Catch History Reconstruction for Rockfish (*Sebastes* spp.) Caught in British Columbia Coastal Waters

R. Haigh and K. L. Yamanaka

Fisheries and Oceans Canada
Science Branch, Pacific Region
Pacific Biological Station
3190 Hammond Bay Road
Nanaimo, British Columbia
V9T 6N7

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Fisheries and Oceans Canada
Science Branch, Pacific Region
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3190 Hammond Bay Road
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ABSTRACT

Haigh, R. and Yamanaka, K.L. 2011. Catch history reconstruction for rockfish (*Sebastes* spp.) caught in British Columbia coastal waters. Can. Tech. Rep. Fish. Aquat. Sci. 2943: viii + 124 p.

This technical report provides a detailed algorithm on how to reconstruct annual commercial catches of any *Sebastes* species for British Columbia during the years 1918 to the present. Reconstructed catches are used in population models as the primary source of mortality due to commercial fishing. The reconstruction presented here makes use of eight historical sources of generic rockfish catch and seven modern sources of specific rockfish catch. Ratios derived from years when the commercial fleets experienced observer coverage and individual vessel quota management inform the reconstruction procedure on how to estimate catches of individual *Sebastes* species relative to those of 'total rockfish' or 'rockfish other than Pacific Ocean Perch'. Ratios also inform the procedure on how to estimate discards. While modern catch statistics require virtually no estimation, earlier time periods (especially prior to 1996) rely increasingly on estimation the further back the reconstruction occurs. The procedure contains many assumptions; however, it essentially automates a laborious compilation process that was previously done manually. The algorithm when launched from the R statistical platform requires less than five minutes to reconstruct a catch history for a single *Sebastes* species.

RÉSUMÉ

Haigh, R. and Yamanaka, K.L. 2011. Catch history reconstruction for rockfish (*Sebastes* spp.) caught in British Columbia coastal waters. Can. Tech. Rep. Fish. Aquat. Sci. 2943: viii + 124 p.

Ce rapport technique fournit un algorithme détaillé servant à reconstituer les captures commerciales annuelles des espèces du genre *Sebastes* en Colombie-Britannique, de 1918 à aujourd'hui. Lorsqu'on établit des modèles de population, les captures reconstituées sont considérées comme principale cause de mortalité due à la pêche commerciale. La reconstitution que nous présentons se fonde sur huit sources historiques de captures de sébastes toutes espèces confondues et sur sept sources contemporaines de captures d'une espèce précise de sébaste. Les ratios obtenus pour les années faisant l'objet d'une surveillance des flottes commerciales et d'une gestion par quota individuel de bateau facilitent l'estimation des captures de chaque espèce de sébaste par rapport aux captures de sébastes toutes espèces confondues ou aux captures d'une espèce autre que le sébaste du Pacifique. Les ratios clarifient également la façon d'estimer les rejets à la mer. Si les statistiques sur les captures contemporaines ne requièrent pratiquement pas d'estimation, celles des époques antérieures (surtout avant 1996) en dépendent de plus en plus, et ce, à mesure que l'on recule dans le temps pour procéder à la reconstitution. La procédure comporte de nombreuses hypothèses; mais avant tout, elle automatise un processus de compilation laborieux, lequel était auparavant effectué à la main. L'algorithme, une fois lancé à partir de la plateforme statistique R, reconstitue en moins de cinq minutes l'historique des captures d'une espèce précise de sébaste.

INTRODUCTION

Groundfish catch statistics for British Columbia (BC) from the first half of the twentieth century contain limited information by species, unless the species' abundance supported a major fishery. Even then, species descriptors often used non-scientific categories (e.g., 'redfish', 'snapper', etc.). Modern rockfish assessments at the Pacific Biological Station (PBS, Nanaimo) model populations comprising fish that can typically reach ages of 100 y and in some species up to 200 y (Munk 2001). Additionally, some of the rockfish stocks in BC have been classified by COSEWIC (Committee on the Status of Endangered Wildlife in Canada) as *threatened* or *endangered*, which requires the formulation and implementation of *recovery potential assessments* (RPAs). For these reasons, we need to reconstruct historical catch time series that extend further back in time (e.g., Edwards et al. in revision, Taylor et al. in prep., Yamanaka et al. in revision) than those previously used.

Our reconstruction algorithm estimates annual removals (landed catch + discards) in metric tonnes (t) of specified rockfish, by:

(i) calendar year,

(ii) Pacific Marine Fisheries Commission (PMFC) area:
- 4B – (major 1) inside waters including Strait of Georgia,
- 3C – (major 3) SW coast of Vancouver Island,
- 3D – (major 4) NW coast of Vancouver Island,
- 5A – (major 5) southern Queen Charlotte Sound,
- 5B – (major 6) northern Queen Charlotte Sound,
- 5C – (major 7) southern Hecate Strait,
- 5D – (major 8) northern Hecate Strait and Dixon Entrance,
- 5E – (major 9) west coast Haida Gwaii (formerly Queen Charlotte Islands); and

(iii) fishery type (FID):
- 1 = groundfish trawl,
- 2 = Halibut longline,
- 3 = Sablefish trap/longline,
- 4 = schedule II comprising primarily Dogfish and Lingcod, and
- 5 = hook and line (H&L) rockfish, eventually regulated under ZN licensing.

Because historical catch data do not provide landings of individual rockfish species, we use broad rockfish categories (POP = Pacific Ocean Perch, ORF = rockfish other than POP, and TRF = total rockfish) and apply ratios that we calculate from modern catches (e.g., POP/TRF for Pacific Ocean Perch (*Sebastes alutus*) or YYR/ORF for Yelloweye Rockfish (*S. ruberrimus*)) to disaggregate historical catches. This assumes that modern ratios reflect historical ones. Many factors may invalidate this assumption – selective fishing, environmental shifts, habitat destruction; however, we have little choice if we want historical catch estimates for specific rockfish species.

In the section following, most sources of historical landings provide data that overlap in some years. Two of the sources provide unique and consequently additive

information, regardless of the year. The first additive series is the very early landed catch from 1918 to 1950. It reflects a basal low exploitation rate that occurred prior to World War II. The second additive series is that of the foreign (Russian and Japanese) fleets that fished heavily along the BC coast from 1965 to 1976 until the inception of the 200-mile exclusive economic zone (EEZ). All other historical series may contain redundant information where they overlap, and so we take the maximum annual value from these.

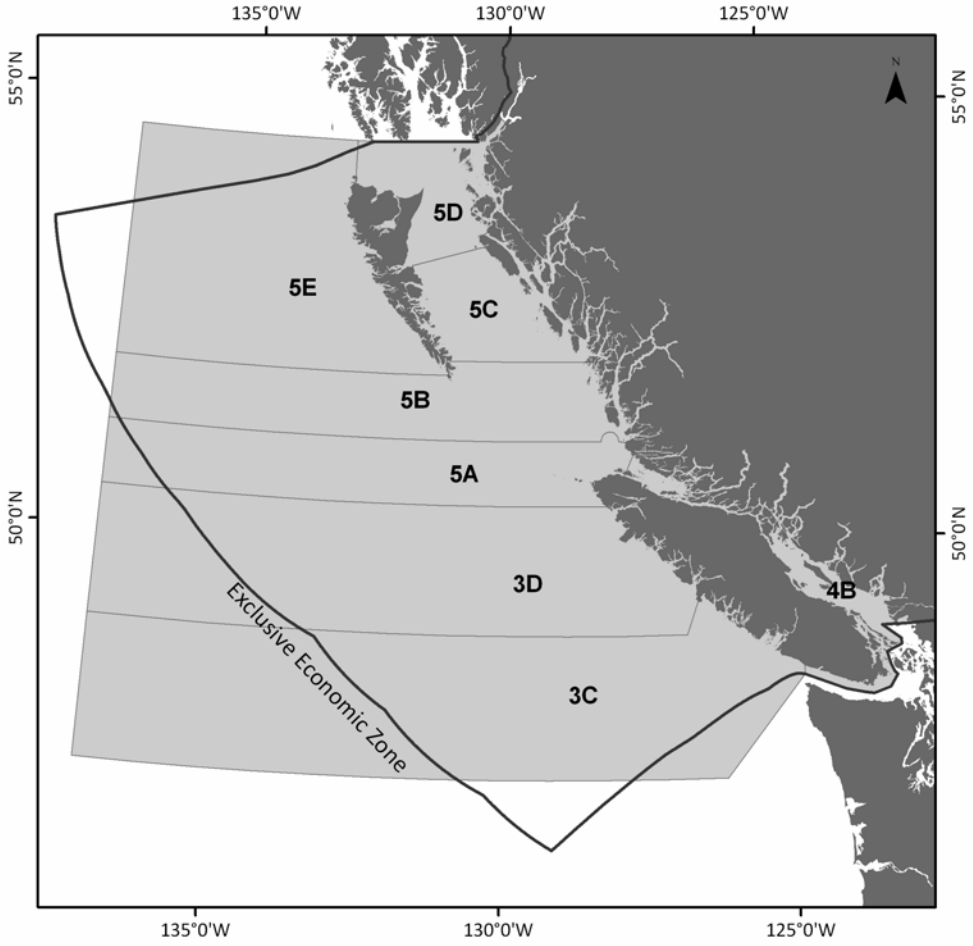

Figure 1. Pacific Marine Fisheries Commission areas along the BC coast and the 200-mile Exclusive Economic Zone (EEZ). (Source: Lisa Lacko, PBS, DFO)

DATA SOURCE OVERVIEW

`PacHarvest` (also known as **`PacHarvTrawl`**) is a DFO (Dept. of Fisheries and Oceans Canada) database that contains catch and effort records from at-sea observer logbooks and dockside landings data from 1996 to March 2007. Catches are recorded as retained or discarded, with the discards subdivided into *marketable live*, *marketable dead* or *unmarketable* categories. The groundfish trawl data from the 2006-07 season are also recorded in DFO's Fishery Operations System (see below), but in **`PacHarvTrawl`** erroneous data have been removed and thorough validation checks have been conducted.

The database **PacHarvSable** includes the commercial trap and longline Sablefish catch and effort records from fisher logbooks (1990-2006), observer logbooks (2000-2005), and the Dockside Monitoring Program (DMP, 1995-2002).

The **PacHarvHL** database was implemented to store catch and effort data from commercial hook and line fisheries in British Columbia. These include directed fisheries for rockfish species (ZN licence), Halibut (L licence), and Dogfish-Lingcod (Schedule II). Data stored from the logbook program include the years 1986-2006 (for ZN) and 2001-2006 (for Schedule II); there are no logbook records for the Halibut fishery. At-sea observer logbooks are available for 1999-2004 (for ZN and Halibut) and 2001-2004 (for Schedule II). **PacHarvHL** also contains the dockside validation data for the ZN (1995-2005), Schedule II (1996-2005), and Halibut (1991-2005) landings.

The Fishery Operations System (FOS) collects and stores commercial fishery catch and effort data for multiple BC fisheries. To facilitate access to the groundfish harvest records, a database called **GFFOS** was created to provide virtual tables linked to **FOS**. These tables emulate those in the suite of **PacHarvest** databases. A Microsoft Access front-end shell for **GFFOS** and a user guide authored by Malcom Wyeth (PBS, DFO) can be found at http://svbcpbsgfiis/sql/DatabaseShells.htm. In 2002, **FOS** began storing Halibut and Sablefish fishery landings from the DMP. In 2006-07, data from fisher logbooks, observer logbooks, and the Electronic Monitoring Program (EMP) were added, including those from the Rockfish, Spiny Dogfish, Lingcod, and Trawl fisheries. These programs are designed to monitor the catch from various trips, including those for quota-holders, seamounts, experiments, and the International Pacific Halibut Commission (IPHC), as well as record landings by US vessels at Canadian ports.

1. RECONSTRUCTION ALGORITHM

In general for a reconstructed rockfish (RRF) species, the algorithm for estimating annual catch (landed + discarded) uses historical landings of broad catch categories and estimates a proportion of them by PMFC area and fishery. The more recent data sources contain catch information for individual rockfish species, and so we do not need to estimate them from a general catch category. The same is true for reported discards: earlier years require estimation, later years report them.

The reconstruction executes a complex series of rules using SQL (Structured Query Language) queries combined with R code (R Development Core Team 2011) to derive an annual catch series for five fisheries (Trawl, Halibut, Sablefish, Dogfish-Lingcod, H&L (hook and line) Rockfish) in BC's eight PMFC areas (4B, 3C, 3D, 5A, 5B, 5C, 5D, 5E). This yields 40 annual series (48 when fisheries are combined).

The landings estimation procedure uses observations from modern data sources to calculate catch ratios of reconstructed rockfish species to a general group that was historically reported – (i) total rockfish (TRF), (ii) Pacific Ocean Perch (POP), or (iii) other rockfish (ORF) excluding POP, where TRF = ORF + POP. These ratios are then

applied to historical landings of the group to estimate landings of RRF. The assumption that modern catch ratios are the same as those in the past is questionable, but with the absence of any real evidence on historic ratios, this assumption is the only viable alternative.

The estimation of discard rates also uses modern data, but restricts the records to those observed by an independent source (e.g., onboard observers). The assumption is that modern discard rates reflect those in the past where management restrictions fostered discarding.

1A. COMPILE THE HISTORICAL CATCHES OF POP, ORF, AND TRF

The first step in the reconstruction is to pull together the historical data for POP, ORF, and TRF. In earlier data sources, there is little information on fishery types as we know them today. For this reason we consolidate the information into four basic gear categories K = ('h&l', 'trap', 'trawl', 'combined'). The latter is reserved for catch where no information exists on gear type used.

The data are also sorted into groups:

(i) additive – where the catch data are unique and therefore additive, and

(ii) redundant – where the catch data may be redundant to or overlap other sources.

An example of the latter occurs when Ketchen's (1976) trawl data (US + Canada landings) usually exceeds the values of Canadian-only landings reported in the database **`GFCatch`**. When data sources are flagged to be redundant, we use the maximum value by year.

Once we've identified purely additive data, including the maxima of redundant sources, we sum the landings to derive the historical rockfish dataset $H_{i\,j\,K\,l}$,

where, $i =$ calendar year {historical years = 1918-1995},

$j =$ PMFC area {

0	= UNK (unknown),	1	= 4B (Strait of Georgia),
2	= 3B (Washington coast),	3	= 3C (SW Vancouver Is),
4	= 3D (NW Vancouver Is),	5	= 5A (S Queen Charlotte Sound),
6	= 5B (N Queen Charlotte Sound),	7	= 5C (S Hecate Strait),
8	= 5D (N Hecate Strait),	9	= 5E (W Haida Gwaii),
10	= 6 (Alaska),	11	= BC (BC offshore waters),
67	= 3A (Capes Falcon to Elizabeth),	68	= 4A (Puget Sound) },

$K =$ gear category {
h&l = hook and line, trap = traps, trawl = trawl nets,
U = combined (either unknown or multiple gear types) },

$l =$ catch group {
C = POP (Pacific Ocean Perch),
D = ORF (rockfish other than POP),
F = TRF (total rockfish) }.

Note that not all the available PMFC areas are used in the reconstruction.

