

Data Report and Summary Analyses of the U.S. West Coast Non-Nearshore Fixed Gear Groundfish Fishery

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INTRODUCTION

Overview

This report summarizes discarded catch data collected by the West Coast Groundfish Observer Program (WCGOP) from three distinct sectors of the fixed gear groundfish fishery along the U.S. west coast. These include: limited entry (LE) sablefish-endorsed fixed gear from April 1, 2008 through October 31, 2008; LE non-sablefish-endorsed fixed gear from January 1, 2008 through April 30, 2009; and open access non-nearshore fixed gear from January 1, 2008 through April 30, 2009. The WCGOP collects at-sea data from LE trawl and fixed gear fisheries, as well as from nearshore, shrimp, California halibut, and deep-water fisheries. The WCGOP's goal is to improve total catch estimates by collecting information on the discarded catch (fish returned overboard at-sea) of west coast groundfish species. The data are used in assessing and managing a variety of groundfish species.

U.S. West Coast Fixed Gear Groundfish Fishery

There are four major components to the west coast fixed gear groundfish fishery; the LE sablefish-endorsed sector, the LE non-sablefish-endorsed sector, the federal open access sector, and the state-permitted nearshore fisheries. This report includes three of the four sectors; the state-permitted nearshore fisheries, which generally occur in depths of less than 50 fathoms, are reported separately in the report "Data Report and Summary Analyses of the West Coast Nearshore Fixed Gear Fishery" (NMFS 2008). Up until 2008, the LE sablefish-endorsed and LE non-sablefish-endorsed sectors were reported in separate reports and the open access sector was not reported. To ease review of the fixed gear sectors in the commercial groundfish fleet, the WCGOP is now reporting all non-nearshore fixed gear sectors in one report.

Regulations for the three sectors of the west coast fixed gear groundfish fishery in this report are set by the Pacific Fishery Management Council (PFMC). The PFMC sets the optimum yield (OY) and harvest guidelines for groundfish species. The use of trip limits by fishery management has been to maintain year-round fishing, processing, and marketing opportunities. Since the 1980's, regulations have evolved to further separate individual groundfish species for management purposes and led to the current use of cumulative two-month trip limits for most species (PFMC 2008). Cumulative trip limits are a specified weight of fish that can be landed during a particular time period.

The limited entry fixed gear fishery requires a federal groundfish permit to participate. There were 227 LE fixed gear permits in 2008. LE fixed gear permits are either sablefish-endorsed or non-sablefish-endorsed. In addition, all LE fixed gear permits have gear endorsements (longline, pot/trap, or both). Of the 227 LE fixed gear permits in 2008, 164 had sablefish-endorsements. Of these, 132 were associated with longline gear, 32 were associated with pot/trap gear, and 4 were associated with both longline and pot/trap gear. The remaining 63 limited entry non-sablefish-endorsed permits were all associated with longline gear.

The open access fixed gear sector does not require federal or state permits. Therefore, the total number of participants varies widely from year to year. Open access vessels can use any type of hook-and-line or pot/trap gear, including longline, fishing pole, and vertical longline.

Limited Entry Sablefish-Endorsed Fixed Gear

Vessels participating in the LE sablefish-endorsed sector range in size from 33 to 95 feet and operate primarily out of ports in Oregon and Washington. Fishing generally occurs in depths greater than 80 fathoms. Nearly all of the vessels participating in this sector deliver their iced catch to shoreside processors. Catch in the LE sablefish-endorsed fishery is composed mostly of sablefish, with bycatch primarily composed of spiny dogfish shark, Pacific halibut, rockfish species, and skates. Vessels retain and deliver to processors the portion of catch that is marketable and permitted to be landed. The portion of their catch which is not marketable or for which regulations prohibit landing is discarded at-sea. In addition to market and regulatory discard, smaller fish may sometimes be discarded, as fishermen seek to maximize the value of their landed catch allowances.

LE sablefish-endorsed permits provide the permit holder with an annual share of the sablefish catch. Sablefish-endorsed permits are assigned to Tier 1, 2 or 3. Each Tier 1 permit receives 1.4% of the sablefish allocation, with Tiers 2 and 3 receiving 0.64% and 0.36%, respectively. Each year, these shares are translated into amounts of catch (in pounds), or “tier limits”, which may be caught during the primary fishery. In both the 2007 and 2008 season, these shares were translated into tier limits of 48,500 pounds for Tier 1, 22,000 pounds for Tier 2, and 12,500 pounds for Tier 3 (71 FR 78638). Of the 164 sablefish-endorsed permits in 2008, 28 were assigned to Tier 1, 42 to Tier 2, and 94 to Tier 3.

Regulations allow for up to three LE sablefish-endorsed permits to be ‘stacked’ on a single vessel. Permit stacking was implemented to increase the economic efficiency of the fleet and promote fleet capacity reduction. Stacking more than one sablefish-endorsed permit on a vessel allows the vessel to land sablefish up to the sum of the associated tier limits. For example, using 2007-2008 tier limits, a vessel with a Tier 1 permit which bought or leased an additional Tier 2 and a Tier 3 permit could land a total of 83,000 pounds of sablefish during the primary fishery (Tier 1 + Tier 2 + Tier 3 = 48,500 + 22,000 + 12,500 lbs). However, permit stacking does not convey additive landing limits for any other species.

LE sablefish-endorsed primary season fishing currently takes place over a seven-month period from April 1 to October 31. The seven-month season was first implemented in 2002. During 2001, the season was open from August 15 to October 31. For several years prior to 2001, tier limits were assigned, but they could only be fished during a 10-day window. Any primary season poundage left uncaught would then be divided into equal limits that were available to permitted vessels during a two-week “mop-up” fishery. Permit holders can now land their tier limits at anytime during the seven-month season. Once the primary season opens, all sablefish landed by a sablefish-endorsed permit is counted toward attainment of its tier limit. Vessels that have LE sablefish-endorsed permits can fish in the LE non-sablefish-endorsed fishery under daily/weekly trip limits once their quota of primary season sablefish has been caught or when the primary season is closed, from November 1 through March 31. These vessels are only included in the WCGOP sampling frame for the LE sablefish-endorsed primary season. Once they switch to the LE non-sablefish-endorsed fishery after reaching their primary tier quota, they are no longer covered.

Limited Entry Non-Sablefish-Endorsed Fixed Gear

The LE non-sablefish-endorsed fixed gear sector operates primarily out of southern California ports, with the largest landings occurring in Newport Beach and Oceanside, California. The fishery operates year-round but the majority of fishing activity occurs during the summer months when weather conditions improve.

Vessels in the LE non-sablefish-endorsed sector range in size from 17 to 60 feet, with an average length of 34 feet. Vessels catch a variety of groundfish species, including thornyheads, sablefish, rockfish, and flatfish. The fleet typically fishes in depths greater than 80 fathoms. Nearly all of the vessels participating in this fishery deliver their iced catch to fresh fish markets. For example, vessels operating out of Newport Beach, California fish in the early morning hours and arrive back to port around 6:00 AM to sell their fish to local restaurants or markets. These vessels retain only the portion of their catch that is marketable and permitted to be landed. The portion of catch that is prohibited or not marketable is discarded at-sea. Fishers may also discard certain size classes or certain species to maximize the value of their landed catch allowance.

LE non-sablefish-endorsed fixed gear permits are subject to daily and weekly trip limits for sablefish, thornyheads, and other species. In 2008, daily landing limits ranged from 300 to 500 pounds for sablefish, depending on the area. There also was a weekly option that provided the opportunity to make a single delivery once a week up to a limit, which ranged from 1,000 to 1,500 pounds depending on the area. Landings made under either of these options were also capped by a two-month cumulative limit ranging from 5,000 to 6,500 pounds depending on area and time period. The two-month cumulative limit for thornyheads was 10,000 pounds of longspine thornyhead and between 2,000 and 3,000 pounds of shortspine thornyhead depending on area.

Open Access Fixed Gear

As the open access sector of the fixed gear groundfish fishery does not require federal or state permits, characterizing the participants can be difficult. Vessels range in size from 10 to 97 feet, with an average length of 33 feet. Vessels catch a variety of groundfish species, including sablefish, spiny dogfish, and skates. Vessels operate out of all three states and generally fish in waters from 35 to 600 fathoms. These vessels retain only the portion of their catch that is marketable and allowed to be landed. The portion of catch that is prohibited or not marketable is discarded at-sea.

Open access fixed gear vessels are subject to daily and weekly trip limits for sablefish, spiny dogfish shark, and other species. In 2008, daily landing limits were 300 pounds for sablefish. There was also a weekly option that provided the opportunity to make a single delivery once a week up to a limit that ranged from 700 to 800 pounds depending on area. Landings made under either of these options were also capped by a two-month cumulative limits that ranged from 2,000 to 2,400 pounds depending on area and time period. Vessels operating north of 34° 27' N. latitude were not allowed to land thornyheads, while vessels operating south of 34° 27' N. latitude were allowed 50 pounds per day with no more than 1,000 pounds per two-month period. Limits for spiny dogfish shark ranged from 100,000 to 200,000 pounds per two-month period. Flatfish species, including dover sole, arrowtooth flounder, petrale sole, English sole, starry flounder, and all other flatfish were managed as a single group for the open access fishery, with a 3,000 pound monthly limit, of which no more than 300 pounds could be a species other than

Pacific sanddab. Landing canary rockfish, yelloweye rockfish, and cowcod was prohibited in all areas.

Commercial Fixed Gear Fisheries Data

Fisheries managers and enforcement officers use state-issued sales receipts, referred to as fish tickets, to monitor fishery landings. This information is transferred to the Pacific Coast Fisheries Information Network (PacFIN) regional database system by state fishery agencies in Washington, Oregon, and California. Unlike the LE groundfish trawl fleet, vessel logbooks are not routinely collected for the limited entry and open access fixed gear fleets. Fish tickets only provide information on the amount of fish landed. In order to ensure that total catch does not exceed the annual Optimum Yield (OY), managers also need discard information for each managed species. One of the best means of acquiring accurate data needed to estimate the amount of discarded catch is through an at-sea observer program.

West Coast Groundfish Observer Program

On May 24, 2001, NOAA Fisheries (National Marine Fisheries Service, NMFS) established the WCGOP in accordance with the Pacific Coast Groundfish Fishery Management Plan (50 CFR Part 660) (66 FR 20609). This regulation requires all vessels that catch groundfish in the United States Exclusive Economic Zone (EEZ) from 3-200 miles offshore to carry an observer when notified to do so by NMFS or its designated agent. Subsequent state legislation has extended observer coverage to California and Oregon vessels that fish in the 0-3 mile state territorial zone. Observers are stationed along the US west coast from Bellingham, Washington to San Diego, California.

Program Goals

The WCGOP's goal is to improve estimates of total catch and discard by observing groundfish fisheries along the U.S. west coast. Originally, the WCGOP focused observer effort in the LE trawl and fixed gear fisheries. In 2002, the WCGOP began deploying observers in open access fisheries while increasing its coverage of the LE trawl fishery. In 2005, the WCGOP increased its coverage of the LE fixed gear fishery and in 2006, the WCGOP improved coverage of the nearshore fishery. Currently, the WCGOP coverage goal is to maintain, at a minimum, 20% coverage of the LE trawl and fixed gear fisheries by landings, while continuing to improve coverage in open access and nearshore fisheries. The observer coverage plan is available at: <http://www.nwfsc.noaa.gov/research/divisions/fram/observer/observersamplingplan.pdf>.

METHODS

Limited Entry Fixed Gear Permit Selection

LE fixed gear permits are selected for observation using stratified random sampling. First, the WCGOP determines the amount of time (based on available resources) it will take to observe the entire fleet; this is termed the selection cycle. The selection cycle varies due to changing priorities and observer resources. Because of data and timeline requirements for fisheries managers and historical observer program vessel coverage, the selection cycle does not coincide with the date range of the observer data analyzed in this report. The WCGOP has two selection lists for the limited entry fixed gear fishery: sablefish-endorsed and non-sablefish-endorsed. For

the LE sablefish-endorsed sector, the data in this report (April-October 2008) were collected during the selection cycle from January 1, 2007 through December 31, 2009 (selection cycle 3). For the non-sablefish-endorsed sector, the data in this report (Jan 2008-April 2009) were collected during two selection cycles, January 1, 2008 through December 31, 2008 (selection cycle 4) and January 1, 2009 through December 31, 2009 (selection cycle 5).

The WCGOP aggregates ports along the US west coast into port groups, which are considered sampling strata. Vessels with LE fixed gear permits are assigned to a port group based upon the location of the previous year's landings. Within each port group, vessels are randomly selected for coverage. LE sablefish-endorsed permits are selected for all trips that land sablefish against their tiered sablefish quota during the primary season. LE non-sablefish-endorsed permits are selected for a two-month period. After the entire fleet has been selected, a new selection cycle begins. This selection process is designed to produce a logistically feasible sampling plan with a distribution of observations throughout the entire geographic range of the fishery over time. Based on this design and the current level of WCGOP funding, the program usually cycles through the LE sablefish-endorsed fixed gear fleet every three years and the LE non-sablefish-endorsed fixed gear fleet every year.

For more information on the rationale behind vessel selection, see the observer coverage plan at: <http://www.nwfsc.noaa.gov/research/divisions/fram/observer/observersamplingplan.pdf>.

Complications in Selecting LE Sablefish-Endorsed Permits

LE sablefish tiered permits can be transferred to any other fixed gear vessel with a sablefish-endorsed permit at any time during the year. This flexibility, combined with the benefits from permit stacking, results in inter- and intra-year movement of permits between fixed gear vessels. As mentioned previously, LE fixed gear vessels participating in the sablefish-endorsed primary fishery can have up to three 'stacked' tier permits.

The movement of permits from vessel to vessel throughout the year complicates permit selection and requires continuous monitoring. Although permit transfers are tracked through the NOAA Fisheries Permits Office at the Northwest Region, the WCGOP has limited resources to monitor permit movement throughout the season. While permit owners are initially contacted before the season begins regarding their selection for coverage, their permits can still be transferred to different vessels, potentially introducing bias into the WCGOP sampling process. The observer program has therefore adopted a policy of observing the vessel on which the selected permit is eventually fished, even though that vessel may land its catch in a different port group.

Additional complications occur when tier permits are stacked. Prior to 2007, vessels with multiple permits were not required to associate their landings with a specific permit. Consequently, if a vessel had a mix of selected and unselected permits, all tier-limit trips had to be observed in order to ensure that the landings of selected permits had been covered. This led to the following two complications: 1) unselected permits received coverage and 2) permits were selected a second time before other permits were covered a first time.

As an example of the first complication, a vessel with a Tier 1 and a Tier 2 permit could land a total of 70,500 pounds of sablefish in 2008. If only the Tier 1 permit was selected for observer

coverage, it would still be necessary to observe all primary season landings, up to 70,500 pounds, to ensure that all of the Tier 1 permit landings had been observed. This interferes with the assumption that the permit selection is a simple random sample of available permits due to the concurrent coverage of a permit that was not selected.

As an example of the second complication, suppose that the unselected Tier 2 permit in the example above was in fact observed, along with the Tier 1 permit during 2008. Following the primary sablefish season, the Tier 2 permit might remain on the same vessel or might be transferred to another vessel for the 2009 fishery. In either case, it might be selected for coverage in 2009, which would result in its landings having been observed in two consecutive years. In such circumstances where a permit has been previously covered, though not selected, the WCGOP has adopted the following policy:

- Observe the permit if it is attached to a vessel not previously observed for the primary fishery during the current selection cycle;
- Do not observe the permit if it is attached to a vessel that has been observed for the primary fishery during the current selection cycle.

In subsequent selection cycles, tracking of permit movement between vessels and permit landings will now be facilitated by additional regulations under Amendment 14 to the Pacific Coast Groundfish Fishery Management Plan (FMP). These included a regulation, effective January 1, 2007, which requires a permit owner who transfers a sablefish-endorsed permit mid-season to certify the cumulative amount of sablefish taken to date with that permit. During 2008, the majority of permit transfers occurred before any fishing had occurred against the permit, and thus most permits were transferred with zero cumulative pounds of sablefish. An additional requirement in 2007 to write the federal groundfish limited entry sablefish-endorsed permit number on state fish ticket landing receipts will also facilitate tracking of specific permit landings.

Open Access Fixed Gear Vessel Selection

The open access fixed gear fleet is also selected for observation using stratified random sampling. First, the WCGOP determines the amount of time (based on available resources) it will take to observe the entire fleet; this is termed the selection cycle. The selection cycle varies due to changing priorities and observer resources. Although the open access fixed gear sector in California has been observed by the WCGOP since 2004, coverage did not extend to Oregon and Washington until the beginning of 2007. For that year, open access fixed gear vessels from all three states were combined into a single sampling population and stratified random sampling was reinitiated under selection cycle 1. For the open access fixed gear sector, the data in this report (Jan 2008- April 2009) were collected in two selection cycles, January 1, 2008 through December 31, 2008 (selection cycle 2) and January 1, 2009 through December 31, 2009 (selection cycle 3).

Because the fishery is not permitted, a list of active open access fixed gear vessels was generated differently than were the permit lists for the limited entry fixed gear fleet. The open access fixed gear vessel list was based on fish ticket information from the PacFIN database. It included all fixed gear vessels with landings in Washington, Oregon, and California, that did not have federal

limited entry groundfish permits and that met the following criteria:

- Vessel had combined landings in 2006 or 2007 of at least 5,000 pounds of starry flounder, spiny dogfish shark, sablefish, or non-nearshore rockfish.
- Vessel landings did not include species allowed in state-permitted nearshore fisheries in California and Oregon.
- Vessel was greater than 17 feet in length.

These criteria resulted in a list of 171 open access fixed gear vessels that were eligible for selection by the observer program in 2008. Once the final vessel list was generated, vessels were assigned to port groups and sampled randomly in the same manner as described in the “Limited Entry Fixed Gear Permit Selection” section.

Coverage of Fixed Gear Sectors

A list of fisheries in order of priority for observer coverage can be found in WCGOP observer training manual (NWFSC 2008). The LE fixed gear groundfish sectors are the second highest priority for the WCGOP. The open access fixed gear sector is the fifth highest priority for the WCGOP. Some trips on selected vessels in the open access fixed gear sector may be missed when observers are unavailable due to coverage needs in one of the higher priority fisheries.

LE sablefish-endorsed vessels are selected for all trips during their primary sablefish season while fishing for tier quota sablefish. Thus, all trips in which a selected vessel lands quota against a tiered sablefish permit are required to have observer coverage. For the LE non-sablefish-endorsed and the open access fixed gear sectors, vessels are selected for a two-month period.

Some vessels whose permits are selected for a specific period may not be covered by an observer during that period or may not be covered on all trips during that period. A single trip may be waived from observer coverage due to observer availability, a safety issue that can be fixed in a relatively short period of time, or vessel space issues that arise when an extra person is aboard. A longer selection cycle waiver allows the vessel to fish without an observer during all trips taken during the entire selection cycle. Selection cycle waivers are given when a vessel has a serious safety concern that cannot be easily remedied or if the vessel is too small or space is too limiting to safely carry an observer.

Some vessels may receive a coverage period waiver. Coverage period waivers allow a vessel to fish all trips during a two-month period without an observer. Coverage period waivers are given for a variety of reasons including observer availability and vessel safety. Vessels are given a coverage period waiver for a specific two-month period or sablefish season. These vessels are added to the selection list for the next year (LE sablefish-endorsed) or two-month period (LE non-sablefish-endorsed). For instance, if a vessel is given a coverage period waiver for January 1 through February 28, that vessel is automatically selected for observer coverage for the period March 1 through April 30. Vessels continue to be added to subsequent selection lists until either an observer covers them or until the selection cycle ends, whichever comes first.

