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# Estimated Discard and Catch of Groundfish Species in the 2013 US West Coast Fisheries



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## Executive Summary

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The primary objective of this report is to estimate fishing mortality of groundfish species in U.S. west coast fisheries during 2013 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 in the federal groundfish regulations for selected groundfish species (50 CFR 660 Subpart G, 78 FR 580). Based on a recommendation from the Pacific Fishery Management Council's (PFMC) Scientific and Statistical Committee (SSC), we present groundfish mortality estimates by species, whenever possible. Our primary findings include:

- Estimated fishing mortality for all groundfish species or complexes did not exceed 2013 ACL, ABC, or OFL harvest goals.
- Estimated fishing mortality of one species or complex was above 90% of ACL: California scorpionfish – south of 34°27' N. latitude (96%).
- Twenty-eight groundfish species or complexes (68%) had fishing mortality estimates which were less than 50% of 2013 ACLs.
- Fishing mortality estimates for all groundfish combined were lower in 2013 relative to the prior year in the non-hake IFQ fixed gear, non-nearshore fixed gear, incidental fisheries, Washington tribal at-sea (where no fishing occurred), and Washington recreational sectors (Bellman et al. 2013). All other sectors showed an increase in overall groundfish mortality relative to 2012.
- An almost equal proportion of groundfish species or complexes showed an increase (49%) or decrease (51%) in estimated fishing mortality from 2012 to 2013.
- An almost equivalent proportion of rockfish species or complexes showed an increase (51%), as compared to a decrease, in estimated fishing mortality in 2013 relative to 2012, in contrast to the greater proportion (61%) of flatfish species which showed an increase in fishing mortality.

Summaries of 2013 catch from the following groundfish fishery sectors are included:

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 midwater trawl gear

At-sea Whiting Co-op Programs\*

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

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)

Tribal –

- Tribal (shoreside fisheries)
- Tribal at-sea Pacific whiting (hake)\*
- Non-commercial –
  - 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

\* indicates sectors that use federal observer data

## 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 shoreside 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. 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 2013 were retrieved from the PacFIN database (03-21-2014) 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 is defined in this report as only catch which is discarded at-sea. Discard at the dock is coded in PacFIN fish ticket landings data and is thus accounted for in landing weights in this report. Landing weights are presented in round weight, as any conversion factors (e.g. for at-sea processing) have already been applied by state agencies or in PacFIN.

Discard estimation focused on commercial groundfish fishery sectors with scientific at-sea observations of discards, conducted by the Northwest Fishery Science Center (NWFSC) Observer Program, 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 A-SHOP data for the at-sea Pacific hake/whiting fishery, including: catcher-processor, mothership, mothership catcher-vessel, and tribal components.

The NWFSC WCGOP program was established in 2001 by NOAA Fisheries (National Marine Fisheries Services (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 federal observers when notified.

The WCGOP's goal is to improve total catch estimates by collecting information on west coast groundfish species discarded at-sea (for more details see <http://www.nwfsc.noaa.gov/research/divisions/fram/observation/index.cfm>). 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/observation/data\\_products/sector\\_products.cfm](http://www.nwfsc.noaa.gov/research/divisions/fram/observation/data_products/sector_products.cfm)

Detailed information on data collection methods employed in each observed fishery can be found in WCGOP manuals (NWFSC 2013b, NWFSC 2014; current manual: [http://www.nwfsc.noaa.gov/research/divisions/fram/observation/data\\_collection/training.cfm](http://www.nwfsc.noaa.gov/research/divisions/fram/observation/data_collection/training.cfm); previous manuals available upon request).

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 the 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 equal the total trip pounds on the fish ticket(s). This adjustment is necessary because observer retained catch weight estimates in the trawl sectors often consists of the visual estimate used in the vessel's logbook, while the fish ticket weight is a physical measurement and is legally binding (for more details see: [http://www.nwfsc.noaa.gov/research/divisions/fram/observation/data\\_processing.cfm](http://www.nwfsc.noaa.gov/research/divisions/fram/observation/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 (a.k.a. Pacific whiting, henceforth referred to as Pacific hake) fishery since 2001. Prior to 2001, observer coverage of the west coast at-sea Pacific hake fishery was conducted by the North Pacific Groundfish Observer Program. Current A-SHOP program information and documentation on data collection methods can be found in the observer manual (NWFSC 2013a; [http://www.nwfsc.noaa.gov/research/divisions/fram/observation/data\\_collection/manuals/ashop\\_manual\\_updated\\_91613.pdf](http://www.nwfsc.noaa.gov/research/divisions/fram/observation/data_collection/manuals/ashop_manual_updated_91613.pdf)). The at-sea hake fishery has mandatory observer coverage, with each vessel over 38 meters carrying two observers. Beginning in 2011, under IFQ/Co-op Program management, all catcher vessels that deliver catch to motherships are required to carry WCGOP observers.

Each year, a certain portion of the ACL for groundfish species is harvested through research activities. In 2013, research programs that caught groundfish included the NWFSC's groundfish bottom trawl survey, Pacific hake acoustic survey, and rockfish hook and line survey, the International Pacific Halibut Commission's (IPHC) longline survey, as well as other scientific research permits. All groundfish research catch information was provided to NOAA's West Coast Regional Office (WCR). These data were then summarized by the WCR and included in this report. For the first time in this report, the WCR applied depth-dependent mortality rates to research catch of canary rockfish, cowcod, and yelloweye rockfish (PFMC 2014a).

In addition to these data sources, mortality estimates were provided by the Groundfish Management Team (GMT) (PFMC 2014b). 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 discarded catch, for sablefish, longnose skate, and lingcod in trawl and fixed gear sectors; for spiny dogfish in hook and line fixed gear sectors only; and for some individual species and major species groups reported in the state-permitted fixed gear nearshore sector (for all discard mortality rates, see PFMC 2014b). All trawl-related discard rates were only applied to estimates generated from bottom trawl gear (the gear from which research originated to inform the selected rates), and were thus not applied to estimates from midwater or pink shrimp trawl gear where assumptions of survivorship may vary greatly from bottom trawl gear.

## 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. Observed discard rates for each species were directly expanded to the fleet-wide level to estimate total discard amount. 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. The overall WCGOP sampling design is based on a stratified multi-stage random sampling. This design-based framework distributes observational effort more evenly coast-wide than simple random sampling, and uses prior information (landings) to improve the efficiency of sampling allocation. Methods employed in this report provide mortality 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 an 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/observation/data\\_processing.cfm](http://www.nwfsc.noaa.gov/research/divisions/fram/observation/data_processing.cfm)). A complete listing of groundfish species is defined in the Groundfish Fishery Management Plan ([http://www.pcouncil.org/wp-content/uploads/GF\\_FMP\\_Ch1-6\\_Sept-22-2010\\_Am23\\_AM16-5\\_NMFS\\_PFMC\\_FINAL.pdf](http://www.pcouncil.org/wp-content/uploads/GF_FMP_Ch1-6_Sept-22-2010_Am23_AM16-5_NMFS_PFMC_FINAL.pdf)).



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.

## **IFQ Fishery Discard Estimation**

The IFQ/Co-op managed groundfish catch-share fishery operates with a variety of gear types and target strategies, which depend on where catch is delivered and processed.

Catch delivered to shore-based processors (IFQ):

- Bottom trawl: Bottom trawl nets were used to target a variety of groundfish species.
- Midwater non-hake trawl: Midwater trawl nets were used to target midwater non-Pacific hake species, such as Widow and 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 target Pacific hake.

Catch processed at-sea (Co-op Program):

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

In 2011, the implementation of the 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, in the non-hake IFQ sectors:

- Vessels must carry NMFS observers on all IFQ fishing trips.
- Observer sampling priorities were shifted to focus more on IFQ and rebuilding groundfish species.
- The use of multiple gear types (trawl or fixed gear) were allowed for fishing under a Federal groundfish trawl-endorsed permit.
- A limit of one (1) IFQ reporting area could be fished per trip.
- Individual fishing quotas (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 in-season management. For a description of the IFQ fishery and observer data collection, see:

[http://www.nwfsc.noaa.gov/research/divisions/fram/observation/catchshares\\_how.cfm](http://www.nwfsc.noaa.gov/research/divisions/fram/observation/catchshares_how.cfm) .

IFQ 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 at the tow-level based on the use of bottom trawl gear and the following criteria: 1) the target was

California halibut and more than 150 lbs of California halibut was landed or 2) the 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 IFQ bottom trawl tows that met at least one of the above requirements were 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 as possible to maintain confidentiality (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. The fishery was further stratified into two seasonal strata: winter (November-April) and summer (May-October, reflecting seasonal changes in RCA boundaries, fishing effort, and target species (e.g. winter petrale sole). Lastly, observations from tows made by IFQ vessels participating in the LE California halibut fishery were combined with all other observations of bottom trawl gear due to low sample size and confidentiality guidelines.

In 2011, an observer coverage rate of 100% of trips was mandated. However, on rare occasions (e.g., observer illness), tows or sets are not sampled (unsampled). In some cases, tows or sets may have some portion of the discarded catch recorded in very broad or mixed (unsampled) categories (Appendix A, Table A-1). We used ratio estimators to apportion any unsampled discard weight to specific species within each stratum, based on what was observed in the sampled catch. Values used to calculate the expanded discard weight of groundfish species from each WCGOP unsampled catch category in the 2013 IFQ fishery are presented in Tables 2a & b. Discard ratios and expansion factors are presented by area, gear type, season and depth. Winter season is January-April and November-December and summer season is May-October. Only strata with unsampled discard weight are shown.

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

$f$  = sampled haul

$x$  = total weight of discarded catch

$W$  = estimated discard weight of the species

$w$  = sampled discard weight of the species

In hauls with unsampled catch categories, unsampled discard weight was recorded as non-IFQ species (NIFQ) or IFQ species. Unsampled IFQ species weight could be further categorized into IFQ flatfish (IFQFF), IFQ rockfish (IFQRF), and IFQ mixed species (IFQM) (Appendix A, Table A-1). IFQM included all 2013 IFQ managed species (see 78 FR 579 for a listing of IFQ species in 2013). NIFQ included all fish species encountered that were not designated as an IFQ species in 2013 management. Observers are instructed that IFQ hauls or sets in which they

record unsampled categories cannot also contain sampled species that are within the unsampled category to avoid double counting.

To obtain the estimated discard weight of a species ( $W$ ) in hauls or sets with unsampled categories, the unsampled discard weight, summed within the stratum, was multiplied by the ratio of the discard weight of the species (summed across sampled hauls within a stratum) divided by the discard weight of all sampled species that are included within an unsampled category (NIFQ, IFQFF, IFQRF, IFQM) within a stratum. This denominator only includes fully sampled hauls (i.e. no unsampled categories) to determine appropriate ratios. Estimated discard weight of the species was summed across unsampled categories and then added to the discard weight of the species that was sampled in the hauls with unsampled categories:

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

where, for each stratum:

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

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

$p$  = haul with unsampled catch category

$f$  = sampled haul

$x$  = weight of discarded catch

$W$  = estimated discard weight of the species

$w$  = sampled discard weight of the species

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

Coast-wide landings, sampled discard weight, estimated discard weight, and estimated fishing mortality in the 2013 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 assumptions made by the GMT and carried over from management under the pre-IFQ LE groundfish bottom trawl sector (before 2011). 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. We apply a 7% mortality rate to discarded lingcod caught by IFQ hook-and-line gear, previously used in nearshore groundfish fixed gear sectors. We also apply SSC recommended discard mortality rate assumptions (previously made for stock assessment purposes) for longnose skate (trawl = 50%, fixed gear = 50%) and spiny dogfish (hook-and-line fixed gear = 50%) (PFMC 2012).

The 2013 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 above, except that no mortality rates were applied. Prior to 2011, this fishery was conducted under an Exempted Fishing Permit (EFP). It continues to operate as a “maximum retention” fishery, where minor amounts of operational discard at-sea are permissible provided the observer accounts for the discard weight. The total estimated weight, comprised of the sampled and expanded discard weight and the landed weight, is reported by species for the shoreside hake sector in Table 3b.

## At-Sea Hake Co-op Sectors

The midwater trawl fishery for Pacific hake is comprised of three at-sea processing fleets: catcher-processors, motherships with catcher vessels, and a tribal catcher vessel fleet delivering to motherships. The A-SHOP produces estimates of total catch (discard and retained) in the at-sea Pacific hake fishery. Observers sample unsorted catch and provide a visual estimate of the proportion retained, at the species level. Discarded catch weight is calculated on a haul basis for the total weight of all species. The discard weight estimate, along with the proportion retained, form the basis for the two at-sea hake sectors summarized in Table 3b. In 2013, the tribal fleet did not make any at-sea landings; shore-based tribal landings are presented in Table 15. Coast-wide landings or retained catch, sampled discard weight, estimated discard weight, and estimated fishing mortality in all 2013 Pacific hake IFQ/Co-op Program sectors (shore-based and at-sea) are reported in Table 3b.

## 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/observation/data\\_products/halibut\\_trawl.cfm](http://www.nwfsc.noaa.gov/research/divisions/fram/observation/data_products/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 for the fleet (expansion factor)

$\hat{D}_s$ : discard estimate for species  $s$

Table 4 presents estimated fishing mortalities of groundfish species caught in the 2013 OA California halibut trawl fishery. A 50% mortality rate was applied for discarded lingcod and sablefish, which are assumptions made by the GMT and carried over from management under the pre-IFQ LE groundfish bottom trawl sector (before 2011). We

also applied an SSC recommended discard mortality rate assumption (previously made for stock assessment purposes) of 50% for longnose skate (PFMC 2012).

## 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/observation/data\\_products/shrimp\\_trawl.cfm](http://www.nwfsc.noaa.gov/research/divisions/fram/observation/data_products/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 2013 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 for the fleet (expansion factor)

$\hat{D}_s$ : discard estimate for species  $s$

In reporting of data prior to 2011, 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 2011-2013 were 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/observation/data\\_products/fixed\\_gear.cfm](http://www.nwfsc.noaa.gov/research/divisions/fram/observation/data_products/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). Fixed gear fish tickets where non-groundfish landings were greater than groundfish landings and sablefish or nearshore species were not recorded were summarized as incidental landings (Table 14). Fixed gear fish tickets with non-groundfish landings greater than groundfish landings but also containing sablefish or nearshore species were classified as non-nearshore fixed gear or nearshore fixed gear sector,

respectively. 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 generated from fixed gear fishing under the IFQ fishery were also excluded.

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 these 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. However, observed LE '0' tier discard rates were used to expand these landings, as these are the best available discard rates for these sectors.

Observer data were stratified by subsector, gear type, and area (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 15.5 mt of groundfish with pot gear in 2013 (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 most 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 (expansion factor). Retained groundfish was used as the denominator rather than sablefish weight alone because some subsectors and, in general, 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 in these calculations. Stratum estimated discard weight 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 2013 LE and OA non-nearshore groundfish fixed gear. A 20% mortality rate is applied for discarded sablefish, as assumed by the GMT. We also applied SSC recommended discard mortality rate assumptions (previously made for stock assessment purposes) for longnose skate (50%) and spiny dogfish (50%) (PFMC 2012).

## **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 (Appendix A, Table A-2). 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/observation/data\\_products/nearshore\\_gear.cfm](http://www.nwfsc.noaa.gov/research/divisions/fram/observation/data_products/nearshore_gear.cfm)

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 2013 federal groundfish management specifications.

For species without swim bladders, we applied a discard mortality rate of 7% for all species (Albin and Karpov 1996). Additional mortality rates provided by the GMT differ for some species according to depth. In December 2013, the GMT provided revised depth-specific discard survival assumptions for some nearshore species (see Appendix A, Table A-2). 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 2003-2013 (Table 10). Using data from all previously observed years helps to ensure that data is comparable across years and that proportions are available for all species landed in a given year. Fleet landings of each nearshore species or complex in 2013 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 (expansion factor).

Prior to the calculation of discard ratios in this sector, WCGOP observer data were stratified by area and depth (Table 11). 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 2013 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 2012).

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 (WDFW), the Oregon Department of Fish and Wildlife (ODFW), and the California Department of Fish and Wildlife (CDFW). State agencies provide catch weight (discarded + retained) estimates with PFMC-approved mortality rates applied to account for discard mortality. WDFW include only surface-release mortality rates for released rockfish and do not use mortality rates for fish released with a descending device (PFMC 2014b). ODFW and CDFW applied depth-dependent mortality rates (PFMC 2014b).

Research catch of groundfish species is summarized in Table 15, based on data provided by the NOAA West Coast 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 caught 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. 2014, salmon species are provided in Al-Humaidhi et al. 2012a, and green sturgeon and Pacific eulachon are provided in Al-Humaidhi et al. 2012b. Observed catch of protected fish species will be reported annually beginning in 2014 and will be available on the WCGOP website. Reports assessing the observed and estimated fleetwide catch of eulachon, green sturgeon, and salmon species will be available on the WCGOP website in 2015.

## **Cumulative Mortality Estimation Methods**

We calculated the cumulative mortality for each species in a sector as the sum of the total discard mortality (with mortality rate applied) and retained weight (100% mortality). To calculate the cumulative mortality across all sectors, we summed the estimated discard mortality and retained weight from all observed sectors, the retained weight from unobserved incidental fisheries (as described above), and the mortality estimates (with mortality rates applied) from research and recreation catch.

## **Results**

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Fishing mortality estimates for all groundfish combined were lower in 2013 relative to 2012 in the non-hake IFQ fixed gear, non-nearshore fixed gear, incidental fisheries, Washington tribal at-sea (where no fishing occurred in 2013), and Washington recreational sectors (Bellman et al. 2013). All other sectors showed an increase in overall groundfish mortality relative to 2012. Similar to 2012, when reviewed at a finer level, an almost equal proportion of groundfish species or complexes showed an increase (50%) or decrease (51%) in estimated fishing mortality from 2012 to 2013.

Relative to 2012, the shore-based IFQ fishery in 2013 demonstrated a minor increase in overall effort (+9% trips, +2% tows/sets), returning to effort levels similar to 2011 (Bellman et al. 2012, Table 1). Only 0.2% of tows/sets in



2013 were unsampled by observers (e.g., rare occasions such as observer illness), although 100% of trips continue to be observed. IFQ fishing with bottom trawl gear also increased slightly in 2013 (+16% trips, +11% tows), with a corresponding increase in both groundfish landings and discards (Tables 1, 3a). Non-hake targeted IFQ fishing with midwater trawl gear increased even further (+63% trips, +57% tows), resulting in a slight increase in both groundfish landings and discards in that subsector (Tables 1, 3a). In 2013, IFQ fishing with hook-and-line fixed gears continued to decrease from 2011 levels (compared to 2012, -40% trips, -69% sets), while fishing with pot gears also decreased relative to 2012 (-64% trips, -37% sets), with totals below 2011 levels (Table 1). A corresponding decrease in both overall groundfish landings and discard occurred in both hook-and-line and pot IFQ fishing (Table 3a). Shore-based IFQ midwater trawl fishing targeting Pacific hake during 2013 increased relative to 2012 (+33% trips, +10% sets), reaching effort levels greater than those of 2011 (Table 1). This increase resulted in greater groundfish landings and discards relative to 2012 (Table 3b).

The At-Sea Hake fishery showed effort increases in the Catcher Processor (+32% tows) and Mothership (+32% tows) sectors, likely corresponding to quota increases. With 100% observer coverage in the at-sea fleet, nearly all hauls were sampled for species composition: only 0.1% of Catcher Processor tows and 0.2% of Mothership tows were unsampled. Groundfish discard and landings showed corresponding increases in the Mothership sector, but the Catcher Processor sector showed a decrease in groundfish discard simultaneous with an increase in groundfish landings (Table 3b).

Two elements which affect WCGOP discard estimates are the discard ratio and the expansion factor used to generate the fleet-wide estimate. Changes in expansion factors are tracked by reviewing the fleet-wide landing trends in each observed fishery. In state fisheries which are observed for incidental groundfish, landings increased by 19% in the OA California halibut trawl fishery compared to 2012 (Table 4). Thus the expansion factor for discard estimation was higher. Fleet-wide landings in the Washington and California pink shrimp fisheries increased relative to 2012, but Oregon's landings decreased slightly (Table 5). Relative to 2012 landings, all sectors of the groundfish non-IFQ, non-nearshore fixed gear fishery (LE and OA) demonstrated decreased landings in 2013 (Table 9). Nearshore fixed gear landings increased in both Oregon and California, resulting in higher expansions factors for north and south of 40°10' N. latitude relative to 2012 (Table 11).

Estimated fishing mortality for all groundfish species or complexes did not exceed 2013 ACL, ABC, or OFL harvest goals (Table 16). Fishing mortality estimates are evaluated in terms of 2013 ACL, ABC, and OFL harvest specifications from federal groundfish regulations (50 CFR 660 Subpart G, 78 FR 580). Twenty-seven groundfish species or complexes (64%) had fishing mortality estimates which were less than 50% of 2013 ACL harvest goals. In 2012, the estimated fishing mortality of four groundfish species/complexes were above 90% of their ACLs: cabezon – Oregon (98%), nearshore rockfish complex – north of 40°10' N. latitude (97%), petrale sole (96%), and California scorpionfish – south of 34°27' N. latitude (95%). The estimated fishing mortalities of the three of these groundfish species / complexes in 2013 were a considerably lower percentage of their ACLs: cabezon – Oregon (73%), nearshore rockfish complex – north of 40°10' N. latitude (80%), and petrale sole (87%). However, one species still had an estimated fishing mortality above 90% of its ACL in 2013: California scorpionfish – south of 34°27' N. latitude (96%). The primary contribution of fishing mortality is the California recreational fishery (112 mt), with the next highest contribution (1.72 mt) from are the commercial nearshore fixed gear fishery.

In addition to the nearshore rockfish complex – north of 40°10' N. latitude (80%) and petrale sole (87%), the estimated fishing mortality of two other groundfish species / complexes were 80% or greater of their ACL: Sablefish (North of 36° N. lat.) (89%) and Black rockfish (South of 46°16' N. lat.) (84%). Overall fishing mortality estimated for the nearshore rockfish complex north of 40°10' N. latitude in 2013 is attributed primarily to recreational fisheries and commercial nearshore fixed gear fishing. In 2013, the estimated fishing mortality of petrale

sole nearly doubled, but the ACL was similarly increased between 2012 and 2013, leading to a smaller percentage of ACL for the year. The majority of petrale sole are caught in the non-hake IFQ fishery with trawl gear, almost all of which are retained and landed. Non-hake IFQ trawl and non-nearshore fixed gear contributed almost equally to sablefish weight caught in the area north of 36° N. latitude, while the majority of black rockfish caught in the area south of 46°16' N. latitude is attributed to recreational fishing in Oregon and California.

An almost equivalent number of rockfish species or complexes showed an increase, as compared to a decrease, in estimated fishing mortality in 2013 relative to 2012, in contrast to the majority of flatfish species (61%) which showed an increase in fishing mortality. This differs from trends in the recent past, when flatfish species primarily showed decreasing estimated fishing mortality relative to prior years. .

For the past five years, sablefish mortality north of 36° N. latitude continues the trend of decreasing. However, due to a decrease in the ACL, this lower fishing mortality represents a greater percentage of the ACL (from 88% in 2012 to 89% in 2013). This is also the second year in a row when the mortality of sablefish south of 36° N. latitude has decreased, leading to a lower percentage of the ACL being caught (from 56% in 2012 to 43% in 2013).

The discard mortality rates for longnose skate and spiny dogfish that were applied in 2012 were again applied to 2013, making the data comparable. Spiny dogfish showed a large decrease in fishing mortality, with 178 mt less in 2013 than in 2012. Longnose skate showed a much smaller decrease of 2 mt. Following new management guidelines, lingcod was analyzed using catch north and south of 40°10' N. latitude rather than 42° N. latitude. Although the northern and southern areas are not comparable between 2012 and 2013, the overall fishing mortality increased by 226 mt in 2013.

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.

## **Acknowledgements**

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## Citations

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Al-Humaidhi, A.W., M.A. Bellman, J. Jannot, and J. Majewski. 2012a. Observed and estimated total bycatch of salmon in the 2002-2010 U.S. west coast fisheries. West Coast Groundfish Observer Program. National Marine Fisheries Service, NWFSC, 2725 Montlake Blvd E., Seattle, WA 98112.

[http://www.nwfsc.noaa.gov/research/divisions/fram/observer/datareport/docs/Salmon\\_0210Rpt\\_Final.pdf](http://www.nwfsc.noaa.gov/research/divisions/fram/observer/datareport/docs/Salmon_0210Rpt_Final.pdf)

Al-Humaidhi, A.W., M.A. Bellman, J. Jannot, and J. Majewski. 2012b. Observed and estimated total bycatch of green sturgeon and Pacific eulachon in the 2002-2010 U.S. west coast fisheries. West Coast Groundfish Observer Program. National Marine Fisheries Service, NWFSC, 2725 Montlake Blvd E., Seattle, WA 98112.

[http://www.nwfsc.noaa.gov/research/divisions/fram/observer/datareport/docs/GreenSturgeonEulachon\\_0210Rpt\\_Final.pdf](http://www.nwfsc.noaa.gov/research/divisions/fram/observer/datareport/docs/GreenSturgeonEulachon_0210Rpt_Final.pdf)

Albin, D. and K. A. Karpov. 1996. Mortality of lingcod, *Ophiodon elongatus*, related to capture by hook and line. *Marine Fisheries Review* 60(3):29-34.

Bellman, M.A., A.W. Al-Humaidhi, J. Jannot, and J. Majewski. 2012. Estimated discard and catch of groundfish species in the 2011 U.S. west coast fisheries. West Coast Groundfish Observer Program. National Marine Fisheries Service, NWFSC, 2725 Montlake Blvd E., Seattle, WA 98112.

[http://www.nwfsc.noaa.gov/research/divisions/fram/observation/pdf/GroundfishMortality2011\\_Final\\_101112.pdf](http://www.nwfsc.noaa.gov/research/divisions/fram/observation/pdf/GroundfishMortality2011_Final_101112.pdf)

Bellman, M.A., J. Jannot, M. Mandrup, and J. McVeigh. 2013. Estimated discard and catch of groundfish species in the 2012 U.S. west coast fisheries. NOAA Fisheries, NWFSC Observer Program, 2725 Montlake Blvd E., Seattle, WA 98112. <http://www.nwfsc.noaa.gov/research/divisions/fram/observation/pdf/GroundfishMortality2012.pdf>

Jannot, J.E., K.A. Somers, N.B. Riley and J. McVeigh. 2014. Pacific halibut bycatch in the U.S. west coast groundfish fisheries (2002-2013). NOAA Fisheries, NWFSC Observer Program, 2725 Montlake Blvd E., Seattle, WA 98112.

Northwest Fisheries Science Center (NWFSC). 2013a. At-Sea Hake Observer Program, Observer Sampling Manual. NOAA Fisheries, NWFSC Observer Program, 2725 Montlake Blvd E., Seattle, WA 98112.

[http://www.nwfsc.noaa.gov/research/divisions/fram/observation/data\\_collection/manuals/ashop\\_manual\\_updated\\_91613.pdf](http://www.nwfsc.noaa.gov/research/divisions/fram/observation/data_collection/manuals/ashop_manual_updated_91613.pdf)

Northwest Fisheries Science Center (NWFSC). 2013b. West Coast Groundfish Observer Program 2014 Non-Catch Shares Observer Manual. West Coast Groundfish Observer Program. NOAA Fisheries, NWFSC Observer Program, 2725 Montlake Blvd E., Seattle, WA 98112.

[http://www.nwfsc.noaa.gov/research/divisions/fram/observation/data\\_collection/training.cfm](http://www.nwfsc.noaa.gov/research/divisions/fram/observation/data_collection/training.cfm)

Northwest Fisheries Science Center (NWFSC). 2014. West Coast Groundfish Observer Program: 2014 Catch Shares Training Manual. NOAA Fisheries, NWFSC Observer Program, 2725 Montlake Blvd E., Seattle, WA 98112.

[http://www.nwfsc.noaa.gov/research/divisions/fram/observation/data\\_collection/training.cfm](http://www.nwfsc.noaa.gov/research/divisions/fram/observation/data_collection/training.cfm)

Pacific Fishery Management Council (PFMC). 2012. Scientific and Statistical Committee report on briefing and limited actions for emerging issues in the 2013-2014 biennial specifications process. Agenda Item F.2.b. Revised supplemental SSC report, March 2012. Pacific Fishery Management Council, Portland, OR.

[http://www.pcouncil.org/wp-content/uploads/F2b\\_SUP\\_REVISED\\_SSC\\_MAR2012BB.pdf](http://www.pcouncil.org/wp-content/uploads/F2b_SUP_REVISED_SSC_MAR2012BB.pdf)

Pacific Fishery Management Council (PFMC). 2014a. Groundfish Management Team report on proposed discard mortality for cowcod, canary rockfish, and yelloweye rockfish released using descending devices in the recreational fishery. Agenda Item D.3.b. Supplemental GMT Report 2, March 2014. Pacific Fishery Management Council, Portland, OR. [http://www.pcouncil.org/wp-content/uploads/D3b\\_SUP\\_GMT\\_RPT2\\_MAR2014BB.pdf](http://www.pcouncil.org/wp-content/uploads/D3b_SUP_GMT_RPT2_MAR2014BB.pdf)

Pacific Fishery Management Council (PFMC). 2014b. Status of the Pacific Coast Groundfish Fishery: Stock Assessment and Fishery Evaluation. Pacific Fishery Management Council, Portland, OR. [http://www.pcouncil.org/wp-content/uploads/Groundfish\\_SAFE\\_August\\_2014.pdf](http://www.pcouncil.org/wp-content/uploads/Groundfish_SAFE_August_2014.pdf)

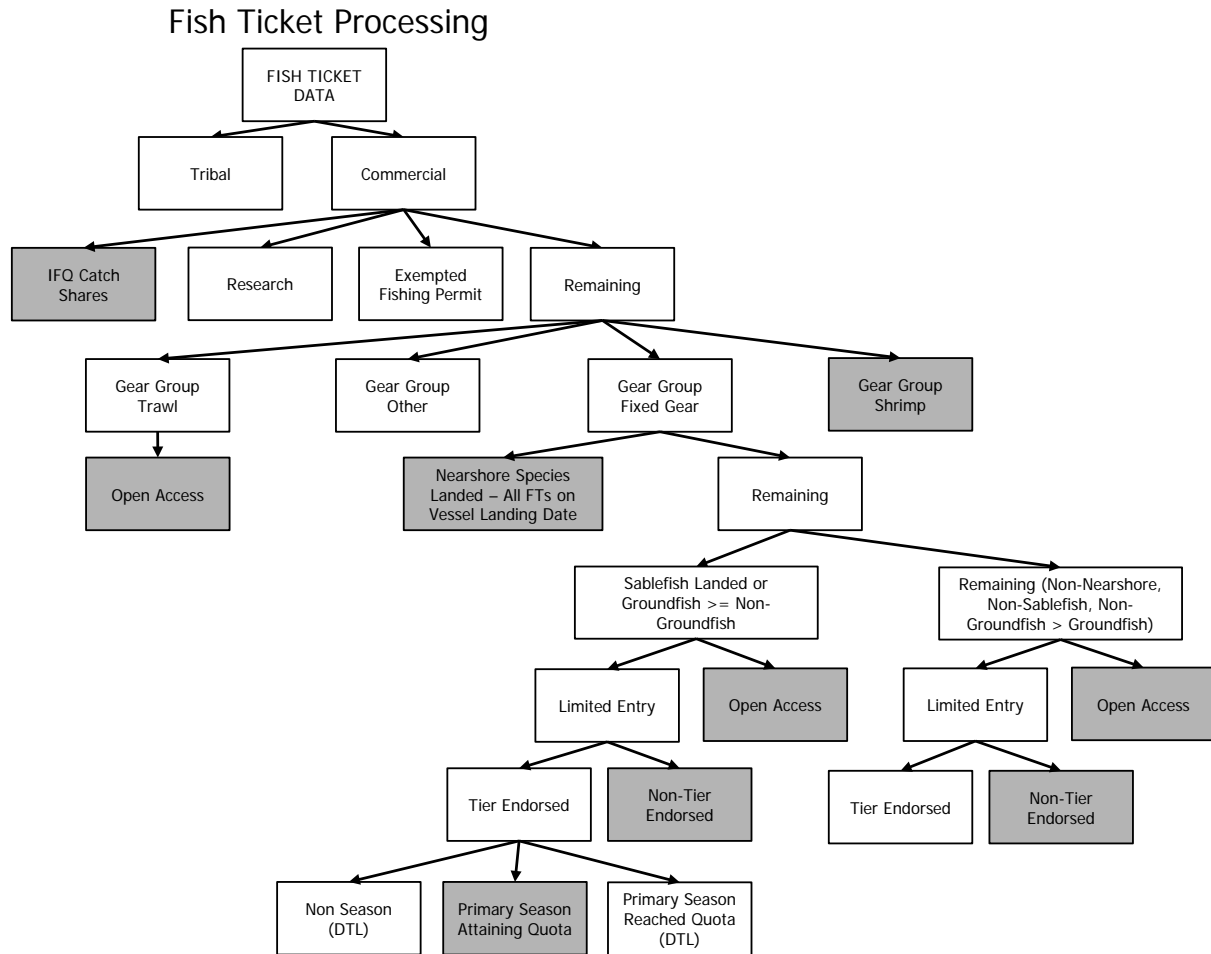
Pacific Fishery Management Council (PFMC) and National Marine Fisheries Service (NMFS). 2012. Proposed Harvest Specifications and Management Measures for the 2013-2014 Pacific Coast Groundfish Fishery and Amendment 21-2 to the Pacific Coast Fishery Management Plan; Final Environmental Impact Statement. Pacific Fishery Management Council, Portland, OR.

