

**STATE OF ALASKA
GROUNDFISH FISHERIES
ASSOCIATED INVESTIGATIONS IN 2000**

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ALASKA DEPARTMENT OF FISH AND GAME
DIVISION of COMMERCIAL FISHERIES
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AGENDA ITEM VII. REVIEW OF AGENCY GROUND FISH RESEARCH, STOCK ASSESSMENT, AND MANAGEMENT

A. Agency Overview

1. Description of the State of Alaska commercial groundfish fishery program:

The Alaska Department of Fish and Game (ADF&G) has jurisdiction over all commercial groundfish fisheries within the internal waters of the state and to three miles offshore along the outer coast. A provision in federal Gulf of Alaska (GOA) Groundfish Fishery Management Plan (FMP) gives the State of Alaska limited management authority for demersal shelf rockfish in the federal waters east of 140° W. longitude. Council action in 1997 removed black and blue rockfish from the Gulf of Alaska FMP so the state now manages these species in both state and federal waters of the GOA. The state also manages the lingcod resource in both state and federal waters of Alaska. Other groundfish fisheries in Alaskan waters are managed by the federal government or in conjunction with the federal management of the adjacent Exclusive Economic Zone (EEZ). The information related in this report is from the state-managed groundfish fisheries only.

The State of Alaska is divided into three maritime regions for marine commercial fisheries management. The Southeast Region extends from the Exclusive Economic Zone (Equi-distant line) boundary in Dixon Entrance north and westward to 144° W. longitude and includes all of Yakutat Bay. This is a change from recent years when the Central Region began at 140° W. longitude. The Central Region includes the internal waters of Prince William Sound (PWS), Cook Inlet, and Bristol Bay and the Outer District off the Kenai Peninsula. The Westward Region includes all territorial waters of the Gulf of Alaska west of Cape Douglas and includes Kodiak Island, the Aleutian Islands, and the Bering Sea.

a. Southeast Region

The Southeast Region Commercial Fisheries Groundfish Project is based in Sitka with the groundfish project leader, assistant project leader and 2 port biologists located there. Seasonal port samplers and data entry staff were employed in Petersburg, Ketchikan, Sitka, and Craig. The project also received biometrics assistance from the regional office in Douglas.

The Southeast Region's groundfish project has responsibility for research and management of all commercial groundfish resources in the territorial waters of the Eastern Gulf of Alaska. The project also cooperates with the federal government for management of the waters of the adjacent EEZ and the project leader participates as a member of the North Pacific Fisheries Management Council's Gulf of Alaska Groundfish Plan Team and produces the annual stock assessment for demersal shelf rockfish for consideration by the North Pacific Fishery Management Council.

Project activities center around fisheries monitoring, resource assessment, and in-season management of the groundfish resources. In-season management decisions are based on data collected from the fisheries and resource assessment surveys. Primary tasks include fish ticket collection, editing, and data entry for both state and federal-managed fisheries; dockside sampling of sablefish, lingcod, Pacific cod, and rockfish landings; skipper interview and logbook collection and data entry; and biological studies of important commercial species. Five resource assessment surveys were conducted during 2000. Funding for the Southeast Groundfish project comes from NOAA Grants NA77FM0209, NA76FI0210 and NA67FN0441B and AKFIN AR 41713/GR 41934 NA97FN0121, CFDA 11-437.

b. Central Region

Central Region groundfish staff is headquartered in Homer and is comprised of a regional groundfish management biologist, a regional shellfish/groundfish research project leader, a groundfish fish ticket entry position, and several commercial catch samplers. An area management biologist is also located in Cordova, a seasonal part-time sampler in Seward, and regional support comes from Anchorage. The research project leader also functions as a member of the North Pacific Fishery Management Council's Gulf of Alaska Groundfish Plan Team.

Groundfish responsibilities in Central Region include research and management duties for most groundfish species occurring in territorial waters of Central Region.. Within Central Region, groundfish species of primary interest include sablefish, rockfish, pollock, Pacific cod, and lingcod. Stock assessment data are collected through port sampling, acoustic surveys, and through ADF&G trawl and longline surveys. Commercial harvest data (fish tickets) are processed in Homer for state and federal fisheries landings to Central Region ports. The development of a state waters Pacific cod fishery in 1997 has provided an extended opportunity for smaller vessels fishing pot and jig gear. Sampling this fishery has become a primary focus of port samplers.

c. Westward Region

The Westward Region Shellfish management and research staff is located in

Kodiak and Dutch Harbor, with seasonal dockside sampling in Chignik, Sand Point, and King Cove. The R/V Resolution and R/V K-Hi-C are home ported in Kodiak and conduct a variety of groundfish related activities in the waters around Kodiak, the south side of the Alaska Peninsula, and in the eastern Aleutian Islands.

Major groundfish activities include fish ticket editing and entry for approximately 11,000 tickets from both state and federal fisheries, analysis of data collected on an annual multi-species trawl survey encompassing the Kodiak archipelago, Alaska Peninsula and Eastern Aleutians, management of the black rockfish, state water Pacific cod, and Aleutian Island sablefish fisheries, conducting dockside interview and biological data collections from commercial groundfish landings, and a number of research projects.. In addition, the Westward Region has a member on the North Pacific Fisheries Management Council's Bering Sea/ Aleutian Island Groundfish Plan Team (Ivan Vining) and the Gulf of Alaska Groundfish Plan Team (David Jackson).

d. Headquarters

ADF&G personnel continued to collect, review, edit and amend, data capture, and archive all ADF&G fish ticket submitted to local offices. These tickets include those required as well as tickets voluntarily submitted by EEZ operators.

In 1998 ADF&G entered into a contract with the Pacific States Marine Fisheries Commission to expand previous data collection and management duties previously carried out under PACFIN. This new contract, which funds most of the ground fish fisheries data collection and analysis by ADF&G, is part of the Alaska Fisheries Information Network (AKFIN). It specifically supports the enhancement of the fish ticket information collection effort and includes: GIS database development and fishery data analysis, catch and production database development and access, age reading laboratory, database management, administration, Bering sea crab data collection and reporting, various fishery economic projects and regional fishery monitoring and data management.

Local ADF&G personnel in nine locations throughout the state of Alaska (Craig, Ketchikan, Petersburg, Sitka, Juneau, Seward, Homer, Kodiak, and Dutch Harbor) maintained close contact with fishers, processors and enforcement to maintain a high quality of accuracy in the submitted fish ticket records. Following processing, the electronic data was transferred to Headquarters on a regularly scheduled basis. The research analyst working with this project works as part of a team to maintain a master statewide groundfish fish ticket database. Data feeds to Headquarters were merged to this master database. Data was routinely reviewed for accuracy with corrections applied as required. Within the confines of confidentiality agreements, raw data was distributed to the Alaska Regional office of National Marine Fishery Service (NMFS-ARO and

NMFS_AFSC), the North Pacific Fishery Management Council (NMFS), the Commercial Fisheries Entry Commission (CFEC), the Pacific States Fisheries Information Network (PACFIN) and the AKFIN Support Center on a regularly scheduled basis. Summary groundfish catch information was also provided back to regional ADF&G offices as well as to the State of Alaska Board of Fish, NMFS, NPFMC and the AKFIN Support Center.

The ADF&G Gene Conservation Laboratory continued studies on genetic diversity and gene flow for a variety of groundfish species in 2000. Efforts focused on black rockfish, light and dark dusky rockfish, and pollock.

Age Determination Unit

The ADFG's centralized, statewide age reading program at the Age Determination Unit (ADU), continued with baseline improvements to physical work spaces, strengthening and broadening reader skills, inventorying and minimizing a backlog of age structures collected in the 1980's, in addition to reading an ever-increasing volume of current samples. In 2000, six people were directly employed for approximately 40 work months to read groundfish and invertebrate age structures and substantial associated work. With only 2 highly experienced age readers on staff (total 14 months effort with less than 1/2 available to age-reading of structures), a great amount of time continues in training age-readers and testing their progress. An additional position has been requested and is expected to receive funding for FY02.

Otolith sampling has increased in both Southeast (Region I) and Southcentral (Region II) Alaska, with receipts at the ADU remaining high (Figure 1). The increases were dominated by lingcod, pacific cod, pollock, rougheye, shorttraker, and sablefish. These species are considered difficult to age, therefore this increasing volume of age structures doubly impacts the ability to process all structures within an inventory year.

The ADU continues to develop its comprehensive database (Oracle platform) with progress expected to increase in 2001. Its primary purpose is to provide easier access for in-house handling of inventory, age data, and quality control data, however one main feature will be integration with regional databases for routine off-hour downloads of new or updated age data to constituents.

Calibration of all readers occurs periodically through informal at-scope sessions for in-house readers, yearly when remote-reading staff in Kodiak and Homer gather in Juneau to work with local ADU staff, or biennially with attendance of CARE workshops.

Quality of age data are routinely assessed through second-reading 20% of the sample, either by the initial-reader (if they have demonstrated consistency in the past) or by an experienced second-reader. If species-specific control limits are

transgressed, additional specimens are reviewed and resolved. Annual and quintennial within and between-reader testing occurs for all readers, to assess drift in application of criteria over time.

The ADU has been working on refining criteria for several challenging species. We believe data for difficult species will benefit from re-evaluation after more years of experience are achieved by a reader or laboratory. Sablefish is one species undergoing re-reading of prior years samples with belief that it is resulting in “better data”. Pollock was elevated to review status for age-reading criteria early in 2000, when a between-lab precision check of 200 specimens revealed error suggesting that dramatically different criteria were being utilized in producing age data. In this comparison, the ADU staff consistently produced higher estimates of age for pollock. Since, the ADU has conducted substantial re-evaluation of their criteria, and feel that, if anything, we may yet be slightly underestimating the actual age of the species. A summary of this work and age-reading criteria will be prepared in the near future.

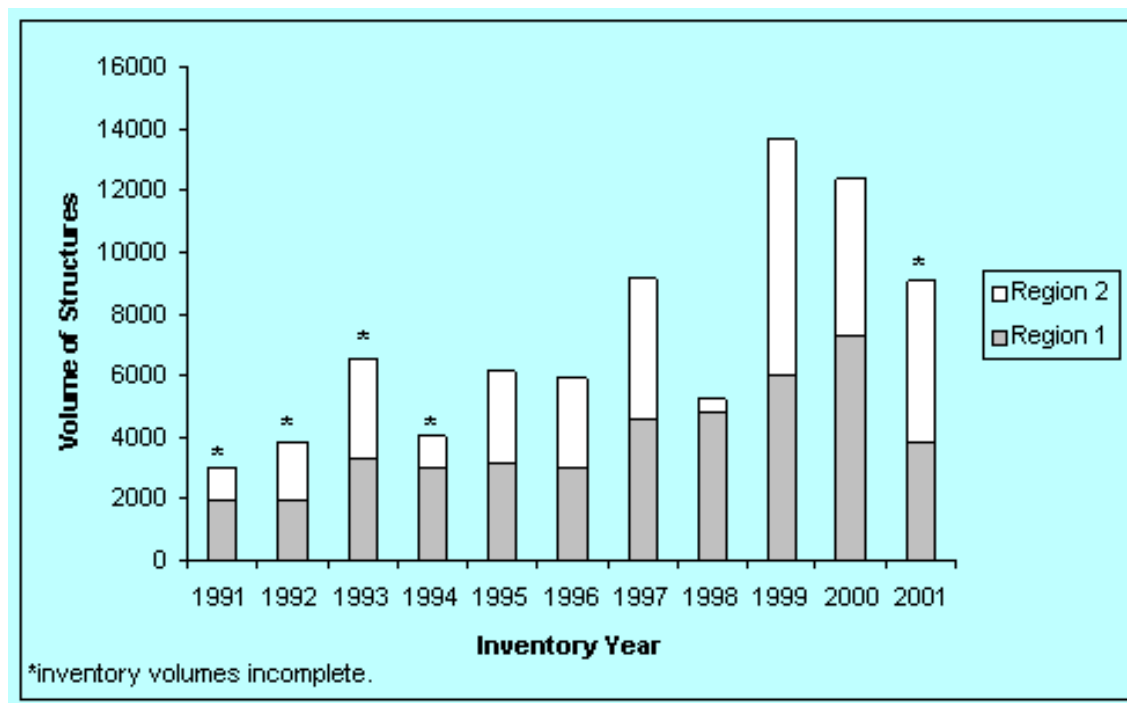


Figure 1. Age structure inventory received from Region 1 & 2.

e. Description of the State of Alaska recreational groundfish fishery program (Sport Fish Division)

ADF&G has jurisdiction over all recreational groundfish fisheries within the internal waters of the state, in coastal waters out to three miles offshore, and throughout the EEZ. The Alaska Board of Fisheries extended existing state regulations governing the sport fishery for all marine species into the waters of the EEZ off Alaska in 1998. This was done under provisions of the Magnuson-

Stevens Fishery Conservation and Management Act, which stipulate that states may regulate fisheries that are not regulated under a federal fishery management plan or other applicable federal regulations.

Most management and research efforts are directed at halibut, rockfish, and lingcod, the primary species targeted by the recreational fishery. Statewide data collection programs include a mail survey to estimate overall harvest (in number) of halibut, rockfish, lingcod, and sharks, and a mandatory logbook to assess harvest of the same species in the charterboat fishery. The Assistant Director of the Division of Sport Fish (Rob Bentz), located in Juneau, takes the statewide lead in federal-state jurisdictional management issues.

Regional programs with varying objectives address estimation of recreational fishery statistics including harvest and release magnitude and biological characteristics such as species, age, size, and sex composition. There are essentially two maritime regions for marine sport fishery management in Alaska. The Southeast Region extends from the Exclusive Economic Zone (Equi-distant line) boundary in Dixon Entrance north and westward to Cape Suckling, at approximately 144° W. longitude. The Southcentral Region includes state and federal waters from Cape Suckling to Cape Newenham, including Prince William Sound (PWS), Cook Inlet, Kodiak, the Alaska Peninsula, and Bristol Bay.

1. Southeast Region Sport Fish

Regional staff in Douglas coordinate a data collection program for halibut and groundfish in conjunction with a regionwide chinook salmon harvest studies project. The project leader is Mike Jaenicke while assistant project biologists are also located in Ketchikan (Dennis Hubartt) and in Juneau (position currently vacant). About 18 technicians at major ports in the Southeast region interview both anglers and charter operators and then collect data from sport harvests of halibut and groundfish while also collecting data on sport harvests of salmon. Data collected on groundfish are limited to species composition, length, and sex; no otoliths or other age structures are collected. Data are provided to the Alaska Board of Fisheries, other ADF&G staff, the public, and a variety of other agencies such as the NPFMC.

Area management biologists in Yakutat, Haines, Sitka, Juneau, Petersburg, Klawock, and Ketchikan are responsible for groundfish management in those local areas. In general, sport fisheries for groundfish are not actively managed in season.

2. Southcentral Region Sport Fish

The Southcentral Region groundfish staff is headquartered in Homer, and consists of the management and research biologist (Scott Meyer) and harvest assessment project assistant (Charlie Stock). The project biometrician (Pat Hansen) is

located in Anchorage. Six seasonal technicians collected data from the sport harvest at major ports in the region. Two technicians located in Homer read all groundfish age structures.

Southcentral region staff are responsible for research on sport halibut and groundfish fisheries and management of groundfish fisheries in state and federal waters. For all species, the lack of stock assessment information has precluded development of abundance-based fishery objectives. As a result, management is based on building a long-term, sustainable regulatory framework and in season management action has generally been unnecessary.

Ongoing assessment of sport harvest and fishery characteristics at major ports throughout the region is the primary activity. Staff collect data from harvested halibut, rockfishes, lingcod, and sharks, and interview anglers and charter boat operators. All age reading is done in Homer using project funds, and the project leader and assistant are active participants in the Committee of Age Reading Experts (CARE). Normal duties also include providing sport halibut harvest statistics to the International Pacific Halibut Commission (IPHC) and NPFMC, coordinating development and analysis of the statewide charter logbook program and statewide harvest survey, working with Alaska Board of Fisheries, advisory committees, and local fishing groups to develop local area management plans (LAMPs), drafting and reviewing proposals for recreational groundfish regulations, and dissemination of information to the public.

B. By Species

1. Pacific cod

a. Research

Catch rate and biological information is gathered from fish ticket records, port sampling programs, a tagging program, and during stock assessment surveys for other species. A mandatory logbook program was initiated for state waters of SE Alaska in 1997 to provide a relative index of CPUE. Commercial landings in SE, Central Region and the Westward Region are sampled for length, weight, age, sex, and stage of maturity.

The Westward Region has continued the cod-tagging program that was initiated in 1997 in the Central and Western Gulf of Alaska. Approximately 2400 fish were tagged in 2000, bringing the total number of tags released to 6,600. By year's end, 332 tags had been recovered. This project is continuing in 2001. Results to date show that while the vast majority of Pacific cod are recovered within 15 km of their tagging location, much longer recapture distances are possible. Several fish were recaptured more than 500 kms from their tagging location.

b. Management

Regulations adopted by the Alaska Board of Fisheries during November 1993 established guideline harvest range (GHR) of 340 to 570 mt for Pacific cod in the internal waters of SE Alaska. The GHR was based on average historic harvest levels rather than on a biomass-based ABC estimate.

Cod along the outer coast are managed in conjunction with the Total Allowable Catch (TAC) levels set by the federal government for the adjacent EEZ. However, there are gear restrictions in state waters in PWS, lower Cook Inlet, and around Kodiak Island to reduce crab bycatch.

In 1996, the Alaska Board of Fisheries adopted state water Pacific cod Management Plans for fisheries in 5 groundfish areas, Prince William Sound, Cook Inlet, Kodiak, Chignik and South Alaska Peninsula. Under these plans, participation is not restricted to vessels qualified under the federal moratorium program. Included within the plans were season, gear and harvest specifications. The fishing seasons are prosecuted after the federal season, which generally closes in the spring. The annual guideline harvest levels (GHLs) are based on the estimate of allowable biological catch (ABC) of Pacific cod as established by the NPFMC. The initial GHLs were set at 15% of the Western Gulf ABC to be reserved for the South Alaska Peninsula Area, 15% of the Central Gulf ABC to be apportioned between the Kodiak, Chignik and Cook Inlet Areas and 25% of the Eastern Gulf ABC for the Prince William Sound Area.

Additional regulations include a 58' vessel size limit in the Chignik and South Alaska Peninsula Areas and allocations between gear types in Kodiak, Cook Inlet and Prince William Sound. The fishery management plans also provided for removal of restrictions on exclusive area registrations, vessel size and gear limits after October 31 to increase late season production

Efforts have increased to collect biological data through port sampling. In addition, observers are used on day-trips to document catches and at-sea discards in the nearshore pot fisheries.

c. Fisheries

Most of the Pacific cod harvested in Southeast Alaska and the North Gulf District of the Cook Inlet Area is taken by longline gear. Pots are the dominant gear in the Cook Inlet District and in the Prince William Sound area. In the Westward Region, trawl gear takes over 60% of the harvest, with the remainder split between longline, jig, and pot gear. Prior to 1993 much of the cod taken in Southeast was utilized as bait in fisheries for other species. Pacific cod harvested since that time is roughly evenly divided between bait use and human consumption. In other areas of the state, Pacific cod are harvested in both state and federal waters and utilized primarily as food fish. Harvests of Pacific cod

totaled 268mt in the SE state-managed fisheries during 2000. The 2000 GHIL's for the Cook Inlet and Prince William Sound state-managed Pacific cod harvest were set at 980 mt and 1338 mt respectively. Harvest from the Central Region state-managed Pacific cod fisheries totaled 521 mt from Cook Inlet and 132 mt from PWS. Harvest from the 1999 state managed fishery in the Kodiak Area totaled 4,890 mt, while 2,927 mt of cod were harvested in the Chignik Area, and the South Alaska Peninsula Area harvest totaled 5,389 mt. The Kodiak and South Alaska Peninsula Areas obtained their maximum GHIL 'step up' provisions for 2000 and all subsequent years. The Kodiak Area will receive 12.5% of the Central Gulf ABC and the South Alaska Peninsula will receive 25% of the Western Gulf ABC in 2000 and all future years. Prince William Sound, Chignik, and Cook Inlet will remain at their current percentages of the Federal TAC for 2000.