For the time period 1918-1949, landings of ORF and TRF are identical because catch agencies did not identify POP. Pacific Ocean Perch started appearing in catch records in 1950, but seem artificially low from 1950-1952. Therefore, for the period 1918-1952 we predict ORF and POP using a regression of ORF against TRF landings using the 1953-1995 data (excluding an anomalous 1966 point and transforming the data in $\log_2$ space to reduce positive skew):

$$D = 2^{(a + b \log_2 E)} = 2^a E^b \quad \text{and} \quad C = E - D \ ,$$

where a = -0.8063372, b = 1.006260, C = POP, D = ORF, and E = TRF. Aside from estimating ORF in the very early series, this general transformation allows POP to be used as a prominent group in the ratio calculations for other species of rockfish.

1B. GATHER THE RRF CATCHES BY FISHERY (LANDED AND DISCARDED)

Annual RRF catches (landed and discarded) are extracted from various databases (Table 1). In 2002, the Fishery Operations System (FOS) began storing the Halibut and Sablefish fishery Dockside Monitoring Program (DMP) data. Later in 2006 and 2007, FOS brought in data from the fisher logbooks, observer logbooks and Electronic Monitoring (EM) programs. At this time, the fishery sectors included Inside Rockfish, Outside Rockfish, Spiny Dogfish, Lingcod and Trawl. The data programs cover quota trips, seamount trips, experimental trips, International Pacific Halibut Commission (IPHC) trips and records of US vessels landing at Canadian ports. Additionally, species are managed through an integrated fisheries management plan (IFMP), which sometimes blurs the distinction among the various fisheries.

Our collection of catch information also includes the landings of prominent groups:

POP = Pacific Ocean Perch (redundant in the case when the RRF species is POP),
ORF = rockfish species other than POP,
TRF = total rockfish (ORF + POP),
TAR = target groups of species that most represent the fisheries.

These groups are used later for calculating various ratios that adjust historical or incomplete catch series. The TAR groups for the H&L fisheries are fairly clear:

Halibut	Pacific Halibut (*Hippoglossus stenolepis*);
Sablefish	Sablefish (*Anoplopoma fimbria*);
Dogfish-Lingcod	Spiny Dogfish (*Squalus acanthias*) + Lingcod (*Ophiodon elongatus*);
H&L Rockfish	Quillback (*Sebastes maliger*) + Copper (*S. caurinus*) + China (*S. nebulosus*) + Tiger (*S. nigrocinctus*) + Yelloweye (*S. ruberrimus*).

The TAR group for trawl is nebulous because this fishery has so many potential targets depending on quota holdings. We don't use the trawl TAR group for any calculation; however, for convenience we simply set the trawl TAR to TRF.

Often we get annual landings where the PMFC area is not known or not specified (major code = 0). Rather than discard these landings (which can be substantial) we allocate them to the BC PMFC areas based on observed proportions of landings in the BC PMFC areas by year.

Table 1. Catch information sources for the five main groundfish fisheries. FID = Fishery identification number; DMP = dockside monitoring program.

FID	Fishery	Years	Database	Catch Information
1	Trawl	1956-1995	**Ketchen/GFCatch**	Mixture (sales slips, validation records)
		1996-2006	**PacHarvest**	Merged (DMP, observer/fisher logs)
		2007-2011	**GFFOS**	Mixture (DMP, observer/fisher logs)
2	Halibut	1982-1995	**PacHarv3**	Sales slips
		1996-2005	**PacHarvHL**	DMP
		2006-2011	**GFFOS**	Mixture (DMP, observer/fisher logs)
3	Sablefish	1982-2002	**PacHarv3**	Mixture (sales slips, validation records)
		2003-2005	**PacHarvSable**	DMP
		2006-2011	**GFFOS**	Mixture (DMP, observer/fisher logs)
4	Dogfish-	1982-1995	**PacHarv3**	Sales slips
	Lingcod	1996-2005	**PacHarvHL**	DMP
		2006-2011	**GFFOS**	Mixture (DMP, observer/fisher logs)
5	H&L	1979-1985	**GFCatch**	Mixture (sales slips, validation records)
	Rockfish	1986-1994	**PacHarvHL**	Fisher logs
		1995-2005	**PacHarvHL**	DMP
		2006-2011	**GFFOS**	Mixture (DMP, observer/fisher logs)

1C. CALCULATE RATIOS

We calculate various ratios (to facilitate the rebuilding of historical catch) from modern catch statistics using reference years that reflect periods when information knowledge is high and/or stable. For most rockfish species, we choose a starting reference year of 1997, which coincides with observer trawl coverage and the initiation of the IVQ (Individual Vessel Quaota) program. The latter year 2005 is the last full calendar year that appears in the **PacHarvHL** and **PacHarvSable** databases.

Starting with the catch dataset

$$C_{h\,i\,j\,k\,l}$$

where, $h =$ fishing event (e.g., trawl tow, longline set, trap set, etc.),
$i =$ calendar year {reference years = 1997-2005},
$j =$ PMFC area {1=4B, 3=3C, 4=3D, 5=5A, 6=5B, 7=5C, 8=5D, 9=5E},

$k =$ fishery ID {
1=Trawl, 2=Halibut, 3=Sablefish, 4=Dogfish-Lingcod, 5=H&L Rockfish},
$l =$ catch species or group {
A = RRF landed,
B = RRF discarded,
C = POP landed,
D = ORF landed,
E = TRF landed,
F = TAR landed },

we derive reference catch Q_{jkl} for PMFC area j and fishery k for each group l:

$$Q_{jkl} = \sum_{i=1997}^{2005} \sum_{h=1}^{n_{ijk}} C_{hijkl} \ ,$$

where $n_{ijk} =$ number of fishing events in year i, area j, and fishery k.

alpha – Proportion RRF caught in PMFC areas by all fisheries

For each fishery k, we use the reference catch Q_{jkA} to define the proportion of the RRF species landed in each PMFC area j:

(R.1) $\alpha_{jk} = \dfrac{Q_{jkA}}{\sum_{j} Q_{jkA}}$, where A = RRF landed and $k =$ fishery IDs {1,2,3,4,5}.

beta – Proportion RRF caught in PMFC areas by H&L fisheries

As the historical hook and line catch series do not specify the various fisheries we have at present, we derive a ratio β_{jk} similar to α_{jk} but only for the hook and line fisheries (Halibut, Dogfish-Lingcod, H&L Rockfish). For each H&L fishery k, we use the reference catch Q_{jkA} to define the proportion of the RRF species landed in each PMFC area j:

(R.2) $\beta_{jk} = \dfrac{Q_{jkA}}{\sum_{k} Q_{jkA}}$, where A = RRF landed and $k =$ fishery IDs {2,4,5}.

gamma – Ratio of RRF to a prominent historical group (POP, ORF, or TRF)

This ratio calculates the landed catch of the RRF (species A) relative to the catch of a prominent historical group (C = POP, D = ORF, or E = TRF). For minor RRFs, the prominent group is often ORF, whereas for a major RRF species like POP we use TRF. The user is advised to try each prominent group as the results can vary substantially depending on the stability of the relationship between the RRF and the prominent group. The ratio is fairly straightforward:

(R.3) $\gamma_{jk} = \frac{Q_{jk\mathrm{A}}}{Q_{jk\mathrm{P}}}$,

where j = major area,
k = fishery,
A = RRF landed, and
P = prominent group {C, D, or E} landed.

delta – Discard rate of RRF from observer logs

During a trip, the at-sea observer records the amount of catch discarded for every fishing event, then applies a mortality rate to generate the amount presumed dead. A species dependant mortality rate is used for tows up to 2 hours in length and an additional species dependant rate is added for each subsequent hour. For rockfish, this mortality rate is 100% right from the time of capture.

Discard rate calculations use observer records (which we designate C' with the same subscripting as that for C) because these records are the only ones that consistently report discarding. Modern observer trawl data comprise chiefly onboard observer records from 1996 to 2006 and so discards are well known for this period. For the non-trawl fisheries, at-sea observer data were collected between 1999 and 2005 and included discarded catch; however, only the period 2000 to 2004 contains useful discarding information by PMFC area for most of the H&L fisheries.

The discard ratios δ_{jk} for RRF species are calculated as means of annual means of ratios within PMFC areas j by fishery k. The numerator for all discard ratios here is discarded catch of the RRF species; however, the denominator depends on the fishery. For Trawl ($k=1$) and H&L Rockfish ($k=5$) most of the RRF are retained often enough to provide sufficient non-zero denominators in simple discard/landed ratios:

(R.4) $\delta_{j1} = \frac{1}{11}\sum_{i=1996}^{2006}\left[\frac{1}{o_{ij1}}\sum_{h=1}^{o_{ij1}}\frac{C'_{hij1\mathrm{B}}}{C'_{hij1\mathrm{A}}}\right]$ for Trawl (k = 1) and

(R.5) $\delta_{j5} = \frac{1}{5}\sum_{i=2000}^{2004}\left[\frac{1}{o_{ij5}}\sum_{h=1}^{o_{ij5}}\frac{C'_{hij5\mathrm{B}}}{C'_{hij5\mathrm{A}}}\right]$ for H&L Rockfish (k = 5),

where A = RRF landed,
B = RRF discarded, and
$o_{ijk} =$ the number of observed fishing events in year i, area j, and fishery k.

For any individual ratio C'_{hijkB}/C'_{hijkA} (discarded/landed RRF catch in fishing event h) for fisheries k = {1,5} we
(a) discard the ratio if an NA-value occurs in either the numerator or denominator;
(b) retain a zero-value discard (numerator) and set C'_{hijkB}/C'_{hijkA} to 0;
(c) retain a zero-value landing (denominator) and set the ratio thus:
(i) if discarded catch > 0 then C'_{hijkB}/C'_{hijkA} = 1 (RRF completely discarded),
(ii) if discarded catch = 0 then C'_{hijkB}/C'_{hijkA} = 0 (RRF not caught or dicarded);
(d) otherwise calculate the discard ratio between 0 and 1.

For species that are rarely retained, we need to use the landings of some other group as the denominator in the discard ratio. That is, we calculate the amount of discarded RRF per landings of a target species or group of species TAR. This is especially true for fisheries other than Trawl and H&L Rockfish. For instance, a Halibut fishing vessel traditionally would not retain *Sebastes* species so that rockfish caught were discarded without any record. Consequently, a discard rate expressed as RRF discarded (0 t) per RRF landed (0 t) yields no information. Even observer records with positive discards of RRF would report no landed RRF catch. Consequently, for the Halibut, Sablefish, and Dogfish-Lingcod fisheries we use:

$$\text{(R.6)} \quad \delta_{jk} = \frac{1}{5} \sum_{i=2000}^{2004} \left[\frac{1}{o_{ijk}} \sum_{h=1}^{o_{ijk}} \frac{C'_{hijkB}}{C'_{hijkF}} \right],$$

where B = RRF discarded,
F = target species landed (TAR, listed in Section 2 above),
$k =$ {2, 3, 4} (Halibut, Sablefish, Dogfish-Lingcod), and
$o_{ijk} =$ the number of observed fishing events in year i, area j, and fishery k.

For any individual ratio C'_{hijkB}/C'_{hijkF} (discarded RRF/ landed TAR catch in fishing event h) for fisheries k = {2,3,4} we use the same rules as above for C'_{hijkB}/C'_{hijkA} but the demominator becomes TAR landed.

lambda – Proportion of early catch taken by general gear type

The very early time series of rockfish catch (1918-1950) only cover three districts (I, II, and III) along the BC coast (Section 2), which we assign to PMFC areas. This early catch has no gear type specified. In past reconstructions, the catch with unknown gear type U was split into general categories K {'h&l', 'trap', 'trawl'} using the empirical gear ratios λ_{jK} from sales slip data. This reconstruction assumes that the catch prior to

World War II (1918-1938) was taken primarily by the hook and line fisheries (90% H&L, 10% trawl). During and after the war, the estimated gear distribution is calculated from the sales slip landings in 1951 and 1952 (Table 2 and Table 51).

Table 2. Gear ratios λ_{jK} : pre-WWII given as a fixed proportion; WWII and later based on sales slip landings (compiled into **PacHarvHL** tables by Shannon Obradovich) from 1951-52.

	gear K (1918-38)			gear K (1939-50)		
PMFC j	h&l	trap	trawl	h&l	trap	trawl
4B	0.9	0	0.1	0.47423	0.01651	0.50926
3C	0.9	0	0.1	0.07197	0	0.92803
3D	0.9	0	0.1	0.90566	0	0.09434
5A	0.9	0	0.1	0.63745	0	0.36255
5B	0.9	0	0.1	0.47743	0	0.52257
5C	0.9	0	0.1	0.53215	0	0.46785
5D	0.9	0	0.1	0.32572	0	0.67428
5E	0.9	0	0.1	1.00000	0	0

1D. RECONSTRUCT THE CATCH OF THE RRF SPECIES

Historical catch series with unknown gear type

The earliest time series of catch (Canadian Dominion Bureau of Statistics) does not specify gear type, i.e., K = 'U' (unknown/ combined/ multiple gears). To assign the PMFC area j catch to the five fisheries k we first modify the hook and line ratio (R.2) by parsing out the 'h&l' category to the three hook and line fisheries (Halibut, Dogfish-Lingcod, H&L Rockfish) and transferring the ratios for Trawl and Trap:

(R.7) $\beta'_{jk=\{2,4,5\}} = \lambda_{jK=\{\text{h\&l}\}}\beta_{jk=\{2,4,5\}}$ and $\beta'_{jk=\{1,3\}} = \lambda_{jK=\{\text{trawl, trap}\}}$,

where λ_{jK} differs depending on two regimes (1918-38 and 1939-50, Table 2).

The ratio γ_{jk} (R.3) describes how to allocate the catch of a prominent group (TRF/ORF) to RRF by area and fishery. Therefore, ratios (R.7) and (R.3) enable the tansformation of the earliest historical rockfish landing data H to annual RRF landings L:

$$L_{ijk} = H_{ij\text{UE}}\left[\beta'_{jk}\,\gamma_{jk}\right] ,$$

where E = TRF for a POP reconstruction
(or use D = ORF to reconstruct most other RRF) and
U = combined gear (either unknown or multiple gear types).

Historical catch series with known gear type

For historical data that specifies gear type (K = 'h&l', 'trap', or 'trawl'), the data generally start in 1930 and run until 1995. To assign the PMFC area j catch to the five

fisheries k we again modify the hook and line ratio (R.2) by parsing out the ‘h&l’ category to the three hook and line fisheries (Halibut, Dogfish-Lingcod, H&L Rockfish) and setting Trawl and Trap ratios to unity:

(R.8) $\beta''_{jk=\{2,4,5\}} = \beta_{jk=\{2,4,5\}}$ and $\beta''_{jk=\{1,3\}} = 1.0$,

The ratio γ_{jk} (R.3) describes how to allocate the catch of a prominent group (TRF/ORF) to RRF by area and fishery. Therefore, ratios (R.8) and (R.3) enable the tansformation of the historical rockfish landing data H to annual RRF landings L:

$$L_{ijk} = H_{ijK\,\mathrm{E}} \left[\beta''_{jk}\, \gamma_{jk} \right] .$$

where E = TRF for a POP reconstruction
(or use D = ORF to reconstruct most other RRF) and
K = gear types {‘h&l’, ‘trap’, ‘trawl’}.

