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Estimated Discard and Catch of Groundfish Species in the 2016 US West Coast Fisheries

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Executive Summary

The primary objective of this report is to estimate fishing mortality of groundfish species in US west coast fisheries during 2016 and evaluate mortality estimates relative to Annual Catch Limit (ACL), Acceptable Biological Catch (ABC), and Overfishing Limit (OFL) harvest management goals. These management goals are published in the federal groundfish regulations for selected groundfish species (50 CFR 660 Subpart 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:

- No groundfish species exceeded 2016 harvest goals.
- The estimated fishing mortality of two groundfish species were greater than 90% of their ACLs: petrale sole (91%) and sablefish north of 36° N. latitude (92%).
- All other groundfish species or complexes achieved less than 90% of their ACLs.
- Of the eight PFMC-defined rebuilding or rebuilt groundfish species, Pacific ocean perch and widow rockfish increased in ACL percentage from 2015 to 2016, by 3 and 6%, respectively.
- Thirty of the groundfish species or complexes (70%) had fishing mortality estimates which were less than 50% of 2016 ACL harvest goals.
- Fishing mortality estimates for all groundfish combined were lower in 2016 relative to 2015 in the pink shrimp, midwater rockfish, nearshore fixed gear, open access (OA) California halibut, and the OA and limited entry (LE) non-primary portions of the non-nearshore fixed gear sector. The bottom trawl and fixed gear portions of the shoreside catch shares fishery, the LE sablefish primary sector, shoreside midwater hake, and CP and MSCV portions of the at-sea hake fleet all showed an increase in estimated fishing mortality of groundfish species or complexes relative to 2015 levels.

Summaries of 2016 catch from the following groundfish fishery sectors are included:
Commercial -
- Shore-based Individual Fishing Quota (IFQ) Program*
  - LE trawl permits – fishing bottom trawl gear
  - LE trawl permits – fishing fixed gear
  - LE trawl permits – fishing midwater trawl gear, landing 50% or more rockfish
  - LE trawl permits – fishing midwater trawl gear, landing 50% or more hake
  - LE trawl permits – fishing bottom trawl gear and using electronic monitoring (EM)
  - LE trawl permits – fishing fixed gear and using EM
  - LE trawl permits – fishing midwater trawl gear, landing 50% or more rockfish and using EM
  - LE trawl permits – fishing midwater trawl gear, landing 50% or more hake and using EM
- At-sea Hake Co-op Programs*
  - Pacific hake catcher-processor (CP)
  - Pacific hake mothership catcher- vessel (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 sectors)*
- Fixed gear OA daily trip limit*
- Exempted fishing permit (EFP) (not including EM sectors listed above)*

Tribal –

- Shoreside hake
- At-sea hake*

Non-commercial –

- Recreational (Washington/Oregon/California)
- Research

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

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

***** indicates sectors that use federal observer data

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 US west coast. Fish tickets are trip-aggregated sales receipts issued to vessels by fish-buyers in each port for each delivery of fish. State agencies provide them to fish-buyers, who return them to the agency for processing. Washington, Oregon, and California each have a slightly different fish ticket format. Each state conducts species-composition sampling for numerous market categories reported on fish tickets. Market categories represent either a single species or a mixture of species. Fish ticket and species-composition data are submitted by state agencies to the Pacific Fisheries Information Network (PacFIN) regional database, which is maintained by the Pacific States Marine Fisheries Commission (PSMFC). For analytical purposes, 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 2016 were retrieved from the PacFIN database on April 17, 2017. The allocation of these landings to unique fishery sectors has been greatly improved to better reflect the sectors as defined for observer coverage (Figure 1). For example, the use of state permits to identify fish tickets as either nearshore or pink shrimp tickets removed mislabeled OA tickets that incidentally landed very small amounts of nearshore species or pink shrimp. All additional data processing steps are described in the methods section below. 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 others sectors, the West Coast Groundfish Observer Program (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 PacFIN.

Discard estimation focused on commercial groundfish fishery sectors with scientific at-sea observations of discards, conducted by the Fishery Observation Science Program, Fishery Resource Analysis and Monitoring Division (FRAM), Northwest Fishery Science Center (NWFSC). The WCGOP and the At-Sea Hake Observer Program (A-SHOP) observe distinct sectors of the groundfish fishery. The WCGOP observes a number of different sectors of the groundfish fishery, including IFQ shore-based, LE and OA fixed gear, and state-permitted nearshore fixed gear sectors. The WCGOP also observes several fisheries that incidentally catch groundfish, including the California halibut trawl and pink shrimp trawl fisheries. WCGOP data from each of these fisheries were used for the purposes of discard estimation. Mortality estimates were summarized from the A-SHOP data for the catcher-processor and mothership catcher-vessel sectors of the at-sea Pacific hake fishery. No tribal fishing in the at-sea hake fishery occurred in 2016.

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

The WCGOP's goal is to improve total catch estimates by collecting information on west coast groundfish species discarded at-sea. Detailed information on data collection methods employed in each observed fishery can be found in WCGOP manuals (NWFSC 2017b). The sampling protocol employed by the WCGOP is primarily focused on the discarded portion of catch. To ensure that recorded weights for the retained portion of the observed catch are accurate, haul-level retained catch recorded by WCGOP observers are reconciled with trip-level fish ticket records. The WCGOP data are linked to fish tickets by fish ticket identification numbers obtained by the observer and are adjusted so that the total trip pounds of retained catch 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 consists of the visual estimate used in the vessel's logbook, while the fish ticket weight is a physical measurement and is legally binding (for more details see: http://www.nwfsc.noaa.gov/research/divisions/fram/observation/data_processing.cfm).

The A-SHOP has conducted observations of the 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 (NWFSC 2017a). The at-sea hake fishery has mandatory observer coverage, with each vessel over 38 meters carrying two observers. Beginning in 2011, under IFQ/Co-op Program management, all catcher vessels that deliver catch to motherships are required to carry WCGOP observers or EM systems.

At-sea discard of IFQ species was recorded by EM systems on those vessels fishing IFQ quota within the EM EFP in 2016. Estimates of discard weight by IFQ species or grouping at the haul level for shoreside vessels were provided by the PSMFC and are used in this report.

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 (often referred as Magnuson-Stevens Acts or MSA), which was most recently reauthorized in 2007 (http://www.fisheries.noaa.gov/sfa/laws_policies/msa/documents/msa_amended_2007.pdf). 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."

Groundfish species catch from the recreational fisheries come directly from the Washington Department of Fish and Wildlife (WDFW), the Oregon Department of Fish and Wildlife (ODFW), and the California Department of Fish and Wildlife (CDFW). State agencies provide catch weight (discarded and retained) estimates with PFMC-approved mortality rates applied to account for discard mortality (PFMC 2014). WDFW include 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. In 2016, research programs that caught groundfish included the NWFSC's groundfish bottom trawl survey and rockfish hook-and-line survey, the PSMFC's research on trawl net selectivity to reduce Chinook bycatch, and the International Pacific Halibut Commission's (IPHC) survey. Total groundfish research catch (discarded and retained) information was provided to and summarized by NOAA's West Coast Regional (WCR) Office. 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, the WCR applied depth-dependent mortality rates to research catch of lingcod was applied where depth data was available (PFMC 2016b).

In addition to these data sources, estimates of discard mortality rates were provided by the PFMC Groundfish Management Team (GMT) (PFMC 2014, PFMC 2016b). The GMT is an advisory body to the PFMC that is comprised of representatives from federal, state, and tribal agencies and is involved in evaluating management performance and alternatives for groundfish fisheries on the west coast of the US, between the Canadian and Mexican borders. For the purposes of this analysis, the 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 reported 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 have only been generated for bottom trawl gears and therefore were only applied to discard estimates generated from bottom trawl gear. We assume 100% mortality for all species caught with midwater or pink shrimp 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 WCGOP-observed sectors of the groundfish fishery. Observed discard rates for each species were expanded to the fleet-wide level to estimate total discard amount. Due to differences in data availability and management structure among sectors of the groundfish fishery, expansions were applied with minor differences between fishery sectors, as described below.

The stratification scheme used in this analysis is inconsistent with the sampling design employed by the WCGOP. The overall WCGOP sampling design is based on a stratified multi-stage random sampling. This design-based framework distributes observational effort more evenly coast-wide than simple random sampling, and uses prior 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 the upper bounds of CIs for rare species could be underestimated. 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). Thus, it can serve as a very informative statistic for discard estimates. In addition, the differences in the magnitude of discarded amounts among the species make the CVs, which are unitless, more useful for comparisons when the estimates of many species are presented in one table.

In all cases where an FMP groundfish species grouping, nearshore species grouping, or unsampled catch category was used to compute discard ratios, any retained weights that were recorded by the observer but that did not appear on fish tickets were excluded from the denominator. This was necessary to prevent double-counting associated with differences in the species codes used by observers and processors. For instance, while observers may record rockfish catch at the species level, various species of rockfish are often grouped, weighed, and recorded together on the fish ticket under a grouped species code (e.g., NUSP = Northern Unspecified Slope Rockfish). 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 the WCGOP Data Processing Appendix (Table A-1 or http://www.nwfsc.noaa.gov/research/divisions/fram/observation/data_processing.cfm). A complete listing of groundfish species is defined in the Groundfish Fishery Management Plan (FMP) (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.

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 allotted. Grey shading indicates that values include estimates of both discard and retained catch. Rebuilding species are capitalized.

IFQ Fishery Discard Estimation

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

Catch delivered to shore-based processors (IFQ):

- Bottom trawl: Bottom trawl nets 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 (Co-op Program):

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

- 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 development of new methods for estimating fishing mortality under the IFQ fishery. For example, in the non-hake IFQ sectors:

- Vessels must carry NMFS observers or EM systems (if participating in the EM EFP) on all IFQ fishing trips.
- If participating in the EM EFP and fishing bottom trawl or fixed gear, vessels must carry NMFS observers when notified to do so.
- Observer sampling priorities were shifted to focus more on IFQ and rebuilding groundfish species.
- The use of multiple gear types (trawl or fixed gear) were allowed for fishing under a Federal groundfish trawl-endorsed permit, although only one gear type is allowed per trip.
- A limit of one IFQ reporting area could be fished per trip.
- IFQs were established for a subset of groundfish managed under the FMP.

Shore-based IFQ Sectors

Fleet-wide discard estimates for the shore-based IFQ sectors were derived from WCGOP observer data, PSMFC EM data, and PacFIN fish ticket landings data (Figure 1). Fish tickets associated with the IFQ fishery were defined by analysts through an extensive quality control and review process of all available data sources, including those utilized for in-season management.

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 bs. of California halibut was landed or (2) the target was nearshore mix, sand sole, or other flatfish and the tow took place in less than 30 fathoms and south of 40°10' N. latitude. All IFQ bottom trawl tows that met at least one of the above requirements were analyzed using methods for IFQ discard estimation to reflect the sampling protocol performed by observers on the boat. Tow targets are typically determined by the vessel captain. In 2016, however, no LE California halibut tows occurred.

100% Observed Shore-Based 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). In 2016, 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; this data is included here as 100% observed. When sample size was adequate (10 hauls or more per strata) 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 40°10' N. latitude. Each management area was divided into three depth strata (0-125, 126-250, >250 fathoms). These depth strata highlight the areas shoreward and seaward of Rockfish Conservation Area (RCA) closures relevant in the fishery management framework and provide consistency when evaluating discard over time, as depth-based spatial closures change. The fishery was further stratified into two seasonal strata: winter (November-April) and summer (May-October), reflecting seasonal changes in RCA boundaries, fishing effort, and target species (e.g. winter petrale sole).

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
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 2016 IFQ managed species (see Tables A-1, A-2 or 78 FR 579), while NIFQ included all other fish species. Observers are instructed that IFQ hauls or sets in which they record unsampled categories cannot also contain sampled species that are within the unsampled category to avoid double counting. Rarely, observers are unable to sort discard by IFQ status, 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 either due 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 data fail quality control measures. In these cases, all observer data for the entire trip was ignored, and discards were estimated based on stratum-level observed discard rates and trip-level 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, 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 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:

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

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
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, 2b).

The 2016 midwater hake and rockfish fisheries which deliver to shore-based processors were observed by the WCGOP under the IFQ fishery, and discard was estimated in the same manner as described above. Prior to 2011, this 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 discard 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 >=50% hake) and the shoreside midwater rockfish sectors (landing < 50% hake).

Electronically Monitored Shore-Based 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 (see Table 2d) that are allowed to be discarded at sea. In 2015, the first year of this EFP, both the 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, the second year of this EFP, these refined protocols provided more accurate discard estimation, as described below.

Vessels fishing using pot or bottom trawl gear followed guidelines for optimized retention and could discard only certain allowed species; on those vessels, observer coverage was targeted at a random sample of 30% of trips to result in 25 to 30% of landings. For non-IFQ species, total at-sea discard estimates were calculated in the same manner described below for non-catch shares 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 by both observers as likely shoreside discard and by shoreside processors on fish tickets were longnose skate, pacific grenadier, and spiny dogfish shark. 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 where the possibility was likely. For at-sea IFQ species, we chose to use EM logbook 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 composition of known landings and at-sea discard.

The midwater sectors operate 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 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 landing data for the EM sector was acquired from PacFIN fish tickets. Data from observer records and from the EM systems via PSMFC enabled the identification of all fish tickets associated with EM trips.

Mortality Summary for Shore-Based IFQ Sectors

We estimated coast-wide landings, discard weight from 100% observer coverage and EM data, and fishing mortality, including discard mortality rates, in the 2016 shore-based 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 from management under the pre-IFQ LE groundfish bottom trawl sector (before 2011). We also applied a 20% mortality rate to discarded sablefish caught by IFQ longline and pot gear, the rate suggest by GMT based on non-nearshore groundfish fixed gear sectors. We applied a 7% mortality rate to discarded lingcod caught by IFQ hook-and-line gear, previously used in nearshore groundfish fixed gear sectors. We also applied SSC-recommended discard mortality rate assumptions (previously made for stock assessment purposes) 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, comprised of 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 Co-op Sectors

The midwater trawl fishery for hake is comprised of three at-sea processing fleets: CPs, MSCVs, and a tribal catcher vessel fleet delivering to motherships. The 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, form the basis for the two at-sea hake sectors summarized in Table 3b. In 2016, the tribal fleet did not make any at-sea landings; shore-based tribal landings are presented in Table 15. We estimated coast-wide landings, sampled discard weight, estimated discard weight, and estimated fishing mortality in all 2016 hake IFQ/Co-op Program sectors (Table 3b).

California Halibut Bottom Trawl Fishery

Fleet-wide 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 unless they also have a federal LE groundfish permit. In 2016, no fishing effort occurred in the LE California halibut fishery. The WCGOP randomly samples the OA California halibut fishery following non-catch shares 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 fleet-wide landed weight of California halibut was then used as a multiplier to expand observed discard ratios to the fleet-wide level (Table 4). Fleet-wide

landings were compiled from OA trawl fish tickets (see Figure 1) for those vessels that had a state-issued California halibut bottom trawl permit 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
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 2016 OA California halibut trawl fishery (Table 4). A 50% mortality rate was applied for discarded lingcod and sablefish, which are assumptions made by the GMT and carried over from management under the pre-IFQ 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 a 50% mortality rate to big skate discard (PFMC 2015a, 2015b).

Pink Shrimp Trawl Fishery

Fleet-wide discard estimates for the pink shrimp trawl fishery were derived from WCGOP and fish ticket data (Figure 1). 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 2016 individual state pink shrimp trawl fisheries (Table 5).

Prior to 2011, shrimp fish tickets in the area north of 40°10' N. latitude were compiled for a single discard expansion factor, but shrimp fish tickets south of 40°10' N. latitude landings 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 were sufficient to further stratify the analysis by state.

Non-Nearshore Fixed Gear Sector

Fleet-wide discard estimates for the LE and OA non-nearshore fixed gear sector of the groundfish fishery were derived from WCGOP 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 (Figure 1). Fixed gear fish tickets where non-groundfish landings were greater than groundfish landings and sablefish or nearshore species were not recorded were summarized as incidental landings (Table 14). Fixed gear fish tickets with non-groundfish landings greater than groundfish landings but also containing sablefish 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 isolated and removed from our analyses based on landed catch of Pacific halibut recorded on the fish ticket on the day of the opening or within two subsequent days.

Fish tickets were partitioned into three commercial fixed gear subsectors: LE sablefish endorsed primary season, LE non-sablefish endorsed, and OA fixed gear groundfish. 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 '0' tier permits). Fish tickets for all LE vessels with tier sablefish endorsements operating during the sablefish primary season (April – October) and within their allotted tier quota were placed in the LE sablefish endorsed primary subsector. If LE sablefish-endorsed vessels fished outside of the primary season (November-March) or made trips within the season after they had reached their cumulative tier quota, the fish tickets were placed in the LE non-sablefish endorsed subsector. Fish tickets from non-sablefish endorsed LE vessels were also placed in this subsector.

Data used in these analyses were collected by the WCGOP from the following fixed gear subsectors in order of priority: LE sablefish endorsed primary season fixed gear, LE '0' tier (non-endorsed), and OA fixed gear (non-nearshore). LE sablefish endorsed vessels that were fishing outside of the primary season or that had reached their cumulative tier quota in the primary season were not observed. However, observed LE '0' tier discard rates were assumed to be the most comparable discard rates and were used to expand these landings.

Observer data were stratified by subsector, gear type, and area (where applicable) (Tables 6-8). Area strata (north and south of 36° N. latitude) are based on PFMC area management for sablefish trip limits. Gear type was defined as longline gear or pot/trap gear. Explicit depth stratification of fixed gear fishing effort is not possible, because there are no fleet-wide estimates of fishing depths. If landings were made by a fixed gear subsector for which there were no or very few WCGOP observations, the most appropriate observed discard ratios were selected and applied to these landings based on similarities in the fishery management structure, fishing and discard behavior, and the gear fished. For example, the LE non-sablefish endorsed fixed gear subsector landed 13 mt of groundfish with pot gear in 2016 (Table 7). Given similarities in gear type and catch composition, OA fixed gear pot data were selected as the most appropriate source of information to compute a discard ratio, which was then multiplied by the LE non-sablefish endorsed fixed gear pot landings to generate estimated discard.

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 because some subsectors, primarily fixed gear fisheries south of 36° N. latitude have, a wider range of target species. A broader denominator was therefore necessary to effectively capture fishing effort in these calculations.

We calculated total coast-wide landings, discard, and fishing mortality for the LE and OA non-nearshore fixed gear sectors (Table 9). A 20% mortality rate is applied for discarded sablefish, based on guidance from the 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).

Nearshore Fixed Gear Sector

Fleet-wide discard estimates for the commercial nearshore fixed gear sector of the groundfish fishery were derived from WCGOP observer data, fish ticket landings (Figure 1), and mortality rates provided by the GMT (Table A-4).

The 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, fleet-wide discard estimates are provided for the areas north and south of the groundfish management line at 40°10' N. latitude, in accordance with 2016 federal groundfish management specifications.

For species without swim bladders, we applied a discard mortality rate of 7% for all FMP species (Albin and Karpov 1996). In June 2017, the GMT provided revised depth-specific discard survival assumptions for some nearshore species (Table A-4). This update separated the >20 fathoms depth bin into 20-30 and > 30 fathoms, allowing for more accurate accounting of discard mortality by depth, and provided distinct rates north and south of 40°10' N. latitude that reflect the differing depth distribution 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, 11-20, 20-30, and >30 fathoms) based on the observed percentage of catch for each species or complex from 2003-2016 (Table 10). Using data from all previously observed years ensures that data is comparable across years and that proportions are available for all species landed in a given year. Fleet landings of each nearshore species or complex in 2016 were then distributed among depth intervals using the percentages computed in the previous step. Finally, the total distributed landed weight of all nearshore groundfish species within each depth stratum was used to expand observed discard to the fleet-wide level.

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 40°10' N. latitude (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 shore-based fisheries are included in Table 15. The Washington tribal data is 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, 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 the PFMC reducing the tribal allocation. For more information on discard and retention in tribal sablefish fisheries and Makah trawl observations, see Appendix B of the 2011-2012 groundfish harvest specifications (PFMC and NMFS 2012).

Groundfish species catch from 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 the WCGOP and A-SHOP are available in separate reports: Pacific halibut (Jannot et al. 2017), salmon species (Somers et al. 2015, Somers et al. 2017b), green sturgeon (Lee et al. 2017), and Pacific eulachon (Gustafson et al. 2017). Mortality estimations for all

non-protected fish species from 2002-2016 are available in the Groundfish Expanded Mortality Multi-year (GEMM) product, which will be published on the FRAM Data Warehouse (https://www.nwfsc.noaa.gov/data).

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 (as described above), and the mortality estimates from research and recreational catch (Table 15).

Results

Fishing mortality estimates for all groundfish combined were lower in 2016 relative to 2015 in the pink shrimp, midwater rockfish, nearshore fixed gear, OA California halibut, and the OA and LE non-primary portions of the non-nearshore fixed gear sector (Table 15, Somers et al. 2016). Estimated fishing mortality of groundfish species and complexes were higher than 2015 levels in the bottom trawl and fixed gear portions of the shoreside catch shares fishery, the LE sablefish primary sector, shoreside midwater hake, and the CP and MSCV portions of the at-sea hake fleet.

The percentage of all shoreside catch shares sectors using EM systems with observers for scientific monitoring increased from 2015 to 2016 (Tables 2a-2e, Somers et al. 2017a). The pot gear portion of the fleet also increased landings slightly (~100 mt), and about 55% of the fleet used EM, representing an increase of 9% over 2015 levels. The hook-and-line gear portion of the fleet has not adopted EM, but landings increased by about 50 mt from 2015 to 2016. Landings by the catch shares bottom trawl sector in 2016 were ~600 mt greater than those in 2015, and approximately one-tenth of the bottom trawl sector used EM, an increase of about 8%. The midwater rockfish fleet landed ~600 mt less in 2016, and about two-thirds of the fleet used EM, an increase of more than 20%. The shoreside midwater hake fleet rebounded from low catch in 2015 by ~27,500 mt, and the proportion of those landings covered by EM increased by 10% to almost 90% of the fleet. Landings by the at-sea hake fishery also increased from 2015 to 2016, by ~40,000 mt and ~37,000 mt in the CP and MSCV sectors, respectively; in both portions of the fleet, less than 0.1% of catch was unsampled.

Two elements which affect WCGOP fleet-wide discard estimates are the discard ratio and the expansion factor used to generate the fleet-wide estimates. Changes in expansion factors are tracked by reviewing the fleet-wide landing trends in each observed fishery. In state fisheries which are observed for incidental groundfish interactions, 2016 landings in the OA California halibut trawl fishery were similar to those in 2015, with only 2.4 fewer mt of California halibut caught (Table 4, Somers et al. 2017a). Landings in the pink shrimp fishery in all three west coast states decreased from 2015 to 2016 (Table 5, Somers et al. 2017a). In Washington and California, pink shrimp landings decreased by nearly two-thirds, while in Oregon landings decreased by one-third, reflecting the dynamic nature of this fishery in recent years.

The longline portion of the LE sablefish primary fishery increased from 2015 to 2016 by ~90 mt, while the pot gear portion remained about the same (Table 6, Somers et al. 2017a). Landings by both pot and line gears in the LE, non-endorsed portion of the non-nearshore fixed gear fleet decreased slightly (Table 7, Somers et al. 2017a), while landings by both gears in the OA fleet increased slightly (Tables 8a, 8b, Somers et al. 2017a). Nearshore fixed gear landings were reduced by a fifth from 2015 to 2016, with most the majority of the decrease in the California portion of the fishery (Table 11, Somers et al. 2017a).

Fishing mortality estimates are evaluated in terms of 2016 ACL, ABC, and OFL harvest specifications from federal groundfish regulations (50 CFR 660 Subpart C, 80 FR 212). Of the eight PFMC-defined rebuilding or rebuilt groundfish species, only two increased in ACL percentage from 2015 to 2016: Pacific ocean perch north of 40°10' N. latitude (3%) and widow rockfish (7%) (Figure 2). Canary rockfish decreased by 35%, while yelloweye rockfish decreased by 12% from 2015 to 2016.

Overall, the achievements of ACLs for the managed groundfish species and complexes in 2016 were similar to those in 2015. In both 2015 and 2016, petrale sole (96% in 2015, 91% in 2016) and sablefish, north of 36° N. latitude (98% in 2015, 92% in 2016) achieved greater than 90% of their ACL harvest goals. All other groundfish species or complexes achieved less than 90% of their ACLs (Table 16). Three complexes that achieved greater than 90% of their ACL goals in 2015 had much lower ACL percentages in 2016: black rockfish, south of 46°16' N. latitude (91% in 2015, 76% in 2016), canary rockfish (93% in 2015, 58% in 2016), and minor nearshore rockfish north of 40°10' N. latitude (91% in 2015, 81% in 2016). Thirty of the groundfish species or complexes (70%) had fishing mortality estimates which were less than 50% of 2016 ACL harvest goals (Table 16).

By estimated mortality weight, yellowtail rockfish decreased the most (~550 mt), followed by arrowtooth flounder (~310 mt) and pacific cod (~264 mt). Pacific hake showed the greatest increase, of more than 105,000 mt, reflecting a better fishing season for those targeting hake processed both shoreside and at-sea. Dover sole (~831 mt) also increased greatly from 2015 to 2016.

The proportional change of mortality from 2015 to 2016 for one management grouping decreased by more than 50% of the level 2015: Chilipepper rockfish south of 40°10' N. latitude decreased by more than half from 204 mt to 92 mt. Additionally, catch of splitnose rockfish south of 40°10' N. latitude, mixed thornyheads, starry flounder, and canary rockfish all decreased by one-third or more.

Relativized by 2015 catch, shortbelly rockfish (223%) by far showed the greatest proportional increases in estimated fishing mortality between 2015 and 2016, due to 22 mt landed and ultimately discarded shoreside in the midwater hake EM fleet. Pacific hake, reflecting the large increase in catch weight above, increased by 67% compared to 2015 catch. Shortspine thornyhead south of 34°27' N. latitude and longspine thornyhead south of 34°27' N. latitude also increased (by 43% and 34%, respectively), in both cases reflecting higher landings by the hook-and-line portion of the LE non-primary fixed gear sector.

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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 04-17-2017. Grey highlight indicates sectors for which federal observer data are available.

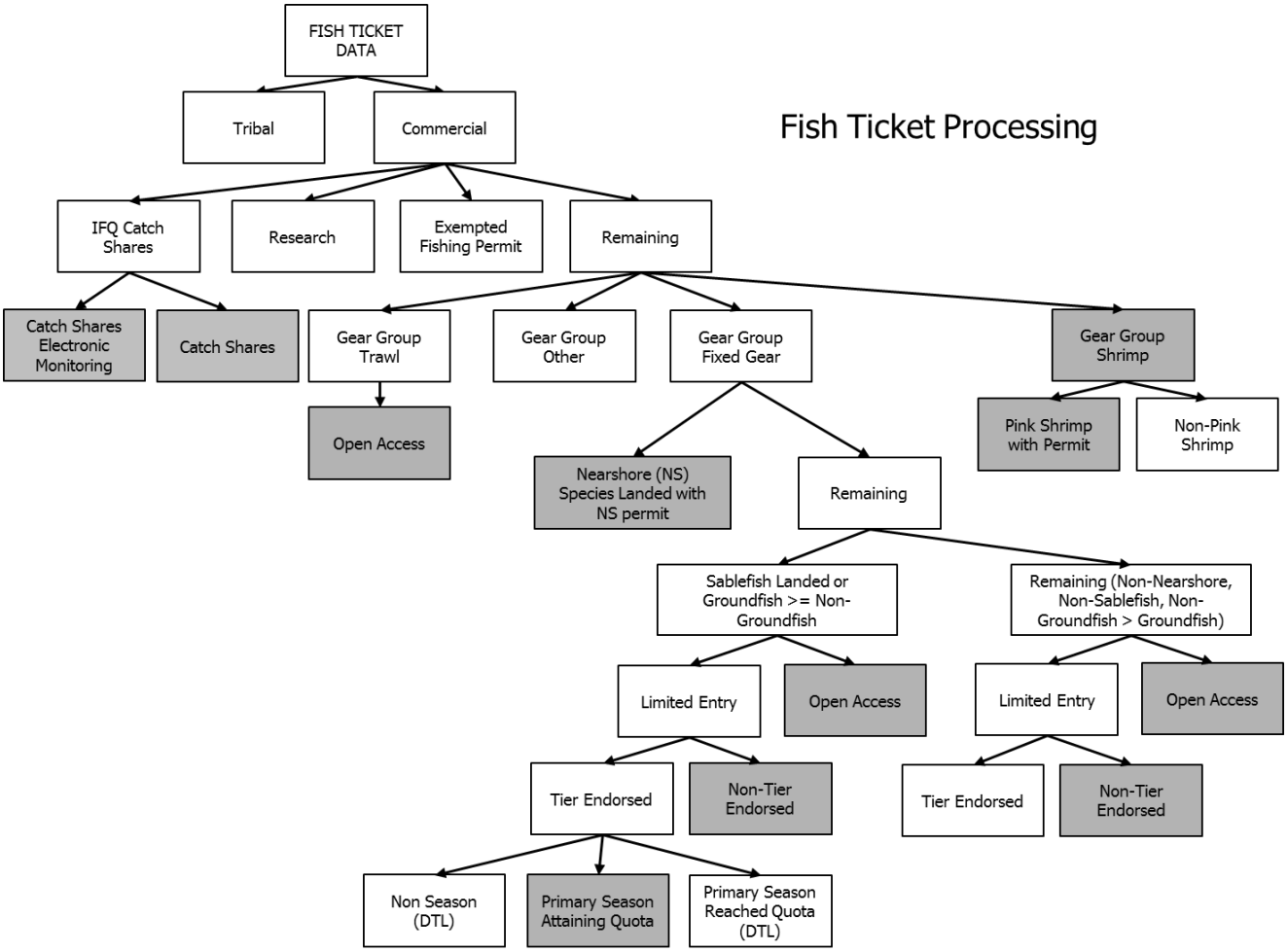
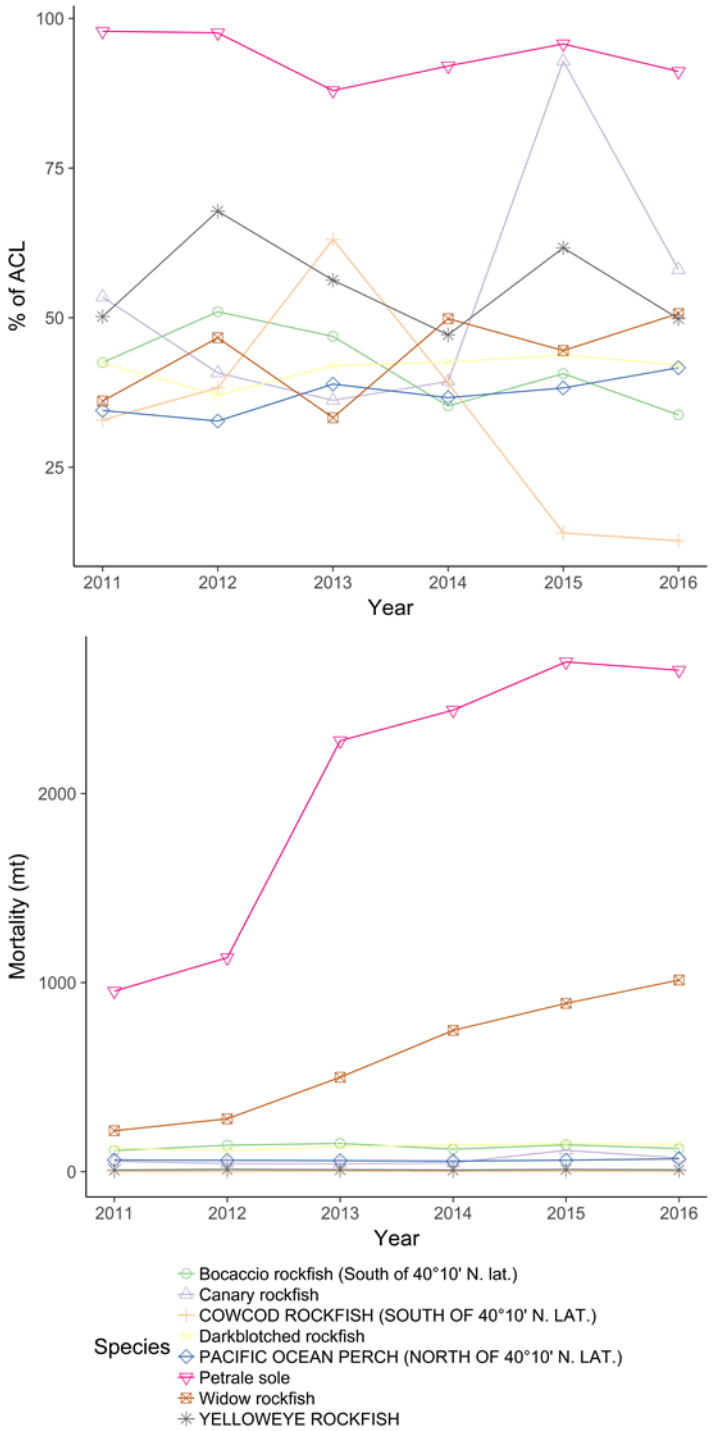


Figure 2. Mortality and ACL percentages 2011-2016 for rebuilding and rebuilt species.

Estimated mortality and percentage of ACL for the eight PFMC-defined rebuilding (in capitals) or rebuilt groundfish species. Only Pacific ocean perch and widow rockfish increased in ACL percentage from 2015 to 2016.



Tables

Note: In all tables, -- was used when there is no actual numeric value (i.e. the species was neither caught nor discarded). Values appear as 0 when a value exists but is smaller than the decimal places allotted. All rebuilding species are capitalized.

Table 1. IFQ Fishery Data Stratification.

Number of vessels, trips, and hauls from WCGOP observer data for the 2016 non-EM IFQ fishery by gear, latitudinal management area, season and depth. In 2016, 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; this data is 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	IFQ flatfish	IFQ rockfish	IFQ roundfish	IFQ mixed	Non-IFQ species	All discarded species	All species (incl. those typically retained)	Failed data	No. unsampled hauls	% of hauls sampled
Trawl - Bottom	North of 40°10' N	Winter	0-125	17	43	275	--	--	--	--	11	--	--	--	--	100.0%
			126-250	38	309	1142	--	--	--	--	13	--	--	--	--	100.0%
			> 250	39	300	1293	--	--	--	--	13	1	2	--	3	99.8%
		Summer	0-125	17	225	2131	--	--	--	1	48	13	--	--	13	99.4%
			126-250	20	131	513	--	--	--	--	7	--	--	--	--	100.0%
			> 250	20	119	475	--	--	--	--	11	--	--	--	--	100.0%
	South of 40°10' N	Winter	0-125	4	11	29	--	--	--	--	--	--	--	--	--	100.0%
			126-250	4	27	113	--	--	--	--	--	--	--	--	--	100.0%
			> 250	4	29	112	--	--	--	--	2	--	--	--	--	100.0%
		Summer	0-125	5	47	211	--	--	--	--	1	--	--	--	--	100.0%
			126-250	4	20	53	--	--	--	--	--	--	--	--	--	100.0%
			> 250	5	34	154	--	--	--	--	--	--	--	--	--	100.0%
Trawl - Midwater Hake	North of 40°10' N	Summer	0-125	4	45	83	--	--	--	--	--	--	--	--	--	100.0%
			126-250	3	66	123	--	--	--	--	--	--	--	--	--	100.0%
Trawl - Midwater Rockfish	North of 40°10' N	Annual	All depths	3	13	40	--	--	--	--	--	--	--	--	--	100.0%
Hook-and-Line	Coastwide	Annual	All depths	5	30	321	--	--	--	--	--	--	--	--	--	100.0%
Pot	North of 40°10' N	Winter	0-250	6	16	151	--	--	--	--	--	--	--	--	--	100.0%
			>250	6	20	80	--	--	--	--	--	--	--	--	--	100.0%
	South of 40°10' N	Summer	0-250	4	29	185	--	--	--	--	--	--	--	--	--	100.0%
			>250	4	19	162	--	--	--	--	--	--	--	--	--	100.0%

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

Values used to calculate the expanded weight of groundfish species from each WCGOP unsampled catch category in the 2016 observed IFQ fishery using bottom trawl gear north of 40°10' N. latitude. In 2016, 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; this data is included here as 100% observed bottom trawl effort. Expansion factors for each season and depth strata are shown in the top row. Discard ratios for each species are presented by season and depth strata in the rest of the table. Winter season is 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: IFQ flatfish species (IFQFF), IFQ rockfish species (IFQRF), IFQ roundfish species (IFQRD), IFQ mixed species (IFQM), non-IFQ species (NIFQ), all discarded species (IFQ & non-IFQ), all species (IFQ & 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.)									
	IFQM	NIFQ						All Discarded Species		All Species
Season	Summer	Summer			Winter			Summer	Winter	Winter
Depth (fm)	0-125	0-125	126-250	>250	0-125	126-250	>250	0-125	>250	>250
Expansion Factor (mt)	0.0454	5.7049	0.7915	0.4513	1.6057	0.7915	2.4449	9.2918	2.7216	2.2680
Groundfish species										
Arrowtooth flounder	0.2240	--	--	--	--	--	--	0.1124	0.1943	0.0887
Black rockfish (North of 46°16' N. lat.)	--	--	--	--	--	--	--	--	--	0.0000
Black rockfish (South of 46°16' N. lat.)	--	--	--	--	--	--	--	--	--	0.0000
Cabezon (Oregon)	--	0.0000	--	--	--	--	--	0.0000	--	--
Canary rockfish	0.0002	--	--	--	--	--	--	0.0001	0.0000	0.0000
Darkblotched rockfish	0.0069	--	--	--	--	--	--	0.0035	0.0003	0.0021
Dover sole	0.0234	--	--	--	--	--	--	0.0117	0.0267	0.5650
Ecosystem component species										
Aleutian Skate	--	0.0000	0.0008	0.0022	--	0.0009	0.0020	0.0000	0.0010	0.0001
Big Skate	--	0.0914	0.0000	0.0012	0.2929	--	0.0003	0.0455	0.0001	0.0005
Black Skate	--	0.0001	0.0033	0.0155	--	0.0009	0.0339	0.0001	0.0178	0.0011
California Grenadier	--	--	0.0000	0.0000	--	0.0000	0.0015	--	0.0008	0.0000
California Skate	--	0.0002	--	0.0000	--	--	--	0.0001	--	--
Deepsea Skate	--	--	--	0.0003	--	0.0002	0.0011	--	0.0006	0.0000
Giant Grenadier	--	--	0.0026	0.0641	--	0.0020	0.0953	--	0.0500	0.0031
Grenadier Unid	--	--	0.0001	0.0024	--	0.0006	0.0043	--	0.0022	0.0004
Pacific Flatnose	--	--	0.0000	0.0001	--	0.0001	0.0010	--	0.0005	0.0000
Pacific Grenadier	--	--	0.0002	0.0088	--	0.0007	0.0319	--	0.0167	0.0013
Popeye Grenadier	--	--	--	--	--	--	0.0000	--	0.0000	0.0000
Sandpaper Skate	--	0.0351	0.0839	0.0319	0.0247	0.0786	0.0689	0.0175	0.0361	0.0023
Softhead Grenadier	--	--	--	--	--	0.0000	--	--	--	--
Soupfin Shark	--	0.0002	--	--	--	--	--	0.0001	--	--
Spotted Ratfish	--	0.1061	0.0974	0.0190	0.1492	0.0704	0.0257	0.0528	0.0135	0.0009
English sole	0.1091	--	--	--	--	--	--	0.0547	0.0000	0.0024
Groundfish unid	--	--	--	--	--	--	--	--	--	0.0003
Lingcod (North of 40°10' N. lat.)	0.0243	--	--	--	--	--	--	0.0122	0.0002	0.0005
Longnose skate	--	0.0708	0.2019	0.0913	0.0642	0.1328	0.0638	0.0352	0.0335	0.0373
Longspine thornyhead (North of 34°27' N. lat.)	0.0000	--	--	--	--	--	--	0.0000	0.0080	0.0408
Minor nearshore rockfish (North of 40°10' N. lat.)										
Blue/Deacon Rockfish	--	--	--	--	--	--	--	--	--	0.0000
Brown Rockfish	--	0.0000	--	--	--	--	--	0.0000	--	--
Quillback Rockfish	--	0.0000	--	--	--	--	--	0.0000	--	--

Table 2a (continued).

