

Estimated Discard and Total Catch of Selected Groundfish Species in the 2007 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 2007 in order to evaluate their status relative to Acceptable Biological Catch (ABC) and Optimum Yield (OY) harvest management goals. 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. OY is 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 2007 discarded catch, retained landings, and total fishing mortality of these species and compares mortality estimates to OY and ABC harvest management goals for 2007.

Our inventory of 2007 total fishing mortality includes summaries from the following groundfish fishery sectors:

- Research
 - NWFSC groundfish trawl survey
 - NWFSC Pacific hake survey
 - Other research catch
- Exempted fishing permit
 - Commercial limited-entry midwater trawl (shoreside hake)
 - Other exempted fishing permits
- 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).

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

Commercial shrimp trawl – north of 40° 10' N latitude*
Commercial shrimp trawl – south of 40° 10' N latitude

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, known as fish tickets, are completed by fish-buyers in each port for each delivery of fish by a vessel. Fish tickets are trip-aggregated sales receipts for market species or 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 2007 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 2007 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 NWFSO 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 here 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 2007).

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/frame/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 2006). 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 2007, research programs that caught groundfish included the NWFSC's bottom trawl and hake surveys, 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 for inclusion 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 (except 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 2007 LE bottom (non-midwater) trawl sector is presented in the WCGOP data report and summary analyses of the West Coast limited-entry groundfish bottom trawl fishery published in October 2008 (NWFSC 2008a).

LE bottom trawl vessels that hold a California-issued California halibut bottom trawl permit may 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, 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 the data set for the LE bottom trawl sector appropriately. First, we searched within the landings data for fish tickets with more than 2 mt of Pacific hake on a given day in order to remove them and exclude effort that was targeted exclusively towards this species. A similar check was then performed on the observer and logbook data, such that tows with more than 2 mt of retained Pacific hake were flagged for removal. Since no data in 2007 met these criteria, these steps did not remove any fish tickets, logbook entries or observer tows from data for the LE bottom trawl sector.

Next, trawl logbook and observer data were filtered to ensure that all spatial and temporal information was complete. To do this, any tows lacking a recorded depth or latitude were removed. None of the tows in the observer data met these criteria. However, 66 tows were removed from the logbook data set due to lacking 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 six depth strata (0-50, 51-75, 76-100, 151-200, 201-300, >300 fathoms). During 2007, the area between management lines representing 100 to 150 fathoms was closed to LE groundfish bottom trawling along the entire coast. 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 (0-50 and 51-75 fathoms). In the south during the winter, data were combined across the three shallowest depth strata (0-50, 51-75, and 76-100 fathoms). Aggregated strata are shown in Table 1, which presents the spatial and temporal distribution of tows and retained FMP groundfish (except Pacific hake) weight in the 2007 observer and trawl logbook data.

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 both data sets 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 except Pacific hake
R: weight of retained FMP groundfish (except 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 previous total mortality analyses in that the present rates include all FMP groundfish retained weight except Pacific hake. Previously, 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 except 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 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 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-2c 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. 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).

Although retained logbook weights of FMP groundfish (except 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 (except 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 (except 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 2007, the value of the adjustment ratios computed for the LE bottom trawl sector ranged between 0.917 and 1.128, with a median of 1.031. All ratios less than 1 occurred in Washington state from September through December. The largest adjustment ratio occurred in California from November through December. This does not appear to be due to the removal of California halibut tows from the logbook data, as the California halibut fishery was least active during this bimonthly period. The weight of groundfish recorded on California halibut logbook tows during November and December represented only 1.2% of the total groundfish weight from all California halibut logbooks tows in 2007.

Coast-wide landings, final discard estimates, and total fishing mortality in the 2007 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.

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 set that met at least one of the above requirements were included in the LE California halibut bottom trawl data set. 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 November 2008 (NWFSC 2008b). These two components of the California halibut trawl fishery remained separate in this analysis.

This is the first time that observer discard ratios from the California halibut fishery have been used to estimate fleet-wide amounts of groundfish discard. 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 the OA sector, landed California halibut weight was compiled from “non-midwater” OA trawl fish tickets (see Figure 1) for those vessels that had a state-issued California halibut bottom trawl permit. For the LE sector, landed California halibut weight was compiled from non-midwater LE trawl fish tickets (see Figure 1) with more than 150 lbs of California halibut recorded. Vessels landing more than 150 lbs of California halibut are required to have a state-issued California halibut permit. The list of California halibut permit holders was not used to compile LE fish ticket weight because a small number of LE vessels that were not included on the California halibut permit list provided to the WCGOP were recorded to have landed large amounts of California halibut in 2007.

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 trips, tows, and vessels, 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_s: 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). 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).

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 landings and estimated total mortalities of species caught in the 2007 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. 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.

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 2008b). 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 suggest 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.

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 2007 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 November 2008 (NWFSC 2008c).

This is the first time that observer discard ratios from the pink shrimp fishery have been used to estimate fleet-wide amounts of groundfish discard. 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 2007 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 the Washington and Oregon pink shrimp fleets. Pink shrimp landings from south of 40°10' N. latitude are instead summarized as part of the remaining incidental OA fisheries landings in Table 18. The number of observed trips, tows, and vessels are also summarized in Table 6. Discard ratios for this fishery (Table 6) 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. 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). Table 7 presents the landings, final discard estimates, and total fishing mortality in the 2007 pink shrimp trawl fishery.

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. Mortality rates provided by the GMT for sablefish and by the IPHC for Pacific halibut were also employed in the analyses for this sector once discard for each species 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: the LE sablefish-endorsed primary season fixed-gear subsector, the LE '0' tier (non-endorsed) subsector, and the OA fixed-gear subsector (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 2007. Data used in our analyses were collected from these three observed fisheries, and are summarized in the WCGOP data report and summary analyses of west coast non-nearshore fixed-gear fishery, published in October 2008 (NWFSC 2008d).

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, 2007 fishery management restricted fixed-gear fishing to depths greater than 100 fathoms in the area north of 40° 10' N. latitude and to depths greater than 150 fathoms in the area south of 40° 10' N. latitude. These two depth zones are therefore tied to area strata, but no further depth stratification of fixed-gear fishing effort is possible.

The number of observed trips, sets, and vessels are summarized for each subsector in Tables 8-10, along with the weight of sablefish and FMP groundfish (except 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. Discard ratios for several non-groundfish species of interest as bycatch in this fishery are also reported (i.e. Dungeness crab, tanner crab, and Pacific halibut). 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, except 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 targeted species. A broader denominator was therefore necessary in order to effectively capture the level of fishing effort.

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.

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 (except 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. For example, the LE sablefish non-primary subsector landed 89 mt of sablefish north of 40° 10' N. latitude with longline gear in 2007 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 discard ratios, which were then applied to landings for the LE sablefish non-primary subsector in this area. Similarly, in the area south of 36° N. latitude, the open-access fixed-gear sector landed slightly over 12 mt of groundfish using hook-and-line gear but WCGOP observations were not available for this gear type within the open-access sector in this area. Instead, observed discard ratios from the LE non-sablefish-endorsed longline fleet were applied towards these landings.

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 2007 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. A 25% rate of mortality is applied for discarded Pacific halibut, as assumed based on personal communication with Gregg Williams of the IPHC.

Nearshore Fixed-Gear Groundfish 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, Oregon nearshore logbook 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 are found 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 2007 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 2008 (NWFSC 2008e).

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, 2007 fleet-wide nearshore landings had to be distributed among the three depth intervals (0-10, 11-20, 21-50 fathoms). For Oregon, the percentage of catch by catch for each species or species group was computed from 2007 nearshore logbook data. For California, the percentage of catch for each species or species group by depth was calculated based on summarized observer data from 2003-2007 (Table 12). Total landings of each nearshore species or species group in 2007 were then distributed among depth intervals using the percentages computed in the previous steps. For example, 29.3 mt of landed black rockfish were observed in the California commercial nearshore fishery from 2003-2007. Of the total observed catch (landed + discarded) of black rockfish, 48.9% were observed in 0-10 fm, 46.8% in 11-20 fm, and 4.3% in 21-50 fm. Using these percentages, of the 61.5 mt of black rockfish landed in California by the nearshore fleet in 2007, 30.1 mt were distributed to the 0-10 fm depth interval, 28.8 mt to the 11-20 fm interval, and 2.6 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 state and depth (Table 13). Area stratification was structured in accordance with state management of the fisheries and the depth stratification (0-10, 11-20, 21-50 fathoms) of mortality rates provided by the GMT. In Oregon, 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 trips, sets, and vessels 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. Estimated discard and landings for several non-groundfish species of interest as bycatch in this fishery are also reported (Dungeness crab, California sheephead, and Pacific halibut).

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 state 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 2007 Oregon and California nearshore fixed-gear sectors are reported in Tables 14a-14b.

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: non-tribal catcher-processors, motherships (with 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. Estimated discard and landings for several non-groundfish species of interest as bycatch in this fishery are also reported (Dungeness crab, eulachon, other non-groundfish, and Pacific halibut). Discard estimates for WA tribal shoreside fisheries were not provided.

Total catch of groundfish species from the recreational fisheries are also 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 also summarized in Table 17, based on data provided by the NOAA Northwest Regional Office. Total catch weight (discarded + retained) was summarized from both groundfish surveys conducted by the NWFSC, FRAM division during 2007: the groundfish bottom trawl survey and the mid-water Pacific hake survey. Catch associated with additional scientific research permits was also included in the summary of research catch in Table 17.

Landings of groundfish species from other non-groundfish fisheries operating under federal open-access landing limits, which are mostly state-managed and catch groundfish incidentally, are also summarized in Table 17 as 'Remaining incidental OA 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 OA fisheries.

In Table 18, total fishing mortality estimates are evaluated in terms of 2007 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 2007 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.

The results of this analysis indicate that none of the ABCs for rebuilding species were exceeded in 2007. However, the estimated total mortality exceeded the OY for two rebuilding species: canary rockfish and Pacific ocean perch. Total mortality of canary rockfish was estimated to exceed its specified OY by 2 mt (4%). In 2006, catch of this species exceeded the OY to a greater extent (21%). The largest mortality of canary rockfish in 2007 came from the limited-entry bottom trawl fleet, followed by the California recreational fishery, research activities, the nearshore fixed-gear fleet, and the Oregon recreational fishery. Small amounts of canary rockfish catch were also estimated in other sectors. Within the limited-entry bottom trawl fishery, the majority of canary rockfish catch was estimated to have occurred north of 40°10' N. latitude, where discard ratios were highest in depths between 50 and 75 fathoms. It should be noted that the standard errors for canary rockfish discard ratios in this depth range were also higher than in other depth strata, particularly in the summer months. This indicates that while the overall discard of this species was high in the 50 to 75 fathom range, discarded weights varied considerably in relation to retained groundfish catch from one haul to the next.

For Pacific ocean perch, total mortality was estimated to exceed the OY by approximately 7 mt (4%). This reflected a considerable increase in Pacific ocean perch catch from 2006 to 2007. Mortality of this species was estimated at 80 mt in 2006, compared with 157 mt reported here for 2007. While much of this increase was due to larger catch of this species in the limited-entry bottom trawl sector, there was also a notable increase in Pacific ocean perch catch in the shoreside hake mid-water trawl fishery. Pacific ocean perch is grouped as part of the slope rockfish category when caught south of 40° 10' N. latitude, so all increases in catch reported for this species occurred in the area north of this line. Discard ratios for this species were highest in depths between 151 and 200 fathoms, particularly in the summer. Again, large standard errors for the discard ratios in this stratum suggested that the catch and discard of Pacific ocean perch varied considerably between hauls in relation to the weight of retained groundfish.

For all other groundfish, total mortality estimates were below OY and ABC harvest management goals in 2007. However, the mortality amounts of four additional species/species groups were estimated to be within 10% of their OYs (Table 18). These included darkblotched rockfish and minor nearshore rockfish in the area north of 40°10' N. latitude, and petrale sole and sablefish along the entire west coast. Catch of darkblotched rockfish primarily occurred in the limited-entry bottom trawl and the pink shrimp trawl fisheries in the area north of 40°10' N. latitude. This is the first time that observer discard ratios from the pink shrimp fishery have been used to estimate fleet-wide discard. Darkblotched rockfish was also caught in the Washington tribal and at-sea Pacific hake fisheries. Estimated total mortality increased for darkblotched rockfish from 193 mt in 2006 to 285 mt in 2007.

Total estimated mortality for minor nearshore rockfish north of 40°10' N. latitude increased by 38 mt from 2006 to 2007. This was primarily due to increased catch of this assemblage in the nearshore fixed-gear fishery. Although the catch of petrale sole was estimated to be 94% of the OY, the total estimated mortality of this species actually decreased from 2723 mt in 2006 to 2340 mt in 2007. Similarly, sablefish mortality was also lower than that estimated for 2006.

It should be noted that several sources of uncertainty that were not accounted for in this analysis 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 2007 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 both canary rockfish and Pacific ocean perch exceeded 2007 OY specifications by 4%.
- Total mortality for darkblotched rockfish was estimated at 98% of the 2007 OY.
- Minor nearshore rockfish mortality in the area north of 40°10' N. latitude was estimated to be 94% of the 2007 OY.
- Although mortality estimates for petrale sole and sablefish decreased, both were estimated to be within 10% of 2007 OY values.
- Total estimated catch for a variety of groundfish species decreased from 2006 to 2007.

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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. Blue sectors indicate sectors for which federal observer data is available.

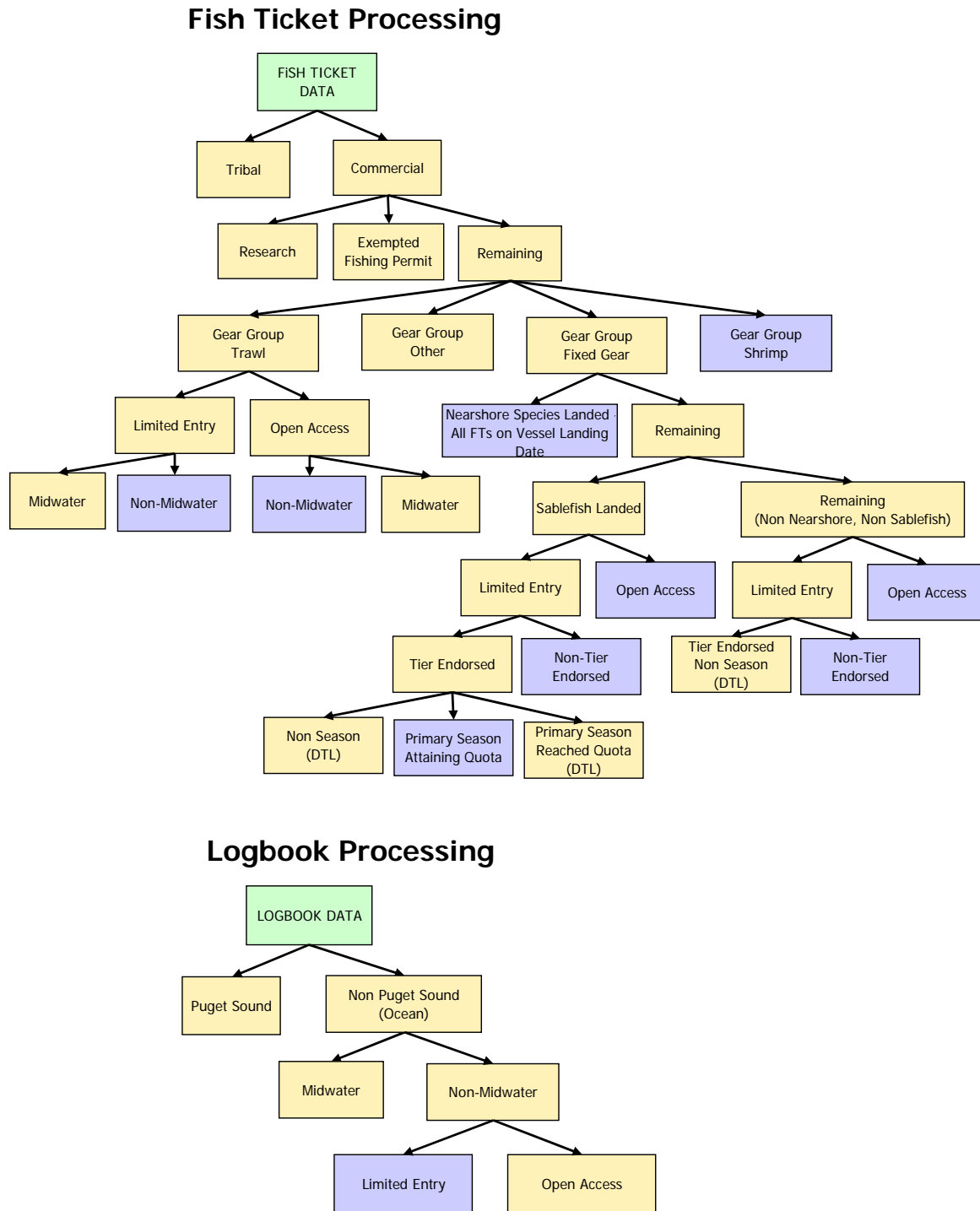


Figure 2. Flow chart illustrating the process by which limited-entry bottom trawl observer data are expanded to the fleet-wide level. Retained weights in the observer data are adjusted based on coinciding fish ticket weights for each observed trip by the WCGOP. Observer data are then assigned to a certain spatial/temporal stratum based on their 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 sector section in the methods for further details.

