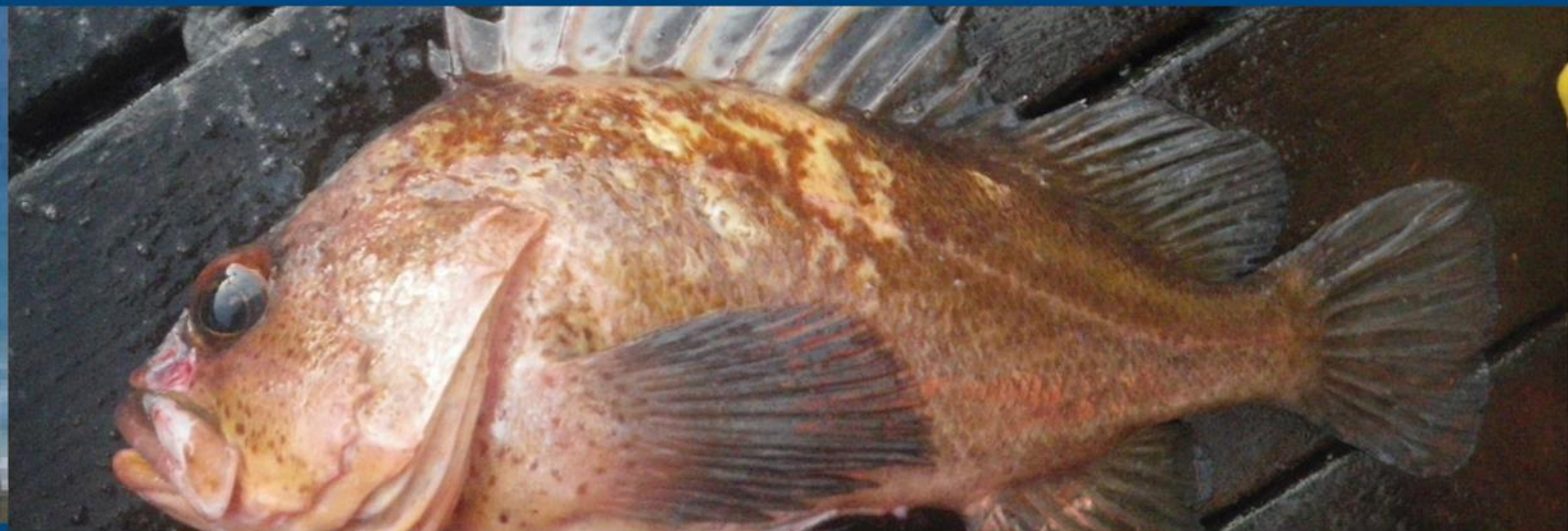




NOAA FISHERIES SERVICE

Estimated Discard and Catch of Groundfish Species in the 2012 US West Coast Fisheries

NOAA



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TABLE OF CONTENTS

Executive Summary	4
Data Sources	5
Methods	7
Discard Estimation Methods Overview.....	7
Final IFQ Fishery Discard Estimation.....	8
Shore-based IFQ Sectors.....	8
At-sea Hake Coop Sectors.....	11
California Halibut Bottom Trawl Fishery.....	12
Pink Shrimp Trawl Fishery.....	12
Non-Nearshore Fixed Gear Sector.....	13
Nearshore Fixed Gear Sector.....	14
Other Commercial Data Summaries.....	15
Results	16
Acknowledgements	18
References	18
Figures	20
Figure 1. PacFIN Fish Ticket Data Processing.....	20
Tables	20
Table 1. IFQ Fishery Data Stratification.....	21
Table 2. IFQ Discard Ratios.....	22
Table 3. Observed Sectors: IFQ/Coop Fishing Mortality Estimates by Sector.....	26
Table 4. OA California Halibut Trawl.....	31
Table 5. Pink Shrimp Trawl.....	32
Table 6. LE Sablefish Primary Fixed Gear.....	34
Table 7. LE Non-Primary Fixed Gear.....	36
Table 8. OA Fixed Gear.....	38
Table 9. LE and OA Fixed Gear Summary.....	41
Table 10. Nearshore Fixed Gear: Partition Landings by Depth.....	43
Table 11. Nearshore Fixed Gear: Discard Ratios.....	44
Table 12. Nearshore Fixed Gear: Fishing Mortality Estimates.....	46
Table 13. Observed Sectors: Non-IFQ Fishing Mortality Estimates by Sector.....	49
Table 14. Incidental Landings.....	52
Table 15. Fishing Mortality Estimates by Sector.....	54
Table 16. Fishing Mortality Estimates Relative to Harvest Specifications.....	59

Executive Summary

The primary objective of this report is to estimate fishing mortality of groundfish species in U.S. west coast fisheries during 2012 and evaluate mortality estimates relative to Annual Catch Limit (ACL), Acceptable Biological Catch (ABC), and Overfishing Limit (OFL) harvest management goals. These management goals are published each year in the federal groundfish regulations for selected groundfish species (50 CFR 660 Subpart G). Based on a recommendation from the Pacific Fishery Management Council's (PFMC) Scientific and Statistical Committee (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 2012 ACL, ABC, or OFL harvest goals.
- Estimated fishing mortality of four species/complexes were above 90% of ACL goals: 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%).
- Twenty-six groundfish species or complexes (65%) had fishing mortality estimates which were less than 50% of 2012 ACL harvest goals.
- Fishing mortality estimates for all groundfish combined were lower in all sectors/fisheries in 2012 relative to the prior year, except mortality estimates were higher in all state recreational groundfish fisheries and groundfish landings increased in those fisheries which catch groundfish incidentally.
- An almost equal proportion of groundfish species or complexes showed an increase (48%) or decrease (53%) in estimated fishing mortality from 2011 to 2012.
- The majority of rockfish species or complexes showed an increase in estimated fishing mortality in 2012 relative to 2011, in contrast to the majority of flatfish species which decreased.

Summaries of 2012 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 Coop Programs*

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

Pacific whiting (hake) mothership (MS)

Pacific whiting (hake) mothership catcher-vessel

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

OA fixed gear nearshore (Oregon/California)*

Fixed gear LE sablefish primary season (tier endorsed)*

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

Fixed gear OA daily trip limit*

Exempted fishing permit (EFP)

Non-commercial –

*Sectors that use federal observer data

Tribal (shoreside fisheries)
Tribal at-sea Pacific whiting (hake)*
Recreational (Washington/Oregon/California)
Research

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

Commercial -
 OA shrimp trawl – Washington/Oregon/California*
 OA bottom trawl
 Other gear groups - not trawl, shrimp trawl, or fixed-gear
 Fixed gear targeting non-groundfish

Data Sources

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

Fleet-wide landing receipts (a.k.a. fish tickets) are the cornerstone of retained catch information for all sectors of the commercial groundfish fishery on the US west coast. Fish tickets are trip-aggregated sales receipts issued to vessels by fish-buyers in each port for each delivery of fish. They are provided to fish-buyers by a state agency and must be returned to the agency for processing. Fish tickets are designed by the individual states. Washington, Oregon, and California each have a slightly different fish ticket format. 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 2012 were retrieved from the PacFIN database (05-29-2013) 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 Service,

NMFS) (66 FR 20609). All commercial vessels that land groundfish caught in the United States Exclusive Economic Zone (EEZ) from 3-200 miles offshore are required to carry an observer when notified to do so by NMFS or its designated agent. Subsequent state rule-making also require vessels that fish for groundfish within 3 miles of shore or participate in other state-managed fisheries to carry 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. Detailed information on data collection methods employed in each observed fishery can be found in WCGOP manuals (NWFSC 2012, NWFSC 2013a; http://www.nwfsc.noaa.gov/research/divisions/fram/observation/data_collection/training.cfm).

The sampling protocol employed by the WCGOP is primarily focused on the discarded portion of catch. To ensure that recorded weights for the retained portion of the observed catch are accurate, haul-level retained catch recorded by WCGOP observers are reconciled with trip-level fish ticket records. The WCGOP data are linked to fish tickets by fish ticket identification numbers obtained by the observer and are adjusted so that the total trip pounds of retained catch equals the total trip pounds on the fish ticket(s). Adjusting observer retained catch weight to fish ticket weight is done because the fish ticket weight is more accurate and fish tickets are legally binding documents (for more details see: http://www.nwfsc.noaa.gov/research/divisions/fram/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 2013b; 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/Coop Program management, all catcher vessels which 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 2012 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 Northwest Regional Office (NWR). These data were then summarized by the NWR and included in this report.

In addition to these data sources, further information provided by the Groundfish Management Team (GMT) was also used in the total mortality estimation process. The GMT is an advisory body to the PFMC that is comprised of representatives from federal, state, and tribal agencies and is involved in evaluating management performance and alternatives for groundfish fisheries between the U.S. borders with Canada and Mexico. For the purposes of this analysis, the GMT provided mortality rates, which are assumptions regarding the survival of discards, for sablefish and lingcod in the trawl and fixed gear sectors and for the major species groups reported in the state-permitted fixed gear nearshore sector. In the 2013-2014 groundfish management cycle, the SSC recommended that discard mortality rate assumptions made for stock assessment purposes should also be considered for discard estimates of longnose skate (trawl and fixed gear) and spiny dogfish (hook-and-line fixed gear) (PFMC 2012). These rates were

first applied to 2012 discard estimates in this report. 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 can vary greatly from bottom trawl gear.

Methods

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

Species were defined and/or grouped for this report according to the WCGOP Data Processing Appendix (http://www.nwfsc.noaa.gov/research/divisions/fram/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/fmpthr19.pdf>). Groundfish species that are currently being managed under rebuilding plans are presented separately from non-rebuilding species.

In all tables, (--) was used when there is no actual numeric value (i.e., the species was not caught). Values appear as 0.0 when a value exists but is smaller than the decimal places allotted. A value of NA represents that the calculation is not applicable for a particular species or stratum, or that the calculation did not produce a result (e.g., very small

values might result in NA from a standard error calculation). Grey shading indicates that values include estimates of both discard and retained catch.

Final IFQ Fishery Discard Estimation

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

Catch processed at-sea (Coop Program):

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

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, under IFQ regulations:

- 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 were allowed for fishing under a Federal groundfish trawl-endorsed permit (trawl or fixed gear).
- A limit of one (1) IFQ reporting area could be fished per trip.
- 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, associated data sources, and observer data collection, see: http://www.nwfsc.noaa.gov/research/divisions/fram/observation/catchshares_how.cfm. For additional information provided in status reports by the Economic Data Collection Program concerning landings and revenue in this fishery, see: <http://www.pcouncil.org/resources/archives/briefing-books/june-2013-briefing-book/>.

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 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 (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). Originally, seasonal strata were based on the structure of two-month cumulative trip limit periods, but they now continue to reflect seasonal changes in RCA closures, fishing effort, and target species in the fishery (e.g. winter petrale sole). Due to a limited number of observations, IFQ vessels fishing midwater trawl gear for non-Pacific hake target species in the area north of 40° 10' N. latitude were not stratified by season or depth. Lastly, observations from tows made by IFQ vessels participating in the LE California halibut fishery (per criteria above) were combined with all other observations of bottom trawl gear due to low sample size and confidentiality guidelines.

Despite the 100% observer coverage mandate which began in 2011, there were some rare occasions (e.g., observer illness) when tows or sets were not sampled (unsampled). In some cases (e.g. protocol), tows or sets may have had some portion of the discarded catch recorded in very broad or mixed (unsampled) categories (Table X). 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 2012 IFQ fishery are presented in Tables 2a & b. Discard ratios and expansion factors are presented by season and depth. Winter season is January-April and November-December and summer season is May-October. 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). IFQM included all 2012 IFQ managed species (see 77 FR 28497 for a listing of IFQ species in 2012). NIFQ included all species encountered that were not designated as an IFQ species in 2012 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.

Table X. WCGOP unsampled catch categories and associated species (used in IFQ fishery protocols) are as follows:

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

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) in order 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 2012 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. For the first time in this report, we 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).

At-Sea Hake Coop Sectors

The midwater trawl fishery for Pacific hake is comprised of three at-sea processing fleets: catcher-processors, motherships (with non-tribal catcher boats), and a tribal fleet delivering to motherships. The A-SHOP produces estimates of total catch (discard + 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. The at-sea tribal fleet is represented in Table 15, along with shore-based tribal landings.

Coast-wide landings or retained catch, sampled discard weight, estimated discard weight, and estimated fishing mortality in all 2012 Pacific hake IFQ/Coop Program sectors (shore-based and at-sea) are reported in Table 3b. The 2012 Pacific hake fleet which delivers to shore-based processors was observed by WCGOP under the IFQ fishery and discard was estimated in the same manner as described for the Shore-based IFQ Sectors (above). Prior to 2011, this fishery was conducted under an Exempted Fishing Permit (EFP). 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.

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.

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 2012 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). For the first time in this report, we apply 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.

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 2012 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 prior reports, pink shrimp fish tickets in the area north of 40°10' N. latitude were compiled for a single discard expansion factor, and south of 40°10' N. latitude landings were summarized as part of the remaining incidental fisheries. Previously, observer data from all state pink shrimp fleets in the north were combined to calculate discard rates. However, WCGOP coverage of the Washington pink shrimp fleet began in 2010 and coverage of all state fisheries in 2011 and 2012 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.

Fish tickets for fixed gear that did not have recorded sablefish or nearshore species were included in the non-nearshore fixed gear sector only if groundfish landings were greater than non-groundfish landings based on a unique vessel and landing date (Figure 1). If non-groundfish landings were greater than groundfish landings, those fixed gear fish tickets (which also did not have recorded sablefish or nearshore species) were summarized in Table 14 incidental landings. The commercial fixed gear fish tickets with recorded nearshore species weight were not used in this portion of the analysis, regardless of whether they included recorded weights for sablefish. These fish tickets were instead included in the nearshore fixed gear groundfish sector (see next section). Fish tickets associated with the Pacific halibut directed commercial fishery were isolated and removed from our analyses based on landed catch of Pacific halibut recorded on the fish ticket on the day of the opening or within two subsequent days. Fish tickets 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 our analyses were collected by WCGOP from the following fixed gear subsectors in order of priority: LE sablefish endorsed primary season fixed gear, LE '0' tier (non-endorsed), and OA fixed gear (non-nearshore). LE sablefish endorsed vessels that were fishing outside of the primary season or that had reached their cumulative tier quota in the primary season were not observed.

Observer data were stratified by subsector, 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 8.6 mt of groundfish with pot gear in 2012 (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 2012 LE and OA non-nearshore groundfish fixed gear. A 20% mortality rate is applied for discarded sablefish, as assumed by the GMT. For the first time in this report, we apply 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. 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.

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 2012 federal groundfish management specifications.

Mortality rates provided by the GMT differ for each species according to depth. In December 2007, the GMT provided revised depth-specific discard survival assumptions for nearshore species. It was therefore necessary to generate discard estimates in each of the three depth intervals employed by the GMT (0-10, 11-20, > 20 fathoms). The percentage of catch for each species or complex by depth was calculated based on summarized observer data from 2003-2012 (Table 10). Fleet landings of each nearshore species or complex in 2012 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. Per GMT preference, gopher rockfish in the area south of 40° 10' N. latitude assumed the Shallow nearshore rockfish discard mortality group rates. 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 2012 nearshore fixed gear sectors north and south of 40° 10' N. latitude are reported in Tables 12a & b.

Other Commercial Data Summaries

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

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

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

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

Bycatch estimation and summaries for several additional fish species observed by the WCGOP and A-SHOP are available in separate reports; Pacific halibut is provided in Jannot et al. 2013, salmon species are provided in Al-Humaidhi et al. 2012a, and green sturgeon and Pacific eulachon are provided in Al-Humaidhi et al. 2012b.

Results

Fishing mortality estimates for all groundfish combined were lower for all sectors in 2012 relative to the prior year, except increases of groundfish landings in those which catch groundfish incidentally and mortality estimates were higher in all state recreational groundfish fisheries (Table 15) (Bellman et al. 2012). However, when reviewed at a finer level, an almost equal proportion of groundfish species or complexes showed an increase (48%) or decrease (53%) in estimated fishing mortality from 2011 to 2012.

Relative to 2011, the shore-based IFQ fishery in 2012 demonstrated a minor decrease in overall effort (-10% trips, -2% tows/sets) (Table 1). Only 0.4% of tows/sets in 2012 were unsampled by observers (e.g., rare occasions such as observer illness), although 100% of trips continue to be observed. IFQ fishing with bottom or midwater trawl gear (non-hake targeted) decreased slightly in 2012 (-6% trips, -3% tows), with a corresponding decrease in both overall groundfish landings and discard (Table 3a). However, it was possible to report 2012 midwater trawl data which was not part of the shoreside hake fleet, due to adequate sample size and enough vessels fishing to meet confidentiality guidelines. In 2012, IFQ fishing with hook-and-line fixed gears decreased (-58% trips, -20% sets) but fishing with pot gears increased (+19% trips, +12% sets). A corresponding decrease in both overall groundfish landings and discard occurred in hook-and-line IFQ fishing. Even though IFQ pot fishing effort (trips and sets) increased in 2012 relative to 2011, there was a decrease in groundfish landings, but an increase in groundfish discard weight. Shore-based IFQ midwater trawl fishing targeting Pacific hake during 2012 demonstrated a decrease in both landings and discard relative to 2011 (Table 3b). We also note that for groundfish species/complexes designated and tracked under IFQ management (excluding Pacific halibut), discard mortality estimates presented in this report, as a whole, were within 0.3% of those calculated in the inseason Vessel Account System for 2012 and landings were within 0.6%.

Two elements which affect 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 were down by 30% in the OA California halibut trawl fishery (Table 4). Thus the expansion factor for discard estimation was lower. Fleet-wide landings in the Washington and Oregon pink shrimp fisheries increased relative to 2011, but California's landings decreased (Table 5). Relative to 2011 landings, all sectors of the groundfish non-IFQ fixed gear fishery (LE and OA) demonstrated decreased landings in 2012 (Table 9). Nearshore fixed gear landings increased slightly in

Oregon and decreased in California, though the expansion factors calculated for north and south of 40°10' N. latitude were both lower in 2012 (Table 11).

Estimated fishing mortality for all groundfish species or complexes did not exceed 2012 ACL, ABC, or OFL harvest goals (Table 16). Fishing mortality estimates are evaluated in terms of 2012 ACL, ABC, and OFL harvest specifications from federal groundfish regulations (50 CFR 660 Subpart G). Twenty-six groundfish species or complexes (65%) had fishing mortality estimates which were less than 50% of 2012 ACL harvest goals. However, the estimated fishing mortality of four groundfish species/complexes were above 90% of their ACL goals: 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 Oregon cabezon represented the closest attainment of an ACL goal in 2012 (98%). The primary contributions of fishing mortality are from the commercial nearshore fixed gear fishery and the Oregon recreational fishery. Overall fishing mortality estimated for the nearshore complex north of 40°10' N. latitude is attributed to recreational fisheries and commercial nearshore fixed gear fishing. The majority of Petrale sole are caught in the non-hake IFQ fishery with trawl gear, almost all of which are retained and landed. Recreational fishing in California contributes the majority of California scorpionfish weight caught in the area south of 34°27' N. latitude.

For rebuilding groundfish, 2012 fishing mortality estimates decreased relative to 2011 for several species: canary rockfish, darkblotched rockfish and Pacific ocean perch, and increased for others: bocaccio rockfish, cowcod, petrale sole, and yelloweye rockfish. In 2012, ACL goals either increased or remained consistent for all rebuilding species except darkblotched rockfish which decreased by 2 mt relative to the 2011 value.

The majority of non-rebuilding rockfish species or complexes showed an increase in estimated fishing mortality in 2012 relative to 2011, in contrast to the majority of flatfish species which decreased. This follows the same trend as in 2011, where all flatfish species had decreased estimated fishing mortality relative to 2010, with the exception of petrale sole.

For the past four years, sablefish mortality north of 36° N. latitude continues the trend of decreasing. However, this is the first year that sablefish mortality south of 36° N. latitude has shown a decrease in mortality. In the past several years, sablefish mortality was estimated very close to the harvest goal in both areas, but 2012 fishing mortality estimates now have a margin remaining from the ACL goal (88% of ACL caught north 36° N lat., 56% south 36° N lat.).

Longnose skate and spiny dogfish discard estimate comparison's between 2012 and 2011 should consider the newly applied discard mortality rates as assumed by the SSC for 2012 data. Discard values are provided in most tables for the gross discard estimate (comparable to 2011 values) and the final estimate reduced by the applicable discard mortality rate.

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

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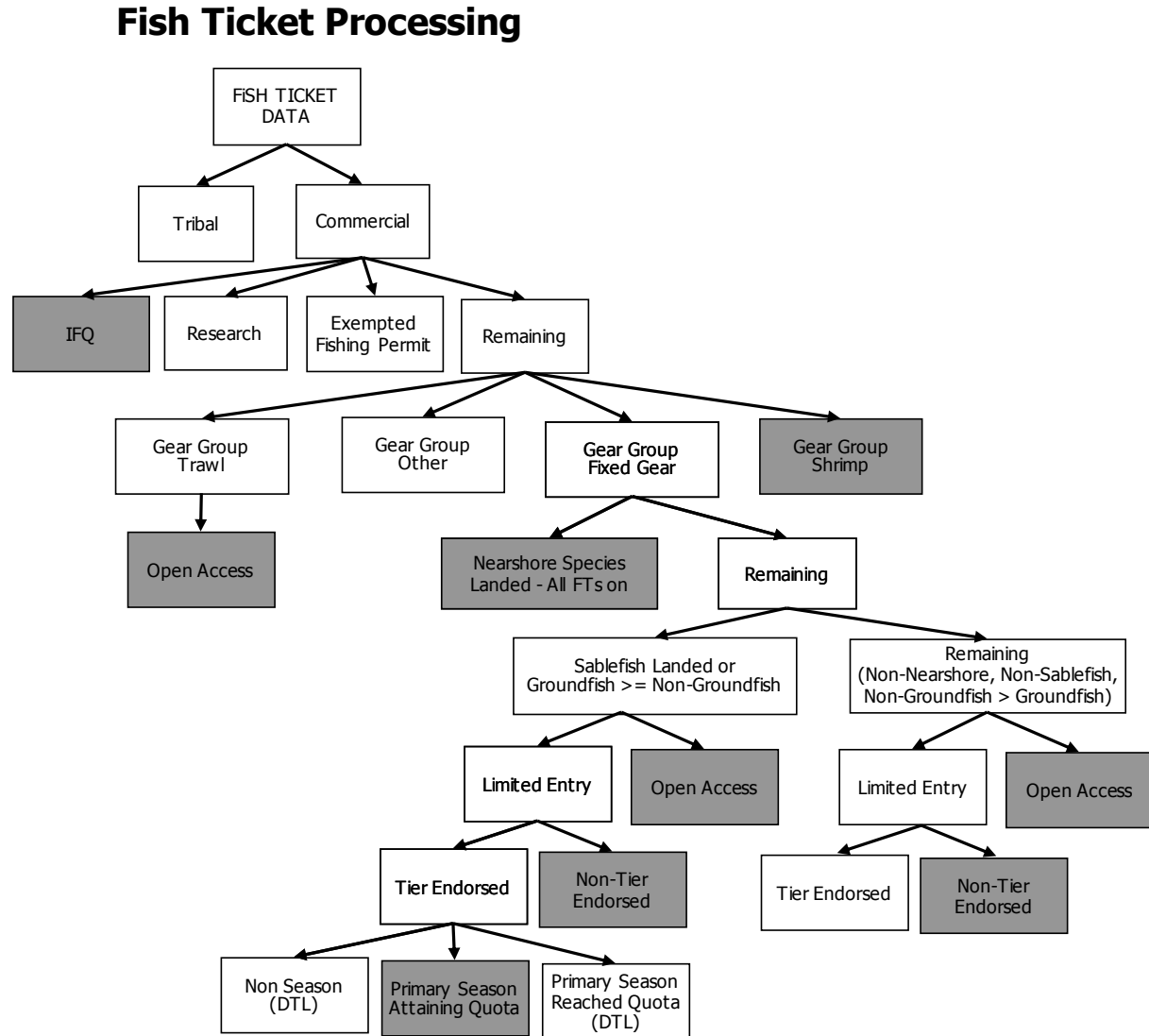
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Figures

Figure 1. Fish ticket data processing for division into groundfish fishery sectors after retrieval of a full calendar year data set from the Pacific Coast Fisheries Information Network (PacFIN) database (query date 05-29-2013). Grey highlight indicates sectors for which federal observer data are available.