	IFQ - Bottom Trawl (North of 40°10' N Lat.)									
	IFQM	NIFQ						All Discarded Species		All Species
Season	Summer	Summer			Winter			Summer	Winter	Winter
Depth (fm)	0-125	0-125	126-250	>250	0-125	126-250	>250	0-125	>250	>250
Expansion Factor (mt)	0.0454	5.7049	0.7915	0.4513	1.6057	0.7915	2.4449	9.2918	2.7216	2.2680
Minor shelf rockfish (North of 40°10' N. lat.)										
Bocaccio Rockfish	0.0000	--	--	--	--	--	--	0.0000	--	0.0000
Bronzespotted Rockfish	--	--	--	--	--	--	--	--	--	0.0000
Chilipepper Rockfish	0.0011	--	--	--	--	--	--	0.0005	--	0.0000
Greenspotted Rockfish	0.0000	--	--	--	--	--	--	0.0000	--	--
Greenstriped Rockfish	0.0066	--	--	--	--	--	--	0.0033	--	0.0000
Harlequin Rockfish	0.0000	--	--	--	--	--	--	0.0000	--	--
Redstripe Rockfish	0.0000	--	--	--	--	--	--	0.0000	--	0.0000
Rosethorn Rockfish	0.0000	--	--	--	--	--	--	0.0000	0.0000	0.0000
Rosy Rockfish	--	--	--	--	--	--	--	--	0.0000	0.0000
Shelf Rockfish Unid	--	--	--	--	--	--	--	--	--	0.0000
Silvergray Rockfish	--	--	--	--	--	--	--	--	--	0.0000
Stripetail Rockfish	0.0038	--	--	--	--	--	--	0.0019	--	0.0000
Minor slope rockfish (North of 40°10' N. lat.)										
Aurora Rockfish	0.0000	--	--	--	--	--	--	0.0000	0.0012	0.0008
Bank Rockfish	--	--	--	--	--	--	--	--	--	0.0001
Blackgill Rockfish	--	--	--	--	--	--	--	--	0.0000	0.0002
Redbanded Rockfish	0.0000	--	--	--	--	--	--	0.0000	0.0000	0.0002
Rougheye/Blackspotted Rockfish	0.0000	--	--	--	--	--	--	0.0000	--	0.0009
Sharpchin Rockfish	0.0000	--	--	--	--	--	--	0.0000	0.0000	0.0001
Shortraker Rockfish	--	--	--	--	--	--	--	--	--	0.0005
Slope Rockfish Unid	--	--	--	--	--	--	--	--	0.0001	0.0008
Splitnose Rockfish	0.0001	--	--	--	--	--	--	0.0001	0.0006	0.0010
Yellowmouth Rockfish	--	--	--	--	--	--	--	--	--	0.0001
Mixed thornyheads										
Shortspine/Longspine Thornyhead	--	--	--	--	--	--	--	--	--	0.0004
Other flatfish										
Butter Sole	0.0000	--	--	--	--	--	--	0.0000	--	--
Curlfin Turbot	--	--	--	--	--	--	--	--	--	0.0000
Flatfish Unid	0.0001	--	--	--	--	--	--	0.0001	--	0.0000
Flathead Sole	0.0417	--	--	--	--	--	--	0.0210	0.0000	0.0001
Pacific Sanddab	0.1743	--	--	--	--	--	--	0.0875	0.0000	0.0000
Rex Sole	0.1121	--	--	--	--	--	--	0.0562	0.0001	0.0162
Rock Sole	0.0011	--	--	--	--	--	--	0.0005	--	0.0000
Sand Sole	0.0008	--	--	--	--	--	--	0.0004	--	--
Other groundfish										
Kelp Greenling (Oregon)	--	0.0000	--	--	--	--	--	0.0000	--	--
Kelp Greenling (Washington)	--	0.0001	--	--	0.0000	--	--	0.0001	--	--
Pacific cod	0.0006	--	--	--	--	--	--	0.0003	--	0.0001
Pacific hake	0.1869	--	--	--	--	--	--	0.0938	0.1926	0.0140
PACIFIC OCEAN PERCH (North of 40°10' N. lat.)	0.0002	--	--	--	--	--	--	0.0001	0.0001	0.0006
Petrale sole	0.0310	--	--	--	--	--	--	0.0156	0.0005	0.0206
Roundfish unid	--	0.0000	--	--	--	--	--	0.0000	--	--

Table 2a (continued).

	IFQ - Bottom Trawl (North of 40˚10' N Lat.)									
	IFQM	NIFQ						All Discarded Species		All Species
Season	Summer	Summer			Winter			Summer	Winter	Winter
Depth (fm)	0-125	0-125	126-250	>250	0-125	126-250	>250	0-125	>250	>250
Expansion Factor (mt)	0.0454	5.7049	0.7915	0.4513	1.6057	0.7915	2.4449	9.2918	2.7216	2.2680
Sablefish (North of 36° N. lat.)	0.0113	--	--	--	--	--	--	0.0057	0.01317	0.1217
Shortbelly rockfish	--	0.0001	0.0000	--	0.0000	0.0000	--	0.0001	--	--
Shortspine thornyhead (North of 34°27' N. lat.)	0.0001	--	--	--	--	--	--	0.0000	0.0015	0.0494
Spiny dogfish	--	0.2786	0.2816	0.0176	0.0536	0.4829	0.0632	0.1388	0.0332	0.0021
Starry flounder	0.0021	--	--	--	--	--	--	0.0010	--	0.0000
Widow rockfish	0.0000	--	--	--	--	--	--	0.0000	--	0.0000
YELLOWEYE ROCKFISH	0.0000	--	--	--	--	--	--	0.0000	--	--
Yellowtail rockfish (North of 40°10' N. lat.)	0.0000	--	--	--	--	--	--	0.0000	--	0.0002
Nongroundfish species										
California halibut	--	0.0000	--	--	--	--	--	0.0000	--	--
Dungeness crab	--	0.2372	0.0017	0.0010	0.2466	0.0012	0.0013	0.1181	0.0007	0.0000
Non-FMP flatfish										
Deepsea Sole	--	0.0000	0.0010	0.0079	--	0.0006	0.0149	0.0000	0.0078	0.0005
Longfin Sanddab	--	--	--	--	--	0.0000	--	--	--	--
Slender Sole	--	0.0804	0.0019	0.0001	0.0534	0.0035	0.0007	0.0400	0.0004	0.0000
Other nongroundfish										
Red Irish Lord Sculpin	--	0.0000	--	--	--	--	--	0.0000	--	--
Sculpin Unid	--	0.0013	0.0000	0.0000	0.0059	0.0001	0.0000	0.0007	0.0000	0.0000
Skate Unid	--	0.0014	--	0.0014	--	--	0.0004	0.0007	0.0002	0.0004
Squid Unid	--	--	--	--	--	0.0000	0.0000	--	0.0000	0.0001
Starry Skate	--	0.0002	--	--	--	--	--	0.0001	--	--
Shared ecosystem component species										
Barracudina Unid	--	--	--	--	--	--	0.0000	--	0.0000	0.0000
Lanternfish Unid	--	--	--	--	--	--	0.0000	--	0.0000	0.0000
Non-Eulachon Smelt Unid	--	0.0000	--	--	0.0000	--	--	0.0000	--	--
Non-Humboldt Squid Unid	--	0.0003	0.0281	0.0338	--	0.0093	0.0131	0.0002	0.0069	0.0004
Pacific Saury	--	--	--	0.0000	--	--	0.0000	--	0.0000	0.0000

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

Values used to calculate the expanded weight of groundfish species from each WCGOP unsampled catch category in 2016 observed IFQ fisheries: bottom trawl gear south of 40˚10' N. latitude. In 2016, 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; this data is included here as 100% observed bottom trawl effort. Expansion factors for each season and depth strata are shown in the top row. Discard ratios for each species are presented by season and depth strata in the rest of the table. Winter season is 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: IFQ flatfish species (IFQFF), IFQ rockfish species (IFQRF), IFQ roundfish species (IFQRD), IFQ mixed species (IFQM), non-IFQ species (NIFQ), all discarded species (IFQ & non-IFQ), all species (IFQ & non-IFQ), and all failed data. See Table A-2 for a list of species included in each unsampled category.

	Bottom Trawl (South of 40˚10' N Lat.)	
	NIFQ	
Season	Summer	Winter
Depth (fm)	0-125	>250
Expansion Factor (mt)	0.2500	250
Groundfish species		
Ecosystem component species		
Big Skate	0.0647	--
Black Skate	--	0.0430
California Grenadier	--	0.0004
California Skate	0.0735	--
Giant Grenadier	--	0.2000
Pacific Flatnose	--	0.0015
Pacific Grenadier	--	0.0197
Sandpaper Skate	0.0003	0.0041
Shoulderspot Grenadier	0.0000	--
Smooth Grenadier	--	0.0002
Soupfin Shark	0.0017	--
Spotted Ratfish	0.2075	0.0027
Longnose skate	0.2437	0.1595
Shortbelly rockfish	0.0061	--
Spiny dogfish	0.0095	0.0011
Non-groundfish species		
Dungeness crab	0.2208	0.0000
Non-FMP flatfish		
Deepsea Sole	--	0.0516
Slender Sole	0.0200	--
Other nongroundfish		
Sculpin Unid	0.0000	0.0000
Shared ecosystem component species		
Non-Humboldt Squid Unid	0.0000	0.0011

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

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 2016 electronically monitored (EM) catch shares 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 catch shares EM 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 - Coastwide									
	Observed						Expansion factor:			
	Vessels		Trips		Hauls		Fleet landings of groundfish (mt)			
	8		30		184		1731			
	At-Sea				Estimated Shoreside					
	Discard Ratio	SE	CV	Discard	Discard Ratio	SE	CV	Discard	Landed	Total Estimate
Groundfish species										
Ecosystem component species										
Big Skate	--	--	--	--	--	--	--	--	0.92	0.92
50% discard mortality (Trawl)‡				--						
Black Skate	0.0003	0.0000	0.1744	0.48	0.0021	0.0005	0.2619	3.58	--	4.05
California Grenadier	0.0000	0.0000	0.3045	0.02	0.0000	0.0000	0.2367	0.00	--	0.02
California Skate	0.0001	0.0000	0.3525	0.16	--	--	--	--	0.02	0.19
Filamented Grenadier	--	--	--	--	0.0000	0.0000	0.0556	0.00	--	0.00
Giant Grenadier	0.0030	0.0006	0.1995	5.18	0.0083	0.0019	0.2270	14.29	--	19.47
Grenadier Unid	--	--	--	--	0.0000	0.0000	0.4809	0.01	1.43	1.44
Pacific Flatnose	0.0000	0.0000	0.2217	0.01	0.0001	0.0000	0.4795	0.16	--	0.17
Pacific Grenadier	0.0003	0.0001	0.3758	0.47	--	--	--	--	17.54	18.01
Popeye Grenadier	--	--	--	--	0.0000	0.0000	0.0556	0.00	--	0.00
Sandpaper Skate	0.0003	0.0001	0.2782	0.55	0.0001	0.0000	0.1934	0.23	0.00	0.79
Spotted Ratfish	0.0016	0.0006	0.3491	2.73	0.0001	0.0000	0.3640	0.09	0.07	2.89
Longnose skate	0.0021	0.0005	0.2350	3.60	--	--	--	--	28.34	30.14
50% discard mortality (Trawl)‡				1.80						
50% discard mortality (Fixed Gear)‡										
Longspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	--	--	--	--
Minor nearshore rockfish (North of 40°10' N. lat.)										
Black and Yellow Rockfish	--	--	--	--	--	--	--	--	0.30	0.30
Blue/Deacon Rockfish	--	--	--	--	--	--	--	--	0.00	0.00
Brown Rockfish	--	--	--	--	0.0000	0.0000	0.0556	0.07	--	0.07
Shortbelly Rockfish	--	--	--	--	0.0000	0.0000	0.0556	0.00	0.15	0.15
Spiny Dogfish Shark	0.0003	0.0001	0.4123	0.58	--	--	--	--	0.24	0.82

Non-IFQ species in EM Catch Shares	Pot - North									
	Observed						Expansion factor:			
	Vessels		Trips		Hauls		Fleet landings of groundfish (mt)			
	4		12		140		297			
	At-Sea				Estimated Shoreside					
	Discard Ratio	SE	CV	Discard	Discard Ratio	SE	CV	Discard	Landed	Total Estimate
Groundfish species										
Ecosystem component species										
Big Skate	--	--	--	--	--	--	--	--	--	--
50% discard mortality (Trawl)‡										
Black Skate	--	--	--	--	--	--	--	--	--	--
California Grenadier	--	--	--	--	--	--	--	--	--	--
California Skate	--	--	--	--	--	--	--	--	--	--
Filamented Grenadier	--	--	--	--	--	--	--	--	--	--
Giant Grenadier	0.0014	0.0002	0.1672	0.42	--	--	--	--	--	0.42
Grenadier Unid	0.0002	0.0001	0.4379	0.06	--	--	--	--	--	0.06
Pacific Flatnose	--	--	--	--	--	--	--	--	--	--
Pacific Grenadier	0.0005	0.0001	0.2980	0.15	--	--	--	--	--	0.15
Popeye Grenadier	--	--	--	--	--	--	--	--	--	--
Sandpaper Skate	--	--	--	--	--	--	--	--	--	--
Spotted Ratfish	--	--	--	--	--	--	--	--	--	--
Longnose skate	0.0000	0.0000	0.0585	0.00	--	--	--	--	0.13	0.14
50% discard mortality (Trawl)‡										
50% discard mortality (Fixed Gear)‡				0.00						
Longspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	--	--	--	--
Minor nearshore rockfish (North of 40°10' N. lat.)										
Black and Yellow Rockfish	--	--	--	--	--	--	--	--	--	--
Blue/Deacon Rockfish	--	--	--	--	--	--	--	--	--	--
Brown Rockfish	--	--	--	--	--	--	--	--	--	--
Shortbelly Rockfish	--	--	--	--	--	--	--	--	--	--
Spiny Dogfish Shark	--	--	--	--	--	--	--	--	--	--

Non-IFQ species in EM Catch Shares	Pot - South									
	Observed						Expansion factor:			
	Vessels		Trips		Hauls		Fleet landings of groundfish (mt)			
	4		7		109		173			
	At-Sea				Estimated Shoreside					
	Discard Ratio	SE	CV	Discard	Discard Ratio	SE	CV	Discard	Landed	Total Estimate
Groundfish species										
Ecosystem component species										
Big Skate	--	--	--	--	--	--	--	--	--	--
50% discard mortality (Trawl)‡										
Black Skate	--	--	--	--	--	--	--	--	--	--
California Grenadier	--	--	--	--	--	--	--	--	--	--
California Skate	--	--	--	--	--	--	--	--	--	--
Filamented Grenadier	--	--	--	--	--	--	--	--	--	--
Giant Grenadier	0.0000	0.0000	0.1322	0.00	--	--	--	--	--	0.00
Grenadier Unid	0.0002	0.0001	0.3462	0.03	--	--	--	--	--	0.03
Pacific Flatnose	0.0000	0.0000	0.0921	0.00	--	--	--	--	--	0.00
Pacific Grenadier	0.0008	0.0003	0.4101	0.13	--	--	--	--	--	0.13
Popeye Grenadier	--	--	--	--	--	--	--	--	--	--
Sandpaper Skate	--	--	--	--	--	--	--	--	--	--
Spotted Ratfish	--	--	--	--	--	--	--	--	--	--
Longnose skate	--	--	--	--	--	--	--	--	--	--
50% discard mortality (Trawl)‡										
50% discard mortality (Fixed Gear)‡										
Longspine thornyhead (South of 34°27' N. lat.)	0.0000	0.0000	0.4947	0.00	--	--	--	--	--	0.00
Minor nearshore rockfish (North of 40°10' N. lat.)										
Black and Yellow Rockfish	--	--	--	--	--	--	--	--	--	--
Blue/Deacon Rockfish	--	--	--	--	--	--	--	--	--	--
Brown Rockfish	--	--	--	--	--	--	--	--	--	--
Shortbelly Rockfish	--	--	--	--	--	--	--	--	--	--
Spiny Dogfish Shark	--	--	--	--	--	--	--	--	--	--

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

Table 2c (continued).

Non-IFQ species in EM Catch Shares	Trawl - Coastwide										Pot - North										Pot - South									
	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)			
	8		30		184		1731				4		12		140		297				4		7		109		173			
	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
Non-groundfish species																														
California halibut	0.0000	0.0000	0.0556	0.02	--	--	--	--	--	0.02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dungeness crab	0.0005	0.0001	0.2494	0.84	--	--	--	--	--	0.84	0.0024	0.0008	0.3434	0.72	--	--	--	--	--	0.72	--	--	--	--	--	--	--	--	--	--
Non-FMP flatfish																														
Deepsea Sole	0.0002	0.0001	0.3055	0.36	0.0015	0.0004	0.2875	2.67	--	3.03	0.0000	0.0000	0.2031	0.01	--	--	--	--	--	0.01	--	--	--	--	--	--	--	--	--	--
Slender Sole	0.0000	0.0000	0.4219	0.01	--	--	--	--	0.14	0.15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other nongroundfish																														
Sculpin Unid	0.0000	0.0000	0.3334	0.01	--	--	--	--	--	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Skate Unid	--	--	--	--	--	--	--	--	1.10	1.10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Squid Unid	--	--	--	--	--	--	--	--	0.02	0.02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Shared ecosystem component species																														
Bristlemouth Unid	0.0000	0.0000	0.0919	0.00	--	--	--	--	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Deepsea Smelt Unid	0.0000	0.0000	0.0556	0.00	--	--	--	--	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lanternfish Unid	0.0000	0.0000	0.2241	0.00	0.0000	0.0000	0.7497	0.07	--	0.07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Non-Humboldt Squid Unid	0.0003	0.0001	0.2450	0.47	--	--	--	--	--	0.47	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 2d. IFQ species in EM Catch Shares

Electronically monitored (EM) estimated discard (mt), landings (mt), and fishing mortality estimates (mt) of IFQ species in the 2016 electronically monitored (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.

	Trawl - Coastwide			Pot - North			Pot - South		
IFQ species in EM Catch Shares	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)
	7	574	1,731	4	417	297	4	603	173
Weight (mt)	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate
Groundfish species									
Arrowtooth flounder	1.12	29.66	30.79	0.04	0.07	0.11	0.00	--	0.00
Bocaccio rockfish (South of 40°10' N. lat.)	0.00	7.54	7.55	--	--	--	--	--	--
Canary rockfish	0.00	0.20	0.20	--	--	--	--	--	--
Chilipepper rockfish (South of 40°10' N. lat.)	0.00	3.93	3.93	--	--	--	--	--	--
COWCOD ROCKFISH (South of 40°10' N. lat.)	0.00	0.09	0.09	--	--	--	--	--	--
Darkblotched rockfish	0.00	0.46	0.46	--	0.00	0.00	--	--	--
Dover sole	0.28	874.58	874.86	0.01	9.79	9.80	0.01	0.07	0.08
English sole	2.47	8.01	10.48	--	0.04	0.04	--	--	--
Lingcod (North of 40°10' N. lat.)	0.00	0.38	0.38	0.02	0.15	0.18	--	--	--
50% discard mortality (Trawl)‡	0.00								
Lingcod (South of 40°10' N. lat.)	0.47	6.08	6.31	--	--	--	0.01	0.03	0.03
50% discard mortality (Trawl)‡	0.23								
Longspine thornyhead (North of 34°27' N. lat.)	0.01	271.27	271.28	0.00	5.93	5.93	0.00	0.01	0.01
Longspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	--	--	--
Minor shelf rockfish (North of 40°10' N. lat.)									
Bocaccio Rockfish	--	0.16	0.16	--	--	--	--	--	--
Bronzespotted Rockfish	--	0.24	0.24	--	--	--	--	--	--
Chilipepper Rockfish	--	0.05	0.05	--	--	--	--	--	--
Greenspotted Rockfish	--	0.00	0.00	--	--	--	--	--	--
Greenstriped Rockfish	--	0.00	0.00	--	--	--	--	--	--
Rosethorn Rockfish	--	--	--	--	--	--	--	--	--
Shelf Rockfish Unid	--	--	--	--	0.00	0.00	--	--	--
Stripetail Rockfish	--	0.00	0.00	--	--	--	--	--	--
Greenblotched Rockfish	0.00	0.01	0.01	--	--	--	--	--	--
Greenspotted Rockfish	0.00	0.13	0.13	--	--	--	--	--	--
Greenstriped Rockfish	0.00	0.05	0.05	--	--	--	--	--	--
Pink Rockfish	--	0.00	0.00	--	--	--	--	--	--
Silvergray Rockfish	0.00	0.09	0.09	--	--	--	--	--	--

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

Table 2d (continued).

IFQ species in EM Catch Shares	Trawl - Coastwide			Pot - North			Pot - South		
	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)
	7	574	1,731	4	417	297	4	603	173
Weight (mt)	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate
Stripetail Rockfish	0.00	0.41	0.41	--	--	--	--	--	--
Vermilion Rockfish	0.00	0.01	0.01	--	--	--	--	--	--
Minor slope rockfish (North of 40°10' N. lat.)									
Aurora Rockfish	0.00	0.46	0.46	--	--	--	--	--	--
Bank Rockfish	0.00	0.01	0.01	--	--	--	--	--	--
Blackgill Rockfish	0.00	0.24	0.24	--	0.01	0.01	--	--	--
Redbanded Rockfish	0.00	0.08	0.08	--	0.04	0.04	--	--	--
Rougheye/Blackspotted Rockfish	0.00	0.02	0.02	--	0.04	0.04	--	--	--
Sharpchin Rockfish	0.00	0.00	0.00	--	--	--	--	--	--
Slope Rockfish Unid	0.00	0.02	0.02	--	--	--	--	--	--
Splitnose Rockfish	0.00	0.69	0.69	--	--	--	--	--	--
Minor slope rockfish (South of 40°10' N. lat.)									
Aurora Rockfish	0.00	0.38	0.38	--	--	--	--	0.01	0.01
Bank Rockfish	0.00	0.33	0.33	--	--	--	--	--	--
Blackgill Rockfish	0.00	0.58	0.58	--	--	--	0.00	0.19	0.19
Pacific Ocean Perch	0.00	0.00	0.00	--	--	--	--	--	--
Redbanded Rockfish	0.00	0.01	0.01	--	--	--	--	--	--
Rougheye/Blackspotted Rockfish	0.00	0.00	0.00	--	--	--	--	--	--
Sharpchin Rockfish	0.00	0.00	0.00	--	--	--	--	--	--
Slope Rockfish Unid	0.00	--	0.00	--	--	--	--	--	--
Yellowmouth Rockfish	0.00	0.00	0.00	--	--	--	--	--	--
Mixed thornyheads	0.04	--	0.04	0.01	--	0.01	0.01	--	0.01
Other flatfish									
Curlfin Turbot	0.00	0.00	0.00	--	--	--	--	--	--
Flatfish Unid	0.05	0.01	0.06	--	--	--	--	0.00	0.00
Pacific Sanddab	0.00	0.61	0.61	--	--	--	--	--	--
Rex Sole	0.01	14.32	14.33	--	0.53	0.53	--	--	--
Rock Sole	--	0.00	0.00	--	--	--	--	--	--
Other rockfish									
Rockfish Unid	0.09	--	0.09	0.00	--	0.00	--	--	--
Pacific cod	--	0.00	0.00	--	--	--	--	--	--
Pacific hake	3.44	2.27	5.71	0.00	--	0.00	0.00	--	0.00
PACIFIC OCEAN PERCH (North of 40°10' N. lat.)	0.00	0.02	0.02	--	0.00	0.00	--	--	--

Table 2d (continued).

IFQ species in EM Catch Shares	Trawl - Coastwide			Pot - North			Pot - South		
	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)
	7	574	1,731	4	417	297	4	603	173
Weight (mt)	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate
Petrale sole	0.02	115.11	115.13	--	4.11	4.11	--	0.00	0.00
Sablefish (North of 36° N. lat.)	0.14	252.01	252.08	5.75	275.50	276.65	0.88	21.13	21.31
50% discard mortality (Trawl)‡	0.07								
20% discard mortality (Fixed Gear)‡				1.15			0.18		
Sablefish (South of 36° N. lat.)	--	--	--	--	--	--	2.55	151.08	151.59
50% discard mortality (Trawl)‡									
20% discard mortality (Fixed Gear)‡							0.51		
Shortspine thornyhead (North of 34°27' N. lat.)	0.01	92.84	92.85	0.04	1.01	1.05	0.10	0.59	0.69
Shortspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	0.01	--	0.01
Splitnose rockfish (South of 40°10' N. lat.)	0.00	0.27	0.27	--	--	--	--	--	--
Starry flounder	0.00	0.03	0.04	--	--	--	--	--	--
Widow rockfish	--	0.04	0.04	--	--	--	--	--	--
YELLOWEYE ROCKFISH	--	0.00	0.00	--	--	--	--	--	--
Yellowtail rockfish (North of 40°10' N. lat.)	--	0.44	0.44	--	0.00	0.00	--	--	--

Table 2e. Discard in EM Midwater trawl

Electronically monitored (EM) estimated discard (mt), landings (mt), and fishing mortality estimates (mt) of groundfish species in the 2016 EM catch shares midwater fisheries. Discard amounts are derived from the EM program and include FOS-estimated expansions of the small amount of unsampled at-sea discard.

	Midwater Rockfish Trawl			Midwater Hake Trawl		
EM Midwater	EM vessels	EM tows	Fleet landings of groundfish (mt)	EM vessels	EM tows	Fleet landings of hake (mt)
	6	74	768	20	1411	76,412
Weight (mt)	Discard	Landed	Estimate	Discard	Landed	Estimate
Groundfish species						
Arrowtooth flounder	0.01	10.13	10.14	0.00	0.03	0.03
Black rockfish (South of 46°16' N. lat.)	--	--	--	--	0.00	0.00
Canary rockfish	0.02	6.63	6.65	0.00	5.92	5.92
Darkblotched rockfish	0.04	13.95	13.99	0.00	0.00	0.00
Dover sole	0.00	0.06	0.06	--	0.00	0.00
Ecosystem component species						
Big Skate	0.00	0.66	0.66	0.00	0.00	0.00
Grenadier Unid	--	0.00	0.00	--	--	--
Soupfin Shark	0.00	0.64	0.64	--	--	--
Spotted Ratfish	0.00	0.00	0.00	--	0.00	0.00
English sole	0.00	0.02	0.02	0.00	0.02	0.02
Groundfish unid	0.01	2.95	2.96	--	0.00	0.00
Lingcod (North of 40°10' N. lat.)	0.03	6.89	6.93	0.00	0.39	0.39
Longnose skate	0.00	0.09	0.09	0.00	0.00	0.00
Longspine thornyhead (North of 34°27' N. lat.)	0.00	0.01	0.01	--	--	--
Minor nearshore rockfish (North of 40°10' N. lat.)						
Blue/Deacon Rockfish	--	--	--	--	0.00	0.00
Olive Rockfish	--	0.00	0.00	--	--	--
Minor shelf rockfish (North of 40°10' N. lat.)						
Bocaccio Rockfish	0.01	0.25	0.26	0.00	0.01	0.01
Chilipepper Rockfish	0.00	3.18	3.19	0.00	0.31	0.31
Harlequin Rockfish	0.00	0.02	0.02	0.00	0.00	0.00
Redstripe Rockfish	0.09	1.61	1.70	0.00	0.08	0.08
Shelf Rockfish Unid	0.00	0.00	0.00	--	--	--
Silvergray Rockfish	0.00	0.41	0.41	0.00	0.01	0.01

Table 2e (continued).

	Midwater Rockfish Trawl			Midwater Hake Trawl		
EM Midwater	EM vessels	EM tows	Fleet landings of groundfish (mt)	EM vessels	EM tows	Fleet landings of hake (mt)
	6	74	768	20	1411	76,412
Weight (mt)	Discard	Landed	Estimate	Discard	Landed	Estimate
Minor slope rockfish (North of 40°10' N. lat.)						
Rougheye/Blackspotted Rockfish	0.01	15.55	15.56	--	--	--
Sharpchin Rockfish	0.00	0.14	0.14	--	--	--
Shortraker Rockfish	0.00	0.02	0.02	--	--	--
Slope Rockfish Unid	0.03	9.61	9.64	--	--	--
Splitnose Rockfish	0.01	17.22	17.22	--	--	--
Other flatfish						
Flatfish Unid	0.00	0.00	0.00	--	--	--
Flathead Sole	--	--	--	0.00	0.00	0.00
Pacific Sanddab	0.00	0.13	0.13	0.00	0.01	0.01
Rex Sole	0.00	3.54	3.54	0.00	0.00	0.00
Other rockfish						
Rockfish Unid	0.02	--	0.02	--	--	--
Pacific cod	0.00	0.07	0.07	0.00	0.00	0.00
Pacific hake	315.19	76,412.20	76,727.39	0.10	48.42	48.52
PACIFIC OCEAN PERCH (North of 40°10' N. lat.)	0.02	25.29	25.32	0.00	0.00	0.00
Petrale sole	--	0.00	0.00	--	0.00	0.00
Roundfish unid	0.65	--	0.65	--	--	--
Sablefish (North of 36° N. lat.)	0.00	5.49	5.49	0.00	0.05	0.05
Shortbelly rockfish	0.05	22.61	22.66	0.00	0.00	0.00
Shortspine thornyhead (North of 34°27' N. lat.)	0.01	11.30	11.31	--	0.00	0.00
Spiny dogfish	0.50	166.88	167.38	0.00	0.32	0.32
Widow rockfish	3.02	202.68	205.70	0.20	403.36	403.55
Yellowtail rockfish (North of 40°10' N. lat.)	0.93	414.32	415.26	0.15	357.73	357.88
Non-groundfish species						
Other nongroundfish						
Skate Unid	0.00	0.04	0.04	--	0.00	0.00
Squid Unid	0.04	15.80	15.84	0.00	0.00	0.00
Shared ecosystem component species						
Smelt Unid	0.00	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 in 2016. Discard ratios (Tables 2a, 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 were 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.

	IFQ - Bottom Trawl			IFQ - Midwater Rockfish Trawl			IFQ - Hook-and-Line			IFQ - Pot		
Weight (mt)	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate
Groundfish species												
Arrowtooth flounder	323.27	1,077.39	1,400.66	0.00	0.04	0.04	2.17	0.07	2.24	0.25	0.32	0.57
Black rockfish (North of 46°16' N. lat.)	0.00	0.47	0.47	--	0.00	0.00	--	--	--	--	--	--
Black rockfish (South of 46°16' N. lat.)	0.00	0.40	0.40	--	0.00	0.00	--	--	--	--	--	--
Bocaccio rockfish (South of 40°10' N. lat.)	0.02	42.85	42.87	--	--	--	--	--	--	--	--	--
Cabezon (Oregon)	0.02	0.09	0.12	--	--	--	--	--	--	--	--	--
California scorpionfish (North of 34°27' N. lat.)	--	0.62	0.62	--	--	--	--	--	--	--	--	--
Canary rockfish	0.08	6.52	6.60	0.00	6.08	6.08	--	--	--	--	--	--
Chilipepper rockfish (South of 40°10' N. lat.)	2.28	72.84	75.12	--	--	--	--	--	--	--	--	--
COWCOD ROCKFISH (South of 40°10' N. lat.)	0.00	0.28	0.28	--	--	--	--	--	--	--	--	--
Darkblotched rockfish	4.39	100.79	105.18	0.00	0.00	0.00	--	0.06	0.06	0.00	0.04	0.04
Dover sole	29.72	7,123.75	7,153.48	--	0.00	0.00	0.03	0.44	0.47	0.28	10.08	10.35
Ecosystem component species												
Aleutian Skate	0.61	--	0.61	--	--	--	--	--	--	--	--	--
Big Skate	30.77	327.78	358.55	0.00	0.00	0.00	0.02	0.40	0.42	--	--	--
Black Skate	7.96	3.58	11.54	--	--	--	0.41	--	0.41	--	--	--
California Grenadier	0.39	0.00	0.40	--	--	--	--	--	--	--	--	--
California Skate	1.61	0.08	1.69	--	--	--	--	--	--	--	--	--
Deepsea Skate	0.21	--	0.21	--	--	--	0.02	--	0.02	--	--	--
Filamented Grenadier	--	0.00	0.00	--	--	--	--	--	--	--	--	--
Giant Grenadier	29.81	14.29	44.10	--	--	--	0.92	--	0.92	1.64	--	1.64
Grenadier Unid	1.35	3.05	4.40	--	--	--	5.24	0.05	5.30	0.10	--	0.10
Pacific Flatnose	0.21	0.16	0.37	--	--	--	0.33	--	0.33	0.01	--	0.01
Pacific Grenadier	8.68	18.98	27.66	--	--	--	1.50	--	1.50	0.73	--	0.73
Popeye Grenadier	0.00	0.00	0.00	--	--	--	--	--	--	--	--	--
Roughshoulder/Broad Skate	0.05	--	0.05	--	--	--	--	--	--	--	--	--
Sandpaper Skate	49.59	0.24	49.83	--	--	--	0.25	--	0.25	--	--	--
Shoulderspot Grenadier	0.00	--	0.00	--	--	--	--	--	--	--	--	--
Smooth Grenadier	0.00	--	0.00	--	--	--	--	--	--	--	--	--
Softhead Grenadier	0.00	--	0.00	--	--	--	--	--	--	--	--	--
Soupfin Shark	0.20	0.21	0.41	--	--	--	--	--	--	--	--	--
Spotted Ratfish	94.52	0.78	95.31	--	0.00	0.00	0.02	--	0.02	--	--	--
English sole	83.36	289.94	373.30	0.00	0.03	0.03	--	--	--	--	0.04	0.04
Groundfish unid	0.00	--	0.00	--	0.00	0.00	--	--	--	--	--	--
Lingcod (North of 40°10' N. lat.)	6.96	236.01	242.97	0.00	0.46	0.46	--	0.32	0.32	0.09	2.02	2.11
Lingcod (South of 40°10' N. lat.)	2.73	18.32	21.04	--	--	--	--	--	--	0.01	0.03	0.03
Longnose skate	53.85	755.85	809.70	0.00	0.02	0.02	1.74	11.86	13.61	0.00	0.13	0.14
Longspine thornyhead (North of 34°27' N. lat.)	12.13	631.74	643.87	--	--	--	0.07	0.02	0.09	0.00	5.94	5.94
Longspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	0.02	0.00	0.03	0.00	--	0.00

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

Table 3a (continued).

