

# Estimated Discard and Total Catch of Selected Groundfish Species in the 2008 U.S. West Coast Fisheries

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## INTRODUCTION

The primary objective of this report is to determine total fishing mortality for groundfish species in U.S. west coast fisheries in 2008 in order to evaluate their status relative to Acceptable Biological Catch (ABC) and Optimum Yield (OY) harvest management goals. The ABC is a biologically based estimate of the amount of fish that may be harvested by the fishery each year without jeopardizing the resource and is used to set the upper limit of the annual total allowable catch. An OY is defined as the amount of fish that will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities, and taking into the account the protection of marine ecosystems. Both of these management goals are published in the federal groundfish regulations each year for selected groundfish species (50 CFR 660 Subpart G). This report summarizes estimates of 2008 discarded catch, retained landings, and total fishing mortality of the species published in federal regulations and compares mortality estimates to OY and ABC harvest management goals for 2008.

Our inventory of 2008 total fishing mortality includes summaries from the following groundfish fishery sectors:

- Research
- Exempted fishing permit
  - Commercial limited entry midwater trawl (shoreside hake)
- Commercial limited entry (LE) non-midwater trawl\*
- Commercial limited entry non-midwater trawl - targeting California halibut\*
- Commercial open access (OA) non-midwater trawl - targeting California halibut\*
- Commercial fixed gear state-permitted nearshore (Oregon/California)\*
- Commercial fixed gear limited entry sablefish primary (endorsed)\*
- Commercial fixed gear limited entry non-primary sablefish (non-endorsed and daily trip limit sectors)\*
- Commercial fixed gear open access daily trip limit\*
- At-sea Pacific hake/whiting catcher-processor\*
- At-sea Pacific hake/whiting mothership\*
- At-sea Pacific hake/whiting tribal\*
- Tribal (shoreside fisheries)
- Recreational (Washington/Oregon/California)

Other non-groundfish fisheries with incidental catch of groundfish species:

- Commercial open access midwater trawl
- Commercial open access non-midwater trawl – not targeting California halibut
- Commercial other gear groups - not trawl, shrimp trawl, or fixed-gear
- Commercial OA and LE fixed gear non-nearshore, non-sablefish – LE north of 36° N latitude (see methods section)
- Commercial shrimp trawl – north of 40° 10' N latitude\*
- Commercial shrimp trawl – south of 40° 10' N latitude
- Other exempted fishing permits

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\* Fishery sectors with observer program data used for analyses and discard estimation in this report.

## Data Sources

This report includes an inventory of groundfish fishing mortality from all available sources, as well as results from discard estimation analyses. Data sources used in this report include landing receipt data (referred to as fish tickets), trawl logbook data, onboard observer data, recreational data provided by state agencies, research catch data provided by NOAA's Northwest Regional Office (NWR), and additional information from the Pacific Fishery Management Council's (PFMC) Groundfish Management Team (GMT).

Records of fleet-wide landings are the cornerstone of retained catch information for all sectors of the commercial groundfish fishery on the west coast. Landing receipts are completed by fish-buyers in each port for each delivery of fish by a vessel. Fish tickets are trip-aggregated sales receipts by market categories. They are issued to fish-buyers by a state agency and must be returned to the agency for processing. Fish tickets are designed by the individual states, and Washington, Oregon, and California each have a slightly different format of receipt. In addition, each state conducts species-composition sampling for numerous market categories that are reported on fish tickets. Market categories may include a mixture of species or may represent individual species. Fish ticket and species-composition data are submitted by state agencies to the Pacific Coast Fisheries Information Network (PacFIN) regional database, which is maintained by the Pacific States Marine Fisheries Commission (PSMFC). Percentages for the species composition within market categories were applied to the fish ticket data used in our analyses. As such, landed weights from sampled market categories were distributed to individual species to the greatest extent possible.

Fish ticket landings data for the calendar year of 2008 were retrieved from the PacFIN database and subsequently divided into various sectors of the groundfish fishery as indicated in Figure 1. All additional data processing steps that were applied during the discard estimation process are described in the methods section below.

Logbook record-keeping is a state-mandated requirement for the LE groundfish trawl sector in Washington, Oregon, and California. A common-format logbook is used by all three states and completed logbook information is entered into state agency databases. The electronic logbook data are then submitted by state agencies to the PacFIN regional database.

Trawl logbook data for the calendar year 2008 were retrieved from the PacFIN database and divided into various sectors of the groundfish fishery as indicated in Figure 1. All additional data processing steps that were applied during the discard estimation process are described in the methods section below. Logbook data from the open-access groundfish trawl sector were not included in our analyses.

Discard estimation analyses focused on commercial groundfish fishery sectors in which the NWFSC FRAM division has conducted scientific at-sea observation of discards. The West Coast Groundfish Observer Program (WCGOP) and the At-sea Hake Observer Program (A-SHOP) observe distinct sectors of the groundfish fishery. The WCGOP observes a number of different sectors of the groundfish fishery, including the limited entry (LE) groundfish bottom trawl, limited entry and open access (OA) fixed gear, and state-permitted nearshore fixed gear sectors. The WCGOP also observes several fisheries that incidentally catch groundfish,

including the California halibut trawl and pink shrimp trawl fisheries. WCGOP data from each of these groundfish sectors and fisheries were used for the purposes of discard estimation. Observations by the A-SHOP from the catcher-processor, mothership, and tribal components of the at-sea Pacific hake/whiting fishery were also used for mortality estimates in this report.

The WCGOP was established in 2001 by NOAA Fisheries (National Marine Fisheries Service, NMFS) (66 FR 20609). All commercial vessels that land groundfish caught in the United States Exclusive Economic Zone (EEZ) from 3-200 miles offshore are required to carry an observer when notified to do so by NMFS or its designated agent. Subsequent state rule-making also requires vessels that fish for groundfish within 3 miles of shore or participate in other state-managed fisheries to carry WCGOP observers when notified. The WCGOP's goal is to improve total catch estimates by collecting information on the discarded catch (fish returned overboard at-sea) of west coast groundfish species. The WCGOP coverage plan details program goals, vessel selection, observer coverage, and basic data collection (NWFSC 2006). A list of fisheries in order of coverage priority and detailed information on data collection methods employed in each observed fishery can be found in the WCGOP manual (NWFSC 2008).

The sampling protocol employed by the WCGOP is primarily focused on the discarded portion of catch. In order to ensure that the recorded weights for the retained portion of the observed catch are accurate, haul-level retained catch recorded by WCGOP observers are reconciled with trip-level fish ticket records. The WCGOP data are linked to fish tickets by fish ticket number(s) obtained by the observer and are adjusted so that the total trip pounds of retained fish equals the total trip pounds on the fish ticket. This is done because the fish ticket weight is more accurate and fish tickets are legally binding documents. These steps are described in further detail in annual reports produced by the WCGOP ([www.nwfsc.noaa.gov/research/divisions/fram/observer/datareport/index.cfm](http://www.nwfsc.noaa.gov/research/divisions/fram/observer/datareport/index.cfm)) and were conducted prior to the analyses presented in this report. All additional data processing steps that were applied to the WCGOP data during the discard estimation process are described in the methods section below.

The At-Sea Hake Observer Program (A-SHOP) has conducted observations of the west coast at-sea Pacific hake/whiting fishery since 2001. Prior observations were conducted by the North Pacific Groundfish Observer Program. A-SHOP program information and documentation on data collection methods can be found in the observer manual (AFSC 2008). The at-sea hake/whiting fishery has 100% mandatory observer coverage, with each processor over 125' carrying two observers.

Each year, a certain portion the OY and ABC for groundfish species is harvested through various research activities. In 2008, research programs that caught groundfish included the NWFSC's groundfish bottom trawl, pre-recruit, hook and line surveys, and the International Pacific Halibut Commission's longline survey, as well as other programs or scientific research permits. All groundfish research catch information was provided to NOAA's Northwest Regional Office. These data were then summarized and included in this report.

In addition to these data sources, further information provided by the GMT was also used in the total mortality estimation process. The GMT is an advisory body to the PFMC that is comprised of representatives from federal, state, and Tribal agencies and is involved in evaluating management performance and alternatives for groundfish fisheries between the U.S. borders with Canada and Mexico. The GMT analyzes catch-related information from all sectors of the

groundfish fishery to assist in groundfish management. For the purposes of this analysis, the GMT provided mortality rates, which are assumptions regarding the survival of discards, for sablefish and lingcod in the trawl and fixed gear sectors and for the major species groupings reported in the state-permitted fixed gear nearshore sector.

## **METHODS**

### **Discard Estimation Methods**

We used a deterministic approach to estimate discard mortality for all sectors of the groundfish fishery for which WCGOP observer data were available. Through this approach, observed discard rates for each species were directly expanded to the fleet-wide level. First, discard ratios were computed from observer data as the discarded weight of a particular species/species group divided by the weight of retained catch of either all groundfish (excluding Pacific hake), sablefish, or some other targeted species. Denominators differed for each sector of the fishery based on the targeting behavior of that sector. Discard ratios were then multiplied by the total fleet-wide landed weight of either groundfish, sablefish or other species (depending on the denominator used to compute observed discard ratios). This provided an expanded estimate of fleet-wide discard weight for each species. Because of differences in data availability and management structure among the various sectors of the groundfish fishery, this approach was applied with slight modifications for each sector. In order to outline each of these modifications explicitly, more detailed methodology of discard estimation is presented for each sector below.

#### ***Limited Entry Bottom Trawl Sector***

Fleet-wide discard estimates for the LE bottom (non-midwater) trawl sector were derived from WCGOP observer data, fish ticket landings data, and trawl logbook data. Fish ticket and logbook data were isolated for this sector based on processing steps outlined in Figure 1. A summary of observer data for the 2008 LE bottom (non-midwater) trawl sector is presented in the WCGOP data report and summary analyses of the U.S. west coast limited entry groundfish bottom trawl fishery published in October 2009 (NWFSC 2009a).

LE bottom trawl vessels may hold a California halibut bottom trawl permit and participate in the state-permitted California halibut fishery. California halibut tows can occur on the same trip as tows targeting groundfish and were identified in logbook and observer data based on the following criteria: 1) the tow target was California halibut or 2) the tow target was nearshore mix, sand sole, or other flatfish, and the tow took place in less than 30 fathoms and south of 40°10' N. latitude. All tows in the observer and logbook data that met at least one of the above requirements were removed from the LE bottom trawl data sets and included as data for the California halibut fishery (see below). Whether in observer or logbook data, the tow target was typically determined by the vessel captain.

Several additional filtering steps were then applied to the data in order to ensure that we had distinguished data for the LE bottom trawl sector appropriately. First, we investigated fish ticket data for landings of more than 2 mt of Pacific hake on a given day, in order to remove them and thus exclude effort that was targeted exclusively towards this species. A similar check was performed on the observer and logbook data, such that tows with more than 2 mt of retained

Pacific hake were flagged for removal. No data in 2008 met this criterion, and thus records were not removed from fish ticket, logbook, or observer data on the basis of Pacific hake catch.

Next, trawl logbook and observer data were filtered to ensure that all spatial and temporal information was complete. Any tows lacking a recorded depth or latitude were removed. None of the tows in the 2008 observer data met these criteria. However, 12 tows were removed from the 2008 logbook data set due to a lack of depth information.

Observer data and trawl logbook data were then stratified by area, season, and depth (Table 1). Records were separated into two areas, north and south of the groundfish management line at 40° 10' N. latitude. Each area was divided into three depth strata (0-125, 126-250, >250 fathoms). Two-month cumulative trip limit periods were combined to form two seasonal strata: winter (January-April and November-December) and summer (May-October). In some cases, if the numbers of observations in particular strata were too limited, data were aggregated across depth strata. In the north during the winter, data were combined across the two shallowest depth strata (0-125 and 126-250 fathoms). Aggregated strata are shown in Table 1, which presents the spatial and temporal distribution of tows and retained FMP groundfish (excluding Pacific hake) weight in the 2008 observer and trawl logbook data.

A similar table for the 2007 LE bottom trawl fishery was provided in the previous groundfish total mortality report (Bellman et al. 2008, Table 1), although the table used a finer level of depth stratification. The finer level of stratification used in previous years analyses required that strata routinely be combined across depth or season to ensure an adequate sample size for analysis. It is unclear how the process of combining strata may influence discard and bycatch ratios. The validity of stratification in terms of isolating variance in discard has not yet been objectively tested. Until more work can be completed to evaluate which strata (area/depth/season) are most appropriate for this discard analysis, broader stratification is warranted. The broader depth strata used in the present analysis continue to highlight the areas shoreward and seaward of RCA closures relevant in the fishery management framework. Broader depth stratification also provides consistency when evaluating discard or bycatch over time, as depth-based spatial closures change on a yearly basis. The depth strata utilized in this report were also used in analyses which evaluated discard and total mortality estimates over time, using all available years of WCGOP data from 2002-2008 (Bellman and Heery In Preparation).

It should be noted that this stratification scheme is inconsistent with the sampling design employed by the WCGOP. The authors recognize this fact, but used this method in order to provide estimates that were relevant within the spatial and temporal structure of groundfish management. While we feel this stratification is most effective in isolating variability and representing trends in the data, measures of uncertainty are not provided within this context, as they would be biased by post-stratification.

Once data had been stratified, discard ratios were computed from the observer data and multiplied by logbook catch weights in each stratum (Figure 2). This was done according to the following equation:



$$\hat{D}_{sxab} = \frac{\sum_t d_{sxt}}{\sum_t r_{xt}} \times \sum_t R_{xabt}$$

where:

- s*: species or species group
- x*: index strata (area, season, depth)
- a*: state of landing (Washington, Oregon or California)
- b*: bimonthly period (Jan-Feb, Mar-Apr, ... , Nov-Dec)
- t*: tows in observer or logbook data
- d*: observed discard weight of species *s*
- r*: observed retained weight of all FMP groundfish excluding Pacific hake
- R*: weight of retained FMP groundfish (excluding Pacific hake) recorded in logbooks
- D*: initial discard estimate for species *s* in stratum *x*, state *a* and bimonthly period *b*

Note that the denominator of observed discard ratios and the logbook expansion factor differed from those used in total mortality analyses of data prior to calendar year 2007, in that the present rates include all FMP groundfish retained weight excluding Pacific hake. Prior to analysis of 2007 data, discard ratio denominators and logbook expansion factors included either the retained weights of individual species or the retained weight of a group of target species. The current approach was favored after an internal examination of the methodology revealed that discard estimates computed using retained weights from individual target species were more susceptible to errors caused by inconsistent species codes in the observer, logbook and fish ticket data sets. We chose to include all groundfish excluding Pacific hake in the denominator rather than a group of target species because of differences in targeting behavior on a coast-wide and temporal basis. Pacific hake was excluded when using the retained FMP groundfish denominator because vessels that target or land large amounts of this species are considered to be part of Pacific hake sectors, which are distinct from the groundfish bottom trawl sector. A complete listing of groundfish species included in the Groundfish Fishery Management Plan and used to compute and expand discard ratios is provided in Appendix A.

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

Discard ratios and standard errors for the LE bottom trawl fishery are presented in Tables 2a-2b by area, season, and depth. Species were grouped according to Appendix B. Groundfish species that are currently being managed under rebuilding plans are presented separately from non-rebuilding species.

Although retained logbook weights of FMP groundfish (excluding Pacific hake) were initially used to expand observed discard ratios to the fleet-wide level in this sector, logbooks are not submitted for 100% of trawl trips and therefore do not capture all groundfish bottom trawl fishing effort. As a result, it was necessary to adjust initial fleet level discard estimates to reflect the level of effort indicated by fish ticket landings. To do this, both the fish ticket and logbook data were aggregated by state and bimonthly periods (Figure 2), which are associated with cumulative trip limits. An adjustment ratio was then computed for each state and bimonthly period as the weight of FMP groundfish (excluding Pacific hake) recorded on fish tickets divided by that recorded in logbooks. Each adjustment ratio was multiplied by coinciding discard estimates and then summed across bimonthly periods, states, and spatial-temporal strata to produce coast-wide adjusted discard estimates for each species:

$$adj(\hat{D}_s) = \sum_x \sum_a \sum_b \hat{D}_{sxab} \times \frac{F_{ab}}{R_{ab}}$$

where:

$F$ : weight of retained FMP groundfish (excluding Pacific hake) recorded on fish tickets  
 $adj(D_s)$ : adjusted discard estimate for species  $s$

Adjustment ratios were computed separately for each state and bimonthly period in order to account for differences between individual states' logbook submission rates and fish ticket recording methods. An adjustment ratio value less than 1 indicated that more FMP groundfish weight was recorded in logbooks than on fish tickets. Conversely, adjustment ratios greater than 1 occurred when fish ticket FMP groundfish weights were larger than logbook weights. In 2008, the value of the adjustment ratios computed for the LE bottom trawl sector ranged between 0.983 and 1.105, with a mean of 1.029. Only two periods in Oregon had ratios less than 1, which occurred from May through June and September through October. The largest adjustment ratio also occurred in Oregon from November through December. The majority of adjustment ratios for state and bimonthly periods were slightly larger than 1.

Coast-wide landings, final discard estimates, and total fishing mortality in the 2008 LE groundfish bottom trawl sector are reported in Table 3. A 50% rate of mortality was applied to discarded sablefish and lingcod weight, as assumed by the GMT. It should also be noted that a combined total estimated fishing mortality is reported for big skate, longnose skate, and unspecified skate. This was done because skates are generally landed as 'unspecified skate' rather than under individual species names. As such, it is not possible to accurately summarize the mortality associated with landings for big skate and longnose skate. Estimated discard and landings for several non-groundfish species of interest as bycatch in this fishery are also reported (i.e. Dungeness crab, etc.).

### ***California Halibut Bottom Trawl Fishery***

Fleet-wide discard estimates in the California halibut bottom trawl fishery were derived from WCGOP observer data and fish ticket landings data. Although all California halibut vessels are permitted by the state of California, we considered this fishery to consist of both a limited entry and an open access component (vessels that do not have federal limited entry groundfish permits). The WCGOP provides observer coverage for both of these components. Observer data for the LE component of the California halibut fishery were collected as part of the LE groundfish bottom trawl sector. Observer data for the California halibut fishery were then subsequently isolated based on the following criteria: 1) the tow target was California halibut or 2) the tow target was nearshore mix, sand sole or other flatfish, and the tow took place in less than 30 fathoms, south of 40°10' N. latitude. All tows in the observer data that met at least one of the above requirements were included in the LE California halibut bottom trawl dataset. The WCGOP randomly samples the OA California halibut sector separately. This is described further in the WCGOP data report and summary analyses of limited entry and open access trawl vessels targeting California halibut, published in October 2009 (NWFSC 2009b). These two components of the California halibut trawl fishery remained separate in this analysis.

Discard ratios were computed for this fishery using the retained weight of California halibut in the denominator. The total landed weight of California halibut was then used as a multiplier to expand observed discard ratios to the fleet-wide level. Just as discard ratios were computed separately for the LE and OA observed components of the California halibut fishery, total fleet-wide landings had to be identified separately for each sector as well. For both the LE and OA sectors, landed California halibut weight was compiled from “non-midwater” trawl fish tickets (see Figure 1) for those vessels that had a state-issued California halibut bottom trawl permit.

Table 4 presents the total LE and OA landed weights of California halibut that were used as multipliers to expand observer discard ratios to the fleet-wide level. Also summarized in this table is the number of observed vessels, trips, and tows, as well as discard ratios. Discard ratios were calculated by dividing the observed discard weight of each species or species group by the observed retained weight of California halibut. Discard estimates were computed for each sector based on the following equation:

$$\hat{D}_s = \frac{\sum_t d_{st}}{\sum_t r_t} \times F$$

where:

- s*: species or species group
- t*: observed tows
- d*: observed discard weight of species *s*
- r*: observed retained weight of California halibut
- F*: weight of retained California halibut recorded on fish tickets
- D<sub>s</sub>*: discard estimate for species *s*

Any species groups used are grouped according to Appendix B. Groundfish species that are being managed under rebuilding plans are presented separately from non-rebuilding species (Table 4).

Although FMP groundfish and California halibut weights from the same fish tickets were used to adjust initial LE groundfish bottom trawl estimates and to expand discard ratios for the LE California halibut fleet, this is not anticipated to be a major source of bias in our analysis, as the primary species retained on observed California halibut tows were non-groundfish (NWFSC 2009b). However, since some flatfish species were retained on these tows, it is possible that estimates for the shallowest strata in California for the LE groundfish bottom trawl sector could have been positively biased due to slightly larger adjustment ratios (caused by the inclusion of landed flatfish weight that was in fact caught on California halibut tows). Examination of the species composition on fish tickets in the areas where California halibut is typically landed suggests that the impact of this is minor. Given that groundfish are regularly discarded by the LE California halibut fishery, we felt that it was more appropriate to estimate discard for this fishery than to exclude LE California halibut discard estimates altogether from this report.

The product of discard ratios for each species and the total fish ticket landed weight of California halibut produced expanded fleet-level discard estimates for each fishery component (LE and OA). These estimates are presented in Table 5, along with total open access landings and estimated mortalities of species caught in the 2008 California halibut trawl fishery. A 50% rate of mortality was applied for discarded lingcod, as assumed by the GMT in the limited entry bottom trawl sector. Estimated discard and landings for several non-groundfish species of interest as bycatch in this fishery are also reported (i.e. Dungeness crab, eulachon, and Pacific halibut). Since limited entry vessels participating in the California halibut fishery often land catch at the same time as catch from bottom trawl tows targeting groundfish, it was not possible to split out landed weights for groundfish species from those reported in the LE bottom trawl sector. Joint groundfish landings for the LE bottom trawl sector and for LE vessels targeting California halibut are presented in Table 3.

### ***Pink Shrimp Trawl Fishery***

Fleet-wide discard estimates for the pink shrimp trawl fishery were derived from WCGOP observer data and fish ticket landings data. Fish ticket data were assigned to this fishery using the classification system outlined in Figure 1. A summary of the observer data for the 2008 pink shrimp trawl fishery can be found in the WCGOP data report and summary analyses of open access trawl vessels targeting pink shrimp, published in October 2009 (NWFSC 2009c).

Discard ratios were computed for this fishery using the retained weight of pink shrimp in the denominator (Table 6). The total landed weight of pink shrimp was then used as a multiplier to expand observed discard ratios for this fishery to the fleet-wide level. Since observer data in 2008 were only available north of 40°10' N. latitude, only pink shrimp fish tickets in the north were compiled for the expansion. We assumed the same discard rates for all pink shrimp fleets in the north. Pink shrimp landings from south of 40°10' N. latitude are summarized as part of the remaining incidental fisheries landings in Table 18. The number of observed vessels, trips, and tows are also summarized in Table 6. Discard ratios for this fishery were calculated by dividing the observed discard weight of each species or species group by the observed retained weight of pink shrimp. The equation for the expansion of pink shrimp discard ratios is identical to that presented for the California halibut fishery, but where  $r$  represents the retained weight of pink shrimp and  $F$  represents the weight of retained pink shrimp recorded on fish tickets. Any species groups used were grouped according to Appendix B. Groundfish species that are being

managed under rebuilding plans are presented separately from non-rebuilding species. Table 7 presents landings, final discard estimates, and total fishing mortality in the 2008 pink shrimp trawl fishery. Estimated discard and landings for several non-groundfish species of interest as bycatch in this fishery are also reported (i.e. Dungeness crab, eulachon, etc.).