Pikitch, E.K., J.R. Wallace, E.A. Babcock, D.L. Erickson, M. Saelens, and G. Oddsson. 1998. Pacific halibut bycatch in the Washington, Oregon, and California groundfish and shrimp trawl fisheries. *N. Am. J. Fish. Mgmt.* 18:569-586.

# Figures

**Figure 1. PacFIN Fish Ticket Data Processing.**

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 03-21-2014). 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. IFQ Fishery Data Stratification.**

Number of vessels, trips and hauls from WCGOP observer data for the 2013 IFQ fishery by gear, latitudinal management area, season and depth (fm). 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.

			Depth (fm)	No. of vessels	No. of trips	No. of sampled hauls	No. of hauls with unsampled categories				No. unsampled hauls	% of hauls sampled
							IFQ Flatfish	IFQ Rockfish	IFQ Mixed	Non-IFQ Species		
<b>Trawl - Bottom + LE CA halibut</b>	North of 40°10' N	Winter	0-125	14	33	242	--	--	--	4	--	100.0%
			126-250	41	350	1596	--	--	4	38	4	99.8%
			> 250	43	405	2240	--	--	5	66	10	99.6%
		Summer	0-125	20	272	2273	4	--	14	85	6	99.7%
			126-250	28	166	682	--	--	2	28	1	99.9%
			> 250	30	238	1079	--	--	5	40	1	99.9%
	South of 40°10' N	Winter	0-125	7	27	166	--	--	--	--	--	100.0%
			126-250	10	65	137	--	--	--	2	--	100.0%
			> 250	11	84	354	--	--	--	22	--	100.0%
		Summer	0-125	9	125	548	--	--	--	5	1	99.8%
			126-250	9	81	198	--	--	--	4	1	99.5%
			> 250	12	129	555	--	--	2	36	--	100.0%
<b>Trawl - Midwater</b>	North of 40°10' N	Annual	All depths	4	13	36	--	--	--	--	100.0%	
<b>Hook-and-Line</b>	Coastwide	Annual	All depths	4	18	153	--	--	--	--	100.0%	
<b>Pot</b>	North of 40°10' N	Annual	All depths	7	52	667	--	--	--	3	--	100.0%
	South of 40°10' N	Annual	All depths	6	41	411	--	--	--	2	--	100.0%
<b>Shoreside Hake</b>	North of 40°10' N	Winter	All depths	10	24	66	--	--	--	1	--	100.0%
		Summer	All depths	25	922	1659	--	--	--	2	--	100.0%

**Table 2a. IFQ Discard Ratios, Bottom Trawl, North of 40°10' N.**

Values used to calculate the expanded weight of groundfish species from each WCGOP unsampled catch category in the 2013 IFQ fishery using bottom trawl gear north of 40°10' N latitude. Expansion factors for each season and depth strata are shown in the top row. Discard ratios for each species are presented by season and depth strata in the rest of the table. Winter season is January-April and November-December and summer season is May-October. Only strata with unsampled discard weight are shown. Unsampled catch weight is assigned to the following categories: IFQ flatfish species (IFQFF), IFQ rockfish species (IFQRF), 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 - Bottom Trawl (North of 40°10' N Lat.)																
Area (40°10' N. Lat.)	IFQFF	IFQM					NIFQ						All Species			
	North	North					North						North			
	Season	Summer		Winter		Summer			Winter			Summer		Winter		
	Depth (fm)	0-125	0-125	126-250	>250	126-250	>250	0-125	126-250	>250	0-125	126-250	>250	0-125	126-250	126-250
Expansion Factor (mt)	0.3447	2.2164	6.9400	0.4196	0.6350	1.4311	8.7546	2.0377	2.3890	0.2994	3.2517	4.0471	1.6015	0.0590	9.6389	0.2550
<b>Groundfish species</b>																
Arrowtooth Flounder	0.6270	0.5558	0.4008	0.1378	0.6054	0.4069	--	--	--	--	--	--	0.2772	0.2338	0.2936	0.0962
Black Rockfish (South of 46°16' N. lat.)	--	--	--	--	--	--	0.0000	--	--	--	--	--	0.0000	--	--	--
Cabezon (Oregon)	--	--	--	--	--	--	--	--	--	0.0000	--	--	--	--	--	--
Canary Rockfish	--	0.0001	0.0002	--	0.0000	--	--	--	--	--	--	--	0.0000	0.0001	0.0000	--
Darkblotched Rockfish	--	0.0044	0.0027	0.0005	0.0010	0.0003	--	--	--	--	--	--	0.0022	0.0016	0.0005	0.0001
Dover Sole	0.0196	0.0174	0.0141	0.1308	0.0057	0.0601	--	--	--	--	--	--	0.0087	0.0082	0.0028	0.0142
English Sole	0.0396	0.0351	0.0003	0.0026	0.0002	0.0000	--	--	--	--	--	--	0.0175	0.0002	0.0001	0.0000
Lingcod (North of 40°10' N. lat.)	--	0.0464	0.0012	0.0013	0.0004	0.0001	--	--	--	--	--	--	0.0232	0.0007	0.0002	0.0000
Longnose Skate	--	--	--	--	--	--	0.1315	0.1167	0.0394	0.0943	0.0613	0.0616	0.0659	0.0486	0.0316	0.0470
Longspine Thornyhead (North of 34°27' N. lat.)	--	0.0000	0.0016	0.2069	0.0024	0.0755	--	--	--	--	--	--	0.0000	0.0009	0.0012	0.0178
Minor nearshore rockfish (North of 40°10' N. lat.)																
Brown Rockfish	--	--	--	--	--	--	0.0000	--	--	--	--	--	0.0000	--	--	--
Copper Rockfish	--	--	--	--	--	--	0.0000	--	--	--	--	--	0.0000	--	--	--
Quillback Rockfish	--	--	--	--	--	--	0.0000	--	--	--	--	--	0.0000	--	--	--
Rockfish Unid	--	--	--	--	--	--	0.0001	--	--	--	--	--	0.0000	--	--	--
Minor shelf rockfish (North of 40°10' N. lat.)																
Bocaccio Rockfish	--	0.0000	--	--	0.0000	--	--	--	--	--	--	--	0.0000	--	0.0000	--
Chilipepper Rockfish	--	0.0005	0.0002	--	0.0001	--	--	--	--	--	--	--	0.0003	0.0001	0.0000	--
Flag Rockfish	--	0.0000	--	--	--	--	--	--	--	--	--	--	0.0000	--	--	--
Greenspotted Rockfish	--	0.0000	--	--	--	--	--	--	--	--	--	--	0.0000	--	--	--
Greenstriped Rockfish	--	0.0063	0.0010	0.0002	0.0002	0.0000	--	--	--	--	--	--	0.0031	0.0006	0.0001	0.0000
Pinkrose Rockfish	--	--	--	--	0.0000	--	--	--	--	--	--	--	--	--	0.0000	--
Pygmy Rockfish	--	0.0000	--	--	--	--	--	--	--	--	--	--	0.0000	--	--	--
Redstripe Rockfish	--	0.0000	--	--	0.0000	--	--	--	--	--	--	--	0.0000	--	0.0000	--
Rockfish Unid	--	0.0000	--	--	--	--	--	--	--	--	--	--	0.0000	--	--	--
Rosethorn Rockfish	--	0.0001	0.0026	0.0008	0.0022	0.0007	--	--	--	--	--	--	0.0000	0.0015	0.0011	0.0002
Rosy Rockfish	--	--	0.0000	0.0000	0.0001	--	--	--	--	--	--	--	--	0.0000	0.0001	--
Silvergray Rockfish	--	--	--	--	0.0000	--	--	--	--	--	--	--	--	--	0.0000	--
Stripetail Rockfish	--	0.0068	--	--	0.0002	0.0000	--	--	--	--	--	--	0.0034	--	0.0001	0.0000
Minor slope rockfish (North of 40°10' N. lat.)																
Aurora Rockfish	--	0.0002	0.0112	0.0065	0.0080	0.0107	--	--	--	--	--	--	0.0001	0.0065	0.0039	0.0025
Bank Rockfish	--	--	--	--	0.0000	0.0000	--	--	--	--	--	--	--	--	0.0000	0.0000
Blackgill Rockfish	--	--	0.0001	0.0002	0.0000	0.0001	--	--	--	--	--	--	--	0.0000	0.0000	0.0000
Redbanded Rockfish	--	0.0002	0.0026	0.0001	0.0010	0.0003	--	--	--	--	--	--	0.0001	0.0015	0.0005	0.0001
Rockfish Unid	--	--	--	0.0000	0.0002	--	--	--	--	--	--	--	--	--	0.0001	--
Rougeye Rockfish	--	0.0000	0.0003	0.0001	0.0001	0.0000	--	--	--	--	--	--	0.0000	0.0002	0.0000	0.0000
Sharpchin Rockfish	--	0.0001	0.0139	0.0068	0.0096	0.0000	--	--	--	--	--	--	0.0001	0.0081	0.0047	0.0000
Shortraker Rockfish	--	0.0000	0.0001	0.0002	0.0000	0.0000	--	--	--	--	--	--	0.0000	0.0001	0.0000	0.0000
Splitnose Rockfish	--	0.0005	0.0378	0.0063	0.0589	0.0108	--	--	--	--	--	--	0.0003	0.0221	0.0286	0.0025
Yellowmouth Rockfish	--	0.0000	--	0.0000	0.0000	--	--	--	--	--	--	--	0.0000	--	0.0000	--
Mixed thornyheads																
Shortspine/Longspine Thornyhead	--	0.0001	0.0005	0.0002	--	0.0002	--	--	--	--	--	--	0.0000	0.0003	--	0.0000

Table 2a (continued).

	IFQ - Bottom Trawl (North of 40°10' N Lat.)															
	IFQFF	IFQM					NIFQ					All Species				
	North	North					North					North				
	Season	Summer		Winter			Summer		Winter			Summer		Winter		
	Depth (fm)	0-125	0-125	126-250	>250	126-250	>250	0-125	126-250	>250	0-125	126-250	>250	0-125	126-250	126-250
Expansion Factor (mt)	0.3447	2.2164	6.9400	0.4196	0.6350	1.4311	8.7546	2.0377	2.3890	0.2994	3.2517	4.0471	1.6015	0.0590	9.6389	0.2550
Other flatfish																
Butter Sole	0.0002	0.0002	--	0.0002	--	--	--	--	--	--	--	--	0.0001	--	--	--
Curlfin Turbot	0.0002	0.0002	--	--	--	--	--	--	--	--	--	--	0.0001	--	--	--
Flatfish Unid	--	--	--	--	0.0000	--	--	--	--	--	--	--	--	--	0.0000	--
Flathead Sole	0.0230	0.0204	0.0001	0.0000	--	--	0.0102	0.0001	--	0.0000	--	--	--	--	--	0.0000
Pacific Sanddab	0.1228	0.1088	0.0029	0.0023	0.0001	0.0000	--	--	--	--	--	--	0.0543	0.0017	0.0000	0.0000
Rex Sole	0.0538	0.0477	0.0068	0.0137	0.0028	0.0012	--	--	--	--	--	--	0.0238	0.0040	0.0014	0.0003
Rock Sole	0.0008	0.0007	--	--	--	--	--	--	--	--	--	--	0.0003	--	--	--
Sanddab Unid	0.0012	0.0010	--	--	0.0000	--	--	--	--	--	--	--	0.0005	--	0.0000	--
Sand Sole	0.0020	0.0018	--	--	--	--	--	--	--	--	--	--	0.0009	--	--	--
Other groundfish																
Big Skate	--	--	--	--	--	--	0.0593	0.0007	0.0013	0.0602	--	0.0001	0.0297	0.0003	--	0.0001
California Skate	--	--	--	--	--	--	0.0000	--	--	--	--	--	0.0000	--	--	--
Kelp Greenling	--	--	--	--	--	--	0.0002	0.0000	0.0000	0.0002	--	0.0000	0.0001	0.0000	--	0.0000
Leopard Shark	--	--	--	--	--	--	--	--	--	--	--	0.0000	--	--	--	0.0000
Pacific Flatnose	--	--	--	--	--	--	--	0.0001	0.0026	--	0.0000	0.0017	--	0.0000	0.0000	0.0013
Pacific Grenadier	--	--	--	--	--	--	--	0.0005	0.1006	--	0.0003	0.0326	--	0.0002	0.0002	0.0249
Roundfish Unid	--	--	--	--	--	--	--	0.0000	--	--	0.0000	0.0000	--	0.0000	0.0000	0.0000
Skate Unid	--	--	--	--	--	--	0.0000	0.0031	0.0007	--	0.0012	0.0004	0.0000	0.0013	0.0006	0.0003
Soupfin Shark	--	--	--	--	--	--	0.0003	--	--	--	--	--	0.0001	--	--	--
Spotted Ratfish	--	--	--	--	--	--	0.1219	0.0719	0.0073	0.3013	0.0258	0.0081	0.0611	0.0300	0.0133	0.0062
Pacific Cod	--	0.0010	--	--	0.0000	--	--	--	--	--	--	--	0.0005	--	0.0000	--
Pacific Hake	--	0.0402	0.3987	0.4334	0.1622	0.3236	--	--	--	--	--	--	0.0201	0.2326	0.0787	0.0765
Pacific Ocean Perch (North of 40°10' N. lat.)	--	0.0004	0.0037	0.0004	0.0022	0.0004	--	--	--	--	--	--	0.0002	0.0022	0.0011	0.0001
Petrale Sole	0.0447	0.0396	0.0002	0.0002	0.0026	0.0028	--	--	--	--	--	--	0.0198	0.0001	0.0012	0.0007
Sablefish (North of 36° N. lat.)	--	0.0054	0.0011	0.0072	0.0018	0.0038	--	--	--	--	--	--	0.0027	0.0006	0.0009	0.0009
Shortbelly Rockfish	--	--	--	--	--	--	0.0000	0.0000	0.0000	--	0.0000	--	0.0000	0.0000	0.0000	--
Shortspine Thornyhead (North of 34°27' N. lat.)	--	0.0005	0.0111	0.0228	0.0120	0.0183	--	--	--	--	--	--	0.0003	0.0065	0.0058	0.0043
Spiny Dogfish	--	--	--	--	--	--	0.1038	0.2217	0.0073	0.1262	0.6954	0.1564	0.0520	0.0924	0.3581	0.1194
Starry Flounder	0.0006	0.0005	--	--	--	--	--	--	--	--	--	--	0.0003	--	--	--
Widow Rockfish	--	0.0000	0.0002	--	0.0001	--	--	--	--	--	--	--	0.0000	0.0001	0.0000	--
Yelloweye Rockfish	--	0.0000	--	--	--	--	--	--	--	--	--	--	0.0000	--	--	--
Yellowtail Rockfish (North of 40°10' N. lat.)	--	0.0000	0.0000	0.0000	0.0000	--	--	--	--	--	--	--	0.0000	0.0000	0.0000	--
<b>Non-groundfish species</b>																
Dungeness Crab	--	--	--	--	--	--	0.2432	0.0010	0.0021	0.2482	0.0005	0.0000	0.1219	0.0004	0.0002	0.0000
Non-FMP flatfish																
Deepsea Sole	--	--	--	--	--	--	0.0000	0.0035	0.0246	--	0.0007	0.0169	0.0000	0.0015	0.0003	0.0129
Longfin Sanddab	--	--	--	--	--	--	--	--	--	0.0002	--	--	--	--	--	--
Slender Sole	--	--	--	--	--	--	0.1196	0.0021	0.0006	0.0432	0.0024	0.0008	0.0599	0.0009	0.0012	0.0006
Non-FMP skate																
Aleutian Skate	--	--	--	--	--	--	0.0000	0.0043	0.0029	--	0.0007	0.0016	0.0000	0.0018	0.0003	0.0012
Black Skate	--	--	--	--	--	--	0.0001	0.0021	0.0305	--	0.0008	0.0263	0.0000	0.0009	0.0004	0.0201
Deepsea Skate	--	--	--	--	--	--	--	--	0.0001	--	--	0.0007	--	--	--	0.0005
Flathead Skate	--	--	--	--	--	--	0.0000	--	--	--	--	--	0.0000	--	--	--
Pacific Electric Ray	--	--	--	--	--	--	0.0013	0.0001	0.0001	0.0008	--	0.0000	0.0006	0.0000	--	0.0000
Roughshoulder/Broad Skate	--	--	--	--	--	--	--	--	0.0001	--	--	--	--	--	--	--
Sandpaper Skate	--	--	--	--	--	--	0.0231	0.0715	0.0189	0.0294	0.0435	0.0250	0.0116	0.0298	0.0224	0.0191
Starry Skate	--	--	--	--	--	--	0.0001	--	0.0000	0.0000	--	--	0.0001	--	--	--
White Skate	--	--	--	--	--	--	0.0000	--	0.0000	--	--	0.0002	0.0000	--	--	0.0001



**Table 2b. IFQ Discard Ratios, Bottom Trawl, South of 40°10' N; Pot; Shoreside Hake.**

Values used to calculate the expanded weight of groundfish species from each WCGOP unsampled catch category in 2013 IFQ fisheries: bottom trawl gear south of 40°10' N latitude, pot gear, shoreside hake. Expansion factors for each season and depth strata are shown in the top row. Discard ratios for each species are presented by season and depth strata in the rest of the table. Winter season is January-April and November-December and summer season is May-October. Only strata with unsampled discard weight are shown. Unsampled catch weight is assigned to the following categories: IFQ flatfish species (IFQFF), IFQ rockfish species (IFQRF), 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.

Area (40°10' N. Lat.) Season Depth (fm) Expansion Factor (mt)	IFQ - Bottom Trawl (South of 40°10' N Lat.)						IFQ - Pot			Shoreside Hake	
	IFQM	NIFQ				All Species	NIFQ		NIFQ		
	South	South				South	North	South	North		
	Summer	Summer				Summer	All year	All year	Summer	Winter	
	>250	0-125	126-250	>250	126-250	>250	0-125	All depths	All depths	All Depths	All Depths
	0.0680	6.3458	0.0091	0.6754	0.0093	0.4280	0.0045	0.0106	0.0008	0.2722	0.0227
<b>Groundfish species</b>											
Arrowtooth Flounder	0.0132	--	--	--	--	--	0.0190	--	--	--	--
Bocaccio Rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	0.0000	--	--	--	--
Canary Rockfish	--	--	--	--	--	--	0.0001	--	--	--	--
Chillipepper Rockfish (South of 40°10' N. lat.)	0.0002	--	--	--	--	--	0.2172	--	--	--	--
Cowcod Rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	0.0000	--	--	--	--
Darkblotched Rockfish	0.0000	--	--	--	--	--	0.0002	--	--	--	--
Dover Sole	0.7600	--	--	--	--	--	0.0135	--	--	--	--
English Sole	0.0006	--	--	--	--	--	0.0180	--	--	--	--
Lingcod (South of 40°10' N. lat.)	0.0001	--	--	--	--	--	0.0158	--	--	--	--
Longnose Skate	--	0.0687	0.1744	0.0631	0.2870	0.0585	0.0258	--	0.0005	--	--
Longspine Thomyhead (North of 34°27' N. lat.)	0.1275	--	--	--	--	--	0.0000	--	--	--	--
Minor nearshore rockfish (South of 40°10' N. lat.)											
Olive Rockfish	--	0.0000	--	--	--	--	0.0000	--	--	--	--
Minor shelf rockfish (South of 40°10' N. lat.)											
Greenspotted Rockfish	--	--	--	--	--	--	0.0011	--	--	--	--
Greenstriped Rockfish	0.0000	--	--	--	--	--	0.0064	--	--	--	--
Halfbanded Rockfish	--	--	--	--	--	--	0.0000	--	--	--	--
Pink Rockfish	--	--	--	--	--	--	0.0000	--	--	--	--
Rockfish Unid	--	--	--	--	--	--	0.0000	--	--	--	--
Rosethorn Rockfish	0.0000	--	--	--	--	--	--	--	--	--	--
Stripetail Rockfish	0.0000	--	--	--	--	--	0.0453	--	--	--	--
Tiger Rockfish	--	--	--	--	--	--	0.0000	--	--	--	--
Yellowtail Rockfish	--	--	--	--	--	--	0.0000	--	--	--	--
Minor slope rockfish (South of 40°10' N. lat.)											
Aurora Rockfish	0.0029	--	--	--	--	--	0.0001	--	--	--	--
Bank Rockfish	0.0002	--	--	--	--	--	--	--	--	--	--
Blackgill Rockfish	0.0001	--	--	--	--	--	0.0000	--	--	--	--
Pacific Ocean Perch	0.0000	--	--	--	--	--	--	--	--	--	--
Redbanded Rockfish	0.0000	--	--	--	--	--	0.0006	--	--	--	--
Rougheye Rockfish	0.0000	--	--	--	--	--	--	--	--	--	--
Sharpchin Rockfish	--	--	--	--	--	--	0.0031	--	--	--	--
Spotted Rockfish Unid	0.0000	--	--	--	--	--	--	--	--	--	--
Mixed thomyheads											
Shortspine/Longspine Thomyhead	0.0000	--	--	--	--	--	--	--	--	--	--

Table 2b (continued).

Area (40°10' N. Lat.) Season Depth (fm) Expansion Factor (mt)	IFQ - Bottom Trawl (South of 40°10' N Lat.)						IFQ - Pot	Shoreside Hake			
	IFQM	NIFQ					All Species	NIFQ			
	South	South					South	North	South		
	Summer	Summer					Summer	Summer	Summer		
	>250	0-125	126-250	>250	126-250	>250	0-125	>250	All Depths		
	0.0680	6.3458	0.0091	0.6754	0.0093	0.4280	0.0045	0.0106	0.0008	0.2722	0.0227
Other flatfish											
Curlfin Turbot	--	--	--	--	--	--	0.0009	--	--	--	--
Flatfish Unid	0.0000	--	--	--	--	--	--	--	--	--	--
Pacific Sanddab	--	--	--	--	--	--	0.0509	--	--	--	--
Rex Sole	0.0007	--	--	--	--	--	0.0042	--	--	--	--
Rock Sole	--	--	--	--	--	--	0.0002	--	--	--	--
Sanddab Unid	--	--	--	--	--	--	0.0000	--	--	--	--
Sand Sole	--	--	--	--	--	--	0.0001	--	--	--	--
Other groundfish											
Big Skate	--	0.0210	--	0.0000	--	0.0000	0.0079	--	0.0002	--	--
California Skate	--	0.0027	0.0007	--	0.0002	0.0000	0.0010	--	--	--	--
Leopard Shark	--	0.0008	--	--	--	--	0.0003	--	--	--	--
Pacific Flatnose	--	--	0.0000	0.0018	--	0.0036	--	0.0006	0.0084	--	--
Pacific Grenadier	--	--	0.0001	0.0600	0.0007	0.0978	--	0.0208	0.1249	--	--
Soupfin Shark	--	--	--	--	--	--	--	--	--	0.0037	--
Spotted Ratfish	--	0.1711	0.1696	0.0068	0.1926	0.0100	0.0643	0.0001	--	--	--
Pacific Hake	0.0895	--	--	--	--	--	0.2086	--	--	--	--
Petrale Sole	0.0005	--	--	--	--	--	0.0031	--	--	--	--
Sablefish (North of 36° N. lat.)	0.0006	--	--	--	--	--	0.0078	--	--	--	--
Sablefish (South of 36° N. lat.)	0.0000	--	--	--	--	--	--	--	--	--	--
Shortbelly Rockfish	--	0.1395	0.0011	--	0.0007	--	0.0524	--	--	--	--
Shortspine Thornyhead (North of 34°27' N. lat.)	0.0036	--	--	--	--	--	0.0002	--	--	--	--
Spiny Dogfish	--	0.0977	0.0226	0.0023	0.1068	0.0029	0.0367	0.0558	--	--	--
Splitnose Rockfish (South of 40°10' N. lat.)	0.0002	--	--	--	--	--	0.0003	--	--	--	--
Starry Flounder	--	--	--	--	--	--	0.0001	--	--	--	--
Skate Unid	--	--	0.0041	0.0002	0.0029	0.0004	--	--	--	--	--
Widow Rockfish	--	--	--	--	--	--	0.0076	--	--	--	--
<b>Nongroundfish species</b>											
California Halibut	--	0.0001	--	--	--	--	0.0000	--	--	--	--
Dungeness Crab	--	0.3735	0.0049	0.0001	0.0084	0.0000	0.1403	0.0306	--	--	--
Non-FMP flatfish											
Deepsea Sole	--	--	0.0007	0.0385	0.0004	0.0523	--	0.0009	--	--	--
Slender Sole	--	0.0038	0.0061	0.0000	0.0062	0.0000	0.0014	--	0.0000	--	--
Non-FMP skate											
Aleutian Skate	--	0.0001	--	0.0012	--	0.0004	0.0000	--	--	--	--
Black Skate	--	0.0001	0.0003	0.0156	--	0.0308	0.0000	0.0001	0.0007	--	--
Deepsea Skate	--	0.0001	--	0.0003	--	0.0012	0.0000	--	--	--	--
Pacific Electric Ray	--	0.0041	0.0122	0.0002	0.0005	--	0.0015	--	--	--	--
Sandpaper Skate	--	0.0017	0.0667	0.0052	0.1098	0.0038	0.0007	--	0.0015	--	--
Starry Skate	--	0.0002	--	--	--	--	0.0001	--	--	--	--
Thornback Skate	--	0.0000	--	--	--	--	0.0000	--	--	--	--

**Table 3a. Observed Sectors: Non-hake IFQ Fishing Mortality Estimates by Sector.**

Landings (mt), estimated discard (mt), and fishing mortality estimate (mt) of groundfish species from non-hake IFQ and limited entry California halibut fisheries in 2013. 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.

Groundfish species	IFQ - Bottom and LE CHLB Trawl				IFQ - Midwater Trawl				IFQ - Hook-and-Line				IFQ - Pot				
	Weight (mt)	Sampled Discard	Expanded Discard	Landed	Estimate	Sampled Discard	Expanded Discard	Landed	Estimate	Sampled Discard	Expanded Discard	Landed	Estimate	Sampled Discard	Expanded Discard	Landed	Estimate
Arrowtooth Flounder		443.14	8.65	1,974.70	2,426.49	0.00	--	0.00	0.00	1.50	--	--	1.50	0.49	--	0.46	0.95
Black Rockfish (North of 46°16' N. lat.)		--	--	0.07	0.07	--	--	--	--	--	--	--	--	--	--	--	--
Black Rockfish (South of 46°16' N. lat.)		0.00	0.00	0.01	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Bocaccio rockfish (South of 40°10' N. lat.)		0.01	0.00	12.27	12.27	--	--	--	--	--	--	--	--	--	--	--	--
Cabezon (Oregon)		0.00	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Canary Rockfish		0.07	0.00	6.23	6.30	--	--	0.54	0.54	--	--	--	--	--	--	--	--
Chilipepper Rockfish (South of 40°10' N. lat.)		73.62	0.00	319.25	392.88	--	--	--	--	--	--	--	--	--	--	--	--
Cowcod Rockfish (South of 40°10' N. lat.)		0.00	0.00	0.19	0.19	--	--	--	--	--	--	--	--	--	--	--	--
Darkblotched Rockfish		2.29	0.04	110.45	112.77	--	--	0.00	0.00	--	--	--	--	--	--	0.00	0.00
Dover Sole		103.53	0.91	7,849.29	7,953.72	--	--	--	--	0.02	--	0.09	0.11	0.07	--	1.27	1.34
English Sole		23.20	0.13	197.07	220.39	0.00	--	0.00	0.00	--	--	--	--	--	--	0.00	0.00
Lingcod (North of 40°10' N. lat.)		17.94	0.15	310.38	319.43	--	--	0.13	0.13	0.02	--	0.26	0.28	0.26	--	2.32	2.58
50% discard mortality (Trawl)‡		8.97	0.08														
7% discard mortality (Hook-and-Line)‡										0.00				0.02			
Lingcod (South of 40°10' N. lat.)		5.88	0.00	10.77	13.71	--	--	--	--	--	--	--	--	0.00	--	--	0.00
50% discard mortality (Trawl)‡		2.94	0.00														
7% discard mortality (Hook-and-Line)‡														0.00			
Longnose Skate		131.23	2.92	851.90	918.97	--	--	0.14	0.14	3.17	--	0.01	1.59	0.00	0.00	0.01	0.01
50% discard mortality (Trawl)‡		65.61	1.46														
50% discard mortality (Fixed Gear)‡										1.58				0.00	0.00		
Longspine Thornyhead (North of 34°27' N. lat.)		33.97	0.29	1,021.78	1,056.04	--	--	0.00	0.00	0.06	--	0.01	0.07	0.02	--	0.04	0.05
Longspine Thornyhead (South of 34°27' N. lat.)		--	--	--	--	--	--	--	--	0.17	--	0.12	0.29	--	--	--	--
Minor nearshore rockfish (North of 40°10' N. lat.)																	
Blue Rockfish		--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Brown Rockfish		0.00	0.00	0.04	0.04	--	--	--	--	--	--	--	--	--	--	--	--
Copper Rockfish		0.00	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Nearshore Rockfish Unid		--	--	0.04	0.04	--	--	--	--	--	--	--	--	--	--	--	--
Quillback Rockfish		0.01	0.00	0.09	0.10	--	--	0.00	0.00	--	--	--	--	--	--	--	--
Rockfish Unid		0.02	0.00	--	0.02	--	--	--	--	--	--	--	--	--	--	--	--
Minor nearshore rockfish (South of 40°10' N. lat.)																	
Brown Rockfish		--	--	0.07	0.07	--	--	--	--	--	--	--	--	--	--	--	--
Olive Rockfish		0.00	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Minor shelf rockfish (North of 40°10' N. lat.)																	
Bocaccio Rockfish		0.00	0.00	0.34	0.34	--	--	0.01	0.01	--	--	--	--	--	--	--	--
Chilipepper Rockfish		0.22	0.00	2.88	3.11	--	--	0.00	0.00	--	--	--	--	--	--	--	--
Cowcod Rockfish		--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Flag Rockfish		0.00	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Greenspotted Rockfish		0.01	0.00	0.04	0.04	--	--	0.00	0.00	--	--	--	--	--	--	--	--
Greenstriped Rockfish		2.75	0.03	12.80	15.59	0.00	--	0.04	0.05	--	--	--	--	0.00	--	--	0.00
Pinkrose Rockfish		0.00	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Pygmy Rockfish		0.00	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--

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

Table 3a (continued).

