same conclusions have been drawn by European biologists studying the North Sea groundfisheries. Reference is made to Special Scientific Report - Fisheries, No. 13, 1950, United States Fish and Wildlife Service, entitled The Rational Exploitation of the Sea Fisheries With Particular Reference to the Fish Stock of the North Sea. This is a translation of a paper published by the Netherlands Directorate of Fisheries.

The principle of a maximum sustained yield as substantially independent of fishing effort is accepted by ICNAF advisors. In his report to ICNAF on United States research in 1952, Dr. Herbert W. Graham, Director of the United States Fish and Wildlife Service laboratory at Woods Hole, Massachusetts, in specific reference to the Georges Bank haddock fishery declares:

"The yield curve for the Georges Bank fishery, based on 15 percent annual natural mortality, indicates that at the present level of fishing intensity the optimum age of first capture lies between 3 and 3½ years. The first step in mesh regulation will make the age of first capture about 2½ years, so that a maximum equilibrium yield would require about 50 percent increase in fishing effort. The computations further show that at any age of first capture lying between 3 and 4 years, the yield will be fairly close to maximum over a range of fishing efforts varying from 75 to 200 percent of the present average annual effort." 77/

A distinction must be made between the maximum sustained physical yield and the maximum net economic yield of a fishery. The maximum net economic yield is the maximum difference between the total value of landings and the total cost of fishing. It is unusual for the maximum sustained physical yield of a fishery to coincide with the maximum net economic yield. The Georges Bank haddock resource, however, was overfished in both a biological and an economic sense prior to mesh regulation. After mesh adoption the resource is still overfished in economic terms.

The problem of achieving the maximum net economic yield of a fishery must involve consideration of the law of diminishing unit returns. H. Scott Gordon notes in this context that "There are some fisheries in which the expansion of fishing effort will, after a point, reduce the total landing of fish....This is the case especially where the average size of the fish is substantially reduced by fishing." 78/ Some biologists believe that the latter postulate is an explanation of the decline in the Georges Bank haddock fishery from the 1927-30 landings peak. 79/ It is felt by many, too, that greatly expanding effort could substantially lower the yield to be expected at present fishing levels.

76/ Thompson, William F. "The Effect of Fishing on Stocks of Halibut in the Pacific." Fisheries Research Institute, University of Washington, p. 58.

77/ International Commission for the Northwest Atlantic Fisheries. Annual Proceedings. Halifax, Nova Scotia, 1953, Vol. 3. for the year 1952-1953. p. 50

78/ Gordon, H. Scott. "An Economic Approach to the Optimum Utilization of Fishery Resources." Journal Fisheries Research Board of Canada, 10 (7), 1953.

79/ Herrington, William C., op. cit. p. 10.

It is beyond the scope of this report to comment on the social implications of a production system which can involve extra unneeded men and vessels in achieving maximum sustained landings. This is not a situation peculiar to the fisheries alone. The phenomenon may be viewed, also, in agriculture, transportation, printing and publishing, and in other industries too numerous to note.

It is necessary, however, to point out the cost implications of the fundamental relationship between effort, catch per day per vessel, and annual sustained yield. If an average annual effort of 2,200 days was sufficient to land 75 million pounds of haddock in the pre-1927 period, it should not, even at a liberal estimate, have taken over 5,000 days to catch the modern day yield of around 91 million pounds. 80/ Yet the average number of days fished annually on Georges Bank since 1931 has been about 7,000. In other words, the catch could have been secured with approximately 29 percent lower physical costs.

In such a situation, if revenues do not advance relative to the higher real physical and financial costs of fishing, the industry has to make fundamental adjustments for survival. In addition to the industry's burden of the excess costs of fishing, the cost of fishing is increasing because of the upward trend in such elements of costs such as labor, insurance, and repairs. Import competition is pertinent to this aspect of the profitability of the domestic industry only to the extent it keeps ex-vessel prices from rising to levels that would cover more, if not all, of increased fishing costs and excess costs of fishing.

The New England industry has over the years accommodated itself partially and often painfully to the resulting lower catch per day situation. From 1931 to 1936 many of the trawlers deserted Georges Bank for the more distant Nova Scotian banks. During the period 1926-30, New England vessels caught an average of 130 million pounds annually from Georges Bank and only 13 million pounds from the Nova Scotian banks. By 1934 the fleet was catching 88 million pounds annually on the Nova Scotian banks versus only 40 million pounds on overexploited Georges. 81/ Other trawlers deserted the haddock fishery to engage in other groundfishing, particularly the new ocean perch fishery which developed after 1935 in Gloucester.

Yet the 1930's were fairly good years for the haddock fleet. The adjustments mentioned, plus the fact that in constant dollars both the ex-vessel price of haddock and scrod and the total value of Boston landings remained reasonably stable, permitted some replacement and investment in haddock otter trawlers in the late 1930's.

Since World War II, however, with the exceptions of 1958 and 1959, both ex-vessel prices and total value in constant dollars have declined and have not reflected the higher costs of fishing. The Boston catch in 1957 in constant dollars was worth almost 20 percent less than that of 1947 and on a par with 1934. Ex-vessel prices for haddock and scrod in 1958 and 1959 were the highest in history because of the severe scarcity. Landings were so light, however, that in constant dollars, values were 13 percent under the 1947-49 average.

The inexorable economic consequences have been severe: there has been a marked reduction in the Boston haddock fleet as vessels have been transferred to other ports for ocean perch fishing or sent to Canada; many operators have left the business; no large otter trawler has been built or replaced in Boston since 1952. Consciously or not, the industry has been forced to reduce its effort expenditures in terms of fishing days. This reduction

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80/ Nesbitt before the United States Tariff Commission, op. cit.

81/ Herrington, op. cit. p. 9. Also ICNAF, Document 9, April 3, 1951, Halifax, Nova Scotia.

in effort has been the result of fewer large trawlers fishing and of less trips by some of the older trawlers still in operation.

There is a body of opinion in the industry which holds that the reduced effort in recent years has caused lighter landings. Analysis of the catch and effort data in table III-8 seems to contradict this view. Substantially reduced fishing time during World War II resulted in dramatically higher catch per day, higher annual fleet landings and a lesser dependence on the scrod contribution. It may be argued that it is not fair to base too many conclusions on the war years because of the effect of many external factors present, such as the favorable O.P.A. ceiling prices, the submarine menace, and the acquisition of fishing vessels by the United States Navy. It is perhaps better to be conservative and omit the evidence of the war years not because of the external factors but because of the shortness of the period. Moreover, catches may have been influenced by a very good brood year in 1939, the results of which were felt throughout the period.

It may be instructive, however, to compare the prewar (1931-39) and postwar (1947-56) years in terms of effort and catch. An effort reduction in recent years of about 10 percent has not resulted in lower total annual landings, but rather in an increase of nearly 7 percent. Nor are more fish escaping the fishermen. There has been an increase of 27.3 percent in the average annual catch in numbers of fish. What is perhaps even more significant, however, is the fact that the lower effort has resulted in a 31 percent increase in the average catch per day. Since most fishing costs remain the same on a per day basis whether a trawler catches 10,000 or 20,000 pounds, the higher landings per day since 1947 have acted as a deterrent to further increases in the costs per pound of securing the fish. This means that in comparing per pound costs in recent years with those of the prewar decade, it is necessary to consider factors other than effort as the determinants of cost advances. This means, too, that while the decrease in the numbers of large haddock otter trawlers operating in the last ten years might have brought personal problems for the owners involved, it has redounded to the benefit of remaining vessel owners by reducing the fleet's fishing effort and thereby increasing the catch per day of the vessels still in operation.

The effect of effort on catch and cost must be illustrated further. The following economic analysis is based upon a biological foundation provided by fishery research biologists, notably Mr. Clyde C. Taylor, who studied the rates of growth, recruitment, and natural and fishing mortality for Georges Bank haddock. By the use of technical yield - isopleth diagrams the biologists were able to show the annual fleet catch and the catch per day to be expected at various levels of fishing effort before adoption of the 1953 mesh regulation. Based on the brood yields prevailing in the 1931-48 period, predictions were also made of the increased landings at each level of effort to be expected after mesh adoption. Table III-9 summarized the findings. As noted earlier brood recruitment in recent years has for unknown reasons dropped below the average prevailing in the 1931-48 period. As a consequence, the expected annual catches did not materialize. Without the mesh change, however, landings would have dropped much more. Yield per recruit has increased as predicted; total landings have not increased because there have been fewer recruits.

A few words of explanation are necessary for an understanding of table III-9. Average annual fishing effort on Georges Bank from 1931-48 was computed in terms of days fished by standard large otter trawlers. This was termed "normal" or 100 percent effort and was related to average annual or "normal" landings for the period. Then the annual landings, before mesh regulation, that could be expected at effort levels at increments of 25 percent above and below the norm were calculated. Of immediate interest is the conclusion that at fishing effort levels ranging from 50 percent to 150 percent of "normal", total landings would vary only slightly while the average catch per day could fall as much as 70 percent. It is seen, too, that an effort level nearer 75 percent of normal would have provided the maximum sustained annual yield. Table III-9 also indicates the expected effects of the 1953

mesh regulation on the effort-yield relationship. At normal effort levels a 28 percent increase in annual landings is expected. The point of maximum sustained yield is advanced from 75 percent to 125 percent of normal. The 125 percent level would not be the point of maximum net economic yield, however, since a 25 percent increase in effort results only in an increase of 1 percent in fleet landings. Between 75 percent and 200 percent of effort the range in landings is only a little over 3 percent.

Although the data developed in table III-9 is based on the 1931-48 period, it need not be revised for purposes of cost analysis of the effort-yield relationship. This period may be taken as typical of pre-mesh regulation fishing. Were the base period to be 1931-52, average annual landings would be 2 percent less and fishing effort 2.5 percent less. Any bias, therefore, in using table III-9 is on the side of liberality in yield "estimate." Still, it will be found that there is overfishing in an economic sense.

The effort-catch analysis serves as a foundation on which to estimate the number of large otter trawlers to be expected at each level of fishing effort. 82/ This is done by making certain assumptions based on actual practice and on average per vessel fishing effort. These assumptions concern the amount of fishing versus non-fishing time per trip out of port, the minimum and maximum length of each trip, the minimum and maximum number of pounds landed per trip, and the total number of days a boat would be out of port annually.

Specifically these assumptions are: (1) That on the average each vessel will have 2.5 days non-fishing time per trip. 83/ Non-fishing time is time spent sailing to or from the fishing banks or in sailing from one part of the fishing grounds to another. (2) That a vessel captain will attempt to land at least 65,500 pounds per average trip. 84/ (3) When catch per day is above 11,900 pounds, a vessel's operations will be limited (on an annual average) to an 8-day round trip. When the catch per day is under 11,900 pounds, a vessel's captain will try to fish long enough to land 65,500 pounds but not beyond the point where total trip time is over 10 days. The upper limit is necessary to prevent spoilage of the first caught fish. (4) The total number of days a vessel will be away from port, annually, will be approximately 240.

Table III-10 incorporates the foregoing assumptions with the effort-catch relationship of table III-9 and thereby gives an estimate of the number of large otter-trawlers to be expected at the various levels of fishing effort. The situation portrayed is one in which brood recruitment has returned to what was considered normal in the 1931-48 period. Thus landings are at the level predicted at the time the mesh regulation was adopted. There is increasing evidence that this assumption errs on the side of liberal landings. Brood recruitment has been at such a low level for such a long time as to make it impossible to predict when it will return to the higher levels which obtained in earlier years. This bias toward more liberal landings than are more likely to occur is explicitly recognized. It can be shown, however, that even with the more liberal yield assumption there is uneconomic overfishing. If such is the case, then there would be even greater overfishing if yields were to remain as they are at present.

Columns I, II, III and IV, on effort, catch per day, and total fleet landings are derived from table III-9. Columns V, VI, and VIII, on days actually fished per trip, trip lengths, and total days absent

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82/ Based largely upon unpublished manuscript of Mr. Clyde C. Taylor, Fishery Research Biologist, Woods Hole Laboratory, United States Fish and Wildlife Service, Woods Hole, Massachusetts.

83/ Source: Data submitted by United States Fish and Wildlife Service to International Commission Northwest Atlantic Fisheries, 1955-1956.

84/ Source: Historical Data from United States Fish and Wildlife Service.

annually per vessel are based on the assumptions given above. Column VII, the number of trips per year for the fleet, is derived by dividing the number of days fished annually (column II) by the fleet by the average number of days fished per trip by each vessel (column V). Column IX, the annual number of trips per vessel, is the result of dividing the number of days it will be absent from port (column VIII) by the length of its trips (column VI). Column X, the number of vessels in operation at the fishing effort postulated, is obtained by dividing the fleet's total annual trips (column VII) by the individual vessel's total trips (column IX).

Naturally it would be possible to construct infinite variations on this basic table by varying the assumptions on the number of days fished per trip and the number of days fished annually. It is believed, however, that the assumptions cited previously are the closest to reality and will serve the general illustrative purpose of this section.

Attention is invited to table III-11, which shows the number of otter trawlers by size in the Boston haddock fleet. On the average, it has been found that the medium vessels have about 44 percent of the capacity of the larger trawlers. Thus, the 36 medium trawlers in Boston in 1957 would be equivalent to 16 large trawlers. In terms of standard large otter-trawlers, then, the Boston fleet in 1957 was composed of about 44 vessels. This figure would be in line with the numbers projected in table III-10 for normal effort. If a backward glance is taken, it will be seen that there has been a considerable lessening of excess capacity in the Boston industry. The 1947 fleet was composed of the equivalent of 71 large trawlers, an amount 160 percent of "normal" and far in excess of need. 85/

Tables III-12 and III-13 develop some of the cost implications of the effort-catch relationship in terms of individual vessels and crewman. A constant price of 8½¢ per pound for haddock at all fishing levels is assumed in the calculations. This is close to the undeflated ex-vessel price of the species in the 1948-57 decade.

A constant price is assumed because total fleet landings are relatively stable over a wide range of fishing effort. From 75 percent of fishing effort to 200 percent of effort, landings vary only 5 percent. Hence, even without considering the ceiling put on price by foreign competition, it seems reasonable to assume price stability if total landings remain fairly constant. (At an effort level of 25 percent, revenues may in fact be understated, as it is reasonable to assume a higher price to compensate for the somewhat lower landings at this point.) Also, analyses of landings and prices in the 1948-57 period reveal that the ex-vessel price remained relatively inflexible on a year to year basis. Ex-vessel prices showed no statistically significant correlation with landings even when landings varied substantially.

The mechanics of table III-12 are as follows: Columns I through V, on the number of vessels and the catch to be expected at various levels of fishing effort are derived from table III-10. Column VI, the annual gross revenue per vessel, is obtained by multiplying the annual poundage landed by the vessel by 8½¢ per pound.

Column VII represents the trip expenses incurred by each vessel. Detailed analysis of vessel settlement sheets reveals that trip expenses account for about 65.4 percent of the gross revenue per trip, (column VII). Trip expenses are the out-of-pocket costs of each voyage. They constitute principally the gross share of the crew (57.8 percent of gross revenues) the bonus to the captain (3.8 percent of gross revenues) and certain items of expense shared jointly by owner and crew.

The contribution to overhead figure in column VIII is the sum that remains for the vessel owner after deducting the trip expenses from the gross revenues. The remainder must cover his overhead costs if he is to make a profit.

85/ In terms of the lower landings level in 1947, a pre-mesh regulation year, there was 175 percent excess capacity.

Column IX, the average overhead per vessel is based on data submitted by vessel owners for the years 1953-57. This was a period when effort was 75 percent to 100 percent of "normal". It is likely that the $65,000 figure is understated for lower levels of fleet effort and overstated for higher levels of fleet effort. For instance, the cost of hull and protection and indemnity insurance is likely to be higher per vessel at lower levels and less expensive at higher levels due to the law of large numbers in spreading risk. 86/

Column X, per vessel profit or loss at each level of fishing effort, is the result of subtracting overhead expenses from overhead contribution.

Table III-13 considers the cost effort relationship in its effect on crew earnings. Column II, the gross crew share was found to be 57.8 percent of gross revenues.

Out of the gross crew share are paid various expenses charged to the fishermen. Food, fuel, and ice (nine months of the year) are the principal items paid for by the crew. On an average basis, it was found that at current 1956-58 prices, the expenses incurred by the crew of a standard otter-trawler would be about $163 per day out of port, column III. Since these costs are nearly directly variable with fishing time, they are assumed to be proportional in total to the changes in fishing effort. The amount then remaining is known as the net crew share,(column IV). (Present fishermen contracts with Boston vessel owners provide for a minimum net crew share per man equivalent to $12 per day out of port, /column VI/. When the net crew share per man is less than this minimum, the owner has to make up the deficiencies.)

Table III-10 made it clear that increases in effort do not provide proportional increases in landings. Examination of table III-12 and III-13 reveals the effect of the diminishing unit returns inherent in this industry.

A word of caution is necessary concerning these tables. This analysis is for illustrative purposes only and is based on a situation in which average large otter trawlers fish only on Georges Bank and only for haddock. In reality, they also fish the western Nova Scotian banks in the spring. These trawlers also catch other species such as cod and pollock when fishing Georges Bank. Revenues per vessel and net crew shares are higher than shown when weight is given to these factors.

Nevertheless, these figures are valuable in developing valid conclusions about the relative position of the industry at present. If one were a monopolist and had sole control over all vessels that could possibly fish for Georges Bank haddock, the point of maximum profit would be at a level 50 percent or less of the recent average. Not only would per vessel profit be highest at this point, but the combined profit to the owner of all the vessels fishing would be at its height here rather than at a level where more vessels were used, (table III-14).

If one owner were to gain control over all vessels in the fleet, it would be to his interest to reduce, in due time, the number of vessels operating for haddock. The reason is again basically that over a wide range of effort total landings will not vary significantly. Stable landings mean stable prices and, therefore, as effort increases a stable revenue is shared among more units. Further, the increase in the number of vessels with their attendant overhead (fixed) costs means not only

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86/ All data were submitted by operators of large otter trawlers. The $65,000 figure is an average, however, and may run about $75-90,000 for the bigger OTL's and $30-60,000 for the smaller. Another variable is managements' decisions on planned refitting. This figure can vary greatly among similar-sized vessels.

more shares to be taken out of a fairly constant gross revenue, but also more shares from a lower net revenue. The additional vessels represent not only added shares but added costs to be distributed before sharing. This is the reason why not only per vessel profit, but also fleet profit diminishes with higher effort.

It is vital to realize, also, that this analysis is valid whether the price of haddock is stable at 8 cents per pound or 28 cents per pound. Profits at all levels may be elevated to a higher plateau but the law of diminishing returns and diminishing net revenues will still operate with equal vigor as long as landings remain stable while effort varies.

Some may feel that the analysis presented leads to a conclusion that the fishery, because of its common property nature, has some aspects of a public utility and that to prevent economically and socially wasteful duplication of effort (vessel and manpower) some form of public control such as licensing or profit regulation is desirable. It is not the purpose of this study to enter such an area of controversy but merely to illuminate the present cost-catch-effort relation.

It is seen from table III-12 that, with more brood years approaching the 1931-48 average, the mesh regulation would make possible break-even operations at about 125 percent of normal effort and that at normal effort, profits would be possible although the fishery would still be wasteful in a social and an economic sense.

Even if the number of vessels projected for 100 percent or normal fishing were to remain in service, but were to cut their fishing activity in half, substantial savings would result. This would be equivalent to an effort level of 50 percent with double the number of vessels needed at that plateau. Because of the relative stability of total fleet yields at the two levels, however, the vessels would get only a slightly lower contribution to overhead (14 percent or $11,400 less). Overhead costs should, however, be cut more than enough to offset the lower contribution. The costs of hull and protection and indemnity insurance, gear, supply and repair, and maintenance costs would be significantly less with the halved running time.

Alternatively, the reduced effort in the Georges Bank haddock fishery would provide additional income opportunities for owner and crew through diversification to other species and other banks.

It must be strongly emphasized again that the profit and loss situation portrayed in table III-12 does not correspond with present conditions in the fishery due to the currently poor abundance. If the table were constructed on the basis of yields prevailing in recent years, the average vessel owner would lose money at normal effort levels and with normal prices. That this does happen can be seen in the actual earnings data reported in Chapter V. Profitable operations would not be possible until fleet effort was cut at least 25 percent below normal. The fact that break-even points and profit operations are so related to abundance of the species, highlights the dangerous dependence of this fishery on scrod haddock. Successively poor scrod years will mean financial disaster to many operators. The continued present dependence on scrod abundance emphasizes the modern uneconomic overfishing and points to the wisdom of reducing fishing effort.

It is not to be argued that Boston's aging fleet needs extensive replacement. It is difficult, however, to be convinced, even under the most sanguine assumptions concerning effort and catch, that this fleet needs to be expanded.

Reference to table III-4 will show that in recent years, with the exception of 1957, there has been a tendency to reduce the annual effort on Georges Bank. Part of this reduced effort has been involuntary, as older vessels became unsuitable for heavy weather, or as owners of lost vessels lacked funds to replace them. Part of the reduction has been voluntary, with vessels being transferred to other ports and other fisheries.

For a fishery to have economic vitality, it is necessary that in the long run something more than a break-even operation be realized. What level of effort

would provide enough profits to attract the investment required for continuance of the industry? It is difficult to estimate the cost of building a typical large otter-trawler today, partly because such a vessel has not been built for many years. Best estimates are that it would entail an investment of at least $450,000 to $500,000 to build a trawler typical of the large ones now operating. 87/ Local industry leaders believe that this is too big a vessel for currently projected yields. They feel that a vessel about 100 feet long (versus the 106-foot vessels now typical) would be of optimum economic size, since capacity utilization on present trawlers is at a low rate.

The nature of the risk for fishing vessel operations requires a return on investment of from 10 to 12 percent in order to retain capital in the industry, and a return of 20 percent to attract new investment into the fishery. To realize a 10 percent return on average investment even before taxes, a vessel would have to earn $22,500-$25,000 if it were of the present-day large size, and $14,500 if it were of the smaller-size class now under consideration.

It was stated earlier that the average annual overhead (not including bonuses to officers) of a large otter-trawler was about $65,000. It is estimated that the overhead on a new vessel of the same size would be from $71,000 to $80,500, provided no subsidy were granted and no loan recourse taken. 88/ Possible increased catching efficiency and lower maintenance costs would be offset by higher depreciation and hull insurance charges.

It is anticipated that the overhead on the smaller trawlers now being designed would be about $61,000. About $14,500 would be depreciation at 5 percent of original cost; $16,200 for minimum insurance (hull at 3 percent of vessel cost and P & I at $500 per man for a 15 man crew); $10,000 for gear and supplies, $10,000 for repair and maintenance; $5,000 for payroll taxes and other vessel expense; and $5,000 for administration.

If abundance returned to the higher levels experienced before mesh adoption, and if the new vessels had the same relative catching efficiency as the old, then new large-vessels of the size now operating could attain their profit objective at the long-run price of 8½¢ only if fleet effort were cut back to nearly 75 percent of that earlier termed normal, (table III-15, Part A, and table III-16, Part I). The smaller sized vessels now under consideration could attain their desired return on investment if effort were to remain normal. In both cases, however, profit maximization for both the fleet and the individual vessel would be at the much lower effort levels indicated previously.

It may be argued that these figures, even as approximate as they are, are misleading in the case of possible new vessels as large as those now typical of the fleet. While their overhead costs would likely be in the $70,000 to $80,000 range, it is contended that their revenues would be increased due to the incorporation of improved technology designed to increase catch efficiency. United States Fish and Wildlife Service experts foresee a 15 percent increase in efficiency if such vessels are built. 89/ If this should be the case, such vessels could attain their desired investment earnings return at a level of fleet effort just under 100 percent of normal.

These vessels would show this level of earnings only if they did not constitute a significant portion of the total fleet. The increased catching efficiency of these vessels would result in increasing the efficiency of each day's fishing effort and would mean that the fishery could support fewer vessels were the fleet gradually to be composed of such craft. In other words, if forty-four vessels fishing in total 7,300 days now constitutes 100 percent or normal effort, the same number of newer, more technically efficient

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87/ Cf. Hearings before the Subcommittee on Fisheries and Wildlife Conservation on H.R. 5421, 86th Congress, 1st Session, April 28, 29, 30, June 4 and 11, 1959. (Material submitted by U. S. Department of the Interior). pp. 151 and 152.
88/ Ibid.
89/ Ibid.

vessels fishing the same number of days would represent 115 percent of normal effort.

It must be continually kept in mind that the return on investment analysis made in tables III-16 and III-17 concerning possible new trawlers, rests on the tenuous assumption of more liberal brood years increasing annual fleet landings from about 90 million to 120 million pounds. If these newer vessels entered the fishery with yields still approximating those now being realized, their investment attractiveness would alter considerably. Vessels of a size similar to the class now typical, even with a 15 percent increase in catching efficiency, could attain a 10-12 percent investment return only if fleet effort were cut to less than 75 percent of normal, (table III-17, part B-II). Even smaller vessels of the class now being designed would attain a desirable return on investment only if fleet effort were cut to about 87.5 percent of normal, (table III-17, part C).

Fishery biologists are less and less optimistic about the return of brood recruitment to the higher levels sustained before 1953. If the currently poor yields are considered in relation to the low capacity utilization of the present large trawlers, the wisdom of replacing these with smaller sized trawlers is evident. This is not to say that these vessels will necessarily be profitable. They can be if they are used to replace present vessels in the haddock fishery or if they are used to exploit other species. If, however, the new vessels are considered only as an addition to the present haddock fleet, the effect of the increased annual fleet fishing effort on the old vessels would be ruinous. The process of bankruptcy, distress sales, and disclocation could begin all over again.

It is recognized that break-even or profit calculations are dependent upon the prevailing price level and the relation of this to changes in costs. It has been repeatedly emphasized that per pound prices have remained relatively inflexible over the years. Yet there are long-term consumption factors generating a stronger demand which should produce some price relief even without Governmental action.

It may, therefore, be instructive to examine table III-16 in which the ex-vessel prices per pound necessary to break-even, and to obtain a minimum profit, are calculated. This is done on the basis of new vessels replacing those in the present large otter trawler fleet. In one case, the replacement vessel is a trawler of a similar size; in the other it is one of the more compact draggers now in design.

For a large trawler of a size typical of that now in the fleet to gain its profit objective at normal fleet effort, the ex-vessel price would have to be 10.4¢ per pound. The only years in history when such a price was achieved were in 1946, 1958, and 1959. The latter two were years of international scarcity of haddock. A price of 8¢ per pound which would permit profit goals being realized at 75 percent of normal effort reflects the weighted average price received in Boston in the 1947-57 period. Again it is shown that profit objectives on new trawlers of a size similar to those now operative can be attained under recent year price trends only if fleet effort is substantially cut. If, however, the 1958 and 1959 price plateau were to remain, new vessels could achieve profit aims even if fleet effort remains at normal levels. Again, the analysis is based on more normal brood years increasing landings about 30 percent. If abundance were to remain at present yields fleet effort would have to be cut to less than 75 percent to attain a minimum return on investment.

If the "smaller" large-trawlers now under design can cut overhead to a $61,000 annual average, and can through better capacity utilization retain present catch per day relationships, then table III-16 shows that the profit goals can be achieved with an 8½¢ price at presently prevailing or "normal" levels of effort.

Summary and Conclusions

It may be well at this point to summarize and to make certain conclusions on the economic implications of the Georges Bank haddock resource. First, the present fishery is uneconomic. Even if abundance increases, due to more normal brood years, fleet fishing effort could be cut 25 percent. Consumer supplies would not be seriously affected and there would

be less social waste of men and vessels plus more profitable operations for remaining interests. Under presently poor yield conditions, fleet effort could be cut 50 percent without impairing supplies but making profitable operations possible. Secondly, it is seen that, conversely, there is no justification for fleet expansion if the expansion be directed toward exploitation of Georges Bank haddock.

Thirdly, until more normal brood years return, present fishing operations will remain financially hazardous and unattractive to new investment. Fourth, there is a continuing need for further research on the causes of the fluctuations in abundance and on the possibilities of further mesh changes designed to postpone the age of first capture and thus ultimately to increase poundage landed.

CHAPTER IV

OTHER GROUNDFISH RESOURCES

Introduction

In addition to haddock, the groundfish industry in New England comprises ocean perch, cod, pollock, cusk, and hake. Of these species, the most important, in terms of demand, landings and value, is ocean perch. This chapter will be devoted to a brief analysis of the past and current status of these species.

Ocean Perch Resource

1. History

Ocean perch (or redfish) are small, slow-growing fish which inhabit the open ocean and the deep coastal waters from Cape Cod to the islands north of Norway. They average around one pound in round weight, and require 10 or 11 years to mature, growing at the rate of about two centimeters in length and two ounces in weight per year. Ocean perch are non-migratory, and some biologists believe that large populations of the fish exist in areas not yet exploited, and that from these areas some ocean perch continually move onto the fishing grounds and replace those removed by the fishing fleet. "However, off New England and eastern Nova Scotia, where prevailing water temperatures restrict the ocean perch to the deep coastal waters along the inner sides of the fishing banks, the earlier catches of large fish have been replaced mainly by relatively small young fish which now predominate in the landings. On the other hand, in the productive ocean perch grounds which are on the outer sides of the Grand Bank the catches are replaced by ocean perch of all sizes moving in from the open ocean."90/

Until the middle 1930's, ocean perch was discarded as trash. In 1933, however, it was discovered that ocean perch could be filleted and frozen successfully. When a heavy demand for the fillets sprung up in the Midwest, the impetus was provided for a phenomenal growth in the ocean perch fishery. Chief beneficiary of this new fishery was the port of Gloucester, which took principal advantage of the development of a growing market for ocean perch fillets for a number of reasons. It was closer than Boston to the Gulf of Maine grounds. It had unused buildings, vessels, and manpower which could be quickly converted to their exploitation. Its gear and fishermen were traditionally employed for short trips and the daytime operations required in ocean perch fishing operations.

Landings of ocean perch at Gloucester grew from 262,000 pounds in 1933 to more than 100 million pounds in 1942,(table IV-1). In the latter year, the Maine ports of Rockland and Portland began landing substantial amounts of ocean perch as they, too, began prosecuting the nearby grounds in the Gulf of Maine. With the exception of negligible amounts landed at Boston, these three ports have accounted for all New England landings of ocean perch down to the present. In 1959, for example, some 134 million pounds of ocean perch were landed in New England ports. Gloucester accounted for 58 million pounds, Portland for 35 million pounds, and Rockland for 38 million pounds. The remaining 3 million pounds were landed at Boston. 91/

2. The Ocean Perch Grounds

The original grounds for ocean perch were in the Gulf of Maine. These grounds were close at hand, necessitating only a two-day trip, and the stock was abundant. As the fishery was prosecuted more vigorously, however, catch per day levels began to decline, making trips by the larger trawlers longer and less profitable, since

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90/ United States Tariff Commission, Groundfish: Fishing and Filleting. May, 1957. p. 35.

91/ New England Fisheries - Annual Summary. Bureau of Commercial Fisheries, 1959. p.3.

they had to spend more days on the grounds.

The decline in productivity resulted mainly from two factors: (1) increased fishing effort; and, (2) slow replacement of stock due to the long period of maturity for ocean perch. Reference to table IV-2 shows a sharp decline in productivity in 1949, such that prior levels have never been regained. In the period 1942-48, average annual productivity in the Gulf of Maine was about 12,000 pounds per day. 92/ From 1949 to 1957, the annual average has been only about 8,400 pounds per day. Consequently, fishing in the Gulf of Maine is now done almost exclusively by small and medium trawlers, while the larger vessels go to the more productive distant banks seeking better catches. This has meant a corresponding decline in fishing effort in the Gulf of Maine, with the result that this fishery has stabilized at a level of about 9,000 pounds per day's fishing. This is believed by some to be at a rate very close to that required to obtain the maximum sustained yield. 93/

As the catch from the New England grounds declined, the large trawlers went farther to increase their landings. Exploitation of the Nova Scotia banks began in 1936 when nearly 16 million pounds of ocean perch, representing 23 percent of the total landings from all banks, were caught there. Landings from these banks, however, followed the pattern of those from the New England banks: early large catches were followed by declines both in catch per unit of effort and in average size of fish caught. In the early 1950's, the fishery on the Nova Scotia banks began leveling off at an average catch per day of some 20,000 pounds.

