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Estimated Discard and Catch of Groundfish Species in the 2018 US West Coast Fisheries



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Executive Summary

The primary objectives of this report are to estimate fishing mortality of groundfish species in U.S. West Coast fisheries during 2018 and evaluate mortality estimates relative to annual catch limit (ACL), acceptable biological catch (ABC), and overfishing limit (OFL) harvest specifications. These management specifications are published in the federal groundfish regulations for selected groundfish species (50 CFR 660 Subpart C, 80 FR 212). 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 (PFMC 2014). Our primary findings include that:

- One groundfish grouping exceeded 2018 harvest goals: shortbelly rockfish achieved 102% of its ACL. However, this is only 9% of the ACL and 7% of the OFL.
- Estimated fishing mortalities of four groundfish species were between 90% and 100% of their ACLs: petrale sole (97%), spiny dogfish shark (93%), cabezon in Oregon (92%), and sablefish north of lat 36°N (91%).
- All other groundfish species and complexes achieved less than 90% of their ACLs.
- Only two species remain in a rebuilding status: cowcod rockfish south of lat 40°10'N and yelloweye rockfish. The ACL attainment for cowcod increased from 17% in 2017 to 32% in 2018, while yelloweye rockfish decreased from 92% to 86%.
- Of the 46 management groupings compared between 2017 and 2018, 17 had greater mortality in 2018, 12 showed similar levels (less than 10% lower than 2017 estimates), and 17 had lower mortality.
- Twenty-seven of the groundfish species and complexes (63%) had fishing mortality estimates which were less than 50% of their 2018 ACLs (Table 16).
- Mortality estimates for all groundfish catch combined were higher in 2018 than in 2017 in the at-sea hake mothership catcher vessel (MSCV), midwater rockfish, catch shares hook-and-line, limited entry (LE) fixed gear primary and non-primary, directed west coast Pacific halibut, ridgeback prawn trawl, and nearshore sectors (Table 15; Somers et al. 2018a). Estimated fishing mortality of all groundfish species and complexes combined were lower than 2017 levels in the at-sea hake catcher-processor (CP), shoreside midwater hake, catch shares bottom trawl and pot, open access (OA) California halibut, OA fixed gear, and coastwide pink shrimp sectors.

Summaries of 2018 catch from the following groundfish fishery sectors are included:

Commercial:

LE shorebased individual fishing quota (IFQ) program*

Bottom trawl gear

Fixed gear

Midwater trawl gear, landing 50% or more rockfish

Midwater trawl gear, landing 50% or more hake

Bottom trawl gear and using electronic monitoring (EM)

Fixed gear and using EM

Midwater trawl gear, landing 50% or more rockfish and using EM

Midwater trawl gear, landing 50% or more hake and using EM

At-sea hake co-ops*

Pacific hake CP

Pacific hake MSCV

- 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 [DTL] sectors)*
- Directed Pacific halibut fishery*
- Fixed gear OA DTL*
- Exempted fishing permit (EFP) (not including EM sectors listed above)*

Tribal:

- Shoreside hake
- At-sea hake*

Recreational (Washington/Oregon/California)

Research

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

- OA pink shrimp trawl (Washington/Oregon/California)*
- OA ridgeback prawn trawl (California)*
- OA bottom trawl targeting California halibut*
- OA bottom trawl targeting sea cucumber (California)
- OA bottom trawl not included above
- Other gear groups not included above
- Fixed gear targeting non-groundfish

* Indicates sectors that use federal observer data.

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Data Sources

Data sources used to estimate groundfish fishing mortality include landing receipts, onboard observer records, EM logbooks, and recreational and research catch information.

Fleet-wide landing receipts (a.k.a., fish tickets) are the cornerstone of retained catch information for all shoreside sectors of the commercial groundfish fishery on the U.S. West Coast. Fish tickets are trip-aggregated sales receipts issued to vessels by fish buyers in each port for each delivery of fish and, in most fisheries, are now reported electronically to state agencies. 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 PSMFC. For analytical purposes, we used fish ticket data with PacFIN-applied percentages of each species weight within market categories obtained from species composition sampling. Landed weights from sampled market categories were distributed to individual species whenever possible.

Fish ticket landings data for the calendar year 2018 were retrieved from the PacFIN database on 6 May 2019. We allocated these landings to reflect sectors as defined for observer coverage (Figure 1; Appendix B). All additional data processing steps are described in [Methods](#).

The Northwest Fisheries Science Center (NWFS) WCGOP was established in 2001 by the National Marine Fisheries Service (NMFS or NOAA Fisheries; 66 FR 20609). All commercial vessels that land groundfish caught in the U.S. Exclusive Economic Zone from 3–200 miles offshore are required to carry an observer when notified to do so by NOAA Fisheries or its designated agent. Subsequent state rule-making also requires vessels that fish for groundfish within three miles of shore, or that participate in other state-managed fisheries, to carry federal observers when notified.

WCGOP's goal is to improve total catch estimates by collecting information on west coast groundfish species discarded at-sea. Detailed information on data collection methods employed in each observed fishery can be found in the WCGOP manual (NWFS 2019b). The sampling protocol employed by the WCGOP primarily focuses 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 is 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 in the WCGOP data equal the total trip pounds on the fish ticket(s). This adjustment is necessary because observer retained catch weight estimates in the trawl sectors often consist of the visual estimate used in the vessel's logbook, while the fish ticket weight is a physical measurement and is legally binding (NWFS).

The A-SHOP has conducted observations of the U.S. West Coast at-sea hake (a.k.a., Pacific whiting, henceforth referred to as hake) fishery since 2001. Prior to 2001, observer coverage of the west coast at-sea hake fishery was conducted by the North Pacific Observer Program. Current A-SHOP program information and documentation on data collection methods can be found in the observer manual (NWFS 2019a). The at-sea hake fishery has mandatory observer coverage, with each vessel over 38 m carrying two observers. Beginning in 2011, under IFQ/co-op program management, in addition to A-SHOP observers aboard the motherships, all catcher vessels that deliver to them are required to carry WCGOP observers or EM systems.

At-sea discards of IFQ species by IFQ vessels participating in the EM exempted fishing permit (EFP) sector in both the shoreside and at-sea processing fleets were recorded by EM systems. Estimates of discard weight by IFQ species or grouping at the haul level for shoreside processing vessels were provided by PSMFC and are used in this report.

Discard is defined in this report primarily as catch which is discarded at sea; however, some estimates of additional "discard" occurring shoreside in optimized or maximized retention are included and explicitly labeled. In all other sectors, WCGOP assumed that the small amount of discard at the dock is accounted for in PacFIN fish ticket landings data. Landing weights are presented in round weight (complete weight as caught, prior to any dressing), as any conversion factors (e.g., for at-sea processing) have already been applied by state agencies or in the PacFIN database.

Discard estimation focused on commercial groundfish fishery sectors with scientific at-sea observations of discards conducted by the Fisheries Observation Science (FOS) Program, Fishery Resource Analysis and Monitoring Division (FRAM), NWFSC. WCGOP and A-SHOP observe distinct sectors of the groundfish fishery. WCGOP observes a number of different sectors of the groundfish fishery, including IFQ shorebased, LE and OA fixed gear, directed Pacific halibut, and state-permitted nearshore fixed gear sectors. WCGOP also observes several fisheries that incidentally catch groundfish, including the pink shrimp, California halibut, California ridgeback prawn, and California sea cucumber trawl fisheries. WCGOP data from each of these fisheries were used for the purposes of discard estimation. Mortality estimates were summarized from the A-SHOP data for the CP and MSCV sectors of the at-sea Pacific hake fishery. No tribal fishing in the at-sea hake fishery occurred in 2018.

For all PacFIN, WCGOP, A-SHOP, and PSMFC data, we maintain confidentiality of persons and businesses as required by the Magnuson–Stevens Fishery Conservation and Management Act (MSA), which was most recently reauthorized in 2007. NOAA Fisheries guidance recommends, and the NWFSC FOS Program follows, the “rule of three,” which states that “Information from at least three participants in the fishery must be aggregated/summarized at a temporal and spatial level to protect not only the identity of a person or a business, but also any business information” (N. Cyr, 2009 memorandum to NOAA Fisheries on data aggregation and summarization guidelines).

Groundfish species catch data from the recreational fisheries was provided by the Washington Department of Fish and Wildlife (WDFW) and the California Department of Fish and Wildlife (CDFW) via the Recreational Fisheries Information Network (RecFIN). Additionally, the Oregon Department of Fish and Wildlife (ODFW) provided data directly. Estimates from all three state agencies include catch weight (discarded and retained) estimates with PFMC-approved mortality rates applied to account for discard mortality (PFMC 2014). WDFW includes only surface-release mortality rates for released rockfish; ODFW and CDFW apply depth-dependent mortality rates.

Each year, a certain portion of the ACL for groundfish species is harvested through research activities. Research programs that caught groundfish included NWFSC’s groundfish bottom trawl survey and sablefish tagging and collection research and the International Pacific Halibut Commission’s (IPHC) survey. Total groundfish research catch (discarded and retained) information was provided by NOAA’s WCR and compiled by FOS analysts. 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. In this report, depth-dependent mortality rates (PFMC 2016b) were applied to canary, cowcod, and yelloweye rockfish discards caught using fixed gear and released at depth, where data were available.

In addition to these data sources, discard mortality rates were provided by PFMC’s GMT (PFMC 2014, PFMC 2016b, PFMC 2017). GMT is an advisory body to PFMC that comprises representatives from federal, state, and tribal agencies and is involved in evaluating management performance and alternatives for groundfish fisheries on the U.S. West Coast, between the Canadian and Mexican borders. For the purposes of this analysis, GMT provided discard mortality rates, which estimate the survival of discarded catch: for big skate, in trawl sectors only; for sablefish, longnose skate, and lingcod, in trawl and fixed gear sectors; for spiny dogfish, in hook-and-line fixed gear sectors only; and for some individual species and major species groups in the state-permitted fixed gear nearshore sector (for all discard mortality rates, see Tables A-3 and A-4 or PFMC 2016b). Trawl mortality rates only apply to bottom trawl gear. We assume 100% mortality for all species caught with midwater, shrimp, prawn, and sea cucumber trawl gear, because species-specific mortality rates have not been identified for these gear types. Changes to estimation, discard rates, and management are documented in Table A-5.

Methods

Discard Estimation Methods Overview

We used a deterministic approach to estimate discard mortality for all observed sectors of the groundfish fishery. Observed discard rates for each species were expanded to the fleet-wide level to estimate total discard amount. Expansion methods varied slightly between fishery sectors to reflect varying data availability and management structure among sectors of the groundfish fishery.

The stratification scheme used in this analysis is inconsistent with the sampling design employed by WCGOP. The overall WCGOP sampling design is based on a stratified multistage random sampling. This design-based framework distributes observational effort more evenly coastwide than simple random sampling and uses prior landings information to improve the efficiency of sampling allocation. Strata 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, etc.) are most appropriate for discard analyses, broader stratification is often warranted to ensure adequate sample size and/or to meet confidentiality mandates.

In addition to standard error (SE), we have provided the coefficient of variation (CV) of the discard ratio for each species (or species group) as another measurement of statistical uncertainty. Although the confidence intervals (CIs) for the estimated discards can be derived from SEs based on normality assumption, we do not provide these statistics in the current report, because preliminary analyses indicated that this method may underestimate the upper CI bounds for rare species. We calculated the SE of the observed discard ratio for each fish species, as described in Pikitch et al. (1998). The SE of the discard ratio was then divided by the discard ratio itself to calculate the CV. Within a given stratum, the CV of the discard ratio of a fish species is identical to the CV of the expanded discard estimate of the given species (Lee 2015). This informative statistic is unitless, which allows for comparisons across estimates of species regardless of differences in the magnitude of discarded amounts.

In all cases where a Fishery Management Plan (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 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 aggregated, weighed, and recorded together on the fish ticket under a grouped species code (e.g., NUSP = Northern Unspecified Slope Rockfish). 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 grouped for this report according to WCGOP data processing codes (Table A-1). The Groundfish FMP provides a complete listing of groundfish species (PFMC 2016a).

As with all point estimates, mortality values presented in Tables 15 and 16 should be considered with caution. Multiple sources of uncertainty that were not accounted for in this analysis might influence mortality estimates, including species composition sampling of landed catch, observed retained weights, and discard mortality rates.

IFQ Fishery Discard Estimation

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

Catch delivered to shorebased processors:

- Bottom trawl: Bottom trawl nets used to target a variety of groundfish species.
- Midwater rockfish trawl: Midwater trawl nets used to target midwater non-hake species, such as widow and yellowtail rockfish.
- Midwater hake trawl: Midwater trawl nets used to target hake.
- Pot: Pot or trap gear used to target groundfish species, primarily sablefish.
- Hook-and-line: Longlines primarily used to target groundfish species, mainly sablefish.

Catch processed at sea:

- MSCV: Midwater trawl nets used to target hake. Catcher vessels deliver unsorted catch to a mothership, where it is sorted and processed at sea.
- CP: Midwater trawl nets used to target hake, which is processed at sea.

In 2011, the implementation of the IFQ management program resulted in changes to fishing regulations which, in turn, resulted in the development of new methods for estimating fishing mortality under the IFQ fishery. In 2015, the addition of EM systems provided another option for 100% monitoring of catch of quota species. In the non-hake IFQ sectors, these regulation changes required that vessels must carry NOAA Fisheries observers or, if operating with an EM EFP, EM systems as well as NOAA Fisheries observers when notified to do so. Regulations also established that the use of multiple gear types (trawl or fixed gear) were allowed for fishing under a federal groundfish trawl-endorsed permit, although only one gear type is allowed per trip, and that only a single IFQ reporting area could be fished per trip. Additionally, observer sampling priorities were shifted to focus more on IFQ and rebuilding groundfish species.

Shorebased IFQ Sectors

Fleetwide discard estimates for the shorebased IFQ sectors were derived from WCGOP observer data, PSMFC EM data, and PacFIN fish ticket landings data. Fish tickets associated with the IFQ fishery were defined by analysts through an extensive quality control and review process of all available data sources.

IFQ bottom trawl vessels can hold a California halibut bottom trawl permit and participate in the state-permitted California halibut fishery. These LE California halibut tows can occur on the same trip as tows targeting IFQ groundfish and were identified at the tow level based on the use of bottom trawl gear and the following criteria: 1) the target was California halibut and more than 150 lb of California halibut were landed, or 2) the target was nearshore mix, sand sole, or other flatfish, and the tow took place in less than 30 fathoms (fth, ~55 m) and south of lat 40°10'N. All IFQ bottom trawl tows that met at least one of the above requirements were analyzed using methods for IFQ discard estimation to reflect the sampling protocol performed by observers on the boat. Tow targets are typically determined by the vessel captain. Since 2013, however, no LE California halibut tows have been identified.

100% Observed Shorebased IFQ Sectors

Observer data from the IFQ fishery not participating in the EM EFP were stratified by sector, gear type, and management area to the finest possible level while maintaining confidentiality (Table 1). When sample size was adequate (10 hauls or more per stratum) and data confidentiality rules could be met, we further stratified by season and depth. Records were separated into two groundfish management areas: north and south of lat 40°10'N. Each management area was divided into three depth strata (0–125, 126–250, >250 fth¹). The fishery was further stratified

¹ 0–228, 229–457, >457 m.

into two seasonal strata: winter (November–April) and summer (May–October), reflecting seasonal changes in Rockfish Conservation Area (RCA) boundaries, fishing effort, and target species (e.g., winter petrale sole).

On rare occasions (e.g., observer illness), tows or sets are unsampled, although an observer is present on 100% of trips. In some cases, tows or sets may have some portion of unsampled discarded catch recorded in very broad or mixed categories (Table A-2). At the stratum level, we used ratio estimators to apportion any unsampled discard weight to specific species based on the composition of observed catch.

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:

$$W = \sum_p x_p \times \frac{\sum_f w_f}{\sum_f x_f}$$

where, for each stratum:

W = estimated unsampled discard weight of a given species in a stratum,

p = unsampled haul,

x = total weight of discarded catch of all species,

f = sampled haul, and

w = sampled discard weight of a given 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), IFQ roundfish (IFQRD), and IFQ mixed species (IFQM; Table A-2). IFQM included all IFQ managed species (see Tables A-1 and A-2, or 78 FR 579), while NIFQ included all other fish species. Observers are instructed to avoid double counting in IFQ hauls or sets by ensuring that unsampled categories do not also contain sampled species. Rarely, observers are unable to sort discard by IFQ category, resulting in unsampled discard that contains both IFQ and non-IFQ species (referred to as ZMIS). Even less often, entire hauls, including species that would have normally been retained, are discarded at sea, due either to errors (e.g., net rips before landed) or operational considerations (e.g., deliberate release of catch from net before landing because of safety or other concerns). In these instances, the observer records a visual estimate as unsorted catch (UNST), including both discarded and retained species. Very infrequently, haul and trip data fail quality control measures. In these cases, observer data for the failed haul or trip were ignored, and discards were estimated based on stratum-level observed discard rates and haul-level estimates of retained values from fish tickets.

To obtain the estimated discard weight of a species (W) in strata that include unsampled categories, the unsampled discard weight, summed within the stratum, was multiplied by the ratio of the sampled discard weight of the species to the sampled weight of all species included in an unsampled category (NIFQ, IFQFF, IFQRF, IFQRD, IFQM, or ZMIS) within a stratum. When entire hauls, including species that are typically retained, were unsampled (UNST), the same formula was applied, but included both discarded and retained weight for all species. Data was failed (FAIL) when errors occurred consistently throughout an observer's sampling of a haul or trip. In these cases, discard is estimated using the ratio of sampled discarded to retained weight for each species in the stratum, multiplied by the known retained weight from the fish tickets associated with the failed trip. Estimated discard weight of the species was calculated and summed across unsampled categories as:

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

where, for each stratum:

W = estimated unsampled discard weight of a given species within a stratum,

y = unsampled catch category (either NIFQ, IFQFF, IFQRF, IFQRD, IFQM, ZMIS, UNST, or FAIL),

p = unsampled catch,

x = catch weight,

f = sampled catch, and

w = sampled discard weight of a given species.

Expanded discard weights of a particular species obtained using the equations above for unsampled hauls or partially unsampled hauls (those containing both sampled and unsampled catch categories) were then added to the sampled discard weight of that species within each stratum to obtain the total species-specific discard weight per stratum (Tables 2a and 2b).

Prior to 2011, the shorebased midwater hake fishery was conducted under an 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 discarded weight. Prior to 2015, this fishery was defined based on the species targeted by the captain and recorded in the logbook and observer notes and divided into the IFQ non-hake midwater trawl and the shoreside hake sector. With new regulations (50 CFR 660, 80 FR 239), this fishery is now defined and managed based on percentage of hake landings for each vessel per landing day, so that the fishery now consists of the shoreside midwater hake (landing $\geq 50\%$ hake) and the shoreside midwater rockfish sectors (landing $\geq 50\%$ widow and yellowtail rockfish).

Electronically Monitored Shorebased IFQ Sectors

For those IFQ vessels participating in the IFQ EM EFP fishery, discard rules and observer requirements varied by gear. EM systems use video recordings to estimate weights of certain IFQ species that are allowed to be discarded at sea (see Table 2d). In 2015, the first year of this EFP, both WCGOP and fishing crews worked to implement and improve procedures for sorting catch into 1) at-sea discard, 2) retained and expected to be landed for revenue, and 3) retained but expected to be discarded shoreside. In 2016 and beyond, these refined protocols provided more accurate discard estimation, as described below.

Vessels fishing using pot or bottom trawl gear could only discard certain species; on those vessels, observer coverage was targeted at a random sample of 30% of trips to result in 25–30% of landings being observed. For non-IFQ species, total at-sea discard estimates were calculated in the same manner described below for non-catch share fisheries. A ratio estimator of observed discard rates from the EM fleet was applied to the total amount of groundfish retained by this fleet, with rates and total landings stratified by gear (pot or bottom trawl) and by area, where possible, while maintaining confidentiality (Table 2c). In addition, observers and fishers worked together to sort non-IFQ species that were not discarded at sea, but were expected to be discarded shoreside (Table 2c). The only species consistently recorded both by observers (as likely shoreside discard) and by shoreside processors (on fish tickets) were longnose skate, Pacific grenadier, and spiny dogfish. For all other species, we calculated a “shoreside discard” rate, following the procedures described above for at-sea discard, and multiplied this rate by total groundfish landings. We are confident that very little double-counting between observed estimated shoreside

discard and landings on fish ticket receipts occurred, as we specifically excluded species likely to be recorded twice. For at-sea discard of IFQ species, we chose to use EM video reviewer data as the most accurate record, as it provides 100% coverage of at-sea discard for this subset of species (Table 2d). However, a small amount of unmonitored at-sea discard occurs, due to spillage or lost gear; in these cases, we expanded the estimated amount of lost catch based on the known catch composition.

The midwater hake sector operates under maximized retention, so no observer coverage was required on any trips where EM systems were in place (Table 2e). Instead, the small amount of at-sea discard of IFQ species recorded by EM logbooks was provided by PSMFC and is included in the report. Similar to the EM pot and bottom trawl sectors, a small amount of unmonitored at-sea discard was expanded at the haul level, based on the composition of shoreside landings.

As with all other sectors, fleetwide landings data for the EM sector were acquired from PacFIN fish tickets. Data from observer records and from EM logbooks via PSMFC enabled the identification of all fish tickets associated with EM trips.

Mortality Summary for Shorebased IFQ Sectors

We estimated coastwide landings, discard weight from 100% observer coverage and EM data, and fishing mortality, including discard mortality rates, in the 2018 shorebased non-hake IFQ sectors (Table 3a). We applied a 50% mortality rate to discarded sablefish and lingcod weight caught by IFQ bottom trawl and LE California halibut trawl sectors, reflecting guidance from the GMT to use rates used in the pre-IFQ LE groundfish bottom trawl sector. We also applied a 20% mortality rate to discarded sablefish caught by IFQ longline and pot gear, the rate suggested by GMT based on studies used to inform mortality rates in non-nearshore groundfish fixed gear sectors. We applied a 7% mortality rate to discarded lingcod caught by IFQ hook-and-line gear, based on mortality rates applied in other groundfish fixed gear sectors. We also applied discard mortality rate assumptions (previously made for stock assessment purposes) recommended by PFMC's Scientific and Statistical Committee (SSC) for longnose skate (50% for both bottom trawl and fixed gear) and spiny dogfish (50% for hook-and-line; PFMC 2012), as well as for big skate (50% for bottom trawl; PFMC 2015a, 2015b).

The total estimated weight, comprising the sampled and expanded discard weight and the landed weight, is reported by species for the shoreside midwater hake sector (Table 3a) and for the shoreside midwater rockfish sector (Table 3b). No discard mortality rates are applied in midwater trawl sectors.

At-Sea Hake Sectors

The midwater trawl fishery for hake comprises three at-sea processing fleets: CPs, MSCVs, and a tribal catcher vessel fleet delivering to motherships. A-SHOP produces estimates of total catch (discarded and retained) in the at-sea 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, forms the basis for the two at-sea hake sectors summarized in Table 3b. In 2018, the tribal fleet did not make any at-sea landings; shorebased tribal landings are presented in Table 15. We estimated coastwide landings, sampled discard weight, estimated discard weight, and estimated fishing mortality in all 2018 hake IFQ/co-op program sectors (Table 3b).

California Halibut Bottom Trawl Fishery

Fleetwide discard estimates in the California halibut bottom trawl fishery were derived from WCGOP and fish ticket data. All California halibut vessels are permitted by the state of California, but are considered OA in this report unless they also have a federal LE groundfish permit. Since 2013, no fishing effort has occurred in the LE California halibut fishery. The WCGOP randomly samples the OA California halibut fishery following non-catch share sampling priorities, protocols, and selection design.

Discard ratios for the OA California halibut fishery were calculated by dividing the observed discard weight of each species or complex by the observed retained weight of California halibut. The fleetwide landed weight of California halibut was then used as a multiplier to expand observed discard ratios to the fleetwide level (Table 4). Fleetwide landings were compiled from OA trawl fish tickets for those vessels that had a state-issued California halibut bottom trawl permit but no federal bottom trawl permit.

The discard estimate for each species was computed based on the following equation:

$$D = \frac{\sum_t d_t}{\sum_t r_t} \times F$$

where:

D = discard estimate for a given species,

t = observed tows,

d = observed discard weight for a given species,

r = observed retained weight of California halibut, and

F = weight of retained California halibut recorded on fish tickets for the fleet (expansion factor).

We estimated fishing mortalities of groundfish species caught in the OA California halibut trawl fishery (Table 4). A 50% mortality rate was applied for discarded lingcod and sablefish, based on assumptions made by GMT and carried over from management under the pre-IFQ groundfish bottom trawl sector. We also applied an SSC-recommended discard mortality rate assumption (previously made for stock assessment purposes) of 50% for longnose skate (PFMC 2012) and big skate (PFMC 2015a, 2015b).

California Sea Cucumber Trawl Fishery

In 2018, WCGOP observed less than three vessels in the sea cucumber trawl fishery. In order to maintain the confidentiality of those data, this report does not include discard estimates for the sea cucumber trawl fishery in 2018. However, we do include estimates of landed catch in Tables 15 and 16. Effort in this fishery was defined as occurring only in California, using shrimp or bottom trawl, and landing more sea cucumber than other species.

Pink Shrimp Trawl Fishery

Fleetwide discard estimates for the pink shrimp trawl fishery were derived from WCGOP and fish ticket data. The discard estimate for each species in each state was computed based on the same equation as described above for the OA California halibut fishery, but utilizing pink shrimp as the retained weight for both discard rates and expansion factors. We estimated landings, discard, and total mortality in the 2018 individual state pink shrimp trawl fisheries (Table 5a).

Prior to 2011, pink shrimp fish tickets in the area north of lat 40°10'N were compiled for a single discard expansion factor, but pink shrimp fish tickets south of lat 40°10'N were summarized as part of the remaining incidental fisheries. Observer data from all state pink shrimp fleets in the north were combined to calculate discard rates. In

2010, WCGOP coverage of the Washington pink shrimp fleet began, and coverage of all state fisheries from 2011 to the present was sufficient to further stratify the analysis by state.

California Ridgeback Prawn Trawl Fishery

WCGOP observed the California ridgeback prawn fishery from 2002–05, covering vessels targeting coonstripe, ridgeback, and spotted prawn, but these data have not been used in discard estimations. Effort in this fishery was defined as occurring only in California, using shrimp or bottom trawl gear, and landing more ridgeback prawn than other species. Discard estimates for each species were computed based on the same equation as described above for the OA California halibut fishery, but utilizing ridgeback prawn as the retained weight for both discard rates and expansion factors. No mortality rates were applied. We estimated landings, discard, and total mortality in the 2018 ridgeback prawn trawl fishery (Table 5b).

Non-Nearshore Fixed Gear Fishery

Fleetwide discard estimates for the LE and OA non-nearshore fixed gear sector of the groundfish fishery were derived from WCGOP and fish ticket data. 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. Fixed gear fish tickets where non-groundfish landings were greater than groundfish landings and sablefish or nearshore species were not recorded were summarized as incidental landings (Table 14). Fixed gear fish tickets with non-groundfish landings greater than groundfish landings but also containing sablefish were classified as non-nearshore fixed gear; those with nearshore species landings on a nearshore permit were classified as nearshore fixed gear sector. Fish tickets associated with the Pacific halibut directed commercial fishery were identified by the IPHC for 2002–2017 in Washington and Oregon. In 2018 and in California, Pacific halibut directed fishery tickets were identified as using line gear and landing Pacific halibut on the day of the opening or within two subsequent days.

Fish tickets were partitioned into three commercial fixed gear subsectors: LE sablefish endorsed primary season, LE non-sablefish endorsed, and OA fixed gear groundfish. Vessels landing catch without a federal groundfish permit were classified as the OA fixed gear groundfish subsector. Those vessels landing catch with a federal groundfish permit were further 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 zero-tier permits). Fish tickets for all LE vessels with tier sablefish endorsements operating during the sablefish primary season (April–October) and within their allotted tier quota were placed in the LE sablefish endorsed primary subsector. If LE sablefish-endorsed vessels fished outside of the primary season (November–March) or made trips within the season after they had reached their cumulative tier quota, the fish tickets were placed in the LE non-sablefish endorsed subsector. Fish tickets from non-sablefish endorsed LE vessels were also placed in this subsector.

Data used in these analyses were collected by WCGOP from the following fixed gear subsectors in order of priority: LE sablefish endorsed primary season fixed gear, LE zero-tier (non-endorsed), and OA non-nearshore fixed gear. LE sablefish endorsed vessels that were fishing outside of the primary season or that had reached their cumulative tier quota in the primary season were not observed. However, observed LE zero-tier discard rates were assumed to be the most comparable discard rates and were used to estimate discard based on these landings.

Observer data were stratified by subsector, gear type, and area (where applicable; Tables 6–8). Area strata (north and south of lat 36°N) are based on PFMC area management for sablefish trip limits. Gear type was defined as longline or pot/trap gear. Explicit depth stratification of fixed gear fishing effort is not possible, because there are no fleetwide estimates of fishing depths in this fishery. 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, observed discard rates from the OA fixed gear pot sector were used to estimate the total discard associated with the small amount of groundfish landed by the pot gear portion of the LE non-sablefish endorsed subsector, which is unobserved.

We summarized the number of observed vessels, trips, and sets, along with fleetwide sablefish and FMP groundfish landings (Tables 6–8). Retained groundfish was used as the denominator, rather than sablefish weight alone, to reflect the wider range of target species in some subsectors, primarily fixed gear fisheries south of lat 36°N.

We calculated total coastwide landings, discard, and fishing mortality for the LE and OA non-nearshore fixed gear sectors (Table 9a). A 20% mortality rate is applied for discarded sablefish and a 7% rate for line-caught discarded lingcod, based on guidance from GMT. We also applied SSC-recommended discard mortality rates (previously made for stock assessment purposes) for longnose skate (50%) and spiny dogfish (50%; PFMC 2012).

Directed Pacific Halibut Fishery

As described above in the non-nearshore fixed gear sector, this fishery was defined based on IPHC identified tickets and using line gear and landing Pacific halibut within two days of the halibut fishery openings. Effort in this fishery occurs primarily in Washington and Oregon. Discard estimates for each species were computed based on the equation for the OA California halibut fishery, but utilizing Pacific halibut as the retained weight for both discard rates and expansion factors. We estimated landings, discard, and total mortality in the 2018 directed Pacific halibut fishery (Table 9b). Because the gear and effort in this fishery are similar to the non-nearshore and catch shares hook-and-line fisheries, the same mortality rates were applied to discarded lingcod (7%), longnose skate (50%), sablefish (20%), and spiny dogfish (50%).

Nearshore Fixed Gear Fishery

Fleetwide discard estimates for the commercial nearshore fixed gear sector of the groundfish fishery were derived from WCGOP observer data, fish ticket landings, and mortality rates provided by GMT (Table A-4).

WCGOP selects commercial nearshore vessels in California and Oregon for observer coverage based on state-issued nearshore permits or licenses; no nearshore fishery exists in Washington. Although California and Oregon nearshore fisheries are sampled separately for observer coverage, fleetwide discard estimates are provided for the areas north and south of the groundfish management line at lat 40°10'N, in accordance with federal groundfish management specifications.

We applied a discard mortality rate of 7% for all FMP species without swim bladders (Albin and Karpov 1996). In June 2017, GMT provided revised depth-specific discard survival assumptions for some nearshore species (Table A-4). This update separated the >20 fth depth bin into 20–30 fth and >30 fth, allowing for more accurate accounting of discard mortality by depth, and provided distinct rates north and south of lat 40°10'N that reflect the differing depth distributions of observed fishing effort and align with recreational mortality rates using similar gear (PFMC 2017). We first generated estimates of the depth distribution of landings (0–10 fth, 11–20 fth, 21–30 fth, and >30 fth) based on the observed percentage of catch for each species or complex from 2003–18 (Table 10).² Using data from all previously observed years ensures that data are comparable across years and that proportions are available for all species landed in a given year. Fleet landings of each nearshore species and complex in 2018 were then distributed among depth intervals using the observed percentages. Finally, the total distributed landed weights of all nearshore groundfish species within each depth stratum were used to expand observed discard to the fleetwide level.

² 10 fth ≈ 18 m, so the depth distributions are approximately 0–18 m, 19–36 m, 37–54 m, and >55 m.

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, and then by the depth-specific discard mortality rates. Nearshore fishermen focus much of their effort in shallow waters, so the estimated amount of catch in deeper depth bins is most often confidential. Because we are unable to display the observed discard ratios used to estimate mortality, we provide the CVs at the finest aggregated, non-confidential strata possible north and south of lat 40°10'N (Table 11). We also report the total estimated gross discard and discard mortality, calculated at the confidential-level depth strata (Tables 12a, 12b).

We summarize the estimated total fishing mortality in observed non-IFQ groundfish fisheries by sector (Table 13).

Other Commercial Data Summaries

Landings of groundfish species from other non-groundfish fisheries operating under federal OA landing limits, which are mostly state-managed, and a small number of EFPs outside of the EM program are summarized by gear group (Table 14). Other than observed non-EM EFP trips, catch summaries of incidental fisheries are based exclusively on fish ticket data and therefore do not include any estimates of discards at sea.

Landings of groundfish species from the Washington tribal shorebased fisheries are included in Table 15. The Washington tribal data are based exclusively on fish ticket data, because tribal directed groundfish fisheries employ full retention requirements. In addition, both the Makah bottom trawl and midwater (targeting yellowtail rockfish) trawl sectors are monitored at a target tribal observation rate of 15%. In tribal management, discard mortality of fixed gear sablefish is accounted for by PFMC reducing the tribal allocation. For more information on discard and retention in tribal sablefish fisheries and Makah trawl observations, see Appendix B of PFMC and NMFS 2012.

Groundfish species catch from research activities and each state's recreational fisheries, combined across all gear types, is also summarized in Table 15.

Bycatch estimation and summaries for managed and protected fish species observed by WCGOP and A-SHOP are available in separate reports: Pacific halibut (Jannot et al. 2019), salmon species (Somers et al. 2015, Somers et al. 2018b), green sturgeon (Richerson et al. 2019), and eulachon (Gustafson et al. 2019). Mortality estimations for all fish species that are not protected from 2002–18 are available in the Groundfish Expanded Mortality Multiyear (GEMM) product on the [FRAM Data Warehouse](https://www.nwfsc.noaa.gov/data)³ and will be published as a NOAA Technical Memorandum in the future following the format of Somers et al. 2019b.

Cumulative Mortality Estimation Methods

We calculated the cumulative mortality for each species in a sector as the sum of the total discard mortality (with mortality rate applied) and retained weight. To calculate the cumulative mortality across all sectors, we summed the estimated discard mortality and retained weight from all observed sectors, the retained weight from unobserved incidental fisheries, and the mortality estimates from research and recreational catch (Table 15).

³ <https://www.nwfsc.noaa.gov/data>

Results

Fishing mortality estimates of total groundfish species and complexes were higher in 2018 than in 2017 in the at-sea hake MSCV, midwater rockfish, catch shares hook-and-line, LE fixed gear primary and non-primary, Pacific halibut directed, ridgeback prawn trawl, and nearshore sectors (Table 15; Somers et al. 2019a). Estimated fishing mortality of all groundfish species and complexes were lower than 2017 levels in the at-sea hake CP, midwater hake, catch shares bottom trawl and pot, OA California halibut, OA fixed gear, and pink shrimp sectors.

Landings by the catch share bottom trawl sector in 2018 were ~2,400 mt less than in 2017 (Somers et al. 2019a). Midwater rockfish landings almost doubled from 2017 to ~12,000 mt of groundfish in 2018, reflecting the continued redevelopment of the midwater rockfish fleet as the primary targets, widow and yellowtail rockfish, have rebuilt and quotas have subsequently increased (Somers et al. 2019a). In 2018, landings by the shoreside midwater hake fleet decreased by about 10% and almost ~15,000 mt compared to the previous year's historic high, with final catch totaling ~130,000 mt (Somers et al. 2019a). Landings by the pot gear portion of the fleet in 2018 were ~150 mt lower than those in 2017, while hook-and-line landings increased by ~45 mt (Somers et al. 2019a).

The percentage of all shoreside catch share sectors using EM systems compared to 100% observer coverage increased from 2017 to 2018 (Somers et al. 2019a). Approximately 15% of the bottom trawl sector landings used EM, an increase from 12% in 2017, while the portion of the midwater rockfish fleet using EM increased from 27% to 44% (Somers et al. 2019a). The proportion of shoreside-processed midwater hake landings covered by EM remained around 92%, as in 2017 (Somers et al. 2019a). The percentage of pot landings monitored using EM increased slightly from 57% in 2017 to 59% in 2018, and the hook-and-line sector does not currently use EM technology (Somers et al. 2019a).

Landings by the CP portion of the at-sea hake fishery decreased by ~20,000 mt between 2017 and 2018, but hake catch in this sub-sector was the second highest observed from 2002 to 2018 (Somers et al. 2019a). The MSCV sector's landings increased slightly by ~640 mt in 2018, resulting in another historically high year for that portion of the fleet. In both parts of the fleet, less than 0.1% of catch was unsampled (Somers et al. 2019a).

Trends in fleetwide landings and in observed discard ratios both inform fleetwide discard estimates. In state fisheries which are observed for incidental groundfish interactions, total 2018 landings in the OA California halibut trawl fishery were ~20 mt lower than in 2017, with a total of ~72 mt of California halibut caught (Table 4; Somers et al. 2019a). Landings in the sea cucumber trawl fishery continued to decrease in 2018, to a new historic low of ~13 mt (Somers et al. 2019a). Landings in the pink shrimp fishery increased in all states in 2018, in Washington and California by ~800 mt each and in Oregon by ~6,000 mt compared to 2017 (Table 5a; Somers et al. 2019a). Ridgeback prawn landings in 2018 were ~165 mt, similar to 2017 (Table 5b; Somers et al. 2019a).

Groundfish landings by the longline portion of the LE sablefish primary fishery were ~70 mt lower in 2018 than in 2017, while the pot gear portion was ~30 mt lower (Somers et al. 2018a). Landings by both pot and line gears in the LE, non-endorsed fixed gear fleet were similar from 2016 to 2018 (Somers et al. 2019a), while landings by the both the OA longline and pot gear fleets decreased by ~30 mt each (Somers et al. 2019a). Pacific halibut fishery landings were ~20 mt lower in 2018 than in 2017 (Somers et al. 2019a). Nearshore fixed gear landings increased by ~20 mt from 2017 to 2018 coastwide, reflecting increases of ~14 mt in Oregon and ~6 mt in California (Somers et al. 2019a).

Fishing mortality estimates are evaluated in terms of 2018 ACL, ABC, and OFL harvest specifications from federal groundfish regulations (50 CFR 660 Subpart C, 83 FR 63998). Only two rebuilding species remain: cowcod rockfish

south of lat 40°10'N and yelloweye rockfish. The ACL percentage for cowcod increased from 17% in 2017 to 32% in 2018 (Figure 2; Somers et al. 2018a). The greatest contributions, of ~1 mt each, to cowcod mortality came from recreational fishing in California and from the non-nearshore fixed gear sector (Figure 4; Somers et al. 2018a). The next largest contributors to cowcod mortality were research effort (0.63 mt) and the catch share bottom trawl fleet (0.42 mt). ACL attainment of yelloweye rockfish decreased from 92% in 2018 to 86% in 2017. The recreational fisheries were the primary contributors to yelloweye attainment in 2018, with mortality of ~3 mt in Washington, ~3.6 mt in Oregon, and ~5 mt in California. The nearshore and non-nearshore fixed gear sectors also included ~2.3 mt and ~1.3 mt of yelloweye rockfish mortality, respectively (Figure 4).

Five management groupings exceeded 90% of their ACLs, including shortbelly rockfish, the only grouping to exceed its ACL and attain 102%. The at-sea and shoreside hake sectors each contributed about half of the total shortbelly rockfish mortality in 2018 (Figure 4). Attainment of petrale sole remained high, achieving 94% of its ACL harvest goal in 2017 and 97% in 2018; nearly all mortality occurred in the catch share bottom trawl sector (Figures 3 and 4; Somers et al. 2018a). Spiny dogfish mortality nearly quadrupled from ~500 mt in 2017 to ~1900 mt in 2018, resulting in an increase in ACL attainment from 24% to 93% (Figure 3; Somers et al. 2018a). Most of this increase came from the hake fleets, primarily the at-sea catcher processor sector. The achievement of ACL for cabezon in Oregon decreased from 108% in 2017 to 92% in 2018 (Figure 3; Somers et al. 2018a). This decrease is attributable to lower mortality in the recreational sector; mortality by the nearshore fleet was close to 30 mt in both 2017 and 2018 (Somers et al. 2018a). Attainment of the ACL for sablefish north of lat 36°N decreased from 102% in 2017 to 91% in 2018, with the greatest contribution from non-catch shares fixed gear, followed by catch share bottom trawl and then catch share fixed gear (Figures 3 and 4; Somers et al. 2018a). Twenty-seven of the groundfish species and complexes (63%) had fishing mortality estimates which were less than 50% of 2018 ACL harvest goals (Table 16).

Of the 46 management groupings that compared across 2017 and 2018, 17 showed greater mortality in 2018 (Somers et al. 2018a). Spiny dogfish mortality showed the greatest relative increase and the second greatest total weight increased, as described above. The 2018 mortality of chilipper rockfish in the south also showed a high increase relative to 2017 (~2×, ~170 mt), mostly attributable to larger landings by the catch share bottom trawl sector. As discussed above, the mortality of cowcod rockfish in the south also showed high relative increases between 2017 and 2018 (~2×, ~2 mt). Widow rockfish mortality increased the most of any grouping from 2017 to 2018, by more than 4,000 mt, almost entirely attributable to the growing midwater rockfish fleet (Somers et al. 2018a). The mortality of seventeen management groupings were lower in 2018 but within 10% of 2017 mortality (Somers et al. 2018a). Starry flounder decreased the most on a relative scale, with landings decreasing by two-thirds from 20 mt to 7 mt. Mortality of longspine thornyheads in the north and pacific cod also decreased to half of that estimated for 2017. In total weight, Pacific hake mortality decreased by ~10% or ~38,000 mt between 2017 and 2018, and Dover sole decreased by ~14% or ~1,000 mt.

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Figures

Figure 1. PacFIN Fish Ticket Data Processing.

Fish ticket data processing for division into groundfish fishery sectors after retrieval of a full calendar year data set from the PacFIN database, queried 6 May 2019. Gray highlight indicates sectors for which federal observer data are available.

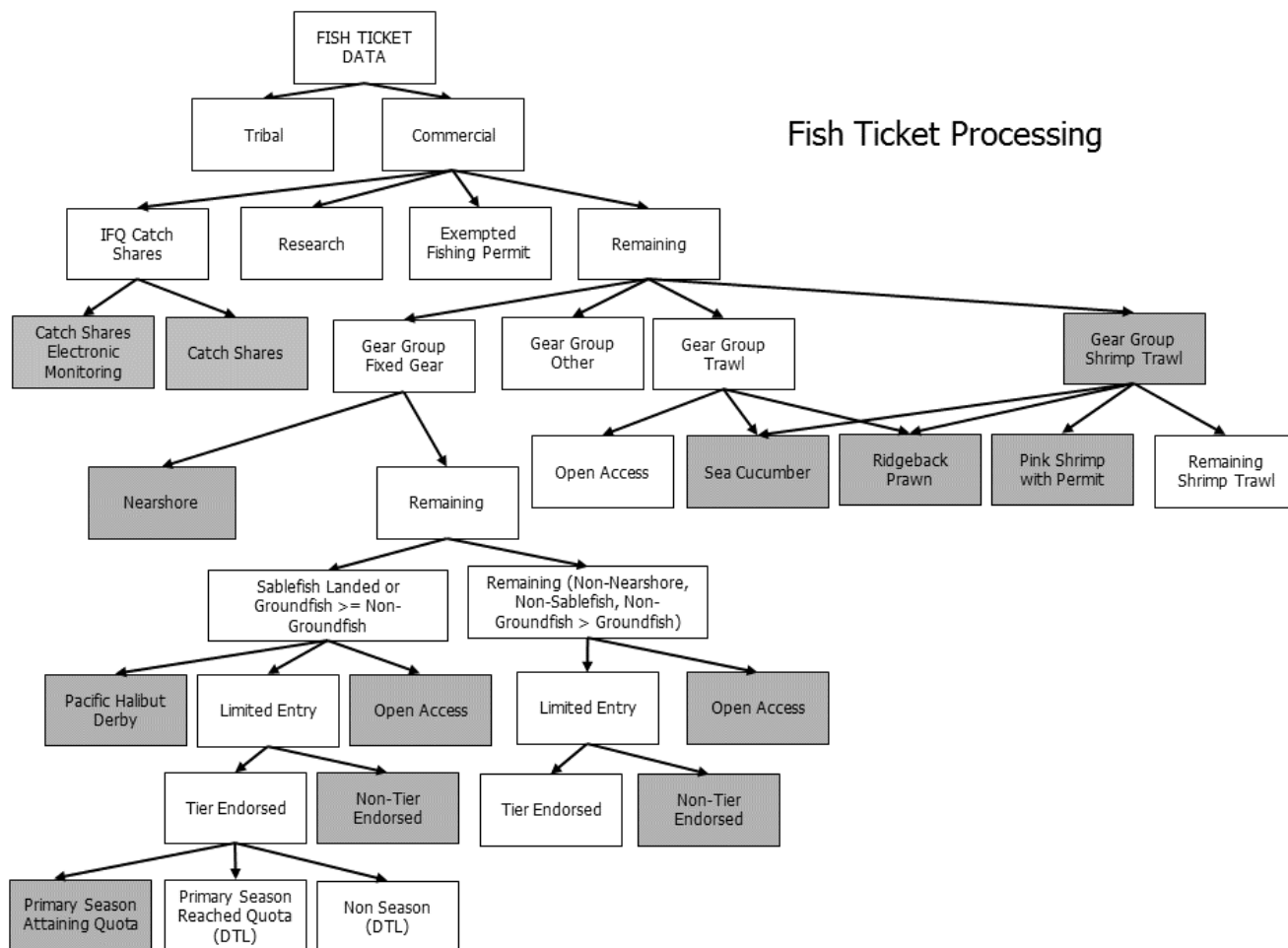


Figure 2. Mortality and ACL percentages for species rebuilding in 2018.

Estimated mortality and percentage of ACL for the two groundfish species defined by the PFMC as rebuilding in 2018.

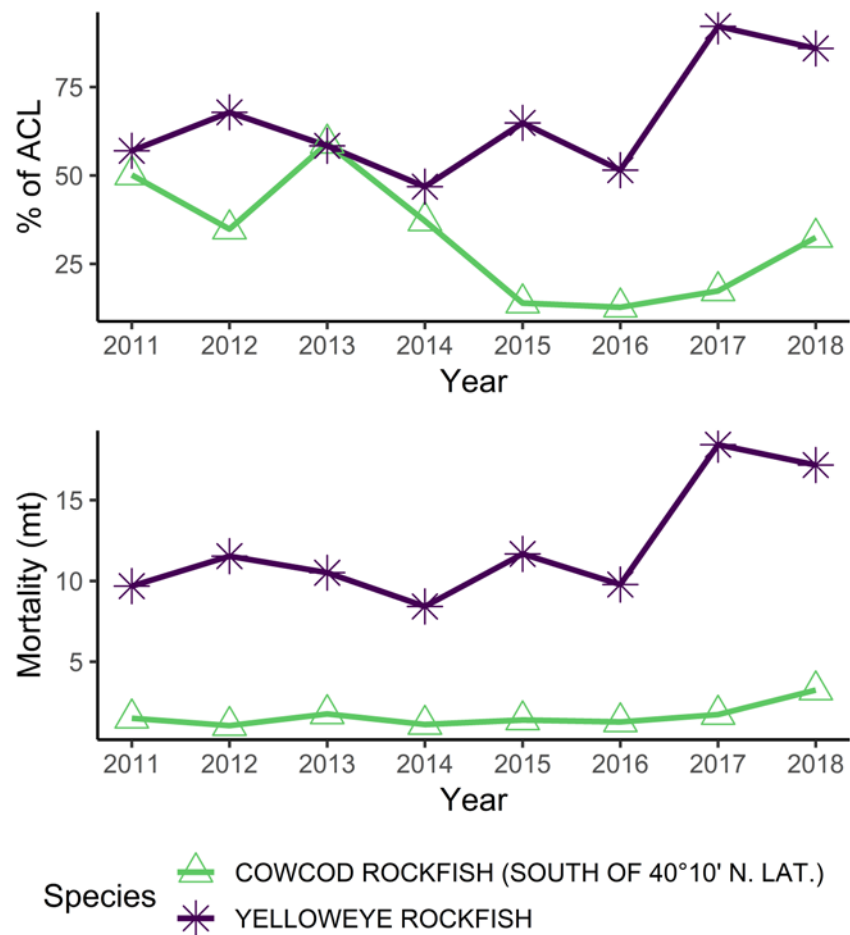


Figure 3. Mortality and ACL percentages 2011-2018 for highly targeted and highly attained species.

Estimated mortality and percentage of ACL for three of the most targeted groundfish species (Pacific hake, dover sole, and sablefish in the north,) and four other highly attained species (cabezon in Oregon, petrale sole, shortbelly rockfish, and spiny dogfish). Pacific hake mortality is shown in a separate panel to reflect the greater magnitude.

