

OREGON'S GROUND FISH FISHERIES AND INVESTIGATIONS IN 2015

OREGON DEPARTMENT OF FISH AND WILDLIFE

2016 AGENCY REPORT

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I) Agency Overview

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The Marine Resources Program (MRP) is within the Oregon Department of Fish and Wildlife (ODFW) and has jurisdiction over marine fish, wildlife and habitat issues coastwide. MRP is headquartered at Newport in the Hatfield Marine Science Center, with field stations at the cities of Astoria, Charleston, Brookings and Corvallis. MRP is tasked with the responsibility for assessment, management and sustainability of Oregon's marine habitat, biological resources and fisheries. In addition to direct responsibilities in state waters (from shore to three miles seaward), MRP provides technical support and policy recommendations to state, federal, regional and international decision-makers who develop management strategies that affect Oregon fish and shellfish stocks, fisheries and coastal communities. Staffing consists of approximately 60 permanent and more than 60 seasonal or temporary positions. The current annual program budget is approximately \$8.75 million, with about 77% coming from state funds including sport license fees, commercial fish license and landing fees, and a small amount of state general fund. Grants from federal agencies and non-profit organizations account for the remaining 23% of the annual program budget.

II) Surveys

a) Sport Fisheries Monitoring

Sampling of the ocean boat sport fishery by MRP's Ocean Recreational Boat Survey (ORBS) continued in 2015. Starting in November 2005, major ports were sampled year-round and minor ports for peak summer-fall season. We continue to estimate catch during un-sampled time periods in minor ports based on the relationship of effort and catch relative to major ports observed during summer-fall =periods when all ports are sampled. Lingcod (*Ophiodon elongatus*), several rockfish species (*Sebastes* spp.), cabezon (*Scorpaenichthys marmoratus*) and kelp greenling (*Hexagrammos decagrammus*) are the most commonly landed species.

The ORBS program continued collecting information on species composition, length and weight of landed groundfish species at Oregon coastal ports during 2015. Since 2003, as part of a related marine fish ageing research project, lingcod fin rays and otoliths from several species of nearshore groundfish, including rockfish species, kelp greenling and cabezon, were gathered. Starting in 2001, a portion of sport charter vessels were sampled using ride-along observers for species composition, discard rates and sizes, location, depth and catch per angler. Beginning in 2003, the recreational harvest of several groundfish species is monitored inseason for catch limit tracking purposes.

Other ODFW management activities in 2015 include participation in the U.S. West Coast Recreational Fish International Network (RecFIN) process, data analysis, public outreach and education, and public input processes to discuss changes to the management of groundfish and Pacific halibut fisheries for 2016, 2017-2018, and beyond.

Contact: Lynn Mattes (lynn.mattes@state.or.us), Patrick Mirick (patrick.p.mirick@state.or.us)

b) Commercial Fisheries Monitoring

Data from commercial groundfish landings are collected throughout the year and routinely analyzed by ODFW to provide current information on groundfish fisheries and the status of the stocks. This information is used in management, including in-season adjustments of the commercial nearshore fishery, which is conducted in state waters, and for participation in the Pacific Fisheries Information Network (PacFIN). Species composition sampling of rockfish and biological sampling of commercially landed finfish continued in 2015 for commercial trawl, fixed gear and hook and line landings. Biological data including length, age, sex and maturity status continued to be collected from landings of major commercial groundfish species.

Contact: Carla Sowell (Carla.Sowell@state.or.us), Scott Malvitch (Scott.Malvitch@state.or.us)

c) Pilot study – Using Electronic Monitoring in Commercial Fishery sampling

Sampling tools for collecting biological data from commercial groundfish landings have not changed in many years. Currently, lengths are determined on manual plastic length boards. Data are recorded on paper datasheets, and transcribed and entered into spreadsheets once back in the office. Funding was secured in 2015 to acquire and test new electronic-based system that includes an electronic length board and scale connected to tablets for commercial landings in 2016. Field and office based tests will collect data on effort, errors and accuracy of the new system to compare with the existing paper-based system. Study design will be finalized in early 2016, and testing will occur during the second half of 2016.

