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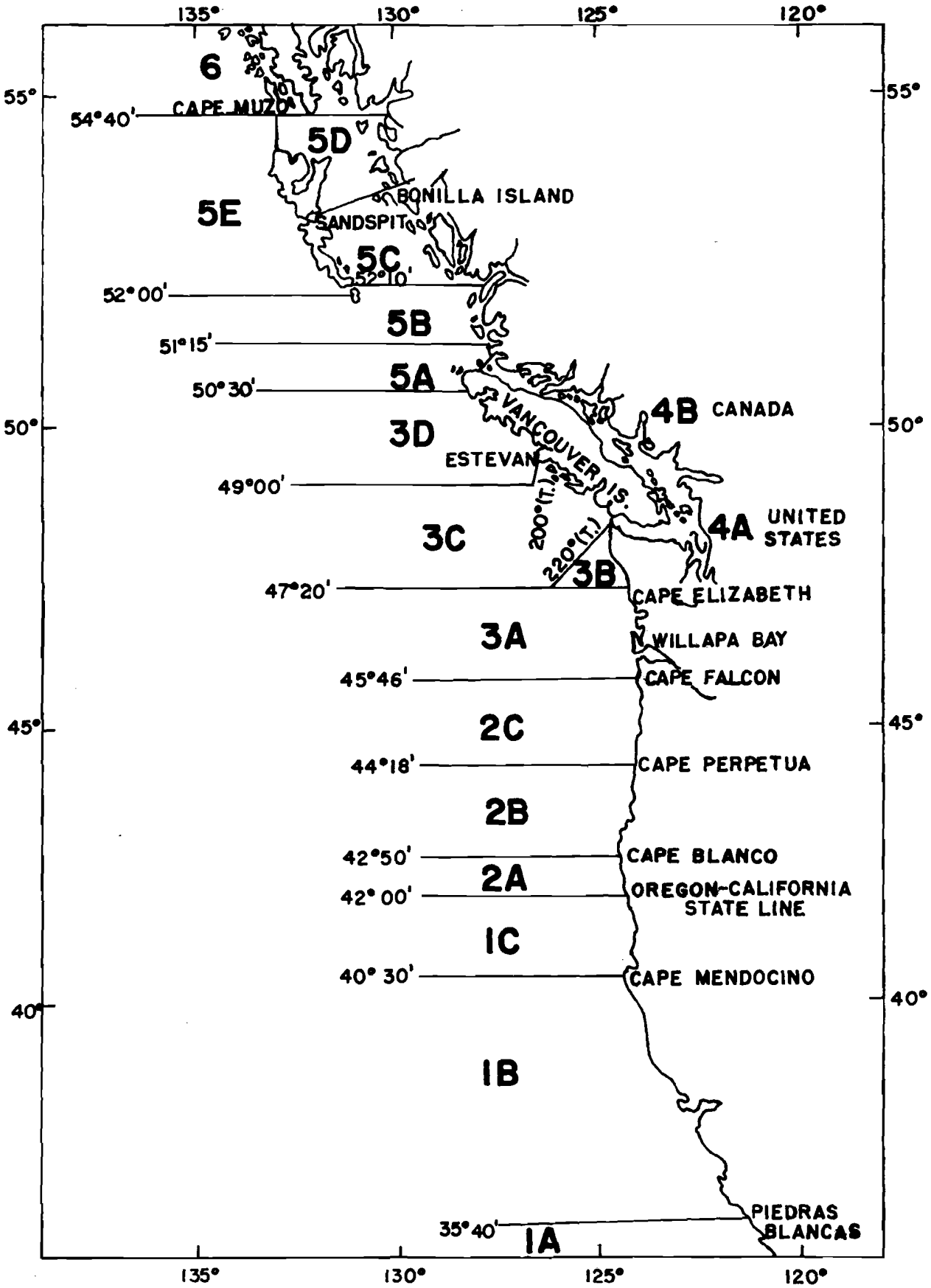
REPORT OF THE TECHNICAL SUB-COMMITTEE OF THE INTERNATIONAL TRAWL FISHERY COMMITTEE Appointed By The Second Conference On Coordination Of Fisheries Regulations Between CANADA and the UNITED STATES

TWELFTH ANNUAL MEETING
JUNE 16-18, 1971
VANCOUVER, B. C.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CAPE BLANCO
OREGON-CALIFORNIA STATE LINE
CAPE MENDOCINO
PIEDRAS BLANCAS

REPORT OF THE TECHNICAL SUB-COMMITTEE OF THE INTERNATIONAL TRAWL FISHERY COMMITTEE

Appointed By
The Second Conference on Coordination
Of Fisheries Regulations Between
CANADA
and the
UNITED STATES

Twelfth Annual Meeting
June 16-18, 1971
Vancouver, B.C.

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Report of the Technical Sub-Committee of the International Trawl Fishery Committee appointed by the Second Conference on Coordination of Fisheries Regulations between Canada and the United States

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DATE: June 16-18, 1971

PLACE: Vancouver, British Columbia

PARTICIPANTS:

CANADA		- C. R. Forrester R. D. Humphreys M. P. Houghton (observer) R. H. McIlwaine (observer)
UNITED STATES		
	California	- T. Jow
	Oregon	- J. M. Meehan - Chairman R. E. Loeffel
	Washington	- G. S. DiDonato D. Gunderson
	PMFC	- L. A. Verhoeven (observer)
	NMFS	- H. A. Larkins (observer)
	INTERNATIONAL PACIFIC HALIBUT COMMISSION	- S. H. Hoag (observer)

I. CALL TO ORDER

The twelfth annual meeting of the Technical Sub-Committee was called to order at 9:00 AM on June 16 by Chairman J. M. Meehan under instructions set forth by the parent committee in 1959. The business of the meeting was guided by a prepared agenda (Appendix A).

II. APPOINTMENT OF SECRETARY

R. D. Humphreys of Canada was appointed to act as recording secretary for the meeting.

III. APPROVAL OF AGENDA

Some changes were made in the order in which agenda items were to be considered so that participants could be accommodated. The agenda was approved as amended.

IV. REVIEW OF MINUTES OF THE NOVEMBER 1970 MEETING OF THE INTERNATIONAL TRAWL FISHERY COMMITTEE

The Sub-Committee discussed the recommendation of the parent committee (Item 7, page 3, Minutes of the November 1970 ITFC meeting), "that the Technical Sub-Committee estimate the magnitude of the Soviet catch of important species by utilizing data available from research and U.S. production vessels that have fished in the same areas as the Soviets." The Sub-Committee recognizes that (1) the task of simulating Soviet fishing techniques with North American research vessels is a very difficult one, (2) the validity of estimating species composition of Soviet catches from North American vessel catches taken in the same area is highly questionable due to differences in gear and fishing practices, and (3) the number of man hours required to complete a compilation and analysis of existing data prohibits the undertaking of such a study at this time.

Reference was made also to Item 9d of the ITFC minutes in which the Committee recommends that "the Technical Sub-Committee submit recommendations for statistical areas." It was noted that the areas of concern are off the State of Alaska. Further discussion of the matter was deferred for consideration under Agenda Item V 2b.

V. REVIEW OF DATA EXCHANGE PROCEDURES

1. Procedures of Current Exchanges of Data

a. Tagging Summaries

At the 1968 meeting, California agreed to compile summaries of all tagging experiments from 1955 to the present that are complete and also data

on new and incomplete tagging experiments. Summaries have now been received from Canada, Oregon, and California. Washington reported difficulty in finding time to compile the results of a large number of tagging cruises, but a report on completed tagging studies will be submitted by the end of August.

Considerable discussion was heard concerning the usefulness of the tagging summaries. It was generally agreed that the summaries would be of much value in analyzing the results of each agency's tagging studies.

b. Status Reports

Tabulated catch data (Appendix B) was received for the trawl fisheries of California, Oregon, and British Columbia. Washington reported that no historical data was readily available but that a submission may be made next year. There may be some minor revisions necessary in some of the catch statistics for earlier years in the California trawl fishery. These submissions will complete the request for historical data and need not be resubmitted each year.

c. Data Series

A suggestion was made to publish catch statistics in the PMFC trawl data series in metric tons rather than pounds.

Consideration was given to the fact that the fishing industry is not likely to change to the metric system in the foreseeable future. Therefore, data in pounds will still be required when dealing with industry. On the other hand, PMFC and Canadian trawl catch statistics are now being converted to metric tons for use by INPFC. It was agreed that it would be advantageous to publish the series (bottomfish section) in the metric system but that this action will be deferred until the data input can be computerized.

2. Expansion of Data Exchange

a. Statistical Data being Exchanged with Soviet Union

The exchange of statistical data between the U.S. and the U.S.S.R. entered its third year in 1970. Soviet data remain gross in terms of species composition information and statistical areas are large.

