STATE OF ALASKA
GROUNDFISH FISHERIES

ASSOCIATED INVESTIGATIONS IN 2015

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

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I. 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 nautical 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 (DSR) in federal waters east of 140° W. longitude. The North Pacific Fisheries Management Council (Council) took action in 1997 to remove black and blue rockfish from the GOA FMP. In 2007 the dark rockfish was removed from both the GOA and the Bering Sea and Aleutian Islands (BSAI) FMP. Thus in these areas the state manages these species in both state and federal waters. The state also manages the lingcod resource in both state and federal waters of Alaska. The state manages some groundfish fisheries occurring in Alaska waters in parallel with NOAA Fisheries, adopting federal seasons and, in some cases, allowable gear types as specified by NOAA Fisheries. 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 (EEZ) equidistant line boundary in Dixon Entrance north and westward to 144° 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 staff is located in Sitka, Juneau, and Petersburg. Sitka staff is comprised of a fishery biologist, one full-time fishery technician, and a seasonal technician. Staff in Juneau includes the project leader and two full time fishery biologists, and Petersburg staff contains a fishery biologist and a seasonal fishery technician. In addition, the project provides support for port samplers in Ketchikan to allow sampling of groundfish landings at this port. The project also receives biometric assistance from ADF&G 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 in federal waters for demersal shelf rockfish (DSR), black, blue, and dark rockfishes, and lingcod. 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 Council Gulf of Alaska Groundfish Plan Team and produces the annual stock assessment for DSR for consideration by the Council.

Project activities center around fisheries monitoring, resource assessment, and in-season management of the groundfish resources. In-season management decisions are based on data collected from the fisheries and resource assessment surveys. Primary tasks include fish ticket collection, editing, and data entry for both state and federally-managed fisheries; dockside sampling of sablefish, lingcod, Pacific cod, and rockfish landings; and logbook collection and data entry. Three resource assessment surveys and a marking survey were conducted in 2015. The ADF&G vessel the R/V *Medeia* is home ported in Juneau and is used to conduct the biennial sablefish marking survey, which was conducted in 2015.

b. Central Region

The **Central Region** groundfish staff is headquartered in Homer and consists of a regional groundfish/shellfish management biologist, a regional groundfish/shellfish research project leader, a groundfish port sampling and age reading coordinator, who also serves as an assistant area management biologist, a groundfish fish ticket processing and data analysis position, two groundfish/shellfish research biologists, one GIS analyst, three to four seasonal technicians, and one seasonal commercial groundfish sampler, who also serves as the primary groundfish age reader. An assistant area management biologist and a seasonal commercial groundfish sampler are also located in Cordova and a seasonal groundfish sampler in Seward. Regional support is located in Anchorage. The regional groundfish management biologist serves as a member of the Council's Gulf of Alaska Groundfish Plan Team, and the research project leader serves on the Council's Scallop Plan Team and as a member of the Kasitsna Bay Lab Science Board. The age reading coordinator is the current Chair of the Committee of Age Reading Experts (CARE), a Working Group of the Technical Subcommittee (TSC). The R/V *Pandalus*, home ported in Homer, and the R/V *Solstice,* in Cordova, conduct a variety of groundfish research activities in Central Region waters.

Groundfish staff responsibilities include research and management of groundfish species harvested in state waters of **Central Region,** which includes Cook Inlet (CI) and Prince William Sound (PWS) areas, as well as in federal waters for black, blue, and dark rockfishes, and lingcod. Within Central Region, groundfish species of primary interest include sablefish, Pacific cod, walleye pollock, lingcod, rockfishes, skates, sharks, and flatfishes. Data are collected through commercial groundfish sampling, fishermen interviews, logbooks, onboard observing, and through ADF&G trawl, pot and remotely operated vehicle (ROV) surveys. Commercial harvest information (fish tickets) is 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 entered into local databases to provide additional information, including catch composition, catch per unit effort, depth, and location 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* hail from 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 15,000 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 interviews and biological data collections from commercial groundfish landings; and a number of research projects. In addition, the Westward Region has a member on the Council Bering Sea/Aleutian Island Groundfish Plan Team (Dave Barnard) and the Gulf of Alaska Groundfish Plan Team (Mark Stichert).

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 ADF&G statewide AKFIN contract and the PSMFC sponsored AKFIN Support Center (AKFIN-SC) in Portland, Oregon. The ADF&G has primary responsibility for the collection, editing, maintenance, analysis, and dissemination of these data and performs this responsibility in a comprehensive program.

The overall goal of ADF&G's AKFIN program is to provide accurate and timely fishery data that are 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 related to the groundfish fisheries 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 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;

3) to provide the support mechanisms needed to collect, store, and report commercial groundfish harvest and production data in Alaska;
4) to integrate existing fishery research data into secure and well maintained databases with consistent structures and definitions;
5) to increase the quality and accuracy of fisheries data analysis and reporting to better meet the needs of ADF&G personnel, AKFIN partner agencies, and the public, and to make more of this information available via web-access while maintaining the department's confidentiality standards;
6) to provide GIS services for AKFIN fishery information mapping to ADF&G Division of Commercial Fisheries personnel and participate in GIS and fishery data analyses and collaboration with other AKFIN partner agencies; and
7) to provide internal oversight of the AKFIN contract between the ADF&G and the PSMFC.

Groundfish species include walleye pollock, Pacific cod, sablefish, skates, various flatfish, various rockfish, Atka mackerel, lingcod, sharks, and miscellaneous species.

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 species landed. Age determination is 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. In addition, the Gulf of Alaska Groundfish FMP and the Bering Sea and Aleutian Islands Groundfish FMP require the collection of groundfish harvest data (fish tickets) in the north Pacific. The AKFIN program is necessary for management and for the analytical and reporting requirements of the FMPs.

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; fisheries data collection and reporting; 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 (NOAA Fisheries, both the Alaska Regional office and the Alaska Fishery Science Center), the Council, 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 (BOF), NOAA Fisheries, Council 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.

Groundfish fishery milestones for this ongoing ADF&G AKFIN program are primarily the annual production of catch records and biological samples. In calendar year 2015, ADF&G AKFIN personnel processed 17,538 groundfish fish tickets, collected 26,612 groundfish biological samples and measured 19,502 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 personnel 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 20152015

ADF&G Region	
1 - Southeast	3,330
2 - Central	2,416
4 – Westward (Kodiak, AK Pen.)	10,708
4 – Westward (BSAI)	1,084
Total	17,538

Groundfish Biological Data Collection - Calendar Year 2015

ADF&G Region	AWL Samples Collected	Age Estimates Produced by Regional Personnel	Age Estimates Produced by the Age Determination Unit
1 - Southeast	4,091	none	10,465
2 - Central	14,325	1,230	2,274
4 - Westward	8,196	5,533	N/A
Total	26,612	6,763	12,739

Interagency Electronic Reporting System (Contact Gail Smith).

ADF&G 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 Headquarters and regional staff via the State of Alaska wide-area network. Data are transferred annually to the Commercial Fisheries Entry Commission, where additional license and value information is merged with all fish ticket records. Once completed, the data are provided to the Alaska Fisheries Information Network (AKFIN) support center, then summarized and made available to Pacific Fisheries Information Network (PacFIN).

Beginning in 2001, the agencies tasked with commercial fisheries management in Alaska (ADF&G, NOAA Fisheries, IPHC) began development of consolidated landing, production, and IFQ reporting from a sole source – the Interagency Electronic Reporting System (IERS). The goal is to move all fisheries dependent data to electronic reporting systems. The web-based reporting component of this system is ***eLandings.*** 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 groundfish and salmon tender vessels. The application and the landings reports are stored on a portable thumb drive and are 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 teamhave implemented an electronic logbook application, ***eLogbook***, currently used by groundfish catcher processors and longline catcher vessels. The ***eLogbook*** will be expanded to be used for all federal groundfish and crab catcher vessels, in the near future. The IERS has been in successful operation in Alaska's commercial fisheries since August 2005. To date, more than 500,000 landing reports have been submitted to the eLandings repository database.

Our approach, throughout this project, has been staged implementation which allows a small staff to successfully manage this ambitious project. Salmon fisheries are more diverse and seasonal than groundfish and crab fisheries. The ADF&G will always support conventional, paper-based reporting for smaller salmon buyers and processors. November 2015, the ADF&G adopted a regulation to require larger seafood processors to use the tLandings application for all tendered salmon. All tendered groundfish must be reported using the tLandings application, as well. We expect 70 percent of all salmon landings to be submitted electronically in 2016. Statewide shellfish and herring fisheries will be addressed in 2017.

The IERS features include electronic landing and production reports, real time quota monitoring, immediate data validation, and printable (.pdf) fish ticket reports. The IERS provides processors with web-based electronic catch and production data extraction using an XML output. ADF&G 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. During 2015, the IERS recorded more than 155,002 landing reports in crab, groundfish and salmon fisheries.

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

In August 2015, the IERS system was in place for ten years. Given the tenure of this innovative reporting system, it was appropriate for the interagency managers to coordinate an evaluation and review of the IERS system with an emphasis on the costs and benefits to agency and industry stakeholders. The report from this analysis is available at: https://elandings.atlassian.net/wiki/display/tr/Review+of+IERS+with+an+Emphasis+on+Costs+and+Benefits+to+Stakeholders

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, tLandings and eLogbook 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 GCI, an Alaska based telecommunications company. IFQ reporting support is provided by the NOAA Fisheries Data Technicians.

Landing and production data are submitted to a central database, 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 vessel operators.

Detailed data are distributed to the State of Alaska Commercial Fisheries Entry Commission (CFEC) annually. As outlined in State of Alaska statue, 16.05.815, detailed groundfish data are available to the NOAA Fisheries-Alaska regional office from the eLandings repository database. The AKFIN Support Center receives groundfish data on a monthly schedule, which is summarized and provided to the Pacific States Fisheries Information Network (PACFIN). 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 Council, NOAA Alaska Science Center staff and summarized data to 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 BOF, the 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 Mark, Tag, and Age (MTA) Laboratory's Age Determination Unit (ADU) is the statewide groundfish and invertebrate age reading program based out of Juneau, AK. The ADU is responsible for providing age data support to regional commercial fisheries programs to monitor population health, assess stock size and growth, and research species life history. The ADU also is responsible for monitoring and improving the quality of age data through precision testing of production data and continual training of age readers. During 2015, the ADU received 7,442 otolith sets from central and southeast Alaska commercial and survey sampling (representing 7 groundfish species). The ADU distributed 12,742 ages to region managers, including data from samples received in previous years but processed in 2015. Age data quality is assessed through precision monitoring using additional, independent estimates. A random 30% of specimens and reads with outlying fish and otolith size-at-age are selected for precision testing (data are compared to estimated ranges from growth models; otolith measurements are described below). Discrepancies between precision tests and original ages are resolved through development of independent age estimates by the disputing readers. During 2015, quality control procedures resulted in an additional 8,592 age estimates. Personnel learn to interpret seasonal banding patterns through training with experienced age readers and independent reading of preprocessed age structures. Trained personnel also continue to calibrate on preprocessed structures to insure consistency of age estimates. Training and calibration procedures resulted in an additional 2,614 age estimates. Given production, quality control, and training procedures, the ADU recorded 10,803 groundfish ages.