Contact: Alison Whitman (alison.d.whitman@state.or.us)

d) Pilot study – Reinitiating the Shore and Estuary Boat Survey (SEBS)

In July 2005, sampling of the shore and estuary fishery was discontinued due to a lack of funding. Marine finfish catches outside the ocean boat modes have not been sampled since. In late 2015, ODFW received funds from two outside sources to resume a survey of limited scope for estimating shore and estuary marine finfish catches in 2016. This pilot study includes two main components – an angler intercept survey and a fishing effort survey that compares effort estimates from both phone and mail surveys. Effort surveys will also include estimates of ocean boat effort, to compare with existing Oregon Recreational Boat Survey effort estimates. Angler intercept surveys will begin in May 2016, and effort surveys will begin July.

Contact: Alison Whitman (alison.d.whitman@state.or.us)

III) Marine Reserves

a) Management

The ODFW Marine Reserves Program is responsible for overseeing the management and scientific monitoring of Oregon's five marine reserve sites. ODFW has launched a new Oregon Marine Reserves website: OregonMarineReserves.com. Also, a new Oregon Marine Reserves *Ecological Monitoring Plan* was released in 2015, which includes information on survey study designs, the four core monitoring tools used by the Marine Reserve Program, and site specific monitoring plans and timelines for ecological surveys. Finally, harvest restrictions began at Oregon's fifth and final marine reserve site, at Cape Falcon, on January 1, 2016.

b) Monitoring

Hook and Line Surveys: The ODFW Marine Reserves Program continued hook and line surveys in 2015 at three of the marine reserves: Cape Falcon, Cascade Head, and Redfish Rocks and their associated comparison areas. Data collection was broken into two periods: Spring (April-May) and Fall (September-October). Surveys were conducted on 36 at-sea fishing days with the assistance of 93 volunteer anglers. Although each site is unique in species composition, the 2015 survey caught a total of 4,325 fish representing 22 species and seven families.

Lander Surveys: In 2015, the ODFW Marine Reserves Program completed lander surveys at Redfish Rocks and Otter Rock marine reserves and their associated comparison areas as well as Seal Rock. A total of 400 drops were conducted with 69% meeting requirements for view, habitat, and visibility. Surveys were conducted February – June and September – October of 2015. The drops conducted at these three sites contained observations of 12 different species from four families.

ROV Surveys: ROV surveys were conducted by the ODFW Marine Habitat Project at Cape Perpetua and Cascade Head marine reserves, and the Cavalier comparison area in 2015. The surveys were conducted in April and September of 2015. A total of five transects were completed at Cape Perpetua marine reserve and nine transects were completed at the Cascade Head marine reserve and Cavalier comparison area.

c) Research

Development and Testing of a Video Mini-Lander for Studying Demersal Fishes on Nearshore Rocky Reefs: In 2015, the ODFW Marine Reserves Program completed a pilot study designed to test a new video lander configuration that is both light-weight and cheap to build -- to more readily survey shallow, rocky, nearshore reefs. Pilot studies using this new configuration were conducted to optimize use of this tool in Oregon's nearshore waters.

First, our studies of fish behavior did not uncover species fleeing the tool (avoidance behavior) or continually curious (attractive behavior). Rather most fish seemed unaffected by this new apparatus entering their home---a good thing for collecting unbiased data on species abundances. Second, while bait has been useful in increasing the numbers and diversity of fishes observed in other lander systems around the globe, in Oregon's nearshore waters baiting the lander did not increase the species diversity or abundance of fish captured on the video nor improve our ability to identify the fish to species. Lastly, this pilot study found that 8 minutes is an appropriate deployment duration to get a representative sample of fish populations at a nearshore study site. Ultimately, these results help our team and other scientists better understand strengths and limitations of video survey tools.

The ODFW Marine Reserve Program has submitted the results of this pilot study for publication to the *Journal of Experimental Marine Biology and Ecology*.

