



## NOAA FISHERIES SERVICE

# Estimated Discard and Catch of Groundfish Species in the 2011 US West Coast Fisheries

NOAA



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## Executive Summary

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The primary objective of this report is to estimate fishing mortality for groundfish species in U.S. west coast fisheries during 2011 and evaluate mortality estimates relative to Annual Catch Limit (ACL), Acceptable Biological Catch (ABC), and Overfishing Limit (OFL) harvest management goals. These management goals are published each year in the federal groundfish regulations for selected groundfish species (50 CFR 660 Subpart G). Based on a recommendation from the Pacific Fishery Management Council's (PFMC) Scientific and Statistical Committee, we present groundfish mortality estimates by species, to the degree possible. Our primary findings include:

- Estimated fishing mortality for all groundfish species or complexes did not exceed 2011 ACL, ABC, or OFL harvest goals.
- Estimated fishing mortality for five species were above 90% of their ACL goals: nearshore complex of minor rockfish - north of 40°10' N. lat. (99.8%), petrale sole (98%), sablefish - north of 36° N. lat. (97%), cabezon – Oregon (96%), sablefish - south of 36° N. lat. (94%).
- Thirty groundfish species or complexes (71%) had fishing mortality estimates which were less than 50% of 2011 ACL harvest goals.
- A majority (55%) of the groundfish species or complexes showed an increase in estimated fishing mortality from 2010 to 2011.
- All flatfish species had decreased estimated fishing mortality in 2011 relative to 2010, with the exception of petrale sole (2% increase) which is under a rebuilding plan.

Summaries of 2011 catch from the following groundfish fishery sectors are included (\*Sectors where observer program data are used):

Commercial -

Shore-based Individual Fishing Quota (IFQ) Program\*

Limited entry (LE) trawl permits – fishing bottom trawl gear

LE trawl permits – fishing fixed gear

LE trawl permits – targeting California halibut with bottom trawl gear

LE trawl permits – targeting Pacific whiting (hake) with mid-water trawl gear

At-sea Whiting Coop Programs\*

Pacific whiting (hake) catcher-processor (C/P)

Pacific whiting (hake) mothership (MS)

Pacific whiting (hake) mothership catcher-vessel

Open access (OA) bottom trawl - targeting California halibut\*

OA fixed gear nearshore (Oregon/California)\*

Fixed gear LE sablefish primary season (tier endorsed)\*

Fixed gear LE non-primary sablefish (non-endorsed and daily trip limit sectors)\*

Fixed gear OA daily trip limit\*

Exempted fishing permit (EFP)

Non-commercial –

Tribal (shoreside fisheries)

Tribal at-sea Pacific whiting (hake)\*

Recreational (Washington/Oregon/California)

## Research

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

Commercial -

OA shrimp trawl – Washington/Oregon/California\*

OA bottom trawl

Other gear groups - not trawl, shrimp trawl, or fixed-gear

Fixed gear targeting non-groundfish

## Data Sources

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Data sources used to estimate groundfish fishing mortality include landing receipts (fish tickets), onboard observer data, recreational catch, research catch, and discard mortality rates.

Fleet-wide landing receipts (a.k.a. fish tickets) are the cornerstone of retained catch information for all sectors of the commercial groundfish fishery on the US west coast. Fish tickets are trip-aggregated sales receipts issued to vessels by fish-buyers in each port for each delivery of fish. They are provided to fish-buyers by a state agency and must be returned to the agency for processing. Fish tickets are designed by the individual states. Washington, Oregon, and California each have a slightly different fish ticket format. In addition, each state conducts species-composition sampling for numerous market categories reported on fish tickets. Market categories represent either a single species or a mixture of species. Fish ticket and species-composition data are submitted by state agencies to the Pacific Fisheries Information Network (PacFIN) regional database, which is maintained by the Pacific States Marine Fisheries Commission (PSMFC). For analytical purposes, the percentage of weight of each species, within market categories, obtained from species composition sampling, was applied to the fish ticket data used in our analyses. Landed weights from sampled market categories were distributed to individual species whenever possible.

Fish ticket landings data for the calendar year 2011 were retrieved from the PacFIN database (05-04-2012) and allocated to various sectors of the groundfish fishery as indicated in Figure 1. All additional data processing steps are described in the methods section below.

Discard estimation focused on commercial groundfish fishery sectors with scientific at-sea observations of discards, conducted by the Northwest Fishery Science Center (NWFSC) Fishery Resource Analysis and Monitoring Division (FRAM). 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 IFQ shore-based sectors, limited entry and open access (OA) fixed gear, and state-permitted nearshore fixed gear sectors. The WCGOP also observes several fisheries that incidentally catch groundfish, including the California halibut trawl and pink shrimp trawl fisheries. WCGOP data from each of these groundfish sectors and fisheries were used for the purposes of discard estimation. Mortality estimates were summarized from the At-Sea Hake Observer Program (A-SHOP) data for the at-sea Pacific hake/whiting fishery, including: catcher-processor, mothership, mothership catcher-vessel, and tribal components.

The NWFSC observer program 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 require vessels that fish for groundfish within 3 miles of shore or participate in other state-managed fisheries to carry 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 (for more details see <http://www.nwfsc.noaa.gov/research/divisions/fram/observer/>). Estimates of observer coverage, observed catch, and a summary of observed fishing depths for each sector can be found at: [http://www.nwfsc.noaa.gov/research/divisions/fram/observer/sector\\_products.cfm](http://www.nwfsc.noaa.gov/research/divisions/fram/observer/sector_products.cfm). 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 WCGOP manuals (NWFSC 2011a, NWFSC 2011b; [http://www.nwfsc.noaa.gov/research/divisions/fram/observer/observer\\_manuals.cfm](http://www.nwfsc.noaa.gov/research/divisions/fram/observer/observer_manuals.cfm)).

The sampling protocol employed by the WCGOP is primarily focused on the discarded portion of catch. To ensure that 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 identification numbers obtained by the observer and are adjusted so that the total trip pounds of retained catch equals the total trip pounds on the fish ticket(s). Adjusting observer retained catch weight to fish ticket weight is done because the fish ticket weight is more accurate and fish tickets are legally binding documents (for more details see: [http://www.nwfsc.noaa.gov/research/divisions/fram/observer/data\\_processing.cfm](http://www.nwfsc.noaa.gov/research/divisions/fram/observer/data_processing.cfm)). Additional data processing steps are described in the methods section below.

The 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 (NWFSC 2011c). The at-sea hake/whiting fishery has mandatory observer coverage, with each vessel over 38 m carrying two observers. Beginning in 2011 under IFQ/Coop Program management, all catcher vessels which deliver catch to motherships are required to carry observers.

Each year, a certain portion of the ACL for groundfish species is harvested through research activities. In 2011, research programs that caught groundfish included the NWFSC's groundfish bottom trawl survey, acoustic survey, a hook and line survey, and the International Pacific Halibut Commission's (IPHC) longline survey, as well as other scientific research permits. In addition, two permits for Pacific hake and Pacific halibut bycatch reduction device (BRD) research reported catch of groundfish in 2011. All groundfish research catch information was provided to NOAA's Northwest Regional Office (NWR). These data were then summarized by the NWR and included in this report.

In addition to these data sources, further information provided by the Groundfish Management Team (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. 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 groups reported in the state-permitted fixed gear nearshore sector. In the 2013-2014 groundfish management cycle, the SSC recommended that discard mortality rate assumptions made for stock assessment purposes should also be considered for discard estimates of longnose skate (trawl = 50%, fixed gear = 50%) and spiny dogfish (hook-and-line fixed gear = 50%). However, these rates were not yet applied to 2011 discard estimates in this report.

## Methods

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### ***Discard Estimation Methods Overview***

We used a deterministic approach to estimate discard mortality for all WCGOP observed sectors of the groundfish fishery. Through this approach, observed discard rates for each species were directly expanded to the fleet-wide level. Because of differences in data availability and management structure among sectors of the groundfish fishery, this approach was applied with slight modifications (see methods below).

The stratification scheme used in this analysis is inconsistent with the sampling design employed by the WCGOP. Rather, methods employed here provide estimates that are relevant to the spatial and temporal structure of groundfish management. The validity of stratification in terms of isolating variance in discard has not been rigorously tested. Until more work can be completed to evaluate which strata (area/depth/season) are most appropriate for discard analyses, broader stratification is often warranted to ensure adequate sample size or to meet confidentiality mandates.

Measures of uncertainty are not provided within the context of the WCGOP sampling design, as they would be biased by post-stratification. However, standard errors consistent with Pikitch et al. (1998) are provided for observed discard ratios in the context of the post-stratified analysis. The standard errors are most likely an underestimate of the actual uncertainty, but are the sole measure we can provide at this time.

In all cases where a FMP groundfish species grouping, nearshore species grouping, or unsampled catch category was used to compute discard ratios, any retained weights that were recorded by the observer but that did not appear on fish tickets were excluded from the denominator. This was necessary to prevent double-counting associated with differences in the species codes used by observers and processors. For instance, while observers may record rockfish catch at the species level, various species of rockfish are often grouped, weighed, and recorded together on the fish ticket under a grouped species code (e.g., NUSP = Northern Unspecified Slope Rockfish). By using only the retained groundfish weight from fish tickets in discard ratio denominators, we prevent double-counting of retained weights. When using a single species in the denominator, (e.g., sablefish in the fixed gear fisheries), any retained weights in observer and fish ticket data that share the same species code will match and adjust properly.

Species were defined and/or grouped for this report according to the WCGOP Data Processing Appendix (<http://www.nwfsc.noaa.gov/research/divisions/fram/observer/xls/Appendix.xlsx>). Appendix updates for 2011 include the designation of observer and PacFIN level data to IFQ managed species or complexes. A complete listing of groundfish species is defined in the Groundfish Fishery Management Plan (<http://www.pcouncil.org/wp-content/uploads/fmpthru19.pdf>). Groundfish species that are currently being managed under rebuilding plans are presented separately from non-rebuilding species.

In all tables, (--) was used when there is no actual numeric value (i.e., the species was not caught). Values appear as 0.0 when a value exists but is smaller than the decimal places allotted. A value of NA represents that the calculation is not applicable for a particular species or stratum, or that the calculation did not produce a result (e.g., very small values might result in NA from a standard error calculation). Grey shading indicates that values include estimates of both discard and retained catch.

### ***Final IFQ Fishery Discard Estimation***

The basic components of how the IFQ/Coop managed groundfish fishery operated in 2011 are subdivided below based on gear and target strategy:

Catch was delivered to shore-based processors (IFQ):

- Bottom trawl: Bottom trawl nets were used to catch a variety of groundfish species.
- Mid-water non-hake trawl: Midwater trawl nets were used to target mid-water non-hake species, primarily yellowtail rockfish.
- Pot: Pot gear was used to target groundfish species, primarily sablefish.
- Hook-and-line: Longlines were primarily used to target groundfish species, mainly sablefish.
- LE California halibut trawl: Bottom trawl nets were used to target California halibut by fishers holding a state California halibut permit and a LE federal trawl groundfish permit.
- Shoreside hake trawl: Midwater trawl nets were used to catch Pacific hake.

Catch was processed at-sea (Coop Program):

- At-sea motherships, mothership catcher vessels, and catcher-processors: Midwater trawl nets are used to catch Pacific hake. Catcher vessels deliver unsorted catch to a mothership. The catch is sorted and processed aboard the mothership. Catcher-processors catch and process at-sea.

The implementation of the 2011 IFQ management program resulted in changes to fishing regulations which, in turn, resulted in development of new methods for estimating fishing mortality under the IFQ fishery. For example, under the 2011 IFQ regulations:

- Vessels must carry NMFS observers on all IFQ fishing trips.
- Observer sampling priorities were shifted (e. g. non-IFQ species were only sampled every 3<sup>rd</sup> haul/set).
- The use of multiple gear types were allowed for fishing under a Federal groundfish trawl-endorsed permit (trawl or fixed gear).
- A limit of one (1) IFQ reporting area could be fished per trip.
- IFQs were established for a subset of groundfish managed under the Fishery Management Plan (FMP).

### Shore-based IFQ Sectors

Fleet-wide discard estimates for the shore-based IFQ sectors were derived from WCGOP observer data and fish ticket landings data (Figure 1). Fish tickets associated with the IFQ fishery were defined by analysts through an extensive quality control and review process of all available data sources, including those utilized for inseason management. For a description of the IFQ fishery, associated data sources, and observer data collection, see: <http://www.nwfsc.noaa.gov/research/divisions/fram/observer/>.

LE bottom trawl vessels can hold a California halibut bottom trawl permit and participate in the state-permitted California halibut fishery. California halibut tows can occur on the same trip as tows targeting IFQ groundfish and were identified 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 IFQ observer data that met at least one of the above requirements were included under the LE California halibut fishery and analyzed using methods for IFQ discard estimation. Tow targets are typically determined by the vessel captain.

Observer data from the IFQ fishery were stratified by sector, gear type, and management area (Table 1). If applicable and sample size permitted, we further stratified by season and depth. Records were separated into two groundfish management areas, north and south of 40° 10' N. latitude. Each management area was divided into three depth strata (0-125, 126-250, >250 fathoms). The depth strata used in the present analysis highlight the areas shoreward and seaward of RCA closures relevant in the fishery management framework and provide consistency



when evaluating discard or bycatch over time, as depth-based spatial closures change. Two-month cumulative trip limit periods were combined to form two seasonal strata: winter (November-April) and summer (May-October). Due to a limited number of observations, IFQ vessels fishing hook-and-line gear south of 40° 10' N. latitude were not stratified by season or depth. Lastly, observations from IFQ vessels fishing mid-water trawl gear targeting Pacific hake or other mid-water target species, and tows fished in the LE California halibut fishery were not post-stratified.

Despite the 100% observer coverage mandate in 2011, there were some rare occasions (e.g., observer illness) when tows or sets were either not sampled or only partially sampled. We used ratio estimators to apportion unsampled weight to specific species within each stratum. Values used to calculate the expanded weight of groundfish species from each WCGOP unsampled catch category in the 2011 IFQ fishery are presented in Tables 2a & b. Discard ratios and expansion factors are presented by season and depth. Winter season is January-April and November-December and summer season is May-October. Strata with no unsampled discard weight associated with them are not shown.

To obtain the estimated weight of a species ( $W$ ) when the entire haul or set was unsampled, the unsampled weight, summed across unsampled hauls within the stratum, was multiplied by the ratio of the weight of the species (summed across fully sampled hauls within a stratum) divided by the total weight of all species in all fully sampled hauls within a stratum:

$$W_{p,s} = \sum_p x_{p,s} \times \frac{\sum_f w_{f,s}}{\sum_f x_{f,s}}$$

where, for each stratum:

$s$  = stratum, which could include, area, depth, gear, and sector

$p$  = unsampled haul

$f$  = fully sampled haul

$x$  = weight of catch

$W$  = estimated weight of the species

$w$  = sampled weight of the species

The unsampled weight of partially sampled hauls or sets was categorized into weight of non-IFQ species (NIFQ) or IFQ species. Unsamped IFQ species weight was further categorized into IFQ flatfish (IFQFF), IFQ rockfish (IFQRF), IFQ roundfish (IFQRD) and IFQ mixed species (IFQM). IFQM included all 2011 IFQ managed species (see 76 FR 27508 for a listing of IFQ species in 2011). NIFQ included all species encountered that were not designated as an IFQ species in 2011 management.

Three WCGOP unsampled catch categories and associated species used in 2011 data only:

IFQFF

- Arrowtooth Flounder
- Butter Sole
- Curlfin Turbot
- Dover Sole
- English Sole
- Flatfish Unid
- Flathead Sole
- Pacific Halibut

IFQRF

- Aurora Rockfish
- Bank Rockfish
- Blackgill Rockfish
- Bocaccio Rockfish
- Canary Rockfish
- Chilipepper Rockfish
- Cowcod Rockfish
- Darkblotched Rockfish

Pacific Sanddab	Flag Rockfish
Petrale Sole	Greenspotted Rockfish
Rex Sole	Greenstriped Rockfish
Rock Sole	Halfbanded Rockfish
Sand Sole	Harlequin Rockfish
Sanddab Unid	Longspine Thornyhead
Starry Flounder	Pacific Ocean Perch
IFQRD	Pygmy Rockfish
Lingcod	Redbanded Rockfish
Pacific Cod	Redstripe Rockfish
Pacific Hake	Rockfish Unid
Sablefish	Rosethorn Rockfish
	Rosy Rockfish
	Rougheye Rockfish
	Sharpchin Rockfish
	Shortraker Rockfish
	Shortspine Thornyhead
	Silvergray Rockfish
	Splitnose Rockfish
	Spotted Rockfish Unid
	Squarespot Rockfish
	Starry Rockfish
	Stripetail Rockfish
	Widow Rockfish
	Yelloweye Rockfish
	Yellowmouth Rockfish
	Yellowtail Rockfish

To obtain the estimated weight of a species ( $W$ ) in partially sampled hauls or sets, the unsampled weight, summed across partially sampled hauls within the stratum, was multiplied by the ratio of the weight of the species (summed across fully sampled hauls within a stratum) divided by the weight of all species occurring within a category (NIFQ, IFQFF, IFQRF, IFQRD, IFQM) in all fully sampled hauls within a stratum. Estimated weight of the species was summed across unsampled categories and then added to the weight of the species that was sampled in the partially sampled hauls:

$$W_{p,s} = \sum_y \left( \sum_p x_{p,y,s} \times \frac{\sum_f w_{f,s}}{\sum_f x_{f,y,s}} \right) + \sum_p w_{p,s}$$

where, for each stratum:

$s$  = stratum, which could include, area, depth, gear, and sector

$y$  = unsampled category (either NIFQ, IFQFF, IFQRF, IFQRD, or IFQM)

$p$  = partially sampled haul

$f$  = fully sampled haul

$x$  = weight of catch

$W$  = estimated weight of the species

$w$  = sampled weight of the species

Expanded weights of a particular species obtained using the equations above for unsampled or partially sampled hauls were then added to the sampled weight of that species (from fully sampled hauls) within each stratum to obtain the total species-specific weight per stratum.

Coast-wide landings, sampled discard weight, estimated discard weight, and estimated fishing mortality in the 2011 shore-based non-hake IFQ sectors and the LE California halibut fishery are reported in Table 3a. We apply a 50% mortality rate to discarded sablefish and lingcod weight caught by IFQ bottom trawl and LE California halibut trawl sectors. These rates are historical legacy and assumptions from the GMT, previously used in the LE groundfish bottom trawl sector. We apply a 20% mortality rate to discarded sablefish caught by IFQ hook-and-line and pot gear. This rate is an assumption by the GMT, previously used in non-nearshore groundfish fixed gear sectors.

### **At-Sea Hake Coop Sectors**

The mid-water trawl fishery for Pacific hake/whiting is comprised of three at-sea processing fleets: catcher-processors, motherships (with non-tribal catcher boats), and a tribal fleet delivering to motherships. The objective of A-SHOP is to produce estimates of total catch (discard + retained) in the at-sea Pacific hake fishery. Discard and retained are not sampled separately; however, observers provide visual estimates of the proportions of catch that are discarded. These proportions form the basis of the retained and discarded catch amounts for the two at-sea hake sectors summarized in Table 3b.

Coast-wide landings or retained catch, sampled discard weight, estimated discard weight, and estimated fishing mortality in all 2011 Pacific hake IFQ/Coop Program sectors (shore-based and at-sea) are reported in Table 3b. The 2011 Pacific hake fleet which delivers to shore-based processors was observed by WCGOP under the IFQ fishery and discard was estimated in the same manner as described for the Shore-based IFQ Sectors (above). Prior to 2011, this fishery was conducted under an Exempted Fishing Permit (EFP).

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

For a description of the California halibut bottom trawl fishery, vessel selection, observer coverage, vessel waivers, and prior California halibut bottom trawl reports, see [http://www.nwfsc.noaa.gov/research/divisions/fram/observer/halibut\\_trawl.cfm](http://www.nwfsc.noaa.gov/research/divisions/fram/observer/halibut_trawl.cfm).

Fleet-wide discard estimates in the California halibut bottom trawl fishery were derived from WCGOP observer data and fish ticket landings data. All California halibut vessels are permitted by the state of California. However, limited entry (LE) vessels also have a federal limited entry groundfish permit, whereas open access (OA) vessels do not. The WCGOP provides observer coverage for the LE California halibut fishery under the shore-based IFQ fishery and isolates data for the LE California halibut fishery based on criteria listed in the previous section. The WCGOP randomly samples the OA California halibut fishery separately. Thus the two components (LE and OA) now have different sampling priorities, protocols, and selection design and therefore are analyzed separately.

Discard ratios were computed for the OA observed data using the retained weight of California halibut in the denominator. The fleet landed weight of California halibut was then used as a multiplier to expand observed discard ratios to the fleet (Table 4). Fleet-wide landings were compiled from OA trawl fish tickets (see Figure 1) for those vessels that had a state-issued California halibut bottom trawl permit.

Discard estimates were computed 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
- $\hat{D}_s$ : discard estimate for species  $s$

Table 4 presents estimated fishing mortalities of groundfish species caught in the 2011 OA California halibut trawl fishery. A 50% mortality rate was applied for discarded lingcod and sablefish, which is a historical legacy and assumption from the GMT in the LE bottom trawl sector.

### ***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 (Figure 1). For a description of the pink shrimp trawl fishery, vessel selection, observer coverage, vessel waivers, and prior pink shrimp trawl reports, see: [http://www.nwfsc.noaa.gov/research/divisions/fram/observer/shrimp\\_trawl.cfm](http://www.nwfsc.noaa.gov/research/divisions/fram/observer/shrimp_trawl.cfm).

Discard ratios for each state pink shrimp fishery were calculated by dividing the observed discard weight of each species or complex by the observed retained weight of pink shrimp (Table 5). The fleet landed weight of pink shrimp was used as a multiplier to expand observed discard ratios to the fleet. Table 5 presents landings, final discard estimates, and total fishing mortality in the 2011 individual state pink shrimp trawl fisheries.

Discard estimates for each state were computed 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 pink shrimp
- $F$ : weight of retained pink shrimp recorded on fish tickets
- $\hat{D}_s$ : discard estimate for species  $s$

In prior reports, pink shrimp fish tickets in the area north of 40°10' N. latitude were compiled for a single discard expansion factor, and south of 40°10' N. latitude landings were summarized as part of the remaining incidental fisheries. Previously, observer data from all state pink shrimp fleets in the north were combined to calculate discard rates. However, WCGOP coverage of the Washington pink shrimp fleet began in 2010 and coverage of all state fisheries in 2011 was sufficient to further stratify the analysis by state.

## ***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. For a description of the fixed gear sectors, vessel selection, observer coverage, vessel waivers, and prior fixed gear sector reports, see: [http://www.nwfsc.noaa.gov/research/divisions/fram/observer/fixed\\_gear.cfm](http://www.nwfsc.noaa.gov/research/divisions/fram/observer/fixed_gear.cfm).

Fish tickets for fixed gear that did not have recorded sablefish or nearshore species were included in the non-nearshore fixed gear sector only if groundfish landings were greater than non-groundfish landings based on a unique vessel and landing date (Figure 1). If non-groundfish landings were greater than groundfish landings, those fixed gear fish tickets (which also did not have recorded sablefish or nearshore species) were summarized in Table 14 incidental landings. The commercial fixed gear fish tickets with recorded nearshore species weight were not used in this portion of the 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 associated with the Pacific halibut directed commercial fishery were isolated and removed from our analyses based on landed catch of Pacific halibut recorded on the fish ticket on the day of the opening or within two subsequent days.

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

Data used in our analyses were collected by WCGOP from the following fixed gear subsectors in order of priority: LE sablefish endorsed primary season fixed gear, LE '0' tier (non-endorsed), and OA fixed gear (non-nearshore). LE sablefish endorsed vessels that were fishing outside of the primary season or that had reached their cumulative tier quota in the primary season were not observed.

Observer data were stratified by subsector, area, and gear type (where applicable) (Tables 6-8). Area strata (north and south of 36° N. latitude) are based on PFMC area management for sablefish trip limits. Gear type was defined as longline gear or pot/trap gear. 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 non-sablefish endorsed fixed gear subsector landed 25.6 mt of groundfish with pot gear in 2011 (Table 7). Given similarities in gear type and catch composition, OA fixed gear pot data were selected as the most appropriate source of information to compute a discard ratio, which was then multiplied by the LE non-sablefish endorsed fixed gear pot landings to generate estimated discard.

Explicit depth stratification of fixed gear fishing effort is not possible because there are no fleet-wide estimates of fishing depths. However, 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.

The number of observed vessels, trips, and sets are summarized for each subsector in Tables 6-8, along with sablefish and FMP groundfish fleet landings (excluding Pacific hake) used as a measure for expanding discard from observed trips to the entire fleet. Retained groundfish was used as the denominator rather than sablefish weight alone because generally fixed gear fisheries south of 36° N. latitude have a wider range of target species. A broader denominator was therefore necessary to effectively capture fishing effort south of 36° N. latitude or in coast-wide calculations. Stratum estimated discard for all subsectors were then summed for each area and summed coast-wide.

Coast-wide landings, final discard estimates, and estimated fishing mortality are reported in Table 9 for 2011 LE and OA non-nearshore groundfish fixed gear. A 20% mortality rate is applied for discarded sablefish, as assumed by the GMT.

### ***Nearshore Fixed Gear Sector***

Fleet-wide discard estimates for the commercial nearshore fixed gear sector of the groundfish fishery were derived from WCGOP observer data, fish ticket landings data (Figure 1), and mortality rates provided by the GMT. For a description of the nearshore fixed gear sector, vessel selection, observer coverage, vessel waivers, and prior nearshore fixed gear sector reports, see: <http://www.nwfsc.noaa.gov/research/divisions/fram/observer/>.

The WCGOP provides coverage for the commercial nearshore fisheries in California and Oregon based on a selection process of state-issued nearshore permits/licenses. Although California and Oregon nearshore fisheries are sampled separately for observer coverage, fleet-wide discard estimates are provided for the areas north and south of the groundfish management line at 40° 10' N. latitude, in accordance with 2010 federal groundfish management specifications.

Mortality rates provided by the GMT differ for each species according to depth. In December 2007, the GMT provided a slightly revised suite of depth-specific discard survival assumptions for nearshore species. It was therefore necessary to generate discard estimates in each of the three depth intervals employed by the GMT (0-10, 11-20, > 20 fathoms). The percentage of catch for each species or complex by depth was calculated based on summarized observer data from 2003-2011 (Table 10). Fleet landings of each nearshore species or complex in 2011 were then distributed among depth intervals using the percentages computed in the previous step. Finally, the total distributed landed weight of all nearshore groundfish species within each depth stratum was used to expand observed discard to the fleet level.

Prior to the calculation of discard ratios in this sector, WCGOP observer data were stratified by area and depth (Table 11). In the area north of 40° 10' N. latitude, data were combined in the two deepest depth strata (11-20 and > 20 fathoms) to ensure an adequate sample size and that confidentiality requirements were met (i.e., number of vessels per stratum  $\geq$  3). Discard ratios were calculated by dividing the stratum discard weight of each species or complex by the retained weight of nearshore species.

Observed discard ratios were multiplied by the allocated landed weight of all nearshore groundfish species within each depth stratum (Table 11). These fleet-level estimates of gross discard within each stratum were then multiplied by depth-specific discard mortality rates (provided by the GMT) to generate estimates of discard mortality in each stratum (Table 12a & b). If provided, a species-specific discard mortality rate was applied in preference to a complex or group rate. Final discard estimates for each area were obtained by summing estimates of discard mortality across depth strata. Gross discard estimates, discard mortality rates, estimated discard mortality, and fishing mortality estimates in the 2011 nearshore fixed gear sectors north and south of 40° 10' N. latitude are reported in Tables 12a & b.

## **Other Commercial Data Summaries**

Landings of groundfish species from the WA tribal shore-based fisheries are summarized in Table 15. The WA tribal summary is based exclusively on fish ticket data. Discard estimates for WA tribal shore-based fisheries were not available. Tribal directed groundfish fisheries employ full retention requirements. In addition, full retention is monitored by a target tribal observation rate of 15% for Makah trawl fisheries. Discard mortality of fixed gear sablefish is accounted for in tribal management by reducing the tribal allocation to account for discard mortality. For more information on discard and retention in tribal sablefish fisheries and Makah trawl observations, see Appendix B of the 2011-2012 groundfish harvest specifications (PFMC and NMFS 2011). The at-sea hake tribal sector must operate within defined boundaries in waters off northwest Washington. The catch can be delivered to a contracted mothership by catcher vessels for processing or be caught and processed by a contracted catcher-processor. Washington at-sea tribal data in Table 15 were summarized from the A-SHOP.

Groundfish species catch from the recreational fisheries are summarized in Table 15, based exclusively on data provided by the Washington Department of Fish and Wildlife, the Oregon Department of Fish and Wildlife, and the California Department of Fish and Game. State agencies provide catch weight (discarded + retained) estimates with PFMC-approved depth dependent mortality rates applied to account for discard mortality.

Research catch of groundfish species is summarized in Table 15, based on data provided by the NOAA Northwest Regional Office. Catch weight (discarded + retained) was summarized from reporting of scientific research permits that directly or indirectly caught groundfish off the U.S. west coast. Catch varies by research permit, including but not limited to: catch from permits with only retained catch, tagging study catch where all fish were released alive, and combined discarded and retained catch. Research catch was summarized for all gear types employed.

Landings of groundfish species from other non-groundfish fisheries operating under federal open access landing limits, which are mostly state-managed and incidentally catch groundfish, are also summarized in Table 15 as 'Incidental fisheries'. A more detailed breakdown of incidental landings by PacFIN gear group is provided in Table 14. Catch summaries of incidental fisheries were based exclusively on fish ticket data.

Bycatch estimation and summaries for several additional fish species observed by the WCGOP and A-SHOP are available in separate reports; Pacific halibut is provided in Jannot et al. 2012, salmon species are provided in Al-Humaidhi et al. 2012a, and green sturgeon and Pacific eulachon are provided in Al-Humaidhi et al. 2012b.