As this latter stabilization was taking place, the New England fleet moved still farther out to the highly productive Grand Banks, and to the Gulf of St. Lawrence. Here again, however, the same pattern occurred. The average catch per day from 1951 to 1957 dropped from 24,000 to 20,000 pounds in the Gulf of St. Lawrence, and from 67,000 to 37,000 pounds on the Grand Bank, (table IV-2). It cannot be said that the fishery has stabilized on the latter two fishing grounds, since fishing on them commenced only in 1951. However, biologists feel that the more distant grounds, when they do stabilize, will do so at higher levels of abundance, just as the New England grounds are now stabilized at their levels of abundance.

3. The Ocean Perch Ports

As noted above, virtually all ocean perch landed in New England are landed at Gloucester, Portland, and Rockland. The distribution of the landings among the three ports has changed substantially, however, over the years. The share of the catch landed in Gloucester has declined from almost 100 percent in 1935 to only 45.5 percent in 1959. This decrease in landings in Gloucester has also been an absolute decrease, since the total New England catch of ocean perch has been decreasing since the early 1950's.

Although Gloucester continues to be the country's leading ocean perch port, the landings of this species have been declining continually. In 1959, ocean perch landings were the lowest since 1940, when the fishery was still very young.

The decline in landings of ocean perch at Gloucester is attributable to many factors, chief among which is the increased foreign competition for the market. Unlike the haddock market, which is partially insulated from competitive effects by the existence of a fresh-fish market, practically all ocean perch go into the frozen market, in which, as we have seen, the Canadians hold a decided edge. Thus, it is more profitable for American processors to import frozen fillets rather than to buy ocean perch from New England fishermen since the ex-vessel price for these fish is $1\frac{1}{2}$ to $2\frac{1}{4}$ cents higher per pound than in Canada.

The reasons for this ex-vessel price spread are enumerated in Chapter V. Suffice it to say here that, in general, the

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92/ Catch per day is based on a 12-hour day.
93/ "An Appraisal of the New England Fisheries," by Clyde C. Taylor. Fishing Gazette, January-February, 1958.

changing structure of the fishery has meant increased costs to the New England fleet. Large trawlers, which account for the bulk of ocean perch landings, (table IV-3), cannot land sufficiently large quantities by short trips to local grounds. Consequently, trips must be made to the more productive distant banks: the Grand Bank and the Gulf of St. Lawrence. These longer trips in large trawlers increase almost every cost involved in fishing: increased labor costs; increased food and fuel costs; increased repair and maintenance costs; increased insurance costs. Compounding these increased costs is the declining rate of catch per day on these distant banks. When the rate of productivity reaches a point of stabilization then, costs and prices may also stabilize but the likelihood is that this will occur at higher levels of cost. Little wonder that, faced with the prospect of a high-cost fishery, Gloucester has been gradually shifting to alternate species, principally whiting.

In contrast with Gloucester, landings of ocean perch have been increasing steadily in the Maine ports of Portland and Rockland, (cf. table IV-1). These two ports are heavily dependent on the ocean perch fishery. Ocean perch landings in Portland account for some two-thirds of all food fish landed; in Rockland, ocean perch accounts for more than 90 percent of all food fish landed. As a result, both ports are very sensitive to any price decline or increase in cost.

Cod Resource

In the 19th century, when New England salted much of its fish, cod was the most important fishery of the region. With the introduction of quick-freezing and filleting, however, the salt cod trade declined as the market for other species developed. As a result of this contraction of the market for cod there has been a gradual decrease in cod landings in New England ports. At the turn of the century, annual landings of cod in New England averaged some 200 million pounds. In recent years, annual landings have fluctuated about 30 million pounds.

Currently, about half the cod catch is taken by large otter trawlers in conjunction with the haddock fishery; the remainder is taken by small-boat operators who fish profitably with various gears at appropriate seasone. Thus, about half the New England landings since 1931 have come from Georges Bank and the Gulf of Maine; but fisherman primarily in search of cod generally go to the Nova Scotia banks or beyond, where cod occur in greater abundance and are larger in size. The bulk of the cod catch is landed at Boston, and the greater part of the remainder is landed at the ports of Gloucester and New Bedford.

Without a rejuvenation of the market for cod - which is unlikely in the foreseeable future - it is most probable that the cod fishery will retain its present status: an incidental fishery for the larger trawlers fishing primarily for haddock and ocean perch, and a primary fishery for small boats fishing principally for cod.

Pollock

There is no "fishery" for pollock in New England, such as there is for haddock or ocean perch. Pollock is landed incidentally by trawlers fishing for the latter two species.

Some 90 percent of all pollock taken by the New England fleet is landed at the ports of Boston and Gloucester. In the period from 1939 to 1948, annual landings of pollock in New England averaged some 33 million pounds. Since that time, however, landings have declined to an annual average of 22 million pounds.

The species is popular in fresh fish markets, and is sold also as frozen fillets. It has a good flavor, white meat, and a firm texture. In addition, it has been canned as fish flakes. There is no great demand for the fish, however, and as a result, the resource is probably underexploited.

Cusk

Little is known of the cusk resource except that it has never been very abundant. Landings have never been important in New England, and have declined sharply from 8 million pounds in 1940 to 1.3 million pounds in 1959.

Cusk is taken incidentally to the catch of haddock or ocean perch. Thus, three-fourths of the entire New England catch is landed at the ports of Boston and Gloucester; the remainder is landed at Portland.

Cusk is marketed largely as fresh and frozen fillets, or is used to make fish sticks.

Very little is known about the biology of the cusk on the New England coast and practically nothing about the size and extent of the cusk populations and potential catch.

Hake

Hake is a name applied to several species of closely related fishes found from Newfoundland to Cape Hatteras. Two types of hake are taken commercially by New England fishermen: white hake and red hake.

White hake is the principal food fish in this group and is landed incidentally with catches of haddock and ocean perch, mainly by large and medium otter-trawlers. Consequently, the principal ports of Massachusetts and Maine account for practically all the landings of white hake. In the past decade, landings have dwindled from 14 million pounds to slightly over 2 million pounds. Whether this decrease is due to scarcity or merely underutilization is undetermined since little is known of the biology of hakes or the extent to which the supply is being utilized. It is believed, however, that, if the market warranted, this fishery could probably be expanded.

Red hake is utilized principally by the industrial fishery of southern New England. Although it is a good-flavored species and, until recently, had been landed as food fish, it is so soft-bodied that it does not keep well fresh or frozen. The negligible quantities landed for food fish are also landed incidentally to the major groundfish species. It is not expected that red hake will assume any importance as a food fish, but will remain of major importance to the industrial fishery.

Whiting

Although whiting (silver hake) is not included in our definition of groundfish, the tremendous growth in landings of this species in New England commands attention. Landings in New England have increased from some 7 million pounds in 1932 to 126 million pounds in 1957, the peak year, (table IV-4). The rapid growth of the fishery is attributable to an increased demand for the fish as human food, animal food, and industrial products. The major source of demand comes from the Midwest, where whiting is popular in fried-fish sandwiches.

Gloucester and Portland are the principal whiting ports, accounting for well over 90 percent of all New England landings. In fact, whiting is gaining in importance in Gloucester where, in the past few years, landings of this species have been almost equal to landings of ocean perch. Indeed, in 1957 and 1959, whiting landings actually exceeded those of ocean perch. In terms of value, however, the ocean perch, with an ex-vessel price roughly twice that of whiting, remained predominant.

Whiting is a summer fishery, the great bulk of the catch being landed from April to September. Practically all whiting are landed by medium and small trawlers operating on the inshore grounds. In recent years, however, there has been some fishing on northwest Georges Bank which resulted in tremendous catches. There is no indication that this caused any decline in the whiting population on the Georges Bank.

Whether the current high levels of landings can be sustained is undetermined. Though whiting is a fast-growing fish - maturing in four years - not too much is known of the existence of populations other than those in the Gulf of Maine and on Georges Bank. The decline in landings in 1958 and 1959 are attributed to biological factors, since the level of fishing effort did not decline substantially. Biologists do feel, however, that it is possible that there are offshore areas, other than those presently being exploited, where commercial quantities of whiting are available. This can be determined only by further surveys.

CHAPTER V

COSTS AND EARNINGS OF NEW ENGLAND TRAWLERS

Introduction

While the groundfish industry of New England has been referred to as a unit in this study, it is in reality a group of "industries" which differ from one another according to the principal species landed at each port. For this reason it was necessary to discuss separately each of the groundfish resources. Likewise for this reason, it was necessary to analyze costs and earnings by ports. Thus, Boston--primarily a haddock port--was the subject of one analysis. Similarly, Gloucester, Portland, and Rockland--the major ocean perch ports--were grouped together in a separate analysis.

Any analysis of the New England trawler fleet must take note of certain important factors. Perhaps the most important are the substantial differencesin vessel landings, receipts and activities. This in turn points up the absence of homogeneity in the productive units which make up the large trawler fleet. The vessels differ one from another in almost every respect: size, horsepower, gear, and managerial skill. And it is these factors which determine the performance and profitability (or lack of it) of the individual vessels. In addition, these factors are neither independent nor divisible. They are both interdependent and mutually interrelated:

"The properties of the hull....partly determine the effect of the engine and the reverse. The properties of the vessel determine for a considerable part the effect of the gear, and the properties of the gear partially determine the behavior of the vessel when fishing....The properties of the skipper - his capacity to serve or quality - largely determine the results of a given outfit, but the properties of the vessel, gear, and other factors influence the skipper's decision." 94/

In view of the foregoing, it would be well to examine briefly the effects of differences in size, activity, and managerial skill on the performance of Boston large trawlers. For purposes of analysis, the large-trawler fleet has been divided into two classes: those 150 to 199 gross-tons, and those 200 gross-tons and over. Admittedly, this is an arbitrary classification. It was necessitated, however, by the fact that a more definitive classification would restrict the number of vessels within any given class, and might also tend to reveal the individual performances of specific vessels.

1. Size As A Factor

It was found that, generally, vessels 200 gross-tons and over are more active and productive than vessels of the 150-199 gross-ton class. In each of the three years for which comparable data was available, 1956-58, the average 200 gross-ton vessel had greater landings and receipts and made more trips than the average 150-199 gross-ton vessel, (table V-1). While at first glance it seems only natural that the larger vessels should have higher landings and receipts, the experience has been that the additional receipts are generally greater than the additional costs incurred, so that the relative performance of the larger vessel results in a greater net return than does that of the smaller vessel.

Another indication of the superiority of the 200 gross-ton and over trawler is the stability of its year-to-year performance. For the years 1956, 1957, and 1958, the fifteen 200 gross-ton trawlers for which information was available were ranked according to total receipts, (table V-2). Over the 3-year period there was very little change in the relative positions of these trawlers.

In a similar ranking for the 150-199 gross-ton trawlers, however, this consistency was lacking. The performance of individual vessels was, in some instances, most erratic, (table V-3).

94/ Bottomanne, C. J. Principles of Fisheries Development. Amsterdam: North-Holland Publishing Company, 1959. p. 73.

That size alone does not determine performance, however, can be seen from a comparison of the average landings and activities of the best and worst of both trawler classes, (table V-4). The top six vessels of the 200 gross-ton class had average landings of 3.9, 3.7, and 3.3 million pounds in the years 1956, 1957, and 1958, respectively. The bottom six, on the other hand, had average landings of 2.5, 2.2, and 1.9 million pounds in these years. Similarly, in each of the three years, the top six trawlers averaged 5 more trips per year than the bottom six. Yet these two groups are of practically the same tonnage. The same held true for the best and worst of the 150-199 gross-ton trawlers. Yet these, too, were of the same tonnage. Furthermore, individual vessels of the 150-199 gross-ton class do out-perform the larger vessels in certain instances, and within the two vessel classes there are substantial variations in vessel landings, receipts, and activity, (table V-5).

Thus size, although an important consideration in the analysis of the Boston trawler fleet, should not be overemphasized, and must be viewed in relation to other factors.

2. Trip Activity As A Factor

The disparity in trip activity between the best and worst of the trawler classes points up a further source of the wide variation in vessel performance. It has been held that vessel profitability depends to a large degree on trip activity:

"....Profitability of individual vessels depends to a large extent on (the trawlers') ability to spend a large number of days at sea." 95/ However, with reference to the best and worst of the 200 gross-ton trawler class, for the worst trawlers to approach or equal the landings of the best vessels, their landings would have to be in excess of 200,000 pounds per trip for the added six trips. This would entail a most substantial improvement over their average per trip landings of 100,000, 85,000, and 76,000 pounds in the years 1956, 1957, and 1958, respectively.

Vessel size and trip activity are, then, two factors which influence vessel receipts and landings. However, the consistent year to year performance of individual vessels, and the substantial differences in per trip landings of the best and worst of the large trawlers, illustrate the importance of a third factor: the human element.

3. Managerial Skill As A Factor

That the capabilities of a captain are a major factor influencing the performance of individual vessels, has long been recognized by those in the Boston trawler fleet and by fishery students the world over. One of the latter notes that "A good skipper with an old-fashioned outfit may be fairly successful, but a bad skipper with a good outfit will have little results; even if a good skipper has a bad outfit he will see his way to improve it." 96/ He also notes that "the choice of the skipper - when the vessel is a given factor - is.....the most decisive choice with a view to making the fishing unit pay." 97/

Although the importance of the captain as a factor influencing the performance of a given fishing vessel is well accepted, some effort was directed toward obtaining a quantitative illustration of his influence. To do this, the performances of two vessels were compared for the years 1956 and 1958 in terms of receipts per day absent from port, crew earnings per day absent from port, and vessel share per day absent from port.

The two vessels are sister-ships. They are under the same management, have the same gross tonnage and horsepower, and are similar in all essential respects. Each vessel was skippered by the same individual in both years, and information was included

95/ Miernyk, W. K., and Sumner Rosen. The Economics of Freezing Fish At Sea, Northeastern University, 1957, unpublished report prepared for United States Fish and Wildlife Service, 1956. p. 30. This report further states that "....earnings (do) not depend primarily on total or average catches; the significant factor is total number of trips." p.32.

96/ Bottomanne, op. cit., p. 79.

97/ Ibid., p. 97.

for only those trips made by the respective captains which had the same or similar landing dates. Thus, except for the skill of the captains, "all other things were equal."

The results of this comparison are shown in table V-6. For both years, the performance of Vessel A in all three categories was superior to that of Vessel B. While this is not conclusive of the proposition, it is at least a partial indication of the importance of the human element in vessel performance. 98/

The foregoing observations have been intended to point up the hazards of oversimplification and generalization in any analysis of the complex New England groundfish industry. It is also intended to show the futility of any unilateral solution to the industry's internal problems.

Costs and Earnings in the Boston Industry: 200+ Gross-Ton Trawlers

1. Methodology

Cost and earnings data was furnished to the authors by various owners of large trawlers operating out of Boston. The information furnished covered the years 1953 to 1957, but its use is severely restricted by the fact that not all vessels are included in every year, and also by the fact that accounting procedures differ from one operator to another, so that cost categories may not, therefore, be strictly comparable. Furthermore, because the data extends only over a five-year period, it was not possible to extract any statistically valid trends.

Aware of these limitations, and in an attempt to introduce some uniformity, it was decided to group the data in three ways. First, the vessels were grouped by size: those 200 gross-tons and over are considered separately from those 150 to 199 gross-tons. Secondly, those vessels 200 gross-tons and over which were continually among the top ten vessels (in terms of receipts) during the period 1956-58 were considered separately from those which were never among the top ten. The basis for the latter distinction is the consistent behavior of vessels 200 gross-tons and over. These vessels, if profitable in one year, tend to be profitable in all years. Conversely, those unprofitable in one year tend to be unprofitable in all years. Thirdly, because of variations in the vessels included in the two periods, the data of 1953-55 was distinguished from that of 1956-57.

2. Landings And Receipts

A comparison of the operating results of the average Boston trawler 200 gross-tons and over for the years from 1953 to 1957 is given in tables V-7 and V-8. Table V-7 contains data which pertains to the average performance of those vessels of this size class which were "successful" (profitable) in each of the years. Conversely, table V-8 gives the average performance of similar sized vessels which were "unsuccessful" (unprofitable) in each of the years. The ensuing discussion relates to these two tables.

The differences in landings and receipts of the more successful and less successful Boston trawlers, 200 gross-tons and over, are substantial in either period. In 1953 through 1955 the average annual landings per vessel of the more successful trawlers rose from 3.2 to 4.1 million pounds; average receipts increased from $266,800 to $284,200. During the same period annual landings of the less successful trawlers increased from only 2.3 million pounds to 2.4 million pounds and average annual receipts fell from $183,600 to $141,700 per vessel.

Although the average landings per vessel on both the more and less successful trawlers were lower in 1957 than in 1956, the average receipts per vessel of the more successful trawlers increased from $255,200 in 1956 to $274,600 in 1957; the less successful trawlers saw their average receipts

98/ Other comparisons involving pairs of sister-ships were attempted but proved to be of no value since the rapid turnover of captains on these vessels made it impossible to assign the captaincy with any degree of certainty.

per vessel fall from $155,900 in 1956 to only $125,800 in 1957.

Differences in trip activity are responsible to a degree for the differences in landings and receipts between the more and less successful trawlers. In 1956 and 1957 the more successful trawlers made 30 trips and 28 trips per year and the less successful trawlers only 24 trips and 19 trips per year in the respective years. However, differences in per trip activity are far from the principal source of the great differences in landings and receipts. In the years 1953 and 1954 the disparity in the trip activity between the more and less successful trawlers was slight. In 1953 and 1954 the less successful trawler made 27 trips per year while the more successful trawlers made 30 and 28 trips in the respective years. Yet in both years the more successful trawlers reported profits while the less successful incurred losses. This reflects the operation of factors other than trip activity.

than $7,100 (in 1954) and were as low as $5,900 in 1955. In 1956 and 1957 per-trip receipts were only $6,500 and $6,600 respectively. The average annual landings per-trip of these least successful trawlers has never been higher than 99,000 pounds (in 1955).

3. Productivity And Earnings

Trawler per trip productivity has a profound effect on the earnings of groundfish trawlers: first, because each trip is a separate venture and at the conclusion of each trip the receipts are shared between vessel and crew; but most important, because of the minimum guarantee of $12 per day per man for deckhands and $13 per day per man for officers, exclusive of the captain, which prevails on the Boston large trawler fleet.

The existence of a minimum guarantee severely restricts the earning ability of large trawler fleets at low levels of per

Exhibit A

Per Trip Performance of Specific Vessels, 1956

Vessels 200 gross-tons and Over

Value	Trip Expenses		Net Crew		Bonus		Vessel Operator's Share		
							Actual		If he received 35 percent
Dollars	Dollars	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent	Dollars
$10,400	$1,961	18.9	$4,407	42.3	$403	3.9	$3,623	34.9	$3,623
8,349	1,929	23.1	3,352	40.1	320	3.8	2,748	32.9	2,922
8,215	1,926	23.4	3,306	40.2	317	3.8	2,665	32.4	2,875
8,153	1,967	24.1	3,254	39.9	313	3.8	2,620	32.1	2,853
7,012	1,889	26.9	2,881	41.1	269	3.8	1,901	27.1	2,454

Equally as important is the significant difference in per trip productivity of the more and least successful of the trawlers which furnished detailed operating results. The average annual per-trip landings of the more successful 200 gross-ton trawlers were, in all years 1953-57, higher than 100,000 pounds per trip. Average annual per-trip receipts of these trawlers were never below $8,500 and were as high as $9,500 in 1957. On the other hand, the average annual per-trip receipts of the least successful trawlers were never higher

trip productivity since, at levels of productivity which fail to allow the crew members to earn $12 or $13 per day per man after the payment of crew expenses of food, fuel, ice, etc., the vessel operator must in effect pay all joint and trip expenditures, including wages, before receiving any part of trip receipts.

The effect of lower levels of per trip receipts or the vessel share of these receipts is illustrated in Exhibit A. A vessel operator with per trip receipts of

$10,400 has as his share of receipts $3,623 or 35 percent after trip expenses, wages, and bonus are paid. On the other hand, a vessel operator with per trip receipts of $7,012 receives as his share only $1,901 or 27.1 percent. The cause of this drastic reduction in the vessel operator's share of receipts which accompanies lower levels of receipts is the existing minimum guarantee which makes total trip expenditures highly inflexible.

In the absence of a minimum guarantee a vessel operator's share would be approximately 35 percent at all levels of per trip receipts. In this event the dollar share available to a trawler owner with per trip receipts of $7,012 would be $2,454, an increase of $600 over the average vessel per trip share of $1,901 in 1957.

The large differences in per trip productivity, and the effect of lower levels of productivity on the distribution of revenue, may well be the cause of the inactivity of the less successful trawlers.

Exhibit B

Comparison of Per Trip Performance of "More Successful" and "Less Successful" Large Trawlers, 1956

	Number of Trips	Value	Trip and Joint	Net Crew	Captain and Bonus	Vessel Operator's Share
Vessel A						
January - April						
Total	10	$92,460	$19,486	$37,614	$3,606	$31,754
Per Trip		9,246	1,949	3,761	361	3,175
Percent of Total Revenue			21.1	40.7	3.9	34.3
May - August						
Total	6	$29,974	$10,850	$12,738	$1,095	$5,291
Per Trip		4,996	1,808	2,123	182	882
Percent of Total Revenue			36.2	42.5	3.7	17.6
September - December						
Total	6	$32,332	$11,564	$13,812	$1,661	$5,295
Per Trip		5,389	1,927	2,303	277	882
Percent of Total Revenue			35.8	42.7	5.1	16.4
Vessel B						
January - April						
Total	11	$130,882	$19,896	$59,755	$5,123	$46,108
Per Trip		11,898	1,809	5,432	466	4,192
Percent of Receipts			15.2	45.7	3.9	35.2
May - August						
Total	10	$73,003	$17,813	$28,649	$2,765	$23,776
Per Trip		7,300	1,781	2,865	277	2,378
Percent of Receipts			24.4	39.2	3.8	32.6
September - December						
Total	11	$96,835	$21,411	$38,709	$3,673	$33,092
Per Trip		8,803	1,946	3,519	334	3,004
Percent of Receipts			22.1	40.0	3.8	34.1

Source: Settlement Sheets of Atlantic Fishermen's Union.

Exhibit B compares the per trip performance of one of the less successful trawlers (Vessel A) and one of the more successful trawlers (Vessel B) during the year 1956. Vessel A is equally as active as Vessel B during the January to April period when its per trip productivity approaches that of Vessel B. In the January to April period the percentage share of receipts obtained by Vessel A is about equal to that obtained by Vessel B.

Only in the May and August and September through December period, when the per trip productivity of the Vessel A is much below that of Vessel B, is the former much less active than the latter. It is during these two periods that the percentage share of receipts obtained by Vessel A is much below the percentage share obtained by Vessel B.

In both the May to August and September through December periods more than 35 percent of the per trip receipts of the less successful trawler were used to defray trip and joint expenses, more than 41 percent of per trip receipts went to cover net crew earnings and 3.8 percent of per trip receipts were paid to the captain as a bonus. The trawler operator received less than 20 percent of the per trip receipts. The less successful trawler operator received less than $900 per trip during these latter two periods with which he must pay gear, repair and maintenance expenses, and other vessel expenses. 99/

A comparison of the less successful trawler and the more successful trawler of Exhibit B also illustrates the effects of broker payments and minimum guarantees at low levels of production. Despite the vast differences in per trip receipts and the percentage share of receipts devoted to trip and joint expenses of the two trawlers, there is little difference in the percentage share devoted to crew earnings. In the September through December period, trip and joint expenses accounted for 36 percent of Vessel A's per trip receipts, and only 22 percent of Vessel B's per trip receipts. Yet 43 percent of Vessel A's per trip receipts were devoted to wages and only 40 percent of Vessel B's receipts were devoted to wages. Thus, while approximately 80 percent of Vessel A's receipts were devoted to trip and wage expenses, only 62 percent of Vessel B's receipts were devoted to trip and wage expenses.

The existence of rigid trip and wage expenses makes it mandatory that consideration be given to the expected level of landings and receipts from any increased activity. Thus, while it is true that trip activity influences trawler landings and receipts, it is equally true that the level of trawler landings and receipts influence trip activity.

4. Vessel Expenditures

The year to year behavior of gear, repair, and maintenance expenditures, the substantial differences in the level of these expenditures, and the contrasting behavior of insurance expenditures are other illustrations of the interdependence of the factors of a fishing unit.

a. Gear, Repair, and Maintenance

Yearly variations in gear, repair, and maintenance expenditures do not of themselves reflect the interdependence of the factors of a fishing unit, for such variations are expected by New England vessel owners. These variations have also been discovered in other vessel investigations: "Individual items of cost, however, such as fishing gear and repair expenses, show wide fluctuations". 100/ The influence, however, of other factors of a fishing unit on gear, repair, and maintenance expenditures is indicated by a

99/ Vessel A of Exhibit B as of July 20, 1956 had accumulated $37,000 as its share of the receipts produced up until this time. On August 31, 1956, its share of receipts was still $37,000 despite the fact that in the interim it had made 4 trips which added $14,000 to total receipts. The vessel received no part of this added revenue.

100/ Hildebrandt A. G. U. Statistical Analysis of Cost and Earnings in the Fishing Industry. Technical Meeting on Cost and Earnings in the Fishing Enterprise. p. 120. F.A.O. London, 1958.

number of things: the difference in the level of these expenditures as between the more and less efficient trawlers; the tendency for these expenditures to be higher in years of high receipts and lower in years of low receipts; and, the degree of association between individual vessel receipts and expenditure for gear, repair, and maintenance. 101/

A direct relationship of vessel receipts and vessel expenditures for gear, repair, and maintenance offers a plausible explanation for the lack of any substantial year to year variation in the relative performances of individual vessels of this class, 200 gross-tons and over, (table V-9). The more efficient trawlers, by reason of the level of earnings, are adequately repaired and properly maintained, and proper maintenance reinforces other factors insuring a continuation of their performance or at least diminishes the risk of a sharp decline in receipts due to physical failures of the vessel. In a like manner the less efficient vessels, with substantially lower receipts, are inadequately repaired and maintained, and improper maintenance compounds other deficiencies, human or mechanical, further diminishing the possibility of improved future performance and increasing the risk of a further decline in receipts due to the physical failure of the vessels.

b. Insurance

The possibility that differences in vessel receipts, their impact on vessel maintenance, and probable influence on future performance, may explain the contrasting behavior in insurance expenditures of the more and less efficient trawlers, cannot be overlooked. In the years 1953-1955, all but one of the more efficient trawlers experienced a slight decline in the cost of their insurance. Again in 1956 and 1957 all of the more efficient trawlers, with one exception, had a slight decline in the cost of insurance. All the less efficient trawlers 200 gross-tons and over, which furnished data for either period, experienced substantial increases in the cost of insurance for the years 1953-55 and again for the years 1956 and 1957.

Initially in our investigation no attempt was made at segregating the cost of hull insurance from the cost of protection and indemnity insurance. Later, efforts were made at obtaining the specific cost of hull insurance and protection and indemnity insurance. Such efforts met with little success. Published material and the comments of individual insurance brokers, however, did provide data and insight for a discussion of the insurance question.

A recent analysis, of the problems of the commercial fishing industry with marine insurance, discovered that there is a high inverse association of receipts and hull insurance losses. 102/ The report noted that "The possibility that a vessel owner may consider the hull insurance contract as a means of overcoming impending financial difficulties either partially or wholly cannot be overlooked," and "At times of falling receipts and mounting bills, the temptation to take advantage of the provisions of the insurance contract may be very strong." 103/ Although the probable presence of moral hazard is not to be denied, it is felt that with regard to vessels included in this investigation of cost and earnings the major cause of any increase in the cost of hull insurance could be primarily attributed to a rise in accidents due to improper and inadequate repairs and maintenance.

The investigation of Messrs. Danforth

101/ Boston owners generally agreed that in many instances repair and maintenance expenditures are influenced by monies available. Gear costs, however, should not vary greatly from year to year unless there are wide changes in vessel activity.

102/ Danforth, W. C. and Theodore, C. A., Hull Insurance and Protection and Indemnity Insurance of Commercial Fishing Vessels, Special Scientific Report Fisheries No. 241. Washington, D. C., 1957. p. 101.

103/ Ibid., p. 101.

and Theodore into protection and indemnity insurance expenditures revealed a direct association between receipts and claim losses which "to some extent may be due to fishing operations requiring greater exposure of crews to risks involved in longer or more frequent trips for larger receipts." 104/ They later note that the direct association of yearly receipts and claim losses is largely spurious and further that "it may be possible to find a stronger argument for an inverse association between receipts and losses." 105/ The high incidence of petty claims (no more than $250) under protection and indemnity insurance, coupled with the share arrangement by which fishermen are paid, tends to verify an argument for an inverse association between receipts and claim losses. Assuming the fishermen of the more efficient trawlers had average per trip net earnings of $250, while a fisherman of the less efficient trawlers received substantially less than $120 per trip, that both suffered a minor injury, and that the filing of a claim necessitates a period of inactivity, one can speculate that the fisherman with net earnings of $250 per trip would be less willing to remain inactive and sacrifice his earnings than would the fisherman with net earnings of $120 per trip. "It would be more logical for a fall in receipts to be associated with a rise in claim losses inasmuch as fishermen might try to compensate losses in wages with larger insurance benefits." 106/

Numerous interviews with individual marine insurance brokers in the New England area again revealed the importance of vessel receipts as a major factor influencing insurance costs. The importance attached to vessel receipts in this respect is particularly evident from brokers comments concerning factors which should be considered when contemplating whether to insure individual vessels, and their reasons for the mounting insurance costs. Most brokers emphasized that in negotiating new insurance contracts special attention should be given to the caliber of management, the owner's financial position, past and present vessel and crew earnings, and the level of vessel maintenance. All agreed that the cost of insurance was increasing because of an increase in both the number of claims and the cost of settlement, and that lower rates can come only from lower loss experience.

5. Crew Earnings

Prior to 1946 the union-management share agreement provided that after certain deductions from gross receipts the remainder was to be shared equally between the crew and vessel owner, the lay then being 50-50. The broker payment (minimum wage guarantee payable to the crew when a physical break-down or low gross receipts impedes the earning capacity of the crew on any particular trip) in existence prior to 1946 called for a payment of $25 per man per trip for a maximum of 10 men; if there were more than 10 men, the maximum amount payable ($250) was to be divided among the crew. The share agreement also provided for minimum per trip payments of $50 to the chief engineer, $45 to the mates, and $40 to the second engineer and cook. In May 1946, the union negotiated a contract changing the lay arrangement from 50-50 to one giving the crew 60 percent and the owner 40 percent of gross receipts after the deductions of certain joint expenses. This contract also changed the broker payment from $25 per trip per man with a maximum of $250 to a guarantee of $6 per day per man for a maximum of 10 days. The amount payable to the chief engineer, mate, etc., was also changed from their per trip basis to one calling for a payment to each of $6 per day per man for a maximum of 10 days. This change, in effect, raised the minimum guarantee payable to the crew by the owner for a 10-day trip from $425 prior to 1946 to $840 thereafter. A further change in the broker agreement during the 1950's raised the guarantee to $12 per day per man for deckhands and $13 per day per man for chief, mate, second engineer and cook. This change in the contract raised the minimum guarantee for a 10-day trip from $840 to $1,960. It also raised the maximum amount payable from $840 to an amount dependent upon the number of days a vessel is absent from port. Another change which took place after 1946 was the increase in the layover time between trips from what was termed a 24-hour layover to a 48-hour layover.