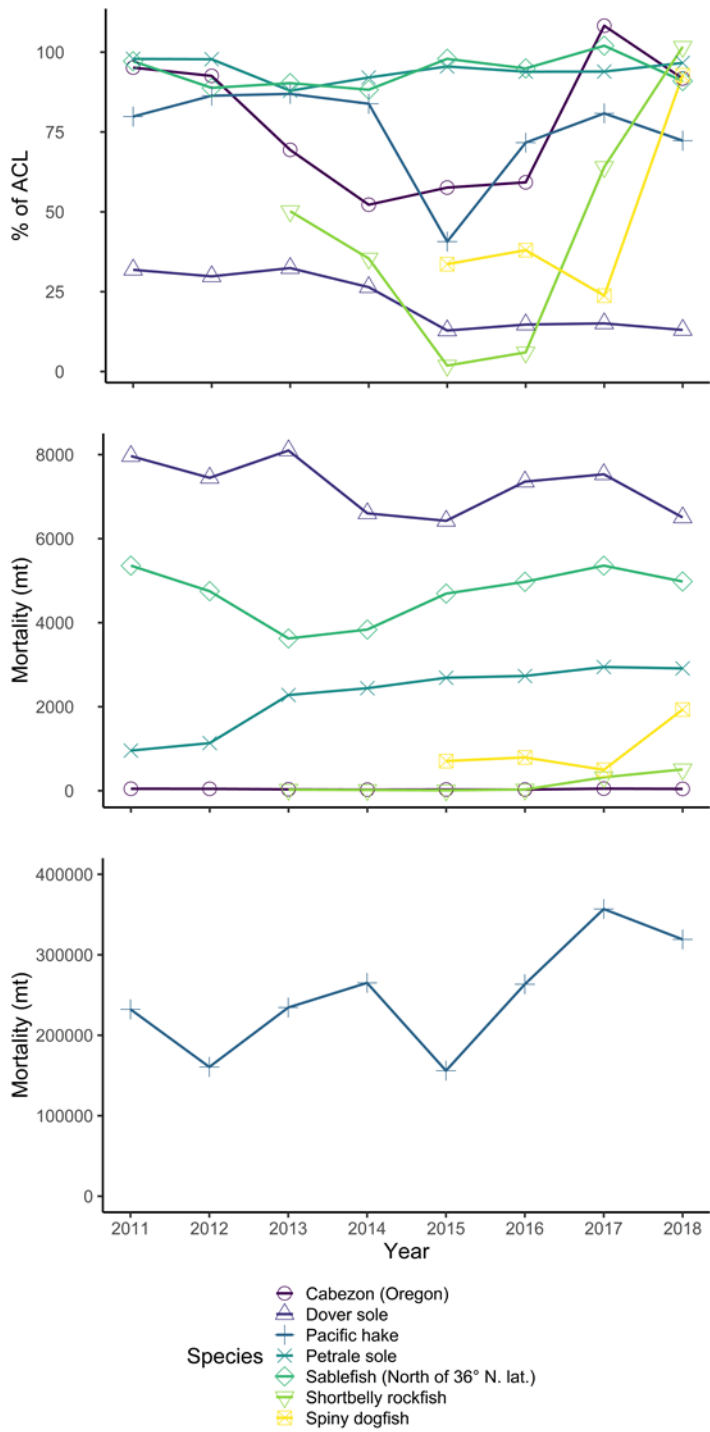
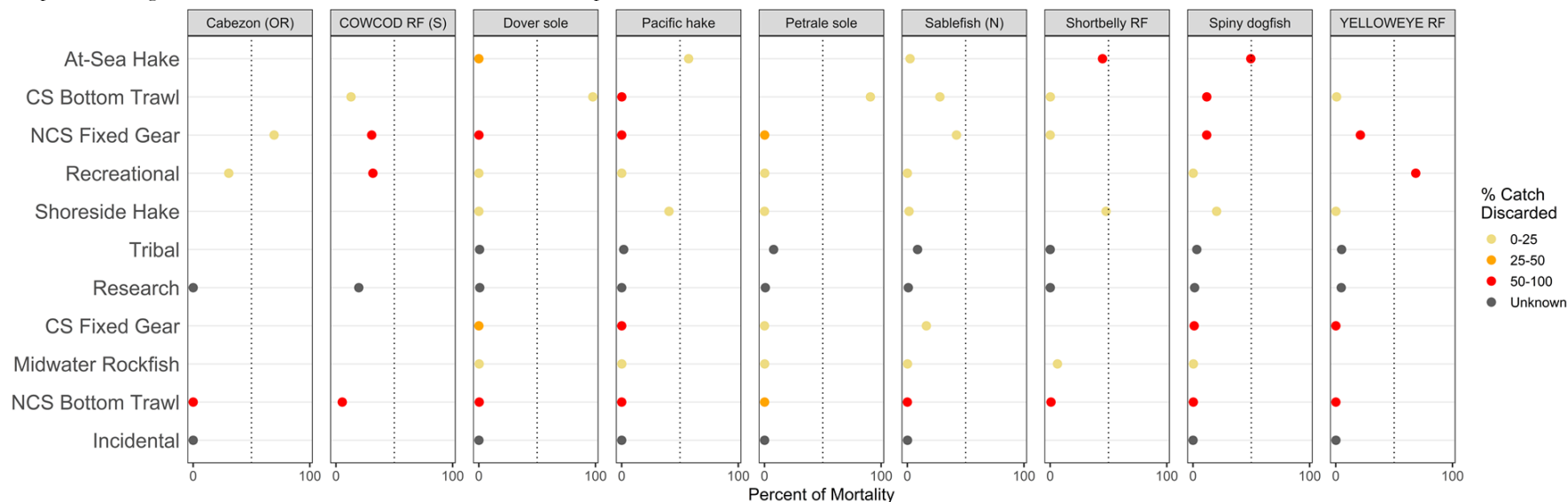


Figure 4. Mortality contributions by sector for a subset of groundfish species.

Percentage of mortality contributed by each sector to 2018 mortality for: the two rebuilding species (cowcod and yelloweye rockfish, capitalized), three of the most targeted groundfish species (Pacific hake, dover sole, and sablefish in the north), and four other highly attained species (cabezon in Oregon, petrale sole, shortbelly rockfish, and spiny dogfish). Sectors are ordered by mean percent contribution to mortality across all species displayed, with greatest contributors at the top of the panels. NCS Fixed Gear includes all non-nearshore and nearshore fixed gear; NCS Bottom Trawl includes California halibut, pink shrimp, ridgeback prawn, and sea cucumber trawl. Dotted line specifies 50% of mortality. Dots are colored to reflect percentage of catch of the given species in the given sector that was discarded; sectors with no dot represent zero contribution.



Tables

Note: In all tables, (—) was used when there is no actual numeric value (i.e., the species was not caught). Values appear as 0 when a value exists but is smaller than the decimal places shown. Grey shading indicates that values include estimates of both discard and retained catch. Rebuilding species are capitalized.

Table 1. IFQ Fishery Data Stratification.

Number of vessels, trips, and hauls from WCGOP observer data for the non-EM IFQ fishery by gear, latitudinal management area, season, and depth. A small amount of effort occurred in an EFP that used EM and an observer on all hauls to explore potential changes to discard handling; these data are included here as 100% observed. Data are combined as needed to ensure confidentiality requirements and a reasonable number of observations. Winter season is November–April, and summer season is May–October. Note that “unsampled hauls” are only those with unsampled categories of “All discarded species,” “All species,” or “Failed data.”

						No. of hauls with unsampled categories									
			Depth (fm)	No. of vessels	No. of trips	No. of sampled hauls								No. unsampled hauls	% of hauls sampled
							IFQ flatfish	IFQ rockfish	IFQ roundfish	IFQ mixed	Non-IFQ species	All discarded species	All species (incl. those typically retained)		
Trawl - Bottom	North of 40°10' N	Winter	0-125	17	46	235	--	--	--	6	7	--	--	--	100.0%
			126-250	37	265	998	--	--	--	--	18	--	1	1	99.9%
			> 250	38	257	950	--	--	--	--	30	1	--	1	99.9%
	South of 40°10' N	Summer	0-125	24	284	1996	--	--	--	--	17	5	1	7	99.7%
			126-250	26	137	524	--	--	--	--	2	1	--	1	99.8%
			> 250	25	132	467	--	--	--	--	7	2	1	3	99.4%
Trawl - Midwater Hake	North of 40°10' N	Winter	All depths	3	19	80	--	--	--	--	--	--	--	--	100.0%
		Summer	All depths	4	19	86	--	--	--	--	--	--	--	--	100.0%
Trawl - Midwater Rockfish	North of 40°10' N	Summer	0-125	5	92	137	--	--	--	--	--	--	--	--	100.0%
		Summer	126-250	5	27	43	--	--	--	--	--	--	--	--	100.0%
Hook-and-Line	North of 40°10' N	Winter	0-125	10	102	134	--	--	--	--	--	--	--	--	100.0%
			>125	3	3	11	--	--	--	--	1	--	--	--	100.0%
		Summer	0-125	9	84	213	--	--	--	--	--	--	--	--	100.0%
			>125	4	6	7	--	--	--	--	--	--	--	--	100.0%
Pot	North of 40°10' N	Annual	0-250	4	10	100	--	--	--	--	1	--	--	2	98.0%
			>250	3	6	35	--	--	--	--	--	--	--	--	100.0%
Pot	North of 40°10' N	Winter	126-250	4	17	159	--	--	--	--	--	--	--	--	100.0%
			>250	3	11	72	--	--	--	--	--	--	--	--	100.0%
		Summer	126-250	2	5	57	--	--	--	--	--	--	--	--	100.0%
			>250	3	5	21	--	--	--	--	--	--	--	--	100.0%

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

Values used to calculate the expanded weight of groundfish species from each WCGOP unsampled catch category in the observed IFQ fishery using bottom trawl gear north of lat 40°10'N. A small amount of effort occurred in an EFP that used EM and an observer on all hauls to explore potential changes to discard handling; these data are included here as 100% observed bottom trawl effort. Expansion factors for each season and depth stratum are shown in the top row. Discard ratios for each species are presented by season and depth stratum in the rest of the table. Winter season is November–April, and summer season is May–October. Only strata with unsampled discard weight are shown. Unsampled catch weight is assigned to the following categories: non-IFQ species (NIFQ), IFQ flatfish species (IFQFF), IFQ rockfish species (IFQRF), IFQ roundfish species (IFQRD), IFQ mixed species (IFQM), all discarded species (IFQ and non-IFQ), all species (IFQ and non-IFQ), and all failed data. See Table A-2 for a list of species included in each unsampled category.

		Bottom Trawl (North of 40°10' N Lat.)													
Season	IFQM	NIFQ						All Discarded Species				All Species			Failed Data
	Winter	Winter			Summer			Winter	Summer			Winter	Summer		Summer
	0-125	0-125	126-250	>250	0-125	126-250	>250	>250	0-125	126-250	>250	126-250	0-125	>250	0-125
Expansion Factor (mt)	1.2660	0.3044	1.3926	1.5752	2.4109	0.1542	0.7802	0.5443	7.2072	0.5216	0.3175	0.0454	0.0771	0.0454	2.6132
Groundfish species															
Arrowtooth flounder	0.0960	--	--	--	--	--	--	0.2236	0.1714	0.2642	0.1133	0.0695	0.0607	0.0331	0.0441
Big skate	--	0.0404	0.0000	0.0001	0.0399	0.0016	0.0002	0.0000	0.0186	0.0006	0.0001	0.0005	0.0307	0.0051	0.0048
Black rockfish (California)	--	--	--	--	--	--	--	--	--	--	--	--	0.0000	--	--
Black rockfish (Oregon)	--	--	--	--	--	--	--	--	--	--	--	0.0000	--	--	--
Black rockfish (Washington)	--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0000	--	--
Canary rockfish	0.0002	--	--	--	--	--	--	--	0.0001	--	--	0.0000	0.0418	0.0000	0.0000
Darkblotched rockfish	0.0155	--	--	--	--	--	--	0.0002	0.0019	0.0032	0.0001	0.0341	0.0011	0.0025	0.0005
Dover sole	0.0082	--	--	--	--	--	--	0.0623	0.0106	0.0005	0.0185	0.3279	0.1711	0.4892	0.0027
Ecosystem component species															
Aleutian Skate	--	--	0.0010	0.0021	0.0000	0.0009	0.0005	0.0009	0.0000	0.0003	0.0003	0.0001	0.0001	0.0001	0.0000
Black Skate	--	--	0.0006	0.0275	--	0.0010	0.0154	0.0115	--	0.0004	0.0092	0.0000	0.0000	0.0009	--
California Grenadier	--	--	0.0000	0.0002	--	0.0001	0.0002	0.0001	--	0.0000	0.0001	0.0000	--	0.0000	--
California Skate	--	0.0009	--	--	0.0002	--	0.0000	--	0.0001	--	0.0000	--	0.0000	0.0000	0.0000
Deepsea Skate	--	--	--	--	--	0.0000	--	--	--	0.0000	--	--	--	--	--
Ghostly Grenadier	--	--	--	0.0000	--	--	--	0.0000	--	--	--	--	--	--	--
Giant Grenadier	--	--	0.0010	0.0992	--	0.0031	0.1062	0.0416	--	0.0011	0.0631	0.0000	--	0.0057	--
Grenadier Unid	--	--	0.0000	0.0006	--	--	--	0.0002	--	--	--	0.0001	0.0000	0.0000	--
Pacific Flatnose	--	--	0.0000	0.0025	--	0.0001	0.0007	0.0010	--	0.0000	0.0004	0.0000	--	0.0000	--
Pacific Grenadier	--	--	0.0003	0.0330	--	0.0004	0.0461	0.0138	--	0.0001	0.0274	0.0000	--	0.0025	--
Popeye Grenadier	--	--	--	0.0000	--	--	--	0.0000	--	--	--	--	--	--	--
Sandpaper Skate	--	0.0282	0.0952	0.1099	0.0209	0.0913	0.0476	0.0461	0.0097	0.0320	0.0282	0.0036	0.0019	0.0027	0.0025
Soupin Shark	--	0.0037	--	--	0.0001	--	--	--	0.0001	--	--	--	0.0000	--	0.0000
Spotted Ratfish	--	0.1954	0.0659	0.0169	0.0895	0.0788	0.0131	0.0071	0.0416	0.0277	0.0078	0.0025	0.0083	0.0007	0.0107
English sole	0.1119	--	--	--	--	--	--	0.0010	0.0359	0.0092	0.0000	0.0053	0.0326	0.0022	0.0092
Lingcod (North of 40°10' N. lat.)	0.0491	--	--	--	--	--	--	0.0000	0.0210	0.0004	0.0000	0.0231	0.0763	0.0001	0.0054
Longnose skate	--	0.1081	0.0759	0.0710	0.1353	0.1734	0.1314	0.0298	0.0629	0.0609	0.0780	0.0453	0.0497	0.0415	0.0162
Longspine thornyhead (North of 34°27' N. lat.)	0.0000	--	--	--	--	--	--	0.0104	0.0000	0.0025	0.0182	0.0023	0.0008	0.0467	0.0000
Minor nearshore rockfish (North of 40°10' N. lat.)															
Blue/Deacon Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0000	--
Nearshore Rockfish Unid	--	--	--	--	--	--	--	--	--	--	--	--	0.0000	--	--
Quillback Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0000	--

Table 2a (continued).

		IFQ - Bottom Trawl (North of 40°10' N Lat.)														
Season	Depth (fm)	IFQM	NIFQ						All Discarded Species				All Species			Failed Data
		Winter	Winter			Summer			Winter	Summer			Winter	Summer		Summer
		0-125	0-125	126-250	>250	0-125	126-250	>250	>250	0-125	126-250	>250	126-250	0-125	>250	0-125
Expansion Factor (mt)		1.2660	0.3044	1.3926	1.5752	2.4109	0.1542	0.7802	0.5443	7.2072	0.5216	0.3175	0.0454	0.0771	0.0454	2.6132
Minor shelf rockfish (North of 40°10' N. lat.)																
	Bocaccio Rockfish	0.0000	--	--	--	--	--	--	--	0.0000	--	--	0.0002	0.0121	0.0001	0.0000
	Chilipepper Rockfish	0.1498	--	--	--	--	--	--	--	0.0106	0.0000	--	0.0000	0.0230	0.0000	0.0027
	Cowcod Rockfish	--	--	--	--	--	--	--	--	0.0000	--	--	0.0000	0.0000	--	0.0000
	Flag Rockfish	--	--	--	--	--	--	--	--	--	--	--	0.0000	--	--	--
	Greenspotted Rockfish	0.0001	--	--	--	--	--	--	--	0.0000	--	--	0.0000	0.0000	0.0000	0.0000
	Greenstriped Rockfish	0.0965	--	--	--	--	--	--	0.0000	0.0165	0.0001	0.0000	0.0000	0.0053	0.0002	0.0042
	Halfbanded Rockfish	--	--	--	--	--	--	--	--	0.0000	--	--	--	0.0000	--	0.0000
	Harlequin Rockfish	--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0000	0.0000	--
	Pygmy Rockfish	--	--	--	--	--	--	--	--	0.0000	--	--	--	0.0000	--	0.0000
	Redstripe Rockfish	0.0008	--	--	--	--	--	--	--	0.0001	--	--	0.0000	0.0000	0.0000	0.0000
	Rosethorn Rockfish	0.0004	--	--	--	--	--	--	0.0000	0.0001	0.0005	0.0001	0.0001	0.0005	0.0008	0.0000
	Shelf Rockfish Unid	--	--	--	--	--	--	--	--	--	--	--	0.0002	0.0043	0.0025	--
	Silvergray Rockfish	--	--	--	--	--	--	--	--	--	--	--	0.0001	0.0005	0.0000	--
	Starry Rockfish	--	--	--	--	--	--	--	--	--	--	0.0003	--	--	0.0000	--
	Stripetail Rockfish	0.0187	--	--	--	--	--	--	0.0000	0.0475	0.0002	0.0000	0.0001	0.0094	0.0000	0.0122
	Tiger Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.0000	--	--
Minor slope rockfish (North of 40°10' N. lat.)																
	Aurora Rockfish	0.0018	--	--	--	--	--	--	0.0016	0.0000	0.0071	0.0061	0.0021	0.0002	0.0017	0.0000
	Bank Rockfish	--	--	--	--	--	--	--	--	--	--	--	0.0001	0.0000	0.0000	--
	Blackgill Rockfish	--	--	--	--	--	--	--	--	--	0.0000	--	0.0004	0.0000	0.0001	--
	Redbanded Rockfish	0.0020	--	--	--	--	--	--	0.0000	0.0001	0.0004	0.0000	0.0010	0.0003	0.0003	0.0000
	Rougheye/Blackspotted Rockfish	--	--	--	--	--	--	--	--	--	--	--	0.0012	0.0004	0.0011	--
	Sharpchin Rockfish	0.0009	--	--	--	--	--	--	0.0000	0.0001	0.0000	0.0000	0.0001	0.0001	0.0000	0.0000
	Shortraker Rockfish	--	--	--	--	--	--	--	--	--	--	--	0.0005	0.0002	0.0009	--
	Shortraker/Rougheye/Blackspotted Rockfish	--	--	--	--	--	--	--	--	--	--	--	0.0000	--	0.0002	--
	Slope Rockfish Unid	--	--	--	--	--	--	--	--	--	--	--	0.0015	0.0004	0.0006	--
	Splitnose Rockfish	0.0275	--	--	--	--	--	--	0.0007	0.0012	0.0088	0.0017	0.0041	0.0003	0.0004	0.0003
	Yellowmouth Rockfish	--	--	--	--	--	--	--	--	--	0.0000	--	0.0000	0.0000	0.0000	--
Mixed thornyheads																
	Shortspine/Longspine Thornyhead	--	--	--	--	--	--	--	0.0000	--	0.0005	--	0.0014	0.0005	0.0044	--
Other flatfish																
	Butter Sole	--	--	--	--	--	--	--	--	0.0000	--	--	0.0000	0.0000	--	0.0000
	Curlfin Sole	0.0004	--	--	--	--	--	--	--	0.0001	--	--	0.0000	0.0001	0.0000	0.0000
	Flatfish Unid	--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0003	--	--
	Fiathead Sole	0.0316	--	--	--	--	--	--	0.0004	0.0092	0.0001	0.0000	0.0000	0.0061	0.0012	0.0024
	Pacific Sanddab	0.1530	--	--	--	--	--	--	0.0000	0.0430	0.0001	0.0000	0.0000	0.0164	0.0006	0.0111
	Rex Sole	0.1080	--	--	--	--	--	--	0.0026	0.0410	0.0048	0.0050	0.0248	0.0407	0.0259	0.0105
	Rock Sole	--	--	--	--	--	--	--	--	0.0004	--	--	0.0000	0.0003	0.0000	0.0001
	Sand Sole	0.0014	--	--	--	--	--	--	--	0.0000	--	--	0.0000	0.0000	0.0000	0.0000
	Sanddab Unid	--	--	--	--	--	--	--	--	0.0000	--	--	0.0000	0.0002	0.0000	0.0000

Table 2a (continued).

		IFQ - Bottom Trawl (North of 40°10' N Lat.)																
Season	Depth (fm)	IFQM	NIFQ						All Discarded Species						All Species			Failed Data
		Winter	Winter			Summer			Winter	Summer			Winter	Summer		Summer		
		0-125	0-125	126-250	>250	0-125	126-250	>250	>250	0-125	126-250	>250	126-250	0-125	>250	0-125		
Expansion Factor (mt)		1.2660	0.3044	1.3926	1.5752	2.4109	0.1542	0.7802	0.5443	7.2072	0.5216	0.3175	0.0454	0.0771	0.0454	2.6132		
Other groundfish																		
Kelp Greenling (Oregon)		--	0.0000	--	--	0.0000	--	--	--	0.0000	--	--	--	0.0000	--	0.0000		
Kelp Greenling (Washington)		--	0.0000	--	--	0.0000	--	--	--	0.0000	--	--	--	0.0000	--	0.0000		
Pacific cod			--	--	--	--	--	--		0.0001	0.0000	--	0.0000	0.0015	0.0001	0.0000		
Pacific hake		0.0628	--	--	--	--	--	--	0.2514	0.0710	0.2883	0.2103	0.0187	0.0141	0.0193	0.0183		
Pacific ocean perch (North of 40°10' N. lat.)		--	--	--	--	--	--	--	0.0003	0.0001	0.0009	0.0000	0.0068	0.0002	0.0007	0.0000		
Petrale sole		0.0115	--	--	--	--	--	--	0.0002	0.0120	0.0001	0.0000	0.3055	0.2420	0.0016	0.0031		
Sablefish (North of 36° N. lat.)		0.0029	--	--	--	--	--	--	0.0059	0.0194	0.0031	0.0077	0.0556	0.0304	0.1759	0.0050		
Shortbelly rockfish		--	0.0012	0.0000	0.0000	0.0001	0.0000	--	0.0000	0.0001	0.0000	--	0.0000	0.0000	0.0000	0.0000		
Shortspine thornyhead (North of 34°27' N. lat.)		0.0003	--	--	--	--	--	--	0.0042	0.0003	0.0138	0.0107	0.0252	0.0073	0.0849	0.0001		
Spiny dogfish		--	0.2636	0.5697	0.1068	0.2476	0.2046	0.0678	0.0448	0.1152	0.0718	0.0403	0.0211	0.0227	0.0037	0.0296		
Starry flounder		0.0003	--	--	--	--	--	--	--	0.0000	--	--	0.0000	0.0002	0.0000	0.0000		
Widow rockfish		0.0000	--	--	--	--	--	--	--	0.0000	--	--	0.0010	0.0030	0.0000	0.0000		
YELLOW EYE ROCKFISH		0.0004	--	--	--	--	--	--	--	0.0000	--	--	0.0000	0.0000	0.0000	0.0000		
Yellowtail rockfish (North of 40°10' N. lat.)		0.0001	--	--	--	--	--	--	--	0.0000	0.0000	--	0.0001	0.0135	0.0002	0.0000		
Non-groundfish species																		
California halibut		--	--	--	--	0.0000	--	--	--	0.0000	--	--	--	0.0000	--	0.0000		
Dungeness crab		--	0.1151	0.0017	0.0002	0.2195	0.0069	0.0003	0.0001	0.1021	0.0024	0.0002	0.0001	0.0201	0.0000	0.0263		
Non-FMP flatfish																		
Deepsea Sole		--	--	0.0005	0.0093	--	0.0012	0.0117	0.0039	--	0.0004	0.0070	0.0000	--	0.0006	--		
Longfin Sanddab		--	--	--	--	0.0000	--	--	--	0.0000	--	--	--	0.0000	--	0.0000		
Slender Sole		--	0.1298	0.0020	0.0003	0.1100	0.0024	0.0003	0.0001	0.0511	0.0008	0.0002	0.0001	0.0101	0.0000	0.0132		
Other non-groundfish																		
Sculpin Unid		--	0.0042	0.0001	0.0000	0.0020	0.0000	0.0000	0.0000	0.0010	0.0000	0.0000	0.0000	0.0002	0.0000	0.0002		
Skate Unid		--	--	--	0.0005	0.0019	0.0001	0.0008	0.0002	0.0009	0.0000	0.0005	0.0028	0.0209	0.0073	0.0002		
Squid Unid		--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0000	0.0000	--		
Starry Skate		--	--	0.0002	0.0000	0.0000	0.0002	--	0.0000	0.0000	0.0001	--	0.0000	0.0000	--	0.0000		
Shared ecosystem component species																		
Barracudina Unid		--	--	--	--	--	--	0.0000	--	--	--	0.0000	--	--	0.0000	--		
Lanternfish Unid		--	--	--	0.0000	--	--	0.0000	0.0000	--	--	0.0000	--	--	0.0000	--		
Non-Eulachon Smelt Unid		--	--	--	--	0.0000	--	--	--	0.0000	--	--	--	0.0000	--	0.0000		
Non-Humboldt Squid Unid		--	0.0000	0.0033	0.0038	0.0016	0.0075	0.0128	0.0016	0.0007	0.0026	0.0076	0.0001	0.0001	0.0007	0.0002		
Pacific Saurv		--	--	--	--	0.0000	0.0000	--	--	0.0000	0.0000	--	--	0.0000	--	0.0000		

Table 2b. IFQ Discard Ratios, Bottom Trawl, South of 40°10'N. Lat.

Values used to calculate the expanded weight of groundfish species from each WCGOP unsampled catch category in the observed IFQ fishery using bottom trawl gear south of lat 40°10'N. A small amount of effort occurred in an EFP that used EM and an observer on all hauls to explore potential changes to discard handling; these data are included here as 100% observed bottom trawl effort. Expansion factors for each season and depth stratum are shown in the top row. Discard ratios for each species are presented by season and depth stratum in the rest of the table. Winter season is November–April, and summer season is May–October. Only strata with unsampled discard weight are shown. Unsampled catch weight is assigned to the following categories: non-IFQ species (NIFQ), IFQ flatfish species (IFQFF), IFQ rockfish species (IFQRF), IFQ roundfish species (IFQRD), IFQ mixed species (IFQM), all discarded species (IFQ and non-IFQ), all species (IFQ and non-IFQ), and all failed data. See Table A-2 for a list of species included in each unsampled category.

	Midwater Rockfish (North of 40°10' N)		Hook-and-Line (North of 40°10' N)	
	NIFQ		NIFQ	
	Winter		Annual	
	Depth (fm)		0-250	
Expansion Factor (mt)	2.7477		0.1396	
Groundfish species				
Arrowtooth flounder	0.0000	0.0000	0.0079	
Big skate	0.0000	0.0148	0.0052	
Canary rockfish	0.0000	0.0000	0.0000	
Darkblotched rockfish	0.0000	0.0000	0.0000	
Dover sole	0.0000	0.0000	0.0002	
Ecosystem component species				
Aleutian Skate	0.0000	0.0002	0.0001	
Giant Grenadier	0.3800	0.0001	0.0000	
Sandpaper Skate	0.0228	0.0062	0.0022	
Spotted Ratfish	0.0046	0.0009	0.0003	
Lingcod (North of 40°10' N. lat.)	0.0000	0.0000	0.0002	
Longnose skate	0.0184	0.0474	0.0168	
Minor shelf rockfish (North of 40°10' N. lat.)				
Greenstriped Rockfish	0.0000	0.0000	0.0000	
Rosethorn Rockfish	0.0000	0.0000	0.0000	
Minor slope rockfish (North of 40°10' N. lat.)				
Redbanded Rockfish	0.0000	0.0000	0.0002	
Rougheye/Blackspotted Rockfish	0.0000	0.0000	0.0004	
Mixed thornyheads				
Shortspine/Longspine Thornyhead	0.0000	0.0000	0.0000	
Petrale sole	0.0000	0.0000	0.0001	
Sablefish (North of 36° N. lat.)	0.0000	0.0000	0.0362	
Shortspine thornyhead (North of 34°27' N. lat.)	0.0000	0.0000	0.0007	
Spiny dogfish	0.0876	0.8368	0.2959	
Yellowtail rockfish (North of 40°10' N. lat.)	0.0000	0.0000	0.0001	
Non-groundfish species				
Dungeness crab	0.0000	0.0000	0.0000	
Non-FMP flatfish				
Deepsea Sole	0.0042	0.0000	0.0000	
Slender Sole	0.0020	0.0000	0.0000	
Other non-groundfish				
Skate Unid	0.0000	0.0058	0.0020	

Table 2c. Non-IFQ species in the Catch Shares EM Fishery.

Observed at-sea and shoreside discard ratios and standard errors thereof, at-sea and shoreside discard coefficients of variations, estimated discard (mt), landings (mt), and fishing mortality estimates (mt) of non-IFQ species in the EM catch share fishery using bottom trawl and pot gear. Ratios are computed as the observed at-sea or estimated shoreside discard weight divided by the observed weight of retained groundfish (adjusted to fish tickets) in the EM catch share fishery. Discard ratios were multiplied by landings of groundfish in the EM fleet to generate estimated discard. Estimates for IFQ species come directly from the EM systems and are in Table 2d.

Non-IFQ species in EM Catch Shares	Trawl - North										Trawl - South										Pot - Coastwide									
	Observed					Expansion factor:					Observed					Expansion factor:					Observed					Expansion factor:				
	Vessels		Trips		Hauls	Fleet landings of groundfish (mt)					Vessels		Trips		Hauls	Fleet landings of groundfish (mt)					Vessels		Trips		Hauls	Fleet landings of groundfish (mt)				
	5		28		166	1554					4		25		142	732					5		24		318	415				
	At-Sea				Estimated Shoreside						At-Sea				Estimated Shoreside						At-Sea				Estimated Shoreside					
Discard Ratio	SE	CV	Discard	Discard Ratio	SE	CV	Discard	Landed	Total Estimate	Discard Ratio	SE	CV	Discard	Discard Ratio	SE	CV	Discard	Landed	Total Estimate	Discard Ratio	SE	CV	Discard	Discard Ratio	SE	CV	Discard	Landed	Total Estimate	
Groundfish species																														
Big skate	0.0001	0.0001	0.5265	0.22	--	--	--	--	2.26	2.37	0.0032	0.0006	0.1897	2.31	--	--	--	--	1.00	2.15	--	--	--	--	--	--	--	--	0.01	0.01
50% discard mortality (Trawl)‡				0.11																										
Ecosystem component species																														
Aleutian Skate	0.0000	0.0000	0.2853	0.05	--	--	--	--	0.00	0.06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Black Skate	0.0019	0.0003	0.1420	2.99	--	--	--	--	0.14	3.13	0.0011	0.0004	0.4165	0.78	--	--	--	--	--	0.78	--	--	--	--	--	--	--	--	--	--
California Grenadier	0.0000	0.0000	0.2219	0.04	--	--	--	--	0.04	0.0000	0.0000	0.0000	0.2514	0.00	--	--	--	--	--	0.00	--	--	--	--	--	--	--	--	--	--
California Skate	0.0000	0.0000	0.0518	0.01	--	--	--	--	0.01	0.0022	0.0007	0.3023	1.61	--	--	--	--	--	0.01	1.62	--	--	--	--	--	--	--	--	--	--
Deepsea Skate	0.0002	0.0001	0.6474	0.36	--	--	--	--	0.36	0.0000	0.0000	0.1033	0.03	--	--	--	--	--	0.03	--	--	--	--	--	--	--	--	--	--	--
Giant Grenadier	0.0062	0.0013	0.2035	9.64	--	--	--	--	9.64	0.0119	0.0033	0.2741	8.72	--	--	--	--	--	8.72	0.0017	0.0003	0.2013	0.71	--	--	--	--	--	--	0.71
Grenadier Unid	0.0001	0.0000	0.0518	0.11	--	--	--	--	1.55	1.66	--	--	--	--	--	--	--	--	0.32	0.32	0.0002	0.0001	0.4499	0.10	--	--	--	--	0.02	0.12
Pacific Flatnose	0.0000	0.0000	0.3752	0.01	--	--	--	--	0.01	0.0000	0.0000	0.3948	0.01	--	--	--	--	--	0.01	--	--	--	--	--	--	--	--	--	--	--
Pacific Grenadier	0.0010	0.0002	0.2387	1.55	--	--	--	--	1.55	0.0035	0.0029	0.8316	2.54	--	--	--	--	--	2.54	0.0013	0.0002	0.1908	0.53	--	--	--	--	--	--	0.53
Popeye Grenadier	--	--	--	--	--	--	--	--	--	0.0000	0.0000	0.1033	0.00	--	--	--	--	--	0.00	--	--	--	--	--	--	--	--	--	--	--
Sandpaper Skate	0.0016	0.0002	0.1216	2.45	--	--	--	--	0.01	2.46	0.0009	0.0002	0.2732	0.64	--	--	--	--	0.64	0.0000	0.0000	0.0996	0.00	--	--	--	--	0.00	0.00	
Smooth Grenadier	--	--	--	--	--	--	--	--	--	0.0000	0.0000	0.1033	0.00	--	--	--	--	--	0.00	--	--	--	--	--	--	--	--	--	--	--
Soupin Shark	--	--	--	--	--	--	--	--	--	0.0029	0.0015	0.5279	2.12	--	--	--	--	--	0.12	2.23	--	--	--	--	--	--	--	--	--	--
Spotted Ratfish	0.0026	0.0009	0.3598	4.04	--	--	--	--	4.04	0.0115	0.0027	0.2356	8.42	--	--	--	--	--	0.07	8.49	--	--	--	--	--	--	--	--	--	--
Longnose skate	0.0083	0.0012	0.1454	12.83	--	--	--	--	54.67	61.08	0.0117	0.0020	0.1697	8.59	--	--	--	--	10.09	14.39	--	--	--	--	--	--	--	--	--	--
50% discard mortality (Trawl)‡				6.42										4.30																
50% discard mortality (Fixed Gear)‡																														
Minor nearshore rockfish (South of 40°10' N. lat.)																														
Copper Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--
Shortbelly rockfish	--	--	--	--	--	--	--	--	--	--	0.0000	0.0000	0.1033	0.00	--	--	--	--	0.38	0.38	--	--	--	--	--	--	--	--	--	--
Spiny dogfish	0.0022	0.0008	0.3658	3.41	--	--	--	--	0.00	3.41	0.0139	0.0043	0.3110	10.17	--	--	--	--	0.09	10.26	0.0000	0.0000	0.0398	0.01	--	--	--	--	--	0.01
Non-groundfish species																														
California halibut	--	--	--	--	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dungeness crab	0.0007	0.0003	0.3609	1.16	--	--	--	--	--	1.16	0.0022	0.0005	0.2266	1.61	--	--	--	--	--	1.61	0.0053	0.0025	0.4701	2.20	--	--	--	--	--	2.20
Non-FMP flatfish																														
Deepsea Sole	0.0004	0.0001	0.3818	0.59	--	--	--	--	0.00	0.59	0.0000	0.0000	0.4979	0.01	--	--	--	--	0.01	0.0000	0.0000	0.3373	0.00	--	--	--	--	--	--	0.00
Slender Sole	0.0005	0.0004	0.7603	0.72	0.0000	0.0000	0.0518	0.04	0.05	0.81	0.0000	0.0000	0.3495	0.04	--	--	--	--	0.08	0.12	--	--	--	--	--	--	--	--	--	--
Other non-groundfish																														
Sculpin Unid	--	--	--	--	--	--	--	--	--	--	0.0000	0.0000	0.1033	0.00	--	--	--	--	--	0.00	--	--	--	--	--	--	--	--	--	--
Skate Unid	0.0000	0.0000	0.0518	0.04	--	--	--	--	0.00	0.05	--	--	--	--	--	--	--	--	0.67	0.67	--	--	--	--	--	--	--	--	0.00	0.00
Starry Skate	--	--	--	--	--	--	--	--	--	--	0.0000	0.0000	0.3686	0.00	--	--	--	--	--	0.00	--	--	--	--	--	--	--	--	--	--
Shared ecosystem component species																														
Barracudina Unid	--	--	--	--	--	--	--	--	--	--	0.0000	0.0000	0.1033	0.00	--	--	--	--	--	0.00	--	--	--	--	--	--	--	--	--	--
Deepsea Smelt Unid	0.0000	0.0000	0.2538	0.00	--	--	--	--	--	0.00	0.0000	0.0000	0.3694	0.00	--	--	--	--	--	0.00	--	--	--	--	--	--	--	--	--	--
Lanternfish Unid	0.0000	0.0000	0.3662	0.00	--	--	--	--	--	0.00	0.0000	0.0000	0.1326	0.00	--	--	--	--	--	0.00	--	--	--	--	--	--	--	--	--	--
Non-Humboldt Squid Unid	0.0002	0.0000	0.1941	0.24	--	--	--	--	--	0.24	0.0008	0.0004	0.4495	0.59	--	--	--	--	--	0.59	--	--	--	--	--	--	--	--	--	--
Pacific Saury	0.0000	0.0000	0.0518	0.00	--	--	--	--	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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

Table 2d. IFQ species in EM Catch Shares Fishery.

Electronically monitored estimated discard (mt), landings (mt), and fishing mortality estimates (mt) of IFQ species in the EM catch shares bottom trawl and pot fisheries. Discard amounts are derived from the EM program and include FOS-estimated expansions of the small amount of unsampled at-sea discard.

IFQ species in EM Catch Shares	Trawl - North			Trawl - South			Pot - Coast		
	EM vessels	EM tows	Fleet landings of groundfish (mt)	EM vessels	EM tows	Fleet landings of groundfish (mt)	EM vessels	EM tows	Fleet landings of groundfish (mt)
	6	510	1,554	4	550	732	7	1011	415
	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate
Weight (mt)									
Groundfish species									
Arrowtooth flounder	43.78	23.90	67.68	6.25	0.22	6.47	0.87	0.05	0.91
Bocaccio rockfish (South of 40°10' N. lat.)	--	--	--	1.07	85.00	86.07	--	--	--
Canary rockfish	0.00	1.67	1.67	0.01	1.70	1.71	0.00	--	0.00
Chilipepper rockfish (South of 40°10' N. lat.)	--	--	--	0.84	161.32	162.16	--	--	--
COWCOD ROCKFISH (South of 40°10' N. lat.)	--	--	--	0.00	0.33	0.33	--	--	--
Darkblotched rockfish	0.01	11.47	11.48	0.00	9.47	9.47	--	0.01	0.01
Dover sole	0.41	973.30	973.70	0.42	101.46	101.88	0.11	0.30	0.41
English sole	1.43	4.85	6.27	14.30	7.91	22.21	--	--	--
Lingcod (North of 40°10' N. lat.)	0.62	3.39	3.70	--	--	--	0.15	1.82	1.96
50% discard mortality (Trawl)‡	0.31								
Lingcod (South of 40°10' N. lat.)	--	--	--	3.53	32.39	34.15	--	0.02	0.02
50% discard mortality (Trawl)‡				1.76					
Longspine thornyhead (North of 34°27' N. lat.)	0.02	84.32	84.34	0.04	38.49	38.53	--	0.02	0.02
Minor shelf rockfish (North of 40°10' N. lat.)									
Bocaccio Rockfish	0.00	0.26	0.26	--	--	--	--	--	--
Chilipepper Rockfish	0.00	2.43	2.43	--	--	--	--	--	--
Cowcod Rockfish	--	--	--	--	--	--	--	--	--
Greenspotted Rockfish	0.00	0.01	0.01	--	--	--	--	--	--
Greenstriped Rockfish	0.00	0.09	0.09	--	--	--	--	--	--
Redstripe Rockfish	--	0.00	0.00	--	--	--	--	--	--
Rosethorn Rockfish	0.00	0.00	0.00	--	--	--	--	0.01	0.01
Shelf Rockfish Unid	0.00	0.35	0.35	--	--	--	--	--	--
Silvergray Rockfish	0.00	0.01	0.01	--	--	--	--	--	--
Stripetail Rockfish	0.00	0.05	0.05	--	--	--	--	--	--
Greenblotched Rockfish	--	--	--	0.00	0.03	0.03	--	--	--
Greenspotted Rockfish	--	--	--	0.00	0.07	0.08	--	--	--
Greenstriped Rockfish	--	--	--	0.02	0.97	0.99	--	--	--
Mexican Rockfish	--	--	--	0.00	0.01	0.01	--	--	--
Rosethorn Rockfish	--	--	--	--	0.00	0.00	--	--	--

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

Table 2d (continued).

IFQ species in EM Catch Shares	Trawl - North			Trawl - South			Pot - Coast		
	EM vessels	Fleet landings of EM tows groundfish (mt)		EM vessels	Fleet landings of EM tows groundfish (mt)		EM vessels	Fleet landings of EM tows groundfish (mt)	
	6	510	1,554	4	550	732	7	1011	415
	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate
Weight (mt)									
Rosy Rockfish	--	--	--	0.00	0.00	0.00	--	--	--
Shelf Rockfish Unid	--	--	--	0.00	0.28	0.28	--	--	--
Stripetail Rockfish	--	--	--	0.01	0.78	0.79	--	--	--
Vermilion Rockfish	--	--	--	0.02	0.57	0.59	--	--	--
Yellowtail Rockfish	--	--	--	0.00	0.00	0.00	--	--	--
Minor slope rockfish (North of 40°10' N. lat.)									
Aurora Rockfish	0.00	2.30	2.30	--	--	--	--	0.02	0.02
Bank Rockfish	0.00	0.05	0.05	--	--	--	--	--	--
Blackgill Rockfish	0.00	0.27	0.27	--	--	--	--	0.01	0.01
Redbanded Rockfish	0.00	0.49	0.49	--	--	--	0.00	0.18	0.18
Rougheye/Blackspotted Rockfish	0.00	0.16	0.16	--	--	--	0.00	0.19	0.19
Sharpchin Rockfish	0.00	0.00	0.00	--	--	--	--	--	--
Shortraker Rockfish	0.00	0.13	0.13	--	--	--	--	--	--
Shortraker/Rougheye/Blackspotted Rockfish	--	--	--	--	--	--	0.00	--	0.00
Slope Rockfish Unid	0.00	0.05	0.05	--	--	--	0.02	--	0.02
Splitnose Rockfish	0.00	0.79	0.79	--	--	--	--	--	--
Yellowmouth Rockfish	0.00	0.01	0.01	--	--	--	--	--	--
Aurora Rockfish	--	--	--	0.00	0.41	0.41	0.00	0.06	0.06
Bank Rockfish	--	--	--	0.04	3.76	3.80	--	--	--
Blackgill Rockfish	--	--	--	0.01	22.64	22.65	0.14	3.61	3.75
Redbanded Rockfish	--	--	--	0.00	0.01	0.01	--	--	--
Rougheye/Blackspotted Rockfish	--	--	--	0.00	0.01	0.01	--	--	--
Shortraker Rockfish	--	--	--	0.00	0.01	0.01	--	--	--
Slope Rockfish Unid	--	--	--	0.03	0.02	0.05	--	--	--
Mixed thornyheads									
Shortspine/Longspine Thornyhead	0.02	--	0.02	0.00	--	0.00	0.01	--	0.01
Other flatfish									
Curlfin Sole	--	0.00	0.00	0.01	0.09	0.10	--	--	--
Flatfish Unid	0.41	--	0.41	0.32	0.35	0.68	--	--	--
Pacific Sanddab	0.39	0.57	0.96	16.98	42.70	59.68	--	--	--
Rex Sole	0.02	21.17	21.18	0.07	6.30	6.36	--	0.00	0.00
Rock Sole	--	--	--	0.01	0.30	0.31	--	--	--

Table 2d (continued).

IFQ species in EM Catch Shares	Trawl - North			Trawl - South			Pot - Coast		
	EM vessels	EM tows	Fleet landings of groundfish (mt)	EM vessels	EM tows	Fleet landings of groundfish (mt)	EM vessels	EM tows	Fleet landings of groundfish (mt)
	6	510	1,554	4	550	732	7	1011	415
	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate
Weight (mt)									
Sand Sole	--	--	--	--	0.01	0.01	--	--	--
Sanddab Unid	--	0.33	0.33	0.07	0.52	0.59	--	--	--
Other rockfish									
Rockfish Unid	0.01	--	0.01	0.45	--	0.45	--	--	--
Pacific cod	--	--	--	0.00	--	0.00	--	--	--
Pacific hake	9.80	0.04	9.83	16.51	0.63	17.14	0.00	--	0.00
Pacific ocean perch (North of 40°10' N. lat.)	0.00	0.36	0.36	--	--	--	--	0.00	0.00
Petrale sole	0.07	127.94	128.01	1.32	141.94	143.25	--	0.00	0.00
Sablefish (North of 36° N. lat.)	0.08	150.09	150.13	0.05	40.95	40.98	4.72	364.46	365.40
50% discard mortality (Trawl)‡	0.04			0.03					
20% discard mortality (Fixed Gear)‡							0.94		
Sablefish (South of 36° N. lat.)	--	--	--	0.00	0.28	0.28	0.85	43.73	43.90
50% discard mortality (Trawl)‡				0.00					
20% discard mortality (Fixed Gear)‡							0.17		
Shortspine thornyhead (North of 34°27' N. lat.)	0.03	83.52	83.55	0.01	12.88	12.89	0.06	0.27	0.33
Splitnose rockfish (South of 40°10' N. lat.)	--	--	--	0.03	5.15	5.18	--	--	--
Starry flounder	--	0.01	0.01	--	--	--	--	--	--
Widow rockfish	0.00	0.73	0.73	0.00	0.16	0.17	--	--	--
YELLOWEYE ROCKFISH	--	--	--	0.00	0.00	0.00	0.00	0.00	0.00
Yellowtail rockfish (North of 40°10' N. lat.)	0.00	0.09	0.09	--	--	--	--	--	--

Table 2e. Discard in the EM Midwater Trawl Fishery.

Electronically monitored estimated discard (mt), landings (mt), and fishing mortality estimates (mt) of groundfish species in the EM catch share midwater trawl fisheries. Discard amounts are derived from the EM program and include FOS-estimated expansions of the small amount of unsampled at-sea discard.

EM Midwater	Midwater Rockfish Trawl			Midwater Hake Trawl		
	EM vessels	EM tows	Fleet landings of groundfish (mt)	EM vessels	EM tows	Fleet landings of hake (mt)
	12	161	5,076	23	1913	119,403
	Discard	Landed	Estimate	Discard	Landed	Estimate
Weight (mt)						
Groundfish species						
Arrowtooth flounder	0.00	0.07	0.07	0.00	6.61	6.62
Big skate	0.00	0.12	0.12	0.00	1.71	1.71
Black rockfish (Oregon)	--	--	--	0.00	0.00	0.00
Canary rockfish	0.03	30.25	30.28	0.19	185.96	186.15
Darkblotched rockfish	0.00	0.16	0.16	0.14	68.78	68.92
Dover sole	0.00	8.15	8.15	0.00	0.01	0.01
Ecosystem component species	0.00	0.02	0.02	0.00	0.76	0.76
Ecosystem component species	--	--	--	0.00	0.01	0.01
English sole	0.00	0.02	0.02	0.00	0.02	0.02
Groundfish unid	--	0.00	0.00	0.00	0.16	0.16
Lingcod (North of 40°10' N. lat.)	0.00	2.06	2.06	0.01	12.67	12.68
Longnose skate	--	0.18	0.18	0.00	0.41	0.41
Longspine thornyhead (North of 34°27' N. lat.)	--	0.68	0.68	--	--	--
Minor shelf rockfish (North of 40°10' N. lat.)						
Bocaccio Rockfish	0.00	8.04	8.04	0.01	6.60	6.61
Chilipepper Rockfish	0.00	3.21	3.21	0.02	8.36	8.38
Greenspotted Rockfish	--	0.02	0.02	--	--	--
Greenstriped Rockfish	0.00	0.18	0.18	0.00	0.03	0.03
Harlequin Rockfish	0.00	0.00	0.00	0.00	0.01	0.01
Pygmy Rockfish	0.00	0.00	0.00	0.00	0.00	0.00
Redstripe Rockfish	0.00	3.75	3.75	0.01	11.03	11.04
Shelf Rockfish Unid	0.01	0.01	0.02	0.00	0.33	0.33
Silvergray Rockfish	0.00	0.62	0.62	0.00	2.60	2.61
Stripetail Rockfish	0.00	0.04	0.04	0.00	0.01	0.01

Table 2e (continued).

EM Midwater	Midwater Rockfish Trawl			Midwater Hake Trawl		
	EM vessels	EM tows	Fleet landings of groundfish (mt)	EM vessels	EM tows	Fleet landings of hake (mt)
	12	161	5,076	23	1913	119,403
	Discard	Landed	Estimate	Discard	Landed	Estimate
Weight (mt)						
Minor slope rockfish (North of 40°10' N. lat.)						
Aurora Rockfish	--	0.02	0.02	--	--	--
Bank Rockfish	0.00	0.25	0.25	0.00	1.17	1.17
Redbanded Rockfish	--	0.04	0.04	0.00	0.16	0.16
Rougheye/Blackspotted Rockfish	--	0.01	0.01	0.00	2.50	2.50
Sharpchin Rockfish	0.00	0.34	0.34	0.00	5.81	5.81
Shortraker Rockfish	--	--	--	0.00	0.06	0.06
Slope Rockfish Unid	0.03	0.00	0.03	0.00	0.02	0.02
Splitnose Rockfish	0.00	2.94	2.95	0.04	56.14	56.19
Yellowmouth Rockfish	0.00	22.91	22.91	0.00	1.84	1.84
Other flatfish						
Butter Sole	--	--	--	0.00	0.00	0.00
Curlfin Sole	--	--	--	--	0.00	0.00
Flatfish Unid	--	0.00	0.00	0.00	0.01	0.01
Flathead Sole	--	--	--	0.00	0.00	0.00
Pacific Sanddab	--	--	--	0.00	0.07	0.07
Rex Sole	0.00	0.01	0.01	0.00	0.28	0.28
Sanddab Unid	--	--	--	--	0.00	0.00
Other rockfish						
Rockfish Unid	0.01	--	0.01	--	--	--
Pacific cod	--	--	--	0.00	0.10	0.10
Pacific hake	6.65	174.78	181.43	165.17	119,402.91	119,568.08
Pacific ocean perch (North of 40°10' N. lat.)	0.00	0.58	0.58	0.10	45.85	45.95
Petrale sole	--	--	--	0.00	0.00	0.00
Roundfish unid	--	--	--	0.01	--	0.01
Sablefish (North of 36° N. lat.)	0.00	1.79	1.79	0.04	54.90	54.95
Shortbelly rockfish	0.08	16.55	16.63	0.41	172.27	172.68
Shortspine thornyhead (North of 34°27' N. lat.)	0.00	0.83	0.83	0.00	1.34	1.34

Table 2e (continued).

EM Midwater	Midwater Rockfish Trawl			Midwater Hake Trawl		
	EM vessels	EM tows	Fleet landings of groundfish (mt)	EM vessels	EM tows	Fleet landings of hake (mt)
	12	161	5,076	23	1913	119,403
	Discard	Landed	Estimate	Discard	Landed	Estimate
Weight (mt)						
Spiny dogfish	0.00	6.18	6.18	0.20	368.47	368.66
Widow rockfish	14.28	4,218.49	4,232.76	0.78	782.08	782.85
YELLOW EYE ROCKFISH	--	--	--	0.00	0.01	0.01
Yellowtail rockfish (North of 40°10' N. lat.)	0.62	747.72	748.33	1.00	992.47	993.47
Non-groundfish species						
Dungeness crab	--	--	--	0.00	0.00	0.00
Other non-groundfish						
Skate Unid	--	--	--	0.00	0.08	0.08
Squid Unid	0.00	0.08	0.08	0.01	8.42	8.43
Shared ecosystem component species						
Smelt Unid	--	--	--	--	0.00	0.00

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

Non-hake IFQ sector totals, including the EM portion of the fleet. Landings (mt), estimated discard (mt), and fishing mortality estimate (mt) of groundfish species from non-hake IFQ fisheries. Discard ratios (Tables 2a and 2b) were multiplied by expansion factors to generate estimated discard, and summarized with sampled discard at the sector level. Estimated total discard of non-IFQ species on observed EM trips was combined with total at-sea discard weight of IFQ species as recorded by EM systems. Discard mortality rates have been applied where appropriate. Finally, landings were summarized from PacFIN.

