STATE OF ALASKA
GROUNDFISH FISHERIES

ASSOCIATED INVESTIGATIONS IN 2010

Prepared for the Fifty-first Annual Meeting of the Technical Subcommittee
of the Canada-United States Groundfish Committee

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April 2011

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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 the federal, Gulf of Alaska (GOA) Groundfish Fishery Management Plan (FMP) gives the State of Alaska limited management authority for demersal shelf rockfish in federal waters east of 140^{o} W. longitude. The North Pacific Fisheries Management Council (NPFMC) took action in 1997 to remove black and blue rockfish from the Gulf of Alaska FMP and in 2007 to do the same with dark rockfish, thus the state 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. The State of Alaska manages some groundfish fisheries occurring in Alaska waters in parallel with NMFS, adopting Federal seasons and in some cases allowable gear types as specified by NMFS. 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^{o} W. longitude and includes all of Yakutat Bay (Appendix II). The Central Region includes the Inside and Outside Districts of Prince William Sound (PWS) and Cook Inlet including the North Gulf District off Kenai Peninsula. The Westward Region includes all territorial waters of the Gulf of Alaska south and west of Cape Douglas and includes North Pacific Ocean waters adjacent to Kodiak, and the Aleutian Islands as well as all U.S. territorial waters of the Bering, Beaufort, and Chukchi Seas.

a. Southeast Region

The **Southeast Region** Commercial Fisheries Groundfish Project is based in Sitka with the groundfish project leader, fisheries biologist, and one full-time fisheries technician located there. One full-time biologist, one full-time fisheries technician and one full time research analyst for this project are based in Douglas. Seasonal technicians and port samplers are employed in Petersburg, Ketchikan and Sitka. The project also receives biometrics assistance from the regional office in Douglas and from headquarters in Juneau.

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 as well as demersal shelf rockfish, black and blue rockfishes, dark rockfish and lingcod in the EEZ. The project cooperates with the federal government for management of the waters of the adjacent EEZ. 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 (NPFMC). In 2010, the project leader also served as member of the

NPFMC Plan Team halibut bycatch working group. The goals of the working group are to determine a best method for extrapolating the catch of bycatch on the IPHC survey to the halibut fishery as a way to comply with Annual Catch Limit (ACL) requirements.

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 federally-managed fisheries; dockside sampling of sablefish, lingcod, Pacific cod, and rockfish landings; and logbook collection and data entry. Four resource assessment surveys were conducted during 2010. The Southeast Groundfish project is funded in part with NOAA Grant NA08NMF4070534.

b. Central Region

b. Central Region

Central Region groundfish staff is headquartered in Homer and is comprised of a regional groundfish management biologist, a regional groundfish/shellfish research project leader, a groundfish sampling coordinator, a groundfish fish ticket entry position, three marine research biologists, five to six seasonal technicians, and one seasonal commercial catch sampler. An assistant area management biologist and a seasonal commercial catch sampler are also located in Cordova and regional support comes from Anchorage. The research project leader also serves as a member of both the North Pacific Fishery Management Council's Gulf of Alaska Groundfish Plan Team and Non-Target Species Committee. The R/V *Pandalus*, home ported in Homer, and the R/V *Solstice,* home ported in Cordova, conduct a variety of groundfish-related research activities in Central Region waters.

Groundfish responsibilities include research and management of groundfish species harvested in territorial waters of **Central Region**. Within Central Region, groundfish species of primary interest include sablefish, Pacific cod, pollock, lingcod, rockfishes, skates, sharks, and flatfishes. Data are collected through commercial catch sampling, fishermen interviews, logbooks, onboard observing, and through ADF&G trawl and remotely operated vehicle (ROV) surveys. Commercial harvest data (fish tickets) are processed in Homer for state and federal fisheries landings in Central Region ports. For some fisheries, logbook data are required and these are collected and data-entered to provide additional depth to harvest data.

c. Westward Region

The **Westward Region** Groundfish management and research staff is located in Kodiak and Dutch Harbor. Kodiak staff is comprised of a regional groundfish management biologist, an area groundfish management biologist, an assistant area groundfish management biologist, a groundfish research project leader, a groundfish research project assistant biologist, a groundfish dockside sampling coordinator, a trawl survey biologist, two seasonal fish ticket processing technicians, and several seasonal dockside samplers. A full-time area management biologist, an assistant area groundfish management biologist and a seasonal fish ticket processing technician are located in the Dutch Harbor office. Seasonal dockside sampling also occurs in Chignik, Sand Point, and King Cove. The R/V *Resolution*, R/V *K-Hi-C*, and R/V *Instar* 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 waters adjacent to the Kodiak archipelago, Alaska Peninsula and Eastern Aleutians, management of black rockfish, state-waters Pacific cod, lingcod, and Aleutian Island state-waters 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 (Dave Barnard) and the Gulf of Alaska Groundfish Plan Team (Nick Sagalkin).

d. Headquarters

The 1996 Magnuson-Stevens Act called for developing regional fishery databases coordinated between state and federal agencies. The Alaska Fisheries Information Network (AKFIN), created in 1997, accomplishes this objective. The AKFIN program provides the essential fishery catch data needed to manage Alaska's groundfish and crab resources within the legislative requirements of the Act in Section 303(a)5. Alaska has diverse data collection needs that are similar to other states but the extensive geographic area and complexity of fisheries management tools used in Alaska have resulted in AKFIN becoming a cooperative structure that is responsive to the needs to improve data collection. The Pacific States Marine Fisheries Commission (PSMFC) manages the AKFIN grant with the funding shared by the Alaska Department of Fish and Game's (ADF&G) statewide AKFIN contract and the PSMFC sponsored AKFIN Support Center (AKFIN-SC) in Portland, Oregon. The ADF&G has primary responsibility for collecting, editing, maintenance, analysis, and dissemination of these data and performs this responsibility in a comprehensive program.

With few exceptions, groundfish resources in Alaska's Exclusive Economic Zone (from 3 to 200 nautical miles offshore) are managed by the National Marine Fisheries Service (NMFS), and groundfish within 3 nautical miles of shore are managed by the state of Alaska. Two fishery management plans (FMPs) require the collection of groundfish harvest data (fish tickets) in the north Pacific: the Gulf of Alaska Groundfish FMP, and the Bering Sea and Aleutian Islands Groundfish FMP. The AKFIN program is necessary for management and for the analytical and reporting requirements of the FMPs.

Implementation of the FMP for the Commercial King and Tanner Crab Fisheries in the Bering Sea and Aleutian Islands (BSAI) resulted in additional responsibilities for data collection, analysis, and reporting by the state, which manages the 17 stocks of crabs covered by the FMP.

The overall goal of ADF&G's AKFIN program is to provide accurate and timely fishery data that is essential to management, pursuant to the biological conservation, economic and social, and research and management objectives of the fishery management plans for groundfish and crab. The specific objectives are:

1) to collect groundfish fishery landing information, including catch and biological data, from Alaskan marine waters extending from Dixon Entrance to the BSAI;
2) to collect crab fishery landing information, including catch and biological data, from the BSAI;

3) to determine ages for groundfish samples using age structures (as otoliths, vertebrae, and spines) arising from statewide commercial catch and resource survey sampling conducted by ADF&G;
4) to provide the support mechanisms needed to collect, store, and report commercial groundfish and shellfish harvest and production data in Alaska;
5) to integrate existing fishery research data into secure and well maintained databases with consistent structures and definitions;
6) to increase the quality and accuracy of fisheries data analysis and reporting to better meet the needs of ADF&G staff, AKFIN partner agencies, and the public, and to make more of this information available over the Internet while maintaining the department's confidentiality standards;
7) to provide GIS services for AKFIN fishery information mapping to ADF&G Division of Commercial Fisheries staff and participate in GIS and fishery data analysis and sharing with other AKFIN partner agencies;
8) to support economic analysis as needed prior to implementation of state and federal fishery regulations; and
9) to provide internal oversight of the AKFIN contract between the ADF&G and the Pacific States Marine Fisheries Commission (PSMFC).

Groundfish species include walleye pollock, Pacific cod, sablefish, skates, various flatfish, various rockfish, Atka mackerel, lingcod, sharks, and miscellaneous species. Crab species in the BSAI include red, blue, golden, and scarlet king crab; several Tanner crab species; snow crab; and hair crab.

The foundation of the state's AKFIN project is an extensive port sampling system for collection and editing of fish ticket data from virtually all of the major ports of landing from Ketchikan to Adak and the Pribilof Islands, with major emphasis on Sitka, Homer, Kodiak, and Dutch Harbor. The port sampling program includes collection of harvest data, such as catch and effort, and also the collection of biological data on the fish and crab species landed, and age determination based on samples of age structures collected from landed catches. A dockside sampling program provides for collection of accurate biological data (e.g., size, weight, sex, maturity, and age) and verifies self reported harvest information submitted on fish tickets from shoreside deliveries of groundfish throughout coastal Alaska and of crab in the BSAI region.

The state's AKFIN program is supported by a strong commitment to development and maintenance of a computer database system designed for efficient storage and retrieval of the catch and production data on a wide area network and the internet. It supports the enhancement of the fish ticket information collection effort including; regional fishery monitoring and data management, GIS database development and fishery data analysis, catch and production database development and access, the Age Determination Unit laboratory, database management and administration, Bering sea crab data collection and reporting, various fishery economic projects, and fisheries information services.

Local ADF&G personnel maintain close contact with fishers, processors and enforcement to maintain a high quality of accuracy in the submitted fish ticket records. Following processing, the data are electronically transferred to Headquarters. 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 are merged to this master database. Data are routinely reviewed for

accuracy with corrections applied as required. Within the confines of confidentiality agreements, raw data are distributed to the National Marine Fishery Service (both NMFS-ARO and NMFS-AFSC), the North Pacific Fishery Management Council (NPFMC), 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 is also provided back to regional ADF&G offices as well as to the State of Alaska Board of Fisheries, NMFS, NPFMC and the AKFIN Support Center.

The fishery information collected by the AKFIN program is not only essential for managers and scientists who must set harvest levels and conserve the fisheries resources, but it is also valuable for the fishermen and processors directly involved in the fisheries, as well as the general public. To meet those needs, the department has designed, implemented, and continues to improve database systems to store and retrieve fishery data, and continues to develop improvements to fishery information systems to provide data to other agencies and to the public.

The department also conducts economic analyses of these data for use in the NPFMC arena. The need for an economic analysis component of the AKFIN program arises from jurisdictional obligations, pressing economic needs, and impacts of environmental regulations. The ADF&G is the management agency for state fisheries under its jurisdiction, and also a lead agency in policy making for federal fisheries of the region through its role in the NPFMC and the Pacific Salmon Commission (PSC). Economic analysis of seafood and fishery management policy is essential for the state to determine how proposed policies will impact the industry, Alaska regions, and coastal localities of the state. The role of state personnel is especially crucial under the rationalization plan currently being refined by the NPFMC, which will directly impact the state managed groundfish fisheries in the Gulf of Alaska.

Groundfish fishery milestones for this ongoing ADF&G AKFIN program are primarily the annual production of catch records and biological samples. In calendar year 2010 ADF&G AKFIN staff processed 23,961 groundfish fish tickets, collected 32,925 groundfish biological samples and measured 15,747 age structures (see tables below for regional breakdown). These basic measures of ongoing production in support of groundfish marine fisheries management by AKFIN funded ADF&G staff are representative of the level of annual productivity by the AKFIN program since its inception in 1997. (Contact: Lee Hulbert)

Groundfish Fish Tickets Processed -Calendar Year 2010

ADF&G Region	
1 - Southeast	4,036
2 - Central	2,907
4 – Westward; Kodiak, AK Pen.	15,573
Westward; BSAI	1,445
Total	23,961

Groundfish Biological Data Collection - Calendar Year 2010

ADF&G Region	AWL Samples Collected	Age Structures Measured
1 - Southeast	9,362	7,508
2 - Central	8,751	2,425
4 - Westward	14,812	5,814
Total	32,925	15,747

Intergency Electronic Reporting System (contact Gail Smith)

The Alaska Department of Fish and Game maintains a commercial harvest database, based on landing report receipts – fish tickets. These data are comprehensive for all commercial salmon, herring, shellfish, and groundfish from 1969 to present. Data are stored in an Oracle relational database and available to regional staff via the State of Alaska wide-area network.