Development and Testing of a Fishery-independent Longline Method for Studying Demersal Fishes on Nearshore Rocky Reefs: While in the early stages of establishing robust, long-term monitoring protocols for evaluating fish communities in Oregon's system of marine reserves, the ODFW Marine Reserve Program is experimenting with alternative fishery-independent methods tailored to each specific reserve site. In 2015, a longline pilot study was conducted concurrently with our ongoing

hook-and-line survey in an attempt to increase the catch of species of interest (e.g. rockfishes such as quillback, copper, China, vermilion, and yelloweye), that are valued in the local fishery surrounding Redfish Rocks Marine Reserve. Our objectives were threefold. First, we sought to document detectability, or the probability of observing a species, among the sampling approaches. Second, we wanted to compare the observed species richness, catch rate (i.e. CPUE), and size distributions for fish species among the sampling approaches. Finally, we sought to compare the cost-benefit of each approach including survey costs, workforce needed, and prevalence of body injury and mortality on fishes by sampling method.

A total of 19 species were observed across all sampling methods. Average species richness varied between eight and ten species, with longline obtaining higher daily species richness compared to hook-and-line. Average daily catch rates of black rockfish, the primary species observed, were significantly different depending on the sampling method that was employed. Hook-and-line sampling had the highest catch rate of black rockfish. Longline sampling methods caught significantly larger sized canary rockfish ($p < 0.001$) and lingcod ($p < 0.001$) compared to the hook-and-line method. Longlining resulted in low incidence of predation (4%) and mortality (0.7%) in the fishes retrieved. Mortality was restricted to two species: canary and deacon rockfish (a single individual each). Similarly, observed barotrauma symptoms were low and only observed in canary rockfishes, though nearly all fish species retrieved did exhibit lethargy/exhausting likely due from time spent on the line. Results of this gear comparison study revealed that detectability of nearshore rocky reef fish species was highest for longline survey and opportunistic jigging surveys compared to hook-and-line sampling. Longline gear was found to select for larger lingcod and canary rockfish, both in mean size and maximum size of landed fish. Longline surveys were more cost effective than hook-and-line surveys and reduced our dependency on using volunteer anglers which can be difficult to obtain in rural communities adjacent to Oregon's marine reserve sites. However, it is important to consider that this sampling tool is not suitable in all areas given the requirements of knowledgeable longline captains who are willing to operate these types of surveys.

More information, including copies of monitoring plans and reports, is available on the Oregon Marine Reserves website at OregonMarineReserves.com.

Contact: Cristen Don (cristen.n.don@state.or.us)

IV) Review of Agency Groundfish Research, Assessment and Management

a) Hagfish

i) Research

No research on hagfish was conducted by ODFW in 2015.

ii) Assessment

No hagfish assessments were completed by ODFW in 2015.

iii) Management

The commercial hagfish fishery operates year-round. Two types of trap gear are typically used by the hagfish fleet, a 55 gallon drum and five gallon bucket. Each of these contains escape holes to increase the size selectivity of the commercial fishery. Commercial hagfish landings in

2015 were 1,824,624 pounds, which is 91% of the 2010 – 2014 average (2,004,150 pounds). No major management actions were taken in 2015 by ODFW.

Contact: Brett Rodomsky, (Brett.T.Rodomsky@state.or.us), Troy Buell (Troy.V.Buell@state.or.us)

b) Dogfish and other sharks

i) Research

No research on dogfish or other sharks was conducted by ODFW in 2015.

ii) Assessment

No dogfish or shark assessments were completed by ODFW in 2015.

iii) Management

There were no major management actions taken for dogfish or other sharks by ODFW in 2015.

c) Skates

i) Research

No research on skates was conducted by ODFW in 2015.

ii) Assessment

No skate assessments were completed by ODFW in 2015.

iii) Management

There were no major management actions taken for skates by ODFW in 2015.

d) Pacific cod

i) Research

No research on Pacific cod was conducted by ODFW in 2015.

ii) Assessment

No Pacific cod assessments were completed by ODFW in 2015.

iii) Management

There were no major management actions taken for Pacific cod by ODFW in 2015.