Exhibit C was constructed to illus-

104/ Ibid., p. 106.
105/ Ibid., p. 106
106/ Ibid., p. 106.

trate the change in the vessel owner's profits brought about by the introduction of the 60-40 lay. In examining the per trip performance of the large trawler operating in 1942 and a large trawler operating in 1956, it is obvious that this development drastically reduced the vessel owner's earnings. In 1942 the vessel owner realized approximately $3,300, after the payment of vessel expenses from gross receipts of $7,500. In 1956, however, the vessel owner realized only $2,950 from sales of $8,700. Thus, while per trip gross sales in 1956 were 16 percent above those of 1942, the vessel owner's earnings were actually 7 percent less than 1942. On a yearly basis the vessel suffered a $15,800 decrease in earnings, before deductions for vessel expense, despite a $21,000 increase in gross revenues. Furthermore, for a vessel operating in 1956 under the "60-40" to obtain yearly dollar earnings equal to those of 1942 ($101,500), gross receipts would have to be $298,000 or 28 percent higher than those of 1942, and 18 percent higher than the gross receipts of 1956, $255,000.

the fact that crew expenses in 1956 had increased by more than 100 percent over their 1942 level. Although it is true that the net real crew earnings of 1956 are perhaps substantially below their net real earnings of 1942, it is also true that their net dollar earnings did not decrease. In fact, net dollar earnings per trip in 1956 were 20 percent above those of 1942 ($3,518 versus $2,930), and the crew's net dollar earnings per year were 12 percent greater than those of 1942.

More precisely, per-trip gross receipts in 1956 were $1,250 greater than 1942, yet crew expenses were approximately $840 greater in 1956 and net crew earnings were almost $600 larger. It is obvious then that as crew expenses and net earnings were higher by better than $1,400, although gross receipts were higher by only $1,250, no part of the higher gross receipts was obtained by the vessel owner, and the vessel owner actually received less in 1956 than he did in 1942 despite the higher gross receipts of 1956.

Exhibit C

Average Trip Settlement of Large Trawler Operating Out of Boston, 1942 and 1956

	1942		1956	
	Value	Percent	Value	Percent
Value	$7,483	100.0	$8,729	100.0
Joint Expense	207	2.8	290	3.3
Crew Share	3,638	48.6	5,063	58.0
Food	211	2.8	525	6.0
Fuel	334	4.5	739	8.5
Total	708	9.5	1,545	17.9
Net	2,930	39.2	3,518	40.1
Brokers			82	1.0
Total	2,930	39.2	3,600	41.0
Per Man Share		$175		$212
Owner's Share	3,638	47.6	3,376	38.7
Brokers			82	-1.0
Bonus	364	4.8	338	3.9
New Owner	3,274	43.8	2,956	33.8
Number of Trips		31		29

Source: New England Fish Exchange.

The institution of the 60-40 lay has, on the other hand, enabled the crew to avoid any major loss in earnings, despite

Exhibit D is an attempt to illustrate the effect of the higher trip expenses and minimum guarantee (broker payments) upon

the vessel's earning capacity, particularly at low levels of production. In constructing Exhibit D, deductions of joint expenses from gross receipts and the deduction of the captain's bonus from the vessel share were ignored.

produce $5,000 in gross receipts to obtain $1,500. The same earnings were obtained while producing only $3,000 in gross receipts in 1942. The increase in trip expenses and guarantee has then drastically raised the minimum level of per trip

Exhibit D

Effect of Broker Payments on Vessel Earning Capacity, 1942 and 1956

Vessel Operating in 1942

Value	$2,000	$3,000	$4,000	$5,000	$6,000	$7,000
Crew Share	1,000	1,500	2,000	2,500	3,000	3,500
Less Trip	700	700	700	700	700	700
Net Crew	300	800	1,300	1,800	2,300	2,800
Guarantee	480	480	480	480	480	480
Owner's Share	1,000	1,500	2,000	2,500	3,000	3,500
Less Amount to Meet Guarantee	-180					
Net Vessel	820	1,500	2,000	2,500	3,000	3,500

Vessel Operating in 1956

Value	$2,000	$3,000	$4,000	$5,000	$6,000	$7,000
Crew Share 60 percent	1,200	1,800	2,400	3,000	3,600	4,200
Less Trip	1,500	1,500	1,500	1,500	1,500	1,500
Net Crew	-300	300	900	1,500	2,100	2,700
Guarantee	1,960	1,960	1,960	1,960	1,960	1,960
Vessel Share 40 percent	800	1,200	1,600	2,000	2,400	2,800
Less Amount to Meet Guarantee	2,260	1,660	1,060	460		
Vessel's Net	-1,460	-460	540	1,540	2,400	2,800
Vessel's Net (Assuming 1942 lay)	-1,400	-400	540		2,540	3,500

Source: Adapted from data in Exhibit C.

The effect of the increases in these items is obvious. It was possible for a vessel operating in 1942 to realize gross earnings of $820 at per trip levels of only $2,000; in 1956 this was impossible. In 1956, with trip and guarantee payments amounting to approximately $3,600, gross receipts must be approximately $4,000 before the vessel owner takes any part of the gross, and even at this level of productivity the vessel owner would receive less dollars than he did at the $2,000 level in 1942. Under the conditions governing its operations in 1956, a vessel would have to receipts necessary to allow a vessel owner to participate in the returns.

At low levels of gross receipts the change in the lay arrangement produces no effect on the vessel's earnings. If the vessel in 1956 had per trip receipts of $4,000, the vessel owner would have received only $540 whether under a 60-40 or 50-50 lay. At trip receipt levels above $6,000 the vessel owner would be substantially better off if the lay were 50-50. The existence of a 50-50 lay in 1956 would, however, allow the crew to

realize net earnings of only $1,960 (the minimum) at all the revenue levels - ($2,000 through $7,000 per trip).

A comparison of the net per trip crew earnings at various levels of dollar productivity under the conditions which existed prior to 1946, with the per-trip crew earnings under present conditions, illustrates again the changes which took place in the fishery after World War II. Given 1942 trip expenses, we find that under the pre-1946 arrangements the per trip crew earnings increased from $480 (the minimum) to approximately $1,800 as per trip value increased from $2,000 to $5,000. Under conditions as they exist today, however, crew earnings would be approximately $1,960 (the minimum) at all per trip values between $2,000 and $5,000. It appears, then, that between 1942 and 1956 the crew has increased its earning capacity by approximately $1,500 per trip ($1,960-$480) at per trip productivity levels of $2,000, and by about $200 ($1,960 - $1,800) at levels of $5,000, despite the fact that trip expenses in 1956 were more than 100 percent greater than the trip expenses of 1942. At productivity levels of $6,000 and $7,000 per trip, the 1956 crew's earnings would be slightly below those of 1942. At higher levels of per trip productivity, however, say $12,000, the 1956 net crew earnings would approach $5,700, while in 1942 its net earnings would be approximately $5,300. Thus, 1956 earnings would be some $400 larger despite the 100 percent increase in trip expenses.

The crew, by means of the increase in the broker payment has greatly added to its earnings at low levels of per trip productivity. Likewise, with the institution of the 60-40 lay, the crew has increased its earning capacity at high levels of productivity. The crew has increased its earning capacity relative to that of 1942 at all levels of productivity and has succeeded in passing on to the vessel owner the substantial rise in trip expenses. These changes have not only increased the element of risk faced by the vessel's owner at low levels of production but have also reduced the profit possibilities available to the vessel owner at high levels of production.

Exhibit E illustrates a further difference which exists between the Boston fleet of the middle 50's and the fleet as it was in the 1942-1944 period. For the 3-year period, 1942-1944, 60 percent of the vessels made 30 or more trips and 18 percent made more than 35 trips per year. In the 3-year period 1956-58, however, only 24 percent of the vessels made more than 30 trips per year and none made 35 or more.

Exhibit E

Comparison of Trip Activity of Boston Trawlers, Selected Years

Of Trips	1942	1943	1944	Total 3 Years	Percent of Distribution	1956	1957	1958	Total 3 Years	Percent of Distribution
35 or more	7	3	1	11	18					
30-34	5	10	10	25	42	9	5	7	21	24
25-29	5	5	5	15	25	14	15	18	47	55
24 or less	3	2	4	9	15	7	8	3	18	21
				60	100				86	100
Average Number of Trips Per Vessel	31	31	29	30		27	26	27	27	

Source: New England Fish Exchange.

Information concerning the number of trips made during each year 1937-39 [107] was available for many of the 20 vessels which served as the basis for the 1942-44 period. This data indicates that the

[107] The data furnished by the New England Fish Exchange.

activity of these vessels was even higher in the 1937-39 period than it had been during the war time period 1942-44. In each year, 1937-39 inclusive, it appears that approximately 70 percent of these vessels made more than 30 trips per year. This information also indicates that the per vessel activity of the entire large trawler fleet - which was then approximately twice the size (numbers) of the existing fleet - was also substantially above present levels: 50 percent made 30 trips or more in each of the years 1937-39; and at least 11 vessels made 35 or more trips per year in any given year. In 1940, despite a strike-caused work stoppage lasting 3½ months, the average large-trawler made 23 trips per year. There is then some justification for assuming that the present large-trawler fleet is not only smaller but much less active than the large trawler-fleet of 1942-44, and 1937-40.

Costs and Earnings in the Boston Industry: 150-199 Gross-Ton Trawlers

1. Receipts And Productivity

The operating results of the average 150-199 gross-ton trawler for the years 1953-57 are shown in table V-10. A major difficulty facing the operators of this size vessel is the same as that with which the operator of the 200+ gross-ton trawler must contend: the decreasing level of receipts.

Per vessel receipts of the 150-199 gross-ton trawler fell continually over the period: from $173,000 in 1953 to $145,500 in 1957. During this same period total costs of vessel operation also declined steadily: from $170,700 in 1953 to$153,900 in 1957. Receipts declined at a faster rate rate, however, than costs, and the result has been operating losses in each of the years 1954 to 1957. The extent of the general unprofitability of these vessels is further emphasized by the fact that all of the five trawlers included in 1956 had operating losses and only one of the six vessels included in 1957 reported an operating profit.

The much lower receipts and larger losses of these trawlers during 1956 and 1957 are attributable to a decline in per trip productivity. In both of these years, per vessel receipts were approximately $5,800 per trip. In contrast, per vessel receipts averaged $6,400 per trip over the previous three-year period. The additional fact that in every year only 32 percent or less of receipts was available as the vessel owner's share, leads to the conclusion that the productivity levels of vessels of this size are such as to make profits highly vulnerable to the burdens of trip expenses and the minimum guarantee for crew wages.

2. Vessel Expenditures

Vessel expenditures for the 150-199 ton trawlers followed a similar pattern as those for the 200+ ton trawlers, showing an inverse relation to receipts.

a. Gear, Repair, and Maintenance

In the years 1953, 1955, and 1957, expenditures for gear, repair, and maintenance were highest on trawlers with the highest receipts and lowest on those with the lowest receipts, (table V-11). At the same time, these expenditures of individual vessels ranged from $16,000 to $32,000 in 1953, and from $13,000 to $26,000 in 1957. Thus, these trawlers in 1957 were not only less productive, but also were spending less for gear, repair, and maintenance than they were in 1953. Here, again, is evidence of the corroding effect of falling receipts: undermaintenance leading to reduced efficiency, which in turn leads to still lower receipts.

b. Insurance

The rise in insurance expenditures of the trawlers studied was substantial. Per vessel insurance expenditures rose steadily from $8,100 in 1953 to more than $11,500 in 1957. Here, again, however, the pattern is the same: increasing insurance expenditures have accompanied decreasing receipts and decreasing gear, repair, and maintenance expenditures.

Gloucester and Maine Trawlers

The analysis of Gloucester and Maine groundfish trawling operations is based on the eight-year performance, 1950-57, of 10 vessels: 5 in Gloucester and 5 from the Maine ports. The choice of these vessels is not based on statistical procedure but rather on the simple fact that these vessels furnished information to all the

recent investigations into the problems of the New England groundfish industry, and thus operating statements were available for each year through 1957. The decision to investigate the eight year period rests on the discovery of drastic changes which occurred in trawling operations some time during 1953. As a result of these changes, trawler operations of 1953 through 1957 are vastly different from those of 1950-52. Therefore an analysis of the differences which exist in the trawler operations of 1950-52 and trawler operations in the years since 1953 is perhaps the best approach to a discussion of the current problems of trawlers engaged in groundfish operations from these ports.

1. Landings, Receipts And Productivity

It was readily apparent from such a comparison that although in the years since 1953 operating losses or dwindling profits have become characteristics of the groundfish operations of these trawlers, in the years immediately preceeding 1953 their groundfish operations were quite successful. In the years 1950-52 average annual operating profits per vessel of the larger 150-199 gross-ton Gloucester and Maine trawlers represent an annual return of 7 percent and 9.6 percent respectively on the average original vessel cost, while 50-75 gross-ton Maine trawlers returned 11 percent per year and Gloucester 125-149 gross-ton trawlers 9 percent per year on their average original vessel cost, (table V-12).

Such a comparison further revealed that the principal reason for dwindling profits or mounting losses of present day trawler operations is the much lower dollar productivity of trawler operations in the years since 1953.

Average landings per-vessel of the 150-199 gross-ton Gloucester and Maine trawlers, during 1953 through 1957, were 10 to 30 percent under their average annual landings of 1950-52. At the same time the average prices received by trawler operators during these years were from 8 to 18 percent under the average prices of 1950-52, (table V-13).

The smaller 50-75 gross-ton Maine trawlers suffered less from a decline in landings. The decline in average landings per vessel during 1953-1957 of these trawlers was in some years severe: in 1954, average landings were 19 percent below those of 1950-52. Yet, in 1953 average landings were only 1.7 percent less than those of 1950-52, and in 1955 average landings were 3.8 percent higher than those of 1950-52. The average price received in 1955, however, was 28 percent lower than 1950-52, and in 1953 the average price was 17 percent lower than 1950-52.

The largest decrease in landings occurred on 125-149 gross-ton Gloucester trawlers in 1957. Average landings per vessel were 42 percent under the average landings of 1950-52 and in all years, 1953 through 1957, average landings were at least 25 percent below the levels of 1950-52. At the same time, however, during 1953-57 average prices were generally higher by 8 to 33 percent, and in only one year, 1953, was the average price received by 125-149 gross-ton Gloucester trawlers below that of 1950-52.

Average receipts per vessel fell perceptibly in 1953 and have remained at levels substantially below the average annual receipts of 1950-52. From 1953 through 1957 average receipts per vessel of both the larger and smaller Gloucester and Maine trawlers were at least 18 percent below the level of 1950-52, and at various times during the 1953-57 period average receipts per vessel declined by as much as 40 percent from 1950-52 levels, (table V-14).

2. Costs

While certain costs of trawler operations have increased appreciably in the years since 1953, the share system of wage determination and the discretionary element of incurring maintenance expenditures for trawler operations have greatly acted as a check upon mounting costs. In fact, the average total-costs per vessel of all classes of Gloucester and Maine trawlers were lower in the years 1953 through 1957 than the average annual total costs per vessel of 1950-52. In some instances, the average total costs per vessels of certain classes of trawlers operating from the port of Gloucester declined by 30 percent from the levels of 1950-52, (table V-15).

a. Trip Expenditure

Since 1953, rising trip expenditures have become characteristic of the operations of the larger 150-199 gross-ton Gloucester and Maine trawlers and the smaller 50-75 gross-ton Maine trawlers. The average trip expenditures per vessel of the large Maine trawlers were only $1,300 per trip in 1950-52. Yet, from 1953 onward trip expenditures were never lower than $1,800 per trip, and were as high as $2,100 per trip in 1956. The experience of 150-199 gross-ton Gloucester trawler paralleled that of the larger Maine trawler. Average trip-expenditures per vessel for 50-75 gross-ton Maine trawlers increased from $290 per trip in 1950-52 to $333 per trip in 1953 and $377 per trip in 1957, (table V-16).

On the other hand, Gloucester vessels in the 125-149 gross-ton class experienced a decrease in trip expenditures on a trip-by-trip basis from 1953 onward. A percentage distribution of wage receipts per vessel, however, reveals that on all trawlers, trip-expenditures represented a much larger share of trawler receipts from 1953 to 1957 than they did during 1950-52, (table V-17). The distribution further reveals that the rising share of receipts now devoted to trip expenditures has meant a fall in the share of receipts available to the crew. This situation, however, has had little effect on the percentage share of receipts available to the vessel owner.

In general, rising outlays for trip expenditures have then been offset by declining crew earnings. Since 1953 the average per man earnings, on all trawlers operating from Gloucester and Maine ports, remained at levels much below the average per man earnings of 1950-52, (table V-18).

The adverse effects of falling receipts and rising trip expenditures on crew earnings is perhaps the contributing factor to the continued decline in the manning requirements of these trawlers. The average crew size of the larger 150-199 gross-ton Gloucester and Maine trawlers shrank from 11 men and 9 men respectively in 1950-52 to 9 and 7 men in 1956 and 1957. The crew size of the 50-75 gross-ton Maine trawler was reduced from 5 men in 1950-52 to 4 men in 1956 and 1957; that of 125-149 gross-ton Gloucester vessels from 10 men during 1950-52 to 8 men in 1956 and 1957.

The differing crew size of the larger Maine and Gloucester trawler may be attributed to the absence of an effective union organization in the Maine ports and the presence of a union organization, although becoming less and less effective, in Gloucester. The presence or absence of union organization perhaps may also explain why falling receipts and increasing trip expenditures have had no effect on the percentage distribution of receipts in Maine ports. They have, however, slightly, influenced the percentage distributions of receipts in Gloucester. In Gloucester there has been some allocation of trip expenditures either by changing the lay entirely or by including more items under joint expenditures. In either event, the vessel operator assumes an added portion of trip expenditures. 108/

b. Insurance

Insurance expenditures have also increased in the years since 1953. It should be noted, however, that in Boston rising insurance expenditures were associated with falling receipts and crew earnings and so, too, in Gloucester and Maine that this rise in insurance expenditures has accompanied falling receipts and decreasing wages. There is again evidence that falling receipts may well be the cause of an increasing loss experience and an increasing insurance rate. 109/

108/ 125-149 gross-ton trawlers under examination changed successively from a straight "60-40" to a "broker 40" to an "Italian lay". The effect of these changes has been to gradually make all items of trip expenditures "joint expenses".

109/ Many insurance brokers who were interviewed noted that rates are higher in Gloucester than other New England ports due to the higher loss experience of these vessels. It was further asserted that it is extremely difficult to settle claims in Gloucester.

c. Gear, Repair, and Maintenance

Average gear, repair, and maintenance expenditures per vessel show little change during the years 1953 through 1957 and are generally equal to or lower than the average gear, repair, and maintenance expenditures per vessel of 1950-52, (table V-19). The average gear, repair and maintenance expenditures of 125-149 gross-ton Gloucester trawlers during 1953-57 are equal to that of 1950-52 despite an increase in activity of some 6 trips per year during this period. In the years since 1953 the average gear, repair, and maintenance expenditures per vessel of Gloucester and Maine 150-199 gross-ton trawlers were lower than the gear, repair, and maintenance expenditures of 1950-52.

The absences of any increase in gear, repair, and maintenance expenditures at a time of rising costs in Gloucester and Maine repair yards is evidence that trawler operations suffer from undermaintenance which may lead to poor trawling performance, falling receipts, and further undermaintenance. It may also lead to increasing insurance expenditures through inadequate safety standards or the temptation to institute insurance claims for repair work which is a result of normal wear and tear. Either eventuality would result in an increasing loss experience and rising expenditures.

Summary

The New England groundfish fleet is comprised of a heterogeneous group of vessels operating from different ports, engaging in distinct fisheries, and differing in size, construction, gear, and managerial skills. These and many other factors contribute to a vessel's performance. Moreover, these factors are interrelated and interdependent so that it is difficult to develop generalizations applicable to the entire New England groundfish fleet, despite the fact that certain developments may affect them all.

Trawler operations in the New England area have been generally highly unprofitable in the years since 1953. The chief reason for this unprofitability was the level of receipts which prevailed during this time. Although certain items of expenditures were steadily increasing, total expenditures changed very little. Falling receipts were met with decreasing total expenditures.

The much higher level of receipts on the more successful Boston trawler and the low level of receipts of the less successful trawler, 200 gross-tons and larger, were responsible for the profitable operations of the former and the unprofitable operations of the latter. The total expenditures of the more successful trawler were substantially higher than those of the less successful.

The low level of receipts of the less successful trawler was a result of its inactivity, its lower per trip productivity, and its lighter landings.

Admittedly, trawler operations in most instances have also been adversely affected by rising trip expenditures, which are up substantially. The combination of inadequate receipts and rising trip expenditures has had a profound effect on trawler operations in Boston, where the existence of the broker payment ($12 per day per man) makes all trip expenditures, including wages, highly inflexible at low levels of receipts. As a result, at low levels of receipts vessel owners may discover that after payment of all trip expenditures, including wages, they have little left with which to defray other expenses such as gear, repair, and maintenance.

In Gloucester and Maine ports, trawler operations were most effected by the substantial reduction in receipts which occurred in 1953 and the low level of receipts which prevailed in the years since 1953. Total expenditures changed very little during these years. Lighter landings and lower prices were responsible for the sharp reduction in receipts.

Even in Gloucester, where there is no broker payment, vessel owners found themselves faced with a reallocation of trip expenditures between crew and vessel, or an entirely new sharing arrangement as a result of falling receipts and rising trip expenditures. They, too, now bear a heavier portion of trip expenditures.

Insurance expenditures were generally higher in all ports. Rising insurance

expenditures were generally associated with decreasing receipts and falling gear, repair, and maintenance expenditures. This was particularly evident from the contrasting behavior of insurance expenditures of the more and less successful Boston trawlers, 200 gross-tons and larger. Insurance expenditures were not increasing on the more successful trawlers.

There was also a higher degree of association between receipts and gear, repair, and maintenance expenditures within any given year: high receipts meant high expenditures. The level of receipts in a particular year affects not only the present profitability of trawlers but may also affect their future profitability.

CHAPTER VI

COMPARATIVE COSTS IN THE CANADIAN AND NEW ENGLAND GROUNDFISH INDUSTRIES

Introduction

In this chapter, costs and earnings in New England groundfish ports - individually and collectively - will be compared with those of the Canadian groundfish industry in an attempt to discover the underlying differences in the two fisheries.

Sources of Advantage of the Canadian Groundfishery

The data supplied to us from New England and the Atlantic Provinces of Canada indicates that the principal sources of the advantages of the Canadian industry and the problems of the New England industry are the geographic, historical, and organizational differences which exist in fisheries of the two regions.

1. Geographic Factors

The Canadian groundfish industry, centered in the Atlantic Provinces, is adjacent to almost all of the major fishing grounds of the Northwest Atlantic, grounds which abound with heavy concentrations of the many species of groundfish. New England, on the other hand, is in close proximity only to the Gulf of Maine, Georges Bank and Browns Bank, and is far removed from the more productive fishing grounds: the Grand Bank, the Gulf of St. Lawrence, and the coast of Labrador. New England's location relative to the more proximate fishing grounds is one of the major factors making for the highly specialized fisheries characteristic of the respective ports. The dangers of too great dependence on one species has been demonstrated by the effect on the Boston fleet of the decline in the abundance of haddock on Georges Bank, and by the effect of the fall in the abundance level of ocean perch in the Gulf of Maine on the Gloucester and Maine port vessels. These two developments have caused both of these fisheries to become higher-cost enterprises.

In sharp contrast to his New England counterpart, the Canadian trawler operator, because of his proximity to the prolific adjacent banks, can engage in a diversified groundfish fishery. Data furnished by Canadian trawler-owners reveals that, for the average Canadian trawler, haddock accounts for 40 percent of annual landings, ocean perch for 25 percent, cod for 10 percent, and flounder for 20 percent. Compare this to the average large trawler in New England, the great bulk of whose annual landings is either haddock or ocean perch, and the remainder are species caught incidentally to these.

Not only does the advantageous location allow Canadian trawlers to engage in a diversified fishery. They also are engaged in a more productive fishery, both in terms of catch per day and annual landings, relative to New England trawlers. In both 1956 and 1957 the average large Canadian trawler landed about twice the poundage of groundfish as did the average New England trawler, (table VI-1). Similarly, Canadian trawlers, because they are closer to the grounds, can make more trips than can New England vessels. In 1956 and 1957, Canadian trawlers of the 200 gross-ton class averaged 3 to 5 more trips than did comparable Boston vessels. The differences in activity of the 150-199 ton vessels was even greater. Canadian vessels made 15 more trips than did Boston vessels, 20 more than Gloucester vessels, and 25 more than Maine vessels, (table VI-2). Not all of the relative inactivity of New England trawlers, however, can be attributed to their locational disadvantage. Trawler activity on many vessels in Gloucester, and on all the large vessels in Boston, is to a degree controlled by the layover requirements of the union. This is discussed below.

2. Historical Factors

The differences in the historical development of the New England and Atlantic Provinces groundfisheries have also had their effects on costs.

The groundfish trawling industry of New England is much older than that of Canada. Its development has been sporadic, conditioned by precedent. The large trawler was first introduced in Boston in

1905, and Boston soon became the major groundfish port. The development of quick freezing and filleting in the 1920's greatly increased the market for Boston groundfish. Not until 1935, when the Midwestern market for ocean perch developed, did Gloucester and Maine vessels enter the groundfish fillet industry.

Precedent thus established, the Boston large trawler today is exclusively concerned with haddock, and those of Gloucester and Maine ports with ocean perch. It is not likely that this specialization will be diminished, since a number of factors tend to sustain it: the proximity of Boston to Georges Bank; the proximity of Maine ports to the Gulf of Maine; market preferences; the large fresh-market for haddock; and the transportation facilities available in Boston. 110/

The development of the large-trawler fleet and the groundfish industry of Canada, on the other hand, is a postwar phenomenon based principally on the rising acceptance of frozen groundfish fillets in the Midwestern markets of the United States and the market growth of the pre-cooked fish stick (processed by United States firms from imported fish blocks) in all areas of the United States. The Canadian industry is based on export and a frozen product. The growth and development of the Canadian large-trawler fleet was occasioned by the realization among processors of the need for large supplies of groundfish and their desire for control of both the supply and cost of the raw product. 111/

Other factors also tend to reinforce the diversified groundfishery in the Canadian industry. Chief among these is the fact that, far removed from the major markets of Canada and the United States, it must deal in a frozen product. Consequently, the Canadian industry is primarily concerned with the production of frozen fillets and fish blocks. Particularly for the latter product there is little consumer preference for one species over another. In addition, the concentration of ownership in the Canadian industry and the facilities available at major Canadian ports also argue well for diversified fishing.

3. Structural Differences Of The Canadian And New England Industries

Perhaps the greatest and most important difference between the fisheries of the two areas lies in their respective structures.

In general, the New England industry is composed of a large number of small firms solely engaged in either operation of vessels or in processing. Although a few firms are engaged in both functions, they are nonetheless not vertically integrated. 112/ Thus the vessel owner sells to an independent processor; the price, in large measure, being determined by the forces of supply and demand.

The industry in the Atlantic Provinces, however, is characterized by a few large vertically-integrated firms which are able to exert a great deal of influence on price. In effect, the processor is "buying" from himself. When he buys the catch of vessels other than his own, he also can exert a downward pressure on the price paid because of his concentrated buying power. 113/

110/ See White, Donald J. The New England Fishing Industry. Harvard University Press, Cambridge, 1954. (Especially Chapter III).

111/ The nature of the economy of the Atlantic Provinces has also been a factor in the development of the Canadian fishing and processing industry. For a detailed discussion of this development, see Chapter II.

112/ While vertical integration of vessel owner and processor has been successfully curtailed in the port of Boston by virtue of a federal court decision rendered in 1918, there is evidence that in the Maine ports, particularly in the port of Rockland, where one large firm owns and operates vessels and a freezing and filleting plant, because of buyer concentrations and in the absence of a selling room, (auction system) groundfish operations are becoming more and more integrated. Even the Gloucester industry may eventually tend toward integrated operations as a result of the waning union strength and the continued decline in the number of both vessels and processing firms.

113/ Report of the Royal Commission on Price Spreads of Food Products, Vol. I. Queen's Printer and Controller of Stationery. Ottawa, 1959, p. 76.

A further major difference between the two industries lies in the organization of New England fishermen and the complete lack of organization in the Atlantic Provinces. Union requirements as to lay arrangements, layovers, and broker payments tend to make costs on New England trawlers more inflexible. Furthermore, labor is the largest item of cost in this region, and is not very amenable to wage reduction. The Canadian industry, however, insulated from labor organization by law and located in an area of labor surplus, is completely unfettered by such union requirements. Thus, Canadian firms have a great deal of discretion both in regard to prices paid and costs incurred.

Effect on Costs of Geographic and Structural Differences

The factors outlined above all concur to give the Canadian industry a decided advantage over the New England industry. These advantages are reflected mainly in the much higher landings and lower trip and vessel expenditures of Canadian trawlers.

1. Landings

The greater landings of the Canadian trawler, relative to its New England counterpart, were discussed above. We have noted that the Canadian fleet is closer to the more productive grounds and can make more trips per year than can a New England trawler. It is able to do so not only because of proximity but also because of the absence of mandatory layover requirements. In this connection, Gloucester owners speculate that in the absence of the 4-day layover requirement between trips on ocean perch vessels, they could increase their trip activity to 25 trips per year. This would be a substantial improvement over their annual activity of 19 trips in each of the years 1956 and 1957. Since many large-trawlers in Boston in the years 1937 to 1941 averaged 35 or more trips per year, while today few make more than 30, there is evidence that the layover requirement (3 days on haddock vessels) has also substantially altered their trip activity.

2. Trip Expenditures

Structural differences in the industries of Canada and New England may be credited with much of the lower per-trip expenditures of the Canadian trawler and the much higher expenditures of the New England-based trawler. A large part of trip expenditures on New England trawlers represents cash outlays, payable at the conclusion of each trip, for commission fees, wages "of lumpers," rent of scales, welfare fund contributions, etc. Such payments are avoided by Canadian trawler owners, since large integrated owners pay no one a commission fee and make no contribution to a welfare fund. Furthermore, because of the nature of the integrated operation, the Canadian owner can, and generally does, charge off certain trip expenditures to operations other than the trawler itself.

Another facet of the structural influence on trip expenditures is indicated by the expenditures for fuel, ice, and food on Boston large trawlers and those of Canada. The large-trawlers operating out of Boston engaged exclusively in the Georges - Browns Banks haddock fishery do not-at least in terms of "days absent per trip,"- suffer from any geographic disadvantage. Both Boston and Canadian trawlers are absent from port for approximately 9 days. Also, Boston-based large trawlers, of the 200 gross-tons and over class, are generally of smaller gross tonnage and lower engine horsepower than Canadian trawlers of the same classification. Despite the absence of a geographic disadvantage and their smaller size and lower landings, fuel and ice expenditures of these Boston trawlers equal the fuel and ice expenditures of the much larger Canadian Vessels. The fuel and ice expenditures of Boston trawlers of the 150-199 gross tons class are substantially above those of Canadian trawlers of the like classification, (table VI-3). This is indicative of the fact that economies of scale are available to the large integrated firm. The substabtially lower per-man food expenditures of the Canadian trawlers again indicate the advantages of concentrated buying power or the willingness of Canadian fishermen to be satisfied with less expensive food than fishermen of the New England area, (table VI-4).