Weight (mt)	IFQ - Bottom Trawl			IFQ - Midwater Rockfish Trawl			IFQ - Hook-and-Line			IFQ - Pot		
	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate
Groundfish species												
Arrowtooth flounder	412.17	586.92	999.09	0.59	0.16	0.75	1.06	0.13	1.20	1.37	0.38	1.75
Big skate	8.90	133.67	142.58	0.02	0.39	0.41	0.73	0.12	0.85	--	0.01	0.01
Black rockfish (California)	0.00	0.01	0.01	--	--	--	--	--	--	--	--	--
Black rockfish (Oregon)	0.00	0.00	0.00	--	0.00	0.00	--	--	--	--	--	--
Black rockfish (Washington)	0.00	0.02	0.02	--	0.00	0.00	--	--	--	--	--	--
Bocaccio rockfish (South of 40°10' N. lat.)	1.08	176.57	177.64	--	--	--	--	--	--	--	--	--
Canary rockfish	0.09	184.83	184.93	0.04	64.21	64.26	0.00	--	0.00	0.00	--	0.00
Chilipepper rockfish (South of 40°10' N. lat.)	9.39	268.96	278.36	--	--	--	--	--	--	--	--	--
COWCOD ROCKFISH (South of 40°10' N. lat.)	0.00	0.41	0.42	--	--	--	--	--	--	--	--	--
Darkblotched rockfish	3.13	182.42	185.54	0.00	0.86	0.86	0.00	0.10	0.10	0.00	0.04	0.04
Dover sole	27.95	6,327.60	6,355.55	0.00	16.97	16.97	0.02	0.21	0.23	0.22	0.33	0.55
Ecosystem component species												
Aleutian Skate	0.53	1.06	1.59	--	--	--	0.02	--	0.02	--	--	--
Black Skate	8.47	0.28	8.75	--	--	--	0.03	--	0.03	--	--	--
California Grenadier	0.89	--	0.89	--	--	--	--	--	--	--	--	--
California Skate	1.73	0.07	1.80	--	--	--	--	--	--	--	--	--
Deepsea Skate	0.39	--	0.39	--	--	--	--	--	--	--	--	--
Ghostly Grenadier	0.00	--	0.00	--	--	--	--	--	--	--	--	--
Giant Grenadier	41.62	--	41.62	0.28	--	0.28	0.33	--	0.33	0.71	--	0.71
Grenadier Unid	0.24	2.91	3.16	--	--	--	--	--	--	0.10	0.02	0.12
Pacific Flatnose	0.35	--	0.35	--	--	--	--	--	--	--	--	--
Pacific Grenadier	11.74	--	11.74	--	--	--	0.61	--	0.61	0.53	--	0.53
Popeye Grenadier	0.00	--	0.00	--	--	--	--	--	--	--	--	--
Sandpaper Skate	47.17	1.59	48.76	0.03	--	0.03	0.32	--	0.32	0.00	0.00	0.00
Smooth Grenadier	0.00	--	0.00	--	--	--	--	--	--	--	--	--
Southern Shark	2.26	0.44	2.71	0.00	0.05	0.05	--	--	--	--	--	--
Spotted Ratfish	70.28	3.96	74.24	0.04	0.03	0.07	0.04	--	0.04	0.00	--	0.00
English sole	50.25	158.05	208.30	0.01	0.75	0.75	--	--	--	--	--	--
Groundfish unid	--	--	--	--	0.00	0.00	--	--	--	--	--	--
Lingcod (North of 40°10' N. lat.)	9.10	398.91	408.02	0.00	4.30	4.30	0.00	0.25	0.25	0.16	2.85	3.01
Lingcod (South of 40°10' N. lat.)	2.60	46.24	48.84	--	--	--	--	--	--	--	0.02	0.02
Longnose skate	59.24	610.52	669.76	0.05	1.77	1.82	1.10	1.94	3.04	0.00	--	0.00
Longspine thornyhead (North of 34°27' N. lat.)	5.84	338.29	344.13	0.00	3.41	3.41	--	0.01	0.01	0.00	0.02	0.02
Minor nearshore rockfish (North of 40°10' N. lat.)												
Blue/Deacon Rockfish	0.00	0.00	0.00	--	--	--	--	--	--	--	--	--
Nearshore Rockfish Unid	0.00	0.00	0.00	--	--	--	--	--	--	--	--	--
Quillback Rockfish	0.00	0.04	0.04	--	--	--	--	--	--	--	--	--
Minor nearshore rockfish (South of 40°10' N. lat.)												
Copper Rockfish	--	0.00	0.00	--	--	--	--	--	--	--	--	--

Table 3a (continued).

	IFQ - Bottom Trawl			IFQ - Midwater Rockfish Trawl			IFQ - Hook-and-Line			IFQ - Pot		
	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate
Minor shelf rockfish (North of 40°10' N. lat.)												
Bocaccio Rockfish	0.03	6.35	6.38	0.00	11.00	11.01	--	--	--	--	--	--
Chilipepper Rockfish	11.94	87.86	99.80	0.00	7.64	7.64	--	0.00	0.00	--	--	--
Cowcod Rockfish	0.00	0.04	0.05	--	--	--	--	--	--	--	--	--
Flag Rockfish	0.00	--	0.00	--	--	--	--	--	--	--	--	--
Greenspotted Rockfish	0.00	0.17	0.17	--	0.02	0.02	--	--	--	--	--	--
Greenstriped Rockfish	15.08	8.85	23.93	0.02	0.19	0.21	0.00	0.03	0.03	--	0.00	0.00
Halfbanded Rockfish	0.00	--	0.00	--	--	--	--	--	--	--	--	--
Harlequin Rockfish	0.00	0.00	0.00	0.00	0.00	0.00	--	--	--	--	--	--
Pygmy Rockfish	0.00	--	0.00	0.00	0.00	0.00	--	--	--	--	--	--
Redstripe Rockfish	0.09	0.16	0.25	5.41	9.26	14.67	--	0.00	0.00	--	--	--
Rosethorn Rockfish	0.40	7.21	7.61	0.00	0.02	0.02	0.00	0.02	0.02	0.01	0.01	0.02
Shelf Rockfish Unid	0.00	36.49	36.49	0.01	0.06	0.06	--	--	--	--	0.00	0.00
Silvergray Rockfish	0.00	1.04	1.04	0.00	1.86	1.86	--	0.01	0.01	--	--	--
Starry Rockfish	0.04	--	0.04	--	--	--	--	--	--	--	--	--
Stripetail Rockfish	36.93	0.49	37.42	0.00	0.04	0.04	--	--	--	--	--	--
Tiger Rockfish	0.00	0.00	0.00	--	--	--	--	--	--	--	--	--
Minor shelf rockfish (South of 40°10' N. lat.)												
Flag Rockfish	--	0.02	0.02	--	--	--	--	--	--	--	--	--
Greenblotched Rockfish	0.00	0.09	0.09	--	--	--	--	--	--	--	--	--
Greenspotted Rockfish	0.02	0.64	0.66	--	--	--	--	--	--	--	--	--
Greenstriped Rockfish	0.05	1.28	1.33	--	--	--	--	--	--	--	--	--
Mexican Rockfish	0.00	0.01	0.01	--	--	--	--	--	--	--	--	--
Rosethorn Rockfish	0.00	0.00	0.00	--	--	--	--	--	--	--	--	--
Rosy Rockfish	0.00	0.00	0.00	--	--	--	--	--	--	--	--	--
Shelf Rockfish Unid	0.00	0.64	0.64	--	--	--	--	--	--	--	--	--
Stripetail Rockfish	0.85	1.11	1.96	--	--	--	--	--	--	--	--	--
Vermilion Rockfish	0.02	0.61	0.63	--	--	--	--	--	--	--	--	--
Yellowtail Rockfish	0.00	0.12	0.12	--	--	--	--	--	--	--	--	--
Minor slope rockfish (North of 40°10' N. lat.)												
Aurora Rockfish	3.64	20.60	24.25	--	0.03	0.03	--	0.01	0.01	0.00	0.02	0.02
Bank Rockfish	0.00	0.29	0.29	0.00	0.27	0.27	--	--	--	--	--	--
Blackgill Rockfish	0.00	2.23	2.23	--	--	--	--	0.00	0.00	0.01	0.02	0.03
Redbanded Rockfish	0.37	6.92	7.28	--	0.04	0.04	0.02	0.40	0.42	0.01	0.22	0.22
Rougheye/Blackspotted Rockfish	0.00	16.90	16.90	--	0.14	0.14	0.06	2.34	2.40	0.02	0.85	0.87
Sharpchin Rockfish	0.13	1.26	1.39	0.06	0.62	0.68	--	--	--	0.00	--	0.00
Shortraker Rockfish	0.00	6.55	6.55	--	0.57	0.57	--	0.28	0.28	0.01	0.01	0.01
Shortraker/Rougheye/Blackspotted Rockfish	0.00	--	0.00	--	--	--	--	--	--	0.00	--	0.00
Slope Rockfish Unid	0.00	1.24	1.24	0.03	0.07	0.10	--	--	--	0.02	0.02	0.03
Splitnose Rockfish	8.60	13.43	22.03	0.00	3.68	3.68	--	0.00	0.00	--	0.00	0.00
Yellowmouth Rockfish	0.00	0.09	0.09	0.00	22.92	22.92	--	0.00	0.00	--	--	--
Minor slope rockfish (South of 40°10' N. lat.)												
Aurora Rockfish	2.10	0.48	2.57	--	--	--	--	--	--	0.00	0.06	0.06
Bank Rockfish	0.04	27.73	27.77	--	--	--	--	--	--	--	--	--
Blackgill Rockfish	0.01	29.61	29.62	--	--	--	--	--	--	0.14	3.61	3.75
Pacific Ocean Perch	0.00	0.00	0.00	--	--	--	--	--	--	--	--	--
Redbanded Rockfish	0.03	0.25	0.28	--	--	--	--	--	--	--	--	--
Rougheye/Blackspotted Rockfish	0.00	0.01	0.01	--	--	--	--	--	--	--	--	--
Sharpchin Rockfish	0.01	--	0.01	--	--	--	--	--	--	--	--	--
Shortraker Rockfish	0.00	0.02	0.02	--	--	--	--	--	--	--	--	--
Slope Rockfish Unid	0.03	9.30	9.33	--	--	--	--	--	--	--	--	--

Table 3a (continued).

Weight (mt)	IFQ - Bottom Trawl			IFQ - Midwater Rockfish Trawl			IFQ - Hook-and-Line			IFQ - Pot		
	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate
Mixed thornyheads												
Shortspine/Longspine Thornyhead	0.14	--	0.14	0.07	--	0.07	0.00	--	0.00	0.01	--	0.01
Other flatfish												
Butter Sole	0.00	0.00	0.00	--	--	--	--	--	--	--	--	--
Curlfin Sole	0.07	0.43	0.50	--	--	--	--	--	--	--	--	--
Flatfish Unid	0.73	2.14	2.88	--	0.04	0.04	--	--	--	--	--	--
Flathead Sole	7.98	19.72	27.70	0.02	0.00	0.02	--	--	--	--	--	--
Pacific Sanddab	54.12	77.16	131.28	0.00	0.00	0.01	--	--	--	--	--	--
Rex Sole	37.11	404.81	441.92	0.03	0.32	0.35	--	--	--	--	0.00	0.00
Rock Sole	0.31	1.36	1.67	--	0.00	0.00	--	--	--	--	--	--
Sand Sole	0.07	0.54	0.61	--	--	--	--	--	--	--	--	--
Sanddab Unid	0.08	2.71	2.79	--	--	--	--	--	--	--	--	--
Other groundfish												
Kelp Greenling (Oregon)	0.00	0.00	0.01	--	--	--	--	--	--	--	--	--
Kelp Greenling (Washington)	0.00	0.00	0.00	--	--	--	--	--	--	--	--	--
Other rockfish												
Rockfish Unid	0.46	--	0.46	0.01	--	0.01	--	--	--	--	--	--
Pacific cod	0.04	6.27	6.31	--	0.01	0.01	--	--	--	--	--	--
Pacific hake	341.81	8.49	350.30	12.54	245.66	258.21	--	--	--	0.00	--	0.00
Pacific ocean perch (North of 40°10' N. lat.)	1.02	37.57	38.59	0.00	3.76	3.76	--	0.00	0.00	0.00	0.02	0.02
Petrale sole	11.55	2,632.47	2,644.02	0.00	4.16	4.16	0.03	0.37	0.40	0.07	0.24	0.31
Sablefish (North of 36° N. lat.)	11.28	1,379.13	1,390.41	0.05	7.68	7.73	1.15	154.21	155.37	1.22	654.41	655.63
Sablefish (South of 36° N. lat.)	0.00	0.28	0.28	--	--	--	--	--	--	0.17	43.73	43.90
Shortbelly rockfish	0.14	0.55	0.69	0.13	31.62	31.75	--	--	--	--	--	--
Shortspine thornyhead (North of 34°27' N. lat.)	7.05	627.64	634.70	0.00	4.96	4.96	0.14	3.49	3.63	0.07	0.49	0.56
Spiny dogfish	221.73	6.73	228.47	0.47	6.69	7.16	19.41	--	19.41	0.52	0.00	0.52
Splitnose rockfish (South of 40°10' N. lat.)	9.29	26.09	35.38	--	--	--	--	--	--	--	--	--
Starry flounder	0.02	1.62	1.64	--	--	--	--	--	--	--	--	--
Widow rockfish	0.01	21.87	21.87	37.23	9,386.69	9,423.92	--	0.00	0.00	--	--	--
YELLOW EYE ROCKFISH	0.01	0.10	0.11	--	--	--	--	--	--	0.00	0.00	0.00
Yellowtail rockfish (North of 40°10' N. lat.)	0.01	101.09	101.10	9.81	1,927.59	1,937.40	0.01	0.03	0.04	--	--	--
Non-groundfish species												
California halibut	0.00	0.00	0.01	--	--	--	--	--	--	--	--	--
Dungeness crab	85.06	0.00	85.06	0.05	--	0.05	0.00	--	0.00	2.31	--	2.31
Non-FMP flatfish												
Deepsea Sole	3.31	0.12	3.43	0.00	--	0.00	--	--	--	0.00	--	0.00
Hornyhead Turbot	--	0.00	0.00	--	--	--	--	--	--	--	--	--
Longfin Sanddab	0.01	--	0.01	--	--	--	--	--	--	--	--	--
Slender Sole	43.14	0.25	43.39	0.01	--	0.01	0.00	--	0.00	--	--	--
Other non-groundfish												
Sculpin Unid	0.83	0.00	0.83	--	--	--	--	--	--	--	--	--
Skate Unid	0.89	6.56	7.44	--	0.02	0.02	0.25	--	0.25	--	0.00	0.00
Squid Unid	0.00	0.20	0.20	0.00	0.09	0.09	--	--	--	--	--	--
Starry Skate	0.06	--	0.06	--	--	--	--	--	--	--	--	--
Shared ecosystem component species												
Barracudina Unid	0.00	--	0.00	--	--	--	--	--	--	--	--	--
Deepsea Smelt Unid	0.00	--	0.00	--	--	--	--	--	--	--	--	--
Lanternfish Unid	0.00	--	0.00	--	--	--	--	--	--	--	--	--
Non-Eulachon Smelt Unid	0.00	--	0.00	--	--	--	--	--	--	--	--	--
Non-Humboldt Squid Unid	4.03	--	4.03	0.00	0.03	0.03	--	--	--	--	--	--
Pacific Saury	0.00	--	0.00	--	--	--	--	--	--	--	--	--

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

Retained catch/landings (mt), discard (mt), and fishing mortality estimates (mt) of groundfish species from hake IFQ/co-op sectors. Observed and EM estimates of discard in the shoreside midwater hake sector are combined with with total landings from PacFIN. The summary of the at-sea hake co-op program was derived from A-SHOP data and includes EM discard estimates in the mothership catcher vessel sector.

Groundfish species	Weight (mt)	IFQ - Midwater Hake			At-sea Catcher-Processors			At-sea Mothership Catcher Vessels		
		Discard	Landed	Estimate	Discard	Retained	Estimate	Discard	Retained	Estimate
Arrowtooth flounder	0.00		6.81	6.81	12.55	32.81	45.36	4.76	5.25	10.02
Big skate	0.05		1.90	1.94	0.42	0.18	0.60	2.03	0.05	2.08
Black rockfish (Oregon)	0.00		0.00	0.00	--	--	--	--	--	--
Canary rockfish	0.20		194.05	194.25	0.27	0.60	0.86	1.42	3.27	4.69
Darkblotched rockfish	5.67		75.31	80.98	8.79	33.05	41.84	10.14	13.11	23.24
Dover sole	0.00		0.01	0.01	0.38	1.73	2.10	0.30	0.25	0.55
Ecosystem component species										
Alaska Skate	--	--	--	--	0.00	--	0.00	--	--	--
Deepsea Skate	--	--	--	--	0.00	--	0.00	--	--	--
Grenadier Unid	--	--	--	--	0.49	5.38	5.86	0.00	0.00	0.00
Pacific Flatnose	--	--	--	--	0.00	--	0.00	--	--	--
Sandpaper Skate	--	--	--	--	0.01	0.03	0.04	0.00	--	0.00
Soupin Shark	0.00		0.77	0.77	0.63	--	0.63	1.06	--	1.06
Spotted Ratfish	0.00		0.01	0.01	0.01	--	0.01	0.00	--	0.00
English sole	0.00		0.02	0.02	0.01	0.12	0.13	0.02	0.03	0.05
Groundfish unid	0.00		0.16	0.16	--	--	--	--	--	--
Lingcod (North of 40°10' N. lat.)	0.04		13.19	13.22	0.05	0.09	0.15	1.64	1.58	3.22
Longnose skate	0.00		0.45	0.45	0.56	0.37	0.93	1.01	--	1.01
Longspine thornyhead (North of 34°27' N. lat.)	--	--	--	--	0.00	0.01	0.01	--	--	--
Minor shelf rockfish (North of 40°10' N. lat.)										
Bocaccio Rockfish	0.01		6.83	6.84	0.08	0.42	0.50	0.55	1.87	2.42
Chillipepper Rockfish	0.03		9.85	9.88	0.00	0.19	0.19	2.50	0.59	3.09
Greenstriped Rockfish	0.00		0.03	0.03	--	--	--	0.00	0.00	0.00
Harlequin Rockfish	0.00		0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Pygmy Rockfish	0.00		0.00	0.00	0.00	--	0.00	--	--	--
Redstripe Rockfish	0.01		12.38	12.39	0.05	0.07	0.12	0.60	1.80	2.40
Rockfish Unid	--	--	--	--	0.00	--	0.00	--	--	--
Shelf Rockfish Unid	0.00		0.57	0.57	--	--	--	--	--	--
Silvergray Rockfish	0.00		2.79	2.79	0.13	0.12	0.25	0.25	0.40	0.65
Stripetail Rockfish	0.00		0.02	0.02	--	0.02	0.02	0.65	0.48	1.14
Minor slope rockfish (North of 40°10' N. lat.)										
Aurora Rockfish	3.11		--	3.11	0.03	0.14	0.18	0.03	0.09	0.12
Bank Rockfish	0.00		1.70	1.70	0.01	0.03	0.05	0.03	0.02	0.04
Redbanded Rockfish	0.00		0.25	0.25	0.00	0.21	0.22	0.02	0.02	0.04
Rockfish Unid	--	--	--	--	--	0.00	0.00	--	--	--
Rougheye/Blackspotted Rockfish	0.00		2.55	2.55	43.73	112.86	156.59	0.85	3.80	4.65
Sharpchin Rockfish	0.00		6.66	6.66	0.00	0.00	0.01	0.02	0.00	0.02
Shortraker Rockfish	0.00		0.06	0.06	0.03	0.08	0.11	0.02	0.02	0.03
Slope Rockfish Unid	0.00		0.02	0.02	--	--	--	--	--	--
Splitnose Rockfish	5.86		68.00	73.86	21.16	40.96	62.12	51.41	17.43	68.84
Yellowmouth Rockfish	0.00		2.30	2.30	0.01	--	0.01	0.01	1.92	1.93
Mixed thornyheads										
Shortspine/Longspine Thornyhead	--	--	--	--	--	1.34	1.34	0.12	--	0.12
Other flatfish										
Butter Sole	0.00		0.00	0.00	--	--	--	0.00	0.00	0.00
Curlfin Sole	--		0.00	0.00	--	--	--	--	0.00	0.00
Flatfish Unid	0.00		0.01	0.01	0.00	--	0.00	0.00	0.01	0.01
Flathead Sole	0.00		0.00	0.00	0.01	0.00	0.01	0.00	0.01	0.02
Pacific Sanddab	0.00		0.07	0.07	0.00	--	0.00	0.00	0.87	0.87
Rex Sole	0.00		0.33	0.33	8.84	18.00	26.84	1.77	2.11	3.88
Sand Sole	--	--	--	--	--	--	--	--	0.00	0.00
Sanddab Unid	--		0.00	0.00	--	--	--	--	--	--
Pacific cod	0.00		0.10	0.10	--	--	--	--	--	--
Pacific hake	294.48		129,148.87	129,443.35	44.32	116,005.48	116,049.81	1,165.58	65,997.35	67,162.93
Pacific ocean perch (North of 40°10' N. lat.)	0.13		46.79	46.93	6.79	24.00	30.79	2.35	22.48	24.84
Petrale sole	0.00		0.00	0.00	--	--	--	--	--	--
Roundfish unid	0.01		--	0.01	0.00	0.00	0.00	0.00	--	0.00
Sablefish (North of 36° N. lat.)	0.06		72.69	72.75	19.25	72.94	92.18	7.25	17.35	24.60
Shortbelly rockfish	46.85		196.80	243.65	50.21	35.68	85.89	80.15	62.01	142.16
Shortspine thornyhead (North of 34°27' N. lat.)	0.00		1.57	1.57	29.23	30.35	59.57	4.28	5.55	9.82
Spiny dogfish	2.51		388.89	391.40	390.46	310.64	701.10	255.63	0.62	256.25
Widow rockfish	1.01		867.36	868.38	22.33	40.31	62.65	84.91	59.34	144.25
YELLOWWEYE ROCKFISH	0.00		0.01	0.01	--	--	--	--	--	--
Yellowtail rockfish (North of 40°10' N. lat.)	1.39		1,047.69	1,049.08	13.36	37.75	51.12	72.33	106.42	178.75

Table 3b (continued).

Weight (mt)	IFQ - Midwater Hake			At-sea Catcher-Processors			At-sea Mothership Catcher Vessels		
	Discard	Landed	Estimate	Discard	Retained	Estimate	Discard	Retained	Estimate
Non-groundfish species									
California halibut	0.02	--	0.02	--	--	--	--	--	--
Dungeness crab	0.00	0.00	0.00	--	--	--	0.01	--	0.01
Non-FMP flatfish									
Slender Sole	0.00	--	0.00	0.00	0.00	0.01	0.02	0.00	0.02
Other non-groundfish									
Sculpin Unid	--	--	--	--	0.00	0.00	0.00	--	0.00
Skate Unid	0.00	0.08	0.08	--	0.00	0.00	--	--	--
Squid Unid	0.01	9.01	9.02	72.08	58.55	130.63	12.77	5.99	18.76
Shared ecosystem component species									
Capelin	--	--	--	--	0.00	0.00	--	--	--
Deepsea Smelt Unid	--	--	--	0.13	0.09	0.21	0.00	--	0.00
Duckbill Barracudina	--	--	--	1.23	0.82	2.04	0.03	0.01	0.03
Lanternfish Unid	0.00	--	0.00	0.47	0.34	0.81	0.01	0.00	0.01
Non-Humboldt Squid Unid	0.02	--	0.02	--	--	--	--	--	--
Pacific Saury	--	--	--	0.00	0.00	0.00	0.00	--	0.00
Slender Barracudina	--	--	--	0.00	0.00	0.00	0.00	--	0.00
Smelt Unid	--	0.00	0.00	0.00	--	0.00	--	--	--
White Barracudina	--	--	--	0.01	0.01	0.01	0.00	--	0.00

Table 4. OA California Halibut Trawl.

Observed discard ratios, SE, CV, estimated discard (mt), landings (mt), and fishing mortality estimates (mt) of groundfish species in the OA California halibut fishery (which only occurs south of 40°10'N lat.). Ratios are computed as the observed discard weight divided by the observed weight of retained California halibut (adjusted to fish tickets). Discard ratios were multiplied by fleet landings of California halibut to generate estimated discard.

Open Access California Halibut South of 40°10' N Lat.	Observed			Expansion factor:		
	Observed vessels		trips	Observed	Fleet landings of	
	11		134	tows	California halibut (mt)	
Weight (mt)	Discard Ratio	SE	CV	Discard	Landed	Total Estimate
Groundfish species						
Arrowtooth flounder	0.0000	0.0000	0.0000	0.00	0.00	0.00
Big skate	0.3808	0.0443	0.1163	27.56	0.00	13.78
50% discard mortality (Trawl)‡				13.78		
Bocaccio rockfish (South of 40°10' N. lat.)	0.0000	0.0000	0.0569	0.00	0.00	0.00
Cabazon (California)	0.0002	0.0001	0.3796	0.01	0.00	0.01
California scorpionfish (South of 34°27' N. lat.)	0.0107	0.0013	0.1242	0.77	0.00	0.77
Dover sole	0.0000	0.0000	0.1582	0.00	0.01	0.01
Ecosystem component species						
California Skate	0.2027	0.0258	0.1274	14.67	0.00	14.67
Pacific Grenadier	0.0000	0.0000	0.0569	0.00	0.00	0.00
Southern Shark	0.0159	0.0020	0.1275	1.15	0.31	1.46
Spotted Ratfish	0.0002	0.0001	0.4220	0.01	0.00	0.01
English sole	0.0293	0.0048	0.1624	2.12	0.15	2.27
Lingcod (South of 40°10' N. lat.)	0.0061	0.0020	0.3239	0.44	0.30	0.52
50% discard mortality (Trawl)‡				0.22		
Longnose skate	0.0091	0.0021	0.2296	0.66	0.00	0.33
50% discard mortality (Trawl)‡				0.33		
Minor nearshore rockfish (South of 40°10' N. lat.)						
Brown Rockfish	0.0015	0.0002	0.1680	0.11	0.00	0.11
Calico Rockfish	0.0001	0.0000	0.1822	0.00	0.00	0.00
Copper Rockfish	0.0001	0.0000	0.1477	0.01	0.00	0.01
Gopher Rockfish	0.0000	0.0000	0.0569	0.00	0.00	0.00
Kelp Rockfish	0.0000	0.0000	0.0569	0.00	0.00	0.00
Minor shelf rockfish (South of 40°10' N. lat.)						
Halfbanded Rockfish	0.0000	0.0000	0.0569	0.00	0.00	0.00
Mexican Rockfish	0.0000	0.0000	0.0569	0.00	0.00	0.00
Shelf Rockfish Unid	0.0003	0.0001	0.2054	0.02	0.00	0.02
Stripetail Rockfish	0.0000	0.0000	0.6695	0.00	0.00	0.00
Vermilion Rockfish	0.0009	0.0005	0.5167	0.07	0.00	0.07
Other flatfish						
Butter Sole	0.0000	0.0000	0.0569	0.00	0.00	0.00
Curlfin Sole	0.0159	0.0027	0.1718	1.15	0.18	1.34
Flatfish Unid	0.0005	0.0004	0.8052	0.04	0.10	0.14
Pacific Sanddab	0.0098	0.0021	0.2115	0.71	0.07	0.78
Rex Sole	0.0005	0.0001	0.2846	0.04	0.00	0.04
Rock Sole	0.0002	0.0001	0.3862	0.02	0.09	0.10
Sand Sole	0.0570	0.0117	0.2056	4.13	9.30	13.42
Other groundfish						
Leopard Shark	0.0206	0.0049	0.2398	1.49	0.00	1.49
Pacific hake	0.0098	0.0006	0.0569	0.71	0.00	0.71
Petrale sole	0.0014	0.0003	0.2457	0.10	0.87	0.97
Spiny dogfish	0.0475	0.0070	0.1475	3.44	0.00	3.44
Starry flounder	0.0210	0.0029	0.1390	1.52	2.87	4.39
Non-groundfish species						
California halibut	0.3979	0.0382	0.0960	28.80	72.38	101.17
Dungeness crab	0.8438	0.0874	0.1036	61.07	0.00	61.07
Non-FMP flatfish						
Diamond Turbot	0.0026	0.0007	0.2592	0.19	0.00	0.19
Hornyhead Turbot	0.0227	0.0021	0.0908	1.64	0.01	1.65
Longfin Sanddab	0.0018	0.0002	0.1228	0.13	0.00	0.13
Speckled Sanddab	0.0000	0.0000	0.1657	0.00	0.00	0.00
Other non-groundfish						
Buffalo Sculpin	0.0000	0.0000	0.6275	0.00	0.00	0.00
California Sheephead	0.0005	0.0002	0.3518	0.04	0.00	0.04
Sculpin Unid	0.0008	0.0003	0.3608	0.06	0.00	0.06
Skate Unid	0.0000	0.0000	0.0000	0.00	0.02	0.02
Starry Skate	0.0005	0.0002	0.3874	0.04	0.00	0.04
Shared ecosystem component species						
Non-Humboldt Squid Unid	0.0006	0.0004	0.6133	0.04	0.00	0.04

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

Table 5a. Pink Shrimp Trawl.

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

Pink Shrimp Trawl	Washington							Oregon							California									
						Expansion factor:							Expansion factor:							Expansion factor:				
	Observed vessels	Observed trips	Observed tows	Fleet landings of pink shrimp (mt)				Observed vessels	Observed trips	Observed tows	Fleet landings of pink shrimp (mt)				Observed vessels	Observed trips	Observed tows	Fleet landings of pink shrimp (mt)						
	13	44	677	3,835				53	127	2105	16,212				12	31	446	2,288						
Weight (mt)	Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard Ratio	SE	CV	Discard	Landed	Estimate
Groundfish species																								
Arrowtooth flounder	0.0000	0.0000	0.1588	0.16	--	0.16	0.0000	0.0000	0.1453	0.59	--	0.59	0.0001	0.0000	0.2379	0.22	--	0.22	0.0000	0.0000	0.0455	0.06	--	0.06
Big skate	0.0001	0.0000	0.2901	0.21	--	0.21	0.0000	0.0000	0.0203	0.00	--	0.00	0.0000	0.0000	0.0455	0.06	--	0.06	0.0000	0.0000	0.0455	0.06	--	0.06
Cabezon (Oregon)	--	--	--	--	--	--	0.0000	0.0000	0.1960	0.02	--	0.02	--	--	--	--	--	--	--	--	--	--	--	--
Canary rockfish	0.0001	0.0000	0.0277	0.21	--	0.21	--	--	--	--	--	--	0.0000	0.0000	0.0455	0.03	--	0.03	0.0000	0.0000	0.0455	0.03	--	0.03
Chilipepper rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	0.0000	0.0000	0.2026	0.14	--	0.14	--	--	--	--	--	--	--	--	--	--	--	--
COWCOD ROCKFISH (South of 40°10' N. lat.)	--	--	--	--	--	--	0.0000	0.0000	0.0203	0.00	--	0.00	0.0000	0.0000	0.1912	0.07	--	0.07	0.0000	0.0000	0.1912	0.07	--	0.07
Darkblotched rockfish	0.0003	0.0000	0.0833	1.20	--	1.20	0.0001	0.0000	0.0772	1.80	--	1.80	0.0001	0.0000	0.1452	0.13	--	0.13	0.0001	0.0000	0.1452	0.13	--	0.13
Dover sole	0.0001	0.0000	0.1461	0.39	--	0.39	0.0002	0.0000	0.1774	3.55	--	3.55	0.0002	0.0000	0.2016	0.46	--	0.46	0.0002	0.0000	0.2016	0.46	--	0.46
Ecosystem component species																								
Aleutian Skate	0.0000	0.0000	0.0277	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
California Skate	--	--	--	--	--	--	0.0000	0.0000	0.2325	0.02	--	0.02	0.0001	0.0000	0.2608	0.14	--	0.14	0.0001	0.0000	0.2608	0.14	--	0.14
Sandpaper Skate	0.0000	0.0000	0.3986	0.02	--	0.02	0.0000	0.0000	0.1458	0.10	--	0.10	0.0000	0.0000	0.3680	0.01	--	0.01	0.0000	0.0000	0.3680	0.01	--	0.01
Spotted Ratfish	0.0001	0.0000	0.2986	0.31	--	0.31	0.0000	0.0000	0.4129	0.27	--	0.27	0.0000	0.0000	0.2417	0.02	--	0.02	0.0000	0.0000	0.2417	0.02	--	0.02
English sole	0.0000	0.0000	0.0277	0.00	--	0.00	0.0000	0.0000	0.2398	0.34	--	0.34	0.0000	0.0000	0.2941	0.02	--	0.02	0.0000	0.0000	0.2941	0.02	--	0.02
Lingcod (North of 40°10' N. lat.)	0.0000	0.0000	0.0277	0.05	--	0.05	0.0000	0.0000	0.3773	0.06	--	0.06	0.0000	0.0000	0.2945	0.01	--	0.01	0.0000	0.0000	0.2945	0.01	--	0.01
Lingcod (South of 40°10' N. lat.)	--	--	--	--	--	--	0.0000	0.0000	0.2650	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Longnose skate	0.0001	0.0000	0.3494	0.48	--	0.48	0.0000	0.0000	0.1700	0.47	--	0.47	0.0004	0.0001	0.2579	0.94	--	0.94	0.0004	0.0001	0.2579	0.94	--	0.94
Longspine thornyhead (North of 34°27' N. lat.)	--	--	--	--	--	--	0.0000	0.0000	0.5665	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Minor nearshore rockfish (North of 40°10' N. lat.)																								
Brown Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0000	0.0455	0.00	--	0.00	0.0000	0.0000	0.0455	0.00	--	0.00
Minor shelf rockfish (North of 40°10' N. lat.)																								
Chilipepper Rockfish	--	--	--	--	--	--	0.0000	0.0000	0.3971	0.35	--	0.35	0.0010	0.0004	0.3644	2.30	--	2.30	0.0010	0.0004	0.3644	2.30	--	2.30
Cowcod Rockfish	--	--	--	--	--	--	0.0000	0.0000	0.4447	0.01	--	0.01	0.0000	0.0000	0.2590	0.00	--	0.00	0.0000	0.0000	0.2590	0.00	--	0.00
Flag Rockfish	--	--	--	--	--	--	0.0000	0.0000	0.0203	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Greenspotted Rockfish	--	--	--	--	--	--	0.0000	0.0000	0.1660	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Greenstriped Rockfish	0.0000	0.0000	0.3122	0.07	--	0.07	0.0001	0.0000	0.1083	0.99	--	0.99	0.0002	0.0000	0.1212	0.42	--	0.42	0.0002	0.0000	0.1212	0.42	--	0.42
Halfbanded Rockfish	--	--	--	--	--	--	0.0000	0.0000	0.2298	0.00	--	0.00	0.0000	0.0000	0.2281	0.01	--	0.01	0.0000	0.0000	0.2281	0.01	--	0.01
Harlequin Rockfish	--	--	--	--	--	--	0.0000	0.0000	0.1857	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Puget Sound Rockfish	--	--	--	--	--	--	0.0000	0.0000	0.1793	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Pygmy Rockfish	0.0000	0.0000	0.5096	0.01	--	0.01	0.0000	0.0000	0.1604	0.02	--	0.02	0.0000	0.0000	0.3101	0.00	--	0.00	0.0000	0.0000	0.3101	0.00	--	0.00
Redstripe Rockfish	0.0000	0.0000	0.2709	0.00	--	0.00	0.0000	0.0000	0.3758	0.01	--	0.01	0.0000	0.0000	0.0455	0.00	--	0.00	0.0000	0.0000	0.0455	0.00	--	0.00
Rosethorn Rockfish	--	--	--	--	--	--	0.0000	0.0000	0.3254	0.01	--	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Shelf Rockfish Unid	0.0000	0.0000	0.2373	0.04	--	0.04	0.0000	0.0000	0.3807	0.11	--	0.11	0.0001	0.0001	0.8903	0.32	--	0.32	0.0001	0.0001	0.8903	0.32	--	0.32
Squarespot Rockfish	--	--	--	--	--	--	0.0000	0.0000	0.0203	0.00	--	0.00	0.0000	0.0000	0.3596	0.00	--	0.00	0.0000	0.0000	0.3596	0.00	--	0.00
Stripetail Rockfish	0.0000	0.0000	0.5455	0.18	--	0.18	0.0004	0.0000	0.0692	6.66	--	6.66	0.0008	0.0002	0.2813	1.79	--	1.79	0.0008	0.0002	0.2813	1.79	--	1.79
Tiger Rockfish	--	--	--	--	--	--	0.0000	0.0000	0.0203	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Minor shelf rockfish (South of 40°10' N. lat.)																								
Greenstriped Rockfish	--	--	--	--	--	--	0.0000	0.0000	0.2308	0.04	--	0.04	--	--	--	--	--	--	--	--	--	--	--	--
Halfbanded Rockfish	--	--	--	--	--	--	0.0000	0.0000	0.1703	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Shelf Rockfish Unid	--	--	--	--	--	--	0.0000	0.0000	0.0203	0.03	--	0.03	0.0002	0.0000	0.2031	0.42	--	0.42	0.0002	0.0000	0.2031	0.42	--	0.42
Squarespot Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0000	0.3675	0.00	--	0.00	0.0000	0.0000	0.3675	0.00	--	0.00
Stripetail Rockfish	--	--	--	--	--	--	0.0000	0.0000	0.3360	0.55	--	0.55	0.0002	0.0000	0.2175	0.35	--	0.35	0.0002	0.0000	0.2175	0.35	--	0.35
Yellowtail Rockfish	--	--	--	--	--	--	0.0000	0.0000	0.1053	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Minor slope rockfish (North of 40°10' N. lat.)																								
Aurora Rockfish	--	--	--	--	--	--	0.0000	0.0000	0.7105	0.02	--	0.02	0.0000	0.0000	0.1518	0.00	--	0.00	0.0000	0.0000	0.1518	0.00	--	0.00
Bank Rockfish	0.0000	0.0000	0.2076	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Redbanded Rockfish	0.0000	0.0000	0.1291	0.13	--	0.13	0.0000	0.0000	0.1758	0.09	--	0.09	--	--	--	--	--	--	--	--	--	--	--	--
Rougheye/Blackspotted Rockfish	0.0000	0.0000	0.2378	0.05	--	0.05	0.0000	0.0000	0.0203	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Sharpchin Rockfish	--	--	--	--	--	--	0.0000	0.0000	0.2264	0.03	--	0.03	0.0000	0.0000	0.0455	0.00	--	0.00	0.0000	0.0000	0.0455	0.00	--	0.00
Shortraker Rockfish	0.0000	0.0000	0.0277	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Splitnose Rockfish	0.0000	0.0000	0.1173	0.10	--	0.10	0.0002	0.0000	0.0835	3.71	--	3.71	0.0000	0.0000	0.1711	0.06	--	0.06	0.0000	0.0000	0.1711	0.06	--	0.06
Yellowmouth Rockfish	0.0000	0.0000	0.0277	0.01	--	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 5a (continued).

Pink Shrimp Trawl	Washington							Oregon							California						
	Observed vessels			Observed trips	Observed tows	Expansion factor: Fleet landings of pink shrimp (mt)	Weight (mt)	Observed vessels			Observed trips	Observed tows	Expansion factor: Fleet landings of pink shrimp (mt)	Weight (mt)	Observed vessels			Observed trips	Observed tows	Expansion factor: Fleet landings of pink shrimp (mt)	Weight (mt)
	13			44	677	3,835		53			127	2105	16,212		12			31	446	2,288	
	Discard Ratio	SE	CV	Discard	Landed	Estimate		Discard Ratio	SE	CV	Discard	Landed	Estimate		Discard Ratio	SE	CV	Discard	Landed	Estimate	
Other flatfish																					
Flatfish Unid	--	--	--	--	--	--		0.0000	0.0000	0.5540	0.72	--	0.72		0.0003	0.0001	0.2333	0.62	--	0.62	
Flathead Sole	0.0000	0.0000	0.1497	0.09	--	0.09		0.0000	0.0000	0.1470	0.33	--	0.33		0.0000	0.0000	0.2908	0.00	--	0.00	
Pacific Sanddab	0.0003	0.0001	0.1921	1.05	--	1.05		0.0001	0.0000	0.1233	1.69	--	1.69		0.0002	0.0000	0.1723	0.48	--	0.48	
Rex Sole	0.0018	0.0002	0.1092	6.76	--	6.76		0.0012	0.0001	0.0596	19.18	--	19.18		0.0010	0.0001	0.1215	2.32	--	2.32	
Rock Sole	0.0000	0.0000	0.0277	0.00	--	0.00		0.0000	0.0000	0.0203	0.02	--	0.02		--	--	--	--	--	--	
Sand Sole	--	--	--	--	--	--		0.0000	0.0000	0.0298	0.14	--	0.14		--	--	--	--	--	--	
Sanddab Unid	--	--	--	--	--	--		0.0000	0.0000	0.3228	0.01	--	0.01		0.0000	0.0000	0.0455	0.00	--	0.00	
Other groundfish																					
Cabezon (Washington)	0.0000	0.0000	0.2330	0.00	--	0.00		--	--	--	--	--	--		--	--	--	--	--	--	
Pacific hake	0.0095	0.0011	0.1157	36.47	--	36.47		0.0038	0.0003	0.0687	60.95	--	60.95		0.0092	0.0021	0.2269	21.09	--	21.09	
Pacific ocean perch (North of 40°10' N. lat.)	0.0000	0.0000	0.2062	0.04	--	0.04		0.0000	0.0000	0.1594	0.02	--	0.02		0.0000	0.0000	0.1815	0.00	--	0.00	
Petrale sole	0.0002	0.0000	0.2051	0.63	--	0.63		0.0000	0.0000	0.2253	0.07	--	0.07		0.0000	0.0000	0.4960	0.06	--	0.06	
Roundfish unid	--	--	--	--	--	--		0.0000	0.0000	0.0298	0.00	--	0.00		--	--	--	--	--	--	
Sablefish (North of 36° N. lat.)	0.0000	0.0000	0.2515	0.09	--	0.09		0.0000	0.0000	0.5285	0.05	--	0.05		0.0000	0.0000	0.3476	0.02	--	0.02	
Shortbelly rockfish	0.0003	0.0000	0.1126	0.96	--	0.96		0.0001	0.0000	0.1911	1.37	--	1.37		0.0003	0.0001	0.1846	0.69	--	0.69	
Shortspine thornyhead (North of 34°27' N. lat.)	--	--	--	--	--	--		0.0000	0.0000	0.1665	0.13	--	0.13		--	--	--	--	--	--	
Spiny dogfish	0.0000	0.0000	0.0277	0.03	--	0.03		0.0000	0.0000	0.2319	0.28	--	0.28		0.0004	0.0001	0.2548	0.83	--	0.83	
Splitnose rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--		0.0000	0.0000	0.1723	0.00	--	0.00		0.0002	0.0000	0.1710	0.51	--	0.51	
Widow rockfish	--	--	--	--	--	--		0.0000	0.0000	0.0203	0.01	--	0.01		0.0001	0.0000	0.3926	0.22	--	0.22	
YELLOW EYE ROCKFISH	--	--	--	--	--	--		0.0000	0.0000	0.5930	0.00	--	0.00		--	--	--	--	--	--	
Yellowtail rockfish (North of 40°10' N. lat.)	0.0003	0.0001	0.3118	1.04	--	1.04		0.0000	0.0000	0.3989	0.03	--	0.03		0.0000	0.0000	0.8299	0.01	--	0.01	
Non-groundfish species																					
Dungeness crab	0.0000	0.0000	0.0277	0.01	--	0.01		--	--	--	--	--	--		0.0000	0.0000	0.3344	0.01	--	0.01	
Non-FMP flatfish																					
Slender Sole	0.0020	0.0002	0.0879	7.52	--	7.52		0.0068	0.0004	0.0571	110.20	--	110.20		0.0120	0.0013	0.1052	27.41	--	27.41	
Other non-groundfish																					
Sculpin Unid	0.0000	0.0000	0.4480	0.00	--	0.00		0.0000	0.0000	0.2038	0.06	--	0.06		0.0000	0.0000	0.1514	0.06	--	0.06	
Skate Unid	--	--	--	--	--	--		0.0000	0.0000	0.5974	0.00	--	0.00		0.0000	0.0000	0.0455	0.00	--	0.00	
Squid Unid	--	--	--	--	--	--		0.0000	0.0000	0.1338	0.00	--	0.00		--	--	--	--	--	--	
Starry Skate	--	--	--	--	--	--		0.0000	0.0000	0.0203	0.00	--	0.00		0.0000	0.0000	0.2661	0.00	--	0.00	
Shared ecosystem component species																					
Barracudina Unid	--	--	--	--	--	--		0.0000	0.0000	0.0203	0.00	--	0.00		--	--	--	--	--	--	
Lanternfish Unid	0.0000	0.0000	0.3195	0.01	--	0.01		0.0000	0.0000	0.2527	0.16	--	0.16		0.0000	0.0000	0.2302	0.01	--	0.01	
Night Smelt	--	--	--	--	--	--		--	--	--	--	--	--		0.0000	0.0000	0.5749	0.08	--	0.08	
Non-Eulachon Smelt Unid	0.0000	0.0000	0.3398	0.04	--	0.04		0.0002	0.0000	0.2377	3.33	--	3.33		0.0003	0.0001	0.2031	0.61	--	0.61	
Non-Humboldt Squid Unid	0.0000	0.0000	0.0919	0.16	--	0.16		0.0041	0.0004	0.1019	66.95	--	66.95		0.0090	0.0009	0.1038	20.50	--	20.50	
Pacific Sauri	--	--	--	--	--	--		0.0000	0.0000	0.2612	0.03	--	0.03		--	--	--	--	--	--	
Smelt Unid	--	--	--	--	--	--		--	--	--	--	--	--		0.0000	0.0000	0.0455	0.10	--	0.10	

Table 5b. Ridgeback Prawn Trawl.

Observed discard ratios, SE, CV, estimated discard (mt), landings (mt), and fishing mortality estimates (mt) of groundfish species in the ridgeback prawn fishery. Ratios are computed as the observed discard weight divided by the observed weight of retained ridgeback prawn (adjusted to fish tickets). Discard ratios were multiplied by fleet landings of ridgeback prawn to generate estimated discard.

Ridgeback Prawn Weight (mt)	Expansion factor:					
	Observed vessels		Observed trips	Observed tows	Fleet landings of ridgeback prawn (mt)	
	4	21	131	165		
	Discard Ratio	SE	CV	Discard	Landed	Total Estimate
Groundfish species						
Bocaccio rockfish (South of 40°10' N. lat.)	0.0045	0.0010	0.2304	0.74	0.02	0.75
California scorpionfish (South of 34°27' N. lat.)	0.0049	0.0023	0.4684	0.80	0.01	0.82
Canary rockfish	0.0003	0.0000	0.0832	0.05	--	0.05
Chilipepper rockfish (South of 40°10' N. lat.)	0.0129	0.0039	0.3034	2.13	--	2.13
COWCOD ROCKFISH (South of 40°10' N. lat.)	0.0006	0.0002	0.2937	0.10	--	0.10
Darkblotched rockfish	0.0000	0.0000	0.0832	0.00	--	0.00
Dover sole	0.1044	0.0228	0.2179	17.24	1.58	18.82
Ecosystem component species						
California Skate	0.0068	0.0014	0.2029	1.13	--	1.13
Spotted Ratfish	0.0094	0.0022	0.2354	1.55	--	1.55
English sole	0.2199	0.0259	0.1177	36.30	1.13	37.44
Lingcod (South of 40°10' N. lat.)	0.0102	0.0029	0.2801	1.69	0.02	1.71
Longnose skate	0.0017	0.0004	0.2521	0.28	--	0.28
Minor nearshore rockfish (South of 40°10' N. lat.)						
Brown Rockfish	--	--	--	--	0.07	0.07
Calico Rockfish	0.0027	0.0008	0.3152	0.44	--	0.44
Copper Rockfish	0.0018	0.0010	0.5707	0.30	0.00	0.31
Nearshore Rockfish Unid	--	--	--	--	0.02	0.02
Minor shelf rockfish (South of 40°10' N. lat.)						
Flag Rockfish	0.0000	0.0000	0.0832	0.00	--	0.00
Freckled Rockfish	0.0000	0.0000	0.4256	0.00	--	0.00
Greenblotched Rockfish	0.0027	0.0015	0.5611	0.44	--	0.44
Greenspotted Rockfish	0.0008	0.0004	0.5590	0.13	--	0.13
Greenstriped Rockfish	0.0010	0.0003	0.2707	0.16	--	0.16
Halfbanded Rockfish	0.1773	0.0366	0.2063	29.27	--	29.27
Mexican Rockfish	0.0001	0.0000	0.0832	0.01	--	0.01
Squarespot Rockfish	0.0001	0.0000	0.2506	0.01	--	0.01
Stripetail Rockfish	0.1643	0.0235	0.1433	27.11	--	27.11
Vermilion Rockfish	0.0011	0.0003	0.2578	0.19	0.01	0.20
Other flatfish						
Curlfin Sole	0.0007	0.0003	0.3441	0.12	--	0.12
Flatfish Unid	--	--	--	--	1.91	1.91
Pacific Sanddab	0.1242	0.0194	0.1564	20.51	--	20.51
Rex Sole	0.0148	0.0034	0.2268	2.45	--	2.45
Rock Sole	--	--	--	--	0.14	0.14
Sanddab Unid	--	--	--	--	0.76	0.76
Other groundfish						
Leopard Shark	0.0106	0.0025	0.2413	1.74	0.01	1.75
Pacific hake	0.0312	0.0070	0.2239	5.15	--	5.15
Petrable sole	--	--	--	--	0.34	0.34
Shortbelly rockfish	0.0041	0.0019	0.4556	0.67	--	0.67
Spiny dogfish	0.0061	0.0022	0.3529	1.01	--	1.01
Splitnose rockfish (South of 40°10' N. lat.)	0.0073	0.0024	0.3265	1.20	--	1.20
Non-groundfish species						
California halibut	0.0037	0.0003	0.0832	0.62	1.62	2.23
Non-FMP flatfish						
Hornyhead Turbot	0.0121	0.0026	0.2162	2.00	0.03	2.03
Longfin Sanddab	0.0231	0.0086	0.3704	3.82	--	3.82
Slender Sole	0.0459	0.0089	0.1930	7.58	--	7.58
Other non-groundfish						
Sculpin Unid	0.0001	0.0000	0.0832	0.02	0.05	0.07
Skate Unid	--	--	--	--	1.75	1.75
Shared ecosystem component species						
Non-Eulachon Smelt Unid	0.0003	0.0001	0.2069	0.06	--	0.06
Non-Humboldt Squid Unid	0.0017	0.0003	0.1755	0.28	--	0.28

Table 6. LE Sablefish Primary Fixed Gear.