2. Rockfishes

Rockfishes are managed under three assemblages: demersal shelf (DSR), pelagic shelf (PSR), and slope rockfish. Demersal Shelf Rockfish include the following species: yelloweye, quillback, china, copper, rosethorn, canary, and tiger.

Pelagic shelf rockfish include black, blue, dusky, yellowtail, and widow. Black and blue rockfish have recently been removed from the PSR assemblage in the federal fisheries management plan and placed totally under state management. Slope rockfish contain all other *Sebastes* and *Sebastalobus* species.

a. Research

Detecting spatial structure in the genetic variation of some marine fishes is challenging as populations are often closely related through high gene flow and the relationships between populations may change over years. However, recent advances in molecular markers provide a large array of potentially valuable approaches to address these questions. The Alaska Department of Fish and Game Gene Conservation Laboratory is currently conducting studies of spatial and temporal variation in dusky and black rockfishes using analyses of allozymes and microsatellite DNA. Investigations of dusky rockfish are focusing on the genetic relationships and level of gene flow between the light and dark forms. Studies of black rockfish are investigating the spatial structure throughout the range of the species from the Pacific Northwest through the Bering Sea. We are also collaborating on a study of gene diversity of quillback rockfish with colleagues from the University of Puget Sound.

During 2000, sample collection efforts were completed for black rockfish. We now have an extensive representation of samples from Oregon through the Alaska Peninsula that should provide for a comprehensive analysis of the species. Preliminary statistical analyses have been conducted and indicate significant differences among collections. The project will now move into the final analysis and reporting phase. A manuscript and final report will be prepared

during 2001. Microsatellite and allozyme analyses of light and dark dusky rockfish is now complete for both color morphs from the eastern and western Gulf of Alaska. Results indicate significant isolation between the light and dark gene pools in the western Gulf of Alaska. Collections from the eastern Gulf of Alaska include individuals with intermediate genotypes suggesting some gene flow between forms. This project is also in the final analyses and reporting phase. Funding for this project was provided by the *Exxon Valdez* Trustee Council Restoration Project 252 , National Marine Fisheries Service, and the State of Alaska (contact Lisa Seeb).

ADF&G port sampling, skipper interview, and logbook programs for rockfish fisheries continued in Southeast Alaska in 2000. The logbook and interview programs are designed to furnish detailed catch and effort information, to estimate at-sea discards, and to obtain more detailed information regarding specific harvest location. The port sampling program provides species composition from the landed catch and an opportunity to collect biological samples. Otoliths were obtained from principal demersal shelf rockfish species and black and dusky rockfishes and sent to the age-reading laboratory in Juneau for age determination. Data from these programs is entered onto a database in Sitka. In 2000, 1,864 yelloweye, 1,209 quillback, 520 dusky, 77 rougheye rockfish, 50 shortraker, and 527 black rockfish were sampled for age, weight, length, sex, and maturity (Contact Mike Vaughn).

Port sampling of rockfish in Central Region during 2000 occurred in Homer, Seward, Whittier, and Cordova. Efforts during the first half of the year primarily sampled slope and demersal species, however, during the last half of the year, sampling focused primarily on black rockfish. Additional sampling occurred during the Cook Inlet and PWS trawl and sablefish longline surveys. Sample data collected included species, length, sex, and gonad condition. Otoliths were collected from most sampled fish. A new port sampling position was hired in Seward during July 1998.

The Westward Region continued its port sampling of the commercial rockfish harvest in 2000. Most dockside sampling looked at black rockfish, although some yelloweye, light and dark dusky rockfish were also sampled. Skippers were interviewed for information on effort, location, and bycatch. Length, weight, gonadal and ovarian maturity and otolith samples were collected (contact Carrie Worton). Otoliths collected during the 2000 season are currently being aged by staff from the Kodiak office. Genetic sampling of 100 black rockfish delivered to the port of Chignik Bay continued. Region wide genetic sampling first begun in 1998.

The use of Quester Tangent Corporation habitat mapping equipment on Westward Region department research vessels which began in 1999 became routine in 2000. Besides being deployed during other projects, 10 days were

spent dedicated to mapping reef areas, including a cooperative study with the University of Alaska comparing the performance of the Quester Tangent equipment and the Biosonics VBT system. (Contact: Dan Urban).

The Division of Sport Fish—Southcentral Region continued collection of harvest and fishery information on rockfish as part of the harvest assessment program. The objectives of this program include estimation of 1) species, age, sex, and size composition of recreational rockfish harvests at major Gulf of Alaska ports, and 2) the geographic distribution of harvest by each fleet. Ports sampled in 2000 included Seward, Valdez, Whittier, Kodiak, and Homer. In 2000, 770 black rockfish, 710 yelloweye rockfish, and 589 rockfish of other species were sampled for age, weight, length, sex, and maturity data. Port samplers in Valdez and Homer also collected genetics samples from black and yelloweye rockfish for ADF&G genetics staff in Anchorage (Contact: Scott Meyer)

The Division of Sport Fish—Southeast Region continued to collect catch and harvest data from rockfish as part of a marine harvest on-site survey program with rockfish harvests tabulated back to 1978 in some selected ports. Data collected in the program include statistics on effort, catch, and harvest of the primary rockfish species commonly taken by Southeast Alaska anglers. Ports sampled in 2000 included Juneau, Sitka, Craig/Klawock, Wrangell, Petersburg, and Ketchikan. Primary species harvested in Southeast Alaska included yelloweye, black, and quillback rockfish (Contact: Mike Jaenicke).

b. Stock Assessment

Results of the 1999 line transect survey were analyzed and used to recommend harvest levels for demersal shelf rockfish (DSR) in the Southeast Outside Subdistrict for 2000. In the southern southeast outside area, which had not been surveyed since 1994, the estimated density of adult yelloweye increased 38%, from 1,173 adult yelloweye per km² to 1,879. Survey techniques have changed considerably since 1994 and some of this increase may be attributable to these changes as well as the larger sample size in 1999. The Fairweather density estimates dropped markedly from the 1997 survey estimates. Density declined 44% from 4,176 adult yelloweye per km² to 2,323. More seafloor was covered in 1999 than in 1997 but fewer fish were seen and there was a 54% drop in the number of yelloweye per meter traversed. Estimates of rocky habitat were revised using a combination of information available from submersible dives, sidescan data, NOS data, and commercial fishery logbook data. Areas were digitized into GIS instead of using grids. Changes from previous estimates were significant and varied by area with some areas showing an increase and some a decrease in estimated area of rock habitat. The overall change was down 46%, with 3,095 km² compared to 5,758 km². The exploitable biomass estimate for yelloweye rockfish in the Southeast Outside Subdistrict, based on the sum of the lower 90% confidence limits of biomass is 15,100 mt. The total allowable catch

limit for DSR for 2000 was set at 340 mt.

The Central District Groundfish staff is developing a focused rockfish survey to extend at least the next three summers. This project will use tagging and SCUBA to explore habitat-based assessment of black rockfish in nearshore waters of southcentral Alaska (contact Bill Bechtol).

c. Management

The DSR assemblage is the component of the rockfish complex most actively managed by the state in Southeast Alaska at this time. Rockfish management for this group is based upon a combination of guideline harvest ranges, gear restrictions, and trip limits. The state has management authority for demersal shelf rockfish in both state and federal waters of Southeast Alaska. Directed harvest of demersal shelf rockfish is restricted to hook-and-line gear. Separate harvest ranges have been established for each of six Southeast Alaska management areas based upon the best available information on the condition of rockfish stocks in each area. Regulations adopted in 1994 include reduced GHRs in internal waters, reduced weekly trip limits from 7,500 pounds per vessel to 6,000 pounds per vessel (12,000 pounds in EYKT), and added a requirement that log-book pages must be submitted with fish tickets from each fishing trip. The 2000 TAC for DSR was 340 mt in Southeast Outside. A significant portion of the harvest is taken as bycatch mortality during the halibut fishery and 125 mt of the TAC was reserved for landed and unreported bycatch. An additional 50 mt of DSR are available for harvest in the SE inside waters. In Southeast Alaska all other rockfish are managed under an area-wide annual harvest limit of 500 mt.

The implementation of the federal IFQ fishery for halibut impacted the directed DSR fishery. Previous to 1995 DSR were managed based on three seasonal allocations: January, July, and October. Because of the bycatch provisions inherent in the IFQ fishery ADF&G does not allow directed fishing for DSR during the IFQ season, March 15 - November 15. The directed DSR fishery quota is now allocated with 2/3 of the quota apportioned to the January 1- March 15 season and 1/3 of the quota apportioned to the November 16- December 31 season. (Contact Tory O'Connell)

The Alaska Board of Fisheries adopted several new regulations regarding rockfish during their 2000 meeting cycle. Full retention of rockfish is now required in all commercial fisheries in Southeast Alaska. All rockfish taken on commercial gear in internal waters of southeast must be retained, weighed and documented on a fish ticket. Profits from fish in excess of legal limits (and bycatch limits) must be forfeited to the State. Full retention of rockfish in outer coastal waters is limited to the demersal shelf rockfish assemblage. This was in an effort to keep regulations consistent with federal regulations in areas where fisheries overlap. Further, the BOF prohibited live fish fisheries for groundfish in Southeast. The Department had originally proposed prohibiting live fish fish-

eries for rockfish only, but the BOF extended the prohibition to all groundfish species.

Rockfish in Central Region's Cook Inlet and PWS Areas are managed under their respective Rockfish Management Plans. Plan elements include a directed fishery GHL of 68 mt followed by a bycatch only fishery, 5-day trip limits of 1.4 mt in PWS, 1.8 mt in the North Gulf District, and 0.5 mt in the Cook Inlet District. Regulations for rockfish have undergone significant changes beginning in 1996 when the Board of Fisheries formalized the 68 mt GHL into a 68 mt harvest cap for all rockfish species in Cook Inlet and PWS and a 5% rockfish bycatch limit for jig gear during the state waters Pacific cod season. In 1998 the Board of Fisheries adopted a directed rockfish season opening date of July 1 for the Cook Inlet Area and restricted legal gear to jigs primarily because this fishery typically targets pelagic rockfish species. At the spring 2000 meeting, the board closed directed rockfish fishing in the PWS area and established a bycatch-only fishery (10% bycatch) with mandatory full retention of all incidentally harvested rockfish. Rockfish in excess of the allowable 10% bycatch level are required to be sold with the proceeds going to the State of Alaska. (Contact Charlie Trowbridge)

The Westward Region has attempted to conservatively manage black rockfish since 1997, when management control was relinquished to the State of Alaska. Area guideline harvest levels were set at 75% of the average production from 1978-1995 and sections were created to further distribute effort and thereby lessen the potential for localized depletion. Since 1997, section GHLS have been reduced in some areas that have received large amounts of effort. In 1999, 90 mt of black rockfish were harvested from the seven sections comprising the Kodiak Area. The vast majority of this harvest came from directed fisheries or as bycatch in the state managed Pacific cod fishery. The 1999 black rockfish harvest in the Chignik Area totaled 39 mt and totaled 42mt in the South Alaska Peninsula Area. The staff of the Westward region is currently seeking an economically feasible and statistically valid means to conduct stock assessments on the rockfish resources of the region. A voluntary logbook program was initiated in 2000 in the hope of obtaining CPUE estimates as well as more detailed harvest locations. The detailed harvest location may be useful in tracking age composition in small habitat areas. (Contact Dave Jackson).

Given the lack of quantitative stock assessment information for much of Alaska, sport fishery managers have established conservative harvest strategies for recreational rockfish fisheries. Recreational seasons and bag and possession limits for rockfish in Alaska are among the most restrictive on the West Coast.

In most of the fisheries in Southcentral Alaska, the majority of rockfish are taken incidental to the recreational halibut fishery or while trolling for salmon. Bag limits in most areas have been designed to discourage targeting of rockfish yet

allow for retention of incidental harvest. Bag limits in most areas are five fish daily and the harvest of non-pelagic (DSR and slope) rockfish is further restricted to one or two fish per day. The Alaska Board of Fisheries has allowed more liberal bag limits in the Kodiak and Alaska Peninsula areas because of lower levels of effort and predominance of pelagic species in the catch (Contact Scott Meyer).

In Southeast Alaska, sport bag limits consist of 5 pelagic rockfish and 5 non-pelagic rockfish per day of which only 2 may be yelloweye rockfish. In addition, bag limits in areas near Ketchikan and Sitka are limited to 3 non-pelagic rockfish, only 1 of which may be a yelloweye rockfish.

d. Fisheries

Reported harvest of rockfishes from state-managed commercial fisheries in Southeast totaled 705 mt in 2000, of which 214 mt was directed DSR and 18 mt was black rockfish. The majority of the remaining rockfish taken in the Southeast district were shortraker and rougheye landings made in conjunction with the NSEI sablefish fishery. All rockfish harvested in state-managed fisheries in SE is taken by hook-and-line gear either in directed fisheries or incidental to fisheries for other species.

The 2000 Cook Inlet Area directed rockfish fishery opened July 1 and closed August 21 with a total harvest of 72 mt. This was the first full year that the new jig-only gear restriction was in place. Directed rockfish effort was high relative to recent years, however, some of this is attributable to a shift in fishing effort from the upper Cook Inlet salmon drift fishery which experienced a decline in fishing time during 2000. In PWS the new regulations did not take effect until June, therefore, the directed fishery opened by regulation on January 1 and closed March 14 when catches in PWS state waters totaled 15 mt, primarily yelloweye rockfish taken as bycatch to the directed Pacific cod longline fishery. Total harvest in both the early-year directed fishery and the bycatch-only fishery was 55 mt.

Recreational rockfish harvest is typically estimated in numbers of fish. Estimates of the 2000 harvest are not yet available from the statewide mail survey, but the average estimated annual harvest for the period 1995-1999 was 44,600 fish in Southeast Alaska and 45,500 fish in Southcentral Alaska.

3. Sablefish

a. Research

In 2000, sablefish longline surveys were conducted in the two Southeast Alaska state-managed sablefish fishery management areas, Southern Southeast Inside (SSEI) and Northern Southeast Inside (NSEI). These surveys are designed to measure trends in relative abundance and biological characteristics of the sable-

fish population. Biological data collected in the survey include length, weight, sex and maturity stage. Otoliths are collected and sent to the ADF&G age reading laboratory in Juneau for age determination. The cost of these surveys is offset by the sale of the fish landed. The fish are dressed and iced according to industry standards and the state receives all the revenues from the sale of the fish.

In the SSEI survey, the overall CPUE (fish/hook) in 2000 was 0.21, 4.5% lower than the CPUE in 1999 (0.22) and 50% higher than 1998 (0.14). The overall CPUE based on biomass was 0.43 kg/hook in 2000 compared to 0.41 in 1999 and 0.30 in 1998. Although the bycatch species composition varied widely between stations, spiny dogfish (*Squalus acanthias*) dominated the bycatch in all areas surveyed. In the NSEI survey, the 2000 mean CPUE based on fish/hook (0.25) showed a 4.8% decline from 1999 (0.26) and a 6.4% decline from 1998 (0.27). Biomass/hook was 0.82 kg/hook in 2000 compared to 0.84 in 1999 and 1.03 in 1998. Thornyheads dominated the bycatch in all areas except the northern-most statistical area. Thornyhead catch rates were twice as high in 2000 compared to 1999.

The on-going mandatory logbook program in the sablefish fisheries provides catch and effort data by date, location, and set. In the SSEI sablefish fishery, the overall pounds/hook in the vessels using conventional gear declined 10% in 2000 (0.45 rd. lbs./hook) compared to 0.50 rd. lbs./hook in 1999 but remained 21.6% higher than 1998 (0.37 rd. lbs./hook). In the NSEI fishery, the rd. lbs./hook was 0.52 in 2000; the same as 1999 and 2% lower than the catch rate in 1998 (0.53).

In 2000, ADF&G continued the mark/recapture study in NSEI, double marking and releasing 5,768 sablefish using pot gear to capture the fish 1.5 months prior to the fishery opening September 1, 2000. The external tags are also a part of the on-going study to describe movement patterns between the Gulf of Alaska and the inside waters of Southeast Alaska. Fish were caught with pot gear this year to minimize the apparent "hook shyness" pattern of tag returns observed in 1997, 1998 and 1999. Tag returns from the fishery this year were significantly higher than in previous years. This suggests that using different gear to capture the fish and extending the time period between capture and recapture may have minimized the "hook shyness" phenomenon. The higher returns could also be a result of a higher exploitation of fish in 2000 compared to 1998 and 1997 (contact Meg Cartwright).

In 1999, ADF&G initiated a mark-recapture study in PWS using the bottom trawl survey as the capture vehicle (contact Bill Bechtol).

b. Stock Assessment

In Southeast, prior to 1997, trends in catch rates in the longline research survey and biological data were the primary information used to set quotas (or seasons) in the sablefish fisheries. In 1997, we developed an age-structured analysis (ASA) and began a mark recapture study in an attempt to estimate absolute abundance in NSEI. The ASA model output has been problematic because of the wide range of biomass estimated depending on the data used. Also the age distributions in NSEI do not appear to track cohorts from year to year. Apparent hook shyness and gear selectivity problems in the mark recapture study in 2000 continue to complicate efforts to estimate biomass using a Peterson estimator. Despite some problems, mark recapture methods seem to have sufficient potential to provide estimates of abundance, exploitation rates and movement that we plan to continue this effort. The return of the external, t-bar tags in the commercial fishery allowed us to estimate exploitation rates, weighted by fish size and area catch rates in the fishery.

A longline survey has been conducted in PWS annually since 1996 using ADF&G vessels. Mean cpue has ranged from 0.37 fish per hook in 1997 to 0.56 fish per hook in 1999. A longline survey was also conducted in the North Gulf District for the first time in 1999. The PWS longline survey involved 36 stations fished during 3 weeks in September 2000 by the R/V Pandalus. The 2000 survey focused on the northwest and eastern PWS. Relative to recent surveys, catch rates among strata (and not weighted for available habitat) increased for sablefish and decreased for most other species, including Pacific cod, Pacific halibut, and arrowtooth flounder. Survey costs are offset by the sale of the fish (contact Bill Bechtol).

c. Management

There are three separate internal water areas in Alaska, which are managed exclusively by the state. The Northern Southeast Inside Subdistrict (NSEI), the Southern Southeast Inside Subdistrict (SSEI), and the Prince William Sound District each have separate seasons and guideline harvest ranges. Sablefish fisheries in outer coastal state waters (0-3 miles) have been managed in conjunction with the federal-managed fishery in the EEZ. In some areas of the Gulf, the state opens the fishery concurrent with the EEZ opening. These fisheries, which occur in the North Gulf District of Cook Inlet and the Aleutian Island District are open access in state waters, as the state cannot legally implement IFQ management at this time. The quotas are based on historic catch averages and closed once these have been reached. There is no open-access sablefish fishery in the Southeast Outside district as there is extremely limited areas that fall inside state waters and are deep enough to support sablefish populations.

