REPORT OF THE
INTERNATIONAL PACIFIC HALIBUT COMMISSION

APPOINTED UNDER THE CONVENTION BETWEEN CANADA AND THE
UNITED STATES OF AMERICA FOR THE PRESERVATION OF THE
NORTHERN PACIFIC HALIBUT FISHERY

NUMBER 24

REGULATION AND INVESTIGATION OF THE PACIFIC HALIBUT FISHERY IN 1955

Commissioners:

EDWARD W. ALLEN
(To June 1955)

HAROLD S. HELLAND

RICHARD NELSON

MATTIAS MADSEN
(From June 1955)

GEORGE R. CLARK
(To Jan. 1955)

J. W. MENDENHALL

SETON H. THOMPSON

SAMUEL V. OZERE
(From Jan. 1955)

SEATTLE, WASHINGTON
1956

FOREWORD

The 1953 Convention between the United States and Canada for the Preservation of the Halibut Fishery of the Northern Pacific Ocean and Bering Sea provides that the International Pacific Halibut Commission, formerly designated the International Fisheries Commission, shall report upon its activities and investigations from time to time.

Twenty-three reports have been issued prior to the present one which is the ninth of a series of annual reports that were commenced in 1947 to provide a brief summary of the Commission's activities during the year.

Those desiring more extensive background material than included herein are referred to previous reports.

REGULATION AND INVESTIGATION OF THE PACIFIC HALIBUT FISHERY IN 1955

BY

INTERNATIONAL PACIFIC HALIBUT COMMISSION

CONTENTS

	Page
Historical Background	5
Activities of the Commission	7
The 1955 Regulations	7
Statistics of the Fishery	9
Multiple Open Seasons	11
Catch per Unit Fishing Effort	12
Composition of Catches	12
Sub-Commercial Sized Halibut	13
Tagging Experiments	14

HISTORICAL BACKGROUND

Since its inception in 1888, the Pacific halibut fishery has been jointly engaged in by the fishing fleets of Canada and of the United States. Prior to the turn of the century, the annual catches did not exceed 10 million pounds and it was not until 1907 that the annual catches first reached such proportions that the fishery would qualify as a major North American fishery.

As early as 1915, international control of the fishery was contemplated as there were already indications of a decline in the yield. After some delay occasioned chiefly by World War I, a convention for the preservation and development of the fishery was signed in 1923 and ratified in 1924. Thus, during 32 of the 48 years that the Pacific halibut fishery has been a major fishery, it has been under joint control of the two participating countries.

The 1923 convention established a three-month winter closed season which went into effect in November 1924. It provided for the appointment of the International Fisheries Commission with two members from each country, to investigate the fishery and to recommend measures for its preservation. Each country agreed to pay the expenses of its own members and one-half of the joint expenses of the Commission.

Intensive investigations were undertaken to determine the characteristics of the species; the condition of its stocks; the cause or causes of the decline in the fishery and the measures necessary to stop the decline. These showed that the stocks of halibut were in an overfished, low-yielding state and that the statutory three-month winter closed season alone was not effective in stopping the decline.

The Commission's findings were reported to the two governments in 1928 and broader regulatory measures to stop the decline and to rebuild the fishery were recommended.

A new convention was signed in 1930 and ratified in 1931. This second convention provided that the Commission could change or suspend the closed season; divide the convention waters into areas and limit the catch of halibut to be taken from each; regulate the licensing and departure of vessels for purposes of the convention; collect statistics; fix the type of gear to be used; and, close grounds found to be populated by small immature halibut. Enforcement was made the responsibility of appropriate established agencies of the individual governments.

To provide for new developments in the fishery a third treaty was signed and ratified in 1937. This expanded the Commission's regulatory authority by providing for the control of the capture of halibut caught incidentally to fishing for other species in areas closed to halibut fishing by reason of attainment of their catch limits. It also authorized the Commission to prohibit the departure of vessels for any area when those which had already departed would suffice to take the area's catch limit.

Under regulation which began in 1932, the stocks on some grounds had doubled in size by 1940. Larger individual fares were made with one-half the fishing effort. The total annual catch allowed was increased from time to time by the Commission as the density of the stocks increased. The management principle followed was to hold the catch from the stocks slightly below the additions being made by growth and new recruits.