	IFQ - Bottom Trawl			IFQ - Midwater Rockfish Trawl			IFQ - Hook-and-Line			IFQ - Pot		
Weight (mt)	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate
Minor nearshore rockfish (North of 40°10' N. lat.)												
Black and Yellow Rockfish	--	0.30	0.30	--	--	--	--	--	--	--	--	--
Blue/Deacon Rockfish	0.00	0.00	0.00	--	0.00	0.00	--	--	--	--	--	--
Brown Rockfish	0.00	0.07	0.07	--	--	--	--	--	--	--	--	--
Quillback Rockfish	0.01	0.07	0.08	--	--	--	--	--	--	--	--	--
Minor nearshore rockfish (South of 40°10' N. lat.)												
Black and Yellow Rockfish	--	0.00	0.00	--	--	--	--	--	--	--	--	--
Copper Rockfish	--	0.00	0.00	--	--	--	--	--	--	--	--	--
Minor shelf rockfish (North of 40°10' N. lat.)												
Bocaccio Rockfish	0.01	3.13	3.14	0.00	0.10	0.10	--	--	--	--	--	--
Bronzespotted Rockfish	0.00	0.24	0.24	--	--	--	--	--	--	--	--	--
Chilipepper Rockfish	0.59	1.46	2.05	0.00	0.41	0.41	--	--	--	--	--	--
Cowcod Rockfish	--	0.00	0.00	--	--	--	--	--	--	--	--	--
Greenspotted Rockfish	0.00	0.01	0.01	--	--	--	--	0.00	0.00	--	--	--
Greenstriped Rockfish	3.72	7.89	11.61	--	--	--	0.01	0.00	0.01	--	0.00	0.00
Harlequin Rockfish	0.00	--	0.00	0.00	0.00	0.00	--	--	--	--	--	--
Pygmy Rockfish	0.00	--	0.00	--	--	--	--	--	--	--	--	--
Redstripe Rockfish	0.03	0.46	0.49	0.00	1.16	1.16	--	--	--	--	--	--
Rosethorn Rockfish	0.58	0.84	1.42	--	--	--	--	0.04	0.04	0.00	0.01	0.01
Rosy Rockfish	0.00	--	0.00	--	--	--	--	0.00	0.00	--	--	--
Shelf Rockfish Unid	0.00	1.42	1.42	--	--	--	--	--	--	--	0.01	0.01
Silvergray Rockfish	0.00	1.47	1.47	0.00	0.04	0.04	--	0.00	0.00	--	--	--
Starry Rockfish	--	--	--	--	--	--	--	--	--	0.01	--	0.01
Stripetail Rockfish	2.41	0.06	2.47	--	--	--	--	--	--	--	--	--
Minor shelf rockfish (South of 40°10' N. lat.)												
Bronzespotted Rockfish	--	0.00	0.00	--	--	--	--	--	--	--	--	--
Flag Rockfish	--	0.00	0.00	--	--	--	--	--	--	--	--	--
Greenblotched Rockfish	0.01	0.19	0.20	--	--	--	--	--	--	--	--	--
Greenspotted Rockfish	0.00	0.17	0.17	--	--	--	--	--	--	--	--	--
Greenstriped Rockfish	0.25	0.08	0.33	--	--	--	--	--	--	--	--	--
Halfbanded Rockfish	0.01	--	0.01	--	--	--	--	--	--	--	--	--
Mexican Rockfish	0.00	0.01	0.01	--	--	--	--	--	--	--	--	--
Pink Rockfish	--	0.01	0.01	--	--	--	--	--	--	--	--	--
Rosethorn Rockfish	0.08	--	0.08	--	--	--	--	--	--	--	0.00	0.00
Shelf Rockfish Unid	--	0.02	0.02	--	--	--	--	--	--	--	--	--
Silvergray Rockfish	0.00	0.11	0.11	--	--	--	--	--	--	--	--	--
Stripetail Rockfish	3.00	0.61	3.61	--	--	--	--	--	--	--	--	--
Vermilion Rockfish	0.00	0.08	0.08	--	--	--	--	--	--	--	--	--
Yellowtail Rockfish	--	0.00	0.00	--	--	--	--	--	--	--	--	--
Minor slope rockfish (North of 40°10' N. lat.)												
Aurora Rockfish	6.48	15.79	22.27	--	--	--	--	0.00	0.00	0.01	--	0.01
Bank Rockfish	0.00	1.02	1.02	--	--	--	--	--	--	--	0.01	0.01
Blackgill Rockfish	0.03	3.19	3.21	--	--	--	--	0.02	0.02	0.02	0.05	0.07
Redbanded Rockfish	0.23	4.03	4.26	--	--	--	0.06	0.72	0.78	0.02	0.24	0.26
Rougheye/Blackspotted Rockfish	0.06	29.59	29.64	--	--	--	0.09	5.46	5.55	0.02	1.09	1.11
Sharpchin Rockfish	1.60	1.46	3.06	--	--	--	--	0.00	0.00	--	--	--
Shortraker Rockfish	0.00	6.72	6.72	--	--	--	--	0.45	0.45	--	--	--
Shortraker/Rougheye/Blackspotted Rockfish	--	--	--	--	--	--	0.31	--	0.31	--	--	--
Slope Rockfish Unid	0.03	1.41	1.44	--	--	--	--	--	--	--	0.03	0.03
Splitnose Rockfish	8.67	13.10	21.76	--	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00
Yellowmouth Rockfish	0.00	1.07	1.07	--	--	--	--	0.01	0.01	--	0.00	0.00

Table 3a (continued).

	IFQ - Bottom Trawl			IFQ - Midwater Rockfish Trawl			IFQ - Hook-and-Line			IFQ - Pot		
Weight (mt)	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate
Minor slope rockfish (South of 40°10' N. lat.)												
Aurora Rockfish	0.49	1.21	1.70	--	--	--	0.00	0.01	0.01	--	0.01	0.01
Bank Rockfish	0.08	35.97	36.04	--	--	--	--	--	--	--	--	--
Blackgill Rockfish	0.85	8.67	9.51	--	--	--	0.06	1.95	2.02	0.00	0.19	0.19
Pacific Ocean Perch	0.01	0.01	0.02	--	--	--	--	--	--	--	--	--
Redbanded Rockfish	0.02	0.31	0.33	--	--	--	--	--	--	--	--	--
Rougheye/Blackspotted Rockfish	0.00	0.01	0.01	--	--	--	--	0.00	0.00	--	--	--
Sharpchin Rockfish	0.02	0.00	0.02	--	--	--	--	--	--	--	--	--
Shortraker Rockfish	0.00	--	0.00	--	--	--	--	--	--	--	--	--
Slope Rockfish Unid	0.00	0.00	0.00	--	--	--	--	--	--	--	--	--
Yellowmouth Rockfish	0.00	0.01	0.01	--	--	--	--	--	--	--	--	--
Mixed thornyheads	0.62	--	0.62	--	--	--	0.02	--	0.02	0.02	--	0.02
Other flatfish												
Butter Sole	0.01	0.13	0.14	--	--	--	--	--	--	--	--	--
Curlfin Turbot	0.00	1.59	1.59	--	--	--	--	--	--	--	--	--
Flatfish Unid	0.10	2.99	3.09	--	--	--	--	--	--	--	0.00	0.00
Flathead Sole	22.62	16.72	39.34	0.00	0.00	0.00	--	--	--	--	--	--
Pacific Sanddab	112.14	89.95	202.09	0.09	0.01	0.10	--	--	--	--	--	--
Rex Sole	63.63	510.20	573.83	0.00	0.00	0.00	--	--	--	--	0.53	0.53
Rock Sole	0.57	1.23	1.80	--	--	--	--	--	--	--	--	--
Sand Sole	0.53	26.95	27.48	--	--	--	--	--	--	--	--	--
Other groundfish												
Kelp Greenling (Oregon)	0.00	0.00	0.00	--	--	--	--	--	--	--	--	--
Kelp Greenling (Washington)	0.08	0.00	0.08	--	--	--	--	--	--	--	--	--
Other rockfish												
Rockfish Unid	0.09	--	0.09	--	--	--	--	--	--	0.00	--	0.00
Pacific cod	0.35	384.48	384.83	0.00	0.01	0.01	0.03	0.02	0.06	--	--	--
Pacific hake	300.97	39.14	340.10	1.01	77.37	78.38	0.08	--	0.08	0.00	--	0.00
PACIFIC OCEAN PERCH (North of 40°10' N. lat.)	0.77	25.92	26.68	0.00	0.00	0.00	--	0.01	0.01	0.00	0.01	0.01
Petrale sole	18.08	2,446.58	2,464.66	--	0.01	0.01	0.09	0.11	0.21	0.03	4.27	4.30
Roundfish unid	0.00	--	0.00	--	--	--	--	--	--	--	--	--
Sablefish (North of 36° N. lat.)	12.17	1,430.37	1,442.54	0.00	0.05	0.05	1.29	133.22	134.51	2.06	670.60	672.66
Sablefish (South of 36° N. lat.)	0.47	4.48	4.95	--	--	--	0.53	28.51	29.04	0.60	160.05	160.66
Shortbelly rockfish	0.45	0.15	0.60	0.00	0.00	0.00	--	--	--	--	--	--
Shortspine thornyhead (North of 34°27' N. lat.)	8.36	717.85	726.21	--	0.00	0.00	0.39	7.36	7.75	0.20	1.81	2.00
Shortspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	0.05	1.57	1.62	0.01	--	0.01
Spiny dogfish	246.85	1.09	247.95	0.00	2.03	2.03	20.79	--	20.79	0.25	--	0.25
Splitnose rockfish (South of 40°10' N. lat.)	11.29	1.80	13.09	--	--	--	--	--	--	--	--	--
Starry flounder	1.80	10.89	12.69	--	--	--	--	--	--	--	--	--
Widow rockfish	0.02	6.32	6.34	1.56	550.12	551.68	--	--	--	--	--	--
YELLOWEYE ROCKFISH	0.00	0.04	0.04	--	--	--	--	--	--	--	0.00	0.00
Yellowtail rockfish (North of 40°10' N. lat.)	0.00	108.33	108.34	0.15	526.96	527.11	0.01	0.05	0.05	--	0.01	0.01

Table 3a (continued).

	IFQ - Bottom Trawl			IFQ - Midwater Rockfish Trawl			IFQ - Hook-and-Line			IFQ - Pot		
Weight (mt)	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate
Non-groundfish species												
California halibut	0.03	0.02	0.05	--	--	--	--	--	--	--	--	--
Dungeness crab	137.91	0.06	137.97	--	--	--	--	--	--	0.83	--	0.83
Non-FMP flatfish												
Deepsea Sole	4.67	2.71	7.38	--	--	--	--	--	--	0.01	--	0.01
Longfin Sanddab	0.00	--	0.00	--	--	--	--	--	--	--	--	--
Slender Sole	44.66	0.25	44.91	--	--	--	--	--	--	--	--	--
Other nongroundfish												
Red Irish Lord Sculpin	0.00	--	0.00	--	--	--	--	--	--	--	--	--
Sculpin Unid	0.97	--	0.97	--	--	--	--	--	--	--	--	--
Skate Unid	0.89	7.02	7.91	--	0.00	0.00	0.00	0.03	0.03	--	--	--
Squid Unid	0.08	1.18	1.26	0.00	0.00	0.00	--	--	--	--	--	--
Starry Skate	0.08	--	0.08	--	--	--	--	--	--	--	--	--
Shared ecosystem component species												
Barracudina Unid	0.00	--	0.00	--	--	--	--	--	--	--	--	--
Bristlemouth Unid	0.00	--	0.00	--	--	--	--	--	--	--	--	--
Deepsea Smelt Unid	0.00	--	0.00	--	--	--	--	--	--	--	--	--
Lanternfish Unid	0.00	0.07	0.07	--	--	--	--	--	--	--	--	--
Non-Eulachon Smelt Unid	0.00	--	0.00	--	--	--	--	--	--	--	--	--
Non-Humboldt Squid Unid	8.04	--	8.04	--	--	--	--	--	--	0.00	--	0.00
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 in 2016. Observed discard in the shoreside midwater hake sector was combined with at-sea discard recorded by EM, along with total landings from PacFIN. The summary of the at-sea hake Co-op Program was derived from A-SHOP data.

	IFQ - Midwater Hake			At-sea Catcher-Processors			At-sea Mothership Catcher Vessels		
Weight (mt)	Discard	Landed	Estimate	Discard	Retained	Estimate	Discard	Retained	Estimate
Groundfish species									
Arrowtooth flounder	0.01	11.39	11.41	2.51	4.61	7.12	2.48	0.44	2.92
Black rockfish (North of 46°16' N. lat.)	--	0.02	0.02	--	--	--	--	--	--
Canary rockfish	0.02	6.99	7.01	0.02	0.08	0.10	0.09	0.33	0.42
Darkblotched rockfish	0.04	15.68	15.72	1.61	1.91	3.52	0.83	0.75	1.58
Dover sole	0.00	0.09	0.09	0.05	0.11	0.16	0.12	0.00	0.13
Ecosystem component species									
Big Skate	0.00	0.70	0.70	0.29	0.21	0.50	0.38	0.05	0.43
Grenadier Unid	--	0.00	0.00	8.07	32.10	40.17	0.00	0.00	0.01
Sandpaper Skate	--	--	--	--	0.00	0.00	0.00	--	0.00
Soupfin Shark	0.00	0.67	0.67	0.09	0.04	0.13	0.87	0.29	1.16
Spotted Ratfish	0.00	0.00	0.00	0.00	--	0.00	--	--	--
English sole	0.00	0.03	0.03	0.00	0.00	0.00	0.00	--	0.00
Groundfish unid	0.01	3.32	3.33	--	--	--	--	--	--
Lingcod (North of 40°10' N. lat.)	0.03	7.47	7.51	--	0.01	0.01	0.06	0.11	0.18
Longnose skate	0.00	0.12	0.12	0.30	0.09	0.39	0.35	0.09	0.44
Longspine thornyhead (North of 34°27' N. lat.)	0.00	0.01	0.01	--	0.00	0.00	--	--	--
Minor nearshore rockfish (North of 40°10' N. lat.)									
Olive Rockfish	--	0.00	0.00	--	--	--	--	--	--
Minor shelf rockfish (North of 40°10' N. lat.)									
Bocaccio Rockfish	0.01	0.27	0.27	--	0.02	0.02	0.07	0.02	0.09
Chilipepper Rockfish	0.01	4.31	4.31	0.05	1.09	1.14	0.94	0.03	0.96
Harlequin Rockfish	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.01
Redstripe Rockfish	0.09	2.00	2.09	0.04	1.75	1.78	0.05	0.01	0.06
Shelf Rockfish Unid	0.00	0.00	0.00	--	--	--	--	--	--
Silvergray Rockfish	0.00	1.46	1.46	0.01	0.03	0.04	0.08	0.06	0.14
Stripetail Rockfish	--	--	--	--	0.00	0.00	--	--	--
Minor slope rockfish (North of 40°10' N. lat.)									
Aurora Rockfish	--	--	--	0.00	0.02	0.02	0.01	--	0.01
Bank Rockfish	--	--	--	0.01	0.04	0.05	0.01	0.00	0.02
Blackgill Rockfish	--	--	--	0.00	0.01	0.01	0.01	--	0.01
Redbanded Rockfish	--	--	--	0.01	0.02	0.03	0.01	--	0.01
Rougheye/Blackspotted Rockfish	0.01	15.63	15.65	6.36	16.07	22.43	1.99	5.22	7.21
Sharpchin Rockfish	0.00	0.14	0.14	0.00	0.00	0.00	0.00	0.00	0.00
Shortraker Rockfish	0.00	0.02	0.02	0.03	--	0.03	--	0.01	0.01
Slope Rockfish Unid	0.03	9.64	9.67	--	--	--	--	--	--
Splitnose Rockfish	0.01	31.13	31.15	24.22	12.39	36.62	4.41	2.04	6.45
Yellowmouth Rockfish	--	--	--	0.02	0.00	0.03	--	--	--
Other flatfish									
Flatfish Unid	0.00	0.00	0.00	--	--	--	--	--	--
Flathead Sole	--	--	--	--	0.01	0.01	0.00	--	0.00
Pacific Sanddab	0.00	0.13	0.13	--	--	--	--	0.00	0.00
Rex Sole	0.00	5.23	5.23	0.73	1.24	1.97	0.79	0.07	0.86
Other rockfish	0.02	--	0.02	--	--	--	--	--	--
Rockfish Unid									
Pacific cod	0.00	0.07	0.07	0.00	--	0.00	--	--	--
Pacific hake	374.42	85,382.17	85,756.58	22.94	108,780.64	108,803.58	420.76	64,597.09	65,017.85
PACIFIC OCEAN PERCH (North of 40°10' N. lat.)	0.02	27.81	27.84	1.69	1.40	3.09	2.68	4.52	7.20
Petrale sole	--	0.00	0.00	--	--	--	--	--	--
Roundfish unid	0.65	--	0.65	0.00	0.01	0.02	--	--	--
Sablefish (North of 36° N. lat.)	0.00	5.95	5.95	1.98	16.13	18.12	4.11	5.48	9.60
Shortbelly rockfish	0.05	22.83	22.88	0.17	0.08	0.24	1.74	0.17	1.91
Shortspine thornyhead (North of 34°27' N. lat.)	0.01	11.90	11.91	2.22	4.99	7.21	3.28	0.03	3.31
Spiny dogfish	0.51	183.73	184.24	61.28	73.77	135.05	47.75	10.81	58.56
Widow rockfish	3.06	237.37	240.42	46.20	66.09	112.28	48.44	25.97	74.41
Yellowtail rockfish (North of 40°10' N. lat.)	0.96	488.57	489.53	4.44	6.84	11.28	27.95	23.10	51.05
Non-groundfish species									
Non-FMP flatfish									
Slender Sole	--	--	--	0.00	0.00	0.00	--	--	--
Other nongroundfish									
Skate Unid	0.00	0.04	0.05	--	--	--	0.00	--	0.00
Squid Unid	0.10	18.04	18.15	62.09	90.39	152.48	19.95	3.23	23.18
Shared ecosystem component species									
Barracudina Unid	--	--	--	0.00	--	0.00	--	--	--
Deepsea Smelt Unid	--	--	--	0.49	0.28	0.77	0.00	0.00	0.00
Duckbill Barracudina	--	--	--	1.44	5.07	6.51	0.03	0.01	0.04
Lanternfish Unid	--	--	--	0.89	1.21	2.09	0.05	0.00	0.05
Pacific Saury	--	--	--	0.00	0.00	0.00	0.00	0.00	0.00
Slender Barracudina	--	--	--	0.00	0.00	0.00	0.00	0.00	0.00
Smelt Unid	0.00	0.00	0.00	--	--	--	--	--	--
White Barracudina	--	--	--	0.01	0.01	0.02	0.00	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 2016 OA California halibut fishery (which only occurs south of 40°10' N. latitude). Ratios are computed as the observed discard weight divided by the observed weight of retained California halibut (adjusted to fish tickets). Discard ratios were multiplied by fleet landings of California halibut to generate estimated discard.

Open Access California Halibut Fishery South of 40°10' N Lat.	Observed vessels		Observed trips	Observed tows	Expansion factor: Fleet landings of California halibut (mt)	
	11		114	498	90	
Weight (mt)	Discard Ratio	SE	CV	Discard	Landed	Total Estimate
Groundfish species						
Bocaccio rockfish (South of 40°10' N. lat.)	0.0000	0.0000	0.0782	0.00	0.00	0.00
Cabezon (California)	0.0003	0.0001	0.3289	0.02	--	0.02
California scorpionfish (South of 34°27' N. lat.)	0.0036	0.0007	0.1938	0.32	--	0.32
Chilipepper rockfish (South of 40°10' N. lat.)	0.0000	0.0000	0.2184	0.00	--	0.00
Dover sole	0.0000	0.0000	0.1615	0.00	0.00	0.00
Ecosystem component species						
Big Skate	0.2668	0.0289	0.1083	23.91	--	11.96
50% discard mortality (Trawl)‡				11.96		
California Skate	0.1513	0.0175	0.1157	13.55	--	13.55
Sandpaper Skate	0.0000	0.0000	0.2220	0.00	--	0.00
Soupfin Shark	0.0015	0.0007	0.4774	0.13	0.01	0.15
Spotted Ratfish	0.0004	0.0001	0.3565	0.03	--	0.03
English sole	0.0358	0.0040	0.1110	3.21	0.18	3.39
Lingcod (South of 40°10' N. lat.)	0.0019	0.0007	0.3729	0.17	0.29	0.38
50% discard mortality (Trawl)‡				0.08		
Longnose skate	0.0001	0.0000	0.2985	0.01	--	0.01
50% discard mortality (Trawl)‡				0.01		
Longspine thornyhead (North of 34°27' N. lat.)	0.0000	0.0000	0.0641	0.00	--	0.00
Minor nearshore rockfish (South of 40°10' N. lat.)						
Brown Rockfish	0.0015	0.0004	0.2444	0.13	--	0.13
Calico Rockfish	0.0000	0.0000	0.3237	0.00	--	0.00
Copper Rockfish	0.0001	0.0000	0.3951	0.01	0.02	0.03
Minor shelf rockfish (South of 40°10' N. lat.)						
Halfbanded Rockfish	0.0000	0.0000	0.1451	0.00	--	0.00
Shelf Rockfish Unid	0.0000	0.0000	0.4774	0.00	--	0.00
Stripetail Rockfish	0.0000	0.0000	0.3053	0.00	--	0.00
Vermilion Rockfish	0.0003	0.0001	0.4271	0.03	0.02	0.05
Other flatfish						
Curlfin Turbot	--	--	--	--	0.63	0.63
Flatfish Unid	0.0001	0.0000	0.1109	0.01	0.20	0.21
Pacific Sanddab	0.0143	0.0021	0.1480	1.28	0.02	1.30
Rex Sole	0.00	0.00	0.2375	0.08	0.02	0.09
Rock Sole	0.0095	0.0023	0.2376	0.85	0.12	0.97
Sanddab Unid	0.0000	0.0000	0.2628	0.00	0.00	0.00
Sand Sole	0.0048	0.0007	0.1467	0.43	2.92	3.35
Other groundfish						
Leopard Shark	0.0060	0.0012	0.1990	0.54	--	0.54
Petrale Sole	0.0067	0.0013	0.1973	0.60	2.35	2.95
Spiny Dogfish Shark	0.0080	0.0012	0.1506	0.72	--	0.72
Starry Flounder	0.0090	0.0012	0.1301	0.81	4.89	5.70
Non-groundfish species						
California halibut	0.1739	0.0188	0.1083	15.58	89.62	105.20
Dungeness crab	1.2279	0.1147	0.0934	110.04	--	110.04
Non-FMP flatfish						
Deepsea Sole	--	--	--	--	0.01	0.01
Diamond Turbot	0.0030	0.0004	0.1488	0.27	--	0.27
Hornyhead Turbot	0.0067	0.0008	0.1223	0.60	0.00	0.60
Longfin Sanddab	0.0005	0.0001	0.1525	0.05	--	0.05
Slender Sole	--	--	--	--	0.05	0.05
Speckled Sanddab	0.0001	0.0000	0.2641	0.01	--	0.01
Other nongroundfish						
California Sheephead	0.0037	0.0008	0.2111	0.33	--	0.33
Sculpin Unid	0.0042	0.0007	0.1721	0.38	--	0.38
Skate Unid	--	--	--	--	0.05	0.05
Starry Skate	0.0020	0.0005	0.2787	0.18	--	0.18
Shared ecosystem component species						
Non-Humboldt Squid Unid	0.0001	0.0001	0.3713	0.01	--	0.01
Pacific Sandlance	0.0000	0.0000	0.0641	0.00	--	0.00

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

Table 5. Pink Shrimp Trawl.

Observed discard ratios, SEs, CVs, estimated discard (mt), landings (mt), and fishing mortality estimates (mt) of groundfish species from 2016 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.

	Washington						Oregon						California					
Pink Shrimp Trawl Fishery	Observed vessels		Observed trips	Observed tows	Expansion factor: Fleet landings of pink shrimp (mt)		Observed vessels		Observed trips	Observed tows	Expansion factor: Fleet landings of pink shrimp (mt)		Observed vessels		Observed trips	Observed tows	Expansion factor: Fleet landings of pink shrimp (mt)	
	17		59	948	6,396		54		153	2179	16,116		11		28	359	1,337	
Weight (mt)	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	0.3096	0.25	--	0.25	0.0003	0.0000	0.1021	4.09	--	4.09	0.0002	0.0000	0.2153	0.20	--	0.20
Bocaccio rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0000	0.2400	0.00	--	0.00
Cabezon (Oregon)	--	--	--	--	--	--	0.0000	0.0000	0.0343	0.00	--	0.00	--	--	--	--	--	--
Canary rockfish	--	--	--	--	--	--	0.0000	0.0000	0.5014	0.06	--	0.06	0.0000	0.0000	0.0630	0.01	--	0.01
Chilipepper rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0000	0.1764	0.03	--	0.03
COWCOD ROCKFISH (South of 40°10' N. lat.)	--	--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0000	0.0630	0.00	--	0.00
Darkblotched rockfish	0.0005	0.0000	0.1077	2.90	--	2.90	0.0002	0.0000	0.0945	3.45	--	3.45	0.0000	0.0000	0.1249	0.03	--	0.03
Dover sole	0.0001	0.0000	0.1935	0.57	--	0.57	0.0002	0.0000	0.0851	2.66	--	2.66	0.0003	0.0001	0.2326	0.34	--	0.34
Ecosystem component species																		
Aleutian Skate	--	--	--	--	--	--	0.0000	0.0000	0.2485	0.00	--	0.00	--	--	--	--	--	--
Big Skate	0.0000	0.0000	0.0281	0.00	--	0.00	0.0000	0.0000	0.2808	0.01	--	0.01	--	--	--	--	--	--
Black Skate	--	--	--	--	--	--	0.0000	0.0000	0.0269	0.00	--	0.00	--	--	--	--	--	--
California Skate	--	--	--	--	--	--	0.0000	0.0000	0.5314	0.00	--	0.00	0.0000	0.0000	0.2089	0.02	--	0.02
Sandpaper Skate	0.0000	0.0000	0.2980	0.01	--	0.01	0.0000	0.0000	0.3207	0.03	--	0.03	0.0000	0.0000	0.2214	0.00	--	0.00
Spotted Ratfish	0.0000	0.0000	0.2994	0.06	--	0.06	0.0000	0.0000	0.5595	0.17	--	0.17	0.0000	0.0000	0.3223	0.06	--	0.06
English sole	0.0000	0.0000	0.4247	0.14	--	0.14	0.0000	0.0000	0.1438	0.36	--	0.36	0.0000	0.0000	0.5543	0.05	--	0.05
Lingcod (North of 40°10' N. lat.)	0.0000	0.0000	0.3031	0.00	--	0.00	0.0000	0.0000	0.3381	0.15	--	0.15	0.0000	0.0000	0.4052	0.00	0.00	0.00
Lingcod (South of 40°10' N. lat.)	--	--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0000	0.4199	0.04	--	0.04
Longnose skate	0.0000	0.0000	0.4408	0.13	--	0.13	0.0000	0.0000	0.1690	0.53	--	0.53	0.0002	0.0001	0.2883	0.24	--	0.24
Longspine thornyhead (North of 34°27' N. lat.)	0.0000	0.0000	0.0281	0.00	--	0.00	0.0000	0.0000	0.0269	0.00	--	0.00	--	--	--	--	--	--
Minor nearshore rockfish (North of 40°10' N. lat.)																		
Black and Yellow Rockfish	0.0000	0.0000	0.0281	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Olive Rockfish	--	--	--	--	--	--	0.0000	0.0000	0.7676	0.60	--	0.60	--	--	--	--	--	--
Quillback Rockfish	0.0000	0.0000	0.4265	0.00	--	0.00	0.0000	0.0000	0.2580	0.00	--	0.00	--	--	--	--	--	--
Minor shelf rockfish (North of 40°10' N. lat.)																		
Bocaccio Rockfish	0.0000	0.0000	0.1689	0.00	--	0.00	0.0000	0.0000	0.3362	0.04	--	0.04	--	--	--	--	--	--
Chilipepper Rockfish	0.0000	0.0000	0.2634	0.01	--	0.01	0.0000	0.0000	0.3325	0.31	--	0.31	0.0000	0.0000	0.2866	0.05	--	0.05
Cowcod Rockfish	--	--	--	--	--	--	0.0000	0.0000	0.4293	0.01	--	0.01	0.0000	0.0000	0.1663	0.00	--	0.00
Greenspotted Rockfish	--	--	--	--	--	--	0.0000	0.0000	0.0269	0.00	--	0.00	--	--	--	--	--	--
Greenstriped Rockfish	0.0000	0.0000	0.1010	0.26	--	0.26	0.0000	0.0000	0.1208	0.46	--	0.46	0.0000	0.0000	0.2237	0.03	--	0.03
Halfbanded Rockfish	0.0000	0.0000	0.0281	0.00	--	0.00	0.0000	0.0000	0.1992	0.01	--	0.01	0.0000	0.0000	0.1758	0.00	--	0.00
Harlequin Rockfish	0.0000	0.0000	0.0281	0.00	--	0.00	0.0000	0.0000	0.0269	0.00	--	0.00	--	--	--	--	--	--
Pygmy Rockfish	0.0000	0.0000	0.1711	0.01	--	0.01	0.0000	0.0000	0.1687	0.02	--	0.02	--	--	--	--	--	--
Redstripe Rockfish	--	--	--	--	--	--	0.0000	0.0000	0.2272	0.00	--	0.00	0.0000	0.0000	0.3628	0.00	--	0.00
Rosethorn Rockfish	0.0000	0.0000	0.0281	0.00	--	0.00	0.0000	0.0000	0.3049	0.00	--	0.00	0.0000	0.0000	0.0630	0.00	--	0.00
Shelf Rockfish Unid	0.0000	0.0000	0.5070	0.11	--	0.11	0.0000	0.0000	0.1777	0.36	--	0.36	0.0002	0.0001	0.5271	0.28	--	0.28
Silvergray Rockfish	0.0000	0.0000	0.4265	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Squarespot Rockfish	--	--	--	--	--	--	0.0000	0.0000	0.1663	0.00	--	0.00	0.0000	0.0000	0.1700	0.00	--	0.00
Stripetail Rockfish	0.0000	0.0000	0.1908	0.06	--	0.06	0.0001	0.0000	0.1439	1.45	--	1.45	0.0001	0.0000	0.3091	0.20	--	0.20
Tiger Rockfish	--	--	--	--	--	--	0.0000	0.0000	0.0269	0.00	--	0.00	--	--	--	--	--	--
Halfbanded Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0000	0.2841	0.04	--	0.04
Shelf Rockfish Unid	--	--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0000	0.6515	0.02	--	0.02
Squarespot Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0000	0.3158	0.06	--	0.06
Stripetail Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.0008	0.0002	0.2188	1.07	--	1.07
Minor slope rockfish (North of 40°10' N. lat.)																		
Aurora Rockfish	0.0000	0.0000	0.0281	0.00	--	0.00	0.0000	0.0000	0.3965	0.00	--	0.00	--	--	--	--	--	--
Blackgill Rockfish	--	--	--	--	--	--	0.0000	0.0000	0.2382	0.00	--	0.00	--	--	--	--	--	--
Redbanded Rockfish	0.0000	0.0000	0.2296	0.01	--	0.01	0.0000	0.0000	0.1433	0.04	--	0.04	0.0000	0.0000	0.0630	0.00	--	0.00
Rougheye/Blackspotted Rockfish	0.0000	0.0000	0.0616	0.00	--	0.00	0.0000	0.0000	0.4032	0.02	--	0.02	--	--	--	--	--	--
Sharpchin Rockfish	0.0000	0.0000	0.3401	0.00	--	0.00	0.0000	0.0000	0.4055	0.02	--	0.02	0.0000	0.0000	0.2723	0.00	--	0.00
Splitnose Rockfish	0.0000	0.0000	0.1435	0.04	--	0.04	0.0000	0.0000	0.1292	0.08	--	0.08	0.0000	0.0000	0.3953	0.00	--	0.00
Yellowmouth Rockfish	--	--	--	--	--	--	0.0000	0.0000	0.1801	0.00	--	0.00	--	--	--	--	--	--
Bank Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0000	0.1385	0.00	--	0.00
Redbanded Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0000	0.0630	0.00	--	0.00

Table 5 (continued).

Pink Shrimp Trawl Fishery	Washington						Oregon						California					
	Observed vessels		Observed trips	Observed tows	Expansion factor: Fleet landings of pink shrimp (mt)		Observed vessels		Observed trips	Observed tows	Expansion factor: Fleet landings of pink shrimp (mt)		Observed vessels		Observed trips	Observed tows	Expansion factor: Fleet landings of pink shrimp (mt)	
	17		59	948	6,396		54		153	2179	16,116		11		28	359	1,337	
Weight (mt)	Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard Ratio	SE	CV	Discard	Landed	Estimate
Mixed thornyheads	--	--	--	--	--	--	0.0000	0.0000	0.0269	0.00	--	0.00	--	--	--	--	--	--
Other flatfish																		
Flatfish Unid	0.0000	0.0000	0.4666	0.12	--	0.12	0.0001	0.0000	0.2315	2.13	--	2.13	0.0001	0.0000	0.3906	0.08	--	0.08
Flathead Sole	0.0001	0.0000	0.1948	0.68	--	0.68	0.0001	0.0000	0.0961	0.84	--	0.84	0.0000	0.0000	0.2926	0.00	--	0.00
Pacific Sanddab	0.0001	0.0000	0.1219	0.55	--	0.55	0.0005	0.0000	0.0775	8.63	--	8.63	0.0006	0.0001	0.2162	0.80	--	0.80
Rex Sole	0.0006	0.0001	0.0909	3.86	--	3.86	0.0017	0.0001	0.0510	27.48	--	27.48	0.0018	0.0003	0.1796	2.44	--	2.44
Rock Sole	0.0000	0.0000	0.0281	0.00	--	0.00	0.0000	0.0000	0.0269	0.00	--	0.00	--	--	--	--	--	--
Sand Sole	0.0000	0.0000	0.6040	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Pacific cod	0.0000	0.0000	0.0281	0.00	--	0.00	0.0000	0.0000	0.0269	0.00	--	0.00	--	--	--	--	--	--
Pacific hake	0.0267	0.0021	0.0790	170.92	--	170.92	0.0142	0.0013	0.0923	228.43	1.24	229.67	0.0900	0.0107	0.1185	120.30	--	120.30
PACIFIC OCEAN PERCH (North of 40°10' N. lat.)	0.0000	0.0000	0.3578	0.02	--	0.02	0.0000	0.0000	0.2089	0.02	--	0.02	0.0000	0.0000	0.0630	0.00	--	0.00
Petrale sole	0.0000	0.0000	0.4146	0.19	--	0.19	0.0000	0.0000	0.2126	0.53	--	0.53	0.0001	0.0000	0.3640	0.16	--	0.16
Sablefish (North of 36° N. lat.)	0.0000	0.0000	0.4809	0.12	--	0.12	0.0000	0.0000	0.1805	0.03	--	0.03	0.0000	0.0000	0.0630	0.01	--	0.01
Sablefish (South of 36° N. lat.)	--	--	--	--	--	--	--	--	--	--	--	--	0.0001	0.0000	0.1727	0.18	--	0.18
Shortbelly rockfish	0.0000	0.0000	0.1181	0.24	--	0.24	0.0001	0.0000	0.1837	1.22	--	1.22	0.0006	0.0001	0.1997	0.75	--	0.75
Shortspine thornyhead (North of 34°27' N. lat.)	0.0000	0.0000	0.5618	0.00	--	0.00	0.0000	0.0000	0.2078	0.01	--	0.01	--	--	--	--	--	--
Spiny dogfish	0.0000	0.0000	0.0281	0.01	--	0.01	0.0000	0.0000	0.3032	0.02	--	0.02	0.0000	0.0000	0.5756	0.03	--	0.03
Splitnose rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	--	--	--	--	--	0.0006	0.0002	0.2897	0.86	--	0.86
Starry flounder	0.0000	0.0000	0.2036	0.01	--	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Widow rockfish	--	--	--	--	--	--	0.0000	0.0000	0.6732	0.00	--	0.00	0.0000	0.0000	0.0630	0.00	--	0.00
YELLOWEYE ROCKFISH	--	--	--	--	--	--	0.0000	0.0000	0.0269	0.00	--	0.00	--	--	--	--	--	--
Yellowtail rockfish (North of 40°10' N. lat.)	0.0000	0.0000	0.1264	0.15	--	0.15	0.0000	0.0000	0.8380	0.32	--	0.32	--	--	--	--	--	--
Non-groundfish species																		
Dungeness crab	0.0000	0.0000	0.2303	0.01	--	0.01	0.0000	0.0000	0.2419	0.48	--	0.48	--	--	--	--	--	--
Non-FMP flatfish																		
Deepsea Sole	0.0000	0.0000	0.2066	0.00	--	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Slender Sole	0.0021	0.0002	0.0851	13.73	--	13.73	0.0031	0.0002	0.0492	49.99	--	49.99	0.0046	0.0007	0.1457	6.19	--	6.19
Other nongroundfish																		
Sculpin Unid	0.0000	0.0000	0.0429	0.00	--	0.00	0.0000	0.0000	0.3658	0.02	--	0.02	0.0000	0.0000	0.2147	0.01	--	0.01
Skate Unid	0.0000	0.0000	0.4319	0.00	--	0.00	0.0000	0.0000	0.2931	0.00	--	0.00	--	--	--	--	--	--
Squid Unid	--	--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0000	0.0821	0.00	--	0.00
Starry Skate	0.0000	0.0000	0.0281	0.00	--	0.00	--	--	--	--	--	--	0.0000	0.0000	0.0630	0.00	--	0.00
Shared ecosystem component species																		
Barracudina Unid	--	--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0000	0.2880	0.00	--	0.00
Lanternfish Unid	0.0000	0.0000	0.1785	0.00	--	0.00	0.0000	0.0000	0.2306	0.02	--	0.02	0.0000	0.0000	0.3009	0.00	--	0.00
Non-Eulachon Smelt Unid	0.0000	0.0000	0.2944	0.03	--	0.03	0.0003	0.0001	0.3036	5.06	--	5.06	0.0001	0.0001	0.6522	0.16	--	0.16
Non-Humboldt Squid Unid	0.0001	0.0000	0.1073	0.65	--	0.65	0.0001	0.0000	0.1063	1.70	--	1.70	0.0016	0.0002	0.1486	2.20	--	2.20
Pacific Sandlance	--	--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0000	0.3720	0.03	--	0.03
Pacific Saury	--	--	--	--	--	--	0.0000	0.0000	0.5906	0.00	--	0.00	--	--	--	--	--	--
Smelt Unid	0.0000	0.0000	0.0429	0.05	--	0.05	0.0000	0.0000	0.0269	0.01	--	0.01	--	--	--	--	--	--
Surf Smelt	--	--	--	--	--	--	0.0000	0.0000	0.2229	0.00	--	0.00	--	--	--	--	--	--
Whitebait Smelt	0.0000	0.0000	0.5519	0.01	--	0.01	0.0001	0.0000	0.2631	1.13	--	1.13	--	--	--	--	--	--

Table 6. LE Sablefish Primary Fixed Gear.