Weight (mt)	IFQ - Bottom and LE CHLB Trawl				IFQ - Midwater Trawl				IFQ - Hook-and-Line				IFQ - Pot			
	Sampled Discard	Expanded Discard	Landed	Estimate	Sampled Discard	Expanded Discard	Landed	Estimate	Sampled Discard	Expanded Discard	Landed	Estimate	Sampled Discard	Expanded Discard	Landed	Estimate
Redstripe Rockfish	0.00	0.00	1.83	1.83	--	--	0.01	0.01	--	--	--	--	--	--	--	--
Rockfish Unid	0.01	0.00	--	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Rosethorn Rockfish	0.86	0.03	1.50	2.39	0.00	--	0.00	0.00	--	--	0.00	0.00	0.00	--	--	0.00
Rosy Rockfish	0.03	0.00	--	0.03	--	--	--	--	--	--	--	--	--	--	--	--
Shelf Rockfish Unid	--	--	0.52	0.52	--	--	--	--	--	--	0.01	0.01	--	--	0.00	0.00
Silvergray Rockfish	0.00	0.00	0.74	0.74	--	--	0.00	0.00	--	--	--	--	--	--	--	--
Stripetail Rockfish	2.55	0.02	0.70	3.28	--	--	0.00	0.00	--	--	--	--	--	--	--	--
Vermilion Rockfish	--	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Minor shelf rockfish (South of 40°10' N. lat.)																
Greenblotched Rockfish	0.00	0.00	0.12	0.12	--	--	--	--	--	--	--	--	--	--	--	--
Greenspotted Rockfish	0.33	0.00	0.25	0.58	--	--	--	--	--	--	--	--	--	--	--	--
Greenstriped Rockfish	2.10	0.00	0.00	2.10	--	--	--	--	--	--	--	--	--	--	--	--
Halfbanded Rockfish	0.00	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Mexican Rockfish	--	--	0.10	0.10	--	--	--	--	--	--	--	--	--	--	--	--
Pink Rockfish	0.00	0.00	0.07	0.07	--	--	--	--	--	--	--	--	--	--	--	--
Redstripe Rockfish	0.00	--	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Rockfish Unid	0.01	0.00	--	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Rosethorn Rockfish	0.04	0.00	0.01	0.05	--	--	--	--	--	--	--	--	0.00	--	--	0.00
Rosy Rockfish	0.00	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Shelf Rockfish Unid	--	0.00	0.18	0.18	--	--	--	--	--	--	--	--	--	--	--	--
Silvergray Rockfish	--	--	0.04	0.04	--	--	--	--	--	--	--	--	--	--	--	--
Stripetail Rockfish	15.31	0.00	0.91	16.22	--	--	--	--	--	--	--	--	--	--	--	--
Tiger Rockfish	0.00	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Vermilion Rockfish	--	--	0.01	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Yellowtail Rockfish	0.00	0.00	0.39	0.40	--	--	--	--	--	--	--	--	--	--	--	--
Minor slope rockfish (North of 40°10' N. lat.)																
Aurora Rockfish	4.25	0.14	17.08	21.47	--	--	0.00	0.00	--	--	--	--	0.00	--	0.00	0.00
Bank Rockfish	0.00	0.00	0.66	0.67	--	--	--	--	--	--	--	--	--	--	--	--
Blackgill Rockfish	0.04	0.00	6.23	6.27	--	--	--	--	--	--	0.07	0.07	--	--	0.02	0.02
Blackspotted Rockfish	--	--	0.12	0.12	--	--	--	--	--	--	0.00	0.00	--	--	--	--
Redbanded Rockfish	0.56	0.02	7.53	8.11	0.00	--	0.00	0.00	0.02	--	0.53	0.55	0.00	--	0.16	0.16
Rockfish Unid	0.05	0.00	--	0.05	--	--	--	--	--	--	--	--	--	--	--	--
Rougheye Rockfish	0.07	0.00	61.99	62.06	--	--	0.00	0.00	0.02	--	2.40	2.42	0.02	--	0.38	0.41
Sharpchin Rockfish	3.83	0.15	6.10	10.08	--	--	0.00	0.00	--	--	--	--	--	--	--	--
Shortraker Rockfish	0.04	0.00	20.38	20.42	--	--	0.00	0.00	0.01	--	0.02	0.03	0.00	--	--	0.00
Shortraker/Rougheye Rockfish	--	--	--	--	--	--	--	--	0.06	--	--	0.06	--	--	--	--
Slope Rockfish Unid	--	0.00	3.54	3.54	--	--	--	--	--	--	1.32	1.32	--	--	0.14	0.14
Splitnose Rockfish	17.35	0.60	24.36	42.31	--	--	0.00	0.00	--	--	--	--	--	--	0.00	0.00
Yellowmouth Rockfish	0.00	0.00	5.52	5.52	--	--	--	--	--	--	0.02	0.02	--	--	--	--
Minor slope rockfish (South of 40°10' N. lat.)																
Aurora Rockfish	2.87	0.00	6.04	8.91	--	--	--	--	--	--	--	--	0.05	--	0.24	0.29
Bank Rockfish	0.03	0.01	45.63	45.67	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Blackgill Rockfish	0.29	0.01	38.10	38.40	--	--	--	--	--	--	--	--	0.14	--	14.92	15.05
Pacific Ocean Perch	0.00	0.00	0.01	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Redbanded Rockfish	0.19	0.00	0.33	0.52	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Rockfish Unid	--	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--

**Table 3a (continued).**

Weight (mt)	IFQ - Bottom and LE CHLB Trawl				IFQ - Midwater Trawl				IFQ - Hook-and-Line				IFQ - Pot			
	Sampled Discard	Expanded Discard	Landed	Estimate	Sampled Discard	Expanded Discard	Landed	Estimate	Sampled Discard	Expanded Discard	Landed	Estimate	Sampled Discard	Expanded Discard	Landed	Estimate
Rougheye Rockfish	0.00	0.00	0.11	0.11	--	--	--	--	--	--	--	--	--	--	--	--
Sharpchin Rockfish	0.86	0.00	--	0.86	--	--	--	--	--	--	--	--	--	--	--	--
Shortraker Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Slope Rockfish Unid	--	0.00	7.48	7.48	--	--	--	--	--	--	--	--	--	--	--	--
Spotted Rockfish Unid	0.01	0.00	--	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Mixed thomyheads																
Shortspine/Longspine Thornyhead	0.10	0.01	5.72	5.83	--	--	--	--	--	--	--	--	--	--	--	--
Other flatfish																
Butter Sole	0.16	0.00	0.06	0.22	--	--	0.00	0.00	--	--	--	--	--	--	--	--
Curfin Turbot	0.83	0.00	0.63	1.46	--	--	0.01	0.01	--	--	--	--	--	--	--	--
Flatfish Unid	0.10	0.00	0.86	0.96	--	--	--	--	--	--	--	--	--	0.00	0.00	--
Flathead Sole	8.02	0.07	9.82	17.90	--	--	0.00	0.00	--	--	--	--	--	--	--	--
Pacific Sanddab	66.23	0.39	139.66	206.28	--	--	0.00	0.00	--	--	--	--	--	--	--	--
Rex Sole	25.51	0.24	466.63	492.38	0.00	--	0.00	0.00	--	--	--	--	0.00	--	0.00	0.00
Rock Sole	0.34	0.00	2.76	3.11	--	--	0.00	0.00	--	--	--	--	--	--	--	--
Sanddab Unid	0.39	0.00	61.54	61.94	--	--	--	--	--	--	--	--	--	--	--	--
Sand Sole	0.71	0.01	12.74	13.46	--	--	--	--	0.02	--	--	0.02	--	--	--	--
Other groundfish																
Big Skate	29.51	0.72	20.21	50.44	--	--	--	--	0.01	--	--	0.01	0.00	0.00	--	0.00
California Skate	0.37	0.02	--	0.39	--	--	--	--	--	--	--	--	--	--	--	--
Grenadier Unid	--	0.00	51.09	51.09	--	--	--	--	--	--	0.03	0.03	--	--	0.09	0.09
Groundfish Unid	--	--	0.03	0.03	--	--	--	--	--	--	--	--	--	--	--	--
Kelp Greenling	0.10	0.00	0.01	0.11	--	--	--	--	--	--	--	--	--	--	--	--
Leopard Shark	0.11	0.01	0.15	0.27	--	--	--	--	--	--	--	--	--	--	--	--
Mixed Species	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pacific Flatnose	1.44	0.02	--	1.46	--	--	--	--	0.01	--	--	0.01	0.04	0.00	--	0.04
Pacific Grenadier	41.84	0.47	6.11	48.41	--	--	--	--	0.35	--	--	0.35	0.69	0.00	--	0.69
Roundfish Unid	--	--	0.03	0.03	--	--	--	--	--	--	--	--	--	--	--	--
Soupfin Shark	0.00	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Spotted Ratfish	2.34	0.03	118.66	121.03	--	--	--	--	--	--	0.03	0.03	--	--	--	--
Rockfish Unid	0.10	0.00	0.21	0.32	--	--	--	--	--	--	--	--	--	--	--	--
Skate Unid	100.22	2.77	1.61	104.60	0.00	--	0.00	0.00	0.02	--	--	0.02	0.00	0.00	--	0.00
Pacific Cod	0.42	0.00	153.53	153.95	--	--	0.06	0.06	--	--	--	--	--	--	0.00	0.00
Pacific Hake	244.30	4.46	58.19	306.94	--	--	0.01	0.01	0.03	--	--	0.03	0.04	--	--	0.04
Pacific Ocean Perch (North of 40°10' N. lat.)	1.00	0.04	41.84	42.88	--	--	0.00	0.00	--	--	0.00	0.00	0.00	--	0.00	0.00
Petrale Sole	17.34	0.19	2,099.95	2,117.48	0.00	--	0.00	0.00	0.56	--	0.11	0.67	0.00	--	0.07	0.07
Sablefish (North of 36° N. lat.)	7.40	0.13	1,394.66	1,398.43	--	--	--	--	2.64	--	56.65	57.18	6.64	--	364.61	365.94
50% discard mortality (Trawl)‡	3.70	0.07											1.33			
20% discard mortality (Fixed Gear)‡									0.53							
Sablefish (South of 36° N. lat.)	0.00	0.00	6.14	6.15	--	--	--	--	0.14	--	16.20	16.23	2.04	--	64.15	64.56
50% discard mortality (Trawl)‡	0.00	0.00														
20% discard mortality (Fixed Gear)‡									0.03				0.41			
Shortbelly Rockfish	17.21	0.89	0.13	18.22	--	--	--	--	--	--	--	--	--	--	--	--
Shortspine Thornyhead (North of 34°27' N. lat.)	7.90	0.23	833.14	841.28	--	--	0.00	0.00	0.07	--	3.25	3.33	0.10	--	0.92	1.02
Shortspine Thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	--	--	0.05	--	3.65	3.70	--	--	--	--

Table 3a (continued).

	IFQ - Bottom and LE CHLB Trawl				IFQ - Midwater Trawl				IFQ - Hook-and-Line				IFQ - Pot			
	Weight (mt)	Sampled Discard	Expanded Discard	Landed	Estimate	Sampled Discard	Expanded Discard	Landed	Estimate	Sampled Discard	Expanded Discard	Landed	Estimate	Sampled Discard	Expanded Discard	Landed
Spiny Dogfish	272.75	8.51	8.65	289.91	0.01	--	0.00	0.01	22.08	--	--	11.04	0.65	0.00	0.00	0.65
50% discard mortality (Fixed Gear)‡									11.04							
Splitnose Rockfish (South of 40°10' N. lat.)	32.98	0.02	13.06	46.06	--	--	--	--	--	--	--	--	0.00	--	--	0.00
Starry Flounder	0.26	0.00	3.17	3.44	--	--	0.00	0.00	--	--	--	--	--	--	--	--
Widow Rockfish	2.43	0.00	49.47	51.90	0.00	--	123.67	123.67	--	--	--	--	--	--	--	--
Yelloweye Rockfish	0.00	0.00	0.05	0.05	--	--	--	--	--	--	--	--	--	--	0.01	0.01
Yellowtail Rockfish (North of 40°10' N. lat.)	0.01	0.00	213.96	213.97	--	--	84.68	84.68	--	--	0.00	0.00	--	--	--	--
<b>Non-groundfish species</b>																
California Halibut	0.01	0.00	18.51	18.52	--	--	--	--	--	--	--	--	--	--	--	--
Dungeness Crab	145.67	4.78	0.02	150.47	0.00	--	0.00	0.00	0.00	--	--	0.00	0.35	0.00	--	0.35
Non-FMP flatfish																
Deepsea Sole	17.91	0.19	0.21	18.31	--	--	--	--	--	--	--	--	0.01	0.00	--	0.01
Hornyhead Turbot	0.01	--	0.00	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Longfin Sanddab	0.01	0.00	--	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Slender Sole	47.50	1.21	--	48.71	0.00	--	--	0.00	--	--	--	--	0.00	0.00	--	0.00
Non-FMP skate																
Aleutian Skate	1.65	0.03	--	1.68	--	--	--	--	0.01	--	--	0.01	--	--	--	--
Black Skate	17.79	0.22	--	18.01	--	--	--	--	0.12	--	--	0.12	0.00	0.00	--	0.00
Deepsea Skate	0.36	0.00	--	0.36	--	--	--	--	--	--	--	--	--	--	--	--
Flathead Skate	0.01	0.00	--	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Pacific Electric Ray	1.37	0.04	--	1.41	--	--	--	--	--	--	--	--	--	--	--	--
Roughshoulder/Broad Skate	0.01	0.00	--	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Sandpaper Skate	40.66	0.91	--	41.57	--	--	--	--	0.02	--	--	0.02	0.01	0.00	--	0.01
Starry Skate	0.08	0.00	--	0.09	--	--	--	--	--	--	--	--	--	--	--	--
Thornback Skate	0.04	0.00	--	0.04	--	--	--	--	--	--	--	--	--	--	--	--
White Skate	0.07	0.00	--	0.07	--	--	--	--	--	--	--	--	--	--	--	--

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

**Table 3b. Observed Sectors: Hake IFQ/Co-op Fishing Mortality Estimates by Sector.**

Retained catch/landings (mt), discard (mt), and fishing mortality estimates (mt) of groundfish species from hake IFQ/Co-op sectors in 2013. 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 Co-op sector data was summarized from the A-SHOP.

Groundfish species	IFQ - Shoreside Hake				At-sea Catcher-Processors			At-sea Mothership		
	Weight (mt)	Sampled Discard	Expanded Discard	Landed	Estimate	Sampled Discard	Retained	Estimate	Sampled Discard	Retained
Arrowtooth Flounder	--	--	5.46	5.46	2.58	8.51	11.09	1.89	1.55	3.44
Black Rockfish (North of 46°16' N. lat.)	--	--	0.00	0.00	--	--	--	--	--	--
Canary Rockfish	0.00	--	3.35	3.36	0.12	0.06	0.18	0.31	0.17	0.48
Darkblotched Rockfish	0.00	--	3.25	3.25	0.74	1.35	2.08	2.94	1.30	4.24
Dover Sole	--	--	0.13	0.13	0.27	0.76	1.03	0.07	0.01	0.07
English Sole	--	--	0.03	0.03	--	0.01	0.01	0.00	0.00	0.00
Lingcod (North of 40°10' N. lat.)	--	--	8.43	8.43	--	0.15	0.15	0.89	0.47	1.36
Longnose Skate	--	--	0.10	0.10	0.03	0.04	0.08	0.17	0.03	0.20
Longspine Thornyhead (North of 34°27' N. lat.)	--	--	0.00	0.00	0.00	0.00	0.00	--	--	--
Minor shelf rockfish (North of 40°10' N. lat.)	--	--	0.51	0.51	0.09	0.14	0.23	0.12	0.05	0.17
Bocaccio Rockfish	--	--	0.01	0.01	--	--	--	0.00	--	0.00
Chillipepper Rockfish	--	--	0.21	0.21	0.00	--	0.00	0.00	0.00	0.00
Greenstriped Rockfish	--	--	--	--	--	--	--	0.00	--	0.00
Harlequin Rockfish	--	--	0.11	0.11	0.84	0.00	0.84	0.01	0.01	0.02
Redstripe Rockfish	--	--	--	--	--	--	--	--	--	--
Rockfish Unid	--	--	0.01	0.01	--	--	--	--	--	--
Rosethorn Rockfish	--	--	0.01	0.01	--	--	--	--	--	--
Shelf Rockfish Unid	--	--	0.01	0.01	--	--	--	--	--	--
Silvergray Rockfish	--	--	0.59	0.59	0.07	0.03	0.10	0.02	0.01	0.03
Stripetail Rockfish	--	--	--	--	0.00	--	0.00	0.00	0.00	0.00
Minor slope rockfish (North of 40°10' N. lat.)	--	--	0.09	0.09	0.00	0.00	0.00	0.00	--	0.00
Aurora Rockfish	--	--	0.03	0.03	0.00	0.01	0.01	--	0.00	0.00
Bank Rockfish	--	--	0.06	0.06	0.02	0.02	0.03	0.00	--	0.00
Blackgill Rockfish	--	--	0.08	0.08	--	0.01	0.01	--	--	--
Redbanded Rockfish	0.01	--	2.84	2.85	5.46	5.73	11.20	1.57	5.04	6.62
Rougheye Rockfish	--	--	0.23	0.23	0.00	--	0.00	0.02	--	0.02
Sharpchin Rockfish	--	--	0.59	0.59	0.01	--	0.01	--	0.01	0.01
Shorthead Rockfish	--	--	0.08	0.08	--	--	--	--	--	--
Slope Rockfish Unid	--	--	5.97	5.97	8.21	13.99	22.21	2.72	1.27	3.98
Splitnose Rockfish	--	--	0.08	0.08	0.00	--	0.00	--	--	--
Yellowmouth Rockfish	--	--	--	--	--	--	--	--	--	--
Mixed thornyheads	--	--	--	--	0.01	0.14	0.16	--	0.35	0.35
Shortspine/Longspine Thornyhead	--	--	--	--	--	--	--	--	--	--
Other flatfish	--	--	0.01	0.01	0.00	--	0.00	0.00	--	0.00
Flatfish Unid	--	--	0.00	0.00	--	0.00	0.00	0.00	--	0.00
Flathead Sole	--	--	0.07	0.07	--	0.00	0.00	0.00	--	0.00
Pacific Sanddab	--	--	0.39	0.39	2.28	8.72	11.00	0.56	0.54	1.10
Rex Sole	--	--	0.00	0.00	--	--	--	--	--	--
Sanddab Unid	--	--	--	--	--	--	--	--	--	--
Other groundfish	--	--	--	--	--	0.10	0.10	0.10	--	0.10
Big Skate	--	--	--	--	0.10	0.07	0.17	0.22	--	0.22
Grenadier Unid	--	--	0.16	0.16	--	--	--	--	--	--
Groundfish Unid	--	--	--	--	0.01	--	0.01	0.00	--	0.00
Pacific Electric Ray	--	--	--	--	--	0.00	0.00	--	--	--
Roundfish Unid	0.03	0.00	0.03	0.03	--	--	--	0.23	--	0.23
Southern Shark	--	--	0.00	0.00	0.00	0.00	0.00	--	--	--
Spotted Ratfish	--	--	0.19	0.19	--	--	--	--	--	--
Skate Unid	--	--	0.04	0.04	--	0.03	0.03	--	--	--
Pacific Cod	459.65	--	96,867.81	97,327.45	36.24	78,004.79	78,041.03	174.01	52,348.33	52,522.34
Pacific Hake	--	--	7.09	7.09	2.83	1.45	4.28	0.67	0.47	1.14
Pacific Ocean Perch (North of 40°10' N. lat.)	--	--	0.00	0.00	--	--	--	--	--	--
Petrale Sole	--	--	0.66	0.66	1.53	8.16	9.68	1.50	1.51	3.02
Sablefish (North of 36° N. lat.)	--	--	2.14	2.14	0.00	0.00	0.00	0.68	0.04	0.73
Shortbelly Rockfish	--	--	3.30	3.30	1.90	13.64	15.54	2.46	3.75	6.21
Shortspine Thornyhead (North of 34°27' N. lat.)	--	--	80.56	80.56	49.61	15.17	64.78	30.87	1.83	32.69
Spiny Dogfish	0.91	--	235.12	236.03	3.72	12.02	15.74	10.06	5.48	15.54
Widow Rockfish	0.16	--	420.46	420.61	22.04	56.41	78.45	189.07	1.85	190.92
Yellowtail Rockfish (North of 40°10' N. lat.)	--	--	0.01	0.01	--	--	--	0.04	--	0.04
<b>Non-groundfish species</b>	--	--	--	--	0.00	0.00	0.00	0.00	0.00	0.00
Dungeness Crab	--	--	--	--	0.00	0.00	0.00	0.00	0.00	0.00
Non-FMP flatfish	--	--	--	--	0.00	0.00	0.00	0.00	0.00	0.00
Slender Sole	--	--	--	--	0.00	0.00	0.00	0.00	0.00	0.00
Non-FMP skate	--	--	--	--	0.00	0.01	0.01	0.00	--	0.00
Sandpaper Skate	--	--	--	--	0.00	0.01	0.01	0.00	--	0.00

**Table 4. OA California Halibut Trawl.**

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 2013 (only occurs south of 40°10' N latitude). 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)	
	5	29	81	69	
	Discard Ratio	SE	Discard	Landed	Total Estimate
<b>Groundfish species</b>					
Arrowtooth Flounder	--	--	--	0.01	0.01
Cabazon (California)	--	--	--	0.01	0.01
California Scorpionfish (South of 34°27' N. lat.)	--	--	--	0.00	0.00
Canary Rockfish	--	--	--	0.00	0.00
Chilipepper Rockfish (South of 40°10' N. lat.)	--	--	--	0.00	0.00
Dover Sole	0.0000	--	0.00	--	0.00
English Sole	0.0061	0.0446	0.42	0.14	0.56
Lingcod (South of 40°10' N. lat.)	0.0002	0.0121	0.01	0.02	0.03
50% discard mortality (Trawl) <sup>‡</sup>			0.01		
Longnose Skate	0.0062	--	0.42	--	0.21
50% discard mortality (Trawl) <sup>‡</sup>			0.21		
Minor nearshore rockfish (South of 40°10' N. lat.)					
Brown Rockfish	0.0004	0.0211	0.03	0.00	0.03
Copper Rockfish	--	--	--	0.01	0.01
Nearshore Rockfish Unid	--	--	--	0.00	0.00
Minor shelf rockfish (South of 40°10' N. lat.)					
Flag Rockfish	--	--	--	0.00	0.00
Starry Rockfish	--	--	--	0.00	0.00
Vermilion Rockfish	--	--	--	0.00	0.00
Other flatfish					
Butter Sole	--	--	--	0.04	0.04
Curlfin Turbot	0.0163	0.5161	1.12	0.01	1.14
Flatfish Unid	--	--	--	0.15	0.15
Pacific Sanddab	0.0154	0.1590	1.06	0.07	1.13
Rock Sole	0.0001	0.0113	0.01	0.13	0.14
Sanddab Unid	--	--	--	0.08	0.08
Sand Sole	0.0066	0.0450	0.45	7.79	8.24
Other groundfish					
Big Skate	0.6178	1.3660	42.52	--	42.52
California Skate	0.0799	2.7942	5.50	--	5.50
Kelp Greenling	0.0000	--	0.00	--	0.00
Leopard Shark	0.0186	0.6141	1.28	0.29	1.57
Soupin Shark	--	--	--	0.09	0.09
Skate Unid	--	--	--	0.34	0.34
Pacific Cod	0.0001	0.0034	0.00	--	0.00
Pacific Hake	0.0000	--	0.00	--	0.00
Petrale Sole	--	--	--	0.41	0.41
Sablefish (North of 36° N. lat.)	0.0000	--	0.00	--	0.00
50% discard mortality (Trawl) <sup>‡</sup>			0.00		
Spiny Dogfish	0.0845	0.6630	5.81	--	5.81
Starry Flounder	0.0111	0.0374	0.76	2.66	3.42
<b>Non-groundfish species</b>					
California Halibut	0.0120	0.0295	0.82	68.82	69.64
Dungeness Crab	2.6431	5.3054	181.90	--	181.90
Non-FMP flatfish					
Diamond Turbot	--	--	--	0.00	0.00
Hornyhead Turbot	0.0002	0.0288	0.01	0.30	0.32
Non-FMP skate					
Pacific Electric Ray	0.0056	0.3412	0.39	--	0.39
Starry Skate	0.0003	0.0287	0.02	--	0.02
Thornback Skate	0.0183	0.5071	1.26	--	1.26

<sup>‡</sup>Mortality rates provided by the Groundfish Management Team (GMT).



**Table 5. Pink Shrimp Trawl.**

Observed discard ratios, standard error, estimated discard (mt), landings (mt), and fishing mortality estimates (mt) of groundfish species from 2013 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:		Observed vessels	Observed trips	Observed tows	Expansion factor:		Observed vessels	Observed trips	Observed tows	Expansion factor:	
				Fleet landings of pink shrimp (mt)					Fleet landings of pink shrimp (mt)					Fleet landings of pink shrimp (mt)	
	13	29	384	6,183		46	107	1353	21,538		10	17	179	3,830	
Weight (mt)	Discard Ratio	SE	Discard	Landed	Estimate	Discard Ratio	SE	Discard	Landed	Estimate	Discard Ratio	SE	Discard	Landed	Estimate
<b>Groundfish species</b>															
Arrowtooth Flounder	0.0002	0.0008	1.05	--	1.05	0.0008	0.0016	16.89	--	16.89	0.0002	0.0006	0.83	--	0.83
Bocaccio Rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Cabazon (California)	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01	0.01
California Scorpionfish (South of 34°27' N. lat.)	--	--	--	--	--	--	--	--	--	--	--	--	--	0.80	0.80
Canary Rockfish	--	--	--	--	--	0.0000	--	0.11	--	0.11	--	--	--	--	--
Darkblotched Rockfish	0.0001	0.0002	0.45	--	0.45	0.0001	0.0002	3.04	--	3.04	0.0000	0.0001	0.19	--	0.19
Dover Sole	0.0000	0.0025	0.22	0.15	0.36	0.0001	0.0016	2.38	--	2.38	0.0000	0.0002	0.03	0.11	0.14
English Sole	--	--	--	--	--	0.0000	0.0007	0.02	--	0.02	--	--	--	1.10	1.10
Lingcod (North of 40°10' N. lat.)	--	--	--	0.08	0.08	0.0000	0.0007	0.09	--	0.09	0.0000	0.0005	0.02	0.09	0.11
Lingcod (South of 40°10' N. lat.)	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01	0.01
Longnose Skate	0.0000	0.0017	0.10	0.88	0.97	0.0000	0.0012	0.08	--	0.08	0.0000	0.0005	0.10	--	0.10
Minor nearshore rockfish (North of 40°10' N. lat.)															
Gopher Rockfish	--	--	--	--	--	0.0000	--	0.00	--	0.00	--	--	--	--	--
Minor nearshore rockfish (South of 40°10' N. lat.)															
Copper Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	0.09	0.09
Nearshore Rockfish Unid	--	--	--	--	--	--	--	--	--	--	--	--	--	0.02	0.02
Minor shelf rockfish (North of 40°10' N. lat.)															
Chilipepper Rockfish	--	--	--	--	--	0.0000	0.0002	0.23	--	0.23	0.0000	--	0.01	--	0.01
Greenstriped Rockfish	0.0000	0.0002	0.01	--	0.01	0.0000	0.0003	0.27	--	0.27	0.0000	0.0002	0.16	--	0.16
Halfbanded Rockfish	--	--	--	--	--	0.0000	0.0002	0.00	--	0.00	0.0000	--	0.00	--	0.00
Harlequin Rockfish	--	--	--	--	--	--	--	0.00	--	0.00	--	--	--	--	--
Rockfish Unid	0.0000	0.0003	0.01	--	0.01	0.0000	0.0032	0.45	--	0.45	0.0000	0.0000	0.00	--	0.00
Stripetail Rockfish	--	--	--	--	--	0.0000	0.0003	0.28	--	0.28	0.0000	0.0004	0.02	--	0.02
Tiger Rockfish	--	--	--	--	--	--	--	--	--	--	0.0000	--	0.00	--	0.00
Vermilion Rockfish	--	--	--	--	--	0.0000	0.0000	0.00	--	0.00	--	--	--	--	--
Minor shelf rockfish (South of 40°10' N. lat.)															
Shelf Rockfish Unid	--	--	--	--	--	--	--	--	--	--	--	--	--	0.02	0.02
Vermilion Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	0.04	0.04
Minor slope rockfish (North of 40°10' N. lat.)															
Redbanded Rockfish	0.0000	0.0005	0.01	--	0.01	0.0000	0.0005	0.02	--	0.02	--	--	--	--	--
Sharpchin Rockfish	--	--	--	--	--	0.0000	0.0004	0.01	--	0.01	0.0000	--	0.05	--	0.05
Slope Rockfish Unid	--	--	--	0.35	0.35	--	--	--	--	--	--	--	--	--	--
Splitnose Rockfish	0.0000	0.0002	0.12	--	0.12	0.0000	0.0002	0.37	--	0.37	--	--	--	--	--
Slope Rockfish Unid	--	--	--	--	--	--	--	--	--	--	--	--	--	0.02	0.02
Other flatfish															
Flatfish Unid	0.0000	0.0014	0.09	--	0.09	0.0001	0.0099	1.92	--	1.92	0.0004	0.0600	1.57	15.56	17.14

**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)	
				Landed	Estimate				Landed	Estimate				Landed	Estimate
Weight (mt)	13	29	384	6,183		46	107	1353	21,538		10	17	179	3,830	
	Discard Ratio	SE	Discard	Landed	Estimate	Discard Ratio	SE	Discard	Landed	Estimate	Discard Ratio	SE	Discard	Landed	Estimate
Flathead Sole	0.0001	0.0009	0.52	--	0.52	0.0000	0.0007	0.52	--	0.52	0.0000	0.0001	0.00	--	0.00
Pacific Sanddab	0.0000	0.0032	0.01	--	0.01	0.0001	0.0006	1.47	--	1.47	0.0006	0.0025	2.33	--	2.33
Rex Sole	0.0007	0.0017	4.44	--	4.44	0.0007	0.0014	14.84	--	14.84	0.0002	0.0007	0.65	2.01	2.66
Rock Sole	0.0000	--	0.00	--	0.00	0.0000	0.0025	0.11	--	0.11	--	--	--	0.48	0.48
Sanddab Unid	--	--	--	--	--	--	--	--	--	--	--	--	--	0.04	0.04
Sand Sole	--	--	--	--	--	--	--	--	--	--	--	--	--	0.02	0.02
Other groundfish															
Big Skate	--	--	--	--	--	--	--	--	--	--	0.0000	--	0.00	--	0.00
Kelp Greenling	--	--	--	--	--	0.0000	--	0.00	--	0.00	--	--	--	--	--
Leopard Shark	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01	0.01
Rockfish Unid	--	--	--	--	--	--	--	--	--	--	--	--	--	0.03	0.03
Skate Unid	--	--	--	--	--	--	--	--	--	--	--	--	--	4.02	4.02
Southern Shark	--	--	--	--	--	--	--	--	--	--	--	--	--	0.04	0.04
Spotted Ratfish	0.0000	0.0001	0.00	--	0.00	0.0000	0.0276	0.26	--	0.26	--	--	--	--	--
Pacific Cod	--	--	--	--	--	--	--	--	--	--	0.0000	0.0000	0.00	--	0.00
Pacific Hake	0.0000	0.0003	0.04	--	0.04	0.0005	0.0070	10.41	--	10.41	0.0051	0.8311	19.41	--	19.41
Pacific Ocean Perch (North of 40°10' N. lat.)	0.0000	0.0004	0.07	--	0.07	0.0000	0.0002	0.16	--	0.16	0.0000	--	0.00	--	0.00
Petrale Sole	0.0001	0.0007	0.51	--	0.51	0.0000	0.0011	0.69	--	0.69	0.0000	0.0005	0.14	0.27	0.41
Sablefish (North of 36° N. lat.)	0.0000	0.0003	0.01	8.02	8.02	0.0000	0.0017	0.05	--	0.05	0.0000	--	0.00	--	0.00
Shortbelly Rockfish	--	--	--	--	--	0.0002	0.0025	3.49	--	3.49	--	--	--	--	--
Shortspine Thornyhead (North of 34°27' N. lat.)	--	--	--	0.17	0.17	0.0000	0.0005	0.08	--	0.08	--	--	--	--	--
Spiny Dogfish	--	--	--	--	--	0.0000	0.0002	0.00	--	0.00	0.0000	0.0004	0.02	0.01	0.03
Starry Flounder	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Yellowtail Rockfish (North of 40°10' N. lat.)	--	--	--	--	--	0.0000	0.0016	0.01	--	0.01	0.0000	0.0000	0.00	--	0.00
<b>Non-groundfish species</b>															
California Halibut	--	--	--	--	--	--	--	--	--	--	--	--	--	8.02	8.02
California Sheephead	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01	0.01
Dungeness Crab	0.0000	--	0.01	--	0.01	--	--	--	--	--	0.0000	--	0.00	0.03	0.03
Non-FMP flatfish															
Hornyhead Turbot	--	--	--	--	--	--	--	--	--	--	--	--	--	3.08	3.08
Slender Sole	0.0034	0.0036	21.15	--	21.15	0.0033	0.0026	71.03	--	71.03	0.0012	0.0022	4.58	--	4.58
Non-FMP skate															
Aleutian Skate	0.0000	--	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--
Sandpaper Skate	--	--	--	--	--	0.0000	0.0007	0.02	--	0.02	0.0000	0.0000	0.00	--	0.00

