

Data Report and Summary Analyses of the West Coast Limited Entry Groundfish Bottom Trawl Fishery

October 2008

West Coast Groundfish Observer Program



Prepared by:

National Marine Fisheries Service

Northwest Fisheries Science Center

Fishery Resource Analysis and Monitoring Division

2725 Montlake Blvd. East

Seattle, WA 98112



NOAA Fisheries

Table of Contents

INTRODUCTION.....	1
Overview.....	1
West Coast Limited Entry Groundfish Trawl Fishery.....	1
Commercial Groundfish Bottom Trawl Fishery Data.....	1
West Coast Groundfish Observer Program.....	2
Program Goals.....	2
METHODS.....	2
Limited Entry Groundfish Trawl Permit Selection.....	2
Coverage of the LE Groundfish Bottom Trawl Fishery.....	3
Trawl Data Collection.....	3
Data Quality Control and Management.....	4
Data Processing.....	5
Analysis.....	7
RESULTS AND DISCUSSION.....	9
Overall Coverage Levels.....	9
Spatial Distribution of Observations.....	9
Observed Total Catch, Discard Ratios, and Bycatch Ratios.....	11
Biological Data Collection and Summary.....	12
Summary.....	12
REFERENCES.....	13
Figure 1a. Locations of observed and logbook tows north of Coos Bay, Oregon in 2007.....	14
Figure 1b. Locations of observed and logbook tows south of Coos Bay, Oregon and north of San Francisco, California in 2007.....	15
Figure 1c. Locations of observed and logbook tows south of San Francisco, California in 2007.....	16
Figure 2. Bycatch ratios over time for rebuilding species in the limited entry bottom trawl fishery north and south of 40° 10' N latitude.....	17
Figure 3. Pie charts showing the percentage of observed tows in the 2007 limited entry bottom trawl fishery during which rebuilding species were caught by management area.....	18
Figure 4. Length frequency distributions of discarded rebuilding species observed in the LE groundfish bottom trawl fishery from September 2003 - April 2008.....	20
Figure 5. Length frequency distributions of discarded (non-rebuilding) species observed in the LE groundfish bottom trawl fishery from September 2003 - April 2008.....	22

Table 1. Total trips, tows, vessels, and groundfish landings observed in LE bottom trawl fishery in 2007 and January through April 2008.....	24
Table 2. Number of tows and retained weight (mt) of FMP groundfish species (excluding Pacific hake) from observer and logbook data for the 2007 limited entry bottom trawl fishery by depth, season, and management area.....	25
Table 3a. Observed catch weight (mt), discard weight (mt), and percent discarded from observed vessels in the 2007 limited entry bottom trawl fishery by management area.....	26
Table 3b. Observed catch weight (mt), discard weight (mt), and percent discarded from observed vessels in the January through April 2008 limited entry bottom trawl fishery by management area.....	30
Table 4a. Discard ratios and standard errors from observed trips north of 40° 10' N latitude in the limited entry bottom trawl fishery by season and depth. Ratios are computed as the observed discard weight divided by the weight of retained groundfish FMP species (excluding Pacific hake).....	33
Table 4b. Discard ratios and standard errors from observed trips south of 40° 10' N latitude in the limited entry bottom trawl fishery by season and depth. Ratios are computed as the observed discard weight divided by the weight of retained groundfish FMP species (excluding Pacific hake).....	35
Table 5a. Discard ratios and standard errors from observed trips north of 40° 10' N latitude in the limited entry bottom trawl fishery by season and depth. Ratios are computed as the observed discard weight divided by tow duration.....	37
Table 5b. Discard ratios and standard errors from observed trips south of 40° 10' N latitude in the limited entry bottom trawl fishery by season and depth. Ratios are computed as the observed discard weight divided by tow duration.....	39
Table 6a. Bycatch ratios and standard errors from observed trips north of 40° 10' N latitude in the limited entry bottom trawl fishery by season and depth. Ratios are computed as the observed discard weight divided by the weight of retained groundfish FMP species (excluding Pacific hake).....	41
Table 6b. Bycatch ratios and standard errors from observed trips south of 40° 10' N latitude in the limited entry bottom trawl fishery by season and depth. Ratios are computed as the observed discard weight divided by the weight of retained groundfish FMP species (excluding Pacific hake).....	43
Table 7. Summary of the number of length measurements and the number of individual fish sexed by WCGOP observers in the LE groundfish bottom trawl fishery from September 2003 through April 2008.....	45
Table 8. Summary of biological data collected for protected fish resources collected by WCGOP observers in the LE groundfish bottom trawl fishery from September 2003 through April 2008.....	46
Appendix A. WCGOP Database Table Hierarchy.....	47

Appendix B. Common and scientific names of species included in the Pacific Coast Groundfish Fishery Management Plan, as amended through Amendment 19 (PFMC 2008).....	48
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 4-6)	51

INTRODUCTION

Overview

This report summarizes discarded catch data collected by the West Coast Groundfish Observer Program (WCGOP) from the limited entry (LE) bottom trawl fishery from January 1, 2007 through April 30, 2008. The WCGOP collects at-sea data from LE trawl and fixed gear fisheries, as well as from nearshore, prawn/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.

West Coast Limited Entry Groundfish Trawl Fishery

The LE groundfish bottom trawl fishery off the west coast of the United States operates from the Canadian border to Morro Bay, California. Each vessel that participates in the LE groundfish bottom fishery must have a federal groundfish permit with a trawl endorsement. In 2007, there were 177 LE trawl permits of which 8 were associated with factory processors that target Pacific hake and are observed by the At-Sea Hake Observer Program (ASHOP).

Groundfish bottom trawl vessels range in size from 35 to 95 feet, with an average length of 65 feet. Vessels fish throughout the year in a wide range of depths and deliver catch to shoreside processors. Bottom trawlers often target species assemblages, which can result in diverse catch, especially when compared to single species trawl fisheries, such as the midwater trawl fishery for Pacific hake. A single groundfish bottom trawl tow often includes fifteen to twenty species. Fish size and weight of the total catch also vary widely. Groundfish trawl vessels retain the portion of their catch that is marketable and permitted to be landed. The portion of the catch which is prohibited by regulations or not marketable is discarded at-sea.

Regulations for the groundfish bottom trawl fishery are set by the Pacific Fishery Management Council (PFMC). Active management of the fishery began in the early 1980's with the establishment of optimum yields (OY) for several managed species and trip limits for widow rockfish, the *Sebastes* complex, and sablefish. The objective of trip limits has been to slow the pace of landings 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.

Commercial Groundfish Bottom Trawl Fishery Data

Fisheries managers and enforcement officers use state-issued sales receipts, referred to as fish tickets, and vessel logbooks to monitor landings and fishing behavior in the LE bottom trawl fishery. Fish ticket and vessel logbook data are transferred to the Pacific Coast Fisheries Information Network (PacFIN) regional database system by state fishery agencies in Washington, Oregon, and California. Fish ticket information is uploaded to PacFIN on a monthly basis and is subject to updates frequently thereafter. Fish tickets are trip-aggregated sales receipts for market species/categories. Trip limit amounts may be changed through in-season management based on the fish ticket data. As fish tickets only provide information on the amount of fish landed, to ensure that total catch does not exceed the annual OY, managers also need discard information for each man-

aged 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 rule-making has extended NMFS's ability to require that California and Oregon vessels which only fish in the 0-3 mile state territorial zone also carry observers. 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 US 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 the 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 Groundfish Trawl Permit Selection

Limited entry groundfish trawl 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 the 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 data in this report were collected during three selection cycles. The three selection cycles were July 1, 2006 to April 30, 2007 (selection cycle 7), May 1, 2007 to February 29, 2008 (selection cycle 8), and March 1, 2008 to October 31, 2008 (selection cycle 9). For each selection cycle, the number of permits selected for observer coverage were as follows: selection cycle 7 - 129 permits; selection cycle 8 - 109 permits; selection cycle 9 - 111 permits.

To avoid selecting vessels that have not been participating in the LE bottom trawl fishery, the WCGOP classified permits meeting the following criteria as inactive:

- Permits that landed little or no non-Pacific hake groundfish during the previous 18-month period.
- All permits associated with catcher-processors or motherships that only participate in the offshore component of the Pacific hake midwater trawl fishery.

- Permits associated with recently sunk vessels or that are owned by deceased or terminally ill persons.
- Permits associated with unidentified vessels.

Permits which were determined to be inactive were removed from all selection cycles. If a vessel becomes active during the selection cycle, they are required to notify the WCGOP and are subsequently added to the selection list.

The WCGOP aggregates ports along the US west coast into port groups, which are considered sampling strata. Vessels with LE groundfish trawl permits are assigned to a port group based upon the location of the previous year's landings. Within each port group, the vessels are randomly selected for coverage during a two-month period, which coincides with the two-month cumulative trip limit 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 is currently cycling through the LE groundfish trawl fleet every eight to ten months.

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>

Coverage of the LE Groundfish Bottom Trawl Fishery

A list of fisheries in order of priority for observer coverage can be found in the WCGOP observer training manual (NWFSC 2007). The LE groundfish bottom trawl fleet is WCGOP's highest priority for observer coverage. Nearly all trips taken within the two-month period by a vessel whose permit has been selected are covered by an observer. However, in some cases, vessels whose permits are selected for a specific two-month period may not be covered by an observer during that period or may not be covered on all trips during that period.

A trip may be waived from observer coverage due to observer availability or a safety issue that can be fixed in a relatively short period of time. A few LE trawl vessels are given longer selection cycle waivers. A 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.

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 participation in a different fishery (i.e. crab, shrimp, etc.), observer availability, and vessel safety. Vessels are given a coverage period waiver for a specified two-month period and are added to the selection list for the next two-month period. 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 in the subsequent selection list until either an observer covers them or until the selection cycle ends.

Trawl 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 2007).

Data collected by the observers on a trip basis include:

- Start time, end time, depth, and the start and end location of tows
- Gear type and fishing strategy
- Fish ticket identification numbers

Data collected by the observers on a tow basis include:

- Estimated total catch weight (including tows 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 which is generally copied from vessel logbooks
- 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 (otoliths, maturity, food habits, genetic samples, etc.)

For more information regarding observer sampling on trawlers, refer to the WCGOP Observer Training Manual, Chapter 4.

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 2007).
2. Data are entered into the database system. The data are entered into a centralized Oracle database located at the Northwest Fisheries Science Center (NWFSC). Data within the Oracle database are accessible via a web-based GUI or by direct SQL queries to the database. The 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 a current safety decal. Any tows during which sampling problems occurred are documented in the logbook and reviewed during debriefing.

- 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: expand the subsample of species composition to the tow-level; translate observer species codes to the appropriate PacFIN fish ticket data codes; identify and select the observer data records to match to fish tickets; query and process all PacFIN fish ticket data associated with the LE groundfish bottom trawl fishery; and merge 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 tow level. A tow-level expansion is needed to estimate the total retained and discarded weight for each species because of the sampling procedure used to collect the species composition data. If the species composition of a catch category is mixed, an observer may take a subsample from the catch category.

The following equation is used to calculate the weight of the subsample by summing across the observed weights of the individual species:

$$w_k = \sum_s x_{ks}$$

where:

x_{ks} = observed weight of the species s in catch category k in the subsample,

w_k = weight of the subsample from catch category k .

The sampling ratio (R_k) used to scale the subsample weights to the amount in the catch category is calculated by dividing the weight of the subsample by the total weight of the catch category using the equation:

$$R_k = w_k / y_k$$

where:

y_k = the total weight of catch category k .

The tow-level expanded weight of species s in category k is calculated by dividing the species weight in the subsample by the sampling ratio in the following equation:

$$X_{ks} = x_{ks}/R_k$$

where:

X_{ks} = the weight of species s in catch category k .

Tallying the weight (X_{ks}) of the species (s) across all categories (k) within a tow provides the total weight of the species retained or discarded.

Once the tow-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 tows 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, the translation step of the process adds coding to the WCGOP observer data that allows for the appropriate match to the coding system used to record data on fish tickets in PacFIN.

Once these two steps are completed, the retained catch records from the observer data, which are typically vessel supplied estimates, are merged with fish ticket data to provide more accurate estimates of retained catch. 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 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 matches the total trip pounds on the fish ticket, because the fish ticket weight is often 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 and observer trip weights for that category, using the following equation to calculate the adjustment factor:

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

where:

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

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

The equation used to adjust the WCGOP data is:

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

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 tows using the proportion of the observed catch per tow divided by the total observed catch per trip using the following equation:

$$B_{mt} = \frac{\sum_k \sum_s x_{mtks}}{\sum_t \sum_k \sum_s x_{mtks}}$$
$$C_{mtk} = B_{mt} \times C_{mk}$$

where:

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

C_{mtk} = lbs in catch category k for tow 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

Observer coverage rates in the LE groundfish bottom trawl fishery were calculated as the proportion of this fishery's fleet-wide landings of Pacific Coast Groundfish Fishery Management Plan (FMP) groundfish (except Pacific hake) that were observed (Appendix B). Coverage rates were computed based on the complete dataset for 2007 and January through April of 2008.

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.
- Tows where no retained or discarded information was recorded.
- Tows where the species composition of discarded catch was not known (unsampled discard).

Although all of the vessels included in the sampling frame described in this report are participants in the LE groundfish bottom trawl fishery, it is necessary to remove some portions of the LE trawl data prior to analysis for two reasons. First, after being selected, some LE bottom trawl vessels may switch to midwater trawl gear, which typically yields a species catch composition and discard/bycatch trends that are distinct from the bottom trawl fleet. All midwater trawl tows are therefore removed from the dataset prior to subsequent analyses. However, none of the observed tows in 2007 or January through April of 2008 were recorded to have employed midwater trawl gear.

Second, some LE bottom trawl vessels participate in more than one fishery on a single observed trip. This is primarily an issue in California, where LE bottom trawl vessels may also participate in the state-permitted California halibut fishery. California halibut tows can occur on the same trip

as tows targeting groundfish and are identified in the LE bottom trawl dataset based on the following criteria:

- The observer recorded the tow target as California halibut.
- The observer recorded the tow target as nearshore mix, sand sole or other flatfish, and the tow took place in less than 30 fathoms and south of 40°10' N. latitude.

All tows that met at least one of the above requirements were removed from the LE bottom trawl dataset and excluded from further analysis. The LE bottom trawl data removed from this analysis for the California halibut fishery are reported for all years of observer coverage in the “Data Report and Summary Analyses of Limited Entry and Open Access Trawl Vessels Targeting California Halibut” (NMFS In Press).

Once these steps had been applied, the ratio estimator technique (Cochran 1977) was used to estimate bycatch and discard rates for each major species or species group. Rates were calculated for all of the stocks currently managed under rebuilding plans, prohibited species in each fishery (Pacific halibut), and all stocks for which discard is estimated annually on a fleet-wide basis. The ratio estimates (R_{ij}) were calculated by area (i), season (j) and depth (d):

$$R_{ijd} = \frac{\sum_t y_{ijdt}}{\sum_t x_{ijdt}}$$

where:

y_{ijdt} = the discarded or total catch pounds of a species in tow t , area i , season j , and depth d .

x_{ijdt} = the retained pounds of FMP groundfish species (except Pacific hake) in tow t , area i , season j , and depth d .

The variance of R_{ijd} is approximated by using the following equation:

$$Var(R_{ijd}) = \left(\frac{\bar{y}_{ijd}}{\bar{x}_{ijd}} \right)^2 \left[\frac{s^2(y_{ijdt})}{\bar{y}_{ijd}^2} + \frac{s^2(x_{ijdt})}{\bar{x}_{ijd}^2} - \left(\frac{s^2(y_{ijdt})}{\bar{y}_{ijd}^2} \cdot \frac{s^2(x_{ijdt})}{\bar{x}_{ijd}^2} \right) \right]$$

where:

\bar{x}_{ijd} and \bar{y}_{ijd} = the means of x_{it} and y_{it} over the tows in area i , season j , and depth d .

$s^2(x_{ijdt})$ and $s^2(y_{ijdt})$ = the standard errors of x_{it} and y_{it} over all tows in area i , season j , and depth d .

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

Discard ratios were 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 (dis-

carded + retained) divided by the observed weight of retained FMP groundfish (except Pacific hake). Pacific hake was excluded when using a retained groundfish denominator because it is inappropriate to include retained hake as a metric of effort in the LE bottom trawl fishery. Vessels that land this species are considered to be targeting Pacific hake exclusively and are thus part of a separate fishery.

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 necessary to prevent double-counting associated with differences in the species codes used by observers and processors. For instance, while observers may record rockfish catch at the species level, various species of rockfish are often grouped, weighed, and recorded together 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 observer-recorded 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 in the fixed gear fisheries, as any retained 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 observed trips, tows, vessels, and observed and total fleet-wide groundfish landings in the LE bottom trawl fishery are summarized in Table 1 for 2007 and for January through April of 2008. The observed coverage rate, calculated as the proportion of fleet-wide non-hake FMP groundfish landings observed, is provided with summaries for each WCGOP port group, two geographic areas north and south of the groundfish management line at 40°10' N. latitude, and for the entire US west coast.

Observer coverage in the LE bottom trawl fishery in 2007 decreased slightly on a coastwide basis relative to 2006 from 22% to 19% (NMFS 2007). Overall, coverage was lower in the area north of 40°10' N. latitude (17%) than in the area south of this line (23%). When split out by port group, Fort Bragg and San Francisco had the highest coverage rates at 24% and 23%. During January through April of 2008, landings from observed LE bottom trawl trips were 19% of the total tonnage for all LE bottom trawl trips. The early 2008 coverage level indicates a consistent rate in the current calendar year which is close to the target of 20% coverage.

Spatial Distribution of Observations

The distribution of observed trips and tows among port groups provides perspective on where observer coverage and, secondarily, fishing effort was focused along the US west coast in the LE groundfish bottom trawl fishery. Overall, observed trips were distributed throughout west coast port groups from Bellingham to Morro Bay, with peaks in Astoria (98 trips) and San Francisco (72 trips).

Relative to 2006, coverage levels in 2007 were down in most port groups, with the exception of Fort Bragg, where it increased from 20% to 24%, and in San Francisco, where it increased from 11% to 23% (NMFS 2007). The coverage rate in Monterey/Morro Bay remained relatively consistent at 16% while coverage in Astoria decreased slightly, from 21% to 20%. Coverage rates in all other port groups decreased by more than a percentage point. Bellingham/Neah Bay, Coos Bay, Crescent City, Eureka and Monterey/Morro Bay all had coverage rates below 20% in 2007.

Coverage levels are subject to variation for several reasons. The WCGOP can control the number of boats observed, but not the amount of fish landed by these boats or the location of fishing effort. Coverage levels will fluctuate as a function of the amount of fish landed in a fishery and the amount of fish landed by the vessels observed, but these fluctuations are to be expected.

In 2007, spatial closures were employed in the LE groundfish trawl fishery by groundfish management. The Rockfish Conservation Area (RCA) closures in this fishery are the most complex in terms of latitudinal stratification and the variety of depth-related boundaries in use. The latitudinal stratification used in 2007 included the following: north of 48° 10' N. latitude, 48° 10' to 46° 16' N. latitude, 46° 16' to 43° 20.83' N. latitude, 43° 20.83' to 42° 40.50' N. latitude, 42° 40.50' to 40° 10' N. latitude, and south of 40° 10' N. latitude. Overall, the boundaries were set anywhere from the shoreline out to 200 fathoms during 2007. The shoreward boundary was set at either 60 or 75 fathoms, when it was not extended to the shoreline in all of the latitudinal areas north of 40° 10' N. latitude. The RCA in the area south of 40° 10' N. latitude was set from 100 to 150 fathoms throughout the entire year.

Maps summarizing the spatial distribution of all LE bottom tows recorded in trawl logbooks and tows observed are presented for three sections of the US west coast in Figures 1a-c. In these figures, trawl tows were assigned to 10 km by 10 km grid blocks based on the starting locations of tows. The shading of each block reflects the number of logbook tows, with darker shading indicating more tows. The circles overlaid on each block reflect the number of observed tows, with larger circles indicating more tows. Blocks with the darkest shading and the smallest circles indicate fishing locations that received less observer coverage relative to fishing effort.

The spatial distribution of the LE trawl fleet and those tows observed by the WCGOP can be reviewed for general spatial sampling coverage in 2007. Figure 1a depicts the coast north of Coos Bay, Oregon. Figure 1b presents the area south of Coos Bay, Oregon to just north of San Francisco, California. Figure 1c portrays the remainder of the California coast with bottom trawl fishing effort, as far south as Morro Bay. Within each of these areas, and for the coast as a whole, the spatial distribution of fleet-wide LE bottom trawl tows appears to have been generally well sampled by observers during 2007.

