

REPORT OF THE TECHNICAL SUB-COMMITTEE
OF THE CANADA-UNITED STATES GROUND FISH COMMITTEE

Appointed by

The Second Conference on Coordination of Fisheries
Regulations Between Canada and the United States

TWENTY-SIXTH ANNUAL MEETING
JUNE 25-27, 1985
JUNEAU, ALASKA

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I. CALL TO ORDER

Chairman Westrheim (DFO) called to order the 26th Annual Meeting of the Technical Subcommittee at 1300 hours on June 25, 1985 in Juneau, Alaska.

II. APPOINTMENT OF SECRETARY

Mr. Rance Morrison (ADF&G) was appointed to serve as secretary.

III. INTRODUCTIONS

Introductions was moved ahead to item III on the Agenda. Members and invited guests introduced themselves.

Attendees are listed below by agency (members indicated by asterisks).

United States

Alaska Department of Fish and Game, (ADF&G)

Mr. James Blackburn
Mr. Barry Bracken
*Mr. Phil Rigby
Ms. Victoria O'Connell
Mr. Peter Jackson
Mr. Fritz Funk
Mr. Rance Morrison

Washington Department of Fisheries, (WDF)

*Mr. Jack Tagart

Oregon Department of Fisheries and Wildlife (ODF&W)

*Mr. Robert Demory

California Department of Fish and Game, (CDF&G)

*Mr. Tom Jow

Pacific Marine Fisheries Commission, (PMFC)

Mr. Lawrence Six (U.S. Member, Parent Committee)

Pacific Fisheries Management Council, (PFMC)

Mr. Henry Wendler

North Pacific Fisheries Management Council, (NPFMC)

Mr. James Glock
Dr. Willard Barber

International Pacific Halibut Commission, (IPHC)

Mr. Calvin Blood

National Marine Fisheries Service, (NMFS)

A. Northwest and Alaska Fisheries Center, (NWAFC)

*Mr. Thomas Dark
Dr. Richard Straty (Auke Bay)
Mr. David Clausen (Auke Bay)
Mr. Jeffrey Fujioka (Auke Bay)

B. Southwest Region

Dr. Joseph Hightower (Tiburon)

Canada

Department of Fisheries and Oceans, (DFO)

A. Field Research Branch

Dr. Albert Tyler
*Mr. S. J. Westrheim, Chairman

B. Field Service Branch

Mr. Edward Zyblut (Canadian member, Parent Committee)

IV. APPROVAL OF THE 1984 REPORT AND 1985 AGENDA

The 1984 Report of the Technical Subcommittee was approved. The preliminary 1985 agenda was reviewed. Minor agenda rearrangements were adopted and approved. The Approved Agenda is included in Appendix A.

V. TERMS OF REFERENCE

No changes in terms of reference have occurred since 1981. Following are the Terms of Reference for the Technical Subcommittee:

1. Exchange information on the status of groundfish stocks of mutual concern and to coordinate, whenever possible, desirable programs of research.

2. Recommend the continuance and further development of research programs having potential value as scientific basis for future management of the groundfish fishery.

3. Review the scientific and technical impacts of existing or proposed management strategies and their component regulations relevant to conservation of stocks or other scientific aspects of groundfish conservation and management of mutual interest.

4. Transmit approved recommendations and appropriate documentation to appropriate sectors of Canadian and U.S. governments and encourage implementation of those recommendations.

VI. REVIEW OF AGENCY GROUND FISH PROGRAMS

A list of Reports pending or published, by agency, is contained in Appendix B.

A. Canada

Groundfish research at the Pacific Biological station is concerned with biology and population dynamics of selected species. Most programs are species oriented, but some are task oriented. Species receiving individual attention are: flatfishes (three species), lingcod, Pacific cod, Pacific hake (whiting), rockfish (nearshore and offshore; several species), sablefish, spiny dogfish, and walleye pollock. Task-oriented programs are: statistics and sampling, age determination, recreational fishery, and the Hecate Strait Project.

A major accomplishment in 1984 was the preparation of a comprehensive stock assessment report, and recommended yield options, for all important groundfish stocks. Publication was in April 1985.

1. Statistics and sampling

Principle activity is maintaining the long-term data series involving catch/effort, by interviewing vessel captains at time of landing, and biological data (length-frequencies, sex, age structure, gonad condition, etc.) by sampling the various species landed. Additional activities during 1984 included: (1) evaluating the effect of reduced effort expended to interview

vessel captains (manuscript submitted for publication); (2) initiating procedures for encoding all biological data to permit machine access and integration with other data systems (such as catch/effort); (3) analysis of biological sampling for rockfish (completed); (4) photographic atlas of groundfish gonad maturities (continuing); and (5) initiating development of an electronic measuring board for collecting groundfish length-frequencies at ports of landing.

2. Age determination

Age determination estimates were provided in 1984 for groundfish, herring and salmon on a service basis as requested by the investigators of the various species. A total of 60,000 ages were resolved, including 10,700 from groundfish (rockfish, sablefish, Pacific hake, lingcod, and walleye pollock).

Oxytetracycline (OTC)-related age validation studies are continuing for sablefish, dogfish, rockfish and flatfish. A preliminary report, including photographs, has been prepared after examining nine pairs of otoliths from tagged and OTC injected rock sole. One pair showed no visible mark on either the surface or cross section. All had been at liberty 2 years after tagging and all otoliths exhibiting a mark showed the correct number of growth zones beyond the time mark.

The Technical Sub-Committee (TSC) of the International Groundfish Committee agreed on a proposed inter-agency age calibration study, as recommended by the Committee of Age Reading Experts (CARE) in 1983-84. The initial trial exchange using a variety of rockfish otoliths has now been completed and the results have been reported to the Chairman, Dr. C.E. Woelke. The Beamish/Fournier precision test was applied to reader and agency comparisons. The average index value was less than 10% and the range was 0.537-12.657.

A major activity during the Fall of 1984 was hosting the INPFC Fish Ageing Workshop, attended by 52 specialists from Canada, Japan and the United States. It was very successful in both stimulating discussion and identification of high-priority research needs.

"Working" visitors came from China, Japan, Korea and U.S.A. during 1984 to study and investigate our fish ageing methods.

3. Flatfish

Field studies were confined to the fifth annual trawl survey for juvenile flatfish in Hecate Strait. Primary target species are English sole and rock sole. The survey took place in April, and results suggest that the 1983 year-class of English sole is exceptionally abundant.

Laboratory studies included age validation of English sole and rock sole, analysis of results from 1979, Dover sole tagging experiment in Hecate Strait, and population dynamics of Dover, English and rock soles in Hecate Strait. The age-validation studies involve establishing criteria for identifying annuli and interpreting of otoliths from recaptured, tagged fish which had been injected with OTC at time of tagging.

The purpose of the 1979 Dover sole tagging experiment was stock delineation. Analysis will be completed in 1985. Studies on the population dynamics of English and rock soles have moved from surplus production analyses to yield-per-recruit and population simulation models, because new standardized-effort/LPUE data sets provided poor fits to surplus production models. Surplus-production analysis is still employed for Dover sole.

4. Lingcod

Field studies consisted of continuing a 3-year tagging study in Georgia Strait to assess the impact of both commercial and sport fisheries on the stock.

Laboratory studies were limited to age validation based on fin-ray sections from recaptured tagged lingcod which had been injected with oxytetracycline at time of tagging.

5. Pacific cod

No field studies were undertaken in 1984.

Laboratory studies involved preparation of long-term data sets of standardized landing statistics and "catch-at-age." Data sets were prepared for the three important offshore regions--west coast Vancouver Island, Queen Charlotte Sound, and Hecate Strait. Preliminary analyses, involving only computation of mortality rates, suggest that stock exploitation differs substantially among regions.

6. Pacific hake (Whiting)

Field studies comprised assisting in monitoring the joint-venture fishery for the offshore stock and collecting length-frequency samples and otoliths for both offshore and Strait of Georgia stocks.

Laboratory studies consisted of: (1) participating in preparation of a joint Canada-U.S. report on stock assessment and management strategies for the B.C.-California ("offshore") stock; (2) comparison of fecundities and oocyte measurements for three hake stocks--"offshore," Georgia Strait, and Puget Sound (analysis scheduled for completion in 1985); and (3) cooperative parasite studies (with Z. Kabata, Pacific Biological Station). This study involves the incidence of two intra-muscular protozoan parasites with respect to stock delineation and marketability of frozen fillets.

7. Rockfish

Rockfish studies have been sub-divided into those involving shelf species (principally S. brevipinis, S. flavidus, and S. pinniger) and slope species (principally S. aleutianus, S. alutus, and S. reedi).

Shelf species. Field studies consisted of one observer trip aboard a trawler targeting on shelf rockfish. The purpose was to examine the feasibility of a shelf rockfish survey off northwest Vancouver Island. No laboratory studies on shelf rockfish were conducted during 1984.

Slope species. All studies of slope rockfish dealt with Pacific ocean perch (*S. alutus*). The single field study was a two-vessel trawl survey to estimate biomass in Goose Island Gully (Queen Charlotte Sound), the eighth such biomass survey since 1965. Laboratory studies included: (1) reproductive biology; (2) age-correction matrix; (3) a new "search-theory" method for stock assessment; and (4) gill parasite incidence for stock delineation. The reproductive biology study is continuing, and involves the integration of life history characteristics (age-specific fecundity, reproductive value, and reproductive effort) and their dynamics into an age-structured population model. Completion is scheduled for 1985. The age-correction matrix is being developed to calibrate past otolith readings, based on surface reading, to recent otolith readings based on "break-and-burn" readings. Completion is scheduled for 1985. A cooperative stock-assessment project (with the University of California, Davis) was completed during 1984 and a manuscript has been submitted for publication. This new method for rockfish stock assessment uses "search theory" and short-term catch-effort data. The cooperative parasite study (with Z. Kabata, Pacific Biological Station) involves the incidence of gill-raker copepods with respect to stock delineation. Preliminary results are encouraging for some Pacific ocean perch stocks.

8. Sablefish

Field studies included: (1) monitoring the commercial fishery; (2) tagging juveniles; (3) trawl survey of juveniles; and (4) survey of pelagic larvae. Monitoring the fishery involved collecting biological data (length-frequencies by sex, otoliths, gonad condition, etc.) aboard commercial vessels (two 2-week cruises) and chartered commercial vessels (one 3-week cruise). Approximately 15,000 juvenile sablefish were tagged and released on the important fishing grounds of British Columbia. This experiment is an international commitment to determine the location of recruitment of juvenile sablefish to the commercial fisheries off North America. The trawl survey of juvenile sablefish in Queen Charlotte Sound and Hecate Strait was intended to provide an abundance index, but preliminary results suggest that this will not be feasible. Negative factors are the daily vertical migrations of juvenile sablefish, and the untrawlability of many index sites. Abundance and distribution of pelagic sablefish larvae were determined off west Vancouver Island in April, with a ship-of-opportunity. Subsequently, this study will continue as part of the La Perouse Project to determine the effect of physical oceanography on year-class abundance.

Laboratory studies involved: (1) stock assessment; (2) outlining a comprehensive international review of sablefish biology; (3) a cooperative parasite study; and (4) rearing of larval sablefish. Stock assessments involved yield-per-recruit and forward simulations. A strategy was developed for harvesting abundant year-classes. Work continued on the joint Canada-Japan-U.S. comprehensive review of sablefish biology. Effort in 1984 was directed at compilation of the all-nation tagging data base. The cooperative parasite study (with Z. Kabata, Pacific Biological Station) utilizes incidence of intestinal nematodes for stock delineation and delineating life history features of both host and parasite. Larval sablefish (15 to 33 mm) were reared at 4 ration levels to assess starvation, cannibalism, and growth rates.

9. Spiny dogfish

Field studies involved continuing the tagging experiment in Georgia Strait, and beginning one off west Vancouver Island. The purpose of both experiments is to assess long-term movements. During 1984, approximately 7,000 spiny dogfish were tagged and released in Georgia Strait, and 3,000 off west Vancouver Island.

Laboratory studies included the completion of a report summarizing results of the 1982-83 tagging in Georgia Strait and Hecate Strait, preliminary analysis of age at 50% maturity, and development of long-term management strategies for both the inshore and offshore stocks.

10. Walleye Pollock

Studies on walleye pollock in 1984 were limited to stock assessment and biological sampling (length-frequencies by sex, fin rays, gonad condition, etc.) A laboratory tagging study was conducted which indicated the feasibility of anchor-tagging pollock.

11. Sport groundfish

A new investigation was established in 1984 to investigate the recreational fishery for groundfishes, primarily in Georgia Strait. Principal species involved are lingcod and rockfishes (mostly S. caurinus, S. maliger and S. ruberimus).

Field studies (all in Georgia Strait) included: (1) selecting study areas for reef fishes, in collaboration with management biologists; (2) developing sampling techniques using research vessels (surface and submersible) and SCUBA; and (3) collecting initial field data on catch/effort, species composition, and size and age composition of species assemblages with respect to biotic and abiotic habitat measures. Densities of quillback rockfish as estimated from the submersible proved nearly related to the research angling CPUE at the same sites under some conditions. This result indicated that research angling CPUE is a meaningful index of quillback rockfish abundance, although results for other species were not as clear. Reports on these results are in preparation.

Reports were published on the results from questionnaire-type surveys on the recreational use of groundfish by anglers and SCUBA divers.

12. Hecate Strait Project

The new Hecate Strait Project is a multi-species research approach to interrelated productivity questions. The general project goal is to acquire sufficient understanding of relationships among selected species in Hecate Strait to develop a multi-species assemblage approach to their management. Currently, groundfish, herring, salmon, and Dungeness crab are scheduled for study.

Groundfish field studies in 1984 consisted of a two-vessel, 3-week trawl survey of Hecate Strait during May-June. The purpose of the cruise was to collect information on the species assemblages on the shelf

(10-79 fath; 18-145 m) by 10-fath intervals, and to investigate the stomach contents of important species in selected locations. Reports for each vessel were published, and analyses have begun on species assemblages and diet of important species.

B. United States

1. NMFS

For the National Marine Fisheries Service (NMFS), groundfish resource assessment at the Northwest and Alaska Fisheries Center (NWAFC) is conducted within two divisions: the Resource Assessment and Conservation Engineering (RACE) Division directed by Dr. Murray Hayes, and the Resource Ecology and Fisheries Management (REFM) Division directed by Dr. Richard Marasco. Dr. Gary Stauffer was recently appointed Deputy Director for the RACE Division. These divisions are organized into a number of tasks and subtasks on regional or scientific discipline basis. A review of pertinent work by these tasks and subtasks during the past year is presented below. Recent publications produced by RACE and REFM scientists are presented in Appendix I and division organizational structures with key permanent staff are found in Appendix II.

RACE Division

The RACE Division is comprised of five major groups. All of the survey activities to provide fishery-independent stock assessments are conducted by the Multispecies Groundfish Assessment and Pelagic Resource Assessment Tasks. In 1984, these groups conducted eleven bottom trawl and hydroacoustic surveys and were involved with a number of cooperative research ventures with foreign research agencies. In all, more than 2100 stations were sampled between Cortes Bank off southern California and St. Matthew Island in the Bering Sea. A summary of NWAFC surveys may be found in Tables 1-3.

The Fish and Shellfish Pathology Task has directed much of its effort at the study of diseases and parasites which may be significant sources of mortality in king and tanner crab resources. Recently, this group also participated in a U.S./Canada cooperative study of Pacific whiting (hake) myxozoan parasites which can greatly affect the marketability of whiting products.

The Recruitment Processes Task has focused on the distribution and abundance of the early life history stages of important groundfish species. Other objectives are to identify and describe eggs and larvae, develop effective sampling methods and sampling designs, and to study factors affecting growth and survival. Recently, a major effort has been directed at monitoring the distribution and abundance of eggs and larvae from pollock spawning in Shelikof Strait as an index to the size of the spawning population. An initial attempt to estimate population size through estimates of planktonic egg abundance was made in 1981, and in 1984 a similar study was completed to refine some of the methodology. In 1985 ichthyoplankton work on Shelikof Strait pollock was aimed at tracing the drift of eggs and larvae and relating their distribution to physical processes in the area. Studies of feeding and growth of larvae are planned in connection with observations on abundance and distribution of larval food organisms.

Table 1. Groundfish research surveys conducted by the Northwest and Alaska Fisheries in the Bering Sea/Aleutian Islands region in 1984.

Primary Purpose	Area	Vessels	Survey Period	Info./ Design	Gear Type	Hauls
<u>Survey A:</u> East Bering Sea crab/groundfish survey	East Bering Sea continental shelf waters, Unimak Pass, St. Matthew Island and Bristol Bay	Chapman* Alaska**	Jun 5-Aug 27 Jun 5-Aug 12	Standard 37x37 km grid	83/112' eastern otter trawl, CSTD, XBT, 400-mesh eastern otter trawl	485
<u>Survey B:</u> East Bering Sea hydro-acoustic survey	East Bering Sea, continental shelf and upper slope characteristics of age 0 pollock and feasibility of monitoring them	Miller* Freeman	Jul 30-Aug 20	Zig-zag tracklines, 25-460 m depths	Diamond and Marinovich midwater trawls CSTD, and XBT	65
<u>Survey C:</u> East Bering Sea special studies	Central and western sections of the eastern Bering Sea ocean fronts, pollock cannibalism, tag Pacific cod	Miller* Freeman	Aug 23-Sep 14	Grid based on oceanographic characteristics, also opportunistic	83/112 eastern Diamond and Marinovich midwater CSTD, XBT, bongo nets	187

* NOAA Vessel
 ** Chartered Vessel
 CSTD - conductivity-salinity-temperature-depth Device
 XBT - expendable bathythermographs

Table 2. Groundfish research surveys by, or in cooperation with, the Northwest & Alaska Fisheries Center and the Auke Bay Laboratory in the Gulf of Alaska (GOA) region in 1984.

Sampling Information						
Primary Purpose	Area	Vessels	Survey Period	Sampling Design	Gear Type	Hauls
<u>Survey A:</u> Western GOA Pacific cod assessment survey	Upper slope & outer shelf, Kodiak I. to Shumagin Gully	Miller* Freeman	Feb 8-Feb 29	Stratified by depth & longitude	90/105' Noreastern trawl, XBT	81
<u>Survey B:</u> Shelikof Strait and central GOA hydro-acoustic survey	Upper Shelikof Strait to Semidi Island, Amatuli Trench Middleton I., Prince Wm. Sd. to Resurrection Bay	Miller* Freeman	Mar 3-Apr 7	Zig-zag transects opportunistic trawl	Diamond midwater trawl, XBT	47
<u>Survey C:</u> Ichthyoplankton sampling in Shelikof Strait	Shelikof Strait	Chapman*	Mar 12-Apr 19	Grid pattern sampling concentrated near highest egg abundance	Bongo nets, drogues	125
<u>Survey D:</u> Groundfish surveys in the eastern GOA	Cape Ommaney & Cape Spencer to Salisbury Sd., Yakutat groundfish indexing sites	Chapman* Miller* Freeman	Apr 21-May 6 Jun 2-Jun 24	Predetermined index sites	Conical sablefish traps fished on a groundline, STD	189

Table 2. Continued

Sampling Information						
Primary Purpose	Area	Vessels	Survey Period	Sampling Design	Gear Type	Hauls
<u>Survey E:</u> Trap survey for sablefish in SE Alaska	Cape Cross to Dixon Entrance	John N. Cobb*	May 16-Jul 27	Opportunistic & stratified by depth	Conical sablefish traps fished on a groundline, STD	117
<u>Survey F:</u> <u>Triennial</u> GOA groundfish trawl survey	Islands of Four Mts. to Dixon Entrance 27-823m depth interval	Morning Star* Ocean Spray** Deikichi Maru #37*** Ryusho Maru #15***	Jun 20-Sep 9 Jun 25-Aug 24 Jul 14-Oct 2	Stratified into bank, gully or slope areas and depth zones	90/105' Nor-eastern otter trawl, XBT, 161/87' Japanese demersal trawl, longlines	528
<u>Survey G:</u> U.S.-USSR groundfish survey	Kodiak, Chirikof & Shumagin INPFC areas	Shantar***	May 26-Aug 14	Established GOA ground-abundance index sites	102/144' demersal trawl	165
<u>Survey H:</u> Juvenile groundfish assessment study	East side of Kodiak Island	Chapman*	Sep 3-Sep 12	Opportunistic	61' high-opening shrimp trawl, XBT	52
<u>Survey I:</u> Juvenile sablefish tagging study	Inside waters of SE Alaska	Miller* Freeman	Oct 18-Oct 29	Opportunistic	83/112' eastern otter trawl, Diamond midwater trawl	27

Table 2. Continued

Primary Purpose	Area	Vessels	Survey Period	Sampling Information		
				Sampling Design	Gear Type	Hauls
<u>Survey J:</u> Ichthyoplankton sampling in Chatham Strait	S. Chatham Strait	Murre II*	Nov 13-Nov 21	Systematic transect across the Strait	Bongo nets	
<u>Survey K:</u> U.S.-USSR cooperative ichthyoplankton survey	Western GOA	Shantar***	Apr 4-May 20	Transects	Bongo nets, neuston nets	393

*NOAA Vessel

**Chartered Vessel

***Foreign-cooperative Vessel

CSTD - conductivity-salinity-temperature-depth device

XBT - expendable bathythermographs

Table 3. Groundfish research surveys conducted by the Northwest and Alaska Fisheries in the West Coast region in 1984.

Primary Purpose	Area	Vessels	Sampling Information			
			Survey Period	Sampling Design	Gear Type	Hauls
<u>Survey A:</u> Upper continental slope groundfish survey	Oregon Coast	Half Moon Bay**	Sep 4-Oct 14	Tracklines, stratified by depth & area within depth intervals	90/105' eastern trawl and sablefish traps, XBT	119
<u>Survey B:</u> Sablefish abundance indexing	S. Oregon & California coasts	U.S. Dominator***	Sep 20-Nov 8	Pre-established fishing sites	Conical & rectangular 150 sablefish traps, XBT	150
<u>Survey C:</u> U.S.-USSR cooperative groundfish survey	Oregon coast	Poseydon***	Apr 20-May 3	Same as item A above	141/199' demersal trawl	63
<u>Survey D:</u> U.S.-USSR cooperative ichthyoplankton survey	Washington, Oregon and Northern California	Poseydon***	Mar 11-Apr 4	Transects	Bongo nets	124

**Chartered Vessel
***Foreign-cooperative Vessel
XBT - expendable bathythermographs

Research-sampling-gear development and support for RACE surveys is provided by the Conservation Engineering Task. Sampling gear (trawls, traps, etc.) is maintained and modified as required for specific study requirements. Evaluation of trawl performance is critical to accurate interpretation of data generated by trawl surveys so the development of electronic sensory and telemetry equipment to provide a variety of mensuration data is an ongoing activity.