**Table 6. LE Sablefish Primary Fixed Gear.**

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 2013. 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  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)	
	18	57	351	736		3	14	49	283	
	Discard Ratio	SE	Discard	Landed	Estimate	Discard Ratio	SE	Discard	Landed	Estimate
<b>Groundfish species</b>										
Arrowtooth Flounder	0.0308	0.1954	22.68	2.82	25.49	0.0007	0.0064	0.18	0.14	0.33
Bocaccio Rockfish (South of 40°10' N. lat.)	--	--	--	0.06	0.06	--	--	--	--	--
Canary Rockfish	0.0001	0.0325	0.08	0.86	0.94	--	--	--	--	--
Chilipepper Rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	--	--	--
Darkblotched Rockfish	0.0008	0.0145	0.58	2.44	3.02	0.0000	0.0008	0.01	0.03	0.04
Dover Sole	0.0010	0.0043	0.73	1.13	1.86	0.0012	0.0054	0.34	0.14	0.48
English Sole	--	--	--	0.02	0.02	--	--	--	--	--
Lingcod (North of 40°10' N. lat.)	0.0006	0.0151	0.46	4.52	4.55	0.0015	0.0403	0.42	1.27	1.69
7% discard mortality (Longline) <sup>‡</sup>			0.03							
Lingcod (South of 40°10' N. lat.)	--	--	--	0.15	0.15	0.0003	0.0164	0.08	0.09	0.17
7% discard mortality (Longline) <sup>‡</sup>										
Longnose Skate	0.0363	0.0597	26.68	19.10	32.44	0.0004	0.0135	0.12	--	0.06
50% discard mortality (Fixed Gear) <sup>‡</sup>			13.34					0.06		
Longspine Thornyhead (North of 34°27' N. lat.)	0.0005	0.0199	0.35	1.25	1.60	0.0000	0.0007	0.00	0.01	0.01
Longspine Thornyhead (South of 34°27' N. lat.)	--	--	--	0.06	0.06	--	--	--	--	--
Minor shelf rockfish (North of 40°10' N. lat.)										
Bocaccio Rockfish	--	--	--	0.06	0.06	--	--	--	--	--
Chilipepper Rockfish	--	--	--	0.00	0.00	--	--	--	--	--
Cowcod Rockfish	0.0000	0.0109	0.03	--	0.03	--	--	--	--	--
Greenspotted Rockfish	--	--	--	0.00	0.00	--	--	--	--	--
Greenstriped Rockfish	0.0001	0.0405	0.11	0.20	0.31	--	--	--	--	--
Redstripe Rockfish	--	--	--	--	--	--	--	--	--	--
Rosethorn Rockfish	0.0006	0.0094	0.47	0.03	0.50	0.0001	0.0029	0.02	0.00	0.02
Rosy Rockfish	0.0000	0.0039	0.02	--	0.02	--	--	--	--	--
Shelf Rockfish Unid	--	--	--	0.35	0.35	--	--	--	0.01	0.01
Silvergray Rockfish	0.0000	0.0396	0.02	0.35	0.37	--	--	--	--	--
Minor shelf rockfish (South of 40°10' N. lat.)										
Flag Rockfish	--	--	--	0.02	0.02	--	--	--	--	--
Rosethorn Rockfish	--	--	--	--	--	--	--	--	--	--
Shelf Rockfish Unid	--	--	--	0.01	0.01	--	--	--	--	--
Stripetail Rockfish	--	--	--	0.00	0.00	--	--	--	--	--
Vermilion Rockfish	--	--	--	0.03	0.03	--	--	--	--	--
Yellowtail Rockfish	--	--	--	0.27	0.27	--	--	--	--	--
Minor slope rockfish (North of 40°10' N. lat.)										
Aurora Rockfish	0.0000	0.0021	0.00	0.00	0.01	0.0000	0.0021	0.01	0.00	0.01
Bank Rockfish	--	--	--	0.27	0.27	--	--	--	--	--
Blackgill Rockfish	0.0020	0.0227	1.46	0.68	2.15	0.0007	0.0163	0.21	0.00	0.21
Blackspotted Rockfish	--	--	--	0.19	0.19	--	--	--	--	--
Redbanded Rockfish	0.0052	0.0265	3.81	7.92	11.74	0.0002	0.0040	0.06	0.06	0.12
Rougheye Rockfish	0.0172	0.0884	12.63	32.98	45.62	--	--	--	0.02	0.02
Sharpchin Rockfish	--	--	--	--	--	--	--	--	0.00	0.00
Shortraker Rockfish	0.0014	0.0388	1.04	1.74	2.78	--	--	--	--	--
Shortraker/Rougheye Rockfish	0.0077	0.4338	5.68	--	5.68	--	--	--	--	--
Slope Rockfish Unid	--	--	--	2.49	2.49	--	--	--	0.58	0.58
Splitnose Rockfish	0.0000	0.0088	0.01	0.03	0.05	--	--	--	0.00	0.00
Yellowmouth Rockfish	--	--	--	0.48	0.48	--	--	--	--	--
Minor slope rockfish (South of 40°10' N. lat.)										
Aurora Rockfish	--	--	--	0.03	0.03	--	--	--	--	--
Blackgill Rockfish	0.0001	0.0186	0.10	1.87	1.98	0.0002	0.0047	0.05	0.49	0.55
Redbanded Rockfish	0.0000	0.0056	0.01	0.00	0.01	0.0000	0.0022	0.00	--	0.00
Slope Rockfish Unid	--	--	--	3.21	3.21	--	--	--	0.04	0.04
Other flatfish										
Rex Sole	0.0000	0.0004	0.00	0.15	0.15	--	--	--	--	--
Sanddab Unid	--	--	--	0.00	0.00	--	--	--	--	--
Other groundfish										
Big Skate	0.0001	0.0447	0.07	--	0.07	--	--	--	--	--

<sup>‡</sup>Mortality rates provided by the Groundfish Management Team (GMT).

**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)	
	18	57	351	736		3	14	49	283	
	Discard Ratio	SE	Discard	Landed	Estimate	Discard Ratio	SE	Discard	Landed	Estimate
Grenadier Unid	--	--	--	6.96	6.96	--	--	--	--	--
Pacific Flatnose	0.0004	0.0507	0.32	--	0.32	--	--	--	--	--
Pacific Grenadier	0.0369	0.7229	27.17	--	27.17	--	--	--	--	--
Skate Unid	--	--	--	5.67	5.67	--	--	--	--	--
Spotted Ratfish	0.0033	0.0358	2.46	0.00	2.46	0.0001	0.0052	0.03	--	0.03
Pacific Cod	0.0001	0.0581	0.09	1.34	1.43	--	--	--	--	--
Pacific Hake	0.0001	0.0183	0.04	0.00	0.05	--	--	--	--	--
Pacific Ocean Perch (North of 40°10' N. lat.)	0.0000	0.0061	0.03	0.19	0.22	--	--	--	--	--
Petrale Sole	0.0013	0.0650	0.98	0.13	1.11	--	--	--	0.00	0.00
Sablefish (North of 36° N. lat.)	0.2141	0.0948	157.58	706.18	737.69	0.4563	0.4040	129.18	283.13	308.97
20% discard mortality (Fixed Gear) <sup>‡</sup>	--	--	31.52	--	--	--	--	25.84	--	--
Sablefish (South of 36° N. lat.)	--	--	--	29.82	29.82	--	--	--	--	--
20% discard mortality (Fixed Gear) <sup>‡</sup>	--	--	--	--	--	--	--	--	--	--
Shortspine Thornyhead (North of 34°27' N. lat.)	0.0045	0.0081	3.34	15.82	19.15	0.0000	0.0010	0.01	0.05	0.05
Shortspine Thornyhead (South of 34°27' N. lat.)	--	--	--	1.67	1.67	--	--	--	--	--
Spiny Dogfish	0.1709	0.8082	125.77	21.15	84.03	0.0009	0.0300	0.26	--	0.26
50% discard mortality (Hook and Line) <sup>‡</sup>	--	--	62.88	--	--	--	--	--	--	--
Splitnose Rockfish (South of 40°10' N. lat.)	--	--	--	0.00	0.00	--	--	--	0.00	0.00
Widow Rockfish	--	--	--	0.44	0.44	--	--	--	--	--
Yelloweye Rockfish	0.0004	0.2022	0.27	--	0.27	--	--	--	--	--
Yellowtail Rockfish (North of 40°10' N. lat.)	0.0000	0.0325	0.03	0.22	0.25	--	--	--	--	--
<b>Non-groundfish species</b>										
Dungeness Crab	--	--	--	--	--	--	--	--	0.02	0.02
Non-FMP flatfish	--	--	--	--	--	--	--	--	--	--
Deepsea Sole	--	--	--	--	--	0.0000	0.0010	0.01	--	0.01
Non-FMP skate	--	--	--	--	--	--	--	--	--	--
Aleutian Skate	0.0002	0.1571	0.18	--	0.18	--	--	--	--	--
Black Skate	0.0012	0.0502	0.91	--	0.91	--	--	--	--	--
Sandpaper Skate	0.0006	0.0087	0.41	--	0.41	--	--	--	--	--

<sup>‡</sup>Mortality rates provided by the Groundfish Management Team (GMT).

**Table 7. LE Non-Primary Fixed Gear.**

Observed discard ratios, standard error, estimated discard (mt), landings (mt), and fishing mortality estimates (mt) from the LE non-endorsed fixed gear fleet in 2013. 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 pot gear) (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					
					Expansion factor:					Expansion factor:						
	Observed vessels	Observed trips	Observed sets	Fleet landings of sablefish (mt)		Observed vessels	Observed trips	Observed sets	Fleet landings of groundfish (mt)		OA Observed (see Table 8b)	Expansion factor: Fleet landings of groundfish (mt)				
	4	12	12	140		18	112	236	620			15				
Weight (mt)	Discard Ratio	SE	Discard	Landed	Estimate	Discard Ratio	SE	Discard	Landed	Estimate	Discard Ratio	SE	Discard	Landed	Estimate	
<b>Groundfish species</b>																
Arrowtooth Flounder	0.0017	0.0347	0.24	0.13	0.37	--	--	--	--	--	0.01	0.08	0.13	0.00	0.14	
Bocaccio Rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	--	0.80	0.80	--	--	--	--	--	
Cabezon (California)	--	--	--	--	--	--	--	--	--	--	0.00	0.01	0.00	--	0.00	
Chilipepper Rockfish (South of 40°10' N. lat.)	0.0005	0.0144	0.07	--	0.07	--	--	--	0.16	0.16	--	--	--	--	--	
Darkblotched Rockfish	--	--	--	0.54	0.54	--	--	--	--	--	0.0001	0.0027	0.00	--	0.00	
Dover Sole	0.0109	0.0648	1.53	0.38	1.90	0.0017	0.0184	1.05	0.38	1.43	0.0010	0.0060	0.01	0.02	0.04	
Lingcod (North of 40°10' N. lat.)	--	--	--	0.33	0.33	--	--	--	--	--	0.0011	0.0406	0.02	--	0.02	
7% discard mortality (Longline)‡	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Lingcod (South of 40°10' N. lat.)	--	--	--	0.06	0.06	--	--	--	0.10	0.10	--	--	--	--	--	
7% discard mortality (Longline)‡	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Longnose Skate	0.0966	0.3426	13.51	5.13	11.88	0.0039	0.1334	2.41	2.18	3.39	--	--	--	0.01	0.01	
50% discard mortality (Fixed Gear)‡	--	--	6.75	--	--	--	--	1.20	--	--	--	--	--	--	--	
Longspine Thornyhead (North of 34°27' N. lat.)	0.0002	0.0034	0.02	0.62	0.64	0.0072	0.1441	4.48	1.43	5.92	--	--	--	--	--	
Longspine Thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	0.0038	0.0029	2.38	14.39	16.76	--	--	--	--	--	
Minor nearshore rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	--	--	--	0.0003	0.0102	0.00	--	0.00	
Copper Rockfish	--	--	--	--	--	--	--	--	--	--	0.0001	0.0034	0.00	--	0.00	
Gopher Rockfish	--	--	--	--	--	--	--	--	--	--	0.0002	0.0074	0.00	--	0.00	
Treefish Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Minor shelf rockfish (North of 40°10' N. lat.)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Bocaccio Rockfish	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	
Chilipepper Rockfish	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	
Greenspotted Rockfish	--	--	--	0.00	0.00	--	--	--	--	--	0.0001	0.0028	0.00	--	0.00	
Greenstriped Rockfish	--	--	--	0.06	0.06	--	--	--	--	--	0.0000	0.0008	0.00	--	0.00	
Redstripe Rockfish	--	--	--	--	--	--	--	--	--	--	0.0000	0.0003	0.00	--	0.00	
Rockfish Unid	--	--	--	--	--	--	--	--	--	--	0.0000	0.0005	0.00	--	0.00	
Rosethorn Rockfish	--	--	--	0.02	0.02	--	--	--	--	--	--	--	--	--	--	
Shelf Rockfish Unid	--	--	--	0.01	0.01	--	--	--	--	--	--	--	--	--	--	
Silvergray Rockfish	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	
Minor shelf rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Flag Rockfish	--	--	--	--	--	--	--	0.01	0.01	0.01	--	--	--	--	--	
Greenspotted Rockfish	--	--	--	--	--	--	--	0.11	0.11	0.11	--	--	--	--	--	
Greenstriped Rockfish	--	--	--	--	--	--	--	0.01	0.01	0.01	--	--	--	--	--	
Mexican Rockfish	--	--	--	--	--	--	--	0.02	0.02	0.02	--	--	--	--	--	
Pinkrose Rockfish	--	--	--	--	--	--	--	0.04	0.04	0.04	--	--	--	--	--	
Rosethorn Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Rosy Rockfish	--	--	--	--	--	--	--	0.16	0.16	0.16	--	--	--	--	--	
Shelf Rockfish Unid	--	--	--	0.02	0.02	--	--	0.04	0.04	0.04	--	--	--	--	--	
Speckled Rockfish	--	--	--	--	--	--	--	0.01	0.01	0.01	--	--	--	--	--	
Squarespot Rockfish	--	--	--	--	--	--	--	0.05	0.05	0.05	--	--	--	--	--	
Starry Rockfish	--	--	--	--	--	--	--	0.22	0.22	0.22	--	--	--	--	--	
Vermilion Rockfish	--	--	--	0.00	0.00	--	--	1.14	1.14	1.14	--	--	--	--	--	
Yellowtail Rockfish	--	--	--	0.00	0.00	--	--	0.07	0.07	0.07	--	--	--	--	--	
Minor slope rockfish (North of 40°10' N. lat.)	--	--	--	0.01	0.01	--	--	--	--	--	--	--	--	--	--	
Aurora Rockfish	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	
Bank Rockfish	--	--	--	0.03	0.03	--	--	--	--	--	--	--	--	--	--	
Blackgill Rockfish	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	
Blackspotted Rockfish	--	--	--	1.54	1.54	--	--	--	--	--	0.0004	0.0154	0.01	--	0.01	
Redbanded Rockfish	--	--	--	3.66	3.66	--	--	--	--	--	--	--	--	--	--	
Rougheye Rockfish	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	
Sharpchin Rockfish	--	--	--	0.00	0.00	--	--	--	--	--	0.0000	0.0025	0.00	--	0.00	

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

**Table 7 (continued).**

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)	SE	Expansion factor: Fleet landings of groundfish (mt)			
				4	12				12	140			18	112	236	620
	Weight (mt)	Discard Ratio	SE	Discard	Landed	Estimate	Discard Ratio	SE	Discard	Landed	Estimate	Discard Ratio	SE	Discard	Landed	Estimate
Shorthead Rockfish	--	--	--	0.05	0.05	--	--	--	--	--	--	--	--	--	--	--
Slope Rockfish Unid	--	--	--	0.05	0.05	--	--	--	--	--	--	--	--	--	--	--
Splitnose Rockfish	--	--	--	0.03	0.03	--	--	--	--	--	--	--	--	--	--	--
Minor slope rockfish (South of 40°10' N. lat.)																
Aurora Rockfish	--	--	--	0.02	0.02	0.0000	0.0051	0.02	0.07	0.08	--	--	--	--	--	--
Bank Rockfish	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--
Blackgill Rockfish	0.0002	0.0038	0.03	3.84	3.87	0.0002	0.1004	0.15	6.47	6.62	--	--	--	0.12	0.12	
Redbanded Rockfish	--	--	--	0.00	0.00	--	--	--	--	--	0.0008	0.0066	0.01	--	0.01	
Slope Rockfish Unid	--	--	--	0.28	0.28	--	--	--	--	--	--	--	--	0.00	0.00	
Mixed thornyheads																
Shortspine/Longspine Thornyhead	--	--	--	0.02	0.02	--	--	--	0.03	0.03	--	--	--	--	--	--
Other flatfish																
Flatfish Unid	--	--	--	--	--	--	--	--	0.01	0.01	--	--	--	--	--	--
Pacific Sanddab	--	--	--	--	--	--	--	--	1.71	1.71	--	--	--	--	--	--
Sanddab Unid	--	--	--	--	--	--	--	--	0.08	0.08	--	--	--	--	--	--
Other groundfish																
Big Skate	--	--	--	0.02	0.02	0.0085	0.3103	5.25	--	5.25	--	--	--	--	--	--
California Skate	--	--	--	--	--	--	--	--	0.01	0.01	--	--	--	--	--	--
Grenadier Unid	--	--	--	5.58	5.58	--	--	--	24.53	24.53	--	--	--	0.00	0.00	
Pacific Flatnose	--	--	--	--	--	0.0075	0.2264	4.63	--	4.63	--	--	--	--	--	--
Pacific Grenadier	--	--	--	--	--	0.2203	5.6150	136.56	--	136.56	0.0002	0.0073	0.00	--	0.00	
Rockfish Unid	--	--	--	--	--	--	--	--	0.01	0.01	--	--	--	--	--	--
Skate Unid	--	--	--	0.32	0.32	0.0002	0.0290	0.10	0.56	0.66	--	--	--	--	--	--
Spotted Ratfish	0.0008	0.0100	0.12	--	0.12	0.0002	0.0407	0.11	--	0.11	--	--	--	--	--	--
Pacific Cod	--	--	--	0.15	0.15	--	--	--	--	--	--	--	--	--	--	--
Pacific Hake	--	--	--	0.02	0.02	0.0003	0.0160	0.18	--	0.18	--	--	--	--	--	--
Pacific Ocean Perch (North of 40°10' N. lat.)	--	--	--	0.03	0.03	--	--	--	--	--	--	--	--	--	--	--
Petrale Sole	--	--	--	0.12	0.12	--	--	--	0.06	0.06	--	--	--	0.00	0.00	
Sablefish (North of 36° N. lat.)	0.0624	0.0898	8.72	139.84	141.58	--	--	--	--	--	0.0953	0.1542	1.47	10.31	10.60	
20% discard mortality (Fixed Gear)‡			1.74										0.29			
Sablefish (South of 36° N. lat.)	--	--	--	--	--	0.0503	0.1532	31.19	445.01	451.25	--	--	--	4.94	4.94	
20% discard mortality (Fixed Gear)‡								6.24								
Shortspine Thornyhead (North of 34°27' N. lat.)	0.0025	0.0112	0.35	7.19	7.55	0.0007	0.0140	0.42	28.12	28.54	--	--	--	0.04	0.04	
Shortspine Thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	0.0178	0.0158	11.03	91.88	102.91	--	--	--	--	--	
Spiny Dogfish	0.2029	2.6088	28.37	23.68	37.87	0.0037	1.0436	2.26	0.02	1.15	0.0006	0.0227	0.01	--	0.01	
50% discard mortality (Longline)‡			14.18					1.13								
Splitnose rockfish (South of 40°10' N. lat.)	--	--	--	0.00	0.00	--	--	--	0.01	0.01	--	--	--	--	--	--
Starry Flounder	--	--	--	--	--	--	--	--	0.00	0.00	--	--	--	--	--	--
Widow Rockfish	--	--	--	0.03	0.03	--	--	--	0.11	0.11	--	--	--	0.01	0.01	
Yellowtail Rockfish (North of 40°10' N. lat.)	--	--	--	0.05	0.05	--	--	--	--	--	--	--	--	--	--	--
<b>Non-groundfish species</b>																
California Halibut	--	--	--	0.02	0.02	--	--	--	0.02	0.02	--	--	--	--	--	--
California Sheephead	--	--	--	--	--	--	--	--	--	--	0.0082	0.7841	0.13	--	0.13	
Dungeness Crab	--	--	--	--	--	--	--	--	--	--	--	--	--	0.02	0.02	
Non-FMP flatfish																
Deepsea Sole	--	--	--	--	--	0.0001	0.0143	0.05	--	0.05	0.0001	0.0041	0.00	--	0.00	
Non-FMP skate																
Black Skate	--	--	--	--	--	0.0068	0.0886	4.20	--	4.20	--	--	--	--	--	--
Deepsea Skate	--	--	--	--	--	0.0003	0.0717	0.20	--	0.20	--	--	--	--	--	--
Sandpaper Skate	0.0003	0.0086	0.04	--	0.04	--	--	--	--	--	--	--	--	--	--	--

**Table 8a. OA Fixed Gear, Longline.**

Observed discard ratios, standard error, estimated discard (mt), landings (mt), and fishing mortality estimates (mt) from the OA fixed gear longline fleet in 2013. 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	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)	
	10	13	14	87		4	10	16	46	
Weight (mt)	Discard Ratio	SE	Discard	Landed	Estimate	Discard Ratio	SE	Discard	Landed	Estimate
<b>Groundfish species</b>										
Arrowtooth Flounder	0.0011	0.0172	0.10	0.12	0.22	--	--	--	--	--
Bocaccio Rockfish (South of 40°10' N. lat.)	--	--	--	0.68	0.68	0.0004	0.0269	0.02	1.35	1.37
Canary Rockfish	--	--	--	0.06	0.06	--	--	--	--	--
Chilipepper Rockfish (South of 40°10' N. lat.)	--	--	--	0.48	0.48	--	--	--	0.14	0.14
Darkblotched Rockfish	--	--	--	0.37	0.37	--	--	--	--	--
Dover Sole	0.0015	0.0321	0.13	0.23	0.36	0.0013	0.0471	0.06	0.00	0.06
English Sole	--	--	--	0.02	0.02	--	--	--	0.00	0.00
Lingcod (North of 40°10' N. lat.)	--	--	--	13.61	13.61	--	--	--	--	--
7% discard mortality (Longline)‡										
Lingcod (South of 40°10' N. lat.)	--	--	--	6.97	6.97	--	--	--	2.22	2.22
7% discard mortality (Longline)‡										
Longnose Skate	0.0062	0.0534	0.53	2.19	2.46	0.0306	1.1138	1.40	1.94	2.63
50% discard mortality (Fixed Gear)‡			0.27					0.70		
Longspine Thornyhead (North of 34°27' N. lat.)	0.0050	0.2138	0.43	0.02	0.45	--	--	--	--	--
Longspine Thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	0.0055	0.0122	0.25	0.88	1.14
Minor nearshore rockfish (South of 40°10' N. lat.)										
Copper Rockfish	--	--	--	--	--	0.0018	0.1254	0.08	--	0.08
Minor shelf rockfish (North of 40°10' N. lat.)										
Bocaccio Rockfish	--	--	--	0.01	0.01	--	--	--	--	--
Greenstriped Rockfish	--	--	--	0.01	0.01	--	--	--	--	--
Rosethorn Rockfish	--	--	--	0.01	0.01	--	--	--	--	--
Shelf Rockfish Unid	--	--	--	0.01	0.01	--	--	--	--	--
Silvergray Rockfish	--	--	--	0.01	0.01	--	--	--	--	--
Tiger Rockfish	--	--	--	0.00	0.00	--	--	--	--	--
Vermilion Rockfish	--	--	--	0.03	0.03	--	--	--	--	--
Minor shelf rockfish (South of 40°10' N. lat.)										
Flag Rockfish	--	--	--	--	--	0.0048	0.3314	0.22	0.18	0.41
Greenblotched Rockfish	--	--	--	--	--	--	--	--	0.05	0.05
Greenspotted Rockfish	--	--	--	0.01	0.01	0.0014	0.0985	0.07	1.29	1.36
Greenstriped Rockfish	--	--	--	--	--	--	--	--	0.04	0.04
Honeycomb Rockfish	--	--	--	--	--	--	--	--	0.02	0.02
Mexican Rockfish	--	--	--	--	--	--	--	--	0.01	0.01
Pink Rockfish	--	--	--	--	--	--	--	--	0.00	0.00
Pinkrose Rockfish	--	--	--	--	--	--	--	--	0.00	0.00
Rosethorn Rockfish	--	--	--	--	--	--	--	--	0.00	0.00
Rosy Rockfish	--	--	--	0.00	0.00	--	--	--	0.01	0.01
Shelf Rockfish Unid	--	--	--	0.06	0.06	--	--	--	0.04	0.04
Speckled Rockfish	--	--	--	--	--	0.0007	0.0448	0.03	0.12	0.15
Squarespot Rockfish	--	--	--	--	--	0.0001	0.0090	0.01	0.01	0.01
Starry Rockfish	--	--	--	0.00	0.00	0.0022	0.1523	0.10	0.36	0.46
Vermilion Rockfish	--	--	--	0.88	0.88	0.0262	1.7913	1.19	7.75	8.94
Yellowtail Rockfish	--	--	--	2.00	2.00	--	--	--	0.23	0.23
Minor slope rockfish (North of 40°10' N. lat.)										
Aurora Rockfish	0.0002	0.0080	0.02	0.00	0.02	--	--	--	--	--

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

**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: Fleet landings of sablefish (mt)		Observed vessels	Observed trips	Observed sets	Expansion factor: Fleet landings of groundfish (mt)	
	10	13	14	87	87	4	10	16	46	46
Weight (mt)	Discard Ratio	SE	Discard	Landed	Estimate	Discard Ratio	SE	Discard	Landed	Estimate
Bank Rockfish	--	--	--	0.00	0.00	--	--	--	--	--
Blackgill Rockfish	0.0001	0.0042	0.01	0.03	0.04	--	--	--	--	--
Blackspotted Rockfish	--	--	--	0.01	0.01	--	--	--	--	--
Redbanded Rockfish	0.0003	0.0046	0.02	0.48	0.50	--	--	--	--	--
Rougheye Rockfish	--	--	--	0.92	0.92	--	--	--	--	--
Sharpchin Rockfish	--	--	--	0.00	0.00	--	--	--	--	--
Shortraker Rockfish	0.0002	0.0071	0.02	0.03	0.05	--	--	--	--	--
Slope Rockfish Unid	--	--	--	0.03	0.03	--	--	--	--	--
Splitnose Rockfish	--	--	--	0.00	0.00	--	--	--	--	--
Yellowmouth Rockfish	--	--	--	0.00	0.00	--	--	--	--	--
Minor slope rockfish (South of 40°10' N. lat.)										
Aurora Rockfish	--	--	--	--	--	--	--	--	0.00	0.00
Bank Rockfish	--	--	--	--	--	--	--	--	0.04	0.04
Blackgill Rockfish	0.0030	0.0576	0.26	0.59	0.85	--	--	--	2.68	2.68
Pacific Ocean Perch	--	--	--	--	--	--	--	--	0.00	0.00
Redbanded Rockfish	--	--	--	--	--	--	--	--	--	--
Slope Rockfish Unid	--	--	--	0.09	0.09	--	--	--	0.00	0.00
Other flatfish										
Butter Sole	--	--	--	0.00	0.00	--	--	--	--	--
Flatfish Unid	--	--	--	--	--	--	--	--	0.20	0.20
Pacific Sanddab	--	--	--	0.00	0.00	0.0003	0.0094	0.01	0.52	0.53
Rock Sole	--	--	--	0.11	0.11	--	--	--	0.02	0.02
Sanddab Unid	--	--	--	1.96	1.96	--	--	--	0.45	0.45
Sand Sole	--	--	--	--	--	--	--	--	0.00	0.00
Other groundfish										
Grenadier Unid	--	--	--	2.26	2.26	--	--	--	--	--
Leopard Shark	--	--	--	--	--	--	--	--	0.03	0.03
Pacific Flatnose	--	--	--	--	--	0.0197	0.2507	0.90	--	0.90
Pacific Grenadier	0.1171	1.6404	10.14	--	10.14	--	--	--	--	--
Rockfish Unid	--	--	--	--	--	--	--	--	0.53	0.53
Skate Unid	--	--	--	0.68	0.68	--	--	--	0.15	0.15
Southern Shark	--	--	--	--	--	--	--	--	0.07	0.07
Spotted Ratfish	0.0019	0.0268	0.17	--	0.17	--	--	--	--	--
Pacific Cod	--	--	--	0.35	0.35	--	--	--	--	--
Pacific Hake	0.0022	0.0651	0.19	0.00	0.20	--	--	--	--	--
Pacific Ocean Perch (North of 40°10' N. lat.)	--	--	--	0.01	0.01	--	--	--	--	--
Petrale Sole	--	--	--	0.37	0.37	--	--	--	0.01	0.01
Sablefish (North of 36° N. lat.)	0.3809	0.6010	32.97	86.57	93.16	--	--	--	--	--
20% discard mortality (Fixed Gear)‡			6.59							
Sablefish (South of 36° N. lat.)	--	--	--	--	--	0.0144	0.0502	0.66	21.65	21.78
20% discard mortality (Fixed Gear)‡								0.13		
Shortspine Thornyhead (North of 34°27' N. lat.)	0.0377	0.4139	3.26	0.13	3.40	--	--	--	--	--
Shortspine Thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	0.0260	0.1146	1.19	2.55	3.73
Spiny Dogfish	0.0070	0.0881	0.60	1.32	1.62	--	--	--	--	--
50% discard mortality (Longline)‡			0.30							
Splitnose Rockfish (South of 40°10' N. lat.)	--	--	--	0.00	0.00	--	--	--	0.02	0.02
Starry Flounder	--	--	--	0.24	0.24	--	--	--	0.01	0.01
Widow Rockfish	--	--	--	0.08	0.08	--	--	--	0.11	0.11
Yellowtail Rockfish (North of 40°10' N. lat.)	--	--	--	0.03	0.03	--	--	--	--	--
<b>Non-groundfish species</b>										
California Halibut	--	--	--	0.18	0.18	--	--	--	0.25	0.25
Non-FMP skate	--	--	--	--	--	--	--	--	--	--
Black Skate	--	--	--	--	--	0.1031	1.4396	4.71	--	4.71

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



**Table 8b. OA Fixed Gear, Pot.**

Observed discard ratios, standard error, estimated discard (mt), landings (mt), and fishing mortality estimates (mt) from the OA fixed gear pot fleet in 2013. 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  Weight (mt)	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)		
	17	25	48	142			12		
	Discard Ratio		SE	Discard	Landed	Estimate	Discard	Landed	Estimate
<b>Groundfish species</b>									
Arrowtooth Flounder		0.0087	0.0822	1.23	0.00	1.23	0.10	--	0.10
Cabezon (California)		0.0001	0.0069	0.01	--	0.01	0.00	--	0.00
Darkblotched Rockfish		0.0001	0.0027	0.02	--	0.02	0.00	--	0.00
Dover Sole		0.0010	0.0060	0.13	0.01	0.14	0.01	--	0.01
Lingcod (North of 40°10' N. lat.)		0.0011	0.0406	0.15	0.07	0.22	--	--	--
Lingcod (South of 40°10' N. lat.)		--	--	--	--	--	--	0.09	0.09
Longnose Skate		--	--	--	0.01	0.01	--	--	--
50% discard mortality (Fixed Gear)‡		--	--	--	--	--	--	--	--
Longspine Thornyhead (North of 34°27' N. lat.)		--	--	--	0.08	0.08	--	--	--
Minor nearshore rockfish (South of 40°10' N. lat.)									
Copper Rockfish		0.0003	0.0102	0.04	--	0.04	0.00	--	0.00
Gopher Rockfish		0.0001	0.0034	0.01	--	0.01	0.00	--	0.00
Treefish Rockfish		0.0002	0.0074	0.03	--	0.03	0.00	--	0.00
Minor shelf rockfish (North of 40°10' N. lat.)									
Greenstriped Rockfish		0.0001	0.0028	0.01	--	0.01	--	--	--
Redstripe Rockfish		0.0000	0.0008	0.00	--	0.00	--	--	--
Rockfish Unid		0.0000	0.0003	0.00	--	0.00	--	--	--
Rosethorn Rockfish		0.0000	0.0005	0.00	--	0.00	--	--	--
Minor shelf rockfish (South of 40°10' N. lat.)									
Starry Rockfish		--	--	--	--	--	--	0.00	0.00
Swordspine Rockfish		--	--	--	--	--	--	0.00	0.00
Vermilion Rockfish		--	--	--	0.01	0.01	--	--	--
Minor slope rockfish (North of 40°10' N. lat.)									
Redbanded Rockfish		0.0004	0.0154	0.05	0.01	0.06	--	--	--
Sharpchin Rockfish		0.0000	0.0025	0.01	--	0.01	--	--	--
Minor slope rockfish (South of 40°10' N. lat.)									
Aurora Rockfish		--	--	--	0.00	0.00	--	0.01	0.01
Blackgill Rockfish		--	--	--	0.07	0.07	--	0.31	0.31
Redbanded Rockfish		0.0008	0.0066	0.11	--	0.11	0.01	--	0.01
Slope Rockfish Unid		--	--	--	--	--	--	0.00	0.00
Mixed thornyheads									
Shortspine/Longspine Thornyhead		--	--	--	--	--	--	0.00	0.00
Other flatfish									
Sanddab Unid		--	--	--	0.07	0.07	--	0.01	0.01
Other groundfish									
Grenadier Unid		--	--	--	0.02	0.02	--	--	--
Pacific Grenadier		0.0002	0.0073	0.03	--	0.03	0.00	--	0.00
Skate Unid		--	--	--	82.20	82.20	--	--	--
Pacific Hake		--	--	--	0.00	0.00	--	--	--
Sablefish (North of 36° N. lat.)		0.0953	0.1542	13.48	58.85	61.54	--	--	--
20% discard mortality (Fixed Gear)‡				2.70					
Sablefish (South of 36° N. lat.)		--	--	--	--	--	--	11.62	11.62
20% discard mortality (Fixed Gear)‡									
Shortspine Thornyhead (North of 34°27' N. lat.)		--	--	--	0.11	0.11	--	--	--
Shortspine Thornyhead (South of 34°27' N. lat.)		--	--	--	--	--	--	0.00	0.00
Spiny Dogfish		0.0006	0.0227	0.09	0.01	0.10	0.01	--	0.01
<b>Non-groundfish species</b>									
California Sheephead		0.0082	0.7841	1.16	--	1.16	0.10	--	0.10
Dungeness Crab		--	--	--	0.36	0.36	--	--	--
Non-FMP flatfish									
Deepsea Sole		0.0001	0.0041	0.02	--	0.02	0.00	--	0.00