For most RRF species we use the ratio γ_{jk} described in Section 1C to estimate their landings when no credible data exist, typically prior to 1995. The only exceptions are POP, which has known trawl landings from 1956 on, and Yelloweye Rockfish caught by the Dogfish-Lingcod and H&L Rockfish fisheries, where we use reported landings from 1982 on. Prior to these periods, we estimate landings using the area-fishery specific ratio γ_{jk}.

Discarded catch

The final step adds discarded catch, which can come from catch records or calculations. In the early years without regulations, discarding was deemed negligible, that is, they kept what they caught. Table 3 reports the various discarding regimes we use in the catch reconstruction.

Table 3. Discard regimes by fishery where ‘negligible’ assumes discarding was minimal, ‘calculated’ derives mean discard rates (Section 1C, p.8), and ‘reported’ indicates that actual discards appear in the catch records.

FID	Fishery	negligible	calculated	reported
1	Trawl	1918-1953	1954-1995	1996-2010
2	Halibut	1918-1978	1979-2005	2006-2010
3	Sablefish	1918-1985	1986-2005	2006-2010
4	Dogfish-Lingcod	1918-1985	1986-2005	2006-2010
5	H&L Rockfish	1918-1985	1986-2005	2006-2010

Discards (or releases) R therefore take one of the following values:

negligible $R_{ijk} = 0$;

calculated $R_{ijk} = \delta_{jk} L_{ijk}$ for $k =$ {1, 5};

$$R_{ijk} = \delta_{jk} \sum_{h=1}^{n_{ijkF}} C_{hijkF} \quad \text{for } k = \{2, 3, 4\} \text{ and F = TAR species;}$$

reported $$R_{ijk} = \sum_{h=1}^{n_{ijkB}} C_{hijkB} \quad \text{for B = RRF discarded.}$$

The total catch T is then simply:

$$T_{ijk} = L_{ijk} + R_{ijk}$$

2. HISTORIC LANDINGS OF ROCKFISH

The following historical catch series are housed in a local relational database called **`Historical_Catch.mdb`**. For convenience, we provide tables of landings converted to metric tonnes in the following sections. Appendix A contains details of the data manipulation.

1918 – 1950: LANDINGS (CANADA DOMINION BUREAU OF STATISTICS)

In British Columbia, the earliest rockfish catch records are those compiled by the Canada Dominion Bureau of Statistics (1918–1950). Landings were reported in three districts (Table 4) that roughly include the following areas: District I – the Vancouver area, District II – the area north of Cape Caution, and District III – the remainder of the province. Yamanaka et al. (in revision) extracted the rockfish records and noted the following. The category of fish varied slightly from year to year and included 'red cod, etc.' (1918-1930), 'red and rock cod' (1931-1943, 1945, 1946), 'red cod' (1944), and 'rockfish' (1947-1950). Fishing gear was not specified in the records. Landings were originally recorded in short hundredweights (centum weights *cwt*, defined as 100 lbs). We convert these to lbs for the historical catch database.

Using 1951-52 sales slip data for red fish and rockfish (see section below on data compiled by Obradovich), we estimate the proportion of district catch caught in PMFC areas:

D1: 4B (p = 1.0);

D2: 5A (0.003), 5B (0.390), 5C (0.165), 5D (0.321), 5E (0.121);

D3: 4B (0.610), 3C (0.207), 3D (0.167), 5A (0.016);

and allocate the district catch accordingly (Table 5).

1930 – 1964: US LANDINGS FROM BC WATERS (STEWART, PERS. COMM.)

Ian J. Stewart[1] (pers. comm.) very kindly sent us his spreadsheet on historical landings (lbs) of rockfish in Washington, Oregon, and California that he used for an

[1] National Marine Fisheries Service, Northwest Fisheries Science Center, 2725 Montlake Blvd. E., Seattle WA, 98112

assessment of Canary Rockfish (*Sebastes pinniger*) in US Pacific waters (Stewart 2009). In particular, we use his Washington landings of rockfish from 1942 to 1964 collected from Pacific Coast States Fisheries bulletins (Department of the Interior) housed at the NW Fisheries Science Center. Stanley et al. (2009) also used these data (but only to 1949), and estimated the proportion of Washington landings coming from BC waters to be 0.715. Further, Stanley et al. (2009) allocated the BC removals to PMFC areas using observed proportions by area of US catch from Ketchen (1976) for the years 1950 to 1953:

3C (0.220), 3D (0.163),

5A (0.209), 5B (0.387), 5C (0.003), and 5D (0.018).

We adopt this allocation scheme here (Table 6).

Additionally, Stewart used Pacific Fisherman yearbooks to compile landings for Washington from 1930 to 1964. Stanley et al. (2009) only used the 1930-1941 data and the same allocation ratios mentioned above to estimate catch from BC's PMFC areas. We follow Stanley's allocation scheme but use all of Stewart's data (Table 6).

1945 – 1953: TABLE B3_CATCH_PRE54 (THOMSON & YATES 1960-61)

The data table **B3_Catch_Pre54** in the DFO database **GFCatch** on the server **SVBCPBSGFIIS** provides rolled-up trawl catch data for predominant species/groups. These landings appear in two Fisheries Research Board of Canada statistical circular series (Thomson & Yates 1960, Thomson & Yates 1961). Table 7 summarizes rockfish catch from this database.

1950 – 1975: CANADIAN AND US LANDINGS FROM BC WATERS (KETCHEN 1976)

During the period 1950 to 1975, American fishing vessels were actively trawling the waters off BC's coast and accounted for the majority of catch. Ketchen (1976) provides annual summaries of landings (thousands of lbs) by PMFC area for thirteen predominant fish species/groups, including 'Pacific Ocean Perch' and 'other rockfish'.

For individual rockfish species other than Pacific Ocean Perch, estimated landings can be calculated as a proportion of 'other rockfish' landed (Table 8). For Pacific Ocean Perch, landings can be used directly (Table 9).

1951 – 1981: SALES SLIP DATA FOR RED FISH AND ROCKFISH (OBRADOVICH)

Shannon Obradovich (PBS, DFO, 2000) compiled sales slip data from 'BC Commercial Catch Statistics: Pacific Region', and the results are available as tables:

B21_Historic_Year_Details
B22_Historic_Area_Catch
PHHL_C_Historic_Gear_Codes

in the DFO database **PacHarvHL** (server **SVBCPBSGFIIS**).

The historic sales slips give landings by Pacific Fisheries Management (PFM) areas[2] (a.k.a. DFO statistical areas, which we convert to PMFC areas), various gear types (1 = trawl, 2 = trap, 3 = gillnet, 5 = longline, 6 = seine, 22 = beach seine, 33 = H&L or troll, 44 = other), and categories of “red and rock cod” (1951-1975) and “rockfish” (1976-1981). The hook and line fisheries (gears 5 and 33 combined, Table 10) and the trawl fishery (gear 1, Table 11) account for most of the catch, with minor amounts recorded by the trap fisheries (gear 2, Table 12). Minor amounts of rockfish were caught by the remaining gear types (3, 6, 22, 44), but we do not use these.

1954 – 1995: LOGBOOKS AND LANDINGS (GFCATCH)

Rutherford (1999) provides a good summary of the **GFCatch** database (server **SVBCPBSGFIIS**) and its history. In brief, this database contains catch and effort data from three sources: logbooks (skippers, onboard observers), landing records (sales slips or validation records), and anecdotal information. The logbooks provide good information on areas fished and amount of effort but only estimates of catch. Species composition is usually limited to dominant retained species. Conversely, sales slips and validation records provide accurate estimates of weight unloaded at the dock but very little information on the areas fished or effort expended. The accuracy of species composition is variable. Anecdotal information (viewing offloads, interviewing vessel crews) often provides information that supplements or sometimes supersedes data provided by the other two sources. Annual catch summaries of rockfish other than POP are presented in Table 13 for hook and line gear, Table 14 for trap gear, and Table 15 for trawl gear. Reported landings of POP by trawl appear in Table 16; landings of POP by hook and line gear are negligible (7 kg in 1983).

1965 – 1976: RUSSIAN AND JAPANESE CATCH IN BC WATERS (KETCHEN 1980)

For a decade along the BC coast, the U.S.S.R. and Japan harvested very large amounts of rockfish (primarily Pacific Ocean Perch). Ketchen (1980) attempts to estimate these foreign catches using whatever catch records he could get from the two nations. The Russians tended to use large sweeping areas to record catch while the Japanese provided more methodical summaries by geo-referenced blocks. Neither of these standards conform to the PMFC areas that Canada and the US had agreed to use. Additionally, the Russians tended to use the term ‘perches’ for all rockfish, while the Japanese terminology of ‘Pacific Ocean Perch’ included all rockfish. Ketchen’s methodology for estimating rockfish catch produces three estimates (minimum, intermediate, and maximum). Catch reconstructions years later tend to use the intermediate estimates, and we follow this tradition. Ketchen estimated ‘other rockfish’ caught by the Russian and Japanese fleets (Table 17, Table 18) and Pacific Ocean Perch caught by the two fleets (Table 19, Table 20).

[2] PFMAR (2007) provides official area boundaries.

1982 – 1994: SALES SLIP DATA (PACHARV3)

Sales slip data from landings records provide catch by trip. The Oracle database generally known as **PacHarv3** but actually called **HARVEST_V2_0** on the **ORAPROD** server is complicated. Luckily there is a **CATCH_SUMMARY** table that provides a rollup from various other tables. We extract annual catches from this summary table by PFM areas converted to PMFC areas. Below, we report 'other rockfish' landings by three gear types: hook and line (Table 21), trap (Table 22), and trawl (Table 23). For Pacific Ocean Perch, hook and line landings are negligible (Table 24) while trawl landings are substantial (Table 25).

3. MODERN CATCH OF ROCKFISH

Modern catch statistics for BC rockfish are currently housed in a variety of DFO databases. These can be accessed through Microsoft front-end shells located at (http://SVBCPBSGFIIS/sql/). However, we have automated the catch reconstruction as much as possible using SQL queries (Appendix B) launched from the R statistical platform using the packages **RODBC**[3] and **PBSfishery**[4].

Some of the data sources below for RRF catch have already been described in the previous section that describes historical landings of rockfish groups (POP and ORF).

Important: Annual landings by area of POP as the RRF will not necessarily match landings of POP as a prominent group because the former may include annual landings with unspecified area allocated across BC major areas proportional to the annual landings by BC major area. Additionally, for **PacHarv3** there are substantial differences in grouping by gear code for prominent group vs. grouping by fishery for RRF (see Appendix A. 'MSA pass-through ORACLE Query: B4_Catch_1982-1994_PacHarv3' vs. Appendix B. 'Oracle Query: ph3_fcatORF.sql')

1954 – 1995: LOGBOOKS AND LANDINGS (GFCATCH)

In the **GFCatch** database (details on page 14), the accuracy of species composition is variable and usually limited to dominant retained species. Sales slips and validation records provide accurate estimates of weight unloaded at the dock but very little information on the areas fished or effort expended.

1982 – 1995: SALES SLIP DATA (PACHARV3)

Sales slip data housed in the Oracle database **PacHarv3** (see page 15) are best summarised by the table **CATCH_SUMMARY** from which we can extract annual catches by PMFC areas converted from PFM areas.

[3] http://cran.r-project.org/web/packages/RODBC/index.html
[4] http://code.google.com/p/pbs-fishery/

1986 – 1995: HOOK AND LINE FISHER LOG DATA (PACHARVHL)

The rockfish hook and line fishing license (ZN) was introduced in 1986 along with a voluntary fishing logbook program. The logbooks became a license requirement in the early 1990s. Logbook records remained the only source of species specific rockfish catch records until the institution of the dockside monitoring program. The format of the ZN logbook has changed over time but the basic catch and effort by location data have been maintained in databases (Haigh and Richards 1997) and are now stored in the **PacHarvHL** database on the **SVBCPBSGFIIS** server.

1995 – 2006: HOOK AND LINE DOCKSIDE MONITORING DATA (PACHARVHL)

The user-pay hook and line dockside monitoring program was instituted in 1995. This program provided timely species specific catch monitoring that replaced the sale slip system for quota and fishery management. The dockside monitoring program is conducted by contractors (Archipelago Marine Research Ltd.) who meet hook and line vessels at the dock and validate their catches as they are offloaded. From 1995 to 2006 the contractors also keypunched this information and sent it to DFO monthly for uploading into **PacHarvHL** on the **SVBCPBSGFIIS** server.

1996 – 2007: OBSERVER TRAWL DATA (PACHARVEST)

The **PacHarvest** database (server **SVBCPBSGFIIS**) houses observer trawl catch and effort information for most fishing events (net hauls) from 1996 to 2006 (with some residual information in 2007). Details and history of **PacHarvest** can be found in Schnute et al. (1999).

In 1996, a mandatory observer program for most Option A trips (bottom trawl) and some Option B trips became an important new data source for the groundfish fishery. Captains of vessels not covered by the observer log program (Options A for Hake and Pollock, B, and C) submit their own logbook records. There is never redundancy in the records, i.e., each fishing event is represented by either an observer log or a fisher log.

1999 – 2005: SABLEFISH TRAP AND LONGLINE DATA (PACHARVSABLE)

The commercial logbook data from Sablefish trap and longline fisheries are stored in the **PacHarvSable** database on the **SVBCPBSGFIIS** server. Fishing events from 1987 to 2006 are available; however, rockfish only appear in 247 records from 1999 to 2005. Most of these comprise catches by trap, with 100 longline records available from 2000 in PMFC 3D. This possibly reflects a failure to report bycatch, but it could also mean that this fishery does not account for significant rockfish mortalities.

2006 – 2010: FISHERY OPERATIONS SYSTEM DATA (GFFOS)

FOS (Fishery Operations System) is a computer information system containing a central data repository and software tools to input, output, and manage the data needed

to support, operate, and manage fisheries. FOS began in 2000 as a collaborative project between commercial and aboriginal fishers of salmon to produce a common catch database. It has since grown to include other fisheries, data, and functions.

The data in FOS are not easily accessible for use in stock assessment; however, Malcolm Wyeth created a separate database called **GFFOS**, which contains 'Views' (queries) to tables in the main DFO fisheries database **FOS**, on the Oracle server **ORADEV**. The groundfish section recently set up a mirror for **GFFOS** on the Oracle server **GFSH**. This latter server might eventually become the sole repository of the **GFFOS** views of the primary **FOS** database. Catch data appear complete for the Sablefish and hook and line fisheries from April 1, 2006 on and for the groundfish trawl fishery from April 1, 2007 on.