Observed discard ratios, SE, CV, estimated discard (mt), landings (mt), and fishing mortality estimates (mt) from the LE sablefish endorsed primary season (tier endorsed) fixed gear fleet. Ratios are computed as the observed discard weight divided by 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; see Table 9 for total mortality across non-IFQ, non-nearshore fixed gear sectors. Effort by pot gear in this fishery only occurred north of 36°N. lat.

Limited Entry Sablefish Endorsed Primary Season	Longline - Coast			Longline - North of 36° N lat.			Longline - South of 36° N lat.			Pot - North of 36° N lat.					
	Observed vessels	Observed trips	Observed sets	Expansion factor: Fleet landings of sablefish (mt)			Expansion factor: Fleet landings of sablefish (mt)			Observed vessels			Expansion factor: Fleet landings of sablefish (mt)		
	27	121	828	990			18			7			36		
	Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard Ratio	SE	CV	Discard	Landed	Estimate
Groundfish species															
Arrowtooth flounder	0.0331	0.0036	0.1147	32.77	0.51	33.28	0.61	--	0.61	0.0064	0.0008	0.1268	2.61	0.06	2.67
Big skate	0.0014	0.0002	0.1557	1.39	3.29	4.68	0.03	--	0.03	--	--	--	--	--	--
Bocaccio rockfish (South of 40°10' N. lat.)	--	--	--	--	0.02	0.02	--	--	--	--	--	--	--	--	--
Canary rockfish	0.0000	0.0000	0.2094	0.04	0.19	0.23	0.00	--	0.00	--	--	--	--	--	--
Chilipepper rockfish (South of 40°10' N. lat.)	--	--	--	--	0.03	0.03	--	--	--	--	--	--	--	--	--
Darkblotched rockfish	0.0005	0.0001	0.1959	0.45	1.31	1.77	0.01	--	0.01	0.0001	0.0000	0.1630	0.03	0.06	0.08
Dover sole	0.0010	0.0001	0.0812	1.00	1.22	2.22	0.02	0.02	0.04	0.0018	0.0002	0.1307	0.74	0.08	0.81
Ecosystem component species															
Aleutian Skate	0.0002	0.0001	0.2905	0.17	--	0.17	0.00	--	0.00	--	--	--	--	--	--
Black Skate	0.0002	0.0000	0.1595	0.21	--	0.21	0.00	--	0.00	0.0000	0.0000	0.7243	0.01	--	0.01
California Grenadier	--	--	--	--	--	--	--	--	--	0.0000	0.0000	0.3708	0.02	--	0.02
Deepsea Skate	0.0001	0.0000	0.2894	0.13	--	0.13	0.00	--	0.00	--	--	--	--	--	--
Giant Grenadier	0.0013	0.0003	0.2586	1.30	--	1.30	0.02	--	0.02	0.0007	0.0002	0.2176	0.31	--	0.31
Grenadier Unid	0.0000	0.0000	0.6656	0.01	0.08	0.09	0.00	0.00	0.00	0.0000	--	--	0.00	--	0.00
Pacific Flatnose	0.0000	--	--	0.00	--	0.00	0.00	--	0.00	0.0000	0.0000	0.1759	0.01	--	0.01
Pacific Grenadier	0.0020	0.0008	0.3790	1.98	6.24	8.23	0.04	--	0.04	0.0004	0.0002	0.4950	0.17	--	0.17
Sandpaper Skate	0.0021	0.0002	0.0794	2.12	--	2.12	0.04	--	0.04	0.0000	--	--	0.00	--	0.00
Soupin Shark	0.0003	0.0000	0.0502	0.28	--	0.28	0.01	--	0.01	--	--	--	--	--	--
Spotted Ratfish	0.0023	0.0002	0.1058	2.27	--	2.27	0.04	--	0.04	0.0000	--	--	0.00	--	0.00
English sole	--	--	--	--	--	--	--	--	--	0.0000	--	--	0.00	0.00	0.00
Lingcod (North of 40°10' N. lat.)	0.0010	0.0001	0.1201	0.98	8.53	8.60	--	--	--	0.0006	0.0002	0.3105	0.25	1.64	1.89
7% discard mortality (Line)‡	--	--	--	0.07	--	--	--	--	--	--	--	--	--	--	--
Lingcod (South of 40°10' N. lat.)	--	--	--	--	0.61	0.61	--	0.01	0.01	--	--	--	--	0.47	0.47
7% discard mortality (Line)‡	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Longnose skate	0.0383	0.0026	0.0686	37.91	32.40	51.36	0.71	--	0.35	0.0000	0.0000	0.2574	0.02	--	0.01
50% discard mortality (Fixed Gear)‡	--	--	--	18.96	--	--	0.35	--	--	--	--	--	0.01	--	--
Longspine thornyhead (North of 34°27' N. lat.)	0.0000	0.0000	0.2468	0.01	0.37	0.37	0.00	0.05	0.05	0.0000	0.0000	0.1644	0.00	0.00	0.00
Longspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	--	0.27	0.27	--	--	--	--	--	--
Minor shelf rockfish (North of 40°10' N. lat.)															
Bocaccio Rockfish	0.0000	0.0000	0.3566	0.01	0.07	0.08	--	--	--	--	--	--	--	--	--
Chilipepper Rockfish	0.0001	0.0000	0.3067	0.09	0.00	0.10	--	--	--	--	--	--	--	--	--
Cowcod Rockfish	0.0000	--	--	0.03	--	0.03	--	--	--	--	--	--	--	--	--
Greenspotted Rockfish	--	--	--	--	0.02	0.02	--	--	--	--	--	--	--	--	--
Greenstriped Rockfish	0.0007	0.0001	0.1123	0.72	0.24	0.96	--	--	--	--	--	--	--	0.00	0.00
Redstripe Rockfish	0.0000	0.0000	0.0446	0.01	0.00	0.01	--	--	--	--	--	--	--	--	--
Rosethorn Rockfish	0.0003	0.0000	0.1058	0.28	0.26	0.54	--	--	--	0.0000	0.0000	0.1777	0.00	0.01	0.01
Rosy Rockfish	0.0000	0.0000	0.3645	0.00	0.00	0.00	--	--	--	--	--	--	--	--	--
Shelf Rockfish Unid	0.0000	--	--	0.00	0.18	0.18	--	--	--	--	--	--	--	0.01	0.01
Silvergray Rockfish	0.0000	0.0000	0.0601	0.02	0.22	0.23	--	--	--	--	--	--	--	--	--
Stripetail Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--
Tiger Rockfish	--	--	--	--	0.01	0.01	--	--	--	--	--	--	--	--	--
Vermilion Rockfish	--	--	--	--	0.01	0.01	--	--	--	0.0000	--	--	0.00	--	0.00
Minor shelf rockfish (South of 40°10' N. lat.)															
Greenspotted Rockfish	--	--	--	--	0.04	0.04	--	--	--	--	--	--	--	--	--
Greenstriped Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--
Shelf Rockfish Unid	--	--	--	--	0.06	0.06	--	--	--	--	--	--	--	--	--
Vermilion Rockfish	--	--	--	--	0.03	0.03	--	0.00	0.00	--	--	--	--	--	--
Minor slope rockfish (North of 40°10' N. lat.)															
Aurora Rockfish	0.0000	0.0000	0.1774	0.05	0.14	0.19	--	--	--	--	--	--	--	0.00	0.00
Bank Rockfish	0.0000	--	--	0.01	--	0.01	--	--	--	0.0000	0.0000	0.2230	0.00	--	0.00
Blackgill Rockfish	0.0002	0.0000	0.2984	0.15	0.14	0.29	--	--	--	0.0000	--	--	0.00	0.00	0.00
Redbanded Rockfish	0.0044	0.0007	0.1575	4.33	14.91	19.23	--	--	--	0.0002	0.0000	0.1711	0.06	0.12	0.19
Rougheye/Blackspotted Rockfish	0.0129	0.0017	0.1290	12.73	18.28	31.01	--	--	--	0.0000	0.0000	0.2452	0.01	0.49	0.49
Sharpchin Rockfish	0.0000	0.0000	0.3356	0.01	--	0.01	--	--	--	0.0000	--	--	0.00	--	0.00
Shortraker Rockfish	0.0043	0.0021	0.4857	4.27	1.51	5.79	--	--	--	--	--	--	--	--	--
Shortraker/Rougheye/Blackspotted Rockfish	0.0000	0.0000	0.1403	0.02	--	0.02	--	--	--	--	--	--	--	--	--
Slope Rockfish Unid	--	--	--	--	4.52	4.52	--	--	--	--	--	--	--	0.15	0.15
Splitnose Rockfish	0.0000	0.0000	0.2816	0.02	0.01	0.03	--	--	--	--	--	--	--	0.00	0.00
Yellowmouth Rockfish	0.0003	0.0000	0.0605	0.26	0.18	0.45	--	--	--	--	--	--	--	--	--

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

Table 6 (continued).

Limited Entry Sablefish Endorsed Primary Season	Longline - Coast			Longline - North of 36° N lat.			Longline - South of 36° N lat.			Pot - North of 36° N lat.					
	Observed vessels	Observed trips	Observed sets	Expansion factor: Fleet landings of sablefish (mt)			Expansion factor: Fleet landings of sablefish (mt)			Observed vessels			Observed trips	Observed sets	Expansion factor: Fleet landings of sablefish (mt)
	27	121	828	990			18			7			36	521	375
	Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard Ratio	SE	CV	Discard	Landed	Estimate
Minor slope rockfish (South of 40°10' N. lat.)															
Aurora Rockfish	0.0000	0.0000	0.3063	0.00	0.01	0.01	0.00	--	0.00	--	--	--	--	--	--
Blackgill Rockfish	0.0000	0.0000	0.2940	0.02	3.42	3.44	0.00	0.38	0.38	--	--	--	--	0.02	0.02
Redbanded Rockfish	0.0000	0.0000	0.5758	0.02	0.31	0.32	0.00	--	0.00	--	--	--	--	--	--
Rougheye/Blackspotted Rockfish	--	--	--	--	0.01	0.01	--	--	--	--	--	--	--	--	--
Shortraker Rockfish	0.0000	0.0000	0.4246	0.05	--	0.05	0.00	--	0.00	--	--	--	--	0.00	0.00
Slope Rockfish Unid	--	--	--	--	2.96	2.96	--	--	--	--	--	--	--	0.03	0.03
Mixed thornyheads															
Shortspine/Longspine Thornyhead	--	--	--	--	0.66	0.66	--	--	--	--	--	--	--	--	--
Other flatfish															
Flathead Sole	--	--	--	--	0.06	0.06	--	--	--	--	--	--	--	--	--
Rex Sole	--	--	--	--	0.00	0.00	--	--	--	0.0000	0.0000	0.1255	0.00	0.00	0.00
Rock Sole	0.0000	--	--	0.00	--	0.00	0.00	--	0.00	--	--	--	--	--	--
Pacific cod	0.0000	0.0000	0.2741	0.03	0.15	0.18	0.00	--	0.00	--	--	--	--	--	--
Pacific hake	0.0010	0.0008	0.7623	1.01	0.01	1.02	0.02	0.01	0.03	--	--	--	--	--	--
Pacific ocean perch (North of 40°10' N. lat.)	0.0001	0.0000	0.1991	0.13	0.13	0.26	0.00	--	0.00	0.0000	0.0000	0.0866	0.00	0.01	0.01
Petrale sole	0.0013	0.0003	0.2160	1.27	0.67	1.94	0.02	--	0.02	0.0000	0.0000	0.1835	0.00	0.01	0.02
Sablefish (North of 36° N. lat.)	0.2076	0.0110	0.0530	205.49	989.89	1030.99	--	--	--	0.2960	0.0295	0.0998	120.92	408.53	432.72
20% discard mortality (Fixed Gear)‡				41.10	--	--	--	--	--				24.18	--	--
Sablefish (South of 36° N. lat.)	--	--	--	--	--	--	0.00	18.44	18.44	--	--	--	--	--	--
20% discard mortality (Fixed Gear)‡				--	--	--	0.00	--	--				--	--	--
Shortbelly rockfish	--	--	--	--	0.01	0.01	--	--	--	--	--	--	--	--	--
Shortspine thornyhead (North of 34°27' N. lat.)	0.0043	0.0006	0.1427	4.30	24.25	28.55	0.08	1.32	1.40	0.0001	0.0000	0.2243	0.06	0.21	0.26
Shortspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	--	2.84	2.84	--	--	--	--	--	--
Spiny dogfish	0.3351	0.0272	0.0812	331.71	0.02	165.88	6.18	--	3.09	0.0001	0.0000	0.1861	0.04	--	0.02
50% discard mortality (Line)‡				165.86	--	--	3.09	--	--				0.02	--	--
Widow rockfish	0.0003	0.0001	0.3326	0.29	0.01	0.30	0.01	--	0.01	--	--	--	--	--	--
YELLOWWEYE ROCKFISH	0.0007	0.0001	0.1490	0.65	--	0.65	0.01	--	0.01	--	--	--	--	--	--
Yellowtail rockfish (North of 40°10' N. lat.)	0.0007	0.0001	0.1848	0.65	0.64	1.29	--	--	--	--	--	--	--	--	--
Non-groundfish species															
Dungeness crab	0.0000	0.0000	0.1312	0.02	--	0.02	0.00	--	0.00	0.0006	0.0002	0.2390	0.27	--	0.27
Non-FMP flatfish															
Deepsea Sole	--	--	--	--	--	--	--	--	--	0.0000	0.0000	0.1842	0.00	--	0.00
Other non-groundfish															
Sculpin Unid	--	--	--	--	--	--	--	--	--	0.0000	--	--	0.00	--	0.00
Skate Unid	0.0000	0.0000	0.1092	0.01	0.23	0.24	0.00	--	0.00	--	--	--	--	0.05	0.05
Shared ecosystem component species															
Non-Humboldt Squid Unid	--	--	--	--	--	--	--	--	--	0.0000	0.0000	0.1530	0.00	--	0.00

Table 7. LE Non-primary Fixed Gear.

Observed discard ratios, SE, CV, estimated discard (mt), landings (mt), and fishing mortality estimates (mt) from the LE non-endorsed fixed gear fleet. Ratios are computed as the observed discard weight divided by the observed weight of FMP groundfish, adjusted to fish tickets. Pot landings in this sector only occurred north of 36°N lat. and were not observed, so observed O/A pot discard ratios were applied to estimate discard. Discard ratios were multiplied by fleet landings of FMP groundfish to generate discard estimates for each gear type; see Table 9 for total mortality across all non-IFQ non-nearshore fixed gear sectors.

Limited Entry Non-Endorsed Fixed Gear	Longline - North of 36° N lat.						Longline - South of 36° N lat.						Pot - North of 36° N lat.					
	Observed vessels			Expansion factor: Fleet landings of groundfish (mt)			Observed vessels			Expansion factor: Fleet landings of groundfish (mt)			OA Observed (see Table 8b)			Expansion factor: Fleet landings of groundfish (mt)		
	Discard Ratio		SE	CV	Discard	Landed	Discard Ratio		SE	CV	Discard	Landed	Discard Ratio		SE	CV	Discard	Landed
	4	5	20	254	Estimate		9	24	63	523			9					
Groundfish species																		
Arrowtooth flounder	0.0061	0.0042	0.6941	1.54	0.33	1.87	--	--	--	--	--	--	0.0013	0.0006	0.4223	0.01	--	0.01
Big skate	0.0013	--	--	0.32	0.11	0.43	0.0012	--	--	0.63	--	0.63	--	--	--	--	--	--
Black rockfish (California)	--	--	--	--	11.66	11.66	--	--	--	--	--	--	--	--	--	--	--	--
Bocaccio rockfish (South of 40°10' N. lat.)	--	--	--	--	1.47	1.47	0.0001	--	--	0.07	1.94	2.01	--	--	--	--	--	--
Cabezon (California)	--	--	--	--	0.01	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Cabezon (Oregon)	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Canary rockfish	--	--	--	--	0.30	0.30	--	--	--	0.24	0.24	--	--	--	--	--	--	--
Chilipepper rockfish (South of 40°10' N. lat.)	--	--	--	--	2.29	2.29	--	--	--	0.02	0.02	--	--	--	--	--	--	--
COWCOD ROCKFISH (South of 40°10' N. lat.)	--	--	--	--	--	--	0.0019	0.0006	0.4022	0.99	--	0.99	--	--	--	--	--	--
Darkblotched rockfish	--	--	--	--	1.30	1.30	--	--	--	--	--	--	0.0001	0.0000	0.1404	0.00	0.00	0.00
Dover sole	0.0008	0.0002	0.3005	0.20	0.41	0.61	0.0009	0.0003	0.3971	0.45	0.38	0.83	0.0017	0.0003	0.1831	0.02	--	0.02
Ecosystem component species	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Black Skate	--	--	--	--	0.00	0.00	0.0081	0.0023	0.2784	4.25	--	4.25	--	--	--	--	--	--
California Grenadier	--	--	--	--	--	--	0.0006	0.0002	0.3583	0.31	--	0.31	--	--	--	--	--	--
California Skate	--	--	--	--	0.02	0.02	--	--	--	0.05	--	--	--	--	--	--	--	--
Giant Grenadier	0.0002	--	--	0.04	--	0.04	0.0037	0.0013	0.3567	1.91	--	1.91	0.0010	0.0003	0.3074	0.01	--	0.01
Grenadier Unid	--	--	--	--	0.94	0.94	0.00	0.00	0.3769	0.55	6.32	6.88	--	--	--	--	--	--
Pacific Flatnose	--	--	--	--	--	--	0.00	0.00	0.3516	0.07	--	0.07	--	--	--	--	--	--
Pacific Grenadier	--	--	--	--	3.20	3.20	0.0001	0.0000	0.3295	0.03	--	0.03	0.0006	0.0002	0.3421	0.01	--	0.01
Sandpaper Skate	0.0006	0.0002	0.3466	0.14	--	0.14	0.0002	0.0000	0.2355	0.09	--	0.09	--	--	--	--	--	--
Scorthead Grenadier	--	--	--	--	--	--	0.0000	--	--	0.0070	--	0.01	--	--	--	--	--	--
Southern Shark	--	--	--	--	--	--	--	--	--	0.03	--	0.03	--	--	--	--	--	--
Spotted Ratfish	0.0021	0.0006	0.2929	0.54	0.00	0.54	0.0009	0.0000	0.2675	0.4535	--	0.45	--	--	--	--	--	--
White Skate	--	--	--	--	--	--	0.0006	--	--	0.3047	--	0.30	--	--	--	--	--	--
English sole	0.0003	0.0001	0.2462	0.08	--	0.08	--	--	--	--	--	--	--	--	--	--	--	--
Lingcod (North of 40°10' N. lat.)	--	--	--	--	2.58	2.58	--	--	--	--	--	--	--	--	--	--	0.36	0.36
7% discard mortality (Line)‡	--	--	--	--	--	--	--	--	--	0.13	0.79	0.80	0.0005	--	--	--	0.00	0.00
Lingcod (South of 40°10' N. lat.)	--	--	--	--	0.50	0.50	0.0003	--	--	0.01	--	--	--	--	--	--	--	--
7% discard mortality (Line)‡	--	--	--	--	--	--	--	--	--	0.01	--	--	--	--	--	--	--	--
Longnose skate	0.0340	0.0081	0.2368	8.63	3.77	8.08	0.0437	0.0130	0.2973	22.84	1.32	12.74	0.0001	--	--	--	0.00	0.00
50% discard mortality (Fixed Gear)‡	--	--	--	4.31	--	--	--	--	--	11.42	--	--	--	--	--	--	--	--
Longspine thornyhead (North of 34°27' N. lat.)	--	--	--	--	0.39	0.39	0.00	0.00	0.4057	1.20	2.12	3.32	0.0000	0.0000	0.3629	0.00	--	0.00
Longspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	0.00	0.00	0.3333	0.5235	12.04	12.56	--	--	--	--	--	--
Minor nearshore rockfish (North of 40°10' N. lat.)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Blue/Deacon Rockfish	--	--	--	--	0.05	0.05	--	--	--	--	--	--	--	--	--	--	--	--
China Rockfish	--	--	--	--	0.01	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Copper Rockfish	--	--	--	--	0.02	0.02	--	--	--	--	--	--	--	--	--	--	--	--
Quillback Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Minor nearshore rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	--	--	--	0.01	0.01	--	--	--	--	--	--
Blue/Deacon Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Minor shelf rockfish (North of 40°10' N. lat.)	--	--	--	--	0.02	0.02	--	--	--	--	--	--	--	--	--	--	--	--
Bocaccio Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Chilipepper Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Greenspotted Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Greenstriped Rockfish	0.0003	--	0.0685	0.04	0.11	--	--	--	--	--	--	--	--	--	--	--	--	--
Redstripe Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Rosethorn Rockfish	--	--	--	--	0.01	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Rosy Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Shelf Rockfish Unid	--	--	--	--	0.01	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Silvergray Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Stripetail Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Vermilion Rockfish	--	--	--	--	0.04	0.04	--	--	--	--	--	--	--	--	--	--	--	--
Minor shelf rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	--	--	--	0.02	0.02	--	--	--	--	--	--
Flag Rockfish	--	--	--	--	--	--	--	--	--	--	0.06	0.06	--	--	--	--	--	--
Greenblotched Rockfish	--	--	--	--	0.02	0.02	--	--	--	--	0.33	0.33	--	--	--	--	--	--
Greenspotted Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	0.04	0.04	--	--	--	--	--	--
Greenstriped Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	0.00	0.00	--	--	--	--	--	--
Honeycomb Rockfish	--	--	--	--	--	--	--	--	--	--	0.02	0.02	--	--	--	--	--	--
Rosethorn Rockfish	--	--	--	--	--	--	--	--	--	--	0.30	0.30	--	--	--	--	--	--
Shelf Rockfish Unid	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

‡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 - North of 36° N lat.					
	Observed vessels			Observed trips	Observed sets	Expansion factor: Fleet landings of groundfish (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)		
	4			5	20	254	9			24	63	523				9		
	Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard Ratio	SE	CV	Discard	Landed	Estimate
Speckled Rockfish	--	--	--	--	--	--	--	--	--	--	0.31	0.31	--	--	--	--	--	--
Squarespot Rockfish	--	--	--	--	--	--	--	--	--	--	0.00	0.00	--	--	--	--	--	--
Starry Rockfish	--	--	--	--	--	--	0.0001	0.0000	0.2335	0.06	0.52	0.58	--	--	--	--	--	--
Vermilion Rockfish	--	--	--	--	--	--	--	--	--	--	13.25	13.25	--	--	--	--	--	--
Yellowtail Rockfish	--	--	--	--	--	--	--	--	--	--	0.19	0.19	--	--	--	--	--	--
Minor slope rockfish (North of 40°10' N. lat.)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aurora Rockfish	--	--	--	--	0.02	0.02	--	--	--	--	--	--	--	--	--	--	--	--
Blackgill Rockfish	--	--	--	--	0.08	0.08	--	--	--	--	--	--	--	--	--	--	--	--
Redbanded Rockfish	0.0012	0.0005	0.4181	0.30	2.25	2.56	--	--	--	--	--	--	--	--	--	--	--	--
Rougheye/Blackspotted Rockfish	0.0003	--	--	0.08	2.79	2.87	--	--	--	--	--	--	--	--	--	--	--	--
Shortraker Rockfish	--	--	--	--	0.16	0.16	--	--	--	--	--	--	--	--	--	--	--	--
Slope Rockfish Unid	--	--	--	--	0.29	0.29	--	--	--	--	--	--	--	--	--	--	0.03	0.03
Splitnose Rockfish	--	--	--	--	0.01	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Yellowmouth Rockfish	--	--	--	--	0.01	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Minor slope rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aurora Rockfish	--	--	--	--	0.04	0.04	--	--	--	--	1.03	1.03	0.0002	0.0000	0.2565	0.00	--	0.00
Bank Rockfish	--	--	--	--	0.20	0.20	--	--	--	--	0.42	0.42	--	--	--	--	--	--
Blackgill Rockfish	--	--	--	--	2.33	2.33	0.0013	0.0005	0.3757	0.70	9.77	10.47	0.0004	0.0001	0.2157	0.00	0.01	0.02
Redbanded Rockfish	--	--	--	--	0.06	0.06	--	--	--	--	0.00	0.00	0.0003	0.0002	0.4473	0.00	--	0.00
Rougheye/Blackspotted Rockfish	--	--	--	--	--	--	--	--	--	--	0.01	0.01	--	--	--	--	--	--
Slope Rockfish Unid	--	--	--	--	0.25	0.25	--	--	--	--	0.01	0.01	--	--	--	--	--	--
Mixed thornyheads	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Shortspine/Longspine Thornyhead	--	--	--	--	0.06	0.06	--	--	--	--	0.02	0.02	--	--	--	--	0.10	0.10
Other flatfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Flatfish Unid	--	--	--	--	--	--	--	--	--	--	0.0036	0.00	--	--	--	--	--	--
Pacific Sanddab	--	--	--	--	--	--	--	--	--	--	0.09	0.09	--	--	--	--	--	--
Rock Sole	--	--	--	--	--	--	--	--	--	--	0.00	0.00	--	--	--	--	--	--
Sanddab Unid	--	--	--	--	--	--	--	--	--	--	0.77	0.77	--	--	--	--	--	--
Other groundfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Kelp Greenling (California)	--	--	--	--	0.01	0.01	--	--	--	--	0.12	0.12	--	--	--	--	--	--
Other rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Rockfish Unid	--	--	--	--	0.00	0.00	--	--	--	--	0.02	0.0172	--	--	--	--	--	--
Pacific cod	--	--	--	--	0.00	0.00	--	--	--	--	0.12	0.12	--	--	--	--	--	--
Pacific hake	--	--	--	--	0.13	0.13	0.0004	0.0001	0.3022	0.18	0.08	0.26	0.0002	--	--	0.00	--	0.00
Pacific ocean perch (North of 40°10' N. lat.)	--	--	--	--	0.02	0.02	--	--	--	--	--	--	--	--	--	--	--	--
Petrale sole	--	--	--	--	0.61	0.61	--	--	--	--	--	--	0.0007	0.0004	0.6547	0.01	--	0.01
Sablefish (North of 36° N. lat.)	0.0920	0.0189	0.2057	23.34	199.87	204.54	--	--	--	--	--	--	0.2774	0.0487	0.1756	2.54	8.64	9.14
20% discard mortality (Fixed Gear)‡	--	--	--	4.67	--	--	--	--	--	--	--	--	--	--	--	0.51	--	--
Sablefish (South of 36° N. lat.)	--	--	--	--	--	--	0.0376	0.0192	0.5094	19.65	356.18	360.11	--	--	--	--	--	--
20% discard mortality (Fixed Gear)‡	--	--	--	--	--	--	--	--	--	3.93	--	--	--	--	--	--	--	--
Shortbelly rockfish	--	--	--	--	--	--	--	--	--	--	0.02	0.02	--	--	--	--	--	--
Shortspine thornyhead (North of 34°27' N. lat.)	0.0007	0.0004	0.5321	0.1826	14.88	15.06	0.0009	0.0004	0.4491	0.4561	14.76	15.21	0.0002	0.0000	0.2290	0.00	0.00	0.01
Shortspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	0.0017	0.0004	0.2489	0.8798	98.40	99.2839	--	--	--	--	--	--
Spiny dogfish	0.3328	0.1052	0.3161	84.43	0.23	42.44	0.0089	0.0070	0.7837	4.64	0.23	2.55	--	--	--	--	--	--
50% discard mortality (Line)‡	--	--	--	42.22	--	--	--	--	--	2.32	--	--	--	--	--	--	--	--
Splitnose rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	--	--	--	0.00	0.00	--	--	--	--	--	--
Widow rockfish	--	--	--	--	0.00	0.00	--	--	--	--	0.42	0.42	--	--	--	--	--	--

Table 7 (continued).

Limited Entry Non-Endorsed Fixed Gear	Longline - North of 36° N lat.						Longline - South of 36° N lat.						Pot - North of 36° N lat.					
	Observed			Expansion factor:			Observed			Expansion factor:			Observed			Expansion factor:		
	vessels			Fleet landings			vessels			Fleet landings			vessels			Fleet landings		
	4	5	20	254			9	24	63	523			9					
	Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard Ratio	SE	CV	Discard	Landed	Estimate
YELLOW EYE ROCKFISH	0.0004	--	--	0.10	--	0.10	0.0004	0.0001	0.2819	0.21	--	0.21	--	--	--	--	--	--
Yellowtail rockfish (North of 40°10' N. lat.)	--	--	--	--	0.02	0.02	--	--	--	--	--	--	--	--	--	--	--	--
Non-groundfish species																		
California halibut	--	--	--	--	--	--	--	--	--	--	0.01	0.01	--	--	--	--	--	--
Dungeness crab	--	--	--	--	--	--	--	--	--	--	--	--	0.0009	0.0004	0.4346	0.01	0.03	0.04
Other non-groundfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
California Sheephead	--	--	--	--	--	--	--	--	--	--	0.01	0.01	--	--	--	--	--	--
Sculpin Unid	0.0000	--	--	0.01	--	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Skate Unid	--	--	--	--	--	--	--	--	--	--	0.55	0.55	--	--	--	--	--	--

Table 8a. OA Fixed Gear, Longline.

Observed discard ratios, SE, CV, estimated discard (mt), landings (mt), and fishing mortality estimates (mt) from the OA fixed gear longline fleet. Ratios are computed as the observed discard weight divided by the observed weight of retained sablefish or FMP groundfish (adjusted to fish tickets). Discard ratios were multiplied by fleet landings of FMP groundfish to generate discard estimates; see Table 9 for total mortality across all non-IFQ non-nearshore fixed gear sectors.

Open Access Fixed Gear	Longline - North of 36° N lat.						Longline - South of 36° N lat.					
	Observed vessels		Observed trips	Observed sets	Expansion factor: Fleet landings of groundfish (mt)		Observed vessels		Observed trips	Observed sets	Expansion factor: Fleet landings of groundfish (mt)	
	40		78	95	262		3		4	7	52	
	Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard Ratio	SE	CV	Discard	Landed	Estimate
Groundfish species												
Arrowtooth flounder	0.0262	0.0087	0.3317	6.85	1.13	7.98	--	--	--	--	--	--
Big skate	0.0078	0.0020	0.2554	2.03	0.89	2.92	--	--	--	--	--	--
Black rockfish (California)	0.0006	0.0002	0.3733	0.16	1.28	1.43	--	--	--	--	0.00	0.00
Black rockfish (Oregon)	0.0009	0.0003	0.3079	0.23	0.56	0.78	--	--	--	--	--	--
Bocaccio rockfish (South of 40°10' N. lat.)	--	--	--	--	1.42	1.42	--	--	--	--	3.15	3.15
Cabazon (California)	0.0001	--	--	0.02	0.58	0.60	--	--	--	--	0.19	0.19
Cabazon (Oregon)	--	--	--	--	0.06	0.06	--	--	--	--	--	--
Canary rockfish	0.0007	0.0002	0.2875	0.19	2.35	2.54	--	--	--	--	0.81	0.81
Chilipepper rockfish (South of 40°10' N. lat.)	--	--	--	--	0.09	0.09	--	--	--	--	0.30	0.30
Darkblotched rockfish	0.0006	0.0002	0.3398	0.16	0.80	0.96	--	--	--	--	--	--
Dover sole	0.0006	0.0001	0.2350	0.16	0.12	0.28	--	--	--	--	0.03	0.03
Ecosystem component species												
Black Skate	0.0001	--	--	0.03	--	0.03	0.0060	--	--	0.31	--	0.31
California Grenadier	--	--	--	--	--	--	0.0003	--	--	0.01	--	0.01
Grenadier Unid	--	--	--	--	0.49	0.49	--	--	--	--	0.44	0.44
Pacific Grenadier	0.0023	--	--	0.59	0.76	1.35	--	--	--	--	--	--
Sandpaper Skate	0.0005	0.0002	0.2972	0.14	0.00	0.14	--	--	--	--	--	--
Southern Shark	--	--	--	--	0.13	0.13	--	--	--	--	0.68	0.68
Spotted Ratfish	0.0036	0.0010	0.2865	0.93	0.00	0.93	--	--	--	--	--	--
Lingcod (North of 40°10' N. lat.)	0.0260	0.0054	0.2063	6.81	38.18	38.66	--	--	--	--	--	--
7% discard mortality (Line)†	--	--	--	0.48	--	--	--	--	--	--	--	--
Lingcod (South of 40°10' N. lat.)	0.0005	0.0001	0.1598	0.12	20.74	20.75	--	--	--	--	4.80	4.80
7% discard mortality (Line)†	--	--	--	0.01	--	--	--	--	--	--	--	--
Longnose skate	0.0318	0.0069	0.2179	8.31	2.82	6.98	0.0104	--	--	0.54	0.01	0.28
50% discard mortality (Fixed Gear)†	--	--	--	4.16	--	--	--	--	--	0.27	--	--
Longspine thornyhead (North of 34°27' N. lat.)	0.0002	0.0001	0.4820	0.06	0.00	0.06	--	--	--	--	--	--
Longspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	0.00	0.00	0.4223	0.0925	0.23	0.32
Minor nearshore rockfish (North of 40°10' N. lat.)												
Blue/Deacon Rockfish	0.0004	0.0002	0.5171	0.11	0.07	0.17	--	--	--	--	--	--
China Rockfish	--	--	--	--	0.01	0.01	--	--	--	--	--	--
Copper Rockfish	0.0005	0.0001	0.1698	0.14	0.02	0.16	--	--	--	--	--	--
Quillback Rockfish	0.0007	0.0002	0.2551	0.18	0.01	0.19	--	--	--	--	--	--
Minor nearshore rockfish (South of 40°10' N. lat.)												
Black and Yellow Rockfish	--	--	--	--	0.13	0.13	--	--	--	--	0.20	0.20
Blue/Deacon Rockfish	--	--	--	--	0.04	0.04	--	--	--	--	0.02	0.02
Brown Rockfish	0.0004	0.0002	0.5103	0.0942	0.01	0.11	--	--	--	--	0.01	0.01
China Rockfish	--	--	--	--	0.03	0.03	--	--	--	--	--	--
Copper Rockfish	0.0001	--	--	0.0303	0.01	0.04	0.0114	--	--	0.59	0.03	0.61
Gopher Rockfish	0.0001	--	--	0.0196	0.07	0.09	--	--	--	--	0.05	0.05
Grass Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	0.10	0.10
Kelp Rockfish	--	--	--	--	--	--	--	--	--	--	0.01	0.01
Nearshore Rockfish Unid	--	--	--	--	--	--	--	--	--	--	0.02	0.02
Olive Rockfish	0.0000	--	--	0.0087	--	0.01	--	--	--	--	--	--
Quillback Rockfish	--	--	--	--	0.01	0.01	--	--	--	--	--	--
Treefish Rockfish	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Minor shelf rockfish (North of 40°10' N. lat.)												
Bocaccio Rockfish	--	--	--	--	0.16	0.16	--	--	--	--	--	--
Chilipepper Rockfish	0.0001	--	--	0.0184	0.00	0.02	--	--	--	--	--	--
Greenstriped Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	--	--
Greenstriped Rockfish	0.0001	0.0000	0.2210	0.0268	0.02	0.05	--	--	--	--	--	--
Rosethorn Rockfish	0.0001	0.0000	0.2541	0.0303	0.01	0.04	--	--	--	--	--	--
Rosy Rockfish	0.0000	--	--	0.0054	0.00	0.01	--	--	--	--	--	--
Shelf Rockfish Unid	--	--	--	--	0.19	0.19	--	--	--	--	--	--
Silvergray Rockfish	--	--	--	--	0.11	0.11	--	--	--	--	--	--
Stripetail Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	--	--

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

Table 8a (continued).

Open Access Fixed Gear	Longline - North of 36° N lat.						Longline - South of 36° N lat.					
	Observed vessels		Observed trips	Observed sets	Expansion factor: Fleet landings of groundfish (mt)		Observed vessels		Observed trips	Observed sets	Expansion factor: Fleet landings of groundfish (mt)	
	40		78	95	262		3		4	7	52	
	Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard Ratio	SE	CV	Discard	Landed	Estimate
Tiger Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	--	--
Vermilion Rockfish	0.0012	0.0006	0.4989	0.31	0.34	0.65	--	--	--	--	--	--
Minor shelf rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	--	--	--	--	--
Flag Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	0.07	0.07
Greenblotched Rockfish	--	--	--	--	--	--	--	--	--	--	0.11	0.11
Greenspotted Rockfish	--	--	--	--	0.02	0.02	--	--	--	--	0.79	0.79
Greenstriped Rockfish	--	--	--	--	--	--	0.0035	--	--	0.18	0.08	0.27
Honeycomb Rockfish	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Mexican Rockfish	--	--	--	--	--	--	--	--	--	--	0.51	0.51
Pink Rockfish	--	--	--	--	--	--	--	--	--	--	0.69	0.69
Rosethorn Rockfish	--	--	--	--	0.02	0.02	--	--	--	--	0.01	0.0086
Rosy Rockfish	0.0000	--	--	0.00	0.10	0.10	--	--	--	--	0.01	0.01
Shelf Rockfish Unid	--	--	--	--	0.06	0.06	--	--	--	--	0.25	0.25
Speckled Rockfish	--	--	--	--	--	--	0.0062	--	--	0.32	0.16	0.49
Squarespot Rockfish	--	--	--	--	--	--	--	--	--	--	0.02	0.02
Starry Rockfish	--	--	--	--	0.02	0.02	--	--	--	--	0.17	0.17
Vermilion Rockfish	0.0001	--	--	0.03	2.70	2.73	0.0036	--	--	0.1881	17.76	17.95
Yellowtail Rockfish	--	--	--	--	2.28	2.28	--	--	--	--	0.37	0.37
Minor slope rockfish (North of 40°10' N. lat.)	--	--	--	--	--	--	--	--	--	--	--	--
Aurora Rockfish	--	--	--	--	0.01	0.01	--	--	--	--	--	--
Blackgill Rockfish	--	--	--	--	0.06	0.06	--	--	--	--	--	--
Redbanded Rockfish	0.0017	0.0012	0.7309	0.4355	1.60	2.04	--	--	--	--	--	--
Rougheye/Blackspotted Rockfish	0.0023	0.0010	0.4469	0.60	2.20	2.80	--	--	--	--	--	--
Shortraker Rockfish	0.0005	--	--	0.13	0.14	0.27	--	--	--	--	--	--
Slope Rockfish Unid	0.0001	--	--	0.02	0.94	0.97	--	--	--	--	--	--
Splitnose Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	--	--
Yellowmouth Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	--	--
Minor slope rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	--	--	--	--	--
Aurora Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	0.00	0.00
Bank Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	0.06	0.06
Blackgill Rockfish	--	--	--	--	0.45	0.45	--	--	--	--	0.91	0.91
Redbanded Rockfish	0.0001	--	--	0.03	0.00	0.03	--	--	--	--	0.00	0.0007
Slope Rockfish Unid	--	--	--	--	0.06	0.06	--	--	--	--	0.03	0.03
Mixed thomyheads	--	--	--	--	--	--	--	--	--	--	--	--
Shortspine/Longspine Thornyhead	--	--	--	--	--	--	--	--	--	--	0.39	0.39
Other flatfish	--	--	--	--	--	--	--	--	--	--	--	--
Flatfish Unid	0.0001	--	--	0.0230	0.00	0.03	--	--	--	--	0.01	0.01
Pacific Sanddab	--	--	--	--	0.02	0.02	--	--	--	--	0.01	0.01
Rock Sole	0.0002	--	--	0.06	0.00	0.06	--	--	--	--	0.01	0.01
Sanddab Unid	--	--	--	--	1.07	1.07	--	--	--	--	2.32	2.32
Other groundfish	--	--	--	--	--	--	--	--	--	--	--	--
Kelp Greenling (California)	0.0001	0.0000	0.2479	0.0192	0.02	0.04	--	--	--	--	0.02	0.02
Kelp Greenling (Oregon)	--	--	--	--	0.00	0.00	--	--	--	--	--	--
Leopard Shark	--	--	--	--	0.05	0.05	0.0255	--	--	1.32	0.05	1.37
Other rockfish	--	--	--	--	--	--	--	--	--	--	--	--
Rockfish Unid	--	--	--	--	0.02	0.02	--	--	--	--	0.55	0.55
Pacific cod	--	--	--	--	0.02	0.02	--	--	--	--	--	--

Table 8a (continued).

Open Access Fixed Gear	Longline - North of 36° N lat.						Longline - South of 36° N lat.					
	Observed vessels			Expansion factor: Fleet landings of groundfish (mt)			Observed vessels			Expansion factor: Fleet landings of groundfish (mt)		
	trips			sets			trips			sets		
	40	78	95	262			3	4	7	52		
	Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard Ratio	SE	CV	Discard	Landed	Estimate
Pacific hake	0.0002	0.0001	0.2568	0.05	0.06	0.11	--	--	--	--	--	--
Pacific ocean perch (North of 40°10' N. lat.)	0.0001	--	--	0.03	0.03	0.05	--	--	--	--	--	--
Petrale sole	0.0002	0.0001	0.3713	0.05	1.02	1.07	--	--	--	--	0.01	0.01
Sablefish (North of 36° N. lat.)	0.1566	0.0413	0.2634	40.99	173.34	181.54	--	--	--	--	--	--
20% discard mortality (Fixed Gear)‡				8.20								
Sablefish (South of 36° N. lat.)	--	--	--	--	--	--	0.0199	0.0085	0.4286	1.03	14.02	14.22
20% discard mortality (Fixed Gear)‡										0.21		
Shortspine thornyhead (North of 34°27' N. lat.)	0.0165	0.0054	0.3301	4.31	0.14	4.45	--	--	--	--	--	--
Shortspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	0.0365	0.0169	0.4622	1.89	1.21	3.10
Spiny dogfish	0.0886	0.0340	0.3837	23.20	1.11	12.71	--	--	--	--	0.05	0.05
50% discard mortality (Line)‡				11.60								
Splitnose rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	--	--	--	0.01	0.01
Starry flounder	--	--	--	--	0.00	0.00	--	--	--	--	--	--
Widow rockfish	--	--	--	--	0.51	0.51	--	--	--	--	0.03	0.03
YELLOWEYE ROCKFISH	0.0014	0.0003	0.2311	0.37	--	0.37	--	--	--	--	--	--
Yellowtail rockfish (North of 40°10' N. lat.)	0.0002	0.0001	0.4222	0.05	0.05	0.10	--	--	--	--	--	--
Non-groundfish species												
California halibut	--	--	--	--	0.73	0.73	--	--	--	--	0.79	0.79
Dungeness crab	0.0001	0.0000	0.1902	0.02	0.01	0.03	--	--	--	--	--	--
Other non-groundfish												
California Sheephead	--	--	--	--	--	--	--	--	--	--	0.01	0.01
Red Irish Lord Sculpin	0.0000	--	--	0.00	--	0.00	--	--	--	--	--	--
Skate Unid	--	--	--	--	0.06	0.06	--	--	--	--	0.00	0.00
Shared ecosystem component species												
Smelt Unid	--	--	--	--	0.04	0.04	--	--	--	--	--	--

Table 8b. OA Fixed Gear, Pot.

Observed discard ratios, SE, CV, estimated discard (mt), landings (mt), and fishing mortality estimates (mt) from the OA fixed gear pot fleet. Ratios are computed as the observed discard weight divided by the observed weight of retained sablefish or FMP groundfish (adjusted to fish tickets). Discard ratios were multiplied by fleet landings of FMP groundfish to generate discard estimates; see Table 9 for total mortality across all non-IFQ non-nearshore fixed gear sectors.

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)		
	33	57	87	167			7		
	Discard Ratio	CV	SE	Discard	Landed	Estimate	Discard	Landed	Estimate
Groundfish species									
Arrowtooth flounder	0.0013	0.0006	0.4223	0.22	0.00	0.22	0.01	--	0.01
Cabazon (Oregon)	--	--	--	--	0.01	0.01	--	--	--
Canary rockfish	--	--	--	--	0.01	0.01	--	--	--
Darkblotched rockfish	0.0001	0.0000	0.1404	0.01	0.00	0.01	0.00	--	0.00
Dover sole	0.0017	0.0003	0.1831	0.29	0.08	0.37	0.01	--	0.01
Ecosystem component species									
Giant Grenadier	0.0010	0.0003	0.3074	0.17	--	0.17	0.01	--	0.01
Pacific Grenadier	0.0006	0.0002	0.3421	0.09	--	0.09	0.00	--	0.00
Lingcod (North of 40°10' N. lat.)	--	--	--	--	0.80	0.80	--	--	--
Lingcod (South of 40°10' N. lat.)	0.0005	--	--	0.09	0.59	0.67	0.00	--	0.00
Longnose skate	0.0001	--	--	0.01	--	0.01	0.00	--	0.00
Longspine thornyhead (North of 34°27' N. lat.)	0.0000	0.0000	0.3629	0.00	0.00	0.01	0.00	--	0.00
Longspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	--	0.00	0.00
Minor shelf rockfish (North of 40°10' N. lat.)									
Flag Rockfish	--	--	--	--	0.01	0.01	--	--	--
Vermilion Rockfish	--	--	--	--	0.00	0.00	--	--	--
Minor shelf rockfish (South of 40°10' N. lat.)									
Shelf Rockfish Unid	--	--	--	--	0.44	0.44	--	--	--
Vermilion Rockfish	--	--	--	--	0.00	0.00	--	--	--
Minor slope rockfish (North of 40°10' N. lat.)									
Aurora Rockfish	--	--	--	--	0.00	0.00	--	--	--
Blackgill Rockfish	--	--	--	--	0.00	0.00	--	--	--
Redbanded Rockfish	--	--	--	--	0.01	0.01	--	--	--
Slope Rockfish Unid	--	--	--	--	0.00	0.00	--	--	--
Minor slope rockfish (South of 40°10' N. lat.)									
Aurora Rockfish	0.0002	0.0000	0.2565	0.03	--	0.03	0.00	0.00	0.00
Blackgill Rockfish	0.0004	0.0001	0.2157	0.07	0.12	0.19	0.00	0.08	0.09
Redbanded Rockfish	0.0003	0.0002	0.4473	0.06	--	0.06	0.00	--	0.00
Slope Rockfish Unid	--	--	--	--	0.00	0.00	--	0.01	0.01
Mixed thornyheads									
Shortspine/Longspine Thornyhead	--	--	--	--	--	--	--	0.01	0.01
Other flatfish									
Sanddab Unid	--	--	--	--	--	--	--	0.24	0.24
Pacific hake	0.0002	--	--	0.04	--	0.04	0.00	--	0.00
Petrale sole	0.0007	0.0004	0.6547	0.11	0.08	0.19	0.00	--	0.00
Sablefish (North of 36° N. lat.)	0.2774	0.0487	0.1756	46.19	164.38	173.62	--	--	--
20% discard mortality (Fixed Gear)‡				9.24					
Sablefish (South of 36° N. lat.)	--	--	--	--	--	--	0.37	6.24	6.31
20% discard mortality (Fixed Gear)‡								0.07	
Shortspine thornyhead (North of 34°27' N. lat.)	0.0002	0.0000	0.2290	0.03	--	0.03	0.00	--	0.00
Shortspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	--	0.12	0.12
Non-groundfish species									
Dungeness crab	0.0009	0.0004	0.4346	0.16	3.15	3.30	0.01	0.03	0.03

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

Table 9a. LE and OA Fixed Gear Summary.

Estimated discard (mt), landings (mt), and fishing mortality estimate (mt) of groundfish species in the LE and OA non-nearshore fixed gear sectors. Discard ratios were multiplied by fleet landings of sablefish or groundfish to generate estimated discard.

	Limited Entry - Coastwide				Open Access - Coastwide				LE & OA Coastwide
	Longline Discard	Pot Discard	Landed	LE Total	Longline Discard	Pot Discard	Landed	OA Total	
Groundfish species									
Arrowtooth flounder	34.92	2.62	0.90	38.44	6.85	0.23	1.13	8.21	46.65
Big skate	2.36	--	3.41	5.76	2.03	--	0.89	2.92	8.69
Black rockfish (California)	--	--	11.66	11.66	0.16	--	1.28	1.44	13.10
Black rockfish (Oregon)	--	--	--	--	0.23	--	0.56	0.78	0.78
Bocaccio rockfish (South of 40°10' N. lat.)	0.07	--	3.43	3.50	--	--	4.57	4.57	8.07
Cabezon (California)	--	--	0.01	0.01	0.02	--	0.76	0.78	0.79
Cabezon (Oregon)	--	--	0.00	0.00	--	--	0.07	0.07	0.07
Canary rockfish	0.04	--	0.73	0.77	0.19	--	3.16	3.36	4.13
Chilipepper rockfish (South of 40°10' N. lat.)	--	--	2.34	2.34	--	--	0.40	0.40	2.73
COWCOD ROCKFISH (South of 40°10' N. lat.)	0.99	--	--	0.99	--	--	--	--	0.99
Darkblotched rockfish	0.46	0.03	2.67	3.15	0.16	0.01	0.80	0.97	4.12
Dover sole	1.67	0.75	2.10	4.53	0.16	0.30	0.23	0.68	5.21
Ecosystem component species									
Aleutian Skate	0.18	--	--	0.18	--	--	--	--	0.18
Black Skate	4.46	0.01	0.00	4.47	0.34	--	--	0.34	4.80
California Grenadier	0.31	0.02	--	0.33	0.01	--	--	0.01	0.34
California Skate	0.05	--	0.02	0.07	--	--	--	--	0.07
Deepsea Skate	0.13	--	--	0.13	--	--	--	--	0.13
Giant Grenadier	3.27	0.32	--	3.59	--	0.17	--	0.17	3.76
Grenadier Unid	0.56	0.00	7.34	7.91	--	--	0.94	0.94	8.85
Pacific Flatnose	0.07	0.01	--	0.07	--	--	--	--	0.07
Pacific Grenadier	2.05	0.17	9.44	11.66	0.59	0.10	0.76	1.45	13.11
Sandpaper Skate	2.39	0.00	--	2.39	0.14	--	0.00	0.14	2.53
Softhead Grenadier	0.01	--	--	0.01	--	--	--	--	0.01
Soupfin Shark	0.28	--	0.03	0.31	--	--	0.80	0.80	1.12
Spotted Ratfish	3.30	0.00	0.00	3.30	0.93	--	0.00	0.93	4.24
White Skate	0.30	--	--	0.30	--	--	--	--	0.30
English sole	0.08	0.00	0.00	0.08	--	--	--	--	0.08
Lingcod (North of 40°10' N. lat.)	0.98	0.25	13.12	13.44	6.81	--	38.98	39.46	52.90
7% discard mortality (Line)‡	0.07	--	--	--	0.48	--	--	--	--
Lingcod (South of 40°10' N. lat.)	0.13	0.00	2.38	2.39	0.12	0.09	26.13	26.23	28.62
7% discard mortality (Line)‡	0.01	--	--	--	0.01	--	--	--	--
Longnose skate	70.09	0.02	37.49	72.54	8.85	0.01	2.83	7.26	79.80
50% discard mortality (Fixed Gear)‡	35.04	0.01	--	--	4.43	0.01	--	--	--
Longspine thornyhead (North of 34°27' N. lat.)	1.21	0.00	2.93	4.14	0.06	0.00	0.00	0.06	4.20
Longspine thornyhead (South of 34°27' N. lat.)	0.52	--	12.30	12.83	0.09	--	0.23	0.32	13.15
Minor nearshore rockfish (North of 40°10' N. lat.)									
Blue/Deacon Rockfish	--	--	0.05	0.05	0.11	--	0.07	0.17	0.22
China Rockfish	--	--	0.01	0.01	--	--	0.01	0.01	0.02
Copper Rockfish	--	--	0.02	0.02	0.14	--	0.02	0.16	0.18
Quillback Rockfish	--	--	0.00	0.00	0.18	--	0.01	0.19	0.19
Minor nearshore rockfish (South of 40°10' N. lat.)									
Black and Yellow Rockfish	--	--	--	--	--	--	0.33	0.33	0.33
Blue/Deacon Rockfish	--	--	0.01	0.01	--	--	0.06	0.06	0.07
Brown Rockfish	--	--	--	--	0.09	--	0.03	0.12	0.12
China Rockfish	--	--	--	--	--	--	0.03	0.03	0.03
Copper Rockfish	--	--	--	--	0.62	--	0.03	0.65	0.65
Gopher Rockfish	--	--	--	--	0.02	--	0.12	0.14	0.14
Grass Rockfish	--	--	--	--	--	--	0.10	0.10	0.10
Kelp Rockfish	--	--	--	--	--	--	0.01	0.01	0.01
Nearshore Rockfish Unid	--	--	--	--	--	--	0.02	0.02	0.02
Olive Rockfish	--	--	--	--	0.01	--	--	0.01	0.01
Quillback Rockfish	--	--	--	--	--	--	0.01	0.01	0.01
Treefish Rockfish	--	--	--	--	--	--	0.00	0.00	0.00
Minor shelf rockfish (North of 40°10' N. lat.)									
Bocaccio Rockfish	0.01	--	0.09	0.10	--	--	0.16	0.16	0.26
Chilipepper Rockfish	0.09	--	0.00	0.10	0.02	--	0.00	0.02	0.12
Cowcod Rockfish	0.03	--	--	0.03	--	--	--	--	0.03
Flag Rockfish	--	--	--	--	--	--	0.01	0.01	0.01
Greenspotted Rockfish	--	--	0.02	0.02	--	--	0.00	0.00	0.02
Greenstriped Rockfish	0.79	--	0.28	1.07	0.03	--	0.02	0.05	1.12
Redstripe Rockfish	0.01	--	0.00	0.01	--	--	--	--	0.01
Rosethorn Rockfish	0.28	0.00	0.28	0.56	0.03	--	0.01	0.04	0.61
Rosy Rockfish	0.00	--	0.00	0.00	0.01	--	0.00	0.01	0.01
Shelf Rockfish Unid	0.00	--	0.20	0.20	--	--	0.19	0.19	0.39
Silvergray Rockfish	0.02	--	0.22	0.23	--	--	0.11	0.11	0.34

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

Table 9a (continued).