The three resource management agencies tasked with commercial fisheries management in Alaska are the Alaska Department of Fish and Game (ADF&G), the International Pacific Halibut Commission (IPHC), and the National Marine Fisheries Service – Alaska Region (NMFS-AK). Beginning in 2001, these agencies began development of a consolidated landing, production, and IFQ reporting from a sole source – the Interagency Electronic Reporting System (IERS). The web-based reporting component of this system is ***eLanding.*** The desktop application for the at-sea catcher processor fleet is ***seaLandings***. Vessels using the seaLandings application email landing and production reports to the centralized database as an email attachment. ***tLandings*** was developed to address electronic reporting on-board salmon tender vessels. The application and the landings reports are stored on a thumb drive and delivered to the shoreside processor for upload to the eLandings database. Fisheries management agencies use a separate application, the ***IERS Agency Interface***, to view and edit landing reports. The IERS management/development team have developed and are expanding an ***eLogbook***, for groundfish catcher processors and crab catcher vessels. Initial deployment of the eLogbook occurred in 2010.

The IERS has been in successful operation in the groundfish and IFQ halibut/sablefish fisheries since July 2006.

Our approach, throughout this project has been staged implementation, which allows a small staff to successfully manage this ambitious project. We expect the IERS will be fully implemented with the salmon fishery by the end of the 2012 season. Statewide shellfish and herring fisheries will be addressed in 2013.

The ADF&G is currently in the next implement of the system with salmon fisheries and hope to have the system in use for these fisheries by 2013.

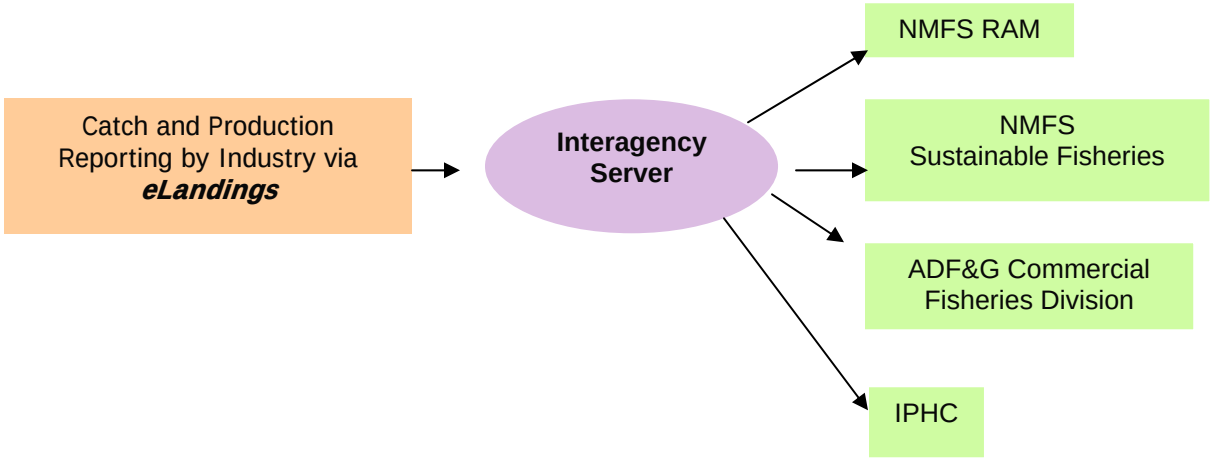
Alaska Department of Fish and Game personnel, funded by AKFIN, Rationalized Crab Cost Recovery funds and IFQ Halibut/Sablefish Cost Recovery funds, participate in the IERS project on the development, implementation, and maintenance levels. The IERS provides processors with a web-based online electronic catch and production reporting program. The IERS features

include electronic landing and production reports, real time quota monitoring, immediate data validation, and printable (.pdf) fish ticket reports. To date, IERS is required in all groundfish and IFQ crab fisheries and extensively used in the Western Gulf and Bering Sea crab fisheries and halibut/sablefish IFQ fisheries – statewide. The ADFG does not expect to require the IERS for any state managed fisheries in the immediate future.

During 2010, the IERS recorded more than 29,250 landing reports in crab, groundfish and salmon fisheries.

The web-based application provides the seafood industry with the ability to submit landing reports (fish tickets), IFQ fisher/processor quota harvest, and processor production information from a single application. The information submitted via the web application, ***eLandings***, is stored in a single repository database. The ADF&G, the IPHC, and the NMFS-AK copy data submitted by industry to their individual data systems.

DATA FLOW MODEL



The Interagency Electronic Reporting System provides several benefits for fisheries management agencies and industry, when compared to paper-based systems. The most obvious benefit is a sole source reporting site for landing and production data. Fisheries managers, individual processing facilities, and the parent company will have the ability to obtain landing report catch and production information immediately. Additional benefits include:

- Significant reduction of redundant reporting to management agencies.
- Consolidated trip level landing reports that accommodate fishery permit stacking.
- Immediate data validation when the landing, IFQ, or production report is submitted.
- Real time harvest data availability to management agencies.
- Staged reporting to accommodate the work flow of industry.
- Application function to allow processors to import or export the catch and production information they submit, facilitating one time data entry for processors.

The IERS is extensively documented on a public and secure wiki at https://elandings.alaska.gov/confluence/

Local ADF&G personnel in six locations throughout the state of Alaska (Petersburg, Sitka, Juneau, Homer, Kodiak and Dutch Harbor) maintain close contact with groundfish fishers, processors and state/federal enforcement to maintain a high quality of accuracy in the submitted fish ticket records. The Interagency Electronic Reporting System – eLandings , seaLandings, and tLandings applications, with immediate data validation and business rules, has improved data quality and allows personnel to function at a higher level. User support on a 24/7 basis is being provided by NMFS Data Technicians and to GCI, an Alaska based telecommunications company.

Landing and production data are submitted to a central database, currently hosted by the State of Alaska, validated and reviewed, and pulled to the individual agency databases. Landing data are available to agency personnel within seconds of submission of the report. Printable documentation of the landing report and the Individual Fishery Quota debit are created within the applications. Signed fish tickets continue to be submitted to local offices of ADF&G for additional review and comparison to other data collection documents. These documents include vessel/fisher logbooks, agency observer datasets, and dockside interviews with skippers.

Within the confines of confidentiality agreements, raw data are distributed to the State of Alaska Commercial Fisheries Entry Commission (CFEC) and to the National Marine Fishery Service NMFS-ARO and AKFIN Support Center on a monthly schedule. The CFEC merges the ADF&G fish ticket data with fisher permit and vessel permit data. This dataset is then provided to the AKFIN Support Center, which distributes the data to the professional staff of the North Pacific Fishery Management Council (NPFMC) and summarized data to the Pacific States Fisheries Information Network (PACFIN). Summary groundfish catch information is also posted on the ADF&G Commercial Fisheries website: http://www.cf.adfg.state.ak.us/geninfo/finfish/grndfish/grndhome.php.
Summarized data are provided to the State of Alaska Board of Fisheries, the North Pacific Fisheries Management Council, and to the State of Alaska legislature as requested.

e. Gene Conservation Laboratory

In the past, the ADF&G Gene Conservation Laboratory collected genetic information on black rockfish, light and dark dusky rockfish, and pollock (a list of *Sebastes and* pollock tissue samples stored at ADF&G's Gene Conservation Laboratory can be found in Appendix III).

f. Age Determination Unit

The ADFG's centralized statewide age reading program at the Age Determination Unit (ADU) in Juneau continued to provide age data to ADFG regional managers in 2010. Age structures from 10,056 groundfish representing 9 species were received from statewide commercial and survey harvest sampling efforts. A total of 9,203 age data were released back to managers, which included data from samples received in previous years. Over 2,541 additional age data were produced through precision testing. A total of 16,279 otoliths (representing 8,198 specimens) were measured. The majority (>70%) of funding for this project is through the Alaska Fisheries Information Network, and the remaining is from State funding. Five people were employed in 2010 for approximately 38 work months to age groundfish and invertebrate age structures or conduct associated work, for example, sample preparation, data entry, archiving, otolith measurements, and project work. One new full-time position was filled in October 2010,

bringing the number of full-time employees to three. Two additional positions are seasonal, one of which was being hired in December 2010.

Quality of age data is routinely assessed through second-reading of at least 15% of the sample, either by the initial-reader or by a reader with equal or greater experience. Species-specific control limits are imposed to further guide release of age data; transgression of control limits direct reviewing of some or the entire sample.

In 2010 the ADU was in production status for all species received except for gadids from commercial fisheries. Aging of sablefish dominated the reading schedule. This is due to substantial increases in sampling of sablefish and the need for these data in age structured models. Effort continued toward increasing objective information (age structure measurements, age validation) to strengthen foundation of pattern interpretation for all species.

Project work on the ADU's radiocarbon studies for the purpose of validating age is now in the writing stages, although on hold due to other high priority work.

The ADU project culturing walleye pollock to measure otolith weight at age, continues. These fish reached age-4 in 2010, and have been under tank culture at the NMFS Auke Bay Marine Station, Juneau Alaska since their capture in 2006 at age-0. This project reaches maturity in 2011 and it will conclude in 2012.

In 2010, ADU staff also tagged and released 115 wild pollock in Auke Bay, for a three year total of 2,415 tagged pollock. The longest distance for a recovery (of a tag which did not include the fish) was approximately 20 miles (north of Benjamin Island in Lynn Canal), and the longest time between tagging and recovery was approximately 1 year. Pollock and other fish tagging updates are available at http://tagotoweb.adfg.state.ak.us/ADU/Tagged.aspx.

The ADU Oracle database *AegIS*, Age Information System, was used for logging in samples, importing and exporting of data, importing field data, and direct entry of age structure measurements. We completed development of an online age structure invoicing system, *OASIS*, which was deployed late 2010. All samples sent to the ADU are first invoiced online, which provide for standardization of sample information prior to receipt of the sample. (Contact Kristen Munk)

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

ADF&G manages 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. No recreational fisheries are included in the Gulf of Alaska Fishery Management Plan.

Most management and research efforts are directed at halibut, rockfish, and lingcod, the primary groundfish species targeted by the recreational fishery. Statewide data collection programs

include an annual mail survey to estimate overall harvest (in number) of halibut, rockfishes (all species combined), lingcod, Pacific cod, and sharks (all species combined), and a mandatory logbook to assess harvest of selected species in the charter boat fishery. The statewide bottomfish coordinator (Scott Meyer) coordinates federal data requests and develops scientifically-based advice for assessment and management of halibut and groundfish.

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. Research was funded through state general funds and the Federal Aid in Sport Fish Restoration Act. 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^{o} 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, the Aleutian Islands, and Bristol Bay.

a. Southeast Region Sport Fish

Regional staff in Douglas coordinates a data collection program for halibut and groundfish in conjunction with a region wide Chinook salmon harvest studies project. The project leader is Mike Jaenicke, with assistant project biologists located in Ketchikan (Kathleen Wendt) and Juneau (Vacant). The project biometrician (Sarah Power) and Research Analyst (Diana Tersteeg) are located in Juneau. A total of 25 technicians worked at the major ports in the Southeast region, where they interviewed anglers and charter operators and collected data from sport harvests of halibut and groundfish while also collecting data on sport harvests of salmon. Data collected on groundfish were limited to species composition, lengths of harvested rockfish halibut and lingcod, and sex of lingcod; no otoliths or other age structures were collected. Data were provided to the Alaska Board of Fisheries, other ADF&G staff, the public, and a variety of other agencies such as the NPFMC and the IPHC.

The Regional Management Coordinator and Area Management Biologists in Yakutat, Haines, Sitka, Juneau, Petersburg, Craig, and Ketchikan are responsible for groundfish management in those local areas. The demersal shelf rockfish and lingcod sport fisheries are managed under the direction of the Demersal Shelf Rockfish Delegation of Authority and Provisions for Management (5 AAC 47.065) and the Lingcod Delegation of Authority and Provisions for Management (5 AAC 47.060) for allocations set by the Alaska Board of Fish.

b. Southcentral Region Sport Fish

The **Southcentral Region** groundfish staff consisted of two Regional Management Biologists as well as Area Management Biologists and assistants for the following areas: (1) PWS and the North Gulf areas, (2) Lower Cook Inlet, and (3) Kodiak, Alaska Peninsula, and the Aleutian Islands. In addition, a region-wide harvest assessment project was based in the Homer office, consisting of a project leader, project assistant, and six technicians. The research project biometrician was located in Anchorage. Ongoing assessment of sport harvest and fishery characteristics at major ports throughout the region is the primary activity. Data were collected from harvested halibut, rockfishes, lingcod, and sharks, and anglers and charter boat operators were interviewed for fishery performance information. All age reading was done in Homer, and the staff are active participants in the Committee of Age Reading Experts (CARE). Seasonal technicians collected data from the sport harvest at seven major ports in the region, and three of

them read all rockfish and lingcod age structures. Halibut otoliths were collected from the harvest and will be forwarded to the International Pacific Halibut Commission for age reading.