Fixed Gear Data Collection

Fisheries observers are trained professionals who monitor and record catch data on commercial fishing vessels by following protocols in the WCGOP Manual (NWFSC 2008).

Data collected by the observers on a trip basis include:

- Start time, end time, depth, and the location of set/retrieval of gear
- Gear type and fishing strategy
- Fish ticket identification number(s)

Data collected by the observers on a set basis include:

- Estimated total catch weight (including sets for which there is 100% discard)
- Weight of discard by catch category
- Reason for discard by catch category or species
- Species composition of discard by catch category
- Weight of fish retained by catch category
- Species composition of fish retained by catch category
- Catch of prohibited species and incidental take of protected species
- Size composition, tags, and viability assessments for Pacific halibut
- Size composition of discarded fish
- Basic taxonomic composition of non-fish bycatch
- Biological collections (length, sex, otoliths, etc.)

For more information regarding observer sampling on fixed gear vessels, refer to the WCGOP Observer Training Manual, Chapter 5.

Data Quality Control and Management

The WCGOP uses the following procedure to ensure that the quality of data collected is maintained:

1. Data are collected at-sea by the observer following protocols in the WCGOP Manual (NWFSC 2008).
2. Data are entered into a secure database system. A database table hierarchy is located in Appendix A.
3. Observers are debriefed by WCGOP staff after every two-month period. The debriefing includes:
 - Calculation, Data Form, and Sampling Methodology Checks - Observers send data to a debriefer on a monthly basis. The debriefer checks all calculations for accuracy, reviews data forms for completeness, and ensures appropriate sampling methodologies were employed.
 - Observer Logbook Review - Observers keep logbooks detailing the events of each trip, basic deck schematics, sampling methods used, communication logs, and confirmation of

- Interview - The observer is interviewed by the debriefer. During the interview, sampling methodologies employed on all trips are discussed and data errors are updated.
 - Evaluation - Observers are evaluated on their performance based upon WCGOP generated criteria.
 - Data Entry Check - Electronic data are compared to the raw data for keypunch errors. Also, all corrections discovered during debriefing are updated in the database program.
4. Database Quality Control Queries - Quality control queries are run to detect data that fall outside specified ranges and identify other inconsistencies between data elements. These database quality control queries are run every six months to a year on all data collected during a specified time period.
 5. Database Update - The raw data from all entries that are highlighted by the quality control queries are reviewed and the electronic data are updated.

Data Processing

Data processing includes the following steps: expanding the subsample of species composition to the set-level, translating observer species codes to the appropriate PacFIN fish ticket data codes, identifying and selecting the observer data records to match to fish tickets, querying and processing PacFIN fish ticket data associated with the fixed gear groundfish fisheries including the observed trips, and merging observer data and fish ticket data. The translation of WCGOP to PacFIN species codes allows a more seamless match of observer data with fish ticket data and provides consistent information for calculating observer coverage of overall fishery landings.

The WCGOP database administrator expands the subsamples of catch categories to the set level. In cases where the observer was only able to sample a portion of a particular set, a set-level expansion is needed. The following equation is used to calculate the weight of the retained and discarded catch of each species in a set:

$$X_s = \frac{x_s}{h} \times H$$

where:

- X_s = the calculated weight of species s in the set
- x_s = observed weight of the species s in the subsample
- h = the number of hooks sampled in a set
- H = the total number of hooks in a set

Once the set-level expansion is complete, a data file that includes all fields necessary for the analysis is produced.

Observer data that meet the following criteria are removed for the fish ticket matching process:

- Trips with sets where no retained or discarded information is recorded.
- All discarded catch information.

- Trips where no fish ticket could be found.
- Partial trips (trips where the vessel was observed for less than 100% of their landed catch).

Next, a translation step is applied to the WCGOP observer data that allows for the appropriate match to species codes on fish tickets in PacFIN.

Once these two steps are completed, the retained catch records from the observer data are merged with fish ticket data to provide more accurate estimates of retained catch. Fish tickets are trip- aggregated sales receipts for market species/categories. Fish ticket information is uploaded from state databases into the regional PacFIN database on a monthly basis and is subject to update frequently thereafter. The WCGOP data are linked to fish tickets by direct fish ticket number(s) obtained by the observer and/or by comparing the return date recorded by the observer with the dates of fish tickets from the vessel. For trips with multiple fish tickets, the fish ticket data are combined at the trip level for analysis purposes. For trips with missing fish tickets, the observer retained catch data are not adjusted.

The WCGOP data are adjusted so that the total trip pounds of retained fish in a catch category equals the total trip pounds on the fish ticket. This is done because the fish ticket weight is more accurate and fish tickets are legally binding documents. To match the total trip pounds, the weights within each observer retained catch category are scaled up or down by the ratio of fish ticket to observer trip weights for that category. The following equation is used to calculate the adjustment factor:

$$A_{mtk} = \frac{x_{mtk}}{\sum_k x_{mtk}}$$

where:

x_{mtk} = lbs in catch category k in set t in trip m

A_{mtk} = adjustment factor used for catch category k in set t in trip m

The adjustment factor for each set is then applied to the total fish ticket weight at the trip level. This produces an adjusted weight for each set within that trip. The equation used for this adjustment is as follows:

$$x_{mtk} = A_{mtk} \times C_{mk}$$

where:

C_{mk} = lbs in catch category k for trip m recorded on the fish ticket

When a catch category in the WCGOP data cannot be matched to a fish ticket catch category, the WCGOP data are not adjusted. Catch categories found only on the fish tickets are distributed across the observed sets using the proportion of the observed catch per set divided by the total observed catch per trip using the following equation:

$$B_{mk} = \frac{\sum_k \sum_s x_{mtks}}{\sum_t \sum_k \sum_s x_{mtks}}$$

$$C_{mtk} = B_{mt} \times C_{mk}$$

where:

B_{mt} = the proportion of observed catch in set t in trip m

C_{mtk} = lbs in catch category k for set t in trip m recorded on the fish ticket

Upon completion of the observer data merge and adjustment with fish ticket data, the data that had been previously removed for the matching process are then incorporated back into the data file for analysis.

Analysis

Observed coverage rates in the limited entry and open access fixed gear sectors were calculated as the proportion of fleet-wide sablefish landings observed. Overall, sablefish is the largest component of the catch in the limited entry sablefish-endorsed and open access fixed gear sectors. The LE non-sablefish-endorsed sector also includes a large component of shortspine thornyhead catch, particularly in the area south of 36° N. latitude. Although different denominators are used north and south of 36° N. latitude when observer data are expanded to estimate discard at the fixed gear fleet-wide level (Bellman et al. 2008), observer coverage rates in this report were calculated using the same denominator (sablefish landings) to provide consistency across all fixed gear sectors. Coverage rates were computed based on the complete dataset for 2008 and January through April of 2009.

After coverage rates were calculated but prior to subsequent analyses, data that met the following criteria were removed:

- Data where WCGOP data quality standards were not met.
- Sets where no retained or discarded information was recorded.
- Sets where the species composition of discarded catch was not known (unsampled discard).

Once these steps had been applied, the ratio estimator technique (Cochran 1977) was used to estimate discard rates for each major species or species group. Rates were calculated for all of the stocks currently managed under rebuilding plans, as well as stocks for which discard is estimated annually on a fleet-wide basis. Bycatch and discard information for prohibited and protected resources such as Pacific halibut, salmon, green sturgeon, marine mammals, seabirds, and sea turtles are provided in separate reports, which are available electronically at www.nwfsc.noaa.gov/research/divisions/fram/observer/datareport/index.cfm. The ratio estimates (R_i) were calculated by area (i):

$$R_i = \frac{\sum_t y_{it}}{\sum_t x_{it}}$$

where:

y_{it} = the discarded or total catch pounds of a species i in the set t

x_{it} = the retained pounds of sablefish or groundfish species (see description below) in the set t

The variance of R_i is approximated by using the following equation:

$$\text{Var}(R_i) = \left(\frac{\bar{y}_i}{\bar{x}_i} \right)^2 \left[\frac{s^2(y_{it})}{\bar{y}_i^2} + \frac{s^2(x_{it})}{\bar{x}_i^2} - \left(\frac{s^2(y_{it})}{\bar{y}_i^2} \cdot \frac{s^2(x_{it})}{\bar{x}_i^2} \right) \right]$$

where:

\bar{x}_i and \bar{y}_i = the means of x_{it} and y_{it} over the sets

$s^2(x_{it})$ and $s^2(y_{it})$ = the standard errors of x_{it} and y_{it} over all sets

This variance estimator is that which was employed by Pikitch et al. (1998) and is based on methods presented by Cochran (1977). Note that $\text{Var}(R_i)$ cannot be calculated when $x_{it} = 0$ or $y_{it} = 0$ for all sets and should be considered with extreme caution when R_i is equal to one. In order to best support fishery management, variance was calculated separately for data in each geographic area (north of 40° 10' N. latitude, 40° 10' to 36° N. latitude, and south of 36° N. latitude). Variance estimates, therefore, do not relate back directly to the random stratified sampling framework employed by WCGOP, where vessels within each port group were the sampling unit.

Discard ratios were computed separately for each fixed gear fishery as the observed discard weight of a particular species over the observed weight of retained sablefish. Because the rates provided in this report are used directly in the estimation of fleet-wide discard, calculations performed on data south of 36° N. latitude were modified to be consistent with methodology in the total mortality analysis (Bellman et al. 2008). For these data, discard ratios were instead computed as the observed discard weight of each species over the observed weight of all retained groundfish species listed in the Pacific Coast Groundfish FMP, except Pacific hake.

Similarly, bycatch ratios were calculated as the observed total catch weight (discarded + retained) divided by the observed weight of retained sablefish for all data north of 36° N. latitude. South of 36° N. latitude, bycatch ratios were calculated using retained FMP groundfish (except Pacific hake) in the denominator rather than sablefish alone. Pacific hake was excluded when using a retained groundfish denominator because vessels that target or land large amounts of this species are considered to be part of the hake fishery, which is distinct from other groundfish fisheries.

In all cases where a FMP groundfish species grouping was used to compute discard and bycatch ratios, any retained weights that were recorded by the observer but that did not appear on fish

tickets were excluded from the denominator. This was done to prevent double counting associated with differences in the species codes used by observers and processors. For instance, while observers record rockfish catch at the species level, various species of rockfish are often grouped, weighed and recorded together on the fish ticket by the processor under a grouped species code such as NUSP - northern unspecified slope rockfish. In some cases, this difference in species coding prevents observer and fish ticket weights from matching and adjusting properly. Species coding on fish tickets varies considerably between processors and over time, and it is not possible to make assumptions regarding which individual species likely coincide with species grouping codes on fish tickets. Instead, by using only the retained groundfish weight from fish tickets in discard and bycatch ratio denominators, we prevent double counting of retained weights. This is not a factor when using a single species in the denominator, such as sablefish, as any weights in observer and fish ticket data that share the same species code will match and adjust properly.

RESULTS AND DISCUSSION

Overall Coverage Levels

The total number of trips, sets, and vessels, and the observed and total fleet-wide sablefish landings in the LE sablefish-endorsed, LE non-sablefish-endorsed, and open access fixed gear groundfish sectors are summarized in Tables 1a through 1c. The observed coverage rate, calculated as the proportion of fleet-wide sablefish landings observed, is provided with summaries for each WCGOP port group, fishery management area, and for the entire U.S. west coast.

Observer coverage in the LE sablefish-endorsed sector in 2008 relative to 2007 increased considerably on a coastwide basis from 25% to 40% (NMFS 2008). Overall, coverage was higher in the area north of 40°10' N. latitude (44%) than in this area during 2007 (24%). When split out by port group, Astoria and Coos Bay had the highest coverage rates, each at 54%. Coverage in the LE sablefish-endorsed sector was lowest in the Bellingham and Neah Bay port groups, which had a combined rate of 25%, compared with 32% and 36% in 2007.

Observer coverage in the LE non-sablefish-endorsed sector in 2008 decreased relative to 2007 from 13% to 7% on a coastwide basis (NMFS 2008). Table 1b provides coverage rates for both the 2008 calendar year and January through April of 2009. In the calendar year of 2008, coverage was highest in the Monterey port group, where 10% of sablefish landings were observed. Coverage rates in the beginning of 2009 reflected a similar trend, with 6 to 10% of sablefish landings observed in California port groups.

Observer coverage in the open access fixed gear sector in 2008 was 4% coastwide, as this is a lower priority sector for the observer program. On a coastwide basis, observer coverage of this sector did not change from 2007 to 2008, although coverage rates calculated by port group went up or down by as much as 3%. During 2008, coverage rates for the open access sector were highest in the combined Neah Bay/Astoria port groups, but overall ranged from 3 to 8%.

Spatial Distribution of Observations

The distribution of observed trips and sets among port groups provides perspective on where observer coverage and, secondarily, fishing effort was focused along the U.S. west coast in each fixed gear sector. Overall, the majority of observed trips in the LE sablefish-endorsed sector were from Oregon and northern California. Observers covered 30 trips from Astoria, 22 trips from Newport, and 32 trips from northern California ports, compared with 14 trips from the Bellingham/Neah Bay port groups. The majority of observed trips in the LE non-sablefish-endorsed sector were focused along the southern California coast, with the largest number of trips (85) from Los Angeles. Observer coverage was focused along the coast in the open access fixed gear sector, with 29 trips from southern California port groups, 20 trips from Fort Bragg, 19 trips from Crescent City, and 19 trips from the combined Astoria/Neah Bay port groups.

In 2008, spatial closures were employed in the LE fixed gear fishery by federal groundfish management. Rockfish Conservation Area (RCA) closures were set for the entire year from the shoreline to 100 fathoms (fm) in the area north of 46° 16' N. latitude, from 30 to 100 fm in the area between 46° 16' and 45° 03.83' N. latitude, from 30 to 150 fm in the area between 40° 10' and 34° 27' N. latitude, and from 60 to 150 fm in the area south of 34° 27' N. latitude. From 45° 3.83' to 42° 50' N. latitude, 30 to 125 fm was closed in January and February, while 30 to 100 fm was closed for the remaining months of the year. In the area between 42° 50' and 40° 10' N. latitude, 20 to 100 fm was closed in January and February, while 30 to 100 fm was again closed for the remaining months of the year.

It is important to note that the WCGOP controls only the selection of permits for coverage. Fishing activity of selected vessels can vary in unpredictable ways. Therefore, the program cannot control the percentage of landings or the number of trips that are actually observed. As a result, coverage levels within each gear type, particularly within a port group, may vary from year to year.

Observed Total Catch, Discard Ratios, and Bycatch Ratios

Table 2 presents the observed total catch weight (mt), discard weight (mt) and percent discarded by gear type for the LE sablefish-endorsed sector in 2008 and from January through April of 2009. Observed coastwide total catch (discarded + retained) in this fishery was largely comprised of sablefish, followed by Pacific halibut, spiny dogfish, arrowtooth flounder, and longnose skate. Of the rebuilding species, darkblotched rockfish, yelloweye rockfish, and canary rockfish were caught in the largest amounts using longline gear. Pacific ocean perch, bocaccio, and widow rockfish were also caught in small amounts with longline gear. Coastwide, the only rebuilding species caught using pot gear were darkblotched rockfish and Pacific ocean perch.

Yelloweye and canary rockfish were not allowed to be retained or landed as a result of management measures in 2008 for rebuilding species. On one observed trip landed in Washington, a species code for redbanded / canary rockfish was recorded on the fish ticket, although no canary rockfish had been recorded by the observer. Based on observer-recorded species composition information, it was concluded that the rockfish landings for this particular trip consisted entirely of redbanded, rougheye, darkblotched and silvergray rockfish. Fish ticket rockfish landings for this trip were therefore removed, and retained weights recorded by the observer were used exclusively to represent rockfish landings.

For non-rebuilding species, the decision to discard is dependent not only upon levels of cumulative retained catch and corresponding landing limits, but also upon the size, condition, and marketability of the catch. Although the variety and quantity of bycatch species caught using pot gear was less than that of longline, larger amounts of dungeness crab and comparable amounts of discarded sablefish and lingcod were associated with pot gear. Overall, sablefish constituted the largest component of observed discard coastwide. Relatively large amounts of Pacific halibut, spiny dogfish, arrowtooth flounder, and longnose skate were also discarded. More than 69 metric tons of Pacific halibut were discarded from longline gear in 2008. An additional 3.7 metric tons of Pacific halibut catch was observed on LE sablefish-endorsed pot vessels. Observed total catch and discard of Pacific halibut in the 2008 groundfish fixed gear fishery was used to inform subsequent estimates of fleet-wide Pacific halibut bycatch. The fleet-wide analysis is presented in the report “Observed and Estimated Total Discard of Pacific Halibut in the 2002-2008 U.S. West Coast Groundfish Non-nearshore Fixed Gear Fishery” (Heery and Bellman 2009). However, fleet-wide bycatch estimates are not included in this report for any species.

Table 3 presents the observed total catch weight (mt), discard weight (mt) and percent discarded for the LE non-sablefish-endorsed fixed gear sector in 2008 and from January through April of 2009. Observed coastwide total catch (discarded + retained) in the LE non-sablefish-endorsed sector is largely comprised of thornyheads and sablefish, followed by grenadiers and skates. Proportionally to other species, the observed catch of thornyhead species in 2008 was much higher than in 2007 in this sector. Discard, however, was still dominated by sablefish, although relatively large amounts of longnose skate and spiny dogfish were also discarded. Of the rebuilding species, only bocaccio, darkblotched rockfish, and Pacific ocean perch were caught in the LE non-sablefish-endorsed sector (Table 3).

Table 4 presents the observed total catch weight (mt), discard weight (mt) and percent discarded for the open access fixed gear sector by gear group. Separate catch summaries are provided for the calendar year of 2008 and from January through April of 2009. Observed total catch (discarded + retained) in this sector was largely comprised of sablefish, followed by spiny dogfish, Pacific halibut, skates, and grenadiers. Of the rebuilding species, darkblotched rockfish and bocaccio were caught in the largest amounts. Canary rockfish, Pacific ocean perch, and widow rockfish were also observed on open access vessels using hook-and-line gears. Discard in this sector was comprised of the non-rebuilding species (listed above) that made up much of the overall catch weight, but also included arrowtooth flounder, shortspine thornyhead, blue shark, lingcod, and others (Table 4).

Tables 5 through 8 present discard ratios and standard errors for the various sectors of the non-nearshore fixed gear fishery by area, sector and gear group. Discard ratios are computed in order to inform subsequent estimates of total fishing mortality in the 2008 non-nearshore fixed gear fishery. As such, they are presented in a format consistent with total mortality methodology, which employs 2 latitudinal breaks at 40° 10' and 36° N. latitude. Although there were not sufficient data to provide separate LE sablefish-endorsed discard ratios by latitude (Table 5), ratios for the LE non-sablefish-endorsed and OA fixed gear sectors are separated into 3 distinct latitudinal strata: (1) north of 40° 10' N. latitude, (2) 40° 10' to 36° N. latitude, and (3) south of 36° N. latitude. In order to ensure sufficient sample sizes in each latitudinal stratum, observer

data must often be combined across sector. This is reflected in Tables 6-8, as rates are provided for individual sectors and gear groups, and for combined sectors when necessary.

