

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

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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 May 1, 2008 through October 31, 2008. The WCGOP collects at-sea data from limited-entry (LE) trawl and fixed-gear fisheries, as well as from open access fisheries targeting nearshore rockfish, 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. However, Oregon licensed pink shrimp vessels can and do fish in waters off Washington state.

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.

California Department of Fish and Game (CDGFG) provided the WCGOP with a list of vessels that participate in the Northern Pink Shrimp Trawl fishery and the Oregon Department of Fish and Wildlife provided the WCGOP with a list of pink shrimp licenses and associated vessels. The data in this report were collected during the selection cycle from March 1, 2008 to October 31, 2008 (selection cycle 4). The initial 2008 list for Oregon pink shrimp vessels had 142 vessels. The initial 2008 list with California Northern Pink Shrimp trawl licenses had 39 vessels. The WCGOP then reduced each list using the following criteria:

- Vessel landed \geq 500 lbs pink shrimp in 2006 or 2007.
- Vessel is greater than 16 feet in length.

After the criteria were applied, 44 vessels were selected for coverage in Oregon and 6 vessels in California during 2008.

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. Within each port group, permits were randomly selected for coverage. California shrimp vessels were selected for a two-month period. Oregon pink shrimp vessels were selected for a one-month period due to the high number of vessels and trips.

After the entire fleet has been selected, a new selection cycle begins. 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 2008). 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 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 2008).

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

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:

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

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:

$$B_{mt} = \frac{\sum_k \sum_s x_{mks}}{\sum_t \sum_k \sum_s x_{mks}}$$

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

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 are calculated as the proportion of fleet-wide landings of pink shrimp that were observed. Coverage rates were computed based on the complete annual dataset for 2008.

After a coverage rate was 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 pink shrimp 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 $Var(R_{ijd})$ cannot be calculated when $x_{ijdt} = 0$ or $y_{ijdt} = 0$ for all tows and should be considered with extreme caution when R_{ijd} 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 California and Oregon pink shrimp trawl fisheries are summarized in Table 1 for 2008. 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, for 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, with 2008 coverage at 6% coastwide. This is slightly lower than the 2007 coastwide coverage rate of 7% (NMFS 2008). All observations occurred 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, with the largest total pink shrimp landings in Astoria during 2008. Total pink shrimp landings in Astoria during 2008 were nearly double the amount landed in 2007, yet observer coverage was not proportional to landings in this port group (4% in 2008 relative to 7% in 2007). In 2007, the largest landings were in the Coos Bay/Crescent City combined port groups, where observer coverage was also greatest.

The pink shrimp trawl fishery is one of the lower priority fisheries for the WCGOP, and observations in some port groups are limited. Low numbers of observations may lead to unbalanced sampling across ports or another important dimension of fishery participation. Some areas or time periods may have been more heavily covered than others, which may skew the analysis to the areas and periods of higher coverage. The WCGOP controls only the selection of permits for coverage. Fishing activity of selected vessels can vary in unpredictable ways. Therefore, the program cannot control the percentage of landings or the number of trips that are actually observed. As a result, coverage levels may vary from year to year depending on which permits were selected.

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 2008 is presented in Table 2. All observations and weights provided are from north of 40° 10' N. latitude, with Oregon and California data combined. Separate reporting for each individual state was not presented to ensure confidentiality. A single total catch weight for some species groups is provided, although discard weights are reported by species within the group. 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 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.

Observed coastwide total catch (discarded + retained) in the 2008 pink shrimp fishery was largely comprised of pink shrimp, Pacific hake, and flatfish species (Table 2). Of the rebuilding species, darkblotched rockfish was the most commonly observed. Canary rockfish, Pacific ocean perch and cowcod 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. Hagfish was the only retained non-groundfish species analyzed other than pink shrimp and unidentified shrimp. Non-target groundfish species which were retained included slope rockfish (29%) and sablefish (84%). Although there was no pink shrimp discard recorded, observers did record discard of unidentified shrimp. Observers are not required to identify shrimp to species due to time constraints.

Discard and bycatch ratios, as well as standard errors, for the 2008 pink shrimp fishery north of 40° 10' N. latitude are presented in Table 3. Species are grouped for ratio calculations according to Appendix B. All ratios in Table 3 were computed with pink shrimp in the denominator. Discard ratios were relatively low for most species and species groups except for Pacific hake. Discard and bycatch ratios were often identical due to 100% of the observed catch for most species being discarded.

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 2009 are summarized in Table 4.