A similar exchange of statistical data between Canada and the U.S.S.R. was initiated in January 1971 as part of a 2-year agreement between the two countries. So far, U.S.S.R. data received by Canada are of the same gross nature as described by the U.S. agencies (i.e., species categories are hake, rockfish, and others).

b. Boundaries of International Statistical Areas

Statistical subdivisions in the Gulf of Alaska were considered. It was agreed that the existing INPFC statistical areas in the Gulf of Alaska are quite adequate for present PMFC statistical requirements. Therefore, PMFC statistical areas and the equivalent INPFC areas in the Gulf of Alaska will be as follows

PMFC	INPFC
6A	Southeastern
6B	Yakutat
7A	Kodiak
7B	Chirikof
7C	Shumagin

The matter of a western boundary for PMFC Area 6 has been resolved at 147°W longitude to correspond with statistical areas in use by INPFC.

VI. INTERNATIONAL PROBLEMS

1. Status of Foreign Trawl Fisheries off the West Coast of Canada and the United States

Canada reported a slight decline in Soviet fishing operations off the coast of British Columbia in 1970. Japanese operations proceeded at about

the same level as last year, concentrating mainly on sablefish. The foreign fleets appear to have accepted Canada's newly declared 12-mile territorial sea; infractions have been few and minor in nature.

United States surveillance indicated no major changes in Soviet fishing pattern; virtually no fishing occurred during the winter and vessels began to appear off the coast of California during May. State agencies report up to 75 foreign vessels in recent weeks off the Oregon and Washington coasts. Oregon reported that although total foreign vessel days along the North American coast were down in 1970, the effort off the coast of Oregon increased. Again, through May of 1971 foreign vessel effort off the Oregon coast was up, perhaps 10% from the 1970 level. California reported a decline in Soviet fishing activities; only seven BMRT's were sighted during the last week in May.

2. Recent Developments in Fisheries Agreements

Canada-U.S.S.R.

Negotiations between Canada and the U.S.S.R. took place in January 1971, sparked by a concern on the part of Canadian fishermen for the herring stocks off the west coast of Vancouver Island and for the safety of the salmon troll fleet on La Perouse Bank.

The two countries agreed to undertake cooperative investigations on species of fish and invertebrates of common interest in the northeastern Pacific Ocean (a Soviet research BMRT is expected to operate in Canadian waters in August) and to exchange scientific and statistical data. The U.S.S.R. agreed to abstain from fishing with trawls in the area adjacent to the territorial sea of Canada and bounded by straight lines connecting the following coordinates in the order as given:

North Latitude	West Longitude
48° 54'	126° 00'
48° 41'	126° 00'
48° 27'	125° 40'
48° 27'	125° 25'
48° 34'	125° 17'

Canada will (1) permit Soviet fishing vessels to fish with trawls in the territorial sea of Canada off the west coast of Moresby Island between 52° 23' north latitude and 52° 56' north latitude; (2) permit U.S.S.R. supply vessels to call at the ports of Prince Rupert and Vancouver for water, provisions, and other supplies; and (3) permit fishing vessels of the U.S.S.R. and their service vessels to conduct loading and unloading operations in Tasu Sound, Queen Charlotte Islands.

Japan-U.S.A.

Negotiations held last fall between Japan and the U.S. resulted in several Japanese trawl fishing restrictions during the winter months off Oregon, Washington, and California. Of major concern was the substantial increase in the Japanese long-line fishery for sablefish off S.E. Alaska. Japan agreed to restrict the number of vessels licensed to fish sablefish to the number already licensed (i.e., 22 vessels). Japan also agreed to use prudence concerning the harvest of Pacific ocean perch stocks and to refrain from engaging in a purposeful rockfish fishery south of 48° 30' north latitude.

U.S.-U.S.S.R.

The U.S.-U.S.S.R. fisheries agreement was renegotiated in February 1971 and another 2-year agreement was signed. Closed season in the five Pacific ocean perch zones was expanded to December through April and the depth range

was increased to between 200 and 600 meters. These changes provide protection for Dover and petrale sole stocks as well as Pacific ocean perch. The U.S.S.R. agreed to refrain from trawl fishing inside the 60-fathom contour between Gray's Harbour and the Columbia River mouth. It was also agreed that there would be no concentrating of Soviet fishing vessels in the Cape Flattery area between June 15 and September 15 and no specialized fishery for rockfish. The U.S. agreed to permit four port calls per month to U.S.S.R. fishing vessels or supply vessels at the ports of Seattle and Portland.

3. Recommendations for Cooperative Programs

It was recommended that the work undertaken during 1970 on a special status report on Pacific ocean perch be continued and that a joint report be prepared for submission to the parent committee in time for the November 1971 meeting. Further discussion of this matter was heard under Agenda Item VIII 1a.

VII. REVIEW OF CURRENT AND PROPOSED RESEARCH

Canada. Groundfish staff of the Fisheries Research Board of Canada, Pacific Region, consisted, as in 1969, of 2 scientists, 7 technicians, and 1 clerk.

Biological Studies: The Near Seas Investigation continued monitoring and assessing the status of the various stocks which support the trawl fishery of British Columbia. A major portion of this work involves collection and analysis of catch and effort data and routine sampling of various species at the main ports to provide data on growth, mortality, and recruitment. Manuscripts have been prepared on the effects of changes in environmental factors on survival of Pacific cod and petrale sole eggs

and a similar manuscript on flathead sole is being prepared. Technical reports were completed on (1) some aspects of the groundfish work undertaken during a scientific exchange visit to Japan during the winter of 1969-70, and (2) a preliminary bibliography on the trawl fishery (in cooperation with Washington State).

The Rockfish Investigation completed two *G. B. Reed* groundfish cruises; *GBR 70-2*, completed in August 1970 off southwest Vancouver Island--primary purpose to estimate species composition of Soviet trawl catches, and *GBR 70-3*, completed in September 1970 off southwest Vancouver Island--primary purpose to determine the distribution and abundance of Pacific ocean perch along two track lines. Two members of the Rockfish Investigation collected pelagic fish eggs and larvae during the March 1971 *"Endeavour"* cruise off Vancouver Island, in Queen Charlotte Sound and in Hecate Strait. A manuscript was prepared on age determination and growth of Pacific ocean perch as was a short paper on *Sebastodes polyspinus*, technical reports on Pacific ocean perch length-weight and length-girth relationships, and a manuscript report on rockfish maturation, spawning season, and larvae identification.

Sampling Program: The Near Seas Investigation took a total of 197 samples in 1970, consisting of approximately 20,441 otoliths and scales with length measurements and sex and a further 27,075 length measurements only.

I.D.S. Projects: Work on the development of an economical "pot" for the capture of sablefish proceeded during 1970. A modified King crab trap proved effective but much too costly (about $220.00 each). However, the NMFS-developed traps, fished on a long-line arrangement and costing about $70.00 each, appear to be favorable. A 55-foot steel boat presently being constructed in Sooke will outfit with 80 to 100 pots.

I.D.S. assisted in equipping and outfitting the vessel *"Canadian No. 1"* of A.&C. Radil Associates, Limited to develop midwater trawling techniques

for groundfish species. The vessel was equipped with a Model VI diamond midwater trawl, 5 sq. meter Suberkrub doors, and a Model 860 Atlas netsonde. Good results were obtained, particularly on Pacific ocean perch.

Sablefish Resource Assessment: The most recent information on the Canadian sablefish fishery was appended to FRB's 1970 submission to the Technical Sub-Committee. In summary, the fishery is currently at a low level with average annual landings for the past 10 years of about 800,000 pounds of which 30% is taken by trawl vessels. In view of the known Japanese catches of sablefish by line vessels in the Gulf of Alaska, it is strongly suspected that low landings in British Columbia are the result of low expenditure of fishing effort.

Washington. The Groundfish Investigations staff remains at seven biologists and three scientific aides. A fisheries research helper position is filled by a University of Washington student on a part-time basis. The scientific aide at the federal-state groundfish age reading unit in Seattle is now a direct employee of PMFC.

Tagging: Six tagging cruises were completed during 1970-71; three cruises in June 1970 to determine migratory habits and establish population estimates of dogfish and other bottomfish in Puget Sound and coastal waters; two cruises in October 1970--a continuation of the joint effort by Dr. J. Paulik's graduate classes at the University of Washington and the Washington State Department of Fisheries to tag and release dogfish in Puget Sound; and one cruise in February-March 1971 to tag Dover sole in two deep-water spawning areas off the northern Washington coast.

Biological Studies: Age determinations were carried out during 1970 on Pacific hake and Pacific ocean perch otoliths and on English sole interopercles. Two Pacific ocean perch biological cruises were completed off

the northern Washington coast. Pacific hake were studied in Puget Sound using catch-effort and market sample data and acoustical surveys for standing stock estimates. Monthly 1-day biological cruises to monitor bottomfish populations in the Gulf of Georgia have continued since November 1969.