Southcentral Region staff is responsible for management of groundfish fisheries in state and federal waters. For all species, the lack of stock assessment information has hindered development of abundance-based fishery objectives. As a result, management is based on building a conservative regulatory framework specifying bag and possession limits, seasons, and methods and means that are hoped to provide for sustained yield over the long term. Lack of stock assessment information coupled with increasing effort and harvest in several groundfish sport fisheries accentuate the need for a comprehensive management plan and harvest strategy.

Typical duties included providing sport halibut harvest statistics to the International Pacific Halibut Commission (IPHC) and NPFMC, assisting in development and analysis of the statewide charter logbook program and statewide harvest survey, providing information to the Alaska Board of Fisheries, advisory committees, and local fishing groups, drafting and reviewing proposals for recreational groundfish regulations, and dissemination of information to the public.

B. By Species

1. Pacific cod

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 in 1997 for the state waters of Southeast Alaska. Commercial landings in Southeast, Central Region and the Westward Region are sampled for length, weight, age, sex, and stage of maturity.

a. Research

The **Westward Region** has continued the cod-tagging program that was initiated in 1997 in the Central, Western, and Eastern Gulf of Alaska. Approximately 972 fish were tagged in 2010, bringing the total number of tags released to 17,409. By year's end, 20 tags had been recovered. 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 km from their tagging location. The relatively small number of long distance recaptures show movement of cod is occurring from the Shumagin Islands into the Bering Sea, the Alaska Peninsula to Kodiak waters, and several fish tagged in Kodiak waters were recovered in Southeast Alaska.

b. Stock Assessment

No stock assessment programs were active for Pacific cod during 2010.

c. Management

Regulations adopted by the Alaska Board of Fisheries during November 1993 established a guideline harvest range (GHR) of 340 to 567 mt for Pacific cod in the internal waters of **Southeast Alaska**. The internal waters of Southeast Alaska are comprised of two areas, the Northern Southeast Inside Area (NSEI) and the Southern Southeast Inside Area (SSEI).The GHR was based on average historic harvest levels rather than on a biomass-based ABC estimate. This fishery is most intense in the winter months, in season management actions are small area

closures intended to spread out the fleet and reduce the risk of localized depletions. Pacific cod in state waters along the outer coast are managed in conjunction with the Total Allowable Catch (TAC) levels set by the federal government for the adjacent EEZ.

In 1996, the Alaska Board of Fisheries adopted Pacific cod Management Plans for fisheries in five groundfish areas, **Prince William Sound**, **Cook Inlet**, **Kodiak**, **Chignik** and **South Alaska Peninsula**. The plans did not restrict participation to vessels qualified under the federal moratorium program. Included within the plans were season, gear and harvest specifications. Fishing seasons begin seven days after the close of the initial federal season in all areas except Cook Inlet, which begins 24 hours after the closure and Chignik, which has a regulatory opening date of March 1. The BOF restricted the state waters fisheries to pot or jig gear in an effort to minimize halibut bycatch and avoid the need to require onboard observers in the fishery. However, in 2009 a new BOF regulation became effective permitting use of longline gear in PWS. This change was largely in response to the very low levels of effort and harvest and the high level of interest from the longline gear group. With the exception of longline gear in PWS, guideline harvest levels (GHL) are allocated by gear type. The annual GHLs are based on the estimate of acceptable biological catch (ABC) of Pacific cod as established by the NPFMC. Current GHLs are set at 25% of the Western Gulf ABC to be reserved for the South Alaska Peninsula Area, 25% 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. Action by the BOF in 2004 reduced the GHL in Prince William Sound to 10% of the Eastern Gulf ABC with a provision to increase subsequent GHLs to15% and then 25% if the GHL is achieved in a year.

Additional regulations include a 58’ vessel size limit in the Chignik and South Alaska Peninsula Areas and allocations between gear types in all five areas. For the Cook Inlet Area the BOF also adopted a harvest cap for vessels >58’ that limited harvest to a maximum of 25% of the GHL. The fishery management plans also provided for removal after October 31 of restrictions on exclusive area registrations, vessel size, and gear limits to increase late season production to promote achievement of the GHL. In addition, observers are occasionally used on day-trips to document catches and at-sea discards in the nearshore pot fisheries.

In February of 2006 the Alaska Board of Fisheries adopted a Pacific cod Management Plan for a nonexclusive Aleutian Islands District, west of 170° W longitude, state-waters fishery. Included within the plan were season, gear and harvest specifications. The fishery GHL was set by regulation at three percent based on the estimate of allowable biological catch (ABC) of Pacific cod as established by the NPFMC for the Bering Sea – Aleutian Islands area with a maximum of 70% of the GHL available before June 10. By regulation the fishery opened on or after March 15, at the conclusion of the initial parallel catcher-vessel trawl fishery for Pacific cod in the federal BSAI Area. Non-pelagic trawl, longline, jig and pot gear were all permissible in the 2006 fishery.

In October of 2006 the Alaska Board of Fisheries amended the Pacific cod Management Plan for the **Aleutian Islands**. Beginning in 2007 a new regulation set the opening date of the fishery at four days after the initial closure of the federal Bering Sea – Aleutian Islands catcher vessel trawl season. Additional regulations introduced new vessel size limits of 125’ or less overall length for pot vessels, 100’ or less overall length for trawl vessels and 58’ or less overall length for longline and jig vessels. In 2009, vessels participating in the B season were restricted to under

60’ overall length for all legal gear types. In 2010, this regulation was once again changed to allow pot vessels 125’ or less to participate in the B season beginning August 1. Prior to August 1, during the B season, all vessels must still be less than 60’.

There is no bag, possession, or size limit for Pacific cod in the recreational fisheries in Alaska, and the season is open year-round. Recreational harvest of Pacific cod is estimated through the Statewide Harvest Survey (SWHS). Limited information is collected through the Sport Fish Division’s Southcentral Region port sampling program. Specifically, numbers of cod kept and released by stat area is recorded by ADF&G groundfish stat area for each vessel-trip interview. No size or age data are collected. No information is collected in the Southeast Region creel survey program on the Pacific cod sport fishery.

d. Fisheries

Most of the Pacific cod harvested in **Southeast Alaska** are taken by longline gear in the NSEI area during the winter months. Pots have been the dominant gear in **Cook Inlet** and longline gear the dominant gear in recent **Prince William Sound** fisheries. Overall Pacific cod harvest from the Cook Inlet and PWS areas during the parallel season has declined in recent years. In the **Westward Region**, trawl gear takes over 60% of the harvest, with the remainder split between longline, jig, and pot gear. In the Aleutian Islands trawl gear took 60% of the harvest, pot gear took 31%, and the remainder was split between longline and jig gear. Trawl gear was used primarily during the A season and pot gear in the B season.

Prior to 1993 much of the cod taken in **Southeast** was utilized as bait in fisheries for other species. In recent years in Southeast Alaska the Pacific cod harvest has been largely sold for human consumption. Specifically in 2010 less than 14% was recorded as being used for bait. 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 in the Southeast state-managed (internal waters) fishery during 2010 totaled 395 mt. In 2009, 279 mt was landed.

The 2010 GHLs for the state-managed Pacific cod seasons in the Cook Inlet and Prince William Sound Areas of the **Central** Region were 1,839 mt and 356 mt, respectively. Harvest from the Cook Inlet Area state-managed Pacific cod fishery totaled 1,417 mt while the Prince William Sound Area harvest totaled 374 mt. In 2011 Cook Inlet will receive its maximum allocation of 3.75% of the CGOA ABC and the PWS allocation will increase from 15% to 25% of the EGOA ABC. Harvest from the 2008 state managed Aleutian Islands Pacific cod fishery totaled 5,313 mt, 33 mt more than 2007. Harvest from the 2008 state managed fishery in the Kodiak Area totaled 4,735 mt, while 3,042 mt of cod were harvested in the Chignik Area, and the South Alaska Peninsula Area harvest totaled 6,133 mt. The Kodiak and South Alaska Peninsula Areas obtained their maximum GHL ‘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 all future years. The Chignik Area achieved its maximum GHL ‘step’ up in 2003. Action by the Alaska Board of Fisheries during 2004 increased the Pacific cod allocation in the Cook Inlet Area to its maximum allowable 3.75% of the Central Gulf ABC, the maximum allowed under regulation and Prince William Sound remains at its minimum allocation of 10% of the Eastern Gulf ABC.

Estimates of the 2010 recreational harvest of Pacific cod are not yet available from the statewide harvest survey, but the 2009 estimates were 11,527 fish in **Southeast** and 24,763 fish in

Southcentral Alaska. The average estimated annual harvest for the most recent five-year period (2005-2009) was 10,506 fish in **Southeast** Alaska and 14,517 fish in **Southcentral** Alaska. There are no estimates of average weight in the sport harvest in either region.

2. Rockfishes

Commercial rockfish fisheries 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 (PSR) include black, blue, dusky, dark, yellowtail, and widow. Black and blue rockfish were removed from the PSR assemblage in the federal fisheries management plan (FMP) and placed totally under state management in 1998. The North Pacific Fisheries Management Council (NPFMC) removed dark rockfish also from the PSR assemblage in the FMP and turned management of them over to the State effective January 1, 2009. Slope rockfish contain all other *Sebastes* species, except *Sebastolobus*, which are defined separately.

a. Research

In the **Southeast Region** port sampling effort for rockfish expanded in 2008 to include the sampling of DSR caught as bycatch in the IFQ halibut fishery. The mandatory logbook program for all groundfish fisheries continued. The logbook program is 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. In 2010 the directed fishery for demersal shelf rockfish (DSR) opened in the Southern Southeast Outside (SSEO) area of the Southeast Outside District (SEO). Length, weight and age structures were collected from 490 yelloweye rockfish caught in the directed fishery. The remaining areas of SEO, the East Yakutat Section (EYKT), Central Southeast Outside (CSEO) and Northern Southeast Outside (NSEO), did not open to directed fishing because the portion of the TAC allocated to those areas was not large enough to support an orderly fishery. The directed fishery for DSR opened in internal waters but landings were minimal and no biological samples of yelloweye rockfish were collected from the internal waters fishery. Over 974 yelloweye rockfish landed as bycatch in the commercial halibut fishery were also sampled for AWL data throughout the halibut season in southeast Alaska.

Rockfish habitat mapping projects continue in the **Southeast Region**. The objective of this project is to continue to collect and evaluate data in the Eastern Gulf of Alaska for the purpose of identifying potential habitats in this important fishing ground. To date ADF&G has mapped approximately 2238 km^2 of seafloor. This represents over 7% of the total habitat inside the 100-fm contour along the outer coast of Southeast. More importantly, over 1118 km^2 of rocky habitat has been mapped, approximately 37% of what is estimated to occur. The most recent collections of data were from Cape Felix in SSEO in August 2010. The goals of this project are to: Produce a GIS compatible sun-illuminated multibeam mosaic of these areas complete with bathymetric contour mosaics and a geological habitat interpretation of the mosaics. Quantification of rockfish habitat based on the geological interpretation of multibeam data is subcontracted to Moss Landing Marine Laboratories. The geologic interpretations for the Cape Felix area are underway at Moss Landing Marine Labs, and we expect these analyses to be completed by the summer of 2011. (Contact Kristen Green). Work is also in progress on an age-structured assessment model for yelloweye rockfish. (Contact Dave Carlile).

Skipper interviews and port sampling of commercial rockfish deliveries in **Central Region** during 2010 occurred in Homer, Seward, Whittier, Anchorage and Cordova. Efforts throughout the year were directed at the sampling of rockfish delivered as bycatch to other groundfish and halibut fisheries, primarily slope and demersal shelf species. The directed jig fishery that targets pelagic rockfish begins July 1 and historically had been the focus of rockfish sampling during the last half of the year. However, very limited fishing effort had drastically reduced sampling opportunities from 2006 to 2009 until an increase in effort in 2010 resulted in additional sampling opportunity. In 2010, harvest of pelagic shelf rockfish was three times the previous four-year average, although catch was still less than half that in 2005. Sample data collected included date and location of harvest, species, length, weight, sex, and gonad condition. Otoliths were collected from most sampled fish. Homer office staff determined ages of pelagic and demersal shelf rockfish otoliths. Otoliths from all other rockfish species were sent to the Age Determination Unit. Additional sampling occurred during the Cook Inlet and PWS trawl surveys. (Contact Elisa Russ).