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 darkblotched rockfish, Pacific ocean perch, arrowtooth flounder, aurora rockfish, dover sole, english sole, greenstriped rockfish, Pacific hake, Pacific sanddab, rougheye rockfish, sablefish, shortspine thornyhead, spiny dogfish, splitnose rockfish, striptail rockfish, and yellowtail rockfish.

There was no protected resources catch recorded in the pink shrimp fishery between September 2003 and April 2009. 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 2008).

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

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FIGURES

Figure 1. Length frequency distributions of discarded rebuilding groundfish species observed in the pink shrimp fishery from September 2003 - April 2009. Length frequencies are provided for species for which 30 observations or more were available.

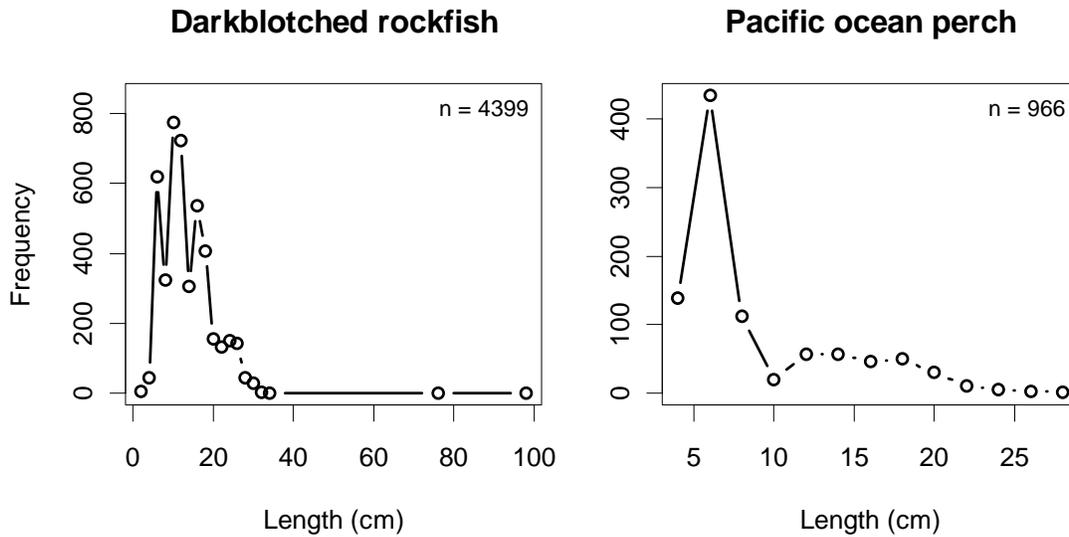


Figure 2. Length frequency distributions of discarded non-rebuilding groundfish species observed in the pink shrimp fishery from September 2003 - April 2009. Length frequencies are provided for species for which 30 observations or more were available.