The GHL for the North Gulf District is set using an historic baseline harvest level adjusted annually by the same relative reduction to the TAC in the Central

Gulf Area. The 2000 fishery GHL was 32 mt, a slight increase over the 1999 GHL due to an increase in the Central Gulf TAC. Also in 2000, the new season opening date of July 15 became effective. This change was adopted by the board at the request of fishermen that believed that larger fish were more prevalent in nearshore areas later in the year. The sablefish fishery in PWS occurred under limited entry for the first time in 1996. Permit holders are restricted to gear and vessel size classes. Additionally a commissioner's permit which stipulates a log-book and catch reporting requirements must be obtained prior to participation in the fishery. The fishery GHL is set at 110 mt which is the midpoint of the harvest range set by a habitat-based estimate. Central Region staff annually conduct post fishery dockside interviews and sample landings in the ports of Cordova, Whittier, and Seward.

Since 1984 both SSEI and NSEI sablefish fisheries have been managed under a license limitation program. Because of increased vessel efficiency the season for the NSEI Subdistrict had been reduced to a 24-hour per year "derby" style fishery by 1987. Even in that short season, the pre-season harvest objectives set by ADF&G has been consistently exceeded. Beginning in 1994 a new harvest strategy was adopted for the NSEI Subdistrict sablefish fishery. In response to a concern for potential over-exploitation, the Board of Fisheries adopted regulations that restrict the harvest to no more than 4.8 million round pounds for the 1994, 1995, and 1996 seasons. In 1997 the BOF adopted this equal share system as a permanent management measure for both the NSEI and SSEI sablefish fisheries. The Department sets the overall annual quota and evenly divides the total quota by the number of eligible permits for each fishery. We will continue to set the annual fishery quota in each fishery based on the data collected prior to the current year. We initiated this change in the 1999 NSEI fishery. The 2000 quota in NSEI remained the same as 1999, 3.12 million round pounds. After reducing the quota 35% in 1999, we decided to maintain the quota the same in 2000 before considering further reductions or an increases in the quota. The SSEI quota was 0.696 million round lbs. in 2000, a 3 % decline in overall quota from 1999. However, the individual quota remained the same due to the elimination of one permit from the fishery. In 2000, the Board of Fish extended the SSEI sablefish fishery season until August 15, increasing the season an additional month.

d. Fisheries

The NSEI sablefish fishery landed a total of 1,398 mt by 111 permits, averaging 12.6 mt per permit between September 1 and November 15, 2000. In the SSEI management area, a total of 268 mt were landed by 29 permit, averaging 9.2 mt per permit between June 1 and August 15, 2000 (contact Meg Cartwright).

The open access sablefish fishery in the North Gulf District was open from July 15 – 26 and harvested 47 mt. Catch rates in the fishery were significantly higher

than previous years when the fishery occurred during the March through May period. During the 2000 season in the Prince William Sound area, a 48-hour fishery opened on May 1 and resulted in a harvest of 162 mt. Several factors contributed to the harvest exceeding the GHL. These included a shift to fixed gear from snap gear which allowed fishermen to fish more hooks, excellent weather, and relatively high catch rates. This latter element was verified via post-fishery interviews and was partially attributable to the recruitment of a new year class of sablefish as evidenced by the small sizes observed during port sampling. (contact Charlie Trowbridge).

Within the Westward region, only the Aleutian Islands have sufficient habitat to support mature sablefish populations of sufficient magnitude to permit commercial fishing. All other sections within the region are closed on an annual basis by Emergency Order to avoid the potential for localized depletion from the small amounts of habitat within the jurisdiction of the state. Bycatch from the areas closed to directed fishing is limited to 1%. The 2000 Aleutian Island fishery opened concurrent to the Federal IFQ season on March 15. The GHL was set at 182 mt for the state managed fishery. The preliminary harvest from the 2000 Aleutian Islands sablefish fishery was 198 mt. (contact Skip Gish).

4. Flatfish

a. Research

No research was conducted on flatfish during 2000.

b. Stock Assessment

No stock assessment programs were active for flatfish during 2000.

c. Management

Trawl fisheries for flatfish are allowed in three small areas in the internal waters of Southeast Alaska under a special permit issued by the department. The permits are generally issued for no more than a month at a time and specify the area fished and may restrict the type of gear used. Mandatory logbooks are required and some areas cannot be fished unless there is an ADF&G observer on board. This restrictive management is necessary because of reduced flatfish stocks and because of a history of very high prohibited species bycatch rates, particularly crab and halibut, in flatfish trawl fisheries conducted in the internal waters of the state. New regulations adopted in November 1993 implemented a 20,000-pound maximum weekly trip limit in the trawl fishery. This was an industry proposal, the intent of which was to keep large catcher-processor vessels out of this fishery. In 1997 a different industry proposal to the BOF requesting an increase in weekly trip limit was rejected.

d. Fishery

The Southeast Alaska inside area flatfish trawl fishery was restricted to three small areas during the 2000-01 season with a harvest objective set for each area. As has been the case for the past five years, there was almost no effort in the Southeast fishery, with less than 2 mt of harvest reported. Most of the Southeast harvest is starry flounder and is used for bait in other groundfish fisheries while the Prince William Sound harvest is a mixture of shallow-water species. The BOF restricted the Southeast flatfish trawl fishery to the use of beam trawl only. The flatfish trawl areas are also the site of a beam trawl fishery for shrimp.

5. Pollock

a. Research

Pollock continue to be a dominant species in the Central Region ecosystems. Due to uncertainty about the appropriate harvest level for the PWS pollock fishery, assessment in 1999 included commercial fishery catch sampling, collection of samples for genetic and isotope analysis, acoustic surveys of the spawning population, and bottom trawl surveys of the summer (post-spawning) population. In 1996, interactions between pollock, herring, and juvenile salmon were also examined as part of Sound Ecosystem Assessment (SEA) funded by the *EXXON Valdez* Oil Spill Restoration.

In pollock we are testing for spatial patterns of genetic variation in six population samples from three regions: North America – Gulf of Alaska; North America – Bering Sea; Asia – East Kamchatka. We tested for annual stability of the genetic signal in replicate samples from three of the North American populations. These studies, begun in 1998 and 1999, continued into 2000. A manuscript documenting the findings is under internal review. Allozyme and mtDNA markers provide concordant estimates of spatial and temporal genetic variation. These data show significant genetic variation between North American and Asian pollock as well as evidence that spawning aggregations in the Gulf of Alaska, such as Prince William Sound, are genetically distinct and may merit management as distinct stocks. These data also provide evidence of inter-annual genetic variation in two of three North American populations. Gene diversity values show this inter-annual variation is of similar magnitude to the spatial variation among North American populations, suggesting the rate and direction of gene flow among some spawning aggregations is highly variable.

b. Assessment

A hydroacoustic and mid-water trawl survey were conducted in PWS in the winters of 1995, 1997 and 1998. (Contact Bill Bechtol).

c. Management

Prince William Sound pollock fishery regulations include a commissioner's permit and a registration deadline of January 13. The permit stipulates logbooks, catch reporting, and accommodation of a department observer upon request. In recent years, the GHL has been based on the estimated pollock biomass during the summer. This is because a significant portion of the spawning population targeted by the winter fishery is thought to have immigrated from federal waters, whereas the summer population is not assessed by the NMFS summer survey (Contact Bill Bechtol).

d. Fisheries

The 1999 fishery opened on January 20 and closed February 25 with a GHL of 2100 mt. Similar to prior years, most of the harvest came from Port Bainbridge in southwestern PWS. Early on, cpue was low, however, as the fishery progressed, cpue increased. The directed fishery achieved the GHL. Fishery bycatch remained quite low with squid predominating and salmon totaling 2,144 lb.

6. Dogfish

a. Research

The relative catch rate of spiny dogfish is monitored in the Southern Southeast Inside area in conjunction with the annual sablefish survey in that area. Commercially landed dogfish are sampled for length, weight, sex and spines taken for aging.

Spiny dogfish and pacific sleeper sharks have been tagged annually since 1997 as part of the PWS longline survey for sablefish. To date, four tagged sleeper sharks have been recovered.

b. Assessment

Sharks are caught in the PWS longline survey. Catch per unit effort for Pacific sleeper sharks has increased from 1.1 fish per set in 1996 to 4.3 fish per set in 1999. Spiny dogfish CPUE has ranged from 0.9 – 2.7 fish per set except for a dramatic increase to 51.3 fish per set in 1998. The high catch rates of spiny dogfish in 1998 appear to have been an anomaly (contact Bill Bechtol).

c. Management

The Alaska Board of Fisheries prohibited all directed fisheries for sharks in 1998. In 2000 the BOF increased the bycatch allowance for dogfish taken while longlining for other species to 35% of the target species and also allowed full retention of dogfish bycatch in the salmon setnet fishery in Yakutat. This action was an effort to minimize waste of dogfish in these two fisheries and to encourage sale of bycatch. In Central Region, bycatch is set by regulation at 20% of the

round weight of the directed species on board.

7. Lingcod

a. Research

Three lingcod research surveys were conducted during 2000 to tag fish for a movement and migration study and to estimate exploitation rate and two trips were made to tag fish with sonic tags (contact Rick Starr, California Sea Grant). A total of 1,458 lingcod were tagged during the reporting period: 1,297 lingcod were tagged using dinglebar gear, 30 were tagged as bycatch during a black rockfish survey, and 111 young fish were tagged by sport fishermen. Length and sex were recorded for all tagged fish and sub-samples of biological specimens were taken for age, growth, and sexual maturity analysis. Over the past five years 5,077 lingcod have been tagged and 136 fish recovered (Contact Cleo Brylinsky).

The Division of Sport Fish—Southeast Region continued to collect catch, harvest, and biological data from lingcod as part of a marine harvest survey program with lingcod harvests tabulated back to 1987 in some selected ports. Data collected in the program include statistics on effort, catch, and harvest of lingcod taken by Southeast Alaska sport anglers. Ports sampled in 2000 included Juneau, Sitka, Craig/Klawock, Wrangell, Petersburg, Yakutat, and Ketchikan. Length and sex data were collected from 2,104 lingcod in 2000.

The Division of Sport Fish—Southcentral Region continued collection of harvest and fishery information on lingcod through the groundfish harvest assessment program. The objectives of this program include estimation of 1) the age, sex, and size composition of lingcod harvests at selected Gulf of Alaska ports and 2) the geographic distribution of harvest by each fleet. Ports sampled in 2000 included Seward, Valdez, Whittier, Kodiak, and Homer. In combination, these ports represent the primary areas of recreational lingcod harvest in Southcentral Alaska. Seven hundred sixty-seven lingcod were sampled for length, age, and sex data in 2000.

The Division of Sport Fish—Southcentral Region also has collected fishery-independent stock assessment data on lingcod on an intermittent basis to assess recruitment in the northern Gulf of Alaska. The last survey was conducted in 1998 to assess changes since 1994 in the relative abundance and length composition of lingcod in waters near Seward. The survey indicated continued very low abundance of lingcod in Resurrection Bay and recommended continuing the sport and commercial fishery closure of those waters. Survey results also indicated a relative downward shift in the size distribution in waters just outside Resurrection Bay (Contact: Scott Meyer).

c. Management

The BOF made significant changes in lingcod management in the Southeast District during 2000. These changes included a total winter closure for all users except longliners between December 1 and May 15 in an effort to protect nest guarding males. Guideline harvest limits were greatly reduced in all areas and allocations made between directed commercial fishery, sport fishery, longline fisheries, and salmon troll fisheries. The 27" minimum size limit remains in effect and fishermen must keep their lingcod with the head on and proof of gender to facilitate biological sampling of the commercial catch. Vessel registration and trip limits are allowed when needed to stay within allocations.

Regulations for the Central Region lingcod fishery include: 1.) A complete area closure from January 1 through June 30, 2.) A minimum size limit of 35 inches (89 cm) overall or 28 inches (71 cm) from the front of the dorsal fin to the tip of the tail. More recently, the Board of Fisheries adopted a jig only gear requirement for lingcod in the Cook Inlet Area. These regulatory changes were adopted to reduce the harvest and effort from previous levels in the Central Region. Additionally, beginning in 1997, the department set commercial lingcod fishery GHL's for the Central Region at 50% of the recent 10-year harvest.

In 2000, sport harvests of lingcod in Southeast Alaska were incorporated into a regionwide lingcod management plan which set GHL's for 7 areas, and sport harvest in pounds was allocated for each of these 7 areas. The opening date of the lingcod sport fishery was also moved back about 2 weeks from May 1, and is now open from May 16 through November 30. The bag and possession limits of 2 and 4 lingcod were reduced to 2 and 1 in a large portion of northern Southeast Alaska (excluding Yakutat) to reduce harvests in this area to meet allocation guidelines. A lingcod minimum size limit of 38 inches was also placed into effect for charter and nonresident anglers fishing in northern Southeast Alaska, and lingcod caught in this area by charter anglers could only be landed by hand or landing net. There was no minimum size limit in other areas of Southeast Alaska and resident anglers fishing from private vessels in northern Southeast could also retain lingcod of any size. Since the department wished to increase biological sampling of lingcod for better determination of length and sex composition, heading or filleting of lingcod prior to off-loading was also prohibited in all sampled ports to enable the department to maximize fishery information obtained. The only area totally closed to lingcod sport fishing was the Pinnacles area near Sitka which is closed to sport fishing year-round for all groundfish (Contact: Tom Brookover).

Conservative harvest strategies have been established for recreational lingcod fisheries in Southcentral Alaska in light of the lack of quantitative stock assessment information. Seasons and bag and possession limits are among the most restrictive on the West Coast. Resurrection Bay is closed to lingcod fishing year-

round, and the fishery is managed in most areas under a spawning/nest guarding season closure through June, a minimum size limit of 35 inches to protect spawners, and bag and possession limits of 2 fish or less daily (Contact: Scott Meyer).

d. Fishery

Lingcod are the target of a “dinglebar” troll fishery in Southeast Alaska. Dinglebar troll gear is salmon power troll gear modified to fish for groundfish. Additionally lingcod are landed as significant bycatch in the DSR longline fishery and as a limited bycatch in the halibut fishery. In 1997 the Board of Fisheries adopted a regulation that would allow longliners fishing for demersal shelf rockfish to retain 35% lingcod, by weight of their target catch. The directed fishery landed 139 mt of lingcod in 2000 and an additional 99 mt was landed as bycatch in other fisheries. The halibut longline fishery accounted for roughly half of lingcod bycatch in the Southeast Region and the salmon troll fishery accounted for 20%.

Central Region lingcod harvests have primarily occurred in the North Gulf District of Cook Inlet and the Outside District of PWS. The North Gulf commercial harvest was restricted to 16-mt and the PWS harvest was set at 12 mt beginning in 1997. During 1999, Cook Inlet Area lingcod harvest totaled 12.8 mt and PWS reached 14 mt. The overage in PWS is primarily due to bycatch to federal waters longline and trawl fisheries during the closed season. Declines in harvest are primarily attributable to the relatively low allowable harvest and market value.

Recreational lingcod harvest is typically estimated in numbers of fish. Estimates of the 2000 harvest are not yet available from the statewide mail survey, but the average estimated annual harvest for the period 1995-1999 was 17,600 fish in Southeast Alaska and 8,200 fish in Southcentral Alaska.

8. Other species

In 1997 the BOF based a new policy that would strictly limit the development of fisheries for other groundfish species in SE. Fishermen are required to apply for a “permit for miscellaneous groundfish” for all fisheries that do not already have specific regulations and permits do not have to be issued if there are management and conservation concerns. At this time that includes all species except sablefish, rockfish, lingcod, flatfish, and Pacific cod. At this time most other groundfish species taken in state waters are taken as bycatch in fisheries for other more valuable groundfish and halibut. Reported landings in SE during 2000 were approximately 1 mt. The State also has a regulation that requires that the bycatch rate of groundfish be set by fishery annually by emergency order unless otherwise specified in regulation.

Regulations adopted by the BOF in 1998 restricted all shark fisheries to bycatch-only and skate to directed harvest under a commissioner's permit. The Board also adopted a management plan governing the recreational fisheries for salmon and other sharks. This plan includes a statewide annual bag limit of 1 and a statewide annual limit of 2 sharks. In 2000 the BOF prohibited the practice of "finning", requiring that all shark retained must be sold or utilized and have fins, head, and tail attached at the time of landing. "Utilize" means use of the flesh of the shark for human consumption, for reduction to meal for production of food for animals or fish, for bait, or for scientific, display, or educational purposes.

In recent years, a small recreational fishery targeting primarily salmon sharks has developed in the Gulf of Alaska and Prince William Sound. Little information is available to assess the status or structures of targeted stocks. In an attempt to collect information, the Division of Sport Fish initiated a modest cooperative tagging program with a few charterboat operators in 1998 and continues to collect biological data on all sharks harvested in the sport fishery through the port sampling program. Sport Fish Division staff in Homer also continued joint research efforts aimed at stock assessment of salmon and sleeper sharks by providing salmon and sleeper shark stomachs and other tissues to NMFS-Auke Bay Lab staff, and providing salmon and sleeper shark vertebrae to the Virginia Institute of Marine Science (VIMS). In addition, staff assisted NMFS and VIMS with field sampling and tagging of salmon sharks in Prince William Sound in 2000.

A commissioner's permit is required before a directed fishery may be prosecuted for skates and rays. This permit may restrict depth, dates, area, and gear, establish minimum size limits, and require logbooks and/or observers, or any other condition determined by the commissioner to be necessary for conservation and management purposes. A commissioner's permit is also required before any trawl fishery besides the existing beam trawl fishery for flatfish may be prosecuted in the Southeast District.

A "Developing Fisheries" policy is being drafted for new fisheries which will reduce the possibility that a fishery can escalate beyond management control and will also outline which species may be restricted from being harvested in a directed fishery.

The recreational halibut fishery is the focus of a statewide research and management effort. Data on the recreational fishery and harvest are collected through port sampling effort in Southcentral Alaska and creel surveys in Southeast Alaska. These data are provided annually to the International Pacific Halibut Commission for use in an annual stock assessment, and to the North Pacific Fishery Management Council. The council has used the information in the design and analysis of regulations governing the sport charter fishery.

As stated earlier in this report, the BOF took action in 2000 prohibiting the development of a live fish fishery for groundfish in the Southeast District.

C. Other Related Studies

The Department of Fish and Game manage state groundfish fisheries under regulations set triennially by the Board of Fisheries. The department announces the open and closed fishing periods consistent with the established regulations, and has authority to close fisheries at any time for justifiable conservation reasons. The department also cooperates with NMFS in regulating fisheries in the off-shore waters.

By regulation, fish tickets are required for all shore-based landings in Alaskan ports and for all landings from state-managed fisheries. The catch data from the fish tickets is used as the primary means of tracking the in-season harvest levels. Groundfish fish tickets are collected from as many as thirty or more processors within the state. The fish tickets are edited for accuracy and the data is entered on microcomputers in Petersburg, Sitka, Ketchikan, Homer, Kodiak, and Dutch Harbor. Because of the intensity of many of the groundfish fisheries, a “soft data” accounting system using processor contacts is also utilized, when necessary, to track landings during a fishery.

In 1997 at the Southeast Groundfish meeting, the Board of Fisheries adopted a regulation that will require all groundfish fishermen to complete mandatory logbook pages while fishing. These logbook pages must be submitted as part of their landing record and attached to their fish ticket at delivery. The Board also now requires that fishermen obtain a conditional use permit when fishing for any species for which specific regulatory language is not in effect. This will allow ADF&G to deny permits for some species and allow exploratory or controlled fishing for others.

Dixon Entrance Area

Total removals from the Dixon Entrance area (Alaska statistical areas 325431, 315431, 325401, and 315401) have declined in recent years, due mostly to reductions in sablefish quotas. The table below lists the catch by species group from 1988 through 2000 rounded to the nearest mt.