PACIFIC OCEAN PERCH LANDINGS AND DISCARDS

Landed catch and reported discards for Pacific Ocean Perch are available from the modern catch databases by fishery (Trawl: Table 26 and Table 27, Halibut: Table 28 and Table 29, Sablefish: Table 30 and Table 31, Dogfish-Lingcod: Table 32 and Table 33, H&L Rockfish: Table 34 and Table 35). For most RRF species, landed catch is only known with some degree of certainty from 1996 on. Prior to this, landings are estimated from ratios to TRF calculated using data observed from 1997 to 2005. For POP, landings from the trawl fishery are known from 1956 on, and landings from the Dogfish-Lingcod and H&L Rockfish fisheries are relatively well known from 1982 on, so the catch reconstruction uses these rather than estimating them. Where annual landings from various databases overlap, the maximum value is used. Annual landings/discards from unknown PMFC areas are allocated to each of the known PMFC areas proportionally by catch weight. Entries marked '---' indicate no catch reported or calculated; values of 0 indicate positive catch less than 0.05 t.

YELLOWEYE ROCKFISH LANDINGS AND DISCARDS

Landed catch and reported discards for Yelloweye Rockfish are available from the modern catch databases by fishery (Trawl: Table 36 and Table 37, Halibut: Table 38 and Table 39, Sablefish: Table 40 and Table 41, Dogfish-Lingcod: Table 42 and Table 43, H&L Rockfish: Table 44 and Table 45). For most RRF species, landed catch is only known with some degree of certainty from 1996 on. Prior to this, landings are estimated from ratios to ORF calculated using data observed from 1997 to 2005. For Yelloweye Rockfish, landings from the Dogfish-Lingcod and H&L Rockfish fisheries (only) are relatively well known from 1982 on, so the catch reconstruction uses these rather than estimating them. Where annual landings from various databases overlap, the maximum value is used. Annual landings/discards from unknown PMFC areas are allocated to each of the known PMFC areas proportionally by catch weight. Entries marked '---' indicate no catch reported or calculated; values of 0 indicate positive catch less than 0.05 t.

4. RECONSTRUCTION RESULTS

The ratios calculated for Pacific Ocean Perch and Yelloweye Rockfish are presented in the following tables:

α_{jk} : proportion of RRF landed in PMFC area j by fishery k (Table 46),
β_{jk} : proportion of RRF caught in PMFC area j by H&L fishery $k = \{2,4,5\}$ (Table 47),
γ_{jk} ratio of RRF to prominent group (e.g., POP/TRF, YYR/ORF) in PMFC area j by fishery k (Table 48),
δ_{jk} : discard rate (RRF discard/ RRF landed) in PMFC area j by fishery $k = \{1,5\}$ (Table 49),
δ_{jk} : discard rate (RRF discard/ TAR landed) in PMFC area j by fishery $k = \{2,3,4\}$ (Table 50), and
λ_{jK} : relative proportions of 1918-1950 rockfish catch in PMFC area j by gear type K (Table 51).

Note that the ratio α_{jk} is not used in the reconstruction. Its calculation offers a matrix where each fishery k could disaggregate a single coastal catch number from that fishery into catches by PMFC area j. Fortunately, catches back to 1918 specify some area information that can be used or disaggregated by other means.

The reconstructed total removals T_{ijk} for Pacific Ocean Perch are presented by year i and PMFC area j for each fishery k – Trawl (Table 52, Figure 2), Halibut (Table 53, Figure 3), Sablefish (Table 54, Figure 4), Dogfish-Lingcod (Table 55, Figure 5), H&L Rockfish (Table 56, Figure 6), and all fisheries combined (Table 57, Figure 7).

The reconstructed total removals T_{ijk} for Yelloweye Rockfish are also presented by year i and PMFC area j for each fishery k – Trawl (Table 58, Figure 8), Halibut (Table 59, Figure 9), Sablefish (Table 60, Figure 10), Dogfish-Lingcod (Table 61, Figure 11), H&L Rockfish (Table 62, Figure 12), and all fisheries combined (Table 63, Figure 13.

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REFERENCES

Canada Dominion Bureau of Statistics, 1918–1950. Fisheries Statistics of Canada (British Columbia). Ottawa, Ontario.

Haigh, R., and Richards, L.J. 1997. A relational database for hook and line rockfish logbook data. *Canadian Manuscript Report of Fisheries and Aquatic Sciences* **2408**, 46 p.

Edwards, A.M., Starr, P.J., and Haigh, R. In revision. Stock assessment for Pacific Ocean Perch (*Sebastes alutus*) in Queen Charlotte Sound, British Columbia. *Canadian Science Advisory Secretariat, Research Document* **2010/nnn.**

Edwards, A.M., Haigh, R., and Starr, P.J. In revision. Stock assessment and recovery potential assessment for Yellowmouth Rockfish (*Sebastes reedi*) along the Pacific coast of Canada. *Canadian Science Advisory Secretariat, Research Document* **2011/nnn.**

Ketchen, K.S. 1976. Catch and effort statistics of the Canadian and United States trawl fisheries in waters adjacent to the British Columbia coast 1950-1975. *Fisheries and Marine Service, Data Record* No. **6**. Nanaimo, BC, May 1976.

Ketchen , K.S. 1980. Reconstruction of Pacific ocean perch (*Sebastes alutus*) stock history in Queen Charlotte Sound. Part I. Estimation of foreign catches, 1965-1976. *Canadian Manuscript Report of Fisheries and Aquatic Sciences* **1570**, iv + 46 pp.

Munk, K.M. 2001. Maximum ages of groundfishes in waters off Alaska and British Columbia and considerations of age determination. *Alaska Fisheries Research Bulletin* **8(1)**:12-21.

PFMAR. 2007. Pacific Fishery Management Area Regulations, 2007. Registration SOR/2007-77, April 19, 2007. *Canada Gazette Part II*: **141(9)**: 449-637.

R Development Core Team. 2011. R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. ISBN 3-900051-07-0, URL http://www.R-project.org/.

Rutherford, K.L. 1999. A brief history of GFCatch (1954-1995), the groundfish catch and effort database at the Pacific Biological Station. *Canadian Technical Report of Fisheries and Aquatic Sciences* **2299**, v + 66 pp.

Schnute, J.T., Olsen, N., and Haigh, R. 1999. Slope rockfish assessment for the west coast of Canada in 1998. *Canadian Stock Assessment Secretariat, Research Document* **99/184**, 104 p.

Stanley, R.D., Starr, P., Olsen, N. 2009. Stock assessment for Canary rockfish (*Sebastes pinniger*) in British Columbia waters. *Canadian Science Advisory Secretariat, Research Document* **2009/013**, xxi + 200 pp.

Stewart, I.J. 2009. Status of the U.S. canary rockfish resource in 2009 (Update of 2007 assessment model). Agenda Item E.6.a Attachment 6 June 2009. National Marine Fisheries Service, Seattle WA.

Taylor,N., Stanley, R., Starr, P., Rutherford, K., and Haigh, R. In prep. A simultaneous assessment of five rockfishes in British Columbia waters: Splitnose, Greenstriped, Redstripe, Harlequin and Sharpchin Rockfish.

Thomson, J.A. and Yates, A.N. 1960. British Columbia landings of trawl-caught groundfish by month, by major statistical area. Volume 1, 1945-1949. *Fisheries Research Board of Canada, Statistical Circular Series* No. **CNS 1**.

Thomson, J.A. and Yates, A.N. 1961. British Columbia landings of trawl-caught groundfish by month, by major statistical area. Volume 2, 1950-1954. *Fisheries Research Board of Canada, Statistical Circular Series* No. **CNS 2**.

Yamanaka, K.L., McAllister, M.M., Etienne, M.-P., Obradovich, S. and Haigh, R. In revision. Stock assessment for the inside population of Yelloweye Rockfish (*Sebastes ruberrimus*) in British Columbia, Canada for 2010. *Canadian Science Advisory Secretariat, Research Document* **2010/nnn**.

Yamanaka, K.L., McAllister, M.K., Etienne, M.-P., and Flemming, R. In revision. Stock Assessment and Recovery Potential Assessment for Quillback Rockfish (Sebastes maliger) on the Pacific Coast of Canada. *Canadian Science Advisory Secretariat, Research Document* **2011/nnn**.

Table 4. Rockfish landings (t) in three districts along the BC coast from 1918 to 1950 reported by the Canadian Dominion Bureau of Statistics.

Year	D1	D2	D3	Year	D1	D2	D3
1918	21	158	102				
1919	89	21	191				
1920	35	30	111				
1921	49	1.5	67	1936	54	39	55
1922	25	0.5	141	1937	60	7.4	15
1923	68	3.3	67	1938	107	3.4	201
1924	83	8.1	65	1939	72	4.6	23
1925	80	12	42	1940	85	5.9	15
1926	74	26	76	1941	25	38	54
1927	56	40	106	1942	51	33	135
1928	64	29	99	1943	548	87	354
1929	110	43	84	1944	851	118	466
1930	109	23	61	1945	996	188	365
1931	58	3.9	62	1946	623	271	320
1932	89	2.4	33	1947	200	45	102
1933	40	0.5	22	1948	304	68	156
1934	50	2.8	22	1949	405	91	208
1935	65	26	27	1950	172	39	88

Table 5. Rockfish catch (t) in PMFC major areas along the BC coast from 1918 to 1950. The top three rows show the proportion of the original district catch allocated to each PMFC area based on sales slip records from 1951-1952.

year	1 (4B)	3 (3C)	4 (3D)	5 (5A)	6 (5B)	7 (5C)	8 (5D)	9 (5E)
D1	1.0							
D2				0.00301	0.38973	0.16521	0.32083	0.12122
D3	0.60986	0.20748	0.16695	0.01571				
1918	83	21	17	2.1	61	26	51	19
1919	205	40	32	3.1	8.2	3.5	6.8	2.6
1920	103	23	19	1.8	12	4.9	9.6	3.6
1921	89	14	11	1.1	0.6	0.2	0.5	0.2
1922	111	29	24	2.2	0.2	0.1	0.2	0.1
1923	108	14	11	1.1	1.3	0.5	1.0	0.4
1924	123	13	11	1.0	3.2	1.3	2.6	1.0
1925	106	8.8	7.1	0.7	4.7	2.0	3.9	1.5
1926	121	16	13	1.3	10	4.3	8.4	3.2
1927	121	22	18	1.8	16	6.6	13	4.8
1928	124	20	16	1.6	11	4.8	9.3	3.5
1929	161	17	14	1.4	17	7.1	14	5.2
1930	146	13	10	1.0	9.0	3.8	7.4	2.8
1931	96	13	10	1.0	1.5	0.6	1.2	0.5
1932	109	6.8	5.5	0.5	1.0	0.4	0.8	0.3
1933	54	4.6	3.7	0.4	0.2	0.1	0.1	0.1
1934	63	4.6	3.7	0.4	1.1	0.5	0.9	0.3
1935	81	5.5	4.4	0.5	10	4.2	8.2	3.1
1936	88	11	9.2	1.0	15	6.4	12	4.7
1937	69	3.0	2.4	0.3	2.9	1.2	2.4	0.9
1938	230	42	34	3.2	1.3	0.6	1.1	0.4
1939	86	4.8	3.8	0.4	1.8	0.8	1.5	0.6
1940	94	3.0	2.4	0.2	2.3	1.0	1.9	0.7
1941	58	11	9.0	1.0	15	6.2	12	4.6
1942	133	28	23	2.2	13	5.5	11	4.0
1943	764	73	59	5.8	34	14	28	11
1944	1,135	97	78	7.7	46	20	38	14
1945	1,219	76	61	6.3	73	31	60	23
1946	818	66	53	5.8	106	45	87	33
1947	262	21	17	1.7	17	7.4	14	5.4
1948	399	32	26	2.7	26	11	22	8.2
1949	532	43	35	3.5	35	15	29	11
1950	226	18	15	1.5	15	6.4	12	4.7

Table 6. Estimated rockfish (t) caught in BC's PMFC areas and landed in Washington state from 1930 to 1964 (Ian Stewart per. comm.). The top two rows show ratios (Stanley et al. 2009) used to allocate the Washington landings to PMFC major areas. Entries marked '---' indicate no recorded catch; zero-values indicate catch less than 0.05 t.

Year	**WA**	**BC**	**3C**	**3D**	**5A**	**5B**	**5C**	**5D**
Ratio		BC/WA	3C/BC	3D/BC	5A/BC	5B/BC	5C/BC	5D/BC
p		0.71480	0.21992	0.16299	0.20886	0.38748	0.00269	0.01807
1930	0	0	0	0	0	0	0	0
1932	0.5	0.3	0.1	0.1	0.1	0.1	0	0
1934	3.8	2.7	0.6	0.4	0.6	1.0	0	0
1935	29	21	4.5	3.3	4.3	8.0	0.1	0.4
1936	37	26	5.8	4.3	5.5	10	0.1	0.5
1937	33	24	5.2	3.8	4.9	9.1	0.1	0.4
1938	49	35	7.6	5.7	7.3	13	0.1	0.6
1939	51	36	8.0	5.9	7.6	14	0.1	0.7
1940	113	81	18	13	17	31	0.2	1.5
1941	42	30	6.7	4.9	6.3	12	0.1	0.5
1942	821	587	129	96	123	227	1.6	11
1943	2,652	1,896	417	309	396	735	5.1	34
1944	1,102	788	173	128	165	305	2.1	14
1945	11,552	8,258	1,816	1,346	1,725	3,200	22	149
1946	5,824	4,163	915	678	869	1,613	11	75
1947	3,042	2,175	478	354	454	843	5.9	39
1948	4,940	3,531	777	576	738	1,368	9.5	64
1949	6,008	4,295	945	700	897	1,664	12	78
1950	5,774	4,127	908	673	862	1,599	11	75
1951	4,831	3,453	759	563	721	1,338	9.3	62
1952	4,607	3,293	724	537	688	1,276	8.9	60
1953	1,998	1,428	314	233	298	553	3.8	26
1954	2,865	2,048	450	334	428	794	5.5	37
1955	2,704	1,933	425	315	404	749	5.2	35
1957	2,137	1,527	336	249	319	592	4.1	28
1958	2,705	1,934	425	315	404	749	5.2	35
1959	3,024	2,162	475	352	451	838	5.8	39
1960	2,735	1,955	430	319	408	757	5.3	35
1961	3,246	2,321	510	378	485	899	6.2	42
1962	4,523	3,233	711	527	675	1,253	8.7	58
1963	3,641	2,603	572	424	544	1,009	7.0	47
1964	2,688	1,921	423	313	401	745	5.2	35

Table 7. Rockfish catch (t) from 1945 to 1953 from table **B3_Catch_Pre54** in **GFCatch**. Entries marked '---' indicate no recorded catch; zero-values indicate catch less than 0.05 t.

Year	4B	3C	3D	5A	5B	5C	5D
1945	70	158	345	11	1.8	5.1	5.3
1946	45	32	96	55	25	---	5.7
1947	31	5.6	1.1	0.3	0	0.1	2.3
1948	16	11	0.3	2.2	2.6	---	6.0
1949	17	4.4	2.2	1.1	5.7	0.8	29
1950	29	14	3.4	6.6	12	0	41
1951	94	22	4.4	4.6	34	0.9	36
1952	62	56	1.7	13	91	0.5	44
1953	53	16	0.3	0.7	194	---	3.0

Table 8. Rockfish (other than POP) landings (t) from 1950 to 1975 by Canadian and US trawl vessels (Ketchen 1976). Entries marked '---' indicate no recorded catch; zero-values indicate catch less than 0.05 t.