	Limited Entry - Coastwide				Open Access - Coastwide				LE & OA Coastwide
	Longline Discard	Pot Discard	Landed	LE Total	Longline Discard	Pot Discard	Landed	OA Total	
Stripetail Rockfish	--	--	0.00	0.00	--	--	0.00	0.00	0.00
Tiger Rockfish	--	--	0.01	0.01	--	--	0.00	0.00	0.01
Vermilion Rockfish	--	0.00	0.05	0.05	0.31	--	0.34	0.65	0.70
Minor shelf rockfish (South of 40°10' N. lat.)									
Flag Rockfish	--	--	0.02	0.02	--	--	0.07	0.07	0.10
Greenblotched Rockfish	--	--	0.09	0.09	--	--	0.11	0.11	0.19
Greenspotted Rockfish	--	--	0.37	0.37	--	--	0.81	0.81	1.18
Greenstriped Rockfish	--	--	0.05	0.05	0.18	--	0.08	0.27	0.32
Honeycomb Rockfish	--	--	0.00	0.00	--	--	0.00	0.00	0.00
Mexican Rockfish	--	--	--	--	--	--	0.51	0.51	0.51
Pink Rockfish	--	--	--	--	--	--	0.69	0.69	0.69
Rosethorn Rockfish	--	--	0.02	0.02	--	--	0.03	0.03	0.04
Rosy Rockfish	--	--	--	--	0.00	--	0.10	0.11	0.11
Shelf Rockfish Unid	--	--	0.35	0.35	--	--	0.75	0.75	1.11
Speckled Rockfish	--	--	0.31	0.31	0.32	--	0.16	0.49	0.79
Squarespot Rockfish	--	--	0.00	0.00	--	--	0.02	0.02	0.02
Starry Rockfish	0.06	--	0.52	0.58	--	--	0.19	0.19	0.77
Vermilion Rockfish	--	--	13.28	13.28	0.22	--	20.47	20.68	33.96
Yellowtail Rockfish	--	--	0.19	0.19	--	--	2.65	2.65	2.84
Minor slope rockfish (North of 40°10' N. lat.)									
Aurora Rockfish	0.05	--	0.17	0.21	--	--	0.01	0.01	0.22
Bank Rockfish	0.01	0.00	--	0.01	--	--	--	--	0.01
Blackgill Rockfish	0.15	0.00	0.23	0.38	--	--	0.06	0.06	0.44
Redbanded Rockfish	4.63	0.06	17.28	21.98	0.44	--	1.61	2.05	24.02
Rougheye/Blackspotted Rockfish	12.81	0.01	21.56	34.37	0.60	--	2.20	2.80	37.17
Sharpchin Rockfish	0.01	0.00	--	0.01	--	--	--	--	0.01
Shortraker Rockfish	4.27	--	1.67	5.95	0.13	--	0.14	0.27	6.22
Shortraker/Rougheye/Blackspotted Rockfish	0.02	--	--	0.02	--	--	--	--	0.02
Slope Rockfish Unid	--	--	4.99	4.99	0.02	--	0.94	0.97	5.95
Splitnose Rockfish	0.02	--	0.02	0.04	--	--	0.00	0.00	0.04
Yellowmouth Rockfish	0.26	--	0.19	0.45	--	--	0.00	0.00	0.45
Minor slope rockfish (South of 40°10' N. lat.)									
Aurora Rockfish	0.00	0.00	1.07	1.08	--	0.03	0.01	0.04	1.12
Bank Rockfish	--	--	0.62	0.62	--	--	0.06	0.06	0.68
Blackgill Rockfish	0.72	0.00	15.93	16.65	--	0.08	1.56	1.64	18.29
Redbanded Rockfish	0.02	0.00	0.36	0.38	0.03	0.06	0.00	0.09	0.47
Rougheye/Blackspotted Rockfish	--	--	0.02	0.02	--	--	--	--	0.02
Shortraker Rockfish	0.05	--	0.00	0.05	--	--	--	--	0.05
Slope Rockfish Unid	--	--	3.25	3.25	--	--	0.10	0.10	3.35
Mixed thornyheads									
Shortspine/Longspine Thornyhead	--	--	0.84	0.84	--	--	0.40	0.40	1.24
Other flatfish									
Flatfish Unid	--	--	0.00	0.00	0.02	--	0.01	0.04	0.04
Flathead Sole	--	--	0.06	0.06	--	--	--	--	0.06
Pacific Sanddab	--	--	0.09	0.09	--	--	0.03	0.03	0.12
Rex Sole	--	0.00	0.00	0.00	--	--	--	--	0.00
Rock Sole	0.00	--	0.00	0.00	0.06	--	0.01	0.07	0.08
Sanddab Unid	--	--	0.77	0.77	--	--	3.62	3.62	4.39
Other groundfish									
Kelp Greenling (California)	--	--	0.12	0.12	0.02	--	0.04	0.05	0.18
Kelp Greenling (Oregon)	--	--	--	--	--	--	0.00	0.00	0.00
Leopard Shark	--	--	--	--	1.32	--	0.09	1.41	1.41
Other rockfish									
Rockfish Unid	--	--	0.02	0.02	--	--	0.57	0.57	0.59
Pacific cod	0.03	--	0.28	0.31	--	--	0.02	0.02	0.34
Pacific hake	1.21	0.00	0.23	1.44	0.05	0.04	0.06	0.15	1.59
Pacific ocean perch (North of 40°10' N. lat.)	0.13	0.00	0.16	0.29	0.03	--	0.03	0.05	0.35
Petrale sole	1.30	0.01	1.30	2.61	0.05	0.12	1.11	1.28	3.88
Sablefish (North of 36° N. lat.)	228.83	123.45	1,606.93	1,677.38	40.99	46.19	337.72	355.15	2,032.54
20% discard mortality (Fixed Gear)‡	45.77	24.69	--	--	8.20	9.24	--	--	--
Sablefish (South of 36° N. lat.)	19.65	--	374.61	378.54	1.03	0.37	20.26	20.54	399.08
20% discard mortality (Fixed Gear)‡	3.93	--	--	--	0.21	0.07	--	--	--
Shortbelly rockfish	--	--	0.03	0.03	--	--	--	--	0.03

Table 9a (continued).

	Limited Entry - Coastwide				Open Access - Coastwide				LE & OA Coastwide
	Longline Discard	Pot Discard	Landed	LE Total	Longline Discard	Pot Discard	Landed	OA Total	
Shortspine thomyhead (North of 34°27' N. lat.)	5.02	0.06	55.41	60.50	4.31	0.04	0.14	4.49	64.99
Shortspine thomyhead (South of 34°27' N. lat.)	0.88	--	101.24	102.12	1.89	--	1.33	3.22	105.34
Spiny dogfish	426.96	0.04	0.48	214.00	23.20	--	1.17	12.77	226.76
50% discard mortality (Line)‡	213.48				11.60				
Splitnose rockfish (South of 40°10' N. lat.)	--	--	0.00	0.00	--	--	0.01	0.01	0.02
Starry flounder	--	--	--	--	--	--	0.00	0.00	0.00
Widow rockfish	0.30	--	0.43	0.72	--	--	0.53	0.53	1.26
YELLOWEYE ROCKFISH	0.97	--	--	0.97	0.37	--	--	0.37	1.34
Yellowtail rockfish (North of 40°10' N. lat.)	0.65	--	0.66	1.32	0.05	--	0.05	0.10	1.42
Non-groundfish species									
California halibut	--	--	0.01	0.01	--	--	1.52	1.52	1.53
Dungeness crab	0.02	0.27	0.03	0.33	0.02	0.16	3.18	3.37	3.70
Non-FMP flatfish									
Deepsea Sole	--	0.00	--	0.00	--	--	--	--	0.00
Other non-groundfish									
California Sheephead	--	--	0.01	0.01	--	--	0.01	0.01	0.01
Red Irish Lord Sculpin	--	--	--	--	0.00	--	--	0.00	0.00
Sculpin Unid	0.01	0.00	--	0.01	--	--	--	--	0.01
Skate Unid	0.01	--	0.83	0.84	--	--	0.06	0.06	0.90
Shared ecosystem component species									
Non-Humboldt Squid Unid	--	0.00	--	0.00	--	--	--	--	0.00
Smelt Unid	--	--	--	--	--	--	0.04	0.04	0.04

Table 9b. Directed Pacific Halibut Fishery.

Observed discard ratios, SE, CV, estimated discard (mt), landings (mt), and fishing mortality estimates (mt) of groundfish species in the directed Pacific halibut fishery. Ratios are computed as the observed discard weight divided by the observed weight of retained Pacific halibut (adjusted to fish tickets). Discard ratios were multiplied by fleet landings of Pacific halibut to generate estimated discard.

Directed Pacific Halibut	Expansion factor:					
	Observed vessels	Observed trips	Observed tows	Fleet landings of Pacific halibut (mt)		
				13	26	79
Weight (mt)	Discard Ratio	SE	CV	Discard	Landed	Total Estimate
Groundfish species						
Arrowtooth flounder	0.0584	0.0149	0.2544	6.78	1.99	8.78
Big skate	0.0204	0.0086	0.4244	2.37	2.15	4.52
Canary rockfish	0.0009	0.0003	0.3836	0.10	0.21	0.31
Darkblotched rockfish	0.0005	0.0001	0.2575	0.06	0.14	0.20
Dover sole	0.0002	0.0001	0.2554	0.03	0.15	0.18
Ecosystem component species						
Aleutian Skate	0.0005	0.0001	0.1518	0.06	0.00	0.06
Sandpaper Skate	0.0010	0.0002	0.2523	0.11	0.01	0.12
Spotted Ratfish	0.0009	0.0002	0.2265	0.10	0.00	0.10
Lingcod (North of 40°10' N. lat.)	0.0016	0.0004	0.2736	0.19	3.12	3.13
7% discard mortality (Line)‡				0.01		
Longnose skate	0.0337	0.0076	0.2248	3.92	4.29	6.25
50% discard mortality (Fixed Gear)‡				1.96		
Longspine thornyhead (North of 34°27' N. lat.)	0.0000	0.0000	0.0000	0.00	0.02	0.02
Minor shelf rockfish (North of 40°10' N. lat.)						
Bocaccio Rockfish	0.0000	0.0000	0.0000	0.00	0.12	0.12
Chilipepper Rockfish	0.0000	0.0000	0.0000	0.00	0.00	0.00
Greenstriped Rockfish	0.0006	0.0002	0.3780	0.07	0.03	0.10
Redstripe Rockfish	0.0000	0.0000	0.0000	0.00	0.00	0.00
Rosethorn Rockfish	0.0000	0.0000	0.3767	0.01	0.01	0.01
Rosy Rockfish	0.0000	0.0000	0.0000	0.00	0.00	0.00
Shelf Rockfish Unid	0.0000	0.0000	0.0000	0.00	0.01	0.01
Silvergray Rockfish	0.0000	0.0000	0.0000	0.00	0.01	0.01
Stripetail Rockfish	0.0000	0.0000	0.0000	0.00	0.00	0.00
Tiger Rockfish	0.0000	0.0000	0.0000	0.00	0.00	0.00
Minor slope rockfish (North of 40°10' N. lat.)						
Aurora Rockfish	0.0000	0.0000	0.0000	0.00	0.00	0.00
Blackgill Rockfish	0.0000	0.0000	0.0000	0.00	0.00	0.00
Redbanded Rockfish	0.0007	0.0002	0.2640	0.08	0.86	0.94
Rougheye/Blackspotted Rockfish	0.0034	0.0019	0.5474	0.40	0.70	1.10
Shortraker Rockfish	0.0003	0.0001	0.2387	0.03	0.06	0.09
Slope Rockfish Unid	0.0000	0.0000	0.0000	0.00	0.02	0.02
Splitnose Rockfish	0.00	0.00	0.0000	0.00	0.00	0.00
Yellowmouth Rockfish	0.0000	0.0000	0.0000	0.00	0.00	0.00
Pacific cod	0.0000	0.0000	0.0000	0.00	0.02	0.02
Pacific hake	0.0001	0.0000	0.2963	0.02	0.02	0.04
Pacific ocean perch (North of 40°10' N. lat.)	0.0000	0.0000	0.0000	0.00	0.01	0.01
Petrale sole	0.0004	0.0001	0.2377	0.04	0.08	0.13
Sablefish (North of 36° N. lat.)	0.0840	0.0175	0.2087	9.76	60.76	62.71
20% discard mortality (Fixed Gear)‡				1.95		
Shortspine thornyhead (North of 34°27' N. lat.)	0.0046	0.0013	0.2695	0.54	0.57	1.11
Spiny dogfish	0.0074	0.0019	0.2559	0.86	0.01	0.44
50% discard mortality (Line)‡				0.43		
YELLOW EYE ROCKFISH	0.0001	0.0000	0.1954	0.01	0.00	0.01
Yellowtail rockfish (North of 40°10' N. lat.)	0.0000	0.0000	0.0000	0.00	0.04	0.04
Non-groundfish species						
Other non-groundfish						
Skate Unid	0.0000	0.0000	0.0000	0.00	0.01	0.01

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

Commercial landings of nearshore species (mt) in Oregon and California during 2018, partitioned by depth interval and groundfish management area based on observed catch 2003-18. Data from both states were combined. The California state-permit framework, which groups nearshore rockfish into either shallow or deeper nearshore rockfish, is represented in the area south of lat 40°10'N.

	2003-2018 Total observed landings (mt)	2003-2018 Percentage of observed catch by depth (fathoms)				2018 Fleet landings (mt)	2018 Fleet landings (mt) reallocated by depth (fathoms)			
		0 - 10	10-20	20-30	> 30		0 - 10	10-20	20-30	> 30
NORTH of 40° 10' N Lat.										
Nearshore Species - Commercial										
Black rockfish (California)	83.87	40.9%	56.4%	2.4%	0.2%	29.27	11.98	16.51	0.71	0.07
Black rockfish (Oregon)	142.03	44.6%	52.5%	2.5%	0.4%	121.22	54.08	63.62	3.00	0.53
Cabazon (California)	2.85	36.4%	53.9%	9.6%	0.1%	1.23	0.45	0.66	0.12	0.00
Cabazon (Oregon)	32.76	30.1%	65.3%	4.0%	0.6%	29.24	8.80	19.08	1.16	0.18
Canary rockfish	0.94	16.9%	62.1%	21.0%	--	3.70	0.63	2.30	0.78	--
Lingcod (North of 40°10' N. lat.)	55.91	28.3%	62.8%	8.5%	0.4%	68.61	19.44	43.07	5.86	0.24
Minor nearshore rockfish (North of 40°10' N. lat.)										
Black and Yellow Rockfish	0.07	33.4%	66.6%	--	--	0.03	0.01	0.02	--	--
Blue/Deacon Rockfish	19.90	21.0%	69.4%	9.3%	0.4%	6.66	1.40	4.62	0.62	0.03
Brown Rockfish	0.33	9.8%	35.4%	54.8%	--	0.07	0.01	0.03	0.04	--
China Rockfish	8.26	28.5%	64.7%	6.4%	0.3%	5.58	1.59	3.61	0.36	0.02
Copper Rockfish	2.34	11.2%	68.0%	20.8%	0.0%	4.09	0.46	2.78	0.85	0.00
Gopher Rockfish	0.07	40.7%	54.9%	4.3%	--	0.09	0.04	0.05	0.00	--
Grass Rockfish	0.49	88.7%	10.5%	0.6%	0.1%	0.23	0.21	0.02	0.00	0.00
Nearshore Rockfish Unid	0.18	18.9%	72.1%	8.9%	--	0.03	0.01	0.02	0.00	--
Olive Rockfish	0.21	17.4%	64.7%	16.6%	1.3%	0.02	0.00	0.01	0.00	0.00
Quillback Rockfish	3.34	9.4%	63.7%	26.4%	0.5%	3.24	0.31	2.06	0.85	0.02
Minor shelf rockfish (North of 40°10' N. lat.)										
Bocaccio Rockfish	0.01	--	100.0%	--	--	0.02	--	0.02	--	--
Other groundfish										
Kelp Greenling (California)	0.82	32.8%	66.3%	0.5%	0.5%	0.38	0.12	0.25	0.00	0.00
Kelp Greenling (Oregon)	18.93	47.2%	51.0%	1.3%	0.6%	17.88	8.43	9.12	0.23	0.10
Widow rockfish	0.16	1.3%	64.9%	33.8%	--	0.15	0.00	0.10	0.05	--
Yellowtail rockfish (North of 40°10' N. lat.)	1.95	16.6%	59.3%	22.6%	1.5%	1.10	0.18	0.65	0.25	0.02
SOUTH of 40° 10' N Lat.										
Nearshore Species - Commercial										
Black rockfish (California)	2.22	48.9%	48.6%	1.8%	0.6%	2.79	1.36	1.36	0.05	0.02
Bocaccio rockfish (South of 40°10' N. lat.)	0.16	0.7%	20.3%	0.5%	78.5%	1.90	0.01	0.39	0.01	1.49
Cabazon (California)	8.14	87.5%	11.2%	0.3%	1.0%	20.30	17.77	2.27	0.06	0.20
California scorpionfish (South of 34°27' N. lat.)	0.63	3.6%	1.0%	30.6%	64.8%	1.43	0.05	0.01	0.44	0.93
Canary rockfish	0.38	0.9%	80.3%	15.3%	3.5%	2.76	0.03	2.22	0.42	0.10
Deeper nearshore rockfish										
Blue/Deacon Rockfish	1.88	30.4%	53.6%	9.1%	7.0%	9.60	2.92	5.14	0.87	0.67
Brown Rockfish	14.26	21.6%	66.6%	11.1%	0.7%	17.50	3.78	11.66	1.94	0.13
Calico Rockfish	--	12.3%	76.3%	10.7%	0.7%	0.01	0.00	0.01	0.00	0.00
Copper Rockfish	1.08	11.5%	56.7%	21.7%	10.0%	11.60	1.34	6.58	2.52	1.16
Nearshore Rockfish Unid	0.57	34.2%	22.7%	29.2%	13.9%	0.25	0.09	0.06	0.07	0.04
Olive Rockfish	0.60	20.0%	57.7%	20.3%	2.0%	0.44	0.09	0.26	0.09	0.01
Quillback Rockfish	0.16	--	45.1%	53.8%	1.1%	1.18	--	0.53	0.64	0.01
Treefish Rockfish	0.33	39.4%	54.5%	2.3%	3.8%	2.13	0.84	1.16	0.05	0.08
Lingcod (South of 40°10' N. lat.)	10.47	31.9%	57.3%	9.8%	1.0%	24.01	7.66	13.77	2.34	0.24
Minor shelf rockfish (South of 40°10' N. lat.)										
Yellowtail Rockfish	0.43	1.2%	52.9%	37.8%	8.1%	1.48	0.02	0.78	0.56	0.12
Other groundfish										
Kelp Greenling (California)	1.60	49.2%	48.5%	1.6%	0.7%	3.27	1.61	1.58	0.05	0.02
Other rockfish										
Rockfish Unid	0.10	34.2%	28.3%	--	37.5%	0.03	0.01	0.01	--	0.01
Shallow nearshore rockfish										
Black and Yellow Rockfish	2.50	85.8%	12.2%	0.3%	1.7%	15.66	13.44	1.91	0.05	0.26
China Rockfish	0.72	28.6%	51.1%	19.7%	0.7%	1.25	0.36	0.64	0.25	0.01
Gopher Rockfish	7.43	46.3%	46.3%	6.6%	0.8%	30.59	14.16	14.18	2.02	0.23
Grass Rockfish	1.03	96.5%	3.0%	0.3%	0.2%	8.66	8.36	0.26	0.03	0.01
Kelp Rockfish	0.22	64.7%	34.6%	0.5%	0.2%	0.78	0.50	0.27	0.00	0.00
Nearshore Rockfish Unid	0.26	62.2%	29.3%	1.7%	6.8%	0.00	0.00	0.00	0.00	0.00
Widow rockfish	0.01	--	6.6%	70.3%	23.1%	0.12	--	0.01	0.08	0.03
Other non-groundfish										
California Sheephead	23.48	69.3%	28.9%	1.5%	0.2%	20.72	14.37	5.98	0.32	0.05

Table 11. Nearshore Fixed Gear: Discard Estimate CVs.

Observed discard CVs from the commercial nearshore fixed gear fishery by groundfish management area and depth. Because the strata at which discard ratios, estimates, and mortality rates applied were confidential, we report CVs at the finest possible level of aggregated state and depth strata. Aggregated mortality estimates are reported in Tables 12a and 12b. The California state-permit framework is represented in the area south of lat 40°10'N.

		North of 40°10' N Lat.									South of 40°10' N Lat.								
		0 - 10 fm			10 - 20 fm			> 20 fm			0 - 10 fm			10 - 20 fm			>20 fm		
		Vessels	Trips	Sets	Vessels	Trips	Sets	Vessels	Trips	Sets	Vessels	Trips	Sets	Vessels	Trips	Sets	Vessels	Trips	Sets
Nearshore Fixed Gear	Observed	37	80	82	56	160	185	16	26	31	9	22	39	16	29	38	6	11	12
	Expansion factor:																		
	Fleet landings of nearshore species (mt)	108			169			16			89			71			19		
Groundfish species																			
	Big skate			--			--			0.3393			--			--			--
	Black rockfish (California)			0.2464			0.2336			--			0.2645			0.6673			--
	Black rockfish (Oregon)			0.1916			0.1202			0.6218			--			--			--
	Cabezon (California)			--			0.0561			--			0.2966			0.2519			--
	Cabezon (Oregon)			0.3771			0.3088			0.5042			--			--			--
	California scorpionfish (South of 34°27' N. lat.)			--			--			--			0.1421			--			0.6817
	Canary rockfish			0.4197			0.1852			0.3837			--			0.4783			0.4830
	Deeper nearshore rockfish																		
	Blue/Deacon Rockfish			--			--			--			0.5597			0.3114			0.4600
	Brown Rockfish			--			--			--			0.5522			0.2864			0.7676
	Calico Rockfish			--			--			--			0.1421			0.2876			--
	Copper Rockfish			--			--			--			0.1421			0.3626			--
	Olive Rockfish			--			--			--			0.1421			0.4855			0.4830
	Treefish Rockfish			--			--			--			0.2738			0.2805			--
	Ecosystem component species																		
	California Skate			--			--			--			--			0.4703			--
	Sandpaper Skate			--			--			0.1920			--			--			--
	Lingcod (North of 40°10' N. lat.)			0.2488			0.1457			0.3446			--			--			--
	Lingcod (South of 40°10' N. lat.)			--			--			--			0.3759			0.3237			0.5211
	Minor nearshore rockfish (North of 40°10' N. lat.)																		
	Black and Yellow Rockfish			0.0912			--			--			--			--			--
	Blue/Deacon Rockfish			0.3417			0.1862			0.6126			--			--			--
	China Rockfish			0.2375			0.2048			0.4004			--			--			--
	Copper Rockfish			0.0912			0.1268			--			--			--			--
	Gopher Rockfish			0.1423			0.4305			--			--			--			--
	Olive Rockfish			0.0912			--			--			--			--			--
	Quillback Rockfish			0.3174			0.1520			0.3427			--			--			--
	Minor shelf rockfish (North of 40°10' N. lat.)																		
	Rosethorn Rockfish			--			0.0561			0.1920			--			--			--
	Rosy Rockfish			0.0912			0.2315			0.5816			--			--			--
	Tiger Rockfish			--			0.2629			0.1920			--			--			--
	Vermilion Rockfish			--			0.3289			0.3068			--			--			--

Table 11 (continued).

	North of 40°10' N Lat.									South of 40°10' N Lat.								
	0 - 10 fm			10 - 20 fm			> 20 fm			0 - 10 fm			10 - 20 fm			>20 fm		
	Vessels	Trips	Sets	Vessels	Trips	Sets	Vessels	Trips	Sets	Vessels	Trips	Sets	Vessels	Trips	Sets	Vessels	Trips	Sets
Nearshore Fixed Gear	37	80	82	56	160	185	16	26	31	9	22	39	16	29	38	6	11	12
Observed																		
Expansion factor:																		
Fleet landings of nearshore species (mt)	108			169			16			89			71			19		
Minor shelf rockfish (South of 40°10' N. lat.)																		
Rosy Rockfish			--			--			--			--			0.4607			0.483
Squarespot Rockfish			--			--			--			--			0.1373			0.483
Vermilion Rockfish			--			--			--			--			0.4404			0.6724
Yellowtail Rockfish			--			--			--			--			0.495			0.5149
Other flatfish																		
Pacific Sanddab			--			0.0561			--			--			0.2747			--
Rock Sole			--			--			--			--			0.1373			--
Sand Sole			--			--			--			--			0.3851			--
Other groundfish																		
Kelp Greenling (California)			0.6596			0.0561			--			0.2209			0.2363			0.6831
Kelp Greenling (Oregon)			0.2256			0.1865			0.2627			--			--			--
Leopard Shark			--			--			--			--			0.2097			0.483
Petrable sole			--			--			--			--			0.5906			0.483
Shallow nearshore rockfish																		
Black and Yellow Rockfish			--			--			--			0.4884			--			--
China Rockfish			--			--			--			0.6529			0.392			0.483
Gopher Rockfish			--			--			--			0.282			0.2516			0.483
Grass Rockfish			--			--			--			0.3233			--			--
Kelp Rockfish			--			--			--			0.2558			0.1373			--
Spiny dogfish			--			--			--			--			0.6024			0.483
Widow rockfish			--			0.0961			0.192			--			0.7078			0.6153
YELLOW EYE ROCKFISH			0.3347			0.2048			0.4253			--			0.3739			0.6817
Yellowtail rockfish (North of 40°10' N. lat.)			0.3899			0.1945			0.3009			--			--			--
Non-groundfish species																		
California halibut			--			--			--			--			0.2889			--
Dungeness crab			--			0.3696			--			--			0.1373			--
Other non-groundfish																		
Buffalo Sculpin			0.2196			0.2679			--			--			--			--
California Sheephead			--			--			--			0.2369			0.3856			--
Red Irish Lord Sculpin			0.395			0.3008			0.192			--			--			--
Sculpin Unid			0.2134			0.4092			--			--			0.3812			0.767
Starry Skate			--			--			--			--			0.1373			--
Shared ecosystem component species																		
Non-Humboldt Squid Unid			--			0.0561			--			--			--			--

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

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

Gross estimated discard (mt), estimated discard mortality (mt), fleet landings (mt), and fishing mortality estimates (mt) at non-confidential depth strata for the commercial nearshore fixed gear fishery north of lat 40°10'N. Mortality rates applied (at finer, confidential strata) are reported in Table A-4.

Nearshore Fixed Gear North of Lat 40°10'N	Gross estimated discard (mt) by depth (fm)			Estimated discard mortality (mt) by depth (fm)			Estimated discard mortality (mt)	Fleet Landings (mt)	Estimated fishing mortality (mt)
	0-10	10-20	> 20	0-10	10-20	> 20			
Groundfish species									
Big skate	--	--	0.68	--	--	0.05	0.05	0.09	0.14
Black rockfish (California)	0.39	0.28	--	0.07	0.08	--	0.15	29.27	29.42
Black rockfish (Oregon)	1.89	2.35	0.50	0.34	0.66	0.30	1.30	121.22	122.52
Cabezon (California)	--	0.03	--	--	0.00	--	0.00	1.23	1.23
Cabezon (Oregon)	1.35	6.86	0.50	0.09	0.48	0.03	0.61	29.24	29.84
Canary rockfish	0.19	0.37	0.08	0.05	0.16	0.05	0.26	3.70	3.96
Darkblotched rockfish	--	--	--	--	--	--	--	0.00	0.00
Ecosystem component species									
Sandpaper Skate	--	--	0.02	--	--	0.00	0.00	--	0.00
Lingcod (North of 40°10' N. lat.)	11.28	14.29	0.84	0.79	1.00	0.06	1.85	68.61	70.46
Longnose skate	--	--	--	--	--	--	--	0.08	0.08
Minor nearshore rockfish (North of 40°10' N. lat.)									
Black and Yellow Rockfish	0.00	--	--	0.00	--	--	0.00	0.03	0.03
Blue/Deacon Rockfish	1.38	2.47	0.28	0.35	0.91	0.16	1.42	6.66	8.08
Brown Rockfish	--	--	--	--	--	--	--	0.07	0.07
China Rockfish	0.20	0.60	0.18	0.04	0.19	0.09	0.32	5.58	5.90
Copper Rockfish	0.02	0.01	--	0.01	0.00	--	0.01	4.09	4.10
Gopher Rockfish	0.01	0.02	--	0.00	0.01	--	0.01	0.09	0.10
Grass Rockfish	--	--	--	--	--	--	--	0.23	0.23
Nearshore Rockfish Unid	--	--	--	--	--	--	--	0.03	0.03
Olive Rockfish	0.02	--	--	0.01	--	--	0.01	0.02	0.02
Quillback Rockfish	0.13	0.38	0.01	0.03	0.16	0.01	0.20	3.24	3.44
Treefish Rockfish	--	--	--	--	--	--	--	0.00	0.00
Minor shelf rockfish (North of 40°10' N. lat.)									
Bocaccio Rockfish	--	--	--	--	--	--	--	0.02	0.02
Chilipepper Rockfish	--	--	--	--	--	--	--	0.00	0.00
Greenstriped Rockfish	--	--	--	--	--	--	--	0.00	0.00
Rosethorn Rockfish	--	0.01	0.01	--	0.01	0.01	0.02	0.01	0.03
Rosy Rockfish	0.00	0.01	0.02	0.00	0.01	0.02	0.03	0.00	0.04
Shelf Rockfish Unid	--	--	--	--	--	--	--	0.09	0.09
Starry Rockfish	--	--	--	--	--	--	--	0.00	0.00
Tiger Rockfish	--	0.02	0.01	--	0.01	0.01	0.02	0.30	0.31
Vermilion Rockfish	--	0.16	0.06	--	0.06	0.04	0.10	4.04	4.14
Minor slope rockfish (North of 40°10' N. lat.)									
Redbanded Rockfish	--	--	--	--	--	--	--	0.05	0.05
Rougheye/Blackspotted Rockfish	--	--	--	--	--	--	--	0.02	0.02
Slope Rockfish Unid	--	--	--	--	--	--	--	0.01	0.01
Other flatfish									
Flatfish Unid	--	--	--	--	--	--	--	0.00	0.00
Pacific Sanddab	--	0.00	--	--	0.00	--	0.00	--	0.00
Rock Sole	--	--	--	--	--	--	--	0.00	0.00
Other groundfish									
Kelp Greenling (California)	0.01	0.01	--	0.00	0.00	--	0.00	0.38	0.38
Kelp Greenling (Oregon)	0.27	0.47	0.03	0.02	0.03	0.00	0.05	17.88	17.93
Pacific ocean perch (North of 40°10' N. lat.)	--	--	--	--	--	--	--	0.00	0.00
Petrable sole	--	--	--	--	--	--	--	0.01	0.01
Sablefish (North of 36° N. lat.)	--	--	--	--	--	--	--	0.40	0.40
Starry flounder	--	--	--	--	--	--	--	0.00	0.00
Widow rockfish	--	0.03	0.00	--	0.01	0.00	0.01	0.15	0.16
YELLOW EYE ROCKFISH	0.21	3.19	0.81	0.06	1.43	0.54	2.03	--	2.03
Yellowtail rockfish (North of 40°10' N. lat.)	0.13	0.61	0.10	0.02	0.15	0.04	0.22	1.10	1.32
Non-groundfish species									
California halibut	--	--	--	--	--	--	--	0.11	0.11
Dungeness crab	--	0.04	--	--	0.04	--	0.04	0.78	0.82
Other non-groundfish									
Buffalo Sculpin	0.06	0.04	--	0.06	0.04	--	0.10	--	0.10
Red Irish Lord Sculpin	0.02	0.11	0.00	0.02	0.11	0.00	0.14	--	0.14
Sculpin Unid	0.03	0.03	--	0.03	0.03	--	0.06	0.00	0.06
Skate Unid	--	--	--	--	--	--	--	0.21	0.21
Shared ecosystem component species									
Non-Humboldt Squid Unid	--	0.00	--	--	0.00	--	0.00	--	0.00

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

Table 12b. Nearshore Fixed Gear: Fishing Mortality Estimates, South of Lat 40°10'N September 2019

Gross estimated discard (mt), estimated discard mortality (mt), fleet landings (mt), and fishing mortality estimates (mt) at non-confidential depth strata for the commercial nearshore fixed gear fishery south of lat 40°10'N. The California state-permit framework is also represented. Mortality rates applied (at finer, confidential strata) are reported in Table A-4.

Nearshore Fixed Gear South of lat 40°10'N	Gross estimated discard (mt) by depth (fm)			Estimated discard mortality (mt) by depth (fm)			Estimated discard mortality (mt)	Fleet Landings (mt)	Estimated fishing mortality (mt)
	0-10	10-20	>20	0-10	10-20	>20			
Groundfish species									
Big skate	--	--	--	--	--	--	--	0.06	0.06
Black rockfish (California)	0.09	0.40	--	0.05	0.25	--	0.30	2.79	3.09
Bocaccio rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	1.90	1.90
Cabazon (California)	0.71	0.94	--	0.05	0.07	--	0.12	20.30	20.41
California scorpionfish (South of 34°27' N. lat.)	0.02	--	0.01	0.00	--	0.00	0.00	1.43	1.43
Canary rockfish	--	2.12	0.17	--	1.51	0.13	1.64	2.76	4.40
Chilipepper rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	0.04	0.04
Darkblotched rockfish	--	--	--	--	--	--	--	0.00	0.00
Deeper nearshore rockfish									
Blue/Deacon Rockfish	0.66	3.24	0.78	0.38	2.17	0.69	3.24	9.60	12.84
Brown Rockfish	0.85	2.94	0.70	0.46	1.88	0.50	2.84	17.50	20.35
Calico Rockfish	0.01	0.09	--	0.00	0.06	--	0.07	0.01	0.08
Copper Rockfish	0.04	0.06	--	0.02	0.04	--	0.07	11.60	11.67
Nearshore Rockfish Unid	--	--	--	--	--	--	--	0.25	0.25
Olive Rockfish	0.12	0.36	0.01	0.08	0.27	0.01	0.36	0.44	0.80
Quillback Rockfish	--	--	--	--	--	--	--	1.18	1.18
Treefish Rockfish	0.27	0.13	--	0.15	0.08	--	0.23	2.13	2.37
Ecosystem component species									
California Skate	--	0.17	--	--	0.01	--	0.01	--	0.01
Pacific Grenadier	--	--	--	--	--	--	--	0.00	0.00
Southern Shark	--	--	--	--	--	--	--	0.75	0.75
Lingcod (South of 40°10' N. lat.)	0.54	11.92	0.95	0.04	0.83	0.07	0.94	24.01	24.95
Longnose skate	--	--	--	--	--	--	--	0.01	0.01
Longspine thornyhead (North of 34°27' N. lat.)	--	--	--	--	--	--	--	0.04	0.04
Minor shelf rockfish (South of 40°10' N. lat.)									
Flag Rockfish	--	--	--	--	--	--	--	0.05	0.05
Greenblotched Rockfish	--	--	--	--	--	--	--	0.13	0.13
Greenspotted Rockfish	--	--	--	--	--	--	--	0.58	0.58
Greenstriped Rockfish	--	--	--	--	--	--	--	0.03	0.03
Honeycomb Rockfish	--	--	--	--	--	--	--	0.06	0.06
Mexican Rockfish	--	--	--	--	--	--	--	0.00	0.00
Rosethorn Rockfish	--	--	--	--	--	--	--	0.13	0.13
Rosy Rockfish	--	0.09	0.03	--	0.09	0.03	0.13	0.22	0.35
Shelf Rockfish Unid	--	--	--	--	--	--	--	0.43	0.43
Speckled Rockfish	--	--	--	--	--	--	--	0.42	0.42
Squarespot Rockfish	--	0.00	0.00	--	0.00	0.00	0.01	0.05	0.05
Starry Rockfish	--	--	--	--	--	--	--	0.63	0.63
Vermilion Rockfish	--	0.17	0.14	--	0.12	0.14	0.25	20.89	21.14
Yellowtail Rockfish	--	0.37	0.21	--	0.23	0.15	0.38	1.48	1.86
Minor slope rockfish (South of 40°10' N. lat.)									
Aurora Rockfish	--	--	--	--	--	--	--	0.00	0.00
Bank Rockfish	--	--	--	--	--	--	--	0.01	0.01
Blackgill Rockfish	--	--	--	--	--	--	--	0.16	0.16
Redbanded Rockfish	--	--	--	--	--	--	--	0.00	0.00
Slope Rockfish Unid	--	--	--	--	--	--	--	0.06	0.06
Mixed thornyheads									
Shortspine/Longspine Thornyhead	--	--	--	--	--	--	--	0.07	0.07
Other flatfish									
Flatfish Unid	--	--	--	--	--	--	--	0.01	0.01
Pacific Sanddab	--	0.01	--	--	0.00	--	0.00	0.78	0.78
Rock Sole	--	0.03	--	--	0.00	--	0.00	0.06	0.06
Sand Sole	--	0.07	--	--	0.00	--	0.00	0.03	0.03
Sanddab Unid	--	--	--	--	--	--	--	2.98	2.98
Other groundfish									
Kelp Greenling (California)	0.07	0.33	0.03	0.00	0.02	0.00	0.03	3.27	3.30
Leopard Shark	--	0.22	0.07	--	0.02	0.01	0.02	0.48	0.50
Other rockfish									
Rockfish Unid	--	--	--	--	--	--	--	0.03	0.03

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

Table 12b (continued).

Nearshore Fixed Gear South of lat 40°10'N	Gross estimated discard (mt) by depth (fm)			Estimated discard mortality (mt) by depth (fm)			Estimated discard mortality (mt)	Fleet Landings (mt)	Estimated fishing mortality (mt)
	0-10	10-20	>20	0-10	10-20	>20			
Pacific hake	--	--	--	--	--	--	--	0.02	0.02
Petrale sole	--	0.04	0.01	--	0.00	0.00	0.00	0.00	0.01
Sablefish (North of 36° N. lat.)	--	--	--	--	--	--	--	1.49	1.49
Sablefish (South of 36° N. lat.)	--	--	--	--	--	--	--	10.05	10.05
Shallow nearshore rockfish									
Black and Yellow Rockfish	0.08	--	--	0.05	--	--	0.05	15.66	15.71
China Rockfish	0.29	1.95	0.13	0.15	1.27	0.09	1.51	1.25	2.76
Gopher Rockfish	0.45	2.34	0.01	0.26	1.62	0.01	1.88	30.59	32.48
Grass Rockfish	0.15	--	--	0.09	--	--	0.09	8.66	8.75
Kelp Rockfish	0.09	0.02	--	0.05	0.01	--	0.06	0.78	0.84
Nearshore Rockfish Unid	--	--	--	--	--	--	--	0.00	0.00
Shortspine thornyhead (North of 34°27' N. lat.)	--	--	--	--	--	--	--	0.89	0.89
Shortspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	--	0.00	0.00
Spiny dogfish	--	5.84	0.06	--	0.41	0.00	0.41	--	0.41
Splitnose rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	0.00	0.00
Starry flounder	--	--	--	--	--	--	--	0.05	0.05
Widow rockfish	--	0.36	0.35	--	0.25	0.34	0.59	0.12	0.71
YELLOW EYE ROCKFISH	--	0.20	0.09	--	0.14	0.09	0.23	--	0.23
Non-groundfish species									
California halibut	--	0.22	--	--	0.22	--	0.22	1.65	1.86
Dungeness crab	--	0.06	--	--	0.06	--	0.06	1.34	1.40
Non-FMP flatfish									
Longfin Sanddab	--	--	--	--	--	--	--	0.02	0.02
Other non-groundfish									
California Sheephead	67.96	6.58	--	67.96	6.58	--	74.54	20.72	95.26
Sculpin Unid	--	0.10	0.06	--	0.10	0.06	0.16	0.02	0.18
Skate Unid	--	--	--	--	--	--	--	0.04	0.04
Starry Skate	--	0.08	--	--	0.08	--	0.08	--	0.08
Shared ecosystem component species									
Smelt Unid	--	--	--	--	--	--	--	0.02	0.02

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

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

Groundfish species	Open Access CA halibut			Sea cucumber			Pink shrimp			Ridgeback prawn			Non-nearshore fixed gear			Pacific halibut derby			Nearshore fixed gear		
	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate
Weight (mt)																					
Arrowtooth flounder	--	0.00	0.00	--	--	--	0.97	--	0.97	--	--	--	44.61	2.03	46.65	6.78	1.99	8.78	--	--	--
Big skate	13.78	--	13.78	--	--	--	0.27	--	0.27	--	--	--	4.39	4.30	8.69	2.37	2.15	4.52	0.05	0.15	0.19
Black rockfish (California)	--	--	--	--	--	--	--	--	--	--	--	--	0.16	12.94	13.10	--	--	--	0.45	32.06	32.51
Black rockfish (Oregon)	--	--	--	--	--	--	--	--	--	--	--	--	0.23	0.56	0.78	--	--	--	1.30	121.22	122.52
Bocaccio rockfish (South of 40°10' N. lat.)	0.00	--	0.00	--	--	--	--	--	--	0.74	0.02	0.75	0.07	8.00	8.07	--	--	--	--	1.90	1.90
Cabazon (California)	0.01	--	0.01	--	--	--	--	--	--	--	--	--	0.02	0.77	0.79	--	--	--	0.12	21.53	21.64
Cabazon (Oregon)	--	--	--	--	--	--	0.02	--	0.02	--	--	--	--	0.07	0.07	--	--	--	0.61	29.24	29.84
California scorpionfish (South of 34°27' N. lat.)	0.77	--	0.77	--	--	--	--	--	--	0.80	0.01	0.82	--	--	--	--	--	--	0.00	1.43	1.43
Canary rockfish	--	--	--	--	--	--	0.24	--	0.24	0.05	--	0.05	0.23	3.89	4.13	0.10	0.21	0.31	1.90	6.47	8.36
Chilipepper rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	0.14	--	0.14	2.13	--	2.13	--	2.73	2.73	--	--	--	--	0.04	0.04
COWCOD ROCKFISH (South of 40°10' N. lat.)	--	--	--	--	--	--	0.08	--	0.08	0.10	--	0.10	0.99	--	0.99	--	--	--	--	--	--
Darkblotched rockfish	--	--	--	--	--	--	3.12	--	3.12	0.00	--	0.00	0.66	3.47	4.12	0.06	0.14	0.20	--	0.00	0.00
Dover sole	0.00	0.01	0.01	--	--	--	4.40	--	4.40	17.24	1.58	18.82	2.88	2.33	5.21	0.03	0.15	0.18	--	--	--
Ecosystem component species																					
Aleutian Skate	--	--	--	--	--	--	0.00	--	0.00	--	--	--	0.18	--	0.18	0.06	--	0.06	--	--	--
Black Skate	--	--	--	--	--	--	--	--	--	--	--	--	4.80	0.00	4.80	--	--	--	--	--	--
California Grenadier	--	--	--	--	--	--	--	--	--	--	--	--	0.34	--	0.34	--	--	--	--	--	--
California Skate	14.67	--	14.67	--	--	--	0.16	--	0.16	1.13	--	1.13	0.05	0.02	0.07	--	--	--	0.01	--	0.01
Deepsea Skate	--	--	--	--	--	--	--	--	--	--	--	--	0.13	--	0.13	--	--	--	--	--	--
Giant Grenadier	--	--	--	--	--	--	--	--	--	--	--	--	3.76	--	3.76	--	--	--	--	--	--
Grenadier Unid	--	--	--	--	--	--	--	--	--	--	--	--	0.57	8.28	8.85	--	--	--	--	--	--
Pacific Flatnose	--	--	--	--	--	--	--	--	--	--	--	--	0.07	--	0.07	--	--	--	--	--	--
Pacific Grenadier	0.00	--	0.00	--	--	--	--	--	--	--	--	--	2.91	10.20	13.11	--	--	--	--	0.00	0.00
Sandpaper Skate	--	--	--	--	--	--	0.13	--	0.13	--	--	--	2.53	0.00	2.53	0.11	0.01	0.12	0.00	--	0.00
Softhead Grenadier	--	--	--	--	--	--	--	--	--	--	--	--	0.01	--	0.01	--	--	--	--	--	--
Soupin Shark	1.15	0.31	1.46	--	--	--	--	--	--	--	--	--	0.28	0.83	1.12	--	--	--	--	0.75	0.75
Spotted Ratfish	0.01	--	0.01	--	0.00	0.00	0.59	--	0.59	1.55	--	1.55	4.23	0.00	4.24	0.10	--	0.10	--	--	--
White Skate	--	--	--	--	--	--	--	--	--	--	--	--	0.30	--	0.30	--	--	--	--	--	--
English sole	2.12	0.15	2.27	--	0.04	0.04	0.36	--	0.36	36.30	1.13	37.44	0.08	0.00	0.08	--	--	--	--	--	--
Lingcod (North of 40°10' N. lat.)	--	--	--	--	--	--	0.12	--	0.12	--	--	--	0.80	52.10	52.90	0.01	3.12	3.13	1.85	68.61	70.46
Lingcod (South of 40°10' N. lat.)	0.22	0.30	0.52	--	--	--	0.00	--	0.00	1.69	0.02	1.71	0.11	28.51	28.62	--	--	--	0.94	24.01	24.95
Longnose skate	0.33	0.00	0.33	--	--	--	1.90	--	1.90	0.28	--	0.28	39.49	40.32	79.80	1.96	4.29	6.25	--	0.09	0.09
Longspine thornyhead (North of 34°27' N. lat.)	--	--	--	--	--	--	0.00	--	0.00	--	--	--	1.27	2.93	4.20	--	0.02	0.02	--	0.04	0.04
Longspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	--	--	--	--	--	--	0.62	12.53	13.15	--	--	--	--	--	--
Minor nearshore rockfish (North of 40°10' N. lat.)																					
Black and Yellow Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.03	0.03
Blue/Deacon Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.11	0.11	0.22	--	--	--	1.42	6.66	8.08
Brown Rockfish	--	--	--	--	--	--	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	0.07	0.07
China Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	0.02	0.02	--	--	--	0.32	5.58	5.90
Copper Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.14	0.04	0.18	--	--	--	0.01	4.09	4.10
Gopher Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01	0.09	0.10
Grass Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.23	0.23
Nearshore Rockfish Unid	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.03	0.03
Olive Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01	0.02	0.02
Quillback Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.18	0.01	0.19	--	--	--	0.20	3.24	3.44
Trefish Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Minor nearshore rockfish (South of 40°10' N. lat.)																					
Black and Yellow Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	0.33	0.33	--	--	--	0.05	15.66	15.71
Blue/Deacon Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	0.07	0.07	--	--	--	3.24	9.60	12.84
Brown Rockfish	0.11	--	0.11	--	0.00	0.00	--	--	--	--	0.07	0.07	0.09	0.03	0.12	--	--	--	2.84	17.50	20.35
Calico Rockfish	0.00	--	0.00	--	--	--	--	--	--	0.44	--	0.44	--	--	--	--	--	--	0.07	0.01	0.08
China Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	0.03	0.03	--	--	--	1.51	1.25	2.76
Copper Rockfish	0.01	0.00	0.01	--	0.02	0.02	--	--	--	0.30	0.00	0.31	0.62	0.03	0.65	--	--	--	0.07	11.60	11.67
Gopher Rockfish	0.00	--	0.00	--	--	--	--	--	--	--	--	--	0.02	0.12	0.14	--	--	--	1.88	30.59	32.48
Grass Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	0.10	0.10	--	--	--	0.09	8.66	8.75
Kelp Rockfish	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	0.01	0.01	--	--	--	0.06	0.78	0.84
Nearshore Rockfish Unid	--	--	--	--	0.00	0.00	--	--	--	--	0.02	0.02	--	0.02	0.02	--	--	--	--	0.26	0.26
Olive Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.01	--	0.01	--	--	--	0.36	0.44	0.80
Quillback Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01	0.01	--	--	--	--	1.18	1.18
Trefish Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00	--	--	--	0.23	2.13	2.37

Table 13 (continued).