### ***Non-Nearshore Fixed Gear Sector***

Fleet-wide discard estimates for the LE and OA non-nearshore fixed gear sector of the groundfish fishery were derived from WCGOP observer data and fish ticket landings data. A mortality rate provided by the GMT for sablefish was also employed in the analyses for this sector once discard had been estimated. Fish ticket data were assigned to this sector using the classification system outlined in Figure 1. The commercial fixed gear fish tickets with recorded nearshore species weight were not used in this portion of the fixed gear analysis, regardless of whether they included recorded weights for sablefish. These fish tickets were instead included in the nearshore fixed gear groundfish sector (see next section).

Fish tickets were partitioned into three commercial fixed gear subsectors: LE sablefish primary, LE sablefish non-endorsed, and OA fixed-gear sablefish. Commercial fixed gear fish tickets were first divided out by whether the vessel had a federal groundfish permit (limited entry) or no federal groundfish permit (open access). OA fish tickets were placed in the OA fixed gear sablefish subsector. Next, LE fish tickets were separated based on whether the vessel's federal groundfish permit(s) had a sablefish endorsement (sablefish-endorsed) with tier quota for the primary season subsector or whether it was not endorsed (also referred to as '0' tier permits). The LE sablefish primary season takes place from April through the end of October. Fish tickets for all LE sablefish vessels with tier endorsements that were operating within this period and within their allotted tier quota were placed in the LE sablefish primary subsector. If LE sablefish-endorsed vessels fished outside of the primary season (November through March) or made trips within the season after they had reached their tier poundage, the fish tickets were placed in the sablefish non-primary subsector. In addition, fish tickets from non-endorsed LE vessels were also placed in the sablefish non-primary subsector.

The WCGOP observes the following fixed gear subsectors in order of priority: LE sablefish-endorsed primary season fixed gear, LE '0' tier (non-endorsed) and OA fixed gear (non-nearshore). LE sablefish-endorsed vessels that were fishing outside of the primary season subsector or that had reached their quota in the primary season were not observed in 2008. Data used in our analyses were collected from these three observed fisheries, and are summarized in the WCGOP data report and summary analyses of the U.S. west coast non-nearshore fixed gear fishery, published in October 2009 (NWFSC 2009d).

WCGOP observer data were stratified according to subsector, area, and gear group (where applicable). Records were separated into three areas; north of the groundfish management line at 40° 10' N. latitude, from 40° 10' to 36° N. latitude, and south of 36° N. latitude. Area stratification was structured in accordance with PFMC management of sablefish trip limits. Data were summarized separately for longline and pot/trap gear groups. Because logbook data are not available for the non-nearshore fixed gear sector, data associated with the depth of fishing for the entire fleet were not available. However, 2008 fishery management restricted fixed gear fishing to depths greater than 100 fathoms in the area north of 40° 10' N. latitude, with the exception of

fishing greater than 125 fathoms from 45° 3.83' to 42° 50' N. latitude during January and February, and to depths greater than 150 fathoms in the area south of 40° 10' N. latitude. These depth zones are therefore tied to area strata, but no further depth stratification of fixed-gear fishing effort is possible.

The number of observed vessels, trips, and sets are summarized for each subsector in Tables 8-10, along with the weight of sablefish and FMP groundfish (excluding Pacific hake) landings used as a measure for expanding discard from observed trips to the entire fleet. Discard ratios were calculated by area stratum, as well as by gear group when an adequate sample size was available. Any species groups used were grouped according to Appendix B. Groundfish species that are being managed under rebuilding plans are presented separately from non-rebuilding species.

In all cases where a FMP groundfish species grouping was used to compute discard ratios, any retained weights that were recorded by the observer but that did not appear on fish tickets were excluded from the denominator. This was necessary to prevent double-counting associated with differences in the species codes used by observers and processors. For instance, while observers may record rockfish catch at the species level, various species of rockfish are often grouped, weighed, and recorded together on the fish ticket by the processor under a grouped species code such as NUSP - northern unspecified slope rockfish. In some cases, this difference in species coding prevents observer and fish ticket weights from matching and adjusting properly. Species coding on fish tickets varies considerably between processors and over time, and it is not possible to make assumptions regarding which individual observer-recorded species likely coincide with species grouping codes on fish tickets. Instead, by using only the retained groundfish weight from fish tickets in discard ratio denominators, we prevent double-counting of retained weights. This is not a factor when using a single species in the denominator, such as sablefish in the area north of 36° N. latitude, as any retained weights in observer and fish ticket data that share the same species code will match and adjust properly.

Discard ratios in the two areas north of 36° N. latitude were calculated by dividing the stratum discard weight of each species by the retained catch weight of sablefish. Discard ratios for all species in the area south of 36° N. latitude were calculated by dividing the stratum discard weight of each species by the retained catch weight of all groundfish species listed in the Pacific Coast Groundfish FMP, excluding Pacific hake (Appendix B). Retained groundfish was used as the denominator in this area rather than sablefish weight alone because fixed gear fisheries south of 36° N. latitude have a wider range of target species. A broader denominator was therefore necessary in order to effectively capture their level of fishing effort.

Next, for each subsector in each area/gear stratum, the observed discard ratio (Tables 8-10) was multiplied by the fish ticket retained weight of sablefish or all FMP groundfish species (excluding Pacific hake) as indicated in Figure 3. This provided an expanded fleet level discard estimate for each subsector in the stratum. If landings were made by a fixed gear subsector for which there were no or very few WCGOP observations, the most appropriate observed discard ratios were selected and applied to these landings based on similarities in the fishery management structure, fishing and discard behavior, and the gear fished. Observations in the LE sablefish primary sector were all pooled north of 36° N. latitude by individual gear type, and not

divided into the small area stratum between 36° and 40° 10' N. latitude. For another example, the LE sablefish non-primary subsector landed 185 mt of sablefish north of 40° 10' N. latitude with longline gear in 2008 but only a small portion of the fleet was observed by the WCGOP program. Given similarities in gear type and catch composition, OA fixed gear data were selected as the most appropriate source of information to supplement observer data from LE non-endorsed sablefish vessels. Observer data from both sources were combined to compute a discard ratio, which was then applied to the LE sablefish non-primary longline landings in this area.

The stratum discard amounts for all subsectors were then summed for each area and totaled coast-wide. Coast-wide landings, final discard estimates, and total fishing mortality in the 2008 LE and OA non-nearshore fixed gear sector are reported in Table 11. A 20% rate of mortality is applied for discarded sablefish, as assumed by the GMT. Estimated discard and landings for several non-groundfish species of interest as bycatch in this fishery are also reported (i.e. Dungeness crab, etc.).

### *Nearshore Fixed Gear Sector*

Fleet-wide discard estimates for the commercial nearshore fixed gear groundfish sector of the groundfish fishery were derived from WCGOP data, fish ticket landings data, and mortality rates provided by the GMT. Fish ticket data were assigned to this sector using the classification system outlined in Figure 1 and included only those fish tickets with recorded nearshore species weight. A list of nearshore species and associated species groups used in this analysis is provided in Appendix C.

The WCGOP provides coverage for the commercial nearshore fisheries in California and Oregon based on a selection process of state-issued nearshore permits/licenses. State regulations have extended the authority of the WCGOP to require observers be carried by vessels participating in these state nearshore fisheries. Summaries of observer data for the 2008 nearshore fixed gear groundfish sector are available in the WCGOP Data report and summary analyses of west coast nearshore fixed gear fishery, published in October 2009 (NWFSC 2009e). Although California and Oregon nearshore fisheries are sampled separately for observer coverage, fleet-wide discard estimates are provided for the areas north and south of the groundfish management line at 40° 10' N. latitude, in accordance with 2008 federal groundfish management specifications.

The mortality rates provided by the GMT differ for each species according to depth, and it was therefore necessary to generate discard estimates in each of the three depth strata employed by the GMT. In order to compute separate estimates by depth, 2008 fleet-wide nearshore landings had to be distributed among the three depth intervals (0-10, 11-20, 21-50 fathoms). The percentage of catch for each species or species group by depth was calculated based on summarized observer data from 2003-2008 (Table 12). Total landings of each nearshore species or species group in 2008 were then distributed among depth intervals using the percentages computed in the previous step. For example, 74.5 mt of landed black rockfish were observed in the commercial nearshore fishery north of 40° 10' N. latitude from 2003-2008. Of the total observed catch (landed + discarded) of black rockfish, 48.2% were observed in 0-10 fm, 49.2% in 11-20 fm, and 2.6% in 21-50 fm. Using these percentages, of the 86.6 mt of black rockfish landed north of 40° 10' N. latitude by the nearshore fleet in 2008, 86.6 mt were distributed to the

0-10 fm depth interval, 88.4 mt to the 11-20 fm interval, and 4.7 mt to the 21-50 fm interval. Finally, the factors used to expand observed discard were derived by summing the distributed weights of all nearshore groundfish species within each depth stratum.

Prior to the calculation of discard ratios in this sector, WCGOP observer data were stratified by area and depth (Table 13). Area stratification was structured in accordance with federal groundfish management and depth stratification (0-10, 11-20, 21-50 fathoms) was structured in accordance with mortality rates provided by the GMT. In both areas, data were combined in the two deepest depth strata (11-20 and 21-50 fathoms) to ensure an adequate sample size. The number of observed nearshore fixed gear vessels, trips, and sets are summarized in Table 13. Discard ratios were calculated by dividing the stratum discard weight of each species or species group by the retained weight of nearshore species. All species groups used in reporting nearshore results reflect the species assignments in Appendix B. Groundfish species that are being managed under rebuilding plans are presented separately from non-rebuilding species.

Observed discard ratios (Table 13) were multiplied by the retained weight of all nearshore groundfish species within each depth stratum (Table 12). These fleet-level estimates of gross discard within each stratum were then multiplied by depth-specific discard mortality rates (provided by the GMT) in order to estimate the amounts of discard mortality in each stratum (Table 14). In December 2007, the GMT provided a slightly revised suite of depth-specific discard survival assumptions for nearshore species. Final discard estimates for each area were obtained by summing amounts of discard mortality across depth strata. Gross discard estimates, discard mortality rates, estimated discard mortality, and total fishing mortality in the 2008 nearshore fixed gear sectors north and south of 40° 10' N. latitude are reported in Tables 14a-14b. Estimated discard and landings for several non-groundfish species of interest as bycatch in this fishery are also reported (Dungeness crab, California sheephead, etc.).

### **Discard Estimation Summary**

The estimated fishing mortalities of major west coast groundfish species are reported by sector/fishery in Table 15. This table includes only the sectors/fisheries for which WCGOP observer data were available and for which discard estimation analyses were conducted by the authors of this report. These include the following fisheries: LE bottom trawl, California halibut trawl, pink shrimp trawl (north of 40° 10' N latitude), non-nearshore fixed gear, and nearshore fixed gear (Oregon and California). Major west coast groundfish species are presented by specific area or species group to be consistent with ABC and OY guidelines.

### **Other Commercial Data Summaries**

The midwater trawl fishery for Pacific hake/whiting is comprised of several at-sea processing fleets. The three at-sea processing sectors include: catcher-processors, motherships (with non-tribal catcher boats), and a tribal fleet delivering to motherships. Observer data were obtained from the At-Sea Hake Observer Program, which observes all of these at-sea sectors. The objective of observation in this program is to produce estimates of total catch in the fishery. Observers do not estimate or report amounts of discard separately. However, they provide visual estimates of the proportions of catch that are discarded. These proportions form the basis of the retained and discarded catch amounts summarized in Table 16. Fishing mortalities from all at-



sea sectors of the Pacific hake fisheries are summarized in Table 17 as ‘All at-sea hake fisheries’. The summary of this fishery is based exclusively on A-SHOP observer data.

In addition, there is also a Pacific hake fleet which delivers to shoreside processors. The shoreside fishery has been conducted under an Exempted Fishing Permit (EFP). Under this EFP, participants place all of their catch directly into refrigerated tanks, rather than sorting the catch on deck, in order to preserve fish quality. They are allowed to avoid penalties for catch weights which go over their allotted trip-limits at the time of landing. This is described as a “maximum” retention fishery. Summaries of catch in the shoreside hake midwater trawl fleet are included in Table 16. The summary of this fishery is based exclusively on fish ticket data assigned to this fishery using the classification system outlined in Figure 1. It is also included in Table 17 as ‘Shoreside hake mid-water trawl’.

Landings of groundfish species from the WA tribal shoreside fisheries, which may directly target Pacific hake or other groundfish, are summarized in Table 17. The summary of this fishery is based exclusively on fish ticket data assigned to this fishery using the classification system outlined in Figure 1. Landings of several non-groundfish species of interest are also included. Discard estimates for WA tribal shoreside fisheries were not provided.

Total catch of groundfish species from the recreational fisheries are summarized in Table 17. The summary of these fisheries is based exclusively on data provided by the state agencies: the Washington Department of Fish and Wildlife, the Oregon Department of Fish and Wildlife, and the California Department of Fish and Game. Several non-groundfish species of interest are also included if data were provided.

Research catch of groundfish species is summarized in Table 17, based on data provided by the NOAA Northwest Regional Office. Total catch weight (discarded + retained) was summarized from reporting based on scientific research permits that directly or indirectly caught groundfish off the U.S. west coast.

Landings of groundfish species from other non-groundfish fisheries operating under federal open access landing limits, which are mostly state-managed and incidentally catch groundfish, are also summarized in Table 17 as ‘Remaining incidental fisheries’. The fisheries included in this summary are listed in the Introduction section. The summary of these fisheries was based exclusively on fish ticket data assigned to each fishery using the classification system outlined in Figure 1. It was not possible to provide discard estimates for the remaining incidental fisheries.

In Table 18, total fishing mortality estimates are evaluated in terms of 2008 OY and ABC harvest specifications from federal groundfish regulations (50 CFR 660 Subpart G). Major west coast groundfish species are summarized by area or species group to be consistent with ABC and OY harvest specifications.

## **RESULTS**

The primary objective of this report is to determine total annual fishing mortality in the 2008 U.S. West Coast groundfish fishery to evaluate the status of groundfish species in terms of ABC and OY harvest specifications. Table 18 provides the basis for these determinations. Overall,

estimated total fishing mortality as a percentage of OY has decreased for most species or species groups in 2008 relative to 2007, with several exceptions.

The results of this analysis indicate that the ABCs and OYs for rebuilding groundfish species were not exceeded in 2008. Two OY specifications changed for rebuilding species in 2008 relative to 2007; the darkblotched rockfish OY increased by 32 mt and the yelloweye rockfish OY decreased by 7 mt. Among rebuilding species, the largest percentage of estimated mortality in relation to OY was 90% for canary rockfish, with an estimated total fishing mortality of 39 mt and an OY of 44 mt. In 2007, total mortality of canary rockfish exceeded the same specified OY (44 mt) by 2 mt, and thus canary rockfish fishing mortality had decreased in 2008. In 2006, catch of this species exceeded the OY to a greater extent (21%). The second highest estimated fishing mortality percentage among rebuilding species was for Pacific ocean perch (POP) at 87% of the 150 mt OY. In 2007, POP mortality was estimated to exceed the same OY by approximately 7 mt (4%), which was greater than the estimate in 2006. However, POP fishing mortality decreased again in 2008. Pacific ocean perch is grouped as part of the slope rockfish category when caught south of 40° 10' N. latitude, so species-specific estimates are reported only in the area north of this line.

For other groundfish, only the total mortality estimate for sablefish was above the OY and at 100.3% of the ABC harvest management goal. The sablefish OY was set at 5934 mt and total fishing mortality was estimated at 6,078 mt, which exceeded the OY by 2%. Total mortality of sablefish was highest in the LE bottom trawl sector, followed by non-nearshore fixed gear sectors. The major contributor to sablefish mortality in both sectors was landed weight in the area north of 40° 10' N. latitude. In addition, fishing mortality values for two species were estimated to be within 10% of their OYs (Table 18). These were petrale sole (90% of OY) and Pacific hake (93% of OY). Although total mortality was close to OY goals, the estimate for petrale sole actually decreased from the previous year from 2,340 to 2,260 mt. In contrast, Pacific hake total mortality increased from the previous year, from 215,340 to 250,205 mt.

It should be noted that several sources of uncertainty were not accounted for in this analysis and may influence total mortality estimates. These include uncertainty in sampling of landings for species composition, logbook spatial and depth information, observed retained weights, discard mortality rates, as well as others. Currently, it is not possible to quantify uncertainty for total mortality estimates presented in this report, as measures of the variability associated with various data source are not available. As with all point estimates, total mortality values presented in Tables 17 and 18 should be considered with caution.

## **SUMMARY AND CONCLUSIONS**

In this analysis, total mortality estimates were derived for the 2008 U.S. west coast groundfish fishery. These estimates were then compared with OY and ABC harvest management goals (Table 18) in order to determine whether overfishing was occurring for west coast groundfish species.

- Total estimated mortality for sablefish exceeded the 2008 OY specification by 2% (6078 mt vs. OY of 5934 mt).

- Total mortality for Pacific hake was estimated at 93% of the 2008 OY (250,205 mt vs. OY of 269,545 mt).
- Although the total mortality estimate for petrale sole decreased, it remained within 10% of 2008 OY values, at 90%.
- Total fishing mortality estimates decreased for the majority of species from 2007 to 2008.
- Total fishing mortality estimates increased for some species from 2007 to 2008, including longspine thornyhead, splitnose rockfish (south of 40°10' N. latitude), and shortspine thornyhead.

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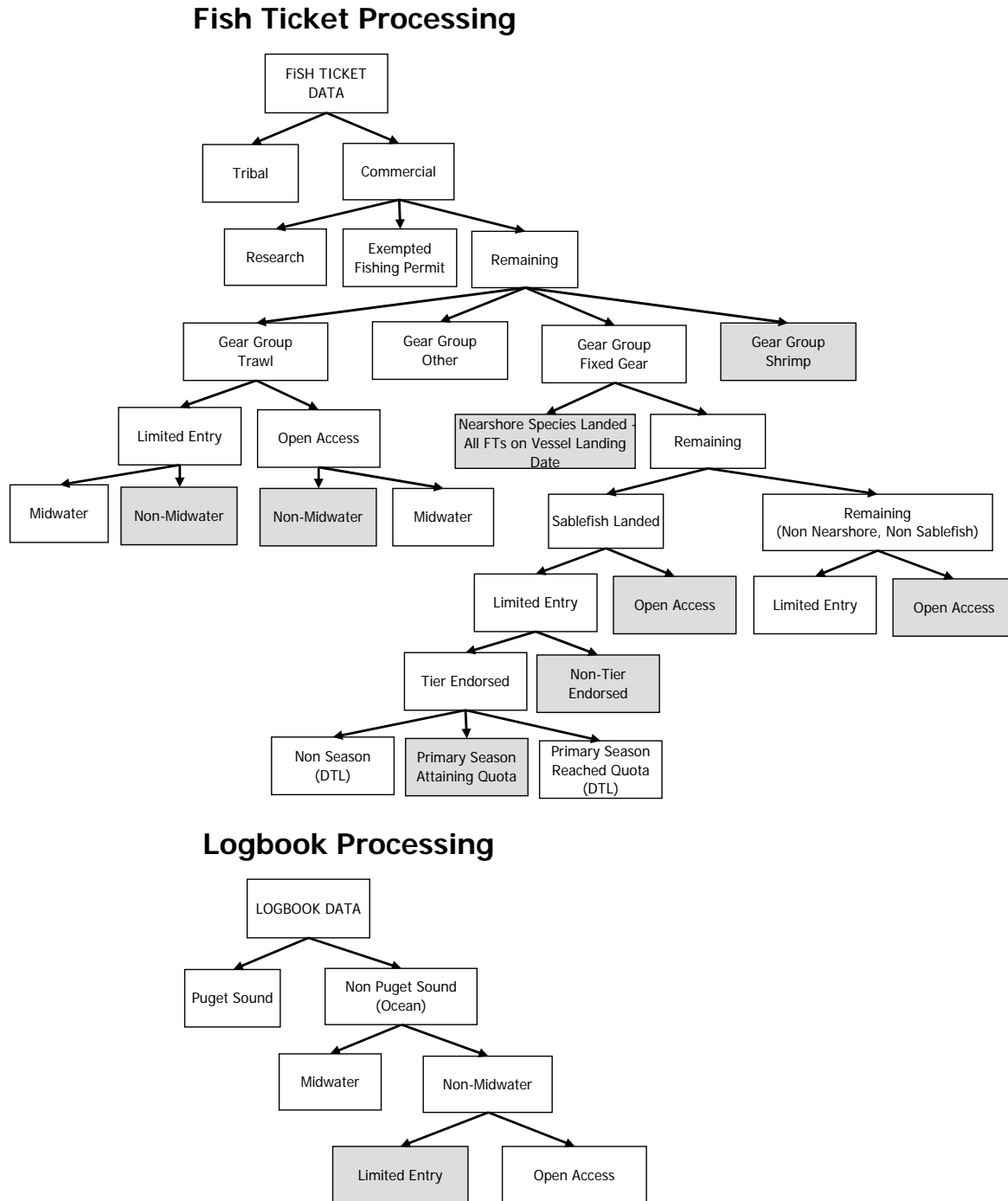
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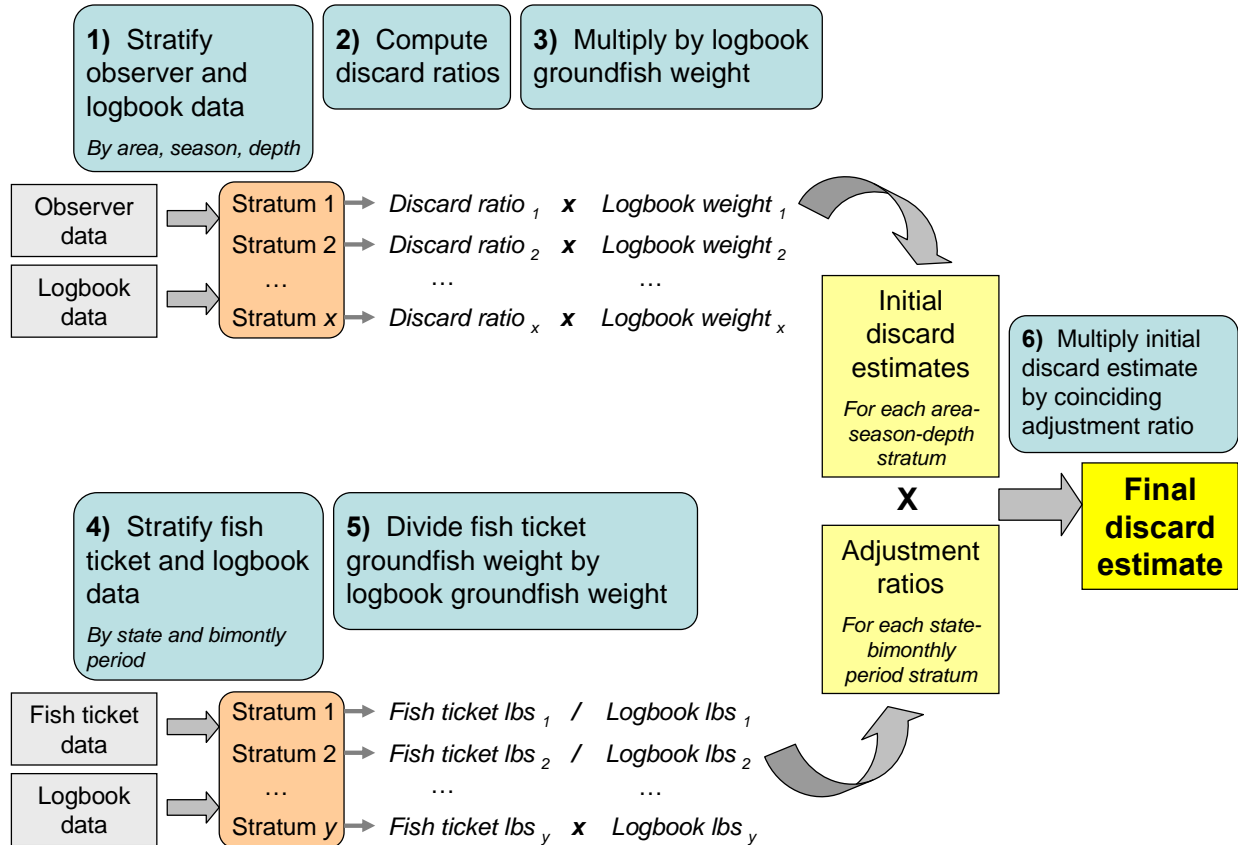
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## FIGURES

**Figure 1.** Fish ticket and logbook data processing for division into groundfish fishery sectors after retrieval of a full calendar year data set from the Pacific Coast Fisheries Information Network (PacFIN) database. Grey highlight indicates sectors for which federal observer data is available.



