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

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REGULATION AND INVESTIGATION OF THE PACIFIC HALIBUT FISHERY IN 1963

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FOREWORD

The terms of the 1953 Convention between the United States and Canada for the Preservation of the Halibut Fishery of the Northern Pacific Ocean and Bering Sea provide that the International Pacific Halibut Commission shall publish a report of its activities and investigations from time to time.

The present report, the thirty-fourth published by the Commission, is the seventeenth in a series of annual reports that was begun in 1947. In addition to providing the usual summary of this Commission's activities and of results of its investigations during the year, this report includes a resume of the recent actions of the International North Pacific Fisheries Commission with respect to the halibut of eastern Bering Sea.

RETIREMENT OF HENRY A. DUNLOP

The retirement of Henry A. Dunlop, Director of Investigations, effective July 8, 1963, was announced by the Commission during the January 31 session of the 1963 Annual Meeting.

Henry A. Dunlop was born in Dunrea, Manitoba, Canada on July 8, 1898. He earned a Bachelor of Arts in zoology at the University of British Columbia in 1919 and a Master of Arts in zoology in 1922 at the same university. He continued his graduate studies at the University of Toronto in 1924-1925 and at the University of Washington between 1931 and 1936.

In July 1925, he was employed in the capacity of Assistant Director of the International Fisheries Commission, predecessor of the International Pacific Halibut Commission, a position he held until May 1939. Mr. Dunlop was appointed Acting Director of the Commission for the period June 1939 to September 1940. In October 1940, upon the resignation of William F. Thompson, the first Director of the Commission, Mr. Dunlop was appointed Director of Investigations, a position he held until his retirement.

Mr. Dunlop is active in professional societies and belongs to the American Society of Ichthyologists and Herpetologists, the American Fisheries Society, and the American Association for the Advancement of Science, as well as being a charter member of the Pacific Fishery Biologists and a Founding Fellow of the American Institute of Fishery Research Biologists. In 1953 he was awarded the Elizabeth II Coronation Medal for meritorious public service to Canada.

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by the

INTERNATIONAL PACIFIC HALIBUT COMMISSION

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INTRODUCTION

The halibut fishery of Canada and the United States in the eastern Pacific Ocean and Bering Sea has been subject to investigation for thirty-nine years and to management for thirty-two years under four successive treaties, signed in 1923, 1930, 1937 and 1953. The investigations and management have been carried out by the International Pacific Halibut Commission under authority of the 1953 treaty and by the precedent International Fisheries Commission under three earlier treaties.

Under the first treaty, which was signed March 2, 1923, and ratified October 21, 1924, the responsibilities of the Commission were largely restricted to investigation of the condition of the fishery for the purpose of recommending measures for its rehabilitation. A winter closed season aimed at reducing fishing intensity on spawning concentrations of halibut was the first attempt to regulate the Pacific Coast halibut fishery and became effective in 1924 after ratification of the 1923 treaty. Subsequently it was shown that the winter closed season alone was of limited effectiveness in reducing fishing mortality and that additional measures were needed to halt the continuing decline of halibut abundance.

The treaties of 1930, 1937 and 1953 provided for the division of the coast into areas, the control of the amount of fishing by setting annual catch limits or by adjusting the length of the closed season in any area and the placing of limits on the size of the fish to be retained by the fishery. The current 1953 treaty, which provided the present name for the Commission, specifically charges it with developing the stocks of Pacific halibut to levels which will permit maximum sustained yield and with maintaining the stocks at those levels.

During the 33 years of management the estimated size of the halibut population of the eastern Pacific has more than trebled. In conjunction with the rebuilding of the stocks there have been successive increases in the permitted annual yield. The annual catch, which had declined to about 44,000,000 pounds by 1931, the year before regulation, attained an all-time record of 75,100,000 pounds in 1962.

In 1963, the total catch declined to approximately 71,200,000 pounds when a coincidence of a number of factors led to deficits from the catch limits of the two major producing areas.

In 1963, Japan participated in the eastern Bering Sea halibut fishery for the first time following action by the International North Pacific Fisheries Commission in 1962, which resulted in the removal of halibut of the eastern Bering Sea from abstention by Japan under the Annex of the International Convention for the High Seas Fisheries of the North Pacific Ocean.

ACTIVITIES OF THE COMMISSION

During 1963 the Commission continued the program of statistical and biological observations which provide the basis for the regulation of the fishery according to scientific principles as required by the 1953 treaty.

Canadian members in 1963 were: Dr. William M. Sprules, Ottawa, Ontario, Chairman; Mr. Harold S. Helland, Prince Rupert, British Columbia to December 21 and Mr. Martin K. Eriksen, Prince Rupert, British Columbia from December 21;

and Mr. Richard Nelson, Vancouver, British Columbia. United States members were: Mr. Harold E. Crowther, Washington, D.C., Vice-chairman; Mr. Mattias Madsen, Seattle, Washington; and Mr. William A. Bates, Ketchikan, Alaska. The Chairmanship and Vice-chairmanship alternate between the two countries in successive years.

The Commission held its regular annual meeting in Petersburg, Alaska, from January 28 to 31, 1963. It was the first annual meeting to be held in Alaska and followed a plan of holding such meetings from time to time at places other than Seattle, Washington, the headquarters of the Commission.

On January 28, en route from Ketchikan to Petersburg on board the fishery patrol vessel C.G.S. HOWAY, placed at the disposal of the Commission by the Canadian Government to provide transportation, a brief meeting was held to discuss a number of matters related to the agenda of the meeting. A joint open session with representatives of all branches of the industry was held January 29. At this time the scientific staff of the Commission reviewed the status of the stocks and the fishery and presented results of scientific investigations in 1962. Proposals regarding the regulation of the fishery in 1963 were discussed with the Commission and the assembled representatives of the industry.

On January 30 the Commission held sessions with the staff to deal with budgetary and other administrative matters. The Commission met jointly on January 31 with the Conference Board, consisting of representatives of the fishermen and vessel owners, and with spokesmen for dealers from all sections of the coast to discuss proposals regarding the regulations for 1963.

During the sixth and last session of the meeting on January 31, the Commission considered proposals of the staff and views of industry regarding regulation and then adopted regulations for 1963. A summary of the measures being recommended for approval by the two governments, as required under the Convention, was immediately released for the information of the industry and the public.

Mr. Henry A. Dunlop's retirement on July 8, 1963, and the appointment of Mr. F. Heward Bell to succeed Mr. Dunlop at that time as Director of Investigations was approved by the Commission during the January 30 session. A resume of Mr. Dunlop's career is given at the beginning of this report.

During the fishing seasons the Commission determined the dates upon which it deemed the catch limits of the various regulatory areas would be attained, announced those dates in advance and subsequently closed the areas accordingly.