Correlations have been found between fish length, otolith morphometrics, and age. The ADU collects otolith measurements and uses them to identify and resolve age estimation, specimen sequence, data entry, and species identification errors. During processing, otolith length, height, and weight are recorded from a minimum of one age structure per fish (18,151 otoliths in 2015, representing 14 groundfish species). To identify possible age estimation errors, the ADU compares fish length, otolith weight, and age to estimated fish and otolith size-at-age ranges for lingcod, yelloweye rockfish, rougheye rockfish, shortraker rockfish, and sablefish. Estimated sizes-at-age were developed from von Bertalanffy and exponential growth models, and reasonable error ranges per size were entered into a database table. To increase quality control efforts, the ADU recently developed estimated size-at-age ranges for central Alaska shortspine thornyhead fish length and otolith weight.

To ensure consistency of age criteria across programs, the ADU exchanged specimens and data, attended workshops, and presented research through the Committee of Age Reading Experts (CARE; Working Group of the TSC) in 2015. The ADU participated in a lingcod otolith age comparison and submitted a section on lingcod otolith pattern interpretation for addition to the CARE manual. The ADU also submitted updates to the sablefish pattern interpretation section of the manual and carried out additional analysis of otolith sizes of one-year-old sablefish for the CARE sablefish working group. ADU personnel also attended the 2015 CARE meeting and crustacean age workshop in Seattle, WA. During the meeting, personnel calibrated with other agencies on sablefish, lingcod, shortraker, and yelloweye rockfish pattern criteria. Personnel also presented on the ADU's use of fish and otolith measurements in quality control procedures,

preliminary evaluation of multispecies bomb radiocarbon activity data for potential age validation, and measurements of otolith weight fluctuation due to drying and storage.

The ADU is funded by State of Alaska, AKFIN, and special project support. In fiscal year 2015 and 2016, approximately 60% was provided by the State of Alaska, 30% by AKFIN, and 8% from a research grant. During 2015, the ADU employed five people (approximately 50 man months) to age, process samples, enter data, maintain sample archives, measure samples, and complete other support tasks for both groundfish and invertebrates.

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

ADF&G manages all sport groundfish fisheries within the internal waters of the state, in coastal waters out to three miles offshore, and throughout the EEZ. The Alaska BOF 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 that stipulate that states may regulate fisheries that are not regulated under a federal fishery management plan or other applicable federal regulations. No sport 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 sport fishery. Statewide data collection programs include an annual mail survey to estimate overall harvest (in number of fish) of halibut, rockfishes (all species combined), lingcod, Pacific cod, sablefish, 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 or responds to federal data requests and provides scientifically-based advice for assessment and management of halibut and groundfish.

Regional programs with varying objectives address estimation of sport 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.

a. Southeast Region Sport Fish

The Southeast Region extends from the EEZ boundary in Dixon Entrance north and westward to Cape Suckling, at approximately 144^{o} W. longitude. Regional staff in Douglas coordinates a data collection program for halibut and groundfish in conjunction with a regionwide Chinook salmon harvest studies project. The project leader, the project biometrician, and the project research analyst are based in Juneau. Beginning in 2014, the Area Management Biologists in Yakutat, Juneau, Sitka, Petersburg, Ketchikan, and Craig were responsible for the onsite daily supervision of the field technicians. 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 rockfish lengths and species composition; halibut length; lingcod length and sex; and sablefish length. No otoliths or other age structures were collected. Data summaries were provided to the Alaska BOF, other ADF&G staff, the public, and a variety of other agencies such as the Council, IPHC and NOAA Fisheries.

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 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. 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, sharks, sablefish, and Pacific cod, and anglers and charter boat operators were interviewed for fishery performance information. All age reading was done in Homer, and the staff members are active participants in CARE. Seasonal technicians collected data from the sport harvest at seven major ports in the region, and two of them read all rockfish and lingcod age structures. Halibut otoliths were collected from the harvest and were forwarded to the IPHC for age reading.

Southcentral Region staff is responsible for management of groundfish fisheries in state and federal waters. The lack of stock assessment information for state-managed species has prevented 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. Stock status is evaluated by examining time series data on age, size, and sex composition. The lack of stock assessments, coupled with increasing effort and harvest in several groundfish sport fisheries, accentuate the need for developing comprehensive management plans and harvest strategies.

Typical duties included providing sport halibut harvest statistics to IPHC and Council, assisting in development and analysis of the statewide charter logbook program and statewide harvest survey, providing information to the Alaska BOF, advisory committees, and local fishing groups, drafting and reviewing proposals for sport groundfish regulations, and dissemination of information to the public.

IV. Review of Agency Groundfish Research, Assessment and Management

A. Hagfish

1. Research

There was no research on hagfish during 2015

2. Assessment

There are no stock assessments for flatfish.

3. Management

A commissioner's permit is required before a directed fishery may be prosecuted for hagfish. This permit may restrict depth, dates, area, and gear, establish minimum size limits, and require logbooks and/or observers, or any other condition determined to be necessary for conservation and management purposes. In 2015, one commissioner's permit was submitted for directed fishing of hagfish in **Southeast Region**; however, no fishing occurred for the permit.

4. Fisheries

There was no directed fishery for hagfish in 2015. Currently in the **Westward**, **Central**, and **Southeast Regions** hagfish are allowed up to 20% as bycatch in aggregate with other groundfish during directed fisheries for groundfish.

B. Dogfish and other sharks

1. Research

In 2009, **Central Region** Commercial Fisheries Division began tagging all sharks with spaghetti-type external tags, but discontinued that work after the 2012 field season. A recent collaboration between ADF&G and NOAA Fisheries staff resulted in the publication of a paper strongly indicating that salmon sharks have a biennial reproductive cycle and a gestation period of no longer than 10 months (Conrath et al. 2014). Another research project on the reproductive biology of salmon sharks via blood hormone concentrations, which was initiated in the summer of 2010, continues with the goal of providing more precise information on the timing and frequency of reproductive activity. A research project examining the energetics of salmon sharks was initiated in the summer of 2012, which includes the concurrent application of temperature/depth transmitters and accelerometers. The department hopes to continue that work in 2017. A collaborative effort led by the National Institute of Polar Research in Japan with collaborators at ADF&G, the University of California at Santa Barbara, the Institute for Ocean Conservation Science at Stony Brook University and the Scottish Oceans Institute's School of Biology at the University of St Andrews, has resulted in a forthcoming publication on the ecological significance of endothermy in fishes (Contact Dr. Kenneth J. 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. Two salmon sharks were reported harvested by interviewed anglers in 2015, and both fish were measured. Nineteen spiny dogfish were reported harvested by interviewed anglers in over 14,900 angler-days of effort. Nine length measurements were obtained from spiny dogfish in 2015. Interviews also provided estimates of the numbers of salmon sharks and spiny dogfish kept and released by ADF&G statistical area (Contact Barbi Failor).

2. Assessment

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

3. Management

The Alaska BOF prohibited all directed commercial fisheries for sharks in 1998. In 2000, the BOF increased the commercial 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 set net fishery in Yakutat. This action was an effort to minimize waste of dogfish in these fisheries and to encourage sale of bycatch. In **Central Region**, bycatch had been set by the maximum allowable retention amount in regulation at 20% of the round weight of the directed species on board a vessel; however, beginning in 2014, allowable bycatch levels were set at 15% by emergency order. 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 Commissioner's permit. Directed fishing for dogfish is also allowed in Southeast Alaska under the terms of a Commissioner's permit but no permits have been issued in recent years.
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.

Sport 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 except spiny dogfish which have a daily bag limit of five. Sport demand for sharks continued to be low in 2015.

4. Fisheries

Sharks (which include spiny dogfish) can be harvested as bycatch with limits to target species in Cook Inlet and PWS. Commissioner's permits can also be issued but no applications were received in 2015 in the **Central** or **Southeast Region**. In Cook Inlet, there was no harvest of spiny dogfish in 2015 and in PWS 0.3 mt was harvested.

Sport shark harvest in 2014 was estimated at 748 sharks of all species in Southeast Alaska and 1,353 sharks in Southcentral Alaska. The precision of these estimates was low; the Southeast estimate had a CV of 57% and the Southcentral estimate had a CV of 44%. 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 sport salmon shark harvest. The 2014 reported charter harvest from logbooks was 15 salmon sharks in Southeast Alaska and seven salmon sharks in Southcentral Alaska.

C. Skates

1. Research

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. From 2010 through 2013, all skate species of all sizes were tagged on ADF&G surveys. In addition to ADF&G's interest in skates, tagging was also in support of a UAF doctoral students work (Contact Dr. Kenneth J. Goldman).

2. Assessment

There are no stock assessments for skates.

3. Management

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 to be necessary for conservation and management purposes.

4. Fisheries

Currently in the **Central Region**, skates are harvested as bycatch and had been allowed up to 20% during other directed fisheries for groundfish until that allowable amount was reduced to 15% in 2014 and set by emergency order. A directed fishery in the Prince William Sound Area for big and longnose skates was prosecuted under the authority of a Commissioner's permit in 2009 and 2010. However, the fishery was deemed unsustainable, and no permits were issued thereafter. The permit stipulated fishing depth, seasons, areas, allowable sizes of harvested fish, gear, and logbooks. In the Cook Inlet Area, big and longnose skate harvest as bycatch was 74.4 mt in 2015, a large increase from 24.4 mt in 2014. In PWS, skate harvest was 121.8 mt in 2015, more than twice the amount harvested in 2014, 54.6 mt. Because bycatch limits are set as a percentage of the targeted species, harvest levels of the target species can affect amount of bycatch that are legally harvested. Retention of big skate incidental catch was closed by emergency order in both Cook Inlet and PWS on February 11, 2015 in response to the federal CGOA closure due to the TAC being achieved.

D. 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.

1. Research

In the **Central Region**, skipper interviews and biological sampling of commercial Pacific cod deliveries from Prince William Sound (PWS) and Cook Inlet (CI) area during 2015 occurred in Seward, , and Homer. Sample data collected included date and location of harvest, species, length, weight, sex, and gonad condition. Otoliths were collected from approximately 20% sampled fish. Data is provided to National Marine Fisheries Service (NMFS) for use in stock assessment (Contact Elisa Russ).

The **Westward Region** discontinued the cod-tagging program in 2011 that was initiated in 1997 in the Central, Western, and Eastern Gulf of Alaska. Of the 18,529 tagged cod released, a total of 1,272 were recaptured, a tag recovery rate of 6.86%. Tagged cod continue to be captured from earlier years, with 3 recovered in 2015. Fish spent from 1 to 2,503 days (6.86 years) at liberty. While 72% of Pacific cod were recovered within 0.6 – 30 km of their tagging location, much longer recapture distances have occurred. A total of 12 fish were recaptured more than 300 km from their tagging location, the maximum distance recorded was 614 km. The relatively small number of long distance recaptures show movement of cod occurring from the Shumagin Islands and Unalaska into the Bering Sea, the Alaska Peninsula to Kodiak waters, and several fish tagged in Kodiak waters were recovered in Cook Inlet.