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

**Table 9. LE and OA Fixed Gear Summary.**

Estimated discard (mt), landings (mt), and fishing mortality estimate (mt) of groundfish species in the LE and OA non-nearshore fixed gear sectors in 2013. 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
	Longline Discard	Pot Discard	Landed	LE Total	Longline Discard	Pot Discard	Landed	OA Total	
<b>Groundfish species</b>									
Arrowtooth Flounder	22.92	0.32	3.09	26.33	0.10	1.33	0.12	1.55	27.88
Bocaccio Rockfish (South of 40°10' N. lat.)	--	--	0.87	0.87	0.02	--	2.03	2.05	2.91
Cabazon (California)	--	0.00	--	0.00	--	0.01	--	0.01	0.01
Canary Rockfish	0.08	--	0.86	0.94	--	--	0.06	0.06	1.00
Chilipepper Rockfish (South of 40°10' N. lat.)	0.07	--	0.16	0.22	--	--	0.62	0.62	0.84
Darkblotched Rockfish	0.58	0.01	3.01	3.60	--	0.02	0.37	0.39	3.99
Dover Sole	3.30	0.35	2.06	5.71	0.19	0.15	0.24	0.58	6.29
English Sole	--	--	0.02	0.02	--	--	0.02	0.02	0.04
Lingcod (North of 40°10' N. lat.)	0.46	0.44	6.11	6.58	--	0.15	13.68	13.83	20.41
7% discard mortality (Longline)‡	0.03	--	--	--	--	--	--	--	--
Lingcod (South of 40°10' N. lat.)	--	0.08	0.40	0.48	--	--	9.28	9.28	9.76
7% discard mortality (Longline)‡	--	--	--	--	--	--	--	--	--
Longnose Skate	42.60	0.12	26.43	47.79	1.93	--	4.14	5.11	52.89
50% discard mortality (Fixed Gear)‡	21.30	0.06	--	--	0.97	--	--	--	--
Longspine Thornyhead (North of 34°27' N. lat.)	4.86	0.00	3.31	8.17	0.43	--	0.09	0.52	8.69
Longspine Thornyhead (South of 34°27' N. lat.)	2.38	--	14.44	16.82	0.25	--	0.88	1.14	17.96
Minor nearshore rockfish (South of 40°10' N. lat.)									
Copper Rockfish	--	0.00	--	0.00	0.08	0.04	--	0.13	0.13
Gopher Rockfish	--	0.00	--	0.00	--	0.01	--	0.01	0.02
Treefish Rockfish	--	0.00	--	0.00	--	0.03	--	0.03	0.03
Minor shelf rockfish (North of 40°10' N. lat.)									
Bocaccio Rockfish	--	--	0.06	0.06	--	--	0.01	0.01	0.07
Chilipepper Rockfish	--	--	0.00	0.00	--	--	--	--	0.00
Cowcod Rockfish	0.03	--	--	0.03	--	--	--	--	0.03
Greenspotted Rockfish	--	--	0.00	0.00	--	--	--	--	0.00
Greenstriped Rockfish	0.11	0.00	0.26	0.37	--	0.01	0.01	0.02	0.39
Redstripe Rockfish	--	0.00	--	0.00	--	0.00	--	0.00	0.00
Rockfish Unid	--	0.00	--	0.00	--	0.00	--	0.00	0.00
Rosethorn Rockfish	0.47	0.02	0.05	0.54	--	0.00	0.01	0.01	0.55
Rosy Rockfish	0.02	--	--	0.02	--	--	--	--	0.02
Shelf Rockfish Unid	--	--	0.37	0.37	--	--	0.01	0.01	0.38
Silvergray Rockfish	0.02	--	0.35	0.37	--	--	0.01	0.01	0.37
Tiger Rockfish	--	--	--	--	--	--	0.00	0.00	0.00
Vermilion Rockfish	--	--	--	--	--	--	0.03	0.03	0.03
Minor shelf rockfish (South of 40°10' N. lat.)									
Flag Rockfish	--	--	0.03	0.03	0.22	--	0.18	0.41	0.44
Greenblotched Rockfish	--	--	--	--	--	--	0.05	0.05	0.05
Greenspotted Rockfish	--	--	0.11	0.11	0.07	--	1.31	1.37	1.49
Greenstriped Rockfish	--	--	0.01	0.01	--	--	0.04	0.04	0.04
Honeycomb Rockfish	--	--	--	--	--	--	0.02	0.02	0.02
Mexican Rockfish	--	--	0.02	0.02	--	--	0.01	0.01	0.03
Pink Rockfish	--	--	--	--	--	--	0.00	0.00	0.00
Pinkrose Rockfish	--	--	0.04	0.04	--	--	0.00	0.00	0.05
Rosethorn Rockfish	--	--	--	--	--	--	0.00	0.00	0.00
Rosy Rockfish	--	--	0.16	0.16	--	--	0.01	0.01	0.17
Shelf Rockfish Unid	--	--	0.07	0.07	--	--	0.11	0.11	0.18
Speckled Rockfish	--	--	0.01	0.01	0.03	--	0.12	0.15	0.16
Squarespot Rockfish	--	--	0.05	0.05	0.01	--	0.01	0.01	0.06
Starry Rockfish	--	--	0.22	0.22	0.10	--	0.36	0.46	0.68
Stripetail Rockfish	--	--	0.00	0.00	--	--	--	--	0.00
Swordspine Rockfish	--	--	--	--	--	--	0.00	0.00	0.00
Vermilion Rockfish	--	--	1.18	1.18	1.19	--	8.63	9.83	11.01
Yellowtail Rockfish	--	--	0.34	0.34	--	--	2.23	2.23	2.57
Minor slope rockfish (North of 40°10' N. lat.)									
Aurora Rockfish	0.00	0.01	0.01	0.03	0.02	--	0.00	0.02	0.05
Bank Rockfish	--	--	0.27	0.27	--	--	0.00	0.00	0.28
Blackgill Rockfish	1.46	0.21	0.71	2.38	0.01	--	0.03	0.04	2.42
Blackspotted Rockfish	--	--	0.19	0.19	--	--	0.01	0.01	0.20

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

**Table 9 (continued).**

Weight (mt)	Limited Entry - Coastwide				Open Access - Coastwide				LE & OA Coastwide
	Longline Discard	Pot Discard	Landed	LE Total	Longline Discard	Pot Discard	Landed	OA Total	
Redbanded Rockfish	3.81	0.07	9.52	13.40	0.02	0.05	0.49	0.56	13.96
Rougheye Rockfish	12.63	--	36.66	49.30	--	--	0.92	0.92	50.22
Sharpchin Rockfish	--	0.00	0.00	0.00	--	0.01	0.00	0.01	0.01
Shortraker Rockfish	1.04	--	1.79	2.83	0.02	--	0.03	0.05	2.89
Shortraker/Rougheye Rockfish	5.68	--	--	5.68	--	--	--	--	5.68
Slope Rockfish Unid	--	--	3.12	3.12	--	--	0.03	0.03	3.15
Splitnose Rockfish	0.01	--	0.06	0.08	--	--	0.00	0.00	0.08
Yellowmouth Rockfish	--	--	0.48	0.48	--	--	0.00	0.00	0.48
Minor slope rockfish (South of 40°10' N. lat.)									
Aurora Rockfish	0.02	--	0.12	0.13	--	--	0.01	0.01	0.14
Bank Rockfish	--	--	0.00	0.00	--	--	0.04	0.04	0.04
Blackgill Rockfish	0.29	0.05	12.80	13.14	0.26	--	3.65	3.91	17.05
Pacific Ocean Perch	--	--	--	--	--	--	0.00	0.00	0.00
Redbanded Rockfish	0.01	0.02	0.00	0.03	--	0.12	--	0.12	0.15
Slope Rockfish Unid	--	--	3.53	3.53	--	--	0.10	0.10	3.63
Mixed thornyheads									
Shortspine/Longspine Thornyhead	--	--	0.05	0.05	--	--	0.00	0.00	0.05
Other flatfish									
Butter Sole	--	--	--	--	--	--	0.00	0.00	0.00
Flatfish Unid	--	--	0.01	0.01	--	--	0.20	0.20	0.21
Pacific Sanddab	--	--	1.71	1.71	0.01	--	0.52	0.54	2.25
Rex Sole	0.00	--	0.15	0.15	--	--	--	--	0.15
Rock Sole	--	--	--	--	--	--	0.13	0.13	0.13
Sanddab Unid	--	--	0.09	0.09	--	--	2.50	2.50	2.59
Sand Sole	--	--	--	--	--	--	0.00	0.00	0.00
Other groundfish									
Big Skate	5.32	--	0.02	5.34	--	--	--	--	5.34
California Skate	--	--	0.01	0.01	--	--	--	--	0.01
Grenadier Unid	--	--	37.07	37.07	--	--	2.29	2.29	39.36
Leopard Shark	--	--	--	--	--	--	0.03	0.03	0.03
Pacific Flatnose	4.95	--	--	4.95	0.90	--	--	0.90	5.85
Pacific Grenadier	163.73	0.00	--	163.74	10.14	0.03	--	10.17	173.90
Rockfish Unid	--	--	0.01	0.01	--	--	0.53	0.53	0.53
Skate Unid	0.10	--	6.55	6.65	--	--	83.02	83.02	89.67
Soupin Shark	--	--	--	--	--	--	0.07	0.07	0.07
Spotted Ratfish	2.69	0.03	0.00	2.72	0.17	--	--	0.17	2.89
Pacific Cod	0.09	--	1.49	1.58	--	--	0.35	0.35	1.93
Pacific Hake	0.22	--	0.02	0.25	0.19	--	0.00	0.20	0.44
Pacific Ocean Perch (North of 40°10' N. lat.)	0.03	--	0.22	0.25	--	--	0.01	0.01	0.26
Petrale Sole	0.98	--	0.32	1.30	--	--	0.38	0.38	1.68
Sablefish (North of 36° N. lat.)	166.30	130.66	1,139.45	1,198.84	32.97	13.48	145.41	154.70	1,353.55
20% discard mortality (Fixed Gear)‡	33.26	26.13	--	--	6.59	2.70	--	--	--
Sablefish (South of 36° N. lat.)	31.19	--	479.78	486.02	0.66	--	33.27	33.40	519.42
20% discard mortality (Fixed Gear)‡	6.24	--	--	--	0.13	--	--	--	--
Shortspine Thornyhead (North of 34°27' N. lat.)	4.11	0.01	51.22	55.33	3.26	--	0.24	3.50	58.84
Shortspine Thornyhead (South of 34°27' N. lat.)	11.03	--	93.55	104.58	1.19	--	2.55	3.74	108.31
Spiny Dogfish	156.40	0.26	44.85	123.31	0.60	0.09	1.33	1.72	125.04
50% discard mortality (Longline)‡	78.20	--	--	--	0.30	--	--	--	--
Splitnose Rockfish (South of 40°10' N. lat.)	--	--	0.02	0.02	--	--	0.03	0.03	0.05
Starry Flounder	--	--	0.00	0.00	--	--	0.25	0.25	0.25
Widow Rockfish	--	--	0.59	0.59	--	--	0.19	0.19	0.78
Yelloweye Rockfish	0.27	--	--	0.27	--	--	--	--	0.27
Yellowtail Rockfish (North of 40°10' N. lat.)	0.03	--	0.28	0.30	--	--	0.03	0.03	0.33
<b>Non-groundfish species</b>									
California Halibut	--	--	0.04	0.04	--	--	0.43	0.43	0.47
California Sheephead	--	0.13	--	0.13	--	1.25	--	1.25	1.38
Dungeness Crab	--	--	0.04	0.04	--	--	0.36	0.36	0.40
Non-FMP flatfish									
Deepsea Sole	0.05	0.01	--	0.05	--	0.02	--	0.02	0.07
Non-FMP skate									
Aleutian Skate	0.18	--	--	0.18	--	--	--	--	0.18
Black Skate	5.11	--	--	5.11	4.71	--	--	4.71	9.82
Deepsea Skate	0.20	--	--	0.20	--	--	--	--	0.20
Sandpaper Skate	0.45	--	--	0.45	--	--	--	--	0.45

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

**Table 10. Nearshore Fixed Gear: Partition Landings by Depth.**

Commercial landings of nearshore species (mt) in Oregon and California during 2013, partitioned by depth interval and groundfish management area based on observed catch from 2003 to 2013. Data from both states were combined. The California state-permit framework, which groups nearshore rockfish into either shallow or deeper nearshore rockfish, is represented in the area south of 40° 10' N latitude.

	2003-2013 Total observed landings (mt)	2003-2013 Percentage of observed catch by depth (fathoms)			2013 Fleet landings (mt)	2013 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	136.90	45.9%	52.0%	2.1%	133.84	61.47	69.60	2.78
Cabezon (California)	2.33	39.0%	53.6%	7.5%	0.95	0.37	0.51	0.07
Cabezon (Oregon)	22.00	33.1%	64.7%	2.2%	19.81	6.55	12.83	0.43
Lingcod (North of 40°10' N. lat.)	27.69	31.5%	60.5%	8.1%	48.85	15.37	29.53	3.95
Minor nearshore rockfish (North of 40°10' N. lat.)								
Black and Yellow Rockfish	0.06	35.3%	64.7%	0.0%	0.05	0.02	0.03	--
Blue Rockfish	15.44	22.1%	69.6%	8.3%	7.20	1.59	5.01	0.60
Brown Rockfish	0.28	8.8%	30.6%	60.6%	0.07	0.01	0.02	0.04
China Rockfish	6.15	31.6%	64.1%	4.3%	7.20	2.28	4.61	0.31
Copper Rockfish	1.41	12.6%	70.3%	17.0%	1.50	0.19	1.06	0.26
Gopher Rockfish	0.05	41.3%	57.2%	1.5%	0.05	0.02	0.03	0.00
Grass Rockfish	0.37	98.3%	1.0%	0.7%	0.26	0.26	0.00	0.00
Nearshore Rockfish Unid	2.21	28.2%	65.4%	6.4%	0.00	0.00	0.00	0.00
Olive Rockfish	0.07	4.6%	82.9%	12.5%	0.01	0.00	0.01	0.00
Quillback Rockfish	2.33	8.3%	61.4%	30.3%	2.59	0.22	1.59	0.78
Other groundfish								
Kelp Greenling	14.66	49.0%	49.5%	1.4%	22.58	11.07	11.19	0.32
Other nongroundfish								
Buffalo Sculpin	0.02	94.1%	5.9%	0.0%	--	--	--	--
Greenling Unid	0.08	86.5%	13.5%	0.0%	--	--	--	--
Red Irish Lord Sculpin	0.02	40.6%	59.4%	0.0%	--	--	--	--
<b>SOUTH of 40° 10' N Lat.</b>								
<b>Nearshore Species - Commercial</b>								
Black Rockfish (South of 46°16' N. lat.)	1.67	53.2%	42.9%	4.0%	7.61	4.05	3.26	0.30
Cabezon (California)	5.89	92.9%	5.6%	1.5%	27.86	25.89	1.56	0.42
California Scorpionfish (South of 34°27' N. lat.)	0.37	4.2%	1.6%	94.2%	1.72	0.07	0.03	1.62
Deeper nearshore rockfish								
Blue Rockfish	1.11	41.6%	45.4%	12.9%	3.32	1.38	1.51	0.43
Brown Rockfish	8.77	27.2%	59.2%	13.6%	27.92	7.58	16.53	3.81
Copper Rockfish	0.64	13.2%	50.1%	36.7%	6.14	0.81	3.08	2.25
Nearshore Rockfish Unid	0.38	29.3%	33.2%	37.5%	0.02	0.01	0.01	0.01
Olive Rockfish	0.48	19.5%	56.6%	23.9%	1.21	0.24	0.68	0.29
Quillback Rockfish	0.15	0.0%	42.9%	57.1%	0.18	--	0.08	0.10
Rockfish Unid	0.02	--	--	100.0%	--	--	--	--
Treefish Rockfish	0.21	37.1%	53.3%	9.7%	1.22	0.45	0.65	0.12
Lingcod (South of 40°10' N. lat.)	6.29	39.6%	49.0%	11.4%	25.23	10.00	12.35	2.88
Other groundfish								
California Scorpionfish	--	--	--	--	0.05	--	--	--
Kelp Greenling	0.76	69.1%	27.4%	3.5%	4.74	3.28	1.30	0.17
Other nongroundfish								
California Sheephead	12.28	69.5%	29.7%	0.7%	27.26	18.95	8.11	0.20
Shallow nearshore rockfish								
Black and Yellow Rockfish	1.50	93.5%	3.3%	3.2%	10.55	9.87	0.35	0.34
China Rockfish	0.60	26.1%	50.1%	23.7%	1.20	0.31	0.60	0.28
Gopher Rockfish	4.83	50.1%	38.9%	10.9%	22.99	11.53	8.95	2.51
Grass Rockfish	0.92	94.9%	4.6%	0.5%	12.42	11.78	0.57	0.07
Kelp Rockfish	0.13	61.7%	37.1%	1.2%	0.97	0.60	0.36	0.01
Nearshore Rockfish Unid	0.25	60.4%	30.7%	8.9%	0.00	0.00	0.00	0.00

**Table 11. Nearshore Fixed Gear: Discard Ratios.**

Observed discard ratios with standard error and nearshore species fleet landings (mt) from the commercial nearshore fixed gear fishery in 2013 by groundfish management area and depth (fathoms). Data from both Oregon and California were combined. The California state-permit framework is represented in the area south of 40°10' N latitude.

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	Vessels	Trips	Sets
	52	103	110	45	144	174	14	16	16	20	41	58	22	68	82	4	13	14
Observed																		
Expansion factor:																		
Fleet landings of nearshore species (mt)	99			136			10			107			60			16		
	Discard Ratio	SE		Discard Ratio	SE		Discard Ratio	SE		Discard Ratio	SE		Discard Ratio	SE		Discard Ratio	SE	
<b>Groundfish species</b>																		
Black Rockfish (South of 46°16' N. lat.)	0.0122	0.0162		0.0151	0.0278		0.0073	0.0832		0.0092	0.0343		0.0054	0.0475		0.0025	0.0666	
Cabezon (California)	0.0009	0.0440	--	--	--	--	--	--	--	0.0128	0.0880		0.0186	0.1444		--	--	
Cabezon (Oregon)	0.0050	0.0159		0.0026	0.0107		0.0005	0.0095		--	--		--	--		--	--	
California Scorpionfish (South of 34°27' N. lat.)	--	--		--	--		--	--		0.0002	0.0405		--	--		--	--	
Canary Rockfish	0.0081	0.0706		0.0158	0.0481		0.0290	0.1311		0.0018	0.0417		0.0916	0.3614		0.3650	2.8000	
Deeper nearshore rockfish																		
Blue Rockfish	--	--		--	--		--	--		0.0047	0.0407		0.0018	0.0123		0.0024	0.0212	
Brown Rockfish	--	--		--	--		--	--		0.0099	0.0275		0.0167	0.0642		0.0006	0.0084	
Calico Rockfish	--	--		--	--		--	--		0.0001	--		0.0003	0.0122		--	--	
Copper Rockfish	--	--		--	--		--	--		0.0013	0.0138		0.0008	0.0043		0.0004	0.0062	
Olive Rockfish	--	--		--	--		--	--		0.0001	0.0101		0.0041	0.0304		0.0047	0.0694	
Treefish Rockfish	--	--		--	--		--	--		0.0039	0.1234		0.0024	0.0825		--	--	
Lingcod (North of 40°10' N. lat.)	0.2723	0.3112		0.2825	0.2628		0.1798	0.3616		--	--		--	--		--	--	
Lingcod (South of 40°10' N. lat.)	--	--		--	--		--	--		0.0484	0.1561		0.1573	0.2547		0.2160	0.5278	
Minor nearshore rockfish (North of 40°10' N. lat.)																		
Blue Rockfish	0.0127	0.0287		0.0239	0.0368		0.0217	0.1293		--	--		--	--		--	--	
China Rockfish	0.0004	0.0040		0.0017	0.0066		0.0002	0.0034		--	--		--	--		--	--	
Copper Rockfish	0.0000	0.0025		--	--		--	--		--	--		--	--		--	--	
Olive Rockfish	0.0003	--		--	--		--	--		--	--		--	--		--	--	
Quillback Rockfish	0.0001	0.0069		0.0004	0.0053		0.0011	0.0091		--	--		--	--		--	--	
Minor shelf rockfish (North of 40°10' N. lat.)																		
Rockfish Unid	0.0014	0.2016		0.0001	0.0520		--	--		--	--		--	--		--	--	
Rosy Rockfish	--	--		--	--		0.0026	0.1314		--	--		--	--		--	--	
Tiger Rockfish	--	--		0.0001	0.0107		--	--		--	--		--	--		--	--	
Vermilion Rockfish	0.0003	0.0118		0.0009	0.0208		--	--		--	--		--	--		--	--	
Minor shelf rockfish (South of 40°10' N. lat.)																		
Greenstriped Rockfish	--	--		--	--		--	--		--	--		--	--		0.0015	0.0229	
Rosy Rockfish	--	--		--	--		--	--		--	--		0.0009	0.0364		0.0013	0.0273	
Squarespot Rockfish	--	--		--	--		--	--		--	--		--	--		0.0013	0.0180	
Starry Rockfish	--	--		--	--		--	--		--	--		0.0001	0.0315		--	--	
Vermilion Rockfish	--	--		--	--		--	--		0.0004	0.0070		0.0001	0.0021		--	--	
Yellowtail Rockfish	--	--		--	--		--	--		--	--		0.0004	0.0111		0.0012	0.0219	
Other flatfish																		
Butter Sole	--	--		0.0000	--		--	--		--	--		--	--		0.00083	--	

**Table 11 (continued).**

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	Vessels	Trips	Sets
Observed	52	103	110	45	144	174	14	16	16	20	41	58	22	68	82	4	13	14
Expansion factor:	99			136			10			107			60			16		
Fleet landings of nearshore species (mt)	Discard Ratio		SE	Discard Ratio		SE	Discard Ratio		SE	Discard Ratio		SE	Discard Ratio		SE	Discard Ratio		SE
Pacific Sanddab	--	--	--	--	--	--	--	--	--	0.0000	--	--	0.0004	0.0397	--	0.0002	--	--
Sand Sole	0.0000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other groundfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Big Skate	--	--	--	--	--	--	--	--	--	--	--	--	0.0026	--	--	--	--	--
California Skate	--	--	--	--	--	--	--	--	--	--	--	--	0.0052	0.3386	--	--	--	--
Kelp Greenling	0.0117	0.0254	--	0.0175	0.0327	--	0.0018	0.0124	--	0.0039	0.0264	--	0.0061	0.0476	--	0.0024	0.1599	--
Leopard Shark	--	--	--	--	--	--	--	--	--	--	--	--	0.0007	0.0874	--	--	--	--
Shallow nearshore rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Black and Yellow Rockfish	--	--	--	--	--	--	--	--	--	0.0012	0.0192	--	0.0001	0.0152	--	--	--	--
China Rockfish	--	--	--	--	--	--	--	--	--	0.0024	0.0516	--	0.0047	0.0541	--	0.0678	0.6078	--
Gopher Rockfish	--	--	--	--	--	--	--	--	--	0.0185	0.0562	--	0.0242	0.0715	--	0.0679	0.4799	--
Grass Rockfish	--	--	--	--	--	--	--	--	--	0.0003	0.0329	--	0.0002	0.0971	--	--	--	--
Kelp Rockfish	--	--	--	--	--	--	--	--	--	0.0028	0.0756	--	0.0005	0.0129	--	--	--	--
Spiny Dogfish	--	--	--	--	--	--	--	--	--	0.0094	0.5801	--	0.0205	0.4351	--	--	--	--
Widow Rockfish	--	--	--	0.0001	0.0353	--	0.0011	0.0255	--	--	--	--	--	--	--	0.0004	0.0278	--
Yelloweye Rockfish	0.0077	0.2659	--	0.0206	0.1019	--	0.0804	0.5903	--	--	--	--	0.0030	0.1779	--	0.0018	--	--
Yellowtail Rockfish (North of 40°10' N. lat.)	0.0023	0.0288	--	0.0029	0.0138	--	0.0036	0.1293	--	--	--	--	--	--	--	--	--	--
<b>Non-groundfish species</b>	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
California Halibut	--	--	--	--	--	--	--	--	--	--	--	--	0.0000	--	--	--	--	--
Dungeness Crab	0.0002	0.0445	--	--	--	--	--	--	--	0.0003	--	--	0.0017	0.0714	--	--	--	--
Non-FMP skate	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Starry Skate	--	--	--	--	--	--	--	--	--	0.0020	--	--	--	--	--	--	--	--
Other nongroundfish <sup>1</sup>	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Brown Irish Lord Sculpin	--	--	--	--	--	--	--	--	--	0.0001	--	--	0.0010	0.1103	--	0.0093	--	--
Buffalo Sculpin	0.0014	0.1301	--	0.0010	0.0507	--	0.0005	--	--	0.0024	0.0838	--	0.0056	0.1486	--	--	--	--
California Sheephead	--	--	--	--	--	--	--	--	--	0.2562	1.6028	--	0.4005	7.6961	--	--	--	--
Red Irish Lord Sculpin	0.0011	0.0097	--	0.0015	0.0305	--	0.0020	0.0352	--	--	--	--	0.0002	0.0431	--	--	--	--

<sup>1</sup> Some listed species are under state nearshore fixed gear management, but not included in the groundfish FMP.

**Table 12a. Nearshore Fixed Gear: Fishing Mortality Estimates, North of 40° 10' N latitude.**

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 2012 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)			Applied 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>Groundfish species</b>												
Arrowtooth Flounder	--	--	--	--	--	--	--	--	--	--	0.01	0.01
Black Rockfish (South of 46°16' N. lat.)	1.21	2.06	0.07	23%	42%	90%	0.28	0.86	0.06	1.21	133.84	135.05
Cabezon (California)	0.09	--	--	7%	--	--	0.01	--	--	0.01	0.95	0.95
Cabezon (Oregon)	0.50	0.36	0.00	7%	7%	7%	0.03	0.02	0.00	0.06	19.81	19.87
Canary Rockfish	0.81	2.15	0.28	32%	54%	100%	0.26	1.16	0.28	1.70	0.00	1.70
Darkblotched Rockfish	--	--	--	--	--	--	--	--	--	--	0.01	0.01
Lingcod (North of 40°10' N. lat.)	27.07	38.42	1.72	7%	7%	7%	1.89	2.69	0.12	4.70	48.85	53.55
Longnose Skate	--	--	--	--	--	--	--	--	--	--	0.06	0.06
Minor nearshore rockfish (North of 40°10' N. lat.)												
Black and Yellow Rockfish	--	--	--	--	--	--	--	--	--	--	0.05	0.05
Blue Rockfish	1.26	3.25	0.21	29%	49%	100%	0.36	1.59	0.21	2.17	7.20	9.37
Brown Rockfish	--	--	--	--	--	--	--	--	--	--	0.07	0.07
China Rockfish	0.04	0.22	0.00	24%	48%	100%	0.01	0.11	0.00	0.12	7.20	7.32
Copper Rockfish	0.00	--	--	24%	--	--	0.00	--	--	0.00	1.50	1.50
Gopher Rockfish	--	--	--	--	--	--	--	--	--	--	0.05	0.05
Grass Rockfish	--	--	--	--	--	--	--	--	--	--	0.26	0.26
Nearshore Rockfish Unid	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Olive Rockfish	0.03	--	--	24%	--	--	0.01	--	--	0.01	0.01	0.01
Quillback Rockfish	0.01	0.05	0.01	24%	48%	100%	0.00	0.03	0.01	0.04	2.59	2.63
Minor shelf rockfish (North of 40°10' N. lat.)												
Bocaccio Rockfish	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Rockfish Unid	0.14	0.02	--	100%	100%	--	0.14	0.02	--	0.16	--	0.16
Rosy Rockfish	--	--	0.03	--	--	100%	--	--	0.03	0.03	0.00	0.03
Shelf Rockfish Unid	--	--	--	--	--	--	--	--	--	--	0.01	0.01
Tiger Rockfish	--	0.01	--	--	50%	--	--	0.01	--	0.01	0.63	0.63
Vermilion Rockfish	0.03	0.12	--	10%	55%	--	0.00	0.07	--	0.07	3.79	3.86
Minor slope rockfish (North of 40°10' N. lat.)												
Aurora Rockfish	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Bank Rockfish	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Blackgill Rockfish	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Redbanded Rockfish	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Rougheye Rockfish	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Splitnose Rockfish	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Other flatfish												
Butter Sole	--	0.00	--	--	7%	--	--	0.00	--	0.00	--	0.00
Sand Sole	0.00	--	--	7%	--	--	0.00	--	--	0.00	--	0.00
Other groundfish												
Kelp Greenling	1.16	2.38	0.02	7%	7%	7%	0.08	0.17	0.00	0.25	22.58	22.83
Sablefish (North of 36° N. lat.)	--	--	--	--	--	--	--	--	--	--	0.55	0.55
Spiny Dogfish	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Starry Flounder	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Widow Rockfish	--	0.01	0.01	--	54%	100%	--	0.00	0.01	0.02	0.06	0.08
Yelloweye Rockfish	0.77	2.80	0.77	32%	56%	100%	0.25	1.57	0.77	2.58	--	2.58
Yellowtail Rockfish (North of 40°10' N. lat.)	0.23	0.39	0.03	100%	100%	100%	0.23	0.39	0.03	0.66	1.10	1.76
<b>Non-groundfish species</b>												
Dungeness Crab	0.02	--	--	100%	--	--	0.02	--	--	0.02	5.24	5.26
Other nongroundfish <sup>1</sup>												
Buffalo Sculpin	0.14	0.13	0.00	100%	100%	100%	0.14	0.13	0.00	0.28	--	0.28
Red Irish Lord Sculpin	0.11	0.20	0.02	100%	100%	100%	0.11	0.20	0.02	0.34	--	0.34

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

<sup>1</sup> Some listed species are under state nearshore fixed gear management, but not included in the groundfish FMP.

**Table 12b. Nearshore Fixed Gear: Fishing Mortality Estimates, South of 40° 10' N latitude.**

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 2012 commercial nearshore fixed gear fishery south of 40° 10' N latitude. The California state-permit framework is also represented.