Table 2 presents the number of tows and retained weight of non-hake FMP groundfish from observer and logbook data split out by management area (north and south of 40° 10' N. latitude), depth interval (0-50, 51-75, 75-100, 151-200, 201-300, and > 300 fathoms) and season (winter: November through April, summer: May through October). This provides an alternative form of observer coverage rate for the 2007 LE bottom trawl fishery that is based on observer and logbook tows rather than fleet-wide fish ticket landings. A similar table for the 2006 LE bottom trawl fishery was provided in the groundfish total mortality report (Hastie and Bellman 2007, Table 1). Although values in several shallow depth strata are grouped differently in 2007 to ensure sufficient sample size, comparison with the previous year reveals a notable shift in bottom trawl effort from shallow to deeper areas north of 40° 10' N. latitude, particularly in the summer months. It

should be noted that the retained groundfish weight reported in previous years in the total mortality report was for target species only, but now includes all groundfish species listed in the Pacific Coast Groundfish Fishery Management Plan, with the exception of Pacific hake (Appendix B).

Observed Total Catch, Discard Ratios, and Bycatch Ratios

Table 3 presents the observed total catch weight (mt), discard weight (mt) and percent discarded for each species north and south of 40° 10' N. latitude in 2007 and January through April of 2008. Observed coastwide total catch (discarded + retained) in the LE groundfish bottom trawl fishery was largely comprised of dover sole, sablefish, arrowtooth flounder, petrale sole, longspine thornyhead, and Pacific hake. Of the rebuilding species, darkblotched rockfish and Pacific ocean perch were caught in the largest amounts north of 40° 10' N. latitude. Widow rockfish, canary rockfish, bocaccio, and a very small amount of yelloweye rockfish were also caught in this area. South of 40° 10' N. latitude, the primary rebuilding species caught were darkblotched rockfish, bocaccio, and canary rockfish, but a small amount of cowcod, widow rockfish, and Pacific ocean perch were also observed. Small amounts of protected species were also caught north of 40° 10' N. latitude. These included chinook salmon, coho salmon, and green sturgeon.

For other non-rebuilding fish species (excluding Pacific halibut), 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. Overall, Pacific hake constituted the largest component of observed discard coastwide, although the total catch and discard weight was lower than in 2006. Relatively large amounts of dover sole, arrowtooth flounder, longnose skate, spiny dogfish, and tanner crab were also discarded. More than 43 metric tons of Pacific halibut were discarded north of 40° 10' N. latitude. An additional 1.7 metric tons of Pacific halibut was caught south of this area. Relative to 2006, the total catch and discard weight of various flatfish species north of 40° 10' N. latitude decreased in 2007. Conversely, total observed catch of longspine and shortspine thornyhead increased in 2007, and a smaller percentage of shortspine thornyhead catch was discarded.

Table 4 presents discard ratios and standard errors for the 2007 LE groundfish bottom trawl fishery by management area, season, and depth interval. Species are grouped for ratio calculations according to Appendix C. All discard ratios in Table 4 were computed using retained FMP groundfish species (except Pacific hake) in the denominator. In Table 5, discard ratios are re-computed using tow duration (in hours) in the denominator. The two methods generally yield comparable results, but differ considerably for certain species, such as Pacific hake. Discard ratios computed using a retained groundfish species grouping in the denominator have traditionally been used to expand observer data to the fleet-wide level for coastwide discard estimation in the LE groundfish bottom trawl fishery (Hastie and Bellman 2007).

A finer level of depth stratification was employed in 2007 in order to be consistent with the methodology in annual estimates of fleet-wide discard and it was therefore necessary to group some depth intervals to ensure an adequate sample size. There was a clear shift in the distribution of observed retained groundfish across depths from 2006 to 2007, particularly in the area north of 40° 10' N. latitude. The 2007 retained weight of FMP groundfish (except Pacific hake) in this area decreased in shallower depths and increased in deeper areas. This was primarily attributed to regulatory changes for the Trawl Rockfish Conservation Area in 2007 relative to 2006, that increased the shoreward extent of the RCA in some areas and decreased the seaward extent in some areas.

Table 6 provides bycatch ratios for the 2007 LE groundfish bottom trawl fishery. All bycatch ratios for this fishery were computed using retained FMP groundfish species (except Pacific hake) in the denominator. Although differences in depth stratification again make it difficult to draw direct comparisons between bycatch ratios in 2007 and those in previous years, some trends were evident (Figure 2). Relative to 2006, bycatch ratios for canary rockfish decreased in all depth strata north of 40° 10' N. latitude, except in 51-75 fathoms in the summer. Bycatch ratios for darkblotched rockfish increased in depths greater than 150 fathoms. South of 40° 10' N. latitude, bycatch ratios for bocaccio, darkblotched rockfish and widow rockfish decreased. Although the observed catch of cowcod was less in 2007 relative to 2006, the bycatch ratio for this species increased in depths greater than 150 fathoms.

Figure 3 displays pie charts representing the percentage of observed tows in which rebuilding species were caught. For each rebuilding species, no catch (0 pounds) was observed on more than 75% of tows. On a percentage basis, darkblotched rockfish was caught most frequently, as 24% of observed tows caught this species. Pacific ocean perch was the next most commonly encountered species, with weight recorded on 16% of observed tows.

Biological Data Collection and Summary

WCGOP observers primarily collect length or sexed lengths from non-protected resources although in some circumstances they also collect otoliths or viabilities. 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 groundfish bottom trawl fishery for non-protected resources from September 2003 through April 2008 are summarized in Table 7.

The length frequency distributions of discarded rebuilding species from biological data are reported for the LE groundfish bottom trawl fishery in Figure 4. Figure 5 presents length frequency distributions of other discarded species.

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. Information regarding biosampling procedures for marine mammals, seabirds, green sturgeon, and salmon is available in the WCGOP observer training manual (NWFSC 2007).

Table 8 summarizes the biological data for protected fish resources collected by observers in the LE groundfish bottom trawl fishery from September 2003 through April 2008. Observers sampled a total of 474 chinook salmon, 8 coho salmon, 2 chum salmon, and 3 unidentified salmon across all years.

Summary

The bycatch and discard rates calculated from observer data collected aboard the LE bottom trawl fishery from January 2007 through April 2008 are now available for use in the management process. The observer data will be used in conjunction with additional commercial bottom trawl 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 this fishery. The collected biological data will also be available for use by stock assessment authors.

REFERENCES

Cochran, W.G. 1977. Sampling Techniques. John Wiley & Sons, New York. 155 p.

National Marine Fisheries Service (NMFS). 2005. Summary of Observed Groundfish Bycatch by Groundfish Limited-Entry Vessels Targeting California Halibut. NOAA, Northwest Fisheries Science Center, 2725 Montlake Blvd E, Seattle, WA. Available at: http://www.nwfsc.noaa.gov/research/divisions/fram/observer/datareport/docs/summary_observed_groundfish_bycatch_groundfish_limited_entry_vessels_targeting_california_halibut.pdf.

National Marine Fisheries Service (NMFS). 2007. West Coast Groundfish Observer Program Data Report and Summary Analyses of Limited-Entry Trawl Permits. NOAA, Northwest Fisheries Science Center, 2725 Montlake Blvd E, Seattle, WA. Available at http://www.nwfsc.noaa.gov/research/divisions/fram/observer/datareport/docs/obs_limited_entry_trawl_rpt_sept07.pdf.

National Marine Fisheries Service (NMFS). In Press. Data Report and Summary Analyses of Limited Entry and Open Access Trawl Vessels Targeting California Halibut. NOAA, Northwest Fisheries Science Center, 2725 Montlake Blvd E, Seattle, WA.

Northwest Fisheries Science Center (NWFSC). 2007. West coast groundfish observer training manual. NOAA, West Coast Groundfish Observer Program. Northwest Fisheries Science Center, 2725 Montlake Blvd E, Seattle, WA. Available at <http://www.nwfsc.noaa.gov/research/divisions/fram/observer/observermanual/observermanual.cfm>.

Pacific Fishery Management Council (PFMC). 2008. Pacific Coast Groundfish Fishery Management Plan. PFMC, 7700 NE Ambassador Place, Suite 100, Portland, OR. Available at: <http://www.pcouncil.org/groundfish/gffmp/fmpthru19.pdf>

Pikitch, E.K., Wallace, J.R., Babcock, E.A., Erikson, D.L. Saelens, M., and G. Oddsson. 1998. Pacific halibut bycatch in the Washington, Oregon, and California groundfish and shrimp trawl fisheries. N. Am. J. Fish. Mgmt. 18:569-586.

Figure 1a: Locations of observed and logbook tows north of Coos Bay, Oregon in 2007.

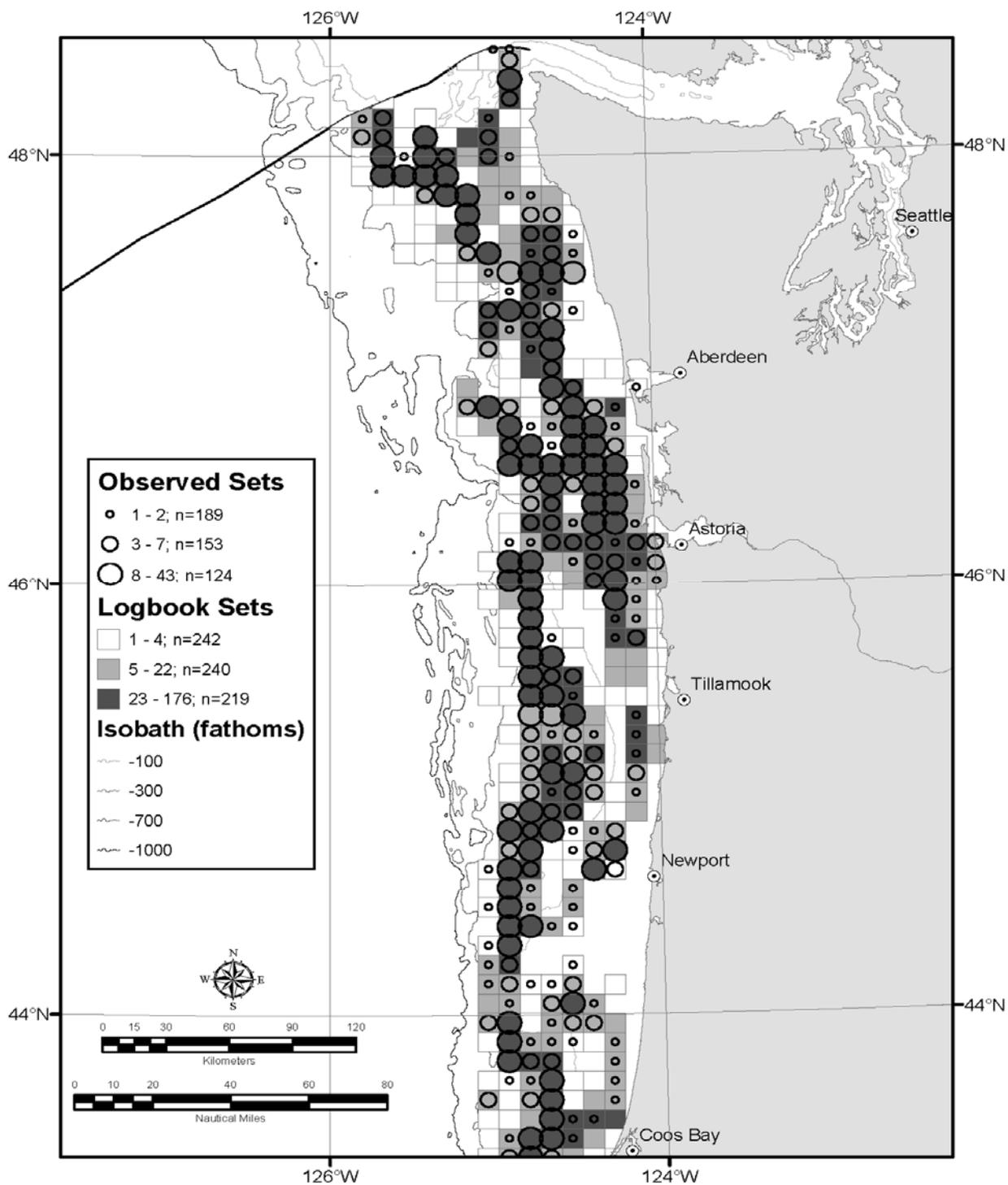


Figure 1b: Locations of observed and logbook tows south of Coos Bay, Oregon and north of San Francisco, California in 2007.

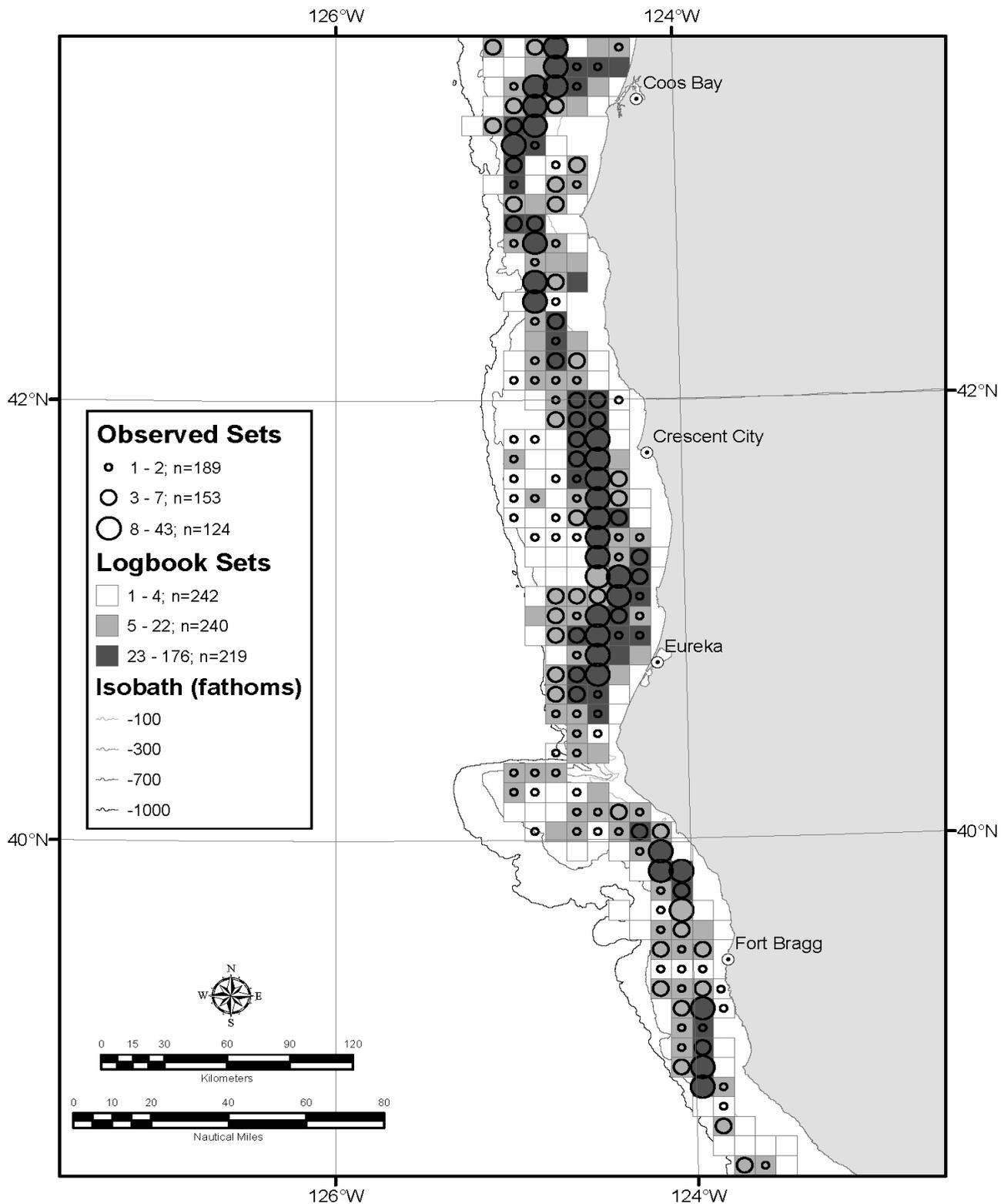


Figure 1c: Locations of observed and logbook tows south of San Francisco, California in 2007.

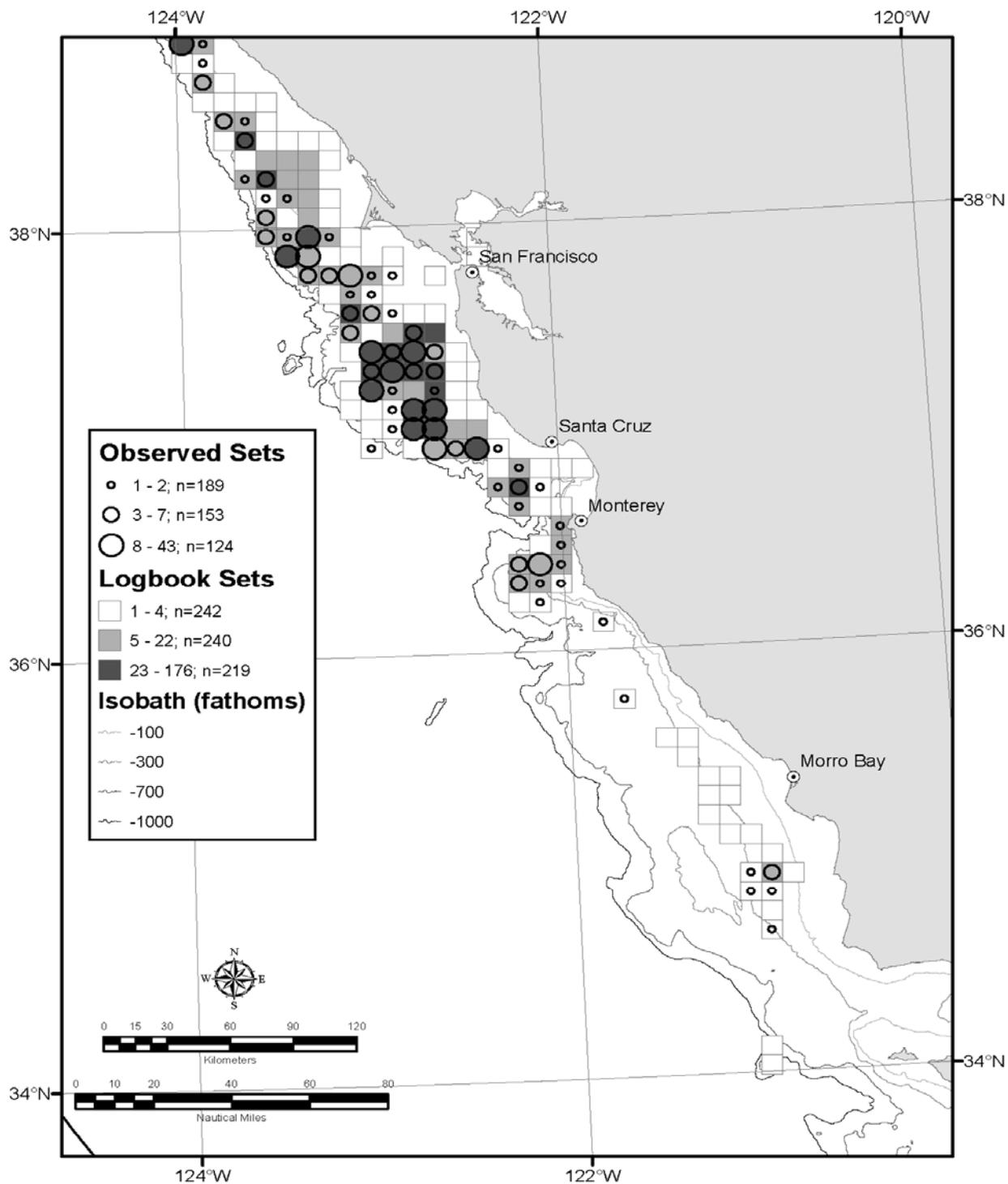


Figure 2: Bycatch ratios over time for rebuilding species in the limited entry bottom trawl fishery north (above) and south (below) of 40°10' N latitude. Bycatch ratios were computed as the observed total catch of a rebuilding species divided by the weight of retained FMP groundfish (excluding Pacific hake).