**Figure 2.** Flow chart illustrating the process by which limited entry bottom trawl WCGOP observer data are expanded to the fleet-wide level. Retained weights in the observer data are adjusted based on coinciding fish ticket weights for each observed trip. Observer data are then assigned to spatial/temporal strata based on latitude, depth, and season. Observed discard ratios are then computed and applied to the coinciding logbook weight for each stratum. Finally, an adjustment ratio of the proportion of logbook groundfish weight to fish ticket groundfish weight is multiplied by the initial expanded estimate to produce a final discard mortality estimate for each species. See the limited entry bottom trawl section in the methods for further details.



**Figure 3.** Expansion factor and observed discard rate by area and gear type for limited entry (LE) and open access (OA) non-nearshore fixed gear sectors used to expand discard estimates to the fleet level for each area-sector-gear stratum. The stratum discard amounts for all sectors were then summarized for each area and totaled coast-wide.

LE and OA Non-nearshore Fixed Gear Sectors + Gear Type				
North of 40° 10' N Latitude	Expansion Factor: Sablefish Landings		Observed Discard Rate	
	LE sablefish primary	Longline Pot	LE sablefish-endorsed (North of 36°) LE sablefish-endorsed (North of 36°)	Longline Pot
LE sablefish non-primary	Longline Pot	LE sablefish non-endorsed + OA fixed gear OA fixed gear	Longline Pot	
OA fixed gear	Longline Pot	OA fixed gear	Longline Pot	
36° to 40° 10' N Latitude	Expansion Factor: Sablefish Landings		Observed Discard Rate	
	LE sablefish primary	Longline Pot	LE sablefish-endorsed (North of 36°) LE sablefish-endorsed (North of 36°)	Longline Pot
LE sablefish non-primary	Longline Pot	LE sablefish non-endorsed OA fixed gear	Longline Pot	
OA fixed gear	Longline Pot	LE sablefish non-endorsed + OA fixed gear OA fixed gear	Longline Pot	
South of 36° N Latitude	Expansion Factor: Groundfish Landings		Observed Discard Rate	
	LE sablefish non-primary	Longline Pot	LE non-sablefish-endorsed + OA fixed gear OA fixed gear	Longline Pot
OA fixed gear	Longline Pot	LE non-sablefish-endorsed + OA fixed gear OA fixed gear	Longline Pot	

## TABLES

**Table 1.** Number of tows and retained weight (mt) of FMP groundfish species (excluding Pacific hake) from observer and logbook data for the 2008 limited entry bottom trawl fishery by depth, season, and management area. Data are combined as needed to ensure adequate sample size. Tows targeting California halibut have been removed from both observer and logbook data. Winter season is January-April and November-December and summer season is May-October.

Depth interval (fathoms)	NORTH of 40°10' N Lat.				SOUTH of 40°10' N Lat.			
	Number of tows		Retained groundfish (mt)		Number of tows		Retained groundfish (mt)	
	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer
<b>Observed fleet</b>								
0-125	423	440	779.7	280.7	10	207	9.7	103.2
126-250		656		1298.0	39	55	34.8	76.5
> 250	523	685	1092.7	1063.2	64	83	93.2	162.7
<b>Total</b>	946	1781	1872.4	2641.8	113	345	137.7	342.4
<b>All trawl logbooks</b>								
0-125	2560	2568	4366.8	1571.8	229	793	102.8	316.8
126-250		2450		4429.8	509	380	556.2	477.9
> 250	2889	2815	6037.7	4242.9	378	620	587.1	876.8
<b>Total</b>	5449	7833	10404.5	10244.6	1116	1793	1246.2	1671.6
<b>Percentage observed</b>								
0-125	17%	17%	18%	18%	4%	26%	9%	33%
126-250		27%		29%	8%	14%	6%	16%
> 250	18%	24%	18%	25%	17%	13%	16%	19%
<b>Total</b>	17%	23%	18%	26%	10%	19%	11%	20%



**Table 2a.** Discard ratios and standard errors from observed trips north of 40°10' N. latitude in the 2008 limited entry bottom trawl fishery by season and depth. Ratios are computed as the observed discard weight divided by the observed weight (adjusted to fish tickets) of retained FMP groundfish species (excluding Pacific hake). Winter season is January-April and November-December and summer season is May-October. Species are grouped according to Appendix B. **Columns with darker shading signify that data were combined across more than one depth interval.**

NORTH OF 40°10' N Lat.		Depth interval (fathoms)					
		0-125		126-250		≥ 250	
		Discard ratio	SE	Discard ratio	SE	Discard ratio	SE
Rebuilding species	Season	<i>Denominator = Retained groundfish (mt)</i>					
Bocaccio	winter			0.0000	0.0050	0.0000	NA
	summer	0.0000	NA	0.0000	0.0596	0.0000	NA
Canary rockfish	winter			0.0025	1.8324	0.0000	NA
	summer	0.0011	0.0215	0.0002	0.0215	0.0000	0.0184
Darkblotched rockfish	winter			0.0187	0.0748	0.0004	0.0065
	summer	0.0002	0.0080	0.0066	0.0468	0.0003	0.0039
Pacific ocean perch	winter			0.0037	0.0442	0.0001	0.0043
	summer	0.0002	0.1822	0.0045	0.0443	0.0001	0.0018
Widow rockfish	winter			0.0007	0.0512	0.0000	0.0002
	summer	0.0000	0.1097	0.0000	0.0040	0.0000	0.0004
Yelloweye rockfish	winter			0.0000	NA	0.0000	NA
	summer	0.0000	0.0132	0.0000	0.0035	0.0000	NA
Non-rebuilding species		<i>Denominator = Retained groundfish (mt)</i>					
Arrowtooth flounder	winter			0.0419	0.1770	0.0093	0.0450
	summer	0.1508	0.2767	0.0179	0.0622	0.0070	0.0409
Big skate	winter			0.0021	0.4779	0.0001	0.0349
	summer	0.0261	0.2079	0.0011	0.4684	0.0001	0.0480
Black rockfish (North of 46° 16' N. lat.)	winter			0.0000	NA	0.0000	NA
	summer	0.0000	NA	0.0000	NA	0.0000	NA
Black rockfish (South of 46° 16' N. lat.)	winter			0.0000	NA	0.0000	NA
	summer	0.0000	0.0015	0.0000	NA	0.0000	NA
Chilipepper	winter			0.0000	0.0405	0.0000	0.0029
	summer	0.0000	NA	0.0000	0.3337	0.0000	NA
Dover sole	winter			0.0224	0.1356	0.0263	0.0974
	summer	0.0162	0.0672	0.0010	0.0062	0.0294	0.1146
English sole	winter			0.0008	0.0119	0.0000	0.0006
	summer	0.0270	0.0699	0.0000	0.0013	0.0000	0.0001
Kelp greenling	winter			0.0000	NA	0.0000	NA
	summer	0.0000	0.0013	0.0000	NA	0.0000	NA
Lingcod (North of 42° N. lat.)	winter			0.0033	0.0802	0.0000	0.0022
	summer	0.0315	0.1478	0.0005	0.0220	0.0000	NA
Lingcod (South of 42° N. lat.)	winter			0.0003	0.0166	0.0000	NA
	summer	0.0000	NA	0.0000	NA	0.0000	NA
Longnose skate	winter			0.0278	0.0803	0.0081	0.0336
	summer	0.0528	0.2356	0.0118	0.0333	0.0057	0.0277
Longspine thornyhead (North of 34° 27' N. lat.)	winter			0.0003	0.0023	0.0069	0.0165
	summer	0.0000	NA	0.0010	0.0049	0.0226	0.0414
Mixed thornyheads	winter			0.0000	0.0153	0.0024	0.1536
	summer	0.0000	NA	0.0000	0.0067	0.0003	0.0807
Other flatfish	winter			0.0029	0.0074	0.0003	0.0048
	summer	0.0589	0.0522	0.0006	0.0025	0.0006	0.0045
Other groundfish	winter			0.0061	0.0329	0.0010	0.0350
	summer	0.0356	0.1237	0.0063	0.0328	0.0011	0.0668
Other nearshore rockfish	winter			0.0000	NA	0.0000	NA
	summer	0.0000	0.0052	0.0000	NA	0.0000	NA
Other shelf rockfish	winter			0.0005	0.0068	0.0000	0.0014
	summer	0.0006	0.0098	0.0009	0.0168	0.0000	0.0039
Other slope rockfish	winter			0.0051	0.0108	0.0008	0.0061
	summer	0.0002	0.0234	0.0116	0.0148	0.0021	0.0059

Table 2a (continued).

NORTH OF 40°10' N Lat.		Depth interval (fathoms)							
		0-125		126-250		≥ 250			
		Discard	SE	Discard	SE	Discard	SE		
<b>Non-rebuilding species (cont.)</b>		<b>Season</b>		<b>Denominator = Retained groundfish (mt)</b>					
Pacific cod (North of 43° N. lat.)	winter			0.0000	0.0004	0.0000	NA		
	summer	0.0001	0.0013	0.0000	0.0012	0.0000	NA		
Pacific hake	winter			0.0727	0.3056	0.0134	0.0678		
	summer	0.0989	1.0227	0.0868	0.2062	0.0356	0.1536		
Petrale sole	winter			0.0049	0.0493	0.0001	0.0038		
	summer	0.0093	0.0154	0.0000	0.0005	0.0000	0.0001		
Redstripe rockfish	winter			0.0000	NA	0.0000	NA		
	summer	0.0000	NA	0.0000	0.0052	0.0000	0.0047		
Sablefish	winter			0.0060	0.0248	0.0076	0.0208		
	summer	0.0042	0.0276	0.0065	0.0268	0.0068	0.0316		
Sharpchin rockfish	winter			0.0003	0.0459	0.0000	0.0010		
	summer	0.0000	NA	0.0005	0.0999	0.0000	0.0008		
Shortbelly rockfish	winter			0.0000	NA	0.0000	NA		
	summer	0.0000	NA	0.0000	NA	0.0000	NA		
Shortspine thornyhead (North of 34° 27' N. lat.)	winter			0.0024	0.0079	0.0006	0.0012		
	summer	0.0000	0.0003	0.0047	0.0108	0.0022	0.0049		
Silvergray rockfish	winter			0.0004	0.1453	0.0000	0.0109		
	summer	0.0000	NA	0.0000	0.0412	0.0000	NA		
Spiny dogfish	winter			0.0968	0.2913	0.0059	0.0959		
	summer	0.2278	1.2702	0.0129	0.1251	0.0033	0.2131		
Splitnose rockfish	winter			0.0095	0.0654	0.0002	0.0114		
	summer	0.0002	0.1600	0.0060	0.0566	0.0013	0.1039		
Starry flounder	winter			0.0000	NA	0.0000	NA		
	summer	0.0009	0.0092	0.0000	NA	0.0000	NA		
Unspecified grenadiers	winter			0.0001	0.0172	0.0115	0.0325		
	summer	0.0000	NA	0.0003	0.0089	0.0205	0.0385		
Unspecified skate	winter			0.0050	0.0067	0.0046	0.0064		
	summer	0.0045	0.0139	0.0053	0.0055	0.0039	0.0042		
Yellowmouth rockfish	winter			0.0000	NA	0.0000	NA		
	summer	0.0000	NA	0.0000	0.0087	0.0000	NA		
Yellowtail rockfish	winter			0.0000	0.0226	0.0000	NA		
	summer	0.0002	0.0060	0.0001	0.0096	0.0000	NA		
<b>Non-groundfish species</b>		<b>Denominator = Retained groundfish (mt)</b>							
Dungeness crab	winter			0.0005	0.0279	0.0000	0.0024		
	summer	0.1206	0.2020	0.0001	0.0095	0.0000	0.0041		
Other non-FMP flatfish	winter			0.0008	0.0108	0.0016	0.0073		
	summer	0.0040	0.0321	0.0003	0.0017	0.0031	0.0089		
Other nongroundfish	winter			0.0065	0.0094	0.0081	0.0039		
	summer	0.0052	0.0339	0.0100	0.0070	0.0173	0.0081		
Tanner crab	winter			0.0018	0.0141	0.0361	0.0621		
	summer	0.0000	NA	0.0024	0.0110	0.0376	0.0555		

**Table 2b.** Discard ratios and standard errors from observed trips south of 40° 10' N. latitude in the 2008 limited entry bottom trawl fishery by season and depth. Ratios are computed as the observed discard weight divided by the observed weight (adjusted to fish tickets) of retained FMP groundfish species (excluding Pacific hake). Winter season is January-April and November-December and summer season is May-October. Species are grouped according to Appendix B.

SOUTH OF 40°10' N Lat.		Depth interval (fathoms)					
		0-125		126-250		≥ 250	
		Discard ratio	SE	Discard ratio	SE	Discard ratio	SE
<b>Rebuilding species</b>	<b>Season</b>	<b>Denominator = Retained groundfish (mt)</b>					
Bocaccio	winter	0.0008	NA	0.0001	NA	0.0000	NA
	summer	0.0126	0.2440	0.0012	0.0551	0.0000	NA
Canary rockfish	winter	0.0000	NA	0.0000	NA	0.0000	NA
	summer	0.0002	0.0043	0.0000	NA	0.0000	NA
Cowcod	winter	0.0000	NA	0.0000	NA	0.0000	NA
	summer	0.0005	0.3228	0.0000	NA	0.0000	NA
Darkblotched rockfish	winter	0.0001	0.0027	0.0002	0.0068	0.0000	NA
	summer	0.0001	0.0075	0.0005	0.0068	0.0000	NA
Widow rockfish	winter	0.0001	NA	0.0000	NA	0.0000	NA
	summer	0.0007	0.1340	0.0010	0.3430	0.0000	NA
Yelloweye rockfish	winter	0.0000	NA	0.0000	NA	0.0000	NA
	summer	0.0000	NA	0.0000	NA	0.0000	NA
<b>Non-rebuilding species</b>		<b>Denominator = Retained groundfish (mt)</b>					
Arrowtooth flounder	winter	0.0009	0.0093	0.0099	0.1176	0.0020	0.3990
	summer	0.0018	0.0551	0.0023	0.0536	0.0003	0.0361
Bank rockfish	winter	0.0000	NA	0.0000	NA	0.0000	NA
	summer	0.0000	NA	0.0001	0.0098	0.0000	NA
Big skate	winter	0.0186	0.4123	0.0001	NA	0.0000	NA
	summer	0.0021	0.3084	0.0000	NA	0.0000	NA
Black rockfish	winter	0.0000	NA	0.0000	NA	0.0000	NA
	summer	0.0000	NA	0.0000	NA	0.0000	NA
Blackgill rockfish	winter	0.0000	NA	0.0000	0.0003	0.0000	NA
	summer	0.0000	0.0067	0.0001	0.0028	0.0000	0.0003
Chilipepper	winter	0.0008	0.0058	0.0023	0.0949	0.0000	NA
	summer	0.1401	0.6611	0.0032	0.0586	0.0000	NA
Dover sole	winter	0.0047	0.0565	0.0145	0.0784	0.0946	0.3216
	summer	0.0128	0.0475	0.0255	0.1318	0.0675	0.3107
English sole	winter	0.0012	0.0089	0.0060	0.0833	0.0000	NA
	summer	0.0514	0.0964	0.0008	0.0565	0.0000	NA
Kelp greenling	winter	0.0000	NA	0.0000	NA	0.0000	NA
	summer	0.0000	NA	0.0000	NA	0.0000	NA
Lingcod	winter	0.0061	0.0594	0.0000	NA	0.0000	NA
	summer	0.0219	0.3080	0.0025	0.0862	0.0000	NA
Longnose skate	winter	0.2729	2.1585	0.1269	0.6342	0.0075	0.1109
	summer	0.1284	0.3479	0.1020	0.4385	0.0277	0.1621
Longspine thornyhead (North of 34° 27' N. lat.)	winter	0.0000	NA	0.0009	0.0263	0.0476	0.0994
	summer	0.0000	NA	0.0081	0.3487	0.0155	0.0927
Mixed thornyheads	winter	0.0000	NA	0.0000	NA	0.0002	NA
	summer	0.0000	NA	0.0000	NA	0.0000	NA
Other flatfish	winter	0.0071	0.0270	0.0077	0.0447	0.0000	0.0013
	summer	0.1191	0.1715	0.0066	0.0368	0.0005	0.0082
Other groundfish	winter	0.0143	0.2336	0.0254	0.2981	0.0027	0.3694
	summer	0.0550	0.3478	0.0478	0.6152	0.0008	0.0199
Other nearshore rockfish	winter	0.0000	NA	0.0000	NA	0.0000	NA
	summer	0.0000	0.0052	0.0000	NA	0.0000	NA
Other shelf rockfish	winter	0.0042	0.0268	0.0004	0.0127	0.0000	NA
	summer	0.0476	0.8608	0.0102	0.0764	0.0000	NA

Table 2b (continued).

SOUTH OF 40°10' N Lat.		Depth interval (fathoms)					
		0-125		126-250		≥ 250	
		Discard ratio	SE	Discard ratio	SE	Discard ratio	SE
Non-rebuilding species (cont.)	Season	<i>Denominator = Retained groundfish (mt)</i>					
Other slope rockfish	winter	0.0000	NA	0.0024	0.0137	0.0000	NA
	summer	0.0001	0.0037	0.0050	0.0298	0.0022	0.0164
Pacific hake	winter	0.0005	0.0107	0.0750	0.6185	0.0040	0.2932
	summer	0.0389	0.2573	0.1070	1.2592	0.0253	0.1658
Petrale sole	winter	0.0038	0.0250	0.0032	0.0235	0.0000	0.0013
	summer	0.0163	0.0469	0.0001	0.0022	0.0000	NA
Sablefish	winter	0.0002	0.0066	0.0060	0.1035	0.0111	0.0854
	summer	0.0013	0.0421	0.0499	0.5950	0.0096	0.0730
Sharpchin rockfish	winter	0.0000	NA	0.0000	NA	0.0000	NA
	summer	0.0000	NA	0.0000	NA	0.0000	NA
Shortbelly rockfish	winter	0.0000	NA	0.0002	NA	0.0000	NA
	summer	0.0003	0.0337	0.0149	0.2654	0.0000	NA
Shortspine thornyhead (North of 34° 27' N. lat.)	winter	0.0000	NA	0.0015	0.0098	0.0004	0.0050
	summer	0.0002	0.0326	0.0009	0.0052	0.0004	0.0023
Spiny dogfish	winter	0.0062	0.0601	0.0147	0.1950	0.0002	0.0660
	summer	0.1121	0.6317	0.0374	0.2864	0.0002	0.0168
Splitnose rockfish	winter	0.0000	NA	0.0494	0.4458	0.0001	0.0044
	summer	0.0004	0.0218	0.1609	0.8763	0.0006	0.0073
Starry flounder	winter	0.0000	NA	0.0000	NA	0.0000	NA
	summer	0.0000	NA	0.0000	NA	0.0000	NA
Unspecified grenadiers	winter	0.0000	NA	0.0001	0.0195	0.0745	0.1839
	summer	0.0000	NA	0.0001	0.0059	0.0324	0.1311
Unspecified skate	winter	0.0005	0.0088	0.0165	0.0985	0.0199	0.0947
	summer	0.0177	0.0404	0.0292	0.1240	0.0072	0.0209
Yellowtail rockfish	winter	0.0000	NA	0.0000	NA	0.0000	NA
	summer	0.0001	0.0226	0.0000	NA	0.0000	NA
Non-rebuilding species	Season	<i>Denominator = Retained groundfish (mt)</i>					
Dungeness crab	winter	0.0236	0.2089	0.0087	0.4473	0.0000	NA
	summer	0.0493	0.1771	0.0002	0.0150	0.0000	NA
Other non-FMP flatfish	winter	0.0114	0.1428	0.0001	0.0050	0.0146	0.0632
	summer	0.0011	0.0076	0.0010	0.0204	0.0041	0.0318
Other nongroundfish	winter	0.0044	0.0196	0.0776	0.4273	0.0458	0.0285
	summer	0.0109	0.0099	0.0119	0.0381	0.0258	0.0227
Tanner crab	winter	0.0000	NA	0.0101	0.1032	0.0721	0.2031
	summer	0.0001	0.0325	0.0158	0.2192	0.0994	0.2876

**Table 3.** Landings (mt), estimated discard (mt), and total catch (mt) of major west coast groundfish species from non-hake, commercial limited entry groundfish bottom trawls in 2008. Discard ratios (Table 2) were multiplied by total FMP groundfish landings (excluding Pacific hake) to generate discard estimates. Species are grouped according to Appendix B.