In addition to these studies, the NWAFC has also supported the research that led to a Ph.D. dissertation entitled "Evaluation and validation of age determination for sablefish, pollock, Pacific cod, and yellowfin sole; optimal sampling design using age-length key; and implications of ageing variability on pollock." The dissertation is written by Han-Lin Lai. (For further information, contact George Hirschhorn, (206) 526-4200).

Trawl surveys are conducted on a triennial basis in the eastern Gulf of Alaska to assess the condition of the "other" groundfish, e.g., rockfish, flatfish (except halibut), etc. Staff members furnish status-of-stock information on these groundfish resources for use by the North Pacific Fishery Management Council. Other studies on groundfish include determining the feasibility of assessing the relative abundance of off-bottom groundfish inhabiting uneven and untrawable rocky bottom areas employing hydroacoustics and mid-water trawl sampling and studies of the distribution and ecology of age -1, -2, and -3 year old Pacific ocean perch.

Supporting oceanographic surveys are conducted to determine the influence of variations in onshore transport on the distribution of eggs and larvae of sablefish and rockfish.

The Auke Bay Laboratory has 11 biologists and one biometrician assigned to groundfish assessment and research. Approximately 150 vessel days employing several NOAA vessels, e.g., MILLER FREEMAN, JOHN N. COBB and MURRE II are devoted to these tasks.

The Laboratory has one staff member on the Gulf of Alaska Groundfish Management Plan Maintenance Team to advise the North Pacific Management Council on the condition of groundfish stocks in the Gulf of Alaska.

ADF&G

The Alaska Department of Fish and Game (ADF&G) groundfish program can be divided into six tasks: catch reporting, observer-port sampling, resource assessment, regulation development, management action, and logbook distribution and collection. In general, fishery monitoring and management activities are conducted on a regional basis. The groundfish staff is conducting the standardization of sampling methods, and the regional staffs cooperate on statewide projects.

The ADF&G has four project leaders responsible for research and management programs in the Westward (Western Gulf and Bering Sea), Central (Cook Inlet and Prince William Sound), and Southeast (Southeastern and Yakutat) Regions. Two project leaders are stationed at Kodiak, and one each in Homer and Petersburg. During 1984 these project leaders were assisted by

seasonal biologists stationed in Dutch Harbor, Kodiak, Sitka and Ketchikan. A coordinator position located in Juneau is responsible for interaction with other agencies and development of the Department's statewide groundfish program, and a biometrician also stationed in Juneau provides analytical support and is taking a major role in the design of sampling projects.

Activities within the Southeast Region's groundfish program center on fisheries monitoring and management. Primary tasks include fish ticket collection, correction, and data entry; dockside and onboard catch sampling; skipper interview and logbook collection; biological studies including age and growth, fecundity, and movement of important commercial species; regulation development through the Alaska Board of Fisheries and the North Pacific Fishery Management Council; and information dissemination. Data collected is used in the regulatory development process. In-season management of the groundfish fisheries within state waters is the direct responsibility of the groundfish leader.

Fish tickets are edited and batched in Petersburg and Sitka with final data entry in Juneau. However, during 1984 the fish ticket system was modified in preparation for direct fish ticket data entry through microcomputer terminals in the major ports of landing during 1985. That system will be implemented during 1985. Sablefish, rockfish and to a lesser extent flatfish are sampled dockside in the major ports of landing to obtain biological data from the landed catch and to determine trends in species composition and size distribution. Due to fiscal constraints, on-board observer work has been restricted to coverage of the winter flatfish trawlfishery in recent years. Skipper interview and logbook programs are conducted to determine catch location and effort information which is used to calculate CPUE by management area. Logbook programs are voluntary with the exception of the Southeastern Alaska trawl fishery for which detailed logbook submissions are required to obtain a permit. With the rapid expansion of the nearshore rockfish fishery, a disproportionate amount of sampling and regulation development effort was expended on this fishery during 1984. That trend will continue until enough data is available to establish an outer coastal rockfish management plan. Late in the year microcomputers were available in Petersburg and Sitka allowing for development of logbook, interview and port sampling data entry and summarization programs as well as providing a better tool for monitoring in-season catch. Computer data entry programs will be improved and expanded in 1985.

Biological sampling and research during 1984 was limited to rockfish and sablefish age studies and rockfish fecundity studies. Samples from these and previous biological studies are currently being analyzed. Problems encountered with the fecundity samples will require much of the work to be repeated. No tags were deployed during 1984, although work on rockfish tagging methods and construction of break-away tags has continued. Sablefish tags were collected by port samplers and distributed to the originating agencies. Analysis of ADF&G sablefish tag returns has continued and has been made much easier with the catch and release data entered into a microcomputer database management system in Petersburg.

Management activity during 1984, included in-season closures for all sablefish fisheries and the closure of one area to flatfish fishing. Increased effort and improved catch rates in the sablefish fisheries resulted in much shorter seasons in 1984. Flounder trawlers have converted back to in-state landing which simplified fisheries monitoring.

The scope of the Central Region program has broadened to include not only the collection of baseline biological data on groundfish species of potential commercial importance to this region, but also the monitoring of the dramatically increased number of sablefish landings into Central Region ports. This increase has necessitated the development of dockside sampling, skipper interview, and logbook distribution and collection programs in both Seward and Homer. Documentation and return of sablefish tags to any of five agencies is also a key function of the port sampling program.

Continued expansion of the fishery may necessitate coverage of additional ports (Valdez, Cordova and Whittier) in the near future. Commercial catch data which were edited in Homer and mailed to Anchorage for data entry during 1984, are now edited and entered in Homer and electronically transferred to the statewide data base in Juneau. Information dissemination to the public including stock condition, catch summaries, and closure announcements continue as a primary function of this project. AWL data continue to be collected on incidentally captured groundfish during ADF&G shellfish index cruises. Collection of life history data (AWL and movement) continue on nearshore rockfish populations found along the Kenai Peninsula.

Activities to the Westward Region groundfish program also include catch data collection; information dissemination; regulation development; resource assessment; and as a primary activity, the domestic trawl observer program. The observer program has placed the greatest sampling effort in the areas most heavily fished by the shorebased fishery near Kodiak Island and Unimak Pass. Catch per unit of effort, species composition, prohibited species incidence, and other biological data are obtained. Although the observer program has been valuable in obtaining biological data prior to sorting and discard, onboard sampling will be severely reduced during 1985 because of the project's high cost and budget reductions.

Dockside catch sampling and logbook distribution and collection programs have been established, and a trawl survey for Tanner crab and groundfish in waters south of the Alaska Peninsula has been conducted in July since 1980. This survey will again be conducted in 1985.

A small age determination laboratory initiated in the westward region has been expanded in 1984 to handle groundfish aging statewide. Primary emphasis is being placed upon sablefish and exploited rockfish species, especially yelloweye rockfish (Sebastes ruberrimus) from the Southeast Alaska longline fishery. Cod and pollock, primarily from the Western Gulf of Alaska and the southern Bering Sea are also being aged. Considerable importance is placed on validation techniques.

The Westward Region groundfish biologists also assist the Gulf of Alaska and Bering Sea groundfish plan teams of the NPFMC. In cooperation with the National Marine Fisheries Service, the Westward Region announced its first groundfish closure when the domestic sablefish allocation within the Central Regulatory Area was reached in September of 1984.

The headquarters groundfish section has been primarily involved in the coordination of Federal and State research and management activities, and the groundfish research coordinator and groundfish biometrician are members of the NPFMC groundfish management plan teams. Sablefish, Pacific ocean perch, other

rockfish, pollock and prohibited species management in the Gulf of Alaska, and the collection of data from the domestic fleet have been issues of special concern to ADF&G and the NPFMC. The headquarters staff has worked in conjunction with the regional staff to provide the Council with input on these issues and has participated in the Council's 'Groundfish Data Working Group.'

Program planning with emphasis on research and fishery monitoring priorities was a primary task for the headquarters section during 1984. Objectives of the groundfish program continue to center on the development of a standardized catch monitoring program with statewide and regional computerized data bases. During April 1984, with this aim in mind, the headquarters section initiated a statewide groundfish planning meeting to document data and project needs and recommend program changes and upgrades. Further work by regional and headquarters staff during 1984 resulted in the implementation in 1985 of a new fish ticket data entry system using microcomputers within area offices to speed the compilation of catch data from the rapidly expanding domestic groundfish fishery. Additional developments include a new groundfish fish ticket and a statewide statistical area reporting system based on latitude and longitude. The new groundfish ticket provides for recording the numerous species and dressed conditions within this diverse fishery, and the ADF&G statistical areas are now directly compatible with those used by the National Marine Fisheries Service. The catch data entry system initially developed by the Computer Services Section of the Commercial Fisheries Division will be used in connection with ADF&G's communications network to provide accurate statewide catch information on a daily basis if necessary. The collection of domestic fishery catch and effort data were given the highest data collection priorities within the groundfish program.

WDF

The Washington Department of Fisheries Marine Fish Program is responsible for research, management and enhancement of non-anadromous finfish resources. There are currently three divisions actively engaged in groundfish management.

1. Coastal Groundfish Management Division. The general Groundfish Management Division is responsible for management and research of groundfish in all coastal waters and in the outer Strait of Juan de Fuca. The Division also handles all issues requiring interstate, regional, federal or international cooperation. Division responsibilities include membership on the Groundfish Management Team (GMT) of the Pacific Fishery Management Council (PFMC), multi-jurisdictional management, stock assessment of groundfish stocks in state waters (0-3 miles) and in the Fisheries Conservation Zone (3-200 miles) adjacent to Washington, and joint research with other agencies or institutions on questions of mutual interest.

The central focus of the Division is effective management of the coastal groundfish stocks. This is primarily accomplished through membership on the GMT which develops annual estimates of "Acceptable Biological Catch" for major species/species groups and proposes management strategies to the PFMC. Division personnel implement Council decisions by drafting state regulations and coordinating state enforcement regarding groundfish management. Division personnel are stationed in major ports of landing to collect catch and biological data and other fishery related information.

Other work during the past year included intensifying studies of fisheries adjacent to Neah Bay. A port-sampling program was initiated to evaluate the catch and effort of recreational and commercial line fisheries for lingcod and black rockfish. Its objective was to determine basic fishery information, identify potential conflicts between recreational and commercial fishermen and to document suspected underreporting of commercial landings. In addition, the Division sponsored a University of Washington graduate student in a cooperative black rockfish tagging study to determine migration patterns, exploitation rates and population size in the Neah Bay area.

Considerable effort was expended to delineate the geographical distribution of trawl caught groundfish in the INPFC Columbia area. The work was aimed at developing improved management strategies by determining whether the Columbia area might reasonably be divided into two management units. And lastly, the division completed an update of the yellowtail rockfish status of stocks.

2. Groundfish Management Division. The responsibilities of the Groundfish Management Division include monitoring, research and management of Puget Sound groundfish resources and their fisheries. General monitoring work includes collection of biological samples of landings from several commercial and recreational gears. Fishery data are also collected from the trawl, setnet, troll, commercial jig, set line, beach seine, and pot fisheries, as well as the recreational anglers and charter boat fleets. The Division provides supervision for the state portion of the National Recreational Fisheries Statistical Survey.

Major accomplishments during 1984 were the implementation of a mandatory log book system for setnet fishing for Pacific cod, issuance of a draft Environmental Impact Statement concerning otter trawl fishing in Puget Sound, evaluation of recreational fisheries for lingcod (including the impact of a minimum size limit), stock identification studies of walleye pollock and lingcod, management of the fishery for whiting in Puget Sound, compilation of fishery statistics for English sole, and review of the Groundfish Management Plan for Washington's Inside Waters which was implemented in 1982.

3. Technical Services Division. The Technical Services Division houses assorted technical experts who perform specialized work for the management divisions and carry out independent projects in their areas, namely Biometrics, Acoustics, Computing and Data Services, Groundfish Age Determinations, and Artificial Reef Investigations.

The Division's major accomplishments in 1984, in addition to routine support work, include: 1) standardization of trawl logbook data: the conversion of logbook data from 1953 to date (about 25,000 trips) into a standard format and code set; 2) selection of a new computer: The Marine Fish Program will acquire a supermicro running the UNIX operating system, with the hope of providing more software stability and compatibility than we've enjoyed in the past; 3) comparative age readings: after switching to the burnt section method of ageing, we compared a large number of new readings to old surface readings to see if we could salvage any of our historical rockfish data; and 4) fish aggregation: a number of parasol-type devices were set out in rocky areas off the coast in an attempt to aggregate black rockfish.

ODFW

In 1984 the Oregon Department of Fish and Wildlife Marine Region staff continued monitoring the groundfish and shrimp trawl fisheries. Although the main emphasis was on trawl fisheries, our staff sampled jig-caught landings of groundfish in several ports for the first time because of increased commercial interest by small boat operators fishing primarily for nearshore rockfish. Our staff also held communication meetings with both sport and commercial users of this resource and subsequently developed a voluntary logbook to be implemented in 1985.

Sampling activity in 1984 was very similar to 1983, declining only 1% in total numbers of samples taken. We attempted to collect 2-5 samples per 100 mt of landed weight and some of the decline can be attributed to reduced landings in 1984 over the previous year. Species-composition sampling of rockfish landings made up 81% of the samples taken. Age samples of widow rockfish (Sebastes entomelas) and Dover sole (Microstomus pacificus) comprised 8 and 5% respectively.

Since the inception of the coastwide uniform logbook, ODFW has been summarizing information from logbooks for convenient data entry and processing. Tow-by-tow information on hauls by species and effort are aggregated on a trip analysis form into depth and State statistical area strata. Beginning with the 1984 season, logbook and fish ticket data were put into the minicomputer located in Portland via terminals in Newport. With the help of our Data System staff, in-season reports and magnetic tapes were made available to Marine Region staff for year-end processing of landing statistics used in this report. During the fishing year, our staff identifies PMFC area of catch and codes it on the fish ticket. We have asked dealers to identify species of rockfish according to management type on the fish ticket. Rockfish species composition samples are taken by species category and data are entered on the minicomputer and merged with fish ticket data.

The aggregate files are sent to the Pacific Fisheries Information Network (PACFIN). At the end of the year, logbook data are used to compute the final catch by area statistics. It is anticipated that Data Systems are the PACFIN system may be able to produce most of the 1985 statistics for the TSC report and PMFC data series in 1986.

In addition to the above changes in our data processing system, software was developed for microcomputers located at field stations. This software now allows entry of biological sample data on age, length, sex and maturity of rockfish and flatfish. In-season assessment of biological parameters such as mean length by sex is now possible. The system was implemented in January of 1985 and is still undergoing development and modification.

Other improvements included new software for extracting data from our logbook and fish ticket files for trip and vessel characteristics analysis. This year TSC tables will have additional detail on landings by rockfish species category and species composition. Our report-generating programs also allow us to compute totals for various groundfish management units (e.g. INPFC areas).

Marine Region staff also initiated compiling historical data of landings by species, gear, and statistical area. These data will be in one format and accessible by computer.

Major analytical tasks accomplished during the past year were completion of status-of-stock reports for canary rockfish and Dover, English and petrale soles. These documents were prepared as part of Oregon's commitment to provide information to the Groundfish Management Team of the Pacific Fishery Management Council.

CDFG

The California Department of Fish and Game groundfish research and management activities are carried out by the Marine Resources Region (MRR), Marine Resources Branch (MRB), and Planning Branch.

The region, MRR, conducts fishery monitoring and assessments of commercial and recreational groundfish fisheries. Sampling programs to provide biological and species composition data are ongoing at major California ports. In 1984, samples from commercial and recreational fisheries totaled 1,001. Logbook programs provide data from trawl, pot, gillnet, and commercial passenger fishing vessels (CPFV).

The MRR Southern California CPFV Survey samples the catch at sea of the fleet. The CPFV fleet fishes for a diversity of species that include groundfish. While not as glamorous as the higher esteemed species of southern California, groundfish comprised the mainstay of catches in recent years. Rockfish are the most numerous in CPFV catches and bocaccio is the leading species.

MRR personnel participated in the Coastwide Marine Recreational Fisheries Statistics Survey coordinated by PMFC. Survey results for 1984 indicate that rockfish are among the leading species in the recreational catch in both southern and northern California.

Considerable work was also performed in support of functions of the Pacific Fishery Management Council in 1984.

Groundfish projects with MRB were continued on gillnet fisheries in southern and central California. The southern California study, a Dingell-Johnson project, assesses the nearshore gillnet fishery. California halibut is one of the major target species. At sea observations provide much of the data base.

The central California gillnet study was carried out with at-sea observations to determine catch of target and non-target species. Observed trips revealed the predominance of yellowtail rockfish (48%), blue rockfish (20%), widow rockfish (14%) and bocaccio (12%) in gillnet catches. By-catches include seabirds and mammals. Area closures and a ceiling on participants were implemented to mitigate the problem.

MRB's central California sportfish survey completed a year-long study of recreational catches by anglers in Monterey Bay. Blue rockfish and olive rockfish were the leading and the fourth species in numbers caught, respectively. Project personnel are completing a fish bulletin on several rockfish species.

Planning Branch provides computer support, systems analyses, and biometrical assistance.

IPHC

Mr. Blood of the International Pacific Halibut Commission reviewed the programs which include annual monitoring of the halibut fishery through commercial and market sampling and standardized stock assessment surveys. The 1984 halibut harvest increased substantially, but fishing days continued to decrease primarily due to circle hooks. Special projects conducted by the IPHC included: 1) comparison of circle and "J" hook efficiency, 2) tagging studies near the Privilof Islands, 3) trawl-setline comparisons for matchability studies, 4) initiation of research into automated age reading using computer enhanced imagery.

VII. Review of Northeast Pacific Groundfish Fisheries

A. Canada-United States

1. Commercial Fisheries

a. Total

Total combined groundfish landings for the United States and Canada (excluding Pacific halibut and joint venture catches) totaled 204,733 mt in 1984. This is only slightly greater than the 1983 total of 196,118 t (Table 4.). Trawl (both bottom and midwater) was the dominant gear type accounting for approximately 87% (177,871 mt) of the total, pots accounted for approximately 3% (6,931 mt), longline approximately 2% (4,026 mt) and all other gear types 8% (15,408 mt).

Trawl landings dropped 0.7% from the 1983 total of 179,144 mt (Table 5). Pacific cod accounted for 28.6% (50,943 mt) of combined 1984 trawl landings and rockfish accounted for 25.1% (44,594 mt). Dover sole was the dominant flatfish accounting for 11.4% (20,306 mt) of the combined total and 62.4% of the combined flatfish total of 32,546 mt. Largest declines in 1984 trawl landings were in arrowtooth flounder (448 mt), down from 2,343 mt in 1983 and Pacific Hake (5,730 mt, down from 10,347 mt in 1983).

b. Canada

Canadian landings of groundfish (excluding Pacific halibut) in 1984 were 34,780 mt (Table 6), the same level as in 1983. Trawlers landed 29,670 mt, 3% more than in 1982 and 10% above the 1974-83 mean (Table 7). The major species in the trawl landings were Pacific ocean perch (22%), Pacific cod (12%), Pacific hake (10%), lingcod (10%), silvergray rockfish (8%), canary rockfish (6%) and yellowmouth rockfish (4%) (Table 8 and 9). Principle areas of trawl production were 5B (19%), 5E (17%), 5D (15%), and 3C (15%).

Canadian landings of groundfish caught by gear other than trawl in 1984 totaled 5,110 mt (Table 10). Trap gear accounted for 3,276 mt (99% sablefish); longline 842 mt (43% sablefish and 34% dogfish), and troll and handline, 992 mt (59% lingcod). Major areas of production were 3D (26%), 5E (21%), 4B (15%), and 5B (15%).

Table 4. Canada-U.S. all-species groundfish landings (t), by gear type and landing location, in 1983 and 1984 (Excluding halibut and joint-venture catches.)

Gear	a Location					TOTAL
	AK	BC	WA	OR	CA	
1983						
Trawl	40,980	27,949	36,659	32,064	33,804 ^B	174,365
Pot	28	3,219	1,474	1,337	UNK	6,058+
Longline	3,088	765	1,073	887	UNK	5,799+
Shrimp trawl	--	----	631	584	UNK	1,215+
Other	291	1,044	1,287	1,266	UNK	3,902
Unknown	--	--	--	--	4,688	4,688
Total	44,387	32,977	44,124	36,138	38,492	196,118
1984						
Trawl	41,496	29,670	43,687	25,766	37,339	177,871
Pot		3,276	1,028	1,830	1,004	6,931
Longline		842	1,674	789	765	4,026
Shrimp trawl			222	215	62	497
Other	10,206	992	1,258	927	1,092	15,408
Total	51,702	34,780	47,869	29,527	41,072	204,733

a

AK = Alaska; BC = British Columbia; CA = California; OR = Oregon; WA = Washington

B UNK = not reported.

Table 5. Trawl removals (mt) from the Northeast Pacific Ocean by U.S. and Canadian vessels and 1984 (excluding joint venture catches).

SPECIES	AK	BC	1/ WA	2/ OR	CA	TOTAL	1983 TOTAL
Arrowtooth Flounder				416	32	448	2,343
Dover sole		1,111	3,311	6,129	9,771	20,306	20,670
English sole		796	771	451	947	2,962	3,351
Petrale sole		412	456	694	587	2,146	2,631
Rex sole		219	155	551	568	1,491	1,497
Rock sole		524	80	2	5	611	780
Starry Flounder		168	306	118	206	805	1,085
other flatfish	411	141	2,017	507	655	3,777	1,964
Ling cod		2,951	1,661	981	912	6,506	6,589
Pacific cod	31,562	3,418	15,885	78		50,943	51,621
Pacific hake (whiting)		3,057		338	2,335	5,730	10,347
Sablefish	1,353	187	2,451	2,795	3,811	10,613	10,529
Walleye Pollock	6,681	699				7,380	2,319
Ocean Perch	1,397	6,563			41	7,960	
Rockfish	60	7,735	6,908	12,647	17,328	44,594	56,426
Spiny dogfish		747	992	Tr		1,739	1,468
Miscellaneous species	32	531	7,955	59	141	8,716	4,090
Animal food Reduction		161 244	346 393			507 637	420 1,014
TOTAL	41,496	29,670	43,687	25,766	37,339	177,871	179,144

1/ 1984 landings include 1,304 mt of Pacific cod, 418 mt of pollock and 18 mt of sablefish caught in the Bering Sea but not reported in the NORFISH summaries in Appendix II. These data represent late fish tickets unincorporated in our trawl adjust program.