During this period, a greatly increased fleet and much larger catches per trip had sharply reduced the length of the fishing season. Since the stocks of halibut on differ-

ent grounds were not equally available at all times of year, it became evident that some were no longer contributing to the fishery in the proportion of which they were capable. After the end of World War II, in 1946, the Commission recommended to the governments treaty changes that would enable it to broaden the period over which halibut might be caught.

Between 1951 and 1953, pending action upon the Commission's recommendations, three underfished sections of the coast were closed to fishing during the regular season and opened at a more appropriate time when other sections were closed. A material increase in the utilization of the underfished stocks resulted.

A fourth convention was signed March 2, 1953 and ratifications were exchanged October 28 of the same year. It contained important changes from the biological and regulatory standpoint, including the responsibility of attaining maximum sustained yield and the authority to establish one or more open or closed seasons each year in any area. Other changes were an increase in membership from four to six Commissioners, three from each country, and the renaming of the Commission as International Pacific Halibut Commission.

In 1954, under authority of the new convention, provisions were made for multiple open seasons and the total Pacific coast catch from all areas reached an all-time record of 71,400,000 pounds.

In 1955, multiple open seasons were again provided but most unfavorable weather conditions throughout the entire period of fishing resulted in a total catch of slightly over 59,000,000 pounds. The 12,000,000 pound reduction from 1954 arose chiefly from a 6,000,000 pound reduction in yield from the second fishing seasons in Areas 2 and 3A, and a 4,000,000 pound deficit in the catch limit taken during the first season in Area 2.

The average of the 1954 and 1955 catches was 22,000,000 pounds greater than the annual total in 1931, the year preceding regulation. At current dockside prices to the fishermen, the average annual gain for 1954 and 1955 was worth about $3,500,000. This is nearly twice the entire usable amount of money appropriated to the Commission by both countries during the 32 years of its existence.

The new halibut convention places a broader responsibility upon the Commission, namely, the attainment of the maximum sustainable yield rather than the protection and conservation of the halibut as required in earlier conventions. Furthermore, under the International North Pacific Fishery Convention, Canada and the United States are required to develop the stocks and maintain them at levels of maximum productivity.

To provide for the Commission's greater regulatory expenses and to permit a beginning during 1954 upon the broader program of research required by the new treaty, Canada increased its appropriation from $55,900 to $77,900 for the Canadian fiscal year commencing April 1954. Since the United States provided only $49,271 for its comparable fiscal year it was not possible to embark upon the broader research program as joint expenses of the Commission are shared in equal moieties.

Appropriations of $93,500 and $93,750 were provided by Canada and the United States in 1955 for their fiscal years commencing April and July respectively. With these funds the Commission embarked upon the broader program of research approved by the Commission early in 1954, and began recruiting the required additional staff.

ACTIVITIES OF THE COMMISSION

In 1955 the Commission continued the regulation of the halibut fishery and the statistical and biological investigations that provide a measure of the effect of current regulations and serve as a guide for the future.

The members of the Commission from Canada in 1955 were: Mr. Richard Nelson, Vancouver, B.C., elected Chairman of the Commission; Mr. Harold S. Helland, Prince Rupert; Mr. George R. Clark, Ottawa and Mr. S. V. Ozere, Ottawa, who in January replaced Mr. Clark, who resigned after seven years of service upon his elevation to the position of Deputy Minister of Fisheries for Canada. The United States members were: Mr. Seton H. Thompson, Washington, D.C., elected Vice-Chairman; Mr. J. W. Mendenhall, recently of Ketchikan, Alaska; Mr. Edward W. Allen, Seattle; and after June, Mr. Mattias Madsen, Seattle, who replaced Mr. Allen, on his resignation after 23 years of service to the Commission.

The Commission held its regular annual meeting at its research headquarters in Seattle, Washington from January 24 to January 27 inclusive. On January 24, the agenda for the sessions was adopted and the research program for 1955, budget needs, and staff matters were discussed. On January 25, a joint meeting was held with representatives of the Pacific coast halibut industry for a presentation of the results of investigations and a review of the 1954 fishery. General proposals for regulation in 1955 were also discussed. On January 26, the Commission separately conferred with wholesale halibut buyers, and with representatives of the vessel owners and fishermen to receive their respective recommendations for the regulation of the fishery in 1955.

On the last day, January 27, the Commission considered the proposals of the industry in light of stock conditions and the prevailing fishery and adopted regulations for 1955. It also established a small group of industry advisers to meet with the Commission and staff immediately prior to annual meetings for an advance exchange of ideas. A press release was issued summarizing the regulatory changes that were being recommended to the two governments for 1955.