The major cost advantage enjoyed by the Canadian trawler operators is their

much lower wage payments. The annual net earnings of Canadian trawler fishermen are substantially below those in the New England area. Newfoundland trawler fishermen earned approximately $2,300 in 1956 and $2,100 in 1957. Many trawler fishermen earned less. Annual net earnings on Newfoundland trawlers ranged from a low of $1,900 to a high of $3,000 in 1956, and from $1,600 to $2,600 in 1957. Nova Scotian trawler fishermen earned approximately $3,500 in 1956, and $2,500 in 1957; fishermen earnings of individual trawlers ranged from $2,200 to $4,300 in both 1956 and 1957, (tables VI-5 and VI-6).

In sharp contrast, Boston trawler fishermen earned $5,100 in 1956 and $5,200 in 1957 on trawlers larger than 200 gross-tons. On 150-199 gross-tons trawlers, fishermen earned approximately $4,000 in 1956 and 1957. The range in Boston trawler fishermen earnings for both 1956 and 1957 was $2,000 to more than $9,000. The average earnings of large-trawler crewmen in Gloucester and Maine ports were also above crewmen earnings of Canadian large trawlers. Large-trawler average earnings in Gloucester were $4,900 per man in 1956 and $4,300 in 1957; in Maine they were $3,400 in 1956 and $4,000 in 1957, (tables VI-5 and VI-6).

3. Vessel Expenditures

a. Gear, Repair and Maintenance

Although unit costs of gear, repair, maintenance, insurance, and other vessel expenditures of the Canadian trawler are significantly lower than that of the New England trawler due to superior productivity, the actual dollar outlay of the Canadian trawler for these items is not necessarily lower than that of New England trawlers, (tables VI-7, VI-7a, and VI-7b). In fact, total vessel expenditures of the Canadian trawler are generally on a par with total vessel expenditures of the New England trawler, which again indicates that the major advantages of the Canadian trawler operator lie in the area of appreciably higher landings and much lower trip expenditures, including wage payments.

It is difficult to conclude that the Canadian trawlers benefit from cost savings resulting from lower dollar outlays for gear, repair, and maintenance in view of the lack of any large differential in the expenditures for these items between the Canadian vessel and similar sized New England trawlers. Gear, repair, and maintenance expenditures of Canadian trawlers of 150-199 gross tons were, in fact, higher than similar sized New England vessels in both 1956 and 1957, (tables VI-7a and VI-7b).

The activity and landings of the Canadian trawlers perhaps indicate that Canadian vessels are much more susceptible to wear and tear. Canadian vessels are subject to rather rigid annual inspections by the Canadian Steamship Inspectors. There are, then, upward influences on gear, repair, and maintenance expenditures of Canadian trawlers which are not present on New England trawlers due to their relative inactivity, lower landings, and the absence of any rigid inspection.

New England trawlers may actually be underspending, particularly on repair and maintenance, due to the lack of any rigid inspection system. This conclusion has been reached by many Canadian buyers of New England trawlers who contend that extensive repairs are necessary on these vessels before they conform to the acceptance standards of the C.S.I. Many local insurers of New England vessels also feel that New England trawlers are undermaintained and lack proper safety equipment.

The economies of scale available to the large integrated operation through concentrated buying power, ability to carry large inventories and maintain its own repair crews, perhaps counteracts the upward influence of activity and inspection on maintenance expenditures. They also partially explain why repair and maintenance expenditures of the Canadian vessel are not substantially higher than those expenditures on New England trawlers which are relatively inactive and which

in the opinion of many are undermaintained. Canadian trawlers benefit also from preferential treatment on supplies obtained from other commonwealth countries - particularly gear from England - and by the fact that labor costs in Canadian yards are lower than those of New England yards.

Despite the lower labor rates of Canadian yards and the absence of the advantages of concentration and integration in New England, it is doubtful whether an individual trawler operating from the Atlantic Provinces would benefit from any substantial cost advantage over comparable New England trawlers from lower repair and maintenance expenses, since most repair parts are purchased from the United States. The costs of repair parts, after tariff and transportation charges, would necessarily be higher to the Canadian operator.

b. Insurance

The lower insurance expenditures of the Canadian vessel relative to New England vessels may be primarily attributed to the lower coverage limits and costs of protection and indemnity insurance of Canadian trawlers.

Coverage limits of P and I insurance on trawlers operating from the Atlantic Provinces were between $100,000 and $150,000 per vessel, 114/ while in New England the coverage limits of P and I insurance are between $300,000 and $500,000 per vessel on both Boston and Gloucester vessels, and $200,000 to $350,000 per vessel on Maine trawlers. 115/

The cost of such insurance was only $150 to $250 per man for Canadian trawlers; while in the New England area, the cost of P and I insurance ranged from $300 to over a $1,000 per man.

The substantial difference in the coverage limits of protection and indemnity insurance between the two areas is due to the differing legal situations facing trawler operators. Canadian fishermen are covered by the Workmen's Compensation Act which expressly spells out the trawler operator's liability. On the other hand, New England fishermen are excluded from coverage under workmen's compensation but are included under the Jones Act. The New England trawler operator, operating within the confines of the Jones Act, is faced with an unlimited liability as the Act fails to specifically state the limits of the owner's liability; and in reality the trawler operator's liability is often determined by jury trial. 116/

Whether New England trawler operators would benefit from lower insurance costs by the inclusion of fishermen under a Workmen's Compensation Act is open to some argument, since many insurance brokers agree with a statement by one of their number that "The Workmen's Compensation Act is a high-cost proposition in Massachusetts." The cost to the owner might even be higher under the Act than it is at present.

c. Other Vessel Expenditures

Differences in accounting procedures are perhaps responsible for the variations in administrative and other expenditures. Although nothing is known of the items included in this category on Canadian trawlers, a large portion of administrative and other expenditures of Boston-based trawlers consists of corporate officer's salaries. Such salaries amounted to approximately $11,000 in both 1956 and 1957 on the large (200 gross-ton) trawlers. This amount is exclusive of the wages paid to the shore captain, which averaged $4,000 per year in both 1956 and 1957. Corporate officer's salaries are not generally included in the

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114/ Information supplied by Canadian trawler owners.
115/ Information supplied by New England insurance brokers.
116/ For a discussion of the Jones Act and its ramifications, see Danforth, Warner C. and Theodore, Chris A., Hull Insurance and Protection and Indemnity Insurance of Commercial Fishing Vessels, United States Department of the Interior, Special Scientific Report--Fisheries No. 241. Washington, D.C., 1957.

operating expenses of Maine trawlers, and are much lower on Gloucester trawlers. In any event, the discretionary element in this cost item is large and the differences which exist may be best attributed to differences in accounting procedures.

Summary

The comparison of the financial experience of large groundfish trawlers operating from the Atlantic Provinces and the various New England ports quickly reveals the much lower costs of Canadian groundfish operations. It further reveals the significant cost differentials even among trawler operations within the New England area. The costs of Maine and Gloucester trawlers are substantially less than those of Boston trawlers.

The costs of trawler operations of the Atlantic Provinces and New England are influenced by many factors: the location of the centers of trawler operations relative to the major fishing grounds; the type of fishery conducted; the structure of the groundfish industry of the respective areas; and the economic climate of the region in which the industry is located. These factors, and their interdependence, are responsible for both the significantly lower costs of the Canadian vessel and the large differences in the costs of trawler operations within the New England area.

Canadian trawler operators have large and very real advantages relative to the large-trawler operators of the New England area. The most notable are the higher landings, lower wage payments, and lower running costs of the Canadian trawler. The superior productivity and lower costs of the Canadian trawler are, however, reflected neither in higher receipts nor more profitable operations. In fact, the financial experience of the Canadian trawler owner indicates that his vessel produces much less revenue and incurs much higher losses than its New England counterpart.

This paradox, that New England large trawlers, landing less at higher costs, produce more revenue with smaller losses than Canadian large trawlers, is illustrative of the structural differences in the groundfish industries of the respective areas. The New England industry is made up of a series of ports, each specializing in a particular species of groundfish. It is also characterized by a large number of nonintegrated firms engaged solely in trawler operations or processing. The Canadian industry is made up of multi-species vessels owned by, and selling to, the vertically-integrated processor who produces for the frozen-export market and often "buys" raw material from himself.

The historical development and ultimate structure of the New England groundfish industry tends to sustain and insure the continuation of port specialization of the New England trawler, at least under present conditions, while the development and ultimate structure of the Canadian industry would appear to insure the nonspecialization of Canadian trawler operations.

CHAPTER VII

RESOURCES AND PRODUCTIVITY

Introduction

In examining the status of the fishery resources, present and future, two facts must constantly be kept in mind:

(1) The deep-sea fisheries are a common-property resource; that is, the grounds are owned by no one, but are there to be fished by all; and,

(2) The practical policy of "fisheries management" is to benefit man, not fish.

While these two propositions seem self-evident, their implications have at times been largely suppressed, if not ignored.

As to the first, the common-property nature of the deep-sea fisheries is not unique and similar problems are encountered in other cases of common-property resource industries, such as petroleum production, and hunting and trapping. The dissipation of the potential net yield of the resources is common to all such industries, and is usually guarded against by some form of regulatory action.

This brings us to the second proposition. What should be the objective of such regulation? For whose benefit should it be intended? What form should regulation take? The answer to the second question posed is, of course, provided directly by the statement of the second proposition itself. The answers to the questions about the objective and the form regulation should take are not so easily formulated.

The great bulk of research on the problem has centered on the question of "net yield," and, more specifically, net physical yield. In other words, it has been largely biological research focused on the maximization of the catch. Such an approach, however, is concerned mainly (if not solely) with output, and neglects the inputs of other factors of production which are used up in fishing and must be accounted for as costs.

The more critical factor, then, is "net economic yield," which equates production with cost of production and takes cognizance of the economics involved in the fishing industry. Only when the net economic yield is maximized will we attain the optimum degree of utilization of any particular fishing ground.

It will be the purpose of this chapter to investigate the current and future state of the various groundfish resources in the light of the foregoing discussion. The most recent productivity experiences on the principal banks fished will then be analyzed.

Current and Future Groundfish Resources

The current rate of utilization of groundfish and the long-term prospects for groundfish stocks were estimated by the Gordon Commission in its recent report on the Canadian fisheries.[117] The report indicates that in the future, prospective stocks will be below current levels (1955), but that catches will increase due to more efficient utilization of the resources.[118] The rationale of the future catch estimates will be seen as the major species are discussed.

1. Cod

Cod is the mainstay of the Newfoundland fishery. In 1958, Newfoundland landed 301 million pounds of cod [119] or 66 percent of all cod landings in the Atlantic Provinces of Canada. Cod comprised 84 percent of all groundfish landings in Newfoundland. The bulk of these landings came from ICNAF Subarea 3, which comprises both the inshore fishing grounds and the offshore Grand Banks grounds. An increasing proportion of

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117/ The Commercial Fisheries of Canada, prepared by the Department of Fisheries of Canada and Fisheries Research Board, for the Royal Commission on Canada's Economic Prospects, Ottawa, 1956.

118/ Ibid., p. 12

119/ Monthly Review of Candian Fisheries Statistics, December 1958. Dominion Bureau of Statistics. Queen's Printer, Ottawa, 1959.

the Canadian production of cod has been landed from Subarea 3, and Canadian fishermen are now abandoning Subarea 2 as a fishing ground, as other countries have been moving in, (table VII-1). Participation by European countries in the Subarea 3 fishery has increased rapidly since World War II, so that they now take about half the catch.

The Royal Commission estimated that the stock of Subareas 2 and 3, based on 1951-54 average landings, was some 5.6 billion pounds, of which Canada utilized 500 million pounds and other countries utilized 300 million pounds. It is expected that by 1980 the stock will decline to 5 billion pounds, but that utilization will increase to 600 million pounds by Canada and 400 million pounds by other countries. Such an estimate takes cognizance of two trends. First, the recent decline of the Canadian catch is due to a fall in production of salt cod. The wet fish fishery has increased, but not as rapidly as the salt fish industry has declined. It is expected that salt fish production will continue to decline in the immediate future, since its production by present methods is only possible on the basis of a very low landed value for the raw material. As production of wet fish increases, however, and mechanical drying methods are utilized, the catch of cod will rise above present levels. Second, since salt fish is a very important part of the protein diet of the European nations which fish the Subareas, they will undoubtedly subsidize their fishermen and ships, and regulate their imports and the price of salt fish to the advantage of their own salt fish producers and consumers, and to the disadvantage of other producing countries. Hence, the European nations will in future take a larger proportion of the cod landed in the Subareas.

Because of the foregoing and the fact that the present stocks of Subarea 3 are probably only moderately exploited, the Royal Commission expects that total Canadian catch could be doubled if markets were available, if landed prices were a little higher, if the Labrador stocks were used fully, and if Canadians prosecuted the offshore fishery vigorously. The more realistic prediction, however, is that the Canadian catch will at first decline somewhat because of the reduction in fish salted, and then gradually come back and rise above present levels by 1960 mainly because of increased use of cod for filleting. This forecast assumes that European competition will not become much greater than at present.

Based on the latest available figures, the prediction of a short-term decline in cod landings from Subareas 2 and 3 is a valid one. Landings, based on 1951-54 averages in the Royal Commission study, were 500 million pounds by Canada and 300 million pounds by other countries. Using average landings for the period 1954-56, it is seen that utilization by Canada had fallen to a level of 400 million pounds, and that of other countries had risen to 400 million pounds. Thus, while the total landings remained the same, Canadian landings made up a smaller part of the total. It is not unreasonable then, to expect that the estimates for 1980 are on the conservative side, and that landings might be higher than expected, with European trawlers landing a higher proportion of the total than forecast.

In Subarea 4, cod are common at the mouth of the Bay of Fundy, on inshore and offshore Nova Scotian grounds, and throughout the Gulf of St. Lawrence. It is estimated that the present stock is some 1.2 billion pounds and that this will increase to 1.5 billion pounds by 1980. Based on 1953-54, utilization amounted to about 310 million pounds: 210 million by Canada and 100 million by other countries. It is expected that this utilization will increase to 370 million pounds by 1980; 250 million pounds by Canada and 120 million pounds by other countries.

The best available statistics of the Subarea 4 catch are given in table VII-2. The annual yield has varied from 327 to 437 million pounds (all countries), and the Canadian share of the catch has varied from 204 to 291 million pounds during the period 1953-56. The catch taken by United States trawlers has fallen to a level where it is insignificant, but the European catch is becoming a larger and larger share of the total. By improving fishing methods and quality of products, however, Canada should continue to take the greatest share of the catch from this Subarea.

Based on 1955-56 averages, the annual catch by Canada from Subarea 4 was in the

neighborhood of 250 million pounds, and that of other countries had already grown to 140 million pounds. If the rate of utilization remains the same as that of 1954 and the stock increases as expected, about 400 million pounds could be taken annually from Subarea 4 on a sustained yield basis, and Canada should continue to take the greatest share of the catch.

2. Haddock

The center of abundance and of the commercial fishery for haddock in Canadian Atlantic waters is in the inshore and offshore waters of Nova Scotia. Haddock are at the northern limit of their occurrence in commercial quantities in the southern part of Subarea 3 (the Grand Bank); consequently, in this area their abundance is largely at the mercy of climatic trends.

The Royal Commission estimates the rate of removal in Subarea 3 at about 40 percent. On that basis, it estimated the stock in 1954 to be about 240 million pounds. Average landings in 1953-54 amounted to some 100 million pounds; 50 million by Canada and 50 million by other countries. By the period 1955-56, however, these average landings had doubled, evidencing a large increase in the stock and an increase in fishing effort, (table VII-3). It is likely, though not proven, that much of the increase in haddock stock in Subarea 3 was a result of warming of the ocean since the late 1920's. However, the subsequent return to cooler temperatures, if it does occur and if it continues, could reduce the stock and catch considerably. It is expected,therefore, that by 1980 the stock of Subarea 3 will be only 120 million pounds, and that landings will drop to some 50 million pounds, with Canada taking half of the harvest.

The annual landings of haddock have remained fairly constant over the past 25 years, (table VII-4). The proportion landed by Canada, however, has been growing constantly. In the period 1931-35, Canada accounted for only 37 percent of total landings from the area; by 1956 this had grown to 70 percent. This increase by Canada, especially during the post-war years, is attributable to a growing fleet of Canadian otter-trawlers and to an increase in the size of the stocks resulting (probably) from more favorable water temperatures.

While it is expected that the stock of haddock in Subarea 4 will decline 10 percent to a level of about 220 million pounds by 1980, total landings should increase slightly due to the program of mesh regulation. Landings of about 115 million pounds may be anticipated by 1980, with Canada landing 70 million pounds of the total, and United States' landings remaining about the same as in recent years, between 40 and 45 million pounds.

3. Ocean Perch

The fishery for ocean perch is a recent development in Canada. It was begun in the United States by New England trawlers in the 1930's in local waters, but as local supplies were reduced the fishery gradually extended northward. Canadian landings of ocean perch were not too significant until 1951, when 38 million pounds were landed from ICNAF Subarea 3, mostly from the eastern slope of the Grand Bank. Since that year, however, Canadian landings from that Subarea have continually declined, reaching a low of 7.9 million pounds in 1956. The decline has been largely due to a concentration of the Canadian fleet on haddock, and some transfer of Newfoundland effort in ocean perch fishing to the more prolific grounds of the Gulf of St. Lawrence. There has also been a drop in abundance of ocean perch on the Newfoundland fishing grounds on the eastern slope of the Grand Bank.

The average Canadian catch of ocean perch from Subarea 3 has dropped considerably from the 1952-54 figure of 24 million pounds used by the Royal Commission. Based on the 1955-56 average, landings have fallen to about 8 million pounds annually. The same is true of average landings by United States trawlers from the Subarea, which fell from 69 million pounds in the 1952-54 period to 29 million pounds in 1955-56, (table VII-5). This reflects the fact that the fishery in the area is still in the stage of removal of accumulated stock. Because of the long period of growth required, there has not been time for the exploited stocks to respond to fishing by increased recruitment. It is expected, however, that total production will return to the 1952-54 level of 90 million pounds by 1980 since the addition of new grounds will compensate for the reduced yields on

the grounds presently fished. At that time, Canada's proximity to the more northern stocks, which will then be fished, will mean that Canada's share of the catch will be 50 percent rather than the present 22 percent.

The Canadian catch of ocean perch from Subarea 4 has shown a steady increase since 1953, the first year of any significant landings by Canada in the area. Here again, however, it is a condition of removal of accumulated stock, and landings will soon depend on annual recruitment and growth. Since 1953, Canadian landings have accounted for 30 percent of total landings from the area, (table VII-6). If the current rate of fishing continues, it is expected that by 1980 the stock will fall to 350 million pounds, with average landings of about 50 million pounds. Of this, Canada will probably take 50 percent, or 25 million pounds.

4. Pollock

Pollock is common in the southern part of ICNAF Subarea 4, and ranges north to the southern Grand Bank and St. Pierre Bank in Subarea 3. The largest catches are made at the mouth of the Bay of Fundy. The stock of pollock was estimated at about 200 million pounds in 1955. Canada lands 32 million of the 40 million pounds annually caught.

Spurred by increased marketability, increased utilization will likely increase the pollock catch in the immediate future possibly to 60 or 70 million pounds. If the cooler temperatures predicted for 1980 actually occur, however, there will be some restriction of range and abundance, so that total production then is estimated as only 50 million pounds a year. At that time, the level of stock will be about 160 million pounds.

5. Whiting (Silver Hake)

Whiting is of no commercial importance to the Canadian fishery, or is it expected to become so in the future. Although it is abundant in the southern part of Subarea 4, whiting has not been exploited by Canada or any other nation in these waters since it quickly becomes soft under ice. The recently increased landings of whiting by United States trawlers has been from the catch in Subarea 5, (cf.page 58, Chapter IV).

At any rate, the 1955 stock of 100 million pounds in Subarea 4 was, for all practical purposes, unutilized, and it is expected that the lower water temperatures predicted for the future will reduce this stock to about 60 million pounds by 1980. At that time, total landings from the area might be 10 million pounds annually, and half this amount might be landed by Canada.

6. Cusk

Cusk is taken on all fishing banks incidentally to catches of other groundfish species. It is of some commercial importance in Subarea 4, but is rarely encountered farther north. Since the species tends to frequent rocky areas where dragging is difficult, the rate of exploitation is low, and it is expected that the stock in 1980 will be at the same level as in the period 1951-54, 30 million pounds. Current landings of about 2 million pounds may increase to about 4 million pounds by 1980, of which at least 3 million pounds may be expected to be taken by Canada.

Summary

The current levels of stocks and catch trends, by species, and those of the future are summed up in table VII-7. With one exception, the stocks of the major groundfish species are expected to decrease. It is anticipated that the stock of cusk will remain at the current level due to its low level of exploitation. On the other hand, with the major exception of haddock, the probable catch trend of all species will increase.

Productivity of the Principal Fishing Grounds

If an intelligent comparison is to be made of the relative efficiencies of the groundfish industries of New England and the Atlantic Provinces, estimates must be made of the productivity of the banks fished by each country. Chapter III attempted such an estimate for Georges Bank, the chief source of New England haddock resource. It is the purpose of this section to investigate the productivity of the other major banks fished for haddock and ocean perch. 120/

120/ Productivity figures will pertain only to large otter trawlers; i.e., those classified by ICNAF in the 150-500 gross ton group.

1. Grand Bank

The Grand Bank (ICNAF Subarea 3) is a major source of both haddock and ocean perch, and is of primary importance to the Newfoundland fishery. Virtually all the haddock landed in Newfoundland in 1957 came from these grounds, (table VII-8). Similarly, almost half of all ocean perch landed in Newfoundland in 1957 was caught on the Grand Bank. Although these grounds are of much less importance to the Nova Scotia fleet, they do account for roughly one-fifth of all haddock landed at Nova Scotia ports.

Although the data in table VII-9 are limited and extend back only a few years, they indicate that these fishing grounds are among the most productive of the Northwest Atlantic. In 1956 and 1957, for example, Nova Scotian large-trawlers averaged some 18,000 pounds of haddock per-day fished, and Newfoundland large-trawlers averaged about 34,000 pounds per day. Ocean perch productivity is even higher. New England large-trawlers, which account for the heaviest landings of ocean perch from the Grand Bank, had average catches of 66,000 pounds per day in 1956 and 77,000 pounds per day in 1957. The major reason for such high figures for ocean perch seems to be that the fishery is not based upon the removal of accumulated stock, as is the case in the Gulf of St. Lawrence and the Nova Scotia grounds. The belief is that there exist large pelagic stocks of ocean perch which come onto the Bank from the ocean, replacing the fish removed. There is no scientific evidence, however, to confirm this belief.

Besides Canada and the United States the fishery on the Grand Bank is also prosecuted vigorously by Spain and, in 1957, by the U. S. S. R. In 1957, Spanish trawlers landed over 64 million pounds of haddock on the Grand Bank. The Russian factory ship, which made 65 trips into the grounds in 1957, fished principally the ocean perch stocks, landing 108 million pounds of that species. In terms of catch per day fished, the productivity experience of the Russian trawler was over 42,000 pounds per day of ocean perch. The Spanish fleet, consisting of trawlers in the 900 to 1,800 ton class, and fishing principally for cod, averaged a catch of 15,000 pounds of haddock per day fished on the Grand Bank in 1957.

It is evident that competition for haddock and ocean perch on the Grand Bank among Canadian, United States, and European trawlers is growing. As noted earlier, the Mediterranean nations will subsidize their fleets and regulate their imports because of their dependence on salt fish as a protein food. Consequently, it may be expected that they will increase their efforts on the highly productive Grand Bank. It is not expected, however, that this will seriously decrease the Canadian rate of productivity in the immediate future. Whether such effect will ensue in later years will depend on a number of factors, including the actual increase in fishing effort expended, and the rate of recruitment of the stock.

2. Nova Scotia Banks

The Nova Scotia Banks (ICNAF Subdivisions 4U, 4W, and 4X) are fished principally by Nova Scotia and the United States. Landings from these banks by Newfoundland trawlers are negligible, and Spain is the only other country to land any appreciable amount of groundfish (cod) from the area.

These banks are the principal haddock grounds fished by Nova Scotia. Three-fourths of all haddock landed in the Province in 1957 came from the adjacent banks, (table VII-8). In fact, Nova Scotia has almost exclusive domain of the haddock fishery in the area. The only other country prosecuting the banks, the United States, fishes there principally for ocean perch and secondarily for haddock.

In recent years, the haddock productivity of the Nova Scotia Banks has been increasing. In 1953, catch per day fished amounted to 9,000 pounds. By 1957 this figure had increased to almost 16,000 pounds. This was accompanied by an increase in effort from 1,593 days fished [121] to 2,531 days fished. [122] These figures are indicative of the efficacy of the proposition that the optimum amount of fishing effort will maintain and may increase the level or productivity. It must

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121/ ICNAF Statistical Volume for the year 1953.

122/ ICNAF Statistical Volume for the year 1957.

be emphasized, however, that the data are very limited and are only indicative. Definitive statements can be forthcoming only when the data are more extensive and more detailed.

The Royal Commission study anticipates increased landings of haddock from these banks, and this increase will accrue to the Nova Scotia fleet. Productivity, likewise, should continue to increase, but if effort (days fished) should increase at a greater rate, then probably productivity will reach a maximum and would decline if the level of optimum effort were passed. Here again, however, the situation is dependent on a number of biological and climatic factors about which there is insufficient knowledge to make any definite statements at this time.

3. Gulf Of St. Lawrence

Nova Scotia, Newfoundland, and the United States all prosecute the ocean perch fishery of the Gulf of St. Lawrence (ICNAF Subdivisions 4R, 4S, and 4T). Each of the three depends on this source of ocean perch in varying degrees. 93 percent of all ocean perch landed in Nova Scotia in 1957 came from these grounds. Newfoundland, on the other hand, landed only 53 percent of its total catch of ocean perch in the Gulf of St. Lawrence, and less than 30 percent of all United States landings of the species came from the area, (table VII-8).

This fishery did not become of importance to Canada until the post-World War II years. As noted previously, 123/ landings of ocean perch have increased rapidly since that time, but in recent years they have shown a downward trend. Newfoundland landings reached a peak of 38 million pounds in 1951, but by 1958 they had declined to 25 million pounds. Nova Scotia did not prosecute the fishery vigorously until 1953, when almost 17 million pounds were landed. Landings increased to a peak of 32 million pounds in 1956, but have likewise begun to decline, receding to 27 million pounds in 1958.

Productivity has also declined. Nova Scotia trawlers had a catch of 30,000 pounds per day fished in the area in 1953, but by 1957 this had fallen to 19,000 pounds per day fished. Newfoundland trawlers averaged 25,000 pounds per day in 1953. The catch reached a peak of 34,000 pounds per day in 1955 and declined to 21,000 pounds per day in 1957.

The cause for these declining landings and productivity figures seems to stem from the fact that the fishery is based on an accumulated stock being subjected to increased effort. Chart VII-1 shows that effort, in terms of days fished, increased from 490 to 1,062 days over the period 1953 to 1957 by Nova Scotia trawlers, with a corresponding decrease in productivity from 30,000 to 19,000 pounds per day. Similarly, in Newfoundland, effort increased from 177 to 391 days fished, while productivity declined from 25,000 to 21,000 pounds per day fished. While these data cover only five years, they indicate clearly that the stock is declining since the stock removed is not being replaced. Moreover, the present rate of fishing effort will inevitably mean further decreases in productivity until eventually fishing effort will be transferred to more productive ocean perch grounds, probably the Grand Bank and more northern waters. When this occurs, the Gulf of St. Lawrence, like previous ocean perch grounds, should stabilize at these lower levels of productivity.

Summary

In summary, it is anticipated that productivity of haddock on the Grand Bank and the Nova Scotia banks will not decrease, and may possibly increase if current levels of effort are maintained or even if they increase somewhat. The Grand Bank, because of its more northerly location, will remain an area of higher productivity relative to the more southerly Nova Scotia Banks.

If ocean perch productivity on the Nova Scotia Banks and in the Gulf of St. Lawrence continues to decline, then the fishery may shift to the Grand Banks where the New England fleet, and recently the Russian factory ship, have been experiencing high levels of productivity.

123/ Chapter II, p. 17, and table II-10.

Chart VII-1

Catch and Effort Data for Large Nova Scotia and Newfoundland Trawlers
Fishing for Ocean Perch in the Gulf

CHAPTER VIII

SUMMARY AND CONCLUSIONS

Summary

1. The Industries

The New England groundfish industry has been of historic importance to the growth of this region. It was a major source of the capital which built the manufacturing economy which today characterizes the area. In recent years the fishing industry has declined in importance to the area as a whole, although certain port cities are still dependent on the fishery for their continued economic health.

New England's chief competitors in the groundfish market are the Atlantic Provinces of Canada, which account for more than two-thirds of the imports of groundfish fillets into the major markets of this country. The industry in the Atlantic Provinces differs in a great many respects from that of New England.

The Canadian industry is centered in relatively underdeveloped areas heavily dependent on primary industries. They are in an unfortunate geographic location relative to markets. But they are very favorably located relative to the fishery resources, and have been able to overcome unfavorable market location by building an industry dealing in a frozen product. Thus the Canadian industry, unlike the New England industry, is dominated by the processor rather than the trawler operator. Also, because of its location and structure the Canadian industry derives definite cost advantages. Since there is a great deal of underemployment, especially in the fishing industry, and the standard of living is lower than that of New England, the labor cost is much lower. Another factor working to keep costs low is the presence of a few large vertically-integrated firms which own the trawlers that catch the fish, own the processing plants, and maintain wholesale and retail outlets where their products are sold. Vertical-integration also enables the Canadian producer to achieve economies of scale which are unknown in the New England industry.

A major characteristic of the New England industry is port specialization. Boston is a haddock port; Gloucester and the Maine ports are ocean perch ports. Such specialization is unknown in the Atlantic Provinces, where diversification is the rule. Heavy dependence on one species can have disastrous effects when the resource declines in abundance. As evidence of this, the direct relation between the decline in abundance of haddock on Georges Bank and the decline in the Boston haddock fishery may be noted.

In an effort to raise living standards in the Atlantic Provinces, the Canadian government has initiated and will continue schemes to raise incomes by increasing labor productivity. In the fishing industry this has taken the form of subsid for construction of small vessels, and loan funds for vessel construction. These plans, while not completely successful, have accomplished the immediate objectives set out for them and will continue in the foreseeable future.

Although these subsidized vessels land groundfish which competes in the market with groundfish landed in New England, no direct cost comparisons can be made between the subsidized vessels and New England trawlers because the former are too dissimilar in types and sizes, and in all cases are much smaller craft than those in the New England fleet. The processors to whom these subsidized vessels sell their catch do, however, derive an advantage in that they can buy much of their requirements from these boats and thereby save the overhead costs of additional trawlers of their own. To the extent, therefore, that the subsidy is used to cover costs which the processor would otherwise have to bear, and to the extent that the subsidy permits the independent fisherman to accept a price lower than would otherwise be possible without it, the Canadian processor has a distinct and very real competitive cost advantage over his New England rival.

2. The Resources

Biological studies of the haddock resource on Georges Bank indicate that the yearly catch will stabilize at between 90

and 120 million pounds, depending on the effectiveness of the mesh regulation which delays the age of first capture. This means that no matter what the level of effort, in terms of days fished, the annual catch will remain the same, and any fishing effort in excess of that required to take this annual amount will be uneconomic, high-cost fishing. Thus, not only is any fleet expansion not justified, but the present effort of the Boston fleet could be cut substantially without impairing supplies, and more profitable operations would result.