Sampling Program: Increased emphasis placed on market sampling during 1970 resulted in a total of 233 biological samples collected. Much effort was again placed on the groundfish computer-oriented data storage and retrieval system for all biological and statistical data.

PL 88-309: The great majority of Washington State Department of Fisheries Groundfish Investigation studies continues to be supported by PL 88-309 contracts.

Oregon. The Trawl Investigation staff of the Oregon Fish Commission consisted of five biologists and two seasonal aides in 1970. A permanent technician position is expected to be added in 1971.

Tagging: Four tagging trips were conducted during 1970; 1 in April to tag rex sole off the southern Oregon coast (hampered by weather), 1 in June to tag rex sole in the same area (2,337 fish tagged), 1 in March off southern Oregon (Dover sole and yellowtail rockfish), and 1 in December off southern Oregon on Dover sole.

Biological Studies: Two resource surveys of species off the Oregon coast will be conducted next year. One study will determine the biomass of demersal fishes occupying the continental shelf (especially flatfish) and the year-class strength of flatfishes prior to recruitment to the fishery. The second study will determine annual biomass of ocean pink shrimp *(Pandalus jordani)* off Oregon and provide estimates of potential yield to the industry. Both studies will be funded with PL 88-309 funds.

Sampling Program: Landings of Dover sole, English sole, petrale sole, Pacific ocean perch, and rockfish were sampled at Coos Bay and Astoria. Animal food landings were sampled at Coos Bay, Newport, and Astoria.

California. The Bottomfish staff of the California Department of Fish and Game remained the same as in previous years at five biologists and 10 months' seasonal assistance. In addition, the PL 88-309 funded Shellfish and Bottomfish Data Analysis Project continued to work closely with the department's bottomfish staff. Normally, its staff includes three biologists, a clerk, and a keypunch operator but the project has been understaffed since last year due to personnel changes.

Tagging: Dover sole (1,053) were tagged and released during an *N. C. Scofield* cruise in February 1971, trawling in depths between 230 and 480 fathoms in Area 1C. Sablefish were tagged in June 1971 during an *N. C. Scofield* cruise in Area 1A. Sablefish will also be tagged during cruises scheduled for July 1971 and April 1972.

Biological Studies: Field work was completed in 1970 for a study of the distribution, abundance, and ecology of bottomfish off Monterey (Area 1B). Eight cruises of the *R. V. Nautilus* were completed in 1970. The predominant species caught on long-line gear was sablefish, and it was noted that an increase in sablefish size occurred with increase in station depth. Commercial longliners, prompted by these studies, improved their catches by fishing in waters deeper than 400 fathoms. Age and growth studies on petrale and English sole are near completion.

Sampling Program: In 1970, 87 English sole, 44 petrale sole, 30 Dover sole, and 19 animal food samples were obtained at various California points.

PL 88-309: The Shellfish and Bottomfish Data Analysis Project was hampered by staff vacancies and problems with availability of suitable computers during 1970. At present, a major undertaking of the project is a cooperative systems analysis of the Bottomfish program.

National Marine Fisheries Service

Work continued in 1970 on the development of efficient sablefish "pots," a synopsis of sablefish stocks, survey techniques for spotting saury, and a pelagic egg and larvae assessment program.

A theoretical yield/recruit study on Pacific ocean perch was undertaken during 1970 to tie in with studies done by Mr. S. Chikuni of the Fisheries Agency of Japan.

International Pacific Halibut Commission

Because of changes in the trawl fishery, the Halibut Commission initiated a study to estimate the magnitude of the incidental trawl catch of halibut off British Columbia. Results indicated that few halibut were caught when trawlers were fishing for Pacific ocean perch and that most of the incidental catch occurred when the trawlers were fishing for lingcod, Pacific cod, and sole. Also, catches were largest from May through August--very few halibut were caught during the winter. The total amount of halibut taken incidentally by trawls was estimated to be 3.2 million pounds, split equally among the three subareas (west coast of Vancouver Island, Queen Charlotte Sound, and Hecate Strait). Approximately 30% of the halibut taken incidentally were below the minimum length of 26 inches.

A special study was initiated during 1970 to obtain information on the mortality suffered by halibut after they are caught and released by trawlers. Approximately 16% of the halibut observed were dead when examined and undoubt-

edly others died soon after they were tagged and released. IPHC suspects that total mortality may be near 50%.

VIII. REVIEW OF PROJECTS OF MUTUAL INTEREST

1. Action on 1970 Technical Sub-Committee Recommendations

a. Status Report on Pacific Ocean Perch

Each agency concerned reported satisfactory progress toward a comprehensive status report on Pacific ocean perch stocks. Canada and Oregon have prepared summary reports. Washington has analyzed available data and is now prepared to submit a summary report. It was decided that these reports will be brought together in a final joint report by an editorial body having both a U.S. and a Canadian representative, and that it should be available for the November 1971 meeting of the parent committee.

b. Exchange of Regulations and Their Rationale

A list of trawl fishery regulations and their rationale from each agency was published as Appendix B in the minutes of the 11th Annual Meeting of the Technical Sub-Committee. No significant changes have taken place in these regulations since their publication in the 1970 minutes.

2. Hake

The Pacific hake stock assessment program carried out in Puget Sound by Washington Department of Fisheries personnel has demonstrated a recent significant decline in CPUE. However, this decline can be attributed at least in part to decreased availability caused by intensive fishing effort resulting in scattering and dispersion of the fish schools.

California has a draft report prepared on Pacific hake length frequencies from samples taken at California ports--a compilation of available data from 1963 to 1970.

3. Other

Data from the NMFS experiments on pot fishing for sablefish have shown some interesting distributional patterns of the species. The immature fish are found in shallower inshore waters, then adult female fish in deeper water, and the adult males at the greatest depths (reaching a peak at 400 or 450 fathoms). A definite patchiness in distribution was apparent and seasonal changes in depth preferences occurred.

[redacted]

A limited pot fishery has developed off the California coast with highly variable results. There have been some high level catches. However, Oregon fishermen are not going into the pot fishery as they insist that sablefish stocks off the Oregon coast have been decimated by foreign fleets.

IX. STATUS REPORTS

1. Total Catch and Effort for the 1970 Trawl Fishery

The 1970 otter trawl catch from the northeastern Pacific by Canadian and United States fishermen was 139.4 million pounds (Table 1). This catch was a decrease of 9.2% from the 153.5 million pounds landed in 1969 and 6.6% below the 10-year (1960-69) average of 149.2 million pounds. Total effort of 154.3 thousand hours in 1970 was a decrease of 3.6% from the 160.2 thousand hours recorded in 1969.

British Columbia fishermen landed approximately 35 million pounds of groundfish (excluding halibut) in 1970, of which about 88% or 30.7 million pounds were trawl-caught. This was a 19% decrease from the total trawl catch in 1969 and 12% below the 1960-69 mean. Total effort expended (28.8 thousand

Table 1. Otter Trawl Landings from the Northeastern Pacific by Canadian and United States Vessels in 1969, 1970, and Mean for 1960-69 in Thousands of Pounds

Species	Mean 1960-69	1969 B.C.	1969 Wash.	1969 Ore.	1969 Calif.	1969 Total	1970 B.C.	1970 Wash.	1970 Ore.	1970 Calif.	1970 Total
English sole	11,808	2,196	2,989	1,716	3,803	10,704	2,613	1,718	1,884	3,279	9,494
Rock sole	5,546	6,653	1,143	25	3	7,829	3,906	452	5	--	4,363
Petrale sole	8,310	351	1,608	1,835	2,867	6,661	463	797	2,141	3,415	6,816
Dover sole	16,396	855	1,850	5,554	12,919	21,178	3,110	2,235	5,538	15,144	26,027
Rex sole	3,278	107	12	1,215	2,253	3,587	372	26	1,074	1,743	3,215
Starry flounder	2,031	171	657	251	351	1,430	335	397	426	262	1,420
Other flatfish	1,918	402	77	506	1,004	1,989	1,284	114	646	996	3,040
Pacific cod	14,441	9,686	3,767	47	--	13,500	6,339	2,660	78	--	9,077
Lingcod	9,544	4,022	3,465	1,084	836	9,407	3,166	2,540	945	1,300	7,951
Sablefish	2,753	327	138	135	2,162	2,762	366	183	111	2,886	3,546
Pacific ocean perch	19,370	3,316	12,269	940	45	16,570	4,626	13,249	1,595	57	19,527
Other rockfish	22,381	1,003	17,141	5,101	7,571	30,816	1,528	12,157	3,515	9,059	26,259
Miscellaneous species	737	199	91	4	304	598	214	55	17	174	460
Dogfish	1,232	2	--	Tr.	3	5	295	--	17	--	312
Animal food	16,348	8,406	3,226	2,599	2,412	16,643	1,952	2,598	2,052	1,057	7,659
Reduction 1/	7,504	131	9,672	45	--	9,848	131	10,132	--	--	10,263
Total	149,268	37,827	58,110	21,057	36,533	153,527	30,700	49,313	20,044	39,372	139,429
% of total catch		24.6	37.8	13.7	23.8	100	22.0	35.4	14.4	28.2	100
Total hours	159,706	33,234	51,800	25,692	49,438	160,164	28,818	45,036	27,587	52,898	154,339
Catch/hour-pound	935	1,138	1,122	818	739	958	1,055	1,095	727	744	903

1/ *Reduction pounds include dogfish in Washington statistics.*

hours) was considerably less than in 1969 (33.2 thousand hours), and the catch per hour of trawling was well below the mean for the past 10 years.