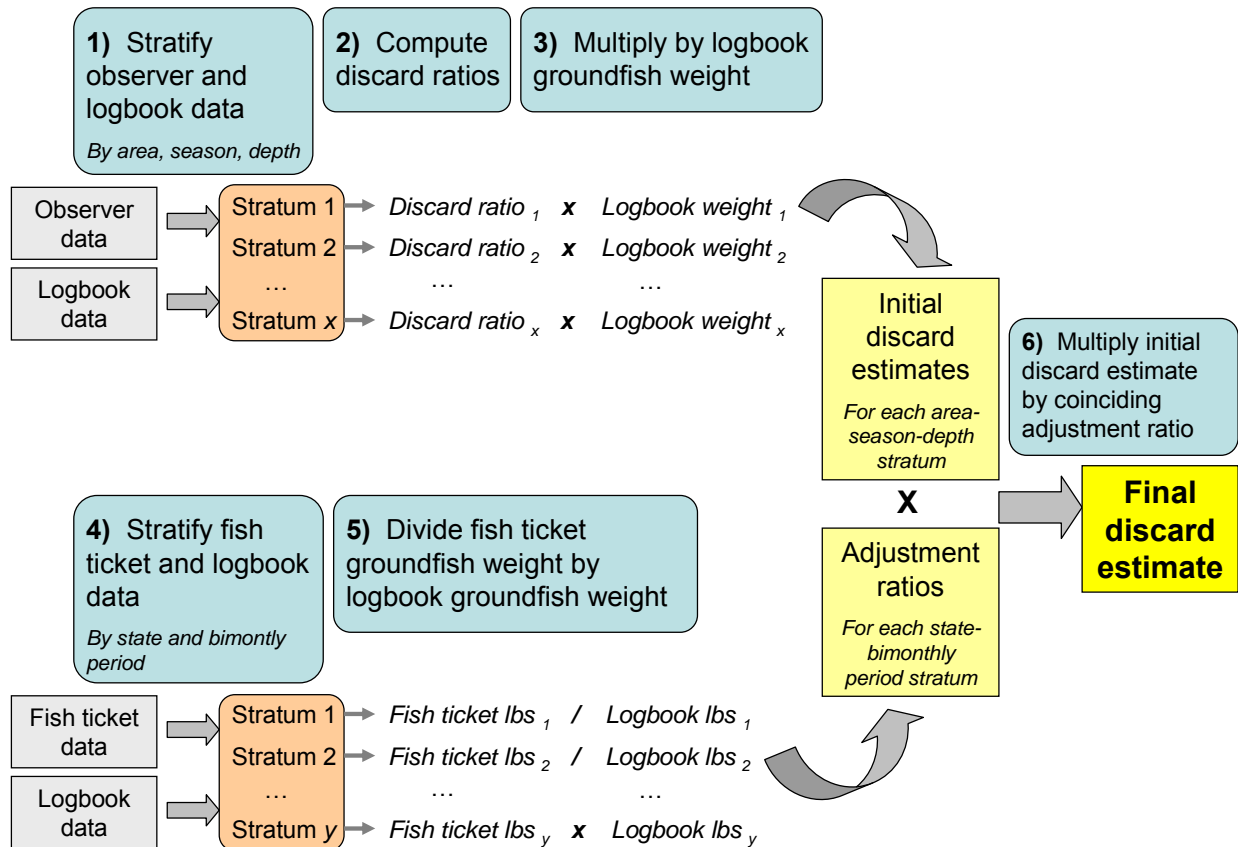


Figure 3. Expansion factor and observed discard rate by area and gear type for limited-entry (LE) and open-access (OA) non-nearshore fixed-gear sectors used to expand discard estimates to the fleet level for each area-sector-gear stratum. The stratum discard amounts for all sectors were then summarized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

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	LE sablefish endorsed	Longline
		Pot		Pot
	LE sablefish non-primary	Longline	LE sablefish non-endorsed + OA fixed gear	Longline
		Pot		Pot
	OA fixed gear	Longline	OA fixed gear	Longline
Pot		Pot		
40° 10' to 36° N Latitude	Expansion Factor: Sablefish Landings		Observed Discard Rate	
	LE sablefish primary	Longline	LE sablefish endorsed	Combined gear
		Pot		
	LE sablefish non-primary	Longline	LE sablefish non-endorsed	Longline
		--		--
	OA fixed gear	Longline	OA fixed gear	Combined gear
Pot				
South of 36° N Latitude	Expansion Factor: Groundfish Landings		Observed Discard Rate	
	LE sablefish non-primary	Longline	LE sablefish non-endorsed	Longline
		--		--
	OA fixed gear	Longline	LE sablefish non-endorsed OA fixed gear	Longline
Pot		Pot		

Table 1. Number of tows and retained weight (mt) of FMP groundfish species (excluding Pacific hake) from observer and logbook data for the 2007 limited entry bottom trawl fishery by depth, season, and management area. Data are combined as needed to ensure 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.				Depth interval (fathoms)	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
Observed fleet									
0-50	39	273	11.8	148.0	0-50	26	28	14.0	9.2
51-75		305		243.5	51-75		39		26.8
76-100	NA	NA	NA	NA	76-100		66		45.8
150-249	239	296	431.0	509.8	150-199	36	35	57.0	41.9
250-299	164	200	354.3	368.9	200-299	44	56	67.9	91.2
≥ 300	239	299	434.1	420.1	≥ 300	63	68	126.6	89.4
Total	681	1373	1231.2	1690.3	Total	169	292	265.5	304.2
All trawl logbooks									
0-50	219	1727	111.2	973.2	0-50	160	411	50.7	108.6
51-75		2381		1703.3	51-75		502		226.6
76-100	NA	NA	NA	NA	76-100		255		176.2
150-249	1600	1598	2821.0	3110.8	150-199	178	176	179.3	221.0
250-299	1047	911	2517.3	1659.3	200-299	274	259	359.8	415.1
≥ 300	1315	1192	2588.0	1678.4	≥ 300	234	391	306.9	587.1
Total	4181	7809	8037.5	9125.1	Total	846	1994	896.8	1734.6
Percentage observed									
0-50	18%	16%	11%	15%	0-50	16%	7%	28%	8%
51-75		13%		14%	51-75		8%		12%
76-100	NA	NA	NA	NA	76-100		26%		26%
150-249	15%	19%	15%	16%	150-199	20%	20%	32%	19%
250-299	16%	22%	14%	22%	200-299	16%	22%	19%	22%
≥ 300	18%	25%	17%	25%	≥ 300	27%	17%	41%	15%
Total	16%	18%	15%	19%	Total	20%	15%	30%	18%

Table 2a. Discard ratios and standard errors from observed trips north of 40°10' N latitude in the 2007 limited entry bottom trawl fishery by season and depth. Ratios are computed as the observed discard weight divided by the 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 intervals (fathoms)													
		0-50		51-75		76-100		150-249		250-299		≥ 300			
		Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE		
Rebuilding species		Season		<i>Denominator = Retained groundfish (mt)</i>											
Bocaccio	winter			0.0000	0.0000	NA	NA	0.0000	0.0148	0.0000	0.0000	0.0000	0.0000		
	summer	0.0000	0.0000	0.0000	0.0000	NA	NA	0.0006	0.1220	0.0000	0.0000	0.0000	0.0000		
Canary rockfish	winter			0.0001	0.0047	NA	NA	0.0001	0.0158	0.0000	0.0000	0.0000	0.0000		
	summer	0.0005	0.0668	0.0063	0.4713	NA	NA	0.0000	0.0047	0.0000	0.0000	0.0000	0.0000		
Darkblotched rockfish	winter			0.0007	0.0061	NA	NA	0.0173	0.0851	0.0006	0.0058	0.0000	0.0006		
	summer	0.0001	0.0084	0.0010	0.0098	NA	NA	0.0197	0.1092	0.0008	0.0121	0.0001	0.0013		
Pacific ocean perch	winter			0.0000	0.0000	NA	NA	0.0016	0.0147	0.0002	0.0079	0.0001	0.0027		
	summer	0.0000	0.0000	0.0002	0.0501	NA	NA	0.0047	0.0804	0.0009	0.0278	0.0001	0.0064		
Widow rockfish	winter			0.0000	0.0000	NA	NA	0.0004	0.0178	0.0000	0.0025	0.0000	0.0000		
	summer	0.0001	0.0144	0.0002	0.0146	NA	NA	0.0028	1.0027	0.0001	0.0727	0.0000	0.0009		
Yelloweye rockfish	winter			0.0000	0.0000	NA	NA	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
	summer	0.0000	0.0011	0.0000	0.0000	NA	NA	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
Non-rebuilding species		<i>Denominator = Retained groundfish (mt)</i>													
Arrowtooth flounder	winter			0.0370	0.3059	NA	NA	0.0354	0.1235	0.0170	0.0780	0.0102	0.0414		
	summer	0.1345	0.4547	0.1464	0.3894	NA	NA	0.0458	0.1919	0.0057	0.0308	0.0031	0.0273		
Big skate	winter			0.1271	0.5853	NA	NA	0.0001	0.1206	0.0002	0.1894	0.0001	0.2364		
	summer	0.0973	0.3687	0.0181	0.1710	NA	NA	0.0010	0.2469	0.0002	0.0562	0.0002	0.0508		
Black rockfish (North of 46° 16' N. lat.)	winter			0.0000	0.0000	NA	NA	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
	summer	0.0030	2.6728	0.0000	0.1615	NA	NA	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
Black rockfish (South of 46° 16' N. lat.)	winter			0.0000	0.0000	NA	NA	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
	summer	0.0000	0.0000	0.0000	0.0000	NA	NA	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
Chilipepper	winter			0.0000	0.0000	NA	NA	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
	summer	0.0000	0.0000	0.0003	0.4867	NA	NA	0.0000	0.0081	0.0000	0.0000	0.0000	0.0000		
Dover sole	winter			0.0034	0.0178	NA	NA	0.0248	0.1463	0.0171	0.1365	0.0473	0.1773		
	summer	0.1131	0.6102	0.0247	0.0583	NA	NA	0.0156	0.1120	0.0139	0.1288	0.1607	0.5299		
English sole	winter			0.0459	0.1398	NA	NA	0.0009	0.0073	0.0000	0.0006	0.0000	0.0001		
	summer	0.1004	0.2635	0.0226	0.0934	NA	NA	0.0001	0.0033	0.0000	0.0017	0.0000	0.0000		
Kelp greenling	winter			0.0000	0.0000	NA	NA	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
	summer	0.0001	0.2706	0.0000	0.0038	NA	NA	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
Lingcod	winter			0.0338	0.1974	NA	NA	0.0025	0.0282	0.0000	0.0000	0.0000	0.0000		
	summer	0.0276	0.1469	0.0472	0.1100	NA	NA	0.0016	0.0905	0.0000	0.0006	0.0000	0.0000		
Longnose skate	winter			0.1365	0.6145	NA	NA	0.0261	0.1589	0.0263	0.1709	0.0057	0.0635		
	summer	0.0387	0.3802	0.0736	0.2097	NA	NA	0.0163	0.0876	0.0114	0.0588	0.0078	0.1049		
Longspine thornyhead	winter			0.0000	0.0000	NA	NA	0.0006	0.0058	0.0015	0.0072	0.0262	0.0619		
	summer	0.0000	0.0000	0.0000	0.0000	NA	NA	0.0015	0.0165	0.0045	0.0163	0.0356	0.0613		
Mixed thornyheads	winter			0.0000	0.0000	NA	NA	0.0000	0.0199	0.0000	0.0042	0.0000	0.0000		
	summer	0.0000	0.0000	0.0000	0.0000	NA	NA	0.0000	0.0000	0.0000	0.0000	0.0000	0.0105		

Note: NA's are shown for strata in which there were no data as a result of Rockfish Conservation Area closures.

Table 2a (cont). Discard ratios and standard errors from observed trips north of 40°10' N latitude in the 2007 limited entry bottom trawl fishery by season and depth. Ratios are computed as the observed discard weight divided by the 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 intervals (fathoms)											
		0-50		51-75		76-100		150-249		250-299		≥ 300	
		Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE
Non-rebuilding species (cont.)	Season	<i>Denominator = Retained groundfish (mt)</i>											
Other flatfish	winter			0.0829	0.0820	NA	NA	0.0047	0.0135	0.0044	0.0614	0.0006	0.0048
	summer	0.2779	0.1628	0.0534	0.0448	NA	NA	0.0039	0.0283	0.0008	0.0035	0.0014	0.0097
Other groundfish	winter			0.1813	0.7494	NA	NA	0.0064	0.0381	0.0025	0.0321	0.0002	0.0102
	summer	0.0450	0.4125	0.0273	0.0787	NA	NA	0.0063	0.0435	0.0018	0.0331	0.0000	0.0073
Other nearshore rockfish	winter			0.0000	0.0000	NA	NA	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	summer	0.0000	0.0105	0.0000	0.0121	NA	NA	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Other shelf rockfish	winter			0.0003	0.0068	NA	NA	0.0012	0.0126	0.0001	0.0051	0.0000	0.0006
	summer	0.0001	0.0053	0.0092	0.0620	NA	NA	0.0021	0.0304	0.0001	0.0030	0.0000	0.0007
Other slope rockfish	winter			0.0000	0.0000	NA	NA	0.0028	0.0082	0.0009	0.0031	0.0002	0.0020
	summer	0.0000	0.0020	0.0001	0.0087	NA	NA	0.0179	0.0252	0.0034	0.0106	0.0007	0.0052
Pacific cod (North of 43° N. lat.)	winter			0.0002	0.0170	NA	NA	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	summer	0.0107	0.1703	0.0007	0.0122	NA	NA	0.0000	0.0032	0.0000	0.0000	0.0000	0.0000
Pacific hake	winter			0.0072	0.0453	NA	NA	0.0929	0.3086	0.0280	0.1293	0.0124	0.0620
	summer	0.0831	0.4563	0.0398	0.2342	NA	NA	0.0568	0.1638	0.0676	0.2820	0.0189	0.1203
Petrale sole	winter			0.0171	0.0618	NA	NA	0.0017	0.0090	0.0003	0.0041	0.0001	0.0016
	summer	0.0251	0.0728	0.0189	0.0371	NA	NA	0.0000	0.0001	0.0000	0.0003	0.0000	0.0065
Redstripe rockfish	winter			0.0000	0.0000	NA	NA	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	summer	0.0000	0.0000	0.0000	0.0000	NA	NA	0.0001	0.0977	0.0000	0.0000	0.0000	0.0000
Sablefish	winter			0.0010	0.0092	NA	NA	0.0059	0.0214	0.0145	0.0649	0.0301	0.1291
	summer	0.0121	0.0564	0.0273	0.0966	NA	NA	0.0238	0.0574	0.0181	0.0420	0.0304	0.0663
Sharpchin rockfish	winter			0.0000	0.0000	NA	NA	0.0006	0.0851	0.0000	0.0027	0.0000	0.0041
	summer	0.0000	0.0000	0.0000	0.0000	NA	NA	0.0015	0.1883	0.0000	0.0573	0.0000	0.0241
Shortbelly rockfish	winter			0.0000	0.0000	NA	NA	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	summer	0.0000	0.0000	0.0000	0.0000	NA	NA	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Shortspine thornyhead	winter			0.0000	0.0000	NA	NA	0.0052	0.0201	0.0028	0.0067	0.0038	0.0110
	summer	0.0000	0.0000	0.0000	0.0103	NA	NA	0.0131	0.0284	0.0068	0.0179	0.0044	0.0164
Silvergray rockfish	winter			0.0000	0.0000	NA	NA	0.0000	0.0081	0.0000	0.0000	0.0000	0.0000
	summer	0.0000	0.0000	0.0000	0.0000	NA	NA	0.0132	17.7474	0.0000	0.0000	0.0000	0.0000
Spiny dogfish	winter			0.0757	0.6511	NA	NA	0.0815	0.3338	0.0218	0.1550	0.0042	0.0704
	summer	0.0853	0.5407	0.0489	0.1924	NA	NA	0.0099	0.2470	0.0054	0.1078	0.0001	0.0107
Splitnose rockfish	winter			0.0000	0.0000	NA	NA	0.0110	0.0471	0.0018	0.0704	0.0001	0.0102
	summer	0.0000	0.0000	0.0001	0.0798	NA	NA	0.0284	0.2565	0.0038	0.1881	0.0002	0.0164
Starry flounder	winter			0.0000	0.0050	NA	NA	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	summer	0.0013	0.0152	0.0000	0.0019	NA	NA	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unspecified grenadiers	winter			0.0000	0.0000	NA	NA	0.0001	0.0121	0.0004	0.0051	0.0179	0.0754
	summer	0.0000	0.0000	0.0000	0.0000	NA	NA	0.0002	0.0165	0.0023	0.0335	0.0937	0.1646

Note: NA's are shown for strata in which there were no data as a result of Rockfish Conservation Area closures.