## **Results**

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In Table 16, fishing mortality estimates are evaluated in terms of 2011 ACL, ABC, and OFL harvest specifications from federal groundfish regulations (50 CFR 660 Subpart G). This was the first year of newly defined harvest specifications, which deviated from the prior use of Optimum Yield (OY), etc. The newly set 2011 ACL, ABC, or OFL harvest goals for all groundfish species or complexes were not exceeded by fishing mortality estimates presented in this report. However, the estimated fishing mortality for five species were above 90% of their 2011 ACL goals: nearshore complex of minor rockfish - north of 40°10' N. lat. (99.8%), petrale sole (98%), sablefish - north of 36° N. lat. (97%), cabezon – Oregon (96%), sablefish - south of 36° N. lat. (94%). In contrast, the majority of groundfish species or complexes (71%) had fishing mortality estimates which were less than 50% of 2011 ACL harvest goals.

Although all were below harvest goals, a majority (55%) of the groundfish species or complexes showed an increase in estimated fishing mortality in 2011 relative to 2010. This is the opposite trend demonstrated in 2010 groundfish fishing mortality estimates relative to 2009, where 57% decreased (Bellman et al. 2011).

The nearshore complex of minor rockfish north of 40°10' N. latitude represented the closest attainment of an ACL goal in 2011 (99.8%). In 2011 relative to 2010, this complex demonstrated an increase in landings, both in the nearshore fixed gear sector and in the Oregon and California recreational catch, which resulted in a higher estimated fishing mortality. This increase was not the result of higher discard of these species in the nearshore fixed gear fishery.

However, all flatfish species had decreased estimated fishing mortality in 2011 relative to 2010. The exception was a 2% increase in the estimated mortality of petrale sole (953 vs 936 mt), which is under a rebuilding plan. The largest contribution of petrale sole fishing mortality was landed catch weight from the shore-based non-hake IFQ sector fishing bottom trawl gear.

Also, many slope rockfish species and the slope rockfish complex north of 40°10' N. lat. demonstrated decreased fishing mortality in 2011 relative to 2010 (-61%). Slope species with decreased mortality included darkblotched rockfish (-40%) and Pacific Ocean Perch (-39%) which are under rebuilding plans. This was the first time in the last three years that darkblotched rockfish did not exceed its harvest goal (over 1% in 2010, 6% in 2009; Bellman et al. 2011, Bellman et al. 2010). Longspine and shortspine thornyheads in the area north of 34°27' N. latitude had a marked decrease as well (-56% and -63% respectively). This was also the first time in the last three years that longnose skate did not exceed its harvest goal (over 3% in 2010, 8% in 2009; Bellman et al. 2011, Bellman et al. 2010).

For the past three years, sablefish mortality north of 36° N. latitude continues the trend of decreasing, and in contrast, sablefish mortality south of 36° N. latitude continues to increase. In both areas, sablefish mortality continues to be estimated very close to the harvest goal each year. For example, if GMT discard mortality rates were not applied, sablefish fishing mortality estimates would have exceeded the ACL north of 36° N. latitude in 2011.

As with all point estimates, mortality values presented in Tables 15 and 16 should be considered with caution. It should be noted that multiple sources of uncertainty were not accounted for in this analysis and might influence mortality estimates. Sources of uncertainty include, but are not limited to: species composition sampling of landed catch, observed retained weights, and discard mortality rates. However, standard errors have been provided for observed discard ratios.

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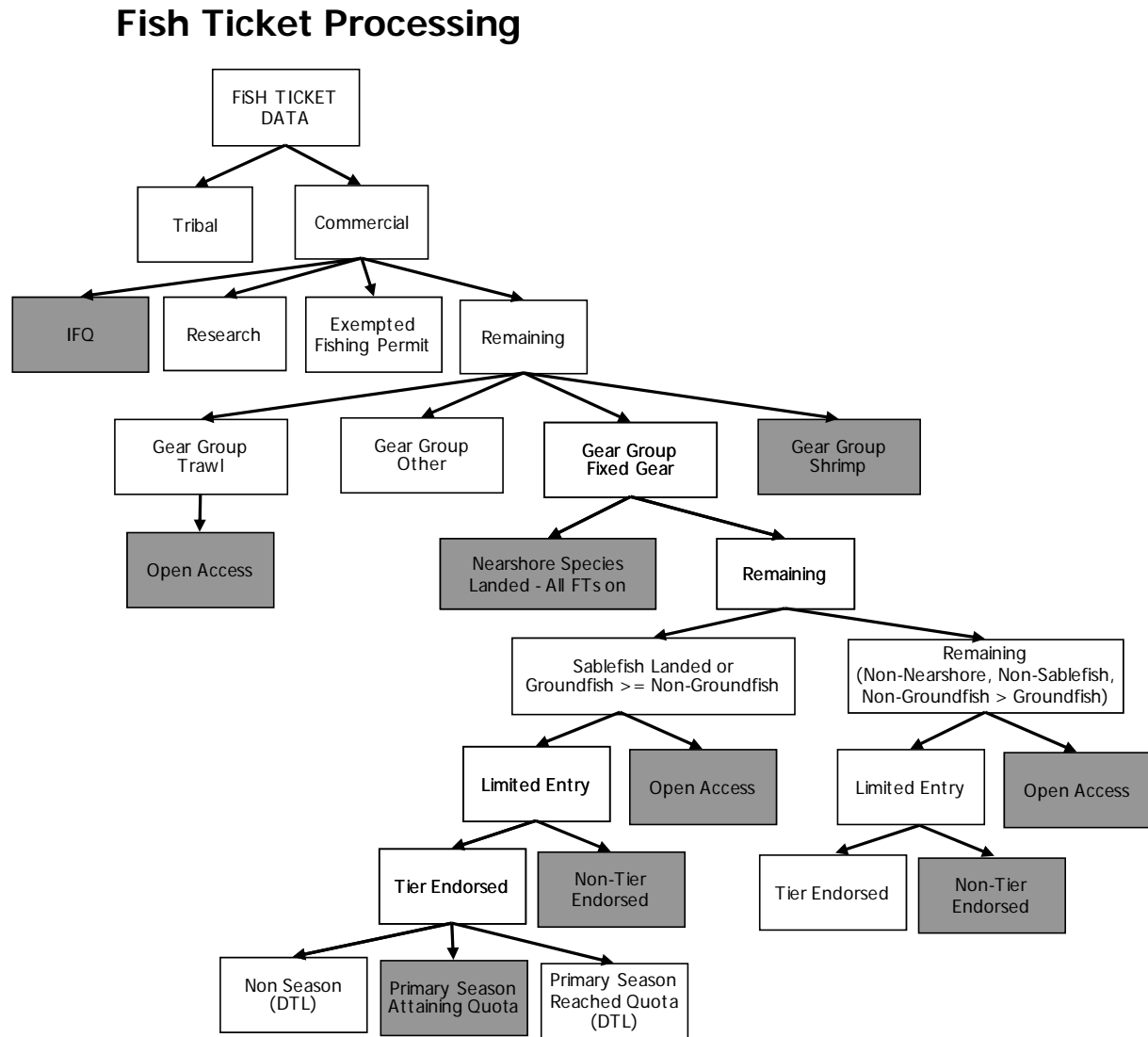
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## Figures

**Figure 1.** Fish ticket 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 (query date 05-04-2012). Grey highlight indicates sectors for which federal observer data are available.



## Tables

Note: In all tables, (--) was used when there is no actual numeric value (i.e. the species was neither caught nor discarded). Values appear as 0.0 when a value exists but is smaller than the decimal places allotted. A value of NA represents that the calculation is not applicable for a particular species or strata, or that the calculation did not produce a result (e.g. very small values might result in NA from a standard error calculation).

**Table 1.** Number of vessels, trips and hauls from WCGOP observer data for the 2011 IFQ fishery by gear, latitudinal management area, season and depth. Data are combined as needed to ensure confidentiality requirements and a reasonable number of observations. Winter season is January-April and November-December and summer season is May-October.

				Num. of observed vessels	Num. of observed trips	Num. of observed hauls	Num. of sampled hauls	% of hauls sampled	Num. of unsampled hauls with Category					
									IFQ Flatfish	IFQ Roundfish	IFQ Rockfish	IFQ Mixed	Non-IFQ Species	All Species
<b>Trawl - Bottom + Midwater</b>	<b>North of 40°10' N</b>	Winter	0-125	6	28	232	222	95.7%	0	0	0	0	10	0
			126-250	44	261	961	847	88.1%	1	0	4	4	100	11
			> 250	48	383	2,177	2,040	93.7%	1	1	3	11	124	11
		Summer	0-125	22	173	1,981	1,857	93.7%	18	0	2	8	88	25
			126-250	36	236	980	949	96.8%	1	0	3	6	27	4
			> 250	36	280	1,371	1,323	96.5%	1	0	2	0	42	6
	<b>South of 40°10' N</b>	Winter	0-125	5	10	23	22	95.7%	1	0	0	0	1	0
			126-250	8	37	108	105	97.2%	0	0	1	0	3	0
			> 250	8	51	191	187	97.9%	0	0	0	0	4	0
		Summer	0-125	8	83	393	381	96.9%	5	0	0	0	8	0
			126-250	12	81	190	185	97.4%	0	0	2	0	4	1
			> 250	13	127	537	520	96.8%	0	0	1	0	15	2
<b>Hook and Line</b>	<b>North of 40°10' N</b>	Annual	0-250	6	18	271	262	96.7%	0	0	8	0	0	1
			> 250	4	13	140	140	100.0%	0	0	0	0	0	0
	<b>South of 40°10' N</b>	Annual	All depths	6	71	212	211	99.5%	0	0	0	0	1	0
<b>Pot</b>	<b>North of 40°10' N</b>	Annual	0-250	6	49	425	422	99.3%	0	0	1	0	0	2
			> 250	7	55	354	353	99.7%	0	0	0	0	1	0
	<b>South of 40°10' N</b>	Annual	0-250	3	21	80	80	100.0%	0	0	0	0	0	0
			> 250	11	137	658	656	99.7%	0	0	0	0	2	0
<b>LE CA halibut</b>	<b>South of 40°10' N</b>	Annual	All depths	3	63	157	155	98.7%	0	0	0	0	2	0
<b>Shoreside Hake</b>	<b>North of 40°10' N</b>	Annual	All depths	26	913	1,701	1,699	99.9%	0	0	0	0	2	0

**Table 2a.** Values used to calculate the expanded weight of groundfish species from each WCGOP unsampled catch category in the 2011 IFQ fishery using bottom trawl gear north of 40°10' N latitude. Discard ratios and expansion factors are presented by season and depth. Winter season is January-April and November-December and summer season is May-October. Strata with no unsampled discard weight associated with them are not shown. Unsampled catch weight could be assigned to the categories: IFQ flatfish species (IFQFF), IFQ rockfish species (IFQRF), IFQ roundfish species (IFQRD), IFQ mixed species (IFQM), non-IFQ species (NIFQ), or all species (IFQ & non-IFQ). See text for a list of species included in each unsampled category.

IFQ Fishery - Bottom Trawl North of 40°10' N Lat.		IFQFF			IFQRF			IFQRD	IFQM			NIFQ			All Species		
		Depth (fm)			Depth (fm)			Depth (fm)	Depth (fm)			Depth (fm)			Depth (fm)		
		0-125	126-250	≥ 250	0-125	126-250	≥ 250	≥ 250	0-125	126-250	≥ 250	0-125	126-250	≥ 250	0-125	126-250	≥ 250
		Expansion Factor (mt)			Discard ratio			Discard ratio	Discard ratio			Discard ratio			Discard ratio		
	summer	2.2101	0.6804	0.0093	7.8150	0.3215			0.4627	0.0068	0.0454	9.6152	1.7678	3.0808	8.3174	5.6883	0.6781
	winter		0.0136	0.0272		0.8165	3.6735	0.0009		0.0993	0.0064	1.1872	17.9307	9.1149		3.1760	2.4681
		Discard ratio			Discard ratio			Discard ratio	Discard ratio			Discard ratio			Discard ratio		
<b>Rebuilding species</b>	<b>Season</b>																
Canary rockfish	summer	--	--	--	0.0005	0.0000	--	--	0.0504	0.0008	--	--	--	--	0.0002	0.0000	--
	winter	--	--	--	0.0022	0.0036	--	--	0.2311	0.0887	0.0075	--	--	--	0.0010	0.0019	0.0004
Darkblotched rockfish	summer	--	--	--	--	0.0034	0.0007	--	--	0.0751	0.0052	--	--	--	--	0.0010	0.0002
	winter	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pacific Ocean Perch (North of 40°10' N. lat.)	summer	--	--	--	0.0001	0.0006	--	--	0.0116	0.0155	0.0009	--	--	--	0.0001	0.0003	0.0001
	winter	--	--	--	--	0.0024	0.0001	--	--	0.0541	0.0011	--	--	--	--	0.0007	0.0000
Petrale sole	summer	0.0487	0.0001	0.0020	0.0380	0.0001	--	--	--	--	--	--	--	--	0.0177	0.0000	0.0002
	winter	--	0.0034	0.0044	--	0.0018	0.0024	--	--	--	--	--	--	--	--	0.0005	0.0006
Yelloweye rockfish	summer	--	--	--	0.0000	--	--	--	0.0020	--	--	--	--	--	0.0000	--	--
<b>Other groundfish species</b>	<b>Season</b>																
Arrowtooth flounder	summer	0.3978	0.8083	0.2516	0.3099	0.4861	--	--	--	--	--	--	--	--	0.1443	0.2473	0.0236
	winter	--	0.6906	0.6536	--	0.3544	0.3583	--	--	--	--	--	--	--	--	0.1086	0.0942
Black rockfish (South of 46°16' N. lat.)	summer	--	--	--	--	--	--	--	--	--	--	--	0.0001	--	--	0.0000	--
	winter	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dover sole	summer	0.0338	0.0257	0.6660	0.0264	0.0155	--	--	--	--	--	--	--	--	0.0123	0.0079	0.0626
	winter	--	0.0350	0.1970	0.0000	0.0179	0.1080	--	--	--	--	--	--	--	--	0.0055	0.0284
English sole	summer	0.0835	0.0001	0.0003	0.0650	0.0000	--	--	--	--	--	--	--	--	0.0303	0.0000	0.0000
	winter	--	0.0012	0.0004	--	0.0006	0.0002	--	--	--	--	--	--	--	--	0.0002	0.0001
Lingcod (North of 42° N. lat.)	summer	--	--	--	0.1185	0.0066	--	--	--	--	--	--	--	--	0.0552	0.0034	0.0005
	winter	--	--	--	--	0.0019	0.0001	0.0002	--	--	--	--	--	--	--	0.0006	0.0000
Lingcod (South of 42° N. lat.)	summer	--	--	--	0.0009	--	--	--	--	--	--	--	--	--	0.0004	--	--
	winter	--	--	--	--	0.0000	--	--	--	--	--	--	--	--	--	0.0000	--
Longnose skate	summer	--	--	--	--	--	--	--	--	--	--	0.0306	0.1462	0.0436	0.0163	0.0718	0.0344
	winter	--	--	--	--	--	--	--	--	--	--	0.0113	0.0544	0.0462	--	0.0378	0.0341
Longspine thornyhead (North of 34°27' N. lat.)	summer	--	--	--	--	0.0028	--	--	--	0.0692	0.8716	--	--	--	--	0.0014	0.0481
	winter	--	--	--	--	0.0015	0.1089	--	--	0.0336	0.8386	--	--	--	--	0.0005	0.0286
Minor nearshore rockfish (North of 40°10' N. lat.)	summer	--	--	--	--	--	--	--	--	--	--	0.0001	--	--	0.0000	--	--
Quillback Rockfish	summer	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Minor shelf rockfish (North of 40°10' N. lat.)	summer	--	--	--	--	--	--	--	--	--	0.0000	--	--	--	--	--	0.0000
	winter	--	--	--	--	--	0.0010	--	--	--	0.0078	--	--	--	--	--	0.0003
Chilipepper Rockfish	summer	--	--	--	--	0.0000	--	--	--	0.0001	--	--	--	--	--	0.0000	--
	winter	--	--	--	--	0.0000	--	--	--	0.0001	--	--	--	--	--	0.0000	--
Flag Rockfish	summer	--	--	--	--	0.0000	--	--	--	0.0001	--	--	--	--	--	0.0000	--
	winter	--	--	--	--	0.0000	--	--	--	0.0001	--	--	--	--	--	0.0000	--
Greenspotted Rockfish	summer	--	--	--	0.0000	0.0000	--	--	0.0015	0.0001	--	--	--	--	0.0000	0.0000	--
	winter	--	--	--	0.0045	0.0003	--	--	0.4803	0.0083	0.0000	--	--	--	0.0021	0.0002	0.0000
Greenstriped Rockfish	summer	--	--	--	--	0.0004	0.0001	--	--	0.0082	0.0004	--	--	--	--	0.0001	0.0000
	winter	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Harlequin Rockfish	summer	--	--	--	0.0000	--	--	--	0.0001	--	--	--	--	--	0.0000	--	--
	winter	--	--	--	0.0000	0.0000	--	--	0.0013	0.0000	--	--	--	--	0.0000	0.0000	--
Redstripe Rockfish	summer	--	--	--	--	0.0002	0.0000	--	--	0.0046	0.0002	--	--	--	--	0.0001	0.0000
	winter	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Rockfish Unid	summer	--	--	--	0.0000	--	--	--	0.0003	--	--	--	--	--	0.0000	--	--
	winter	--	--	--	0.0000	0.0010	--	--	0.0051	0.0248	0.0009	--	--	--	0.0000	0.0005	0.0000
Rosethorn Rockfish	summer	--	--	--	--	0.0032	0.0002	--	--	0.0721	0.0013	--	--	--	--	0.0010	0.0000
	winter	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Rosy Rockfish	summer	--	--	--	--	0.0000	--	--	--	0.0001	--	--	--	--	--	0.0000	--
	winter	--	--	--	--	0.0001	0.0000	--	--	0.0033	0.0001	--	--	--	--	0.0000	0.0000
Silvergray Rockfish	summer	--	--	--	0.0000	0.0000	--	--	0.0006	0.0004	--	--	--	--	0.0000	0.0000	--
	winter	--	--	--	0.0000	--	--	--	0.0006	--	--	--	--	--	0.0000	--	--
Stary Rockfish	summer	--	--	--	0.0002	--	--	--	0.0263	--	--	--	--	--	0.0001	--	--
	winter	--	--	--	--	0.0000	0.0000	--	--	0.0000	0.0000	--	--	--	--	0.0000	0.0000

Table 2a (continued).

IFQ Fishery - Bottom Trawl North of 40°10' N Lat.		IFQFF			IFQRF			IFQRD	IFQM			NIFQ			All Species		
		Depth (fm)			Depth (fm)			Depth (fm)	Depth (fm)			Depth (fm)			Depth (fm)		
		0-125	126-250	≥ 250	0-125	126-250	≥ 250	≥ 250	0-125	126-250	≥ 250	0-125	126-250	≥ 250	0-125	126-250	≥ 250
		2.2101	0.6804	0.0093	7.8150	0.3215			0.4627	0.0068	0.0454	9.6152	1.7678	3.0808	8.3174	5.6883	0.6781
Expansion Factor (mt)		0.0136	0.0272	0.8165	3.6735		0.0009	0.0993	0.0064	1.1872	17.9307	9.1149		3.1760	2.4681		
		Discard ratio			Discard ratio			Discard ratio	Discard ratio			Discard ratio			Discard ratio		
Minor slope rockfish (North of 40°10' N. lat.)																	
Aurora Rockfish	summer	--	--	--	0.0001	0.0086	--	--	0.0061	0.2102	0.0115	--	--	--	0.0000	0.0044	0.0006
	winter	--	--	--	--	0.0057	0.0024	--	--	0.1257	0.0188	--	--	--	--	0.0017	0.0006
Bank Rockfish	summer	--	--	--	--	0.0000	--	--	--	0.0001	--	--	--	--	--	0.0000	--
	winter	--	--	--	--	0.0000	--	--	--	0.0010	0.0000	--	--	--	--	0.0000	0.0000
Blackgill Rockfish	summer	--	--	--	--	0.0001	0.0001	--	--	0.0016	0.0004	--	--	--	--	0.0000	0.0000
	winter	--	--	--	0.0001	0.0011	--	--	0.0100	0.0256	0.0005	--	--	--	0.0000	0.0005	0.0000
Redbanded Rockfish	summer	--	--	--	--	0.0010	0.0001	--	--	0.0222	0.0005	--	--	--	--	0.0003	0.0000
	winter	--	--	--	--	0.0013	--	--	--	0.0325	0.0000	--	--	--	--	0.0007	0.0000
Rockfish Unid	summer	--	--	--	--	0.0017	--	--	--	0.0382	--	--	--	--	--	0.0005	--
	winter	--	--	--	0.0000	0.0000	--	--	0.0012	0.0007	0.0009	--	--	--	0.0000	0.0000	0.0001
Rougheye Rockfish	summer	--	--	--	--	0.0001	0.0000	--	--	0.0025	0.0002	--	--	--	--	0.0000	0.0000
	winter	--	--	--	0.0001	0.0004	--	--	0.0061	0.0103	0.0007	--	--	--	0.0000	0.0002	0.0000
Sharpchin Rockfish	summer	--	--	--	--	0.0016	0.0000	--	--	0.0365	0.0001	--	--	--	--	0.0005	0.0000
	winter	--	--	--	--	0.0001	--	--	--	0.0017	0.0002	--	--	--	--	0.0000	0.0000
Shortraker Rockfish	summer	--	--	--	--	--	0.0001	--	--	--	0.0011	--	--	--	--	--	0.0000
	winter	--	--	--	--	0.0000	--	--	--	0.0001	--	--	--	--	--	0.0000	--
Shortraker/Rougheye Rockfish	summer	--	--	--	0.0013	0.0123	--	--	0.1389	0.3000	0.0027	--	--	--	0.0006	0.0063	0.0001
	winter	--	--	--	--	0.0145	0.0007	--	--	0.3224	0.0052	--	--	--	--	0.0044	0.0002
Splitnose Rockfish	summer	--	--	--	--	0.0000	--	--	--	0.0006	--	--	--	--	--	0.0000	--
	winter	--	--	--	--	0.0022	--	--	--	0.0539	0.0460	--	--	--	--	0.0011	0.0025
Mixed thornyheads	summer	--	--	--	--	0.0016	0.0103	--	--	0.0351	0.0791	--	--	--	--	0.0005	0.0027
	winter	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other flatfish	summer	0.0033	--	--	0.0026	--	--	--	--	--	--	--	--	--	0.0012	--	--
	winter	--	0.0000	--	--	0.0000	--	--	--	--	--	--	--	--	--	0.0000	--
Butter Sole	summer	0.0003	--	--	0.0002	--	--	--	--	--	--	--	--	--	0.0001	--	--
	winter	--	0.0000	--	--	0.0000	--	--	--	--	--	--	--	--	--	0.0000	--
Curlfin Turbot	summer	0.0010	0.0001	0.0006	0.0008	0.0001	--	--	--	--	--	--	--	--	0.0004	0.0000	0.0001
	winter	--	--	0.0011	--	--	0.0006	--	--	--	--	--	--	--	--	--	0.0002
Flatfish Unid	summer	0.0111	0.0000	0.0001	0.0087	0.0000	--	--	--	--	--	--	--	--	0.0040	0.0000	0.0000
	winter	--	0.0001	0.0000	--	0.0001	0.0000	--	--	--	--	--	--	--	--	0.0000	0.0000
Flathead Sole	summer	0.2291	0.0000	0.0001	0.1785	0.0000	--	--	--	--	--	--	--	--	0.0831	0.0000	0.0000
	winter	--	0.0000	0.0000	--	0.0000	0.0000	--	--	--	--	--	--	--	--	0.0000	0.0000
Pacific Sanddab	summer	0.0756	0.0066	0.0091	0.0589	0.0040	--	--	--	--	--	--	--	--	0.0274	0.0020	0.0009
	winter	--	0.0037	0.0015	--	0.0019	0.0008	--	--	--	--	--	--	--	--	0.0006	0.0002
Rex Sole	summer	0.0005	--	--	0.0004	--	--	--	--	--	--	--	--	--	0.0002	--	--
	winter	0.0010	--	--	0.0008	--	--	--	--	--	--	--	--	--	0.0004	--	--
Rock Sole	summer	0.0010	--	--	0.0008	--	--	--	--	--	--	--	--	--	0.0004	--	--
	winter	0.0010	--	--	0.0008	--	--	--	--	--	--	--	--	--	0.0004	--	--
Sand Sole	summer	0.0010	--	--	0.0008	--	--	--	--	--	--	--	--	--	0.0004	--	--
	winter	0.0010	--	--	0.0008	--	--	--	--	--	--	--	--	--	0.0004	--	--
Other groundfish	summer	--	--	--	--	--	--	--	--	--	--	0.0716	0.0001	0.0001	0.0383	0.0001	0.0000
	winter	--	--	--	--	--	--	--	--	--	--	0.1499	0.0007	0.0001	--	0.0005	0.0001
Big Skate	summer	--	--	--	--	--	--	--	--	--	--	0.0000	--	--	0.0000	--	--
	winter	--	--	--	--	--	--	--	--	--	--	--	0.0001	0.0000	--	0.0000	0.0000
Cabezon	summer	--	--	--	--	--	--	--	--	--	--	--	0.0005	0.0002	--	0.0004	0.0002
	winter	--	--	--	--	--	--	--	--	--	--	0.0001	--	--	0.0001	--	--
California Skate	summer	--	--	--	--	--	--	--	--	--	--	0.0003	--	--	--	--	--
	winter	--	--	--	--	--	--	--	--	--	--	--	0.0001	0.0041	--	0.0000	0.0032
Kelp Greenling	summer	--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0040	--	0.0000	0.0029
	winter	--	--	--	--	--	--	--	--	--	--	--	0.0014	0.0844	--	0.0007	0.0665
Pacific Flatnose	summer	--	--	--	--	--	--	--	--	--	--	--	0.0003	0.0405	--	0.0002	0.0298
	winter	--	--	--	--	--	--	--	--	--	--	0.0000	--	0.0000	0.0000	--	0.0000
Pacific Grenadier	summer	--	--	--	--	--	--	--	--	--	--	0.0000	--	0.0000	--	--	0.0000
	winter	--	--	--	--	--	--	--	--	--	--	0.0004	--	0.0000	--	--	0.0000
Roundfish Unid	summer	--	--	--	--	--	--	--	--	--	--	0.0858	0.1129	0.0059	0.0459	0.0555	0.0047
	winter	--	--	--	--	--	--	--	--	--	--	0.1153	0.0345	0.0040	--	0.0239	0.0029
Southern Shark	summer	--	--	--	--	--	--	--	--	--	--	0.0128	0.0033	0.0013	0.0069	0.0016	0.0010
	winter	--	--	--	--	--	--	--	--	--	--	--	0.0002	0.0043	--	0.0001	0.0032
Spotted Ratfish	summer	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	winter	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Unspecified Skate	summer	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	winter	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 2a (continued).

IFQ Fishery - Bottom Trawl North of 40°10' N Lat.		IFQFF			IFQRF			IFQRD	IFQM			NIFQ			All Species			
		Depth (fm)			Depth (fm)			Depth (fm)	Depth (fm)			Depth (fm)			Depth (fm)			
		0-125	126-250	≥ 250	0-125	126-250	≥ 250	≥ 250	0-125	126-250	≥ 250	0-125	126-250	≥ 250	0-125	126-250	≥ 250	
Expansion Factor (mt)		summer	2.2101	0.6804	0.0093	7.8150	0.3215		0.4627	0.0068	0.0454	9.6152	1.7678	3.0808	8.3174	5.6883	0.6781	
		winter		0.0136	0.0272		0.8165	3.6735	0.0009		0.0993	0.0064	1.1872	17.9307	9.1149		3.1760	2.4681
			Discard ratio			Discard ratio			Discard ratio			Discard ratio			Discard ratio			
Pacific cod	summer	--	--	--	0.0000	--	--	--	--	--	--	--	--	--	0.0000	--	--	
	winter	--	--	--	--	0.0000	--	--	--	--	--	--	--	--	--	0.0000	--	
Pacific hake	summer	--	--	--	0.0818	0.3478	--	--	--	--	--	--	--	--	0.0381	0.1769	0.0600	
	winter	--	--	--	--	0.4373	0.3134	0.9734	--	--	--	--	--	--	--	0.1340	0.0824	
Sablefish (North of 36° N. lat.)	summer	--	--	--	0.0103	0.0030	--	--	--	--	--	--	--	--	0.0048	0.0016	0.0024	
	winter	--	--	--	--	0.0027	0.0085	0.0264	--	--	--	--	--	--	--	0.0008	0.0022	
Shortspine thornyhead (North of 34°27' N. lat.)	summer	--	--	--	0.0001	0.0064	--	--	0.0148	0.1552	0.0561	--	--	--	0.0001	0.0032	0.0031	
	winter	--	--	--	--	0.0072	0.0049	--	--	0.1609	0.0381	--	--	--	--	0.0022	0.0013	
Spiny dogfish	summer	--	--	--	--	--	--	--	--	--	--	0.2451	0.1657	0.0042	0.1310	0.0814	0.0033	
	winter	--	--	--	--	--	--	--	--	--	--	0.1527	0.6861	0.0968	--	0.4759	0.0713	
Starry flounder	summer	0.0022	0.0001	--	0.0017	0.0001	--	--	--	--	--	--	--	--	0.0008	0.0000	--	
	winter	--	0.0000	--	--	0.0000	--	--	--	--	--	--	--	--	--	0.0000	--	
Widow rockfish	summer	--	--	--	0.0001	0.0000	--	--	0.0109	0.0009	0.0004	--	--	--	0.0000	0.0000	0.0000	
	winter	--	--	--	--	0.0001	0.0001	--	--	0.0025	0.0006	--	--	--	--	0.0000	0.0000	
Yellowtail rockfish (North of 40°10' N. lat.)	summer	--	--	--	0.0000	--	--	--	0.0006	--	--	--	--	--	0.0000	--	--	
	winter	--	--	--	--	0.0000	0.0002	--	--	0.0005	0.0013	--	--	--	--	0.0000	0.0000	
<b>Non-groundfish species</b>		<b>Season</b>																
Dungeness crab	summer	--	--	--	--	--	--	--	--	--	--	0.3478	0.0067	0.0001	0.1859	0.0033	0.0001	
	winter	--	--	--	--	--	--	--	--	--	--	0.4024	0.0020	0.0001	--	0.0014	0.0001	
Non-FMP flatfish																		
Deepsea Sole	summer	--	--	--	--	--	--	--	--	--	--	--	0.0028	0.0295	--	0.0014	0.0232	
	winter	--	--	--	--	--	--	--	--	--	--	--	0.0005	0.0167	--	0.0003	0.0123	
Slender Sole	summer	--	--	--	--	--	--	--	--	--	--	0.0571	0.0012	0.0003	0.0305	0.0006	0.0003	
	winter	--	--	--	--	--	--	--	--	--	--	0.0009	0.0004	0.0002	--	0.0003	0.0001	
Non-FMP skate																		
Aleutian Skate	summer	--	--	--	--	--	--	--	--	--	--	0.0013	0.0045	0.0014	0.0007	0.0022	0.0011	
	winter	--	--	--	--	--	--	--	--	--	--	--	0.0007	0.0009	--	0.0005	0.0007	
Black Skate	summer	--	--	--	--	--	--	--	--	--	--	0.0003	0.0017	0.0296	0.0002	0.0008	0.0233	
	winter	--	--	--	--	--	--	--	--	--	--	0.0011	0.0009	0.0381	--	0.0006	0.0281	
Butterfly Ray	summer	--	--	--	--	--	--	--	--	--	--	0.0000	--	--	0.0000	--	--	
Deepsea Skate	summer	--	--	--	--	--	--	--	--	--	--	--	0.0001	0.0016	--	0.0001	0.0013	
	winter	--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0007	--	0.0000	0.0005	
Flathead Skate	summer	--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0000	--	0.0000	0.0000	
	winter	--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0000	--	0.0000	0.0000	
Pacific Electric Ray	summer	--	--	--	--	--	--	--	--	--	--	0.0002	0.0004	--	0.0001	0.0002	--	
	winter	--	--	--	--	--	--	--	--	--	--	0.0011	--	0.0001	--	--	0.0000	
Roughshoulder/Broad Skate	summer	--	--	--	--	--	--	--	--	--	--	--	0.0001	0.0001	--	0.0001	0.0001	
	winter	--	--	--	--	--	--	--	--	--	--	--	--	0.0000	--	--	0.0000	
Sandpaper Skate	summer	--	--	--	--	--	--	--	--	--	--	0.0084	0.0785	0.0144	0.0045	0.0385	0.0114	
	winter	--	--	--	--	--	--	--	--	--	--	0.0111	0.0288	0.0230	--	0.0200	0.0170	
Starry Skate	summer	--	--	--	--	--	--	--	--	--	--	0.0000	--	--	0.0000	--	--	
	winter	--	--	--	--	--	--	--	--	--	--	--	--	0.0000	--	--	0.0000	
White Skate	winter	--	--	--	--	--	--	--	--	--	--	--	--	0.0000	--	--	0.0000	

**Table 2b.** Values used to calculate the expanded weight of groundfish species from each WCGOP unsampled catch category in the 2011 IFQ fishery using bottom trawl gear south of 40°10' N latitude. Winter season is January-April and November-December and summer season is May-October. Strata with no unsampled discard weight are not shown. Unsampled catch weight could be assigned to the categories: IFQ flatfish species (IFQFF), IFQ rockfish species (IFQRF), IFQ roundfish species (IFQRD), IFQ mixed species (IFQM), non-IFQ species (NIFQ), or all species (IFQ & non-IFQ).