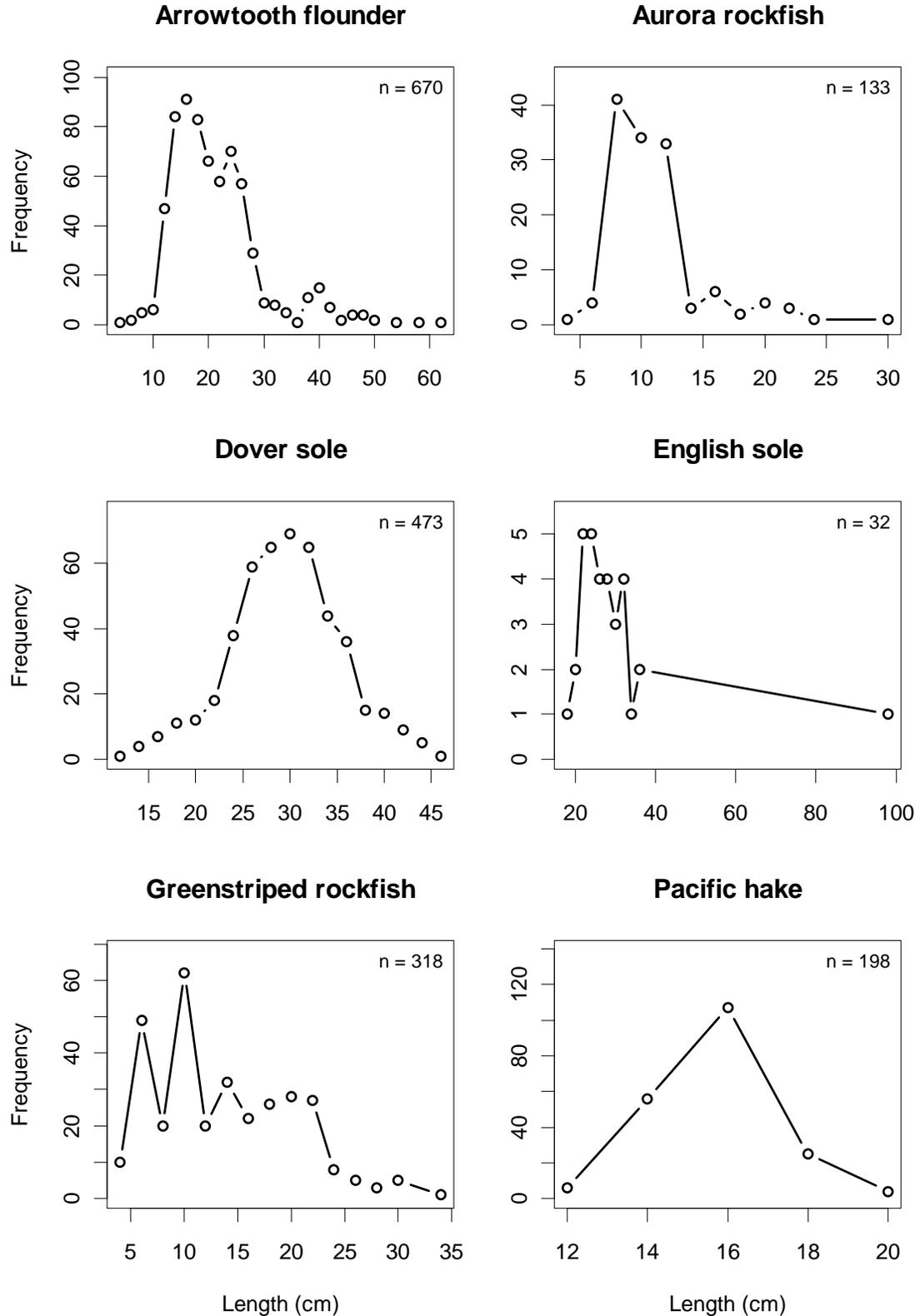


Figure 2 continued. Length frequency distributions of discarded non-rebuilding groundfish species observed in the pink shrimp fishery from September 2003 - April 2009. Length frequencies are provided for species for which 30 observations or more were available.