Tables

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

Table 1. Number of vessels, trips and hauls from WCGOP observer data for the 2012 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			
Trawl - Bottom + LE CA halibut	North of 40°10' N	Winter	0-125	10	21	150	0	0	0	1	0	100%
			126-250	48	271	994	0	0	6	28	7	99.3%
			> 250	47	354	1838	0	0	13	57	5	99.7%
	South of 40°10' N	Summer	0-125	24	206	2324	5	0	19	73	32	98.6%
			126-250	32	183	742	0	1	6	25	4	99.5%
			> 250	33	221	1118	0	0	10	50	1	99.9%
	South of 40°10' N	Winter	0-125	3	27	119	0	0	0	3	0	100%
			126-250	11	53	147	0	0	0	4	1	99.3%
			> 250	11	68	336	0	0	0	9	0	100%
South of 40°10' N	Summer	0-125	8	110	512	0	0	0	8	2	99.6%	
		126-250	9	76	219	1	1	0	21	0	100%	
		> 250	9	111	524	0	0	1	26	0	100%	
Trawl - Midwater	North of 40°10' N	Annual	All depths	6	11	37	0	0	0	0	100%	
Hook-and-Line	Coastwide	Winter	0-250	3	8	78	0	0	0	0	0	100%
			> 250	3	7	103	0	0	0	0	0	100%
		Summer	0-250	6	15	211	0	0	0	0	0	100%
			> 250	4	13	106	0	0	0	0	0	100%
Pot	North of 40°10' N	Winter	0-250	4	14	50	0	0	0	0	0	100%
			> 250	7	33	258	0	0	0	1	0	100%
	South of 40°10' N	Summer	0-250	4	25	136	0	0	0	0	0	100%
			> 250	7	51	443	0	0	0	6	0	100%
		Winter	0-250	3	10	17	0	0	0	0	0	100%
			> 250	9	48	163	0	0	0	0	0	100%
South of 40°10' N	Summer	0-250	5	12	30	0	0	0	0	0	100%	
		> 250	11	119	604	0	0	0	1	0	100%	
Shoreside Hake	North of 40°10' N	Winter	All depths	21	109	208	0	0	0	1	0	100%
		Summer	All depths	23	606	1357	0	0	0	2	0	100%

Table 2a. Values used to calculate the expanded weight of groundfish species from each WCGOP unsampled catch category in the 2012 IFQ fishery using bottom trawl gear north of 40°10' N latitude. Discard ratios and expansion factors are presented by season and depth. Winter season is January-April and November-December and summer season is May-October. 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 Fishery - Bottom Trawl North of 40°10' N Lat.	Season Depth (m) Expansion Factor (mt)	IFQFF	IFQRF	IFQM				NIFQ					All Species						
		Summer	Summer	Summer			Winter		Summer			Winter		Summer			Winter		
		0-125	126-250	0-125	126-250	>250	126-250	>250	0-125	126-250	>250	0-125	126-250	>250	0-125	126-250	>250	126-250	>250
		0.5092	0.0009	4.8726	1.4765	4.4453	0.3719	0.5715	11.7434	2.6011	3.6148	0.0136	1.5161	3.3143	7.3451	12.4771	0.0227	7.2596	7.2893
Rebuilding species		--	--	0.0001	--	--	--	--	--	--	--	--	--	--	0.0001	--	--	--	--
Canary Rockfish		--	0.0839	0.0054	0.0048	0.0011	0.0016	0.0008	--	--	--	--	--	--	0.0021	0.0025	0.0003	0.0006	0.0002
Darkblotched Rockfish		--	0.0744	0.0008	0.0042	0.0003	0.0030	0.0006	--	--	--	--	--	--	0.0003	0.0023	0.0001	0.0012	0.0002
Pacific Ocean Perch (North of 40°10' N. lat.)		0.0472	--	0.0378	0.0001	--	0.0023	0.0004	--	--	--	--	--	--	0.0147	0.0001	--	0.0009	0.0001
Petrale Sole																			
Other groundfish species																			
Arrowtooth Flounder		0.3074	--	0.2460	0.4269	0.1116	0.3396	0.2652	--	--	--	--	--	--	0.0960	0.2280	0.0269	0.1358	0.0781
Black Rockfish (North of 46°16' N. lat.)		--	--	--	--	--	--	--	0.0000	--	--	--	--	--	0.0000	--	--	--	--
Cabezon (Oregon)		--	--	--	--	--	--	--	0.0002	--	--	--	--	--	0.0001	--	--	--	--
Dover Sole		0.0374	--	0.0299	0.0037	0.2870	0.0007	0.0987	--	--	--	--	--	--	0.0117	0.0020	0.0693	0.0003	0.0291
English Sole		0.1137	--	0.0910	0.0001	0.0000	0.0002	0.0001	--	--	--	--	--	--	0.0355	0.0000	0.0000	0.0001	0.0000
Lingcod (North of 42° N. lat.)		--	--	0.0788	0.0025	0.0011	0.0031	0.0001	--	--	--	--	--	--	0.0307	0.0013	0.0003	0.0012	0.0000
Lingcod (South of 42° N. lat.)		--	--	0.0073	0.0002	0.0000	0.0001	--	--	--	--	--	--	--	0.0029	0.0001	0.0000	0.0000	--
Longnose Skate		--	--	--	--	--	--	--	0.0624	0.1173	0.0542	0.0288	0.0647	0.0423	0.0381	0.0547	0.0411	0.0388	0.0299
Longspine Thornyhead (North of 34°27' N. lat.)		--	0.0483	0.0000	0.0027	0.2320	0.0013	0.1034	--	--	--	--	--	--	0.0000	0.0015	0.0560	0.0005	0.0305
Minor nearshore rockfish (North of 40°10' N. lat.)																			
Rockfish Unid		--	--	--	--	--	--	--	--	--	--	--	0.0000	--	--	--	--	0.0000	--
Minor shelf rockfish (North of 40°10' N. lat.)																			
Bocaccio Rockfish		--	--	0.0000	--	--	--	--	--	--	--	--	--	--	0.0000	--	--	--	--
Chilipepper Rockfish		--	--	0.0002	--	--	0.0000	--	--	--	--	--	--	--	0.0001	--	--	0.0000	--
Cowcod Rockfish		--	--	0.0000	--	--	--	--	--	--	--	--	--	--	0.0000	--	--	--	--
Greenspotted Rockfish		--	--	0.0000	--	--	--	--	--	--	--	--	--	--	0.0000	--	--	--	--
Greenstriped Rockfish		--	0.0092	0.0128	0.0005	0.0000	0.0004	0.0000	--	--	--	--	--	--	0.0050	0.0003	0.0000	0.0002	0.0000
Halfbanded Rockfish		--	--	0.0000	--	--	--	--	--	--	--	--	--	--	0.0000	--	--	--	--
Harlequin Rockfish		--	--	0.0000	--	--	--	--	--	--	--	--	--	--	0.0000	--	--	--	--
Redstripe Rockfish		--	0.0002	0.0002	0.0000	0.0000	0.0000	0.0000	--	--	--	--	--	--	0.0001	0.0000	0.0000	0.0000	0.0000
Rosethorn Rockfish		--	0.0300	0.0001	0.0017	0.0005	0.0037	0.0003	--	--	--	--	--	--	0.0001	0.0009	0.0001	0.0015	0.0001
Rosy Rockfish		--	0.0026	--	0.0001	0.0002	0.0003	0.0001	--	--	--	--	--	--	--	0.0001	0.0000	0.0001	0.0000
Shelf Rockfish Unid		--	0.0862	0.0006	0.0049	--	0.0000	--	--	--	--	--	--	--	0.0002	0.0026	--	0.0000	--
Silvergray Rockfish		--	--	--	--	--	0.0000	--	--	--	--	--	--	--	--	--	--	0.0000	--
Squarespot Rockfish		--	--	0.0000	--	--	--	--	--	--	--	--	--	--	0.0000	--	--	--	--
Squid Rockfish		--	--	--	--	0.0010	--	--	--	--	--	--	--	--	--	--	0.0002	--	--
Starry Rockfish		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Stripetail Rockfish		--	--	0.0057	--	--	--	--	--	--	--	--	--	--	0.0022	--	--	--	--
Minor slope rockfish (North of 40°10' N. lat.)																			
Aurora Rockfish		--	0.2347	0.0017	0.0133	0.0070	0.0079	0.0043	--	--	--	--	--	--	0.0007	0.0071	0.0017	0.0031	0.0013
Bank Rockfish		--	--	0.0000	--	--	--	--	--	--	--	--	--	--	0.0000	--	--	--	--
Blackgill Rockfish		--	0.0013	--	0.0001	0.0000	0.0001	0.0000	--	--	--	--	--	--	--	0.0000	0.0000	0.0000	0.0000
Redbanded Rockfish		--	0.0316	0.0001	0.0018	0.0003	0.0021	0.0006	--	--	--	--	--	--	0.0000	0.0010	0.0001	0.0008	0.0002
Rougheye Rockfish		--	0.0041	0.0000	0.0002	0.0000	0.0002	0.0000	--	--	--	--	--	--	0.0000	0.0001	0.0000	0.0001	0.0000
Sharpchin Rockfish		--	0.0132	0.0002	0.0007	0.0002	0.0040	0.0001	--	--	--	--	--	--	0.0001	0.0004	0.0001	0.0016	0.0000
Shortraker Rockfish		--	0.0007	0.0000	0.0000	0.0000	--	--	--	--	--	--	--	--	0.0000	0.0000	0.0000	--	--
Slope Rockfish Unid		--	--	--	--	--	0.0013	--	--	--	--	--	--	--	--	--	--	0.0005	--
Splitnose Rockfish		--	0.1311	0.0038	0.0074	0.0060	0.0223	0.0082	--	--	--	--	--	--	0.0015	0.0040	0.0014	0.0089	0.0024
Yellowmouth Rockfish		--	--	0.0000	--	--	--	0.0000	--	--	--	--	--	--	0.0000	--	--	--	0.0000

Table 2a (continued).

IFQ Fishery - Bottom Trawl North of 40°10' N Lat.	Season Depth (fm) Expansion Factor (mt)	IFQFF	IFQRF	IFQM				NIFQ						All Species					
		Summer	Summer	Summer			Winter		Summer			Winter			Summer			Winter	
		0-125	126-250	0-125	126-250	>250	126-250	>250	0-125	126-250	>250	0-125	126-250	>250	0-125	126-250	>250	126-250	>250
		0.5092	0.0009	4.8726	1.4765	4.4453	0.3719	0.5715	11.7434	2.6011	3.6148	0.0136	1.5161	3.3143	7.3451	12.4771	0.0227	7.2596	7.2893
Mixed thornyheads																			
Shortspine/Longspine Thornyhead	--	0.0083	--	0.0005	0.0109	0.0001	0.0018	--	--	--	--	--	--	--	0.0003	0.0026	0.0000	0.0005	
Other flatfish																			
Butter Sole	0.0084	--	0.0067	--	--	--	--	--	--	--	--	--	--	--	0.0026	--	--	--	--
Curfin Turbot	0.0002	--	0.0002	--	--	--	--	--	--	--	--	--	--	--	0.0001	--	--	--	--
Flatfish Unid	--	--	--	--	0.0000	0.0000	--	--	--	--	--	--	--	--	--	0.0000	0.0000	--	--
Flathead Sole	0.0135	--	0.0108	0.0001	0.0000	0.0000	--	--	--	--	--	--	--	--	0.0042	0.0000	0.0000	0.0000	--
Pacific Sanddab	0.2432	--	0.1946	0.0000	--	--	0.0000	--	--	--	--	--	--	--	0.0759	0.0000	--	--	0.0000
Rex Sole	0.1098	--	0.0878	0.0017	0.0059	0.0015	0.0011	--	--	--	--	--	--	--	0.0343	0.0009	0.0014	0.0006	0.0003
Rock Sole	0.0007	--	0.0005	--	--	--	--	--	--	--	--	--	--	--	0.0002	--	--	--	--
Sanddab Unid	0.0008	--	0.0006	--	--	--	--	--	--	--	--	--	--	--	0.0002	--	--	--	--
Sand Sole	0.0031	--	0.0025	--	--	--	--	--	--	--	--	--	--	--	0.0010	--	--	--	--
Other groundfish																			
Big Skate	--	--	--	--	--	--	--	0.0840	0.0005	0.0001	0.0910	0.0002	0.0002	0.0512	0.0002	0.0001	0.0001	0.0002	
California Skate	--	--	--	--	--	--	--	0.0000	--	--	--	0.0000	--	0.0000	--	--	0.0000	--	--
Cod Unid	--	--	--	--	--	--	--	0.0000	--	--	--	--	--	0.0000	--	--	--	--	--
Kelp Greenling	--	--	--	--	--	--	--	0.0002	--	--	0.0003	--	0.0000	0.0001	--	--	--	--	0.0000
Pacific Flatnose	--	--	--	--	--	--	--	--	0.0000	0.0037	--	0.0000	0.0025	--	0.0000	0.0028	0.0000	0.0018	
Pacific Grenadier	--	--	--	--	--	--	--	0.0000	0.0010	0.0992	--	0.0003	0.0462	0.0000	0.0005	0.0753	0.0002	0.0326	
Ray Unid	--	--	--	--	--	--	--	0.0000	--	--	--	--	--	0.0000	--	--	--	--	--
Roundfish Unid	--	--	--	--	--	--	--	--	--	--	--	0.0000	--	--	--	--	0.0000	--	--
Skate Unid	--	--	--	--	--	--	--	0.0023	0.0006	0.0029	--	0.0006	0.0009	0.0014	0.0003	0.0022	0.0003	0.0007	
Soupin Shark	--	--	--	--	--	--	--	0.0002	--	0.0010	0.0026	--	--	0.0001	--	0.0007	--	--	
Spotted Ratfish	--	--	--	--	--	--	--	0.0868	0.0774	0.0091	0.2565	0.0562	0.0091	0.0529	0.0361	0.0069	0.0337	0.0064	
Pacific Cod	--	--	0.0026	0.0000	--	0.0000	--	--	--	--	--	--	--	0.0010	0.0000	--	0.0000	--	
Pacific Hake	--	--	0.0690	0.4266	0.2801	0.4109	0.4057	--	--	--	--	--	--	0.0269	0.2278	0.0676	0.1643	0.1195	
Sablefish (North of 36° N. lat.)	--	--	0.0094	0.0015	0.0068	0.0046	0.0077	--	--	--	--	--	--	0.0037	0.0008	0.0016	0.0018	0.0023	
Shortbelly Rockfish	--	--	--	--	--	--	--	0.0000	0.0000	--	--	--	--	0.0000	0.0000	--	--	--	
Shortspine Thornyhead (North of 34°27' N. lat.)	--	0.2103	0.0006	0.0119	0.0139	0.0073	0.0146	--	--	--	--	--	--	0.0002	0.0064	0.0033	0.0029	0.0043	
Spiny Dogfish	--	--	--	--	--	--	--	0.2242	0.2974	0.0096	0.1846	0.6518	0.1403	0.1367	0.1386	0.0073	0.3911	0.0989	
Starry Flounder	0.0012	--	0.0009	--	0.0001	--	0.0000	--	--	--	--	--	--	0.0004	--	0.0000	--	0.0000	
Widow Rockfish	--	0.0005	--	0.0000	--	0.0000	--	--	--	--	--	--	--	--	0.0000	--	0.0000	--	
Yellowtail Rockfish (North of 40°10' N. lat.)	--	0.0291	0.0001	0.0017	0.0000	--	--	--	--	--	--	--	--	0.0000	0.0009	0.0000	--	--	
Non-groundfish species																			
Dungeness Crab	--	--	--	--	--	--	--	0.3409	0.0036	0.0004	0.3683	0.0019	0.0001	0.2079	0.0017	0.0003	0.0011	0.0001	
Non-FMP flatfish																			
Deepsea Sole	--	--	--	--	--	--	--	--	0.0015	0.0287	--	0.0008	0.0185	--	0.0007	0.0218	0.0005	0.0130	
Slender Sole	--	--	--	--	--	--	--	0.0889	0.0025	0.0004	0.0115	0.0013	0.0003	0.0542	0.0012	0.0003	0.0008	0.0002	
Non-FMP skate																			
Aleutian Skate	--	--	--	--	--	--	--	0.0000	0.0091	0.0038	--	0.0019	0.0013	0.0000	0.0042	0.0029	0.0011	0.0009	
Bering Skate	--	--	--	--	--	--	--	--	--	--	--	0.0000	--	--	--	--	0.0000	--	
Black Skate	--	--	--	--	--	--	--	0.0000	0.0011	0.0353	--	0.0008	0.0358	0.0000	0.0005	0.0268	0.0005	0.0252	
Deepsea Skate	--	--	--	--	--	--	--	--	--	0.0001	--	0.0002	0.0010	--	--	0.0000	0.0001	0.0007	
Pacific Electric Ray	--	--	--	--	--	--	--	0.0001	0.0005	--	0.0005	0.0002	0.0001	0.0001	0.0002	--	0.0001	0.0000	
Sandpaper Skate	--	--	--	--	--	--	--	0.0133	0.0653	0.0198	0.0106	0.0562	0.0354	0.0081	0.0304	0.0150	0.0338	0.0250	
Starry Skate	--	--	--	--	--	--	--	0.0001	--	0.0000	--	--	--	0.0001	--	0.0000	--	--	
White Skate	--	--	--	--	--	--	--	--	--	0.0014	--	0.0000	0.0006	--	--	0.0011	0.0000	0.0004	

Table 2b. Values used to calculate the expanded weight of groundfish species from each WCGOP unsampled catch category in 2012 IFQ fisheries: bottom trawl gear south of 40°10' N latitude, pot gear, shoreside hake. 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			
	IFQFF	IFQRF	IFQM	NIFQ						All Species		NIFQ			NIFQ	
	South	South	South	South			South			South		North	South	North	North	
	Summer	Summer	Summer	Summer			Winter			Summer	Winter	Summer	Summer	Winter	Summer	Winter
	126-250	126-250	>250	0-125	126-250	>250	0-125	126-250	>250	0-125	126-250	>250	>250	>250	All Depths	All Depths
Rebuilding species	0.0068	0.0023	0.0340	4.2293	0.4871	1.1451	0.0612	0.0295	1.2453	1.5635	0.3629	0.0073	0.0009	0.0045	0.3402	0.0227
Bocaccio rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	--	--	0.0001	--	--	--	--	--	--
Canary Rockfish	--	--	--	--	--	--	--	--	--	0.0000	--	--	--	--	--	--
Cowcod Rockfish (South of 40°10' N. lat.)	--	0.0000	--	--	--	--	--	--	--	0.0000	--	--	--	--	--	--
Darkblotched Rockfish	--	0.0011	0.0001	--	--	--	--	--	--	0.0000	0.0000	--	--	--	--	--
Petrale Sole	0.0036	--	0.0004	--	--	--	--	--	--	0.0043	0.0003	--	--	--	--	--
Other groundfish species																
Arrowtooth Flounder	0.7493	--	0.0534	--	--	--	--	--	--	0.0190	0.0423	--	--	--	--	--
Chilipepper Rockfish (South of 40°10' N. lat.)	--	0.0826	0.0000	--	--	--	--	--	--	0.2671	0.0134	--	--	--	--	--
Dover Sole	0.1578	--	0.5326	--	--	--	--	--	--	0.0080	0.0191	--	--	--	--	--
English Sole	0.0258	--	0.0003	--	--	--	--	--	--	0.0341	0.0076	--	--	--	--	--
Lingcod (South of 42° N. lat.)	--	--	0.0002	--	--	--	--	--	--	0.0203	0.0057	--	--	--	--	--
Longnose Skate	--	--	--	0.0862	0.2855	0.0949	0.1707	0.1085	0.2020	0.0380	0.0642	--	0.0002	--	--	--
Longspine Thornyhead (North of 34°27' N. lat.)	--	0.0037	0.2367	--	--	--	--	--	--	0.0000	0.0014	--	--	--	--	--
Longspine Thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	--	--	--	--	--	--	0.0007	--	--	--
Minor nearshore rockfish (South of 40°10' N. lat.)																
Brown Rockfish	--	--	--	0.0000	--	--	--	--	--	0.0000	--	--	--	--	--	--
Minor shelf rockfish (South of 40°10' N. lat.)																
Greenspotted Rockfish	--	0.0007	--	--	--	--	--	--	--	0.0008	0.0000	--	--	--	--	--
Greenstriped Rockfish	--	0.0013	--	--	--	--	--	--	--	0.0054	0.0002	--	--	--	--	--
Halfbanded Rockfish	--	0.0000	--	--	--	--	--	--	--	0.0001	--	--	--	--	--	--
Pink Rockfish	--	0.0000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Redstripe Rockfish	--	0.0000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Rosethorn Rockfish	--	0.0013	--	--	--	--	--	--	--	--	0.0001	--	--	--	--	--
Rosy Rockfish	--	0.0000	--	--	--	--	--	--	--	0.0000	0.0001	--	--	--	--	--
Shelf Rockfish Unid	--	0.0052	--	--	--	--	--	--	--	0.0011	--	--	--	--	--	--
Squarespot Rockfish	--	0.0000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Stripetail Rockfish	--	0.1058	0.0000	--	--	--	--	--	--	0.0318	0.0321	--	--	--	--	--
Tiger Rockfish	--	--	--	--	--	--	--	--	--	0.0000	--	--	--	--	--	--
Yellowtail Rockfish	--	--	--	--	--	--	--	--	--	0.0000	--	--	--	--	--	--
Minor slope rockfish (South of 40°10' N. lat.)																
Aurora Rockfish	--	0.0718	0.0188	--	--	--	--	--	--	--	0.0094	--	--	--	--	--
Bank Rockfish	--	0.0012	0.0000	--	--	--	--	--	--	0.0000	0.0000	--	--	--	--	--
Blackgill Rockfish	--	0.0033	0.0001	--	--	--	--	--	--	--	0.0004	--	--	--	--	--
Pacific Ocean Perch	--	0.0001	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Redbanded Rockfish	--	0.0007	0.0000	--	--	--	--	--	--	0.0000	0.0007	--	--	--	--	--
Sharpchin Rockfish	--	0.0018	--	--	--	--	--	--	--	0.0007	0.0005	--	--	--	--	--
Slope Rockfish Unid	--	0.0003	0.0001	--	--	--	--	--	--	--	--	--	--	--	--	--
Mixed thornyheads																
Shortspine/Longspine Thornyhead	--	0.0017	0.0190	--	--	--	--	--	--	--	--	--	--	--	--	--

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			
	IFQFF	IFQRF	IFQM	NIFQ						All Species		NIFQ			NIFQ	
	South	South	South	South			South			South		North	South	North	North	North
	Summer	Summer	Summer	Summer			Winter			Summer	Winter	Summer	Summer	Winter	Summer	Winter
	126-250	126-250	>250	0-125	126-250	>250	0-125	126-250	>250	0-125	126-250	>250	>250	>250	>250	All Depths
Other flatfish																
Butter Sole	0.0002	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Curffin Turbot	0.0007	--	--	--	--	--	--	--	--	0.0018	--	--	--	--	--	--
Flatfish Unid	--	--	0.0002	--	--	--	--	--	--	--	--	--	--	--	--	--
Pacific Sanddab	0.0003	--	--	--	--	--	--	--	--	0.0951	--	--	--	--	--	--
Rex Sole	0.0622	--	0.0004	--	--	--	--	--	--	0.0053	0.0093	--	--	--	--	--
Rock Sole	--	--	--	--	--	--	--	--	--	0.0005	--	--	--	--	--	--
Roughscale Sole	--	--	--	--	--	--	--	--	--	0.0000	--	--	--	--	--	--
Sanddab Unid	--	--	--	--	--	--	--	--	--	0.0054	--	--	--	--	--	--
Sand Sole	--	--	--	--	--	--	--	--	--	0.0000	--	--	--	--	--	--
Other groundfish																
Big Skate	--	--	--	0.0239	0.0006	--	--	0.1636	--	0.0106	--	--	--	--	--	--
California Skate	--	--	--	0.0086	--	--	0.0001	0.0097	--	0.0038	--	--	--	--	--	--
Leopard Shark	--	--	--	0.0007	--	--	--	0.0102	--	0.0003	--	--	--	--	--	--
Pacific Flatnose	--	--	--	--	--	0.0018	0.0017	--	0.0001	--	0.0000	0.0032	0.0059	0.0098	--	--
Pacific Grenadier	--	--	--	--	0.0001	0.0571	0.0159	--	0.0016	--	0.0005	0.1176	0.3129	0.0495	--	--
Skate Unid	--	--	--	--	0.0060	0.0002	0.0020	0.0001	0.0006	--	0.0002	--	--	--	--	--
Souffin Shark	--	--	--	0.0026	--	--	--	0.0013	--	0.0012	--	--	--	--	0.0189	--
Spotted Ratfish	--	--	--	0.0675	0.2349	0.0055	0.0114	0.0299	0.1336	0.0298	0.0425	--	0.0015	--	--	--
Pacific Hake	--	--	0.1269	--	--	--	--	--	--	0.0458	0.2397	--	--	--	--	--
Sablefish (North of 36° N. lat.)	--	--	0.0026	--	--	--	--	--	--	0.0117	0.0039	--	--	--	--	--
Shortbelly Rockfish	--	--	--	0.0505	0.0179	0.0000	--	0.0164	0.0136	0.0223	0.0043	--	--	--	--	--
Shortspine Thornyhead (North of 34°27' N. lat.)	--	0.0088	0.0079	--	--	--	--	--	--	0.0000	0.0025	--	--	--	--	--
Spiny Dogfish Shark	--	--	--	0.0519	0.0527	0.0013	0.0205	0.0073	0.2990	0.0229	0.0951	--	--	0.0051	0.0518	0.0594
Splitnose rockfish (South of 40°10' N. lat.)	--	0.7082	0.0002	--	--	--	--	--	--	0.0000	0.2933	--	--	--	--	--
Starry Flounder	--	--	--	--	--	--	--	--	--	0.0001	--	--	--	--	--	--
Widow Rockfish	--	--	--	--	--	--	--	--	--	0.0000	--	--	--	--	--	--
Non-groundfish species																
California Halibut	--	--	--	--	--	--	--	0.0004	--	--	--	--	--	--	--	--
Dungeness Crab	--	--	--	0.5050	0.0106	0.0001	--	0.3965	0.0190	0.2228	0.0060	0.0002	--	--	0.0002	--
Non-FMP flatfish																
Deepsea Sole	--	--	--	--	0.0004	0.0277	0.0337	--	0.0009	--	0.0003	0.0008	--	0.0028	--	--
Diamond Turbot	--	--	--	0.0013	--	--	--	--	--	0.0006	--	--	--	--	--	--
Hornyhead Turbot	--	--	--	0.0002	--	--	--	--	--	0.0001	--	--	--	--	--	--
Slender Sole	--	--	--	0.0011	0.0020	0.0000	0.0000	0.0005	0.0031	0.0005	0.0010	--	--	--	--	--
Speckled Sanddab	--	--	--	0.0000	--	--	--	--	--	0.0000	--	--	--	--	--	--
Non-FMP skate																
Black Skate	--	--	--	--	--	0.0165	0.0199	--	0.0001	--	0.0000	0.0004	--	--	--	--
Deepsea Skate	--	--	--	--	--	0.0002	0.0004	--	--	--	--	--	--	--	--	--
Pacific Electric Ray	--	--	--	0.0020	0.0207	0.0001	--	0.0013	0.0058	0.0009	0.0019	--	--	--	--	--
Sandpaper Skate	--	--	--	0.0017	0.0524	0.0070	0.0113	0.0108	0.0894	0.0007	0.0284	--	--	--	--	--
Shovelnose Guitarfish	--	--	--	--	--	--	--	0.0002	--	--	--	--	--	--	--	--
Starry Skate	--	--	--	0.0007	--	--	--	0.0007	--	0.0003	--	--	--	--	--	--
Thornback Skate	--	--	--	0.0001	--	--	--	--	--	0.0000	--	--	--	--	--	--
White Skate	--	--	--	--	0.0001	--	0.0001	--	--	--	--	--	--	--	--	--

Table 3a. Non-hake IFQ sectors and LE California halibut. Landings (mt), estimated discard (mt), and fishing mortality estimate (mt) of groundfish species from non-hake IFQ and limited entry California halibut fisheries in 2012. Discard ratios (Table 2) were multiplied by expansion factors to generate estimated discard, sampled discard was expanded to the haul level and summed by sector, and landings were summarized from PacFIN.