Table 5 presents 2008 discard ratios and standard errors for the LE sablefish-endorsed sector north of 36° N. latitude by gear group. Species are grouped for ratio calculations according to Appendix C. All discard ratios in the area north of 36° N. latitude were computed using retained sablefish in the denominator. Relative to 2007, LE sablefish-endorsed discard ratios associated with longline gear increased for several species, including sablefish, Pacific halibut, longnose skate, and other slope rockfish, but decreased for spiny dogfish. Among observed LE sablefish-endorsed pot vessels, the discard ratio for sablefish decreased, while lingcod and spiny dogfish increased slightly (NMFS 2008).

Table 6 presents discard ratios and standard errors for the OA fixed gear and LE non-sablefish-endorsed sectors north of 40° 10' N. latitude. There were not sufficient data to report separate discard rates for the LE non-sablefish-endorsed sector in this area. LE non-sablefish-endorsed observer data were therefore grouped with data from the OA fixed gear sector to produce discard ratios in the far right-hand columns. All discard ratios in the area north of 40° 10' N. latitude were computed using retained sablefish in the denominator, and species were again grouped according to Appendix C. Observer discard ratios were generally higher for hook-and-line gears than for pot gear. Relative to 2007, OA fixed gear discard ratios for hook-and-line gears increased for several species, including arrowtooth flounder, longnose skate, and Pacific halibut, but decreased for sablefish (NMFS 2008). Observed OA fixed gear vessels fishing with pot gear exhibited a lower discard rate for sablefish and lingcod in 2008 relative to 2007 (NMFS 2008).

Table 7 presents discard ratios and standard errors for the OA fixed gear and LE non-sablefish-endorsed sectors between 40° 10' and 36° N. latitude. There were not sufficient data in this area to report ratios for the OA fixed gear sector fishing with hook-and-line gears. Therefore, combined hook-and-line gear ratios are provided from the LE non-sablefish-endorsed sector and the OA fixed gear sector. Again, species are grouped according to Appendix C, and discard ratios are computed using retained sablefish in the denominator. Relative to 2007, discard ratios in the LE non-sablefish-endorsed sector in this area decreased for dover sole, sablefish, spiny dogfish, Pacific halibut, and bocaccio. Discard ratios in the OA sector using pot gear decreased for darkblotched rockfish, dover sole, and sablefish, but increased for Pacific halibut and lingcod (NMFS 2008).

Table 8 presents discard ratios and standard errors for the OA fixed gear and LE non-sablefish-endorsed sectors south of 36° N. latitude. Although sablefish was used as the denominator for discard ratios north of 36° N. latitude, retained catch in the sectors operating south of this line contain a variety of other groundfish species, including thornyheads, blackgill rockfish, and other shelf and slope rockfish species. In order to better represent targeting behavior in this area, discard ratios south of 36° N. latitude were computed using retained FMP groundfish (except Pacific hake) in the denominator. Discard ratios for the LE non-sablefish-endorsed sector in this area were relatively consistent from 2007 to 2008, with slight increases or decreases for some species. For the OA fixed gear sector using pot gear, discard ratios for longnose skate and thornyheads increased notably, while the rate for sablefish discard decreased (NMFS 2008).

Although bycatch ratios are not used in total mortality estimation, they are important for projection modeling of the non-nearshore fixed gear groundfish fishery that is conducted annually by the Groundfish Management Team (GMT) of the Pacific Fishery Management Council (PFMC). Bycatch ratios for rebuilding species in the 2008 non-nearshore fixed gear groundfish fishery are presented in Table 9. These are computed as the total catch weight of rebuilding species divided by the total retained weight of sablefish, and are calculated from 2008 data for all fixed gear groundfish sectors combined. Stratification used in GMT projection models is similar to that in total mortality estimation, with latitudinal breaks at 40° 10' and 36° N. latitude and separate estimates for each gear type. Bycatch ratios of rebuilding species across all sectors were highest for darkblotched rockfish and canary rockfish in 2008.

Bycatch ratios for rebuilding species are also represented graphically in Figures 1 and 2. In Figure 1, rebuilding species bycatch ratios in the LE sablefish-endorsed sector are presented by gear type from all years of observer data to provide perspective on bycatch over time. Bycatch ratios over time in the LE non-sablefish-endorsed sector are presented in Figure 2. A similar figure was not generated for the OA fixed gear sector, as this sector has only received coastwide coverage since 2007. Rebuilding species bycatch ratios in each sector have generally fluctuated since 2002, and may change due to a number of biological, economic, and regulatory factors. Bycatch ratio trends should not be viewed as analogous to trends in total estimated fishing mortality, which rely on both bycatch and landings information from the fishery.

Biological Data Collection and Summary

WCGOP observers collect four types of biological data from non-protected resources. These include lengths, sexes, otoliths for aging, and viabilities (Pacific halibut only). Biological data are collected from randomly selected individuals within a species composition sample and only from the discarded portion of the total catch. Biological data collected in the LE and OA fixed gear groundfish sectors for non-protected resources, from September 2003 through April 2009, are summarized in Table 10. Although the open access fixed gear sector was only observed in California prior to 2007, all biological data available for this sector are presented jointly.

The length frequency distributions of discarded sablefish from biological data are reported for the LE sablefish-endorsed, LE non-sablefish-endorsed, and OA fixed gear sectors in Figure 3. Distributions are presented separately for longline and pot/trap gear. The central tendency of discarded sablefish lengths remained relatively consistent between gear types, however, fish between 10 and 30 cm in length were only observed in association with pot gears.

Figure 4 presents length frequency distributions for rebuilding species observed in the LE sablefish-endorsed, LE non-sablefish-endorsed, and OA fixed gear sectors from September 2003 through April 2009. Length frequencies for other non-rebuilding species are also presented in Figure 5. Distributions are only provided for species for which there were more than 50 observations.

For protected resources, including any species regulated under the Endangered Species Act (ESA), additional types of biological data are collected whenever possible. It is the policy of the WCGOP to collect lengths, photographs and tissue samples from all green sturgeon observed, as well as sexes and fin ray samples from all dead individuals. For salmon, observers record length

and sex for all individuals, as well as record weight, note presence or absence of an adipose fin, and collect scales and snouts for a subsample. Information regarding biosampling procedures for marine mammals and seabirds is available in the WCGOP observer training manual (NWFSC 2008).

Table 11 summarizes the biological data for protected fish resources collected by observers in the limited entry and open access fixed gear groundfish sectors from September 2003 through April 2009. Only two specimens were observed: individual coho salmon in 2005 and 2007. These specimens were caught in association with longline gear in the LE sablefish-endorsed sector.

Summary

Bycatch and discard rates calculated from observer data collected aboard fixed gear groundfish vessels from January 2008 through April 2009 are now available for use in the management process. The observer data will be used in conjunction with additional commercial fixed gear fishery data to inform current fishery management in projection modeling of bycatch. In addition, these discard rates will be used to estimate discard at the fleet-wide level to account for annual coastwide mortality in the groundfish fixed gear fishery. The collected biological data will also be available for use by stock assessment authors.

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FIGURES

Figure 1. Bycatch ratios for rebuilding species in the limited entry (LE) sablefish-endorsed (primary) sector of the non-nearshore fixed gear groundfish fishery from 2002 through 2008 by gear group. Bycatch ratios were computed as the observed total catch weight of rebuilding species divided by the weight of retained sablefish.

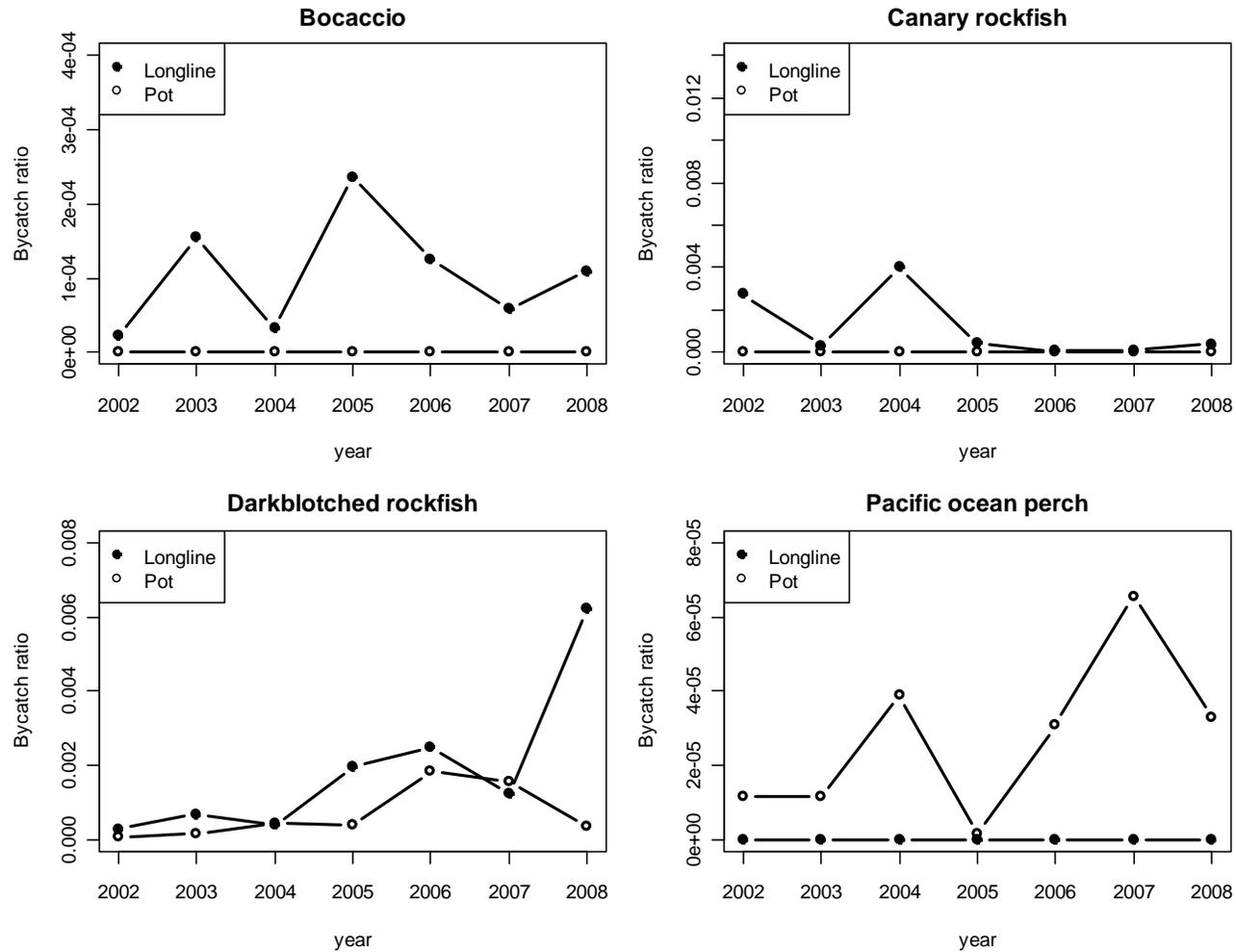


Figure 1 continued. Bycatch ratios for rebuilding species in the limited entry (LE) sablefish-endorsed (primary) sector of the non-nearshore fixed gear groundfish fishery from 2002 through 2008 by gear group. Bycatch ratios were computed as the observed total catch weight of rebuilding species divided by the weight of retained sablefish.

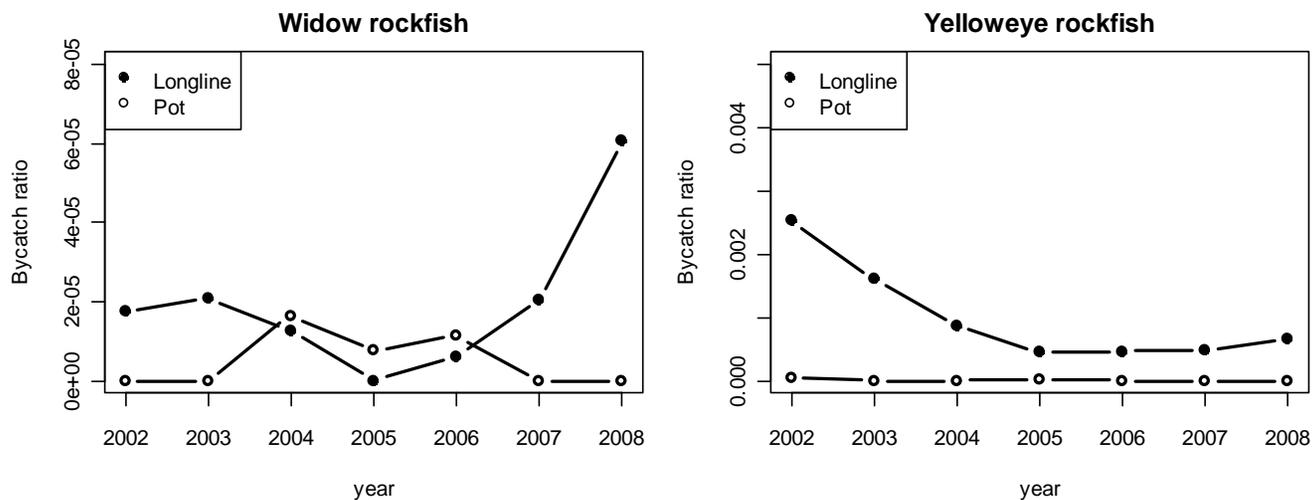


Figure 2. Bycatch ratios for the limited entry (LE) non-sablefish-endorsed sector of the non-nearshore fixed gear groundfish fishery from 2002 through 2008. Bycatch ratios were computed as the observed total catch weight of a rebuilding species divided by the observed weight of retained FMP groundfish (excluding Pacific hake).

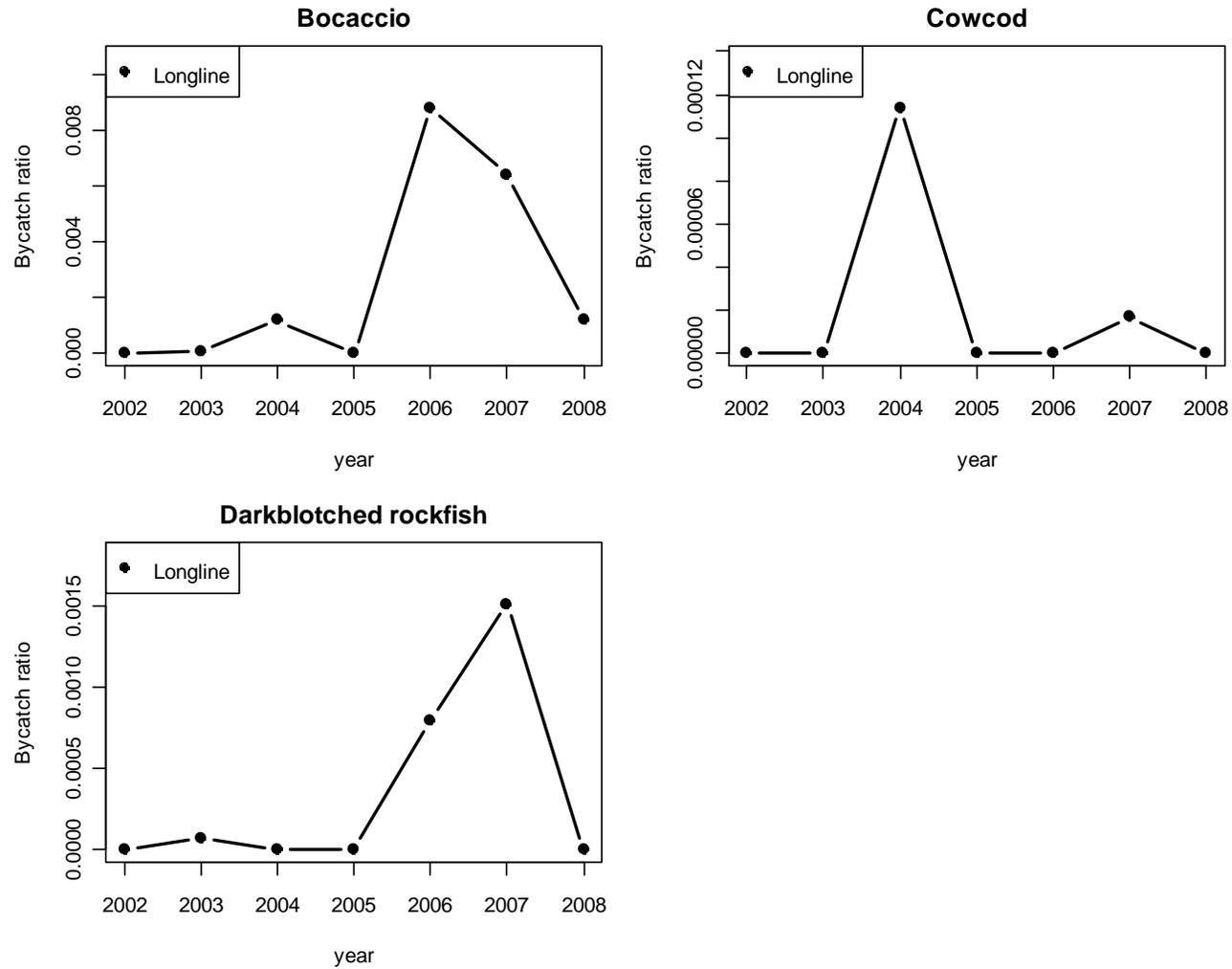


Figure 3. Length frequency distributions of discarded sablefish in the limited entry (LE) sablefish-endorsed sector (above), the LE non-sablefish-endorsed (middle), and open access (OA) fixed gear (below) sectors from all years observed. Length frequencies are presented for longline (black) and pot gear (gray) when applicable.

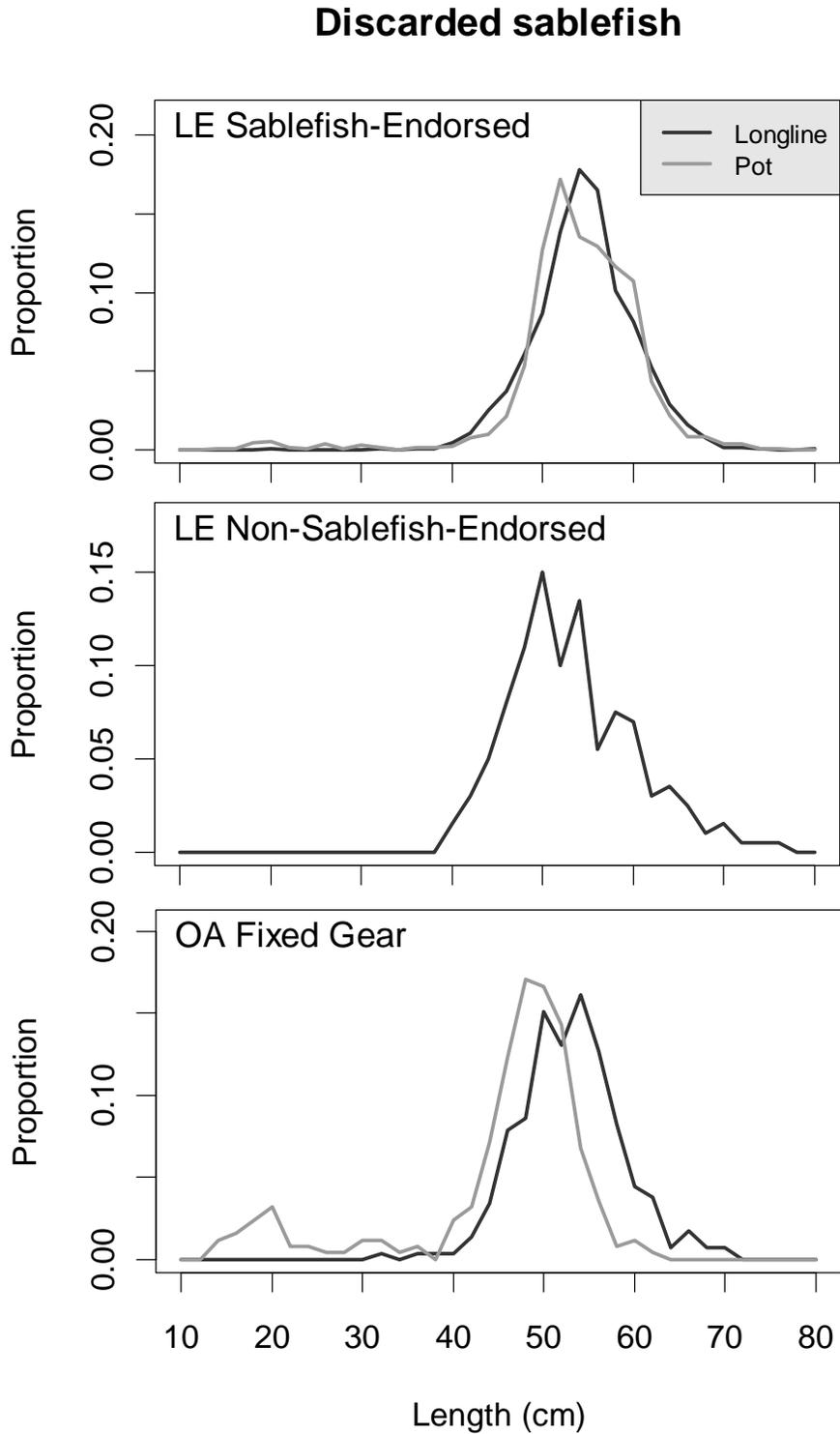


Figure 4. Length frequency distributions of discarded rebuilding species from all years observed in the limited entry sablefish-endorsed, limited entry non-sablefish-endorsed, and open access fixed gear sectors. Biological data are combined across all gear types to generate length frequencies for rebuilding species. Length frequencies are only provided for rebuilding species with more than 50 observations across all years observed.