2/ Includes midwater trawl

Table 6. British Columbia landings (t) of groundfish in 1984 by species and gear type.

Species	Bottom trawl	Midwater trawl	Trap	Longline	Troll & handline	Total
English sole	795.3	0.7	-	-	-	796.0
Rock sole	523.6	-	-	-	-	523.6
Petrale sole	411.7	-	-	-	-	411.7
Dover sole	1,111.0	-	-	-	-	1,111.0
Rex sole	219.2	-	-	-	-	219.2
Starry flounder	167.9	-	-	-	-	167.9
Turbot	365.2	-	-	-	-	365.2
Other flatfish	141.3	-	-	-	1.3	142.6
Pacific cod	3,417.8	tr.	-	0.7	2.7	3,421.2
Lingcod	2,957.4	-	0.1	49.4	590.1	3,597.0
Sablefish	186.9	-	3,275.4	364.1	-	3,826.4
Pollock	102.7	596.3	-	-	-	699.0
Hake	1.1	3,055.4	-	-	-	3,056.5
Ocean perch	6,563.3	-	-	-	-	6,563.3
other rockfish	7,680.6	54.1	tr.	143.7	396.3	8,274.7
Misc. species	166.0	0.2	-	1.4	1.8	169.4
Dogfish	710.7	36.5	-	282.6	-	1,029.8
Animal food	137.5	23.8	-	-	-	161.3
Recuction	243.8	-	-	-	-	243.8
Total	25,903.0	3,767.0	3,275.5	841.9	992.2	34,779.6

Table 7. British Columbia Trawl landings (t) of groundfish species, total effort (h), and CPUE (t/h, excluding dogfish), 1974-84.

SPECIES	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1974-83	Mean 1984
English sole	663	1,095	1,307	1,469	807	1,070	1,244	1,500	559	532	1,025	796
Rock sole	945	1,744	2,154	1,249	1,309	1,875	1,843	1,060	745	668	1,359	524
Petrale sole	684	441	337	285	226	203	223	291	367	439	350	412
Dover sole	822	1,030	1,153	695	732	861	1,274	1,246	914	871	960	1,111
Rex sole	137	98	132	99	102	204	145	190	74	49	123	219
Starry flounder	61	90	48	89	73	296	118	198	168	66	121	168
Turbot	365	953	1,311	1,591	2,318	1,823	1,448	946	525	324	1,160	365
Other flatfish	6	1	9	16	25	53	51	180	220	199	76	141
Total flatfish	3,683	5,452	6,451	5,493	5,592	6,385	5,611	3,572	3,148	5,173	3,736	3,418
Pacific cod	8,807	10,252	10,067	7,627	6,668	9,501	8,667	6,677	4,794	4,496	7,756	2,957
Lingcod	1,507	1,877	1,368	1,175	908	1,160	1,311	1,729	2,879	2,988	1,690	187
Sablefish	122	283	382	787	131	277	334	234	248	274	307	187
Pollock	48	103	1,323	890	2,407	3,384	2,201	1,252	924	1,070	1,360	699
Hake	54	1	-	2	2	818	606	5,692	2,826	3,122	1,312	3,057
Pacific ocean perch	1,529	2,040	1,746	2,716	3,861	2,819	5,290	5,104	5,983	5,655	3,674	6,563
Other rockfish	914	978	2,019	4,866	6,147	5,574	4,154	4,488	4,645	6,559	4,034	7,735
Misc. species	89	181	200	260	163	191	292	264	139	155	193	166
Total foodfish	16,699	21,167	23,556	23,816	25,879	30,109	29,201	31,051	26,010	27,467	25,496	28,518
Dogfish	320	479	85	724	941	1,275	2,871	638	1,719	967	1,002	747
Animal Food	174	36	100	49	112	214	191	42	65	94	108	161
Reduction	274	211	300	181	302	241	528	303	450	321	311	244
Total landings	17,467	21,893	24,041	24,770	27,234	31,839	32,791	32,034	28,244	28,849	26,916	29,670
Total hours	23,608	34,058	36,671	34,407	33,198	38,297	46,924	38,706	34,635	33,288	35,369	33,689
CPUE (t/h, excluding dogfish)	0.720	0.629	0.659	0.699	0.792	0.798	0.638	0.811	0.766	0.838	0.735	0.859

^a Preliminary data.

Table 3. British Columbia trawl landings (t) by main species and major area in 1984 (excluding dumped and discarded fish).

Species	Major area										Total
	3C	3D	4B	5A	5B	5C	5D	5E			
English sole	60.2	2.5	34.3	9.5	6.6	52.8	605.3	4.8		796.0	
Rock sole	86.4	11.1	7.5	141.9	87.5	63.6	124.6	1.0		523.6	
Petrale sole	213.1	76.4	5.6	37.9	39.2	11.8	12.1	15.6		411.7	
Dover sole	49.0	48.6	15.3	16.7	39.1	7.8	630.1	302.4		1,111.0	
Rex sole	0.5	-	-	tr.	0.1	1.0	186.9	30.7		219.2	
Starry flounder	6.1	tr.	9.7	tr.	-	0.3	151.8	-		167.9	
Turbot	44.5	3.2	7.3	30.7	62.2	11.8	200.7	4.8		365.2	
Other flatfish	55.6	8.5	68.9	2.3	3.1	0.2	2.7	-		141.3	
Pacific cod	639.1	28.4	621.8	227.1	150.2	314.6	1,533.3	3.3		3,417.8	
Lingcod	1,730.4	320.9	41.8	257.5	455.0	23.2	121.9	6.7		2,957.4	
Sablefish	107.6	12.4	2.1	3.9	6.6	1.2	6.3	46.8		183.9	
Pollock	5.1	-	67.3	11.4	7.2	1.6	606.4	tr.		699.0	
Hake	-	-	3,056.5	-	-	-	tr.	-		3,056.5	
Ocean perch	406.2	337.6	-	112.9	2,417.2	411.3	11.5	2,656.6		6,563.3	
Other rockfish	621.2	1,693.0	37.6	959.3	2,147.2	502.5	158.5	1,615.4		7,734.7	
Misc. species	11.9	0.3	15.2	7.4	8.6	2.1	118.4	2.3		166.2	
Dogfish	405.2	-	265.3	29.0	8.8	15.2	23.7	-		747.2	
Animal food	-	-	0.2	12.0	15.0	19.1	67.2	47.8		161.3	
Reduction	8.0	26.6	tr.	7.1	91.8	16.6	23.4	66.1		243.8	
Total	4,470.1	2,571.7	4,256.4	1,668.6	5,545.4	1,356.7	4,561.8	5,016.3		29,670.0	

Effort (h)	7,597	2,982	4,645	3,706	4,803	1,634	6,215	1,957		33,660
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Table 9. Other rockfish landings (t) from Canadian trawlers by International Areas in 1984.

Species	Major areas								Total
	3C	3D	4B	5A	5B	5C	5D	5E	
<i>Sebastes aleutianus</i>	-	0.5	-	0.1	17.1	0.3	-	325.5	343.5
<i>S. babcocki</i>	-	9.9	-	4.5	75.2	18.3	5.0	16.0	128.9
<i>S. borealis</i>	0.2	0.4	-	-	2.2	0.1	-	19.0	22.0
<i>S. brevispinis</i>	96.9	450.7	1.2	552.0	643.1	297.2	50.1	319.5	2,410.7
<i>S. crameri</i>	0.2	-	-	0.5	25.6	2.4	-	18.1	46.8
<i>S. diploproa</i>	2.0	8.9	-	0.9	105.7	3.1	-	17.1	137.7
<i>S. elongatus</i>	0.4	0.3	0.1	-	-	-	-	-	0.8
<i>S. entomelas</i>	4.3	5.2	0.1	-	18.8	-	-	11.5	39.9
<i>S. flavidus</i>	19.8	18.8	3.5	85.6	108.3	47.5	65.8	0.7	350.0
<i>S. helvomaculatus</i>	tr.	0.2	-	-	-	0.2	-	tr.	0.4
<i>S. maliger</i>	0.1	0.1	0.1	2.9	0.1	0.5	1.7	tr.	5.5
<i>S. melanops</i>	-	-	-	-	-	-	0.2	-	0.2
<i>S. paucispinis</i>	14.0	50.1	-	42.5	35.9	14.1	9.2	-	165.8
<i>S. pinniger</i>	302.8	870.8	0.6	215.6	295.7	68.9	4.7	10.9	1,770.0
<i>S. proriger</i>	14.2	29.4	-	5.1	85.7	12.9	0.1	260.9	408.3
<i>S. reedf</i>	6.0	119.5	-	28.4	590.2	26.2	-	506.0	1,276.3
<i>S. ruberrimus</i>	-	tr.	-	0.6	0.5	-	1.1	0.3	2.5
<i>S. variegatus</i>	-	-	-	-	-	-	-	2.3	2.3
<i>S. zacentrus</i>	1.6	10.9	-	-	34.0	8.6	-	48.3	103.9
<i>Sebastolobus alascanus</i>	-	-	-	-	0.7	2.0	3.9	35.6	42.2
Unspecified	158.7	117.3	32.0	20.6	108.4	0.2	16.7	23.1	477.0
Total	621.2	1693.0	37.6	959.3	2147.2	502.5	158.5	1615.4	7734.7

Table 10. British Columbia landings (t, round weight) of groundfish caught by gear other than trawl in 1984 by major area and species.

Gear and Species	Major area							Total	
	3C	3D	4B	5A	5B	5C	5D		5E
Longline									
Dogfish	-	-	228.9	53.7	-	-	-	-	282.6
Lingcod	3.7	13.3	6.1	8.4	-	2.4	11.0	4.5	49.4
Pacific cod	-	-	0.4	tr.	-	-	0.2	0.1	0.7
Rockfish	1.9	48.4	30.7	19.2	0.4	0.8	10.1	32.2	143.7
Sablefish	-	211.2	-	-	8.8	-	132.4	11.7	364.1
Misc. species	tr.	0.6	0.2	0.3	0.1	-	-	0.2	1.4
Total	5.6	273.5	266.3	81.6	9.3	3.2	153.7	48.7	841.9
Trap									
Lingcod	-	0.1	-	-	-	-	-	-	0.1
Rockfish	-	-	tr.	-	-	tr.	-	-	tr.
Sablefish	291.4	887.2	4.3	296.1	714.6	72.1	2.1	1,007.6	3,275.4
Total	291.4	887.2	4.3	296.1	714.6	72.1	2.1	1,007.6	3,275.5
Troll & Handline									
Flatfish	0.1	-	1.2	-	-	-	-	-	1.3
Lingcod	118.5	131.9	186.3	32.0	26.5	8.0	61.7	25.2	590.1
Pacific cod	-	-	2.6	-	-	-	0.1	tr.	2.7
Rockfish	17.2	28.5	305.9	8.1	7.0	3.4	21.4	4.8	396.3
Misc. species	tr.	-	1.8	-	-	-	tr.	-	1.8
Total	135.8	160.4	497.8	40.1	33.5	11.4	83.2	30.0	992.2
TOTAL	432.8	1,321.2	768.4	417.8	757.4	86.7	239.0	1,086.3	5,109.6

c. Alaska

Total Alaska catches including landings in the State of Washington totaled 59,211 metric tons (mt) for 1984, 108% of the 54,876 mt caught off Alaska during 1983. Approximately 13% of the domestic catch was landed outside of Alaska during 1984. These landings were primarily Pacific cod. Groundfish landings in Alaska were 51,702 mt in 1984, representing a 13% increase over the 1983 landings of 45,613 mt (Table 11).

Trawl landings increased by only 21% between 1983 and 1984, rising from 40,707 mt to 41,496 mt. The trawl fishery accounted for approximately 80% of the total Alaskan groundfish landings in 1984, down from 89% of the landings in 1983. The principal species landed was Pacific cod, the majority of which came from the developing fishery in the Bering Sea and Aleutian Islands.

Alaskan non-trawl landings totaled 10,206 t in 1984, 208% of the 4,911 mt landed in 1983. The longline fishery was the primary non-trawl gear with sablefish the principal target species. The total sablefish landings (round weight) in 1984 were 9809 mt, a 168% gain over the 1983 landings of 3,663 mt. Trawl gear took 14% of the landed sablefish in 1984, while in 1983, trawl landings were less than 1%. The sablefish fishery will continue its rapid expansion during 1985 into the western Gulf of Alaska and Bering Sea. Approximately 171 mt of sablefish were landed outside of Alaska in 1984.

The 1984 landings of rockfish other than Pacific ocean perch (POP) increased by 134% from 1983 landings of 413 mt to 966 mt in 1984. Most of this increase came from the rapidly growing longline fishery in Southeastern Alaska targeting on shelf demersal rockfish, particularly Sebastes ruberrimus. A trawl fishery targeting on POP was initiated in the Aleutian Islands during the fall of 1984, and total landings of this species based on fish ticket data were 1,401 mt. Further increases in effort on Aleutian rockfish stocks are expected during 1985.

d. Washington

Washington's commercial groundfish landings totaled 47,869 mt in 1984, representing an 8% increase over the 44,124 mt landed in 1983. Trawl landings increased 10% from 39,657 mt in 1983 to 43,687 mt in 1984. Trawl effort was up 14% from 69,615 hours in 1983 to 79,483 hours in 1984. Landings from gears other than trawl declined 6% from 4,467 mt in 1983 to 4,182 mt in 1984; 1,028 mt by pot gear, 1,674 mt by longline, 222 mt by shrimp trawl and 1,258 mt by miscellaneous gears.

Trawl-caught landings of flatfish increased from 6,618 mt in 1983 to 7,096 mt in 1984. Principal species in 1984 were Dover sole (3,341 mt), arrowtooth flounder (1,908 mt) and English sole (771 mt). These three species comprise 84% of the total flatfish landings.

Table II. Total Alaska groundfish landings (t) by United States vessels in 1983 and 1984 by major species groups (joint venture catches are excluded).

<u>Species</u>	<u>1983</u>	<u>1984</u>
Pacific cod	37,044	32,167
Pollock	727	6,801
Sablefish	3,663	9,809
Flounders	338	418
P.O. Perch ¹	23	1,401
Other Rockfish ¹	413	966
Lingcod	38	82
Other ²	3,372	58
Total	45,618	51,702

¹ Separation based only on fish ticket data

² Includes unspecified

Trawl-caught landings of groundfish (Pacific cod, lingcod, sablefish, Pacific whiting and walleye pollock) increased 41% from 19,786 mt in 1983 to 27,819 mt in 1984. Principal species were Pacific cod (15,885 mt), Pacific whiting (3,927 mt), pollock (3,911 mt) and sablefish (2,451 mt). Ninety percent of the Pacific cod landings were from Alaskan fishing grounds.

Trawl-caught landings of rockfish declined 38% from 11,208 mt in 1983 to 6,908 mt in 1984. This marks the fourth consecutive year of declining rockfish landings. Declines in the last two years are primarily the result of increasingly restrictive regulations imposed by the Pacific Fisheries Management Council. Principal species in the landings were yellowtail rockfish (2,409 mt), widow rockfish (1,523 mt) and Pacific ocean perch (748 mt).

Washington's non-trawl landings were 4,182 mt in 1984 compared to 4,467 mt in 1983. Principal species in the landings were sablefish (2,281 mt), dogfish (772 mt), rockfish (506 mt) and lingcod (486 mt).

e. Oregon

Total landed catch of groundfish by commercial gear types was 28,973 mt. This represents a decline of 19% from the 1983 landings of 35,484 mt. The trawl fishery accounted for 25,766 mt or 89% of the landed commercial catch, a 20% reduction from 1983. Trawl effort in 1984 was 83,048 hours, a decline of 18% but still nearly twice as great as the 10-year mean of 52,198 hours. The decline in trawl landings can be attributed mostly to reduced effort, in part due to regulatory action. The major species/groups were rockfish (all species), Dover sole, and sablefish which comprised 12,647 mt, 6,129 mt and 2,795 mt, respectively.

The number of trawlers participating in 1984 was 169, a 10% reduction from the 188 that participated in 1983. Many of the exiting vessels found markets in California, Washington and Alaska. Some of the decline was offset by a shift of shrimp trawlers into groundfish fisheries. Of 130 shrimp fishery participants in 1983, only 59 fished in 1984. Fish trawlers made 4,343 deliveries in 1984 averaging 11,653 lbs. and 31,533 lbs. of groundfish for bottom and mid-water vessels, respectively. In 1983, the trawl fleet made 5,359 deliveries averaging 12,790 and 25,306 lbs. per delivery. Regulation changes influenced the size and frequency of trips in both years. Bottom trawlers fishing for rockfish especially faced more restrictive regulations in 1984 resulting in reduced numbers and size of deliveries. Mid-water trawlers on the other hand had more liberal trip limits in 1984 resulting in increased participation, trips and average size of deliveries compared to 1983.

Landed catch by other commercial gear types was 3,207 mt. Of these, pot gear was most important followed by longline at 1,830 mt, and 789 mt, respectively. Sablefish and Pacific halibut were the principal species landed.

Table 12. California groundfish landings (metric tons) from International Statistical Areas in 1984.

SPECIES	1A	1B	1C	TOTAL
English Sole	32	497	423	952
Rock Sole		5		5
Petrale Sole	50	298	243	591
Dover Sole	1,286	4,339	4,148	9,773
Rex Sole	45	227	296	568
Starry Flounder	8	160	45	213
Other Flatfish	329	472	176	977
Lingcod	21	736	193	950
Sablefish	1,070	2,220	1,533	4,823
Pacific Ocean Perch			39	39
Widow Rockfish	68	938	1,775	2,781
Other Rockfish	2,950	11,403	2,461	16,814
Misc. Species	107	113	31	251
Whiting		23	2,312	2,335
Animal Food				
Total Landings	5,966	21,431	13,675	41,072

f. California

Groundfish landings in 1984 were 41,072 mt, an increase of 7% over 1983 landings of 38,492 mt, (Table 12). Notable were the decrease of sablefish and the increase in Pacific whiting between years. Trawlers landed 37,339 mt, or 91%. An increase occurred for the gillnet catch to 1,902 mt.

Dover sole landings in 1984 increased 16% over those of 1983. The largest increase occurred in Area 1A where 1,286 mt were landed in 1984 compared to 369 mt in 1983. The downward landing trend for English sole which began in 1980 continued in 1984 when 952 mt were landed. This total is half of the 1980 total and is 18% below 1983 landings of 1,161 mt. Petrale sole landings in 1984 of 591 mt is a modest increase over 1983 landings of 562 mt. Landings in recent years are well below the long-term average petrale landing of over 1,300 mt. Rock sole landings were 5 mt, all in Area 1B. The 1984 lingcod landings of 950 mt increased 14% over the 830 mt of 1983. No Pacific cod were caught off California in 1984. Only minor catches of Pacific ocean perch occur off California. In 1984, 39 mt were landed, all in Area 1C. Rockfish species, other than Pacific ocean perch or widow rockfish, landed in 1984 totaled 16,814 mt, an increase over 1983 landings of 15,976 mt. Widow rockfish landings also increased 2,781 mt compared to 2,242 mt of 1983. Area 1B was the leading area of rockfish landings. Sablefish continued to decline from the peak year of 1982 when 9,494 mt were landed. The 1984 landings in California were 4,823 mt. Landings were depressed by unfavorable market conditions. An upturn in Pacific whiting landings occurred in 1984 when 2,335 mt were landed. All but 23 mt of the total were landed at Eureka and Crescent City in Area 1C.

2. Recreational Fisheries

a. Canada

Catch data from the 1984 recreational fisheries are not yet available. Limited data from the 1983 recreational fisheries indicate 334,000 pieces of groundfish were caught in the Strait of Georgia (Area 4B). Approximately one-half of the catch consists of rockfish, lingcod and dogfish.

b. Washington

The preliminary estimate of the 1984 groundfish harvest by boat anglers is 2,162 mt. The majority of the harvest (80%) came from Puget Sound. Principal species harvested were black rockfish (S. melanops), pollock (Theragra chalcogramma) and Pacific cod (Gadus macrocephalus).

c. Oregon

The 1984 recreational catch out of Oregon ports was estimated to be 353,364 fish, 13 percent below 1983 landings. However, at least some of this decrease was due to a shorter 1984 sampling period in most ports.

A record number of bottomfish-directed angler trips (50,530) was taken in 1984. These anglers targetting on bottomfish landed an average of 6.1 fish per trip. This was down somewhat from the 1983 average catch of 7.5 fish per trip. The catch by 1984 bottomfish anglers was 307,373 fish; this represented 87 percent of the total bottomfish catch.

Black rockfish again led all species in the recreational catch comprising 71 percent of the total. Combined rockfish species accounted for 92 percent of the landings.

PMFC area 2C contributed 372 mt toward the State's total catch of 554 mt. This area includes the ports of Newport, Garibaldi, and Depoe Bay that ranked first, second, and fourth, respectively, in the State's landings.

On a weight basis, rockfish comprised 85 percent of the total catch; lingcod made up 12 percent of the total. Flatfish landings were again small, less than one percent of the total. The most common flatfish were sand sole and Pacific sanddab. The miscellaneous species group accounted for two percent of the total, and was comprised mainly of cabezon and kelp greenling.

d. California

California recreational fisheries for groundfish continued at high levels in 1984. Groundfish are taken by anglers from shore and aboard private vessels and aboard CPFV.

Groundfish catches by California anglers are estimated at 5.125 mt. The major components of the catch are rockfishes with bocaccio the major species. Rockfish catches totaled 4,400 metric ton and lingcod catches were estimated at 675 mt. Flatfish catches of 50 mt includes starry flounder, California halibut and Pacific sanddab.