Weight (mt)	Open Access CA halibut			Sea cucumber			Pink shrimp			Ridgeback prawn			Non-nearshore fixed gear			Pacific halibut derby			Nearshore fixed gear		
	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate
Minor shelf rockfish (North of 40°10' N. lat.)																					
Bocaccio Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.01	0.24	0.26	--	0.12	0.12	--	0.02	0.02
Chilipepper Rockfish	--	--	--	--	--	--	2.65	--	2.65	--	--	--	0.11	0.01	0.12	--	0.00	0.00	--	0.00	0.00
Cowcod Rockfish	--	--	--	--	--	--	0.01	--	0.01	--	--	--	0.03	--	0.03	--	--	--	--	--	--
Flag Rockfish	--	--	--	--	--	--	0.00	--	0.00	--	--	--	--	0.01	0.01	--	--	--	--	--	--
Greenspotted Rockfish	--	--	--	--	--	--	0.00	--	0.00	--	--	--	--	0.02	0.02	--	--	--	--	--	--
Greenstriped Rockfish	--	--	--	--	--	--	1.48	--	1.48	--	--	--	0.82	0.31	1.12	0.07	0.03	0.10	--	0.00	0.00
Halfbanded Rockfish	--	--	--	--	--	--	0.01	--	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Harlequin Rockfish	--	--	--	--	--	--	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Puget Sound Rockfish	--	--	--	--	--	--	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Pygmy Rockfish	--	--	--	--	--	--	0.02	--	0.02	--	--	--	--	--	--	--	--	--	--	--	--
Redstripe Rockfish	--	--	--	--	--	--	0.01	--	0.01	--	--	--	0.01	0.00	0.01	--	0.00	0.00	--	--	--
Rosethorn Rockfish	--	--	--	--	--	--	0.01	--	0.01	--	--	--	0.31	0.30	0.61	0.01	0.01	0.01	0.02	0.01	0.03
Rosy Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.01	0.00	0.01	--	0.00	0.00	0.03	0.00	0.04
Shelf Rockfish Unid	--	--	--	--	--	--	0.46	--	0.46	--	--	--	0.00	0.38	0.39	--	0.01	0.01	--	0.09	0.09
Silvergray Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.02	0.33	0.34	--	0.01	0.01	--	--	--
Squarespot Rockfish	--	--	--	--	--	--	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Starry Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Stripetail Rockfish	--	--	--	--	--	--	8.63	--	8.63	--	--	--	--	0.00	0.00	--	0.00	0.00	--	--	--
Tiger Rockfish	--	--	--	--	--	--	0.00	--	0.00	--	--	--	--	0.01	0.01	--	0.00	0.00	0.02	0.30	0.31
Vermilion Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.32	0.39	0.70	--	--	--	0.10	4.04	4.14
Minor shelf rockfish (South of 40°10' N. lat.)																					
Flag Rockfish	--	--	--	--	--	--	--	--	--	0.00	--	0.00	--	0.10	0.10	--	--	--	--	0.05	0.05
Freckled Rockfish	--	--	--	--	--	--	--	--	--	0.00	--	0.00	--	--	--	--	--	--	--	--	--
Greenblotched Rockfish	--	--	--	--	--	--	--	--	--	0.44	--	0.44	--	0.19	0.19	--	--	--	--	0.13	0.13
Greenspotted Rockfish	--	--	--	--	--	--	--	--	--	0.13	--	0.13	--	1.18	1.18	--	--	--	--	0.58	0.58
Greenstriped Rockfish	--	--	--	--	--	--	0.04	--	0.04	0.16	--	0.16	0.18	0.14	0.32	--	--	--	--	0.03	0.03
Halfbanded Rockfish	0.00	--	0.00	--	--	--	0.00	--	0.00	29.27	--	29.27	--	--	--	--	--	--	--	--	--
Honeycomb Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00	--	--	--	--	0.06	0.06
Mexican Rockfish	0.00	--	0.00	--	--	--	--	--	--	0.01	--	0.01	--	0.51	0.51	--	--	--	--	0.00	0.00
Pink Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	0.69	0.69	--	--	--	--	--	--
Rosethorn Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	0.04	0.04	--	--	--	--	0.13	0.13
Rosy Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.10	0.11	--	--	--	0.13	0.22	0.35
Shelf Rockfish Unid	0.02	--	0.02	--	--	--	0.46	--	0.46	--	--	--	--	1.11	1.11	--	--	--	--	0.43	0.43
Speckled Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.32	0.47	0.79	--	--	--	--	0.42	0.42
Squarespot Rockfish	--	--	--	--	--	--	0.00	--	0.00	0.01	--	0.01	--	0.02	0.02	--	--	--	0.01	0.05	0.05
Starry Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.06	0.71	0.77	--	--	--	--	0.63	0.63
Stripetail Rockfish	0.00	--	0.00	--	--	--	0.90	--	0.90	27.11	--	27.11	--	--	--	--	--	--	--	--	--
Vermilion Rockfish	0.07	--	0.07	--	0.00	0.00	--	--	--	0.19	0.01	0.20	0.22	33.75	33.96	--	--	--	0.25	20.89	21.14
Yellowtail Rockfish	--	--	--	--	--	--	0.00	--	0.00	--	--	--	--	2.84	2.84	--	--	--	0.38	1.48	1.86
Minor slope rockfish (North of 40°10' N. lat.)																					
Aurora Rockfish	--	--	--	--	--	--	0.02	--	0.02	--	--	--	0.05	0.17	0.22	--	0.00	0.00	--	--	--
Bank Rockfish	--	--	--	--	--	--	0.00	--	0.00	--	--	--	0.01	--	0.01	--	--	--	--	--	--
Blackgill Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.15	0.29	0.44	--	0.00	0.00	--	--	--
Redbanded Rockfish	--	--	--	--	--	--	0.22	--	0.22	--	--	--	5.13	18.89	24.02	0.08	0.86	0.94	--	0.05	0.05
Rougheye/Blackspotted Rockfish	--	--	--	--	--	--	0.05	--	0.05	--	--	--	13.41	23.76	37.17	0.40	0.70	1.10	--	0.02	0.02
Sharpchin Rockfish	--	--	--	--	--	--	0.03	--	0.03	--	--	--	0.01	--	0.01	--	--	--	--	--	--
Shortraker Rockfish	--	--	--	--	--	--	0.00	--	0.00	--	--	--	4.40	1.82	6.22	0.03	0.06	0.09	--	--	--
Shortraker/Rougheye/Blackspotted Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.02	--	0.02	--	--	--	--	--	--
Slope Rockfish Unid	--	--	--	--	--	--	--	--	--	--	--	--	0.02	5.93	5.95	--	0.02	0.02	--	0.01	0.01
Splitnose Rockfish	--	--	--	--	--	--	3.87	--	3.87	--	--	--	0.02	0.02	0.04	--	0.00	0.00	--	--	--
Yellowmouth Rockfish	--	--	--	--	--	--	0.01	--	0.01	--	--	--	0.26	0.19	0.45	--	0.00	0.00	--	--	--
Minor slope rockfish (South of 40°10' N. lat.)																					
Aurora Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.03	1.08	1.12	--	--	--	--	0.00	0.00
Bank Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	0.68	0.68	--	--	--	--	0.01	0.01
Blackgill Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.80	17.49	18.29	--	--	--	--	0.16	0.16
Redbanded Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.10	0.37	0.47	--	--	--	--	0.00	0.00
Rougheye/Blackspotted Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	0.02	0.02	--	--	--	--	--	--
Shortraker Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.05	0.00	0.05	--	--	--	--	--	--
Slope Rockfish Unid	--	--	--	--	--	--	--	--	--	--	--	--	--	3.35	3.35	--	--	--	--	0.06	0.06
Mixed thornyheads																					
Shortspine/Longspine Thornyhead	--	--	--	--	--	--	--	--	--	--	--	--	--	1.24	1.24	--	--	--	--	0.07	0.07

Table 13 (continued).

Weight (mt)	Open Access CA halibut			Sea cucumber			Pink shrimp			Ridgeback prawn			Non-nearshore fixed gear			Pacific halibut derby			Nearshore fixed gear		
	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate
Other flatfish																					
Butter Sole	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Curlfin Sole	1.15	0.18	1.34	--	--	--	--	--	--	0.12	--	0.12	--	--	--	--	--	--	--	--	--
Flatfish Unid	0.04	0.10	0.14	--	0.01	0.01	1.34	--	1.34	--	1.91	1.91	0.02	0.02	0.04	--	--	--	--	0.01	0.01
Flathead Sole	--	--	--	--	--	--	0.42	--	0.42	--	--	--	--	0.06	0.06	--	--	--	--	--	--
Pacific Sanddab	0.71	0.07	0.78	--	--	--	3.22	--	3.22	20.51	--	20.51	--	0.12	0.12	--	--	--	--	0.00	0.78
Rex Sole	0.04	--	0.04	--	--	--	28.26	--	28.26	2.45	--	2.45	0.00	0.00	0.00	--	--	--	--	--	--
Rock Sole	0.02	0.09	0.10	--	--	--	0.02	--	0.02	--	0.14	0.14	0.06	0.01	0.08	--	--	--	--	0.00	0.06
Sand Sole	4.13	9.30	13.42	--	--	--	0.14	--	0.14	--	--	--	--	--	--	--	--	--	--	0.00	0.03
Sanddab Unid	--	--	--	--	0.00	0.00	0.01	--	0.01	--	0.76	0.76	--	4.39	4.39	--	--	--	--	--	2.98
Other groundfish																					
Cabazon (Washington)	--	--	--	--	--	--	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Kelp Greenling (California)	--	--	--	--	--	--	--	--	--	--	--	--	0.02	0.16	0.18	--	--	--	--	0.03	3.65
Kelp Greenling (Oregon)	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00	--	--	--	--	0.05	17.88
Leopard Shark	1.49	--	1.49	--	--	--	--	--	--	1.74	0.01	1.75	1.32	0.09	1.41	--	--	--	--	0.02	0.48
Other rockfish																					
Rockfish Unid	--	--	--	--	--	--	--	--	--	--	--	--	--	0.59	0.59	--	--	--	--	--	0.03
Pacific cod	--	--	--	--	--	--	--	--	--	--	--	--	0.03	0.30	0.34	--	0.02	0.02	--	--	--
Pacific hake	0.71	--	0.71	--	--	--	118.51	--	118.51	5.15	--	5.15	1.30	0.28	1.59	0.02	0.02	0.04	--	0.02	0.02
Pacific ocean perch (North of 40°10' N. lat.)	--	--	--	--	--	--	0.06	--	0.06	--	--	--	0.16	0.18	0.35	--	0.01	0.01	--	0.00	0.00
Petrale sole	0.10	0.87	0.97	--	--	--	0.76	--	0.76	--	0.34	0.34	1.48	2.41	3.88	0.04	0.08	0.13	0.00	0.01	0.02
Roundfish unid	--	--	--	--	--	--	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Sablefish (North of 36° N. lat.)	--	--	--	--	--	--	0.16	--	0.16	--	--	--	87.89	1,944.64	2,032.54	1.95	60.76	62.71	--	1.88	1.88
Sablefish (South of 36° N. lat.)	--	--	--	--	--	--	--	--	--	--	--	--	4.21	394.87	399.08	--	--	--	--	10.05	10.05
Shortbelly rockfish	--	--	--	--	--	--	3.02	--	3.02	0.67	--	0.67	--	0.03	0.03	--	--	--	--	--	--
Shortspine thornyhead (North of 34°27' N. lat.)	--	--	--	--	--	--	0.13	--	0.13	--	--	--	9.43	55.56	64.99	0.54	0.57	1.11	--	0.89	0.89
Shortspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	--	--	--	--	--	--	2.77	102.57	105.34	--	--	--	--	0.00	0.00
Spiny dogfish	3.44	--	3.44	--	--	--	1.14	--	1.14	1.01	--	1.01	225.12	1.65	226.76	0.43	0.01	0.44	0.41	--	0.41
Splittnose rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	0.51	--	0.51	1.20	--	1.20	--	0.02	0.02	--	--	--	--	0.00	0.00
Starry flounder	1.52	2.87	4.39	--	--	--	--	--	--	--	--	--	--	0.00	0.00	--	--	--	--	0.05	0.05
Widow rockfish	--	--	--	--	--	--	0.23	--	0.23	--	--	--	0.30	0.96	1.26	--	--	--	--	0.61	0.27
YELLOW EYE ROCKFISH	--	--	--	--	--	--	0.00	--	0.00	--	--	--	1.34	--	1.34	0.01	--	0.01	2.27	--	2.27
Yellowtail rockfish (North of 40°10' N. lat.)	--	--	--	--	--	--	1.08	--	1.08	--	--	--	0.71	0.71	1.42	--	0.04	0.04	0.22	1.10	1.32
Non-groundfish species																					
California halibut	28.80	72.38	101.17	--	0.01	0.01	--	--	--	0.62	1.62	2.23	--	1.53	1.53	--	--	--	--	0.22	1.76
Dungeness crab	61.07	--	61.07	--	--	--	0.02	--	0.02	--	--	--	0.48	3.22	3.70	--	--	--	--	0.10	2.12
Non-FMP flatfish																					
Deepsea Sole	--	--	--	--	--	--	--	--	--	--	--	--	0.00	--	0.00	--	--	--	--	--	--
Diamond Turbot	0.19	--	0.19	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hornyhead Turbot	1.64	0.01	1.65	--	--	--	--	--	--	2.00	0.03	2.03	--	--	--	--	--	--	--	--	--
Longfin Sanddab	0.13	--	0.13	--	--	--	--	--	--	3.82	--	3.82	--	--	--	--	--	--	--	0.02	0.02
Slender Sole	--	--	--	--	--	--	145.13	--	145.13	7.58	--	7.58	--	--	--	--	--	--	--	--	--
Speckled Sanddab	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other non-groundfish																					
Buffalo Sculpin	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.10	0.10
California Sheephead	0.04	--	0.04	--	--	--	--	--	--	--	--	--	--	0.01	0.01	--	--	--	--	74.54	20.72
Red Irish Lord Sculpin	--	--	--	--	--	--	--	--	--	--	--	--	0.00	--	0.00	--	--	--	--	0.14	0.14
Sculpin Unid	0.06	--	0.06	--	--	--	0.12	--	0.12	0.02	0.05	0.07	0.01	--	0.01	--	--	--	--	0.22	0.02
Skate Unid	--	0.02	0.02	--	0.18	0.18	0.00	--	0.00	--	1.75	1.75	0.01	0.89	0.90	--	0.01	0.01	--	0.25	0.25
Squid Unid	--	--	--	--	--	--	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Starry Skate	0.04	--	0.04	--	--	--	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	0.08	0.08
Shared ecosystem component species																					
Barracudina Unid	--	--	--	--	--	--	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Lanternfish Unid	--	--	--	--	--	--	0.17	--	0.17	--	--	--	--	--	--	--	--	--	--	--	--
Night Smelt	--	--	--	--	--	--	0.08	--	0.08	--	--	--	--	--	--	--	--	--	--	--	--
Non-Eulachon Smelt Unid	--	--	--	--	--	--	3.98	--	3.98	0.06	--	0.06	--	--	--	--	--	--	--	--	--
Non-Humboldt Squid Unid	0.04	--	0.04	--	--	--	87.61	--	87.61	0.28	--	0.28	0.00	--	0.00	--	--	--	--	0.00	0.00
Pacific Saury	--	--	--	--	--	--	0.03	--	0.03	--	--	--	--	--	--	--	--	--	--	--	--
Smelt Unid	--	--	--	--	--	--	0.10	--	0.10	--	--	--	--	0.04	0.04	--	--	--	--	0.02	0.02

Table 14. Incidental Landings.

Incidental landings (mt) of groundfish from unobserved shoreside commercial fisheries by gear group. To maintain confidentiality, discard and landings from non-EM exempted fishing permits are incorporated.

	Shoreside Commercial Landings (mt)							Total Incidental Estimate
	Bottom Trawl	Hook & Line	Other Miscellaneous Gears	Other Net Gears	Pot	Shrimp Trawl	Troll	
Groundfish species								
Arrowtooth flounder	--	--	--	0.01	--	0.05	--	0.05
Big skate	0.13	0.04	--	--	--	--	--	0.17
Black rockfish (California)	--	--	--	--	--	--	0.25	0.25
Black rockfish (Oregon)	--	0.06	--	--	--	--	0.17	0.23
Bocaccio rockfish (South of 40°10' N. lat.)	--	1.03	--	--	0.01	0.00	0.09	1.14
Cabazon (California)	--	0.00	0.08	0.03	0.02	--	--	0.13
Cabazon (Oregon)	--	0.01	--	--	--	--	--	0.01
Canary rockfish	0.11	0.18	--	--	0.00	--	0.12	0.41
Chilipepper rockfish (South of 40°10' N. lat.)	--	0.05	--	--	--	--	0.02	0.07
Darkblotched rockfish	0.31	0.00	--	--	--	--	--	0.31
Dover sole	6.85	0.01	--	0.03	--	0.06	--	6.95
Ecosystem component species								
California Skate	--	--	--	0.49	--	0.00	--	0.49
Grenadier Unid	--	0.03	--	--	--	--	--	0.03
Soupin Shark	--	0.49	--	5.25	0.01	--	--	5.75
Spotted Ratfish	--	0.00	--	--	--	--	--	0.00
English sole	0.86	--	--	0.01	--	1.54	--	2.41
Lingcod (North of 40°10' N. lat.)	4.55	0.34	--	0.00	0.38	--	3.16	8.43
Lingcod (South of 40°10' N. lat.)	0.10	1.78	0.03	0.08	0.25	0.01	1.61	3.86
Longnose skate	--	0.02	--	0.77	--	--	--	0.80
Longspine thornyhead (North of 34°27' N. lat.)	0.00	0.06	0.02	--	--	--	--	0.08
Longspine thornyhead (South of 34°27' N. lat.)	--	0.79	0.04	--	--	--	--	0.83
Minor nearshore rockfish (North of 40°10' N. lat.)								
Blue/Deacon Rockfish	--	--	--	--	--	--	0.02	0.02
China Rockfish	--	0.00	--	--	--	--	--	0.00
Copper Rockfish	--	0.00	--	--	--	--	0.00	0.01
Minor nearshore rockfish (South of 40°10' N. lat.)								
Black and Yellow Rockfish	--	0.00	0.14	--	0.02	--	--	0.16
Blue/Deacon Rockfish	--	0.32	0.00	--	--	--	--	0.32
Brown Rockfish	--	--	--	0.00	0.01	0.01	0.00	0.02
China Rockfish	--	--	0.01	--	--	--	--	0.01
Copper Rockfish	--	0.01	0.05	0.00	--	0.01	--	0.07
Gopher Rockfish	--	--	0.01	--	--	--	--	0.01
Grass Rockfish	--	0.00	0.00	0.00	0.03	--	--	0.04
Nearshore Rockfish Unid	--	0.01	--	0.00	--	0.01	0.00	0.03
Olive Rockfish	--	0.09	--	--	--	--	0.00	0.09
Quillback Rockfish	--	0.00	--	--	--	--	--	0.00
Minor shelf rockfish (North of 40°10' N. lat.)								
Bocaccio Rockfish	0.00	--	--	--	--	--	--	0.00
Chilipepper Rockfish	5.84	--	--	--	--	--	--	5.84
Cowcod Rockfish	0.00	--	--	--	--	--	--	0.00
Greenspotted Rockfish	0.00	--	--	--	--	--	--	0.00
Greenstriped Rockfish	0.00	--	--	--	--	--	--	0.00
Rosethorn Rockfish	--	0.00	--	--	--	--	--	0.00
Shelf Rockfish Unid	--	--	--	--	--	--	0.12	0.12
Silvergray Rockfish	0.00	--	--	--	--	--	--	0.00
Stripetail Rockfish	0.01	--	--	--	--	--	--	0.01
Vermilion Rockfish	--	0.03	--	--	--	--	0.00	0.03
Minor shelf rockfish (South of 40°10' N. lat.)								
Flag Rockfish	--	0.00	--	--	--	--	--	0.00
Greenblotched Rockfish	--	0.00	--	--	--	--	--	0.00
Greenspotted Rockfish	--	0.01	--	--	--	--	--	0.01
Honeycomb Rockfish	--	0.01	--	--	--	--	--	0.01
Rosethorn Rockfish	--	0.00	--	--	--	--	--	0.00
Rosy Rockfish	--	0.00	--	--	--	--	--	0.00
Shelf Rockfish Unid	--	0.12	--	--	--	0.02	0.00	0.15
Speckled Rockfish	--	0.10	--	--	--	--	--	0.10
Squarespot Rockfish	--	0.00	--	--	--	--	--	0.00
Starry Rockfish	--	0.01	--	--	--	--	--	0.01
Swordspine Rockfish	--	0.00	--	--	--	--	--	0.00
Vermilion Rockfish	--	3.77	0.01	0.04	0.01	0.03	0.27	4.12
Yellowtail Rockfish	--	4.01	--	--	0.25	--	0.17	4.43

Table 14 (continued).

	Shoreside Commercial Landings (mt)							Total Incidental Estimate
	Bottom Trawl	Hook & Line	Other Miscellaneous Gears	Other Net Gears	Pot	Shrimp Trawl	Troll	
Minor slope rockfish (North of 40°10' N. lat.)								
Aurora Rockfish	0.05	--	--	--	--	--	--	0.05
Redbanded Rockfish	0.94	0.00	--	--	--	--	--	0.94
Rougheye/Blackspotted Rockfish	--	0.05	--	--	--	--	--	0.05
Shortraker Rockfish	--	0.01	--	--	--	--	--	0.01
Slope Rockfish Unid	--	--	--	--	--	--	0.06	0.06
Minor slope rockfish (South of 40°10' N. lat.)								
Aurora Rockfish	--	0.03	--	--	--	--	--	0.03
Bank Rockfish	--	--	--	0.70	--	--	--	0.70
Blackgill Rockfish	--	0.48	--	0.05	0.02	--	--	0.55
Slope Rockfish Unid	--	0.00	--	--	0.00	0.02	0.01	0.04
Mixed thomyheads								
Shortspine/Longspine Thomyhead	--	--	0.01	--	0.01	--	--	0.02
Other flatfish								
Curlfin Sole	0.07	--	--	--	--	0.68	--	0.75
Flatfish Unid	0.01	0.02	0.01	0.22	--	0.96	--	1.23
Flathead Sole	--	--	--	0.00	--	--	--	0.00
Pacific Sanddab	--	0.00	--	--	--	--	--	0.00
Rex Sole	0.84	--	--	--	--	0.01	0.01	0.86
Rock Sole	0.02	0.00	--	0.06	--	0.18	--	0.27
Sand Sole	0.09	0.00	--	0.01	--	--	0.00	0.10
Sanddab Unid	0.05	0.13	--	0.14	--	0.14	0.00	0.47
Other groundfish								
Kelp Greenling (California)	--	--	--	--	0.01	--	--	0.01
Kelp Greenling (Oregon)	--	0.03	--	--	--	--	--	0.03
Leopard Shark	0.02	0.03	--	3.38	0.06	0.02	--	3.51
Other rockfish								
Rockfish Unid	--	--	--	--	--	--	0.00	0.00
Pacific cod	0.15	--	--	--	--	--	--	0.15
Pacific hake	--	--	--	--	--	--	0.00	0.00
Pacific ocean perch (North of 40°10' N. lat.)	--	0.00	--	--	--	--	--	0.00
Petrable sole	2.92	0.07	--	0.16	0.01	0.07	0.04	3.28
Sablefish (North of 36° N. lat.)	1.41	2.02	0.22	--	2.50	--	0.22	6.36
Sablefish (South of 36° N. lat.)	--	10.30	0.89	0.24	0.40	--	--	11.83
Shortspine thomyhead (North of 34°27' N. lat.)	0.49	0.43	0.19	--	--	--	--	1.11
Shortspine thomyhead (South of 34°27' N. lat.)	--	5.35	0.54	--	0.00	--	0.11	6.00
Spiny dogfish	--	0.04	--	0.57	--	0.10	--	0.71
Starry flounder	0.21	0.08	--	--	--	--	--	0.29
Widow rockfish	0.03	0.28	--	--	0.00	--	0.03	0.35
YELLOW EYE ROCKFISH	--	0.01	--	--	--	--	--	0.01
Yellowtail rockfish (North of 40°10' N. lat.)	0.00	0.00	--	--	--	--	1.77	1.78
California scorpionfish (South of 34°27' N. lat.)	--	--	--	0.01	--	0.00	--	0.01
Non-groundfish species								
California halibut	1.24	92.95	0.14	62.59	0.47	18.11	1.54	177.04
Dungeness crab	0.22	4.26	12.37	0.83	24,624.09	--	1.11	24,642.88
Non-FMP flatfish								
Hornyhead Turbot	--	--	--	--	--	0.05	--	0.05
Other non-groundfish								
California Sheephead	--	0.06	--	0.09	0.11	--	--	0.26
Sculpin Unid	0.25	0.00	--	0.01	--	0.05	--	0.31
Skate Unid	0.84	--	0.00	1.83	0.01	0.51	--	3.19
Shared ecosystem component species								
Smelt Unid	--	3.95	0.10	129.14	0.21	--	--	133.40

Table 15. Fishing Mortality Estimates by Sector.

Estimated fishing mortality (mt) of groundfish and a subset of non-groundfish species by sector.

	Commercial fisheries														WA tribal shoreside	Recreational fishing mortality			Research	Estimated fishing mortality
	IFQ/Co-op Management						Non-IFQ													
	Bottom trawl	Fixed gear	Midwater rockfish	Shoreside midwater hake	At-sea midwater CP	At-sea midwater MSCV	OA CA halibut	Sea cucumber	Pink shrimp	Ridgeback prawn	Non- nearshore fixed gear	Pacific halibut derby	Nearshore fixed gear	Incidental fisheries		WA	OR	CA		
Groundfish species																				
Arrowtooth flounder	999.09	2.94	0.75	6.81	45.36	10.02	0.00	--	0.97	--	46.65	8.78	--	0.05	0.90	--	0.04	--	10.31	1,132.68
Big skate	142.58	0.86	0.41	1.94	0.60	2.08	13.78	--	0.27	--	8.69	4.52	0.19	0.17	3.91	--	0.11	--	3.24	183.35
Black rockfish (California)	0.01	--	--	--	--	--	--	--	--	--	13.10	--	32.51	0.25	--	--	--	95.68	0.07	141.62
Black rockfish (Oregon)	0.00	--	0.00	0.00	--	--	--	--	--	--	0.78	--	122.52	0.23	--	--	295.26	--	0.00	418.80
Black rockfish (Washington)	0.02	--	0.00	--	--	--	--	--	--	--	--	--	--	--	0.00	251.39	--	--	0.03	251.45
Bocaccio rockfish (South of 40°10' N. lat.)	177.64	--	--	--	--	--	0.00	--	--	0.75	8.07	--	1.90	1.14	--	--	--	118.50	4.72	312.73
Cabazon (California)	--	--	--	--	--	--	0.01	--	--	--	0.79	--	21.64	0.13	--	--	--	29.35	0.00	51.93
Cabazon (Oregon)	--	--	--	--	--	--	--	--	0.02	--	0.07	--	29.84	0.01	--	--	13.16	--	0.00	43.11
California scorpionfish (North of 34°27' N. lat.)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00	0.00
California scorpionfish (South of 34°27' N. lat.)	--	--	--	--	--	--	0.77	--	--	0.82	--	--	1.43	0.01	--	--	--	98.88	0.17	102.09
Canary rockfish	184.93	0.00	64.26	194.25	0.86	4.69	--	--	0.24	0.05	4.13	0.31	8.36	0.41	21.07	4.52	39.04	61.84	6.22	595.17
Chilipepper rockfish (South of 40°10' N. lat.)	278.36	--	--	--	--	--	--	--	0.14	2.13	2.73	--	0.04	0.07	--	--	--	2.02	14.05	299.54
COWCOD ROCKFISH (South of 40°10' N. lat.)	0.42	--	--	--	--	--	--	--	0.08	0.10	0.99	--	--	--	--	--	--	1.03	0.63	3.25
Darkblotched rockfish	185.54	0.15	0.86	80.98	41.84	23.24	--	--	3.12	0.00	4.12	0.20	0.00	0.31	0.22	--	--	--	2.51	343.11
Dover sole	6,355.55	0.79	16.97	0.01	2.10	0.55	0.01	--	4.40	18.82	5.21	0.18	--	6.95	42.46	--	0.01	--	50.84	6,504.85
Ecosystem component species																				
Alaska Skate	--	--	--	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
Aleutian Skate	1.59	0.02	--	--	--	--	--	--	0.00	--	0.18	0.06	--	--	--	--	--	--	0.01	1.85
Black Skate	8.75	0.03	--	--	--	--	--	--	--	--	4.80	--	--	--	--	--	--	--	0.62	14.21
California Grenadier	0.89	--	--	--	--	--	--	--	--	--	0.34	--	--	--	--	--	--	--	0.08	1.32
California Skate	1.80	--	--	--	--	--	14.67	--	0.16	1.13	0.07	--	0.01	0.49	--	--	--	--	0.35	18.68
Deepsea Skate	0.39	--	--	--	0.00	--	--	--	--	--	0.13	--	--	--	--	--	--	--	0.07	0.60
Ghostly Grenadier	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
Giant Grenadier	41.62	1.04	0.28	--	--	--	--	--	--	--	3.76	--	--	--	--	--	--	--	2.06	48.76
Grenadier Unid	3.16	0.12	--	--	5.86	0.00	--	--	--	--	8.85	--	--	0.03	--	--	--	--	--	18.02
Pacific Flatnose	0.35	--	--	--	0.00	--	--	--	--	--	0.07	--	--	--	--	--	--	--	0.16	0.58
Pacific Grenadier	11.74	1.13	--	--	--	--	0.00	--	--	--	13.11	--	0.00	--	--	--	--	--	5.13	31.11
Popeye Grenadier	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.01
Sandpaper Skate	48.76	0.32	0.03	--	0.04	0.00	--	--	0.13	--	2.53	0.12	0.00	--	--	--	--	--	0.77	52.69
Shark and Skate Unid	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Shoulderspot Grenadier	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Smooth Grenadier	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.05	0.06
Softhead Grenadier	--	--	--	--	--	--	--	--	--	--	0.01	--	--	--	--	--	--	--	--	0.01
Soupin Shark	2.71	--	0.05	0.77	0.63	1.06	1.46	--	--	--	1.12	--	0.75	5.75	--	--	0.01	--	0.64	14.95
Spotted Ratfish	74.24	0.04	0.07	0.01	0.01	0.00	0.01	0.00	0.59	1.55	4.24	0.10	--	0.00	0.00	--	--	--	3.33	84.19
White Skate	--	--	--	--	--	--	--	--	--	--	0.30	--	--	--	--	--	--	--	--	0.30
English sole	208.30	--	0.75	0.02	0.13	0.05	2.27	0.04	0.36	37.44	0.08	--	--	2.41	40.45	--	0.01	--	4.84	297.15
Groundfish unid	--	--	0.00	0.16	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.16

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Table 15 (continued).

	Commercial fisheries														WA tribal shoreside	Recreational fishing mortality			Research	Estimated fishing mortality
	IFQ/Co-op Management						Non-IFQ													
	Bottom trawl	Fixed gear	Midwater rockfish	Shoreside midwater hake	At-sea midwater CP	At-sea midwater MSCV	OA CA halibut	Sea cucumber	Pink shrimp	Ridgeback prawn	Non- nearshore fixed gear	Pacific halibut derby	Nearshore fixed gear	Incidental fisheries		WA	OR	CA		
Lingcod (North of 40°10' N. lat.)	408.02	3.26	4.30	13.22	0.15	3.22	--	--	0.12	--	52.90	3.13	70.46	8.43	23.63	141.80	213.57	57.24	8.84	1,012.29
Lingcod (South of 40°10' N. lat.)	48.84	0.02	--	--	--	--	0.52	--	0.00	1.71	28.62	--	24.95	3.86	--	--	--	346.21	2.00	456.74
Longnose skate	669.76	3.04	1.82	0.45	0.93	1.01	0.33	--	1.90	0.28	79.80	6.25	0.09	0.80	13.04	--	0.23	--	12.45	792.18
Longspine thornyhead (North of 34°27' N. lat.)	344.13	0.02	3.41	--	0.01	--	--	--	0.00	--	4.20	0.02	0.04	0.08	0.77	--	--	--	17.49	370.18
Longspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	--	--	--	--	13.15	--	--	0.83	--	--	--	--	1.33	15.31
Minor nearshore rockfish (North of 40°10' N. lat.)																				
Black and Yellow Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.03	--	--	--	0.00	0.02	0.00	0.06
Blue/Deacon Rockfish	0.00	--	--	--	--	--	--	--	--	--	0.22	--	8.08	0.02	--	0.72	13.85	3.02	0.02	25.93
Brown Rockfish	--	--	--	--	--	--	--	--	0.00	--	--	--	0.07	--	--	--	0.05	0.60	0.00	0.72
China Rockfish	--	--	--	--	--	--	--	--	--	--	0.02	--	5.90	0.00	--	1.41	2.57	1.21	0.01	11.11
Copper Rockfish	--	--	--	--	--	--	--	--	--	--	0.18	--	4.10	0.01	--	1.80	9.10	6.12	0.04	21.34
Gopher Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.10	--	--	--	0.02	0.10	--	0.22
Grass Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.23	--	--	--	0.02	0.14	--	0.40
Nearshore Rockfish Unid	0.00	--	--	--	--	--	--	--	--	--	--	--	0.03	--	0.00	--	--	--	--	0.03
Olive Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.02	--	--	--	0.03	0.59	--	0.65
Quillback Rockfish	0.04	--	--	--	--	--	--	--	--	--	0.19	--	3.44	--	--	1.95	9.35	4.15	0.04	19.16
Treefish Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.00	--	--	--	--	--	--	0.00
Minor nearshore rockfish (South of 40°10' N. lat.)																				
Black and Yellow Rockfish	--	--	--	--	--	--	--	--	--	--	0.33	--	15.71	0.16	--	--	--	3.45	--	19.65
Blue/Deacon Rockfish	--	--	--	--	--	--	--	--	--	--	0.07	--	12.84	0.32	--	--	--	198.23	0.09	211.55
Brown Rockfish	--	--	--	--	--	--	0.11	0.00	--	0.07	0.12	--	20.35	0.02	--	--	--	92.11	0.02	112.80
Calico Rockfish	--	--	--	--	--	--	0.00	--	--	0.44	--	--	0.08	--	--	--	--	0.40	0.00	0.93
China Rockfish	--	--	--	--	--	--	--	--	--	--	0.03	--	2.76	0.01	--	--	--	13.00	--	15.80
Copper Rockfish	0.00	--	--	--	--	--	0.01	0.02	--	0.31	0.65	--	11.67	0.07	--	--	--	183.32	0.28	196.34
Gopher Rockfish	--	--	--	--	--	--	0.00	--	--	--	0.14	--	32.48	0.01	--	--	--	40.32	0.00	72.95
Grass Rockfish	--	--	--	--	--	--	--	--	--	--	0.10	--	8.75	0.04	--	--	--	2.35	--	11.24
Kelp Rockfish	--	--	--	--	--	--	0.00	--	--	--	0.01	--	0.84	--	--	--	--	5.64	--	6.48
Nearshore Rockfish Unid	--	--	--	--	--	--	--	0.00	--	0.02	0.02	--	0.26	0.03	--	--	--	--	--	0.33
Olive Rockfish	--	--	--	--	--	--	--	--	--	--	0.01	--	0.80	0.09	--	--	--	46.32	0.09	47.31
Quillback Rockfish	--	--	--	--	--	--	--	--	--	--	0.01	--	1.18	0.00	--	--	--	5.96	--	7.15
Treefish Rockfish	--	--	--	--	--	--	--	--	--	--	0.00	--	2.37	--	--	--	--	10.28	0.00	12.65
Minor shelf rockfish (North of 40°10' N. lat.)																				
Bocaccio Rockfish	6.38	--	11.01	6.84	0.50	2.42	--	--	--	--	0.26	0.12	0.02	0.00	1.82	0.81	0.65	0.05	0.28	31.15
Chilipepper Rockfish	99.80	0.00	7.64	9.88	0.19	3.09	--	--	2.65	--	0.12	0.00	0.00	5.84	--	--	0.01	0.00	1.21	130.42
Cowcod Rockfish	0.05	--	--	--	--	--	--	--	0.01	--	0.03	--	--	0.00	--	--	0.00	0.00	0.00	0.10
Flag Rockfish	0.00	--	--	--	--	--	--	--	0.00	--	0.01	--	--	--	--	--	--	--	--	0.01
Greenspotted Rockfish	0.17	--	0.02	--	--	--	--	--	0.00	--	0.02	--	--	0.00	0.03	--	--	--	0.04	0.27
Greenstriped Rockfish	23.93	0.03	0.21	0.03	--	0.00	--	--	1.48	--	1.12	0.10	0.00	0.00	0.12	--	0.02	--	2.42	29.47
Halfbanded Rockfish	0.00	--	--	--	--	--	--	--	0.01	--	--	--	--	--	--	--	--	--	0.00	0.01
Harlequin Rockfish	0.00	--	0.00	0.01	0.00	0.00	--	--	0.00	--	--	--	--	--	--	--	--	--	--	0.02
Puget Sound Rockfish	--	--	--	--	--	--	--	--	0.00	--	--	--	--	--	--	--	--	--	0.00	0.00
Pygmy Rockfish	0.00	--	0.00	0.00	0.00	--	--	--	0.02	--	--	--	--	--	--	--	--	--	0.01	0.03
Redstripe Rockfish	0.25	0.00	14.67	12.39	0.12	2.40	--	--	0.01	--	0.01	0.00	--	--	0.46	--	0.02	--	0.28	30.61
Rockfish Unid	--	--	--	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Rosethorn Rockfish	7.61	0.04	0.02	--	--	--	--	--	0.01	--	0.61	0.01	0.03	0.00	0.11	--	0.04	--	0.35	8.83
Rosy Rockfish	--	--	--	--	--	--	--	--	--	--	0.01	0.00	0.04	--	--	--	0.01	0.02	0.00	0.08
Shelf Rockfish Unid	36.49	0.00	0.06	0.57	--	--	--	--	0.46	--	0.39	0.01	0.09	0.12	0.01	--	--	--	--	38.21

Table 15 (continued).

	Commercial fisheries														WA tribal shoreside	Recreational fishing mortality			Research	Estimated fishing mortality
	IFQ/Co-op Management						Non-IFQ													
	Bottom trawl	Fixed gear	Midwater rockfish	Shoreside midwater hake	At-sea midwater CP	At-sea midwater MSCV	OA CA halibut	Sea cucumber	Pink shrimp	Ridgeback prawn	Non- nearshore fixed gear	Pacific halibut derby	Nearshore fixed gear	Incidental fisheries		WA	OR	CA		
Silvergray Rockfish	1.04	0.01	1.86	2.79	0.25	0.65	--	--	--	--	0.34	0.01	--	0.00	2.46	--	0.19	--	0.08	9.69
Squarespot Rockfish	--	--	--	--	--	--	--	--	0.00	--	--	--	--	--	--	--	--	--	--	0.00
Stary Rockfish	0.04	--	--	--	--	--	--	--	--	--	--	--	0.00	--	--	--	--	0.01	--	0.04
Stripetail Rockfish	37.42	--	0.04	0.02	0.02	1.14	--	--	8.63	--	0.00	0.00	--	0.01	--	--	--	--	2.60	49.88
Tiger Rockfish	0.00	--	--	--	--	--	--	--	0.00	--	0.01	0.00	0.31	--	0.04	0.23	1.29	0.32	0.00	2.21
Vermilion Rockfish	--	--	--	--	--	--	--	--	--	--	0.70	--	4.14	0.03	--	1.16	9.09	7.63	0.00	22.76
Minor shelf rockfish (South of 40°10' N. lat.)																				
Flag Rockfish	0.02	--	--	--	--	--	--	--	--	0.00	0.10	--	0.05	0.00	--	--	--	10.35	0.02	10.55
Freckled Rockfish	--	--	--	--	--	--	--	--	--	0.00	--	--	--	--	--	--	--	--	0.00	0.01
Greenblotched Rockfish	0.09	--	--	--	--	--	--	--	--	0.44	0.19	--	0.13	0.00	--	--	--	0.15	0.16	1.16
Greenspotted Rockfish	0.66	--	--	--	--	--	--	--	--	0.13	1.18	--	0.58	0.01	--	--	--	14.45	1.05	18.06
Greenstriped Rockfish	1.33	--	--	--	--	--	--	--	0.04	0.16	0.32	--	0.03	--	--	--	--	0.91	0.51	3.30
Halfbanded Rockfish	--	--	--	--	--	--	0.00	--	0.00	29.27	--	--	--	--	--	--	--	2.94	2.02	34.23
Honeycomb Rockfish	--	--	--	--	--	--	--	--	--	--	0.00	--	0.06	0.01	--	--	--	3.34	0.00	3.42
Mexican Rockfish	0.01	--	--	--	--	--	0.00	--	--	0.01	0.51	--	0.00	--	--	--	--	--	0.04	0.57
Pink Rockfish	--	--	--	--	--	--	--	--	--	--	0.69	--	--	--	--	--	--	--	0.03	0.71
Pinkrose Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Rosethorn Rockfish	0.00	--	--	--	--	--	--	--	--	--	0.04	--	0.13	0.00	--	--	--	--	0.03	0.20
Rosy Rockfish	0.00	--	--	--	--	--	--	--	--	--	0.11	--	0.35	0.00	--	--	--	16.94	0.07	17.47
Shelf Rockfish Unid	0.64	--	--	--	--	--	0.02	--	0.46	--	1.11	--	0.43	0.15	--	--	--	--	--	2.80
Silvergray Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Speckled Rockfish	--	--	--	--	--	--	--	--	--	--	0.79	--	0.42	0.10	--	--	--	7.48	0.44	9.23
Squarespot Rockfish	--	--	--	--	--	--	--	--	0.00	0.01	0.02	--	0.05	0.00	--	--	--	23.28	0.15	23.52
Stary Rockfish	--	--	--	--	--	--	--	--	--	--	0.77	--	0.63	0.01	--	--	--	37.19	0.17	38.78
Stripetail Rockfish	1.96	--	--	--	--	--	0.00	--	0.90	27.11	--	--	--	--	--	--	--	--	2.94	32.92
Swordspine Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	--	--	--	0.10	0.12	0.23
Tiger Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.45	--	0.45
Vermilion Rockfish	0.63	--	--	--	--	--	0.07	0.00	--	0.20	33.96	--	21.14	4.12	--	--	--	278.16	6.65	344.93
Yellowtail Rockfish	0.12	--	--	--	--	--	--	--	0.00	--	2.84	--	1.86	4.43	--	--	--	58.28	0.70	68.24
Minor slope rockfish (North of 40°10' N. lat.)																				
Aurora Rockfish	24.25	0.03	0.03	3.11	0.18	0.12	--	--	0.02	--	0.22	0.00	--	0.05	0.03	--	--	--	0.21	28.24
Bank Rockfish	0.29	--	0.27	1.70	0.05	0.04	--	--	0.00	--	0.01	--	--	--	--	--	--	--	0.01	2.38
Blackgill Rockfish	2.23	0.03	--	--	--	--	--	--	--	--	0.44	0.00	--	--	0.01	--	--	--	0.03	2.74
Redbanded Rockfish	7.28	0.64	0.04	0.25	0.22	0.04	--	--	0.22	--	24.02	0.94	0.05	0.94	8.38	--	0.00	--	0.22	43.25
Rockfish Unid	--	--	--	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
Rougheye/Blackspotted Rockfish	16.90	3.28	0.14	2.55	156.59	4.65	--	--	0.05	--	37.17	1.10	0.02	0.05	16.84	--	--	--	0.27	239.61
Sharpchin Rockfish	1.39	0.00	0.68	6.66	0.01	0.02	--	--	0.03	--	0.01	--	--	--	0.00	--	--	--	1.50	10.31
Shortraker Rockfish	6.55	0.30	0.57	0.06	0.11	0.03	--	--	0.00	--	6.22	0.09	--	0.01	1.39	--	--	--	0.06	15.39
Shortraker/Rougheye/Blackspotted Rockfish	0.00	0.00	--	--	--	--	--	--	--	--	0.02	--	--	--	--	--	--	--	--	0.02
Slope Rockfish Unid	1.24	0.03	0.10	0.02	--	--	--	--	--	--	5.95	0.02	0.01	0.06	--	--	--	--	--	7.45
Splitnose Rockfish	22.03	0.00	3.68	73.86	62.12	68.84	--	--	3.87	--	0.04	0.00	--	--	0.03	--	--	--	1.87	236.35
Yellowmouth Rockfish	0.09	0.00	22.92	2.30	0.01	1.93	--	--	0.01	--	0.45	0.00	--	--	0.01	--	0.00	--	0.54	28.28
Minor slope rockfish (South of 40°10' N. lat.)																				
Aurora Rockfish	2.57	0.06	--	--	--	--	--	--	--	--	1.12	--	0.00	0.03	--	--	--	--	0.51	4.29
Bank Rockfish	27.77	--	--	--	--	--	--	--	--	--	0.68	--	0.01	0.70	--	--	--	0.23	0.92	30.30
Blackgill Rockfish	29.62	3.75	--	--	--	--	--	--	--	--	18.29	--	0.16	0.55	--	--	--	--	0.73	53.10
Pacific Ocean Perch	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01	0.01
Redbanded Rockfish	0.28	--	--	--	--	--	--	--	--	--	0.47	--	0.00	--	--	--	--	--	0.03	0.78

Table 15 (continued).

	Commercial fisheries														WA tribal shoreside	Recreational fishing mortality			Research	Estimated fishing mortality
	IFQ/Co-op Management						Non-IFQ													
	Bottom trawl	Fixed gear	Midwater rockfish	Shoreside midwater hake	At-sea midwater CP	At-sea midwater MSCV	OA CA halibut	Sea cucumber	Pink shrimp	Ridgeback prawn	Non- nearshore fixed gear	Pacific halibut derby	Nearshore fixed gear	Incidental fisheries		WA	OR	CA		
Rougheye/Blackspotted Rockfish	0.01	--	--	--	--	--	--	--	--	--	0.02	--	--	--	--	--	--	--	--	0.03
Sharpchin Rockfish	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.26	0.27
Shortraker Rockfish	0.02	--	--	--	--	--	--	--	--	--	0.05	--	--	--	--	--	--	--	0.07	
Slope Rockfish Unid	9.33	--	--	--	--	--	--	--	--	--	3.35	--	0.06	0.04	--	--	--	--	12.78	
Mixed thornyheads																				
Shortspine/Longspine Thornyhead	0.14	0.01	0.07	--	1.34	0.12	--	--	--	--	1.24	--	0.07	0.02	--	--	--	--	0.02	3.02
Other flatfish																				
Butter Sole	0.00	--	--	0.00	--	0.00	0.00	--	--	--	--	--	--	--	--	--	0.01	--	0.02	0.04
Curlfin Sole	0.50	--	--	0.00	--	0.00	1.34	--	--	0.12	--	--	--	0.75	--	--	--	--	0.11	2.83
Flatfish Unid	2.88	--	0.04	0.01	0.00	0.01	0.14	0.01	1.34	1.91	0.04	--	0.01	1.23	10.77	1.58	--	--	0.00	19.97
Flathead Sole	27.70	--	0.02	0.00	0.01	0.02	--	--	0.42	--	0.06	--	--	0.00	--	--	--	--	0.45	28.69
Pacific Sanddab	131.28	--	0.01	0.07	0.00	0.87	0.78	--	3.22	20.51	0.12	--	0.78	0.00	--	--	0.21	35.07	8.13	201.05
Rex Sole	441.92	0.00	0.35	0.33	26.84	3.88	0.04	--	28.26	2.45	0.00	--	--	0.86	32.91	--	--	--	13.04	550.86
Rock Sole	1.67	--	0.00	--	--	--	0.10	--	0.02	0.14	0.08	--	0.07	0.27	0.17	--	0.02	2.45	0.18	5.17
Sand Sole	0.61	--	--	--	--	0.00	13.42	--	0.14	--	--	--	0.03	0.10	--	--	0.14	0.14	0.01	14.60
Sanddab Unid	2.79	--	--	0.00	--	--	--	0.00	0.01	0.76	4.39	--	2.98	0.47	0.13	--	--	--	0.00	11.51
Other groundfish																				
Cabezon (Washington)	--	--	--	--	--	--	--	--	0.00	--	--	--	--	--	--	6.76	--	--	0.01	6.77
Kelp Greenling (California)	--	--	--	--	--	--	--	--	--	--	0.18	--	3.68	0.01	--	--	--	5.27	--	9.13
Kelp Greenling (Oregon)	0.01	--	--	--	--	--	--	--	--	--	0.00	--	17.93	0.03	--	--	14.97	--	0.02	32.96
Kelp Greenling (Washington)	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.16	--	--	0.02	1.18
Leopard Shark	--	--	--	--	--	--	1.49	--	--	1.75	1.41	--	0.50	3.51	--	--	--	13.01	--	21.67
Other rockfish																				
Rockfish Unid	0.46	--	0.01	--	--	--	--	--	--	--	0.59	--	0.03	0.00	--	0.45	0.10	--	0.00	1.66
Pacific cod	6.31	--	0.01	0.10	--	--	--	--	--	--	0.34	0.02	--	0.15	69.76	1.07	0.10	--	0.12	77.99
Pacific hake	350.30	0.00	258.21	129,443.35	116,049.81	67,162.93	0.71	--	118.51	5.15	1.59	0.04	0.02	0.00	5,706.38	--	0.06	--	13.97	319,111.04
Pacific ocean perch (North of 40°10' N. lat.)	38.59	0.02	3.76	46.93	30.79	24.84	--	--	0.06	--	0.35	0.01	0.00	0.00	1.24	--	--	--	5.39	151.97
Petrale sole	2,644.02	0.71	4.16	0.00	--	--	0.97	--	0.76	0.34	3.88	0.13	0.02	3.28	227.24	--	2.57	2.72	21.23	2,912.04
Roundfish unid	--	--	--	0.01	0.00	0.00	--	--	0.00	--	--	--	--	--	--	--	--	--	--	0.01
Sablefish (North of 36° N. lat.)	1,390.41	811.00	7.73	72.75	92.18	24.60	--	--	0.16	--	2,032.54	62.71	1.88	6.36	434.78	--	1.95	--	41.06	4,980.12
Sablefish (South of 36° N. lat.)	0.28	43.90	--	--	--	--	--	--	--	--	399.08	--	10.05	11.83	--	--	--	--	1.09	466.23
Shortbelly rockfish	0.69	--	31.75	243.65	85.89	142.16	--	--	3.02	0.67	0.03	--	--	--	0.00	--	--	--	0.48	508.35
Shortspine thornyhead (North of 34°27' N. lat.)	634.70	4.19	4.96	1.57	59.57	9.82	--	--	0.13	--	64.99	1.11	0.89	1.11	21.93	--	0.00	--	7.75	812.73
Shortspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	--	--	--	--	105.34	--	0.00	6.00	--	--	--	--	0.45	111.79
Spiny dogfish	228.47	19.93	7.16	391.40	701.10	256.25	3.44	--	1.14	1.01	226.76	0.44	0.41	0.71	63.66	--	0.01	3.49	27.18	1,932.57
Splitnose rockfish (South of 40°10' N. lat.)	35.38	--	--	--	--	--	--	--	0.51	1.20	0.02	--	0.00	--	--	--	--	--	5.44	42.56
Starry flounder	1.64	--	--	--	--	--	4.39	--	--	--	0.00	--	0.05	0.29	--	--	0.01	0.71	0.03	7.13
Widow rockfish	21.87	0.00	9,423.92	868.38	62.65	144.25	--	--	0.23	--	1.26	--	0.87	0.35	3.77	--	7.53	23.44	12.56	10,571.08
YELLOWEYE ROCKFISH	0.11	0.00	--	0.01	--	--	--	--	0.00	--	1.34	0.01	2.27	0.01	0.85	3.15	3.62	4.99	0.80	17.18
Yellowtail rockfish (North of 40°10' N. lat.)	101.10	0.04	1,937.40	1,049.08	51.12	178.75	--	--	1.08	--	1.42	0.04	1.32	1.78	118.91	38.16	34.84	0.99	4.22	3,520.24

Table 15 (continued).