Table 2a (cont). Discard ratios and standard errors from observed trips north of 40°10' N latitude in the 2007 limited entry bottom trawl fishery by season and depth. Ratios are computed as the observed discard weight divided by the 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 intervals (fathoms)											
		0-50		51-75		76-100		150-249		250-299		≥ 300	
		Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE
Non-rebuilding species (cont.)	Season	Denominator = Retained groundfish (mt)											
Unspecified skate	winter			0.0139	0.0882	NA	NA	0.0184	0.0638	0.0049	0.0133	0.0079	0.0257
	summer	0.0052	0.0157	0.0059	0.0133	NA	NA	0.0130	0.0379	0.0050	0.0115	0.0097	0.0234
Yellowmouth rockfish	winter			0.0000	0.0000	NA	NA	0.0000	0.0237	0.0000	0.0000	0.0000	0.0000
	summer	0.0000	0.0000	0.0000	0.0000	NA	NA	0.0024	4.3080	0.0001	0.0000	0.0000	0.0000
Yellowtail rockfish	winter			0.0000	0.0000	NA	NA	0.0000	0.0000	0.0000	0.0075	0.0000	0.0000
	summer	0.0004	0.0080	0.0024	0.0954	NA	NA	0.0010	0.4660	0.0000	0.0000	0.0000	0.0000
Non-groundfish species		Denominator = Retained groundfish (mt)											
California halibut	winter			0.0000	0.0000	NA	NA	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	summer	0.0000	0.0000	0.0000	0.0000	NA	NA	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Dungeness crab	winter			0.0779	0.3284	NA	NA	0.0003	0.0271	0.0000	0.0202	0.0000	0.0014
	summer	0.1595	0.3696	0.0353	0.0943	NA	NA	0.0003	0.0334	0.0000	0.0000	0.0000	0.0000
Eulachon	winter			0.0000	0.0000	NA	NA	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	summer	0.0000	0.0008	0.0000	0.0000	NA	NA	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Green sturgeon	winter			0.0000	0.0000	NA	NA	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	summer	0.0002	0.0000	0.0000	0.0000	NA	NA	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Other non-FMP flatfish	winter			0.0053	0.0283	NA	NA	0.0011	0.0106	0.0003	0.0031	0.0018	0.0141
	summer	0.0051	0.0408	0.0128	0.0497	NA	NA	0.0004	0.0049	0.0005	0.0035	0.0060	0.0181
Other nongroundfish	winter			0.0050	0.0152	NA	NA	0.0035	0.0072	0.0059	0.0071	0.0105	0.0097
	summer	0.0060	0.0173	0.0019	0.0079	NA	NA	0.0078	0.0075	0.0095	0.0074	0.0261	0.0104
Pacific halibut	winter			0.0092	0.2011	NA	NA	0.0234	0.1071	0.0202	0.1767	0.0083	0.3826
	summer	0.0445	0.2209	0.0431	0.3754	NA	NA	0.0090	0.0795	0.0037	0.1227	0.0006	0.1147
Tanner crab	winter			0.0000	0.0000	NA	NA	0.0020	0.0358	0.0109	0.0453	0.0514	0.1410
	summer	0.0000	0.0000	0.0000	0.0000	NA	NA	0.0047	0.0288	0.0143	0.0410	0.0693	0.1136

Note: NA's are shown for strata in which there were no data as a result of Rockfish Conservation Area closures.

Table 2b. Discard ratios and standard errors from observed trips south of 40°10' N latitude in the 2007 limited entry bottom trawl fishery by season and depth. Ratios are computed as the observed discard weight divided by the 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.

SOUTH OF 40°10' N Lat.		Depth intervals (fathoms)												
		0-50		51-75		76-100		150-199		200-299		≥ 300		
		Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	
Rebuilding species		<i>Denominator = Retained groundfish (mt)</i>												
Season														
Bocaccio	winter	0.0091 0.1027						0.0008	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	summer	0.0035	0.1993	0.0009	0.1567	0.0107	0.1046	0.0001	0.0068	0.0002	0.0000	0.0000	0.0000	
Canary rockfish	winter	0.0028 0.3462						0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
	summer	0.0000	0.0074	0.0198	1.0589	0.0003	0.0094	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Cowcod	winter	0.0000 0.0000						0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
	summer	0.0000	0.0000	0.0000	0.0000	0.0004	0.0335	0.0036	0.2681	0.0000	0.0000	0.0000	0.0000	
Darkblotched rockfish	winter	0.0000 0.0000						0.0003	0.0045	0.0002	0.0169	0.0000	0.0000	
	summer	0.0000	0.0000	0.0000	0.0000	0.0002	0.0075	0.0001	0.0011	0.0000	0.0006	0.0000	0.0000	
Widow rockfish	winter	0.0001 0.0000						0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
	summer	0.0000	0.0000	0.0003	0.0466	0.0001	0.0496	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Yelloweye rockfish	winter	0.0000 0.0000						0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
	summer	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Non-rebuilding species		<i>Denominator = Retained groundfish (mt)</i>												
Arrowtooth flounder	winter	0.0000 0.0000						0.0016	0.1430	0.0031	0.0432	0.0001	0.0164	
	summer	0.0000	0.0000	0.0000	0.0000	0.0122	0.1733	0.0118	0.3430	0.0136	0.1061	0.0001	0.0117	
Bank rockfish	winter	0.0000 0.0000						0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
	summer	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0020	0.0000	0.0000	0.0000	0.0000	
Big skate	winter	0.0022 0.0000						0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
	summer	0.0142	0.7338	0.0197	2.3255	0.0034	0.4739	0.0010	0.0517	0.0000	0.0000	0.0000	0.0000	
Black rockfish	winter	0.0000 0.0000						0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
	summer	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Blackgill rockfish	winter	0.0000 0.0000						0.0001	0.0042	0.0003	0.0058	0.0000	0.0010	
	summer	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0036	0.0000	0.0023	
Chilipepper	winter	0.0461 0.2459						0.0011	0.0557	0.0000	0.0000	0.0000	0.0000	
	summer	0.0000	0.0000	0.1223	1.6792	0.2440	1.4309	0.0002	0.0179	0.0000	0.0000	0.0000	0.0000	
Dover sole	winter	0.0052 0.0285						0.0767	0.3601	0.0210	0.1899	0.0090	0.0707	
	summer	0.0145	0.1088	0.0186	0.1410	0.0129	0.0693	0.1080	0.8766	0.0273	0.1239	0.1439	0.3889	
English sole	winter	0.2614 0.7127						0.0331	0.2361	0.0001	0.0010	0.0000	0.0012	
	summer	0.1341	0.4754	0.0845	0.3857	0.0718	0.2751	0.0026	0.0385	0.0001	0.0054	0.0000	0.0000	
Kelp greenling	winter	0.0000 0.0000						0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
	summer	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Lingcod	winter	0.0092 0.0311						0.0000	0.0054	0.0000	0.0000	0.0000	0.0000	
	summer	0.0152	0.3643	0.0206	0.4106	0.0549	0.3438	0.0001	0.0058	0.0001	0.0075	0.0000	0.0000	

Table 2b (cont). Discard ratios and standard errors from observed trips south of 40°10' N latitude in the 2007 limited entry bottom trawl fishery by season and depth. Ratios are computed as the observed discard weight divided by the 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.**

SOUTH OF 40°10' N Lat.		Depth intervals (fathoms)											
		0-50		51-75		76-100		150-199		200-299		≥ 300	
		Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE
Non-rebuilding species (cont.)	Season	<i>Denominator = Retained groundfish (mt)</i>											
Longnose skate	winter			0.0120	0.0610			0.0826	0.5694	0.0571	0.4123	0.0098	0.0421
	summer	0.0654	0.3294	0.1228	0.8805	0.1269	0.4074	0.0653	0.3836	0.0557	0.2714	0.0341	0.3776
Longspine thornyhead	winter			0.0000	0.0000			0.0001	0.0042	0.0013	0.0328	0.0052	0.0143
	summer	0.0000	0.0000	0.0000	0.0000	0.0000	0.0054	0.0009	0.0531	0.0010	0.0055	0.0304	0.0708
Mixed thornyheads	winter			0.0000	0.0000			0.0000	0.0000	0.0003	0.0000	0.0012	0.0000
	summer	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Other flatfish	winter			0.0693	0.0823			0.0347	0.1456	0.0067	0.0310	0.0001	0.0061
	summer	0.3349	0.4323	0.2010	0.4159	0.0186	0.0558	0.0102	0.0766	0.0013	0.0149	0.0004	0.0056
Other groundfish	winter			0.0571	0.6851			0.0242	0.1145	0.0016	0.0214	0.0007	0.0978
	summer	0.0144	0.2340	0.0293	0.3559	0.1272	0.8345	0.0556	0.3236	0.0171	0.1184	0.0003	0.0077
Other nearshore rockfish	winter			0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	summer	0.0000	0.0034	0.0000	0.0000	0.0002	0.0214	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Other shelf rockfish	winter			0.0271	0.0763			0.0001	0.0018	0.0001	0.0032	0.0000	0.0000
	summer	0.0000	0.0000	0.0258	0.2129	0.0238	0.0597	0.0010	0.0098	0.0003	0.0119	0.0000	0.0000
Other slope rockfish	winter			0.0000	0.0000			0.0042	0.0389	0.0017	0.0054	0.0000	0.0001
	summer	0.0000	0.0000	0.0000	0.0000	0.0007	0.0152	0.0320	0.2230	0.0033	0.0144	0.0043	0.0964
Pacific hake	winter			0.0003	0.0290			0.1112	0.6234	0.3329	2.0401	0.0076	0.0708
	summer	0.0737	1.4347	0.0625	1.1383	0.0393	0.4215	0.1324	0.9078	0.1583	0.9232	0.0107	0.1851
Petrale sole	winter			0.0290	0.0767			0.0121	0.0865	0.0001	0.0017	0.0000	0.0059
	summer	0.0110	0.0432	0.1278	1.5317	0.0235	0.1338	0.0210	0.5069	0.0001	0.0059	0.0000	0.0000
Sablefish	winter			0.0000	0.0000			0.0155	0.2280	0.0002	0.0026	0.0048	0.0192
	summer	0.0000	0.0000	0.0001	0.0052	0.0000	0.0008	0.0013	0.0137	0.0020	0.0324	0.0043	0.0375
Sharpchin rockfish	winter			0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	summer	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0009	0.1315	0.0000	0.0000	0.0000	0.0000
Shortbelly rockfish	winter			0.0007	0.0757			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	summer	0.0000	0.0000	0.0000	0.0000	0.0008	0.0160	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Shortspine thornyhead	winter			0.0000	0.0000			0.0013	0.0108	0.0034	0.0207	0.0000	0.0001
	summer	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0023	0.0308	0.0022	0.0117	0.0005	0.0063
Spiny dogfish	winter			0.0072	0.2541			0.0492	0.4881	0.0799	0.8160	0.0001	0.0087
	summer	0.0077	0.1246	0.0278	0.3737	0.0519	0.4369	0.0367	0.3773	0.0054	0.0840	0.0002	0.0249
Splitnose rockfish	winter			0.0000	0.0000			0.0886	0.3452	0.0542	0.2362	0.0000	0.0003
	summer	0.0000	0.0000	0.0000	0.0000	0.0018	0.0634	0.1488	0.6140	0.0123	0.0768	0.0001	0.0020
Starry flounder	winter			0.0001	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	summer	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Table 2b (cont). Discard ratios and standard errors from observed trips south of 40°10' N latitude in the 2007 limited entry bottom trawl fishery by season and depth. Ratios are computed as the observed discard weight divided by the 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.**

SOUTH OF 40°10' N Lat.		Depth intervals (fathoms)											
		0-50		51-75		76-100		150-199		200-299		≥ 300	
		Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE	Discard ratio	SE
Non-groundfish species (cont)	Season	Denominator = Retained groundfish (mt)											
Unspecified grenadiers	winter	0.0000 0.0000				0.0000 0.0000		0.0001 0.0000		0.0001 0.0033		0.0113 0.0540	
	summer	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0035	0.0007	0.0184	0.0751	0.2634
Unspecified skate	winter	0.0083 0.0692				0.1049 0.4324		0.0308 0.4955		0.0148 0.1297			
	summer	0.1138	0.3491	0.0218	0.1690	0.0079	0.0258	0.0170	0.0894	0.0159	0.0840	0.0173	0.0644
Yellowtail rockfish	winter	0.0000 0.0000				0.0000 0.0000		0.0000 0.0000		0.0000 0.0000		0.0000 0.0000	
	summer	0.0032	0.2432	0.0003	0.0409	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Non-rebuilding species	Season	Denominator = Retained groundfish (mt)											
California halibut	winter	0.0000 0.0000				0.0000 0.0000		0.0000 0.0000		0.0000 0.0000		0.0000 0.0000	
	summer	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Dungeness crab	winter	0.0005 0.0190				0.0008 0.0874		0.0000 0.0000		0.0000 0.0000		0.0000 0.0000	
	summer	0.0716	0.8659	0.0149	0.1841	0.0136	0.1304	0.0003	0.0647	0.0000	0.0000	0.0000	0.0000
Eulachon	winter	0.0000 0.0000				0.0000 0.0000		0.0000 0.0000		0.0000 0.0000		0.0000 0.0000	
	summer	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Green sturgeon	winter	0.0000 0.0000				0.0000 0.0000		0.0000 0.0000		0.0000 0.0000		0.0000 0.0000	
	summer	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Other non-FMP flatfish	winter	0.0000 0.0000				0.0012 0.0179		0.0002 0.0058		0.0010 0.0091			
	summer	0.0016	0.0293	0.0053	0.0437	0.0016	0.0308	0.0016	0.0459	0.0003	0.0078	0.0104	0.0405
Other nongroundfish	winter	0.0064 0.0080				0.0062 0.0130		0.0077 0.0105		0.0123 0.0079			
	summer	0.0210	0.0254	0.0534	0.1088	0.0020	0.0122	0.0145	0.0592	0.0251	0.0500	0.0440	0.0334
Pacific halibut	winter	0.0000 0.0000				0.0000 0.0000		0.0001 0.0428		0.0000 0.0000			
	summer	0.0000	0.0000	0.0004	0.0000	0.0327	0.3573	0.0009	0.0658	0.0013	0.0779	0.0000	0.0000
Tanner crab	winter	0.0000 0.0000				0.0010 0.0491		0.0263 0.3972		0.0937 0.3561			
	summer	0.0000	0.0000	0.0005	0.0000	0.0000	0.0000	0.0054	0.1080	0.0244	0.1061	0.1061	0.2760

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 2007. Discard ratios were multiplied by total FMP groundfish landings (except Pacific hake) to generate discard estimates (Table 2). 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
Rebuilding species									
Bocaccio	0	2	2	1	3	5	2	5	7
Canary rockfish	1	12	12	2	5	7	2	17	19
Cowcod (South of 40°10' N. lat.)	--	--	--	2	1	3	2	1	3
Darkblotched rockfish	97	119	216	25	0	26	123	119	242
Pacific ocean perch (North of 40°10' N. lat.)	103	23	126	--	--	--	103	23	126
Widow rockfish	2	11	13	3	0	3	5	11	16
Yelloweye rockfish	0	0	0	--	--	--	0	0	0
Non-rebuilding species									
Arrowtooth flounder	2021	732	2753	3	13	16	2024	745	2769
Bank rockfish (South of 40°10' N. lat.)	--	--	--	27	0	27	27	0	27
Black rockfish (North of 46°16' N. lat.)	0	3	3	--	--	--	0	3	3
Black rockfish (South of 46°16' N. lat.)	0	0	0	0	--	0	0	0	0
Blackgill (South of 40°10' N. lat.)	--	--	--	28	0	29	28	0	29
Chilipepper	2	1	2	31	77	109	33	78	111
Dover sole	8092	753	8846	818	160	978	8910	914	9824
English sole	551	148	699	71	70	141	622	217	839
Kelp greenling	--	0	0	--	--	--	0	0	0
Lingcod		126			17	45		144	
50% mortality	89	63	153	28	9	37	117	72	189
Longspine thornyhead	559	150	709	160	22	181	719	172	890
Mixed thornyheads	4	0	4	0	1	1	4	1	5
Other flatfish	698	424	1122	216	105	321	915	528	1443
Other groundfish	0	162	163	1	61	62	1	224	225
Other nearshore rockfish	0	0	0	1	0	1	1	0	1
Other shelf rockfish	2	27	29	21	12	33	23	39	62
Other slope rockfish	101	76	177	43	13	56	144	89	233
Pacific cod (North of 43° N. lat.)	43	12	55	--	--	--	43	12	55
Pacific hake	2	863	865	1	290	290	2	1153	1155
Other shelf rockfish	2	27	29	21	12	33	23	39	62
Other slope rockfish	102	76	178	43	13	56	145	89	234

Note: A mortality estimate is (–) when the species was not observed to be caught, discarded, or landed (no value). Estimated values appear as 0.0000 when a species was observed or landed but in very small amounts.