During the fishing season the Commission determined the dates upon which the area catch limits should be attained, announced these dates in advance, and closed the areas accordingly.

THE 1955 REGULATIONS

The Pacific Halibut Fishery Regulations for 1955 were approved by the Governor General of Canada on March 8 and by the President of the United States on March 18 and became effective on the latter date.

The 1955 regulations were not changed materially from those of 1954. The Commission considered it essential that, in view of the great increase in catch in 1954 as a result of the inauguration of multiple fishing seasons, there be at least one more year of observation of the fishery under virtually the same conditions and that there be no changes in the regulations that might materially increase the removals from the stocks in 1955.

The boundary line between Area 3A and 3B was moved eastward from the Sanak Islands to the vicinity of the Shumagin Islands to facilitate both the administration of the fishery and fishing operations during the third fishing season in Area 3B.

The five regulatory areas in 1955, shown in Figure 1, were: Area 1A, the waters

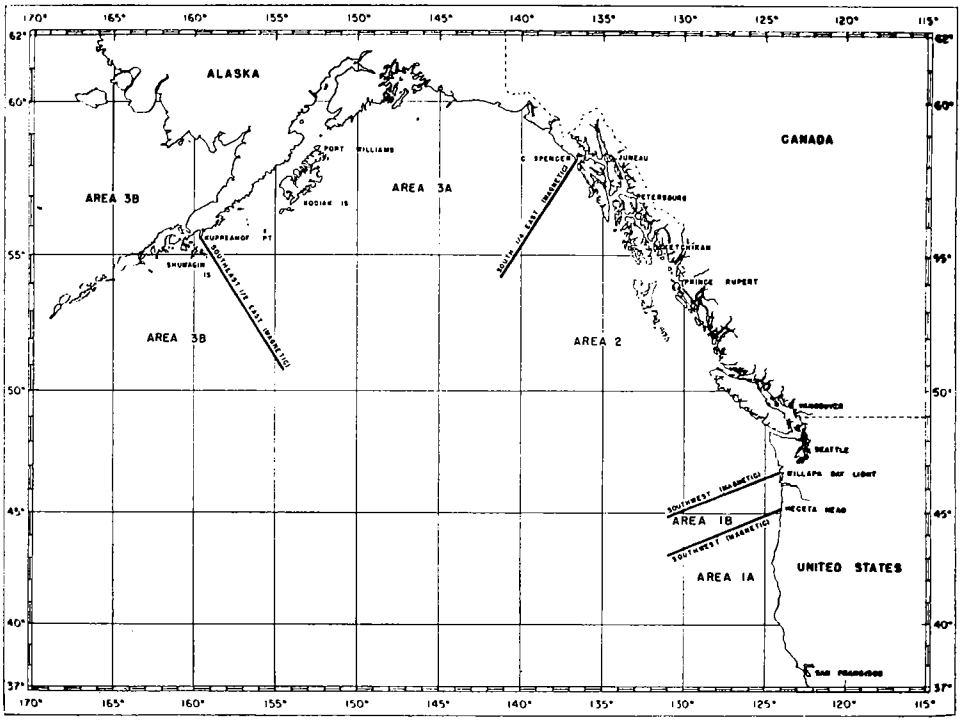

Figure 1. Pacific Coast of North America showing regulatory areas defined by the International Pacific Halibut Commission in 1955.

off the northern California and southern Oregon coasts, south of Heceta Head, Oregon; Area 1B, the waters off the Oregon and Washington coasts between Heceta Head and Willapa Bay, Washington; Area 2, the waters between Willapa Bay and Cape Spencer, Alaska; Area 3A, from Cape Spencer to a line running southeast one-half east from Kupreanof Point near Shumagin Islands; Area 3B, all convention waters west of Area 3A including those of the Bering Sea.

The fishing season in all areas was opened on May 12. Area 1A was closed to halibut fishing on September 21. The first season in Areas 1B and 2 closed on June 5 and the first season in Areas 3A and 3B closed on August 4, at which dates it was deemed that the catch limits set for Areas 2 and 3A respectively would be attained. Second seasons of seven days in Areas 1B and 2 and of nine days in Areas 3A and 3B commenced on August 14. A third season of 23 days in Area 3B commenced on August 29 and terminated on September 21. All seasons commenced and terminated at 6:00 a.m. of the dates indicated.