Observed discard ratios, SEs, CVs, estimated discard (mt), landings (mt), and fishing mortality estimates (mt) from the LE sablefish endorsed primary season (tier endorsed) fixed gear fleet in 2016. Ratios are computed as the observed discard weight divided by the observed weight of retained sablefish (adjusted to fish tickets). Discard ratios were multiplied by fleet landings of sablefish to generate discard estimates for each gear type; see Table 9 for total mortality across all non-IFQ, non-nearshore fixed gear sectors.

Limited Entry Sablefish Endorsed Primary Season	Longline - North of 36° N lat.						Longline - South of 36° N lat.						Pot					
	Observed vessels		Observed trips	Observed sets	Expansion factor: Fleet landings of sablefish (mt)		Observed vessels		Observed trips	Observed sets	Expansion factor: Fleet landings of sablefish (mt)		Observed vessels		Observed trips	Observed sets	Expansion factor: Fleet landings of sablefish (mt)	
	21		94	662	1,025		21		94	662	1,025		7		55	596	359	
	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	0.0163	0.0014	0.0854	16.44	0.75	17.19	0.0163	0.0014	0.0854	0.27	--	0.27	0.0077	0.0008	0.0994	2.78	0.15	2.93
Black rockfish (North of 46°16' N. lat.)	0.0000	--	--	0.00	--	0.00	0.0000	--	--	0.00	--	0.00	--	--	--	--	--	--
Black rockfish (South of 46°16' N. lat.)	0.0000	--	--	0.02	--	0.02	0.0000	--	--	0.00	--	0.00	--	--	--	--	--	--
Bocaccio rockfish (South of 40°10' N. lat.)	0.0000	--	--	0.00	0.03	0.03	0.0000	--	--	0.00	--	0.00	--	--	--	--	--	--
Canary rockfish	0.0014	0.0006	0.3984	1.39	0.05	1.44	0.0014	0.0006	0.3984	0.02	--	0.02	--	--	--	--	--	--
Chilipepper rockfish (South of 40°10' N. lat.)	--	--	--	--	0.05	0.05	--	--	--	--	--	--	--	--	--	--	--	--
Darkblotched rockfish	0.0002	0.0001	0.3237	0.22	1.58	1.80	0.0002	0.0001	0.3237	0.00	--	0.00	0.0000	0.0000	0.1769	0.01	0.11	0.13
Dover sole	0.0006	0.0001	0.1483	0.61	1.11	1.71	0.0006	0.0001	0.1483	0.01	0.00	0.01	0.0035	0.0004	0.1225	1.26	0.33	1.59
Ecosystem component species																		
Aleutian Skate	0.0000	--	--	0.02	--	0.02	0.0000	--	--	0.00	--	0.00	--	--	--	--	--	--
Big Skate	0.0028	0.0006	0.2273	2.87	1.59	4.46	0.0028	0.0006	0.2273	0.05	--	0.05	--	--	--	--	--	--
Black Skate	0.0001	0.0001	0.6338	0.12	--	0.12	0.0001	0.0001	0.6338	0.00	--	0.00	--	--	--	--	--	--
California Grenadier	0.0000	--	--	0.00	--	0.00	0.0000	--	--	0.00	--	0.00	0.0004	0.0001	0.2496	0.14	--	0.14
Giant Grenadier	0.0036	0.0008	0.2329	3.67	0.00	3.68	0.0036	0.0008	0.2329	0.06	--	0.06	0.0013	0.0002	0.1438	0.48	--	0.48
Grenadier Unid	0.0006	--	--	0.59	0.01	0.61	0.0006	--	--	0.01	--	0.01	0.0002	0.0001	0.4433	0.06	0.46	0.52
Pacific Flatnose	--	--	--	--	--	--	--	--	--	--	--	--	0.0000	--	--	0.00	--	0.00
Pacific Grenadier	0.0029	0.0010	0.3514	2.87	5.64	8.51	0.0029	0.0010	0.3514	0.05	--	0.05	0.0003	0.0001	0.3981	0.10	--	0.10
Sandpaper Skate	0.0011	0.0001	0.1001	1.06	--	1.06	0.0011	0.0001	0.1001	0.02	--	0.02	0.0000	--	--	0.00	--	0.00
Soupfin Shark	0.0002	--	--	0.22	--	0.22	0.0002	--	--	0.00	--	0.00	--	--	--	--	--	--
Spotted Ratfish	0.0014	0.0001	0.0879	1.42	0.00	1.43	0.0014	0.0001	0.0879	0.02	--	0.02	0.0000	--	--	0.00	--	0.00
White Skate	0.0000	0.0000	0.2264	0.03	--	0.03	0.0000	0.0000	0.2264	0.00	--	0.00	--	--	--	--	--	--
Lingcod (North of 40°10' N. lat.)	0.0023	0.0003	0.1272	2.30	8.88	9.04	--	--	--	--	--	--	0.0168	0.0019	0.1156	6.04	4.81	10.85
7% discard mortality (Line)‡				0.16														
Lingcod (South of 40°10' N. lat.)	0.0000	--	--	0.02	0.34	0.34	0.0000	--	--	0.00	0.00	0.00	0.0001	0.0000	0.0567	0.02	0.54	0.56
7% discard mortality (Line)‡				0.00						0.00								
Longnose skate	0.0595	0.0047	0.0783	59.95	26.96	56.94	0.0595	0.0047	0.0783	1.00	--	0.50	0.0001	0.0000	0.3662	0.02	0.00	0.01
50% discard mortality (Fixed Gear)‡				29.98						0.50						0.01		
Longspine thornyhead (North of 34°27' N. lat.)	0.0000	0.0000	0.3446	0.05	0.80	0.84	0.0000	0.0000	0.3446	0.00	0.18	0.18	0.0000	0.0000	0.0837	0.00	0.00	0.00
Longspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	--	--	--	--	0.04	0.04	--	--	--	--	--	--
Minor nearshore rockfish (North of 40°10' N. lat.)																		
Olive Rockfish	0.0001	--	--	0.10	--	0.10	--	--	--	--	--	--	--	--	--	--	--	--
Minor shelf rockfish (North of 40°10' N. lat.)																		
Bocaccio Rockfish	0.0000	0.0000	0.1875	0.03	0.15	0.18	--	--	--	--	--	--	--	--	--	--	--	--
Chilipepper Rockfish	0.0000	0.0000	0.2633	0.04	0.10	0.14	--	--	--	--	--	--	--	--	--	--	--	--
Greenspotted Rockfish	--	--	--	--	0.01	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Greenstriped Rockfish	0.0003	0.0000	0.1325	0.34	0.18	0.52	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Redstripe Rockfish	0.0001	0.0000	0.2539	0.10	0.01	0.11	--	--	--	--	--	--	--	--	--	--	--	--
Rosethorn Rockfish	0.0001	0.0000	0.1308	0.14	0.32	0.46	--	--	--	--	--	--	0.0000	0.0000	0.1214	0.00	0.00	0.01
Rosy Rockfish	0.0000	0.0000	0.3470	0.01	0.00	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Shelf Rockfish Unid	--	--	--	--	0.18	0.18	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Silvergray Rockfish	0.0000	0.0000	0.1942	0.02	0.21	0.23	--	--	--	--	--	--	--	--	--	--	--	--
Stripetail Rockfish	0.0000	--	--	0.00	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Minor shelf rockfish (South of 40°10' N. lat.)																		
Greenspotted Rockfish	--	--	--	--	0.02	0.02	--	--	--	--	--	--	--	--	--	--	--	--
Rosethorn Rockfish	0.0000	--	--	0.00	0.00	0.00	0.0000	--	--	0.00	--	0.00	--	--	--	--	--	--
Minor slope rockfish (North of 40°10' N. lat.)																		
Aurora Rockfish	0.0000	0.0000	0.2424	0.02	0.05	0.07	--	--	--	--	--	--	0.0000	0.0000	0.2867	0.00	--	0.00
Bank Rockfish	0.0000	--	--	0.01	0.00	0.01	--	--	--	--	--	--	--	--	--	--	0.01	0.01
Blackgill Rockfish	0.0003	0.0001	0.4507	0.31	0.38	0.69	--	--	--	--	--	--	0.0000	0.0000	0.0870	0.00	0.02	0.02
Redbanded Rockfish	0.0066	0.0013	0.1922	6.63	14.58	21.21	--	--	--	--	--	--	0.0001	0.0000	0.1768	0.02	0.59	0.61
Rougheye/Blackspotted Rockfish	0.0095	0.0018	0.1847	9.60	22.90	32.50	--	--	--	--	--	--	0.0003	0.0001	0.2108	0.10	0.98	1.08
Sharpchin Rockfish	--	--	--	--	0.02	0.02	--	--	--	--	--	--	--	--	--	--	--	--
Shortraker Rockfish	0.0005	0.0001	0.2454	0.46	2.10	2.56	--	--	--	--	--	--	0.0000	--	--	0.01	0.01	0.02
Shortraker/Rougheye/Blackspotted Rockfish	0.0001	0.0000	0.3042	0.09	--	0.09	--	--	--	--	--	--	--	--	--	--	--	--
Slope Rockfish Unid	0.0000	0.0000	0.3771	0.04	2.43	2.47	--	--	--	--	--	--	0.0000	--	--	0.00	0.30	0.30
Splitnose Rockfish	0.0000	--	--	0.00	0.05	0.05	--	--	--	--	--	--	--	--	--	--	--	--
Yellowmouth Rockfish	0.0000	--	--	0.00	0.13	0.13	--	--	--	--	--	--	--	--	--	--	0.00	0.00

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

Table 6 (continued).

Limited Entry Sablefish Endorsed Primary Season	Longline - North of 36° N lat.						Longline - South of 36° N lat.						Pot					
	Observed vessels		Observed trips	Observed sets	Expansion factor: Fleet landings of sablefish (mt)		Observed vessels		Observed trips	Observed sets	Expansion factor: Fleet landings of sablefish (mt)		Observed vessels		Observed trips	Observed sets	Expansion factor: Fleet landings of sablefish (mt)	
	21		94	662	1,025		21		94	662	1,025		7		55	596	359	
	Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard Ratio	SE	CV	Discard	Landed	Estimate
Minor slope rockfish (South of 40°10' N. lat.)																		
Aurora Rockfish	0.0000	--	--	0.00	0.02	0.02	0.0000	--	--	0.00	0.01	0.01	0.0000	--	--	0.00	--	0.00
Bank Rockfish	--	--	--	--	--	--	--	--	--	--	0.01	0.01	--	--	--	--	--	--
Blackgill Rockfish	0.0001	0.0000	0.3107	0.10	3.60	3.70	0.0001	0.0000	0.3107	0.00	0.44	0.44	0.0000	--	--	0.00	0.11	0.12
Redbanded Rockfish	0.0000	0.0000	0.2186	0.01	1.21	1.22	0.0000	0.0000	0.2186	0.00	--	0.00	--	--	--	--	0.01	0.01
Rougheye/Blackspotted Rockfish	--	--	--	--	0.27	0.27	--	--	--	--	--	--	--	--	--	--	--	--
Shortraker Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Mixed thornyheads	0.0001	0.0000	0.2184	0.06	--	0.06	0.0001	0.0000	0.2184	0.00	--	0.00	--	--	--	--	--	--
Other flatfish																		
Flathead Sole	0.0000	--	--	0.01	--	0.01	0.0000	--	--	0.00	--	0.00	--	--	--	--	--	--
Rex Sole	--	--	--	--	--	--	--	--	--	--	--	--	0.0000	--	--	0.00	--	0.00
Rock Sole	--	--	--	--	0.18	0.18	--	--	--	--	--	--	--	--	--	--	--	--
Other groundfish																		
Greenling Unid	0.0000	--	--	0.00	--	0.00	0.0000	--	--	0.00	--	0.00	--	--	--	--	--	--
Other rockfish																		
Rockfish Unid	--	--	--	--	0.19	0.19	--	--	--	--	--	--	--	--	--	--	--	--
Pacific cod	0.0019	0.0002	0.1251	1.89	4.94	6.83	0.0019	0.0002	0.1251	0.03	--	0.03	--	--	--	--	0.00	0.00
Pacific hake	0.0001	0.0000	0.1645	0.11	0.00	0.11	0.0001	0.0000	0.1645	0.00	--	0.00	--	--	--	--	--	--
PACIFIC OCEAN PERCH (North of 40°10' N. lat.)	0.0001	0.0000	0.4385	0.08	0.10	0.18	0.0001	0.0000	0.4385	0.00	--	0.00	--	--	--	--	0.00	0.00
Petrale sole	0.0005	0.0001	0.1465	0.55	0.75	1.30	0.0005	0.0001	0.1465	0.01	--	0.01	0.0001	0.0000	0.2801	0.03	0.02	0.06
Sablefish (North of 36° N. lat.)	0.3408	0.0214	0.0627	343.71	1008.43	1077.17	--	--	--	--	--	--	0.3508	0.0218	0.0623	125.95	359.00	384.19
20% discard mortality (Fixed Gear)‡				68.74												25.19		
Sablefish (South of 36° N. lat.)	--	--	--	--	--	--	--	--	--	--	16.83	16.83	--	--	--	--	--	--
20% discard mortality (Fixed Gear)‡																		
Shortspine thornyhead (North of 34°27' N. lat.)	0.0042	0.0005	0.1292	4.28	20.08	24.37	0.0042	0.0005	0.1292	0.07	1.28	1.35	0.0003	0.0001	0.1750	0.10	0.30	0.41
Shortspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	--	--	--	--	2.18	2.18	--	--	--	--	--	--
Spiny dogfish	0.2005	0.0252	0.1256	202.20	0.09	50.55	0.2005	0.0252	0.1256	3.37	--	0.84	0.0004	0.0001	0.1587	0.15	--	0.15
50% discard mortality (Line)‡				101.10						1.69								
Splitnose rockfish (South of 40°10' N. lat.)	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Widow rockfish	0.0006	0.0001	0.2051	0.56	0.05	0.61	0.0006	0.0001	0.2051	0.01	--	0.01	--	--	--	--	--	--
YELLOWEYE ROCKFISH	0.0005	0.0002	0.3343	0.51	--	0.51	0.0005	0.0002	0.3343	0.01	--	0.01	0.0001	0.0000	0.1241	0.03	--	0.03
Yellowtail rockfish (North of 40°10' N. lat.)	0.0011	0.0002	0.1752	1.07	0.47	1.54	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Non-groundfish species																		
Dungeness crab	0.0000	0.0000	0.3364	0.02	--	0.02	0.0000	0.0000	0.3364	0.00	--	0.00	0.0024	0.0004	0.1789	0.85	--	0.85
Non-FMP flatfish																		
Deepsea Sole	0.0000	--	--	0.00	--	0.00	0.0000	--	--	0.00	--	0.00	0.0000	0.0000	0.3846	0.00	--	0.00
Speckled Sanddab	--	--	--	--	--	--	--	--	--	--	--	--	0.0000	--	--	0.00	--	0.00
Other nongroundfish																		
Sculpin Unid	0.0000	--	--	0.00	--	0.00	0.0000	--	--	0.00	--	0.00	0.0000	0.0000	0.1688	0.00	--	0.00
Skate Unid	0.0000	0.0000	0.6005	0.04	2.77	2.81	0.0000	0.0000	0.6005	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 in 2016. Ratios are computed as the observed discard weight divided by the observed weight of FMP groundfish, adjusted to fish tickets. The observed OA discard ratios were used for pot gear, as no pot was observed in this sector. Pot landings in this sector only occurred north of 36° N. latitude. 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		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)		
	8		19	26	201		8		22	43	525					13		
	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	0.0001	--	--	0.02	0.10	0.12	--	--	--	--	--	--	0.0077	0.0008	0.0994	0.10	--	0.10
Bocaccio rockfish (South of 40°10' N. lat.)	--	--	--	--	0.07	0.07	--	--	--	--	1.49	1.49	--	--	--	--	--	--
California scorpionfish (South of 34°27' N. lat.)	--	--	--	--	--	--	0.0081	--	--	4.24	0.03	4.28	--	--	--	--	--	--
Canary rockfish	0.0002	--	--	0.04	--	0.04	--	--	--	--	--	--	--	--	--	--	--	--
Chilipepper rockfish (South of 40°10' N. lat.)	--	--	--	--	0.03	0.03	--	--	--	--	0.04	0.04	--	--	--	--	--	--
Darkblotched rockfish	--	--	--	--	0.89	0.89	--	--	--	--	0.24	0.24	0.0000	0.0000	0.1769	0.00	--	0.00
Dover sole	0.0002	--	--	0.05	0.26	0.31	0.0008	0.0002	0.2466	0.43	0.55	0.98	0.0035	0.0004	0.1225	0.04	0.00	0.05
Ecosystem component species																		
Big Skate	--	--	--	--	--	--	0.0005	--	--	0.26	--	0.26	--	--	--	--	--	--
Black Skate	--	--	--	--	--	--	0.0028	0.0007	0.2511	1.48	0.35	1.83	--	--	--	--	--	--
California Grenadier	--	--	--	--	--	--	0.0000	0.0000	0.2888	0.01	--	0.01	0.0004	0.0001	0.2496	0.01	--	0.01
California Skate	--	--	--	--	--	--	0.0004	--	--	0.19	0.01	0.20	--	--	--	--	--	--
Giant Grenadier	--	--	--	--	0.01	0.01	0.0012	0.0004	0.3191	0.62	--	0.62	0.0013	0.0002	0.1438	0.02	--	0.02
Grenadier Unid	--	--	--	--	0.30	0.30	0.0000	--	--	0.01	9.88	9.89	0.0002	0.0001	0.4433	0.00	--	0.00
Pacific Flatnose	--	--	--	--	--	--	0.00	0.00	0.2897	0.64	--	0.64	0.0000	--	--	0.00	--	0.00
Pacific Grenadier	--	--	--	--	17.38	17.38	0.0510	0.0228	0.4467	26.74	1.93	28.68	0.0003	0.0001	0.3981	0.00	--	0.00
Sandpaper Skate	0.0013	0.0004	0.2709	0.26	--	0.26	--	--	--	--	--	--	0.0000	--	--	0.00	--	0.00
Smooth Grenadier	--	--	--	--	--	--	0.00	--	--	0.01	--	0.01	--	--	--	--	--	--
Soupfin Shark	--	--	--	--	--	--	0.0129	--	--	6.76	--	6.76	--	--	--	--	--	--
Spotted Ratfish	0.0020	0.0006	0.3012	0.40	0.01	0.40	0.0002	--	--	0.10	0.00	0.10	0.0000	--	--	0.00	--	0.00
Lingcod (North of 40°10' N. lat.)	0.0012	--	--	0.24	0.47	0.48	--	--	--	--	--	--	0.0168	0.0019	0.1156	0.21	0.22	0.43
7% discard mortality (Line)‡				0.02														
Lingcod (South of 40°10' N. lat.)	--	--	--	--	0.10	0.10	--	--	--	--	0.16	0.16	0.0001	0.0000	0.0567	0.00	0.05	0.05
7% discard mortality (Line)‡																		
Longnose skate	0.0205	0.0066	0.3245	4.13	1.44	5.57	0.0073	0.0047	0.6379	3.83	1.54	5.37	0.0001	0.0000	0.3662	0.00	--	0.00
50% discard mortality (Fixed Gear)‡				2.06						1.91						0.00		
Longspine thornyhead (North of 34°27' N. lat.)	0.0001	--	--	0.01	0.64	0.66	0.0072	0.0021	0.2982	3.76	3.04	6.81	0.0000	0.0000	0.0837	0.00	0.00	0.00
Longspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	0.0009	0.0002	0.2825	0.45	9.40	9.84	--	--	--	--	--	--
Minor nearshore rockfish (North of 40°10' N. lat.)																		
Copper Rockfish	0.0001	--	--	0.03	--	0.03	--	--	--	--	--	--	--	--	--	--	--	--
Quillback Rockfish	0.0001	--	--	0.03	--	0.03	--	--	--	--	--	--	--	--	--	--	--	--
Minor nearshore rockfish (South of 40°10' N. lat.)																		
China Rockfish	--	--	--	--	--	--	--	--	--	--	0.07	0.07	--	--	--	--	--	--
Copper Rockfish	--	--	--	--	--	--	--	--	--	--	0.08	0.08	--	--	--	--	--	--
Olive Rockfish	--	--	--	--	--	--	--	--	--	--	0.01	0.01	--	--	--	--	--	--
Minor shelf rockfish (North of 40°10' N. lat.)																		
Bocaccio Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Chilipepper Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Greenspotted Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Greenstriped Rockfish	--	--	--	--	0.01	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Rosethorn Rockfish	--	--	--	--	0.14	0.14	--	--	--	--	--	--	0.0000	0.0000	0.1214	0.00	--	0.00
Shelf Rockfish Unid	--	--	--	--	0.01	0.01	--	--	--	--	--	--	--	--	--	--	--	--
Silvergray Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Stripetail Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Minor shelf rockfish (South of 40°10' N. lat.)																		
Flag Rockfish	--	--	--	--	--	--	--	--	--	--	0.06	0.06	--	--	--	--	--	--
Greenblotched Rockfish	--	--	--	--	0.00	0.00	0.0000	--	--	0.01	--	0.01	--	--	--	--	--	--
Greenspotted Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	0.43	0.43	--	--	--	--	--	--
Greenstriped Rockfish	--	--	--	--	--	--	--	--	--	--	0.02	0.02	--	--	--	--	--	--
Halfbanded Rockfish	--	--	--	--	--	--	0.0000	--	--	0.01	--	0.01	--	--	--	--	--	--
Honeycomb Rockfish	--	--	--	--	--	--	0.0000	--	--	0.00	0.01	0.01	--	--	--	--	--	--
Rosethorn Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	0.00	0.00	--	--	--	--	--	--
Rosy Rockfish	--	--	--	--	--	--	--	--	--	--	0.06	0.06	--	--	--	--	--	--
Shelf Rockfish Unid	--	--	--	--	0.01	0.01	--	--	--	--	0.01	0.01	--	--	--	--	--	--
Speckled Rockfish	--	--	--	--	--	--	--	--	--	--	0.09	0.09	--	--	--	--	--	--
Squarespot Rockfish	--	--	--	--	--	--	--	--	--	--	0.00	0.00	--	--	--	--	--	--
Starry Rockfish	--	--	--	--	--	--	--	--	--	--	0.48	0.48	--	--	--	--	--	--
Vermilion Rockfish	--	--	--	--	--	--	--	--	--	--	2.67	2.67	--	--	--	--	--	--

‡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)		
	8		19	26	201		8		22	43	525					13		
	Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard Ratio	SE	CV	Discard	Landed	Estimate
Minor slope rockfish (North of 40°10' N. lat.)																		
Aurora Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	--	--	0.0000	0.0000	0.2867	0.00	--	0.00
Bank Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Blackgill Rockfish	--	--	--	--	0.06	0.06	--	--	--	--	--	--	0.0000	0.0000	0.0870	0.00	--	0.00
Redbanded Rockfish	0.0000	--	--	0.00	2.33	2.33	--	--	--	--	--	--	0.0001	0.0000	0.1768	0.00	--	0.00
Rougheye/Blackspotted Rockfish	--	--	--	--	3.82	3.82	--	--	--	--	--	--	0.0003	0.0001	0.2108	0.00	--	0.00
Sharpchin Rockfish	--	--	--	--	0.02	0.02	--	--	--	--	--	--	--	--	--	--	--	--
Shortraker Rockfish	--	--	--	--	0.12	0.12	--	--	--	--	--	--	0.0000	--	--	0.00	--	0.00
Slope Rockfish Unid	--	--	--	--	2.13	2.13	--	--	--	--	--	--	0.0000	--	--	0.00	0.01	0.01
Splitnose Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Yellowmouth Rockfish	--	--	--	--	0.04	0.04	--	--	--	--	--	--	--	--	--	--	--	--
Minor slope rockfish (South of 40°10' N. lat.)																		
Aurora Rockfish	--	--	--	--	0.06	0.06	--	--	--	--	1.12	1.12	0.0000	--	--	0.00	--	0.00
Bank Rockfish	--	--	--	--	--	--	--	--	--	--	0.60	0.60	--	--	--	--	--	--
Blackgill Rockfish	0.0021	0.0011	0.5066	0.43	3.60	4.03	--	--	--	--	13.59	13.59	0.0000	--	--	0.00	0.01	0.01
Redbanded Rockfish	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Rougheye/Blackspotted Rockfish	--	--	--	--	0.04	0.04	--	--	--	--	--	--	--	--	--	--	--	--
Slope Rockfish Unid	--	--	--	--	--	--	--	--	--	--	0.01	0.01	--	--	--	--	--	--
Mixed thornyheads	--	--	--	--	0.01	0.01	--	--	--	--	1.56	1.56	--	--	--	--	--	--
Other flatfish																		
Pacific Sanddab	--	--	--	--	--	--	--	--	--	--	0.40	0.40	--	--	--	--	--	--
Rex Sole	--	--	--	--	--	--	--	--	--	--	--	--	0.0000	--	--	0.00	--	0.00
Other rockfish																		
Rockfish Unid	--	--	--	--	0.09	0.09	--	--	--	--	0.13	0.13	--	--	--	--	--	--
Pacific cod	--	--	--	--	0.09	0.09	--	--	--	--	--	--	--	--	--	--	--	--
Pacific hake	--	--	--	--	0.02	0.02	0.0004	0.0002	0.3596	0.23	0.02	0.25	--	--	--	--	--	--
PACIFIC OCEAN PERCH (North of 40°10' N. lat.)	--	--	--	--	0.07	0.07	--	--	--	--	--	--	--	--	--	--	--	--
Petrale sole	--	--	--	--	0.12	0.12	--	--	--	--	0.07	0.07	0.0001	0.0000	0.2801	0.00	0.00	0.00
Sablefish (North of 36° N. lat.)	0.2767	0.1083	0.3915	55.74	161.08	172.23	--	--	--	--	--	--	0.3508	0.0218	0.0623	4.47	12.44	13.33
20% discard mortality (Fixed Gear)‡				11.15												0.89		
Sablefish (South of 36° N. lat.)	--	--	--	--	--	--	0.0387	0.0123	0.3181	20.32	361.24	365.31	--	--	--	--	--	--
20% discard mortality (Fixed Gear)‡										4.06								
Shortspine thornyhead (North of 34°27' N. lat.)	0.0002	0.0001	0.2873	0.0470	5.73	5.77	0.0011	0.0002	0.2221	0.58	10.93	11.51	0.0003	0.0001	0.1750	0.00	0.00	0.01
Shortspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	0.0030	0.0008	0.2465	1.60	102.11	103.71	--	--	--	--	--	--
Spiny dogfish	0.0043	0.0015	0.3423	0.86	0.18	0.61	0.0006	--	--	0.31	0.00	0.16	0.0004	0.0001	0.1587	0.01	--	0.01
50% discard mortality (Line)‡				0.43						0.15								
Splitnose rockfish (South of 40°10' N. lat.)	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Widow rockfish	--	--	--	--	--	--	--	--	--	--	0.23	0.23	--	--	--	--	--	--
YELLOWEYE ROCKFISH	0.0006	--	--	0.11	--	0.11	--	--	--	--	--	--	0.0001	0.0000	0.1241	0.00	--	0.00
Yellowtail rockfish (North of 40°10' N. lat.)	--	--	--	--	0.04	0.04	--	--	--	--	--	--	--	--	--	--	--	--
Non-groundfish species																		
California halibut	--	--	--	--	--	--	--	--	--	--	0.01	0.01	--	--	--	--	--	--
Dungeness crab	--	--	--	--	--	--	--	--	--	--	--	--	0.0024	0.0004	0.1789	0.03	--	0.03
Non-FMP flatfish																		
Deepsea Sole	--	--	--	--	--	--	--	--	--	--	0.00	0.00	0.0000	0.0000	0.3846	0.00	--	0.00
Speckled Sanddab	--	--	--	--	--	--	--	--	--	--	--	--	0.0000	--	--	0.00	--	0.00
Other nongroundfish																		
Sculpin Unid	--	--	--	--	--	--	--	--	--	--	--	--	0.0000	0.0000	0.1688	0.00	--	0.00
Skate Unid	--	--	--	--	0.77	0.77	--	--	--	--	0.03	0.03	--	--	--	--	--	--

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 in 2016. 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 - Coastwide			North of 36° N lat. Expansion factor: Fleet landings of groundfish (mt)			South of 36° N lat. Expansion factor: Fleet landings of groundfish (mt)		
	Observed vessels	Observed trips	Observed sets						
	30	55	78	268			41		
	Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard	Landed	Estimate
Groundfish species									
Arrowtooth flounder	0.0331	0.0123	0.3707	8.89	0.34	9.23	1.35	--	1.35
Black rockfish (South of 46°16' N. lat.)	0.0001	--	--	0.03	0.53	0.57	0.01	0.00	0.01
Bocaccio rockfish (South of 40°10' N. lat.)	--	--	--	--	1.13	1.13	--	1.37	1.37
Cabezon (California)	--	--	--	--	0.03	0.03	--	0.00	0.00
Cabezon (Oregon)	--	--	--	--	0.11	0.11	--	--	--
Canary rockfish	0.0019	0.0009	0.4566	0.51	--	0.51	0.08	--	0.08
Chilipepper rockfish (South of 40°10' N. lat.)	--	--	--	--	0.29	0.29	--	0.12	0.12
Darkblotched rockfish	0.0017	0.0007	0.4425	0.45	0.70	1.16	0.07	--	0.07
Dover sole	0.0021	0.00064	0.3012	0.57	0.05	0.62	0.09	--	0.09
Ecosystem component species									
Big Skate	0.0022	--	--	0.58	0.20	0.79	0.09	--	0.09
Black Skate	0.0006	0.0001	0.1420	0.16	--	0.16	0.02	--	0.02
Deepsea Skate	0.0001	--	--	0.04	--	0.04	0.01	--	0.01
Giant Grenadier	0.0009	0.0005	0.5665	0.25	0.00	0.25	0.04	--	0.04
Grenadier Unid	0.0002	0.0001	0.3872	0.04	0.03	0.07	0.01	--	0.01
Pacific Flatnose	0.0017	0.0005	0.3134	0.45	--	0.45	0.07	--	0.07
Pacific Grenadier	0.0660	0.0237	0.3589	17.70	11.58	29.29	2.70	0.06	2.75
Sandpaper Skate	0.0009	0.0002	0.2742	0.23	--	0.23	0.04	--	0.04
Soupfin Shark	--	--	--	--	--	--	--	0.07	0.07
Spotted Ratfish	0.0026	0.0005	0.1984	0.70	--	0.70	0.11	--	0.11
Lingcod (North of 40°10' N. lat.)	0.0069	0.0023	0.3358	1.84	32.15	32.28	--	--	--
7% discard mortality (Line)‡				0.13					
Lingcod (South of 40°10' N. lat.)	0.0005	--	--	0.14	25.53	25.54	0.02	5.13	5.13
7% discard mortality (Line)‡				0.01			0.00		
Longnose skate	0.0561	0.0168	0.2994	15.06	5.95	13.48	2.29	--	1.15
50% discard mortality (Fixed Gear)‡				7.53			1.15		
Longspine thornyhead (North of 34°27' N. lat.)	0.0013	0.0004	0.2879	0.36	0.00	0.36	0.05	--	0.05
Longspine thornyhead (South of 34°27' N. lat.)	0.0000	--	--	0.01	--	0.01	0.00	0.24	0.24
Minor nearshore rockfish (North of 40°10' N. lat.)									
Blue/Deacon Rockfish	0.0001	--	--	0.03	0.04	0.07	--	--	--
China Rockfish	--	--	--	--	0.01	0.01	--	--	--
Copper Rockfish	0.0002	--	--	0.05	0.01	0.06	--	--	--
Quillback Rockfish	0.0001	--	--	0.02	0.01	0.03	--	--	--
Minor nearshore rockfish (South of 40°10' N. lat.)									
Black and Yellow Rockfish	--	--	--	--	0.11	0.11	--	0.01	0.01
Blue/Deacon Rockfish	0.0002	--	--	0.04	0.04	0.09	0.01	--	0.01
Brown Rockfish	--	--	--	--	0.00	0.00	--	0.02	0.02
China Rockfish	--	--	--	--	--	--	--	0.00	0.00
Copper Rockfish	--	--	--	--	0.00	0.00	--	0.03	0.03
Gopher Rockfish	0.0001	--	--	0.02	0.03	0.05	0.00	0.01	0.01
Grass Rockfish	--	--	--	--	--	--	--	0.00	0.00
Olive Rockfish	0.0001	--	--	0.02	0.01	0.03	0.00	--	0.00
Treefish Rockfish	--	--	--	--	--	--	--	0.00	0.00
Minor shelf rockfish (North of 40°10' N. lat.)									
Bocaccio Rockfish	--	--	--	--	0.06	0.06	--	--	--
Chilipepper Rockfish	--	--	--	--	0.00	0.00	--	--	--
Greenspotted Rockfish	--	--	--	--	0.00	0.00	--	--	--
Greenstriped Rockfish	0.0015	0.0009	0.5943	0.41	0.00	0.41	--	--	--
Rosethorn Rockfish	0.0010	0.0003	0.2763	0.27	0.03	0.31	--	--	--
Rosy Rockfish	0.0000	--	--	0.01	--	0.01	--	--	--
Shelf Rockfish Unid	--	--	--	--	0.09	0.09	--	--	--
Silvergray Rockfish	--	--	--	--	0.01	0.01	--	--	--
Stripetail Rockfish	--	--	--	--	0.00	0.00	--	--	--
Tiger Rockfish	--	--	--	--	0.01	0.01	--	--	--
Vermilion Rockfish	--	--	--	--	0.08	0.08	--	--	--

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

Table 8a (continued).