e) Walleye pollock

i) Research

No research on pollock was conducted by ODFW in 2015.

ii) Assessment

No pollock assessments were completed by ODFW in 2015.

iii) Management

There were no major management actions taken for pollock by ODFW in 2015.

f) Pacific whiting (hake)

i) Research

No research on whiting was conducted by ODFW in 2015.

ii) Assessment

No whiting assessments were completed by ODFW in 2015.

iii) Management

There were no major management actions taken for whiting by ODFW in 2015.

g) Grenadiers

i) Research

No research on grenadiers was conducted by ODFW in 2015.

ii) Assessment

No grenadier assessments were completed by ODFW in 2015.

iii) Management

There were no major management actions taken for grenadiers by ODFW in 2015.

h) Rockfish

i) Research

There were several ongoing research projects for rockfish. These are detailed below.

Movement of yelloweye rockfish using acoustic telemetry: We continued work writing up prior years field work on yelloweye rockfish movements.

Contact: Polly Rankin (polly.s.rankin@state.or.us) or Bob Hannah (bob.w.hannah@state.or.us)

Discard mortality of hook-and-line caught yelloweye rockfish with barotrauma: We continued work writing up our 2014 study evaluating the longer-term survival, health and behavioral competency of yelloweye rockfish experiencing capture-related barotrauma.

Contact: Polly Rankin (polly.s.rankin@state.or.us) or Bob Hannah (bob.w.hannah@state.or.us)

Investigation of site fidelity and movement of deacon rockfish (Sebastes diaconus): We will be investigating the site fidelity and movement tendencies of deacon rockfish at a site near Seal Rocks, Oregon.

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ii) Assessment

Two federal nearshore rockfish assessments were completed in 2015 for China and Black rockfish. ODFW staff were co-authors on both rockfish assessments (available in early 2016) and ODFW staff also participated in STAR panels reviewing these assessments in the summer and fall of 2015. Assessments indicated harvest of China rockfish could increase while harvest of Black rockfish needs to decrease slightly.

iii) Management

Commercial fishery: Rockfish are mainly taken in the nearshore commercial fishery. The commercial nearshore fishery in Oregon became a limited-entry permit-based program in 2004, following the development of the open access nearshore fishery in the late 1990's. The commercial nearshore fishery exclusively targets groundfish, including Black Rockfish, Blue Rockfish, Cabezon, Kelp Greenling, and Oregon's "Other Nearshore Rockfish" complex. The fishery is primarily composed of small vessels (25 ft. average) fishing in waters less than 30 fathoms. Fishing occurs mainly with hook-and-line jig and bottom longline gear types. Fish landed in this fishery supply mainly live fish markets, but also provide product for fresh fish markets. Landings are regulated through two-month trip limits, minimum size limits, and annual harvest guidelines. Weekly updates on landings allow MRP staff to more effectively manage the fishery in-season.

There were several notable events in 2015 commercial nearshore fishery management. Allowable impacts to federal minor nearshore rockfish were reduced. To manage to these reductions state trip limits for other nearshore rockfish were reduced and a separate trip limit for Blue Rockfish, alone, was established. Stock assessments occurred for three commercial nearshore species including Black rockfish, China rockfish, and kelp greenling. Landings from 2014 commercial nearshore fishing, logbook compliance, economic data, and biological data were published in the 2014 Commercial Nearshore Fishery Summary (Rodomsky et al. 2015). Overall, the majority of active fishery permit holders are located on the southern Oregon coast, resulting in most of the catch landed in Port Orford, Gold Beach and Brookings. Black rockfish continued to comprise the majority of landings. In-season management in 2015 included increases to two-month trip limits for Black rockfish, Blue rockfish, Other Nearshore Rockfish, and Greenling.