Catch limits of 26,500,000 pounds during the first season in Area 2 and of 28,000,000 pounds in Area 3A were provided as in 1954. Other areas and other seasons, in which the total catch of halibut is comparatively small, were continued without catch limits.

Vessels fishing for crab in the Bering Sea with bottom nets of 12-inch or larger mesh, were permitted to retain a limited proportion of halibut caught incidentally to such fishing between May 12 and November 14 inclusive.

Other regulatory provisions were also continued as follows: a minimum size

limit of 26 inches heads-on or five pounds heads-off for halibut; the closure of two nursery areas, one off Massett in northern British Columbia and one off Timbered Islet in southeastern Alaska; the prohibition of the use of dory gear and nets of any kind in fishing for halibut; the termination after November 15 of permits for the retention and possession of halibut caught incidentally by setline gear during fishing for other species in Areas 1A, 1B, 2, 3A and 3B; and, the beginning of the statutory closed season after November 30 in any area that might still be open by reason of the non-attainment of the catch limit which otherwise determined its closure.

STATISTICS OF THE FISHERY

LANDINGS FROM REGULATORY AREAS

Landings during 1955 from groups of regulatory areas that correspond to the original Areas 1, 2 and 3 are shown in the following table and compared with landings for 1953 and 1954, and with those at intervals back to 1931, the year immediately prior to the commencement of regulation by the Commission.

All poundages given in the tables are in thousands of pounds. They are corrected for amounts declared from the wrong area and include amounts of halibut caught in contravention of the regulations. All 1955 figures in this report are preliminary and subject to minor changes.

UNITED STATES AND CANADIAN CATCHES BY REGULATORY AREAS

	Areas1A,1B*	Area 2**			Area 3***			All Areas		
Year	U.S.	U.S.	Can.	Total	U.S.	Can.	Total	U.S.	Can.	Total
1931	923	14,609	7,018	21,627	20,907	765	21,672	36,439	7,783	44,222
1935	1489	13,563	9,255	22,818	22,088	953	23,041	37,140	10,208	47,348
1940	779	15,362	12,254	27,616	25,266	646	25,912	41,407	12,900	54,307
1945	401	12,824	11,554	24,378	25,584	3,567	29,151	38,809	15,121	53,930
1950	392	12,862	14,184	27,046	25,396	4,815	30,211	38,650	18,999	57,649
1953	383	14,832	18,175	33,007	19,447	7,678	27,125	34,662	25,853	60,515
1954	674	19,165	17,574	36,839	23,841	9,952	33,793	43,680	27,526	71,206
1955	637	15,645	13,015	28,660	20,607	9,184	29,791	36,889	22,199	59,088

*South of Willapa Bay
**Willapa Bay-Cape Spencer
***West of Cape Spencer

The landings from Areas 1A and 1B are combined and correspond to those from original Area 1. These areas are at the southern extremity of the commercial range of the species and, as their halibut stocks are relatively small, no catch limits have been placed upon them. The combined annual catch from Areas 1A and 1B has been about one-half million pounds or less in recent years. The increase in 1954 and 1955 to about three-quarters million pounds was brought about by the regulations in those years providing for Area 1A to remain open to halibut fishing as long as any other area is open. This extended the season well into September instead of closing it in July or August as in other recent years.

The total catch from Area 2 was 28.7 million pounds from all sources in 1955, much lower than in 1954 when it reached a 40-year high of nearly 37 million pounds. The catch during the first season of 24 days commencing May 12 amounted to about 22.5 million pounds. The deficit from the catch limit resulted from the incidence of severe weather during the last five days of the season when it was impractical to revise the previously announced date of closure.

The catch in Area 2 during the 7-day second season commencing August 14

amounted to 5.3 million pounds, about 4 million pounds under the 9.2 million pound catch during the 8-day second season in 1954. The smaller catch in 1955 resulted chiefly from unfavorable tides, bad weather and a somewhat smaller fleet operating.

Included in the combined total landings from Area 2 are 1,136,000 pounds of halibut caught incidentally to fishing for other species under permit after the area was closed to halibut fishing. In Area 3A there was no halibut caught under permit.

The 1955 catch from Areas 3A and 3B combined in the above table under Area 3 was 29.8 million pounds compared to 33.8 million pounds in 1954. The total catch in Area 3A during the first season of 84 days commencing May 12 amounted to about 27.5 million pounds, about one-half million pounds under the 28.0 million pound catch limit provided in the regulations for the first season in the area. In 1954 the 28,000,000 pound catch limit taken in a 58-day season was exceeded by about 1,735,000 pounds. The 1955 season was greatly prolonged primarily by the unduly bad weather during most of the season.