IFQ Fishery - Bottom Trawl South of 40°10' N Lat.	IFQFF	IFQFF	NIFQ	NIFQ	NIFQ	NIFQ	NIFQ	NIFQ	All Species	All Species
	summer	winter	summer	winter	summer	winter	summer	winter	summer	summer
	0-125	0-125	0-125	0-125	126-250	126-250	>250	>250	126-250	>250
	Expansion Factor (mt)	0.1348	0.0057	1.0047	0.0003	0.1134	0.0926	1.2604	0.4100	1.0446
Discard ratio										
<b>Rebuilding species</b>										
Bocaccio rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	--	0.0001	--
Darkblotched rockfish	--	--	--	--	--	--	--	--	0.0005	--
Petrale sole	0.0904	0.0243	--	--	--	--	--	--	0.0004	--
<b>Other groundfish species</b>										
Arrowtooth flounder	0.0173	0.0023	--	--	--	--	--	--	0.0565	0.0026
Chilipepper rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	--	0.0034	--
Dover sole	0.0087	0.0126	--	--	--	--	--	--	0.0521	0.3330
English sole	0.1453	0.1710	--	--	--	--	--	--	0.0009	--
Lingcod (South of 42° N. lat.)	--	--	--	--	--	--	--	--	0.0004	0.0000
Longnose skate	--	--	0.1010	0.0577	0.2732	0.1300	0.0840	0.0767	0.0989	0.0483
Longspine thornyhead (North of 34°27' N. lat.)	--	--	--	--	--	--	--	--	0.0045	0.0568
Minor shelf rockfish (South of 40°10' N. lat.)										
Greenspotted Rockfish	--	--	--	--	--	--	--	--	0.0001	--
Greenstriped Rockfish	--	--	--	--	--	--	--	--	0.0004	--
Halfbanded Rockfish	--	--	--	--	--	--	--	--	0.0007	--
Redstripe Rockfish	--	--	--	--	--	--	--	--	0.0000	--
Rosethorn Rockfish	--	--	--	--	--	--	--	--	0.0000	--
Stripetail Rockfish	--	--	--	--	--	--	--	--	0.0233	--
Minor slope rockfish (South of 40°10' N. lat.)										
Aurora Rockfish	--	--	--	--	--	--	--	--	0.0039	0.0012
Bank Rockfish	--	--	--	--	--	--	--	--	0.0002	--
Blackgill Rockfish	--	--	--	--	--	--	--	--	0.0001	0.0000
Redbanded Rockfish	--	--	--	--	--	--	--	--	0.0004	--
Sharpchin Rockfish	--	--	--	--	--	--	--	--	0.0000	--
Spotted Rockfish Unid	--	--	--	--	--	--	--	--	--	0.0000
Mixed thornyheads										
Shortspine/ Longspine Thornyhead	--	--	--	--	--	--	--	--	--	0.0022
Other flatfish										
Curlfin Turbot	0.0125	0.0131	--	--	--	--	--	--	--	--
Flathead Sole	--	0.0001	--	--	--	--	--	--	--	--
Pacific Sanddab	0.7018	0.7669	--	--	--	--	--	--	0.0000	--
Rex Sole	0.0144	0.0097	--	--	--	--	--	--	0.0112	0.0000
Rock Sole	0.0081	0.0002	--	--	--	--	--	--	--	--
Sanddab Unid	0.0012	--	--	--	--	--	--	--	--	--
Sand Sole	0.0003	--	--	--	--	--	--	--	--	--
Other groundfish										
Big Skate	--	--	0.0200	0.0007	--	0.0000	--	0.0008	--	--
California Skate	--	--	0.0342	0.0017	0.0089	--	0.0003	--	0.0032	0.0002
Pacific Flatnose	--	--	--	--	0.0001	--	0.0037	0.0112	0.0000	0.0021
Pacific Grenadier	--	--	--	--	0.0025	0.0013	0.1500	0.0497	0.0009	0.0863
Roundfish Unid	--	--	--	--	--	--	0.0000	--	--	0.0000
Soupin Shark	--	--	--	0.0079	--	--	--	--	--	--
Spotted Ratfish	--	--	0.1487	0.3546	0.2159	0.1875	0.0057	0.0142	0.0782	0.0033
Unspecified Skate	--	--	0.0007	0.0572	0.0046	0.0267	0.0001	0.0004	0.0017	0.0000
Pacific hake	--	--	--	--	--	--	--	--	0.1969	0.0255
Sablefish (North of 36° N. lat.)	--	--	--	--	--	--	--	--	0.0261	0.0007
Shortbelly rockfish	--	--	0.1951	0.1598	0.0259	0.0015	--	--	0.0094	--
Shortspine thornyhead (North of 34°27' N. lat.)	--	--	--	--	--	--	--	--	0.0018	0.0020
Spiny dogfish	--	--	0.0197	0.0650	0.0299	0.3279	0.0007	0.0174	0.0108	0.0004
Splitnose rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	--	0.2539	0.0009
Widow rockfish	--	--	--	--	--	--	--	--	0.0000	--
<b>Non-groundfish species</b>										
Dungeness crab	--	--	0.3229	0.1553	0.0206	0.0048	0.0000	--	0.0075	0.0000
Non-FMP flatfish										
Deepsea Sole	--	--	--	--	0.0009	0.0005	0.0255	0.0872	0.0003	0.0147
Slender Sole	--	--	0.0004	0.0026	0.0008	0.0029	0.0000	--	0.0003	0.0000
Non-FMP skate										
Black Skate	--	--	0.0000	--	0.0291	0.0101	0.0216	0.0569	0.0105	0.0124
Deepsea Skate	--	--	--	--	--	--	0.0016	0.0011	--	0.0009
Pacific Electric Ray	--	--	0.0065	0.0123	0.0078	0.0032	--	--	0.0028	--
Sandpaper Skate	--	--	0.0028	0.0039	0.0538	0.0779	0.0083	0.0062	0.0195	0.0048
Starry Skate	--	--	0.0011	--	0.0002	--	--	--	0.0001	--
White Skate	--	--	--	--	--	--	0.0001	--	--	0.0000

**Table 2c.** Values used to calculate the expanded weight of groundfish species from each WCGOP unsampled catch category in the 2011 IFQ fishery by sector-gear, area, and depth. Winter season is January-April and November-December and summer season is May-October. Strata with no unsampled discard weight are not shown. Unsampled catch weight could be assigned to the categories: IFQ flatfish species (IFQFF), IFQ rockfish species (IFQRF), IFQ roundfish species (IFQRD), IFQ mixed species (IFQM), non-IFQ species (NIFQ), or all species (IFQ & non-IFQ).

Sector Area (Latitude) Depth interval (fm) Expansion Factor (mt)	IFQ Fishery - Hook and Line			IFQ Fishery - Pot				LE CA Halibut	Shoreside Hake
	North of 40°10' N		South of 40°10' N	North of 40°10' N			South of 40°10' N	South of 40°10' N	North of 40°10' N
	IFQRF	All Species	NIFQ	IFQRF	NIFQ	All Species	NIFQ	NIFQ	NIFQ
	0-250	0-250	All depths	0-250	>250	0-250	>250	0-125	All depths
	0.0809	0.0045	0.0009	0.0032	0.0009	0.0056	0.0017	0.0068	1.3721
	Discard ratio			Discard ratio				Ratio	Ratio
<b>Rebuilding species</b>									
Darkblotched rockfish	0.0135	0.0022	--	0.0058	--	0.0001	--	--	--
Pacific Ocean Perch (North of 40°10' N. lat.)	0.0028	0.0005	--	0.0173	--	0.0002	--	--	--
Petrale sole	--	0.0005	--	--	--	--	--	--	--
<b>Other groundfish species</b>									
Arrowtooth flounder	--	0.0158	--	--	--	0.0215	--	--	--
Dover sole	--	0.0012	--	--	--	0.0003	--	--	--
Lingcod (North of 42° N. lat.)	--	0.0009	--	--	--	0.0130	--	--	--
Longnose skate	--	0.1470	0.2438	--	--	--	--	0.0002	--
Longspine thornyhead (South of 34°27' N. lat.)	--	--	0.0152	--	--	--	--	--	--
Minor shelf rockfish (North of 40°10' N. lat.)									
Greenstriped Rockfish	--	--	--	0.0049	--	0.0001	--	--	--
Redstripe Rockfish	0.0013	0.0002	--	--	--	--	--	--	--
Rosethorn Rockfish	0.0010	0.0002	--	0.0173	--	0.0002	--	--	--
Minor slope rockfish (North of 40°10' N. lat.)									
Aurora Rockfish	0.0001	0.0000	--	--	--	--	--	--	--
Blackgill Rockfish	0.0299	0.0048	--	--	--	--	--	--	--
Redbanded Rockfish	0.0055	0.0009	--	0.0285	--	0.0003	--	--	--
Rockfish Unid	--	--	--	0.0138	--	0.0002	--	--	--
Rougheye Rockfish	0.8779	0.1406	--	0.1643	--	0.0019	--	--	--
Shortraker Rockfish	0.0196	0.0031	--	0.1602	--	0.0019	--	--	--
Shortraker/Rougheye Rockfish	0.0151	0.0024	--	0.4505	--	0.0052	--	--	--
Splitnose Rockfish	0.0027	0.0004	--	--	--	--	--	--	--
Yellowmouth Rockfish	0.0005	0.0001	--	--	--	--	--	--	--
Other flatfish									
Flatfish Unid	--	0.0000	--	--	--	--	--	--	--
Rock Sole	--	0.0001	--	--	--	--	--	--	--
Other groundfish									
Big Skate	--	--	--	--	--	--	--	0.0426	0.0495
California Skate	--	--	0.0001	--	--	--	--	0.0101	--
Leopard Shark	--	--	--	--	--	--	--	0.0010	--
Pacific Flatnose	--	--	0.0093	--	0.0002	0.0000	0.0066	--	--
Pacific Grenadier	--	0.0012	0.2238	--	0.0957	0.0000	0.1747	--	--
Southern Shark	--	--	--	--	--	--	--	0.0000	0.0084
Spotted Ratfish	--	0.0003	0.0001	--	--	--	--	0.0002	--
Unspecified Skate	--	0.0148	0.0156	--	--	--	--	--	--
Pacific hake	--	0.0001	--	--	--	--	--	--	--
Sablefish (North of 36° N. lat.)	--	0.0475	--	--	--	0.2951	--	--	--
Shortspine thornyhead (North of 34°27' N. lat.)	0.0300	0.0048	--	0.1375	--	0.0016	--	--	--
Spiny dogfish	--	0.4256	0.0087	--	0.0002	0.0213	0.0001	0.0138	0.0565
Widow rockfish	0.0002	0.0000	--	--	--	--	--	--	--
<b>Non-groundfish species</b>									
California halibut	--	--	--	--	--	--	--	0.0006	--
Dungeness crab	--	--	--	--	--	0.0862	--	0.6805	--
Non-FMP flatfish									
Deepsea Sole	--	--	0.0001	--	0.0013	0.0002	0.0006	--	--
Diamond Turbot	--	--	--	--	--	--	--	0.0000	--
Homyhead Turbot	--	--	--	--	--	--	--	0.0001	--
C-O (C-O Turbot) Sole	--	--	--	--	--	--	--	0.0000	--
Non-FMP skate									
Aleutian Skate	--	0.0003	--	--	--	--	--	--	--
Banded Guitarfish	--	--	--	--	--	--	--	0.0000	--
Black Skate	--	0.0003	0.0076	--	--	--	0.0003	--	0.0020
Deepsea Skate	--	--	0.0069	--	--	--	--	--	--
Pacific Electric Ray	--	--	--	--	--	--	--	0.0007	--
Sandpaper Skate	--	0.0012	0.0012	--	--	--	0.0000	--	--
Starry Skate	--	--	--	--	--	--	--	0.0000	--
Thornback Skate	--	--	--	--	--	--	--	0.0003	--



**Table 3a. Non-hake IFQ sectors and LE California halibut.** Landings (mt), estimated discard (mt), and fishing mortality estimate (mt) of groundfish species from non-hake IFQ and limited entry California halibut fisheries in 2011. Discard ratios (Table 2) were multiplied by expansion factors to generate estimated discard, sampled discard was expanded to the haul level and summed by sector, and landings were summarized from PacFIN.

Weight (mt)	IFQ - Trawl				IFQ - Hook-and-Line				IFQ - Pot				LE California Halibut			
	Landed	Sampled Discard	Expanded Discard	Estimate	Landed	Discard	Expanded Discard	Estimate	Landed	Discard	Expanded Discard	Estimate	Landed	Sampled Discard	Expanded Discard	Estimate
<b>Rebuilding species</b>																
Bocaccio rockfish (South of 40°10' N. lat.)	5.30	0.01	0.00	5.31	--	--	--	--	--	--	--	--	--	--	--	--
Canary rockfish	2.68	0.14	0.03	2.85	0.00	--	--	0.00	--	--	--	--	--	--	--	--
Cowcod rockfish (South of 40°10' N. lat.)	0.01	0.00	--	0.02	--	--	--	--	--	--	--	--	--	--	--	--
Darkblotched rockfish	87.54	1.55	0.16	89.25	0.25	0.12	0.00	0.37	0.05	0.00	0.00	0.05	--	--	--	--
Pacific Ocean Perch (North of 40°10' N. lat.)	45.95	0.37	0.02	46.34	0.01	0.03	0.00	0.04	0.01	0.00	0.00	0.01	--	--	--	--
Petrале sole	793.78	15.85	0.58	810.20	0.00	0.03	0.00	0.03	0.09	0.00	--	0.09	0.06	0.01	--	0.07
Yelloweye rockfish	0.04	0.01	0.00	0.05	0.01	--	--	0.01	--	--	--	--	--	--	--	--
<b>Other groundfish species</b>																
Arrowtooth flounder	2,223.09	240.27	8.90	2,472.26	0.09	1.01	0.00	1.10	0.22	0.15	0.00	0.36	--	--	--	--
Black rockfish (North of 46°16' N. lat.)	0.70	--	--	0.70	--	--	--	--	--	--	--	--	--	--	--	--
Black rockfish (South of 46°16' N. lat.)	0.03	0.01	0.00	0.04	--	--	--	--	--	--	--	--	--	--	--	--
Chilipepper rockfish (South of 40°10' N. lat.)	292.42	24.99	0.00	317.41	--	--	--	--	--	--	--	--	--	--	--	--
Dover sole	7,636.47	156.11	1.16	7,793.74	0.07	0.27	0.00	0.33	0.73	0.31	0.00	1.05	--	--	--	--
English sole	108.02	28.52	0.97	137.51	--	--	--	--	--	--	--	--	0.08	0.05	--	0.13
Lingcod (North of 42° N. lat.)	234.55	37.60	1.41	254.06	0.30	0.05	0.00	0.36	2.94	0.09	0.00	3.03	--	--	--	--
50% discard mortality (Trawl)*		18.80	0.71		--	--	--	--	--	--	--	--	--	--	--	--
Lingcod (South of 42° N. lat.)	6.66	1.51	0.01	7.42	--	--	--	--	0.01	0.00	--	0.01	0.00	0.01	--	0.00
50% discard mortality (Trawl)*		0.76	0.01		--	--	--	--	--	--	--	--	--	0.00	--	--
Longnose skate	759.33	84.13	3.27	846.74	0.43	14.65	0.00	15.08	--	--	--	--	0.00	0.01	0.00	0.01
Longspine thornyhead (North of 34°27' N. lat.)	900.33	41.74	0.59	942.66	0.29	0.53	--	0.82	0.04	0.02	--	0.05	--	--	--	--
Longspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	0.06	0.32	0.00	0.39	--	--	--	--	--	--	--	--
Minor nearshore rockfish (North of 40°10' N. lat.)																
Blue Rockfish	0.00	--	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Brown Rockfish	0.01	--	--	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Quillback Rockfish	0.03	0.02	0.00	0.06	--	--	--	--	--	--	--	--	--	--	--	--
Minor nearshore rockfish (South of 40°10' N. lat.)																
Brown Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.00	--	--	0.00
Minor shelf rockfish (North of 40°10' N. lat.)																
Bocaccio Rockfish	0.33	--	--	0.33	--	--	--	--	--	--	--	--	--	--	--	--
Chilipepper Rockfish	1.32	0.10	0.00	1.43	--	--	--	--	--	--	--	--	--	--	--	--
Flag Rockfish	--	0.00	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Greenspotted Rockfish	0.02	0.00	0.00	0.02	--	--	--	--	--	--	--	--	--	--	--	--
Greenstriped Rockfish	6.99	1.52	0.28	8.78	--	--	--	--	--	0.00	0.00	0.00	--	--	--	--
Harlequin Rockfish	--	0.00	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Pygmy Rockfish	0.00	--	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Redstripe Rockfish	0.13	0.03	0.00	0.16	--	0.01	0.00	0.01	--	--	--	--	--	--	--	--
Rosethorn Rockfish	1.22	0.68	0.02	1.92	0.00	0.01	0.00	0.01	--	0.00	0.00	0.00	--	--	--	--
Rosy Rockfish	0.00	0.01	0.00	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Shelf Rockfish Unid	2.28	0.00	0.00	2.28	0.00	--	--	0.00	0.04	--	--	0.04	--	--	--	--
Silvergray Rockfish	0.29	0.00	0.00	0.29	0.00	--	--	0.00	--	--	--	--	--	--	--	--
Starry Rockfish	--	0.00	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Stripetail Rockfish	0.28	0.07	0.02	0.36	--	--	--	--	--	--	--	--	--	--	--	--

Table 3a - Non-hake IFQ sectors and LE California halibut (continued).

Weight (mt)	IFQ - Trawl				IFQ - Hook-and-Line				IFQ - Pot				LE California Halibut			
	Landed	Sampled	Expanded	Estimate	Landed	Sampled	Expanded	Estimate	Landed	Sampled	Expanded	Estimate	Landed	Sampled	Expanded	Estimate
Minor shelf rockfish (South of 40°10' N. lat.)																
Greenblotched Rockfish	0.00	--	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Greenspotted Rockfish	0.01	0.03	0.00	0.04	--	--	--	--	--	--	--	--	--	--	--	--
Greenstriped Rockfish	0.03	0.33	0.00	0.35	--	--	--	--	--	--	--	--	--	--	--	--
Halfbanded Rockfish	--	0.05	0.00	0.05	--	--	--	--	--	--	--	--	--	--	--	--
Pygmy Rockfish	--	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Redstripe Rockfish	--	0.00	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Rosethorn Rockfish	0.02	0.03	0.00	0.05	--	--	--	--	--	--	--	--	--	--	--	--
Rosy Rockfish	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Shelf Rockfish Unid	0.03	--	--	0.03	--	--	--	--	--	--	--	--	--	--	--	--
Speckled Rockfish	--	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Squarespot Rockfish	--	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Stripetail Rockfish	--	2.39	0.02	2.42	--	--	--	--	--	--	--	--	--	--	--	--
Yellowtail Rockfish	0.03	--	--	0.03	--	--	--	--	--	--	--	--	--	--	--	--
Minor slope rockfish (North of 40°10' N. lat.)																
Aurora Rockfish	17.94	1.83	0.07	19.84	0.00	0.00	0.00	0.00	0.02	--	--	0.02	--	--	--	--
Bank Rockfish	0.22	0.00	0.00	0.22	0.04	--	--	0.04	--	--	--	--	--	--	--	--
Blackgill Rockfish	2.91	0.02	0.00	2.93	0.05	0.28	0.00	0.33	0.00	--	--	0.00	--	--	--	--
Blackspotted Rockfish	0.65	--	--	0.65	0.01	--	--	0.01	0.00	--	--	0.00	--	--	--	--
Redbanded Rockfish	4.49	0.29	0.01	4.79	0.52	0.06	0.00	0.58	0.03	0.00	0.00	0.04	--	--	--	--
Rougheye Rockfish	51.50	0.04	0.00	51.54	6.36	7.94	0.07	14.37	0.56	0.02	0.00	0.57	--	--	--	--
Sharpchin Rockfish	0.83	0.65	0.01	1.50	--	--	--	0.00	--	--	--	--	--	--	--	--
Shortraker Rockfish	21.54	0.02	0.00	21.56	0.22	0.18	0.00	0.40	0.00	0.01	0.00	0.02	--	--	--	--
Shortraker/Rougheye Rockfish	--	0.00	0.00	0.00	--	0.13	0.00	0.14	--	0.04	0.00	0.04	--	--	--	--
Slope Rockfish Unid	3.74	0.41	0.01	4.17	0.22	--	--	0.22	0.75	0.00	0.00	0.75	--	--	--	--
Splitnose Rockfish	5.76	3.05	0.18	9.00	0.00	0.02	0.00	0.02	0.00	--	--	0.00	--	--	--	--
Yellowmouth Rockfish	0.36	0.00	0.00	0.36	0.02	0.00	0.00	0.02	--	--	--	--	--	--	--	--
Minor slope rockfish (South of 40°10' N. lat.)																
Aurora Rockfish	5.26	0.75	0.00	6.01	0.03	0.00	--	0.03	0.03	0.00	--	0.03	--	--	--	--
Bank Rockfish	27.77	0.05	0.00	27.82	--	--	--	--	--	--	--	--	--	--	--	--
Blackgill Rockfish	14.23	0.04	0.00	14.27	0.92	0.01	--	0.92	0.75	0.04	--	0.80	0.00	--	--	0.00
Pacific Ocean Perch Rockfish	0.03	--	--	0.03	--	--	--	--	--	--	--	--	--	--	--	--
Redbanded Rockfish	0.16	0.03	0.00	0.19	--	--	--	--	--	--	--	--	--	--	--	--
Rougheye Rockfish	0.02	--	--	0.02	--	--	--	--	--	--	--	--	--	--	--	--
Sharpchin Rockfish	--	0.01	0.00	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Slope Rockfish Unid	1.60	0.06	--	1.66	--	--	--	--	0.26	--	--	0.26	--	--	--	--
Spotted Rockfish Unid	--	0.01	0.00	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Mixed thornyheads																
Shortspine/ Longspine Thornyhead	--	4.59	0.06	4.65	--	0.02	--	0.02	--	0.01	--	0.01	--	--	--	--
Other flatfish																
Butter Sole	0.06	0.76	0.04	0.85	--	--	--	--	--	--	--	--	--	--	--	--
Curlfin Turbot	0.37	0.60	0.00	0.97	--	--	--	--	--	--	--	--	0.12	0.32	--	0.43
Flatfish Unid	6.04	0.45	0.01	6.50	--	0.00	0.00	0.00	0.00	--	--	0.00	--	--	--	--
Flathead Sole	3.63	2.61	0.13	6.37	--	--	--	--	--	0.00	--	0.00	--	--	--	--
Pacific Sanddab	137.24	91.57	2.69	231.50	--	--	--	--	--	--	--	--	0.05	0.18	--	0.24
Rex Sole	357.05	21.04	0.89	378.98	--	--	--	--	0.00	0.00	--	0.00	0.00	0.00	--	0.01
Rock Sole	2.20	0.41	0.01	2.62	0.00	0.00	0.00	0.00	--	--	--	--	0.05	0.00	--	0.05
Sanddab Unid	3.38	1.05	0.01	4.44	--	--	--	--	--	--	--	--	--	--	--	--
Sand Sole	64.86	0.33	0.01	65.21	--	--	--	--	--	--	--	--	4.83	0.05	--	4.88

Table 3a - Non-hake IFQ sectors and LE California halibut (continued).

Weight (mt)	IFQ - Trawl				IFQ - Hook-and-Line				IFQ - Pot				LE California Halibut			
	Landed	Sampled Discard	Expanded Discard	Estimate	Landed	Sampled Discard	Expanded Discard	Estimate	Landed	Sampled Discard	Expanded Discard	Estimate	Landed	Sampled Discard	Expanded Discard	Estimate
Other groundfish																
Big Skate	--	30.17	1.22	31.40	--	0.01	--	0.01	--	--	--	--	0.03	3.20	0.00	3.22
Cabezon	--	0.00	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--
California Skate	0.35	1.98	0.05	2.39	--	0.00	0.00	0.00	--	--	--	--	--	0.75	0.00	0.75
Grenadier Unid	89.27	--	--	89.27	0.54	--	--	0.54	0.00	--	--	0.00	--	--	--	--
Groundfish Unid	0.00	--	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Kelp Greenling	0.01	0.05	0.00	0.06	--	--	--	--	--	--	--	--	--	--	--	--
Leopard Shark	--	--	--	--	--	--	--	--	--	--	--	--	0.01	0.08	0.00	0.09
Pacific Flatnose	--	2.88	0.07	2.95	--	0.49	0.00	0.49	--	0.04	0.00	0.04	--	--	--	--
Pacific Grenadier	--	50.53	1.00	51.53	--	8.23	0.00	8.23	--	1.43	0.00	1.43	--	--	--	--
Roundfish Unid	--	0.02	0.00	0.02	--	--	--	--	--	--	--	--	--	--	--	--
Soupin Shark	0.40	0.03	0.00	0.43	--	0.00	--	0.00	--	--	--	--	0.07	0.00	0.00	0.07
Spotted Ratfish	0.36	67.45	2.91	70.72	--	0.02	0.00	0.02	--	0.00	--	0.00	--	0.02	0.00	0.02
Unspecified Skate	268.18	7.39	0.26	275.83	0.09	1.29	0.00	1.38	--	--	--	--	0.38	--	--	0.38
Other rockfish	0.00	--	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Pacific cod	251.34	0.01	0.00	251.35	0.00	--	--	0.00	--	--	--	--	--	--	--	--
Pacific hake	26.50	188.65	4.47	219.63	--	0.15	0.00	0.15	--	0.00	--	0.00	--	--	--	--
Sablefish (North of 36° N. lat.)	1,656.32	9.18	0.20	1,661.01	159.40	5.55	0.00	160.51	525.19	7.70	0.00	526.73	--	--	--	--
50% discard mortality (Trawl)*		4.59	0.10													
20% discard mortality (Fixed Gear)*						1.11	0.00			1.54	0.00					
Sablefish (South of 36° N. lat.)	17.03	--	--	17.03	145.54	2.42	--	146.03	283.56	4.07	--	284.37	--	--	--	--
50% discard mortality (Trawl)*																
20% discard mortality (Fixed Gear)*						0.48				0.81						
Shortbelly rockfish	0.43	9.91	0.21	10.55	--	--	--	--	--	--	--	--	--	--	--	--
Shortspine Thornyhead (North of 34°27' N. lat.)	698.37	3.58	0.09	702.05	11.37	0.66	0.00	12.04	0.62	0.19	0.00	0.81	--	--	--	--
Shortspine Thornyhead (South of 34°27' N. lat.)	--	--	--	--	5.90	0.22	--	6.12	--	--	--	--	--	--	--	--
Spiny dogfish	69.81	277.80	19.34	366.96	0.04	26.76	0.00	26.80	0.02	0.15	0.00	0.17	--	1.05	0.00	1.05
Splitnose rockfish (South of 40°10' N. lat.)	8.62	30.64	0.27	39.52	0.00	--	--	0.00	0.00	--	--	0.00	0.00	--	--	0.00
Starry flounder	8.14	0.57	0.03	8.74	--	--	--	--	--	--	--	--	2.82	0.12	--	2.93
Widow rockfish	14.44	0.08	0.01	14.52	--	0.00	0.00	0.00	--	--	--	--	--	--	--	--
Yellowtail Rockfish (North of 40°10' N. lat.)	314.22	0.03	0.00	314.25	--	--	--	--	--	--	--	--	--	--	--	--
<b>Non-groundfish species</b>																
California halibut	0.01	--	--	0.01	--	--	--	--	--	--	--	--	11.94	0.04	0.00	11.98
Dungeness crab	0.05	146.00	5.78	151.82	--	--	--	--	--	0.59	0.00	0.59	--	51.44	0.00	51.45
Non-FMP flatfish																
C-O (C-O Turbot) Sole	--	--	--	0.00	--	--	--	--	--	--	--	--	--	0.00	0.00	0.00
Deepsea Sole	1.96	17.85	0.38	20.19	--	0.00	0.00	0.00	0.00	0.01	0.00	0.01	--	--	--	--
Diamond Turbot	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00	0.00
Hornyhead Turbot	0.01	--	--	0.01	--	--	--	--	--	--	--	--	0.04	0.01	0.00	0.05
Slender Sole	--	18.85	0.82	19.67	--	--	--	--	--	--	--	--	--	--	--	--
Non-FMP skate																
Aleutian Skate	--	1.58	0.07	1.65	--	0.01	0.00	0.01	--	--	--	--	--	--	--	--
Banded Guitarfish	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00	0.00
Black Skate	0.00	23.49	0.62	24.12	--	0.61	0.00	0.61	--	0.00	0.00	0.00	--	--	--	--
Butterfly Ray	--	0.00	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Deepsea Skate	--	0.80	0.02	0.82	--	0.14	0.00	0.14	--	--	--	--	--	--	--	--
Flathead Skate	--	0.01	0.00	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Pacific Electric Ray	--	0.68	0.02	0.70	--	--	--	--	--	--	--	--	--	0.06	0.00	0.06
Roughshoulder/Broad Skate	--	0.03	0.00	0.03	--	--	--	--	--	--	--	--	--	--	--	--
Sandpaper Skate	0.08	29.77	1.42	31.28	--	0.10	0.00	0.10	--	0.00	0.00	0.00	--	--	--	--
Starry Skate	--	0.07	0.00	0.07	--	--	--	--	--	--	--	--	--	0.00	0.00	0.00
Thornback Skate	--	--	--	--	--	--	--	--	--	--	--	--	--	0.03	0.00	0.03
White Skate	--	0.01	0.00	0.01	--	--	--	--	--	--	--	--	--	--	--	--

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

**Table 3b. Hake IFQ/Coop sectors.** Retained catch/landings (mt), discard (mt), and fishing mortality estimates (mt) of groundfish species from hake IFQ/Coop sectors in 2011. In shoreside hake, discard ratios (Table 2) were multiplied by expansion factors to generate estimated discard, sampled discard was expanded to the haul level and summed by sector, and landings were summarized from PacFIN. At-sea hake Coop Program data was summarized from the A-SHOP.