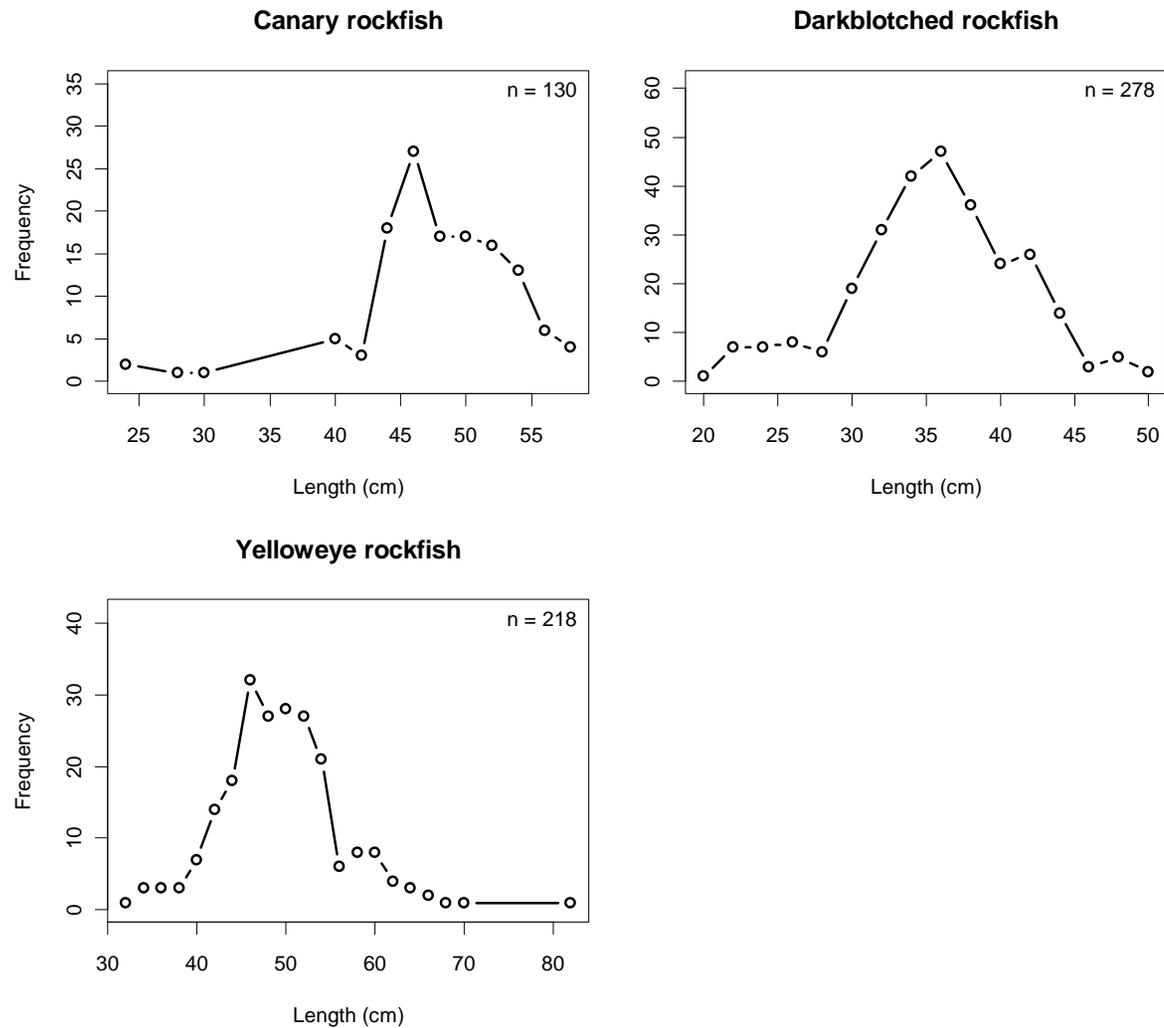


Figure 5. Length frequency distributions of discarded non-rebuilding groundfish species from all years observed in the limited entry sablefish-endorsed, limited entry non-sablefish-endorsed, and open access fixed gear sectors. Biological data are combined across all year types to generate length frequencies for each species. Length frequencies are only provided for species with more than 50 observations across all years.

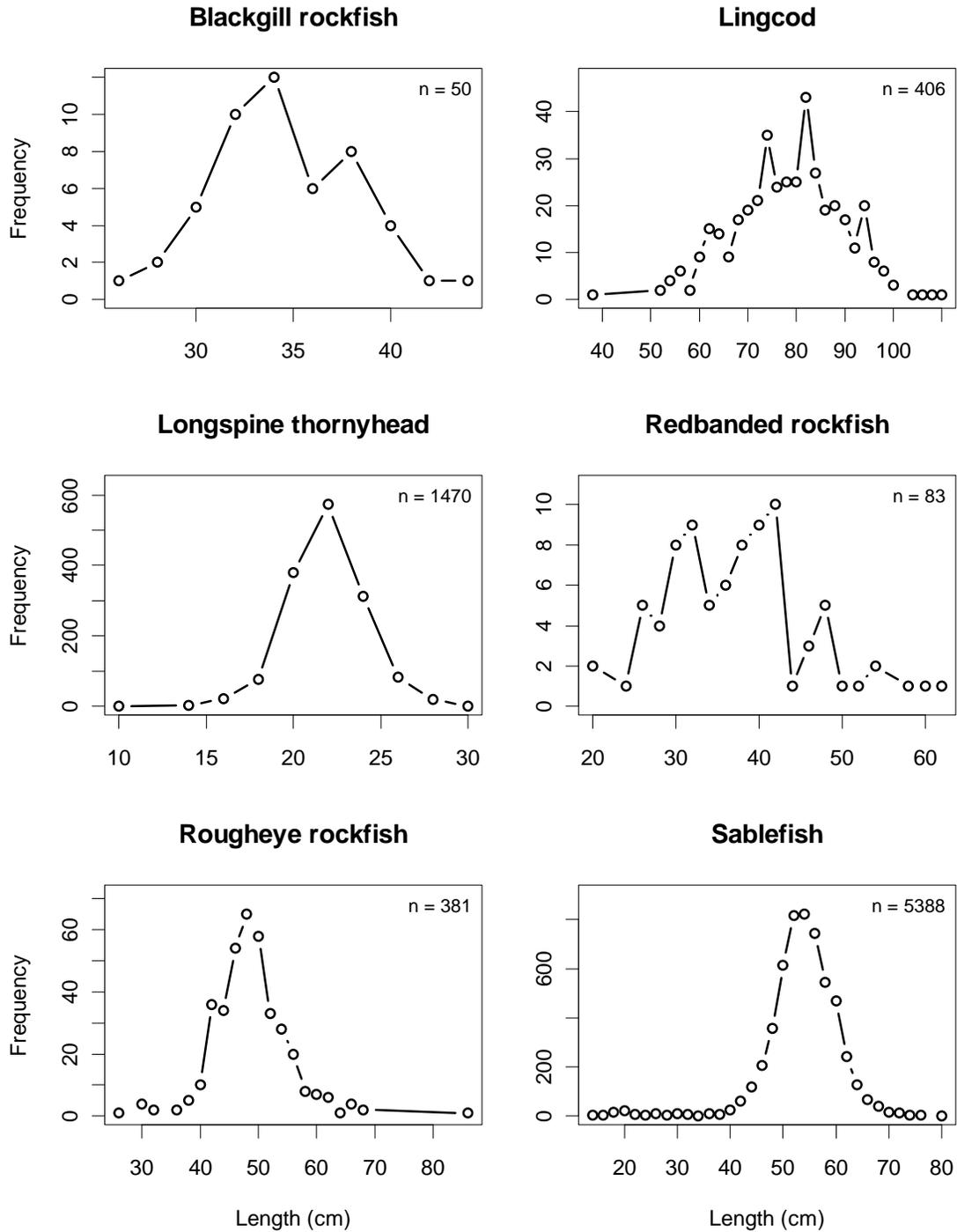
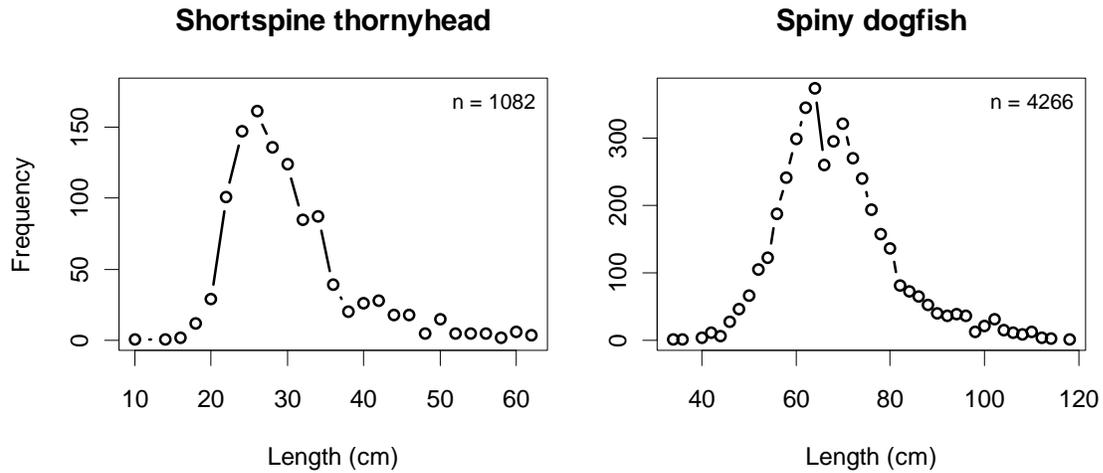


Figure 5 continued. Length frequency distributions of discarded non-rebuilding groundfish species from all years observed in the limited entry sablefish-endorsed, limited entry non-sablefish-endorsed, and open access fixed gear sectors. Biological data are combined across all year types to generate length frequencies for each species. Length frequencies are only provided for species with more than 50 observations across all years.



TABLES

Table 1a. Total trips, sets, vessels and sablefish landings observed in the 2008 limited entry sablefish-endorsed sector of the non-nearshore fixed gear groundfish fishery. Coverage rates (far-right column) for each port group, gear type, and management area are computed as the proportion of total sablefish landings that were observed. Data are combined as needed to ensure confidentiality.

		Limited Entry Sablefish-Endorsed (Primary) Sector					
Port Group		Number of observed trips	Number of observed sets	Number of observed vessels	Observed sablefish landings (mt)	Total fleet sablefish landings (mt)	% of total sablefish landings observed
2008	Bellingham	14	148	6	76.2	300.2	25.4%
	Neah Bay						
	Astoria	30	295	7	196.5	365.9	53.7%
	Newport	22	232	6	157.9	353.1	44.7%
	Coos Bay	5	120	3	78.2	146.1	53.5%
	Crescent City	32	88	6	84.6	292.3	28.9%
	Eureka						
	Fort Bragg						
	San Francisco						
	Monterey	--	--	--	--	17.0	--
	Morro Bay	--	--	--	--	--	--
	Santa Barbara	--	--	--	--	--	--
	Los Angeles	--	--	--	--	--	--
	Longline gear	79	553	18	346.0	1053.8	32.8%
Pot gear	24	330	6	247.4	420.8	58.8%	
North of 40°10' N	101	879	23	591.2	1343.2	44.0%	
South of 40°10' N	3	4	2	2.2	131.4	1.7%	
Coastwide total	103	883	28	593.4	1474.6	40.2%	

Note: The number of trips and vessels north and south of 40°10' N. latitude do not sum to coastwide totals because some vessels fish in both areas on the same trip. Also, any sets that are lacking spatial information are included in coastwide and port group totals only.

Table 1b. Total trips, sets, vessels and sablefish landings observed in the 2008 and January through April of 2009 limited entry non-sablefish-endorsed sector of the non-nearshore fixed gear groundfish fishery. Coverage rates (far-right column) for each port group and management area are computed as the proportion of total sablefish landings that were observed. Data are combined as needed to ensure confidentiality.

	Limited Entry Non-Sablefish-Endorsed Sector						
	Number of observed trips	Number of observed sets	Number of observed vessels	Observed sablefish landings (mt)	Total fleet sablefish landings (mt)	% of total sablefish landings observed	
2008	Bellingham	--	--	--	--	--	
	Neah Bay	--	--	--	--	--	
	Astoria	11	17	3	2.2	30.1	7%
	Newport						
	Coos Bay						
	Crescent City						
	Eureka						
	Fort Bragg						
	San Francisco	--	--	--	--	2.0	--
	Monterey	9	15	3	3.7	38.8	10%
	Morro Bay	17	25	5	1.5	31.9	5%
	Santa Barbara						
	Los Angeles	85	164	21	3.2	45.8	7%
	North of 36° N	21	33	7	5.9	70.9	8%
South of 36° N	101	188	26	4.7	78.0	6%	
Coastwide total	122	221	32	10.5	148.6	7%	

Jan - Apr 2009	Bellingham	--	--	--	--	--	
	Neah Bay	--	--	--	--	--	
	Astoria	--	--	--	--	--	
	Newport	--	--	--	--	--	
	Coos Bay	*	*	*	*	2.7	*
	Crescent City						
	Eureka	--	--	--	--	5.2	--
	Fort Bragg						
	San Francisco	4	6	2	1.9	18.4	10%
	Monterey						
	Morro Bay						
	Santa Barbara	22	36	8	1.3	21.0	6%
	Los Angeles						
	North of 36° N	*	*	*	*	17.5	*
South of 36° N	23	39	9	1.8	29.9	6%	
Coastwide total	*	*	*	*	47.3	*	

* Not reported due to confidentiality.

Note: The number of trips and vessels north and south of 36° N. latitude do not sum to coastwide totals because some vessels fish in both areas on the same trip. Also, any sets that are lacking spatial information are included in coastwide and port group totals only.

Table 1c. Total trips, sets, vessels and sablefish landings observed in the 2008 and January through April of 2009 open access fixed gear sector of the non-nearshore fixed gear groundfish fishery. Coverage rates (far-right column) for each port group, gear type, and management area are computed as the proportion of total sablefish landings that were observed. Data are combined as needed to ensure confidentiality.

	West Coast Open Access Fixed Gear Fishery						
	Number of observed trips	Number of observed sets	Number of observed vessels	Observed sablefish landings (mt)	Total fleet sablefish landings (mt)	% of total sablefish landings observed	
2008	Bellingham	--	--	--	--	--	
	Neah Bay	19	46	10	4.8	59.6	8%
	Astoria						
	Newport	--	--	--	--	30.2	--
	Coos Bay	12	14	7	2.0	62.1	3%
	Crescent City	19	19	9	4.2	91.4	5%
	Eureka	6	6	4	2.0	54.5	4%
	Fort Bragg	20	20	11	5.2	96.9	5%
	San Francisco	11	11	7	2.6	89.9	3%
	Monterey						
	Morro Bay	29	31	4	2.9	94.9	3%
	Santa Barbara						
	Los Angeles						
	Hook-and-line gear	62	72	34	13.5	344.5	4%
	Pot gear	55	75	20	10.3	235.1	4%
	North of 40°10' N	56	85	30	13.0	297.8	4%
	40°10' N to 36° N	31	31	18	7.8	186.8	4%
South of 36° N	29	31	4	2.9	94.9	3%	
Coastwide total	116	147	52	23.8	579.5	4%	

Jan - Apr 2009	Bellingham	--	--	--	--	--	
	Neah Bay	--	--	--	--	2.5	--
	Astoria	5	10	3	1.0	22.5	4%
	Newport						
	Coos Bay						
	Crescent City	8	8	5	1.7	53.2	3%
	Eureka						
	Fort Bragg						
	San Francisco	--	--	--	--	9.9	--
	Monterey	--	--	--	--	11.4	--
	Morro Bay	*	*	*	*	31.4	*
	Santa Barbara	--	--	--	--	--	--
	Los Angeles	--	--	--	--	0.8	--
	Hook-and-line gear	11	11	6	2.4	78.1	3%
	Pot gear	3	8	3	0.6	53.6	1%
	North of 40°10' N	12	17	7	2.4	61.4	4%
	40°10' N to 36° N	*	*	*	*	38.0	*
South of 36° N	*	*	*	*	32.2	*	
Coastwide total	14	19	9	3.0	131.7	2%	

* Not reported due to confidentiality.

Table 2. Summary of fishing effort, total catch weight (mt), discard weight (mt) and percent discarded from observed limited entry sablefish-endorsed (primary) vessels by gear type in 2008 and for combined gears from January through April of 2009. Gears were combined for the first four months of 2009 to ensure confidentiality. Effort is summarized from observed vessels in terms of retained sablefish (mt), retained FMP groundfish (excluding Pacific hake), the number of trips, the number of sets, and the number of hooks or pots across sets.