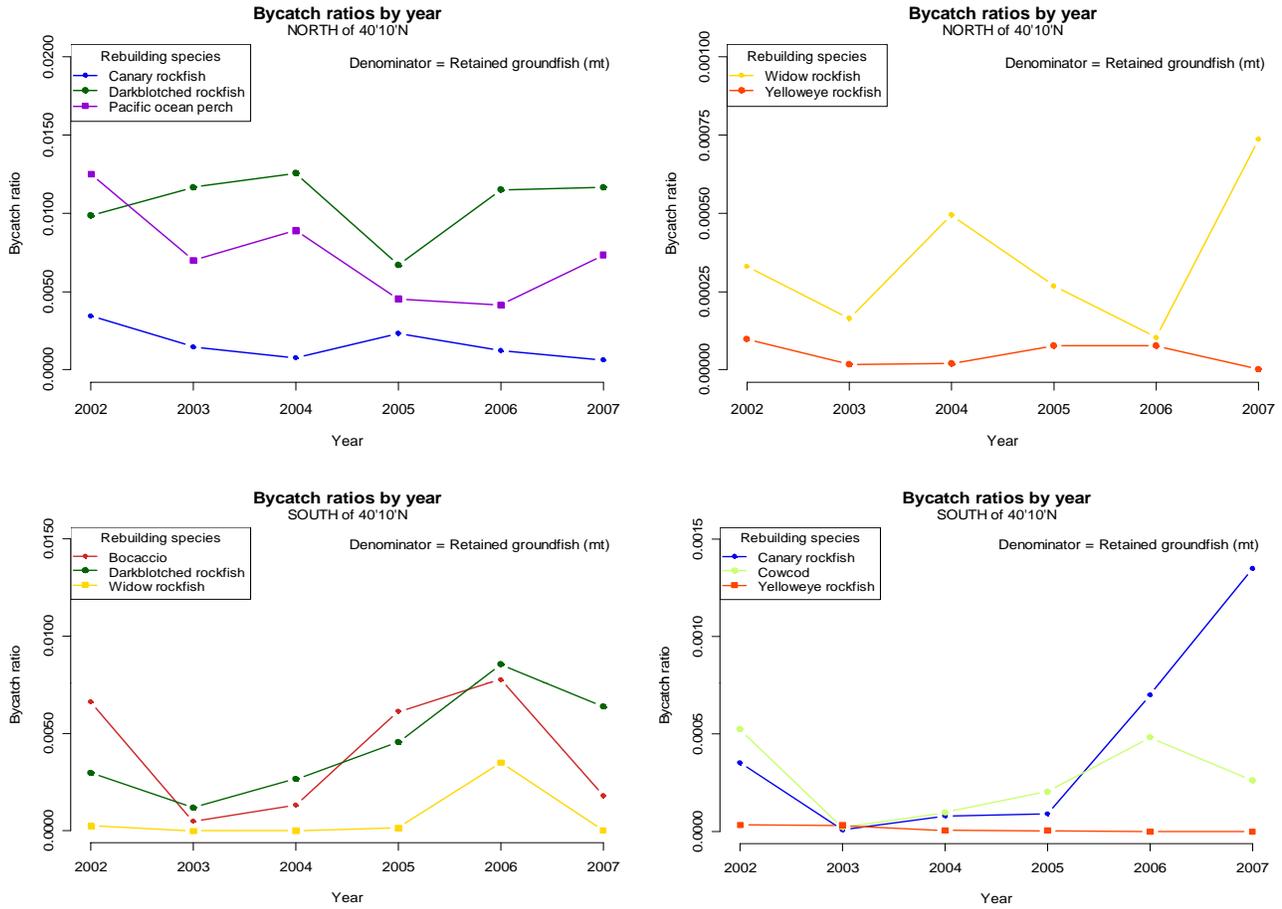


Figure 3: Pie charts showing the percentage of observed tows in the 2007 limited entry bottom trawl fishery during which rebuilding species were caught (0, 1-15, 16-50, 51-150, 151-300, or > 300 pounds) by management area.

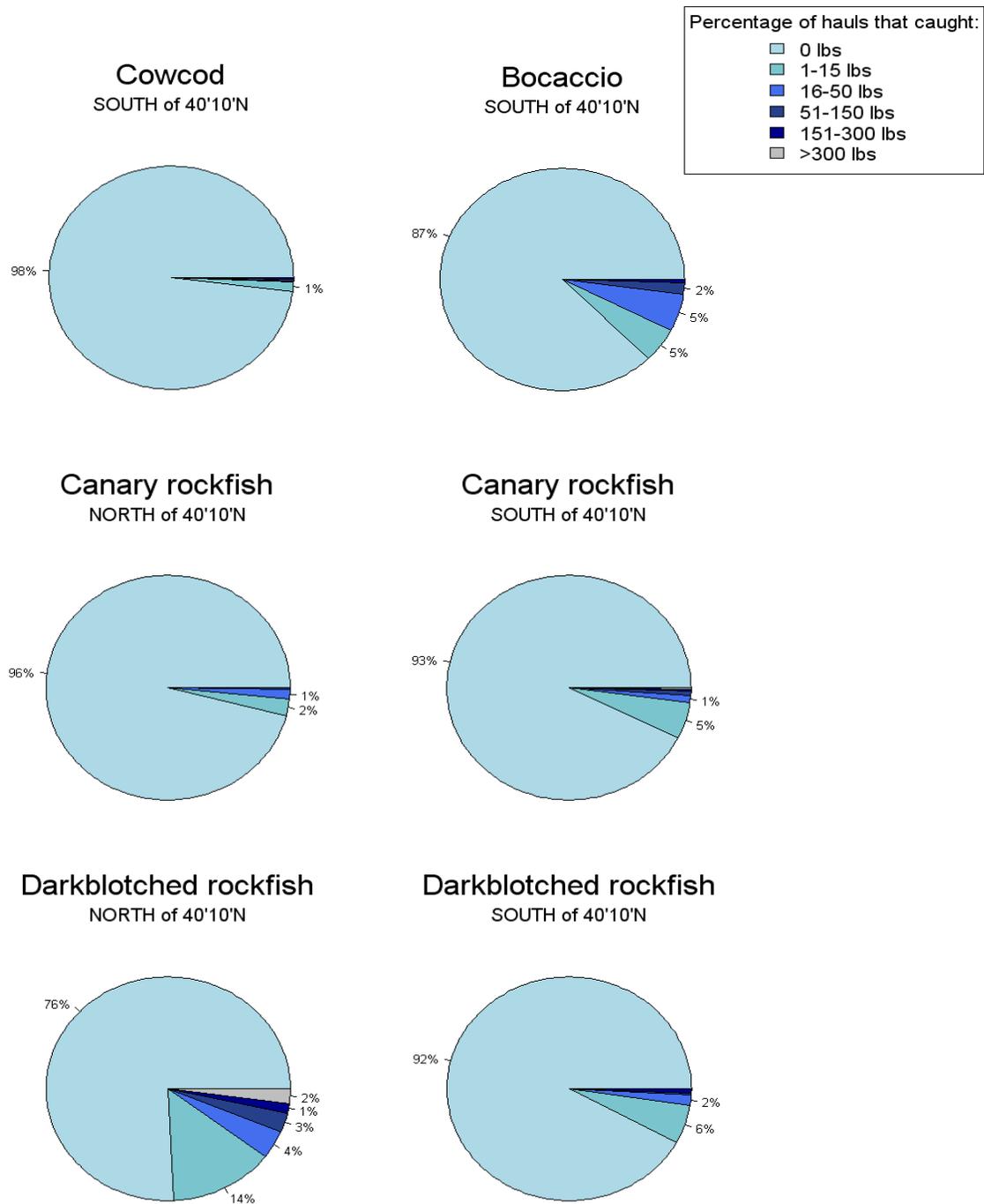


Figure 3 (cont.): Pie charts showing the percentage of observed hauls in the 2007 limited entry bottom trawl fishery during which rebuilding species were caught (0, 1-15, 16-50, 51-150, 151-300, or > 300 pounds) by management area.

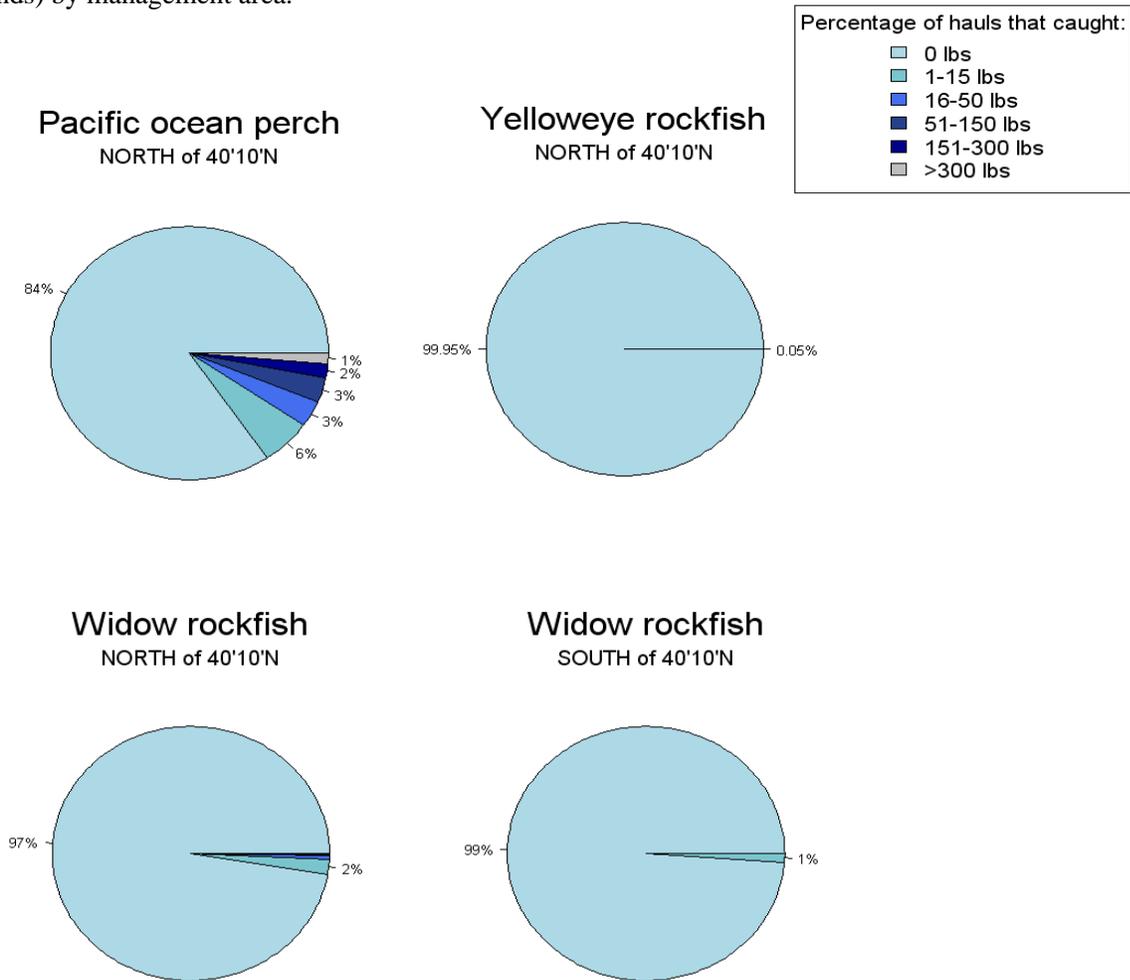


Figure 4: Length frequency distributions of discarded rebuilding species observed in the LE groundfish bottom trawl fishery from September 2003 - April 2008.

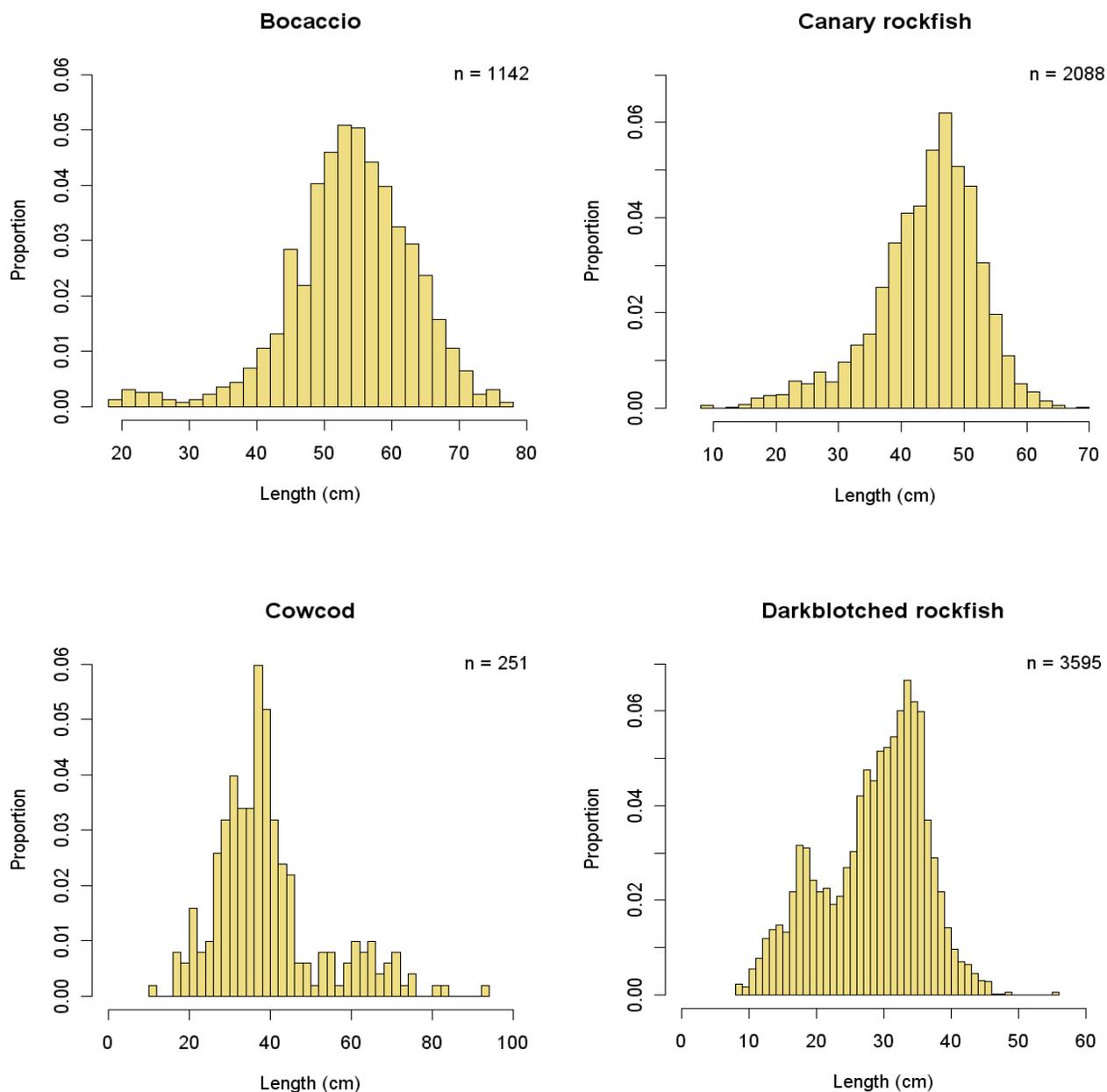


Figure 4 (cont.): Length frequency distributions of discarded rebuilding species observed in the LE groundfish bottom trawl fishery from September 2003 - April 2008.

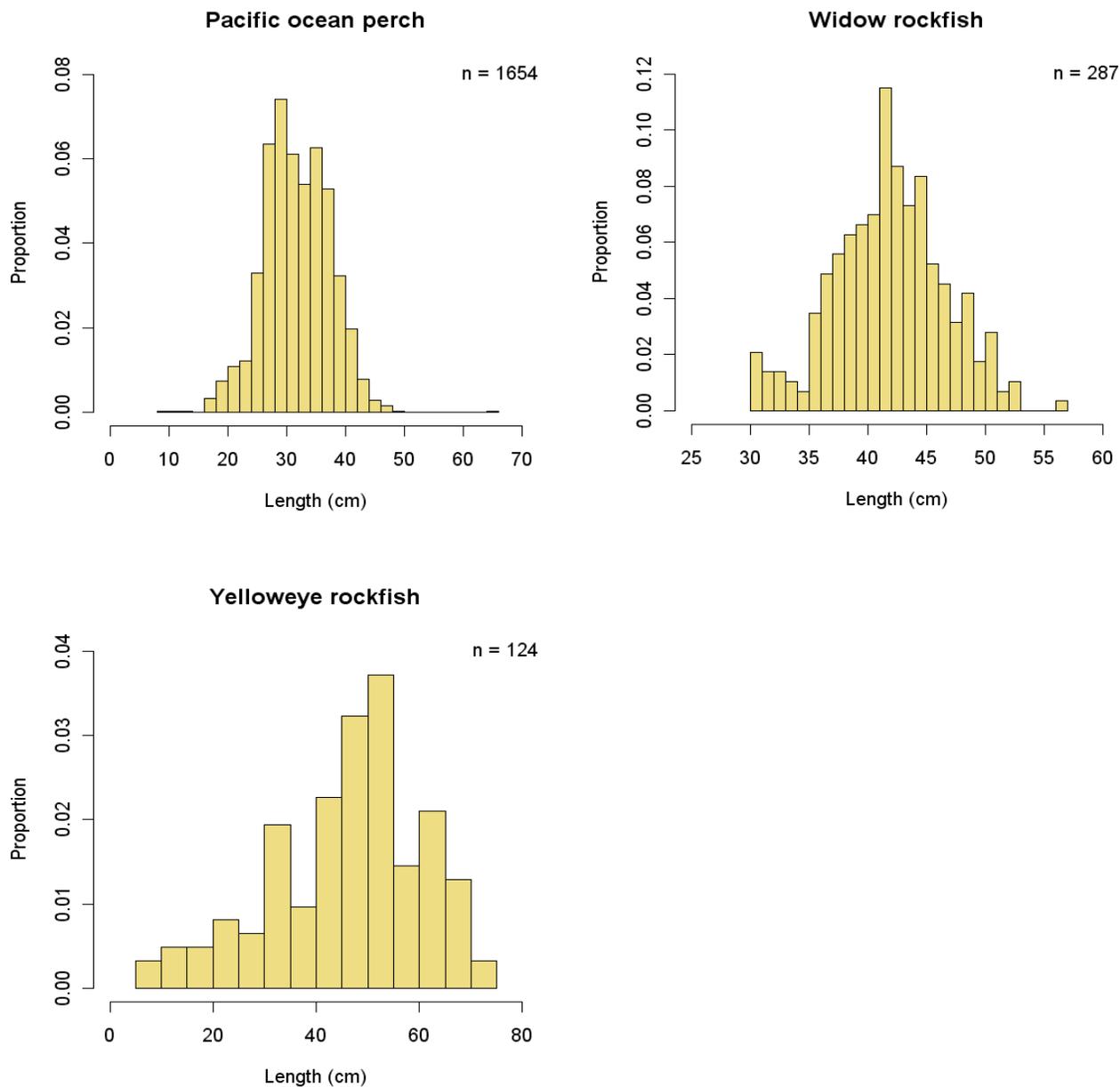


Figure 5: Length frequency distributions of discarded (non-rebuilding) species observed in the LE groundfish bottom trawl fishery from September 2003 - April 2008.