Weight (mt)	IFQ - Shoreside Hake				At-sea Catcher-Processors			At-sea Mothership		
	Landed	Sampled Discard	Expanded Discard	Estimate	Retained	Sampled Discard	Estimate	Retained	Sampled Discard	Estimate
<b>Rebuilding species</b>										
Canary rockfish	0.85	--	--	0.85	0.25	0.20	0.46	0.02	0.06	0.08
Darkblotched rockfish	1.22	0.00	--	1.22	8.87	1.42	10.29	1.00	0.70	1.70
Pacific Ocean Perch (North of 40°10' N. lat.)	0.28	--	--	0.28	3.40	3.11	6.51	0.32	0.34	0.66
Petrale sole	0.00	--	--	0.00	--	--	--	--	--	--
<b>Other groundfish species</b>										
Arrowtooth flounder	12.69	--	--	12.69	13.06	24.92	37.98	3.36	3.87	7.23
Black rockfish (North of 46°16' N. lat.)	0.00	--	--	0.00	--	--	--	--	--	--
Dover sole	0.07	--	--	0.07	0.83	0.10	0.93	0.12	0.13	0.25
English sole	0.00	--	--	0.00	0.01	0.00	0.02	--	0.00	0.00
Lingcod (North of 42° N. lat.)	4.52	0.04	--	4.55	0.03	0.01	0.04	0.02	0.10	0.12
Longnose skate	0.18	--	--	0.18	0.24	0.04	0.29	0.02	0.10	0.12
Longspine thornyhead (North of 34°27' N. lat.)	--	--	--	--	0.37	0.00	0.37	0.00	0.02	0.02
Minor shelf rockfish (North of 40°10' N. lat.)										
Bocaccio Rockfish	0.96	0.00	--	0.97	0.08	0.15	0.22	0.02	0.15	0.17
Chilipepper Rockfish	--	--	--	--	--	--	--	--	0.01	0.01
Dusky Rockfish	--	--	--	--	--	--	--	--	0.01	0.01
Greenstriped Rockfish	0.05	--	--	0.05	--	--	--	--	--	--
Redstripe Rockfish	0.00	--	--	0.00	0.00	0.00	0.01	--	0.01	0.01
Rosethorn Rockfish	0.18	--	--	0.18	--	--	--	--	--	--
Shelf Rockfish Unid	0.09	--	--	0.09	--	0.00	0.00	--	0.03	0.03
Silvergray Rockfish	0.15	0.00	--	0.15	0.02	0.02	0.04	0.01	0.22	0.22
Stripetail Rockfish	0.00	--	--	0.00	--	--	--	--	--	--
Minor slope rockfish (North of 40°10' N. lat.)										
Aurora Rockfish	0.28	--	--	0.28	0.06	0.03	0.09	0.00	0.01	0.01
Bank Rockfish	0.04	--	--	0.04	0.01	0.00	0.01	--	0.00	0.00
Blackgill Rockfish	--	--	--	--	--	--	--	0.00	--	0.00
Blackspotted Rockfish	0.12	--	--	0.12	--	--	--	--	--	--
Redbanded Rockfish	0.14	--	--	0.14	--	0.00	0.00	--	--	--
Rougheye Rockfish	2.74	--	--	2.74	48.76	25.59	74.35	2.86	1.17	4.04
Sharpchin Rockfish	0.01	--	--	0.01	0.01	0.00	0.01	0.00	--	0.00
Shortraker Rockfish	1.75	--	--	1.75	0.15	0.03	0.18	--	--	--
Shortraker/Rougheye Rockfish	--	--	--	--	--	--	0.00	--	0.01	0.01
Slope Rockfish Unid	1.35	--	--	1.35	--	--	0.00	--	--	--
Splitnose Rockfish	3.69	--	--	3.69	3.81	0.97	4.78	3.42	3.71	7.13
Yellowmouth Rockfish	--	--	--	--	0.05	0.01	0.06	0.01	0.00	0.01
<b>Mixed thornyheads</b>										
Shortspine/ Longspine Thornyhead	--	--	--	--	0.13	--	0.13	--	--	--
<b>Other flatfish</b>										
Flatfish Unid	0.00	--	--	0.00	0.00	0.00	0.00	--	0.00	0.00
Flathead Sole	--	--	--	--	0.00	--	0.00	--	--	--
Pacific Sanddab	0.00	--	--	0.00	0.00	--	0.00	--	--	--
Rex Sole	0.85	0.00	--	0.85	2.92	1.03	3.95	1.63	0.29	1.91
<b>Other groundfish</b>										
Big Skate	--	0.17	0.07	0.24	--	0.13	0.13	--	0.04	0.04
Grenadier Unid	--	--	--	--	0.05	0.01	0.05	0.03	0.05	0.08
Groundfish Unid	0.28	--	--	0.28	--	--	--	--	--	--
Pacific Electric Ray	--	--	--	--	0.01	--	0.01	--	--	--
Pacific Grenadier	--	--	--	--	--	0.03	0.03	--	--	--
Roundfish Unid	--	--	--	--	0.01	0.00	0.01	--	0.00	0.00
Soupin Shark	0.47	0.03	0.01	0.51	--	0.12	0.12	--	--	--
Spotted Ratfish	0.00	--	--	0.00	--	--	--	--	--	--
Unspecified Skate	0.58	--	--	0.58	0.00	--	0.00	--	--	--
Pacific cod	6.59	--	--	6.59	0.00	0.00	0.01	--	0.00	0.00
Pacific hake	90249.14	509.54	--	90758.68	71194.84	327.61	71522.44	49871.20	178.65	50049.85
Sablefish (North of 36° N. lat.)	30.39	--	--	30.39	2.08	0.86	2.94	1.73	0.31	2.04
Shortbelly rockfish	0.00	--	--	0.00	--	--	--	--	--	--
Shortspine thornyhead (North of 34°27' N. lat.)	2.18	--	--	2.18	10.17	1.67	11.84	0.36	1.08	1.44
Spiny dogfish	180.77	0.19	0.08	181.04	251.63	388.43	640.06	39.08	45.93	85.01
Widow rockfish	111.28	11.80	--	123.07	9.62	14.44	24.05	1.15	11.69	12.85
Yellowtail Rockfish (North of 40°10' N. lat.)	424.24	0.08	--	424.33	9.34	5.23	14.57	6.25	60.42	66.67
<b>Non-groundfish species</b>										
Dungeness crab	0.03	--	--	0.03	--	--	--	--	0.00	0.00
<b>Non-FMP flatfish</b>										
Slender Sole	--	--	--	--	0.03	0.00	0.03	0.00	0.00	0.00
<b>Non-FMP skate</b>										
Black Skate	--	0.01	0.00	0.01	--	--	--	--	--	--
Sandpaper Skate	--	--	--	--	0.00	--	0.00	--	0.00	0.00

**Table 4.** Observed discard ratios, standard error, estimated discard (mt), landings (mt), and fishing mortality estimates (mt) of groundfish species from federal open access participants in the state-licensed California halibut fishery in 2011 (only occurs south of 40°10' N Lat.). Ratios are computed as the observed discard weight divided by the observed weight of retained California halibut (adjusted to fish tickets). Discard ratios were multiplied by fleet landings of California halibut to generate estimated discard.

Open Access California Halibut Fishery South of 40°10' N Lat.	Observed vessels	Observed trips	Observed tows	Expansion factor: Fleet landings of California halibut (mt)	
	13	48	204	79.9	
	Weight (mt) Discard Ratio	SE	Discard	Landed	Total Estimate
<b>Rebuilding species</b>					
Petrale sole	0.0008	0.0322	0.07	0.06	0.13
<b>Other groundfish species</b>					
California scorpionfish (South of 34°27' N. lat.)	0.0034	0.1362	0.27	0.00	0.28
English sole	0.0177	0.0918	1.41	0.04	1.45
Lingcod (South of 42° N. lat.)	0.0027	0.0455	0.22	--	0.11
50% discard mortality (Trawl)*			0.11		
Longnose skate	0.0027	3.3819	0.22	--	0.22
Minor nearshore rockfish (South of 40°10' N. lat.)					
Brown Rockfish	0.0000	0.0106	0.00	0.00	0.00
Calico Rockfish	0.0000	NA	0.00	--	0.00
Copper Rockfish	0.0000	NA	0.00	--	0.00
Minor shelf rockfish (South of 40°10' N. lat.)					
Greenspotted Rockfish	--	--	--	0.01	0.01
Other flatfish					
Curffin Turbot	0.0035	0.0448	0.28	--	0.28
Flatfish Unid	0.0077	0.1600	0.62	0.61	1.23
Pacific Sanddab	0.0178	0.1006	1.42	0.00	1.42
Rex Sole	--	--	--	0.00	0.00
Rock Sole	0.0005	0.1511	0.04	0.13	0.17
Sanddab Unid	0.0015	NA	0.12	0.01	0.14
Sand Sole	0.0087	0.0639	0.69	7.76	8.45
Other groundfish					
Big Skate	0.4552	1.3888	36.37	0.28	36.65
California Skate	0.0759	0.3024	6.07	--	6.07
Leopard Shark	0.0691	3.1273	5.52	0.00	5.52
Soupin Shark	0.0203	1.9891	1.62	0.08	1.70
Spotted Ratfish	0.0009	0.6099	0.07	--	0.07
Unspecified Skate	0.0264	1.0887	2.11	0.59	2.70
Sablefish (South of 36° N. lat.)	--	--	--	0.01	0.01
Spiny dogfish	0.0067	0.4300	0.54	--	0.54
Starry flounder	0.0541	0.3324	4.33	3.89	8.22
<b>Non-groundfish species</b>					
California halibut	0.0761	0.1076	6.08	79.91	85.98
Dungeness crab	0.8203	3.5092	65.55	--	65.55
Non-FMP flatfish					
Deepsea Sole	--	--	--	0.94	0.94
Fantail Sole	0.0060	0.0570	0.48	0.14	0.62
Hornyhead Turbot	0.0146	0.0615	1.17	0.03	1.20
Longfin Sanddab	0.0001	0.0151	0.00	--	0.00
Slender Sole	0.0000	0.0060	0.00	--	0.00
Speckled Sanddab	0.0004	0.0214	0.03	--	0.03
Non-FMP skate					
Pacific Electric Ray	0.0074	0.2366	0.59	--	0.59
Shovelnose Guitarfish	0.0262	1.3367	2.10	--	2.10
Stary Skate	0.0016	0.2380	0.13	--	0.13
Thornback Skate	0.0096	0.4155	0.77	--	0.77

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

**Table 5.** Observed discard ratios, standard error, estimated discard (mt), landings (mt), and fishing mortality estimates (mt) of groundfish species from state pink shrimp fisheries. Ratios are computed as the observed discard weight divided by the observed weight of retained pink shrimp (adjusted to fish tickets). Discard ratios were multiplied by state fleet landings of pink shrimp to generate estimated discard.

Pink Shrimp Trawl Fishery	Washington					Oregon					California				
	Observed vessels	Observed trips	Observed tows	Expansion factor: Fleet landings of pink shrimp (mt)		Observed vessels	Observed trips	Observed tows	Expansion factor: Fleet landings of pink shrimp (mt)		Observed vessels	Observed trips	Observed tows	Expansion factor: Fleet landings of pink shrimp (mt)	
	11	35	566	4,211.9		41	132	1,819	21,915.1		8	19	194	3,333.0	
Weight (mt)	Discard Ratio	SE	Discard	Landed	Estimate	Discard Ratio	SE	Discard	Landed	Estimate	Discard Ratio	SE	Discard	Landed	Estimate
<b>Rebuilding species</b>															
Canary rockfish	0.0000	0.0013	0.02	--	0.02	0.0000	NA	0.01	--	0.01	--	--	--	--	--
Darkblotched rockfish	0.0003	0.0006	1.37	--	1.37	0.0005	0.0058	10.09	0.00	10.09	0.0002	0.0004	0.53	--	0.53
Pacific Ocean Perch (North of 40°10' N. lat.)	0.0000	0.0004	0.14	--	0.14	0.0000	0.0001	0.41	--	0.41	0.0000	NA	0.00	--	0.00
Petrale sole	0.0002	0.0007	0.74	--	0.74	0.0000	0.0009	1.01	0.00	1.02	0.0000	0.0003	0.02	--	0.02
Yelloweye rockfish	--	--	--	--	--	0.0000	0.0001	0.00	--	0.00	--	--	--	--	--
<b>Other groundfish species</b>															
Arrowtooth flounder	0.0005	0.0020	2.03	--	2.03	0.0002	0.0005	4.35	--	4.35	0.0003	0.0013	1.13	--	1.13
California scorpionfish (South of 34°27' N. lat.)	--	--	--	--	--	--	--	--	--	--	--	--	--	1.05	1.05
Dover sole	0.0002	0.0009	0.93	--	0.93	0.0001	0.0009	2.37	0.00	2.37	0.0000	0.0007	0.03	0.08	0.11
English sole	0.0000	0.0015	0.03	--	0.03	0.0000	0.0010	0.39	--	0.39	--	--	--	0.33	0.33
Lingcod (North of 42° N. lat.)	0.0001	0.0027	0.44	--	0.44	0.0000	0.0005	0.14	--	0.14	--	--	--	--	--
Lingcod (South of 42° N. lat.)	--	--	--	--	--	0.0000	0.0008	0.01	--	0.01	0.0000	0.0003	0.04	--	0.04
Longnose skate	0.0001	0.0037	0.47	--	0.47	0.0000	0.0014	0.41	--	0.41	0.0000	0.0003	0.04	0.04	0.08
Minor nearshore rockfish (North of 40°10' N. lat.)															
Olive Rockfish	--	--	--	--	--	0.0000	NA	0.03	--	0.03	--	--	--	--	--
Minor nearshore rockfish (South of 40°10' N. lat.)															
Brown Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	0.03	0.03
Copper Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01	0.01
Minor shelf rockfish (North of 40°10' N. lat.)															
Bocaccio Rockfish	--	--	--	--	--	--	--	--	--	--	0.0000	NA	0.00	--	0.00
Chilipepper Rockfish	0.0000	0.0001	0.00	--	0.00	0.0000	0.0001	0.10	--	0.10	0.0000	0.0001	0.07	--	0.07
Cowcod Rockfish	--	--	--	--	--	0.0000	0.0008	0.00	--	0.00	--	--	--	--	--
Greenstriped Rockfish	0.0001	0.0002	0.31	--	0.31	0.0000	0.0005	0.69	--	0.69	0.0000	0.0002	0.16	--	0.16
Halfbanded Rockfish	--	--	--	--	--	0.0000	0.0002	0.00	--	0.00	0.0000	NA	0.00	--	0.00
Harlequin Rockfish	0.0000	0.0001	0.02	--	0.02	0.0000	0.0001	0.00	--	0.00	--	--	--	--	--
Pygmy Rockfish	--	--	--	--	--	0.0000	0.0002	0.04	--	0.04	--	--	--	--	--
Redstripe Rockfish	0.0000	NA	0.00	--	0.00	0.0000	NA	0.00	--	0.00	--	--	--	--	--
Rosethorn Rockfish	--	--	--	--	--	0.0000	NA	0.00	--	0.00	--	--	--	--	--
Shelf Rockfish Unid	0.0000	0.0013	0.14	--	0.14	0.0001	0.0006	1.21	0.00	1.21	0.0002	0.0113	0.76	--	0.76
Stripetail Rockfish	0.0000	0.0001	0.01	--	0.01	0.0000	0.0010	0.61	--	0.61	0.0000	0.0006	0.00	--	0.00
Tiger Rockfish	--	--	--	--	--	0.0000	NA	0.00	--	0.00	0.0000	NA	0.00	--	0.00
Minor slope rockfish (North of 40°10' N. lat.)															
Aurora Rockfish	--	--	--	--	--	0.0000	0.0045	0.12	--	0.12	--	--	--	--	--
Bank Rockfish	--	--	--	--	--	0.0000	NA	0.00	--	0.00	--	--	--	--	--
Blackgill Rockfish	0.0000	0.0002	0.01	--	0.01	0.0000	0.0009	0.00	--	0.00	--	--	--	--	--
Redbanded Rockfish	0.0000	0.0000	0.03	--	0.03	0.0000	0.0001	0.03	--	0.03	0.0000	0.0002	0.00	--	0.00
Rougheye Rockfish	--	--	--	--	--	0.0000	0.0008	0.01	--	0.01	--	--	--	--	--
Sharpchin Rockfish	0.0000	0.0005	0.01	--	0.01	0.0000	0.0022	0.03	--	0.03	0.0000	NA	0.00	--	0.00
Slope Rockfish Unid	--	--	--	--	--	--	--	--	0.00	0.00	--	--	--	--	--
Splitnose Rockfish	0.0002	0.0023	0.92	--	0.92	0.0001	0.0004	1.10	--	1.10	0.0000	0.0001	0.01	--	0.01

Table 5 (continued).

Pink Shrimp Trawl Fishery	Washington					Oregon					California				
	Observed vessels	Observed trips	Observed tows	Expansion factor: Fleet landings of pink shrimp (mt)		Observed vessels	Observed trips	Observed tows	Expansion factor: Fleet landings of pink shrimp (mt)		Observed vessels	Observed trips	Observed tows	Expansion factor: Fleet landings of pink shrimp (mt)	
	11	35	566	4,211.9		41	132	1,819	21,915.1		8	19	194	3,333.0	
Weight (mt)	Discard Ratio	SE	Discard	Landed	Estimate	Discard Ratio	SE	Discard	Landed	Estimate	Discard Ratio	SE	Discard	Landed	Estimate
Other flatfish															
Curlfin Turbot	--	--	--	--	--	0.0000	NA	0.00	--	0.00	--	--	--	--	--
Flatfin Unid	--	--	--	--	--	0.0001	0.0072	1.11	--	1.11	0.0008	0.0638	2.79	8.79	11.58
Flathead Sole	0.0000	0.0004	0.20	--	0.20	0.0000	0.0002	1.08	--	1.08	0.0000	0.0001	0.01	--	0.01
Pacific Sanddab	0.0000	0.0013	0.15	--	0.15	0.0001	0.0005	2.20	--	2.20	0.0001	0.0014	0.33	--	0.33
Rex Sole	0.0018	0.0032	7.57	0.01	7.58	0.0006	0.0009	13.33	--	13.33	0.0001	0.0003	0.33	1.05	1.38
Rock Sole	--	--	--	--	--	0.0000	0.0004	0.01	--	0.01	--	--	--	0.08	0.08
Sanddab Unid	--	--	--	--	--	--	--	--	--	--	--	--	--	0.70	0.70
Other groundfish															
Big Skate	0.0001	0.0344	0.34	--	0.34	0.0000	0.0513	0.22	--	0.22	--	--	--	--	--
Spotted Ratfish	0.0000	0.0009	0.11	--	0.11	0.0000	0.0005	0.06	--	0.06	--	--	--	--	--
Unspecified Skate	--	--	--	--	--	--	--	--	--	--	--	--	--	2.66	2.66
Pacific cod	0.0000	0.0017	0.04	--	0.04	--	--	--	0.03	0.03	--	--	--	--	--
Pacific hake	0.0049	0.0088	20.66	--	20.66	0.0107	0.0195	233.53	--	233.53	0.0084	0.1397	27.90	--	27.90
Sablefish (North of 36° N. lat.)	0.0000	0.0014	0.02	--	0.02	0.0000	0.0026	0.05	0.00	0.05	0.0000	0.0016	0.03	--	0.03
Shortbelly rockfish	0.0000	0.0003	0.00	--	0.00	0.0000	0.0001	0.15	--	0.15	0.0000	0.0001	0.06	--	0.06
Shortspine thornyhead (North of 34°27' N. lat.)	0.0000	0.0004	0.00	--	0.00	0.0000	0.0010	0.21	--	0.21	--	--	--	--	--
Spiny dogfish	0.0007	0.7001	2.80	--	2.80	0.0000	0.0006	0.06	--	0.06	0.0000	0.0004	0.03	0.01	0.03
Widow rockfish	--	--	--	--	--	0.0000	NA	0.00	--	0.00	0.0000	NA	0.00	0.04	0.04
Yellowtail rockfish (North of 40°10' N. lat.)	0.0001	0.0078	0.26	--	0.26	0.0000	NA	0.01	0.00	0.01	0.0000	0.0001	0.00	--	0.00
<b>Non-groundfish species</b>															
California halibut	--	--	--	--	--	--	--	--	--	--	--	--	--	7.58	7.58
Dungeness crab	0.0000	NA	0.01	--	0.01	0.0000	0.0007	0.05	--	0.05	0.0000	0.0002	0.01	--	0.01
Non-FMP flatfish															
C-O (C-O Turbot) Sole	0.0000	NA	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--
Hornyhead Turbot	--	--	--	--	--	--	--	--	--	--	--	--	--	4.49	4.49
Slender Sole	0.0056	0.0069	23.70	--	23.70	0.0041	0.0040	90.35	--	90.35	0.0014	0.0033	4.73	--	4.73
Non-FMP skate															
Aleutian Skate	--	--	--	--	--	0.0000	NA	0.00	--	0.00	--	--	--	--	--
Black Skate	0.0000	NA	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--
Sandpaper Skate	0.0000	0.0019	0.01	--	0.01	0.0000	0.0002	0.02	--	0.02	--	--	--	--	--
Starry Skate	0.0000	0.0005	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--

**Table 6.** Observed discard ratios, standard error, estimated discard (mt), landings (mt), and fishing mortality estimates (mt) from the LE sablefish endorsed primary season (tier endorsed) fixed gear fleet in 2011. Ratios are computed as the observed discard weight divided by the observed weight of retained sablefish (adjusted to fish tickets). Discard ratios were multiplied by fleet landings of sablefish to generate discard estimates for each gear type; combined with other fixed gear sectors in Table 9.

Limited Entry Sablefish Endorsed Primary Season	Longline					Pot				
	Observed vessels	Observed trips	Observed sets	Expansion factor:		Observed vessels	Observed trips	Observed sets	Expansion factor:	
				Fleet landings of sablefish (mt)					Fleet landings of sablefish (mt)	
	23	98	673	1,142.2		3	22	227	376.8	
Weight (mt)	Discard Ratio	SE	Discard	Landed	Estimate	Discard Ratio	SE	Discard	Landed	Estimate
<b>Rebuilding species</b>										
Canary rockfish	0.0001	0.0205	0.09	--	0.09	--	--	--	--	--
Darkblotched rockfish	0.0001	0.0016	0.13	7.01	7.14	0.0001	0.0014	0.05	0.76	0.81
Pacific Ocean Perch (North of 40°10' N. lat.)	0.0000	0.0036	0.02	0.41	0.42	--	--	--	0.01	0.01
Petrale sole	0.0000	0.0043	0.05	0.11	0.17	0.0000	NA	0.00	0.00	0.00
Yelloweye rockfish	0.0003	0.0513	0.29	0.00	0.30	--	--	--	--	--
<b>Other groundfish species</b>										
Arrowtooth flounder	0.0309	0.0514	35.25	1.31	36.56	0.0029	0.0139	1.09	0.23	1.32
Chilipepper rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	--	--	--
Dover sole	0.0005	0.0039	0.54	1.34	1.88	0.0018	0.0071	0.69	0.12	0.81
Lingcod (North of 42° N. lat.)	0.0007	0.0131	0.82	5.83	6.65	0.0003	0.0137	0.13	0.95	1.08
Lingcod (South of 42° N. lat.)	0.0001	0.0174	0.06	0.48	0.55	0.0053	0.1080	2.00	0.45	2.45
Longnose skate	0.0469	0.0641	53.55	13.80	67.35	--	--	--	--	--
Longspine thornyhead (North of 34°27' N. lat.)	0.0000	0.0010	0.02	0.71	0.74	0.0000	0.0005	0.01	0.01	0.02
Longspine thornyhead (South of 34°27' N. lat.)	0.0000	0.0150	0.03	--	0.03	--	--	--	--	--
Minor shelf rockfish (North of 40°10' N. lat.)										
Bocaccio Rockfish	0.0000	NA	0.02	0.14	0.16	--	--	--	--	--
Bronzespotted Rockfish	0.0000	NA	0.01	--	0.01	--	--	--	--	--
Chilipepper Rockfish	--	--	--	0.00	0.00	0.0000	NA	0.00	--	0.00
Greenspotted Rockfish	--	--	--	0.00	0.00	--	--	--	--	--
Greenstriped Rockfish	0.0002	0.0076	0.21	0.01	0.23	--	--	--	--	--
Redstripe Rockfish	--	--	--	0.00	0.00	--	--	--	--	--
Rosethorn Rockfish	0.0001	0.0042	0.17	0.20	0.37	0.0000	0.0004	0.00	--	0.00
Shelf Rockfish Unid	0.0000	NA	0.01	0.60	0.60	--	--	--	0.00	0.00
Silvergray Rockfish	--	--	--	0.03	0.03	--	--	--	--	--
Stripetail Rockfish	--	--	--	0.00	0.00	--	--	--	--	--
Tiger Rockfish	0.0000	0.0054	0.01	--	0.01	--	--	--	--	--
Minor shelf rockfish (South of 40°10' N. lat.)										
Flag Rockfish	--	--	--	0.01	0.01	--	--	--	--	--
Greenstriped Rockfish	0.0000	NA	0.00	--	0.00	--	--	--	--	--
Rosethorn Rockfish	0.0000	0.0088	0.03	--	0.03	--	--	--	--	--
Shelf Rockfish Unid	--	--	--	0.00	0.00	--	--	--	--	--
Minor slope rockfish (North of 40°10' N. lat.)										
Aurora Rockfish	0.0000	0.0020	0.01	0.05	0.06	0.0000	0.0024	0.00	0.01	0.01
Bank Rockfish	--	--	--	0.18	0.18	--	--	--	--	--
Blackgill Rockfish	0.0001	0.0074	0.08	0.79	0.86	0.0001	0.0032	0.03	0.02	0.06
Blackspotted Rockfish	--	--	--	0.24	0.24	--	--	--	--	--
Redbanded Rockfish	0.0014	0.0070	1.55	9.57	11.13	0.0007	0.0066	0.26	0.13	0.39
Rougheye Rockfish	0.0008	0.0057	0.89	31.19	32.08	0.0001	0.0040	0.03	1.87	1.89
Shortraker Rockfish	0.0000	0.0049	0.01	2.50	2.51	--	--	--	0.07	0.07
Shortraker/Rougheye Rockfish	0.0001	0.0387	0.15	--	0.15	--	--	--	--	--
Slope Rockfish Unid	0.0000	0.0134	0.01	0.99	1.00	--	--	--	0.66	0.66
Splitnose Rockfish	0.0000	0.0008	0.00	0.07	0.07	0.0000	0.0027	0.01	--	0.01
Yellowmouth Rockfish	--	--	--	0.04	0.04	--	--	--	--	--
Minor slope rockfish (South of 40°10' N. lat.)										
Aurora Rockfish	0.0002	0.0502	0.19	0.09	0.28	--	--	--	--	--
Blackgill Rockfish	0.0023	0.4418	2.67	7.93	10.61	--	--	--	--	--
Redbanded Rockfish	0.0001	0.0359	0.09	0.02	0.11	--	--	--	--	--
Rougheye Rockfish	0.0001	0.0186	0.08	0.20	0.28	--	--	--	--	--
Slope Rockfish Unid	--	--	--	0.40	0.40	--	--	--	1.06	1.06



Table 6 (continued).