Open Access Fixed Gear	Longline - Coastwide			North of 36° N lat.			South of 36° N lat.		
	Observed vessels	Observed trips	Observed sets	Expansion factor: Fleet landings of groundfish (mt)			Expansion factor: Fleet landings of groundfish (mt)		
	30	55	78	268			41		
	Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard	Landed	Estimate
Minor shelf rockfish (South of 40°10' N. lat.)									
Bronzespotted Rockfish	--	--	--	--	--	--	--	0.03	0.03
Flag Rockfish	--	--	--	--	--	--	--	0.11	0.11
Greenblotched Rockfish	--	--	--	--	--	--	--	0.01	0.01
Greenspotted Rockfish	--	--	--	--	0.04	0.04	--	0.89	0.89
Greenstriped Rockfish	--	--	--	--	--	--	--	0.09	0.09
Honeycomb Rockfish	--	--	--	--	--	--	--	0.01	0.01
Mexican Rockfish	--	--	--	--	--	--	--	0.02	0.02
Rosy Rockfish	--	--	--	--	0.00	0.00	--	0.04	0.04
Shelf Rockfish Unid	--	--	--	--	0.01	0.01	--	0.17	0.17
Speckled Rockfish	--	--	--	--	--	--	--	0.14	0.14
Squarespot Rockfish	--	--	--	--	--	--	--	0.02	0.02
Starry Rockfish	--	--	--	--	0.02	0.02	--	0.19	0.19
Vermilion Rockfish	--	--	--	--	3.34	3.34	--	10.02	10.02
Yellowtail Rockfish	--	--	--	--	0.78	0.78	--	0.19	0.19
Minor slope rockfish (North of 40°10' N. lat.)									
Aurora Rockfish	--	--	--	--	0.01	0.01	--	--	--
Bank Rockfish	--	--	--	--	0.00	0.00	--	--	--
Blackgill Rockfish	--	--	--	--	0.04	0.04	--	--	--
Redbanded Rockfish	0.0033	0.0009	0.2823	0.88	2.14	3.01	--	--	--
Rougheye/Blackspotted Rockfish	0.0107	0.0048	0.4514	2.88	3.48	6.36	--	--	--
Shortraker Rockfish	--	--	--	--	0.09	0.09	--	--	--
Shortraker/Rougheye/Blackspotted Rockfish	0.0007	0.0001	0.1486	0.20	--	0.20	--	--	--
Slope Rockfish Unid	0.0002	--	--	0.06	0.05	0.11	--	--	--
Splitnose Rockfish	0.0001	--	--	0.02	0.00	0.02	--	--	--
Yellowmouth Rockfish	--	--	--	--	0.01	0.01	--	--	--
Minor slope rockfish (South of 40°10' N. lat.)									
Aurora Rockfish	--	--	--	--	--	--	--	0.01	0.01
Bank Rockfish	--	--	--	--	--	--	--	0.03	0.03
Blackgill Rockfish	--	--	--	--	0.88	0.88	--	0.44	0.44
Pacific Ocean Perch	--	--	--	--	--	--	--	0.01	0.01
Redbanded Rockfish	--	--	--	--	0.00	0.00	--	--	--
Rougheye/Blackspotted Rockfish	--	--	--	--	0.06	0.06	--	--	--
Slope Rockfish Unid	--	--	--	--	0.01	0.01	--	0.00	0.00
Mixed thornyheads	0.0000	--	--	0.00	0.03	0.04	0.00	0.20	0.20
Other flatfish									
Flatfish Unid	--	--	--	--	0.00	0.00	--	0.00	0.00
Pacific Sanddab	--	--	--	--	0.04	0.04	--	0.24	0.24
Rock Sole	--	--	--	--	0.03	0.03	--	0.00	0.00
Sanddab Unid	--	--	--	--	1.30	1.30	--	0.53	0.53
Sand Sole	--	--	--	--	0.01	0.01	--	--	--
Other groundfish									
Kelp Greenling (California)	--	--	--	--	0.00	0.00	--	0.00	0.00
Kelp Greenling (Oregon)	--	--	--	--	0.01	0.01	--	--	--
Leopard Shark	--	--	--	--	0.82	0.82	--	0.01	0.01
Other rockfish									
Rockfish Unid	--	--	--	--	0.01	0.01	--	0.00	0.00
Pacific cod	0.0023	0.0008	0.3570	0.60	0.66	1.27	0.09	--	0.09
Pacific hake	0.0001	--	--	0.03	0.07	0.10	0.00	--	0.00
PACIFIC OCEAN PERCH (North of 40°10' N. lat.)	0.0000	--	--	0.01	0.01	0.02	0.00	--	0.00
Petrale sole	0.0009	0.0001	0.1734	0.23	0.45	0.68	0.03	0.03	0.06
Sablefish (North of 36° N. lat.)	0.2492	0.0604	0.2423	66.88	173.99	187.37	--	--	--
20% discard mortality (Fixed Gear)‡				13.38					
Sablefish (South of 36° N. lat.)	0.0005	0.0001	0.1743	--	--	--	0.02	16.86	16.87
20% discard mortality (Fixed Gear)‡							0.00		
Shortspine thornyhead (North of 34°27' N. lat.)	0.0152	0.0042	0.2782	4.07	0.06	4.14	0.62	--	0.62
Shortspine thornyhead (South of 34°27' N. lat.)	0.0032	0.0006	0.1799	0.86	--	0.86	0.13	3.41	3.54
Spiny dogfish	0.0562	0.0173	0.3077	15.07	0.38	7.91	2.29	--	1.15
50% discard mortality (Line)‡				7.54			1.15		
Splitnose rockfish (South of 40°10' N. lat.)	--	--	--	--	--	--	--	0.00	0.00

Table 8a (continued).

Open Access Fixed Gear	Longline - Coastwide			North of 36° N lat. Expansion factor: Fleet landings of groundfish (mt)			South of 36° N lat. Expansion factor: Fleet landings of groundfish (mt)		
	Observed vessels	Observed trips	Observed sets						
	30	55	78	268			41		
	Discard Ratio	SE	CV	Discard	Landed	Estimate	Discard	Landed	Estimate
Starry flounder	--	--	--	--	0.01	0.01	--	--	--
Widow rockfish	0.0001	--	--	0.02	0.32	0.35	0.00	0.08	0.09
YELLOWEYE ROCKFISH	0.0005	0.0001	0.2939	0.12	--	0.12	0.02	--	0.02
Yellowtail rockfish (North of 40°10' N. lat.)	0.0006	0.0002	0.2885	0.16	0.07	0.23	--	--	--
Non-groundfish species									
California halibut	--	--	--	--	0.68	0.68	--	0.14	0.14
Dungeness crab	--	--	--	--	--	--	--	--	--
Other nongroundfish									
Sculpin Unid	0.0000	--	--	0.01	--	0.01	0.00	--	0.00
Skate Unid	0.0003	--	--	0.09	0.12	0.20	0.01	--	0.01
Shared ecosystem component species									
Smelt Unid	--	--	--	--	0.00	0.00	--	--	--

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 in 2016. 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. Expansion factor: Fleet landings of groundfish (mt)			South of 36° N lat. Expansion factor: Fleet landings of groundfish (mt)		
	Observed vessels	Observed trips	Observed sets						
	28	56	74	199			8		
	Discard Ratio	CV	SE	Discard	Landed	Estimate	Discard	Landed	Estimate
Groundfish species									
Arrowtooth flounder	0.0011	0.0002	0.2014	0.22	--	0.22	0.01	--	0.01
Bocaccio rockfish (South of 40°10' N. lat.)	0.0002	--	--	0.04	--	0.04	0.00	0.01	0.01
Darkblotched rockfish	--	--	--	--	0.00	0.00	--	--	--
Dover sole	0.0015	0.0003	0.2236	0.30	0.05	0.35	0.01	--	0.01
Ecosystem component species									
Grenadier Unid	--	--	--	--	0.02	0.02	--	--	--
Pacific Flatnose	0.0001	--	--	0.03	--	0.03	0.00	--	0.00
Pacific Grenadier	0.0014	0.0002	0.1515	0.28	--	0.28	0.01	--	0.01
Soupfin Shark	--	--	--	--	--	--	--	0.07	0.07
Lingcod (North of 40°10' N. lat.)	0.0007	0.0004	0.5555	0.15	0.65	0.80	--	--	--
Lingcod (South of 40°10' N. lat.)	0.0003	0.0001	0.4824	0.06	0.79	0.85	0.00	--	0.00
Longnose skate	--	--	--	--	0.06	0.06	--	--	--
50% discard mortality (Fixed Gear)‡									
Longspine thornyhead (North of 34°27' N. lat.)	--	--	--	--	0.01	0.01	--	--	--
Minor nearshore rockfish (North of 40°10' N. lat.)									
Minor nearshore rockfish (South of 40°10' N. lat.)									
Minor shelf rockfish (North of 40°10' N. lat.)									
Shelf Rockfish Unid	--	--	--	--	0.00	0.00	--	--	--
Vermilion Rockfish	--	--	--	--	0.00	0.00	--	--	--
Minor shelf rockfish (South of 40°10' N. lat.)									
Starry Rockfish	--	--	--	--	--	--	--	0.01	0.01
Vermilion Rockfish	--	--	--	--	--	--	--	0.04	0.04
Minor slope rockfish (North of 40°10' N. lat.)									
Blackgill Rockfish	--	--	--	--	0.00	0.00	--	--	--
Redbanded Rockfish	--	--	--	--	0.00	0.00	--	--	--
Rougheye/Blackspotted Rockfish	--	--	--	--	0.04	0.04	--	--	--
Shortraker Rockfish	--	--	--	--	0.00	0.00	--	--	--
Slope Rockfish Unid	--	--	--	--	0.05	0.05	--	--	--
Minor slope rockfish (South of 40°10' N. lat.)									
Aurora Rockfish	0.0000	--	--	0.00	--	0.00	0.00	--	0.00
Blackgill Rockfish	0.0005	0.0002	0.3774	0.11	0.14	0.25	0.00	0.04	0.04
Redbanded Rockfish	0.0001	0.0000	0.2708	0.03	--	0.03	0.00	--	0.00
Slope Rockfish Unid	0.0001	0.0000	0.3071	0.03	--	0.03	0.00	--	0.00
Mixed thornyheads	--	--	--	--	--	--	--	0.00	0.00
Other flatfish									
Other groundfish									
Other rockfish									
Pacific cod	--	--	--	--	0.02	0.02	--	--	--
Petrale sole	0.0001	0.0000	0.3071	0.03	0.01	0.03	0.00	--	0.00
Sablefish (North of 36° N. lat.)	0.2992	0.0631	0.2109	59.49	196.91	208.80	--	--	--
20% discard mortality (Fixed Gear)‡				11.90					
Sablefish (South of 36° N. lat.)	0.0010	0.0002	0.1908	--	--	--	0.01	7.46	7.46
20% discard mortality (Fixed Gear)‡							0.00		
Shortspine thornyhead (North of 34°27' N. lat.)	0.0001	0.0001	0.4417	0.03	0.07	0.09	0.00	--	0.00
Non-groundfish species									
California halibut	--	--	--	--	0.01	0.01	--	0.01	0.01
Dungeness crab	0.0007	--	--	0.13	1.75	1.88	0.01	--	0.01
Other nongroundfish									
Skate Unid	--	--	--	--	0.02268	0.02	--	--	--

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

Table 9. LE and OA Fixed Gear Summary.

Estimated discard (mt), landings (mt), and fishing mortality estimate (mt) of groundfish species in the LE and OA non-nearshore fixed gear sectors in 2016. Discard ratios were multiplied by fleet landings of sablefish or groundfish to generate estimated discard.

	Limited Entry - Coastwide				Open Access - Coastwide				
	Longline Discard	Pot Discard	Landed	LE Total	Longline Discard	Pot Discard	Landed	OA Total	**LE & OA Coastwide**
Groundfish species									
Arrowtooth flounder	16.74	2.87	1.00	20.61	10.24	0.23	0.34	10.82	31.43
Black rockfish (North of 46°16' N. lat.)	0.00	--	--	0.00	--	--	--	--	0.00
Black rockfish (South of 46°16' N. lat.)	0.02	--	--	0.02	0.04	--	0.53	0.57	0.59
Bocaccio rockfish (South of 40°10' N. lat.)	0.00	--	1.59	1.59	--	0.04	2.51	2.55	4.15
Cabezon (California)	--	--	--	--	--	--	0.03	0.03	0.03
Cabezon (Oregon)	--	--	--	--	--	--	0.11	0.11	0.11
California scorpionfish (South of 34°27' N. lat.)	4.24	--	0.03	4.28	--	--	--	--	4.28
Canary rockfish	1.45	--	0.05	1.50	0.59	--	--	0.59	2.08
Chilipepper rockfish (South of 40°10' N. lat.)	--	--	0.12	0.12	--	--	0.41	0.41	0.53
Darkblotched rockfish	0.22	0.01	2.83	3.06	0.52	--	0.71	1.23	4.29
Dover sole	1.10	1.31	2.25	4.65	0.66	0.31	0.09	1.07	5.72
Ecosystem component species									
Aleutian Skate	0.02	--	--	0.02	--	--	--	--	0.02
Big Skate	3.18	--	1.59	4.77	0.67	--	0.20	0.87	5.64
Black Skate	1.60	--	0.35	1.95	0.18	--	--	0.18	2.13
California Grenadier	0.01	0.15	--	0.16	--	--	--	--	0.16
California Skate	0.19	--	0.01	0.20	--	--	--	--	0.20
Deepsea Skate	--	--	--	--	0.05	--	--	0.05	0.05
Giant Grenadier	4.36	0.50	0.01	4.87	0.29	--	0.00	0.29	5.15
Grenadier Unid	0.61	0.07	10.65	11.33	0.05	--	0.05	0.10	11.43
Pacific Flatnose	0.64	0.00	--	0.64	0.52	0.03	--	0.55	1.19
Pacific Grenadier	29.66	0.10	24.95	54.71	20.40	0.29	11.64	32.33	87.04
Sandpaper Skate	1.34	0.00	--	1.34	0.27	--	--	0.27	1.61
Smooth Grenadier	0.01	--	--	0.01	--	--	--	--	0.01
Soupfin Shark	6.98	--	--	6.98	--	--	0.14	0.14	7.12
Spotted Ratfish	1.94	0.00	0.01	1.96	0.81	--	--	0.81	2.77
White Skate	0.03	--	--	0.03	--	--	--	--	0.03
Lingcod (North of 40°10' N. lat.)	2.55	6.26	14.38	21.91	1.84	0.15	32.80	33.87	55.77
7% discard mortality (Line)‡	1.27				0.92				
Lingcod (South of 40°10' N. lat.)	0.02	0.02	1.20	1.23	0.16	0.06	31.45	31.59	32.82
7% discard mortality (Line)‡	0.01				0.08				
Longnose skate	68.91	0.02	29.95	64.42	17.35	--	6.02	14.69	79.12
50% discard mortality (Fixed Gear)‡	34.45	0.01			8.68				
Longspine thornyhead (North of 34°27' N. lat.)	3.83	0.00	4.66	8.49	0.41	--	0.01	0.42	8.91
Longspine thornyhead (South of 34°27' N. lat.)	0.45	--	9.43	9.88	0.01	--	0.24	0.25	10.13
Minor nearshore rockfish (North of 40°10' N. lat.)									
Blue/Deacon Rockfish	--	--	--	--	0.03	--	0.04	0.07	0.07
China Rockfish	--	--	--	--	--	--	0.01	0.01	0.01
Copper Rockfish	0.03	--	--	0.03	0.05	--	0.01	0.06	0.09
Olive Rockfish	0.10	--	--	0.10	--	--	--	--	0.10
Quillback Rockfish	0.03	--	--	0.03	0.02	--	0.01	0.03	0.06
Minor nearshore rockfish (South of 40°10' N. lat.)									
Black and Yellow Rockfish	--	--	--	--	--	--	0.12	0.12	0.12
Blue/Deacon Rockfish	--	--	--	--	0.05	--	0.04	0.09	0.09
Brown Rockfish	--	--	--	--	--	--	0.03	0.03	0.03
China Rockfish	--	--	0.07	0.07	--	--	0.00	0.00	0.07
Copper Rockfish	--	--	0.08	0.08	--	--	0.03	0.03	0.11
Gopher Rockfish	--	--	--	--	0.02	--	0.03	0.06	0.06
Grass Rockfish	--	--	--	--	--	--	0.00	0.00	0.00
Olive Rockfish	--	--	0.01	0.01	0.03	--	0.01	0.04	0.05
Treefish Rockfish	--	--	--	--	--	--	0.00	0.00	0.00
Minor shelf rockfish (North of 40°10' N. lat.)									
Bocaccio Rockfish	0.03	--	0.15	0.18	--	--	0.06	0.06	0.24
Chilipepper Rockfish	0.04	--	0.10	0.14	--	--	0.00	0.00	0.14
Greenspotted Rockfish	--	--	0.01	0.01	--	--	0.00	0.00	0.01
Greenstriped Rockfish	0.34	--	0.18	0.52	0.41	--	0.00	0.41	0.94
Redstripe Rockfish	0.10	--	0.01	0.11	--	--	--	--	0.11
Rosethorn Rockfish	0.14	0.00	0.47	0.61	0.27	--	0.03	0.31	0.92
Rosy Rockfish	0.01	--	0.00	0.01	0.01	--	--	0.01	0.02
Shelf Rockfish Unid	--	--	0.19	0.19	--	--	0.09	0.09	0.29
Silvergray Rockfish	0.02	--	0.21	0.23	--	--	0.01	0.01	0.24
Stripetail Rockfish	0.00	--	0.00	0.00	--	--	0.00	0.00	0.00
Tiger Rockfish	--	--	--	--	--	--	0.01	0.01	0.01
Vermilion Rockfish	--	--	--	--	--	--	0.08	0.08	0.08

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

Table 9 (continued).

	Limited Entry - Coastwide				Open Access - Coastwide				
	Longline Discard	Pot Discard	Landed	LE Total	Longline Discard	Pot Discard	Landed	OA Total	**LE & OA Coastwide**
Minor shelf rockfish (South of 40°10' N. lat.)									
Bronzespotted Rockfish	--	--	--	--	--	--	0.03	0.03	0.03
Flag Rockfish	--	--	0.06	0.06	--	--	0.11	0.11	0.17
Greenblotched Rockfish	0.01	--	0.00	0.02	--	--	0.01	0.01	0.03
Greenspotted Rockfish	--	--	0.46	0.46	--	--	0.93	0.93	1.39
Greenstriped Rockfish	--	--	0.02	0.02	--	--	0.09	0.09	0.11
Halfbanded Rockfish	0.01	--	--	0.01	--	--	--	--	0.01
Honeycomb Rockfish	0.00	--	0.01	0.01	--	--	0.01	0.01	0.02
Mexican Rockfish	--	--	--	--	--	--	0.02	0.02	0.02
Rosethorn Rockfish	0.00	--	0.01	0.01	--	--	--	--	0.01
Rosy Rockfish	--	--	0.06	0.06	--	--	0.04	0.04	0.11
Shelf Rockfish Unid	--	--	0.02	0.02	--	--	0.19	0.19	0.20
Speckled Rockfish	--	--	0.09	0.09	--	--	0.14	0.14	0.22
Squarespot Rockfish	--	--	0.00	0.00	--	--	0.02	0.02	0.03
Starry Rockfish	--	--	0.48	0.48	--	--	0.22	0.22	0.70
Vermilion Rockfish	--	--	2.67	2.67	--	--	13.40	13.40	16.07
Yellowtail Rockfish	--	--	--	--	--	--	0.96	0.96	0.96
Minor slope rockfish (North of 40°10' N. lat.)									
Aurora Rockfish	0.02	0.00	0.05	0.08	--	--	0.01	0.01	0.08
Bank Rockfish	0.01	--	0.02	0.02	--	--	0.00	0.00	0.02
Blackgill Rockfish	0.31	0.00	0.46	0.77	--	--	0.04	0.04	0.81
Redbanded Rockfish	6.63	0.03	17.50	24.15	0.88	--	2.14	3.02	27.17
Rougheye/Blackspotted Rockfish	9.60	0.10	27.69	37.40	2.88	--	3.51	6.39	43.79
Sharpchin Rockfish	--	--	0.04	0.04	--	--	--	--	0.04
Shortraker Rockfish	0.46	0.01	2.23	2.70	--	--	0.09	0.09	2.80
Shortraker/Rougheye/Blackspotted Rockfish	0.09	--	--	0.09	0.20	--	--	0.20	0.29
Slope Rockfish Unid	0.04	0.00	4.86	4.91	0.06	--	0.10	0.16	5.07
Splitnose Rockfish	0.00	--	0.05	0.05	0.02	--	0.00	0.02	0.07
Yellowmouth Rockfish	0.00	--	0.18	0.18	--	--	0.01	0.01	0.19
Minor slope rockfish (South of 40°10' N. lat.)									
Aurora Rockfish	0.00	0.00	1.21	1.22	--	0.00	0.01	0.01	1.23
Bank Rockfish	--	--	0.61	0.61	--	--	0.03	0.03	0.63
Blackgill Rockfish	0.53	0.00	21.36	21.89	--	0.11	1.49	1.60	23.49
Pacific Ocean Perch	--	--	--	--	--	--	0.01	0.01	0.01
Redbanded Rockfish	0.01	--	1.22	1.24	--	0.03	0.00	0.03	1.27
Rougheye/Blackspotted Rockfish	--	--	0.31	0.31	--	--	0.06	0.06	0.37
Shortraker Rockfish	--	--	0.00	0.00	--	--	--	--	0.00
Slope Rockfish Unid	--	--	0.01	0.01	--	0.03	0.02	0.04	0.05
Mixed thornyheads	0.06	--	1.57	1.63	0.00	--	0.24	0.24	1.87
Other flatfish									
Flatfish Unid	--	--	--	--	--	--	0.00	0.00	0.00
Flathead Sole	0.01	--	--	0.01	--	--	--	--	0.01
Pacific Sanddab	--	--	0.40	0.40	--	--	0.28	0.28	0.68
Rex Sole	--	0.00	--	0.00	--	--	--	--	0.00
Rock Sole	--	--	0.18	0.18	--	--	0.03	0.03	0.21
Sanddab Unid	--	--	--	--	--	--	1.83	1.83	1.83
Sand Sole	--	--	--	--	--	--	0.01	0.01	0.01
Other groundfish									
Greenling Unid	0.00	--	--	0.00	--	--	--	--	0.00
Kelp Greenling (California)	--	--	--	--	--	--	0.00	0.00	0.00
Kelp Greenling (Oregon)	--	--	--	--	--	--	0.01	0.01	0.01
Leopard Shark	--	--	--	--	--	--	0.83	0.83	0.83
Other rockfish									
Rockfish Unid	--	--	0.41	0.41	--	--	0.01	0.01	0.42
Pacific cod	1.93	--	5.03	6.96	0.70	--	0.69	1.38	8.34
Pacific hake	0.34	--	0.04	0.38	0.04	--	0.07	0.11	0.49
PACIFIC OCEAN PERCH (North of 40°10' N. lat.)	0.08	--	0.18	0.26	0.01	--	0.01	0.02	0.28
Petrale sole	0.55	0.03	0.97	1.56	0.26	0.03	0.48	0.77	2.33
Sablefish (North of 36° N. lat.)	399.45	130.42	1,540.95	1,646.92	66.88	59.49	370.90	396.17	2,043.09
20% discard mortality (Fixed Gear)‡	79.89	26.08			13.38	11.90			
Sablefish (South of 36° N. lat.)	20.32	--	378.08	382.14	0.02	0.01	24.33	24.33	406.47
20% discard mortality (Fixed Gear)‡	4.06				0.00	0.00			
Shortspine thornyhead (North of 34°27' N. lat.)	4.98	0.11	38.32	43.42	4.69	0.03	0.13	4.85	48.27
Shortspine thornyhead (South of 34°27' N. lat.)	1.60	--	104.30	105.89	1.00	--	3.41	4.41	110.30
Spiny dogfish	206.73	0.16	0.27	103.64	17.37	--	0.38	9.06	112.70
50% discard mortality (Line)‡	103.37				8.68				
Splitnose rockfish (South of 40°10' N. lat.)	--	--	0.00	0.00	--	--	0.00	0.00	0.00
Starry flounder	--	--	--	--	--	--	0.01	0.01	0.01
Widow rockfish	0.57	--	0.28	0.85	0.03	--	0.41	0.43	1.28
YELLOWEYE ROCKFISH	0.63	0.03	--	0.65	0.14	--	--	0.14	0.80
Yellowtail rockfish (North of 40°10' N. lat.)	1.07	--	0.51	1.58	0.16	--	0.07	0.23	1.81

Table 9 (continued).

	Limited Entry - Coastwide				Open Access - Coastwide				
	Longline Discard	Pot Discard	Landed	LE Total	Longline Discard	Pot Discard	Landed	OA Total	**LE & OA Coastwide**
Non-groundfish species									
California halibut	--	--	0.01	0.01	--	--	0.84	0.84	0.86
Dungeness crab	0.02	0.88	--	0.90	--	0.14	1.75	1.88	2.79
Non-FMP flatfish									
Deepsea Sole	0.00	0.00	0.00	0.00	--	--	--	--	0.00
Speckled Sanddab	--	0.00	--	0.00	--	--	--	--	0.00
Other nongroundfish									
Sculpin Unid	0.00	0.00	--	0.00	0.01	--	--	0.01	0.02
Skate Unid	0.04	--	3.57	3.61	0.10	--	0.14	0.24	3.85
Shared ecosystem component species									
Smelt Unid	--	--	--	--	--	--	0.00	0.00	0.00

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

Commercial landings of nearshore species (mt) in Oregon and California during 2016, partitioned by depth interval and groundfish management area based on observed catch from 2003 to 2016. Data from both states were combined. The California state-permit framework, which groups nearshore rockfish into either shallow or deeper nearshore rockfish, is represented in the area south of 40°10' N. latitude.

	2003-2016 Total observed landings (mt)	2003-2016 Percentage of observed catch by depth (fathoms)				2016 Fleet landings (mt)	2016 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 (South of 46°16' N. lat.)	193.93	44.4%	53.3%	1.9%	0.4%	162.33	71.99	86.50	3.15	0.68
Cabezon (California)	2.61	39.2%	52.6%	8.1%	0.1%	0.83	0.33	0.44	0.07	0.00
Cabezon (Oregon)	26.69	32.7%	64.3%	2.2%	0.8%	15.73	5.14	10.12	0.35	0.12
Lingcod (North of 40°10' N. lat.)	43.30	30.5%	61.6%	7.5%	0.4%	48.64	14.83	29.96	3.64	0.22
Minor nearshore rockfish (North of 40°10' N. lat.)										
Black and Yellow Rockfish	0.06	34.7%	65.3%	--	--	0.01	0.00	0.01	--	--
Blue/Deacon Rockfish	18.29	21.3%	70.6%	7.6%	0.4%	5.37	1.14	3.79	0.41	0.02
Brown Rockfish	0.29	11.0%	31.8%	57.2%	--	0.02	0.00	0.01	0.01	--
China Rockfish	7.29	30.4%	64.4%	4.8%	0.4%	3.54	1.08	2.28	0.17	0.01
Copper Rockfish	1.70	13.2%	71.8%	14.9%	--	1.29	0.17	0.93	0.19	--
Gopher Rockfish	0.06	40.6%	55.6%	3.8%	--	0.06	0.02	0.03	0.00	--
Grass Rockfish	0.42	98.2%	1.2%	0.6%	--	0.13	0.13	0.00	0.00	--
Olive Rockfish	0.12	5.2%	86.6%	5.9%	2.4%	0.04	0.00	0.03	0.00	0.00
Quillback Rockfish	2.63	8.7%	63.8%	27.0%	0.6%	1.44	0.12	0.92	0.39	0.01
Other groundfish										
Kelp Greenling (California)	0.77	31.7%	67.3%	0.4%	0.5%	0.30	0.10	0.20	0.00	0.00
Kelp Greenling (Oregon)	17.04	48.0%	50.4%	1.0%	0.6%	8.37	4.02	4.22	0.08	0.05
SOUTH of 40° 10' N Lat.										
Nearshore Species - Commercial										
Black rockfish (South of 46°16' N. lat.)	2.12	48.5%	48.2%	2.9%	0.4%	4.68	2.27	2.26	0.14	0.02
Cabezon (California)	7.78	88.3%	10.5%	0.2%	1.0%	29.63	26.15	3.10	0.07	0.30
California scorpionfish (South of 34°27' N. lat.)	0.57	3.0%	1.1%	34.4%	61.5%	2.28	0.07	0.03	0.78	1.40
Deeper nearshore rockfish										
Blue/Deacon Rockfish	1.50	39.8%	50.0%	10.2%	--	5.41	2.15	2.70	0.55	--
Brown Rockfish	12.17	23.5%	65.4%	10.6%	0.5%	19.19	4.51	12.55	2.04	0.10
Copper Rockfish	0.87	13.5%	57.6%	22.9%	5.9%	8.19	1.11	4.72	1.88	0.48
Nearshore Rockfish Unid	0.45	34.2%	28.8%	32.7%	4.2%	0.05	0.02	0.01	0.02	0.00
Olive Rockfish	0.55	19.2%	58.2%	21.6%	1.1%	0.40	0.08	0.23	0.09	0.00
Quillback Rockfish	0.15	--	43.1%	55.7%	1.2%	0.41	--	0.18	0.23	0.01
Treefish Rockfish	0.31	39.8%	53.6%	2.5%	4.2%	2.15	0.86	1.15	0.05	0.09
Lingcod (South of 40°10' N. lat.)	9.10	35.6%	54.7%	9.2%	0.5%	25.79	9.19	14.10	2.37	0.14
Other groundfish										
Kelp Greenling (California)	1.50	52.0%	46.0%	1.6%	0.4%	4.57	2.38	2.10	0.07	0.02
Other nongroundfish										
California Sheephead	19.66	69.1%	28.8%	1.8%	0.3%	28.15	19.45	8.10	0.52	0.08
Other rockfish										
Rockfish Unid	0.13	25.5%	44.0%	--	30.5%	0.02	0.01	0.01	--	0.01
Shallow nearshore rockfish										
Black and Yellow Rockfish	2.31	89.6%	8.3%	0.3%	1.8%	14.16	12.68	1.18	0.05	0.25
China Rockfish	0.68	29.3%	49.5%	20.7%	0.5%	1.22	0.36	0.61	0.25	0.01
Gopher Rockfish	7.06	48.5%	44.0%	6.8%	0.7%	22.22	10.78	9.78	1.51	0.14
Grass Rockfish	1.00	97.8%	1.7%	0.3%	0.2%	8.71	8.52	0.15	0.03	0.01
Kelp Rockfish	0.21	65.6%	33.7%	0.5%	0.2%	0.78	0.51	0.26	0.00	0.00
Nearshore Rockfish Unid	0.27	61.7%	29.8%	1.7%	6.8%	0.02	0.01	0.01	0.00	0.00

Table 11. Nearshore Fixed Gear: Discard Estimate CVs.

Observed discard CVs from the commercial nearshore fixed gear fishery in 2016 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 40°10' N. latitude.

	North of 40°10' N Lat.									South of 40°10' N Lat.					
	0 - 10 fm			10 - 20 fm			> 20 fm			0 - 10 fm			> 10 fm		
Nearshore Fixed Gear Fishery	Vessels	Trips	Sets	Vessels	Trips	Sets	Vessels	Trips	Sets	Vessels	Trips	Sets	Vessels	Trips	Sets
Observed	43	97	108	51	139	164	9	28	30	20	47	72	15	37	41
Expansion factor: Fleet landings of nearshore species (mt)	99			139			10			101			77		
Groundfish species															
Black rockfish (South of 46°16' N. lat.)			0.2477			0.3511			0.3210			0.3649			0.4130
Cabezon (California)			0.1481			0.2396			--			0.2848			0.3229
Cabezon (Oregon)			0.2109			0.2167			0.3723			--			--
California scorpionfish (South of 34°27' N. lat.)			--			--			--			0.2116			0.1517
Canary rockfish			0.2148			0.2045			0.3287			0.2098			0.2702
Deeper nearshore rockfish															
Blue/Deacon Rockfish			--			--			--			0.3684			0.4186
Brown Rockfish			--			--			--			0.3270			0.4199
Calico Rockfish			--			--			--			0.2188			0.2658
Copper Rockfish			--			--			--			0.6265			0.2578
Olive Rockfish			--			--			--			0.2758			0.4717
Treefish Rockfish			--			--			--			0.2217			0.3946
Ecosystem component species															
California Skate			--			--			--			--			0.1517
Sandpaper Skate			0.0734			--			--			--			--
Spotted Ratfish			0.6573			0.3228			--			--			--
Lingcod (North of 40°10' N. lat.)			0.1918			0.1544			0.2808			--			--
Lingcod (South of 40°10' N. lat.)			--			--			--			0.2204			0.2476
Longnose skate			0.0734			--			--			--			--
Minor nearshore rockfish (North of 40°10' N. lat.)															
Blue/Deacon Rockfish			0.2131			0.2297			0.3611			--			--
Brown Rockfish			0.0734			--			--			--			--
China Rockfish			0.4171			0.2132			0.2062			--			--
Copper Rockfish			0.0734			0.3312			0.2522			--			--
Quillback Rockfish			0.3564			0.1954			0.1554			--			--
Minor shelf rockfish (North of 40°10' N. lat.)															
Rosy Rockfish			--			0.0741			--			--			--
Squarespot Rockfish			--			--			0.4394			--			--
Tiger Rockfish			--			0.0741			--			--			--
Vermilion Rockfish			0.0734			0.2922			--			--			--
Minor shelf rockfish (South of 40°10' N. lat.)															
Rosy Rockfish			--			--			--			0.1200			--
Vermilion Rockfish			--			--			--			0.3284			0.6502
Yellowtail Rockfish			--			--			--			--			0.2575

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 fm		
Nearshore Fixed Gear Fishery	Vessels	Trips	Sets	Vessels	Trips	Sets	Vessels	Trips	Sets	Vessels	Trips	Sets	Vessels	Trips	Sets
Observed	43	97	108	51	139	164	9	28	30	20	47	72	15	37	41
Expansion factor:	99			139			10			101			77		
Fleet landings of nearshore species (mt)															
Other flatfish															
Butter Sole			--			0.0741			--			--			--
Pacific Sanddab			--			--			--			--			0.3192
Rock Sole			--			0.0741			--			--			--
Sanddab Unid			--			0.0741			--			--			--
Sand Sole			--			0.0741			--			--			--
Other groundfish															
Kelp Greenling (California)			0.2721			0.5739			--			0.2259			0.2622
Kelp Greenling (Oregon)			0.1971			0.2141			0.1007			--			--
Leopard Shark			--			--			--			--			0.1517
Petrale sole			--			0.1074			--			--			0.1517
Shallow nearshore rockfish															
Black and Yellow Rockfish			--			--			--			0.2362			0.1517
China Rockfish			--			--			--			0.25			0.3657
Gopher Rockfish			--			--			--			0.2135			0.3835
Grass Rockfish			--			--			--			0.167			--
Kelp Rockfish			--			--			--			0.3747			0.2467
Widow rockfish			--			0.4957			--			--			--
YELLOWEYE ROCKFISH			0.5291			0.2225			0.5999			--			--
Yellowtail rockfish (North of 40°10' N. lat.)			0.3634			0.2178			0.3039			--			--
Non-groundfish species															
Dungeness crab			0.186			0.4836			0.442			0.12			0.1517
Non-FMP flatfish															
Diamond Turbot			--			--			--			0.12			--
Other nongroundfish															
Brown Irish Lord Sculpin			--			--			0.1142			--			--
Buffalo Sculpin			0.2954			0.3573			--			--			0.425
California Sheephead			--			--			--			0.3049			0.3584
Red Irish Lord Sculpin			0.2344			0.1643			--			--			--
Sculpin Unid			0.2031			0.3904			--			0.12			0.3838
Starry Skate			0.0734			--			--			0.12			--

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

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

Gross estimated discard (mt), estimated discard mortality (mt), fleet landings (mt), and fishing mortality estimates (mt) at non-confidential depth strata for the 2016 commercial nearshore fixed gear fishery north of 40°10' N. latitude. Mortality rates applied (at finer, confidential strata) are reported in Table A-4.

Nearshore Fixed Gear Fishery North of 40°10' N lat.	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									
Arrowtooth flounder	--	--	--	--	--	--	--	0.00	0.00
Black rockfish (South of 46°16' N. lat.)	2.45	3.71	0.08	0.44	1.04	0.04	1.52	162.33	163.85
Cabezon (California)	0.06	0.06	--	0.00	0.00	--	0.01	0.83	0.84
Cabezon (Oregon)	0.31	0.67	0.23	0.02	0.05	0.02	0.09	15.73	15.81
Canary rockfish	0.48	1.76	0.12	0.13	0.76	0.08	0.97	--	0.97
Dover sole	--	--	--	--	--	--	--	0.00	0.00
Ecosystem component species									
Big Skate	--	--	--	--	--	--	--	0.24	0.24
Sandpaper Skate	0.02	--	--	0.00	--	--	0.00	--	0.00
Spotted Ratfish	0.10	0.18	--	0.01	0.01	--	0.02	0.00	0.02
Lingcod (North of 40°10' N. lat.)	9.94	16.28	0.48	0.70	1.14	0.03	1.87	48.64	50.51
Longnose skate	0.06	--	--	0.00	--	--	0.00	0.04	0.05
Longspine thornyhead (North of 34°27' N. lat.)	--	--	--	--	--	--	--	0.00	0.00
Minor nearshore rockfish (North of 40°10' N. lat.)									
Black and Yellow Rockfish	--	--	--	--	--	--	--	0.01	0.01
Blue/Deacon Rockfish	2.12	5.16	0.17	0.53	1.91	0.11	2.55	5.37	7.92
Brown Rockfish	0.00	--	--	0.00	--	--	0.00	0.02	0.02
China Rockfish	0.08	0.27	0.01	0.02	0.08	0.01	0.11	3.54	3.65
Copper Rockfish	0.01	0.03	0.01	0.00	0.01	0.00	0.02	1.29	1.31
Gopher Rockfish	--	--	--	--	--	--	--	0.06	0.06
Grass Rockfish	--	--	--	--	--	--	--	0.13	0.13
Olive Rockfish	--	--	--	--	--	--	--	0.04	0.04
Quillback Rockfish	0.05	0.18	0.01	0.01	0.07	0.01	0.10	1.44	1.53
Minor shelf rockfish (North of 40°10' N. lat.)									
Greenstriped Rockfish	--	--	--	--	--	--	--	0.01	0.01
Rosy Rockfish	--	0.00	--	--	0.00	--	0.00	0.00	0.01
Shelf Rockfish Unid	--	--	--	--	--	--	--	0.02	0.02
Squarespot Rockfish	--	--	0.01	--	--	0.01	0.01	--	0.01
Tiger Rockfish	--	0.01	--	--	0.01	--	0.01	0.23	0.24
Vermilion Rockfish	0.03	0.08	--	0.01	0.03	--	0.04	2.67	2.71
Minor slope rockfish (North of 40°10' N. lat.)									
Redbanded Rockfish	--	--	--	--	--	--	--	0.00	0.00
Rougheye/Blackspotted Rockfish	--	--	--	--	--	--	--	0.00	0.00
Slope Rockfish Unid	--	--	--	--	--	--	--	0.03	0.03
Other flatfish									
Butter Sole	--	0.01	--	--	0.00	--	0.00	--	0.00
Flatfish Unid	--	--	--	--	--	--	--	0.00	0.00
Rock Sole	--	0.01	--	--	0.00	--	0.00	0.00	0.00
Sanddab Unid	--	0.00	--	--	0.00	--	0.00	--	0.00
Sand Sole	--	0.01	--	--	0.00	--	0.00	0.00	0.00
Other groundfish									
Kelp Greenling (California)	0.34	0.13	--	0.02	0.01	--	0.03	0.30	0.33
Kelp Greenling (Oregon)	0.27	0.31	0.02	0.02	0.02	0.00	0.04	8.37	8.41
PACIFIC OCEAN PERCH (North of 40°10' N. lat.)	--	--	--	--	--	--	--	0.00	0.00
Petrale sole	--	0.02	--	--	0.00	--	0.00	0.00	0.00
Sablefish (North of 36° N. lat.)	--	--	--	--	--	--	--	0.51	0.51
Shortspine thornyhead (North of 34°27' N. lat.)	--	--	--	--	--	--	--	0.10	0.10
Starry flounder	--	--	--	--	--	--	--	0.00	0.00
Widow rockfish	--	0.00	--	--	0.00	--	0.00	0.01	0.01
YELLOWEYE ROCKFISH	0.16	1.08	0.14	0.05	0.49	0.10	0.63	--	0.63
Yellowtail rockfish (North of 40°10' N. lat.)	0.06	0.13	0.02	0.01	0.03	0.01	0.05	0.54	0.59
Non-groundfish species									
Dungeness crab	0.00	0.01	0.04	0.00	0.01	0.04	0.05	3.01	3.06
Other nongroundfish									
Brown Irish Lord Sculpin	--	--	0.00	--	--	0.00	0.00	--	0.00
Buffalo Sculpin	0.15	0.20	--	0.15	0.20	--	0.35	--	0.35
Red Irish Lord Sculpin	0.11	0.10	--	0.11	0.10	--	0.21	--	0.21
Sculpin Unid	0.01	0.08	--	0.01	0.08	--	0.09	0.03	0.12
Skate Unid	--	--	--	--	--	--	--	0.16	0.16
Starry Skate	0.01	--	--	0.01	--	--	0.01	--	0.01
Shared ecosystem component species									
Smelt Unid	--	--	--	--	--	--	--	0.10	0.10

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

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

Gross estimated discard (mt), estimated discard mortality (mt), fleet landings (mt), and fishing mortality estimates (mt) at non-confidential depth strata for the 2016 commercial nearshore fixed gear fishery south of 40°10' N. latitude. The California state-permit framework is also represented. Mortality rates applied (at finer, confidential strata) are reported in Table A-4.