2. Assessment

No stock assessment programs were active for Pacific cod during 2014.

3. Management

Regulations adopted by the Alaska BOF 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 (NSEI) Subdistrict and the Southern Southeast Inside (SSEI) Subdistrict. The GHR was based on average historic harvest levels rather than on a biomass-based acceptable biological catch (ABC) estimate. This fishery has the most participation in the winter months, and in-season management actions such as small area closures are implemented to spread out the fleet and reduce the risk of localized depletion. 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 BOF 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. State-waters fishing seasons were set to 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. However, in 2011 the BOF adjusted state-waters seasons in Prince William Sound (PWS) for pot gear and jig gear to open 24 hours following the closure of the initial federal season and for longline gear in PWS to open seven days following the initial federal season closure or concurrent with the individual fishing quota (IFQ) halibut season opening date, whichever occurs later. 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. Guideline harvest levels (GHL) are allocated by gear type; however, the one exception was longline gear in PWS until 2014. In 2011, the BOF adopted thresholds for PWS whereas longline gear will close when 85% of the GHL is reached and pot gear will close when 90% of the GHL is reached. Further changes were implemented in 2014 making allocation simpler, 85% of the GHL can be harvested by longline gear and 15% is allocated to mechanical jigging machine and hand troll and groundfish pot gear with a step up and step down provision.

The Council established sector allocations for the federal Central Gulf of Alaska (CGOA) Pacific cod fisheries implemented in 2012. The Council's action established unique Pacific cod harvest allocations for pot, jig, trawl, and longline gear vessels. Beginning in 2012, the federal/parallel Pacific cod season for each federal gear sector was prosecuted independently of other Pacific cod federal gear sectors, resulting in staggered federal season closure dates. Prior to federal sector allocations, all gear types competed for federal/parallel Pacific cod during a single derby-style fishery. In order to coordinate state-waters Pacific cod fisheries a BOF meeting was held in October 2011 to adopt or amend regulations anticipating these federal changes. In most cases, starting in 2012, state-waters fisheries opened independently for each gear type.

In October 2011, the BOF held a special meeting to coordinate state-managed Pacific cod fisheries with changes occurring in the federal fisheries due to the implementation of gear sector splits (differential allocations of the TAC by gear type), and adjust Pacific Cod Management Plans and related regulations accordingly. The BOF adopted regulatory changes to align the parallel seasons with the federal seasons for each legal gear type. In PWS, the parallel longline season was aligned with the federal catcher vessel less than 50 feet overall length (OAL) hook-and-line gear sector. Different parallel season closures by gear type resulted in different seasons for each gear type in the state-waters seasons, and ADF&G considered these changes manageable. The annual GHLs are based on the estimate of acceptable biological catch (ABC) of Pacific cod as established by the Council. Current GHLs are set at 25% of the Central Gulf ABC, apportioned between the Kodiak, Chignik, and Cook Inlet Areas and 25% of the Eastern Gulf ABC for the Prince William Sound Area. Historically 25% of the Western Gulf ABC was reserved for the South Alaska Peninsula Area. In October 2013, the BOF increased the South Alaska Peninsula Area ABC apportionment from 25% to 30% of the Western Gulf Pacific cod ABC.

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; in 2011 the Prince William Sound GHL was set at the maximum level of 25% after achieving the GHL the two previous years, and in 2011 the BOF removed the step-up provision, as there was no mechanism to lower the GHL to previous levels.

Additional regulations include a 58 foot OAL vessel size limit in the Chignik and South Alaska Peninsula Areas. The BOF also adopted a harvest cap for vessels >58 feet that limited harvest to a maximum of 25% of the GHL in the Cook Inlet Area and 50% of the GHL in the Kodiak Area. The fishery management plans also provided for removal of restrictions after October 31 on exclusive area registrations, vessel size, and gear limits to increase late season harvest 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 BOF 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 of the acceptable biological catch (ABC) of Pacific cod as established by the Council 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 BOF 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 feet or less OAL for pot vessels, 100 feet or less OAL for trawl vessels and 58 feet or less OAL for longline and jig vessels. In 2009, vessels participating in the B season were restricted to under 60 feet OAL for all legal gear types. In 2010, this regulation was once again changed to allow pot vessels 125 feet or less OAL 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 feet OAL.

As of 2012, the state-waters A season opens January 1 in waters between 175° W long and 178° W long to vessels 60 feet OAL or less using trawl, pot, and jig gear, and vessels 58 feet OAL or less using longline gear. Harvests between 175° W long and 178° W long accrue toward the GHL, while harvest in state waters east of 175° W long and west of 178° W long are initially managed under parallel fishery regulations with harvest accruing toward federal TAC. If the state-waters A season GHL has not been taken by April 1, when the federal catcher-vessel trawl B season opens, the state-waters A season in waters east of 175° W long and west of 178° W long will close and a parallel fishery will immediately open in those waters.

Within state waters from 175° W long to 178° W long, the state-waters A season remains open to vessels 60 feet OAL or less using trawl, pot, and jig gear, and vessels 58 feet OAL or less using longline gear. If state-waters A season GHL remains when the federal catcher-vessel trawl B season closes, the state-waters A season reopens in all waters west of 170° W long until the state-

waters A season GHL is reached, or through June 9. During this time trawl vessels may not be greater than 100 feet OAL, pot vessels may not be greater than 125 feet OAL, and vessels using mechanical jig or longline gear not greater than 58 feet OAL.

In October 2013, the BOF created a state-waters Pacific cod fishery management plan in waters of the Bering Sea near Dutch Harbor. The Dutch Harbor Subdistrict Pacific cod season is open to vessels 58 feet or less OAL using pot gear, with a limit of 60 pots. The season opens seven days after the federal Bering Sea–Aleutian Islands pot/longline sector's season closure, and may close and re-open as needed to coordinate with federal fishery openings. The fishery was not opened to jig gear because the federal jig season typically occurs year-round

There is no bag, possession, or size limit for Pacific cod in the sport fisheries in Alaska, and the season is open year-round. Sport harvest of Pacific cod is estimated through the Statewide Harvest Survey (SWHS). The Southcentral Region creel sampling program also collects data on cod catch by stat area (on a vessel-trip basis), and lengths of sport-caught Pacific cod. No information is collected in the Southeast Region creel survey program on the Pacific cod sport fishery.

4. Fisheries

Most of the Pacific cod harvested in **Southeast Alaska** are taken by longline gear in the NSEI Subdistrict during the winter months. For Central Region Pacific cod fisheries, pots have been the dominant gear in **Cook Inlet (CI)** and longline gear the dominant gear in recent **Prince William Sound (PWS)** fisheries. Pot gear is still the dominant gear during the state-waters season in CI, longline is not a legal gear type for this fishery, and longline gear is dominant during the parallel fishery. Total harvest in the CI parallel fishery doubled from 2014 to 2015 and in 2015 was at the highest level since 1999. In the most recent 5 parallel seasons in CI, longline took the largest percentage in 2015 at 81% of the harvest. Harvest in the CI state-waters was the highest since 2012. The total harvest during the PWS parallel fishery from 2002 to 2008 was at low levels, picked up in the next 6 years and jumped dramatically from 2011 to 2012 and then again in 2013; the largest increase occurred from 2014 to 2015 when the harvest increased more than fourfold. The PWS state-waters season had the lowest Pacific cod harvest since 2008, the year prior to longline becoming a legal gear type in the fishery, however, this was mainly due to an extended parallel season. In PWS, longline gear has taken over 99% of the total harvest during the past five seasons. In 2014 in the **Westward Region** parallel Pacific cod fisheries, pot gear vessels take over 70% of the total harvest, with the remainder divided between trawl, jig, and longline gear. Pot and jig gear are the only legal gear types during state-waters fisheries in the Kodiak, Chignik, and South Alaska Peninsula Areas. Pot gear vessels take approximately 75% of the total Pacific cod catch annually. In the Aleutian Islands trawl gear took 24% of the harvest and pot gear took 76%. Trawl and pot gear were used only during the A season. There was no harvest in the B season.

Prior to 1993 much of the cod taken in **Southeast Alaska** commercial fisheries 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. In 2015, 9% of the Pacific cod catch 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. A total of 424 mt of Pacific cod were harvested in Southeast state-managed (internal waters) fisheries during 2015 with 396 mt harvested from the directed fishery.

The 2015 GHLs for the state-waters Pacific cod seasons in the Cook Inlet and Prince William Sound Areas of the **Central** Region were 2,299 mt and 707 mt, respectively. The 2015 harvest from the Cook Inlet Area state-waters Pacific cod fishery totaled 1,509 mt and the Prince William Sound Area harvest totaled 104 mt. In Cook Inlet in 2015, state-waters GHLs were not achieved by pot and jig gear, and fishing with these two gear types was open all year in parallel or state-waters seasons. In PWS, the parallel longline season stayed open until it closed by regulation on June 10 and had a short state-waters season. Longline only harvested 88 mt and jig gear harvest was confidential due to only 2 vessels participating in the state-waters season. For the parallel season, longline gear harvested 100% of the total, 1,382 mt. In 2015, Cook Inlet received 3.75% of the CGOA ABC, and the PWS allocation was 25.0% of the EGOA ABC.

In the **Westward** Region, the Kodiak Area state-waters Pacific cod GHL is based on 12.5% of the annual CGOA Pacific cod ABC while the Chignik Area GHL is based on 8.75% of the annual CGOA ABC. The 2014 South Alaska Peninsula Area state-waters Pacific cod GHL was based on 30% of the WGOA Pacific cod ABC. Legal gear is limited to pot and jig gear during state-waters Pacific cod fisheries in these three areas. The 2015 Pacific cod GHLs were 7,665 mt in the Kodiak Area, 5,366 mt in the Chignik Area and 11,611 mt in the South Alaska Peninsula Area. Total state-waters Pacific cod catch in the Kodiak, Chignik and South Alaska Peninsula was 5,497 mt, 4,649 mt and 10,826 mt respectively. In the Aleutian Islands District state-waters Pacific cod GHL is based on 3% of the annual BSAI Pacific cod ABC. Legal gear is limited to non-pelagic trawl, pot, longline and jig gear during state-waters the Pacific cod fishery in this area. The 2015 total state-waters Pacific cod catch in the Aleutian Islands District is confidential due to limited participation. The Dutch Harbor Subdistrict state-waters Pacific cod GHL is based on 3% of the annual BSAI Pacific cod ABC and is open to pot gear only. In 2015, the total state-waters catch for the Dutch Harbor Subdistrict was 8,000 mt.

Estimates of the 2015 sport harvest of Pacific cod are not yet available from the statewide harvest survey, but the 2014 estimates were 20,323 fish in **Southeast** and 40,381 fish in **Southcentral Alaska**. The estimated annual harvests for the prior five-year period (2009-2013) averaged about 11,000 fish in **Southeast** Alaska and 29,000 fish in **Southcentral** Alaska.