Limited Entry Sablefish Endorsed Primary Season  Weight (mt)	Longline					Pot				
	Observed vessels	Observed trips	Observed sets	Expansion factor: Fleet landings of sablefish (mt)		Observed vessels	Observed trips	Observed sets	Expansion factor: Fleet landings of sablefish (mt)	
				23	98				673	1,142.2
	Discard Ratio	SE	Discard	Landed	Estimate	Discard Ratio	SE	Discard	Landed	Estimate
Mixed thornyheads										
Shortspine/ Longspine Thornyhead	0.0000	NA	0.01	--	0.01	--	--	--	--	--
Other flatfish										
Curlfin Turbot	0.0000	NA	0.00	--	0.00	--	--	--	--	--
Rex Sole	0.0000	NA	0.00	--	0.00	--	--	--	--	--
Other groundfish										
Big Skate	0.0007	0.1151	0.80	0.07	0.87	--	--	--	--	--
Grenadier Unid	--	--	--	5.20	5.20	--	--	--	0.00	0.00
Pacific Flatnose	0.0001	0.0718	0.12	--	0.12	0.0000	0.0024	0.01	--	0.01
Pacific Grenadier	0.0010	0.0942	1.20	--	1.20	0.0016	0.0165	0.62	--	0.62
Spotted Ratfish	0.0020	0.0115	2.26	--	2.26	--	--	--	--	--
Unspecified Skate	--	--	--	5.19	5.19	--	--	--	0.01	0.01
Other rockfish	--	--	--	0.01	0.01	--	--	--	--	--
Pacific cod	0.0001	0.0114	0.10	1.45	1.55	--	--	--	--	--
Pacific hake	0.0001	0.0096	0.10	0.01	0.11	0.0000	NA	0.01	--	0.01
Sablefish (North of 36° N. lat.)	0.2481	0.0875	283.33	1,121.61	1,178.28	0.4005	0.1701	150.90	350.21	380.39
20% discard mortality (Fixed Gear)*			56.67					30.18		
Sablefish (South of 36° N. lat.)	--	--	--	20.60	20.60	--	--	--	26.56	26.56
Shortspine thornyhead (North of 34°27' N. lat.)	0.0009	0.0023	1.03	19.31	20.34	0.0001	0.0035	0.03	0.29	0.32
Shortspine thornyhead (South of 34°27' N. lat.)	0.0001	0.0456	0.08	2.01	2.08	--	--	--	--	--
Spiny dogfish	0.0401	0.1254	45.82	4.82	50.63	0.0010	0.0239	0.38	0.41	0.80
Splitnose rockfish (South of 40°10' N. lat.)	0.0000	0.0016	0.00	0.03	0.03	--	--	--	--	--
Widow rockfish	0.0000	0.0389	0.04	0.01	0.05	--	--	--	--	--
Yellowtail rockfish (North of 40°10' N. lat.)	0.0001	0.0109	0.08	0.25	0.34	--	--	--	--	--
<b>Non-groundfish species</b>										
Dungeness crab	0.0000	0.0135	0.04	--	0.04	0.0015	0.0193	0.58	--	0.58
Non-FMP flatfish										
Deepsea Sole	--	--	--	--	--	0.0000	0.0007	0.00	--	0.00
Non-FMP skate										
Black Skate	0.0003	0.0664	0.32	--	0.32	--	--	--	--	--
Sandpaper Skate	0.0005	0.0139	0.53	--	0.53	0.0000	NA	0.00	--	0.00

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

**Table 7.** Observed discard ratios, standard error, estimated discard (mt), landings (mt), and fishing mortality estimates (mt) from the LE non-endorsed fixed gear fleet in 2011. Ratios are computed as the observed discard weight divided by the observed weight of retained sablefish (north of 36° N lat.) or FMP groundfish (south of 36° N lat. and coast-wide) (adjusted to fish tickets). Discard ratios were multiplied by fleet landings of sablefish or FMP groundfish to generate discard estimates for each gear type; combined with fixed gear sectors in Table 9.

Limited Entry Non-Endorsed Fixed Gear	Longline - North of 36° N lat.					Longline - South of 36° N lat.					Pot - Coastwide				
	Observed vessels	Observed trips	Observed sets	Expansion factor: Fleet landings of sablefish (mt)		Observed vessels	Observed trips	Observed sets	Expansion factor: Fleet landings of groundfish (mt)		OA Observed (see Table 8b)	Expansion factor: Fleet landings of groundfish (mt)			
				11	34				93	524.5		27	167	333	420.3
Weight (mt)	Discard Ratio	SE	Discard	Landed	Estimate	Discard Ratio	SE	Discard	Landed	Estimate	Discard Ratio	SE	Discard	Landed	Estimate
<b>Rebuilding species</b>															
Bocaccio rockfish (South of 40°10' N. lat.)	--	--	--	0.02	0.02	--	--	--	0.00	0.00	--	--	--	--	--
Darkblotched rockfish	0.0002	0.0040	0.08	0.14	0.23	--	--	--	5.08	5.08	--	--	--	0.00	0.00
Pacific Ocean Perch (North of 40°10' N. lat.)	--	--	--	--	--	--	--	--	0.12	0.12	--	--	--	--	--
Petrale sole	0.0000	0.0039	0.01	0.01	0.01	--	--	--	0.37	0.37	--	--	--	0.00	0.00
<b>Other groundfish species</b>															
Arrowtooth flounder	0.0308	0.2056	16.13	--	16.13	--	--	--	1.68	1.68	0.0001	NA	0.00	0.06	0.06
Black rockfish (South of 46°16' N. lat.)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chilipepper rockfish (South of 40°10' N.lat.)	--	--	--	--	--	--	--	--	0.03	0.03	--	--	--	--	--
Dover sole	0.0001	0.0035	0.04	0.43	0.47	0.0027	0.0107	1.15	0.71	1.86	0.0007	0.0041	0.02	0.02	0.03
Lingcod (North of 42° N. lat.)	0.0002	0.0382	0.12	--	0.12	--	--	--	1.18	1.18	--	--	--	--	--
Lingcod (South of 42° N. lat.)	--	--	--	0.01	0.01	--	--	--	0.18	0.18	0.0001	NA	0.00	0.11	0.11
Longnose skate	0.0386	0.1087	20.24	1.05	21.29	0.0248	0.2487	10.42	9.40	19.82	--	--	--	--	--
Longspine thornyhead (North of 34°27'N.lat.)	0.0003	0.0031	0.16	3.38	3.54	0.0022	0.0344	0.94	0.56	1.50	--	--	--	--	--
Longspine thornyhead (South of 34°27'N.lat.)	--	--	--	19.73	19.73	0.0041	0.0038	1.74	--	1.74	--	--	--	--	--
Minor shelf rockfish (North of 40°10' N. lat.)															
Bocaccio Rockfish	--	--	--	--	--	--	--	--	0.03	0.03	--	--	--	--	--
Chilipepper Rockfish	--	--	--	--	--	--	--	--	0.00	0.00	--	--	--	--	--
Greenspotted Rockfish	--	--	--	--	--	--	--	--	0.00	0.00	--	--	--	--	--
Greenstriped Rockfish	--	--	--	--	--	--	--	--	0.00	0.00	--	--	--	--	--
Redstripe Rockfish	--	--	--	--	--	--	--	--	0.00	0.00	--	--	--	--	--
Rosethorn Rockfish	--	--	--	--	--	--	--	--	0.03	0.03	--	--	--	--	--
Shelf Rockfish Unid	--	--	--	--	--	--	--	--	0.04	0.04	--	--	--	--	--
Silvergray Rockfish	--	--	--	--	--	--	--	--	0.02	0.02	--	--	--	--	--
Stripetail Rockfish	--	--	--	--	--	--	--	--	0.00	0.00	--	--	--	--	--
Minor shelf rockfish (South of 40°10' N. lat.)															
Flag Rockfish	--	--	--	--	--	--	--	--	0.01	0.01	--	--	--	--	--
Greenspotted Rockfish	--	--	--	0.01	0.01	--	--	--	0.00	0.00	--	--	--	--	--
Shelf Rockfish Unid	--	--	--	--	--	--	--	--	0.03	0.03	--	--	--	--	--
Vermilion Rockfish	--	--	--	0.71	0.71	--	--	--	--	--	--	--	--	--	--

Table 7 (continued).

Limited Entry Non-Endorsed Fixed Gear  Weight (mt)	Longline - North of 36° N lat.					Longline - South of 36° N lat.					Pot - Coastwide				
	Observed vessels	Observed trips	Observed sets	Expansion factor: Fleet landings of sablefish (mt)		Observed vessels	Observed trips	Observed sets	Expansion factor: Fleet landings of groundfish (mt)		OA Observed (see Table 8b)	Observed	Expansion factor: Fleet landings of groundfish (mt)		
				11	34				93	524.5			27	167	333
	Discard Ratio	SE	Discard	Landed	Estimate	Discard Ratio	SE	Discard	Landed	Estimate	Discard Ratio	SE	Discard	Landed	Estimate
Minor slope rockfish (North of 40°10' N. lat.)															
Aurora Rockfish	0.0000	NA	0.02	--	0.02	--	--	--	0.01	0.01	--	--	--	0.00	0.00
Bank Rockfish	--	--	--	--	--	--	--	--	0.04	0.04	--	--	--	--	--
Blackgill Rockfish	--	--	--	--	--	--	--	--	0.30	0.30	--	--	--	--	--
Blackspotted Rockfish	--	--	--	--	--	--	--	--	0.03	0.03	--	--	--	--	--
Redbanded Rockfish	--	--	--	--	--	--	--	--	4.24	4.24	0.0001	NA	0.00	--	0.00
Rougheye Rockfish	0.0001	0.0013	0.03	--	0.03	--	--	--	4.96	4.96	--	--	--	0.00	0.00
Shortraker Rockfish	--	--	--	--	--	--	--	--	0.31	0.31	--	--	--	--	--
Slope Rockfish Unid	--	--	--	--	--	--	--	--	0.32	0.32	--	--	--	0.12	0.12
Splitnose Rockfish	--	--	--	--	--	--	--	--	0.07	0.07	--	--	--	--	--
Yellowmouth Rockfish	--	--	--	--	--	--	--	--	0.01	0.01	--	--	--	--	--
Minor slope rockfish (South of 40°10' N.lat.)															
Aurora Rockfish	--	--	--	0.15	0.15	0.0000	0.0010	0.00	0.04	0.04	0.0005	0.0273	0.01	--	0.01
Bank Rockfish	--	--	--	0.92	0.92	--	--	--	0.09	0.09	--	--	--	--	--
Blackgill Rockfish	--	--	--	66.62	66.62	0.0028	0.1273	1.18	4.60	5.78	0.0018	0.0135	0.05	0.00	0.05
Redbanded Rockfish	--	--	--	--	--	--	--	--	0.01	0.01	0.0007	0.0055	0.02	--	0.02
Rougheye Rockfish	--	--	--	--	--	--	--	--	0.06	0.06	--	--	--	--	--
Slope Rockfish Unid	--	--	--	0.01	0.01	--	--	--	0.09	0.09	--	--	--	--	--
Mixed thornyheads															
Shortspine/ Longspine Thornyhead	--	--	--	0.02	0.02	0.0005	0.2383	0.20	--	0.20	--	--	--	0.00	0.00
Other flatfish															
Flatfish Unid	--	--	--	0.06	0.06	--	--	--	--	--	--	--	--	--	--
Pacific Sanddab	--	--	--	0.98	0.98	0.0000	NA	0.00	--	0.00	--	--	--	--	--
Sanddab Unid	--	--	--	0.01	0.01	--	--	--	--	--	--	--	--	--	--
Sand Sole	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--
Other groundfish															
Big Skate	--	--	--	--	--	0.0020	0.5277	0.82	0.00	0.82	--	--	--	--	--
Grenadier Unid	--	--	--	9.56	9.56	--	--	--	11.73	11.73	--	--	--	0.01	0.01
Pacific Flatnose	0.0020	0.1163	1.07	--	1.07	0.0024	0.1636	1.01	--	1.01	--	--	--	--	--
Pacific Grenadier	0.0611	1.9740	32.06	--	32.06	0.0316	1.3400	13.27	--	13.27	0.0007	0.0157	0.02	--	0.02
Spotted Ratfish	0.0018	0.0174	0.93	0.01	0.94	0.0007	0.0575	0.29	--	0.29	--	--	--	--	--
Unspecified Skate	--	--	--	0.65	0.65	--	--	--	3.07	3.07	--	--	--	--	--
Other rockfish	--	--	--	0.00	0.00	--	--	--	0.00	0.00	--	--	--	--	--

Table 7 (continued).

Limited Entry Non-Endorsed Fixed Gear  Weight (mt)	Longline - North of 36° N lat.					Longline - South of 36° N lat.					Pot - Coastwide								
	Observed vessels	Observed trips	Observed sets	Expansion factor: Fleet landings of sablefish (mt)		Observed vessels	Observed trips	Observed sets	Expansion factor: Fleet landings of groundfish (mt)		OA Observed (see Table 8b)	Expansion factor: Fleet landings of groundfish (mt)							
				27	167				333	420.3		25.6		Discard Ratio	SE	Discard	Landed	Estimate	
	11	34	93	524.5		27	167	333	420.3										
	Discard Ratio	SE	Discard	Landed	Estimate	Discard Ratio	SE	Discard	Landed	Estimate	Discard Ratio	SE	Discard	Landed	Estimate				
Pacific cod	--	--	--	--	--	--	--	--	0.36	0.36	--	--	--	--	--				
Pacific hake	0.0004	0.1243	0.22	0.03	0.25	0.0001	0.0134	0.06	0.01	0.07	--	--	--	--	--				
Sablefish (North of 36° N. lat.)	0.2032	0.1365	106.61	--	21.32	--	--	--	357.71	357.71	0.1034	0.1062	2.65	15.27	15.80				
20% discard mortality (Fixed Gear)*			21.32										0.53						
Sablefish (South of 36° N. lat.)	--	--	--	524.55	524.55	0.0926	0.2665	38.91	--	7.78	0.0026	0.0098	0.07	9.77	9.78				
20% discard mortality (Fixed Gear)*								7.78					0.01						
Shortspine thornyhead (North of 34°27'N.lat.)	0.0007	0.0052	0.39	28.47	28.85	0.0010	0.0136	0.44	9.82	10.26	0.0001	NA	0.00	0.04	0.04				
Shortspine thornyhead (South of 34°27'N.lat.)	--	--	--	160.72	160.72	0.0143	0.0098	6.02	--	6.02	--	--	--	--	--				
Spiny dogfish	0.1281	0.5123	67.19	0.01	67.19	0.0011	0.0452	0.47	2.90	3.36	--	--	--	0.20	0.20				
Splitnose rockfish (South of 40°10' N. lat.)	--	--	--	0.02	0.02	--	--	--	0.00	0.00	--	--	--	--	--				
Widow rockfish	--	--	--	--	--	--	--	--	0.00	0.00	--	--	--	--	--				
Yellowtail rockfish (North of 40°10' N. lat.)	0.0015	0.0773	0.78	--	0.78	--	--	--	0.01	0.01	--	--	--	--	--				
<b>Non-groundfish species</b>																			
California halibut	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--				
Dungeness crab	--	--	--	--	--	--	--	--	--	--	0.0009	0.0209	0.02	0.52	0.54				
Non-FMP skate																			
Black Skate	0.0001	NA	0.07	0.11	0.18	0.0077	0.1124	3.25	--	3.25	--	--	--	--	--				
Deepsea Skate	--	--	--	--	--	0.0003	0.1281	0.12	--	0.12	--	--	--	--	--				
Pelagic Stingray	--	--	--	--	--	0.0002	0.0517	0.08	--	0.08	--	--	--	--	--				
Sandpaper Skate	0.0006	0.0444	0.29	--	0.29	0.0008	0.0816	0.33	--	0.33	0.0001	NA	0.00	--	0.00				

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

**Table 8a.** Observed discard ratios, standard error, estimated discard (mt), landings (mt), and fishing mortality estimates (mt) from the OA fixed gear longline fleet in 2011. Ratios are computed as the observed discard weight divided by the observed weight of retained sablefish or FMP groundfish (adjusted to fish tickets). Discard ratios were multiplied by fleet landings of sablefish or FMP groundfish to generate discard estimates; combined with fixed gear sectors in Table 9.

Open Access Fixed Gear	Longline - North of 36° N lat.					Longline - South of 36° N lat.				
	Observed vessels	Observed trips	Observed sets	Expansion factor: Fleet landings of sablefish (mt)		Observed vessels	Observed trips	Observed sets	Expansion factor: Fleet landings of groundfish (mt)	
	59	107	147	100.3		4	9	24	273.3	
Weight (mt)	Discard Ratio	SE	Discard	Landed	Estimate	Discard Ratio	SE	Discard	Landed	Estimate
<b>Rebuilding species</b>										
Bocaccio rockfish (South of 40°10' N. lat.)	--	--	--	1.16	1.16	--	--	--	0.39	0.39
Darkblotched rockfish	0.0006	0.0126	0.06	0.00	0.06	--	--	--	2.47	2.47
Pacific Ocean Perch (North of 40°10' N. lat.)	--	--	--	--	--	--	--	--	0.08	0.08
Petrale sole	--	--	--	0.08	0.08	--	--	--	0.04	0.04
<b>Other groundfish species</b>										
Arrowtooth flounder	0.0363	0.1769	3.64	--	3.64	--	--	--	0.98	0.98
Chilipepper rockfish (South of 40°10' N. lat.)	--	--	--	0.05	0.05	--	--	--	0.59	0.59
Dover sole	0.0032	0.0187	0.32	0.04	0.36	0.0040	0.0356	1.08	0.32	1.40
Lingcod (North of 42° N. lat.)	0.0010	0.0642	0.10	--	0.10	--	--	--	8.32	8.32
Lingcod (South of 42° N. lat.)	0.0003	0.1098	0.03	0.74	0.77	--	--	--	2.00	2.00
Longnose skate	0.0282	0.1659	2.83	--	2.83	0.5087	4.4442	139.04	3.81	142.85
Longspine thomyhead (North of 34°27' N. lat.)	0.0019	0.0503	0.19	0.05	0.24	0.0017	0.0187	0.46	0.00	0.46
Longspine thomyhead (South of 34°27' N. lat.)	--	--	--	0.66	0.66	--	--	--	--	--
Minor shelf rockfish (North of 40°10' N. lat.)										
Bocaccio Rockfish	--	--	--	--	--	--	--	--	0.01	0.01
Greenspotted Rockfish	--	--	--	--	--	--	--	--	0.00	0.00
Greenstriped Rockfish	0.0000	NA	0.00	--	0.00	--	--	--	0.00	0.00
Redstripe Rockfish	0.0000	NA	0.00	--	0.00	--	--	--	--	--
Rosethorn Rockfish	0.0000	0.0047	0.00	--	0.00	--	--	--	0.00	0.00
Shelf Rockfish Unid	--	--	--	--	--	--	--	--	0.14	0.14
Silvergray Rockfish	--	--	--	--	--	--	--	--	0.02	0.02
Stripetail Rockfish	--	--	--	--	--	--	--	--	0.00	0.00
Tiger Rockfish	--	--	--	--	--	--	--	--	0.00	0.00
Vermilion Rockfish	--	--	--	--	--	--	--	--	0.04	0.04
Minor shelf rockfish (South of 40°10' N. lat.)										
Flag Rockfish	--	--	--	0.18	0.18	--	--	--	0.00	0.00
Freckled Rockfish	--	--	--	0.00	0.00	--	--	--	--	--
Greenblotched Rockfish	--	--	--	0.10	0.10	--	--	--	--	--
Greenspotted Rockfish	0.0000	NA	0.00	0.80	0.80	--	--	--	0.01	0.01
Greenstriped Rockfish	--	--	--	0.06	0.06	--	--	--	--	--
Honeycomb Rockfish	--	--	--	0.03	0.03	--	--	--	--	--
Rosethorn Rockfish	--	--	--	0.00	0.00	--	--	--	--	--
Rosy Rockfish	--	--	--	0.05	0.05	--	--	--	0.00	0.00
Shelf Rockfish Unid	--	--	--	0.14	0.14	--	--	--	0.01	0.01
Speckled Rockfish	--	--	--	0.09	0.09	--	--	--	--	--
Squarespot Rockfish	--	--	--	0.00	0.00	--	--	--	--	--
Starry Rockfish	--	--	--	0.22	0.22	--	--	--	0.01	0.01
Vermilion Rockfish	--	--	--	7.45	7.45	--	--	--	0.64	0.64
Yellowtail Rockfish	--	--	--	0.18	0.18	--	--	--	0.18	0.18
Minor slope rockfish (North of 40°10' N. lat.)										
Aurora Rockfish	--	--	--	--	--	--	--	--	0.00	0.00
Bank Rockfish	--	--	--	--	--	--	--	--	0.01	0.01
Blackgill Rockfish	--	--	--	--	--	--	--	--	0.12	0.12
Blackspotted Rockfish	--	--	--	--	--	--	--	--	0.01	0.01
Redbanded Rockfish	0.0013	0.0184	0.13	--	0.13	--	--	--	1.94	1.94
Rougheyeye Rockfish	0.0002	0.0066	0.02	--	0.02	--	--	--	1.43	1.43
Shortraker Rockfish	0.0002	0.0091	0.02	--	0.02	--	--	--	0.07	0.07
Slope Rockfish Unid	--	--	--	--	--	--	--	--	0.10	0.10
Splitnose Rockfish	0.0000	0.0141	0.00	--	0.00	--	--	--	0.02	0.02
Yellowmouth Rockfish	--	--	--	--	--	--	--	--	0.00	0.00

Table 8a (continued).

Open Access Fixed Gear	Longline - North of 36° N lat.					Longline - South of 36° N lat.				
	Observed vessels	Observed trips	Observed sets	Expansion factor:		Observed vessels	Observed trips	Observed sets	Expansion factor:	
				Fleet landings of sablefish (mt)					Fleet landings of groundfish (mt)	
Weight (mt)	59	107	147	100.3		4	9	24	273.3	
	Discard Ratio	SE	Discard	Landed	Estimate	Discard Ratio	SE	Discard	Landed	Estimate
Minor slope rockfish (South of 40°10' N. lat.)										
Aurora Rockfish	0.0000	NA	0.00	0.01	0.01	--	--	--	0.00	0.00
Bank Rockfish	--	--	--	0.09	0.09	--	--	--	--	--
Blackgill Rockfish	0.0007	0.0220	0.07	48.15	48.22	--	--	--	0.59	0.59
Redbanded Rockfish	0.0002	0.0382	0.02	--	0.02	--	--	--	0.00	0.00
Rougheye Rockfish	--	--	--	--	--	--	--	--	0.00	0.00
Slope Rockfish Unid	--	--	--	0.10	0.10	--	--	--	--	--
Mixed thornyheads										
Shortspine/ Longspine Thornyhead	--	--	--	0.85	0.85	--	--	--	--	--
Other flatfish										
Flatfish Unid	--	--	--	0.11	0.11	--	--	--	0.00	0.00
Pacific Sanddab	--	--	--	1.89	1.89	--	--	--	1.22	1.22
Rock Sole	--	--	--	0.00	0.00	--	--	--	--	--
Sanddab Unid	--	--	--	--	--	--	--	--	0.00	0.00
Sand Sole	--	--	--	0.00	0.00	--	--	--	--	--
Other groundfish										
Big Skate	0.0008	0.2206	0.08	--	0.08	--	--	--	0.03	0.03
Grenadier Unid	--	--	--	0.18	0.18	--	--	--	7.59	7.59
Leopard Shark	--	--	--	0.11	0.11	--	--	--	0.05	0.05
Pacific Flatnose	0.0002	0.0150	0.02	--	0.02	--	--	--	--	--
Pacific Grenadier	0.0253	1.1136	2.54	--	2.54	0.0013	NA	0.35	--	0.35
Southern Shark	--	--	--	0.20	0.20	--	--	--	0.05	0.05
Spotted Ratfish	0.0007	0.0137	0.07	--	0.07	--	--	--	0.00	0.00
Unspecified Skate	0.0017	0.2293	0.17	0.25	0.42	--	--	--	1.02	1.02
Other rockfish	--	--	--	0.34	0.34	--	--	--	--	--
Pacific cod	0.0006	0.1298	0.06	--	0.06	--	--	--	0.39	0.39
Pacific hake	0.0001	NA	0.01	0.00	0.01	0.0035	0.1039	0.96	0.15	1.11
Sablefish (North of 36° N. lat.)	0.2097	0.1238	21.03	--	4.21	--	--	--	235.85	235.85
20% discard mortality (Fixed Gear)*			4.21							
Sablefish (South of 36° N. lat.)	--	--	--	100.31	100.31	0.0574	0.1039	15.69	--	3.14
20% discard mortality (Fixed Gear)*								3.14		
Shortspine thornyhead (North of 34°27' N. lat.)	0.0122	0.0615	1.22	0.94	2.16	0.0383	0.2639	10.48	0.42	10.90
Shortspine thornyhead (South of 34°27' N. lat.)	--	--	--	6.53	6.53	--	--	--	--	--
Spiny dogfish	0.0457	0.2549	4.58	0.01	4.60	0.0019	0.0314	0.51	2.22	2.73
Splitnose rockfish (South of 40°10' N. lat.)	--	--	--	0.06	0.06	--	--	--	0.00	0.00
Starry flounder	--	--	--	0.00	0.00	--	--	--	0.01	0.01
Widow rockfish	--	--	--	0.00	0.00	--	--	--	0.00	0.00
Yellowtail rockfish (North of 40°10' N. lat.)	0.0001	0.0246	0.01	--	0.01	--	--	--	0.07	0.07
<b>Non-groundfish species</b>										
California halibut	--	--	--	0.35	0.35	--	--	--	0.10	0.10
Dungeness crab	0.0010	0.1832	0.10	--	0.10	--	--	--	--	--
Non-FMP flatfish										
Bigmouth Sole	--	--	--	0.00	0.00	--	--	--	--	--
Slender Sole	--	--	--	0.00	0.00	--	--	--	--	--
Non-FMP skate										
Black Skate	0.0003	NA	0.03	0.12	0.15	--	--	--	--	--
Sandpaper Skate	0.0003	0.0039	0.03	--	0.03	0.0049	NA	1.35	--	1.35

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

**Table 8b.** Observed discard ratios, standard error, estimated discard (mt), landings (mt), and fishing mortality estimates (mt) from the OA fixed gear pot fleet in 2011. Ratios are computed as the observed discard weight divided by the observed weight of retained FMP groundfish (adjusted to fish tickets). Discard ratios were multiplied by fleet landings of FMP groundfish to generate discard estimates; combined with fixed gear sectors in Table 9.

Open Access Fixed Gear	Pot - Coastwide			North of 36° N lat.			South of 36° N lat.		
	Observed vessels	Observed trips	Observed sets	Expansion factor: Fleet landings of groundfish (mt)			Expansion factor: Fleet landings of groundfish (mt)		
	27	55	71	64.3			191.0		
	Discard Ratio		SE	Discard	Landed	Estimate	Discard	Landed	Estimate
<b>Rebuilding species</b>									
Bocaccio rockfish (South of 40°10' N. lat.)	--	--	--	0.00	0.00	--	--	--	
Darkblotched rockfish	--	--	--	--	--	--	0.00	0.00	
Pacific Ocean Perch (North of 40°10' N. lat.)	--	--	--	--	--	--	0.03	0.03	
Petrale sole	--	--	--	--	--	--	0.00	0.00	
<b>Other groundfish species</b>									
Arrowtooth flounder	0.0001	NA	0.01	--	0.01	0.03	0.01	0.04	
Dover sole	0.0007	0.0041	0.05	0.01	0.05	0.13	0.01	0.15	
Lingcod (North of 42° N. lat.)	--	--	--	--	--	--	0.21	0.21	
Lingcod (South of 42° N. lat.)	0.0001	NA	0.00	0.00	0.01	0.01	0.08	0.09	
Longnose skate	--	--	--	--	--	--	0.00	0.00	
Minor shelf rockfish (South of 40°10' N. lat.)									
Vermilion Rockfish	--	--	--	0.01	0.01	--	--	--	
Minor slope rockfish (North of 40°10' N. lat.)									
Redbanded Rockfish	0.0001	NA	0.00	--	0.00	0.01	--	0.01	
Slope Rockfish Unid	--	--	--	--	--	--	0.04	0.04	
Minor slope rockfish (South of 40°10' N. lat.)									
Aurora Rockfish	0.0005	0.0273	0.03	--	0.03	0.10	--	0.10	
Blackgill Rockfish	0.0018	0.0135	0.12	1.05	1.16	0.34	0.25	0.59	
Redbanded Rockfish	0.0007	0.0055	0.04	--	0.04	0.13	--	0.13	
Slope Rockfish Unid	--	--	--	--	--	--	0.02	0.02	
Other flatfish									
Sanddab Unid	--	--	--	--	--	--	0.01	0.01	
Other groundfish									
Grenadier Unid	--	--	--	0.01	0.01	--	0.01	0.01	
Pacific Grenadier	0.0007	0.0157	0.04	--	0.04	0.13	--	0.13	
Sablefish (North of 36° N. lat.)	0.1034	0.1062	6.65	--	1.33	19.75	190.33	194.28	
20% discard mortality (Fixed Gear)*			1.33			3.95			
Sablefish (South of 36° N. lat.)	0.0026	0.0098	0.16	62.84	62.87	0.49	--	0.10	
20% discard mortality (Fixed Gear)*			0.03			0.10			
Shortspine thornyhead (North of 34°27' N. lat.)	0.0001	NA	0.01	0.02	0.03	0.02	--	0.02	
Shortspine thornyhead (South of 34°27' N. lat.)	--	--	--	0.36	0.36	--	--	--	
<b>Non-groundfish species</b>									
Dungeness crab	0.0009	0.0209	0.06	--	0.06	0.18	1.42	1.60	
Non-FMP skate									
Sandpaper Skate	0.0001	NA	0.00	--	0.00	0.01	--	0.01	

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

**Table 9.** Estimated discard (mt), landings (mt), and fishing mortality estimate (mt) of groundfish species in the LE and OA non-nearshore fixed gear sectors in 2011. Discard ratios were multiplied by fleet landings of sablefish or FMP groundfish to generate estimated discard (Tables 6-8: LE sablefish endorsed primary season, LE non-endorsed, OA).