Nearshore Fixed Gear Fishery South of 40°10' N lat	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	> 20	0-10	> 20			
Groundfish species							
Black rockfish (South of 46°16' N. lat.)	0.43	0.13	0.23	0.08	0.31	4.68	4.99
Bocaccio rockfish (South of 40°10' N. lat.)	--	--	--	--	--	0.74	0.74
Cabezon (California)	3.30	0.32	0.23	0.02	0.25	29.63	29.88
California scorpionfish (North of 34°27' N. lat.)	--	--	--	--	--	0.00	0.00
California scorpionfish (South of 34°27' N. lat.)	0.04	0.01	0.00	0.00	0.00	2.28	2.29
Canary rockfish	0.04	8.22	0.02	5.83	5.86	--	5.86
Chilipepper rockfish (South of 40°10' N. lat.)	--	--	--	--	--	0.01	0.01
Deeper nearshore rockfish							
Blue/Deacon Rockfish	1.15	1.55	0.65	1.04	1.69	5.41	7.11
Brown Rockfish	0.31	0.52	0.17	0.33	0.50	19.19	19.69
Calico Rockfish	0.01	0.03	0.00	0.02	0.03	--	0.03
Copper Rockfish	0.24	0.11	0.14	0.08	0.21	8.19	8.40
Nearshore Rockfish Unid	--	--	--	--	--	0.05	0.05
Olive Rockfish	0.09	0.26	0.06	0.20	0.26	0.40	0.66
Quillback Rockfish	--	--	--	--	--	0.41	0.41
Treefish Rockfish	0.24	0.47	0.13	0.30	0.43	2.15	2.59
Ecosystem component species							
California Skate	--	0.08	--	0.01	0.01	--	0.01
Soupfin Shark	--	--	--	--	--	1.31	1.31
Spotted Ratfish	--	--	--	--	--	0.00	0.00
Lingcod (South of 40°10' N. lat.)	3.84	8.40	0.27	0.59	0.86	25.79	26.65
Longspine thornyhead (North of 34°27' N. lat.)	--	--	--	--	--	0.06	0.06
Longspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	0.06	0.06
Minor shelf rockfish (South of 40°10' N. lat.)							
Flag Rockfish	--	--	--	--	--	0.03	0.03
Greenblotched Rockfish	--	--	--	--	--	0.00	0.00
Greenspotted Rockfish	--	--	--	--	--	0.08	0.08
Greenstriped Rockfish	--	--	--	--	--	0.00	0.00
Honeycomb Rockfish	--	--	--	--	--	0.00	0.00
Rosethorn Rockfish	--	--	--	--	--	0.08	0.08
Rosy Rockfish	0.01	--	0.01	--	0.01	0.04	0.05
Shelf Rockfish Unid	--	--	--	--	--	1.12	1.12
Speckled Rockfish	--	--	--	--	--	0.16	0.16
Squarespot Rockfish	--	--	--	--	--	0.02	0.02
Starry Rockfish	--	--	--	--	--	0.23	0.23
Vermilion Rockfish	0.01	0.16	0.01	0.11	0.12	11.76	11.88
Yellowtail Rockfish	--	0.02	--	0.01	0.01	0.44	0.45
Minor slope rockfish (South of 40°10' N. lat.)							
Aurora Rockfish	--	--	--	--	--	0.01	0.01
Bank Rockfish	--	--	--	--	--	0.00	0.00
Blackgill Rockfish	--	--	--	--	--	0.73	0.73
Rougheye/Blackspotted Rockfish	--	--	--	--	--	0.00	0.00
Slope Rockfish Unid	--	--	--	--	--	0.00	0.00
Mixed thornyheads	--	--	--	--	--	0.00	0.00
Other flatfish							
Flatfish Unid	--	--	--	--	--	0.01	0.01
Pacific Sanddab	--	0.01	--	0.00	0.00	3.55	3.55
Rock Sole	--	--	--	--	--	0.03	0.03
Sanddab Unid	--	--	--	--	--	0.01	0.01
Sand Sole	--	--	--	--	--	0.01	0.01
Other groundfish							
Kelp Greenling (California)	0.11	0.44	0.01	0.03	0.04	4.57	4.61
Leopard Shark	--	0.10	--	0.01	0.01	0.39	0.40
Other rockfish							
Rockfish Unid	--	--	--	--	--	0.02	0.02

Table 12b (continued).

Nearshore Fixed Gear Fishery South of 40°10' N lat	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	> 20	0-10	> 20			
Petrale sole	--	0.04	--	0.00	0.00	--	0.00
Sablefish (North of 36° N. lat.)	--	--	--	--	--	0.06	0.06
Sablefish (South of 36° N. lat.)	--	--	--	--	--	6.25	6.25
Shallow nearshore rockfish							
Black and Yellow Rockfish	0.45	0.01	0.24	0.01	0.25	14.16	14.41
China Rockfish	0.02	0.53	0.01	0.34	0.35	1.22	1.58
Gopher Rockfish	1.12	1.99	0.64	1.38	2.01	22.22	24.23
Grass Rockfish	0.02	--	0.01	--	0.01	8.71	8.72
Kelp Rockfish	0.07	0.04	0.04	0.02	0.06	0.78	0.84
Nearshore Rockfish Unid	--	--	--	--	--	0.02	0.02
Shortspine thornyhead (North of 34°27' N. lat.)	--	--	--	--	--	1.10	1.10
Shortspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	0.91	0.91
Spiny dogfish	--	--	--	--	--	0.14	0.14
Starry flounder	--	--	--	--	--	0.02	0.02
Widow rockfish	--	--	--	--	--	0.03	0.03
Non-groundfish species							
California halibut	--	--	--	--	--	0.53	0.53
Dungeness crab	0.01	0.02	0.01	0.02	0.03	2.58	2.61
Non-FMP flatfish							
Deepsea Sole	--	--	--	--	--	0.00	0.00
Diamond Turbot	0.00	--	0.00	--	0.00	--	0.00
Other nongroundfish							
Buffalo Sculpin	--	0.09	--	0.09	0.09	--	0.09
California Sheephead	30.96	13.88	30.96	13.88	44.84	28.15	72.99
Sculpin Unid	0.04	0.12	0.04	0.12	0.16	0.00	0.16
Skate Unid	--	--	--	--	--	0.00	0.00
Starry Skate	0.04	--	0.04	--	0.04	--	0.04
Shared ecosystem component species							
Smelt Unid	--	--	--	--	--	0.00	0.00

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

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

Estimated discard (mt), landings (mt), and estimated total fishing mortality (mt) of groundfish species in non-IFQ 2016 fisheries observed by the WCGOP.

	Open Access CA halibut			Pink shrimp			Non-nearshore fixed gear			Nearshore fixed gear		
Weight (mt)	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate
Groundfish species												
Arrowtooth flounder	--	--	--	4.54	--	4.54	30.08	1.35	31.43	--	0.00	0.00
Black rockfish (North of 46°16' N. lat.)	--	--	--	--	--	--	0.00	--	0.00	--	--	--
Black rockfish (South of 46°16' N. lat.)	--	--	--	--	--	--	0.06	0.53	0.59	1.83	167.01	168.84
Bocaccio rockfish (South of 40°10' N. lat.)	0.00	0.00	0.00	0.00	--	0.00	0.04	4.10	4.15	--	0.74	0.74
Cabezon (California)	0.02	--	0.02	--	--	--	--	0.03	0.03	0.26	30.46	30.72
Cabezon (Oregon)	--	--	--	0.00	--	0.00	--	0.11	0.11	0.09	15.73	15.81
California scorpionfish (North of 34°27' N. lat.)	--	--	--	--	--	--	--	--	--	--	0.00	0.00
California scorpionfish (South of 34°27' N. lat.)	0.32	--	0.32	--	--	--	4.24	0.03	4.28	0.00	2.28	2.29
Canary rockfish	--	--	--	0.07	--	0.07	2.04	0.05	2.08	6.83	--	6.83
Chilipepper rockfish (South of 40°10' N. lat.)	0.00	--	0.00	0.03	--	0.03	--	0.53	0.53	--	0.01	0.01
COWCOD ROCKFISH (South of 40°10' N. lat.)	--	--	--	0.00	--	0.00	--	--	--	--	--	--
Darkblotched rockfish	--	--	--	6.38	--	6.38	0.75	3.54	4.29	--	--	--
Dover sole	0.00	0.00	0.00	3.57	--	3.57	3.38	2.34	5.72	--	0.00	0.00
Ecosystem component species												
Aleutian Skate	--	--	--	0.00	--	0.00	0.02	--	0.02	--	--	--
Big Skate	11.96	--	11.96	0.01	--	0.01	3.85	1.79	5.64	--	0.24	0.24
Black Skate	--	--	--	0.00	--	0.00	1.78	0.35	2.13	--	--	--
California Grenadier	--	--	--	--	--	--	0.16	--	0.16	--	--	--
California Skate	13.55	--	13.55	0.02	--	0.02	0.19	0.01	0.20	0.01	--	0.01
Deepsea Skate	--	--	--	--	--	--	0.05	--	0.05	--	--	--
Giant Grenadier	--	--	--	--	--	--	5.14	0.01	5.15	--	--	--
Grenadier Unid	--	--	--	--	--	--	0.73	10.70	11.43	--	--	--
Pacific Flatnose	--	--	--	--	--	--	1.19	--	1.19	--	--	--
Pacific Grenadier	--	--	--	--	--	--	50.46	36.58	87.04	--	--	--
Sandpaper Skate	0.00	--	0.00	0.04	--	0.04	1.61	--	1.61	0.00	--	0.00
Smooth Grenadier	--	--	--	--	--	--	0.01	--	0.01	--	--	--
Soupfin Shark	0.13	0.01	0.15	--	--	--	6.98	0.14	7.12	--	1.31	1.31
Spotted Ratfish	0.03	--	0.03	0.29	--	0.29	2.76	0.01	2.77	0.02	0.00	0.02
White Skate	--	--	--	--	--	--	0.03	--	0.03	--	--	--
English sole	3.21	0.18	3.39	0.55	--	0.55	--	--	--	--	--	--
Lingcod (North of 40°10' N. lat.)	--	--	--	0.15	0.00	0.15	6.71	47.17	53.89	1.87	48.64	50.51
Lingcod (South of 40°10' N. lat.)	0.08	0.29	0.38	0.04	--	0.04	0.10	32.65	32.74	0.86	25.79	26.65
Longnose skate	0.01	--	0.01	0.90	--	0.90	43.14	35.96	79.10	0.00	0.04	0.05
Longspine thornyhead (North of 34°27' N. lat.)	0.00	--	0.00	0.00	--	0.00	4.24	4.67	8.91	--	0.06	0.06
Longspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	0.46	9.67	10.13	--	0.06	0.06
Minor nearshore rockfish (North of 40°10' N. lat.)												
Black and Yellow Rockfish	--	--	--	0.00	--	0.00	--	--	--	--	0.01	0.01
Blue/Deacon Rockfish	--	--	--	--	--	--	0.03	0.04	0.07	2.55	5.37	7.92
Brown Rockfish	--	--	--	--	--	--	--	--	--	0.00	0.02	0.02
China Rockfish	--	--	--	--	--	--	--	0.01	0.01	0.11	3.54	3.65
Copper Rockfish	--	--	--	--	--	--	0.07	0.01	0.09	0.02	1.29	1.31
Gopher Rockfish	--	--	--	--	--	--	--	--	--	--	0.06	0.06
Grass Rockfish	--	--	--	--	--	--	--	--	--	--	0.13	0.13
Olive Rockfish	--	--	--	0.60	--	0.60	0.10	--	0.10	--	0.04	0.04
Quillback Rockfish	--	--	--	0.00	--	0.00	0.05	0.01	0.06	0.10	1.44	1.53
Minor nearshore rockfish (South of 40°10' N. lat.)												
Black and Yellow Rockfish	--	--	--	--	--	--	--	0.12	0.12	0.25	14.16	14.41
Blue/Deacon Rockfish	--	--	--	--	--	--	0.05	0.04	0.09	1.69	5.41	7.11
Brown Rockfish	0.13	--	0.13	--	--	--	--	0.03	0.03	0.50	19.19	19.69
Calico Rockfish	0.00	--	0.00	--	--	--	--	--	--	0.03	--	0.03
China Rockfish	--	--	--	--	--	--	--	0.07	0.07	0.35	1.22	1.58
Copper Rockfish	0.01	0.02	0.03	--	--	--	--	0.11	0.11	0.21	8.19	8.40
Gopher Rockfish	--	--	--	--	--	--	0.02	0.03	0.06	2.01	22.22	24.23
Grass Rockfish	--	--	--	--	--	--	--	0.00	0.00	0.01	8.71	8.72
Kelp Rockfish	--	--	--	--	--	--	--	--	--	0.06	0.78	0.84
Nearshore Rockfish Unid	--	--	--	--	--	--	--	--	--	--	0.06	0.06
Olive Rockfish	--	--	--	--	--	--	0.03	0.02	0.05	0.26	0.40	0.66
Quillback Rockfish	--	--	--	--	--	--	--	--	--	--	0.41	0.41
Treefish Rockfish	--	--	--	--	--	--	--	0.00	0.00	0.43	2.15	2.59

Table 13 (continued).

	Open Access CA halibut			Pink shrimp			Non-nearshore fixed gear			Nearshore fixed gear		
Weight (mt)	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate
Minor shelf rockfish (North of 40°10' N. lat.)												
Bocaccio Rockfish	--	--	--	0.04	--	0.04	0.03	0.21	0.24	--	--	--
Chilipepper Rockfish	--	--	--	0.36	--	0.36	0.04	0.10	0.14	--	--	--
Cowcod Rockfish	--	--	--	0.01	--	0.01	--	--	--	--	--	--
Greenspotted Rockfish	--	--	--	0.00	--	0.00	--	0.01	0.01	--	--	--
Greenstriped Rockfish	--	--	--	0.75	--	0.75	0.75	0.19	0.94	--	0.01	0.01
Halfbanded Rockfish	--	--	--	0.01	--	0.01	--	--	--	--	--	--
Harlequin Rockfish	--	--	--	0.00	--	0.00	--	--	--	--	--	--
Pygmy Rockfish	--	--	--	0.03	--	0.03	--	--	--	--	--	--
Redstripe Rockfish	--	--	--	0.00	--	0.00	0.10	0.01	0.11	--	--	--
Rosethorn Rockfish	--	--	--	0.00	--	0.00	0.41	0.50	0.92	--	--	--
Rosy Rockfish	--	--	--	--	--	--	0.02	0.00	0.02	0.00	0.00	0.01
Shelf Rockfish Unid	--	--	--	0.75	--	0.75	--	0.29	0.29	--	0.02	0.02
Silvergray Rockfish	--	--	--	0.00	--	0.00	0.02	0.22	0.24	--	--	--
Squarespot Rockfish	--	--	--	0.00	--	0.00	--	--	--	0.01	--	0.01
Stripetail Rockfish	--	--	--	1.71	--	1.71	0.00	0.00	0.00	--	--	--
Tiger Rockfish	--	--	--	0.00	--	0.00	--	0.01	0.01	0.01	0.23	0.24
Vermilion Rockfish	--	--	--	--	--	--	--	0.08	0.08	0.04	2.67	2.71
Minor shelf rockfish (South of 40°10' N. lat.)												
Bronzespotted Rockfish	--	--	--	--	--	--	--	0.03	0.03	--	--	--
Flag Rockfish	--	--	--	--	--	--	--	0.17	0.17	--	0.03	0.03
Greenblotched Rockfish	--	--	--	--	--	--	0.01	0.02	0.03	--	0.00	0.00
Greenspotted Rockfish	--	--	--	--	--	--	--	1.39	1.39	--	0.08	0.08
Greenstriped Rockfish	--	--	--	--	--	--	--	0.11	0.11	--	0.00	0.00
Halfbanded Rockfish	0.00	--	0.00	0.04	--	0.04	0.01	--	0.01	--	--	--
Honeycomb Rockfish	--	--	--	--	--	--	0.00	0.01	0.02	--	0.00	0.00
Mexican Rockfish	--	--	--	--	--	--	--	0.02	0.02	--	--	--
Rosethorn Rockfish	--	--	--	--	--	--	0.00	0.01	0.01	--	0.08	0.08
Rosy Rockfish	--	--	--	--	--	--	--	0.11	0.11	0.01	0.04	0.05
Shelf Rockfish Unid	0.00	--	0.00	0.02	--	0.02	--	0.20	0.20	--	1.12	1.12
Speckled Rockfish	--	--	--	--	--	--	--	0.22	0.22	--	0.16	0.16
Squarespot Rockfish	--	--	--	0.06	--	0.06	--	0.03	0.03	--	0.02	0.02
Starry Rockfish	--	--	--	--	--	--	--	0.70	0.70	--	0.23	0.23
Stripetail Rockfish	0.00	--	0.00	1.07	--	1.07	--	--	--	--	--	--
Vermilion Rockfish	0.03	0.02	0.05	--	--	--	--	16.07	16.07	0.12	11.76	11.88
Yellowtail Rockfish	--	--	--	--	--	--	--	0.96	0.96	0.01	0.44	0.45
Minor slope rockfish (North of 40°10' N. lat.)												
Aurora Rockfish	--	--	--	0.01	--	0.01	0.02	0.06	0.08	--	--	--
Bank Rockfish	--	--	--	--	--	--	0.01	0.02	0.02	--	--	--
Blackgill Rockfish	--	--	--	0.00	--	0.00	0.31	0.50	0.81	--	--	--
Redbanded Rockfish	--	--	--	0.05	--	0.05	7.53	19.64	27.17	--	0.00	0.00
Rougheye/Blackspotted Rockfish	--	--	--	0.02	--	0.02	12.58	31.21	43.79	--	0.00	0.00
Sharpchin Rockfish	--	--	--	0.02	--	0.02	--	0.04	0.04	--	--	--
Shortraker Rockfish	--	--	--	--	--	--	0.47	2.33	2.80	--	--	--
Shortraker/Rougheye/Blackspotted Rockfish	--	--	--	--	--	--	0.29	--	0.29	--	--	--
Slope Rockfish Unid	--	--	--	--	--	--	0.11	4.96	5.07	--	0.03	0.03
Splitnose Rockfish	--	--	--	0.13	--	0.13	0.02	0.05	0.07	--	--	--
Yellowmouth Rockfish	--	--	--	0.00	--	0.00	0.00	0.18	0.19	--	--	--
Minor slope rockfish (South of 40°10' N. lat.)												
Aurora Rockfish	--	--	--	--	--	--	0.01	1.22	1.23	--	0.01	0.01
Bank Rockfish	--	--	--	0.00	--	0.00	--	0.63	0.63	--	0.00	0.00
Blackgill Rockfish	--	--	--	--	--	--	0.65	22.85	23.49	--	0.73	0.73
Pacific Ocean Perch	--	--	--	--	--	--	--	0.01	0.01	--	--	--
Redbanded Rockfish	--	--	--	0.00	--	0.00	0.04	1.23	1.27	--	--	--
Rougheye/Blackspotted Rockfish	--	--	--	--	--	--	--	0.37	0.37	--	0.00	0.00
Shortraker Rockfish	--	--	--	--	--	--	--	0.00	0.00	--	--	--
Slope Rockfish Unid	--	--	--	--	--	--	0.03	0.02	0.05	--	0.00	0.00
Mixed thornyheads	--	--	--	0.00	--	0.00	0.06	1.81	1.87	--	0.00	0.00
Other flatfish												
Butter Sole	--	--	--	--	--	--	--	--	--	0.00	--	0.00
Curlfin Turbot	--	0.63	0.63	--	--	--	--	--	--	--	--	--
Flatfish Unid	0.01	0.20	0.21	2.33	--	2.33	--	0.00	0.00	--	0.01	0.01
Flathead Sole	--	--	--	1.53	--	1.53	0.01	--	0.01	--	--	--
Pacific Sanddab	1.28	0.02	1.30	9.98	--	9.98	--	0.68	0.68	0.00	3.55	3.55
Rex Sole	0.08	0.02	0.09	33.78	--	33.78	0.00	--	0.00	--	--	--
Rock Sole	0.85	0.12	0.97	0.00	--	0.00	--	0.21	0.21	0.00	0.03	0.03
Sanddab Unid	0.00	0.00	0.00	--	--	--	--	1.83	1.83	0.00	0.01	0.01
Sand Sole	0.43	2.92	3.35	0.00	--	0.00	--	0.01	0.01	0.00	0.01	0.01

Table 13 (continued).

	Open Access CA halibut			Pink shrimp			Non-nearshore fixed gear			Nearshore fixed gear		
Weight (mt)	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate	Discard	Landed	Estimate
Other groundfish												
Greenling Unid	--	--	--	--	--	--	0.00	--	0.00	--	--	--
Kelp Greenling (California)	--	--	--	--	--	--	--	0.00	0.00	0.07	4.87	4.94
Kelp Greenling (Oregon)	--	--	--	--	--	--	--	0.01	0.01	0.04	8.37	8.41
Leopard Shark	0.54	--	0.54	--	--	--	--	0.83	0.83	0.01	0.39	0.40
Other rockfish												
Rockfish Unid	--	--	--	--	--	--	--	0.42	0.42	--	0.02	0.02
Pacific cod	--	--	--	0.00	--	0.00	2.62	5.72	8.34	--	--	--
Pacific hake	--	--	--	519.65	1.24	520.89	0.38	0.11	0.49	--	--	--
PACIFIC OCEAN PERCH (North of 40°10' N. lat.)	--	--	--	0.03	--	0.03	0.09	0.19	0.28	--	0.00	0.00
Petrale sole	0.60	2.35	2.95	0.88	--	0.88	0.88	1.45	2.33	0.00	0.00	0.01
Sablefish (North of 36° N. lat.)	--	--	--	0.16	--	0.16	131.25	1,911.85	2,043.09	--	0.57	0.57
Sablefish (South of 36° N. lat.)	--	--	--	0.18	--	0.18	4.07	402.40	406.47	--	6.25	6.25
Shortbelly rockfish	--	--	--	2.21	--	2.21	--	--	--	--	--	--
Shortspine thornyhead (North of 34°27' N. lat.)	--	--	--	0.01	--	0.01	9.82	38.45	48.27	--	1.20	1.20
Shortspine thornyhead (South of 34°27' N. lat.)	--	--	--	--	--	--	2.59	107.71	110.30	--	0.91	0.91
Spiny dogfish	0.72	--	0.72	0.06	--	0.06	112.21	0.65	112.86	--	0.14	0.14
Splitnose rockfish (South of 40°10' N. lat.)	--	--	--	0.86	--	0.86	--	0.00	0.00	--	--	--
Starry flounder	0.81	4.89	5.70	0.01	--	0.01	--	0.01	0.01	--	0.02	0.02
Widow rockfish	--	--	--	0.00	--	0.00	0.59	0.69	1.28	0.00	0.04	0.04
YELLOWEYE ROCKFISH	--	--	--	0.00	--	0.00	0.80	--	0.80	0.63	--	0.63
Yellowtail rockfish (North of 40°10' N. lat.)	--	--	--	0.47	--	0.47	1.23	0.59	1.81	0.05	0.54	0.59
Non-groundfish species												
California halibut	15.58	89.62	105.20	--	--	--	--	0.86	0.86	--	0.53	0.53
Dungeness crab	110.04	--	110.04	0.48	--	0.48	1.04	1.75	2.79	0.08	5.59	5.67
Non-FMP flatfish												
Deepsea Sole	--	0.01	0.01	0.00	--	0.00	0.00	0.00	0.00	--	0.00	0.00
Diamond Turbot	0.27	--	0.27	--	--	--	--	--	--	0.00	--	0.00
Hornyhead Turbot	0.60	0.00	0.60	--	--	--	--	--	--	--	--	--
Longfin Sanddab	0.05	--	0.05	--	--	--	--	--	--	--	--	--
Slender Sole	--	0.05	0.05	69.91	--	69.91	--	--	--	--	--	--
Speckled Sanddab	0.01	--	0.01	--	--	--	0.00	--	0.00	--	--	--
Other nongroundfish												
Brown Irish Lord Sculpin	--	--	--	--	--	--	--	--	--	0.00	--	0.00
Buffalo Sculpin	--	--	--	--	--	--	--	--	--	0.44	--	0.44
California Sheephead	0.33	--	0.33	--	--	--	--	--	--	44.84	28.15	72.99
Red Irish Lord Sculpin	--	--	--	--	--	--	--	--	--	0.21	--	0.21
Sculpin Unid	0.38	--	0.38	0.03	--	0.03	0.02	--	0.02	0.25	0.03	0.27
Skate Unid	--	0.05	0.05	0.01	--	0.01	0.14	3.71	3.85	--	0.17	0.17
Squid Unid	--	--	--	0.00	--	0.00	--	--	--	--	--	--
Starry Skate	0.18	--	0.18	0.00	--	0.00	--	--	--	0.06	--	0.06
Shared ecosystem component species												
Barracudina Unid	--	--	--	0.00	--	0.00	--	--	--	--	--	--
Lanternfish Unid	--	--	--	0.02	--	0.02	--	--	--	--	--	--
Non-Eulachon Smelt Unid	--	--	--	5.25	--	5.25	--	--	--	--	--	--
Non-Humboldt Squid Unid	0.01	--	0.01	4.55	--	4.55	--	--	--	--	--	--
Pacific Sandlance	0.00	--	0.00	0.03	--	0.03	--	--	--	--	--	--
Pacific Saury	--	--	--	0.00	--	0.00	--	--	--	--	--	--
Smelt Unid	--	--	--	0.06	--	0.06	--	0.00	0.00	--	0.10	0.10
Surf Smelt	--	--	--	0.00	--	0.00	--	--	--	--	--	--
Whitebait Smelt	--	--	--	1.14	--	1.14	--	--	--	--	--	--

Table 14. Incidental Landings.

Incidental landings (mt) of groundfish from unobserved shoreside commercial fisheries by gear group in 2016. To maintain confidentiality, discard and landings from non-EM exempted fishing permits are incorporated.

	Shoreside Commercial Landings (mt)						
	Bottom Trawl	Hook & Line	Other Miscellaneous Gears	Pot	Shrimp Trawl	Troll	Total Incidental Estimate
Groundfish species							
Arrowtooth flounder	--	0.78	--	--	--	--	--
Black rockfish (South of 46°16' N. lat.)	0.01	0.24	0.00	0.00	0.00	0.00	0.04
Bocaccio rockfish (South of 40°10' N. lat.)	--	0.18	0.01	--	--	0.02	0.06
Cabezon (California)	--	0.00	0.13	--	--	0.01	0.01
California scorpionfish (South of 34°27' N. lat.)	--	0.00	--	0.00	--	0.13	--
Canary rockfish	--	0.01	--	--	--	--	--
Chilipepper rockfish (South of 40°10' N. lat.)	--	0.00	--	--	--	0.00	0.01
Darkblotched rockfish	--	0.02	--	--	0.01	--	0.00
Dover sole	0.00	0.07	--	0.01	--	0.66	0.02
Ecosystem component species							
Big Skate	--	0.81	--	--	--	--	0.01
California Skate	--	--	0.03	--	--	--	--
Grenadier Unid	--	0.01	--	--	--	--	0.00
Pacific Grenadier	--	0.00	--	--	--	--	--
Soupfin Shark	--	0.28	--	2.94	--	0.01	--
English sole	0.22	--	--	--	--	0.98	--
Lingcod (North of 40°10' N. lat.)	--	2.46	--	--	0.15	--	2.42
Lingcod (South of 40°10' N. lat.)	0.03	1.29	0.19	--	0.04	0.01	2.75
Longnose skate	--	4.40	--	--	--	--	0.38
Longspine thornyhead (North of 34°27' N. lat.)	--	0.00	--	--	--	--	--
Longspine thornyhead (South of 34°27' N. lat.)	--	0.02	--	0.02	--	--	--
Minor nearshore rockfish (North of 40°10' N. lat.)							
Blue/Deacon Rockfish	--	0.00	--	--	--	--	--
Minor nearshore rockfish (South of 40°10' N. lat.)							
Black and Yellow Rockfish	--	0.00	0.23	--	--	--	--
Blue/Deacon Rockfish	--	0.00	0.00	--	--	--	0.01
Brown Rockfish	0.04	0.00	0.04	--	--	0.00	0.00
China Rockfish	--	--	0.01	--	--	--	--
Copper Rockfish	0.04	0.01	0.02	0.00	--	0.00	--
Gopher Rockfish	--	0.01	0.04	--	--	--	--
Grass Rockfish	--	--	0.00	--	--	--	0.00
Nearshore Rockfish Unid	--	--	0.03	--	--	--	--
Olive Rockfish	--	0.00	--	--	--	--	--
Treefish Rockfish	--	--	0.00	--	--	--	--
Minor shelf rockfish (North of 40°10' N. lat.)							
Bocaccio Rockfish	--	0.00	--	--	--	--	--
Chilipepper Rockfish	--	0.03	--	--	--	--	--
Greenspotted Rockfish	--	0.00	--	--	--	--	--
Greenstriped Rockfish	--	0.03	--	--	--	--	--
Rosethorn Rockfish	--	0.02	--	--	--	--	--
Shelf Rockfish Unid	--	0.00	--	--	--	--	0.01
Silvergray Rockfish	--	0.01	--	--	--	--	--
Vermilion Rockfish	--	--	--	--	--	--	0.01
Minor shelf rockfish (South of 40°10' N. lat.)							
Flag Rockfish	--	--	--	--	0.00	--	--
Greenspotted Rockfish	0.01	0.02	--	--	0.00	--	--
Greenstriped Rockfish	--	0.00	--	--	--	--	0.00
Shelf Rockfish Unid	--	0.00	0.00	--	--	0.01	0.00
Speckled Rockfish	--	0.00	--	--	0.00	0.00	--
Starry Rockfish	--	0.03	--	--	--	--	--
Vermilion Rockfish	0.11	0.46	0.05	--	0.05	0.04	0.32
Yellowtail Rockfish	--	0.33	--	0.09	--	--	0.21
Minor slope rockfish (North of 40°10' N. lat.)							
Aurora Rockfish	--	0.00	--	--	--	--	--
Bank Rockfish	--	0.00	--	--	--	--	--
Blackgill Rockfish	--	0.01	--	--	--	--	--
Redbanded Rockfish	--	0.74	--	--	--	--	--
Rougheye/Blackspotted Rockfish	--	0.53	--	--	0.01	--	0.00
Sharpchin Rockfish	--	0.00	--	--	--	--	--
Shortraker Rockfish	--	0.13	--	--	--	--	0.39
Slope Rockfish Unid	--	0.09	--	--	0.02	--	0.09
Splitnose Rockfish	--	0.00	--	--	--	--	--
Yellowmouth Rockfish	--	0.00	--	--	--	--	--

Table 14 (continued).

	Shoreside Commercial Landings (mt)						
	Bottom Trawl	Hook & Line	Other Miscellaneous Gears	Pot	Shrimp Trawl	Troll	Total Incidental Estimate
Minor slope rockfish (South of 40°10' N. lat.)							
Aurora Rockfish	--	0.00	--	--	--	--	--
Bank Rockfish	--	0.00	--	--	--	--	--
Blackgill Rockfish	--	0.10	--	--	--	--	0.35
Slope Rockfish Unid	--	0.00	0.00	--	--	0.01	0.00
Mixed thornyheads	--	--	--	--	--	0.01	--
Other flatfish							
Curlfin Turbot	0.05	--	--	--	--	--	--
Flatfish Unid	0.00	0.01	--	0.01	--	10.32	0.00
Flathead Sole	--	--	--	0.05	--	--	--
Pacific Sanddab	0.10	0.01	--	0.01	--	--	--
Rex Sole	0.02	--	--	--	--	2.55	--
Rock Sole	0.01	--	--	--	--	0.30	--
Sanddab Unid	0.03	--	--	--	--	1.12	0.00
Sand Sole	0.06	--	--	--	--	--	--
Other groundfish							
Kelp Greenling (California)	--	--	0.00	--	--	--	0.00
Leopard Shark	0.04	0.26	--	3.97	0.02	0.04	0.01
Other rockfish							
Rockfish Unid	--	0.00	0.01	--	--	--	--
Pacific cod	--	0.38	--	--	0.04	--	0.17
Pacific hake	--	0.00	--	--	--	0.00	--
PACIFIC OCEAN PERCH (North of 40°10' N. lat.)	--	0.01	--	--	--	--	--
Petrale sole	0.94	0.71	--	0.02	--	0.90	0.01
Sablefish (North of 36° N. lat.)	--	42.73	0.41	--	0.45	--	2.67
Sablefish (South of 36° N. lat.)	--	--	--	0.13	--	0.06	--
Shortspine thornyhead (North of 34°27' N. lat.)	--	0.30	--	--	--	--	0.09
Shortspine thornyhead (South of 34°27' N. lat.)	--	0.02	--	0.45	--	--	--
Spiny dogfish	--	0.14	--	--	--	--	--
Starry flounder	0.22	0.02	--	0.02	--	--	--
Widow rockfish	--	0.04	--	--	--	--	0.04
Yellowtail rockfish (North of 40°10' N. lat.)	--	0.04	--	--	--	--	2.68
Non-groundfish species							
California halibut	0.92	57.93	0.70	36.29	0.09	25.01	0.62
Dungeness crab	0.19	--	15.47	0.41	24,658.54	--	0.39
Non-FMP flatfish							
Deepsea Sole	0.02	0.11	--	--	--	--	--
Hornyhead Turbot	0.00	--	--	--	--	0.01	--
Slender Sole	0.02	--	--	--	--	--	--
Other nongroundfish							
California Sheephead	0.04	0.02	0.01	0.00	0.05	0.00	--
Sculpin Unid	0.05	--	--	--	--	--	--
Skate Unid	0.10	0.25	0.01	0.76	--	2.50	--
Shared ecosystem component species							
Round Herring	--	--	--	14.28	--	--	--
Smelt Unid	0.16	2.67	0.25	131.21	0.08	--	--

Table 15. Fishing Mortality Estimates by Sector.

Estimated fishing mortality (mt) of groundfish and a subset of non-groundfish species in 2016 by sector.