	North of 40°10' N Lat.			South of 40°10' N Lat.			Coastwide		
	Landed	Discard	Total	Landed	Discard	Total	Landed	Discard	Total
<b>Rebuilding species</b>									
Bocaccio	0.3	0.2	0.5	1.3	4.9	6.2	1.6	5.1	6.8
Canary rockfish	0.3	13.9	14.2	0.6	0.1	0.6	0.8	14.0	14.8
Cowcod (South of 40°10' N. lat.)	NA	NA	NA	0.0	0.2	0.2	0.0	0.2	0.2
Darkblotched rockfish	83.4	118.6	201.9	20.2	0.4	20.6	103.6	118.9	222.5
Pacific ocean perch (North of 40°10' N. lat.)	68.5	37.9	106.3	NA	NA	NA	68.5	37.9	106.3
Widow rockfish	1.8	3.3	5.1	0.2	0.8	0.9	2.0	4.0	6.0
Yelloweye rockfish	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1
<b>Non-rebuilding species</b>									
Arrowtooth flounder	2633.3	601.6	3234.9	1.2	9.0	10.3	2634.5	610.6	3245.1
Bank rockfish (South of 40°10' N. lat.)	NA	NA	NA	91.7	0.1	91.8	91.7	0.1	91.8
Black rockfish (North of 46°16' N. lat.)	0.0	0.0	0.0	NA	NA	NA	0.0	0.0	0.0
Black rockfish (South of 46°16' N. lat.)	0.2	0.0	0.2	0.0	0.0	0.0	0.2	0.0	0.2
Blackgill rockfish (South of 40°10' N. lat.)	NA	NA	NA	35.6	0.1	35.6	35.6	0.1	35.6
Chilipepper rockfish	0.8	0.4	1.2	88.6	49.8	138.3	89.3	50.2	139.5
Dover sole	9922.6	423.4	10346.0	1032.3	145.0	1177.3	10955.0	568.3	11523.3
English sole	257.0	47.5	304.5	69.4	21.1	90.6	326.4	68.7	395.0
Kelp greenling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lingcod (North of 42° N. lat.)		68.2			NA			68.2	
50% mortality*	73.3	34.1	107.4	NA	NA	NA	73.3	34.1	107.4
Lingcod (South of 42° N. lat.)		1.3			9.2			10.5	
50% mortality*	10.0	0.6	10.6	22.7	4.6	27.3	32.7	5.2	37.9
Longspine thornyhead (North of 34° 27' N. lat.)	948.7	146.1	1094.9	286.4	47.4	333.8	1235.1	193.6	1428.7
Mixed thornyheads	1.6	16.1	17.8	0.0	0.1	0.1	1.6	16.3	17.9
Other flatfish	590.0	114.9	704.9	144.3	48.6	192.9	734.3	163.5	897.8
Other groundfish	0.1	124.1	124.2	1.2	60.7	61.9	1.4	184.8	186.1
Other nearshore rockfish	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.2
Other shelf rockfish	1.9	7.4	9.4	1.2	21.6	22.8	3.1	29.0	32.2
Other slope rockfish	84.0	89.5	173.5	9.6	5.9	15.5	93.5	95.4	189.0
Pacific cod (North of 43° N. lat.)	11.6	0.1	11.7	NA	NA	NA	11.6	0.1	11.7
Pacific hake	0.0	1115.8	1115.8	0.5	135.0	135.5	0.5	1250.8	1251.3
Petrale sole	1622.4	37.8	1660.2	544.0	7.7	551.7	2166.4	45.5	2211.9
Redstripe rockfish (North of 40°10' N. lat.)	0.3	0.3	0.6	NA	NA	NA	0.3	0.3	0.6

\* Mortality rates provided by the Groundfish Management Team (GMT).

**Table 3 (continued).**

	North of 40°10' N Lat.			South of 40°10' N Lat.			Coastwide		
	Landed	Discard	Total	Landed	Discard	Total	Landed	Discard	Total
<b>Non-rebuilding species (cont.)</b>									
Sablefish		140.2			44.4			184.6	
50% mortality*	2535.7	70.1	2605.9	334.8	22.2	357.0	2870.5	92.3	2962.8
Sharpchin rockfish	1.1	3.4	4.6	0.0	0.0	0.0	1.1	3.4	4.6
Shortbelly rockfish	0.0	0.0	0.0	0.0	7.7	7.7	0.0	7.7	7.7
Shortspine thornyhead (North of 34° 27' N. lat.)	1076.2	45.3	1121.5	119.1	2.0	121.1	1195.3	47.3	1242.6
Silvergray rockfish (North of 40°10' N. lat.)	0.7	1.7	2.5	NA	NA	NA	0.7	1.7	2.5
Skates **	1235.6	496.3	1731.9	46.7	276.6	323.3	1282.3	772.9	2055.2
Big skate	0.0	57.5		0.0	2.7		0.0	60.2	
Longnose skate	0.0	339.3		0.0	225.4		0.0	564.6	
Unspecified skate	1235.6	99.6		46.7	48.5		1282.3	148.1	
Spiny dogfish	38.9	914.9	953.8	3.7	65.4	69.1	42.6	980.3	1022.8
Splitnose rockfish	4.9	76.7	81.6	64.3	109.5	173.8	69.1	186.3	255.4
Starry flounder	4.3	1.5	5.8	8.4	0.0	8.4	12.7	1.5	14.2
Unspecified grenadiers	39.3	162.2	201.5	26.2	74.9	101.0	65.5	237.0	302.5
Yellowmouth rockfish (North of 40°10' N. lat.)	1.3	0.1	1.3	NA	NA	NA	1.3	0.1	1.3
Yellowtail rockfish	7.5	0.9	8.4	1.0	0.0	1.0	8.5	0.9	9.4
<b>Non-groundfish species</b>									
Dungeness crab	0.0	197.5	197.5	0.5	24.0	24.6	0.5	221.6	222.1
Other non-FMP flatfish	0.0	35.3	35.3	2.2	14.8	17.0	2.2	50.1	52.3
Other nongroundfish	28.2	208.0	236.2	4.3	105.6	109.9	32.5	313.6	346.1
Tanner crab	0.0	406.6	406.6	0.0	148.5	148.5	0.0	555.1	555.1

\* Mortality rates provided by the Groundfish Management Team (GMT).

\*\* Skates are typically landed as 'unspecified skate' and there is no species composition sampling of this market category. We have provided a total mortality value for skates as a whole, so as not to imply that big skate and longnose skate mortality came exclusively from discard.

**Table 4.** Observed discard ratios and total California halibut landings (mt) from the federal limited entry and open access participants in the state-licensed California halibut trawl fishery in 2008. Species are grouped according to Appendix B.

<b>SOUTH of 40°10' N Lat.</b>	<b>Limited Entry</b>	<b>Open Access</b>
<b>Expansion factor</b>		
<b>Total fleet landings of California halibut (mt)</b> (Based on fish tickets)	38.9	50.2
Number of observed vessels	6	7
Number of observed trips	46	49
Number of observed tows	124	197
<b>Observed discard ratios</b>		
<b>Rebuilding species</b>		
Bocaccio	0.0000	0.0000
Canary rockfish	0.0000	0.0000
Cowcod	0.0000	0.0000
Darkblotched rockfish	0.0000	0.0000
Widow rockfish	0.0000	0.0000
Yelloweye rockfish	0.0000	0.0000
<b>Non-rebuilding species</b>		
Big skate	0.3587	0.2027
Cabazon	0.0000	0.0000
California scorpionfish	0.0000	0.0167
Chilipepper rockfish	0.0001	0.0000
Dover sole	0.0000	0.0005
English sole	0.0165	0.0167
Leopard shark	0.0500	0.0151
Lingcod	0.0007	0.0009
Longnose skate	0.0184	0.0044
Other flatfish	0.0539	0.0168
Other groundfish	0.0135	0.0047
Other nearshore rockfish	0.0012	0.0000
Other shelf rockfish	0.0000	0.0002
Other slope rockfish	0.0000	0.0000
Pacific hake	0.0010	0.0000
Petrale sole	0.0039	0.0010
Soupin shark	0.0014	0.0000
Spiny dogfish	0.0442	0.0293
Starry flounder	0.0105	0.0300
Unspecified skate	0.2368	0.2757
<b>Non-groundfish species</b>		
Bat ray	0.7778	0.1366
California halibut	0.3730	0.2602
Dungeness crab	0.8925	2.5941
Other non-FMP flatfish	0.0080	0.0231
Other nongroundfish	0.1809	0.6040
Pacific halibut	0.0085	0.0000
Unspecified jellyfish	4.0393	0.6421

**Table 5.** Landings (mt), estimated discard (mt), total catch (mt), and total fishing mortality (mt) of major west coast groundfish species from the federal limited entry and open access participants in the state-licensed California halibut trawl fishery in 2008. Discard ratios (Table 4) were multiplied by total landings of California halibut to generate estimated discard for each sector. Since limited entry vessels participating in the California halibut fishery often land catch from this fishery at the same time as catch from bottom trawl tows targeting groundfish, it was not possible to split out groundfish landed weights for the limited entry bottom trawl and limited entry California halibut sectors. Joint landings for these two sectors are presented in Table 3.

SOUTH of 40°10' N Lat.	Limited Entry		Open Access			All CA Halibut Sectors		
	Landed	Discard	Landed	Discard	Total	OA Landed	Discard	Total Fishing Mortality
<b>Rebuilding species</b>								
Bocaccio		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Canary rockfish		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cowcod		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Darkblotched rockfish		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Widow rockfish		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yelloweye rockfish		0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Non-rebuilding species</b>								
Cabazon		0.0	0.0	0.0	0.0	0.0	0.0	0.0
California scorpionfish		0.0	0.0	0.8	0.8	0.0	0.8	0.8
Chilipepper rockfish		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dover sole		0.0	0.0	0.0	0.1	0.0	0.0	0.1
English sole		0.6	0.4	0.8	1.2	0.4	1.5	1.8
Leopard shark		1.9	0.0	0.8	0.8	0.0	2.7	2.7
Lingcod		0.0		0.0			0.1	0.1
50% mortality *		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other flatfish		2.1	1.8	0.8	2.6	1.8	2.9	4.7
Other groundfish		0.5	0.0	0.2	0.2	0.0	0.8	0.8
Other nearshore rockfish		0.0	0.2	0.0	0.2	0.2	0.0	0.2
Other shelf rockfish		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other slope rockfish		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pacific hake		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Petrале sole		0.2	0.0	0.1	0.1	0.0	0.2	0.2
Skates **		23.9	1.4	24.2	25.7	1.4	48.1	49.6
Big skate		14.0	0.0	10.2		0.0	24.1	
Longnose skate		0.7	0.0	0.2		0.0	0.9	
Unspecified skate		9.2	1.4	13.8		1.4	23.1	
Southern shark		0.1	0.0	0.0	0.0	0.0	0.1	0.1
Spiny dogfish		1.7	0.1	1.5	1.5	0.1	3.2	3.3
Starry flounder		0.4	0.6	1.5	2.1	0.6	1.9	2.6
<b>Non-groundfish species</b>								
Bat ray		30.3	0.0	6.9	6.9	0.0	37.1	37.1
California halibut		14.5	50.2	13.1	63.2	50.2	27.6	77.8
Dungeness crab		34.8	0.0	130.2	130.2	0.0	164.9	164.9
Other non-FMP flatfish		0.3	0.0	1.2	1.2	0.0	1.5	1.5
Other nongroundfish		7.0	5.8	30.3	36.1	5.8	37.4	43.1
Pacific halibut		0.3	0.0	0.0	0.0	0.0	0.3	0.3
Unspecified jellyfish		157.3	0.0	32.2	32.2	0.0	189.5	189.5

\* The mortality rate for lingcod is assumed to be the same as in the limited entry bottom trawl fishery, provided by the Groundfish Management Team.

\*\* Skates are typically landed as 'unspecified skate' and there is no species composition sampling of this market category. We have provided a total mortality value for skates as a whole, so as not to imply that big skate and longnose skate mortality came exclusively from discard.



**Table 6.** Observed discard ratios and total pink shrimp landings (mt) from the pink shrimp trawl fishery north of 40° 10' N. latitude in 2008. Species are grouped according to Appendix B.

<b>NORTH of 40°10' N Lat.</b>	<b>Pink Shrimp Fishery</b>
<b>Expansion factor</b>	
<b>Total fleet landings of pink shrimp (mt)</b> (Based on fish tickets)	15374.61
Number of observed vessels	31
Number of observed trips	55
Number of observed tows	840
<b>Observed discard ratios</b>	
<b>Rebuilding species</b>	
Bocaccio	0.0000
Canary rockfish	0.0000
Darkblotched rockfish	0.0007
Pacific ocean perch	0.0000
Widow rockfish	0.0000
Yelloweye rockfish	0.0000
<b>Non-rebuilding species</b>	
Arrowtooth flounder	0.0020
Big skate	0.0000
Black rockfish (South of 46° 16' N. lat.)	0.0000
Dover sole	0.0008
English sole	0.0001
Lingcod (North of 42° N. lat.)	0.0000
Longnose skate	0.0001
Other flatfish	0.0021
Other groundfish	0.0000
Other nearshore rockfish	0.0000
Other shelf rockfish	0.0008
Other slope rockfish	0.0000
Pacific hake	0.0445
Petrale sole	0.0001
Redstripe rockfish	0.0000
Sablefish	0.0001
Sharpchin rockfish	0.0000
Shortspine thornyhead	0.0000
Spiny dogfish	0.0002
Splitnose rockfish	0.0008
Unspecified skate	0.0000
Yellowtail rockfish	0.0000
<b>Non-groundfish species</b>	
Dungeness crab	0.0000
Eulachon	0.0008
Other non-FMP flatfish	0.0096
Other nongroundfish	0.0038
Pacific halibut	0.0000
Pink shrimp + unidentified shrimp	0.0130

**Table 7.** Landings (mt), estimated discard (mt), and total catch (mt) of major west coast groundfish species from the pink shrimp trawl fishery north of 40° 10' N. latitude in 2008. Discard ratios (Table 6) were multiplied by total landings of pink shrimp to generate estimated discard.

NORTH of 40°10' N Lat.	Pink Shrimp Fishery		
	Landed	Discard	Total
<b>Rebuilding species</b>			
Bocaccio	0.0	0.0	0.0
Canary rockfish	0.0	0.3	0.3
Darkblotched rockfish	0.0	11.3	11.3
Pacific ocean perch	0.0	0.1	0.1
Widow rockfish	0.0	0.0	0.0
Yelloweye rockfish	0.0	0.0	0.0
<b>Non-rebuilding species</b>			
Arrowtooth flounder	0.0	30.2	30.2
Black rockfish (South of 46°16' N. lat.)	0.0	0.0	0.0
Chilipepper rockfish	0.0	0.0	0.0
Dover sole	0.0	12.9	12.9
English sole	0.0	1.2	1.3
Lingcod (North of 42° N. lat.)	0.0	0.1	0.1
Lingcod (South of 42° N. lat.)	0.0	0.0	0.0
Other flatfish	0.1	32.7	32.8
Other groundfish	0.0	0.5	0.5
Other nearshore rockfish	0.0	0.0	0.0
Other shelf rockfish	0.0	12.4	12.4
Other slope rockfish	0.0	0.4	0.4
Pacific hake	0.0	683.7	683.7
Petrale sole	0.0	1.3	1.4
Redstripe rockfish	0.0	0.0	0.0
Sablefish	0.4	1.6	2.1
Sharpchin rockfish	0.0	0.1	0.1
Shortbelly rockfish	0.0	0.4	0.4
Shortspine thornyhead	0.0	0.5	0.5
Skates *	0.0	1.4	1.4
Big skate	0.0	0.0	
Longnose skate	0.0	1.2	
Unspecified skate	0.0	0.2	
Spiny dogfish	0.0	3.7	3.7
Splitnose rockfish	0.0	12.8	12.8
Yellowtail rockfish	0.0	0.1	0.1
<b>Non-groundfish species</b>			
Dungeness crab	0.0	0.7	0.7
Eulachon	0.0	12.1	12.1
Other non-FMP flatfish	0.0	147.4	147.4
Other nongroundfish	0.2	57.7	57.9
Pacific halibut	0.0	0.1	0.1
Pink shrimp + unidentified shrimp	15374.6	199.8	15574.4

\* Skates are typically landed as 'unspecified skate' and there is no species composition sampling of this market category. We have provided a total mortality value for skates as a whole, so as not to imply that big skate and longnose skate mortality came exclusively from discard.

**Table 8.** Observed discard ratios and total sablefish landings (mt) from the LE sablefish primary (endorsed) fixed gear fleet in 2008. Discard ratios were multiplied by the total landings of sablefish to generate discard estimates for each area and gear type, which are combined with other fixed gear sectors in Table 11.

LE Sablefish Primary	North of 40°10' N Lat.		40°10' to 36° N Lat.		South of 36° N Lat.	
	Longline	Pot	Longline	Pot	Longline	Pot
<b>Expansion factor</b>						
<b>Total fleet landings of sablefish (mt)</b>	960.1	383.1	93.8	37.6		
<b>Total fleet landings of groundfish (mt)</b> (Based on fish tickets)					--	--
	<i>Coastwide</i>		<i>Coastwide</i>			
Number of observed vessels	18	6	18	6	--	--
Number of observed trips	77	24	77	24	--	--
Number of observed sets	539	329	539	329	--	--
<b>Observed discard ratios</b>	<b>Denominator = Retained sablefish (mt)</b>				<b>Denominator = Retained groundfish (mt)</b>	
<b>Rebuilding species</b>						
Bocaccio	0.0000	0.0000	0.0000	0.0000	--	--
Canary rockfish	0.0004	0.0000	0.0004	0.0000	--	--
Cowcod (South of 40°10' N. lat.)	NA	NA	0.0000	0.0000	--	--
Darkblotched rockfish	0.0032	0.0000	0.0032	0.0000	--	--
Pacific ocean perch (North of 40°10' N. lat.)	0.0000	0.0000	NA	NA	--	--
Widow rockfish	0.0000	0.0000	0.0000	0.0000	--	--
Yelloweye rockfish	0.0007	0.0000	0.0007	0.0000	--	--
<b>Non-rebuilding species</b>						
Arrowtooth flounder	0.0650	0.0020	0.0650	0.0020	--	--
Big skate	0.0036	0.0000	0.0036	0.0000	--	--
Chilipepper (North of 40°10' N. lat.)	0.0003	0.0000	NA	NA	--	--
Chilipepper (South of 40°10' N. lat.)	NA	NA	0.0000	0.0000	--	--
Dover sole	0.0028	0.0012	0.0028	0.0012	--	--
English sole	0.0000	0.0000	0.0000	0.0000	--	--
Lingcod (North of 42° N. lat.)	0.0079	0.0029	NA	NA	--	--
Lingcod (South of 42° N. lat.)	0.0000	0.0004	0.0000	0.0004	--	--
Longnose skate	0.0534	0.0000	0.0534	0.0000	--	--
Longspine thornyhead (North of 34° 27' N. lat.)	0.0000	0.0000	0.0000	0.0000	--	--
Other flatfish	0.0000	0.0000	0.0000	0.0000	--	--
Other groundfish	0.0013	0.0000	0.0013	0.0000	--	--
Other shelf rockfish	0.0011	0.0000	0.0011	0.0000	--	--
Other slope rockfish	0.0360	0.0000	0.0360	0.0000	--	--
Pacific cod (North of 40°10' N. lat.)	0.0000	0.0000	NA	NA	--	--
Pacific hake	0.0002	0.0000	0.0002	0.0000	--	--
Petrable sole	0.0001	0.0000	0.0001	0.0000	--	--
Redstripe rockfish (North of 40°10' N. lat.)	0.0000	0.0000	NA	NA	--	--
Sablefish	0.1695	0.2629	0.1695	0.2629	--	--
Sharpchin rockfish (North of 40°10' N. lat.)	0.0000	0.0000	NA	NA	--	--
Shortbelly rockfish	0.0000	0.0000	0.0000	0.0000	--	--

Note: A discard ratio is (--) when the species was neither caught nor discarded (no value). Discard ratio values appear as 0.0000 when a species was caught but there was no or very little discard observed.

**Table 8 (continued).**

LE Sablefish Primary	North of 40°10' N Lat.		40°10' to 36° N Lat.		South of 36° N Lat.	
	Longline	Pot	Longline	Pot	Longline	Pot
<b>Observed discard ratios (cont)</b>	<i>Denominator = Retained sablefish (mt)</i>				<i>Denominator = Retained groundfish (mt)</i>	
<b>Non-rebuilding species (cont)</b>						
Shortspine thornyhead (North of 34° 27' N. lat.)	0.0006	0.0000	0.0006	0.0000	--	--
Silvergray rockfish (North of 40°10' N. lat.)	0.0005	0.0000	NA	NA	--	--
Spiny dogfish	0.0920	0.0022	0.0920	0.0022	--	--
Splitnose rockfish (North of 40°10' N. lat.)	0.0000	0.0000	NA	NA	--	--
Unspecified grenadiers	0.0043	0.0002	0.0043	0.0002	--	--
Unspecified skate	0.0007	0.0000	0.0007	0.0000	--	--
Yellowmouth rockfish (North of 40°10' N. lat.)	0.0007	0.0000	NA	NA	--	--
Yellowtail rockfish	0.0000	0.0000	0.0000	0.0000	--	--
<b>Non-groundfish species</b>						
Dungeness crab	0.0000	0.0023	0.0000	0.0023	--	--
Other nongroundfish	0.0332	0.0023	0.0332	0.0023	--	--
Tanner crab	0.0001	0.0028	0.0001	0.0028	--	--

Note: A discard ratio is (--) when the species was neither caught nor discarded (no value). Discard ratio values appear as 0.0000 when a species was caught but there was no or very little discard observed.

**Table 9.** Observed discard ratios, total sablefish landings (mt), and total groundfish landings (mt) from the LE non-primary sablefish fixed gear fleet in 2008. Discard ratios were multiplied by total landings of sablefish north of 36° N latitude and total landings of FMP groundfish south of 36° N latitude to generate discard estimates, which are combined with other fixed gear sectors in Table 11.

LE Non-primary	North of 40°10' N Lat.		40°10' to 36° N Lat.		South of 36° N Lat.	
	Longline	Pot	Longline	Pot	Longline	Pot
<b>Expansion factor</b>						
<b>Total fleet landings of sablefish (mt)</b>	185.5	15.1	101.6	0.2		
<b>Total fleet landings of groundfish (mt)</b> (Based on fish tickets)					221.8	0.0
	<i>LE non-primary + OA data*</i>		<i>OA pot data</i>		<i>OA pot data</i>	
Number of observed vessels	28	4	6	13	26	3
Number of observed trips	50	7	17	26	101	22
Number of observed sets	64	24	24	26	188	24
<b>Observed discard ratios</b>	<b>Denominator = Retained sablefish (mt)</b>				<b>Denominator = Retained groundfish (mt)</b>	
<b>Rebuilding species</b>						
Bocaccio	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Canary rockfish	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000
Cowcod (South of 40°10' N. lat.)	NA	NA	0.0000	0.0000	0.0000	0.0000
Darkblotched rockfish	0.0014	0.0003	0.0000	0.0011	0.0000	0.0000
Pacific ocean perch (North of 40°10' N. lat.)	0.0001	0.0000	NA	NA	NA	NA
Widow rockfish	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Yelloweye rockfish	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
<b>Non-rebuilding species</b>						
Arrowtooth flounder	0.0391	0.0197	0.0000	0.0002	0.0000	0.0000
Bank rockfish (South of 40°10' N. lat.)	NA	NA	0.0000	0.0000	0.0000	0.0000
Blackgill rockfish (South of 40°10' N. lat.)	NA	NA	0.0016	0.0018	0.0000	0.0003
Chilipepper rockfish (South of 40°10' N. lat.)	NA	NA	0.0000	0.0000	0.0000	0.0000
Dover sole	0.0047	0.0000	0.0070	0.0034	0.0080	0.0002
Lingcod (North of 42° N. lat.)	0.0017	0.0112	NA	NA	NA	NA
Lingcod (South of 42° N. lat.)	0.0000	0.0000	0.0000	0.0096	0.0000	0.0000
Longnose skate	0.0483	0.0000	0.0602	0.0000	0.0262	0.0000
Longspine thornyhead (North of 34° 27' N. lat.)	0.0000	0.0000	0.0110	0.0000	0.0000	0.0000
Longspine thornyhead (South of 34° 27' N. lat.)	NA	NA	NA	NA	0.0173	0.0000
Mixed thornyheads	0.0000	0.0000	0.0000	0.0000	0.0112	0.0000
Other groundfish	0.0002	0.0000	0.0017	0.0000	0.0000	0.0000
Other shelf rockfish	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000
Other slope rockfish	0.0063	0.0000	0.0025	0.0008	0.0000	0.0003
Pacific hake	0.0005	0.0000	0.0075	0.0000	0.0035	0.0000
Petrable sole	0.0000	0.0000	0.0000	0.0018	0.0000	0.0000
Sablefish	0.3274	0.0641	0.1579	0.1648	0.0057	0.1305
Shortspine thornyhead (North of 34° 27' N. lat.)	0.0035	0.0003	0.0045	0.0001	0.0001	0.0000
Shortspine thornyhead (South of 34° 27' N. lat.)	NA	NA	NA	NA	0.0307	0.0003
Spiny dogfish	0.2430	0.0000	0.0345	0.0000	0.0018	0.0000
Splitnose rockfish (South of 40°10' N. lat.)	NA	NA	0.0000	0.0003	0.0000	0.0000
Splitnose rockfish (North of 40°10' N. lat.)	0.0001	0.0000	NA	NA	NA	NA
Unspecified grenadiers	0.0000	0.0000	0.0848	0.0002	0.0009	0.0000
Unspecified skate	0.0002	0.0000	0.0056	0.0000	0.0016	0.0000
<b>Non-groundfish species</b>						
Dungeness crab	0.0000	0.0327	0.0000	0.0037	0.0000	0.0000
Other nongroundfish	0.0149	0.0015	0.0828	0.0000	0.0524	0.0362
Tanner crab	0.0000	0.0000	0.0080	0.0102	0.0001	0.0010

**Table 10.** Observed discard ratios, total sablefish landings (mt), and total groundfish landings (mt) from the open access fixed gear fleet in 2008. Discard ratios were multiplied by total landings of sablefish north of 36° N latitude and total landings of FMP groundfish south of 36° N latitude to generate discard estimates for each gear type, which are combined with other fixed gear sectors in Table 11.