Nearshore Fixed Gear Fishery South of 40° 10' N lat	Gross estimated discard (mt) by depth (fm)			Discard mortality rate $\pm$ 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>Groundfish species</b>												
Black Rockfish (South of 46°16' N. lat.)	0.98	0.32	0.04	23%	42%	90%	0.23	0.14	0.04	0.40	7.61	8.01
Bocaccio Rockfish (South of 40°10' N. lat.)	--	--	--	0%	0%	0%	--	--	--	--	0.96	0.96
Cabezon (California)	1.37	1.11	--	7%	7%	0%	0.10	0.08	--	0.17	27.86	28.03
California Scorpionfish (South of 34°27' N. lat.)	0.02	--	--	7%	0%	0%	0.00	--	--	0.00	1.72	1.72
Canary Rockfish	0.19	5.50	5.77	32%	54%	100%	0.06	2.97	5.77	8.80	--	8.80
Chilipepper Rockfish (South of 40°10' N. lat.)	--	--	--	0%	0%	0%	--	--	--	--	0.11	0.11
<b>Deeper nearshore rockfish</b>												
Blue Rockfish	0.51	0.11	0.04	29%	49%	100%	0.15	0.05	0.04	0.24	3.32	3.56
Brown Rockfish	1.05	1.00	0.01	23%	48%	100%	0.24	0.48	0.01	0.73	27.92	28.65
Calico Rockfish	0.01	0.02	--	23%	48%	0%	0.00	0.01	--	0.01	--	0.01
Copper Rockfish	0.14	0.05	0.01	23%	48%	100%	0.03	0.02	0.01	0.06	6.14	6.20
Nearshore Rockfish Unid	--	--	--	0%	0%	0%	--	--	--	--	0.02	0.02
Olive Rockfish	0.02	0.25	0.07	23%	48%	100%	0.00	0.12	0.07	0.20	1.21	1.40
Quillback Rockfish	--	--	--	0%	0%	0%	--	--	--	--	0.18	0.18
Treefish Rockfish	0.42	0.15	--	23%	48%	0%	0.10	0.07	--	0.17	1.22	1.39
Dover Sole	--	--	--	0%	0%	0%	--	--	--	--	0.00	0.00
Lingcod (South of 40°10' N. lat.)	5.17	9.43	3.42	7%	7%	7%	0.36	0.66	0.24	1.26	25.23	26.49
Longnose Skate	--	--	--	0%	0%	0%	--	--	--	--	0.07	0.07
Longspine Thornyhead (North of 34°27' N. lat.)	--	--	--	0%	0%	0%	--	--	--	--	0.00	0.00
Longspine Thornyhead (South of 34°27' N. lat.)	--	--	--	0%	0%	0%	--	--	--	--	0.11	0.11
<b>Minor shelf rockfish (South of 40°10' N. lat.)</b>												
Flag Rockfish	--	--	--	0%	0%	0%	--	--	--	--	0.05	0.05
Greenblotched Rockfish	--	--	--	0%	0%	0%	--	--	--	--	0.01	0.01
Greenspotted Rockfish	--	--	--	0%	0%	0%	--	--	--	--	0.10	0.10
Greenstriped Rockfish	--	--	0.02	0%	0%	100%	--	--	0.02	0.02	--	0.02
Honeycomb Rockfish	--	--	--	0%	0%	0%	--	--	--	--	0.00	0.00
Rosethorn Rockfish	--	--	--	0%	0%	0%	--	--	--	--	0.03	0.03
Rosy Rockfish	--	0.06	0.02	0%	100%	100%	--	0.06	0.02	0.08	0.08	0.16
Shelf Rockfish Unid	--	--	--	0%	0%	0%	--	--	--	--	1.69	1.69
Speckled Rockfish	--	--	--	0%	0%	0%	--	--	--	--	0.07	0.07
Squarespot Rockfish	--	--	0.02	0%	0%	100%	--	--	0.02	0.02	0.00	0.02
Starry Rockfish	--	0.01	--	0%	100%	0%	--	0.01	--	0.01	0.13	0.14
Swordspine Rockfish	--	--	--	0%	0%	0%	--	--	--	--	0.00	0.00
Vermilion Rockfish	0.04	0.01	--	10%	55%	0%	0.00	0.00	--	0.01	10.28	10.29
Yellowtail Rockfish	--	0.02	0.02	0%	30%	75%	--	0.01	0.01	0.02	0.69	0.71
<b>Minor slope rockfish (South of 40°10' N. lat.)</b>												
Aurora Rockfish	--	--	--	0%	0%	0%	--	--	--	--	0.00	0.00
Bank Rockfish	--	--	--	0%	0%	0%	--	--	--	--	0.14	0.14
Blackgill Rockfish	--	--	--	0%	0%	0%	--	--	--	--	1.01	1.01
Slope Rockfish Unid	--	--	--	0%	0%	0%	--	--	--	--	0.00	0.00
<b>Other flatfish</b>												
Butter Sole	--	--	0.01	0%	0%	7%	--	--	0.00	0.00	--	0.00
Flatfish Unid	--	--	--	0%	0%	0%	--	--	--	--	0.02	0.02
Pacific Sanddab	0.00	0.02	0.00	7%	7%	7%	0.00	0.00	0.00	0.00	2.09	2.09
Rex Sole	--	--	--	0%	0%	0%	--	--	--	--	0.07	0.07
Rock Sole	--	--	--	0%	0%	0%	--	--	--	--	0.36	0.36
Sanddab Unid	--	--	--	0%	0%	0%	--	--	--	--	0.00	0.00
Sand Sole	--	--	--	0%	0%	0%	--	--	--	--	0.04	0.04
<b>Other groundfish</b>												
Big Skate	--	0.16	--	0%	7%	0%	--	0.01	--	0.01	0.04	0.05
California Scorpionfish	--	--	--	0%	0%	0%	--	--	--	--	0.05	0.05
California Skate	--	0.31	--	0%	7%	0%	--	0.02	--	0.02	0.00	0.02
Grenadier Unid	--	--	--	0%	0%	0%	--	--	--	--	0.09	0.09
Kelp Greenling	0.42	0.37	0.04	7%	7%	7%	0.03	0.03	0.00	0.06	4.74	4.80
Leopard Shark	--	0.04	--	0%	7%	0%	--	0.00	--	0.00	0.45	0.45

<sup>3</sup>Discard mortality rates provided by the Groundfish Management Team (GMT). Each mortality rate is applied to each gross estimated discard weight by depth.



**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			
Rockfish Unid	--	--	--	0%	0%	0%	--	--	--	--	0.47	0.47
Skate Unid	--	--	--	0%	0%	0%	--	--	--	--	0.02	0.02
Soupin Shark	--	--	--	0%	0%	0%	--	--	--	--	0.78	0.78
Sablefish (North of 36° N. lat.)	--	--	--	0%	0%	0%	--	--	--	--	0.35	0.35
Sablefish (South of 36° N. lat.)	--	--	--	0%	0%	0%	--	--	--	--	5.32	5.32
Shallow nearshore rockfish												
Black and Yellow Rockfish	0.12	0.01	--	25%	49%	0%	0.03	0.00	--	0.04	10.55	10.59
China Rockfish	0.26	0.28	1.07	25%	49%	100%	0.06	0.14	1.07	1.28	1.20	2.47
Gopher Rockfish	1.97	1.45	1.07	25%	49%	100%	0.49	0.71	1.07	2.28	22.99	25.27
Grass Rockfish	0.03	0.01	--	25%	49%	0%	0.01	0.01	--	0.01	12.42	12.43
Kelp Rockfish	0.30	0.03	--	25%	49%	0%	0.08	0.02	--	0.09	0.97	1.06
Nearshore Rockfish Unid	--	--	--	0%	0%	0%	--	--	--	--	0.00	0.00
Shortspine Thornyhead (North of 34°27' N. lat.)	--	--	--	0%	0%	0%	--	--	--	--	0.04	0.04
Shortspine Thornyhead (South of 34°27' N. lat.)	--	--	--	0%	0%	0%	--	--	--	--	0.82	0.82
Spiny Dogfish	1.00	1.23	--	50%	50%	0%	0.50	0.61	--	1.11	0.05	1.17
Splitnose Rockfish (South of 40°10' N. lat.)	--	--	--	0%	0%	0%	--	--	--	--	0.00	0.00
Starry Flounder	--	--	--	0%	0%	0%	--	--	--	--	0.10	0.10
Widow Rockfish	--	--	0.01	0%	0%	100%	--	--	0.01	0.01	0.04	0.05
Yelloweye Rockfish	--	0.18	0.03	0%	56%	100%	--	0.10	0.03	0.13	0.00	0.13
<b>Non-groundfish species</b>												
California Halibut	--	0.00	--	0%	7%	0%	--	0.00	--	0.00	0.81	0.81
Dungeness Crab	0.03	0.10	--	100%	100%	0%	0.03	0.10	--	0.13	0.89	1.02
Non-FMP skate												
Starry Skate	0.22	--	--	7%	0%	0%	0.02	--	--	0.02	--	0.02
Other nongroundfish <sup>1</sup>												
Brown Irish Lord Sculpin	0.01	0.06	0.15	100%	100%	100%	0.01	0.06	0.15	0.22	--	0.22
Buffalo Sculpin	0.26	0.34	--	100%	100%	0%	0.26	0.34	--	0.60	--	0.60
California Sheephead	27.37	24.02	--	100%	100%	0%	27.37	24.02	--	51.39	27.26	78.65
Red Irish Lord Sculpin	--	0.01	--	0%	100%	0%	--	0.01	--	0.01	--	0.01

<sup>‡</sup>Discard mortality rates provided by the Groundfish Management Team (GMT). Each mortality rate is applied to each gross estimated discard weight by depth.

<sup>1</sup> Some listed species are under state nearshore fixed gear management, but not included in the groundfish FMP.

**Table 13. Observed Sectors: Non-IFQ Fishing Mortality Estimates by Sector.**

Estimated discard (mt), landings (mt), and estimated total fishing mortality (mt) of west coast groundfish species in non-IFQ 2013 fisheries/groundfish sectors observed by the WCGOP.

Groundfish species	Weight (mt)	Open Access CA halibut			Pink shrimp			Non-nearshore fixed gear				Nearshore fixed gear		
		Discard	Landed	Estimate	Discard	Landed	Estimate	Longline Discard	Pot Discard	Landed	Estimate	Discard	Landed	Estimate
Arrowtooth Flounder	--	0.01	0.01	18.77	--	18.77	23.01	1.65	3.22	27.88	--	0.01	0.01	
Black Rockfish (South of 46°16' N. lat.)	--	--	--	--	--	--	--	--	--	--	1.60	141.46	143.06	
Bocaccio Rockfish (South of 40°10' N. lat.)	--	--	--	0.00	0.00	0.00	0.02	--	2.89	2.91	--	0.96	0.96	
Cabezon (California)	--	0.01	0.01	0.01	0.01	0.01	--	0.01	--	0.01	0.18	28.81	28.99	
Cabezon (Oregon)	--	--	--	--	--	--	--	--	--	--	0.06	19.81	19.87	
California Scorpionfish (South of 34°27' N. lat.)	--	0.00	0.00	0.80	0.80	0.80	--	--	--	--	0.00	1.72	1.72	
Canary Rockfish	--	0.00	0.00	0.11	--	0.11	0.08	--	0.92	1.00	10.50	0.00	10.50	
Chilipepper Rockfish (South of 40°10' N. lat.)	--	0.00	0.00	--	--	--	0.07	--	0.77	0.84	--	0.11	0.11	
Darkblotched Rockfish	--	--	--	3.67	--	3.67	0.58	0.03	3.38	3.99	--	0.01	0.01	
Dover Sole	0.00	--	0.00	2.62	0.25	2.88	3.49	0.50	2.30	6.29	--	0.00	0.00	
English Sole	0.42	0.14	0.56	0.02	1.10	1.13	--	--	0.04	0.04	--	--	--	
Lingcod (North of 40°10' N. lat.)	--	--	--	0.11	0.17	0.28	0.46	0.59	19.79	20.41	4.70	48.85	53.55	
50% discard mortality (Trawl)‡														
7% discard mortality (Longline)‡							0.03							
Lingcod (South of 40°10' N. lat.)	0.01	0.02	0.03	--	0.01	0.01	--	0.08	9.67	9.76	1.26	25.23	26.49	
50% discard mortality (Trawl)‡	0.01													
7% discard mortality (Longline)‡														
Longnose Skate	0.42	--	0.21	0.28	0.88	1.16	44.53	0.12	30.57	52.89	--	0.13	0.13	
50% discard mortality (Trawl)‡	0.21													
50% discard mortality (Fixed Gear)‡							22.26	0.06						
Longspine Thornyhead (North of 34°27' N. lat.)	--	--	--	--	--	--	5.29	0.00	3.40	8.69	--	0.00	0.00	
Longspine Thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	2.63	--	15.33	17.96	--	0.11	0.11	
Minor nearshore rockfish (North of 40°10' N. lat.)														
Black and Yellow Rockfish	--	--	--	--	--	--	--	--	--	--	--	0.05	0.05	
Blue Rockfish	--	--	--	--	--	--	--	--	--	--	2.17	7.20	9.37	
Brown Rockfish	--	--	--	--	--	--	--	--	--	--	--	0.07	0.07	
China Rockfish	--	--	--	--	--	--	--	--	--	--	0.12	7.20	7.32	
Copper Rockfish	--	--	--	--	--	--	--	--	--	--	0.00	1.50	1.50	
Gopher Rockfish	--	--	--	0.00	--	0.00	--	--	--	--	--	0.05	0.05	
Grass Rockfish	--	--	--	--	--	--	--	--	--	--	--	0.26	0.26	
Nearshore Rockfish Unid	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00	
Olive Rockfish	--	--	--	--	--	--	--	--	--	--	0.01	0.01	0.01	
Quillback Rockfish	--	--	--	--	--	--	--	--	--	--	0.04	2.59	2.63	
Minor nearshore rockfish (South of 40°10' N. lat.)														
Black and Yellow Rockfish	--	--	--	--	--	--	--	--	--	--	0.04	10.55	10.59	
Blue Rockfish	--	--	--	--	--	--	--	--	--	--	0.24	3.32	3.56	
Brown Rockfish	0.03	0.00	0.03	--	--	--	--	--	--	--	0.73	27.92	28.65	
Calico Rockfish	--	--	--	--	--	--	--	--	--	--	0.01	--	0.01	
China Rockfish	--	--	--	--	--	--	--	--	--	--	1.28	1.20	2.47	
Copper Rockfish	--	0.01	0.01	0.09	0.09	0.09	0.08	0.05	--	0.13	0.06	6.14	6.20	
Gopher Rockfish	--	--	--	--	--	--	--	0.02	--	0.02	2.28	22.99	25.27	
Grass Rockfish	--	--	--	--	--	--	--	--	--	--	0.01	12.42	12.43	
Kelp Rockfish	--	--	--	--	--	--	--	--	--	--	0.09	0.97	1.06	
Nearshore Rockfish Unid	--	0.00	0.00	--	0.02	0.02	--	--	--	--	--	0.00	0.00	
Nearshore Rockfish Unid	--	0.00	0.00	--	0.02	0.02	--	--	--	--	--	0.02	0.02	
Olive Rockfish	--	--	--	--	--	--	--	--	--	--	0.20	1.21	1.40	
Quillback Rockfish	--	--	--	--	--	--	--	--	--	--	--	0.18	0.18	
Treefish Rockfish	--	--	--	--	--	--	--	0.03	--	0.03	0.17	1.22	1.39	
Minor shelf rockfish (North of 40°10' N. lat.)														
Bocaccio Rockfish	--	--	--	--	--	--	--	--	0.07	0.07	--	0.00	0.00	
Chilipepper Rockfish	--	--	--	0.23	--	0.23	--	--	0.00	0.00	--	--	--	
Cowcod Rockfish	--	--	--	--	--	--	0.03	--	--	0.03	--	--	--	
Greenspotted Rockfish	--	--	--	--	--	--	--	--	0.00	0.00	--	--	--	
Greenstriped Rockfish	--	--	--	0.44	--	0.44	0.11	0.01	0.27	0.39	--	--	--	
Halfbanded Rockfish	--	--	--	0.00	--	0.00	--	--	--	--	--	--	--	
Harlequin Rockfish	--	--	--	0.00	--	0.00	--	--	--	--	--	--	--	
Redstripe Rockfish	--	--	--	--	--	--	--	0.00	--	0.00	--	--	--	
Rockfish Unid	--	--	--	0.47	--	0.47	--	0.00	--	0.00	0.16	--	0.16	
Rosethorn Rockfish	--	--	--	--	--	--	0.47	0.02	0.06	0.55	--	--	--	
Rosy Rockfish	--	--	--	--	--	--	0.02	--	--	0.02	0.03	0.00	0.03	
Shelf Rockfish Unid	--	--	--	--	--	--	--	--	0.38	0.38	--	0.01	0.01	
Silvergray Rockfish	--	--	--	--	--	--	0.02	--	0.35	0.37	--	--	--	
Stripetail Rockfish	--	--	--	0.30	--	0.30	--	--	--	--	--	--	--	

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

**Table 13 (continued).**

Weight (mt)	Open Access CA halibut			Pink shrimp			Non-nearshore fixed gear				Nearshore fixed gear		
	Discard	Landed	Estimate	Discard	Landed	Estimate	Longline Discard	Pot Discard	Landed	Estimate	Discard	Landed	Estimate
Tiger Rockfish	--	--	--	0.00	--	0.00	--	--	0.00	0.00	0.01	0.63	0.63
Vermilion Rockfish	--	--	--	0.00	--	0.00	--	--	0.03	0.03	0.07	3.79	3.86
Minor shelf rockfish (South of 40°10' N. lat.)													
Flag Rockfish	--	0.00	0.00	--	--	--	0.22	--	0.22	0.44	--	0.05	0.05
Greenblotched Rockfish	--	--	--	--	--	--	--	--	0.05	0.05	--	0.01	0.01
Greenspotted Rockfish	--	--	--	--	--	--	0.07	--	1.42	1.49	--	0.10	0.10
Greenstriped Rockfish	--	--	--	--	--	--	--	--	0.04	0.04	0.02	--	0.02
Honeycomb Rockfish	--	--	--	--	--	--	--	--	0.02	0.02	--	0.00	0.00
Mexican Rockfish	--	--	--	--	--	--	--	--	0.03	0.03	--	--	--
Pink Rockfish	--	--	--	--	--	--	--	--	0.00	0.00	--	--	--
Pinkrose Rockfish	--	--	--	--	--	--	--	--	0.05	0.05	--	--	--
Rosethorn Rockfish	--	--	--	--	--	--	--	--	0.00	0.00	--	0.03	0.03
Rosy Rockfish	--	--	--	--	--	--	--	--	0.17	0.17	0.08	0.08	0.16
Shelf Rockfish Unid	--	--	--	--	0.02	0.02	--	--	0.18	0.18	--	1.69	1.69
Speckled Rockfish	--	--	--	--	--	--	0.03	--	0.13	0.16	--	0.07	0.07
Squarespot Rockfish	--	--	--	--	--	--	0.01	--	0.06	0.06	0.02	0.00	0.02
Stary Rockfish	--	0.00	0.00	--	--	--	0.10	--	0.58	0.68	0.01	0.13	0.14
Stripetail Rockfish	--	--	--	--	--	--	--	--	0.00	0.00	--	--	--
Swordspine Rockfish	--	--	--	--	--	--	--	--	0.00	0.00	--	0.00	0.00
Vermilion Rockfish	--	0.00	0.00	--	0.04	0.04	1.19	--	9.81	11.01	0.01	10.28	10.29
Yellowtail Rockfish	--	--	--	--	--	--	--	--	2.57	2.57	0.02	0.69	0.71
Minor slope rockfish (North of 40°10' N. lat.)													
Aurora Rockfish	--	--	--	--	--	--	0.02	0.01	0.01	0.05	--	0.00	0.00
Bank Rockfish	--	--	--	--	--	--	--	--	0.28	0.28	--	0.00	0.00
Blackgill Rockfish	--	--	--	--	--	--	1.47	0.21	0.74	2.42	--	0.00	0.00
Blackspotted Rockfish	--	--	--	--	--	--	--	--	0.20	0.20	--	--	--
Redbanded Rockfish	--	--	--	0.03	--	0.03	3.84	0.12	10.00	13.96	--	0.00	0.00
Rougheye Rockfish	--	--	--	--	--	--	12.63	--	37.59	50.22	--	0.00	0.00
Sharpchin Rockfish	--	--	--	0.06	--	0.06	--	0.01	0.00	0.01	--	--	--
Shortraker Rockfish	--	--	--	--	--	--	1.06	--	1.82	2.89	--	--	--
Shortraker/Rougheye Rockfish	--	--	--	--	--	--	5.68	--	--	5.68	--	--	--
Slope Rockfish Unid	--	--	--	--	0.35	0.35	--	--	3.15	3.15	--	--	--
Splitnose Rockfish	--	--	--	0.49	--	0.49	0.01	--	0.06	0.08	--	0.00	0.00
Yellowmouth Rockfish	--	--	--	--	--	--	--	--	0.48	0.48	--	--	--
Minor slope rockfish (South of 40°10' N. lat.)													
Aurora Rockfish	--	--	--	--	--	--	0.02	--	0.13	0.14	--	0.00	0.00
Bank Rockfish	--	--	--	--	--	--	--	--	0.04	0.04	--	0.14	0.14
Blackgill Rockfish	--	--	--	--	--	--	0.55	0.05	16.45	17.05	--	1.01	1.01
Pacific Ocean Perch	--	--	--	--	--	--	--	--	0.00	0.00	--	--	--
Redbanded Rockfish	--	--	--	--	--	--	0.01	0.14	0.00	0.15	--	--	--
Rougheye Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--
Slope Rockfish Unid	--	--	--	--	0.02	0.02	--	--	3.63	3.63	--	0.00	0.00
Mixed thornyheads													
Shortspine/Longspine Thornyhead	--	--	--	--	--	--	--	--	0.05	0.05	--	--	--
Other flatfish													
Butter Sole	--	0.04	0.04	--	--	--	--	--	0.00	0.00	0.00	--	0.00
Curfin Turbot	1.12	0.01	1.14	--	--	--	--	--	--	--	--	--	--
Flatfish Unid	--	0.15	0.15	3.58	15.56	19.15	--	--	0.21	0.21	--	0.02	0.02
Flathead Sole	--	--	--	1.04	--	1.04	--	--	--	--	--	--	--
Pacific Sanddab	1.06	0.07	1.13	3.82	--	3.82	0.01	--	2.24	2.25	0.00	2.09	2.09
Rex Sole	--	--	--	19.93	2.01	21.94	0.00	--	0.15	0.15	--	0.07	0.07
Rock Sole	0.01	0.13	0.14	0.11	0.48	0.59	--	--	0.13	0.13	--	0.36	0.36
Sanddab Unid	--	0.08	0.08	--	0.04	0.04	--	--	2.59	2.59	--	0.00	0.00
Sand Sole	0.45	7.79	8.24	--	0.02	0.02	--	--	0.00	0.00	0.00	0.04	0.04
Other groundfish													
Big Skate	42.52	--	42.52	0.00	--	0.00	5.32	--	0.02	5.34	0.01	0.04	0.05
California Scorpionfish	--	--	--	--	--	--	--	--	--	--	--	0.05	0.05
California Skate	5.50	--	5.50	--	--	--	--	--	0.01	0.01	0.02	0.00	0.02
Grenadier Unid	--	--	--	--	--	--	--	--	39.36	39.36	--	0.09	0.09
Kelp Greenling	0.00	--	0.00	0.00	--	0.00	--	--	--	--	0.31	27.33	27.63
Leopard Shark	1.28	0.29	1.57	--	0.01	0.01	--	--	0.03	0.03	0.00	0.45	0.45
Pacific Flatnose	--	--	--	--	--	--	5.85	--	--	5.85	--	--	--
Pacific Grenadier	--	--	--	--	--	--	173.87	0.03	--	173.90	--	--	--
Rockfish Unid	--	--	--	--	0.03	0.03	--	--	0.53	0.53	--	0.47	0.47
Skate Unid	--	0.34	0.34	--	4.02	4.02	0.10	--	89.57	89.67	--	0.02	0.02
Soupin Shark	--	0.09	0.09	--	0.04	0.04	--	--	0.07	0.07	--	0.78	0.78
Spotted Ratfish	--	--	--	0.27	--	0.27	2.85	0.03	0.00	2.89	--	--	--

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

**Table 13 (continued).**

Weight (mt)	Open Access CA halibut			Pink shrimp			Non-nearshore fixed gear				Nearshore fixed gear		
	Discard	Landed	Estimate	Discard	Landed	Estimate	Longline Discard	Pot Discard	Landed	Estimate	Discard	Landed	Estimate
Pacific Cod	0.00	--	0.00	0.00	--	0.00	0.09	--	1.84	1.93	--	--	--
Pacific Hake	0.00	--	0.00	29.86	--	29.86	0.42	--	0.03	0.44	--	--	--
Pacific Ocean Perch (North of 40°10' N. lat.)	--	--	--	0.24	--	0.24	0.03	--	0.23	0.26	--	--	--
Petrale Sole	--	0.41	0.41	1.33	0.27	1.61	0.98	--	0.70	1.68	--	--	--
Sablefish (North of 36° N. lat.)	0.00	--	0.00	0.06	8.02	8.08	199.27	144.14	1,284.87	1,353.55	--	0.90	0.90
50% discard mortality (Trawl)‡	0.00	--	--	--	--	--	--	--	--	--	--	--	--
20% discard mortality (Fixed Gear)‡	--	--	--	--	--	--	39.85	28.83	--	--	--	--	--
Sablefish (South of 36° N. lat.)	--	--	--	--	--	--	31.85	--	513.05	519.42	--	5.32	5.32
50% discard mortality (Trawl)‡	--	--	--	--	--	--	--	--	--	--	--	--	--
20% discard mortality (Fixed Gear)‡	--	--	--	--	--	--	6.37	--	--	--	--	--	--
Shortbelly Rockfish	--	--	--	3.49	--	3.49	--	--	--	--	--	--	--
Shortspine Thornyhead (North of 34°27' N. lat.)	--	--	--	0.08	0.17	0.25	7.37	0.01	51.46	58.84	--	0.04	0.04
Shortspine Thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	12.22	--	96.10	108.31	--	0.82	0.82
Spiny Dogfish	5.81	--	5.81	0.02	0.01	0.03	157.00	0.36	46.18	125.04	1.11	0.06	1.17
50% discard mortality (Longline)‡	--	--	--	--	--	--	78.50	--	--	--	--	--	--
Splitnose Rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	--	0.05	0.05	--	0.00	0.00
Starry Flounder	0.76	2.66	3.42	--	0.00	0.00	--	--	0.25	0.25	--	0.10	0.10
Widow Rockfish	--	--	--	--	--	--	--	--	0.78	0.78	0.02	0.11	0.13
Yelloweye Rockfish	--	--	--	--	--	--	0.27	--	--	0.27	2.71	0.00	2.71
Yellowtail Rockfish	--	--	--	0.01	--	0.01	0.03	--	0.30	0.33	0.66	1.10	1.76
<b>Non-groundfish species</b>													
California Halibut	0.82	68.82	69.64	--	8.02	8.02	--	--	0.47	0.47	0.00	0.81	0.81
Dungeness Crab	181.90	--	181.90	0.01	0.03	0.04	--	--	0.40	0.40	0.15	6.13	6.29
Non-FMP flatfish													
Deepsea Sole	--	--	--	--	--	--	0.05	0.02	--	0.07	--	--	--
Diamond Turbot	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--
Hornyhead Turbot	0.01	0.30	0.32	--	3.08	3.08	--	--	--	--	--	--	--
Slender Sole	--	--	--	96.76	--	96.76	--	--	--	--	--	--	--
Non-FMP skate													
Aleutian Skate	--	--	--	0.00	--	0.00	0.18	--	--	0.18	--	--	--
Black Skate	--	--	--	--	--	--	9.82	--	--	9.82	--	--	--
Deepsea Skate	--	--	--	--	--	--	0.20	--	--	0.20	--	--	--
Pacific Electric Ray	0.39	--	0.39	--	--	--	--	--	--	--	--	--	--
Sandpaper Skate	--	--	--	0.02	--	0.02	0.45	--	--	0.45	--	--	--
Starry Skate	0.02	--	0.02	--	--	--	--	--	--	--	0.02	--	0.02
Thornback Skate	1.26	--	1.26	--	--	--	--	--	--	--	--	--	--

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

**Table 14. Incidental Landings.**

Incidental landings (mt) of groundfish from shoreside commercial fisheries and exempted fishing permits in 2013 by gear group. Gear groups are as follows: HKL (hook-and-lines), MSC (miscellaneous), NET (nets), POT (pots), TLS (troll), TWL (trawl), TWS (shrimp trawls).