During the second season of 9 days in Area 3A a catch of 1.5 million pounds was taken which was considerably below the 3.4 million pounds taken in 1954 due to the smaller fleet operating and the poor weather encountered in 1955.

In Area 3B during the first and second seasons, very little fishing was undertaken, the fleets remaining to the eastward of the area.

During the third season in Area 3B, the catch totalled 933,000 pounds compared to 611,000 pounds in 1954. The larger total taken in 1955 can be largely attributed to the change in the eastern boundary of the area which facilitated operations and attracted more vessels to the fishery. A limited portion of the catch was taken by the setline fleet on the Bering Sea side of the Aleutian Peninsula.

United States and Canadian landings from all areas in 1955 amounted to slightly over 59.0 million pounds compared to 71.2 million in 1954. The decrease resulted chiefly from a 6.0 million pound reduction in yield from the second fishing seasons in Areas 2 and 3A and deficits in the catch-limit landings taken in the two areas compared to surpluses in 1954.

LANDINGS BY PORTS

The distribution of landings from all regulatory areas according to ports is shown for various years in the following table.

LANDINGS BY PORTS FROM ALL AREAS BY UNITED STATES AND CANADIAN VESSELS COMBINED

		Washington		Alaska		British Columbia			Total	
Year	Calif. and Oregon	Seattle	Other Ports	SE Alaska	Western Alaska	Vancouver	Prince Rupert	Other Ports	Can. Ports	U.S. Ports
1931	892	15,032	202	8,240	1,482	1,066	16,792	516	18,374	25,848
1935	1,281	22,275	114	6,536	13	2,242	12,964	1,923	17,129	30,219
1940	1,014	19,203	258	9,544	182	1,907	18,765	3,434	24,106	30,201
1945	756	12,140	553	18,796	2,181	1,943	15,346	2,215	19,504	34,426
1950	723	7,473	1,465	21,008	4,367	1,096	17,020	4,497	22,613	35,036
1953	622	13,192	1,706	14,589	3,625	4,572	18,086	4,123	26,781	33,734
1954	1,061	16,270	1,510	19,493	3,408	5,892	18,187	5,385	29,464	41,742
1955	731	14,520	2,004	14,210	5,026	5,260	14,594	2,743	22,597	36,491

With the exception of central Alaska and Washington state ports other than Seattle, 1955 landings in all ports reflected the over-all decline in catch.

MULTIPLE OPEN SEASONS

The 1953 convention provided that there may be established one or more open or closed seasons as to each area. In 1954 and 1955 all areas except Area 1A, south of Heceta Head, Oregon, were opened for a first season in mid-May and for a second season in August. Area 3B was reopened for a third season in both years.

The lengths of the fishing seasons in the several areas are shown below. The length of the first season was determined by the dates upon which the Commission deemed that the catch limits set in the regulations would be taken. The closing date of Area 2 applied to Area 1B and that for Area 3A to Area 3B.

LENGTH OF SEASONS, IN DAYS

Area	First Season		Second Season		Third Season	
	1954	1955	1954	1955	1954	1955
1A	*	*	—	—	—	—
1B	21	24	8	7	—	—
2	21	24	8	7	—	—
3A	58	84	10	9	—	—
3B	58	84	10	9	25	23

*Area 1A remained open continuously from May 16 to September 9 in 1954 and from May 12 to September 21 in 1955.

In 1954 the second season in Areas 2, 3A and 3B commenced on August 1. In 1955 the second seasons began on August 14, eighteen days later than the originally planned date of July 27. The delay was occasioned by the prolongation of the first seasons in Areas 3A and 3B and provision in the regulations for an interval of not less than 10 days between the first and second seasons.

The intended dates of reopening of the areas for the second season in 1954 and 1955 took into consideration the historical seasonal availability of the stocks and favorable tidal conditions. The delayed reopening in 1955 resulted in the second season coinciding with unfavorable tidal conditions, the effects of which were aggravated by three days of bad weather in Area 2.

The combined catch resulting from the reopenings of the areas amounted to 7.7 million pounds, about 5.7 million pounds under the 13.4 million combined catch of 1954.

The catches and number of regular halibut vessels participating in the second and third seasons in 1954 and 1955 are shown by areas in the following table.