Table 3 (cont). 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 2007. Discard ratios were multiplied by total FMP groundfish landings (except Pacific hake) to generate discard estimates (Table 2). 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
Non-rebuilding species (cont.)									
Pacific cod (North of 43° N. lat.)	43	12	55	--	--	--	43	12	55
Pacific hake	2	863	865	1	290	290	2	1153	1155
Petrale sole	1614	66	1680	561	45	606	2175	111	2286
Redstripe rockfish (North of 40°10' N. lat.)	0	0	1	--	--	--	0	0	1
Sablefish		356			8			364	
50% mortality	2106	178	2284	318	4	323	2425	182	2607
Sharpchin rockfish	2	7	9	--	0	0	2	7	9
Shortbelly rockfish	--	--	--	0	0	0	0	0	0
Shortspine thornyhead	760	94	854	122	3	126	883	98	980
Silvergray rockfish (North of 40°10' N. lat.)	0	42	43	--	--	--	0	42	43
Skates *	919	749	1668	23	248	271	942	997	1939
Big skate	--	148		--	7		0	155	
Longnose skate	--	429		--	162		0	591	
Unspecified skate	919	172		23	78		942	250	
Spiny dogfish	46	527	573	10	69	79	56	596	652
Splitnose rockfish	10	135	145	62	78	140	72	213	285
Starry flounder	9	1	10	10	0	10	19	1	21
Unspecified grenadiers	49	217	265	43	50	93	91	267	359
Yellowmouth (North of 40°10' N. lat.)	3	8	11	--	--	--	3	8	11
Yellowtail rockfish	9	8	17	1	0	2	10	8	18
Non-groundfish species									
California halibut	--	--	--	42	0	42	42	0	42
Dungeness crab	--	232	232	0	14	14	0	246	246
Eulachon	--	0	0	--	--	--	0	0	0
Green sturgeon	0	0	0	--	--	--	0	0	0
Other non-FMP flatfish	0	49	50	1	9	10	1	59	60
Other nongroundfish	13	151	164	13	65	78	26	216	242
Pacific halibut		301			7			308	
73% mortality (South of 40°10' N. lat.) **	--	211	211	--	5	5	0	216	216
Tanner crab	--	332	332	--	118	118	0	451	451

* 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.

** Pacific halibut discard mortality rate adopted for the area south of 40°10' N. lat. adopted from Wallace and Hastie (2008). Pacific halibut discard estimate north of 40°10' N. lat. also taken from their report.

Note: A mortality estimate is (--) when the species was not observed to be caught, discarded, or landed (no value). Estimated values appear as 0.0000 when a species was observed or landed but in very small amounts.

Table 4. Total California halibut landings (mt) and observed discard ratios from the limited-entry and "open-access" California halibut fishery in 2007. Species are grouped according to Appendix B.

	Limited-Entry	"Open-Access"
Expansion factor		
Total fleet landings of California halibut (mt) (Based on fish tickets)	39.2	39.1
Number of observed trips	39	48
Number of observed tows	80	226
Number of observed vessels	5	8
Observed discard ratios		
Rebuilding species		
Bocaccio	--	--
Canary rockfish	0.0001	--
Cowcod	--	--
Darkblotched rockfish	--	--
Widow rockfish	--	--
Yelloweye rockfish	--	--
Non-rebuilding species		
Big skate	0.2440	0.0340
Cabazon	--	0.0002
California scorpionfish	--	0.0129
Dover sole	0.0001	0.0000
English sole	0.0453	0.0063
Gopher rockfish	--	0.0000
Leopard shark	0.0254	0.0052
Lingcod	0.0028	--
Longnose skate	0.0100	--
Other flatfish	0.1523	0.0015
Other groundfish	0.0061	0.0180
Other nearshore rockfish	0.0006	0.0005
Other shelf rockfish	--	0.0000
Other slope rockfish	0.0000	--
Petrале sole	0.0074	0.0000
Soupin shark	0.0040	--
Spiny dogfish	0.0534	0.0225
Starry flounder	0.0737	0.0009
Unspecified skate	0.1866	0.7745
Non-groundfish species		
California halibut	0.2060	0.5691
Dungeness crab	0.9131	0.0669
Green sturgeon	0.0169	--
Other non-FMP flatfish	0.0017	0.0451
Other nongroundfish	0.1479	0.8035
Pacific halibut	0.0015	--

Table 5. Landings (mt), estimated discard (mt), total catch (mt), and total fishing mortality (mt) of major west coast groundfish species from the limited-entry and "open-access" California halibut fisheries in 2007. Discard ratios were multiplied by total landings of California halibut to generate estimated discard for each sector (Table 4). 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.

	Limited-Entry		"Open-Access"			All CA Halibut Sectors		
	Landed	Discard	Landed	Discard	Total	Landed	Discard	Total Fishing Mortality
Rebuilding species								
Bocaccio		--	--	--	--	--	--	--
Canary rockfish		0.0	--	--	0.0	--	0.0	0.0
Cowcod		--	--	--	--	--	--	--
Darkblotched rockfish		--	--	--	--	--	--	--
Widow rockfish		--	--	--	--	--	--	--
Yelloweye rockfish		--	--	--	--	--	--	--
Non-rebuilding species								
Cabazon		--	--	0.0	0.0	--	0.0	0.0
California scorpionfish		--	--	0.5	0.5	--	0.5	0.5
Dover sole		0.0	0.1	0.0	0.1	0.1	0.0	0.1
English sole		1.8	0.3	0.2	0.6	0.3	2.0	2.3
Gopher rockfish		--	--	0.0	0.0	--	0.0	0.0
Leopard shark		1.0	0.0	0.2	0.2	0.0	1.2	1.2
Lingcod		0.1		--	0.0		0.1	0.1
50% mortality *		0.1	0.0	--	0.0	0.0	0.1	0.1
Other flatfish		6.0	1.1	0.1	1.2	1.1	6.0	7.2
Other groundfish		0.2	--	0.7	0.7	--	0.9	0.9
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
Other slope rockfish		0.0	--	--	0.0	--	0.0	0.0
Petrale sole		0.3	0.1	0.0	0.1	0.1	0.3	0.4
Skates **		17.3	0.7	31.6	32.3	0.7	48.9	49.6
Big skate		9.6	0.0	1.3		0.0	10.9	
Longnose skate		0.4	--	--		--	0.4	
Unspecified skate		7.3	0.7	30.3		0.7	37.6	
Soupfin shark		0.2	--	--	0.0	--	0.2	0.2
Spiny dogfish		2.1	--	0.9	0.9	--	3.0	3.0
Starry flounder		2.9	2.0	0.0	2.0	2.0	2.9	4.9
Non-groundfish species								
California halibut		8.1	39.1	22.3	61.4	39.1	30.3	69.4
Dungeness crab		35.8	--	2.6	2.6	--	38.4	38.4
Green sturgeon		0.7	--	--	0.0	--	0.7	0.7
Other non-FMP flatfish		0.1	0.1	1.8	1.9	0.1	1.8	1.9
Other nongroundfish		5.8	42.5	31.4	73.9	42.5	37.2	79.7
Pacific halibut		0.1	--	--	0.0	--	0.1	0.1

* 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. Total pink shrimp landings (mt) and observed discard ratios from the pink shrimp fishery north of 40° 10' N. latitude in 2007. Species are grouped according to Appendix B.

	Pink Shrimp Fishery
Expansion factor	
Total fleet landings of Pink shrimp (mt) (Based on fish tickets)	10934.9
Number of observed trips	63
Number of observed tows	951
Number of observed vessels	30
Observed discard ratios	
Rebuilding species	
Bocaccio	0.0000
Canary rockfish	0.0000
Darkblotched rockfish	0.0017
Pacific ocean perch	0.0000
Widow rockfish	0.0000
Yelloweye rockfish	--
Non-rebuilding species	
Arrowtooth flounder	0.0010
Big skate	0.0001
Chilipepper	0.0000
Dover sole	0.0029
English sole	0.0000
Lingcod	0.0001
Longnose skate	0.0001
Longspine thornyhead	0.0000
Other flatfish	0.0094
Other groundfish	0.0001
Other nearshore rockfish	0.0000
Other shelf rockfish	0.0023
Other slope rockfish	0.0002
Pacific cod (North of 43° N. lat.)	0.0000
Pacific hake	0.2568
Petrale sole	0.0002
Pink shrimp	0.0325
Sablefish	0.0000
Sharpchin rockfish	0.0001
Shortbelly rockfish	0.0000
Shortspine thornyhead	0.0000
Spiny dogfish	0.0001
Splitnose rockfish	0.0013
Unspecified skate	0.0000
Yellowtail rockfish	0.0000
Non-groundfish species	
Dungeness crab	0.0000
Eulachon	0.0004
Other non-FMP flatfish	0.0203
Other nongroundfish	0.0069
Pacific halibut	0.0000

Table 7. Landings (mt), estimated discard (mt), and total catch (mt) of major west coast groundfish species from the pink shrimp fishery north of 40° 10' N. latitude in 2007. Discard rates (Table 6) were multiplied by total landings of pink shrimp to generate estimated discard.

	Pink Shrimp Fishery		
	Landed	Discard	Total
Rebuilding species			
Bocaccio	--	0.0	0.0
Canary rockfish	--	0.4	0.4
Darkblotched rockfish	--	18.4	18.4
Pacific ocean perch	--	0.1	0.1
Widow rockfish	--	0.0	0.0
Yelloweye rockfish	--	--	--
Non-rebuilding species			
Arrowtooth flounder	--	11.1	11.1
Chilipepper	--	0.0	0.0
Dover sole	--	31.9	31.9
English sole	--	0.5	0.5
Lingcod	0.0	1.2	1.2
Longspine thornyhead	--	0.0	0.0
Other flatfish	--	103.0	103.0
Other groundfish	--	1.3	1.3
Other nearshore rockfish	--	0.2	0.2
Other shelf rockfish	--	25.3	25.3
Other slope rockfish	--	2.7	2.7
Pacific cod (North of 43° N. lat.)	--	0.0	0.0
Pacific hake	--	2807.8	2807.8
Petrale sole	--	2.3	2.3
Sablefish	0.0	0.3	0.3
Sharpchin rockfish	--	1.3	1.3
Shortbelly rockfish	--	0.1	0.1
Shortspine thornyhead	--	0.5	0.5
Skates *			
Big skate	--	1.1	1.1
Longnose skate	--	1.3	1.3
Unspecified skate	--	0.1	0.1
Spiny dogfish	--	0.7	0.7
Splitnose rockfish	--	14.1	14.1
Yellowtail rockfish	--	0.1	0.1
Non-groundfish species			
Dungeness crab	--	0.4	0.4
Eulachon	--	4.7	4.7
Other non-FMP flatfish	--	221.8	221.8
Other nongroundfish	--	75.0	75.0
Pacific halibut	--	0.2	0.2

* 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. Total sablefish landings (mt) and observed discard ratios from the LE sablefish-primary (endorsed) fixed-gear fleet in 2007. 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.

	North of 40°10' N lat.		40°10' to 36° N lat.		South of 36° N lat.	
	Longline	Pot	Longline	Pot	Longline	Pot
Expansion factor						
Total fleet landings of sablefish (mt) (Based on fish tickets)	1028.0	387.3	94.5	38.6	--	--
			<i>Data combined across gear type*</i>			
Number of observed trips	66	25	14		--	--
Number of observed sets	489	127	55		--	--
Number of observed vessels	19	3	4		--	--
Observed discard ratios	<i>Denominator = Retained sablefish (mt)</i>				<i>Denominator = Retained groundfish (mt)</i>	
Rebuilding species						
Bocaccio	0.0000	--	--		--	--
Canary rockfish	0.0001	--	--		--	--
Cowcod (South of 40°10' N. lat.)	--	--	--		--	--
Darkblotched rockfish	0.0003	0.0006	0.0000		--	--
Pacific ocean perch (North of 40°10' N. lat.)	0.0000	0.0000	--		--	--
Widow rockfish	0.0000	--	--		--	--
Yelloweye rockfish	0.0005	--	--		--	--
Non-rebuilding species						
Arrowtooth flounder	0.0620	0.0077	--		--	--
Big skate	0.0000	--	--		--	--
Blackgill (South of 40°10' N. lat.)	--	--	0.0001		--	--
Chilipepper	0.0003	--	--		--	--
Dover sole	0.0005	0.0011	0.0029		--	--
English sole	0.0000	--	--		--	--
Lingcod	0.0008	0.0277	0.0068		--	--
Longnose skate	0.0476	--	0.0151		--	--
Longspine thornyhead	0.0000	--	0.0001		--	--
Mixed thornyheads	0.0001	--	0.0009		--	--
Other flatfish	0.0001	0.0000	--		--	--
Other groundfish	0.0019	--	0.0005		--	--
Other shelf rockfish	0.0007	0.0000	0.0000		--	--
Other slope rockfish	0.0129	0.0023	0.0000		--	--
Pacific cod (North of 43° N. lat.)	0.0000	--	--		--	--
Pacific hake	0.0001	--	--		--	--
Petrals sole	0.0001	0.0001	--		--	--
Redstripe rockfish (North of 40°10' N. lat.)	0.0000	--	--		--	--
Sablefish	0.0957	0.3193	0.2931		--	--
Sharpchin rockfish	0.0000	--	--		--	--

* Observer data from both gear types were combined in the area between 40°10' and 36° N latitude in order to maintain confidentiality.

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 very little no weight was discarded and thus the value is very small.

Table 8 (cont). Total sablefish landings (mt) and observed discard ratios from the LE sablefish-primary (endorsed) fixed-gear fleet in 2007. 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.

	North of 40°10' N lat.		40°10' to 36° N lat.		South of 36° N lat.	
	Longline	Pot	Longline	Pot	Longline	Pot
Observed discard ratios (cont)	<i>Denominator = Retained sablefish (mt)</i>				<i>Denominator = Retained groundfish (mt)</i>	
Non-rebuilding species (cont)						
Shortspine thornyhead	0.0032	0.0000	0.0006		--	--
Silvergray rockfish (North of 40°10' N. lat.)	0.0001	--	--			
Spiny dogfish	0.2251	0.0053	0.0022			
Splitnose rockfish	0.0001	0.0001	0.0000			
Unspecified grenadiers	0.0019	--	0.0042			
Unspecified skate	0.0032	--	0.0009			
Yellowmouth (North of 40°10' N. lat.)	0.0000	0.0000	--			
Yellowtail rockfish	0.0003	--	--			
Non-groundfish species						
Dungeness crab	0.0000	0.0005	--		--	--
Other non-FMP flatfish	--	0.0000	0.0000		--	--
Other nongroundfish	0.0396	0.0005	0.0020			
Pacific halibut	0.1378	0.0141	--		--	--
Tanner crab	0.0000	--	0.0008		--	--

* Observer data from both gear types were combined in the area between 40°10' and 36° N latitude in order to maintain confidentiality.

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 very little to no weight was discarded and thus the value is very small.

Table 9. Total sablefish landings (mt), total groundfish landings (mt) and observed discard ratios from the LE non-primary sablefish fixed-gear fleet in 2007. 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.

	North of 40°10' N Lat.		40°10' to 36° N Lat.		South of 36° N Lat.	
	Longline	Pot	Longline	Pot	Longline	Pot
Expansion factor						
Total fleet landings of sablefish (mt)	89.1	2.6	86.8	0.0		
Total fleet landings of groundfish (mt) (Based on fish tickets)					226.9	0.0
	<i>LE non-primary + OA data used*</i>		<i>LE non-primary data**</i>		<i>LE non-primary data**</i>	
Number of observed trips	46	10	15	--	139	--
Number of observed sets	62	37	23	--	276	--
Number of observed vessels	23	6	7	--	28	--
Observed discard ratios	<i>Denominator = Retained sablefish (mt)</i>				<i>Denominator = Retained groundfish (mt)</i>	
Rebuilding species						
Bocaccio	--	--	0.0406	--	0.0000	--
Canary rockfish	--	--	--	--	--	--
Cowcod (South of 40°10' N. lat.)	--	--	--	--	0.0000	--
Darkblotched rockfish	0.0076	--	--	--	0.0000	--
Pacific ocean perch (North of 40°10' N. lat.)	0.0001	--	--	--	--	--
Widow rockfish	0.0011	--	--	--	--	--
Yelloweye rockfish	--	--	--	--	--	--
Non-rebuilding species						
Arrowtooth flounder	0.0190	0.0017	--	--	--	--
Bank rockfish (South of 40°10' N. lat.)	--	--	0.0005	--	0.0000	--
Big skate	0.0014	--	0.0005	--	--	--
Blackgill (South of 40°10' N. lat.)	--	--	0.0009	--	0.0004	--
Chilipepper	--	--	0.0000	--	0.0000	--
Dover sole	0.0007	--	0.0218	--	0.0069	--
Lingcod	0.0015	0.0277	--	--	0.0002	--
Longnose skate	0.0401	--	0.0795	--	0.0702	--
Longspine thornyhead	--	--	0.0053	--	0.0119	--
Mixed thornyheads	--	--	0.0003	--	0.0009	--
Other flatfish	--	--	0.0000	--	0.0000	--
Other groundfish	0.0008	--	0.0018	--	0.0004	--
Other shelf rockfish	0.0001	--	0.0001	--	0.0002	--
Other slope rockfish	0.0024	0.0021	0.0010	--	0.0000	--
Pacific hake	0.0001	--	0.0003	--	0.0080	--
Petrals sole	--	0.0004	0.0002	--	--	--
Sablefish	0.4478	0.2788	0.9802	--	0.0106	--
Shortspine thornyhead	0.0022	--	0.0063	--	0.0365	--
Silvergray rockfish (North of 40°10' N. lat.)	0.0000	--	--	--	--	--
Spiny dogfish	0.2441	0.0118	0.0890	--	0.0022	--

* It was not possible to use only LE non-sablefish-endorsed observer data from 40°10' N. latitude due to insufficient sample size.