During the year the Commission published its 1962 annual report and prepared various technical manuscript reports to provide the governments of Canada and the United States with background information, chiefly with respect to matters under consideration by the International North Pacific Fisheries Commission. Titles of these are listed at the close of this report.

REGULATION IN BERING SEA

Regulation of the Pacific halibut fishery in 1963 underwent considerable modification of a procedural nature. The Pacific Halibut Fishery Regulations came to possess the dual function of implementing with respect to Canada and

United States not only the conservation controls of the International Pacific Halibut Commission for the Northern Pacific Ocean and Bering Sea but also the conservation measures of the International North Pacific Fisheries Commission with respect to the eastern Bering Sea.

International North Pacific Fisheries Commission

The International North Pacific Fisheries Commission was established in 1953 under the International Convention for the High Seas Fisheries of the North Pacific Ocean of Canada, Japan and the United States. This treaty, like that between Canada and the United States for the Preservation of the Halibut Fishery of the Northern Pacific Ocean and Bering Sea, also embodies the principle that exploitation of the high seas fisheries should be conducted in a manner to ensure the maximum sustained productivity of the resource. In addition it also includes the principle of abstention from fishing certain exploited stocks of fish.

With respect to halibut, Japan under the terms of the 1953 convention recognized that the stocks of halibut originating along the coast of North America fulfilled the conditions for abstention and accordingly abstained from fishing those stocks. The treaty provides that the continued abstention by Japan is contingent upon the stocks continuing to reasonably satisfy the following conditions:

> "i. Evidence based upon scientific research indicates that more intensive exploitation of the stock will not provide a substantial increase in yield which can be sustained year after year.
>
> "ii. The exploitation of the stock is limited or otherwise regulated through legal measures by each Party which is substantially engaged in its exploitation, for the purpose of maintaining or increasing its maximum sustained productivity; such limitations and regulations being in accordance with conservation programs based upon scientific research, and
>
> "iii. The stock is the subject of extensive scientific study designed to discover whether the stock is being fully utilized and the conditions necessary for maintaining its maximum sustained productivity."

It also requires that the International North Pacific Fisheries Commission study the stocks of halibut for the purpose of determining annually whether such stocks continue to qualify for abstention. However, no determination or recommendation as to whether such a stock continues to qualify for abstention was to be made before the Convention had been in force for five years, namely, before June 13, 1958 and all decisions of that Commission on abstention must be made by unanimous vote of the three national sections involved.

From 1958 to 1961 inclusive, the International North Pacific Fisheries Commission, annually reviewed the qualifications of the halibut stocks for continued abstention. No determination was made and Japan continued to abstain despite non-agreement with Canada and United States as to the continued qualification of the stocks for abstention.

In 1962 the International North Pacific Fisheries Commission at its Ninth Annual Meeting at Seattle, Washington recommended to the governments of the Contracting Parties that the stocks of halibut of the eastern Bering Sea, east of 175° W. longitude no longer be regarded as qualifying for abstention as specified

by the Annex. Notification of the acceptance of the recommendation of the International North Pacific Fisheries Commission was received by that Commission from Japan on February 26, 1963, from the United States on March 23, and from Canada on May 8. Japan commenced fishing halibut in eastern Bering Sea east of 175° W. longitude and on May 10 reported the first landings.

In anticipation that Japan, Canada and the United States would confirm the recommended removal of halibut from the Annex with respect to eastern Bering Sea, joint conservation measures for the region were agreed to at an Interim Meeting of the International North Pacific Fisheries Commission in Tokyo in February 1963. These proposed measures, announced on February 14, included among others the establishment of a regulatory area in eastern Bering Sea with an 11,000,000 pound three-nation catch limit for 1963. The area was subsequently designated by the International Pacific Halibut Commission in the 1963 Pacific Halibut Fishery Regulations as Area 3B North Triangle.

International Pacific Halibut Commission

Prior to the February meeting of the North Pacific Commission in Tokyo, the International Pacific Halibut Commission at its annual meeting in Petersburg, Alaska, adopted regulations for the Pacific halibut fishery for 1963 on the basis of the status quo with respect to Bering Sea. These were approved by the Governor General of Canada in Council on March 18 and by the President of the United States of America on March 21, and became effective on the latter date. However, also in anticipation that Japan, Canada and the United States would approve the recommended removal of halibut in Bering Sea from abstention and adopt the conservation measures proposed by the International North Pacific Fisheries Commission an alternate set of regulations was subsequently prepared which included the substance of these conservation measures.

Review of Regulation in Bering Sea

In view of the change in the management procedures in eastern Bering Sea in 1963, resulting from the three-nation participation in the fishery, a brief review of regulation in Bering Sea during the past 30 years is given.

The Bering Sea has been specifically included in the convention waters as defined in the present and preceding three conventions between Canada and United States for the Preservation of the Halibut Fishery of the Northern Pacific Ocean including Bering Sea. Regulation in the region has followed the same principles pursued on other sections of the coast. Also in Bering Sea as in other areas the constantly changing conditions in the fishery or in the halibut population have necessitated many adjustments in the regulations to secure the seasonal and geographic distribution of fishing required to fulfill the objectives of the several halibut treaties.

From the outset of regulation in 1932 and continuing through 1946, the Bering Sea and the waters about the Aleutian Islands west of Umnak Island were designated Area 4. No limit on the catch was set as the immediate development of an extensive fishery in the region was improbable, first for economic reasons and subsequently because of war with Japan. For enforcement reasons, the area was opened and closed at the same time as Area 3 which included the remaining grounds west of Cape Spencer.

In 1947, after the end of the war, the boundary between Areas 3 and 4 was shifted to Cape Sarichef so as to include in Area 3 the halibut in Bering Sea along the north shores of the Aleutian Islands, which early marking experiments had demonstrated to be a part of the population west of Cape Spencer. This was done because expansion of the fishery south of the Alaska Peninsula after World War II now made the development of halibut fishing in Bering Sea probable. Also, a United States mothership expedition in the region was planned for 1947, primarily for king crab and secondarily for halibut and other demersal fish. A catch limit of 500,000 pounds of halibut was set for the new Area 4 to test the abundance of the halibut in the region and yet provide a safeguard for the supply until its production potential was better known.

Further, it had also become apparent by the middle 1940's that the successful rehabilitation of the halibut population east of Trinity Islands commencing in the early 1930's was diverting fishing from the far-western grounds. As full loads could be obtained from grounds closer to port, fishing was not being distributed according to the productive capacities of the various grounds. Some modification in the regulations was required since marking experiments all along the coast had shown that it was unlikely that full utilization of the halibut on lightly-fished grounds could be assured through intermingling with those on heavily-fished grounds. Consequently, it was desirable that some fishing be conducted upon each ground.

