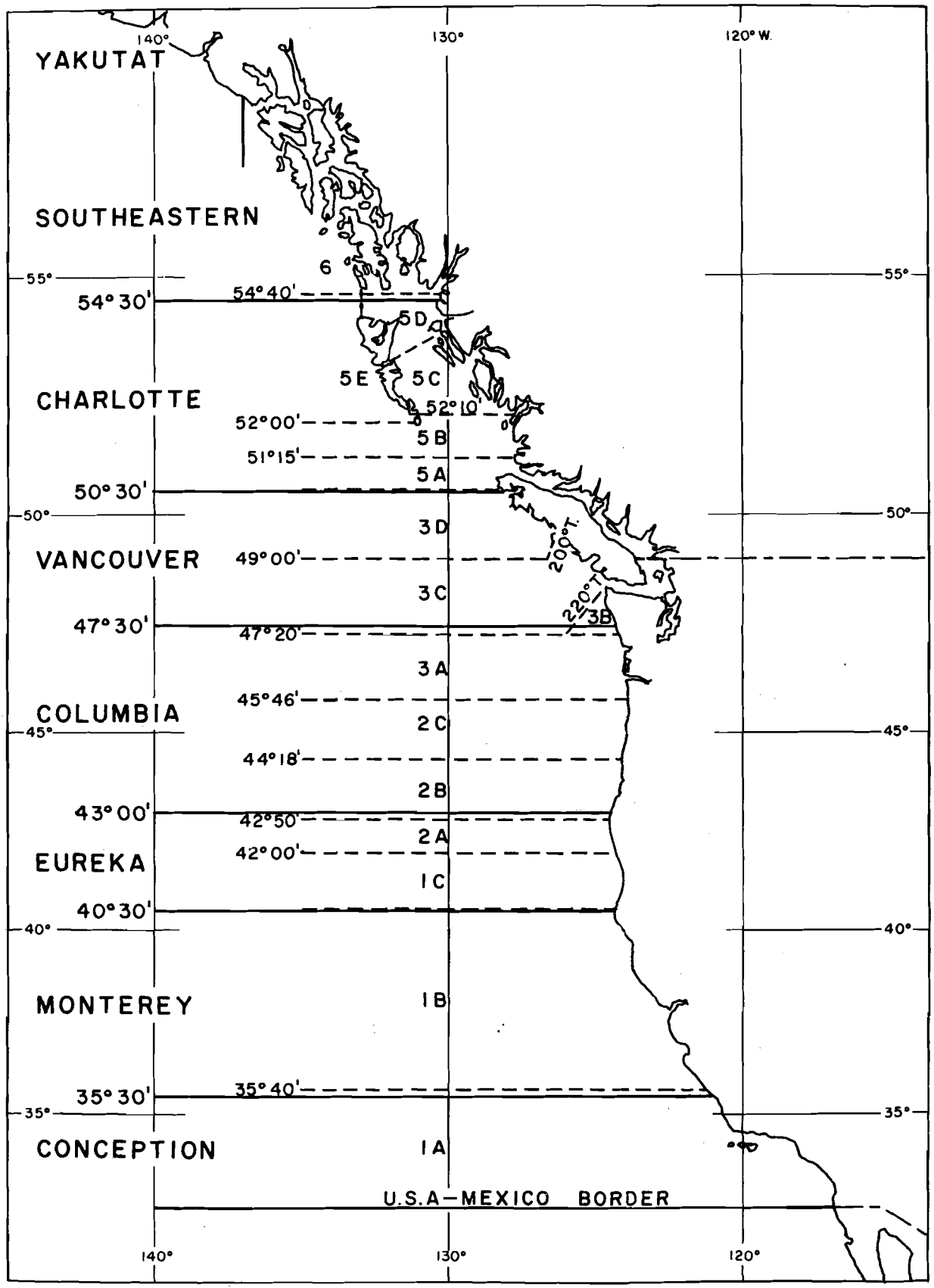
REPORT OF THE TECHNICAL SUBCOMMITTEE OF THE INTERNATIONAL GROUNDFISH COMMITTEE

APPOINTED BY
THE SECOND CONFERENCE ON COORDINATION
OF FISHERIES REGULATIONS BETWEEN
CANADA AND THE UNITED STATES

EIGHTEENTH ANNUAL MEETING

JUNE 15-16, 1977

SEATTLE, WASHINGTON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REPORT OF THE

TECHNICAL SUBCOMMITTEE OF THE

INTERNATIONAL GROUNDFISH COMMITTEE

Appointed by

The Second Conference on Coordination

of Fisheries Regulations Between Canada and the United States

Eighteenth Annual Meeting

June 15-16, 1977

Seattle, Washington

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Report of the Technical Subcommittee of the International Groundfish Committee Appointed by the Second Conference on Coordination of Fisheries Regulations Between Canada and the United States

Date: June 15-16, 1977

Place: Seattle, Washington

Participants:

Canada

Fisheries and Marine Service Department of Environment	Mr. B. Leaman, Chairman Dr. R. Beamish Ms. J. Smith Mr. K. Pitre (Observer)

United States

California Department of Fish and Game	Mr. T. Jow
Oregon Department of Fish and Wildlife	Mr. R. Demory
Washington Department of Fisheries	Mr. M. Pedersen Mr. M. Fraidenburg
Alaska Department of Fish and Game	Mr. P. Rigby
National Marine Fisheries Service	Mr. T. Dark Dr. D. Gunderson (Observer) Dr. W. Lenarz (Observer)
Pacific Marine Fisheries Commission	Dr. J. Harville (Observer)
International Pacific Halibut Commission	Mr. S. Hoag (Observer) Mr. R. McNaughton (Observer)

I. Call to Order

The 18th annual meeting of the Technical Sub-committee was called to order at 0900, June 15, 1977, by Chairman pro tem Mr. B. Leaman under instructions set forth by the Parent Committee in 1959. Mr. Leaman was unanimously selected to act as Chairman during the absence of Mr. J. Westrheim, who had been elected to serve as Chairman during 1977-78.

II. Appointment of Secretary

Mr. T. Dark of NMFS was appointed as recording secretary.

III. Approval of the Agenda

The tentative agenda circulated prior to the meeting was approved with the following modifications: "Aging criteria for Sebastes flavidus" and "Rockfish age of entry and appropriate mesh size" were added as items 8 and 9, respectively, under VII.B. The meeting was conducted according to the approved agenda found in Appendix A.

IV. Terms of Reference of the Sub-committee

The Sub-committee reviewed its term of reference as described in the first meeting of the Technical Sub-committee in 1961 and amended at the 13th meeting of the International Groundfish Committee (1971). No changes were proposed. The terms of reference remain as follows:

(1) to review proposed changes in groundfish regulations affecting fisheries of common interest before they are implemented;

(2) to review the effectiveness of existing regulations;

IGC clarify?

(3) to exchange information on the status of groundfish stocks of mutual concern and to coordinate, wherever possible, programs of research; and

(4) to recommend the continuance and further development of research programs in order to provide a basis for future management of the groundfish fishery and to coordinate with poss. programs of research

V. Review of Agency Groundfish Programs

A. Reports Completed or in Progress

Each agency distributed with its status reports a list of reports completed or in progress.

B. Current and Proposed Research

1. Canada

A minor reorganization of the three units involved in groundfish research took place during 1975-76. The Marine Resources Management Program was formed under the direction of Dr. Z. Kabata to deal with domestic fisheries, as well as those affected by the coming of the extended jurisdiction regime. Accordingly, the focus of the three units has broadened to encompass these added responsibilities.

During 1976 the Strait of Georgia hake and pollock study was concluded. Results of this study should be available early in 1978. The aging of older Pacific hake in this study necessitated the use of thin sections of otoliths, a technique which has provided both insights and questions with regard to these older fish. A study of the biology of lingcod with an assessment of the size of various stocks was initiated. As part of this study a new method for aging lingcod using dorsal fin spines was developed.

An analysis of the population dynamics of dogfish stocks was completed. This analysis indicated that the infusion of juveniles from their midwater habitat played an important role in the rapid recovery of the stocks following

the extensive wartime fishery. Studies of the life history of the lamprey and its effect on commercial fish stocks were continued during 1976.

The hydroacoustic unit continued using digital echo integration to determine the distribution and abundance of certain fish stocks off the southwest coast of Vancouver Island and in Queen Charlotte Sound. In the former area the stocks included herring, hake, pollock, dogfish, and the "other rockfish" complex; in the latter area the stocks were mainly "other rockfish." Acoustic surveys formed part of the joint Canada-United States rockfish survey of Queen Charlotte Sound in September 1976.

