

Data Report and Summary Analyses of the California and Oregon Pink Shrimp Fisheries

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West Coast Groundfish Observer Program



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INTRODUCTION

Overview

This report summarizes discarded catch data collected by the West Coast Groundfish Observer Program (WCGOP) from the Oregon and California state-licensed pink shrimp trawl fisheries from January 1, 2004 through December 31, 2005 and January 1, 2007 through December 31, 2007. (These fisheries were not observed in 2006). The WCGOP collects at-sea data from limited-entry (LE) trawl and fixed-gear fisheries, as well as from open access fisheries targeting near-shore rockfish, prawn/shrimp, California halibut, and deep-water species. The WCGOP's goal is to improve total catch estimates by collecting information on the discarded catch (fish returned overboard at-sea) and bycatch of west coast groundfish species. The data are used in assessing and managing a variety of groundfish species.

West Coast Pink Shrimp Trawl Fishery

The pink shrimp trawl fishery off the west coast of the United States primarily operates in Washington, Oregon, and Northern California. The WCGOP only observes vessels with Oregon state pink shrimp licenses and California state Northern Pink Shrimp Trawl Vessel licenses. Washington pink shrimp trawlers are not observed by the WCGOP, as the state has not yet issued a ruling allowing federal observer coverage of its state managed fisheries.

Pink shrimp trawl vessels range in size from 38 to 105 feet, with an average length of 65 feet, and use single and double-rigged shrimp trawl gear. The pink shrimp fishery is open April 1 through October 31 and vessels deliver catch to shoreside processors. Vessels generally fish in depths ranging from 50 to 140 fathoms. Pink shrimp trawl vessels retain the portion of their catch that is marketable. The portion of the catch that is not marketable or for which regulations prohibit landing is discarded at-sea.

Oregon and California pink shrimp vessels are required to use bycatch reduction devices (BRDs) when targeting pink shrimp. The primary goal of requiring BRDs is to reduce the incidental take of groundfish species. In addition, both states have a minimum size requirement for pink shrimp of 160 individuals per pound. Vessels are allowed to land up to 500 pounds of groundfish per day multiplied by the number of days fished, but not to exceed 1,500 pounds per trip. However, since the requirements for BRD's were imposed, most groundfish species are rarely landed by pink shrimp trawl vessels.

Commercial Pink Shrimp Fisheries Data

Fisheries managers and enforcement officers use state-issued sales receipts, referred to as fish tickets, to monitor fishery landings. Fish ticket data are transferred to the Pacific Coast Fisheries Information Network (PacFIN) regional database system by state fishery agencies in Washington, Oregon, and California. Fish tickets only provide information on the amount of fish landed. However, managers also need discard information for each managed species. One of the best means of acquiring accurate data needed to estimate the amount of discarded catch is through an at-sea observer program.

West Coast Groundfish Observer Program

On May 24, 2001, NOAA Fisheries (National Marine Fisheries Service, NMFS) established the WCGOP in accordance with the Pacific Coast Groundfish Fishery Management Plan (50 CFR Part 660) (66 FR 20609). This regulation requires all vessels that catch and retain 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 Oregon and California 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 open access and nearshore fisheries. The observer coverage plan is available at: <http://www.nwfsc.noaa.gov/research/divisions/fram/observer/observersamplingplan.pdf>.

METHODS

Pink Shrimp Trawl Fishery License Selection

State-issued pink shrimp trawl licenses 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.

In 2004 and 2005, California Department of Fish and Game (CDGFG) provided the WCGOP with a list of vessels that participated in the Northern Pink Shrimp Trawl fishery by port group and the Oregon Department of Fish and Wildlife provided the WCGOP with a list of pink shrimp licenses and associated vessels. Oregon pink shrimp vessels were aggregated into port groups by the WCGOP. The selection cycles and number of vessels selected for the pink shrimp fishery in 2004 and 2005 were as follows:

- Oregon Pink Shrimp Selection Cycle 1 (May 1, 2004 - October 31, 2004): 144 vessels
- California Pink Shrimp Selection Cycle 1 (July 1, 2004 - October 31, 2004): 4 vessels
- Oregon Pink Shrimp Selection Cycle 2 (Apr 1, 2005 - October 31, 2005): 44 vessels
- California Pink Shrimp Selection Cycle 2 (Apr 1, 2005 - October 31, 2005): 3 vessels

The WCGOP did not cover the pink shrimp fleet in 2006 because it was necessary to concentrate resources in other fisheries.

In 2007, the WCGOP initially placed Oregon and California pink shrimp vessels within the same selection frame. In July 2007, the WCGOP separated Oregon and California vessels into their

own selection frames. The selection cycle that combined Oregon and California pink shrimp trawl licenses was from April 1 through June 30, 2007. The second selection cycle that split state licenses into two selection lists based on state, was from July 1 through October 31, 2007.

The initial 2007 list, which combined Oregon and California pink shrimp vessels, had 182 vessels; 141 vessels with Oregon Pink Shrimp trawl licenses and 41 vessels with California Northern Pink Shrimp trawl licenses. The WCGOP then reduced the list using the following criteria:

- Vessel landed \geq 500 lbs pink shrimp in 2005 or 2006.
- Vessel is greater than 16 feet in length.

After the criteria were applied, 56 vessels remained available for the 2007 combined state selection. During the period from April 1 to June 30, 27 of those vessels were selected for coverage. The remaining 29 vessels were then separated by state, and 23 vessels were placed on the Oregon pink shrimp selection list and 6 vessels were placed on the California pink shrimp selection list.

For selection purposes, vessels with pink shrimp permits were assigned to a port group based upon the location of their landings in the previous year. Port groups generally contain one or two major ports and several smaller ports within a contiguous geographic area. In 2004 and 2005, WCGOP utilized the port group assignments provided by CDFG as part of the lists of permitted vessels, while assignment of Oregon vessels to port groups was conducted by the WCGOP. In 2007, assignment of both California and Oregon vessels to port groups was conducted by the WCGOP. Within each port group, permits were randomly selected for coverage during a one or two-month period. As noted above, all Oregon and California shrimp vessels were selected for a two-month period during 2004 and 2005 and May - June 2007. From July - October 2007, Oregon pink shrimp vessels were selected for a one-month period, while California vessels continued to be selected for a two-month period. Oregon vessels were only selected for one-month due to their high level of effort and documented low bycatch rates due to the use of bycatch reduction devices. After the entire fleet had been selected, a new selection cycle began. This selection process was 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 pink shrimp permits on an annual basis.

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 Pink Shrimp 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 pink shrimp trawl fleet is one of WCGOP's lower priorities for observer coverage, as their incidental take of groundfish species is much lower than other observed fisheries. Nearly all trips taken within a one or two-month period by a vessel whose state pink shrimp permit has been selected are covered by an observer. However, sometimes vessels whose permits are selected for a specific one or 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 pink shrimp trawl vessels may be given 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 one or 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 one or two-month period and are added to the selection list for the next one or 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, whichever comes first.

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/shrimp retained by catch category
- Catch of prohibited species and incidental take of protected species
- Size composition, tags, and viability assessments for Pacific halibut
- Size composition of discarded fish
- Basic taxonomic composition of non-fish bycatch
- Biological collections (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 the 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. A database table hierarchy is located in Appendix A.
3. Observers are debriefed by WCGOP staff after every two-month period. The debriefing includes:
 - Calculation, Data Form, and Sampling Methodology Checks - Observers send data to a debriefer on a monthly basis. The debriefer checks all calculations for accuracy, reviews data forms for completeness, and ensures appropriate sampling methodologies were employed.
 - Observer Logbook Review - Observers keep logbooks detailing the events of each trip, basic deck schematics, sampling methods used, communication logs, and confirmation of 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 Oregon and California pink shrimp trawl fisheries; 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 catch 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:

$$B_{mt} = \sum_k \sum_s x_{mtks} / \sum_t \sum_k \sum_s x_{mtks}$$

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

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 pink shrimp trawl fishery were calculated as the proportion of fleet-wide landings of pink shrimp that were observed. Coverage rates were computed based on the complete annual datasets for the years 2004, 2005 and 2007.

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).

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 groundfish stocks currently managed under rebuilding plans, prohibited species in each fishery (Pacific halibut), and all groundfish stocks for which discard is estimated annually on a fleet-wide basis. The ratio estimates (R) were calculated for each species across all data or, when there was a sufficient sample size, by fleet (f) (Oregon or California):

$$R_f = \frac{\sum_t y_{ft}}{\sum_t x_{ft}}$$

where:

y_{ft} = the discarded or total catch pounds of a species in tow t and fleet f .

x_{ft} = the retained pounds of FMP groundfish species (except Pacific hake) in tow t and fleet f .

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

$$Var(R_f) = \left(\frac{\bar{y}_f}{\bar{x}_f}\right)^2 \left[\frac{s^2(y_{ft})}{\bar{y}_f^2} + \frac{s^2(x_{ft})}{\bar{x}_f^2} - \left(\frac{s^2(y_{ft})}{\bar{y}_f^2} \cdot \frac{s^2(x_{ft})}{\bar{x}_f^2} \right) \right]$$

where:

\bar{x}_f and \bar{y}_f = the means of x_{ft} and y_{ft} over the tows from fleet f .

$s^2(x_{ft})$ and $s^2(y_{ft})$ = the standard errors of x_{ft} and y_{ft} over all tows from fleet f .

This variance estimator is consistent with that employed by Pikitch et al. (1998) and is based on methods presented by Cochran (1977). Note that $Var(R_{ijdt})$ cannot be calculated when $x_{ijdt} = 0$ or $y_{ijdt} = 0$ for all tows and should be considered with extreme caution when R_{ijdt} is equal to one. In order to best support fishery management, variance was calculated by year or separately for data from the Oregon and California fleets. 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 retained pink shrimp. Similarly, bycatch ratios were calculated as the observed total catch weight (discarded + retained) divided by the observed weight of retained pink shrimp.