Limited Entry Sablefish- Endorsed (Primary) Sector	2008						Jan - Apr 2009		
	Longline			Pot			Combined gears		
<u>Summary of effort</u>									
Retained sablefish (mt)	341.6			247.4			42.5		
Retained groundfish (mt)	365.4			251.3			43.8		
# of trips	77			24			13		
# of sets	539			329			53		
# of hooks/pots	1244141			13638			87609		
<u>Summary of catch and discard</u>									
	Total catch (mt)	Discard (mt)	Total % discarded	Total catch (mt)	Discard (mt)	Total % discarded	Total catch (mt)	Discard (mt)	Total % discarded
Rebuilding species									
Bocaccio *	0.037	0.011	30.4%	--	--	--	--	--	--
Canary rockfish	0.136	0.136	100.0%	--	--	--	--	--	--
Darkblotched rockfish *	2.120	1.089	51.4%	0.085	0.000	0.3%	0.005	0.000	0.0%
Pacific ocean perch *	0.067	0.009	12.8%	0.008	0.000	0.0%	--	--	--
Widow rockfish	0.021	0.012	56.3%	--	--	--	--	--	--
Yelloweye rockfish *	0.225	0.225	100.0%	--	--	--	--	--	--
Non-rebuilding species									
Arrowtooth flounder	22.716	22.190	97.7%	1.878	0.487	25.9%	0.695	0.688	99.0%
Big skate	1.319	1.241	94.1%	--	--	--	--	--	--
California skate	--	--	--	--	--	--	0.002	0.002	100.0%
Chilipepper rockfish	0.128	0.097	75.1%	--	--	--	--	--	--
Dover sole	1.096	0.949	86.6%	0.788	0.298	37.9%	0.071	0.071	99.4%
English sole	--	--	--	0.004	0.000	0.0%	--	--	--
Flatfish	0.003	0.003	100.0%	0.001	0.001	100.0%	--	--	--
Grenadier	1.461	1.461	100.0%	0.104	0.060	58.3%	1.571	1.342	85.4%
Giant grenadier		1.396			0.000			0.541	
Pacific grenadier		0.005			0.018			0.801	
Popeye grenadier		0.061			--			--	
Unspecified grenadier		--			0.043			--	

* Mislabeling or grouping of these species on non-distributed fish tickets may cause retained catch weights to be underestimated.

Table 2 continued.

Limited Entry Sablefish- Endorsed (Primary) Sector	2008						Jan - Apr 2009		
	Longline			Pot			Combined gears *		
	Total catch (mt)	Discard (mt)	Total % discarded	Total catch (mt)	Discard (mt)	Total % discarded	Total catch (mt)	Discard (mt)	Total % discarded
Non-rebuilding species (cont.)									
Lingcod	4.622	2.709	58.6%	2.575	0.826	32.1%	--	--	--
Pacific cod	0.040	0.014	35.4%	--	--	--	--	--	--
Pacific hake	0.053	0.053	100.0%	0.001	0.001	100.0%	--	--	--
Petrale sole	0.058	0.047	81.4%	0.010	0.003	25.6%	--	--	--
Rosy rockfish	0.000	0.000	100.0%	--	--	--	--	--	--
Sablefish	399.501	57.908	14.5%	312.445	65.044	20.8%	55.473	12.964	23.4%
Shelf rockfish	1.063	0.550	51.7%	0.028	0.002	5.5%	0.004	0.002	44.7%
Flag rockfish		0.000			--			--	
Greenspotted rockfish		0.000			--			--	
Greenstriped rockfish		0.220			--			0.002	
Redstripe rockfish		0.005			--			--	
Rosethorn rockfish		0.145			0.002			0.000	
Shortbelly rockfish		--			0.000			--	
Silvergray rockfish		0.171			--			--	
Speckled rockfish		0.000			--			--	
Unspecified shelf rockfish		0.008			--			--	
Skates	23.765	18.480	77.8%	0.010	0.010	100.0%	1.185	1.185	100.0%
Aleutian skate		0.022			--			--	
Black skate		0.042			--			0.002	
Longnose skate		18.242			0.010			1.181	
Sandpaper skate		0.121			0.001			0.001	
Unspecified skate		0.054			--			--	
Slope rockfish	38.253	12.551	32.8%	1.179	0.003	0.2%	0.996	0.027	2.7%
Aurora rockfish		0.002			0.000			0.000	
Bank rockfish		0.009			--			--	
Blackgill rockfish		0.059			0.000			0.001	
Redbanded rockfish		0.881			0.003			0.003	
Rougheye rockfish		0.532			0.000			0.000	
Sharpchin rockfish		0.005			--			--	
Shortraker rockfish		0.806			0.000			--	
Shortraker/Rougheye rockfish		10.001			0.000			0.022	

Table 2 continued.

Limited Entry Sablefish- Endorsed (Primary) Sector	2008						Jan - Apr 2009		
	Longline			Pot			Combined gears *		
	Total catch (mt)	Discard (mt)	Total % discarded	Total catch (mt)	Discard (mt)	Total % discarded	Total catch (mt)	Discard (mt)	Total % discarded
Non-rebuilding species (cont.)									
Slope rockfish	38.253	12.551	32.8%	1.179	0.003	0.2%	0.996	0.027	2.7%
Splitnose rockfish		0.009			0.000			--	
Yellowmouth rockfish		0.236			--			--	
Unspecified slope rockfish		0.012			0.000			0.000	
Spiny dogfish	32.999	31.426	95.2%	0.548	0.548	100.0%	0.981	0.981	100.0%
Spotted ratfish	0.442	0.442	100.0%	0.003	0.003	100.0%	0.008	0.008	100.0%
Thornyheads	2.186	0.212	9.7%	0.016	0.004	27.3%	0.162	0.009	5.5%
Longspine thornyhead		0.000			--			0.003	
Shortspine thornyhead		0.212			0.004			0.006	
Yellowtail rockfish	0.055	0.013	23.5%	--	--	--	--	--	--
Non-groundfish species									
Albacore tuna	0.007	0.007	100.0%	--	--	--	--	--	--
Bairdi tanner crab	--	--	--	0.000	0.000	100.0%	--	--	--
Black hagfish	0.003	0.003	100.0%	--	--	--	--	--	--
Blue shark	7.564	7.530	99.6%	--	--	--	--	--	--
Brown box crab	--	--	--	0.020	0.020	100.0%	--	--	--
Brown cat shark	0.122	0.122	100.0%	0.001	0.001	100.0%	0.012	0.012	100.0%
California slickhead	0.001	0.001	100.0%	--	--	--	0.002	0.002	100.0%
Decorator/spider crab (unidentified)	--	--	--	0.002	0.002	100.0%	--	--	--
Dungeness crab	0.005	0.005	100.0%	0.573	0.573	100.0%	--	--	--
Eelpout (unidentified)	0.003	0.003	100.0%	--	--	--	--	--	--
Filetail cat shark	--	--	--	--	--	--	0.001	0.001	100.0%
Giant wrymouth	0.008	0.008	100.0%	0.004	0.000	0.0%	--	--	--
Hagfish (unidentified)	0.025	0.025	100.0%	0.006	0.006	100.0%	0.001	0.001	100.0%
Hair crab	--	--	--	0.011	0.011	100.0%	--	--	--
Hermit crab (unidentified)	--	--	--	0.000	0.000	100.0%	--	--	--
Longnose cat shark	--	--	--	--	--	--	0.002	0.002	100.0%
Lyre crab (unidentified)	--	--	--	0.000	0.000	100.0%	--	--	--
Monkeyface prickleback	--	--	--	0.016	0.000	0.0%	--	--	--
Octopus (unidentified)	0.000	0.000	100.0%	0.011	0.005	49.5%	0.007	0.007	100.0%
Pacific flatnose	0.001	0.001	100.0%	--	--	--	0.062	0.062	100.0%

Table 2 continued.

Limited Entry Sablefish- Endorsed (Primary) Sector	2008						Jan - Apr 2009		
	Longline			Pot			Combined gears *		
	Total catch (mt)	Discard (mt)	Total % discarded	Total catch (mt)	Discard (mt)	Total % discarded	Total catch (mt)	Discard (mt)	Total % discarded
Non-groundfish species (cont.)									
Pacific hagfish	0.004	0.004	100.0%	0.008	0.008	100.0%	--	--	--
Pacific halibut	74.728	69.941	93.6%	3.741	3.741	100.0%	0.632	0.632	100.0%
Sculpin (unidentified)	0.000	0.000	100.0%	--	--	--	--	--	--
Sea cucumber (unidentified)	0.003	0.003	100.0%	0.004	0.004	100.0%	--	--	--
Shark (unidentified)	3.624	3.624	100.0%	--	--	--	--	--	--
Shrimp (unidentified)	--	--	--	0.122	0.000	0.0%	--	--	--
Snailfish (unidentified)	--	--	--	0.002	0.002	100.0%	--	--	--
Snipe eel (unidentified)	--	--	--	0.000	0.000	100.0%	--	--	--
Squid (unidentified)	0.007	0.007	100.0%	--	--	--	--	--	--
Tanner crab (unidentified)	0.006	0.006	100.0%	--	--	--	0.007	0.007	100.0%
Tanneri tanner crab	0.040	0.040	100.0%	0.689	0.689	100.0%	0.024	0.024	100.0%
Urchin (unidentified)	--	--	--	0.512	0.512	100.0%	0.002	0.002	100.0%
Wolf eel	--	--	--	0.006	0.000	0.0%	--	--	--

Table 3. Summary of fishing effort, total catch weight (mt), discard weight (mt) and percent discarded from observed limited entry non-sablefish-endorsed vessels in 2008 and from January through April 2009. Effort is summarized from observed vessels in terms of retained sablefish (mt), retained FMP groundfish (excluding Pacific hake), the number of trips, the number of sets, and the number of hooks or pots across sets.

Limited Entry Non-Sablefish Endorsed Sector	2008			Jan - Apr 2009		
	Longline			Longline		
Summary of effort						
Retained sablefish (mt)	10.5			3.3		
Retained groundfish (mt)	33.1			5.8		
# of trips	122			27		
# of sets	220			43		
# of hooks/pots	631653			116425		
Summary of catch and discard						
	Total catch (mt)	Discard (mt)	Total % discarded	Total catch (mt)	Discard (mt)	Total % discarded
Rebuilding species						
Bocaccio *	0.039	0.000	0.0%	--	--	--
Darkblotched rockfish *	--	--	--	0.001	0.000	0.0%
Pacific ocean perch *	0.005	0.000	0.0%	--	--	--
Non-rebuilding species						
Arrowtooth flounder	0.019	0.007	37.8%	--	--	--
California skate	--	--	--	0.000	0.000	100.0%
Chilipepper rockfish	0.166	0.000	0.0%	--	--	--
Dover sole	0.248	0.229	92.4%	0.023	0.023	96.1%
Flatfish	--	--	--	0.000	0.000	0.0%
Grenadier	2.378	0.392	16.5%	0.041	0.012	29.3%
California grenadier		--			0.001	
Giant grenadier		0.220			0.003	
Pacific grenadier		0.158			0.002	
Unspecified grenadier		0.013			0.006	
Lingcod	0.011	0.000	0.0%	--	--	--
Pacific hake	0.121	0.118	97.7%	0.024	0.009	36.2%
Sablefish	11.842	1.328	11.2%	4.486	1.184	26.4%
Shelf rockfish	0.020	0.000	0.0%	--	--	--
Greenspotted rockfish		0.000			--	
Halfbanded rockfish		0.000			--	
Honeycomb rockfish		0.000			--	
Vermilion rockfish		0.000			--	
Unspecified shelf rockfish		0.000			--	
Skates	1.121	0.988	88.1%	0.631	0.631	100.0%
Black skate		0.035			0.043	
Longnose skate		0.923			0.587	
Pelagic stingray		0.001			--	
Sandpaper skate		0.003			0.001	
Unspecified skate		0.026			--	
Slope rockfish	0.387	0.019	4.8%	0.975	0.001	0.1%
Aurora rockfish		0.012			0.000	
Bank rockfish		0.000			--	

* Mislabeling or grouping of these species on non-distributed fish tickets may cause retained catch weights to be underestimated.

Table 3 continued.

Limited Entry Non-Sablefish Endorsed Sector	2008 Longline			Jan - Apr 2009 Longline		
	Total catch (mt)	Discard (mt)	Total % discarded	Total catch (mt)	Discard (mt)	Total % discarded
Non-rebuilding species (cont.)						
Slope rockfish	0.387	0.019	4.8%	0.975	0.001	0.1%
Blackgill rockfish		0.007			0.001	
Redbanded rockfish		0.000			--	
Rougeye rockfish		--			0.000	
Unspecified slope rockfish		--			0.000	
Spiny dogfish	0.860	0.860	100.0%	0.166	0.166	100.0%
Spotted ratfish	0.007	0.007	100.0%	0.011	0.011	100.0%
Thornyheads	24.133	1.527	6.3%	2.716	0.176	6.5%
Longspine thornyhead		0.473			0.062	
Shortspine thornyhead		0.778			0.114	
Mixed thornyheads		0.276			0.000	
Non-groundfish species						
Black hHagfish	0.003	0.003	100.0%	0.003	0.003	100.0%
Blue shark	0.247	0.247	100.0%	0.130	0.130	100.0%
Bonito (shortfin mako) shark	0.062	0.005	7.3%	--	--	--
Brown cat shark	0.354	0.354	100.0%	0.047	0.047	100.0%
California king crab	0.000	0.000	100.0%	--	--	--
California slickhead	0.003	0.003	100.0%	--	--	--
Crab (unidentified)	0.000	0.000	100.0%	--	--	--
Decorator/spider crab (unidentifie	0.000	0.000	100.0%	--	--	--
Deep-sea rock crab	0.000	0.000	100.0%	--	--	--
Filetail cat shark	0.211	0.211	100.0%	0.500	0.500	100.0%
Hagfish (unidentified)	0.009	0.009	100.0%	0.016	0.016	100.0%
Longnose cat shark	0.002	0.002	100.0%	--	--	--
Octopus (unidentified)	0.008	0.003	34.3%	0.003	0.001	21.4%
Pacific black dogfish	0.001	0.001	100.0%	--	--	--
Pacific bonito	0.001	0.001	100.0%	--	--	--
Pacific flatnose	0.150	0.150	100.0%	--	--	--
Pacific halibut	0.146	0.146	100.0%	--	--	--
Pacific mackerel	0.003	0.001	20.0%	--	--	--
Pacific tom cod	0.159	0.000	0.0%	--	--	--
Sea cucumber (unidentified)	0.011	0.011	100.0%	0.002	0.002	100.0%
Shark (unidentified)	0.641	0.620	96.8%	0.136	0.136	100.0%
Slickhead (unidentified)	0.004	0.004	100.0%	--	--	--
Snipe eel (unidentified)	0.001	0.001	100.0%	--	--	--
Squid (unidentified)	0.048	0.048	100.0%	--	--	--
Tanneri tanner crab	0.037	0.037	100.0%	0.000	0.000	100.0%
Top smelt	0.001	0.001	100.0%	--	--	--
Urchin (unidentified)	--	--	--	0.001	0.001	100.0%

Table 4. Summary of fishing effort, total catch weight (mt), discard weight (mt) and percent discard on observed open access fixed gear vessels by gear in 2008 and from January through April 2009. Effort is summarized from observed vessels in terms of retained sablefish (mt), retained FMP groundfish (excluding Pacific hake), the number of trips, the number of sets, and the number of hooks or pots across sets.

Open Access Fixed Gear Sector	2008						Jan - Apr 2009					
	Hook-and-line gears			Pot			Hook-and-line gears			Pot		
Summary of effort												
Retained sablefish (mt)	12.8			10.3			2.4			0.6		
Retained groundfish (mt)	16.3			10.5			2.6			0.6		
# of trips	58			55			11			3		
# of sets	68			74			11			8		
# of hooks/pots	73885			831			17957			41		
Summary of catch and discard												
	Total catch (mt)	Discard (mt)	Total % discarded	Total catch (mt)	Discard (mt)	Total % discarded	Total catch (mt)	Discard (mt)	Total % discarded	Total catch (mt)	Discard (mt)	Total % discarded
Rebuilding species												
Bocaccio *	0.038	0.000	0.0%	--	--	--	--	--	--	--	--	--
Canary rockfish	0.003	0.003	100.0%	--	--	--	--	--	--	--	--	--
Darkblotched rockfish *	0.131	0.018	13.5%	0.009	0.008	86.2%	--	--	--	--	--	--
Pacific ocean perch *	0.004	0.001	33.6%	--	--	--	--	--	--	--	--	--
Widow rockfish	0.001	0.000	0.0%	--	--	--	--	--	--	--	--	--
Non-rebuilding species												
Arrowtooth flounder	0.594	0.491	82.7%	0.022	0.022	100.0%	0.026	0.005	18.3%	--	--	--
Brown rockfish	0.002	0.000	0.0%	--	--	--	--	--	--	--	--	--
Dover sole	0.069	0.064	92.7%	0.022	0.022	100.0%	0.001	0.001	100.0%	0.002	0.002	100.0%
Gopher rockfish	0.001	0.001	100.0%	--	--	--	--	--	--	--	--	--
Grenadier	1.134	0.084	7.4%	0.001	0.001	100.0%	0.002	0.002	100.0%	0.000	0.000	--
Giant grenadier		0.033			--			0.002		--	--	
Unspecified grenadier		--			0.001			--		--	--	
Pacific grenadier		0.052			--			--		--	--	
Linç Lingcod	0.143	0.030	20.8%	0.175	0.073	41.7%	--	--	--	0.005	0.005	100.0%
Nearshore rockfish	0.032	0.000	0.0%	0.000	0.000	--	0.000	0.000	--	0.000	0.000	--
Copper rockfish		0.000			--			--		--	--	
Unspecified nearshore rockfish		0.000			--			--		--	--	
Pacific hake	0.009	0.006	71.7%	--	--	--	0.006	0.006	100.0%	--	--	--
Petrale sole	0.003	0.000	0.0%	0.011	0.011	100.0%	--	--	--	--	--	--
Rosy rockfish	0.000	0.000	100.0%	--	--	--	--	--	--	--	--	--
Sablefish	17.094	4.339	25.4%	11.828	1.502	12.7%	2.535	0.089	3.5%	0.592	0.022	3.8%
Shelf rockfish	0.364	0.005	1.3%	0.000	0.000	--	0.000	0.000	--	0.000	0.000	--
Flag rockfish		0.000			--			--		--	--	
Greenblotched rockfish		0.000			--			--		--	--	
Greenspotted rockfish		0.000			--			--		--	--	
Greenstriped rockfish		0.002			--			--		--	--	
Honeycombrockfish		0.000			--			--		--	--	
Rosethorn rockfish		0.000			--			--		--	--	

* Mislabeling or grouping of these species on non-distributed fish tickets may cause retained catch weights to be underestimated.

Table 4 continued.