Development continued on marine habitat GIS in **Central Region**. Additional NOAA multibeam bathymetry and backscatter data were collected. Bathymetry data were gridded and incorporated and further analysis of backscatter data are planned. Margaret Spahn, ADF&G Homer, is responsible for this project. Multibeam and side scan sonar projects continue to be one of the major focal areas of the Central Region commercial fisheries research program. Multibeam bathymetry data were collected from the vicinity of the Chugach Islands in August 2010; data processing is currently underway. (Contact Margaret Spahn or Dr. Ken Goldman).

Central Region conducts ROV surveys along the north Gulf of Alaska coast from the Kenai Peninsula to Prince William Sound to monitor the local abundance of lingcod and DSR in selected index sites. These sites are on the order of 100's of sq km and tend to be relatively isolated rocky banks boarded by land masses, deep fjords, and / or expanses of deeper soft substrates. In 2009, a Resurrection Bay lingcod ROV survey was conducted to estimate the abundance of legal size lingcod within the bay. Analysis of these data was completed in 2010 and estimates of abundance for yelloweye and quillback rockfish were made in addition to lingcod. The estimated abundance of yelloweye rockfish was 93,912 (95% CI 63,670 – 128,632) and quillback rockfish was 290,185 (95% CI 213,933 – 376,869). Laser measurements were made to estimate fish length and these lengths will be used with a length weight relationship to estimate biomass. These analyses have not been completed, however.

The rocky bank surrounding and extending to the south of outer Pye Island was mapped with multibeam during a department survey in 2008. The seafloor habitats within the survey area were delineated and an ROV survey to estimate DSR and lingcod abundance and biomass was conducted there in May 2010. No analyses or population estimates have been completed since video reviews were only just completed. (Contact Mike Byerly or Dr. Ken Goldman).

The **Westward Region** continued its port sampling of the commercial rockfish and Pacific cod harvests in 2010. Rockfish sampling consisted mainly of black rockfish with opportunistic sampling of duskys, darks, and other miscellaneous *Sebastes* species. Skippers were interviewed for information on effort, location, and bycatch. Length, weight, gonadal maturity, and otolith samples were collected (Contact Sonya El Mejjati).

Staff from the Kodiak office has completed aging black rockfish otoliths through the 2010 season while a number of Pacific cod ototlihs remain to be read.

The **Westward Region** also continued several studies on Western Gulf of Alaska black and dark rockfish. The acoustic tagging of black rockfish and dark rockfish ended in 2010 and is currently being analyzed. Daily and seasonal movement data were collected from 85 black rockfish and 55 dark rockfish tags that were released off the east side of Spruce Island, just north of the port of Kodiak. In addition, hydroacoustic surveys of black and dark rockfish were conducted in 2010 in the Westside District of the Kodiak Management Area and the Chignik Management Area in an effort to generate biomass estimates for both black and dark rockfish. Surveys are planned for the South Alaska Peninsula Area and several districts in the Kodiak Area in 2011 (Contact Carrie Worton).

The **Division of Sport Fish—Southeast Region** continued to collect catch and harvest data from rockfish as part of a marine harvest onsite survey program with rockfish harvests tabulated back to 1978 in some selected ports. Rockfish objectives included estimation of 1) species composition, 2) weight and length composition, and 3) the geographic distribution of harvest by the fleets by port. Primary species harvested in Southeast Alaska included yelloweye, black, and quillback rockfish. Approximately 5,380 rockfish were sampled at Ketchikan, Craig, Klawock, Wrangell, Petersburg, Juneau, Sitka, Gustavus, Elfin Cove, and Yakutat in 2010 (Contact Mike Jaenicke).

The **Division of Sport Fish—Southcentral Region** continued collection of harvest and fishery information on rockfish as part of the harvest assessment program. Rockfish objectives included estimation of 1) species composition, 2) age, sex, and length composition, and 3) the geographic distribution of harvest by the fleets by port. Approximately 4,169 rockfish were sampled from the sport harvests at Seward, Valdez, Whittier, Kodiak, and Homer in 2010 (Contact Barbi Failor).

The Division of Sport Fish completed a three year research project that investigated the effectiveness of deepwater release at improving the discard survival of yelloweye rockfish. This project used mark-recapture to generate a maximum likelihood estimate of the 17-day survival probability of yelloweye rockfish (n = 182) caught by hook-and-line (depth range = 18 – 72 m) and subsequently released at depth. In a separate study, yelloweye were captured with hook-and-line (n=95) and released at the water's surface for observation of submergence success. The submergence probability of yelloweye rockfish was then used as the conceptual upper bound of survival of individuals released at the water's surface. The average Cormack-Jolly-Seber survival probability for yelloweye released at depth was remarkably high (0.988, 95% CI = 0.426 – 0.999) and positively correlated with individual total length. Survival probability was not significantly influenced by capture depth or exposure to barotrauma and other capture stressors. Submergence success of yelloweye rockfish released at the water's surface was 0.221 (95% CI = 0.149 – 0.315) and suggests that the maximum survival potential of individuals released at the surface is low. The results of this study indicate that the average survival of discarded yelloweye rockfish can be substantially improved with the use of deepwater release (Contact Sam Hochhalter).

b. Stock Assessment

The **Southeast Region** uses line-transect methods, conducted from the submersible "Delta", to collect density estimates of yelloweye rockfish. Biomass is the product of density, average weight, and area of rock habitat. The most recent yelloweye rockfish density survey was conducted in EYKT in 2009. Yelloweye rockfish density for the current stock assessment is based on the latest best estimate by management area. The CSEO and SSEO areas were last surveyed in 2007 and 2005 respectively, NSEO was surveyed in 2001. Density estimates by area range from 1,068 to 2,196 adult yelloweye per km^2. A submersible research cruise is planned for summer 2012, when we plan to conduct surveys for yelloweye rockfish density in SSEO.

No rockfish stock assessments were conducted in the **Central Region** in 2010. Population estimates from ROV surveys have not yet been used to set harvest limits or incorporated into a stock assessment.

In the **Southeast Region** no black rockfish surveys were conducted in 2010.

In the **Westward Region** hydroacoustic equipment was deployed in a preliminary effort at stock assessment of black and dark rockfish. Surveyed areas included the Westside District of the Kodiak Management Area and the Chignik Management Area (contact Carrie Worton).

c. Management

Management of DSR is based upon a combination of guideline harvest ranges, seasons, gear restrictions, and trip limits. The state has management authority for demersal shelf rockfish in both state and federal waters of **Southeast Alaska**.

Directed commercial harvest of demersal shelf rockfish is restricted to hook-and-line gear. Directed fishing quotas are set for the 4 outside water management areas (SEO) individually and are based on the poundage remaining after assigning a 2% harvest rate to the adult yelloweye biomass estimate and estimating bycatch (reported and nonreported) mortality. Directed fishery quotas for the two internal water management areas are set at 25 mt annually. Regulations adopted in 1994 include trip limits (within any 5 day period) of 6,000 pounds per vessel in all areas except for EYKT where the trip limit is 12,000 pounds, and added a requirement that logbook pages must be submitted with fish tickets for each fishing trip. At the Board of Fisheries meeting in early 2006 the season for the directed fishery of DSR in SEO was changed to occur in the winter only from January 5th until the day before the start of the commercial halibut IFQ season, or until the annual harvest limit is reached whichever occurs first. At this meeting the total allowable catch (TAC) for DSR was allocated 84% to the commercial sector and 16% to the sport sector. At the 2009 Board of Fisheries meeting it was decided that the anticipated harvest of DSR in the subsistence fisheries would be deducted from the TAC before the split in allocation is made between commercial and sport fisheries. This change was adopted for the first time in the 2010 fishery.

The 2010 TAC for DSR in SEO was 295 mt, which resulted in an allocation of 241 mt to commercial fisheries and 46 mt to sport fisheries (after a deduction of 8 mt for the subsistence fishery). A significant portion of the total commercial harvest is taken as bycatch mortality during the halibut fishery. We continue to use the method for bycatch determination we developed in 2006 to which recognizes the significance of depth as a component of the bycatch

rate. Full retention of DSR has been in regulation in state waters since 2002 and in Federal water since 2005.

The commercial fishery for DSR in SEO opened in SSEO in 2010 with a 30 mt quota. Sport fishery harvest estimates have been used since 2005 to add to our knowledge of what we determine to be the total harvest of DSR in other fisheries. The preliminary estimate of total sport fishery removals for 2010 was 36 mt (SE = 2 mt). (Contact Kristen Green).

Management of the commercial black rockfish fishery is based upon a combination of guideline harvest limits and gear restrictions. The state has management authority for black rockfish in both state and federal waters of Southeast Alaska. Directed fishery guideline harvest limits are set by management area, and range from 11.3 mt in IBS to 57 mt in SSEOC, totaling 147 mt. A series of open and closed areas was also created so managers could better understand the effect a directed fishery has on black rockfish stocks. Halibut and groundfish fishermen are required to retain and report all black rockfish caught. The directed fishery for black rockfish continues to have very little participation with 1.1 mt landed in directed and bycatch fisheries combined in 2010.

Shortspine thornyhead, shortraker rockfish, rougheye rockfish and redbanded rockfish may be taken as bycatch only (no directed fishing). A total of 98 mt of slope rockfish were landed in NSEI and SSEI during 2010, similar to the 2009 landing of 97 mt.

Rockfish in **Central Region's** Cook Inlet and PWS Areas are managed under their respective regulatory Rockfish Management Plans. Plan elements include a fishery GHL of 68 mt for each area and 5-day trip limits of approximately 0.5 mt in the Cook Inlet District, 1.8 mt in the North Gulf District, and 1.4 mt in PWS. Rockfish regulations underwent significant change beginning in 1996 when the Alaska Board of Fisheries formalized the 68 mt GHL into a harvest cap for all rockfish species in Cook Inlet and PWS and adopted a 5% rockfish bycatch limit for jig gear during the state waters Pacific cod season. In 1998 the board adopted a directed rockfish season opening date of July 1 for the Cook Inlet Area and restricted legal gear to jigs, primarily because the 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 with mandatory full retention of all incidentally harvested rockfish. In November 2004 the board also adopted a full retention requirement for rockfish in the Cook Inlet Area and restricted the directed harvest to pelagic shelf rockfish. Rockfish bycatch levels were also set at 20% during sablefish, 5% during the parallel Pacific cod season and 10% during other directed fisheries. Proceeds from rockfish landed in excess of allowable bycatch levels are surrendered to the State of Alaska. (Contact Charles Trowbridge).

The **Westward Region** has conservatively managed 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 the Kodiak Area, vessels may not possess or land more than 5,000 pounds of black rockfish in a 5-day period. Additionally, vessel operators are required to register for a single groundfish

fishery at a time. A registration requirement also exists for the Chignik Area; that area was also designated as super-exclusive for the black rockfish fishery beginning in 2003.

In 2010, 47 mt of black rockfish were harvested from five sections in the Kodiak Area. Guideline harvest levels were attained in three sections. In the Chignik Management Area 21 mt of black rockfish were harvested. The 2010 black rockfish harvest in the South Alaska Peninsula areas remains confidential because of minimum participation. In 2010 no vessels made directed black rockfish landings in the Aleutian Islands Area. Fishers are allowed to retain up to 5% of black rockfish by weight incidentally during other fisheries. The incidental harvest in the Aleutian Islands Area is confidential due to limited participation. 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 logbook program was made mandatory in 2005. (Contact: Nick Sagalkin).

Statewide, the majority of **sport caught** rockfish is taken incidental to recreational fisheries for halibut or while trolling for salmon. Size limits have never been set for rockfish harvested in the sport fishery, although there has been a progression of bag and possession limit changes over the last 20 years.

For the 2007-2010 seasons, the entire **Southeast Alaska** region's sport bag and possession limit for pelagic rockfish was 5 fish per day, 10 in possession. The non-pelagic rockfish regulations were set as follows: 1) resident bag limit was 3 fish, only 1 of which could be a yelloweye; 6 fish in possession, of which no more than 2 could be yelloweye; all non-pelagic rockfish caught must be retained until the bag limit is reached; 2) nonresident bag limit was 2 fish, only 1 of which could be a yelloweye, 4 fish in possession, of which no more than 2 could be yelloweye; all non-pelagic rockfish caught must be retained until the bag limit is reached; and an annual limit of 2 yelloweye rockfish, which must be recorded in ink on the back of the sport fishing license or on a harvest record at the time of harvest; 3) Charter operators and crewmembers could not retain rockfish while clients are on board the vessel (Contact Robert Chadwick).