	Commercial fisheries																
	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	Pink shrimp	Non-nearshore fixed gear	Nearshore fixed gear	Incidental fisheries	WA tribal shoreside	Recreational fishing mortality WA	OR	CA	Research	Estimated fishing mortality
Groundfish species																	
Arrowtooth flounder	1,400.66	2.81	0.04	11.41	7.12	2.92	--	4.54	31.43	0.00	0.78	0.00	--	0.09	0.00	12.05	1,473.86
Black rockfish (North of 46°16' N. lat.)	0.47	--	0.00	0.02	--	--	--	--	0.00	--	--	0.09	359.94	--	--	0.00	360.53
Black rockfish (South of 46°16' N. lat.)	0.40	--	0.00	--	--	--	--	--	0.59	168.84	0.30	--	--	425.30	165.80	0.00	761.23
Bocaccio rockfish (South of 40°10' N. lat.)	42.87	--	--	--	--	--	0.00	0.00	4.15	0.74	0.27	--	--	--	68.60	5.58	122.22
Cabezon (California)	--	--	--	--	--	--	0.02	--	0.03	30.72	0.16	--	--	--	46.70	0.02	77.65
Cabezon (Oregon)	0.12	--	--	--	--	--	--	0.00	0.11	15.81	--	--	--	11.74	--	0.04	27.81
California scorpionfish (North of 34°27' N. lat.)	0.62	--	--	--	--	--	--	--	--	0.00	--	--	--	--	--	--	0.63
California scorpionfish (South of 34°27' N. lat.)	--	--	--	--	--	--	0.32	--	4.28	2.29	0.14	--	--	--	73.00	0.03	80.05
Canary rockfish	6.60	--	6.08	7.01	0.10	0.42	--	0.07	2.08	6.83	0.01	3.69	2.51	10.02	23.90	3.23	72.54
Chilipepper rockfish (South of 40°10' N. lat.)	75.12	--	--	--	--	--	0.00	0.03	0.53	0.01	0.01	--	--	--	5.30	10.54	91.54
COWCOD ROCKFISH (South of 40°10' N. lat.)	0.28	--	--	--	--	--	--	0.00	--	--	--	--	--	--	0.70	0.29	1.27
Darkblotched rockfish	105.18	0.10	0.00	15.72	3.52	1.58	--	6.38	4.29	--	0.03	0.33	--	--	--	8.46	145.59
Dover sole	7,153.48	10.82	0.00	0.09	0.16	0.13	0.00	3.57	5.72	0.00	0.76	66.26	--	--	--	49.21	7,290.20
Ecosystem component species																	
Aleutian Skate	0.61	--	--	--	--	--	--	0.00	0.02	--	--	--	--	--	--	0.01	0.64
Big Skate	358.55	0.42	0.00	0.70	0.50	0.43	11.96	0.01	5.64	0.24	0.82	--	--	0.11	--	5.50	384.88
Black Skate	11.54	0.41	--	--	--	--	--	0.00	2.13	--	--	--	--	--	--	0.51	14.60
California Grenadier	0.40	--	--	--	--	--	--	--	0.16	--	--	--	--	--	--	0.08	0.63
California Skate	1.69	--	--	--	--	--	13.55	0.02	0.20	0.01	0.03	--	--	--	--	0.29	15.78
Deepsea Skate	0.21	0.02	--	--	--	--	--	--	0.05	--	--	--	--	--	--	0.03	0.31
Filamented Grenadier	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
Giant Grenadier	44.10	2.56	--	--	--	--	--	--	5.15	--	--	--	--	--	--	2.44	54.25
Grenadier Unid	4.40	5.39	--	0.00	40.17	0.01	--	--	11.43	--	0.02	--	--	--	--	0.12	61.54
Pacific Flatnose	0.37	0.33	--	--	--	--	--	--	1.19	--	--	--	--	--	--	0.30	2.20
Pacific Grenadier	27.66	2.23	--	--	--	--	--	--	87.04	--	0.00	--	--	--	--	6.22	123.16
Popeye Grenadier	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
Roughshoulder/Broad Skate	0.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.05
Sandpaper Skate	49.83	0.25	--	--	0.00	0.00	0.00	0.04	1.61	0.00	--	--	--	--	--	1.10	52.84
Shoulderspot Grenadier	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
Smooth Grenadier	0.00	--	--	--	--	--	--	--	0.01	--	--	--	--	--	--	0.03	0.04
Softhead Grenadier	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
Soupfin Shark	0.41	--	--	0.67	0.13	1.16	0.15	--	7.12	1.31	3.24	--	--	--	0.00	0.55	14.73
Spotted Ratfish	95.31	0.02	0.00	0.00	0.00	--	0.03	0.29	2.77	0.02	--	--	--	--	--	4.46	102.91
White Skate	--	--	--	--	--	--	--	--	0.03	--	--	--	--	--	--	--	0.03

Table 15 (continued).

	Commercial fisheries																
	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	Pink shrimp	Non-nearshore fixed gear	Nearshore fixed gear	Incidental fisheries	WA tribal shoreside	Recreational fishing mortality WA	OR	CA	Research	Estimated fishing mortality
English sole	373.30	0.04	0.03	0.03	0.00	0.00	3.39	0.55	--	--	1.20	64.64	--	--	--	8.01	451.18
Groundfish unid	0.00	--	0.00	3.33	--	--	--	--	--	--	--	--	--	--	--	--	3.33
Lingcod (North of 40°10' N. lat.)	242.97	2.44	0.46	7.51	0.01	0.18	--	0.15	53.89	50.51	5.03	32.58	183.46	145.47	68.00	16.60	809.25
Lingcod (South of 40°10' N. lat.)	21.04	0.03	--	--	--	--	0.38	0.04	32.74	26.65	4.31	--	--	--	582.90	3.20	671.29
Longnose skate	809.70	13.74	0.02	0.12	0.39	0.44	0.01	0.90	79.10	0.05	4.78	1.87	--	0.19	--	12.47	923.79
Longspine thornyhead (North of 34°27' N. lat.)	643.87	6.03	--	0.01	0.00	--	0.00	0.00	8.91	0.06	0.00	0.35	--	--	--	13.23	672.45
Longspine thornyhead (South of 34°27' N. lat.)	--	0.03	--	--	--	--	--	--	10.13	0.06	0.04	--	--	--	--	1.20	11.45
Minor nearshore rockfish (North of 40°10' N. lat.)																	
Black and Yellow Rockfish	0.30	--	--	--	--	--	--	0.00	--	0.01	--	--	--	--	0.00	--	0.32
Blue/Deacon Rockfish	0.00	--	0.00	--	--	--	--	--	0.07	7.92	0.00	--	2.56	20.56	2.90	0.01	34.02
Brown Rockfish	0.07	--	--	--	--	--	--	--	--	0.02	--	--	--	0.03	0.40	--	0.53
China Rockfish	--	--	--	--	--	--	--	--	0.01	3.65	--	--	1.30	0.29	0.80	0.02	6.06
Copper Rockfish	--	--	--	--	--	--	--	--	0.09	1.31	--	--	0.89	1.07	3.80	0.03	7.19
Gopher Rockfish	--	--	--	--	--	--	--	--	--	0.06	--	--	--	--	0.10	--	0.16
Grass Rockfish	--	--	--	--	--	--	--	--	--	0.13	--	--	--	0.05	0.10	--	0.28
Nearshore Rockfish Unid	--	--	--	--	--	--	--	--	--	--	--	0.06	--	--	--	--	0.06
Olive Rockfish	--	--	--	0.00	--	--	--	0.60	0.10	0.04	--	--	--	0.06	0.30	--	1.10
Quillback Rockfish	0.08	--	--	--	--	--	--	0.00	0.06	1.53	--	--	1.50	0.68	2.40	0.16	6.41
Minor nearshore rockfish (South of 40°10' N. lat.)																	
Black and Yellow Rockfish	0.00	--	--	--	--	--	--	--	0.12	14.41	0.23	--	--	--	5.60	--	20.36
Blue/Deacon Rockfish	--	--	--	--	--	--	--	--	0.09	7.11	0.02	--	--	--	140.60	0.04	147.86
Brown Rockfish	--	--	--	--	--	--	0.13	--	0.03	19.69	0.07	--	--	--	82.10	0.03	102.06
Calico Rockfish	--	--	--	--	--	--	0.00	--	--	0.03	--	--	--	--	0.40	0.00	0.43
China Rockfish	--	--	--	--	--	--	--	--	0.07	1.58	0.01	--	--	--	14.90	0.01	16.57
Copper Rockfish	0.00	--	--	--	--	--	0.03	--	0.11	8.40	0.08	--	--	--	147.90	0.34	156.87
Gopher Rockfish	--	--	--	--	--	--	--	--	0.06	24.23	0.05	--	--	--	66.80	0.05	91.18
Grass Rockfish	--	--	--	--	--	--	--	--	0.00	8.72	0.01	--	--	--	8.90	--	17.63
Kelp Rockfish	--	--	--	--	--	--	--	--	--	0.84	--	--	--	--	12.60	--	13.44
Nearshore Rockfish Unid	--	--	--	--	--	--	--	--	--	0.06	0.03	--	--	--	--	--	0.10
Olive Rockfish	--	--	--	--	--	--	--	--	0.05	0.66	0.00	--	--	--	52.20	0.09	52.99
Quillback Rockfish	--	--	--	--	--	--	--	--	--	0.41	--	--	--	--	6.30	0.01	6.72
Treefish Rockfish	--	--	--	--	--	--	--	--	0.00	2.59	0.00	--	--	--	12.70	0.00	15.29

Table 15 (continued).

	Commercial fisheries																
	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	Pink shrimp	Non-nearshore fixed gear	Nearshore fixed gear	Incidental fisheries	WA tribal shoreside	Recreational fishing mortality WA	OR	CA	Research	Estimated fishing mortality
Minor shelf rockfish (North of 40°10' N. lat.)																	
Bocaccio Rockfish	3.14	--	0.10	0.27	0.02	0.09	--	0.04	0.24	--	0.00	--	0.88	0.07	0.00	0.12	5.00
Bronzespotted Rockfish	0.24	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.24
Chilipepper Rockfish	2.05	--	0.41	4.31	1.14	0.96	--	0.36	0.14	--	0.03	--	--	--	--	1.29	10.70
Cowcod Rockfish	0.00	--	--	--	--	--	--	0.01	--	--	--	--	--	--	0.00	0.02	0.03
Greenspotted Rockfish	0.01	0.00	--	--	--	--	--	0.00	0.01	--	0.00	--	--	--	--	0.08	0.10
Greenstriped Rockfish	11.61	0.02	--	--	--	--	--	0.75	0.94	0.01	0.03	0.00	--	0.01	--	10.09	23.45
Halfbanded Rockfish	--	--	--	--	--	--	--	0.01	--	--	--	--	--	--	--	--	0.01
Harlequin Rockfish	0.00	--	0.00	0.02	0.00	0.01	--	0.00	--	--	--	--	--	--	--	--	0.03
Pygmy Rockfish	0.00	--	--	--	--	--	--	0.03	--	--	--	--	--	--	--	0.02	0.05
Redstripe Rockfish	0.49	--	1.16	2.09	1.78	0.06	--	0.00	0.11	--	--	0.01	--	--	--	0.99	6.69
Rosethorn Rockfish	1.42	0.05	--	--	--	--	--	0.00	0.92	--	0.02	0.41	--	0.02	--	0.46	3.30
Rosy Rockfish	0.00	0.00	--	--	--	--	--	--	0.02	0.01	--	--	--	--	0.00	0.02	0.05
Shelf Rockfish Unid	1.42	0.01	--	0.00	--	--	--	0.75	0.29	0.02	0.02	3.78	--	--	--	0.00	6.26
Silvergray Rockfish	1.47	0.00	0.04	1.46	0.04	0.14	--	0.00	0.24	--	0.01	0.02	--	--	--	0.01	3.42
Squarespot Rockfish	--	--	--	--	--	--	--	0.00	--	0.01	--	--	--	--	--	--	0.01
Starry Rockfish	--	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01
Stripetail Rockfish	2.47	--	--	--	0.00	--	--	1.71	0.00	--	--	--	--	--	--	2.14	6.33
Tiger Rockfish	--	--	--	--	--	--	--	0.00	0.01	0.24	--	--	0.14	0.31	0.10	0.02	0.82
Vermilion Rockfish	--	--	--	--	--	--	--	--	0.08	2.71	0.01	--	0.74	3.71	4.50	0.07	11.82
Minor shelf rockfish (South of 40°10' N. lat.)																	
Bronzespotted Rockfish	0.00	--	--	--	--	--	--	--	0.03	--	--	--	--	--	--	0.02	0.05
Flag Rockfish	0.00	--	--	--	--	--	--	--	0.17	0.03	0.00	--	--	--	9.50	0.01	9.71
Freckled Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Greenblotched Rockfish	0.20	--	--	--	--	--	--	--	0.03	0.00	--	--	--	--	0.30	0.06	0.59
Greenspotted Rockfish	0.17	--	--	--	--	--	--	--	1.39	0.08	0.03	--	--	--	9.50	0.75	11.93
Greenstriped Rockfish	0.33	--	--	--	--	--	--	--	0.11	0.00	0.00	--	--	--	1.10	0.06	1.60
Halfbanded Rockfish	0.01	--	--	--	--	--	0.00	0.04	0.01	--	--	--	--	--	1.80	0.63	2.49
Honeycomb Rockfish	--	--	--	--	--	--	--	--	0.02	0.00	--	--	--	--	5.20	0.00	5.22
Mexican Rockfish	0.01	--	--	--	--	--	--	--	0.02	--	--	--	--	--	0.00	0.00	0.03
Pink Rockfish	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01
Pinkrose Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Rosethorn Rockfish	0.08	0.00	--	--	--	--	--	--	0.01	0.08	--	--	--	--	--	0.04	0.21
Rosy Rockfish	--	--	--	--	--	--	--	--	0.11	0.05	--	--	--	--	8.90	0.11	9.17
Shelf Rockfish Unid	0.02	--	--	--	--	--	0.00	0.02	0.20	1.12	0.01	--	--	--	--	0.00	1.38

Table 15 (continued).

	Commercial fisheries																
	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	Pink shrimp	Non-nearshore fixed gear	Nearshore fixed gear	Incidental fisheries	WA tribal shoreside	Recreational fishing mortality WA	OR	CA	Research	Estimated fishing mortality
Silvergray Rockfish	0.11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.11
Speckled Rockfish	--	--	--	--	--	--	--	--	0.22	0.16	0.01	--	--	--	10.30	0.39	11.08
Squarespot Rockfish	--	--	--	--	--	--	--	0.06	0.03	0.02	--	--	--	--	22.90	0.07	23.08
Starry Rockfish	--	--	--	--	--	--	--	--	0.70	0.23	0.03	--	--	--	26.90	0.09	27.95
Stripetail Rockfish	3.61	--	--	--	--	--	0.00	1.07	--	--	--	--	--	--	0.00	2.96	7.64
Swordspine Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.14	0.14
Tiger Rockfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.10	0.01	0.11
Vermilion Rockfish	0.08	--	--	--	--	--	0.05	--	16.07	11.88	1.03	--	--	--	261.80	3.07	293.98
Yellowtail Rockfish	0.00	--	--	--	--	--	--	--	0.96	0.45	0.63	--	--	--	32.00	0.14	34.18
Minor slope rockfish (North of 40°10' N. lat.)																	
Aurora Rockfish	22.27	0.02	--	--	0.02	0.01	--	0.01	0.08	--	0.00	0.01	--	--	--	0.26	22.67
Bank Rockfish	1.02	0.01	--	--	0.05	0.02	--	--	0.02	--	0.00	0.01	--	--	--	0.01	1.13
Blackgill Rockfish	3.21	0.10	--	--	0.01	0.01	--	0.00	0.81	--	0.01	0.05	--	--	--	0.21	4.41
Redbanded Rockfish	4.26	1.04	--	--	0.03	0.01	--	0.05	27.17	0.00	0.74	6.59	--	--	--	0.12	40.02
Rougheye/Blackspotted Rockfish	29.64	6.66	--	15.65	22.43	7.21	--	0.02	43.79	0.00	0.53	11.58	--	--	--	0.37	137.88
Sharpchin Rockfish	3.06	0.00	--	0.14	0.00	0.00	--	0.02	0.04	--	0.00	0.00	--	--	--	0.90	4.16
Shortraker Rockfish	6.72	0.45	--	0.02	0.03	0.01	--	--	2.80	--	0.52	0.43	--	--	--	0.07	11.05
Shortraker/Rougheye/Blackspotted Rockfish	--	0.31	--	--	--	--	--	--	0.29	--	--	--	--	--	--	--	0.59
Slope Rockfish Unid	1.44	0.03	--	9.67	--	--	--	--	5.07	0.03	0.20	0.03	--	--	--	0.00	16.47
Splitnose Rockfish	21.76	0.00	0.00	31.15	36.62	6.45	--	0.13	0.07	--	0.00	0.04	--	--	--	8.46	104.68
Yellowmouth Rockfish	1.07	0.02	--	--	0.03	--	--	0.00	0.19	--	0.00	0.02	--	--	--	0.11	1.44
Minor slope rockfish (South of 40°10' N. lat.)																	
Aurora Rockfish	1.70	0.02	--	--	--	--	--	--	1.23	0.01	0.00	--	--	--	--	0.43	3.38
Bank Rockfish	36.04	--	--	--	--	--	--	0.00	0.63	0.00	0.00	--	--	--	2.20	0.38	39.26
Blackgill Rockfish	9.51	2.21	--	--	--	--	--	--	23.49	0.73	0.46	--	--	--	--	0.25	36.65
Pacific Ocean Perch	0.02	--	--	--	--	--	--	--	0.01	--	--	--	--	--	--	--	0.03
Redbanded Rockfish	0.33	--	--	--	--	--	--	0.00	1.27	--	--	--	--	--	--	0.01	1.60
Rougheye/Blackspotted Rockfish	0.01	0.00	--	--	--	--	--	--	0.37	0.00	--	--	--	--	--	--	0.38
Sharpchin Rockfish	0.02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.30	0.31
Shortraker Rockfish	0.00	--	--	--	--	--	--	--	0.00	--	--	--	--	--	--	--	0.01
Slope Rockfish Unid	0.00	--	--	--	--	--	--	--	0.05	0.00	0.01	--	--	--	--	--	0.07
Yellowmouth Rockfish	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01
Mixed thornyheads																	
Shortspine/Longspine Thornyhead	0.62	0.04	--	--	--	--	--	0.00	1.87	0.00	0.01	--	--	--	--	--	2.53
Other flatfish																	
Butter Sole	0.14	--	--	--	--	--	--	--	--	0.00	--	--	--	0.01	--	0.01	0.15
Curlfin Sole	2.05	--	--	--	--	--	5.62	0.00	--	--	0.05	--	--	--	--	0.00	7.72
Flatfish Unid	3.09	0.00	--	0.00	--	--	0.21	2.33	0.00	0.01	10.34	9.76	1.94	--	--	--	27.70
Flathead Sole	39.34	--	0.00	--	0.01	0.00	--	1.53	0.01	--	0.05	--	--	--	--	0.71	41.65
Pacific Sanddab	202.09	--	0.10	0.13	--	0.00	1.30	9.98	0.68	3.55	0.12	--	--	0.13	28.20	7.38	253.67
Rex Sole	573.83	0.53	0.00	5.23	1.97	0.86	0.09	33.78	0.00	--	2.57	47.15	--	--	--	14.15	680.16

Table 15 (continued).

	Commercial fisheries																
	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	Pink shrimp	Non-nearshore fixed gear	Nearshore fixed gear	Incidental fisheries	WA tribal shoreside	Recreational fishing mortality WA	Recreational fishing mortality OR	Recreational fishing mortality CA	Research	Estimated fishing mortality
Rock Sole	1.80	--	--	--	--	--	0.97	0.00	0.21	0.03	0.31	4.79	--	0.01	0.60	0.10	8.82
Sand Sole	27.48	--	--	--	--	--	3.35	0.00	0.01	0.01	0.06	--	--	0.48	0.10	0.03	31.52
Sanddab Unid	--	--	--	--	--	--	0.00	--	1.83	0.01	1.15	0.14	--	--	--	0.02	3.14
Other groundfish																	
Cabezon (Washington)	--	--	--	--	--	--	--	--	--	--	--	--	2.96	--	--	--	2.96
Greenling Unid	--	--	--	--	--	--	--	--	0.00	--	--	--	--	--	--	--	0.00
Kelp Greenling (California)	--	--	--	--	--	--	--	--	0.00	4.94	0.00	--	--	--	10.70	0.00	15.65
Kelp Greenling (Oregon)	0.00	--	--	--	--	--	--	--	0.01	8.41	--	--	--	2.71	--	0.03	11.17
Kelp Greenling (Washington)	0.08	--	--	--	--	--	--	--	--	--	--	--	0.94	--	--	0.03	1.04
Leopard Shark	--	--	--	--	--	--	0.54	--	0.83	0.40	4.33	--	--	--	63.10	--	69.20
Other rockfish																	
Rockfish Unid	0.09	0.00	--	0.02	--	--	--	--	0.42	0.02	0.01	--	--	--	--	--	0.56
Pacific cod	384.83	0.06	0.01	0.07	0.00	--	--	0.00	8.34	--	0.59	145.25	0.40	0.12	--	0.75	540.41
Pacific hake	340.10	0.09	78.38	85,756.58	108,803.58	65,017.85	--	520.89	0.49	--	0.01	--	--	--	0.00	654.31	261,172.29
PACIFIC OCEAN PERCH (North of 40°10' N. lat.)	26.68	0.03	0.00	27.84	3.09	7.20	--	0.03	0.28	0.00	0.01	0.02	--	--	--	3.10	68.29
Petrale sole	2,464.66	4.50	0.01	0.00	--	--	2.95	0.88	2.33	0.01	2.59	146.70	--	2.08	1.30	24.14	2,652.16
Roundfish unid	0.00	--	--	0.65	0.02	--	--	--	--	--	--	--	--	--	--	--	0.67
Sablefish (North of 36° N. lat.)	1,442.54	807.17	0.05	5.95	18.12	9.60	--	0.16	2,043.09	0.57	46.26	399.33	--	1.62	--	21.65	4,796.11
Sablefish (South of 36° N. lat.)	4.95	189.70	--	--	--	--	--	0.18	406.47	6.25	0.19	--	--	--	0.00	0.85	608.58
Shared ecosystem component species																	
Arrow Squid	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Barracudina Unid	0.00	--	--	--	0.00	--	--	0.00	--	--	--	--	--	--	--	--	0.01
Barracudina/Daggertooth Unid	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Blacksmelt Unid	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01	0.01
Blue Lanternfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Boreal Clubhook Squid	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Bristlemouth Unid	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
Brokenline Lampfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00
California Headlightfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.02	0.02
California Lanternfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.05	0.05
California Smoothtongue	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Clawed Armhook Squid	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Cone Squid	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Deepsea Smelt Unid	0.00	--	--	--	0.77	0.00	--	--	--	--	--	--	--	--	--	0.01	0.79
Duckbill Barracudina	--	--	--	--	6.51	0.04	--	--	--	--	--	--	--	--	--	0.00	6.55

Table 15 (continued).

	Commercial fisheries																
	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	Pink shrimp	Non-nearshore fixed gear	Nearshore fixed gear	Incidental fisheries	WA tribal shoreside	Recreational fishing mortality WA	OR	CA	Research	Estimated fishing mortality
Glass Squid Unid	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Gonatopsis Unid	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Gonatus Unid	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Jewel Squid	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01	0.01
Lanternfish Unid	0.07	--	--	--	2.09	0.05	--	0.02	--	--	--	--	--	--	--	0.05	2.28
Lightfish Unid	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Long-armed Jewel Squid	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Magistrate Armhook Squid	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01	0.01
Non-Eulachon Smelt Unid	0.00	--	--	--	--	--	--	5.25	--	--	--	--	--	--	--	--	5.26
Non-Humboldt Squid Unid	8.04	0.00	--	--	--	--	0.01	4.55	--	--	--	--	--	--	--	--	12.61
North Pacific Armhook Squid	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Northern Lampfish	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.14	0.14
Northern Smoothtongue	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01	0.01
Octopus Squid	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.02	0.02
Oregon Armhook Squid	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Pacific Blacksmelt	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Pacific Sandlance	--	--	--	--	--	--	0.00	0.03	--	--	--	--	--	--	--	--	0.03
Pacific Saury	0.00	--	--	--	0.00	0.00	--	0.00	--	--	--	--	--	--	--	--	0.01
Ribbon Barracudina	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Robust Blacksmelt	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00
Robust Clubhook Squid	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.15	0.15
Round Herring	--	--	--	--	--	--	--	--	--	--	14.28	--	--	--	--	--	14.28
Sandpaper Squid	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.02	0.02
Slender Barracudina	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	0.01	0.01
Smelt Unid	--	--	--	0.00	--	--	--	0.06	0.00	0.10	134.37	--	--	--	--	0.01	134.55
Surf Smelt	--	--	--	--	--	--	--	0.00	--	--	--	--	--	--	--	0.00	0.01
White Barracudina	--	--	--	--	0.02	0.00	--	--	--	--	--	--	--	--	--	--	0.02
Whitebait Smelt	--	--	--	--	--	--	--	1.14	--	--	--	--	--	--	--	--	1.14
Shortbelly rockfish	0.60	--	0.00	22.88	0.24	1.91	--	2.21	--	--	--	--	--	--	--	2.16	30.00
Shortspine thornyhead (North of 34°27' N. lat.)	726.21	9.76	0.00	11.91	7.21	3.31	--	0.01	48.27	1.20	0.39	19.78	--	--	--	7.01	835.06
Shortspine thornyhead (South of 34°27' N. lat.)	--	1.63	--	--	--	--	--	--	110.30	0.91	0.47	--	--	--	--	0.43	113.73
Spiny dogfish	247.95	21.04	2.03	184.24	135.05	58.56	0.72	0.06	112.86	0.14	0.14	--	0.01	--	0.60	11.73	775.12
Splitnose rockfish (South of 40°10' N. lat.)	13.09	--	--	--	--	--	--	0.86	0.00	--	--	--	--	--	--	3.86	17.81
Starry flounder	12.69	--	--	--	--	--	5.70	0.01	0.01	0.02	0.26	0.00	--	0.03	0.30	0.05	19.07
Widow rockfish	6.34	--	551.68	240.42	112.28	74.41	--	0.00	1.28	0.04	0.09	7.62	--	0.45	2.00	17.27	1,013.89
YELLOWEYE ROCKFISH	0.04	0.00	--	--	--	--	--	0.00	0.80	0.63	--	0.19	2.34	3.28	1.30	0.89	9.47
Yellowtail rockfish (North of 40°10' N. lat.)	108.34	0.06	527.11	489.53	11.28	51.05	--	0.47	1.81	0.59	2.72	160.06	36.25	7.70	0.20	20.55	1,417.72

Table 15 (continued).

	Commercial fisheries																
	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	Pink shrimp	Non-nearshore fixed gear	Nearshore fixed gear	Incidental fisheries	WA tribal shoreside	Recreational fishing mortality WA	Recreational fishing mortality OR	Recreational fishing mortality CA	Research	Estimated fishing mortality
Non-groundfish species																	
California halibut	0.05	--	--	--	--	--	105.20	--	0.86	0.53	121.57	--	--	0.02	85.70	--	313.93
Dungeness crab	137.97	0.83	--	--	--	--	110.04	0.48	2.79	5.67	24,675.00	557.97	--	--	--	0.01	25,490.76
Non-FMP flatfish																	
Deepsea Sole	7.38	0.01	--	--	--	--	0.01	0.00	0.00	0.00	0.13	--	--	--	--	0.01	7.54
Diamond Turbot	--	--	--	--	--	--	0.27	--	--	0.00	--	--	--	--	0.00	0.00	0.28
Hornyhead Turbot	--	--	--	--	--	--	0.60	--	--	--	0.01	--	--	--	--	--	0.61
Longfin Sanddab	0.00	--	--	--	--	--	0.05	--	--	--	--	--	--	--	0.00	--	0.05
Slender Sole	44.91	--	--	--	0.00	--	0.05	69.91	--	--	0.02	--	--	--	--	0.13	115.02
Speckled Sanddab	--	--	--	--	--	--	0.01	--	0.00	--	--	--	--	--	0.00	0.00	0.01
Other nongroundfish																	
Brown Irish Lord Sculpin	--	--	--	--	--	--	--	--	--	0.00	--	--	--	--	0.00	--	0.00
Buffalo Sculpin	--	--	--	--	--	--	--	--	--	0.44	--	--	--	--	0.10	--	0.54
California Sheephead	--	--	--	--	--	--	0.33	--	--	72.99	0.13	--	--	--	40.60	0.03	114.08
Red Irish Lord Sculpin	0.00	--	--	--	--	--	--	--	--	0.21	--	--	--	--	0.00	--	0.21
Sculpin Unid	0.97	--	--	--	--	--	0.38	0.03	0.02	0.27	0.05	0.01	--	--	--	0.00	1.72
Skate Unid	7.91	0.03	0.00	0.05	--	0.00	0.05	0.01	3.85	0.17	3.61	106.20	--	--	--	--	121.87
Squid Unid	1.26	--	0.00	18.15	152.48	23.18	--	0.00	--	--	--	--	--	--	--	--	195.07
Starry Skate	0.08	--	--	--	--	--	0.18	0.00	--	0.06	--	--	--	--	--	0.03	0.34

Table 16. Fishing Mortality Estimates Relative to Harvest Specifications.

Estimated fishing mortality (mt) of major west coast groundfish species in 2016 and corresponding management reference points (harvest specifications). Values which are greater than 90% relative to a management reference point are highlighted in yellow.

	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	**1,474**	5,328	28	5,328	28	6,396	23
Black rockfish (North of 46°16' N. lat.)	**361**	404	89	404	89	423	85
Black rockfish (South of 46°16' N. lat.)	**761**	1,000	76	1,131	67	1,183	64
Bocaccio rockfish (South of 40°10' N. lat.)	**122**	362	34	1,291	9	1,351	9
Cabezon (California)	**78**	151	51	151	51	158	49
Cabezon (Oregon)	**28**	47	59	47	59	49	57
California scorpionfish (South of 34°27' N. lat.)	**80**	111	72	111	72	117	68
Canary rockfish	**73**	125	58	697	10	729	10
Chilipepper rockfish (South of 40°10' N. lat.)	**92**	1,619	6	1,619	6	1,694	5
COWCOD ROCKFISH (South of 40°10' N. lat.)	**1**	10	13	62	2	68	2
Darkblotched rockfish	**146**	346	42	554	26	580	25
Dover sole	**7,290**	50,000	15	56,615	13	59,221	12
English sole	**451**	7,204	6	7,204	6	7,890	6
Lingcod (North of 40°10' N. lat.)	**809**	2,719	30	2,719	30	2,891	28
Lingcod (South of 40°10' N. lat.)	**671**	946	71	946	71	1,136	59
Longnose skate	**924**	2,000	46	2,299	40	2,405	38
Minor rockfish (North of 40°10' N. lat.)	**479**	3,727	13	3,736	13	4,150	12
Nearshore	**56**	69	81	77	73	88	64
Shelf	**78**	1,952	4	1,953	4	2,218	4
Slope	**345**	1,706	20	1,706	20	1,844	19
Minor rockfish (South of 40°10' N. lat.)	**1,164**	3,326	35	3,479	33	4,021	29
Nearshore	**642**	1,006	64	1,148	56	1,288	50
Shelf	**441**	1,625	27	1,626	27	1,919	23
Slope	**82**	695	12	705	12	814	10
Other flatfish	**1,055**	7,243	15	7,243	15	9,645	11
Other groundfish	**100**	243	41	243	41	291	34
Pacific cod	**540**	1,600	34	2,221	24	3,200	17
Pacific hake	**261,172**	2016 US TAC = 367,553 mt, 71% of US TAC					
PACIFIC OCEAN PERCH (North of 40°10' N. lat.)	**68**	164	42	813	8	850	8
Petrale sole	**2,652**	2,910	91	2,910	91	3,044	87
Sablefish (North of 36° N. lat.)	**4,796**	5,241	92	7,784	69	8,526	63
Sablefish (South of 36° N. lat.)	**609**	1,880	32				
Shortbelly rockfish	**30**	500	6	5,789	1	6,950	0
Spiny dogfish	**775**	2,085	37	2,085	37	2,503	31
Splitnose rockfish (South of 40°10' N. lat.)	**18**	1,746	1	1,746	1	1,826	1
Starry flounder	**19**	1,539	1	1,686	1	1,847	1
Thornyheads							
Longspine Thornyhead (North of 34°27' N. lat.)	**672**	3,015	22	3,968	17	4,763	14
Longspine Thornyhead (South of 34°27' N. lat.)	**11**	952	1				
Shortspine Thornyhead (North of 34°27' N. lat.)	**835**	1,726	48	2,640	36	3,169	30
Shortspine Thornyhead (South of 34°27' N. lat.)	**114**	913	12				
Mixed thornyheads	**3**						
Widow rockfish	**1,014**	2,000	51	3,790	27	3,990	25
YELLOWEYE ROCKFISH	**9**	19	50	43	22	52	18
Yellowtail rockfish (North of 40°10' N. lat.)	**1,418**	6,344	22	6,344	22	6,949	20

Appendix A

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

Species identification codes used in the PacFIN database and assigned to WCGOP observer 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 2016.