Washington trawl landings in 1970 (49.3 million pounds) were down 15% from 1969 and 9% from the 1960-69 mean. Food fish species account for the decline. Fishing effort was reduced in 1970 to 45.0 thousand hours and there were some marketing restrictions imposed on landings of green or black rockfish.

The 1970 Oregon trawl landings totaled 20.0 million pounds, down 4.8% from the 1969 production and 24.5% below the 10-year mean. Dover sole was the most important species of flatfish landed. Total effort expended (27.6 thousand hours) in 1970 was above the 1969 estimate (25.7 thousand hours) and slightly below the 10-year average.

The California trawl fleet landed 39.4 million pounds of groundfish in 1970--the highest annual total in the history of the fishery. Trawling effort was up from 49.4 thousand hours in 1969 to 52.9 thousand hours in 1970. Total catch per hour was the highest on record for the past decade. The record catch and high CPUE was the result of an intense deep-water fishery for Dover sole that produced a new record catch of Dover sole as well as high catches of sablefish and channel rockfish.

2. Petrale Sole

a. Catch/Effort

The U.S. and Canada landed a total of 6.8 million pounds of petrale sole in 1970, a slight increase (156,000 pounds or 2.3%) over the 1969 catch but 18% below the 10-year mean (1960-69) of 8.3 million pounds.

Canada. Landings of petrale sole from the northern and southern stocks by Canadian fishermen totaled 463,000 pounds in 1970, an increase of 31.9% over the 1969 landings but 53.6% below the 10-year mean (1960-69) of

997,000 pounds. The Canadian catch from the southern stock off the lower west coast of Vancouver Island (Area 3C) was 318,000 pounds, which was almost three times the amount taken in 1969 but about the same as the mean for the 1960-69 period. Average catch per effort was 108 pounds/hour, almost twice that in 1969 but still 22% less than the mean for the previous 10 years. Northern stock landings at 139,000 pounds were 38% lower than in 1969. It is obvious that the petrale sole of the British Columbia coast has been relegated to a very minor position in trawl catches and is taken only as an incidental species in inshore catches.

Washington. The 1969 trawl catch of petrale sole totaled 797,000 pounds, down 50% from 1969 and only one-third the past 10-year mean of 2.4 million pounds. The total Area 3C catch amounted to only 264,000 pounds which is 65% below the 1969 level and 78% below the 1960-69 mean. Landings from the Cape Flattery Spit region within Area 3C (February to April fishery on deep-water spawning populations) accounted for 165,000 pounds. The remaining Area 3C catch (99,000 pounds) came from the summer fishery inshore along the shelf and was down 48% from 1969 and 88% from the 1960-69 mean. Area 3B catches also remain relatively low. Catch levels of "northern stock" petrale sole were also down substantially in all areas, totaling 318,000 pounds, down 49% from 1969 and 65% from the 1960-69 mean. A sharp drop in CPUE has developed since 1968 and the 1970 CPUE value of 264 pounds per hour is substantially below the 1955-59 mean of 555 which included years preceding winter landing restrictions.

Oregon. The 1970 catch of 2.1 million pounds of petrale sole was 16.7% above the 1969 level and 8.7% above the 10-year mean. Catch/effort for Areas 2A through 3A was 255 pounds/hour or 9.9% below the 1969 level of 283 pounds/hour.

California. Petrale sole landings in 1970 totaled 3.4 million pounds, an increase of approximately 19% over the 1969 catch of 2.9 million pounds and the 1960-69 mean of 2.9 million pounds. Landings were highest from Area 1B where an increase of 0.9 million pounds over the 1969 catch was recorded. Area 1C catch was slightly less than that of 1969.

b. No new information on stock definition was available.

c. The Canadian winter fishery for petrale sole in 1970-71 yielded 40,000 pounds, less than half the 1969-70 catch. Washington fishermen landed 334,000 pounds, mostly from the deep-water spawning grounds at Esteban Deep and the Cape Flattery Spit deep. The catch represents a substantial reduction from the 1 million pounds landed in 1967-68 and 1968-69. The California winter petrale catch (November 1969-January 1970) was down in Area 1C and up in Area 1B from the previous winter catch.

3. Lingcod

a. Catch/Effort

Trawl-caught U.S. and Canadian lingcod landings totaled 8.0 million pounds in 1970, a decrease of 15.5% from the 1969 catch of 9.4 million pounds and 16.7% below the 1960-69 mean of 9.5 million pounds.

Canada. Total Canadian trawl catch of lingcod in 1970 was 3.2 million pounds, a 20% decrease from the 1969 catch and about the same as the mean for the 1960-69 period. Approximately 63% of the trawl catch was taken from grounds off the west coast of Vancouver Island with 1.2 million pounds from Area 3C and 800,000 pounds from Area 3D. The trawl catch of lingcod from Area 3C decreased 14% from that in 1969. Catch/effort in Area 3C was 601 pounds/hour which is 5% less than the 1969 level and 20% less than the mean for the previous 10 years. The proportion of annual catch of lingcod accounted for by trawlers in 1970 decreased to 47% of the total catch. This reduction in share

of catch by the trawlers was caused not by an increase in line catch but by a decrease in the trawl catch of lingcod.

Washington. The 1970 Washington trawl catch of lingcod totaled 2.5 million pounds, a 27% decline from 1969 and a 42% decline from the 1960-69 mean. Most of the Washington landings come from Areas 3C, 5A, and 5B. A substantial drop in Area 3C production occurred in 1970, resulting in a 15.6% contribution to the total catch as compared with an average contribution of 45.4% over the past 10 years. A fishery on large concentrations of spawning lingcod developed in Area 5A in February 1970 and accounted for 52% of the area's total production.

Oregon. The catch of lingcod in Oregon was 0.9 million pounds, down 12.8% from 1969 and 7.5% above the 10-year mean. A total of 77% of the catch came from Areas 2B, 3A, and 3B.

California. The catch of lingcod by California fishermen was 1.3 million pounds in 1970, an increase of 56% over 1969 and a 55% increase over the 1960-69 mean. Area 1B continued to be the most productive area with a catch of 795,000 pounds.

4. Pacific Cod

a. Catch/Effort

Landings of Pacific cod by Canadian and U.S. trawlers in 1970 totaled 9.1 million pounds, down 32.8% from 1969 and down 37.1% from the 1960-69 mean of 14.4 million pounds.

Canada. A total of 6.3 million pounds of Pacific cod was landed by Canadian trawlers in 1970--again the dominant species in British Columbia trawl landings. However, the catch was a decrease of 35% from the 1969 landings and less than half the mean for the 1960-69 period. Prospects for the fishery in 1971 are not favorable.

Washington. The Washington trawl catch of Pacific cod totaled 2.7 million pounds in 1970, a 29% decrease from 1969 and 56% below the 1960-69 mean. Coastal landings were down in all major areas. CPUE values were well below the past 10-year means. Production from the inside waters of Juan de Fuca Strait and northern Puget Sound remained relatively stable.

Oregon. Only 78,000 pounds of Pacific cod were landed in Oregon in 1970. Most of the catch (47,000 pounds) was caught in Area 3A.

California. No Pacific cod were caught off California in 1970.

5. Pacific Ocean Perch

a. Catch/Effort

There was an encouraging increase in Pacific ocean perch catches in 1970 by Canadian and U.S. trawlers. Total catch reached 19.5 million pounds, about the same as the 1960-69 mean and 17.8% higher than the 1969 catch of 16.6 million pounds.

Canada. British Columbia trawlers landed 4.6 million pounds of Pacific ocean perch in 1970, 40% more than the 1969 catch and more than twice the mean annual catch (1960-69). As usual, the bulk of the catch (84%) was taken in Queen Charlotte Sound (Areas 5A and 5B). CPUE in 1970 was 9% less than the 1969 level.

Washington. Pacific ocean perch landings in Washington totaled 13.2 million pounds in 1970, an increase of 7% over 1969 and 8% over the 1960-69 mean. This was the first year that significant quantities of Pacific ocean perch (1.1 million pounds) were harvested off Alaska and landed in Washington. Total production of Pacific ocean perch from Queen Charlotte Sound declined although a slight increase occurred in the Cape Scott statistical area. A significant increase in catch occurred from areas off the northern Washington coast and west coast of Vancouver Island. A major part

of this increase was due to fishing effort of a 294-foot factory stern-ramp trawler which landed its processed catch in Washington.