Weight (mt)	Limited Entry - Coastwide			Open Access - Coastwide			LE & OA Coastwide
	Discard	Landed	LE Total	Discard	Landed	OA Total	
<b>Rebuilding species</b>							
Bocaccio rockfish (South of 40°10' N. lat.)	--	0.02	0.02	--	1.54	1.54	1.57
Canary rockfish	0.09	--	0.09	--	--	--	0.09
Darkblotched rockfish	0.26	13.00	13.26	0.09	2.47	2.56	15.82
Pacific Ocean Perch (North of 40°10' N. lat.)	0.02	0.53	0.55	--	0.12	0.12	0.67
Petrale sole	0.06	0.49	0.55	--	0.12	0.12	0.67
Yelloweye rockfish	0.29	0.00	0.30	--	--	--	0.30
<b>Other groundfish species</b>							
Arrowtooth flounder	52.48	3.27	55.75	5.33	0.99	6.32	62.07
Black rockfish (South of 46°16' N. lat.)	--	--	--	--	--	--	--
Chilipepper rockfish (South of 40°10' N. lat.)	--	0.03	0.03	0.00	0.64	0.64	0.67
Dover sole	2.48	2.61	5.09	2.41	0.37	2.79	7.88
Lingcod (North of 42° N. lat.)	1.07	7.96	9.03	0.14	8.53	8.67	17.69
Lingcod (South of 42° N. lat.)	2.07	1.23	3.30	0.10	2.82	2.92	6.22
Longnose skate	84.21	24.25	108.47	207.71	3.81	211.52	319.99
Longspine thornyhead (North of 34°27' N. lat.)	1.13	4.66	5.79	0.90	0.06	0.96	6.75
Longspine thornyhead (South of 34°27' N. lat.)	1.77	19.73	21.51	--	0.66	0.66	22.17
Minor shelf rockfish (North of 40°10' N. lat.)							
Bocaccio Rockfish	0.02	0.17	0.19	--	0.01	0.01	0.19
Bronzespotted Rockfish	0.01	--	0.01	--	--	--	0.01
Chilipepper Rockfish	0.00	0.00	0.00	--	--	--	0.00
Greenspotted Rockfish	--	0.00	0.00	--	0.00	0.00	0.00
Greenstriped Rockfish	0.21	0.01	0.23	0.01	0.00	0.01	0.24
Redstripe Rockfish	--	0.00	0.00	0.00	--	0.00	0.00
Rosethorn Rockfish	0.17	0.23	0.40	0.00	0.00	0.00	0.41
Shelf Rockfish Unid	0.01	0.64	0.65	--	0.14	0.14	0.79
Silvergray Rockfish	--	0.05	0.05	--	0.02	0.02	0.07
Stripetail Rockfish	--	0.00	0.00	--	0.00	0.00	0.00
Tiger Rockfish	0.01	--	0.01	--	0.00	0.00	0.01
Vermilion Rockfish	--	--	--	--	0.04	0.04	0.04
Minor shelf rockfish (South of 40°10' N. lat.)							
Flag Rockfish	--	0.03	0.03	--	0.18	0.18	0.20
Freckled Rockfish	--	--	--	--	0.00	0.00	0.00
Greenblotched Rockfish	--	--	--	--	0.10	0.10	0.10
Greenspotted Rockfish	--	0.01	0.01	0.01	0.80	0.81	0.82
Greenstriped Rockfish	0.00	--	0.00	--	0.06	0.06	0.06
Honeycomb Rockfish	--	--	--	--	0.03	0.03	0.03
Rosethorn Rockfish	0.03	--	0.03	--	0.00	0.00	0.03
Rosy Rockfish	--	--	--	--	0.05	0.05	0.05
Shelf Rockfish Unid	--	0.03	0.03	--	0.15	0.15	0.18
Speckled Rockfish	--	--	--	--	0.09	0.09	0.09
Squarespot Rockfish	--	--	--	--	0.00	0.00	0.00
Starry Rockfish	--	--	--	--	0.23	0.23	0.23
Vermilion Rockfish	--	0.71	0.71	--	8.10	8.10	8.81
Yellowtail Rockfish	--	--	--	--	0.36	0.36	0.36
Minor slope rockfish (North of 40°10' N. lat.)							
Aurora Rockfish	0.03	0.07	0.10	--	0.00	0.00	0.10
Bank Rockfish	--	0.22	0.22	--	0.01	0.01	0.23
Blackgill Rockfish	0.11	1.11	1.22	--	0.12	0.12	1.34
Blackspotted Rockfish	--	0.27	0.27	--	0.01	0.01	0.29
Redbanded Rockfish	1.81	13.94	15.75	0.20	1.94	2.14	17.89
Rougheye Rockfish	0.95	38.02	38.97	0.03	1.43	1.46	40.43
Sharpchin Rockfish	--	--	--	--	--	--	--
Shortraker Rockfish	0.01	2.88	2.89	0.03	0.07	0.10	2.99
Shortraker/Rougheye Rockfish	0.15	--	0.15	--	--	--	0.15
Slope Rockfish Unid	0.01	2.09	2.11	--	0.14	0.14	2.25
Splitnose Rockfish	0.02	0.14	0.16	0.00	0.02	0.03	0.18
Yellowmouth Rockfish	--	0.05	0.05	--	0.00	0.00	0.05



Table 9 (continued).

Weight (mt)	Limited Entry - Coastwide			Open Access - Coastwide			LE & OA
	Discard	Landed	LE Total	Discard	Landed	OA Total	Coastwide
Minor slope rockfish (South of 40°10' N. lat.)							
Aurora Rockfish	0.20	0.28	0.48	0.08	0.01	0.09	0.56
Bank Rockfish	--	1.00	1.00	--	0.09	0.09	1.10
Blackgill Rockfish	3.90	79.15	83.05	0.47	50.03	50.51	133.56
Redbanded Rockfish	0.10	0.02	0.13	0.13	0.00	0.13	0.26
Rougheye Rockfish	0.08	0.26	0.34	--	0.00	0.00	0.34
Slope Rockfish Unid	--	1.56	1.56	--	0.13	0.13	1.68
Mixed thornyheads							
Shortspine/ Longspine Thornyhead	0.20	0.02	0.22	--	0.85	0.85	1.07
Other flatfish							
Curlfin Turbot	0.00	--	0.00	--	--	--	0.00
Flatfish Unid	--	0.06	0.06	--	0.11	0.11	0.17
Pacific Sanddab	0.00	0.98	0.99	--	3.10	3.10	4.09
Rex Sole	0.00	--	0.00	--	--	--	0.00
Rock Sole	--	--	--	--	0.00	0.00	0.00
Sanddab Unid	--	0.01	0.01	--	0.02	0.02	0.03
Sand Sole	--	0.00	0.00	--	0.00	0.00	0.00
Other groundfish							
Big Skate	1.63	0.07	1.70	0.12	0.03	0.15	1.85
Grenadier Unid	--	26.51	26.51	--	7.78	7.78	34.28
Leopard Shark	--	--	--	--	0.16	0.16	0.16
Pacific Flatnose	2.21	--	2.21	0.05	--	0.05	2.26
Pacific Grenadier	47.16	--	47.16	3.86	--	3.86	51.03
Soupfin Shark	--	--	--	--	0.25	0.25	0.25
Spotted Ratfish	3.48	0.01	3.49	0.11	0.00	0.11	3.59
Unspecified Skate	--	8.92	8.92	0.24	1.27	1.51	10.43
Other rockfish							
Pacific cod	0.10	1.81	1.91	0.09	0.39	0.48	2.40
Pacific hake	0.38	0.05	0.43	1.42	0.15	1.57	2.00
Sablefish (North of 36° N. lat.)	543.67	1,844.80	1,953.54	53.05	426.18	436.79	2,390.33
20% discard mortality (Fixed Gear)*	108.73			10.61			
Sablefish (South of 36° N. lat.)	39.03	581.48	589.28	6.73	163.15	164.49	753.78
20% discard mortality (Fixed Gear)*	7.81			1.35			
Shortspine thornyhead (North of 34°27' N. lat.)	1.88	57.92	59.81	17.13	1.38	18.52	78.32
Shortspine thornyhead (South of 34°27' N. lat.)	6.10	162.73	168.83	--	6.88	6.88	175.71
Spiny dogfish	113.85	8.33	122.18	7.40	2.23	9.63	131.81
Splitnose rockfish (South of 40°10' N. lat.)	0.00	0.05	0.06	--	0.06	0.06	0.11
Starry flounder	--	--	--	--	0.01	0.01	0.01
Widow rockfish	0.04	0.02	0.06	--	0.00	0.00	0.06
Yellowtail rockfish (North of 40°10' N. lat.)	0.86	0.27	1.13	0.01	0.07	0.08	1.21
<b>Non-groundfish species</b>							
California halibut	--	0.00	0.00	--	0.45	0.45	0.45
Dungeness crab	0.66	0.52	1.18	0.46	1.42	1.88	3.06
Non-FMP flatfish							
Bigmouth Sole	--	--	--	--	0.00	0.00	0.00
Deepsea Sole	0.00	--	0.00	--	--	--	0.00
Slender Sole	--	--	--	--	0.00	0.00	0.00
Non-FMP skate							
Black Skate	3.64	0.11	3.75	0.04	0.12	0.16	3.91
Deepsea Skate	0.12	--	0.12	--	--	--	0.12
Pelagic Stingray	0.08	--	0.08	--	--	--	0.08
Sandpaper Skate	1.15	--	1.15	2.03	--	2.03	3.18

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

**Table 10.** Commercial landings of nearshore species (mt) in Oregon and California during 2011, partitioned by depth interval and groundfish management area based on observed catch from 2003 to 2011.

	2003-2011 Total observed landings (mt)	2003-2011 Percentage of observed catch by depth (fathoms)			2011 Fleet landings (mt)	2011 Fleet landings (mt) reallocated by depth (fathoms)		
		0 - 10	11 - 20	> 20		0 - 10	11 - 20	> 20
<b>NORTH of 40° 10' N Lat.</b>								
<b>Nearshore species - commercial</b>								
Black rockfish (South of 46°16' N. lat.)	111.17	46.8%	51.3%	1.9%	120.61	56.43	61.84	2.34
Cabazon (California)	1.68	44.4%	45.3%	10.3%	2.35	1.05	1.07	0.24
Cabazon (Oregon)	16.86	30.7%	66.7%	2.6%	29.49	9.06	19.66	0.76
Lingcod (North of 42° N. lat.)	14.96	34.0%	61.7%	4.3%	30.15	10.26	18.61	1.28
Lingcod (South of 42° N. lat.)	4.68	29.9%	51.4%	18.7%	3.96	1.18	2.03	0.74
Minor nearshore rockfish (North of 40°10' N. lat.)								
Black and Yellow Rockfish	0.03	71.8%	28.2%	0.0%	0.12	0.08	0.03	0.00
Blue Rockfish	12.37	23.8%	68.0%	8.3%	12.37	2.94	8.41	1.02
Brown Rockfish	0.25	8.2%	25.4%	66.3%	0.03	0.00	0.01	0.02
China Rockfish	4.50	32.6%	62.6%	4.8%	8.43	2.75	5.28	0.41
Copper Rockfish	1.10	10.7%	68.3%	21.0%	1.70	0.18	1.16	0.36
Gopher Rockfish	0.03	39.5%	58.4%	2.1%	0.11	0.04	0.06	0.00
Grass Rockfish	--	--	--	--	0.22	--	--	--
Olive Rockfish	0.06	4.5%	81.6%	14.0%	0.10	0.00	0.08	0.01
Quillback Rockfish	1.87	7.6%	57.1%	35.3%	2.91	0.22	1.66	1.03
Other groundfish								
Kelp Greenling	10.94	51.7%	46.8%	1.4%	20.98	10.85	9.83	0.30
<b>SOUTH of 40° 10' N Lat.</b>								
<b>Nearshore species - commercial</b>								
Black rockfish (South of 46°16' N. lat.)	0.94	49.5%	45.5%	4.9%	2.29	1.14	1.04	0.11
Cabazon (California)	5.26	94.5%	4.1%	1.4%	29.81	28.17	1.23	0.41
California scorpionfish (South of 34°27' N. lat.)	0.37	4.0%	1.3%	94.8%	3.25	0.13	0.04	3.08
Deeper nearshore rockfish								
Brown Rockfish	6.34	27.7%	60.8%	11.5%	28.73	7.97	17.45	3.31
Copper Rockfish	0.35	17.4%	43.7%	38.9%	3.07	0.54	1.34	1.19
Nearshore Rockfish Unid	0.17	20.6%	46.3%	33.1%	0.04	0.01	0.02	0.01
Olive Rockfish	0.35	24.3%	55.2%	20.5%	0.75	0.18	0.41	0.15
Quillback Rockfish	0.14	0.0%	43.7%	56.3%	0.10	0.00	0.04	0.05
Treefish Rockfish	0.15	36.8%	58.7%	4.5%	1.94	0.72	1.14	0.09
Lingcod (South of 42° N. lat.)	4.27	48.4%	42.4%	9.2%	17.22	8.34	7.29	1.59
Minor nearshore rockfish (South of 40°10' N. lat.)								
Blue Rockfish	0.90	46.7%	42.2%	11.1%	1.58	0.74	0.67	0.18
Gopher Rockfish	3.65	52.7%	37.3%	10.0%	29.96	15.80	11.17	2.99
Other groundfish								
Kelp Greenling	0.46	88.5%	8.8%	2.8%	1.85	1.64	0.16	0.05
Other nongroundfish								
California Sheephead	8.41	73.6%	25.3%	1.1%	30.67	22.56	7.78	0.33
Shallow nearshore rockfish								
Black and Yellow Rockfish	1.17	95.3%	2.9%	1.8%	12.25	11.68	0.35	0.22
China Rockfish	0.39	31.6%	46.9%	21.5%	1.53	0.48	0.72	0.33
Grass Rockfish	0.86	95.2%	4.4%	0.3%	12.11	11.54	0.54	0.04
Kelp Rockfish	0.09	68.9%	29.4%	1.7%	0.73	0.50	0.21	0.01
Nearshore Rockfish Unid	--	--	--	--	0.00	--	--	--

**Table 11.** Observed discard ratios with standard error and nearshore species fleet landings (mt) from the commercial nearshore fixed gear fishery in 2011 by groundfish management area and depth (fathoms).

Nearshore Fixed Gear Fishery	North of 40° 10' N lat.						South of 40° 10' N lat.											
	0 - 10 fm			11 - 20 fm + > 20 fm			0 - 10 fm			11 - 20 fm			> 20 fm					
	Vessels	Trips	Sets	Vessels	Trips	Sets	Vessels	Trips	Sets	Vessels	Trips	Sets	Vessels	Trips	Sets			
Observed	46	125	149	49	143	166	13	35	63	15	51	57	4	17	19			
Expansion factor:	95.3			129.7			8.5			112.1			51.6			14.2		
Fleet landings of nearshore species (mt)	Discard Ratio		SE	Discard Ratio		SE	Discard Ratio		SE	Discard Ratio		SE	Discard Ratio		SE			
<b>Rebuilding species</b>																		
Canary rockfish	0.0058	0.0556		0.0208	0.0511		0.0064	0.2478		0.2428	1.0414		0.4815	2.1931				
Petrale sole	--	--		--	--		--	--		0.0001	NA		0.0016	0.0428				
Yelloweye rockfish	0.0029	0.0753		0.0088	0.0950		--	--		0.0025	0.4635		0.0016	0.0323				
<b>Other groundfish species</b>																		
Black rockfish (South of 46°16' N. lat.)	0.0171	0.0258		0.0091	0.0169		0.0248	0.1455		0.0078	0.0482		0.0005	0.0321				
Cabezon (California)	0.0030	0.0918		--	--		0.0369	0.0937		0.0059	0.2545		0.0013	0.1208				
Cabezon (Oregon)	0.0122	0.0625		0.0190	0.0867		--	--		--	--		--	--				
Deeper nearshore rockfish (South of 40°10' N. lat.)																		
Brown Rockfish	NA	NA		NA	NA		0.0035	0.0182		0.0131	0.0431		0.0133	0.0671				
Calico Rockfish	NA	NA		NA	NA		0.0001	NA		0.0016	0.0321		0.0033	0.0444				
Copper Rockfish	NA	NA		NA	NA		0.0006	0.0305		0.0034	0.0160		0.0027	0.0223				
Olive Rockfish	NA	NA		NA	NA		0.0004	NA		0.0060	0.0857		0.0041	0.1174				
Treefish Rockfish	NA	NA		NA	NA		--	--		0.0004	0.0150		--	--				
Lingcod (North of 42° N. lat.)	0.1321	0.1538		0.1302	0.1511		--	--		--	--		--	--				
Lingcod (South of 42° N. lat.)	0.0022	0.0517		0.0068	0.0690		0.1794	0.2514		0.2102	0.3066		0.2504	1.4199				
Minor nearshore rockfish (North of 40°10' N. lat.)																		
Blue Rockfish	0.0240	0.0593		0.0302	0.0629		NA	NA		NA	NA		NA	NA				
China Rockfish	0.0008	0.0040		0.0015	0.0067		NA	NA		NA	NA		NA	NA				
Copper Rockfish	0.0012	0.0689		0.0006	0.0099		NA	NA		NA	NA		NA	NA				
Quillback Rockfish	0.0004	0.0173		0.0003	0.0051		NA	NA		NA	NA		NA	NA				
Minor nearshore rockfish (South of 40°10' N. lat.)																		
Blue Rockfish	--	--		--	--		0.0110	0.1228		0.0347	0.1699		0.0820	0.3801				
Gopher Rockfish	--	--		--	--		0.0215	0.0303		0.0717	0.1288		0.0329	0.1764				
Minor shelf rockfish (North of 40°10' N. lat.)																		
Vermilion Rockfish	--	--		0.0011	0.0219		--	--		--	--		--	--				
Minor shelf rockfish (South of 40°10' N. lat.)																		
Flag Rockfish	--	--		--	--		--	--		--	--		0.0006	0.0229				
Greenstriped Rockfish	--	--		--	--		--	--		--	--		0.0003	NA				
Rosethorn Rockfish	--	--		--	--		--	--		0.0004	NA		--	--				
Rosy Rockfish	--	--		--	--		--	--		0.0018	0.0170		0.0146	0.0860				
Starry Rockfish	--	--		--	--		--	--		0.0001	0.0068		0.0023	0.0535				
Vermilion Rockfish	--	--		--	--		0.0004	0.0188		0.0046	0.0396		--	--				
Yellowtail Rockfish	--	--		--	--		--	--		0.0056	0.0696		0.0314	0.2112				
<b>Other flatfish</b>																		
Pacific Sanddab	--	--		--	--		0.0004	NA		0.0004	0.0173		0.0016	0.0331				
Rock Sole	--	--		--	--		--	--		--	--		0.0039	0.0766				
Sand Sole	0.0000	0.0135		--	--		0.0015	0.0491		0.0055	0.0641		0.0047	0.0565				
<b>Other groundfish</b>																		
Big Skate	0.0003	NA		--	--		--	--		--	--		--	--				
Kelp Greenling	0.0191	0.0182		0.0153	0.0239		0.0443	0.1289		0.0360	0.3422		0.0669	0.7668				
Spotted Ratfish	--	--		0.0001	NA		--	--		0.0009	NA		--	--				
Shallow nearshore rockfish (South of 40°10' N. lat.)																		
Black and Yellow Rockfish	NA	NA		NA	NA		0.0179	0.0580		--	--		--	--				
China Rockfish	NA	NA		NA	NA		0.0110	0.0865		0.0224	0.0862		0.0291	0.1052				
Grass Rockfish	NA	NA		NA	NA		0.0016	0.0265		--	--		--	--				
Kelp Rockfish	NA	NA		NA	NA		0.0025	0.0937		--	--		--	--				
Spiny dogfish	0.0003	NA		--	--		0.0016	NA		0.0464	2.3761		0.0580	1.0614				
Widow rockfish	--	--		0.0001	0.0267		--	--		--	--		--	--				
Yellowtail rockfish (North of 40°10' N. lat.)	0.0009	0.0124		0.0044	0.0222		--	--		--	--		--	--				
<b>Non-groundfish species</b>																		
Dungeness crab	--	--		0.0000	NA		0.0004	NA		0.0003	NA		0.0023	NA				
<b>Non-FMP skate</b>																		
Starry Skate	--	--		--	--		--	--		0.0014	--		--	--				
<b>Other nongroundfish</b>																		
Buffalo Sculpin	0.0000	NA		0.0001	NA		0.0067	0.2362		0.0002	NA		--	--				
Pacific Staghorn Sculpin	--	--		--	--		--	--		0.0002	NA		--	--				
Red Irish Lord Sculpin	0.0004	0.0201		0.0000	0.0355		0.0006	NA		--	--		--	--				
Sculpin Unid	0.0074	0.0442		0.0040	0.0309		0.0015	0.0829		0.0049	0.1031		0.0186	0.1860				

**Table 12a.** Gross estimated discard (mt), discard mortality rates (provided by the Groundfish Management Team), estimated discard mortality (mt), fleet landings (mt), and fishing mortality estimates (mt) for the 2011 commercial nearshore fixed gear fishery north of 40° 10' N latitude.

Nearshore Fixed Gear Fishery North of 40° 10' N lat.	Gross estimated discard (mt) by depth (fm)			Discard mortality rate * by depth (fm)			Estimated discard mortality (mt) by depth (fm)			Estimated discard mortality (mt)	Fleet Landings (mt)	Estimated fishing mortality (mt)
	0-10	11-20	> 20	0-10	11-20	> 20	0-10	11-20	> 20			
<b>Rebuilding species</b>												
Canary rockfish	0.56	2.69	0.18	10%	55%	100%	0.06	1.48	0.18	1.71	--	1.71
Darkblotched rockfish	--	--	--	--	--	--	--	--	--	--	0.01	0.01
Pacific Ocean Perch (North of 40°10' N. lat.)	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Yelloweye rockfish	0.27	1.14	0.07	10%	50%	100%	0.03	0.57	0.07	0.67	--	0.67
<b>Other groundfish species</b>												
Arrowtooth flounder	--	--	--	--	--	--	--	--	--	--	0.01	0.01
Black rockfish (South of 46°16' N. lat.)	1.63	1.18	0.08	10%	40%	90%	0.16	0.47	0.07	0.71	120.61	121.32
Cabezon (California)	0.28	--	--	7%	7%	7%	0.02	--	--	0.02	2.35	2.37
Cabezon (Oregon)	1.17	2.47	0.16	7%	7%	7%	0.08	0.17	0.01	0.27	29.49	29.76
Dover sole	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Lingcod (North of 42° N. lat.)	12.59	16.90	1.11	7%	7%	7%	0.88	1.18	0.08	2.14	30.15	32.29
Lingcod (South of 42° N. lat.)	0.21	0.88	0.06	7%	7%	7%	0.01	0.06	0.00	0.08	3.96	4.04
Longnose skate	--	--	--	--	--	--	--	--	--	--	0.06	0.06
Minor nearshore rockfish (North of 40°10' N. lat.)												
Black and Yellow Rockfish	--	--	--	--	--	--	--	--	--	--	0.12	0.12
Blue Rockfish	2.28	3.91	0.26	10%	60%	100%	0.23	2.35	0.26	2.83	12.37	15.20
Brown Rockfish	--	--	--	--	--	--	--	--	--	--	0.03	0.03
China Rockfish	0.08	0.19	0.01	10%	50%	100%	0.01	0.09	0.01	0.11	8.43	8.55
Copper Rockfish	0.12	0.08	0.00	10%	40%	100%	0.01	0.03	0.00	0.05	1.70	1.74
Gopher Rockfish	--	--	--	--	--	--	--	--	--	--	0.11	0.11
Grass Rockfish	--	--	--	--	--	--	--	--	--	--	0.22	0.22
Olive Rockfish	--	--	--	--	--	--	--	--	--	--	0.10	0.10
Quillback Rockfish	0.04	0.04	0.00	10%	40%	100%	0.00	0.02	0.00	0.02	2.91	2.94
Minor shelf rockfish (North of 40°10' N. lat.)												
Bocaccio Rockfish	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Shelf Rockfish Unid	--	--	--	--	--	--	--	--	--	--	0.03	0.03
Tiger Rockfish	--	--	--	--	--	--	--	--	--	--	0.29	0.29
Vermilion Rockfish	--	0.14	0.01	10%	55%	100%	--	0.08	0.01	0.09	3.97	4.06
Minor slope rockfish (North of 40°10' N. lat.)												
Blackgill Rockfish	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Redbanded Rockfish	--	--	--	--	--	--	--	--	--	--	0.01	0.01
Rougheye Rockfish	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Splitnose Rockfish	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Other flatfish												
Sand Sole	0.00	--	--	7%	7%	7%	0.00	--	--	0.00	--	0.00
Other groundfish												
Big Skate	0.03	--	--	7%	7%	7%	0.02	--	--	0.02	--	0.02
Kelp Greenling	1.82	1.99	0.13	7%	7%	7%	0.13	0.14	0.01	0.28	20.98	21.25
Spotted Ratfish	--	0.01	0.00	7%	7%	7%	--	0.00	0.00	0.00	--	0.00
Unspecified Skate	--	--	--	--	--	--	--	--	--	--	0.04	0.04
Sablefish (North of 36° N. lat.)	--	--	--	--	--	--	--	--	--	--	0.59	0.59
Spiny dogfish	0.03	--	--	7%	7%	7%	0.00	--	--	0.00	0.03	0.03
Widow rockfish	--	0.01	0.00	50%	90%	100%	--	0.01	0.00	0.01	0.03	0.04
Yellowtail rockfish (North of 40°10' N. lat.)	0.08	0.57	0.04	10%	30%	75%	0.01	0.17	0.03	0.21	0.72	0.93
<b>Non-groundfish species</b>												
California halibut	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Dungeness crab	--	0.00	0.00	100%	100%	100%	--	0.00	0.00	0.00	1.07	1.07
Other nongroundfish												
Buffalo Sculpin	0.00	0.01	0.00	100%	100%	100%	0.00	0.01	0.00	0.02	--	0.02
Red Irish Lord Sculpin	0.04	0.01	0.00	100%	100%	100%	0.04	0.01	0.00	0.05	--	0.05
Sculpin Unid	0.70	0.51	0.03	100%	100%	100%	0.70	0.51	0.03	1.25	0.00	1.25

\* Discard mortality rates provided by the Groundfish Management Team (GMT). A mortality rate is applied to each gross estimated discard weight by depth.

**Table 12b.** Gross estimated discard (mt), discard mortality rates (provided by the Groundfish Management Team), estimated discard mortality (mt), fleet landings (mt), and fishing mortality estimates (mt) for the 2011 commercial nearshore fixed gear fishery south of 40° 10' N latitude.

Nearshore Fixed Gear Fishery South of 40° 10' N lat	Gross estimated discard (mt) by depth (fm)			Discard mortality rate * by depth (fm)			Estimated discard mortality (mt) by depth (fm)			Estimated discard mortality (mt)	Fleet Landings (mt)	Estimated fishing mortality (mt)
	0-10	11-20	> 20	0-10	11-20	> 20	0-10	11-20	> 20			
<b>Rebuilding species</b>												
Bocaccio rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	--	--	--	0.73	0.73
Canary rockfish	0.72	12.53	6.81	10%	55%	100%	0.07	6.89	6.81	13.78	--	13.78
Darkblotched rockfish	--	--	--	--	--	--	--	--	--	--	0.01	0.01
Petrale sole	--	0.01	0.02	7%	7%	7%	--	0.00	0.00	0.00	--	0.00
Yelloweye rockfish	--	0.13	0.02	10%	50%	100%	--	0.06	0.02	0.09	--	0.09
<b>Other groundfish species</b>												
Black rockfish (South of 46°16' N. lat.)	2.78	0.41	0.01	10%	40%	90%	0.28	0.16	0.01	0.45	2.29	2.74
Cabezon (California)	4.14	0.30	0.02	7%	7%	7%	0.29	0.02	0.00	0.31	29.81	30.13
California scorpionfish (South of 34°27' N. lat.)	--	--	--	--	--	--	--	--	--	--	--	3.25
Chilipepper rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	--	--	--	0.05	0.05
<b>Deeper nearshore rockfish</b>												
Brown Rockfish	0.39	0.68	0.19	10%	40%	90%	0.04	0.27	0.17	0.48	28.73	29.21
Calico Rockfish	0.01	0.08	0.05	10%	40%	90%	0.00	0.03	0.04	0.08	--	0.08
Copper Rockfish	0.06	0.18	0.04	10%	40%	100%	0.01	0.07	0.04	0.11	3.07	3.19
Nearshore Rockfish Unid	--	--	--	--	--	--	--	--	--	--	0.04	0.04
Olive Rockfish	0.05	0.31	0.06	10%	40%	90%	0.00	0.12	0.05	0.18	0.75	0.93
Quillback Rockfish	--	--	--	--	--	--	--	--	--	--	--	0.10
Treefish Rockfish	--	0.02	--	10%	40%	90%	--	0.01	--	0.01	1.94	1.95
Dover sole	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Lingcod (South of 42° N. lat.)	20.11	10.85	3.54	7%	7%	7%	1.41	0.76	0.25	2.42	17.22	19.64
Longnose skate	--	--	--	--	--	--	--	--	--	--	0.01	0.01
Longspine thornyhead (North of 34°27' N. lat.)	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Longspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	--	--	--	--	0.01	0.01
<b>Minor nearshore rockfish (South of 40°10' N. lat.)</b>												
Blue Rockfish	1.23	1.79	1.16	10%	60%	100%	0.12	1.07	1.16	2.36	1.58	3.94
Gopher Rockfish	2.41	3.70	0.47	10%	40%	100%	0.24	1.48	0.47	2.19	29.96	32.15
<b>Minor shelf rockfish (South of 40°10' N. lat.)</b>												
Chameleon Rockfish	--	--	--	--	--	--	--	--	--	--	0.10	0.10
Flag Rockfish	--	--	0.01	--	--	100%	--	--	0.01	0.01	0.00	0.01
Greenblotched Rockfish	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Greenspotted Rockfish	--	--	--	--	--	--	--	--	--	--	0.02	0.02
Greenstriped Rockfish	--	--	0.00	--	--	100%	--	--	0.00	0.00	0.00	0.01
Rosethorn Rockfish	--	0.02	--	--	100%	--	--	0.02	--	0.02	0.01	0.03
Rosy Rockfish	--	0.09	0.21	--	100%	100%	--	0.09	0.21	0.30	0.08	0.38
Shelf Rockfish Unid	--	--	--	--	--	--	--	--	--	--	0.36	0.36
Speckled Rockfish	--	--	--	--	--	--	--	--	--	--	0.05	0.05
Starry Rockfish	--	0.00	0.03	--	100%	100%	--	0.00	0.03	0.04	0.12	0.16
Vermilion Rockfish	0.04	0.24	--	10%	55%	100%	0.00	0.13	--	0.14	7.07	7.20
Yellowtail Rockfish	--	0.29	0.44	--	30%	75%	--	0.09	0.33	0.42	0.19	0.61
<b>Minor slope rockfish (South of 40°10' N. lat.)</b>												
Bank Rockfish	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Blackgill Rockfish	--	--	--	--	--	--	--	--	--	--	0.37	0.37
Redbanded Rockfish	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Slope Rockfish Unid	--	--	--	--	--	--	--	--	--	--	0.01	0.01
<b>Mixed thornyheads</b>												
Shortspine/ Longspine Thornyhead	--	--	--	--	--	--	--	--	--	--	0.00	0.00
<b>Other flatfish</b>												
Flatfish Unid	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Pacific Sanddab	0.05	0.02	0.02	7%	7%	7%	0.00	0.00	0.00	0.01	1.15	1.15
Rex Sole	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Rock Sole	--	--	0.05	--	--	7%	--	--	0.00	0.00	0.06	0.07
Sanddab Unid	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Sand Sole	0.17	0.28	0.07	7%	7%	7%	0.01	0.02	0.00	0.04	0.15	0.19

Table 12b (continued).