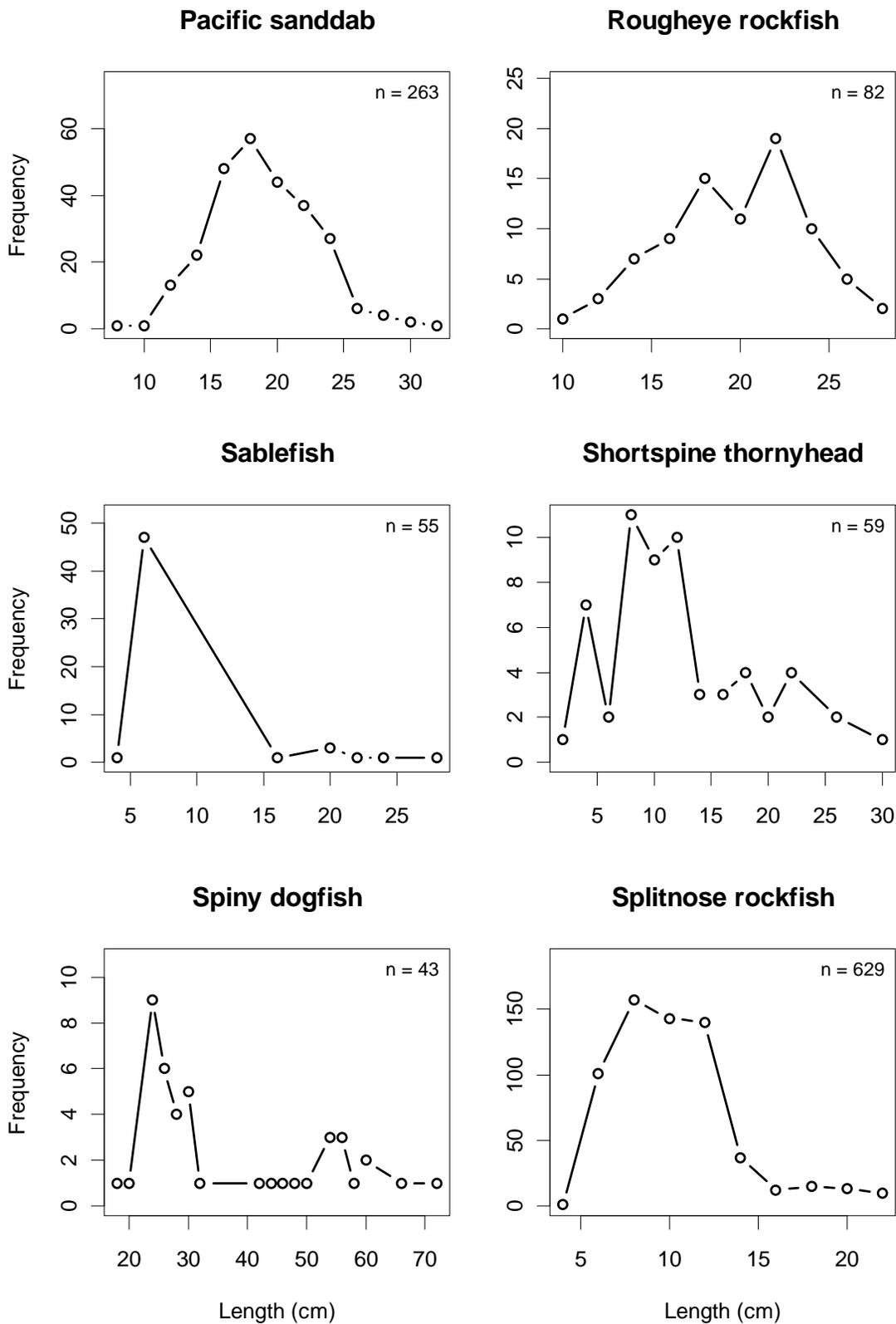
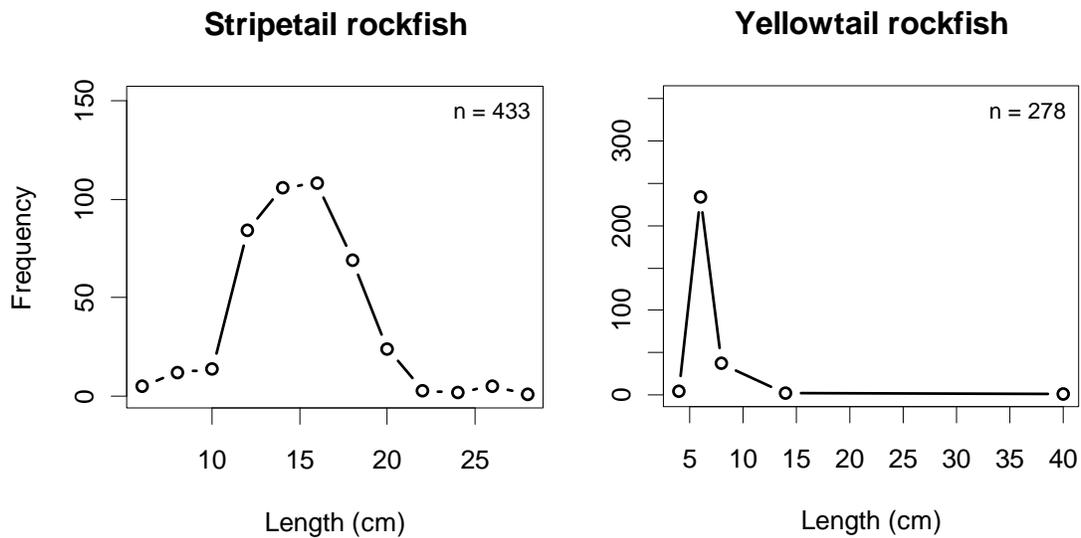


Figure 2 continued. Length frequency distributions of discarded non-rebuilding groundfish species observed in the pink shrimp fishery from September 2003 - April 2009. Length frequencies are provided for species for which 30 observations or more were available.



TABLES

Table 1. Total observed trips, hauls, vessels and pink shrimp landings in the pink shrimp trawl fishery in 2008. 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
2008	Bellingham	--	--	--	--	--	--
	Neah Bay	--	--	--	--	--	--
	Astoria	19	363	11	285	6358	4%
	Newport	12	186	7	196	3804	5%
	Coos Bay	25	362	13	420	5202	8%
	Crescent City						
	Eureka						
	Fort Bragg	--	--	--	--	--	--
	San Francisco	--	--	--	--	--	--
	Monterey	--	--	--	--	--	--
	Morro Bay	--	--	--	--	--	--
	Santa Barbara	--	--	--	--	--	--
	Los Angeles	--	--	--	--	--	--
		North of 40°10' N	56	911	31	901	15364
	South of 40°10' N	--	--	--	--	--	--
	Coastwide total	56	911	31	901	15364	6%

Table 2. Observed catch weight (mt), discard weight (mt) and percent discarded from observed 2008 pink shrimp vessels. All data were collected north of 40°10' N. latitude.