OA Fixed Gear	North of 40°10' N Lat.		40°10' to 36° N Lat.		South of 36° N Lat.	
	Hook-and-line	Pot	Hook-and-line	Pot	Hook-and-line	Pot
<b>Expansion factor</b>						
<b>Total fleet landings of sablefish (mt)</b>	273.5	24.5	56.7	130.1		
<b>Total fleet landings of groundfish (mt)</b> (Based on fish tickets)					18.9	84.1
			<i>LE non-primary + OA data</i>		<i>LE non-primary + OA data</i>	
Number of observed vessels	27	4	10	13	27	3
Number of observed trips	46	7	22	26	108	22
Number of observed sets	56	24	29	26	195	24
<b>Observed discard ratios</b>	<b>Denominator = Retained sablefish (mt)</b>				<b>Denominator = Retained groundfish (mt)</b>	
<b>Rebuilding species</b>						
Bocaccio	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Canary rockfish	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000
Cowcod (South of 40°10' N. lat.)	NA	NA	0.0000	0.0000	0.0000	0.0000
Darkblotched rockfish	0.0016	0.0003	0.0000	0.0011	0.0000	0.0000
Pacific ocean perch (North of 40°10' N. lat.)	0.0001	0.0000	NA	NA	NA	NA
Widow rockfish	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Yelloweye rockfish	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
<b>Non-rebuilding species</b>						
Arrowtooth flounder	0.0436	0.0197	0.0000	0.0002	0.0000	0.0000
Bank rockfish (South of 40°10' N. lat.)	NA	NA	0.0000	0.0000	0.0000	0.0000
Blackgill rockfish (South of 40°10' N. lat.)	NA	NA	0.0012	0.0018	0.0000	0.0003
Chilipepper rockfish (South of 40°10' N. lat.)	NA	NA	0.0000	0.0000	0.0000	0.0000
Dover sole	0.0052	0.0000	0.0060	0.0034	0.0080	0.0002
Gopher rockfish (South of 40°10' N. lat.)	NA	NA	0.0000	0.0000	0.0000	0.0000
Lingcod (North of 42° N. lat.)	0.0020	0.0112	NA	NA	NA	NA
Lingcod (South of 42° N. lat.)	0.0000	0.0000	0.0000	0.0096	0.0003	0.0000
Longnose skate	0.0532	0.0000	0.0501	0.0000	0.0260	0.0000
Longspine thornyhead (North of 34° 27' N. lat.)	0.0000	0.0000	0.0107	0.0000	0.0000	0.0000
Longspine thornyhead (South of 34° 27' N. lat.)	NA	NA	NA	NA	0.0171	0.0000
Mixed thornyheads	0.0000	0.0000	0.0002	0.0000	0.0111	0.0000
Other groundfish	0.0002	0.0000	0.0013	0.0000	0.0000	0.0000
Other nearshore rockfish	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Other shelf rockfish	0.0002	0.0000	0.0000	0.0000	0.0001	0.0000
Other slope rockfish	0.0072	0.0000	0.0018	0.0008	0.0000	0.0003
Pacific hake	0.0006	0.0000	0.0056	0.0000	0.0034	0.0000
Petrale sole	0.0000	0.0000	0.0000	0.0018	0.0000	0.0000
Sablefish	0.3262	0.0641	0.2310	0.1648	0.0056	0.1305
Shortspine thornyhead (North of 34° 27' N. lat.)	0.0039	0.0003	0.0221	0.0001	0.0001	0.0000
Shortspine thornyhead (South of 34° 27' N. lat.)	NA	NA	NA	NA	0.0304	0.0003
Spiny dogfish	0.2161	0.0000	0.0265	0.0000	0.0018	0.0000
Splitnose rockfish (South of 40°10' N. lat.)	NA	NA	0.0000	0.0003	0.0000	0.0000
Unspecified grenadiers	0.0000	0.0000	0.0777	0.0002	0.0009	0.0000
Unspecified skate	0.0002	0.0000	0.0042	0.0000	0.0016	0.0000
<b>Non-groundfish species</b>						
Dungeness crab	0.0000	0.0327	0.0000	0.0037	0.0000	0.0000
Other nongroundfish	0.0146	0.0015	0.0635	0.0000	0.0519	0.0362
Tanner crab	0.0000	0.0000	0.0083	0.0102	0.0001	0.0010

**Table 11.** Landings (mt), estimated discard mortality (mt), and total catch (mt) of rebuilding, non-rebuilding groundfish, and non-groundfish species in non-nearshore fixed gear fisheries by area during 2008. Discard ratios were multiplied by total landings of sablefish north of 36° N latitude and total landings of FMP groundfish south of 36° N latitude to generate discard estimates (Tables 8-10).

	North of 40°10' N Lat.			40°10' to 36° N Lat.			South of 36° N Lat.			Coastwide
	Landed	Discard	Total	Landed	Discard	Total	Landed	Discard	Total	Total
<b>Rebuilding species</b>										
Bocaccio	0.0	0.0	0.0	0.3	0.0	0.3	0.0	0.0	0.0	0.4
Canary rockfish	1.4	0.5	1.9	0.0	0.0	0.0	0.0	0.0	0.0	1.9
Cowcod (South of 40°10' N. lat.)	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Darkblotched rockfish	5.9	3.8	9.7	0.2	0.4	0.6	0.2	0.0	0.2	10.5
Pacific ocean perch (North of 40°10' N. lat.)	0.2	0.1	0.3	NA	NA	NA	NA	NA	NA	0.3
Widow rockfish	0.0	0.0	0.1	0.2	0.0	0.2	0.0	0.0	0.0	0.2
Yelloweye rockfish	0.0	0.6	0.6	0.0	0.1	0.1	0.0	0.0	0.0	0.7
<b>Non-rebuilding species</b>										
Arrowtooth flounder	6.1	83.1	89.1	0.0	6.2	6.2	0.0	0.0	0.0	95.3
Bank rockfish (South of 40°10' N. lat.)	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Blackgill rockfish (South of 40°10' N. lat.)	NA	NA	NA	5.0	0.5	5.5	15.8	0.0	15.8	21.3
Chilipepper	0.1	0.3	0.4	0.6	0.0	0.6	0.0	0.0	0.0	0.9
Dover sole	2.1	5.4	7.5	0.0	1.8	1.8	0.2	2.0	2.1	11.4
English sole	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gopher rockfish (South of 40°10' N. lat.)	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lingcod (North of 42° N. lat.)	18.7	10.0	28.7	NA	NA	NA	NA	NA	NA	28.7
Lingcod (South of 42° N. lat.)	3.4	0.2	3.6	0.6	1.3	1.9	0.0	0.0	0.0	5.5
Longspine thornyhead (North of 34° 27' N. lat.)	0.0	0.0	0.0	0.6	1.7	2.4	0.0	0.0	0.0	2.4
Longspine thornyhead (South of 34° 27' N. lat.)	NA	NA	NA	NA	NA	NA	10.0	4.2	14.2	14.2
Mixed thornyheads	0.0	0.0	0.0	0.1	0.0	0.1	1.9	2.7	4.6	4.7
Other flatfish	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other groundfish	0.1	1.4	1.4	0.1	0.4	0.4	0.1	0.0	0.1	1.9
Other nearshore rockfish	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other shelf rockfish	2.0	1.2	3.2	0.1	0.1	0.2	0.0	0.0	0.0	3.4
Other slope rockfish	62.2	37.7	99.9	2.3	3.8	6.1	0.1	0.0	0.1	106.2
Pacific cod	0.1	0.0	0.1	NA	NA	NA	NA	NA	NA	0.1
Pacific hake	0.0	0.4	0.4	0.0	1.1	1.1	0.1	0.8	0.9	2.4
Petrале sole	0.3	0.1	0.4	0.0	0.2	0.2	0.0	0.0	0.0	0.7
Redstripe rockfish (North of 40°10' N. lat.)	0.0	0.0	0.0	NA	NA	NA	NA	NA	NA	0.0
Sablefish		415.9			76.4			12.3		
20% mortality *	1841.8	83.2	1925.0	420.0	15.3	435.3	172.9	2.5	175.4	2535.7

\* Mortality rates provided by the Groundfish Management Team (GMT).

**Table 11 (continued).**

	North of 40°10' N Lat.			40°10' to 36° N Lat.			South of 36° N Lat.			Coastwide
	Landed	Discard	Total	Landed	Discard	Total	Landed	Discard	Total	Total
<b>Non-rebuilding species (cont.)</b>										
Sharpchin rockfish (North of 40°10' N. lat.)	0.0	0.0	0.0	NA	NA	NA	NA	NA	NA	0.0
Shortbelly rockfish	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shortspine thornyhead (North of 34° 27' N. lat.)	11.0	2.3	13.3	8.4	1.8	10.2	0.1	0.0	0.2	23.6
Shortspine thornyhead (South of 34° 27' N. lat.)	NA	NA	NA	NA	NA	NA	122.4	7.4	129.8	129.8
Silvergray rockfish (North of 40°10' N. lat.)	0.1	0.5	0.6	NA	NA	NA	NA	NA	NA	0.6
Skates *	37.5	79.1	116.6	0.1	15.2	15.3	0.9	6.7	7.6	139.5
Big skate	0.0	3.5		0.0	0.3		0.0	0.0		
Longnose skate	0.0	74.8		0.0	14.0		0.0	6.3		
Unspecified skate	37.5	0.8		0.1	0.9		0.9	0.4		
Spiny dogfish	124.6	193.4	318.0	0.0	13.7	13.7	0.0	0.4	0.4	332.2
Splitnose rockfish	0.3	0.1	0.4	0.0	0.0	0.1	0.0	0.0	0.0	0.5
Unspecified grenadiers	0.0	4.2	4.2	58.7	13.5	72.1	0.0	0.2	0.2	76.5
Yellowmouth rockfish (North of 40°10' N. lat.)	0.1	0.7	0.8	NA	NA	NA	NA	NA	NA	0.8
Yellowtail rockfish	0.4	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.4
<b>Non-groundfish species</b>										
California halibut	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Dungeness crab	1.8	2.2	4.0	1.5	0.6	2.1	0.0	0.0	0.0	6.1
Other nongroundfish	0.7	39.6	40.3	4.2	15.2	19.4	5.5	15.7	21.1	80.9
Tanner crab	0.0	1.2	1.2	0.1	2.7	2.8	0.0	0.1	0.1	4.1

\* Skates are typically landed as 'unspecified skate' and there is no species composition sampling of this market category. We have provided a total mortality value for skates as a whole, so as not to imply that big skate and longnose skate mortality came exclusively from discard.



**Table 12.** Commercial landings of nearshore species (mt) in Oregon and California during 2008, partitioned by depth interval and groundfish management area. Landings were partitioned by depth based on observed catch from 2003 to 2008. Nearshore species and groups are listed in Appendix C.

	Observed landings (mt) 2003-2008	2008 Total landings (mt)	Percentage of observed catch by depth (fathoms) 2003-2008			2008 Total landings reallocated by depth (fathoms)		
			0 - 10	11 - 20	21 - 50	0 - 10	11 - 20	21 - 50
<b>NORTH of 40° 10' N Lat.</b>								
<b>Nearshore species - commercial</b>								
Black rockfish	74.5	179.7	48.2%	49.2%	2.6%	86.6	88.4	4.7
Blue rockfish	9.5	26.4	23.3%	66.1%	10.6%	6.2	17.4	2.8
Cabazon	11.2	27.1	27.3%	68.1%	4.6%	7.4	18.4	1.3
Kelp greenling	6.7	22.1	46.7%	51.0%	2.2%	10.3	11.3	0.5
Lingcod (North of 42° N. lat.)	10.0	30.8	30.1%	63.9%	6.0%	9.3	19.7	1.8
Lingcod (South of 42° N. lat.)	3.9	10.4	30.6%	47.0%	22.4%	3.2	4.9	2.3
Other minor nearshore rockfish	8.0	21.2	24.5%	58.1%	17.4%	5.2	12.3	3.7
<b>Total:</b>						128.2	172.4	17.1
<b>SOUTH of 40° 10' N Lat.</b>								
<b>Nearshore species - commercial</b>								
Black rockfish	0.7	1.7	44.9%	49.2%	5.9%	0.8	0.8	0.1
Blue rockfish	0.7	3.4	53.6%	39.3%	7.2%	1.8	1.4	0.2
Cabazon	4.8	20.7	95.1%	3.7%	1.2%	19.6	0.8	0.3
California sheephead	8.1	36.6	72.6%	26.3%	1.1%	26.6	9.6	0.4
Deeper nearshore rockfish	4.8	28.9	29.1%	61.6%	9.4%	8.4	17.8	2.7
Gopher rockfish	2.4	24.2	60.4%	36.9%	2.7%	14.6	8.9	0.7
Kelp greenling	0.4	1.1	93.0%	7.0%	0.0%	1.0	0.1	0.0
Lingcod	2.9	14.9	56.8%	38.9%	4.3%	8.5	5.8	0.6
Shallow nearshore rockfish	2.0	30.5	86.7%	11.3%	2.0%	26.4	3.4	0.6
California scorpionfish *		2.5				2.1	0.3	0.0
<b>Total:</b>						109.8	48.9	5.7

\* Observer data were not sufficient to allocate California scorpionfish landings to each depth interval. This species was previously part of the shallow nearshore rockfish grouping and the percentages from the grouping were instead used to split out California scorpionfish by depth.

**Table 13.** Observed discard ratios and total nearshore species landings (mt) from the commercial nearshore fixed gear fishery in 2008 by groundfish management area and depth. Nearshore species and groups are listed in Appendix C.

	North of 40° 10' N lat.			South of 40° 10' N lat.		
	0 - 10 fm	11 - 20 fm	21 - 50 fm	0 - 10 fm	11 - 20 fm	21 - 50 fm
<b>Expansion factor</b>						
<b>Total landings of nearshore species (mt)</b> (Based on fish tickets)	128.2	172.4	17.1	109.8	48.9	5.7
		<i>Data combined across depths *</i>			<i>Data combined across depths *</i>	
Number of observed vessels	39	44		6	13	
Number of observed trips	91	114		11	19	
Number of observed sets	103	131		12	24	
<b>Observed discard ratios</b>	<b>Denominator = Retained nearshore species (mt)</b>					
<b>Rebuilding species</b>						
Bocaccio	0.0000	0.0000		0.0000	0.0000	
Canary rockfish	0.0024	0.0127		0.0015	0.0227	
Cowcod (South of 40°10' N. lat.)	NA	NA		0.0000	0.0000	
Darkblotched rockfish	0.0000	0.0000		0.0000	0.0000	
Pacific ocean perch (North of 40°10' N. lat.)	0.0000	0.0000		NA	NA	
Widow rockfish	0.0000	0.0000		0.0000	0.0000	
Yelloweye rockfish	0.0011	0.0179		0.0000	0.0011	
<b>Non-rebuilding species</b>						
Black rockfish **	0.0300	0.0131		0.0332	0.0065	
Blue rockfish **	0.0154	0.0249		0.0067	0.0253	
Cabezon **	0.0016	0.0002		0.0089	0.0553	
California scorpionfish **	0.0000	0.0000		0.0000	0.0000	
Deeper nearshore rockfish **	0.0000	0.0000		0.0020	0.0041	
Gopher rockfish (South of 40°10' N. lat.) **	NA	NA		0.0091	0.0140	
Kelp greenling **	0.0126	0.0142		0.0635	0.0296	
Lingcod (North of 42° N. lat.) **	0.0900	0.0902		NA	NA	
Lingcod (South of 42° N. lat.) **	0.0009	0.0078		0.0843	0.1436	
Longnose skate	0.0000	0.0000		0.0000	0.0000	
Minor shelf rockfish	0.0008	0.0018		0.0000	0.0009	
Minor slope rockfish	0.0000	0.0000		0.0000	0.0000	
Other flatfish	0.0000	0.0000		0.0000	0.0084	
Other groundfish	0.0095	0.0026		0.0185	0.0146	
Other minor nearshore rockfish **	0.0029	0.0053		0.0000	0.0000	
Shallow nearshore rockfish	0.0000	0.0000		0.0238	0.0202	
Spiny dogfish	0.0000	0.0000		0.0654	0.0717	
Starry flounder	0.0000	0.0000		0.0000	0.0000	
Unspecified skate	0.0000	0.0000		0.0000	0.0025	
Yellowtail rockfish	0.0008	0.0031		0.0000	0.0015	
<b>Non-groundfish species</b>						
California sheephead	0.0000	0.0000		0.1555	0.0549	
Dungeness crab	0.0000	0.0000		0.0000	0.0000	
Other nongroundfish	0.0052	0.0049		0.4306	0.1901	
Pacific halibut	0.0000	0.0024		0.0000	0.0000	

\* Observer data were combined across the 11-20 and 21-50 fathom depth intervals before computing discard ratios to maintain an adequate sample size.

\*\* Included in nearshore species denominator for discard ratios.

**Table 14a.** Gross estimated discard (mt), discard mortality rates (provided by the Groundfish Management Team), estimated discard mortality (mt), total landings (mt), and total fishing mortality (mt) for the 2008 commercial nearshore fixed gear fishery north of 40° 10' N latitude by depth.

Nearshore North of 40° 10' N lat.	Gross estimated discard (mt) by depth (fathoms)			Discard mortality rate * by depth (fathoms)			Estimated discard mortality (mt) by depth (fathoms)			Total estimated discard mortality (mt)	Total Landings (mt)	Total fishing mortality (mt)
	0-10	11-20	21-50	0-10	11-20	21-50	0-10	11-20	21-50			
<b>Rebuilding species</b>												
Bocaccio	0.00	0.00	0.00	10%	70%	100%	0.00	0.00	0.00	0.00	0.00	0.00
Canary rockfish	0.31	2.19	0.22	10%	55%	100%	0.03	1.20	0.22	1.45	0.00	1.45
Darkblotched rockfish	0.00	0.00	0.00	--	--	--	0.00	0.00	0.00	0.00	0.00	0.00
Pacific ocean perch	0.00	0.00	0.00	--	--	--	0.00	0.00	0.00	0.00	0.00	0.00
Widow rockfish	0.00	0.00	0.00	50%	90%	100%	0.00	0.00	0.00	0.00	0.02	0.02
Yelloweye rockfish	0.14	3.09	0.31	10%	50%	100%	0.01	1.54	0.31	1.86	0.00	1.86
<b>Non-rebuilding species</b>												
Black rockfish (South of 46° 16' N. lat.)	3.84	2.27	0.22	10%	40%	90%	0.38	0.91	0.20	1.49	179.74	181.23
Blue rockfish	1.97	4.29	0.43	10%	60%	100%	0.20	2.58	0.43	3.20	26.39	29.59
Cabezon	0.20	0.04	0.00	7%	7%	7%	0.01	0.00	0.00	0.02	2.38	2.40
Kelp greenling	1.62	2.45	0.24	7%	7%	7%	0.11	0.17	0.02	0.30	22.14	22.44
Lingcod (North of 42° N. lat.)	11.54	15.56	1.54	7%	7%	7%	0.81	1.09	0.11	2.00	30.80	32.81
Lingcod (South of 42° N. lat.)	0.12	1.34	0.13	7%	7%	7%	0.01	0.09	0.01	0.11	10.40	10.51
Minor shelf rockfish	0.11	0.31	0.03	10%	55%	100%	0.01	0.17	0.03	0.21	8.56	8.77
Minor slope rockfish	0.00	0.00	0.00	--	--	--	0.00	0.00	0.00	0.00	0.01	0.01
Other flatfish	0.00	0.00	0.00	7%	7%	7%	0.00	0.00	0.00	0.00	0.00	0.00
Other groundfish	1.22	0.45	0.04	7%	7%	7%	0.09	0.03	0.00	0.12	24.70	24.82
Other minor nearshore rockfish	0.37	0.91	0.09	10%	40%	100%	0.04	0.36	0.09	0.49	21.19	21.68
Sablefish	0.00	0.00	0.00	--	--	--	0.00	0.00	0.00	0.00	0.86	0.86
Skates **	0.00	0.00	0.00	7%	7%	7%	0.00	0.00	0.00	0.00	0.37	0.37
Longnose skate	0.00	0.00	0.00	7%	7%	7%	0.00	0.00	0.00	0.00	0.00	
Unspecified skate	0.00	0.00	0.00	7%	7%	7%	0.00	0.00	0.00	0.00	0.37	
Starry flounder	0.00	0.00	0.00	--	--	--	0.00	0.00	0.00	0.00	0.01	0.01
Yellowtail rockfish	0.10	0.54	0.05	10%	30%	75%	0.01	0.16	0.04	0.21	1.12	1.33
<b>Non-groundfish species</b>												
Dungeness crab	0.00	0.00	0.00	--	--	--	0.00	0.00	0.00	0.00	10.86	10.86
Other nongroundfish	0.67	0.84	0.08	--	--	--	0.67	0.84	0.08	1.59	0.33	1.92
Pacific halibut	0.00	0.41	0.04	--	--	--	0.00	0.41	0.04	0.45	0.00	0.45

\* Discard mortality rates provided by the Groundfish Management Team (GMT).

\*\* Skates are typically landed as 'unspecified skate' and there is no species composition sampling of this market category. We have provided a total mortality value for skates as a whole, so as not to imply that longnose skate mortality came exclusively from discard.

**Table 14b.** Gross estimated discard (mt), discard mortality rates (provided by the Groundfish Management Team), estimated discard mortality (mt), total landings (mt), and total fishing mortality (mt) for the 2008 commercial nearshore fixed gear fishery south of 40° 10' N latitude by depth.