RESULTS AND DISCUSSION

Overall Coverage Levels

The total number of observed trips, tows, vessels, and observed and total fleet-wide pink shrimp landings in the pink shrimp trawl fishery are summarized in Table 1 for 2004, 2005, and 2007. The observed coverage rate, calculated as the proportion of fleet-wide pink shrimp landings that were 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 pink shrimp trawl fishery has remained relatively consistent, at around 7% coastwide. The majority of observations have been made north of the groundfish management line at 40° 10' N. latitude. The primary port groups observed in this fishery were Astoria, Newport, Coos Bay, and Crescent City. Although total pink shrimp landings were greatest in Astoria in 2004 and 2005, the largest landings occurred farther south in 2007. This shift is reflected by the distribution of observer coverage in 2007, which was higher for the combined port groups of Coos Bay, Crescent City, and Eureka than in previous years.

Observed Total Catch, Discard Ratios, and Bycatch Ratios

The observed total catch weight (mt), discard weight (mt) and percent discarded from observed vessels in the pink shrimp fishery in 2007 is presented in Table 2. All weights provided are from north of 40° 10' N. latitude. The WCGOP sampling protocol requires that observers focus their data collection efforts on the discarded portion of the catch. Retained catch from observed vessels is not typically measured using a comprehensive or random sampling approach. In order to ensure that retained weights in the observer data are accurate, WCGOP data analysts subsequently match observed trips to landed weights that are recorded by processors on shore using a scale. While this process is more efficient and accurate than the evident alternatives, landed weights are often recorded at a broader level of species resolution than observer discard data. Because of this, in many cases it is only appropriate for the WCGOP to report total catch and retained weights for species groups rather than individual species. WCGOP analysts have evaluated which species are typically grouped on fish tickets and which are recorded at a species-specific level. Total catch weights are reported for individual species whenever possible. However, when landed weights for individual species are anticipated to be underestimated by more than 10% coastwide, total catch for these species is reported jointly with the larger catch groupings under which they are typically recorded. For instance, although observers record discard of longnose skate at the species level, processors often report this weight along with other skate species as unspecified skate. A single total catch weight is therefore given for unspecified skate, longnose skate, and others in Table 2, while discarded amounts are broken down by species.

Observed coastwide total catch (discarded + retained) in the 2007 pink shrimp fishery was largely comprised of pink shrimp, Pacific hake, and other mixed nongroundfish species (Table 2). Flatfish species, primarily slender sole and rex sole, were also present in the catch. Of the rebuilding species, darkblotched rockfish was the most commonly observed. Canary rockfish, Pacific ocean perch and yelloweye rockfish were caught in small amounts. The vast majority of catch other than pink shrimp is discarded in this fishery, as demonstrated by the percent discarded in the far right-hand column of Table 2. With only 8% of its catch discarded, sablefish was the only non-target species or species group analyzed for which discards did not represent at least 99% of the total catch.

The observed total catch weight (mt), discard weight (mt) and percent discarded from observed pink shrimp vessels in 2004, 2005, and 2007 are presented in Table 3. Multiple years of data are combined so as to allow for separate reporting of the Oregon and California pink shrimp fleet. Overall, observed coastwide total catch (discarded + retained) was largely comprised of pink shrimp, Pacific hake, various flatfish species, and slope rockfish. All rebuilding species were observed in the Oregon pink shrimp fishery across these years, although catch of darkblotched

rockfish was the largest. In California, fewer rebuilding species were observed, and in smaller amounts. A smaller number of pink shrimp vessels was observed overall in California, potentially accounting for some of this difference.

Discard and bycatch ratios, as well as standard errors, for the 2007 pink shrimp fishery north of 40° 10' N. latitude are presented in Table 4. Species are grouped for ratio calculations according to Appendix B. All ratios in Table 4 were computed with pink shrimp in the denominator. Discard ratios were relatively low for most species and species groups except for Pacific hake and non-FMP flatfish. Discard and bycatch ratios were often identical due to 100% of the observed catch for most species being discarded.

Discard ratios and standard errors by state from 2004, 2005, and 2007 data combined are presented in Table 5. Although some vessels originating in Oregon did fish south of 40° 10' N. latitude, ratios specific to this area are not reported for the Oregon fleet for confidentiality purposes. Similarly, Table 6 presents bycatch ratios and standard errors by state across all years available. Ratios for Pacific hake, darkblotched rockfish, dover sole, other flatfish, and eulachon indicate that there is a higher rate of bycatch for these species in Oregon pink shrimp fishery. On the other hand, higher bycatch ratios for shortbelly rockfish, other shelf rockfish, and other nongroundfish were associated with the California pink shrimp fleet.

Biological Sampling Data: Length-Frequency Distributions

WCGOP observers primarily collect measurements of fish length, sometimes by sex, 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 pink shrimp 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 provided for the pink shrimp fishery in Figure 1. Figure 2 presents length frequency distributions for other discarded species. Length frequency plots are shown for all species for which greater than 30 observations were available. These include arrowtooth flounder, aurora rockfish, dover sole, greenstriped rockfish, Pacific sanddab, roughey rockfish, splitnose rockfish, and striptail rockfish. There were no protected resources catch recorded in the pink shrimp fishery between September 2003 and April 2008.

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 green sturgeon and salmon is available in the WCGOP observer training manual (NWFSC 2007).

Summary

Discard and bycatch rates calculated from observer data collected in the Oregon and California pink shrimp trawl fisheries are now available for use in the management process. The observer data will be used in conjunction with additional commercial pink shrimp fishery landings infor-

mation to expand discard estimates to the fleet-wide level in order to inform the management process on coastwide total mortality in this fishery. Biological sample data will also be available for use by stock assessment authors.

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Figure 1: Length frequency distributions of discarded rebuilding species observed in the pink shrimp fishery from September 2003 - April 2008. Length frequencies are provided for species for which 30 observations or more were available.

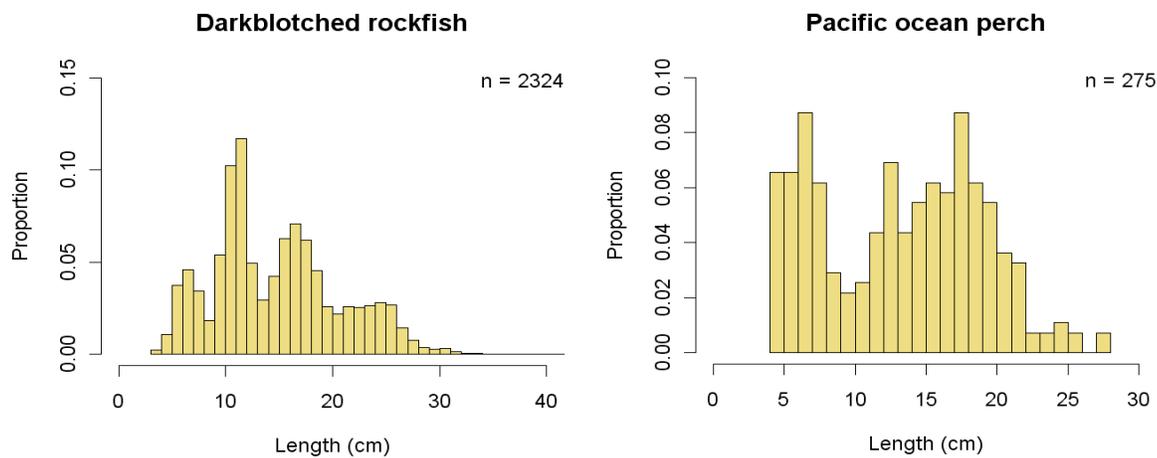


Figure 2: Length frequency distributions of discarded non-rebuilding species observed in the pink shrimp fishery from September 2003 - April 2008. Length frequencies are provided for species for which 30 observations or more were available.

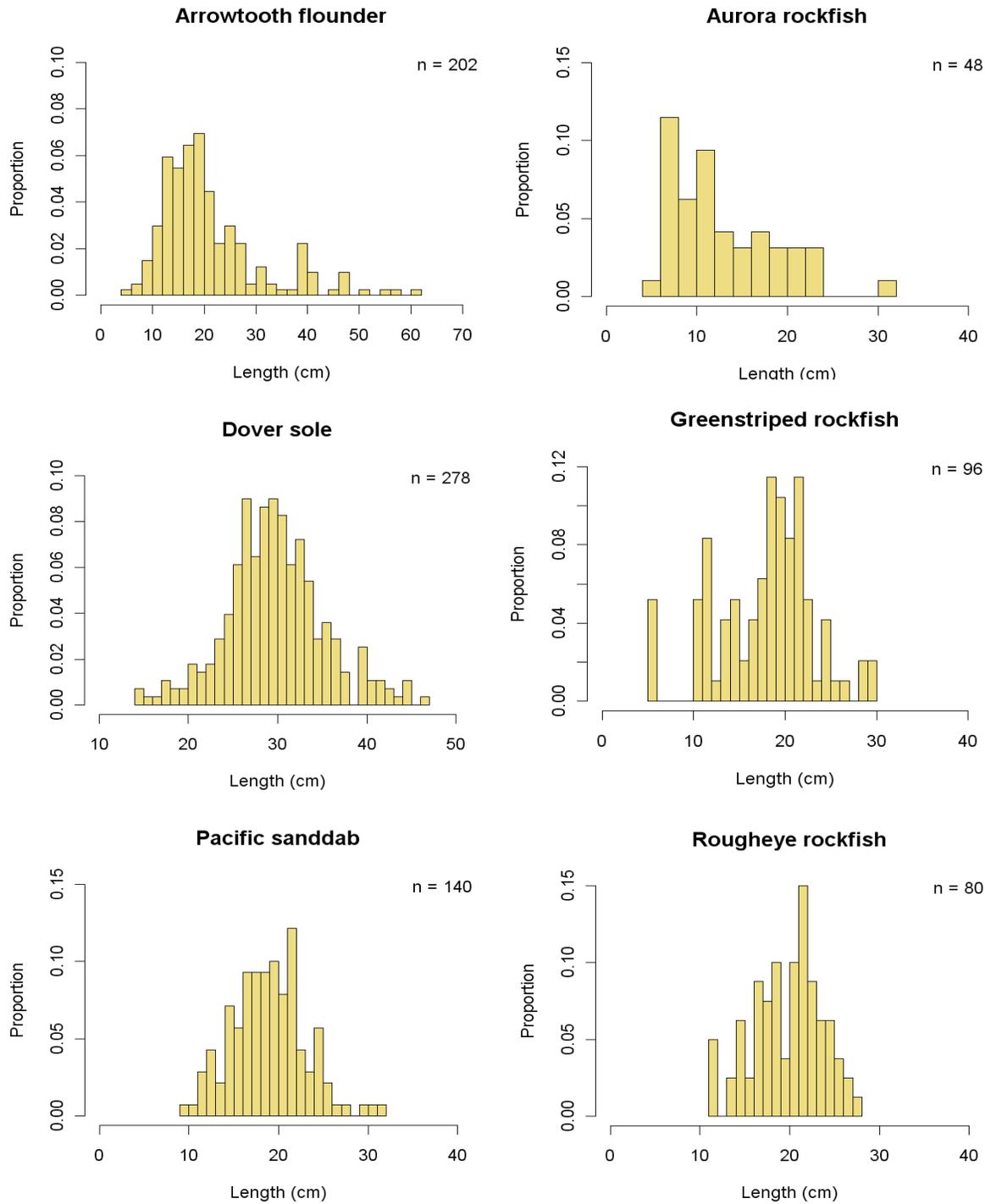


Figure 2 (cont.): Length frequency distributions of discarded non-rebuilding species observed in the pink shrimp fishery from September 2003 - April 2008. Length frequencies are provided for species for which 30 observations or more were available.