Oregon. Landings of Pacific ocean perch in Oregon totaled 1.6 million pounds in 1970, 69.7% above the 1969 landings and 70% below the 1960-69 mean. The bulk of the catch (56.5) came from Area 3C. CPUE for Area 3C was 3,481 pounds/hour in 1970.

California. In 1970, landings of Pacific ocean perch in California totaled 57,000 pounds. Of this total, 55,000 pounds were taken in Area 1C.

6. English Sole

Total 1970 catch of English sole by Canadian and U.S. trawl fishermen was 9.5 million pounds, a decrease of 11.3% from the 1969 level and 19.6% from the 1960-69 mean.

Canada. Landings of English sole in 1970 at 2.6 million pounds were 19% above those for 1969 and 58% greater than the mean for the previous 10 years. The bulk of the catch (77%) was taken from grounds in northern Hecate Strait. CPUE in this fishery in 1970 was 10% higher than the mean for the preceding 5 years.

Washington. Trawl landings of English sole in 1970 totaled 2.6 million pounds, of which 1.7 million pounds were landed for human consumption and 0.9 million pounds for animal food. Food fish production of English sole is down 42% from 1969 and 52% from the past 10-year mean. A decline in catch and CPUE in Area 3B (the primary English sole coastal area for Washington trawlers) reflects an apparent substantial decrease in abundance in this area during 1970.

Oregon. English sole landings were 1.9 million pounds in 1970, up 9.8% from the 1969 total but 13% below the 10-year mean. CPUE of 240 pounds/hour in 1970 was 4.8% above the 1969 figure of 229 pounds/hour.

California. The declining trend of English sole catches which began in 1968 following the recent high of 5.8 million pounds in 1967 was continued in 1970. The 1970 catch of 3.3 million pounds was down 14% from the 1969 catch of 3.8 million pounds and was 26% below the 10-year average of 4.4 million pounds.

7. Dover Sole

The U.S. and Canada landed a total of 26 million pounds of Dover sole in 1970, an increase of 22.6% over the 1969 landings of 21.2 million pounds and 58.5% above the 1960-69 mean of 16.4 million pounds.

Canada. Landings of Dover sole in 1970 at 3.1 million pounds (68% from Area 5D) were more than three times the amount landed in 1969. Increased market demands were responsible for some increase in landings, but scarcity of Pacific cod undoubtedly caused some diversion of effort to Dover sole.

Washington. Trawl landings of Dover sole in 1970 amounted to 2.2 million pounds, up 20.5% over 1969 and 9% over the 1960-69 mean. The recent increase in landings has occurred principally by the development of winter deep-water fisheries on spawning concentrations of Dover sole (off Quillayute, Estaban Deep, and Cape Flattery Spit).

Oregon. Landings of Dover sole decreased to 5.5 million pounds in 1970, down 0.3% from the 1969 total but 22.6% above the 10-year mean. CPUE also decreased to 369 pounds/hour in 1970 from 479 pounds/hour in 1969.

California. The 1970 Dover sole catch of 15.1 million pounds is a new record. It surpassed last year's record of 12.9 million pounds by 17% and the 10-year average of 9.4 million pounds by 61%.

X. CHANGES IN TRAWL REGULATIONS

All agencies reported no change in trawl regulations during the past year. California is considering closing an area inside the 25-fathom line

in Area 1A to trawl fishing except with nets in excess of 7-inch mesh size.

XI. OTHER BUSINESS

Market sampling techniques were discussed and it was recommended that any important changes in sampling methods should be appended to this report (Appendix C).

Distribution of minutes was discussed and the list of recipients revised (Appendix L).

XII. RECOMMENDATIONS

1. Future Work

The Sub-Committee recommends

(a) That the working group meet at the earliest possible date to review and commence integration of the special status report on Pacific ocean perch.

2. Parent Committee

No specific recommendation.

XIII. SCHEDULE OF MEETINGS

1. Parent Committee Meeting

The International Trawl Committee will meet on Wednesday, November 17, 1971, in Seattle, Washington.

2. Thirteenth Annual Meeting of the Technical Sub-Committee

The Technical Sub-Committee will meet in Newport, Oregon, in late June 1972.

XIV. ELECTION OF CHAIRMAN

It was agreed that J. M. Meehan, Oregon Fish Commission, would retain the chairmanship in 1972.

XV. ADJOURNMENT

The meeting was adjourned at 9:15 AM on June 18, 1971.

AGENDA AS ADOPTED
TECHNICAL SUB-COMMITTEE OF THE
INTERNATIONAL TRAWL FISHERY COMMITTEE
VANCOUVER, JUNE 1971

12TH ANNUAL MEETING

I. CALL TO ORDER

II. APPOINTMENT OF SECRETARY

III. APPROVAL OF AGENDA

IV. REVIEW OF MINUTES OF NOVEMBER 1970 MEETING OF THE INTERNATIONAL TRAWL FISHERY COMMITTEE

V. REVIEW OF DATA EXCHANGE PROCEDURES

1. Procedures of Current Exchanges of Data
   a. Tagging Summaries
   b. Status Reports
   c. Data Series
2. Expansion of Data Exchange
   a. Statistical Data being Exchanged with Soviet Union
   b. Boundaries of International Statistical Areas

VI. INTERNATIONAL PROBLEMS

1. Status of Foreign Trawl Fisheries off the West Coast of Canada and the United States
2. Recent Developments in Fisheries Agreements
3. Recommendations for Cooperative Programs

VII. REVIEW OF CURRENT AND PROPOSED RESEARCH

VIII. REVIEW OF PROJECTS OF MUTUAL INTEREST

1. Action on 1970 Technical Sub-Committee Recommendations
   a. Status Report on Pacific Ocean Perch
   b. Exchange of Regulations and Their Rationale
2. Hake
3. Other

IX. STATUS REPORTS

1. Total Catch and Effort for the 1970 Trawl Fishery
2. Petrale Sole
   a. Catch/Effort
   b. Definition of Stocks
   c. Winter Fishery
3. Lingcod
   a. Catch/Effort
4. Pacific Cod
   Catch/Effort (Areas 3C, 5D)
5. Pacific Ocean Perch
   Catch/Effort (Areas 3A to 5B)
6. English Sole
7. Dover Sole

X. CHANGES IN TRAWL REGULATIONS

XI. OTHER BUSINESS

XII. RECOMMENDATIONS

1. Future Work
2. Parent Committee

XIII. SCHEDULE OF MEETINGS

1. Parent Committee Meeting
2. Thirteenth Annual Meeting of Technical Sub-Committee

XIV. ELECTION OF CHAIRMAN

XV. ADJOURNMENT

Statistics of the British Columbia Trawl Fishery for the Years 1945 to 1949 Inclusive (Landings in 1,000 Pounds)

Species	1945	1946	1947	1948	1949	Mean 1945-49
English sole	2,174	2,209	950	2,045	1,688	1,813
Rock sole	414	1,085	2,786	2,135	1,678	1,620
Petrale sole	810	2,398	1,765	7,722	3,291	3,197
Dover sole	514	1,008	417	157	171	453
Rex sole	91	159	65	119	161	119
Starry flounder	246	633	187	128	184	276
Other flatfish	1,465	1,562	276	676	51	806
Total flatfish	5,714	9,054	6,446	12,982	7,224	8,284
Pacific cod	1,604	2,862	941	920	1,682	1,602
Lingcod	1,390	1,453	535	993	1,625	1,199
Sablefish	13	19	1	32	33	20
Pacific ocean perch	--	--	--	--	--	--
Other rockfish	1,312	569	88	85	134	438
Miscellaneous species	84	79	54	55	68	68
Total food fish	10,117	14,036	8,065	15,067	10,766	11,611
Dogfish	5,712	3,462	2,683	3,907	3,841	3,921
Animal food	212	27	41	43	63	77
Reduction	675	292	--	1	26	199
Total catch	16,716	17,817	10,789	19,018	14,696	15,808
Total hours	NA	NA	NA	NA	NA	NA

NA = not available

Statistics of the British Columbia Trawl Fishery for the Years 1950 to 1954 Inclusive (Landings in 1,000 Pounds)