Nearshore South of 40° 10' N lat	Gross estimated discard (mt) by depth (fathoms)			Discard mortality rate * by depth (fathoms)			Estimated discard mortality (mt) by depth (fathoms)			Total estimated discard mortality (mt)	Total Landings (mt)	Total fishing mortality (mt)
	0-10	11-20	21-50	0-10	11-20	21-50	0-10	11-20	21-50			
<b>Rebuilding species</b>												
Bocaccio	0.00	0.00	0.00	10%	70%	100%	0.00	0.00	0.00	0.00	0.94	0.94
Canary rockfish	0.16	1.11	0.13	10%	55%	100%	0.02	0.61	0.13	0.76	0.02	0.77
Cowcod (South of 40°10' N. lat.)	0.00	0.00	0.00	--	--	--	0.00	0.00	0.00	0.00	0.00	0.00
Darkblotched rockfish	0.00	0.00	0.00	--	--	--	0.00	0.00	0.00	0.00	0.03	0.03
Widow rockfish	0.00	0.00	0.00	50%	90%	100%	0.00	0.00	0.00	0.00	0.04	0.04
Yelloweye rockfish	0.00	0.06	0.01	10%	50%	100%	0.00	0.03	0.01	0.03	0.02	0.05
<b>Non-rebuilding species</b>												
Bank rockfish (South of 40°10' N. lat.)	0.00	0.00	0.00	--	--	--	0.00	0.00	0.00	0.00	0.00	0.00
Black rockfish (South of 46° 16' N. lat.)	3.64	0.32	0.04	10%	40%	90%	0.36	0.13	0.03	0.52	1.71	2.23
Blackgill rockfish (South of 40°10' N. lat.)	0.00	0.00	0.00	--	--	--	0.00	0.00	0.00	0.00	0.38	0.38
Blue rockfish	0.74	1.24	0.14	10%	60%	100%	0.07	0.74	0.14	0.96	3.44	4.40
Cabazon	0.98	2.70	0.31	7%	7%	7%	0.07	0.19	0.02	0.28	20.65	20.93
California scorpionfish	0.00	0.00	0.00	7%	7%	7%	0.00	0.00	0.00	0.00	2.46	2.46
Chilipepper rockfish	0.00	0.00	0.00	10%	55%	100%	0.00	0.00	0.00	0.00	0.38	0.38
Deeper nearshore rockfish	0.22	0.20	0.02	10%	40%	90%	0.02	0.08	0.02	0.12	28.86	28.98
Dover sole	0.00	0.00	0.00	--	--	--	0.00	0.00	0.00	0.00	0.00	0.00
Gopher rockfish (South of 40°10' N. lat.)	1.00	0.68	0.08	10%	45%	100%	0.10	0.31	0.08	0.49	24.18	24.67
Kelp greenling	6.98	1.44	0.17	7%	7%	7%	0.49	0.10	0.01	0.60	1.06	1.66
Lingcod	9.26	7.01	0.82	7%	7%	7%	0.65	0.49	0.06	1.20	14.90	16.10
Longspine thornyhead (South of 34° 27' N. lat.)	0.00	0.00	0.00	--	--	--	0.00	0.00	0.00	0.00	0.14	0.14
Minor shelf rockfish	0.00	0.04	0.01	10%	55%	100%	0.00	0.02	0.01	0.03	7.85	7.88
Minor slope rockfish	0.00	0.00	0.00	--	--	--	0.00	0.00	0.00	0.00	0.00	0.00
Other flatfish	0.00	0.41	0.05	7%	7%	7%	0.00	0.03	0.00	0.03	1.19	1.22
Other groundfish	2.03	0.71	0.08	7%	7%	7%	0.14	0.05	0.01	0.20	0.92	1.11
Petrale sole	0.00	0.00	0.00	--	--	--	0.00	0.00	0.00	0.00	0.00	0.00
Sablefish	0.00	0.00	0.00	--	--	--	0.00	0.00	0.00	0.00	3.34	3.34
Shallow nearshore rockfish	2.61	0.99	0.12	10%	45%	100%	0.26	0.44	0.12	0.82	30.46	31.28
Shortspine thornyhead (North of 34° 27' N. lat.)	0.00	0.00	0.00	--	--	--	0.00	0.00	0.00	0.00	0.12	0.12
Shortspine thornyhead (South of 34° 27' N. lat.)	0.00	0.00	0.00	--	--	--	0.00	0.00	0.00	0.00	0.30	0.30

\* Discard mortality rates provided by the Groundfish Management Team (GMT).

Table 14b (continued).

Nearshore South of 40° 10' N lat	Gross estimated discard (mt) by depth (fathoms)			Discard mortality rate * by depth (fathoms)			Estimated discard mortality (mt) by depth (fathoms)			Total estimated discard mortality (mt)	Total Landings (mt)	Total fishing mortality (mt)
	0-10	11-20	21-50	0-10	11-20	21-50	0-10	11-20	21-50			
<b>Non-rebuilding species (cont.)</b>												
Skates **	0.00	0.12	0.01	7%	7%	7%	0.00	0.01	0.00	0.01	0.02	0.03
Big skate	0.00	0.00	0.00	7%	7%	7%	0.00	0.00	0.00	0.00	0.01	
Unspecified skate	0.00	0.12	0.01	7%	7%	7%	0.00	0.01	0.00	0.01	0.01	
Spiny dogfish	7.18	3.50	0.41	7%	7%	7%	0.50	0.25	0.03	0.78	0.00	0.78
Starry flounder	0.00	0.00	0.00	7%	7%	7%	0.00	0.00	0.00	0.00	0.29	0.29
Yellowtail rockfish	0.00	0.07	0.01	10%	30%	75%	0.00	0.02	0.01	0.03	0.44	0.47
<b>Non-groundfish species</b>												
California halibut	0.00	0.00	0.00	--	--	--	0.00	0.00	0.00	0.00	1.32	1.32
California sheephead	17.08	2.68	0.31	7%	7%	7%	1.20	0.19	0.02	1.41	36.64	38.04
Dungeness crab	0.00	0.00	0.00	--	--	--	0.00	0.00	0.00	0.00	0.62	0.62
Other nongroundfish	47.29	9.29	1.08	--	--	--	47.29	9.29	1.08	57.66	36.17	93.83
Tanner crab	0.00	0.00	0.00	--	--	--	0.00	0.00	0.00	0.00	0.00	0.00

\* Discard mortality rates provided by the Groundfish Management Team (GMT).

\*\* Skates are typically landed as 'unspecified skate' and there is no species composition sampling of this market category. We have provided a total mortality value for skates as a whole, so as not to imply that big skate mortality came exclusively from discard.

**Table 15.** Landings (mt), estimated discard (mt), and estimated total fishing mortality (mt) of major west coast groundfish species in the 2008 groundfish fisheries by sector.

	LE bottom trawl			California halibut			Pink shrimp			Non-nearshore fixed gear			Nearshore fixed gear		
	Landed	Discard	Total	Landed	Discard	Total	Landed	Discard	Total	Landed	Discard	Total	Landed	Discard	Total
<b>Rebuilding species</b>															
Bocaccio (South of 40°10' N. lat.)	1.3	4.9	6.2	0.0	0.0	0.0	NA	NA	NA	0.3	0.0	0.3	0.9	0.0	0.9
Canary rockfish	0.8	14.0	14.8	0.0	0.0	0.0	0.0	0.3	0.3	1.4	0.5	1.9	0.0	2.2	2.2
Cowcod (South of 40°10' N. lat.)	0.0	0.2	0.2	0.0	0.0	0.0	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0
Darkblotched rockfish	103.6	118.9	222.5	0.0	0.0	0.0	0.0	11.3	11.3	6.3	4.2	10.5	0.0	0.0	0.0
Pacific ocean perch (North of 40°10' N. lat.)	68.5	37.9	106.3	NA	NA	NA	0.0	0.1	0.1	0.2	0.1	0.3	0.0	0.0	0.0
Widow rockfish	2.0	4.0	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.2	0.1	0.0	0.1
Yelloweye rockfish	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.7	0.0	1.9	1.9
<b>Non-rebuilding species</b>															
Arrowtooth flounder	2634.5	610.6	3245.1	0.0	0.0	0.0	0.0	30.2	30.2	6.1	89.3	95.3	0.0	0.0	0.0
Black rockfish (North of 46°16' N. lat.)	0.0	0.0	0.0	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Black rockfish (South of 46°16' N. lat.)	0.2	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	181.4	2.0	183.5
Cabazon (South of 42° N. lat.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.7	2.7	23.3
California scorpionfish (South of 36° N. lat.)	0.0	0.0	0.0	0.0	0.8	0.8	NA	NA	NA	0.6	0.0	0.6	2.5	0.0	2.5
Chilipepper rockfish (South of 40°10' N. lat.)	88.6	49.8	138.3	0.0	0.0	0.0	NA	NA	NA	0.0	0.0	0.0	0.4	0.0	0.4
Dover sole	10955.0	568.3	11523.3	0.0	0.0	0.1	0.0	12.9	12.9	2.3	9.2	11.4	0.0	0.0	0.0
English sole	326.4	68.7	395.0	0.4	1.5	1.8	0.0	1.2	1.3	0.0	0.0	0.0	0.0	0.0	0.0
Lingcod (North of 42° N. lat.)	73.3	34.1	107.4	NA	NA	NA	0.0	0.1	0.1	18.7	10.0	28.7	30.8	2.0	32.8
Lingcod (South of 42° N. lat.)	32.7	5.2	37.9	0.0	0.0	0.0	0.0	0.0	0.0	4.0	1.5	5.5	25.3	1.3	26.6
Other flatfish	734.3	163.5	897.8	1.8	2.9	4.7	0.1	32.7	32.8	0.0	0.0	0.0	1.2	0.0	1.2
Other groundfish	1391.7	2175.0	3566.7	1.5	54.9	56.4	0.0	5.6	5.6	222.1	328.0	550.1	24.5	1.9	26.4
Kelp greenling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.2	0.9	24.1
Skates *	1282.3	772.9	2055.2	1.4	48.1	49.6	0.0	1.4	1.4	38.5	100.9	139.5	0.4	0.0	0.4
Big skate	0.0	60.2		0.0	24.1		0.0	0.0		0.0	3.8	0.0	0.0	0.0	0.0
Longnose skate	0.0	564.6		0.0	0.9		0.0	1.2		0.0	95.1	0.0	0.0	0.0	0.0
Unspecified skate	1282.3	148.1		1.4	23.1		0.0	0.2		38.5	2.0	0.0	0.4	0.0	0.0
Spiny dogfish	42.6	980.3	1022.8	0.1	3.2	3.3	0.0	3.7	3.7	124.6	207.5	332.2	0.0	0.8	0.8
Unspecified grenadiers	65.5	237.0	302.5	0.0	0.0	0.0	0.0	0.0	0.0	58.7	17.9	76.5	0.0	0.0	0.0
Other	1.4	184.8	186.1	0.0	3.5	3.6	0.0	0.5	0.5	0.2	1.7	1.9	1.0	24.9	25.9
Minor rockfish (North of 40°10' N. lat.)	95.3	179.9	275.2	NA	NA	NA	0.0	25.7	25.7	64.9	40.4	105.4	56.1	3.9	60.0
Nearshore	0.0	0.1	0.1	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	47.6	3.7	51.3
Shelf	4.1	10.1	14.1	NA	NA	NA	0.0	12.4	12.4	2.3	2.0	4.2	8.6	0.2	8.8
Bocaccio	0.3	0.2	0.5	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chilipepper rockfish	0.8	0.4	1.2	NA	NA	NA	0.0	0.0	0.0	0.1	0.3	0.4	0.0	0.0	0.0

\* Skates are typically landed as 'unspecified skate' and there is no species composition sampling of this market category. We have provided a total mortality value for skates as a whole, so as not to imply that big skate and longnose skate mortality came exclusively from discard.

**Table 15 (continued).**

	LE bottom trawl			California halibut			Pink shrimp			Non-nearshore fixed gear			Nearshore fixed gear		
	Landed	Discard	Total	Landed	Discard	Total	Landed	Discard	Total	Landed	Discard	Total	Landed	Discard	Total
<b>Non-rebuilding species (cont.)</b>															
Minor rockfish (North of 40°10' N. lat.)															
Shelf (cont.)															
Redstripe rockfish	0.3	0.3	0.6	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Silvergray rockfish	0.7	1.7	2.5	NA	NA	NA	0.0	0.0	0.0	0.1	0.5	0.6	0.0	0.0	0.0
Remaining shelf rockfish	1.9	7.4	9.4	NA	NA	NA	0.0	12.4	12.4	2.0	1.2	3.2	8.6	0.2	8.8
Slope	91.2	169.8	261.0	NA	NA	NA	0.0	13.3	13.3	62.7	38.5	101.1	0.0	0.0	0.0
Sharpchin rockfish	1.1	3.4	4.6	NA	NA	NA	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Splitnose rockfish	4.9	76.7	81.6	NA	NA	NA	0.0	12.8	12.8	0.3	0.1	0.4	0.0	0.0	0.0
Yellowmouth rockfish	1.3	0.1	1.3	NA	NA	NA	0.0	0.0	0.0	0.1	0.7	0.8	0.0	0.0	0.0
Remaining slope rockfish	84.0	89.5	173.5	NA	NA	NA	0.0	0.4	0.4	62.2	37.7	99.9	0.0	0.0	0.0
Minor rockfish (South of 40°10' N. lat.)	139.2	27.7	166.8	0.2	0.1	0.2	NA	NA	NA	23.4	4.5	27.9	95.6	2.4	98.1
Nearshore	0.1	0.0	0.1	0.2	0.0	0.2	NA	NA	NA	0.0	0.0	0.0	86.9	2.4	89.3
Gopher rockfish	0.0	0.0	0.0	0.0	0.0	0.0	NA	NA	NA	0.0	0.0	0.0	24.2	0.5	24.7
Remaining nearshore rockfish	0.1	0.0	0.1	0.2	0.0	0.2	NA	NA	NA	0.0	0.0	0.0	62.8	1.9	64.7
Shelf	2.2	21.6	23.8	0.0	0.0	0.0	NA	NA	NA	0.1	0.1	0.2	8.3	0.1	8.3
Yellowtail rockfish	1.0	0.0	1.0	0.0	0.0	0.0	NA	NA	NA	0.0	0.0	0.0	0.4	0.0	0.5
Remaining shelf rockfish	1.2	21.6	22.8	0.0	0.0	0.0	NA	NA	NA	0.1	0.1	0.2	7.8	0.0	7.9
Slope	136.9	6.1	142.9	0.0	0.0	0.0	NA	NA	NA	23.3	4.4	27.7	0.4	0.0	0.4
Bank rockfish	91.7	0.1	91.8	0.0	0.0	0.0	NA	NA	NA	0.1	0.0	0.1	0.0	0.0	0.0
Blackgill rockfish	35.6	0.1	35.6	0.0	0.0	0.0	NA	NA	NA	20.8	0.5	21.3	0.4	0.0	0.4
Sharpchin rockfish	0.0	0.0	0.0	0.0	0.0	0.0	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0
Remaining slope rockfish	9.6	5.9	15.5	0.0	0.0	0.0	NA	NA	NA	2.4	3.9	6.3	0.0	0.0	0.0
Pacific cod (North of 40°10' N. lat.)	11.6	0.1	11.7	NA	NA	NA	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0
Pacific hake	0.5	1250.8	1251.3	0.0	0.0	0.0	0.0	683.7	683.7	0.1	2.3	2.4	0.0	0.0	0.0
Petrale sole	2166.4	45.5	2211.9	0.0	0.2	0.2	0.0	1.3	1.4	0.3	0.4	0.7	0.0	0.0	0.0
Sablefish	2870.5	92.3	2962.8	0.0	0.0	0.0	0.4	1.6	2.1	2434.7	100.9	2535.7	4.2	0.0	4.2
Shortbelly rockfish	0.0	7.7	7.7	0.0	0.0	0.0	0.0	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0
Splitnose rockfish (South of 40°10' N. lat.)	64.3	109.5	173.8	0.0	0.0	0.0	NA	NA	NA	0.0	0.0	0.1	0.0	0.0	0.0
Starry flounder	12.7	1.5	14.2	0.6	1.9	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.3
Thornyheads	2432.1	257.1	2689.2	0.0	0.0	0.0	0.0	0.5	0.5	154.5	20.1	174.7	0.6	0.0	0.6
Longspine thornyhead (North of 34° 27' N. lat.)	1235.1	193.6	1428.7	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.7	2.4	0.0	0.0	0.0
Longspine thornyhead (South of 34° 27' N. lat.)	0.0	0.0	0.0	0.0	0.0	0.0	NA	NA	NA	10.0	4.2	14.2	0.1	0.0	0.1
Shortspine thornyhead (North of 34° 27' N. lat.)	1195.3	47.3	1242.6	0.0	0.0	0.0	0.0	0.5	0.5	19.5	4.1	23.6	0.1	0.0	0.1
Shortspine thornyhead (South of 34° 27' N. lat.)	0.0	0.0	0.0	0.0	0.0	0.0	NA	NA	NA	122.4	7.4	129.8	0.3	0.0	0.3
Mixed thornyheads	1.6	16.3	17.9	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.7	4.7	0.0	0.0	0.0
Yellowtail rockfish (North of 40°10' N. lat.)	7.5	0.9	8.4	0.0	0.0	0.0	0.0	0.1	0.1	0.4	0.0	0.4	1.1	0.2	1.3

**Table 15 (continued).**

	LE bottom trawl			California halibut			Pink shrimp			Non-nearshore fixed gear			Nearshore fixed gear		
	Landed	Discard	Total	Landed	Discard	Total	Landed	Discard	Total	Landed	Discard	Total	Landed	Discard	Total
<b>Non-groundfish species</b>															
California halibut	39.2	0.0	39.2	50.2	27.6	77.8	0.0	0.0	0.0	0.1	0.0	0.1	1.3	0.0	1.3
Dungeness crab	0.5	221.6	222.1	0.0	164.9	164.9	0.0	0.7	0.7	3.3	2.8	6.1	11.5	0.0	11.5
Eulachon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.1	12.1	0.0	0.0	0.0	0.0	0.0	0.0
Other non-FMP flatfish	2.2	50.1	52.3	0.0	1.5	1.5	0.0	147.4	147.4	0.0	0.0	0.0	0.0	0.0	0.0
Pacific halibut **	--	--	--	0.0	0.3	0.3	0.0	0.1	0.1	--	--	--	0.0	0.4	0.4
Tanner crab	0.0	555.1	555.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	4.0	4.1	0.0	0.0	0.0

\*\* Discard estimates for Pacific halibut in the Non-nearshore fixed gear (Heery and Bellman 2009) and LE bottom trawl (Wallace and Hastie 2009) sectors were computed in separate reports.



**Table 16.** Catch (mt), estimated discard (mt), and total fishing mortality (mt) of major west coast groundfish species in the 2008 at-sea and shoreside Pacific hake/whiting fisheries by sector. These fisheries take place north of the groundfish management line at 40° 10' N latitude.

	Catcher-Processor			Mothership			Tribal			All At-Sea Hake Fisheries	Shoreside Hake Midwater Trawl
	Retained	Discard	Total	Retained	Discard	Total	Retained	Discard	Total	Total	Total
<b>Rebuilding species</b>											
Bocaccio (South of 40°10' N. lat.)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Canary rockfish	1.5	0.9	2.4	0.4	0.4	0.7	0.6	0.0	0.6	3.8	1.7
Cowcod (South of 40°10' N. lat.)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Darkblotched rockfish	1.6	0.8	2.4	2.3	1.6	3.9	--	--	--	6.3	0.5
Pacific ocean perch (North of 40°10' N. lat.)	9.2	3.7	12.9	1.8	1.2	2.9	0.1	0.0	0.1	15.9	0.1
Widow rockfish	34.8	17.8	52.6	21.1	39.8	60.9	1.7	0.0	1.7	115.2	101.1
Yelloweye rockfish	0.0	0.0	0.0	--	--	--	--	--	--	0.0	0.1
<b>Non-rebuilding species</b>											
Arrowtooth flounder	2.2	0.8	3.0	0.6	0.6	1.2	0.0	2.0	2.0	6.3	1.6
Black rockfish (North of 46°16' N. lat.)	--	--	--	0.0	0.0	0.0	--	--	--	0.0	0.0
Black rockfish (South of 46°16' N. lat.)	--	--	--	--	--	--	--	--	--	--	--
Dover sole	0.6	0.1	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0
English sole	0.0	0.0	0.0	0.0	0.0	0.0	--	--	--	0.0	0.0
Lingcod (North of 42° N. lat.)	0.5	0.1	0.6	1.7	1.2	3.0	0.0	2.0	2.0	5.0	3.3
Lingcod (South of 42° N. lat.)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0
Other flatfish	0.3	0.1	0.4	0.0	0.0	0.1	0.0	0.0	0.0	0.5	0.1
Other groundfish	168.7	321.0	489.7	4.2	20.4	24.6	0.0	0.0	0.0	514.3	60.0
Kelp greenling	--	--	--	--	--	--	--	--	--	--	--
Skates *	0.1	0.1	0.2	0.1	0.3	0.4	--	--	--	0.6	0.3
Big skate	0.1	0.1	0.2	0.1	0.2	0.3	--	--	--	0.5	--
Longnose skate	0.0	0.0	0.0	0.0	0.1	0.1	--	--	--	0.1	--
Unspecified skate	0.0	0.0	0.0	--	--	--	--	--	--	0.0	0.3
Spiny dogfish	168.3	320.9	489.1	3.9	20.0	24.0	0.0	159.6	159.6	672.7	59.5
Unspecified grenadiers	0.0	0.0	0.0	0.0	0.0	0.0	--	--	--	0.0	--
Other	0.2	0.1	0.3	0.1	0.1	0.2	0.0	0.0	0.0	0.5	0.2
Minor rockfish (North of 40°10' N. lat.)	58.2	13.0	71.2	2.6	1.5	4.0	3.3	0.0	3.3	78.5	6.0
Nearshore	--	--	--	0.0	0.0	0.0	--	--	--	0.0	0.0
Shelf	0.4	0.2	0.5	0.1	0.6	0.8	0.5	0.0	0.5	1.8	4.4
Bocaccio	0.2	0.1	0.4	0.0	0.1	0.1	0.5	0.0	0.5	1.0	0.4
Chilipepper rockfish	0.0	0.0	0.1	0.1	0.5	0.6	0.0	0.0	0.0	0.7	4.0

\* In the shoreside hake fishery (far right column), skates are typically landed as 'unspecified skate' and there is no species composition sampling of this market category. The total mortality value provided for skates in the shoreside hake fishery may include landed weight from big skate or longnose skate.

Note: Shoreside tribal hake landings are summarized in Table 17 in the WA tribal landings column.