E. Walleye Pollock

1. Research

In the **Central Region** skipper interviews and biological sampling of PWS commercial trawl pollock deliveries during 2015 occurred in Seward and Kodiak. Additionally, onboard observers were placed on vessels participating in the Cook Inlet Area pollock seine fishery occurring by Commissioner's Permit from Homer. Sample data collected included date and location of harvest, species, length, weight, sex, and gonad condition. Otoliths were collected from approximately half of sampled fish. Homer staff determined ages of 1,230 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).

There are no bag, possession, or size limits for pollock in the sport fisheries in Alaska. Harvest of pollock is not explicitly estimated by the SWHS and no pollock harvest information is collected in charter logbooks or creel surveys in Southcentral or Southeast Alaska.

2. Assessment

No stock assessment work was conducted by the department on pollock in 2014 (Contact Dr. Kenneth J. Goldman).

3. Management

Prince William Sound pollock pelagic trawl fishery regulations were amended by BOF in 2009 and included a January 13 registration deadline, logbooks, catch reporting, check-in and check-out provisions, and accommodation of a department observer upon request. 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. In 2014, inhouse rockfish bycatch limits for this fishery were put into regulation in the Rockfish Management Plan, allowing only 0. 5% bycatch of rockfish during this pollock fishery. In 2013, new management measures were implemented to set the PWS pollock GHL at 2.5% of the federal Gulf of Alaska ABC. For **Cook Inlet Area (CI),** directed fishing for pollock is managed under a "Miscellaneous Groundfish" Commissioner's permit. Initiated in December 2014, a Commissioner's permit fishery for pollock using seine gear has been prosecuted. In 2015, season dates ran January 1 to March 31 and from October 1 to December 31 with an allowable annual harvest level set at 220,000 lb. In **Central Region**, pollock is also retained as bycatch to other directed groundfish fisheries, primarily Pacific cod (Contact Jan Rumble).

4. Fisheries

The 2015 PWS Pollock Pelagic Trawl fishery opened January 20, and continued through February 5th at noon, 16 days. The fleet rotated through with 6 vessels or less fishing in PWS at any one time. There were 35 landings made by 17 vessels. The total harvest for the fishery was 4,454 mt harvesting 99% of the guideline harvest level of 4,511 mt. Rockfish bycatch during the fishery totaled 11 mt well below the 31 mt of rockfish that was caught in 2014. In the Cook Inlet Area (CI) in 2015, aseine pollock fishery under the terms of a commissioner's permit was opened January 1 through March 31 and from October 1 to December 31. For this fishery, 99.8 mt of pollock was available and 13.3 mt was harvested in 2015. There were 2 permits issued for the fishery and both vessels participated; both vessels agreed to release confidential data. In addition, pollock was harvested in **Central Region** as bycatch to other groundfish fisheries; in 2015, 1.7 mt was harvested in PWS and 5.8 mt in CI (Contact Jan Rumble).

In Southeast, three commissioner's permits were submitted to fish for pollock, two with harvest by purse seine and one with harvest by jig. However, no fishing occurred in 2015 (Contact Mike Vaughn).

F. Pacific Whiting (hake)

1. Research

There was no research conducted on Pacific whiting (hake) in 2015.

2. Assessment

There are no stock assessments for Pacific whiting (hake).

3. Management

A commissioner's permit is required in **Central Region** and **Southeast Region** before a directed fishery may be prosecuted for Pacific Whiting (hake). This permit may restrict depth, dates, area, and gear, establish minimum size limits, and require logbooks and/or observers, or any other condition determined to be necessary for conservation and management purposes.

4. Fisheries

There was no directed fishery for Pacific whiting (hake) in 2015. There was no directed fishery for Pacific whiting (hake) in 2015. Currently in **Central Region** and **Southeast Region** Pacific whiting (hake) are considered other groundfish and are allowed up to 20% as bycatch in aggregate during directed fisheries for groundfish.

G. Grenadiers

1. Research

There was no research conducted on grenadiers in 2015.

2. Assessment

There are no stock assessments for grenadiers.

3. Management

A commissioner's permit is required in **Central Region** and **Southeast Region** before a directed fishery may be prosecuted for grenadiers. This permit may restrict depth, dates, area, and gear, establish minimum size limits, and require logbooks and/or observers, or any other condition determined to be necessary for conservation and management purposes.

4. Fisheries

There was no directed fishery for grenadiers in 2015. Currently in the **Central Region** and **Southeast Region** grenadiers are considered other groundfish and are allowed up to 20% as bycatch in aggregate during directed fisheries for groundfish.

H. Rockfishes

Commercial rockfish fisheries are managed under three assemblages: demersal shelf (DSR), pelagic shelf (PSR), and slope rockfish. DSR include the following species: yelloweye, quillback, china, copper, rosethorn, canary, and tiger. PSR include black, blue, dusky, dark, yellowtail, and widow. Slope rockfish contain all other *Sebastes* species. Thornyhead, *Sebastolobus* species are defined separately.

1. Research

In the **Southeast Region** biological samples of rockfish are collected from the directed commercial DSR fishery; sampling effort was expanded in 2008 to include the sampling of DSR caught as bycatch in the IFQ halibut fishery. The sampling of the halibut fishery was started in part to obtain more samples in years that the directed fishery was not opened. Fishery data are also collected from the logbook program, which is mandatory for all groundfish fisheries. The logbook program is designed to obtain detailed information regarding specific harvest location. Length, weight and age structures were collected from 1,378 yelloweye rockfish caught in the directed and halibut commercial longline fisheries. No biological samples of yelloweye rockfish were collected from the internal waters commercial fishery.

Rockfish habitat mapping projects continue in the **Southeast Region.** Seafloor mapping is performed to identify rockfish habitat in this important fishing ground. To date, ADF&G has mapped approximately 3,097 km^2 of seafloor within SEO. More importantly, over 1,706 km^2 of rocky habitat has been mapped. In 2015, a mapping survey was conducted jointly with the U.S. Geological Survey in the NSEO management area and surveyed approximately 849 km^2 area with 442 km^2 rocky habitat.

In addition, an age-structured assessment model for yelloweye rockfish has been submitted to the Gulf of Alaska Groundfish Plan Team and is under review (Contact Kristen Green).

Skipper interviews and port sampling of commercial rockfish deliveries in **Central Region** during 2015 occurred in Homer, Seward, Whittier, Kodiak, 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 in the Cook Inlet Area that targets pelagic rockfish begins July 1 and historically had been the focus of rockfish sampling during the last half of the year. Limited fishing effort drastically reduced sampling opportunities from 2006 to 2009 until an increase in effort resulted in additional sampling opportunity with sampling goals for CI black rockfish met in both 2014 and 2015. Additional rockfish samples were collected from bycatch fisheries in CI and PWS with the sampling goal achieved or nearly achieved for quillback and yelloweye rockfish in both areas, and shortraker and rougheye rockfish in PWS. Sample data collected included date and location of harvest, species, length, weight, sex, gonad condition, and otoliths. Homer staff determined ages of pelagic and demersal shelf rockfish otoliths, and otoliths from slope and thornyhead rockfish species were sent to the ADF&G Age Determination Unit in Juneau. Additional sampling occurred during CI and PWS research trawl surveys (Contact Elisa Russ).

Due to budget shortfalls, no seafloor mapping surveys were conducted in Central Region in 2015. An evaluation of existing ROV survey and seafloor bathymetry data was done to determine the location and scale of the next ROV survey to be conducted in 2016. Commercial and sport DSR harvest density and current management concerns were studied to help guide this process. It was determined that the PWS Management Area should be the location of the 2016 survey. Sport fish DSR harvest in the PWS Management Area have increased steadily in recent years as has the commercial harvest since the inception of the directed Pacific cod longline fishery in 2009. The PWS Inside District has the most multibeam sonar data available from which more accurate seafloor habitat delineations can be made. Mapping the extent of available rocky habitat is necessary for conducting ROV surveys and estimation of population size. Some of the highest harvest rates occur in the outside district. Much of this district has not been mapped with multibeam and the only bathymetry data available from which to delineate habitat is from lower resolution single beam sonar surveys. The final habitat delineations will be made using a combination of analytical methods and heads-up digitizing using multibeam and single beam sonar data, seafloor sediment samples, visual observations, and survey catch data. Work on delineating rocky seafloor features for the inside and outside districts of PWSMA was begun in 2015 and will continue into the winter and fall of 2016 (Contact Mike Byerly or Dr. Kenneth J. Goldman).

The **Westward Region** continued port sampling of several commercial rockfish species and Pacific cod in 2015. Rockfish sampling concentrated on black and dark rockfish with opportunistic sampling of 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 2015 season. Pacific cod otolith aging is ongoing.

The **Westward Region** also continued to conduct hydroacoustic surveys of black and dark rockfish in the Northeast, Afognak, and Westside districts of the Kodiak Management Area in 2015 in an effort to generate biomass estimates for both black and dark rockfish. Surveys of the Afognak and Northeast districts in the Kodiak Management Area will continue in 2016 (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) length composition and average weight, and 3) biomass of total sport removals (harvest and release mortality). Primary species harvested in Southeast Alaska included yelloweye, black, copper, and quillback rockfish. A total sample size of 10,671 rockfish was obtained from the sport harvests at Ketchikan, Craig, Klawock, Wrangell, Petersburg, Juneau, Sitka, Gustavus, Elfin Cove, and Yakutat in 2015 (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 port. The 2015 total sample size from the sport harvests at Seward, Valdez, Whittier, Kodiak, and Homer was 4,661 rockfish (Contact Barbi Failor).

The Division of Sport Fish continued research in Prince William Sound on survival of rockfish following recompression. In 2015, dusky, tiger, canary, and silvergray rockfish were caught using sport fishing gear over a range of depths, and held for two days at capture depths of at least 35 m to evaluate survival. Ninety percent of held fish survived, which is consistent with results from other studies indicating high survival for yelloweye and quillback rockfish in Prince William Sound and for other species in the Pacific Northwest. This study will be continued through 2017 to achieve sample sizes that are adequate to estimate post-recompression survival for as many demersal rockfish species as possible in Prince William Sound (Contact Jay Baumer).

2. Assessment

The **Southeast Region** performs multi-year stock assessments for DSR in the Southeast District. Biomass is estimated by management area as the product of yelloweye rockfish density determined from line transect surveys, the area of rocky habitat within the 100 fathom contour, and the yelloweye rockfish average weight. Yelloweye rockfish density for the stock assessment is based on the most recent estimate by management area. Yelloweye rockfish densities for each area are multiplied by the current year's average commercial fishery weight of yelloweye

rockfish specific to that management area. Allowable biological catch for the SEO is set by multiplying the lower bound of the 90% confidence interval of total biomass for yelloweye rockfish by the natural mortality rate (0.02). In the past, the yelloweye biomass estimate was expanded to the entire DSR assemblage by multiplying the proportion of other DSR species in the commercial catch (2–4.0%). However, in 2015, the non-yelloweye DSR biomass estimate was calculated from the catch data from 2010–2014 recreational, commercial, and subsistence fisheries; the non-yelloweye ABC was added to the yelloweye ABC to obtain a total for the entire DSR assemblage. There is no stock assessment information available for DSR in NSEI and SSEI management areas, and no surveys for non-DSR species (e.g. black rockfish) have been conducted since 2002.