As a result of the pervasive lack of quantitative stock assessment information, rockfish regulations in **Southcentral Alaska** have been designed to discourage targeting of rockfish yet allow for retention of incidental harvest. Bag limits are lower for demersal and slope species because of their lower natural mortality rates. The bag limit in Cook Inlet was five rockfish daily, only one of which could be a non-pelagic species (DSR or slope species). The bag limit in Prince William Sound during the period May 1-September 15 was four rockfish, no more than two of which could be a non-pelagic species. During the period September 16-April 30, the bag limit was 8 rockfish, of which no more than 2 could be non-pelagic species. During both periods, the first two non-pelagic rockfish caught were required to be retained. The bag limit in the North Gulf Coast area was four rockfish daily, including no more than one non-pelagic rockfish. The bag limit in the Kodiak and Alaska Peninsula areas was 10 fish daily of any species, but that limit was revised by the Alaska Board of Fisheries in late 2010. The daily bag limit effective in 2011 will be 5 rockfish, no more than two of which can be non-pelagic species, and no more than one of the non-pelagic species may be a yelloweye.

d. Fisheries

Directed fisheries for demersal shelf rockfish and black rockfish occurred in **Southeast** in 2010. Effort in the directed black rockfish fishery was minimal with only 3 vessels participating. The directed DSR fishery in 2010 in outside waters was opened in SSEO only for a total harvest of 29.5 mt. There was also a directed DSR fishery in internal waters in 2010 (SSEI and NSEI); the total harvest was 20.6 mt.

The total amount of rockfish (all species) taken as bycatch in all commercial fisheries conducted east of 140^0 W Longitude in 2010 in state and Federal water was 492 mt. DSR bycatch made in conjunction with the IFQ halibut fishery in outside as well as internal waters contributed 148 mt to this total. All rockfish harvested in state-managed fisheries in Southeast is taken by hook-and-line gear either in directed fisheries or incidental to fisheries for other species.

The 2010 **Cook Inlet Area** directed rockfish fishery opened July 1 and closed December 31 with a harvest of 10.1 mt. Total rockfish harvest including bycatch to longline, pot and jig fisheries was 24 mt. Total rockfish harvest for the PWS Area rockfish bycatch-only fishery was 47.6 mt. This included a 3 mt incidental catch of demersal and slope rockfish from the walleye pollock trawl fishery and a 44 mt incidental harvest of demersal and slope rockfish primarily from the sablefish and halibut longline fisheries.

Estimates of **sport harvest** are obtained by three methods – the Statewide Harvest Survey (SWHS), charter vessel logbooks, and, in major ports, creel survey dockside sampling. Harvest reporting areas for these programs are different than commercial reporting areas making direct comparisons difficult. Additionally, species-specific data are available only from creel surveys.

The SWHS reported harvest for the general category of “rockfish”, and the charter vessel logbook recorded rockfish harvest in three categories - pelagic, yelloweye, and other non-pelagics. DSR are part of the “non-pelagic” category. Recreational rockfish harvest is typically estimated in numbers of fish. Estimates of the 2010 harvest are not yet available from the statewide harvest survey, but the 2009 estimates were 93,751 fish in Southeast and 115,343 fish in Southcentral Alaska. The average estimated annual harvest for the most recent five-year period (2005-2009) was 96,552 rockfish (all species) in Southeast Alaska and 101,431 fish in Southcentral Alaska.

3. Sablefish

a. Research

In 2010, sablefish longline surveys were conducted for both the NSEI and SSEI areas. These surveys are designed to measure trends in relative abundance and biological characteristics of the sablefish population. Biological data collected in these surveys include length, weight, sex and maturity stage. Otoliths are collected and sent to the ADF&G age determination unit in Juneau for age reading. The 2010 fishery and survey CPUE for NSEI are not yet available yet.
The cost of these surveys is offset by the sale of the fish landed, but in 2010 for the first time, the three commercial fishermen that participated in the surveys were allowed to sell their share of PQS from the total testfish harvested in the survey, thus reducing the total testfish harvest impact on the quota.

In the SSEI longline survey there has been a downward trend in CPUE since 2006. In 2010 CPUE was 0.29 kg/hook compared to 0.36 kg/hook in 2009.

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, overall CPUE (adjusted for hook spacing) has been decreasing since 2005. In 2010 it was 0.15 round kg/hook, up slightly from 0.14 round kg/hook in 2009. In 2005, the SSEI CPUE was 0.24 kg/hook. In the NSEI fishery, the overall CPUE adjusted for hook spacing expressed in round kg/hook was 0.37 in 2010, down slightly from 0.39 kg/hook in 2009.

In 2010, ADF&G continued a mark/recapture study in NSEI, tagging and releasing 7,443 sablefish. Pot gear was used to capture the fish from May 31st to June 25th, one and a half months prior to the start of the fishery which commenced on August 15, 2010. Using pot gear to capture the fish for tagging has minimized the apparent "hook shyness" pattern of tag returns observed in 1997, 1998 and 1999 when longline gear was used to catch fish for tagging. Tagged fish are distributed by area and depth in proportion to the harvested commercial catch using logbook data from the three previous years. No biological samples were taken in 2010 in the pot survey as sufficient sampling occurs during the longline surveys and in the commercial fishery (contact Deidra Holum).

Central Region, ADF&G conducted longline surveys for sablefish from 1996 through 2006 in Prince William Sound. Longline survey effort was extended into the North Gulf District in 1999, 2000 and 2002. All longline surveys were discontinued due to funding issues, and with the goal of transitioning to a pot longline survey, particularly in PWS. Between 1999 and 2005, sablefish were opportunistically tagged in PWS on ADF&G trawl surveys. Central Region staff will initiate a sablefish tagging project in 2011 using pot longline gear. Long-term goals include tag-recapture analysis potentially in combination with an age-structured model. (Contact Dr. Ken Goldman).

Skipper interviews and port sampling occurred in Whittier, Valdez, Cordova and Seward for the PWS Area commercial fishery and in Seward and Homer for the Cook Inlet Area fishery. Data obtained included date and location of harvest, length, weight, sex, and gonad condition. Otoliths were removed and sent to the Age Determination Unit. Logbooks are required for both fisheries and provide catch and effort data by date and location. (Contact Elisa Russ).

b. Stock Assessment

In **Southeast**, the department is using mark-recapture methods with external tags and fin clips to estimate abundance and exploitation rates for sablefish in the NSEI Subdistrict. Sablefish are captured with pot gear in June, marked with a tag and a fin clip then released. Tags are recovered from the fishery and fish are counted at the processing plants and observed for fin-clips. The Allowable Biological Catch (ABC) for 2010 was based on the 2008 Petersen–estimated number of sablefish fish in NSEI. The forecast for 2010 was made by decrementing the 2009 estimate to account for natural mortality, and adding a number of age-4 recruits equal to that of 2008. Each age class was converted to biomass using the average weight of that age class from the 2009 commercial fishery. The forecast for 2010 was 19,097,883 round pounds of sablefish. An $F_{50\%}$ (=0.071) harvest rate was applied to the point estimate of the forecasted biomass to give a ABC of 1,250,961 round pounds. This represents a 3% decrease from the 2009 ABC (1,290,868 round pounds). In addition to the mark-recapture work, an annual longline survey is conducted in

NSEI to provide biological data as well as relative abundance information. In SSEI only an annual longline survey is conducted to provide biological data as well as relative abundance information. (Contact Sherri Dressel).

c. Management

There are three separate internal water areas in Alaska which have state-managed limited-entry commercial sablefish fisheries. The NSEI and SSEI (**Southeast Region**), and the Prince William Sound Inside District (**Central Region**) each have separate seasons and guideline harvest ranges. In the Cook Inlet Area there is an open access sablefish fishery.

In the **Southeast Region** both the SSEI and NSEI sablefish fisheries have been managed under a license limitation program since 1984. In 1994 the BOF adopted regulations implementing an equal share quota system where the annual guideline harvest level was divided equally between permit holders and the season was extended to allow for a more orderly fishery. In 1997 the BOF adopted this equal share system as a permanent management measure for both the NSEI and SSEI sablefish fisheries.

Due to declines in fishery CPUE and preliminary results from our mark-recapture work, ADF&G reduced the NSEI quota 35% in 1999 to 1,415 mt where it remained through 2000. Beginning in 2001 a biomass estimate was available and the NSEI area total allowable catch (TAC) was set using an $F_{40\%}$ applied to the lower 90% confidence limit of the forecasted estimate of biomass. The TAC is then decremented by estimating mortality in other fisheries before the directed fishery quota is set. The quota was decreased in 2001 to 990 mt and to 909 mt for 2002 and 2003. In 2004 the quota was increased to 1,018 mt. The 2005 directed fishery quota was 931 mt with 106 permit holders (longline). In 2006 the 2005 quota was used rather than base the quota on the recommendation put forward by the biometrician. There were 105 permit holders eligible to fish in NSEI in 2006. Data collected during 2006 was used to determine an updated stock assessment forecasted for 2007. The use of this updated stock assessment with the forecast for 2007 resulted in a drop in the TAC to 675 mt down 28% from the TAC used in 2006. There were 103 permit holders participating in the fishery in 2007. In 2008 the stock assessment from 2006 and the forecast for 2007 were used to set the TAC for the 2008 fishery. In 2008 there were 96 permit holders eligible to fish. In 2009 there were 88 permit holders eligible to fish. A stock assessment was conducted in 2009 with a forecast for 2010 and is referenced in the "stock assessment" section of this report. As in 2009, the point estimate rather than the lower 90% confidence level was used. However, in 2010, the testfish decrement was smaller because three permit holders participated in the survey, and harvested their share of their EQS during the survey rather than during the fishery. In 2010, an $F_{50\%}$ harvest rate was used rather than an $F_{45\%}$ rate as in 2009. The updated stock assessment combined with the changes listed above resulted in a 3% drop to the allowable harvest objective (AHO) for 2009. There were 87 permit holders eligible to fish in 2010. The Commercial Fisheries Entry Commission predicts that the number of permits will continue to be reduced and that the resulting number of permanent permits for this fishery will be approximately 76.

The SSEI quota was set at 265 mt for 2010, an 8% decrease from the 2009 quota. The quota reduction was based on declining survey CPUE since 2006, and declining survey CPUE from 2006-2009 (there was a slight increase in fishery CPUE in 2010). From 2000 to 2005 there were

28 permit holders (4 pot gear, 24 longline) legally permitted to fish in this fishery. In 2006 the Commercial Fisheries Entry Commission (CFEC) allowed 4 permits back into the fishery bringing the total permits to 32 (28 longline and 4 pot gear). For the 2009 fishery CFEC denied 4 permits leaving 25 longline and 3 pot permits allowed to harvest sablefish in this fishery. In 2010, there were 24 longline and 3 pot permits allowed to harvest sablefish in this fishery.

During the February 2009 Board of Fisheries (BOF) meeting, the BOF made no changes affecting the regulation of commercial sablefish fisheries. The BOF did however establish bag and possession limits for sablefish in the sportfish fishery.

Commercial sablefish fisheries in outer coastal state waters (0-3 miles) have been managed in conjunction with the federal-managed fishery in the EEZ. There is no open-access sablefish fishery in the Southeast Outside District as there are limited areas that are deep enough to support sablefish populations inside state waters. In some areas of the Gulf, the state opens the fishery concurrent with the EEZ opening. These fisheries, which occur in Cook Inlet Area's North Gulf District and the Aleutian Island District, are open access in state waters, as the state cannot legally implement IFQ management at this time. The fishery GHLs are based on historic catch averages and closed once these have been reached.

Within the **Central Region** the Cook Inlet North Gulf District sablefish GHL is set using an historic baseline harvest level adjusted annually by the same relative change to the TAC in the Central Gulf Area. The 2010 fishery GHL was 24 mt. In 2004 the BOF adopted sablefish fishery-specific registration, a logbook requirement, and a 48-hour trip limit of 1.3 mt. in Cook Inlet. For PWS, a limited entry program that included gear restrictions and established vessel size classes was adopted in 1996. The fishery GHL is set at 110 mt, which is the midpoint of the harvest range set by a habitat-based estimate. Fishery management continued to develop through access limitation and in 2003 into a shared quota system wherein permit holders are allocated shares of the harvest guideline. Shares are equal within each of four vessel size classes, but differ between size classes. In 2009, the commissioner's permit requirement was removed by BOF action and regulations adopted which included a registration deadline, logbooks, and catch reporting requirements.