** The WCGOP does not observe sablefish primary vessels once they are outside of their primary season. Discard ratios presented here are from non-endorsed sablefish vessels but are used to expand landed weight from both non-endorsed vessels and endorsed vessels outside of their primary season.

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 very little to no weight was discarded and thus the value is very small.

Table 9 (cont). Total sablefish landings (mt), total groundfish landings (mt) and observed discard ratios from the LE non-primary sablefish fixed-gear fleet in 2007. 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.

	North of 40°10' N Lat.		40°10' to 36° N Lat.		South of 36° N Lat.		
	Longline	Pot	Longline	Pot	Longline	Pot	
Observed discard ratios (cont)	<i>Denominator = Retained sablefish (mt)</i>					<i>Denominator = Retained groundfish (mt)</i>	
Non-rebuilding species (cont)							
Splitnose rockfish	0.0000	--	--	--	0.0000	--	
Unspecified grenadiers	--	--	0.0875	--	0.0037	--	
Unspecified skate	0.0009	--	0.0114	--	0.0200	--	
Yellowtail rockfish	0.0004	--	--	--	--	--	
Non-groundfish species							
Other nongroundfish	0.0133	0.0002	0.0516	--	0.1238	--	
Pacific halibut	0.0892	0.0192	--	--	--	--	
Tanner crab	--	0.0002	0.0047	--	0.0001	--	

* It was not possible to use only LE non-sablefish-endorsed observer data from 40°10' N. latitude due to insufficient sample size.

** The WCGOP does not observe sablefish primary vessels once they are outside of their primary season. Discard ratios presented here are from non-endorsed sablefish vessels but are used to expand landed weight from both non-endorsed vessels and endorsed vessels outside of their primary season.

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 very little to no weight was discarded and thus the value is very small.

Table 10. Total sablefish landings (mt), total groundfish landings (mt) and observed discard ratios from the open-access fixed-gear fleet in 2007. 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.

	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
Expansion factor						
Total fleet landings of sablefish (mt)	185.4	33.3	29.5	108.1		
Total fleet landings of groundfish (mt) (Based on fish tickets)					12.2	111.0
			<i>Data combined across gear type*</i>		<i>LE non-primary data used</i> **	
Number of observed trips	42	10	26		139	17
Number of observed sets	58	37	26		276	17
Number of observed vessels	22	6	13		28	4
Observed discard ratios	<i>Denominator = Retained sablefish (mt)</i>				<i>Denominator = Retained groundfish (mt)</i>	
Rebuilding species						
Bocaccio	--	--	--		0.0000	--
Canary rockfish	--	--	--		--	--
Cowcod (South of 40°10' N. lat.)	--	--	--		0.0000	--
Darkblotched rockfish	0.0089	--	0.0034		0.0000	--
Pacific ocean perch (North of 40°10' N. lat.)	0.0002	--	--		--	--
Widow rockfish	0.0013	--	0.0000		--	--
Yelloweye rockfish	--	--	--		--	--
Non-rebuilding species						
Arrowtooth flounder	0.0217	0.0017	0.0003		--	--
Bank rockfish (South of 40°10' N. lat.)	--	--	--		0.0000	--
Big skate	0.0017	--	--		--	--
Blackgill (South of 40°10' N. lat.)	--	--	0.0011		0.0004	0.0000
Chilipepper	--	--	0.0003		0.0000	--
Dover sole	0.0008	--	0.0051		0.0069	0.0003
Lingcod	0.0018	0.0277	0.0016		0.0002	--
Longnose skate	0.0465	--	0.0025		0.0702	--
Longspine thornyhead	--	--	--		0.0119	0.0000
Mixed thornyheads	--	--	--		0.0009	--
Other flatfish	--	--	--		0.0000	--
Other groundfish	0.0009	--	--		0.0004	--
Other shelf rockfish	0.0001	--	0.0001		0.0002	--
Other slope rockfish	0.0029	0.0021	0.0026		0.0000	0.0000
Pacific hake	0.0001	--	--		0.0080	--
Petrable sole	--	0.0004	0.0002		--	--
Sablefish	0.4919	0.2788	0.2082		0.0106	0.3068

* Observer data from both gear types were combined in order to maintain adequate sample size.

** Only pot vessels were observed in the open-access fixed-gear fleet south of 36° N latitude. Discard ratios from observed LE non-sablefish-endorse (longline) vessels are multiplied by open access hook-and-line landings in this area for the expansion.

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 very little to no weight was discarded and thus the value is very small.

Table 10 (cont). Total sablefish landings (mt), total groundfish landings (mt) and observed discard ratios from the open-access fixed-gear fleet in 2007. 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.

	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
Observed discard ratios (cont)	<i>Denominator = Retained sablefish (mt)</i>				<i>Denominator = Retained groundfish (mt)</i>	
Non-rebuilding species (cont)						
Shortspine thornyhead	0.0026	--	0.0009		0.0365	0.0000
Silvergray rockfish (North of 40°10' N. lat.)	0.0000	--	--		--	--
Spiny dogfish	0.2141	0.0118	0.0661		0.0022	--
Splitnose rockfish	0.0000	--	0.0001		0.0000	0.0000
Unspecified grenadiers	--	--	0.0012		0.0037	--
Unspecified skate	0.0010	--	0.0001		0.0200	--
Yellowtail rockfish	0.0004	--	--		--	--
Non-groundfish species						
Other nongroundfish	0.0134	0.0002	0.0005		0.1238	0.0136
Pacific halibut	0.0916	0.0192	--		--	--
Tanner crab	--	0.0002	0.0026		0.0001	0.0011

* Observer data from both gear types were combined in order to maintain adequate sample size.

** Only pot vessels were observed in the open-access fixed-gear fleet south of 36° N latitude. Discard ratios from observed LE non-sablefish-endorsed (longline) vessels are multiplied by open access hook-and-line landings in this area for the expansion.

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 very little to no weight was discarded and thus the value is very small.

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 2007. 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
Rebuilding species										
Bocaccio	0.0	0.0	0.0	0.7	3.5	4.2	0.5	0.0	0.5	4.7
Canary rockfish	--	0.1	0.1	--	--	--	--	--	--	0.1
Cowcod (South of 40°10' N. lat.)	--	--	--	--	--	--	--	0.0	0.0	0.0
Darkblotched rockfish	7.0	2.8	9.8	0.1	0.5	0.6	0.0	0.0	0.0	10.4
Pacific ocean perch (North of 40°10' N. lat.)	0.3	0.1	0.4	--	--	--	--	--	--	0.4
Widow rockfish	0.0	0.4	0.4	0.3	0.0	0.3	--	--	--	0.7
Yelloweye rockfish	0.0	0.5	0.5	--	--	--	--	--	--	0.5
Non-rebuilding species										
Arrowtooth flounder	4.1	72.5	76.6	--	0.0	0.0	0.0	--	0.0	76.6
Bank rockfish (South of 40°10' N. lat.)	--	--	--	0.1	0.0	0.1	0.9	0.0	0.9	1.0
Big skate	--	0.4	0.4	--	0.0	0.0	--	--	--	0.5
Blackgill (South of 40°10' N. lat.)	--	--	--	3.7	0.2	3.9	15.0	0.1	15.1	19.0
Chilipepper	--	0.3	0.3	3.6	0.0	3.6	0.1	0.0	0.1	4.0
Dover sole	1.0	1.2	2.2	0.2	3.0	3.2	0.1	1.7	1.8	7.2
English sole	--	0.0	0.0	--	--	--	--	--	--	0.0
Lingcod	12.9	13.0	25.9	1.1	1.1	2.3	0.5	0.0	0.6	28.7
Longnose skate	--	61.1	61.1	--	9.3	9.3	--	16.8	16.8	87.2
Longspine thornyhead	0.0	0.0	0.0	6.0	0.5	6.5	13.5	2.8	16.3	22.8
Mixed thornyheads	--	0.1	0.1	0.2	0.2	0.4	3.6	0.2	3.8	4.2
Other flatfish	0.0	0.1	0.1	--	0.0	0.0	0.3	0.0	0.3	0.4
Other groundfish	0.0	2.2	2.2	0.3	0.2	0.5	0.1	0.1	0.2	2.9
Other shelf rockfish	3.8	0.7	4.5	0.0	0.0	0.1	2.3	0.0	2.3	6.8
Other slope rockfish	56.6	15.0	71.6	3.5	0.4	3.9	0.7	0.0	0.7	76.3
Pacific cod (North of 43° N. lat.)	0.1	0.0	0.1	--	--	--	--	--	--	0.1
Pacific hake	--	0.1	0.1	--	0.0	0.0	0.6	1.9	2.5	2.7
Petrale sole	0.2	0.2	0.4	0.0	0.0	0.1	0.0	--	0.0	0.4
Redstripe rockfish (North of 40°10' N. lat.)	--	0.0	0.0	--	--	--	--	--	--	0.0
Sablefish		363.2			152.7			36.6		
20% mortality	1725.7	72.6	1798.3	357.4	30.5	387.9	180.7	7.3	188.0	2374.2

Table 11 (cont). 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 2007. 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
Non-rebuilding species (cont.)										
Sharpchin rockfish	--	0.0	0.0	--	--	--	--	--	--	0.0
Shortbelly rockfish	--	--	--	--	--	--	0.0	--	0.0	0.0
Shortspine thornyhead	10.6	4.1	14.7	11.1	0.8	11.9	130.4	8.7	139.1	165.7
Silvergray rockfish (North of 40°10' N. lat.)	--	0.1	0.1	--	--	--	--	--	--	0.1
Skates *	24.2	65.1	89.3	0.3	10.4	10.7	1.4	21.6	23.0	123.0
Big skate	--	0.4		--	0.0		--	--		
Longnose skate	--	61.1		--	9.3		--	16.8		
Unspecified skate	24.2	3.6		0.3	1.1		1.4	4.8		
Spiny dogfish	196.4	295.3	491.7	0.0	17.1	17.1	0.0	0.5	0.5	509.4
Splitnose rockfish	0.2	0.2	0.3	0.0	0.0	0.0	0.1	0.0	0.1	0.5
Unspecified grenadiers	--	1.9	1.9	36.7	8.3	45.1	--	0.9	0.9	47.9
Yellowmouth (North of 40°10' N. lat.)	0.2	0.0	0.2	--	--	--	--	--	--	0.2
Yellowtail rockfish	0.3	0.4	0.7	--	--	--	0.0	--	0.0	0.7
Non-groundfish species										
California halibut	0.0	--	0.0	0.0	--	0.0	0.2	--	0.2	0.2
Dungeness crab	2.7	0.2	2.9	1.2	--	1.2	--	--	--	4.1
Other non-FMP flatfish	--	0.0	0.0	--	0.0	0.0	--	--	--	0.0
Other nongroundfish	1.8	44.6	46.3	8.4	4.8	13.2	12.3	31.1	43.4	102.9
Pacific halibut		172.8			--			--		
25% mortality	134.5	43.2	177.7	--	--	--	--	--	--	177.7
Tanner crab	--	0.0	0.0	--	0.9	0.9	--	0.1	0.1	1.0

* 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 12. Commercial landings of nearshore species (mt) in Oregon and California during 2007 partitioned by depth interval. For Oregon, landings were partitioned by depth based on 2007 nearshore logbook data. Logbooks were not available for the California commercial nearshore fleet and landings for this fleet were instead partitioned by depth based on observed catch from 2003 - April 2008. Nearshore species and groups are listed in Appendix C.

Oregon (Commercial)	2007 Total landings (mt)	Percentage of Oregon nearshore logbook weight by depth in 2007 (fathoms)			2007 Total landings reallocated by depth (fathoms)		
		0 - 10	11 - 20	21 - 50	0 - 10	11 - 20	21 - 50
Nearshore species							
Black rockfish	99.6	58.8%	38.3%	2.9%	58.6	38.2	2.8
Blue rockfish	4.2	41.3%	44.5%	14.3%	1.7	1.9	0.6
Cabezon	21.9	39.9%	58.2%	1.9%	8.7	12.7	0.4
Kelp greenling	18.3	76.3%	23.5%	0.1%	14.0	4.3	0.0
Lingcod	27.9	48.3%	47.4%	4.3%	13.5	13.2	1.2
Other minor nearshore rockfish	8.4	46.2%	50.4%	3.4%	3.9	4.2	0.3
Total	180.4				100.4	74.6	5.4

California (Commercial)	Observed landings (mt) 2003-2007	2007 Total landings (mt)	Percentage of observed catch by depth (fathoms) 2003-2007			2007 Total landings reallocated by depth (fathoms)		
			0 - 10	11 - 20	21 - 50	0 - 10	11 - 20	21 - 50
Nearshore species								
Black rockfish	29.3	61.5	48.9%	46.8%	4.3%	30.1	28.8	2.6
Blue rockfish	7.4	29.2	23.2%	64.5%	12.3%	6.8	18.8	3.6
Cabezon	5.8	25.4	87.0%	9.0%	4.0%	22.1	2.3	1.0
California sheephead	7.8	29.7	73.3%	25.6%	1.2%	21.7	7.6	0.4
Deeper nearshore rockfish	6.2	40.6	23.2%	54.4%	22.3%	9.4	22.1	9.1
Gopher rockfish (South of 40° 10' N)	2.2	20.0	62.8%	35.1%	2.1%	12.6	7.0	0.4
Kelp greenling	0.7	1.5	69.7%	29.8%	0.5%	1.0	0.4	0.0
Lingcod	6.5	26.4	42.5%	42.3%	15.2%	11.2	11.2	4.0
Shallow nearshore rockfish		34.7				27.4	5.5	1.8
California scorpionfish *	2.6	1.9	79.0%	15.8%	5.2%	1.5	0.3	0.1
Total	68.4	207.8				142.3	103.7	22.9

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

Table 13. Total observed trips, sets, vessels, total nearshore species landings and discard ratios in the 2007 commercial nearshore fixed gear fishery by state and depth.

	Oregon			California		
	0 - 10 fm	11 - 20 fm	21 - 50 fm	0 - 10 fm	11 - 20 fm	21 - 50 fm
Expansion factor						
Total landings of nearshore species (mt) (Based on fish tickets)	100.4	74.6	5.4	142.3	103.7	22.9
		<i>Data combined across depths *</i>				
Number of observed trips	74	111		57	74	20
Number of observed sets	90	152		96	95	33
Number of observed vessels	24	27		20	27	13
Observed discard ratios	Denominator = Retained nearshore species (mt)					
Rebuilding species						
Bocaccio	--	--		--	0.0000	0.0000
Canary rockfish	0.0047	0.0121		0.0008	0.0272	0.0785
Cowcod (South of 40°10' N. lat.)	--	--		--	--	--
Darkblotched rockfish	--	--		--	--	--
Pacific ocean perch (North of 40°10' N. lat.)	--	--		--	--	--
Widow rockfish	--	0.0000		--	0.0025	0.0028
Yelloweye rockfish	0.0033	0.0134		0.0011	0.0086	0.0678
Non-rebuilding species						
Black rockfish **	0.0297	0.0189		0.0049	0.0045	0.0000
Blue rockfish **	0.0141	0.0258		0.0114	0.0271	0.0232
Cabezon **	0.0040	0.0083		0.0373	0.0181	0.0201
California scorpionfish **	--	--		0.0002	--	--
Deeper nearshore rockfish **	--	--		0.0047	0.0039	0.0137
Gopher rockfish (South of 40°10' N. lat.) **	--	--		0.0103	0.0084	0.0034
Kelp greenling **	0.0113	0.0030		0.0107	0.0074	0.0114
Lingcod **	0.0613	0.0818		0.0343	0.0572	0.0504
Longnose skate	--	0.0001		--	--	--
Minor shelf rockfish	0.0007	0.0000		0.0000	0.0008	0.0007
Minor slope rockfish	--	--		--	0.0000	0.0000
Other flatfish	--	0.0001		0.0000	0.0006	0.0000
Other groundfish	--	0.0003		0.0018	0.0018	--
Other minor nearshore rockfish **	0.0015	0.0021		--	--	--
Petrable sole	--	--		--	--	0.0009
Shallow nearshore rockfish	--	--		0.0041	0.0014	0.0043
Spiny dogfish	--	0.0000		0.0050	0.0064	0.0036
Starry flounder	--	--		--	--	0.0000
Unspecified skate	0.0000	0.0000		0.0004	--	--
Yellowtail rockfish	0.0004	0.0012		0.0003	0.0015	0.0013
Non-groundfish species						
California sheephead	--	--		0.0625	0.0189	--
Dungeness crab	--	0.0015		--	0.0001	--
Other nongroundfish	0.0023	0.0047		0.0888	0.0152	0.0058
Pacific halibut	--	0.0007		--	--	--

* Observer data in Oregon 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.

Note: A more detailed list of the species included in the nearshore species denominator is provided in Appendix C.

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 2007 Oregon commercial nearshore fixed gear fishery by depth.