Prior to 2012, line transect surveys were conducted using a submersible; after that time, visual surveys have been conducted using an ROV. The last submersible surveys were conducted in 2009 in EYKT, 2005 in SSEO, 2007 in CSEO, and 2001 in NSEO; density estimates were derived from each of these surveys with the exception of the NSEO management area where data were too limited to obtain a valid density estimate. Consequently, the most recent valid density estimate for NSEO is from 1994. Density estimates by area for the most recent submersible surveys ranged from 765 to 1,755 yelloweye rockfish per km^2 with CV estimates of 12–33%. ROV surveys were performed in collaboration with Central Region staff in 2012 in CSEO, 2013 in SSEO, and 2015 in EYKT. Yelloweye rockfish density was 752 yelloweye per km^2 (CV=14%) for CSEO in 2012, 986 yelloweye per km^2 (CV=22%) in SSEO in 2013, and 1,755 yelloweye per km^2 (CV=25%) for EYKT in 2015. In addition from ROV video data, we are able to measure fish lengths for yelloweye rockfish, lingcod, and halibut using stereo camera imaging software (SeaGIS, Ltd).

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 bordered by land masses, deep fjords, and/or expanses of deeper soft substrates. There were no ROV surveys conducted in 2015. Due to the need to address more urgent management concerns, it was determined that population estimates on the management area or district scales are needed more quickly than what is being obtained using the current assessment approach. As discussed in the preceding research section of this report, a survey of the PWSMA was identified as the best location for the next ROV DSR assessment survey. This survey will be conducted in summer 2016. (Contact Mike Byerly or Dr. Kenneth J. Goldman).

In the **Westward Region** rockfish surveys using hydroacoustic equipment were deployed in an effort to assess black and dark rockfish stocks in the Kodiak Management Area. Surveyed areas included the Northeast, Afognak, and Westside districts of the Kodiak Management Area (Contact Carrie Worton).

3. Management

Management of DSR in the **Southeast Region** is based upon a combination of GHRs, seasons, gear restrictions, and trip limits. Directed commercial harvest of DSR is restricted to hook-and-line gear. Directed fishing quotas are set for the four outside water management areas (NSEO,

CSEO, SSEO, and EYKT) based on the stock assessment. Directed fishery quotas for the two internal water management areas (NSEI and SSEI) are set at 25 mt annually. Regulations adopted in 1994 include trip limits (within any five-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 BOF meeting in early 2006 the season for the directed DSR fishery in SEO was changed to occur only in the winter 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 BOF meeting it was decided that the anticipated harvest of DSR in the subsistence fisheries would be deducted from the ABC before the split in allocation is made between commercial and sport fisheries. The 2015 ABC for DSR was 293 mt, which resulted in a total TAC of 217 with a 182 mt to commercial fisheries and 35 mt to sport fisheries, and the 2016 ABC is set at 224 mt, resulting in a TAC of 188 mt for commercial and 36 mt for sport fisheries. The TACs are set after deducting the subsistence catch, 8 mt for 2015 and 7 mt for 2016. A significant portion of the total commercial harvest is taken as bycatch during the halibut fishery; each year this is estimated and decremented from the commercial TAC. Prior to the 2012 fishery, we had used IPHC survey data to estimate bycatch rate by depth and apply this to the commercial catch to estimate DSR bycatch. Since 2012, commercial landing data has been used to calculate the commercial bycatch rate of DSR in the halibut fishery and this bycatch rate has been applied to the current year's quota to estimate bycatch of DSR. This change in methodology was made for greater accuracy and was implemented once several years of landings were available under the DSR full retention regulation. This regulation has been in place in state waters since 2002 and in federal waters since 2005.

Management of the commercial black rockfish fishery in the **Southeast Region** is based upon a combination of GHLs and gear restrictions. Directed fishery GHLs are set by management area and range from 11 mt in EYKT and IBS to 57 mt in SSEOC with a total GHL of 147 mt for all of SEO. A series of open and closed areas was also created in order for managers to better understand the effects of directed fishing on black rockfish stocks. Halibut and groundfish fishermen are required to retain and report all black rockfish caught. Shortspine thornyhead, shortraker rockfish, rougheye rockfish and redbanded rockfish may be taken as bycatch only (no directed fishing) (Contact Kristen Green).

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 BOF formalized the 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 BOF adopted a directed rockfish season opening of July 1 for the Cook Inlet Area and restricted legal gear to jigs to target pelagic shelf rockfish species. At the spring 2000 BOF meeting, the BOF 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 BOF 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 the sablefish fishery, 5% during the state-waters Pacific cod season and 10% during other directed fisheries. In 2010, the BOF adjusted rockfish bycatch levels for Cook Inlet to 10% during halibut and directed groundfish, other than rockfish, and 20% nonpelagic rockfish during the directed pelagic shelf rockfish fishery. In addition, logbooks are required to be filled out during the CI directed fishery and returned to the department. In 2014, the BOF adopted regulations to adjust rockfish bycatch levels during the parallel Pacific cod season in PWS to 5%, for consistency with the state-waters season. In addition, a .05 % rockfish bycatch limit was established for the PWS pollock pelagic trawl fishery . Proceeds from rockfish landed in excess of allowable bycatch and harvest levels are surrendered to the State of Alaska (Contact Jan Rumble).

The **Westward Region** has conservatively managed black rockfish since 1997, when management control was relinquished to the State of Alaska. Area GHLs 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 2.3 mt 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 2015, 51 mt of black rockfish were harvested from five sections in the Kodiak Area. GHLs were attained in three sections. Harvest in the Chignik and South Alaska Peninsula Management areas remain confidential. In 2015, vessels made directed black rockfish landings in the Aleutian Islands Area but harvest information is confidential due to limited participation. 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 in 2015. 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 Mark Stichert).

Statewide, the majority of sport caught rockfish is taken incidental to sport 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 2015 season, the entire **Southeast Alaska** region's sport bag and possession limit for pelagic rockfish was five fish per day, 10 in possession. The non-pelagic rockfish regulations were set as follows:

Southeast Alaska Outside Waters: 1) all non-pelagic rockfish caught must be retained until the bag limit is reached; 2) resident bag limit was two fish, only one of which could be a yelloweye; four fish in possession, of which no more than two could be yelloweye; 3) nonresident bag limit was two fish, only one of which could be a yelloweye, four fish in possession, of which no more than one could be yelloweye; and an annual limit of one yelloweye rockfish.

Southeast Alaska Inside Waters: 1) all non-pelagic rockfish caught must be retained until the bag limit is reached; 2) resident bag limit was three fish, only one of which could be a yelloweye; six fish in possession, of which no more than two could be yelloweye; 3) nonresident bag limit was two fish, only one of which could be a yelloweye, four fish in possession, of which no more than two could be yelloweye; and an annual limit of two yelloweye rockfish.

For the entire Southeast Alaska region, charter operators and crewmembers could not retain non-pelagic rockfish while clients were on board the vessel. In addition, anglers fishing from charter vessels were required to release non-pelagic rockfish to the depth of capture or at least 100 feet, whichever is shallower, using a deepwater release device. Charter vessels were required to have at least one functional deep water release device on board and available for inspection (Contact Bob Chadwick).

Sportfish rockfish regulations in **Southcentral Alaska** have been designed to discourage targeting of rockfish yet allow and mandate retention of incidental harvest. As in Southeast Alaska, bag limits are more restrictive for non-pelagic species to account for their lower natural mortality rates. The open season for rockfish was year-round in all areas. 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 eight rockfish, of which no more than two could be non-pelagic species. During both periods, the first two non-pelagic rockfish caught in Prince William Sound 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 five rockfish, no more than two of which could be non-pelagic species, and no more than one of the non-pelagic species could be a yelloweye.

4. Fisheries

Directed fisheries for DSR and black rockfish occurred in **Southeast** in 2015. Effort in the directed black rockfish fishery in Southeast Outside District (SEO) was low with 3.6 mt and only three vessels participating; consequently, directed harvest is confidential. Black rockfish harvest in all groundfish, halibut, and salmon troll fisheries in SEO was 7.8 mt. In addition, one application for a commissioner's permit was made for directed fishing of black rockfish in inside waters. Because there are no GHLs set for black rockfish in internal waters by regulation, a commisioner's permit is required. The harvest of black rockfish from this directed fishery in inside waters is confidential due to limited participation. The directed fishery for DSR in SEO only opened in the East Yakutat (EYKT) area. The Central Southeast Outside (CSEO), Southern Southeast Outside (SSEO), and Northern Southeast Outside (NSEO) sections 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. Directed fishing for DSR was also opened in internal waters. The 2015 harvest of DSR by directed fisheries in EYKT was 33.2 mt and in internal waters (SSEI and NSEI) was 13.6 mt. In addition, DSR was taken as bycatch with 68.7 mt harvested in SEO and 17.8 mt in internal waters. Eighty-nine percent in SEO was harvested from the IFQ halibut or sablefish fisheries, and 89% in internal waters was harvested from the IFQ halibut fishery.

Slope, PSR, and thornyhead rockfish were also taken as bycatch in internal waters with 70.8 mt harvested in 2014.

In the **Central Region**, in the Cook Inlet Area in 2015, the total rockfish harvest, including the directed jig PSR rockfish fishery and bycatch, more than doubled from 2014, with a harvest of 63.9 mt. PSR harvest comprised 59% of the total harvest with DSR at 38%, and slope rockfish (including thornyhead) at 3%. Most of the harvest came from the directed PSR fishery. In PWS, rockfish are only harvested as bycatch, there is no directed fishery. For PWS, the rockfish harvest exceeded the GHL by a small amount in 2015, the total was 69 mt. A majority of this rockfish bycatch was caught by longline gear (85%) with the remaining rockfish harvested by trawl gear (15%).
Overall **sport harvest** (guided and unguided) is estimated primarily through the Statewide Harvest Survey (SWHS). Charter vessel logbooks provide reported harvest for the guided sector only. 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 estimates are for the general category of "rockfish" (all species combined), and the charter vessel logbooks require reporting of rockfish harvest in three categories - pelagic, yelloweye, and other non-pelagics. Sport rockfish harvest is typically estimated in numbers of fish. Estimates of the 2015 harvest are not yet available from the SWHS, but the 2014 estimates for all species combined were 193,098 fish in Southeast and 141,808 fish in Southcentral Alaska. The average estimated annual harvest for the prior five-year period (2009–2013) was 115,361 rockfish in Southeast Alaska and 110,687 fish in Southcentral Alaska.

I. Thornyheads

1. Research

There was no research conducted on thornyheads in 2015.

2. Assessment

There are no stock assessments for thornyheads.