Open Access Fixed Gear Sector	2008						Jan - Apr 2009					
	Hook-and-line gears			Pot			Hook-and-line gears			Pot		
	Total catch (mt)	Discard (mt)	Total % discarded	Total catch (mt)	Discard (mt)	Total % discarded	Total catch (mt)	Discard (mt)	Total % discarded	Total catch (mt)	Discard (mt)	Total % discarded
Non-rebuilding species (cont.)												
Speckled rockfish		0.000			--			--			--	
Starry rockfish		0.000			--			--			--	
Vermilion rockfish		0.000			--			--			--	
Unspecified shelf rockfish		0.002			--			--			--	
Skates	0.987	0.632	64.1%	0.000	0.000	--	0.357	0.223	62.5%	0.000	0.000	--
Longnose skate		0.630			--			0.222			--	
Sandpaper skate		0.001			--			0.001			--	
Unspecified skate		0.001			--			0.000			--	
Slope rockfish	0.809	0.083	10.2%	0.086	0.021	23.9%	0.107	0.000	0.0%	0.003	0.003	100.0%
Aurora rockfish		--			0.002			0.000			--	
Blackgill rockfish		0.000			0.012			0.000			0.003	
Redbanded rockfish		0.038			0.005			0.000			--	
Rougheye rockfish		0.043			--			0.000			--	
Shortraker rockfish		--			--			0.000			--	
Splitnose rockfish		0.002			0.002			0.000			--	
Unspecified slope rockfish		0.000			0.000			0.000			--	
Spiny dogfish	3.882	2.439	62.8%	--	--	--	0.443	0.443	100.0%	--	--	--
Spotted ratfish	0.003	0.003	100.0%	--	--	--	--	--	--	--	--	--
Squarespot rockfish	0.000	0.000	100.0%	--	--	--	--	--	--	--	--	--
Thornyheads	0.190	0.168	88.5%	0.071	0.002	2.3%	0.030	0.030	100.0%	0.000	0.000	--
Longspine thornyhead		0.014			0.000			--			--	
Shortspine thornyhead		0.153			0.002			0.030			--	
Mixed thornyheads		0.001			--			--			--	
Non-groundfish species												
Black hagfish	--	--	--	0.000	0.000	100.0%	--	--	--	--	--	--
Blue shark	0.148	0.141	94.8%	--	--	--	--	--	--	--	--	--
Brown cat shark	0.009	0.009	100.0%	0.002	0.002	100.0%	0.007	0.007	100.0%	--	--	--
California king crab	--	--	--	0.000	0.000	100.0%	--	--	--	--	--	--
Cat shark (unidentified)	--	--	--	0.001	0.001	100.0%	--	--	--	--	--	--
Crab (unidentified)	--	--	--	0.000	0.000	100.0%	--	--	--	--	--	--
Decorator/spider crab (unidentified)	--	--	--	0.001	0.001	100.0%	--	--	--	--	--	--
Deep-sea rock crab	--	--	--	0.004	0.004	100.0%	--	--	--	--	--	--
Dungeness crab	--	--	--	0.058	0.058	100.0%	--	--	--	0.002	0.002	100.0%
Filetail cat shark	--	--	--	0.011	0.011	100.0%	0.025	0.025	100.0%	--	--	--
Hagfish (unidentified)	0.000	0.000	100.0%	0.000	0.000	100.0%	--	--	--	--	--	--
Hair crab	--	--	--	0.001	0.001	100.0%	--	--	--	--	--	--
Jackmackerel	0.002	0.002	100.0%	--	--	--	--	--	--	--	--	--
King crab (unidentified)	--	--	--	0.004	0.000	0.0%	--	--	--	--	--	--
Lyre crab (unidentified)	--	--	--	--	--	--	--	--	--	0.000	0.000	100.0%
Octopus (unidentified)	--	--	--	--	--	--	--	--	--	0.002	0.002	100.0%
Pacific barracuda	0.002	0.000	0.0%	--	--	--	--	--	--	--	--	--

Table 4 continued.

Open Access Fixed Gear Sector	2008						Jan - Apr 2009					
	Hook-and-line gears			Pot			Hook-and-line gears			Pot		
	Total catch (mt)	Discard (mt)	Total % discarded	Total catch (mt)	Discard (mt)	Total % discarded	Total catch (mt)	Discard (mt)	Total % discarded	Total catch (mt)	Discard (mt)	Total % discarded
Non-groundfish species (cont.)												
Pacific flatnose	0.005	0.005	100.0%	--	--	--	0.001	0.001	100.0%	--	--	--
Pacific halibut	1.606	1.606	100.0%	0.010	0.010	100.0%	0.020	0.020	100.0%	--	--	--
Pacific hHagfish	0.000	0.000	100.0%	0.001	0.001	100.0%	0.001	0.001	100.0%	--	--	--
Pacific mackerel	0.001	0.000	0.0%	--	--	--	--	--	--	--	--	--
Pacific sleeper shark	0.019	0.019	100.0%	--	--	--	--	--	--	--	--	--
Scarlet King Crab	--	--	--	0.063	0.063	100.0%	--	--	--	--	--	--
Sea cucumber (unidentified)	--	--	--	0.000	0.000	100.0%	0.000	0.000	100.0%	--	--	--
Shark (unidentified)	--	--	--	0.023	0.023	100.0%	--	--	--	--	--	--
Tanneri tanner crab	0.014	0.014	100.0%	0.068	0.068	100.0%	--	--	--	0.002	0.002	100.0%
Urchin (unidentified)	--	--	--	0.003	0.003	100.0%	--	--	--	--	--	--

Table 5. Discard ratios and standard errors from observed trips in the 2008 limited entry (LE) sablefish-endorsed sector by gear type. Ratios are computed as the observed discard weight divided by the weight of retained sablefish. Species are grouped according to Appendix C. Discard ratios presented here are used directly in subsequent total mortality estimates and are grouped across management areas (36° to 40°10' N. latitude and north of 40°10' N. latitude) in order to ensure sufficient sample size.

North of 36° N. latitude	LE Sablefish-Endorsed (Primary)			
	Longline		Pot	
	Discard ratio	Standard Error	Discard ratio	Standard Error
Rebuilding species				
Bocaccio	0.0000	0.0225	0.0000	NA
Canary rockfish	0.0004	0.0805	0.0000	NA
Darkblotched rockfish	0.0032	0.0390	0.0000	0.0001
Pacific ocean perch	0.0000	0.0020	0.0000	NA
Widow rockfish	0.0000	0.0362	0.0000	NA
Yelloweye rockfish	0.0007	0.0836	0.0000	NA
Non-rebuilding species				
Arrowtooth flounder	0.0650	0.1100	0.0020	0.0048
Big skate	0.0036	0.1965	0.0000	NA
Chilipepper	0.0003	0.0747	0.0000	NA
Dover sole	0.0028	0.0168	0.0012	0.0037
English sole	0.0000	NA	0.0000	NA
Lingcod	0.0079	0.0594	0.0033	0.0139
Longnose skate	0.0534	0.0819	0.0000	NA
Longspine thornyhead	0.0000	0.0028	0.0000	NA
Other flatfish	0.0000	0.0063	0.0000	NA
Other groundfish	0.0013	0.0067	0.0000	NA
Other shelf rockfish	0.0011	0.0036	0.0000	0.0006
Other slope rockfish	0.0360	0.0339	0.0000	0.0001
Pacific cod	0.0000	0.0251	0.0000	NA
Pacific hake	0.0002	0.0106	0.0000	NA
Petrable sole	0.0001	0.0263	0.0000	0.0015
Redstripe rockfish (North of 40°10' N. lat.)	0.0000	0.0097	0.0000	NA
Sablefish	0.1695	0.0619	0.2629	0.1004
Sharpchin rockfish (North of 40°10' N. lat.)	0.0000	0.0222	0.0000	NA
Shortbelly rockfish	0.0000	NA	0.0000	NA
Shortspine thornyhead	0.0006	0.0015	0.0000	0.0009
Silvergray rockfish (North of 40°10' N. lat.)	0.0005	0.1412	0.0000	NA
Spiny dogfish	0.0920	0.2733	0.0022	0.0190
Splitnose rockfish (North of 40°10' N. lat.)	0.0000	0.0038	0.0000	NA
Unspecified grenadiers	0.0043	0.3952	0.0002	0.0777
Unspecified skate	0.0007	0.0040	0.0000	NA
Yellowmouth (North of 40°10' N. lat.)	0.0007	0.5878	0.0000	NA
Yellowtail rockfish	0.0000	0.0041	0.0000	NA
Non-groundfish species				
Dungeness crab	0.0000	0.0031	0.0023	0.0058
Other nongroundfish	0.0332	0.1389	0.0023	0.0065
Tanner crab	0.0001	0.0155	0.0028	0.0604

Table 6. Discard ratios and standard errors from observed trips in the 2008 open access (OA) fixed gear sector by gear and the combined OA and limited entry (LE) non-sablefish-endorsed sector fishing with hook-and-line gears north of 40°10' N. latitude. Ratios are computed as the observed discard weight divided by the weight of retained sablefish. Species are grouped according to Appendix C. Discard ratios presented here are used directly in subsequent total mortality estimates and are grouped across sector when necessary to ensure sufficient sample size.

North of 40°10' N. lat	OA Fixed Gear				LE Non-Sablefish-Endorsed + OA Fixed Gear	
	Hook-and-line gears		Pot		Hook-and-line gears	
	Discard ratio	Standard Error	Discard ratio	Standard Error	Discard ratio	Standard Error
Rebuilding species						
Canary rockfish	0.0003	NA	0.0000	NA	0.0003	NA
Darkblotched rockfish	0.0016	0.0132	0.0003	NA	0.0014	0.0133
Pacific ocean perch	0.0001	0.0127	0.0000	NA	0.0001	0.0129
Non-rebuilding species						
Arrowtooth flounder	0.0436	0.1435	0.0197	0.4158	0.0391	0.1261
Dover sole	0.0052	0.0927	0.0000	NA	0.0047	0.0760
Lingcod	0.0020	0.0377	0.0112	0.1369	0.0017	0.0352
Longnose skate	0.0532	0.2922	0.0000	NA	0.0483	0.2422
Other groundfish	0.0002	0.0260	0.0000	NA	0.0002	0.0263
Other shelf rockfish	0.0002	0.0165	0.0000	NA	0.0002	0.0166
Other slope rockfish	0.0072	0.0180	0.0000	NA	0.0063	0.0182
Pacific hake	0.0006	0.0346	0.0000	NA	0.0005	0.0350
Petrable sole	0.0000	NA	0.0000	NA	0.0000	NA
Sablefish	0.3262	0.3499	0.0641	0.0540	0.3274	0.3052
Shortspine thornyhead	0.0039	0.0735	0.0003	NA	0.0035	0.0682
Spiny dogfish	0.2161	0.8667	0.0000	NA	0.2430	0.7953
Splitnose rockfish	0.0001	NA	0.0000	NA	0.0001	NA
Unspecified skate	0.0002	0.0055	0.0000	NA	0.0002	0.0044
Non-groundfish species						
Dungeness crab	0.0000	0.0000	0.0327	0.5367	0.0000	NA
Other nongroundfish	0.0146	0.1362	0.0015	0.0064	0.0149	0.1353

Table 7. Discard ratios and standard errors from observed trips in the 2008 non-nearshore fixed gear groundfish fishery from 40° 10' to 36° N. latitude by sector and gear type. Ratios are computed as the observed discard weight divided by the weight of retained sablefish. Species are grouped according to Appendix C. Discard ratios presented here are used directly in subsequent total mortality estimates and are grouped across sector or gear type in order to ensure sufficient sample size.

40° 10' to 36° N. lat	LE Non-Sablefish-Endorsed		OA Fixed Gear		LE Non-Sablefish-Endorsed + OA Fixed Gear	
	Longline		Pot		Hook-and-line gears	
	Discard ratio	Standard Error	Discard ratio	Standard Error	Discard ratio	Standard Error
Rebuilding species						
Bocaccio	0.0000	NA	0.0000	NA	0.0000	NA
Darkblotched rockfish	0.0000	NA	0.0011	0.0153	0.0000	NA
Non-rebuilding species						
Arrowtooth flounder	0.0000	NA	0.0002	NA	0.0000	NA
Bank rockfish	0.0000	NA	0.0000	NA	0.0000	NA
Blackgill rockfish	0.0016	0.0342	0.0018	0.0066	0.0012	0.0277
Chilipepper rockfish	0.0000	NA	0.0000	NA	0.0000	NA
Dover sole	0.0070	0.0746	0.0034	0.0264	0.0060	0.0557
Lingcod	0.0000	NA	0.0096	0.1105	0.0000	NA
Longnose skate	0.0602	0.5971	0.0000	NA	0.0501	0.4326
Longspine thornyhead	0.0110	0.0844	0.0000	NA	0.0107	0.0694
Mixed thornyheads	0.0000	NA	0.0000	NA	0.0002	0.0149
Other groundfish	0.0017	0.0556	0.0000	NA	0.0013	0.0500
Other shelf rockfish	0.0000	NA	0.0000	NA	0.0000	NA
Other slope rockfish	0.0025	0.0907	0.0008	0.0034	0.0018	0.0818
Pacific hake	0.0075	0.2544	0.0000	NA	0.0056	0.2311
Petrable sole	0.0000	NA	0.0018	0.0458	0.0000	NA
Sablefish	0.1579	0.2660	0.1648	0.1183	0.2310	0.5121
Shortspine thornyhead	0.0045	0.0253	0.0001	0.0044	0.0221	0.1135
Spiny dogfish	0.0345	0.2453	0.0000	NA	0.0265	0.2017
Splitnose rockfish	0.0000	NA	0.0003	0.0034	0.0000	NA
Unspecified grenadiers	0.0848	0.3013	0.0002	NA	0.0777	0.2047
Unspecified skate	0.0056	0.1527	0.0000	NA	0.0042	0.1191
Non-groundfish species						
Dungeness crab	0.0000	NA	0.0037	0.0968	0.0000	NA
Other nongroundfish	0.0828	0.2643	0.0000	NA	0.0635	0.2020
Tanner crab	0.0080	0.0843	0.0102	0.0315	0.0083	0.0544

Table 8. Discard ratios and standard errors from observed trips in the 2008 non-nearshore fixed gear groundfish fishery south of 36° N. latitude by sector and gear type. Ratios are computed as the observed discard weight divided by the weight of retained FMP groundfish species (except Pacific hake). Species are grouped according to Appendix C. Discard ratios presented here are used directly in subsequent total mortality estimates and are grouped across sector or gear type in order to ensure sufficient sample size.

South of 36° N. lat	LE Non-Sablefish-Endorsed		OA Fixed Gear		LE Non-Sablefish-Endorsed + OA Fixed Gear	
	Longline		Pot		Hook-and-line gears	
	Discard ratio	Standard Error	Discard ratio	Standard Error	Discard ratio	Standard Error
Rebuilding species						
Bocaccio	0.0000	NA	0.0000	NA	0.0000	NA
Widow rockfish	0.0000	NA	0.0000	NA	0.0000	NA
Non-rebuilding species						
Blackgill rockfish	0.0000	NA	0.0003	0.0027	0.0000	NA
Dover sole	0.0080	0.0180	0.0002	NA	0.0080	0.0181
Gopher rockfish	0.0000	NA	0.0000	NA	0.0000	NA
Lingcod	0.0000	NA	0.0000	NA	0.0003	0.1368
Longnose skate	0.0262	0.1218	0.0000	NA	0.0260	0.1224
Longspine thornyhead	0.0173	0.0098	0.0000	NA	0.0171	0.0099
Mixed thornyheads	0.0112	0.0458	0.0000	NA	0.0111	0.0461
Other nearshore rockfish	0.0000	NA	0.0000	NA	0.0000	NA
Other shelf rockfish	0.0000	NA	0.0000	NA	0.0001	0.0038
Other slope rockfish	0.0000	0.0034	0.0003	0.0028	0.0000	0.0034
Pacific hake	0.0035	0.1164	0.0000	NA	0.0034	0.1172
Sablefish	0.0057	0.0137	0.1305	0.2237	0.0056	0.0138
Shortspine thornyhead	0.0309	0.0163	0.0003	0.0047	0.0306	0.0164
Spiny dogfish	0.0018	0.0344	0.0000	NA	0.0018	0.0346
Unspecified grenadiers	0.0009	0.0075	0.0000	NA	0.0009	0.0075
Unspecified skate	0.0016	0.1729	0.0000	NA	0.0016	0.1741
Non-groundfish species						
Other nongroundfish	0.0524	0.0696	0.0362	0.0331	0.0519	0.0695
Tanner crab	0.0001	0.0090	0.0010	0.0207	0.0001	0.0090

Table 9. Retained sablefish (lbs), total rebuilding species catch (lbs), and rebuilding species bycatch ratios from observed trips in the 2008 non-nearshore fixed gear groundfish fishery north of 40°10' N. latitude and between 40°10' and 36° N. latitude. Bycatch ratios are computed as the observed total catch weight divided by the observed weight of retained sablefish.

	Longline		Pot	
	North of 40°10' N. lat.	40°10' to 36° N. lat.	North of 40°10' N. lat.	40°10' to 36° N. lat.
Total retained sablefish observed (lbs)	800984	24097	548424	85278
Total catch observed (lbs)				
Bocaccio	82.5	85.0	0.0	0.0
Canary rockfish	305.9	0.0	0.0	0.0
Cowcod	0.0	0.0	0.0	0.0
Darkblotched rockfish	4946.4	17.6	189.1	28.5
Pacific ocean perch	156.2	0.0	18.0	0.0
Widow rockfish	45.7	0.0	0.0	0.0
Yelloweye rockfish	495.8	0.0	0.0	0.0
Observed bycatch ratio				
Bocaccio	0.0001	0.0035	0.0000	0.0000
Canary rockfish	0.0004	0.0000	0.0000	0.0000
Cowcod	0.0000	0.0000	0.0000	0.0000
Darkblotched rockfish	0.0062	0.0007	0.0003	0.0003
Pacific ocean perch	0.0002	0.0000	0.0000	0.0000
Widow rockfish	0.0001	0.0000	0.0000	0.0000
Yelloweye rockfish	0.0006	0.0000	0.0000	0.0000

Table 10. Summary of the number of length measurements and the number of individual fish sexed by WCGOP observers in the limited entry sablefish-endorsed, limited entry non-sablefish-endorsed, and open access fixed gear groundfish fisheries from September 2003 through April 2009. The date range of biological data for each species is also provided.

	Years available	# lengths	# sexes
Rebuilding species			
Bocaccio	2006 - 2008	22	0
Canary rockfish	2004 - 2008	130	65
Cowcod	2004	1	0
Darkblotched rockfish	2004 - 2008	278	66
Pacific ocean perch	2004 - 2008	32	3
Widow rockfish	2005, 2007 - 2008	13	2
Yelloweye rockfish	2004 - 2008	218	130
Non-rebuilding species			
Arrowtooth flounder	2005, 2007 - 2008	6	0
Aurora rockfish	2004, 2008	40	0
Black rockfish	2006	4	0
Blackgill rockfish	2004 - 2008	50	0
Brown rockfish	2006	9	0
Cabazon	2006	7	0
Chilipepper rockfish	2008	1	0
Dover sole	2007, Jan - Apr 2009	8	0
Dungeness crab	2007 - Apr 2009	16	16
Gopher rockfish	2006, 2008	4	0
Greenstriped rockfish	2005, 2007 - 2008	34	0
Kelp greenling	2006	11	11
Lingcod	2004 - Apr 2009	406	3
Longnose skate	2006 - Apr 2009	20	18
Longspine thornyhead	2005 - Apr 2009	1470	5
Olive rockfish	2006	1	0
Pacific hake	2006	1	0
Redbanded rockfish	2005 - 2008	83	1
Redstripe rockfish	2007	1	0
Rosethorn rockfish	2005 - 2008	10	0
Rougheye rockfish	2004 - 2008	381	213
Sablefish	2005 - Apr 2009	5388	16
Shortraker rockfish	2004 - 2008	42	18
Shortraker/Rougheye rockfish	2007 - 2008	6	0
Shortspine thornyhead	2005 - Apr 2009	1082	2
Silvergray rockfish	2004 - 2005, 2008	10	9
Spiny dogfish	2006 - Apr 2009	4266	4184
Splitnose rockfish	2004, 2007 - 2008	14	0
Spotted ratfish	2006, 2008	5	1
Vermilion rockfish	2006	1	0
Yellowtail rockfish	2006 - 2008	48	0
Non-groundfish			
Blue shark	2007 - 2008	8	8
Tanner crab	2008	7	7
Pacific halibut	2004 - 2008	84	0
Pacific black dogfish	2007	2	2
Pacific dogfish	2007	8	8

Table 11. Summary of biological data for protected resources collected by WCGOP observers in the limited entry sablefish-endorsed, limited entry non-sablefish-endorsed, and open access fixed gear groundfish fisheries from September 2003 through April 2009. The number of length or weight measurements and the number of individuals sexed is reported for each year where data are available.