PacFIN Species ID	PacFIN Common Name	IFQ Grouping	Limited Entry/Non-nearshore Species Group		Nearshore Fixed Gear Species Group		FMP Species	Nearshore Species	IFQ Species	Rebuilding 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				
ART1	NOM. ARROWTOOTH FLOUNDER	Arrowtooth Flounder	Arrowtooth flounder	Arrowtooth flounder	Arrowtooth flounder	Arrowtooth flounder	X			X
ARTH	ARROWTOOTH FLOUNDER	Arrowtooth Flounder	Arrowtooth flounder	Arrowtooth flounder	Arrowtooth flounder	Arrowtooth flounder	X			X
CNR1	NOM. CANARY ROCKFISH	Canary Rockfish	Canary rockfish	Canary rockfish	Canary rockfish	Canary rockfish	X			X
CNRY	CANARY ROCKFISH	Canary Rockfish	Canary rockfish	Canary rockfish	Canary rockfish	Canary rockfish	X			X
RCK8	CANARY+VERMILION RCKFSH	Canary Rockfish	Canary rockfish	Canary rockfish	Canary rockfish	Canary rockfish	X			X
DBR1	NOM. DARKBLOTCHED ROCKFISH	Darkblotched Rockfish	Darkblotched rockfish	Darkblotched rockfish	Darkblotched rockfish	Darkblotched rockfish	X			X
DBRK	DARKBLOTCHED ROCKFISH	Darkblotched Rockfish	Darkblotched rockfish	Darkblotched rockfish	Darkblotched rockfish	Darkblotched rockfish	X			X
DOVR	DOVER SOLE	Dover Sole	Dover sole	Dover sole	Dover sole	Dover sole	X			X
DVR1	NOM. DOVER SOLE	Dover Sole	Dover sole	Dover sole	Dover sole	Dover sole	X			X
EGL1	NOM. ENGLISH SOLE	English Sole	English sole	English sole	English sole	English sole	X			X
EGLS	ENGLISH SOLE	English Sole	English sole	English sole	English sole	English sole	X			X
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.)	X	X		X
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.)	X	X		X
LSP1	NOM. LONGSPINE THORNYHEAD	Longspine Thornyhead	Longspine thornyhead	Longspine thornyhead	Longspine thornyhead	Longspine thornyhead	X			X
LSPN	LONGSPINE THORNYHEAD	Longspine Thornyhead	Longspine thornyhead	Longspine thornyhead	Longspine thornyhead	Longspine thornyhead	X			X
RCK4	UNSP. REDS RCKFSH	Minor Rockfish	Other rockfish	Other rockfish	Other rockfish	Other rockfish	X	X		X
RCK5	UNSP. SMALL REDS RCKFSH	Minor Rockfish	Other rockfish	Other rockfish	Other rockfish	Other rockfish	X	X		X
RCK6	UNSP. ROSEFISH RCKFSH	Minor Rockfish	Other rockfish	Other rockfish	Other rockfish	Other rockfish	X	X		X
ODSR	OTHER DEMERSAL RKFSH	Minor Rockfish	Other rockfish	Other rockfish	Other rockfish	Other rockfish	X	X		X
OPLG	OTHER PELAGIC RKFSH	Minor Rockfish	Other rockfish	Other rockfish	Other rockfish	Other rockfish	X			X
RRCK	REMAINING ROCKFISH	Minor Rockfish	Other rockfish	Other rockfish	Other rockfish	Other rockfish	X	X		X
UDM1	UNSP. DEMERSAL-91	Minor Rockfish	Other rockfish	Other rockfish	Other rockfish	Other rockfish	X	X		X
UDSR	UNSP. DEMERSAL RKFSH	Minor Rockfish	Other rockfish	Other rockfish	Other rockfish	Other rockfish	X	X		X
UPLG	UNSP. PELAGIC RKFSH	Minor Rockfish	Other rockfish	Other rockfish	Other rockfish	Other rockfish	X			X
USR1	UNSP. SLOPE-91	Minor Rockfish	Other rockfish	Other rockfish	Other rockfish	Other rockfish	X			X
USR2	UNSP. SLOPE-93	Minor Rockfish	Other rockfish	Other rockfish	Other rockfish	Other rockfish	X			X
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.)	X			X
BCC1	NOM. 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.)	X			X
CLP1	NOM. 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.)	X			X
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.)	X			X
CWC1	NOM. 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.)	X		X	X
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.)	X		X	X
YTR1	NOM. YELLOWTAIL ROCKFISH	Minor Shelf Rockfish	Yellowtail rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	Yellowtail rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	X			X
YTRK	YELLOWTAIL ROCKFISH	Minor Shelf Rockfish	Yellowtail rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	Yellowtail rockfish (North of 40°10' N. lat.)	Minor shelf rockfish (South of 40°10' N. lat.)	X			X
VRM1	NOM. VERMILLION 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.)	X			X
VRML	VERMILION 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.)	X			X
NSLF	NORTHERN SHELF 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.)	X			X
NUSF	NOR. UNSP. SHELF 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.)	X			X
RCK1	BOCACCIO+CHILIPEPPER RCKFSH	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.)	X			X
SSLF	SOUTHERN SHELF 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.)	X			X

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	IFQ Species	Rebuilding Species
			North of 40° 10' latitude	South of 40° 10' latitude	North of 40° 10' latitude	South of 40° 10' latitude				
SUSF	SOU. UNSP. SHELF 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.)	X			X
USLF	UNSP. SHELF 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.)	X			X
ORCK	OTHER 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.)	X			X
URCK	UNSP. 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.)	X			X
TGR1	NOM. TIGER 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.)	X			X
TIGR	TIGER 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.)	X			X
SWS1	NOM. SWORDSPINE 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.)	X			X
SWSP	SWORDSPINE 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.)	X			X
STL1	NOM. STRIPETAIL 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.)	X			X
STRK	STRIPETAIL 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.)	X			X
STAR	STARRY 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.)	X			X
STR1	NOM. STARRY 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.)	X			X
SQR1	NOM. SQUARESPOT	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.)	X			X
SQRS	SQUARESPOT 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.)	X			X
SPK1	NOM. SPECKLED 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.)	X			X
SPKL	SPECKLED 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.)	X			X
SLGR	SILVERGREY 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.)	X			X
RST1	NOM. ROSETHORN 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.)	X			X
RSTN	ROSETHORN 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.)	X			X
ROS1	NOM. ROSY 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.)	X			X
ROSY	ROSY 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.)	X			X
REDS	REDSTRIPE 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.)	X			X
PUGT	PUGET SOUND 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.)	X			X
PRR1	NOM. PINKROSE 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.)	X			X
PRRK	PINKROSE 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.)	X			X
PNK1	NOM. PINK 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.)	X			X
PNKR	PINK 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.)	X			X
PGMY	PYGMY 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.)	X			X
NRCK	NORTHERN 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.)	X			X
MXR1	NOM. MEXICAN 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.)	X			X
MXRF	MEXICAN 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.)	X			X
HNY1	NOM. HONEYCOMB 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.)	X			X
HNYC	HONEYCOMB 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.)	X			X
HLQN	HARLEQUIN 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.)	X			X
HBRK	HALFBANDED 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.)	X			X
GSR1	NOM. 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.)	X			X
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.)	X			X
GSP1	NOM. 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.)	X			X
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.)	X			X
GBL1	NOM. 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.)	X			X

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	IFQ Species	Rebuilding Species
			North of 40° 10' latitude	South of 40° 10' latitude	North of 40° 10' latitude	South of 40° 10' latitude				
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.)	X			X
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.)	X			X
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.)	X			X
FLG1	NOM. 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.)	X			X
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.)	X			X
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.)	X			X
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.)	X			X
CML1	NOM. 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.)	X			X
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.)	X			X
BRZ1	NOM. 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.)	X			X
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.)	X			X
POP	PACIFIC OCEAN PERCH	Minor Slope Rockfish	PACIFIC OCEAN PERCH (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.)	X		X	X
POP2	NOMINAL POP	Minor Slope Rockfish	PACIFIC OCEAN PERCH (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.)	X		X	X
UPOP	UNSP. POP GROUP	Minor Slope Rockfish	PACIFIC OCEAN PERCH (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.)	X		X	X
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.)	X			X
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.)	X			X
NSLP	NORTHERN 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.)	X			X
NUSP	NOR. 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.)	X			X
OSLR	OTHER 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.)	X			X
SSLP	SOUTHERN 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.)	X			X
SUSP	SOU. 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.)	X			X
UDW1	SHORTRAKER+ROUGHEYE	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.)	X			X
URK1	SRKR+REYE+NRCK+SHRP	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.)	X			X
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.)	X			X
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.)	X			X
ORCK	OTHER 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.)	X			X
POP1	GEN. SHELF/SLOPE RF	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.)	X			X
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.)	X			X
SRKR	SHORTRAKER 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.)	X			X
SRK1	NOMINAL SHORTRAKER 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.)	X			X
SHRP	SHARPCHIN 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.)	X			X
BSPR	BLACKSPOTTED 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.)	X			X
BSP1	NOM. BLACKSPOTTED 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.)	X			X
RBR1	NOM. ROUGHEYE + BLACKSPOTTED	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.)	X			X
REYE	ROUGHEYE 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.)	X			X
REY1	NOM. ROUGHEYE 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.)	X			X
RDB1	NOM. REDBANDED 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.)	X			X
RDBD	REDBANDED 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.)	X			X
BGL1	NOM. BLACKGILL 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.)	X			X
BLGL	BLACKGILL 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.)	X			X

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	IFQ Species	Rebuilding Species
			North of 40° 10' latitude	South of 40° 10' latitude	North of 40° 10' latitude	South of 40° 10' latitude				
BANK	BANK 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.)	X			X
BNK1	NOM. BANK 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.)	X			X
ARR1	NOM. AURORA 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.)	X			X
ARRA	AURORA 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.)	X			X
SNOS	SPLITNOSE ROCKFISH	Minor Slope Rockfish	Minor slope rockfish (North of 40°10' N. lat.)	Splitnose rockfish (South of 40°10' N. lat.)	Minor slope rockfish (North of 40°10' N. lat.)	Splitnose rockfish (South of 40°10' N. lat.)	X			X
SNS1	NOM. SPLITNOSE ROCKFISH	Minor Slope Rockfish	Minor slope rockfish (North of 40°10' N. lat.)	Splitnose rockfish (South of 40°10' N. lat.)	Minor slope rockfish (North of 40°10' N. lat.)	Splitnose rockfish (South of 40°10' N. lat.)	X			X
THD1	NOM. THORNYHEADS	Mixed Thornyhead	Mixed thornyheads	Mixed thornyheads	Mixed thornyheads	Mixed thornyheads	X			X
THDS	THORNYHEADS (MIXED)	Mixed Thornyhead	Mixed thornyheads	Mixed thornyheads	Mixed thornyheads	Mixed thornyheads	X			X
DFLT	UNSP. DEEP FLOUNDERS	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
SFLT	UNSP. SHALLOW FLOUNDERS	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
UDF1	UNSP. DEEP-91 FLOUNDERS	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
UDF2	UNSP. DEEP-95 FLOUNDERS	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
UFL1	FLOUNDERS (NO FSOL)	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
USF1	UNSP. SHALLOW-91 FLOUNDERS	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
SSO1	NOM. SAND SOLE	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
SSOL	SAND SOLE	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
RSL1	NOM. ROCK SOLE	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
RSOL	ROCK SOLE	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
REX	REX SOLE	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
REX1	NOM. REX SOLE	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
CSL1	NOM. CURLFIN SOLE	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
CSOL	CURLFIN SOLE	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
BSOL	BUTTER SOLE	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
PDAB	PACIFIC SANDDAB	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
PDB1	NOM. PACIFIC SANDDAB	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
UDAB	UNSP. SANDDABS	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
FSOL	FLATHEAD SOLE	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
OFLT	OTHER FLATFISH	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
RFLT	REMAINING FLATFISH	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
UFLT	UNSP. FLATFISH	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
UTRB	UNSP. TURBOTS	Other Flatfish	Other flatfish	Other flatfish	Other flatfish	Other flatfish	X			X
PCOD	PACIFIC COD	Pacific Cod	Pacific cod	Pacific cod	Pacific cod	Pacific cod	X			X
PWHT	PACIFIC WHITING	Pacific Hake	Pacific hake	Pacific hake	Pacific hake	Pacific hake	X			X
PTR1	NOM. PETRALE SOLE	Petrale Sole	Petrale sole	Petrale sole	Petrale sole	Petrale sole	X			X
PTRL	PETRALE SOLE	Petrale Sole	Petrale sole	Petrale sole	Petrale sole	Petrale sole	X			X
SABL	SABLEFISH	Sablefish	Sablefish	Sablefish	Sablefish	Sablefish	X			X
SSP1	NOM. SHORTSPINE THORNYHEAD	Shortspine Thornyhead	Shortspine thornyhead	Shortspine thornyhead	Shortspine thornyhead	Shortspine thornyhead	X			X
SSPN	SHORTSPINE THORNYHEAD	Shortspine Thornyhead	Shortspine thornyhead	Shortspine thornyhead	Shortspine thornyhead	Shortspine thornyhead	X			X
SFL1	NOM. STARRY FLOUNDER	Starry Flounder	Starry flounder	Starry flounder	Starry flounder	Starry flounder	X			X
STRY	STARRY FLOUNDER	Starry Flounder	Starry flounder	Starry flounder	Starry flounder	Starry flounder	X			X

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	IFQ Species	Rebuilding Species
			North of 40° 10' latitude	South of 40° 10' latitude	North of 40° 10' latitude	South of 40° 10' latitude				
WDOW	WIDOW ROCKFISH	Widow Rockfish	Widow rockfish	Widow rockfish	Widow rockfish	Widow rockfish	X			X
WDW1	NOM. WIDOW ROCKFISH	Widow Rockfish	Widow rockfish	Widow rockfish	Widow rockfish	Widow rockfish	X			X
YEY1	NOM. YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	X		X	X
YEYE	YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	YELLOWEYE ROCKFISH	X		X	X
RCK9	BLACK+BLUE ROCKFISH		Black rockfish	Black rockfish	Black rockfish	Black rockfish	X	X		
BLCK	BLACK ROCKFISH		Black rockfish	Black rockfish	Black rockfish	Black rockfish	X	X		
BLK1	NOM. BLACK ROCKFISH		Black rockfish	Black rockfish	Black rockfish	Black rockfish	X	X		
SCOR	CALIFORNIA SCORPIONFISH		California scorpionfish	California scorpionfish	California scorpionfish	California scorpionfish	X	X		
SCR1	NOM. CALIF. SCORPIONFISH		California scorpionfish	California scorpionfish	California scorpionfish	California scorpionfish	X	X		
RCK2	UNSP. BOLINA RCKFSH		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	X	X		
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	X	X		
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	X	X		
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	X	X		
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	X	X		
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	X	X		
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	X	X		
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	X	X		
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	X	X		
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	X	X		
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	X	X		
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	X	X		
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	X	X		
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	X	X		
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	X	X		
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	X	X		
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	X	X		
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	X	X		
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	X	X		
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	X	X		
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	X	X		
GRDR	UNSP. GRENADIERS		Ecosystem component species	Ecosystem component species	Ecosystem component species	Ecosystem component species	X			
RATF	SPOTTED RATFISH		Ecosystem component species	Ecosystem component species	Ecosystem component species	Ecosystem component species	X			
CSKT	CALIFORNIA SKATE		Ecosystem component species	Ecosystem component species	Ecosystem component species	Ecosystem component species	X			
BSKT	BIG SKATE		Ecosystem component species	Ecosystem component species	Ecosystem component species	Ecosystem component species	X			
BSK1	NOM. BIG SKATE		Ecosystem component species	Ecosystem component species	Ecosystem component species	Ecosystem component species	X			
SSRK	SOUPFIN SHARK		Ecosystem component species	Ecosystem component species	Ecosystem component species	Ecosystem component species	X			
AKSK	ALASKA SKATE		Ecosystem component species	Ecosystem component species	Ecosystem component species	Ecosystem component species	X			
ASKT	ALEUTIAN SKATE		Ecosystem component species	Ecosystem component species	Ecosystem component species	Ecosystem component species	X			
BLSK	BLACK SKATE		Ecosystem component species	Ecosystem component species	Ecosystem component species	Ecosystem component species	X			
RTSK	ROUGHTAIL SKATE		Ecosystem component species	Ecosystem component species	Ecosystem component species	Ecosystem component species	X			

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	IFQ Species	Rebuilding Species
			North of 40° 10' latitude	South of 40° 10' latitude	North of 40° 10' latitude	South of 40° 10' latitude				
GGRD	GIANT GRENADIER		Ecosystem component species	Ecosystem component species	Ecosystem component species	Ecosystem component species	X			
GREN	PACIFIC GRENADIER		Ecosystem component species	Ecosystem component species	Ecosystem component species	Ecosystem component species	X			
PFNS	PACIFIC FLATNOSE		Ecosystem component species	Ecosystem component species	Ecosystem component species	Ecosystem component species	X			
SPSK	SANDPAPER SKATE		Ecosystem component species	Ecosystem component species	Ecosystem component species	Ecosystem component species	X			
OGRN	OTHER GROUNDFISH		Groundfish unid	Groundfish unid	Groundfish unid	Groundfish unid	X			
RGRN	REMAINING GROUNDFISH		Groundfish unid	Groundfish unid	Groundfish unid	Groundfish unid	X			
UGRN	UNSP. GROUNDFISH		Groundfish unid	Groundfish unid	Groundfish unid	Groundfish unid	X			
LSKT	LONGNOSE SKATE		Longnose skate	Longnose skate	Longnose skate	Longnose skate	X			
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.)	X	X		
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.)	X	X		
KGL1	NOM. KELP GREENLING		Other groundfish	Other groundfish	Other groundfish	Other groundfish	X	X		
KLPG	KELP GREENLING		Other groundfish	Other groundfish	Other groundfish	Other groundfish	X	X		
CBZ1	NOM. CABEZON		Other groundfish	Other groundfish	Other groundfish	Other groundfish	X	X		
CBZN	CABEZON		Other groundfish	Other groundfish	Other groundfish	Other groundfish	X	X		
LSRK	LEOPARD SHARK		Other groundfish	Other groundfish	Other groundfish	Other groundfish	X			
UGLG	UNSP. GREENLING		Other groundfish	Other groundfish	Other groundfish	Other groundfish	X	X		
ORND	OTHER ROUNDFISH		Roundfish unid	Roundfish unid	Roundfish unid	Roundfish unid	X			
RRND	REMAINING ROUNDFISH		Roundfish unid	Roundfish unid	Roundfish unid	Roundfish unid	X			
URND	UNSP. ROUNDFISH		Roundfish unid	Roundfish unid	Roundfish unid	Roundfish unid	X			
RCK7	UNSP. GOPHER RCKFSH		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	X	X		
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	X	X		
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	X	X		
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.)	Shallow nearshore rockfish	X	X		
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	X	X		
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	X	X		
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	X	X		
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	X	X		
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	X	X		
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	X	X		
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	X	X		
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	X	X		
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	X	X		
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	X	X		
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	X	X		
SBL1	NOM. SHORTBELLY ROCKFISH		Shortbelly rockfish	Shortbelly rockfish	Shortbelly rockfish	Shortbelly rockfish	X			
SBLY	SHORTBELLY ROCKFISH		Shortbelly rockfish	Shortbelly rockfish	Shortbelly rockfish	Shortbelly rockfish	X			
DSRK	SPINY DOGFISH		Spiny dogfish	Spiny dogfish	Spiny dogfish	Spiny dogfish	X			
PHLB	PACIFIC HALIBUT	Pacific Halibut	Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				X
CHL1	NOM. CALIFORNIA HALIBUT		California halibut	California halibut	California halibut	California halibut				
CHLB	CALIFORNIA HALIBUT		California halibut	California halibut	California halibut	California halibut				

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	IFQ Species	Rebuilding Species
			North of 40° 10' latitude	South of 40° 10' latitude	North of 40° 10' latitude	South of 40° 10' latitude				
DCRB	DUNGENESS CRAB		Dungeness crab	Dungeness crab	Dungeness crab	Dungeness crab				
OSKT	OTHER SKATES		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
USKT	UNSP. SKATE		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
SSKT	STARRY SKATE		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
EULC	EULACHON		Eulachon	Eulachon	Eulachon	Eulachon				
ABLN	__ALL ABALONE		NA	NA	NA	NA				
BASS	__ALL BASS		NA	NA	NA	NA				
CLAM	__ALL CLAMS		NA	NA	NA	NA				
CPEL	__ALL COASTAL PELAGIC		NA	NA	NA	NA				
CRAB	__ALL CRAB		NA	NA	NA	NA				
DEEP	__DEEP-91 FLOUNDERS		NA	NA	NA	NA				
DRCK	__DEMERSAL-91 RKFSH		NA	NA	NA	NA				
ECHN	__ALL ECHINODERMS		NA	NA	NA	NA				
FLAT	__ALL FLATFISH		NA	NA	NA	NA				
GRND	__ALL GROUNDFISH		NA	NA	NA	NA				
HMSP	__ALL HIGHLY MIGRATORY		NA	NA	NA	NA				
KCRB	__ALL KING CRAB		NA	NA	NA	NA				
MGRN	__MISC. GROUNDFISH		NA	NA	NA	NA				
MLSK	__ALL MOLLUSKS		NA	NA	NA	NA				
NONE	*** NONE ***		NA	NA	NA	NA				
OBRK	__OTHER BSA RKFSH		NA	NA	NA	NA				
OTHR	__OTHER SPECIES (NO M-GROUP)		NA	NA	NA	NA				
OYST	__ALL OYSTERS		NA	NA	NA	NA				
POPG	__POP GROUP		NA	NA	NA	NA				
PRCK	__PELAGIC ROCKFISH		NA	NA	NA	NA				
ROCK	__ALL ROCKFISH		NA	NA	NA	NA				
ROND	__ALL ROUNDFISH		NA	NA	NA	NA				
SAMN	__ALL SALMON		NA	NA	NA	NA				
SBTS	__RCKFSH SUBTOTAL #1		NA	NA	NA	NA				
SCAL	__ALL SCALLOPS		NA	NA	NA	NA				
SDAB	__SANDDABS		NA	NA	NA	NA				
SHAL	__SHALLOW-91 FLOUNDERS		NA	NA	NA	NA				
SHLL	__ALL SHELLFISH		NA	NA	NA	NA				
SHRK	__ALL SHARKS		NA	NA	NA	NA				
SKAT	__ALL SKATES & RAYS		NA	NA	NA	NA				
SRCK	__SLOPE-91 ROCKFISH		NA	NA	NA	NA				
SRKG	__SHORTRAKER GROUP		NA	NA	NA	NA				
STRG	__ALL STURGEON		NA	NA	NA	NA				
TCRB	__ALL TANNER CRAB		NA	NA	NA	NA				
TRBT	__TURBOTS		NA	NA	NA	NA				

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	IFQ Species	Rebuilding Species
			North of 40° 10' latitude	South of 40° 10' latitude	North of 40° 10' latitude	South of 40° 10' latitude				
TRNY	__THORNYHEADS COMPLEX		NA	NA	NA	NA				
TUNA	__ALL TUNAS		NA	NA	NA	NA				
WETF	__ALL WET FISH		NA	NA	NA	NA				
XXXX	UNKNOWN SPECIES		NA	NA	NA	NA				
HTRB	HORNYHEAD TURBOT		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish				
GTRB	GREENLAND TURBOT		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish				
DTRB	DIAMOND TURBOT		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish				
KMKA	KAMCHATKA FLOUNDER		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish				
YSOL	YELLOWFIN SOLE		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish				
SLNS	SLENDER SOLE		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish				
FNTS	FANTAIL SOLE		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish				
DSOL	DEEPSEA SOLE		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish				
CTRB	C-O SOLE		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish				
LDAB	LONGFIN SANDDAB		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish				
LDB1	NOM. LONGFIN SANDDAB		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish				
SDB1	NOM. SPECKLED SANDDAB		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish				
SSDB	SPECKLED SANDDAB		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish				
APLC	ALASKA PLAICE		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish				
BMO1	NOM. BIGMOUTH SOLE		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish				
BMOL	BIGMOUTH SOLE		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish				
STRB	SPOTTED TURBOT		Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish	Non-FMP flatfish				
SRMP	__ALL SHRIMP & PRAWNS		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
PLCK	WALLEYE POLLOCK		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
CPLN	CAPELIN		Shared ecosystem component species	Shared ecosystem component species	Shared ecosystem component species	Shared ecosystem component species				
AMCK	ATKA MACKEREL		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
BSRM	UNSP. BAIT SHRIMP		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
GPRW	GOLDEN PRAWN		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
GSRM	GHOST SHRIMP		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
MSRM	MUD SHRIMP		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
OSRM	OTHER SHRIMP		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
PSHP	PINK SHRIMP		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
RPRW	RIDGEBACK PRAWN		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
RSRM	GRASS SHRIMP		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
SPRW	SPOTTED PRAWN		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
USRM	UNSP. OCEAN SHRIMP		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
BTCR	BAIRDI TANNER CRAB		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
UKCR	UNSP. KING CRAB		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
SKCR	SCARLET KING CRAB		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
RKCR	RED KING CRAB		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
GKCR	GOLDEN KING CRAB		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				

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	IFQ Species	Rebuilding Species
			North of 40° 10' latitude	South of 40° 10' latitude	North of 40° 10' latitude	South of 40° 10' latitude				
BKCR	BLUE KING CRAB		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
OCRB	OTHER CRAB		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
UCRB	UNSPECIFIED CRAB		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
RCRB	ROCK CRAB		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
USMN	UNSP. SALMON		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
STLH	STEELHEAD		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
SOCK	SOCKEYE SALMON		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
PINK	PINK SALMON		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
COHO	COHO SALMON		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
CHUM	CHUM SALMON		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
CHNK	CHINOOK SALMON		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
YLTL	YELLOWTAIL		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
OTNA	OTHER TUNA		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
UTNA	UNSPECIFIED TUNA		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
YTNA	YELLOWFIN TUNA		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
STNA	SKIPJACK TUNA		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
ETNA	BIGEYE TUNA		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
BTNA	BLUEFIN TUNA		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
BSJK	BLACK SKIPJACK		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
ALBC	ALBACORE		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
RHRG	ROUND HERRING		Shared ecosystem component species	Shared ecosystem component species	Shared ecosystem component species	Shared ecosystem component species				
PHRG	PACIFIC HERRING		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
WHOO	WAHOO		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
UMCK	UNSP. MACKEREL		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
JMCK	JACK MACKEREL		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
CMCK	CHUB MACKEREL		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
PSDN	PACIFIC SARDINE		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
PBNT	PACIFIC BONITO		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
OANC	OTHER ANCHOVY		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
NANC	NORTHERN ANCHOVY		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
MSHP	PLAINFIN MIDSHIPMAN		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
UHLB	UNSPECIFIED HALIBUT		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
OCRK	OTHER CROAKER		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
WCRK	WHITE CROAKER		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
OURC	OTHER SEA URCHINS		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
UURC	UNSP. SEA URCHINS		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
RURC	RED SEA URCHIN		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
OECH	OTHER ECHINODERM		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
UECH	UNSPECIFIED ECHINODERM		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
USCU	UNSP. SEA CUCUMBERS		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				

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	IFQ Species	Rebuilding Species
			North of 40° 10' latitude	South of 40° 10' latitude	North of 40° 10' latitude	South of 40° 10' latitude				
USTG	UNSP. STURGEON		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
WSTG	WHITE STURGEON		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
GSTG	GREEN STURGEON		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
WBAS	WHITE SEABASS		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
UHAG	UNSPECIFIED HAGFISH		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
TCOD	PACIFIC TOMCOD		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
SWRD	SWORDFISH		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
SSCL	SHARPNOSE SCULPIN		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
SRFP	SURFPERCH SPP.		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
SMLT	UNSP. SMELT		Shared ecosystem component species	Shared ecosystem component species	Shared ecosystem component species	Shared ecosystem component species				
SHP1	NOM. CALIFORNIA SHEEPHEAD		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish		X		
SHPD	CALIFORNIA SHEEPHEAD		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish		X		
SHAD	UNSPECIFIED SHAD		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
SCLP	UNSP. SCULPIN		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
SARY	PACIFIC SAURY		Shared ecosystem component species	Shared ecosystem component species	Shared ecosystem component species	Shared ecosystem component species				
SAIL	SAILFISH		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
RCKG	ROCK GREENLING		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
RGL1	NOM. ROCK GREENLING		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
QFSH	QUEENFISH		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
PROW	PROWFISH		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
POMF	PACIFIC POMFRET		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
PBTR	PACIFIC BUTTERFISH		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
OWFS	OCEAN WHITEFISH		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
OBAS	OTHER BASS		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
MRLN	STRIPED MARLIN		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
MOLA	COMMON MOLA		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
LUVR	LOUVAR		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
KFSH	GIANT KELPFISH		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
GBAS	GIANT SEA BASS		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
DRDO	DORADO		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
CUDA	PACIFIC BARRACUDA		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
BMRL	BLUE MARLIN		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
BMCK	BULLET MACKEREL		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
EELS	UNSPECIFIED EELS		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
CEEL	SPOTTED CUSK-EEL		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
WEEL	WOLF EEL		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
MEEL	MONKEYFACE EEL		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
OCTP	UNSP. OCTOPUS		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
SQID	UNSP. SQUID		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
MSQD	MARKET SQUID		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				

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	IFQ Species	Rebuilding Species
			North of 40° 10' latitude	South of 40° 10' latitude	North of 40° 10' latitude	South of 40° 10' latitude				
GSQD	GIANT SQUID		Shared ecosystem component species	Shared ecosystem component species	Shared ecosystem component species	Shared ecosystem component species				
UJEL	UNSP. JELLYFISH		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
BTRY	BAT RAY		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
OSRK	OTHER SHARK		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
USRK	UNSP. SHARK		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
ASRK	PACIFIC ANGEL SHARK		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
TSRK	COMMON THRESHER SHARK		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
PSRK	PELAGIC THRESHER SHARK		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
MAKO	SHORTFIN MAKO SHARK		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
ISRK	BIGEYE THRESHER SHARK		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
BSRK	BLUE SHARK		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
OCLM	OTHER CLAM		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
UCLM	UNSPECIFIED CLAM		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
WCLM	WASHINGTON CLAM		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
SCLM	SOFT-SHELLED CLAM		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
RZCL	ROSY RAZOR CLAM		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
RCLM	RAZOR CLAM		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
QCLM	NORTHERN QUAHOG CLAM		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
PRCL	PURPLE CLAM		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
PCLM	PISMO CLAM		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
MCLM	MANILA CLAM		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
MACL	MUD CLAMS		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
LCLM	NATIVE LITTLENECK		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
JCLM	CALIFORNIA JACKKNIFE CLAM		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
HCLM	HORSE CLAMS		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
GDUK	GEODUCK		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
GCLM	GAPER CLAM		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
CMSL	CALIFORNIA MUSSEL		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
CKLE	BASKET COCKLE		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
BMSL	BLUE OR BAY MUSSEL		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
BCLM	BUTTER CLAM		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
OSTR	OTHER OYSTER		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
USTR	UNSPECIFIED OYSTER		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
PSTR	PACIFIC OYSTER		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
LSTR	OLYMPIA OYSTER		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
KSTR	KUMAMOTO OYSTER		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
EURO	EUROPEAN OYSTER		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
ESTR	EASTERN OYSTER		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
OABL	OTHER ABALONE		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
UABL	UNSPECIFIED ABALONE		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				

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	IFQ Species	Rebuilding Species
			North of 40° 10' latitude	South of 40° 10' latitude	North of 40° 10' latitude	South of 40° 10' latitude				
WABL	WHITE ABALONE		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
RABL	RED ABALONE		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
PABL	PINK ABALONE		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
GABL	GREEN ABALONE		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
BABL	BLACK ABALONE		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
OSCL	OTHER SCALLOP		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
USCL	UNSPECIFIED SCALLOP		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
OMSK	OTHER MOLLUSKS		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
UMSK	UNSPECIFIED MOLLUSKS		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
LOBS	CALIF. SPINY LOBSTER		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
MISC	MISC. FISH/ANIMALS		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
MSC2	MISCELLANEOUS FISH		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
BHAG	BLACK HAGFISH		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
BISC	BROWN IRISH LORD		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish		X		
BLPT	BLACK EELPOUT		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
BSCL	BUFFALO SCULPIN		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish		X		
CSLK	CALIFORNIA SLICKHEAD		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
CSRK	BROWN CAT SHARK		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
PHAG	PACIFIC HAGFISH		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
RSCL	RED IRISH LORD		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish		X		
SSPF	SHORTBILL SPEARFISH		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
VCLM	VARNISH CLAM		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
SKIL	SKILFISH		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
OTCR	OPILIO TANNER CRAB		Tanner crab	Tanner crab	Tanner crab	Tanner crab				
UTCR	UNSP. TANNER CRAB		Tanner crab	Tanner crab	Tanner crab	Tanner crab				
OPAH	OPAH		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				
HSQD	HUMBOLT SQUID		Other nongroundfish	Other nongroundfish	Other nongroundfish	Other nongroundfish				

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 2016 IFQ species, and the NIFQ category includes all fish species except 2016 IFQ 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 the 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%
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%
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%
Spiny Dogfish Shark	IFQ Fixed Gear	Line	50%
	Non-Nearshore Fixed Gear	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 the GMT and were updated in June 2017.

Nearshore Grouping	Species	Area Compared to 40° 10' N. latitude	Depth (fm)	Discard Mortality Rate
Black rockfish (South of 46°16' N. lat.)	Black Rockfish	NORTH	0-10 fm	0.18
Black rockfish (South of 46°16' N. lat.)	Black Rockfish	NORTH	10-20 fm	0.28
Black rockfish (South of 46°16' N. lat.)	Black Rockfish	NORTH	20-30 fm	0.46
Black rockfish (South of 46°16' N. lat.)	Black Rockfish	NORTH	>30 fm	0.63
Black rockfish (South of 46°16' N. lat.)	Black Rockfish	SOUTH	0-10 fm	0.53
Black rockfish (South of 46°16' N. lat.)	Black Rockfish	SOUTH	10-20 fm	0.63
Black rockfish (South of 46°16' N. lat.)	Black Rockfish	SOUTH	20-30 fm	0.69
Black rockfish (South of 46°16' N. lat.)	Black Rockfish	SOUTH	>30 fm	0.96
Bocaccio rockfish (South of 40°10' N. lat.)	Bocaccio Rockfish	SOUTH	10-20 fm	0.68
Bocaccio rockfish (South of 40°10' N. lat.)	Bocaccio Rockfish	SOUTH	>30 fm	1
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	0-10 fm	0.07
Cabezon (California)	Cabezon	SOUTH	10-20 fm	0.07
Cabezon (California)	Cabezon	SOUTH	20-30 fm	0.07
Cabezon (California)	Cabezon	SOUTH	>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
Cabezon (Oregon)	Cabezon	NORTH	>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	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
California scorpionfish (South of 34°27' N. lat.)	California Scorpionfish	SOUTH	>30 fm	0.07
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	NORTH	>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
Canary rockfish	Canary 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	Blue/Deacon Rockfish	SOUTH	>30 fm	1
Deeper nearshore rockfish	Brown Rockfish	SOUTH	0-10 fm	0.54
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	Brown 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	Calico 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	Copper Rockfish	SOUTH	>30 fm	1

Table A-4 (continued).

Nearshore Grouping	Species	Area Compared to 40° 10' N. latitude	Depth (fm)	Discard Mortality Rate
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	Olive Rockfish	SOUTH	>30 fm	1
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	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
Deeper nearshore rockfish	Treefish Rockfish	SOUTH	>30 fm	1
Ecosystem component species	Big Skate	NORTH	0-10 fm	0.07
Ecosystem component species	Big Skate	NORTH	10-20 fm	0.07
Ecosystem component species	Big Skate	SOUTH	0-10 fm	0.07
Ecosystem component species	Big Skate	SOUTH	10-20 fm	0.07
Ecosystem component species	Big Skate	SOUTH	20-30 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	California Skate	SOUTH	>30 fm	0.07
Ecosystem component species	Sandpaper Skate	NORTH	0-10 fm	0.07
Ecosystem component species	Soupfin Shark	NORTH	20-30 fm	0.07
Ecosystem component species	Soupfin 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	10-20 fm	0.07
Ecosystem component species	Spotted Ratfish	SOUTH	20-30 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 (North of 40°10' N. lat.)	Lingcod	NORTH	>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
Lingcod (South of 40°10' N. lat.)	Lingcod	SOUTH	>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
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.)	Blue/Deacon Rockfish	NORTH	>30 fm	1
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	0-10 fm	0.2
Minor nearshore rockfish (North of 40°10' N. lat.)	China Rockfish	NORTH	10-20 fm	0.31

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.)	China Rockfish	NORTH	20-30 fm	0.52
Minor nearshore rockfish (North of 40°10' N. lat.)	China Rockfish	NORTH	>30 fm	1
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	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.)	Olive 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 nearshore rockfish (North of 40°10' N. lat.)	Quillback Rockfish	NORTH	>30 fm	1
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	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 (North of 40°10' N. lat.)	Vermilion Rockfish	NORTH	>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.)	Vermilion Rockfish	SOUTH	>30 fm	1
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	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	Pacific Sanddab	SOUTH	>30 fm	0.07
Other flatfish	Rock Sole	NORTH	0-10 fm	0.07
Other flatfish	Rock Sole	NORTH	10-20 fm	0.07
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

Table A-4 (continued).

Nearshore Grouping	Species	Area Compared to 40° 10' N. latitude	Depth (fm)	Discard Mortality Rate
Other flatfish	Sanddab Unid	NORTH	10-20 fm	0.07
Other flatfish	Sanddab Unid	SOUTH	0-10 fm	0.07
Other flatfish	Sanddab Unid	SOUTH	10-20 fm	0.07
Other flatfish	Sanddab Unid	SOUTH	>30 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	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)	NORTH	>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 (California)	SOUTH	>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	Kelp Greenling (Oregon)	NORTH	>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 nongroundfish	Pacific Halibut	NORTH	0-10 fm	0.07
Other nongroundfish	Pacific Halibut	NORTH	10-20 fm	0.07
Other nongroundfish	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	0-10 fm	0.54
Shallow nearshore rockfish	Black and Yellow Rockfish	SOUTH	10-20 fm	0.65
Shallow nearshore rockfish	Black and Yellow 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	China 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
Shallow nearshore rockfish	Gopher Rockfish	SOUTH	>30 fm	1
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	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

Table A-4 (continued).

Nearshore Grouping	Species	Area Compared to 40° 10' N. latitude	Depth (fm)	Discard Mortality Rate
Spiny dogfish	Spiny Dogfish Shark	SOUTH	>30 fm	0.07
Starry flounder	Starry Flounder	SOUTH	0-10 fm	0.07
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	10-20 fm	0.7
Widow rockfish	Widow Rockfish	SOUTH	20-30 fm	0.79
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	NORTH	>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	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
Yellowtail rockfish (North of 40°10' N. lat.)	Yellowtail Rockfish	NORTH	>30 fm	0.5

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

Year	Estimation Updates	Mortality Rate Updates	Management Updates
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 2016 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. Provided by Kelly Ames of the GMT.

Date	**Action** (with hyperlink to Federal Register Notice)
1/5/2016	81FR215: Proposed rule for comprehensive ecosystem-based amendment 1, amending several west coast fishery management plans; public comment period closes February 9, 2016
1/5/2016	81FR183: Reapportionment of tribal Pacific whiting allocation at the end of 2015
1/19/2016	81FR2831: Proposed rule to revise scale requirements for processing vessels in the Groundfish Trawl Rationalization Program, public comment period closes February 18, 2016
3/10/2016	81FR12676: Magnuson-Stevens Act Provisions; Fisheries off West Coast States; Pacific Coast Groundfish Fishery; 2016 Tribal Fishery for Pacific Whiting
3/28/2016	81FR17094: Inseason adjustment to incidental halibut retention in the sablefish primary fishery N. of Pt Chehalis
4/4/2016	81FR19054: Final Rule; Comprehensive Ecosystem-Based Amendment 1, Fisheries Off West Coast States
5/5/2016	81FR27006: Final Rule Regarding Scale Requirements in the Trawl Rationalization Program
5/16/2016	81FR30203: Final rule; Annual specifications and management measures for the 2016 tribal and non-tribal fisheries for Pacific whiting, effective May 12, 2016
6/1/2016	81FR34947: Proposed rule affecting commercial sablefish fisheries including electronic fish tickets, changes to ownership interest, and joint registration; public comments must be received by July 1, 2016
6/8/2016	81FR36806: Final rule to codify Court-ordered boundaries of Pacific coast tribal usual and accustomed fishing areas, effective June 8, 2016
6/10/2016	81FR37575: Proposed Information Collection; Comment Request; Pacific Coast Groundfish Trawl Rationalization Program Permit and License Information Collection

6/28/2016	81FR41868: Inseason action to reduce trip limits in the limited entry fixed gear and open access sablefish daily trip limit fisheries beginning July 1, 2016
6/29/2016	81FR42295: Proposed Rule to Reallocate Widow Rockfish Quota Shares in the Individual Fishing Quota Fishery
9/1/2016	81FR60288: Inseason Adjustments To Biennial Groundfish Management Measures
9/6/2016	81FR61161: NOAA Fisheries proposed approval of a regulatory amendment to implement electronic monitoring for sectors of the limited entry trawl fishery. Proposed Rule. Comments due by October 6.
9/30/2016	81FR67287: Notice of availability of Pacific Coast Groundfish Fishery Management Plan Amendment 27; comments must be received by November 29, 2016
9/30/2016	81FR67295: Notice of sub-loan repayment for the California pink shrimp buyback; fees will no longer be collected after August 31, 2016
10/28/2016	81FR75266: Proposed rule to establish 2017-2018 harvest specifications and management measures for Groundfish off of the West Coast. Comments must be received no later than November 28, 2016.
11/23/2016	81FR84419: New electronic fish ticket reporting requirements for sablefish landings, joint registration, and exemption to ownership limitations on sablefish permits. Effective December 23, 2016, electronic fish ticket requirements effective January 1, 2017.
12/30/2016	81FR96437: Notice of receipt of EFP application; comments due by January 24, 2017