3. Management

A commissioner's permit is required before a directed fishery may be prosecuted for thornyheads. This permit may restrict depth, dates, area, and gear, establish minimum size limits, and require logbooks and/or observers, or any other condition determined to be necessary for conservation and management purposes.

4. Fisheries

There was no directed fishery for thornyheads in 2015. In **Central Region** thornyheads are retained as bycatch up to 10% in aggregate with other groundfish during a halibut or directed groundfish fishery, with exceptions occurring for the bycatch allowance for the directed sablefish fishery (20%), Pacific cod (5%), and directed pollock trawl fishery (0.5%). For directed drift or set gillnet fisheries for salmon or herring up to 10% of thornyheads and other rockfish in aggregate may be retained. Any bycatch overages that occur are forfeited to ADF&G.

In **Southeast Region** thornyheads are retained as bycatch of up to 15% in aggregate with other rockfish for a directed DSR fishery, 5% in aggregate with other rockfish for halibut fishing and a directed lingcod fishery, 15% for a directed black rockfish, sablefish, and Pacific cod, 0% for a directed pot fishery for sablefish and Pacific cod, and 5% for a directed fishery in outside waters of **Southeast Region**. Any bycatch overages that occur are forfeited to ADF&G.

J. Sablefish

1. Research

In 2015, 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 cost of these surveys is offset by the sale of the fish landed; however, in 2015 three commercial fishermen participated in the surveys and were allowed to sell their Personal Quota Share (PQS); thus, reducing the impact on the quota by approximately 30% for fish harvested and sold by the state. The department plans to allow permit holders to harvest their PQS aboard future NSEI longline surveys.

The survey CPUE for NSEI decreased in 2015 from 1.47 lb/hook in 2014 to 1.36 lb/hook in 2015. In the SSEI stock assessment, analyses revealed a decline in the overall longline survey CPUE index (round lb/hook) from 0.61 in 2014 (0.53 in 2015. There is a high proportion of immature fish in the SSEI longline and pot fisheries (>45% from 2011–2015) and in the SSEI survey (>55% from 2011–2015). In 2013, the SSEI survey was redesigned to expand survey station coverage in Dixon Entrance as well as increase the minimum spacing between survey stations. The Dixon Entrance area is an important area to the SSEI commercial fishery (40 to 60% of the annual commercial harvest), yet this area had been underrepresented in the department survey. The new survey design has been used since 2013.

A mark-recapture survey has been conducted using longlined pots since 2000 with this survey performed using the state vessel the R/V *Medeia* since 2012. In May and June 2015, 6,862 fish were marked and released in NSEI over the course of the tagging survey. Over the 18 day survey, 33 longline pot sets were made. Sablefish were targeted by area and depth in proportion to the commercial catch using logbook data from the three previous years. The mark-recapture results serve as the basis of our NSEI stock assessment. No tagging survey is scheduled for 2016; due to

budget restrictions, this survey is scheduled to occur biannually in the future rather than on an annual schedule.

In 2015, groundfish staff met with port samplers in Ketchikan and 26 ovary samples were collected from the SSEI pot and longline fisheries in order to determine if samplers were correctly classifying fish using macroscopic methods. During these fisheries it is difficult to accurately classify fish as immature or mature for inexperienced samplers, because there is little yolk development in mature fish with the spawning season months away. We hope to use the information and pictures collected from this study to develop guidelines for samplers to better distinguish mature and immature fish using macroscopic classification (Contact Kristen Green).

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 lack of funding, 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. Sablefish tagging surveys were conducted in PWS in 2011, 2013, and 2015 using pot longline gear. There were 1,203, 318, and 26 fish tagged in 2011, 2013, and 2015, respectively. CPUE was very low in 2013 with an average of 0.11 fish per pot. To date, 302 fish have been recaptured from the 2011 survey and 41 were captured from the 2013 survey. Of all tagged releases, 65% have been recaptured within PWS and 25% outside in the GOA with the remainder of unknown location. There is no PWS sablefish tagging survey planned for 2016.

Short-terms goals are to determine whether the portion of the GOA sablefish stock that resides in and used PWS is well- or poorly-mixed with the larger GOA population. If well-mixed, there would be no need for a PWS sablefish stock assessment as the Federal assessment could be used to apportion catch for the PWS sablefish fishery. If poorly-mixed, there would be a need to conduct more tagging work in PWS to provide an assessment of the abundance within those waters from which to set harvest limits and manage the fishery. The department will continue to conduct more sablefish tagging as funding allows, and work towards addressing the mixing question via tag-recapture analysis. If data results indicate that a PWS assessment needs to be conducted, the department would continue its tagging study potentially in combination with an age-structured model to accomplish the goal of providing information with which to best manage the fishery. With such small catches in the recent survey and the reduction in funding to continue this work, a request will be made for biometric support for analysis of all Central Region sablefish data (Contact Mike Byerly or Dr. Kenneth J. Goldman).

Skipper interviews and port sampling occurred in Cordova, Whittier, and Seward for the PWS Area commercial fishery and in Seward and Homer for the Cook Inlet Area fishery. In 2015, due to extremely low effort and poor fishery performance for the PWS fishery, sampling goals for sablefish were not achieved. The Cook Inlet Area fishery also showed decreased effort and fishery performance, however, sampling goals were still met. 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).

2. 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 May or 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 2015 recommended ABC of 447 mt for the NSEI fishery was calculated by applying the 2014 fishery mortality at age (based on a harvest rate of 7.1% using the $F_{50\%}$ biological reference point (BRP)) to the 2015 forecast of total biomass at age and summing across all ages. The 2015 ABC was a 4% increase from the 2014 ABC (432 mt), which was also based on the $F_{50\%}$ BRP (the harvest rate was 6.9% for 2014). Since 2009 BRPs have become more conservative, i.e. $F_{45\%}$ in 2009 and $F_{50\%}$ since 2010.

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. Unlike NSEI, the department does not currently estimate the absolute abundance of SSEI sablefish. There appears to be substantial movement of sablefish in and out of the SSEI area, which violates the assumption of a closed population; consequently, Peterson mark-recapture estimates of abundance or exploitation rates are not possible for this fishery. Instead, the SSEI sablefish population is managed based on relative abundance trends from survey and fishery CPUE data, as well as with survey and fishery biological data that are used to describe the age and size structure of the population and detect recruitment events (Contact Kristen Green).

3. 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 GHLs. In the Cook Inlet Area, there is a state-managed open access sablefish fishery with a separate GHL.

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 GHL 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. There were 78 permit holders eligible to fish in 2014 in NSEI and 23 permit holders eligible to fish in SSEI.

The SSEI quota was set at 243 mt for 2015.

During the February 2009 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 sport fishery. At the 2012 BOF meeting, a regulation was passed to require personal use and subsistence use sablefish permits, and at the 2015 BOF meeting, limits were

defined for personal use sablefish fisheries for the number of fish, number of permits per vessel, and number of hooks. No changes were made to sablefish subsistence fisheries in 2015.

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 Area North Gulf District sablefish GHL is set using an historic baseline harvest level adjusted annually by the relative change to the ABC in the federal CGOA. The 2015 fishery GHL was 25.02 mt. In 2004, the BOF adopted sablefish fishery-specific registration, a logbook requirement, and a 48-hour trip limit of 1.36 mt in the Cook Inlet Area. For PWS, a limited-entry program that included gear restrictions and established vessel size classes was adopted in 1996.

Between 1996 and 2014, the PWS fishery GHL was set at 110 mt, which is the midpoint of the harvest range set by a habitat-based estimate. PWS fishery management developed 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 BOF adopted regulations which included a registration deadline, logbooks, and catch reporting requirements. In 2009, new season dates were also adopted by the BOF for PWS sablefish, 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 2015 PWS sablefish fishery had a guideline harvest level of 55.3 mt. This is a reduction of approximately 50% from the 2014 GHL, and is in response to declining trends in fishery catch per unit effort (CPUE) and harvest; harvest in 2014 was 43.9 mt. In addition, tagging studies conducted by the National Marine Fisheries Service (NMFS) and ADF&G indicate that sablefish populations throughout the Gulf of Alaska (GOA) including the PWS area are likely mixed. Therefore, the GHL was adjusted by applying the relative change each year in the NMFS GOA sablefish acceptable biological catch (ABC), which is derived from NMFS stock assessment surveys.

The sole **Westward Region** sablefish fishery occurs in the Aleutian Islands. The GHL for the Aleutian Islands is set at 5% of the combined Bering Sea Aleutian Islands 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 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. In 2013, the BOF changed the season opening and closing dates to revert back to coinciding with the federal IFQ season.

The Southeast Alaska **sport fishery** for sablefish was regulated for the first time in 2009. Sport limits in 2015 were four fish of any size per day, four in possession, with an annual limit of eight fish applied to nonresidents only in lower Lynn Canal and Chatham Strait. Creel surveys in Southeast Alaska in 2015 sampled 114 sablefish, reflecting the small harvest relative to other species. The sablefish sport fishery in Southcentral Alaska was unregulated, with no bag, possession, or size limits. Port samplers in Southcentral Alaska measured one sablefish from the sport harvest, again reflecting the relatively small harvests.

4. Fisheries

In the **Southeast Region** the 2015 NSEI sablefish fishery opened August 15 and closed November 15. The 78 permit holders landed a total of 354 mt of sablefish. The fishery is managed by equal quota share; each permit holder was allowed 4.6 mt. In the NSEI fishery, the overall CPUE (adjusted for hook spacing expressed in round lb/hook) declined from 0.85 lb/hook in 2014 to 0.71 in 2015. The 2015 SSEI sablefish fishery opened June 1 and closed November 15. Twenty-two permit holders landed a total of 233 mt of sablefish, each with an equal quota share of 10.6 mt. In SSEI, 20 permits were designated to be fished with longline gear and the remaining three fished with pot gear. However, one of the longline permits did not fish in 2015. SSEI longline fishery CPUE has remained fairly stable in the last four years (0.30–0.33 lb/hook from 2012–2015) (Contact Kristen Green).

In the **Central Region,** the 2015 open access sablefish fishery in the Cook Inlet Area opened at noon July 15 and was open through the remainder of the calendar year. Four vessels participated and harvested 14.4 mt, the fourth year that the GHL was not achieved, and the lowest annual harvest since 1990. During the 2015 PWS sablefish fishery, harvest totaled 8 mt, was the lowest harvest on record, less than 10% of the historical average and a decrease of 36 mt from 2014 (Contact Jan Rumble).

Within the **Westward Region**, only the Aleutian Islands have sufficient habitat to support mature sablefish populations of enough 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 2015 Aleutian Island fishery opened on March 14 with only pot, longline, jig and hand troll gear allowed. Additional requirements for the fishery include registration and logbook requirements. The GHL was set at 157 mt for the state-waters fishery. The harvest from the 2015 Aleutian Islands sablefish fishery was 69 mt. The season remained open until the November 7 closure date (Contact Miranda Westphal).