Species	1950	1951	1952	1953	1954	Mean 1950-54
English sole	5,276	2,162	2,496	2,341	1,369	2,729
Rock sole	2,148	3,548	5,998	1,923	2,767	3,277
Petrale sole	2,046	1,592	1,827	1,049	888	1,480
Dover sole	694	972	941	464	306	675
Rex sole	235	234	180	89	21	152
Starry flounder	326	450	493	134	291	339
Other flatfish	54	1,879	3,833	453	259	1,296
Total flatfish	10,779	10,837	15,768	6,453	5,901	9,948
Pacific cod	2,467	5,719	4,885	3,454	6,924	4,690
Lingcod	1,735	1,875	1,118	816	1,263	1,361
Sablefish	15	51	75	18	58	43
Pacific ocean perch	--	--	--	407	475	176
Other rockfish	234	434	588	181	361	360
Miscellaneous species	85	136	128	106	216	134
Total food fish	15,315	19,052	22,562	11,435	15,198	16,712
Dogfish	817	1,358	1,535	1,681	1,939	1,466
Animal food	41	398	1,426	2,295	2,460	1,324
Reduction	140	71	251	285	421	234
Total catch	16,313	20,879	25,774	15,696	20,018	19,736
Total hours	NA	NA	NA	NA	24,195	

NA = not available

Statistics of the British Columbia Trawl Fishery for the Years 1955 to 1959 Inclusive (Landings in 1,000 Pounds)

Species	1955	1956	1957	1958	1959	Mean 1955-59
English sole	1,593	2,007	1,080	1,320	1,664	1,533
Rock sole	3,661	4,175	4,200	4,565	1,904	3,701
Petrale sole	654	620	1,059	923	841	819
Dover sole	497	375	448	272	180	354
Rex sole	130	52	40	30	9	52
Starry flounder	282	254	195	135	106	194
Other flatfish	520	777	1,303	511	224	667
Total flatfish	7,337	8,260	8,325	7,756	4,928	7,320
Pacific cod	4,622	5,154	8,505	10,057	9,187	7,505
Lingcod	1,634	2,446	2,173	2,132	2,469	2,171
Sablefish	32	82	104	259	128	121
Pacific ocean perch	29	339	200	703	545	363
Other rockfish	311	188	275	236	654	333
Miscellaneous species	136	171	124	134	125	138
Total food fish	14,101	16,640	19,706	21,277	18,036	17,951
Dogfish	1,841	448	978	1,312	1,964	1,309
Animal food	7,129	10,568	3,982	3,031	4,178	5,778
Reduction	767	425	476	120	27	363
Total catch	23,838	28,081	25,142	25,740	24,205	25,401
Total hours	29,415	30,773	26,283	22,934	21,677	26,216

Statistics of the British Columbia Trawl Fishery, 1960-70
(Landings in 1,000 of Pounds, Effort in Hours)

Species	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	Mean 1960-69	1970
English sole	2,140	2,075	1,556	1,295	1,447	1,335	1,243	1,448	1,849	2,196	1,659	2,613
Rock sole	4,049	2,888	3,262	2,977	2,638	3,077	7,235	5,697	6,744	6,653	4,523	3,906
Petrale sole	988	923	1,107	937	1,225	1,288	1,302	1,040	813	351	997	464
Dover sole	219	204	384	397	501	434	504	192	231	855	392	3,110
Rex sole	12	27	19	9	21	19	21	42	19	107	29	372
Starry flounder	197	265	211	203	149	169	153	239	156	171	191	335
Other flatfish	124	66	108	171	275	583	457	777	429	402	339	1,284
Total flatfish	7,731	6,447	6,647	5,989	6,256	6,905	10,915	9,435	10,241	10,735	8,130	12,084
Pacific cod	6,891	4,547	5,934	8,919	15,541	24,466	26,803	14,552	14,840	9,686	13,218	6,339
Lingcod	2,422	2,912	2,095	1,433	2,826	3,840	4,337	4,159	6,435	4,022	3,448	3,166
Sablefish	143	216	251	143	276	577	684	306	369	327	329	366
Pacific ocean perch	786	272	1,178	1,002	1,039	3,075	5,217	863	1,932	3,316	1,868	4,626
Other rockfish	194	317	719	365	782	642	542	500	719	1,003	578	1,528
Miscellaneous species	161	148	208	156	221	165	180	171	207	199	181	214
Total food fish	18,328	14,859	17,032	18,007	26,941	39,670	48,678	29,986	34,743	29,288	27,992	28,323
Dogfish	2,938	7,344	683	373	109	223	370	124	65	2	1,223	295
Animal food	5,809	7,634	7,224	3,738	4,836	3,812	4,849	6,511	4,996	8,406	5,782	1,952
Reduction	9	8	167	267	377	215	654	350	219	131	240	131
Total landings	27,083	29,845	25,106	22,384	32,262	43,920	54,551	36,972	40,023	37,827	34,997	30,701
Total hours	25,960	23,329	25,407	23,243	27,703	29,029	28,124	26,483	29,352	33,234	27,187	28,818
Catch/Effort (pounds/hour except dogfish)	930	965	961	947	1,161	1,505	1,927	1,396	1,364	1,138	1,249	1,055

Washington Trawl Landings, 1960 through 1970
(Thousands of Pounds)

Species	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	Mean 1960-69	1970
English sole	5,039	3,582	3,075	3,607	3,739	3,779	3,693	2,915	3,169	2,989	3,559	1,718
Rock sole	863	584	789	793	830	1,013	1,377	1,879	826	1,148	1,010	452
Petrale sole	2,472	3,507	2,964	2,944	2,162	2,737	2,547	1,830	1,575	1,608	2,435	797
Dover sole	3,466	2,655	3,083	2,785	1,714	1,373	1,072	998	1,526	1,850	2,052	2,235
Rex sole	14	22	32	41	66	105	89	129	19	12	529	26
Starry flounder	1,105	1,174	982	1,020	802	704	483	1,271	1,957	657	1,016	397
Other flatfish	57	97	70	44	66	86	216	166	48	77	93	114
Total flatfish	13,016	11,621	10,995	11,234	9,379	9,797	9,477	9,188	9,120	8,341	10,694	5,739
Pacific cod	5,134	2,955	3,154	6,298	6,211	9,942	9,466	8,365	5,526	3,767	6,082	2,660
Lingcod	4,702	4,732	3,418	2,468	2,953	4,569	5,737	5,778	5,940	3,465	4,376	2,540
Sablefish	962	523	2,361	545	271	182	245	182	155	138	556	183
Pacific ocean perch	6,064	7,871	11,447	15,616	11,244	14,388	17,416	13,579	11,715	12,269	12,161	13,249
Other rockfish	5,449	6,706	9,518	7,464	5,509	6,515	9,315	6,863	10,255	17,141	8,474	12,157
Miscellaneous species	24	25	100	76	76	81	155	86	80	91	79	55
Total food fish	35,351	34,433	40,933	43,701	35,643	45,747	51,791	44,041	42,791	45,212	42,422	36,583
Animal food	3,390	5,184	3,966	2,419	3,135	3,844	7,212	6,829	6,310	3,226	4,552	2,598
Reduction	3,025	2,213	2,330	2,286	3,628	4,247	9,867	26,819	6,865	9,672	7,095	10,132
Total landings	41,766	41,830	47,289	48,406	42,406	53,565	68,870	77,689	55,966	58,110	54,069	49,313
Total hours	57,900	50,700	54,600	52,900	53,800	49,600	51,800	49,700	46,100	51,800	51,900	45,036

Statistics of the Oregon Trawl Fishery, 1942-49
(Landings in Thousands of Pounds) 1/

Species	1942	1943	1944	1945	1946	1947	1948	1949
English sole	228	898	1,058	1,097	3,950	1,883	3,321	1,092
Rock sole	NA	NA	31	NA	NA	NA	1	NA
Petrale sole	3,745	3,805	2,019	1,574	2,984	1,444	2,659	1,515
Dover sole	2,309	6,432	1,593	2,704	3,198	2,032	2,808	3,004
Rex sole	14	570	117	70	49	15	131	224
Starry flounder	444	860	877	1,024	1,280	667	1,435	272
Other flatfish	1,729	4,594	809	343	379	857	1,366	1,808
Pacific cod	29	25	26	69	254	30	29	5
Lingcod	989	935	1,208	1,015	1,151	569	810	728
Sablefish	624	1,116	568	418	1,016	288	518	409
Pacific ocean perch	NA	NA	NA	NA	97	164	211	972
Other rockfish	1,898	6,923	11,367	17,458	10,770	6,636	4,447	3,765
Miscellaneous species	0	0	0	0	9	5	2	8
Dogfish	1,086	1,601	399	41	31	103	339	504
Animal food	20	165	294	30	120	375	1,651	1,620
Total	13,115	27,924	20,366	25,843	25,288	15,068	19,728	15,926

1/ *Includes long-line catch*

Statistics of the Oregon Trawl Fishery, 1950-59
(Landings in Thousands of Pounds; Effort in Hours)