Weight (mt)	IFQ - 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
Rebuilding species																
Bocaccio rockfish (South of 40°10' N. lat.)	0.01	0.00	8.83	8.84	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Canary Rockfish	0.04	0.00	4.47	4.51	--	--	0.49	0.49	--	--	--	--	--	--	0.00	0.00
Cowcod rockfish (South of 40°10' N. lat.)	0.01	0.00	0.08	0.09	--	--	--	--	--	--	--	--	--	--	--	--
Darkblotched Rockfish	2.22	0.09	78.72	81.04	--	--	0.07	0.07	0.16	--	0.06	0.22	0.00	--	0.03	0.03
Pacific Ocean Perch (North of 40°10' N. lat.)	1.08	0.05	35.00	36.13	--	--	0.03	0.03	0.02	--	0.06	0.08	0.00	--	0.00	0.01
Petrale Sole	11.18	0.33	1018.98	1030.50	--	--	1.69	1.69	0.19	--	0.13	0.32	0.03	--	0.05	0.08
Yelloweye Rockfish	--	--	0.03	0.03	--	--	--	--	--	--	--	--	--	--	--	--
Other groundfish species																
Arrowtooth Flounder	193.36	7.92	2155.87	2357.15	--	--	1.90	1.90	4.29	--	0.09	4.38	1.15	--	0.07	1.22
Black Rockfish (North of 46°16' N. lat.)	0.01	0.00	0.71	0.72	--	--	--	--	--	--	--	--	--	--	--	--
Black Rockfish (South of 46°16' N. lat.)	--	--	0.02	0.02	--	--	--	--	--	--	--	--	--	--	--	--
Cabezon (Oregon)	0.08	0.00	--	0.08	--	--	--	--	--	--	--	--	--	--	--	--
Chilipepper Rockfish (South of 40°10' N. lat.)	52.95	0.42	234.77	288.14	--	--	--	--	--	--	--	--	--	--	0.01	0.01
Dover Sole	75.00	1.87	6938.37	7015.24	--	--	4.17	4.17	0.17	--	0.25	0.41	1.13	--	2.15	3.28
English Sole	31.18	0.82	114.59	146.59	0.00	--	0.12	0.12	--	--	--	--	--	--	--	--
Lingcod (North of 42° N. lat.)	22.76	0.65	317.54	329.24	0.23	--	2.38	2.61	0.04	--	0.15	0.19	0.01	--	1.81	1.83
50% discard mortality (Trawl) [‡]	11.38	0.32	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lingcod (South of 42° N. lat.)	6.48	0.09	16.35	19.63	--	--	--	--	--	--	--	--	--	--	0.32	0.32
50% discard mortality (Trawl) [‡]	3.24	0.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Longnose Skate	104.99	3.85	836.37	890.79	--	--	1.56	1.56	19.51	--	5.22	14.98	0.01	0.00	--	0.00
50% discard mortality (Trawl) [‡]	52.49	1.93	--	--	--	--	--	--	9.76	--	--	--	0.00	0.00	--	--
50% discard mortality (Fixed Gear) [‡]	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00	--	--
Longspine Thornyhead (North of 34°27' N. lat.)	36.25	1.35	854.24	891.84	--	--	0.12	0.12	0.02	--	0.18	0.20	0.02	--	0.01	0.03
Longspine Thornyhead (South of 34°27' N. lat.)	--	--	0.40	0.40	--	--	--	--	--	--	--	--	0.00	0.00	0.00	0.00
Minor nearshore rockfish (North of 40°10' N. lat.)																
Brown Rockfish	0.00	0.00	0.01	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Nearshore Rockfish Unid	0.00	0.00	0.01	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Quillback Rockfish	--	--	0.10	0.10	--	--	--	--	--	--	--	--	--	--	--	--
Minor shelf rockfish (North of 40°10' N. lat.)																
Bocaccio Rockfish	0.00	0.00	1.66	1.66	--	--	0.01	0.01	--	--	0.00	0.00	--	--	--	--
Chilipepper Rockfish	0.06	0.00	0.12	0.18	--	--	0.00	0.00	--	--	0.00	0.00	--	--	--	--
Cowcod Rockfish	0.00	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Greenspotted Rockfish	0.00	0.00	0.08	0.08	--	--	0.00	0.00	--	--	--	--	--	--	--	--
Greenstriped Rockfish	3.34	0.10	24.76	28.20	--	--	0.57	0.57	--	--	--	--	0.00	--	--	0.00
Halfbanded Rockfish	0.01	0.00	--	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Harlequin Rockfish	0.00	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Pygmy Rockfish	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Redstripe Rockfish	0.04	0.00	0.66	0.71	--	--	0.00	0.00	0.00	--	--	0.00	--	--	--	--
Rosethorn Rockfish	0.70	0.03	2.35	3.09	--	--	0.00	0.00	0.04	--	0.05	0.08	0.00	--	0.00	0.01
Rosy Rockfish	0.06	0.00	--	0.07	--	--	--	--	--	--	--	--	--	--	--	--
Shelf Rockfish Unid	0.68	0.04	0.65	1.37	--	--	--	--	--	--	0.00	0.00	--	--	0.00	0.00
Silvergray Rockfish	0.00	0.00	1.28	1.28	--	--	0.09	0.09	0.00	--	0.01	0.01	--	--	--	--
Squarespot Rockfish	0.00	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Starry Rockfish	0.06	0.00	--	0.06	--	--	--	--	--	--	--	--	--	--	--	--
Stripetail Rockfish	1.42	0.04	0.06	1.53	--	--	--	--	--	--	--	--	--	--	--	--

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

Table 3a. Non-hake IFQ sectors and LE California halibut (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
Minor shelf rockfish (South of 40°10' N. lat.)																
Bronzespotted Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.02	0.02
Flag Rockfish	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Greenblotched Rockfish	--	--	0.03	0.03	--	--	--	--	--	--	--	--	--	--	--	--
Greenspotted Rockfish	0.16	0.00	0.24	0.41	--	--	--	--	--	--	--	--	--	--	--	--
Greenstriped Rockfish	1.08	0.01	0.08	1.17	--	--	--	--	--	--	--	--	--	--	--	--
Halfbanded Rockfish	0.02	0.00	--	0.02	--	--	--	--	--	--	--	--	--	--	--	--
Mexican Rockfish	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Pink Rockfish	0.00	0.00	0.01	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Redstripe Rockfish	0.00	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Rosethorn Rockfish	0.04	0.00	0.00	0.04	--	--	--	--	--	--	--	--	--	--	--	--
Rosy Rockfish	0.01	0.00	--	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Shelf Rockfish Unid	0.34	0.00	0.00	0.35	--	--	--	--	--	--	--	--	--	--	0.10	0.10
Speckled Rockfish	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Squarespot Rockfish	0.00	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Stripetail Rockfish	10.98	0.06	0.29	11.32	--	--	--	--	--	--	--	--	--	--	--	--
Tiger Rockfish	0.00	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Vermilion Rockfish	0.00	--	0.01	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Yellowtail Rockfish	0.00	0.00	0.01	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Minor slope rockfish (North of 40°10' N. lat.)																
Aurora Rockfish	3.59	0.19	15.09	18.87	--	--	0.01	0.01	0.00	--	0.07	0.07	0.00	--	0.03	0.04
Bank Rockfish	0.00	0.00	0.27	0.28	--	--	--	--	--	--	--	--	0.00	--	--	0.00
Blackgill Rockfish	0.03	0.00	4.70	4.73	--	--	0.00	0.00	0.22	--	0.26	0.48	--	--	0.06	0.06
Blackspotted Rockfish	--	--	0.19	0.19	--	--	--	--	--	--	0.04	0.04	--	--	--	--
Redbanded Rockfish	0.54	0.03	5.33	5.90	--	--	0.00	0.00	0.17	--	0.54	0.71	0.03	--	0.03	0.06
Rougheye Rockfish	0.06	0.00	47.29	47.35	--	--	0.07	0.07	4.39	--	14.98	19.36	0.03	--	0.06	0.09
Sharpchin Rockfish	0.61	0.02	7.92	8.55	--	--	--	--	0.00	--	--	0.00	--	--	--	--
Shortraker Rockfish	0.01	0.00	12.65	12.66	--	--	0.04	0.04	1.02	--	0.23	1.26	0.02	--	--	0.02
Shortraker/Rougheye Rockfish	--	--	--	--	--	--	--	--	2.16	--	--	2.16	--	--	--	--
Slope Rockfish Unid	0.15	0.00	1.24	1.39	0.01	--	1.15	1.16	--	--	--	--	--	--	0.02	0.02
Splitnose Rockfish	5.43	0.21	7.05	12.69	--	--	0.00	0.00	0.01	--	0.01	0.02	--	--	--	--
Yellowmouth Rockfish	0.00	0.00	6.64	6.64	--	--	--	--	0.10	--	0.08	0.18	0.00	--	0.00	0.00
Minor slope rockfish (South of 40°10' N. lat.)																
Aurora Rockfish	3.47	0.00	20.91	24.38	--	--	--	--	--	--	0.00	0.00	0.02	--	0.17	0.19
Bank Rockfish	0.04	0.00	16.55	16.58	--	--	--	--	--	--	--	--	--	--	--	--
Blackgill Rockfish	0.12	0.00	72.98	73.11	--	--	--	--	0.00	--	0.76	0.76	0.23	--	5.04	5.28
Blackspotted Rockfish	--	--	0.05	0.05	--	--	--	--	--	--	--	--	--	--	--	--
Pacific Ocean Perch	0.00	0.00	0.08	0.08	--	--	--	--	--	--	--	--	--	--	--	--
Redbanded Rockfish	0.07	0.00	0.62	0.70	--	--	--	--	--	--	--	--	--	--	--	--
Rougheye Rockfish	--	--	0.24	0.24	--	--	--	--	--	--	--	--	--	--	--	--
Sharpchin Rockfish	0.25	0.00	--	0.25	--	--	--	--	--	--	--	--	--	--	--	--
Shortraker Rockfish	0.00	--	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Slope Rockfish Unid	0.01	0.00	0.98	1.64	--	--	--	--	--	--	--	--	--	--	0.04	0.04
Yellowmouth Rockfish	--	--	0.05	0.05	--	--	--	--	--	--	--	--	--	--	--	--
Mixed thornyheads																
Shortspine/Longspine Thornyhead	1.58	0.06	--	1.64	--	--	--	--	--	--	--	--	0.00	--	--	0.00

Table 3a. Non-hake IFQ sectors and LE California halibut (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
Other flatfish																
Butter Sole	1.68	0.06	0.48	2.22	--	--	--	--	--	--	--	--	--	--	--	--
Curfin Turbot	0.50	0.00	0.43	0.94	--	--	--	--	--	--	--	--	--	--	--	--
Flatfish Unid	0.01	0.00	2.06	2.06	--	--	--	--	--	--	--	--	--	--	--	--
Flathead Sole	2.72	0.09	4.52	7.33	--	--	0.01	0.01	--	--	--	--	--	--	--	--
Pacific Sanddab	68.95	1.78	144.69	215.41	0.00	--	0.01	0.01	--	--	--	--	--	--	--	--
Rex Sole	25.44	0.80	348.17	374.40	--	--	1.15	1.15	--	--	--	--	0.01	--	0.00	0.01
Rock Sole	0.24	0.01	4.73	4.97	--	--	0.00	0.00	--	--	--	--	--	--	--	--
Roughscale Sole	0.00	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Sanddab Unid	1.32	0.01	2.14	3.47	--	--	--	--	--	--	--	--	--	--	--	--
Sand Sole	0.73	0.02	69.95	70.70	--	--	--	--	--	--	--	--	--	--	--	--
Other groundfish																
Big Skate	39.59	1.50	6.60	47.69	0.00	--	--	0.00	0.03	--	--	0.03	--	--	--	--
California Skate	0.89	0.04	1.17	2.11	--	--	--	--	--	--	--	--	--	--	--	--
Cod Unid	0.00	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Grenadier Unid	--	--	70.21	70.21	--	--	--	--	--	--	--	--	--	--	0.01	0.01
Groundfish Unid	--	--	0.04	0.04	--	--	--	--	--	--	--	--	--	--	--	--
Kelp Greenling	0.08	0.00	0.06	0.15	--	--	--	--	--	--	--	--	--	--	--	--
Leopard Shark	0.26	0.00	--	0.26	--	--	--	--	--	--	--	--	--	--	--	--
Pacific Flatnose	1.56	0.04	--	1.60	--	--	--	--	0.08	--	--	0.08	0.07	0.00	--	0.07
Pacific Grenadier	36.00	0.85	14.32	51.17	--	--	--	--	2.70	--	--	2.70	2.00	0.00	--	2.00
Ray Unid	0.01	0.00	--	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Roundfish Unid	0.00	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Skate Unid	2.10	0.07	228.69	230.85	--	--	0.12	0.12	--	--	0.02	0.02	0.00	--	--	0.00
Soupfin Shark	0.52	0.02	0.08	0.62	--	--	--	--	--	--	--	--	--	--	--	--
Spotted Ratfish	75.39	2.99	0.61	78.99	0.16	--	0.04	0.21	0.12	--	--	0.12	0.01	0.00	--	0.01
Pacific Cod	0.68	0.02	394.96	395.66	--	--	0.21	0.21	--	--	--	--	--	--	--	--
Pacific Hake	222.62	7.87	18.45	248.94	--	--	0.68	0.68	0.00	--	--	0.00	0.00	--	--	0.00
Sablefish (North of 36° N. lat.)	7.54	0.17	1402.18	1406.04	--	--	1.62	1.62	8.56	--	203.35	205.06	10.42	--	519.63	521.72
50% discard mortality (Trawl) [‡]	3.77	0.09														
20% discard mortality (Fixed Gear) [‡]									1.71				2.08			
Sablefish (South of 36° N. lat.)	0.00	--	22.67	22.68	--	--	--	--	0.04	--	1.93	1.94	1.87	--	197.65	198.02
50% discard mortality (Trawl) [‡]	0.00															
20% discard mortality (Fixed Gear) [‡]									0.01				0.37			
Shortbelly Rockfish	5.18	0.26	0.04	5.48	--	--	--	--	--	--	--	--	--	--	--	--
Shortspine Thornyhead (North of 34°27' N. lat.)	5.38	0.23	681.32	686.92	--	--	1.12	1.12	0.58	--	11.36	11.94	0.33	--	0.86	1.19
Shortspine Thornyhead (South of 34°27' N. lat.)	--	--	0.59	0.59	--	--	--	--	--	--	--	--	0.03	--	0.33	0.36
Spiny Dogfish	276.65	11.54	51.85	340.04	0.00	--	0.21	0.21	57.50	--	--	28.75	0.11	0.00	--	0.05
50% discard mortality (Fixed Gear) [‡]									28.75				0.05	0.00		
Splitnose rockfish (South of 40°10' N. lat.)	40.28	0.11	19.48	59.87	--	--	--	--	--	--	--	--	--	--	--	--
Starry Flounder	0.28	0.01	8.05	8.34	--	--	--	--	--	--	--	--	--	--	--	--
Widow Rockfish	0.01	0.00	34.26	34.27	--	--	10.88	10.88	--	--	--	--	--	--	--	--
Yellowtail rockfish (North of 40°10' N. lat.)	0.21	0.01	389.23	389.45	0.00	--	185.62	185.62	0.01	--	--	0.01	--	--	--	--

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

Table 3a. Non-hake IFQ sectors and LE California halibut (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
Non-groundfish species																
California Halibut	0.01	0.00	18.78	18.78	--	--	--	--	--	--	--	--	--	--	--	--
Dungeness Crab	188.31	8.09	0.04	196.44	0.07	--	--	0.07	--	--	--	--	0.56	0.00	--	0.56
Non-FMP flatfish																
Deepsea Sole	14.24	0.35	1.70	16.29	--	--	--	--	--	--	--	--	0.02	0.00	--	0.02
Diamond Turbot	0.11	0.01	--	0.11	--	--	--	--	--	--	--	--	--	--	--	--
Hornyhead Turbot	0.02	0.00	--	0.02	--	--	--	--	--	--	--	--	--	--	--	--
Slender Sole	35.57	1.48	0.17	37.22	--	--	--	--	--	--	--	--	--	--	--	--
Speckled Sanddab	0.00	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Non-FMP skate																
Aleutian Skate	2.20	0.11	--	2.31	--	--	--	--	0.03	--	--	0.03	--	--	--	--
Bering Skate	0.00	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Black Skate	17.92	0.49	0.01	18.42	--	--	--	--	1.01	--	--	1.01	0.00	0.00	--	0.00
Deepsea Skate	0.32	0.01	--	0.33	--	--	--	--	--	--	--	--	--	--	--	--
Pacific Electric Ray	1.07	0.03	--	1.10	--	--	--	--	--	--	--	--	--	--	--	--
Sandpaper Skate	38.13	1.54	0.04	39.71	0.01	--	--	0.01	0.18	--	--	0.18	0.00	--	--	0.00
Shovelnose Guitarfish	0.00	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Starry Skate	0.12	0.01	--	0.12	--	--	--	--	--	--	--	--	--	--	--	--
Thornback Skate	0.00	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
White Skate	0.42	0.01	--	0.43	--	--	--	--	--	--	--	--	--	--	--	--

Table 3b. Hake IFQ/Coop sectors. Retained catch/landings (mt), discard (mt), and fishing mortality estimates (mt) of groundfish species from hake IFQ/Coop sectors in 2012. In shoreside hake, discard ratios (Table 2) were multiplied by expansion factors to generate estimated discard, sampled discard was expanded to the haul level and summed by sector, and landings were summarized from PacFIN. At-sea hake Coop Program data was summarized from the A-SHOP.

Weight (mt)	IFQ - Shoreside Hake				At-sea Catcher-Processors			At-sea Mothership		
	Sampled Discard	Expanded Discard	Landed	Estimate	Sampled Discard	Retained	Estimate	Sampled Discard	Retained	Estimate
Rebuilding species										
Canary Rockfish	0.00	--	2.14	2.14	0.14	0.13	0.27	0.13	0.02	0.15
Darkblotched Rockfish	0.03	--	4.30	4.33	0.43	1.01	1.44	0.70	0.56	1.26
Pacific Ocean Perch (North of 40°10' N. lat.)	0.03	--	12.33	12.36	1.85	1.30	3.16	0.34	1.03	1.37
Petrale Sole	--	--	0.00	0.00	--	--	--	--	--	--
Other groundfish species										
Arrowtooth Flounder	--	--	24.82	24.82	1.06	1.49	2.55	0.89	1.19	2.09
Dover Sole	--	--	0.60	0.60	0.09	0.20	0.29	0.02	0.01	0.03
English Sole	--	--	0.02	0.02	0.00	0.01	0.01	0.00	--	0.00
Lingcod (North of 42° N. lat.)	--	--	3.74	3.74	--	0.01	0.01	0.07	0.10	0.17
Longnose Skate	--	--	0.24	0.24	0.03	--	0.03	0.03	--	0.03
Longspine Thornyhead (North of 34°27' N. lat.)	--	--	0.05	0.05	0.00	--	0.00	--	--	--
Minor shelf rockfish (North of 40°10' N. lat.)										
Bocaccio Rockfish	--	--	0.13	0.13	0.03	0.04	0.08	0.03	0.01	0.04
Chilipepper Rockfish	--	--	0.01	0.01	--	0.01	0.01	0.00	0.00	0.01
Greenspotted Rockfish	--	--	0.00	0.00	--	--	--	--	--	--
Greenstriped Rockfish	--	--	0.05	0.05	--	--	--	--	--	--
Harlequin Rockfish	--	--	--	--	--	0.00	0.00	--	--	--
Redstripe Rockfish	--	--	0.04	0.04	0.00	0.03	0.03	0.02	0.01	0.03
Rosethorn Rockfish	--	--	0.00	0.00	--	0.00	0.00	--	--	--
Shelf Rockfish Unid	--	--	0.01	0.01	--	0.00	0.00	--	--	--
Silvergray Rockfish	--	--	0.57	0.57	0.23	0.43	0.65	0.05	0.07	0.13
Stripetail Rockfish	--	--	--	--	--	--	--	0.00	--	0.00
Minor slope rockfish (North of 40°10' N. lat.)										
Aurora Rockfish	--	--	0.46	0.46	0.00	0.00	0.01	0.01	--	0.01
Bank Rockfish	--	--	--	--	0.00	0.01	0.01	--	0.01	0.01
Blackgill Rockfish	--	--	0.23	0.23	0.01	0.01	0.03	--	0.00	0.00
Redbanded Rockfish	--	--	0.83	0.83	0.00	0.00	0.00	0.00	--	0.00
Rougheye Rockfish	0.01	--	47.07	47.08	22.85	19.59	42.44	1.30	10.29	11.59
Sharpchin Rockfish	--	--	0.66	0.66	--	--	--	0.00	0.00	0.00
Shortraker Rockfish	--	--	5.63	5.63	0.07	0.60	0.68	--	0.01	0.01
Shortraker/Rougheye Rockfish	--	--	--	--	0.00	--	0.00	--	--	--
Slope Rockfish Unid	--	--	0.09	0.09	0.00	--	0.00	--	--	--
Splitnose Rockfish	0.23	--	16.21	16.44	0.47	9.23	9.70	2.85	7.93	10.78
Yellowmouth Rockfish	--	--	0.52	0.52	0.20	0.01	0.21	--	0.04	0.04
Other flatfish										
Flatfish Unid	--	--	0.00	0.00	--	0.00	0.00	0.00	0.00	0.01
Rex Sole	--	--	4.39	4.39	0.59	2.03	2.62	0.15	0.14	0.29
Rock Sole	--	--	0.00	0.00	--	--	--	--	--	--
Other groundfish										
Big Skate	--	--	--	--	0.09	--	0.09	0.01	--	0.01
Grenadier Unid	--	--	0.01	0.01	--	0.00	0.00	0.01	--	0.01
Groundfish Unid	--	--	1.36	1.36	--	--	--	--	--	--
Pacific Electric Ray	--	--	--	--	0.03	--	0.03	0.03	--	0.03
Roundfish Unid	--	--	--	--	0.05	0.00	0.05	0.00	--	0.00
Skate Unid	--	--	0.07	0.07	0.00	--	0.00	--	--	--
Southern Shark	0.13	0.01	0.51	0.64	--	0.02	0.02	0.07	--	0.07
Spotted Ratfish	--	--	0.00	0.00	--	--	--	--	--	--
Pacific Cod	--	--	0.04	0.04	0.01	0.00	0.02	0.01	--	0.01
Pacific Hake	127.92	--	65288.38	65416.31	145.51	55549.05	55694.56	155.20	38060.27	38215.47
Sablefish (North of 36° N. lat.)	--	--	47.21	47.21	0.12	4.11	4.23	0.61	0.27	0.88
Shortbelly Rockfish	--	--	0.08	0.08	0.00	0.02	0.02	0.17	0.10	0.27
Shortspine Thornyhead (North of 34°27' N. lat.)	--	--	8.32	8.32	0.87	0.36	1.23	0.35	0.16	0.51
Spiny Dogfish	0.44	0.02	159.64	160.10	110.15	38.19	148.34	22.56	6.90	29.46
Widow Rockfish	0.05	--	107.36	107.41	15.05	26.94	42.00	26.20	11.14	37.34
Yellowtail rockfish (North of 40°10' N. lat.)	0.03	--	388.21	388.24	25.35	6.65	32.00	6.25	4.75	11.00
Non-groundfish species										
Dungeness Crab	0.00	0.00	0.00	0.00	--	--	--	--	--	--
Non-FMP flatfish										
Slender Sole	--	--	--	--	--	0.00	0.00	0.00	0.02	0.02

Table 4. Observed discard ratios, standard error, estimated discard (mt), landings (mt), and fishing mortality estimates (mt) of groundfish species from federal open access participants in the state-licensed California halibut fishery in 2012 (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	Observed	Observed	Expansion factor:	
	vessels	trips	tows	Fleet landings of California halibut (mt)	
	7	27	77	56.3	
Weight (mt)	Discard Ratio	SE	Discard	Landed	Total Estimate
Rebuilding species					
Canary rockfish	--	--	--	0.00	0.00
Petrale sole	0.0027	0.0593	0.15	0.23	0.38
Other groundfish species					
Arrowtooth flounder	--	--	--	0.04	0.04
Black rockfish (South of 46°16' N. lat.)	--	--	--	0.00	0.00
California scorpionfish (South of 34°27' N. lat.)	--	--	--	0.00	0.00
English sole	0.0155	0.1392	0.87	0.23	1.10
Lingcod (South of 42° N. lat.)	--	--	--	0.01	0.01
50% discard mortality (Trawl) [‡]			--		
Longnose skate	0.0008	0.1657	0.05	--	0.02
50% discard mortality (Trawl) [‡]			0.02		
Minor nearshore rockfish (South of 40°10' N. lat.)					
Brown Rockfish	--	--	--	0.01	0.01
Copper Rockfish	--	--	--	0.00	0.00
Minor shelf rockfish (South of 40°10' N. lat.)					
Vermilion Rockfish	--	--	--	0.00	0.00
Other flatfish					
Butter Sole	--	--	--	0.00	0.00
Curlfin Turbot	0.0102	0.0909	0.58	0.00	0.58
Flatfish Unid	--	--	--	0.45	0.45
Pacific Sanddab	0.0134	0.1908	0.75	0.04	0.80
Rex Sole	0.0001	--	0.01	--	0.01
Rock Sole	0.00	0.0195	0.00	0.14	0.14
Sanddab Unid	--	--	--	0.00	0.00
Sand Sole	0.0004	0.0024	0.02	10.23	10.26
Other groundfish					
Big Skate	0.3598	0.5777	20.25	--	20.25
California Skate	0.0082	0.3574	0.46	--	0.46
Leopard Shark	--	--	--	0.05	0.05
Skate Unid	--	--	--	0.68	0.68
Soupfin Shark	--	--	--	0.11	0.11
Pacific cod	0.0000	--	0.00	--	0.00
Spiny dogfish	0.03	0.2162	1.83	--	1.83
Starry flounder	0.0150	0.0470	0.84	3.72	4.57
Non-groundfish species					
California Halibut	0.0061	0.0196	0.34	56.30	56.64
Dungeness Crab	2.6828	5.1052	151.03	--	151.03
Non-FMP flatfish					
Deepsea Sole	--	--	--	0.22	0.22
Fantail Sole	0.0024	0.1979	0.13	0.01	0.14
Hornyhead Turbot	0.0028	0.1214	0.16	0.12	0.28
Non-FMP skate					
Pacific Electric Ray	0.0053	0.2614	0.30	--	0.30
Sandpaper Skate	0.0000	--	0.00	--	0.00
Shovelnose Guitarfish	0.0011	--	0.06	--	0.06
Thornback Skate	0.0048	0.3649	0.27	--	0.27

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

Table 5. Observed discard ratios, standard error, estimated discard (mt), landings (mt), and fishing mortality estimates (mt) of groundfish species from 2012 state pink shrimp fisheries. Ratios are computed as the observed discard weight divided by the observed weight of retained pink shrimp (adjusted to fish tickets). Discard ratios were multiplied by state fleet landings of pink shrimp to generate estimated discard.