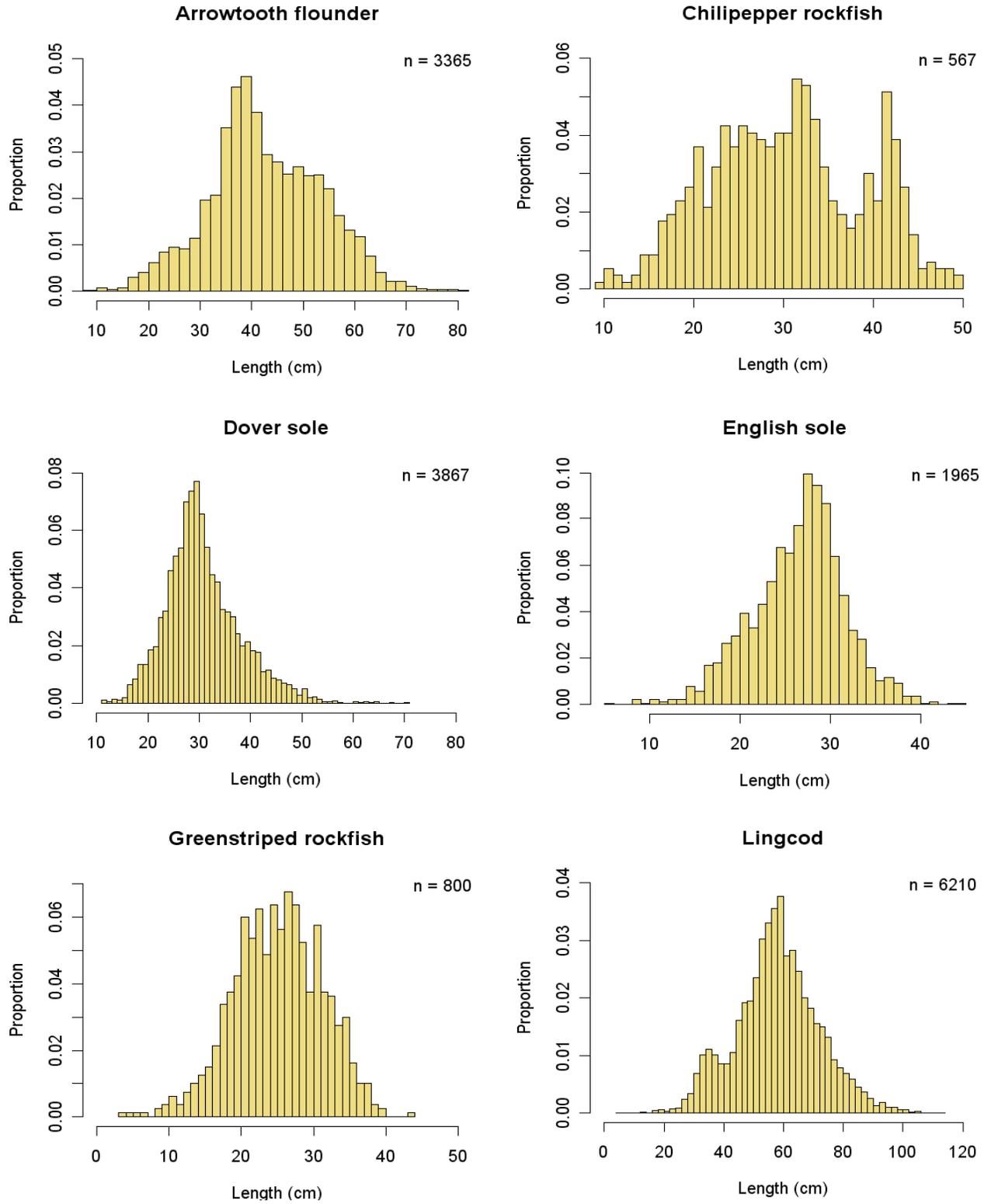


Figure 5 (cont.): Length frequency distributions of discarded (non-rebuilding) species observed in the LE groundfish bottom trawl fishery from September 2003 - April 2008.

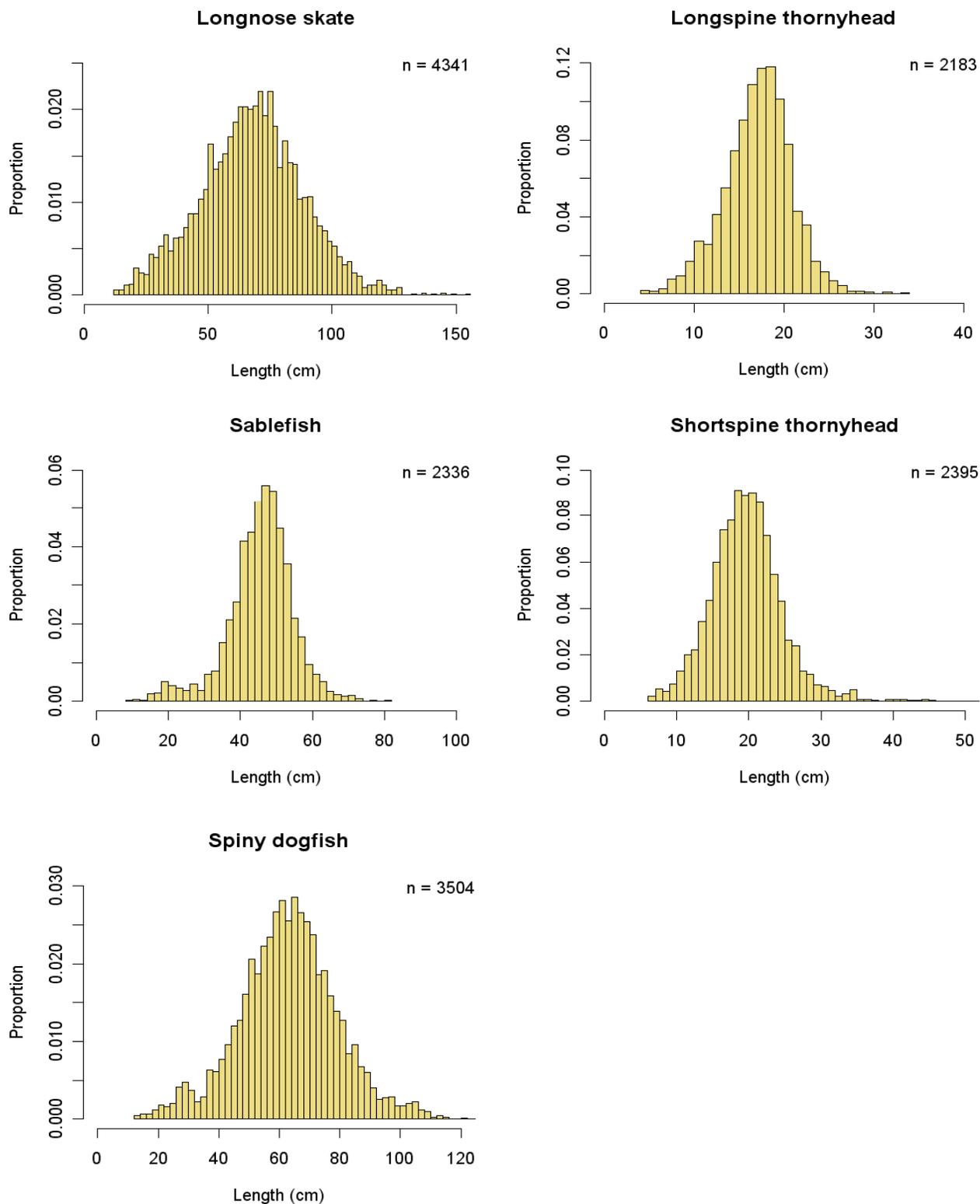


Table 1: Total trips, tows, vessels and groundfish landings observed in the limited entry bottom trawl fishery in 2007 (above) and January through April of 2008 (below). Coverage rates (far-right column) for each port group and management area are computed as the proportion of total FMP groundfish landings (excluding Pacific hake) that were observed. Data are combined as needed to ensure confidentiality.

	Port Group	Number of observed trips	Number of observed tows	Number of observed vessels	Observed groundfish landings (mt)	Total groundfish landings (mt)	% of total groundfish landings observed
2007	Bellingham	21	118	4	138.6	946.7	15%
	Neah Bay						
	Astoria	98	1125	25	1296.9	7042.7	18%
	Newport	46	352	16	448.3	2245.6	20%
	Coos Bay	49	269	15	506.7	3074.5	16%
	Crescent City	30	155	11	219.5	1703.8	13%
	Eureka	43	234	10	511.0	2880.5	18%
	Fort Bragg	32	219	7	320.9	1348.6	24%
	San Francisco	72	274	7	236.3	1032.5	23%
	Monterey	16	71	4	38.5	238.8	16%
	Morro Bay						
	Santa Barbara	--	--	--	--	--	--
	Los Angeles	--	--	--	--	--	--
		North of 40°10' N	286	2247	74	3114.8	17893.7
	South of 40°10' N	123	569	19	601.9	2619.9	23%
	Coastwide total	407	2817	99	3716.7	20513.6	18%
Jan - Apr 2008	Bellingham	--	--	--	--	352.8	0%
	Neah Bay	--	--	--	--	--	--
	Astoria	34	350	11	725.5	2983.2	24%
	Newport	14	133	4	188.3	807.7	23%
	Coos Bay	19	89	5	215.3	1443.3	15%
	Crescent City	12	60	3	123.7	841.0	15%
	Eureka	36	170	7	237.5	1376.0	17%
	Fort Bragg						
	San Francisco	48	200	6	88.8	354.1	25%
	Monterey						
	Morro Bay						
	Santa Barbara	--	--	--	--	--	--
	Los Angeles	--	--	--	--	--	--
		North of 40°10' N	106	741	28	1410.3	7292.6
	South of 40°10' N	61	261	11	168.8	865.5	20%
	Coastwide total	163	1002	36	1579.1	8158.1	19%

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 hauls that are lacking spatial information are included in coastwide and port group totals only.

Table 2: Number of tows and retained weight (mt) of FMP groundfish species (excluding Pacific hake) from observer and logbook data for the 2007 limited entry bottom trawl fishery by depth, season, and management area. Data are combined as needed to ensure confidentiality and adequate sample size. Tows targeting California halibut have been removed from both observer and logbook data. Winter season is January-April and November-December and summer season is May-October.

Depth interval (fathoms)	NORTH of 40°10' N				SOUTH of 40°10' N				
	Number of tows		Retained groundfish (mt)		Number of tows		Retained groundfish (mt)		
	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	
Observed fleet	0-50		273			28		9.2	
	51-75	40	305	11.8	26	39	14.0	26.8	
	76-100	NA	NA	NA		66		45.8	
	151-200	122	107	210.7	171.6	37	37	60.0	43.5
	201-300	367	443	756.2	791.1	44	63	66.1	103.2
> 300	152	245	252.5	336.1	62	59	125.5	75.8	
All trawl logbooks	0-50		1727			411		108.6	
	51-75	221	2383	113.4	1704.8	160	502	50.7	226.6
	76-100	NA	NA	NA	NA		255		176.2
	151-200	875	541	1411.3	1127.7	199	195	202.4	253.2
	201-300	2181	2240	4910.3	4051.4	278	288	359.8	454.5
> 300	904	918	1602.5	1267.9	209	343	283.9	515.5	
Percentage observed	0-50		16%			7%		8%	
	51-75	18%	13%	10%	14%	16%	8%	28%	12%
	76-100	NA	NA	NA	NA		26%		26%
	151-200	14%	20%	15%	15%	19%	19%	30%	17%
	201-300	17%	20%	15%	20%	16%	22%	18%	23%
> 300	17%	27%	16%	27%	30%	17%	44%	15%	

Table 3a: Observed catch weight (mt), discard weight (mt) and percent discarded from observed vessels in the 2007 limited entry bottom trawl fishery by management area. Rebuilding, non-rebuilding, and non-groundfish species are presented alphabetically. Retained weights were grouped when species-specific information was unavailable or grouped on fish tickets and did not allowing for a specific specific catch versus discard comparison.

	NORTH of 40°10' N			SOUTH of 40°10' N		
	Total catch (mt)	Discard (mt)	Total % discarded	Total catch (mt)	Discard (mt)	Total % discarded
Rebuilding species						
Bocaccio *	0.29	0.29	100.0%	1.00	0.73	72.9%
Canary rockfish	1.71	1.62	94.6%	0.75	0.58	78.2%
Cowcod *	--	--	--	0.15	0.15	100.0%
Darkblotched rockfish *	33.54	18.02	53.7%	3.54	0.04	1.1%
Pacific ocean perch *	21.09	3.57	16.9%	0.03	0.03	100.0%
Widow rockfish	2.12	1.66	78.3%	0.02	0.01	83.2%
Yelloweye rockfish *	0.00	0.00	5.6%	--	--	--
Non-rebuilding species						
Arrowtooth flounder	432.43	105.90	24.5%	2.95	2.50	84.6%
Big skate	20.78	20.22	97.3%	0.88	0.88	100.0%
Black rockfish	0.54	0.43	78.9%	--	--	--
Brown rockfish	--	--	--	0.10	0.01	9.7%
Butter sole	0.12	0.10	83.1%	--	--	--
Cabazon	0.01	0.01	100.0%	--	--	--
California skate	--	--	--	1.66	1.66	100.0%
Chilipepper rockfish	0.08	0.08	100.0%	21.18	15.07	71.1%
Dover sole	1428.38	138.22	9.7%	231.36	26.99	11.7%
English sole	87.69	20.40	23.3%	24.08	12.27	51.0%
Flatfish	74.08	46.65	63.0%	16.43	9.02	54.9%
Curlfin turbot		0.35			0.53	
Deepsea sole		3.48			1.09	
Flathead sole		0.00			--	
Hornyhead turbot		--			0.04	
Pacific sanddab		35.42			6.96	
Roughscale sole		0.02			--	
Slender sole		4.58			0.32	
Unspecified flatfish		2.37			0.01	
Unspecified sanddab		0.10			0.07	
Flathead sole	0.70	0.34	49.1%	--	--	--
Grenadier	65.01	47.70	73.4%	13.85	8.21	59.3%
California grenadier		0.00			0.06	
Giant grenadier		30.45			2.79	
Pacific grenadier		17.23			5.04	
Popeye grenadier		0.02			--	
Shoulderspot grenadier		0.00			--	
Unidentified grenadier		0.00			0.32	
Unspecified grenadier		0.00			0.00	
Kelp greenling	0.02	0.02	100.0%	--	--	--
Leopard shark	--	--	--	0.01	0.00	0.0%
Lingcod	29.93	17.38	58.1%	9.02	3.33	36.9%
Nearshore rockfish	0.04	0.01	17.6%	0.09	0.00	0.0%
Quillback rockfish		0.01			0.00	
Unspecified nearshore rockfish		0.00			0.00	

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

	NORTH of 40°10' N			SOUTH of 40°10' N		
	Total catch (mt)	Discard (mt)	Total % discarded	Total catch (mt)	Discard (mt)	Total % discarded
Non-rebuilding species (cont.)						
Other unspecified rockfish	0.05	0.00	0.0%	1.65	0.00	0.0%
Pacific cod	4.49	1.66	37.1%	--	--	--
Petrale sole	226.16	9.07	4.0%	131.65	6.41	4.9%
Rex sole	100.56	19.30	19.2%	15.99	5.29	33.1%
Rock sole	0.35	0.13	39.1%	1.44	0.19	13.2%
Rosy rockfish	--	--	--	0.00	0.00	100.0%
Sablefish	442.13	59.90	13.5%	72.82	2.07	2.8%
Sand sole	3.75	1.05	28.1%	0.04	0.00	5.2%
Shelf rockfish	23.75	10.94	46.1%	11.53	2.91	25.3%
Greenspotted rockfish		0.00			0.03	
Greenstriped rockfish		1.83			1.39	
Halfbanded rockfish		--			0.02	
Redstripe rockfish		0.04			--	
Rosethorn rockfish		0.67			0.01	
Shortbelly rockfish		--			0.05	
Silvergray rockfish		6.61			--	
Stripetail rockfish		1.24			0.77	
Unspecified shelf rockfish		0.53			0.65	
Vermilion rockfish		0.01			--	
Skates	228.49	90.58	39.6%	47.15	42.85	90.9%
Aleutian skate		0.40			0.01	
Black skate		3.73			1.10	
Deepsea skate		0.00			--	
Longnose skate		62.93			29.40	
Pacific electric ray		0.09			0.16	
Sandpaper skate		9.84			3.48	
Starry skate		0.01			0.17	
Unidentified skate		13.57			8.53	
White skate		0.01			--	
Slope rockfish	56.54	34.99	61.9%	49.83	16.19	32.5%
Aurora rockfish		2.73			1.46	
Bank rockfish		0.04			0.00	
Blackgill rockfish		0.33			0.04	
Redbanded rockfish		0.80			0.04	
Roughey rockfish		5.00			--	
Sharpchin rockfish		1.05			0.03	
Shortraker rockfish		1.95			--	
Shortraker/Roughey rockfish		0.71			--	
Splitnose rockfish		21.03			14.62	
Unspecified slope rockfish		0.08			0.00	
Yellowmouth rockfish		1.27			--	
Spiny dogfish	76.75	75.72	98.7%	12.73	12.73	100.0%
Spotted ratfish	22.45	22.45	100.0%	12.58	12.51	99.4%
Starry flounder	1.28	0.19	14.9%	0.04	0.00	2.5%
Thornyheads	328.79	44.94	13.7%	71.86	4.37	6.1%
Longspine thornyhead		29.20			3.59	
Shortspine thornyhead		15.71			0.61	
Mixed thornyheads		0.03			0.17	
Yellowtail rockfish	1.76	1.13	64.2%	0.36	0.04	10.8%

	NORTH of 40°10' N			SOUTH of 40°10' N		
	Total catch (mt)	Discard (mt)	Total % discarded	Total catch (mt)	Discard (mt)	Total % discarded
Non-groundfish species						
Albacore tuna	0.34	0.00	0.0%	--	--	--
American shad	0.33	0.33	100.0%	0.08	0.08	100.0%
Angulatus tanner crab	0.04	0.04	100.0%	--	--	--
Armored box crab	--	--	--	0.32	0.32	100.0%
Bat ray	--	--	--	0.01	0.01	100.0%
Bigfin eelpout	0.47	0.47	100.0%	0.19	0.19	100.0%
Black eelpout	0.01	0.01	100.0%	--	--	--
Blob sculpin	0.03	0.03	100.0%	--	--	--
Blue shark	0.07	0.01	13.4%	--	--	--
Brown box crab	0.02	0.02	100.0%	0.90	0.90	100.0%
Brown cat shark	4.26	4.26	100.0%	1.97	1.97	100.0%
Brown smoothhound shark	--	--	--	0.04	0.04	100.0%
California halibut	--	--	--	0.11	0.00	0.0%
California slickhead	1.91	1.91	100.0%	1.92	1.92	100.0%
Cat shark (unidentified)	0.02	0.02	100.0%	--	--	--
Common thresher shark	--	--	--	0.03	0.00	0.0%
Deep-sea spider crab	0.01	0.01	100.0%	--	--	--
Dungeness crab	31.90	31.90	100.0%	1.73	1.73	100.0%
Eelpout (unidentified)	5.81	5.81	100.0%	0.87	0.87	100.0%
Filetail cat shark	0.02	0.02	100.0%	0.06	0.06	100.0%
Giant wrymouth	0.01	0.01	100.0%	--	--	--
Green sturgeon	0.03	0.03	100.0%	--	--	--
Hair crab	0.01	0.01	100.0%	--	--	--
Jackmackerel	0.06	0.06	100.0%	0.00	0.00	100.0%
Jellyfish (unidentified)	0.06	0.06	100.0%	0.09	0.09	100.0%
King (Chinook) salmon	0.05	0.05	100.0%	--	--	--
King of the salmon	0.01	0.01	100.0%	--	--	--
Longnose cat shark	0.06	0.06	100.0%	--	--	--
Longspine combfish	0.00	0.00	100.0%	0.07	0.07	100.0%
Mackerel (unidentified)	0.01	0.01	100.0%	--	--	--
Market squid	0.01	0.00	0.0%	--	--	--
Midshipman (unidentified)	0.02	0.02	100.0%	0.00	0.00	100.0%
Mola mola (sunfish)	0.18	0.18	100.0%	0.00	0.00	100.0%
Monkeyface prickleback	0.01	0.01	100.0%	0.00	0.00	100.0%
Octopus (unidentified)	1.30	1.13	87.3%	0.28	0.19	66.5%
Other unidentified nongroundfish	2.31	0.33	14.3%	0.10	0.09	88.5%
Pacific argentine	--	--	--	0.00	0.00	100.0%
Pacific flatnose	2.02	2.02	100.0%	0.73	0.73	100.0%
Pacific hake	138.59	137.00	98.9%	52.04	51.67	99.3%
Pacific halibut	43.43	43.43	100.0%	1.66	1.65	99.3%
Pacific herring	0.02	0.02	100.0%	0.09	0.09	100.0%
Pacific mackerel	0.01	0.01	100.0%	0.01	0.01	100.0%
Pacific sardine	0.02	0.02	100.0%	0.00	0.00	100.0%
Pacific scabbardfish	0.01	0.01	100.0%	--	--	--
Pacific sleeper shark	0.60	0.60	100.0%	0.08	0.08	100.0%
Pacific staghorn sculpin	0.04	0.04	100.0%	--	--	--
Pacific tom cod	0.01	0.01	100.0%	--	--	--
Pink surfperch	--	--	--	0.03	0.03	100.0%
Plainfin midshipman	0.00	0.00	100.0%	0.05	0.05	100.0%

	NORTH of 40°10' N			SOUTH of 40°10' N		
	Total catch (mt)	Discard (mt)	Total % discarded	Total catch (mt)	Discard (mt)	Total % discarded
Non-groundfish species (cont.)						
Poacher (unidentified)	0.05	0.05	100.0%	0.01	0.01	100.0%
Prickleback (unidentified)	0.01	0.01	100.0%	--	--	--
Prowfish	0.03	0.03	100.0%	--	--	--
Ragfish	0.10	0.10	100.0%	0.03	0.03	100.0%
Red rock crab	--	--	--	0.01	0.01	100.0%
Salmon shark	0.01	0.01	100.0%	--	--	--
Scarlet king crab	0.03	0.03	100.0%	0.00	0.00	100.0%
Sculpin (unidentified)	0.25	0.25	100.0%	0.00	0.00	100.0%
Sea cucumber (unidentified)	0.65	0.65	100.0%	0.00	0.00	100.0%
Shark (unidentified)	2.38	2.38	100.0%	0.75	0.69	91.4%
Shrimp (unidentified)	0.00	0.00	100.0%	0.01	0.01	88.1%
Sixgill shark	--	--	--	0.01	0.01	100.0%
Slickhead (unidentified)	0.05	0.05	100.0%	--	--	--
Snailfish (unidentified)	0.79	0.79	100.0%	0.04	0.04	100.0%
Spiny king crab	--	--	--	0.00	0.00	100.0%
Squid (unidentified)	5.05	4.41	87.3%	7.80	2.01	25.8%
Stone coral	0.02	0.02	100.0%	--	--	--
Surfperch (unidentified)	0.02	0.02	100.0%	0.04	0.04	100.0%
Tanner crab (unidentified)	6.29	6.29	100.0%	0.56	0.56	100.0%
Tanneri tanner crab	56.82	56.82	100.0%	24.83	24.83	100.0%
Threadfin sculpin	0.02	0.02	100.0%	0.00	0.00	100.0%
Threadfin slickhead	0.09	0.09	100.0%	--	--	--
Tubeshoulder (unidentified)	0.03	0.03	100.0%	--	--	--
Twoline eelpout	0.40	0.40	100.0%	0.06	0.06	100.0%
Urchin (unidentified)	0.27	0.27	100.0%	0.02	0.02	100.0%
Warty poacher	0.01	0.01	100.0%	--	--	--
White croaker	0.01	0.01	100.0%	0.10	0.01	8.9%
Wolf-eel	0.01	0.00	6.4%	0.00	0.00	100.0%

Table 3b: Observed catch weight (mt), discard weight (mt) and percent discarded from observed vessels in the January through April of 2008 limited entry bottom trawl fishery by management area. Rebuilding, non-rebuilding, and non-groundfish species are presented alphabetically. Retained weights were grouped when species-specific information was unavailable or grouped on fish tickets and did not allowing for a specific specific catch versus discard comparison.