The ocean perch fishery in the Gulf of Maine has stabilized at a level of about 9,000 pounds per day fished, and is capable of supporting a fishery for medium and small trawlers. The large trawlers, however, must go to the more distant grounds, where productivity levels are higher, in order to insure heavy landings. These distant banks- the Gulf of St. Lawrence, the Nova Scotia Banks, and the Grand Bank - are also in the process of stabilization. It can be expected that when they do stabilize, they will do so at a level of some 20,000 pounds per day fished, which will be high enough to support a large trawler fishery. On these banks, however, the New England trawlers face competition with those of Canada and, more recently of Russian factory ships. Thus, too intensive a fishery could lead to lower levels of productivity and consequent higher-cost operations.

Without an expansion in the market for cod, particularly in fresh form, no increase in New England cod landings can be expected. Cod supports a medium-sized trawler fishery which fishes primarily for the species and accounts for about half the annual landings. The remainder is landed by large trawlers fishing primarily for haddock and ocean perch.

Pollock, cusk and white hake are groundfish taken incidentally to the haddock and ocean perch fisheries. The combined landings of the three are minor compared to those of the two major groundfish species and will remain so since the market for them is a restricted one. Red hake has been, and will continue to be, one of the major species of the industrial fishery of southern New England.

The whiting fishery has, in recent years, grown in importance in New England. This is due chiefly to the opening up of a market in the Midwest and to the increased use of whiting in the industrial fishery. Whether the recent substantial catches can be sustained depends upon biological surveys to determine if commercial quantities are available in offshore areas other than those currently being exploited.

3. Costs And Earnings

The New England groundfish "industry," is, in reality, a group of industries, each built upon a particular species. The haddock industry is centered in Boston; the ocean perch industry is centered in Gloucester and the Maine ports of Portland and Rockland. 124/ For this reason, it is necessary to analyze each industry separately.

The production units of the Boston haddock fleet - the trawlers - differ in almost every essential respect: size, horsepower, gear, and particularly managerial skill. These differences work to determine the profitability or lack of it for these vessels, but their effects are complex, interdependent, and mutually related. Thus, the general proposition "the larger the vessel, the greater the likelihood of its being profitable" is subject to the exception of many Boston large-trawlers which are, in fact, very unprofitable.

The Boston trawlers examined generally face the prospects of falling receipts. Though expenditures have also been generally decreasing, they are more rigid than receipts and hence have decreased at a slower rate. The biggest item of cost - labor - is fixed rigidly at 60 percent of vessel receipts less certain joint expenses. The "broker" arrangement, by which the crew is guaranteed $12 per man per day

124/ This is true also in New England fisheries other than groundfish. For example, the scallop industry is centered in New Bedford, and the industrial fishery is the main industry of Southern New England ports.

regardless of the level of receipts, also operates to keep costs inflexible. At low levels of receipts, this guarantee is not covered and must be made up from vessel owner's share of receipts. The result is a loss to the vessel owner on the trip.

Expenditures for gear, repair, and maintenance show a high degree of association with the level of efficiency of a trawler. Vessels with high levels of earnings almost invariably have greater expenditures for these items than do those with low levels of earnings. Thus it appears that the less efficient trawlers suffer from undermaintenance because of their lower productivity. But this undermaintenance makes the trawler less efficient and receipts continue to decline while other costs increase.

The level of maintenance or undermaintenance shows its effects in the insurance costs incurred by efficient and inefficient trawlers. The more efficient vessels are properly maintained and hence their accident rates are low. Consequently, they receive the benefit of lower insurance rates and decreased insurance costs. This was borne out by the financial statements of the efficient trawlers, all of which had no increase in this cost over the five year period 1953 to 1957. This inverse relation between receipts and insurance costs likewise held true for the less efficient trawlers, again demonstrating the interrelation of receipts, maintenance expenditures, and insurance costs.

The experience of Gloucester and Maine trawlers has also been falling receipts and decreasing expenditures. This situation is due mainly to the share arrangements in these ports, which differ from the Boston lay in that the crew takes a smaller share of receipts, and also to the large discretionary element involved in incurring maintenance and repair expenditures for these trawlers. Although trip expenditures have been increasing on these vessels, they have had little effect on the percentage share of receipts available to the vessel owner because they have been offset by declining crew earnings.

Expenditures for gear, repair, and maintenance on these vessels remained stable over the eight-year period (1950-57) studied. This fact is significant, since this was a time of rising costs in Gloucester and Maine repair yards, and is evidence that these vessels, too, suffer from undermaintenance. Similarly, insurance costs on these trawlers have increased during these years - following the same pattern as on the less efficient Boston trawlers - again giving weight to the agrument that there is a high degree of association between receipts and vessel expenditures.

Conclusions

Based on the findings and analyses presented in this report, the following conclusions are submitted:

(1) Basic differences between the New England and the Atlantic Provinces industries in four respects account for the competitive advantages enjoyed by the latter: geographic location; structure; organization; and, the economic framework within which the two industries operate.

(a) Being closer to the more productive grounds of the Northwest Atlantic, the Canadian fleet can make more trips - and more productive trips - than the New England fleet, and at lower cost.

(b) The vertical integration typical of the Canadian industry allows the Canadian operator widespread discretion in controlling costs and prices - a degree of control almost unknown in New England.

(c) The unorganized trawler fishermen of the Atlantic Provinces can exert little, if any, influence on wages and working conditions. Consequently, union requirements affecting costs are unknown in the Canadian industry.

(d) The lower standards of living and the degree of underemployment in the Atlantic Provinces work to keep labor costs low for the Canadian operator.

(2) The Canadian industry, which engages in a diversified fishery, is less affected by declines in abundance of a particular species than is the New England industry which is composed of

groups of specialized fisheries, each heavily dependent on the abundance of a particular species.

(3) The Canadian subsidy program directly benefits only the small trawler operators and not the large integrated firms which are the chief competitors of the New England industry. These firms benefit from the subsidy only to the extent that it enables them to buy the catch of the subsidized vessels and thus avoid incurring the overhead costs of large trawlers which they might add to their own fleets.

(4) Foreign competition is an important source of the problems of the New England groundfish industry. Nevertheless, the industry's lack of ability to adjust to diminished but relatively stable resources is also important.

(5) To the extent practicable, the New England fleet should seek to diversify its catch and lessen the dangers of dependence on one species. Whether and how this diversification could be accomplished will depend on a number of biological and economic factors. Its worth, however, has been demonstrated by the ocean perch and whiting fisheries in helping the port of Gloucester.

(6) The Boston trawler fleet includes a number of marginal boats engaged in uneconomic overfishing. Because of the limited resources which the Boston fleet can now effectively harvest, these vessels will be eliminated by the process of attrition which has been taking place since 1948. Thus, contraction rather than expansion is postulated for the Boston trawler fleet.

(7) Not only contraction, but also concentration is postulated for the Boston industry; i.e., the Boston fleet may eventually be characterized by a small number of operators, each owning many boats. In any event, only in this way can the economies of scale necessary to efficient operation in this high-cost industry be accomplished.

(8) The ocean perch fleet in Gloucester and Maine also faces contraction because of the decline in productivity on the more distant ocean perch grounds.

Appendix

Tables for Chapter I

Tables I-1 through I-16

Table I-1

Groundfish: Landings and Values at New England Ports, by Species, 1939-1957
(In Thousands of Pounds, Whole Fish and Thousands of Dollars)

Year	Cod		Haddock		Ocean Perch		Pollock, Cusk and Hake		Total	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
1939	105,417		157,812		77,375		63,416		404,020	
1940	82,289		141,193		85,142		59,622		368,246	
1941 1/	122,041		188,209		154,837		58,259		523,346	
1942	65,092		137,409		123,090		46,706		377,297	
1943	65,540		117,216		114,737		40,554		338,047	
1944	93,756		133,065		120,216		43,062		390,099	
1945	141,072		147,195		131,834		67,951		488,052	
1946	88,753		147,359		173,149		66,689		480,950	
1947	64,040	3,675	162,102	11,137	146,587	5,925	41,224	1,417	413,953	22,154
1948	68,251	4,303	154,607	12,237	238,095	9,647	62,557	2,257	523,510	28,444
1949	58,795	3,377	133,765	9,171	236,987	9,819	88,268	1,864	517,815	24,231
1950	53,968	3,250	157,765	11,771	207,793	9,137	46,296	1,537	465,822	25,695
1951	47,479	3,318	153,291	11,887	258,320	12,597	43,201	1,815	502,291	29,617
1952	42,401	2,994	161,341	12,492	189,042	8,210	46,394	1,818	439,178	25,514
1953	31,899	2,116	139,494	10,518	153,398	5,972	39,554	1,373	364,845	19,979
1954	35,239	2,050	154,895	10,008	181,452	7,376	33,212	1,123	404,798	20,557
1955	32,369	1,874	135,029	8,100	156,989	6,038	39,248	1,240	363,635	17,252
1956	32,760	1,969	152,193	9,583	151,113	5,723	40,695	1,206	376,761	18,481
1957	31,911	1,941	133,409	10,186	133,931	5,088	32,260	1,198	331,511	18,413

1/ Landings for New York, New Jersey, Connecticut, and Rhode Island are estimated; other New England landings from published and unpublished statistical data of the International Commission for the Northwest Atlantic Fisheries, Halifax, Nova Scotia, Canada.

Source: For 1939-1956, United States Fish and Wildlife Service, Fishery Statistics of the United States (annual); for New England Fisheries - 1957, C.F.S. No. 1909, Bureau of Commercial Fisheries, Washington 25, D.C.

Table I-2

Annual weighted ex-vessel prices in Boston and Gloucester of the principal species of groundfish, and index of these prices, unadjusted and adjusted for changes in the index of wholesale prices, 1947-1958

Year	Cod 1/		Haddock 2/		Scrod Haddock 3/		Ocean Perch 4/	
	Average Price Per Pound	Index (1947-1949 = 100)	Average Price Per Pound	Index (1947-1949 = 100)	Average Price Per Pound	Index (1947-1949 = 100)	Average Price Per Pound	Index (1947-1949 = 100)
	Cents		Cents		Cents		Cents	
1947	6.79	98	8.73	95	6.49	89	4.40	102
1948	7.47	109	9.96	109	8.43	116	4.19	97
1949	6.41	93	8.82	96	6.90	95	4.31	100
1950	7.11	104	10.69	117	6.82	94	4.73	110
1951	8.20	120	10.59	115	7.59	104	4.97	116
1952	7.82	114	10.68	116	7.67	106	4.35	101
1953	7.44	108	9.56	104	7.94	109	3.86	90
1954	6.94	101	9.40	102	5.90	81	4.08	95
1955	6.25	91	7.81	85	6.09	84	3.86	90
1956	6.74	98	7.96	87	6.66	92	3.77	88
1957	6.64	97	9.66	105	8.24	113	3.86	90
1958 5/	8.79	128	11.87	129	11.08	152	4.23	98

1/ Eviscerated cod of market size (2½ to 10 pounds) at Boston.
2/ Eviscerated haddock of large size (2½ pounds and over) at Boston.
3/ Eviscerated haddock of scrod size (1 to 2½ pounds) at Boston.
4/ Whole Ocean perch of all sizes at Gloucester.
5/ Preliminary.

Source: Prices from United States Fish and Wildlife Service, Landings by Fishing Vessels at certain New England Ports (1939-1946) and Massachusetts Landings (1947-1956); Massachusetts Landings - 1957, C.F.S. No. 1767; New England Fisheries - Monthly Summary December 1958; Market News Service, Boston.

Table I-2A

Comparison of Average Landings and Average Prices, Leading Groundfish Species 1947-1949 versus 1955-1957

(Landings in Thousands of Pounds)

	Average Landings		Average Price		Percent Change	
	1947-1949	1955-1957	1947-1949	1955-1957	Average Landings	Average Price
			(cents per pound)			
Cod	63,695	32,347	6.86	6.54	-49.2	-4.7
Haddock	150,158	140,210	(L) 9.17	(L) 8.48	-6.6	-7.5
Ocean Perch	207,223	147,344	4.30	3.83	-28.9	-10.9

(L) - Large.

Source: Tables I-1 and I-2.

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Table I-3

Geographical Concentration, New England Fishing Industry in Leading Ports, 1957

Ports	All Fish and Shellfish (Thousands)		Groundfish (Thousands)		Groundfish as percent of All Fish and Shellfish	
	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars
Boston	135,071	11,177	129,137	10,922	95.6	97.7
Gloucester	248,928	7,024	81,634	3,514	32.8	50.0
New Bedford	104,334	13,059	11,697	912	11.2	7.0
Portland 1/	89,650	4,058	45,040	1,794	50.2	44.2
Rockland 2/	82,014	4,452	30,603	1,166	37.3	26.2
TOTAL	659,997	39,770	298,111	18,308	45.2	46.0
New England Total	1,030,883	60,810	331,511	18,413	32.2	30.3
Percent five leading ports is of total	64.0	65.4	89.9	99.4		

1/ Data for Cumberland County.

2/ Data for Knox County.

Source: Massachusetts ports - Fishery Statistics of the United States, 1957. Statistical Digest No. 44, United States Department of the Interior, Washington 25, D.C., p. 106; Maine ports - Maine Landings, 1957. C.F.S. No. 1779, Fish and Wildlife Service, Branch of Commercial Fisheries, Washington 25, D.C., p. 1.

Table I-4

Percent Change in Average Landed Values at the Five Principal New England Ports for the Periods 1947-1949, 1950-1952, and 1955-1957

(Values in Thousands of Dollars)

Period	Boston	Gloucester	New Bedford	Portland			Rockland		
	All Fish and Shellfish			All Fish and Shellfish	Groundfish Only	Shellfish Only	All Fish and Shellfish	Groundfish Only	Shellfish Only
1947-49	14,448	9,776	10,620	3,259	1,269	1,473	3,955	1,208	2,161
1950-52	14,071	10,455	12,134	4,169	1,994	1,697	4,578	1,888	2,275
1955-57	10,316	7,466	12,433	4,007	1,746	1,664	4,602	1,321	2,725
				Percent Change					
1947-49 to 1955-57	-29	-24	+17	+23	+38	+13	+16	+9	+26
1950-52 to 1955-57	-27	-29	+ 2.5	-4	-12	-2	+1	-30	+20

Source: Fishery Statistics of the United States, 1947-1957; data for Portland and Rockland from Maine Landings by County and Gear, Annual Summaries, 1947-1957.

Table I-5

Employment on Otter Trawlers 1/
1939 and 1947 to 1957

Year	Massachusetts	Maine	Rhode Island	Connecticut	TOTAL New England
1939	2,507	86	35	94	2,722
1947	4,314	275	133	206	4,928
1948	4,080	376	121	235	4,812
1949	4,085	335	174	185	4,779
1950	3,693	528	162	129	4,512
1951	3,858	819	418	203	5,298
1952	3,636	505	394	197	4,732
1953	3,441	684	399	190	4,714
1954	3,170	668	566	157	4,561
1955	2,867	493	489	160	4,009
1956	2,777	393	585	151	3,906
1957	2,727	319	512	131	3,689
			Percent Change		
1947-57	-37	+16	+285	-36	-25
1951-57		-61			-30

1/ Vessels of over 5 net tons only. Scallop draggers not included.

Source: Compiled from Fishery Statistics of the United States, 1947-1957.

Table I-6

Compensation and Average Annual Earnings of Fishermen on Vessels of 10 Net Tons and Over, All Massachusetts, Boston and Gloucester, 1948-1957.

Year	Massachusetts	Payments Boston and Gloucester	Average Number of Workers Employed	Average Annual Earnings	Index of Annual Earnings Unadjusted	Consumer Price Index	Value Catch Massachusetts Otter Trawlers	Number Fishermen	Estimated 1/ Share To The Fishermen
Year									
	$1,000	$1,000					$1,000		
1948	14,245	8,604	3,109	$2,767	100	102.8	32,494	4,080	$3,353
1949	12,117	7,063	2,873	2,458	89	101.8	27,617	4,085	2,846
1950	13,285	7,354	2,741	2,683	97	102.8	28,164	3,693	3,211
1951	14,985	8,537	2,766	3,086	112	111.0	33,797	3,858	3,688
1952	14,512	7,565	2,682	2,821	102	113 5	29,694	3,636	3,438
1953	12,139	6,201	2,515	2,466	89	114.4	23,324	3,441	2,854
1954	11,994	6,823	2,371	2,878	104	114.8	23,457	3,170	3,115
1955	13,217	6,880	2,329	2,954	107	114.5	21,488	2,867	3,155
1956	14,064	7,657	2,351	3,257	118	116.2	22,271	2,777	3,376
1957	14,688	7,938	2,318	3,425	124	120.2			
				Percent Change 1957 From 1948					
	+3.1	-7.7	-25.4	+23.8		+16.9		-32	

Source: Columns 1-5 from Massachusetts Division of Employment Security, Columns 7-9 from Fishery Statictics of the United States.

1/ Based on 42.1 percent of average value per trip. An analysis of trawler fleet operations out of Boston based on settlement sheets of the Atlantic Fishermen's Union shows that under terms of the "lay" 42.1 percent of the value of the catch was available for distribution to the fishermen as net shares after trip expenses.

Table I-7

Age Composition of Atlantic Fishermen's Union, 1958, Boston, Gloucester, and New Bedford

	Boston			Gloucester			New Bedford		
	Number	Percent	Percent Cumulative	Number	Percent	Percent Cumulative	Number	Percent	Percent Cumulative
71 and over	90	7.5	7.5	64	5.7	5.7	27	1.9	1.9
61-70	273	22.8	30.3	160	14.2	19.9	113	8.0	9.9
51-60	465	38.9	69.2	267	23.7	43.6	270	19.1	29.0
41-50	260	21.8	91.0	316	28.1	71.7	404	28.6	57.6
31-40	95	8.0	99.0	246	21.9	93.6	420	29.7	87.3
21-30	12	1.0	100.0	72	6.4	100.0	180	12.7	100.0
	1,195	100.0		1,125	100.0		1,414	100.0	
Average Age		55			49			44	

Source: Membership files, Atlantic Fishermen's Union, 1958.

Table I-8

Number and Net Tonnage of Otter Trawlers,
New England Specified Years, 1947-1957

Year	MASSACHUSETTS No.	MASSACHUSETTS Tonnage	MAINE No.	MAINE Tonnage	RHODE ISLAND No.	RHODE ISLAND Tonnage	CONNECTICUT No.	CONNECTICUT Tonnage	NEW ENGLAND Total No.	NEW ENGLAND Total Tonnage
1947	565	24,628	52	1,295	55	638	70	1,041	742	27,602
1948	539	23,266	61	1,785	50	538	77	1,205	727	26,794
1949	538	23,041	55	1,817	63	824	63	975	719	26,657
1950	505	20,156	69	2,936	54	792	44	713	672	24,597
1951	525	20,422	103	4,364	104	2,091	63	1,343	795	28,220
1952	510	20,688	92	3,693	107	2,109	60	1,090	769	27,580
1953	482	20,466	128	5,480	107	2,045	59	1,037	776	29,028
1954	444	19,366	124	6,026	136	2,879	55	946	759	29,217
1955	412	17,173	94	4,643	120	2,541	58	971	684	25,328
1956	407	16,613	77	4,044	141	2,978	50	910	675	24,545
1957	407	16,747	70	3,458	129	2,720	43	801	649	23,726
Percent Changes 1957 From 1947										
	-28	-32	+35	+167	+135	+326	-39	-23	-13	-14

Source: Fishery Statistics of the United States, 1947-1957.

Table I-9

Activity of Large and Medium Trawlers 1/
At Certain Massachusetts Ports, 1947-1957,
(Boston, Gloucester, New Bedford, and Cape Cod)

Year	Number of Trawlers			Annual Number of Trips by Trawlers		Average Annual Number of Trips per Trawler		Average Number of Days At Sea Per Trip Per Trwl.	
	Large	Medium	Total	Large	Medium	Large	Medium	Large	Medium
1947	80	215	295	1,875	3,345	23.4	15.6	8.4	5.8
1948	85	212	297	1,955	3,783	23.0	17.8	8.7	5.8
1949	81	192	273	1,768	3,372	21.8	22.8	8.9	5.5
1950	64	181	245	1,549	3,722	24.2	20.6	9.2	5.7
1951	63	171	234	1,506	4,227	23.9	24.7	9.2	5.5
1952	69	168	237	1,546	4,187	22.4	24.9	9.3	5.3
1953	70	162	232	1,369	3,862	19.6	23.8	9.7	5.1
1954	68	159	227	1,229	4,117	18.1	25.9	9.8	4.9
1955	57	143	200	1,069	4,545	18.8	31.8	10.3	4.3
1956	51	148	199	1,206	4,580	23.6	30.9	9.1	4.3
1957	50	153	203	1,101	4,985	22.0	32.6	9.5	4.1

1/ Trawlers are classified as large if 151 gross-tons or over; as medium if 51 to 150 gross tons.

Source: Compiled from official statistics of the United States Fish and Wildlife Service.

Table I-10

Boston's Active Fishing Fleet, 1947-1957

Year	Number of Trawlers		
	Large	Medium	Small
1947	59	28	30
1948	52	24	30
1949	38	24	32
1950	39	24	31
1951	38	23	29
1952	38	22	24
1953	34	23	20
1954	34	27	16
1955	31	24	14
1956	30	28	11
1957	30	33	10

Source: Landings and Prices of Fishery Products, Boston Fish Pier, 1957. Market News Service, United States Fish and Wildlife Service, Boston, Massachusetts,

Table I-11

Review of Major New England Fisheries, 1947-1957

Year	Groundfish	Sea Fish Other Than Groundfish	Flounders	Whiting	Mackerel	Herring	Menhaden	Trash Or Industrial	Scallops	Lobsters	TOTAL Shellfish
					Landings (in millions of pounds)						
1947	414.0	324.9	67.5	62.0	47.3	124.1	.2		13.0	23.3	63.7
1948	523.5	415.8	71.8	80.5	40.8	192.1	1.2	.8	12.5	20.2	59.0
1949	517.8	413.6	66.8	90.0	17.9	168.4	12.6	28.4	14.0	24.0	68.5
1950	465.8	475.9	66.8	65.6	14.4	195.2	9.3	91.6	13.8	22.6	64.9
1951	502.3	347.8	60.5	118.5	9.9	64.9	11.8	43.7	14.4	25.5	66.7
1952	439.1	453.6	55.4	106.0	12.5	153.5	36.1	53.0	15.4	24.3	61.8
1953	364.8	427.1	47.3	85.4	6.8	110.5	39.9	88.7	20.0	27.1	72.1
1954	404.8	499.8	47.5	90.4	3.1	129.2	59.7	133.7	15.6	26.4	61.8
1955	363.6	528.5	50.1	110.6	3.3	104.3	79.8	136.9	16.8	27.6	63.4
1956	376.8	579.8	47.9	90.1	3.8	146.5	78.3	139.1	16.9	25.2	58.7
1957	331.5	631.6	53.9	126.3	2.1	161.0	41.8	189.3	18.8	29.1	67.8
					Value (in millions of dollars)						
1947	22.2	13.5	6.0	1.4	2.4	1.6			6.4	8.7	20.6
1948	28.4	17.9	7.4	1.8	2.7	3.7			6.5	8.4	21.6
1949	24.2	14.4	6.4	1.9	1.3	2.7	.1	.3	5.2	8.6	20.0
1950	25.7	13.6	7.0	1.3	1.1	1.4	.1	.8	6.4	8.1	21.3
1951	29.6	15.5	7.8	2.8	.8	1.0	.2	.4	6.5	9.2	22.3
1952	25.5	15.6	7.1	2.2	1.0	1.9	.4	.5	9.1	10.3	26.2
1953	20.0	13.5	5.6	1.6	.7	1.8	.5	.8	8.9	10.5	26.6
1954	20.6	13.8	5.5	1.8	.4	1.9	.8	1.3	7.0	10.1	23.2
1955	17.2	14.4	6.1	1.8	.4	1.4	1.0	1.2	8.8	10.9	25.6
1956	18.5	15.1	5.7	1.5	.4	2.4	1.0	1.2	9.1	11.4	25.7
1957	18.4	16.2	6.4	2.2	.3	2.4	.5	1.6	9.1	11.1	26.2

Source: Fishery Statistics of the United States, 1947-1957.

Table I-12

Value of Groundfish Species Landed in New England, 1957

	$1,000	Percent
Haddock	10,186	55.3
Ocean Perch	5,088	27.6
Cod	1,941	10.5
Pollock	775	4.2
Cusk	105	0.6
Hake	318	1.8
	18,413	100.0

Source: New England Fisheries - 1957 Annual Survey - Fishery Statistics, Number 1909, United States Fish and Wildlife Service.

Table I-13

Value Distribution, Haddock and Ocean Perch Landings, Major New England Ports, 1957

Port	Percent of Value of Total New England Haddock Landings	Percent of Value of Total New England Ocean Perch Landings
Boston	82.1	3.3
Gloucester	6.6	49.6
Portland	2.0	26.2
Rockland		20.8
New Bedford	6.8	-
Other Ports	2.5	.1

Source: Fishery Statistics of the United States, 1957.

Table I-14

Landings and Value, Major Groundfish Species, Leading New England Ports, 1958

Port	All Fish And Shellfish	All Groundfish	Haddock	Ocean Perch	Flounders	Scallops
			Landings (Thousands of Pounds)			
Boston	123,764	118,796	81,510	2,625	3,570	10
Gloucester	230,218	97,514	9,799	74,951	1,917	418
New Bedford	111,669	16,242	8,177		36,845	15,253
Portland	96,669	41,666	2,472	32,990	435	24
Rockland	96,331	40,853	727	38,028	545	303
			Value (Thousands of Dollars)			
Boston	12,636	12,011	9,356	141	492	6
Gloucester	7,966	4,818	1,017	3,133	207	196
New Bedford	13,746	1,385	816		4,313	7,390
Portland	4,409	1,884	230	1,354	34	14
Rockland	5,522	1,767	55	1,647	41	146

Source: Boston, Gloucester and New Bedford data from Massachusetts Landings, C.F.S. No. 2019, Bureau of Commercial Fisheries, December, 1958; Portland and Rockland data from Maine Landings, 1958, C.F.S. No. 2031, Bureau of Commercial Fisheries, December, 1958.

Table I-14A

Relative Importance of Haddock and Ocean Perch to the Leading New England Groundfish Ports in Terms of Value, 1958

Port	Haddock as Percent of All Fish and Shellfish	Haddock As Percent of All Groundfish	Ocean Perch as Percent of All Fish and Shellfish	Ocean Perch as Percent of All Groundfish
Boston	74.0	77.9	1.1	1.2
Gloucester	12.8	21.1	39.3	65.0
New Bedford	5.9	58.9		
Portland	5.2	12.2	30.7	72.0
Rockland	1.0	3.1	29.9	93.2

Note: In New Bedford, value of scallops represents 53.8 percent of value of all fish and shellfish; value of flounders accounts for 31.3 percent of value of all fish and shellfish.

Source: Table I-14.

Table I-15

United States Imports of Groundfish Fillets and Slabs, Fresh and Frozen by Principal Sources, 1939-1958
(Thousands of Pounds)

Year	All Countries	Canada 1/	Percent of Total	Iceland	Percent of Total	Other Countries 2/	Percent of Total
1939	9,892	9,413	95.2	13	0.1	466	4.7
1940	9,740	9,676	99.3	47	0.5	17	0.2
1941	9,931	9,931	100.0				
1942	16,674	16,634	99.8	40	0.2		
1943	16,323	15,651	95.9	672	4.1		
1944	24,546	23,865	97.2	681	2.8		
1945	43,169	41,767	96.8	1,402	3.2		
1946	49,171	44,931	91.4	4,240	8.6		
1947	35,093	30,927	88.1	4,166	11.9		
1948	53,565	49,594	92.6	3,965	7.4	6	-
1949	47,777	41,685	87.3	5,131	10.7	961	2.0
1950	66,468	49,212	74.0	12,767	19.2	4,489	6.8
1951	88,196	57,585	65.3	24,518	27.8	6,093	6.9
1952	108,008	56,427	52.2	35,142	32.5	16,439	15.3
1953	91,571	59,180	64.6	23,596	25.8	8,795	9.6
1954	137,625	81,095	58.9	41.208	30.0	15,322	11.1
1955	130,068	96,408	74.1	20,672	15.9	12,988	10.0
1956	138,714	99,810	72.0	27,178	19.6	11,723	8.4
1957	141,180	108,309	76.7	22,283	15.8	10,588	7.5
1958	165,531	103,013	62.2	29,141	17.6	33,377	20.2

1/ Includes statistics for Newfoundland and Labrador.
2/ Includes data for Norway, Denmark, United Kingdom, West Germany and The Netherlands.

Source: Compiled from Annual Summary issues of Frozen Fish. United States Department of the Interior, Fish and Wildlife Service, Bureau of Commercial Fisheries.

Table I-16

United States Supply of Groundfish and Ocean Perch Fillets, 1939-1960

Year	United States Production		Imports 1/		Total
	Thousand pounds	Percent of total	Thousand pounds	Percent of total	Thousand pounds
1939	100,482	91.0	9,892	9.0	110,374
1940	90,644	90.3	9,740	9.7	100,384
1941	122,584	92.5	9,931	7.5	132,515
1942	105,173	86.3	16,674	13.7	121,847
1943	86,562	84.1	16,323	15.9	102,885
1944	108,634	81.6	24,546	18.4	133,180
1945	126,372	74.5	43,169	25.5	169,541
1946	126,730	72.0	49,171	28.0	175,901
1947	115,507	76.7	35,093	23.3	150,600
1948	137,758	72.0	53,565	28.0	191,323
1949	140,078	74.6	47,777	25.4	187,855
1950	136,593	67.3	66,468	32.7	203,061
1951	148,786	62.8	88,196	37.2	236,982
1952	132,662	55.1	108,008	44.9	240,670
1953	112,280	55.1	91,571	44.9	203,851
1954	122,391	47.1	137,625	52.9	260,016
1955	105,157	44.7	130,068	55.3	235,225
1956	107,138	43.6	138,714	56.4	245,852
1957	96,650	40.6	141,180	59.4	237,830
1958	99,074	37.4	2/ 165,531	62.6	264,605
1959	91,133	33.0	2/ 184,837	67.0	275,970
1960 3/	93,793	37.6	2/ 155,551	62.4	249,344

1/ Data from the Bureau of Customs, 1948-1960.

2/ Includes imports of frozen blocks and slabs.

3/ Preliminary.

Tables for Chapter II

Tables II-1 through II-19

Table II-1

Net Value of Production, Atlantic Provinces and Canada, 1955

(Thousands of Dollars)

Industry	Newfoundland		P.E.I.		Nova Scotia		New Brunswick		Atlantic Provinces		Canada	
	Value	Percent	Value	Percent	Value	Percent	Value	Percent	Value	Percent	Value	Percent
Agriculture			18,171	45.9	30,225	8.7	38,375	12.7	86,771	9.9	1,937,170	12.2
Forestry	24,295	12.8	376	1.0	16,052	4.6	32,423	10.8	73,146	8.3	664,665	4.2
Fisheries	13,661	7.2	3,279	8.3	23,582	6.8	6,753	2.2	47,275	5.4	90,891	.6
Fish Processing	9,239	4.9	975	2.5	14,071	4.0	5,020	1.7	29,305	3.3		
Trapping	48		2		207	.1	184	.1	441		17,424	.1
Mining	42,625	22.5			50,850	14.5	10,405	3.4	103,880	11.8	1,061,430	6.7
Electric Power	6,698	3.5	1,367	3.4	16,481	4.7	11,986	4.0	36,532	4.2	543,305	3.4
Manufacturing 1/	51,348	27.0	5,457	13.8	125,575	36.0	115,788	38.4	298,168	33.9	8,753,450	55.3
Construction	41,863	22.1	9,930	25.1	71,920	20.6	80,566	26.7	204,279	23.2	2,769,715	17.5
Total	189,777	100.0	39,557	100.0	348,963	100.0	301,500	100.0	879,797	100.0	15,838,050	100.0
Fishery Connected	22,900	12.1	4,254	10.8	37,653	10.8	11,773	3.9	76,580	8.7		

1/ Excluding fish processing.