2008 North of 40°10' N Lat.	Total catch (mt)	Discard (mt)	Total % discarded
Rebuilding species			
Bocaccio	--	--	--
Canary rockfish	0.014	0.014	100.0%
Cowcod	0.000	0.000	100.0%
Darkblotched rockfish	0.670	0.670	100.0%
Pacific ocean perch	0.011	0.011	100.0%
Widow rockfish	--	--	--
Yelloweye rockfish	--	--	--
Non-rebuilding species			
Arrowtooth flounder	1.718	1.718	100.0%
Big skate	0.000	0.000	100.0%
Black rockfish	0.001	0.001	100.0%
Chilipepper rockfish	0.001	0.001	100.0%
Dover sole	0.760	0.760	100.0%
English sole	0.070	0.070	100.0%
Flatfish	9.066	9.066	100.0%
Unspecified flatfish		0.138	
Pacific sanddab		0.246	
Sand sole		0.016	
Slender sole		8.666	
Flathead sole	0.023	0.023	100.0%
Lingcod	0.003	0.003	100.0%
Nearshore rockfish	0.000	0.000	100.0%
Other groundfish	0.000	0.000	100.0%
Petrale sole	0.076	0.076	100.0%
Rex sole	1.498	1.498	100.0%
Sablefish	0.569	0.093	16.3%
Shelf rockfish	0.518	0.518	100.0%
Greenstriped rockfish		0.092	
Pygmy rockfish		0.001	
Redstripe rockfish		0.000	
Stripetail rockfish		0.425	
Skates	0.089	0.089	100.0%
California skate		0.000	
Longnose skate		0.067	
Sandpaper skate		0.001	
Unspecified skate		0.021	
Slope rockfish	1.543	1.090	70.6%
Aurora rockfish		0.017	
Redbanded rockfish		0.002	
Unspecified slope rockfish		0.249	
Rougheye rockfish		0.001	

Table 2 continued.

2008			
North of 40°10' N Lat.	Total catch (mt)	Discard (mt)	Total % discarded
Non-rebuilding species (cont.)			
Slope rockfish (cont.)	1.543	1.090	70.6%
Sharpchin rockfish		0.004	
Shortraker rockfish		0.004	
Splitnose rockfish		0.813	
Spiny dogfish	0.211	0.211	100.0%
Spotted ratfish	0.030	0.030	100.0%
Thornyheads	0.026	0.026	100.0%
Shortspine Thornyhead		0.026	
Yellowtail rockfish	0.003	0.003	100.0%
Non-groundfish species			
American Shad	0.010	0.010	100.0%
Anchovy (unidentified)	0.023	0.023	100.0%
Bigfin Eelpout	0.037	0.037	100.0%
Bivalves (unidentified)	0.000	0.000	100.0%
Blackedge Poacher	0.000	0.000	100.0%
Bluebarred Prickleback	0.007	0.007	100.0%
Decomposed Fish	0.059	0.059	100.0%
Decorator/Spider Crab	0.000	0.000	100.0%
Dragonfish (unidentified)	0.000	0.000	100.0%
Dungeness Crab	0.040	0.040	100.0%
Dwarf Wrymouth	0.001	0.001	100.0%
Eelpout (unidentified)	0.549	0.549	100.0%
Eulachon	0.683	0.683	100.0%
Gunnel (unidentified)	0.000	0.000	100.0%
Hatchetfish (unidentified)	0.000	0.000	100.0%
Hagfish (unidentified)	1.823	0.182	10.0%
Hermit Crab (unidentified)	0.000	0.000	100.0%
Jellyfish (unidentified)	0.036	0.036	100.0%
Laternfish (unidentified)	0.003	0.003	100.0%
Leaf Like Eel	0.000	0.000	100.0%
Lightfish (unidentified)	0.002	0.002	100.0%
Longspine Combfish	0.003	0.003	100.0%
Lyre Crab (unidentified)	0.000	0.000	100.0%
Unspecified fish	4.845	4.845	100.0%
Monkeyface Prickleback	0.000	0.000	100.0%
Northern Anchovy	0.000	0.000	100.0%
Octopus (unidentified)	0.033	0.033	100.0%
Pacific Argentine	0.000	0.000	100.0%
Pacific Hagfish	0.063	0.063	100.0%
Pacific Hake	42.733	42.733	100.0%
Pacific Halibut	0.020	0.020	100.0%
Pacific Herring	0.112	0.112	100.0%
Pacific Lamprey	0.002	0.002	100.0%
Pacific Sardine	0.051	0.051	100.0%
Pacific Staghorn Sculpin	0.001	0.001	100.0%
Pacific Tom Cod	0.002	0.002	100.0%

Table 2 continued.