	NORTH of 40°10' N			SOUTH of 40°10' N		
	Total catch (mt)	Discard (mt)	Total % discarded	Total catch (mt)	Discard (mt)	Total % discarded
Rebuilding species						
Bocaccio *	0.04	0.00	9.2%	0.01	0.01	100.0%
Canary rockfish	1.93	1.93	99.8%	0.00	0.00	0.0%
Cowcod *	--	--	--	--	--	--
Darkblotched rockfish *	17.94	12.07	67.3%	0.60	0.01	1.5%
Pacific ocean perch *	7.80	2.77	35.5%	0.20	0.00	0.0%
Widow rockfish	0.72	0.47	65.8%	0.00	0.00	100.0%
Yelloweye rockfish *	--	--	--	--	--	--
Non-rebuilding species						
Arrowtooth flounder	212.38	31.13	14.7%	0.46	0.45	96.6%
Big skate	1.63	1.63	100.0%	0.18	0.18	100.0%
California skate	--	--	--	0.00	0.00	100.0%
Chilipepper rockfish	0.08	0.00	1.6%	0.51	0.09	17.3%
Dover sole	678.34	28.62	4.2%	35.63	7.28	20.4%
English sole	12.98	0.53	4.1%	1.55	0.25	16.0%
Flatfish	3.86	2.24	58.0%	1.51	1.51	99.8%
Curlfin turbot		--			0.00	
Deepsea sole		1.46			1.35	
Pacific sanddab		0.14			0.05	
Slender sole		0.46			0.11	
Unspecified flatfish		0.19			0.00	
Unspecified sanddab		0.00			--	
Grenadier	14.44	9.80	67.9%	8.12	6.62	81.5%
California grenadier		0.01			0.10	
Giant grenadier		6.90			2.94	
Pacific grenadier		2.88			3.44	
Popeye grenadier		0.01			0.00	
Shoulderspot grenadier		0.01			--	
Unidentified grenadier		0.00			0.15	
Unspecified grenadier		0.00			--	
Lingcod	6.47	2.73	42.2%	0.45	0.06	13.1%
Other unspecified rockfish	0.04	0.00	0.0%	0.19	0.00	0.0%
Pacific cod	0.51	0.00	0.2%	--	--	--
Petrable sole	157.56	3.51	2.2%	24.13	0.15	0.6%
Rex sole	19.52	1.86	9.5%	3.04	0.72	23.7%
Sablefish	124.67	10.08	8.1%	22.35	0.95	4.3%
Shelf rockfish	5.46	0.57	10.5%	0.11	0.05	45.0%
Greenspotted rockfish		--			0.00	
Greenstriped rockfish		0.04			0.02	
Rosethorn rockfish		0.20			0.00	
Shortbelly rockfish		--			0.00	
Silvergray rockfish		0.15			--	
Stripetail rockfish		0.13			0.02	
Unspecified shelf rockfish		0.05			0.01	

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

	NORTH of 40°10' N			SOUTH of 40°10' N		
	Total catch (mt)	Discard (mt)	Total % discarded	Total catch (mt)	Discard (mt)	Total % discarded
Non-rebuilding species (cont.)						
Skates	114.18	28.97	25.4%	14.38	14.29	99.4%
Aleutian skate		0.14			--	
Black skate		2.80			1.76	
Deepsea skate		0.07			--	
Longnose skate		22.25			11.81	
Pacific electric ray		--			0.00	
Sandpaper skate		3.62			0.69	
Thornback skate		--			0.04	
Unspecified skate		0.10			0.00	
Slope rockfish	11.10	6.16	55.6%	12.78	4.83	37.8%
Aurora rockfish		0.64			0.39	
Bank rockfish		0.00			0.00	
Blackgill rockfish		0.35			0.00	
Redbanded rockfish		0.33			0.00	
Roughey rockfish		0.83			--	
Sharpchin rockfish		0.08			--	
Shortraker rockfish		0.53			--	
Splitnose rockfish		3.40			4.43	
Unspecified slope rockfish		0.00			0.00	
Southern spiny dogfish	0.03	0.00	0.0%	0.03	0.00	0.0%
Spiny dogfish	65.71	60.72	92.4%	0.22	0.22	100.0%
Spotted ratfish	5.07	5.07	100.0%	1.76	1.76	100.0%
Starry flounder	0.00	0.00	100.0%	0.00	0.00	0.0%
Thornyheads						
Longspine thornyhead	51.27	7.20	14.0%	30.60	3.85	12.6%
Shortspine thornyhead	43.20	1.94	4.5%	9.27	0.10	1.1%
Mixed thornyheads	4.79	1.14	23.7%	0.02	0.02	100.0%
Yellowtail rockfish	0.04	0.02	47.6%	--	--	--
Non-groundfish species (cont.)						
American shad	0.02	0.02	100.0%	0.00	0.00	100.0%
Bat ray	--	--	--	0.03	0.03	100.0%
Bigfin eelpout	0.08	0.08	100.0%	0.01	0.01	100.0%
Blob sculpin	0.04	0.04	100.0%	--	--	--
Brown cat shark	1.41	1.41	100.0%	0.81	0.81	100.0%
Brown smoothhound shark	0.31	0.31	100.0%	--	--	--
California halibut	--	--	--	0.06	0.02	34.7%
California king crab	0.00	0.00	100.0%	0.01	0.01	100.0%
California slickhead	0.91	0.91	100.0%	1.85	1.85	100.0%
Dungeness crab	0.39	0.39	100.0%	0.23	0.23	100.0%
Eelpout (unidentified)	1.91	1.91	100.0%	0.15	0.15	100.0%
Filetail cat shark	0.00	0.00	100.0%	0.13	0.13	100.0%
Jellyfish (unidentified)	0.02	0.02	100.0%	0.01	0.01	100.0%
King (Chinook) salmon	0.11	0.11	100.0%	--	--	--
Lancetfish (unidentified)	0.02	0.02	100.0%	--	--	--
Lumpsucker (unidentified)	--	--	--	0.01	0.01	100.0%
Midshipman (unidentified)	--	--	--	0.01	0.01	100.0%
Octopus (unidentified)	0.46	0.46	100.0%	0.22	0.22	100.0%
Other unidentified nongroundfish	0.22	0.13	58.9%	--	--	--
Pacific flatnose	0.65	0.65	100.0%	0.69	0.69	100.0%

	NORTH of 40°10' N			SOUTH of 40°10' N		
	Total catch (mt)	Discard (mt)	Total % discarded	Total catch (mt)	Discard (mt)	Total % discarded
Non-groundfish species (cont.)						
Pacific hake	8.48	8.48	100.0%	1.55	1.55	100.0%
Pacific halibut	22.92	22.92	100.0%	0.22	0.22	100.0%
Pacific sleeper shark	0.65	0.65	100.0%	0.09	0.09	100.0%
Poacher (unidentified)	0.01	0.01	100.0%	0.00	0.00	100.0%
Ragfish	0.03	0.03	100.0%	--	--	--
Scarlet king crab	0.03	0.03	100.0%	0.01	0.01	100.0%
Sculpin (unidentified)	0.01	0.01	100.0%	--	--	--
Sea cucumber (unidentified)	0.10	0.10	100.0%	0.00	0.00	100.0%
Shark (unidentified)	0.60	0.55	92.4%	0.10	0.10	100.0%
Sixgill shark	--	--	--	0.03	0.03	100.0%
Slickhead (unidentified)	0.03	0.03	100.0%	0.04	0.04	100.0%
Snailfish (unidentified)	0.15	0.15	100.0%	0.03	0.03	100.0%
Spiny lithode crab	0.31	0.31	100.0%	0.00	0.00	100.0%
Squid (unidentified)	0.05	0.05	100.0%	0.02	0.02	100.0%
Swell shark	--	--	--	0.00	0.00	100.0%
Tanner crab (unidentified)	2.85	2.85	100.0%	0.44	0.44	100.0%
Tanneri tanner crab	30.71	30.71	100.0%	6.07	6.07	100.0%
Threadfin slickhead	0.07	0.07	100.0%	0.00	0.00	100.0%
Tube shoulder (unidentified)	0.00	0.00	100.0%	0.03	0.03	100.0%
Twoline eelpout	0.09	0.09	100.0%	0.08	0.08	100.0%
Urchin (unidentified)	0.05	0.05	100.0%	0.05	0.05	100.0%
White sea bass	--	--	--	0.01	0.00	25.5%

Table 4a: Discard ratios and standard errors from observed trips north of 40°10' N latitude in the 2007 limited entry bottom trawl fishery by season and depth. Ratios are computed as the observed discard weight divided by the weight of retained FMP groundfish species (excluding Pacific hake). Winter season is January-April and November-December and summer season is May-October. Species are grouped according to Appendix C. **Bold numbers signify that data have been grouped across more than one depth interval (i.e. discard ratio of Canary rockfish in the winter, in depths 0 - 75 fathoms = 0.0001).**

Rebuilding species	Season	Depth intervals (fathoms)											
		0-50		51-75		76-100		151-200		201-300		> 300	
		Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE
Denominator = Retained groundfish (mt)													
Bocaccio *	winter	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	summer	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Canary rockfish	winter	0.0001	0.0048	0.0001	0.0048	NA	NA	0.0001	0.0238	0.0000	0.0232	NA	NA
	summer	0.0005	0.0668	0.0063	0.4713	NA	NA	0.0000	NA	0.0000	NA	NA	NA
Cowcod *	winter	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	summer	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Darkblotched rockfish	winter	0.0001	0.0084	0.0007	0.0060	NA	NA	0.0196	0.1225	0.0047	0.0417	0.0000	0.0008
	summer	0.0001	0.0084	0.0010	0.0098	NA	NA	0.0327	0.1776	0.0060	0.0713	0.0001	0.0014
Pacific ocean perch *	winter	NA	NA	NA	NA	NA	NA	0.0029	0.0275	0.0002	0.0041	0.0001	0.0048
	summer	NA	NA	0.0002	0.0534	NA	NA	0.0085	0.1640	0.0016	0.0470	0.0002	0.0078
Widow rockfish	winter	0.0001	0.0144	0.0000	NA	NA	NA	0.0007	0.0298	0.0000	0.0026	0.0000	NA
	summer	0.0001	0.0144	0.0002	0.0146	NA	NA	0.0084	1.8049	0.0000	0.0226	0.0000	0.0011
Yelloweye rockfish	winter	0.0000	0.0011	0.0000	NA	NA	NA	NA	NA	NA	NA	NA	NA
	summer	0.0000	0.0011	0.0000	NA	NA	NA	NA	NA	NA	NA	NA	NA
Denominator = Retained groundfish (mt)													
Other species	winter	0.0370	0.3080	0.0290	0.0996	0.0225	0.0748	0.0100	0.0605	0.0237	0.1276	0.0028	0.0320
	summer	0.1345	0.4547	0.1464	0.3894	NA	NA	0.0001	NA	0.0002	0.1144	NA	NA
Big skate	winter	0.1271	0.5893	0.0181	0.1710	NA	NA	0.0024	0.5532	0.0003	0.0477	0.0000	0.0107
	summer	0.0973	0.3687	0.0181	0.1710	NA	NA	0.0024	0.5532	0.0003	0.0477	0.0000	0.0107
Black rockfish	winter	0.0030	2.6728	0.0000	0.1077	NA	NA	NA	NA	NA	NA	NA	NA
	summer	0.0030	2.6728	0.0000	0.1077	NA	NA	NA	NA	NA	NA	NA	NA
Chillipepper *	winter	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	summer	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dover sole	winter	0.1131	0.6102	0.0034	0.0180	NA	NA	0.0340	0.2928	0.0139	0.0723	0.0776	0.3091
	summer	0.1131	0.6102	0.0247	0.0583	NA	NA	0.0247	0.3427	0.0122	0.0664	0.1986	0.6718
Dungeness crab	winter	0.0779	0.3307	0.0353	0.0943	NA	NA	0.0003	0.0152	0.0001	0.0502	0.0000	0.0016
	summer	0.1595	0.3696	0.0353	0.0943	NA	NA	0.0007	0.0561	0.0000	0.0022	0.0000	NA
English sole	winter	0.0459	0.1392	0.0010	0.0072	NA	NA	0.0010	0.0072	0.0002	0.0059	0.0000	0.0001
	summer	0.1004	0.2635	0.0226	0.0934	NA	NA	0.0003	0.0056	0.0000	0.0009	0.0000	NA
Green sturgeon	winter	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	summer	0.0002	NA	NA	NA								
Lingcod	winter	0.0338	0.1952	0.0031	0.0269	0.0006	0.0243	0.0000	NA	0.0000	NA	NA	NA
	summer	0.0276	0.1469	0.0472	0.1100	NA	NA	0.0022	0.1766	0.0006	0.0631	0.0000	NA
Longnose skate	winter	0.1365	0.6187	0.0384	0.3261	0.0182	0.0950	0.0049	0.0568	0.0049	0.0568	0.0049	0.0568
	summer	0.0387	0.3802	0.0736	0.2097	NA	NA	0.0113	0.1050	0.0152	0.0604	0.0052	0.1123

* Species group assignment varies according to area strata (see Appendix C).

NORTH OF 40°10' N	0-50		51-75		76-100		151-200		201-300		> 300	
	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE
Other species (cont.)	Denominator = Retained groundfish (mt)											
Longspine thornyhead	winter	NA	NA	NA	NA	NA	0.0002	0.0032	0.0029	0.0129	0.0395	0.0982
	summer	NA	NA	NA	NA	NA	0.0008	0.0417	0.0036	0.0116	0.0428	0.0709
Other flatfish	winter	0.0883	0.0690	0.0072	0.0181	0.0037	0.0221	0.0035	0.0098	0.0035	0.0085	0.0123
	summer	0.2843	0.1300	0.0662	0.0377	NA	0.0023	0.0078	0.0032	0.0138	0.0085	0.0173
Other groundfish	winter	0.1813	0.7546	0.0273	0.0779	NA	0.0084	0.0763	0.0025	0.0176	0.0001	0.0067
	summer	0.0451	0.4075	NA	NA	NA	0.0101	0.1098	0.0027	0.0228	0.0000	0.0138
Other nearshore rockfish	winter	NA	NA	NA								
	summer	0.0000	0.0105	0.0000	0.0121	NA	NA	NA	NA	NA	NA	NA
Other nongroundfish	winter	0.0050	0.0153	0.0019	0.0079	NA	0.0036	0.0144	0.0058	0.0069	0.0121	0.0101
	summer	0.0060	0.0172	0.0019	0.0079	NA	0.0067	0.0102	0.0102	0.0062	0.0274	0.0111
Other shelf rockfish	winter	0.0003	0.0066	0.0095	0.0612	NA	0.0018	0.0204	0.0003	0.0043	0.0000	NA
	summer	0.0001	0.0052	0.0095	0.0612	NA	0.0467	0.8722	0.0002	0.0031	0.0000	0.0010
Other slope rockfish	winter	0.0000	NA	0.0000	NA	NA	0.0201	0.0311	0.0040	0.0094	0.0001	0.0017
	summer	0.0000	0.0020	0.0001	0.0107	NA	0.1008	0.1437	0.0142	0.0307	0.0006	0.0037
Pacific cod *	winter	0.0002	0.0172	0.0007	0.0122	NA	NA	NA	NA	NA	NA	NA
	summer	0.0107	0.1703	0.0007	0.0122	NA	0.0000	0.0037	0.0000	NA	0.0000	NA
Pacific hake	winter	0.0456	1.3502	0.0398	0.2342	NA	0.0945	0.4634	0.0426	0.1348	0.0109	0.0881
	summer	0.0831	0.4563	0.0092	0.0255	NA	0.0429	0.2082	0.0625	0.1618	0.0149	0.1497
Pacific halibut	winter	0.0092	0.2025	0.0431	0.3754	NA	0.0258	0.1423	0.0195	0.1316	0.0028	0.3098
	summer	0.0445	0.2209	0.0331	0.3754	NA	0.0150	0.1437	0.0046	0.0731	0.0002	0.0360
Petrale sole	winter	0.0171	0.0622	0.0189	0.0371	NA	0.0023	0.0147	0.0005	0.0040	0.0001	0.0027
	summer	0.0251	0.0728	0.0189	0.0371	NA	0.0000	NA	0.0000	0.0028	0.0000	NA
Sablefish	winter	0.0010	0.0093	0.0054	0.0318	NA	0.0054	0.0318	0.0132	0.0418	0.0380	0.2159
	summer	0.0121	0.0564	0.0273	0.0966	NA	0.0210	0.1009	0.0225	0.0364	0.0304	0.0800
Shortbelly rockfish	winter	NA	NA	NA								
	summer	NA	NA	NA								
Shortspine thornyhead	winter	NA	NA	NA	NA	NA	0.0041	0.0225	0.0038	0.0090	0.0044	0.0172
	summer	NA	NA	0.0000	0.0103	NA	0.0116	0.0359	0.0094	0.0179	0.0048	0.0201
Spiny dogfish	winter	0.0757	0.6555	0.0969	0.4677	NA	0.0969	0.4677	0.0315	0.1823	0.0016	0.0302
	summer	0.0853	0.5407	0.0489	0.1924	NA	0.0142	0.2745	0.0059	0.1982	0.0001	0.0161
Splitnose rockfish *	winter	NA	NA	NA								
	summer	NA	NA	NA								
Tanner crab	winter	NA	NA	NA	NA	NA	0.0009	0.0307	0.0112	0.0375	0.0729	0.2363
	summer	NA	NA	NA	NA	NA	0.0037	0.0504	0.0129	0.0330	0.0773	0.1329
Unspecified skate	winter	0.0139	0.0889	0.0267	0.1264	NA	0.0267	0.1264	0.0070	0.0185	0.0088	0.0364
	summer	0.0052	0.0157	0.0059	0.0133	NA	0.0086	0.0359	0.0097	0.0235	0.0101	0.0255
Yellowtail rockfish *	winter	0.0000	NA	0.0000	NA	NA	0.0000	NA	0.0000	0.0042	0.0000	NA
	summer	0.0004	0.0080	0.0024	0.0954	NA	0.0030	0.8217	0.0000	NA	0.0000	NA

* Species group assignment varies according to area strata (see Appendix C).