In 1946 upon termination of World War II, the Commission requested broader regulatory authority that was deemed necessary to obtain an adequate seasonal and geographical distribution of fishing, including the use of multiple fishing seasons which were not permitted under the 1937 treaty. Pending provision of such authority, the portion of Area 3 west of Sanak Island was established in 1952 as Area 3B and was opened along with Area 4, without catch limit, for a designated 17-day fishing season in August after the remainder of Area 3, then thereafter designated as Area 3A, had been closed by reason of attainment of its catch limit. Enforcement of such differential openings had become feasible with the development of aerial patrol after World War II. In 1953, the length of the special season in Areas 3B and 4 was increased to 25 days.

In 1954, by which time further tagging had indicated that the halibut on the flats in southeastern Bering Sea were also not biologically separable from the large population to the south and east of the Alaska Peninsula, Areas 3B and 4 were combined and designated as Area 3B. Under authority of the 1953 Convention, three open seasons were provided in the new area, the first two coincident with two seasons in Area 3A and the third one after the final closure of Area 3A. These changes were made to further increase fishing in the region.

In 1957, when the second season in Area 3A was discontinued as being no longer necessary because of prolongation of the first season, Area 3B was expanded to include the Shumagin Islands ground and was opened continuously from May 1 to October 16. Commercing in 1958, Area 3B was opened on April 1, one month earlier than Area 3A and kept open until October 16 each year, as previously-tried regulatory procedures had not achieved the distribution of fishing that appeared desirable.

The regulations, since 1958, have continued the differential opening dates between Areas 3A and 3B. In 1961, Area 3B was divided into two portions, Area 3B North (Bering Sea) and Area 3B South, each with different opening dates to obtain a better distribution of fishing within the region. These regulatory procedures have materially increased fishing in southeastern Bering Sea and on other grounds west of Shumagin Islands, fulfilling a course of action that was initiated shortly after World War II.

REGULATIONS IN 1963

Upon acceptance by all three countries of the recommended removal of the halibut in eastern Bering Sea from abstention, the amended Pacific Halibut Fishery Regulations were sent forward for approval of the two governments. They were approved by the Governor General of Canada in Council on May 23 and by the President of the United States of America on June 8, at which time they became effective. These regulations superseded those of March 21, and as stated above served also to implement on behalf of Canada and the United States the conservation measures of the International North Pacific Fisheries Commission in eastern Bering Sea.

Regulatory Areas

The regulatory areas in 1963, shown in Figure 1, were as follows: Area 1—the convention waters south of Willapa Bay, Washington; Area 2—the waters off northern Washington, British Columbia and southeastern Alaska between Willapa Bay and Cape Spencer, Alaska; Area 3A—the waters off Alaska between Cape Spencer and Kupreanof Point near the Shumagin Islands; Area 3B South—the waters south of the Alaska Peninsula and the Aleutian Islands west of Kupreanof Point; Area 3B North Triangle—the waters between the Pribilof Islands and Unimak Pass and along the Aleutian Island chain from Unimak Island to the 170° West longitude line; and Area 3B North—the waters of Bering Sea, not including those in Area 3B North Triangle.

The above divisions of the convention waters are designed to provide practical management divisions. These may be opened or closed to fishing at different times in order to secure the amount of fishing appropriate to the productivity of the various grounds, and with recognition of the seasonal differences in availability of halibut on various sections of the coast. These separations should not necessarily be regarded as defining biologically independent populations.

Catch Limits

Catch limits during 1963 for Areas 2, 3A and 3B North Triangle were 28,000,000 and 34,000,000 and 11,000,000 pounds respectively, the latter a three-nation total for Canada, United States and Japan. The Area 2 limit was the same as in 1962, the Area 3A limit had been increased 1,000,000 pounds and the Area 3B North Triangle limit was as recommended by the International North Pacific Fisheries Commission. There was no catch limit in Area 1, 3B South and 3B North.

Production from Area 1 which is at the southern extreme of the species range is relatively inconsequential and that from Area 3B North was largely

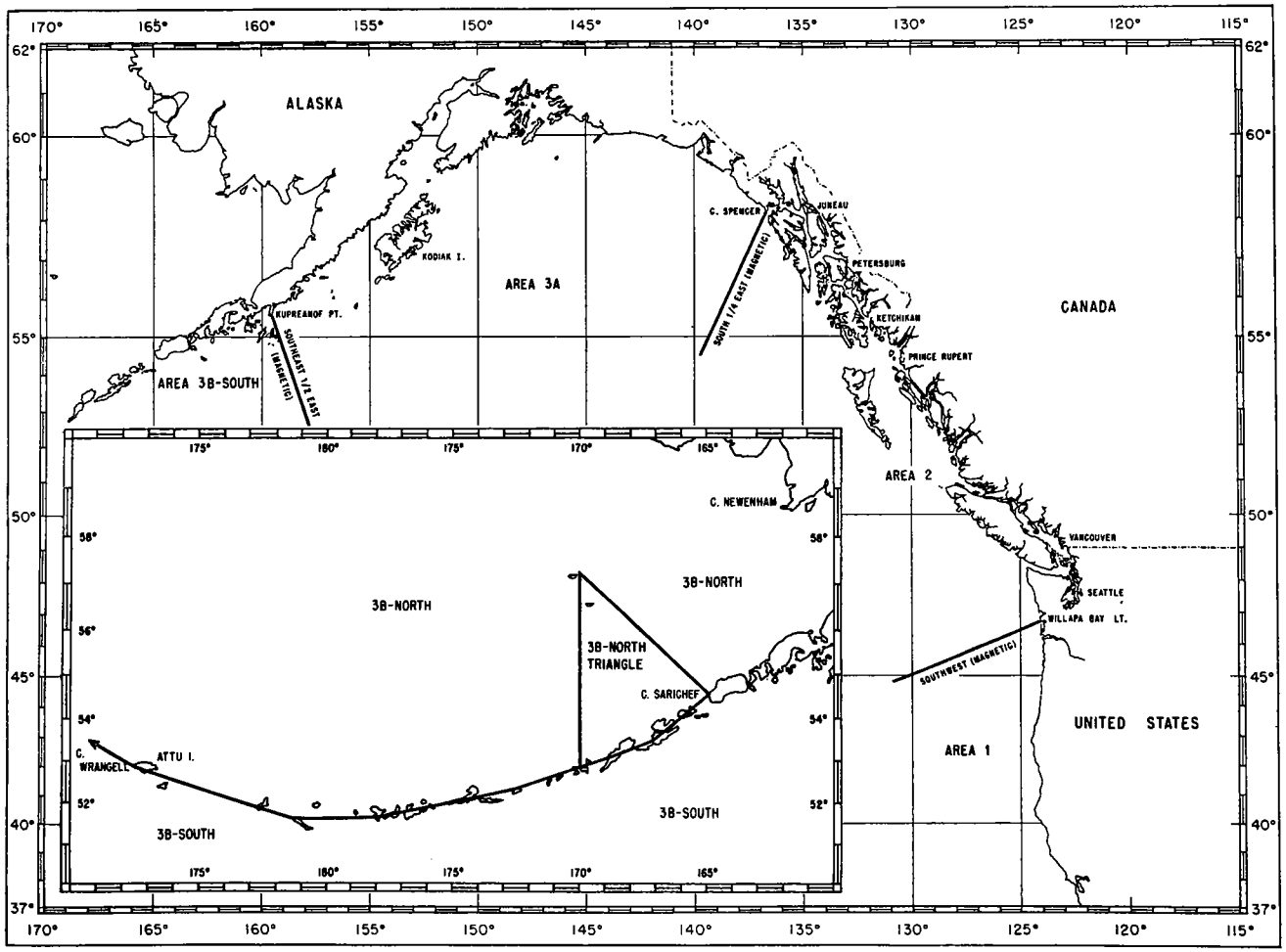

Figure 1. Pacific Coast of North America showing regulatory areas defined by the International Pacific Halibut Commission in 1963.

the result of a limited amount of exploratory fishing beyond the range of the main Bering Sea fishing in Area 3B North Triangle.