Contact: Brett Rodomsky (Brett.T.Rodomsky@state.or.us), Troy Buell (Troy.V.Buell@state.or.us)

Recreational fishery: Black rockfish (*Sebastes melanops*) remains the dominant species caught in the recreational ocean boat fishery. As in recent years, the retention of yelloweye rockfish (*S. ruberrimus*) was prohibited year round. In order to remain within the yelloweye rockfish impact cap (via discard mortality), the recreational groundfish fishery was restricted pre-season to inside

of 30 fathoms from April 1 to September 30. New in 2015 for the first time since 2004, retention of canary rockfish (*S. pinniger*; one fish sub-bag limit) was allowed, due to increasing trends in the stock abundance.

Contact: Lynn Mattes (lynn.mattes@state.or.us), Patrick Mirick (patrick.p.mirick@state.or.us)

Outreach: To reduce bycatch mortality of overfished rockfish species in the sport fisheries, ODFW began an outreach campaign in 2013 with the goal of increasing descending device usage among sport anglers. The effort, branded “No Floaters: Release At-Depth”, has distributed over 12,000 descending devices to date, to all charter vessel owners and to the majority of sport boat owners who had previously targeted groundfish or halibut. ODFW staff have also participated in a number of angler education workshops, meetings, and shows to educate anglers and distribute devices. In addition, several thousand stickers bearing an emblem of the brand (**Error! Reference source not found.**) have been distributed with the goal of making rockfish conservation an innate aspect of fishing culture. This outreach and education campaign appears to be successful. Prior to the beginning of the campaign, fewer than 40 percent of anglers used descending devices. After the campaign, the percentage of users increased to greater than 80 percent. The percentage of users has remained near that 80 percent level. Additional outreach efforts include: videos are being produced that show fish successfully swimming away after release with a device and new rockfish barotrauma flyers have been produced. This outreach campaign has been the result of collaboration between ODFW, two angler groups (Oregon Coalition for Educating Anglers and Oregon Angler Research Society), Utah’s Hogle Zoo, ODFW’s Restoration and Enhancement (R & E) program, and the National Marine Fisheries Service (NMFS) Saltwater Recreational Policy.

Contact: Lynn Mattes (lynn.mattes@state.or.us), Patrick Mirick (patrick.p.mirick@state.or.us)

i) Thornyheads

i) Research

No research on thornyheads was conducted by ODFW in 2015.

ii) Assessment

No thornyhead assessments were completed by ODFW in 2015.

iii) Management

There were no major management actions taken for thornyheads by ODFW in 2015.

j) Sablefish

i) Research

No research on sablefish was conducted by ODFW in 2015.

ii) Assessment

No sablefish assessments were completed by ODFW in 2015.

iii) Management

There were no major management actions taken for sablefish by ODFW in 2015.

k) Lingcod

i) Research

No research on lingcod was conducted by ODFW in 2015.

ii) Assessment

No lingcod assessments were completed by ODFW in 2015.

iii) Management

Lingcod are landed both commercially and recreationally. Commercial lingcod landings are monitored weekly as part of the nearshore commercial groundfish fishery. In 2015, nearshore landings were dominated by hook and line catches (91%) and totaled 207,066 pounds. The Dahl limited entry/open access sector landings were 147,861 pounds in 2015. Recreational lingcod landings are monitored by ORBS and subject to a daily bag limit and a minimum size limit (22 inches).

l) Atka mackerel

i) Research

No research on atka mackerel was conducted by ODFW in 2015.

ii) Assessment

No atka mackerel assessments were completed by ODFW in 2015.

iii) Management

There were no major management actions taken for atka mackerel by ODFW in 2015.

m) Pacific halibut & IPHC activities

i) Research

ODFW did not conduct any halibut research projects in 2015.

ii) Assessment

ODFW did not complete any halibut assessments completed in 2015.

iii) Management

Oregon's recreational fishery for Pacific halibut continues to be a popular, high profile fishery requiring International Pacific Halibut Commission (IPHC), federal, and state technical and

management considerations. In 2015, the IPHC recommended an annual catch limit for Area 2A (Oregon, Washington, and California) of 0.97 million pounds. The recreational fishery for Pacific halibut is managed under three subareas with a combination of all-depth and nearshore quotas. In 2015, the Columbia River subarea quota was 10,254 pounds, the Central coast subarea quota was 175,633 pounds, and the Southern coast subarea quota, after inseason adjustments, was 3,081 pounds. Landings in the sport Pacific halibut fisheries are monitored weekly for tracking landings versus catch limits. The majority of halibut continue to be landed in the central coast subarea, with the greatest landings in Newport followed by Garibaldi or Pacific City. Total 2015 recreational landings in the Central coast subarea was 174,957 pounds (99% of quota). Landings in the Southern subarea were 2,583 pounds (84% of quota) and in the Columbia River subarea, landings were 9,339 pounds (91%).