Nearshore Fixed Gear Fishery South of 40° 10' N lat	Gross estimated discard (mt) by depth (fm)			Discard mortality rate * by depth (fm)			Estimated discard mortality (mt) by depth (fm)			Estimated discard mortality (mt)	Fleet Landings (mt)	Estimated fishing mortality (mt)
	0-10	11-20	> 20	0-10	11-20	> 20	0-10	11-20	> 20			
Other groundfish												
Grenadier Unid	--	--	--	--	--	--	--	--	--	--	0.61	0.61
Kelp Greenling	4.97	1.86	0.95	7%	7%	7%	0.35	0.13	0.07	0.54	1.85	2.40
Leopard Shark	--	--	--	--	--	--	--	--	--	--	0.18	0.18
Soupfin Shark	--	--	--	--	--	--	--	--	--	--	0.05	0.05
Spotted Ratfish	--	0.05	--	--	7%	--	--	0.00	--	0.00	0.02	0.02
Other rockfish												
Sablefish (North of 36° N. lat.)	--	--	--	--	--	--	--	--	--	--	0.83	0.83
Sablefish (South of 36° N. lat.)	--	--	--	--	--	--	--	--	--	--	8.79	8.79
Shallow nearshore rockfish												
Black and Yellow Rockfish	2.01	--	--	10%	--	--	0.20	--	--	0.20	12.25	12.45
China Rockfish	1.23	1.16	0.41	10%	50%	100%	0.12	0.58	0.41	1.11	1.53	2.64
Grass Rockfish	0.17	--	--	10%	--	--	0.02	--	--	0.02	12.11	12.13
Kelp Rockfish	0.28	--	--	10%	--	--	0.03	--	--	0.03	0.73	0.76
Nearshore Rockfish Unid	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Shortspine thornyhead (North of 34°27' N. lat.)	--	--	--	--	--	--	--	--	--	--	0.02	0.02
Shortspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	--	--	--	--	1.14	1.14
Spiny dogfish	0.18	2.40	0.82	7%	7%	7%	0.01	0.17	0.06	0.24	--	0.24
Starry flounder	--	--	--	--	--	--	--	--	--	--	0.06	0.06
Widow rockfish	--	--	--	--	--	--	--	--	--	--	0.02	0.02
<b>Non-groundfish species</b>												
California halibut	--	--	--	--	--	--	--	--	--	--	1.31	1.31
Dungeness crab	0.05	0.01	0.03	100%	100%	100%	0.05	0.01	0.03	0.09	0.63	0.73
Non-FMP flatfish												
Fantail Sole	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Homyhead Turbot	--	--	--	--	--	--	--	--	--	--	0.01	0.01
Non-FMP skate												
Starry Skate	--	0.07	--	--	7%	--	--	0.01	--	0.01	--	0.01
Other nongroundfish												
Buffalo Sculpin	0.76	0.01	--	100%	100%	--	0.76	0.01	--	0.77	--	0.77
California Sheephead	--	--	--	--	--	--	--	--	--	--	30.67	30.67
Pacific Staghorn Sculpin	--	0.01	--	--	100%	--	--	0.01	--	0.01	--	0.01
Red Irish Lord Sculpin	0.07	--	--	100%	--	--	0.07	--	--	0.07	--	0.07
Rock Greenling	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Sculpin Unid	0.17	0.25	0.26	100%	100%	100%	0.17	0.25	0.26	0.68	--	0.68

\* Discard mortality rates provided by the Groundfish Management Team (GMT). Each mortality rate is applied to each gross estimated discard weight by depth.

**Table 13.** Estimated discard (mt), landings (mt), and estimated total fishing mortality (mt) of major west coast groundfish species in non-IFQ 2011 fisheries/groundfish sectors observed by the WCGOP.

Weight (mt)	Open Access CA halibut			Pink shrimp			Non-nearshore fixed gear			Nearshore fixed gear		
	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate
<b>Rebuilding species</b>												
Bocaccio rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	1.57	1.57	--	0.73	0.73
Canary rockfish	--	--	--	0.03	--	0.03	0.09	--	0.09	15.49	--	15.49
Darkblotched rockfish	--	--	--	11.98	0.00	11.99	0.32	15.47	15.80	--	0.02	0.02
Pacific Ocean Perch (North of 40°10' N. lat.)	--	--	--	0.55	--	0.55	0.02	0.65	0.67	--	0.00	0.00
Petrale sole	0.07	0.06	0.13	1.77	0.00	1.77	0.06	0.61	0.67	0.00	--	0.00
Yelloweye rockfish	--	--	--	0.00	--	0.00	0.29	0.00	0.30	0.76	--	0.76
<b>Other groundfish species</b>												
Arrowtooth flounder	--	--	--	7.51	--	7.51	56.15	4.26	60.42	--	0.01	0.01
Black rockfish (South of 46°16' N. lat.)	--	--	--	--	--	--	--	--	--	1.15	122.90	124.05
Cabazon (California)	--	--	--	--	--	--	--	--	--	0.33	32.17	32.50
Cabazon (Oregon)	--	--	--	--	--	--	--	--	--	0.27	29.49	29.76
California scorpionfish (South of 34°27' N. lat.)	0.27	0.00	0.28	--	1.05	1.05	--	--	--	--	3.25	3.25
Chilipepper rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	0.67	0.67	--	0.05	0.05
Dover sole	--	--	--	3.33	0.09	3.41	4.03	2.98	7.01	--	0.01	0.01
English sole	1.41	0.04	1.45	0.43	0.33	0.76	--	--	--	--	--	--
Lingcod (North of 42° N. lat.)	NA	NA	NA	0.58	--	0.58	1.16	16.49	17.65	2.14	30.15	32.29
Lingcod (South of 42° N. lat.)	0.22	--	0.11	0.04	--	0.04	2.11	4.05	6.16	2.50	21.18	23.68
50% discard mortality (Trawl)*	0.11	--	--	--	--	--	--	--	--	--	--	--
Longnose skate	0.22	--	0.22	0.91	0.04	0.96	226.08	28.06	254.15	--	0.07	0.07
Longspine thornyhead (North of 34°27' N. lat.)	--	--	--	--	--	--	1.78	4.71	6.49	--	0.00	0.00
Longspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	1.77	20.39	22.17	--	0.01	0.01
<b>Minor nearshore rockfish (North of 40°10' N. lat.)</b>												
Black and Yellow Rockfish	NA	NA	NA	--	--	--	--	--	--	--	0.12	0.12
Blue Rockfish	NA	NA	NA	--	--	--	--	--	--	2.83	12.37	15.20
Brown Rockfish	NA	NA	NA	--	--	--	--	--	--	--	0.03	0.03
China Rockfish	NA	NA	NA	--	--	--	--	--	--	0.11	8.43	8.55
Copper Rockfish	NA	NA	NA	--	--	--	--	--	--	0.05	1.70	1.74
Gopher Rockfish	NA	NA	NA	--	--	--	--	--	--	--	0.11	0.11
Grass Rockfish	NA	NA	NA	--	--	--	--	--	--	--	0.22	0.22
Olive Rockfish	NA	NA	NA	0.03	--	0.03	--	--	--	--	0.10	0.10
Quillback Rockfish	NA	NA	NA	--	--	--	--	--	--	0.02	2.91	2.94

Table 13 (continued).

Weight (mt)	Open Access CA halibut			Pink shrimp			Non-nearshore fixed gear			Nearshore fixed gear		
	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate
Minor nearshore rockfish (South of 40°10' N. lat.)												
Black and Yellow Rockfish	--	--	--	--	--	--	--	--	--	0.20	12.25	12.45
Blue Rockfish	--	--	--	--	--	--	--	--	--	2.36	1.58	3.94
Brown Rockfish	0.00	0.00	0.00	--	0.03	0.03	--	--	--	0.48	28.73	29.21
Calico Rockfish	0.00	--	0.00	--	--	--	--	--	--	0.08	--	0.08
China Rockfish	--	--	--	--	--	--	--	--	--	1.11	1.53	2.64
Copper Rockfish	0.00	--	0.00	--	0.01	0.01	--	--	--	0.11	3.07	3.19
Gopher Rockfish	--	--	--	--	--	--	--	--	--	2.19	29.96	32.15
Grass Rockfish	--	--	--	--	--	--	--	--	--	0.02	12.11	12.13
Kelp Rockfish	--	--	--	--	--	--	--	--	--	0.03	0.73	0.76
Nearshore Rockfish Unid	--	--	--	--	--	--	--	--	--	--	0.04	0.04
Olive Rockfish	--	--	--	--	--	--	--	--	--	0.18	0.75	0.93
Quillback Rockfish	--	--	--	--	--	--	--	--	--	--	0.10	0.10
Treefish Rockfish	--	--	--	--	--	--	--	--	--	0.01	1.94	1.95
Minor shelf rockfish (North of 40°10' N. lat.)												
Bocaccio Rockfish	NA	NA	NA	0.00	--	0.00	0.02	0.18	0.19	--	0.00	0.00
Bronzespotted Rockfish	NA	NA	NA	--	--	--	0.01	--	0.01	--	--	--
Chilipepper Rockfish	NA	NA	NA	0.17	--	0.17	0.00	0.00	0.00	--	--	--
Cowcod Rockfish	NA	NA	NA	0.00	--	0.00	--	--	--	--	--	--
Greenspotted Rockfish	NA	NA	NA	--	--	--	--	0.00	0.00	--	--	--
Greenstriped Rockfish	NA	NA	NA	1.16	--	1.16	0.22	0.02	0.24	--	--	--
Halfbanded Rockfish	NA	NA	NA	0.00	--	0.00	--	--	--	--	--	--
Harlequin Rockfish	NA	NA	NA	0.02	--	0.02	--	--	--	--	--	--
Pygmy Rockfish	NA	NA	NA	0.04	--	0.04	--	--	--	--	--	--
Redstripe Rockfish	NA	NA	NA	0.00	--	0.00	0.00	0.00	0.00	--	--	--
Rosethorn Rockfish	NA	NA	NA	0.00	--	0.00	0.17	0.24	0.41	--	--	--
Shelf Rockfish Unid	NA	NA	NA	2.12	0.00	2.12	0.01	0.78	0.79	--	0.03	0.03
Silvergray Rockfish	NA	NA	NA	--	--	--	--	0.07	0.07	--	--	--
Stripetail Rockfish	NA	NA	NA	0.63	--	0.63	--	0.00	0.00	--	--	--
Tiger Rockfish	NA	NA	NA	0.00	--	0.00	0.01	0.00	0.01	--	0.29	0.29
Vermilion Rockfish	NA	NA	NA	--	--	--	--	0.04	0.04	0.09	3.97	4.06



Table 13 (continued).

Weight (mt)	Open Access CA halibut			Pink shrimp			Non-nearshore fixed gear			Nearshore fixed gear		
	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate
Minor shelf rockfish (South of 40°10' N. lat.)												
Chameleon Rockfish	--	--	--	--	--	--	--	--	--	--	0.10	0.10
Flag Rockfish	--	--	--	--	--	--	--	0.20	0.20	0.01	0.00	0.01
Freckled Rockfish	--	--	--	--	--	--	--	0.00	0.00	--	--	--
Greenblotched Rockfish	--	--	--	--	--	--	--	0.10	0.10	--	0.00	0.00
Greenspotted Rockfish	--	0.01	0.01	--	--	--	0.00	0.82	0.82	--	0.02	0.02
Greenstriped Rockfish	--	--	--	--	--	--	0.00	0.06	0.06	0.00	0.00	0.01
Honeycomb Rockfish	--	--	--	--	--	--	--	0.03	0.03	--	--	--
Rosethorn Rockfish	--	--	--	--	--	--	0.03	0.00	0.03	0.02	0.01	0.03
Rosy Rockfish	--	--	--	--	--	--	--	0.05	0.05	0.30	0.08	0.38
Shelf Rockfish Unid	--	--	--	--	--	--	--	0.18	0.18	--	0.36	0.36
Speckled Rockfish	--	--	--	--	--	--	--	0.09	0.09	--	0.05	0.05
Squarespot Rockfish	--	--	--	--	--	--	--	0.00	0.00	--	--	--
Stary Rockfish	--	--	--	--	--	--	--	0.23	0.23	0.04	0.12	0.16
Vermilion Rockfish	--	--	--	--	--	--	--	8.81	8.81	0.14	7.07	7.20
Yellowtail Rockfish	--	--	--	--	--	--	--	0.36	0.36	0.42	0.19	0.61
Minor slope rockfish (North of 40°10' N. lat.)												
Aurora Rockfish	NA	NA	NA	0.12	--	0.12	0.03	0.07	0.10	--	--	--
Bank Rockfish	NA	NA	NA	0.00	--	0.00	--	0.23	0.23	--	--	--
Blackgill Rockfish	NA	NA	NA	0.01	--	0.01	0.11	1.23	1.34	--	0.00	0.00
Blackspotted Rockfish	NA	NA	NA	--	--	--	--	0.29	0.29	--	--	--
Redbanded Rockfish	NA	NA	NA	0.06	--	0.06	1.96	15.88	17.84	--	0.01	0.01
Rougheye Rockfish	NA	NA	NA	0.01	--	0.01	0.97	39.45	40.42	--	0.00	0.00
Sharpchin Rockfish	NA	NA	NA	0.04	--	0.04	--	--	--	--	--	--
Shortraker Rockfish	NA	NA	NA	--	--	--	0.03	2.95	2.98	--	--	--
Shortraker/Rougheye Rockfish	NA	NA	NA	--	--	--	0.15	--	0.15	--	--	--
Slope Rockfish Unid	NA	NA	NA	--	0.00	0.00	0.01	2.23	2.25	--	--	--
Splitnose Rockfish	NA	NA	NA	2.03	--	2.03	0.02	0.16	0.18	--	0.00	0.00
Yellowmouth Rockfish	NA	NA	NA	--	--	--	--	0.05	0.05	--	--	--

Table 13 (continued).

Weight (mt)	Open Access CA halibut			Pink shrimp			Non-nearshore fixed gear			Nearshore fixed gear		
	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate
Minor slope rockfish (South of 40°10' N. lat.)												
Aurora Rockfish	--	--	--	--	--	--	0.34	0.29	0.62	--	--	--
Bank Rockfish	--	--	--	--	--	--	--	1.10	1.10	--	0.00	0.00
Blackgill Rockfish	--	--	--	--	--	--	4.43	129.19	133.62	--	0.37	0.37
Redbanded Rockfish	--	--	--	--	--	--	0.30	0.02	0.32	--	0.00	0.00
Rougheye Rockfish	--	--	--	--	--	--	0.08	0.26	0.34	--	--	--
Slope Rockfish Unid	--	--	--	--	--	--	--	1.68	1.68	--	0.01	0.01
Mixed thornyheads												
Shortspine/ Longspine Thornyhead	--	--	--	--	--	--	0.20	0.87	1.07	--	0.00	0.00
Other flatfish												
Curlfin Turbot	0.28	--	0.28	0.00	--	0.00	0.00	--	0.00	--	--	--
Flatfish Unid	0.62	0.61	1.23	3.90	8.79	12.69	--	0.17	0.17	--	0.00	0.00
Flathead Sole	--	--	--	1.29	--	1.29	--	--	--	--	--	--
Pacific Sanddab	1.42	0.00	1.42	2.68	--	2.68	0.00	4.09	4.09	0.01	1.15	1.15
Rex Sole	--	0.00	0.00	21.22	1.07	22.29	0.00	--	0.00	--	0.00	0.00
Rock Sole	0.04	0.13	0.17	0.01	0.08	0.09	--	0.00	0.00	0.00	0.06	0.07
Sand Sole	0.69	7.76	8.45	--	--	--	--	0.00	0.00	0.04	0.15	0.19
Sanddab Unid	0.12	0.01	0.14	--	0.70	0.70	--	0.03	0.03	--	0.00	0.00
Other groundfish												
Big Skate	36.37	0.28	36.65	0.57	--	0.57	1.71	0.11	1.81	0.02	--	0.02
California Skate	6.07	--	6.07	--	--	--	--	--	--	--	--	--
Grenadier Unid	--	--	--	--	--	--	--	34.28	34.28	--	0.61	0.61
Kelp Greenling	--	--	--	--	--	--	--	--	--	0.82	22.83	23.65
Leopard Shark	5.52	0.00	5.52	--	--	--	--	0.16	0.16	--	0.18	0.18
Pacific Flatnose	--	--	--	--	--	--	2.23	--	2.23	--	--	--
Pacific Grenadier	--	--	--	--	--	--	50.22	--	50.22	--	--	--
Soupin Shark	1.62	0.08	1.70	--	--	--	--	0.25	0.25	--	0.05	0.05
Spotted Ratfish	0.07	--	0.07	0.17	--	0.17	3.55	0.01	3.56	0.00	0.02	0.02
Unspecified Skate	2.11	0.59	2.70	--	2.66	2.66	0.17	10.19	10.36	--	0.04	0.04
Other rockfish	--	--	--	--	--	--	--	0.36	0.36	--	0.33	0.33

Table 13 (continued).

Weight (mt)	Open Access CA halibut			Pink shrimp			Non-nearshore fixed gear			Nearshore fixed gear		
	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate
Pacific cod	--	--	--	0.04	0.03	0.07	0.17	2.20	2.37	--	--	--
Pacific hake	--	--	--	282.09	--	282.09	1.35	0.20	1.55	--	--	--
Sablefish (North of 36° N. lat.)	--	--	--	0.10	0.00	0.10	590.91	2270.98	2389.17	--	1.42	1.42
20% discard mortality (Fixed Gear)*							118.18					
Sablefish (South of 36° N. lat.)	--	0.01	0.01	--	--	--	55.32	744.63	755.69	--	8.79	8.79
20% discard mortality (Fixed Gear)*							11.06					
Shortbelly rockfish	--	--	--	0.21	--	0.21	--	--	--	--	--	--
Shortspine thornyhead (North of 34°27' N. lat.)	--	--	--	0.21	--	0.21	13.61	59.31	72.92	--	0.02	0.02
Shortspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	6.10	169.61	175.71	--	1.14	1.14
Spiny dogfish	0.54	--	0.54	2.89	0.01	2.89	118.95	10.56	129.51	0.24	0.03	0.27
Splitnose rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	0.00	0.11	0.11	--	--	--
Starry flounder	4.33	3.89	8.22	--	--	--	--	0.01	0.01	--	0.06	0.06
Widow rockfish	--	--	--	0.00	0.04	0.04	0.04	0.02	0.06	0.01	0.05	0.06
Yellowtail rockfish (North of 40°10' N. lat.)	NA	NA	NA	0.27	0.00	0.28	0.87	0.34	1.21	0.21	0.72	0.93
<b>Non-groundfish species</b>												
California halibut	6.08	79.91	85.98	--	7.58	7.58	--	0.45	0.45	--	1.31	1.31
Dungeness crab	65.55	--	65.55	0.06	--	0.06	0.97	1.94	2.91	0.10	1.70	1.80
Non-FMP flatfish												
Bigmouth Sole	--	--	--	--	--	--	--	0.00	0.00	--	--	--
C-O (C-O Turbot) Sole	--	--	--	0.00	--	0.00	--	--	--	--	--	--
Deepsea Sole	--	0.94	0.94	--	--	--	0.00	--	0.00	--	--	--
Fantail Sole	0.48	0.14	0.62	--	--	--	--	--	--	--	0.00	0.00
Hornyhead Turbot	1.17	0.03	1.20	--	4.49	4.49	--	--	--	--	0.01	0.01
Longfin Sanddab	0.00	--	0.00	--	--	--	--	--	--	--	--	--
Slender Sole	0.00	--	0.00	118.78	--	118.78	--	0.00	0.00	--	--	--
Speckled Sanddab	0.03	--	0.03	--	--	--	--	--	--	--	--	--
Non-FMP skate												
Aleutian Skate	--	--	--	0.00	--	0.00	--	--	--	--	--	--
Black Skate	--	--	--	0.00	--	0.00	3.67	0.23	3.90	--	--	--
Deepsea Skate	--	--	--	--	--	--	0.12	--	0.12	--	--	--
Pacific Electric Ray	0.59	--	0.59	--	--	--	--	--	--	--	--	--
Pelagic Stingray	--	--	--	--	--	--	0.08	--	0.08	--	--	--
Sandpaper Skate	--	--	--	0.03	--	0.03	2.55	--	2.55	--	--	--
Shovelnose Guitarfish	2.10	--	2.10	--	--	--	--	--	--	--	--	--
Starry Skate	0.13	--	0.13	0.00	--	0.00	--	--	--	0.01	--	0.01
Thornback Skate	0.77	--	0.77	--	--	--	--	--	--	--	--	--

**Table 14.** Incidental landings (mt) of groundfish from shoreside commercial fisheries in 2011 by gear group. Gear groups are as follows: HKL (hook-and-lines), MSC (miscellaneous), NET (nets), POT (pots), TLS (troll) and TWL (trawl).

	Shoreside Commercial Landings (mt)						Incidental fisheries estimate
	Other Fisheries By Gear Group						
	HKL	MSC	NET	POT	TLS	TWL	
<b>Rebuilding species</b>							
Bocaccio Rockfish (South of 40°10' N. lat.)	0.07	--	--	0.01	0.00	--	0.09
Canary rockfish	0.00	--	--	--	--	--	0.00
Darkblotched rockfish	0.13	--	--	--	--	--	0.13
Pacific Ocean Perch (North of 40°10' N. lat.)	0.02	--	--	--	--	--	0.02
Petrale sole	0.07	--	0.01	--	0.29	0.00	0.37
Yelloweye rockfish	0.14	0.15	--	--	0.00	--	0.29
<b>Other groundfish species</b>							
Arrowtooth flounder	0.98	--	--	--	--	--	0.98
Black rockfish (South of 46°16' N. lat.)	--	--	0.00	--	0.11	--	0.11
Cabezon (California)	--	0.01	0.04	--	0.03	--	0.08
California scorpionfish (South of 34°27' N. lat.)	--	--	0.24	--	--	0.00	0.24
Chilipepper Rockfish (South of 40°10' N. lat.)	--	--	--	--	0.01	--	0.01
Dover sole	0.06	--	0.00	--	--	0.02	0.08
English sole	0.00	--	--	--	--	--	0.00
Lingcod (North of 42° N. lat.)	1.39	--	--	0.00	2.26	--	3.65
Lingcod (South of 42° N. lat.)	0.46	0.02	0.02	0.20	0.23	0.00	0.94
Longnose skate	1.07	--	--	--	--	--	1.07
Longspine Thornyhead (North of 34°27' N. lat.)	0.00	--	--	--	--	--	0.00
Minor nearshore rockfish (South of 40°10' N. lat.)							
Black and Yellow Rockfish	--	0.02	--	--	--	--	0.02
Blue Rockfish	--	--	--	--	0.04	--	0.04
Brown Rockfish	--	--	--	--	0.00	--	0.00
China Rockfish	--	--	--	--	0.00	--	0.00
Copper Rockfish	--	--	0.00	--	--	0.00	0.01
Gopher Rockfish	--	0.03	--	--	0.01	--	0.05
Grass Rockfish	--	--	0.01	--	--	--	0.01
Kelp Rockfish	--	0.00	--	--	--	--	0.00
Olive Rockfish	0.01	--	--	--	0.00	--	0.01
Minor shelf rockfish (North of 40°10' N. lat.)							
Chilipepper Rockfish	0.00	--	--	--	--	--	0.00
Greenspotted Rockfish	0.03	--	--	--	--	--	0.03
Greenstriped Rockfish	0.06	--	--	--	--	--	0.06
Redstripe Rockfish	0.00	--	--	--	--	--	0.00
Rosethorn Rockfish	0.01	--	--	--	--	--	0.01
Shelf Rockfish Unid	0.02	--	--	--	0.14	--	0.16
Silvergray Rockfish	0.00	--	--	--	--	--	0.00
Stripetail Rockfish	0.01	--	--	--	--	--	0.01
Vermilion Rockfish	--	--	--	--	0.00	--	0.00
Minor shelf rockfish (South of 40°10' N. lat.)							
Flag Rockfish	0.00	--	--	0.00	--	--	0.00
Greenspotted Rockfish	0.02	--	--	0.00	--	--	0.02
Rosy Rockfish	0.00	--	--	--	--	--	0.00
Shelf Rockfish Unid	0.03	0.00	--	--	0.00	0.03	0.06
Speckled Rockfish	0.00	--	--	--	--	--	0.00
Starry Rockfish	0.02	--	--	0.00	--	--	0.02
Vermilion Rockfish	0.51	--	--	0.09	0.06	--	0.66
Yellowtail Rockfish	0.00	0.07	--	0.03	0.03	--	0.13

Table 14 (continued).

	Shoreside Commercial Landings (mt)						Incidental fisheries estimate
	Other Fisheries By Gear Group						
	HKL	MSC	NET	POT	TLS	TWL	
Minor slope rockfish (North of 40°10' N. lat.)							
Aurora Rockfish	0.00	--	--	--	--	--	0.00
Bank Rockfish	0.00	--	--	--	--	--	0.00
Blackgill Rockfish	0.01	--	--	--	--	--	0.01
Blackspotted Rockfish	0.00	--	--	--	--	--	0.00
Redbanded Rockfish	0.07	--	--	--	--	--	0.07
Rougheye Rockfish	0.27	--	--	--	--	--	0.27
Shorthead Rockfish	0.01	--	--	--	--	--	0.01
Slope Rockfish Unid	0.05	--	--	--	0.05	--	0.09
Splitnose Rockfish	0.00	--	--	--	--	--	0.00
Minor slope rockfish (South of 40°10' N. lat.)							
Redbanded Rockfish	--	0.02	--	--	--	--	0.02
Slope Rockfish Unid	0.03	0.00	--	--	0.00	0.03	0.06
Mixed thornyheads							
Shortspine/ Longspine Thornyhead	--	--	0.02	--	--	--	0.02
Other flatfish							
Flatfish Unid	0.00	0.11	0.13	--	0.06	1.57	1.87
Pacific Sanddab	0.03	--	--	--	--	0.00	0.03
Rock Sole	0.00	--	--	--	0.05	0.00	0.05
Sanddab Unid	--	--	0.03	0.00	0.01	--	0.04
Sand Sole	0.02	--	--	--	0.00	0.42	0.44
Other groundfish							
Big Skate	0.00	--	0.00	--	--	--	0.00
Kelp Greenling	--	0.01	--	--	--	--	0.01
Leopard Shark	0.02	--	1.88	--	--	0.03	1.93
Soupfin Shark	0.12	--	1.81	--	--	0.03	1.95
Unspecified Skate	0.35	--	5.64	--	--	0.05	6.04
Other rockfish	0.02	--	--	--	0.01	--	0.03
Pacific cod	0.07	--	--	--	--	--	0.07
Sablefish (North of 36° N. lat.)	17.92	--	--	--	1.37	--	19.30
Sablefish (South of 36° N. lat.)	--	--	0.87	--	0.95	--	1.82
Shortspine thornyhead (North of 34°27' N. lat.)	0.09	--	--	--	--	--	0.09
Shortspine thornyhead (South of 34°27' N. lat.)	0.12	--	0.02	--	--	--	0.14
Spiny dogfish	0.04	--	0.04	--	--	--	0.08
Starry flounder	0.05	--	--	--	--	0.07	0.12
Widow rockfish	--	--	--	--	0.02	--	0.02
Yellowtail rockfish (North of 40°10' N. lat.)	0.01	--	--	--	0.98	--	0.99
<b>Non-groundfish species</b>							
California halibut	57.07	0.04	42.99	0.21	1.27	0.02	101.60
Dungeness crab	--	11.87	--	24221.42	--	--	24,233.29
Non-FMP flatfish							
Deepsea Sole	--	--	--	--	--	0.03	0.03
Fantail Sole	0.00	--	--	--	--	--	0.00
Hornyhead Turbot	--	--	0.04	--	--	0.00	0.05
Slender Sole	--	--	0.00	--	--	--	0.00

**Table 15.** Estimated fishing mortality (mt) of major west coast groundfish species and a subset of non-groundfish bycatch species in 2011 by sector or fishery.