Species	1950 1/	1951 1/	1952	1953	1954	1955	1956	1957	1958	1959
English sole	2,421	2,416	1,893	880	1,158	940	961	1,654	1,834	1,451
Rock sole	NA	NA	NA	NA	NA	NA	NA	NA	0	0
Petrale sole	3,175	2,049	1,465	898	1,326	1,323	1,022	2,096	1,754	1,275
Dover sole	6,348	8,227	7,289	2,325	3,737	2,981	2,595	3,560	3,338	4,543
Rex sole	253	273	324	400	954	766	418	565	666	864
Starry flounder	364	341	210	229	373	332	115	320	350	288
Other flatfish	90	122	3	142	207	775	37	4	20	78
Pacific cod	42	120	150	279	781	301	180	516	470	344
Lingcod	660	886	492	275	255	236	130	562	298	327
Sablefish	341	551	187	178	245	116	185	226	131	75
Pacific ocean perch	1,525	1,856	4,738	2,649	4,026	2,170	2,880	2,994	2,473	2,471
Other rockfish	4,164	3,670	3,751	1,977	3,376	2,046	2,188	3,312	4,378	3,696
Miscellaneus species	5	3	86	10	0	5	2	0	127	249
Dogfish 2/	6	Tr.	47	5	0	0	48	0	0	67
Animal food	698	1,299	1,408	5,334	6,152	10,848	14,065	10,055	9,608	7,134
Total	20,092	21,813	22,043	15,581	22,590	22,839	24,826	25,864	25,447	22,862
Total hours	NA	NA	NA	NA	NA	NA	NA	NA	NA	22,769
Catch/hour	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,004

1/ *Includes long-line catch.*
2/ *1950-53 - all sharks.*

Statistics of the Oregon Trawl Fishery, 1960-70
(Landings in Thousands of Pounds; Effort in Hours)

Species	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	Mean 1960-69	1970
English sole	2,454	1,789	2,295	1,948	1,562	1,678	3,537	2,304	2,360	1,716	2,165	1,884
Rock sole	0	0	0	0	9	4	18	8	51	25	12	5
Petrale sole	2,143	1,838	2,607	2,295	1,877	1,838	1,838	1,771	1,653	1,835	1,970	2,141
Dover sole	5,208	4,054	4,454	5,345	5,529	3,631	3,492	3,565	4,325	5,554	4,516	5,538
Rex sole	1,280	988	1,333	1,033	806	985	1,498	1,219	1,075	1,215	1,143	1,074
Starry flounder	234	403	706	273	528	410	477	277	454	251	401	426
Other flatfish	204	138	216	73	143	62	205	245	215	506	201	646
Pacific cod	224	103	19	67	200	194	628	425	385	47	229	78
Lingcod	664	619	756	493	736	852	993	1,067	1,526	1,084	879	945
Sablefish	172	159	150	188	183	117	68	72	56	135	130	111
Pacific ocean perch	2,734	4,568	5,789	7,982	9,548	13,660	4,518	1,707	1,649	940	5,310	1,595
Other rockfish	5,392	4,832	7,125	4,681	4,147	4,121	5,069	4,061	4,253	5,101	4,879	3,515
Miscellaneous species	413	117	65	6	32	23	12	8	31	4	72	17
Dogfish	45	0	0	0	0	1	0	0	2	Tr.	5	17
Animal food	4,435	5,790	6,176	5,540	5,990	4,152	3,357	3,999	2,815	2,599	3,887	2,052
Reduction use	--	--	--	--	--	1,498	79	18	49	45	169	0
Total	25,602	25,398	31,691	29,924	31,290	33,226	25,789	20,746	20,899	21,057	26,562	20,044
Total hours	30,005	29,429	35,254	32,412	31,312	29,254	23,676	20,183	24,456	25,692	28,167	27,587
Catch/hour	853	863	899	923	999	1,136	1,089	1,028	855	818	946	727

California Trawl Landings
1924-30
(Thousands of Pounds)

Species	1924	1925	1926	1927	1928	1929	1930
English sole	7,696	7,481	7,157	8,649	7,588	8,765	6,758
Rock sole							
Petrale sole	66	321	356	387	854	1,064	2,244
Dover sole							
Rex sole	121	149	457	693	767	1,001	954
Starry flounder	324	525	494	559	373	542	380
Other flatfish	1,559	1,821	1,528	840	1,098	1,024	603
Lingcod	82	116	133	114	302	259	407
Sablefish	23	30	26	62	88	247	273
Pacific ocean perch							
Rockfish	62	54	160	311	401	475	482
Miscellanecus species	367	339	167	550	774	765	473
Dogfish		Tr.				13	1
Animal food							
Total	10,300	10,836	10,478	12,165	12,245	14,155	12,575

California Trawl Landings
1931-40
(Thousands of Pounds)

Species	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940
English sole	3,483	6,436	6,090	5,181	5,880	6,181	5,616	4,725	5,103	5,013
Rock sole										
Petrale sole	4,244	1,204	966	2,451	1,972	1,113	1,780	1,987	2,543	1,572
Dover sole										
Rex sole	784	534	564	715	629	515	451	509	666	593
Starry flounder	139	494	450	516	616	602	941	526	655	780
Other flatfish	506	778	746	1,040	780	742	649	893	909	901
Lingcod	420	312	354	363	391	201	365	225	175	225
Sablefish	82	41	125	234	652	96	72	8	180	138
Pacific ocean perch										
Rockfish	345	333	613	601	604	549	665	637	630	547
Miscellaneous species	242	588	384	605	690	710	964	1,892	1,453	1,082
Dogfish					1					
Animal food										
Total	10,245	10,720	10,292	11,706	12,215	10,709	11,503	11,402	12,314	10,851

California Trawl Landings
1941-50
(Thousands of Pounds)

Species	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950
English sole	3,233	2,005	2,968	2,842	2,360	5,431	4,337	8,166	5,664	8,045
Rock sole										9
Petrale sole	874	601	897	1,073	711	1,758	1,169	5,082	4,859	4,337
Dover sole			62	129	587	--	--	7,234	7,890	9,548
Rex sole	371	384	495	406	296	448	289	891	976	1,064
Starry flounder	588	361	465	354	161	399	249	397	334	899
Other flatfish	473	344	513	506	1,025	995	593	1,592	1,283	1,961
Lingcod	105	94	220	372	195	585	385	1,224	917	1,354
Sablefish	52	10	82	356	837	289	62	698	565	517
Pacific ocean perch										
Rockfish	408	124	1,168	4,993	5,133	7,347	2,161	4,140	3,483	4,606
Miscellaneous species	875	441	288	763	712	1,405	1,039	826	349	594
Dogfish		1	319	592	1	12		454	51	1
Animal food										
Total	6,979	4,365	7,477	12,386	12,018	18,669	10,284	30,704	26,371	32,935

California Trawl Landings
1951-60
(Thousands of Pounds)

Species	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960
English sole	5,624	4,910	4,099	3,749	4,135	3,825	4,820	5,150	4,618	2,376
Rock sole	12	1	2		2	2	1	1		3
Petrale sole	2,716	2,889	3,349	4,168	3,616	2,824	3,454	3,155	2,632	2,475
Dover sole	8,621	11,748	8,904	9,930	8,186	8,268	7,932	8,053	7,327	9,185
Rex sole	1,321	1,185	1,019	1,183	1,095	1,147	1,234	1,423	1,443	1,107
Starry flounder	1,120	987	492	495	640	369	500	466	1,043	248
Other flatfish	957	1,173	977	1,696	1,784	2,016	1,856	1,214	1,657	1,908
Pacific true cod										
Lingcod	1,227	664	772	701	724	634	1,239	1,358	1,153	1,099
Sablefish	869	662	937	1,457	1,272	2,106	1,268	1,415	1,703	2,133
Pacific ocean perch			41	7	47	8	1	6	Tr.	20
Other rockfish	7,632	8,454	10,720	10,841	11,128	13,076	14,279	14,626	12,240	11,712
Miscellaneous species	112	549	915	875	1,233	1,684	1,528	1,535	1,415	618
Dogfish		7	15	1			1	1		
Animal food										
Total	30,211	33,229	32,242	35,103	33,862	35,959	35,113	38,403	35,231	32,884
Total hours									48,465	44,984

California Trawl Landings
1960-70
(Thousands of Pounds)

Species	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	Mean 1960-69	1970
English sole	2,376	3,646	4,209	4,254	4,594	4,893	4,841	5,824	5,810	3,803	4,425	3,279
Rock sole	3	1	--	1	2	--	--	--	3	3	1	--
Petrale sole	2,475	3,391	3,038	3,317	2,699	2,659	2,925	2,770	2,943	2,867	2,908	3,415
Dover sole	9,185	7,826	8,581	9,780	9,267	10,760	10,301	7,212	8,526	12,919	9,436	15,144
Rex sole	1,107	1,209	1,408	1,565	1,409	1,491	1,635	1,762	1,929	2,253	1,577	1,743
Starry flounder	248	296	298	461	370	324	284	788	811	351	423	262
Other flatfish	1,908	934	1,160	1,312	1,384	1,224	1,319	1,371	1,229	1,004	1,285	996
Lingcod	1,099	1,163	819	857	673	618	586	737	923	836	841	1,300
Sablefish	2,133	1,340	1,690	1,660	1,618	1,880	2,077	1,398	1,418	2,162	1,738	2,886
Pacific ocean perch	20	16	--	63	85	38	6	18	23	45	31	57
Rockfish	11,712	8,896	7,757	9,744	6,702	7,635	8,493	8,149	7,841	7,571	8,450	9,059
Miscellaneous species	618	327	354	482	428	400	339	429	365	304	405	174
Dogfish	--	2	2	9	9	5	3	3	--	3	4	--
Animal food	--	3,777	1,879	1,034	1,738	2,875	2,375	2,592	2,590	2,412	2,127 1/	1,057
Total	32,884	32,824	31,195	34,539	30,978	34,802	35,184	33,053	34,411	36,533	33,640	39,372
Effort/hours	44,984	52,944	51,473	59,263	52,758	58,299	54,098	51,089	50,175	49,438	52,452	52,898

1/ *9-year average*

Market Sampling Techniques Used by California Department of Fish and Game

A. Petrale sole

1. Number of samples: one per week at Eureka and San Francisco, one or more per month at other ports dependent on availability.