CATCH AND NUMBER OF REGULAR HALIBUT VESSELS FISHING IN 1954 AND 1955 IN SECOND SEASON IN AREAS 2 AND 3A AND THIRD SEASON IN AREA 3B

	AREA 2		AREA 3A		AREA 3B*		ALL AREAS	
	Catch	No. of Vessels	Catch	No. of Vessels	Catch	No. of Vessels	Catch	No. of Vessels**
Canada 1955	2,015	61	43	1	156	3	2,214	65
U.S. 1955	3,287	127	1,415	36	777	18	5,479	181
Total 1955	5,302	188	1,458	37	933	21	7,693	246
Total 1954	9,425	230	3,393	79	611	14	13,429	319

*All catches were made during third season in this area.
**Exclusive of duplication.

In addition to vessels of the regular halibut fleet, small setline boats and salmon trollers using troll gear participated in the short August fishery in Area 2. In 1954 a very large number of trollers landed a total of about 1.5 million pounds

of halibut, with a number of the individual landings being as high as 15,000 pounds and one reaching 18,000 pounds. In 1955 the troll salmon fleet evidenced very little interest in halibut and only about 150,000 pounds were landed by that gear. The difference can be attributed chiefly to changes in the relative market value and availability of salmon and of halibut in the two years.

CATCH PER UNIT FISHING EFFORT

The relative size of the halibut stocks available to the commercial fishery from year to year is ascertained by analysis of the daily fishing records kept by the captains of halibut vessels. All halibut vessels of five net tons or over are required to keep such records showing the date, fishing location, amount of gear fished and estimated catch of halibut in pounds for each fishing operation.

Catch-per-unit-effort data must be carefully evaluated and corrected to some degree for changes in the concentration of fishing from year to year, variable weather, tidal and other conditions that affect the success of fishing. Even after such corrections have been made, trends over several years must be used as indicators of changes in the size of a stock on account of the year-to-year differences in availability that have been observed.

In Area 2 during the May-June season the catch per unit of effort was lower throughout the area as a whole than in 1954 and particularly so on the Cape Scott, Goose Island and Icy Strait grounds. On the grounds in Hecate Strait and notably in the middle portion, the catch per unit of effort showed some increase over 1954.

In Area 3A during the first season from May to early August, the over-all catch per unit of effort was somewhat lower than in 1954, particularly in the heavily producing section between Cape St. Elias and Trinity Islands. On the grounds between Cape Spencer and Cape St. Elias the catch per unit of effort was about the same as in 1954 and on the grounds between Trinity Islands and the Shumagin Islands there was some increase over 1954.

During the second fishing season in both areas, the catch per unit effort was also generally lower than in 1954 and the variation from one section of the coast to another was similar to what prevailed during the first season.

In Area 3B, west of Shumagin Islands, the catch per unit effort during the August-September fishery in that area was higher than during the 1952 to 1954 seasons in spite of unfavorable weather during most of the third fishing season of 23 days in that area.

In view of the extreme abnormality of the 1955 fishing seasons, judgment as to whether the larger yields allowed in 1953 and 1954 may have brought about a general cessation of increase in the stocks must be deferred. Results must be obtained from a more normal year of fishing before even tentative conclusions can be drawn.

COMPOSITION OF CATCHES

Sampling of the commercial catches to secure data and materials for the study of changes in the length composition and age composition of the stocks was again conducted at the ports of Seattle and Prince Rupert during the fishing seasons. Over 60,000 length measurements and about 15,000 otoliths were collected from 108 trips from Areas 2, 3A and 3B. An additional 10,000 length measure-

ments and the same number of otoliths were secured incidentally during tagging operations.

Samples from the Goose Island grounds in the Queen Charlotte Sound region of Area 2 taken during both the first and second fishing seasons in 1955 showed in general a lower abundance of fish in all age groups than in the respective seasons in 1954. This reflects the reduced availability of fish in 1955 in this area shown by the catch per unit of effort. There was, however, a pronounced increase in the showing of fish seven years old and younger. The good 1944 brood group that was strong as 10-year olds in 1954 continued in 1955 to contribute relatively heavily to the catch as 11-year olds.

In northern Hecate Strait, the most productive section of Area 2, there was a slight decline from 1954 to 1955 in the numerical strength of the various length classes in the commercial catches. From the first to the second fishing seasons in both years, there was a great increase, both relatively and absolutely, in the availability of the larger and presumably older fish.