Source: Canada Year Book, 1957-1958.

Table II-2

Labor Force, Atlantic Provinces and Canada, 1951
Percentage Distribution by Industry

Industry	Nova Scotia	New Brunswick	Newfoundland	Canada
All Industries	100.0	100.0	100.0	100.0
Agriculture	10.6	15.9	3.3	15.6
Forestry and Logging	2.7	9.5	9.9	2.5
Fishing and Trapping	4.4	2.6	17.3	1.0
Mining, Quarrying, Oil Wells	7.1	.7	3.4	2.0
Manufacturing 1/	16.7	18.4	13.7	25.7
Utilities	1.2	1.0	.6	1.2
Construction	7.4	6.0	6.8	6.6
Transportation, Storage, Communication	8.2	9.9	9.4	7.6
Trade	13.6	13.1	13.4	13.4
Finance Insurance & Real Estate	1.6	1.6	.6	2.7
Service 2/	24.8	19.5	20.2	20.4
Not Stated	1.7	1.8	1.4	1.3
1/ Fish Processing	1.8	2.0	3.0	
2/ Government	10.4	5.2	8.9	5.8
Percent in Primary Industries	24.8	28.7	23.9	21.1

Source: Census of Canada, 1951.

Table II-3

Employment and Earnings Atlantic Provinces, 1950-1957

Province	Year	Employment (1949=100)	Aggregate Payrolls (1949=100)	Weekly Earnings (Dollars)	Earnings as Percent of Dominion Average
Newfoundland	1950	n.a.	n.a.	40.10	89
	1951	n.a.	n.a.	44.51	90
	1952	130.2	178.3	51.00	94
	1953	140.9	209.5	55.54	97
	1954	128.2	186.1	54.47	93
	1955	131.0	189.0	54.08	89
	1956	136.9	209.4	54.14	84
	1957	130.8	215.5	61.75	95
Nova Scotia	1950	95.6	100.1	39.40	88
	1951	100.3	113.3	42.51	86
	1952	104.0	126.9	45.88	85
	1953	101.2	131.5	48.45	85
	1954	97.7	129.3	49.57	84
	1955	96.8	131.2	50.70	83
	1956	101.7	143.2	52.67	82
	1957	100.5	150.6	56.13	87
New Brunswick	1950	102.6	104.4	38.76	86
	1951	109.0	122.9	43.02	87
	1952	109.5	131.6	46.04	85
	1953	101.4	131.0	48.99	85
	1954	97.8	130.1	50.36	86
	1955	103.1	141.4	51.91	85
	1956	109.9	159.5	54.81	85
	1957	104.8	158.9	57.35	89
Canada	1950	101.5	106.0	44.84	
	1951	108.8	125.6	49.61	
	1952	111.6	140.3	54.13	
	1953	113.4	151.5	57.30	
	1954	109.9	151.3	58.88	
	1955	112.5	160.2	60.87	
	1956	120.1	180.5	64.18	
	1957	122.9	194.5	64.70	

n.a. - Data not available.

Source: Canadian Statistical Review, 1950-1957.

Table II-4

Hours and Gross Earnings of Production Workers,
Atlantic Provinces and New England Selected Years

Area	Average Weekly Earnings 1950	1955	1956
		Dollars	
Nova Scotia	39.74	51.53	53.61
New Brunswick	40.68	54.37	57.61
Newfoundland	46.52	56.93	59.89
Maine	48.93	58.98	63.43
Massachusetts	55.98	69.09	72.21
Canada	45.94	60.53	63.97
United States	59.33	76.52	79.99
Ratio			
Maine to Nova Scotia	123	114	118
Massachusetts to Nova Scotia	141	134	135
Maine to Newfoundland	105	104	106
Massachusetts to Newfoundland	120	121	121
Maine to New Brunswick	120	108	110
Massachusetts to New Brunswick	138	127	125

Source: Canadian Statistical Review, 1950, 1955 and 1956; United States Bureau of Labor Statistics.

Table II-5

Net Value of Production, Fisheries
and Fish Processing, Atlantic Provinces, 1955
(In Thousands of Dollars)

	Newfoundland		Prince Edward Island		Nova Scotia		New Brunswick		Atlantic Provinces	
	Value	Percent	Value	Percent	Value	Percent	Value	Percent	Value	Percent
Fisheries	13,661	7.2	3,279	8.3	23,582	6.8	6,753	2.2	47,275	5.2
Fish Processing	9,239	4.9	975	2.5	14,071	4.0	5,020	1.7	29,305	3.3
Total	22,900	12.1	4,254	10.8	37,653	10.8	11,773	3.9	76,580	8.5
All Industries	189,777	100.0	39,557	100.0	348,963	100.0	301,500	100.0	897,797	100.0

Source: Canada Year Book, 1957-1958.

Table II-6

Relative Importance of Fishing and Fish Processing in Labor Force, Atlantic Provinces and New England, 1950

	Total Labor Force	Total Fishermen	Fishermen as Percent of Total Labor Force
New England	3,845,879	23,434	.6
Maine	342,442	9,725	2.8
Massachusetts	1,938,611	10,380	.5
Maritime Provinces	419,000	30,239	7.2
Newfoundland	105,000	21,100	20.1

Source: Fishery Statistics of the United States, 1950 for data on employment in fishery and fish processing.
United States Census, 1950 for labor force data.
Fishery Statistics of Canada, 1950 for employment in fishery and fish processing.
The Labor Force, November 1945 - January 1955, Dominion Bureau of Statistics, Reference Paper, No. 58, for labor force data.

Table II-7

Employment in Total Manufacturing and in Fish Processing, Selected New England States, and Atlantic Provinces, 1956

Area	Manufacturing Employment	Employment in Fish Processing	Percent in Fish Processing
New England	1,508,000	1/ 9,917	.7
Maine	110,000	1/ 4,607	4.2
Massachusetts	711,000	1/ 4,626	.6
Newfoundland	10,361	2,735	26.4
Prince Edward Island	1,769	448	25.3
Nova Scotia	30,218	4,381	14.5
New Brunswick	22,434	2,570	11.5
Atlantic Provinces	64,782	10,134	15.6

1/ Yearly Average (including wholesaling).

Source: Canada Year Book, 1957-1958; United States Bureau of Labor Statistics.

Table II-8

Percentage Distribution of Leading Manufacturing Industries by Number of Employees, Salary and Wages, and Selling Value of Factory Shipments Atlantic Provinces, 1955

Industry	NEWFOUNDLAND			PRINCE EDWARD ISLAND			NOVA SCOTIA			NEW BRUNSWICK		
	Employees	Salaries And Wages	Selling Value of Factory Shipment	Employees	Salaries and Wages	Selling Value of Factory Shipment	Employees	Salaries and Wages	Selling Value of Factory Shipment	Employees	Salaries and Wages	Selling Value of Factory Shipment
Pulp and Paper	32.6	53.2	54.2				4.0	5.7	6.4	18.6	29.4	32.0
Fish Processing	26.4	15.1	15.1	25.3	16.4	17.2	14.5	10.2	14.3	11.5	4.9	6.8
Sawmills	8.9	1.9	1.8	7.8	4.1	2.5	10.7	5.9	7.0	11.9	7.9	7.0
Butter and Cheese				11.1	13.3	21.0	2.4	2.2	3.4	2.0	1.7	3.2
Fruit & Vegetable Preparation				5.6	3.6	3.1	1.6	.9	1.3			
Printing and Publishing	2.5	2.7	1.6	8.1	10.9	3.0	2.6	3.2	1.9	2.8	3.1	1.4
Primary Iron and Steel							13.5	19.0	13.2			
Shipbuilding							9.6	11.8	6.1	5.4	5.1	2.2
All Other Industries	29.6	27.1	27.3	42.1	51.7	53.2	41.1	41.1	46.4	47.8	47.9	47.4
TOTAL ALL INDUSTRIES	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Fish Processing Rank	2	2	2	1	1	2	1	3	1	3	4	3

Source: General Review of the Manufacturing Industries of Canada, 1955. Dominion Bureau of Statistics. The Queen's Ottawa, 1958. pp. 125 and 126.

Table II-9

Groundfish Landings and Values, by Species,
Canadian Atlantic Coast and New England, 1957

(Thousands of Pounds and Thousands of Dollars)

Species	CANADIAN-ATLANTIC COAST 1/ Quantity	Value	NEW ENGLAND Quantity	Value
Cod	642,494	15,030	31,911	1,941
Haddock	131,632	4,209	133,409	10,186
Ocean Perch	46,256	1,028	133,931	5,088
Pollock	36,825	708	22,030	775
Hake and Cusk	23,202	449	10,230	423
Total	880,409	21,424	331,511	18,413

Percentage Distribution

	CANADIAN-ATLANTIC COAST 1/		NEW ENGLAND	
Cod	73	70	10	11
Haddock	15	20	40	55
Ocean Perch	5	5	40	28
Pollock	4	3	7	4
Hake and Cusk	3	2	3	2
Total	100	100	100	100

1/ Includes Quebec.

Source: Canadian Data: Monthly Review of Canadian Fisheries Statistics, December, 1958, Dominion Bureau of Statistics, Ottawa, Ontario, Canada.
New England Data: New England Fisheries, 1957, C.F.S., No. 1909, Bureau of Commercial Fisheries, Washington 25, D.C.

Table II-10

Landings and Values of Haddock and Ocean Perch in Nova Scotia and Newfoundland, 1949-1958

(Millions of Pounds and Millions of Dollars)

	NOVA SCOTIA				NEWFOUNDLAND			
	HADDOCK		OCEAN PERCH		HADDOCK		OCEAN PERCH	
Year	Landings	Value	Landings	Value	Landings	Value	Landings	Value
1949	45.4	2.1	2.0	0.1	20.9	n.a.	17.7	n.a.
1950	46.2	2.3	2.1	0.1	17.4	n.a.	23.7	n.a.
1951	53.4	2.5	3.9	0.1	5.3	n.a.	38.2	n.a.
1952	51.2	2.5	7.5	0.2	9.7	n.a.	30.9	n.a.
1953	52.8	2.3	16.6	0.4	14.5	n.a.	28.9	n.a.
1954	67.9	2.7	27.9	0.7	42.8	1.2	19.8	0.4
1955	78.4	2.7	24.5	0.6	51.5	1.4	17.5	0.4
1956	87.8	3.1	32.1	0.8	62.3	1.7	21.7	0.4
1957	83.8	3.0	23.9	0.6	44.0	1.0	16.1	0.3
1958	66.6	3.1	27.0	0.8	30.7	0.7	25.4	0.5

Source: Fishery Statistics of Canada, 1949-1958. Dominion Bureau of Statistics, Ottawa.

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Table II-11

Landings of Groundfish, Canadian East Coast, 1957
Percentage Distribution by Province and by Species

	Cod	Haddock	Ocean Perch	Pollock	Hake and Cusk
Atlantic Coast	100	100	100	100	100
Newfoundland	63	33	35		
Nova Scotia	18	64	52	84	58
New Brunswick	6	2	6	16	13
Quebec	12		)		)
Prince Edward Island	1	1	) 7		) 29

Source: Monthly Review of Canadian Fisheries Statistics, December, 1958. Dominion Bureau of Statistics, Ottawa, Ontario, Canada.

Table II-12

Number of Boats Built Under the
Federal-Provincial Modernization Programme, 1947-1958 1/
Atlantic Seaboard

Type and Size Class of Boat	Newfoundland	Nova Scotia	Prince Edward Island	New Brunswick	Quebec	Total
Longliners						
30-40 feet	2/ 14					14
40-50 feet	10	3			23	36
50-60 feet	11	95			8	114
60-70 feet		1				1
Sub-total	35	99			31	165
Draggers						
40-50 feet			3	14	3	20
50-60 feet	3/ 7	14	12	44	23	100
60-70 feet		10	1	20	7	38
70 and over		1				1
Sub-total	7	25	16	78	33	159
Grand Total	42	124	16	78	64	4/ 324

1/ To the end of September, 1958. A few boats were lost at sea, and there were, also, a small number of transfers from one province to another.
2/ Trapper-longliners built with Newfoundland Bounty Assistance.
3/ Federal grants have been paid on 249 of these boats, 14 trapper-longliners have received the Newfoundland provincial bounty, and 61 boats are now being processed for payment of grant.

Source: Proskie, John. Operations of Modern Longliners and Draggers, Atlantic Seaboard, 1952-1957. Economics Service, Department of Fisheries of Canada. Primary Industry Studies, No. 1, Volume 7 - Part 1. p. 5.

Table II-13

Capital Costs, Operating Profits, Return on Investment, Debt Payment Time
Sample of Subsidized LongLiners and Draggers
Based on 1957 Operations
LongLiners

	30-40'	40-50'			50-60'		
	Newfoundland	Nfld.	Que.	Nfld.	Nfld.S.	Nova Scotia	Quebec
Numbers in Universe	14	10	16	11		88	8
Original Cost to Fishermen	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
a) With Subsidy	6,818	12,074	12,768	15,644	26,199	21,526	18,485
b) Without Subsidy	8,258	19,912	15,302	24,438	39,941	28,960	25,137
Debt at Purchase							
a) With Subsidy	2,077	7,566	11,891	10,909	16,703	14,379	17,477
b) Without Subsidy	3,517	15,404	14,425	19,703	30,445	21,813	24,129
Net Earnings after 18 percent Corporate Taxes							
a) With Subsidy	1,492	-281	805	-1,504	-894	2,808	1,446
b) Without Subsidy	1,389	-1,065	597	-2,384	-2,269	2,198	901
Life of Vessels 13.3 Years							
Debt Payment Time using Net Earnings							
a) With Subsidy	1.4		14.8			5.1	12.1
b) Without Subsidy	2.5		24.2			9.9	26.8
Percent Return on Capital Invested	22.0	-1.8	6.4	-6.2	-2.2	11.8	7.0
Depreciation							
a) With Subsidy	266	833	935	1,058	1,414	1,468	1,310
b) Without Subsidy	619	1,493	1,148	1,833	2,996	2,172	1,885
Debt Payment Time using Net Earnings and Depreciation							
a) With Subsidy	1.2	13.7	6.8		32.1	3.4	6.3
b) With Subsidy	1.8	36.0	8.3		41.9	5.0	8.7

Source: Operations of Modern LongLiners and Draggers, Atlantic Seaboard, 1952 - 1957, Part II, By John Proskie, Economics Service, Department of Fisheries of Canada, Ottawa, Ontario, Canada, 1957.

Table II-13 - continued

Capital Costs, Operating Profits, Return on Investment, Debt Payment Time
Sample of Subsidized LongLiners and Draggers
Based on 1957 Operations

	LongLiners						Draggers			
	46-50'			50-60'					60-70'	
Numbers in Universe	N.B. 14	Que. 3	Nfld. 7	N.S. 14	N.B.F. 42	N.B.	P.E.I. 12	Que. 23	N.S. 8	N.B. 16
Original Cost to Fishermen	Dollars		Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
a) With Subsidy	32,227		33,356	48,027	31,699	32,863	35,918	37,218	57,979	42,670
b) Without Subsidy	36,505		45,728	55,862	37,422	39,361	43,883	44,805	68,410	51,757
Debt at Purchase										
a) With Subsidy	22,240		16,641	39,226	26,040	24,699	30,590	34,098	38,322	40,978
b) Without Subsidy	26,518		29,013	47,061	31,763	31,197	38,555	41,687	48,753	50,045
Net Earnings after 18 percent Corporate Taxes										
a) With Subsidy	461		502	2,333	3,696	1,568	1,359	711	-93	1,737
b) Without Subsidy	110		-625	1,690	3,229	1,036	713	89	-1,136	993
Life of Vessels 13.3 Years Debt Payment Time Using Net Earnings										
a) With Subsidy	48.2		331	16.8	7.0	15.8	22.5	48.0		23.6
b) Without Subsidy	241.1			27.8	9.8	30.1	54.1	468.4		50.4
Percent Return on Capital Invested	1.5		1.3	5.1	12.0	4.9	3.8	2.0	-0.1	4.1
Depreciation										
a) With Subsidy	1,914		2,357	3,076	2,190	2,182	2,593	2,560	3,851	3,063
b) Without Subsidy	2,738		3,430	4,190	2,807	2,952	3,291	3,360	5,131	3,880
Debt Payment Time Using Net Earnings and Depreciation										
a) With Subsidy	9.4		5.8	7.3	4.4	6.6	7.7	10.4	10.2	8.5
b) Without Subsidy	9.3		10.3	8.0	5.3	7.8	9.6	12.1	12.2	10.3

Table II-14

Comparisons of Average Weekly Earnings by Provinces and in Subsidized Fishing Operations, Atlantic Seaboard, 1957

Area and Type of Vessel	Size Class (Feet)	Average Weekly Earnings	Net Cash Crew Share per Man per Season	Annual Earnings Prorated Over Entire Year (Col. (4)-52)
		Dollars	Dollars	Dollars
Newfoundland 1/		61.75		61.75
Trapper-LongLiner	30-40	59.15	1,641	31.56
LongLiner	40-50	47.51	1,354	26.04
LongLiner	50-60	35.15	868	16.69
LongLiner, S.C.	50-60	54.79	1,672	32.15
Dragger-Seiner	50-60	50.14	1,960	37.69
Nova Scotia 1/		56.13		56.13
LongLiner (Swordfish)	50-60	70.98	3,284	63.15
LongLiner (Groundfish)	50-60	40.83	2,072	39.85
Dragger	50-60	57.98	2,686	51.65
Dragger	60-70	71.18	3,249	62.48
Prince Edward Island 1/		50.45		50.45
Dragger	50-60	55.91	1,896	36.46
New Brunswick 1/		57.35		57.35
Dragger	40-50	44.78	1,307	25.13
Dragger	50-60	61.23	1,786	34.35
Dragger, B.F.	50-60	63.54	3,036	58.38
Dragger	60-70	72.56	2,221	42.71

1/ The figures in this line represent average weekly wages and salaries reported by firms customarily employing 15 persons or more.

Source: Table 10. "Employment and Earnings by Provinces", Canadian Statistical Review, February, 1959, Volume XXXIV, number 2, page 21; Operations of Modern LongLiners and Draggers, Atlantic Seaboard, 1952-1957, Part I , by John Proskie. Economics Service, Department of Fisheries of Canada, pp. 16, 28.

Table II-15

Numbers of Fishermen, 1937-1957
(In Thousands)

Year	Newfoundland	Maritimes and Quebec	Maritimes	Nova Scotia 1/	New Brunswick	Prince Edward Island 1/	Quebec
1937	20.8	44.6	35.3	18.1	13.9	3.3	9.7
1938	23.8	46.7	35.9	18.5	14.1	3.3	11.2
1939	23.6	45.6	34.8	17.5	13.8	3.5	11.2
1940	21.3	44.4	32.9	17.6	12.4	2.9	11.9
1941	17.4	38.2	28.7	15.1	11.2	2.4	9.8
1942	16.5	35.4	26.3	13.5	10.5	2.3	9.5
1943	18.7	34.0	25.8	13.4	10.2	2.2	8.6
1944	21.0	34.0	26.6	13.9	10.4	2.3	7.8
1945	23.2	34.7	27.6	14.4	10.8	2.4	7.5
1946	24.5	38.3	30.0	15.9	11.1	3.0	8.8
1947	26.3	34.8	28.9	14.5	11.1	3.3	6.2
1948	26.2	35.1	28.9	14.9	11.0	3.0	6.6
1949	25.0	35.4	28.8	14.9	11.0	2.9	6.6
1950	21.1	36.5	30.2	15.7	11.6	2.9	8.0
1951	19.6	36.4	29.5	15.6	11.2	2.7	7.0
1952	17.8	32.8	28.2	15.2	10.3	2.7	4.6
1953	16.8	33.3	27.9	14.6	10.5	2.8	5.8
1954	16.3	32.0	27.0	14.9	9.3	2.8	5.1
1955	16.0	31.9	27.2	14.2	9.6	2.9	5.1
1956	15.0	32.0	26.8	14.4	9.4	3.0	5.3
1957	16.3	31.7	26.1	15.3	7.8	3.0	5.6

1/ Includes small numbers in carrying smacks.

Source: Newfoundland, p. 150, The Commercial Fisheries of Canada, Royal Commission of Canada's Economic Prospects, 1956. Maritimes and Quebec, p. 68, Canadian Fisheries Annual - 1959, National Business Publications, Limited, Gardenvale, P.Q. Others: Fisheries Statistics of Canada.

Table II-16

Comparison of Percentage Returns to Vessel Owner, New England Union Lay Versus That on Atlantic Provinces' Trawlers

	New England 1/	Newfoundland 2/	Nova Scotia 3/ Boat A	Nova Scotia 3/ Boat B
Gross Receipts	100.00	100.00	100.00	100.00
Joint Expense	3.75		2.10	1.10
Gross Crew Share	57.75	37.50	36.70	36.70
Gross Vessel Share	38.50	62.50	61.20	62.20
Bonus and Commissions	3.85	7.80	7.70	7.60
Fuel and Ice		26.50	16.00	21.70
Contribution to Vessel Overhead	34.65	28.20	37.50	32.90

1/ Theoretical lay without considering effect of "broken" payments.
2/ Average of seven vessels results 1958. 1957 results much the same. In 1956, however, fuel and ice costs were only 21.8 percent of gross revenues and, hence, contribution to overhead was 33.9 percent.
3/ Based on two vessels only for 1956. Need further data.

Table II-17

Actual Distribution of Percentage Returns to Vessel Owners New England "Lay" versus Canada and Newfoundland

	Gross Revenue	Joint Expenses	Gross Crew Share	Gross Owner Share	Bonus and Commissions	Fuel and Ice Canada Only	Contribution to Vessel Overhead
Boston							
1953	100.0			38.1	4.1		34.0
1954	100.0			37.8	4.1		33.7
1955	100.0			37.4	4.0		33.4
1956	100.0			34.3	3.8		30.5
1957	100.0			35.7	3.9		31.8
Gloucester							
1953	100.0			37.5	3.7		33.8
1954	100.0			37.1	3.7		33.4
1955	100.0			36.8	3.7		33.1
1956	100.0			36.2	4.0		32.2
1957	100.0			36.3	4.0		32.3
Newfoundland							
1956	100.0			62.5	6.8	21.8	33.9
1957	100.0			62.4	7.0	25.6	29.7
1958	100.0			62.5	7.8	26.5	28.2
Nova Scotia							
1956	100.0			61.2	7.7	16.0	37.5
1957	100.0			62.2	7.6	21.7	32.9
5 Boston Vessels with Frequent Brokers							
1953	100.0			37.2	4.0		33.2
1954	100.0			37.8	4.1		33.7
1955	100.0			35.9	4.0		31.9
1956	100.0			32.8	3.9		22.9
1957	100.0			35.7	4.0		31.7

Table II-18

Estimated Production of Salted Codfish, 1935-1958

Year	Thousands of Pounds
1935	141,792
1936	108,640
1937	108,640
1938	129,476
1939	117,066
1940	98,055
1941	93,045
1942	78,787
1943	105,280
1944	110,742
1945	106,984
1946	110,604
1947	130,696
1948	105,280
1949	117,600
1950	95,200
1951	92,566
1952	82,039
1953	71,758
1954	85,361
1955	66,579
1956	72,608
1957	71,497
1958 1/	46,473

1/ Preliminary.

Source: Canadian Fisheries Annual - 1958, National Business Publications, Limited, Gardenvale, Quebec, Canada. p. 69, Table 10.

Table II-19

Median Monthly Price of Cod, Ocean Perch and Large Haddock at Principal New England and Atlantic Province Ports, 1949-1958

(Cents Per Pound)

Month	Cod, Market			Ocean Perch		Large Haddock		
	Boston	Halifax	St. John's 1/	Gloucester	Halifax 2/	Boston	Halifax	St. John's 3/
January	9.56	4.00	2.25	4.44	3.00	13.00	6.00	3.00
February	8.56	3.75	2.25	4.46	3.00	9.08	5.75	3.00
March	7.80	3.75	2.25	4.82	3.00	9.21	5.75	3.00
April	6.40	3.50	2.25	4.20	3.00	7.72	5.25	3.00
May	6.50	3.50	2.25	4.11	3.00	9.15	5.00	3.00
June	6.18	3.50	2.25	3.96	3.00	8.77	5.00	3.00
July	5.95	3.50	2.00	3.90	2.75	9.74	5.00	3.00
August	7.40	3.38	2.25	3.88	2.75	10.26	5.00	3.00
September	7.74	3.50	2.25	4.02	2.75	10.76	5.25	3.00
October	9.06	3.75	2.13	4.14	3.00	11.50	5.25	3.00
November	7.64	4.00	2.25	4.25	3.00	12.16	5.75	3.00
December	8.84	4.00	2.25	4.32	3.00	12.38	6.00	3.00

1/ Based on prices over the period 1951-1958.
2/ Based on prices over the period 1957-1959 only.
3/ Ungraded haddock.

Source: Fishery Statistics of the United States, 1949-1957; New England Fisheries - Annual Summary, 1958; Monthly Review of Canadian Fisheries Statistics, Dominion Bureau of Statistics, January, 1949 - September, 1959.

Tables for Chapter III

Tables III-1 through III-17

Table III-1

Landings of Groundfish from the New England, Nova Scotia-Gulf of St. Lawrence and Newfoundland grounds, by countries, 1956
(In Thousands of Metric Tons)

Area	United States	Canada	Spain	France	Portugal	United Kingdom	All Countries
New England Grounds	230						230
Nova Scotia - Gulf of St. Lawrence Grounds	60	229	13	39	15		356
Newfoundland Grounds	14	266	104	27	72	3	486

Source: International Commission Northwest Atlantic Fisheries, Statistical Bulletin, Volume 6 for the Year 1956, Halifax, Nova Scotia, 1958. pp. 16-17.

Table III-2

Haddock Landings at Massachusetts Ports by Waters of Origin, 1957
(In Thousands of Pounds)

		Georges Bank	Other United States Waters	Browns Bank	Other Canadian Waters
Haddock Large	Quantity	44,039	4,018	6,016	1,886
	Percent	78.7	7.2	10.8	3.3
Haddock Scrod	Quantity	45,048	3,521	5,364	2,938
	Percent	79.2	6.2	9.4	5.2
Total Haddock	Quantity	89,087	7,539	11,380	4,824
	Percent	78.9	6.7	10.1	4.3

Source: Landings at Certain Massachusetts Ports, Summary of Fishing, By Area and Subarea, 1957, pp. 131-132. Fishery Statistics of the United States, 1957. Statistical Digest Number 44. Fish and Wildlife Service, United States Department of the Interior, Washington 25, D.C.

Table III-3

Historical Fishery Statistics
Catch of Haddock at Certain Massachusetts and Middle Atlantic Ports, 1891-1958
(Thousands of Pounds)

Year	Boston	Gloucester	Portland	Other New England And Middle Atlantic Ports	Total
	Quantity	Quantity	Quantity	Quantity	Quantity
1891	38,601	5,167	(1)	14,714	58,482
1893	35,601	3,105	(1)	14,760	53,466
1894	45,033	6,969	(1)	14,688	66,690
1895	41,268	6,195	(1)	14,667	62,130
1896	32,957	1,434	(1)	14,743	49,134
1897	31,481	3,833	(1)	14,732	50,046
1898	24,817	12,296	(1)	16,672	53,785
1899	28,665	9,322	(1)	14,681	52,668
1900	32,189	5,493	(1)	14,758	52,440
1901	28,194	4,891	(1)	14,681	47,766
1902	38,918	4,857	(1)	10,979	54,754
1903	42,426	3,569	(1)	14,653	60,648
1904	46,645	8,728	(1)	14,737	70,110
1905	60,079	16,009	(1)	12,414	88,502
1906	54,406	16,270	(1)	14,710	85,386
1907	41,134	7,590	(1)	14,660	63,384
1908	45,389	10,128	(1)	14,057	69,574
1909	43,873	5,432	(1)	14,649	63,954
1910	51,063	5,833	(1)	14,696	71,592
1911	54,363	10,205	(1)	14,662	79,230
1912	60,166	12,645	(1)	14,741	87,552
1913	52,455	9,002	(1)	14,695	76,152
1914	53,831	12,186	5,901	8,908	80,826
1915	54,537	11,668	9,312	9,755	85,272
1916	55,349	7,736	6,159	8,390	77,634
1917	51,889	3,386	5,960	7,393	68,628
1918	59,492	9,716	6,876	9,188	85,272
1919	65,947	20,519	8,743	18,791	114,000
1920	73,817	9,829	5,485	20,195	109,326
1921	62,976	10,536	4,106	13,012	90,630
1922	60,264	14,497	6,261	18,272	99,294
1923	69,021	9,001	6,116	20,514	104,652
1924	77,682	5,863	7,608	22,847	114,000
1925	84,681	10,950	9,291	24,012	128,934
1926	93,324	7,013	6,980	28,001	135,318
1927	125,241	12,953	8,459	45,323	191,976
1928	155,997	11,021	10,069	70,749	247,836

Table III-3 - continued

Historical Fishery Statistics

Catch of Haddock at Certain Massachusetts and Middle Atlantic Ports, 1891-1958

(Thousands of Pounds)

Year	Boston Quantity	Gloucester Quantity	Portland Quantity	Other New England and Middle Atlantic Ports Quantity	Total Quantity
1929	183,197	21,505	8,710	80,397	293,809
1930	190,492	15,340	10,051	54,876	270,759
1931	137,127	5,765	8,553	43,974	195,419
1932	130,796	2,771	3,366	29,581	166,514
1933	140,091	2,919	5,050	18,346	166,406
1934	134,885	5,590	4,689	19,566	164,730
1935	168,475	5,479	5,036	23,018	202,008
1936	154,771	4,537	4,720	21,450	185,478
1937	148,110	4,796	3,474	21,118	177,498
1938	146,438	4,295	3,027	22,028	175,788
1939	147,315	4,350	2,503	24,356	178,524
1940	125,590	5,873	5,858	18,631	155,952
1941	158,521	5,593	3,728	2/ 18,500	2/ 186,342
1942	114,227	8,926	2,018	20,516	145,687
1943	85,324	17,030	467	22,872	125,693
1944	83,456	18,173	371	38,566	140,566
1945	75,635	24,821	562	53,970	154,988
1946	81,479	18,448	829	54,279	155,035
1947	122,511	12,692	(1)	31,168	166,371
1948	120,052	12,724	(1)	23,599	156,375
1949	102,766	9,708	(1)	22,497	134,971
1950	122,412	11,381	(1)	24,766	158,559
1951	121,886	6,660	(1)	25,557	154,103
1952	124,419	12,735	(1)	24,343	161,497
1953	112,166	9,630	(1)	17,807	139,603
1954	123,641	10,584	(1)	20,709	154,934
1955	109,837	8,650	(1)	16,548	135,035
1956	121,595	10,002	(1)	20,649	152,246
1957	93,617	8,898	(1)	31,056	133,571
1958	81,524	9,801	2,168	3/ 9,399	4/ 102,892

1/ Included with other New England and Middle Atlantic ports.
2/ Partly estimated.
3/ Other New England ports only.
4/ Total landings at New England ports only.

Source: 1891-1956: Fishery Statistics of the United States, 1956. United States Fish and Wildlife Service, Washington 25, D.C., p. 434; 1957. Fishery Statistics of the United States, 1957; 1958: New England Fisheries - Annual Summary, 1958. Market News Service, Bureau of Commercial Fisheries, Boston, Massachusetts.