Pink Shrimp Trawl Fishery	Washington					Oregon					California				
	Observed vessels	Observed trips	Observed tows	Expansion factor: Fleet landings of pink shrimp (mt)		Observed vessels	Observed trips	Observed tows	Expansion factor: Fleet landings of pink shrimp (mt)		Observed vessels	Observed trips	Observed tows	Expansion factor: Fleet landings of pink shrimp (mt)	
	10	31	516	4,242		52	154	2046	22,292		7	15	169	2,791	
Weight (mt)	Discard Ratio	SE	Discard	Landed	Estimate	Discard Ratio	SE	Discard	Landed	Estimate	Discard Ratio	SE	Discard	Landed	Estimate
Rebuilding species															
Bocaccio rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01	0.01
Canary rockfish	--	--	--	--	--	0.0000	--	0.01	0.01	0.02	--	--	--	--	--
Darkblotched rockfish	0.0004	0.0007	1.58	--	1.58	0.0001	0.0002	2.67	0.00	2.67	0.0003	0.0008	0.71	--	0.71
Pacific Ocean Perch (North of 40°10' N. lat.)	0.0000	0.0003	0.05	--	0.05	0.0000	0.0003	0.14	0.05	0.19	--	--	--	--	--
Petrale sole	0.0000	0.0018	0.08	--	0.08	0.0000	0.0014	0.49	0.11	0.60	0.0001	0.0138	0.32	0.15	0.47
Yelloweye rockfish	0.0000	--	0.00	--	0.00	0.0000	--	0.00	--	0.00	--	--	--	--	--
Other groundfish species															
Arrowtooth flounder	0.0006	0.0032	2.49	--	2.49	0.0002	0.0008	3.71	0.05	3.76	0.0001	0.0011	0.22	--	0.22
Cabazon (California)	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01	0.01
California scorpionfish (South of 34°27' N. lat.)	--	--	--	--	--	--	--	--	--	--	--	--	--	0.36	0.36
Dover sole	0.0001	0.0011	0.46	--	0.46	0.0000	0.0007	1.06	0.61	1.67	0.0000	--	0.00	0.18	0.18
English sole	0.0000	--	0.00	--	0.00	0.0000	0.0007	0.05	--	0.05	0.0000	0.0008	0.02	0.55	0.57
Lingcod (North of 42° N. lat.)	0.0001	0.1163	0.53	--	0.53	0.0000	--	0.00	--	0.00	--	--	--	--	--
Lingcod (South of 42° N. lat.)	--	--	--	--	--	--	--	--	--	--	0.0000	0.0009	0.01	0.01	0.02
Longnose skate	0.0001	0.0261	0.41	--	0.41	0.0000	0.0010	0.11	0.09	0.21	0.0000	0.0006	0.03	--	0.03
Longspine thornyhead (North of 34°27' N. lat.)	--	--	--	--	--	0.0000	--	0.00	0.02	0.02	--	--	--	--	--
Minor nearshore rockfish (South of 40°10' N. lat.)															
Copper Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01	0.01
Minor shelf rockfish (North of 40°10' N. lat.)															
Bocaccio Rockfish	--	--	--	--	--	0.0000	--	0.02	--	0.02	--	--	--	--	--
Chilipepper Rockfish	--	--	--	--	--	0.0000	0.0007	0.05	--	0.05	0.0003	0.0134	0.96	--	0.96
Greenstriped Rockfish	0.0000	0.0006	0.13	--	0.13	0.0000	0.0006	0.38	--	0.38	0.0000	0.0001	0.04	--	0.04
Halfbanded Rockfish	--	--	--	--	--	0.0000	0.0003	0.00	--	0.00	--	--	--	--	--
Harlequin Rockfish	--	--	--	--	--	0.0000	--	0.00	--	0.00	--	--	--	--	--
Pygmy Rockfish	--	--	--	--	--	0.0000	0.0001	0.00	--	0.00	--	--	--	--	--
Redstripe Rockfish	--	--	--	--	--	0.0000	--	0.00	--	0.00	--	--	--	--	--
Shelf Rockfish Unid	0.0007	0.7261	3.07	--	3.07	0.0001	0.0007	1.59	--	1.59	0.0004	0.0137	1.12	--	1.12
Stripetail Rockfish	--	--	--	--	--	0.0000	0.0013	0.68	--	0.68	--	--	--	--	--
Minor slope rockfish (North of 40°10' N. lat.)															
Aurora Rockfish	0.0000	0.0038	0.06	--	0.06	0.0000	0.0008	0.07	--	0.07	--	--	--	--	--
Blackgill Rockfish	--	--	--	--	--	0.0000	--	0.00	--	0.00	--	--	--	--	--
Redbanded Rockfish	0.0000	0.0001	0.00	--	0.00	0.0000	0.0001	0.01	--	0.01	--	--	--	--	--
Rougheye Rockfish	0.0000	0.0005	0.01	--	0.01	0.0000	0.0002	0.00	--	0.00	--	--	--	--	--
Sharpchin Rockfish	--	--	--	--	--	0.0000	0.0001	0.00	--	0.00	--	--	--	--	--
Slope Rockfish Unid	--	--	--	--	--	--	--	--	0.08	0.08	--	--	--	--	--
Splitnose Rockfish	0.0000	0.0007	0.09	--	0.09	0.0000	0.0015	0.98	--	0.98	--	--	--	--	--

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)	
				4,242	Estimate				22,292	Estimate				2,791	Estimate
	10	31	516	Landed	Estimate	52	154	2046	Landed	Estimate	7	15	169	Landed	Estimate
Discard Ratio	SE	Discard	Landed	Estimate	Discard Ratio	SE	Discard	Landed	Estimate	Discard Ratio	SE	Discard	Landed	Estimate	
Mixed thornyheads															
Shortspine/Longspine Thornyhead	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00	
Other flatfish															
Flatfish Unid	0.0002	0.0328	1.00	--	1.00	0.0002	0.0149	3.97	--	3.97	0.0000	0.0122	0.05	12.32	12.37
Flathead Sole	0.0004	0.0017	1.76	--	1.76	0.0000	0.0003	0.25	--	0.25	--	--	--	--	--
Pacific Sanddab	0.0000	0.0025	0.10	--	0.10	0.0001	0.0007	1.71	0.03	1.73	0.0006	0.0067	1.67	--	1.67
Rex Sole	0.0009	0.0017	4.02	--	4.02	0.0004	0.0006	9.60	0.09	9.70	0.0000	0.0003	0.07	0.27	0.35
Rock Sole	0.0001	0.0021	0.32	--	0.32	--	--	--	--	--	--	--	--	0.60	0.60
Sanddab Unid	--	--	--	--	--	0.0000	0.0059	0.08	--	0.08	--	--	--	0.02	0.02
Sand Sole	--	--	--	--	--	--	--	--	--	--	--	--	--	0.05	0.05
Other groundfish															
Big Skate	0.0000	--	0.00	--	0.00	0.0000	0.0150	0.09	--	0.09	--	--	--	--	--
California Skate	--	--	--	--	--	0.0000	0.0002	0.00	--	0.00	--	--	--	--	--
Leopard Shark	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01	0.01
Skate Unid	--	--	--	--	--	0.0000	0.0001	0.00	--	0.00	--	--	--	1.19	1.19
Soupfin Shark	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01	0.01
Spotted Ratfish	0.0000	0.0077	0.09	--	0.09	0.0000	0.0009	0.08	--	0.08	--	--	--	--	--
Pacific cod	--	--	--	--	--	0.0000	--	0.00	0.00	0.00	--	--	--	--	--
Pacific hake	0.0000	0.0007	0.15	--	0.15	0.0006	0.0019	12.82	--	12.82	0.0021	0.0327	5.79	--	5.79
Sablefish (North of 36° N. lat.)	0.0000	0.0004	0.00	--	0.00	0.0000	0.0004	0.00	0.13	0.14	0.0000	0.0014	0.07	--	0.07
Sablefish (South of 36° N. lat.)	--	--	--	--	--	--	--	--	--	--	--	--	--	0.12	0.12
Shortbelly rockfish	--	--	--	--	--	0.0000	0.0045	0.28	--	0.28	0.0000	0.0005	0.09	--	0.09
Shortspine Thornyhead (North of 34°27' N. lat.)	0.0000	0.0059	0.01	--	0.01	0.0000	0.0002	0.10	0.12	0.22	--	--	--	--	--
Spiny dogfish	0.0001	0.0933	0.53	--	0.53	0.0000	0.0007	0.06	--	0.06	0.0001	0.0017	0.31	0.01	0.31
Starry flounder	--	--	--	--	--	0.0000	--	0.01	--	0.01	--	--	--	--	--
Widow rockfish	0.0000	--	0.00	--	0.00	0.0000	0.0355	0.12	0.00	0.12	--	--	--	--	--
Yellowtail rockfish (North of 40°10' N. lat.)	0.0001	0.0885	0.54	--	0.54	0.0000	--	0.61	0.00	0.61	--	--	--	--	--
Non-groundfish species															
California Halibut	--	--	--	--	--	--	--	--	--	--	--	--	--	8.41	8.41
Dungeness Crab	--	--	--	--	--	0.0000	0.0028	0.04	--	0.04	0.0000	--	0.01	0.00	0.01
Non-FMP flatfish															
Hornyhead Turbot	--	--	--	--	--	--	--	--	--	--	--	--	--	2.51	2.51
Slender Sole	0.0048	0.0059	20.19	--	20.19	0.0033	0.0019	72.65	--	72.65	0.0002	0.0007	0.68	--	0.68
Speckled Sanddab	--	--	--	--	--	0.0000	0.0027	0.01	--	0.01	--	--	--	--	--
Non-FMP skate															
Sandpaper Skate	0.0000	0.0000	0.00	--	0.00	0.0000	0.0002	0.01	--	0.01	--	--	--	--	--
Starry Skate	--	--	--	--	--	0.0000	--	0.00	--	0.00	--	--	--	--	--

Table 6. Observed discard ratios, standard error, estimated discard (mt), landings (mt), and fishing mortality estimates (mt) from the LE sablefish endorsed primary season (tier endorsed) fixed gear fleet in 2012. Ratios are computed as the observed discard weight divided by the observed weight of retained sablefish (adjusted to fish tickets). Discard ratios were multiplied by fleet landings of sablefish to generate discard estimates for each gear type; combined with other fixed gear sectors in Table 9.

Limited Entry Sablefish Endorsed Primary Season	Longline					Pot					
	Observed vessels	Observed trips	Observed sets	Expansion factor: Fleet landings of sablefish (mt)		Observed vessels	Observed trips	Observed sets	Expansion factor: Fleet landings of sablefish (mt)		
	17	88	532	1,066		5	19	351	297		
	Weight (mt)	Discard Ratio	SE	Discard	Landed	Estimate	Discard Ratio	SE	Discard	Landed	Estimate
Rebuilding species											
Bocaccio rockfish (South of 40°10' N. lat.)	--	--	--	0.03	0.03	--	--	--	--	--	--
Canary rockfish	0.0000	0.0090	0.03	0.02	0.04	0.0000	0.0029	0.01	--	0.01	
Darkblotched rockfish	0.0014	0.0284	1.49	5.26	6.75	0.0000	0.0003	0.00	0.04	0.04	
Pacific Ocean Perch (North of 40°10' N. lat.)	0.0000	0.0027	0.03	0.27	0.30	--	--	--	0.04	0.04	
Petrale sole	0.0000	0.0050	0.05	0.48	0.53	0.0000	0.0040	0.00	--	0.00	
Yelloweye rockfish	0.0002	0.0374	0.23	--	0.23	--	--	--	--	--	
Other groundfish species											
Arrowtooth Flounder	0.0306	0.1167	32.61	2.44	35.05	0.0003	0.0028	0.08	0.07	0.15	
Chilipepper Rockfish (South of 40°10' N. lat.)	0.0000	0.0117	0.01	0.14	0.15	--	--	--	--	--	
Dover Sole	0.0028	0.0211	2.96	1.58	4.55	0.0030	0.0090	0.89	0.22	1.11	
English Sole	0.0000	0.0103	0.02	0.28	0.30	--	--	--	--	--	
Lingcod (North of 42° N. lat.)	0.0012	0.0276	1.29	4.18	5.46	0.0002	0.0219	0.05	0.56	0.61	
Lingcod (South of 42° N. lat.)	0.0000	0.0111	0.05	1.14	1.19	0.0047	0.3566	1.40	0.78	2.18	
Longnose Skate	0.0441	0.0855	47.02	20.89	44.39	--	--	--	0.69	0.69	
50% discard mortality (Fixed Gear) [‡]			23.51								
Longspine Thornyhead (North of 34°27' N. lat.)	0.0000	0.0036	0.05	0.72	0.77	0.0001	0.0008	0.02	0.00	0.02	
Minor shelf rockfish (North of 40°10' N. lat.)											
Bocaccio Rockfish	0.0000	0.0120	0.04	0.01	0.04	--	--	--	--	--	
Chilipepper Rockfish	--	--	--	0.03	0.03	--	--	--	--	--	
Greenspotted Rockfish	--	--	--	0.00	0.00	--	--	--	--	--	
Greenstriped Rockfish	0.0001	0.0095	0.14	0.05	0.20	--	--	--	--	--	
Rosethorn Rockfish	0.0003	0.0062	0.30	0.49	0.79	0.0000	0.0014	0.01	0.00	0.01	
Rosy Rockfish	0.0000	0.0054	0.05	--	0.05	--	--	--	--	--	
Shelf Rockfish Unid	0.0000	0.0038	0.01	0.16	0.17	--	--	--	0.00	0.00	
Silvergray Rockfish	0.0000	0.0054	0.01	0.04	0.04	--	--	--	--	--	
Stripetail Rockfish	0.0000	0.0024	0.01	0.00	0.01	--	--	--	--	--	
Minor shelf rockfish (South of 40°10' N. lat.)											
Flag Rockfish	--	--	--	0.05	0.05	--	--	--	--	--	
Rosy Rockfish	0.0000	0.0047	0.00	--	0.00	--	--	--	--	--	
Shelf Rockfish Unid	--	--	--	0.02	0.02	--	--	--	--	--	
Swordspine Rockfish	0.0000	0.0691	0.04	--	0.04	--	--	--	--	--	
Minor slope rockfish (North of 40°10' N. lat.)											
Aurora Rockfish	0.0001	0.0147	0.13	0.05	0.18	--	--	--	0.00	0.00	
Bank Rockfish	--	--	--	0.01	0.01	--	--	--	--	--	
Blackgill Rockfish	0.0016	0.1102	1.74	1.19	2.93	0.0000	0.0007	0.00	0.03	0.03	
Blackspotted Rockfish	--	--	--	0.15	0.15	--	--	--	--	--	
Redbanded Rockfish	0.0066	0.0418	7.05	10.50	17.55	0.0000	0.0008	0.01	0.09	0.09	
Rougheye Rockfish	0.0150	0.1703	15.94	30.61	46.55	--	--	--	0.06	0.06	
Sharpchin Rockfish	--	--	--	0.01	0.01	--	--	--	--	--	
Shortraker Rockfish	0.0029	0.1205	3.13	2.99	6.12	--	--	--	--	--	
Shortraker/Rougheye Rockfish	0.0340	0.7760	36.24	--	36.24	--	--	--	--	--	
Slope Rockfish Unid	0.0000	0.0189	0.03	3.32	3.35	--	--	--	2.16	2.16	
Splitnose Rockfish	0.0000	0.0031	0.01	0.12	0.13	0.0000	0.0010	0.00	--	0.00	
Yellowmouth Rockfish	--	--	--	1.19	1.19	--	--	--	--	--	
Minor slope rockfish (South of 40°10' N. lat.)											
Aurora Rockfish	0.0001	0.0229	0.08	0.03	0.11	--	--	--	--	--	
Blackgill Rockfish	0.0059	0.5185	6.26	3.61	9.87	--	--	--	0.03	0.03	
Blackspotted Rockfish	--	--	--	7.13	7.13	--	--	--	--	--	
Redbanded Rockfish	0.0008	0.1863	0.88	--	0.88	--	--	--	--	--	
Rougheye Rockfish	0.0002	0.0344	0.17	--	0.17	--	--	--	--	--	
Slope Rockfish Unid	--	--	--	0.94	0.94	--	--	--	1.88	1.88	
Mixed thornyheads	0.0000	0.0011	0.00	0.16	0.16	--	--	--	--	--	
Other flatfish											
Flatfish Unid	--	--	--	--	--	0.0000	0.0011	0.00	--	0.00	
Rex Sole	--	--	--	0.32	0.32	0.0000	0.0019	0.00	--	0.00	
Sand Sole	--	--	--	0.22	0.22	--	--	--	--	--	

[‡]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)	
	17	88	532	1,066		5	19	351	297	
	Discard Ratio	SE	Discard	Landed	Estimate	Discard Ratio	SE	Discard	Landed	Estimate
Other groundfish										
Big Skate	0.0022	0.3527	2.38	--	2.38	--	--	--	--	--
California Skate	0.0000	0.0015	0.00	--	0.00	--	--	--	--	--
Grenadier Unid	--	--	--	6.87	6.87	--	--	--	0.00	0.00
Pacific Flatnose	0.0000	0.0022	0.02	--	0.02	0.0001	0.0109	0.02	--	0.02
Pacific Grenadier	0.0049	1.0493	5.22	--	5.22	0.0032	0.0111	0.96	--	0.96
Rockfish Unid	--	--	--	0.01	0.01	--	--	--	--	--
Skate Unid	--	--	--	2.55	2.55	0.0000	0.0006	0.00	--	0.00
Spotted Ratfish	0.0030	0.0188	3.21	0.01	3.22	--	--	--	--	--
Pacific Cod	0.0002	0.0277	0.20	1.03	1.23	--	--	--	0.00	0.00
Pacific Hake	0.0009	0.0494	0.94	--	0.94	--	--	--	--	--
Sablefish (North of 36° N. lat.)	0.3916	0.1259	424.82	1030.22	1115.18	0.4317	0.2510	128.17	269.61	295.25
20% discard mortality (Fixed Gear) [‡]			84.96					25.63		
Sablefish (South of 36° N. lat.)	--	--	--	35.88	35.88	--	--	--	27.25	27.25
Shortspine Thornyhead (North of 34°27' N. lat.)	0.0039	0.0076	4.14	25.04	29.18	0.0001	0.0015	0.02	0.42	0.44
Shortspine Thornyhead (South of 34°27' N. lat.)	--	--	--	0.89	0.89	--	--	--	--	--
Spiny Dogfish	0.1314	0.3603	140.09	0.41	70.45	0.0002	0.0287	0.06	--	0.03
50% discard mortality (Fixed Gear) [‡]			70.04					0.03		
Splitnose Rockfish (South of 40°10' N. lat.)	--	--	--	0.00	0.00	--	--	--	0.00	0.00
Starry Flounder	--	--	--	0.02	0.02	--	--	--	--	--
Widow Rockfish	0.0000	0.0066	0.00	0.08	0.08	--	--	--	--	--
Yellowtail Rockfish (North of 40°10' N. lat.)	0.0001	0.0187	0.16	0.38	0.53	--	--	--	0.00	0.00
Non-groundfish species										
Dungeness Crab	0.0000	0.0058	0.02	--	0.02	0.0006	0.0140	0.17	0.17	0.34
Non-FMP flatfish										
Deepsea Sole	--	--	--	--	--	0.0000	0.0027	0.01	--	0.01
Non-FMP skate										
Aleutian Skate	0.0003	0.1403	0.29	--	0.29	--	--	--	--	--
Black Skate	0.0002	0.0513	0.24	--	0.24	--	--	--	--	--
Sandpaper Skate	0.0012	0.0151	1.25	--	1.25	--	--	--	--	--
Starry Skate	0.0000	0.0019	0.01	--	0.01	--	--	--	--	--

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

Table 7. Observed discard ratios, standard error, estimated discard (mt), landings (mt), and fishing mortality estimates (mt) from the LE non-endorsed fixed gear fleet in 2012. 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				
	Observed vessels	Observed trips	Observed sets	Expansion factor: Fleet landings of sablefish (mt)		Observed vessels	Observed trips	Observed sets	Expansion factor: Fleet landings of groundfish (mt)		OA Observed (see Table 8b)	Expansion factor: Fleet landings of groundfish (mt)			
				9	23				29	196.6		17	105	223	542.1
Weight (mt)	Discard Ratio	SE	Discard	Landed	Estimate	Discard Ratio	SE	Discard	Landed	Estimate	Discard Ratio	SE	Discard	Landed	Estimate
Rebuilding species															
Bocaccio Rockfish (South of 40°10' N. lat.)	--	--	--	0.10	0.10	--	--	--	0.67	0.67	--	--	--	--	--
Darkblotched Rockfish	--	--	--	1.34	1.34	--	--	--	0.10	0.10	--	--	--	--	--
Pacific Ocean Perch (North of 40°10' N. lat.)	--	--	--	0.03	0.03	--	--	--	--	--	--	--	--	--	--
Petrale Sole	--	--	--	0.06	0.06	--	--	--	0.13	0.13	--	--	--	--	--
Other groundfish species															
Arrowtooth Flounder	0.0033	0.0253	0.64	0.32	0.97	--	--	--	--	--	0.0105	0.0865	0.09	--	0.09
Chilipepper Rockfish (South of 40°10' N. lat.)	--	--	--	0.44	0.44	--	--	--	0.20	0.20	--	--	--	--	--
Dover Sole	0.0017	0.0214	0.34	0.59	0.94	0.0036	0.0229	1.94	0.39	2.33	0.0016	0.0051	0.01	0.02	0.03
Lingcod (North of 42° N. lat.)	0.0032	0.1247	0.62	0.33	0.95	--	--	--	--	--	--	--	--	0.05	0.05
Lingcod (South of 42° N. lat.)	--	--	--	0.20	0.20	--	--	--	0.10	0.10	--	--	--	--	--
Longnose Skate	0.0209	0.0659	4.12	7.01	9.07	0.0062	0.1258	3.36	1.52	3.20	--	--	--	--	--
50% discard mortality (Fixed Gear) [‡]	--	--	2.06	--	--	--	--	1.68	--	--	--	--	--	--	--
Longspine Thornyhead (North of 34°27' N. lat.)	0.0001	0.0067	0.02	0.66	0.67	0.0053	0.3238	2.90	1.33	4.23	--	--	--	0.00	0.00
Longspine Thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	0.0049	0.0042	2.63	12.37	15.00	--	--	--	--	--
Minor shelf rockfish (North of 40°10' N. lat.)															
Greenstriped Rockfish	--	--	--	0.03	0.03	--	--	--	--	--	--	--	--	--	--
Rosethorn Rockfish	0.0000	0.0069	0.01	0.01	0.02	--	--	--	--	--	--	--	--	--	--
Shelf Rockfish Unid	--	--	--	0.07	0.07	--	--	--	--	--	--	--	--	--	--
Silvergray Rockfish	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--
Stripetail Rockfish	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--
Minor shelf rockfish (South of 40°10' N. lat.)															
Bronzespotted Rockfish	--	--	--	--	--	0.0002	0.0403	0.10	0.00	0.10	--	--	--	--	--
Flag Rockfish	--	--	--	--	--	--	--	--	0.01	0.01	--	--	--	--	--
Greenblotched Rockfish	--	--	--	--	--	--	--	--	0.08	0.08	--	--	--	--	--
Greenspotted Rockfish	--	--	--	--	--	0.0001	0.0618	0.04	0.20	0.23	--	--	--	--	--
Greenstriped Rockfish	--	--	--	--	--	--	--	--	0.00	0.00	--	--	--	--	--
Mexican Rockfish	--	--	--	--	--	--	--	--	0.00	0.00	--	--	--	--	--
Pink Rockfish	--	--	--	--	--	0.0014	0.4286	0.76	--	0.76	--	--	--	--	--
Pinkrose Rockfish	--	--	--	--	--	--	--	--	0.00	0.00	--	--	--	--	--
Rosethorn Rockfish	--	--	--	--	--	0.0003	0.0140	0.16	0.23	0.39	--	--	--	--	--
Rosy Rockfish	--	--	--	--	--	--	--	--	0.03	0.03	--	--	--	--	--
Shelf Rockfish Unid	--	--	--	0.01	0.01	--	--	--	0.00	0.00	--	--	--	--	--
Speckled Rockfish	--	--	--	--	--	--	--	--	0.09	0.09	--	--	--	--	--
Squarespot Rockfish	--	--	--	--	--	--	--	--	0.16	0.16	--	--	--	--	--
Starry Rockfish	--	--	--	--	--	--	--	--	0.10	0.10	--	--	--	--	--
Vermilion Rockfish	--	--	--	--	--	--	--	--	0.64	0.64	--	--	--	--	--
Yellowtail Rockfish	--	--	--	--	--	--	--	--	0.04	0.04	--	--	--	--	--
Minor slope rockfish (North of 40°10' N. lat.)															
Aurora Rockfish	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--
Bank Rockfish	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--
Blackgill Rockfish	--	--	--	0.20	0.20	--	--	--	--	--	--	--	--	--	--
Blackspotted Rockfish	--	--	--	0.01	0.01	--	--	--	--	--	--	--	--	--	--
Redbanded Rockfish	0.0002	0.0051	0.03	2.38	2.41	--	--	--	--	--	--	--	--	--	--
Rougheye Rockfish	0.0004	0.0140	0.07	3.06	3.13	--	--	--	--	--	--	--	--	--	--
Sharpchin Rockfish	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--
Shortraker Rockfish	--	--	--	0.22	0.22	--	--	--	--	--	--	--	--	--	--
Shortraker/Rougheye Rockfish	0.0006	0.0411	0.12	--	0.12	--	--	--	--	--	--	--	--	--	--
Slope Rockfish Unid	--	--	--	0.80	0.80	--	--	--	--	--	--	--	--	--	--
Splitnose Rockfish	--	--	--	0.03	0.03	--	--	--	--	--	--	--	--	--	--
Yellowmouth Rockfish	--	--	--	0.07	0.07	--	--	--	--	--	--	--	--	--	--

[‡]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)	Expansion factor: Fleet landings of groundfish (mt)			
	9	23	29	196.6		17	105	223	542.1			8.6			
	Discard Ratio	SE	Discard	Landed	Estimate	Discard Ratio	SE	Discard	Landed	Estimate	Discard Ratio	SE	Discard	Landed	Estimate
Weight (mt)															
Minor slope rockfish (South of 40°10' N. lat.)															
Aurora Rockfish	--	--	--	0.00	0.00	0.0000	0.0113	0.03	0.09	0.11	--	--	--	--	--
Bank Rockfish	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--
Blackgill Rockfish	0.0012	0.0517	0.23	10.38	10.61	0.0037	0.2836	2.02	31.39	33.40	0.0002	0.0054	0.00	0.01	0.01
Blackspotted Rockfish	--	--	--	1.67	1.67	--	--	--	--	--	--	--	--	--	--
Redbanded Rockfish	--	--	--	0.00	0.00	--	--	--	--	--	0.0006	0.0042	0.01	--	0.01
Sharpchin Rockfish	--	--	--	--	--	--	--	--	--	--	0.0003	0.0069	0.00	--	0.00
Slope Rockfish Unid	--	--	--	0.04	0.04	--	--	--	0.00	0.00	--	--	--	--	--
Mixed thornyheads															
Shortspine/Longspine Thornyhead	--	--	--	0.01	0.01	--	--	--	0.52	0.52	--	--	--	--	--
Other flatfish															
Flatfish Unid	--	--	--	--	--	--	--	--	0.06	0.06	--	--	--	--	--
Flathead Sole	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--
Pacific Sanddab	--	--	--	--	--	--	--	--	0.64	0.64	--	--	--	--	--
Rex Sole	--	--	--	--	--	--	--	--	0.02	0.02	--	--	--	--	--
Other groundfish															
Big Skate	--	--	--	0.02	0.02	0.0065	1.4640	3.52	--	3.52	--	--	--	--	--
California Skate	--	--	--	--	--	--	--	--	0.01	0.01	--	--	--	--	--
Grenadier Unid	--	--	--	14.71	14.71	--	--	--	23.48	23.48	--	--	--	0.00	0.00
Leopard Shark	--	--	--	--	--	--	--	--	0.10	0.10	--	--	--	--	--
Pacific Flatnose	--	--	--	--	--	0.0016	0.1875	0.85	--	0.85	--	--	--	--	--
Pacific Grenadier	0.0004	0.0290	0.08	--	0.08	0.0225	0.9794	12.19	--	12.19	0.0004	0.0081	0.00	--	0.00
Rockfish Unid	--	--	--	0.24	0.24	--	--	--	0.05	0.05	--	--	--	--	--
Skate Unid	--	--	--	1.44	1.44	0.0034	0.4086	1.82	3.66	5.49	--	--	--	--	--
Soupin Shark	--	--	--	--	--	--	--	--	0.11	0.11	--	--	--	--	--
Spotted Ratfish	0.0063	0.0914	1.25	0.00	1.25	0.0021	0.1018	1.13	--	1.13	--	--	--	--	--
Pacific Cod	--	--	--	0.03	0.03	--	--	--	0.11	0.11	--	--	--	--	--
Pacific Hake	--	--	--	0.01	0.01	0.0040	0.1044	2.16	0.26	2.42	--	--	--	--	--
Sablefish (North of 36° N. lat.)	0.2190	0.2190	43.06	196.64	205.25	--	--	--	--	--	0.2139	0.1408	1.85	8.55	8.92
20% discard mortality (Fixed Gear) [‡]			8.61										0.37		
Sablefish (South of 36° N. lat.)	--	--	--	--	--	0.0366	0.1840	19.84	336.90	340.86	--	--	--	--	--
20% discard mortality (Fixed Gear) [‡]								3.97							
Shortspine Thornyhead (North of 34°27' N. lat.)	0.0013	0.0082	0.25	8.78	9.03	0.0007	0.0482	0.39	20.25	20.64	--	--	--	0.01	0.01
Shortspine Thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	0.0230	0.0196	12.49	106.18	118.66	--	--	--	--	--
Spiny Dogfish	0.0214	0.1442	4.20	0.74	2.84	0.0015	0.0578	0.84	0.03	0.45	0.0015	0.0300	0.01	--	0.01
50% discard mortality (Fixed Gear) [‡]			2.10					0.42					0.01		
Splitnose Rockfish (South of 40°10' N. lat.)	--	--	--	0.01	0.01	0.0000	0.0037	0.01	0.09	0.10	--	--	--	--	--
Widow Rockfish	--	--	--	--	--	--	--	--	0.09	0.09	--	--	--	--	--
Yellowtail Rockfish (North of 40°10' N. lat.)	--	--	--	0.02	0.02	--	--	--	--	--	--	--	--	--	--
Non-groundfish species															
California Halibut	--	--	--	--	--	--	--	--	0.04	0.04	--	--	--	--	--
Dungeness Crab	0.0003	0.0051	0.06	0.01	0.07	--	--	--	--	--	0.0040	0.0804	0.03	1.11	1.14
Non-FMP flatfish															
Deepsea Sole	--	--	--	--	--	0.0000	0.0075	0.02	--	0.02	--	--	--	--	--
Non-FMP skate															
Black Skate	--	--	--	--	--	0.0071	0.2356	3.84	--	3.84	--	--	--	--	--
Pelagic Stingray	--	--	--	--	--	0.0002	0.0484	0.12	--	0.12	--	--	--	--	--
Sandpaper Skate	0.0003	0.0127	0.06	--	0.06	0.0004	0.27	0.20	--	0.20	--	--	--	--	--