The third unit in the program continued its monitoring of the commercial fishery through vessel interviews and samples of landings. In 1976 a total of 198 biological samples was taken; the intensity of sampling for any given species was generally in proportion to its annual landings.

Biological studies conducted by this unit were primarily concerned with Pacific cod and Pacific ocean perch. Two cruises of the G. B. Reed (July 1976 and March 1977) involved a study of Pacific cod spawning sites and their surficial sediments in an attempt to determine if this species exhibited sediment-specific egg deposition. A report was prepared detailing the length-weight, length-girth, maturity, spawning season, and diet characteristics of Pacific cod collected during April, 1975-February, 1976. In addition, a report is being prepared on the growth of Pacific cod in British Columbia waters. Estimation of Pacific ocean perch biomass in Goose Island and Mitchell's gullies was conducted during the joint Canada-United States rockfish survey in Queen Charlotte Sound during September 1976. In conjunction with the Industrial Development Program of Environment Canada, explorations for Dover sole fishing grounds were made off the northwest coast of the Queen Charlotte Islands during February 1977.

2. United States

(a) Alaska

Groundfish management responsibilities are assumed by Alaska Department of Fish and Game area and region management personnel. One full-time groundfish position was created in 1976 to coordinate and develop groundfish management and research programs and to coordinate state-federal cooperative activities.

Proposed, but as yet unfunded, projects include domestic observer, log book, and commercial catch sampling programs.

(b) Washington

The Marine Fish Program is responsible for the research, monitoring, and management of groundfish resources as well as baitfish species and albacore tuna. The PMFC age reader position is also included in this program.

Stock Assessment Unit (1 biometrician, 2 biologists).—There are three projects included under this unit: (1) the marine fish biometrics project is responsible for assisting the Marine Fish Program staff in the area of statistical and mathematical analyses; (2) the marine fish acoustics project involves hydroacoustic survey techniques to determine population sizes of baitfish and groundfish species within Puget Sound and coastal waters; and (3) the coastal rockfish assessment project is responsible for determining species composition, analysis of data on catch and effort by the trawl fishery, and establishment of proper harvest levels. Participation in the synoptic rockfish survey is proposed during September 1977.

Groundfish-Albacore Management Unit (4 biologists, 5 technicians).—This unit is responsible for development, implementation, and evaluation of regulations required to maintain a suitable harvest of groundfish species to

commercial and recreational fishermen. Major tasks included groundfish monitoring and management of Puget Sound trawl fisheries and bottomfish set net fisheries. Substantial effort was directed toward development of age determination techniques for Sebastes flavidus and other rockfish.

Marine Fish Enhancement Unit (2 biologists).--This unit develops and evaluates enhancement programs for important marine fish species, primarily in the form of fishing piers and artificial reef designs to create new opportunities for recreational fishermen.

(c) Oregon

Since the Technical Sub-committee meeting in June 1976, there has not been a major change in program direction, but a Biologist-3 position was added to the stock assessment project.

Stock Assessment Project.--The second of two groundfish surveys was completed off Washington in September 1976. Major emphasis was again on pleuronectids. In addition to the survey off Washington (86 tows), an additional 15 tows were made off Oregon between the Columbia River and Cascade Head seaward of 100 fathoms. A completion report covering both surveys off Washington is nearly finished.

Groundfish-Shrimp Management Project.--A major effort in this project was the completion and implementation of the automatic data processing system that provides coastwide-compatible groundfish statistics and CPUE by state and PMFC statistical areas. This project is also responsible for collection and summary of market sampling data. A total of 42 samples were taken in 1976.

Proposed Projects.--Projects proposed under P.L. 88-309 funding during FY 1978 are: (1) participation in the synoptic rockfish survey in September; (2) lingcod tagging off Newport, both inshore and offshore, with initial

tagging starting on inshore reefs in November 1977 and offshore tagging starting in summer 1978 (it is proposed, at present, that offshore tagging will take place from chartered commercial trawlers); and (3) English sole tagging in PMFC areas 2B and 2C, with tagging beginning in November or December to take place at two as yet undetermined locations.

(d) California

Groundfish research and management activities are conducted by the Marine Resources Region and Operations Research Branch.

Monitoring, surveillance, and assessments of commercial and sport fisheries for groundfish are major tasks performed by and supervised by unit managers of the region at major coastal ports. Major groundfish species were sampled for age, size, sex, and species composition. The total number of samples from commercial landings was 366.

In addition to commercial sampling, species composition of the rockfish catch from commercial passenger carrying vessels (partyboats) and from private vessels were obtained through sampling programs in southern and central California.

Considerable effort was devoted to preparation of groundfish management plans in 1976. Draft plans were prepared for flatfish, rockfish, sablefish, and lingcod.

Data acquisition and compilation are major tasks. The NORFISH computer system for trawl data has been tested with several month's data. Implementation of the system on 1976 data has been delayed due to a backlog of keypunching.

In April 1977, NMFS's Southwest Fisheries Center contracted with the California Department of Fish and Game to sample rockfish and associated species for length, age, and species composition.

Current programs of fishery monitoring, surveillance, and assessment will be continued. Analyses of rockfish fisheries in relation to mesh regulations were performed in 1977.

(e) National Marine Fisheries Service

Groundfish Assessment Task.—The Groundfish Assessment Task has been engaged in a number of assessment programs under the auspices of MARMAP II and under contract to the Bureau of Land Management for the provision of baseline information.

Chukchi Sea/Norton Sound Resource Assessment: A bottom trawl survey was conducted during September-October of 1976 to determine the distribution and abundance of groundfish, shellfish, and epibenthic invertebrate resources. Analysis of the results is in progress, and a final report will be available in September, 1977.

Bering Sea Groundfish Assessment: The second phase of a two-year program to survey the groundfish resources of the outer continental shelf and slope of the eastern Bering Sea was completed in 1976. The 1975 work has been reported to the Outer Continental Shelf Environmental Assessment Program (OCSEAP), and last year's results will be available in a report scheduled for completion in June 1977. During 1977, this activity will support a crab/groundfish survey to monitor the status of eastern Bering Sea populations and will utilize shrimp and halibut survey vessels to examine the feasibility of determining the relative abundance of pre-recruited pollock and juveniles of other species.

Gulf of Alaska Groundfish Assessment: A survey was conducted in the vicinity of Kodiak Island westward to the Semidi Islands during January-February, 1977 to determine the winter distribution of important groundfish resources.

Northeast Pacific Groundfish Assessment: The subtask continues to compile release and recovery information generated by the Cooperative Sablefish Tagging Program and is preparing a report on results to date. The program will continue to assist with the rockfish assessment studies and will utilize data generated by the 1977 synoptic survey to determine the current status of the Pacific hake population.

Rockfish Investigations: A pilot rockfish survey was completed in areas off Monterey, California, and in Queen Charlotte Sound, B.C., during the summer of 1976. That work has served to guide the development of plans for a two-year synoptic survey of the rockfish resources of the northeastern Pacific Ocean. The first phase will begin in July 1977 with a multi-vessel trawl/hydroacoustic survey of the region between Pt. Hueneme, California, and Cape Flattery, Washington.

Latent Resource Assessment.—A joint-industry-government venture will be launched in 1977 to assess and determine the feasibility of harvesting the clam resources of the eastern Bering Sea. A study will be conducted in the inside waters of southeastern Alaska during the summer of 1977 to examine the efficiency of sunken gillnets and traps in the capture of bottomfish (particularly Pacific cod) inhabiting untrawlable areas.

Pelagic Resource Assessment.—The hydroacoustic resource assessment system is in the final stage of development. It has been containerized and will be portable enough to be utilized on a variety of sea-going platforms. The system will be employed during the 1977-78 rockfish survey and will be used in the future to assess other semi-demersal forms such as hake and pollock.

Other activities.--NMFS has taken the lead role in the development of preliminary management plans utilized to a large extent by the Regional Fishery Management Councils in the preparation of management schemes implemented during the first year of extended jurisdiction under the Fisheries Conservation and Management Act. The observer program continues at an increased level to accommodate the need to monitor the catch of foreign vessels operating under permit within the U.S. fishery zone.

(f) International Pacific Halibut Commission

Mr. S. Hoag and Mr. R. McNaughton reported on the progress of the halibut fishery and described research undertaken by the IPHC. Stock assessments were made in 1976 using CPUE, data from juvenile surveys, tagging data, and cohort analysis. Other studies conducted in 1976 included a standardized stock assessment survey in IPHC Areas 2 and 3 with setline gear, comparison of fecundity as observed in 1920 and 1973 samples, trawl experiments aboard Japanese vessels in an effort to reduce the incidence of halibut in catches, and analysis of observer data on the incidence of halibut in Japanese and Russian trawl catches.