Table III-4

Total United States Haddock Landed from Georges Bank in Terms of Pounds, Days Fished, Catch-Per-Day, and Catch in Numbers, 1917-1957

Years	Pounds Landed (000's)	Catch-Per-Day (000's) of Pounds	Days Fished	Annual Catch In Thousands of Numbers	Average Weight Per Fish	Catch-Per Day In Numbers
1917	47,200	25.8	1,052			
1918	47,900	33.0	1,454			
1919	76,300	35.0	2,183			
1920	78,600	36.6	2,150			
1921	57,500	32.4	1,771			
1922	59,600	24.4	2,437			
1923	63,700	18.4	3,466			
1924	71,300	23.2	3,080			
1925	80,000	32.2	2,482			
1926	99,200	41.3	2,404			
1927	142,900	43.8	3,263			
1928	190,600	34.5	5,522			
1929	223,400	22.4	9,972			
1930	183,700	11.6	15,908			
1931	115,040	8.9	12,955	39,127	2.94	3,020
1932	105,420	11.6	9,110	39,481	2.67	4,334
1933	81,640	9.7	8,410	30,894	2.64	3,673
1934	49,884	11.3	4,839	19,335	2.58	3,996
1935	79,181	12.3	6,451	32,303	2.45	5,007
1936	84,018	13.5	6,224	35,387	2.37	5,686
1937	95,455	11.7	8,194	36,534	2.61	4,459
1938	92,387	11.7	7,874	37,897	2.44	4,813
1939	104,535	13.0	8,016	43,845	2.38	5,470
1940	96,645	12.8	7,218	34,963	2.65	4,844
1941	121,726	16.6	7,326	51,262	2.37	6,997
1942	107,091	18.7	5,732	45,262	2.37	7,896
1943	89,584	18.3	4,882	37,429	2.39	7,667
1944	95,992	17.0	5,656	33,149	2.90	5,861
1945	78,271	16.0	4,892	26,552	2.95	5,428
1946	103,886	14.3	7,283	37,373	2.78	5,132
1947	105,265	12.8	8,223	41,795	2.52	5,083
1948	93,523	12.1	7,714	41,168	2.27	5,337
1949	81,714	11.4	7,140	33,681	2.43	4,717
1950	79,818	14.5	5,486	42,879	1.86	7,816
1951	91,508	14.1	6,490	43,668	2.10	6,728
1952	83,645	14.1	5,933	45,621	1.83	7,689
1953	69,476	10.7	6,511	32,004	2.17	4,915
1954	89,710	15.4	5,807	48,301	1.86	8,318
1955	78,942	15.6	5,059	33,086	2.38	6,540
1956	94,505	13.9	6,794	38,612	2.45	5,683
1957	89,261	11.1	8,050	34,832	2.56	4,328

Source: United States Fish and Wildlife Service, Woods Hole, Massachusetts, Woods Hole Laboratory.

Table III-5

Breakdown of Haddock Landings from Georges Bank, with Catch Per Day For Large and Scrod Haddock, 1931-1957.

Year	Large (000 lbs.)	Percent Large Of Total	Scrod (000 lbs.)	Percent Scrod Of Total	Total (000 lbs.)	Days Fished	Large (Catch per day in pounds)	Scrod (Catch per day in pounds)
1931	97,539	84.8	17,501	15.2	115,040	12,955	7,529	1,351
1932	73,907	70.1	31,513	29.9	105,420	9,110	8,113	3,459
1933	62,842	77.0	18,798	23.0	81,640	8,410	7,472	2,235
1934	36,908	74.0	12,976	26.0	49,884	4,839	7,627	2,682
1935	53,644	67.7	25,537	32.3	79,181	6,451	8,316	3,959
1936	54,068	64.4	29,950	35.6	84,018	6,224	8,687	4,812
1937	64,371	67.4	31,084	32.6	95,455	8,194	7,856	3,794
1938	52,480	56.8	39,907	43.2	92,387	7,784	6,742	5,127
1939	61,410	58.7	43,125	41.3	104,535	8,016	7,661	5,380
1940	63,045	68.1	29,600	31.9	92,645	7,218	8,734	4,101
1941	67,962	55.8	53,764	44.2	121,726	7,326	9,277	7,339
1942	57,611	53.8	49,480	46.2	107,091	5,732	10,051	8,632
1943	52,077	58.1	37,507	41.9	89,584	4,882	10,667	7,683
1944	80,744	84.1	15,248	15.9	95,992	5,656	14,276	2,696
1945	66,597	85.1	11,674	14.9	78,271	4,892	13,613	2,386
1946	82,766	79.7	21,120	20.3	103,886	7,283	11,364	2,900
1947	64,360	61.1	40,905	38.9	105,265	8,223	7,827	4,974
1948	48,967	52.4	44,556	47.6	93,523	7,714	6,348	5,776
1949	47,679	58.3	34,035	41.7	81,714	7,140	6,678	4,767
1950	32,693	41.0	47,125	59.0	79,818	5,486	5,959	8,590
1951	37,326	41.0	54,182	59.0	91,508	6,490	5,751	8,349
1952	27,741	33.2	55,904	66.8	83,645	5,933	4,676	9,423
1953	31,687	45.6	37,789	54.4	69,476	6,511	4,867	5,804
1954	29,118	32.5	60,592	67.5	89,710	5,807	5,014	10,434
1955	34,569	43.8	44,373	56.2	78,942	5,059	6,833	8,771
1956	44,410	47.0	50,095	53.0	94,505	6,794	6,537	7,373
1957	44,462	49.8	44,799	50.2	89,261	8,050	5,523	5,565

Source: United States Fish and Wildlife Service, Woods Hole Laboratory, Woods Hole, Massachusetts.

Table III-6

Boston Landings, Haddock and Scrod, 1914-1959
(Millions of Pounds)

Year	Haddock (a) Quantity	Haddock Percent of Total	Scrod (b) Quantity	Scrod Percent of Total	Total
1914	40.99	86.8	6.24	13.2	47.23
1915	36.04	75.3	11.80	24.7	47.84
1916	34.35	70.8	14.20	29.2	48.55
1917	34.04	74.8	11.47	25.2	45.51
1918	46.14	88.4	6.05	11.6	52.19
1919	55.56	96.0	2.30	4.0	57.86
1920	64.72	100.0			64.72
1921	55.22	100.0			55.52
1922	52.67	99.6	.20	.4	52.87
1923	56.12	92.7	4.42	7.3	60.54
1924	57.12	83.8	11.02	16.2	68.14
1925	61.39	82.7	12.89	17.3	74.28
1926	71.46	87.3	10.41	12.7	81.87
1927	96.12	87.5	13.74	12.5	109.86
1928	124.79	91.2	12.05	8.8	136.84
1929	151.59	94.3	9.11	5.7	160.70
1930	159.28	95.3	7.82	4.7	167.10
1931	106.03	88.1	14.26	11.9	120.29
1932	87.08	75.9	27.65	24.1	114.73
1933	90.35	73.5	32.53	26.5	122.88
1934	71.85	57.2	53.81	42.8	125.66
1935	100.64	68.1	47.15	31.9	147.79
1936	97.59	71.9	38.17	28.1	135.76
1937	96.82	74.5	33.10	25.5	129.92
1938	85.43	66.5	43.02	33.5	128.45
1939	79.46	61.5	49.77	38.5	129.23
1940	73.30	66.5	36.87	33.5	110.17
1941	80.05	57.6	59.00	42.4	139.05
1942	54.39	54.3	45.81	45.7	100.20
1943	42.70	57.0	32.15	43.0	74.85
1944	59.84	82.0	13.16	18.0	73.00
1945	59.30	89.5	6.99	10.5	66.29
1946	57.78	80.9	13.64	19.1	71.42
1947	70.25	65.4	37.22	34.6	107.47
1948	58.13	55.2	47.18	44.8	105.31
1949	52.85	58.6	37.30	41.4	90.15
1950	47.84	44.6	59.54	55.4	107.38
1951	46.47	43.5	60.45	56.5	106.92
1952	44.99	41.2	64.14	58.8	109.13
1953	48.50	49.3	49.89	50.7	98.39
1954	46.90	43.2	61.55	56.8	108.45
1955	46.68	48.4	49.67	51.6	96.35
1956	52.95	49.6	53.71	50.4	106.66
1957	45.38	48.5	48.24	51.5	93.62
1958	41.14	50.5	40.39	49.5	81.53
1959	36.27	50.6	35.36	49.4	71.63

(a) This data applies to haddock weighing over 2½ pounds. (Figures rounded in most instances to nearest hundredth.) Negligible salt-fish figures calculated.

(b) This data applies to haddock weighing up to 2½ pounds. (Figures rounded in most instances to nearest hundredth. Landings of scrod were negligible in 1920 and 1921.

Source: United States Fish and Wildlife Service, Market News Reports, Boston, Massachusetts.

Table III-7

Average Ex-Vessel* Prices for Large and Scrod Haddock, 1946-1959 New England Fish Exchange, Boston, Massachusetts

(Dollars per 100 Pounds)

Year	Large Haddock	Scrod Haddock	Difference In Price	Weighted Average Price, All Haddock
1946	10.55	9.61	0.94	10.35
1947	8.71	6.51	2.20	7.96
1948	9.95	8.44	1.51	9.27
1949	8.81	6.90	1.91	8.02
1950	10.65	6.83	3.82	8.52
1951	10.61	7.58	3.03	8.89
1952	10.69	7.68	3.01	8.92
1953	9.57	7.94	1.63	8.74
1954	9.40	5.90	3.50	7.42
1955	7.81	6.11	1.70	6.93
1956	7.96	6.67	1.29	7.31
1957	9.67	8.24	1.43	8.94
1958	11.87	11.08	0.79	11.48
1959	12.13	10.58	1.55	11.37

* - The auction price at which the catch is sold.

Source: Annual Summaries, 1946-1959, Market News Reports, United States Fish and Wildlife Service, Boston, Massachusetts.

Table III-8

Changes in Georges Bank Haddock Fishing Effort, 1931-1956, in Effort on Catch Per Day, Annual Fleet Landings, Annual Fleet Catch in Numbers

Years	Average Catch Per Day In Pounds	Average Total Annual Catch In Thousands Of Pounds	Average Annual Catch In Thousands Of Numbers	Average Number of Days Fished
1931-1939	10,267	80,756	31,484	7,257
1942-1945	17,502	92,735	35,598	5,290
1947-1956	13,474	86,310	40,082	6,516
		Percent Change		
1931-1939 to 1947-1956	+31.2	+6.9	+27.3	-10.2
1931-1939 to 1942-1945	+70.5	+14.8	+13.1	-27.1

Source: United States Fish and Wildlife Service, Woods Hole, Massachusetts.

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Table III-9

Taylor Basic Study of Effort/Catch Relationship Georges Bank Haddock Fishery

Fishing Effort In Days	Effort Level (Percent)	Before Mesh Regulations		After Mesh Regulations	
		Annual Landings (Millions of pounds)	Catch Per Day (Thousands of pounds)	Annual Landings (Millions of pounds)	Catch Per Day (Thousands of pounds)
1,827	25	70.7	38.7	73.6	40.3
3,653	50	92.5	25.3	103.8	28.4
5,480	75	96.6	17.6	115.5	21.1
7,306	100	94.2	12.9	120.7	16.5
9,133	125	89.7	9.8	122.0	13.4
10,959	150	84.8	7.7	121.7	11.1
12,786	175	79.7	6.2	120.8	9.4
14,612	200	75.1	5.1	119.4	8.2

Source: Excerpts from unpublished manuscript of Clyde C. Taylor, Fishery Research Biologist, Woods Hole, Laboratory, United States Fish and Wildlife Service, Woods Hole, Massachusetts.

Table III-10

Number of Large Otter Trawlers at Various Levels of Fishing Effort on Georges Bank Haddock Resource

I Effort Level (Percent)	II Annual Number Of Days Fished By Fleet	III Fleet landings	IV Catch Per Day	V Days Fished Per Trip	VI Length Of Each Trip	VII Number Of Trips Per Year By Fleet	VIII Number of Days Absent From Port Per Boat	IX Number of Trips Per Boat Per Year	X Number Of Boats	XI Annual Catch Per Boat In Millions Pounds
25	1,827	73.6	40.3	5.5	8.0	332	240	30	11	6.69
50	3,653	103.8	28.4	5.5	8.0	664	240	30	22	4.72
75	5,480	115.5	21.1	5.5	8.0	996	240	30	33	3.50
100	7,306	120.7	16.5	5.5	8.0	1,328	240	30	44	2.74
125	9,133	122.0	13.4	5.5	8.0	1,661	240	30	55	2.22
150	10,959	121.7	11.1	5.9	8.4	1,858	240	29	64	1.90
175	12,786	120.8	9.4	6.9	9.4	1,853	240	25	74	1.63
200	14,612	119.4	8.2	7.5	10.0	1,948	240	24	81	1.47

Source: See text.

Table III-11

Number of Haddock Trawler Vessels by Size - Boston, 1947-1958

Year	Over 150 Gross Tons Large	50-150 Gross Tons Medium	Under 50 Gross Tons Small
1947	59	28	30
1948	52	24	30
1949	38	24	32
1950	39	24	31
1951	38	23	29
1952	38	22	24
1953	34	23	20
1954	34	27	16
1955	31	24	14
1956	30	28	11
1957	30	33	10
1958	28	36	8

Source: New England Fisheries - Annual Summary 1957, 1958, by John J. O'Brien, Bureau of Commercial Fisheries, Market News Service, Boston 10, Massachusetts.

Table III-12

Revenue-Expense Relationships Per Boat As Fishing Effort Changes

I Effort Level (Percent)	II Effort In Days Fished	III Number Of Boats	IV Fleet Landings in Millions of Pounds	V Annual Yield Per Boat Millions of Pounds	VI Total Revenue Per Boat 1/	VII Trip Expenses Per Boat 2/ (65.35 percent of Gross Revenue)	VIII Contribution to Overhead	IX Average Overhead 3/	X Profit or (loss) per Boat
25	1,827	11	73.6	6.69	$568,650	$371,613	$197,037	$65,000	$132,037
50	3,653	22	103.8	4.72	401,200	262,184	139,016	65,000	74,016
75	5,480	33	115.5	3.50	297,500	194,416	103,084	65,000	38,084
100	7,306	44	120.7	2.74	232,900	152,200	80,700	65,000	15,700
125	9,133	55	122.0	2.22	188,700	123,315	65,385	65,000	385
150	10,959	64	121.7	1.90	161,500	105,540	55,960	65,000	(9,040)
175	12,786	74	120.8	1.63	138,550	90,542	48,008	65,000	(16,992)
200	14,612	81	119.4	1.47	124,950	81,655	43,295	65,000	(21,705)

1/ At 8½ cents per pound.

2/ Source of Trip Expense Rates and Daily Crew Expenses are Settlement Sheets of Atlantic Fishermen's Union, 1956-1957. Trip expenses also include Captain's Bonus, usually 10 percent of Owner's Gross Share. Trip expenses are 65.35 percent of Gross Revenue; 3.75 percent of Gross is Joint Expenses; 57.75 percent is Gross Crew Share; 3.85 percent is Captain's Bonus.

3/ Based on data submitted by vessel owners to the United States Tariff Commission in 1956 and Boston College in 1958.

Table III-13

Crew Share and Expenses at Various Levels of Fishing Effort
(Based on Data in Table III-12)

I Effort Level (Percent)	II Gross Crew Share Per Boat (57.75 percent of Gross Revenue)	III Crew Expenses Per Boat 1/ ($163 Per Day Out Of Port)	IV Net Crew Share Per Boat	V Net Crew Share Per Man (16 Men)	VI Crew Guarantee 2/ (15 Men Per Boat)
25	$328,395	$39,120	$289,275	$18,080	$43,200
50	231,693	39,120	192,573	12,036	43,200
75	171,806	39,120	132,686	8,293	43,200
100	134,500	39,120	95,380	5,961	43,200
125	108,974	39,120	69,854	4,366	43,200
150	93,266	39,120	54,146	3,384	43,200
175	80,013	39,120	40,893	2,556	43,200
200	72,159	39,120	33,039	2,065	43,200

1/ Crew expenses based on 16-man crew: 50 percent of Boston's large haddock boats have 17 men; 50 percent have 15 men. 240 days out of port annually.

2/ Crew guarantee in labor contract is $12 per man per day out of port, Captain is not covered by this. Each boat out of port 240 days annually.

Table III-14

Revenue-Expense Relationships For Fleet As Fishing Effort Changes

Effort Level (Percent)	Number of Boats	Fleet's Annual Catch In Millions Of Pounds	Total Gross Revenue In Millions of Dollars (8½ Cents Per Pound)	Total Trip Expenses In Millions Of Dollars 1/	Total Contribution To Overhead In Millions Of Dollars	Overhead 2/ For Fleet	Net Profit (loss) for Fleet
25	11	73.6	6.26	4.09	2.17	715,000	1,455,000
50	22	103.8	8.82	5.76	3.06	1,430,000	1,630,000
75	33	115.5	9.82	6.42	3.40	2,145,000	1,255,000
100	44	120.7	10.26	6.70	3.56	2,860,000	700,000
125	55	122.0	10.37	6.78	3.59	3,575,000	15,000
150	64	121.7	10.34	6.76	3.58	4,160,000	(580,000)
175	74	120.8	10.27	6.71	3.56	4,810,000	(1,250,000)
200	81	119.4	10.15	6.63	3.52	5,265,000	(1,745,000)

1/ Source of Trip Expense Rates and Daily Crew Expenses are Settlement Sheets of Atlantic Fishermen's Union 1956-1957. Trip Expenses also include Captain's Bonus, usually 10 percent of Owner's Gross Share. Trip Expenses are 65.35 percent of Gross Revenue; 3.75 percent of Gross is Joint Expenses; 57.75 percent is Gross Crew Share; 3.85 percent is Captain's Bonus. Crew Expenses based on 16 man crew. 50 percent of Boston boats have 17 men, 50 percent have 15 men.

2/ $65,000 times the number of vessels.

Table III-15

Poundage Needed To Make A Return On Investment Of 10 Percent, If Price Is $8\frac{1}{2}$ Cents Per Pound

A. In the case of a new large otter-trawler of same size as the ones now in the Boston fleet:

Let y = revenue necessary to make $23,750 before taxes.

Overhead = $75,000

Trip Expenses = 65.35 percent of gross revenue
then, y = .6535y + 75,000 + 23,750

.3465y = 98,750

y = $284,993

At $8\frac{1}{2}$ cents per pound, this is 3,352,858 pounds per vessel.

B. In the case of the smaller large-trawlers now being designed:

Overhead = $61,000

Trip expenses = 65.35 percent of gross revenue

then, y = .6535y = 61,000 = 14,500

.3465y = 75,500

y = $217,893

At $8\frac{1}{2}$ cents per pound, this is 2,563,447 pounds per vessel.

Table III-16

Part I. Prices Necessary To Break-Even And Earn $23,750 on New OTL Of Size Now Typical of Fleet At Various Effort Levels With Mesh Increasing Landings

I Effort Levels (Percent)	II Per Boat Catch In Millions of Pounds	III Revenue To Break-Even 1/	IV Price To Break-Even	V Revenue To 2/ Earn $23,750	VI Price Per Pound To Earn $23,750
25	6.69	216,450	3.2	284,993	4.3
50	4.72	216,450	4.6	284,993	6.0
75	3.50	216,450	6.2	284,993	8.1
100	2.74	216,450	7.9	284,993	10.4
125	2.22	216,450	9.8	284,993	12.8
150	1.90	216,450	11.4	284,993	15.0
175	1.63	216,450	13.3	284,993	17.5
200	1.47	216,450	14.7	284,993	19.4

Part II. Prices Necessary To Break-Even and Earn $14,500 On Smaller OTL's Being Designed

Effort Levels (Percent)	Per Boat Catch In Millions of Pounds	Revenue To Break-Even 3/	Price To Break-Even	Revenue to Earn $14,500	Price To Earn $14,500
25	6.69	176,046	2.6	217,893	3.3
50	4.72	176,046	3.7	217,893	4.6
75	3.50	176,046	5.0	217,893	6.2
100	2.74	176,046	6.4	217,893	8.0
125	2.22	176,046	7.9	217,893	9.8
150	1.90	176,046	9.3	217,893	11.5
175	1.60	176,046	10.8	217,893	13.4
200	1.47	176,046	12.0	217,893	14.8

1/ Based on $75,000 overhead.
2/ Based on above overhead and $23,750 average investment return.
3/ Based on $61,000 overhead.

Table III-17

Effort Level (Percent)	Total Revenue Per Vessel	Contribution To Overhead	Overhead Present Average OTL	Profit or (loss)
	(Expressed in Dollars)			
	A. Present Average Large Otter Trawler			
25	568,650	197,037	65,000	132,037
50	401,200	139,016	65,000	74,016
75	297,500	103,084	65,000	38,084
100	232,900	80,700	65,000	15,700
125	188,700	65,385	65,000	385
150	161,500	55,960	65,000	(9,040)
175	138,550	48,008	65,000	(16,992)
200	124,950	43,295	65,000	(21,705)
	B. New Large Trawler Of Same Size As Present Ones			
	I With No Increase In Catching Efficiency			
25	568,650	197,037	75,000	122,037
50	401,200	139,016	75,000	64,016
75	297,500	103,084	75,000	28,084
100	232,900	80,700	75,000	5,700
125	188,700	65,385	75,000	(9,615)
150	161,500	55,960	75,000	(19,040)
175	138,550	48,008	75,000	(26,992)
200	124,950	43,295	75,000	(31,705)
	II With 15 Percent Increase In Catching Efficiency			
25	653,948	226,593	75,000	151,593
50	461,380	159,868	75,000	84,868
75	342,125	118,546	75,000	43,546
100	267,835	92,805	75,000	17,805
125	217,005	75,192	75,000	192
150	185,725	64,354	75,000	(10,646)
175	159,333	55,209	75,000	(19,791)
200	143,693	49,790	75,000	(25,300)
	C. New Otter Trawler of Smaller 100' Class			
25	568,650	197,037	61,000	136,037
50	401,200	139,016	61,000	78,016
75	297,500	103,084	61,000	42,084
100	232,900	80,700	61,000	19,700
125	188,700	65,385	61,000	4,385
150	161,500	55,960	61,000	(5,040)
175	138,550	48,008	61,000	(12,992)
200	124,950	43,295	61,000	(17,705)

Tables for Chapter IV

Tables IV-1 through IV-4

Table IV-1

Catch of Ocean Perch, Maine and Massachusetts, 1930-1959

(In Thousands of Pounds)

Year	Maine	Percent	Massachusetts	Percent	Total
1930	4	3.5	110	96.5	114
1931	10	4.3	223	95.7	233
1932	2	1.7	118	98.3	120
1933	2	0.8	262	99.2	264
1934	n.a.		n.a.		n.a.
1935	47	0.3	17,110	99.7	17,157
1936	n.a.		n.a.		n.a.
1937	140	0.2	58,216	99.8	58,356
1938	569	0.9	64,436	99.1	65,005
1939	4,585	5.9	72,790	94.1	77,375
1940	7,036	8.3	78,106	91.7	85,142
1941	n.a.		n.a.		n.a.
1942	26,847	21.0	101,243	79.0	128,090
1943	25,654	22.4	89,083	77.6	114,737
1944	26,555	22.1	93,661	77.9	120,216
1945	28,352	21.5	103,482	78.5	131,834
1946	41,072	23.1	137,077	76.9	178,149
1947	39,988	27.3	106,599	72.7	146,587
1948	49,041	20.6	189,054	79.4	238,095
1949	55,503	23.4	181,484	76.6	236,987
1950	79,281	38.2	128,512	61.8	207,793
1951	73,942	28.6	184,371	71.4	258,313
1952	60,468	32.0	128,566	68.0	189,034
1953	60,623	39.4	93,271	60.6	153,894
1954	79,671	43.9	101,781	56.1	181,452
1955	67,685	43.1	89,303	56.9	156,988
1956	64,967	43.0	86,146	57.0	151,113
1957	64,723	48.3	69,208	51.7	133,931
1958	77,573	52.6	70,013	47.4	147,586
1959	73,074	54.5	60,921	45.5	133,995

n.a. - Data not available.

Source: 1930-1957, Fishery Statistics of the United States; 1958 and 1959, New England Fisheries - Annual Summeries.

Table IV-2

Ocean Perch Fishing Effort Statistics

Gulf of Maine Statistical Subarea XXII			Nova Scotia Banks Statistical Subarea XXII			Grand Banks Statistical Subarea XX			Gulf of St. Lawrence Statistical Subarea XIX		
Year	Calculated Fishing Effort (Days Fished)	Average Catch/Day (Thousands Of Pounds)	Year	Calculated Fishing Effort (Days Fished)	Average Catch/Day (Thousands Of Pounds)	Year	Calculated Fishing Effort (Days Fished)	Average Catch/Day (Thousands Of Pounds)	Year	Calculated Fishing Effort (Days Fished)	Average Catch/Day (Thousands Of Pounds)
1942	8,122.7	15.17	1942	286.2	17.01						
1943	7,221.5	14.76	1943	268.9	30.29						
1944	9,344.4	11.90	1944	369.3	24.41						
1945	8,374.8	9.98	1945	2,456.7	19.64						
1946	9,080.2	10.30	1946	3,079.3	27.48						
1947	8,344.5	10.73	1947	2,820.6	20.58						
1948	8,096.7	11.88	1948	4,984.3	28.47						
1949	9,208.7	7.36	1949	7,719.2	21.92						
1950	8,422.6	8.98	1950	7,060.2	18.63	1950	12.9	48.00			
1951	9,814.8	6.95	1951	6,922.8	21.91	1951	445.5	67.12	1951	353.1	24.12
1952	6,042.1	7.80	1952	5,013.8	16.74	1952	818.6	55.13	1952	463.4	21.47
1953	4,459.8	8.30	1953	1,837.7	16.11	1953	1,647.9	44.66	1953	681.7	23.51
1954	3,858.9	7.42	1954	1,899.5	24.25	1954	1,785.9	38.60	1954	1,517.4	25.03
1955	3,089.1	9.93	1955	1,099.9	18.70	1955	1,125.9	26.25	1955	2,397.1	31.95
1956	3,266.7	9.71	1956	1,460.7	24.62	1956	942.5	31.12	1956	2,024.0	27.04
1957	3,862.3	9.40	1957	1,895.6	24.54	1957	288.5	36.65	1957	1,960.4	20.60

Source: Data submitted by G. P. Kelly, ocean perch specialist, United States Fish and Wildlife Service, Woods Hole, Massachusetts, December, 1958.

Table IV-3

Ocean Perch Landings, By Gear, Various Years, at Certain New England Ports

(In Thousands of Pounds)

Year	Large Trawlers	Per-cent	Medium Trawlers	Per-cent	Small Trawlers	Per-cent	Total
1942	5,810	5.0	92,428	80.3	16,903	14.7	115,141
1943	5,246	5.2	83,206	82.1	12,875	12.7	101,327
1944	4,584	4.4	88,440	85.0	11,026	10.6	104,050
1946	23,118	14.6	120,499	76.3	14,327	9.1	157,944
1947	28,539	26.8	72,327	67.8	5,731	5.4	106,597
1948	69,631	36.8	114,730	60.7	4,690	2.5	189,051
1949	66,925	36.9	110,065	60.6	4,486	2.5	181,476
1950	43,809	34.1	81,343	63.3	3,360	2.6	128,512
1951	67,320	36.5	114,169	61.9	2,877	1.6	184,366
1952	51,125	39.8	74,834	58.2	2,602	2.0	128,561
1953	45,141	48.4	46,262	49.6	1,868	2.0	93,271
1954	47,928	47.1	52,881	52.0	968	0.9	101,777
1955	51,907	58.1	36,529	40.9	866	1.0	89,302
1956	46,580	54.1	37,954	44.0	1,613	1.9	86,147
1957	41,154	59.5	26,130	37.8	1,924	2.7	69,208

Source: Fishery Statistics of the United States, 1942-1957.

Table IV-4

Whiting Landings In Massachusetts and Maine, Various Years

(In Thousands of Pounds)

Years	Massachusetts	Maine	Total New England Landings
1932	6,377	3	7,201
1933	8,678	-	9,419
1935	15,418	12	17,415
1937	21,038	(1)	22,480
1938	24,203	648	25,095
1939	23,493	4,046	28,055
1940	35,954	4,036	40,869
1942	43,266	2,634	46,870
1943	46,497	1,962	53,997
1944	43,537	3,836	51,788
1945	68,577	5,289	77,664
1946	43,171	5,697	51,080
1947	52,921	6,015	61,981
1948	68,904	8,655	80,468
1949	75,776	12,580	90,036
1950	48,831	15,616	65,464
1951	97,974	19,577	118,467
1952	81,202	23,328	105,955
1953	71,858	12,668	85,365
1954	78,050	9,319	90,386
1955	81,884	25,128	110,630
1956	72,445	14,835	90,090
1957	107,972	15,810	126,312
1958	65,582	15,522	82,140
1959	67,254	14,019	82,961

1/ Less than 500 pounds.

Source: 1932-1957, Fishery Statistics of the United States (Annual); 1958 and 1959, New England Landings - Annual Summary.

Tables for Chapter V

Tables V-1 through V-19

Table V-1

Landings, Receipts and Trips for the Average 200 Gross Ton and Over Vessel and the Average 150-199 Gross Ton Vessel, 1956-1958

(In Thousands of Pounds and Thousands of Dollars)

Year	200 Gross Tons and Over 1/			150-199 Gross Tons 2/		
	Landings (Quantity)	Receipts (Value)	Trips	Landings (Quantity)	Receipts (Value)	Trips
1956	3,393.2	238.9	29	2,437.9	169.7	27
1957	3,190.5	261.1	29	2,008.5	143.9	26
1958	2,770.5	286.5	29	1,811.0	190.5	27

1/ Average of 15 trawlers in each year.
2/ Average of 9 trawlers in each year.

Source: Information furnished by the New England Fish Exchange.

Table V-2

15 Boston Trawlers 200 Gross+ Ranked By Total Receipts, 1956-1958

Vessel	1956	1957	1958
A	1	1	1
B	2	3	3
C	3	2	2
D	4	4	4
E	5	6	6
F	6	7	7
G	7	5	5
H	8	8	9
I	9	10	10
J	10	9	8
K	11	13	12
L	12	12	13
M	13		
N	14	11	11
O	15		15

Source: New England Fish Exchange.

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Table V-3

9 Boston Trawlers 150-199 Gross Tons Ranked by Total Receipts, 1956-1958

Vessel	1956	1957	1958
P	1	1	3
Q	2	2	5
R	3	3	1
S	4	7	
T	5		
U	6	5	9
V	7		2
W	8	4	4
X	9	8	

Source: New England Fish Exchange.

Table V-4

Average Landings, Gross Tonnage and Number of Trips, Best and Worst of Boston Trawlers 200 Gross+ and 150-199 Gross Tons, 1956-1958

	1956	1957	1958
200 Gross+, Top 6 Trawlers			
Average Landings	3.9	3.7	3.3
Average Gross Tonnage	245	245	245
Average Number of Trips	31	31	31
200 Gross+, Bottom 6 Trawlers			
Average Landings	2.5	2.2	1.9
Average Gross Tonnage	240	240	240
Average Number of Trips	25	25	25
150-199 Gross Tons, Top 3 Trawlers			
Average Landings	2.8	2.2	1.9
Average Gross Tonnage	164	164	164
Average Number of Trips	29	28	28
150-199 Gross Tons, Bottom 3 Trawlers			
Average Landings	1.9	1.4	1.7
Average Gross Tons	170	164	164
Average Number of Tripa	23	21	23

Source: New England Fish Exchange.