Year	# permits	# landings	DSR	Other Rock	Sablefish	Other	Total
1988	20	27	4	2	83	3	92
1989	8	8	1	1	20	0	22
1990	16	18	3	5	182	1	191
1991	24	24	6	12	149	2	170
1992	19	22	3	4	150	1	159
1993	26	30	7	13	232	1	254
1994	27	27	1	20	216	3	240
1995	21	23	0	20	137	0	157
1996	16	17	1	12	83	0	95
1997	37	45	1	18	103	1	123
1998	26	31	1	8	95	0	105
1999	23	30	0	7	74	1	82
2000	27	34	0	14	51	1	67

Marine Reserves

In September of 1997 the ADF&G submitted proposals to both the BOF and the NPFMC requesting that they implement a small no-take marine reserve in Southeast. The purpose of these proposals is to permanently close a 3.2 sq. mile area off Cape Edgecumbe to all bottomfish and halibut fishing (including commercial, sport, charter, bycatch and subsistence) and anchoring to prevent over-fishing and to create a groundfish refuge. This area is dominated by two large volcanic pinnacles that have a diversity and density of fishes not seen in surrounding areas. The pinnacles rise abruptly from the seafloor and sit at the mouth of Sitka Sound where ocean currents and tidal rips create massive water flows over this habitat. These two pinnacles provide a very unique habitat of rock boulders, encrusted with *Metridium*, bryozoans and other fragile invertebrate communities, which attracts and shelters an extremely high density of juvenile rockfishes. The area is used seasonally by lingcod for spawning, nest-guarding, and post-nesting feeding. Yelloweye rockfish and pelagic rockfish species as well as large numbers of prowfish and Puget Sound rockfish also densely inhabit the pinnacles. This closure protects the fragile nature of this rare habitat, and prevent the harvest or bycatch of these species during critical portions of their life history. In February 1998 the BOF approved of the reserve and the NPFMC approved of the reserve at their June 1998 meeting. The NPFMC recommended to the BOF that they consider closure of the area to salmon

trolling which would make the area a complete-no take zone. In February 2000 the BOF rejected closing the area to salmon trolling. The area is an important “turn-around” area for commercial trollers and the BOF did not believe there was sufficient conservation benefit to warrant closing the area to salmon fishing.

User Pay/ Test Fish Programs

The state of Alaska Department of Fish and Game receives receipt authority from the state legislature that allows us to conduct stock assessment surveys by recovering costs through sale of fish taken during the surveys. Receipt authority varies by region. In Southeast Alaska we have several projects that are funded through test fish funds (total allocation approximately 300k), notably the sablefish longline assessments, the king crab survey, and the herring fishery and dive surveys. Also in 1995 the Southeast Region was given a separate receipt authority for \$250,000 to conduct sea urchin research using test fish funds. In the case of sea urchins the industry placed bids on the right to harvest and market sea urchins. The low bidder was responsible for paying for the department’s expenses in research and management of this fishery and was limited to a 12% profit after state expenses were paid.

GIS

ArcView version 3.x and MapInfo version 4.5 and 5.1 are currently being used by ADFG CF for general map production, project planning and spatial analysis. More advanced spatial analyses are performed using ArcView’s Spatial Analyst and MapInfo’s Vertical Mapper and Arc/Info.

The Division currently maintains its basemaps in both ArcView and MapInfo format; however, beginning in 2002 the ArcView shapefile format will be the Division’s standard data distribution format. The Division is also supporting data in both the NAD27 and NAD83 datums. The NAD27 datum is primarily used for terrestrial-based mapping and the NAD83 datum is used for marine-based mapping. Because the Division’s managed fisheries span both the terrestrial and marine

environments, both datums will be supported. Basemaps which originated in the NAD27 datum are being converted to the NAD83 datum. Most of this conversion will be completed by mid-2001.

In 2000, the Division developed new hard copy and digital groundfish and shellfish statistical area charts. These charts became effective January 1, 2001, and hard copy charts were distributed to processors in early January. Digital versions of the charts are available in two forms. Adobe PDF versions of the charts can be viewed or downloaded at <http://www.cf.adfg.state.ak.us/geninfo/statmaps/charts.htm>. ArcView- and

MapInfo-compatible charts can be downloaded from the ADF&G CF GIS Maps

and Data Server at <http://maps.cf.adfg.state.ak.us>. This server will be the home for all publicly available GIS maps developed by the division. In the future this server will also feature online maps using ESRI's ArcIMS (Internet Map Server) software (contact Tim Haverland).

Logbooks

Beginning in 1997 logbooks are mandatory for all state-managed commercial fisheries in SE. Logbooks for rockfish and lingcod have been mandatory for a number of years. All usable longline and jig logbook data through 2000 has been entered.

Since 1998, marine recreational charter operators have been required to log port of landing, effort and harvest, and ADF&G statistical area for every charter trip made. The 2000 logbook was modified slightly to improve reporting and accuracy. Data collected for each vessel trip included port of landing, location(s) fished, angler residency, effort for salmon and bottomfish, and harvest and release (in numbers) of salmon, halibut, rockfish, lingcod, and salmon sharks. A copy of this logbook and the associated instructions are appended to this document. The Sport Fish Division is planning a thorough evaluation of the 1998-2000 charter logbook data, including comparisons of data from the logbook, the statewide mail survey, and on-site interviews.

Number of commercial fishery logbooks collected by fishery, target species, and year.

SE	Longline					Jig/dinglebar			
Year	DSR	Pcod	Slope Rock	PSR	Sablefish	Ling	Black rock	DSR	PSR
1986	21	1							
1987	25								
1988	20								
1989	19								
1990	50	1	2						
1991	232	8	1						
1992	259	7							
1993	190	8							

1994	197	9	3			108			
1995	140	13		6		215			
1996	261	8		5		252	31	6	
1997	204	98	4	0	466	177	64	8	1
1998	177	135	15		552	153	70	3	4
1999	165	223	9	0	405	89	21	1	1
2000	153	97	4	0	421	153	30		

Web Pages

ADF&G Home Page: <http://www.state.ak.us/local/akpages/FISH.GAME/adfghome.htm>

Commercial Fishery Division Home Page:

http://www.cf.adfg.state.ak.us/cf_home.htm

News Releases: http://www.cf.adfg.state.ak.us/region1/news/news_rel.htm

Sport Fish Division Home Page:

http://www.state.ak.us/local/akpages/FISH.GAME/sportf/sf_home.htm

Tag Lab Home Page: <http://tagoweb.adfg.state.ak.us/>

Commercial Fisheries Entry Commission: <http://www.cfec.state.ak.us>

State of Alaska home page: <http://www.state.ak.us/>

Gene Conservation Laboratory Home Page:

<http://www.cf.adfg.state.ak.us/geninfo/research/genetics/genetics.htm>

11th Western Groundfish Conference Abstracts:

<http://www.cf.adfg.state.ak.us/region1/finfish/grndfish/wgcprgrm.pdf>

Adobe PDF versions of groundfish charts can be viewed or downloaded at

<http://www.cf.adfg.state.ak.us/geninfo/statmaps/charts.htm>.

ArcView- and MapInfo-compatible charts can be downloaded from the ADF&G CF GIS Maps and Data Server at <http://maps.cf.adfg.state.ak.us>. This server will be the home for all publicly available GIS maps developed by the division. In the future this server will also feature online maps using ESRI's ArcIMS (Internet Map Server) software (contact Tim Haverland).

REPORTS COMPLETED DURING 2000

Cartwright, Margaret.. 2000. The 1996 Sablefish Survey Results For The Southern Southeast Inside and Northern Southeast Inside Management Areas in Southeast Alaska. Alaska Department of Fish and Game Regional Information Report 1J00-10. Douglas, AK.

Gish, Robert K. 2000. Bering Sea – Aleutian Islands State-Managed Groundfish Fisheries, and Groundfish Harvest From State Waters Under Federal Management Annual Management Report, 1999. Alaska Department of Fish and Game Regional Information Report No. 4K00-64, Kodiak, AK.

Gish, Robert K. 2000. Aleutian Islands Black Rockfish Fishery. A Report to the Alaska Board of Fisheries. Alaska Department of Fish and Game Regional Information Report No. 4K00-73, Kodiak, AK.

Gish, Robert K. 2000. Aleutian Islands State-Waters Sablefish Fishery. A Report to the Alaska Board of Fisheries. Alaska Department of Fish and Game Regional Information Report No. 4K00-74, Kodiak, AK.

Hubartt, D. J., A. E. Bingham, and B. J. Frenette. 2000. Harvest estimates for selected marine sport fisheries in Southeast Alaska during 1999. Alaska Department of Fish and Game, Fishery Data Series 00-17, Anchorage.

Meyer, Scott C. 2000. Composition and biomass of the recreational rockfish *Sebastes* harvest in Southcentral Alaska, 1992-1995. Alaska Department of Fish and Game, Fishery Data Series No. 00-6, Anchorage.

Meyer, Scott. 2000. Halibut otolith exchanges between the IPHC and Alaska Department of Fish and Game, 1991-1998. IN Report of Assessment and Research Activities 1999. International Pacific Halibut Commission, Seattle.

O'Connell, V.M., D. Carlile, and C. Brylinsky. 2000. Demersal shelf rockfish. IN 2001 Stock Assessment and Fishery Evaluation Report For the Gulf of Alaska. North Pacific Fishery Management Council, Anchorage AK.

O'Connell, V.M., D. Carlile, and C. Brylinsky. 2000. Demersal Shelf Rockfish stock assessment and fishery evaluation report for 2001. Alaska Department of Fish and Game, Regional Information Report 1J00-36, Douglas AK 42 pp.

O'Connell, V. M., M. A. Cartwright, B. Richardson and D. Holum. 2000. Report to the Board of Fisheries, Region I Groundfish Fisheries Regional Information Report 1J99-49.. Alaska Department of Fish and Game, Douglas, Alaska. 39 pp.

O'Connell, V., Mike Ruccio, Dan Urban, Charlie Trowbridge, Tom Brookover, Meg Cartwright, Cleo Brylinsky, Scott Meyers, Kristen Munk, Brian Frenette, Bob Piorkowski, Bill Bechtol, and Rob Bentz. 2000. State of Alaska groundfish fisheries associated investigations in 1999: report to the Canada/US Groundfish Subcommittee of the Technical Subcommittee. Alaska Department of Fish and Game, Douglas, Alaska. Regional Information Report 1J00-23.

APPENDIX I
ALASKA DEPARTMENT OF FISH AND GAME
PERMANENT FULL-TIME GROUND FISH STAFF
DURING 1998
COMMERCIAL FISHERIES DIVISION

HEADQUARTERS

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GIS Programmer/Analyst
Tim Haverland
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Bob Piorkowski-AKFIN Program Coordinator
(907) 465-6109

Age Determination Unit
Kristen Munk
(907) 465-3054

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Assistant Project Leader
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(907) 465-3054

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PO Box 240020
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(907) 465-4301

Tom Brookover
Regional Management Coordinator
Division of Sport Fish
304 Lake Street, Room 103
Sitka, AK 99835

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(907) 235-8191

APPENDIX II
INSTRUCTIONS FOR 2000 SPORT CHARTER LOGBOOKS
& SAMPLE FORM

Complete Complete Logbooks Daily.

It is not necessary to start logbook entries until the vessel is actually used for a charter fishing trip during 2000. Once a vessel has been used for a charter fishing trip in 2000, the logbook must include daily reporting until the last trip of the season is completed.

The owner or agent of the business operating this vessel is required to make an entry into this logbook per the following schedule.

RETURNING TO A DOCK

- **FISH KEPT**

Complete the logbook before off-loading any clients or fish.

- **NO FISH KEPT**

Complete the logbook before the operator leaves the vessel.

NO DOCKING FACILITIES (e.g., trailered vessels)

FISH KEPT

Complete the logbook before the vessel or operator departs the landing site and before off-loading any fish.

NO FISH KEPT

Complete the logbook before the vessel or operator departs the landing site.

MULTIPLE TRIPS PER DAY

Complete the logbook at the end of each trip, as described above.

MULTIPLE DAY TRIPS

Complete the logbook at day's end for each day of the trip; complete the last day's activity as described above.

PERIODS OF INACTIVITY

Once a vessel has been used for a charter trip during 2000, the logbook must be completed daily to report inactivity or fishing trips. A logbook sheet must be submitted weekly, even if no trips were taken for the entire week.

Illness or unexpected absences may prohibit timely completion of logbook sheets that report inactivity. Nevertheless, logbooks must be completed and weekly reports submitted as close to the required reporting deadlines as is possible.

Please be complete and write legibly. You may be contacted in person or by mail if forms are delinquent, missing, incomplete, or illegible.

Return Logbook Reports Weekly.

Once a vessel has been used for a charter fishing trip, the logbook must be completed daily and returned per the schedule printed on each logbook sheet until a sheet is submitted indicating that the vessel has taken its last trip for the year.

Weekly Logbook Sheets & Supplemental Logbook Sheets.

Weekly Logbook Sheets should be used to report charter fishing activity between April 24 and October 1.

Supplemental Logbook Sheets should be used to report charter fishing activity before April 24 or after October 1, or to report trips in addition to the first two trips taken on any day.

Supplemental Logbook Sheets used prior to April 24 should be postmarked by May 7.

Supplemental Logbook Sheets used after April 30 should be submitted when a form is full or when you are through fishing for the season (whichever comes first).

Supplemental Logbook Sheets may be adapted to special needs. For example, two trips are taken in a day, then the vessel departs on a multi-day trip. Use the **Supplemental Form** to report the first day of the multi-day trip.

Additional **Supplemental Logbooks Sheets** beyond the five in this logbook are available from local ADF&G offices.

Certification Signature Deadline	
Each Weekly Logbook Form and each Supplemental Logbook Form <u>must</u> be legibly signed and dated by the owner or agent of the business operating the vessel to which the logbook has been assigned. All completed and signed 2000 forms must be received by ADF&G before JANUARY 15, 2001.	
Logbook Data.	
ADF&G No.	The 5-digit vessel number assigned by the Commercial Fisheries Entry Commission (CFEC). A vessel must have this number to be a legally licensed charter vessel in Alaska.
Vessel Name	The Vessel Name or identity, as it corresponds to the ADF&G No. issued by the CFEC.
Date	Dates are printed on the weekly sheets from April 24 through October 1. You must write the date on Supplemental Logbook Sheets .
Inactive (X):	Check Inactive if the vessel is not used for charter fishing on a given date.
Trip No.	A Trip starts when the vessel leaves a dock, port, or launch site with clients on board to go sport fishing. A trip typically ends when the vessel returns to a dock, port, or site of landing to offload clients and fish. A trip may cover part of one day, one day, or multiple days. Do NOT sum information for two or more trips; each trip must be reported separately in the Logbook. The first two trips on a day should be reported on the Weekly Logbook Sheets; all additional trips for the day would be reported in the Supplemental Logbook Sheets. Write the date and trip number on the Supplemental Logbook Form.
Day No. of Multi-day trip	This applies to trips that span two or more calendar days (see definition of Trip above). A "1" would be entered for the first day of a trip, "2" would be written for the second day, and so on until the trip is completed.
Port of Landing	The port (or site) where clients and/or fish are offloaded at the conclusion of the trip.
Number of Clients and Crew Fishing	The number of clients and crew who fished any part of the trip, whether or not they landed a fish. If crew do not fish, leave crew blank. Do NOT add crew information to client information.

SALMON	
Primary Stat Area Fished	The 6-digit area code where you caught most of the salmon on this trip. If you fished for salmon, but caught none, write the code for the location fished the most time on this date and trip.
Maximum Rods Fished	The maximum number of rods/lines fished for salmon at any one time during this trip. Record client rods separate from crew rods.
No. Boat Hours Fished	The number of boat hours at least one rod/line was fishing for salmon. This is NOT the number of hours the boat was on the water. DO NOT include the time it took to run to the fishing grounds from port. Round up to the nearest whole hour.
Fish Kept & Released	The total number of fish kept and released by client and crew as indicated. Do NOT combine client and crew information.
BOTTOMFISH	
Primary Stat Area Fished	The 6-digit area code where you caught most of the bottomfish on this trip. If you fished for bottomfish, but caught none, write the code for the location fished the most time on this date and trip.
Maximum Rods Fished	The maximum number of rods/lines fished for bottomfish at any one time during this trip. Record client rods separate from crew rods.
No. Boat Hours Fished	The number of boat hours at least one rod/line was fishing for bottomfish. This is NOT the number of hours the boat was on the water. DO NOT include the time it took to run to the fishing grounds from port. Round up to the nearest whole hour.
Fish Kept & Released	The total number of fish kept and released by client and crew as indicated. Do NOT combine client and crew information.
<u>Special Notes-Rods, Boat Hours.</u>	
What species group was targeted?	An operator must decide if gear and fishing methods were effectively targeting salmon, bottomfish, or both species groups equally.
BASIC RULE	Simply write the targeted rods and boat hours under each target species group. The sum of targeted boat hours may or may not exceed the hours the boat was engaged in fishing (see below).
EXAMPLE: One target salmon <u>or</u> bottomfish	If SALMON were targeted, write the number of rods and number of boat hours under the SALMON section, even if no salmon were caught or kept. Do NOT report rods and boat hours under the species group that was NOT targeted.

EXAMPLE: Two targets salmon and bottomfish	If BOTH salmon and bottomfish were targeted on a trip, write the targeted rods and boat hours of targeted effort under EACH species group section. It is possible that the sum of salmon boat hours and bottomfish boat hours <u>will not exceed</u> the number of hours the boat was engaged in fishing. Yet it is also possible that the sum of salmon boat hours and bottomfish boat hours <u>will exceed</u> the number of hours the boat was engaged in fishing (e.g., different anglers target different species groups during the same time, or when gear used targeted both species groups equally at the same time).
Incidental Catch (same guidelines for both salmon and bottomfish)	Record all fish kept and released, as indicated. Do NOT include rods or boat hours for a species group that was NOT targeted, even if fish of that group were caught and kept. EXAMPLE: If a salmon was caught while targeting bottomfish, record the salmon as kept and/or released, but do NOT record salmon effort for that fish.
- - - <u>Special Notes - Species.</u>	
"Shakers"	Chinook (king) salmon that are under the 28" minimum size (only in the Southeast Region) that must be released upon capture, unless caught in designated terminal harvest areas.
Pelagic Rockfish	Includes black and dusky rockfish (commonly called "black bass") and yellowtail rockfish. These species of rockfish are uniformly gray, green, brown, or black (see rockfish ID chart in your regulation booklet).
Non-pelagic Rockfish	All other rockfish not mentioned above. Includes yelloweye (commonly called "red snapper"), quillback, and copper rockfish, as well as numerous other species..

**Washington Contribution to the 2001 Meeting
of the Technical Sub-Committee (TSC)
of the Canada-US Groundfish Committee**

Washington Department of Fish and Wildlife
Olympia, Washington

May 8-10, 2001

Contributors:

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Ray Buckley
Thomas Jagielo
Mary Lou Mills
Wayne Palsson
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Mark O'Toole
Farron Wallace
Sandie O'Neill**

Edited by:

Thomas Jagielo

Review of Agency Groundfish Research, Assessment, and Management

A. Puget Sound Area Activities

1. Puget Sound Groundfish Management (*Contributed by Wayne Palsson (425) 379-2313, Greg Bargmann (360) 902-2825, Mary Lou Mills (360) 902-2834*)

ESA Petition for Puget Sound Marine Fish

In February 1999, the National Marine Fisheries Service (NMFS) received a petition for eighteen species of marine fish that are found in Puget Sound to be considered as threatened or endangered under the provisions of the Endangered Species Act. The petition was developed by Sam Wright, a retired Department of Fish and Wildlife employee, who used stock assessments and other information developed by WDFW staff as the basis of the petition. Besides Pacific herring, the other species were exclusively groundfishes that have been identified as in critical or depressed status in Puget Sound (Table 1). In June 1999, NMFS accepted the petition as meriting further consideration but limited the petition list to only seven species which were likely to have data available for a biological opinion. Since this determination, WDFW staff has consulted with NMFS numerous times to provide survey, stock structure, and biological information that were important in the Biological Review Team's deliberations regarding Distinct Population Segments (DPS's) and the evaluation of the extinction risk of each DPS. During November 2000, the National Marine Fisheries Service announced their final decision regarding the Endangered Species Act listings for codfishes and found that listings are not warranted for Pacific hake, Pacific cod, and walleye pollock populations from Puget Sound. They did, however, retain Pacific hake as a candidate species pending further genetic and other studies. Decisions were made for the remaining species in the spring of 2001 (Table 1). A detailed review of the status of the codfishes has been published by Gustafson et al. (2000).