Weight (mt)	Commercial fisheries										Recreational fishing mortality			Research	Estimated fishing mortality
	IFQ/Coop Management			Non-nearshore fixed gear	Nearshore fixed gear	OA CA halibut	Pink shrimp	Incidental fisheries landings	WA tribal landings	WA tribal at-sea	WA	OR	CA		
	Non-tribal At-sea hake	Non-tribal shoreside hake	Non-hake IFQ												
<b>Rebuilding groundfish species</b>															
Bocaccio rockfish (South of 40°10' N. lat.)	--	--	5.31	1.57	0.73	--	--	0.09	--	--	NA	NA	103.17	0.92	111.79
Canary rockfish	0.53	0.85	2.85	0.09	15.49	--	0.03	0.00	11.55	0.54	0.85	3.17	15.83	0.62	52.41
Cowcod rockfish (South of 40°10' N. lat.)	--	--	0.02	--	--	--	--	--	--	--	NA	NA	0.83	0.14	0.99
Darkblotched rockfish	11.99	1.22	89.68	15.80	0.02	--	11.99	0.13	0.10	0.18	--	--	--	1.63	132.73
Pacific Ocean Perch (North of 40°10' N. lat.)	7.17	0.28	46.39	0.67	0.00	--	0.55	0.02	2.96	1.98	--	--	NA	1.94	61.97
Petrale sole	--	0.00	810.39	0.67	0.00	0.13	1.77	0.37	125.06	--	--	0.10	0.52	14.22	953.23
Yelloweye rockfish	--	--	0.06	0.30	0.76	--	0.00	0.29	0.06	--	2.35	2.10	2.09	0.84	8.85
<b>Other groundfish species</b>															
Arrowtooth flounder	45.20	12.69	2,473.72	60.42	0.01	--	7.51	0.98	48.59	3.77	--	0.00	--	12.97	2,665.86
Black rockfish (North of 46°16' N. lat.)	--	0.00	0.70	--	--	NA	--	--	0.01	--	207.77	NA	NA	0.00	208.49
Black rockfish (South of 46°16' N. lat.)	--	--	0.04	--	124.05	--	--	0.11	--	--	NA	220.50	178.04	0.00	522.75
Cabazon (California)	--	--	--	--	32.50	--	--	0.08	--	--	NA	NA	17.6	0.02	50.20
Cabazon (Oregon)	--	--	--	--	29.76	NA	--	--	--	--	NA	18.30	NA	--	48.06
California scorpionfish (South of 34°27' N. lat.)	--	--	--	--	3.25	0.28	1.05	0.24	--	--	NA	NA	99.56	0.06	104.44
Chilipepper rockfish (South of 40°10' N. lat.)	--	--	317.41	0.67	0.05	--	--	0.01	--	--	NA	NA	5.02	5.54	328.70
Dover sole	1.17	0.07	7,795.12	7.01	0.01	--	3.41	0.08	92.57	--	--	0.01	--	27.79	7,927.25
English sole	0.02	0.00	137.64	--	--	1.45	0.76	0.00	59.74	0.00	--	0.00	0.04	5.78	205.43
Lingcod (North of 42° N. lat.)	0.16	4.55	257.44	17.65	32.29	NA	0.58	3.65	47.56	0.16	103.44	114.29	NA	6.27	588.05
Lingcod (South of 42° N. lat.)	--	--	7.44	6.16	23.68	0.11	0.04	0.94	--	--	NA	NA	225.16	0.36	263.88
Longnose skate	0.41	0.18	861.83	254.15	0.07	0.22	0.96	1.07	3.70	0.01	--	0.10	--	10.44	1,133.13
Longspine thornyhead (North of 34°27' N. lat.)	0.39	--	943.53	6.49	0.00	--	--	0.00	0.00	0.00	--	--	--	11.03	961.44
Longspine thornyhead (South of 34°27' N. lat.)	--	--	0.39	22.17	0.01	--	--	--	--	--	NA	NA	--	0.84	23.40
<b>Minor nearshore rockfish (North of 40°10' N. lat.)</b>															
Black and Yellow Rockfish	--	--	--	--	0.12	NA	--	--	--	--	--	0.01	3.11	--	3.24
Blue Rockfish	--	--	0.00	--	15.20	NA	--	--	--	--	1.3	27.47	--	--	43.97
Brown Rockfish	--	--	0.01	--	0.03	NA	--	--	--	--	--	0.19	1.22	--	1.45
China Rockfish	--	--	--	--	8.55	NA	--	--	--	--	3.18	3.51	4.17	--	19.41
Copper Rockfish	--	--	--	--	1.74	NA	--	--	--	--	2.19	7.65	--	--	11.58
Gopher Rockfish	--	--	--	--	0.11	NA	--	--	--	--	--	--	3.23	--	3.34
Grass Rockfish	--	--	--	--	0.22	NA	--	--	--	--	--	1.34	--	--	1.56
Kelp Rockfish	--	--	--	--	--	NA	--	--	--	--	--	--	0.01	--	0.01
Nearshore Rockfish Unid	--	--	--	--	--	NA	--	--	0.01	--	--	--	--	--	0.01
Olive Rockfish	--	--	--	--	0.10	NA	0.03	--	--	--	--	0.06	0.84	--	1.03
Quillback Rockfish	--	--	0.06	--	2.94	NA	--	--	--	--	1.81	5.80	2.62	0.01	13.24

Note: A value is (-) when the species was neither caught nor discarded (no value). Values appear as 0.00 when a value is smaller than two decimal places.

Table 15 (continued).

Weight (mt)	Commercial fisheries													Research	Estimated fishing mortality
	IFQ/Coop Management			Non-nearshore fixed gear	Nearshore fixed gear	OA CA halibut	Pink shrimp	Incidental fisheries landings	WA tribal landings	WA tribal at-sea	Recreational fishing mortality				
	Non-tribal At-sea hake	Non-tribal shoreside hake	Non-hake IFQ								WA	OR	CA		
Minor nearshore rockfish (South of 40°10' N. lat.)															
Black and Yellow Rockfish	--	--	--	--	12.45	--	--	0.02	NA	NA	NA	NA	11.02	--	23.50
Blue Rockfish	--	--	--	--	3.94	--	--	0.04	NA	NA	NA	NA	54.3	0.02	58.31
Brown Rockfish	--	--	0.00	--	29.21	0.00	0.03	0.00	NA	NA	NA	NA	84.98	0.01	114.23
Calico Rockfish	--	--	--	--	0.08	0.00	--	--	NA	NA	NA	NA	1.91	--	1.99
China Rockfish	--	--	--	--	2.64	--	--	0.00	NA	NA	NA	NA	10.86	--	13.51
Copper Rockfish	--	--	--	--	3.19	0.00	0.01	0.01	NA	NA	NA	NA	62.07	0.08	65.35
Gopher Rockfish	--	--	--	--	32.15	--	--	0.05	NA	NA	NA	NA	67.18	0.00	99.38
Grass Rockfish	--	--	--	--	12.13	--	--	0.01	NA	NA	NA	NA	10.05	--	22.19
Kelp Rockfish	--	--	--	--	0.76	--	--	0.00	NA	NA	NA	NA	--	--	0.76
Nearshore Rockfish Unid	--	--	--	--	0.04	--	--	--	NA	NA	NA	NA	--	--	0.04
Olive Rockfish	--	--	--	--	0.93	--	--	0.01	NA	NA	NA	NA	22.49	0.01	23.45
Quillback Rockfish	--	--	--	--	0.10	--	--	--	NA	NA	NA	NA	--	--	0.10
Treefish Rockfish	--	--	--	--	1.95	--	--	--	NA	NA	NA	NA	11.68	--	13.63
Minor shelf rockfish (North of 40°10' N. lat.)															
Bocaccio Rockfish	0.39	0.97	0.33	0.19	0.00	NA	0.00	--	--	0.22	1.67	0.09	0.14	0.02	4.03
Bronzespotted Rockfish	--	--	--	0.01	--	NA	--	--	--	--	--	--	--	--	0.01
Chilipepper Rockfish	0.01	--	1.43	0.00	--	NA	0.17	0.00	--	--	--	0.01	--	0.76	2.38
Cowcod Rockfish	--	--	--	--	--	NA	0.00	--	--	--	--	--	--	0.02	0.02
Dusky Rockfish	0.01	--	--	--	--	NA	--	--	--	--	--	--	--	--	0.01
Flag Rockfish	--	--	0.00	--	--	NA	--	--	--	--	--	--	--	--	0.00
Greenspotted Rockfish	--	--	0.02	0.00	--	NA	--	0.03	--	--	--	--	--	0.08	0.14
Greenstriped Rockfish	--	0.05	8.78	0.24	--	NA	1.16	0.06	0.55	--	--	0.02	--	2.12	12.99
Halfbanded Rockfish	--	--	--	--	--	NA	0.00	--	--	--	--	--	--	--	0.00
Harlequin Rockfish	--	--	0.00	--	--	NA	0.02	--	--	--	--	--	--	--	0.02
Pygmy Rockfish	--	--	0.00	--	--	NA	0.04	--	--	--	--	--	--	0.92	0.96
Redstripe Rockfish	0.02	0.00	0.17	0.00	--	NA	0.00	0.00	--	0.01	--	0.01	--	8.16	8.38
Rosethorn Rockfish	--	0.18	1.94	0.41	--	NA	0.00	0.01	2.29	--	--	0.00	--	0.46	5.27
Rosy Rockfish	--	--	0.01	--	--	NA	--	--	--	--	--	0.00	--	--	0.02
Shelf Rockfish Unid	0.03	0.09	2.33	0.79	0.03	NA	2.12	0.16	16.65	--	--	--	--	--	24.37
Silvergray Rockfish	0.27	0.15	0.30	0.07	--	NA	--	0.00	0.01	0.01	--	0.01	--	0.21	1.03
Squarespot Rockfish	--	--	--	--	--	NA	--	--	--	--	--	--	--	0.00	0.00
Starry Rockfish	--	--	0.00	--	--	NA	--	--	--	--	--	--	0.01	--	0.01
Stripetail Rockfish	--	0.00	0.36	0.00	--	NA	0.63	0.01	--	--	--	--	--	0.69	1.69
Tiger Rockfish	--	--	--	0.01	0.29	NA	0.00	--	--	--	0.17	0.68	0.17	0.01	1.34
Vermilion Rockfish	--	--	--	0.04	4.06	NA	--	0.00	--	--	0.97	6.62	10.94	0.00	22.63

Note: A value is (--) when the species was neither caught nor discarded (no value). Values appear as 0.00 when a value is smaller than two decimal places.

Table 15 (continued).

Weight (mt)	Commercial fisheries									WA tribal landings	WA tribal at-sea	Recreational fishing mortality			Research	Estimated fishing mortality	
	IFQ/Coop Management			Non-nearshore fixed gear	Nearshore fixed gear	OA CA halibut	Pink shrimp	Incidental fisheries landings	WA tribal landings			WA tribal at-sea	WA	OR			CA
	Non-tribal At-sea hake	Non-tribal shoreside hake	Non-hake IFQ														
Minor shelf rockfish (South of 40°10' N. lat.)																	
Chameleon Rockfish	--	--	--	--	0.10	--	--	--	NA	NA	NA	NA	--	--	0.10		
Flag Rockfish	--	--	--	0.20	0.01	--	--	0.00	NA	NA	NA	NA	8.08	0.01	8.30		
Freckled Rockfish	--	--	--	0.00	--	--	--	--	NA	NA	NA	NA	--	0.00	0.00		
Greenblotched Rockfish	--	--	0.00	0.10	0.00	--	--	--	NA	NA	NA	NA	1.26	0.07	1.43		
Greenspotted Rockfish	--	--	0.04	0.82	0.02	0.01	--	0.02	NA	NA	NA	NA	17.31	0.30	18.53		
Greenstriped Rockfish	--	--	0.35	0.06	0.01	--	--	--	NA	NA	NA	NA	--	0.25	0.68		
Halfbanded Rockfish	--	--	0.05	--	--	--	--	--	NA	NA	NA	NA	0.99	1.29	2.33		
Honeycomb Rockfish	--	--	--	0.03	--	--	--	--	NA	NA	NA	NA	8.02	0.00	8.05		
Pygmy Rockfish	--	--	0.00	--	--	--	--	--	NA	NA	NA	NA	--	0.00	0.00		
Redstripe Rockfish	--	--	0.00	--	--	--	--	--	NA	NA	NA	NA	--	--	0.00		
Rosethorn Rockfish	--	--	0.05	0.03	0.03	--	--	--	NA	NA	NA	NA	--	0.01	0.12		
Rosy Rockfish	--	--	0.00	0.05	0.38	--	--	0.00	NA	NA	NA	NA	5.79	0.01	6.23		
Shelf Rockfish Unid	--	--	0.03	0.18	0.36	--	--	0.06	NA	NA	NA	NA	--	--	0.63		
Silvergray Rockfish	--	--	--	--	--	--	--	--	NA	NA	NA	NA	--	0.00	0.00		
Speckled Rockfish	--	--	0.00	0.09	0.05	--	--	0.00	NA	NA	NA	NA	8.02	0.08	8.24		
Squarespot Rockfish	--	--	0.00	0.00	--	--	--	--	NA	NA	NA	NA	5.51	0.02	5.53		
Starry Rockfish	--	--	--	0.23	0.16	--	--	0.02	NA	NA	NA	NA	22.17	0.02	22.60		
Stripetail Rockfish	--	--	2.42	--	--	--	--	--	NA	NA	NA	NA	--	1.46	3.88		
Swordspine Rockfish	--	--	--	--	--	--	--	--	NA	NA	NA	NA	--	0.16	0.16		
Tiger Rockfish	--	--	--	--	--	--	--	--	NA	NA	NA	NA	0.27	--	0.27		
Vermilion Rockfish	--	--	--	8.81	7.20	--	--	0.66	NA	NA	NA	NA	184.28	1.94	202.89		
Yellowtail Rockfish	--	--	0.03	0.36	0.61	--	--	0.13	NA	NA	NA	NA	44.49	0.46	46.09		
Minor slope rockfish (North of 40°10' N. lat.)																	
Aurora Rockfish	0.10	0.28	19.86	0.10	--	NA	0.12	0.00	0.05	--	--	--	--	0.14	20.66		
Bank Rockfish	0.02	0.04	0.27	0.23	--	NA	0.00	0.00	0.01	--	--	--	--	0.12	0.67		
Blackgill Rockfish	0.00	--	3.26	1.34	0.00	NA	0.01	0.01	0.00	--	--	--	--	0.01	4.64		
Blackspotted Rockfish	--	0.12	0.65	0.29	--	NA	--	0.00	0.02	--	--	--	--	--	1.09		
Red Banded Rockfish	0.00	--	--	--	--	NA	--	--	--	--	--	--	--	0.15	0.15		
Redbanded Rockfish	--	0.14	5.41	17.84	0.01	NA	0.06	0.07	8.18	--	--	--	--	--	31.70		
Rougheye Rockfish	78.38	2.74	66.48	40.42	0.00	NA	0.01	0.27	16.06	2.40	--	--	--	0.34	207.11		
Sharpchin Rockfish	0.01	0.01	1.50	--	--	NA	0.04	--	0.00	--	--	--	--	4.92	6.48		
Shortraker Rockfish	0.18	1.75	21.98	2.98	--	NA	--	0.01	1.26	--	--	--	--	0.09	28.26		
Shortraker/Rougheye Rockfish	0.01	--	0.18	0.15	--	NA	--	--	--	--	--	--	--	--	0.34		
Slope Rockfish Unid	--	1.35	5.14	2.25	--	NA	0.00	0.09	1.10	--	--	--	--	--	10.37		
Splitnose Rockfish	11.90	3.69	9.02	0.18	0.00	NA	2.03	0.00	0.08	0.19	--	--	--	2.11	29.21		
Yellowmouth Rockfish	0.07	--	0.38	0.05	--	NA	--	--	--	0.00	--	--	--	0.18	0.68		

Note: A value is (--) when the species was neither caught nor discarded (no value). Values appear as 0.00 when a value is smaller than two decimal places.



Table 15 (continued).

Weight (mt)	Commercial fisheries													Research	Estimated fishing mortality
	IFQ/Coop Management			Non-nearshore fixed gear	Nearshore fixed gear	OA CA halibut	Pink shrimp	Incidental fisheries landings	WA tribal landings	WA tribal at-sea	Recreational fishing mortality				
	Non-tribal At-sea hake	Non-tribal shoreside hake	Non-hake IFQ								WA	OR	CA		
Minor slope rockfish (South of 40°10' N. lat.)															
Aurora Rockfish	--	--	6.07	0.62	--	--	--	--	NA	NA	NA	NA	--	0.30	7.00
Bank Rockfish	--	--	27.82	1.10	0.00	--	--	--	NA	NA	NA	NA	0.23	0.05	29.20
Blackgill Rockfish	--	--	15.99	133.62	0.37	--	--	--	NA	NA	NA	NA	--	0.29	150.27
Pacific Ocean Perch Rockfish	--	--	0.03	--	--	--	--	--	NA	NA	NA	NA	--	--	0.03
Redbanded Rockfish	--	--	0.19	0.32	0.00	--	--	0.02	NA	NA	NA	NA	--	0.01	0.54
Rougheye Rockfish	--	--	0.02	0.34	--	--	--	--	NA	NA	NA	NA	--	--	0.36
Sharpchin Rockfish	--	--	0.01	--	--	--	--	--	NA	NA	NA	NA	--	0.39	0.40
Slope Rockfish Unid	--	--	1.92	1.68	0.01	--	--	0.06	NA	NA	NA	NA	--	--	3.68
Spotted Rockfish Unid	--	--	0.01	--	--	--	--	--	NA	NA	NA	NA	--	--	0.01
Mixed thomyheads															
Shortspine/ Longspine Thomyhead	0.13	--	4.68	1.07	0.00	--	--	0.02	--	--	--	--	--	--	5.90
Other flatfish															
Butter Sole	--	--	0.85	--	--	--	--	--	--	--	--	0.01	--	0.04	0.90
Curfin Turbot	--	--	1.40	0.00	--	0.28	0.00	--	--	--	--	--	--	0.09	1.78
Flatfish Unid	0.00	0.00	6.51	0.17	0.00	1.23	12.69	1.87	0.97	--	1.82	0.00	--	0.07	25.33
Flathead Sole	0.00	--	6.37	--	--	--	1.29	--	--	--	--	--	--	0.28	7.94
Pacific Sanddab	0.00	0.00	231.74	4.09	1.15	1.42	2.68	0.03	--	--	--	0.07	78.61	9.32	329.12
Rex Sole	5.86	0.85	378.99	0.00	0.00	0.00	22.29	--	29.86	0.01	--	--	--	6.20	444.07
Rock Sole	--	--	2.67	0.00	0.07	0.17	0.09	0.05	3.23	--	--	0.00	1.3	0.12	7.70
Sand Sole	--	--	70.09	0.00	0.19	8.45	--	0.44	0.03	--	--	0.33	1.08	0.04	80.65
Sanddab Unid	--	--	4.44	0.03	0.00	0.14	0.70	0.04	18.44	--	--	--	--	--	23.79
Other groundfish															
Big Skate	0.17	0.24	34.62	1.81	0.02	36.65	0.57	0.00	--	0.08	--	0.04	--	3.97	78.16
Cabazon	--	--	0.00	--	--	--	--	--	--	--	6.79	--	--	--	6.79
California Skate	--	--	3.14	--	--	6.07	--	--	--	--	--	--	--	0.38	9.58
Grenadier Unid	0.13	--	89.82	34.28	0.61	--	--	--	--	--	--	--	--	--	124.84
Groundfish Unid	--	0.28	0.00	--	--	--	--	--	--	--	--	--	--	7.88	8.17
Kelp Greenling	--	--	0.06	--	23.65	--	--	0.01	--	--	2.03	26.16	22.63	0.03	74.57
Leopard Shark	--	--	0.09	0.16	0.18	5.52	--	1.93	--	--	--	--	13.38	--	21.26
Pacific Flatnose	--	--	3.48	2.23	--	--	--	--	--	--	--	--	--	--	5.71
Pacific Grenadier	0.03	--	61.19	50.22	--	--	--	--	--	--	--	--	--	3.94	115.38
Roundfish Unid	0.01	--	0.02	--	--	--	--	--	--	--	--	--	--	--	0.03
Soupfin Shark	0.12	0.51	0.50	0.25	0.05	1.70	--	1.95	--	--	--	0.03	--	--	5.11
Spiny dogfish	725.07	181.04	394.97	129.51	0.27	0.54	2.89	0.08	127.72	58.45	0.23	0.11	9.26	31.52	1,661.66
Spotted Ratfish	--	0.00	70.76	3.56	0.02	0.07	0.17	--	--	--	--	--	--	--	74.58
Unspecified skate	0.00	0.58	277.60	10.36	0.04	2.70	2.66	6.04	34.12	--	--	--	--	--	334.09
Other rockfish	--	--	0.00	0.36	0.33	--	--	0.03	--	--	--	--	--	0.01	0.74

Note: A value is (--) when the species was neither caught nor discarded (no value). Values appear as 0.00 when a value is smaller than two decimal places.

Table 15 (continued).

Weight (mt)	Commercial fisheries													Research	Estimated fishing mortality
	IFQ/Coop Management			Non-nearshore fixed gear	Nearshore fixed gear	OA CA halibut	Pink shrimp	Incidental fisheries landings	WA tribal landings	WA tribal at-sea	Recreational fishing mortality				
	Non-tribal At-sea hake	Non-tribal shoreside hake	Non-hake IFQ								WA	OR	CA		
Pacific cod	0.01	6.59	251.36	2.37	--	--	0.07	0.07	338.96	0.03	1.58	0.02	--	5.47	606.52
Pacific hake	121,572.29	90,758.68	219.77	1.55	--	--	282.09	--	11,756.35	6,343.63	--	--	--	1,061.88	231,996.22
Sablefish (North of 36° N. lat.)	4.98	30.39	2,363.53	2,389.17	1.42	--	0.10	19.30	535.77	0.08	--	0.49	0.03	16.91	5,362.16
Sablefish (South of 36° N. lat.)	--	--	452.61	755.69	8.79	0.01	--	1.82	NA	NA	NA	NA	--	1.07	1,219.99
Shortbelly rockfish	--	0.00	10.55	--	--	--	0.21	--	--	--	--	--	--	1.45	12.21
Shortspine thornyhead (North of 34°27' N. lat.)	13.28	2.18	714.90	72.92	0.02	--	0.21	0.09	19.48	0.00	--	--	NA	4.31	827.40
Shortspine thornyhead (South of 34°27' N. lat.)	--	--	6.12	175.71	1.14	--	--	0.14	NA	NA	NA	NA	--	0.41	183.53
Splitnose rockfish (South of 40°10' N. lat.)	--	--	39.53	0.11	--	--	--	--	NA	NA	NA	NA	--	2.10	41.74
Starry flounder	--	--	11.67	0.01	0.06	8.22	--	0.12	0.02	--	--	3.03	1.24	0.07	24.45
Widow rockfish	36.90	123.07	14.52	0.06	0.06	--	0.04	0.02	35.98	1.46	--	0.53	1.34	2.20	216.20
Yellowtail rockfish (North of 40°10' N. lat.)	81.24	424.33	314.25	1.21	0.93	NA	0.28	0.99	440.51	19.81	37.97	12.38	1.45	16.57	1,351.92
<b>Non-groundfish species</b>															
California halibut	--	--	12.00	0.45	1.31	85.98	7.58	101.60	--	--	--	0.09	--	--	209.01
California sheephead	--	--	--	--	30.67	--	--	0.20	--	--	--	--	40.91	--	71.78
Dungeness crab	0.00	0.03	203.86	2.91	1.80	65.55	0.06	24,233.29	1,815.27	--	--	--	--	0.02	26,322.79
<b>Non-FMP flatfish</b>															
Bigmouth Sole	--	--	--	0.00	--	--	--	--	--	--	--	--	--	--	0.00
C-O (C-O Turbot) Sole	--	--	0.00	--	--	--	0.00	--	--	--	--	--	--	--	0.00
Deepsea Sole	--	--	20.20	0.00	--	0.94	--	0.03	--	--	--	--	--	--	21.17
Diamond Turbot	--	--	0.00	--	--	--	--	--	--	--	--	--	--	--	0.00
Fantail Sole	--	--	--	--	0.00	0.62	--	0.00	--	--	--	--	--	--	0.62
Hornyhead Turbot	--	--	0.06	--	0.01	1.20	4.49	0.05	--	--	--	--	--	--	5.81
Longfin Sanddab	--	--	--	--	--	0.00	--	--	--	--	--	--	--	--	0.00
Slender Sole	0.03	--	19.67	0.00	--	0.00	118.78	0.00	--	--	--	--	--	--	138.49
Speckled Sanddab	--	--	--	--	--	0.03	--	--	--	--	--	--	--	--	0.03
<b>Non-FMP skate</b>															
Aleutian Skate	--	--	1.66	--	--	--	0.00	--	--	--	--	--	--	--	1.66
Banded Guitarfish	--	--	0.00	--	--	--	--	--	--	--	--	--	--	--	0.00
Black Skate	--	0.01	24.73	3.90	--	--	0.00	--	--	--	--	--	--	--	28.64
Butterfly Ray	--	--	0.00	--	--	--	--	--	--	--	--	--	--	--	0.00
Deepsea Skate	--	--	0.96	0.12	--	--	--	--	--	--	--	--	--	--	1.08
Flathead Skate	--	--	0.01	--	--	--	--	--	--	--	--	--	--	--	0.01
Pacific Electric Ray	0.01	--	0.75	--	--	0.59	--	--	--	--	--	--	--	0.02	1.37
Pelagic Stingray	--	--	--	0.08	--	--	--	--	--	--	--	--	--	--	0.08
Roughshoulder/Broad Skate	--	--	0.03	--	--	--	--	--	--	--	--	--	--	--	0.03
Sandpaper Skate	0.00	--	31.38	2.55	--	--	0.03	--	--	--	--	--	--	--	33.96
Shovelnose Guitarfish	--	--	--	--	--	2.10	--	--	--	--	--	--	--	--	2.10
Starry Skate	--	--	0.07	--	0.01	0.13	0.00	--	--	--	--	--	--	--	0.20
Thornback Skate	--	--	0.03	--	--	0.77	--	--	--	--	--	--	--	--	0.79
White Skate	--	--	0.01	--	--	--	--	--	--	--	--	--	--	--	0.01

Note: A value is (--) when the species was neither caught nor discarded (no value). Values appear as 0.00 when a value is smaller than two decimal places.

**Table 16.** Estimated fishing mortality (mt) of major west coast groundfish species in 2011 and corresponding management reference points (harvest specifications).

	Estimated fishing mortality (mt)	Management reference points (harvest specifications)					Estimated mortality (% of OFL)
		ACL (mt)	Estimated mortality (% of ACL)	ABC (mt)	Estimated mortality (% of ABC)	OFL (mt)	
<b>Rebuilding species</b>							
Bocaccio (South of 40°10' N. lat.)	112	263	43%	704	16%	737	15%
Canary rockfish	52	102	51%	586	9%	614	9%
Cowcod (South of 40°10' N. lat.)	1	3	33%	10	10%	13	8%
Darkblotched rockfish	133	298	45%	485	27%	508	26%
Pacific ocean perch (North of 40°10' N. lat.)	62	180	34%	981	6%	1026	6%
Petrale sole	953	976	98%	976	98%	1021	93%
Yelloweye rockfish	9	17	52%	46	19%	48	18%
<b>Non-rebuilding species</b>							
Arrowtooth flounder	2666	15174	18%	15174	18%	18211	15%
Black rockfish (North of 46°16' N. lat.)	208	426	49%	426	49%	445	47%
Black rockfish (South of 46°16' N. lat.)	523	1000	52%	1163	45%	1217	43%
Cabezon (California)	50	179	28%	179	28%	187	27%
Cabezon (Oregon)	48	50	96%	50	96%	52	92%
California scorpionfish (South of 34°27' N. lat.)	104	135	77%	135	77%	141	74%
Chilipepper rockfish (South of 40°10' N. lat.)	329	1981	17%	1981	17%	2073	16%
Dover sole	7927	25000	32%	42436	19%	44400	18%
English sole	205	19761	1%	19761	1%	20675	1%
Lingcod (North of 42° N. lat.)	588	2330	25%	2330	25%	2438	24%
Lingcod (South of 42° N. lat.)	264	2102	13%	2102	13%	2523	10%
Longnose Skate	1133	1349	84%	2990	38%	3128	36%
Other flatfish	921	4884	19%	7044	13%	10146	9%
Other groundfish	2521	5575	45%	7742	33%	11150	23%
Minor rockfish (North of 40°10' N. lat.)	526	2227	24%	3363	16%	3767	14%
Nearshore	99	99	100%	99	100%	116	85%
Shelf	85	968	9%	1940	4%	2188	4%
Slope	341	1160	29%	1324	26%	1462	23%
Unspecified remaining rockfish							
Minor rockfish (South of 40°10' N. lat.)	964	2341	41%	3723	26%	4302	22%
Nearshore	436	1001	44%	1001	44%	1156	38%
Shelf	336	714	47%	1885	18%	2238	15%
Slope	191	626	31%	836	23%	907	21%
Unspecified remaining rockfish							
Pacific cod (North of 43° N. lat.)	607	1600	38%	2222	27%	3200	19%
Pacific hake	231996	290903	80%	NA	NA	719370	32%
Sablefish (North of 36° N. lat.)	5362	5515	97%	8418	78%	8808	75%
Sablefish (South of 36° N. lat.)	1220	1298	94%				
Shortbelly rockfish	12	50	24%	5789	0%	6950	0%
Splitnose rockfish (South of 40°10' N. lat.)	42	1461	3%	1461	3%	1529	3%
Starry flounder	24	1352	2%	1502	2%	1802	1%
<b>Thornyheads</b>							
Longspine thornyhead (North of 34°27' N. lat.)	961	2119	45%	2981	33%	3577	28%
Longspine thornyhead (South of 34°27' N. lat.)	23	376	6%				
Shortspine thornyhead (North of 34°27' N. lat.)	827	1573	53%	2279	44%	2384	42%
Shortspine thornyhead (South of 34°27' N. lat.)	184	405	45%				
Mixed thornyheads	6						
Widow rockfish	216	600	36%	4872	4%	5097	4%
Yellowtail rockfish (North of 40°10' N. lat.)	1352	4364	31%	4364	31%	4566	30%