2008			
North of 40°10' N Lat.	Total catch (mt)	Discard (mt)	Total % discarded
Non-groundfish species (cont.)			
Pink Shrimp	900.420	--	0.0%
Plainfin Midshipman	0.000	0.000	100.0%
Poacher (unidentified)	0.156	0.156	100.0%
Prickleback (unidentified)	0.007	0.007	100.0%
Ronquill (unidentified)	0.000	0.000	100.0%
Sculpin (unidentified)	0.011	0.011	100.0%
Sea Cucumber (unidentified)	0.094	0.094	100.0%
Shrimp (unidentified)	12.518	11.883	94.9%
Smelt (unidentified)	1.441	1.441	100.0%
Snailfish (unidentified)	0.001	0.001	100.0%
Spotted Cusk-eel	0.000	0.000	100.0%
Squid (unidentified)	0.262	0.262	100.0%
Surf Smelt	0.010	0.010	100.0%
Surfperch (unidentified)	0.007	0.007	100.0%
Urchin (unidentified)	0.160	0.160	100.0%
Whitebait Smelt	0.002	0.002	100.0%
Whitebarred Prickleback	0.004	0.004	100.0%
Wrymouth (unidentified)	0.000	0.000	100.0%

Table 3. Discard ratios, bycatch ratios and standard errors from observed trips in the 2008 pink shrimp trawl fishery. All 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.

2008				
North of 40°10' N Lat.	Discard ratio	SE	Bycatch ratio	SE
Rebuilding species				
Bocaccio	--	--	--	--
Canary rockfish	0.0000	0.0025	0.0000	0.0025
Cowcod	--	--	--	--
Darkblotched rockfish	0.0007	0.0001	0.0007	0.0001
Pacific ocean perch	0.0000	0.0006	0.0000	0.0006
Widow rockfish	--	--	--	--
Yelloweye rockfish	--	--	--	--
Non-rebuilding species				
Arrowtooth flounder	0.0020	0.0006	0.0020	0.0006
Big skate	0.0000	0.0001	0.0000	0.0001
Black rockfish	0.0000	0.0001	0.0000	0.0001
Dover sole	0.0008	0.0005	0.0008	0.0005
English sole	0.0001	0.0008	0.0001	0.0008
Lingcod	0.0000	0.0001	0.0000	0.0001
Longnose skate	0.0001	0.0003	0.0001	0.0003
Other flatfish	0.0021	0.0004	0.0021	0.0004
Other groundfish	0.0000	0.0002	0.0000	0.0002
Other nearshore rockfish	0.0000	--	0.0000	--
Other shelf rockfish	0.0008	0.0005	0.0008	0.0005
Other slope rockfish	0.0000	0.0002	0.0005	0.0047
Pacific hake	0.0445	0.0129	0.0445	0.0129
Petrale sole	0.0001	0.0006	0.0001	0.0006
Redstripe rockfish	0.0000	--	0.0000	--
Sablefish	0.0001	0.0028	0.0007	0.0156
Sharpchin rockfish	0.0000	0.0002	0.0000	0.0002
Shortspine thornyhead	0.0000	0.0002	0.0000	0.0002
Spiny dogfish	0.0002	0.0046	0.0002	0.0046
Splitnose rockfish	0.0008	0.0007	0.0008	0.0007
Unspecified skate	0.0000	0.0010	0.0000	0.0010
Yellowtail rockfish	0.0000	0.0000	0.0000	0.0000
Non-groundfish species				
Dungeness crab	0.0000	0.0011	0.0000	0.0011
Eulachon	0.0008	0.0008	0.0008	0.0008
Other non-FMP flatfish	0.0096	0.0013	0.0096	0.0013
Other nongroundfish	0.0038	0.0001	0.0056	0.0003
Pacific halibut	0.0000	--	0.0000	--
Pink shrimp + Unidentified shrimp	0.0130	0.0035	1.0130	0.0611