Area	4B	3C	3C	3D	3D	5A	5A	5B	5B	5C	5C	5D	5D
Nation	CA	CA	US	CA	US	CA	US	CA	US	CA	US	CA	US
1950	29	14	870	3.2	750	6.8	1,019	12	1,241	---	16	41	97
1951	94	22	847	4.5	479	4.5	574	34	1,712	0.9	5.9	36	44
1952	63	56	653	1.8	533	13	653	91	1,355	0.5	6.8	44	51
1953	53	16	335	0.5	243	0.9	323	9.1	459	---	4.5	3.2	30
1954	44	54	349	4.5	279	2.7	258	53	483	---	8.6	5.9	34
1955	33	29	315	5.9	372	3.6	643	61	357	---	3.2	7.7	52
1956	27	12	286	0.9	405	---	674	38	316	2.7	8.2	4.1	14
1957	33	10	382	---	434	18	284	41	321	0.5	3.6	4.1	15
1958	25	5.9	288	0.9	296	23	416	43	195	5.4	---	4.1	29
1959	39	13	1,057	---	355	77	470	148	136	2.3	---	18	39
1960	34	7.3	1,066	1.8	372	13	208	22	243	0.5	1.4	9.5	25
1961	51	16	1,085	2.7	694	13	409	39	260	---	0.5	20	9.5
1962	39	16	1,335	14	1,101	25	632	182	662	---	---	48	24
1963	38	11	593	0.5	845	26	561	76	810	---	12	12	4.5
1964	54	12	561	5.9	342	162	442	94	489	1.4	7.7	24	15
1965	36	9.1	659	33	483	102	586	95	652	4.5	25	11	18
1966	60	21	637	11	804	54	1,440	76	837	3.6	1.4	20	---
1967	17	15	296	8.2	632	136	821	29	1,050	0.5	3.2	21	7.3
1968	34	13	494	49	767	154	1,361	54	1,167	7.7	---	10	---
1969	31	35	614	90	1,160	206	2,548	50	2,103	10	---	32	---
1970	43	61	614	78	1,365	180	1,569	129	1,557	12	---	189	---
1971	29	106	565	59	839	194	1,441	185	1,510	9.5	---	197	---
1972	39	41	355	21	805	394	1,520	638	1,716	3.2	---	402	---
1973	24	48	277	36	799	631	2,074	221	2,157	18	---	238	---
1974	21	71	88	35	942	215	1,130	263	1,259	19	---	290	---
1975	29	39	290	20	627	164	494	475	873	34	---	217	---

Table 9. Pacific Ocean Perch landings (t) from 1950 to 1975 by Canadian and US trawl vessels (Ketchen 1976). Entries marked '---' indicate no recorded catch; zero-values indicate catch less than 0.05 t.

Area	4B	3C	3C	3D	3D	5A	5A	5B	5B	5C	5C	5D	5D
Nation	CA	CA	US	CA	US	CA	US	CA	US	CA	US	CA	US
1950	---	---	56	---	17	---	14	---	124	---	---	---	---
1951	---	---	68	---	20	---	16	---	152	---	---	---	---
1952	---	---	355	---	52	---	41	---	205	---	---	---	---
1953	---	---	318	---	94	---	74	185	708	---	---	---	---
1954	---	---	704	---	123	---	110	215	2,215	---	---	---	---
1955	0.5	---	458	---	226	---	164	10	388	---	0.9	2.3	0.9
1956	---	---	653	---	55	11	395	130	790	12	60	0.9	---
1957	---	---	501	---	256	14	320	82	636	---	4.5	1.8	---
1958	---	---	120	---	48	60	212	255	399	4.1	11	---	5.4
1959	---	---	545	---	158	172	1,421	59	245	---	2.3	---	---
1960	---	---	713	---	204	9.5	724	347	597	---	29	---	---
1961	---	0.9	727	4.5	944	14	416	103	665	---	---	---	0.5
1962	---	---	2,142	2.3	945	3.6	456	528	850	---	---	---	---
1963	---	2.3	2,450	---	808	13	998	438	2,263	---	25	0.9	0.5
1964	2.3	41	1,191	1.8	436	93	1,545	325	1,543	---	13	5.4	---
1965	---	5.9	2,595	0.5	231	469	1,841	917	1,662	0.9	49	---	---
1966	0.9	2.3	1,926	---	179	781	2,204	1,580	3,688	0.5	---	0.9	---
1967	---	4.5	642	2.7	82	157	975	227	4,386	---	34	0.5	---
1968	---	---	191	---	67	147	1,612	729	3,562	---	---	---	---
1969	---	1.4	311	1.4	115	593	1,443	908	3,684	---	---	0.5	---
1970	1.8	299	1,131	5.4	257	992	1,507	769	2,808	---	0.5	26	---
1971	0.5	207	638	11	84	229	1,050	870	2,016	---	---	7.7	---
1972	0.5	72	275	45	85	608	1,167	1,588	2,199	---	---	14	---
1973	---	---	194	---	39	171	427	1,190	1,838	24	---	15	---
1974	---	---	242	2.7	20	49	302	1,447	1,856	15	---	15	---
1975	---	5.4	236	---	54	92	181	1,740	693	137	---	67	---

Table 10. Rockfish landings (t) reported in sales slips by **hook and line** gear from 1951 to 1981 (Obradovich tables, **PacHarvHL**). Entries marked '---' indicate no recorded catch; zero-values indicate catch less than 0.05 t.

Year	4B	3C	3D	5A	5B	5C	5D	5E
1951	79	5.4	43	1.5	38	25	27	29
1952	60	2.1	32	4.2	35	9.7	14	19
1953	75	2.2	16	7.2	8.9	2.5	4.2	2.3
1954	47	2.4	20	3.5	8.8	1.6	6.0	4.2
1955	46	1.3	23	1.1	1.6	2.6	2.6	5.2
1956	44	3.9	22	1.7	3.8	0.9	0.4	1.4
1957	76	11	34	---	8.6	1.0	1.5	7.2
1958	110	3.7	33	---	2.1	0.4	0.2	0.5
1959	113	6.0	36	0.7	2.8	0.1	0.1	0.7
1960	92	6.2	40	5.7	4.6	5.7	3.7	2.0
1961	68	6.3	52	4.0	7.5	1.6	1.6	2.3
1962	111	17	60	5.8	7.4	14	0.2	1.9
1963	85	11	39	7.2	31	6.4	3.0	9.5
1964	51	4.7	28	1.5	9.7	2.4	0.3	0.8
1965	46	3.9	23	0.8	4.4	6.1	1.2	6.1
1966	37	2.8	28	3.4	6.6	2.5	3.2	3.0
1967	57	6.1	37	2.2	5.5	9.1	8.4	3.5
1968	62	4.8	30	0.5	6.8	1.1	1.5	0.5
1969	71	10	31	7.4	19	14	0.7	0.2
1970	88	20	37	2.3	38	40	12	0.2
1971	75	13	10	7.3	24	32	12	1.1
1972	83	23	57	8.5	28	22	17	2.1
1973	102	17	24	11	9.8	19	16	2.9
1974	50	38	29	7.9	7.0	53	23	0.5
1975	40	29	24	7.5	23	71	23	4.5
1976	49	27	27	6.4	31	20	17	4.5
1977	137	35	31	35	32	35	17	3.6
1978	154	29	29	18	29	47	39	14
1979	246	53	60	39	24	54	32	26
1980	178	46	58	29	18	41	45	32
1981	211	41	40	23	13	31	33	21

Table 11. Rockfish landings (t) reported in sales slips by **trawl** gear from 1951 to 1981 (Obradovich tables, **PacHarvHL**). Entries marked '---' indicate no recorded catch; zero-values indicate catch less than 0.05 t.

Year	4B	3C	3D	5A	5B	5C	5D	5E
1951	77	34	5.7	0.1	32	19	34	---
1952	73	61	2.2	3.2	48	12	50	---
1953	40	20	0.2	0.8	5.9	3.1	3.7	---
1954	48	38	0.3	15	33	0.1	11	---
1955	43	33	6.7	6.1	9.5	2.3	11	---
1956	44	13	0.8	20	26	3.9	4.8	---
1957	43	15	4.7	8.8	28	14	22	---
1958	29	5.9	0.7	19	53	1.1	7.2	---
1959	52	17	---	57	142	8.4	25	---
1960	33	10	0.7	10	15	0.3	13	---
1961	48	22	2.5	21	37	0	20	---
1962	41	18	14	24	171	0	53	---
1963	43	10	---	28	72	1.0	14	---
1964	50	16	8.2	155	96	2.4	21	---
1965	29	11	31	94	93	4.9	7.1	---
1966	49	20	11	57	71	3.3	21	---
1967	21	15	8.1	123	28	0.4	15	---
1968	33	14	31	149	59	2.5	15	---
1969	30	36	90	200	51	17	34	---
1970	37	62	78	174	133	8.6	190	0.1
1971	29	106	76	190	175	4.8	194	---
1972	24	42	21	391	641	28	379	---
1973	24	55	34	496	225	15	237	---
1974	21	51	17	9.1	46	25	123	---
1975	20	6.8	2.0	5.0	2.3	27	120	---
1976	35	200	181	431	2,162	125	511	79
1977	31	528	134	858	2,009	232	668	3,068
1978	58	177	285	1,240	3,127	362	716	3,970
1979	125	472	243	1,072	2,944	749	1,088	1,547
1980	66	334	429	462	3,367	2,023	864	1,660
1981	57	487	295	420	2,899	2,701	564	1,526

Table 12. Rockfish landings (t) reported in sales slips by **trap** gear from 1951 to 1981 (Obradovich tables, **PacHarvHL**). Entries marked '---' indicate no recorded catch; zero-values indicate catch less than 0.05 t.

Year	4B	3C	3D	5A	5B	5C	5D	5E
1951	0.2	---	---	---	---	---	---	---
1952	4.8	---	---	---	---	---	---	---
1953	5.2	---	---	---	---	---	---	---
1954	3.1	---	---	---	---	---	---	---
1955	1.4	---	---	---	---	---	---	---
1957	2.1	---	---	---	---	---	---	---
1958	2.6	---	---	---	---	---	---	---
1965	0.1	---	---	---	---	---	---	---
1968	0	---	---	---	---	---	---	---
1970	0.3	---	---	---	---	---	---	---
1972	0.3	0.1	---	---	---	---	0.8	---
1973	---	---	---	---	0.2	---	---	---
1975	0.5	---	0.2	---	---	---	0.2	0.5
1976	0.5	---	---	---	---	---	---	---

Table 13. Rockfish (other than POP) landings (t) by **hook & line** gear from **GFCatch** 1979-1986. Entries marked '---' indicate no recorded catch; zero-values indicate catch less than 0.05 t.

Year	4B	3C	3D	5A	5B	5C	5D	5E
1979	69	0.4	23	6.8	0.7	0.7	2.3	6.1
1980	42	1.1	13	6.1	0.8	4.5	6.9	16
1981	35	0.6	5.0	0.9	0.8	3.1	6.9	10
1982	35	0.3	5.7	2.3	0.1	3.1	3.3	2.0
1983	26	0	25	0.3	---	1.4	6.6	7.9
1984	33	1.9	48	19	0.4	0.7	10	33
1985	80	4.8	107	16	8.1	3.4	34	17
1986	43	34	30	4.6	4.6	0.1	11	2.8

Table 14. Rockfish (other than POP) landings (t) by **trap** gear from **GFCatch** 1979 to 1995. Entries marked '---' indicate no recorded catch; zero-values indicate catch less than 0.05 t.

Year	4B	3C	3D	5A	5B	5C	5D	5E
1979	0.7	0	0.9	1.0	0.4	1.5	0.2	0.7
1980	0	---	0.2	0.2	0.1	0.5	---	0.4
1981	0	0	0.3	---	0.1	0.1	0.3	0.1
1983	---	---	---	---	---	0.2	0.1	---
1984	0	---	---	---	---	0	0	---
1985	---	---	---	---	0.3	---	---	---
1987	---	---	44	---	---	---	---	1.5
1988	---	---	1.5	0.7	8.8	---	---	0.1
1990	---	0	0.8	---	---	---	---	0.1
1991	---	---	3.2	---	---	---	---	7.4
1992	---	0	1.3	---	---	---	---	0.3
1993	---	0.1	2.0	---	---	---	---	1.4
1994	---	0.2	0.4	---	---	---	---	4.0
1995	---	0.5	1.2	---	---	---	---	1.4

Table 15. Rockfish (other than POP) landings (t) by **trawl** gear from **GFCatch** 1954 to 1995. Entries marked '---' indicate no recorded catch; zero-values indicate catch less than 0.05 t.

Year	4B	3C	3D	5A	5B	5C	5D	5E
1954	120	64	4.8	16	53	---	7.7	---
1955	130	59	5.7	3.5	33	---	35	---
1956	71	42	3.0	28	51	2.0	7.2	---
1957	33	31	2.2	45	61	0.4	60	---
1958	53	33	1.1	26	48	8.9	5.9	---
1959	159	57	0.5	108	206	5.4	53	---
1960	176	38	4.8	34	80	0	89	---
1961	103	110	4.7	39	48	0.3	101	---
1962	92	43	19	33	261	2.5	153	---
1963	51	39	2.2	41	110	0.1	42	---
1964	113	19	35	279	129	16	80	---
1965	64	17	51	132	124	18	75	---
1966	135	28	5.7	109	91	2.2	71	---
1967	49	15	13	163	43	0.5	46	---
1968	99	22	55	179	70	11	52	---
1969	99	38	101	285	69	16	148	---
1970	101	65	79	165	132	9.2	215	0.2
1971	34	107	65	198	179	13	198	---
1972	45	42	18	397	636	2.7	404	---
1973	24	48	36	489	219	18	240	---
1974	22	71	35	137	247	19	303	---
1975	29	38	20	56	482	32	217	---
1976	31	184	180	308	716	46	457	0.2
1977	29	260	131	529	771	71	670	1,618
1978	50	117	156	1,036	1,849	231	510	1,774
1979	63	165	222	825	1,920	734	590	816
1980	38	158	241	399	1,326	796	305	861
1981	50	124	128	259	1,103	869	196	1,639
1982	43	343	404	797	1,303	455	118	1,166
1983	27	473	1,643	812	1,336	556	100	1,302
1984	33	639	1,744	957	2,156	604	128	1,650
1985	25	576	2,582	1,275	1,767	1,229	88	3,111
1986	26	1,124	4,705	1,669	1,899	811	48	4,377
1987	14	906	3,858	2,921	3,020	983	98	2,430
1988	9.7	1,926	3,326	2,290	3,735	903	136	2,628
1989	3.1	1,458	3,181	2,021	3,459	1,250	103	2,139
1990	38	1,136	3,077	2,367	3,841	1,214	482	2,318
1991	1.9	1,244	3,290	3,221	3,690	699	418	1,304
1992	20	1,763	3,160	3,994	3,596	915	496	2,026
1993	11	2,058	3,445	2,787	2,817	703	889	2,606
1994	5.0	1,412	2,470	2,175	2,226	1,470	476	2,293
1995	1.7	1,287	2,424	2,622	2,431	1,065	354	1,475

Table 16. Pacific Ocean Perch landings (t) by **trawl** gear from **GFCatch** 1954 to 1995. Entries marked '---' indicate no recorded catch; zero-values indicate catch less than 0.05 t.