Oregon	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 fm	11-20 fm	21-50 fm	0-10 fm	11-20 fm	21-50 fm	0-10 fm	11-20 fm	21-50 fm			
Rebuilding species												
Bocaccio	--	--	--	10%	70%	100%	--	--	--	0.00	--	0.00
Canary rockfish	0.47	0.91	0.07	10%	55%	100%	0.05	0.50	0.07	0.61	--	0.61
Darkblotched rockfish	--	--	--	--	--	--	--	--	--	0.00	0.01	0.01
Pacific ocean perch	--	--	--	--	--	--	--	--	--	0.00	0.00	0.00
Widow rockfish	--	0.00	0.00	50%	90%	100%	--	0.00	0.00	0.00	0.23	0.23
Yelloweye rockfish	0.34	1.00	0.07	10%	50%	100%	0.03	0.50	0.07	0.60	0.00	0.61
Non-rebuilding species												
Arrowtooth flounder	--	--	--	--	--	--	--	--	--	--	0.01	0.01
Black rockfish	2.99	1.41	0.10	10%	40%	90%	0.30	0.56	0.09	0.95	99.63	100.58
Blue rockfish	1.41	1.92	0.14	10%	60%	100%	0.14	1.15	0.14	1.43	4.23	5.66
Cabezon	0.40	0.62	0.04	7%	7%	7%	0.03	0.04	0.00	0.07	21.86	21.93
Kelp greenling	1.13	0.22	0.02	7%	7%	7%	0.08	0.02	0.00	0.10	18.34	18.43
Lingcod	6.15	6.10	0.44	7%	7%	7%	0.43	0.43	0.03	0.89	27.93	28.82
Minor shelf rockfish	0.07	0.00	0.00	10%	55%	100%	0.01	0.00	0.00	0.01	2.05	2.06
Minor slope rockfish	--	--	--	--	--	--	--	--	--	--	1.25	1.25
Other flatfish	--	0.01	0.00	7%	7%	7%	--	0.00	0.00	0.00	0.00	0.00
Other groundfish	--	0.03	0.00	7%	7%	7%	--	0.00	0.00	0.00	0.01	0.01
Other minor nearshore rockfish	0.15	0.16	0.01	10%	40%	100%	0.01	0.06	0.01	0.09	8.38	8.47
Sablefish	--	--	--	--	--	--	--	--	--	--	0.72	0.72
Skates **	0.00	0.01	0.00	7%	7%	7%	0.00	0.00	0.00	0.00	0.11	0.12
Longnose skate	--	0.01	0.00	7%	7%	7%	--	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		
Spiny dogfish	--	0.00	0.00	7%	7%	7%	--	0.00	0.00	0.00	--	0.00
Splitnose rockfish	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Yellowtail rockfish	0.04	0.09	0.01	10%	30%	75%	0.00	0.03	0.00	0.04	1.05	1.08
Non-groundfish species												
Dungeness crab	--	0.11	0.01	--	--	--	--	--	--	0.00	0.98	0.98
Other nongroundfish	0.23	0.35	0.03	--	--	--	--	--	--	0.00	1.08	1.08
Pacific halibut	--	0.06	0.00	--	--	--	--	--	--	0.00	0.27	0.27

* 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 (as provided by the Groundfish Management Team), estimated discard mortality (mt), total landings (mt) and total fishing mortality (mt) for the 2007 California commercial nearshore fixed gear fishery.

California	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 fm	11-20 fm	21-50 fm	0-10 fm	11-20 fm	21-50 fm	0-10 fm	11-20 fm	21-50 fm			
	Rebuilding species											
Bocaccio	--	0.00	0.00	10%	70%	100%	--	0.00	0.00	0.00	1.12	1.12
Canary rockfish	0.11	2.83	1.80	10%	55%	100%	0.01	1.56	1.80	3.37	0.00	3.37
Cowcod (South of 40°10' N. lat.)	--	--	--	--	--	--	--	--	--	0.00	--	0.00
Darkblotched rockfish	--	--	--	--	--	--	--	--	--	0.00	0.12	0.12
Widow rockfish	--	0.26	0.06	50%	90%	100%	--	0.24	0.06	0.30	0.26	0.56
Yelloweye rockfish	0.15	0.89	1.56	10%	50%	100%	0.02	0.45	1.56	2.02	0.01	2.03
Non-rebuilding species												
Arrowtooth flounder	--	--	--	--	--	--	--	--	--	0.00	0.01	0.01
Black rockfish	0.70	0.47	0.00	10%	40%	90%	0.07	0.19	0.00	0.26	61.53	61.79
Blue rockfish	1.64	2.82	0.53	10%	60%	100%	0.16	1.69	0.53	2.39	29.22	31.60
Cabazon	5.36	1.89	0.46	7%	7%	7%	0.38	0.13	0.03	0.54	25.36	25.90
California scorpionfish	0.02	--	--	7%	7%	7%	0.00	--	--	0.00	1.86	1.86
Chilipepper rockfish	--	--	--	--	--	--	--	--	--	0.00	0.11	0.11
Deeper nearshore rockfish	0.67	0.41	0.31	10%	40%	90%	0.07	0.16	0.28	0.51	40.56	41.07
Dover sole	--	--	--	--	--	--	--	--	--	0.00	0.00	0.00
Gopher rockfish (South of 40°10' N. lat.)	1.48	0.87	0.08	10%	40%	90%	0.15	0.35	0.07	0.57	20.01	20.57
Kelp greenling	1.54	0.77	0.26	7%	7%	7%	0.11	0.05	0.02	0.18	1.49	1.67
Lingcod	4.94	5.95	1.16	7%	7%	7%	0.35	0.42	0.08	0.84	26.41	27.26
Longspine thornyhead	--	--	--	--	--	--	--	--	--	0.00	0.05	0.05
Minor shelf rockfish	0.01	0.09	0.02	10%	55%	100%	0.00	0.05	0.02	0.06	15.84	15.91
Minor slope rockfish	--	0.00	0.00	--	--	--	--	0.00	0.00	0.00	0.46	0.46
Other flatfish	0.00	0.06	0.00	7%	7%	7%	0.00	0.00	0.00	0.00	0.20	0.20
Other groundfish	0.25	0.18	--	7%	7%	7%	0.02	0.01	--	0.03	2.05	2.09
Pacific hake	--	--	--	--	--	--	--	--	--	0.00	0.01	0.01
Petrale sole	--	--	0.02	7%	7%	7%	--	--	0.00	0.00	--	0.00
Sablefish	--	--	--	--	--	--	--	--	--	0.00	5.76	5.76
Shallow nearshore rockfish	0.59	0.14	0.10	10%	45%	100%	0.06	0.06	0.10	0.22	34.68	34.90

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

Table 14b (cont). Gross estimated discard (mt), discard mortality rates (as provided by the Groundfish Management Team), estimated discard mortality (mt), total landings (mt) and total fishing mortality (mt) for the 2007 California commercial nearshore fixed gear fishery.

California (cont)	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 fm	11-20 fm	21-50 fm	0-10 fm	11-20 fm	21-50 fm	0-10 fm	11-20 fm	21-50 fm			
Non-rebuilding species (cont)												
Shortspine thornyhead	--	--	--	--	--	--	--	--	--	0.00	0.08	0.08
Spiny dogfish	0.71	0.66	0.08	7%	7%	7%	0.05	0.05	0.01	0.10	--	0.10
Starry flounder	--	--	0.00	7%	7%	7%	--	--	0.00	0.00	0.14	0.14
Unspecified skate	0.05	--	--	7%	7%	7%	0.00	--	--	0.00	0.03	0.03
Yellowtail rockfish	0.04	0.15	0.03	10%	30%	75%	0.00	0.05	0.02	0.07	5.05	5.12
Non-groundfish species												
California halibut	--	--	--	--	--	--	--	--	--	0.00	1.44	1.44
California sheephead	8.98	1.96	--	7%	7%	7%	0.63	0.14	--	0.77	29.67	30.44
Dungeness crab	--	0.01	--	--	--	--	--	0.01	--	0.01	14.63	14.64
Other nongroundfish	12.77	1.58	0.13	--	--	--	12.77	1.58	0.13	14.49	21.56	36.05

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

Table 15. Landings (mt), estimated discard (mt) and estimated total fishing mortality (mt) of major west coast groundfish species in the 2007 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
Rebuilding species															
Bocaccio (South of 40°10' N. lat.)	1	3	5	--	--	--	NA	NA	NA	1	4	5	1	0	1
Canary rockfish	2	17	19	--	0	0	--	0	0	0	0	0	0	4	4
Cowcod (South of 40°10' N. lat.)	2	1	3	--	--	--	NA	NA	NA	0	0	0	0	0	0
Darkblotched rockfish	123	119	242	--	--	--	--	18	18	7	3	10	0	0	0
Pacific ocean perch (North of 40°10' N. lat.)	103	23	126	--	--	--	--	0	0	0	0	0	0	0	0
Widow rockfish	5	11	16	--	--	--	--	0	0	0	0	1	0	0	1
Yelloweye rockfish	0	0	0	--	--	--	--	--	--	0	1	1	0	3	3
Non-rebuilding species															
Arrowtooth flounder	2024	745	2769	--	--	--	--	11	11	4	72	77	0	0	0
Black rockfish (North of 46°16' N. lat.)	0	3	3	NA	NA	NA	--	--	--	--	--	--	NA	NA	NA
Black rockfish (South of 46°16' N. lat.)	0	0	0	--	--	--	--	--	--	--	--	--	161	1	162
Cabezon (South of 42° N. lat.)	--	--	--	--	0	0	--	--	--	--	--	--	25	1	26
California scorpionfish (South of 36° N. lat.)	--	--	--	--	1	1	NA	NA	NA	--	--	--	2	0	2
Chilipepper rockfish (South of 40°10' N. lat.)	31	77	109	--	--	--	NA	NA	NA	4	0	4	0	0	0
Dover sole	8910	914	9824	0	0	0	--	32	32	1	6	7	0	0	0
English sole	622	217	839	0	2	2	--	1	1	0	0	0	--	--	--
Lingcod	117	72	189	0	0	0	0	1	1	15	14	29	54	2	56
Other flatfish	915	528	1443	1	6	7	--	103	103	0	0	0	0	0	0
Other groundfish	1090	2084	3174	1	54	55	0	5	5	259	424	683	44	0	44
Kelp greenling	0	0	0	--	--	--	--	--	--	--	--	--	20	0	20
Skates	942	997	1939	1	49	50	0	2	2	26	97	123	0	0	0
Big skate	0	155		0	11		--	1		0	0		--	--	
Longnose skate	0	591		--	0		--	1		0	87		0	0	
Unspecified skate	942	250		1	38		--	0		26	9		0	0	
Spiny dogfish	56	596	652	--	3	3	--	1	1	196	313	509	0	0	0
Unspecified grenadiers	91	267	359	--	--	--	--	--	--	37	11	48	--	--	--
Other	1	224	225	0	2	2	--	1	1	0	3	3	24	0	24
Minor rockfish (North of 40°10' N. lat.)	121	298	418	NA	NA	NA	0	44	44	61	16	77	82	4	86
Nearshore	0	0	0	NA	NA	NA	--	0	0	--	--	--	70	4	74
Shelf	5	72	77	NA	NA	NA	0	25	25	4	1	5	11	0	11
Bocaccio	0	2	2	NA	NA	NA	--	0	0	0	0	0	0	0	0
Chilipepper rockfish	2	1	2	NA	NA	NA	--	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 (cont). Landings (mt), estimated discard (mt) and estimated total fishing mortality (mt) of major west coast groundfish species in the 2007 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
Non-rebuilding species (cont)															
Minor rockfish (North of 40°10' N. lat.) (cont)	121	298	418	NA	NA	NA	0	44	44	61	16	77	82	4	86
Redstripe rockfish	0	0	1	NA	NA	NA	--	--	--	0	0	0	--	--	--
Silvergray rockfish	0	42	43	NA	NA	NA	--	--	--	0	0	0	--	--	--
Remaining shelf rockfish	2	27	29	NA	NA	NA	--	25	25	4	1	4	11	0	11
Slope	116	226	342	NA	NA	NA	0	18	18	57	15	72	1	0	1
Sharpchin rockfish	2	7	9	NA	NA	NA	--	1	1	--	0	0	--	--	--
Splitnose rockfish	10	135	145	NA	NA	NA	--	14	14	0	0	0	0	0	0
Yellowmouth rockfish	3	8	11	NA	NA	NA	--	--	--	0	0	0	--	--	--
Remaining slope rockfish	101	76	177	NA	NA	NA	--	3	3	57	15	72	1	--	1
Minor rockfish (South of 40°10' N. lat.)	121	26	147	0	0	0	NA	NA	NA	26	1	27	77	1	78
Nearshore	1	0	1	0	0	0	NA	NA	NA	--	--	--	67	1	69
Gopher rockfish	--	--	--		0	0	NA	NA	NA	--	--	--	20	1	21
Remaining nearshore rockfish	1	0	1	0	0	0	NA	NA	NA	--	--	--	47	1	48
Shelf	22	13	35	0	0	0	NA	NA	NA	2	0	2	9	0	9
Yellowtail rockfish	1	0	2	--	--	--	NA	NA	NA	0	0	0	2	0	2
Remaining shelf rockfish	21	12	33	--	0	0	NA	NA	NA	2	0	2	7	0	7
Slope	98	14	112	0	0	0	NA	NA	NA	24	1	25	0	0	0
Bank rockfish	27	0	27	--	--	--	NA	NA	NA	1	0	1	--	--	--
Blackgill rockfish	28	0	29	--	--	--	NA	NA	NA	19	0	19	--	--	--
Sharpchin rockfish	--	0	0	--	--	--	NA	NA	NA	0	0	0	--	--	--
Remaining slope rockfish	43	13	56	--	0	0	NA	NA	NA	4	0	5	0	0	0
Pacific cod (North of 43° N. lat.)	43	12	55	NA	NA	NA	--	0	0	0	0	0	--	--	--
Pacific hake	2	1153	1155	--	--	--	--	2808	2808	1	2	3	0	0	0
Petrale sole	2175	111	2286	0	0	0	--	2	2	0	0	0	0	0	0
Sablefish	2425	182	2607	--	--	--	0	0	0	2264	110	2374	6	0	6
Shortbelly rockfish	0	0	0	--	--	--	--	0	0	0	0	0	--	--	--
Splitnose rockfish (South of 40°10' N. lat.)	62	78	140	--	--	--	NA	NA	NA	0	0	0	--	--	--
Starry flounder	19	1	21	2	3	5	--	--	--	--	--	--	0	0	0
Thornyheads	1606	270	1876	--	--	--	0	1	1	175	17	193	0	0	0
Longspine thornyhead	719	172	890	--	--	--	--	0	0	19	3	23	0	0	0
Shortspine thornyhead	883	98	980	--	--	--	--	0	0	152	14	166	0	0	0
Mixed thornyheads	4	1	5	--	--	--	--	--	--	4	0	4	--	--	--
Yellowtail rockfish (North of 40°10' N. lat.)	9	8	17	NA	NA	NA	--	0	0	0	0	1	4	0	4

Table 15 (cont). Landings (mt), estimated discard (mt) and estimated total fishing mortality (mt) of major west coast groundfish species in the 2007 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
Non-groundfish species															
California halibut	42	0	42	39	30	69	--	--	--	0	0	0	1	0	1
Dungeness crab	0	246	246	--	38	38	--	0	0	4	0	4	16	0	16
Eulachon	0	0	0	--	--	--	--	5	5	--	--	--	--	--	--
Green sturgeon	0	0	0	--	1	1	--	--	--	--	--	--	--	--	--
Other non-FMP flatfish	1	59	60	0	2	2	--	222	222	0	0	0	--	--	--
Other nongroundfish	26	216	242	42	37	80	--	75	75	22	80	103	23	14	36
Pacific halibut	0	216	216	--	0	0	--	0	0	134	43	178	0	0	0
Tanner crab	0	451	451	--	--	--	--	--	--	0	1	1	--	--	--

Table 16. Catch (mt), estimated discard (mt) and total fishing mortality (mt) of major west coast groundfish species in the 2007 at-sea and shoreside Pacific hake/whiting fisheries by sector. Note: 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
Rebuilding species											
Bocaccio (South of 40°10' N. lat.)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Canary rockfish	0.2	0.1	0.3	0.8	0.9	1.6	0.0	0.0	0.0	2.0	2.0
Cowcod (South of 40°10' N. lat.)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Darkblotched rockfish	3.2	2.1	5.3	1.7	5.1	6.7	0.0	0.0	0.0	12.1	0.9
Pacific ocean perch (North of 40°10' N. lat.)	1.6	1.3	2.9	0.3	0.4	0.7	0.4	0.0	0.4	4.0	23.3
Widow rockfish	35.8	37.4	73.1	26.5	46.4	73.0	0.1	0.0	0.1	146.1	81.9
Yelloweye rockfish	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Non-rebuilding species											
Arrowtooth flounder	1.1	0.8	1.8	0.3	0.3	0.7	0.0	0.5	0.5	3.0	2.8
Black rockfish (North of 46°16' N. lat.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9
Black rockfish (South of 46°16' N. lat.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cabezon (South of 42° N. lat.)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
California scorpionfish (South of 36° N. lat.)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chilipepper rockfish (South of 40°10' N. lat.)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dover sole	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2
English sole	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Lingcod	0.6	0.3	1.0	1.6	2.6	4.2	0.8	0.2	1.0	6.2	5.0
Other flatfish	0.1	0.1	0.2	0.0	0.1	0.1	0.0	0.0	0.0	0.3	1.0
Other groundfish	28.4	35.9	64.2	3.1	20.7	23.7	0.0	69.1	69.1	157.1	52.5
Kelp greenling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
Skates *	0.1	0.4	0.5	0.2	0.6	0.8	0.0	0.2	0.2	1.5	0.8
Big skate	0.0	0.3	0.4	0.0	0.3	0.3	0.0	0.0	0.0	0.7	--
Longnose skate	0.1	0.1	0.1	0.1	0.4	0.5	0.0	0.2	0.2	0.8	--
Unspecified skate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8
Spiny dogfish	28.3	35.2	63.5	2.9	19.7	22.6	0.0	68.9	68.9	155.0	51.4
Unspecified grenadiers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
Other	0.0	0.2	0.2	0.0	0.3	0.3	0.0	0.0	0.0	0.6	0.3
Minor rockfish (North of 40°10' N. lat.)	16.9	11.3	28.2	2.5	3.4	5.9	0.8	0.1	0.9	35.1	24.1
Nearshore	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shelf	0.1	0.1	0.2	0.6	0.9	1.5	0.7	0.1	0.8	2.5	5.9
Bocaccio	0.0	0.1	0.1	0.0	0.0	0.0	0.7	0.1	0.8	1.0	0.0
Chilipepper rockfish	0.0	0.0	0.0	0.1	0.2	0.3	0.0	0.0	0.0	0.3	5.6

* 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 (far right column) may include landed weight from big skate or longnose skate.