Table 4. 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 2009. 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 - Apr 2009	9	6
Cowcod	2004, 2008	4	0
Darkblotched rockfish	2004 - Apr 2009	4399	1710
Pacific ocean perch	2004 - 2005, 2007 - 2008	966	71
Widow rockfish	2007	4	0
Yelloweye rockfish	2004	2	0
Non-rebuilding species			
Arrowtooth flounder	2007 - Apr 2009	670	0
Aurora rockfish	2004, 2007 - 2008	133	0
Chilipepper rockfish	2005, 2007	5	0
Dover sole	2007 - Apr 2009	473	0
Dungeness crab	2007 - 2008	28	27
English sole	2007 - 2008	32	0
Greenstriped rockfish	2007 - Apr 2009	318	0
Lingcod	2004 - 2008	25	6
Longnose skate	2007 - 2008	25	23
Pacific hake	Jan - Apr 2009	198	0
Pacific sanddab	2007 - Apr 2009	263	0
Petrable sole	2007 - Apr 2009	29	19
Redbanded rockfish	2007 - 2008	28	0
Redstripe rockfish	2008	1	0
Rex sole	2007	1	0
Rougheye rockfish	2004 - 2008	82	64
Sablefish	2008 - Apr 2009	55	0
Sharpchin rockfish	2007	1	0
Shortraker rockfish	2008	1	0
Shortspine thornyhead	2007 - 2008	59	0
Spiny dogfish	2007 - 2008	43	42
Splitnose rockfish	2007 - 2008	629	0
Stripetail rockfish	2007 - Apr 2009	433	0
Yellowtail rockfish	2007 - 2008	278	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 (Remaining rockfish)
BCAC	BOCACCIO	Bocaccio (Remaining rockfish)	Bocaccio
BCC1	NOM. BOCACCIO	Bocaccio (Remaining rockfish)	Bocaccio
BCLM	BUTTER CLAM	Other nongroundfish	Other nongroundfish
BGL1	NOM. BLACKGILL ROCKFISH	Other slope rockfish	Blackgill (Remaining rockfish)
BKCR	BLUE KING CRAB	Other nongroundfish	Other nongroundfish
BLCK	BLACK ROCKFISH	Black rockfish	Black rockfish
BLGL	BLACKGILL ROCKFISH	Other slope rockfish	Blackgill (Remaining rockfish)
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 MACKEREL	Other nongroundfish	Other nongroundfish
BMRL	BLUE MARLIN	Other nongroundfish	Other nongroundfish
BMSL	BLUE OR BAY MUSSEL	Other nongroundfish	Other nongroundfish
BNK1	NOM. BANK ROCKFISH	Other slope rockfish	Bank rockfish (Remaining rockfish)
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 ROCKFISH	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 ROCKFISH	Other nearshore rockfish	Other nearshore rockfish
CBZ1	NOM. CABEZON	Other groundfish	Cabezon
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

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40° 10' N latitude	Species Group - South of 40° 10' N latitude
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 (Remaining rockfish)	Chilipepper
CLPR	CHILIPEPPER	Chilipepper (Remaining rockfish)	Chilipepper
CMCK	CHUB MACKEREL	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
DFLT	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
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

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40° 10' N latitude	Species Group - South of 40° 10' N latitude
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 ROCKFISH	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 (Remaining rockfish)
GPHR	GOPHER ROCKFISH	Other nearshore rockfish	Gopher rockfish (Remaining rockfish)
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 MACKEREL	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
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	CALIF. SPINY LOBSTER	Other nongroundfish	Other nongroundfish
LSKT	LONGNOSE SKATE	Longnose skate	Longnose skate
LSP1	NOM. LONGSPINE THORNYHEAD	Longspine thornyhead	Longspine thornyhead

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40° 10' N latitude	Species Group - South of 40° 10' N latitude
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 ROCKFISH	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 ROCKFISH	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
OCTP	UNSP. OCTOPUS	Other nongroundfish	Other nongroundfish
ODSR	OTHER DEMERSAL RKFSH	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 RKFSH	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 RKFSH	Other slope rockfish	Other slope rockfish
OSRK	OTHER SHARK	Other nongroundfish	Other nongroundfish
OSRM	OTHER SHRIMP	Pink shrimp	Pink shrimp

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40° 10' N latitude	Species Group - South of 40° 10' N latitude
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 URCHINS	Other nongroundfish	Other nongroundfish
OWFS	OCEAN WHITEFISH	Other nongroundfish	Other nongroundfish
PABL	PINK ABALONE	Other nongroundfish	Other nongroundfish
PBNT	PACIFIC BONITO	Other nongroundfish	Other nongroundfish
PBTR	PACIFIC BUTTERFISH	Other nongroundfish	Other nongroundfish
PCLM	PISMO CLAM	Other nongroundfish	Other nongroundfish
PCOD	PACIFIC COD	Pacific cod	Other groundfish
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 RF	Other slope rockfish	Other slope rockfish
POP2	NOMINAL POP	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
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	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 RCKFSH	Other shelf rockfish	Other shelf rockfish
RCK2	UNSP. BOLINA RCKFSH	Other nearshore rockfish	Other nearshore rockfish
RCK3	UNSP. DPWTR REDS RCKFSH	Other slope rockfish	Other slope rockfish
RCK4	UNSP. REDS RCKFSH	Other groundfish	Other groundfish
RCK5	UNSP. SMALL REDS RCKFSH	Other groundfish	Other groundfish
RCK6	UNSP. ROSEFISH RCKFSH	Other groundfish	Other groundfish
RCK7	UNSP. GOPHER RCKFSH	Other nearshore rockfish	Gopher rockfish (Remaining rockfish)