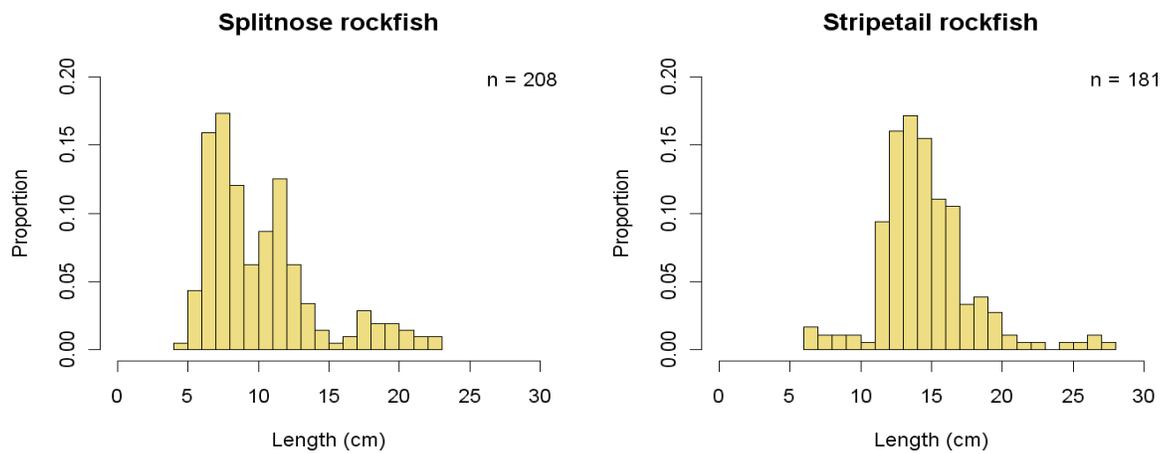


Table 1. Total observed trips, hauls, vessels and pink shrimp landings in the pink shrimp trawl fishery in 2004, 2005 and 2007. Coverage rates (far-right column) for each port group and management area are computed as the proportion of total pink shrimp landings that were observed. Data are combined as needed to ensure confidentiality.

	Port Group	Number of observed trips	Number of observed hauls	Number of observed vessels	Observed pink shrimp landings (mt)	Total pink shrimp landings (mt)	% of total pink shrimp landings observed
2004	Bellingham	--	--	--	--	--	--
	Neah Bay	--	--	--	--	--	--
	Astoria	20	394	6	216	5030	4%
	Newport	24	504	12	300	2482	12%
	Coos Bay	13	282	5	118	1458	8%
	Crescent City						
	Eureka						
	Fort Bragg						
	San Francisco						
	Monterey						
	Morro Bay						
	Santa Barbara	--	--	--	--	--	--
	Los Angeles	--	--	--	--	--	--
	North of 40°10' N	48	944	20	533	8706	6%
South of 40°10' N	*	*	*	*	264	*	
Coastwide total	57	1180	23	634	8970	7%	
2005	Bellingham	--	--	--	--	--	--
	Neah Bay	--	--	--	--	--	--
	Astoria	14	243	10	170	5527	3%
	Newport	10	174	6	120	2291	5%
	Coos Bay	14	221	7	182	2343	8%
	Crescent City						
	Eureka	--	--	--	--	526	--
	Fort Bragg	--	--	--	--	--	--
	San Francisco	--	--	--	--	--	--
	Monterey	--	--	--	--	--	--
	Morro Bay	--	--	--	--	*	--
	Santa Barbara	--	--	--	--	--	--
	Los Angeles	--	--	--	--	--	--
	North of 40°10' N	37	601	23	448	10687	4%
South of 40°10' N	*	*	*	*	*	*	
Coastwide total	*	*	*	*	*	*	

* Not reported due to confidentiality.

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 1 (cont). Total observed trips, hauls, vessels and pink shrimp landings in the pink shrimp trawl fishery in 2004, 2005 and 2007. Coverage rates (far-right column) for each port group and management area are computed as the proportion of total pink shrimp landings that were observed. Data are combined as needed to ensure confidentiality.

	Port Group	Number of observed trips	Number of observed hauls	Number of observed vessels	Observed pink shrimp landings (mt)	Total pink shrimp landings (mt)	% of total pink shrimp landings observed
2007	Bellingham	--	--	--	--	--	--
	Neah Bay	--	--	--	--	--	--
	Astoria	21	380	8	209	3478	6%
	Newport	19	398	10	236	3282	7%
	Coos Bay	26	331	12	304	4174	7%
	Crescent City						
	Eureka						
	Fort Bragg	--	--	--	--	--	--
	San Francisco	--	--	--	--	--	--
	Monterey	--	--	--	--	--	--
	Morro Bay	--	--	--	--	--	--
	Santa Barbara	--	--	--	--	--	--
	Los Angeles	--	--	--	--	--	--
	North of 40°10' N	66	1109	30	749	10935	7%
South of 40°10' N	--	--	--	--	--	--	
Coastwide total	66	1109	30	749	10935	7%	

Table 2. Observed catch weight (mt), discard weight (mt) and percent discarded from observed 2007 pink shrimp vessels. All data were collected north of 40°10' N. latitude.

2007 - North of 40°10' N	Total catch (mt)	Discard (mt)	Total % discarded
Rebuilding species			
Bocaccio	0.000	0.000	100.0%
Canary rockfish	0.026	0.026	100.0%
Cowcod	--	--	--
Darkblotched rockfish	1.177	1.177	100.0%
Pacific ocean perch	0.009	0.009	100.0%
Widow rockfish	0.003	0.003	100.0%
Yelloweye rockfish	--	--	--
Non-rebuilding species			
Arrowtooth flounder	0.745	0.745	100.0%
Big skate	0.069	0.069	100.0%
Chilipepper rockfish	0.001	0.001	100.0%
Dover sole	2.081	2.081	100.0%
English sole	0.033	0.033	100.0%
Flatfish	15.488	15.488	100.0%
Unspecified flatfish		0.017	
Pacific sanddab		0.572	
Unspecified sanddab		0.023	
Slender sole		14.876	
Flathead sole	0.091	0.091	100.0%
Lingcod	0.075	0.075	100.0%
Nearshore rockfish	0.014	0.014	100.0%
Petrale sole	0.140	0.140	100.0%
Rex sole	6.111	6.111	100.0%
Sablefish	0.197	0.016	8.0%
Shelf rockfish	0.408	0.408	100.0%
Greenstriped rockfish		0.170	
Pygmy rockfish		0.003	
Unspecified shelf rockfish		0.000	
Rosethorn rockfish		0.001	
Shortbelly rockfish		0.004	
Stripetail rockfish		0.231	
Skates	0.085	0.085	100.0%
Aleutian skate		0.000	
Longnose skate		0.082	
Sandpaper skate		0.002	
Unspecified skate		0.002	
Slope rockfish	2.521	2.521	100.0%
Aurora rockfish		0.149	
Redbanded rockfish		0.007	
Unspecified slope rockfish		1.308	
Rougheye rockfish		0.007	

Table 2 (cont). Observed catch weight (mt), discard weight (mt) and percent discarded from observed 2007 pink shrimp vessels. All data were collected north of 40°10' N. latitude.

2007 - North of 40°10' N	Total catch (mt)	Discard (mt)	Total % discarded
Non-rebuilding species (cont.)			
Slope rockfish (cont.)	2.521	2.521	100.0%
Sharpchin rockfish		0.079	
Shortraker rockfish		0.001	
Splitnose rockfish		0.969	
Spiny dogfish	0.051	0.051	100.0%
Spotted ratfish	0.088	0.088	100.0%
Thornyheads	0.033	0.033	100.0%
Longspine Thornyhead		0.003	
Shortspine Thornyhead		0.030	
Yellowtail rockfish	0.004	0.004	100.0%
Non-groundfish species			
American shad	0.003	0.003	100.0%
Anchovy (unidentified)	0.037	0.037	100.0%
Bigfin eelpout	0.131	0.131	100.0%
Black hagfish	0.008	0.008	100.0%
Bluebarred prickleback	0.003	0.003	100.0%
Capelin	0.001	0.001	100.0%
Dungeness crab	0.024	0.024	100.0%
Eelpout (unidentified)	0.468	0.468	100.0%
Eulachon	0.297	0.297	100.0%
Gunnel (unidentified)	0.001	0.001	100.0%
Hachetfish (unidentified)	0.002	0.002	100.0%
Hagfish (unidentified)	0.192	0.192	100.0%
Jellyfish (unidentified)	0.027	0.027	100.0%
Laternfish (unidentified)	0.053	0.053	100.0%
Longspine sombfish	0.002	0.002	100.0%
Mixed species	51.897	51.753	99.7%
Monkeyface prickleback	0.001	0.001	100.0%
Night smelt	0.198	0.198	100.0%
Octopus (unidentified)	0.059	0.059	100.0%
Other unspecified nongroundfish	1.857	1.857	100.0%
Pacific hagfish	0.218	0.218	100.0%
Pacific hake	179.948	179.948	100.0%
Pacific halibut	0.015	0.015	100.0%
Pacific herring	0.052	0.052	100.0%
Pacific lamprey	0.004	0.004	100.0%
Pacific sardine	0.005	0.005	100.0%
Pink shrimp	771.851	22.728	2.9%
Poacher (unidentified)	0.283	0.283	100.0%
Prickleback (unidentified)	0.004	0.004	100.0%
Red Irish lord sculpin	0.001	0.001	100.0%
Ronquil (unidentified)	0.001	0.001	100.0%

Table 2 (cont). Observed catch weight (mt), discard weight (mt) and percent discarded from observed 2007 pink shrimp vessels. All data were collected north of 40°10' N. latitude.