	Shoreside Commercial Landings (mt)							Incidental fisheries estimate
	Other Fisheries By Gear Group							
	HKL	MSC	NET	POT	TLS	TWL	TWS	
<b>Groundfish species</b>								
Arrowtooth Flounder	0.67	--	0.02	--	--	0.14	--	0.83
Black Rockfish (South of 46°16' N. lat.)	--	--	--	--	0.62	--	--	0.62
Bocaccio Rockfish (South of 40°10' N. lat.)	0.01	--	--	--	0.02	0.00	--	0.04
Cabazon (California)	--	0.01	0.00	--	0.00	--	--	0.01
California Scorpionfish (South of 34°27' N. lat.)	--	0.00	0.14	--	--	--	--	0.14
Canary Rockfish	--	--	--	--	0.11	0.10	--	0.21
Chilipepper Rockfish (South of 40°10' N. lat.)	--	--	--	--	0.00	--	--	0.00
Darkblotched Rockfish	0.00	--	0.01	--	--	0.46	--	0.48
Dover Sole	0.05	--	0.01	--	--	2.32	--	2.37
English Sole	--	--	0.02	--	--	0.19	--	0.21
Lingcod (North of 40°10' N. lat.)	1.43	--	--	0.10	1.74	0.31	--	3.58
Lingcod (South of 40°10' N. lat.)	0.63	0.02	0.03	0.04	0.65	0.01	--	1.38
Longnose Skate	2.06	--	0.10	--	--	0.73	--	2.89
Longspine Thornyhead (North of 34°27' N. lat.)	0.00	--	--	--	--	1.00	--	1.00
Minor nearshore rockfish (North of 40°10' N. lat.)								
Blue Rockfish	--	--	--	--	0.04	--	--	0.04
Quillback Rockfish	0.00	--	--	--	0.01	--	--	0.01
Minor nearshore rockfish (South of 40°10' N. lat.)								
Black and Yellow Rockfish	--	0.03	--	--	--	--	--	0.03
Blue Rockfish	--	--	0.00	--	0.01	--	--	0.01
Brown Rockfish	--	--	--	--	0.01	0.00	--	0.01
China Rockfish	--	0.00	--	--	--	--	--	0.00
Copper Rockfish	--	0.00	0.01	--	0.00	0.11	0.01	0.14
Gopher Rockfish	--	0.00	--	--	--	--	--	0.00
Grass Rockfish	--	--	0.00	--	0.02	--	--	0.02
Kelp Rockfish	--	0.00	--	--	--	--	--	0.00
Nearshore Rockfish Unid	--	--	--	--	0.01	0.00	--	0.01
Olive Rockfish	--	--	0.00	--	0.00	--	--	0.00
Minor shelf rockfish (North of 40°10' N. lat.)								
Chilipepper Rockfish	0.00	--	--	--	--	0.00	--	0.00
Greenspotted Rockfish	0.02	--	--	--	--	--	--	0.02
Greenstriped Rockfish	0.05	--	--	--	--	--	--	0.05
Rosethorn Rockfish	0.00	--	--	--	--	0.22	--	0.22
Shelf Rockfish Unid	--	--	--	--	0.02	--	--	0.02
Vermilion Rockfish	--	--	--	--	0.03	--	--	0.03
Minor shelf rockfish (South of 40°10' N. lat.)								
Flag Rockfish	--	--	--	--	--	0.00	--	0.00
Greenspotted Rockfish	0.00	--	--	--	--	--	--	0.00
Shelf Rockfish Unid	--	--	--	--	0.02	0.00	--	0.02
Stary Rockfish	0.00	--	--	--	--	0.00	--	0.00
Vermilion Rockfish	0.16	1.13	--	--	0.21	0.02	--	1.52
Yellowtail Rockfish	0.02	--	--	0.00	0.33	--	--	0.36
Minor slope rockfish (North of 40°10' N. lat.)								
Aurora Rockfish	0.00	--	--	--	--	0.09	--	0.09
Bank Rockfish	0.00	--	--	--	--	0.00	--	0.00
Blackgill Rockfish	0.01	--	--	--	--	0.08	--	0.09
Blackspotted Rockfish	0.00	--	--	--	--	--	--	0.00
Redbanded Rockfish	0.05	--	--	0.01	--	0.00	--	0.07

**Table 14 (continued).**

	Shoreside Commercial Landings (mt)							Incidental fisheries estimate
	Other Fisheries By Gear Group							
	HKL	MSC	NET	POT	TLS	TWL	TWS	
Rougeye Rockfish	0.31	--	--	--	--	0.27	--	0.58
Sharpchin Rockfish	--	--	--	--	--	0.00	--	0.00
Shortraker Rockfish	0.01	--	--	--	--	0.11	--	0.12
Slope Rockfish Unid	0.01	--	0.04	--	0.00	--	--	0.05
Splitnose Rockfish	0.00	--	--	--	--	0.00	--	0.00
Yellowmouth Rockfish	0.00	--	--	--	--	--	--	0.00
Minor slope rockfish (South of 40°10' N. lat.)								
Bank Rockfish	--	--	8.11	--	--	--	--	8.11
Blackgill Rockfish	--	--	0.11	--	0.00	--	--	0.11
Redbanded Rockfish	--	--	0.01	--	--	--	--	0.01
Slope Rockfish Unid	--	--	--	--	0.02	--	--	0.02
Other flatfish								
Flatfish Unid	0.00	0.23	0.02	--	--	0.13	--	0.39
Pacific Sanddab	0.02	--	0.03	--	0.00	--	--	0.05
Rex Sole	--	--	0.01	--	--	0.94	--	0.95
Rock Sole	0.00	0.92	--	--	--	0.06	--	0.99
Sanddab Unid	0.10	--	0.02	0.00	0.49	0.01	--	0.62
Sand Sole	0.03	--	0.00	--	--	3.30	--	3.33
Other groundfish								
Kelp Greenling	--	0.00	--	--	0.01	--	--	0.01
Leopard Shark	0.02	--	0.19	--	--	--	--	0.21
Rockfish Unid	--	--	--	--	0.03	0.00	--	0.03
Skate Unid	0.25	--	1.53	--	--	0.35	--	2.13
Soupin Shark	0.02	--	0.18	--	0.01	0.01	--	0.23
Pacific Cod	0.01	--	0.03	--	--	0.02	--	0.06
Pacific Hake	--	--	0.01	--	--	--	--	0.01
Pacific Ocean Perch (North of 40°10' N. lat.)	0.00	--	--	--	--	0.26	--	0.27
Petrale Sole	0.04	--	0.15	--	--	0.52	--	0.71
Sablefish (North of 36° N. lat.)	11.33	--	2.39	--	0.33	0.75	--	14.79
Sablefish (South of 36° N. lat.)	--	--	0.04	--	0.22	--	--	0.27
Shortspine Thornyhead (North of 34°27' N. lat.)	0.05	--	0.01	--	0.02	0.64	--	0.72
Shortspine Thornyhead (South of 34°27' N. lat.)	--	--	--	--	0.02	--	--	0.02
Spiny Dogfish	0.16	--	0.03	--	0.28	--	--	0.47
Splitnose Rockfish (South of 40°10' N. lat.)	--	--	0.02	--	--	--	--	0.02
Starry Flounder	0.10	--	0.00	0.00	--	0.92	--	1.02
Widow Rockfish	--	--	--	--	0.06	0.01	--	0.07
Yelloweye Rockfish	0.04	--	--	--	--	0.06	--	0.10
Yellowtail Rockfish (North of 40°10' N. lat.)	--	--	0.00	--	1.50	0.02	--	1.53
<b>Non-groundfish species</b>								
California Halibut	50.94	0.57	20.75	0.10	1.47	0.94	--	74.78
California Sheephead	--	0.04	0.09	0.02	--	--	--	--
Dungeness Crab	--	3.62	2.08	33,167.21	1.82	--	--	33,174.73
Non-FMP flatfish								
Diamond Turbot	--	--	--	--	--	0.01	--	0.01
Hornyhead Turbot	--	--	--	--	--	0.12	--	0.12
Longfin Sanddab	0.01	--	--	--	--	--	--	0.01

**Table 15. Fishing Mortality Estimates by Sector.**

Estimated fishing mortality (mt) of west coast groundfish species and a subset of non-groundfish bycatch species in 2013 by sector or fishery.

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	WA			OR	CA			
	Non-tribal at-sea hake	Non-tribal shoreside hake	Non-hake IFQ trawl	Non-hake IFQ fixed gear													
<b>Groundfish species</b>																	
Arrowtooth Flounder	14.53	5.46	2,426.49	2.45	27.88	0.01	0.01	18.77	0.83	2.48	--	--	0.01	0.03	10.97	2,509.93	
Black Rockfish (North of 46°16' N. lat.)	--	0.00	0.07	--	--	--	--	--	--	--	--	252.00	--	--	0.02	252.10	
Black Rockfish (South of 46°16' N. lat.)	--	--	0.01	--	--	143.06	--	--	0.62	--	--	--	338.52	362.62	0.02	844.84	
Bocaccio Rockfish (South of 40°10' N. lat.)	--	--	12.27	--	2.91	0.96	--	0.00	0.04	--	--	--	--	130.84	2.03	149.05	
Cabazon (California)	--	--	--	--	0.01	28.99	0.01	0.01	0.01	--	--	--	--	39.27	--	68.31	
Cabazon (Oregon)	--	--	0.00	--	--	19.87	--	--	--	--	--	--	14.40	--	0.00	34.27	
California Scorpionfish (South of 34°27' N. lat.)	--	--	--	--	--	1.72	0.00	0.80	0.14	--	--	--	--	112.00	0.18	114.85	
Canary Rockfish	0.66	3.36	6.84	--	1.00	10.50	0.00	0.11	0.21	3.40	--	0.62	3.20	12.52	0.70	43.11	
Chilipepper Rockfish (South of 40°10' N. lat.)	--	--	392.88	--	0.84	0.11	0.00	--	0.00	--	--	--	--	7.26	2.99	404.08	
Cowcod Rockfish (South of 40°10' N. lat.)	--	--	0.19	--	--	--	--	--	--	--	--	--	--	1.52	0.18	1.89	
Darkblotched Rockfish	6.33	3.25	112.78	0.00	3.99	0.01	--	3.67	0.48	0.02	--	--	--	--	2.45	132.98	
Dover Sole	1.10	0.13	7,953.72	1.44	6.29	0.00	0.00	2.88	2.37	91.54	--	--	0.01	--	21.42	8,080.91	
English Sole	0.01	0.03	220.39	0.00	0.04	--	0.56	1.13	0.21	132.62	--	--	--	0.01	2.39	357.40	
Lingcod (North of 40°10' N. lat.)	1.51	8.43	319.56	2.84	20.41	53.55	--	0.28	3.58	61.04	--	107.95	226.99	51.72	2.66	860.51	
Lingcod (South of 40°10' N. lat.)	--	--	13.71	0.00	9.76	26.49	0.03	0.01	1.38	--	--	--	--	381.27	0.83	433.48	
Longnose Skate	0.28	0.10	919.11	1.60	52.89	0.13	0.21	1.16	2.89	2.94	--	--	--	--	7.57	988.88	
Longspine Thornyhead (North of 34°27' N. lat.)	0.00	0.00	1,056.04	0.12	8.69	0.00	--	--	1.00	0.16	--	--	--	--	10.52	1,076.54	
Longspine Thornyhead (South of 34°27' N. lat.)	--	--	--	0.29	17.96	0.11	--	--	--	--	--	--	--	--	0.40	18.76	
Minor nearshore rockfish (North of 40°10' N. lat.)																	
Black and Yellow Rockfish	--	--	--	--	--	0.05	--	--	--	--	--	--	--	0.22	--	0.27	
Blue Rockfish	--	--	0.00	--	--	9.37	--	--	0.04	--	--	0.80	23.96	2.33	0.01	36.51	
Brown Rockfish	--	--	0.04	--	--	0.07	--	--	--	--	--	--	0.06	0.94	--	1.11	
China Rockfish	--	--	--	--	--	7.32	--	--	--	--	--	3.10	3.74	1.23	--	15.39	
Copper Rockfish	--	--	0.00	--	--	1.50	--	--	--	--	--	1.20	4.33	2.34	0.03	9.41	
Gopher Rockfish	--	--	--	--	--	0.05	--	0.00	--	--	--	--	--	0.04	0.00	0.09	
Grass Rockfish	--	--	--	--	--	0.26	--	--	--	--	--	--	0.01	0.21	--	0.48	
Nearshore Rockfish Unid	--	--	0.04	--	--	0.00	--	--	--	0.00	--	--	--	--	--	0.04	
Olive Rockfish	--	--	--	--	--	0.01	--	--	--	--	--	--	0.06	0.05	--	0.12	
Quillback Rockfish	--	--	0.10	--	--	2.63	--	--	0.01	--	--	1.10	5.98	1.92	0.01	11.74	
Rockfish Unid	--	--	0.02	--	--	--	--	--	--	--	--	--	--	--	--	0.02	
Minor nearshore rockfish (South of 40°10' N. lat.)																	
Black and Yellow Rockfish	--	--	--	--	--	10.59	--	--	0.03	--	--	--	--	5.58	--	16.20	
Blue Rockfish	--	--	--	--	--	3.56	--	--	0.01	--	--	--	--	103.88	0.17	107.62	

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	WA			OR	CA			
	Non-tribal at-sea hake	Non-tribal shoreside hake	Non-hake IFQ trawl	Non-hake IFQ fixed gear													
Brown Rockfish	--	--	0.07	--	--	28.65	0.03	--	0.01	--	--	--	--	80.72	0.03	109.52	
Calico Rockfish	--	--	--	--	--	0.01	--	--	--	--	--	--	--	0.93	0.00	0.95	
China Rockfish	--	--	--	--	--	2.47	--	--	0.00	--	--	--	--	8.81	0.01	11.29	
Copper Rockfish	--	--	--	--	0.13	6.20	0.01	0.09	0.14	--	--	--	--	96.49	0.13	103.18	
Gopher Rockfish	--	--	--	--	0.02	25.27	--	--	0.00	--	--	--	--	41.19	0.00	66.47	
Grass Rockfish	--	--	--	--	--	12.43	--	--	0.02	--	--	--	--	9.57	--	22.02	
Kelp Rockfish	--	--	--	--	--	1.06	--	--	0.00	--	--	--	--	19.17	--	20.23	
Nearshore Rockfish Unid	--	--	--	--	--	0.02	0.00	0.02	0.01	--	--	--	--	--	--	0.05	
Olive Rockfish	--	--	0.00	--	--	1.40	--	--	0.00	--	--	--	--	20.30	0.09	21.80	
Quillback Rockfish	--	--	--	--	--	0.18	--	--	--	--	--	--	--	0.95	0.01	1.14	
Treefish Rockfish	--	--	--	--	0.03	1.39	--	--	--	--	--	--	--	13.09	--	14.51	
Minor shelf rockfish (North of 40°10' N. lat.)																	
Bocaccio Rockfish	0.40	0.51	0.35	--	0.07	0.00	--	--	--	0.53	--	1.60	0.06	0.00	0.03	3.55	
Chilipepper Rockfish	0.00	0.01	3.11	--	0.00	--	--	0.23	0.00	--	--	--	--	--	1.57	4.93	
Cowcod Rockfish	--	--	0.00	--	0.03	--	--	--	--	--	--	--	--	--	--	0.03	
Flag Rockfish	--	--	0.00	--	--	--	--	--	--	--	--	--	--	--	0.01	0.01	
Greenspotted Rockfish	--	--	0.04	--	0.00	--	--	--	0.02	--	--	--	0.03	--	0.05	0.14	
Greenstriped Rockfish	0.00	0.21	15.63	0.00	0.39	--	--	0.44	0.05	0.10	--	--	0.03	--	1.35	18.19	
Halfbanded Rockfish	--	--	--	--	--	--	--	0.00	--	--	--	--	--	--	--	0.00	
Harlequin Rockfish	0.00	--	--	--	--	--	--	0.00	--	--	--	--	--	--	--	0.00	
Pinkrose Rockfish	--	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--	0.00	
Pygmy Rockfish	--	--	0.00	--	--	--	--	--	--	--	--	--	--	--	1.23	1.23	
Redstripe Rockfish	0.86	0.11	1.84	--	0.00	--	--	--	--	0.05	--	--	--	--	0.89	3.76	
Rockfish Unid	--	--	0.01	--	0.00	0.16	--	0.47	--	--	--	--	--	--	--	0.63	
Rosethorn Rockfish	--	0.01	2.39	0.00	0.55	--	--	--	0.22	0.24	--	--	0.05	--	0.47	3.94	
Rosy Rockfish	--	--	0.03	--	0.02	0.03	--	--	--	--	--	--	0.01	0.00	--	0.09	
Shelf Rockfish Unid	--	0.01	0.52	0.01	0.38	0.01	--	--	0.02	7.18	--	--	--	--	--	8.13	
Silvergray Rockfish	0.13	0.59	0.74	--	0.37	--	--	--	--	1.10	--	--	--	--	0.48	3.43	
Stripetail Rockfish	0.00	--	3.28	--	--	--	--	0.30	--	--	--	--	--	--	0.92	4.50	
Tiger Rockfish	--	--	--	--	0.00	0.63	--	0.00	--	--	--	0.20	1.50	0.25	0.01	2.59	
Vermilion Rockfish	--	--	0.00	--	0.03	3.86	--	0.00	0.03	--	--	1.20	6.64	2.66	0.00	14.42	
Minor shelf rockfish (South of 40°10' N. lat.)																	
Bronzespotted Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00	
Flag Rockfish	--	--	--	--	0.44	0.05	0.00	--	0.00	--	--	--	--	14.17	0.01	14.67	

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-hake IFQ fixed gear	Non-nearshore fixed gear	Nearshore fixed gear	OA CA halibut	Pink shrimp	Incidental fisheries	WA			OR	CA			
	Non-tribal at-sea hake	Non-tribal shoreside hake	Non-hake IFQ trawl														
Greenblotched Rockfish	--	--	0.12	--	0.05	0.01	--	--	--	--	--	--	--	0.36	0.03	0.57	
Greenspotted Rockfish	--	--	0.58	--	1.49	0.10	--	--	0.00	--	--	--	--	11.09	0.29	13.56	
Greenstriped Rockfish	--	--	2.10	--	0.04	0.02	--	--	--	--	--	--	--	1.27	0.15	3.58	
Halfbanded Rockfish	--	--	0.00	--	--	--	--	--	--	--	--	--	--	3.25	3.40	6.66	
Honeycomb Rockfish	--	--	--	--	0.02	0.00	--	--	--	--	--	--	--	9.15	0.02	9.20	
Mexican Rockfish	--	--	0.10	--	0.03	--	--	--	--	--	--	--	--	--	0.01	0.14	
Pink Rockfish	--	--	0.07	--	0.00	--	--	--	--	--	--	--	--	--	0.00	0.07	
Pinkrose Rockfish	--	--	--	--	0.05	--	--	--	--	--	--	--	--	--	0.00	0.05	
Pygmy Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01	0.01	
Redstripe Rockfish	--	--	0.00	--	--	--	--	--	--	--	--	--	--	--	0.14	0.14	
Rockfish Unid	--	--	0.01	--	--	--	--	--	--	--	--	--	--	--	0.00	0.01	
Rosethorn Rockfish	--	--	0.05	0.00	0.00	0.03	--	--	--	--	--	--	--	0.02	0.00	0.10	
Rosy Rockfish	--	--	0.00	--	0.17	0.16	--	--	--	--	--	--	--	5.54	0.03	5.90	
Shelf Rockfish Unid	--	--	0.18	--	0.18	1.69	--	0.02	0.02	--	--	--	--	--	--	2.09	
Silvergray Rockfish	--	--	0.04	--	--	--	--	--	--	--	--	--	--	--	--	0.04	
Speckled Rockfish	--	--	--	--	0.16	0.07	--	--	--	--	--	--	--	15.51	0.18	15.92	
Squarespot Rockfish	--	--	--	--	0.06	0.02	--	--	--	--	--	--	--	16.56	0.52	17.17	
Starry Rockfish	--	--	--	--	0.68	0.14	0.00	--	0.00	--	--	--	--	23.98	0.07	24.87	
Stripetail Rockfish	--	--	16.22	--	0.00	--	--	--	--	--	--	--	--	--	1.68	17.90	
Swordspine Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	0.01	0.01	0.02	
Tiger Rockfish	--	--	0.00	--	--	--	--	--	--	--	--	--	--	0.02	--	0.02	
Vermilion Rockfish	--	--	0.01	--	11.01	10.29	0.00	0.04	1.52	--	--	--	--	208.04	2.28	233.18	
Yellowtail Rockfish	--	--	0.40	--	2.57	0.71	--	--	0.36	--	--	--	--	55.28	1.13	60.45	
Minor slope rockfish (North of 40°10' N. lat.)																	
Aurora Rockfish	0.00	0.09	21.47	0.00	0.05	0.00	--	--	0.09	0.00	--	--	--	--	1.51	23.21	
Bank Rockfish	0.02	0.03	0.67	--	0.28	0.00	--	--	0.00	--	--	--	--	0.33	0.00	1.33	
Blackgill Rockfish	0.04	0.06	6.27	0.09	2.42	0.00	--	--	0.09	0.01	--	--	--	--	0.02	8.99	
Blackspotted Rockfish	--	--	0.12	0.00	0.20	--	--	--	0.00	0.00	--	--	--	--	--	0.33	
Redbanded Rockfish	0.01	0.08	8.11	0.71	13.96	0.00	--	0.03	0.07	9.37	--	--	--	--	0.19	32.53	
Rockfish Unid	--	--	0.05	--	--	--	--	--	--	--	--	--	--	--	--	0.05	
Rougheye Rockfish	17.81	2.85	62.06	2.83	50.22	0.00	--	--	0.58	17.42	--	--	--	--	--	153.78	
Rougheye/Blackspotted Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.56	0.56	
Sharpchin Rockfish	0.03	0.23	10.08	--	0.01	--	--	0.06	0.00	0.01	--	--	--	--	2.04	12.46	
Shortraker Rockfish	0.02	0.59	20.42	0.04	2.89	--	--	--	0.12	0.71	--	--	--	--	0.13	24.92	
Shortraker/Rougheye Rockfish	--	--	--	0.06	5.68	--	--	--	--	--	--	--	--	--	--	5.73	
Slope Rockfish Unid	--	0.08	3.54	1.46	3.15	--	--	0.35	0.05	0.26	--	--	--	--	--	8.90	
Splitnose Rockfish	26.19	5.97	42.31	0.00	0.08	0.00	--	0.49	0.00	0.02	--	--	--	--	1.57	76.63	
Yellowmouth Rockfish	0.00	0.08	5.52	0.02	0.48	--	--	--	0.00	0.00	--	--	--	--	0.12	6.23	

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-hake IFQ fixed gear	Non-nearshore fixed gear	Nearshore fixed gear	OA CA halibut	Pink shrimp	Incidental fisheries	WA			OR	CA			
	Non-tribal at-sea hake	Non-tribal shoreside hake	Non-hake IFQ trawl														
Minor slope rockfish (South of 40°10' N. lat.)																	
Aurora Rockfish	--	--	8.91	0.29	0.14	0.00	--	--	--	--	--	--	--	--	0.17	9.52	
Bank Rockfish	--	--	45.67	0.00	0.04	0.14	--	--	8.11	--	--	--	--	--	0.06	54.04	
Blackgill Rockfish	--	--	38.40	15.05	17.05	1.01	--	--	0.11	--	--	--	--	--	0.40	72.02	
Pacific Ocean Perch	--	--	0.01	--	0.00	--	--	--	--	--	--	--	--	--	--	0.01	
Redbanded Rockfish	--	--	0.52	0.00	0.15	--	--	--	0.01	--	--	--	--	--	0.01	0.69	
Rockfish Unid	--	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--	0.00	
Rougheye Rockfish	--	--	0.11	--	--	--	--	--	--	--	--	--	--	--	--	0.11	
Sharpchin Rockfish	--	--	0.86	--	--	--	--	--	--	--	--	--	--	--	0.03	0.89	
Slope Rockfish Unid	--	--	7.48	--	3.63	0.00	--	0.02	0.02	--	--	--	--	--	--	11.15	
Spotted Rockfish Unid	--	--	0.01	--	--	--	--	--	--	--	--	--	--	--	--	0.01	
Yellowmouth Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00	
Mixed thornyheads																	
Shortspine/Longspine Thornyhead	0.50	--	5.83	--	0.05	--	--	--	--	--	--	--	--	--	--	6.38	
Other flatfish																	
Butter Sole	--	--	0.22	--	0.00	0.00	0.04	--	--	--	--	0.01	--	--	0.01	0.28	
Curlfin Turbot	--	--	1.47	--	--	--	1.14	--	--	--	--	--	--	--	0.16	2.76	
Flatfish Unid	0.00	0.01	0.96	0.00	0.21	0.02	0.15	19.15	0.39	0.83	--	6.96	--	--	0.69	29.36	
Flathead Sole	0.00	0.00	17.90	--	--	--	--	1.04	--	--	--	--	--	--	0.12	19.07	
Pacific Sanddab	0.00	0.07	206.28	--	2.25	2.09	1.13	3.82	0.05	--	--	0.12	134.42	9.28	359.51		
Rex Sole	12.10	0.39	492.38	0.00	0.15	0.07	--	21.94	0.95	32.27	--	--	--	5.38	565.64		
Rock Sole	--	--	3.11	--	0.13	0.36	0.14	0.59	0.99	5.21	--	0.02	0.72	0.08	11.34		
Sand Sole	--	--	13.46	0.02	0.00	0.04	8.24	0.02	3.33	--	--	0.15	1.00	--	26.26		
Sanddab Unid	--	0.00	61.94	--	2.59	0.00	0.08	0.04	0.62	0.70	--	--	--	--	65.96		
Other groundfish																	
Big Skate	0.21	--	50.44	0.01	5.34	0.05	42.52	0.00	--	--	--	--	--	2.42	100.98		
Cabezon	--	--	--	--	--	--	--	--	--	--	6.00	--	--	--	6.00		
California Scorpionfish	--	--	--	--	--	0.05	--	--	--	--	--	--	--	--	0.05		
California Skate	--	--	0.39	--	0.01	0.02	5.50	--	--	--	--	--	--	0.30	6.22		
Grenadier Unid	0.39	--	51.09	0.12	39.36	0.09	--	--	--	--	--	--	--	3.15	94.20		
Groundfish Unid	--	0.16	0.03	--	--	--	--	--	--	--	--	--	--	3.70	3.88		
Kelp Greenling	--	--	0.11	--	--	27.63	0.00	0.00	0.01	--	--	2.60	26.22	13.66	0.01	70.25	
Leopard Shark	--	--	0.27	--	0.03	0.45	1.57	0.01	0.21	--	--	--	13.99	--	16.52		
Pacific Electric Ray	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01		
Pacific Flatnose	--	--	1.46	0.05	5.85	--	--	--	--	--	--	--	--	--	7.35		
Pacific Grenadier	--	--	48.41	1.04	173.90	--	--	--	--	--	--	--	--	--	223.35		
Rockfish Unid	--	--	0.03	--	0.53	0.47	--	0.03	0.03	--	--	--	--	0.33	1.42		
Roundfish Unid	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	0.01		
Skate Unid	--	0.19	121.02	0.03	89.67	0.02	0.34	4.02	2.13	64.15	--	--	--	0.00	281.58		
Soupin Shark	0.23	0.03	0.32	--	0.07	0.78	0.09	0.04	0.23	--	--	--	--	--	1.78		
Spotted Ratfish	0.00	0.00	104.60	0.02	2.89	--	--	0.27	--	--	--	--	0.02	--	107.80		

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-hake IFQ fixed gear	Non-nearshore fixed gear	Nearshore fixed gear	OA CA halibut	Pink shrimp	Incidental fisheries	WA tribal at-sea			WA tribal at-sea	WA	OR			CA
	Non-tribal at-sea hake	Non-tribal shoreside hake	Non-hake IFQ trawl															
Pacific Cod	0.03	0.04	154.02	0.00	1.93	--	0.00	0.00	0.06	233.98	--	0.50	0.02	--	0.30	390.88		
Pacific Hake	130,563.38	97,327.45	306.95	0.07	0.44	--	0.00	29.86	0.01	5,215.56	--	--	--	0.03	1,055.57	234,499.32		
Pacific Ocean Perch (North of 40°10' N. lat.)	5.41	7.09	42.89	0.01	0.26	--	--	0.24	0.27	0.03	--	--	--	--	2.14	58.33		
Petrale Sole	--	0.00	2,117.48	0.73	1.68	--	0.41	1.61	0.71	136.31	--	--	0.37	1.11	5.02	2,265.43		
Sablefish (North of 36° N. lat.)	12.70	0.66	1,398.43	423.12	1,353.55	0.90	0.00	8.08	14.79	349.16	--	--	0.83	0.05	17.35	3,579.61		
Sablefish (South of 36° N. lat.)	--	--	6.15	80.79	519.42	5.32	--	--	0.27	--	--	--	--	--	0.66	612.60		
Shortbelly Rockfish	0.73	2.14	18.22	--	--	--	--	3.49	--	0.02	--	--	--	--	0.50	25.09		
Shortspine Thornyhead (North of 34°27' N. lat.)	21.74	3.30	841.28	4.35	58.84	0.04	--	0.25	0.72	20.74	--	--	--	--	4.30	955.54		
Shortspine Thornyhead (South of 34°27' N. lat.)	--	--	--	3.70	108.31	0.82	--	--	0.02	--	--	--	--	--	0.20	113.06		
Spiny Dogfish	97.47	80.56	289.92	11.69	125.04	1.17	5.81	0.03	0.47	24.21	--	0.30	--	7.03	8.74	652.45		
Splitnose Rockfish (South of 40°10' N. lat.)	--	--	46.06	0.00	0.05	0.00	--	--	0.02	--	--	--	--	--	2.83	48.95		
Starry Flounder	--	--	3.44	--	0.25	0.10	3.42	0.00	1.02	--	--	--	0.01	0.93	0.05	9.22		
Widow Rockfish	31.28	236.03	175.57	--	0.78	0.13	--	--	0.07	28.43	--	--	1.11	17.84	8.15	499.39		
Yelloweye Rockfish	--	--	0.05	0.01	0.27	2.71	--	--	0.10	0.35	--	2.08	2.72	1.47	0.93	10.70		
Yellowtail Rockfish (North of 40°10' N. lat.)	269.38	420.61	298.66	0.00	0.33	1.76	--	0.01	1.53	391.50	--	19.90	15.24	0.64	4.07	1,423.63		
<b>Non-groundfish species</b>																		
California Halibut	--	--	18.52	--	0.47	0.81	69.64	8.02	74.78	--	--	--	0.02	--	--	172.26		
California Sheephead	--	--	--	--	1.38	78.65	--	0.01	0.15	--	--	--	--	61.28	--	141.47		
Dungeness Crab	0.04	0.01	150.47	0.36	0.40	6.29	181.90	0.04	33,174.73	1,555.98	--	--	--	--	0.00	35,070.21		
Non-FMP flatfish																		
Deepsea Sole	--	--	18.31	0.01	0.07	--	--	--	--	--	--	--	--	--	--	18.39		
Diamond Turbot	--	--	--	--	--	--	0.00	--	0.01	--	--	--	--	0.02	--	0.03		
Hornyhead Turbot	--	--	0.01	--	--	--	0.32	3.08	0.12	--	--	--	--	--	--	3.52		
Longfin Sanddab	--	--	0.01	--	--	--	--	--	0.01	--	--	--	--	--	--	0.01		
Slender Sole	0.00	--	48.71	0.00	--	--	--	96.76	--	--	--	--	--	--	--	145.48		
Speckled Sanddab	--	--	--	--	--	--	--	--	--	--	--	--	--	0.06	--	0.06		
Non-FMP skate																		
Aleutian Skate	--	--	1.68	0.01	0.18	--	--	0.00	--	--	--	--	--	--	--	1.87		
Black Skate	--	--	18.01	0.12	9.82	--	--	--	--	--	--	--	--	--	--	27.95		
Deepsea Skate	--	--	0.36	--	0.20	--	--	--	--	--	--	--	--	--	--	0.56		
Flathead Skate	--	--	0.01	--	--	--	--	--	--	--	--	--	--	--	--	0.01		
Pacific Electric Ray	--	--	1.41	--	--	--	0.39	--	--	--	--	--	--	--	--	1.80		
Roughshoulder/Broad Skate	--	--	0.01	--	--	--	--	--	--	--	--	--	--	--	--	0.01		
Sandpaper Skate	0.01	--	41.57	0.02	0.45	--	--	0.02	--	--	--	--	--	--	--	42.07		
Starry Skate	--	--	0.09	--	--	0.02	--	--	--	--	--	--	--	--	--	0.12		
Thomback Skate	--	--	0.04	--	--	--	1.26	--	--	--	--	--	--	--	--	1.30		
White Skate	--	--	0.07	--	--	--	--	--	--	--	--	--	--	--	--	0.07		

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. Fishing Mortality Estimates Relative to Harvest Specifications.**

Estimated fishing mortality (mt) of major west coast groundfish species in 2013 and corresponding management reference points (harvest specifications). Values which are 90% or greater relative to a management reference point are highlighted.

	Estimated fishing mortality (mt)	Management reference points (harvest specifications)					
		ACL (mt)	Estimated mortality (% of ACL)	ABC (mt)	Estimated mortality (% of ABC)	OFL (mt)	Estimated mortality (% of OFL)
Arrowtooth flounder	<b>2,510</b>	6,157	41%	6,157	41%	7,391	34%
Black rockfish (North of 46°16' N. lat.)	<b>252</b>	411	61%	411	61%	430	59%
Black rockfish (South of 46°16' N. lat.)	<b>845</b>	1,000	84%	1,108	76%	1,159	73%
Bocaccio rockfish (South of 40°10' N. lat.)	<b>149</b>	320	47%	845	18%	884	17%
Cabazon (California)	<b>68</b>	163	42%	163	42%	170	40%
Cabazon (Oregon)	<b>34</b>	47	73%	47	73%	49	70%
California scorpionfish (South of 34°27' N. lat.)	<b>115</b>	120	96%	120	96%	126	91%
Canary rockfish	<b>43</b>	116	37%	719	6%	752	6%
Chilipepper rockfish (South of 40°10' N. lat.)	<b>404</b>	1,690	24%	1,690	24%	1,768	23%
Cowcod rockfish (South of 40°10' N. lat.)	<b>2</b>	3	63%	9	21%	11	17%
Darkblotched rockfish	<b>133</b>	317	42%	517	26%	541	25%
Dover sole	<b>8,081</b>	25,000	32%	88,865	9%	92,955	9%
English sole	<b>357</b>	6,815	5%	6,815	5%	7,129	5%
Lingcod (North of 40°10' N. lat.)	<b>861</b>	3,036	28%	3,036	28%	3,334	26%
Lingcod (South of 40°10' N. lat.)	<b>433</b>	1,111	39%	1,111	39%	1,334	32%
Longnose skate	<b>989</b>	2,000	49%	2,774	36%	2,902	34%
Minor rockfish (North of 40°10' N. lat.)	<b>500</b>	4,524	11%	8,455	6%	9,704	5%
Nearshore	<b>75</b>	94	80%	94	80%	110	68%
Shelf	<b>70</b>	968	7%	1,920	4%	2,183	3%
Slope	<b>355</b>	1,160	31%	1,381	26%	1,518	23%
Minor rockfish (South of 40°10' N. lat.)	<b>1,070</b>	2,842	38%	4,918	22%	5,611	19%
Nearshore	<b>495</b>	990	50%	1,005	49%	1,164	43%
Shelf	<b>426</b>	714	60%	1,617	26%	1,910	22%
Slope	<b>148</b>	618	24%	618	24%	681	22%
Other flatfish	<b>1,080</b>	4,884	22%	6,982	15%	10,060	11%
Other groundfish <sup>1</sup>	<b>1,574</b>	4,717	33%	4,717	33%	6,832	23%
Pacific cod	<b>391</b>	1,600	24%	2,221	18%	3,200	12%
Pacific hake	<b>234,499</b>	2013 US TAC = 269,745 mt, % of US TAC = 87%					
Pacific Ocean Perch (North of 40°10' N. lat.)	<b>58</b>	150	39%	807	7%	844	7%
Petrale sole	<b>2,265</b>	2,592	87%	2,592	87%	2,711	84%
Sablefish (North of 36° N. lat.)	<b>3,580</b>	4,012	89%	6,045	69%	6,621	63%
Sablefish (South of 36° N. lat.)	<b>613</b>	1,439	43%				
Shortbelly rockfish	<b>25</b>	50	50%	5,789	0%	6,950	0%
Splitnose rockfish (South of 40°10' N. lat.)	<b>49</b>	1,610	3%	1,610	3%	1,684	3%
Starry flounder	<b>9</b>	1,520	1%	1,520	1%	1,825	1%
Thornyheads							
Longspine Thornyhead (North of 34°27' N. lat.)	<b>1,077</b>	2,009	54%				
Longspine Thornyhead (South of 34°27' N. lat.)	<b>19</b>	356	5%	2,825	39%	3,391	32%
Shortspine Thornyhead (North of 34°27' N. lat.)	<b>956</b>	1,540	62%				
Shortspine Thornyhead (South of 34°27' N. lat.)	<b>113</b>	397	28%	2,230	48%	2,333	46%
Mixed thornyheads	<b>6</b>						
Widow rockfish	<b>499</b>	1,500	33%	4,598	11%	4,841	10%
Yelloweye rockfish	<b>11</b>	18	59%	43	25%	51	21%
Yellowtail rockfish (North of 40°10' N. lat.)	<b>1,424</b>	4,378	33%	4,378	33%	4,579	31%

<sup>1</sup>Includes the Other Groundfish category and Spiny dogfish from Table 15.