Table 4b: Discard ratios and standard errors from observed trips south of 40°10' N latitude in the 2007 limited entry bottom trawl fishery by season and depth. Ratios are computed as the observed discard weight divided by the weight of retained FMP groundfish species (excluding Pacific hake). Winter season is January-April and November-December and summer season is May-October. Species are grouped according to Appendix C **Bold numbers signify that data have been grouped across more than one depth interval (i.e. discard ratio of Bocaccio rockfish in the winter, in depths 0 - 100 fathoms = 0.0091).**

Rebuilding species	Season	Depth intervals (fathoms)												
		0-50		51-75		76-100		151-200		201-300		> 300		
		Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	
Denominator = Retained groundfish (mt)														
Bocaccio *	winter					0.0091	0.1027	0.0008	NA	NA	NA	NA	NA	NA
	summer	0.0035	0.1993	0.0009	0.1567	0.0107	0.1046	0.0001	0.0069	0.0002	NA	NA	NA	NA
	winter					0.0028	0.3462	NA	NA	NA	NA	NA	NA	NA
Canary rockfish	summer	0.0000	0.0074	0.0198	1.0589	0.0003	0.0094	0.0000	NA	0.0000	NA	0.0000	NA	NA
	winter					NA	NA	NA	NA	NA	NA	NA	NA	NA
Cowcod *	summer	NA	NA	NA	NA	0.0004	0.0335	0.0034	0.2694	NA	NA	NA	NA	NA
	winter	NA	NA	NA	NA	NA	NA	0.0003	0.0045	0.0002	0.0169	0.0000	NA	NA
Darkblotched rockfish	summer	NA	NA	NA	NA	0.0002	0.0075	0.0001	0.0010	0.0000	0.0006	0.0000	NA	NA
	winter	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pacific ocean perch *	summer	NA	NA	NA	NA	0.0001	NA	NA	NA	NA	NA	NA	NA	NA
	winter	NA	NA	0.0003	0.0466	0.0001	0.0496	NA	NA	NA	NA	NA	NA	NA
Widow rockfish	summer	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	winter	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Yelloweye rockfish	summer	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Denominator = Retained groundfish (mt)														
Other species						NA	NA	0.0016	0.1396	0.0031	0.0434	0.0001	0.0096	0.0096
Arrowtooth flounder	winter	NA	NA	0.0000	NA	0.0122	0.1733	0.0113	0.3168	0.0121	0.1033	0.0000	NA	NA
	summer					0.0022	NA	NA	NA	NA	NA	NA	NA	NA
Big skate	summer	0.0142	0.7338	0.0197	2.3255	0.0034	0.4739	0.0009	0.0503	NA	NA	NA	NA	NA
	winter	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Black rockfish	summer	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	winter					0.0461	0.2459	0.0011	0.0558	0.0000	NA	0.0000	NA	NA
Chillipepper *	summer	0.0000	NA	0.1223	1.6792	0.2440	1.4309	0.0002	0.0180	0.0000	NA	0.0000	NA	NA
	winter					0.0052	0.0285	0.0754	0.3539	0.0209	0.1883	0.0091	0.0716	0.0716
Dover sole	summer	0.0145	0.1088	0.0186	0.1410	0.0129	0.0693	0.1035	0.8320	0.0261	0.1104	0.1670	0.4572	0.4572
	winter					0.0005	0.0190	0.0002	0.0876	NA	NA	NA	NA	NA
Dungeness crab	summer	0.0716	0.8659	0.0149	0.1841	0.0136	0.1304	0.0002	0.0652	NA	NA	NA	NA	NA
	winter					0.2614	0.7127	0.0325	0.2319	0.0001	0.0011	0.0000	0.0006	0.0006
English sole	summer	0.1341	0.4754	0.0845	0.3857	0.0718	0.2751	0.0025	0.0387	0.0001	0.0053	0.0000	NA	NA
	winter					NA	NA	NA	NA	NA	NA	NA	NA	NA
Green sturgeon	summer	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	winter					0.0092	0.0311	0.0000	0.0054	0.0000	NA	0.0000	NA	NA
Lingcod	summer	0.0152	0.3643	0.0206	0.4106	0.0549	0.3438	0.0001	0.0058	0.0001	0.0074	0.0000	NA	NA
	winter					0.0120	0.0610	0.0813	0.5542	0.0570	0.4141	0.0098	0.0424	0.0424
Longnose skate	summer	0.0654	0.3294	0.1228	0.8805	0.1269	0.4074	0.0630	0.3703	0.0693	0.2845	0.0130	0.3252	0.3252

* Species group assignment varies according to area strata (see Appendix C).

SOUTH OF 40° 10' N	Depth intervals (fathoms)											
	0-50		51-75		76-100		151-200		201-300		> 300	
	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE
Other species (cont.)	Denominator = Retained groundfish (mt)											
Longspine thornyhead	winter	NA	NA	0.0000	0.0054	0.0001	0.0042	0.0014	0.0294	0.0057	0.0152	
	summer	NA	0.0000	NA	0.0054	0.0009	0.0469	0.0009	0.0047	0.0358	0.0802	
Other flatfish	winter			0.0694	0.0808	0.0354	0.1125	0.0068	0.0281	0.0012	0.0067	
	summer	0.3366	0.4022	0.2063	0.3379	0.0202	0.0476	0.0113	0.0633	0.0015	0.0100	0.0342
Other groundfish	winter			0.0571	0.6851	0.0238	0.1143	0.0016	0.0215	0.0007	0.0968	
	summer	0.0144	0.2340	0.0293	0.3559	0.1272	0.8345	0.0545	0.3085	0.0147	0.1099	0.0003
Other nearshore rockfish	winter			NA	NA	NA	NA	NA	NA	0.0000	NA	0.0000
	summer	0.0000	0.0034	0.0000	NA	0.0002	0.0214	0.0000	NA	0.0000	NA	0.0000
Other nongroundfish	winter			0.0064	0.0080	0.0061	0.0128	0.0078	0.0103	0.0123	0.0080	
	summer	0.0210	0.0254	0.0534	0.1088	0.0020	0.0122	0.0145	0.0564	0.0268	0.0437	0.0452
Other shelf rockfish	winter			0.0271	0.0763	0.0001	0.0017	0.0001	0.0033	0.0000	NA	
	summer	0.0033	0.2100	0.0262	0.1844	0.0238	0.0597	0.0010	0.0096	0.0003	0.0118	0.0000
Other slope rockfish	winter			NA	NA	0.0042	0.0266	0.0020	0.0048	0.0000	0.0001	
	summer	0.0000	NA	0.0000	NA	0.0007	0.0152	0.0315	0.1720	0.0043	0.0131	0.0034
Pacific cod *	winter	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	summer	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pacific hake	winter			0.0003	0.0290	0.1148	0.6190	0.3286	2.0490	0.0069	0.0688	
	summer	0.0737	1.4347	0.0625	1.1383	0.0393	0.4215	0.1274	0.8745	0.1452	0.7953	0.0048
Pacific halibut	winter			NA	NA	0.0009	0.0658	0.0011	0.0430	NA	NA	
	summer	NA	NA	0.0004	NA	0.0327	0.3573	0.0009	0.0658	0.0011	0.0759	NA
Petrale sole	winter			0.0290	0.0767	0.0120	0.0837	0.0001	0.0017	0.0000	0.0059	
	summer	0.0110	0.0432	0.1278	1.5317	0.0235	0.1338	0.0202	0.5105	0.0001	0.0055	0.0000
Sablefish	winter			NA	NA	0.0152	0.2286	0.0003	0.0029	0.0048	0.0194	
	summer	NA	NA	0.0001	0.0052	0.0000	0.0008	0.0013	0.0129	0.0018	0.0289	0.0051
Shortbelly rockfish	winter			0.0007	0.0757	NA	NA	NA	NA	NA	NA	
	summer	NA	NA	0.0000	NA	0.0008	0.0160	NA	NA	NA	NA	
Shortspine thornyhead	winter			NA	NA	0.0013	0.0105	0.0036	0.0207	0.0007	0.0129	
	summer	NA	NA	NA	NA	0.0022	0.0281	0.0020	0.0106	0.0006	0.0074	
Spiny dogfish	winter			0.0012	0.2541	0.0488	0.4730	0.0793	0.8201	0.0000	0.0126	
	summer	0.0077	0.1246	0.0278	0.3737	0.0519	0.4369	0.0358	0.3610	0.0046	0.0856	0.0002
Spillnose rockfish *	winter			NA	NA	0.1045	0.4033	0.0388	0.1402	0.0000	0.0003	
	summer	NA	NA	0.0000	NA	0.1434	0.5860	0.0105	0.0775	0.0001	0.0021	
Tanner crab	winter			NA	NA	0.0010	0.0493	0.0269	0.3832	0.0942	0.3579	
	summer	NA	NA	0.0005	NA	0.0061	0.1056	0.0345	0.1416	0.1074	0.3055	
Unspecified skate	winter			0.0083	0.0692	0.1032	0.4240	0.0307	0.5104	0.0149	0.1284	
	summer	0.1138	0.3491	0.0218	0.1690	0.0079	0.0258	0.0170	0.0828	0.0179	0.0814	0.0150
Yellowtail rockfish *	winter	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
	summer	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	

* Species group assignment varies according to area strata (see Appendix C).

Table 5a: Discard ratios and standard errors from observed trips north of 40°10' N latitude in the 2007 limited entry bottom trawl fishery by season and depth. Ratios are computed as the observed discard weight divided by tow duration. Winter season is January-April and November-December and summer season is May-October. Species are grouped according to Appendix C. **Bold numbers signify that data have been grouped across more than one depth interval (i.e. discard ratio of Canary rockfish in the winter, in depths 0 - 75 fathoms = 0.0272).**

Rebuilding species	Season	NORTH OF 40°10' N													
		0-50		51-75		76-100		151-200		201-300		> 300			
		Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE		
		Depth intervals (fathoms)													
		Denominator = Tow duration (hr)													
Bocaccio *	winter	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	summer	NA	NA	0.0272	0.0573	NA	NA	0.0948	0.8331	0.0151	1.0202	NA	NA	NA	NA
Canary rockfish	winter	0.2224	1.2717	3.8651	12.4366	NA	NA	0.0043	NA	0.0013	NA	NA	NA	NA	NA
	summer	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cowcod *	winter	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	summer	NA	NA	0.2020	0.0674	NA	NA	18.6311	4.4024	4.8889	1.8346	0.0122	0.0229	NA	NA
Darkblotched rockfish	winter	0.0330	0.1593	0.5885	0.2510	NA	NA	28.6468	5.5960	4.2156	2.1153	0.0237	0.0245	NA	NA
	summer	NA	NA	NA	NA	NA	NA	2.7292	0.9905	0.2220	0.1824	0.0344	0.1369	NA	NA
Pacific ocean perch *	winter	NA	NA	0.1279	1.4066	NA	NA	7.4423	5.5296	1.1172	1.3997	0.0609	0.1396	NA	NA
	summer	0.0000	0.0000	NA	NA	NA	NA	0.7042	1.0904	0.0459	0.1124	0.0000	0.0000	NA	NA
Widow rockfish	winter	0.0295	0.2750	0.0956	0.3831	NA	NA	7.3239	61.2038	0.0198	0.6745	0.0008	0.0191	NA	NA
	summer	0.0007	0.0214	0.0000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Yelloweye rockfish	winter	0.0007	0.0214	0.0000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	summer	0.0007	0.0214	0.0000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Other species		Denominator = Tow duration (hr)													
Arrowtooth flounder	winter	58.4531	8.3589	11.4019	3.6054	NA	NA	27.6574	3.4121	23.6283	3.2288	6.2065	1.6531	NA	NA
	summer	58.4531	8.3589	89.2926	9.9120	NA	NA	35.6867	8.2339	16.7027	3.7476	1.0817	0.5680	NA	NA
Big skate	winter	42.2976	6.7874	39.2002	6.5419	NA	NA	0.0970	NA	0.1874	5.0457	NA	NA	NA	NA
	summer	42.2976	6.7874	11.0601	4.3994	NA	NA	2.1407	18.4598	0.1973	1.4062	0.0191	0.1884	NA	NA
Black rockfish	winter	1.2961	50.9838	0.0280	2.8438	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	summer	1.2961	50.9838	0.0280	2.8438	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chillipepper *	winter	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	summer	NA	NA	1.0454	0.2083	NA	NA	32.3973	10.6158	14.6067	3.1644	48.2233	8.2922	NA	NA
Dover sole	winter	49.1714	11.5797	15.0438	1.4951	NA	NA	21.6214	11.5545	8.6099	1.6646	77.9747	11.7690	NA	NA
	summer	49.1714	11.5797	24.0330	3.6058	NA	NA	0.2995	0.5399	0.1004	2.2210	0.0021	0.0434	NA	NA
Dungeness crab	winter	69.3530	6.6545	21.5559	2.2936	NA	NA	0.6198	1.8865	0.0079	0.0643	0.0013	0.0013	NA	NA
	summer	69.3530	6.6545	14.1549	1.5911	NA	NA	0.9699	0.2588	0.2488	0.2607	0.0014	0.0029	NA	NA
English sole	winter	43.6507	4.9388	13.7852	2.4282	NA	NA	0.2235	0.1851	0.0069	0.0268	0.0000	0.0000	NA	NA
	summer	43.6507	4.9388	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Green sturgeon	winter	0.0847	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	summer	0.0847	NA	10.4116	2.2801	NA	NA	2.9819	0.9640	0.5902	1.0753	0.0000	0.0000	NA	NA
Lingcod	winter	12.0166	2.7548	28.7752	2.7744	NA	NA	1.8845	5.9924	0.3878	1.8782	0.0000	0.0000	NA	NA
	summer	12.0166	2.7548	42.1066	6.7275	NA	NA	36.5189	11.0708	19.0301	3.9905	3.0156	1.5205	NA	NA
Longnose skate	winter	16.8307	7.1274	44.8872	5.1170	NA	NA	9.8719	3.1980	10.7216	1.6893	2.0400	1.9862	NA	NA
	summer	16.8307	7.1274	44.8872	5.1170	NA	NA	9.8719	3.1980	10.7216	1.6893	2.0400	1.9862	NA	NA

* Species group assignment varies according to area strata (see Appendix C).

NORTH OF 40°10' N	Depth intervals (fathoms)									
	0-50	51-75	76-100	151-200	201-300	> 300				
Other species (cont.)	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE				
Season	Denominator = Tow duration (hr)									
Longspine thornyhead	winter	NA	NA	NA	0.1785	0.1171	3.0297	0.5603	24.5230	2.5347
	summer	NA	NA	NA	0.6732	1.3946	2.5364	0.3292	16.8178	1.2121
Other flatfish	winter	NA	NA	NA	6.8745	0.6185	3.8770	0.9732	2.1731	0.2590
	summer	123.5723	2.3689	40.3739	0.9260	NA	2.0258	0.2366	2.2652	0.4072
Other groundfish	winter	NA	NA	NA	8.0296	2.6761	2.6650	0.7387	0.0383	0.2044
	summer	19.6275	7.6901	16.6552	1.9210	NA	8.8922	3.5012	1.9147	0.6574
Other nearshore rockfish	winter	NA	NA	NA	NA	NA	NA	NA	NA	NA
	summer	0.0171	0.2001	0.0056	0.3195	NA	NA	NA	NA	NA
Other nongroundfish	winter	NA	NA	NA	3.3932	0.5176	6.0719	0.2931	7.5209	0.2337
	summer	2.6187	0.3216	1.1884	0.2026	NA	5.8720	0.2850	7.1845	0.1649
Other shelf rockfish	winter	NA	NA	NA	1.7105	0.7374	0.2795	0.1852	0.0000	NA
	summer	0.0639	0.0997	5.7801	1.5832	NA	40.8854	29.5103	0.1466	0.0922
Other slope rockfish	winter	0.0000	NA	NA	19.1751	1.0345	4.2087	0.4058	0.0723	0.0468
	summer	0.0014	0.0385	0.0568	0.2066	NA	88.3299	4.2340	9.9637	0.8969
Pacific cod *	winter	4.6561	3.2418	0.4069	0.3204	NA	0.0105	0.1244	0.0000	NA
	summer	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pacific hake	winter	36.1451	8.5361	24.2578	6.0589	NA	37.5809	5.7236	43.9941	4.4242
	summer	14.0649	16.2344	2.8405	2.3627	NA	24.5316	4.8009	20.4175	5.5982
Pacific halibut	winter	19.3500	4.0297	26.3184	9.7707	NA	13.1078	4.1182	3.2090	2.0913
	summer	5.2624	0.7197	NA	NA	NA	2.1471	0.5298	0.4857	0.1761
Petrale sole	winter	10.9127	1.3610	11.5321	0.9407	NA	0.0000	NA	0.0190	0.0839
	summer	0.3079	0.1095	NA	NA	NA	5.1500	1.1372	13.8642	1.8069
Sablefish	winter	5.2473	1.0591	16.6558	2.4755	NA	18.4058	3.1290	15.8092	1.0069
	summer	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shorbelly rockfish	winter	NA	NA	NA	NA	NA	NA	NA	NA	NA
	summer	NA	NA	NA	NA	NA	3.9037	0.8037	4.0324	0.3867
Shortspine thornyhead	winter	NA	NA	0.0082	0.2718	NA	10.1876	1.0486	6.5924	0.5082
	summer	NA	NA	23.3373	7.6149	NA	92.2503	15.7870	33.0038	7.8084
Splyn dogfish	winter	37.1019	10.1577	29.8358	4.8966	NA	12.4853	8.9368	4.1287	5.8663
	summer	NA	NA	NA	NA	NA	NA	NA	NA	NA
Splitnose rockfish *	winter	NA	NA	NA	NA	NA	NA	NA	NA	NA
	summer	NA	NA	NA	NA	NA	0.8987	1.1116	11.7895	1.5207
Tanner crab	winter	NA	NA	NA	NA	NA	3.2473	1.5596	9.0744	0.8767
	summer	NA	NA	4.2897	1.0230	NA	25.4126	4.4896	7.2889	0.7985
Unspecified skate	winter	2.2405	0.2881	3.5774	0.3338	NA	7.5485	1.1074	6.8466	0.6795
	summer	0.0000	NA	NA	NA	NA	0.0000	NA	0.0168	0.1851
Yellowtail rockfish *	winter	0.1583	0.1524	1.4417	2.5175	NA	2.6331	27.8477	0.0000	0.0000
	summer	NA	NA	NA	NA	NA	NA	NA	NA	NA

* Species group assignment varies according to area strata (see Appendix C).

Table 5b: Discard ratios and standard errors from observed trips south of 40°10' N latitude in the 2007 limited entry bottom trawl fishery by season and depth. Ratios are computed as the observed discard weight divided by tow duration. Winter season is January-April and November-December and summer season is May-October. Species are grouped according to Appendix C. **Bold numbers that are shown in bold signify that data have been grouped across more than one depth interval (i.e. discard ratio of Bocaccio rockfish in the winter, in depths 0 - 75 fathoms = 4,9240).**

SOUTH OF 40°10' N	Depth intervals (fathoms)												
	0-50		51-75		76-100		151-200		201-300		> 300		
	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	
Rebuilding species	Season												
Bocaccio *	winter												
	summer	0.8096	1.9625	0.4484	3.2477	4.9240	2.1271	0.5537	NA	NA	NA	NA	NA
	winter					4.9247	2.2170	0.0444	0.3288	0.1170	NA	NA	NA
	summer					1.5069	8.7933	NA	NA	NA	NA	NA	NA
Canary rockfish	summer	0.0058	0.0808	9.9617	22.5400	0.1593	0.2126	0.0000	NA	0.0000	NA	0.0000	NA
Cowcod *	winter					NA	NA	NA	NA	NA	NA	NA	NA
	summer					NA	NA	0.1850	0.7393	2.6525	12.6119	NA	NA
Darkblotched rockfish	winter					NA	NA	0.1866	0.1252	0.1144	0.5030	0.0000	NA
	summer					NA	NA	0.0959	0.1672	0.0546	0.0481	0.0093	0.0218
Pacific ocean perch *	winter					NA	NA	NA	NA	NA	NA	NA	NA
	summer					NA	NA	NA	NA	NA	NA	NA	NA
Widow rockfish	winter					0.0468	NA	NA	NA	NA	NA	NA	NA
	summer					NA	NA	0.0341	1.1258	NA	NA	NA	NA
Yelloweye rockfish	winter					NA	NA	NA	NA	NA	NA	NA	NA
	summer					NA	NA	NA	NA	NA	NA	NA	NA
Other species	Denominator = Tow duration (hr)												
Arrowtooth flounder	winter					NA	NA	1.0861	4.2197	2.0948	1.2408	0.0797	0.2688
	summer					NA	NA	5.6602	3.7213	8.7459	14.7003	8.6648	3.2102
Big skate	winter					1.1985	NA	NA	NA	NA	NA	NA	NA
	summer					3.3173	7.5036	9.9153	49.5322	1.5914	10.5232	0.7270	1.6409
Black rockfish	winter					NA	NA	NA	NA	NA	NA	NA	NA
	summer					NA	NA	NA	NA	NA	NA	NA	NA
Chillipepper *	winter					24.8469	5.7149	0.7260	1.7584	0.0000	NA	0.0000	NA
	summer					0.0000	NA	61.5192	30.1268	112.7506	31.5902	0.1676	0.8632
Dover sole	winter					2.7994	0.5668	51.3627	10.1440	14.1493	5.5743	6.4831	2.7493
	summer					3.3713	1.1170	9.3661	1.9929	5.9539	1.4959	79.9527	38.6281
Dungeness crab	winter					0.2765	0.3369	0.5638	2.6928	NA	NA	NA	NA
	summer					16.7004	9.2423	7.4748	2.5919	6.2807	2.6885	0.1872	3.1183
English sole	winter					140.8154	14.9885	22.1673	7.0242	0.0869	0.0319	0.0036	0.0249
	summer					31.2616	4.7579	42.5316	5.7054	33.1763	5.8493	1.9406	1.8014
Green sturgeon	winter					NA	NA	NA	NA	NA	NA	NA	NA
	summer					NA	NA	NA	NA	NA	NA	NA	NA
Lingcod	winter					4.9669	0.6857	0.0232	0.1714	0.0000	NA	0.0000	NA
	summer					3.5395	3.9288	10.3413	8.7745	25.3806	7.4547	0.0918	0.2782
Longnose skate	winter					6.4761	1.1835	55.4074	15.2188	38.5039	11.6649	6.9685	1.3679
	summer					15.2477	2.6870	61.7798	8.5667	58.6698	7.3873	48.6838	15.7179

* Species group assignment varies according to area strata (see Appendix C).