Table 1. ESA Listing Status for Marine Fish Species for Puget Sound.			
Common Name	Scientific Name	DPS	Status
Pacific herring	<i>Clupea pallasii</i>	Puget Sound-Georgia Basin	Not warranted
Pacific cod	<i>Gadus macrocephalus</i>	South of Dixon Entrance	Not warranted
Pacific whiting (hake)	<i>Merluccius productus</i>	Puget Sound-Georgia Basin	Candidate
Walleye pollock	<i>Theragra chalcogramma</i>	Eastern Boreal Pacific	Not warranted
Copper rockfish	<i>Sebastes caurinus</i>	Puget Sound and northern Puget Sound	Not warranted
Quillback rockfish	<i>S. maliger</i>	Puget Sound and northern Puget Sound	Not warranted
Brown rockfish	<i>S. auriculatus</i>	Puget Sound and northern Puget Sound	Not warranted

Conservation Planning

The Puget Sound Groundfish Management Plan (Palsen et al., 1998) calls for the completion of species specific conservation plans and the development of use plans for groundfish resources in Puget Sound. While support to complete these plans has been limited, the pressing ESA petition has forced the development of some of these plans. Greg Bargmann has completed a Puget Sound Groundfish Conservation Plan that identifies precautionary harvest guidelines based upon quantitative stock assessments and surveys. The plan also calls for the establishment of marine refuges for rocky habitat species and ecological marine protected areas for the conservation of all groundfish species. To further institute these plans, a set of interim species conservation plans were developed for Pacific cod, walleye pollock, Pacific whiting, and the three petitioned rockfishes. These plans are being reviewed by tribal co-managers and will be taken up as co-management agreements are developed with each treaty tribe in Puget Sound.

Tribal Co-management

The Rafeedie Court decision mandated that all marine resources including groundfish were subject to catch sharing with non-tribal fishers and population

management was to be shared between the state and treaty tribes. During the development of recent plans and fisheries management, the treaty tribes have been contacted and asked to participate. In November 2000, WDFW Director Koenings met with treaty tribes and committed WDFW to groundfish co-management especially in the development of a network of marine protected areas. The WDFW Intergovernmental Policy group has drafted a memorandum of agreement for consideration by the tribes and is seeking agreements on how to proceed with groundfish co-management.

Recreational Management

In response to depressed stock levels of rockfishes in Puget Sound, the Washington Fish and Wildlife Commission adopted and implemented new rules to control and restrict the recreational harvest of nearshore rockfishes. The daily bag limit for rockfish was reduced from 5 in northern Puget Sound and 3 in southern Puget Sound to only one fish per day throughout Puget Sound. Such conservative limits are expected to decrease harvests of rockfish by 50% and are expected to drastically curtail directed fisheries for rockfish but allow bycatch from other fisheries. A special increased limit of black rockfish was allowed in the Sekiu area during the end of the summer of 2000 and will be considered as a more permanent rule to take advantage of harvestable quantities of black rockfish nearer to the coast of Washington.

The Commission also adopted and implemented a new rule to limit the spearfishery for lingcod. In Puget Sound, there was an inequity between the laws controlling recreational anglers and spearfishers fishing for lingcod. During the six-week fishery period for lingcod, anglers were restricted to keeping lingcod that were between 26 inches and 40 inches in length while spearfishers could harvest fish of any size. To rectify this inequity, the Fish and Wildlife Commission reduced the season for the dive fishery to less than four weeks allowing anglers to fish for first 3 weeks of the fishery period before the initiation of the dive fishery.

Commercial Management

There were no substantial regulations instituted to change the commercial trawl, set net, set line, or drag seine fisheries for groundfish in Puget Sound, but a number of management issues were pursued. The Fish and Wildlife Commission banned roller gear in Neah Bay to limit the harvest of rockfishes by trawling. Few fishers used this gear in the area, so the fishery was not greatly affected. Regulations and quotas continued to reduce the trawl fishery harvest of Pacific cod. The 200,000 lb quota for the western Strait of Juan de Fuca was not met—the total harvest of cod was 164,000 lbs. The deep water 55,000 lb quota of cod was reached in the Strait of Georgia and the area was closed through regular seasonal closures. The final cod catch from the Strait of Georgia was 57,000 lbs.

Commercial management also focused on the fishery for spiny dogfish in Puget Sound. Precipitous declines in catch rates for all three fisheries for dogfish (trawl, set net, and set line) for 1998 and 1999 and declines in population survey estimates resulted in several proposed restrictions for the dogfish fishery in late 1999. After consulting the industry, a harvest guideline of 500,000 lbs of dogfish for Puget Sound was established. Slightly less than 125,000 lbs of dogfish were harvested during 2000.

Signs at Marine Reserves and Conservation Areas

Through cooperative efforts of dive clubs in Washington, signs have been placed at several of the areas closed by Department of Fish and Wildlife regulations. The areas have been closed as Marine Reserves (closed to harvest of most species) and as Conservation Areas (closed to the harvest of all species). The dive clubs have gotten grant funding to cover the cost of the signs and have installed them with volunteer labor. The state is researching the land ownership for areas such as Orchard Rocks and working with both the divers and local governments such as the City of Edmonds.

Northwest Straits Initiative

Department of Fish and Wildlife staff have continued efforts to supply data and expertise to the counties involved in the Northwest Straits Initiative. Seven northern counties in Puget Sound have received funding from the federal government to focus on marine waters. The counties have established Marine Resources Committees (MRCs), volunteer groups with diverse backgrounds to develop solutions to marine problems at a local level. Included in their tasks is to help with recovery of depressed bottomfish stocks. The efforts of the first county involved (San Juan) resulted in establishment of eight voluntary bottomfish recovery zones. Other counties are following suit with outreach meetings to involve the public in the problems and in seeking solutions. Department staff have attended both meetings of the Marine Resources Committees and the public meetings held by these MRCs.

Sixgill Shark Management

Sixgill sharks are caught infrequently in Puget Sound in both commercial and recreational fisheries. Recently, recreational scuba divers have observed sixgill sharks in Seattle's Elliott Bay. These observational opportunities have spread throughout the recreational dive community and became very popular for the last several years. The dive site is located next to a recreational fishing pier and a number of anglers began using fishing techniques that targeted the sixgill sharks. A number of sharks were harvested during the summer of 2000 prompting a conflict between recreational scuba divers and anglers. Because very little information was available on sixgill shark biology and population status in Puget Sound, the Washington Department of Fish and Wildlife instituted pre-

cautionary management identified in the Puget Sound Groundfish Management Plan (Palsson et al., 1998) and established an emergency closure for sixgill shark in Puget Sound. Permanent recreational and commercial regulations are being sought, and a research program is being initiated to better understand the biology and status of sixgill shark populations.

The Washington Department of Fish and Wildlife is participating in a joint research program with the University of Washington, Point Defiance Zoo and Aquarium and the Seattle Aquarium to collect data on sixgill shark populations. Part of this activity includes collection of biological samples for genetic analysis. We are interested in obtaining small samples of muscle from sixgill sharks which may be encountered in other states or British Columbia. We would be happy to supply a small sampling kit and data collection form to any researcher willing to contribute to this effort.

2. Puget Sound Groundfish Monitoring, Research, and Assessment

(Contributed by Wayne Palsson (425) 379-2313)

Video-Acoustic Technique for Assessing Rocky Habitat Fishes

With continued support from Sport Fish Restoration Act Funds, the rocky habitats in the Strait of Georgia-Bellingham region were surveyed for lingcod and rockfish using the Video-Acoustic Technique (VAT) developed during previous project segments. The VAT has been used throughout Puget Sound to identify and characterize nearshore rocky reef habitats and to estimate the density of lingcod, rockfish, and other marine fishes that inhabit the rocky habitats. During the Summer of 2000, the nearshore rocky habitats of the San Juan Archipelago were surveyed. The video component of the survey consisted of establishing a grid that encompassed recognized or potential rocky habitats in the San Juan Archipelago, randomly selecting individual cells, and occupying from 3 to 5 randomly selected video stations within each cell. Acoustic transects were also conducted at most stations that targeted pelagic rockfishes. During this survey, a laser package was employed to provide measures of fish length and, in many cases, measure the visual range of the camera. In total, 1091 camera deployments in 264 cells and 232 acoustic transects were completed.

Staff completed estimates of rocky habitat fishes from the 1998 VAT survey of Neah Bay.

Black rockfish and blue rockfish were the dominant rockfishes in the region, while copper and quillback rockfish were seldom encountered (Table 2). Only 26,000 yellowtail rockfish were estimated for the region. Canary rockfish are typically a deeper water species, with an estimated population of almost 96,000. China rockfish and tiger rockfish are benthic species that exhibit cryptic behav-

iors and are seldom observed by the VAT camera, as indicated by the very low population estimates. Populations of lingcod and kelp greenling in the region were estimated to be 47,500 and 159,800, respectively.

Evaluation of No-Take Refuges for Reef Fish Management

Table 2. Population estimates for rocky reef species from the 1998 VAT survey of Neah Bay.		
Species	Population estimate (1000's)	% C.V.
Copper rockfish	32.2	35.0
Quillback rockfish	40.6	58.8
Black rockfish	316.8	36.2
Blue rockfish	258.2	44.9
Canary	95.4	47.4
Yellowtail rockfish	26.0	81.1
China	3.7	48.8
Tiger	2.6	100.0
Unidentified rockfish	453.1	52.1
Lingcod	47.5	50.7
Kelp greenling	159.8	20.8

Ongoing field work was conducted during 2000 to further evaluate the potential of no-take refuges as a fisheries management tool for rockfish and lingcod in Puget Sound. The work, which began in 1992, has compared the size, density, and reproductive responses of rockfishes, lingcod, and other rocky reef fishes in no-fishing areas to comparable habitats in fished zones. Several years of intensive field work have shown that a small no-take refuge established at Edmonds, Washington in 1970 has large modal sizes of rockfishes and lingcod that are virtually absent on any of the fished sites. This long-term refuge also has many times the densities of large rockfishes that are typically caught in recreational fisheries. Surveys also revealed greater numbers of lingcod nests in the no-take refuges compared to the corresponding fished sites.

The new study initiated in 1999 takes advantage of the previous information collected at Orchard Rocks which was one of the fished sites monitored during

the first study. In 1998, this site was declared a complete no-take refuge for all organisms by the Washington Fish and Wildlife Commission. With the addition of a new fished site treatment at Point Glover, the newly created refuge in a formerly monitored fished area is an excellent opportunity to evaluate the before and after impacts of refuge creation and the implications of refuge management in Puget Sound. To date, the recovery of fishes at the Orchard Rocks Conservation Area has been slow, and follow up monitoring at the Edmonds Underwater Park, a long-term refuge, has shown local depletions of large rockfish. Continuing surveys were conducted at marine refuge sites in Hood Canal where 20% of the nearshore rocky habitat is conserved as marine refuges and in the San Juan Islands marine refuges.

The results from the rocky reef refuge studies in Puget Sound have been useful to begin planning a refuge network for Puget Sound. Many agencies and organizations are involved in planning marine refuges in Puget Sound and WDFW staff are integrally involved in most planning efforts. The results from stock assessments, fishery monitoring, refuge comparisons, and video assessments of rockfish and lingcod populations and their habitats are being integrated into a design of a system of no-take refuges to manage lingcod and rockfish populations in Puget Sound. An MPA system is also the centerpiece of the conservation plans for the rockfishes that are being petitioned under the ESA. Planning work during 2000 has included the development of criteria for identifying and establishing rocky habitat refuges and the guidelines for the criteria will be published through the Puget Sound Research '01 Proceedings in 2001.

Wolf-eel Life History SCUBA Surveys

In January 1999, groundfish staff began a study of wolf eel *Anarrhichthys ocellatus* in Puget Sound. While this is an identified species managed under the Puget Sound Groundfish Management Plan, little is known about their life history, population status, or vulnerability to fishing. Although the recreational harvest of wolf-eel is not allowed in South Sound, wolf-eel remain open to harvest in the Strait of Juan de Fuca. The basic study was initiated at two sites in South Puget Sound known to have wolf-eel colonies. Scuba transects were established at each site and individual den locations mapped. These sites at Day Island and Sunrise Beach, lie at the southern and northern ends of the Tacoma Narrows, respectively, and are separated by a distance of approximately 7 nautical miles. A monthly dive schedule was developed to gain information on den occupancy, consistency of counts, and basic biological observations. Individual wolf-eels were marked by implanting visible elastomer tags *in-situ* in the lip region of the animal. In addition, naturally occurring marks were used to identify non-tagged fish. During the survey dives, 35 mm still and digital video cameras were used to capture high quality images of both tagged and non-tagged wolf eels. It is conjectured and being tested that spot patterns around the eyes of wolf eels are unique and may be used as natural marks to identify individuals. Image

enhancement software is being used to analyze these images and to develop a catalog of individual animals for long-term identification purposes.

To date, we have found that photographic identification of wolf-eel is useful and that spotting patterns and marks were relatively stable in tagged individuals. However, it was difficult to obtain photographs or videos of every observed individual due to the cryptic and reclusive nature of the animals. The positive identification of many individuals did allow for mate and den fidelity to be examined. Differences in mate fidelity between sites were observed for the first fifteen months, with wolf-eels at Days Island exhibiting lower fidelity rates than those at Sunrise Beach. We observed a considerable decline in mate and den fidelity through subsequent spawning seasons at both survey sites. Only one of the original eight pairs that were observed at the beginning of the study remained together and five of twenty-one individuals remained in the same den throughout the duration of the study. Our results contrast with total mate and site fidelity resulting from captive observations and the generally accepted belief that wolf-eels mate for life. Factors that may contribute to a decline in mate and site fidelity of wolf-eels include the harvest management of competing and prey base species. Pacific giant octopuses have been observed displacing wolf-eels from their dens and we have observed evidence of such occurrences at our study sites.

There were no significant changes in the seasonal or inter-annual abundance of wolf-eels for twenty-five dens observed throughout the study period. Immigration rates have approximated emigration rates at both sites, but overall, they appear to be low. There were only four juvenile recruits to the study sites. All juveniles were found in small crevices and were the only inhabitants observed in these dens during the study.

Wolf-eel appear to be a species that is sensitive to harvest and may be affected by competition with Pacific giant octopus and with fisheries. During 1999, one area in the harvest zone was surveyed that once contained a large wolf-eel colony. There were no wolf-eel present when surveyed. Fisheries that harvest crab, octopuses, urchins, and crab may remove prey resources that wolf-eel depend upon. These issues are being evaluated for a comprehensive management plan for wolf-eel in Puget Sound.

Tacoma Narrows Lingcod Monitoring

Lingcod in south Puget Sound are assessed, in part, by using the results of a creel survey of bottomfish anglers fishing at the Tacoma Narrows for lingcod. This creel survey, developed under the auspices of previous Sportfish Aid projects, has provided consistent and precise estimates of catch per unit effort, total catch, and effort (Palsson 1991). The creel survey consists of boat counts at a designated fishing area (an artificial reef) as measures of total effort and a corresponding creel survey at major access points. The survey is stratified by periods

of spring and neap tidal exchange and by weekends and week days.

The 2000 lingcod fishery at Tacoma Narrows showed several reversals in the trends in participation, catch and fishing success observed during the preceding several years (Table 3). Angler trips increased to 813 taken during the six week fishery compared to only 483 during the previous year. These 813 anglers harvested 131 lingcod during the fishery with a fishing success rate of 0.16 lingcod per bottomfish trip. The trend in fishing success and inferred abundance from the Tacoma Narrows fishery has shown relative stability during the past ten years, and although the 1999 angler catch rate of 0.09 is the lowest since the 1983, the 2000 catch rate of 0.16 lingcod per bottomfish trip equals the ten year average. Given the recent increasing trend estimated from the WDFW general survey and the recent stability of most of the recent years from the Tacoma Narrows fishery, the current regulatory regime will be continued.

Marine Recreational Fisheries Statistical Survey

Table 3. Catch, Effort and Catch Rate Estimates from the Tacoma Narrows Lingcod Fishery						
Year	Bottomfish Anglers			Scuba Fishers		
	Trips	Catch	CPUE	Trips	Catch	CPUE
1983			0.27			0
1984			0.33			0.50
1985			0.43			0.63
1986	1927	928	0.42	259	178	0.69
1987	2948	1085	0.37	175	104	0.59
1988	1940	428	0.22	280	121	0.43
1989	1661	385	0.23	171	124	0.72
1990	1479	291	0.20	133	57	0.43
1991	1333	217	0.19	291	220	0.76
1992	500	105	0.21	29	19	0.65
1993	1483	288	0.19	86	25	0.29
1994	1673	297	0.18	175	107	0.66
1995	1498	395	0.26	177	75	0.43
1996	1296	139	0.12	138	97	0.70
1997	843	168	0.20	80	80	1.00
1998	691	118	0.17	156	106	0.68
1999	483	44	0.09	29	29	1.00
2000	813	131	0.16	0	0	0

In 1996, the Pacific States Marine Fisheries Commission selected WDFW as a contractor for the Marine Recreational Fisheries Statistical Survey (MRFSS). The MRFSS is a federal catch estimation system for marine anglers conducted in most coastal states. Although WDFW has had its own recreational catch estimation system, the implementation of the MRFSS came at a time when major fishery closures for salmon have prevented the WDFW system from estimating the catch of groundfish during key months in important fishery areas. Although MRFSS estimates do not provide precise sub-regional estimates, they provide a basis for comparing WDFW estimates, are more timely, result in biological and species composition information, and estimate catch and effort for all modes of fishing. Many of these statistics have not been available through the WDFW recreational catch estimation system. Staff has been involved in discussions with the RECFIN statistical committee and with PSMFC regarding improvements to the survey in Puget Sound and along the coast of Washington.

Puget Sound Groundfish Stock Assessments

Puget Sound Groundfish staff are in the process of reviewing the status of the 20 groundfish species in Puget Sound. In 1997, WDFW issued the 1995 Status of Puget Sound Bottomfish Stocks (revised) (Palsson et al., 1997) which described the status and trends for 18 species or species groups of bottomfish. When sufficient and appropriate data were available, recent measures of stock abundance were compared to long-term means, and these comparisons were categorized into above average, average, below average, depressed, and critical measures of stock status. These stock status categories correspondingly range from populations that are healthy to populations that have poor productive capacity. The new assessment reported in the last TSC report was published in the Puget Sound Update 2000 (PSAT 2000) as a part of a comprehensive assessment of the status of the health of Puget Sound marine ecosystem. The assessment found that the majority of assessed groundfish populations are in poor condition in Puget Sound.