In Area 3B South the catch was controlled by adjusting the timing and length of season for a fleet whose magnitude has been reasonably predictable. An average catch of nearly 4,000,000 pounds in Area 3B South has been provided annually by this method of control since 1958. When this is combined with the average annual catch permitted in Area 3A in the same period the total catch closely approximates the maximum sustainable yield of 38,000,000 pounds indicated for the two regions in Report No. 31 (1962) of the Commission.

Lengths of Seasons

The season in Areas 1 and 2, which opened on May 9, terminated on November 30, the statutory closing date since the catch limit for Area 2 was not attained. The season in Area 3A, which also commenced on May 9, terminated on August 9 with announcement on July 22 to provide the customary 18 days notice of closure. The fishing season in Areas 3B North and 3B North Triangle opened on March 25 and terminated on October 15. Area 3B South opened on April 19, the same as in 1962, and closed October 15. The opening dates of all areas and closing dates of those areas without catch limits are announced in regulations published prior to the fishing season.

STATISTICS OF THE FISHERY

Landings by Regulatory Areas

Landings of halibut in thousands of pounds for groups of regulatory areas for the years 1961 to 1963 are shown in the following table with comparable landings for 1931, the year immediately preceding the commencement of regulation by the Commission. Since Areas 3A, 3B South, 3B North and 3B North Triangle are management areas only and not indicative of stock separations, the landings from these areas are combined in the table. Estimates of the poundage taken in contravention of the regulations are included in the totals for each section of the coast.

United States and Canadian Catches by Regulatory Areas in Thousands of Pounds

Year	Area 1*	Area 2			Areas 3A, 3B North, 3B North Triangle and 3B South			All Areas		
	U.S.	U.S.	Canada	Total	U.S.	Canada	Total**	U.S.	Canada	Total
1931	923	14,609	7,018	21,627	20,907	765	21,672	36,439	7,783	44,222
1961	270	15,756	13,093	28,849	24,039	16,373	40,412	40,065	29,466	69,531
1962	312	14,480	14,183	28,663	25,654	20,490	46,144	40,446	34,673	75,119
1963	210	11,603	14,208	25,811	22,430	22,776	44,756	34,243	36,984	71,227

* Catches from Area 1 are shown separately only to indicate the relatively small production from these grounds at the southern limit of the species.

** Does not include 3,600,000 pounds taken by Japan in Area 3B North Triangle in 1963 or their halibut catches in the remainder of Bering Sea in any year.

Area 1

In Area 1 the total catch in 1963 was 210,000 pounds, much of which was taken incidentally while fishing for other species. Despite the 400-mile length of the shelf in Area 1 where halibut have been reported, the annual catches in recent years have usually been less than one-quarter million pounds. Historically,

some dense concentrations were found at isolated locations in the region, but they appeared to have been of a transitory and discontinuous nature. One such location off the Columbia River, which in 1915 produced about four million pounds in the space of a few months at a very high catch per unit effort, now provides but very modest catches at a relatively low catch per unit effort. The same situation prevails on Heceta Bank, which also provided some relatively heavy catches in the early years.

Despite the reduced amount of fishing in Area 1 the halibut population within the region has not increased as has been the case within Areas 2, 3A and 3B South. This suggests that the portion of the population in the southern area does not have the potential productivity of stocks elsewhere. While the capture of individuals tagged elsewhere indicates that the halibut in Area 1 are not separable from those found on grounds to the north, tagging experiments within the area are required to further evaluate the relationship.

Area 2

The total catch from Area 2 in 1963 was 25,811,000 pounds, about two million pounds less than the catch limit. The deficiency was due to several factors, chief of which was the diversion of many vessels from halibut to blackcod fishing during the latter part of the summer when relatively high prices were paid for blackcod. Also, the very sharp decline in halibut prices from 1962 levels in itself greatly lessened interest in halibut fishing. Furthermore, the catch per unit effort has remained below the long-term trend for the past three years despite the reduction in the catches that have been effected since 1960.

Area 3A

A catch of 33.4 million pounds was taken during the season from May 9 to August 9 in Area 3A. The deficit below the catch limit of 34.0 million pounds resulted chiefly from the failure of a few vessels to carry out their last trip, after announcement of closure of the area, due to a labor dispute in the British Columbia fishing industry.

Area 3B South

In Area 3B South, 3.9 million pounds were taken compared to 4.1 million pounds in 1962. This level of catch was as planned when the opening and closing dates for the area were established. The seasonal distribution of the catches was also close to what was expected. Although there was some fishing in the region in June and July, most of the production was taken when Area 3A was closed. Nearly a million pounds were taken in the months of April and May and about 2.7 million pounds in August and September. The total catch of nearly four million pounds when combined with the 33.1-million-pound catch in Area 3A provides a total removal of 37.0 million pounds from both areas, an amount slightly less than the current estimate of maximum sustainable production.

Areas 3B North and 3B North Triangle

In 1963 the grounds in southeastern Bering Sea were divided into two regulatory areas as recommended by the International North Pacific Fisheries Commission. Area 3B North Triangle encompasses the grounds along the "edge"

from the Pribilof Islands to Unimak Pass and along the Aleutian Island chain from Cape Sarichef to 170° West longitude. Area 3B North included the remaining grounds in convention waters in Bering Sea. Accordingly, Area 3B North in 1963 is not comparable with Area 3B North in previous years.

The catch in Area 3B North for 1963 was 844,000 pounds, most of which was taken along the edge west of the Pribilof Islands. This area did not have a catch limit.

From Area 3B North Triangle the United States and Canadian fleets removed 7.3 million pounds and the Japanese 3.6 million pounds, resulting in a combined catch close to the 11,000,000 pound catch limit recommended for the area by the International North Pacific Fisheries Commission.