The most recent sablefish sport harvest estimates from the SWHS are for 2014. The estimated harvest was 8,622 fish in Southeast Alaska and 3,788 fish in Southcentral Alaska. SWHS estimates are suspected to be biased high due to misidentification and misreporting. Sablefish are not commonly taken by anglers, and relatively high catches were reported from some areas where sablefish are rarely or never observed by creel survey crews. Charter logbooks indicated

guided-only harvests of 6,983 sablefish in Southeast Alaska and 267 sablefish in Southcentral Alaska in 2014 (Contact Bob Chadwick, Dan Bosch).

K. Lingcod

1. Research

Since 1996, 9,189 lingcod have been tagged and 499 fish recovered in the **Southeast** Region. Length, sex and tagging location are recorded for all tagged fish. Dockside sampling of lingcod caught in the commercial fishery continued in 2015 in Sitka, Yakutat, and Ketchikan with 1,067 fish sampled for biological data. 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, Seward, and Homer. Data obtained included date and location of harvest, length, weight, sex and age. There were 318 lingcod samples collected in 2015 and 87% were from the Prince William Sound Area, as there was little effort in the directed fishery in the Cook Inlet Area. 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).

In the **Westward Region**, no directed lingcod effort occurred during 2015. All lingcod were harvested incidental to other federal and state managed groundfish fisheries. The 2015 harvest totaled 28 mt in the Kodiak Area and 1 mt in the Chignik Area.

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 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 2015 included Juneau, Sitka, Craig/Klawock, Wrangell, Petersburg, Gustavus, Elfin Cove, Yakutat, and Ketchikan. Length and sex data were collected from 1,368 lingcod in 2015, primarily from the ports of Sitka, Ketchikan, Craig, Klwock, 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. The program sampled 530 lingcod from the sport harvest at Seward, Valdez, Whittier, Kodiak, and Homer in 2015. These ports accounted for the majority of sport lingcod harvest in Southcentral Alaska (Contact Barbi Failor).

2. 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) from fishery logbooks, 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 sport

catch had developed. Consequently the quota for lingcod was reduced in all areas in 2000. After reductions in GHRs, CPUE increased in CSEO until around 2007; since then CPUE has generally decreased. CPUE in NSEO has been generally stable since reductions in GHRs. In SSEOC, CPUE was highly variable from 1994 to 2003; since then, limited participation in this fishery is too erratic to characterize CPUE. In EYKT, after the GHR was reduced, CPUE was fairly stable; however, in last four years CPUE has been the lowest since 2000. Yet, CPUE in EYKT remains high relative to other management areas, likely because fishing is concentrated in smaller areas with typically higher abundances of lingcod. The CPUE in IBS was stable between 2004 and 2009, increased from 2010 to 2014, and declined again in 2015. Higher CPUE in recent years may be due to increases in stocks or changes in fishery dynamics—vessel participation has decreased with experienced fishermen remaining in this area.

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 bordered by land masses, deep fjords, and/or expanses of deeper soft substrates. There were no ROV surveys conducted in 2015. Due to the need to address more urgent management concerns, it was determined that population estimates on the management area or district scales are needed more quickly than what is being obtained using the current assessment approach. A similar analysis for lingcod to the one which was done for DSR discussed in the preceding rockfish research section of this report was conducted in 2015. As with DSR, the PWS Management Area was identified as the best location for the next ROV lingcod assessment survey. This survey will be conducted in summer 2016. (Contact Mike Byerly or Dr. Kenneth J. Goldman).

3. Management

Management of lingcod in **Southeast Alaska** is based upon a combination of GHRs, season and gear restrictions. Regulations include a winter closure for all users, except longliners, between December 1 and May 15 to protect nest-guarding males. GHLs 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 year sport catch was included in a quota allocation. The 27" minimum commercial size limit remains in effect and fishermen are requested to keep a portion of their lingcod with the head on, and proof of gender to facilitate biological sampling of the commercial catch. Vessel registration is required and trip limits are utilized by ADF&G staff, when needed, for the fleet to stay within its allocations. The directed fishery is limited to jig or dinglebar troll gear. In 2003 the Board of Fish (BOF) established a super-exclusive directed fishery registration for lingcod permit holders fishing in the IBS Subdistrict.

The **Central Region** has directed commercial fisheries for lingcod in Cook Inlet and PWS. Regulations for the 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 and a jig-only gear requirement for the directed lingcod fishery in the Cook Inlet Area. Guideline harvest levels (GHLs) are 24 mt for Cook Inlet and 3.3 mt in the Inside District of PWS and 11.5 mt for the PWS Outside District. Resurrection Bay, near

Seward, is closed to commercial harvest of lingcod. In 2009, a new BOF regulation permitted retention of lingcod at a 20% bycatch level in PWS waters following closure of the directed season. Cook Inlet also allows 20% bycatch levels for lingcod, however, no bycatch may be retained after the GHL is achieved.

In **Southeast Alaska**, sport harvests of lingcod are incorporated into a regionwide lingcod management plan. This plan 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.

The sport fishery lingcod season for 2015 was May 16-November 30. Charter vessel operators and crew members were prohibited from retaining lingcod while guiding clients. For resident anglers, the limits regionwide were one fish per day and two in possession, with no size limit. Additional restrictions were put into place for nonresidents to keep harvest from exceeding allocations specified by the Alaska Board of Fisheries. Nonresidents were allowed one fish daily and one in possession. In the Yakutat and Southern Southeast districts, nonresidents were allowed to harvest fish 30-45 inches in length, or fish 55 inches and greater in length. In the Northern Southeast District, nonresidents were only allowed to harvest fish that were 30-35 inches in total length, or fish 55 inches and greater in length. In all areas, nonresidents were limited to two lingcod annually, only one of which could be 55 inches or greater in length. In addition, the Pinnacles area near Sitka has been closed to sport fishing year-round for all groundfish since 1997 (Contact Robert Chadwick).

A suite of regulations was established in 1993 for sport lingcod fisheries in **Southcentral Alaska** in light of the lack of quantitative stock assessment information. Resurrection Bay remained closed to lingcod fishing year-round to rebuild the population, although there is no formal rebuilding plan. The season was closed region-wide from January 1 through June 30 to protect spawning and nest guarding lingcod. Daily bag limits in 2015 were two 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 Dan Bosch or Matt Miller).

4. 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 and halibut longline and salmon troll fisheries. At the 2009 BOF meeting a regulation was adopted that allowed Southeast management staff to adjust the lingcod bycatch levels in the halibut fishery to maximize the harvest of the lingcod longline allocations. The directed fishery landed 104 mt of lingcod in 2015. An additional 59 mt was landed as bycatch in halibut and other groundfish fisheries and 11 mt in the salmon troll fishery.

Central Region commercial lingcod harvests have primarily occurred in the North Gulf District of the Cook Inlet Area and PWS. Lingcod harvests in 2015 totaled 3.1mt in Cook Inlet and 9.2

mt in PWS. Approximately 41% of the lingcod harvest in Cook Inlet resulted from directed jig effort. In PWS, approximately 99% of lingcod harvest was from directed longline effort. In both areas, the remaining harvest resulted from bycatch to other directed (primarily halibut) longline fisheries. Cook Inlet and PWS fisheries remained open through December 31 (Contact Jan Rumble).

No directed effort occurred for lingcod in the **Westward Region** during 2015. Most lingcod are taken as bycatch to federally managed bottom trawl fisheries. Incidental take by trawl vessels peaked in 2008 when 250 mt of lingcod were harvested in 2008. In response, ADF&G reduced bycatch limits in 2009 from 20% to 5%. Incidental take of lingcod had ranged between 30 to 106 mt per year since 2009. Most lingcod are harvested in federal waters northeast of the Port of Kodiak.

Sport lingcod harvest estimates from the statewide mail survey for 2014 (the most recent year available) were 13,528 lingcod in Southeast Alaska and 18,789 lingcod in Southcentral Alaska. The average estimated annual harvest for the prior five-year period (2009–2013) was 10,887 fish in Southeast Alaska and 22,019 fish in Southcentral Alaska.

L. Atka Mackerel

1. Research

There was no research on Atka mackerel during 2015.

2. Assessment

There are no stock assessments for Atka mackerel.

3. Management

A commissioner's permit is required in **Central Region** and **Southeast Region** before a directed fishery may be prosecuted for Atka mackerel. This permit may restrict depth, dates, area, and gear, establish minimum size limits, and require logbooks and/or observers, or any other condition determined to be necessary for conservation and management purposes.

4. Fisheries

There was no directed fishery for Atka mackerel in 2015. Currently in the **Central Region** and **Southeast Region** Atka mackerel are considered other groundfish and are allowed up to 20% as bycatch in aggregate during directed fisheries for groundfish.

M. Flatfish

1. Research

There was no research on flatfish during 2015.

2. Assessment

There are no stock assessments for flatfish.

3. Management

Trawl fisheries for flatfish are allowed in four 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 an ADF&G Commissioner's permit. The permit may stipulate fishing depth, seasons, areas, allowable sizes of harvested fish, gear, logbooks, and "other conditions" deemed necessary for conservation or management purposes. No permits have been issued to harvest flatfish.

There are no bag, possession, or size limits for flatfish (excluding Pacific halibut) in the sport 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 sport fisheries in Southcentral or Southeast Alaska. Flatfish are occasionally taken incidentally to other species and in small shore fisheries, but the sport harvest is believed to be negligible.

4. Fisheries

Very little effort has occurred in the **Southeast** fishery in recent years. Since the 1998–1999 season only once vessel has applied for a Commissioner's permit to participate in this fishery; this vessel made a single flatfish landing in 2013. Due to limited participation, harvest information is confidential for this landing. 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. In state waters of the **Westward Region**, the State of Alaska adopts most NOAA Fisheries regulations and the flatfish fishery is managed under a parallel management structure. No permits to harvest flatfish were issued in **Central Region** during 2015.

N. Pacific Halibut and IPHC Activities

The sport halibut fishery is a focus of a statewide monitoring and management effort by the Division of Sport Fish. Data on the sport fishery and harvest are collected through port sampling in Southeast and Southcentral Alaska. Estimates of harvest and related information is provided annually to the IPHC for use in the annual stock assessment, and to the North Pacific Fishery Management Council. The council's Scientific and Statistical Committee has periodically reviewed the state's estimation and projection methods. ADF&G provides an analysis each year that is used by the Council to recommend regulatory changes for the charter fishery to keep its

harvest within allocations specified in the Catch Sharing Plan for Guided Sport and Commercial Fisheries in Alaska. The Council's recommendations are also considered by the IPHC and incorporated as annual management measures for the charter fishery. Estimates of sport harvest and associated analyses are posted on the North Pacific Fishery Management Council's web page at http://www.npfmc.org (Contact Scott Meyer).

O. Other groundfish species

In 1997 the BOF approved 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" if they wish to participate in a directed fishery for species that do not already have regulations in place. Permits do not have to be issued if there are management and conservation concerns. 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.

Other Related Studies

Staff in the **Central Region** currently house all data in an MS Access database format. Queries are complete for calculating CPUE, abundance, and biomass estimates from most surveys. All data are additionally captured in GIS for spatial analysis.