**Table 16 (continued).**

	Catcher-Processor			Mothership			Tribal			All At-Sea Hake Fisheries	Shoreside Hake Midwater Trawl
	Retained	Discard	Total	Retained	Discard	Total	Retained	Discard	Total	Total	Total
<b>Non-rebuilding species (cont)</b>											
Minor rockfish (North of 40°10' N. lat.) (cont)											
Redstripe rockfish	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
Silvergray rockfish	0.1	0.0	0.1	0.0	0.0	0.0	--	--	--	0.1	--
Remaining shelf rockfish	--	--	--	0.0	0.0	0.0	--	--	--	0.0	0.0
Slope	57.8	12.9	70.7	2.5	0.8	3.3	2.8	0.0	2.8	76.7	1.5
Sharpchin rockfish	0.0	0.0	0.0	--	--	--	--	--	--	0.0	0.0
Splitnose rockfish	0.5	0.2	0.7	0.1	0.2	0.3	0.0	0.0	0.0	0.9	0.1
Yellowmouth rockfish	0.1	0.0	0.1	0.0	0.0	0.0	--	--	--	0.1	0.2
Remaining slope rockfish	57.3	12.7	70.0	2.4	0.7	3.0	2.8	0.0	2.8	75.7	1.3
Pacific cod (North of 43° N. lat.)	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.2
Pacific hake	108013	108	108121	57432	0	57432	14943	0	14943	180496	50788
Petrale sole	--	--	--	--	--	--	--	--	--	--	0.0
Sablefish	1.1	0.2	1.3	0.2	0.1	0.3	0.0	0.7	0.8	2.4	0.3
Shortbelly rockfish	--	--	--	--	--	--	--	--	--	--	0.0
Starry flounder	--	--	--	--	--	--	--	--	--	--	0.0
Thornyheads	6.0	0.9	7.0	0.2	0.0	0.2	0.0	0.0	0.0	7.1	--
Longspine thornyhead (North of 34° 27' N. lat.)	0.4	0.0	0.4	0.0	0.0	0.0	--	--	--	0.4	0.0
Longspine thornyhead (South of 34° 27' N. lat.)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--
Shortspine thornyhead (North of 34° 27' N. lat.)	4.3	0.8	5.1	0.2	0.0	0.2	0.0	0.0	0.0	5.3	0.1
Shortspine thornyhead (South of 34° 27' N. lat.)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--
Mixed thornyheads	1.3	0.1	1.4	--	--	--	--	--	--	1.4	--
Yellowtail rockfish (North of 40°10' N. lat.)	51.2	26.0	77.2	27.1	43.7	70.8	36.2	0.2	36.4	184.4	43.4
<b>Non-groundfish species</b>											
California halibut	--	--	--	0.0	0.0	0.0	--	--	--	0.0	--
Dungeness crab	--	--	--	0.0	0.0	0.0	--	--	--	0.0	0.1
Eulachon	0.0	0.0	0.0	0.0	0.0	0.0	--	--	--	0.0	--
Other non-FMP flatfish	--	--	--	--	--	--	--	--	--	--	--
Pacific halibut	0.0	2.1	2.1	0.0	0.6	0.6	0.0	1.3	1.3	4.0	0.5
Tanner crab	--	--	--	--	--	--	--	--	--	--	--

Note: Shoreside tribal hake landings are summarized in Table 17 in the WA tribal landings column.

**Table 17.** Estimated total fishing mortality (mt) of major west coast groundfish species in 2008 by sector.

	Shoreside commercial fisheries						WA tribal landings	All at-sea hake fisheries	Total recreational fishing mortality			Research	Remaining incidental fisheries landings	Estimated total fishing mortality
	LE bottom trawl	CA halibut	Pink shrimp	Non-nearshore fixed gear	Nearshore fixed gear	Shoreside hake mid-water trawl			WA	OR	CA			
	<b>Rebuilding species</b>													
Bocaccio (South of 40°10' N. lat.)	6	--	NA	0	1	NA	NA	NA	NA	NA	35	1	3	47
Canary rockfish	15	--	0	2	2	2	5	4	1	3	6	2	--	41
Cowcod (South of 40°10' N. lat.)	0	--	NA	--	--	NA	NA	NA	NA	NA	0	0	--	1
Darkblotched rockfish	223	--	11	11	0	1	0	6	--	--	--	1	0	253
Pacific ocean perch (North of 40°10' N. lat.)	106	NA	0	0	--	0	7	16	--	--	--	1	0	131
Widow rockfish	6	--	--	0	0	101	9	115	--	0	5	0	1	238
Yelloweye rockfish	0	--	--	1	2	0	0	0	2	3	2	1	0	12
<b>Non-rebuilding species</b>														
Arrowtooth flounder	3245	--	30	95	--	2	25	6	--	0	--	5	0	3409
Black rockfish (North of 46°16' N. lat.)	--	NA	--	--	--	0	0	0	156	NA	NA	0	--	156
Black rockfish (South of 46°16' N. lat.)	0	--	0	--	183	--	NA	NA	NA	255	155	--	0	593
Cabazon (South of 42° N. lat.)	--	--	--	--	23	NA	NA	NA	NA	NA	15	0	0	39
California scorpionfish (South of 36° N. lat.)	--	1	NA	1	2	NA	NA	NA	NA	NA	60	--	1	65
Chilipepper rockfish (South of 40°10' N. lat.)	138	0	NA	--	0	NA	NA	NA	NA	NA	3	5	5	151
Dover sole	11523	0	13	11	0	0	238	1	--	--	0	33	0	11820
English sole	395	2	1	--	--	0	36	0	--	--	--	2	0	436
Lingcod (North of 42° N. lat.)	107	NA	0	29	33	3	68	5	46	88	--	3	16	398
Lingcod (South of 42° N. lat.)	38	0	0	5	27	0	--	--	--	--	99	0	7	176
Other flatfish	898	5	33	0	1	0	43	0	0	--	34	12	13	1040
Other groundfish	3567	56	6	550	26	60	356	514	6	22	41	30	106	5339
Kelp greenling	0	--	--	--	24	--	--	--	1	22	9	0	0	57
Skates*	2055	50	1	139	0	0	53	1	2	--	--	--	12	2314
Spiny dogfish	1023	3	4	332	1	59	303	673	--	0	3	14	82	2497
Unspecified grenadiers	303	--	--	77	--	--	--	0	--	--	--	--	--	379
Other	186	4	1	2	26	0	0	1	3	--	29	16	12	277
Minor rockfish (North of 40°10' N. lat.)	275	NA	26	105	60	6	28	79	9	38	12	13	1	651
Nearshore	0	NA	0	--	51	0	0	0	7	31	8	0	--	97
Shelf	14	NA	12	4	9	4	2	2	1	7	4	14	1	75
Bocaccio	1	NA	--	0	--	0	1	1	1	0	0	0	0	4
Chilipepper rockfish	1	NA	0	0	--	4	--	1	--	0	0	0	0	6

**Table 17 (continued).**

	Shoreside commercial fisheries						WA tribal landings	All at-sea hake fisheries	Total recreational fishing mortality			Research	Remaining incidental fisheries landings	Estimated total fishing mortality
	LE bottom trawl	CA halibut	Pink shrimp	Non- nearshore fixed gear	Nearshore fixed gear	Shoreside hake mid- water trawl			WA	OR	CA			
	Minor rockfish (North of 40°10' N. lat.)													
Shelf (continued)														
Redstripe rockfish	1	NA	0	0	--	--	1	0	--	--	--	0	--	2
Silvergray rockfish	2	NA	--	1	--	--	0	0	--	0	--	0	--	3
Remaining shelf rockfish	9	NA	12	3	9	0	1	0	1	7	4	0	0	47
Slope	261	NA	13	101	0	2	25	77	--	0	--	4	0	484
Sharpchin rockfish	5	NA	0	0	--	0	0	0	--	--	--	2	--	7
Splitnose rockfish	82	NA	13	0	--	0	2	1	--	--	--	2	0	99
Yellowmouth rockfish	1	NA	--	1	--	0	1	0	--	--	--	--	--	3
Remaining slope rockfish	173	NA	0	100	0	1	23	76	--	0	--	0	0	375
Minor rockfish (South of 40°10' N. lat.)	167	0	NA	28	98	NA	--	NA	NA	NA	476	8	25	802
Nearshore	0	0	NA	0	89	NA	--	NA	NA	NA	304	--	0	394
Gopher rockfish	--	--	NA	0	25	NA	NA	NA	NA	NA	42	--	0	67
Remaining nearshore rockfish	0	0	NA	--	65	NA	NA	NA	NA	NA	262	--	0	327
Shelf	24	0	NA	0	8	NA	--	NA	NA	NA	171	0	8	212
Yellowtail rockfish	1	--	NA	--	0	NA	NA	NA	NA	NA	15	0	1	18
Remaining shelf rockfish	23	0	NA	0	8	NA	NA	NA	NA	NA	156	--	7	194
Slope	143	--	NA	28	0	NA	--	NA	NA	NA	0	0	17	189
Bank rockfish	92	--	NA	0	0	NA	NA	NA	NA	NA	0	0	1	93
Blackgill rockfish	36	--	NA	21	0	NA	NA	NA	NA	NA	--	0	15	72
Sharpchin rockfish	--	--	NA	--	--	NA	NA	NA	NA	NA	--	0	--	0
Remaining slope rockfish	15	--	NA	6	0	NA	NA	NA	NA	NA	--	--	1	23
Pacific cod (North of 43° N. lat.)	12	NA	--	0	--	0	26	0	0	0	NA	0	0	39
Pacific hake	1251	0	684	2	--	50788	16972	180496	--	0	0	12	0	250205
Petrале sole	2212	0	1	1	0	0	44	--	--	0	1	2	0	2260
Sablefish	2963	--	2	2536	4	0	525	2	--	2	0	13	30	6078
Shortbelly rockfish	8	--	0	0	--	0	--	--	--	--	--	1	--	9
Splitnose rockfish (South of 40°10' N. lat.)	174	--	NA	0	--	NA	NA	NA	NA	NA	--	3	0	177
Starry flounder	14	3	--	--	0	0	--	--	--	3	1	0	0	21
Thornyheads	2689	--	0	175	1	0	37	7	--	--	--	19	45	2972
Longspine thornyhead (North of 34° 27' N. lat.)	1429	--	--	2	--	0	0	0	--	--	--	13	0	1445
Longspine thornyhead (South of 34° 27' N. lat.)	--	--	NA	14	0	--	--	NA	--	--	--	1	2	18
Shortspine thornyhead (North of 34° 27' N. lat.)	1243	--	0	24	0	0	36	5	--	--	--	4	1	1313
Shortspine thornyhead (South of 34° 27' N. lat.)	--	--	NA	130	0	--	--	NA	--	--	--	1	42	172
Mixed thornyheads	18	--	--	5	--	--	--	1	--	--	--	--	--	24
Yellowtail rockfish (North of 40°10' N. lat.)	8	--	0	0	1	43	214	184	15	5	0	3	0	476

**Table 17 (continued).**

	Shoreside commercial fisheries						WA tribal landings	All at-sea hake fisheries	Total recreational fishing mortality			Research	Remaining incidental fisheries landings	Estimated total fishing mortality
	LE bottom trawl	CA halibut	Pink shrimp	Non- nearshore fixed gear	Nearshore fixed gear	Shoreside hake mid- water trawl			WA	OR	CA			
	<b>Non-groundfish species</b>													
California halibut	39	78	--	0	1	--	--	0	--	--	235	--	124	478
Dungeness crab	222	165	1	6	11	0	1148	0	--	--	--	--	15602	17155
Eulachon	--	--	12	--	--	--	--	0	--	--	--	--	--	12
Other non-FMP flatfish	52	1	147	--	--	--	--	--	--	--	0	--	--	202
Pacific halibut **	(265**)	0	0	(68**)	0	0	202	4	--	--	12	10	27	589
Tanner crab	555	--	--	4	0	--	--	--	--	--	--	--	--	559

\*\* Discard estimates for Pacific halibut in the Non-nearshore fixed gear (Heery and Bellman 2009) and LE bottom trawl (Wallace and Hastie 2009) sectors were computed in separate reports.

**Table 18.** Estimated total fishing mortality (mt) of major west coast groundfish species in 2008 and corresponding management reference points (harvest specifications).

	Estimated total fishing mortality (mt)	Management reference points (harvest specifications)			
		Optimum Yield (mt)	Estimated mortality (as % of OY)	Allowable Biological Catch (mt)	Estimated mortality (as % of ABC)
<b>Rebuilding species</b>					
Bocaccio (South of 40°10' N. lat.)	47	218	21%	618	8%
Canary rockfish	41	44	94%	179	23%
Cowcod (South of 40°10' N. lat.)	1	4	13%	36	1%
Darkblotched rockfish	253	330	77%	487	52%
Pacific ocean perch (North of 40°10' N. lat.)	131	150	87%	911	14%
Widow rockfish	238	368	65%	5144	5%
Yelloweye rockfish	12	20	58%	26	45%
<b>Non-rebuilding species</b>					
Arrowtooth flounder	3409	5800	59%	5800	59%
Black rockfish (North of 46°16' N. lat.)	156	540	29%	540	29%
Black rockfish (South of 46°16' N. lat.)	593	722	82%	722	82%
Cabazon (South of 42° N. lat.)	39	69	56%	94	41%
California scorpionfish (South of 36° N. lat.)	65	175	37%	219	30%
Chilipepper rockfish (South of 40°10' N. lat.)	151	2000	8%	2700	6%
Dover sole	11820	16500	72%	28442	42%
English sole	436	6237	7%	6237	7%
Lingcod (North of 42° N. lat.)	398	5558	7%	5428	7%
Lingcod (South of 42° N. lat.)	176	612	29%	852	21%
Other flatfish	1040	4884	21%	6731	15%
Other groundfish	5339	7300	73%	14600	37%
Kelp greenling	57				
Skates *	2314				
Spiny dogfish	2497				
Unspecified grenadiers	379				
Other	277				
Minor rockfish (North of 40°10' N. lat.)	651	2270	29%	3680	18%
Nearshore	97	142	69%		
Shelf	75	968	8%		
Bocaccio	4			**	
Chilipepper rockfish	6			**	
Redstripe rockfish	2			**	
Silvergray rockfish	3			**	
Remaining shelf rockfish	47			**	
Slope	484	1160	42%		
Sharpchin rockfish	7			**	
Splitnose rockfish	99			**	
Yellowmouth rockfish	3			**	
Remaining slope rockfish	375			**	

\* Skates include big skate, longnose skate, and unspecified skate. Individual total mortality values are not presented for these species because all skates are typically landed as 'unspecified skate' and the mortality from landings for big skate and longnose skate cannot be accurately summarized.

\*\* ABCs are not available for these species. ABC values that are listed for these species in other sources represent ABC contributions to the Minor Rockfish ABCs.

**Table 18 (continued).**

	Estimated total fishing mortality (mt)	Management reference points (harvest specifications)			Estimated mortality (as % of ABC)
		Optimum Yield (mt)	Estimated mortality (as % of OY)	Allowable Biological Catch (mt)	
<b>Non-rebuilding species (cont.)</b>					
Minor rockfish (South of 40°10' N. lat.)	802	1904	42%	3403	24%
Nearshore	394	564	70%		
Gopher rockfish	67			**	
Remaining nearshore rockfish	327			**	
Shelf	212	714	30%		
Yellowtail rockfish	18			**	
Remaining shelf rockfish	194			**	
Slope	189	626	30%		
Bank rockfish	93			**	
Blackgill rockfish	72			**	
Sharpchin rockfish	0			**	
Remaining slope rockfish	23			**	
Pacific cod (North of 43° N. lat.)	39	1600	2%	3200	1%
Pacific hake	250205	269545	93%	295520	85%
Petrale sole	2260	2499	90%	2919	77%
Sablefish	6078	5934	102.4%	6058	100.3%
Shortbelly rockfish	9	13900	0%	13900	0%
Splitnose rockfish (South of 40°10' N. lat.)	177	461	38%	615	29%
Starry flounder	21	890	2%	1221	2%
Thornyheads					
Longspine thornyhead (North of 34° 27' N. lat.)	1445	2220	65%	3907	37%
Longspine thornyhead (South of 34° 27' N. lat.)	18	476	4%		
Shortspine thornyhead (North of 34° 27' N. lat.)	1313	1634	80%	2476	60%
Shortspine thornyhead (South of 34° 27' N. lat.)	172	421	41%		
Mixed thornyheads	24				
Yellowtail rockfish (North of 40°10' N. lat.)	476	4548	10%	4548	10%

\*\* ABCs are not available for these species. ABC values that are listed for these species in other sources represent ABC contributions to the Minor Rockfish ABCs.

## APPENDIX A

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

### SHARKS

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

### RATFISH

Ratfish, *Hydrolagus colliei*

### MORIDS

Finescale codling, *Antimora microlepis*

### GRENADIERS

Pacific rattail, *Coryphaenoides acrolepis*

### ROUND FISH

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

### FLATFISH

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



## ROCKFISH

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

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

Shortraker, *S. borealis*  
Shortspine thornyhead, *Sebastolobus alascanus*  
Silvergray, *Sebastes. brevispinus*  
Speckled, *S. ovalis*  
Splitnose rockfish, *S. diploproa*  
Squarespot, *S. hopkinsi*  
Starry, *S. constellatus*  
Stripetail, *S. saxicola*  
Swordspine, *S. ensifer*  
Tiger, *S. nigorcinctus*  
Treefish, *S. serriceps*  
Vermilion, *S. miniatus*  
Widow, *S. entomelas*  
Yelloweye, *S. ruberrimus*  
Yellowmouth, *S. reedi*  
Yellowtail, *S. flavidus*

## APPENDIX 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 for the non-nearshore sectors of the groundfish fishery.

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

<b>PacFIN Species ID</b>	<b>PacFIN Common Name</b>	<b>Species Group - North of 40° 10' N latitude</b>	<b>Species Group - South of 40° 10' N latitude</b>	<b>FMP</b>
CBZ1	NOM. CABEZON	Other groundfish	Cabezon	yes
CBZN	CABEZON	Other groundfish	Cabezon	yes
CEEL	SPOTTED CUSK-EEL	Other nongroundfish	Other nongroundfish	
CHL1	NOM. CALIFORNIA HALIBUT	California halibut	California halibut	
CHLB	CALIFORNIA HALIBUT	California halibut	California halibut	
CHN1	NOM. CHINA ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
CHNA	CHINA ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
CHNK	CHINOOK SALMON	Other nongroundfish	Other nongroundfish	
CHUM	CHUM SALMON	Other nongroundfish	Other nongroundfish	
CKLE	BASKET COCKLE	Other nongroundfish	Other nongroundfish	
CLC1	NOM. CALICO ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
CLCO	CALICO ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
CLP1	NOM. CHILIPEPPER	Chilipepper (Remaining rockfish)	Chilipepper	yes
CLPR	CHILIPEPPER	Chilipepper (Remaining rockfish)	Chilipepper	yes
CMCK	CHUB MACKEREL	Other nongroundfish	Other nongroundfish	
CMEL	CHAMELEON ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
CML1	NOM. CHAMELEON ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
CMSL	CALIFORNIA MUSSEL	Other nongroundfish	Other nongroundfish	
CNR1	NOM. CANARY ROCKFISH	Canary rockfish	Canary rockfish	yes
CNRY	CANARY ROCKFISH	Canary rockfish	Canary rockfish	yes
COHO	COHO SALMON	Other nongroundfish	Other nongroundfish	
COP1	NOM. COPPER ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
COPP	COPPER ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
CPLN	CAPELIN	Other nongroundfish	Other nongroundfish	
CSKT	CALIFORNIA SKATE	Unspecified skate	Unspecified skate	yes
CSOL	CURLFIN SOLE	Other flatfish	Other flatfish	yes
CTRB	C-O SOLE	Other non-FMP flatfish	Other non-FMP flatfish	
CUDA	PACIFIC BARRACUDA	Other nongroundfish	Other nongroundfish	
CWC1	NOM. COWCOD ROCKFISH	Other shelf rockfish	Cowcod	yes
CWCD	COWCOD ROCKFISH	Other shelf rockfish	Cowcod	yes
DBR1	NOM. DARKBLOTCHED ROCKFISH	Darkblotched rockfish	Darkblotched rockfish	yes
DBRK	DARKBLOTCHED ROCKFISH	Darkblotched rockfish	Darkblotched rockfish	yes
DCRB	DUNGENESS CRAB	Dungeness crab	Dungeness crab	
DFLT	UNSP. DEEP FLOUNDERS	Other flatfish	Other flatfish	yes
DOVR	DOVER SOLE	Dover sole	Dover sole	yes
DRDO	DORADO	Other nongroundfish	Other nongroundfish	
DSOL	DEEPSEA SOLE	Other non-FMP flatfish	Other non-FMP flatfish	
DSRK	SPINY DOGFISH	Spiny dogfish	Spiny dogfish	yes
DTRB	DIAMOND TURBOT	Other non-FMP flatfish	Other non-FMP flatfish	
DUSK	DUSKY ROCKFISH	Other groundfish	Other groundfish	yes
DVR1	NOM. DOVER SOLE	Dover sole	Dover sole	yes
DWRF	DWARF-RED ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
EELS	UNSPECIFIED EELS	Other nongroundfish	Other nongroundfish	
EGL1	NOM. ENGLISH SOLE	English sole	English sole	yes
EGLS	ENGLISH SOLE	English sole	English sole	yes

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

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KSTR	KUMAMOTO OYSTER	Other nongroundfish	Other nongroundfish	
LCD1	NOM. LINGCOD	Lingcod	Lingcod	yes
LCLM	NATIVE LITTLENECK	Other nongroundfish	Other nongroundfish	
LCOD	LINGCOD	Lingcod	Lingcod	yes
LDAB	LONGFIN SANDDAB	Other non-FMP flatfish	Other non-FMP flatfish	
LDB1	NOM. LONGFIN SANDDAB	Other non-FMP flatfish	Other non-FMP flatfish	
LOBS	CALIF. SPINY LOBSTER	Other nongroundfish	Other nongroundfish	
LSKT	LONGNOSE SKATE	Longnose skate	Longnose skate	yes
LSP1	NOM. LONGSPINE THORNYHEAD	Longspine thornyhead	Longspine thornyhead	yes
LSPN	LONGSPINE THORNYHEAD	Longspine thornyhead	Longspine thornyhead	yes
LSRK	LEOPARD SHARK	Other groundfish	Other groundfish	yes
LSTR	OLYMPIA OYSTER	Other nongroundfish	Other nongroundfish	
LUVR	LOUVAR	Other nongroundfish	Other nongroundfish	
MACL	MUD CLAMS	Other nongroundfish	Other nongroundfish	
MAKO	SHORTFIN MAKO SHARK	Other nongroundfish	Other nongroundfish	
MCLM	MANILA CLAM	Other nongroundfish	Other nongroundfish	
MEEL	MONKEYFACE EEL	Other nongroundfish	Other nongroundfish	
MISC	MISC. FISH/ANIMALS	Other nongroundfish	Other nongroundfish	
MOLA	COMMON MOLA	Other nongroundfish	Other nongroundfish	
MRLN	STRIPED MARLIN	Other nongroundfish	Other nongroundfish	
MSC2	MISCELLANEOUS FISH	Other nongroundfish	Other nongroundfish	
MSHP	PLAINFIN MIDSHIPMAN	Other nongroundfish	Other nongroundfish	
MSQD	MARKET SQUID	Other nongroundfish	Other nongroundfish	
MSRM	MUD SHRIMP	Other nongroundfish	Other nongroundfish	
MXR1	NOM. MEXICAN ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
MXRF	MEXICAN ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
NANC	NORTHERN ANCHOVY	Other nongroundfish	Other nongroundfish	
NRCK	NORTHERN ROCKFISH	Other groundfish	Other groundfish	yes
NSHR	NORTHERN NEAR-SHORE RK	Other nearshore rockfish	Other nearshore rockfish	yes
NSLF	NORTHERN SHELF ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
NSLP	NORTHERN SLOPE ROCKFISH	Other slope rockfish	Other slope rockfish	yes
NUSF	NOR. UNSP. SHELF ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
NUSP	NOR. UNSP. SLOPE ROCKFISH	Other slope rockfish	Other slope rockfish	yes
NUSR	NOR. UNSP. NEAR-SHORE RK	Other nearshore rockfish	Other nearshore rockfish	yes
OABL	OTHER ABALONE	Other nongroundfish	Other nongroundfish	
OANC	OTHER ANCHOVY	Other nongroundfish	Other nongroundfish	
OBAS	OTHER BASS	Other nongroundfish	Other nongroundfish	
OCLM	OTHER CLAM	Other nongroundfish	Other nongroundfish	
OCRB	OTHER CRAB	Other nongroundfish	Other nongroundfish	
OCRK	OTHER CROAKER	Other nongroundfish	Other nongroundfish	
OCTP	UNSP. OCTOPUS	Other nongroundfish	Other nongroundfish	
ODSR	OTHER DEMERSAL RKFSH	Other groundfish	Other groundfish	yes
OECH	OTHER ECHINODERM	Other nongroundfish	Other nongroundfish	
OFLT	OTHER FLATFISH	Other flatfish	Other flatfish	yes
OGRN	OTHER GROUND FISH	Other groundfish	Other groundfish	yes
OLV1	NOM. OLIVE ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes

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

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



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

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

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

## APPENDIX C

Species identification codes used in the Pacific Coast Fisheries Information Network (PacFIN) database and assigned to WCGOP observer data, with aggregated species groups used in this report for the nearshore fixed gear sector of the groundfish fishery.