VI. Review of Northeastern Pacific Groundfish Fisheries

A. Canada-United States Fisheries in 1976

1. Total landings

The 1976 aggregate trawl landings by Canadian and United States vessels from the northeast Pacific ocean were 85,395 mt (188.3 million pounds), an increase of 12.3% over 1975 (Table 1). Total effort was estimated to be more than 209,000 hours, which was more than 7% higher than the 1975 value of 195,000 hours.

Table 1.-Trawl landings in metric tons & 1000's of lbs. from the northeast Pacific by Canadian and U.S. vessels in 1975 and 1976, and means for 1966-75.

	B.C.		Washington		Oregon		California		Alaska		Total		Mean-1966-75 1/	
	mt	1000 lbs	mt	1000 lbs	mt	1000 lbs	mt	1000 lbs	mt	1000 lbs	mt	1000 lbs	mt	1000 lbs
1975														
English sole	1,095	2,415	1,107	2,441	988	2,166	1,955	4,310	--	--	5,139	11,332	4,783	10,547
Rock sole	1,743	3,844	246	542	13	29	10	21	--	--	2,012	4,436	2,421	5,339
Petrale sole	441	472	1,522	3,355	1,201	2,649	1,475	3,252	--	--	4,639	10,228	3,748	8,264
Dover sole	1,030	2,270	558	1,230	2,168	4,780	10,287	22,683	--	--	14,042	30,963	10,598	23,368
Rex sole	98	215	136	300	464	1,024	743	1,639	--	--	1,441	3,178	2,009	4,429
Starry flounder	90	199	261	575	371	817	270	596	--	--	992	2,187	931	2,053
Other flatfish	954	2,104	142	312	459	1,013	623	1,373	--	--	2,178	4,802	1,323	2,918
Pacific cod	10,250	22,602	5,049	11,134	265	585	--	--	--	--	15,565	34,321	10,793	23,799
Lingcod	1,877	4,139	1,596	3,518	693	1,529	1,183	2,609	--	--	5,349	11,795	4,716	10,399
Sablefish	283	623	172	380	305	672	2,840	6,263	--	--	3,600	7,938	2,120	4,674
POP	2,040	4,497	1,335	2,944	435	960	67	147	--	--	3,877	8,548	6,790	14,972
Other rockfish	978	2,157	3,123	6,885	1,120	2,469	8,061	17,775	--	--	13,282	29,286	12,317	27,159
Misc. species	285	629	42	93	15	32	177	391	--	--	519	1,145	346	762
Dogfish	479	1,057	188	414	2	4	--	--	--	--	669	1,475	146	321
Animal food	36	80	865	1,908	264	581	2	5	--	--	1,167	2,574	4,240	9,348
Reduction	211	465	1,347	2,970	--	--	--	--	--	--	1,558	3,435	4,089	9,017
Total	21,890	48,268	17,688	39,001	8,757	19,310	27,693	61,064	--	--	76,029	167,643	71,837	158,400
% Total		28.8		23.3		11.5		36.4	--	--	--	100.0	--	--
Total Hours		34058		46816		28648		85271	--	--	--	194613	--	162,330
Catch/effort (excludes dogfish)	643	1,417	378	833	312	687	325	716	--	--	391	861	443	976
1976														
English sole	1,307	2,882	1,618	3,568	1,643	3,622	2,154	4,750	--	--	6,722	14,822		
Rock sole	2,154	4,749	182	402	7	15	9	20	--	--	2,352	5,186		
Petrale sole	337	742	1,108	2,444	793	1,749	1,338	2,950	--	--	3,576	7,885		
Dover sole	1,153	2,542	1,274	2,810	2,262	4,987	10,431	23,000	--	--	15,120	33,339		
Rex sole	132	291	171	378	477	1,052	816	1,800	--	--	1,597	3,521		
Starry flounder	48	106	311	686	773	1,705	227	500	--	--	1,359	2,997		
Other flatfish	1,320	2,910	290	640	566	1,248	635	1,400	154	339	2,965	6,537		
Pacific cod	10,065	22,193	5,229	11,529	277	611	--	--	106	234	15,677	34,567		
Lingcod	1,367	3,015	1,470	3,241	439	968	998	2,200	--	--	4,274	9,424		
Sablefish	382	842	291	641	442	975	2,721	6,000	--	--	3,836	8,458		
POP	1,746	3,850	1,375	3,031	1,019	2,247	36	80	2	4	4,178	9,212		
Other rockfish	2,018	4,450	5,752	12,683	2,076	4,578	8,425	18,577	--	--	18,236	40,211		
Misc. species	1,614	3,558	52	114	512	1,128	136	300	181	400	2,404	5,300		
Dogfish	85	188	486	1,071	6	13	--	--	--	--	577	1,272		
Animal food	100	220	997	2,198	56	124	--	--	--	--	1,153	2,542		
Reduction	300	662	1,051	2,318	--	--	--	--	--	--	1,352	2,980		
Total	24,036	53,000	21,657	47,754	11,348	25,022	27,891	61,500	443	977	85,376	188,253		
% Total		28.1		25.4		13.3		32.6	--	5.2	--	100.0		
Total Hours		36371		53400		33259		86000	--	--	--	--		
Catch/effort (excludes dogfish)	659	1,452	405	894	322	710	324	715	--	--	--	--		

Canadian trawl landings were 23,945 mt (52.8 million pounds), representing a 9.7% increase over 1975. Total Canadian trawling effort was 36,400 hours, 6.7% greater than the 1975 figure. Landings by gear other than trawl rose 18.5% above the 1975 level to 12,472 mt (27.5 million pounds).

United States trawl landings for 1976 were 61,430 mt (135.5 million pounds), up 13.3% over 1975. Catch by gear other than otter trawl was 10,340 mt[1/] (22.8 million pounds), an increase of 23.2% over 1975.

2. Dover sole

Coastwide landings of Dover sole in 1976 were 15,120 mt (33.3 million pounds), representing a new high which is 8% greater than 1975 and 43% greater than the 1966-75 mean.

a. Canada

Landings in 1976 were 1,053 mt (2.5 million pounds), a 12% increase over 1975, but 57% greater than the 10-year mean. Area 5D accounted for 87% of the total production. CPUE was .28 mt (626 pounds)/hr. in Area 5D, a 13% reduction from 1975.

b. United States

Washington.--Landings of Dover sole at Washington ports in 1976 were 1,274 mt (2.8 million pounds), an increase of 125% over 1975 and 98% greater than the 1966-75 mean. Area 3C was highest in production at 544 mt (1.2 million pounds). CPUE in Area 3C was .19 mt (409 pounds)/hr., the highest since 1972.

Oregon.--Landings of Dover sole at Oregon's ports during 1976 were 2,261 mt (5.0 million pounds), 4% greater than 1975 landings. The leading area of production was Area 2B.

[1/] Oregon line catches not available.

California.--Landings of Dover sole in California in 1976 were 10,431 mt (23 million pounds), 1% greater than 1975 and 49% greater than the 10-year mean. Catches were primarily from Areas 1B and 1C.

3. English sole

The upward trend in English sole catches continued in 1976 when 6,722 mt (14.8 million pounds) were landed. The 1976 landings were 33% above 1975 landings of 5,139 mt (11.3 million pounds), and 43% above the 10-year mean catch of 4,783 mt (10.5 million pounds). The areas of highest production were 1B, 1C, 2B, 3A, 3B, 4A, and 5D.

a. Canada

In 1976, Canadian landings totalled 1,307 mt (2.9 million pounds), 19% above the 1975 catch and 65% above the 1966-75 mean. The majority of the total catch (72%) was taken from northern Hecate Strait (Area 5D). The Area 5D catch was about the same as that of 1975 but 1976 CPUE (.35 mt or 761 pounds/hr) declined 3%.

b. United States

Washington.--English sole landings of 1,618 mt (3.6 million pounds) in 1976 were the highest in 10 years. The 1976 catch was 46% above that of 1975 and 42% above the 10-year mean. Area 3B was the leading catch area for Washington fishermen.

Oregon.--English sole landings in 1976 were 1,642 mt (3.6 million pounds), a 67% increase over 1975 landings and 64% above the 10-year mean. CPUE was .11 mt (238 pounds)/hr. in 1976, a 21% increase over 1975 CPUE. The most productive area for Oregon fishermen was Area 2B where 726 mt (1.6 million pounds) were taken.