Year	4B	3C	3D	5A	5B	5C	5D	5E
1954	---	---	---	---	215	---	---	---
1955	---	---	---	---	39	---	---	---
1956	0.5	---	---	1.4	142	---	0.1	---
1957	---	---	---	13	75	---	1.8	---
1958	---	0.1	---	60	255	4.1	---	---
1959	---	0	---	201	59	---	---	---
1960	---	0	4.1	9.5	388	---	---	---
1961	0.8	3.3	4.4	2.6	64	---	---	---
1962	---	1.5	2.4	3.4	542	---	---	---
1963	1.1	2.8	---	13	447	---	1.1	---
1964	2.2	42	1.9	108	338	0	5.6	---
1965	1.7	5.9	4.1	470	950	0.9	0.7	---
1966	3.5	2.3	2.9	657	1,801	0.3	4.0	0.3
1967	---	4.5	2.6	60	339	---	---	---
1968	0.1	0.1	0.4	147	734	---	---	---
1969	---	---	2.5	600	940	---	0.8	---
1970	1.6	299	5.4	993	774	---	27	---
1971	0.6	207	11	249	848	1.5	8.3	---
1972	0.5	72	45	679	1,517	---	13	---
1973	---	---	---	145	1,190	23	15	---
1974	---	---	2.9	44	1,465	21	15	---
1975	0	5.5	---	38	1,710	97	19	---
1976	0	1.3	---	97	1,407	42	36	79
1977	0.6	15	1.1	69	996	43	31	1,539
1978	1.1	49	7.1	163	1,080	67	10	2,429
1979	0.9	81	44	279	1,078	145	123	1,062
1980	0.0	286	144	132	1,721	2,030	49	962
1981	0.4	382	166	37	2,367	1,388	45	708
1982	5.9	395	113	85	2,715	1,705	17	956
1983	---	373	463	523	2,351	809	11	1,127
1984	---	407	337	113	2,444	424	11	3,027
1985	---	137	408	107	2,163	468	27	2,749
1986	0.1	108	1,180	364	794	107	8.3	3,367
1987	0	340	637	547	2,594	410	4.0	1,791
1988	---	184	604	564	3,002	714	6.0	1,855
1989	---	190	1,079	352	1,880	352	5.9	2,081
1990	---	183	1,010	465	1,806	520	1.9	1,759
1991	0.4	11	816	405	2,122	346	5.9	636
1992	---	279	787	367	2,027	220	11	374
1993	4.3	648	927	312	1,559	477	83	496
1994	0	1,053	552	634	2,914	217	32	320
1995	---	408	500	622	3,132	678	13	853

Table 17. Rockfish (other than POP) catch (t) by Russian **trawl** gear from 1965 to 1972 (Ketchen 1980). Entries marked '---' indicate no recorded catch; zero-values indicate catch less than 0.05 t.

Year	3C	3D	5A	5B	5D	5E
1965	---	---	3,011	763	1,249	2,293
1966	2,924	3,774	6,316	1,602	1,926	3,534
1967	475	613	3,089	783	297	544
1968	745	962	1,371	348	361	663
1969	10	13	11	2.8	2.6	4.8
1970	87	112	---	---	4.2	7.8
1971	187	242	32	8.1	21	38
1972	126	162	---	---	---	---

Table 18. Rockfish (other than POP) catch (t) by Japanese **trawl** gear from 1966 to 1976 (Ketchen 1980). Entries marked '---' indicate no recorded catch; zero-values indicate catch less than 0.05 t.

Year	5A	5B
1966	338	17
1967	580	64
1968	864	161
1969	2,807	277
1970	1,125	160
1971	180	1.0
1972	1,474	43
1973	3,104	100
1974	8,518	75
1975	3,843	88
1976	2,132	28

Table 19. Pacific Ocean Perch catch (t) by Russian **trawl** gear from 1965 to 1972 (Ketchen 1980). Entries marked '---' indicate no recorded catch; zero-values indicate catch less than 0.05 t.

Year	3C	3D	5A	5B	5D	5E
1965	---	---	2,470	626	3,764	2,720
1966	2,870	2,021	10,364	2,628	5,801	4,193
1967	466	328	7,728	1,960	894	646
1968	731	515	3,136	795	1,089	787
1969	10	7.1	45	11	7.9	5.7
1970	85	60	---	---	13	9.2
1971	184	130	64	16	63	45
1972	124	87	---	---	---	---

Table 20. Pacific Ocean Perch catch (t) by Japanese **trawl** gear from 1966 to 1976 (Ketchen 1980). Entries marked '---' indicate no recorded catch; zero-values indicate catch less than 0.05 t.

Year	5A	5B
1966	794	94
1967	1,831	334
1968	2,140	732
1969	2,049	1,113
1970	1,293	570
1971	165	3.0
1972	996	130
1973	2,151	271
1974	5,446	186
1975	2,524	198
1976	1,161	59

Table 21. Rockfish (other than POP) landings (t) by **hook & line** gear from **PacHarv3** 1982 to 1994. Entries marked '---' indicate no recorded catch; zero-values indicate catch less than 0.05 t.

Year	4B	3C	3D	5A	5B	5C	5D	5E
1982	281	34	36	18	8.7	31	18	13
1983	299	31	55	19	10	31	28	4.8
1984	347	26	93	25	11	29	36	65
1985	437	34	125	51	37	112	72	33
1986	527	180	338	67	40	197	71	92
1987	423	198	329	161	57	240	160	44
1988	496	166	217	191	108	163	173	84
1989	460	148	298	233	101	146	194	98
1990	470	260	298	382	176	199	302	133
1991	481	154	374	286	311	175	326	98
1992	178	88	215	283	224	183	231	301
1993	199	65	607	163	149	185	275	340
1994	280	50	459	194	268	135	245	348

Table 22. Rockfish (other than POP) landings (t) by **trap** gear from **PacHarv3** 1982 to 1994. Entries marked '---' indicate no recorded catch; zero-values indicate catch less than 0.05 t.

Year	4B	3C	3D	5A	5B	5C	5D	5E
1982	0.1	0	0	---	---	0	---	---
1983	0	---	---	---	---	---	---	---
1984	2.3	0	---	---	---	0	---	---
1985	---	---	---	---	0.3	---	---	---
1986	0	---	---	---	---	---	---	---
1987	---	---	28	---	---	---	---	1.4
1988	---	---	9.0	---	---	---	---	---
1989	0	---	---	---	---	---	---	---
1990	0.1	1.2	2.5	---	0.2	---	---	0.1
1991	---	0.2	3.2	---	---	1.3	---	7.1
1992	---	---	1.0	---	---	---	---	3.1
1993	---	---	3.3	---	---	---	---	0.2
1994	---	1.9	1.0	---	0	4.1	0.5	0.8

Table 23. Rockfish (other than POP) landings (t) by **trawl** gear from **PacHarv3** 1982 to 1994. Entries marked '---' indicate no recorded catch; zero-values indicate catch less than 0.05 t.

Year	4B	3C	3D	5A	5B	5C	5D	5E
1982	48	296	348	977	1,095	175	328	765
1983	32	533	1,400	611	1,013	391	286	973
1984	43	720	1,531	1,009	1,460	432	678	698
1985	35	817	2,137	1,322	1,603	1,148	1,429	1,942
1986	36	1,434	5,243	1,516	1,783	869	2,389	1,954
1987	22	960	4,856	2,693	2,870	963	984	1,551
1988	16	1,899	4,813	1,653	3,358	1,789	1,206	1,519
1989	3.1	1,512	3,887	1,458	3,051	1,693	1,438	810
1990	19	1,161	4,188	1,414	3,271	1,680	1,396	1,197
1991	1.9	1,283	4,416	2,002	3,313	970	567	1,203
1992	20	2,001	4,662	2,414	3,089	1,335	763	1,577
1993	11	2,315	4,195	1,855	2,510	1,023	1,192	2,313
1994	5.0	2,040	2,902	1,249	2,028	3,680	971	---

Table 24. Pacific Ocean Perch landings (t) by **hook & line** gear from **PacHarv3** 1982 to 1994. Entries marked '---' indicate no recorded catch; zero-values indicate catch less than 0.05 t.

Year	4B	3C	3D	5A	5B	5C	5D	5E
1982	---	0.4	0	---	---	---	---	---
1983	---	0.1	0.3	---	0	---	0	---
1984	0	0	---	---	---	---	---	---
1985	0	0	---	---	---	---	---	---
1986	0	---	---	0	---	---	0	---
1987	0.1	0.6	0.2	---	---	0.1	0	---
1988	0.6	0.1	0	---	---	0	---	0
1989	0.2	0.1	0.2	---	0	0	---	---
1990	0.3	0.4	0.1	1.0	0.9	0.1	0.1	1.3
1991	0.1	---	0.2	---	0	0	0	---
1992	0	3.1	---	---	---	0	---	0
1993	0	1.7	0.1	0	1.7	---	0	---
1994	0.1	---	0.7	0	0.4	0	0	0.1

Table 25. Pacific Ocean Perch landings (t) by **trawl** gear from **PacHarv3** 1982 to 1994. Entries marked '---' indicate no recorded catch; zero-values indicate catch less than 0.05 t.

Year	4B	3C	3D	5A	5B	5C	5D	5E
1982	6.8	414	95	296	2,690	1,086	423	650
1983	1.2	303	589	177	1,579	1,076	322	1,609
1984	0.2	488	265	51	2,355	470	2,481	1,052
1985	0.5	222	540	43	1,850	571	2,196	900
1986	0.2	129	1,167	382	772	102	2,891	604
1987	0.2	350	643	581	2,492	386	1,178	639
1988	29	184	651	527	1,190	2,326	1,132	720
1989	---	204	1,117	349	781	1,426	1,555	557
1990	0.3	183	1,041	366	908	1,313	1,154	567
1991	0.4	11	982	232	643	1,794	7.0	615
1992	---	288	890	235	763	1,425	21	342
1993	4.4	698	991	198	717	1,319	113	473
1994	0	1,151	575	462	2,116	1,337	121	---

Table 26. Pacific Ocean Perch **landed** catch*(t) by the **Trawl** fishery from **PacHarv3** (1982-2001), **GFCatch** (1954-1995), **PacHarvest** (1996-2007), and **GFFOS** (2007-2011).

PacHarv3 Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1982	7.0	420	97	299	2,746	1,130	440	676	5,814
1983	1.1	230	582	149	1,559	1,078	323	1,613	5,534
1984	0.2	224	262	38	2,351	473	2,497	1,058	6,905
1985	0.1	123	514	43	1,716	570	2,196	900	6,061
1986	0.1	87	1,167	326	610	102	2,891	604	5,786
1987	0.2	280	647	580	2,482	386	1,178	639	6,192
1988	28	139	661	524	1,200	2,326	1,132	720	6,730
1989	0.1	179	1,117	136	822	1,426	1,555	557	5,792
1990	0.6	139	962	166	910	1,313	1,196	568	5,254
1991	0.5	8.6	981	223	617	1,796	7.0	615	4,247
1992	0	228	893	246	723	1,429	21	342	3,882
1993	4.5	462	1,066	203	709	1,301	115	473	4,332
1994	0.1	1,013	576	312	2,122	1,336	124	0	5,484
1995	0	414	312	157	2,104	2,013	79	1.0	5,080
1996	---	---	---	---	---	---	---	---	---
1997	---	---	---	---	---	---	---	0	0
1998	---	---	73	---	---	---	48	---	121
1999	---	---	---	---	---	---	---	---	---
2000	---	---	0	---	---	---	0	0.4	0.4
2001	8.8	---	0	---	---	---	---	0	8.9
GFCatch Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1954	---	---	---	---	215	---	---	---	215
1955	---	---	---	---	39	---	---	---	39
1956	0.5	---	---	1.4	142	---	0.1	---	144
1957	---	---	---	13	75	---	1.8	---	91
1958	---	0.1	---	60	255	4.1	---	---	319
1959	---	0	---	201	59	---	---	---	260
1960	---	0	4.1	9.5	388	---	---	---	402
1961	0.8	3.3	4.4	2.6	64	---	---	---	75
1962	---	1.5	2.4	3.4	542	---	---	---	549
1963	1.1	2.8	---	13	447	---	1.1	---	465
1964	2.2	42	1.9	108	338	0	5.6	---	498
1965	1.7	5.9	4.1	470	950	0.9	0.7	---	1,433
1966	3.5	2.3	2.9	657	1,801	0.3	4.0	0.3	2,471
1967	---	4.5	2.6	60	339	---	---	---	406
1968	0.1	0.1	0.4	147	734	---	---	---	882
1969	---	---	2.5	600	940	---	0.8	---	1,542
1970	1.6	299	5.4	993	774	---	27	---	2,100
1971	0.6	207	11	249	867	1.5	8.3	---	1,344
1972	0.5	72	45	679	1,517	---	13	---	2,327
1973	---	---	---	170	1,190	23	15	---	1,398
1974	---	---	2.9	49	1,465	22	15	---	1,552
1975	0	5.5	---	98	1,813	97	19	---	2,033
1976	0	1.3	---	106	1,412	49	37	79	1,684
1977	0.6	15	1.1	69	1,005	43	31	1,551	2,716
1978	1.1	49	7.1	165	1,134	68	10	2,429	3,863
1979	0.9	81	44	279	1,079	145	123	1,067	2,819
1980	0.0	286	144	132	1,721	2,030	49	962	5,324
1981	0.4	382	166	37	2,367	1,388	45	708	5,094
1982	5.9	395	113	86	2,730	1,705	18	956	6,009
1983	---	374	463	527	2,358	809	11	1,127	5,670
1984	---	407	337	113	2,444	424	11	3,027	6,763
1985	---	148	408	107	2,163	468	27	2,750	6,071
1986	0.1	108	1,180	364	794	107	8.3	3,367	5,928
1987	0	340	652	547	2,595	410	4.0	1,791	6,340
1988	---	184	614	564	3,019	714	6.0	1,855	6,955
1989	---	190	1,079	362	1,957	352	5.9	2,081	6,028
1990	---	183	1,014	472	1,807	520	2.2	1,759	5,757
1991	0.4	11	818	406	2,125	346	5.9	636	4,349
1992	---	280	788	380	2,037	220	11	374	4,091
1993	4.3	650	987	328	1,562	477	83	496	4,587
1994	0	1,054	553	640	2,918	217	32	320	5,734

1995	0	409	506	627	3,193	678	13	853	6,280
PacHarvest Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1996	---	112	489	390	4,117	500	32	697	6,337
1997	---	292	147	837	3,405	375	58	697	5,810
1998	---	312	208	929	3,164	472	289	789	6,163
1999	---	328	211	946	2,962	536	108	727	5,818
2000	---	274	223	569	3,452	407	225	1,038	6,188
2001	---	287	201	700	2,974	306	154	1,185	5,808
2002	---	290	242	705	3,095	315	143	1,109	5,899
2003	0	301	251	804	3,598	257	123	947	6,281
2004	---	305	219	724	3,568	125	76	956	5,974
2005	0	302	217	843	2,682	123	161	769	5,097
2006	0	293	202	519	3,323	89	93	828	5,348
2007	---	56	61	64	283	5.8	22	410	901
GFFOS Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
2007	---	162	152	572	2,469	48	0.9	419	3,823
2008	---	401	286	474	2,277	29	75	840	4,381
2009	---	280	192	740	2,286	41	75	793	4,407
2010	---	207	181	890	3,147	22	71	919	5,437
2011	---	209	107	160	506	0	38	604	1,623

*Unspecified-area catch prorated across BC PMFC areas; catch in 2011 not complete.