2000 Trawl Survey

The Strait of Juan de Fuca is an arm of the Pacific Ocean shared by both the United States and Canada. Many of the resources harvested by commercial and recreational fisheries in the eastern portion of the region have undergone severe declines which have prompted a number of fishery closures and consideration of seven species under the U.S. Endangered Species Act. The Washington Department of Fish and Wildlife conducted a bottom trawl survey in the eastern Strait during spring 2000 which included both Washington and British Columbian (Canada) waters. The goals and objectives of this survey were to estimate the abundance and describe the distribution of key recreational and commercial groundfish and macroinvertebrate species, collect biological information from key species, and evaluate the relationship of abundance and

distribution of key species to oceanographic features and the need for trans-boundary management.

The chartered *F.V. Chasina* was used as the sampling vessel which towed a 400 mesh Eastern net fitted with a 3 cm codend liner. Stations were selected with a stratified systematic approach based upon four depth zones for each of the country survey areas. The area sampled at each station was measured with differential GPS and known net width openings. The catch from each trawl was identified, weighed, and enumerated, and the weights and numbers of each species were divided by the area sampled to estimate species densities. Abundances were estimated by averaging station densities within each stratum and multiplying these by the stratum area.

A total of 77 trawl stations were occupied and completed. Twenty five stations were occupied in British Columbia and 52 stations were sampled in the U.S. There were 179 living taxa identified including 76 species of fish and 102 species of invertebrates. Species richness was greater on the U.S. side with 70 fish species sampled compared to 49 species in Canada. There were 1,825 records of species which comprised a catch weight of over 22 mt and represented 59,000 individuals. Almost 26,000 individual fish were collected which weighed over 11 mt. Of note, juvenile lingcod and Pacific cod were especially common in Canadian samples, juvenile walleye pollock occurred throughout the study area, and Dungeness crab and English sole more frequent in the U.S. Strait of Juan de Fuca than in Canada. There were a series of samples collected for later analysis or archives. These collections included several hundred fin clips for the genetic analysis of walleye pollock, Pacific cod, lingcod, quillback rockfish, and copper rockfish; 48 laboratory samples of up to 50 English sole and 19 of starry flounder; and approximately 50 voucher specimens for positive fish identification. A series of fish samples were also collected for a food consumption study of marine pinnipeds.

Puget Sound Ambient Monitoring Program (PSAMP) (*Contributed by Sandie O'Neill (360) 902-2843*)

PSAMP is a multi-agency effort to monitor the health of Puget Sound. The Washington Department of Fish and Wildlife participates by monitoring toxic contaminants in Puget Sound fishes. To date, we have measured contaminant levels in English sole, Pacific cod, three species of demersal rockfish, Pacific herring, and chinook and coho salmon from a wide range of environments (polluted to clean). Geographic patterns of contaminants in these species were described. We have now completed focus studies in Elliott Bay, Sinclair Inlet and Commencement Bay, three of Puget Sound's most highly contaminated areas. With these studies we have documented fine-scale distribution patterns of contaminants in English sole and rockfish, as well as the effects of contaminants on reproductive competence in English sole.

Papers on English sole, salmon and rockfish were presented at the 1998 Research in Puget Sound Conference (March 1998) in Seattle, Washington. Copies are available on-line at www.wa.gov/Puget_Sound or from PSAMP researchers.

Recently we have shown that English sole from urban and near urban areas were 2 to 33 times more likely to develop liver disease than fish from clean reference areas. Liver disease in English sole is strongly correlated with the presence of polycyclic aromatic hydrocarbons (PAHs) in sediments, which originate from petroleum or from the combustion of fossil fuels. In addition, we have found from our six long-term Puget Sound sampling sites that the chances of English sole developing toxicant-related liver disease have increased roughly two-fold from 1989 to 1998 but then declined in 1999, in English sole from Elliott Bay (relative to clean reference sites). The risk of English sole developing liver disease has remained unchanged during this period in the five other areas (Commencement Bay, Sinclair Inlet, Everett, Hood Canal, and the Strait of Georgia). These results were presented as a poster the '2001 Research in Puget Sound Conference (PSR'01, February 2001).

We have completed two samplings of contaminants in Pacific herring from three to five locations in Puget Sound and Canada (1999 and 2000). Herring from central and southern Puget Sound had significantly higher PCB concentrations in whole bodies than fish from northern Puget Sound and the Strait of Georgia. Exposure to PAH metabolites (measured as PAH metabolites in bile) were also elevated in herring from central and southern Puget Sound but not in fish from northern Puget Sound. In a collaborative study with National Marine Fisheries Service, we have also documented that English sole and quillback and brown rockfish from several locations in central Puget Sound are displaying evidence of endocrine disruption. We have also continued archiving tissues from Puget Sound groundfish and forage fish for future molecular genetics studies. The results on contaminant exposure in Pacific herring and endocrine disruption in rock fish and English sole were also presented at the (PSR'01) and the results will be published as extended abstracts in the upcoming proceedings.

3. Puget Sound Forage Fish Monitoring and Assessment

Pacific Herring Fisheries *(Contributed by Greg Bargmann (360) 902-2825)*

Fisheries for adult herring remain closed throughout Washington waters. A small fishery for juvenile herring for use as bait continues to operate. Spawning abundance of herring continues to be generally increasing over the low levels seen throughout most of the 1990's. Spawning populations remain low at Cherry Point near Bellingham and at Discovery Bay in the eastern Strait of Juan de Fuca.

Herring Stock Assessment *(Contributed by Mark O'Toole (360) 466-4345 ext 241)*

Annual herring spawning activity is currently just winding down at most spawning grounds, and spawning biomass estimates for 2001 are not yet available. Herring spawning activity in Washington State generally takes place from mid January to mid April, with the exception of the Cherry Point area where spawning occurs from early April to early June.

In 2000, herring spawning biomass estimates were made at nineteen spawning grounds in Puget Sound and two on the coast. Spawning biomass was estimated utilizing two different methods, spawn deposition surveys and acoustic-trawl surveys. Most spawning grounds were surveyed with either one method or the other, a few with both methods.

Washington State herring spawning biomass estimates, 1994 - 2000:

	<u>Year</u>						
<u>Spawning Ground</u>	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>	<u>1998</u>	<u>1999</u>	<u>2000</u>
Squaxin Pass	225	157	374	149	68	474	371
Hale Pass							142
Quartermaster Harbor	1412	2001	805	1402	947	1257	743
Port Orchard/Madison	424	863	806	360	489	2006	1756
South Hood Canal			239	226	101	516	140
Quilcene Bay		817	328	465	1152	2464	2426
Port Gamble	2857	3158	2058	1419	971	1664	2459
Kilisut Harbor	292		380	307	311	802	107
Port Susan	365	363	110	828	2084	545	785
Holmes Harbor			336	530	464	175	281
Skagit/Similk Bay		891	736	893	209	905	649
Fidalgo Bay	1207	1173	590	929	844	1005	737
Samish/Portage Bay	459	194	636	509	643	555	196
Interior San Juans			277	30		197	128
NW San Juans			53	79	107		90

Semiahmoo Bay	1389	1245	1219	621	919	868	926
Cherry Point	6324	4105	3095	1574	1322	1266	808
Discovery Bay	375	261	747	199	0	307	159
Dungeness/Sequim Bay		287	180	158	112	352	138
Grays Harbor					77	297	166
Willapa Bay				144	57	397	345

Spawning ground maps

The department received a grant from the Puget Sound Action Team to produce a report containing maps of all known spawning grounds of Pacific herring, sand lance and surf smelt in Puget Sound. Since these species spawn at fixed shallow water or intertidal areas, spawning grounds are at risk from human alterations. The report was designed as a reference for local governments, land use planners, developers and environmental groups. The reports have proven to be quite popular.

B. Coastal Area Activities

1. Coastal Groundfish Management *(Contributed by Michele Robinson (360) 249-1211)*

Council Activities

The Department contributes technical support for coastal groundfish management issues via participation on the Groundfish Management Team (GMT), the Scientific and Statistical Committee (SSC), and the Habitat Steering Group (HSG) of the Pacific Fishery Management Council (PFMC). The Department is also represented on the Scientific and Statistical Committee and Groundfish Plan Team of the North Pacific Fishery Management Council (NPFMC). Landings and fishery management descriptions for PFMC-managed groundfish are summarized annually by the GMT in the Stock Assessment and Fishery Evaluation (SAFE) document.

Groundfish Strategic Plan

The Council's ad hoc Strategic Plan Oversight Committee met in January and March to discuss priorities for implementing the strategic plan which was adopted by the Council in November 2000. The following themes were identified as the four top priorities:

Capacity Reduction

Harvest Policy

Marine Reserves

Science

A buyback program is the preferred means for reducing capacity in the trawl fleet because a large reduction is needed to rationalize the fleet and the industry supports a buyback program. However, without Congressional help, a buyback program is unlikely as the Council and the industry does not have the means to do it. West Coast industry representatives are actively lobbying Congress for a buyback program; however, the Council agreed that, after June, trawl permit stacking as a means to reduce capacity should become a high priority and will discuss this further in June. An ad hoc Marine Reserves Implementation Development Team met in February to develop a plan (process and budget) to develop siting criteria to implement marine reserves on the West Coast. The budget proposal for \$4.7 million (over three years) was submitted to Congress for approval, but the Council has not received a reply to date.

Groundfish Rebuilding

The Pacific Council approved a canary rockfish rebuilding plan that will limit total coastwide fishery impacts on the canary stock to 93 mt annually for the next two years. The plan envisions a 57-year rebuilding period; the actual length of time to rebuild the stock depends upon its future reproductive success and annual catch levels. The adopted rebuilding period is based on a constant annual catch and a precautionary assumption of reproductive success. The Council seriously considered a more pessimistic recruitment forecast that resulted in an annual catch near 60 mt, which would have virtually shut down all commercial groundfish fishing on the continental shelf. In the end, however, the Council adopted a slight less pessimistic forecast for two years. During that time, the National Marine Fisheries Service will conduct another survey of the groundfish resources and the new information will be incorporated into an updated assessment in 2002. During 2001 and 2002, sport and commercial fisheries will be managed not to exceed preseason targets of 44 mt each, the remaining 5 mt to be used for research sampling, if necessary. The plan calls for annual review of the various fisheries that take canary rockfish and includes a mandatory review of the entire plan after two years. All sources of canary rockfish fishing mortality must be considered towards the allowed impact level, including bycatch in the Pacific whiting fishery, the salmon troll fishery, and the pink shrimp trawl fishery.

The Council also approved a cowcod rebuilding plan limiting fishery impacts to one percent per year (2.4 mt for 2001), a 95-year rebuilding period, and the use

of area closures south of Pt. Conception to reduce bycatch mortality. In 2001, cowcod will be managed as a prohibited species for all commercial and recreational fishers, and the Council will request the State of California to prohibit fishing in the closed area for state-managed species.

A first draft of the rebuilding plan for widow rockfish was reviewed by the Council's Scientific and Statistical Committee in March and a second draft is currently being prepared. The Council is expected to begin developing a widow rockfish rebuilding strategy at its meeting in June. An initial rebuilding analysis for the darkblotched rockfish stock is also being prepared and may be available for distribution at June Council meeting. As with widow rockfish, a rebuilding plan must be prepared and approved by the Council's November 2001 meeting.

West Coast Groundfish Observer Program

The National Marine Fisheries Service (NMFS) drafted a sampling and logistics plan for the West Coast Fishery Observer Program. Current funding will provide approximately 20 experienced observers who will be stationed among 13 port groups coastwide. The sampling plan is designed to provide in the first year at least 10% coverage coastwide for the limited entry trawl fleet and pilot observer coverage in the limited entry fixed gear sablefish and rockfish fisheries. In addition, one or two observers will be allocated to a pilot program on overages.

The primary goal of the observer program is to improve management of groundfish by improving the estimate of total catch, mainly through ongoing collection of information on discarded catch which will complement current shoreside information on landed catch. Also, fishery and resource management can be improved through the collection of groundfish biological information and information on the catch of prohibited species. NMFS, Pacific States Marine Fisheries Commission (PSMFC) and the states will cooperate to manage the observer program. NMFS will be responsible for training, debriefing, and coordinating observers; designating which vessels are to carry observers; determining observer assignments; data entry; and database development and maintenance. Through a contract with an experienced provider of observer services, PSMFC will hire, equip, insure, and transport observers. In addition, PSMFC will work with the states who are providing coordination with current shoreside fishery sampling and other support for the observers.

Vessels will be selected so that coverage in the trawl fleet would cycle through all the trawl vessels in about two years and would prevent vessels from being selected in consecutive fishing periods. Observers will plan to observe a selected vessel for all of its fishing trips through a cumulative trip limit period. The goal is to collect tow-by-tow information from each catch (market) category. The final administrative details are expected to be worked out by the end of May; however, NMFS has expressed concern that the program may be delayed due to

the current federal hiring freeze.

Bottom trawling in coastal state waters

The Washington Fish and Wildlife Commission voted to prohibit bottom trawling in all coastal state waters (from the shore seaward three miles). This prohibition was enacted to protect coastal populations of rockfish. The closed area included areas which are not habitat for rockfish but the Commission decided to close the entire area to avoid concentrating trawlers into the areas remaining open.

2. Coastal Groundfish Monitoring, Research, and Assessment

Coastal Lingcod Stock Assessment for PFMC *(Contributed by Tom Jagielo (360) 902-2837)*

Coastwide fishery, survey, and biological data were summarized for the Vancouver through Conception INPFC areas, and an age-structured population assessment was presented for the stock in two geographic units: Lingcod-North (LCN) (US-Vancouver and Columbia areas) and Lingcod-South (LCS) (Eureka, Monterey, and Conception areas) (Jagiello et. al. 2000). Each assessment unit incorporated fishery, survey, and abundance index data sampling unique aspects of the lingcod population, which is non-randomly distributed by size and sex. The age-structured models were implemented in AD (Automatic Differentiation) Model Builder (version 4.0.1) software (Otter Research, Ltd; Fournier 1996).

LCN model likelihood components included 1) Commercial landings: 1973-2000, 2) Recreational landings: 1973-2000, 3) Commercial (trawl) age composition, 1979-1999, 4) Recreational age composition, 1980 and 1986-1999, 5) NMFS triennial trawl shelf survey age composition: 1992, 1995, and 1998, 6) WDFW Cape Flattery tag survey age composition: 1986-1997, 7) NMFS triennial trawl shelf survey biomass: 1977, 1980, 1983, 1986, 1989, 1992, 1995, and 1998, 8) WDFW Cape Flattery tag survey abundance: 1986-1992, and 9) Trawl fishery logbook CPUE index: Washington and Oregon: 1983-1997.

LCS model likelihood components included: 1) Commercial landings: 1973-2000, 2) Recreational landings: 1973-2000, 3) Commercial (trawl) age composition: 1992-1998, 4) Recreational age composition: 1992-1998, 5) NMFS triennial trawl shelf survey age composition: 1992, 1995, 1998, 6) NMFS triennial trawl shelf survey biomass: 1977, 1980, 1983, 1986, 1989, 1992, 1995, and 1998, 7) Trawl fishery logbook CPUE index: California: 1978-1997.

Coastwide, commercial landings peaked in 1983 at 4146 mt.. Historically (1981-1999), trawl gear has made up the majority of commercial landings coastwide

(76%). In 1999, trawl gear comprised 63% of the commercial total for the northern coast (US Vancouver and Columbia areas) and 50% of the total for the southern coast (Eureka, Monterey, and Conception areas). From 1981-1999, gears other than trawl comprised a relatively larger portion of the total in the Eureka (30%), Monterey (40%) and Conception (53%) areas relative to the US Vancouver (22%) and Columbia (13%) areas. In 1999, coastwide landings totaled 325 mt and were distributed as follows by area: U.S.-Vancouver 55 mt (17%), Columbia 111 mt (34%), Eureka 95 mt (29%), Monterey 52 mt (16%), Conception 12 mt (4%). Historically, recreational landings have comprised a larger proportion of the total landings for the southern area, compared to the northern area. In recent years, the recreational portion of the total landings has increased in the north. The 1995-1999 average proportion recreational was 49% of the total weight in the south and 21% in the north.

Estimated female spawner per recruit (SPR) fishing mortality rates ($F_{45\%}$) were .12 for the northern area, and .14 for the southern area. Female spawning stock biomass (SSB) in 2000 was estimated at 3522 mt for the northern area, and 3262 mt for the southern area. Estimates of the female unfished spawning stock size (B_0), derived using the method recommended by the STAR panel, were 29,877 mt for the northern area, and 24,437 mt for the southern area, respectively. Using these values, female spawning stock size in 2000 was 12% of the unfished stock size in the north, and 13% in the south, respectively.

Total biomass (age 2+) in the northern area declined from over 27,000 mt in the mid 1970's to approximately 6400 mt in the mid-1990's. Estimates of recent biomass indicate an increase to approximately 8,900 mt in the northern area. In the southern area, total biomass declined from over 14,000 mt in the mid 1970's to approximately 5700 mt in the late-1990's. Estimates of recent biomass indicate an increase to approximately 6,200 mt in the southern area.

In both regions, estimated recruitment was higher in the early part of the time series and relatively low by comparison through the 1990's. From 1973-1982, recruitment averaged 1841 (thousand age 2 fish) in the north, and 1904 in the south. From 1986-1995, recruitment averaged 1036 in the north, and 1589 in the south.

Estimates of exploitation rate (catch/available biomass) in the northern area reached .61 (commercial fishery) and .07 (sport fishery) in 1993, and declined to .04 and .02 in 2000, respectively. In the southern area, exploitation rates reached .14 (commercial fishery) and .31 (sport fishery) in 1987, and declined to .04 and .11 in 2000, respectively.

The following research and data collection needs were identified: 1) Emphasis should be placed on improving fishery age structure sampling size and geographical coverage in both regions. Additional between-lab age reading tests

should be conducted to resolve potential age reading disparities; 2) More frequent and synoptic fishery independent surveys should be conducted in both regions to aid in determination of stock status and recent recruitment; 3) In the southern region, CPFV observer project CPUE data should be analyzed (on a reef-specific basis) using a General Linear Model (GLM) analysis, and evaluated for use as an index of abundance; 4) Coastwide enumeration of at-sea discards (e.g. by an on-board observer program) is needed to properly account for total fishery mortality.

Cape Flattery Lingcod Tagging Study *(Contributed by Tom Jagielo (360) 902-2837)*

The annual February-March lingcod survey with bottom troll gear at Cape Flattery was conducted for the 15th year in 2001. This survey produces estimates of lingcod survival and abundance at Cape Flattery, which have proven useful for the PFMC stock assessment, particularly as an aid to estimate recruitment. Since 1998 we have employed coded wire tags in the mark-recapture survey as internal marks, and WDFW samplers have examined as many fish as possible from the sport catch at Neah Bay with an R8-tube CWT detection system. The new survey design involves a much more labor-intensive recapture sampling effort, but eliminates the need for estimates or assumptions about tag reporting rates. The direct catch sub-sampling approach also has the potential to yield estimates of abundance with greater precision than the voluntary tag return sampling design, as estimates of the total sport catch and its variance are not required.

Black Rockfish Tagging study *(Contributed by Farron Wallace (360) 249-4628)*

In 1998, WDFW began a multi-year mark-recapture survey near Westport Washington, the principal location of recreational landings of black rockfish along the Washington coast. The survey design involves five annual releases, and seven years of tag-recovery monitoring in the sport fishery. Aboard the WDFW research vessel Corliss, 2,622, 3,478 and 2,779 black rockfish were captured, tagged and released during 1998, 1999 and 2000 respectively. Fish were released on pinnacles distributed throughout the area fished by the Westport charter fishing fleet. Each fish was tagged with two coded wire tags (CWT) placed in the opercular musculature: one on each side of the fishes head. The tags were marked to allow for identification of specific individuals upon subsequent recapture. No tag shedding or tag related mortality was observed during holding experiments during 1998 and 1999.