	Commercial fisheries														WA tribal shoreside	Recreational fishing mortality			Research	Estimated fishing mortality
	IFQ/Co-op Management						Non-IFQ													
	Bottom trawl	Fixed gear	Midwater rockfish	Shoreside midwater hake	At-sea midwater CP	At-sea midwater MSCV	OA CA halibut	Sea cucumber	Pink shrimp	Ridgeback prawn	Non- nearshore fixed gear	Pacific halibut derby	Nearshore fixed gear	Incidental fisheries		WA	OR	CA		
Non-groundfish species																				
California halibut	0.01	--	--	0.02	--	--	101.17	0.01	--	2.23	1.53	--	1.97	177.04	--	--	0.33	154.96	--	439.28
Dungeness crab	85.06	2.32	0.05	0.00	--	0.01	61.07	--	0.02	--	3.70	--	2.22	24,642.88	593.25	--	--	--	--	25,390.57
Non-FMP flatfish																				
Deepsea Sole	3.43	0.00	0.00	--	--	--	--	--	--	--	0.00	--	--	--	--	--	--	--	--	3.44
Diamond Turbot	--	--	--	--	--	--	0.19	--	--	--	--	--	--	--	--	--	--	--	--	0.19
Hornyhead Turbot	0.00	--	--	--	--	--	1.65	--	--	2.03	--	--	--	0.05	--	--	--	--	--	3.74
Longfin Sanddab	0.01	--	--	--	--	--	0.13	--	--	3.82	--	--	0.02	--	--	--	--	0.01	0.01	3.99
Slender Sole	43.39	0.00	0.01	0.00	0.01	0.02	--	--	145.13	7.58	--	--	--	--	--	--	--	--	0.25	196.39
Speckled Sanddab	--	--	--	--	--	--	0.00	--	--	--	--	--	--	--	--	--	--	--	0.02	0.02
Other non-groundfish																				
Brown Irish Lord Sculpin	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	--	0.00	0.00
Buffalo Sculpin	--	--	--	--	--	--	0.00	--	--	--	--	--	0.10	--	--	--	0.02	--	--	0.12
California Sheephead	--	--	--	--	--	--	0.04	--	--	--	0.01	--	95.26	0.26	--	--	--	48.34	0.00	143.92
Red Irish Lord Sculpin	--	--	--	--	--	--	--	--	--	--	0.00	--	0.14	--	--	--	0.04	--	0.00	0.18
Sculpin Unid	0.83	--	--	--	0.00	0.00	0.06	--	0.12	0.07	0.01	--	0.24	0.31	--	--	0.00	--	0.01	1.65
Skate Unid	7.44	0.25	0.02	0.08	0.00	--	0.02	0.18	0.00	1.75	0.90	0.01	0.25	3.19	67.20	--	0.07	--	0.02	81.39
Squid Unid	0.20	--	0.09	9.02	130.63	18.76	--	--	0.00	--	--	--	--	--	0.01	--	0.00	--	--	158.72
Starry Skate	0.06	--	--	--	--	--	0.04	--	0.00	--	--	--	0.08	--	--	--	--	--	0.03	0.21
Shared ecosystem component species																				
Barracudina Unid	0.00	--	--	--	--	--	--	--	0.00	--	--	--	--	--	--	--	--	--	--	0.00
Blacksmelt Unid	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01	0.01
Capelin	--	--	--	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
Deepsea Smelt Unid	0.00	--	--	--	0.21	0.00	--	--	--	--	--	--	--	--	--	--	--	--	0.02	0.24
Duckbill Barracudina	--	--	--	--	2.04	0.03	--	--	--	--	--	--	--	--	--	--	--	--	--	2.08
Jacksmelt	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01	30.33	--	30.34
Lanternfish Unid	0.00	--	--	0.00	0.81	0.01	--	--	0.17	--	--	--	--	--	--	--	--	--	0.03	1.02
Lightfish Unid	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.03	0.03
Night Smelt	--	--	--	--	--	--	--	--	0.08	--	--	--	--	--	--	--	--	--	--	0.08
Non-Eulachon Smelt Unid	0.00	--	--	--	--	--	--	--	3.98	0.06	--	--	--	--	--	--	--	--	0.03	4.07
Non-Humboldt Squid Unid	4.03	--	0.03	0.02	--	--	0.04	--	87.61	0.28	0.00	--	0.00	--	--	--	--	--	0.05	92.06
Pacific Sandlance	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Pacific Saury	0.00	--	--	--	0.00	0.00	--	--	0.03	--	--	--	--	--	--	--	--	--	0.00	0.03
Round Herring	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Slender Barracudina	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Smelt Unid	--	--	--	0.00	0.00	--	--	--	0.10	--	0.04	--	0.02	133.40	0.00	--	--	--	0.00	133.56
Smelt/Herring Unid	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Surf Smelt	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00
White Barracudina	--	--	--	--	0.01	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01
Whitebait Smelt	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.03	0.03

Table 16. Fishing Mortality Estimates Relative to Harvest Specifications.

Estimated fishing mortality (mt) of major west coast groundfish species and corresponding management reference points (harvest specifications). Values greater than 90–100% relative to a management reference point are highlighted in yellow. Values greater than 100% relative to a management reference point are highlighted in red.

	Estimated fishing mortality (mt)	Management reference points (harvest specifications)					
		ACL (mt)	Estimated mortality (% of ACL)	ABC (mt)	Estimated mortality (% of ABC)	OFL (mt)	Estimated mortality (% of OFL)
Arrowtooth flounder	1,133	13,743	8	13,743	8	16,498	7
Big skate	183	494	37	494	37	541	34
Black rockfish (California)	142	332	43	332	43	347	41
Black rockfish (Oregon)	419	520	81	520	81	570	73
Black rockfish (Washington)	251	301	84	301	84	315	80
Bocaccio rockfish (South of 40°10' N. lat.)	313	741	42	1,924	16	2,013	16
Cabazon (California)	52	149	35	149	35	156	33
Cabazon (Oregon)	43	47	92	47	92	49	88
California scorpionfish (South of 34°27' N. lat.)	102	150	68	254	40	278	37
Canary rockfish	595	1,526	39	1,526	39	1,596	37
Chilipepper rockfish (South of 40°10' N. lat.)	300	2,507	12	2,507	12	2,623	11
COWCOD ROCKFISH (South of 40°10' N. lat.)	3	10	32	64	5	71	5
Darkblotched rockfish	343	653	53	653	53	683	50
Dover sole	6,505	50,000	13	86,310	8	90,282	7
English sole	297	7,537	4	7,537	4	8,255	4
Lingcod (North of 40°10' N. lat.)	1,012	3,110	33	3,110	33	3,310	31
Lingcod (South of 40°10' N. lat.)	457	1,144	40	1,144	40	1,373	33
Longnose skate	792	2,000	40	2,415	33	2,526	31
Minor rockfish (North of 40°10' N. lat.)							
Nearshore	80	105	76	105	76	119	67
Shelf	354	2,047	17	2,048	17	2,302	15
Slope	614	1,754	35	1,754	35	1,896	32
Minor rockfish (South of 40°10' N. lat.)							
Nearshore	715	1,179	61	1,180	61	1,344	53
Shelf	611	1,624	38	1,625	38	1,918	32
Slope	102	709	14	719	14	829	12
Other flatfish	835	7,281	11	7,281	11	9,690	9
Other groundfish	72	441	16	441	16	501	14
Pacific cod	78	1,600	5	2,221	4	3,200	2
Pacific hake	319,111	2018 US TAC = 441,433 mt, 72% of US TAC					
Pacific ocean perch (North of 40°10' N. lat.)	152	281	54	941	16	984	15
Petrale sole	2,912	3,013	97	3,013	97	3,152	92
Sablefish (North of 36° N. lat.)	4,980	5,475	91	7,604	72	8,329	65
Sablefish (South of 36° N. lat.)	466	1,944	24				
Shortbelly rockfish	508	500	102	5,789	9	6,950	7
Spiny dogfish	1,933	2,083	93	2,083	93	2,500	77
Splitnose rockfish (South of 40°10' N. lat.)	43	1,761	2	1,761	2	1,842	2
Starry flounder	7	1,282	1	1,282	1	1,847	0
Thornyheads							
Longspine Thornyhead (North of 34°27' N. lat.)	370	2,747	13				
Longspine Thornyhead (South of 34°27' N. lat.)	15	867	2	3,614	11	4,339	9
Shortspine Thornyhead (North of 34°27' N. lat.)	813	1,698	48	2,596	36	3,116	30
Shortspine Thornyhead (South of 34°27' N. lat.)	112	898	12				
Widow rockfish	10,571	12,655	84	12,655	84	13,237	80
YELLOW EYE ROCKFISH	17	20	86	48	36	58	30
Yellowtail rockfish (North of 40°10' N. lat.)	3,520	6,002	59	6,002	59	6,574	54

Appendix A

Table A-1. Species identification codes used in the Pacific Coast Fisheries Information Network (PacFIN) database and assigned to WCGOP data.

Columns on the far right specify which species were defined as groundfish (as identified in the Pacific Coast Groundfish FMP), as nearshore species, as IFQ managed species or categories, or as rebuilding species in 2018.

PacFIN Species ID	PacFIN Common Name	IFQ Grouping	Limited Entry/Non-nearshore Species Group		Nearshore Fixed Gear Species Group		FMP Species	Nearshore Species	Rebuilding Species	IFQ Species
			North of 40° 10' N. latitude	South of 40° 10' N. latitude	North of 40° 10' N. latitude	South of 40° 10' N. latitude				
ARTH	ARROWTOOTH FLOUNDER	Arrowtooth Flounder	Arrowtooth flounder	Arrowtooth flounder	Arrowtooth flounder	Arrowtooth flounder	1	0	0	1
ART1	NOM. ARROWTOOTH FLOUNDER	Arrowtooth Flounder	Arrowtooth flounder	Arrowtooth flounder	Arrowtooth flounder	Arrowtooth flounder	1	0	0	1
CNRY	CANARY ROCKFISH	Canary Rockfish	Canary rockfish	Canary rockfish	Canary rockfish	Canary rockfish	1	0	0	1
RCK8	CANARY+VERMILION ROCKFISH	Canary Rockfish	Canary rockfish	Canary rockfish	Canary rockfish	Canary rockfish	1	0	0	1
CNR1	NOM. CANARY ROCKFISH	Canary Rockfish	Canary rockfish	Canary rockfish	Canary rockfish	Canary rockfish	1	0	0	1
DBRK	DARKBLOTCHED ROCKFISH	Darkblotched Rockfish	Darkblotched rockfish	Darkblotched rockfish	Darkblotched rockfish	Darkblotched rockfish	1	0	0	1
DBR1	NOM. DARKBLOTCHED ROCKFISH	Darkblotched Rockfish	Darkblotched rockfish	Darkblotched rockfish	Darkblotched rockfish	Darkblotched rockfish	1	0	0	1
DOVR	DOVER SOLE	Dover Sole	Dover sole	Dover sole	Dover sole	Dover sole	1	0	0	1
DVR1	NOM. DOVER SOLE	Dover Sole	Dover sole	Dover sole	Dover sole	Dover sole	1	0	0	1
EGLS	ENGLISH SOLE	English Sole	English sole	English sole	English sole	English sole	1	0	0	1
EGL1	NOM. ENGLISH SOLE	English Sole	English sole	English sole	English sole	English sole	1	0	0	1
LCOD	LINGCOD	Lingcod	Lingcod (North of 40°10' N. lat.)	Lingcod (South of 40°10' N. lat.)	Lingcod (North of 40°10' N. lat.)	Lingcod (South of 40°10' N. lat.)	1	1	0	1
LCD1	NOM. LINGCOD	Lingcod	Lingcod (North of 40°10' N. lat.)	Lingcod (South of 40°10' N. lat.)	Lingcod (North of 40°10' N. lat.)	Lingcod (South of 40°10' N. lat.)	1	1	0	1
LSPN	LONGSPINE THORNYHEAD	Longspine Thornyhead	Longspine thornyhead	Longspine thornyhead	Longspine thornyhead	Longspine thornyhead	1	0	0	1
LSP1	NOM. LONGSPINE THORNYHEAD	Longspine Thornyhead	Longspine thornyhead	Longspine thornyhead	Longspine thornyhead	Longspine thornyhead	1	0	0	1
ODSR	OTHER DEMERSAL ROCKFISH	Minor Rockfish	Other rockfish	Other rockfish	Other rockfish	Other rockfish	1	1	0	1
OPLG	OTHER PELAGIC ROCKFISH	Minor Rockfish	Other rockfish	Other rockfish	Other rockfish	Other rockfish	1	0	0	1
RRCK	REMAINING ROCKFISH	Minor Rockfish	Other rockfish	Other rockfish	Other rockfish	Other rockfish	1	1	0	1
UDSR	UNSP. DEMERSAL ROCKFISH	Minor Rockfish	Other rockfish	Other rockfish	Other rockfish	Other rockfish	1	1	0	1
UDM1	UNSP. DEMERSAL-91	Minor Rockfish	Other rockfish	Other rockfish	Other rockfish	Other rockfish	1	1	0	1
UPLG	UNSP. PELAGIC ROCKFISH	Minor Rockfish	Other rockfish	Other rockfish	Other rockfish	Other rockfish	1	0	0	1
RCK4	UNSP. REDS ROCKFISH	Minor Rockfish	Other rockfish	Other rockfish	Other rockfish	Other rockfish	1	1	0	1
RCK6	UNSP. ROSEFISH ROCKFISH	Minor Rockfish	Other rockfish	Other rockfish	Other rockfish	Other rockfish	1	1	0	1
USR1	UNSP. SLOPE-91	Minor Rockfish	Other rockfish	Other rockfish	Other rockfish	Other rockfish	1	0	0	1
USR2	UNSP. SLOPE-93	Minor Rockfish	Other rockfish	Other rockfish	Other rockfish	Other rockfish	1	0	0	1
RCK5	UNSP. SMALL REDS ROCKFISH	Minor Rockfish	Other rockfish	Other rockfish	Other rockfish	Other rockfish	1	1	0	1
BCAC	BOCACCIO	Minor Shelf Rockfish	Minor shelf rockfish (North of 40°10' N. lat.)	Bocaccio rockfish (South of 40°10' N. lat.)	Minor shelf rockfish (North of 40°10' N. lat.)	Bocaccio rockfish (South of 40°10' N. lat.)	1	0	0	1
RCK1	BOCACCIO+CHILIPEPPER ROCKFISH	Minor Shelf Rockfish	Minor shelf rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	Minor shelf rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	1	0	0	1
BRNZ	BRONZESPOTTED ROCKFISH	Minor Shelf Rockfish	Minor shelf rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	Minor shelf rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	1	0	0	1
CMEL	CHAMELEON ROCKFISH	Minor Shelf Rockfish	Minor shelf rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	Minor shelf rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	1	0	0	1
CLPR	CHILIPEPPER	Minor Shelf Rockfish	Minor shelf rockfish (North of 40°10' N. lat.)	Chilipepper rockfish (South of 40°10' N. lat.)	Minor shelf rockfish (North of 40°10' N. lat.)	Chilipepper rockfish (South of 40°10' N. lat.)	1	0	0	1
CWCD	COWCOD ROCKFISH	Minor Shelf Rockfish	Minor shelf rockfish (North of 40°10' N. lat.)	COWCOD ROCKFISH (South of 40°10' N. lat.)	Minor shelf rockfish (North of 40°10' N. lat.)	COWCOD ROCKFISH (South of 40°10' N. lat.)	1	0	1	1
DARK	DARK ROCKFISH	Minor Shelf Rockfish	Minor shelf rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	Minor shelf rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	1	0	0	1
DUSK	DUSKY ROCKFISH	Minor Shelf Rockfish	Minor shelf rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	Minor shelf rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	1	0	0	1
DWRF	DWARF-RED ROCKFISH	Minor Shelf Rockfish	Minor shelf rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	Minor shelf rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	1	0	0	1
FLAG	FLAG ROCKFISH	Minor Shelf Rockfish	Minor shelf rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	Minor shelf rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	1	0	0	1
FRCK	FRECKLED ROCKFISH	Minor Shelf Rockfish	Minor shelf rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	Minor shelf rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	1	0	0	1
GBLC	GREENBLOTCHED ROCKFISH	Minor Shelf Rockfish	Minor shelf rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	Minor shelf rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	1	0	0	1
GSPT	GREENSPOTTED ROCKFISH	Minor Shelf Rockfish	Minor shelf rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	Minor shelf rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	1	0	0	1
GSRK	GREENSTRIPED ROCKFISH	Minor Shelf Rockfish	Minor shelf rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	Minor shelf rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	1	0	0	1

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Table A-1 (continued).[illegible]

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Table A-1 (continued).

[illegible]

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Table A-1 (continued).

PacFIN Species ID	PacFIN Common Name	IFQ Grouping	Limited Entry/Non-nearshore Species Group		Nearshore Fixed Gear Species Group		FMP Species	Nearshore Species	Rebuilding Species	IFQ Species
			North of 40° 10' latitude	South of 40° 10' latitude	North of 40° 10' latitude	South of 40° 10' latitude				
RCK3	UNSP. DPWTR REDS RCKFSH	Minor Slope Rockfish	Minor slope rockfish (North of 40°10' N. lat.)	Minor slope rockfish (South of 40°10' N. lat.)	Minor slope rockfish (North of 40°10' N. lat.)	Minor slope rockfish (South of 40°10' N. lat.)	1	0	0	1
UPOP	UNSP. POP GROUP	Minor Slope Rockfish	Minor slope rockfish (North of 40°10' N. lat.)	Minor slope rockfish (South of 40°10' N. lat.)	Pacific ocean perch (North of 40°10' N. lat.)	Minor slope rockfish (South of 40°10' N. lat.)	1	0	0	1
URCK	UNSP. ROCKFISH	Minor Slope Rockfish	Minor slope rockfish (North of 40°10' N. lat.)	Minor slope rockfish (South of 40°10' N. lat.)	Minor slope rockfish (North of 40°10' N. lat.)	Minor slope rockfish (South of 40°10' N. lat.)	1	0	0	1
USLR	UNSP. SLOPE RKFSH	Minor Slope Rockfish	Minor slope rockfish (North of 40°10' N. lat.)	Minor slope rockfish (South of 40°10' N. lat.)	Minor slope rockfish (North of 40°10' N. lat.)	Minor slope rockfish (South of 40°10' N. lat.)	1	0	0	1
USLP	UNSP. SLOPE ROCKFISH	Minor Slope Rockfish	Minor slope rockfish (North of 40°10' N. lat.)	Minor slope rockfish (South of 40°10' N. lat.)	Minor slope rockfish (North of 40°10' N. lat.)	Minor slope rockfish (South of 40°10' N. lat.)	1	0	0	1
YMTH	YELLOWMOUTH ROCKFISH	Minor Slope Rockfish	Minor slope rockfish (North of 40°10' N. lat.)	Minor slope rockfish (South of 40°10' N. lat.)	Minor slope rockfish (North of 40°10' N. lat.)	Minor slope rockfish (South of 40°10' N. lat.)	1	0	0	1
THD1	NOM. THORNYHEADS	Mixed Thornyhead	Mixed Thornyhead	Mixed thornyheads	Mixed thornyheads	Mixed thornyheads	1	0	0	1
THDS	THORNYHEADS (MIXED)	Mixed Thornyhead	Mixed thornyheads	Mixed thornyheads	Mixed thornyheads	Mixed thornyheads	1	0	0	1
BSOL	BUTTER SOLE	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	1	0	0	1
CSOL	CURLFIN SOLE	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	1	0	0	1
FSOL	FLATHEAD SOLE	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	1	0	0	1
UFL1	FLOUNDERS (NO FSOL)	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	1	0	0	1
CSL1	NOM. CURLFIN SOLE	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	1	0	0	1
PDB1	NOM. PACIFIC SANDDAB	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	1	0	0	1
REX1	NOM. REX SOLE	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	1	0	0	1
RSL1	NOM. ROCK SOLE	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	1	0	0	1
SSO1	NOM. SAND SOLE	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	1	0	0	1
OFLT	OTHER FLATFISH	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	1	0	0	1
PDAB	PACIFIC SANDDAB	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	1	0	0	1
RFLT	REMAINING FLATFISH	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	1	0	0	1
REX	REX SOLE	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	1	0	0	1
RSOL	ROCK SOLE	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	1	0	0	1
SSOL	SAND SOLE	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	1	0	0	1
DFLT	UNSP. DEEP FLOUNDERS	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	1	0	0	1
UDF1	UNSP. DEEP-91 FLOUNDERS	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	1	0	0	1
UDF2	UNSP. DEEP-95 FLOUNDERS	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	1	0	0	1
UFLT	UNSP. FLATFISH	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	1	0	0	1
UDAB	UNSP. SANDDABS	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	1	0	0	1
SFLT	UNSP. SHALLOW FLOUNDERS	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	1	0	0	1
USF1	UNSP. SHALLOW-91 FLOUNDERS	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	1	0	0	1
UTRB	UNSP. TURBOTS	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	1	0	0	1
PCOD	PACIFIC COD	Pacific Cod	Pacific cod	Pacific cod	Pacific cod	Pacific cod	1	0	0	1
PWHT	PACIFIC WHITING	Pacific Hake	Pacific hake	Pacific hake	Pacific hake	Pacific hake	1	0	0	1
PTR1	NOM. PETRALE SOLE	Petrale Sole	Petrale sole	Petrale sole	Petrale sole	Petrale sole	1	0	0	1
PTRL	PETRALE SOLE	Petrale Sole	Petrale sole	Petrale sole	Petrale sole	Petrale sole	1	0	0	1
SABL	SABLEFISH	Sablefish	Sablefish	Sablefish	Sablefish	Sablefish	1	0	0	1
SSP1	NOM. SHORTSPINE THORNYHEAD	Shortspine Thornyhead	Shortspine thornyhead	Shortspine thornyhead	Shortspine thornyhead	Shortspine thornyhead	1	0	0	1
SSPN	SHORTSPINE THORNYHEAD	Shortspine Thornyhead	Shortspine thornyhead	Shortspine thornyhead	Shortspine thornyhead	Shortspine thornyhead	1	0	0	1
SFL1	NOM. STARRY FLOUNDER	Starry Flounder	Starry flounder	Starry flounder	Starry flounder	Starry flounder	1	0	0	1
STRY	STARRY FLOUNDER	Starry Flounder	Starry flounder	Starry flounder	Starry flounder	Starry flounder	1	0	0	1

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Table A-1 (continued).

PacFIN Species ID	PacFIN Common Name	IFQ Grouping	Limited Entry/Non-nearshore Species Group		Nearshore Fixed Gear Species Group		FMP Species	Nearshore Species	Rebuilding Species	IFQ Species
			North of 40° 10' latitude	South of 40° 10' latitude	North of 40° 10' latitude	South of 40° 10' latitude				
WDW1	NOM. WIDOW ROCKFISH	Widow Rockfish	Widow rockfish	Widow rockfish	Widow rockfish	Widow rockfish	1	0	0	1
WDOW	WIDOW ROCKFISH	Widow Rockfish	Widow rockfish	Widow rockfish	Widow rockfish	Widow rockfish	1	0	0	1
YEV1	NOM. YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	1	0	1	1
YEV	YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	1	0	1	1
AKSK	ALASKA SKATE		Ecosystem component species	Ecosystem component species	Ecosystem component species	Ecosystem component species	1	0	0	0
ASKT	ALEUTIAN SKATE		Ecosystem component species	Ecosystem component species	Ecosystem component species	Ecosystem component species	1	0	0	0
BSKT	BIG SKATE		Big skate	Big skate	Big skate	Big skate	1	0	0	0
BLCK	BLACK ROCKFISH		Black rockfish	Black rockfish	Black rockfish	Black rockfish	1	1	0	0
BLSK	BLACK SKATE		Ecosystem component species	Ecosystem component species	Ecosystem component species	Ecosystem component species	1	0	0	0
RCK9	BLACK+BLUE ROCKFISH		Black rockfish	Black rockfish	Black rockfish	Black rockfish	1	1	0	0
BYEL	BLACK-AND-YELLOW ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Shallow nearshore rockfish	1	1	0	0
BLUR	BLUE ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	1	1	0	0
BRWN	BROWN ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	1	1	0	0
CBZN	CABEZON		Other groundfish	Other groundfish	Other groundfish	Other groundfish	1	1	0	0
CLCO	CALICO ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	1	1	0	0
SCOR	CALIFORNIA SCORPIONFISH		California scorpionfish	California scorpionfish	California scorpionfish	California scorpionfish	1	1	0	0
CSKT	CALIFORNIA SKATE		Ecosystem component species	Ecosystem component species	Ecosystem component species	Ecosystem component species	1	0	0	0
CHNA	CHINA ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Shallow nearshore rockfish	1	1	0	0
COPP	COPPER ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	1	1	0	0
DEAC	DEACON ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	1	1	0	0
SSRD	DEEP SO. NEAR-SHORE RF		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	1	1	0	0
GGRD	GIANT GRENADE		Ecosystem component species	Ecosystem component species	Ecosystem component species	Ecosystem component species	1	0	0	0
GPHR	GOPHER ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Shallow nearshore rockfish	1	1	0	0
GRAS	GRASS ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Shallow nearshore rockfish	1	1	0	0
KLPG	KELP GREENLING		Other groundfish	Other groundfish	Other groundfish	Other groundfish	1	1	0	0
KLPR	KELP ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Shallow nearshore rockfish	1	1	0	0
LSRK	LEOPARD SHARK		Other groundfish	Other groundfish	Other groundfish	Other groundfish	1	0	0	0
LSKT	LONGNOSE SKATE		Longnose skate	Longnose skate	Longnose skate	Longnose skate	1	0	0	0
BSK1	NOM. BIG SKATE		Big skate	Big skate	Big skate	Big skate	1	0	0	0
BLK1	NOM. BLACK ROCKFISH		Black rockfish	Black rockfish	Black rockfish	Black rockfish	1	1	0	0
BYL1	NOM. BLACK-AND-YELLOW ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Shallow nearshore rockfish	1	1	0	0
BLU1	NOM. BLUE ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	1	1	0	0
BRW1	NOM. BROWN ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	1	1	0	0
CBZ1	NOM. CABEZON		Other groundfish	Other groundfish	Other groundfish	Other groundfish	1	1	0	0
CLC1	NOM. CALICO ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	1	1	0	0
SCR1	NOM. CALIF. SCORPIONFISH		California scorpionfish	California scorpionfish	California scorpionfish	California scorpionfish	1	1	0	0
CHN1	NOM. CHINA ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Shallow nearshore rockfish	1	1	0	0
COP1	NOM. COPPER ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	1	1	0	0
GPH1	NOM. GOPHER ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Shallow nearshore rockfish	1	1	0	0
GRS1	NOM. GRASS ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Shallow nearshore rockfish	1	1	0	0

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PacFIN Species ID	PacFIN Common Name	IFQ Grouping	Limited Entry/Non-nearshore Species Group		Nearshore Fixed Gear Species Group		FMP Species	Nearshore Species	Rebuilding Species	IFQ Species
			North of 40° 10' latitude	South of 40° 10' latitude	North of 40° 10' latitude	South of 40° 10' latitude				
KGL1	NOM. KELP GREENLING		Other groundfish	Other groundfish	Other groundfish	Other groundfish	1	1	0	0
KLP1	NOM. KELP ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Shallow nearshore rockfish	1	1	0	0
OLV1	NOM. OLIVE ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	1	1	0	0
QLB1	NOM. QUILLBACK ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	1	1	0	0
SBL1	NOM. SHORTEBELLY ROCKFISH		Shorthead rockfish	Shorthead rockfish	Shorthead rockfish	Shorthead rockfish	1	0	0	0
TRE1	NOM. TREEFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	1	1	0	0
NUSR	NOR. UNSP. NEAR-SHORE ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	1	1	0	0
NSHR	NORTHERN NEAR-SHORE ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	1	1	0	0
OLVE	OLIVE ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	1	1	0	0
OGRN	OTHER GROUND FISH		Groundfish unid	Groundfish unid	Groundfish unid	Groundfish unid	1	0	0	0
ORND	OTHER ROUND FISH		Roundfish unid	Roundfish unid	Roundfish unid	Roundfish unid	1	0	0	0
PFNS	PACIFIC FLATNOSE		Ecosystem component species	Ecosystem component species	Ecosystem component species	Ecosystem component species	1	0	0	0
GRFN	PACIFIC GRENADIER		Ecosystem component species	Ecosystem component species	Ecosystem component species	Ecosystem component species	1	0	0	0
QLBK	QUILLBACK ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	1	1	0	0
RGRN	REMAINING GROUND FISH		Groundfish unid	Groundfish unid	Groundfish unid	Groundfish unid	1	0	0	0
RRND	REMAINING ROUND FISH		Roundfish unid	Roundfish unid	Roundfish unid	Roundfish unid	1	0	0	0
RTSK	ROUGHTAIL SKATE		Ecosystem component species	Ecosystem component species	Ecosystem component species	Ecosystem component species	1	0	0	0
SPSK	SANDPAPER SKATE		Ecosystem component species	Ecosystem component species	Ecosystem component species	Ecosystem component species	1	0	0	0
SSRS	Shallow So. Near-shore RF		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Shallow nearshore rockfish	1	1	0	0
SBLY	SHORTEBELLY ROCKFISH		Shorthead rockfish	Shorthead rockfish	Shorthead rockfish	Shorthead rockfish	1	0	0	0
SUSR	SOU. UNSP. NEAR-SHORE ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	1	1	0	0
SSUR	SOU. UNSP. NEAR-SHORE ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Shallow nearshore rockfish	1	1	0	0
SSRK	SOUPFIN SHARK		Ecosystem component species	Ecosystem component species	Ecosystem component species	Ecosystem component species	1	0	0	0
SSHR	SOUTHERN NEAR-SHORE ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	1	1	0	0
SSHR	SOUTHERN NEAR-SHORE ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Shallow nearshore rockfish	1	1	0	0
DSRK	SPINY DOGFISH		Spiny dogfish	Spiny dogfish	Spiny dogfish	Spiny dogfish	1	0	0	0
RATF	SPOTTED RATFISH		Ecosystem component species	Ecosystem component species	Ecosystem component species	Ecosystem component species	1	0	0	0
TREE	TREEFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	1	1	0	0
RCK2	UNSP. BOLINA ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	1	1	0	0
UDNR	UNSP. DEEP NEAR-SHORE RF		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	1	1	0	0
RCK7	UNSP. GOPHER ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Shallow nearshore rockfish	1	1	0	0
UGLG	UNSP. GREENLING		Other groundfish	Other groundfish	Other groundfish	Other groundfish	1	1	0	0
GRDR	UNSP. GRENADIERS		Ecosystem component species	Ecosystem component species	Ecosystem component species	Ecosystem component species	1	0	0	0
UGRN	UNSP. GROUND FISH		Groundfish unid	Groundfish unid	Groundfish unid	Groundfish unid	1	0	0	0
USHR	UNSP. NEAR-SHORE ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Deeper nearshore rockfish	1	1	0	0
USHR	UNSP. NEAR-SHORE ROCKFISH		Minor nearshore rockfish (North of 40°10' N. lat.)	Minor nearshore rockfish (South of 40°10' N. lat.)	Minor nearshore rockfish (North of 40°10' N. lat.)	Shallow nearshore rockfish	1	1	0	0
URND	UNSP. ROUND FISH		Roundfish unid	Roundfish unid	Roundfish unid	Roundfish unid	1	0	0	0
PHLB	PACIFIC HALIBUT	Pacific Halibut	Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	1
NONE	*** NONE ***		NA	NA	NA	NA	0	0	0	0
ABLN	ALL ABALONE		NA	NA	NA	NA	0	0	0	0

Table A-1 (continued).

PacFIN Species ID	PacFIN Common Name	IFQ Grouping	Limited Entry/Non-nearshore Species Group		Nearshore Fixed Gear Species Group		FMP Species	Nearshore Species	Rebuilding Species	IFQ Species
			North of 40° 10' latitude	South of 40° 10' latitude	North of 40° 10' latitude	South of 40° 10' latitude				
BASS	ALL BASS		NA	NA	NA	NA	0	0	0	0
CLAM	ALL CLAMS		NA	NA	NA	NA	0	0	0	0
CPEL	ALL COASTAL PELAGIC		NA	NA	NA	NA	0	0	0	0
CRAB	ALL CRAB		NA	NA	NA	NA	0	0	0	0
ECHN	ALL ECHINODERMS		NA	NA	NA	NA	0	0	0	0
FLAT	ALL FLATFISH		NA	NA	NA	NA	0	0	0	0
GRND	ALL GROUNDFISH		NA	NA	NA	NA	0	0	0	0
HMSF	ALL HIGHLY MIGRATORY		NA	NA	NA	NA	0	0	0	0
KCRB	ALL KING CRAB		NA	NA	NA	NA	0	0	0	0
MLSK	ALL MOLLUSKS		NA	NA	NA	NA	0	0	0	0
OYST	ALL OYSTERS		NA	NA	NA	NA	0	0	0	0
ROCK	ALL ROCKFISH		NA	NA	NA	NA	0	0	0	0
ROND	ALL ROUNDFISH		NA	NA	NA	NA	0	0	0	0
SAMN	ALL SALMON		NA	NA	NA	NA	0	0	0	0
SCAL	ALL SCALLOPS		NA	NA	NA	NA	0	0	0	0
SHRK	ALL SHARKS		NA	NA	NA	NA	0	0	0	0
SHLL	ALL SHELLFISH		NA	NA	NA	NA	0	0	0	0
SRMP	ALL SHRIMP & PRAWNS		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
SKAT	ALL SKATES & RAYS		NA	NA	NA	NA	0	0	0	0
STRG	ALL STURGEON		NA	NA	NA	NA	0	0	0	0
TCRB	ALL TANNER CRAB		NA	NA	NA	NA	0	0	0	0
TUNA	ALL TUNAS		NA	NA	NA	NA	0	0	0	0
WETF	ALL WET FISH		NA	NA	NA	NA	0	0	0	0
DEEP	DEEP-91 FLOUNDERS		NA	NA	NA	NA	0	0	0	0
DRCK	DEMERSAL-91 RKFSH		NA	NA	NA	NA	0	0	0	0
MGRN	MISC. GROUNDFISH		NA	NA	NA	NA	0	0	0	0
OBRK	OTHER BSA RKFSH		NA	NA	NA	NA	0	0	0	0
OTHR	OTHER SPECIES (NO M-GROUP)		NA	NA	NA	NA	0	0	0	0
PRCK	PELAGIC ROCKFISH		NA	NA	NA	NA	0	0	0	0
POPG	POP GROUP		NA	NA	NA	NA	0	0	0	0
SBTS	RCKFSH SUBTOTAL #1		NA	NA	NA	NA	0	0	0	0
SDAB	SANDDABS		NA	NA	NA	NA	0	0	0	0
SHAL	SHALLOW-91 FLOUNDERS		NA	NA	NA	NA	0	0	0	0
SRKG	SHORTRAKER GROUP		NA	NA	NA	NA	0	0	0	0
SRCK	SLOPE-91 ROCKFISH		NA	NA	NA	NA	0	0	0	0
TRNY	THORNYHEADS COMPLEX		NA	NA	NA	NA	0	0	0	0
TRBT	TURBOTS		NA	NA	NA	NA	0	0	0	0
APLC	ALASKA PLAICE		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	0	0	0	0
ALBC	ALBACORE		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
AMCK	ATKA MACKEREL		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0

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Table A-1 (continued).

PacFIN Species ID	PacFIN Common Name	IFQ Grouping	Limited Entry/Non-nearshore Species Group		Nearshore Fixed Gear Species Group		FMP Species	Nearshore Species	Rebuilding Species	IFQ Species
			North of 40° 10' latitude	South of 40° 10' latitude	North of 40° 10' latitude	South of 40° 10' latitude				
BTCR	BAIRDI TANNER CRAB		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
CKLE	BASKET COCKLE		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
BTRY	BAT RAY		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
ISRK	BIGEYE THRESHER SHARK		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
ETNA	BIGEYE TUNA		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
BMOL	BIGMOUTH SOLE		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	0	0	0	0
BABL	BLACK ABALONE		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
BLPT	BLACK EELPOUT		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
BHAG	BLACK HAGFISH		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
BSJK	BLACK SKIPJACK		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
BKCR	BLUE KING CRAB		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
BMRL	BLUE MARLIN		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
BMSL	BLUE OR BAY MUSSEL		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
BSRK	BLUE SHARK		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
BTNA	BLUEFIN TUNA		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
CSRK	BROWN CAT SHARK		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
BISC	BROWN IRISH LORD		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	1	0	0
BACL	BUFFALO SCULPIN		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	1	0	0
BMCK	BULLET MACKEREL		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
BCLM	BUTTER CLAM		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
LOBS	CALIF. SPINY LOBSTER		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
CHLB	CALIFORNIA HALIBUT		California halibut	California halibut	California halibut	California halibut	0	0	0	0
JCLM	CALIFORNIA JACKKNIFE CLAM		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
CMSL	CALIFORNIA MUSSEL		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
SHPD	CALIFORNIA SHEEPHEAD		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	1	0	0
CSLK	CALIFORNIA SLICKHEAD		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
CPLN	CAPELIN		Shared ecosystem component species	Shared ecosystem component species	Shared ecosystem component species	Shared ecosystem component species	0	0	0	0
CHNK	CHINOOK SALMON		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
CMCK	CHUB MACKEREL		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
CHUM	CHUM SALMON		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
CTRB	C-O SOLE		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	0	0	0	0
COHO	COHO SALMON		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
MOLA	COMMON MOLA		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
TSRK	COMMON THRESHER SHARK		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
DSOL	DEEPEA SOLE		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	0	0	0	0
DTRB	DIAMOND TURBOT		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	0	0	0	0
DRDO	DORADO		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
DCRB	DUNGENESS CRAB		Dungeness crab	Dungeness crab	Dungeness crab	Dungeness crab	0	0	0	0
ESTR	EASTERN OYSTER		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
EULC	EULACHON		Eulachon	Eulachon	Eulachon	Eulachon	0	0	0	0

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Table A-1 (continued).

PacFIN Species ID	PacFIN Common Name	IFQ Grouping	Limited Entry/Non-nearshore Species Group		Nearshore Fixed Gear Species Group		FMP Species	Nearshore Species	Rebuilding Species	IFQ Species
			North of 40° 10' latitude	South of 40° 10' latitude	North of 40° 10' latitude	South of 40° 10' latitude				
EURO	EUROPEAN OYSTER		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
FNTS	FANTAIL SOLE		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	0	0	0	0
GCML	GAPER CLAM		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
GDUK	GEODUCK		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
GSRM	GHOST SHRIMP		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
KFSH	GIANT KELPFISH		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
GBAS	GIANT SEA BASS		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
GSQD	GIANT SQUID		Shared ecosystem component species	Shared ecosystem component species	Shared ecosystem component species	Shared ecosystem component species	0	0	0	0
GKCR	GOLDEN KING CRAB		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
GPRW	GOLDEN PRAWN		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
RSRM	GRASS SHRIMP		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
GABL	GREEN ABALONE		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
GSTG	GREEN STURGEON		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
GTRB	GREENLAND TURBOT		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	0	0	0	0
HTRB	HORNYHEAD TURBOT		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	0	0	0	0
HCLM	HORSE CLAMS		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
HSQD	HUMBOLT SQUID		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
JMCK	JACK MACKEREL		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
KMKA	KAMCHATKA FLOUNDER		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	0	0	0	0
KSTR	KUMAMOTO OYSTER		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
LDAB	LONGFIN SANDDAB		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	0	0	0	0
LIVR	LOUVAR		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
MLML	MANILA CLAM		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
MSQD	MARKET SQUID		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
MISC	MISC. FISH/ANIMALS		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
MSC2	MISCELLANEOUS FISH		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
MEEL	MONKEYFACE EEL		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
MACL	MUD CLAMS		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
MSRM	MUD SHRIMP		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
LCML	NATIVE LITTLENECK		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
BMO1	NOM. BIGMOUTH SOLE		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	0	0	0	0
CHL1	NOM. CALIFORNIA HALIBUT		California halibut	California halibut	California halibut	California halibut	0	0	0	0
SHP1	NOM. CALIFORNIA SHEEPHEAD		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	1	0	0
LDB1	NOM. LONGFIN SANDDAB		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	0	0	0	0
RGL1	NOM. ROCK GREENLING		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
SDB1	NOM. SPECKLED SANDDAB		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	0	0	0	0
NANC	NORTHERN ANCHOVY		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
QCLM	NORTHERN QUAHOG CLAM		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
OWFS	OCEAN WHITEFISH		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
LSTR	OLYMPIA OYSTER		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0

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Table A-1 (continued).

PacFIN Species ID	PacFIN Common Name	IFQ Grouping	Limited Entry/Non-nearshore Species Group		Nearshore Fixed Gear Species Group		FMP Species	Nearshore Species	Rebuilding Species	IFQ Species
			North of 40° 10' latitude	South of 40° 10' latitude	North of 40° 10' latitude	South of 40° 10' latitude				
OPAH	OPAH		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
OTCR	OPILIO TANNER CRAB		Tanner crab	Tanner crab	Tanner crab	Tanner crab	0	0	0	0
OABL	OTHER ABALONE		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
OANC	OTHER ANCHOVY		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
OBAS	OTHER BASS		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
OCLM	OTHER CLAM		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
OCRB	OTHER CRAB		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
OCRK	OTHER CROAKER		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
OECH	OTHER ECHINODERM		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
OMSK	OTHER MOLLUSKS		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
OSTR	OTHER OYSTER		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
OSCL	OTHER SCALLOP		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
OURC	OTHER SEA URCHINS		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
OSRK	OTHER SHARK		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
OSRM	OTHER SHRIMP		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
OSKT	OTHER SKATES		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
OTNA	OTHER TUNA		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
ASRK	PACIFIC ANGEL SHARK		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
CUDA	PACIFIC BARRACUDA		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
PBNT	PACIFIC BONITO		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
PBTR	PACIFIC BUTTERFISH		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
PHAG	PACIFIC HAGFISH		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
PHRG	PACIFIC HERRING		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
PSTR	PACIFIC OYSTER		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
POMF	PACIFIC POMFRET		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
PSDN	PACIFIC SARDINE		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
SARY	PACIFIC SAURY		Shared ecosystem component species	Shared ecosystem component species	Shared ecosystem component species	Shared ecosystem component species	0	0	0	0
TCOD	PACIFIC TOMCOD		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
PSRK	PELAGIC THRESHER SHARK		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
PABL	PINK ABALONE		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
PINK	PINK SALMON		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
PSHP	PINK SHRIMP		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
PCLM	PISMO CLAM		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
MSHP	PLAINFIN MIDSHIPMAN		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
PROW	PROWFISH		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
PRCL	PURPLE CLAM		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
QFSH	QUEENFISH		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
RCLM	RAZOR CLAM		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
RABL	RED ABALONE		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
RSCL	RED IRISH LORD		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	1	0	0

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Table A-1 (continued).

PacFIN Species ID	PacFIN Common Name	IFQ Grouping	Limited Entry/Non-nearshore Species Group		Nearshore Fixed Gear Species Group		FMP Species	Nearshore Species	Rebuilding Species	IFQ Species
			North of 40° 10' latitude	South of 40° 10' latitude	North of 40° 10' latitude	South of 40° 10' latitude				
RKCR	RED KING CRAB		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
RJRC	RED SEA URCHIN		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
RPRW	RIDGEBACK PRAWN		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
RCRB	ROCK CRAB		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
RCKG	ROCK GREENLING		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
RZCL	ROSY RAZOR CLAM		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
RHRG	ROUND HERRING		Shared ecosystem component species	Shared ecosystem component species	Shared ecosystem component species	Shared ecosystem component species	0	0	0	0
SAIL	SAILFISH		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
SKCR	SCARLET KING CRAB		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
SSCL	SHARPNOSE SCULPIN		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
SSPF	SHORTBILL SPEARFISH		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
MAKO	SHORTFIN MAKO SHARK		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
SKIL	SKILFISH		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
STNA	SKIPJACK TUNA		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
SLNS	SLENDER SOLE		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	0	0	0	0
SOCK	SOCKEYE SALMON		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
SCLM	SOFT-SHELLED CLAM		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
SSDB	SPECKLED SANDDAB		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	0	0	0	0
CEEL	SPOTTED CUSK-EEL		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
SPRW	SPOTTED PRAWN		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
STRB	SPOTTED TURBOT		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	0	0	0	0
SSKT	STARRY SKATE		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
STLH	STEELHEAD		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
MRLN	STRIPED MARLIN		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
SFRP	SURFPERCH SPP.		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
SWRD	SWORDFISH		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
XXXX	UNKNOWN SPECIES		NA	NA	NA	NA	0	0	0	0
BSRM	UNSP. BAIT SHRIMP		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
UJEL	UNSP. JELLYFISH		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
UKCR	UNSP. KING CRAB		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
UMCK	UNSP. MACKEREL		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
USRM	UNSP. OCEAN SHRIMP		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
OCTP	UNSP. OCTOPUS		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
USMN	UNSP. SALMON		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
SCLP	UNSP. SCULPIN		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
USCU	UNSP. SEA CUCUMBERS		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
UURC	UNSP. SEA URCHINS		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
USRK	UNSP. SHARK		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
USKT	UNSP. SKATE		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
SMLT	UNSP. SMELT		Shared ecosystem component species	Shared ecosystem component species	Shared ecosystem component species	Shared ecosystem component species	0	0	0	0

Table A-1 (continued).

PacFIN Species ID	PacFIN Common Name	IFQ Grouping	Limited Entry/Non-nearshore Species Group		Nearshore Fixed Gear Species Group		FMP Species	Nearshore Species	Rebuilding Species	IFQ Species
			North of 40° 10' latitude	South of 40° 10' latitude	North of 40° 10' latitude	South of 40° 10' latitude				
SQID	UNSP. SQUID		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
USTG	UNSP. STURGEON		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
UTCR	UNSP. TANNER CRAB		Tanner crab	Tanner crab	Tanner crab	Tanner crab	0	0	0	0
UABL	UNSPECIFIED ABALONE		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
UCLM	UNSPECIFIED CLAM		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
UCRB	UNSPECIFIED CRAB		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
UECH	UNSPECIFIED ECHINODERM		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
EELS	UNSPECIFIED EELS		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
UHAG	UNSPECIFIED HAGFISH		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
UHLB	UNSPECIFIED HALIBUT		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
UMSK	UNSPECIFIED MOLLUSKS		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
USTR	UNSPECIFIED OYSTER		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
USCL	UNSPECIFIED SCALLOP		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
SHAD	UNSPECIFIED SHAD		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
UTNA	UNSPECIFIED TUNA		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
VCML	VARNISH CLAM		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
WHOO	WAHOO		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
PLCK	WALLEYE POLLOCK		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
WCLM	WASHINGTON CLAM		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
WABL	WHITE ABALONE		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
WCRK	WHITE CROAKER		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
WBAS	WHITE SEABASS		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
WSTG	WHITE STURGEON		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
WEEL	WOLF EEL		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
YSOL	YELLOWFIN SOLE		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	0	0	0	0
YTNA	YELLOWFIN TUNA		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0
YTLT	YELLOWTAIL		Other non-groundfish	Other non-groundfish	Other non-groundfish	Other non-groundfish	0	0	0	0

Table A-2. Species belonging to each WCGOP unsampled IFQ catch category.

Species belonging to each WCGOP unsampled IFQ catch category. The IFQM catch category includes all IFQ species, and the NIFQ category includes all non-IFQ fish species.

IFQFF	IFQRF	IFQRD
Arrowtooth Flounder	Aurora Rockfish	Lingcod
Butter Sole	Bank Rockfish	Pacific Cod
Curlfin Turbot	Blackgill Rockfish	Pacific Hake
Dover Sole	Bocaccio Rockfish	Sablefish
English Sole	Canary Rockfish	
Flatfish Unid	Chilipepper Rockfish	
Flathead Sole	Cowcod Rockfish	
Pacific Halibut	Darkblotched Rockfish	
Pacific Sanddab	Flag Rockfish	
Petrale Sole	Greenspotted Rockfish	
Rex Sole	Greenstriped Rockfish	
Rock Sole	Halfbanded Rockfish	
Sand Sole	Harlequin Rockfish	
Sanddab Unid	Longspine Thornyhead	
Starry Flounder	Pacific Ocean Perch	
	Pygmy Rockfish	
	Redbanded Rockfish	
	Redstripe Rockfish	
	Rockfish Unid	
	Rosethorn Rockfish	
	Rosy Rockfish	
	Rougheye Rockfish	
	Sharpchin Rockfish	
	Shortraker Rockfish	
	Shortspine Thornyhead	
	Silvergray Rockfish	
	Splitnose Rockfish	
	Spotted Rockfish Unid	
	Squarespot Rockfish	
	Starry Rockfish	
	Stripetail Rockfish	
	Widow Rockfish	
	Yelloweye Rockfish	
	Yellowmouth Rockfish	
	Yellowtail Rockfish	

Table A-3. Mortality rates applied in bottom trawl and fixed gear fisheries.

Unlisted species were assumed to have 100% mortality rate. Rates are provided by GMT.

Species	Fishery	Gear	Discard Mortality Rate
Big Skate	California Halibut	Trawl	50%
	IFQ Bottom Trawl	Trawl	50%
	LE Bottom Trawl	Trawl	50%
Lingcod	California Halibut	Trawl	50%
	IFQ Bottom Trawl	Trawl	50%
	IFQ Fixed Gear	Line	7%
	LE Bottom Trawl	Trawl	50%
	Non-Nearshore Fixed Gear	Line	7%
	Pacific Halibut Derby	Line	7%
Longnose Skate	California Halibut	Trawl	50%
	IFQ Bottom Trawl	Trawl	50%
	IFQ Fixed Gear	Line and Pot	50%
	LE Bottom Trawl	Trawl	50%
	Non-Nearshore Fixed Gear	Line and Pot	50%
	Pacific Halibut Derby	Line	50%
Sablefish	California Halibut	Trawl	50%
	IFQ Bottom Trawl	Trawl	50%
	IFQ Fixed Gear	Line and Pot	20%
	LE Bottom Trawl	Trawl	50%
	Non-Nearshore Fixed Gear	Line and Pot	20%
	Pacific Halibut Derby	Line	20%
Spiny Dogfish Shark	IFQ Fixed Gear	Line	50%
	Non-Nearshore Fixed Gear	Line	50%
	Pacific Halibut Derby	Line	50%

Table A-4. Depth-dependent mortality rates applied in the nearshore fixed gear fishery

Unlisted species were assumed to have 100% mortality rate or were not observed in the given strata across all years of WCGOP data. Rates are provided by GMT and were updated in June 2017.