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40° 10' N latitude	Species Group - South of 40° 10' N latitude	NS Species
ALBC	ALBACORE	Other nongroundfish	Other nongroundfish	
APLC	ALASKA PLAICE	Other non-FMP flatfish	Other non-FMP flatfish	
ARR1	NOM. AURORA ROCKFISH	Minor slope rockfish	Minor slope rockfish	
ARRA	AURORA ROCKFISH	Minor slope rockfish	Minor 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	Minor 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	Minor slope rockfish	Blackgill (Remaining rockfish)	
BKCR	BLUE KING CRAB	Other nongroundfish	Other nongroundfish	
BLCK	BLACK ROCKFISH	Black rockfish	Black rockfish	yes
BLGL	BLACKGILL ROCKFISH	Minor slope rockfish	Blackgill (Remaining rockfish)	
BLK1	NOM. BLACK ROCKFISH	Black rockfish	Black rockfish	yes
BLU1	NOM. BLUE ROCKFISH	Blue rockfish	Blue rockfish	yes
BLUR	BLUE ROCKFISH	Blue rockfish	Blue rockfish	yes
BMCK	BULLET MACKEREL	Other nongroundfish	Other nongroundfish	
BMRL	BLUE MARLIN	Other nongroundfish	Other nongroundfish	
BMSL	BLUE OR BAY MUSSEL	Other nongroundfish	Other nongroundfish	
BNK1	NOM. BANK ROCKFISH	Minor slope rockfish	Bank rockfish (Remaining rockfish)	
BRNZ	BRONZESPOTTED ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
BRW1	NOM. BROWN ROCKFISH	Other minor nearshore rockfish	Deeper nearshore rockfish	yes
BRWN	BROWN ROCKFISH	Other minor nearshore rockfish	Deeper nearshore rockfish	yes
BRZ1	NOM. BRONZESPOTTED RK	Minor shelf rockfish	Minor 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 nongroundfish	Other nongroundfish	
BTCR	BAIRDI TANNER CRAB	Tanner crab	Tanner crab	
BTNA	BLUEFIN TUNA	Other nongroundfish	Other nongroundfish	

<b>PacFIN Species ID</b>	<b>PacFIN Common Name</b>	<b>Species Group - North of 40° 10' N latitude</b>	<b>Species Group - South of 40° 10' N latitude</b>	<b>NS Species</b>
BTRY	BAT RAY	Other nongroundfish	Other nongroundfish	
BYEL	BLACK-AND-YELLOW ROCKFISH	Other minor nearshore rockfish	Shallow nearshore rockfish	yes
BYL1	NOM. BLACK-AND-YELLOW RK	Other minor nearshore rockfish	Shallow nearshore rockfish	yes
CBZ1	NOM. CABEZON	Cabezon	Cabezon	yes
CBZN	CABEZON	Cabezon	Cabezon	yes
CEEL	SPOTTED CUSK-EEL	Other nongroundfish	Other nongroundfish	
CHL1	NOM. CALIFORNIA HALIBUT	California halibut	California halibut	
CHLB	CALIFORNIA HALIBUT	California halibut	California halibut	
CHN1	NOM. CHINA ROCKFISH	Other minor nearshore rockfish	Shallow nearshore rockfish	yes
CHNA	CHINA ROCKFISH	Other minor nearshore rockfish	Shallow nearshore rockfish	yes
CHNK	CHINOOK SALMON	Other nongroundfish	Other nongroundfish	
CHUM	CHUM SALMON	Other nongroundfish	Other nongroundfish	
CKLE	BASKET COCKLE	Other nongroundfish	Other nongroundfish	
CLC1	NOM. CALICO ROCKFISH	Other minor nearshore rockfish	Deeper nearshore rockfish	yes
CLCO	CALICO ROCKFISH	Other minor nearshore rockfish	Deeper nearshore rockfish	yes
CLP1	NOM. CHILIPEPPER	Chilipepper (Remaining rockfish)	Chilipepper	
CLPR	CHILIPEPPER	Chilipepper (Remaining rockfish)	Chilipepper	
CMCK	CHUB MACKEREL	Other nongroundfish	Other nongroundfish	
CMEL	CHAMELEON ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
CML1	NOM. CHAMELEON ROCKFISH	Minor shelf rockfish	Minor 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 minor nearshore rockfish	Deeper nearshore rockfish	yes
COPP	COPPER ROCKFISH	Other minor nearshore rockfish	Deeper nearshore rockfish	yes
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	Minor shelf rockfish	Cowcod	
CWCD	COWCOD ROCKFISH	Minor 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	Minor shelf rockfish	Minor shelf rockfish	
EELS	UNSPECIFIED EELS	Other nongroundfish	Other nongroundfish	

<b>PacFIN Species ID</b>	<b>PacFIN Common Name</b>	<b>Species Group - North of 40° 10' N latitude</b>	<b>Species Group - South of 40° 10' N latitude</b>	<b>NS Species</b>
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	Minor shelf rockfish	Minor shelf rockfish	
FLG1	NOM. FLAG ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
FNTS	FANTAIL SOLE	Other non-FMP flatfish	Other non-FMP flatfish	
FRCK	FRECKLED ROCKFISH	Minor shelf rockfish	Minor 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 RK	Minor shelf rockfish	Minor shelf rockfish	
GBLC	GREENBLOTCHED ROCKFISH	Minor shelf rockfish	Minor 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 minor nearshore rockfish	Gopher rockfish (Remaining rockfish)	yes
GPHR	GOPHER ROCKFISH	Other minor nearshore rockfish	Gopher rockfish (Remaining rockfish)	yes
GPRW	GOLDEN PRAWN	Other nongroundfish	Other nongroundfish	
GRAS	GRASS ROCKFISH	Other minor nearshore rockfish	Shallow nearshore rockfish	yes
GRDR	UNSP. GRENADIERS	Unspecified grenadiers	Unspecified grenadiers	
GRS1	NOM. GRASS ROCKFISH	Other minor nearshore rockfish	Shallow nearshore rockfish	yes
GSP1	NOM. GREENSPOTTED ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
GSPT	GREENSPOTTED ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
GSQD	GIANT SQUID	Other nongroundfish	Other nongroundfish	
GSR1	NOM. GREENSTRIPED ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
GSRK	GREENSTRIPED ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
GSRM	GHOST SHRIMP	Other nongroundfish	Other nongroundfish	
GSTG	GREEN STURGEON	Green sturgeon	Green sturgeon	
GTRB	GREENLAND TURBOT	Other non-FMP flatfish	Other non-FMP flatfish	
HBRK	HALFBANDED ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
HCLM	HORSE CLAMS	Other nongroundfish	Other nongroundfish	
HLQN	HARLEQUIN ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
HNY1	NOM. HONEYCOMB ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
HNYC	HONEYCOMB ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
HTRB	HORNYHEAD TURBOT	Other non-FMP flatfish	Other non-FMP flatfish	
ISRK	BIGEYE THRESHER SHARK	Other nongroundfish	Other nongroundfish	
JCLM	CALIFORNIA JACKKNIFE CLAM	Other nongroundfish	Other nongroundfish	
JMCK	JACK MACKEREL	Other nongroundfish	Other nongroundfish	
KFSH	GIANT KELPFISH	Other nongroundfish	Other nongroundfish	
KGL1	NOM. KELP GREENLING	Kelp greenling	Kelp greenling	yes
KLP1	NOM. KELP ROCKFISH	Other minor nearshore rockfish	Shallow nearshore rockfish	yes
KLPG	KELP GREENLING	Kelp greenling	Kelp greenling	yes

<b>PacFIN Species ID</b>	<b>PacFIN Common Name</b>	<b>Species Group - North of 40° 10' N latitude</b>	<b>Species Group - South of 40° 10' N latitude</b>	<b>NS Species</b>
KLPR	KELP ROCKFISH	Other minor nearshore rockfish	Shallow nearshore rockfish	yes
KMKA	KAMCHATKA FLOUNDER	Other non-FMP flatfish	Other non-FMP flatfish	
KSTR	KUMAMOTO OYSTER	Other nongroundfish	Other nongroundfish	
LCD1	NOM. LINGCOD	Lingcod	Lingcod	yes
LCLM	NATIVE LITTLENECK	Other nongroundfish	Other nongroundfish	
LCOD	LINGCOD	Lingcod	Lingcod	yes
LDAB	LONGFIN SANDDAB	Other non-FMP flatfish	Other non-FMP flatfish	
LDB1	NOM. LONGFIN SANDDAB	Other non-FMP flatfish	Other non-FMP flatfish	
LOBS	CALIF. SPINY LOBSTER	Other nongroundfish	Other nongroundfish	
LSKT	LONGNOSE SKATE	Longnose skate	Longnose skate	
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 nongroundfish	Other nongroundfish	
MXR1	NOM. MEXICAN ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
MXRF	MEXICAN ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
NANC	NORTHERN ANCHOVY	Other nongroundfish	Other nongroundfish	
NRCK	NORTHERN ROCKFISH	Other groundfish	Other groundfish	
NSHR	NORTHERN NEAR-SHORE RK	Other minor nearshore rockfish	Northern nearshore rockfish	yes
NSLF	NORTHERN SHELF ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
NSLP	NORTHERN SLOPE ROCKFISH	Minor slope rockfish	Minor slope rockfish	
NUSF	NOR. UNSP. SHELF ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
NUSP	NOR. UNSP. SLOPE ROCKFISH	Minor slope rockfish	Minor slope rockfish	
NUSR	NOR. UNSP. NEAR-SHORE RK	Other minor nearshore rockfish	Northern nearshore rockfish	yes
OABL	OTHER ABALONE	Other nongroundfish	Other nongroundfish	
OANC	OTHER ANCHOVY	Other nongroundfish	Other nongroundfish	
OBAS	OTHER BASS	Other nongroundfish	Other nongroundfish	
OCLM	OTHER CLAM	Other nongroundfish	Other nongroundfish	
OCRB	OTHER CRAB	Other nongroundfish	Other nongroundfish	
OCRK	OTHER CROAKER	Other nongroundfish	Other nongroundfish	
OCTP	UNSP. OCTOPUS	Other nongroundfish	Other nongroundfish	
ODSR	OTHER DEMERSAL RKFSH	Other groundfish	Other groundfish	
OECH	OTHER ECHINODERM	Other nongroundfish	Other nongroundfish	
OFLT	OTHER FLATFISH	Other flatfish	Other flatfish	

<b>PacFIN Species ID</b>	<b>PacFIN Common Name</b>	<b>Species Group - North of 40° 10' N latitude</b>	<b>Species Group - South of 40° 10' N latitude</b>	<b>NS Species</b>
OGRN	OTHER GROUND FISH	Other groundfish	Other groundfish	
OLV1	NOM. OLIVE ROCKFISH	Other minor nearshore rockfish	Deeper nearshore rockfish	yes
OLVE	OLIVE ROCKFISH	Other minor nearshore rockfish	Deeper nearshore rockfish	yes
OMSK	OTHER MOLLUSKS	Other nongroundfish	Other nongroundfish	
OPLG	OTHER PELAGIC RKFSH	Other groundfish	Other groundfish	
ORCK	OTHER ROCKFISH	Minor slope rockfish	Minor slope rockfish	
ORCK	OTHER ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
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	Minor slope rockfish	Minor slope rockfish	
OSRK	OTHER SHARK	Other nongroundfish	Other nongroundfish	
OSRM	OTHER SHRIMP	Other nongroundfish	Other nongroundfish	
OSTR	OTHER OYSTER	Other nongroundfish	Other nongroundfish	
OTCR	OPILIO TANNER CRAB	Tanner crab	Tanner crab	
OTNA	OTHER TUNA	Other nongroundfish	Other nongroundfish	
OURC	OTHER SEA 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	Pacific cod	
PDAB	PACIFIC SANDDAB	Other flatfish	Other flatfish	
PDB1	NOM. PACIFIC SANDDAB	Other flatfish	Other flatfish	
PGMY	PYGMY ROCKFISH	Minor shelf rockfish	Minor 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	Minor shelf rockfish	Minor shelf rockfish	
PNKR	PINK ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
POMF	PACIFIC POMFRET	Other nongroundfish	Other nongroundfish	
POP	PACIFIC OCEAN PERCH	Pacific ocean perch	Minor slope rockfish	
POP1	GEN. SHELF/SLOPE RF	Minor slope rockfish	Minor slope rockfish	
POP2	NOMINAL POP	Pacific ocean perch	Minor slope rockfish	
PRCL	PURPLE CLAM	Other nongroundfish	Other nongroundfish	
PROW	PROWFISH	Other nongroundfish	Other nongroundfish	
PRR1	NOM. PINKROSE ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
PRRK	PINKROSE ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
PSDN	PACIFIC SARDINE	Other nongroundfish	Other nongroundfish	
PSHP	PINK SHRIMP	Other nongroundfish	Other nongroundfish	
PSRK	PELAGIC THRESHER SHARK	Other nongroundfish	Other nongroundfish	
PSTR	PACIFIC OYSTER	Other nongroundfish	Other nongroundfish	
PTR1	NOM. PETRALE SOLE	Petrale sole	Petrale sole	
PTRL	PETRALE SOLE	Petrale sole	Petrale sole	



<b>PacFIN Species ID</b>	<b>PacFIN Common Name</b>	<b>Species Group - North of 40° 10' N latitude</b>	<b>Species Group - South of 40° 10' N latitude</b>	<b>NS Species</b>
PUGT	PUGET SOUND ROCKFISH	Minor shelf rockfish	Minor 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 minor nearshore rockfish	Deeper nearshore rockfish	yes
QLBK	QUILLBACK ROCKFISH	Other minor nearshore rockfish	Deeper nearshore rockfish	yes
RABL	RED ABALONE	Other nongroundfish	Other nongroundfish	
RATF	SPOTTED RATFISH	Other groundfish	Other groundfish	
RCK1	BOCACCI+CHILIPEPPER RCKFSH	Minor shelf rockfish	Minor shelf rockfish	
RCK2	UNSP. BOLINA RCKFSH	Other minor nearshore rockfish	Deeper nearshore rockfish	yes
RCK3	UNSP. DPWTR REDS RCKFSH	Minor slope rockfish	Minor 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 minor nearshore rockfish	Gopher rockfish (Remaining rockfish)	yes
RCK8	CANARY+VERMILION RCKFSH	Canary rockfish	Canary rockfish	
RCK9	BLACK+BLUE ROCKFISH	Black rockfish	Black rockfish	yes
RCKG	ROCK GREENLING	Other nongroundfish	Other nongroundfish	
RCLM	RAZOR CLAM	Other nongroundfish	Other nongroundfish	
RCRB	ROCK CRAB	Other nongroundfish	Other nongroundfish	
RDB1	NOM. REDBANDED ROCKFISH	Minor slope rockfish	Minor slope rockfish	
RDBD	REDBANDED ROCKFISH	Minor slope rockfish	Minor slope rockfish	
REDS	REDSTRIPE ROCKFISH	Redstripe rockfish (Remaining rockfish)	Minor shelf rockfish	
REX	REX SOLE	Other flatfish	Other flatfish	
REX1	NOM. REX SOLE	Other flatfish	Other flatfish	
REYE	ROUGHEYE ROCKFISH	Minor slope rockfish	Minor 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	Minor shelf rockfish	Minor shelf rockfish	
ROSY	ROSY ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
RPRW	RIDGEBACK PRAWN	Other nongroundfish	Other nongroundfish	
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	Minor shelf rockfish	Minor shelf rockfish	
RSTN	ROSETHORN ROCKFISH	Minor shelf rockfish	Minor 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	

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40° 10' N latitude	Species Group - South of 40° 10' N latitude	NS Species
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 minor nearshore rockfish	Shallow nearshore rockfish	yes
SCR1	NOM. CALIF. SCORPIONFISH	Other minor nearshore rockfish	Shallow nearshore rockfish	yes
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	California sheephead	California sheephead	yes
SHPD	CALIFORNIA SHEEPHEAD	California sheephead	California sheephead	yes
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)	Minor 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 (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	Minor shelf rockfish	Minor shelf rockfish	
SPKL	SPECKLED ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
SPRW	SPOTTED PRAWN	Other nongroundfish	Other nongroundfish	
SQID	UNSP. SQUID	Other nongroundfish	Other nongroundfish	
SQR1	NOM. SQUARESPOT	Minor shelf rockfish	Minor shelf rockfish	
SQRS	SQUARESPOT ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
SRFP	SURFPERCH SPP.	Other nongroundfish	Other nongroundfish	
SRKR	SHORTRAKER ROCKFISH	Minor slope rockfish	Minor slope rockfish	
SSCL	SHARPNOSE SCULPIN	Other nongroundfish	Other nongroundfish	
SSDB	SPECKLED SANDDAB	Other non-FMP flatfish	Other non-FMP flatfish	
SSHR	SOUTHERN NEAR-SHORE RK	Southern nearshore rockfish	Deeper nearshore rockfish	yes
SSHR	SOUTHERN NEAR-SHORE RK	Southern nearshore rockfish	Shallow nearshore rockfish	yes
SSLF	SOUTHERN SHELF ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
SSLP	SOUTHERN SLOPE ROCKFISH	Minor slope rockfish	Minor 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. Nearshore RF	Southern nearshore rockfish	Deeper nearshore rockfish	yes
SSRK	SOUPFIN SHARK	Other groundfish	Other groundfish	
SSRS	Shallow So. Nearshore RF	Southern nearshore rockfish	Shallow nearshore rockfish	yes
STAR	STARRY ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
STL1	NOM. STRIPETAILED ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
STLH	STEELHEAD	Other nongroundfish	Other nongroundfish	

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STNA	SKIPJACK TUNA	Other nongroundfish	Other nongroundfish	
STR1	NOM. STARRY ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
STRK	STRIPETAILED ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
STRY	STARRY FLOUNDER	Starry flounder	Starry flounder	
SUSF	SOU. UNSP. SHELF ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
SUSP	SOU. UNSP. SLOPE ROCKFISH	Minor slope rockfish	Minor slope rockfish	
SUSR	SOU. UNSP. NEAR-SHORE RK	Southern nearshore rockfish	Deeper nearshore rockfish	yes
SUSR	SOU. UNSP. NEAR-SHORE RK	Southern nearshore rockfish	Shallow nearshore rockfish	yes
SWRD	SWORDFISH	Other nongroundfish	Other nongroundfish	
SWS1	NOM. SWORDSPINE ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
SWSP	SWORDSPINE ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
TCOD	PACIFIC TOMCOD	Other nongroundfish	Other nongroundfish	
TGR1	NOM. TIGER ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
THD1	NOM. THORNYHEADS	Mixed thornyheads	Mixed thornyheads	
THDS	THORNYHEADS (MIXED)	Mixed thornyheads	Mixed thornyheads	
TIGR	TIGER ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
TRE1	NOM. TREEFISH	Other minor nearshore rockfish	Deeper nearshore rockfish	yes
TREE	TREEFISH	Other minor nearshore rockfish	Deeper nearshore rockfish	yes
TSRK	COMMON THRESHER SHARK	Other nongroundfish	Other nongroundfish	
UABL	UNSPECIFIED ABALONE	Other nongroundfish	Other nongroundfish	
UCLM	UNSPECIFIED CLAM	Other nongroundfish	Other nongroundfish	
UCRB	UNSPECIFIED CRAB	Other nongroundfish	Other nongroundfish	
UDAB	UNSP. SANDDABS	Other flatfish	Other flatfish	
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 minor nearshore rockfish	Deeper nearshore rockfish	yes
UDSR	UNSP. DEMERSAL RKFSH	Other groundfish	Other groundfish	
UDW1	SHORTRAKER+ROUGHEYE	Minor slope rockfish	Minor 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	Minor slope rockfish	
URCK	UNSP. ROCKFISH	Minor slope rockfish	Minor slope rockfish	
URCK	UNSP. ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
URK1	SRKR+REYE+NRCK+SHRP	Minor slope rockfish	Minor slope rockfish	
URND	UNSP. ROUND FISH	Other groundfish	Other groundfish	
USCL	UNSPECIFIED SCALLOP	Other nongroundfish	Other nongroundfish	

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USCU	UNSP. SEA CUCUMBERS	Other nongroundfish	Other nongroundfish	
USF1	UNSP. SHALLOW-91 FLOUNDERS	Other flatfish	Other flatfish	
USHR	UNSP. NEAR-SHORE ROCKFISH	Other minor nearshore rockfish	Deeper nearshore rockfish	yes
USHR	UNSP. NEAR-SHORE ROCKFISH	Other minor nearshore rockfish	Shallow nearshore rockfish	yes
USKT	UNSP. SKATE	Unspecified skate	Unspecified skate	
USLF	UNSP. SHELF ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
USLP	UNSP. SLOPE ROCKFISH	Minor slope rockfish	Minor slope rockfish	
USLR	UNSP. SLOPE RKFSH	Minor slope rockfish	Minor 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	Other nongroundfish	Other nongroundfish	
USTG	UNSP. STURGEON	Other nongroundfish	Other nongroundfish	
USTR	UNSPECIFIED OYSTER	Other nongroundfish	Other nongroundfish	
UTCR	UNSP. TANNER CRAB	Tanner crab	Tanner crab	
UTNA	UNSPECIFIED TUNA	Other nongroundfish	Other nongroundfish	
UTRB	UNSP. TURBOTS	Other flatfish	Other flatfish	
UURC	UNSP. SEA URCHINS	Other nongroundfish	Other nongroundfish	
VRM1	NOM. VERMILLION ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
VRML	VERMILION ROCKFISH	Minor shelf rockfish	Minor 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 rockfish (Remaining rockfish)	Minor 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)	