The Area 3A fishery continued to be dependent mainly on the 11 to 16-year olds, as it has since 1952. The abundant 1944 brood class was the dominant age group by number as in 1954, and in 1955 became the largest contributor to the catch by weight. Samples from the August Area 3A season in 1955 indicate a slight increase in availability of older fish over the May-June period as was the case in 1954.

SUB-COMMERCIAL SIZED HALIBUT

There are two complex problems involved in managing a fishery; namely, securing the maximum yield from the recruits available and the still more difficult task of obtaining the optimum recruitment.

Because of wide variations in the numbers of recruits produced by relatively stable stocks of matures, a knowledge of the factors which limit the production of recruits is necessary. These factors may operate upon the eggs and larvae or may operate upon the early bottom stages prior to recruitment into the commercial stocks.

The production of eggs has been found to be very variable and attempts to correlate their production with the general abundance of spawners has been unsuccessful to date. It appears that a more effective approach to the recruitment problem would be to study the factors limiting survival between the time the young begin life on the bottom and the time they begin to appear in the commercial catch, 5 to 7 years later.

Of particular value to such a study would be information regarding the distribution of the sub-commercial sizes, the nature and probable extent of their habitat, their food and the species which compete with them, the species that prey upon them, and their growth rate. These could show whether serious limitations are likely to be placed upon recruitment by the space available for young halibut, by any unusual abundance of other species or by great abundance of commercial-sized halibut. Year-to-year changes in growth rate could indicate whether growth and survival conditions within the environment were favorable or unfavorable.

Preliminary to such investigations planned for the next several years, an exploratory operation was undertaken in 1955 in British Columbia waters. A

Canadian otter trawler, the PHYLLIS CARLYLE, was chartered from September 10 to September 28, inclusive. Small otter trawls of one and one-quarter inch mesh were used. The immediate objectives were to test the effectiveness of the small-meshed trawls, to solve operational problems, and to acquire as much information as possible regarding the geographical and depth distribution of the small halibut.

This reconnaissance survey was made on grounds in Dixon Entrance, in northern and middle Hecate Strait and to a limited extent in the vicinity of the northern end of Vancouver Island. A total of 54 tows of short duration were made, usually parallel to the shore. When the nature of the bottom permitted, tows were begun in depths of 3 to 5 fathoms and continued out to 30 fathoms at intervals of about 2 to 4 fathoms.

A total of 133 young halibut of the 0 and 1-year classes were caught. They were about equally divided as to males and females. There was no overlap in the length frequency distributions of the 0-year class and the 1-year class, which ranged from 7 to 12 centimeters and from 18 to 35 centimeters respectively. Also, no difference was indicated in the average size of the males and females in these young year groups.

The results showed that small halibut of the 0 and 1-year groups could be taken upon trawlable bottom with the gear used and gave some indication of their depth distribution in the autumn and of their location in the area sampled. This preliminary investigation also indicated the need for modifications of the gear and operational procedures.

TAGGING EXPERIMENTS

The halibut vessel ECLIPSE was chartered for a period of 89 days commencing on July 15 and terminating on October 11. A total of six trips were made between the northern end of Vancouver Island off British Columbia and Coronation Island off southeastern Alaska. A total of 8,526 halibut weighing approximately 162,000 pounds were tagged from a total catch of 398,000 pounds. Fish unsuitable for tagging provided materials for age, length, sex and maturity studies.

The halibut vessel ALEUTIAN QUEEN was chartered for a period of 59 days between October 27 and December 24 for tagging on the "W" and Yakutat spawning grounds in the eastern part of the Gulf of Alaska. Although the operation was seriously handicapped by bad weather, 1,242 fish weighing 51,300 pounds were tagged from a total catch of 123,000 pounds, mainly on the "W" ground.

Tagging operations in 1955 are summarized by trips in the following table.