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

Table 8a. Observed discard ratios, standard error, estimated discard (mt), landings (mt), and fishing mortality estimates (mt) from the OA fixed gear longline fleet in 2012. 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 - 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)		
	41	66	104	194.4		139.1		
Weight (mt)	Discard Ratio	SE	Discard	Landed	Estimate	Discard	Landed	Estimate
Rebuilding species								
Bocaccio Rockfish (South of 40°10' N. lat.)	--	--	--	0.31	0.31	--	1.52	1.52
Canary Rockfish	--	--	--	0.07	0.07	--	--	--
Darkblotched Rockfish	0.0001	0.0031	0.02	0.77	0.79	0.01	0.00	0.02
Pacific Ocean Perch (North of 40°10' N. lat.)	--	--	--	0.04	0.04	--	--	--
Petrale Sole	0.0001	0.0076	0.02	0.05	0.07	0.02	0.01	0.02
Yelloweye Rockfish	0.0003	0.0194	0.06	--	0.06	0.04	--	0.04
Other groundfish species								
Arrowtooth flounder	0.0139	0.0797	2.70	0.31	3.01	1.93	--	1.93
Chilipepper Rockfish (South of 40°10' N. lat.)	--	--	--	0.20	0.20	--	0.13	0.13
Dover sole	0.0013	0.0087	0.26	0.30	0.55	0.18	0.01	0.20
Lingcod (North of 42° N. lat.)	0.0011	0.0436	0.21	10.94	11.15	--	--	--
Lingcod (South of 42° N. lat.)	0.0014	0.1230	0.28	2.70	2.98	0.20	2.50	2.70
Longnose skate	0.0154	0.0693	2.99	3.89	5.39	2.14	1.34	2.41
50% discard mortality (Fixed Gear) [‡]			1.49			1.07		
Longspine Thornyhead (North of 34°27' N. lat.)	0.0003	0.0326	0.06	0.07	0.13	0.05	--	0.05
Longspine Thornyhead (South of 34°27' N. lat.)	0.0000	0.0008	--	--	--	0.00	0.66	0.66
Minor shelf rockfish (North of 40°10' N. lat.)								
Bocaccio Rockfish	--	--	--	0.08	0.08	--	--	--
Chilipepper Rockfish	--	--	--	0.00	0.00	--	--	--
Greenstriped Rockfish	0.0000	0.0010	0.01	0.14	0.14	--	--	--
Rosethorn Rockfish	--	--	0.02	0.02	0.04	--	--	--
Shelf Rockfish Unid	0.0001	0.0038	--	0.04	0.04	--	--	--
Silvergray Rockfish	--	--	--	0.09	0.09	--	--	--
Stripetail Rockfish	--	--	--	0.00	0.00	--	--	--
Vermilion Rockfish	--	--	--	0.04	0.04	--	--	--
Minor shelf rockfish (South of 40°10' N. lat.)								
Flag Rockfish	--	--	--	--	--	--	0.18	0.18
Greenblotched Rockfish	--	--	--	--	--	--	0.07	0.07
Greenspotted Rockfish	--	--	--	0.01	0.01	--	0.95	0.95
Greenstriped Rockfish	--	--	--	--	--	--	0.04	0.04
Honeycomb Rockfish	--	--	--	--	--	--	0.00	0.00
Mexican Rockfish	--	--	--	--	--	--	0.03	0.03
Rosy Rockfish	--	--	--	0.05	0.05	--	0.03	0.03
Shelf Rockfish Unid	--	--	--	--	--	--	0.61	0.61
Speckled Rockfish	--	--	--	--	--	--	0.01	0.01
Squarespot Rockfish	--	--	--	--	--	--	0.03	0.03
Starry Rockfish	--	--	--	0.05	0.05	--	0.17	0.17
Vermilion Rockfish	--	--	--	0.74	0.74	--	7.62	7.62
Yellowtail Rockfish	--	--	--	0.27	0.27	--	0.28	0.28
Minor slope rockfish (North of 40°10' N. lat.)								
Aurora Rockfish	--	--	--	0.00	0.00	--	--	--
Bank Rockfish	--	--	--	0.00	0.00	--	--	--
Blackgill Rockfish	--	--	--	0.20	0.20	--	--	--
Blackspotted Rockfish	--	--	--	0.01	0.01	--	--	--
Redbanded Rockfish	0.0001	0.0021	0.02	1.78	1.80	--	--	--
Rougheye Rockfish	0.0005	0.0186	0.09	2.70	2.79	--	--	--
Sharpchin Rockfish	--	--	--	0.00	0.00	--	--	--
Shortraker Rockfish	--	--	--	0.17	0.17	--	--	--
Shortraker/Rougheye Rockfish	0.0001	0.0066	0.02	--	0.02	--	--	--
Slope Rockfish Unid	--	--	--	0.18	0.18	--	--	--
Splitnose Rockfish	--	--	--	0.04	0.04	--	--	--
Yellowmouth Rockfish	--	--	--	0.00	0.00	--	--	--

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

Table 8a (continued).

Open Access Fixed Gear	Longline - Coastwide			North of 36° N lat.			South of 36° N lat.		
	Observed vessels	Observed trips	Observed sets	Expansion factor: Fleet landings of sablefish (mt)			Expansion factor: Fleet landings of groundfish (mt)		
	41	66	104	157.8			139.1		
Weight (mt)	Discard Ratio	SE	Discard	Landed	Estimate	Discard	Landed	Estimate	
Minor slope rockfish (South of 40°10' N. lat.)									
Aurora Rockfish	0.0001	0.0298	0.02	0.01	0.03	0.02	0.02	0.03	
Bank Rockfish	--	--	--	--	--	--	0.42	0.42	
Blackgill Rockfish	0.0026	0.0315	0.51	0.87	1.37	0.36	57.75	58.11	
Blackspecked Rockfish	--	--	--	0.01	0.01	--	--	--	
Redbanded Rockfish	0.0001	0.0106	0.02	0.00	0.03	0.02	--	0.02	
Rougheye Rockfish	0.0001	0.0087	0.03	--	0.03	0.02	--	0.02	
Sharpchin Rockfish	--	--	--	--	--	--	--	--	
Slope Rockfish Unid	--	--	--	--	--	--	0.54	0.54	
Mixed thornyheads									
Shortspine/Longspine Thornyhead	0.0000	0.0008	0.00	--	0.00	0.00	0.05	0.05	
Other flatfish									
Flatfish Unid	--	--	--	--	--	--	0.00	0.00	
Pacific Sanddab	--	--	--	0.00	0.00	--	1.96	1.96	
Rock Sole	--	--	--	0.00	0.00	--	0.01	0.01	
Sanddab Unid	--	--	--	1.21	1.21	--	0.66	0.66	
Sand Sole	--	--	--	0.01	0.01	--	0.00	0.00	
Other groundfish									
Big Skate	0.0017	0.1071	0.34	0.04	0.38	0.24	--	0.24	
Grenadier Unid	--	--	--	5.78	5.78	--	0.02	0.02	
Leopard Shark	--	--	--	0.07	0.07	--	0.72	0.72	
Pacific Flatnose	0.0001	0.0035	0.01	--	0.01	0.01	--	0.01	
Pacific Grenadier	0.0013	0.1907	0.25	--	0.25	0.18	--	0.18	
Rockfish Unid	--	--	--	0.01	0.01	--	1.28	1.28	
Skate Unid	--	--	--	0.37	0.37	--	0.39	0.39	
Soupin Shark	--	--	--	--	--	--	0.04	0.04	
Spotted Ratfish	0.0033	0.0295	0.64	0.00	0.64	0.46	0.01	0.46	
Pacific Cod	--	--	--	1.03	1.03	--	0.05	0.05	
Pacific Hake	0.0000	0.0021	0.01	--	0.01	0.00	--	0.00	
Sablefish (North of 36° N. lat.)	0.1931	0.1433	37.52	157.79	165.30	--	--	--	
20% discard mortality (Fixed Gear) [‡]			7.50			--			
Sablefish (South of 36° N. lat.)	0.0050	0.0878	--	--	--	0.70	51.68	51.82	
20% discard mortality (Fixed Gear) [‡]			--			0.14			
Shortspine Thornyhead (North of 34°27' N. lat.)	0.0069	0.0420	1.35	0.44	1.79	0.96	0.94	1.90	
Shortspine Thornyhead (South of 34°27' N. lat.)	0.0006	0.0287	--	--	--	0.08	6.15	6.23	
Spiny Dogfish	0.0483	0.6150	9.38	0.40	5.09	6.71	--	3.36	
50% discard mortality (Fixed Gear) [‡]			4.69			3.36			
Splitnose rockfish (South of 40°10' N. lat.)	--	--	--	0.01	0.01	--	0.19	0.19	
Starry Flounder	--	--	--	0.01	0.01	--	0.00	0.00	
Widow Rockfish	--	--	--	0.01	0.01	--	0.03	0.03	
Yellowtail rockfish (North of 40°10' N. lat.)	--	--	--	0.05	0.05	--	--	--	
Non-groundfish species									
California Halibut	--	--	--	0.12	0.12	--	0.39	0.39	
Non-FMP flatfish									
Bigmouth Sole	--	--	--	--	--	--	0.00	0.00	
Slender Sole	--	--	--	--	--	--	0.00	0.00	
Non-FMP skate									
Sandpaper Skate	0.0003	0.0261	0.06	--	0.06	0.04	--	0.04	

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

Table 8b. Observed discard ratios, standard error, estimated discard (mt), landings (mt), and fishing mortality estimates (mt) from the OA fixed gear pot fleet in 2012. Ratios are computed as the observed discard weight divided by the observed weight of retained FMP groundfish (adjusted to fish tickets). Discard ratios were multiplied by fleet landings of FMP groundfish to generate discard estimates; combined with fixed gear sectors in Table 9.

Open Access Fixed Gear	Pot - Coastwide			North of 36° N lat.			South of 36° N lat.		
	Observed vessels	Observed trips	Observed sets	Expansion factor: Fleet landings of groundfish (mt)			Expansion factor: Fleet landings of groundfish (mt)		
	16	29	51	103.8			22.6		
Weight (mt)	Discard Ratio		SE	Discard	Landed	Estimate	Discard	Landed	Estimate
Rebuilding species									
Petrale sole		--	--	--	0.01	0.01	--	--	--
Other groundfish species									
Arrowtooth flounder		0.0105	0.0865	1.09	0.01	1.10	0.24	--	0.24
Chilipepper rockfish (South of 40°10' N. lat.)		--	--	--	--	--	--	0.00	0.00
Dover sole		0.0016	0.0051	0.17	0.01	0.17	0.04	0.00	0.04
Lingcod (North of 42° N. lat.)		--	--	--	0.05	0.05	--	--	--
Lingcod (South of 42° N. lat.)		--	--	--	0.11	0.11	--	0.02	0.02
Longnose skate		--	--	--	0.05	0.05	--	--	--
50% discard mortality (Fixed Gear) [‡]		--	--	--	--	--	--	--	--
Longspine thornyhead (North of 34°27' N. lat.)		--	--	--	0.00	0.00	--	0.09	0.09
Minor shelf rockfish (North of 40°10' N. lat.)									
Shelf Rockfish Unid		--	--	--	0.05	0.05	--	--	--
Minor shelf rockfish (South of 40°10' N. lat.)									
Shelf Rockfish Unid		--	--	--	--	--	--	0.07	0.07
Minor slope rockfish (North of 40°10' N. lat.)									
Blackgill Rockfish		--	--	--	0.00	0.00	--	--	--
Redbanded Rockfish		--	--	--	0.00	0.00	--	--	--
Rougheye Rockfish		--	--	--	0.00	0.00	--	--	--
Slope Rockfish Unid		--	--	--	0.08	0.08	--	--	--
Minor slope rockfish (South of 40°10' N. lat.)									
Aurora Rockfish		--	--	--	0.00	0.00	--	0.02	0.02
Bank Rockfish		--	--	--	--	--	--	0.01	0.01
Blackgill Rockfish		0.0002	0.0054	0.02	0.04	0.06	0.00	0.22	0.23
Redbanded Rockfish		0.0006	0.0042	0.06	--	0.06	0.01	--	0.01
Sharpchin Rockfish		0.0003	0.0069	0.04	--	0.04	0.01	--	0.01
Slope Rockfish Unid		--	--	--	0.01	0.01	--	0.07	0.07
Mixed thornyheads									
Shortspine/Longspine Thornyhead		--	--	--	--	--	--	0.01	0.01
Other flatfish									
Sanddab Unid		--	--	--	--	--	--	0.02	0.02
Other groundfish									
Grenadier Unid		--	--	--	0.02	0.02	--	--	--
Leopard Shark		--	--	--	--	--	--	0.08	0.08
Pacific Grenadier		0.0004	0.0081	0.04	--	0.04	0.01	--	0.01
Rockfish Unid		--	--	--	--	--	--	0.01	0.01
Skate Unid		--	--	--	--	--	--	1.31	1.31
Pacific cod		--	--	--	0.00	0.00	--	--	--
Sablefish (North of 36° N. lat.)		0.2139	0.1408	22.20	103.33	107.77	--	--	--
20% discard mortality (Fixed Gear) [‡]				4.44					
Sablefish (South of 36° N. lat.)		--	--	--	--	--	--	20.66	20.66
20% discard mortality (Fixed Gear) [‡]				--				--	--
Shortspine Thornyhead (North of 34°27' N. lat.)		--	--	--	0.04	0.04	--	0.02	0.02
Spiny dogfish		0.0015	0.0300	0.15	--	0.08	0.03	--	0.02
50% discard mortality (Fixed Gear) [‡]				0.08			0.02		
Splitnose rockfish (South of 40°10' N. lat.)		--	--	--	0.00	0.00	--	--	--
Non-groundfish species									
California halibut		--	--	--	--	--	--	0.02	0.02
Dungeness crab		0.0040	0.0804	0.42	2.60	3.02	0.09	--	0.09

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

Table 9. Estimated discard (mt), landings (mt), and fishing mortality estimate (mt) of groundfish species in the LE and OA non-nearshore fixed gear sectors in 2012. Discard ratios were multiplied by fleet landings of sablefish or FMP groundfish to generate estimated discard (Tables 6-8: LE sablefish endorsed primary season, LE non-endorsed, OA).

Weight (mt)	Limited Entry - Coastwide			Open Access - Coastwide			LE & OA Coastwide
	Discard	Landed	LE Total	Discard	Landed	OA Total	
Rebuilding species							
Bocaccio rockfish (South of 40°10' N. lat.)	--	0.80	0.80	--	1.82	1.82	2.62
Canary rockfish	0.03	0.02	0.05	--	0.07	0.07	0.12
Darkblotched rockfish	1.49	6.75	8.23	0.03	0.78	0.81	9.04
Pacific Ocean Perch (North of 40°10' N. lat.)	0.03	0.35	0.38	--	0.04	0.04	0.41
Petrale sole	0.05	0.68	0.73	0.04	0.06	0.10	0.83
Yelloweye rockfish	0.23	--	0.23	0.10	--	0.10	0.34
Other groundfish species							
Arrowtooth flounder	33.42	2.83	36.26	5.95	0.32	6.27	42.53
Chilipepper rockfish (South of 40°10' N. lat.)	0.01	0.78	0.79	--	0.34	0.34	1.13
Dover sole	6.15	2.80	8.95	0.64	0.32	0.96	9.91
English Sole	0.02	0.28	0.30	--	--	--	0.30
Lingcod (North of 42° N. lat.)	1.96	5.11	7.07	0.21	10.99	11.20	18.27
Lingcod (South of 42° N. lat.)	1.45	2.22	3.67	0.48	5.33	5.81	9.48
Longnose skate	54.49	30.11	57.35	5.13	5.28	7.85	65.20
50% discard mortality (Fixed Gear) [‡]	27.25	--	--	2.56	--	--	--
Longspine thornyhead (North of 34°27' N. lat.)	2.99	2.71	5.70	0.11	0.15	0.26	5.96
Longspine thornyhead (South of 34°27' N. lat.)	2.63	12.37	15.00	0.00	0.66	0.66	15.66
Minor shelf rockfish (North of 40°10' N. lat.)							
Bocaccio Rockfish	0.04	0.01	0.04	--	0.08	0.08	0.12
Chilipepper Rockfish	--	0.03	0.03	--	0.00	--	0.03
Greenspotted Rockfish	--	0.00	0.00	--	--	--	0.00
Greenstriped Rockfish	0.14	0.08	0.23	0.01	0.14	0.14	0.37
Rosethorn Rockfish	0.32	0.50	0.82	0.02	0.02	0.04	0.86
Rosy Rockfish	0.05	--	0.05	--	--	--	0.05
Shelf Rockfish Unid	0.01	0.23	0.24	--	0.08	0.08	0.32
Silvergray Rockfish	0.01	0.04	0.04	--	0.09	0.09	0.13
Stripetail Rockfish	0.01	0.00	0.01	--	0.00	0.00	0.01
Vermilion Rockfish	--	--	--	--	0.04	0.04	0.04
Minor shelf rockfish (South of 40°10' N. lat.)							
Bronzespotted Rockfish	0.10	0.00	0.10	--	--	--	0.10
Flag Rockfish	--	0.06	0.06	--	0.18	0.18	0.24
Greenblotched Rockfish	--	0.08	0.08	--	0.07	0.07	0.14
Greenspotted Rockfish	0.04	0.20	0.23	--	0.96	0.96	1.19
Greenstriped Rockfish	--	0.00	0.00	--	0.04	0.04	0.04
Honeycomb Rockfish	--	--	--	--	0.00	0.00	0.00
Mexican Rockfish	--	0.00	0.00	--	0.03	0.03	0.04
Pink Rockfish	0.76	--	0.76	--	--	--	0.76
Pinkrose Rockfish	--	0.00	0.00	--	--	--	0.00
Rosethorn Rockfish	0.16	0.23	0.39	--	--	--	0.39
Rosy Rockfish	0.00	0.03	0.03	--	0.07	0.07	0.11
Shelf Rockfish Unid	--	0.03	0.03	--	0.68	0.68	0.71
Speckled Rockfish	--	0.09	0.09	--	0.01	0.01	0.11
Squarespot Rockfish	--	0.16	0.16	--	0.03	0.03	0.18
Starry Rockfish	--	0.10	0.10	--	0.22	0.22	0.31
Swordspine Rockfish	0.04	--	0.04	--	--	--	0.04
Vermilion Rockfish	--	0.64	0.64	--	8.36	8.36	9.00
Yellowtail Rockfish	--	0.04	0.04	--	0.54	0.54	0.58
Minor slope rockfish (North of 40°10' N. lat.)							
Aurora Rockfish	0.13	0.06	0.19	--	0.00	0.00	0.20
Bank Rockfish	--	0.02	0.02	--	0.00	0.00	0.02
Blackgill Rockfish	1.74	1.42	3.15	--	0.20	0.20	3.35
Blackspotted Rockfish	--	0.16	0.16	--	0.01	0.01	0.17
Redbanded Rockfish	7.09	12.97	20.06	0.02	1.78	1.80	21.85
Rougheye Rockfish	16.01	33.74	49.75	0.09	2.70	2.79	52.53
Sharpchin Rockfish	--	0.01	0.01	--	0.00	0.00	0.02
Shortraker Rockfish	3.13	3.21	6.34	--	0.17	0.17	6.52
Shortraker/Rougheye Rockfish	36.36	--	36.36	0.02	--	0.02	36.38
Slope Rockfish Unid	0.03	6.28	6.31	--	0.26	0.26	6.57
Splitnose Rockfish	0.01	0.14	0.15	--	0.04	0.04	0.19
Yellowmouth Rockfish	--	1.26	1.26	--	0.00	0.00	1.26

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

Table 9 (continued).

Weight (mt)	Limited Entry - Coastwide			Open Access - Coastwide			LE & OA Coastwide
	Discard	Landed	LE Total	Discard	Landed	OA Total	
Minor slope rockfish (South of 40°10' N. lat.)							
Aurora Rockfish	0.10	0.12	0.22	0.04	0.04	0.08	0.31
Bank Rockfish	--	0.00	0.00	--	0.43	0.43	0.43
Blackgill Rockfish	8.50	45.41	53.91	0.89	58.88	59.77	113.68
Blackspotted Rockfish	--	8.80	8.80	--	0.01	0.01	8.82
Redbanded Rockfish	0.88	0.00	0.88	0.12	0.00	0.12	1.01
Roughey Rockfish	0.17	--	0.17	0.05	--	0.05	0.22
Sharpchin Rockfish	0.00	--	0.00	0.04	--	0.04	0.05
Slope Rockfish Unid	--	2.87	2.87	--	0.62	0.62	3.49
Mixed thornyheads							
Shortspine/Longspine Thornyhead	0.00	0.68	0.68	0.00	0.06	0.06	0.75
Other flatfish							
Flatfish Unid	0.00	0.06	0.06	--	0.00	0.00	0.06
Flathead Sole	--	0.00	0.00	--	--	--	0.00
Pacific Sanddab	--	0.64	0.64	--	1.96	1.96	2.60
Rex Sole	0.00	0.34	0.35	--	--	--	0.35
Rock Sole	--	--	--	--	0.02	0.02	0.02
Sanddab Unid	--	--	--	--	1.89	1.89	1.89
Sand Sole	--	0.22	0.22	--	0.01	0.01	0.23
Other groundfish							
Big Skate	5.90	0.02	5.92	0.58	0.04	0.62	6.54
California Skate	0.00	0.01	0.01	--	--	--	0.01
Grenadier Unid	--	45.06	45.06	--	5.82	5.82	50.88
Leopard Shark	--	0.10	0.10	--	0.86	0.86	0.96
Pacific Flatnose	0.89	--	0.89	0.02	--	0.02	0.91
Pacific Grenadier	18.46	--	18.46	0.47	--	0.47	18.93
Skate Unid	1.83	7.55	9.38	--	2.06	2.06	11.44
Southern Shark	--	0.11	0.11	--	0.04	0.04	0.15
Spotted Ratfish	5.58	0.01	5.59	1.09	0.01	1.10	6.70
Rockfish Unid	--	0.29	0.29	--	1.29	1.29	1.59
Pacific Cod	0.20	1.17	1.38	--	1.08	1.08	2.45
Pacific Hake	3.12	0.27	3.39	0.01	--	0.01	3.40
Sablefish (North of 36° N. lat.)							
20% discard mortality (Fixed Gear) [‡]	119.58			11.94			
Sablefish (South of 36° N. lat.)							
20% discard mortality (Fixed Gear) [‡]	3.97			0.14			
Shortspine thornyhead (North of 34°27' N. lat.)	4.81	54.49	59.30	2.31	1.44	3.75	63.05
Shortspine thornyhead (South of 34°27' N. lat.)	12.49	107.07	119.56	0.08	6.15	6.23	125.79
Spiny Dogfish							
50% discard mortality (Fixed Gear) [‡]	72.60			8.14			
Splitnose Rockfish (South of 40°10' N. lat.)	0.01	0.11	0.12	--	0.20	0.20	0.32
Starry Flounder	--	0.02	0.02	--	0.01	0.01	0.03
Widow Rockfish	0.00	0.17	0.17	--	0.04	0.04	0.21
Yellowtail Rockfish (North of 40°10' N. lat.)	0.16	0.40	0.56	--	0.05	0.05	0.61
Non-groundfish species							
California Halibut	--	0.04	0.04	--	0.54	0.54	0.58
Dungeness Crab	0.28	1.29	1.57	0.51	2.60	3.11	4.68
Non-FMP flatfish							
Bigmouth Sole	--	--	--	--	0.00	0.00	0.00
Deepsea Sole	0.02	--	0.02	--	--	--	0.02
Slender Sole	--	--	--	--	0.00	0.00	0.00
Non-FMP skate							
Aleutian Skate	0.29	--	0.29	--	--	--	0.29
Black Skate	4.08	--	4.08	--	--	--	4.08
Pelagic Stingray	0.12	--	0.12	--	--	--	0.12
Sandpaper Skate	1.51	--	1.51	0.09	--	0.09	1.61
Starry Skate	0.01	--	0.01	--	--	--	0.01

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

Table 10. Commercial landings of nearshore species (mt) in Oregon and California during 2012, partitioned by depth interval and groundfish management area based on observed catch from 2003 to 2012. Data from both states were combined. The California state-permit framework is represented in the area south of 40° 10' N latitude.