Table 27. Pacific Ocean Perch **discarded** catch*(t) by the **Trawl** fishery from **GFCatch** (1966-1995), **PacHarvest** (1996-2007), and **GFFOS** (2007-2011).

GFCatch Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1966	---	---	---	---	28	---	---	---	28
1967	---	---	---	---	---	---	---	---	---
1968	---	---	---	1.4	0	0.5	1.1	---	3.0
1969	---	---	---	---	---	---	---	---	---
1970	---	---	---	---	---	---	---	---	---
1971	---	---	---	---	---	---	1.4	---	1.4
1972	---	---	---	---	---	---	---	---	---
1973	---	---	---	---	---	---	---	---	---
1974	---	---	---	---	---	---	---	---	---
1975	---	---	---	---	---	---	0.5	---	0.5
1976	---	---	---	---	---	---	---	---	---
1977	---	0.5	---	0.5	14	---	---	---	15
1978	---	---	---	0.1	0.2	2.5	1.8	15	20
1979	---	11	0.5	---	0.2	---	0.1	---	12
1980	---	0.2	---	---	0.9	0.5	---	---	1.6
1981	---	2.4	0.7	---	1.8	9.8	---	---	15
1982	---	0.2	---	0.1	2.7	4.4	1.4	19	28
1983	---	---	---	---	2.2	1.0	---	32	35
1984	---	---	---	0.7	6.9	2.9	---	---	11
1985	---	12	4.0	2.7	30	---	---	---	48
1986	---	---	---	2.3	17	---	---	---	20
1987	---	---	24	1.1	17	---	---	0.9	43
1988	---	37	16	0.9	26	---	---	0.7	80
1989	---	27	5.9	0.5	17	9.5	8.2	31	99
1990	---	0.5	1.4	1.1	23	5.2	1.4	15	48
1991	---	16	5.3	---	24	5.9	---	4.5	56
1992	---	5.1	8.0	6.8	21	0.7	---	4.1	45
1993	---	0.9	9.3	2.2	3.4	1.2	0.5	23	41
1994	0	5.3	4.2	1.9	35	1.9	---	5.4	54
1995	---	0	1.2	1.4	26	2.5	---	0.2	31

PacHarvest Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1996	0	7.8	13	21	106	66	0.9	4.3	220
1997	---	12	6.5	30	89	33	1.6	6.3	177
1998	---	12	9.2	21	79	29	3.6	2.5	155
1999	---	9.6	6.1	6.2	40	26	1.8	1.2	91
2000	---	7.2	8.4	2.3	36	11	3.3	2.7	71
2001	---	5.4	3.8	4.3	23	4.6	0.7	1.5	44
2002	---	7.5	3.3	3.9	16	10	0.6	1.5	43
2003	0	9.6	6.6	10	42	5.9	0.2	0.6	75
2004	0	16	7.5	10	42	3.9	0.2	0.9	81
2005	0	18	7.0	15	42	7.0	1.7	4.3	95
2006	0	12	7.6	17	124	9.1	0.4	0.9	171
2007	---	6.1	5.1	2.0	6.2	0.1	0.2	0.2	20

GFFOS Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
2007	0.1	5.0	25	19	98	1.5	0.3	0.3	149
2008	0	25	39	26	91	0.8	0.8	1.8	184
2009	0	15	25	13	76	2.3	0	1.4	134
2010	0.1	10	21	10	44	0.4	0.7	8.1	95
2011	0	2.0	7.1	1.2	4.7	---	0.0	0.3	15

*Unspecified-area catch prorated across BC PMFC areas; catch in 2011 not complete.

Table 28. Pacific Ocean Perch **landed** bycatch*(t) in the **Halibut** fishery from **PacHarv3** (1983-2002), **PacHarvHL** (Halibut 1995-2005), **PacHarvHL** (DMP 1999-2003), and **GFFOS** (2006-2011).

PacHarv3 Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1983	---	---	---	---	---	---	0	---	0
1984	---	---	---	---	---	---	---	---	---
1985	---	---	---	---	---	---	---	---	---
1986	---	---	---	---	---	---	---	---	---
1987	---	---	---	---	---	0.1	---	---	0.1
1988	0.6	---	---	---	---	0	---	0	0.6
1989	---	---	---	---	---	0	---	---	0
1990	---	---	0	---	---	---	---	---	0
1991	---	---	---	---	---	0	0	---	0
1992	---	---	---	---	---	---	---	---	---
1993	---	---	---	0	---	---	0	---	0
1994	---	---	0.7	0	---	0	0	0	0.8
1995	---	---	---	---	0	0.3	0	---	0.3
1996	---	---	0	---	0	0	0	0	0
1997	---	0	0	0	0	0	0	0	0
1998	---	---	---	0	0	0.1	0	---	0.1
1999	---	0	0	0	0	0	0	---	0.1
2000	---	0	0	0	0	0	0.1	0.1	0.3
2001	---	0	0	0	0	0.3	0	0.1	0.5
2002	---	0	0.1	0	0	0.1	0	0	0.3

PacHarvHL (halibut) Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1995	---	---	---	---	---	---	0	---	0
1996	---	0	0	---	---	0	---	0	0
1997	---	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0.1	0	---	0.1
1999	---	0	0	0	0	0	0	0	0.1
2000	---	---	---	---	---	---	---	---	---
2001	---	---	0.1	---	0.1	---	---	0.3	0.5
2002	---	---	0.2	---	0	---	0	0.2	0.4
2003	---	---	0.2	---	0	---	---	0.2	0.4
2004	---	---	0.4	---	0	---	---	0.3	0.7
2005	---	---	0.3	---	0	---	0	0.1	0.4

PacHarvHL (DMP) Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1999	---	---	---	---	0	---	---	---	0
2000	---	---	0	0	0	0	0	---	0
2001	---	0	0	0	0	---	0	0	0
2002	---	0	0	0	0.1	0	---	0	0.2
2003	0	0	0	0	0	0	---	0	0.1

GFFOS Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
2006	---	0.1	0.2	0	0.2	---	0	0	0.6
2007	---	0.1	0.3	0.1	0.1	0	0	---	0.7
2008	---	0.1	0.2	0	0.1	---	0	0	0.4
2009	---	0	0.1	0	0.1	---	---	0	0.2
2010	---	0.1	0.2	0	0	---	0	0	0.3
2011	---	---	0	---	0	---	0	0.1	0.2

*Unspecified-area catch prorated across BC PMFC areas; catch in 2011 not complete.

Table 29. Pacific Ocean Perch **discarded** bycatch*(t) in the **Halibut** fishery (2006-2011).

GFFOS Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
2006	---	---	0	0	0	0	---	---	0
2007	---	---	---	0	0	---	---	---	0
2008	---	---	0	0	---	---	0	---	0
2009	---	---	---	0	---	---	---	---	0
2010	---	0	0	---	0	---	---	0	0
2011	---	---	---	0	---	---	---	---	0

*Unspecified-area catch prorated across BC PMFC areas; catch in 2011 not complete.

Table 30. Pacific Ocean Perch **landed** bycatch*(t) in the **Sablefish** fishery from **PacHarv3** (1982-2002), and **GFFOS** (2006-2010).

PacHarv3 Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1982	---	---	---	---	54	---	---	---	54
1983	---	---	0.3	---	---	---	---	---	0.3
1984	---	---	---	---	---	---	---	---	---
1985	---	---	---	---	---	---	---	---	---
1986	---	0.4	---	---	---	---	---	---	0.4
1987	---	0.6	---	---	---	---	0	---	0.6
1988	---	0	---	---	---	---	---	---	0
1989	---	5.5	---	---	---	---	---	---	5.5
1990	---	---	---	---	---	---	---	---	---
1991	---	---	---	---	---	---	---	---	---
1992	---	---	---	---	---	---	---	---	---
1993	---	1.7	---	---	---	---	---	---	1.7
1994	---	---	---	---	---	---	---	---	---
1995	---	---	---	---	---	---	---	---	---
1996	---	---	---	---	---	---	---	---	---
1997	---	---	---	---	---	---	---	---	---
1998	---	0	---	---	---	---	---	---	0
1999	---	---	---	---	---	---	---	---	---
2000	---	---	0	---	---	---	---	0	0
2001	---	---	---	---	0	---	---	---	0
2002	---	0	0	---	---	---	---	---	0
GFFOS Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
2006	---	---	---	---	0.5	---	---	---	0.5
2007	---	---	0	0	0.2	---	---	---	0.2
2008	---	---	---	---	---	---	---	---	---
2009	---	0	0	---	---	---	---	---	0
2010	---	---	0.7	---	0	---	---	---	0.7

*Unspecified-area catch prorated across BC PMFC areas.

Table 31. Pacific Ocean Perch **discarded** bycatch*(t) in the **Sablefish** fishery from **GFCatch** (1990-1993), **PacHarvSable** (2002-2004), and **GFFOS** (2006-2010).

GFCatch Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1990	---	---	---	---	---	---	---	2.1	2.1
1991	---	---	---	---	---	---	---	4.0	4.0
1992	---	---	---	---	---	---	---	1.9	1.9
1993	---	---	---	---	---	---	---	0.9	0.9
PacHarvSable Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
2002	---	---	---	0	---	---	---	---	0
2003	---	---	---	---	---	---	---	---	---
2004	---	---	0	---	---	---	---	---	0
GFFOS Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
2006	---	0	---	---	0	---	---	---	0
2007	---	---	---	0	0	---	---	---	0
2008	---	---	---	---	---	---	---	---	---
2009	---	---	---	---	---	---	---	0	0
2010	---	---	---	---	0	---	---	---	0

*Unspecified-area catch prorated across BC PMFC areas.

Table 32. Pacific Ocean Perch **landed** bycatch*(t) in the **Dogfish-Lingcod** fishery from **PacHarv3** (1982-2005), **PacHarvHL** (DMP 1998-2005), **PacHarvHL** (fisherlogs 1998-1999), and **GFFOS** (2008-2010).

PacHarv3 Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1982	0.1	12	2.4	7.9	---	---	---	---	22
1983	0	119	4.6	39	31	---	---	---	193
1984	0.1	265	4.3	13	19	---	---	---	302
1985	0.4	109	0.7	---	134	1.2	---	---	246
1986	0.1	42	---	56	162	---	---	---	260
1987	0.1	70	---	1.4	10	---	---	---	82
1988	0.6	46	---	10	---	---	---	---	57
1989	0.1	20	0.1	224	27	---	---	---	270
1990	---	50	83	206	0.9	0	0.1	0.3	341
1991	---	2.5	3.8	12	29	---	---	---	47
1992	---	64	---	---	44	---	---	---	108
1993	---	244	---	0.1	11	18	0	---	274
1994	---	146	0.1	154	---	1.1	---	---	301
1995	0	87	0.1	32	1.8	0.3	---	---	122
1996	---	---	---	---	---	---	---	---	---
1997	---	0	0	---	---	---	---	---	0
1998	---	---	---	---	---	---	0.2	---	0.2
1999	---	0	---	---	---	---	---	---	0
2000	---	---	0	---	---	---	---	0	0
2001	---	0	0	---	---	---	---	---	0
2002	---	---	0	---	---	---	---	---	0
2003	---	---	0	---	---	---	---	---	0
2004	---	---	---	---	---	---	---	---	---
2005	---	---	0	---	---	---	---	---	0

PacHarvHL (DMP) Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1998	---	---	0	---	---	---	---	---	0
1999	---	---	---	---	---	---	---	---	---
2000	---	---	---	---	---	---	---	---	---
2001	---	---	---	---	---	---	---	---	---
2002	---	---	---	---	---	---	---	---	---
2003	---	---	---	---	---	---	---	---	---
2004	---	---	---	0	---	---	---	---	0
2005	---	---	0	0	0	---	---	---	0

PacHarvHL (fisherlogs) Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1998	---	---	---	---	---	---	---	0	0
1999	---	---	---	---	---	---	---	0.6	0.6

GFFOS Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
2008	---	0	---	---	---	---	---	---	0
2009	---	---	0	---	---	---	---	---	0
2010	---	0	0	---	0	0	---	---	0

*Unspecified-area catch prorated across BC PMFC areas.

Table 33. Pacific Ocean Perch **discarded** bycatch*(t) in the **Dogfish-Lingcod** fishery from **PacHarvHL** (fisherlogs 2002).

PacHarvHL (fisherlogs) Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
2002	---	---	---	0	0	0	---	---	0

*Unspecified-area catch prorated across BC PMFC areas.

Table 34. Pacific Ocean Perch **landed** catch*(t) by the **H&L Rockfish** fishery from **PacHarv3** (1983-1995), **GFCatch** (1983), **PacHarvHL** (DMP 1995-2006), **PacHarvHL** (fisherlogs 1988-2006), and **GFFOS** (2007-2011).

PacHarv3 Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1983	---	---	3.7	---	---	---	---	---	3.7
1984	---	---	---	---	---	---	---	---	---
1985	---	---	26	---	---	---	---	---	26
1986	---	---	---	---	---	---	0	---	0
1987	0	---	---	---	---	---	---	---	0
1988	0	---	0	---	---	---	---	---	0.1
1989	0	---	0	---	---	---	---	---	0
1990	---	0.2	0.1	---	---	0	0	---	0.3
1991	---	---	0.2	---	---	---	---	---	0.2
1992	---	---	---	---	---	---	0	---	0	0
1993	---	---	0.1	---	1.7	---	---	---	1.7
1994	---	---	0	---	---	---	---	0	0
1995	---	---	---	---	---	0	---	---	0

GFCatch Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1983	---	---	---	---	---	---	0	---	0

PacHarvHL (DMP) Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1995	---	---	0.1	0.1	0	0	0	0.6	0.9
1996	---	---	0.3	0.3	0	0	0	0.5	1.1
1997	---	---	0.1	0	0	0	0	0.4	0.5
1998	---	---	0	0	---	0	---	1.4	1.4
1999	0	0	0.5	0.2	0	0	0	0.3	1.0
2000	0	0	0.1	0.1	0	0.1	0	0.7	1.0
2001	---	---	0	0.1	0	0	0	0.7	0.9
2002	---	0	0	0	0	0	---	0.5	0.6
2003	---	---	0	0	0	---	0	0.1	0.2
2004	---	---	0	0.1	0	---	---	0.1	0.1
2005	---	0	0	0	0	---	---	0	0.1
2006	---	---	0	0	---	---	---	---	0

PacHarvHL (fisherlogs) Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1988	---	---	---	---	---	---	0.4	---	0.4
1989	0.1	0.1	0.3	0	---	---	---	---	0.5
1990	0	0.7	0.7	0.5	0	---	0	1.9	3.7
1991	---	5.0	8.4	0.1	0.6	0.2	0	1.2	15
1992	---	0	0.3	0.7	0	0.1	0.1	0.6	1.9
1993	---	0	0	0	0	0	---	0.5	0.6
1994	---	---	0.8	0	---	---	---	---	0.8
1995	---	---	0.1	0.1	0.1	---	---	0.6	0.9
1996	0.1	---	0.1	0.5	---	---	0	0.5	1.2
1997	0	---	0.2	0.7	---	---	---	0.2	1.1
1998	0	---	---	---	---	---	---	1.1	1.1
1999	0	---	0.2	0.2	0	0.1	---	0.6	1.2
2000	---	---	0	0	1.2	0	0	2.6	3.8
2001	0	0	---	0	1.2	---	---	2.0	3.2
2002	---	---	0	0	0	0	---	0.2	0.2
2003	---	---	---	0	0	---	---	0	0.1
2004	---	---	---	---	---	---	---	0	0
2005	---	---	0.1	0	---	---	---	0	0.1
2006	---	---	---	0	---	---	---	---	0

GFFOS Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
2007	---	---	---	---	---	---	---	0.1	0.1
2008	---	---	---	0.1	---	---	0	0.1	0.2
2009	---	---	---	---	---	---	---	0.2	0.2
2010	---	---	---	---	0	0	---	0.3	0.3
2011	---	---	---	---	---	---	---	0	0

*Unspecified-area catch prorated across BC PMFC areas; catch in 2011 not complete.