Trip	Locality	Month	No. Skates	No. Tagged	Pounds Tagged	Total Catch
ECLIPSE						
1	Goose Island Ground	July	644	1,962	33,900	73,200
2	North Hecate Strait-Dixon Entrance	August	391	1,337	35,600	95,700
3	Timbered Island Nursery	August	477	1,400	27,800	67,700
4	Masset Nursery	Aug.-Sept.	491	2,535	41,500	105,100
5	Lower Hecate Strait	September	523	679	13,500	31,600
6	Goose Island Ground	Sept.-Oct.	264	613	9,800	25,100
ALEUTIAN QUEEN						
1	"W" Ground	November	201	499	15,000	35,200
2	"W" Ground	November	237	579	29,000	70,800
3	"W" and Yakutat	December	125	164	7,300	16,700
	TOTAL		3,353	9,768	213,400	521,100

Recoveries in 1955 were 783 compared to 1,584 in 1954. Those from Area 2 decreased from 1,379 in 1954 to 559, which was not unexpected in view of the normal year-to-year decline due to removals by the fishery, natural mortality and the decrease in the total Area 2 catch mentioned in an earlier section.

Recoveries from Area 3A in 1955 were 224 compared to 205 in 1954, in spite of a decrease in the total catch from the area. This increase resulted from the extensive tagging in the area in 1954.

The following table shows the 1955 tag recoveries from 1952-1954 tagging by seasons, compared with the 1954 recoveries.

SUMMARY OF 1953, 1954 AND 1955 REGULAR AND AUGUST SEASON TAG RECOVERIES.. FROM 1952 TO 1954 TAGGING EXPERIMENTS

Year and Location	Month	No. Tagged	Number of Recoveries								
			1953	1954				1955			
			Reg.	May-June	Aug.	Other	Total	May-June	Aug.	Other	Total
SOUTH OF CAPE SPENCER											
1952 EXPERIMENTS											
Cape Scott	Mar.-April	772	30	23	7	2	32	10	1	—	11
Hecate Strait	June-July	658	49	15	14	—	29	12	6	—	18
Two Peaks	April	378	71	21	1	1	23	5	1	1	7
Two Peaks	June-July	707	117	39	22	7	68	17	3	5	25
Frederick I.	April	70	5	—	—	—	—	—	—	—	—
Dixon Entrance	April	30	3	—	—	—	—	1	—	—	1
Pr. of Wales I.	June-July	250	11	4	—	2	6	1	—	—	1
1953 EXPERIMENTS											
W. Coast Graham I.	April	171	*	11	4	—	15	2	—	—	2
Whaleback	April	359	—	27	3	—	30	15	—	1	16
Dixon Entrance	April	120	—	15	1	—	16	8	—	—	8
Two Peaks	May	692	—	135	8	9	152	36	3	2	41
Two Peaks	July	173	—	30	4	2	36	14	4	2	20
Bonilla I.	May	944	—	68	25	4	97	35	12	1	48
Horseshoe Gnd.	July	1,701	—	209	76	15	300	46	19	6	71
Ramsay I.	June-July	641	—	15	4	—	19	10	6	—	16
Pr. of Wales I.	June	98	—	1	1	—	2	—	—	—	—
Cape Ulitka	June	726	—	10	3	—	13	4	—	11	15
Goose I.	June	191	—	30	13	—	43	17	2	—	19
Coronation I.	June	235	—	4	6	2	12	5	—	—	5
Cape Scott	July	139	—	20	2	—	22	11	—	—	11
WEST OF CAPE SPENCER											
1952 EXPERIMENTS											
Seward Gully	May	822	25	14	4	—	18	11	1	—	12
Chiniak Gully	May	493	9	3	2	—	5	6	—	—	6
Albatross Gully	May	75	2	—	—	—	—	1	—	—	1
1954 EXPERIMENTS											
Seward Gully	May	735	—	*	*	*	*	35	—	—	35
Albatross Bank	May-June	485	—	—	—	—	—	4	—	—	4
Yakutat	June	741	—	—	—	—	—	47	—	—	47
Cape Fairweather	June	11	—	—	—	—	—	2	—	—	2
Portlock	June-July	509	—	—	—	—	—	17	1	—	18
Albatross Bank	July	307	—	—	—	—	—	4	—	—	4
Yakutat	Aug.	959	—	—	—	—	—	50	1	—	51
Trinity Is.	July	255	—	—	—	—	—	—	—	—	—
Bering Sea	Mar-May,Nov.	41	—	—	—	—	—	—	—	—	—

* Zero year recoveries omitted because they are not comparable.

Availability (as measured by the recoveries per unit of effort) of tagged fish on the productive grounds lying between Cape Scott and Dixon Entrance showed a significant decline from 1954, particularly on Goose Island ground and in lower Hecate Strait. Middle Hecate Strait, on the other hand, showed an increase in availability. It is interesting to note that these differences were observed to occur in both the May-June and in the August seasons.