The Japanese ceased fishing about mid-July, probably because of the scarcity of fish. During September and October a number of Canadian and United States vessels visited Area 3B North Triangle without success. All United States and Canadian vessels found it necessary to return to Area 3B South in order to secure sufficient fish for a profitable trip.

Landings by Ports

The distribution of halibut landings in thousands of pounds from all areas is shown in the following table according to regions and ports or groups of ports for 1963 with comparable data for 1961 and 1962.

United States and Canadian Landings by Regions and Ports in Thousands of Pounds

Ports	1961 U.S.	1961 Canada	1961 Total	1962 U.S.	1962 Canada	1962 Total	1963 prel. U.S.	1963 prel. Canada	1963 prel. Total
California and Oregon	371	—	371	392	—	392	228	—	228
Seattle	12,671	420	13,091	10,089	877	10,966	10,578	1,392	11,970
Bellingham	1,554	1,493	3,047	2,065	3,256	5,321	770	2,880	3,650
Other Wash.	339	—	339	237	—	237	295	—	295
Vancouver, B.C.	—	6,782	6,782	—	4,527	4,527	—	5,769	5,769
Vancouver I.	—	1,085	1,085	—	1,354	1,354	—	1,432	1,432
Prince Rupert	1,755	15,160	16,915	644	17,142	17,786	734	17,221	17,955
Other B.C.	—	1,887	1,887	—	1,794	1,794	—	1,221	1,221
Ketchikan	9,337	161	9,498	10,101	705	10,806	6,935	1,174	8,109
Other S.E. Alaska	11,031	674	11,705	11,638	895	12,533	8,832	651	9,483
Central Alaska	3,007	1,804	4,811	5,280	4,123	9,403	5,871	5,244	11,115
TOTALS	40,065	29,466	69,531	40,446	34,673	75,119	34,243	36,984	71,227

Landings in California and Oregon in 1963 were slightly lower and in Seattle slightly higher than in 1961 and 1962, with some shift of landings away from Bellingham, Washington and Ketchikan, Alaska, to Seattle.

Landings in Vancouver in 1963 were higher than in 1962, but not as high as in 1961. Landings in Prince Rupert in 1963 continued the upward trend noted for several years.

In southeastern Alaska landings decreased sharply in 1963 to a level much below 1962, reflecting the smaller fleet in the region. Landings in central Alaska showed a very marked increase in 1963 particularly by Canadian vessels. The improved facilities and an increased number of buyers in the Kodiak Island area have been mainly responsible for this increase. Also, the number of landings at Sand Point from the growing United States and Canadian fleets fishing in Bering Sea also continued to increase in 1963.

Catch Per Unit Fishing Effort

All halibut vessels of five net tons or over are required to keep records showing the date, fishing location, amount of gear fished and the estimated catch of halibut in pounds for each fishing operation. These records are collected and analyzed to determine the average catch per standardized unit of fishing effort in the various areas and subsections thereof and in the different seasons. The resultant returns per unit effort are then compared with those of earlier years to ascertain whether changes in relative abundance have occurred and to measure the magnitude of such changes.

In Area 2 the catch per unit effort for the area as a whole declined less rapidly from 1962 to 1963 than in the previous two years. While the levels of catch per unit effort on most grounds in 1961 were close to the long-term trend of slowly-rising values, the 1962 and 1963 averages on all grounds were below this trend. In 1963 the moderate increase in abundance observed between Cape Scott and Dixon Entrance was more than offset by the continued decline in southeastern Alaska. In light of all circumstances, a general reduction of fishing in Area 2 as a whole is indicated. Also, should the catch per unit effort of each of the above two major sections of the area continue to move in opposite directions separate regulation of the grounds off British Columbia and those in southeastern Alaska may be required.

In both Areas 3A and 3B South the catch per unit effort declined from 1962 to 1963, but not as rapidly as from 1961 to 1962. However, the persistence of the decline requires that the catches not be increased, particularly in view of the continued large removals from Bering Sea from which there is a high emigration rate into Area 3A.

In Area 3B North Triangle the catch per unit effort declined to nearly three-quarters of the 1962 level; on some important sections of the area the decline was even greater. The progressively greater annual decline in catch per unit effort since about 1960 and the increased dependence of the catch on younger halibut indicate that the 6.8 and 7.3 million pound removals in 1962 and 1963 respectively, not including the 3.6 million pounds by Japan in 1963, were in excess of what this portion of the halibut population might be expected to produce on a continuable basis.

In Area 3B North the United States and Canadian fishery is still in the exploratory stage except on the Slime Bank. Indications to date are that the halibut on the edge grounds west of the Pribilof Islands will not be as plentiful as on the grounds between the Pribilof Islands and Unimak Pass.

COMPOSITION OF THE CATCHES

Measures of abundance derived from records of catch per unit fishing effort and rates of utilization based on tagging experiments, while essential to scientific management of the halibut stocks, do not by themselves completely describe the condition of the stocks. Knowledge of the age structure of the population is needed to obtain total mortality and growth rates which in conjunction with measures of abundance and utilization form the bases upon which the stocks of Pacific halibut have been managed.

The research into the age composition of the stocks consists chiefly of analysing representative samples of lengths and associated samples of otoliths collected from the commercial landings for age assessment. Since the sex of the individual is not identifiable in the eviscerated fish as landed, these market samples are supplemented by those taken at sea from commercial as well as research vessels where data regarding sex and stage of maturity of individual fish can be obtained.

In 1963 sampling of the commercial landings was conducted regularly at Seattle, Prince Rupert and Petersburg with occasional samples being obtained at Bellingham, Vancouver, Ketchikan, Pelican and Sand Point. Through the cooperation of several United States and Canadian vessels, the halibut catches of 20 commercial setline and 9 trawler trips were also sampled at sea. Over 95,000 measurements from a record number of 287 commercial trips were taken during the past season. Operations on vessels chartered for tagging, young halibut investigations, and the trawl-survey provided 15,000 additional measurements. Otoliths for age assessment and sex information were collected from a large proportion of these. Readings of about 37,000 otoliths were made in 1963 for use in age composition studies. Nearly 25,000 of the otoliths read were collected in 1963.

During 1962 and 1963 observers were placed aboard commercial trawlers fishing off British Columbia to reappraise the findings of the 1947 study of the effects of trawling upon stocks of halibut. In addition to collecting size and age composition data, information needed to determine the viability of trawl-caught halibut was gathered through observation and tagging. Several United States and Canadian trawl vessels cooperated in the program providing accommodations for Commission personnel.

The following table gives the number of trawl trips sampled and the number of halibut measured, otolithed or tagged on various grounds in 1962 and 1963.