2. Sample size:

   a. Lengths: 50 fish total lengths by 2 mm divisions.

   b. Ages: Both otoliths are taken from first 25 fish in length sample.

3. Sex: By gonad examination.

B. English sole

1. Number of samples: one per week at Eureka and San Francisco, one or more per month at other ports dependent on availability.

2. Sample size:

   a. Lengths: 25 fish total lengths by 2 mm divisions if fish are sorted, otherwise 50 fish.

   b. Ages: Right interopercle bone taken from first 25 fish in length sample.

3. Sex: By external or gonad examination.

C. Dover sole

1. Number of samples: one per week at Eureka and San Francisco, one or more per month at other ports dependent on availability.

2. Sample size:

   a. Lengths: 50 fish total lengths by 2 mm divisions.

   b. Ages: Both otoliths are taken from first 25 fish in length sample. (Scales are being considered for ages 8/71).

3. Sex: By gonad examination.

D. Animal food samples

1. Number of samples: one per week at Eureka, one or more per month at Fort Bragg, San Francisco, and Santa Barbara.

2. Sample size: one sample box, approximately 125-200 pounds.

3. Species:

   a. Each species is segregated, total of each species weighed, and each fish measured by cm divisions, (petrale, Dover, and English sole are measured by 2 mm divisions).

Market Sampling Techniques Used by the Fish Commission of Oregon

A. Flatfish

1. Number of samples: one per month per fishing area at Astoria and Coos Bay, one per month per fishing area at other ports dependent upon availability.

2. Sample size: 100 fish

3. Sample information:

Weight:	to nearest 10 grams
Sex:	by external or gonad examination
Age:	Petrale sole: both otoliths
	Dover sole: scales
	English sole: right interopercle bone
	Other flatfish: both otoliths

4. Sampling period: May to August

B. Pacific ocean perch

1. Number of samples: four per quarter per fishing area at Astoria and Coos Bay.

2. Sample size: 125 fish

3. Sample information:

Weight:	to nearest 10 grams
Sex:	gonad examination
Age:	both otoliths
Length[1/]:	nearest centimeter
Maturity[1/]:	International maturity code

4. Sampling period: year round; divided into four 3-month quarters

1/ *Collected only on first four Astoria samples per quarter regardless of area fished.*

1971 Washington Market Sampling Procedures

A. Collection of biological samples

1. Standard equipment:
   a. measuring board
   b. plastic overlays
   c. otolith vial rack
   d. knife and forceps
   e. rubber gloves
   f. plastic apron
   g. other materials and equipment as needed
2. Sampling procedures
   a. biological samples shall be taken from all bottomfish species landed if:
      (i) catch is from a reasonably narrow depth range on a descrete fishing ground
      (ii) the catch is from within a Washington State statistical area
      (iii) the catch is from within a PMFC area
   b. insuring the collection of representative samples from catches being unloaded:
      (i) unless the entire catch is to be sampled, avoid sampling from the first and last bucket load when possible
      (ii) in subsampling a bucket or cart load, or fish on the floor, take a vertical section rather than a horizontal one--do not include in the sample fish that slide down from the top of the pile
      (iii) in sampling from the fillet line, avoid the start and end of runs, and take all frames accessible on a given portion of the belt rather than picking them off, one at a time, allowing some to pass by
   c. collection of flatfish sample (all species of flatfish): a flatfish sample consists of approximately 30 fish
      (i) procure a cart of whole fish or frames 1/
      (ii) collect one otolith (Blindslide) from the first 10 fish of each length increment group (cm) of each sex
      (iii) continue to record length and sex data from all remaining fish until approximately 300 individuals have been sampled
   d. collection of roundfish sample (lingcod, true cod, Blackcod and miscellaneous roundfish): a roundfish sample consists of approximately 300 fish
      (i) procure one or more carts of whole fish or frames 1/
      (ii) record length frequencies of roundfish, and/or length frequencies by sex of frames
      (iii) when taking a sample of blackcod the length frequency may be taken from the anterior origin of the first dorsal fin to the fork of the tail--this might occur in the case of dressed fish

e. collection of rockfish sample (all *Sebastodes* sp. including ocean perch *alutus*):
   (i) in the case of Pacific ocean perch, the sample consists of approximately 300 fish (one or more carts) 1/
      (a) otoliths are taken from the first 100 fish by length (cm) and sex
      (b) length frequency by sex is taken from all remaining fish in the sample
   (ii) in the case of all other species of rockfish the sample consists of approximately 300 fish (one or more carts) 1/
      (a) each sample shall consist of one specific species of rockfish
      (b) record length frequencies of roundfish, and/or length frequencies by sex of frames

f. collection of species composition sample (all species)
   (i) suggested procedures for sampling south Puget Sound catches:
      (a) obtain length frequency by sex of English sole
      (b) obtain species composition of catch
         (1) collect weight samples of individual species
         (2) collect percentage species composition
      (c) obtain percentage of wormy English sole included in the catch
   (ii) suggested procedures for sampling central Puget Sound catches:
      (a) sample every other week aboard an active trawl vessel
         (1) establish pounds of food fish for each tow made
         (2) establish pounds of animal food fish for each tow made
         (3) obtain length frequency by sex for both food fish and industrial-use fish
         (4) note presence of wormy English sole in the catch and utilization of same
   (iii) suggested procedures for collection of rockfish species composition samples:
      (a) obtain a percentage breakdown by species of mixed catches of rockfish and ocean perch
         (1) conversation with captain and/or crew members
         (2) visual estimation
         (3) actual count of different species included in a representative sample

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1/ *Carts of fish should be weighed in order to obtain an average weight for all species sampled.*

Market Sampling Techniques Used by the Fisheries Research Board of Canada

Objective: one sample per major species per week

Flatfish
- Total length: generally frames to nearest cm
- Age structure: otoliths

Pacific cod
- Total length of dressed fish to nearest cm
- Age structure: scales

Lingcod
- Length: Dressed fish measured from the insertion of the dorsal fin to the center of the tail
- Age structure: scales

Sablefish
- Length: Dressed fish measured from the insertion of the dorsal fin to the center of the tail.

Sample size
- Flatfish: three consecutive 20's in a sample or one 30 in a sample
- Roundfish: same frequency if possible

Flatfish samples may run from 150 specimens (rock sole) to over 400 (petrale sole, Dover sole). Roundfish samples up to 350 specimens in each sample.

Special samples: special techniques
length-girth
length-weight
maturity, etc.

Conversion factors

Weight
- Pacific cod: dressed weight x 1.34 = total weight
- Lingcod: dressed weight x 1.38 = total weight
- Dogfish liver: liver weight x 6.67 = round weight

Length
- Lingcod: $Y = 1.228X + 0.558$ where Y = total length (cm and X = origin of dorsal to fork of caudal length (cm)
- Blackcod: Origin of dorsal fin to fork of caudal length times 1.32 = total length

Distribution of Minutes
Technical Sub-Committee

		Total
Technical Sub-Committee		
California	T. Jow (2)	2
Oregon	J. Meehan, R. Loeffel	2
Washington	G. DiDonato, D. Gunderson	2
Alaska	C. L. Rosier (2)	2
Canada	C. R. Forrester, R. D. Humphreys	2
Trawl Fishery Committee		
Canada	M. P. Houghton (4, 2 for Ottawa)	4
U.S.	J. P. Harville (4, 2 for U.S. Government)	4
Advisors and Others		
Canada	K. S. Ketchen, S. J. Westrheim (2, 2 for Ottawa)	4
U.S.	G. R. Arnett - California Fish and Game (2)	2
	R. W. Schoning - Oregon	1
	W. Hublou - Oregon	1
	T. Tollefson - Washington (2)	2
	D. Kauffman - Washington	1
	H. A. Larkins - NMFS	1
	W. Noerenberg - Alaska	1
I.P.H.C.	S. H. Hoag	1
Spare		4
	Total	36