ADF&G manages state groundfish fisheries under regulations set triennially by the BOF.

ADF&G 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 NOAA Fisheries in regulating fisheries in offshore waters.

1. Dixon Entrance Area

Total removals (including those from test fishing) from the Dixon Entrance area (Alaska groundfish statistical areas 325431, 315431, 325401, and 315401). The table below lists the catch by species group from 1988 through 2015 rounded to the nearest mt. Landings with only halibut catch are excluded.

Year	# Permits	# Landings	DSR	Other Rock	Sablefish	Other Groundfish	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	<1	9	138	<1	148
2006	43	32	1	12	167	1	181
2007	32	31	<1	19	165	1	184
2008	27	32	1	16	101	<1	118
2009	29	34	1	18	132	2	153
2010	34	37	2	17	107	2	128
2011	31	41	<1	16	112	2	130
2012	21	26	<1	18	116	4	139
2013	25	27	<1	14	115	2	132
2014	24	23	5	12	89	5	158
2015	24	35	2	10	96	5	112

2. Marine Reserves

In September of 1997 the ADF&G submitted proposals to both the BOF and the Council 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 the reserve and the Council approved the reserve at their June 1998 meeting. The Council 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 department 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 herring fishery and some salmon assessments.

4. Statistical Area Charts

Digital groundfish and shellfish statistical area charts are available and can be viewed or downloaded at: http://www.adfg.alaska.gov/index.cfm?adfg=CommercialByFisheryGroundfish.groundfishmaps
(Contact Lee Hulbert)

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.

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	85	closed	170	104	5	0	closed
2011	25	78	closed	137	113	5	0	closed
2012	67	67	closed	127	117	15	0	closed
2013	66	84	closed	129	87	4	1	closed
2014	28	68	closed	125	55	2	0	closed
2015	24	59	Closed	156	71	6	0	closed

Since 1998, marine sport charter operators have been required to log port of landing, effort and harvest, and ADF&G statistical area for every charter trip made. In 2014, 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 (contact Bob Powers).

WEBSITES

ADF&G Home Page: http://www.adfg.alaska.gov

Commercial Fishing home page: http://www.adfg.alaska.gov/index.cfm?adfg=fishingCommercial.main

Sport Fisheries home page: http://www.adfg.alaska.gov/index.cfm?adfg=fishingSport.main

News Releases: http://www.adfg.alaska.gov/index.cfm?adfg=newsreleases.main

Rockfish Conservation page:
http://www.adfg.alaska.gov/index.cfm?adfg=fishingSportFishingInfo.rockfishconservation

Age Determination Unit Home Page:
http://mtalab.adfg.alaska.gov/ADU/http://mtalab.adfg.alaska.gov/ADU/

Region I, Southeast Region, Groundfish Home Page:
http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareasoutheast.groundfish

Gene Conservation Laboratory Home Page:
http://www.adfg.alaska.gov/index.cfm?adfg=fishinggeneconservationlab.main

Region II, Central Region, Groundfish Pages:
http://www.adfg.alaska.gov/index.cfm?adfg=fishingcommercialbyarea.southcentral

Westward Region, Groundfish Pages:
http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyfisherygroundfish.groundfishareas

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

Demersal shelf rockfish stock assessment document:
http://www.afsc.noaa.gov/REFM/Docs/2015/GOAdsr.pdf

Groundfish charts:
http://www.adfg.alaska.gov/index.cfm?adfg=CommercialByFisheryGroundfish.groundfishmaps

VI. Publications

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APPENDICES

Appendix I. Alaska Department of Fish and Game Full-time Groundfish Staff During 2016

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SOUTHCENTRAL REGION

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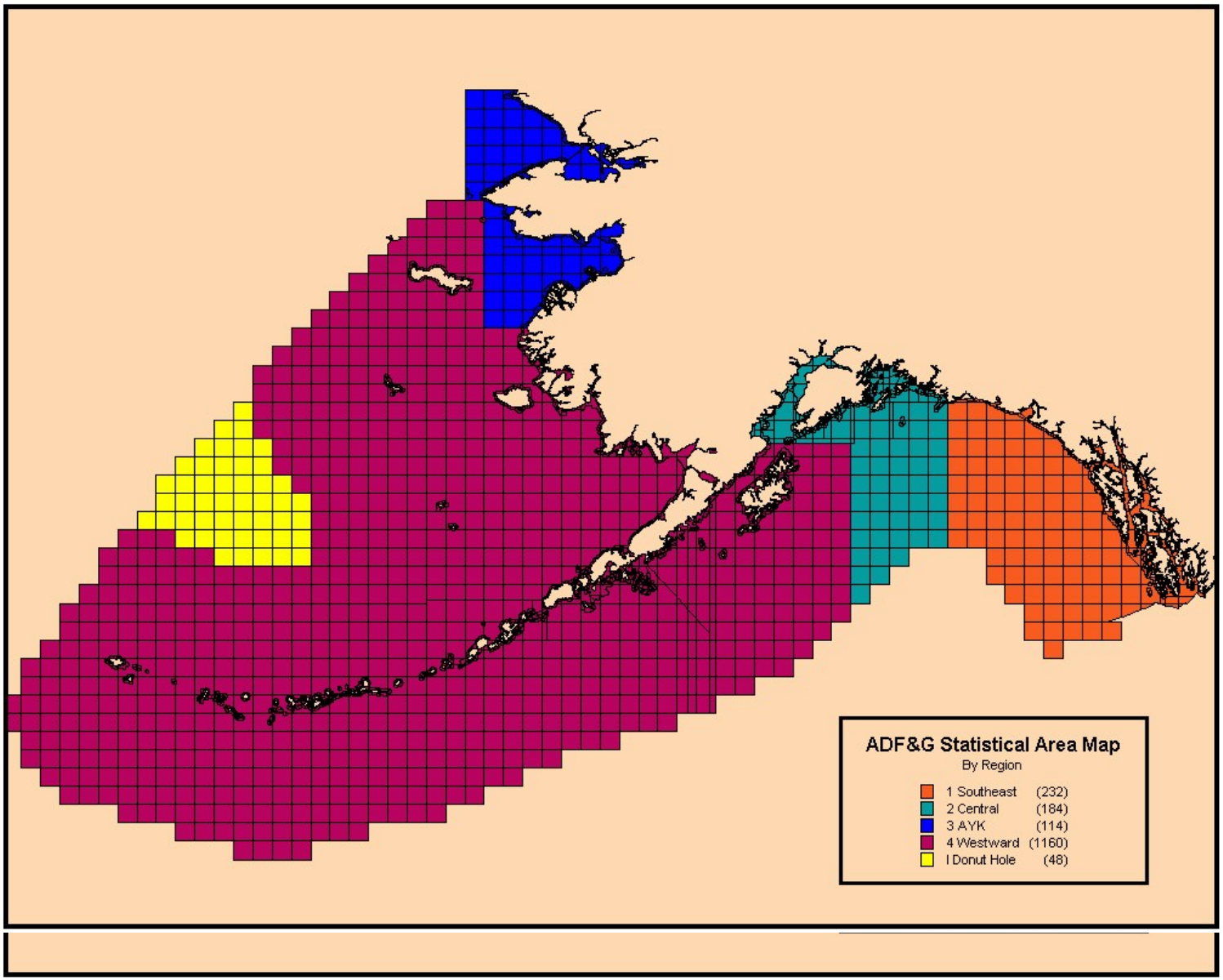
Appendix II. Map Depicting State of Alaska Commercial Fishery Management Regions.


ADF&G Statistical Area Map
By Region
1 Southeast (232)
2 Central (184)
3 AYK (114)
4 Westward (1160)
I Donut Hole (48)

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
	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
	Kachemak Bay	1999	58	fin
	Kodiak Island	1999	115	fin
	Resurrection Bay	1999	100	fin
	Fairweather Grounds	1999	100	fin
	SE Stat Areas 355601, 365701 (CSEO)	1999	100	fin
	Whittier	2000	97	fin
	Whittier	2000	50	fin
Black rockfish, *S. melanops*				
	Kodiak Island	1996	2	muscle, liver, heart, eye
	Ugak Bay, Kodiak Island	1997	100	muscle, liver, heart, eye
	Resurrection Bay - South tip Hive Island	1997	82	muscle, liver, heart, eye, fin
	Carpa Island	1998	40	fin
	Eastside Kodiak Is.: Ugak and Chiniak Bays	1998	100	fin
	Southwest side Kodiak Island	1998	86	fin
	Westside Kodiak Island	1998	114	fin
	North of Fox Island	1998	24	fin
	Washington - Pacific Northwest	1998	20	fin
	Sitka	1998	50	fin
	Castle Rock near Sand Point	1999	60	fin
	Akutan	1999	100	fin
	Oregon - Pacific Northwest	1999	50	muscle, liver, heart
	SE Stat Areas 355631, 365701 (CSEO)	1999	83	fin
	Sitka Sound Tagging study	1999	200	fin
	Dutch Harbor	2000	6	fin
	Chignik	2000	100	fin
	Valdez	2000	13	fin

	Whittier	2000	16	fin
	Valdez	2001	50	fin
	Whittier	2001	93	fin
	Yakutat Bay	2003	130	fin
Dusky rockfish, *S. ciliatus*				
	Kodiak Island	1997	50	muscle, liver, heart, eye
	Resurrection Bay	1998	3	fin
	Eastside Kodiak Is.: Ugak, Chiniak, Ocean Bays	1998	100	muscle, liver, heart, eye
	Sitka Black RF Tagging study	1999	15	muscle, liver, heart, eye
	Sitka	2000	23	liver, fin
	Sitka	2000	23	fin
	Harris Bay - Outer Kenai Peninsula	2002	37	muscle
	North Gulf Coast - Outer Kenai Peninsula	2003	45	fin
Walleye pollock, *Gadus chalcogrammus*				
	Exact location unknown; see comments	1997	402	fin
	Bogoslof Island	1997	120	muscle, liver, heart
	Middleton Island	1997	100	fin
	NE Montague/E Stockdale	1997	100	fin
	Orca Bay, PWS	1997	100	fin
	Port Bainbridge	1997	100	fin
	Shelikof Strait	1997	104	muscle, liver, heart, eye, fin
	Bogoslof Island	1998	100	muscle
	Eastern Bering Sea	1998	40	muscle, liver, heart
	Middleton Island	1998	100	muscle, liver, heart
	Port Bainbridge	1998	100	muscle, liver, heart
	Resurrection Bay	1998	120	fin
	Shelikof Strait	1998	100	muscle, liver, heart
	PWS Montague	1999	300	heart
	Eastern PWS	1999	94	heart
	Kronotsky Bay, E. Coast Kamtchatka	1999	96	muscle, liver, heart, eye, fin
	Avacha Bay	1999	100	unknown
	Bogoslof Island	2000	100	muscle, liver, heart
	Middleton Island	2000	100	muscle, liver, heart
	Prince William Sound	2000	100	muscle, liver, heart
	Shelikof Strait	2000	100	muscle, liver, heart