- n) Other groundfish species
 - i) Kelp greenling

Kelp greenling are a component of both the nearshore commercial fishery and the recreational fishery. Commercial landings from the nearshore commercial fishery totaled 28,467 pounds in 2015. Recreational catches totaled 11,464 pounds (5.2 metric tons). ODFW staff acted as a co-author on the federal kelp greenling stock assessment, which was completed in 2015 (Berger et al, 2015). An ODFW informational report on kelp greenling growth and maturity was completed in 2015 and is available on the ODFW website.

- ii) Cabezon

Commercial cabezon landings from the commercial nearshore fishery in 2015 were 36,064 pounds. Recreational landings were 35,715 pounds (16.2 metric tons). Pre-season in 2014, and continuing in 2015, the cabezon season was modified to July 1 through December 31. This allowed the cabezon season to proceed with a lower chance of inseason actions being necessary.

- V) Ecosystem Studies
 - a) Development of a Fishery Independent Survey

The Marine Resources Program annual retreat in 2015 identified the development of a fishery independent survey for nearshore groundfish species as a high priority for the MRP. Four working groups were established to accomplish this and other identified high priorities. One specific task assigned to the Stock Assessment and Management working group was to host a workshop with federal assessors to invite their input on preliminary designs and tools appropriate for a fishery independent survey. The workshop is planned for early 2016.

Multiple projects at MRP have been working on the development of both visual and acoustic tools for the purposes of estimating population size and fish habitat associations of various types of groundfish for many years. Further information on these tools can be found in sections V.b – V.e below and in the Marine Reserves section above (Section III).

Contact: Alison Whitman (alison.d.whitman@state.or.us)

- b) Video lander development and surveys

Development and testing of video lander lighting conditions: We initiated a study investigating the effects of ambient light and turbidity/scattering on the effective sampling range of a stereo-video lander. This work is currently “in press” at the Marine and Coastal Fisheries journal.

Contact: Bob Hannah, (bob.w.hannah@state.or.us), or Matthew Blume (matthew.blume@state.or.us)

Surveys of subtidal rocky areas with the video lander: Surveys of shallow (<55 m) subtidal rocky areas were continued in the spring of 2015 in the waters near Newport, OR. This effort focused on exploring the use of the video lander designed by ODFW (Hannah and Blume 2012) as a tool for fishery independent surveys of nearshore rocky reef associated fishes and invertebrates and their habitat associations. In addition to collecting information to classify the primary and secondary substrates in view, water column properties were collected at the drop site using a casting conductivity temperature depth instrument (Seabird 19plus) equipped with an oxygen sensor. In 2015 we sampled 102 stations, adding to the 105 stations sampled in 2014. The lander sampled the bottom for approximately 14 minutes. Initial examination of the video collected in 2014 by both this project and similar video lander tools utilized by the ODFW marine reserves group suggests that the number of fish species seen in the videos collected on Oregon’s nearshore rocky reefs tends to level off after approximately 8 to 10 minutes and the maximum number for any given species seen at any one time also occurs within that time frame. We plan to analyze how the fish community in Oregon’s nearshore varies with environmental gradients.

Contact: Greg Krutzikowsky, (greg.krutzikowsky@state.or.us)

c) Hook and Line Surveys

We conducted two brief field studies evaluating standardized methods for nearshore hook-and-line surveys including an evaluation of semi-circle barbless hooks and a comparison of approaches to fishing site selection. Internal summary reports available upon request.