B. Joint Venture Fisheries

1. Canada

In 1984, twenty-eight Canadian catcher vessels delivered Pacific hake to thirteen processing vessels in cooperative fishing arrangements. Nine Polish vessels and four Soviet vessels participated in this fishery. A total of 28,906 metric tons of Pacific hake was processed in the 1984 joint-venture fishery.

The quota and catches for 1984 are listed below:

NATION	SPECIES	QUOTA (t)	CATCH (t)
Poland	Hake	10,000	9,214
	Pollock	Incidental	66
	Rockfish	Incidental	35
USSR	Hake	20,000	19,692
	Pollock	Incidental	
	Rockfish	Incidental	87
Total	Hake	30,000	28,906
	Pollock		107
	Rockfish		122

2. United States

Joint-venture fisheries continued to increase in importance to U.S. fishermen in 1984 with dramatic increases in catches occurring in the Bering Sea and Gulf of Alaska. Joint-venture catches in the Bering Sea grew from 211,154 mt in 1983 to 357,542 mt in 1984 which represents a 69% increase. Most of this increase was due to the considerable larger landings of pollock, Pacific cod, and Atka mackerel. Gulf of Alaska fisheries also were much more productive with catches increasing from 142,986 mt in 1983 to 219,625 mt in 1984; a 54% increase. Largest increases were in catches of pollock and Pacific cod. Joint-venture catches were also larger in the Washington-California region, but the increase was not nearly as notable as those off Alaska. The Pacific whiting catch went from 72,100 mt in 1983 to 78,889 mt (+9%) in 1984. These increases in catches paralleled increases in effort. The number of vessel days increased in the Bering Sea from 1,731 in 1983 to 3,358 (+69%) in 1984, from 1,384 to 2,425 (+75%) in the Gulf of Alaska, and from 1,461 to 1,663 (+14%) off the west coast. Joint-venture catches in all regions in 1984 are presented in Table 13. Initial joint venture allocations for 1985 are 587,989 mt in the Bering Sea, 239,691 mt in the Gulf of Alaska and 85,000 mt in the Washington-California region which represents increases over 1984 catches in all areas.

C. United States

1. Canada

The Polish People's Republic conducted national fisheries for Pacific hake (whiting) off southwest Vancouver Island (Area 3C) in 1984. Fifteen Polish vessels caught 12,623 t of hake. Eight of the processing vessels involved in the joint-venture fishery occasionally fished directly (supplemental fishing) when domestic vessels could not supply enough hake. This supplemental catch of 579 t is added to the national catch.

A summary of foreign fishery catches follows:

NATION	SPECIES	QUOTA (t)	CATCH (t)	SUPPLEMENTAL CATCH (t)	TOTAL CATCH (t)
Poland	Hake	10,000	12,623	579	13,202
	Pollock	Incidental	--	1	1
	Rockfish	Incidental	385	20	405

2. United States

Foreign nations operated directed fisheries within the U.S. Fishery Conservation Zone (FCZ) in the Bering Sea and Gulf of Alaska as well as a small directed fishery in the Washington-California region. Foreign catches in the Bering Sea increased 6% between 1983 and 1984 due mainly to larger catches of pollock and yellowfin sole. Only catches of sablefish and arrowtooth flounder showed significant decreases. Reduced catches of all species except pollock in the Gulf of Alaska resulted in a 16% decrease in total catch in 1984. Both Poland and the USSR conducted small directed fisheries off California, Oregon and Washington where they harvested 14,772 mt of Pacific whiting; a quantity considerably below historic levels. Foreign catches in 1984 are presented in Table 14.

Foreign effort in the Bering Sea was only 62% (18,617 vessel days) of 1983 effort but a larger total catch resulted. This is thought to be a result of reallocation of effort from some relatively low volume species such as turbot to pollock and yellowfin which provide much higher CPUE. In the Gulf of Alaska, the reduced catch was accompanied by a reduction in effort from 6,614 vessel days in 1983 to 2693 (-59%) in 1984. There were 331 vessel days expended off Washington, Oregon and California.

Following a trend which began with the onset of the Alaska joint venture fisheries, foreign directed fishery allocations for 1985 have again been reduced substantially. Final 1984 and initial 1985 foreign groundfish allocations are presented in Table 15.

D. Groundfish Management and Regulations --- Significant Changes.

1. Canada

a. Pacific cod

The continued low abundance of Pacific cod in Area 3C, combined with its exceptionally high availability on the spawning ground (Amphitrite Bank), led to a total closure, January-March, of an area enclosing Amphitrite Bank. In 1984, a quota of 400 metric ton was imposed for Area 3C-N during January-March, but was not attained.

b. Rockfish

No major revisions of rockfish regulations were implemented in 1984. Management continued with experimental open fishing of slope rockfish in Area 5E-North (Langara Island). That portion of 5E north of 54 degrees north latitude was designated an experimental fishing area in 1983 following a 2-vessel survey. All restrictions on the harvest of pacific ocean perch were eliminated. Special permits were issued in trade for regular groundfish harvest permits and the right to concurrently fish any other area. Completed logbooks were mandatory to regain regular harvest permit for other areas. The program was recommended for a 5-year period to be open to review on a yearly basis. Poor cooperation was achieved in 1984 with regard to provision of catch and effort data by trawl skippers. Research staff recommended termination of the experiment if the situation is not improved in 1985.

c. Sablefish

Two changes in regulations were proposed and adopted in the sablefish fishery in 1985.

(i) All sablefish setline gear (hooks or traps), must be marked on the floats at one end of the string, with the fishing vessels CFV number in letters six inches in height.

(ii) To enable closer monitoring of the total catch, the fishery was conducted in 3-5 week periods, with a 3-week closure between periods. This enabled all catch information to be collated prior to the next opening.

2. United States

a. Eastern Bering Sea-Gulf of Alaska

1. NPFMC Mr. Jim Glock provided an overview of regulations in the Gulf of Alaska and Bering Sea/Aleutian Islands. In April 1984, the North Pacific Management Council approved an annual management cycle for amending the Gulf of Alaska and Bering Sea/Aleutian Islands Groundfish FMP's. Under this cycle, management proposals are accepted only during September-December, and then the groundfish Plan Teams review the amendment proposals and begin work on the biological and socioeconomic analyses required by the federal government. The Council approved amendments to the two FMP's in May 1985 and the amendments are now undergoing review by the U.S. Secretary of Commerce with implementation expected in November 1985.

The Gulf of Alaska Groundfish Fishery Management Plan was adopted in 1978, and 13 amendments have since been implemented or approved. Amendment 14 consisted of seven parts: (1) established gear/area restrictions, OY allocations and a gear phase-out schedule in the sablefish fishery to reduce gear conflict and grounds-preemption problems, provide necessary bycatch amounts of sablefish for continued trawl operations on other species, and minimize the economic impact on existing pot fishermen; (2)

Table 13. --1984 joint venture landings (mt) in the Bering Sea, Gulf of Alaska and Washington-California region by species and INPFC area. Values in parenthesis indicate amounts discarded.

	Bering Sea			
	Area I	Area II	Area IV	Total
Pollock	185,863.42	44,450.51	6,694.30	237,008.23
Pacific cod	24,136.49	245.05	6,389.89	30,771.43
Sablefish	74.11	2.12	271.86	348.09
Atka Mackerel	0.89	15.22	35,926.86	35,942.97
POP	149.04	0.28	429.17	578.49
Other rockfish	7.25	0.00	36.11	43.36
Yellowfin sole	32,714.92	41.73	7.33	32,763.98
Turbot	186.45	2.06	67.02	255.53
Flounders w/o yellowfin sole	16,840.02	20.70	290.50	17,151.22
Squid	27.15	0.02	7.23	34.40
Herring	---	---	---	---
Other fish	1,128.24	30.84	1,485.62	2,644.70
Total	261,127.98	44,808.53	51,605.89	357,542.40
	Gulf of Alaska			
	Shumagin	Chirikof	Kodiak	Total
Pollock	8,018.06	175,688.79	23,397.33	207,104.18
Pacific cod	305.29	774.96	3,569.30	4,649.55
Sablefish	283.37	28.10	216.80	528.27
Atka Mackerel	578.00	2.24	4.82	585.06
POP	1,441.06	234.76	57.87	1,733.69
Shortspine thornyhead	17.58	0.18	0.75	18.51
Other rockfish	199.82	49.75	34.33	283.90
Flounder	566.44	223.88	2,658.10	3,448.42
Squid	1.36	3.47	0.35	5.18
Other fish	59.65	1,056.63	152.03	1,268.31
Total	11,470.63	178,062.76	30,091.68	219,625.07

Table 13. (Continued)

	Washington-California				
	Vancouver	Columbia	Eureka	Monterey	TOTAL
Pacific whiting	8,922.23	66,200.25	3,747.09	19.50	78,889.07
Jack mackerel	0.03 (1.05)	0.65 (68.27)	0.00 (8.42)	0.0 (0.0)	0.68 (77.74)
Sablefish	1.81 (5.79)	1.77 (9.63)	0.46 (5.25)	0.0 (0.0)	4.04 (20.67)
POP	0.04 (6.37)	0.15 (2.46)	0.00 (0.09)	0.0 (0.0)	0.19 (8.92)
Other rockfish	24.28 (74.30)	112.43(339.85)	3.34 (5.37)	0.0 (0.02)	140.05 (420.54)
Flounders	0.09 (0.30)	0.01 (0.55)	0.00 (0.01)	0.0 (0.0)	0.10 (0.86)
Other fish	3.56 (15.27)	8.29 (53.94)	1.04 (7.85)	0.0 (0.0)	12.89 (77.06)
Total	8,952.04 (104.08)	66,323.55 (474.70)	3,751.93 (26.99)	19.50 (0.02)	79,047.02 (605.79)

Table 14. --1984 foreign directed groundfish catches (mt) from the Bering Sea, Gulf of Alaska, and the Washington-California region by species and INPFC area. National participating are listed in order of tonnage landed.

	Bering Sea				Total	Participating Nations
	Area I	Area II	Area III	Area IV		
Pollock	258,870.41	604,871.00	347.88	70,900.54	932,989.83	JPN, ROK, POL, GER, USSR, TAIWAN
Pacific cod	20,163.03	37,070.08	0.0	1,276.96	58,510.07	JPN, ROK, USSR, GER, POL, TAIWAN
Sablefish	519.26	678.96	0.0	724.52	1,922.74	JPN, ROK, TAIWAN, POL, GER, USSR
Atka Mackerel	23.11	17.65	0.0	70.78	111.54	JPN, ROK, GER, POL, USSR, TAIWAN
POP	101.62	230.12	0.0	394.22	725.96	JPN, ROK, USSR, POL, GER, TAIWAN
Other Rockfish	67.42	62.59	0.0	61.97	191.98	JPN, ROK, USSR, POL, TAIWAN, GER
Yellowfin sole	119,342.56	7,419.55	0.0	0.04	126,762.15	JPN, ROK, USSR, TAIWAN, POL, GER
Turbot	9,587.71	20,121.53	0.0	3,129.68	32,838.92	JPN, ROK, POL, TAIWAN, POL, GER
Flounders w/o yellowfin sole	23,963.62	2,286.45	0.0	256.52	26,506.59	JPN, ROK, USSR, POL, TAIWAN, GER
Squid	387.37	2,409.57	0.0	335.61	3,132.55	JPN, ROK, POL, GER, USSR, TAIWAN
Herring	630.41	626.40	0.0	0.0	1,256.81	JPN, ROK, POL, GER, USSR, TAIWAN
Other Fish	4,116.59	3,232.11	0.0	183.53	7,532.23	JPN, ROK, USSR, POL, GER, TAIWAN
Total	453,773.11	679,026.01	347.88	77,334.37	1,192,481.37	
Gulf of Alaska						
	Shumagin	Chirikof	Kodiak	Yakutat	Total	Nations
Pollock	42,471.47	38,626.41	18,161.43	--	99,259.31	JPN, ROK, POL
Pacific cod	10,843.35	4,906.09	147.38	--	15,896.82	JPN, ROK, POL
Sablefish	754.04	313.00	39.56	--	1,106.60	JPN, ROK, POL

Table 14. (Continued)

Table 14. (continued)

Atka Mackerel	478.20	57.26	0.28	--	535.74	JPN, ROK, POL
POP	214.22	1,164.10	1,220.32	--	2,598.64	JPN, ROK, POL
Shortspine thornyhead	49.69	54.74	60.41	--	164.84	JPN, ROK, POL
Other Rockfish	46.70	115.68	251.80	--	414.18	JPN, ROK, POL
Flounders	603.43	1,348.09	1,081.15	--	3,032.67	JPN, ROK, POL
Squid	50.86	20.64	48.44	--	119.94	JPN, ROK, POL
Other fish	285.93	223.51	66.31	--	575.75	JPN, ROK, POL
Total	55,797.89	46,829.52	21,077.08	--	123,704.49	

Washington-California

	Columbia	Eureka	Total	Nations
Pacific whiting	14,769.20	3.15	14,772.35	POL, USSR
Jack Mackerel	115.37	0.09	115.46	POL, USSR
Sablefish	0.48	0.0	0.48	POL, USSR
POP	1.04	0.0	1.04	POL, USSR
Other Rockfish	179.99	0.02	180.01	POL, USSR
Flounder	0.0	0.0	0.0	POL, USSR
Other Fish	12.50	0.08	12.58	POL, USSR
Total	15,078.58	3.34	15,081.92	

establish a Central Southeast District with a 600 mt OY for purposes of preventing the localized depletion of shelf demersal rockfish; (3) formally implement the 1985 OY's for pollock, Pacific ocean perch, other rockfish, Atka mackerel and other species; (4) improve the monitoring of fishing effort and harvests by requiring catcher/processor vessels to check in and out of management areas and provide weekly catch reports to NMFS; (5) establish a framework procedure for the annual review and setting of halibut PSC limits; (6) incorporate the NMFS Habitat Policy into the FMP and (7) set an April 1 - December 31 sablefish season for the longline and pot fisheries to mitigate weather and fish-quality problems.

Other Council action in the Gulf of Alaska included the approval of a regulatory amendment that addresses the problem of area closure when a single groundfish species OY is reached. There was concern that in Southeast Alaska for example, the taking of the sablefish OY would close the area for the remainder of 1985, thereby precluding the rockfish fishery. The regulatory amendment allows NMFS to exempt, if appropriate, fisheries or gear that take minimal amounts of the closing species. The Council also adopted a draft regulation to prohibit the discard of fishing gear and other debris by domestic vessels. This is similar to the regulation already in place for foreign vessels and is intended to reduce entanglement of marine animals by man-made debris.

Future projects and amendments for the Gulf FMP include a rewrite of the plan itself making it more flexible and useful as a management tool; and to develop a comprehensive approach for the treatment of incidental catches of prohibited and fully-utilized species by the groundfish fisheries.

The Bering Sea FMP has now been amended nine times. Amendment 9 consists of three parts: (1) closure of the area within 20 miles of the Aleutian Islands (in INPFC Area 4) to foreign trawling in order to reduce the bycatch of species fully utilized by U.S. fishermen; (2) improve the monitoring of fishing effort and harvests by requiring catcher/processor vessels to check in and out of management areas and provide weekly catch reports to NMFS; and (3) incorporate the NMFS Habitat Protection Policy into the FMP. The Council had also considered raising the optimum yield ceiling from the current 2.0 million metric tons to 2.4 million metric tons but decided that it is not likely that the groundfish complex can support increased harvests in the immediate future. Also, the Council reviewed the increased bycatch of chum salmon by joint venture vessels. Over 60,000 salmon were taken in 1984 compared to 24,000 in 1983. The joint venture companies were told to prepare a plan to reduce bycatches and submit it to the Council prior to operations in 1985.

Future projects and amendments for the Bering Sea FMP include setting salmon prohibited-species catch limits for foreign vessels and possible action with respect to joint-venture salmon catches.

2. PFMC

Mr. Hank Wendler reviewed current year regulations of the Pacific Fisheries Management Council (presented in Appendix C).

b. Washington-California

1. WDF

(A). Puget Sound. Major regulation changes for Puget Sound groundfish management during 1984 included: a time/area closure of the otter trawl fishery in northern Puget Sound to protect newly molted crabs; management of the Port Susan Pacific whiting fishery by emergency regulation to ensure no overfishing; and the sport limit on lingcod was reduced to one fish daily.

(B). Coastal Management Zone. During 1984, regulation changes of the Department of Fisheries paralleled those of the Pacific Fisheries Management Council. Effective January 1, 1984: widow rockfish trip limits were set to 50,000 pounds/trip, no more than one trip per week; Sebastes complex (rockfish other than widow, Pacific ocean perch and thornyheads) trip limits were set at 30,000 pounds/trip, one trip per week in the INPFC Vancouver/Columbia area, 40,000 pounds/trip, no trip frequency limit, south of 43 degrees N. latitude (later changed to 42 degrees 50'). On May 6, 1984: the widow rockfish trip limit was reduced to 40,000 pounds/trip, one trip per week; the Sebastes complex trip limit was reduced to 15,000 pounds/trip, one trip per week; or 30,000 pounds/trip, one trip every two weeks, in the Vancouver/Columbia areas. On August 1, 1984: changed the Vancouver/Columbia area trip limit on Pacific ocean perch from 5,000 pounds or 10% of the weight aboard which ever is larger, to 20% by weight of all fish aboard not to exceed 5,000 pounds. August 16, 1984 the Columbia area Pacific ocean perch fishery was closed. September 9, 1984 stopped directed fishing for widow rockfish and set an incidental catch limit of 1,000 pounds/trip.

2. ODFW

The Oregon Department of Fish and Wildlife introduced numerous changes in regulations affecting rockfish as a result of Pacific Fishery Management Council discussions and recommendations designed to conserve and optimally utilize widow rockfish, Pacific ocean perch, and other rockfish ("Sebastes complex").

Among regulations adopted consistent with the PFMC and federal actions were:

January 1984 -

Widow rockfish - 50,000 lb. trip limit once per week

Sebastes complex - 30,000 lb. trip limit once per week in the area between Cape Blanco and Canada-U.S. boundary

May 1984 -

Widow rockfish - trip limit reduced to 40,000 lb./week

Sebastes complex - trip limit reduced to 15,000 lb. once per week; option to land 30,000 lb once in two weeks offered.

Table 15. --Final 1984 and initial 1985 foreign groundfish allocations (mt) for the Bering Sea-Aleutians area, Gulf of Alaska, and Washington-California region.

		Bering Sea - Aleutians Final 1984					Bering Sea - Aleutians Initial 1985				
		Japan	ROK	Germany	USSR	Poland	Portugal	Total			Total
Pollock		693,031	194,377	23,447	12,401	54,568	500	978,324			978,324
Pacific cod		56,110	11,718	887	1,129	500	5,000	75,344			75,344
Yellowfin sole		130,911	35,008	366	11,000	6	129	177,420			177,420
Flounders		61,666	11,328	1,023	3,150	101	349	77,617			77,617
POP		1,028	173	32	13	20	13	1,279			1,279
Other rockfish		1,300	210	37	21	18	12	1,598			1,598
Sablefish		2,168	456	7	31	28	12	2,702			2,702
Atka Mackerel		761	145	36	16	16	12	986			986
Turbot		44,566	4,807	923	322	50	316	50,984			50,984
Squid		5,113	1,528	429	57	99	189	7,415			7,415
Other fish		23,237	4,410	808	1,860	150	283	30,748			30,748
Total		1,019,891	264,160	27,995	30,000	55,556	6,815	1,404,417			1,404,417
Bering Sea - Aleutians Initial 1985											
		Japan	ROK	Portugal	Poland	USSR	Total			Total	
Pollock		369,822	93,241	43	18,991	12,364	494,461			494,461	
Pacific cod		25,511	731	440	138	395	27,215			27,215	
Yellowfin sole		50,833	20,429	12	290	8,545	80,109			80,109	
Flounders		18,671	6,409	31	276	1,412	25,799			25,799	
POP		230	48	1	10	4	293			293	
Other rockfish		2,700	364	1	18	24	3,107			3,107	
Sablefish		298	44	3	9	13	367			367	
Atka Mackerel		45	12	1	4	3	65			65	
Turbot		17,394	2,142	28	160	196	19,920			19,920	
Squid		4,497	1,121	15	200	214	6,047			6,047	
Other fish		11,577	3,500	25	504	1,047	16,653			16,653	
Total		501,578	128,041	600	20,600	24,217	675,036			675,036	

Table 15. (continued)

	Final 1984			Initial 1985		
	Japan	ROK	Poland	Total	Japan	Total
Pollock	77,820	38,531	3,350	119,701	12,500	12,500
Pacific cod	17,191	2,077	45	19,313	10,000	10,000
Flounders	9,243	1,050	9	10,302	225	225
POP	3,169	442	4	3,615	--	--
Shortspine thornyhead	2,287	637	5	2,929	25	25
Other rockfish	1,663	1,711	5	3,379	--	--
Sablefish	1,513	200	4	1,717	--	--
Atka Mackerel	5,454	15,408	26	20,888	60	60
Other Fish	10,182	4,592	80	14,854	150	150
Squid	3,127	949	5	4,081	25	25
Total	131,649	65,597	3,533	200,779	22,985	22,985

	Final 1984			Initial 1985		
	USSR	Poland	Total	USSR	Poland	Total
Pacific whiting	5,000	20,000	25,000	5,000	25,000	30,000
Flounders	5	20	25	5	25	30
POP	3	12	15	3	15	18
Other rockfish	37	148	185	37	185	222
Sablefish	9	34	43	9	42	51
Jack Mackerel	150	600	750	150	750	900
Other Fish	25	100	125	25	125	150
Total	5,229	20,914	26,143	5,229	26,112	31,371

*August 1984 - Reduced Pacific ocean perch trip limit to 20 percent of all fish aboard not to exceed 5,000 lb. per vessel per trip.

Sebastes complex trip limit reduced to 7,500 lb. once per week; or 15,000 lb. once in two weeks. Pacific ocean perch landings were prohibited August 16 for remainder of year (Columbia Area) when OY was reached.

*September 1984 - Widow rockfish trip limit was reduced to 1,000 per trip (OY nearly reached). In November OY was deemed to be reached and landings were prohibited the remainder of 1984.

*Implemented by Oregon in mid-July.

*In November OY was deemed to be reached and landings were prohibited the remainder of 1984.

3. CDF&G

The California Department of Fish and Game introduced regulation changes in the set gill net fishery for groundfish and associated species included:

1) The northern boundary south of which set gill nets may be used was changed from south of Point Reyes to south of a line 245 degrees magnetic from Point Reyes.