2007 - North of 40°10' N	Total catch (mt)	Discard (mt)	Total % discarded
Non-groundfish species (cont.)			
Sculpin (unidentified)	0.032	0.032	100.0%
Sea cucumber (unidentified)	0.138	0.138	100.0%
Shiner surfperch	0.002	0.002	100.0%
Smelt (unidentified)	0.422	0.422	100.0%
Snailfish (unidentified)	0.001	0.001	100.0%
Spotted cusk-eel	0.005	0.005	100.0%
Squid (unidentified)	0.359	0.359	100.0%
Surfperch (unidentified)	0.004	0.004	100.0%
Threadfin sculpin	0.011	0.011	100.0%
Urchin (unidentified)	0.191	0.191	100.0%
Whitebarred prickleback	0.009	0.009	100.0%
Wrymouth (unidentified)	0.001	0.001	100.0%

Table 3. Observed catch weight (mt), discard weight (mt) and percent discarded in the pink shrimp trawl fishery from the combined years of 2004, 2005 and 2007 by state. Data are combined across all available years in order to report observed weight by state.

2004, 2005 & 2007	Oregon			California		
	Total catch (mt)	Discard (mt)	Total % discarded	Total catch (mt)	Discard (mt)	Total % discarded
Rebuilding species						
Bocaccio	0.000	0.000	100.0%	--	--	--
Canary rockfish	0.031	0.031	100.0%	--	--	--
Cowcod	0.000	0.000	100.0%	0.001	0.001	100.0%
Darkblotched rockfish	2.624	2.624	100.0%	0.034	0.034	100.0%
Pacific ocean perch	0.239	0.239	100.0%	0.016	0.016	100.0%
Widow rockfish	0.003	0.003	100.0%	0.000	0.000	100.0%
Yelloweye rockfish	0.000	0.000	100.0%	--	--	--
Non-rebuilding species						
Arrowtooth flounder	2.943	2.769	94.1%	0.014	0.014	100.0%
Big skate	0.071	0.071	100.0%	0.000	0.000	100.0%
Cabezon	0.001	0.001	100.0%	--	--	--
California skate	--	--	--	0.001	0.001	100.0%
Chilipepper rockfish	0.016	0.016	100.0%	0.095	0.095	100.0%
Dover sole	3.713	3.511	94.6%	0.133	0.133	100.0%
English sole	0.151	0.151	100.0%	0.001	0.001	100.0%
Flatfish	26.516	26.516	100.0%	1.544	1.544	100.0%
Curlfin turbot		--			0.000	
Unspecified flatfish		0.174			--	
Pacific sanddab		1.360			0.102	
Unspecified sanddab		0.028			0.000	
Slender sole		24.954			1.441	
Flathead sole	0.417	0.417	100.0%	--	--	--
Lingcod	0.112	0.112	100.0%	--	--	--
Nearshore rockfish	0.014	0.014	100.0%	0.000	0.000	--
Blue rockfish		0.014			--	
Copper rockfish		0.000			--	
Petrale sole	0.370	0.370	100.0%	0.005	0.005	100.0%
Rex sole	10.264	10.172	99.1%	0.104	0.104	100.0%
Rock sole	0.034	0.034	100.0%	--	--	--
Sablefish	1.135	0.160	14.1%	0.000	0.000	100.0%
Shelf rockfish	1.029	1.029	100.0%	0.818	0.818	100.0%
Greenstriped rockfish		0.623			0.014	
Halfbanded rockfish		--			0.003	
Pygmy rockfish		0.009			--	
Redstripe rockfish		0.012			--	
Unspecified shelf rockfish		0.001			0.000	
Rosethorn rockfish		0.001			--	
Shortbelly rockfish		0.008			0.512	
Stripetail rockfish		0.374			0.289	
Skates	0.216	0.216	100.0%	0.043	0.043	100.0%
Aleutian skate		0.000			--	
Longnose skate		0.188			0.038	
Sandpaper skate		0.006			0.001	
Unspecified skate		0.022			0.004	
Slope rockfish	6.005	6.005	100.0%	0.544	0.544	100.0%
Aurora rockfish		0.048			0.113	
Blackgill rockfish		0.000			--	
Redbanded rockfish		0.017			0.001	
Unspecified slope rockfish		1.824			0.299	
Rougheye rockfish		0.025			--	
Sharpchin rockfish		0.034			0.073	
Shortraker rockfish		0.008			--	
Splitnose rockfish		4.048			0.058	

Table 3 (cont). Observed catch weight (mt), discard weight (mt) and percent discarded in the pink shrimp trawl fishery from the combined years of 2004, 2005 and 2007 by state. Data are combined across all available years in order to report observed weight by state.

2004, 2005 & 2007	Oregon			California		
	Total catch (mt)	Discard (mt)	Total % discarded	Total catch (mt)	Discard (mt)	Total % discarded
Non-rebuilding species (cont.)						
Spiny dogfish	0.345	0.345	100.0%	0.071	0.071	100.0%
Spotted ratfish	0.159	0.159	100.0%	0.005	0.005	100.0%
Thornyheads	0.090	0.090	100.0%	0.000	0.000	--
Longspine thornyhead		0.003			--	
Shortspine thornyhead		0.087			--	
Yellowtail rockfish	0.017	0.017	100.0%	0.001	0.001	100.0%
Non-groundfish species						
American shad	0.046	0.046	100.0%	0.000	0.000	100.0%
Anchovy (unidentified)	0.182	0.182	100.0%	0.005	0.005	100.0%
Armored box crab	0.000	0.000	100.0%	0.001	0.001	100.0%
Bigfin eelpout	0.435	0.435	100.0%	0.007	0.007	100.0%
Black hagfish	0.008	0.008	100.0%	--	--	--
Bluebarred prickleback	0.003	0.003	100.0%	--	--	--
California sheephead	0.091	0.000	0.0%	--	--	--
Capelin	0.001	0.001	100.0%	--	--	--
Cusk-eel (unidentified)	--	--	--	0.002	0.002	100.0%
Deepsea smelt (unidentified)	0.020	0.020	100.0%	--	--	--
Dungeness crab	0.028	0.028	100.0%	0.000	0.000	100.0%
Dwarf wrymouth	0.001	0.001	100.0%	--	--	--
Eelpout (unidentified)	1.196	1.196	100.0%	0.045	0.045	100.0%
Eulachon	0.842	0.842	100.0%	0.028	0.028	100.0%
Giant wrymouth	0.006	0.006	100.0%	0.001	0.001	100.0%
Gunnel (unidentified)	0.002	0.002	100.0%	0.000	0.000	100.0%
Hachetfish (unidentified)	0.002	0.002	100.0%	0.000	0.000	100.0%
Hagfish (unidentified)	0.699	0.699	100.0%	0.030	0.030	100.0%
Jellyfish (unidentified)	0.111	0.111	100.0%	0.225	0.225	100.0%
Laternfish (unidentified)	0.056	0.056	100.0%	0.001	0.001	100.0%
Longspine combfish	0.004	0.004	100.0%	--	--	--
Mackerel (unidentified)	--	--	--	0.001	0.001	100.0%
Medusafish	--	--	--	0.000	0.000	100.0%
Midshipman (toadfish) (unidentified)	0.018	0.018	100.0%	--	--	--
Mixed species	81.695	81.550	99.8%	1.911	1.911	100.0%
Monkeyface prickleback	0.001	0.001	100.0%	--	--	--
Night smelt	0.247	0.247	100.0%	--	--	--
Northern anchovy	0.057	0.057	100.0%	1.143	1.143	100.0%
Northern ronquil	0.001	0.001	100.0%	--	--	--
Octopus (unidentified)	0.173	0.173	100.0%	0.009	0.009	100.0%
Other unspecified nongroundfish	1.857	1.857	100.0%	0.089	0.089	100.0%
Pacific Argentine	--	--	--	0.155	0.155	100.0%
Pacific hagfish	0.610	0.610	100.0%	0.022	0.022	100.0%
Pacific hake	225.238	225.238	100.0%	11.438	11.438	100.0%
Pacific halibut	0.018	0.018	100.0%	--	--	--
Pacific herring	0.556	0.556	100.0%	0.037	0.037	100.0%
Pacific lamprey	0.010	0.010	100.0%	0.000	0.000	100.0%
Pacific sardine	0.102	0.102	100.0%	0.049	0.049	100.0%
Pacific saury	0.000	0.000	100.0%	0.000	0.000	100.0%
Pacific scabbardfish	--	--	--	0.002	0.002	100.0%
Pacific tom cod	0.008	0.008	100.0%	--	--	--
Pink shrimp	1766.453	0.000	0.0%	147.771	0.000	0.0%
Plainfin midshipman	--	--	--	0.024	0.024	100.0%
Poacher (unidentified)	0.850	0.850	100.0%	0.006	0.006	100.0%
Prickleback (unidentified)	0.007	0.007	100.0%	0.000	0.000	100.0%
Pygmy poacher	0.007	0.007	100.0%	--	--	--
Red Irish lord sculpin	0.001	0.001	100.0%	--	--	--

Table 3 (cont). Observed catch weight (mt), discard weight (mt) and percent discarded in the pink shrimp trawl fishery from the combined years of 2004, 2005 and 2007 by state. Data are combined across all available years in order to report observed weight by state.