The GHL for the Aleutian Island District is set roughly at 5% of the BSAI TAC. The state GHL can be adjusted according to recent state-waters harvest history when necessary. From 1995 to 2000 the fishery opened concurrently with the EEZ IFQ sablefish fishery. In 2001 the BOF changed the opening date of the state-waters fishery to May 15 so as to provide small vessel operators an opportunity to take advantage of potentially better weather conditions. From 1995 to 2000 all legal groundfish gear types were permissible during the fishery. Effective in 2001, longline, pot, jig and hand troll became the only legal gear types. Vessels participating in the fishery are required to fill out logbooks and processors are required to send the Department weekly processing reports.

The Southeast Alaska **sport fishery** for sablefish was regulated for the first time in 2009. Sport limits in 2010 were 4 fish per day, 4 in possession, with an annual limit of 8 fish applied to nonresidents only. A small number of sablefish were sampled during creel surveys in Southeast Alaska, indicating that recreational sablefish harvest was relatively small. Sablefish harvest was required to be reported in charter logbooks beginning in 2010.

The sablefish **sport fishery** in Southcentral Alaska was unregulated in 2010, with no bag, possession, or size limits. Port samplers throughout Southcentral Alaska encountered and sampled only three sablefish from the sport harvest.

d. Fisheries

In the **Southeast Region** the 2010 NSEI sablefish fishery opened August 15 and closed November 15. The 87 permit holders landed a total of 478 mt of sablefish. The fishery is managed by equal quota share; each permit holder was allowed 5.5 mt. The 2010 SSEI sablefish fishery opened June 1 and closed November 15. Twenty-six permit holders landed a total of 253 mt of sablefish, each with an equal quota share of 9.4 mt. In SSEI 24 permits were designated to be fished with longline gear and the remaining three fished with pot gear. One of the longline permits did not fish in 2010. (Contact Kristen Green).

In the **Central Region** the 2010 open access sablefish fishery in the Cook Inlet North Gulf District opened at noon July 15 and closed at noon September 7. Nine vessels harvested 25 mt. In 2009, new season dates adopted by the BOF for PWS sablefish were April 15 – August 31. The new season opening date, one month later than in previous years, was adopted to reduce the opportunity for orca depredation on hooked sablefish which predominately occurred prior to May 1. The 2010 PWS harvest totaled 96 mt (Contact Charles 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 by regulation 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% for trawl gear only, no bycatch is allowed for all other gear types. The 2010 Aleutian Island fishery opened on May 15, 2010. Additional requirements for the fishery include registration and logbook requirements. The GHL was set at 242 mt for the state managed fishery. The harvest from the 2010 Aleutian Islands sablefish fishery was 94 mt. The season remained open until the November 15 closure date (Contact Trent Hartill or Heather Fitch).

Sablefish were included in the Statewide Sport Fish mail survey questionnaire for 2010, but those estimates will not be available until September 2011. Charter operators reported (in logbooks) a guided sport harvest of about 3,927 sablefish in Southeast Alaska and 153 sablefish in Southcentral Alaska in 2010.

4. Flatfish

a. Research

There was no research on flatfish during 2010.

b. Stock Assessment

There are no stock assessments for flatfish.

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 other requirements. Trawl gear is limited to beam trawls, and mandatory logbooks are required, observers can be required, and there is a 20,000 pound weekly trip limit.

Within **Central Region** flatfish may be harvested in a targeted fishery only under the authority of a permit from the commissioner of ADF&G. The permit may stipulate fishing depth, seasons, areas, allowable sizes of harvested fish, gear, logbooks, and "other conditions" the commissioner deems necessary for conservation or management purposes.

There are no bag, possession, or size limits for flatfish (excluding Pacific halibut) in the recreational fisheries in Alaska. Harvest of flatfish besides Pacific halibut are not explicitly estimated by the SWHS and no information is collected in the creel surveys and port sampling of the recreational fisheries in Southcentral or Southeast Alaska. Flatfish are occasionally taken incidentally to other species and in small shore fisheries, but the recreational harvest is believed to be very small.

d. Fisheries

There has been almost no effort in the **Southeast** fishery for the past nine years, with no harvest reported for the 2008-2010 season. The Southeast flatfish trawl areas are also the sites of a shrimp beam trawl fishery. In the past most of the Southeast harvest was starry flounder. NMFS manages the flatfish fishery and harvest in the state waters of **Westward Region**. No flatfish harvest permits were issued in **Central Region** during 2010.

5. Pollock

State-managed pollock is limited to the Central Region and Aleutian Islands

a. Research

Pollock continue to be a dominant species in the **Central Region** ecosystem. Skipper interviews and biological sampling of **Central Region** commercial pollock deliveries during 2010 occurred in Seward and Kodiak. Sample data collected included date and location of harvest, species, length, weight, sex, and gonad condition. Otoliths were collected from most sampled fish. Homer office staff determined ages of pollock otoliths (Contact Elisa Russ).

Beginning in 1998, spatial patterns of genetic variation were investigated in six populations of walleye pollock from three regions: North America – Gulf of Alaska; North America – Bering Sea; Asia – East Kamchatka. The annual stability of the genetic signal was measured in replicate samples from three of the North American populations. Allozyme and mtDNA markers provided 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 consideration 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. This study was published in 2002 in the Fishery Bulletin (Olsen et al. 2002).
(Contact Bill Templin).

b. Stock Assessment

No stock assessment work was conducted on pollock in 2010 (Contact Dr. Ken Goldman).

c. Management

Prince William Sound pollock fishery regulations were amended by BOF action and for 2009 included a January 13 registration deadline, logbooks, catch reporting, check-in and check-out provisions, and accommodation of a department observer upon request. Prior to 2009 these requirements were stipulated as terms of a commissioner's permit. The Prince William Sound Inside District is divided into three 'sections" for pollock management: Port Bainbridge, Knight Island, and Hinchinbrook, with the harvest from any section limited to a maximum of 60% of the GHL. Additionally, the fishery is managed under a 5% maximum bycatch allowance that is further divided into five species or species groups. (Contact Charlie Trowbridge). For **Cook Inlet** directed fishing for pollock is managed under a "Miscellaneous Groundfish" commissioner's permit. However, due to pelagic trawl closures associated with Steller sea lion conservation measures no directed fishing has occurred in the Cook Inlet Area since 2000.

d. Fisheries

The 2010 **Prince William Sound** fishery opened on January 20 with a GHL of 1,651 mt. The Hinchinbrook section closed by emergency order at 9:00 p.m. February 25 while the Knight Island and Bainbridge sections closed by emergency order at midnight March 3. Total pollock harvest for all sections combined was 1,661 mt. Total bycatch was 20 mt, just over one percent of the GHL and was dominated by squid at 7.7 mt. (Contact Charlie Trowbridge).

6. Sharks

a. Research

In 2009, **Central Region** Commercial Fisheries Division began tagging all sharks with spaghetti-type tags. A research project on the reproductive biology of salmon sharks was initiated in the summer of 2010 with the goal of providing an accurate and precise estimate of the timing of reproductive activity (annual vs. biennial) and length-at-maturity via the examination of blood hormone concentrations. (Contact Dr. Ken Goldman)

The **Division of Sport Fish—Southcentral Region** collected harvest and fishery information on sharks through the groundfish harvest assessment program although no specific research objectives were identified. Few samples were collected in 2010, most from a modest salmon shark fishery in Prince William Sound. Interviews also provided estimates of the numbers of

salmon sharks and spiny dogfish kept and released by ADF&G statistical area (Contact Barbi Failor).

b. Stock Assessment

There is no stock assessment work being conducted on sharks in Central Region. (Contact Ken Goldman).

c. Management

The Alaska Board of Fisheries prohibited all directed commercial fisheries for sharks in 1998. In 2000 the BOF increased the bycatch allowance in **Southeast Region** for dogfish taken while longlining for other species to 35% round weight 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. However in 2004 the BOF amended Cook Inlet Area regulations to provide for a directed fishery for spiny dogfish in the Cook Inlet area under terms of a permit issued by the commissioner.

Also in 2000 the BOF prohibited the practice of "finning", requiring that all sharks 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.

Recreational fishing for sharks is allowed under the statewide Sport Shark Fishery Management Plan adopted by the BOF in 1998. The plan recognizes the lack of stock assessment information, the potential for rapid growth of the fishery, and the potential for over harvest, and sets a statewide daily bag limit of one shark and a season limit of two sharks of any species. Recreational demand for spiny dogfish remains low and they are widely considered a nuisance species. There is, however, a directed charter boat fishery for salmon sharks in Southcentral Alaska, primarily in Prince William Sound. Pacific sleeper sharks are occasionally caught but rarely retained.

d. Fisheries

The Department received no requests for permits to target spiny dogfish in Cook Inlet during 2010.

Estimates of **recreational shark harvest** in 2010 are not yet available from the Statewide Harvest Survey, but in 2009 an estimated 159 sharks of all species were harvested in Southeast Alaska and 237 sharks were harvested in Southcentral Alaska. The precision of these estimates is low; the Southeast estimate has a CV of 54% and the Southcentral estimate has a CV of 27%. The statewide charter logbook program also required reporting of the number of salmon sharks kept and released in the charter fishery. Charter anglers are believed to account for the majority of the recreational salmon shark harvest. The 2010 reported charter harvest from logbooks was 8 salmon sharks in Southeast Alaska and 19 salmon sharks in Southcentral Alaska.

7. Lingcod

a. Research

Beginning in the spring of 1996 and over the fourteen years since, in the **Southeast Region** 9,128 lingcod have been tagged and 455 fish recovered. Opportunistic tagging of 17 lingcod in Sitka Sound occurred during 2010. Length, sex and tagging location are recorded for all tagged fish. Dockside sampling of lingcod caught in the commercial fishery continued in 2010 in Sitka and Yakutat with over 920 fish sampled for AWL. Otoliths were sent to the ADU in Juneau for age determination. (Contact Kristen Green).

In the **Central Region**, skipper interviews and port sampling were conducted in Cordova, Whittier, Seward and Homer. Data obtained included date and location of harvest, length, weight, sex and age. Otoliths were sent to the ADU in Juneau for age determination. Gonad condition was generally not determined as nearly all fish were delivered gutted (Contact Elisa Russ).

Resurrection Bay was closed in 1993 to recreational and commercial fishing for lingcod to rebuild what was anecdotally believed to be a depleted stock. Central Region conducted a Resurrection Bay lingcod ROV survey in 2009 to estimate the abundance of legal size lingcod within the bay. This survey was conducted to serve as a benchmark for future assessments, potentially be correlated with other indices of abundance (e.g. standardized CPUE) to monitor changes in stock status, and potentially provide a basis for determining options for a limited but sustainable fishery. Analysis of these data was completed in 2010. This was a stratified random survey, stratified by habitat (high relief rugose rock, low relief rock, and soft substrates). Estimated lingcod density was 3,190, 1266, and 0 fish / km^2 for high relief rock, low relief rock, and soft substrates, respectively. The estimated abundance of legal size lingcod within the regulatory line defining Resurrection Bay was 51,433 fish (95% CI 21,115 – 81,771).

The rocky bank surrounding and extending to the south of outer Pye Island was mapped with multibeam sonar during a department survey in 2008. Seafloor habitats within the survey area were delineated and an ROV survey to estimate DSR and lingcod abundance and biomass was conducted there in May 2010. No analyses or population estimates have been completed since video reviews were only just completed. (Contact Mike Byerly or Dr. Ken Goldman).

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 2010 included Juneau, Sitka, Craig/Klawock, Wrangell, Petersburg, Gustavus, Elfin Cove, Yakutat, and Ketchikan. Length and sex data were collected from 1,203 lingcod in 2010, primarily from the ports of Sitka, Ketchikan, Craig, Gustavus, Elfin Cove, and Yakutat (Contact Mike Jaenicke).