	# lengths / weights	# sexes
Salmon		
Coho salmon		
2005	1	1
2007	1	1

APPENDIX A

WCGOP Database Table Hierarchy

TRIPS

FISHING_ACTIVITIES

FISHING_LOCATIONS

CATCHES

SPECIES COMPOSITION

SPECIES_COMPOSITION_ITEMS

BIO_SPECIMENS

BIO_SPECIMEN_ITEMS

DISSECTIONS

Database Table Descriptions

The database tables listed below are a subset of the tables contained in the entire Oracle database. They represent the tables that are actually used to contain the WCGOP data collected by the WCGOP.

BIO_SPECIMENS	Sets of species physical measurements resulting from sampling catches occurring in a tow or set
BIO_SPECIMEN_ITEMS	Physical measurements collected for an individual fish, mammal or bird occurring in a biological sample
CATCHES	PacFIN catch category based on estimates of fish caught during a tow or set
CATCH_CATEGORIES	PacFIN catch categories
DISSECTIONS	Physical specimens collected for an individual fish, mammal or bird
FISHING_ACTIVITIES	Fishing tows or sets occurring during a trip
FISHING_LOCATIONS	Locations of tows or sets
PORTS	Coastal cities where fishing activity is based out of
SPECIES	Fish, mammal, and bird species that might be encountered during fishing
SPECIES_COMPOSITIONS	Sets of species weights and counts resulting from sampling catches occurring in a tow or set
SPECIES_COMPOSITIONS_ITEMS	Weights and counts for individual species occurring in a species composition sample
TRIPS	Sets of fishing activities that occur between the time a vessel leaves port and when it returns
VESSELS	Trawl, longline, pot, or other fishing vessels

APPENDIX B

Common and scientific names of species included in the Pacific Coast Groundfish Fishery Management Plan, as amended through Amendment 19 (PFMC 2008).

SHARKS

Big skate, *Raja binoculata*
California skate, *R. inornata*
Leopard shark, *Triakis semifasciata*
Longnose skate, *R. rhina*
Soupfin shark, *Galeorhinus zyopterus*
Spiny dogfish, *Squalus acanthias*

RATFISH

Ratfish, *Hydrolagus colliei*

MORIDS

Finescale codling, *Antimora microlepis*

GRENADIERS

Pacific rattail, *Coryphaenoides acrolepis*

ROUNDFISH

Cabazon, *Scorpaenichthys marmoratus*
Kelp greenling, *Hexagrammos decagrammus*
Lingcod, *Ophiodon elongatus*
Pacific cod, *Gadus macrocephalus*
Pacific whiting, (hake) *Merluccius productus*
Sablefish, *Anoplopoma fimbria*

FLATFISH

Arrowtooth flounder, (turbot) *Atheresthes stomias*
Butter sole, *Isopsetta isolepis*
Curlfin sole, *Pleuronichthys decurrens*
Dover sole, *Microstomus pacificus*
English sole, *Parophrys vetulus*
Flathead sole, *Hippoglossoides elassodon*
Pacific sanddab, *Citharichthys sordidus*
Petrale sole, *Eopsetta jordani*
Rex sole, *Glyptocephalus zachirus*
Rock sole, *Lepidopsetta bilineata*
Sand sole, *Psettichthys melanostictus*
Starry flounder, *Platichthys stellatus*

ROCKFISH

Includes all genera and species of the family Scopaenidae, even if not listed, that occur in the Washington, Oregon, and California area. The Scopaenidae genera are *Sebastes*, *Scorpaena*, *Sebastolobus*, and *Scorpaenodes*.

Aurora, *Sebastes. aurora*
Bank, *S. rufus*
Black, *S. melanops*
Black-and-yellow, *S. chrysomelas*.
Blackgill, *S. melanostomus*
Blue, *S. mystinus*
Bocaccio, *S. paucispinis*
Bronzespotted, *S. gilli*
Brown, *S. auriculatus*
Calico, *S. dalli*
California scorpionfish, *Scorpaena guttata*
Canary, *Sebastes pinniger*
Chameleon, *S. phillipsi*
Chilipepper, *S. goodei*
China, *S. nebulosus*
Copper, *S. caurinus*
Cowcod, *S. levis*
Darkblotched, *S. cramerii*
Dusky, *S. ciliatus*
Dwarf-red, *S. rufianus*
Flag, *S. rubrivinctus*
Freckled, *S. lentiginosus*
Gopher, *S. carnatus*
Grass, *S. rastrelliger*
Greenblotched, *S. rosenblatti*
Greenspotted, *S. chlorostictus*
Greenstriped, *S. elongatus*
Halfbanded, *S. semicinctus*
Harlequin, *S. variegatus*
Honeycomb, *S. umbrosus*
Kelp, *S. atrovirens*
Longspine thornyhead, *Sebastolobus altivelis*
Mexican, *Sebastes. macdonaldi*
Olive, *S. serranoides*
Pink, *S. eos*
Pinkrose, *S. simulator*
Pygmy, *S. wilsoni*
Pacific ocean perch, *S. alutus*
Quillback, *S. maliger*
Redbanded, *S. babcocki*

Redstripe, *S. proriger*
Rosethorn, *S. helvomaculatus*
Rosy, *S. rosaceus*
Rougheye, *S. aleutianus*
Sharpchin, *S. zacentrus*
Shortbelly, *S. jordani*
Shortraker, *S. borealis*
Shortspine thornyhead, *Sebastolobus alascanus*
Silvergrey, *Sebastes. brevispinus*
Speckled, *S. ovalis*
Splitnose rockfish, *S. diploproa*
Squarespot, *S. hopkinsi*
Starry, *S. constellatus*
Stripetail, *S. saxicola*
Swordspine, *S. ensifer*
Tiger, *S. nigorcinctus*
Treefish, *S. serriceps*
Vermilion, *S. miniatus*
Widow, *S. entomelas*
Yelloweye, *S. ruberrimus*
Yellowmouth, *S. reedi*
Yellowtail, *S. flavidus*

APPENDIX C

Species identification codes used in the Pacific Coast Fisheries Information Network (PacFIN) database and assigned to WCGOP observer data, with aggregated species groups used in this report (Tables 3, 4, 6, 7, 9, and 10).

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40° 10' N latitude	Species Group - South of 40° 10' N latitude	FMP
ALBC	ALBACORE	Other nongroundfish	Other nongroundfish	
APLC	ALASKA PLAICE	Other non-FMP flatfish	Other non-FMP flatfish	
ARR1	NOM. AURORA ROCKFISH	Other slope rockfish	Other slope rockfish	yes
ARRA	AURORA ROCKFISH	Other slope rockfish	Other slope rockfish	yes
ART1	NOM. ARROWTOOTH FLOUNDER	Arrowtooth flounder	Arrowtooth flounder	yes
ARTH	ARROWTOOTH FLOUNDER	Arrowtooth flounder	Arrowtooth flounder	yes
ASRK	PACIFIC ANGEL SHARK	Other nongroundfish	Other nongroundfish	
BABL	BLACK ABALONE	Other nongroundfish	Other nongroundfish	
BANK	BANK ROCKFISH	Other slope rockfish	Bank rockfish (Remaining rockfish)	yes
BCAC	BOCACCIO	Bocaccio (Remaining rockfish)	Bocaccio	yes
BCC1	NOM. BOCACCIO	Bocaccio (Remaining rockfish)	Bocaccio	yes
BCLM	BUTTER CLAM	Other nongroundfish	Other nongroundfish	
BGL1	NOM. BLACKGILL ROCKFISH	Other slope rockfish	Blackgill (Remaining rockfish)	yes
BKCR	BLUE KING CRAB	Other nongroundfish	Other nongroundfish	
BLCK	BLACK ROCKFISH	Black rockfish	Black rockfish	yes
BLGL	BLACKGILL ROCKFISH	Other slope rockfish	Blackgill (Remaining rockfish)	yes
BLK1	NOM. BLACK ROCKFISH	Black rockfish	Black rockfish	yes
BLU1	NOM. BLUE ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
BLUR	BLUE ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
BMCK	BULLET MACKEREL	Other nongroundfish	Other nongroundfish	
BMRL	BLUE MARLIN	Other nongroundfish	Other nongroundfish	
BMSL	BLUE OR BAY MUSSEL	Other nongroundfish	Other nongroundfish	
BNK1	NOM. BANK ROCKFISH	Other slope rockfish	Bank rockfish (Remaining rockfish)	yes
BRNZ	BRONZESPOTTED ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
BRW1	NOM. BROWN ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
BRWN	BROWN ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
BRZ1	NOM. BRONZESPOTTED RK	Other shelf rockfish	Other shelf rockfish	yes
BSJK	BLACK SKIPJACK	Other nongroundfish	Other nongroundfish	
BSKT	BIG SKATE	Big skate	Big skate	yes
BSOL	BUTTER SOLE	Other flatfish	Other flatfish	yes
BSRK	BLUE SHARK	Other nongroundfish	Other nongroundfish	
BSRM	UNSP. BAIT SHRIMP	Other nongroundfish	Other nongroundfish	
BTCR	BAIRDI TANNER CRAB	Tanner crab	Tanner crab	
BTNA	BLUEFIN TUNA	Other nongroundfish	Other nongroundfish	
BTRY	BAT RAY	Other nongroundfish	Other nongroundfish	
BYEL	BLACK-AND-YELLOW ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
BYL1	NOM. BLACK-AND-YELLOW RK	Other nearshore rockfish	Other nearshore rockfish	yes
CBZ1	NOM. CABEZON	Other groundfish	Cabezon	yes
CBZN	CABEZON	Other groundfish	Cabezon	yes

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40° 10' N latitude	Species Group - South of 40° 10' N latitude	FMP
CEEL	SPOTTED CUSK-EEL	Other nongroundfish	Other nongroundfish	
CHL1	NOM. CALIFORNIA HALIBUT	California halibut	California halibut	
CHLB	CALIFORNIA HALIBUT	California halibut	California halibut	
CHN1	NOM. CHINA ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
CHNA	CHINA ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
CHNK	CHINOOK SALMON	Other nongroundfish	Other nongroundfish	
CHUM	CHUM SALMON	Other nongroundfish	Other nongroundfish	
CKLE	BASKET COCKLE	Other nongroundfish	Other nongroundfish	
CLC1	NOM. CALICO ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
CLCO	CALICO ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
CLP1	NOM. CHILIPEPPER	Chilipepper (Remaining rockfish)	Chilipepper	yes
CLPR	CHILIPEPPER	Chilipepper (Remaining rockfish)	Chilipepper	yes
CMCK	CHUB MACKEREL	Other nongroundfish	Other nongroundfish	
CMEL	CHAMELEON ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
CML1	NOM. CHAMELEON ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
CMSL	CALIFORNIA MUSSEL	Other nongroundfish	Other nongroundfish	
CNR1	NOM. CANARY ROCKFISH	Canary rockfish	Canary rockfish	yes
CNRY	CANARY ROCKFISH	Canary rockfish	Canary rockfish	yes
COHO	COHO SALMON	Other nongroundfish	Other nongroundfish	
COP1	NOM. COPPER ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
COPP	COPPER ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
CPLN	CAPELIN	Other nongroundfish	Other nongroundfish	
CSKT	CALIFORNIA SKATE	Unspecified skate	Unspecified skate	yes
CSOL	CURLFIN SOLE	Other flatfish	Other flatfish	yes
CTRB	C-O SOLE	Other non-FMP flatfish	Other non-FMP flatfish	
CUDA	PACIFIC BARRACUDA	Other nongroundfish	Other nongroundfish	
CWC1	NOM. COWCOD ROCKFISH	Other shelf rockfish	Cowcod	yes
CWCD	COWCOD ROCKFISH	Other shelf rockfish	Cowcod	yes
DBR1	NOM. DARKBLOTCHED ROCKFISH	Darkblotched rockfish	Darkblotched rockfish	yes
DBRK	DARKBLOTCHED ROCKFISH	Darkblotched rockfish	Darkblotched rockfish	yes
DCRB	DUNGENESS CRAB	Dungeness crab	Dungeness crab	
DFLT	UNSP. DEEP FLOUNDERS	Other flatfish	Other flatfish	yes
DOVR	DOVER SOLE	Dover sole	Dover sole	yes
DRDO	DORADO	Other nongroundfish	Other nongroundfish	
DSOL	DEEPSEA SOLE	Other non-FMP flatfish	Other non-FMP flatfish	
DSRK	SPINY DOGFISH	Spiny dogfish	Spiny dogfish	yes
DTRB	DIAMOND TURBOT	Other non-FMP flatfish	Other non-FMP flatfish	
DUSK	DUSKY ROCKFISH	Other groundfish	Other groundfish	yes
DVR1	NOM. DOVER SOLE	Dover sole	Dover sole	yes
DWRF	DWARF-RED ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
EELS	UNSPECIFIED EELS	Other nongroundfish	Other nongroundfish	
EGL1	NOM. ENGLISH SOLE	English sole	English sole	yes
EGLS	ENGLISH SOLE	English sole	English sole	yes
ESTR	EASTERN OYSTER	Other nongroundfish	Other nongroundfish	
ETNA	BIGEYE TUNA	Other nongroundfish	Other nongroundfish	

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40° 10' N latitude	Species Group - South of 40° 10' N latitude	FMP
EULC	EULACHON	Eulachon	Eulachon	
EURO	EUROPEAN OYSTER	Other nongroundfish	Other nongroundfish	
FLAG	FLAG ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
FLG1	NOM. FLAG ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
FNTS	FANTAIL SOLE	Other non-FMP flatfish	Other non-FMP flatfish	
FRCK	FRECKLED ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
FSOL	FLATHEAD SOLE	Other flatfish	Other flatfish	yes
GABL	GREEN ABALONE	Other nongroundfish	Other nongroundfish	
GBAS	GIANT SEA BASS	Other nongroundfish	Other nongroundfish	
GBL1	NOM. GREENBLOTCHED RK	Other shelf rockfish	Other shelf rockfish	yes
GBLC	GREENBLOTCHED ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
GCLM	GAPER CLAM	Other nongroundfish	Other nongroundfish	
GDUK	GEODUCK	Other nongroundfish	Other nongroundfish	
GKCR	GOLDEN KING CRAB	Other nongroundfish	Other nongroundfish	
GPH1	NOM. GOPHER ROCKFISH	Other nearshore rockfish	Gopher rockfish (Remaining rockfish)	yes
GPHR	GOPHER ROCKFISH	Other nearshore rockfish	Gopher rockfish (Remaining rockfish)	yes
GPRW	GOLDEN PRAWN	Other nongroundfish	Other nongroundfish	
GRAS	GRASS ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
GRDR	UNSP. GRENADIERS	Unspecified grenadiers	Unspecified grenadiers	yes
GRS1	NOM. GRASS ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
GSP1	NOM. GREENSPOTTED RK	Other shelf rockfish	Other shelf rockfish	yes
GSPT	GREENSPOTTED ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
GSQD	GIANT SQUID	Other nongroundfish	Other nongroundfish	
GSR1	NOM. GREENSTRIPED ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
GSRK	GREENSTRIPED ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
GSRM	GHOST SHRIMP	Other nongroundfish	Other nongroundfish	
GSTG	GREEN STURGEON	Green sturgeon	Green sturgeon	
GTRB	GREENLAND TURBOT	Other non-FMP flatfish	Other non-FMP flatfish	
HBRK	HALFBANDED ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
HCLM	HORSE CLAMS	Other nongroundfish	Other nongroundfish	
HLQN	HARLEQUIN ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
HNY1	NOM. HONEYCOMB ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
HNYC	HONEYCOMB ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
HTRB	HORNYHEAD TURBOT	Other non-FMP flatfish	Other non-FMP flatfish	
ISRK	BIGEYE THRESHER SHARK	Other nongroundfish	Other nongroundfish	
JCLM	CALIFORNIA JACKKNIFE CLAM	Other nongroundfish	Other nongroundfish	
JMCK	JACK MACKEREL	Other nongroundfish	Other nongroundfish	
KFSH	GIANT KELPFISH	Other nongroundfish	Other nongroundfish	
KGL1	NOM. KELP GREENLING	Kelp greenling	Kelp greenling	yes
KLP1	NOM. KELP ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
KLPG	KELP GREENLING	Kelp greenling	Kelp greenling	yes
KLPR	KELP ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
KMKA	KAMCHATKA FLOUNDER	Other non-FMP flatfish	Other non-FMP flatfish	
KSTR	KUMAMOTO OYSTER	Other nongroundfish	Other nongroundfish	
LCD1	NOM. LINGCOD	Lingcod	Lingcod	yes

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40° 10' N latitude	Species Group - South of 40° 10' N latitude	FMP
LCLM	NATIVE LITTLENECK	Other nongroundfish	Other nongroundfish	
LCOD	LINGCOD	Lingcod	Lingcod	yes
LDAB	LONGFIN SANDDAB	Other non-FMP flatfish	Other non-FMP flatfish	
LDB1	NOM. LONGFIN SANDDAB	Other non-FMP flatfish	Other non-FMP flatfish	
LOBS	CALIF. SPINY LOBSTER	Other nongroundfish	Other nongroundfish	
LSKT	LONGNOSE SKATE	Longnose skate	Longnose skate	yes
LSP1	NOM. LONGSPINE THORNYHEAD	Longspine thornyhead	Longspine thornyhead	yes
LSPN	LONGSPINE THORNYHEAD	Longspine thornyhead	Longspine thornyhead	yes
LSRK	LEOPARD SHARK	Other groundfish	Other groundfish	yes
LSTR	OLYMPIA OYSTER	Other nongroundfish	Other nongroundfish	
LUVR	LOUVAR	Other nongroundfish	Other nongroundfish	
MACL	MUD CLAMS	Other nongroundfish	Other nongroundfish	
MAKO	SHORTFIN MAKO SHARK	Other nongroundfish	Other nongroundfish	
MCLM	MANILA CLAM	Other nongroundfish	Other nongroundfish	
MEEL	MONKEYFACE EEL	Other nongroundfish	Other nongroundfish	
MISC	MISC. FISH/ANIMALS	Other nongroundfish	Other nongroundfish	
MOLA	COMMON MOLA	Other nongroundfish	Other nongroundfish	
MRLN	STRIPED MARLIN	Other nongroundfish	Other nongroundfish	
MSC2	MISCELLANEOUS FISH	Other nongroundfish	Other nongroundfish	
MSHP	PLAINFIN MIDSHIPMAN	Other nongroundfish	Other nongroundfish	
MSQD	MARKET SQUID	Other nongroundfish	Other nongroundfish	
MSRM	MUD SHRIMP	Other nongroundfish	Other nongroundfish	
MXR1	NOM. MEXICAN ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
MXRF	MEXICAN ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
NANC	NORTHERN ANCHOVY	Other nongroundfish	Other nongroundfish	
NRCK	NORTHERN ROCKFISH	Other groundfish	Other groundfish	yes
NSHR	NORTHERN NEAR-SHORE RK	Other nearshore rockfish	Other nearshore rockfish	yes
NSLF	NORTHERN SHELF ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
NSLP	NORTHERN SLOPE ROCKFISH	Other slope rockfish	Other slope rockfish	yes
NUSF	NOR. UNSP. SHELF ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
NUSP	NOR. UNSP. SLOPE ROCKFISH	Other slope rockfish	Other slope rockfish	yes
NUSR	NOR. UNSP. NEAR-SHORE RK	Other nearshore rockfish	Other nearshore rockfish	yes
OABL	OTHER ABALONE	Other nongroundfish	Other nongroundfish	
OANC	OTHER ANCHOVY	Other nongroundfish	Other nongroundfish	
OBAS	OTHER BASS	Other nongroundfish	Other nongroundfish	
OCLM	OTHER CLAM	Other nongroundfish	Other nongroundfish	
OCRB	OTHER CRAB	Other nongroundfish	Other nongroundfish	
OCRK	OTHER CROAKER	Other nongroundfish	Other nongroundfish	
OCTP	UNSP. OCTOPUS	Other nongroundfish	Other nongroundfish	
ODSR	OTHER DEMERSAL RKFSH	Other groundfish	Other groundfish	yes
OECH	OTHER ECHINODERM	Other nongroundfish	Other nongroundfish	
OFLT	OTHER FLATFISH	Other flatfish	Other flatfish	yes
OGRN	OTHER GROUND FISH	Other groundfish	Other groundfish	yes
OLV1	NOM. OLIVE ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
OLVE	OLIVE ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
OMSK	OTHER MOLLUSKS	Other nongroundfish	Other nongroundfish	