2) Several depth areas prohibitions in shallow water, May 1 - September 30 in the San Francisco area including the Farallon Islands and Noonday Rock.

3) Year round prohibition in 15 fathoms or less between Yankee Point 36 degrees 29' N. latitude and the Santa Maria River 34 degrees 58' N. latitude.

4) Permits required for use of gillnets statewide and a special permit is required for the area north of Pfeiffer Point, 36 degrees 14' N. latitude.

VIII. Groundfish Research

A. Stock Assessment

1. Pacific Cod

a. DFQ

Detailed assessments were completed for the three principle offshore stocks of Pacific cod for 1960-84 -- west Vancouver Island, Queen Charlotte Sound, Hecate Strait. Analyses utilized standardized LPUE's and age composition of landings. Estimates of mortality rates were: $Z = 1.11-1.27$; $M = 0.58-0.78$; and $F = 0.35-0.62$. Estimates of annual exploitation rates were 0.21-0.35. VPA analysis produced ratios of maximum to minimum

recruits at age 2 which ranged from 3.9 to 6.3. Coastwide, cod abundance is at a quasi-cyclical low level, but available information suggests that the fishery is not the causative agent, with the possible exception of the stock off west Vancouver Island.

b. NMFS

The relative abundance of cod has increased about nine-fold in the Bering Sea between 1975 and 1983 based on NWAFC survey data. Survey catch per unit effort has increased from 2.7 to 24.8 kg/ha during that period. Survey CPUE in 1984 declined slightly to 221.5 kg/ha and this may signal that the population is entering a period of decline as the influence of the very strong 1977 year class weakens. Subsequent year classes appear not to be strong. Biomass estimates for 1983 and 1984 are 1,126,400 and 999,700 mt respectively. Allowable Biological Catch for the eastern Bering Sea and Aleutian Islands area was set at 347,400 mt for 1985.

In the Gulf of Alaska between Kodiak Island and the Shumagin Islands, survey catch rates increased from 1979 to 1980, but declined by about 40% in 1984. Biomass in that region was estimated to be 85,126 mt in 1984. All indices suggest that the 1977 year-class was also very strong in the western Gulf of Alaska and in addition the 1978 and 1980 year-classes appear relatively large based on information from the Japanese longline fishery. Even though the population seems to have declined somewhat in some areas since 1980, the status of the resource is considered good and OY for the entire Gulf of Alaska was maintained at 60,000 mt in 1984.

A Management-oriented Model of the Population Dynamics of Pacific Cod (*Gadus macrocephalus*) in the Eastern Bering Sea

The strong 1977 year class of the eastern Bering Sea Pacific cod contributed substantially to the high harvest levels of that stock during the years 1983-1984. However, natural mortality was thought to be capable of eliminating nearly all of the remaining members of the 1977 year-class by 1987 regardless of harvest levels. When setting the guideline harvest for the 1985 season the North Pacific Fishery Management Council was forced to consider the following question: Would it be better to fish the stock heavily in the years 1985-1986, thereby taking advantage of the remaining members of the 1977 year-class in the form of a short-term increase in yield, or would it be preferable to forego such an increase in yield in the hope that these fish would produce subsequent large year classes?

To help answer this question, a computer model of the eastern Bering Sea Pacific cod population was constructed during the fall of 1984 and was used to calculate an optimal harvest schedule for the years 1985-1986. The model was based on age-specific schedules of catchability, natural mortality, and fecundity, and utilized a modified form of the Beverton-Holt recruitment function (Beverton and Holt 1957). Prescription of an optimal harvest strategy was based on the relationship of population age structure at the time of the study to population age structure at maximum sustainable yield. (For further information, contact Dr. Grant Thompson, (206) 526-4232).

about the effect these restrictions have had on the rebuilding of ocean perch stocks. We have therefore conducted an analysis of rebuilding schedules and the cost of those schedules.

Our analysis is presented in several parts beginning with brief descriptions of Pacific ocean perch biology and the fisheries that have exploited the Alaskan ocean perch stocks. Then, a review of past analyses of abundance and productivity is followed by our most current interpretation of the available data using virtual population analysis and stock reduction analysis.

Our best population parameter estimates are used in a simple predictive model to estimate future stock size under a variety of fishing rates. This is the section of most interest, but it is also the section of most uncertainty. The cornerstone of predictions of future abundance is the prediction of recruitment from the spawning stock. We have not been able to identify a stock recruitment relationship in the data. Alternatively, we have presented a range of recruitment responses and used the population model to predict future stock for this range.

We have provided an economic analysis of the simulated populations. Cost and revenue functions were added to the predictive model and long-term yield and profits examined.

In some cases, the fishing rates imposed on the simulated populations result in Pacific ocean perch quotas reduced below the present levels of fishing. Our research examines the effect such reduced quotas would have on existing fisheries.

(For further information, contact Daniel Ito, (206) 526-4231).

c. WDF

An updated analysis of the status of stocks of yellowtail rockfish was performed using generalized Stock Reduction Analysis. Catch data included estimates of landings by foreign fisheries as well as domestic landings from the Canadian trawl fishery. The analysis relies on National Marine Fishery Service coastal groundfish cruises to provide an estimate of stock decline between 1977 and 1983. The analysis was conducted at two levels of assumed natural mortality, $M = 0.075$ and 0.100 . The analysis also assumes a Cushing-type stock recruitment curve with an "r" value of 0.25 . Results of the analysis indicate that maximum sustained yield for yellowtail rockfish ranges from 1004 to 1149 mt in the Vancouver area and from 1859 to 2222 mt in the Columbia area. Virgin biomass is estimated at 31,750 to 36,250 mt in the Vancouver area and at 60,750 to 66,500 mt in the Columbia area.

The 1984 biomass was estimated to be 8,303 to 10,306 mt in the Vancouver area and 26,049 to 28,719 mt in the Columbia area. The Vancouver area is clearly overfished and catch rates in the Columbia area would soon lead to overfishing if not abated.

d. ODFW

A status of stock report was completed for canary rockfish (Sebastes pinniger) in the INPFC Columbia, Vancouver, and Eureka

areas in 1984. Several technical problems made traditional analyses such as production modeling and virtual population analysis difficult to perform satisfactorily. In the former case sufficient effort data was lacking and variability inherent in the data that was available was large enough to render catch per effort models useless. In the latter case uncertainties in validity of new ageing techniques, the large number of age classes, the large number of incompletely recruited ages, high variability of catch at age data and lack of age samples complicated virtual population analysis as an assessment technique.

A simpler approach was chosen based on subjective evaluation of age and length composition as well as catch history and recent rockfish survey results. These were:

1. If landings were stable from stocks with a history of moderate exploitation with no consistent signs of biological stress present then allow for an Allowable Biological Catch (ABC) of up to 130% of the mean landing in recent years. This ABC estimate should be held constant for more than one year or until stock assessment is complete.

2. If landings have undergone a recent (5-7 years) substantial increase (2-3 times) over the long-term average and no consistent biological stress was observed, set ABC in the range of the long term mean landing before the increase and the peak landing. Continue with assessments.

3. If landings have peaked or were high and signs of stress, especially juvenescence, were apparent, reduce the most current annual landing by 10-30%. ABC would then range from 70-90% of the most recent landing of record.

Adopting the above criteria, the Pacific Fishery Management Council's (PFMC) groundfish management team set ABC in 1985 at 800 mt in the U.S. sector of the Vancouver area; 2,100 mt in the Columbia area; and 600 mt in the Eureka area. The PFMC subsequently approved these ABC's for 1985.

e. CDF&G

In progress are stock assessments of fisheries for bocaccio and chilipepper. Age structured and dynamic pool models are used with age and fishery data generated from 1977 to 1984.

Bocaccio catch and age data are being refined for further analyses of cohorts. Preliminary results indicate that one or two strong year classes can greatly influence the fishery over a number of years. For the period 1978 to 1982 the 1977 year class dominated landings. Following recruitment as 2 and 3-year-olds, their availability apparently diverted effort away from older age classes which are distributed in deeper water than younger classes.

Chilipepper age and landing data from 1977 to 1984 are under analysis. During this period chilipepper comprised an average of 24.5% (range 9-34%) of all trawler rockfish landings. Ages in the trawl fishery are primarily 4 to 12. The predominant age is 6. Preliminary results suggest that fishing mortality has not been intense enough over the period of the data set for rapid convergence of F. Trials with high and low F values will be made to provide minimum and maximum biomass and yield estimates.

The bocaccio and chilipepper assessments are being done by two biologists. Discussions reveal that these species have mutual impacts on each other at some life stages when they occur in a common fishery.

3. Sablefish

a. DFQ

The sablefish stock off Canada is monitored aboard commercial and research vessels. The total allowable catch for 1984 remained at 3,500 mt.

CPUE has remained stable over the duration of the domestic fishery (1977-1984). Analysis of the Canadian stocks, using yield-per-recruit and forward simulation models has provided yield options for managing the strong 1977 cohort. These results indicate that the total allowable catch should be increased in a "stepwise fashion" over the next few years. A yield option of 4,000 mt is recommended for 1985 and 1986. This management strategy is considered conservative.

b. NMFS

Sablefish stocks in the Bering Sea have declined dramatically from their relatively high levels of the mid 1960's. Japanese longline CPUE indicated that sablefish abundance in 1979 was 20% of the 1970 level and CPUE values continued to decrease until 1981 when some increase was noted. Survey and catch data showed the presence of a strong 1977 year-class and a cooperative U.S./Japan survey on the continental slope showed that population numbers tripled between 1979 and 1981 when estimates of biomass went from 12,200 mt to 39,000 mt. The MSY for the eastern Bering Sea is judged to be 13,000 mt based on a production model analysis. EY for 1981 was estimated to be 2,000 mt based on trends in CPUE and catch. Survey trawl data from 1982 put the biomass at 52,300 mt which together with commercial fishery data suggest some stock improvement recently. Japanese scientists propose a sustainable exploitation rate of .05 which when applied to the 1982 biomass estimates provides an EY of 2,600 mt.

Sablefish in the Gulf of Alaska produced steadily increasing catches from 1958 to 1972 when the N.E. Pacific all-nation catch reached 67,000 mt. Evidence of declining stocks has led to significant fishery restrictions since 1977. Foreign harvests in the Gulf have gone from 15,961 mt in 1977 to 4,966 mt in 1983. The 1977 year-class also seems to have had a positive impact on sablefish stocks in the Gulf of Alaska. Commercial and survey CPUE tended to increase in most areas starting in 1980 and by 1982 the resource size was thought to be similar to 1969-1970 levels. Increases in stock biomass due to the recruitment of the 1977 year-class seem to have ceased. The MSY is estimated at 25,100 mt and EY estimates range from 10,695 to 26,100 mt. The OY for 1984 was set at 9,480 mt.

In the Washington-California area, the NWAFC's abundance indexing surveys indicate sablefish abundance was on the decline between 1979 and 1981, but rebounded sharply between 1981 and 1983, again due to recruitment of a strong year class. The MSY has been estimated to be 13,400 mt but recent production-per-unit-of-habitat analysis indicates that 13,400 mt may be at the

upper end of production which the resource could be expected to sustain. The MSY may be more on the order of 7,200 mt. Because recruitment seems strong coastwide the resource may be capable of supporting catches in excess of MSY for awhile; the 1985 OY was established at 13,600 mt.

Sablefish Catch Per Unit of Habitat

In the past, measures of productivity of the sablefish (Anoplopoma fimbria) resource in the Northeast Pacific have been derived from surplus production models of Japanese longline CPUE data and from the potential yield equation using an extrapolation of trawl estimates of biomass. These estimates have only provided a first approximation for the INPFC Columbia-Conception region. In the absence of updated assessments of sablefish off the West Coast, we have developed an index of relative catch rates. This index is the catch in metric tons per unit of sablefish habitat. The utility of this approach depends on adult sablefish being dispersed over the habitat and not migrating quickly between INPFC areas. It also assumes that the fishing effort has been dispersed over the sablefish habitat. Given our limited understanding of the biology of this demersal species, we believe that these indices provide a standard role for comparing the magnitude of the sablefish catches among INPFC areas. From this comparison and a review of the exploitation histories, we believe that a range of harvest goals can be proposed based on relative catch rates per unit of habitat.

(For further information, contact Sandra McDevitt, (206) 526-4230).

c. ADF&G

Dramatic increases in domestic sablefish landings have necessitated extensive port sampling in Alaska. Problems in indexing the commercial catch are due to rapidly changing fleet components. An attempt to obtain age structures through a head collection program continues.

4. Flatfish

a. DFO

Dover sole: Principle regions of exploitation are 3C, 3D, 5C, 5D, and 5E. In area 3C + 3D, exploitation of deep-water stocks began in earnest about 5 years ago. Recently, an area-swept biomass estimate was 5,000 mt, + 80%, but this estimate was deemed minimal. Current production appears to be appreciably below MSY. In Area 5C + 5D + 5E, standardized landing statistics for the complete history of the fishery (1970-date), indicate a modest initial decline, followed by stabilization of abundance. Surplus-production analysis suggests that current production is close to MSY, but processor-imposed trip limits, due to weak markets, confound the analysis.

English sole: Principle stock exploited is in Area 5D. Analysis is based on a 24-year time series of standardized landing statistics, and size and age composition. Stock appears to be in satisfactory condition. Yield/recruit analysis suggests that production could be increased appreciably, without increasing effort, by reducing the catch of undersized specimens.

Petrale sole: Principle region of exploitation is Area 3C + 3D. Recent "warm" ocean years have increased recruitment, but no quantification is possible yet. Current abundance of petrale sole is low, but is expected to increase because of the "warm" period 1978-84. Both Canadian and U.S. scientists agree that petrale stocks off Washington State and British Columbia are more vulnerable to oceanic conditions than to the fishery.

Rock sole: Principle regions of exploitation are Queen Charlotte Sound (Areas 5A + 5B) and Hecate Strait (Areas 5C + 5D). In Queen Charlotte Sound, standardized LPUE's for 1960-68 exhibit no trend. Fluctuations are caused by variable recruitment. The condition of these stocks appears satisfactory. In Hecate Strait, two stocks are recognized--one in 5C and the other in 5D. Analyses are based on a 24-year time series of standardized landing statistics, as well as size and age compositions. A Beverton-Holt stock-recruitment relationship has been demonstrated, and recruitment appears to be related to two factors--water temperature during spawning season, and stock biomass. The stock in Area 5C appears to be at a near critical low level, while the stock in 5D is above a critical low level but recruitment remains low.

b. NMFS

Survey estimates of flatfish in the Bering Sea show that yellowfin sole abundance has more than tripled since 1975 due to recruitment of strong 1973-87 year-classes. A slight reduction in the biomass estimate in 1984 may indicate that the population weight reached its maximum in 1983 and is now a period of decline. The 1984 estimated biomass was 3,366,000 mt and EY was 310,000. Greenland turbot abundance has been decreasing since 1980, apparently due to poor recruitment. Biomass estimates of juvenile turbot have gone from 172,000 mt in 1980 to 17,900 mt in 1984. Abundance is considered below average. It is believed the stock was producing MSY (67,000 mt) in 1979 and EY now is 37,000 mt. Arrowtooth flounder biomass has increased from a relatively stable condition as a result of good recruitment of 1979 and 1981 year-classes. The stock is in good condition with EY (20,000 mt) slightly above MSY.

Research surveys in the Gulf of Alaska indicate that flatfish (primarily arrowtooth flounder and rock sole) stocks are in a good condition with catches (7,147 mt in 1984) continuing to be substantially below OY (33,500 mt). The EY is considered to equal MSY (67,000 mt) but OY was set at 50% of EY to protect stocks of halibut.

c. ODFW

Dover sole: A stock assessment was made for Dover sole (Microstomus pacificus) in the INPFC Columbia and Vancouver areas. Analyses utilized 1971-76 trawl survey data and comprehensive information on catch, effort, age composition and other biological and fishery information. Results indicated that MSY and hence ABC's, for Dover sole were significantly underestimated in the Fishery Management Plan. Analyses provided a range of estimates of ABC85 in the INPFC Columbia area from 11,480 to 16,456 mt. Projected landings for 1985 (8,436 mt) are well below any of these ABC85 estimates. Status of Dover sole in the Vancouver area is less certain due to the relative paucity of information. However, analyses provide a range of

ABC85 estimate of 2,358-3,949 mt which bracket and projected 1985 landings of 3,027 mt. Because recent tagged fish aging and other age structure examinations by ODFW indicate Dover sole have been underaged using present methodology, we suggested ABC in 1985 be set no higher than 2,400 mt in the Vancouver area and 11,500 mt in the Columbia area, pending further analyses.

Yield-per-recruit analyses conducted for the Columbia area indicate that at current levels of fishing mortality, there would be no increase in yield per recruit were mesh size to increase, thus mesh size regulations should remain unchanged, at least for the time being. Because projected landings are below, or approximately equal to, current estimates of ABC85 in the Columbia and Vancouver areas, respectively, it is highly unlikely that overfishing would occur in the immediate future, but additional fishing effort would not be beneficial.

English sole: A stock assessment was made for English sole (Parophry vetulus) in the INPFC Columbia and Vancouver areas. Survey estimates (1973-76) of exploitable biomass available at the beginning of 1977 were 15,917 mt. Estimates of the 1985 biomass were determined by multiplying the ratio of CPUE(77) to CPUE(83) times the initial estimate of biomass equal to 5,788 mt. The simplified version of the SRA model was also used after first reducing the initial estimate of biomass by the CPUE ratio. This estimate of biomass was 5,427 mt.

Estimates of ABC for 1985 ranged from 800 to 850 mt. Because a strong 1980 year-class may be entering the population, we recommended ABC85 should remain unchanged from ABC 1984 until the 1980 year-class can be evaluated as age-5 fish in early to mid-1985, and until further stock assessments using other methods are completed. The PFMC Groundfish Management Team, however, chose to recommend reduction of coastwide ABC for English sole in 1985, pending information on the 1980 year-class.

Petrale Sole: A stock assessment was made for petrale sole (Eopsetta jordani) in the INPFC Columbia and Vancouver areas. Estimates of biomass were derived from a combination of survey results (1973-76) for most of the Columbia and Vancouver areas and by extrapolation of survey and catch information for a part of the Vancouver area. Exploitable biomass was estimated to be 6,458 mt at the beginning of 1977. Biomass available at the beginning of 1985 was determined by using the forward SRA model. The estimate of 1985 biomass was 8,697 mt. Results were judged to be satisfactory because the recruitment index, although not constant, was without trend.

ABC was estimated to be 1,739 mt and nearly equal to the estimated MSY of 1,732 mt. Results of the assessment suggest that petrale sole stocks in the Columbia-Vancouver area are at MSY level for practical purposes.

5. Pacific Hake

a. DFQ

Monitoring of the Strait of Georgia stock to assess reproduction response to exploitation is continuing. The total allowable catch for 1984 remains at 10,000 mt. or 1985 a yield option not exceeding 10,000 mt is recommended. A yield option at high risk level could be as high as

15,000 mt, however, the reproductive response of the stock to exploitation must be carefully monitored.

A total allowable catch for the "offshore" hake in Canadian waters remains at 35,000 mt. The 1985 yield option based on the split stock analysis by the Canadian and U.S. scientists is 67,000 mt for Canada. However, because of the concern of over estimation of the hydroacoustic surveys and the reduction in size at age, this must be considered a high risk option. A conservative yield option of 45,000 mt is recommended until these effects are fully investigated.

b. NMFS

Bottom trawl-hydroacoustic surveys as well as analyses of commercial fishery data show that the Pacific whiting (hake) stock is in good condition. The population has benefited from the recruitment of strong 1977 and 1980 year-classes and recent harvests have been well below the 175,000 mt OY. Recruitment since 1980 has been below average and should the 1984 year-class be weak, the outlook is for current population levels to decline within a year or two. Canadian and U.S. scientists have completed a modeling study which suggests that the present U.S./Canadian OY of 210,000 mt cannot be sustained and would eventually drive the stock to low levels. The work also showed that OY should be no more than 190,000 mt and it could only be sustained under a policy of varying catch annually to utilize strong year-classes when present and to protect the stock during periods of poor recruitment. An ABC for 1984 was estimated to be about 270,000 mt. Under a policy of constant annual removal, MSY appears to be no more than 175,000 mt.

6. Spiny dogfish

a. DFQ

Commercial catches of spiny dogfish continue to be below the recommended TAC of 3,000 mt recommended for the Strait of Georgia, and 15,000 mt for other areas in the Canadian Zone.

The model used to investigate the dynamics of the dogfish populations has been updated to include recently compiled historic catch records. It indicates that the offshore stock ranging from British Columbia to California can sustain catches of up to 15,000 mt. While U.S. catches remain low, the TAC in the offshore Canadian zone has been set at 15,000 mt.

Model trends for the Strait of Georgia-Puget Sound stock concur with evidence that abundance of marketable sized fish is decreasing in the Strait of Georgia. Projections indicate that at current harvest levels, the stock size will begin to increase by the late 1980's. The model indicates that catch levels of 4,000 to 6,000 mt are sustainable in the Strait of Georgia-Puget Sound region. Assuming an even split in biomass between the Strait of Georgia and Puget Sound, a TAC of 3,000 mt has been recommended for the Strait of Georgia.

The Strait of Georgia-Puget Sound assessment should be regarded as qualitative until questions regarding the degree of mixing between these stocks have been answered and until a reliable estimate of absolute abundance is obtained.

7. Walleye Pollock

a. DFQ

The total allowable catch in 1984 remained at 3,400 mt in the Strait of Georgia and 1,000 mt for Dixon Entrance--northern Hecate Strait. The present assessment of the stocks in the Strait of Georgia indicate yield options for 1985 to range from a conservative 2,350 mt to a high risk 10,500 mt. Based on our understanding of the biology of pollock ($a = 0.4$; $m = 0.5-0.6$) and a mid-point in the biomass estimate (22,600 mt) a yield option between 2,500 mt and 5,400 mt be recommended. In Dixon Entrance-northern Hecate Strait an unlimited yield option for 1985 is proposed. The stock is currently under-exploited due to intermittent availability and weak market demand.

b. NMFS

Survey and fishery data show that pollock in the eastern Bering Sea declined dramatically in the early 1970's, stabilized from the mid 1970's to 1982 and increased thereafter. Survey CPUE has been more variable than other indices of abundance which is thought to be a function of variable availability to such sampling gear. A combined hydroacoustic/bottom trawl survey was conducted in 1982 and although a larger area was covered, the estimated population numbers were only about 21% of that estimated from a similar survey in 1979. This was due primarily to much reduced numbers of 1 and 2 year olds in 1982; a failure of 1980-81 year classes. Biomass estimates have declined from about 11 million mt in 1979 to about 8 million mt in 1982. Increases in survey CPUE in 1983 and 1984 are felt to be an artifact of increasing vulnerability of an older population rather than an increase in population size. The MSY is considered to be 1.5 million mt, but given a declining population and poor recruitment EY is estimated at 1.1 million mt for 1985.