The **Division of Sport Fish—Southcentral Region** continued collection of harvest and fishery information on lingcod through the groundfish harvest assessment program. Lingcod objectives include estimation of 1) the age, sex, and length composition of lingcod harvests by ports and 2) the geographic distribution of harvest by each fleet. A total of 921 lingcod were sampled from sport harvest at Seward, Valdez, Whittier, Kodiak, and Homer in 2010. These ports accounted for the majority of recreational lingcod harvest in Southcentral Alaska (Contact Barbi Failor).

b. Stock Assessment

The **Southeast Region** is not currently able to reliably estimate lingcod biomass or abundance. Lacking abundance estimates, and given the complex life history and behavior of lingcod, impacts to lingcod populations from fishing are difficult to assess. Analysis of catch per unit effort data (CPUE), in terms of fish per hook-hour for 1988–1998, showed that CPUE had declined between 21 to 62% in areas where a directed fishery and increased recreational catch had developed. Consequently the quota for lingcod was reduced in all areas in 2000. Commercial logbook data for the period 2002–2009 shows CPUE in fish per hook hour trending up since 2000 in CSEO but down from 2008. Fishery CPUE for 2010 is not yet available.

A lingcod stock assessment was not conducted in the **Central Region** in 2010. Population estimates from ROV surveys have not been incorporated into a stock assessment.

c. Management

Management of lingcod in **Southeast Alaska** is based upon a combination of guideline harvest ranges, season and gear restrictions. The state has management authority for lingcod in both state and federal waters. Regulations include a winter closure for all users except longliners between December 1 and May 15 to protect nest-guarding males. Guideline harvest limits were greatly reduced in 2000 in all areas and allocations made between directed commercial fishery, sport fishery, longline fisheries, and salmon troll fisheries. This was the first time sport catch was included in a quota allocation. The 27" minimum commercial 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. The directed fishery is limited to jig or dinglebar troll gear. In 2003 the Board of Fish established a super-exclusive directed fishery for lingcod in the IBS Subdistrict.

Regulations for the **Central Region commercial** lingcod fishery include open season dates of July 1 to December 31 and 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. In 1997, the BOF adopted a jig only gear requirement for the directed lingcod fishery in the Cook Inlet Area. Resurrection Bay, near Seward is closed to commercial harvest of lingcod. In 2009, a new BOF regulation permitted retention of lingcod in PWS waters following closure of the directed season.

No directed effort occurred for lingcod in the **Westward Region** during 2010. A large jump in the amount of incidental harvest in the bottom trawl fisheries occurred in 2008. In response, ADF&G reduced bycatch limits in 2009 from 20% to 5% and the department maintained the 5% limit in 2010. Bycatch harvest totaled 23 mt in 2007, 250 mt in 2008, 39 mt in 2009, and 41 mt in 2010. The majority of the harvest occurred in the Kodiak Area with a minor amount occurring in the Chignik Area.

In **Southeast Alaska**, the sport fishery for lingcod prior to 2000 had a open season of May 1 to November 30, and a region wide bag and possession limit of two per day, four in possession, with no size limits. Area-specific exceptions to this included: 1) The Pinnacles area near Sitka has been closed to sport fishing year-round for all groundfish since 1997, and 2) the nonresident sport anglers bag and possession limit for the Sitka Sound LAMP area was one per day, two in possession during 1997-2000.

Beginning in 2000, the open season has been set at May 16 to November 30. Sport harvests of lingcod in Southeast Alaska as of the year 2000 have been incorporated into a region wide lingcod management plan, which reduced GHLs for all fisheries (combined) in seven management areas, and allocated a portion of the GHL for each area to the sport fishery. Since 2000, harvest limits reductions, size limits, and mid-season closures have been implemented by emergency order in various management areas to ensure sport harvests do not exceed allocations.

In 2010, lingcod bag limits for all anglers were one fish per day, one in possession. There were no size limits for resident anglers. Throughout most of Southeast Alaska, nonresident anglers were allowed to keep only fish between 30 and 35 inches and fish 55 inches or longer. In the Yakutat area, nonresidents were allowed to retain fish between 30 and 40 inches or fish 55 inches or longer. Nonresidents were also constrained by a two fish annual limit. Seasons varied by area. (Contact Robert Chadwick).

Conservative harvest strategies were established in 1993 for recreational lingcod fisheries in **Southcentral Alaska** in light of the lack of quantitative stock assessment information. Resurrection Bay was closed to lingcod fishing year-round to rebuild the population, although no formal rebuilding plan was put in place. The season was closed region-wide from January 1 through June 30 to protect spawning and nest guarding lingcod. Daily bag limits in 2010 were 2 fish in all areas except the North Gulf, where the daily bag limit was one fish. All areas except Kodiak had a minimum size limit of 35 inches to protect spawning females (Contact Matt Miller and Tom Vania).

d. Fisheries

Lingcod are the target of a "dinglebar" troll fishery in **Southeast Alaska**. Dinglebar troll gear is power troll gear modified to fish for groundfish. Additionally lingcod are landed as significant bycatch in the DSR longline fishery (35% limit), bycatch in the other longline fisheries and as bycatch in the salmon troll fishery. At the 2009 Board of Fisheries meeting a regulation regarding lingcod bycatch was written such that managers in southeast can adjust the bycatch levels in- season to maximize the opportunity for current bycatch allocations to be met. For example, in years when the halibut catch limits are low the bycatch of lingcod can be set higher without the risk of going over the longline allocation. The directed fishery landed 109 mt of lingcod in 2010 and an additional 69 mt was landed as bycatch in other fisheries (60 mt in the halibut longline fishery and 9 mt in the salmon troll fishery).

Central Region commercial lingcod harvests have primarily occurred in the North Gulf District of Cook Inlet and PWS. In 2010, the Cook Inlet GHL was 24 mt and the PWS GHL was 15 mt. Lingcod harvests in 2010 totaled 10 mt in Cook Inlet and 24 mt in PWS. Approximately half of the lingcod harvest in Cook Inlet resulted from directed jig effort. However in PWS lingcod harvest resulted from bycatch to other directed (primarily halibut) longline fisheries. The Outside District of PWS closed at noon September 20 when the district GHL of approximately 11.5 mt total harvest was achieved. The Inside District remained open for the entire year (Contact Charlie Trowbridge).

No directed effort occurred for lingcod in the **Westward Region** during 2010. A large jump in the amount of incidental harvest in the bottom trawl fisheries occurred in 2008. In response,

ADF&G reduced bycatch limits in 2009 from 20% to 5%. Incidental harvest totaled 23 mt in 2007, 250 mt in 2008, and 39 mt in 2009. The majority of the harvest occurred in the Kodiak Area with a minor amount occurring in the Chignik Area.

Recreational lingcod harvest estimates for 2010 are not yet available from the statewide mail survey, but in 2009 an estimated 9,299 lingcod were harvested in Southeast Alaska while 22,877 lingcod were taken in Southcentral Alaska. The average estimated annual harvest for the most recent five-year period (2005-2009) was 15,173 fish in Southeast Alaska and 21,416 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 Southeast. 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. Most other groundfish species taken in state waters are taken as bycatch in fisheries for other groundfish and halibut. The State also has a regulation that requires that the bycatch rate of groundfish be set annually for each fishery by emergency order unless otherwise specified in regulation.

A commissioner's permit is required before a directed fishery may be prosecuted for skates. 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.

Skates may be harvested in a directed fishery within the **Central Region** only under the authority of a permit from the commissioner of ADF&G. The permit may stipulate fishing depth, seasons, areas, allowable sizes of harvested fish, gear, logbooks, and "other conditions" the commissioner deems necessary for conservation or management purposes. A directed fishery in the Prince William Sound Area for big and longnose skates was prosecuted under this authority in 2009 and 2010. Skates may also be retained as bycatch up to 20% during other directed fisheries for groundfish or halibut.

In 2009 Central Region received a capital budget increment of $55K to conduct a trial fishery for big and longnose skates in PWS. Fishery GHLs based upon trawl survey density data were used to set Inside District GHLs of 9 mt for big and 50 mt lb for longnose skates. Trawl survey density data were extrapolated based upon area to the Outside District and yielded GHLs of 13.6 mt and 68 mt for big and longnose skates. The fishery was announced with a registration deadline in order to gauge participation and commissioner's permits with stipulations for logbooks, reporting requirements and accommodation of a department observer were issued to 23 vessels. Management for the relatively small GHLs for big skate proved problematic in 2009 with one GHL exceeded by a single landing. Harvests of big skate totaled 21.4 mt and 37.6 mt from the Inside and Outside Districts in 2009. Longnose skate GHLs were not achieved in either district and harvest totaled 31.2 mt and 27.0 mt from the Inside and Outside Districts respectively. With enough funds remaining for a second year of skate fishing, the PWS fishery

reopened in 2010 on March 6, concurrent with the commercial halibut fishery, with GHLs similar to those in 2009 and similar permit stipulations except for a trip limit restriction on big skate of 2,500 lb per consecutive two-day period. Although the Inside District big skate GHL was achieved and fishing there closed March 21, no other GHLs were achieved and the Outside District and longnose skate in the Inside District closed April 30. Skate harvest in the 2010 directed fishery was 12 mt of big skate and 35 mt of longnose skate. (Contact Charlie Trowbridge)

For the directed skate fishery, data was collected through dockside sampling, onboard observing, and logbooks. In 2009, there was 18% observer coverage which increased to 56% in 2010. Over 2,000 combined skates were sampled for length, weight, and sex. In 2010, skates were additionally sampled for gonad condition and disc width. A total of 464 vertebrae samples were collected and analyzed for age determination for both years combined. A sub-sample of vertebrae from 2010 was sent to the NOAA Fisheries Narragansett Laboratory, Apex Predators Program, for additional histological sampling. During both 2009 and 2010, halibut comprised the greatest proportion of discarded bycatch. Big skate was the second largest component of discarded bycatch due to GHLs being achieved and implementation of big skate trip limits while fishermen continued to target longnose skate. (Contact Elisa Russ). Work on a "Developing Fisheries" policy, intended to reduce the potential for a fishery to escalate beyond management control has halted at present.

In the **Central Region**, skates may also be retained as bycatch up to 20% during other directed fisheries for groundfish or halibut. Bycatch harvest in 2010 of combined big and longnose skates in the **Prince William Sound Area** was 49 mt and 3 mt in the **Cook Inlet Area**.

In 2009, **Central Region** Commercial Fisheries Division began tagging all big, longnose and Aleutian skates greater than 70 cm total length with spaghetti-type tags. Starting in 2010, all skate species of all sizes were tagged on ADF&G surveys. (Contact Dr. Ken Goldman)

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 in Southcentral Alaska and creel surveys and port sampling in Southeast Alaska. Harvest estimates 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's Scientific and Statistical Committee has periodically reviewed the states estimation and projection methods, and the council has used the information in the design and analysis of regulations for the sport charter fishery (Contact Scott Meyer).

C. Other Related Studies

Staff in the **Central Region** continued the development of an Oracle database, currently named "Sedna", for historical multi-species large-mesh and small mesh trawl survey data. Though these surveys originated as Tanner crab and shrimp surveys many groundfish species are captured and in fact compose most of the catches in recent years. They therefore, represent a valuable tool for monitoring groundfish population trends and collecting biological data. These database projects are error-checking, reformatting, and consolidating survey data for all years so they can be captured in a standardized database format to facilitate convenient access for analyses and timely reporting. All data are being

additionally captured in a GIS for spatial analysis. The long-term goal is to have the database house all Central Region commercial fisheries survey and port sampling data in a GIS relational format.

The Department of Fish and Game manages 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 offshore waters.

In 1997 at the Southeast Groundfish meeting, the Board of Fisheries adopted a regulation that requires 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 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.

1. Dixon Entrance Area

Total removals (including those from test fishing) from the Dixon Entrance area (Alaska statistical areas 325431, 315431, 325401, and 315401) has dropped since last year due to a decline in sablefish removals from that area. The table below lists the catch by species group from 1988 through 2010 rounded to the nearest mt.

Year	# Permits	# Landings	DSR	Other Rock	Sablefish	Other	Total
1988	20	25	3	3	82	3	91
1989	8	7	1	1	20	0	22
1990	16	17	3	5	182	1	191
1991	24	21	6	12	150	2	170
1992	19	19	3	5	150	1	159
1993	27	26	6	14	232	1	253
1994	27	26	1	20	216	2	239
1995	21	18	0	20	137	0	157
1996	16	14	1	12	83	0	96
1997	37	30	1	18	103	0	122
1998	26	23	1	8	95	0	104
1999	23	24	0	7	71	0	78
2000	27	22	0	14	49	0	63
2001	23	29	1	14	86	0	101
2002	30	46	1	11	106	0	118
2003	29	44	8	12	89	2	111
2004	23	33	5	9	114	2	130
2005	23	26	Tr	9	138	Tr	148
2006	43	32	1	12	167	1	181
2007	32	31	Tr	19	165	1	184
2008	27	32	1	16	101	Tr	118
2009	29	34	1	18	132	2	153
2010	29	35	2	17	107	2	128

2. 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 was 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. Two large volcanic pinnacles that have a diversity and density of fishes not seen in surrounding areas dominate the Edgecumbe Pinnacles Marine Reserve. 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 prevents 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.