Ground	No. Trips	No. Measured	No. Otoliths	No. Tagged	Total
			1962		
Cape Flattery and Vancouver Island	5	336	248	227	811
Cape Scott	2	1,761	460	249	2,470
Goose Islands	3	161	98	118	317
Hecate Strait	1	488	143	63	694
TOTAL	11	2,746	949	657	4,352
			1963		
Cape Flattery	1	13	4	—	17
Goose Islands	8	1,355	376	303	2,304
TOTAL	9	1,368	380	303	2,051

In addition, through the cooperation of the Japanese Fisheries Agency and the Nippon Suisan Kaisha Co., Ltd., a Commission observer spent July and August, 1963, aboard the TENRYU MARU, a Japanese side-trawler of 545 gross-tons operating in the Gulf of Alaska primarily for shrimp and ocean perch. During the period the catches were sampled for size and age composition of the inadvertent halibut catch. Observations were made upon the viability of halibut in the catches and the observer assisted the Japanese biologist in tagging some of the halibut; such tagging is part of the Japanese research program.

In Area 2 the existing age composition of the catches continued to indicate the need for further reduction in the permitted annual catch. The catches from important fishing grounds in Hecate Strait and Queen Charlotte Sound are unduly dependent upon young fish, nine years of age (the 1954 year class) and younger. The 1951 year class, which has been important to the fishery for several years, has passed from prominence on most Hecate Strait grounds. The 1954 class, which apparently passed its peak of availability at only 7 years of age after entering the fishery strongly, also continued to decline.

In southeastern Alaska, on both inside and outside grounds, the abundance of older fish has also declined and the catches are becoming increasingly dependent upon the younger age groups. However, the newly-entering 1956 and 1957 year classes which comprised a large proportion of the catches off the British Columbia coast in 1963, have not yet made a significant entry into the fishery in southeastern Alaska. There is no indication from age composition data that an increase in abundance can be expected in the immediate future in Area 2.

West of Cape Spencer, samples from the Portlock-Albatross section of Area 3A and from the Shumagin Islands and Davidson Bank grounds in Area 3B South have displayed very similar age compositions for many years with the same year classes prominent in all sections. There has been some decline in abundance of older fish since 1958, the decline being somewhat more pronounced on the far-western grounds than on the Portlock-Albatross grounds. The 1951 year class declined slightly as 12-year olds in 1963 in the Shumagin Island region but remained strong on Portlock and Albatross.

In Bering Sea, catches from Area 3B North Triangle showed a continued decline in numbers of older fish and a further increased dependence upon young fish. The decline in number of halibut over age 12 on the Polaris ground from

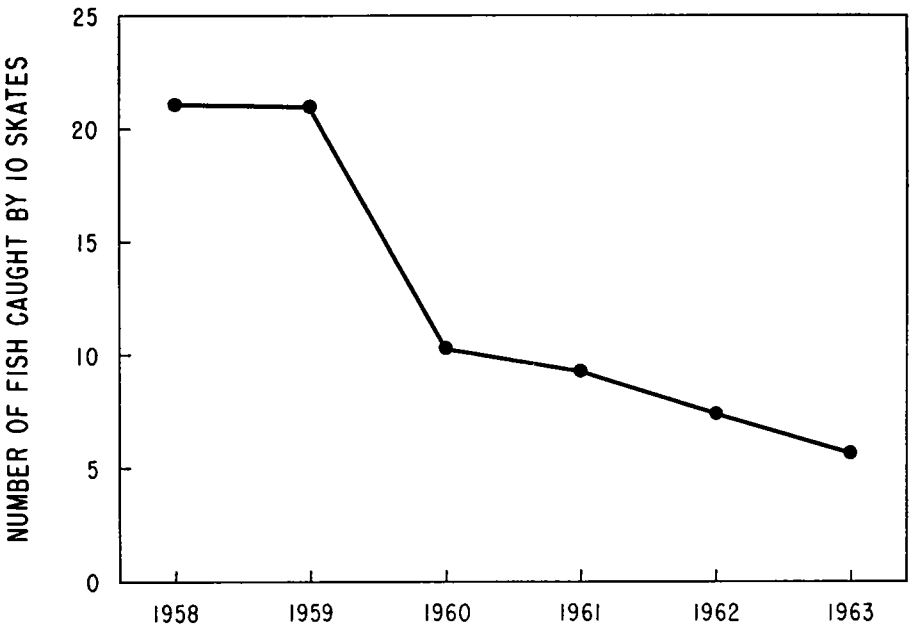

Figure 2. Decline in abundance of halibut over age 12 on the Polaris grounds, 1958 to 1963.

1958 to 1963 is shown in Figure 2. Fish older than 12 years of age comprised over 78 percent of the weight of the initial catches in 1956 but by 1963 their contribution had been progressively reduced to about 18 percent. In contrast, on the long-exploited Portlock-Albatross grounds in Area 3A, these age groups have averaged over 30 percent of the weight of catches since 1960.

Limited and discontinuous concentrations of old, slow-growing halibut have been encountered along the edge, west of the Pribilof Islands. One catch taken in October consisted of the oldest and slowest-growing halibut yet observed in Bering Sea. The age compositions of this catch for each sex were bimodal, again suggesting the presence of two groups of fish such as were noted on the Polaris ground at the time of initial fishing in 1956—an accumulated group of older fish, and a younger, perhaps migratory group.

TAGGING EXPERIMENTS

Tagging experiments, which are one of the Commission's most valuable tools for regulating the halibut fishery in a scientific manner, provide information regarding the relationships between the stocks upon the various fishing grounds and the extent of their utilization by the fishery. In addition, both fishing and natural mortality rates, needed to determine the stock levels which will produce maximum sustained yield, can be ascertained from tagging studies.

In 1963 three chartered vessels, the ARTHUR H., ECLIPSE and SEATTLE, were engaged in tagging operations for a total period of 269 days, the most intensive tagging activity in a single year in the history of the Commission. Their operations are summarized as follows:

	Units of Gear		Total Catch	Number Tagged	Pounds Tagged
	Setline	Trawl			
ECLIPSE	2,611	—	205,015	2,615	65,799
ARTHUR H.	408	101	10,568	1,386	7,433
SEATTLE	651	—	96,764	1,337	41,431
TOTALS	3,670	101	312,347	5,338	114,663

An additional 1,769 fish were tagged in connection with other operations, as shown in the following table.

Vessel Name	Source	Region of Tagging	No. Tagged
ARTHUR H.	Trawl Survey	Yakutat-Seward Gully	119
ST. MICHAEL	Trawl Survey	Cape Cleare-Seward Gully	19
WESTERN FLYER	Trawl Survey	Icy Bay-Cape Cleare	61
ST. MICHAEL	Small Fish Survey	Shelikof Bay-Shumagin Island	1,260
ST. MICHAEL	Commercial Trawl	Goose Island	159
TORDENSKJOLD	Commercial Trawl	Cape Flattery-Goose Island	62
MORNING STAR	Commercial Trawl	Cape Flattery-Goose Island	89
TOTAL			1,769

The halibut vessel ECLIPSE operated for a period of 106 days from May to mid-August to conduct the first stage of a three-year program of tagging from setline vessels on a predetermined grid or network of stations similar to that used

between Cape Cleare and Trinity Islands during the 1961-1963 trawl survey. Such tagging over the entire shelf area is designed to aid in resolving the differences between mortality rates estimated by tagging studies and those estimated by other means for this region.