California.--The 1976 English sole catch was 2,154 mt (4.8 million pounds), a 9% increase over 1975 landings and 14% above the 10-year mean. Areas 1B and 1C were the leading California catch areas.

4. Petrale sole

Canada and United States petrale sole landings in 1976 were 3,576 mt (7.9 million pounds), a 23% decline from 1975 landings of 4,639 mt (10.2 million pounds), and a 5% decline from the 10-year mean catch of 3,748 mt (8.3 million pounds). Canada and each state reported declines in 1976.

a. Canada

Landings of petrale sole totalled 336 mt (742,000 pounds) in 1976, a 24% decrease from 1975 and 25% below the 1966-75 mean. Most (60%) of the catch occurred in Area 3C where 203 mt (447,000 pounds) were taken. Area 3C landings in 1976 were 36% below those of 1975. CPUE also decreased 27% to .06 mt (136 pounds/hr). Landings from Areas 3D, 5A-5D totalled 130 mt (286,000 pounds). Canadian vessels did not target on petrale sole in 1976.

b. United States

Washington.--The 1976 catch of 1,108 mt (2.4 million pounds) was a 27% decrease from 1975, but it was 24% above the 10-year mean. Area 3C was the leading catch area where 544 mt (1.2 million pounds) were taken.

Oregon.--Landings of petrale sole in 1976 were 793 mt (1.7 million pounds), a decrease from the 10-year mean. CPUE of .11 mt (235 pounds/hr) was a 10% increase over 1975. Area 2B was the major area where the catch was just over 454 mt.

California.--Landings in 1976 of 1,338 mt (3 million pounds) were 9% below 1975 landings and 7% below the 10-year mean. Area 1B was the major petrale sole catch area.

5. Rock sole

Total trawl landings of rock sole in 1976 were 2,352 mt (5.2 million pounds), 17% greater than in 1975, but slightly less (4%) than the 1966-75 mean.

a. Canada

Canadian landings accounted for 2,154 mt (4.7 million pounds), 92% of the total catch. This was an increase of 24% from 1975. Hecate Strait (Areas 5C and 5D) was the main area of production.

b. United States

Total landings of rock sole were 198 mt (437,000 pounds). Washington landings were 182 mt (402,000 pounds), while landings from California and Oregon were 9 and 6 mt (20,000 and 15,000 pounds) respectively.

6. Lingcod

Total Canadian and United States trawl landings of lingcod in 1976 were 4,274 mt (9.4 million pounds), a decrease of 20% from 1975 and 9% below the 1966-75 mean.

a. Canada

Canadian lingcod landings in 1976 of 2,313 mt (5.1 million pounds) represent a decrease of 19% from 1975. Trawl landings of 1,367 mt (3.0 million pounds) were 27% below those of 1975 and 21% less than the 1966-75 mean. More than 50% of this catch came from Area 3C where the CPUE decreased 33% from 1975.

b. United States

Washington.--Lingcod landings totalled 1,470 mt (3.2 million pounds) in 1976, 8% less than both the 1975 catch and the 1966-75 average.

Oregon.--Landings of lingcod in 1976 were 439 mt (1.0 million pounds), 37% less than in 1975 and 29% below the 1966-75 mean. Landings were the

lowest since 1970, and represent the third year of a decline that began in 1974.

California.--Estimated lingcod trawl landings in 1976 were 998 mt (2.2 million pounds), 16% less than the previous year, but 25% above the 1966-75 mean. Line catches of lingcod are estimated at 499 mt (1.1 million pounds).

7. Pacific cod

Total landings of Pacific cod by Canadian and Unites States vessels rose only slightly during 1976 to 15,677 mt (34.6 million pounds).

a. Canada

Paicfic cod continued to be the major species (42%) in the Canadian trawl fishery. While the total landings of 10,065 mt (22.2 million pounds) were slightly below the 1975 value, they were still 38% higher than the 1966-75 mean. Hecate Strait (Areas 5C and 5D) and the southwest coast of Vancouver Island (Area 3C) continued to be the major areas of production. CPUE decreased 16% in Hecate Strait during 1976 and fell 9% below the 1966-75 mean, while the Area 3C CPUE fell 2% below 1975, but was still 23% above the 1966-1975 mean.

b. United States

Washington.--Pacific cod continued to be the dominant species in Washington's trawl fishery and, at 5,229 mt (11.5 million pounds), rose 3% over the 1975 landings and 58% over the 1966-75 mean.

Oregon.--Pacific cod continued to be a minor component of Oregon trawl landings at 277 mt (611,000 pounds). This was approximately 4% more than 1975 and 26% more than the 1966-75 mean.

8. Pacific ocean perch

United States and Canadian landings of Pacific ocean perch in 1976 were 4,176 mt (9.2 million pounds), up 8% from 1975 and down 38% from the 1966-75 mean. Primary areas of catch were Areas 5B, 3C, and 2C.

a. Canada

Landings of Pacific ocean perch in 1976 were 1,746 mt (3.8 million pounds), a decrease of 14% over 1975 but 10% above the 1966-75 mean. The majority of the catch was taken from southern Queen Charlotte Sound.

b. United States

Alaska.--Alaska's all species rockfish landings (presumed to consist mainly of Pacific ocean perch) in 1976 were 129 mt (283,904 pounds), up 31% from 1975.

Washington.--The 1976 trawl landings were 1,375 mt (3.0 million pounds), a 3% increase from 1975 but 69% below the 1966-75 mean. Areas 5A, 5B, and 3C accounted for most of Washington's landings.

Oregon.--Oregon's 1976 landings were 1,019 mt (2.2 million pounds), up 134% from 1975 and up 50% from the 1966-75 mean. Appearance of a strong 1970 year class harvested mainly in area 2C accounted for the increased landings in 1976.

California.--The 1976 landings were 36 mt (80,000 pounds), down 46% from 1976 and up 7% from the 10-year mean.

9. Other rockfish

Total 1976 Canadian and United States trawl landings were 18,236 mt (40.2 million pounds), up 37% over 1975 and up 48% over the 1966-75 mean.

a. Canada

The 1976 trawl catch was 2,018 mt (4.4 million pounds), up 106% from 1975 and up 174% from the 1966-75 mean. Areas 5B and 5D were the major production areas, and Sebastes flavidus was the major species landed.

b. United States

Washington.--Washington trawlers landed 5,753 mt (12.7 million pounds) in 1976, up 84% from 1975 and up 23% from the 1966-75 mean. Areas 5A, 3A, and 3C were major production areas. Sebastes flavidus was the prominant species landed.

Oregon.--Landings totaled 2,076 mt (4.6 million pounds), up 85% from 1975 and up 20% from the 1966-75 mean. Area 3A accounted for most of the production, and Sebastes flavidus was the principal species landed.

California.--In 1976 the estimated landings are 8,392 mt (18.5 million pounds), up 4% from 1975 and up 62% from the 1966-75 mean. Area 1B was the leading area and the leading species were Sebastes paucispinis and Sebastes goodei. Line and gillnet catches were substantial and approached 2,268 mt (5.0 million pounds). Rockfish are the most numerous species in the ocean sport catch. Each year about 4,536 mt (10.0 million pounds) of rockfish are taken by sport fishermen.

10. Sablefish

Canadian and United States trawl landings of sablefish in 1976 were 3,836 mt (8.5 million pounds), a 7% increase from the 3,600 mt (7.9 million

pounds) landed in 1975 and 81% greater than the 1966-75 mean. Non-trawl sablefish catches were about 4,036 mt (8.9 million pounds). Over 70% of the total 1976 catch came from areas 1B and 1C off California.

(a) Canada

Total sablefish landings in 1976 were 816 mt (1.8 million pounds), 14% less than in 1975. The trawl catch was 382 mt (842,000 pounds), mainly from areas 3C and 5B. This production was 35% greater than in 1975 and 66% greater than the 10-year mean. Non-trawl landings were 413 mt (911,000 pounds), with most of the catch by trap gear in Area 5E.

(b) United States

Alaska.--The 1976 catch was 792 mt (1.7 million pounds), which is 317 mt (.7 million pounds) less than the 1975 catch, but is greater than the 10 year mean of 544 mt (1.2 million pounds). The 1976 catch was made off southeastern Alaska by six trap vessels and 159 longline vessels, with 80% of the catch taken by longline.

Washington.--Trawl landings of sablefish totaled 291 mt (641,000 pounds) in 1976 which was about twice the size of 1975 landings and four times greater than the 10-year mean. There was a 79% reduction in catch by trap gear which caught 121 mt (268,000 pounds) in 1976. Setline gear took 200 mt (442,000 pounds) in 1976.