Hydroacoustic surveys in the Shelikof Strait since 1981 have produced biomass estimates which have declined from 3.8 million mt to 1.8 million mt. Much of this decline is attributed to the weakness of the 1980 year-class first observed in 1983. It now appears that the 1981 year-class is also very weak. If recruitment is weak in 1985 as suggested by the survey just completed, projections are that the exploitable biomass will decline further to 1.2 million mt in 1985. The OY in 1984 was 416,000 mt with a recommended reduction to 300,000 mt in 1985. The 1983 and, particularly, the 1984 year classes appear strong so the current trend of decreasing population size may be reversed by 1986-87.

8. Pacific Halibut

a. IPHC

The total catch was 44.8 million pounds in 1984. This was 1.8 million pounds greater than the catch limit and 6.4 million greater than the catch in 1983. A trend toward shorter seasons continued as fewer days were needed to take the increased catch. Shorter seasons are due almost entirely to use of circle hooks. The circle hook outfishes the conventional "J" hook by about 2.2 to 1. This has resulted in dramatic increases in CPUE. In our 1985 stock assessment cruises in the Gulf of Alaska, CPUE has decreased slightly.

Pacific halibut stocks have continued to increase under the rehabilitation strategy. Stocks appear to be particularly strong throughout the central range. Most sectors are now managed at 90% of Annual Surplus Production (ASP). IPHC is still concerned over the slower progress being made in British Columbia and the Bering Sea. IPHC is continuing to use analyses based on catch-at-age data from the commercial catch. Various methods of analyses and data sets are used to prevent the limitations of any one method or data set from overly influencing the estimates. A scientific report is scheduled to be published in 1985 by Dr. T. Quinn detailing the assumptions and limitations of these methods. Overall setline ASP is estimated at 69.8 million pounds. Accounting for losses to the setline ASP is estimated at 69.8 million pounds. Accounting for losses to the setline fishery for incidental catches, the total surplus production is about 80-90 million pounds, one of the highest on record. Although a surplus of this magnitude is probably not sustainable, it is a further indication of the excellent condition of the Pacific halibut population at this time.

9. Lingcod

a. DFO

Stocks off the the west coast of Vancouver Island and in Queen Charlotte Sound continue to be at above average abundance as a result of recent surges in recruitment. Stock assessments conducted in 1984 indicate that offshore stocks are currently under exploited.

In the absence of a suitable time-series of recreational landing statistics, it has not been possible to estimate the current productivity of stocks in the Strait of Georgia. However, the long-term decline in commercial landings and the recent decline in sportcatches indicate that stocks in the Strait of Georgia are at low levels of abundance. Mark-recapture studies continued in the Strait of Georgia to assess the impact of commercial and sports fisheries on lingcod stocks. Approximately 9,000 tagged lingcod have been released in the Strait of Georgia since 1982.

B. Related Studies

1. Age Determination

a. DFO

Dr. Tyler briefly outlined the current production break and burn ageing on yellowtail and silver gray rockfish. Some corroboration of break-and-burn ageing was obtained based on 8 to 10 OTC injected yellowtail rockfish recovered to date. Dr. Tyler feels that the break-and-burn method is sufficiently validated. Chairman Westrheim discussed the relatively poor performance of the break-and-burn method on young fish of some species. Some deviation has been observed for the younger age classes of sablefish and English sole.

b. ADF&G

Mr. Rigby discussed the formation of the ageing lab in Kodiak headed by Jim Blackburn. Joan Organ who has trained at WDF and Nanaimo will do most of the ageing, and training. Due to major budget reductions, the lab may only age Pacific cod, yelloweye rockfish and a limited number of sablefish from state waters fisheries. Contract ageing may be considered. Mr. Rigby also extended formal thanks to Mr. Blackfurn and Ms. Organ for their fine ageing work thus far completed. Mr. Bracken mentioned that the lab was in the process of ageing sablefish tagged as juveniles (age class known).

c. WDF

According to Mr. Tagart, Washington is in the process of doing break-and-burn comparison of stored structures previously surface read. Not all previous surface-read structures were retained. An estimated 2-3man years will be required to age all yellowtail structures, and 6-man years to age the estimated 25,000 Pacific ocean perch structures on hand. OTC-injected black rockfish have been recovered, but no report has been released.

d. ODFW

A project was initiated in late 1984 to compare Dover sole age determination methods. Age determinations made by the otolith break-and-burn method show higher ages than do scales. The maximum age thus far observed has been 43 years. Agreement after three readings is low -- on the order of 10%.

e. NMFS

Age determination of Bering Sea cod have a been based on scales at the NWAFC. These structures indicated a maximum age of 5-6 years. It became apparent the cod live much longer when we were able to follow the emergence of a very strong 1977 year-class in the Bering Sea length samples. Studies of other age structures have revealed that dorsal fin rays may provide much more reliable ages. Model analysis of length composition data produces mean lengths-at-age which are very similar to those produced by fin-ray reading which is encouraging but further validation of this method is in progress. It now appears that maximum ages may be as high as 12-14 years.

2. Rockfish Tagging

a. DFQ

Dr. Tyler commented on the ability of yellowtail rockfish to move great distances. Mr. Tagart brought up the recovery of a DFP tagged yellowtail recovered off Coos Bay, Oregon.

b. ADF&G

Ms. Tory O'Connell discussed a break-away longline rockfish tagging program conducted in Sitka Sound. 1,000 tags have been put out, 800 detached (some snagged), no tag recoveries to date. A brief project summary is presented in Appendix D. Mr. Morrison briefly discussed black and dusky rockfish tagging study in progress on the Outer Kenai Peninsula. Preliminary results indicate no observed movement. Appendix E briefly summarizes the program.

c. WDF

Mr. Tagart discussed black rockfish in Neah Bay. 1,000 tags were put out, 20 recovered thus far, no movement detected. Both black and yellowtail rockfish in the Puget Sound area appear to move, but quillback and copper rockfish moved less than one half mile in several years at large according to Mr. Tagart. A double-tag study indicates some tag loss.

d. ODFW

In 1983 a total of 1,910 tagged black rockfish were released in two principal areas just south of Garibaldi. In the most southerly area off Cape Lookout, 545 fish were released; five tagged fish (0.9%) have been recovered from this group. Two of these showed no movement; that is, they were recaptured at or very near the release site. One other fish was taken approximately 7 nautical miles south. The remaining two tags were recovered in a fish processing plant. Recovery information was not available.

In the other principle tagging area, near Three Arch Rocks, 1,290 fish were tagged and released. Of these, 20 were recovered (1.6%). Thirteen tagged fish were recaptured at or very near the initial area. Four tagged fish showed significant movement; one moved south 17 nautical miles. Another was caught 15 miles north of the tagging area. Two other fish were recaptured off the mouth of the Columbia River, 60 miles north. The additional three fish tags were turned in with no recovery data.

e. CDF&G

Mr. Jow discussed inshore tagging of copper, gopher, yellowtail and olive rockfish by Mr. Bob Lea (CDF&G, Monterey). These studies indicate no movement. Tagged copper and bocaccio rockfish also showed no recruitment into fisheries further north.

3. Economics

A report on the economic status of the Washington, Oregon and California groundfish fishery from Mr. Charles Korson and Dr. Wes Silverthorne, (regional economists for NMFS), was accepted by the TSC. During the discussion of the report the TSC expressed regret that no economist was present at the meeting. Because no summary of the report was available prior to the meeting, no economists were present, the entire report is attached at Appendix F.

a. DFO

Dr. Tyler commented on the need to let high level agency officials know the value of the entire groundfish fishery. In 1984 groundfish were valued at 33 million dollars. Through March of 1985 the value of groundfish landings totaled 9 million dollars compared to 35-45 million for herring, 16 million for salmon and 6 million for shellfish. Dr. Tyler emphasized the need for a time component in the groundfish economic report other than the annual summaries currently used. He also stressed the need for greater availability of groundfish economic information.

b. ADF&G

Mr. Bracken stated 1984 was the first year the total value of groundfish (excluding halibut) was higher than herring and shellfish combined.

c. WDF

Mr. Tagart commented that attendance of economic representatives at the TSC and similar meetings would help give them a better idea of economic information needs.

d. ODFW

Mr. Demory noted the TSC should more specifically advise agency economists on information needs. Mr. Demory also briefly discussed a working group currently examining alternative fisheries management measures (limited effort) and how effort is affected by economic changes in the fishery. Report to be available by September 1985.

e. CDF&G

Mr. Jow noted an economic study of the central California groundfish gillnet fleet by NMFS (Tiburon) economist Ed Weber and Sea Grant. Mr. Jow also suggested on the value of groundfish fisheries that no negative lobbying be used, but rather to present the economic data and reports to provide the message.

f. NMFS

During the past year, REFM economists have conducted or contributed to a variety of research projects including: 1) an overview of U.S. groundfish markets and the potential for groundfish resources off Alaska to become a major source of supply for these markets; 2) a bioeconomic assessment of Pacific ocean perch; 3) an evaluation of alternative management options; 4) an analysis of the economic behavior of the Oregon multispecies trawl fleet; and 5) an analysis of the optimal choice of regulatory instruments in a fishery under uncertainty and instrument-adjustment constraints. The preparation of periodic reports on the economic status of the fisheries has also begun.

(For further information, contact Dr. Joe Terry, (206) 526-4253).

g. NPFMC

The North Pacific Council has expanded its economics staff in response to increased demand for analysis of economic impacts of regulations. Dr. Terry Smith of the University of Maryland will arrive in September and will be involved in modeling and other analyses. The Council will make the results of economic studies available to the TSC and may send an economist to future meetings.

4. Pacific hake (whiting) management report (from PFMC). Initial phase of study has been reported. McFarlane has a summarized version of the hake report however, no draft copies were sent to TSC prior to meeting for review. No further action was taken by the TSC.

a. NMFS

The multinational management analysis of the offshore Pacific hake fishery (Francis et al 1984) is presently in the process of being reworked. New model parameters are being estimated and various forms of management compared. The investigators feel that, at the present time, it would be premature to use this analysis as a basis for deliberations between U.S. and Canadian fisheries managers. It is hoped that by the time of the next TSC meeting, a more definitive basis for collaborative U.S./Canadian management of this stock will be available.

5. Pacific Hake Parasite Study. Dr. Tyler submitted the Canadian parasite report (Appendix G). Mr. Dark briefly summarized U.S. Pacific Hake parasite studies, some of which are still in progress. Full presentation of both U.S. and Canadian reports was deferred until the 1986 TSC meeting.

6. Other

a. DFO

Mark-recapture studies continued in the Strait of Georgia to assess the impact of commercial and sports fisheries in lingcod stocks. Approximately 9,000 tagged lingcod have been released in the Strait of Georgia since 1982.

b. ADF&G

Mr. Bracken reported the 1984 analysis of sablefish and starry flounder fecundity study has been completed. Yelloweye rockfish fecundity study is still in progress. Problems have been encountered in fixing ovaries. Mr. Bruce Leaman was recommended as a possible source for help in this matter.

c. WDF

Recreational Diving. In Washington State, an estimated 14,880 residents made one or more dives for recreational purposes in the marine waters of the state between April 1, 1982 and March 31, 1983. These divers averaged 5.8 days of diving on an annual basis for an estimated annual total of 86,300 diving days. An additional 34,300 dive days were spent by non-resident divers for a total of 12,200 dive days annually; 44,200 of these dives involved spear fishing.

Divers speared an estimated 82,300 finfish. Rockfish comprised 42% of the catch, surfperch 20%, lingcod 19%, greenling 13%, and other species 5%. Divers averaged 1.9 fish per spearfishing dive day.

The harvest of fish by divers was estimated to be 5% of the total recreational harvest of foodfish in Washington. In general, this harvest was judged not to be of fisheries management concern. An exception is the spearfishing harvest of lingcod in certain areas, which is significant.

d. ODFW

The recapture of tagged lingcod in 1984 was two, while no tagged English sole were recaptured.

e. NMFS

Tagging studies of Pacific cod movement in the Bering Sea have been conducted since 1981. Recently, returns of tagged cod from the Japanese longline fishery operating near the Shumagin Island provided the first evidence of movement from the Bering Sea in to the Gulf of Alaska. This may force reconsideration of the accepted view that the Bering Sea and Gulf stocks are discrete groups.

An Analysis of Differences in Regional Growth Rates for Walleye Pollock in the Eastern Bering Sea and Aleutian Basin

The growth of the walleye pollock (Theragra chalcogramma) from the Eastern Bering Sea and Aleutian Basin was examined by region overtime. Five regions were defined based on the hydrographic domains of Shumacher (1984): northern and southern middle shelf, northern and southern slope and Aleutian basin. A comparison of von Bertalanffy growth curves with time measured in quarters and years as replicates indicated highly significant differences in growth between regions. Over 67% of the residual sum of squares due to a common growth curve was explained by region specific growth curves. Mean length-at-age increased from north to south and from west to east. Growth of pollock from the Aleutian basin and northern slope regions was similar and was noticeably less than from other regions. Plots of mean length-at-age by region and year revealed seasonal variations in growth that could not be explained by normal von Bertalanffy growth. Often mean length-at-age decreased during subsequent quarters. A second growth model was fit which, in effect, examined the residuals of the region specific von Bertalanffy growth model for the presence of year, quarter and year-quarter additive terms. All regions exhibited significant temporal deviations from von Bertalanffy growth either in the form of a significant year-quarter interaction term or a significant quarter main effect. The authors interpret the presence of seasonal deviation from von Bertalanffy growth (i.e. negative growth in some quarters) as evidence of migration between regions.

Due to the differences in growth between regions the authors suggest that pollock from the Bering Sea be managed as separate production units and that potential migration and recruitment links between pollock from the Aleutian Basin and eastern Bering Sea slope be investigated in light of the large and growing foreign catch in the Aleutian Basin, much of which occurs inside the U.S.-U.S.S.R. convention line but outside the U.S. fishery conservation zone.

(For further information, contact Macgill Lynde, (206) 526-4251)

f. CDF&G

Dover sole: Tagging performed during the past two decades (1969 to 1971) are under analysis. Returns from separate releases span up to 16 years. The return data has been placed in a microcomputer file to facilitate analyses.

C. Cooperative research with other Nations

1. U.S.-Canada transboundary rockfish survey.

Logistics of the survey were discussed. It was noted that U.S. and Canadian cruises are not currently scheduled at the same time period. Dr. Tyler noted that Mr. Bruce Leaman will be contacting Mr. Dark for site location information.

2. U.S.-Canada Pacific Hake study discussed.
3. International effort on sablefish discussed.
4. U.S.-Japan longline survey. This survey is scheduled to continue as long as Japan continued to get acceptable allocations.

IX. Other Topics for Discussion.

A. Age determination by break/burn method--recommended species. (See section X A4).

B. PMFC Data Series/PacFin

The incorporation of the PMFC data series into PacFin was discussed. Mr. Six noted that due to dissimilarities in the two report types (different data elements) actual merger of PMFC into PacFin might not take place until sometime in 1987. The TSC agreed on the need to merge the two reporting systems but noted PMFC series should be retained until all problems are completely worked out. Mr. Tagart commended that PMFC format should be incorporated into the PacFin series.

C. Dover Sole Working Group--proposed for analysis of past tagging experiments with respect to stock delineation. Agencies agreed to comply with recommendation to create a working group to compile and analyze all existing data for sub-publication. Coast-wide results would be combined into a primary publication in a recognized U.S. journal. Mr. Tagart indicated his participation may not be possible due to budget restrictions, but agreed to provide data. A written report will be presented at next years meeting.

D. Sub-divide 3C into 3C-S (U.S.) and 3C-N (Canada).

During the early stages of the discussion it was proposed that the TSC ratify the boundary changes. Dr. Tyler agreed to immediately draft a recommendation to be submitted to the Parent Committee from the TSC (presented in Sec. XI C.4). Mr. Zyblut discussed problems in Canadian and U.S. reporting in the vicinity of the current international boundary. A motion was introduced (to be from the TSC to the Parent Committee) to split both 3C and 5E. Discussion followed and the 5E portion of the proposal was eventually withdrawn. Discussion of protocol for directing TSC recommendations to PMFC resulted in agreement that TSC must make its recommendations to PMFC through the Parent Committee.

E. Time Period of Publication.

Dr. Tyler proposed standardization of the agency publication lists from the current April-April cycle to the calendar year. The following variations were suggested: report list specifically for TSC (meeting to meeting), calendar year plus addendum report list for TSC (most current list available), calendar year or status quo. Maintenance of a formal list with supplemental submission by agency was also suggested. The outcome of the discussion was a decision to maintain status quo.

X. Progress on 1984 Recommendation.

A. TSC Recommendations to Itself

1. Report of CARE Working Group

Amended report attached in Appendix I. The TSC accepted the preliminary CARE report and expressed hopes a more detailed report will be forthcoming at the 1986 meeting.

2. Data deficiencies

An earlier Parent Committee request of the TSC to provide specific groundfish data needs was discussed. Chairman Westrheim directed to the Parent Committee the question of why sablefish were included. Mr. Six responded that sablefish data deficiencies should be addressed with all other groundfish data priorities to put them in perspective. Mr. Six then asked for a consensus of current data needs. Response was that development of data needs for all groundfish species currently is beyond agencies' willingness to devote time required. Mr. Tagart mentioned the 1976 or 1977 meeting, at the NMFS Montlake Laboratory of west coast biologist which produced a data needs list. It was suggested this list could act as a beginning framework for a new list.

3. Economics

Compliance with the 1984 recommendations to have an economic sub-section included in the 1985 agenda under GROUND FISH RESEARCH was noted. A report from NMFS economists Mr. Korson and Dr. Silverthorne was accepted (economic summary also given by Canadian member Dr. Tyler, presented in section VIII). The TSC once again voiced regret that no economist was in attendance. It was suggested that travel funding may not have been available for U.S. or Canadian economist to attend. Copy of economic report by Korson and Silverthorne is attached (Appendix F).

4. Endorsed species

Chairman Westrheim reported receiving an endorsed species report from Mr. Tagart. ADF&G biologists could not endorse specific methods for any species, as validation work has not yet been done. Canada reported no additions have been made to last years list. The TSC formally withdrew its request for an endorsed species list and elected to rely on the CARE group report.

B. Recommendations to the Parent Committee

1. NWAFC Report Review

TSC was unable to review NWAFC Processed Report (No. 84-18) as requested by the Parent Committee, as report was unavailable prior to or at the TSC meeting.

C. Recommendations from the Parent Committee to the TSC

1. Pacific Ocean Perch Working Group

Discussion of a working group to be appointed at the TSC meeting as requested by the Parent Committee centered around the management difficulties with the transboundary nature of the fishery. It was noted that the reality of this type of fishery is different on paper than in real life.

Mr. Dark questioned the necessity of the working group. Mr. Tyler suggested Mr. Bruce Leaman would likely be willing to participate in a POP working group. Need for current estimation of stock condition and distribution north and south of the provisional boundary was expressed. Several members felt this information was necessary before a working group could really get started. Mr. Rigby commented that data collection and terms of reference should center on biological aspects rather than management to prevent the working group from bogging down. Mr. Dark discussed merits of the working group but suggested formation of the group should come about after completion of the Canadian fall survey. The TSC agreed to recommend: 1) postponement of development of the working group until completion of the Canadian survey; 2) extension of the Canadian survey south into U.S. waters of Area 3C; and 3) an intermediate meeting with a list of potential participants and terms of reference for the working group.

XI. 1985 Technical Subcommittee Recommendations

A. To CARE

The TSC recommends agency summaries of current groundfish age-reading methods be furnished as an appendix to minutes of the next Annual Committee of Age Reading Experts (CARE) meeting, and updated annually (Appendix J). Proposed terms of reference for CARE are presented in Appendix K.

B. To the TSC

1. The TSC recommends that CARE appoint a coordinator to administer data analysis and report results and that said coordinator(s) named be reported to TSC (Appendix L).

C. To the Parent Committee

(All TSC recommendations to the Parent Committee which were adopted are attached in Appendix M as amended).

1. Improvements in United States sablefish data collection).
Adopted as amended (appended).

2. Southwest Fisheries Center Participation).

Adopted as amended (appended).

3. Annual Economic Report.

Adopted as amended (appended). It was recommended that U.S. and Canadian economists be added to the TSC mailing list and be sent a copy of the upcoming agenda.

4. Proposed division of International Statistical Area 3C.

Adopted as amended (appended).

5. Division of International Statistical 5E (north and south).

Discussion and withdrawn.

6. Proposed Division (north and south) of INPFC statistical area Vancouver.

Adopted as amended (appended).

XII. The TSC agreed to hold its next annual meeting starting Tuesday June 17, 1986 at 1:00 p.m. in Ashland, Oregon.

Mr. Zyblut suggested having the Parent Committee meeting in conjunction with the TSC meeting. Mr. Six noted better communications and reduced expenses (having to finance only one instead of two trips) as two advantages of this approach.

If both meetings were held at the same time it was suggested that TSC recommendations be handled at the beginning of the TSC meeting to allow additional consideration time prior to the Parent Committee meeting. Disadvantages of holding the two meetings together (back to back) were also discussed. A reduction of 50 percent in the number of annual meetings, and the loss of the ability of the Parent Committee to make requests of the TSC (at the TSC meeting) for use at the Parent Committee meeting were mentioned. Mr. Dark suggested having the TSC and Parent Committee meetings together (PC meeting just after TSC) and then meeting via telephone at some later date. Following discussion it was decided that the Parent Committee would meet immediately after TSC at 1:00 p.m. Thursday. The Parent Committee still plans to hold its winter 1985 meeting, to be announced.