On an annual basis, roughly 40% of the total Westport recreational black rockfish catch is sampled for tags by passing fish carcasses through a CWT tube detector. A total of 14, 79 and 300 tags were recovered in 1998, 1999 and 2000 respectively. Cooperation of the charter boat industry was very good and enabled us to achieve the high sample proportion of the total number of fish

landed (including those filleted at sea). Mark-recapture data will be used to produce estimates of abundance, survival, and mortality for black rockfish in the Westport coastal area. Population parameter estimates will be incorporated into the 2002 black rockfish age structured model.

Data analysis show the importance of tagging as many fish as possible each year, and conducting an accurate and thorough sampling of as large a proportion of the catch as possible for tags. We hope to increase our releases and sampling rate during 2001. Study results so far are quite promising and efforts may be expanded to include the entire Washington coast in subsequent segments.

Nearshore Habitat Mapping (*Contributed by Tom Jagielo (360) 902-2837*).

During the month of June, 2000 Evans Hamilton Inc. (EHI) was contracted by Washington Department of Fish and Wildlife to conduct a multibeam bathymetric survey of an area extending from 48° 00' N to 48° 20' N and from 125° 00' W eastward, to as close to shore as possible in the area of Cape Alava. The purpose of this project was to obtain detailed maps to use in the design of *in-situ* rockfish surveys.

Survey work in the originally planned Cape Alava area were curtailed due to severe weather conditions. Alternative survey sites were chosen within the Straits of Juan de Fuca where the sea state permitted data acquisition. These alternative sites are along the Washington coast with the first site near Cape Flattery and the second site near Sail Rock and the entrance to Neah Bay.

The fieldwork performed by EHI comprised survey lines at a maximum spacing of 225 meters; this spacing varied and was reduced as water depth decreased. Survey data were collected as near to shore as the captain and helmsmen would pilot their craft. The Seabeam 1180 (180 kHz) multibeam was used as the prime system during the survey to map the study areas. Information gathered with the Seabeam was digitized, processed, and logged with the Hysweep module of the Hypack Max software package by Coastal Oceanographics. Ship motion information (pitch, roll, heave) was provided directly to the Seabeam via a TSS model 350 motion sensor. This motion sensor was mounted centerline on the lower deck and thwart-ship from the Seabeam transducers. This motion information is processed real-time by the Seabeam software for proper geo-coding of the 126 multibeam soundings.

The multibeam data collected at the Flattery and Sail Rock sites proved of sufficient quality to adequately characterize the relief of seabed features in these areas. These data sets greatly enhance coverage of the reef systems in these areas. The Cape Alava data possesses an extremely high noise level, due to excessive ship roll during data collection, and required extensive editing and smoothing. The eastern-most survey lines of this area do characterize several rock features not formerly identified in the NOAA data. Otherwise, this is a flat

to very gently sloping section of the Washington continental shelf.

Studies on the Efficacy of Intra-muscular Injections of Strontium Chloride to Produce Trans-generational Otolith Marks in the Progeny of Kelp Perch, (*Brachyistius frenatus*). (Contributed by Ray Buckley (360) 902-2828 and Eric Volk (360) 902-2759)

One of the crucial questions surrounding Marine Protected Area (MPA) efforts is to determine if larval rockfishes and juvenile surf perches released by the adults in MPAs survive to produce recruitment to stocks in the region. Because it is impractical to mark these juvenile fishes by any conventional means, we have made attempts to induce a trans-generational mark through intra-muscular injection of strontium chloride solutions into the female parents prior to parturition. The idea behind these trials is for gestating females to transfer strontium to embryos *in vivo* during the normal nutrient transfer processes in these viviparous fishes. We tested the technique with brown rockfish and kelp perch, and report on results for the kelp perch trials.

Late stage gestating females were collected in Puget Sound, WA, and held in a local aquarium. Treatment females were given intra-muscular injections of either 9,000 ppm or 30,000 ppm SrCl_2 in a saline solution carrier. Control females received only the saline injections. A total of 26 chemical analysis transects were conducted on kelp perch otoliths; nine control specimens, eleven specimens from females injected with 9,000 ppm SrCl_2 , and seven specimens whose female parents were injected with 30,000 ppm SrCl_2 . Analysis transects began at the mid-dorsal edge of each otolith and ended between 105 mm and 245 mm inward from the edge at 15 mm intervals. For each analysis point, the strontium to calcium atomic ratio was calculated. For control specimens, analyses at each discrete location were plotted together, starting with the analysis conducted at the otolith edge. For the other two groups, transects were arranged so that peak Sr/Ca values fell at the same relative location.

Results of this study demonstrate that trans-generational marking of viviparous marine fishes is possible by injecting gravid females with strontium chloride solutions. In kelp perch otoliths, Sr/Ca values were significantly elevated over those in control otoliths and comparisons of results between the two treatment categories showed that there was an approximately linear dose-response effect, with larvae from the 30,000 ppm injected group exhibiting roughly 3 times the peak Sr/Ca level as that observed in the 9,000 ppm group. The treatment transects also showed that the dramatic increase in Sr/Ca values from background levels occurred in adjacent analyses, 15 mm apart. Since daily increments appear to be approximately 5.3-6.5 mm wide on this particular axis, we can conclude that strontium reaches the otoliths of larvae suddenly, in less than

three days.

3. Coastal Pelagics Management

Sardine (*Contributed by Michele Robinson (360) 249-1211*)

Trial Purse Seine Fishery for Sardines

In Washington, sardines are managed under the Emerging Commercial Fishery provisions as a trial commercial fishery. In February 2000, in response to a request from Washington-based fishers and processors, the Washington Fish and Wildlife Commission approved a trial ocean purse seine sardine fishery. The target of the trial fishery was sardines; however, anchovy, mackerel, and squid could also be landed.

The 2000 trial purse seine fishery for sardines fishery opened on May 15, 2000; however, the first landing into Washington occurred on June 26. The Department issued a total of 45 permits and 11 permit holders participated in the fishery. There were three primary vessels who accounted for 88% of the total landings—two vessels fished out of Ilwaco and one fished out of Westport. A total of 4,791.4 mt of sardines were landed into Washington. A total of 153 landings were made and 70 occurred within the month of August. A total of 288 sets were made with 66% (190) of them successful. Average catch per successful set was about 25 mt.

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2000 Report

OREGON DEPARTMENT OF FISH AND WILDLIFE

2000 AGENCY REPORT

Prepared for the

FOURTIETH ANNUAL MEETING OF THE TECHNICAL OF THE
CANADA-UNITED STATES GROUND FISH COMMITTEE

April 2001

compiled by

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2. OREGON DEPARTMENT OF FISH AND WILDLIFE AGENCY

A. AGENCY OVERVIEW

Marine Resources Program (MRP) process of reorganization stalled in 2000. We expect the process to begin again in 2001. By the year 2002, MRP hopes to be realigned under three new divisions, and they will be: 1) Resource Assessment and Analysis under Jim Golden; 2) Resource Monitoring and Sampling under Rod Kaiser and Data Services under Phil Flanders.

In 2000, Carla Sowell filled a new NRS2 Position in Brookings. Her time was split between port biologist duties and groundfish research.

See APPENDIX A for Marine Finfish Program personnel.

B. MULTISPECIES STUDIES

1. Recreational Fisheries Project:

Sampling of the ocean boat fishery by the Ocean Recreational Boat Survey (ORBS) continued in 2000. Year round sampling in the major ports to evaluate winter activity, initiated during 1999, also continued in 2000. Based on this evaluation, Oregon plans to sample the March through October period during 2001, because approximately 95 percent of the annual fishing occurred during this period in 1999-2000.

Black rockfish continues to be the dominant species caught in the ocean boat fishery. Lingcod and several rockfish species (blue, yellowtail, and canary) are also commonly observed. The fishery for Pacific halibut continues to be very popular.

The ORBS continued to expand its species composition and biological sampling of groundfish species during 2000. Black, blue, canary and yellowtail rockfish otoliths were gathered, in addition to lingcod fin rays, for ageing. ORBS continued to expand the collection of length and weight data from groundfish species.

Other management activities included participation in the PecFIN process and data analysis. We also sponsored public hearings to discuss changes to the management of Pacific halibut, lingcod and rockfish fisheries. See the species section for more details.

Contact Don Bodenmiller for more information (541) 867-4741, ext 223

2. Nearshore Studies:

Oregon completed the third of a five-year project to investigate nearshore bottomfish populations. Funded under the Interjurisdictional Fisheries Act, we plan to survey the entire Oregon coast. Species composition, genetic samples, and age structure information will be gathered. This work is also coordinated with Oregon's habitat mapping project.

We continued nearshore work in 2000 with investigations in the area off Coos Bay to Bandon, Oregon. Approximately 1,700 fish of several species were. In 2001, we intend to continue this work off the Oregon south coast.

Contact Don Bodenmiller for more information (541) 867-4741

3. Marine Recreational Fisheries Statistics Survey:

Marine Recreational Fisheries Statistics Survey (MRFSS) samplers continued collecting demographic and creel data in 2000. Species composition sampling, length, and weight sampling was continued.

MRFSS samplers collect fishery data from boat and shore anglers who have fished in the ocean and estuaries. For groundfish species, black rockfish continue to dominate the ocean landings. Surfperch make up the majority of shore based catch. Sturgeon dominate the inland landings. For 2001, the program will begin to collect surfperch age structures and will again collect economic data.

Contact Don Bodenmiller for more information (541) 867-4741

4. Species Composition Sampling:

Species composition sampling of rockfish, thornyheads and other bottomfish continues on commercial trawl landings, commercial fixed gear landings and recreational landings.

Contact Mark Saelens (commercial) or Don Bodenmiller (recreational) for more information (541) 867-4741

5. Finfish Excluder and Shrimp Bycatch Work:

One field project was completed in 2000 that relates to groundfish bycatch in the shrimp fishery. In May 2000, we tested large open areas in the belly of a shrimp

trawl, just behind the footrope, as escapement areas for groundfish. Preliminary results were encouraging but were confounded somewhat by differences in efficiency between the two nets. The comparative data suggested small and large flatfish and lingcod utilized the escape areas readily. This study needs to be repeated with better control of footrope height above bottom between the two nets.

For more information contact Bob Hannah at (541) 867-4741, ext 231.

6. Groundfish Maturity Study

We collected maturity data on a variety of groundfish, using histology to aid in determining maturity status. So far we have completed analysis of only the petrale sole data. Our sampling goal was to estimate female maturity by length and age, from samples collected prior to spawning aggregation. The data show that this was feasible by sampling in September and using histology to help reliably determine maturity status. The data also indicate that recent maturity data used in assessments for this species relied on samples from time periods when visual assessment of maturity status was unreliable. Analysis of our rockfish data is continuing.

For more information contact Bob Hannah at (541) 867-4741.

7. Whiting Bycatch Sampling:

ODFW continued to coordinate a cooperative observation program to monitor bycatch and collect biological samples of unsorted Pacific whiting landings made at shoreside processors. Cooperators are the fishing industry, ODFW, CDFG, WDFW, PSMFC, NMFS, and PFMC. Observers and staff obtained age samples from 1,050 yellowtail rockfish, 959 widow rockfish, 171 sablefish, 1,050 jack mackerel, 761 Pacific mackerel, and 1,600 Pacific whiting. Additional length frequency samples were taken on 1,150 Pacific whiting.

For more information contact Lara Hutton (541) 867-4741, ext 258.

8. Orford Reef Fixed Gear Survey.

ODFW conducted a pilot study during the summer of 2000, using fixed hook and line gear to sample fish on nearshore rocky reefs. The long-term goal of the project is to develop the ability to consistently survey relative fish abundance on nearshore rocky reefs using fixed gear. The primary objectives during this first year were to determine logistical requirements of fishing different types of fixed gear in different rocky bottom habitat types at shallow depths, compare catch, CPUE, and species composition of the gear types, and collect shallow water rocky reef fish specimens for biological sampling. Sampling was completed at Orford Reef, Oregon, using cable gear and longline gear from a chartered commercial fishing vessel. The gear was fished successfully in various ocean condi-

tions and at the depths planned for the survey. Cable gear performed well in habitat that is difficult to sample, including rugged bottom relief and kelp beds. The analysis for comparing gear types will be completed during spring of 2001.

For information contact Carla Sowell at (541) 412-7395 or odfwbrookings@wave.net.

9. Enhanced Groundfish Data Collection Project (EDCP):

A "public" version of the Enhanced Data Collection Program (EDCP) data was made available in March 2000. Since then we have worked on a soon to be released final report. A final CD containing data not available in March will be released with the report.

For more information contact Mark Saelens (541) 867-4741, ext 251.

10. Juvenile Rockfish Recruitment Index Study:

The Oregon Department of Fish and Wildlife's Marine Program conducted a 3-month pilot project to investigate the potential of sampling estuaries and intertidal areas to develop a juvenile rockfish recruitment index for selected nearshore species. Initial goals were to determine whether rockfish could consistently be captured in estuarine and open coast environments, to determine the best capture methods, and to determine the best capture sites. The study sites ranged from Coos Bay to Tillamook Bay and included four primary sites (Yaquina Bay estuary, Salmon River estuary, Boiler Bay and Seal Rock), as well as, seven secondary sites. Sampling took place from late May until late August. Capture methods included 10'-50' seine nets, fish traps, dip nets, cast nets and snorkel/small nets. Forty-eight species and 15,729 fish were collected including 1,148 black rockfish, 21 copper rockfish, 4 blue rockfish and 6 unidentified rockfish. Black rockfish were caught in Yaquina Bay and on the open coast.

In 2001, we will expand the project to sample several estuaries in a 4-month period.

Contact John Johnson for more information at (541) 867-4741, ext 237.

11. Cooperative Research:

We provided catch, effort, catch-at-age and other data as need to support the stock assessments.

12. CORE Studies:

The Cooperative Reef Ecosystem (CORE) study continued work on subtidal rocky bottom habitats off the Oregon coast. ODFW biologists completed two tasks during 2000. The first task, was examination of nearshore rockfish use of small isolated rocky reef habitat patches. The research questions included:

-What are the patterns of nearshore rockfish use of small disjunct rocky habitat patches?

-What is the lower size limit of isolated rocky habitat patches utilized by nearshore rockfish?

The purpose of the survey was to determine if small habitat patch areas are important enough to include in future nearshore reef fish abundance estimation studies. The study approach was to survey and characterize rocky reef patches using sidescan sonar and survey fish using ROV video strip transects. The study found nearshore rockfish and other groundfish species to be abundant on very small habitat patches (<5 m across) and provided data on the patterns of use by species. The second task was completion of a high-resolution multibeam bathymetry survey of Bandon Reef. Results of hook and line sampling completed by another Marine Resources Program project were overlain on the bathymetry data to examine the relationship between catch and reef physical structure. Staff also continued their on-going project of kelp canopy biomass surveys at Orford, Blanco, Redfish Rocks, Humbug and Rogue Reefs by taking kelp bed aerial photos and measuring plant weights. However, the data were not worked up due to a shortage of staff resources. The kelp data analysis should be completed in 2001. The results of the 2000 work are summarized in Fox, et al. (2000). The report can be downloaded from www.hmsc.orst.edu/odfw/habitat.

For information contact Dave Fox at (541) 867-0300 ext. 228 or dave.fox@hmsc.orst.edu.

GIS Description

The Marine Resources Program GIS was summarized in the 1997 TSC report. Additions to the GIS in 2000 are listed below.

For information contact Dave Fox at (541) 867-0300 ext. 228 or dave.fox@hmsc.orst.edu.

Base Maps and Baseline Data

Base Maps

No additions for 2000.

Baseline Data

1) Side scan sonar map of a 32 km² area off Cape Perpetua, Oregon.

Software

No additions for 2000.

Bathymetric Data Sources

No additions for 2000.

13. Pelagic Species:

Refer to section on Pacific sardine

Contact Jean McCrae for more information (541) 867-4741

14. Developmental Fisheries Project:

The Developmental Fisheries Program was created to allow for controlled development of new fisheries. Each year, the Developmental Fisheries Board recommends to the Oregon Fish and Wildlife Commission a list of food fish species that are considered to be developmental and a harvest program which includes a limited entry system. The Developmental Fishery Board is made up of members from a broad range of fishing interests (harvesters, processors, and state agencies).

In 2000, a total of 120 permits were issued for all species, and 42 permits were for finfish species. The main finfish of interest was sardines, which had all 15 permits issued. Other species for which we issued permits were hagfish (7), swordfish (15), blue shark (4), and anchovy/herring (1).

The majority of the landings of developmental species was as by-catch in other established fisheries. However, landings of Pacific sardines greatly increased in 2000. Eighteen vessels landed over 21 million pounds (9,524 mt); the highest landings since 1941. Market samples were collected and we conducted a seasonal worker to conduct ride-along trips to observe by-catch. Observed by-catch consisted of sharks, Pacific whiting, Pacific herring, flatfish, and some salmon. Observed salmon averaged 2.1 per trip, with 76% being released alive. Logs (accounting for 91% of the landings) show 75% of the harvest was taken off Oregon and 25% off southern Washington. Incidental landings of mackerel accounted for 0.2-0.3% of the catch.

Market samples were collected for length, weight, maturity and age data. The average length and weight for all samples was 209 mm (standard length) and 153.4 gm. Size of sardines showed a decrease over the sample period. The samples taken during the first part of the season had the highest percent of less mature fish (condition 1). Age structures were sent to California Department of Fish and Game to be analyzed and showed mostly 2-4 year old fish.

Contact Jean McCrae for more information (541) 867-4741.

15. Cooperative Ageing Unit:

Twelve months of in-kind supervision and "lead worker" oversight were pro-

vided for the Cooperative Ageing Project (CAP). The Ageing Unit production aged darkblotched rockfish, shortspine thornyhead, sablefish, Dover sole, and black rockfish for stock assessment purposes, and finished up production work on bank rockfish and Pacific ocean perch. This work resulted in 23,152 specimens aged for the year.

A fourth age reader was hired full-time in 2000, however, another resigned. The resigned age reader is being brought back under a one-year contract in March 2001, and a sixth age reader is to be hired in the summer of 2001.

Contact Bob Mikus for more information on ageing (541) 867-4741, ext 247.

Type	Years	Entered	Verified
1) Trawl Log	'76 - '00	00	'00
2) LE Sable Logs	'79 - '00	None	None
3) H&L Volunteer Logs	'88, '92 & Thru '99	None	'94 - '00

16. Logbooks:

A new voluntary Open Access Hook & Line Logbook was printed and distribution started in March 2000.

Status of Oregon logbooks is as follows:

BY SPECIES

1. Pacific cod: no work was conducted on Pacific cod. Few fish were found in the trawl landings. Total Oregon Pacific cod landings were down 71% in 2000 at about 24,164 pounds (11 mt) compared to about 82,995 pounds (38 mt) in 1999.

2. Shelf rockfish

a. Black rockfish

1) Coastwide sampling continues on recreational catches of black rockfish. Black rockfish are the most frequently caught fish in the ocean boat recreational fishery. Port samplers take market samples from commercial landings. Sampling includes biological sampling for age, length, sex and maturity. Age determination is done by ODFW.

2) Total commercial Oregon landings were 239,852 pounds (about 109 mt) which was down from the 1999 landings of 281,146 pounds (about 128 mt). This

is about a 15% decrease from 1998.