Oregon.--Total landings of sablefish in 1976 were about 499 mt (1.1 million pounds), 90% of which was caught by trawl. The 1976 landing was 45% greater than that of 1975, but 211% greater than the 10-year mean.

California.--The trawl landings of sablefish in 1976 are estimated to have been 2,721 mt (6 million pounds). The trap catch is expected to have equaled or exceeded the trawl catch. Longline catches were minor.

B. Other Nations' Fisheries in 1976

1. Soviet fisheries

(a) Gulf of Alaska

The Soviet trawl fishery in the Gulf of Alaska during 1976 was very similar to that observed in 1975. Most effort was concentrated at the edge of the continental shelf off Albatross and Potlock Banks near Kodiak Island with lesser effort in the western and southeastern Gulf. At times 5-10 trawlers fished near Middleton and Kayak Islands and another 3 vessels were occasionally observed off southeastern Alaska. Rockfish, pollock and Atka mackerel were again the target species, and a provisional total groundfish catch of 79,578 mt (175.5 million pounds) was reported.

(b) British Columbia

The Soviet fishery off the British Columbia coast in 1976 was limited to a very light effort by up to 4 vessels for a few days in mid-August off the lower west coast of Vancouver Island. One research trawler was noted off the west coast of Vancouver Island for 2 days in late June and a second was sighted at about the same location on two occasions in mid-September and late November.

(c) Washington-California

The Soviet hake fleet was about the same size in 1976 as it was during 1975. Fleet size reached a peak in June when 89 vessels (72 stern trawlers, 9 transports, 1 tanker, and 7 support vessels) were observed. Fishing activity was again centered off northern California and Oregon with only occasional forays off Washington. By the end of September the fishery had essentially terminated. A provisional hake catch of 156,210 mt (344.4 million pounds) was reported.

2. Japanese fisheries

(a) Gulf of Alaska

Japan again licensed 42 trawlers and 22 longline-gillnetters to fish in the northeastern Pacific. Preliminary information indicates that the total catch between January and July was 59,950 mt (132.2 million pounds), a decrease of 5,730 mt (12.6 million pounds) from the catch made during the same period in 1975 and a 30,195 mt (66.6 million pounds) decrease from the 1974 January-July catch. Species composition remained nearly the same with 37% of the total catch comprised of Pacific ocean perch, 23% was blackcod, 14% was pollock, 12% was other rockfish, and 14% was other species.

(b) British Columbia

A total of 20 longliners and 10 trawlers fished at various times off the British Columbia coast in 1976. Activity was quite sporadic, and during the period April through July was extremely light. Fishing was fairly well distributed along the entire coast; however there was some concentration of effort by both longline and trawl off Langara Island and Dixon Entrance.

(c) Washington-California

Japan's fishing effort in the Washington-California region in 1976 consisted of only two stern trawlers. They were first observed in July and by September only one remained.

3. Polish fisheries

(a) British Columbia

Until early October 1976, there was no concentrated fishery by Polish vessels off the British Columbia Coast. A short hake and rockfish fishery by 3 to 5 vessels took place in early September off the lower west coast. Upon termination of the season off the United States coast in October, the 7

vessel Polish fleet moved north to Canadian waters and resumed the hake and rockfish fishery west of La Perouse Bank and to the north and west off Estevan Point. By the end of December the fleet had dwindled to two vessels which continued to fish towards an agreed quota until the eve of the declaration of the extension of Canadian jurisdiction.

Total catches were 2,054 mt (4.5 million pounds) of hake and 3500 ~~4,614~~ mt (10.2 million pounds) of rockfish in the Vancouver area.

(b) Washington-California

In accordance with the 1976 U.S.-Poland bilateral agreement, the Polish hake fishery did not begin until June. The maximum number of trawlers (7) allowed under the terms of the agreement was reached in August. By late September the agreed quota of 26,000 mt (57.3 million pounds) was reached and the fleet was requested by U.S. authorities to leave the area. They may also have taken about 400 mt (882,000 pounds) of rockfish and 800 mt (1.8 million pounds) of jack mackerel.

4. South Korean fisheries

(a) Gulf of Alaska

The South Korean trawl fishery began in May when 2 vessels began fishing south of Unimak Island. They were joined by 17 additional vessels in June, but only seven vessels fished through July to the middle of August. The total catch is estimated at 16,000-17,000 mt (35.3-37.5 million pounds), primarily rockfish, sablefish, and pollock.

As many as six longline vessels fished off southeastern Alaska where they took an estimated 1,500-2,000 mt (3.3-4.4 million pounds) which was primarily sablefish.

(b) British Columbia

During 1976 there was intermittent activity by 12 different South Korean longliners. These vessels operated mainly on the west coast of Vancouver Island and off Queen Charlotte Sound with an average effort of from 1 to 3 vessels per month. There has been no evidence to indicate that any of these vessels have been using blackcod trap gear such as has been employed off the United States coast.

(c) Washington-California

The South Korean longline-trap fishery for sablefish was in progress in January with 8 vessels fishing primarily off Oregon. Fleet size increased to 15 fishing vessels and 3 transports in July and was observed operating between San Luis Obispo and Cape Flattery. By September the number of fishing vessels had decreased to 8. The catch is estimated to have been 7,100 mt (15.7 million pounds).

5. Taiwan fisheries

(a) Gulf of Alaska

A single Taiwanese trawler fished in the Gulf of Alaska during July. It is estimated that 800 mt (1.8 million pounds) of groundfish were taken. As many as 5 longliners fished off southeastern Alaska from May through September and caught an estimated 600-700 mt (1.3-1.5 million pounds) of sablefish.

(b) British Columbia

There were 13 sightings of Taiwanese longliners off the British Columbia coast in 1976. This figure does not accurately reflect the fishing effort since it is estimated that possibly half this number or less actually fished to any appreciable extent in Canadian waters.

(c) Washington-California

In mid-December 1975 two longline vessels initiated a sablefish fishery off Washington. One to 2 vessels fished off Washington and Oregon until the middle of May when fishing ceased. It is estimated their catch was 500 mt (1.1 million pounds).

6. Other fisheries

(a) Washington-California

Bulgaria entered the hake fishery for the first time in May 1976 with the arrival of 3 stern trawlers off California. By September the fleet expanded to include 5 stern trawlers and 1 transport which operated off Oregon and Washington. Their catch is estimated at about 25,000 mt (55.1 million pounds).

East Germany began fishing for hake off California in late June with 1 stern trawler. The number of fishing vessels increased throughout the summer until reaching a maximum of 5 in September. Their catch is estimated to have been about 24,000 mt (52.9 million pounds) of hake.

(b) British Columbia

The only fishing by a German Democratic Republic vessel occurred during the one week carry-over of the late 1975 herring fishery into January 1976.

C. All-Nation Catch of Major Species

1. Pacific hake

Total removals of Pacific hake were approximately 232,932 mt (513.6 million pounds). The USSR took 156,210 mt (344.4 million pounds), Poland caught 25,722 mt (56.7 million pounds), Japan about 2,000 mt (4.4 million pounds), East Germany about 24,000 mt (52.9 million pounds), and Bulgaria about 25,000 mt (55.1 million pounds). Once again the major portion of the catch was from off Oregon and northern California.

2. Rockfish

The total rockfish catch in the northeastern Pacific ocean in 1976 is estimated at ~~90,175~~ 89,061 mt (198.8 million pounds). Largest catches were made by the United States (18,892 mt, 39.9 million pounds), and Japan (an estimated 54,008 mt, or 119.1 million pounds). Canada took 3,764 mt (8.3 million pounds), Poland took ~~4,614~~ 3500 mt (10.2 million pounds), and the Soviet Union harvested about 9,697 mt (21.4 million pounds).

3. Sablefish

The all-nation catch of sablefish in the northeast Pacific Ocean is estimated to have been about 41,700 mt (91.9 million pounds). A major portion of the catch in the Washington-California area (about 8,000 mt, 17.6 million pounds) was made by vessels of the Republic of Korea. Information on the large Japanese longline fishery operating in the Gulf of Alaska is unavailable, but it is believed that the catch probably fell just short of the agreed 25,000 mt (55.1 million pounds) quota.

D. Canada-United States Groundfish Regulations

1. Changes since 1976 Technical Sub-committee meeting

Only Washington and Canada reported changes since the last meeting of the Technical Sub-committee. Washington redesigned and consolidated its Marine Fish-Shellfish Management and Catch Reporting Areas. Washington also implemented a new fish receiving ticket system to increase the accuracy and timeliness of landing data, established permanent regulations for set net fisheries for Pacific cod and dogfish in inside waters, and made certain season-area changes for other groundfish gear used in inside waters.