SOUTH OF 40° 10' N		Depth intervals (fathoms)											
		0-50		51-75		76-100		151-200		201-300		> 300	
Other species (cont.)	Season	Discard	SE	Discard	SE	Discard	SE	Discard	SE	Discard	SE	Discard	SE
		ratio	ratio	ratio	ratio	ratio	ratio	ratio	ratio	ratio	ratio	ratio	ratio
Denominator = Tow duration (hr)													
Longspine thornyhead	winter												
	summer	NA	NA	0.0000	NA	0.0055	0.1217	0.0959	0.1296	0.9752	0.8638	4.0732	0.5428
Other flatfish	winter												
	summer	78.4726	3.8883	103.7823	4.2333	37.4011	1.4140	24.0915	3.1399	4.6041	0.8131	15.5601	1.8053
Other groundfish	winter												
	summer	3.6604	2.4913	14.7406	5.4671	30.7594	17.0427	16.2180	2.9091	1.0993	0.3286	5.4787	0.7299
Other nearshore rockfish	winter												
	summer	0.0092	0.0369	0.0000	NA	0.0905	0.4836	0.0000	NA	0.0000	NA	0.0000	NA
Other nongroundfish	winter												
	summer	4.8954	0.2257	26.8762	1.5480	3.4344	0.1357	4.1218	0.3230	5.2896	0.2649	8.7542	0.2250
Other shelf rockfish	winter												
	summer	0.7627	2.2504	13.1623	2.8694	14.5883	1.5981	0.0394	0.0509	0.0766	0.0991	0.0000	NA
Other slope rockfish	winter												
	summer	0.0000	NA	0.0000	NA	0.3015	0.3432	24.3410	8.0979	3.0869	0.4141	1.4868	1.9970
Pacific cod *	winter												
	summer	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pacific hake	winter												
	summer	17.1911	15.2743	31.4594	20.3356	0.1719	0.7278	78.1980	16.9350	222.0806	57.9473	4.8918	2.5503
Pacific halibut	winter												
	summer	NA	NA	0.1907	NA	15.0970	7.3465	0.7015	2.9653	0.8191	2.3559	NA	NA
Petrale sole	winter												
	summer	2.5564	0.4344	64.3076	34.0233	15.6137	1.6061	8.1530	2.5614	0.0823	0.0498	0.0292	0.2253
Sablefish	winter												
	summer	NA	NA	0.0488	0.0996	NA	NA	10.3813	7.1373	0.2184	0.0858	3.4022	0.7060
Shorbelly rockfish	winter												
	summer	NA	NA	0.0068	NA	0.3749	1.9148	NA	NA	NA	NA	NA	NA
Shortspine thornyhead	winter												
	summer	NA	NA	NA	NA	NA	NA	0.9051	0.2880	2.4058	0.5837	0.5259	0.5029
Spiny dogfish	winter												
	summer	1.8050	1.2360	13.9657	6.6069	3.8981	6.0499	33.2147	13.7648	53.6105	23.6506	0.0284	0.4818
Splitnose rockfish *	winter												
	summer	NA	NA	0.0000	NA	NA	NA	71.2069	11.5333	26.2548	3.9464	0.0062	0.0108
Tanner crab	winter												
	summer	NA	NA	0.2392	NA	0.0082	NA	0.6536	1.5240	18.1769	10.9635	67.0735	12.1055
Unspecified skate	winter												
	summer	26.5287	3.0237	10.9725	1.9911	4.4764	1.7137	70.2964	11.3854	20.7191	15.0852	10.6378	4.9085
Yellowtail rockfish *	winter												
	summer	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

* Species group assignment varies according to area strata (see Appendix C).

Table 6a: Bycatch ratios and standard errors from observed trips north of 40°10' N latitude in the 2007 limited entry bottom trawl fishery by season and depth. Ratios are computed as the observed total catch weight divided by the weight of retained FMP groundfish species (excluding Pacific hake). Winter season is January-April and November-December and summer season is May-October. Species are grouped according to Appendix C. **Bold numbers signify that data have been grouped across more than one depth interval (i.e. bycatch ratio of Canary rockfish in the winter, in depths 0 - 75 fathoms = 0.0010).**

Rebuilding species	Season	Depth intervals (fathoms)												
		0-50		51-75		76-100		151-200		201-300		> 300		
		Bycatch ratio	SE	Bycatch ratio	SE	Bycatch ratio	SE	Bycatch ratio	SE	Bycatch ratio	SE	Bycatch ratio	SE	
Denominator = Retained groundfish (mt)														
Bocaccio *	winter	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	summer	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Canary rockfish	winter	0.0008	0.0890	0.0010	0.0174	NA	NA	0.0001	0.0238	0.0000	0.0232	NA	NA	NA
	summer	0.0008	0.0890	0.0065	0.4710	NA	NA	0.0000	NA	0.0000	NA	NA	NA	NA
Cowcod *	winter	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	summer	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Darkblotched rockfish	winter	0.0003	0.0255	0.0007	0.0060	NA	NA	0.0373	0.1436	0.0125	0.0483	0.0039	0.0358	0.0358
	summer	0.0003	0.0255	0.0013	0.0129	NA	NA	0.0395	0.1846	0.0098	0.0722	0.0023	0.0120	0.0120
Pacific ocean perch *	winter	NA	NA	0.0002	0.0517	NA	NA	0.0215	0.1603	0.0038	0.0731	0.0007	0.0255	0.0255
	summer	NA	NA	0.0002	0.0049	NA	NA	0.0461	0.3247	0.0069	0.1134	0.0008	0.0223	0.0223
W/dow rockfish	winter	0.0001	0.0142	0.0002	0.0144	NA	NA	0.0014	0.0418	0.0002	0.0077	0.0001	0.0261	0.0261
	summer	0.0001	0.0142	0.0002	0.0049	NA	NA	0.0093	1.7990	0.0000	0.0220	0.0000	0.0040	0.0040
Yelloweye rockfish	winter	0.0000	0.0034	0.0000	0.0006	NA	NA	NA	NA	NA	NA	NA	NA	NA
	summer	0.0000	0.0034	0.0000	0.0006	NA	NA	NA	NA	NA	NA	NA	NA	NA
Denominator = Retained groundfish (mt)														
Arrowtooth flounder	winter	0.1549	0.4615	0.0573	0.5369	NA	NA	0.1960	0.6732	0.2022	0.4046	0.0614	0.4772	0.4772
	summer	0.1549	0.4615	0.2361	0.4939	NA	NA	0.4531	2.0278	0.0851	0.2238	0.0101	0.0912	0.0912
Big skate	winter	0.1003	0.3711	0.1271	0.5893	NA	NA	0.0001	NA	0.0002	0.1144	NA	NA	NA
	summer	0.1003	0.3711	0.0187	0.1728	NA	NA	0.0024	0.5532	0.0003	0.0477	0.0000	0.0107	0.0107
Black rockfish	winter	0.0037	2.3900	0.0001	0.0511	NA	NA	NA	NA	NA	NA	NA	NA	NA
	summer	0.0037	2.3900	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chillipepper *	winter	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	summer	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dover sole	winter	0.2953	0.6863	0.0367	0.2098	NA	NA	0.2333	1.5164	0.5496	0.8403	0.5952	1.6770	1.6770
	summer	0.2953	0.6863	0.4431	0.5646	NA	NA	0.3320	1.2409	0.6147	0.7602	0.4135	0.8167	0.8167
Dungeness crab	winter	0.1595	0.3696	0.0779	0.3307	NA	NA	0.0003	0.0152	0.0001	0.0502	0.0000	0.0016	0.0016
	summer	0.1595	0.3696	0.0353	0.0943	NA	NA	0.0007	0.0561	0.0000	0.0022	0.0000	NA	NA
English sole	winter	0.3513	0.4969	0.2653	0.5519	NA	NA	0.0427	0.1691	0.0027	0.0328	0.0011	0.0204	0.0204
	summer	0.3513	0.4969	0.0974	0.2192	NA	NA	0.0037	0.0682	0.0004	0.0196	0.0003	0.0064	0.0064
Green sturgeon	winter	0.0002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	summer	0.0002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lingcod	winter	0.0382	0.1548	0.0840	0.3477	NA	NA	0.0149	0.1045	0.0021	0.0304	0.0003	0.0058	0.0058
	summer	0.0382	0.1548	0.0663	0.1198	NA	NA	0.0046	0.1817	0.0028	0.1877	0.0001	0.0125	0.0125
Longnose skate	winter	0.0387	0.3802	0.1365	0.6187	NA	NA	0.0384	0.3261	0.0182	0.0950	0.0052	0.0576	0.0576
	summer	0.0387	0.3802	0.0736	0.2097	NA	NA	0.0113	0.1050	0.0162	0.0614	0.0052	0.1122	0.1122

* Species group assignment varies according to area strata (see Appendix C).

NORTH OF 40°10' N	Depth intervals (fathoms)												
	0-50		51-75		76-100		151-200		201-300		> 300		
Other species (cont.)	Season	Bycatch ratio	SE	Bycatch ratio	SE	Bycatch ratio	SE	Bycatch ratio	SE	Bycatch ratio	SE	Bycatch ratio	SE
Denominator = Retained groundfish (mt)													
Longspine thornyhead	winter	NA	NA	NA	NA	NA	NA	0.0024	0.0524	0.0072	0.0201	0.1495	0.2891
	summer	NA	NA	NA	NA	NA	NA	0.0032	0.1224	0.0168	0.0523	0.3330	0.3605
Other flatfish	winter	0.5679	0.1772	0.2799	0.1868	NA	NA	0.0251	0.0452	0.0239	0.0448	0.0154	0.0407
	summer	0.5679	0.1772	0.1324	0.0612	NA	NA	0.0264	0.0938	0.0361	0.0437	0.0209	0.0296
Other groundfish	winter	0.0451	0.4075	0.1814	0.7545	NA	NA	0.0085	0.0763	0.0025	0.0176	0.0001	0.0067
	summer	0.0451	0.4075	0.0273	0.0779	NA	NA	0.0102	0.1098	0.0027	0.0228	0.0000	0.0132
Other nearshore rockfish	winter	0.0002	0.0751	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	summer	0.0002	0.0751	0.0000	0.0456	NA	NA	NA	NA	NA	NA	NA	NA
Other nongroundfish	winter	0.0070	0.0173	0.0050	0.0153	NA	NA	0.0078	0.0460	0.0075	0.0123	0.0122	0.0101
	summer	0.0070	0.0173	0.0026	0.0119	NA	NA	0.0076	0.0114	0.0106	0.0063	0.0283	0.0117
Other shelf rockfish	winter	0.0005	0.0071	0.0019	0.0269	NA	NA	0.00472	0.8723	0.0010	0.0487	0.0002	0.0216
	summer	0.0005	0.0071	0.0102	0.0615	NA	NA	0.00472	0.8723	0.0010	0.0487	0.0002	0.0216
Other slope rockfish	winter	0.0001	0.0071	0.0000	NA	NA	NA	0.0409	0.0475	0.0166	0.0358	0.0041	0.0517
	summer	0.0001	0.0071	0.0013	0.0331	NA	NA	0.1371	0.1663	0.0274	0.0361	0.0051	0.0206
Pacific cod *	winter	0.0142	0.1758	0.0004	0.0159	NA	NA	NA	NA	NA	NA	NA	NA
	summer	0.0142	0.1758	0.0103	0.1972	NA	NA	0.0945	0.4634	0.0426	0.1348	0.0109	0.0881
Pacific hake	winter	0.0831	0.4563	0.0456	1.3502	NA	NA	0.0258	0.2082	0.0645	0.1696	0.0149	0.1497
	summer	0.0831	0.4563	0.0398	0.2342	NA	NA	0.0429	0.2082	0.0645	0.1696	0.0149	0.1497
Pacific halibut	winter	0.0445	0.2209	0.0092	0.2025	NA	NA	0.0150	0.1423	0.0195	0.1316	0.0028	0.3098
	summer	0.0445	0.2209	0.0431	0.3754	NA	NA	0.0150	0.1437	0.0046	0.0731	0.0002	0.0360
Petrale sole	winter	0.1814	0.2591	0.4356	1.0675	NA	NA	0.4271	1.2048	0.0756	0.2945	0.0019	0.0599
	summer	0.1814	0.2591	0.1977	0.2198	NA	NA	0.0017	0.0476	0.0023	0.0784	0.0001	0.0038
Sablefish	winter	0.0145	0.0564	0.0026	0.0124	NA	NA	0.0408	0.2068	0.1136	0.1591	0.2472	0.5377
	summer	0.0145	0.0564	0.0479	0.1258	NA	NA	0.1041	0.3283	0.1817	0.1847	0.3431	0.3967
Shortbelly rockfish	winter	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	summer	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shortspine thornyhead	winter	NA	NA	NA	NA	NA	NA	0.0187	0.0760	0.0375	0.0474	0.0863	0.1529
	summer	NA	NA	0.0002	0.2335	NA	NA	0.0730	0.1668	0.0732	0.0685	0.1159	0.1429
Spiny dogfish	winter	0.0853	0.5407	0.0757	0.6555	NA	NA	0.0971	0.4677	0.0328	0.1829	0.0016	0.0302
	summer	0.0853	0.5407	0.0490	0.1924	NA	NA	0.0142	0.2745	0.0059	0.1982	0.0001	0.0161
Splitnose rockfish *	winter	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	summer	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tanner crab	winter	NA	NA	NA	NA	NA	NA	0.0009	0.0307	0.0112	0.0375	0.0729	0.2353
	summer	NA	NA	0.0724	0.5909	NA	NA	0.0037	0.0504	0.0129	0.0330	0.0773	0.1339
Unspecified skate	winter	0.1487	0.2985	0.1443	0.2402	NA	NA	0.0631	0.1735	0.0364	0.0495	0.0223	0.0610
	summer	0.1487	0.2985	0.0033	0.4378	NA	NA	0.0595	0.2059	0.0598	0.0684	0.0176	0.0406
Yellowtail rockfish *	winter	0.0015	0.0209	0.0033	0.4378	NA	NA	0.0000	0.0079	0.0000	0.0038	0.0000	0.0066
	summer	0.0015	0.0209	0.0035	0.0959	NA	NA	0.0037	0.8242	0.0000	0.0004	0.0000	0.0003

* Species group assignment varies according to area strata (see Appendix C).

Table 6b: Bycatch ratios and standard errors from observed trips south of 40°10' N latitude in the 2007 limited entry bottom trawl fishery by season and depth. Ratios are computed as the observed total catch weight divided by the weight of retained FMP groundfish species (excluding Pacific hake). Winter season is January-April and November-December and summer season is May-October. Species are grouped according to Appendix C. **Bold numbers signify that data have been grouped across more than one depth interval (i.e. discard ratio of Bocaccio rockfish in the winter, in depths 0 - 100 fathoms = 0.0091).**

Rebuilding species	Season	Depth Intervals (fathoms)															
		0-50		51-75		76-100		151-200		201-300		> 300					
		Bycatch ratio	SE	Bycatch ratio	SE	Bycatch ratio	SE	Bycatch ratio	SE	Bycatch ratio	SE	Bycatch ratio	SE				
Bocaccio *	winter	0.0035	0.1993	0.0009	0.1567	0.0091	0.1027	0.0008	NA	NA	NA	NA	NA	NA			
	summer					0.0107	0.1046	0.0074	0.3552	0.0002	NA	NA	NA	NA			
Canary rockfish	winter					0.0028	0.3462	NA	NA	NA	NA	NA	NA	NA			
	summer	0.0002	0.0373	0.0217	1.0643	0.0025	0.0166	0.0002	0.0144	0.0000	0.0033	0.0001	NA	NA			
Cowcod *	winter					NA	NA	NA	NA	NA	NA	NA	NA	NA			
	summer					0.0004	0.0335	0.0034	0.2694	NA	NA	NA	NA	NA			
Darkblotched rockfish	winter					NA	NA	0.0063	0.2336	0.0023	0.1939	0.0016	NA	NA			
	summer					NA	NA	0.0017	0.0346	0.0276	0.2021	0.0130	0.6726	0.0059			
Pacific ocean perch *	winter					NA	NA	NA	NA	NA	NA	NA	NA	NA			
	summer					0.0001	NA	NA	NA	NA	NA	NA	NA	NA			
Widow rockfish	winter					0.0001	NA	NA	NA	NA	NA	NA	NA	NA			
	summer					NA	NA	0.0001	0.0140	NA	NA	NA	NA	NA			
Yelloweye rockfish	winter					NA	NA	NA	NA	NA	NA	NA	NA	NA			
	summer					NA	NA	NA	NA	NA	NA	NA	NA	NA			
Other species						Denominator = Retained groundfish (mt)											
Arrowtooth flounder	winter					NA	NA	0.0016	0.1396	0.0031	0.0434	0.0001	0.0096	NA			
	summer					NA	NA	0.0124	0.1726	0.0143	0.3094	0.0151	0.1047	0.0004			
Big skate	winter					0.0022	NA	NA	NA	NA	NA	NA	NA	NA			
	summer	0.0142	0.7338	0.0197	2.3255	0.0034	0.4739	0.0009	0.0503	NA	NA	NA	NA	NA			
Black rockfish	winter					NA	NA	NA	NA	NA	NA	NA	NA	NA			
	summer					NA	NA	NA	NA	NA	NA	NA	NA	NA			
Chillipepper *	winter					0.0706	0.3130	0.0207	0.4239	0.0001	NA	NA	NA	NA			
	summer	0.0006	0.0749	0.1493	1.8231	0.2749	1.4407	0.0692	4.4889	0.0000	NA	NA	0.0000	NA			
Dover sole	winter					0.0052	0.0285	0.1071	0.4196	0.3053	1.1053	0.6077	1.5832	NA			
	summer	0.0170	0.1102	0.0202	0.1473	0.1464	0.5271	0.5348	2.5533	0.7106	1.6191	0.4118	1.0594	NA			
Dungeness crab	winter					0.0005	0.0190	0.0008	0.0876	NA	NA	NA	NA	NA			
	summer	0.0716	0.8659	0.0149	0.1841	0.0136	0.1304	0.0002	0.0652	NA	NA	NA	NA	NA			
English sole	winter					0.5019	0.9565	0.0694	0.2846	0.0236	0.1727	0.0009	0.0427	NA			
	summer	0.2111	0.5579	0.1702	0.6694	0.1036	0.3136	0.0101	0.0918	0.0015	0.1810	0.0002	0.0314	NA			
Green sturgeon	winter					NA	NA	NA	NA	NA	NA	NA	NA	NA			
	summer					NA	NA	NA	NA	NA	NA	NA	NA	NA			
Lingcod	winter					0.0381	0.1094	0.0007	0.0344	0.0132	0.1778	0.0001	0.0095	NA			
	summer	0.0270	0.3867	0.0563	0.7368	0.0857	0.3669	0.0429	0.7197	0.0036	0.1585	0.0000	0.0015	NA			
Longnose skate	winter					0.0120	0.0610	0.0813	0.5542	0.0570	0.4141	0.0098	0.0424	NA			
	summer	0.0654	0.3294	0.1228	0.8805	0.1269	0.4074	0.0630	0.3703	0.0693	0.2845	0.0130	0.3252	NA			

* Species group assignment varies according to area strata (see Appendix C).