	2003-2012 Total observed landings (mt)	2003-2012 Percentage of observed catch by depth (fathoms)			2012 Fleet landings (mt)	2012 Fleet landings (mt) reallocated by depth (fathoms)		
		0 - 10	11 - 20	> 20		0 - 10	11 - 20	> 20
NORTH of 40° 10' N Lat.								
Nearshore Species - Commercial								
Black rockfish (South of 46°16' N. lat.)	124.79	46.4%	51.6%	2.0%	116.52	54.04	60.10	2.38
Cabazon (California)	2.03	39.5%	51.9%	8.6%	1.68	0.66	0.87	0.14
Cabazon (Oregon)	20.18	33.2%	64.6%	2.2%	28.85	9.59	18.63	0.63
Lingcod (North of 42° N. lat.)	18.60	33.9%	61.5%	4.6%	35.12	11.91	21.58	1.62
Lingcod (South of 42° N. lat.)	5.49	28.7%	55.1%	16.1%	4.01	1.15	2.21	0.65
Minor nearshore rockfish (North of 40°10' N. lat.)								
Black and Yellow Rockfish	0.03	69.4%	30.6%	--	0.01	0.01	0.00	--
Blue Rockfish	14.34	22.4%	70.1%	7.5%	9.91	2.22	6.95	0.74
Brown Rockfish	0.25	8.7%	25.3%	66.0%	0.30	0.03	0.08	0.20
China Rockfish	5.53	32.8%	63.2%	4.0%	9.21	3.02	5.82	0.37
Copper Rockfish	1.30	12.2%	70.0%	17.9%	2.23	0.27	1.56	0.40
Gopher Rockfish	0.04	43.0%	55.5%	1.5%	0.06	0.02	0.03	0.00
Grass Rockfish	0.36	98.3%	1.0%	0.7%	0.22	0.22	0.00	0.00
Nearshore Rockfish Unid	2.21	28.2%	65.4%	6.4%	--	--	--	--
Olive Rockfish	0.07	4.9%	82.0%	13.2%	0.04	0.00	0.03	0.01
Quillback Rockfish	2.15	7.8%	60.8%	31.4%	3.17	0.25	1.93	1.00
Other groundfish								
Kelp Greenling	12.90	50.5%	48.2%	1.3%	19.51	9.85	9.41	0.26
SOUTH of 40° 10' N Lat.								
Nearshore Species - Commercial								
Black rockfish (South of 46°16' N. lat.)	1.16	47.4%	47.2%	5.5%	3.02	1.43	1.43	0.16
Cabazon (California)	5.77	94.0%	4.5%	1.5%	28.57	26.85	1.28	0.44
California scorpionfish (South of 34°27' N. lat.)	0.37	4.0%	1.4%	94.7%	3.19	0.13	0.04	3.02
Deeper nearshore rockfish								
Brown Rockfish	7.36	28.6%	56.4%	15.0%	25.83	7.38	14.57	3.88
Copper Rockfish	0.50	13.4%	45.0%	41.6%	4.62	0.62	2.08	1.92
Nearshore Rockfish Unid	0.38	29.3%	33.2%	37.5%	0.13	0.04	0.04	0.05
Olive Rockfish	0.42	21.7%	53.8%	24.5%	0.88	0.19	0.47	0.22
Quillback Rockfish	0.15	--	42.5%	57.5%	0.21	--	0.09	0.12
Treefish Rockfish	0.20	39.5%	50.2%	10.3%	1.60	0.63	0.80	0.17
Lingcod (South of 42° N. lat.)	5.12	46.0%	42.2%	11.8%	18.22	8.39	7.69	2.14
Minor nearshore rockfish (South of 40°10' N. lat.)								
Blue Rockfish	0.97	42.3%	44.9%	12.9%	1.04	0.44	0.47	0.13
Gopher Rockfish	4.50	50.3%	38.4%	11.4%	22.06	11.09	8.46	2.51
Nearshore Rockfish Unid	0.25	60.6%	30.4%	9.0%	--	--	--	--
Other groundfish								
Kelp Greenling	0.59	82.6%	13.1%	4.3%	4.49	3.71	0.59	0.19
Other nongroundfish								
California Sheepshead	10.33	71.6%	27.5%	0.9%	27.58	19.74	7.60	0.24
Shallow nearshore rockfish								
Black and Yellow Rockfish	1.46	93.5%	3.2%	3.3%	11.25	10.53	0.36	0.37
China Rockfish	0.55	25.1%	49.0%	25.9%	1.37	0.34	0.67	0.35
Grass Rockfish	0.91	95.0%	4.5%	0.5%	11.46	10.88	0.51	0.06
Kelp Rockfish	0.11	65.7%	32.9%	1.4%	0.57	0.37	0.19	0.01
Nearshore Rockfish Unid	--	--	--	--	0.03	--	--	--

Table 11. Observed discard ratios with standard error and nearshore species fleet landings (mt) from the commercial nearshore fixed gear fishery in 2012 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
Observed	44	110	130	51	170	202	5	6	6	22	63	102	20	49	71	7	17	17
Expansion factor: Fleet landings of nearshore species (mt)	93.2			129.2			8.4			102.8			47.3			16.0		
	Discard Ratio		SE	Discard Ratio		SE	Discard Ratio		SE	Discard Ratio		SE	Discard Ratio		SE	Discard Ratio		SE
Rebuilding species																		
Canary rockfish		0.0053	0.1149		0.0161	0.0463		0.0477	0.3092		0.0038	0.4228		0.0586	0.3800		0.2551	1.2986
Petrale sole		--	--		--	--		--	--		--	--		--	--		0.0011	0.0267
Yelloweye rockfish		0.0110	0.8748		0.0226	0.1943		0.0171	0.1074		--	--		0.0009	0.0429		0.0038	0.2223
Other groundfish species																		
Black rockfish (South of 46°16' N. lat.)		0.0108	0.0250		0.0103	0.0215		0.0026	0.0178		0.0185	0.0801		0.0030	0.0181		0.0268	0.5112
Cabezon (California)		0.0006	0.0715		0.0014	0.0655		--	--		0.0358	0.0953		0.0148	0.1387		0.0060	0.1326
Cabezon (Oregon)		0.0090	0.0209		0.0061	0.0177		--	--		--	--		--	--		--	--
Deeper nearshore rockfish (South of 40°10' N. lat.)																		
Brown Rockfish		--	--		--	--		--	--		0.0136	0.0566		0.0024	0.0095		0.0120	0.0410
Calico Rockfish		--	--		--	--		--	--		0.0000	--		--	--		0.0001	--
Copper Rockfish		--	--		--	--		--	--		0.0012	0.0157		0.0048	0.0381		0.0001	0.0028
Olive Rockfish		--	--		--	--		--	--		0.0005	0.0130		0.0056	0.0387		0.0191	0.2107
Quillback Rockfish		--	--		--	--		--	--		--	--		0.0001	--		--	--
Treefish Rockfish		--	--		--	--		--	--		0.0038	0.0473		0.0010	0.0187		--	--
Lingcod (North of 42° N. lat.)		0.0963	0.0811		0.1134	0.1103		0.0539	0.2167		--	--		--	--		--	--
Lingcod (South of 42° N. lat.)		0.0073	0.3584		0.0136	0.1448		0.0114	0.3641		0.0607	0.1042		0.1429	0.2782		0.1855	0.5224
Minor nearshore rockfish (North of 40°10' N. lat.)																		
Blue Rockfish		0.0135	0.0400		0.0194	0.0356		0.0887	0.7038		--	--		--	--		--	--
China Rockfish		0.0027	0.0091		0.0027	0.0075		0.0004	0.0096		--	--		--	--		--	--
Copper Rockfish		--	--		0.0003	0.0072		--	--		--	--		--	--		--	--
Olive Rockfish		--	--		0.0000	0.0163		0.0034	0.1077		--	--		--	--		--	--
Quillback Rockfish		0.0004	0.0168		0.0014	0.0143		0.0160	0.1323		--	--		--	--		--	--
Minor nearshore rockfish (South of 40°10' N. lat.)																		
Blue Rockfish		--	--		--	--		--	--		0.0053	0.0603		0.0062	0.0322		0.0090	0.0500
Gopher Rockfish		--	--		--	--		--	--		0.0100	0.0266		0.0207	0.0433		0.0096	0.0318
Minor shelf rockfish (North of 40°10' N. lat.)																		
Rosy Rockfish		--	--		0.0000	0.0204		--	--		--	--		--	--		--	--
Tiger Rockfish		--	--		0.0000	0.0056		--	--		--	--		--	--		--	--
Vermilion Rockfish		0.0003	0.0158		0.0004	0.0096		--	--		--	--		--	--		--	--
Minor shelf rockfish (South of 40°10' N. lat.)																		
Rosy Rockfish		--	--		--	--		--	--		--	--		--	--		0.0170	0.1514
Starry Rockfish		--	--		--	--		--	--		--	--		--	--		0.0015	0.0351
Vermilion Rockfish		--	--		--	--		--	--		0.0002	0.0080		0.0003	0.0048		--	--
Yellowtail Rockfish		--	--		--	--		--	--		--	--		--	--		0.006	0.1056

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	44	110	130	51	170	202	5	6	6	22	63	102	20	49	71	7	17	17
Expansion factor: Fleet landings of nearshore species (mt)	93.2			129.2			8.4			102.8			47.3			16.0		
	Discard Ratio		SE	Discard Ratio		SE	Discard Ratio		SE	Discard Ratio		SE	Discard Ratio		SE	Discard Ratio		SE
Other flatfish																		
Pacific Sanddab		--	--		--	--		--	--		--	--	0.0001	--		0.0007	--	
Rock Sole		--	--		--	--		--	--		--	--		--		0.0003	0.0097	
Sanddab Unid		--	--		--	--		--	--		--	--	0.0004	0.0601		--	--	
Sand Sole		--	--	0.0001	0.0141			--	--	0.0001	0.0393		0.0005	0.1717		--	--	
Other groundfish																		
Big Skate		--	--	0.0006	--			--	--		--	--		--		--	--	
California Scorpionfish		--	--		--	--		--	--	0.0001	--		--	--		--	--	
Kelp Greenling	0.0276	0.0366		0.0174	0.0253		0.0062	0.0533		0.0034	0.0161		0.0069	0.1235		0.0005	0.0139	
Leopard Shark		--	--		--	--		--	--	0.0079	--		--	--		--	--	
Spotted Ratfish		--	--	0.0000	--			--	--		--		--	--		--	--	
Skate Unid		--	--		--	--		--	--	0.0005	--		--	--		--	--	
Shallow nearshore rockfish (South of 40°10' N. lat.)																		
Black and Yellow Rockfish		--	--		--	--		--	--	0.0054	0.0146		0.0014	0.0288		0.0034	0.2223	
China Rockfish		--	--		--	--		--	--	0.0012	0.0303		0.0307	0.1354		0.0644	0.1763	
Grass Rockfish		--	--		--	--		--	--	0.0001	0.0074		--	--		--	--	
Kelp Rockfish		--	--		--	--		--	--	0.0014	0.0345		0.0007	0.0155		--	--	
Spiny Dogfish Shark		--	--		--	--		--	--	--	--		0.0030	0.9618		--	--	
Widow Rockfish		--	--	0.0002	0.0250			--	--	--	--		--	--		--	--	
Yellowtail Rockfish	0.0012	0.0217		0.0030	0.0175		0.0556	0.3293		--	--		--	--		--	--	
Non-groundfish species																		
California Halibut		--	--		--	--		--	--	0.0004	0.0983		--	--		--	--	
Dungeness Crab		--	--	0.0000	0.0136			--	--	0.0003	0.0716		0.0004	--		--	--	
Non-FMP flatfish																		
Diamond Turbot		--	--		--	--		--	--	0.0001	--		--	--		--	--	
Non-FMP skate																		
Round Stingray		--	--		--	--		--	--	0.0002	--		--	--		--	--	
Other nongroundfish ¹																		
Brown Irish Lord Sculpin		--	--		--	--		--	--		--		0.0005	--		--	--	
Buffalo Sculpin	0.0014	0.0543		0.0004	0.0247			--	--		--		0.0011	0.2769		--	--	
California Sheephead		--	--		--	--		--	--	0.2252	1.9675		0.1690	3.7807		--	--	
Greenling Unid		--	--	0.0000	--			--	--		--		--	--		--	--	
Pacific Staghorn Sculpin		--	--		--	--		--	--		--		0.0001	--		--	--	
Red Irish Lord Sculpin	0.0019	0.0272		0.0010	0.0217			--	--	0.0002	--		--	--		--	--	
Rock Greenling		--	--		--	--		--	--	0.0003	0.0195		--	--		--	--	

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

Table 12a. Gross estimated discard (mt), discard mortality rates (provided by the Groundfish Management Team), estimated discard mortality (mt), fleet landings (mt), and fishing mortality estimates (mt) for the 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)			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			
Rebuilding species												
Canary rockfish	0.49	2.08	0.40	10%	55%	100%	0.05	1.14	0.40	1.59	--	1.59
Darkblotched rockfish	--	--	--	100%	100%	100%	--	--	--	--	0.07	0.07
Yelloweye rockfish	1.03	2.92	0.14	10%	50%	100%	0.10	1.46	0.14	1.71	--	1.71
Other groundfish species												
Arrowtooth flounder	--	--	--	7%	7%	7%	--	--	--	--	0.01	0.01
Black rockfish (South of 46°16' N. lat.)	1.01	1.33	0.02	10%	40%	90%	0.10	0.53	0.02	0.65	116.52	117.17
Cabezon (California)	0.06	0.18	--	7%	7%	7%	0.00	0.01	--	0.02	1.68	1.70
Cabezon (Oregon)	0.84	0.79	--	7%	7%	7%	0.06	0.06	--	0.11	28.85	28.97
Dover sole	--	--	--	7%	7%	7%	--	--	--	--	0.00	0.00
Lingcod (North of 42° N. lat.)	8.98	14.65	0.45	7%	7%	7%	0.63	1.03	0.03	1.69	35.12	36.80
Lingcod (South of 42° N. lat.)	0.68	1.76	0.10	7%	7%	7%	0.05	0.12	0.01	0.18	4.01	4.18
Longnose skate	--	--	--	7%	7%	7%	--	--	--	--	0.03	0.03
Minor nearshore rockfish (North of 40°10' N. lat.)												
Black and Yellow Rockfish	--	--	--	10%	40%	100%	--	--	--	--	0.01	0.01
Blue Rockfish	1.26	2.51	0.74	10%	60%	100%	0.13	1.50	0.74	2.37	9.91	12.28
Brown Rockfish	--	--	--	10%	40%	100%	--	--	--	--	0.30	0.30
China Rockfish	0.25	0.35	0.00	10%	50%	100%	0.03	0.18	0.00	0.21	9.21	9.41
Copper Rockfish	--	0.03	--	10%	40%	100%	--	0.01	--	0.01	2.23	2.24
Gopher Rockfish	--	--	--	10%	40%	100%	--	--	--	--	0.06	0.06
Grass Rockfish	--	--	--	10%	40%	100%	--	--	--	--	0.22	0.22
Olive Rockfish	--	0.01	0.03	10%	40%	100%	--	0.00	0.03	0.03	0.04	0.07
Quillback Rockfish	0.03	0.18	0.13	10%	40%	100%	0.00	0.07	0.13	0.21	3.17	3.38
Minor shelf rockfish (North of 40°10' N. lat.)												
Bocaccio Rockfish	--	--	--	10%	70%	100%	--	--	--	--	0.01	0.01
Rosy Rockfish	--	0.00	--	100%	100%	100%	--	0.00	--	0.00	--	0.00
Shelf Rockfish Unid	--	--	--	100%	100%	100%	--	--	--	--	0.07	0.07
Starry Rockfish	--	--	--	100%	100%	100%	--	--	--	--	0.00	0.00
Tiger Rockfish	--	0.01	--	10%	50%	100%	--	0.00	--	0.00	0.50	0.50
Vermilion Rockfish	0.03	0.05	--	10%	55%	100%	0.00	0.03	--	0.03	3.89	3.92
Minor slope rockfish (North of 40°10' N. lat.)												
Redbanded Rockfish	--	--	--	100%	100%	100%	--	--	--	--	0.00	0.00
Rougheye Rockfish	--	--	--	100%	100%	100%	--	--	--	--	0.00	0.00
Shorthead Rockfish	--	--	--	100%	100%	100%	--	--	--	--	0.00	0.00
Slope Rockfish Unid	--	--	--	100%	100%	100%	--	--	--	--	0.01	0.01
Other flatfish												
Sand Sole	--	0.01	--	7%	7%	7%	--	0.00	--	0.00	--	0.00
Other groundfish												
Big Skate	--	0.07	--	7%	7%	7%	--	0.01	--	0.01	--	0.01
Kelp Greenling	2.58	2.25	0.05	7%	7%	7%	0.18	0.16	0.00	0.34	19.51	19.85
Rockfish Unid	--	--	--	100%	100%	100%	--	--	--	--	0.01	0.01
Spotted Ratfish	--	0.01	--	7%	7%	7%	--	0.00	--	0.00	--	0.00
Sablefish (North of 36° N. lat.)	--	--	--	20%	20%	20%	--	--	--	--	1.04	1.04
Spiny Dogfish	--	--	--	7%	7%	7%	--	--	--	--	0.01	0.01
Starry Flounder	--	--	--	7%	7%	7%	--	--	--	--	0.00	0.00
Skate Unid	--	--	--	7%	7%	7%	--	--	--	--	0.20	0.20
Widow Rockfish	--	0.02	--	50%	90%	100%	--	0.02	--	0.02	0.02	0.04
Yellowtail Rockfish	0.11	0.39	0.47	100%	100%	100%	0.11	0.39	0.47	0.97	0.79	1.76
Non-groundfish species												
Dungeness Crab	--	0.00	--	100%	100%	100%	--	0.00	--	0.00	1.46	1.47
Other nongroundfish ¹												
Buffalo Sculpin	0.13	0.05	--	100%	100%	100%	0.13	0.05	--	0.18	--	0.18
Greenling Unid	--	0.00	--	7%	7%	7%	--	0.00	--	0.00	--	0.00
Red Irish Lord Sculpin	0.18	0.12	--	100%	100%	100%	0.18	0.12	--	0.30	--	0.30

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

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

Table 12b. Gross estimated discard (mt), discard mortality rates (provided by the Groundfish Management Team), estimated discard mortality (mt), fleet landings (mt), and fishing mortality estimates (mt) for the 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 ± 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			
Rebuilding species												
Bocaccio rockfish (South of 40°10' N. lat.)	--	--	--	10%	70%	100%	--	--	--	--	0.73	0.73
Canary rockfish	0.39	2.77	4.08	10%	55%	100%	0.04	1.52	4.08	5.64	--	5.64
Darkblotched rockfish	--	--	--	100%	100%	100%	--	--	--	--	0.02	0.02
Petrale sole	--	--	0.02	7%	7%	7%	--	--	0.00	0.00	0.00	0.00
Yelloweye rockfish	--	0.04	0.06	10%	50%	100%	--	0.02	0.06	0.08	--	0.08
Other groundfish species												
Black rockfish (South of 46°16' N. lat.)	1.90	0.14	0.43	10%	40%	90%	0.19	0.06	0.39	0.63	3.02	3.65
Cabezon (California)	3.68	0.70	0.10	7%	7%	7%	0.26	0.05	0.01	0.31	28.57	28.88
California scorpionfish (South of 34°27' N. lat.)	--	--	--	7%	7%	7%	--	--	--	--	3.19	3.19
Chilipepper rockfish (South of 40°10' N. lat.)	--	--	--	100%	100%	100%	--	--	--	--	0.04	0.04
Deeper nearshore rockfish												
Brown Rockfish	1.40	0.12	0.19	10%	40%	90%	0.14	0.05	0.17	0.36	25.83	26.19
Calico Rockfish	0.00	--	0.00	10%	40%	90%	0.00	--	0.00	0.00	--	0.00
Copper Rockfish	0.13	0.23	0.00	10%	40%	100%	0.01	0.09	0.00	0.11	4.62	4.72
Nearshore Rockfish Unid	--	--	--	10%	40%	90%	--	--	--	--	0.13	0.13
Olive Rockfish	0.05	0.26	0.31	10%	40%	90%	0.00	0.11	0.27	0.39	0.88	1.26
Quillback Rockfish	--	0.01	--	10%	40%	90%	--	0.00	--	0.00	0.21	0.21
Treefish Rockfish	0.3917	0.05	--	10%	40%	90%	0.0392	0.02	--	0.06	1.60	1.66
Lingcod (South of 42° N. lat.)	6.24	6.76	2.97	7%	7%	7%	0.44	0.47	0.21	1.12	18.22	19.34
Longspine thornyhead (North of 34°27' N. lat.)	--	--	--	100%	100%	100%	--	--	--	--	0.00	0.00
Longspine thornyhead (South of 34°27' N. lat.)	--	--	--	100%	100%	100%	--	--	--	--	0.05	0.05
Minor nearshore rockfish (South of 40°10' N. lat.)												
Blue Rockfish	0.54	0.29	0.14	10%	60%	100%	0.05	0.18	0.14	0.37	1.04	1.41
Gopher Rockfish ¹	1.03	0.98	0.15	10%	45%	100%	0.10	0.44	0.15	0.70	22.06	22.76
Minor shelf rockfish (South of 40°10' N. lat.)												
Flag Rockfish	--	--	--	100%	100%	100%	--	--	--	--	0.11	0.11
Freckled Rockfish	--	--	--	100%	100%	100%	--	--	--	--	0.01	0.01
Greenblotched Rockfish	--	--	--	100%	100%	100%	--	--	--	--	0.05	0.05
Greenspotted Rockfish	--	--	--	100%	100%	100%	--	--	--	--	0.07	0.07
Greenstriped Rockfish	--	--	--	100%	100%	100%	--	--	--	--	0.01	0.01
Honeycomb Rockfish	--	--	--	100%	100%	100%	--	--	--	--	0.00	0.00
Mexican Rockfish	--	--	--	100%	100%	100%	--	--	--	--	0.00	0.00
Rosethorn Rockfish	--	--	--	100%	100%	100%	--	--	--	--	0.03	0.03
Rosy Rockfish	--	--	0.27	100%	100%	100%	--	--	0.27	0.27	0.23	0.50
Shelf Rockfish Unid	--	--	--	100%	100%	100%	--	--	--	--	0.81	0.81
Speckled Rockfish	--	--	--	100%	100%	100%	--	--	--	--	0.02	0.02
Squarespot Rockfish	--	--	--	100%	100%	100%	--	--	--	--	0.00	0.00
Starry Rockfish	--	--	0.0235	100%	100%	100%	--	--	0.0235	0.02	0.25	0.27
Vermilion Rockfish	0.03	0.01	--	10%	55%	100%	0.00	0.01	--	0.01	7.04	7.05
Yellowtail Rockfish	--	--	0.09	10%	30%	75%	--	--	0.07	0.07	0.28	0.35
Minor slope rockfish (South of 40°10' N. lat.)												
Bank Rockfish	--	--	--	100%	100%	100%	--	--	--	--	0.01	0.01
Blackgill Rockfish	--	--	--	100%	100%	100%	--	--	--	--	2.31	2.31
Blackspotted Rockfish	--	--	--	100%	100%	100%	--	--	--	--	0.02	0.02
Redbanded Rockfish	--	--	--	100%	100%	100%	--	--	--	--	0.00	0.00
Slope Rockfish Unid	--	--	--	100%	100%	100%	--	--	--	--	0.07	0.07
Mixed thornyheads												
Shortspine/ Longspine Thornyhead	--	--	--	100%	100%	100%	--	--	--	--	0.03	0.03
Other flatfish												
Flatfish Unid	--	--	--	7%	7%	7%	--	--	--	--	0.01	0.01
Pacific Sanddab	--	0.00	0.01	7%	7%	7%	--	0.00	0.00	0.00	2.40	2.40
Rex Sole	--	--	--	7%	7%	7%	--	--	--	--	0.00	0.00
Rock Sole	--	--	0.00	7%	7%	7%	--	--	0.00	0.00	0.07	0.07
Sanddab Unid	--	0.02	--	7%	7%	7%	--	0.00	--	0.00	0.00	0.01
Sand Sole	0.02	0.03	--	7%	7%	7%	0.00	0.00	--	0.00	0.13	0.13

²Discard mortality rates provided by the Groundfish Management Team (GMT). Each mortality rate is applied to each gross estimated discard weight by depth.

¹Gopher rockfish assume the discard mortality rate for the Shallow Nearshore Rockfish group.

Table 12b (continued).

Nearshore Fixed Gear Fishery South of 40° 10' N lat	Gross estimated discard (mt) by depth (fm)			Discard mortality rate ± by depth (fm)			Estimated discard mortality (mt) by depth (fm)			Estimated discard mortality (mt)	Fleet Landings (mt)	Estimated fishing mortality (mt)
	0-10	11-20	> 20	0-10	11-20	> 20	0-10	11-20	> 20			
Other groundfish												
California Scorpionfish	0.02	--	--	7%	7%	7%	0.00	--	--	0.00	0.00	0.00
Grenadier Unid	--	--	--	100%	100%	100%	--	--	--	--	0.62	0.62
Kelp Greenling	0.35	0.33	0.01	7%	7%	7%	0.02	0.02	0.00	0.05	4.49	4.54
Leopard Shark	0.81	--	--	7%	7%	7%	0.06	--	--	0.06	0.18	0.24
Rockfish Unid	--	--	--	100%	100%	100%	--	--	--	--	0.31	0.31
Skate Unid	0.05	--	--	7%	7%	7%	0.00	--	--	0.00	0.10	0.11
Soupin Shark	--	--	--	7%	7%	7%	--	--	--	--	0.25	0.25
Spotted Ratfish	--	--	--	100%	100%	100%	--	--	--	--	0.00	0.00
Sablefish (North of 36° N. lat.)	--	--	--	20%	20%	20%	--	--	--	--	0.65	0.65
Sablefish (South of 36° N. lat.)	--	--	--	20%	20%	20%	--	--	--	--	4.39	4.39
Shallow nearshore rockfish												
Black and Yellow Rockfish	0.56	0.07	0.05	10%	45%	100%	0.06	0.03	0.05	0.14	11.25	11.39
China Rockfish	0.12	1.45	1.03	10%	50%	100%	0.01	0.73	1.03	1.77	1.37	3.14
Grass Rockfish	0.01	--	--	10%	45%	100%	0.00	--	--	0.00	11.46	11.46
Kelp Rockfish	0.15	0.03	--	10%	45%	100%	0.01	0.01	--	0.03	0.57	0.59
Nearshore Rockfish Unid	--	--	--	10%	45%	100%	--	--	--	--	0.03	0.03
Shortspine thornyhead (North of 34°27' N. lat.)	--	--	--	100%	100%	100%	--	--	--	--	0.12	0.12
Shortspine thornyhead (South of 34°27' N. lat.)	--	--	--	100%	100%	100%	--	--	--	--	0.97	0.97
Spiny dogfish shark	--	0.14	--	7%	7%	7%	--	0.01	--	0.01	--	0.01
Starry flounder	--	--	--	7%	7%	7%	--	--	--	--	0.13	0.13
Widow rockfish	--	--	--	50%	90%	100%	--	--	--	--	0.00	0.00
Non-groundfish species												
California halibut	0.04	--	--	7%	7%	7%	0.00	--	--	0.00	1.34	1.35
Dungeness crab	0.03	0.02	--	100%	100%	100%	0.03	0.02	--	0.05	1.36	1.42
Non-FMP flatfish												
Diamond Turbot	0.01	--	--	7%	7%	7%	0.00	--	--	0.00	--	0.00
Hornyhead Turbot	--	--	--	7%	7%	7%	--	--	--	--	0.00	0.00
Other nongroundfish ¹												
Brown Irish Lord Sculpin	--	0.02	--	100%	100%	100%	--	0.02	--	0.02	--	0.02
Buffalo Sculpin	--	0.05	--	100%	100%	100%	--	0.05	--	0.05	--	0.05
California Sheephead	23.15	8.00	--	100%	100%	100%	23.15	8.00	--	31.16	27.58	58.74
Pacific Staghorn Sculpin	--	0.00	--	100%	100%	100%	--	0.00	--	0.00	--	0.00
Red Irish Lord Sculpin	0.02	--	--	100%	100%	100%	0.02	--	--	0.02	--	0.02
Rock Greenling	0.03	--	--	7%	7%	7%	0.00	--	--	0.00	0.05	0.05

²Discard mortality rates provided by the Groundfish Management Team (GMT). Each mortality rate is applied to each gross estimated discard weight by depth.