Canada noted that effective June 13, 1977, all directed fishing for rockfish in Canadian waters south of a line projected true west from the

the west coast of Vancouver Island along 50°30'N latitude would be prohibited, and incidental catches of rockfish in the area could not exceed 1 mt (2,205 pounds) per vessel trip.

2. Regulation changes under current consideration

No regulation changes were reported under consideration.

E. International Fisheries Agreements

1. Canada-U.S. Agreement

On February 24, 1977, Canada and the United States signed a Reciprocal Fisheries Agreement which would take effect following ratification by both governments and terminate on December 31, 1977. The purpose of the Agreement is to provide a framework within which the concept of reciprocal fishing privileges could be continued but which would also give consideration to the extended fisheries jurisdiction zones of both countries. This agreement was intended to be an interim one, in hope that a more formal and comprehensive agreement could be negotiated during 1977. Salient points of this Agreement with regard to Pacific coast groundfish are:

(a) Provision for suspension of fishing privileges by U.S. vessels and nationals in Canadian waters when the following Canada-U.S. aggregate catches have been taken--

(1) rockfishes, including Pacific ocean perch

- 6,700 metric tons (14.8 million pounds) in and off Queen Charlotte Sound
- 1,400 metric tons (3.1 million pounds) in PMFC Areas 3C and 3D

(2) blackcod

- 1,750 metric tons (3.9 million pounds)

Directed fisheries for blackcod by U.S. nationals and vessels within 12 nautical miles of the Canadian coast limited to region between lines projected 225°T. from Estevan Point and Cape Scott, respectively.

(b) Provision for suspension of fishing by Canadian vessels and nationals in the U.S. zone when the following catches have been taken--

(1) rockfishes, including Pacific ocean perch, when 1,400 metric tons (3.1 million pounds) aggregate catch is taken in PMFC Areas 3C and 3D , and

(2) blackcod, when Canadian nationals and vessels have taken a catch of 15 mt (33,000 pounds).

Directed fisheries by Canadian nationals and vessels within 12 nautical miles of the U.S. coast limited to the area between lines projected 225°T. from Cape Ommaney and Cape Bingham respectively during the open seasons specified for blackcod fishing in the adjacent territorial sea.

Considerable discussion ensued regarding the difficulty the State of Washington anticipates in the control of the rockfish catch by U.S. vessels fishing in the portion of area 3C occurring off the north coast of Washington. A recommendation to the parent committee urging the control of Pacific ocean perch catches in the INPFC Vancouver and Columbia Areas occurs in section IX B.

(3) Provision for suspension of fishing for shrimp by U.S. nationals and vessels in the Canadian zone when these nationals and vessels have taken a catch of 548 metric tons (1.2 million pounds), subject to possible revision during 1977, as more recent scientific information becomes available.

2. Other Canadian Agreements

In keeping with Territorial Sea and Fishing Zones Act of January 1, 1977, Canada has entered into bilateral agreements with Poland, and the USSR, ~~Japan~~, ~~and the~~

~~Republic of Korea~~ regarding the management of stocks within the Canadian extended fishing jurisdiction zone. These Agreements recognize the rights of Canada with respect to setting allowable catches, surveillance, inspection, etc. Following is a summary of time/area national quotas established under these agreements.

Informal arrangements with ROK + Japan govern licensing + fishing rights in Can. 200 mile zone in 1977.

	State	Species	Quota mt	Quota millions of lbs.	Waters	Gear
1.	Japan	Rockfish	2,000	4.4	Sub-zone 5-5	Trawl
2.	Japan	Rockfish	1,000	2.2	Sub-zone 5-4	Trawl
3.	Japan	Blackcod	3,000	6.6	Zone 5	Setline, pot/trap
4.	Japan	Hake	5,000	11.0	Sub-zone 5-2	Midwater trawl

Hake fishing will be permitted in Sub-zone 5-2 between August 1 and November 1.

Rockfish fishing permitted in Sub-zone 5-4 (off Queen Charlotte Sound) June 15 to September 30 and in Sub-zone 5-5 at any time.

Blackcod fishing permitted in Zone 5 (whole coast) throughout the year.

5.	S. Korea	Blackcod	250	0.6	Zone 5	Setline, pot/trap
6.	Poland	Hake	7,500	16.5	Sub-zone 5-2	Midwater trawl
7.	USSR	Hake	7,500	16.5	Sub-zone 5-2	Midwater trawl

There will also be an experimental fishery for dogfish in Sub-zone 5-2 conducted by Poland, under Canadian supervision, during the fall of 1977.

3. Other U.S. Agreements

The United States has, since 1967, entered into a number of bilateral fishery agreements with Japan, USSR, Poland, and the Republic of Korea (ROK). The most recent bilateral agreements with Japan, Poland, and USSR expired in December 1976, while the U.S.-ROK agreement was to be effective through December 12, 1977. Subsequently, all these bilaterals have been replaced by Governing International Fishery Agreements (GIFAs) as specified under

the terms of the Fisheries Conservation and Management Act of 1976. GIFAs provide primarily for recognition of U.S. authority to manage fishery resources within U.S. fishery zone. They also contain a scientific annex which defines fishery and biological data reporting systems. The aforementioned countries and the Republic of China entering into GIFAs with the United States have requested permits to fish within the contiguous fishery zone. Permits specify area-time closures, quotas, incidental catch levels, etc.

VII. Groundfish Research

A. Stock Assessment

1. Pacific cod-lingcod-petrale sole (W. Vancouver Island, and

2. Pacific cod-lingcod-rock sole (Queen Charlotte Sound)

Mr. M. Fraidenburg reported that little progress has been made since initital contacts due to other commitments. The group has outlined the approach to be taken for study, and assessments will begin in late summer as the principals find available time. While efforts will be made to meet the June 1978 deadline, agency reorganization and changes in research emphasis may force postponement.

3. Pacific ocean perch

Dr. D. Gunderson stated that the latest status report has been published in the Technical Report Series (No. 690) of Environment Canada, Fisheries and Marine Service.

4. Shelf rockfish

Mr. M. Fraidenburg reported on the updating of the report on shelf rockfish and its submission to INPFC in 1976. It will be published as a WDF Technical Report during 1977. He also described the WDF-NMFS joint studies to determine factors affecting availability of rockfish to sampling gear.

Differences in species composition were noted between day and night tows; day/night differences in relative abundance within most species was not detected. He concluded that a bottom trawl survey for rockfish would best be conducted during daylight hours.

5. Slope rockfish

Mr. M. Fraidenburg reported little progress to date. Species composition samples of landings of Pacific ocean perch continue to be taken. Mr. R. Demory noted that about 70% of the reported "perch" landings in Oregon are actually S. alutus.

B. Special Studies

1. Lingcod

Dr. R. Beamish reported that little information was available on lingcod maturation and spawning season; however, considerable progress on age determination techniques has been made. The dorsal spines of fish younger than 5 years have proven to be reliable structures for age determination. He described in general the structure collection, preparation, and reading process which will be published in the August 1977 issue of the Journal of the Fisheries Research Board of Canada. Samples of age structures are being taken routinely from commercial landings.

2. Pacific ocean perch biomass estimates

Mr. B. Leamen discussed the divergence between U.S. and Canadian estimates of perch biomass in Queen Charlotte Sound resulting from the 1976 pilot survey. Two different trawl net openings were incorporated in the calculations. Estimates were 61,000 mt and 35,000 mt (134.5 and 77.2 million pounds) for 27 foot and 50 foot openings, respectively.

3. Pacific cod

Mr. B. Leaman reported from a manuscript prepared by Mr. J. Westrheim. Length-weight relationships varied by time of year. Sizes at 50% maturity were found to be larger in fish from Hecate Strait than for fish from off Vancouver Island. Stomach analysis suggests that cod feed more actively during April, July, and October than in February. Principal food items were euphausids, pink shrimp, brown shrimp, crab, sandlance, and herring. Spawning in 1976 was in March in Hecate Strait and February-March off Vancouver Island. Peak spawning may take place in waves throughout the season, and different age groups may dominate spawning during different years.