Contact: Bob Hannah (bob.w.hannah@state.or.us)

d) Drop Camera development

Work has been initiated, and will be continued, on developing a suspended GoPro-based stereo-video drop camera for estimating species and size composition of suspended rockfish schools for use in conjunction with acoustic estimates of rockfish abundance. If successful, we hope to use this device in conjunction with acoustic estimates of rockfish abundance on nearshore rocky reefs.

Contact: Bob Hannah, (bob.w.hannah@state.or.us) or Matthew Blume (matthew.blume@state.or.us)

e) Acoustic survey development

Surveys for Pacific herring in Yaquina Bay with an acoustic system began in 2014 to estimate spawning population size in early spring. A DT-X acoustic system was purchased from BioSonics Inc. to continue these surveys in 2015 and to expand use of this system to groundfish fishery independent surveys. Additional training in general hydroacoustic theory and analysis for ODFW MRP staff was completed

in October 2015. Accompanying tool development was initiated by the Research Project (see V.d “Drop Camera development”, above) and infrastructure for acoustic deployment on larger vessels was manufactured in late 2015. Initial testing of simultaneous deployment of the acoustic and drop camera will occur in early 2016.

Contact: Alison Whitman (alison.d.whitman@state.or.us)

f) Aging Activities

During 2015, 4,356 age estimates were produced for recreation, commercial, and research purposes within the Marine Resource Program. For recreation and commercial programs, 2092 black rockfish ages were produced, with an additional 413 test ages generated. Kelp greenling were also aged for the recreation fishery with 326 ages generated, and 66 tested. To fulfill research needs, an additional 404 black rockfish (76 tested), 456 red banded rockfish (76 tested), 254 brown rockfish (52 tested), and 117 kelp greenling (24 tested) were also aged.

Contact: Lisa Kautzi (Lisa.A.Kautzi@state.or.us)

g) Maturity Studies

We continued research begun several years ago to produce histologically verified female maturity data for a variety of species for which maturity data is unavailable or outdated. We completed work on female deacon and blue rockfish (previously called blue-sided and blue-blotched rockfish, respectively), as well as kelp greenling, in 2014. We also completed a summary of female maturity data for redbanded rockfish from Oregon waters. Agency Informational Reports describing our findings can be accessed at: <http://www.dfw.state.or.us/MRP/publications/#Research>. A report summarizing ODFW maturity studies from 2000-2015 will be worked on.

Contact: Bob Hannah (bob.w.hannah@state.or.us; summary report, rockfish); Brett Rodomsky (Brett.T.Rodomsky@state.or.us; kelp greenling)

h) ROV Habitat studies

The Marine Habitat project conducted video transect surveys of seafloor habitats and biota at five locations in 2015 using a remotely operated vehicle (ROV). The Department's first ROV surveys at Cape Arago Reef quantified habitat and groundfish abundance in 19 transects targeting rocky reef between 20 m and 100 m depth in October 2015. Other surveys, focused on methodological development for assessing potential biogenic habitats in nearshore waters, were conducted at Cape Perpetua Marine Reserve, Cascade Head Marine Reserve, Cavalier Comparison Area, and further offshore at Stonewall Banks, with a total of 19 transects conducted over three days in April 2015. In addition, in September 2015 the ROV was used to investigate the potential for large sand dollar beds to provide low-relief habitat for flatfish and other organisms in shallow water (15 - 20 m) near Otter Rock Marine Reserve, and also to repeat transects at Cape Perpetua Marine Reserve for a continuation of the ongoing time series of reef observations at that site.

Contact: Scott Marion (Scott.R.Marion@state.or.us)

VI) Publications

Berger, A., L. Arnold, and B.T. Rodomsky. 2015. Status of Kelp Greenling (*Hexagrammos decagrammus*) along the Oregon coast in 2015. www.pcouncil.org.

Easton, R.R., S.S. Heppell and R.W. Hannah. 2015. Quantification of habitat and community relationships among nearshore temperate fishes through analysis of drop camera video. *Marine and Coastal Fisheries: Dynamics, Management and Ecosystem Science* 7:87-102.

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