Table V-5

Range in Landings, Receipts, Activity, Boston Vessels 200 Gross+ and 150-199 Gross, 1956-1958

	1956	1957	1958
Millions of Pounds			
High	4.7	4.8	4.2
Low	2.1	1.5	1.3
Receipts (Thousands of Dollars)			
High	340.0	390.0	400.0
Low	137.0	114.0	121.0
Trips			
High	33	33	32
Low	14	16	13
Vessels 150-199 Gross Tons			
Millions of Pounds			
High	2.9	2.2	1.9
Low	1.5	1.1	1.1
Receipts (Thousands of Dollars)			
High	211.0	193.0	213.0
Low	108.0	118.0	103.0
Trips			
High	30	27	30
Low	20	18	15

Source: Information furnished by New England Fish Exchange.

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Table V-6

Comparative Performance of Two Sister-Ships Similar in All Respects Except for Captaincy

	1956		1957	
	Vessel A	Vessel B	Vessel A	Vessel B
Per Day Absent Receipts	$880	$759	$958	$835
Per Day Absent Crew Earnings	$20/man	$16/man	$23/man	$20/man
Vessel Share/Per Day Absent	$316	$291	$370	$323

Source: Information furnished by operators of Vessels A and B.

Table V-7

Average Performance of "Successful" Boston Trawlers, 200 Gross+, 1953-1957

	1953	As a Percent of Receipts	1954	As a Percent of Receipts	1955	As a Percent of Receipts	1956	As a Percent of Receipts	1957	As a Percent of Receipts
Pounds	3,183.0		3,752.0		4,074.0		3,534.0		3,282.8	
Receipts	266.8		264.5		284.2		255.2		274.6	
Trip and Joint	54.2	20.3	49.4	18.7	55.5	19.5	59.4	23.3	62.6	22.8
Net Crew	111.2	41.7	115.9	43.8	120.4	42.4	101.6	39.8	108.5	39.5
Bonus	10.2	3.8	10.3	3.9	10.8	3.8	9.7	3.8	10.4	3.8
Vessel Share	91.2	34.2	88.9	33.6	97.4	34.3	84.5	33.1	92.9	33.8
Gear and Repair	39.8	14.9	39.4	14.9	46.3	16.3	36.8	14.4	43.7	15.9
Depreciation	11.3	4.2	11.3	4.3	11.6	4.1	12.0	4.7	9.0	3.3
Insurance	13.3	5.0	13.2	5.0	12.8	4.5	12.0	4.7	11.4	4.2
Interest										
Payroll Taxes	3.0	1.1	5.0	1.9	5.0	1.8	2.7	1.1	2.9	1.0
Administration and Other	17.3	6.5	15.0	5.7	16.3	5.7	17.8	7.0	20.3	7.4
Total Vessel Expense	84.7	31.7	83.9	31.8	92.0	32.4	81.3	31.9	87.3	31.8
Operating Profit or Loss	6.4		5.0		5.4		3.2		5.6	
Trips	30		28		30		30		29	
Men	17		17		17		17		17	

Source: Cost and Earnings data furnished by trawler operators.

Table V-8

Average Performance of "Unsuccessful"
Boston Trawlers, 200 Gross+, 1953-1957

	1953	As a Percent of Receipts	1954	As a Percent of Receipts	1955	As a Percent of Receipts	1956	As a Percent of Receipts	1957	As a Percent of Receipts
Pounds	2,279.5		2,270.5		2,369.0		2,321.8		1,654.8	
Receipts	183.6		190.2		141.7		155.9		125.8	
Trip and Joint	43.6	23.7	47.3	24.9	38.9	27.5	39.0	25.0	36.1	28.7
New Crew Share	73.6	40.2	73.3	38.5	58.4	41.2	64.4	41.2	48.6	38.6
Bonus	7.1	3.9	7.2	3.8	5.4	3.8	6.0	3.8	4.9	3.9
Vessel Share	59.2	32.2	62.3	32.8	38.9	27.5	46.5	30.0	36.2	28.8
Gear and Repair	29.4	16.0	28.1	14.8	21.6	15.2	17.6	11.3	28.6	22.7
Depreciation	7.4	4.0	7.4	3.9	7.4	5.2	7.9	5.0	7.9	6.3
Insurance	9.0	4.9	10.6	5.6	14.2	10.0	14.9	9.5	15.6	12.4
Payroll Taxes	3.1	1.7	4.4	2.3	3.4	2.4	2.9	1.9	3.5	2.8
Administration and Other	13.1	7.1	13.2	6.9	13.4	9.5	13.2	8.5	13.0	10.3
Total Vessel	62.0	33.8	63.7	33.5	60.0	42.3	56.5	36.2	68.6	54.5
Operating Profit or Loss	(2.8)		(1.4)		(21.1)		(10.0)		(32.4)	
Trips	27		27		24		24		19	
Crew	17		17		17		17		16	

Source: Cost and Earnings data furnished by trawler operators.

Table V-9

Boston Trawlers 200 Gross Tons and Over
Association Between Vessel Receipts and Gear, Repair and Maintenance Expenditures, 1953, 1955, and 1957

1953 - Rank		1955 - Rank		1957 - Rank	
Vessel Receipts	Gear, Etc.	Vessel Receipts	Gear, Etc.	Vessel Receipts	Gear, Etc.
1	1	1	2	1	1
2	2	2	3	2	2
3	3	3	1	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6		
7	7	7	8		
8	8	8	7		

Source: 1953-1955 data furnished by United States Tariff Commission, 1957 data furnished by Boston large trawler owners.

Table V-10

Per Vessel Operating Results of
Boston Trawlers 150-199 Gross Tons, 1953-1957
(Thousands of Pounds and Thousands of Dollars)

	1953	As Percent of Receipts	1954	As Percent of Receipts	1955	As Percent of Receipts	1956	As Percent of Receipts	1957	As Percent of Receipts
Landings	1,951.9		1,827.6		2,377.9		2,095.0		1,705.3	
Receipts	173.8		163.1		161.3		150.4		145.5	
Trip and Joint Expenses	37.9	21.8	36.2	22.2	38.2	23.7	40.0	26.7	39.0	26.8
Net Crew Share	73.9	42.5	70.4	43.2	65.0	40.3	60.2	40.0	56.2	38.7
Bonus	6.6	3.8	6.2	3.8	6.1	3.8	5.6	3.7	5.5	3.8
Vessel Share	55.4	31.9	50.3	30.8	52.0	32.2	44.6	29.6	44.6	30.7
Gear and Repair	23.3	13.4	23.0	14.1	21.9	13.6	19.9	13.3	20.4	14.0
Depreciation	8.6	4.9	8.9	5.4	7.3	4.5	7.4	4.9	8.2	5.7
Insurance	8.1	4.7	9.9	6.1	10.8	6.7	11.9	7.9	11.5	7.9
Payroll	3.0	1.7	3.5	2.1	3.1	1.9	2.5	1.7	2.8	1.9
Interest	.3	.2	.9	.6	1.0	.6	.8	.5	.9	.6
Administration and Other	9.0	5.2	7.5	4.6	8.5	5.3	7.3	4.8	9.1	6.3
Total Vessel Expense	52.3	30.1	53.7	32.9	52.6	32.6	49.8	33.1	53.0	36.4
Operating Profit or Loss	3.1		(3.4)		(.6)		(5.2)		(8.4)	
Trips	27		26		25		26		25	
Crew Size	15		15		15		15		14	
Total Vessels Included	4		4		4		5		6	

Source: Information furnished by trawler owners.

Table V-11

Boston Trawlers 150-199 Gross Tons Association
Between Vessel Receipts and Gear, Repair
and Maintenance Expenditures, 1953, 1955, 1957

Vessel Receipts	1953 Rank Gear, Repair and Maintenance Expenses	Vessel Receipts	1955 - Rank Gear, Repair and Maintenance Expenses	Vessel Receipts	1957 - Rank Gear, Repair and Maintenance Expenses
1	1	1	1	1	2
2	2	2	2	2	3
3	3	3	3	3	4
4	4	4	4	4	5
				5	1
				6	6

Source: Data for 1953 and 1955 furnished by United States Tariff Commission; data for 1957 furnished by trawler owners.

Table V-12

Average Pre-Tax Operating Profit (or Loss) on Gloucester and Maine Trawlers, 1950-1957

	Average Original Cost	Average Return on Original Cost 1950-1952 (Percent)	3 Year Average 1950-1952	Average Annual Profit or (Loss)				
				1953	1954	1955	1956	1957
Maine Trawlers								
150-199 gross tons	$150,000	7	$10,300	($4,200)	($9,500)	($5,900)	($13,500)	($7,700)
50-75 gross tons	52,000	11	5,900	4,700	2,200	1,900	1,300	2,400
Gloucester Trawlers								
150-199 gross tons	$137,500	9.6	$13,200	($5,100)	($8,700)	($4,900)	1,100	($6,700)
125-149 gross tons	90,000	9.0	8,000	(3,400)	3,400	(4,200)	(100)	(1,100)

Source: Information furnished by Trawler Operators.

Table V-13

Per Vessel Annual Landings and Average Price Per Pound, Gloucester and Maine Trawlers, 1950-1957
(In Thousands of Pounds and Dollars per cwt.)

	1950-1952		1953		1954		1955		1956		1957	
Maine Trawlers	Landings	Price	Landings	Price	Landings	Price	Landings	Price	Landings	Price	Landings	Price
150-199 gross tons	3,381.7	4.33	3,008.1	3.80	2,933.5	3.97	3,048.9	3.74	2,215.2	3.94	3,017.1	3.78
50-75 gross tons	1,431.6	4.44	1,417.8	3.70	1,158.0	4.30	1,486.4	3.20	1,206.7	3.86	1,301.9	4.06
Gloucester Trawlers												
150-199 gross tons	3,513.3	4.89	2,568.0	4.01	2,389.2	4.72	2,646.8	4.49	3,173.6	4.06	2,817.7	4.00
125-149 gross tons	2,942.3	4.82	2,062.7	4.42	2,210.0	5.45	1,947.0	5.19	2,147.9	5.20	1,720.0	6.40
			Percent Change from 1950-1952									
Maine Trawlers												
150-199 gross tons	100.0	100.0	-11.1	-12.2	-13.3	-8.3	-9.8	-13.6	-34.5	-9.0	-10.8	-12.7
50-75 gross tons	100.0	100.0	-1.0	-16.7	-19.1	-3.2	+3.8	-27.9	-15.7	-13.1	-9.1	-8.6
Gloucester Trawlers												
150-199 gross tons	100.0	100.0	-26.9	-18.0	-32.0	-3.5	-24.7	-8.2	-9.7	-17.0	-19.8	-18.2
125-149 gross tons	100.0	100.0	-29.9	-8.3	-24.9	+13.1	-33.8	+7.7	-27.0	+7.9	-41.5	+32.8

Source: Information furnished by trawler operators.

Table V-14

Per Vessel Receipts
Gloucester and Maine Trawlers, 1950-1957
(Thousands of Dollars)

	Annual Average	Annual Average				
Maine Trawlers	1950-1952	1953	1954	1955	1956	1957
150-199 gross tons	146.1	114.4	116.6	114.0	87.3	144.0
Percent change from 1950-1952		-21.7	-20.2	-22.0	-40.2	-1.0
50-75 gross tons	64.1	52.4	49.8	47.4	46.6	52.9
Percent change from 1950-1952		-18.3	-22.3	-26.1	-27.3	-17.5
Gloucester Trawlers						
150-199 gross tons	173.4	103.0	112.8	118.7	128.8	112.5
Percent change from 1950-1952		-40.6	-35.0	-31.6	-25.7	-35.1
125-149 gross tons	147.3	91.2	120.5	101.1	113.5	109.0
Percent change from 1950-1952		-38.1	-18.2	-31.4	-22.9	-26.0

Source: Information furnished by trawler owners.

Table V-15

Average Total Costs Per Vessel
Gloucester and Maine Trawlers, 1950-1957
(Thousands of Dollars)

	1950-1952	1953	1954	1955	1956	1957
Maine Trawlers						
150-199 gross tons	135.8	118.6	126.1	119.9	108.0	121.7
Percent Change		-12.7	-7.2	-11.7	-20.5	-10.4
50-75 gross tons	58.2	47.7	47.7	45.4	45.1	50.5
Percent Change		-18.0	-18.0	-22.0	-22.5	-13.2
Gloucester Trawlers						
150-199 gross tons	160.2	108.1	121.5	123.6	117.7	119.2
Percent Change		-32.5	-24.2	-22.8	-26.5	-25.6
50-75 gross tons	139.3	96.6	124.7	105.3	113.6	110.1
Percent Change		-30.7	-10.5	-24.4	-18.4	-21.0

Source: Information furnished by trawler owners.

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Table V-16

Average Annual Trip Expenditures of
Gloucester and Maine Trawlers, 1950-1957

Maine Trawlers	1950-1952	1953	1954	1955	1956	1957
150-199 gross tons	$1,318	$1,815	$1,860	$1,890	$2,065	$1,900
50-75 gross tons	292	333	365	343	372	377
Gloucester Trawlers						
150-199 gross tons	$1,563	$1,820	$1,915	$1,784	$1,980	$1,770
125-149 gross tons	1,418	1,444	1,485	1,305	1,104	1,135

Source: Information furnished by trawler operators.

Table V-17

Vessel Expenditures As A Percent of Vessel Receipts, Gloucester and Maine Trawlers, 1950-1957

	1950-1952	1953	1954	1955	1956	1957
	Percent	Percent	Percent	Percent	Percent	Percent
Maine Trawlers (150-199 gross tons)						
Trip and Joint	18.1	28.6	28.7	32.3	35.5	31.6
Net Crew Share	42.2	32.3	37.3	28.8	25.4	29.4
Bonus	3.6	3.7	3.9	3.9	3.9	3.9
Vessel Share	36.1	35.3	35.0	35.0	35.2	35.1
Gloucester Trawlers (150-199 gross tons)						
Trip and Joint	19.2	30.0	28.9	27.0	29.2	29.9
Net Crew Share	42.4	37.5	33.9	36.1	34.2	34.0
Bonus	3.8	3.8	3.7	3.7	4.3	4.3
Vessel Share	34.6	33.8	33.4	33.1	32.2	31.7
Maine Trawlers (50-75 gross tons)						
Trip and Joint	13.4	19.1	20.5	22.4	23.8	21.2
Net Crew Share	47.4	42.2	40.0	38.8	37.3	40.0
Bonus	4.3	4.0	4.0	4.0	3.9	3.8
Vessel Share	34.8	34.7	35.5	34.8	35.0	34.8
Gloucester Trawlers (125-149 gross tons)						
Trip and Joint	21.4	30.0	23.3	27.1	26.3	27.1
Net Crew Share	40.4	34.6	39.4	37.0	35.9	36.9
Bonus	4.2	3.8	3.4	3.7	3.7	3.9
Vessel Share	34.0	33.7	33.8	32.2	34.1	32.2

Source: Information furnished by trawler owners.

Table V-18

Per Man Earnings, Gloucester and Maine Trawlers, 1950-1957

	1950-1952	1953	1954	1955	1956	1957
Maine Trawlers						
150-199 gross tons	$6,900	$4,600	$4,700	$4,100	$3,200	$4,200
50-75 gross tons	6,100	4,400	4,000	3,700	4,400	5,300
Gloucester Trawlers						
150-199 gross tons	$6,700	$3,400	$3,800	$4,300	$4,900	$4,300
125-149 gross tons	5,700	3,600	5,600	4,200	5,100	5,000

Source: Information furnished by trawler owners.

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Table V-19

Average Annual Expenditures for Gear, Repair and Maintenance, Gloucester and Maine Trawlers, 1950-1957
(Thousands of Dollars)

	1950-1952	1953	1954	1955	1956	1957
Maine Trawlers						
150-199 gross tons	19.3	15.4	17.7	15.6	14.7	15.0
50-75 gross tons	7.8	6.6	7.9	7.0	7.0	8.3
Gloucester Trawlers						
150-199 gross tons	22.8	16.9	21.0	20.8	16.2	18.7
125-149 gross tons	22.5	19.3	23.6	20.1	22.7	19.5

Source: Information furnished by trawler owners.

Tables for Chapter VI

Tables VI-1 through VI-7b

Table VI-1

Average Landings By Large Trawlers, Atlantic Provinces and New England, 1956 and 1957

	200+ Gross Ton		150-199 Gross Ton	
	1956	1957	1956	1957
Atlantic Provinces	6.2	6.5	5.1	4.7
New England				
Boston	3.0	2.6	2.1	1.7
Gloucester			3.1	2.8
Maine			2.2	2.5

Source: Data submitted by trawler operators.

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Table VI-2

Average Trawler Activity, Atlantic Provinces and New England, 1956 and 1957

	200+ Gross Ton		150-199 Gross Ton	
	1956	1957	1956	1956
Atlantic Provinces				
Newfoundland	33	31	40	39
Nova Scotia	31	30		
New England				
Boston	28	25	26	25
Gloucester			19	19
Maine			15	17

Source: Data submitted by trawler operators.

Table VI-3

Average Trawler Per-Trip Running Costs, Atlantic Provinces and New England, 1956 and 1957

	200+ Gross Ton		150-199 Gross Ton	
	1956	1957	1956	1957
Atlantic Provinces				
Newfoundland	$1,370	$1,400	$ 727	$ 770
Nova Scotia	1,170	n.a.		
New England				
Boston	1,860	2,080	1,540	1,560
Gloucester			1,990	1,790
Maine			2,000	1,950

n.a. - Data not available.

Source: Data submitted by trawler operators.

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Table VI-4

Food Expenditures Per Man For Atlantic Provinces and New England Trawlers, 1956 and 1957

	200+ Gross Ton		150-199 Gross Ton	
	1956	1957	1956	1957
Atlantic Provinces	$26	$23	$21	$20
New England				
Boston	31	33	30	30
Gloucester			35	33
Maine		50	40	40

Source: Data submitted by trawler operators.

Table VI-5

Per Man Earnings, Atlantic Provinces and New England Trawlers, 1956 and 1957

	200+ Gross Ton Trawlers		150-199 Gross Ton Trawlers	
	1956	1957	1956	1957
Atlantic Provinces				
Newfoundland	$2,300	$2,100	$2,300	$2,100
Nova Scotia	3,200	2,500		
New England				
Boston	5,100	5,200	4,000	4,000
Gloucester			4,900	4,300
Maine		4,000	3,400	4,000

Source: Data submitted by trawler operators.

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Table VI-6

Crew Earnings On Atlantic Provinces and New England Large Trawlers, 1956 and 1957

	Range In Earnings	
	1956	1957
Boston 1/		
High	$9,000	$9,900
Low	2,100	2,400
Gloucester		
High	8,600	7,800
Low	4,600	3,500
Maine		
High	7,300	6,200
Low	1,800	2,100
Atlantic Provinces		
High	4,300	4,300
Low	1,900	1,600

1/ Range in Boston is for the entire large trawler fleet.

Source: Information furnished by large trawler owners and New England Fish Exchange.

Table VI-7

Financial Experiences, Trawlers 200 Gross and Larger Atlantic Provinces and New England, 1956-1957 1/
(All Values In Thousands Of Dollars)

	Atlantic Provinces				Boston			
	Dollars				Dollars			
	1956	(Per cwt.)	1957	Dollars (Per cwt.)	1956	(Per cwt.)	1957	Dollars (Per cwt.)
Landings (Millions of lbs.)	6.2		5.5		3.0		2.6	
Value	$123.6	1.99	$111.3	2.02	$215.5	7.18	$215.0	8.27
Trip and Joint	42.3	.68	44.1	.80	51.2	1.71	52.0	2.00
Net Crew	35.2	.57	31.3	.57	86.7	2.88	84.6	3.25
Bonus	7.9	.13	7.5	.13	8.3	.28	8.2	.32
Vessel Share	38.2	.61	28.4	.52	69.3	2.31	70.2	2.70
Gear and Repair	38.1	.61	36.3	.66	29.0	.97	37.6	1.45
Depreciation	11.8	.19	11.8	.22	10.3	.34	8.6	.33
Insurance	6.5	.11	7.0	.13	13.1	.44	13.1	.50
Payroll	1.1	.02	1.2	.02	2.8	.09	3.1	.12
Administration and Other	11.8	.19	9.5	.17	15.8	.54	17.4	.67
Interest								
Total Vessel Expenditures	69.3	1.12	65.8	1.20	71.3	2.38	79.8	3.07
Operating Profit Or Loss	(31.1)	-.51	(37.4)	-.68	(2.0)	-.07	(9.6)	-.37
Total Cost	154.7	2.50	148.7	2.70	217.5	7.25	224.6	8.64
Number of Trips	33		32		28		25	
Average Size of Crew	16		16		17		16.5	

1/ Average of 5 trawlers in each year.
Source: Financial statements of trawler operators.

Table VI-7a

Financial Experiences Of Trawlers 150-199 Gross Tons, Atlantic Provinces and New England, 1956
(All Values In Thousands Of Dollars)

	Atlantic Provinces		Boston		Gloucester		Maine	
	1956	Dollars (Per cwt.)	1956	Dollars (Per cwt.)	1956	Dollars (Per cwt.)	1956	Dollars (Per cwt.)
Landings (Millions of lbs.)	5.1		2.1		3.2		2.2	
Value	101.4	1.99	150.5	7.17	129.1	4.03	88.6	4.02
Trip and Joint	29.8	.58	40.0	1.90	37.9	1.18	30.1	1.37
Net Crew	27.5	.54	60.2	2.87	44.1	1.38	23.5	1.07
Bonus	7.0	.14	5.6	.27	5.6	.18	3.6	.16
Vessel Share	37.1	.73	44.7	2.13	41.5	1.29	31.4	1.42
Gear and Repair	30.1	.59	19.9	.95	16.2	.51	16.5	.75
Depreciation	7.4	.14	7.4	.35	7.5	.23	8.7	.39
Insurance	4.0	.08	11.9	.57	9.0	.28	6.7	.30
Payroll	.9	.02	2.5	.12	2.3	.07	1.3	.06
Interest			.8	.04	.1	.01	3.0	.14
Administration and Others	9.6	.19	7.2	.34	5.2	.16	3.5	.16
Total Vessel	52.0	1.02	49.7	2.37	40.3	1.26	39.7	1.80
Operating Profit Or Loss	(14.9)	-.29	(5.0)	-.24	1.2	.03	(8.3)	-.38
Total Cost	116.3	2.28	155.5	7.41	127.9	4.00	96.9	4.40
Number of Trips	21		26		19		15	
Average Size of Crew	12		15		9		7	

Source: Financial statements of trawler operators.

Table VI-7b

Financial Experiences of Trawlers 150-199 Gross Tons, Atlantic Provinces and New England, 1957
(All Values In Thousands Of Dollars)

	Atlantic Provinces		Boston		Gloucester		Maine	
	1957	Dollars	1957	Dollars	1957	Dollars	1957	Dollars
Landings (Millions of lbs.)	4.7	(Per cwt.)	1.7	(Per cwt.)	2.8	(Per cwt.)	2.5	(Per cwt.)
Value	93.2	1.98	145.2	8.54	112.5	4.02	100.3	4.01
Trip and Joint	30.0	.64	38.9	2.29	33.5	1.20	33.1	1.32
Net Crew	25.1	.53	56.2	3.30	38.3	1.37	27.7	1.11
Bonus	6.8	.14	5.5	.32	5.0	.18	4.1	.16
Vessel Share	31.3	.67	44.6	2.63	35.7	1.27	35.4	1.42
Gear and Repair	23.1	.49	20.3	1.19	18.6	.66	20.4	.82
Depreciation	7.4	.16	8.2	.48	6.4	.23	8.2	.33
Insurance	4.0	.09	11.6	.68	8.6	.31	7.2	.29
Payroll	.9	.02	2.9	.17	2.1	.07	1.6	.06
Interest			0.9	.06	.1	.01	2.9	.11
Administration and Others	8.2	.17	9.1	.54	6.5	.23	3.9	.16
Total Vessel	43.6	.93	53.0	3.12	42.3	1.51	44.2	1.77
Operating Profit Or Loss	(12.3)	-.26	(8.4)	-.49	(6.6)	-.24	(8.6)	-.35
Total Cost	105.5	2.24	153.6	9.03	119.1	4.26	108.9	4.36
Number of Trips	39		25		19		17	
Average Size of Crew	12		14		9		7	

Source: Financial statements of trawler operators.

Tables for Chapter VII

Tables VII-1 through VII-9

Table VII-1

Average Yearly Cod Production By Canada And By Other Countries, ICNAF Subarea 2 and 3, 1931 to 1957
(Millions Of Pounds, Round Weight)

Years	Subarea 2			Subarea 3			Both Subareas
	Canada	Others	Total	Canada	Others	Total	
1931-1935	140	0.2	140	465	96	561	701
1936-1940	145		145	433	126	559	704
1941-1945	95		95	454	23	477	572
1946-1950	76		76	550	238	788	864
1951	62	8	70	501	289	790	860
1952	38	80	118	462	217	679	797
1953	25	215	240	411	302	713	953
1954	26	22	48	543	496	1,039	1,087
1955	23	34	57	454	492	946	1,003
1956	19	57	76	469	373	842	918
1957	26	45	71	444	546	990	1,061

Source: 1931-1935 to 1946-1950, The Fisheries Research Board of Canada; 1951 to 1957, Annual Statistical Bulletins of the International Commission for the Northwest Atlantic Fisheries.

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Table VII-2

Average Yearly Cod Production By Canada, U.S.A., and European Countries From ICNAF Subarea 4, 1931 to 1957
(Millions Of Pounds, Round Weight)

Years	Canada		Others		
	Mainland	Newfoundland	USA	Europe	Total
1931-1935	183 (33-35)	18	47	n.a.	248+
1936-1940	172	10	55	n.a.	237+
1941-1945	246	16	43	n.a.	305+
1946-1950	275	17	18	n.a.	310+
1951	220	26	10	n.a.	256+
1952	227	39	13	11	290+
1953	166	38	8	115	327
1954	177	36	8	107	328
1955	184	35	5	128	352
1956	256	35	4	142	437
1957	252	55	3	104	414

n.a. - data not available.

Source: 1931-1935 to 1946-1950, The Fisheries Research Board of Canada; 1951 to 1957, Annual Statistical Bulletins of the International Commission for the Northwest Atlantic Fisheries.

Table VII-3

Average Yearly Landings of Haddock in ICNAF Subarea 3 by Canada and Other Countries, 1927-1957 (Millions of Pounds, Round Weight)

Years	Canada	Others	Total
1927-1930	0.3	5	5.3
1931-1935	1	5	6
1936-1940	1	1	2
1941-1945	1	4	5
1946-1950	23	67	90
1951	9	42	51
1952	17	44	61
1953	31	52	83
1954	71	51	122
1955	95	135	230
1956	107	71	178
1957	76	74	150

Source: 1927-1930 to 1946-1950, The Fisheries Research Board of Canada; 1951 to 1957, Annual Statistical Bulletins of the International Commission for the Northwest Atlantic Fisheries.

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Table VII-4

Average Yearly Landings of Haddock in ICNAF Subarea 4 by Canada and the U.S.A., 1931-1957

Years	Canada	U.S.A.	Total
1931-1935	40	67	107
1936-1940	46	54	100
1941-1945	34	29	63
1946-1950	48	37	85
1951	60	33	93
1952	60	55	115
1953	56	40	96
1954	69	39	108
1955	62	31	93
1956	79	31	110
1957	83	20	103

Source: 1931-1935 to 1946-1950, The Fisheries Research Board of Canada; 1951 to 1957, Annual Statistical Bulletins of the International Commission for the Northwest Atlantic Fisheries.

Table VII-5

Average Yearly Landings of Ocean Perch In ICNAF Subareas 2 and 3 By Canada And Other Countries, 1942-1957 (Millions of Pounds)

Years	Canada	Others	Total
1942-1945	0.1		0.1
1935-1950	11.5	0.1	11.6
1951	38.2	29.9	68.1
1952	32.4	69.4	101.8
1953	27.5	73.0	100.5
1954	13.0	69 .0	82.0
1955	9.0	29.8	38.8
1956	7.8	29.3	37.1
1957	8.4	118.7	127.1

Source: 1942-1945 and 1946-1950, The Fisheries Research Board of Canada; 1951-1956, Annual Statistical Bulletins of the International Commission for the Northwest Atlantic Fisheries.

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Table VII-6

Average Yearly Landings Of Ocean Perch In ICNAF Subarea 4 By Canada And U.S.A., 1931-1957 (Millions of Pounds)

Years	Canada		U.S.A.	Total
	Maritimes and Quebec	Newfoundland		
1931-1936			0.3	0.3
1936-1940	0.3		22	22.3
1941-1945			19	19
1946-1950	1		117	118
1951	2		184	186
1952	3	4	69	76
1953	14	6	43	63
1954	25	11	84	120
1955	24	11	97	132
1956	33	16	91	140
1957	30	8	83	121

Source: 1931-1935 to 1946-1950, The Fisheries Research Board of Canada; 1951 to 1957, Annual Statistical Bulletins of the International Commission for the Northwest Atlantic Fisheries.

Table VII-7

Atlantic Groundfish Resources, 1955 and Prospective Stock, 1980

(Millions of Pounds, Round Weight)

Species	Present Stock	Present Utilization			Rate (Percent)	Probable Catch Trend	Prospective Stock 1980
		Canada	Others	Total			
Cod	6,800	710	400	1,110	16.3	increase	6,500
Haddock	480	112	90	202	42.1	decrease	340
Ocean Perch	2,200	38	124	162	7.4	increase	1,350
Pollock	200	32	7	39	19.5	increase	160
Cusk	30	2	*	2	6.7	increase	30
Whiting	100	*	*	*		increase	60

* Negligible quantity.

Source: The Commercial Fisheries of Canada. Royal Commission on Canada's Economic Prospects, September, 1956. p. 13.

Table VII-8

Landings of Haddock and Ocean Perch By Nova Scotia, Newfoundland and New England By Principal Fishing Grounds, 1957

(Thousands of Pounds)

	Nova Scotia	Percent of Total	Newfoundland	Percent of Total	New England	Percent of Total
Haddock:						
All Areas	104,930	100.0	54,731	100.0	140,351	100.0
Grand Bank	21,801	20.8	54,484	99.5	22	
Nova Scotia Banks	78,504	74.8	179	0.3	19,729	14.1
Georges Banks					107,058	76.3
Ocean Perch:						
All Areas	30,633	100.0	15,391	100.0	133,967	100.0
Grand Bank	939	3.1	7,445	46.9	10,467	7.8
Nova Scotia Banks	1,111	3.6	9		44,070	32.9
Gulf of St. Lawrence	28,583	93.3	8,437	53.1	38,666	28.9
Gulf of Maine					31,903	23.8

Source: ICNAF Statistical Bulletin, Volume 7 for the year 1957. Halifax, Nova Scotia, 1959. pp. 18-19.

Table VII-9

Productivity of Major Canadian Fishing Grounds, 1953-1957
(In Pounds Per Day Fished)

	Nova Scotia		Newfoundland		New England	
	Haddock	Ocean Perch	Haddock	Ocean Perch	Haddock	Ocean Perch
Grand Bank - 3O, 3P						
1953	9,600		12,000			76,300
1954	9,600		21,600			66,600
1955	16,100		26,400			27,900
1956	23,500		36,100			65,700
1957	11,500		32,000			77,500
Nova Scotia Banks - 4V, 4W, 4X						
1953	9,000					n.a.
1954	11,100					22,100
1955	10,400					13,300
1956	14,000					29,500
1957	15,800					38,400
Gulf of St. Lawrence - 4R, 4S, 4T						
1953		30,000		25,400		n.a.
1954		30,500		29,900		26,500
1955		25,900		34,100		38,300
1956		18,700		29,400		41,400
1957		19,100		21,300		36,800

n.a. - data not available.

Source: Computed from Data in Annual Statistical Volumes of ICNAF, 1953-1957.

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