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

Table 13. Estimated discard (mt), landings (mt), and estimated total fishing mortality (mt) of west coast groundfish species in non-IFQ 2012 fisheries/groundfish sectors observed by the WCGOP.

Weight (mt)	Open Access CA halibut			Pink shrimp			Non-nearshore fixed gear			Nearshore fixed gear		
	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate
Rebuilding species												
Bocaccio rockfish (South of 40°10' N. lat.)	--	--	--	--	0.01	0.01	--	2.62	2.62	--	0.73	0.73
Canary rockfish	--	0.00	0.00	0.01	0.01	0.02	0.03	0.08	0.12	7.23	--	7.23
Darkblotched rockfish	--	--	--	4.96	0.00	4.96	1.52	7.52	9.04	--	0.10	0.10
Pacific Ocean Perch (North of 40°10' N. lat.)	--	--	--	0.19	0.05	0.24	0.03	0.39	0.41	--	--	--
Petrale sole	0.15	0.23	0.38	0.88	0.26	1.15	0.09	0.74	0.83	0.00	0.00	0.00
Yelloweye rockfish	--	--	--	0.00	--	0.00	0.34	--	0.34	1.79	--	1.79
Other groundfish species												
Arrowtooth flounder	--	0.04	0.04	6.43	0.05	6.47	39.38	3.15	42.53	--	0.01	0.01
Black rockfish (South of 46°16' N. lat.)	--	0.00	0.00	--	--	--	--	--	--	1.28	119.54	120.82
Cabezon (California)	--	--	--	--	0.01	0.01	--	--	--	0.33	30.25	30.58
Cabezon (Oregon)	--	--	--	--	--	--	--	--	--	0.11	28.85	28.97
California scorpionfish (South of 34°27' N. lat.)	--	0.00	0.00	--	0.36	0.36	--	--	--	--	3.19	3.19
Chilipepper rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	0.01	1.12	1.13	--	0.04	0.04
Dover sole	--	--	--	1.52	0.79	2.31	6.79	3.12	9.91	--	0.00	0.00
English sole	0.87	0.23	1.10	0.06	0.55	0.61	0.02	0.28	0.30	--	--	--
Lingcod (North of 42° N. lat.)	--	--	--	0.53	--	0.53	2.17	16.10	18.27	1.69	35.12	36.80
Lingcod (South of 42° N. lat.)	--	0.01	0.01	0.01	0.01	0.02	1.93	7.55	9.48	1.29	22.22	23.52
50% discard mortality (Trawl) [‡]												
Longnose skate	0.05	--	0.05	0.55	0.09	0.64	59.62	35.39	65.20	--	0.03	0.03
50% discard mortality (Trawl) [‡]							29.81					
50% discard mortality (Fixed Gear) [‡]												
Longspine thornyhead (North of 34°27' N. lat.)	--	--	--	0.00	0.02	0.02	3.10	2.86	5.96	--	0.00	0.00
Longspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	2.64	13.03	15.66	--	0.05	0.05
Minor nearshore rockfish (North of 40°10' N. lat.)												
Black and Yellow Rockfish	--	--	--	--	--	--	--	--	--	--	0.01	0.01
Blue Rockfish	--	--	--	--	--	--	--	--	--	2.37	9.91	12.28
Brown Rockfish	--	--	--	--	--	--	--	--	--	--	0.30	0.30
China Rockfish	--	--	--	--	--	--	--	--	--	0.21	9.21	9.41
Copper Rockfish	--	--	--	--	--	--	--	--	--	0.01	2.23	2.24
Gopher Rockfish	--	--	--	--	--	--	--	--	--	--	0.06	0.06
Grass Rockfish	--	--	--	--	--	--	--	--	--	--	0.22	0.22
Olive Rockfish	--	--	--	--	--	--	--	--	--	0.03	0.04	0.07
Quillback Rockfish	--	--	--	--	--	--	--	--	--	0.21	3.17	3.38
Minor nearshore rockfish (South of 40°10' N. lat.)												
Black and Yellow Rockfish	--	--	--	--	--	--	--	--	--	0.14	11.25	11.39
Blue Rockfish	--	--	--	--	--	--	--	--	--	0.37	1.04	1.41
Brown Rockfish	--	0.01	0.01	--	--	--	--	--	--	0.36	25.83	26.19
Calico Rockfish	--	--	--	--	--	--	--	--	--	0.00	--	0.00
China Rockfish	--	--	--	--	--	--	--	--	--	1.77	1.37	3.14
Copper Rockfish	--	0.00	0.00	--	0.01	0.01	--	--	--	0.11	4.62	4.72
Gopher Rockfish	--	--	--	--	--	--	--	--	--	0.70	22.06	22.76
Grass Rockfish	--	--	--	--	--	--	--	--	--	0.00	11.46	11.46
Kelp Rockfish	--	--	--	--	--	--	--	--	--	0.03	0.57	0.59
Nearshore Rockfish Unid	--	--	--	--	--	--	--	--	--	--	0.16	0.16
Olive Rockfish	--	--	--	--	--	--	--	--	--	0.39	0.88	1.26
Quillback Rockfish	--	--	--	--	--	--	--	--	--	0.00	0.21	0.21
Treefish Rockfish	--	--	--	--	--	--	--	--	--	0.06	1.60	1.66
Minor shelf rockfish (North of 40°10' N. lat.)												
Bocaccio Rockfish	--	--	--	0.02	--	0.02	0.04	0.08	0.12	--	0.01	0.01
Chilipepper Rockfish	--	--	--	1.01	--	1.01	--	0.03	0.03	--	--	--
Greenspotted Rockfish	--	--	--	--	--	--	--	0.00	0.00	--	--	--
Greenstriped Rockfish	--	--	--	0.55	--	0.55	0.15	0.22	0.37	--	--	--
Halfbanded Rockfish	--	--	--	0.00	--	0.00	--	--	--	--	--	--
Harlequin Rockfish	--	--	--	0.00	--	0.00	--	--	--	--	--	--
Pygmy Rockfish	--	--	--	0.00	--	0.00	--	--	--	--	--	--
Redstripe Rockfish	--	--	--	0.00	--	0.00	--	--	--	--	--	--
Rosethorn Rockfish	--	--	--	--	--	--	0.34	0.53	0.86	--	--	--
Rosy Rockfish	--	--	--	--	--	--	0.05	--	0.05	0.00	--	0.00
Shelf Rockfish Unid	--	--	--	5.77	--	5.77	0.01	0.31	0.32	--	0.07	0.07
Silvergray Rockfish	--	--	--	--	--	--	0.01	0.12	0.13	--	--	--
Starry Rockfish	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Stripetail Rockfish	--	--	--	0.68	--	0.68	0.01	0.00	0.01	--	--	--
Tiger Rockfish	--	--	--	--	--	--	--	--	--	0.00	0.50	0.50
Vermilion Rockfish	--	--	--	--	--	--	--	0.04	0.04	0.03	3.89	3.92

[‡]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	Discard	Landed	Estimate	Discard	Landed	Estimate
Minor shelf rockfish (South of 40°10' N. lat.)												
Bronzespotted Rockfish	--	--	--	--	--	--	0.10	0.00	0.10	--	--	--
Flag Rockfish	--	--	--	--	--	--	--	0.24	0.24	--	0.11	0.11
Freckled Rockfish	--	--	--	--	--	--	--	--	--	--	0.01	0.01
Greenblotched Rockfish	--	--	--	--	--	--	--	0.14	0.14	--	0.05	0.05
Greenspotted Rockfish	--	--	--	--	--	--	0.04	1.15	1.19	--	0.07	0.07
Greenstriped Rockfish	--	--	--	--	--	--	--	0.04	0.04	--	0.01	0.01
Honeycomb Rockfish	--	--	--	--	--	--	--	0.00	0.00	--	0.00	0.00
Mexican Rockfish	--	--	--	--	--	--	--	0.04	0.04	--	0.00	0.00
Pink Rockfish	--	--	--	--	--	--	0.76	--	0.76	--	--	--
Pinkrose Rockfish	--	--	--	--	--	--	--	0.00	0.00	--	--	--
Rosethorn Rockfish	--	--	--	--	--	--	0.16	0.23	0.39	--	0.03	0.03
Rosy Rockfish	--	--	--	--	--	--	0.00	0.11	0.11	0.27	0.23	0.50
Shelf Rockfish Unid	--	--	--	--	--	--	--	0.71	0.71	--	0.81	0.81
Speckled Rockfish	--	--	--	--	--	--	--	0.11	0.11	--	0.02	0.02
Squarespot Rockfish	--	--	--	--	--	--	--	0.18	0.18	--	0.00	0.00
Starry Rockfish	--	--	--	--	--	--	--	0.31	0.31	0.02	0.25	0.27
Swordspine Rockfish	--	--	--	--	--	--	0.04	--	0.04	--	--	--
Vermilion Rockfish	--	0.00	0.00	--	--	--	--	9.00	9.00	0.01	7.04	7.05
Yellowtail Rockfish	--	--	--	--	--	--	--	0.58	0.58	0.07	0.28	0.35
Minor slope rockfish (North of 40°10' N. lat.)												
Aurora Rockfish	--	--	--	0.13	--	0.13	0.13	0.06	0.20	--	--	--
Bank Rockfish	--	--	--	--	--	--	--	0.02	0.02	--	--	--
Blackgill Rockfish	--	--	--	0.00	--	0.00	1.74	1.61	3.35	--	--	--
Blackspotted Rockfish	--	--	--	--	--	--	--	0.17	0.17	--	--	--
Redbanded Rockfish	--	--	--	0.02	--	0.02	7.11	14.75	21.85	--	0.00	0.00
Rougheye Rockfish	--	--	--	0.01	--	0.01	16.10	36.44	52.53	--	0.00	0.00
Sharpchin Rockfish	--	--	--	0.00	--	0.00	--	0.02	0.02	--	--	--
Shortraker Rockfish	--	--	--	--	--	--	3.13	3.38	6.52	--	0.00	0.00
Shortraker/Rougheye Rockfish	--	--	--	--	--	--	36.38	--	36.38	--	--	--
Slope Rockfish Unid	--	--	--	--	0.08	0.08	0.03	6.54	6.57	--	0.01	0.01
Splitnose Rockfish	--	--	--	1.06	--	1.06	0.01	0.18	0.19	--	--	--
Yellowmouth Rockfish	--	--	--	--	--	--	--	1.26	1.26	--	--	--
Minor slope rockfish (South of 40°10' N. lat.)												
Aurora Rockfish	--	--	--	--	--	--	0.14	0.16	0.31	--	--	--
Bank Rockfish	--	--	--	--	--	--	--	0.43	0.43	--	0.01	0.01
Blackgill Rockfish	--	--	--	--	--	--	9.40	104.28	113.68	--	2.31	2.31
Blackspotted Rockfish	--	--	--	--	--	--	--	8.82	8.82	--	0.02	0.02
Redbanded Rockfish	--	--	--	--	--	--	1.00	0.01	1.01	--	0.00	0.00
Rougheye Rockfish	--	--	--	--	--	--	0.22	--	0.22	--	--	--
Sharpchin Rockfish	--	--	--	--	--	--	0.05	--	0.05	--	--	--
Slope Rockfish Unid	--	--	--	--	--	--	--	3.49	3.49	--	0.07	0.07
Mixed thornyheads												
Shortspine/ Longspine Thornyhead	--	--	--	--	0.00	0.00	0.01	0.74	0.75	--	0.03	0.03
Other flatfish												
Butter Sole	--	0.00	0.00	--	--	--	--	--	--	--	--	--
Curlfin Turbot	0.58	0.00	0.58	--	--	--	--	--	--	--	--	--
Flatfish Unid	--	0.45	0.45	5.02	12.32	17.34	0.00	0.06	0.06	--	0.01	0.01
Flathead Sole	--	--	--	2.01	--	2.01	--	0.00	0.00	--	--	--
Pacific Sanddab	0.75	0.04	0.80	3.47	0.03	3.50	--	2.60	2.60	0.00	2.40	2.40
Rex Sole	0.01	--	0.01	13.70	0.37	14.07	0.00	0.34	0.35	--	0.00	0.00
Rock Sole	0.00	0.14	0.14	0.32	0.60	0.91	--	0.02	0.02	0.00	0.07	0.07
Sand Sole	0.02	10.23	10.26	--	0.05	0.05	--	0.23	0.23	0.00	0.13	0.13
Sanddab Unid	--	0.00	0.00	0.08	0.02	0.09	--	1.89	1.89	0.00	0.00	0.01
Other groundfish												
Big Skate	20.25	--	20.25	0.09	--	0.09	6.48	0.06	6.54	0.01	--	0.01
California Scorpionfish	--	--	--	--	--	--	--	--	--	0.00	0.00	0.00
California Skate	0.46	--	0.46	0.00	--	0.00	0.00	0.01	0.01	--	--	--
Grenadier Unid	--	--	--	--	--	--	--	50.88	50.88	--	0.62	0.62
Kelp Greenling	--	--	--	--	--	--	--	--	--	0.39	24.01	24.40
Leopard Shark	--	0.05	0.05	--	0.01	0.01	--	0.96	0.96	0.06	0.18	0.24
Pacific Flatnose	--	--	--	--	--	--	0.91	--	0.91	--	--	--
Pacific Grenadier	--	--	--	--	--	--	18.93	--	18.93	--	--	--
Rockfish Unid	--	--	--	--	--	--	--	1.59	1.59	--	0.32	0.32
Skate Unid	--	0.68	0.68	0.00	1.19	1.20	1.83	9.61	11.44	0.05	0.31	0.35
Southern Shark	--	0.11	0.11	--	0.01	0.01	--	0.15	0.15	--	0.25	0.25
Spotted Ratfish	--	--	--	0.17	--	0.17	6.67	0.02	6.70	0.00	0.00	0.00

Table 13 (continued).

Weight (mt)	Open Access CA halibut			Pink shrimp			Non-nearshore fixed gear			Nearshore fixed gear		
	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate
Pacific cod	0.00	--	0.00	0.00	0.00	0.00	0.20	2.25	2.45	--	--	--
Pacific hake	--	--	--	18.75	--	18.75	3.13	0.27	3.40	--	--	--
Sablefish (North of 36° N. lat.)	--	--	--	0.08	0.13	0.21	657.62	1766.14	1897.67	--	1.69	1.69
20% discard mortality (Fixed Gear) [‡]							131.52					
Sablefish (South of 36° N. lat.)	--	--	--	--	0.12	0.12	20.53	472.36	476.47	--	4.39	4.39
20% discard mortality (Fixed Gear) [‡]							4.11					
Shortbelly rockfish	--	--	--	0.38	--	0.38	--	--	--	--	--	--
Shortspine thornyhead (North of 34°27' N. lat.)	--	--	--	0.11	0.12	0.23	7.12	55.93	63.05	--	0.12	0.12
Shortspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	12.57	113.22	125.79	--	0.97	0.97
Spiny dogfish	1.83	--	1.83	0.89	0.01	0.90	161.47	1.57	163.05	0.01	0.01	0.02
50% discard mortality (Fixed Gear) [‡]												
Splitnose rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	0.01	0.31	0.32	--	--	--
Starry flounder	0.84	3.72	4.57	0.01	--	0.01	--	0.03	0.03	--	0.13	0.13
Widow rockfish	--	--	--	0.12	0.00	0.12	0.00	0.21	0.21	0.02	0.03	0.04
Yellowtail rockfish (North of 40°10' N. lat.)	--	--	--	1.14	0.00	1.14	0.16	0.45	0.61	0.97	0.79	1.76
Non-groundfish species												
California halibut	0.34	56.30	56.64	--	8.41	8.41	--	0.58	0.58	0.00	1.34	1.35
Dungeness crab	151.03	--	151.03	0.05	0.00	0.05	0.78	3.89	4.68	0.06	2.83	2.88
Non-FMP flatfish												
Bigmouth Sole	--	--	--	--	--	--	--	0.00	0.00	--	--	--
Deepsea Sole	--	0.22	0.22	--	--	--	0.02	--	0.02	--	--	--
Diamond Turbot	--	--	--	--	--	--	--	--	--	0.00	--	0.00
Fantail Sole	0.13	0.01	0.14	--	--	--	--	--	--	--	--	--
Hornyhead Turbot	0.16	0.12	0.28	--	2.51	2.51	--	--	--	--	0.00	0.00
Slender Sole	--	--	--	93.52	--	93.52	--	0.00	0.00	--	--	--
Speckled Sanddab	--	--	--	0.01	--	0.01	--	--	--	--	--	--
Non-FMP skate												
Aleutian Skate	--	--	--	--	--	--	0.29	--	0.29	--	--	--
Black Skate	--	--	--	--	--	--	4.08	--	4.08	--	--	--
Pacific Electric Ray	0.30	--	0.30	--	--	--	--	--	--	--	--	--
Pelagic Stingray	--	--	--	--	--	--	0.12	--	0.12	--	--	--
Round Stingray	--	--	--	--	--	--	--	--	--	0.00	--	0.00
Sandpaper Skate	0.00	--	0.00	0.01	--	0.01	1.61	--	1.61	--	--	--
Shovelnose Guitarfish	0.06	--	0.06	--	--	--	--	--	--	--	--	--
Starry Skate	--	--	--	0.00	--	0.00	0.01	--	0.01	--	--	--
Thornback Skate	0.27	--	0.27	--	--	--	--	--	--	--	--	--

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

Table 14. Incidental landings (mt) of groundfish from shoreside commercial fisheries and exempted fishing permits in 2012 by gear group. Gear groups are as follows: HKL (hook-and-lines), MSC (miscellaneous), NET (nets), POT (pots), TLS (troll) and TWL (trawl).

	Shoreside Commercial Landings (mt)						Incidental fisheries estimate
	Other Fisheries By Gear Group						
	HKL	MSC	NET	POT	TLS	TWL	
Rebuilding species							
Bocaccio rockfish (South of 40°10' N. lat.)	0.01	--	--	--	0.01	--	0.02
Canary rockfish	0.02	--	0.02	--	--	1.12	1.15
Darkblotched rockfish	0.03	--	--	0.03	--	0.02	0.08
Pacific Ocean Perch (North of 40°10' N. lat.)	0.00	--	--	--	0.00	0.16	0.16
Petrale sole	0.34	--	0.08	--	0.00	0.34	0.76
Yelloweye rockfish	0.05	--	--	--	--	0.04	0.09
Other groundfish species							
Arrowtooth flounder	0.24	--	--	--	--	0.00	0.24
Black rockfish (South of 46°16' N. lat.)	--	--	0.01	--	0.29	--	0.30
Cabazon (California)	--	0.06	0.03	--	--	--	0.10
California scorpionfish (South of 34°27' N. lat.)	--	0.02	0.19	--	--	0.07	0.27
Chilipepper rockfish (South of 40°10' N. lat.)	--	--	--	--	--	0.10	0.10
Dover sole	0.02	--	0.00	--	0.07	0.99	1.09
English sole	--	--	--	--	--	0.20	0.20
Lingcod (North of 42° N. lat.)	3.04	--	--	--	2.38	1.06	6.49
Lingcod (South of 42° N. lat.)	0.45	0.01	0.14	0.29	0.49	--	1.38
Longnose skate	2.83	--	--	--	0.03	0.28	3.15
Longspine thornyhead (North of 34°27' N. lat.)	0.00	--	--	--	0.01	0.25	0.26
Longspine thornyhead (South of 34°27' N. lat.)	0.00	--	--	--	--	--	0.00
Minor nearshore rockfish (North of 40°10' N. lat.)							
Blue Rockfish	--	--	--	--	0.08	--	0.08
Quillback Rockfish	--	--	--	--	--	0.06	0.06
Minor nearshore rockfish (South of 40°10' N. lat.)							
Black and Yellow Rockfish	--	0.01	--	--	--	--	0.01
Blue Rockfish	--	--	0.00	--	0.02	--	0.02
Brown Rockfish	--	--	--	--	--	0.00	0.00
Copper Rockfish	--	0.00	--	--	--	0.08	0.09
Gopher Rockfish	--	0.03	--	--	0.01	--	0.04
Grass Rockfish	--	0.01	0.01	--	--	--	0.02
Kelp Rockfish	--	0.00	--	--	--	--	0.00
Olive Rockfish	--	--	--	--	0.05	--	0.05
Treefish Rockfish	--	--	0.00	--	--	--	0.00
Minor shelf rockfish (North of 40°10' N. lat.)							
Bocaccio Rockfish	0.00	--	--	--	--	--	0.00
Chilipepper Rockfish	0.00	--	--	--	--	--	0.00
Greenstriped Rockfish	0.00	--	--	--	--	0.00	0.00
Redstripe Rockfish	--	--	--	--	--	--	--
Rosethorn Rockfish	0.03	--	--	--	--	--	0.03
Shelf Rockfish Unid	0.00	--	--	--	0.17	0.01	0.19
Silvergray Rockfish	0.03	--	--	--	--	--	0.03
Vermilion Rockfish	--	--	--	--	0.01	--	0.01
Minor shelf rockfish (South of 40°10' N. lat.)							
Greenspotted Rockfish	0.02	--	--	--	--	--	0.02
Pink Rockfish	--	--	--	--	--	0.01	0.01
Rosy Rockfish	0.00	--	--	--	--	--	0.00
Shelf Rockfish Unid	0.00	--	0.00	--	0.01	--	0.02
Speckled Rockfish	0.00	--	--	--	--	--	0.00
Starry Rockfish	0.01	--	--	--	--	--	0.01
Vermilion Rockfish	0.16	0.00	--	0.02	0.10	--	0.28
Yellowtail Rockfish	0.15	--	0.88	--	0.07	--	1.10

Table 14 (continued).

	Shoreside Commercial Landings (mt)						Incidental fisheries estimate
	Other Fisheries By Gear Group						
	HKL	MSC	NET	POT	TLS	TWL	
Minor slope rockfish (North of 40°10' N. lat.)							
Aurora Rockfish	0.00	--	--	--	--	0.00	0.01
Blackgill Rockfish	0.01	--	--	--	0.01	0.00	0.02
Blackspotted Rockfish	0.00	--	--	--	--	--	0.00
Redbanded Rockfish	0.18	--	--	--	--	0.00	0.19
Rougheyeye Rockfish	0.68	--	--	--	--	0.04	0.72
Shortraker Rockfish	0.13	--	--	--	--	0.02	0.15
Slope Rockfish Unid	0.15	--	0.27	--	0.26	--	0.68
Splitnose Rockfish	0.00	--	--	--	--	0.00	0.00
Yellowmouth Rockfish	0.02	--	--	--	--	--	0.02
Minor slope rockfish (South of 40°10' N. lat.)							
Bank Rockfish	--	--	1.04	--	--	--	1.04
Slope Rockfish Unid	0.01	--	0.00	--	0.01	--	0.02
Other flatfish							
Butter Sole	--	--	0.09	--	--	0.00	0.09
Curlfin Turbot	0.02	--	--	--	--	0.01	0.03
Flatfish Unid	0.01	0.02	0.16	--	--	0.19	0.38
Flathead Sole	--	--	--	--	--	0.00	0.00
Pacific Sanddab	0.11	--	--	--	--	0.01	0.12
Rex Sole	--	--	--	--	--	0.33	0.33
Rock Sole	0.01	--	--	--	--	0.01	0.01
Sanddab Unid	0.02	--	0.06	0.04	0.03	--	0.14
Sand Sole	0.03	0.05	0.00	--	0.01	3.20	3.28
Other groundfish							
California Skate	--	--	0.01	--	--	--	0.01
Grenadier Unid	--	--	--	--	0.85	--	0.85
Kelp Greenling	--	0.00	--	--	0.01	--	0.02
Leopard Shark	0.09	--	1.54	--	--	--	1.63
Rockfish Unid	0.00	--	--	--	--	--	0.00
Skate Unid	0.36	--	5.52	--	--	--	6.00
Soupfin Shark	0.06	--	0.69	--	--	0.02	0.77
Pacific cod	0.45	0.00	--	--	0.08	0.01	0.54
Sablefish (North of 36° N. lat.)	14.32	0.29	0.14	1.26	5.71	9.90	31.61
Sablefish (South of 36° N. lat.)	--	--	0.13	--	--	--	0.13
Shortspine thornyhead (North of 34°27' N. lat.)	0.23	--	--	--	0.36	0.79	1.38
Shortspine thornyhead (South of 34°27' N. lat.)	0.02	--	--	--	--	--	0.02
Spiny dogfish	0.03	--	0.04	--	--	--	0.07
Splitnose rockfish (South of 40°10' N. lat.)	--	0.00	0.00	--	--	--	0.01
Starry flounder	0.03	--	--	--	--	0.31	0.34
Widow rockfish	--	--	--	--	0.04	--	0.04
Yellowtail rockfish (North of 40°10' N. lat.)	0.05	--	--	--	2.10	0.07	2.21
Non-groundfish species							
California halibut	46.22	0.15	38.43	0.49	1.99	0.24	87.51
Dungeness crab	0.01	30.51	--	18644.13	0.51	0.10	18675.26
Non-FMP flatfish							
Deepsea Sole	--	--	--	--	--	0.01	0.01
Hornyhead Turbot	--	--	0.06	--	--	0.01	0.07
Slender Sole	--	--	0.02	--	--	0.01	0.03