SOUTH OF 40°10' N		Depth intervals (fathoms)											
		0-50		51-75		76-100		151-200		201-300		> 300	
Other species (cont.)	Season	Bycatch	SE	Bycatch	SE	Bycatch	SE	Bycatch	SE	Bycatch	SE	Bycatch	SE
		ratio	ratio	ratio	ratio	ratio	ratio	ratio	ratio	ratio	ratio	ratio	ratio
Denominator = Retained groundfish (m)													
Longspine thornyhead	winter	NA	NA	0.0000	NA	0.0001	0.0139	0.0015	0.0552	0.0132	0.2111	0.1814	0.3078
	summer	NA	NA	0.0000	NA	0.0001	0.0139	0.0022	0.0675	0.0205	0.0916	0.3556	0.5629
Other flatfish	winter	0.8349	0.7581	0.3587	0.5500	0.0856	0.0903	0.0556	0.1513	0.0855	0.3151	0.0075	0.0809
	summer	0.8349	0.7581	0.3587	0.5500	0.0284	0.0554	0.0225	0.0865	0.0261	0.0732	0.0188	0.0632
Other groundfish	winter	0.0144	0.2340	0.0293	0.3559	0.0571	0.6851	0.0356	0.1753	0.0026	0.0299	0.0010	0.0723
	summer	0.0144	0.2340	0.0293	0.3559	0.1412	0.8390	0.0612	0.3250	0.0150	0.1098	0.0011	0.0157
Other nearshore rockfish	winter	0.0030	0.1068	0.0005	0.0186	NA	NA	NA	NA	0.0002	0.0124	0.0003	0.0083
	summer	0.0030	0.1068	0.0005	0.0186	0.0012	0.0270	0.0000	0.0124	0.0004	0.0248	0.0001	NA
Other nongroundfish	winter	0.0274	0.0314	0.0596	0.1172	0.0116	0.0238	0.0344	0.1735	0.0501	0.1032	0.0137	0.0091
	summer	0.0274	0.0314	0.0596	0.1172	0.0158	0.2537	0.0145	0.0564	0.0346	0.0671	0.0452	0.0370
Other shelf rockfish	winter	0.0045	0.1994	0.0418	0.2613	0.0271	0.0763	0.0001	0.0065	0.0008	0.0241	0.0000	NA
	summer	0.0045	0.1994	0.0418	0.2613	0.0275	0.0624	0.0201	0.1459	0.0008	0.0241	0.0001	0.0542
Other slope rockfish	winter	0.0001	NA	0.0020	0.0528	0.0031	0.0267	0.0919	0.4599	0.0644	0.1894	0.0083	0.0955
	summer	0.0001	NA	0.0020	0.0528	0.0031	0.0267	0.3477	0.9769	0.0297	0.0838	0.0350	0.4075
Pacific cod *	winter	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	summer	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pacific hake	winter	0.0737	1.4347	0.0625	1.1383	0.0993	0.4215	0.1274	0.8745	0.1452	0.7953	0.0048	0.1378
	summer	0.0737	1.4347	0.0625	1.1383	0.0993	0.4215	0.1274	0.8745	0.1452	0.7953	0.0048	0.1378
Pacific halibut	winter	NA	NA	0.0004	NA	0.0327	0.3573	0.0009	0.0658	0.0011	0.0759	NA	NA
	summer	NA	NA	0.0004	NA	0.0327	0.3573	0.0009	0.0658	0.0011	0.0759	NA	NA
Petrale sole	winter	0.4108	1.4107	0.7972	4.9658	0.6548	1.5211	0.0853	0.5905	0.1283	0.6410	0.1400	0.3458
	summer	0.4108	1.4107	0.7972	4.9658	0.6548	1.5211	0.0378	0.5842	0.0216	0.7605	0.0002	0.0147
Sablefish	winter	NA	NA	0.0069	0.7289	0.1004	0.6899	0.1001	0.6409	0.1641	0.4309	0.2314	0.5848
	summer	NA	NA	0.0069	0.7289	0.1004	0.6899	0.1001	0.6409	0.1641	0.4309	0.2314	0.5848
Shortbelly rockfish	winter	NA	NA	0.0000	NA	0.0007	0.0757	NA	NA	NA	NA	NA	NA
	summer	NA	NA	0.0000	NA	0.0008	0.0160	NA	NA	NA	NA	NA	NA
Shortspine thornyhead	winter	NA	NA	NA	NA	NA	NA	0.0023	0.0139	0.0347	0.1772	0.0545	0.1416
	summer	NA	NA	NA	NA	NA	NA	0.0149	0.1416	0.0325	0.0726	0.0822	0.2037
Spiny dogfish	winter	0.0077	0.1246	0.0278	0.3737	0.0519	0.4369	0.0358	0.3610	0.0046	0.0856	0.0002	0.0253
	summer	0.0077	0.1246	0.0278	0.3737	0.0519	0.4369	0.0358	0.3610	0.0046	0.0856	0.0002	0.0253
Splitnose rockfish *	winter	NA	NA	0.0000	NA	0.0033	0.0761	0.1585	0.5039	0.0949	0.2193	0.0222	0.2136
	summer	NA	NA	0.0000	NA	0.0033	0.0761	0.1585	0.5039	0.0949	0.2193	0.0222	0.2136
Tanner crab	winter	NA	NA	0.0005	NA	0.0000	NA	0.0010	0.0493	0.0269	0.3832	0.0942	0.3579
	summer	NA	NA	0.0005	NA	0.0000	NA	0.0010	0.0493	0.0269	0.3832	0.0942	0.3579
Unspecified skate	winter	0.1191	0.3512	0.0256	0.2004	0.0834	0.2976	0.1119	0.4333	0.0315	0.5103	0.0149	0.1284
	summer	0.1191	0.3512	0.0256	0.2004	0.0834	0.2976	0.1119	0.4333	0.0315	0.5103	0.0149	0.1284
Yellowtail rockfish *	winter	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	summer	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

* Species group assignment varies according to area strata (see Appendix C).

Table 7: Summary of the number of length measurements and the number of individual fish sexed by WCGOP observers in the LE groundfish bottom trawl fishery from September 2003 through April 2008. The date range of biological data for each species is also provided. Biological data is only summarized for species with more than 30 observations.

	Years available	# lengths	# sexes
Rebuilding species			
Bocaccio	2004 - Apr 2008	1142	633
Canary rockfish	2004 - Apr 2008	2088	1427
Cowcod	2004 - 2007	251	133
Darkblotched rockfish	Sep 2003 - Apr 2008	3595	1765
Pacific ocean perch	2004 - Apr 2008	1654	598
Widow rockfish	2004 - Apr 2008	287	119
Yelloweye rockfish	Sep 2003 - 2007	124	90
Other species			
Arrowtooth flounder	2006 - Apr 2008	3365	1
Aurora rockfish	2004, 2006 - Apr 2008	1776	3
Blackgill rockfish	2004 - Apr 2008	205	5
Chilipepper rockfish	2004, 2006 - Apr 2008	567	6
Dover sole	2006 - Apr 2008	3867	0
Dungeness crab	2007 - Apr 2008	824	811
English sole	2006 - Apr 2008	1965	0
Greenstriped rockfish	2005 - Apr 2008	800	6
Lingcod	2004 - Apr 2008	6210	480
Longnose skate	2006 - Apr 2008	4341	4172
Longspine thornyhead	2006 - Apr 2008	2183	0
Pacific halibut	Sep 2003 - Apr 2008	2919	0
Pacific sanddab	2006 - Apr 2008	1641	0
Petrable sole	2006 - Apr 2008	1544	1079
Redbanded rockfish	2006 - Apr 2008	753	0
Rosethorn rockfish	2007 - Apr 2008	33	0
Rougheye rockfish	2004 - Apr 2008	739	79
Sablefish	2004 - Apr 2008	2336	153
Shortraker	2004 - Apr 2008	224	28
Shortspine thornyhead	2006 - Apr 2008	2395	4
Silvergray rockfish	2004 - Apr 2008	74	25
Spiny dogfish	2006 - Apr 2008	3504	3442
Splitnose rockfish	2004, 2006 - Apr 2008	1496	1
Starry flounder	2006 - Apr 2008	88	0
Stripetail rockfish	2006 - Apr 2008	395	0
Unspecified skate	2007 - Apr 2008	104	104
Yellowtail rockfish	2004, 2006 - Apr 2008	76	0

Table 8: Summary of biological data for protected resources collected by WCGOP observers in the LE groundfish bottom trawl fishery from September 2003 through April 2008. The number of length measurements and the number of individuals sexed is reported for each year where data are available.

	# lengths	# sexes
Salmon		
Chinook salmon		
Sep - Dec 2003	8	8
2004	265	254
2005	112	99
2006	9	9
2007	28	28
Jan - Apr 2008	52	51
Chum salmon		
2003	1	0
2004	1	1
Coho salmon		
2004	5	5
2005	1	1
2007	2	1
Unidentified salmon		
2004	3	3

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 Scorpaenidae, even if not listed, that occur in the Washington, Oregon, and California area. The Scorpaenidae 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. crameri*
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 4-6).

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40° 10' N latitude	Species Group - South of 40° 10' N latitude	FMP Groundfish
ALBC	ALBACORE	Other nongroundfish	Other nongroundfish	
APLC	ALASKA PLAICE	Other flatfish	Other 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	Other slope rockfish	yes
BCAC	BOCACCIO	Other shelf rockfish	Bocaccio	yes
BCC1	NOM. BOCACCIO	Other shelf rockfish	Bocaccio	yes
BCLM	BUTTER CLAM	Other nongroundfish	Other nongroundfish	
BGL1	NOM. BLACKGILL ROCKFISH	Other slope rockfish	Other slope rockfish	yes
BKCR	BLUE KING CRAB	Other nongroundfish	Other nongroundfish	
BLCK	BLACK ROCKFISH	Black rockfish	Black rockfish	yes
BLGL	BLACKGILL ROCKFISH	Other slope rockfish	Other slope 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 MACKERAL	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	Other slope 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 RF	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 RF	Other nearshore rockfish	Other nearshore rockfish	yes
CBZ1	NOM. 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 Groundfish
CBZN	CABEZON	Other groundfish	Cabezon	yes
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	Other shelf rockfish	Chilipepper	yes
CLPR	CHILIPEPPER	Other shelf rockfish	Chilipepper	yes
CMCK	CHUB MACKERAL	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 flatfish	Other 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	
DLFT	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 flatfish	Other flatfish	
DSRK	SPINY DOGFISH	Spiny dogfish	Spiny dogfish	yes
DTRB	DIAMOND TURBOT	Other flatfish	Other 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

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40° 10' N latitude	Species Group - South of 40° 10' N latitude	FMP Groundfish
EGLS	ENGLISH SOLE	English sole	English sole	yes
ESTR	EASTERN OYSTER	Other nongroundfish	Other nongroundfish	
ETNA	BIGEYE TUNA	Other nongroundfish	Other nongroundfish	
EULC	EULACHON	Other nongroundfish	Other nongroundfish	
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 flatfish	Other 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 RF	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	Other nearshore rockfish	yes
GPHR	GOPHER ROCKFISH	Other nearshore rockfish	Other nearshore 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 ROCKFISH	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 flatfish	Other 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	HORNHEAD TURBOT	Other flatfish	Other flatfish	
ISRK	BIGEYE THRESHER SHARK	Other nongroundfish	Other nongroundfish	
JCLM	CALIFORNIA JACKKNIFE CLAM	Other nongroundfish	Other nongroundfish	
JMCK	JACK MACKERAL	Other nongroundfish	Other nongroundfish	
KFSH	GIANT KELPFISH	Other nongroundfish	Other nongroundfish	
KGL1	NOM. KELP GREENLING	Other groundfish	Other groundfish	yes
KLP1	NOM. KELP ROCKFISH	Other nearshore rockfish	Other nearshore 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 Groundfish
KLPG	KELP GREENLING	Other groundfish	Other groundfish	yes
KLPR	KELP ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
KMKA	KAMCHATKA FLOUNDER	Other flatfish	Other flatfish	
KSTR	KUMAMOTO OYSTER	Other nongroundfish	Other nongroundfish	
LCD1	NOM. LINGCOD	Lingcod	Lingcod	yes
LCLM	NATIVE LITTLENECK	Other nongroundfish	Other nongroundfish	
LCOD	LINGCOD	Lingcod	Lingcod	yes
LDAB	LONGFIN SANDDAB	Other flatfish	Other flatfish	
LDB1	NOM. LONGFIN SANDDAB	Other flatfish	Other flatfish	
LOBS	CALIFORNIA 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 RF	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 RF	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	

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40° 10' N latitude	Species Group - South of 40° 10' N latitude	FMP Groundfish
OCTP	UNSP. OCTOPUS	Other nongroundfish	Other nongroundfish	
ODSR	OTHER DEMERSAL ROCKFISH	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	
OPLG	OTHER PELAGIC ROCKFISH	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 ROUND FISH	Other groundfish	Other groundfish	yes
OSCL	OTHER SCALLOP	Other nongroundfish	Other nongroundfish	
OSKT	OTHER SKATES	Unspecified skate	Unspecified skate	yes
OSLR	OTHER SLOPE ROCKFISH	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	OPILIO TANNER CRAB	Tanner crab	Tanner crab	
OTNA	OTHER TUNA	Other nongroundfish	Other nongroundfish	
OURC	OTHER SEA URCHIN	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	PYGMY 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 ROCKFISH	Other slope rockfish	Other slope rockfish	yes
POP2	NOM. PACIFIC OCEAN PERCH	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

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40° 10' N latitude	Species Group - South of 40° 10' N latitude	FMP Groundfish
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 (HAKE)	Pacific hake	Pacific hake	yes
QCLM	NORTHERN QUAHOG CLAM	Other nongroundfish	Other nongroundfish	
QFSH	QUEENFISH	Other nongroundfish	Other nongroundfish	
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	BOCACCIIO+CHILIPEPPER RF	Other shelf rockfish	Other shelf rockfish	yes
RCK2	UNSP. BOLINA ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
RCK3	UNSP. DPWTR REDS ROCKFISH	Other slope rockfish	Other slope rockfish	yes
RCK4	UNSP. REDS ROCKFISH	Other groundfish	Other groundfish	yes
RCK5	UNSP. SMALL REDS ROCKFISH	Other groundfish	Other groundfish	yes
RCK6	UNSP. ROSEFISH ROCKFISH	Other groundfish	Other groundfish	yes
RCK7	UNSP. GOPHER ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
RCK8	CANARY+VERMILION ROCKFISH	Canary rockfish	Canary rockfish	yes
RCK9	BLACK+BLUE ROCKFISH	Other nearshore rockfish	Other nearshore 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	Other shelf 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

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40° 10' N latitude	Species Group - South of 40° 10' N latitude	FMP Groundfish
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	
SCOR	CALIFORNIA SCORPIONFISH	Other groundfish	Other nearshore rockfish	yes
SCR1	NOM. CALIFORNIA SCORPIONFISH	Other groundfish	Other nearshore rockfish	yes
SDB1	NOM. SPECKLED SANDDAB	Other flatfish	Other flatfish	
SFL1	NOM. STARRY FLOUNDER	Other flatfish	Other flatfish	yes
SFLT	UNSP. SHALLOW FLOUNDERS	Other flatfish	Other flatfish	yes
SHAD	UNSPECIFIED SHAD	Other nongroundfish	Other nongroundfish	
SHPI	NOM. CALIFORNIA SHEEPHEAD	Other nongroundfish	Other nongroundfish	
SHPD	CALIFORNIA SHEEPHEAD	Other nongroundfish	Other nongroundfish	
SHRP	SHARPCHIN ROCKFISH	Other slope rockfish	Other slope rockfish	yes
SKCR	SCARLET KING CRAB	Other nongroundfish	Other nongroundfish	
SLGR	SILVERGREY ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
SLNS	SLENDER SOLE	Other flatfish	Other flatfish	
SMLT	UNSP. SMELT	Other nongroundfish	Other nongroundfish	
SNOS	SPLITNOSE ROCKFISH	Other slope rockfish	Splitnose rockfish	yes
SNS1	NOM. SPLITNOSE ROCKFISH	Other slope 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 flatfish	Other flatfish	
SSHR	SOUTHERN NEAR-SHORE RF	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

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40° 10' N latitude	Species Group - South of 40° 10' N latitude	FMP Groundfish
SSP1	NOM. SHORTSPINE THORNYHEAD	Shortspine thornyhead	Shortspine thornyhead	yes
SSPN	SHORTSPINE THORNYHEAD	Shortspine thornyhead	Shortspine thornyhead	yes
SSRD	DEEP SO. NEAR-SHORE RF	Other nearshore rockfish	Other nearshore rockfish	yes
SSRK	SOUPFIN SHARK	Other groundfish	Other groundfish	yes
SSRS	SHALLOW SO. NEAR-SHORE RF	Other nearshore rockfish	Other nearshore rockfish	yes
STAR	STARRY ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
STL1	NOM. STRIPETAILED 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	STRIPETAILED ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
STRY	STARRY FLOUNDER	Other flatfish	Other flatfish	yes
SUSF	SO. UNSP. SHELF ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
SUSP	SO. UNSP. SLOPE ROCKFISH	Other slope rockfish	Other slope rockfish	yes
SUSR	SO. UNSP. NEAR-SHORE RF	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	Shortspine thornyhead (60%)	Shortspine thornyhead (60%)	yes
THD1	NOM. THORNYHEADS	Longspine thornyhead (40%)	Longspine thornyhead (40%)	yes
THDS	THORNYHEADS (MIXED)	Shortspine thornyhead (60%)	Shortspine thornyhead (60%)	yes
THDS	THORNYHEADS (MIXED)	Longspine thornyhead (40%)	Longspine thornyhead (40%)	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 ROCKFISH	Other groundfish	Other groundfish	yes
UDW1	SHORTTRAKER+ROUGHEYE RF	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	Unspecified grenadiers	Unspecified grenadiers	yes
UHAG	UNSP. HAGFISH	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 Groundfish
UHLB	UNSP. HALIBUT	Other nongroundfish	Other nongroundfish	
UJEL	UNSP. JELLYFISH	Other nongroundfish	Other nongroundfish	
UKCR	UNSP. KING CRAB	Other nongroundfish	Other nongroundfish	
UMCK	UNSP. MACKERAL	Other nongroundfish	Other nongroundfish	
UMSK	UNSP. MOLLUSKS	Other nongroundfish	Other nongroundfish	
UPLG	UNSP. PELAGIC ROCKFISH	Other groundfish	Other groundfish	yes
UPOP	UNSP. POP GROUP	Pacific ocean perch	Other slope rockfish	yes
URCK	UNSP. ROCKFISH	Other shelf rockfish (<150 fm)	Other shelf rockfish (<150 fm)	yes
URCK	UNSP. ROCKFISH	Other slope rockfish (>150 fm)	Other slope rockfish (>150 fm)	yes
URK1	SRKR+REYE+NRCK+SHRP	Other slope rockfish	Other slope rockfish	yes
URND	UNSP. ROUNDFISH	Other groundfish	Other groundfish	yes
USCL	UNSP. SCALLOP	Other nongroundfish	Other nongroundfish	
USCU	UNSP. SEA CUCUMBER	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
USLR	UNSP. SLOPE ROCKFISH	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	UNSP. OYSTER	Other nongroundfish	Other nongroundfish	
UTCR	UNSP. TANNER CRAB	Tanner crab	Tanner crab	
UTNA	UNSP. TUNA	Other nongroundfish	Other nongroundfish	
UTRB	UNSP. TURBOTS	Other flatfish	Other flatfish	yes
UURC	UNSP. SEA URCHIN	Other nongroundfish	Other nongroundfish	
VRM1	NOM. VERMILLION ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
VRML	VERMILLION 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

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40° 10' N latitude	Species Group - South of 40° 10' N latitude	FMP Groundfish
YLTL	YELLOWTAIL	Other nongroundfish	Other nongroundfish	
YMTH	YELLOWMOUTH ROCKFISH	Other slope rockfish	Other slope rockfish	yes
YSOL	YELLOWFIN SOLE	Other flatfish	Other flatfish	
YTNA	YELLOWFIN TUNA	Other nongroundfish	Other nongroundfish	
YTR1	NOM. YELLOWTAIL ROCKFISH	Yellowtail rockfish	Yellowtail rockfish	yes
YTRK	YELLOWTAIL ROCKFISH	Yellowtail rockfish	Yellowtail rockfish	yes