XIII. Election of Chairperson.

Chairman Westrheim will remain in office through the 1986 meeting.

XIV. Adjournment

Chairman Westrheim presented a motion thanking the Alaska delegation which was seconded.

The 1985 TSC meeting adjourned at 11:10 a.m. Thursday June 27, 1985.

APPENDIX A

Agenda for the 26th Annual Meeting of the Technical Sub-Committees of the Canada-U.S. Groundfish Committee, Juneau, Alaska, June 25-27, 1985.

- I. Call to Order
- II. Appointment of Secretary
- III. Introductions
- IV. Approval of the 1984 report and 1985 agenda
- V. Terms of Reference
- VI. Review of Agency Groundfish Programs
- VII. Review of North Pacific Groundfish Fisheries
 - A. Canada-U.S. Fisheries
 1. Commercial Fisheries -- New fisheries, notable changes in resources, landings, markets, etc.
 - a. Canada-U.S.
 - b. Alaska
 - c. British Columbia
 - d. Washington
 - e. Oregon
 - f. California
 2. Recreational fisheries -- where applicable
 - a. Canada-U.S.
 - b. Alaska
 - c. British Columbia
 - d. Washington
 - e. Oregon
 - f. California
 - B. Joint-Venture Fisheries
 1. Canada
 2. United States
 - a. East Bering Sea
 - b. Gulf of Alaska
 - c. Washington-California
 - C. Foreign Fisheries
 1. Canada
 2. United States
 - a. East Bering Sea
 - b. Gulf of Alaska
 - c. Washington-California

- D. Groundfish Management and Regulations - significant changes
 - 1. Canada
 - 2. United States
 - a. East Bering Sea
 - b. Gulf of Alaska
 - c. Washington-California

VIII. Groundfish Research

- A. Stock Assessments
 - 1. Pacific cod
 - 2. Rockfish
 - 3. Sablefish
 - 4. Flatfish
 - 5. Pacific hake (whiting)
 - 6. Spiny dogfish
 - 7. Walleye pollock
 - 8. Pacific halibut
 - 9. Lingcod
 - 10. Other
- B. Related Studies
 - 1. Age determination
 - 2. Rockfish tagging
 - 3. Economics
 - 4. Pacific hake (whiting) management report (from PFMC)
 - 5. Pacific hake (whiting) parasite study
 - 6. Other
- C. Cooperative research with other nations

IX. Other Topics for Discussion

- A. PFMC Data Series/PACFIN
- B. Dover sole working group -- proposed for analysis of past tagging experiments
- C. Sub-divide 3C-S (U.S.) and 3C-N (Canada)

X. Progress on 1984 Recommendations

- A. The TSC to itself
 - 1. CARE Report
 - 2. Data deficiencies (including sablefish)
 - 3. Economics
 - 4. Endorsed species

- B. To the Parent Committee
 - 1. NWAFC Report Review
- C. From the PARENT Committee
 - 1. Pacific ocean perch working group
- XI. 1985 Technical Sub-Committee Recommendations
 - A. To CARE
 - B. To the TSC
 - C. To the Parent Committee
- XII. Schedule of Future Meeting
- XIII. Election of Chairperson
- XIV. Adjournment

APPENDIX B

Reports Published (or Pending) By Member Agencies 1984 to 1985

1. DFO

- TO APRIL 30, 1985 ARE LISTED BELOW:

- Bakkala, R., S. Westrheim, LS. Mishima, C. Zhang, and E. Brown. 1984. Distribution of Pacific cod (Gadus macrocephalus) in the North Pacific Ocean. Int. North Pac. Fish. Comm. Bull. 42: 111-115.
- Cass, A.J., R.J. Beamish, and M.S. Smith. 1984. Study of the biology of lingcod off the west coast of Vancouver Island, M/V ARTIC HARVESTER, November 22-December 2, 1977. Can. Data Rep. Fish. Aquat. Sci. 461: 73 p.
- Cass, A.J., G.A. McFarlane, K. Rutherford, and I. Barber. 1984. Lingcod tagging study in the Strait of Georgia, November 1982-March 1983. Can. MS Rep. Fish. Aquat. Sci. 1971: 49 p.
- Cass, A.J., and J.R. Scarsbrook. 1984. A preliminary study of variability in year-class abundance of post larval and juvenile lingcod in the Strait of Georgia, during 1980-82. Can. MS Rep. Fish. Aquat. Sci. 1755: 27 p.
- Chilton, Doris E., Shayne E. MacLellan, Margaret Burke, Dawne Barnes, and Linda Zado. 1984. An inventory of fishes aged, from the Pacific coast commercial and research samples, by the Pacific Biological Station Fish Ageing Unit during 1982 and 1983. Can. Data Rep. Fish. Aquat. Sci. 470: 45 p.
- Davenport, D. 1985. Biological observations of the foreign hake fishery for 1983. Can. MS Rep. Fish. Aquat. Sci. 1811: 15 p.
- Fargo, J., R. P. Foucher, J. Cooper, and S.C. Shields. 1984. Trawl survey of juvenile flatfish in Hecate Strait by the M/V DOUBLE DECKER, April 10-27, 1984. Can. Data Rep. Fish. Aquat. Sci. 486: 51 p.

- Fargo, J., A.V. Tyler J. Cooper, S.C. Schields, and S. Stebbins. 1984 F/V ARTIC OCEAN assemblage survey of Hecate Strait, May 28-June 17. 1984. Can. Data Rep. Fish. Aquat. Sci. 491: 108 p.
- Foucher, R.P., R.G. Bakkala, and D. Fournier. 1984. Comparison of age frequency derived by length-frequency analysis and scale reading for Pacific cod in the North Pacific Ocean. Int. North Pac. Fish. Comm. Bull. 42: 232-242.
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PACIFIC FISHERY MANAGEMENT COUNCIL

526 S. W. Mill Street

Portland, Oregon 97201

Phone: Commercial (503) 221-6352

FTS 8-423-6352

CHAIRMAN

James A. Crutchfield

EXECUTIVE DIRECTOR

Joseph C. Greenley

M E M O R A N D U M

DATE: June 10, 1985

TO: Technical Subcommittee (TSC) of the International Groundfish Committee

FROM: Hank ^{Quinn} Kendler, Council Staff Officer

SUBJECT: Current Year (1985) Groundfish Regulations

This memorandum responds to item VII D.2c of the TSC agenda: Groundfish Management and Regulations--significant changes.

Appendix 1 provides final estimates of the acceptable biological catch (ABC) used by the Pacific Fishery Management Council (Council) in developing management measures for 1985. Optimum yields (OY) established by the Council are quotas which are intended to take into account social, economic, and ecological factors in the catch of fish and, therefore, may be set higher than the ABC.

Management measures developed by the Council were intended to limit landings of groundfish, thereby minimizing the likelihood or intensity of biological stress on groundfish stocks, and reducing the chances of having to close a fishery before the end of the year. In each case, the Council recommended some kind of trip limit. The Council's recommendations for 1985 acknowledged the lack of alternative fisheries and the severe impact on the fishing industry if OY were set equal to ABC or reduced significantly below 1984 specifications (Appendix 2):

Numerical OY Species (Selectively Harvested)

Widow Rockfish: Coastwide OY = 9,300 mt (same as 1984)

- ° Trip limit of 30,000 pounds once-per-week (or 60,000 pounds once-every-two-weeks if this option is declared in advance); adjust in mid-season, if necessary.

Pacific Ocean Perch (POP): Vancouver area OY = 600 mt; Columbia area
OY = 950 mt (same as 1984)

- ° Trip limit of 20 percent of all fish on board; evaluate in mid-season.

Sablefish: Coastwide OY = 13,600 mt (decreased 3,800 mt from 1984)

- ° Minimum size limit restriction of 22 inches in all areas north of Point Conception; incidental landing limit of 5,000 pounds per trip for sablefish less than 22 inches; no size limit on sablefish south of Point Conception.

Pacific Whiting: Coastwide OY = 175,000 mt (reduced 500 mt from 1984)

- ° Retain 95,000 mt of OY for domestic harvest (10,000 mt for shore-based processors; 85,000 mt for joint ventures); retain 35,000 mt of OY as a reserve to be released only if it is determined that it will not be utilized by the domestic industry; TALFF = 45,000 mt, no more than half of which may be allocated to foreign nations during first half of the season.

Non-Numerical OY Species (Not Selectively Harvested)

Sebastes Complex: Coastwide ABC = 28,900 mt of which only 10,100 mt may be taken in Vancouver and Columbia area (Vancouver/Columbia area ABC is an increase of 900 mt over 1984)

- ° North of Cape Blanco: Trip limit of 30,000 pounds once-per-week of which no more than 10,000 pounds may be yellowtail rockfish (or 60,000 pounds once-every-two-weeks of which no more than 20,000 pounds may be yellowtail if this option is declared in advance); adjust in mid-season.
- ° South of Cape Blanco: Trip limit of 40,000 pounds; no trip frequency imposed; adjust in mid-season, if necessary.

NOTE: Landings of Sebastes complex and widow rockfish less than 3,000 pounds are not considered a trip.

Other Species:

Flatfish Complex: Coastwide ABC = 40,300 mt
(Dover sole ABC = 27,900 mt; English sole ABC = 1,500 mt; Petrale sole
ABC = 3,200 mt)

Lingcod : Coastwide ABC = 7,000 mt

Pacific Cod: Coastwide ABC = 3,100 mt

Jack Mackerel Coastwide ABC/OY = 12,000 mt

Others: Coastwide ABC = 14,700 mt

Technical Subcommittee of the
International Groundfish Committee
June 10, 1985
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Other Species which, for the most part, are not harvested selectively, or which are of little commercial interest, or about which there is little scientific data, are part of the non-numeric OY category and are managed most commonly by gear, area, and landing restrictions. The above measures were implemented January 1, 1985.

Inseason Modifications

The Council subsequently recommended certain mid-season adjustments which became effective late in April:

Widow Rockfish: Removed trip limit option of landing 60,000 pounds once-every-two-weeks. If 90 percent of the OY (about 8,400 mt) is reached before Council's July meeting, the trip limit will be automatically reduced to 10 percent (by weight) of all fish aboard not to exceed 3,000 pounds but, in any case, up to 1,000 pounds may be landed regardless of the percentage.

POP: Reduced current trip limit to 5,000 pounds or 20 percent (by weight) of all fish aboard whichever is less.

Sebastes Complex (Vancouver and Columbia Areas): Reduced current trip limit north of Cape Blanco to 15,000 pounds once-per-week of which no more than 5,000 pounds may be yellowtail (or 30,000 pounds once-every-two-weeks of which no more than 10,000 pounds may be yellowtail); provided for a third trip limit which allows landings of 7,500 pounds twice-a-week of which no more than 3,000 pounds in each landing may be yellowtail.

The saga of inseason adjustments to be continued in July.

HOW:mps
Attachments

TABLE 1.—FINAL ESTIMATES OF AEC FOR 1985 IN METRIC TONS (MT) FOR THE CALIFORNIA/WASHINGTON REGIONS BY INPFC AREAS

Species	Vancouver ¹	Columbia	Eureka	Monterey	Coronation	Total
Roundfish						
Lingcod	1,000	4,000	500	1,100	400	7,000
Pacific Cod	2,200	900	(*)	(*)	(*)	3,100
Pacific Whiting						* 175,000
Sablefish				* 2,500		* 12,500
Rockfish						
Pacific Ocean Perch	800	950	(*)	(*)	(*)	1,550
Shortbelly						* 10,000
Widow						* 7,400
Other Rockfish²						
Rockcod	(*)	(*)	(*)	4,100	2,000	6,100
Canary	800	2,100	600	(*)	(*)	3,500
Chesapeake	(*)	(*)	(*)	1,300	1,100	2,500
Yellowtail	600	2,100	300	(*)	(*)	3,000
Remaining Rockfish	800	3,700	1,800	4,300	3,200	14,000
Flatfish						
Dover Sole	2,400	11,500	8,000	5,000	1,000	27,900
English Sole						* 1,500
Petrale Sole	600	1,100	500	800	200	3,200
Other Flatfish (except arrowtooth flounder)	700	3,000	1,700	1,600	500	7,500
Other Fish³						
Jack Mackerel						* 12,000
Others	2,500	7,000	1,200	2,000	2,000	14,700

¹ U.S. portion.
² These species are not common nor important in the areas footnoted. Accordingly, for convenience, Pacific cod is included in "Other" category for the areas footnoted and rockfish species are included in the "Remaining Rockfish" category for the areas footnoted only.
³ Total all areas.
⁴ Monterey Bay only.
⁵ "Other rockfish" means rockfish species at § 665.2, as amended, which do not have a numerical OY.
⁶ "Other fish" includes sharks, skates, rattfish, monk, groundlings, jack mackerel, arrowtooth flounder, and, in the Eureka, Monterey, and Coronation area, Pacific cod. "Other fish" is part of the "other species" category listed at § 663.2.
⁷ North of 39° N. latitude.

TABLE 2.—FINAL SPECIFICATIONS OF OY AND ITS DISTRIBUTION FOR 1985

[In thousands of metric tons]

Species	Total OY	DAP	JVP ¹	DAH	Reserve	TALFF ²
Pacific whiting	175.0	10.0	85.0	65.0	35.0	45.0
Sablefish	* 13.6	13.6	0.0	13.6	0.0	0.0
Pacific ocean perch	* 1.55	1.55	0.0	1.55	0.0	2.0
Shortbelly rockfish	10.0	3.4	0.0	3.4	0.0	6.6
Widow rockfish	9.3	9.3	0.0	9.3	0.0	2.0
Jack mackerel	12.0	2.0	10.0	12.0	0.0	0.0
Other species	(*)					

¹ In the foreign treaty and joint venture fisheries for Pacific whiting, incidental catch allowance percentages (based on TALFF) and incidental retention allowance percentages (based on JVP) are: sablefish 0.173%, Pacific ocean perch 0.062%, rockfish excluding Pacific ocean perch 0.736%, flatfish 0.1%, jack mackerel 3.0%, and other species 0.5%. In foreign treaty and joint venture fisheries, "other species" means all species, including non-groundfish species, except Pacific whiting, sablefish, Pacific ocean perch, rockfish excluding Pacific ocean perch, flatfish, jack mackerel, and prohibited species. In a foreign treaty or joint venture fishery for species other than Pacific whiting, incidental allowance percentages will be stated in the conditions and restrictions to the foreign fishing permit. See § 611.70(c)(2) for application of incidental retention allowance percentages to joint venture fisheries.
² Of this 13,600 metric tons, 2,500 metric tons is for part of the Monterey subarea. See § 663.21(e)(1).
³ Of this 1,550 metric tons, 800 metric tons is for the Vancouver subarea and 650 metric tons is for the Columbia subarea. Pacific ocean perch from other subareas are included in the OY for "other species." See § 663.21(a)(3).
⁴ The total OY for "other species" is that amount of fish that may be lawfully harvested and/or processed under § 611.70 and Part 663. See § 663.2 for species listing.

Classification

These final specifications are made under the authority of 50 CFR 663.24. This action is in compliance with Executive Order 12291 and is covered by the Regulatory Flexibility Analysis prepared for the authorizing regulations.

116 U.S.C. 1801 et seq.).

List of Subjects in 50 CFR Part 663

Administrative practice and procedures, Fish, Fisheries, Fishing.

Dated: December 31, 1984.

Garnet J. Blondin,

Deputy Assistant Administrator for Fisheries Resource Management, National Marine Fisheries Service.

[FR Doc. 84-34033 Filed 12-31-84; 5:03 pm]

BILLING CODE 3510-22-44

List of Subjects in 50 CFR Part 663

Dated: January 3, 1984.

Administrative practice and procedure, Fish, Fisheries, Fishing.

Carmen J. Bloodin,
Deputy Assistant Administrator for Fisheries
Resource Management, National Marine
Fisheries Service.

TABLE 1.—1984 SPECIFICATIONS OF ABC

(In thousands of metric tons)

Species/areas	Vancouver ¹	Columbia	Eureka	Monterey	Conception	Total
Groundfish						
Lingcod	1.0	4.0	0.5	1.1	0.4	7.0
Pacific cod	2.2	0.9	(?)	(?)	(?)	3.1
Pacific whiting						* 175.5
Sebastes ²				* 2.5		* 13.4
Rockfish						
Pacific ocean perch	0.8	0.85	(?)	(?)	(?)	1.55
Shortbelly						* 10.0
Widow	0.3	5.4	1.8	1.8	(?)	9.3
Other rockfish ³						
Scorpaen	(?)	(?)	(?)	4.1	2.0	6.1
Geny	0.8	1.3	0.6	(?)	(?)	2.7
Chilipepper	(?)	(?)	(?)	1.3	1.0	2.3
Yellowtail	1.4	1.5	0.3	(?)	(?)	3.2
Remaining rockfish	0.5	3.7	1.8	4.3	3.3	13.7
Flatfish						
Dover sole	2.4	7.2	8.0	5.0	1.0	23.6
English sole	0.8	2.0	0.8	0.8	0.2	4.5
Petrale sole	0.6	1.1	0.5	0.8	0.2	3.2
Other surflet (except snowdrift flounder)	0.7	3.0	1.7	1.8	0.5	7.7
Other fish ⁴						
Jack mackerel ⁵						12.0
Others	2.5	7.0	1.2	2.0	2.0	14.7

¹ U.S. portion.
² These species are not common or important in the area footnoted. Accordingly, for convenience, Pacific cod is included in the "other fish" category for the areas footnoted, and rockfish species are included in the "remaining rockfish" category for the areas footnoted.
³ Total all areas.
⁴ Monterey Bay only.
⁵ "Other rockfish" means rockfish species listed in § 663.2 which do not have a numerical OY.
⁶ "Other fish" includes herring, sculpin, netlet, mounds, greenstems, jack mackerel. "Other fish" is part of the "other species" category listed in § 663.2.
⁷ North of 35°00' N. latitude.

TABLE 2.—1984 SPECIFICATIONS OF OY AND ITS COMPONENTS

(In thousands of metric tons)

Species	Total OY	DAP	JVP ¹	DAH	Reserve	TALFF ¹
Pacific whiting	175.5	10.0	100.0	110.0	35.0	30.5
Sebastes	* 17.4	17.4	0.0	17.4	0.0	0.0
Pacific ocean perch	* 1.55	1.55	0.0	1.55	0.0	0.0
Shortbelly rockfish	10.0	3.4	0.0	10.0	0.0	6.6
Widow rockfish	9.3	9.3	0.0	9.3	0.0	0.0
Other species	(?)					

¹ In the foreign troll and joint venture fisheries for Pacific whiting, incidental catch allowance percentages (based on TALFF) and incidental retention allowance percentages (based on JVP) are: Sebastes 0.173%, Pacific ocean perch 0.062%, Rockfish excluding Pacific ocean perch 0.738%, flatfish 0.1%, jack mackerel 3.0%, and other species 0.5%. In foreign troll and joint venture fisheries, "other species" means all species, including non-groundfish species, except Pacific whiting, sculpin, Pacific ocean perch, rockfish excluding Pacific ocean perch, flatfish, jack mackerel, and prohibited species. In a foreign troll or joint venture fishery for species other than Pacific whiting, incidental allowance percentages will be stated in the conditions and restrictions to the foreign fishing permit. See § 611.70(c)(2) for application of incidental retention allowance percentages to joint venture fisheries.
² Of this 17,400 metric tons, 2,500 metric tons is for part of the Monterey subarea. See § 663.21(a)(2).
³ Of this 1,550 metric tons, 600 metric tons is for the Vancouver subarea and 950 metric tons is for the Columbia subarea. Pacific ocean perch from other subareas are included in the OY for "other species." See § 663.21(a)(3).
⁴ The total OY for "other species" is that amount of fish that may be lawfully harvested and/or processed under § 611.70 and Part 663. See § 663.2 for species listing.

[FR Doc. 84-463 Filed 1-4-84; 120 pp.]
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APPENDIX D

Summary of ADF&G break away longline tagging program in southeast Alaska

During 1984 ADF&G initiated a tagging program to determine movement and migration of demersal shelf rockfish off Southeast. To avoid the high mortality associated with surface tagging in these fishes an in-situ tag adapted from a design by Grimes (1983) was used. The vinyl tubing tag is attached to a circle hook and tied to the gangion with a piece of light test monofilament. The tag is baited and snapped on to the longline as the gear is deployed. Regular gangions are interspersed between the tag gear to allow for species composition sampling. 890 tags were set in the commercial fishing grounds in May 1985. The project is scheduled to set 2,110 additional tags this year. No tag returns had been reported as of June 26, 1985.

APPENDIX E

Rockfish Tagging -- Kenai Peninsula

Initiated in August of 1984 this project was aimed at collection of information on school size and movement of Black (*Sebastes melanops*) and Dusky (*S. ciliatus*) rockfish along the Outer coast of the Kenai Peninsula. In the initial phase of the study 400 Black and Dusky rockfish were tagged (floy anchor) from a small skiff (sport hook and line caught) at two locations in the Granite Island area, approximately 30 air miles south of Seward. Each area (school) was selected by underwater observations for its apparent isolation to other rockfish schools. Pre-tagging SCUBA survey estimates were made of each school (total number of individuals) in hopes of developing a method of visually estimating (by means of SCUBA) fish numbers before and after commercial exploitation. During 1984 and 1985 dive transect surveys were conducted and tagged to total number of fish were counted. From this ratio total school size was calculated and compared to initial pre-tag survey estimates. Peripheral schools were also examined for movement of tagged fish from the adjacent study area. Study areas were separated by sufficient open water of considerable depth to make exchange of tagged fish between schools extremely unlikely.

Results of 1984 dive surveys conducted immediately after tagging indicated pre-tag population estimates of about 25% of calculated values. At that time percent of tagged fish to total fish (individual dive survey results) ranged from 3.4% to 23%. In 1985 percent of tagged fish to total fish ranged from 0 to 8.5% indicating apparent mortality or movement of tagged fish. No tagged fish were observed in any peripheral areas surveyed.

APPENDIX F

Economic Status of the Washington, Oregon, and
California Groundfish Fishery in 1984

By
Charles S. Korson
Wesley Silverthorne

Prepared for the
TWENTY-SIXTH ANNUAL MEETING
of the
TECHNICAL SUBCOMMITTEE
of the
CANADA/UNITED STATES GROUND FISH COMMITTEE

June 18-20, 1985
Juneau, Alaska

Southwest Region
National Marine Fisheries Service
300 South Ferry Street
Terminal Island, California 90731

I. Introduction

This report reviews the economic performance of the Washington, Oregon, and California (WOC) groundfish industry in 1984. Indicators of economic performance such as total catch, total exvessel revenue, revenue per vessel, and number of operating vessels, are provided for major components of the groundfish fleet.