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40° 10' N latitude	Species Group - South of 40° 10' N latitude	FMP
OPLG	OTHER PELAGIC RKFSH	Other groundfish	Other groundfish	yes
ORCK	OTHER ROCKFISH	Other slope rockfish (>150 fm)	Other slope rockfish (>150 fm)	yes
ORCK	OTHER ROCKFISH	Other shelf rockfish (<150 fm)	Other shelf rockfish (<150 fm)	yes
ORND	OTHER ROUNDFISH	Other groundfish	Other groundfish	yes
OSCL	OTHER SCALLOP	Other nongroundfish	Other nongroundfish	
OSKT	OTHER SKATES	Unspecified skate	Unspecified skate	yes
OSLR	OTHER SLOPE RKFSH	Other slope rockfish	Other slope rockfish	yes
OSRK	OTHER SHARK	Other nongroundfish	Other nongroundfish	
OSRM	OTHER SHRIMP	Other nongroundfish	Other nongroundfish	
OSTR	OTHER OYSTER	Other nongroundfish	Other nongroundfish	
OTCR	OPILO TANNER CRAB	Tanner crab	Tanner crab	
OTNA	OTHER TUNA	Other nongroundfish	Other nongroundfish	
OURC	OTHER SEA URCHINS	Other nongroundfish	Other nongroundfish	
OWFS	OCEAN WHITEFISH	Other nongroundfish	Other nongroundfish	
PABL	PINK ABALONE	Other nongroundfish	Other nongroundfish	
PBNT	PACIFIC BONITO	Other nongroundfish	Other nongroundfish	
PBTR	PACIFIC BUTTERFISH	Other nongroundfish	Other nongroundfish	
PCLM	PISMO CLAM	Other nongroundfish	Other nongroundfish	
PCOD	PACIFIC COD	Pacific cod	Other groundfish	yes
PDAB	PACIFIC SANDDAB	Other flatfish	Other flatfish	yes
PDB1	NOM. PACIFIC SANDDAB	Other flatfish	Other flatfish	yes
PGMY	PYGYM ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
PHLB	PACIFIC HALIBUT	Pacific halibut	Pacific halibut	
PHRG	PACIFIC HERRING	Other nongroundfish	Other nongroundfish	
PINK	PINK SALMON	Other nongroundfish	Other nongroundfish	
PLCK	WALLEYE POLLOCK	Other groundfish	Other groundfish	yes
PNK1	NOM. PINK ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
PNKR	PINK ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
POMF	PACIFIC POMFRET	Other nongroundfish	Other nongroundfish	
POP	PACIFIC OCEAN PERCH	Pacific ocean perch	Other slope rockfish	yes
POP1	GEN. SHELF/SLOPE RF	Other slope rockfish	Other slope rockfish	yes
POP2	NOMINAL POP	Pacific ocean perch	Other slope rockfish	yes
PRCL	PURPLE CLAM	Other nongroundfish	Other nongroundfish	
PROW	PROWFISH	Other nongroundfish	Other nongroundfish	
PRR1	NOM. PINKROSE ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
PRRK	PINKROSE ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
PSDN	PACIFIC SARDINE	Other nongroundfish	Other nongroundfish	
PSHP	PINK SHRIMP	Other nongroundfish	Other nongroundfish	
PSRK	PELAGIC THRESHER SHARK	Other nongroundfish	Other nongroundfish	
PSTR	PACIFIC OYSTER	Other nongroundfish	Other nongroundfish	
PTR1	NOM. PETRALE SOLE	Petrale sole	Petrale sole	yes
PTRL	PETRALE SOLE	Petrale sole	Petrale sole	yes
PUGT	PUGET SOUND ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
PWHT	PACIFIC WHITING	Pacific hake	Pacific hake	yes
QCLM	NORTHERN QUAHOG CLAM	Other nongroundfish	Other nongroundfish	
QFSH	QUEENFISH	Other nongroundfish	Other nongroundfish	

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40° 10' N latitude	Species Group - South of 40° 10' N latitude	FMP
QLB1	NOM. QUILLBACK ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
QLBK	QUILLBACK ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
RABL	RED ABALONE	Other nongroundfish	Other nongroundfish	
RATF	SPOTTED RATFISH	Other groundfish	Other groundfish	yes
RCK1	BOCACCIO+CHILIPEPPER RK	Other shelf rockfish	Other shelf rockfish	yes
RCK2	UNSP. BOLINA RCKFSH	Other nearshore rockfish	Other nearshore rockfish	yes
RCK3	UNSP. DPWTR REDS RCKFSH	Other slope rockfish	Other slope rockfish	yes
RCK4	UNSP. REDS RCKFSH	Other groundfish	Other groundfish	yes
RCK5	UNSP. SMALL REDS RCKFSH	Other groundfish	Other groundfish	yes
RCK6	UNSP. ROSEFISH RCKFSH	Other groundfish	Other groundfish	yes
RCK7	UNSP. GOPHER RCKFSH	Other nearshore rockfish	Gopher rockfish (Remaining rockfish)	yes
RCK8	CANARY+VERMILION RCKFSH	Canary rockfish	Canary rockfish	yes
RCK9	BLACK+BLUE ROCKFISH	Black rockfish	Black rockfish	yes
RCKG	ROCK GREENLING	Other nongroundfish	Other nongroundfish	
RCLM	RAZOR CLAM	Other nongroundfish	Other nongroundfish	
RCRB	ROCK CRAB	Other nongroundfish	Other nongroundfish	
RDB1	NOM. REDBANDED ROCKFISH	Other slope rockfish	Other slope rockfish	yes
RDBD	REDBANDED ROCKFISH	Other slope rockfish	Other slope rockfish	yes
REDS	REDSTRIPE ROCKFISH	Redstripe rockfish (Remaining rockfish)	Other shelf rockfish	yes
REX	REX SOLE	Other flatfish	Other flatfish	yes
REX1	NOM. REX SOLE	Other flatfish	Other flatfish	yes
REYE	ROUGHEYE ROCKFISH	Other slope rockfish	Other slope rockfish	yes
RFLT	REMAINING FLATFISH	Other flatfish	Other flatfish	yes
RGL1	NOM. ROCK GREENLING	Other nongroundfish	Other nongroundfish	
RGRN	REMAINING GROUND FISH	Other groundfish	Other groundfish	yes
RHRG	ROUND HERRING	Other nongroundfish	Other nongroundfish	
RKCR	RED KING CRAB	Other nongroundfish	Other nongroundfish	
ROS1	NOM. ROSY ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
ROSY	ROSY ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
RPRW	RIDGEBACK PRAWN	Other nongroundfish	Other nongroundfish	
RRCK	REMAINING ROCKFISH	Other groundfish	Other groundfish	yes
RRND	REMAINING ROUND FISH	Other groundfish	Other groundfish	yes
RSL1	NOM. ROCK SOLE	Other flatfish	Other flatfish	yes
RSOL	ROCK SOLE	Other flatfish	Other flatfish	yes
RST1	NOM. ROSETHORN ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
RSTN	ROSETHORN ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
RURC	RED SEA URCHIN	Other nongroundfish	Other nongroundfish	
RZCL	ROSY RAZOR CLAM	Other nongroundfish	Other nongroundfish	
SABL	SABLEFISH	Sablefish	Sablefish	yes
SAIL	SAILFISH	Other nongroundfish	Other nongroundfish	
SARY	PACIFIC SAURY	Other nongroundfish	Other nongroundfish	
SBL1	NOM. SHORTBELLY ROCKFISH	Shortbelly rockfish	Shortbelly rockfish	yes
SBLY	SHORTBELLY ROCKFISH	Shortbelly rockfish	Shortbelly rockfish	yes
SCLM	SOFT-SHELLED CLAM	Other nongroundfish	Other nongroundfish	
SCLP	UNSP. SCULPIN	Other nongroundfish	Other nongroundfish	

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40° 10' N latitude	Species Group - South of 40° 10' N latitude	FMP
SCOR	CALIFORNIA SCORPIONFISH	Other groundfish	Other nearshore rockfish	yes
SCR1	NOM. CALIF. SCORPIONFISH	Other groundfish	Other nearshore rockfish	yes
SDB1	NOM. SPECKLED SANDDAB	Other non-FMP flatfish	Other non-FMP flatfish	
SFL1	NOM. STARRY FLOUNDER	Starry flounder	Starry flounder	yes
SFLT	UNSP. SHALLOW FLOUNDERS	Other flatfish	Other flatfish	yes
SHAD	UNSPECIFIED SHAD	Other nongroundfish	Other nongroundfish	
SHP1	NOM. CALIFORNIA SHEEPHEAD	Other nongroundfish	Other nongroundfish	
SHPD	CALIFORNIA SHEEPHEAD	Other nongroundfish	Other nongroundfish	
SHRP	SHARPCHIN ROCKFISH	Sharpchin rockfish (Remaining rockfish)	Sharpchin - south	yes
SKCR	SCARLET KING CRAB	Other nongroundfish	Other nongroundfish	
SLGR	SILVERGREY ROCKFISH	Silvergrey rockfish (Remaining rockfish)	Other shelf rockfish	yes
SLNS	SLENDER SOLE	Other non-FMP flatfish	Other non-FMP flatfish	
SMLT	UNSP. SMELT	Other nongroundfish	Other nongroundfish	
SNOS	SPLITNOSE ROCKFISH	Splitnose rockfish (Remaining rockfish)	Splitnose rockfish	yes
SNS1	NOM. SPLITNOSE ROCKFISH	Splitnose rockfish (Remaining rockfish)	Splitnose rockfish	yes
SOCK	SOCKEYE SALMON	Other nongroundfish	Other nongroundfish	
SPK1	NOM. SPECKLED ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
SPKL	SPECKLED ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
SPRW	SPOTTED PRAWN	Other nongroundfish	Other nongroundfish	
SQID	UNSP. SQUID	Other nongroundfish	Other nongroundfish	
SQR1	NOM. SQUARESPOT	Other shelf rockfish	Other shelf rockfish	yes
SQRS	SQUARESPOT ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
SRFP	SURFPERCH SPP.	Other nongroundfish	Other nongroundfish	
SRKR	SHORTRAKER ROCKFISH	Other slope rockfish	Other slope rockfish	yes
SSCL	SHARPNOSE SCULPIN	Other nongroundfish	Other nongroundfish	
SSDB	SPECKLED SANDDAB	Other non-FMP flatfish	Other non-FMP flatfish	
SSHR	SOUTHERN NEAR-SHORE RK	Other nearshore rockfish	Other nearshore rockfish	yes
SSLF	SOUTHERN SHELF ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
SSLP	SOUTHERN SLOPE ROCKFISH	Other slope rockfish	Other slope rockfish	yes
SSO1	NOM. SAND SOLE	Other flatfish	Other flatfish	yes
SSOL	SAND SOLE	Other flatfish	Other flatfish	yes
SSP1	NOM. SHORTSPINE THORNYHEAD	Shortspine thornyhead	Shortspine thornyhead	yes
SSPN	SHORTSPINE THORNYHEAD	Shortspine thornyhead	Shortspine thornyhead	yes
SSRD	Deep So. Nearshore RF	Other nearshore rockfish	Other nearshore rockfish	yes
SSRK	SOUPFIN SHARK	Other groundfish	Other groundfish	yes
SSRS	Shallow So. Nearshore RF	Other nearshore rockfish	Other nearshore rockfish	yes
STAR	STARRY ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
STL1	NOM. STRIPETAIL ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
STLH	STEELHEAD	Other nongroundfish	Other nongroundfish	
STNA	SKIPJACK TUNA	Other nongroundfish	Other nongroundfish	
STR1	NOM. STARRY ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
STRK	STRIPETAIL ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
STRY	STARRY FLOUNDER	Starry flounder	Starry flounder	yes
SUSF	SOU. UNSP. SHELF ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40° 10' N latitude	Species Group - South of 40° 10' N latitude	FMP
SUSP	SOU. UNSP. SLOPE ROCKFISH	Other slope rockfish	Other slope rockfish	yes
SUSR	SOU. UNSP. NEAR-SHORE RK	Other nearshore rockfish	Other nearshore rockfish	yes
SWRD	SWORDFISH	Other nongroundfish	Other nongroundfish	
SWS1	NOM. SWORDSPINE ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
SWSP	SWORDSPINE ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
TCOD	PACIFIC TOMCOD	Other nongroundfish	Other nongroundfish	
TGR1	NOM. TIGER ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
THD1	NOM. THORNYHEADS	Mixed thornyheads	Mixed thornyheads	yes
THDS	THORNYHEADS (MIXED)	Mixed thornyheads	Mixed thornyheads	yes
TIGR	TIGER ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
TRE1	NOM. TREEFISH	Other nearshore rockfish	Other nearshore rockfish	yes
TREE	TREEFISH	Other nearshore rockfish	Other nearshore rockfish	yes
TSRK	COMMON THRESHER SHARK	Other nongroundfish	Other nongroundfish	
UABL	UNSPECIFIED ABALONE	Other nongroundfish	Other nongroundfish	
UCLM	UNSPECIFIED CLAM	Other nongroundfish	Other nongroundfish	
UCRB	UNSPECIFIED CRAB	Other nongroundfish	Other nongroundfish	
UDAB	UNSP. SANDDABS	Other flatfish	Other flatfish	yes
UDF1	UNSP. DEEP-91 FLOUNDERS	Other flatfish	Other flatfish	yes
UDF2	UNSP. DEEP-95 FLOUNDERS	Other flatfish	Other flatfish	yes
UDM1	UNSP. DEMERSAL-91	Other groundfish	Other groundfish	yes
UDNR	UNSP. DEEP NEAR-SHORE RF	Other nearshore rockfish	Other nearshore rockfish	yes
UDSR	UNSP. DEMERSAL RKFSH	Other groundfish	Other groundfish	yes
UDW1	SHORTRAKER+ROUGHEYE	Other slope rockfish	Other slope rockfish	yes
UECH	UNSPECIFIED ECHINODERM	Other nongroundfish	Other nongroundfish	
UFL1	FLOUNDERS (NO FSOL)	Other flatfish	Other flatfish	yes
UFLT	UNSP. FLATFISH	Other flatfish	Other flatfish	yes
UGRN	UNSP. GROUND FISH	Other groundfish	Other groundfish	yes
UHAG	UNSPECIFIED HAGFISH	Other nongroundfish	Other nongroundfish	
UHLB	UNSPECIFIED HALIBUT	Other nongroundfish	Other nongroundfish	
UJEL	UNSP. JELLYFISH	Other nongroundfish	Other nongroundfish	
UKCR	UNSP. KING CRAB	Other nongroundfish	Other nongroundfish	
UMCK	UNSP. MACKEREL	Other nongroundfish	Other nongroundfish	
UMSK	UNSPECIFIED MOLLUSKS	Other nongroundfish	Other nongroundfish	
UPLG	UNSP. PELAGIC RKFSH	Other groundfish	Other groundfish	yes
UPOP	UNSP. POP GROUP	Pacific ocean perch	Other slope rockfish	yes
URCK	UNSP. ROCKFISH	Other slope rockfish (>150 fm)	Other slope rockfish (>150 fm)	yes
URCK	UNSP. ROCKFISH	Other shelf rockfish (<150 fm)	Other shelf rockfish (<150 fm)	yes
URK1	SRKR+REYE+NRCK+SHRP	Other slope rockfish	Other slope rockfish	yes
URNR	UNSP. ROUND FISH	Other groundfish	Other groundfish	yes
USCL	UNSPECIFIED SCALLOP	Other nongroundfish	Other nongroundfish	
USCU	UNSP. SEA CUCUMBERS	Other nongroundfish	Other nongroundfish	
USF1	UNSP. SHALLOW-91 FLOUNDERS	Other flatfish	Other flatfish	yes
USHR	UNSP. NEAR-SHORE ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
USKT	UNSP. SKATE	Unspecified skate	Unspecified skate	yes
USLF	UNSP. SHELF ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
USLP	UNSP. SLOPE ROCKFISH	Other slope rockfish	Other slope rockfish	yes

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USLR	UNSP. SLOPE RKFSH	Other slope rockfish	Other slope rockfish	yes
USMN	UNSP. SALMON	Other nongroundfish	Other nongroundfish	
USR1	UNSP. SLOPE-91	Other groundfish	Other groundfish	yes
USR2	UNSP. SLOPE-93	Other groundfish	Other groundfish	yes
USRK	UNSP. SHARK	Other nongroundfish	Other nongroundfish	
USRM	UNSP. OCEAN SHRIMP	Other nongroundfish	Other nongroundfish	
USTG	UNSP. STURGEON	Other nongroundfish	Other nongroundfish	
USTR	UNSPECIFIED OYSTER	Other nongroundfish	Other nongroundfish	
UTCR	UNSP. TANNER CRAB	Tanner crab	Tanner crab	
UTNA	UNSPECIFIED TUNA	Other nongroundfish	Other nongroundfish	
UTRB	UNSP. TURBOTS	Other flatfish	Other flatfish	yes
UURC	UNSP. SEA URCHINS	Other nongroundfish	Other nongroundfish	
VRM1	NOM. VERMILLION ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
VRML	VERMILION ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
WABL	WHITE ABALONE	Other nongroundfish	Other nongroundfish	
WBAS	WHITE SEABASS	Other nongroundfish	Other nongroundfish	
WCLM	WASHINGTON CLAM	Other nongroundfish	Other nongroundfish	
WCRK	WHITE CROAKER	Other nongroundfish	Other nongroundfish	
WDOW	WIDOW ROCKFISH	Widow rockfish	Widow rockfish	yes
WDW1	NOM. WIDOW ROCKFISH	Widow rockfish	Widow rockfish	yes
WEEL	WOLF EEL	Other nongroundfish	Other nongroundfish	
WHOO	WAHOO	Other nongroundfish	Other nongroundfish	
WSTG	WHITE STURGEON	Other nongroundfish	Other nongroundfish	
YEY1	NOM. YELLOWEYE ROCKFISH	Yelloweye rockfish	Yelloweye rockfish	yes
YEYE	YELLOWEYE ROCKFISH	Yelloweye rockfish	Yelloweye rockfish	yes
YLTL	YELLOWTAIL	Other nongroundfish	Other nongroundfish	
YMTH	YELLOWMOUTH ROCKFISH	Yellowmouth rockfish (Remaining rockfish)	Other slope rockfish	yes
YSOL	YELLOWFIN SOLE	Other non-FMP flatfish	Other non-FMP flatfish	
YTNA	YELLOWFIN TUNA	Other nongroundfish	Other nongroundfish	
YTR1	NOM. YELLOWTAIL ROCKFISH	Yellowtail rockfish	Yellowtail rockfish (Remaining rockfish)	yes
YTRK	YELLOWTAIL ROCKFISH	Yellowtail rockfish	Yellowtail rockfish (Remaining rockfish)	yes