Nearshore Grouping	Species	Area Compared to 40° 10' N. latitude	Depth (fm)	Discard Mortality Rate
Big skate	Big Skate	NORTH	0-10 fm	0.07
Big skate	Big Skate	NORTH	10-20 fm	0.07
Big skate	Big Skate	NORTH	20-30 fm	0.07
Big skate	Big Skate	SOUTH	0-10 fm	0.07
Big skate	Big Skate	SOUTH	10-20 fm	0.07
Big skate	Big Skate	SOUTH	20-30 fm	0.07
Black rockfish (California)	Black Rockfish	NORTH	>30 fm	0.63
Black rockfish (California)	Black Rockfish	NORTH	0-10 fm	0.18
Black rockfish (California)	Black Rockfish	NORTH	10-20 fm	0.28
Black rockfish (California)	Black Rockfish	NORTH	20-30 fm	0.46
Black rockfish (California)	Black Rockfish	SOUTH	>30 fm	0.96
Black rockfish (California)	Black Rockfish	SOUTH	0-10 fm	0.53
Black rockfish (California)	Black Rockfish	SOUTH	10-20 fm	0.63
Black rockfish (California)	Black Rockfish	SOUTH	20-30 fm	0.69
Black rockfish (Oregon)	Black Rockfish	NORTH	>30 fm	0.63
Black rockfish (Oregon)	Black Rockfish	NORTH	0-10 fm	0.18
Black rockfish (Oregon)	Black Rockfish	NORTH	10-20 fm	0.28
Black rockfish (Oregon)	Black Rockfish	NORTH	20-30 fm	0.46
Bocaccio rockfish (South of 40°10' N. lat.)	Bocaccio Rockfish	SOUTH	>30 fm	1
Bocaccio rockfish (South of 40°10' N. lat.)	Bocaccio Rockfish	SOUTH	10-20 fm	0.68
Cabezon (California)	Cabezon	NORTH	0-10 fm	0.07
Cabezon (California)	Cabezon	NORTH	10-20 fm	0.07
Cabezon (California)	Cabezon	NORTH	20-30 fm	0.07
Cabezon (California)	Cabezon	SOUTH	>30 fm	0.07
Cabezon (California)	Cabezon	SOUTH	0-10 fm	0.07
Cabezon (California)	Cabezon	SOUTH	10-20 fm	0.07
Cabezon (California)	Cabezon	SOUTH	20-30 fm	0.07
Cabezon (Oregon)	Cabezon	NORTH	>30 fm	0.07
Cabezon (Oregon)	Cabezon	NORTH	0-10 fm	0.07
Cabezon (Oregon)	Cabezon	NORTH	10-20 fm	0.07
Cabezon (Oregon)	Cabezon	NORTH	20-30 fm	0.07
California scorpionfish (North of 34°27' N. lat.)	California Scorpionfish	SOUTH	0-10 fm	0.07
California scorpionfish (South of 34°27' N. lat.)	California Scorpionfish	SOUTH	>30 fm	0.07
California scorpionfish (South of 34°27' N. lat.)	California Scorpionfish	SOUTH	0-10 fm	0.07
California scorpionfish (South of 34°27' N. lat.)	California Scorpionfish	SOUTH	10-20 fm	0.07
California scorpionfish (South of 34°27' N. lat.)	California Scorpionfish	SOUTH	20-30 fm	0.07
Canary rockfish	Canary Rockfish	NORTH	>30 fm	1
Canary rockfish	Canary Rockfish	NORTH	0-10 fm	0.27
Canary rockfish	Canary Rockfish	NORTH	10-20 fm	0.43
Canary rockfish	Canary Rockfish	NORTH	20-30 fm	0.65
Canary rockfish	Canary Rockfish	SOUTH	>30 fm	1
Canary rockfish	Canary Rockfish	SOUTH	0-10 fm	0.58
Canary rockfish	Canary Rockfish	SOUTH	10-20 fm	0.71
Canary rockfish	Canary Rockfish	SOUTH	20-30 fm	0.79
Deeper nearshore rockfish	Blue/Deacon Rockfish	SOUTH	>30 fm	1
Deeper nearshore rockfish	Blue/Deacon Rockfish	SOUTH	0-10 fm	0.57
Deeper nearshore rockfish	Blue/Deacon Rockfish	SOUTH	10-20 fm	0.67
Deeper nearshore rockfish	Blue/Deacon Rockfish	SOUTH	20-30 fm	0.75
Deeper nearshore rockfish	Brown Rockfish	SOUTH	>30 fm	1
Deeper nearshore rockfish	Brown Rockfish	SOUTH	0-10 fm	0.54

Table A-4 (continued).

Nearshore Grouping	Species	Area Compared to 40° 10' N. latitude	Depth (fm)	Discard Mortality Rate
Deeper nearshore rockfish	Brown Rockfish	SOUTH	10-20 fm	0.64
Deeper nearshore rockfish	Brown Rockfish	SOUTH	20-30 fm	0.71
Deeper nearshore rockfish	Calico Rockfish	SOUTH	>30 fm	1
Deeper nearshore rockfish	Calico Rockfish	SOUTH	0-10 fm	0.6
Deeper nearshore rockfish	Calico Rockfish	SOUTH	10-20 fm	0.73
Deeper nearshore rockfish	Calico Rockfish	SOUTH	20-30 fm	0.82
Deeper nearshore rockfish	Copper Rockfish	SOUTH	>30 fm	1
Deeper nearshore rockfish	Copper Rockfish	SOUTH	0-10 fm	0.57
Deeper nearshore rockfish	Copper Rockfish	SOUTH	10-20 fm	0.69
Deeper nearshore rockfish	Copper Rockfish	SOUTH	20-30 fm	0.77
Deeper nearshore rockfish	Olive Rockfish	SOUTH	>30 fm	1
Deeper nearshore rockfish	Olive Rockfish	SOUTH	0-10 fm	0.65
Deeper nearshore rockfish	Olive Rockfish	SOUTH	10-20 fm	0.74
Deeper nearshore rockfish	Olive Rockfish	SOUTH	20-30 fm	0.81
Deeper nearshore rockfish	Quillback Rockfish	SOUTH	0-10 fm	0.58
Deeper nearshore rockfish	Quillback Rockfish	SOUTH	10-20 fm	0.7
Deeper nearshore rockfish	Quillback Rockfish	SOUTH	20-30 fm	0.79
Deeper nearshore rockfish	Treefish Rockfish	SOUTH	>30 fm	1
Deeper nearshore rockfish	Treefish Rockfish	SOUTH	0-10 fm	0.55
Deeper nearshore rockfish	Treefish Rockfish	SOUTH	10-20 fm	0.65
Deeper nearshore rockfish	Treefish Rockfish	SOUTH	20-30 fm	0.73
Ecosystem component species	California Skate	SOUTH	>30 fm	0.07
Ecosystem component species	California Skate	SOUTH	0-10 fm	0.07
Ecosystem component species	California Skate	SOUTH	10-20 fm	0.07
Ecosystem component species	California Skate	SOUTH	20-30 fm	0.07
Ecosystem component species	Sandpaper Skate	NORTH	0-10 fm	0.07
Ecosystem component species	Sandpaper Skate	NORTH	20-30 fm	0.07
Ecosystem component species	Soupin Shark	NORTH	20-30 fm	0.07
Ecosystem component species	Soupin Shark	SOUTH	>30 fm	0.07
Ecosystem component species	Spotted Ratfish	NORTH	0-10 fm	0.07
Ecosystem component species	Spotted Ratfish	NORTH	10-20 fm	0.07
Ecosystem component species	Spotted Ratfish	NORTH	20-30 fm	0.07
Ecosystem component species	Spotted Ratfish	SOUTH	>30 fm	0.07
Ecosystem component species	Spotted Ratfish	SOUTH	10-20 fm	0.07
Ecosystem component species	Spotted Ratfish	SOUTH	20-30 fm	0.07
English sole	English Sole	SOUTH	>30 fm	0.07
Lingcod (North of 40°10' N. lat.)	Lingcod	NORTH	>30 fm	0.07
Lingcod (North of 40°10' N. lat.)	Lingcod	NORTH	0-10 fm	0.07
Lingcod (North of 40°10' N. lat.)	Lingcod	NORTH	10-20 fm	0.07
Lingcod (North of 40°10' N. lat.)	Lingcod	NORTH	20-30 fm	0.07
Lingcod (South of 40°10' N. lat.)	Lingcod	SOUTH	>30 fm	0.07
Lingcod (South of 40°10' N. lat.)	Lingcod	SOUTH	0-10 fm	0.07
Lingcod (South of 40°10' N. lat.)	Lingcod	SOUTH	10-20 fm	0.07
Lingcod (South of 40°10' N. lat.)	Lingcod	SOUTH	20-30 fm	0.07
Longnose skate	Longnose Skate	NORTH	0-10 fm	0.07
Longnose skate	Longnose Skate	NORTH	10-20 fm	0.07
Longnose skate	Longnose Skate	SOUTH	10-20 fm	0.07
Minor nearshore rockfish (North of 40°10' N. lat.)	Black and Yellow Rockfish	NORTH	0-10 fm	0.2
Minor nearshore rockfish (North of 40°10' N. lat.)	Black and Yellow Rockfish	NORTH	10-20 fm	0.31
Minor nearshore rockfish (North of 40°10' N. lat.)	Black and Yellow Rockfish	NORTH	20-30 fm	0.52

Table A-4 (continued).

Nearshore Grouping	Species	Area Compared to 40° 10' N. latitude	Depth (fm)	Discard Mortality Rate
Minor nearshore rockfish (North of 40°10' N. lat.)	Blue/Deacon Rockfish	NORTH	>30 fm	1
Minor nearshore rockfish (North of 40°10' N. lat.)	Blue/Deacon Rockfish	NORTH	0-10 fm	0.25
Minor nearshore rockfish (North of 40°10' N. lat.)	Blue/Deacon Rockfish	NORTH	10-20 fm	0.37
Minor nearshore rockfish (North of 40°10' N. lat.)	Blue/Deacon Rockfish	NORTH	20-30 fm	0.57
Minor nearshore rockfish (North of 40°10' N. lat.)	Brown Rockfish	NORTH	0-10 fm	0.19
Minor nearshore rockfish (North of 40°10' N. lat.)	Brown Rockfish	NORTH	10-20 fm	0.3
Minor nearshore rockfish (North of 40°10' N. lat.)	China Rockfish	NORTH	>30 fm	1
Minor nearshore rockfish (North of 40°10' N. lat.)	China Rockfish	NORTH	0-10 fm	0.2
Minor nearshore rockfish (North of 40°10' N. lat.)	China Rockfish	NORTH	10-20 fm	0.31
Minor nearshore rockfish (North of 40°10' N. lat.)	China Rockfish	NORTH	20-30 fm	0.52
Minor nearshore rockfish (North of 40°10' N. lat.)	Copper Rockfish	NORTH	0-10 fm	0.26
Minor nearshore rockfish (North of 40°10' N. lat.)	Copper Rockfish	NORTH	10-20 fm	0.4
Minor nearshore rockfish (North of 40°10' N. lat.)	Copper Rockfish	NORTH	20-30 fm	0.61
Minor nearshore rockfish (North of 40°10' N. lat.)	Gopher Rockfish	NORTH	0-10 fm	0.26
Minor nearshore rockfish (North of 40°10' N. lat.)	Gopher Rockfish	NORTH	10-20 fm	0.4
Minor nearshore rockfish (North of 40°10' N. lat.)	Grass Rockfish	NORTH	0-10 fm	0.29
Minor nearshore rockfish (North of 40°10' N. lat.)	Olive Rockfish	NORTH	>30 fm	1
Minor nearshore rockfish (North of 40°10' N. lat.)	Olive Rockfish	NORTH	0-10 fm	0.39
Minor nearshore rockfish (North of 40°10' N. lat.)	Olive Rockfish	NORTH	10-20 fm	0.5
Minor nearshore rockfish (North of 40°10' N. lat.)	Olive Rockfish	NORTH	20-30 fm	0.68
Minor nearshore rockfish (North of 40°10' N. lat.)	Quillback Rockfish	NORTH	>30 fm	1
Minor nearshore rockfish (North of 40°10' N. lat.)	Quillback Rockfish	NORTH	0-10 fm	0.27
Minor nearshore rockfish (North of 40°10' N. lat.)	Quillback Rockfish	NORTH	10-20 fm	0.41
Minor nearshore rockfish (North of 40°10' N. lat.)	Quillback Rockfish	NORTH	20-30 fm	0.64
Minor shelf rockfish (North of 40°10' N. lat.)	Tiger Rockfish	NORTH	10-20 fm	0.41
Minor shelf rockfish (North of 40°10' N. lat.)	Tiger Rockfish	NORTH	20-30 fm	0.63
Minor shelf rockfish (North of 40°10' N. lat.)	Vermilion Rockfish	NORTH	>30 fm	1
Minor shelf rockfish (North of 40°10' N. lat.)	Vermilion Rockfish	NORTH	0-10 fm	0.26
Minor shelf rockfish (North of 40°10' N. lat.)	Vermilion Rockfish	NORTH	10-20 fm	0.4
Minor shelf rockfish (North of 40°10' N. lat.)	Vermilion Rockfish	NORTH	20-30 fm	0.62
Minor shelf rockfish (South of 40°10' N. lat.)	Vermilion Rockfish	SOUTH	>30 fm	1
Minor shelf rockfish (South of 40°10' N. lat.)	Vermilion Rockfish	SOUTH	0-10 fm	0.58
Minor shelf rockfish (South of 40°10' N. lat.)	Vermilion Rockfish	SOUTH	10-20 fm	0.69
Minor shelf rockfish (South of 40°10' N. lat.)	Vermilion Rockfish	SOUTH	20-30 fm	0.78
Minor shelf rockfish (South of 40°10' N. lat.)	Yellowtail Rockfish	SOUTH	>30 fm	0.94
Minor shelf rockfish (South of 40°10' N. lat.)	Yellowtail Rockfish	SOUTH	0-10 fm	0.53
Minor shelf rockfish (South of 40°10' N. lat.)	Yellowtail Rockfish	SOUTH	10-20 fm	0.61
Minor shelf rockfish (South of 40°10' N. lat.)	Yellowtail Rockfish	SOUTH	20-30 fm	0.67
Other flatfish	Butter Sole	NORTH	0-10 fm	0.07
Other flatfish	Butter Sole	NORTH	10-20 fm	0.07
Other flatfish	Butter Sole	SOUTH	20-30 fm	0.07
Other flatfish	Flatfish Unid	NORTH	10-20 fm	0.07
Other flatfish	Flatfish Unid	SOUTH	>30 fm	0.07
Other flatfish	Pacific Sanddab	NORTH	10-20 fm	0.07
Other flatfish	Pacific Sanddab	SOUTH	>30 fm	0.07
Other flatfish	Pacific Sanddab	SOUTH	0-10 fm	0.07
Other flatfish	Pacific Sanddab	SOUTH	10-20 fm	0.07
Other flatfish	Pacific Sanddab	SOUTH	20-30 fm	0.07
Other flatfish	Rock Sole	NORTH	0-10 fm	0.07
Other flatfish	Rock Sole	NORTH	10-20 fm	0.07

Table A-4 (continued).

Nearshore Grouping	Species	Area Compared to 40° 10' N. latitude	Depth (fm)	Discard Mortality Rate
Other flatfish	Rock Sole	NORTH	20-30 fm	0.07
Other flatfish	Rock Sole	SOUTH	0-10 fm	0.07
Other flatfish	Rock Sole	SOUTH	10-20 fm	0.07
Other flatfish	Rock Sole	SOUTH	20-30 fm	0.07
Other flatfish	Sand Sole	NORTH	0-10 fm	0.07
Other flatfish	Sand Sole	NORTH	10-20 fm	0.07
Other flatfish	Sand Sole	SOUTH	0-10 fm	0.07
Other flatfish	Sand Sole	SOUTH	10-20 fm	0.07
Other flatfish	Sand Sole	SOUTH	20-30 fm	0.07
Other flatfish	Sanddab Unid	NORTH	10-20 fm	0.07
Other flatfish	Sanddab Unid	SOUTH	>30 fm	0.07
Other flatfish	Sanddab Unid	SOUTH	0-10 fm	0.07
Other flatfish	Sanddab Unid	SOUTH	10-20 fm	0.07
Other groundfish	Greenling Unid	NORTH	0-10 fm	0.07
Other groundfish	Greenling Unid	NORTH	10-20 fm	0.07
Other groundfish	Greenling Unid	SOUTH	0-10 fm	0.07
Other groundfish	Greenling Unid	SOUTH	10-20 fm	0.07
Other groundfish	Greenling Unid	SOUTH	20-30 fm	0.07
Other groundfish	Kelp Greenling (California)	NORTH	>30 fm	0.07
Other groundfish	Kelp Greenling (California)	NORTH	0-10 fm	0.07
Other groundfish	Kelp Greenling (California)	NORTH	10-20 fm	0.07
Other groundfish	Kelp Greenling (California)	NORTH	20-30 fm	0.07
Other groundfish	Kelp Greenling (California)	SOUTH	>30 fm	0.07
Other groundfish	Kelp Greenling (California)	SOUTH	0-10 fm	0.07
Other groundfish	Kelp Greenling (California)	SOUTH	10-20 fm	0.07
Other groundfish	Kelp Greenling (California)	SOUTH	20-30 fm	0.07
Other groundfish	Kelp Greenling (Oregon)	NORTH	>30 fm	0.07
Other groundfish	Kelp Greenling (Oregon)	NORTH	0-10 fm	0.07
Other groundfish	Kelp Greenling (Oregon)	NORTH	10-20 fm	0.07
Other groundfish	Kelp Greenling (Oregon)	NORTH	20-30 fm	0.07
Other groundfish	Leopard Shark	SOUTH	0-10 fm	0.07
Other groundfish	Leopard Shark	SOUTH	10-20 fm	0.07
Other groundfish	Leopard Shark	SOUTH	20-30 fm	0.07
Other non-groundfish	Pacific Halibut	NORTH	0-10 fm	0.07
Other non-groundfish	Pacific Halibut	NORTH	10-20 fm	0.07
Other non-groundfish	Pacific Halibut	NORTH	20-30 fm	0.07
Petrale sole	Petrale Sole	NORTH	10-20 fm	0.07
Petrale sole	Petrale Sole	SOUTH	10-20 fm	0.07
Petrale sole	Petrale Sole	SOUTH	20-30 fm	0.07
Shallow nearshore rockfish	Black and Yellow Rockfish	SOUTH	>30 fm	1
Shallow nearshore rockfish	Black and Yellow Rockfish	SOUTH	0-10 fm	0.54
Shallow nearshore rockfish	Black and Yellow Rockfish	SOUTH	10-20 fm	0.65
Shallow nearshore rockfish	China Rockfish	SOUTH	>30 fm	1
Shallow nearshore rockfish	China Rockfish	SOUTH	0-10 fm	0.54
Shallow nearshore rockfish	China Rockfish	SOUTH	10-20 fm	0.65
Shallow nearshore rockfish	China Rockfish	SOUTH	20-30 fm	0.72
Shallow nearshore rockfish	Gopher Rockfish	SOUTH	>30 fm	1
Shallow nearshore rockfish	Gopher Rockfish	SOUTH	0-10 fm	0.57
Shallow nearshore rockfish	Gopher Rockfish	SOUTH	10-20 fm	0.69
Shallow nearshore rockfish	Gopher Rockfish	SOUTH	20-30 fm	0.78

Table A-4 (continued).

Nearshore Grouping	Species	Area Compared to 40° 10' N. latitude	Depth (fm)	Discard Mortality Rate
Shallow nearshore rockfish	Grass Rockfish	SOUTH	0-10 fm	0.59
Shallow nearshore rockfish	Grass Rockfish	SOUTH	10-20 fm	0.74
Shallow nearshore rockfish	Kelp Rockfish	SOUTH	0-10 fm	0.53
Shallow nearshore rockfish	Kelp Rockfish	SOUTH	10-20 fm	0.62
Shallow nearshore rockfish	Kelp Rockfish	SOUTH	20-30 fm	0.69
Spiny dogfish	Spiny Dogfish Shark	NORTH	0-10 fm	0.07
Spiny dogfish	Spiny Dogfish Shark	NORTH	10-20 fm	0.07
Spiny dogfish	Spiny Dogfish Shark	SOUTH	>30 fm	0.07
Spiny dogfish	Spiny Dogfish Shark	SOUTH	0-10 fm	0.07
Spiny dogfish	Spiny Dogfish Shark	SOUTH	10-20 fm	0.07
Spiny dogfish	Spiny Dogfish Shark	SOUTH	20-30 fm	0.07
Starry flounder	Starry Flounder	SOUTH	0-10 fm	0.07
Widow rockfish	Widow Rockfish	NORTH	0-10 fm	0.27
Widow rockfish	Widow Rockfish	NORTH	10-20 fm	0.42
Widow rockfish	Widow Rockfish	NORTH	20-30 fm	0.64
Widow rockfish	Widow Rockfish	SOUTH	>30 fm	1
Widow rockfish	Widow Rockfish	SOUTH	10-20 fm	0.7
Widow rockfish	Widow Rockfish	SOUTH	20-30 fm	0.79
YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	NORTH	>30 fm	1
YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	NORTH	0-10 fm	0.28
YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	NORTH	10-20 fm	0.45
YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	NORTH	20-30 fm	0.67
YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	SOUTH	>30 fm	1
YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	SOUTH	10-20 fm	0.72
YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	SOUTH	20-30 fm	0.81
Yellowtail rockfish (North of 40°10' N. lat.)	Yellowtail Rockfish	NORTH	>30 fm	0.5
Yellowtail rockfish (North of 40°10' N. lat.)	Yellowtail Rockfish	NORTH	0-10 fm	0.17
Yellowtail rockfish (North of 40°10' N. lat.)	Yellowtail Rockfish	NORTH	10-20 fm	0.25
Yellowtail rockfish (North of 40°10' N. lat.)	Yellowtail Rockfish	NORTH	20-30 fm	0.43

Table A-5. Updates to analysis used in this report.

Year	Estimation Updates	Mortality Rate Updates	Management Updates
2018	Bocaccio, canary, cowcod, widow, yelloweye, and yellowtail have been added to the group of species used for estimates of retained in the nearshore sector. We now estimate discard for the rare cases where EM video failed and where both EM failed and WCGOP data are unavailable.		
2017	Discards estimated in newly observed sectors (sea cucumber, ridgeback prawn, Pacific halibut derby).	Mortality rates applied to non-nearshore fixed gear line also applied to Pacific halibut derby line	Big skate removed from "Ecosystem Component Species" and managed separately. Black rockfish managed at state level. Bocaccio rockfish, darklotched rockfish, Pacific Ocean perch declared rebuilt.
2016	Definitions of EFP, nearshore, and pink shrimp sectors improved. Nearshore estimation based on 4 depth bins. EM CS fleet at-sea discard methods improved and shoreside discard estimate methods created. Haul-level EM dataset enhanced to provide more accurate mortality estimates.	Nearshore mortality rates updated to include 4 depth bins and N and S of 40'10 deg. N.	New grouping of "Shared Ecosystem Component Species"
2015	Definition of midwater rockfish and midwater hake sectors improved. EM CS fleet discard estimated.	Nearshore rates updated for a variety of species.	New grouping of "Ecosystem Component Species" and changes to "Other fish"/"Other groundfish" grouping
2014	Failed data occurred and were estimated. CVs calculated. EFP displayed separately.	50% mortality rate applied to all Big Skate discard caught using trawl gear	Petrale sole, canary rockfish, widow rockfish declared rebuilt.
2013	Unsampled, unsorted (UNST) hauls occurred and were estimated.		Lingcod split at 40'10 deg. N.
2012		Longnose skate, spiny dogfish mortality rates applied.	
2011	IFQ estimations added.		IFQ management began. ACL, ABC, OFL harvest goals defined.

Table A-6. In-season adjustments to 2018 west coast groundfish fisheries.

A complete list of NMFS Public Notices and a complete list of Federal Register Notices can be found at www.westcoast.fisheries.noaa.gov.

Date	Action (with hyperlink to Federal Register Notice)
1/8/2018	83FR757: Final Rule to Change Pacific Whiting At-Sea Sector Darkblotched Rockfish and Pacific Ocean Perch (POP) Allocations to Set-Asides, Amendment 21-3 to the Pacific Coast Groundfish Fishery Management Plan
1/24/2018	83FR3291: Proposed rule for the 2018 Pacific whiting tribal allocation; public comments must be received by February 23, 2018
1/30/2018	83FR4175: Proposed rule to approve changes to the Pacific halibut Catch Sharing Plan for 2018; public comments must be received by March 1, 2018
2/2/2018	83FR4850: Inseason Adjustments to big skate, sablefish, and lingcod trip limits-Effective February 2, 2018
2/12/2018	83FR5952: Temporary rule to reapportion tribal Pacific whiting and widow rockfish allocations
3/26/2018	83FR13080: Interim final rule to set the 2018 Pacific halibut catch limit in Area 2A; public comments must be received by April 25, 2018
3/26/2018	83FR13090: Final rule to implement the Pacific halibut catch sharing plan and codified regulations, effective March 24, 2018
3/29/2018	83FR13428: Final Rule to authorize midwater long-leader gear for recreational fishing in waters off the Oregon coast; effective date April 1, 2018
4/13/2018	83FR16005: Inseason Adjustments for incidental Pacific halibut rules, Washington and California recreational management measures; effective date April 13, 2018
4/26/2018	83FR18259: Advance notice of proposed rulemaking regarding a control date to limit gear switching in the Shorebased IFQ program; public comments must be received by May 29, 2018
5/15/2018	83FR22401: Final Rule to Implement 2018 Tribal Whiting Allocation and Fishery Harvest Guideline for Non-tribal Fishery
9/6/2018	83FR45224: Notice, request for comments on applications for three exempted fishing permits (EFPs) for gear to selectively harvest underutilized, midwater rockfish species off the Pacific Coast of the U.S.; public comment period closes October 9, 2018
9/7/2018	83FR45396: Proposed Regulations for Groundfish Bottom Trawl and Midwater Trawl Gear in the Trawl Rationalization Program
9/19/2018	83FR47416: 2019-2020 Groundfish Harvest Specifications and Management Measures Proposed Rule
10/1/2018	83FR48727: Inseason Adjustments for CA Recreational Fisheries-effective September 27, 2018
10/9/2018	83FR50510: Inseason Adjustments for Commercial Fisheries-Effective October 9, 2019
10/25/2018	83FR53827: Final rule to implement court-ordered changes to Pacific coast tribal usual and accustomed fishing area boundaries, effective October 25, 2018
11/30/2018	83FR61569: 2018 Tribal Fishery Allocations for Pacific Whiting; Reapportionment Between Tribal and Non-tribal Sectors
12/3/2018	83FR62269: Final Rule for Trawl Gear Changes
12/12/2018	83FR63970: Final Rule for 2019–2020 Pacific Coast Groundfish Harvest Specifications and Management Measures
12/26/2018	83FR66251: Notice, Magnuson-Stevens Act Provisions; Fisheries Off West Coast States; Pacific Coast Groundfish Fishery; Trawl Rationalization Program; 2019 Cost Recovery; effective January 1, 2019
12/27/2018	83FR66638: Correction to 2019-2020 Groundfish Harvest Specifications and Management Measures
12/27/2018	83FR66636: Correction to Trawl Gear Changes

Appendix B: PacFIN Data Processing Protocol

Fish Ticket Data Retrieval and Processing

The basic protocol we employ using Oracle SQL developer and R software is as follows:

- Run an SQL query to retrieve PacFIN data from 2002 through previous year and output an initial data file (.csv file).
- Postprocess the PacFIN data internally.
- Utilize postprocessed PacFIN data files in analyses and groundfish mortality (GM) reporting.

We selected from all data from 2002–18 from one view created by PacFIN:

WCGOP_COMPFT_FEDPERMITS_V2, which join permits tables to the comprehensive fish ticket table.

Prior to running the code below, edits are made to the downloaded PacFIN data, including:

- Correcting gear, vessel ID, IFQ landing, ticket date, and removal type fields based on intense QAQC of observer data.
- Removing duplicated tickets.
- Adding salmon counts based on electronic fish tickets data.
- Incorporating state permit data.

Explicit WCGOP postprocessing of PacFIN fish ticket data output from query above in order to identify sectors as shown in in Figure 1 –

Add field YMD and calculate:

$(([\text{YEAR}]) \times 10000) + ([\text{MONTH}] \times 100) + [\text{DAY}]$

Add field VIDYMD and calculate:

$[\text{DRVID}] \& [\text{YMD}]$

Select Tribal landings as $\text{PARGRP} == 'T'$

Assigned sector “Tribal Commercial” and summarized with “Tribal landings.”

Select Research landings as $\text{REMOVAL_TYPE} == 'R'$ and $\text{IFQ_LANDING} == 'FALSE'$

Assigned sector “Commercial Research.”

Note: Commercial research data are provided by WCR for GM reports, and thus the data from this step are omitted. Further, IFQ trips in early years of the program were often incorrectly identified as research, so we ignore overlap between those two fields.

Select Non-Research landings as $!(\text{REMOVAL_TYPE} == 'R' \text{ and } \text{IFQ_LANDING} == 'FALSE')$

Select fish tickets not identified to an entity/vessel in Non-Research as $\text{DRVID} == 'MISSING'$, 'UNKNOWN', or blank

Assigned sector “Non-Identified Vessel/Entity.”

Select fish tickets identified to an entity/vessel in Non-Research as $\text{DRVID} != 'MISSING'$, 'UNKNOWN', or blank

Select non-IFQ EFP landings from Non-Research, Vessel ID known as REMOVAL_TYPE == 'E' and IFQ_LANDING == 'FALSE'

Assigned sector "Commercial EFP."

Note that we ignore the EFP flag where IFQ_LANDING = 'TRUE' because this field is not always correct. Instead, we use a separate list from PSMFC to identify EM and other EFP tickets under the IFQ program. In 2017, the gear modification EFP trip was included in the IFQ catch share program as EM or observed as appropriate.

2002-2010

If ADJ_GRID = MDT, summarized with "Non-tribal shoreside hake"

If ADJ_GRID ≠ MDT, summarized with "Incidental fisheries" or as "EFP"

Select non-EFP and IFQ EFP from Non-Research, Vessel ID known as REMOVAL_TYPE != 'E' or REMOVAL_TYPE == 'E' and IFQ_LANDING == 'TRUE'

Select IFQ landings from Non-Research, Vessel ID known as IFQ_LANDING == 'TRUE'

Identify hake sector for all IFQ midwater tickets:

Landed ≥ 50% hake on VIDYMD, hake sector = "Midwater Hake"

Landed ≥ 50% widow and yellowtail rockfish on VIDYMD, hake sector = "Midwater Rockfish"

If neither of the above are true, the captain's target as recorded on the logbook was used

Identify non-EM EFP fleet:

If not in EM list from PSMFC:

If fishing non-midwater, assign sector "Catch Shares"

If fishing midwater 2011–14 and observer identified as non-hake trip, assign sector "Catch Shares"

If fishing midwater 2011–14 and observer identified as hake trip, assign sector "Shoreside Hake"

If fishing midwater 2015–forward, assign sector "Midwater Hake" or "Midwater Rockfish" based on hake sector above

If in EM list from PSMFC:

If fishing non-midwater, assign sector "Catch Shares EM"

If fishing midwater, assign "Midwater Hake EM" or "Midwater Rockfish EM" based on hake sector field above

Select non-IFQ landings from Non-Research, Non-EFP, Vessel ID known: IFQ_LANDING == 'FALSE'

Select Gear Group Shrimp trawl landings from non-IFQ that landed more Pink Shrimp (PS) than not, fished with a state PS permit between April and November:

GRGROUP == 'TWS' and PS permit and MONTH in 4–11

Assign sector "Commercial Shrimp Trawl"

Summarized as Pink Shrimp

Select Gear Group Shrimp trawl landings from non-IFQ that did not land more Pink Shrimp (PS) than not, did not fish with a state PS permit, and/or fished outside of April to November:
GRGROUP == 'TWS' and no PS permit or MONTH in 1–3, 12

MONTH 1-5
Select landed ridgeback prawn and no sea cucumber, had state permit, and fished in
Assign sector "Commercial Prawn Trawl"

Select landed sea cucumber and no ridgeback prawn and had state permit
Assign sector "Commercial Sea Cucumber Trawl"

Select landed sea cucumber and ridgeback prawn and had both state permits.

Select landed more ridgeback prawn
Assign sector "Commercial Prawn Trawl"

Select landed more sea cucumber
Assign sector "Commercial Sea Cucumber Trawl"

Select landed more of anything other than ridgeback prawn or sea cucumber
Assign sector "Commercial Grgroup Others"
Summarized with Incidental fisheries

Select did not land ridgeback or sea cucumber
Assign sector "Commercial Grgroup Others"
Summarized with Incidental fisheries

Select Gear Group Other landings from Non-Research/EFP Commercial:
(GRGROUP != 'HKL') & (GRGROUP != 'POT') & (GRGROUP != 'TWL') & (GRGROUP != 'TWS')
Assign sector "Commercial Grgroup Others"
Summarized with "Incidental fisheries"

Select Gear Group Trawl landings from Non-IFQ:
GRGROUP== 'TWL'

Select Limited Entry permitted:
PERM1 != ' '

Select Midwater:
ADJ_GRID == 'MDT'
Assign sector "Commercial LE Trawl Midwater"
2002-2010
Summarized with "Non-tribal shoreside hake"

2011-present

research trip.
If sector present, indicates an error that needs to be corrected. Often unlabeled

Select Non-Midwater:

ADJ_GRID != 'MDT'

Assign sector "Commercial LE Trawl Non-midwater."

Select CA halibut:

2002-2006 based on CA halibut weight > 150lb:

(SPID %in% c('CHLB', 'CHL1')) & (LWT_LBS > 150)

2007-Present based on CA halibut on ticket and vessel carrying a year specific

CA halibut permit and CA halibut weight > 150lb:

(SPID %in% c('CHLB', 'CHL1')) & (LWT_LBS > 150) & (DRVID
%in% unique(FT.perm\$DRVID))

Assign to as "LE CA Halibut"

For non-CA halibut:

Likely permit was not used for given landing. Assign to "Commercial OA Trawl
Non-Midwater" and summarized with "Incidental fisheries"

Select Non-LE permitted (Open Access):

PERM1 == ' '

Select Midwater:

ADJ_GRID == 'MDT'

Assign sector "Commercial OA Trawl Midwater."

Summarized with "Incidental fisheries"

Select Non-Midwater:

ADJ_GRID != 'MDT'

Assign sector "Commercial OA Trawl Non-midwater."

Select CA halibut:

2002-2006 based on CA halibut weight > 150lb:

(SPID %in% c('CHLB', 'CHL1')) & (LWT_LBS > 150)

2007-Present based on CA halibut on ticket and vessel carrying a year specific

CA halibut permit

(SPID %in% c('CHLB', 'CHL1')) & (DRVID %in%
unique(FT.perm\$DRVID))

Assign to "OA CA Halibut"

Select non-OA CA Halibut

Select landed ridgeback prawn and no sea cucumber, had state permit, and fished in

MONTH 1-5

Assign sector "Commercial Prawn Trawl"

Select landed sea cucumber and no ridgeback prawn and had state permit
Assign sector "Commercial Sea Cucumber Trawl"

Select landed sea cucumber and ridgeback prawn and had both state permits.

Select landed more ridgeback prawn
Assign sector "Commercial Prawn Trawl"

Select landed more sea cucumber
Assign sector "Commercial Sea Cucumber Trawl"

Select landed more of anything other than ridgeback prawn or sea cucumber
Assign sector "Commercial OA Trawl Non-midwater"
Summarized with Incidental fisheries

Select any remaining
Assign sector "Commercial OA Trawl Non-midwater"
Summarized with "Incidental fisheries"

Select Gear Group Fixed Gear landings from Non-IFQ/Research/EFP Commercial:
(GRGROUP == 'HKL') | (GRGROUP == 'POT')

Select Nearshore Species on FT:

SPID %in% c('BLCK', 'BLK1', 'RCK9', 'RCK7', 'RCK2', 'BYEL', 'BYL1', 'BLU1',
'BLUR', 'BRW1', 'BRWN', 'CLC1', 'CLCO', 'SCOR', 'SCR1', 'CHN1', 'CHNA', 'COP1',
'COPP', 'GPH1', 'GPHR', 'GRAS', 'GRS1', 'KLP1', 'KLPR', 'OLV1', 'OLVE', 'QLB1',
'QLBK', 'TRE1', 'TREE', 'NSHR', 'NUSR', 'SSHR', 'SUSR', 'USHR', 'CBZ1', 'CBZN',
'KGL1', 'KLPG', 'SHPD', 'SHP1', 'UDNR', 'SSRS', 'SSRD', 'BISC', 'BSCL', 'RSCL',
'UGLG')

Compile unique vessel-landing date (VIDYMD) values for those FTs with Nearshore Species.

Retrieve all FTs (and all FT line items) for those VIDYMD values (so obtaining *all* fish tickets for a vessel's landing date if one or more of the vessel's fish tickets on that date had a nearshore species recorded on it).

2002-2003

If not landed in WA, assign to Nearshore

2004-present

If not landed in WA and had active Nearshore permit for given year, assign o Nearshore

Of the Remaining Non-Nearshore Fixed Gear landings:

1. Create a catch variable for Groundfish (based on a GF_ID in a separate file maintained by WCGOP), and summarize RWT_LBS of groundfish and non-groundfish for each unique VIDYMD.

If weight of non-sablefish groundfish weight is greater than non-groundfish weight in a unique fishing day for a vessel (VIDYMD), included in Fixed Gear Sablefish Landings
GFLB.Sum >= NonGFLB.Sum

2. Select all VIDYMD if Sablefish is a line item of catch on a FT:
SPID == 'SABL'
3. Compile unique VIDYMDs that fit either criteria of 1. Sablefish landings or 2. groundfish greater than non-groundfish.

Retrieve all FT line items for those VIDYMD values.
(See next section for more processing of these Fixed Gear Sablefish Landings).

Remaining not identified in Step 3. are Non-Nearshore, Non-Sablefish Fixed Gear landings:

Select Limited Entry permitted:
PERM1 != ' '

Select if Tier Endorsed:
SABL1 != 0 | SABL2 != 0 | SABL3 != 0 | SABL4 != 0
Assign sector "Commercial Fixed-Gear Non-Nearshore Non-Sablefish LE Tier"

Select if Not Tier Endorsed:
SABL1 == 0 & SABL2 == 0 & SABL3 == 0 & SABL4 == 0
Assign sector "Commercial Fixed-Gear Non-Nearshore Non-Sablefish LE 0Tier"

Select Non-LE permitted (Open Access):
PERM1 == ' '
Assign sector "Commercial Fixed-Gear Non-Nearshore Non-Sablefish OA"

Summarize with "Incidental fisheries"

Fixed Gear Sablefish landing FTs (see above for initial Steps 1-3 to identify):

Select Limited Entry permitted:
PERM1 != ' '
Assign sector "Commercial Fixed-Gear LE Sablefish."

Select if Tier Endorsed:
SABL1 != 0 | SABL2 != 0 | SABL3 != 0 | SABL4 != 0
(See below for additional steps)

Select if Not Tier Endorsed:

SABL1 == 0 & SABL2 == 0 & SABL3 == 0 & SABL4 == 0

Select if Pot gear (LE 0 tier cannot fish pot gear, so thus OA) :

GRGROUP == 'POT'

Assign sub-sector "Sable OA."

Summarize with "Non-nearshore fixed gear" (and "OA Fixed Gear" prior)

GRGROUP != 'POT'

Assign sub-sector "LE 0 Tier."

Summarize with "Non-nearshore fixed gear" (and "LE Non-primary"

prior)

Select Non-LE permitted (Open Access):

PERM1 == ' '

Assign sector "Commercial Fixed-Gear OA Sablefish."

Assign sub-sector "Sable OA."

Summarize with "Non-nearshore fixed gear" (and "OA Fixed Gear" prior)

For LE Tier Endorsed FTs, to determine if

a) landings are assigned to the primary fishery (Primary Season Attaining Quota),

b) landings were made in the non-season fishery (Non-season DTL), or

c) if the vessel fished in the primary season but had already reached their tier limit and landings should be assigned to the DTL fishery (Primary Season Reached Quota DTL).

Select if definitely non-primary season (with 5 days buffer at end of the season to evaluate those FTs at the "borderline" which could fall into either primary or non-season):

(MONTH < 4) | (MD > 1105)

Note: MD is a concatenated field with Month and Day

Assign sub-sector "LE SAB Non-PSeason."

Summarize with "Non-nearshore fixed gear" (and "LE Non-primary" prior)

Select if primary season (with 5 days buffer at end of the season to evaluate those FTs at the "borderline" which could fall into either primary or non-season):

(MONTH >= 4) & (MD <= 1105)

Year	Tier 1 Quota (lbs)	Tier 2 Quota (lbs)	Tier 3 Quota (lbs)	DTL Max Landing (lbs)	Federal Register Reference
2002	36000	16500	9500	1050	67 FR 10490
2003	53000	24000	14000	1050	68 FR 11182
2004	64300	29200	16700	1050	69 FR 11064
2005	64000	29100	16600	1050	69 FR 77012
2006	62700	28500	16300	1050	69 FR 77012

2007	48500	22000	12500	1050	71 FR 78638
2008	48500	22000	12500	1050	71 FR 78638
2009	61296	27862	15921	1000	73 FR 80516
2010	56081	25492	14567	3000	73 FR 80516
2011.1	41379	18809	10748	2000	76 FR 11381
2011.2	47697	21680	12389	2000	76 FR 34910
2012	46238	21017	12010	1800	76 FR 77415
2013	34513	15688	8964	1880	78 FR 49190
2014	37441	17019	9725	2000	78 FR 580
2015	41175	18716	10695	2000	80 FR 12567
2016	45053	20479	11702	1275	80 FR 12567
2017	45120	20509	11720	1275	82 FR 9634
2018	47050	21386	12221	1125	82 FR 9634

Order multiple landings on a day from greatest sablefish landing to smallest sablefish landing to ensure consistent results across different years of analysis.

Add field SABL1_Lim, SABL2_Lim, SABL3_Lim and calculate using year-specific tier limits:

For 2002-present except 2011 (repeated for each sabletier unlimited data field; SABL1, etc.):

```
SABL1_Lim [ which(SABL == 1) ] = Tier1Quota
SABL2_Lim [ which(SABL == 2) ] = Tier2Quota
SABL3_Lim [ which(SABL == 3) ] = Tier3Quota
```

For 2011 – tier limits were increased mid-season, taking effect on June 11th:

```
SABL1_Lim [ which((SABL == 1) & (MD < 0611)) ] = Tier1Quota for 2011a
SABL2_Lim [ which((SABL == 2) & (MD < 0611)) ] = Tier2Quota for 2011a
SABL3_Lim [ which((SABL == 3) & (MD < 0611)) ] = Tier3Quota for 2011a

SABL1_Lim [ which((SABL == 1) & (MD >= 0611)) ] = Tier1Quota for 2011b
SABL2_Lim [ which((SABL == 2) & (MD >= 0611)) ] = Tier2Quota for 2011b
SABL3_Lim [ which((SABL == 3) & (MD >= 0611)) ] = Tier3Quota for 2011b
```

Add field QUOTA and calculate:

```
[SABL1_Lim] + [SABL2_Lim] + [SABL3_Lim]
```

Add field SABL_LND and for weight of sablefish landings for each line:

```
SABL_LND = 0
```

```
SABL_LND [ which(SPID == 'SABL') ] = RWT_LBS[ which(SPID == 'SABL') ]
```

Select out just those FT line items with Sablefish:

```
SPID = 'SABL'
```

Add field CUMSABL and calculate the cumulative sablefish weight landed by a vessel (each fish ticket line item of sablefish weight gets added up over time to see how the vessel's sablefish landings move toward attaining their total quota limit).

Add field PROPORTION and calculate the proportion of sablefish weight caught relative to their total tier quota weight:
[CUMSABL] / [QUOTA]

Select if the vessel is over their tier quota:
PROPORTION >1

Select by criteria to identify the DTL sector, based on a "cushion" of sablefish quota overage weight (proportion >1.15) to allow for vessels that have reached their quota and are landing below the annual maximum DTL weekly limit::
(PROPORTION >1.15 AND SABL_LND <1880 "DTL Max from above") OR YMD
>20131105

Compile unique FTID values for the FTs selected in the "Select by criteria" step above.

Retrieve all FT line items for those FTID values (for the DTL sectors).
Assign sub-sector "LE SAB DTL."
Summarize with "Non-nearshore fixed gear" (and "LE Non-primary" prior)

Remaining are Sablefish Primary Season Attaining Quota landings.
One more step is used to place these into season vs. non-season landings.

Select if in Primary Season:
"YMD" < 20131101
Assign sub-sector "LE SAB Primary."
Summarize with "Non-nearshore fixed gear" (and "LE Sablefish Primary" prior)

Select if outside Primary Season (non-season):
"YMD" >= 20131101
Assign sub-sector "LE SAB Non-PSeason."
Summarize with "Non-nearshore fixed gear" (and "LE Non-primary" prior)

All data segments are combined together to reproduce the original dataset. If a SubSector value was not designated in the processing above, it is given the value from the SECTOR field.

All additional data processing steps that were applied during the discard estimation process are described in Methods. Of these, specific identification and removal of commercial directed Pacific halibut fixed gear landings is as follows:

If SubSector equals 'Sable OA', 'LE 0 Tier', 'LE SAB Non-PSeason', 'LE SAB DTL', 'LE SAB Primary'

For 2002–17: If listed by the International Pacific Halibut Commission (IPHC) as a directed Pacific halibut (PHLB) ticket, summarize with “Directed PHLB”

For most recent year of data, IPHC’s list is not yet available, and IPHC does not currently track directed PHLB landings in California. In the most recent year, for all states, if FTID had recorded PHLB catch landed on one of the specific calendar year 10 hour openings, plus two days post (to allow for any subsequent deliveries)

Summarize with “Directed PHLB”

2018:

((MONTH == 6) & (DAY %in% 26:28)) |
((MONTH == 7) & (DAY %in% 10:12)) |
((MONTH == 7) & (DAY %in% 24:26))

In addition, California FTID had recorded PHLB catch landed on one of the specific calendar year 10 hour openings, plus two days post (to allow for any subsequent deliveries)

2017:

((MONTH == 6) & (DAY %in% 28:30)) |
((MONTH == 7) & (DAY %in% 12:14)) |
((MONTH == 7) & (DAY %in% 26:28))

2016:

((MONTH == 6) & (DAY %in% 21:23)) |
((MONTH == 7) & (DAY %in% 5:7)) |
((MONTH == 7) & (DAY %in% 19:21)) |

2015:

((MONTH == 6) & (DAY %in% 23:25)) |
((MONTH == 7) & (DAY %in% 7:9)) |

2014:

((MONTH == 6) & (DAY %in% 25:27)) |
((MONTH == 7) & (DAY %in% 9:11)) |

2013:

((MONTH == 6) & (DAY %in% 26:28)) |
((MONTH == 7) & (DAY %in% 10:12)) |

2012:

((MONTH == 6) & (DAY %in% 27:29)) |
((MONTH == 7) & (DAY %in% 11:13)) |

2011:

((MONTH == 6) & (DAY %in% 29:30)) |
((MONTH == 7) & (DAY == 1)) |
((MONTH == 7) & (DAY %in% 13:15)) |
((MONTH == 7) & (DAY %in% 27:29)) |
((MONTH == 8) & (DAY %in% 10:12)) |
((MONTH == 8) & (DAY %in% 24:26)) |
((MONTH == 9) & (DAY %in% 7:9)) |
((MONTH == 9) & (DAY %in% 21:23)) |

2010:

```
((MONTH == 6) & (DAY %in% 30:31)) |
((MONTH == 7) & (DAY %in% 1:2)) |
2009:
((MONTH == 6) & (DAY %in% 24:26)) |
((MONTH == 7) & (DAY %in% 8:10)) |
2008:
((MONTH == 6) & (DAY %in% 11:13)) |
((MONTH == 6) & (DAY %in% 25:27)) |
((MONTH == 7) & (DAY %in% 9:11)) |
((MONTH == 7) & (DAY %in% 23:25)) |
2007:
((MONTH == 6) & (DAY %in% 27:29)) |
((MONTH == 7) & (DAY %in% 11:13)) |
((MONTH == 7) & (DAY %in% 25:27)) |
((MONTH == 8) & (DAY %in% 8:10)) |
2006:
((MONTH == 6) & (DAY %in% 28:30)) |
((MONTH == 7) & (DAY %in% 12:14)) |
((MONTH == 7) & (DAY %in% 26:28)) |
2005:
((MONTH == 6) & (DAY %in% 29:30)) |
((MONTH == 7) & (DAY == 1)) |
((MONTH == 7) & (DAY %in% 13:15)) |
((MONTH == 7) & (DAY %in% 27:29)) |
((MONTH == 8) & (DAY %in% 10:12)) |
2004:
((MONTH == 6) & (DAY %in% 23:25)) |
((MONTH == 7) & (DAY %in% 14:16)) |
((MONTH == 7) & (DAY %in% 28:30)) |
((MONTH == 8) & (DAY %in% 11:13)) |
2003:
((MONTH == 6) & (DAY %in% 25:27)) |
((MONTH == 7) & (DAY %in% 9:11)) |
((MONTH == 7) & (DAY %in% 23:25)) |
((MONTH == 8) & (DAY %in% 6:8)) |
2002:
((MONTH == 6) & (DAY %in% 26:28)) |
((MONTH == 7) & (DAY %in% 10:12)) |
((MONTH == 7) & (DAY %in% 24:26))
```

Trawl Logbook Data Retrieval and Processing

Logbook data are downloaded from a view in PacFIN that incorporates logbook data and permit information: `pacfin.lbk_codemb0310multiftidlim`.

Data from 2002–10 are used in estimations of discard for the LE trawl fleet. Data from 2011–present are sometimes used for effort estimations when observer data are unavailable because a trip was monitored using an electronic system.

Explicit WCGOP postprocessing of PacFIN logbook data output from query above

Select Puget Sound landings:
“PSGRNDCODE” <> 0

Select Non-Puget Sound (Ocean) landings:
“PSGRNDCODE” = 0

Select Midwater:
“GRID” = ‘MDT’

Select Non-Midwater:
“GRID” <> ‘MDT’

Select Limited Entry permitted:
“PERMID_1” <> ‘ ‘

Select Non-LE permitted (Open Access):
“PERMID_1” = ‘ ‘

Note: LE Nonmidwater logbook data is further delineated into the state California halibut trawl fishery for each individual tow/haul as follows:

- a) If tow target is California halibut (PACFIN_TARGET = CHLB or CHL1), or
- b) Tow target PACFIN_TARGET = (NSM or OFLT or SSOL or SSO1) AND DEPTH1 < 30 (fth) AND SET_LAT < 40.16667.

The remaining LE non-midwater logbook data tows are considered part of the LE groundfish trawl fishery.

Additional data processing steps are described in each report and product.