II. Overview of the Fishery in 1984

The total landings and exvessel value of landings of groundfish from U.S. waters off Washington, Oregon, and California remained almost the same in 1984 as they had been in 1983. The total landings in 1984 were 168,635 mt (including joint venture deliveries) compared to 169,808 mt in 1983 (Table 1). The exvessel value of these landings declined 2.4 percent, from \$62,417,000 in 1983 to \$60,931,000 in 1984. However, this apparently static outcome was the result of offsetting changes within the groundfish industry.

The joint venture Pacific whiting landings increased substantially in 1984, but this increase was offset by a nearly 16 percent decline in domestic rockfish landings and a 6 percent decline in flatfish landings. The shoreside WOC groundfish landings for all species were down 8.3 percent in 1984 (Table 2). Developments in the fisheries for principal components of the groundfish catch are given below.

Sablefish

Sablefish landings declined 3 percent, from 14,500 mt in 1983 to 14,100 mt in 1984. This follows a 22 percent drop in landings from 1982-1983. The exvessel value of sablefish landings was \$7.2 million compared to \$8.0 million in 1983. Sablefish still remains one of the most valuable commercial species on the WOC coast.

Widow Rockfish

Since reaching a high of almost 28,000 mt in 1981, widow rockfish landings have fallen in each of the last three years. This decline has been the result of declining quotas imposed by the Pacific Fishery Management Council in order to bring the catch down and stabilize the biomass at a level consistent with MSY. Landings were limited in 1984 by the quota (OY) of 9,300 mt set by the Pacific Fishery Management Council (PFMC). The catch totaled 9,620 mt in 1984 compared to 9,900 mt in 1983. The resulting small decline in landings was offset by an increase in the exvessel value of these landings; the exvessel value of \$4.8 million was 14 percent higher than in 1983.

Other Rockfish

Landings of rockfish (excluding POP and widows) were 28,700 mt, down 20 percent from the 1983 total of almost 36,000 mt. The value of these landings was 10.5 percent lower in 1984. The sharp decline in rockfish production was due primarily to the reduction in the harvest guideline established for the Sebastes complex in the Columbia/Vancouver INPFC areas. The rockfish group represented 34 percent of the total value of groundfish landed in WOC in 1984, compared to 35.4 percent in 1983.

Flatfish

Landings of all flatfish totaled 27,600 mt, off 6 percent from the 29,400 mt of flatfish delivered shoreside in 1983. The reduction applies to all the major species in the group - dover sole, petrale sole, and english sole. Dover sole landings fell only slightly, while english and petrale sole declined more significantly (Table 3). The exvessel value of dover sole landings was essentially unchanged from 1983 and this species continues to rank second in commercial importance for the WOC groundfish fishery. The lower production of petrale and english sole was accompanied by a decline in exvessel values; english sole values dropped 26 percent and petrale sole fell 18 percent.

Pacific Whiting

The trawl fleet delivered 2,700 mt of Pacific whiting to U.S. processors in 1984, more than doubling the total for 1983 (Table 3). Renewed industry efforts to develop markets for frozen headed-and-gutted and canned whiting was responsible for the substantial increase in landings. At the same time, the joint venture fisheries continued to expand, landing 79,047 mt of fish, 78,889 mt of which were Pacific whiting (Table 4). The total revenue to U.S. fishermen from Pacific whiting was approximately \$12 million in 1984, making it the leading revenue source among groundfish species.

III. Harvesting Sector

Otter Trawl Fleet

Otter trawl fleet revenue from groundfish landings in 1984 was approximately \$48.8 million, compared to \$51 million in 1983, while trawl fleet size was 403 and 439 in those respective years (this includes joint venture boats operating off WOC but making no landings in those states). Thus, average revenue per vessel increased from \$116 thousand in 1983 to \$121 thousand in 1984, or just enough to offset the effects of inflation from 1983 to 1984. This increase, however, was not shared equally by all segments of the trawl fleet; revenue per vessel for the non-joint venture fishery dropped slightly from \$93.5 thousand in 1983 to \$92.6 thousand in 1984 (Table 5).

Breakdowns of the WOC trawl fleet by length and home state as well as average physical characteristics are given in Table 6. The changes in length-frequencies since 1983 suggest that the fleet is becoming more homogeneous; the percentage decline in vessels over 89 feet and less than 60 feet in length has been substantially greater than for vessels in the 60-89 feet range. The otter trawl fleet declined in size for the second consecutive year (Table 7).

Pot/Trap Vessels

Groundfish caught and landed with traps (pots) amounted to 3,850 mt in 1984, or 29 percent lower than the total for 1983 (Table 5). Over 99 percent of the volume consisted of sablefish. The exvessel value of these landings decreased 35 percent to \$2.35 million or 37.5 percent after adjusting for inflation.

WOC pot sablefish landings have declined for the second consecutive year, but the causes are uncertain. In 1983 demand decreased for sablefish in Japanese markets; however, the market situation in Japan improved significantly in 1984. The Japanese purchased greater quantities of U.S. sablefish to offset a reduction in their catch. The Alaskan harvest of sablefish with longline gear increased from 32,00 mt in 1983 to over 8,000 mt in 1984 while exvessel prices rose substantially in 1984 (Joseph Terry, personal communication, 1985). However, off WOC the average weighted price per pound paid for pot sablefish declined from \$0.303 in 1983 to \$0.277 in 1984. This drop in average price despite apparently increased demand may have occurred as a result of a shift in the size composition of the catch to smaller, lower priced fish.

Other Gear Vessels

The WOC groundfish catch by other gear, including longline, set-nets, troll, jigs, poles and shrimp trawl was approximately 13,500 mt in 1984. This was 28.5 percent higher than the total for 1983. The exvessel value of \$9.8 million was 25 percent above the 1983 exvessel value of landings by other groundfish gear. Within this gear group, longline landings remained relatively stable, while landings by the gillnet fleet in California continued to expand.

Table 1. Landings and Ex-vessel Values of Landings in Washington, Oregon, and California, including Joint Venture Deliveries in Waters off these States.

	<u>1984</u>	<u>1983</u>	<u>% Change</u>
Shoreside (mt)	89,588	97,665	-8.3
Joint Venture (mt)	79,047	72,137	+9.6
	-----	-----	-----
Total WOC Landings	168,635	169,802	-0.70
Shoreside Values \$			
Current	49,090,200	52,200,600	-6.0
Real*	21,974,000	24,421,000	-9.3
Joint-Venture Value			
Current	11,841,000	10,217,000	+15.9
Real	5,300,400	4,744,600	+11.7
Total WOC Groundfish Landed Value			
Current	60,931,000	62,417,000	-2.4
Real	27,274,000	28,986,000	-5.9

*Real values are current values adjusted to eliminate the effects of inflation. This adjustment has been made by dividing current values by the current year GNP implicit price deflator, with a base year of 1972.

Table 2. California, Oregon, and Washington Commercial Groundfish Landings from U.S. FCZ Waters (Metric Tons) and Ex-Vessel Values (Thousands of Dollars) from 1977-1984.

Year	California		Oregon		Washington		Total Coast	
	mt	\$	mt	\$	mt	\$	mt	\$
1977	32,082	12,184.5	10,172	4,150.3	12,712	4,361.7	54,966	20,697
1978	36,805	18,456.7	16,469	7,871.4	19,285	8,213.0	72,559	34,541
1979	36,392	19,565.9	28,935	17,264.0	22,508	11,111.7	87,835	47,942
1980	36,862	16,551.4	28,515	11,424.6	22,514	9,119.3	87,891	37,095
1981	42,698	21,460.4	37,487	14,711.1	23,683	10,652.5	103,868	46,824
1982	52,608	27,794.9	41,021	20,443.7	25,474	12,100.4	119,002	60,339
1983	39,498	21,984.0	35,200	18,420.2	22,970	11,795.9	97,668	52,200
1979-83 Average	41,612	21,471.0	34,232	16,453.0	23,430	10,956.0	99,253	48,880
1984	40,360	22,726.1	28,218	15,265.2	21,010	11,098.8	89,588	49,090

Source: 1977-1980 preliminary data from State Fishery Agencies
 1981-1984 preliminary data from PacFIN reports

Species	-----1984-----		-----1983-----		-----1982-----	
	mt	\$	mt	\$	mt	\$
Lingcod	4,052	2,281,800	4,146	2,360,900	-2.3	
Pacific Cod	585	301,100	597	311,500	-2.0	-3.9
Pacific Whiting	2,716	405,700	1,051	194,600	+158.4	+108.5
Sablefish	14,056	7,240,200	14,528	8,001,600	-3.2	-9.5
Pacific Ocean Perch	1,520	757,200	1,659	794,400	-8.4	-4.7
Widow Rockfish	9,620	4,786,700	9,904	4,213,700	-2.9	+13.6
Other Rockfish	28,662	16,444,100	35,920	18,381,200	-20.2	-10.5
Dover Sole	19,185	9,779,800	19,819	9,776,800	-3.2	+0.3
English Sole	1,719	1,219,200	2,336	1,656,400	-26.4	-26.4
Petrale Sole	1,733	2,707,100	2,193	3,300,100	-21.0	-18.0
Other Flatfish	4,990	2,661,000	5,052	2,861,800	-1.2	-7.0
TOTAL	88,838	48,584,000	97,205	51,853,000		

Source: PacFIN Reports, May 1985, preliminary data.

*Includes domestic landings from U.S. coastal waters off WOC, but not Puget Sound; a small amount of landings of miscellaneous groundfish species are not included in the totals.

Table 4. Landings and Participation in Pacific Whiting Joint-Venture Fisheries off of Washington, Oregon and California, 1979-1984.

<u>Year</u>	<u>Landings (mt)</u>	<u>Estimated Dollar Value</u>	<u>Number of Trawl Vessels</u>
1979	9,054	1,162,000	11
1980	26,793	3,275,000	15
1981	43,758	6,345,000	21
1982	68,420	10,367,000	17
1983	72,140	10,217,000	19
1984	79,047	11,841,000	21

Source: PacFIN Reports; NMFS Northwest Regional Office

Table 6. Washington, Oregon, and California Groundfish Trawl Fleet Activity in 1984 and 1983.

	1984	1983
Total Number Landing	399	436
Frequency by Size (Length) Class:		
< 30 feet	2	2
30-39	20	22
40-49	100	112
50-59	109	124
60-69	105	109
70-79	44	43
80-89	11	11
> 90	8	13
Fleet Characteristics:		
Average Length	57.43	57.43
Average Horsepower	310.8	312.4
Average Net Tonnage	45.8	45.7
Number Vessel Based in Each State:		
California	171	195
Oregon	145	161
Washington	83	80
Vessels Landing in More than One State	62	74

Table 7. Size of Washington, Oregon, and California Commercial Groundfish Fleets from 1977-1983.

Year	Otter* Trawl	Pot/Trap**	Longline**
1977	286	60	N/A
1978	351	119	N/A
1979	472	207	299
1980	458	116	205
1981	408	66	191
1982	444	82	208
1983	436	61	184
1984	399	N/A	N/A

Source: State Fishery Agencies

*Beginning in 1981, double counting of trawlers has been eliminated and therefore numbers represent the true size of the active otter trawl fleet.

**Vessels landing fish caught with this gear-type in two or more states are counted in each state. These numbers therefore are an upper bound for the true number of vessels using this gear-type.

APPENDIX G

MYXOSPORIDIAN PARASITES IN THE MUSCULATURE OF PACIFIC HAKE (WHITING)

(Synopsis of a manuscript prepared for publication by Z. Kabata and
D. J. Whitaker; Pacific Biological Station, Nanaimo, B.C.)

INTRODUCTION

Pacific hake (whiting), Merluccius productus, is an abundant, but under-utilized, resource occupying the continental shelf of North America, from Baja, California to British Columbia. Its under-utilization is due at least in part to the rapid deterioration of the flesh after death. Myxosporidian parasites (Kudoa sp.) have been suspected to be the causative agent.

In 1983, a joint Canada-U.S. study was undertaken to simultaneously investigate the technological (United States) and parasitological (Canada) aspects of the problem. This report briefly summarized the parasitological studies, undertaken by Canadian scientists.

MATERIALS AND METHODS

During July 17 - September 28, 1983, Pacific hake catches were sampled from 37 on-bottom trawl hauls of the triennial coastwide hake survey. Geographic range of the sampled catches was central California (37 degrees 18' N. lat) to

Juan de Fuca Strait (48 degrees 54' N. lat). Depth range was 34-163 fm. Total sample was 581 fish, of which 579 were processed. Each fish was frozen at capture. At the NMFS Laboratory (Seattle, WA), each frozen specimen was cut longitudinally into two equal parts.

One half of each specimen was retained in Seattle for technological studies by U.S. scientists, while the other half was shipped to the Pacific biological Station (Nanaimo) for parasitological studies by Canadian scientists. For each specimen, biological information included fork length (cm), sex, and location of capture. Capture "zones" (1-7 hauls in each) were established and numbered 1-12 from south to north, with 10 and 11 near the Columbia River. Age classes were assigned to the specimens on the basis of length -- 1+ = 11-14 cm; 2+ = 18-27 cm; 3+ = 33-43 cm; and >3+ = 44-80 cm.

Intensity of infection was quantitatively expressed in numbers of pseudocysts (infected muscle fibres) per gram of flesh, by age class and catch zone. Three types of infection were recorded: single infections with Kudoa paniformis or K. thyrstitis and mixed infection with both species. Separate accounts were taken of white pseudocysts (early stage of infection before the onset of the host's reaction is already in progress), and black pseudocysts (host's reaction already in progress).

For the sake of brevity, details of examination procedures have been omitted here.

RESULTS

Generally, incidence of K. paniformis decreased northward, and incidence of K. thyrstitis decreased southward. Inclusion of the "mixed" category did not disturb this relationship. Infection rate was negligible for age-classes 1+ and 2+, and substantially higher for age-class >3+ than for age-class 3+.

The reaction of hake to the two species of parasites differed in speed and efficiency. Infection with K. thyrstitis produced rapid and extensive reaction, manifest in the proportion of black pseudocysts. Only relatively few white pseudocysts were found and the overall intensity of infection tended to be low. Hence, this species has fairly slight impact on the quality of the flesh. The opposite holds true for K. paniformis. Slow and not very intensive reaction of the fish results in the preponderance of white pseudocysts and high intensity of infection. The effects on the flesh are correspondingly serious.

K. paniformis may even inhibit the extend of northern migration. Within age-class >3+, 72% of the fish with the highest intensity of white pseudocysts (>125/g) were caught in the southern zones (1-6), and 28% in the northern zones (7-12). Intensity of black pseudocysts was substantially lower, and exhibited no geographic cline -- 47% in zones 1-6; 53% in zones 7-12.

Other findings were : (1) fish are continually exposed to the parasite resulting in increasing prevalence and severity of infections over the animal's life span; (2) infections are chronic, but not lethal; (3) degeneration of encapsulated stages appears to be slow; and (4) K. thyrstitis infections are less common and less severe than those produced by K. paniformis.

A fourth study was aimed at identifying relationships between infestation levels and flesh texture. Preliminary results show increasing soft or mushy texture with increasing Kudoa counts. K. paniformis accounted for the highest infestation rates of up to 800/g of flesh. Highest infestation rates were associated with flesh containing "white" pseudocysts and counts fell significantly in muscle with "black" pseudocysts. Kudoa counts per gram of muscle were lowest in fish taken off Oregon, Washington, and British Columbia and highest in samples from off California.

APPENDIX H

Bering Sea Pacific hake (whiting) parasite study

During the past year National Marine Fisheries Service scientists have been engaged in a number of studies of myxosporean parasites infesting whiting, one of which seriously affects the marketability of whiting products.

An ultrastructural study examined the sporogenesis of Kudoa paniformis. Capsulogenesis and valvogenesis occur in a manner similar to that of other myxosporeans, but sporogenesis differed in two aspects: (1) spore development does not appear to begin as a result of one generative cell engulfing another and (2) the sporoplasm of developing and mature spores contains two morphologically distinct cells, one of which surrounds the other.

Ultrastructural studies were also conducted on the host-parasite interaction. Host response was observed only after a plasmodium had replaced the width of an infected muscle fiber. At that time, the plasmodia became encapsulated and occasional phagocytes were located at the capsule edge. Encapsulated plasmodia did not appear to be proteolytically active. Melanin deposition did not occur, but encapsulated plasmodia with deteriorating spores contained breakdown products. An independent microscopic study confirmed host reaction which first consisted of the appearance of phagocytes, followed by granulomata and capsule formation. Again, host reaction did not occur until the invaded muscle fiber was either replaced or liquified.

APPENDIX I

Report of CARE Working Group

The TSC recognizes the importance of the efforts of CARE (Committee of Age Reading Experts) and the accomplishments of this group at their meetings and workshops. In an effort to facilitate continued progress, the TSC proposes that the primary focus of CARE is the description of groundfish age-reading methods and the development of age-reading quality-control procedures among agencies. It further recommends that CARE meet annually and provide a report of each meeting to TSC; that within the guidelines above, they (CARE) develop their own terms of reference, report these to TSC, and carry out their initiatives; and that TSC agencies seek the necessary financial support to convene the annual meeting.

Note: Underlined sections were suggested by reviewers.

APPENDIX J

RECOMMENDATION

TO: CARE

AGENDA SECTION: XI.A.1

FROM: TSC

SUBJECT: Annual Groundfish age-reading methods report

For the past several years, the subject of listing "endorsed" species for groundfish age determination has been discussed by the Technical Sub-Committee. Many species are still being evaluated for preferred age-reading methods, and many species lack validation. As an interim measure, the TSC recommends that agency summaries of current groundfish age-reading methods be furnished as an appendix to the minutes of the next annual Committee of Age Reading Experts (CARE) meeting, and updated annually. An aging method update would be valuable for determining methods used by species by area by the various agencies. This report should be considered for reference purposes only, and should not be construed as an endorsement of preferred coast-wide age-reading methods.

APPENDIX K

RECOMMENDATION

Proposed Terms of Reference for CARE

PURPOSE

The primary role of CARE is the development and description of agreed on standards and age reading quality control procedures within and among agencies responsible for management of groundfish on the northeast Pacific rim. Results of these efforts shall be reported to the Technical Sub-Committee (TSC) of the Canada-United States Groundfish Committee.

MEMBERSHIP AND OFFICERS

Membership of CARE shall be limited to agencies represented on the TSC, including PMFC, with participation by appropriate educational institutions and other groups with special knowledge or interest in groundfish ageing. A chair, vice chair and recorder (secretary/reporter) shall be chosen and serve at the pleasure of CARE. Elections (selections) of officers shall be on odd numbered years for 2-year terms on a July 1 to June 30 basis. As needed, CARE may

establish sub-committees to deal with specific issues such as age reading methodology and quality control. The officers and sub-committee chairpersons (if any) shall constitute an executive committee to establish meeting locations, dates, preliminary agendas, etc.

OPERATING PROCEDURES

Annual meetings shall be held at mutually agreed upon locations within the jurisdiction of the parent committee where facilities are adequate to carry out the purposes of said meetings. The member agencies shall seek the necessary financial support to convene the annual meeting. Special meetings may be called at the request of a majority of the membership or the TSC to deal with high priority issues. Where special expertise such as experimental design or biometric/statistical analyses, etc., are required, CARE may draw on the TSC or other resources as needed. Results of the meetings shall be circulated to the CARE membership and participants and reported to the TSC by the chair of CARE. PMFC shall act as the coordinating secretariat of CARE.

APPENDIX M₂

RECOMMENDATION

TO: Parent Committee

AGENDA SECTION: XI.C.2

FROM: Technical Sub-Committee

SUBJECT: Southwest Fisheries Center participation

The technical Sub-Committee (TSC) of the Canada-United States Groundfish Committee has provided a forum to discuss, coordinate, and promote coastwide groundfish research since 1959. Because of increased emphasis on groundfish research by the Southwest Fisheries Center (SWFC) of the National Marine Fisheries Service (NMFS), it seems appropriate that the SWFC be encouraged to participate in TSC activities. The TSC recommends to Parent committee that the SWFC be invited to send an observer to future TSC meetings and to submit a brief written report which is responsive to the meeting agenda as appropriate.

APPENDIX M₃

RECOMMENDATION

TO: Parent Committee

AGENDA SECTION: XI.C.3

FROM: TSC

SUBJECT: Annual Economic Report

The Technical Sub-Committee (TSC) was pleased to receive, and has found very informative, an economic report of the groundfish fisheries in the Washington-California region. Due to the recent growth of domestic/joint venture fisheries in the Alaska area and the very dynamic character of groundfish fisheries throughout the Northeastern Pacific Ocean and Bering Sea, the TSC believes that economic data are a necessary and important element of fisheries analyses.

The TSC recommends that an annual report be presented by each nation which summarizes catches and ex-vessel values by important groundfish species or species groups by convenient periods (i.e. calendar quarters), by convenient

geographical areas (i.e. state or province), and by gear for fisheries occurring throughout the Northeastern Pacific Ocean and Bering Sea. Similar information for important non-groundfish species should also be included for purposes of comparison.

APPENDIX M₄

RECOMMENDATION

TO: Parent Committee

AGENDA SECTION: XI.C.4

FROM: TSC

SUBJECT: Proposed division of International Statistical Area 3C

The Technical Sub-Committee (TSC) recommends that International Statistical Area 3C be divided into two parts -- 3C-N and 3C-S. Area 3C-N comprises that portion lying north of the provisional Canada-U.S. boundary. Area 3C-N and 3C-S will replace Area 3C in the PMFC Groundfish Data Series.

APPENDIX M₅

RECOMMENDATION

TO: Parent Committee

AGENDA SECTION: XI.C.6

FROM: TSC

SUBJECT: Proposed division of INPFC stat area Vancouver

The Technical Sub-Committee (TSC) recommends that INPFC Area Vancouver be divided into two parts -- Vancouver-N and Vancouver-S. Vancouver-N comprises that portion lying north of the provisional Canada-U.S. boundary. Vancouver-S comprises that portion lying south of the provisional Canada-U.S. boundary.