4. Pacific hake

Mr. T. Dark presented a summary of the 1975 hake survey and results. The U.S. biomass estimate, based on acoustic and area-swept methods, was about 430,000 mt (948.2 million pounds). This estimate differed markedly with a Soviet estimate of 1.8 million mt (3,969 million pounds). While the U.S. estimate is considered to be a conservative one, Soviet scientists believe they overestimated the true size of the population. The U.S. survey indicated that about half the biomass occurred near bottom and half in midwater. Approximately 75% of the estimated biomass was found off Oregon. The 1976 egg and larvae survey off Mexico and south-central California suggested the size of the spawning population was relatively very small. Preliminary results of the 1977 survey indicate a more average distribution and abundance of hake eggs and larvae.

5. Pollock

Dr. R. Beamish reported on pollock and hake studies in the Gulf of Georgia relating to estimates of biomass and biological parameters. Pollock

made up only 5-10% of the biomass, and were mostly age 3 fish, suggesting a high rate of natural mortality. The hake biomass was significantly larger. Hake concentrate around Nanaimo in May and June to spawn and as much as 18 mt (40,000 pounds) have been taken in a 1 hour tow. Age determination techniques were also discussed. A good relationship between otolith thickness and age has been revealed.

6. Sablefish tagging

Mr. T. Dark reported that as of late 1976 over 34,000 sablefish had been tagged and released in areas from off southern California to Kodiak Island, Alaska. As of September 1976, 829 tagged sablefish had been recovered, giving a recovery rate of 2.4%. Intensive migrations have not been observed. Sixty-three to 95% of the recoveries have come from the INPFC area of release, while 88-100% of the recoveries were from the INPFC area of adjacent area of release even after several years of freedom. Occasional long migrations were observed as exemplified by a few fish which migrated from southern California to southeast Alaska and vice versa. Fifty-five percent of the sablefish recovered migrated at an average minimum rate of less than .16 km (0.1 mile)/day, while 45% migrated at an average minimum rate of .72 km (.45 miles)/day. Movement along the California-Washington coast appeared to be mainly northward and movement from southeast Alaska seemed to be mainly southward.

7. 1976 Rockfish study and plan for 1977

Dr. D. Gunderson briefly reviewed the results of the 1976 pilot rockfish surveys in Monterey Bay and Queen Charlotte Sound. He then summarized plans for the 1977 comprehensive rockfish survey which included vessel schedules and experimental design and data collections. There will be 4 vessels engaged in bottom trawling and 2 vessels conducting hydroacoustic/midwater trawl

studies. The Polish research vessel Profesor Seidlecki will be a participant. The survey area will be from 91-457 m (50-250 fms) between Pt. Hueneme, California, and Cape Flattery, Washington. The survey period will be from July to October. Age reading responsibilities were assigned as follows: S. alutus--ODFW; S. flavidus--WDF; S. paucispinis, S. pinniger, S. goodei, and M. productus--NMFS. The fecundity of rockfish species will also be examined.

8. Age determination criteria for S. flavidus

Mr. M. Pedersen distributed and referred to a report on age determination of S. flavidus, which was an illustrated narrative describing techniques, reader variability, and otolith interpretations.

9. Mesh size studies for other rockfish

Mr. T. Jow discussed a preliminary yield per recruit study to re-evaluate the effect of California's 4.5 inch minimum trawl mesh size regulation on yield. Initial results indicate that the yields of the primary rockfish species, S. goodei and S. paucispinis, would be diminished by lowering the age of entry through reduction of the minimum mesh size. Results of this analysis are presently under review.

C. Cooperative Research Programs with Other Nations

1. Canada

Canada reported that a survey of the rockfish resources in the Moresby Gully region of Queen Charlotte Sound will be conducted during September 1977. Canada may seek the participation of the Polish research vessel Profesor Seidlecki.

2. United States

With the termination of the cooperative sablefish tagging program, the only international cooperative study scheduled for 1977 is the participation

of the Profesor Seidlecki in the California-Washington rockfish survey. The Polish vessel will work in concert with the U.S. research vessel Miller B. Freeman in hydroacoustic/midwater trawl studies.

VIII. Progress on 1976 Recommendations of the Technical Sub-Committee

A. Future Work

1. The 1975-76 sablefish market conditions were discussed at the 1976 interim Technical Sub-committee meeting, and little was added at the present meeting. It was noted that prices remain high and demand continues to be strong.

2. Lingcod, Pacific cod, rock sole stock assessment

Mr. M. Fraidenburg reported that work has progressed slowly due to other commitments by the principal investigators. The working group has outlined the approach to be pursued and assessments should begin by late summer, 1977. The June 1978 deadline for the working group report is considered to be tentative.

3. Lingcod, Pacific cod, petrale sole stock assessment

Mr. M. Fraidenburg reiterated the report given above.

4. Species composition of "other rockfish" landings

The working group reported that the original work has been updated and was submitted to INPFC in 1976 as a document. The updated version will be published in the WDF technical report series.

5. Sablefish stock assessment

The Technical Sub-committee considered the merits of a working group to review and analyze existing information to establish a standardized system for the collection of biological and fishery data, to examine age

determination and techniques, and to recommend any necessary coordination of U.S. and Canadian sablefish management programs. Such a working group was considered desirable and is recommended in a subsequent section of this report.

B. Parent Committee

1. Pacific ocean perch

Dr. J. Harville and Mr. R. Demory reviewed the Pacific Fishery Management Council's consideration of the Technical Sub-committee's 1976 interim meeting recommendation to further control the foreign bycatch of Pacific ocean perch off Oregon. It was reported that the recommendation failed to receive Council support primarily due to lack of information as to whether the area under consideration contained a "stock" or management unit and the unknown effects of anticipated displacement of foreign fishing effort.

There was lengthy discussion relating to Pacific ocean perch management goals and strategies. The Technical Sub-committee noted that recommended harvest levels had been surpassed in both the Columbia and Vancouver Areas in recent years and considered the difficulties in control of that harvest. Technical Sub-committee concern was expressed in the form of a recommendation to the International Groundfish Committee in a subsequent section of this report.

2. Coordinated rockfish survey

The parent committee approved and transmitted to its respective governments a Technical Sub-committee recommendation concerning the need for governmental support of a coordinated survey of the rockfish resources off the United States and Canada. Canada's research priorities precluded such a joint effort during 1977, but the U.S. study was supported with additional vessel time.

3. Rockfish statistics

The International Groundfish Committee supported and transmitted to its respective governments the 1976 Technical Sub-committee recommendation that the collection of accurate rockfish catch statistics by species from each nation fishing off Canada and the United States be encouraged. Canada and the United States have required detailed reporting of catch statistics by foreign vessels fishing within their respective areas of jurisdiction and will augment such reporting with observer information.

4. Standardized procedures

The International Groundfish Committee approved the Technical Sub-committee recommendation that standardized procedures be developed for collecting and recording statistical and biological data obtained by Canadian and U.S. nationals with respect to foreign fishing vessels operating in the respective areas of extended jurisdiction. The International Groundfish Committee directed its Technical Sub-committee to develop recommendations for such standardization. The Technical Sub-committee agreed that principals in U.S. and Canadian observer programs should confer on the matter of standardization and report to appropriate Technical Sub-committee members.

5. Shelf rockfish, Pacific cod, and lingcod stock assessment

The Technical Sub-committee recommendation for assessment of shelf rockfish, Pacific cod, and lingcod stocks was supported by the International Groundfish Committee, transmitted to respective governments, and subsequently the Washington Department of Fisheries gave a high priority to an additional position for a groundfish biologist.

IX. 1977 Technical Sub-Commitee Recommendations

A. Future Work

1. Sablefish-specification of biological and fishery data base and standardization of format for data collection

In view of the International Groundfish Committee instructions to the Technical Sub-committee at the interim meeting of November 1976 "to accord a high priority to improving the data base for sablefish...," the Technical Sub-committee recommends that a working group be convened to review and analyze existing information, to establish a standardized system for the collection of biological and fishery data, to examine age determination techniques and consider further refinements, and to recommend any necessary coordination of sablefish management by Canada and the United States. The working group is to be convened during the latter half of January 1978, at a location to be named. Mr. T. Dark will act to coordinate initial arrangements, and will inform participating agencies of details at the earliest possible time.

2. Others

a. Acquisition of improved biological and fishery data for petrale sole.--The Technical Sub-committee views with concern the coastwide decline of petrale sole in landings of the past year and recommends that the necessary steps be taken by member agencies to continue and intensify the acquisition and analysis of biological and fishery data to assess the condition of the stocks, and to decide if management measures need to be considered.

b. Hydroacoustic assessment techniques workshop.--The Technical Sub-committee recommends that a workshop be held to consider: (1) the progress and potential of hydroacoustic techniques to assess the biomass of groundfish stocks; (2) the compatibility of the various agency hydroacoustic techniques

to estimate biomass, and (3) to provide a specific evaluation of the techniques for the assessment of rockfish, Pacific hake, and Pacific cod.