Table 16 (cont). Catch (mt), estimated discard (mt) and total fishing mortality (mt) of major west coast groundfish species in the 2007 at-sea and shoreside Pacific hake/whiting fisheries by sector. Note: 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
Non-rebuilding species (cont)											
Minor rockfish (North of 40°10' N. lat.) (cont)	16.9	11.3	28.2	2.5	3.4	5.9	0.8	0.1	0.9	35.1	24.1
Redstripe rockfish	0.0	0.0	0.0	0.4	0.7	1.1	0.0	0.0	0.0	1.1	--
Silvergray rockfish	0.0	0.0	0.1	0.0	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	0.0	0.0	0.0	0.0	0.0	0.3
Slope	16.9	11.2	28.1	1.9	2.4	4.4	0.1	0.0	0.1	32.5	18.2
Sharpchin rockfish	0.0	0.0	0.0	0.0	0.8	0.8	0.0	0.0	0.0	0.8	0.0
Splitnose rockfish	0.3	0.2	0.4	0.4	1.4	1.8	0.0	0.0	0.0	2.2	8.5
Yellowmouth rockfish	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Remaining slope rockfish	16.6	11.0	27.6	1.6	0.2	1.8	0.1	0.0	0.1	29.5	9.5
Minor rockfish (South of 40°10' N. lat.)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nearshore	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gopher rockfish	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Remaining nearshore rockfish	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shelf	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Yellowtail rockfish	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Remaining shelf rockfish	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Slope	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bank rockfish	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Blackgill rockfish	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sharpchin rockfish	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Remaining slope rockfish	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pacific cod (North of 43° N. lat.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pacific hake	72533	727	73260	47432	379	47811	5103	63	5166	126237	73300
Petrale sole	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sablefish	2.3	0.7	3.1	0.1	0.0	0.1	0.0	0.0	0.0	3.2	9.0
Shortbelly rockfish	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
Splitnose rockfish (South of 40°10' N. lat.)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Starry flounder	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
Thornyheads	1.4	1.2	2.7	0.0	0.1	0.1	0.0	0.0	0.0	2.7	1.4
Longspine thornyhead	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2
Shortspine thornyhead	1.4	1.2	2.7	0.0	0.1	0.1	0.0	0.0	0.0	2.7	0.2
Mixed thornyheads	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
Yellowtail rockfish (North of 40°10' N. lat.)	13.7	15.5	29.2	14.8	24.5	39.3	10.3	0.1	10.4	78.8	186.4

Table 16 (cont). Catch (mt), estimated discard (mt) and total fishing mortality (mt) of major west coast groundfish species in the 2007 at-sea and shoreside Pacific hake/whiting fisheries by sector. Note: 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
Non-groundfish species											
California halibut	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
Dungeness crab	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Eulachon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
Green sturgeon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--
Other non-FMP flatfish	--	--	--	--	--	--	--	--	--	--	--
Other nongroundfish	--	--	--	--	--	--	--	--	--	--	204.5
Pacific halibut	0.0	0.5	0.5	0.0	0.6	0.6	0.0	0.1	0.1	1.2	0.3
Tanner crab	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--

Table 17. Estimated total fishing mortality (mt) of major west coast groundfish species in 2007 by sector.

	Shoreside commercial fisheries						WA tribal landings	All at-sea hake fisheries	Total recreational fishing mortality			Research	Remaining incidental OA 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			
	Rebuilding species													
Bocaccio (South of 40°10' N. lat.)	5	--	NA	5	1	NA	NA	NA	NA	NA	54	1	2	67
Canary rockfish	19	0	0	0	4	2	1	2	1	2	11	3	--	46
Cowcod (South of 40°10' N. lat.)	3	--	NA	0	0	NA	NA	NA	NA	NA	0	0	0	3
Darkblotched rockfish	242	--	18	10	0	1	0	12	0	0	0	1	0	285
Pacific ocean perch (North of 40°10' N. lat.)	126	--	0	0	0	23	2	4	0	0	0	1	0	157
Widow rockfish	16	--	0	1	1	82	1	146	0	0	8	0	4	259
Yelloweye rockfish	0	--	--	1	3	0	0	0	2	3	8	2	0	19
Non-rebuilding species														
Arrowtooth flounder	2769	--	11	77	0	3	225	3	0	0	0	7	4	3099
Black rockfish (North of 46°16' N. lat.)	3	NA	--	--	NA	1	--	0	256	NA	NA	0	--	260
Black rockfish (South of 46°16' N. lat.)	0	--	--	--	162	0	NA	0	NA	271	143	0	0	577
Cabezon (South of 42° N. lat.)	--	0	--	--	26	NA	NA	NA	NA	NA	16	0	0	42
California scorpionfish (South of 36° N. lat.)	--	1	NA	--	2	NA	NA	NA	NA	NA	64	0	1	68
Chillipepper rockfish (South of 40°10' N. lat.)	109	--	NA	4	0	NA	NA	NA	NA	NA	8	6	2	128
Dover sole	9824	0	32	7	0	0	303	0	0	0	0	38	23	10227
English sole	839	2	1	0	--	0	66	0	0	0	0	5	1	914
Lingcod	189	0	1	29	56	5	48	6	66	102	174	4	26	706
Other flatfish	1443	7	103	0	0	1	48	0	0	0	19	12	15	1649
Other groundfish	3174	55	5	683	44	52	170	157	7	22	42	61	43	4516
Kelp greenling	0	--	--	--	20	--	--	0	1	22	10	0	0	53
Skates*	1939	50	2	123	0	1	56	2	2	0	0	6	13	2192
Spiny dogfish	652	3	1	509	0	51	113	155	0	0	5	13	1	1504
Unspecified grenadiers	359	--	--	48	--	--	--	0	0	0	0	5	2	414
Other	225	2	1	3	24	0	1	1	4	0	27	36	27	352
Minor rockfish (North of 40°10' N. lat.)	418	NA	44	77	86	24		35	10	41	27	11	1	774
Nearshore	0	NA	0	--	74	0	0	0	8	33	17	0	0	133
Shelf	77	NA	25	5	11	6	1	3	2	8	10	6	1	153
Bocaccio	2	NA	0	0	0	0	--	1	1	0	0	0	--	4
Chillipepper rockfish	2	NA	0	0	--	6	--	0	0	0	0	2	--	11

* 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.

Table 17 (cont). Estimated total fishing mortality (mt) of major west coast groundfish species in 2007 by sector.

	Shoreside commercial fisheries						WA tribal landings	All at-sea hake fisheries	Total recreational fishing mortality			Research	Remaining incidental OA 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			
	Non-rebuilding species (cont.)													
Minor rockfish (North of 40°10' N. lat.)	418	NA	44	77	86	24		35	10	41	27	11	1	774
Redstripe rockfish	1	NA	--	0	--	--	--	1	0	0	0	0	--	2
Silvergray rockfish	43	NA	--	0	--	--	--	0	0	0	0	0	--	43
Remaining shelf rockfish	29	NA	25	4	11	0	1	0	1	7	9	4	1	93
Slope	342	NA	18	72	1	18	32	33	0	0	0	5	1	522
Sharpchin rockfish	9	NA	1	0	--	0	0	1	0	0	0	0	--	11
Splitnose rockfish	145	NA	14	0	0	9	0	2	0	0	0	5	0	175
Yellowmouth rockfish	11	NA	--	0	--	0	0	0	0	0	0	0	--	11
Remaining slope rockfish	177	NA	3	72	1	9	32	29	0	0	0	0	1	324
Minor rockfish (South of 40°10' N. lat.)	147	0	NA	27	78	NA	NA	NA	NA	NA	703	4	21	981
Nearshore	1	0	NA	--	69	NA	NA	NA	NA	NA	396	0	1	466
Gopher rockfish	--	0	NA	--	21	NA	NA	NA	NA	NA	34	0	0	55
Remaining nearshore rockfish	1	0	NA	--	48	NA	NA	NA	NA	NA	361	0	1	411
Shelf	35	0	NA	2	9	NA	NA	NA	NA	NA	308	3	9	365
Yellowtail rockfish	2	--	NA	0	2	NA	NA	NA	NA	NA	55	0	1	60
Remaining shelf rockfish	33	0	NA	2	7	NA	NA	NA	NA	NA	252	3	7	305
Slope	112	0	NA	25	0	NA	NA	NA	NA	NA	0	1	11	149
Bank rockfish	27	--	NA	1	--	NA	NA	NA	NA	NA	0	0	8	36
Blackgill rockfish	29	--	NA	19	--	NA	NA	NA	NA	NA	0	0	3	51
Sharpchin rockfish	0	--	NA	0	--	NA	NA	NA	NA	NA	0	0	--	0
Remaining slope rockfish	56	0	NA	5	0	NA	NA	NA	NA	NA	0	0	0	62
Pacific cod (North of 43° N. lat.)	55	NA	0	0	--	0	45	0	0	0	0	0	0	101
Pacific hake	1155	--	2808	3	0	73300	11789	126237	0	0	0	49	0	215340
Petrale sole	2286	0	2	0	0	0	45	0	0	0	1	5	0	2340
Sablefish	2607	--	0	2374	6	9	515	3	0	4	0	9	17	5545
Shortbelly rockfish	0	--	0	0	--	--	--	0	0	0	0	0	--	1
Splitnose rockfish (South of 40°10' N. lat.)	140	--	NA	0	--	NA	NA	NA	NA	NA	0	3	0	143
Starry flounder	21	5	--	--	0	--	0	0	0	3	0	0	0	30
Thornyheads	1876	--	1	193	0	1	38	3					2	2114
Longspine thornyhead	890	--	0	23	0	1	0	0	0	0	0	12	1	928
Shortspine thornyhead	980	--	0	166	0	0	38	3	0	0	0	5	1	1194
Mixed thornyheads	5	--	--	4	--	--	--	0	0	0	0	0	--	9
Yellowtail rockfish (North of 40°10' N. lat.)	17	NA	0	1	4	186	74	79	14	7	0	4	3	389

Table 17 (cont). Estimated total fishing mortality (mt) of major west coast groundfish species in 2007 by sector.

	Shoreside commercial fisheries						WA tribal landings	All at-sea hake fisheries	Total recreational fishing mortality			Research	Remaining incidental OA 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			
Non-groundfish species														
California halibut	42	69	--	0	1	--	--	0	--	--	--	--	94	208
Dungeness crab	246	38	0	4	16	0	1622	0	--	--	--	--	18410.4 *	20337
Eulachon	0	--	5	--	--	--	--	0	--	--	--	--	--	5
Green sturgeon	0	1	--	--	--	--	0	0	--	--	--	--	--	1
Other non-FMP flatfish	60	2	222	0	--	--	--	--	--	--	--	--	--	284
Pacific halibut	216	0	0	178	0	0	170	1	--	--	--	--	31	597
Tanner crab	451	--	--	1	--	--	--	0	--	--	--	--	--	452

* Remaining incidental OA fisheries landings includes retained weights from the Dungeness crab fishery.

Table 18. Estimated total fishing mortality (mt) of major west coast groundfish species during 2007 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)
Rebuilding species					
Bocaccio (South of 40°10' N. lat.)	67	218	31%	602	11%
Canary rockfish	46	44	104%	172	27%
Cowcod (South of 40°10' N. lat.)	3	4	83%	36	9%
Darkblotched rockfish	285	290	98%	456	63%
Pacific ocean perch (North of 40°10' N. lat.)	157	150	104%	900	17%
Widow rockfish	259	368	70%	5334	5%
Yelloweye rockfish	19	23	83%	26	73%
Non-rebuilding species					
Arrowtooth flounder	3099	5800	53%	5800	53%
Black rockfish (North of 46°16' N. lat.)	260	540	48%	540	48%
Black rockfish (South of 46°16' N. lat.)	577	722	80%	722	80%
Cabazon (South of 42° N. lat.)	42	69	61%	94	45%
California scorpionfish (South of 36° N. lat.)	68	175	39%	219	31%
Chilipepper rockfish (South of 40°10' N. lat.)	128	2000	6%	2700	5%
Dover sole	10227	16500	62%	28522	36%
English sole	914	6237	15%	6237	15%
Lingcod	706	6170	11%	6280	11%
Other flatfish	1649	4884	34%	6731	24%
Other groundfish	4516	7300	62%	14600	31%
Kelp greenling	53				
Skates *	2192				
Spiny dogfish	1504				
Unspecified grenadiers	414				
Other	352				
Minor rockfish (North of 40°10' N. lat.)	774	2270	34%	3680	21%
Nearshore	133	142	94%		
Shelf	153	968	16%		
Bocaccio	4			**	
Chilipepper rockfish	11			**	
Redstripe rockfish	2			**	
Silvergray rockfish	43			**	
Remaining shelf rockfish	93			**	
Slope	522	1160	45%		
Sharpchin rockfish	11			**	
Splitnose rockfish	175			**	
Yellowmouth rockfish	11			**	
Remaining slope rockfish	324			**	

* 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 (cont). Estimated total fishing mortality (mt) of major west coast groundfish species during 2007 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)
Non-rebuilding species (cont.)					
Minor rockfish (South of 40°10' N. lat.)	981	1904	52%	3403	29%
Nearshore	466	564	83%		
Gopher rockfish	55			**	
Remaining nearshore rockfish	411			**	
Shelf	365	714	51%		
Yellowtail rockfish	60			**	
Remaining shelf rockfish	305			**	
Slope	149	626	24%		
Bank rockfish	36			**	
Blackgill rockfish	51			**	
Sharpchin rockfish	0			**	
Remaining slope rockfish	62			**	
Pacific cod (North of 43° N. lat.)	101	1600	6%	3200	3%
Pacific hake	215340	242591	89%	452196	48%
Petrale sole	2340	2499	94%	3025	77%
Sablefish	5545	5934	93%	6210	89%
Shortbelly rockfish	1	13900	0%	13900	0%
Splitnose rockfish (South of 40°10' N. lat.)	143	461	31%	615	23%
Starry flounder	30	890	3%	1221	2%
Thornyheads	2114				
Longspine thornyhead	928	2696	34%	3907	24%
Shortspine thornyhead	1194	2055	58%	2476	48%
Mixed thornyheads	9				
Yellowtail rockfish (North of 40°10' N. lat.)	389	4548	9%	4548	9%

** 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*

ROUNDFISH

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

FLATFISH

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

ROCKFISH

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

Aurora, *Sebastes. aurora*

Bank, *S. rufus*
Black, *S. melanops*
Black-and-yellow, *S. chrysolmelas*.
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 groundfish
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	yes
BCAC	BOCACCIO	Bocaccio	Bocaccio	yes
BCC1	NOM. BOCACCIO	Bocaccio	Bocaccio	yes
BCLM	BUTTER CLAM	Other nongroundfish	Other nongroundfish	
BGL1	NOM. BLACKGILL ROCKFISH	Other slope rockfish	Blackgill 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 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	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 ROCKFISH	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 ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
CBZ1	NOM. CABEZON	Other groundfish (N. of 42° N. lat.) / Cabezon (S. of 42° N. lat.)	Cabezon	yes
CBZN	CABEZON	Other groundfish (N. of 42° N. lat.) / Cabezon (S. of 42° N. lat.)	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. CHILPEPPER	Chilipepper	Chilipepper	yes
CLPR	CHILPEPPER	Chilipepper	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