## Appendix A

**Table A-1. WCGOP unsampled catch categories and associated species used in IFQ fishery protocols.**

IFQFF	IFQRF
Arrowtooth Flounder	Aurora Rockfish
Butter Sole	Bank Rockfish
Curlfin Turbot	Blackgill Rockfish
Dover Sole	Bocaccio Rockfish
English Sole	Canary Rockfish
Flatfish Unid	Chilipepper Rockfish
Flathead Sole	Cowcod Rockfish
Pacific Halibut	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
	Pygmy Rockfish
	Redbanded Rockfish
	Redstripe Rockfish
	Rockfish Unid
	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

**Table A-2. Discard mortality rates used in the Nearshore Fixed Gear Fishery.**

Any species or grouping not otherwise specified was assumed to have a discard mortality rate of 1.

<b>Nearshore Grouping</b>	<b>Species</b>	<b>Depth (fm)</b>	<b>Discard Mortality Rate</b>
Black rockfish (North of 46°16' N. lat.)	Black Rockfish	0 - 10	0.23
Black rockfish (North of 46°16' N. lat.)	Black Rockfish	11 - 20	0.42
Black rockfish (North of 46°16' N. lat.)	Black Rockfish	> 20	0.9
Black rockfish (South of 46°16' N. lat.)	Black Rockfish	0 - 10	0.23
Black rockfish (South of 46°16' N. lat.)	Black Rockfish	11 - 20	0.42
Black rockfish (South of 46°16' N. lat.)	Black Rockfish	> 20	0.9
Bocaccio rockfish (South of 40°10' N. lat.)	Bocaccio Rockfish	0 - 10	0.3
Bocaccio rockfish (South of 40°10' N. lat.)	Bocaccio Rockfish	11 - 20	0.51
Bocaccio rockfish (South of 40°10' N. lat.)	Bocaccio Rockfish	> 20	1
Cabezon (California)	Cabezon	0 - 10	0.07
Cabezon (California)	Cabezon	11 - 20	0.07
Cabezon (California)	Cabezon	> 20	0.07
Cabezon (Oregon)	Cabezon	0 - 10	0.07
Cabezon (Oregon)	Cabezon	11 - 20	0.07
Cabezon (Oregon)	Cabezon	> 20	0.07
Cabezon (Washington)	Cabezon	0 - 10	0.07
Cabezon (Washington)	Cabezon	11 - 20	0.07
Cabezon (Washington)	Cabezon	> 20	0.07
California halibut	California Halibut	0 - 10	0.07
California halibut	California Halibut	11 - 20	0.07
California halibut	California Halibut	> 20	0.07
California scorpionfish (North of 34°27' N. lat.)	California Scorpionfish	0 - 10	0.07
California scorpionfish (North of 34°27' N. lat.)	California Scorpionfish	11 - 20	0.07
California scorpionfish (North of 34°27' N. lat.)	California Scorpionfish	> 20	0.07
California scorpionfish (South of 34°27' N. lat.)	California Scorpionfish	0 - 10	0.07
California scorpionfish (South of 34°27' N. lat.)	California Scorpionfish	11 - 20	0.07
California scorpionfish (South of 34°27' N. lat.)	California Scorpionfish	> 20	0.07
Canary rockfish	Canary Rockfish	0 - 10	0.32
Canary rockfish	Canary Rockfish	11 - 20	0.54
Canary rockfish	Canary Rockfish	> 20	1
Cowcod rockfish (South of 40°10' N. lat.)	Cowcod	0 - 10	1
Cowcod rockfish (South of 40°10' N. lat.)	Cowcod	11 - 20	1
Cowcod rockfish (South of 40°10' N. lat.)	Cowcod	> 20	1
Darkblotched rockfish	Darkblotched Rockfish	0 - 10	1
Darkblotched rockfish	Darkblotched Rockfish	11 - 20	1
Darkblotched rockfish	Darkblotched Rockfish	> 20	1
Deeper nearshore rockfish	Blue Rockfish	0 - 10	0.29
Deeper nearshore rockfish	Blue Rockfish	11 - 20	0.49
Deeper nearshore rockfish	Blue Rockfish	> 20	1
Deeper nearshore rockfish	Brown Rockfish	0 - 10	0.23
Deeper nearshore rockfish	Brown Rockfish	11 - 20	0.48
Deeper nearshore rockfish	Brown Rockfish	> 20	1
Deeper nearshore rockfish	Calico Rockfish	0 - 10	0.23
Deeper nearshore rockfish	Calico Rockfish	11 - 20	0.48
Deeper nearshore rockfish	Calico Rockfish	> 20	1
Deeper nearshore rockfish	Copper Rockfish	0 - 10	0.23
Deeper nearshore rockfish	Copper Rockfish	11 - 20	0.48
Deeper nearshore rockfish	Copper Rockfish	> 20	1
Deeper nearshore rockfish	Olive Rockfish	0 - 10	0.23

**Table A-2 (continued).**

<b>Nearshore Grouping</b>	<b>Species</b>	<b>Depth (fm)</b>	<b>Discard Mortality Rate</b>
Deeper nearshore rockfish	Olive Rockfish	11 - 20	0.48
Deeper nearshore rockfish	Olive Rockfish	> 20	1
Deeper nearshore rockfish	Quillback Rockfish	0 - 10	0.23
Deeper nearshore rockfish	Quillback Rockfish	11 - 20	0.48
Deeper nearshore rockfish	Quillback Rockfish	> 20	1
Deeper nearshore rockfish	Treefish Rockfish	0 - 10	0.23
Deeper nearshore rockfish	Treefish Rockfish	11 - 20	0.48
Deeper nearshore rockfish	Treefish Rockfish	> 20	1
Dungeness crab	Dungeness Crab	0 - 10	1
Dungeness crab	Dungeness Crab	11 - 20	1
Dungeness crab	Dungeness Crab	> 20	1
Lingcod (North of 40°10' N. lat.)	Lingcod	0 - 10	0.07
Lingcod (North of 40°10' N. lat.)	Lingcod	11 - 20	0.07
Lingcod (North of 40°10' N. lat.)	Lingcod	> 20	0.07
Lingcod (South of 40°10' N. lat.)	Lingcod	0 - 10	0.07
Lingcod (South of 40°10' N. lat.)	Lingcod	11 - 20	0.07
Lingcod (South of 40°10' N. lat.)	Lingcod	> 20	0.07
Longnose skate	Longnose Skate	0 - 10	0.5
Longnose skate	Longnose Skate	11 - 20	0.5
Longnose skate	Longnose Skate	> 20	0.5
Minor nearshore rockfish (North of 40°10' N. lat.)	Black and Yellow Rockfish	0 - 10	0.24
Minor nearshore rockfish (North of 40°10' N. lat.)	Black and Yellow Rockfish	11 - 20	0.48
Minor nearshore rockfish (North of 40°10' N. lat.)	Black and Yellow Rockfish	> 20	1
Minor nearshore rockfish (North of 40°10' N. lat.)	Blue Rockfish	0 - 10	0.29
Minor nearshore rockfish (North of 40°10' N. lat.)	Blue Rockfish	11 - 20	0.49
Minor nearshore rockfish (North of 40°10' N. lat.)	Blue Rockfish	> 20	1
Minor nearshore rockfish (North of 40°10' N. lat.)	Brown Rockfish	0 - 10	0.24
Minor nearshore rockfish (North of 40°10' N. lat.)	Brown Rockfish	11 - 20	0.48
Minor nearshore rockfish (North of 40°10' N. lat.)	Brown Rockfish	> 20	1
Minor nearshore rockfish (North of 40°10' N. lat.)	Calico Rockfish	0 - 10	0.24
Minor nearshore rockfish (North of 40°10' N. lat.)	Calico Rockfish	11 - 20	0.48
Minor nearshore rockfish (North of 40°10' N. lat.)	Calico Rockfish	> 20	1
Minor nearshore rockfish (North of 40°10' N. lat.)	China Rockfish	0 - 10	0.24
Minor nearshore rockfish (North of 40°10' N. lat.)	China Rockfish	11 - 20	0.48
Minor nearshore rockfish (North of 40°10' N. lat.)	China Rockfish	> 20	1
Minor nearshore rockfish (North of 40°10' N. lat.)	Copper Rockfish	0 - 10	0.24
Minor nearshore rockfish (North of 40°10' N. lat.)	Copper Rockfish	11 - 20	0.48
Minor nearshore rockfish (North of 40°10' N. lat.)	Copper Rockfish	> 20	1
Minor nearshore rockfish (North of 40°10' N. lat.)	Gopher Rockfish	0 - 10	0.24
Minor nearshore rockfish (North of 40°10' N. lat.)	Gopher Rockfish	11 - 20	0.48
Minor nearshore rockfish (North of 40°10' N. lat.)	Gopher Rockfish	> 20	1
Minor nearshore rockfish (North of 40°10' N. lat.)	Grass Rockfish	0 - 10	0.24
Minor nearshore rockfish (North of 40°10' N. lat.)	Grass Rockfish	11 - 20	0.48
Minor nearshore rockfish (North of 40°10' N. lat.)	Grass Rockfish	> 20	1
Minor nearshore rockfish (North of 40°10' N. lat.)	Kelp Rockfish	0 - 10	0.24
Minor nearshore rockfish (North of 40°10' N. lat.)	Kelp Rockfish	11 - 20	0.48
Minor nearshore rockfish (North of 40°10' N. lat.)	Kelp Rockfish	> 20	1
Minor nearshore rockfish (North of 40°10' N. lat.)	Olive Rockfish	0 - 10	0.24
Minor nearshore rockfish (North of 40°10' N. lat.)	Olive Rockfish	11 - 20	0.48

**Table A-2 (continued).**

<b>Nearshore Grouping</b>	<b>Species</b>	<b>Depth (fm)</b>	<b>Discard Mortality Rate</b>
Minor nearshore rockfish (North of 40°10' N. lat.)	Olive Rockfish	> 20	1
Minor nearshore rockfish (North of 40°10' N. lat.)	Quillback Rockfish	0 - 10	0.24
Minor nearshore rockfish (North of 40°10' N. lat.)	Quillback Rockfish	11 - 20	0.48
Minor nearshore rockfish (North of 40°10' N. lat.)	Quillback Rockfish	> 20	1
Minor nearshore rockfish (North of 40°10' N. lat.)	Treefish Rockfish	0 - 10	0.24
Minor nearshore rockfish (North of 40°10' N. lat.)	Treefish Rockfish	11 - 20	0.48
Minor nearshore rockfish (North of 40°10' N. lat.)	Treefish Rockfish	> 20	1
Minor shelf rockfish (North of 40°10' N. lat.)	Bocaccio Rockfish	0 - 10	0.3
Minor shelf rockfish (North of 40°10' N. lat.)	Bocaccio Rockfish	11 - 20	0.51
Minor shelf rockfish (North of 40°10' N. lat.)	Bocaccio Rockfish	> 20	1
Minor shelf rockfish (North of 40°10' N. lat.)	Cowcod	0 - 10	1
Minor shelf rockfish (North of 40°10' N. lat.)	Cowcod	11 - 20	1
Minor shelf rockfish (North of 40°10' N. lat.)	Cowcod	> 20	1
Minor shelf rockfish (North of 40°10' N. lat.)	Greenspotted Rockfish	0 - 10	1
Minor shelf rockfish (North of 40°10' N. lat.)	Greenspotted Rockfish	11 - 20	1
Minor shelf rockfish (North of 40°10' N. lat.)	Greenspotted Rockfish	> 20	1
Minor shelf rockfish (North of 40°10' N. lat.)	Shelf Rockfish Unid	0 - 10	1
Minor shelf rockfish (North of 40°10' N. lat.)	Shelf Rockfish Unid	11 - 20	1
Minor shelf rockfish (North of 40°10' N. lat.)	Shelf Rockfish Unid	> 20	1
Minor shelf rockfish (North of 40°10' N. lat.)	Tiger Rockfish	0 - 10	0.1
Minor shelf rockfish (North of 40°10' N. lat.)	Tiger Rockfish	11 - 20	0.5
Minor shelf rockfish (North of 40°10' N. lat.)	Tiger Rockfish	> 20	1
Minor shelf rockfish (North of 40°10' N. lat.)	Vermilion Rockfish	0 - 10	0.1
Minor shelf rockfish (North of 40°10' N. lat.)	Vermilion Rockfish	11 - 20	0.55
Minor shelf rockfish (North of 40°10' N. lat.)	Vermilion Rockfish	> 20	1
Minor shelf rockfish (South of 40°10' N. lat.)	Flag Rockfish	0 - 10	1
Minor shelf rockfish (South of 40°10' N. lat.)	Flag Rockfish	11 - 20	1
Minor shelf rockfish (South of 40°10' N. lat.)	Flag Rockfish	> 20	1
Minor shelf rockfish (South of 40°10' N. lat.)	Greenblotched Rockfish	0 - 10	1
Minor shelf rockfish (South of 40°10' N. lat.)	Greenblotched Rockfish	11 - 20	1
Minor shelf rockfish (South of 40°10' N. lat.)	Greenblotched Rockfish	> 20	1
Minor shelf rockfish (South of 40°10' N. lat.)	Greenspotted Rockfish	0 - 10	1
Minor shelf rockfish (South of 40°10' N. lat.)	Greenspotted Rockfish	11 - 20	1
Minor shelf rockfish (South of 40°10' N. lat.)	Greenspotted Rockfish	> 20	1
Minor shelf rockfish (South of 40°10' N. lat.)	Greenstriped Rockfish	0 - 10	1
Minor shelf rockfish (South of 40°10' N. lat.)	Greenstriped Rockfish	11 - 20	1
Minor shelf rockfish (South of 40°10' N. lat.)	Greenstriped Rockfish	> 20	1
Minor shelf rockfish (South of 40°10' N. lat.)	Rockfish Unid	0 - 10	1
Minor shelf rockfish (South of 40°10' N. lat.)	Rockfish Unid	11 - 20	1
Minor shelf rockfish (South of 40°10' N. lat.)	Rockfish Unid	> 20	1
Minor shelf rockfish (South of 40°10' N. lat.)	Rosethorn Rockfish	0 - 10	1
Minor shelf rockfish (South of 40°10' N. lat.)	Rosethorn Rockfish	11 - 20	1
Minor shelf rockfish (South of 40°10' N. lat.)	Rosethorn Rockfish	> 20	1
Minor shelf rockfish (South of 40°10' N. lat.)	Rosy Rockfish	0 - 10	1
Minor shelf rockfish (South of 40°10' N. lat.)	Rosy Rockfish	11 - 20	1
Minor shelf rockfish (South of 40°10' N. lat.)	Rosy Rockfish	> 20	1
Minor shelf rockfish (South of 40°10' N. lat.)	Shelf Rockfish Unid	0 - 10	1
Minor shelf rockfish (South of 40°10' N. lat.)	Shelf Rockfish Unid	11 - 20	1
Minor shelf rockfish (South of 40°10' N. lat.)	Shelf Rockfish Unid	> 20	1



**Table A-2 (continued).**

<b>Nearshore Grouping</b>	<b>Species</b>	<b>Depth (fm)</b>	<b>Discard Mortality Rate</b>
Minor shelf rockfish (South of 40°10' N. lat.)	Speckled Rockfish	0 - 10	1
Minor shelf rockfish (South of 40°10' N. lat.)	Speckled Rockfish	11 - 20	1
Minor shelf rockfish (South of 40°10' N. lat.)	Speckled Rockfish	> 20	1
Minor shelf rockfish (South of 40°10' N. lat.)	Starry Rockfish	0 - 10	1
Minor shelf rockfish (South of 40°10' N. lat.)	Starry Rockfish	11 - 20	1
Minor shelf rockfish (South of 40°10' N. lat.)	Starry Rockfish	> 20	1
Minor shelf rockfish (South of 40°10' N. lat.)	Tiger Rockfish	0 - 10	0.1
Minor shelf rockfish (South of 40°10' N. lat.)	Tiger Rockfish	11 - 20	0.5
Minor shelf rockfish (South of 40°10' N. lat.)	Tiger Rockfish	> 20	1
Minor shelf rockfish (South of 40°10' N. lat.)	Vermilion Rockfish	0 - 10	0.1
Minor shelf rockfish (South of 40°10' N. lat.)	Vermilion Rockfish	11 - 20	0.55
Minor shelf rockfish (South of 40°10' N. lat.)	Vermilion Rockfish	> 20	1
Minor shelf rockfish (South of 40°10' N. lat.)	Yellowtail Rockfish	0 - 10	0.1
Minor shelf rockfish (South of 40°10' N. lat.)	Yellowtail Rockfish	11 - 20	0.3
Minor shelf rockfish (South of 40°10' N. lat.)	Yellowtail Rockfish	> 20	0.75
Minor slope rockfish (South of 40°10' N. lat.)	Redbanded Rockfish	0 - 10	1
Minor slope rockfish (South of 40°10' N. lat.)	Redbanded Rockfish	11 - 20	1
Minor slope rockfish (South of 40°10' N. lat.)	Redbanded Rockfish	> 20	1
Non-FMP flatfish	Bigmouth Sole	0 - 10	0.07
Non-FMP flatfish	Bigmouth Sole	11 - 20	0.07
Non-FMP flatfish	Bigmouth Sole	> 20	0.07
Non-FMP flatfish	Diamond Turbot	0 - 10	0.07
Non-FMP flatfish	Diamond Turbot	11 - 20	0.07
Non-FMP flatfish	Diamond Turbot	> 20	0.07
Non-FMP flatfish	Longfin Sanddab	0 - 10	0.07
Non-FMP flatfish	Longfin Sanddab	11 - 20	0.07
Non-FMP flatfish	Longfin Sanddab	> 20	0.07
Non-FMP flatfish	Slender Sole	0 - 10	0.07
Non-FMP flatfish	Slender Sole	11 - 20	0.07
Non-FMP flatfish	Slender Sole	> 20	0.07
Non-FMP skate	Round Stingray	0 - 10	0.07
Non-FMP skate	Round Stingray	11 - 20	0.07
Non-FMP skate	Round Stingray	> 20	0.07
Non-FMP skate	Starry Skate	0 - 10	0.07
Non-FMP skate	Starry Skate	11 - 20	0.07
Non-FMP skate	Starry Skate	> 20	0.07
Non-FMP skate	Thornback Skate	0 - 10	0.07
Non-FMP skate	Thornback Skate	11 - 20	0.07
Non-FMP skate	Thornback Skate	> 20	0.07
Other flatfish	Butter Sole	0 - 10	0.07
Other flatfish	Butter Sole	11 - 20	0.07
Other flatfish	Butter Sole	> 20	0.07
Other flatfish	Flatfish Unid	0 - 10	0.07
Other flatfish	Flatfish Unid	11 - 20	0.07
Other flatfish	Flatfish Unid	> 20	0.07
Other flatfish	Pacific Sanddab	0 - 10	0.07
Other flatfish	Pacific Sanddab	11 - 20	0.07
Other flatfish	Pacific Sanddab	> 20	0.07
Other flatfish	Rock Sole	0 - 10	0.07

**Table A-2 (continued).**

<b>Nearshore Grouping</b>	<b>Species</b>	<b>Depth (fm)</b>	<b>Discard Mortality Rate</b>
Other flatfish	Rock Sole	11 - 20	0.07
Other flatfish	Rock Sole	> 20	0.07
Other flatfish	Sand Sole	0 - 10	0.07
Other flatfish	Sand Sole	11 - 20	0.07
Other flatfish	Sand Sole	> 20	0.07
Other flatfish	Sanddab Unid	0 - 10	0.07
Other flatfish	Sanddab Unid	11 - 20	0.07
Other flatfish	Sanddab Unid	> 20	0.07
Other groundfish	Big Skate	0 - 10	0.07
Other groundfish	Big Skate	11 - 20	0.07
Other groundfish	Big Skate	> 20	0.07
Other groundfish	California Scorpionfish	0 - 10	0.07
Other groundfish	California Scorpionfish	11 - 20	0.07
Other groundfish	California Scorpionfish	> 20	0.07
Other groundfish	California Skate	0 - 10	0.07
Other groundfish	California Skate	11 - 20	0.07
Other groundfish	California Skate	> 20	0.07
Other groundfish	Kelp Greenling	0 - 10	0.07
Other groundfish	Kelp Greenling	11 - 20	0.07
Other groundfish	Kelp Greenling	> 20	0.07
Other groundfish	Leopard Shark	0 - 10	0.07
Other groundfish	Leopard Shark	11 - 20	0.07
Other groundfish	Leopard Shark	> 20	0.07
Other groundfish	Spotted Ratfish	0 - 10	0.07
Other groundfish	Spotted Ratfish	11 - 20	0.07
Other groundfish	Spotted Ratfish	> 20	0.07
Other nongroundfish	Bat Ray	0 - 10	0.07
Other nongroundfish	Bat Ray	11 - 20	0.07
Other nongroundfish	Bat Ray	> 20	0.07
Other nongroundfish	Brown Box Crab	0 - 10	1
Other nongroundfish	Brown Box Crab	11 - 20	1
Other nongroundfish	Brown Box Crab	> 20	1
Other nongroundfish	Brown Smoothhound Shark	0 - 10	0.07
Other nongroundfish	Brown Smoothhound Shark	11 - 20	0.07
Other nongroundfish	Brown Smoothhound Shark	> 20	0.07
Other nongroundfish	Buffalo Sculpin	0 - 10	1
Other nongroundfish	Buffalo Sculpin	11 - 20	1
Other nongroundfish	Buffalo Sculpin	> 20	1
Other nongroundfish	Decorator/Spider Unid Crab	0 - 10	1
Other nongroundfish	Decorator/Spider Unid Crab	11 - 20	1
Other nongroundfish	Decorator/Spider Unid Crab	> 20	1
Other nongroundfish	Filetail Cat Shark	0 - 10	0.07
Other nongroundfish	Filetail Cat Shark	11 - 20	0.07
Other nongroundfish	Filetail Cat Shark	> 20	0.07
Other nongroundfish	Gray Smoothhound Shark	0 - 10	0.07
Other nongroundfish	Gray Smoothhound Shark	11 - 20	0.07
Other nongroundfish	Gray Smoothhound Shark	> 20	0.07
Other nongroundfish	Greenling Unid	0 - 10	0.07
Other nongroundfish	Greenling Unid	11 - 20	0.07

**Table A-2 (continued).**

<b>Nearshore Grouping</b>	<b>Species</b>	<b>Depth (fm)</b>	<b>Discard Mortality Rate</b>
Other nongroundfish	Greenling Unid	> 20	0.07
Other nongroundfish	Hagfish Unid	0 - 10	1
Other nongroundfish	Hagfish Unid	11 - 20	1
Other nongroundfish	Hagfish Unid	> 20	1
Other nongroundfish	Jack Smelt	0 - 10	1
Other nongroundfish	Jack Smelt	11 - 20	1
Other nongroundfish	Jack Smelt	> 20	1
Other nongroundfish	Jackmackerel	0 - 10	1
Other nongroundfish	Jackmackerel	11 - 20	1
Other nongroundfish	Jackmackerel	> 20	1
Other nongroundfish	King (Chinook) Salmon	0 - 10	1
Other nongroundfish	King (Chinook) Salmon	11 - 20	1
Other nongroundfish	King (Chinook) Salmon	> 20	1
Other nongroundfish	Mixed Fish	0 - 10	1
Other nongroundfish	Mixed Fish	11 - 20	1
Other nongroundfish	Mixed Fish	> 20	1
Other nongroundfish	Mixed Species	0 - 10	1
Other nongroundfish	Mixed Species	11 - 20	1
Other nongroundfish	Mixed Species	> 20	1
Other nongroundfish	Octopus Unid	0 - 10	1
Other nongroundfish	Octopus Unid	11 - 20	1
Other nongroundfish	Octopus Unid	> 20	1
Other nongroundfish	Pacific Hagfish	0 - 10	1
Other nongroundfish	Pacific Hagfish	11 - 20	1
Other nongroundfish	Pacific Hagfish	> 20	1
Other nongroundfish	Pacific Halibut	0 - 10	1
Other nongroundfish	Pacific Halibut	11 - 20	1
Other nongroundfish	Pacific Halibut	> 20	1
Other nongroundfish	Pacific Mackerel	0 - 10	1
Other nongroundfish	Pacific Mackerel	11 - 20	1
Other nongroundfish	Pacific Mackerel	> 20	1
Other nongroundfish	Pacific Rock Crab	0 - 10	1
Other nongroundfish	Pacific Rock Crab	11 - 20	1
Other nongroundfish	Pacific Rock Crab	> 20	1
Other nongroundfish	Pacific Staghorn Sculpin	0 - 10	1
Other nongroundfish	Pacific Staghorn Sculpin	11 - 20	1
Other nongroundfish	Pacific Staghorn Sculpin	> 20	1
Other nongroundfish	Painted Greenling	0 - 10	0.07
Other nongroundfish	Painted Greenling	11 - 20	0.07
Other nongroundfish	Painted Greenling	> 20	0.07
Other nongroundfish	Red Irish Lord Sculpin	0 - 10	1
Other nongroundfish	Red Irish Lord Sculpin	11 - 20	1
Other nongroundfish	Red Irish Lord Sculpin	> 20	1
Other nongroundfish	Red Rock Crab	0 - 10	1
Other nongroundfish	Red Rock Crab	11 - 20	1
Other nongroundfish	Red Rock Crab	> 20	1
Other nongroundfish	Rock Greenling	0 - 10	0.07
Other nongroundfish	Rock Greenling	11 - 20	0.07
Other nongroundfish	Rock Greenling	> 20	0.07

**Table A-2 (continued).**

<b>Nearshore Grouping</b>	<b>Species</b>	<b>Depth (fm)</b>	<b>Discard Mortality Rate</b>
Other nongroundfish	Sculpin Unid	0 - 10	1
Other nongroundfish	Sculpin Unid	11 - 20	1
Other nongroundfish	Sculpin Unid	> 20	1
Other nongroundfish	Sea Cucumber Unid	0 - 10	1
Other nongroundfish	Sea Cucumber Unid	11 - 20	1
Other nongroundfish	Sea Cucumber Unid	> 20	1
Other nongroundfish	Shark Unid	0 - 10	0.07
Other nongroundfish	Shark Unid	11 - 20	0.07
Other nongroundfish	Shark Unid	> 20	0.07
Other nongroundfish	Sheep Crab	0 - 10	1
Other nongroundfish	Sheep Crab	11 - 20	1
Other nongroundfish	Sheep Crab	> 20	1
Other nongroundfish	Silver (Coho) Salmon	0 - 10	1
Other nongroundfish	Silver (Coho) Salmon	11 - 20	1
Other nongroundfish	Silver (Coho) Salmon	> 20	1
Other nongroundfish	Surfperch Unid	0 - 10	1
Other nongroundfish	Surfperch Unid	11 - 20	1
Other nongroundfish	Surfperch Unid	> 20	1
Other nongroundfish	Swell Shark	0 - 10	0.07
Other nongroundfish	Swell Shark	11 - 20	0.07
Other nongroundfish	Swell Shark	> 20	0.07
Other nongroundfish	White Croaker	0 - 10	1
Other nongroundfish	White Croaker	11 - 20	1
Other nongroundfish	White Croaker	> 20	1
Other nongroundfish	White Sea Bass	0 - 10	1
Other nongroundfish	White Sea Bass	11 - 20	1
Other nongroundfish	White Sea Bass	> 20	1
Other nongroundfish	Wolf-eel	0 - 10	1
Other nongroundfish	Wolf-eel	11 - 20	1
Other nongroundfish	Wolf-eel	> 20	1
Other nongroundfish	Yellow Rock Crab	0 - 10	1
Other nongroundfish	Yellow Rock Crab	11 - 20	1
Other nongroundfish	Yellow Rock Crab	> 20	1
Other rockfish	Rockfish Unid	0 - 10	1
Other rockfish	Rockfish Unid	11 - 20	1
Other rockfish	Rockfish Unid	> 20	1
Petrals sole	Petrals Sole	0 - 10	0.07
Petrals sole	Petrals Sole	11 - 20	0.07
Petrals sole	Petrals Sole	> 20	0.07
Sablefish (North of 36° N. lat.)	Sablefish	0 - 10	0.2
Sablefish (North of 36° N. lat.)	Sablefish	11 - 20	0.2
Sablefish (North of 36° N. lat.)	Sablefish	> 20	0.2
Sablefish (South of 36° N. lat.)	Sablefish	0 - 10	0.2
Sablefish (South of 36° N. lat.)	Sablefish	11 - 20	0.2
Sablefish (South of 36° N. lat.)	Sablefish	> 20	0.2
Shallow nearshore rockfish	Black and Yellow Rockfish	0 - 10	0.25
Shallow nearshore rockfish	Black and Yellow Rockfish	11 - 20	0.49
Shallow nearshore rockfish	Black and Yellow Rockfish	> 20	1
Shallow nearshore rockfish	China Rockfish	0 - 10	0.25

**Table A-2 (continued).**

<b>Nearshore Grouping</b>	<b>Species</b>	<b>Depth (fm)</b>	<b>Discard Mortality Rate</b>
Shallow nearshore rockfish	China Rockfish	11 - 20	0.49
Shallow nearshore rockfish	China Rockfish	> 20	1
Shallow nearshore rockfish	Gopher Rockfish	0 - 10	0.25
Shallow nearshore rockfish	Gopher Rockfish	11 - 20	0.49
Shallow nearshore rockfish	Gopher Rockfish	> 20	1
Shallow nearshore rockfish	Grass Rockfish	0 - 10	0.25
Shallow nearshore rockfish	Grass Rockfish	11 - 20	0.49
Shallow nearshore rockfish	Grass Rockfish	> 20	1
Shallow nearshore rockfish	Kelp Rockfish	0 - 10	0.25
Shallow nearshore rockfish	Kelp Rockfish	11 - 20	0.49
Shallow nearshore rockfish	Kelp Rockfish	> 20	1
Spiny dogfish	Spiny Dogfish Shark	0 - 10	0.5
Spiny dogfish	Spiny Dogfish Shark	11 - 20	0.5
Spiny dogfish	Spiny Dogfish Shark	> 20	0.5
Starry flounder	Starry Flounder	0 - 10	0.07
Starry flounder	Starry Flounder	11 - 20	0.07
Starry flounder	Starry Flounder	> 20	0.07
Unspecified skate	Skate Unid	0 - 10	0.07
Unspecified skate	Skate Unid	11 - 20	0.07
Unspecified skate	Skate Unid	> 20	0.07
Widow rockfish	Widow Rockfish	0 - 10	0.32
Widow rockfish	Widow Rockfish	11 - 20	0.54
Widow rockfish	Widow Rockfish	> 20	1
Yelloweye rockfish	Yelloweye Rockfish	0 - 10	0.32
Yelloweye rockfish	Yelloweye Rockfish	11 - 20	0.56
Yelloweye rockfish	Yelloweye Rockfish	> 20	1
Yellowtail Rockfish (North of 40°10' N. lat.)	Yellowtail Rockfish	0 - 10	0.1
Yellowtail Rockfish (North of 40°10' N. lat.)	Yellowtail Rockfish	11 - 20	0.3
Yellowtail Rockfish (North of 40°10' N. lat.)	Yellowtail Rockfish	> 20	0.75
Yellowtail Rockfish (South of 40°10' N. lat.)	Yellowtail Rockfish	0 - 10	0.1
Yellowtail Rockfish (South of 40°10' N. lat.)	Yellowtail Rockfish	11 - 20	0.3
Yellowtail Rockfish (South of 40°10' N. lat.)	Yellowtail Rockfish	> 20	0.75