Contact Don Bodenmiller for more information (541) 867-4741.

b. Widow rockfish - coastwide sampling continues for age, length and sex. Age determination is done by NMFS, Tiburon. Oregon landings in 1999 were 6,004,282 pounds (2,724 mt) which is down from the 6,640,382 pounds (3,012 mt) in 1999. This is about a 9.6% decrease from 1999.

c. Canary rockfish - coastwide sampling continues for age, length and sex. Age determination is done by ODFW. Oregon landings in 2000 were 71,346 pounds (32 mt) which was about a 92% decrease from the 933,653 pounds (424 mt) in 1999.

d. Yellowtail rockfish - coastwide sampling continues for age, length and sex. We also continued sampling yellowtail rockfish landed by shrimp trawlers. Age determination is done by WDFW. Oregon landings in 2000 were about 4,427,720 pounds (2,008 mt) which was a 25% increase from the 3,547,421 pounds (1,609 mt) from 1999.

3. Slope rockfish

Most sampling is limited to species composition sampling. Length frequency samples were taken on selected species. In 2000, we began taking age structures on darkblotched rockfish. In 2001, we will take age structures on both darkblotched rockfish and Pacific ocean perch.

4. Thornyheads

Sampling included sampling for species composition, length frequency, age and sex. Oregon landings of longspine thornyhead increased slightly to 1,685,484 (765 mt) in 2000, which was about a 3% increase from 1999. Oregon landings of shortspine thornyhead were 628,308 pounds (285 mt) in 2000, which was about an 11% decrease from 1999.

5. Sablefish

a. Routine age samples were obtained on sablefish. Otoliths were sent to the NMFS / ODFW Cooperative Ageing Project in Newport, Oregon for age determination. Oregon landings were 6,256,290 pounds (2,838 mt) in 2000, which was down 5% from the 1999.

b. Sablefish Fixed Gear Project:

One research project was completed in 2000. In cooperation with Craig Rose of NMFS, we placed underwater camera equipment on baited sablefish pots to study basic behavior upon approach and entry to the pots. Our observations used visible and infrared light. The footage suggests that visible light may deter

sablefish from approaching the pots, while infrared does not. Sablefish were seen to both enter and exit the pots. The swimming behavior of sablefish in this environment was slow and involved oscillation from side to side that appeared to be olfactory search behavior.

Contact Bob Hannah for additional information (541) 867-4741.

6. Flatfish

a. Age sampling continued and ages were determined on Dover sole.

Contact Bob Mikus for additional information on aging (541) 867-4741.

Most Oregon flatfish landings were down or somewhat similar in 2000 compared to 1999. Dover sole were 10,393,272 pounds (4,714 mt) up 4% from 9,950,464 pounds (4,514 mt) in 1999. Landings of English sole were 542,991 pounds (246 mt) down 29% from 768,843 pounds (349 mt) in 1999. Landings of petrale sole were 1,896,175 pounds (860 mt), up 28% from 1,486,914 pounds (674 mt) in 1999. Landings of arrowtooth flounder were down by 49% at 2,580,307 pounds (1,170 mt) compared to 5,021,558 pounds (2,278 mt) in 1999. Pacific sanddab landings were down 47% at 321,829 pounds (146 mt) compared to 602,442 pounds (273mt) in 1999.

b. Pacific halibut

1) Weekly harvest of both the recreational and commercial troll fisheries was monitored for quota tracking purposes. The majority of recreational caught fish continue to be landed into Newport and Garibaldi. In 2000, the directed recreational fishery was open 6 days, which was drastically down from a decade ago when it was open year round. As the number of annual open days decrease, safety concerns increase. In 2000 as in recent years, the recreational and commercial fisheries received equal allocations.

Oregon commercial fishers landed 330,045 pounds (150 mt) down 6% from 350,389 pounds (159 mt) in 1999.

3) Public meeting were held to discuss 2000 recreational fishery structuring and proposed changes to the 2001 catch sharing plan for Oregon recreational fisheries.

Contact Don Bodenmiller for more information (541) 867-4741

7. Pacific whiting

In 2000, ODFW continued to coordinate a cooperative observation program to monitor bycatch and collect biological samples of unsorted Pacific whiting landings made at shoreside processors. Cooperators are the fishing industry, ODFW, CDFG, WDFW, PSMFC, NMFS, and PFMC.

Oregon landings and observations were made at Newport, Astoria and Charleston. Landings and observations were also made at Ilwaco and Westport, WA through WDFW and at Crescent City and Eureka, CA through CDFG. Overall, 23% of whiting landings were observed over the course of the season. Sampling and observations were conducted from April through the season end in mid-September. Two Washington, three California and seven Oregon processors, and thirty-five vessels participated in the program. Exempted Fishing Permits (EFPs) were issued by NMFS through CDFG and ODFW to participating vessels to permit the landing of unsorted whiting; participating vessels with EFPs were exempted from prohibitions on landing prohibited species (Pacific halibut and salmon) and groundfish trip limit overages. Prohibited species and the monetary value of trip limit overages were turned over to the state of landing.

Approximately 85,400mt of Pacific whiting were landed at shoreside processors, compared to approximately 83,400 mt in 1999. Oregon processors received approximately 80% of total landings, Washington processors received approximately 14%, and the balance was landed in California. The overall salmon bycatch rate was 0.039 salmon per mt whiting; this is higher than in 1999 (0.014 salmon/mt), and closer to the 0.032 salmon/mt whiting in 1995. An increase in salmon returns and abundance appears to have contributed to the increased salmon bycatch rate in the 2000 season. A total of 3,345 salmon (3,321 Chinook, 23 coho, and 1 chum salmon) were taken as bycatch in this fishery and turned over to state agencies in 2000 - this compares to 1,712 Chinook in 1999 and 1,713 Chinook salmon in 1998. In Oregon, all salmon in acceptable condition are turned over to hunger relief agencies. Other species with notable bycatch volumes are yellowtail rockfish (190 mt), widow rockfish (76 mt) and mackerel (chub and jack mackerel combined - 264 mt). Bycatch rates for mackerel were much lower relative to 1997 through 1999. Bycatch of yellowtail and widow rockfish were very low compared to 1997 through 1999 levels.

For more information contact Lara Hutton (541) 867-4741 (reports regarding 1997-2000 whiting is available at the ODFW MRP web site:

www.hmsc.orst.edu/odfw/)

We provided catch, effort, catch-at-age and other data as need to support the Pacific whiting stock assessments.

For more information contact Mark Saelens (541) 867-4741

8. Dogfish

No work was conducted on dogfish. Landings decreased to 88,621 pounds (40 mt), down 55% from 195,932 pounds (89 mt) in 1999.

9. Lingcod

- a. Age samples were collected and sent to NMFS, Tiburon for age determination. Oregon landings were 141,189 pounds (64 mt) which is down 63% from 1999 landings of 381,485 pounds (173 mt).
- b. ODFW continued collecting age samples from the recreational fishery in 2000. Also new for 2000 was a reduction in the recreational bag from 2 to 1 lingcod with a 24-inch minimum length and a 34-inch maximum length restriction.
- c. Discard Mortality of Lingcod in the Bottom Trawl Fishery.

In an effort to estimate mortality rates for lingcod discarded in the bottom trawl fishery, we conducted two experiments in collaboration with NMFS, AFSC. Lingcod (51-66 cm) were captured with bottom trawls of various tow durations, held in laboratory tanks for 3 weeks, and then evaluated for physical condition. In a separate experiment, the amount of time lingcod remain on deck during sorting was evaluated. Lingcod from a single tow remained on deck for various time periods up to 1 hour prior to being placed in holding tanks and monitored for 3 weeks as above. Tow duration had no effect on survival. Fifty- percent mortality occurred after approximately 30 minutes on deck and within 4-days of post-capture. Mortality events continued sporadically for up to 30 days. We hope to evaluate volume in future experiments.

10. Other

a. Surfperch

Extensive biological sampling continued along the southern Oregon coast. Special emphasis was again on redbtail surfperch. Volunteers have helped tag surfperch and collect carcasses for sampling. Samples were collected from 1,917 redbtail, 71 striped, 72 pile, 62 walleye, 200 white, 8 silver, and 12 calico surfperch. There were 2,185 surfperch including 1,882 redbtail surfperch tagged in 2000, and a total of 9,219 surfperch have been tagged to date. In 2000, tagging effort was concentrated along the coast to the south of Coos Bay. We also continued to tag in the Coos Bay estuary during the months of March and April. Age determination was done by ODFW at the Charleston lab.

Processors reported receiving 2,052 pounds of surfperch in 2000, which is an increase from 727 pounds in 1999. Interest continues for the commercial harvests of surfperch, especially in Oregon's south coast area. In 2000, commercial harvest of surfperch was prohibited in the months of August and September. This new regulation was established to protect redbtail surfperch during the months that they spawn off Oregon.

For more information contact Don Bodenmiller (541) 867-4741.

b. Pacific herring

In 2000, commercial fishers decided not to fish Yaquina Bay for roe herring due to the projected poor run

Contact John Johnson for more information (541) 867-4741.

c. Hagfish

Landings of Pacific hagfish were down 52% in 2000 at 318,627 pounds (145 mt) compared to 667,550 pounds (303 mt) in 1999.

d. Skates

Landings of skates in 2000 were 1,772,262 pounds (804 mt) which was up 36% from 1,300,928 pounds (590 mt) in 1999. Species composition and length frequency samples were taken.

e. Mackerel

Landings of Pacific mackerel and jack mackerel combined were 617,167 pounds (280 mt), down 63% from 1,664,906 pounds (755 mt), in 1999. Almost all Oregon mackerel landings are landed as bycatch from the Pacific whiting fishery.

f. Pacific Sardine

Landings for sardine continue to increase. Eighteen vessels landed 21 million pounds (9,524 mt) compared to 775.7 mt in 1999; the highest landings since 1941. Most of the sardine catch was by seine gear (99%), and fish were landed into Astoria and processed as bait for a Japanese longline fishery. Incidental landings of mackerel accounted for 0.2-0.3% of the catch.

We conducted 22 ride-along trips to observe by-catch. Observed by-catch consisted of sharks, hake, herring, flatfish, and some salmon. Observed salmon averaged 2.1 per trip, with 76% being released alive. Market samples of Pacific sardine were collected for length, weight, maturity, and age. The average length and weight for all samples 209 mm (standard length) and 153.4 gm. Age structures analyzed by California Department of Fish and Game showed mostly 2-4 year old fish.

For more information contact Jean McCrae at (541) 867-4741.

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APPENDIX A

Marine Finfish Program Staff

Jim Golden, Marine Resources Program Leader	Newport
Rod Kaiser, Program Leader	Newport
Bill Barss, Project Leader, Field Operations	Newport
Dave Douglas, Port Biologist	Astoria
Gary Hettman, Port Biologist	Newport
John Seabourne, Port Biologist	Charleston
Darrell Pruden, Sportfish Biologist	Charleston
Carla Sowell, Port/Research Biologist	Brookings
Tom Preston, Port Sampling EBA	Astoria
Rhonda Haynes, Port Sampling EBA & Tuna	Newport
Doris Kollodge, Port Sampling EBA	Charleston
Cathy Nist, Port Sampling EBA (seasonal)	Astoria
Travis Howlett, P. Sardine Fishery Observer EBA (seasonal)	Astoria
Becky Banghart, Whiting Sampling EBA (seasonal)	Astoria
Elizabeth Greene, Whiting Sampling EBA (seasonal)	Newport
Nancy McLean-Cooper, Albacore Sampling EBA (seasonal)	Newport
Shauna Cotrell, Port Sampling EBA (seasonal)	Newport
Dean Headlee, Port Sampling EBA	Charleston
Nick Wilsman, Port Sampling EBA	Brookings
Karen Hans, Port Sampling EBA (seasonal)	Brookings
Mark Saelens, Project Leader, Tech. Services	Newport
Jodene Summers, EDC Tech. Assistant	Newport
Steve Kupillas, EDC Project Coordinator & Tech Services EBA	Newport
Bob Mikus, Biologist, Age-reading Specialist	Newport
Mark Freeman, Data Coordinator Biologist	Newport

Carol Perkins, Data Management Technician	Newport
Betty Kamikawa, Data Entry EBA	Newport
Steve Parker, Project Leader, At-Sea Research	Newport
Lara Hutton, PSMFC, Whiting Project Administrator	Newport
Bob Hannah, Project Leader, At-Sea Research	Newport
Keith Matteson, Asst. Project Leader, At-Sea Research/Devo. Fish	Newport
Erica Fruh, At-Sea Research EBA	Newport
Polly Rankin, At-Sea Research EBA	Newport
Marcus Appy, Coastal Juvenile Rockfish Project EBA	Newport
P.J. Collson, Coastal Juvenile Rockfish Project EBA	Newport
Jean McCrae, Project Leader, Developmental Fisheries	Newport
Don Bodenmiller, Project Leader, Recreational Fisheries	Newport
Josie Thompson, Nearshore Bottomfish Studies EBA (seasonal)	Newport
Bill Miller, Biologist, Recreational Fisheries, Age Reader	Newport
Linda ZumBrunnen, PSMFC, MRFSS Supervisor	Newport
Sheila Johanns, PSMFC, MRFSS Fishery Tech.	Tillamook
Gway Kirchner, PSMFC, MRFSS Fishery Tech.	Newport
Christee Harwood, PSMFC, MRFSS Fishery Tech. (seasonal)	Charleston
Jock Headlee, PSMFC, MRFSS Fishery Tech.	Gold Beach
David Sampson, Consultant, OSU	Newport
Clayton Creech, Contract Programmer, OSU	Newport

Projects planned for year 2001:

1. Discard mortality of lingcod in bottom trawls:

We will repeat the time-on-deck component of the 2000 discard experiments to increase the sample size and target fish in the 51-66 cm range. Fish will again be transported to shorebased tanks for 3 weeks and monitored for survival and stress indicators.

2. Development and Testing of a Flatfish Selective Bottom Trawl.

We will adapt a flatfish-selective trawl from the Faroe Islands to fish with West Coast bottom trawlers with the assistance of NMFS gear specialists. The trawl will be tested in the Dover sole fishery to attempt to selectively capture Dover sole while avoiding weaker stocks, such as sablefish and thornyheads. If successful, this trawl design may allow more harvest on productive flatfish stocks. Harvest is currently limited to protect less productive species in the slope community.

Contact Steve Parker for additional information (541) 867-4741.

3. Juvenile Rockfish Recruitment Index Study:

The Oregon Department of Fish and Wildlife's Marine Program will conduct the second year of a study to attempt to develop a juvenile rockfish recruitment index for selected nearshore species. In 2001, field studies are planned for 4-month sampling season. The project is based on sampling estuaries and adjacent nearshore rocky intertidal areas using beach seines, fish traps, dip nets, cast nets and snorkel/small nets. The hope is that juvenile rockfish numbers using the nearshore and estuaries will reflect the relative abundance of adults in the open ocean. Several seasons will be required to show a correlation. The hope is that estuary seining will provide an easy and reliable method of determining general population trends for nearshore adult rockfish.

Contact Bob Hannah for additional information (541) 867-4741.

4. We are hoping to complete analysis of maturity data for yellowtail and black rockfish and Pacific ocean perch. We will also be collecting maturity data for yelloweye, quillback and vermillion rockfish.

Contact Bob Hannah for additional information (541) 867-4741.

5. We hope to test two new fish excluder designs in the shrimp fishery, and also a device for in situ measurement of shrimp trawl footrope height above bottom. Later in 2000 we may start some tag retention and tagging mortality studies on black rockfish.

Contact Bob Hannah for additional information (541) 867-4741.

**Committee of Age-Reading Experts
2001 Report to the Technical Subcommittee
of the
Canada-United States Groundfish Committee**

May 8-11, 2001

Prepared by
Brenda A. Erwin
2000-2002 CARE, chairperson
Pacific States Marine Fisheries Commission
California Department of Fish and Game
P O Box 249
Belmont, CA 94002 USA

A. CARE Overview, 2000-2001

History - The Committee of Age-Reading Experts, CARE, is a subcommittee of the Canada-USA Groundfish Committee's, Technical Subcommittee, charged with the task to develop and apply standardized age determination criteria and techniques, and operating within the Terms of Reference approved by the TSC in 1986.

1. The last biennial CARE Workshop was held May 16-18, 2000, with attendance by agency members from California, Oregon, Washington, British Columbia, and Alaska.
2. The CARE web page continues to be updated, though with some lag time because of opportunistic use of resources. It is available at <http://www.psmfc.org/care/>. New to the website will be posting of recent and historical age-structure exchange results.

B. CARE Working Group Reports

CARE Manual/Glossary Subcommittee- Shayne MacLellan (chair, report contributor), Betty Goetz, Kristen Munk

1.1 CARE Glossary- No action. This working group served an individual purpose at inception, however will likely be formally rolled into the Manual committee during this year's workshop.

1.2 CARE Manual- No action.

Web Page Subcommittee- Brenda Erwin (chair, report contributor), Delsa Anderl, Mark Blaisdell, Marion Mann

The CARE web page is located on the PSMFC server at www.psmfc.org/care and has four basic sections at this time. They are the history of CARE, Ageing Manual, Summary of Age Reading Methodology and CARE meeting minutes..

There are several sections that should be added to the web page soon. There has been one submission for a logo for the web page by Joan Forsberg. Marion Mann created a fisher interaction page that explains what an otolith is, how the otolith is aged, and how to remove the otolith. New sections that will be added soon also include an otolith exchange document, the CARE Participants list, and ageing links.

The Ageing Manual is a living document and as such is continually changing. The images in the Ageing Manual have been rescanned to improve quality of the images on the web page; however, it was decided

to wait on uploading the improved images until the manual has been reformatted. Once the manual has been reformatted, the version on the web page will be updated as well and identical to the hard copy version of the manual.

The TSC is encouraged to contribute ideas for this web page which would aid their processes.

Charter Subcommittee – Shayne MacLellan, Kristen Munk, (more members to be volunteered)

This working group hopes to preserve the original intention of CARE by: a) better documenting past goals and accomplishments; b) clarifying elements of organization in accord with past and present understanding of the original Terms of Reference; and c) develop organizational structure and responsibilities of CARE officers, members, etc. The future of CARE will be best served if those members of longest tenure develop this charter. The goal is to have 1 member from each agency participate in this process...more members are encouraged.

C. Agency Structure Exchanges – Delsa Anderl

Tracking of agency structure-exchanges has been delegated to the CARE vice-chair.

D. CARE Workshop Business

1. Status of 1998 Recommendations from CARE to TSC

These recommendations to the TSC were reviewed and commented on by the TSC during their 1998 annual meeting. The CARE membership were advised of the TSC's responses in an attachment to the "CARE - 1999 Committee Report to the TSC", following the 1999 meeting.

2. Status of 1998 Recommendations from TSC to CARE

The CARE membership were advised of the 1998 and 1999 recommendations from the TSC to CARE, in a summary report following the 1999 meeting. Collective consideration or statement of accomplishment will be developed at the 2000 CARE workshop.

3. Status of 1999 Recommendations from TSC to CARE

The CARE membership were advised of the 1999 recommendations from

the TSC to CARE, at the 2000 CARE workshop. CARE initiated exchanges for hake, sablefish, and lingcod finrays, with all but the former completed in time for resolution at the 2000 CARE Workshop. CARE reviewed the list of species from the 1999 and 2000 TSC meetings and have no other species to add at this time.

4. Status of 2000 Recommendations from CARE to TSC

CARE would like to investigate setting up of a discussion group, "egroups", to facilitate and broadly disseminate common age-reading questions and solutions. Will the TSC support this effort in assuring technical assistance from the PSMFC webmaster, and/or, would the TSC like to be subscribers to the discussion list? The TSC has not had a chance to review and comment on this item.

5. Status of 2000 Recommendations from TSC to CARE

The CARE membership were advised of the 2000 recommendations from the TSC to CARE, at the 2000 CARE workshop. CARE recognizes the TSC benefits from these exchanges and will work to complete and submit the results of the exchanges as production schedules and/or supervisory influences allow.