2004, 2005 & 2007	Oregon			California		
	Total catch (mt)	Discard (mt)	Total % discarded	Total catch (mt)	Discard (mt)	Total % discarded
Non-groundfish species (cont.)						
Ronquil (unidentified)	0.001	0.001	100.0%	0.000	0.000	100.0%
Sculpin (unidentified)	0.055	0.055	100.0%	0.001	0.001	100.0%
Sea cucumber (unidentified)	0.295	0.295	100.0%	0.028	0.028	100.0%
Shiner surfperch	0.002	0.002	100.0%	--	--	--
Shrimp (unidentified)	43.895	40.710	92.7%	1.627	1.627	100.0%
Smelt (unidentified)	5.580	5.580	100.0%	0.023	0.023	100.0%
Snailfish (unidentified)	0.001	0.001	100.0%	0.001	0.001	100.0%
Spotted cusk-eel	0.005	0.005	100.0%	0.004	0.004	100.0%
Squid (unidentified)	1.137	1.137	100.0%	0.094	0.094	100.0%
Surf smelt	0.217	0.217	100.0%	--	--	--
Surfperch (unidentified)	0.013	0.013	100.0%	--	--	--
Threadfin sculpin	0.022	0.022	100.0%	--	--	--
Tubeshoulder (unidentified)	--	--	--	0.000	0.000	100.0%
Urchin (unidentified)	0.818	0.818	100.0%	0.379	0.379	100.0%
Whitebait smelt	0.070	0.070	100.0%	0.039	0.039	100.0%
Whitebarred prickleback	0.012	0.012	100.0%	0.000	0.000	100.0%
Wrymouth (unidentified)	0.001	0.001	100.0%	--	--	--

Table 4. Discard ratios, bycatch ratios and standard errors from observed trips in the 2007 pink shrimp trawl fishery. All 2007 data were collected north of 40°10' N. latitude. Discard ratios are computed as the observed discard weight divided by the retained weight of pink shrimp. Bycatch ratios are computed as the observed total catch weight divided by the retained weight of pink shrimp. Species are grouped according to Appendix B.

2007 - North of 40°10' N	Discard ratio	SE	Bycatch ratio	SE
Rebuilding species				
Bocaccio	0.0000	--	0.0000	--
Canary rockfish	0.0000	0.0047	0.0000	0.0047
Cowcod	--	--	--	--
Darkblotched rockfish	0.0017	0.0005	0.0017	0.0005
Pacific ocean perch	0.0000	0.0003	0.0000	0.0003
Widow rockfish	0.0000	0.0015	0.0000	0.0015
Yelloweye rockfish	--	--	--	--
Non-rebuilding species				
Arrowtooth flounder	0.0010	0.0007	0.0010	0.0007
Big skate	0.0001	0.0409	0.0001	0.0409
Chilipepper	0.0000	0.0003	0.0000	0.0003
Dover sole	0.0029	0.0009	0.0029	0.0009
English sole	0.0000	0.0004	0.0000	0.0004
Lingcod	0.0001	0.0058	0.0001	0.0058
Longnose skate	0.0001	0.0012	0.0001	0.0012
Longspine thornyhead	0.0000	0.0027	0.0000	0.0027
Other flatfish	0.0094	0.0013	0.0094	0.0013
Other groundfish	0.0001	0.0004	0.0001	0.0004
Other nearshore rockfish	0.0000	0.0075	0.0000	0.0075
Other shelf rockfish	0.0023	0.0006	0.0023	0.0006
Other slope rockfish	0.0002	0.0003	0.0002	0.0003
Pacific cod	0.0000	--	0.0000	--
Pacific hake	0.2568	0.0263	0.2568	0.0263
Petrale sole	0.0002	0.0013	0.0002	0.0013
Sablefish	0.0000	0.0012	0.0003	0.0330
Sharpchin rockfish	0.0001	0.0033	0.0001	0.0033
Shortbelly rockfish	0.0000	0.0024	0.0000	0.0024
Shortspine thornyhead	0.0000	0.0003	0.0000	0.0003
Spiny dogfish	0.0001	0.0010	0.0001	0.0010
Splitnose rockfish	0.0013	0.0006	0.0013	0.0006
Unspecified skate	0.0000	0.0001	0.0000	0.0001
Yellowtail rockfish	0.0000	0.0032	0.0000	0.0032
Non-groundfish species				
Dungeness crab	0.0000	0.0025	0.0000	0.0025
Eulachon	0.0004	0.0030	0.0004	0.0030
Other non-FMP flatfish	0.0203	0.0027	0.0203	0.0027
Other nongroundfish	0.0069	0.0018	0.0071	0.0018
Pacific halibut	0.0000	0.0111	0.0000	0.0111
Pink shrimp	0.0325	0.0047	1.0325	0.0516

Table 5. Discard ratios and standard errors from observed trips in the pink shrimp trawl fishery from the combined years of 2004, 2005 and 2007 by state. Data are combined across all available years in order to report ratios by state. Discard ratios are computed as the observed discard weight divided by the retained weight of pink shrimp. Species are grouped according to Appendix B.

2004, 2005 & 2007	Oregon		California	
	Discard ratio	SE	Discard ratio	SE
Rebuilding species				
Bocaccio	0.0000	--	--	--
Canary rockfish	0.0000	0.0035	--	--
Cowcod	--	--	0.0000	0.0001
Darkblotched rockfish	0.0017	0.0003	0.0002	0.0003
Pacific ocean perch	0.0001	0.0007	--	--
Widow rockfish	0.0000	0.0006	0.0000	--
Yelloweye rockfish	0.0000	0.0001	--	--
Non-rebuilding species				
Arrowtooth flounder	0.0015	0.0003	0.0001	0.0003
Big skate	0.0000	0.0261	0.0000	--
Chilipepper (North of 40°10' N. lat.)	0.0000	0.0001	0.0000	--
Chilipepper (South of 40°10' N. lat.)	*	*	0.0007	0.0007
Dover sole	0.0023	0.0004	0.0009	0.0009
English sole	0.0001	0.0006	0.0000	0.0003
Lingcod	0.0001	0.0028	--	--
Longnose skate	0.0001	0.0006	0.0003	0.0005
Longspine thornyhead	0.0000	0.0013	--	--
Other flatfish	0.0076	0.0005	0.0015	0.0008
Other groundfish	0.0001	0.0002	0.0000	0.0006
Other nearshore rockfish	0.0000	0.0070	--	--
Other shelf rockfish	0.0017	0.0003	0.0043	0.0008
Other slope rockfish	0.0001	0.0001	0.0010	0.0009
Pacific cod	0.0000	0.0000	--	--
Pacific hake	0.1401	0.0127	0.0790	0.0181
Petrale sole	0.0002	0.0005	0.0000	0.0007
Redstripe rockfish (North of 40°10' N. lat.)	0.0000	0.0005	--	--
Sablefish	0.0000	0.0010	0.0000	--
Sharpchin (South of 40°10' N. lat.)	*	*	0.0000	0.0002
Sharpchin rockfish (North of 40°10' N. lat.)	0.0000	0.0002	0.0005	0.0093
Shortbelly rockfish	0.0000	0.0004	0.0036	0.0022
Shortspine thornyhead	0.0001	0.0008	--	--
Spiny dogfish	0.0002	0.0013	0.0005	0.0025
Splitnose rockfish (North of 40°10' N. lat.)	0.0026	0.0010	0.0001	0.0050
Splitnose rockfish (South of 40°10' N. lat.)	*	*	0.0003	0.0003
Unspecified grenadiers	0.0000	--	--	--
Unspecified skate	0.0000	0.0002	0.0000	0.0005
Yellowtail rockfish	0.0000	0.0016	0.0000	--
Non-groundfish species				
Dungeness crab	0.0000	0.0021	0.0000	--
Eulachon	0.0018	0.0027	0.0002	0.0011
Other non-FMP flatfish	0.0148	0.0013	0.0105	0.0027
Other nongroundfish	0.0095	0.0006	0.0196	0.0028
Pacific halibut	0.0000	0.0075	--	--
Pink shrimp	0.0228	0.0031	0.0119	0.0018

Table 6. Bycatch ratios and standard errors from observed trips in the pink shrimp trawl fishery from the combined years of 2004, 2005 and 2007 by state. Data were combined across all available years in order to report ratios by state. Bycatch ratios are computed as the total catch weight divided by the retained weight of pink shrimp. Species are grouped according to Appendix B.

2004, 2005 & 2007	Oregon		California	
	Bycatch ratio	SE	Bycatch ratio	SE
Rebuilding species				
Bocaccio	0.0000	--	--	--
Canary rockfish	0.0000	0.0035	--	--
Cowcod	--	--	0.0000	0.0001
Darkblotched rockfish	0.0017	0.0003	0.0002	0.0003
Pacific ocean perch	0.0001	0.0007	--	--
Widow rockfish	0.0000	0.0006	0.0000	--
Yelloweye rockfish	0.0000	0.0001	--	--
Non-rebuilding species				
Arrowtooth flounder	0.0016	0.0003	0.0001	0.0003
Big skate	0.0000	0.0261	0.0000	--
Chilipepper (South of 40°10' N. lat.)	*	*	0.0007	0.0007
Chilipepper (North of 40°10' N. lat.)	0.0000	0.0001	0.0000	--
Dover sole	0.0024	0.0004	0.0009	0.0009
English sole	0.0001	0.0006	0.0000	0.0003
Lingcod	0.0001	0.0028	--	--
Longnose skate	0.0001	0.0006	0.0003	0.0005
Longspine thornyhead	0.0000	0.0013	--	--
Other flatfish	0.0077	0.0005	0.0015	0.0008
Other groundfish	0.0001	0.0002	0.0000	0.0006
Other nearshore rockfish	0.0000	0.0070	--	--
Other shelf rockfish	0.0017	0.0003	0.0043	0.0008
Other slope rockfish	0.0001	0.0001	0.0010	0.0009
Pacific cod	0.0000	0.0000	--	--
Pacific hake	0.1401	0.0127	0.0790	0.0181
Petrale sole	0.0002	0.0005	0.0000	0.0007
Redstripe rockfish (North of 40°10' N. lat.)	0.0000	0.0005	--	--
Sablefish	0.0007	0.0480	0.0000	--
Sharpchin rockfish (South of 40°10' N. lat.)	*	*	0.0000	0.0002
Sharpchin rockfish (North of 40°10' N. lat.)	0.0000	0.0002	0.0005	0.0093
Shortbelly rockfish	0.0000	0.0004	0.0036	0.0022
Shortspine thornyhead	0.0001	0.0008	--	--
Spiny dogfish	0.0002	0.0013	0.0005	0.0025
Splitnose rockfish	0.0000	--	0.0003	0.0003
Splitnose rockfish (North of 40°10' N. lat.)	0.0026	0.0010	0.0001	0.0050
Unspecified grenadiers	0.0000	--	--	--
Unspecified skate	0.0000	0.0002	0.0000	0.0005
Yellowtail rockfish	0.0000	0.0016	0.0000	--
Non-groundfish species				
Dungeness crab	0.0000	0.0021	0.0000	--
Eulachon	0.0018	0.0027	0.0002	0.0011
Other non-FMP flatfish	0.0148	0.0013	0.0105	0.0027
Other nongroundfish	0.0097	0.0006	0.0196	0.0028
Pacific halibut	0.0000	0.0075	--	--
Pink shrimp	1.0228	0.0326	1.0119	0.1113

Table 7: Summary of the number of length measurements and the number of individual fish sexed by WCGOP observers in pink shrimp fishery from September 2003 through April 2008. The date range of biological data for each species is also provided.