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RCK8	CANARY+VERMILION RCKFSH	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 (Remaining rockfish)	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
RSL1	NOM. ROCK SOLE	Other flatfish	Other flatfish
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. CALIF. 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
SHP1	NOM. CALIFORNIA SHEEPHEAD	Other nongroundfish	Other nongroundfish
SHPD	CALIFORNIA SHEEPHEAD	Other nongroundfish	Other nongroundfish
SHRP	SHARPCHIN ROCKFISH	Sharpchin rockfish (Remaining rockfish)	Sharpchin rockfish (Remaining rockfish)
SKCR	SCARLET KING CRAB	Other nongroundfish	Other nongroundfish
SLGR	SILVERGREY ROCKFISH	Silvergray rockfish (Remaining rockfish)	Other shelf rockfish
SLNS	SLENDER SOLE	Other non-FMP flatfish	Other non-FMP flatfish
SMLT	UNSP. SMELT	Other nongroundfish	Other nongroundfish

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SNOS	SPLITNOSE ROCKFISH	Splitnose rockfish (Remaining rockfish)	Splitnose rockfish
SNS1	NOM. SPLITNOSE ROCKFISH	Splitnose rockfish (Remaining rockfish)	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 ROCKFISH	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
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. STRIPETAIL 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	STRIPETAIL ROCKFISH	Other shelf rockfish	Other shelf rockfish
STRY	STARRY FLOUNDER	Starry flounder	Starry flounder
SUSF	SOU. UNSP. SHELF ROCKFISH	Other shelf rockfish	Other shelf rockfish
SUSP	SOU. UNSP. SLOPE ROCKFISH	Other slope rockfish	Other slope rockfish
SUSR	SOU. UNSP. NEAR-SHORE ROCKFISH	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

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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 RKFSH	Other groundfish	Other groundfish
UDW1	SHORTTRAKER+ROUGHEYE	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	UNSPECIFIED HAGFISH	Other nongroundfish	Other nongroundfish
UHLB	UNSPECIFIED HALIBUT	Other nongroundfish	Other nongroundfish
UJEL	UNSP. JELLYFISH	Other nongroundfish	Other nongroundfish
UKCR	UNSP. KING CRAB	Other nongroundfish	Other nongroundfish
UMCK	UNSP. MACKEREL	Other nongroundfish	Other nongroundfish
UMSK	UNSPECIFIED MOLLUSKS	Other nongroundfish	Other nongroundfish
UPLG	UNSP. PELAGIC RKFSH	Other groundfish	Other groundfish
UPOP	UNSP. POP GROUP	Pacific ocean perch	Other slope rockfish
URCK	UNSP. ROCKFISH	Other slope rockfish (>150 fm)	Other slope rockfish (>150 fm)
URCK	UNSP. ROCKFISH	Other shelf rockfish (<150 fm)	Other shelf rockfish (<150 fm)
URK1	SRKR+REYE+NRCK+SHRP	Other slope rockfish	Other slope rockfish
URND	UNSP. ROUND FISH	Other groundfish	Other groundfish
USCL	UNSPECIFIED SCALLOP	Other nongroundfish	Other nongroundfish
USCU	UNSP. SEA CUCUMBERS	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 RKFSH	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	UNSPECIFIED OYSTER	Other nongroundfish	Other nongroundfish
UTCR	UNSP. TANNER CRAB	Tanner crab	Tanner crab
UTNA	UNSPECIFIED TUNA	Other nongroundfish	Other nongroundfish
UTRB	UNSP. TURBOTS	Other flatfish	Other flatfish
UURC	UNSP. SEA URCHINS	Other nongroundfish	Other nongroundfish
VRM1	NOM. VERMILLION ROCKFISH	Other shelf rockfish	Other shelf rockfish
VRML	VERMILION 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

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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 rockfish (Remaining rockfish)	Other slope rockfish
YSOL	YELLOWFIN SOLE	Other non-FMP flatfish	Other non-FMP flatfish
YTNA	YELLOWFIN TUNA	Other nongroundfish	Other nongroundfish
YTR1	NOM. YELLOWTAIL ROCKFISH	Yellowtail rockfish	Yellowtail rockfish (Remaining rockfish)
YTRK	YELLOWTAIL ROCKFISH	Yellowtail rockfish	Yellowtail rockfish (Remaining rockfish)