The otter trawler ARTHUR H. was engaged in a tagging operation using a combination of setline and trawl gear on a predetermined 82-station grid chiefly on the flats in southeastern Bering Sea where large foreign trawl fleets operate. Tagging was conducted from May to August over a period of 119 days.

The flats are characterized by a large, dispersed population of young juvenile halibut whose capture was effected by the use of trawl nets operated in conjunction with the setline gear. This tagging experiment was designed to provide information on the possible relationship between these young fish and the adult population in Bering Sea or elsewhere in the eastern Pacific.

The M/V SEATTLE was chartered in November for a three and one-half month period to tag halibut during the winter months in Bering Sea as far westward as 180° west longitude and on grounds south of the Alaska Peninsula between Shumagin Islands and Unimak Pass. Such wintertime tagging has not been conducted west of Kodiak Island and will provide information regarding the relationship of possible spawning halibut in eastern Bering Sea with halibut on grounds in western Bering Sea as well as halibut south of the Alaska Peninsula. The vessel operated 44 days in November and December when the charter was temporarily suspended. A second phase of the experiment is planned to begin in early January 1964.

The 1,337 tags released thus far by the SEATTLE bring the total number of tagged halibut released in Bering Sea by the Commission by the end of 1963 to nearly 12,000, of which 10,800 have been released since 1956. This volume of tagging is indicative of the intensity of the scientific investigations conducted in Bering Sea since 1956 by the Commission.

Recovery of 584 halibut tags was reported in 1963 compared to 772 in the previous year. Of this year's returns, 13 had been captured in previous years by United States and Canadian vessels and 19 were recovered by Japanese vessels in 1962 and 1963. In addition, 4 tags released by Japanese research vessels between Cape Barnabas and Dixon Entrance in 1962 were recovered in 1963 by Canadian and United States vessels and forwarded by the Commission to the Japanese Fisheries Agency. Recoveries of tagged halibut during 1963 from experiments in 1960, 1961 and 1962 are summarized in the following table.

The reduced number of recoveries in 1963 over recent years is largely the result of the type of the current tagging experiments. In 1961 and 1962 most of the halibut tagged were from the catches of otter trawl vessels chartered by the Commission to conduct a survey of the demersal fishes of the Gulf of Alaska at the request of the two governments. Most of the fish tagged were less than about 60 centimeters in length and would not be expected to be available to the commercial setline fleets for several years. The 81 recoveries from these experiments that have been taken to date have been predominantly fish that were of commercial size at the time of tagging.

Summary of 1963 Tag Recoveries from 1960 - 1962 Tagging Experiments

Year and Location	Month of Experiment	Number Tagged	Recoveries By Type Of Gear: Setline & Trawl	Recoveries By Type Of Gear: Other Gear*	Total Recoveries
SOUTH OF CAPE SPENCER					
1960 Experiments					
Goose Is.	April	2,289	74	7	81
Masset	May	175	4	—	4
Northern Hecate Strait	May	529	16	—	16
Outside Southeastern Alaska	May-June	998	25	—	25
Northern Hecate Strait	June-July	76	5	—	5
Outside Southeastern Alaska	July	2,977	68	—	68
West Coast Graham I.	August	700	11	—	11
Bowie Seamount	August	23	1	—	1
Masset	August	132	4	—	4
Two Peaks	August	168	5	—	5
Goose Is.	August	1,012	49	7	56
Cape Scott	August	16	—	—	—
Butler Cove	May-July	265	6	—	6
1961 Experiments					
Icy Strait	August	57	—	—	—
Cape Flattery	April	3	—	—	—
1962 Experiments					
West Coast Vancouver I.	June-Sept.	237	4	—	4
Cape Scott	June-Aug.	332	16	9	25
Goose Is.	June-Aug.	214	22	3	25
Horseshoe	July	58	6	2	8
Icy Strait	Oct.	2	1	—	1
WEST OF CAPE SPENCER					
1961 Experiments					
Unimak I.-Trinity Is.	May-Nov.	2,886	7	—	7
Kodiak I.	May-Nov.	2,372	6	—	6
Cape Cleare-Cape St. Elias	Aug.-Oct.	640	—	—	—
Cape St. Elias-Cape Spencer	June-Sept.	601	3	—	3
Bering Sea	July	116	—	—	—
1962 Experiments					
Unimak Pass-Trinity Is.	Feb.-April	1,277	—	—	—
Kodiak I.	Feb.-Oct.	1,686	9	—	9
Cape Cleare-Cape St. Elias	May-Oct.	1,804	10	5	15
Cape St. Elias-Cape Spencer	June-Dec.	284	4	1	5

*Otter trawl or small fish experiments.

The number of recoveries from tagging on the edge and the flats grounds in Bering Sea in 1959 have continued to be less than from the 1956 experiment on the Bering Sea edge. Most of this difference apparently arises from the large proportion of tags which were released on Slime Bank in 1959. On this ground the fish are smaller, the intensity of fishing is less and the rate of emigration is lower than in the case of the edge grounds.

It was previously observed that the percentage recovery of halibut tags has increased less rapidly than the total mortality rate for a number of major experiments, implying that a significant loss of halibut tags due to non-reporting may be taking place. During 1963 further tests were made to evaluate the magnitude of such losses. Nearly 70 percent of about 64,000 fish on 37 halibut trips landed in Seattle were closely examined for tags that may have been overlooked. During this experiment 17 unreported tags were found. This sampling has provided concrete evidence of the overlooking of tags but more important, it has provided the first evidence of the magnitude of such loss. It has also indicated that the loss is higher for some types of tags than previously considered. Such a loss would tend to lower the estimates of fishing mortality derived from tagging data.

STUDIES OF HALIBUT BELOW COMMERCIAL SIZE

Investigation of the distribution and abundance of halibut of younger ages than those taken by the United States and Canadian setline fishery was initiated in 1955. At the outset, the work was exploratory in nature and confined to bays and inlets of the British Columbia and Alaska coasts between Queen Charlotte Sound and the Shumagin Islands. As knowledge concerning the location of the young halibut was accumulated, the emphasis of the program shifted from exploration to measuring abundance of each appearing year class for the purpose of relating this to its subsequent recruitment into the commercial fishery.

During the Commission's recent trawl survey of the demersal fishes in the Gulf of Alaska, it was found that young halibut from two to four years of age are distributed generally over the entire continental shelf between Cape Spencer and Unimak Pass. With the advent of trawling on these grounds by Japan and Russia, it has become necessary to direct an increasing share of the annual sampling of young fish to offshore grounds between Cape Cleare and the Shumagin Islands to provide indications of the possible impact that such foreign trawling may be having upon the stocks of young halibut in the Gulf of Alaska.