4. Age determination workshop.--The Technical Sub-committee has determined that an age reading workshop would be timely and appropriate for those agency personnel engaged in age determination, in order to promote standardization of techniques developed by several agencies. It is therefore recommended that an age reading workshop take place at the Pacific Biological Station, Nanaimo, during the first week in November 1977. Mr. M. Pedersen will act to coordinate initial arrangements and will inform participating agencies of details.

5. Pacific ocean perch working group.--The Technical Sub-committee recommends that a working group be organized to update the 1974 assessment of Pacific ocean perch (and associated slope rockfish) stocks off British Columbia, Washington, and Oregon; to identify the consequences of various harvest levels; and to consider alternative means by which such harvest levels could be implemented and enforced. The working group will consist of Dr. D. Gunderson (NMFS), Mr. M. Fraidenburg (WDF); Mr. R. Demory (ODFW), and a Canadian scientist, and should attempt to finalize their analysis by November 1977.

6. Shelf rockfish working group.--The Technical Sub-committee recommends that a working group be organized to examine all available catch and biological information on shelf rockfish, together with the results from the 1977 rockfish survey. This group should identify the consequences of various management strategies for the shelf rockfish group, and consider the means by which these can be implemented and enforced. Mr. M. Fraidenburg will act to coordinate initial arrangements and notify participating agencies.

7. Reporting in metric units.--The Technical Sub-committee recommends that weights and measurements henceforth used in reports prepared expressly for and by the Technical Sub-committee be given in metric units. Until complete national conversion to the metric system has been achieved, it may be appropriate to parenthetically include English units in documents to be widely distributed outside the Technical Sub-committee.

B. Parent Committee

1. Control of Pacific ocean perch harvest

The Technical Sub-committee evaluated the steps which led to the 1976 recommendation to the International Groundfish Committee with respect to harvest limits for Pacific ocean perch in the INPFC Vancouver and Columbia Areas (287 and 111 mt respectively) and reaffirms this recommendation. These harvest levels have been exceeded in 1977, resulting in increased concerns by the Technical Sub-committee over the condition of Pacific ocean perch stocks in these areas. The Technical Sub-committee is now in the process of updating the detailed technical evaluation of the condition of Pacific ocean perch stocks off the United States and Canada. In view of the above, the Technical Sub-committee strongly recommends that the International Groundfish Committee urge its member governments to take timely and appropriate action to curtail further harvest of Pacific ocean perch stocks in excess of recommended levels for the Vancouver and Columbia Areas until the detailed technical re-evaluation can be completed.

2. Coordinated rockfish survey

The Technical Sub-committee reaffirms its support of the concept of a coordinated rockfish survey as a means of gaining a better understanding of the

condition of the rockfish stocks, and urges both countries to seek adequate ship time and other support required to accomplish such a coordinated survey during 1977, 1978, and 1979.

X. Other Business

A. Mr. T. Jow reported on the progress of updating the Technical Sub-committee tagging summaries. Canada's tagging summaries are current, and U.S. agencies are in the process of updating.

B. There was a brief discussion of U.S. and Canadian plans to convert from Loran A to Loran C and how the conversion would impact upon the collection of fishery statistics. It was generally agreed that it would be premature to modify data collection procedures until all nautical charts display Loran C lines and conversion is nearly complete.

XI. Schedule of Meetings

The 19th annual meeting of the Technical Sub-committee will be held in California (site to be selected), and is tentatively scheduled for June 1978. If the Pacific ocean perch working group has a report prepared in time, it may be considered desirable to schedule an interim meeting of the Technical Sub-committee prior to the International Groundfish Committee meeting to be convened in early November 1977, in Portland, Oregon.

XII. Election of Chairman

Mr. J. Westrheim was reconfirmed as Chairman for 1978. If these duties cannot be performed, Technical Sub-committee members will be notified by correspondence.

XIII. Adjournment

The meeting was adjourned at 6:00 p.m., June 16.

Appendix A

AGENDA

for

Technical Sub-Committee of the

International Groundfish Committee

Seattle, Washington

June 15-17, 1977

18th Annual Meeting

I. CALL TO ORDER

II. APPOINTMENT OF SECRETARY

III. APPROVAL OF AGENDA

IV. TERMS OF REFERENCE OF THE SUB-COMMITTEE

V. REVIEW OF AGENCY GROUNDFISH PROGRAMS

A. Reports completed or in progress

VI. REVIEW OF NORTHEASTERN PACIFIC GROUNDFISH FISHERIES

A. Canada-United States Fisheries in 1976

1. Total landings (Chairman)
2. Dover sole (ODFW)
3. English sole (CDFG)
4. Petrale sole (CDFG)
5. Rock sole (CDE)
6. Lingcod (CDE)
7. Pacific cod (CDE)
8. Pacific ocean perch (WDF)
9. Other rockfish (WDF)
10. Sablefish (NMFS)

B. Other Nations' Fisheries in 1976 (CDE and NMFS)

1. Japan
2. Polish Peoples' Republic
3. Republic of Korea
4. USSR
5. Others

C. All-Nation Catch of Major Species

1. Pacific hake (NMFS)
2. Rockfish (CDE)
3. Sablefish (NMFS)

D. Canada-United States Groundfish Regulations

1. Changes since 1976 TSC Meeting
2. Changes currently under consideration

E. International Fisheries Agreements

1. Canada-U.S.A. Agreement
2. Other Canadian Agreements
3. Other U.S.A. Agreements

VII. GROUNDFISH RESEARCH

A. Stock Assessment

1. Pacific cod-lingcod-petrale sole (W. Vancouver Island) (Kimura - WDF)
2. Pacific cod-lingcod-rock sole (Queen Charlotte Sound) (Kimura - WDF)
3. Pacific ocean perch (Gunderson - NMFS)
4. Shelf rockfish (Fraidenburg - WDF)
5. Slope rockfish (Fraidenburg - WDF)
6. Others?

B. Special Studies

1. Lingcod - age determination, maturity, spawning season (Beamish)
2. Pacific ocean perch biomass estimates (Westrheim)
3. Pacific cod - length-weight, length-girth, maturity, diet, spawning ground migration; growth (Westrheim and Leaman)
4. Pacific hake (Dark)
5. Pollock (Beamish)
6. Sablefish tagging (Dark)
7. Summary of 1976 Pilot Rockfish Study and Plans for 1977 (NMFS)
8. Aging criteria for S. flavidus
9. Rockfish entry age & mesh size

C. Cooperative Research Programs With Other Nations

1. Canada - shelf rockfish survey in QCS
2. United States

VIII. 1976 INTERNATIONAL GROUNDFISH RECOMMENDATIONS

A. Future Work

1. 1975-76 sablefish market conditions (reported at November 1976 meeting)
2. Lingcod-Pacific cod-rock sole stock assessment
3. Lingcod-Pacific cod-petrale sole stock assessment
4. Species composition of "other rockfish" landings
5. Sablefish stock assessment

B. Parent Committee

1. Pacific ocean perch
2. Coordinated rockfish survey
3. Rockfish statistics
4. Standardized procedures
5. Shelf rockfish, Pacific cod, and lingcod stock assessment

IX. 1977 TECHNICAL SUB-COMMITTEE RECOMMENDATIONS

A. Future work

1. Biological and fishery data base for sablefish
2. Development of a standardized format for domestic and foreign data on sablefish
3. Others

B. Parent Committee

X. OTHER BUSINESS

XI. SCHEDULE OF MEETINGS

XII. ELECTION OF CHAIRMAN

XIII. ADJOURNMENT

Appendix B

Distribution of the Report of the Technical Sub-Committee

Technical Sub-Committee		
Canada:	J. Westreheim, B. Leaman, J. Smith, R. Beamish	4
United States:		
NMFS	T. Dark	3
California	T. Jow	2
Oregon	R. Demory	2
Washington	M. Pedersen, M. Fraidenburg	2
Alaska	P. Rigby	2
International Groundfish Committee		
Canada	K. Pietre	4
United States	J. Harville	4
Advisors and Others		
Canada	K. Ketchen, W. Hourston	4
United States	C. Fullerton, J. Baxter--California	3
	J. Donaldson, W. Hublou--Oregon	2
	G. Sandison--Washington	2
	D. Johnson, D. Alverson, H. Larkins--NMFS	3
International Pacific Halibut Commission	S. Hoag, R. McNaughton	2
Spare copies		5
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