PacFIN Species ID	PacFIN Common Name	Species group - North of 40° 10' N. latitude	Species group - South of 40° 10' N. latitude	FMP ground-fish
CPLN	CAPELIN	Other nongroundfish	Other nongroundfish	
CSKT	CALIFORNIA SKATE	Unspecified skate	Unspecified skate	yes
CSOL	CURLFIN SOLE	Other flatfish	Other flatfish	yes
CTRB	C-O SOLE	Other non-FMP flatfish	Other non-FMP flatfish	
CUDA	PACIFIC BARRACUDA	Other nongroundfish	Other nongroundfish	
CWC1	NOM. COWCOD ROCKFISH	Other shelf rockfish	Cowcod	yes
CWCD	COWCOD ROCKFISH	Other shelf rockfish	Cowcod	yes
DBR1	NOM. DARKBLOTCHED ROCKFISH	Darkblotched rockfish	Darkblotched rockfish	yes
DBRK	DARKBLOTCHED ROCKFISH	Darkblotched rockfish	Darkblotched rockfish	yes
DCRB	DUNGENESS CRAB	Dungeness crab	Dungeness crab	
DFLT	UNSP. DEEP FLOUNDERS	Other flatfish	Other flatfish	yes
DOVR	DOVER SOLE	Dover sole	Dover sole	yes
DRDO	DORADO	Other nongroundfish	Other nongroundfish	
DSOL	DEEPSEA SOLE	Other non-FMP flatfish	Other non-FMP flatfish	
DSRK	SPINY DOGFISH	Spiny dogfish	Spiny dogfish	yes
DTRB	DIAMOND TURBOT	Other non-FMP flatfish	Other non-FMP flatfish	
DUSK	DUSKY ROCKFISH	Other groundfish	Other groundfish	yes
DVR1	NOM. DOVER SOLE	Dover sole	Dover sole	yes
DWRF	DWARF-RED ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
EELS	UNSPECIFIED EELS	Other nongroundfish	Other nongroundfish	
EGL1	NOM. ENGLISH SOLE	English sole	English sole	yes
EGLS	ENGLISH SOLE	English sole	English sole	yes
ESTR	EASTERN OYSTER	Other nongroundfish	Other nongroundfish	
ETNA	BIGEYE TUNA	Other nongroundfish	Other nongroundfish	
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 ROCKFISH	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	yes
GPHR	GOPHER ROCKFISH	Other nearshore rockfish	Gopher rockfish	yes
GPRW	GOLDEN PRAWN	Other nongroundfish	Other nongroundfish	
GRAS	GRASS ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
GRDR	UNSP. GRENADIERS	Unspecified grenadiers	Unspecified grenadiers	yes
GRS1	NOM. GRASS ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
GSP1	NOM. GREENSPOTTED ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
GSPT	GREENSPOTTED ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
GSQD	GIANT SQUID	Other nongroundfish	Other nongroundfish	
GSR1	NOM. GREENSTRIPED ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
GSRK	GREENSTRIPED ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
GSRM	GHOST SHRIMP	Other nongroundfish	Other nongroundfish	
GSTG	GREEN STURGEON	Green sturgeon	Green sturgeon	
GTRB	GREENLAND TURBOT	Other non-FMP flatfish	Other non-FMP flatfish	
HBRK	HALFBANDED ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
HCLM	HORSE CLAMS	Other nongroundfish	Other nongroundfish	
HLQN	HARLEQUIN ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
HNY1	NOM. HONEYCOMB ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
HNYC	HONEYCOMB ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
HTRB	HORNYHEAD TURBOT	Other non-FMP flatfish	Other non-FMP flatfish	
ISRK	BIGEYE THRESHER SHARK	Other nongroundfish	Other nongroundfish	
JCLM	CALIFORNIA JACKKNIFE CLAM	Other nongroundfish	Other nongroundfish	
JMCK	JACK MACKEREL	Other nongroundfish	Other nongroundfish	
KFSH	GIANT KELPFISH	Other nongroundfish	Other nongroundfish	
KGL1	NOM. KELP GREENLING	Kelp greenling	Kelp greenling	yes
KLP1	NOM. KELP ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
KLPG	KELP GREENLING	Kelp greenling	Kelp greenling	yes
KLPR	KELP ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
KMKA	KAMCHATKA FLOUNDER	Other non-FMP flatfish	Other non-FMP flatfish	
KSTR	KUMAMOTO OYSTER	Other nongroundfish	Other nongroundfish	
LCD1	NOM. LINGCOD	Lingcod	Lingcod	yes

PacFIN Species ID	PacFIN Common Name	Species group - North of 40° 10' N. latitude	Species group - South of 40° 10' N. latitude	FMP ground-fish
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 ROCKFISH	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 ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
OABL	OTHER ABALONE	Other nongroundfish	Other nongroundfish	
OANC	OTHER ANCHOVY	Other nongroundfish	Other nongroundfish	
OBAS	OTHER BASS	Other nongroundfish	Other nongroundfish	
OCLM	OTHER CLAM	Other nongroundfish	Other nongroundfish	
OCRB	OTHER CRAB	Other nongroundfish	Other nongroundfish	
OCRK	OTHER CROAKER	Other nongroundfish	Other nongroundfish	
OCTP	UNSP. OCTOPUS	Other nongroundfish	Other nongroundfish	
ODSR	OTHER DEMERSAL RKFSH	Other groundfish	Other groundfish	yes
OECH	OTHER ECHINODERM	Other nongroundfish	Other nongroundfish	
OFLT	OTHER FLATFISH	Other flatfish	Other flatfish	yes
OGRN	OTHER GROUND FISH	Other groundfish	Other groundfish	yes
OLV1	NOM. OLIVE ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
OLVE	OLIVE ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
OMSK	OTHER MOLLUSKS	Other nongroundfish	Other nongroundfish	
OPLG	OTHER PELAGIC RKFSH	Other groundfish	Other groundfish	yes
ORCK	OTHER ROCKFISH	Other shelf rockfish (< 150 fm)	Other shelf rockfish (< 150 fm)	yes
ORCK	OTHER ROCKFISH	Other slope rockfish (> 150 fm)	Other slope 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	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 (N. of 43° N. lat.) / Other groundfish (S. of 43° N. lat.)	Other groundfish	yes
PDAB	PACIFIC SANDDAB	Other flatfish	Other flatfish	yes
PDB1	NOM. PACIFIC SANDDAB	Other flatfish	Other flatfish	yes
PGMY	PYGMY ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes

PacFIN Species ID	PacFIN Common Name	Species group - North of 40° 10' N. latitude	Species group - South of 40° 10' N. latitude	FMP ground-fish
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 (N. of 43° N. lat.) / Other slope rockfish (S. of 43° N. lat.)	Other slope rockfish	yes
POP1	GEN. SHELF/SLOPE RF	Other slope rockfish	Other slope rockfish	yes
POP2	NOMINAL POP	Pacific ocean perch (N. of 43° N. lat.) / Other slope rockfish (S. of 43° N. lat.)	Other slope rockfish	yes
PRCL	PURPLE CLAM	Other nongroundfish	Other nongroundfish	
PROW	PROWFISH	Other nongroundfish	Other nongroundfish	
PRR1	NOM. PINKROSE ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
PRRK	PINKROSE ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
PSDN	PACIFIC SARDINE	Other nongroundfish	Other nongroundfish	
PSHP	PINK SHRIMP	Other nongroundfish	Other nongroundfish	
PSRK	PELAGIC THRESHER SHARK	Other nongroundfish	Other nongroundfish	
PSTR	PACIFIC OYSTER	Other nongroundfish	Other nongroundfish	
PTR1	NOM. PETRALE SOLE	Petrale sole	Petrale sole	yes
PTRL	PETRALE SOLE	Petrale sole	Petrale sole	yes
PUGT	PUGET SOUND ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
PWHT	PACIFIC WHITING	Pacific hake	Pacific hake	yes
QCLM	NORTHERN QUAHOG CLAM	Other nongroundfish	Other nongroundfish	
QFSH	QUEENFISH	Other nongroundfish	Other nongroundfish	
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	BOCACCI+CHILIPEPPER RCKFSH	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	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	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
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	SALFISH	Other nongroundfish	Other nongroundfish	
SARY	PACIFIC SAURY	Other nongroundfish	Other nongroundfish	
SBL1	NOM. SHORTBELLY ROCKFISH	Shortbelly rockfish	Shortbelly rockfish	yes
SBLY	SHORTBELLY ROCKFISH	Shortbelly rockfish	Shortbelly rockfish	yes
SCLM	SOFT-SHELLED CLAM	Other nongroundfish	Other nongroundfish	
SCLP	UNSP. SCULPIN	Other nongroundfish	Other nongroundfish	

PacFIN Species ID	PacFIN Common Name	Species group - North of 40° 10' N. latitude	Species group - South of 40° 10' N. latitude	FMP ground-fish
SCOR	CALIFORNIA SCORPIONFISH	Other groundfish	Other nearshore rockfish (N. of 36° N. lat.) / California scorpionfish (S. of 36° N. lat.)	yes
SCR1	NOM. CALIF. SCORPIONFISH	Other groundfish	Other nearshore rockfish (N. of 36° N. lat.) / California scorpionfish (S. of 36° N. lat.)	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	Sharpchin rockfish	yes
SKCR	SCARLET KING CRAB	Other nongroundfish	Other nongroundfish	
SLGR	SILVERGREY ROCKFISH	Silvergray 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	Splitnose rockfish	yes
SNS1	NOM. SPLITNOSE ROCKFISH	Splitnose 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 ROCKFISH	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. Near-shore RF	Other nearshore rockfish	Other nearshore rockfish	yes
SSRK	SOUPFIN SHARK	Other groundfish	Other groundfish	yes
SSRS	Shallow So. Near-shore RF	Other nearshore rockfish	Other nearshore rockfish	yes
STAR	STARRY ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
STL1	NOM. STRIPTAIL 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	STRIPTAIL ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
STRY	STARRY FLOUNDER	Starry flounder	Starry flounder	yes
SUSF	SOU. UNSP. SHELF ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
SUSP	SOU. UNSP. SLOPE ROCKFISH	Other slope rockfish	Other slope rockfish	yes
SUSR	SOU. UNSP. NEAR-SHORE ROCKFISH	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

PacFIN Species ID	PacFIN Common Name	Species group - North of 40° 10' N. latitude	Species group - South of 40° 10' N. latitude	FMP ground-fish
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 (N. of 43° N. lat.) / Other slope rockfish (S. of 43° N. lat.)	Other slope rockfish	yes
URCK	UNSP. ROCKFISH	Other shelf rockfish (< 150 fm)	Other shelf rockfish (< 150 fm)	yes
URCK	UNSP. ROCKFISH	Other slope rockfish (> 150 fm)	Other slope rockfish (> 150 fm)	yes
URK1	SRKR+REYE+NRCK+SHRP	Other slope rockfish	Other slope rockfish	yes
URND	UNSP. ROUND FISH	Other groundfish	Other groundfish	yes
USCL	UNSPECIFIED SCALLOP	Other nongroundfish	Other nongroundfish	
USCU	UNSP. SEA CUCUMBERS	Other nongroundfish	Other nongroundfish	
USF1	UNSP. SHALLOW-91 FLOUNDERS	Other flatfish	Other flatfish	yes
USHR	UNSP. NEAR-SHORE ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
USKT	UNSP. SKATE	Unspecified skate	Unspecified skate	yes
USLF	UNSP. SHELF ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
USLP	UNSP. SLOPE ROCKFISH	Other slope rockfish	Other slope rockfish	yes
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	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	yes
YTRK	YELLOWTAIL ROCKFISH	Yellowtail rockfish	Yellowtail 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	Near-shore 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	
BCAC	BOCACCIO	Bocaccio	Bocaccio	
BCC1	NOM. BOCACCIO	Bocaccio	Bocaccio	
BCLM	BUTTER CLAM	Other nongroundfish	Other nongroundfish	
BGL1	NOM. BLACKGILL ROCKFISH	Minor slope rockfish	Blackgill rockfish	
BKCR	BLUE KING CRAB	Other nongroundfish	Other nongroundfish	
BLCK	BLACK ROCKFISH	Black rockfish	Black rockfish	yes
BLGL	BLACKGILL ROCKFISH	Minor slope rockfish	Blackgill 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	
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 ROCKFISH	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	
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 ROCKFISH	Other minor nearshore rockfish	Shallow nearshore rockfish *	yes
CBZ1	NOM. CABEZON	Other groundfish (N. of 42° N. lat.) / Cabezon (S. of 42° N. lat.)	Cabezon	yes
CBZN	CABEZON	Other groundfish (N. of 42° N. lat.) / Cabezon (S. of 42° N. lat.)	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	Chilipepper	
CLPR	CHILIPEPPER	Chilipepper	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

PacFIN Species ID	PacFIN Common Name	Species group - North of 40° 10' N. latitude	Species group - South of 40° 10' N. latitude	Near-shore species
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	
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 ROCKFISH	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	yes
GPHR	GOPHER ROCKFISH	Other minor nearshore rockfish	Gopher 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
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

PacFIN Species ID	PacFIN Common Name	Species group - North of 40° 10' N. latitude	Species group - South of 40° 10' N. latitude	Near-shore species
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 ROCKFISH	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 ROCKFISH	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	
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 shelf rockfish (< 150 fm)	Minor shelf rockfish (< 150 fm)	
ORCK	OTHER ROCKFISH	Minor slope rockfish (> 150 fm)	Minor slope rockfish (> 150 fm)	
ORND	OTHER ROUND FISH	Other groundfish	Other groundfish	
OSCL	OTHER SCALLOP	Other nongroundfish	Other nongroundfish	
OSKT	OTHER SKATES	Unspecified skate	Unspecified skate	
OSLR	OTHER SLOPE RKFSH	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 (N. of 43° N. lat.) / Other groundfish (S. of 43° N. lat.)	Other groundfish	
PDAB	PACIFIC SANDDAB	Other flatfish	Other flatfish	
PDB1	NOM. PACIFIC SANDDAB	Other flatfish	Other flatfish	
PGMY	PYGMY ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	

PacFIN Species ID	PacFIN Common Name	Species group - North of 40° 10' N. latitude	Species group - South of 40° 10' N. latitude	Near-shore species
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 (N. of 43° N. lat.) /	Minor slope rockfish	
POP1	GEN. SHELF/SLOPE RF	Minor slope rockfish (S. of 43° N. lat.)	Minor slope rockfish	
POP2	NOMINAL POP	Pacific ocean perch (N. of 43° N. lat.) /	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	
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	BOCACCIO+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	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	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	
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	
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	

PacFIN Species ID	PacFIN Common Name	Species group - North of 40° 10' N. latitude	Species group - South of 40° 10' N. latitude	Near-shore species
SCOR	CALIFORNIA SCORPIONFISH	Other minor nearshore rockfish	Shallow nearshore rockfish * (N. of 36° N. lat.) / California scorpionfish (S. of 36° N. lat.)	yes
SCR1	NOM. CALIF. SCORPIONFISH	Other minor nearshore rockfish	Shallow nearshore rockfish * (N. of 36° N. lat.) / California scorpionfish (S. of 36° N. lat.)	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	SHARPCIN ROCKFISH	Sharpchin rockfish	Sharpchin rockfish	
SKCR	SCARLET KING CRAB	Other nongroundfish	Other nongroundfish	
SLGR	SILVERGREY ROCKFISH	Silvergray 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	Splitnose rockfish	
SNS1	NOM. SPLITNOSE ROCKFISH	Splitnose 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 ROCKFISH	Southern nearshore rockfish	Deeper nearshore rockfish * (> 10 fm)	yes
SSHR	SOUTHERN NEAR-SHORE ROCKFISH	Southern nearshore rockfish	Shallow nearshore rockfish * (< 10 fm)	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. Near-shore RF	Southern nearshore rockfish	Deeper nearshore rockfish *	yes
SSRK	SOUPFIN SHARK	Other groundfish	Other groundfish	
SSRS	Shallow So. Near-shore RF	Southern nearshore rockfish	Shallow nearshore rockfish *	yes
STAR	STARRY ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
STL1	NOM. STRIPETAIL ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
STLH	STEELHEAD	Other nongroundfish	Other nongroundfish	
STNA	SKIPJACK TUNA	Other nongroundfish	Other nongroundfish	
STR1	NOM. STARRY ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
STRK	STRIPETAIL 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 ROCKFISH	Southern nearshore rockfish	Deeper nearshore rockfish * (> 10 fm)	yes
SUSR	SOU. UNSP. NEAR-SHORE ROCKFISH	Southern nearshore rockfish	Shallow nearshore rockfish * (< 10 fm)	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

PacFIN Species ID	PacFIN Common Name	Species group - North of 40° 10' N. latitude	Species group - South of 40° 10' N. latitude	Near-shore species
UDSR	UNSP. DEMERSAL RKFISH	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 RKFISH	Other groundfish	Other groundfish	
UPOP	UNSP. POP GROUP	Pacific ocean perch (N. of 43° N. lat.) / Minor slope rockfish (S. of 43° N. lat.)	Minor slope rockfish	
URCK	UNSP. ROCKFISH	Minor shelf rockfish (< 150 fm)	Minor shelf rockfish (< 150 fm)	
URCK	UNSP. ROCKFISH	Minor slope rockfish (> 150 fm)	Minor slope rockfish (> 150 fm)	
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	
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 * (> 10 fm)	yes
USHR	UNSP. NEAR-SHORE ROCKFISH	Other minor nearshore rockfish	Shallow nearshore rockfish * (< 10 fm)	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 RKFISH	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	Yellowmouth 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	
YTRK	YELLOWTAIL ROCKFISH	Yellowtail rockfish	Yellowtail rockfish	