	Years available	# lengths	# sexes
Rebuilding species			
Bocaccio	2007	1	0
Canary rockfish	2004 - 2005, 2007	5	4
Cowcod	2004, Jan - Apr 2008	4	0
Darkblotched rockfish	2004 - 2005, 2007 - Apr 2008	2324	1125
Pacific ocean perch	2004 - 2005, 2007	275	59
Widow rockfish	2007	4	0
Yelloweye rockfish	2004	2	0
Non-rebuilding species			
Arrowtooth flounder	2007 - Apr 2008	202	0
Aurora rockfish	2004, 2007	48	0
Chilipepper rockfish	2005, 2007	5	0
Dover sole	2007 - Apr 2008	278	0
Dungeness crab	2007 - Apr 2008	8	7
English sole	2007 - Apr 2008	21	0
Greenstriped rockfish	2007 - Apr 2008	96	0
Lingcod	2004 - 2005, 2007	22	6
Longnose skate	2007 - Apr 2008	8	7
Pacific sanddab	2007 - Apr 2008	140	0
Petrale sole	2007	14	8
Redbanded rockfish	2007 - Apr 2008	13	0
Rex sole	2007	1	0
Rougheye rockfish	2004 - 2005, 2007	80	64
Sharpchin rockfish	2007	1	0
Shortspine thornyhead	2007 - Apr 2008	29	0
Spiny dogfish	2007 - Apr 2008	18	17
Splitnose rockfish	2007 - Apr 2008	208	0
Stripetail rockfish	2007 - Apr 2008	181	0
Yellowtail rockfish	2007	1	0

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.

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.

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40° 10' N latitude	Species Group - South of 40° 10' N latitude
ALBC	ALBACORE	Other nongroundfish	Other nongroundfish
APLC	ALASKA PLAICE	Other non-FMP flatfish	Other non-FMP flatfish
ARR1	NOM. AURORA ROCKFISH	Other slope rockfish	Other slope rockfish
ARRA	AURORA ROCKFISH	Other slope rockfish	Other slope rockfish
ART1	NOM. ARROWTOOTH FLOUNDER	Arrowtooth flounder	Arrowtooth flounder
ARTH	ARROWTOOTH FLOUNDER	Arrowtooth flounder	Arrowtooth flounder
ASRK	PACIFIC ANGEL SHARK	Other nongroundfish	Other nongroundfish
BABL	BLACK ABALONE	Other nongroundfish	Other nongroundfish
BANK	BANK ROCKFISH	Other slope rockfish	Bank rockfish - south
BCAC	BOCACCIO	Bocaccio - north	Bocaccio
BCC1	NOM. BOCACCIO	Bocaccio - north	Bocaccio
BCLM	BUTTER CLAM	Other nongroundfish	Other nongroundfish
BGL1	NOM. BLACKGILL ROCKFISH	Other slope rockfish	Blackgill rockfish - south
BKCR	BLUE KING CRAB	Other nongroundfish	Other nongroundfish
BLCK	BLACK ROCKFISH	Black rockfish	Black rockfish
BLGL	BLACKGILL ROCKFISH	Other slope rockfish	Blackgill rockfish - south
BLK1	NOM. BLACK ROCKFISH	Black rockfish	Black rockfish
BLU1	NOM. BLUE ROCKFISH	Other nearshore rockfish	Other nearshore rockfish
BLUR	BLUE ROCKFISH	Other nearshore rockfish	Other nearshore rockfish
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	Bank rockfish - south
BRNZ	BRONZESPOTTED ROCKFISH	Other shelf rockfish	Other shelf rockfish
BRW1	NOM. BROWN ROCKFISH	Other nearshore rockfish	Other nearshore rockfish
BRWN	BROWN ROCKFISH	Other nearshore rockfish	Other nearshore rockfish
BRZ1	NOM. BRONZESPOTTED RF	Other shelf rockfish	Other shelf rockfish
BSJK	BLACK SKIPJACK	Other nongroundfish	Other nongroundfish
BSKT	BIG SKATE	Big skate	Big skate
BSOL	BUTTER SOLE	Other flatfish	Other flatfish
BSRK	BLUE SHARK	Other nongroundfish	Other nongroundfish
BSRM	UNSP. BAIT SHRIMP	Other shrimp	Other shrimp
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
BYL1	NOM. BLACK-AND-YELLOW RF	Other nearshore rockfish	Other nearshore rockfish
CBZ1	NOM. CABEZON	Other groundfish	Cabezon

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40° 10' N latitude	Species Group - South of 40° 10' N latitude
CBZN	CABEZON	Other groundfish	Cabezon
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
CHNA	CHINA ROCKFISH	Other nearshore rockfish	Other nearshore rockfish
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
CLCO	CALICO ROCKFISH	Other nearshore rockfish	Other nearshore rockfish
CLP1	NOM. CHILIPEPPER	Chilipepper - north	Chilipepper
CLPR	CHILIPEPPER	Chilipepper - north	Chilipepper
CMCK	CHUB MACKERAL	Other nongroundfish	Other nongroundfish
CMEL	CHAMELEON ROCKFISH	Other shelf rockfish	Other shelf rockfish
CML1	NOM. CHAMELEON ROCKFISH	Other shelf rockfish	Other shelf rockfish
CMSL	CALIFORNIA MUSSEL	Other nongroundfish	Other nongroundfish
CNR1	NOM. CANARY ROCKFISH	Canary rockfish	Canary rockfish
CNRY	CANARY ROCKFISH	Canary rockfish	Canary rockfish
COHO	COHO SALMON	Other nongroundfish	Other nongroundfish
COP1	NOM. COPPER ROCKFISH	Other nearshore rockfish	Other nearshore rockfish
COPP	COPPER ROCKFISH	Other nearshore rockfish	Other nearshore rockfish
CPLN	CAPELIN	Other nongroundfish	Other nongroundfish
CSKT	CALIFORNIA SKATE	Unspecified skate	Unspecified skate
CSOL	CURLFIN SOLE	Other flatfish	Other flatfish
CTRB	C-O SOLE	Other non-FMP flatfish	Other non-FMP flatfish
CUDA	PACIFIC BARRACUDA	Other nongroundfish	Other nongroundfish
CWC1	NOM. COWCOD ROCKFISH	Other shelf rockfish	Cowcod
CWCD	COWCOD ROCKFISH	Other shelf rockfish	Cowcod
DBR1	NOM. DARKBLOTCHED ROCKFISH	Darkblotched rockfish	Darkblotched rockfish
DBRK	DARKBLOTCHED ROCKFISH	Darkblotched rockfish	Darkblotched rockfish
DCRB	DUNGENESS CRAB	Dungeness crab	Dungeness crab
DLFT	UNSP. DEEP FLOUNDERS	Other flatfish	Other flatfish
DOVR	DOVER SOLE	Dover sole	Dover sole
DRDO	DORADO	Other nongroundfish	Other nongroundfish
DSOL	DEEPSEA SOLE	Other non-FMP flatfish	Other non-FMP flatfish
DSRK	SPINY DOGFISH	Spiny dogfish	Spiny dogfish
DTRB	DIAMOND TURBOT	Other non-FMP flatfish	Other non-FMP flatfish
DUSK	DUSKY ROCKFISH	Other groundfish	Other groundfish
DVR1	NOM. DOVER SOLE	Dover sole	Dover sole
DWRF	DWARF-RED ROCKFISH	Other shelf rockfish	Other shelf rockfish
EELS	UNSPECIFIED EELS	Other nongroundfish	Other nongroundfish
EGL1	NOM. ENGLISH SOLE	English sole	English sole