3. 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** several projects are funded through test fish funds (total receipt authority is approximately 600k), notably the sablefish longline assessments and mark-recapture work, the king crab survey, the herring fishery and some salmon assessments.

4. GIS

The ADF&G Division of Commercial Fisheries Headquarters Office is using ArcGIS 9.2 for general map production, project planning and spatial analysis. Basemaps are maintained in ArcGIS format. Statistical area charts have been updated using ArcGIS 9.0 and the NAD83 datum. All data and map requests are made in NAD83 (the State of Alaska standard) or will be converted into NAD83, if possible. Final output and all metadata will be in NAD83. Users in other divisional and area offices use ArcGIS 8, ArcView 3.x, and MapInfo 9.0 for their GIS work.

Hardcopy and digital groundfish and shellfish statistical area charts are available. Digital are available in Abode PDF and can be viewed or downloaded at http://www.cf.adfg.state.ak.us/geninfo/statmaps/charts.php . (Contact Mike Plotnick)

5. Logbooks

In 1997 logbooks became mandatory for all state-managed commercial fisheries in Southeast Alaska. Logbooks for rockfish and lingcod had been mandatory for a number of years. All usable longline and jig logbook data through 2010 has been entered.

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

SE	Longline				Jig/dinglebar			
Year	DSR	Pacific cod	Slope Rock	Sablefish (includes pot gear)	Lingcod	Black rockfish	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			215			
1996	261	8			252	31	6	
1997	204	98	4	466	177	64	8	1
1998	177	135	15	552	153	70	3	4
1999	165	223	9	405	89	21	1	1

2000	153	97	4	421	153	30		
2001	128	48	2	332	44	2	2	
2002	143	27	5	276	53	31	4	0
2003	115	53	closed	298	54	37	2	closed
2004	139	97	closed	283	40	23	3	closed
2005	17	53	closed	249	52	23	2	closed
2006	8	65	closed	241	97	8	0	closed
2007	2	83	closed	200	115	2	0	closed
2008	27	113	closed	190	91	2	0	closed
2009	37	87	closed	164	152	3	0	closed
2010	30	78	closed	159	104	5	0	closed

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. In 2010, catch and harvest were reported for each individual angler, along with their name and fishing license number (if required). Other data collected for each vessel trip included port of landing, statistical area fished, effort for salmon and bottomfish, and harvest and/or release (in numbers) of Chinook, coho, sockeye, other salmon, halibut, pelagic rockfish, yelloweye rockfish, other rockfish, lingcod, sablefish, and salmon sharks. The Sport Fish Division conducted a three-year evaluation of logbook data, including comparisons to an independent end-of-season survey of anglers, to estimates from the statewide harvest survey, and to data from onsite interviews. This evaluation was presented to the North Pacific Fishery Management Council in October and December 2009.

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Web Pages

ADF&G Home Page: http://www.adfg.alaska.gov
Commercial Fishing home page:
http://www.adfg.alaska.gov/index.cfm?adfg=fishingCommercial.main
News Releases: http://www.adfg.alaska.gov/index.cfm?adfg=newsreleases.main

Sport Fishing home page: http://www.adfg.alaska.gov/index.cfm?adfg=fishingSport.main
Age Determination Unit Home Page: http://tagotoweb.adfg.state.ak.us/
Region 1 Groundfish Home Page:
http://www.cf.adfg.state.ak.us/region1/finfish/grndfish/grndhom1.php
Region II Groundfish Home Page:
http://www.cf.adfg.state.ak.us/region2/finfish/grndfish/grndhom2.php
ADF&G Groundfish Overview Page:
http://www.adfg.alaska.gov/index.cfm?adfg=CommercialByFisheryGroundfish.main
Commercial Fisheries Entry Commission: http://www.cfec.state.ak.us/
State of Alaska home page: http://www.alaska.gov
Gene Conservation Laboratory Home Page:
http://www.adfg.alaska.gov/index.cfm?adfg=fishinggeneconservationlab.main
Demersal shelf rockfish stock assessment document:
http://www.afsc.noaa.gov/refm/docs/2010/GOAdsr.pdf

Adobe PDF versions of groundfish charts can be viewed or downloaded at http://www.adfg.alaska.gov/index.cfm?adfg=CommercialByFisheryGroundfish.groundfishmaps

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APPENDIX I. ALASKA DEPARTMENT OF FISH AND GAME PERMANENT FULL-TIME GROUNDFISH STAFF DURING 2010.

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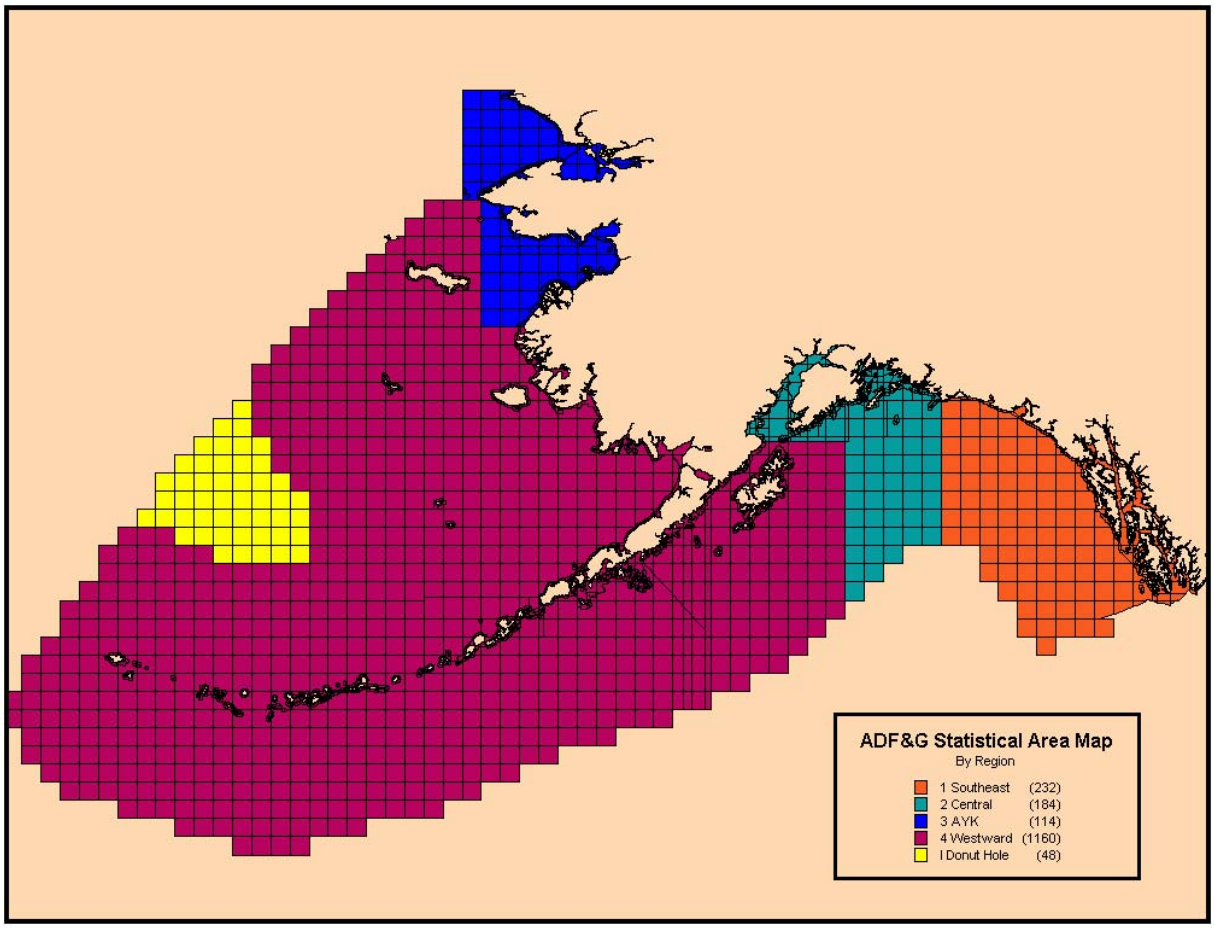
Appendix II. Map Depicting State of Alaska Commercial Fishery Management Regions.



Appendix III. Tissue samples of *Sebastes* species and pollock collected for genetic analyses and stored at Alaska Department Fish and Game, Gene Conservation Laboratory, Anchorage. Species, sampling location year collected, sample size, and tissue type are given.

Species	Location	Year	Sample size	Tissues
Yelloweye rockfish *Sebastes ruberrimus*				
	Gravina,Danger,Herring	1991	27	muscle, liver, eye
	Knight Is./Naked Islands area	1998	100	fin
	Whittier	2000	97	fin
		2000	50	fin
	Kachemak Bay	1999	58	fin
	Kodiak Island	1999	115	fin
	Resurrection Bay	1999	100	fin
	Fairweather Grounds	1999	100	fin
	Flamingo Inlet	1998	46	fin, larvae
	Tasu Sound	1998	50	fin
	Topknot	1998	49	fin
	Triangle Island	1998	63	fin, larvae
	Sitka	1998	49	fin
	SE Stat Areas 355601, 365701 (CSEO)	1999	100	fin
Black rockfish *S. melanops*				
	Carpa Island	1998	40	fin
	Castle Rock near Sand Point	1999	60	fin
	Akutan	1999	100	fin
	Dutch Harbor	2000	6	fin
	Chignik	2000	100	fin
	Ugak Bay, Kodiak Island	1997	100	muscle,liver,heart,eye
	Eastside Kodiak Is.: Ugak and Chiniak Bays	1998	100	fin
	Southwest side Kodiak Island	1998	86	fin

Species	Location	Year	Sample size	Tissues
	Westside Kodiak Island	1998	114	fin
	Kodiak Island	1996	2	muscle,liver,heart,eye
	North of Fox Island	1998	24	fin
	Resurrection Bay - South tip Hive Island	1997	82	muscle,liver,heart,eye,fin
	Yakutat Bay	2003	130	fin
	Valdez	2000	13	fin
		2001	50	fin
	Whittier	2000	16	fin
		2001	93	fin
	Oregon - Pacific Northwest	1999	50	muscle, liver, heart
	Washington - Pacific Northwest	1998	20	fin
	Sitka	1998	50	fin
	SE Stat Areas 355631, 365701 (CSEO)	1999	83	fin
	Sitka Sound Tagging study	1999	200	fin
Dusky rockfish *S. ciliatus*				
	Sitka	2000	23	liver, fin
		2000	23	fin
	Sitka Black RF Tagging study	1999	15	muscle,liver,heart,eye
	Harris Bay - Outer Kenai Peninsula	2002	37	muscle
	North Gulf Coast - Outer Kenai Peninsula	2003	45	fin
	Resurrection Bay	1998	3	fin
	Eastside Kodiak Is.: Ugak, Chiniak, Ocean Bays	1998	100	muscle,liver,heart,eye
	Kodiak Island	1997	50	muscle,liver,heart,eye
Walleye pollock *Theragra chalcogramma*				
	Exact location unknown; see comments	199	402	fin

Species	Location	Year	Sample size	Tissues
		7		
	Bogoslof Island	1997	120	muscle,liver,heart
		1998	100	muscle
		2000	100	muscle,liver,heart
	Eastern Bering Sea	1998	40	muscle,liver,heart
	Middleton Island	1997	100	fin
		1998	100	muscle,liver,heart
		2000	100	muscle,liver,heart
	NE Montague/E Stockdale	1997	100	fin
	Orca Bay, PWS	1997	100	fin
	Prince William Sound	2000	100	muscle,liver,heart
	Port Bainbridge	1997	100	fin
		1998	100	muscle,liver,heart
	PWS Montague	1999	300	heart
	Eastern PWS	1999	94	heart
	Resurrection Bay	1998	120	fin
	Kronotsky Bay, E. Coast Kamtchatka	1999	96	muscle,liver,heart,eye,fin
	Avacha Bay	1999	100	
	Shelikof Strait	1997	104	muscle,liver,heart,eye,fin
		1998	100	muscle,liver,heart
		2000	100	muscle,liver,heart