Table 15. Estimated fishing mortality (mt) of west coast groundfish species and a subset of non-groundfish bycatch species in 2012 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				Management												
	Non-tribal at-sea hake	Non-tribal shoreside hake	Non-hake IFQ trawl	Non-hake IFQ fixed gear	Non-nearshore fixed gear	Nearshore fixed gear	OA CA halibut	Pink shrimp	Incidental fisheries	WA			OR	CA			
Rebuilding groundfish species																	
Bocaccio rockfish (South of 40°10' N. lat.)	--	--	8.84	0.00	2.62	0.73	--	0.01	0.02	--	--	--	--	124.73	2.55	139.51	
Canary rockfish	0.41	2.14	5.01	0.00	0.12	7.23	0.00	0.02	1.15	7.24	--	0.64	3.67	13.41	3.75	44.80	
Cowcod rockfish (South of 40°10' N. lat.)	--	--	0.09	--	--	--	--	--	--	--	--	--	--	0.84	0.22	1.15	
Darkblotched rockfish	2.70	4.33	81.11	0.25	9.04	0.10	--	4.96	0.08	0.64	--	--	--	--	1.74	104.95	
Pacific Ocean Perch (North of 40°10' N. lat.)	4.53	12.36	36.17	0.09	0.41	--	--	0.24	0.16	0.21	--	--	--	--	1.63	55.79	
Petrale sole	--	0.00	1032.19	0.40	0.83	0.00	0.38	1.15	0.76	69.71	--	--	0.16	0.73	4.43	1110.73	
Yelloweye rockfish	--	--	0.03	--	0.34	1.79	--	0.00	0.09	0.15	--	3.22	3.08	1.61	1.25	11.56	
Other groundfish species																	
Arrowtooth flounder	4.64	24.82	2359.05	5.60	42.53	0.01	0.04	6.47	0.24	55.55	0.04	--	0.00	0.00	9.09	2508.08	
Black rockfish (North of 46°16' N. lat.)	--	--	0.72	--	--	--	--	--	--	0.10	--	248.57	--	--	0.01	249.40	
Black rockfish (South of 46°16' N. lat.)	--	--	0.02	--	--	120.82	0.00	--	0.30	--	--	--	231.13	210.43	0.00	562.71	
Cabezon (California)	--	--	--	--	--	30.58	--	0.01	0.10	--	--	--	--	43.25	--	73.93	
Cabezon (Oregon)	--	--	0.08	--	--	28.97	--	--	--	--	--	--	17.78	--	--	46.83	
California scorpionfish (South of 34°27' N. lat.)	--	--	--	--	--	3.19	0.00	0.36	0.27	--	--	--	--	116.26	0.10	120.18	
Chilipepper rockfish (South of 40°10' N. lat.)	--	--	288.14	0.01	1.13	0.04	--	--	0.10	--	--	--	--	7.74	5.30	302.45	
Dover sole	0.32	0.60	7019.41	3.69	9.91	0.00	--	2.31	1.09	96.25	--	--	0.00	0.01	41.85	7175.44	
English sole	0.01	0.02	146.71	--	0.30	--	1.10	0.61	0.20	73.02	--	--	0.01	0.01	2.45	224.43	
Lingcod (North of 42° N. lat.)	0.18	3.74	331.86	2.02	18.27	36.80	--	0.53	6.49	50.68	--	119.32	156.24	--	5.27	731.40	
Lingcod (South of 42° N. lat.)	--	--	19.63	0.32	9.48	23.52	0.01	0.02	1.38	--	--	--	--	281.44	1.14	336.94	
Longnose skate	0.06	0.24	892.35	14.98	65.20	0.03	0.01	0.64	3.15	3.68	--	--	--	--	10.65	990.99	
Longspine thornyhead (North of 34°27' N. lat.)	0.00	0.05	891.96	0.23	5.96	0.00	--	0.02	0.26	0.04	--	--	--	--	13.51	912.04	
Longspine thornyhead (South of 34°27' N. lat.)	--	--	0.40	0.00	15.66	0.05	--	--	0.00	--	--	--	--	--	1.41	17.53	
Minor nearshore rockfish (North of 40°10' N. lat.)																	
Black and Yellow Rockfish	--	--	--	--	--	0.01	--	--	--	--	--	--	0.00	0.01	--	0.02	
Blue Rockfish	--	--	--	--	--	12.28	--	--	0.08	--	--	1.27	27.12	2.86	0.03	43.64	
Brown Rockfish	--	--	0.01	--	--	0.30	--	--	--	--	--	--	0.09	0.52	--	0.92	
China Rockfish	--	--	--	--	--	9.41	--	--	--	--	--	2.58	3.72	1.39	--	17.11	
Copper Rockfish	--	--	--	--	--	2.24	--	--	--	--	--	1.48	8.90	1.45	--	14.07	
Gopher Rockfish	--	--	--	--	--	0.06	--	--	--	--	--	--	--	0.08	--	0.14	
Grass Rockfish	--	--	--	--	--	0.22	--	--	--	--	--	--	1.35	0.15	--	1.72	
Nearshore Rockfish Unid	--	--	0.01	--	--	--	--	--	--	0.08	--	--	--	--	--	0.09	
Olive Rockfish	--	--	--	--	--	0.07	--	--	--	--	--	--	0.00	0.08	--	0.15	
Quillback Rockfish	--	--	0.10	--	--	3.38	--	--	0.06	--	--	2.31	8.82	3.56	0.07	18.31	

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					Nearshore fixed gear	OA CA halibut	Pink shrimp	Incidental fisheries	WA tribal at-sea			WA	OR	CA		
	Non-tribal at-sea hake	Non-tribal shoreside hake	Non-hake IFQ trawl	Non-hake IFQ fixed gear	Non-nearshore fixed gear												
Minor nearshore rockfish (South of 40°10' N. lat.)																	
Black and Yellow Rockfish	--	--	--	--	--	11.39	--	--	0.01	--	--	--	--	5.44	0.00	16.85	
Blue Rockfish	--	--	--	--	--	1.41	--	--	0.02	--	--	--	--	48.90	0.38	50.70	
Brown Rockfish	--	--	0.01	--	--	26.19	0.01	--	0.00	--	--	--	--	69.76	0.01	95.99	
Calico Rockfish	--	--	--	--	--	0.00	--	--	--	--	--	--	--	5.11	0.00	5.12	
China Rockfish	--	--	--	--	--	3.14	--	--	--	--	--	--	--	12.41	0.01	15.56	
Copper Rockfish	--	--	--	--	--	4.72	0.00	0.01	0.09	--	--	--	--	78.41	2.14	85.38	
Gopher Rockfish	--	--	--	--	--	22.76	--	--	0.04	--	--	--	--	52.32	0.00	75.11	
Grass Rockfish	--	--	--	--	--	11.46	--	--	0.02	--	--	--	--	20.64	--	32.11	
Kelp Rockfish	--	--	--	--	--	0.59	--	--	0.00	--	--	--	--	19.11	--	19.70	
Nearshore Rockfish Unid	--	--	--	--	--	0.16	--	--	--	--	--	--	--	--	--	0.16	
Olive Rockfish	--	--	--	--	--	1.26	--	--	0.05	--	--	--	--	31.50	0.12	32.93	
Quillback Rockfish	--	--	--	--	--	0.21	--	--	--	--	--	--	--	2.70	0.01	2.93	
Treefish Rockfish	--	--	--	--	--	1.66	--	--	0.00	--	--	--	--	10.97	0.00	12.64	
Minor shelf rockfish (North of 40°10' N. lat.)																	
Bocaccio Rockfish	0.12	0.13	1.67	0.00	0.12	0.01	--	0.02	0.00	0.29	--	2.24	0.07	--	0.07	4.73	
Chilipepper Rockfish	0.02	0.01	0.18	0.00	0.03	--	--	1.01	0.00	--	--	--	0.00	--	0.13	1.38	
Cowcod Rockfish	--	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--	0.00	
Greenblotched Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00	
Greenspotted Rockfish	--	0.00	0.08	--	0.00	--	--	--	--	--	--	--	0.01	0.00	0.02	0.11	
Greenstriped Rockfish	--	0.05	28.77	0.00	0.37	--	--	0.55	0.00	0.23	--	--	0.01	--	1.91	31.89	
Halfbanded Rockfish	--	--	0.01	--	--	--	--	0.00	--	--	--	--	--	--	0.00	0.01	
Harlequin Rockfish	0.00	--	0.00	--	--	--	--	0.00	--	--	--	--	--	--	0.00	0.00	
Pygmy Rockfish	--	--	0.00	--	--	--	--	0.00	--	--	--	--	--	--	0.00	0.00	
Redstripe Rockfish	0.07	0.04	0.71	0.00	--	--	--	0.00	--	6.41	--	--	0.00	--	4.02	11.25	
Rosethorn Rockfish	0.00	0.00	3.09	0.09	0.86	--	--	--	0.03	0.10	--	--	0.03	--	0.45	4.66	
Rosy Rockfish	--	--	0.07	--	0.05	0.00	--	--	--	--	--	--	0.01	0.01	--	0.13	
Shelf Rockfish Unid	0.00	0.01	1.37	0.00	0.32	0.07	--	5.77	0.19	0.34	--	--	--	--	--	8.07	
Silvergray Rockfish	0.78	0.57	1.37	0.01	0.13	--	--	--	0.03	0.00	--	--	--	--	0.10	2.99	
Squarespot Rockfish	--	--	0.00	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00	
Starry Rockfish	--	--	0.06	--	--	0.00	--	--	--	--	--	--	--	--	--	0.06	
Stripetail Rockfish	0.00	--	1.53	--	0.01	--	--	0.68	--	--	--	--	--	--	0.85	3.07	
Swordspine Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00	
Tiger Rockfish	--	--	--	--	--	0.50	--	--	--	--	--	--	0.15	1.77	0.14	2.56	
Vermilion Rockfish	--	--	--	--	0.04	3.92	--	--	0.01	--	--	--	0.67	9.17	4.86	18.67	
Yellowtail Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	0.75	--	0.75	

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					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	Non-nearshore fixed gear												
Minor shelf rockfish (South of 40°10' N. lat.)																	
Bronzespotted Rockfish	--	--	--	0.02	0.10	--	--	--	--	--	--	--	--	--	--	--	0.12
Flag Rockfish	--	--	0.00	--	0.24	0.11	--	--	--	--	--	--	--	14.15	0.03	14.53	
Freckled Rockfish	--	--	--	--	--	0.01	--	--	--	--	--	--	--	--	0.00	0.01	
Greenblotched Rockfish	--	--	0.03	--	0.14	0.05	--	--	--	--	--	--	--	0.71	0.05	0.98	
Greenspotted Rockfish	--	--	0.41	--	1.19	0.07	--	--	0.02	--	--	--	--	17.83	0.38	19.89	
Greenstriped Rockfish	--	--	1.17	--	0.04	0.01	--	--	--	--	--	--	--	1.16	0.17	2.55	
Halfbanded Rockfish	--	--	0.02	--	--	--	--	--	--	--	--	--	--	3.85	2.68	6.55	
Honeycomb Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	6.22	0.00	6.23	
Mexican Rockfish	--	--	0.00	--	0.04	0.00	--	--	--	--	--	--	--	--	0.00	0.04	
Pink Rockfish	--	--	0.01	--	0.76	--	--	--	0.01	--	--	--	--	--	0.02	0.79	
Pinkrose Rockfish	--	--	--	--	0.00	--	--	--	--	--	--	--	--	--	--	0.00	
Pygmy Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	
Redstripe Rockfish	--	--	0.00	--	--	--	--	--	--	--	--	--	--	0.01	--	0.01	
Rosethorn Rockfish	--	--	0.04	--	0.39	0.03	--	--	--	--	--	--	--	--	0.02	0.48	
Rosy Rockfish	--	--	0.01	--	0.11	0.50	--	--	0.00	--	--	--	--	5.62	0.19	6.43	
Shelf Rockfish Unid	--	--	0.35	0.10	0.71	0.81	--	--	0.02	--	--	--	--	--	--	1.98	
Speckled Rockfish	--	--	0.00	--	0.11	0.02	--	--	0.00	--	--	--	--	9.59	0.04	9.76	
Squarespot Rockfish	--	--	0.00	--	0.18	0.00	--	--	--	--	--	--	--	4.41	0.05	4.64	
Starry Rockfish	--	--	--	--	0.31	0.27	--	--	0.01	--	--	--	--	23.35	0.07	24.01	
Stripetail Rockfish	--	--	11.32	--	--	--	--	--	--	--	--	--	--	--	2.06	13.38	
Swordspine Rockfish	--	--	--	--	0.04	--	--	--	--	--	--	--	--	0.01	0.01	0.05	
Tiger Rockfish	--	--	0.00	--	--	--	--	--	--	--	--	--	--	0.05	--	0.05	
Vermilion Rockfish	--	--	0.01	--	9.00	7.05	0.00	--	0.28	--	--	--	--	214.66	2.09	233.09	
Yellowtail Rockfish	--	--	0.01	--	0.58	0.35	--	--	1.10	--	--	--	--	52.71	1.69	56.44	
Minor slope rockfish (North of 40°10' N. lat.)																	
Aurora Rockfish	0.02	0.46	18.88	0.11	0.20	--	--	0.13	0.01	0.02	--	--	--	--	0.25	20.06	
Bank Rockfish	0.02	--	0.28	0.00	0.02	--	--	--	--	--	--	--	--	--	0.01	0.32	
Blackgill Rockfish	0.03	0.23	4.73	0.54	3.35	--	--	0.00	0.02	0.01	--	--	--	--	0.07	8.98	
Blackspotted Rockfish	--	--	0.19	0.04	0.17	--	--	--	0.00	0.00	--	--	--	--	--	0.41	
Redbanded Rockfish	0.01	0.83	5.90	0.77	21.85	0.00	--	0.02	0.19	6.06	--	--	--	--	0.23	35.86	
Rougheye Rockfish	54.03	47.08	47.42	19.46	52.53	0.00	--	0.01	0.72	15.19	--	--	--	--	0.26	236.70	
Sharpchin Rockfish	0.00	0.66	8.55	0.00	0.02	--	--	0.00	--	0.23	--	--	--	--	4.19	13.65	
Shortraker Rockfish	0.69	5.63	12.70	1.27	6.52	0.00	--	--	0.15	1.30	--	--	--	--	0.02	28.29	
Shortraker/Rougheye Rockfish	0.00	--	--	2.16	36.38	--	--	--	--	--	--	--	--	--	--	38.54	
Slope Rockfish Unid	0.00	0.09	1.39	1.18	6.57	0.01	--	0.08	0.68	0.37	--	--	--	--	--	10.38	
Splitnose Rockfish	20.48	16.44	12.69	0.02	0.19	--	--	1.06	0.00	0.05	--	--	--	--	0.02	50.96	
Yellowmouth Rockfish	0.25	0.52	6.64	0.18	1.26	--	--	--	0.02	0.00	--	--	--	--	0.02	8.90	

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					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	Non-nearshore fixed gear												
Minor slope rockfish (South of 40°10' N. lat.)																	
Aurora Rockfish	--	--	24.38	0.19	0.31	--	--	--	--	--	--	--	--	--	0.34	--	25.21
Bank Rockfish	--	--	16.58	--	0.43	0.01	--	--	1.04	--	--	--	--	0.62	0.06	--	18.74
Blackgill Rockfish	--	--	73.11	6.04	113.68	2.31	--	--	--	--	--	--	--	--	0.30	--	195.44
Blackspotted Rockfish	--	--	0.05	--	8.82	0.02	--	--	--	--	--	--	--	--	--	--	8.89
Pacific Ocean Perch	--	--	0.08	--	--	--	--	--	--	--	--	--	--	--	--	--	0.08
Redbanded Rockfish	--	--	0.70	--	1.01	0.00	--	--	--	--	--	--	--	--	0.01	--	1.71
Rougheye Rockfish	--	--	0.24	--	0.22	--	--	--	--	--	--	--	--	--	--	--	0.46
Sharpchin Rockfish	--	--	0.25	--	0.05	--	--	--	--	--	--	--	--	--	0.03	--	0.33
Shortraker Rockfish	--	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
Slope Rockfish Unid	--	--	2.55	0.02	3.49	0.07	--	--	0.02	--	--	--	--	--	--	--	6.14
Yellowmouth Rockfish	--	--	0.05	--	--	--	--	--	--	--	--	--	--	--	--	--	0.05
Mixed thornyheads																	
Shortspine/ Longspine Thornyhead	--	--	1.64	0.00	0.75	0.03	--	0.00	--	--	--	--	--	--	--	--	2.42
Other flatfish																	
Butter Sole	--	--	2.22	--	--	--	0.00	--	0.09	--	--	--	0.01	--	0.01	--	2.33
Curffin Turbot	--	--	0.94	--	--	--	0.58	--	0.03	--	--	--	--	--	0.17	--	1.71
Flatfish Unid	0.01	0.00	2.06	--	0.06	0.01	0.45	17.34	0.38	0.59	--	5.91	--	0.01	--	0.01	26.82
Flathead Sole	--	--	7.34	--	0.00	--	--	2.01	0.00	--	--	--	--	--	0.07	--	9.42
Pacific Sanddab	--	--	215.43	--	2.60	2.40	0.80	3.50	0.12	--	--	--	0.11	65.89	9.77	--	300.62
Rex Sole	2.91	4.39	375.55	0.01	0.35	0.00	0.01	14.07	0.33	37.44	--	--	--	--	8.79	--	443.84
Rock Sole	--	0.00	4.98	--	0.02	0.07	0.14	0.91	0.01	7.24	--	--	0.01	1.17	0.11	--	14.66
Roughscale Sole	--	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
Sanddab Unid	--	--	3.47	--	1.89	0.01	0.00	0.09	0.14	4.37	--	--	--	--	--	--	9.97
Sand Sole	--	--	70.70	--	0.23	0.13	10.26	0.05	3.28	--	--	--	0.22	2.92	0.03	--	87.81
Other groundfish																	
Big Skate	0.10	--	47.69	0.03	6.54	0.05	20.25	0.09	--	--	--	--	--	--	1.79	--	76.53
Cabezon	--	--	--	--	--	--	--	--	--	--	--	7.97	--	--	--	--	7.97
California Scorpionfish	--	--	--	--	--	0.00	--	--	--	--	--	--	--	--	--	--	0.00
California Skate	--	--	2.11	--	0.01	--	0.46	0.00	0.01	--	--	--	--	--	0.35	--	2.93
Cod Unid	--	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
Grenadier Unid	0.01	0.01	70.21	0.01	50.88	0.62	--	--	0.85	--	--	--	--	--	3.64	--	126.23
Groundfish Unid	--	1.36	0.04	--	--	--	--	--	--	--	--	--	--	--	9.02	--	10.42
Kelp Greenling	--	--	0.15	--	--	24.40	--	--	0.02	--	--	2.06	25.56	12.88	0.02	--	65.07
Leopard Shark	--	--	0.26	--	0.96	0.24	0.05	0.01	1.63	--	--	--	0.01	35.28	--	--	38.43
Pacific Electric Ray	0.06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.06
Pacific Flatnose	--	--	1.60	0.14	0.91	--	--	--	--	--	--	--	--	--	--	--	2.65
Pacific Grenadier	--	--	51.17	4.70	18.93	--	--	--	--	--	--	--	--	--	--	--	74.80
Ray Unid	--	--	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01
Rockfish Unid	--	--	--	--	1.59	0.32	--	--	0.00	--	--	--	--	--	0.02	--	1.93
Roundfish Unid	0.05	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	0.05
Skate Unid	0.00	0.07	230.98	0.02	11.44	0.31	0.68	1.20	6.00	77.27	--	--	--	--	0.05	--	328.02
Soupin Shark	0.10	0.64	0.62	--	0.15	0.25	0.11	0.01	0.77	--	--	--	--	--	--	--	2.66
Spotted Ratfish	--	0.00	79.20	0.13	6.70	0.00	--	0.17	--	--	--	--	--	0.08	--	--	86.28

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									WA			OR	CA			
	Non-tribal at-sea hake	Non-tribal shoreside hake	Non-hake IFQ trawl	Non-hake IFQ fixed gear	Non-nearshore fixed gear	Nearshore fixed gear	OA CA halibut	Pink shrimp	Incidental fisheries								
Pacific cod	0.02	0.04	395.87	--	2.45	--	0.00	0.00	0.54	233.13	--	0.13	0.11	--	1.46	633.76	
Pacific hake	93910.03	65416.31	249.62	0.00	3.40	--	--	18.75	--	612.69	21.33	--	0.01	0.06	473.41	160705.61	
Sablefish (North of 36° N. lat.)	5.11	47.21	1407.66	726.78	1897.67	1.69	--	0.21	31.61	561.91	--	--	0.33	0.03	21.20	4701.40	
Sablefish (South of 36° N. lat.)	--	--	22.68	199.96	476.47	4.39	--	0.12	0.13	--	--	--	--	--	0.99	704.73	
Shortbelly rockfish	0.29	0.08	5.48	--	--	--	--	0.38	--	--	--	--	--	--	1.22	7.45	
Shortspine thornyhead (North of 34°27' N. lat.)	1.74	8.32	688.05	13.13	63.05	0.12	--	0.23	1.38	19.56	--	--	--	--	5.85	801.43	
Shortspine thornyhead (South of 34°27' N. lat.)	--	--	0.59	0.36	125.79	0.97	--	--	0.02	--	--	--	--	--	0.53	128.26	
Spiny dogfish	177.80	160.10	340.25	28.81	82.31	0.02	1.83	0.90	0.07	1.84	0.65	0.13	0.06	2.79	33.22	830.78	
Splitnose rockfish (South of 40°10' N. lat.)	--	--	59.87	--	0.32	--	--	--	0.01	--	--	--	--	--	1.71	61.91	
Starry flounder	--	--	8.34	--	0.03	0.13	4.57	0.01	0.34	0.00	--	--	2.97	0.94	0.03	17.36	
Widow rockfish	79.34	107.41	45.15	--	0.21	0.04	--	0.12	0.04	38.35	0.00	--	1.02	5.19	0.77	277.64	
Yellowtail rockfish (North of 40°10' N. lat.)	43.00	388.24	575.07	0.01	0.61	1.76	--	1.14	2.21	511.31	0.07	21.99	14.02	--	10.33	1569.76	
Non-groundfish species																	
California halibut	--	--	18.78	--	0.58	1.35	56.64	8.41	87.51	--	--	--	0.03	172.78	--	346.08	
California sheephead	--	--	--	--	--	58.74	--	0.02	0.54	--	--	--	--	42.97	--	102.27	
Dungeness crab	--	0.00	196.51	0.56	4.68	2.88	151.03	0.05	18675.26	1265.51	--	--	--	--	0.02	20296.51	
Non-FMP flatfish																	
Bigmouth Sole	--	--	--	--	0.00	--	--	--	--	--	--	--	--	--	--	0.00	
Deepsea Sole	--	--	16.29	0.02	0.02	--	0.22	--	0.01	--	--	--	--	--	--	16.55	
Diamond Turbot	--	--	0.11	--	--	0.00	--	--	--	--	--	--	--	0.12	--	0.24	
Fantail Sole	--	--	--	--	--	--	0.14	--	--	--	--	--	--	--	--	0.14	
Hornyhead Turbot	--	--	0.02	--	--	0.00	0.28	2.51	0.07	--	--	--	--	--	--	2.88	
Slender Sole	0.02	--	37.22	--	0.00	--	--	93.52	0.03	--	--	--	--	--	--	130.79	
Speckled Sanddab	--	--	0.00	--	--	--	--	0.01	--	--	--	--	--	0.06	--	0.08	
Non-FMP skate																	
Aleutian Skate	--	--	2.31	0.03	0.29	--	--	--	--	--	--	--	--	--	--	2.63	
Bering Skate	--	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--	0.00	
Black Skate	--	--	18.42	1.01	4.08	--	--	--	--	--	--	--	--	--	--	23.50	
Deepsea Skate	--	--	0.33	--	--	--	--	--	--	--	--	--	--	--	--	0.33	
Pacific Electric Ray	--	--	1.10	--	--	--	0.30	--	--	--	--	--	--	--	--	1.39	
Pelagic Stingray	--	--	--	--	0.12	--	--	--	--	--	--	--	--	--	--	0.12	
Round Stingray	--	--	--	--	--	0.00	--	--	--	--	--	--	--	--	--	0.00	
Sandpaper Skate	--	--	39.72	0.19	1.61	--	0.00	0.01	--	--	--	--	--	--	--	41.52	
Shovelnose Guitarfish	--	--	0.00	--	--	--	0.06	--	--	--	--	--	--	8.88	--	8.94	
Starry Skate	--	--	0.12	--	0.01	--	--	0.00	--	--	--	--	--	--	--	0.13	
Thornback Skate	--	--	0.00	--	--	--	0.27	--	--	--	--	--	--	0.31	--	0.59	
White Skate	--	--	0.43	--	--	--	--	--	--	--	--	--	--	--	--	0.43	

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

Table 16. Estimated fishing mortality (mt) of major west coast groundfish species in 2012 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)	mortality (% of ABC)	OFL (mt)	Estimated mortality (% of OFL)
Rebuilding species							
Bocaccio (South of 40°10' N. lat.)	140	274	51%	700	20%	732	19%
Canary rockfish	45	107	42%	594	8%	622	7%
Cowcod (South of 40°10' N. lat.)	1	3	38%	10	11%	13	9%
Darkblotched rockfish	105	296	35%	475	22%	497	21%
Pacific ocean perch (North of 40°10' N. lat.)	56	183	30%	962	6%	1007	6%
Petrale sole	1111	1160	96%	1222	91%	1279	87%
Yelloweye rockfish	12	17	68%	46	25%	48	24%
Non-rebuilding species							
Arrowtooth flounder	2508	12049	21%	12049	21%	14460	17%
Black rockfish (North of 46°16' N. lat.)	249	415	60%	415	60%	435	57%
Black rockfish (South of 46°16' N. lat.)	563	1000	56%	1117	50%	1169	48%
Cabazon (California)	74	168	44%	168	44%	176	42%
Cabazon (Oregon)	47	48	98%	48	98%	50	94%
California scorpionfish (South of 34°27' N. lat.)	120	126	95%	126	95%	132	91%
Chilipepper rockfish (South of 40°10' N. lat.)	302	1789	17%	1789	17%	1872	16%
Dover sole	7175	25000	29%	42843	17%	44826	16%
English sole	224	10150	2%	10150	2%	10620	2%
Lingcod (North of 42° N. lat.)	731	2151	34%	2151	34%	2251	32%
Lingcod (South of 42° N. lat.)	337	2164	16%	2164	16%	2597	13%
Longnose Skate	991	1349	73%	2873	34%	3006	33%
Other flatfish	897	4884	18%	7044	13%	10146	9%
Other groundfish ¹	1655	5575	30%	7742	21%	11150	15%
Minor rockfish (North of 40°10' N. lat.)	640	2227	29%	3414	19%	3820	17%
Nearshore	96	99	97%	99	97%	116	83%
Shelf	90	968	9%	1948	5%	2197	4%
Slope	453	1160	39%	1367	33%	1507	30%
Minor rockfish (South of 40°10' N. lat.)	1104	2341	47%	3712	30%	4291	26%
Nearshore	445	990	45%	990	45%	1145	39%
Shelf	402	714	56%	1890	21%	2243	18%
Slope	257	626	41%	832	31%	903	28%
Pacific cod (North of 43° N. lat.)	634	1600	40%	2222	29%	3200	20%
Pacific hake	160706	2012 US TAC = 186037 mt, % of US TAC = 86%					
Sablefish (North of 36° N. lat.)	4701	5347	88%	8242	66%	8623	63%
Sablefish (South of 36° N. lat.)	705	1258	56%				
Shortbelly rockfish	7	50	15%	5789	0%	6950	0%
Splitnose rockfish (South of 40°10' N. lat.)	62	1538	4%	1538	4%	1610	4%
Starry flounder	17	1360	1%	1511	1%	1813	1%
Thornyheads							
Longspine thornyhead (North of 34°27' N. lat.)	912	2064	44%	2902	32%	3483	27%
Longspine thornyhead (South of 34°27' N. lat.)	18	366	5%				
Shortspine thornyhead (North of 34°27' N. lat.)	801	1556	52%	2254	41%	2358	39%
Shortspine thornyhead (South of 34°27' N. lat.)	128	401	32%				
Mixed thornyheads	2						
Widow rockfish	278	600	46%	4705	6%	4923	6%
Yellowtail rockfish (North of 40°10' N. lat.)	1570	4371	36%	4371	36%	4573	34%

¹Includes the Other Groundfish category and Spiny dogfish from Table 15.