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40° 10' N latitude	Species Group - South of 40° 10' N latitude
EGLS	ENGLISH SOLE	English sole	English sole
ESTR	EASTERN OYSTER	Other nongroundfish	Other nongroundfish
ETNA	BIGEYE TUNA	Other nongroundfish	Other nongroundfish
EULC	EULACHON	Eulachon	Eulachon
EURO	EUROPEAN OYSTER	Other nongroundfish	Other nongroundfish
FLAG	FLAG ROCKFISH	Other shelf rockfish	Other shelf rockfish
FLG1	NOM. FLAG ROCKFISH	Other shelf rockfish	Other shelf rockfish
FNTS	FANTAIL SOLE	Other non-FMP flatfish	Other non-FMP flatfish
FRCK	FRECKLED ROCKFISH	Other shelf rockfish	Other shelf rockfish
FSOL	FLATHEAD SOLE	Other flatfish	Other flatfish
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
GBLC	GREENBLOTCHED ROCKFISH	Other shelf rockfish	Other shelf rockfish
GCLM	GAPER CLAM	Other nongroundfish	Other nongroundfish
GDUK	GEODUCK	Other nongroundfish	Other nongroundfish
GKCR	GOLDEN KING CRAB	Other nongroundfish	Other nongroundfish
GPH1	NOM. GOPHER ROCKFISH	Other nearshore rockfish	Gopher rockfish - south
GPHR	GOPHER ROCKFISH	Other nearshore rockfish	Gopher rockfish - south
GPRW	GOLDEN PRAWN	Other shrimp	Other shrimp
GRAS	GRASS ROCKFISH	Other nearshore rockfish	Other nearshore rockfish
GRDR	UNSP. GRENADIERS	Unspecified grenadiers	Unspecified grenadiers
GRS1	NOM. GRASS ROCKFISH	Other nearshore rockfish	Other nearshore rockfish
GSP1	NOM. GREENSPOTTED ROCKFISH	Other shelf rockfish	Other shelf rockfish
GSPT	GREENSPOTTED ROCKFISH	Other shelf rockfish	Other shelf rockfish
GSQD	GIANT SQUID	Other nongroundfish	Other nongroundfish
GSR1	NOM. GREENSTRIPED ROCKFISH	Other shelf rockfish	Other shelf rockfish
GSRK	GREENSTRIPED ROCKFISH	Other shelf rockfish	Other shelf rockfish
GSRM	GHOST SHRIMP	Other shrimp	Other shrimp
GSTG	GREEN STURGEON	Green sturgeon	Green sturgeon
GTRB	GREENLAND TURBOT	Other non-FMP flatfish	Other non-FMP flatfish
HBRK	HALFBANDED ROCKFISH	Other shelf rockfish	Other shelf rockfish
HCLM	HORSE CLAMS	Other nongroundfish	Other nongroundfish
HLQN	HARLEQUIN ROCKFISH	Other shelf rockfish	Other shelf rockfish
HNY1	NOM. HONEYCOMB ROCKFISH	Other shelf rockfish	Other shelf rockfish
HNYC	HONEYCOMB ROCKFISH	Other shelf rockfish	Other shelf rockfish
HTRB	HORNHEAD TURBOT	Other non-FMP flatfish	Other non-FMP flatfish
ISRK	BIGEYE THRESHER SHARK	Other nongroundfish	Other nongroundfish
JCLM	CALIFORNIA JACKKNIFE CLAM	Other nongroundfish	Other nongroundfish
JMCK	JACK MACKERAL	Other nongroundfish	Other nongroundfish
KFSH	GIANT KELPFISH	Other nongroundfish	Other nongroundfish
KGL1	NOM. KELP GREENLING	Kelp greenling	Kelp greenling
KLP1	NOM. KELP ROCKFISH	Other nearshore rockfish	Other nearshore rockfish

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40° 10' N latitude	Species Group - South of 40° 10' N latitude
KLPG	KELP GREENLING	Kelp greenling	Kelp greenling
KLPR	KELP ROCKFISH	Other nearshore rockfish	Other nearshore rockfish
KMKA	KAMCHATKA FLOUNDER	Other non-FMP flatfish	Other non-FMP flatfish
KSTR	KUMAMOTO OYSTER	Other nongroundfish	Other nongroundfish
LCD1	NOM. LINGCOD	Lingcod	Lingcod
LCLM	NATIVE LITTLENECK	Other nongroundfish	Other nongroundfish
LCOD	LINGCOD	Lingcod	Lingcod
LDAB	LONGFIN SANDDAB	Other non-FMP flatfish	Other non-FMP flatfish
LDB1	NOM. LONGFIN SANDDAB	Other non-FMP flatfish	Other non-FMP flatfish
LOBS	CALIFORNIA SPINY LOBSTER	Other nongroundfish	Other nongroundfish
LSKT	LONGNOSE SKATE	Longnose skate	Longnose skate
LSP1	NOM. LONGSPINE THORNYHEAD	Longspine thornyhead	Longspine thornyhead
LSPN	LONGSPINE THORNYHEAD	Longspine thornyhead	Longspine thornyhead
LSRK	LEOPARD SHARK	Other groundfish	Other groundfish
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 shrimp	Other shrimp
MXR1	NOM. MEXICAN ROCKFISH	Other shelf rockfish	Other shelf rockfish
MXRF	MEXICAN ROCKFISH	Other shelf rockfish	Other shelf rockfish
NANC	NORTHERN ANCHOVY	Other nongroundfish	Other nongroundfish
NRCK	NORTHERN ROCKFISH	Other groundfish	Other groundfish
NSHR	NORTHERN NEAR-SHORE RF	Other nearshore rockfish	Other nearshore rockfish
NSLF	NORTHERN SHELF ROCKFISH	Other shelf rockfish	Other shelf rockfish
NSLP	NORTHERN SLOPE ROCKFISH	Other slope rockfish	Other slope rockfish
NUSF	NOR. UNSP. SHELF ROCKFISH	Other shelf rockfish	Other shelf rockfish
NUSP	NOR. UNSP. SLOPE ROCKFISH	Other slope rockfish	Other slope rockfish
NUSR	NOR. UNSP. NEAR-SHORE RF	Other nearshore rockfish	Other nearshore rockfish
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
OCTP	UNSP. OCTOPUS	Other nongroundfish	Other nongroundfish
ODSR	OTHER DEMERSAL ROCKFISH	Other groundfish	Other groundfish
OECH	OTHER ECHINODERM	Other nongroundfish	Other nongroundfish
OFLT	OTHER FLATFISH	Other flatfish	Other flatfish
OGRN	OTHER GROUND FISH	Other groundfish	Other groundfish
OLV1	NOM. OLIVE ROCKFISH	Other nearshore rockfish	Other nearshore rockfish
OLVE	OLIVE ROCKFISH	Other nearshore rockfish	Other nearshore rockfish
OMSK	OTHER MOLLUSKS	Other nongroundfish	Other nongroundfish
OPLG	OTHER PELAGIC ROCKFISH	Other groundfish	Other groundfish
ORCK	OTHER ROCKFISH	Other slope rockfish (>150 fm)	Other slope rockfish (>150 fm)
ORCK	OTHER ROCKFISH	Other shelf rockfish (<150 fm)	Other shelf rockfish (<150 fm)
ORND	OTHER ROUND FISH	Other groundfish	Other groundfish
OSCL	OTHER SCALLOP	Other nongroundfish	Other nongroundfish
OSKT	OTHER SKATES	Unspecified skate	Unspecified skate
OSLR	OTHER SLOPE ROCKFISH	Other slope rockfish	Other slope rockfish
OSRK	OTHER SHARK	Other nongroundfish	Other nongroundfish
OSRM	OTHER SHRIMP	Pink shrimp	Pink shrimp
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
PDAB	PACIFIC SANDDAB	Other flatfish	Other flatfish
PDB1	NOM. PACIFIC SANDDAB	Other flatfish	Other flatfish
PGMY	PYGMY ROCKFISH	Other shelf rockfish	Other shelf rockfish
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
PNK1	NOM. PINK ROCKFISH	Other shelf rockfish	Other shelf rockfish
PNKR	PINK ROCKFISH	Other shelf rockfish	Other shelf rockfish
POMF	PACIFIC POMFRET	Other nongroundfish	Other nongroundfish
POP	PACIFIC OCEAN PERCH	Pacific ocean perch	Other slope rockfish
POP1	GEN. SHELF/SLOPE ROCKFISH	Other slope rockfish	Other slope rockfish
POP2	NOM. PACIFIC OCEAN PERCH	Pacific ocean perch	Other slope rockfish
PRCL	PURPLE CLAM	Other nongroundfish	Other nongroundfish
PROW	PROWFISH	Other nongroundfish	Other nongroundfish
PRR1	NOM. PINKROSE ROCKFISH	Other shelf rockfish	Other shelf rockfish

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40° 10' N latitude	Species Group - South of 40° 10' N latitude
PRRK	PINKROSE ROCKFISH	Other shelf rockfish	Other shelf rockfish
PSDN	PACIFIC SARDINE	Other nongroundfish	Other nongroundfish
PSHP	PINK SHRIMP	Pink shrimp	Pink shrimp
PSRK	PELAGIC THRESHER SHARK	Other nongroundfish	Other nongroundfish
PSTR	PACIFIC OYSTER	Other nongroundfish	Other nongroundfish
PTR1	NOM. PETRALE SOLE	Petrale sole	Petrale sole
PTRL	PETRALE SOLE	Petrale sole	Petrale sole
PUGT	PUGET SOUND ROCKFISH	Other shelf rockfish	Other shelf rockfish
PWHT	PACIFIC WHITING (HAKE)	Pacific hake	Pacific hake
QCLM	NORTHERN QUAHOG CLAM	Other nongroundfish	Other nongroundfish
QFSH	QUEENFISH	Other nongroundfish	Other nongroundfish
QLB1	NOM. QUILLBACK ROCKFISH	Other nearshore rockfish	Other nearshore rockfish
QLBK	QUILLBACK ROCKFISH	Other nearshore rockfish	Other nearshore rockfish
RABL	RED ABALONE	Other nongroundfish	Other nongroundfish
RATF	SPOTTED RATFISH	Other groundfish	Other groundfish
RCK1	BOCACCI+CHILIPEPPER RF	Other shelf rockfish	Other shelf rockfish
RCK2	UNSP. BOLINA ROCKFISH	Other nearshore rockfish	Other nearshore rockfish
RCK3	UNSP. DPWTR REDS ROCKFISH	Other slope rockfish	Other slope rockfish
RCK4	UNSP. REDS ROCKFISH	Other groundfish	Other groundfish
RCK5	UNSP. SMALL REDS ROCKFISH	Other groundfish	Other groundfish
RCK6	UNSP. ROSEFISH ROCKFISH	Other groundfish	Other groundfish
RCK7	UNSP. GOPHER ROCKFISH	Other nearshore rockfish	Gopher rockfish - south
RCK8	CANARY+VERMILION ROCKFISH	Canary rockfish	Canary rockfish
RCK9	BLACK+BLUE ROCKFISH	Other nearshore rockfish	Other nearshore rockfish
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
RDBD	REDBANDED ROCKFISH	Other slope rockfish	Other slope rockfish
REDS	REDSTRIPE ROCKFISH	Redstripe rockfish - north	Other shelf rockfish
REX	REX SOLE	Other flatfish	Other flatfish
REX1	NOM. REX SOLE	Other flatfish	Other flatfish
REYE	ROUGHEYE ROCKFISH	Other slope rockfish	Other slope rockfish
RFLT	REMAINING FLATFISH	Other flatfish	Other flatfish
RGL1	NOM. ROCK GREENLING	Other nongroundfish	Other nongroundfish
RGRN	REMAINING GROUND FISH	Other groundfish	Other groundfish
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
ROSY	ROSY ROCKFISH	Other shelf rockfish	Other shelf rockfish
RPRW	RIDGEBACK PRAWN	Other shrimp	Other shrimp
RRCK	REMAINING ROCKFISH	Other groundfish	Other groundfish
RRND	REMAINING ROUND FISH	Other groundfish	Other groundfish