In 1963 the trawler ST. MICHAEL was chartered for a period of 79 days from July 1 to September 17. The inshore locations were sampled with an otter trawl with a 60-foot groundline and 1¼-inch mesh codend; offshore stations were fished with an otter trawl having a 90-foot groundline and 3½-inch mesh codend, identical to those used during the aforementioned survey by the Commission of demersal fish stocks in the Gulf of Alaska.

During the operations 176 hauls were made and 6,164 halibut less than 66 centimeters in length were taken at depths ranging from 6 to 67 fathoms. The age composition of these halibut are summarized in the following table according to locality, both inshore and offshore. Over 1,200 halibut, one through three years of age, were tagged with plastic dart tags during 1963. Six tagged fish less than 66

centimeters in length from two experiments in previous years were recovered. These recoveries were made near Cape St. Elias; three from tagging in 1962 during the Commission's trawl survey and two tagged in 1962 and one tagged in 1963 during the small fish investigations. These recovered tagged fish ranged from two to nine years of age at recovery.

During the small fish investigations from Queen Charlotte Sound to Kodiak Island in previous years relatively large numbers of the 1954 and 1957 year classes have been taken as 1- to 3-year-olds. The 1954 year class made a strong appearance in recent commercial catches from Queen Charlotte Sound and Hecate Strait. Although only observed in the commercial fishery for one or two years, the 1957 year class has also entered strongly on some grounds. In contrast, the 1955 and 1956 year classes were relatively scarce in the small fish catches and at older ages have made a weaker entry into the commercial catch. Such correspondence between the numerical strength or weakness of the year classes as 1- to 3-year-olds and the subsequent appearance of a particular year class in the commercial catch indicates that, within limits, recruitment into the commercial fishery may be anticipated in advance from sampling of young halibut. It also suggests that the sampling program of young halibut, though limited in extent, may be providing acceptable measures of year class strength.

Numbers of Halibut Less than 66 Centimeters in Length Taken in 1963 According to Locality and Age

Locality	Age 0	1	2	3	4	5	6	7	8	9	Total
AREA 2											
Dixon Ent.-Cape Addington (inshore)	—	—	—	—	6	9	8	10	3	3	39
Shelikof Bay (inshore)	61	91	168	29	3	1	1	—	—	—	354
Icy Strait (inshore)	—	—	44	44	58	48	37	13	4	—	248
AREA 3A											
Cape Fairweather (offshore)	—	—	—	3	9	17	13	1	1	—	44
Cape St. Elias (inshore)	—	159	122	56	30	13	12	2	—	—	394
Prince Wm.-Cook Inlet (inshore)	3	259	401	71	38	12	6	—	—	—	790
(offshore)	—	—	19	76	73	61	82	9	2	1	323
Kodiak I. (inshore)	—	990	303	82	41	18	10	—	—	—	1,444
(offshore)	—	5	415	360	148	121	50	4	—	—	1,103
Trinity Is. (inshore)	—	415	28	4	2	—	—	—	—	—	449
Chirikof I.-Chignik Bay (offshore)	—	3	171	162	74	83	61	12	—	—	566
AREA 3BS											
Shumagin Is. (inshore)	7	354	46	2	—	1	—	—	—	—	410
Total	71	2,276	1,717	889	482	384	280	51	10	4	6,164
Inshore	71	2,268	1,112	449	178	102	74	25	7	3	4,289
Offshore	—	8	605	440	304	282	206	26	3	1	1,875

During 1963 relatively large catches of the 1961 year class were made. On the basis of the correspondence between catches of the 1954, 1956 and 1957 year classes taken while sampling for young halibut and the subsequent respective entry of these classes into the fishery in Area 2, the 1961 year class should enter the commercial fishery with considerable strength within a few years.

Offshore sampling in the Gulf of Alaska must be expanded materially in order to distinguish between natural fluctuations that may occur in year class strength and variations in the numbers of young halibut that may be due to removals through foreign trawling.

At the offshore stations near Kodiak and Chirikof Islands the lack of an observed decrease in the numbers of halibut per one hour's haul over the past several years suggests that trawling by foreign fleets for demersal fishes in those areas has not substantially reduced the numbers of very young halibut, although the number of stations with comparable 1961 to 1963 data are few.

TRAWL SURVEY

At the request of the Governments of Canada and the United States, the Commission conducted, commencing in May, 1961, a comprehensive two-year investigation of the distribution and availability of halibut and of other demersal species off the coast of Alaska between Cape Spencer and Unimak Pass, using otter trawl gear. The purpose of the survey was to estimate the potentialities of the region for bottom trawling and the effect that such a fishery might have upon the supply of adult and juvenile halibut.

In 1961, the survey area extended from Kodiak Island to Unimak Pass, a distance of 550 miles along the coast, and included about 40,000 square miles of shelf area. At the further request of the two governments, the survey was expanded in 1962 and 1963 to include the grounds between Kodiak Island and Cape Spencer, a distance of 480 miles along the coast and covering about 25,000 square miles of shelf area.

The survey was completed at the end of March, 1963. During the latter period considerable time was spent fishing setline and trawl gear simultaneously on the Yakutat spawning grounds in an attempt to determine if spawning concentrations of halibut were susceptible to capture by trawl gear. Unfortunately, however, inclement weather prevented as extensive sampling as desired. In addition, to begin an annual monitoring of the supply of young halibut in the Gulf of Alaska some time was spent fishing on the locations off Kodiak Island and Chirikof Island, where large numbers of halibut had been taken during the previous year.

Publications and Manuscript Reports Prepared During 1963

Published Reports:

Regulation and Investigation of the Pacific Halibut Fishery in 1962.

Manuscript Reports:

Summary Report Upon a Trawl Survey of the Demersal Fish Stocks Conducted by the International Pacific Halibut Commission Between the Eastern End of Kodiak Island and Cape Spencer, Alaska, from May, 1962 to April, 1963.

Loss in Yield from Trawling for Halibut as Shown by a Yield Per Recruitment Model.

The Effect of Codend Mesh on Sizes of Halibut Caught.

Size and Age Composition of Catches of Pacific Halibut Taken by Trawl and Setline Gear.

The Incidental Capture of Halibut in Area 2 by Troll and Trawl Gear.

Statistics of Catch, Fishing, Tagging and Size and Age Composition from the Canadian and United States Fishery in Bering Sea, Tables 1-10.

Recent Statistics and Current State of Affairs in Bering Sea.

The Halibut Fishery, Shumagin Islands and Westward, Not Including Bering Sea.

Halibut Fishing by United States Vessels in Waters Contiguous to the Pacific Coast of Canada and by Canadian Vessels in Waters Off the Pacific Coast of United States.

Preliminary Report on the July-August 1963 Operation of the TENRYU MARU in the Gulf of Alaska.