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RSOL	ROCK SOLE	Other flatfish	Other flatfish
RST1	NOM. ROSETHORN ROCKFISH	Other shelf rockfish	Other shelf rockfish
RSTN	ROSETHORN ROCKFISH	Other shelf rockfish	Other shelf rockfish
RURC	RED SEA URCHIN	Other nongroundfish	Other nongroundfish
RZCL	ROSY RAZOR CLAM	Other nongroundfish	Other nongroundfish
SABL	SABLEFISH	Sablefish	Sablefish
SAIL	SAILFISH	Other nongroundfish	Other nongroundfish
SARY	PACIFIC SAURY	Other nongroundfish	Other nongroundfish
SBL1	NOM. SHORTBELLY ROCKFISH	Shortbelly rockfish	Shortbelly rockfish
SBLY	SHORTBELLY ROCKFISH	Shortbelly rockfish	Shortbelly rockfish
SCLM	SOFT-SHELLED CLAM	Other nongroundfish	Other nongroundfish
SCLP	UNSP. SCULPIN	Other nongroundfish	Other nongroundfish
SCOR	CALIFORNIA SCORPIONFISH	Other groundfish	Other nearshore rockfish
SCR1	NOM. CALIFORNIA SCORPIONFISH	Other groundfish	Other nearshore rockfish
SDB1	NOM. SPECKLED SANDDAB	Other non-FMP flatfish	Other non-FMP flatfish
SFL1	NOM. STARRY FLOUNDER	Starry flounder	Starry flounder
SFLT	UNSP. SHALLOW FLOUNDERS	Other flatfish	Other flatfish
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	Sharpchin rockfish - north	Sharpchin rockfish - south
SKCR	SCARLET KING CRAB	Other nongroundfish	Other nongroundfish
SLGR	SILVERGREY ROCKFISH	Silvergrey rockfish - north	Other shelf rockfish
SLNS	SLENDER SOLE	Other non-FMP flatfish	Other non-FMP flatfish
SMLT	UNSP. SMELT	Other nongroundfish	Other nongroundfish
SNOS	SPLITNOSE ROCKFISH	Splitnose rockfish - north	Splitnose rockfish
SNS1	NOM. SPLITNOSE ROCKFISH	Splitnose rockfish - north	Splitnose rockfish
SOCK	SOCKEYE SALMON	Other nongroundfish	Other nongroundfish
SPK1	NOM. SPECKLED ROCKFISH	Other shelf rockfish	Other shelf rockfish
SPKL	SPECKLED ROCKFISH	Other shelf rockfish	Other shelf rockfish
SPRW	SPOTTED PRAWN	Other shrimp	Other shrimp
SQID	UNSP. SQUID	Other nongroundfish	Other nongroundfish
SQR1	NOM. SQUARESPOT	Other shelf rockfish	Other shelf rockfish
SQRS	SQUARESPOT ROCKFISH	Other shelf rockfish	Other shelf rockfish
SRFP	SURFPERCH SPP.	Other nongroundfish	Other nongroundfish
SRKR	SHORTRAKER ROCKFISH	Other slope rockfish	Other slope rockfish
SSCL	SHARPNOSE SCULPIN	Other nongroundfish	Other nongroundfish
SSDB	SPECKLED SANDDAB	Other non-FMP flatfish	Other non-FMP flatfish
SSHR	SOUTHERN NEAR-SHORE RF	Other nearshore rockfish	Other nearshore rockfish
SSLF	SOUTHERN SHELF ROCKFISH	Other shelf rockfish	Other shelf rockfish
SSLP	SOUTHERN SLOPE ROCKFISH	Other slope rockfish	Other slope rockfish
SSO1	NOM. SAND SOLE	Other flatfish	Other flatfish
SSOL	SAND SOLE	Other flatfish	Other flatfish

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SSP1	NOM. SHORTSPINE THORNYHEAD	Shortspine thornyhead	Shortspine thornyhead
SSPN	SHORTSPINE THORNYHEAD	Shortspine thornyhead	Shortspine thornyhead
SSRD	DEEP SO. NEAR-SHORE RF	Other nearshore rockfish	Other nearshore rockfish
SSRK	SOUPFIN SHARK	Other groundfish	Other groundfish
SSRS	SHALLOW SO. NEAR-SHORE RF	Other nearshore rockfish	Other nearshore rockfish
STAR	STARRY ROCKFISH	Other shelf rockfish	Other shelf rockfish
STL1	NOM. STRIPETAILED ROCKFISH	Other shelf rockfish	Other shelf rockfish
STLH	STEELHEAD	Other nongroundfish	Other nongroundfish
STNA	SKIPJACK TUNA	Other nongroundfish	Other nongroundfish
STR1	NOM. STARRY ROCKFISH	Other shelf rockfish	Other shelf rockfish
STRK	STRIPETAILED ROCKFISH	Other shelf rockfish	Other shelf rockfish
STRY	STARRY FLOUNDER	Starry flounder	Starry flounder
SUSF	SO. UNSP. SHELF ROCKFISH	Other shelf rockfish	Other shelf rockfish
SUSP	SO. UNSP. SLOPE ROCKFISH	Other slope rockfish	Other slope rockfish
SUSR	SO. UNSP. NEAR-SHORE RF	Other nearshore rockfish	Other nearshore rockfish
SWRD	SWORDFISH	Other nongroundfish	Other nongroundfish
SWS1	NOM. SWORDSPINE ROCKFISH	Other shelf rockfish	Other shelf rockfish
SWSP	SWORDSPINE ROCKFISH	Other shelf rockfish	Other shelf rockfish
TCOD	PACIFIC TOMCOD	Other nongroundfish	Other nongroundfish
TGR1	NOM. TIGER ROCKFISH	Other shelf rockfish	Other shelf rockfish
THD1	NOM. THORNYHEADS	Mixed thornyheads	Mixed thornyheads
THDS	THORNYHEADS (MIXED)	Mixed thornyheads	Mixed thornyheads
TIGR	TIGER ROCKFISH	Other shelf rockfish	Other shelf rockfish
TRE1	NOM. TREEFISH	Other nearshore rockfish	Other nearshore rockfish
TREE	TREEFISH	Other nearshore rockfish	Other nearshore rockfish
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
UDF1	UNSP. DEEP-91 FLOUNDERS	Other flatfish	Other flatfish
UDF2	UNSP. DEEP-95 FLOUNDERS	Other flatfish	Other flatfish
UDM1	UNSP. DEMERSAL-91	Other groundfish	Other groundfish
UDNR	UNSP. DEEP NEAR-SHORE RF	Other nearshore rockfish	Other nearshore rockfish
UDSR	UNSP. DEMERSAL ROCKFISH	Other groundfish	Other groundfish
UDW1	SHORTRAKER+ROUGHEYE RF	Other slope rockfish	Other slope rockfish
UECH	UNSPECIFIED ECHINODERM	Other nongroundfish	Other nongroundfish
UFL1	FLOUNDERS (NO FSOL)	Other flatfish	Other flatfish
UFLT	UNSP. FLATFISH	Other flatfish	Other flatfish
UGRN	UNSP. GROUND FISH	Other groundfish	Other groundfish
UHAG	UNSP. HAGFISH	Other nongroundfish	Other nongroundfish
UHLB	UNSP. HALIBUT	Other nongroundfish	Other nongroundfish
UJEL	UNSP. JELLYFISH	Other nongroundfish	Other nongroundfish

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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
UPOP	UNSP. POP GROUP	Pacific ocean perch	Other slope rockfish
URCK	UNSP. ROCKFISH	Other shelf rockfish (<150 fm)	Other shelf rockfish (<150 fm)
URCK	UNSP. ROCKFISH	Other slope rockfish (>150 fm)	Other slope rockfish (>150 fm)
URK1	SRKR+REYE+NRCK+SHRP	Other slope rockfish	Other slope rockfish
URND	UNSP. ROUND FISH	Other groundfish	Other groundfish
USCL	UNSP. SCALLOP	Other nongroundfish	Other nongroundfish
USCU	UNSP. SEA CUCUMBER	Other nongroundfish	Other nongroundfish
USF1	UNSP. SHALLOW-91 FLOUNDERS	Other flatfish	Other flatfish
USHR	UNSP. NEAR-SHORE ROCKFISH	Other nearshore rockfish	Other nearshore rockfish
USKT	UNSP. SKATE	Unspecified skate	Unspecified skate
USLF	UNSP. SHELF ROCKFISH	Other shelf rockfish	Other shelf rockfish
USLP	UNSP. SLOPE ROCKFISH	Other slope rockfish	Other slope rockfish
USLR	UNSP. SLOPE ROCKFISH	Other slope rockfish	Other slope rockfish
USMN	UNSP. SALMON	Other nongroundfish	Other nongroundfish
USR1	UNSP. SLOPE-91	Other groundfish	Other groundfish
USR2	UNSP. SLOPE-93	Other groundfish	Other groundfish
USRK	UNSP. SHARK	Other nongroundfish	Other nongroundfish
USRM	UNSP. OCEAN SHRIMP	Pink shrimp	Pink shrimp
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
UURC	UNSP. SEA URCHIN	Other nongroundfish	Other nongroundfish
VRM1	NOM. VERMILLION ROCKFISH	Other shelf rockfish	Other shelf rockfish
VRML	VERMILLION ROCKFISH	Other shelf rockfish	Other shelf rockfish
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
WDW1	NOM. WIDOW ROCKFISH	Widow rockfish	Widow rockfish
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
YEYE	YELLOWEYE ROCKFISH	Yelloweye rockfish	Yelloweye rockfish
YLTL	YELLOWTAIL	Other nongroundfish	Other nongroundfish
YMTH	YELLOWMOUTH ROCKFISH	Yellowmouth - north	Other slope rockfish

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YSOL	YELLOWFIN SOLE	Other non-FMP flatfish	Other non-FMP flatfish
YTNA	YELLOWFIN TUNA	Other nongroundfish	Other nongroundfish
YTR1	NOM. YELLOWTAIL ROCKFISH	Yellowtail rockfish	Yellowtail rockfish - south
YTRK	YELLOWTAIL ROCKFISH	Yellowtail rockfish	Yellowtail rockfish - south