Table 35. Pacific Ocean Perch **discarded** catch* (t) by the **H&L Rockfish** fishery from **PacHarvHL** (fisherlogs 2001-2003), and **GFFOS** (2008).

PacHarvHL (fisherlogs) Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
2001	---	---	---	---	0	0	---	---	0
2002	---	---	---	---	---	---	---	---	---
2003	---	---	---	---	0	---	---	---	0
GFFOS Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
2008	---	---	---	---	---	---	---	0	0

*Unspecified-area catch prorated across BC PMFC areas.

Table 36. Yelloweye Rockfish **landed** catch*(t) by the **Trawl** fishery from **PacHarv3** (1982-2002), **GFCatch** (1969-1995), **PacHarvest** (1996-2007), and **GFFOS** (2007-2011).

PacHarv3 Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1982	5.5	0.9	0	4.7	0	0.1	0.7	---	12
1983	7.3	2.6	39	1.8	30	4.9	3.4	1.0	90
1984	28	6.1	88	119	172	14	5.3	6.4	439
1985	63	5.9	216	133	53	---	2.2	---	473
1986	49	7.7	138	27	57	0.2	17	---	295
1987	25	0.3	3.3	2.7	2.1	0.4	1.2	---	35
1988	56	2.3	0.4	4.4	10	---	0	1.1	75
1989	50	7.5	2.1	3.1	7.7	---	0.2	---	71
1990	60	7.4	2.6	9.4	2.3	1.7	2.2	12	98
1991	32	3.4	2.0	1.1	8.9	1.3	10	---	59
1992	18	2.2	0.2	13	7.9	4.9	2.5	0.2	49
1993	10	0.4	25	5.4	30	4.7	3.4	---	79
1994	9.8	12	87	17	41	26	17	2.8	214
1995	10	3.3	79	19	37	18	24	126	317
1996	---	---	---	0	---	---	---	---	0
1997	---	---	---	---	---	---	---	0.5	0.5
1998	---	---	---	0	---	---	---	---	0
1999	---	---	---	---	---	---	0	---	0
2000	---	---	0.5	---	---	1.6	0.5	0.5	3.0
2001	---	---	0.4	---	0.1	---	---	---	0.4
2002	---	---	---	---	0.6	---	---	---	0.6
GFCatch Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1969	0	---	0.2	---	---	---	---	---	0.3
1970	---	---	---	---	---	---	---	---	---
1971	---	---	---	---	---	---	---	---	---
1972	---	---	---	---	0.1	---	---	---	0.1
1973	---	---	---	---	---	---	---	---	---
1974	---	---	---	---	---	---	---	---	---
1975	---	---	---	---	---	---	---	---	---
1976	---	---	---	---	---	---	---	---	---
1977	0.1	0.1	---	0.3	---	0	0.2	---	0.7
1978	0.2	1.4	0.6	0.8	1.3	0.1	0.2	---	4.6
1979	0	0.1	---	---	---	---	---	0.7	0.8
1980	---	---	---	0.3	0.4	---	0	---	0.8
1981	---	---	2.1	0.3	0.3	2.2	0.7	0.2	5.8
1982	---	---	---	---	---	---	---	2.0	2.0
1983	0	---	0.8	---	---	---	---	---	0.9
1984	---	---	0	0.6	0.5	---	1.1	0.3	2.5
1985	---	0.2	---	0.8	4.1	---	---	---	5.1
1986	---	---	1.1	0.5	1.7	3.2	0	4.4	11
1987	0.3	5.5	6.0	6.2	5.3	8.6	---	---	32
1988	0	1.2	0.8	1.8	1.0	---	0.4	11	16
1989	0	7.2	1.2	0.1	27	0.5	0	---	36
1990	---	1.4	3.3	12	25	6.1	0.3	0.5	48
1991	---	4.0	8.1	5.6	6.1	6.6	1.8	---	32
1992	---	5.2	2.4	9.7	16	3.5	1.2	---	38
1993	0	17	7.2	7.0	6.6	1.3	6.4	---	45

1994	0.4	8.1	20	14	29	7.2	3.5	---	82
1995	0.0	5.1	8.5	8.8	17	3.5	2.5	0.1	46
PacHarvest									
Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1996	0	4.1	4.9	3.7	5.9	1.0	0.3	0	20
1997	---	1.9	1.8	1.9	7.1	0.2	0.2	0	13
1998	---	0.6	1.1	1.0	2.9	0.2	0.1	0	5.9
1999	---	1.0	1.8	1.3	2.4	0.3	0	---	6.9
2000	---	1.0	3.1	1.5	2.0	0.2	0	---	7.7
2001	---	1.3	1.5	0.4	3.3	1.5	0	0	8.0
2002	---	1.3	0.8	0.3	2.8	0.5	0	---	5.8
2003	---	0.6	0.7	0.4	3.4	1.4	0.1	0.1	6.6
2004	---	0.6	0.5	0.2	1.6	1.6	0.1	0.1	4.8
2005	---	1.4	0.8	0.4	1.7	0.9	0	0.1	5.3
2006	---	0.3	0.5	0.6	2.8	0.8	0	0.1	5.1
2007	---	0.2	0.2	0.1	0.2	0.4	---	---	1.1
GFFOS									
Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
2007	---	0.6	0.3	0.2	1.1	0.3	0	---	2.6
2008	---	0.5	0.6	0.1	1.0	0.4	0	0.1	2.8
2009	---	0.6	1.5	0.7	0.5	0.1	0	---	3.5
2010	---	0.4	1.2	2.1	1.9	0.1	0	0	5.8
2011	---	0.5	1.0	1.1	0.1	0	---	0	2.7

*Unspecified-area catch prorated across BC PMFC areas; catch in 2011 not complete.

Table 37. Yelloweye Rockfish **discarded** catch*(t) by the **Trawl** fishery from **GFCatch** (1983-1995), **PacHarvest** (1996-2007), and **GFFOS** (2007-2011).

GFCatch									
Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1983	---	---	---	---	---	0	---	---	0
1984	---	---	---	---	---	---	---	---	---
1985	---	---	---	---	---	---	---	---	---
1986	---	---	---	---	---	---	---	---	---
1987	---	---	---	---	---	---	---	---	---
1988	---	---	---	---	---	---	---	---	---
1989	---	---	---	---	---	---	---	---	---
1990	---	---	---	---	---	---	---	---	---
1991	---	---	---	---	---	---	---	---	---
1992	0.1	---	---	---	---	---	---	---	0.1
1993	---	---	---	---	---	---	---	---	---
1994	---	---	---	---	---	---	---	---	---
1995	---	---	---	0.1	0	---	---	---	0.1
PacHarvest									
Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1996	---	---	0	---	0	0	---	---	0
1997	---	0.4	0.4	1.3	3.8	0.3	0	---	6.2
1998	---	0.6	1.8	1.9	4.8	0.5	0.2	---	9.8
1999	---	0.8	1.2	1.0	5.5	0.5	0.1	0	9.2
2000	---	0.4	1.0	0.9	5.2	0.3	0.1	0	7.9
2001	0	0.6	1.8	0.9	1.9	0.2	0	0	5.4
2002	---	0.8	0.6	1.1	4.0	0.2	0	0	6.7
2003	0	0.6	0.8	1.3	3.8	0.2	0	0	6.8
2004	---	0.7	1.2	0.6	2.0	0.1	0	0.1	4.8
2005	0	1.0	0.9	0.7	2.3	0.1	0	0.1	5.1
2006	---	0.6	0.7	0.6	0.7	0.3	0	0.1	3.0
2007	---	0.2	0.2	0.1	0	---	---	0	0.6
GFFOS									
Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
2007	0	0.6	0.6	0.3	0.9	0.1	0	---	2.4
2008	0	1.3	1.5	0.5	0.4	0	0	0	3.9
2009	---	1.0	1.4	1.0	1.0	0.1	0	---	4.6
2010	---	1.2	1.8	0.6	2.0	0	0	0	5.7
2011	---	0.5	1.6	0.4	0.2	0	0	---	2.7

*Unspecified-area catch prorated across BC PMFC areas; catch in 2011 not complete.

Table 38. Yelloweye Rockfish **landed** bycatch*(t) in the **Halibut** fishery from **PacHarv3** (1982-2004), **PacHarvHL** (Halibut 1995-2005), **PacHarvHL** (DMP 1996-2003), and **GFFOS** (2006-2011).

PacHarv3 Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1982	1.2	1.0	1.5	3.3	0.8	13	4.6	4.0	29
1983	0.2	0.2	0.7	---	1.2	5.4	8.1	3.0	19
1984	3.3	2.8	5.1	1.8	1.5	10	8.1	5.4	38
1985	3.5	1.3	3.7	5.9	7.3	35	18	6.9	81
1986	12	0.5	17	7.5	4.7	27	17	18	102
1987	7.0	7.2	13	17	9.7	75	39	3.7	171
1988	3.4	3.7	2.6	25	10	34	58	20	157
1989	13	5.8	64	92	24	73	61	33	367
1990	5.0	7.9	59	89	16	57	99	49	381
1991	11	8.1	66	49	15	28	87	45	308
1992	2.5	1.3	20	36	22	43	86	37	248
1993	3.5	2.0	33	59	20	69	123	202	512
1994	0.6	3.4	11	31	33	45	85	64	273
1995	---	2.4	9.6	48	31	115	112	2.0	320
1996	3.9	2.9	22	22	19	41	82	30	224
1997	5.0	3.5	11	15	13	39	75	13	175
1998	3.3	3.0	19	23	30	55	68	6.5	208
1999	0.9	2.5	11	6.1	13	22	44	6.2	105
2000	0.7	5.8	18	6.5	33	36	83	13	195
2001	0.9	4.5	8.7	8.6	20	41	75	21	179
2002	0	5.9	9.7	4.4	13	40	47	18	138
2003	---	---	---	---	---	---	---	---	---
2004	---	---	---	---	---	---	0	---	0

PacHarvHL (halibut) Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1995	0.7	2.1	4.9	5.2	12	15	10	7.7	58
1996	1.3	1.5	7.6	8.7	11	15	40	7.9	94
1997	2.4	1.7	6.1	7.9	6.4	14	26	5.6	70
1998	6.3	6.5	33	34	31	54	72	11	247
1999	1.6	3.9	13	8.6	15	27	45	7.8	122
2000	0.4	---	48	---	41	---	9.7	123	222
2001	0.8	---	47	---	38	---	10	146	241
2002	0	---	36	---	20	---	7.8	104	168
2003	---	---	33	---	18	---	3.8	87	142
2004	0.2	---	25	---	11	---	6.8	85	128
2005	0	---	26	---	14	---	8.7	80	129

PacHarvHL (DMP) Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1996	---	---	---	1.0	---	---	---	---	1.0
1997	---	---	---	---	---	---	---	---	---
1998	---	---	---	---	---	---	---	---	---
1999	0	0	0.2	0.2	0.3	0	0.3	---	1.0
2000	---	0.4	0.5	0.3	0.5	2.5	0.3	0.7	5.1
2001	0.5	1.0	0.2	1.7	7.4	3.8	2.2	8.3	25
2002	0.1	1.5	1.4	2.0	6.2	5.9	2.1	5.6	25
2003	0.1	1.0	1.4	2.6	10	6.0	3.0	8.6	33

GFFOS Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
2006	0.6	4.9	9.1	13	34	30	12	32	136
2007	1.9	4.7	8.2	25	34	28	13	50	165
2008	2.4	8.8	8.5	44	45	33	20	61	222
2009	1.0	5.4	8.7	34	30	27	15	52	173
2010	1.3	8.7	7.0	24	30	32	10	45	158
2011	0.4	0.6	5.3	6.2	6.4	1.0	1.7	8.6	30

*Unspecified-area catch prorated across BC PMFC areas; catch in 2011 not complete.

Table 39. Yelloweye Rockfish **discarded** bycatch*(t) in the **Halibut** fishery from **GFFOS** (2006-2011).

GFFOS Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
2006	0	0.5	0.2	0.3	0.5	2.0	0.3	0.9	4.7
2007	---	0.1	0.1	0.4	0.4	0.7	0.1	0.6	2.4
2008	0	0.2	0.5	0.2	0.9	0.4	0.3	0.7	3.2
2009	0	0.1	0.1	0.3	0.2	0.4	0.2	0.3	1.5
2010	---	0.2	0.1	0.2	0.3	0.6	0	0.5	1.8
2011	0	0	0	0	0.3	0	0	0	0.4

*Unspecified-area catch prorated across BC PMFC areas; catch in 2011 not complete.

Table 40. Yelloweye Rockfish **landed** bycatch*(t) in the **Sablefish** fishery from **PacHarv3** (1982-2002), **GFCatch** (1979-1995), and **GFFOS** (2007-2010).

PacHarv3 Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1982	---	---	1.2	---	---	---	0.1	1.5	2.9
1983	---	---	17	---	---	---	0.3	---	17
1984	---	---	12	---	---	---	0.4	---	13
1985	---	0.7	6.7	---	---	---	---	3.0	10
1986	---	19	19	0	0.5	---	---	3.1	41
1987	---	5.5	8.6	2.2	---	3.9	10	1.8	32
1988	---	31	31	---	---	---	4.2	7.6	74
1989	---	16	32	---	3.2	---	---	3.1	54
1990	---	52	54	---	17	0.2	31	---	154
1991	---	6.9	54	---	23	1.3	---	7.4	92
1992	---	---	4.6	---	17	4.4	0.1	---	26
1993	---	7.4	33	---	---	0.7	---	2.4	43
1994	---	0.2	16	---	---	---	---	---	16
1995	---	0.2	5.1	---	0.5	0.8	0.4	2.9	9.9
1996	---	0.3	1.1	---	0.4	---	1.2	0.6	3.7
1997	---	0.4	0.8	---	---	---	---	0.1	1.3
1998	---	0.9	0.2	---	---	---	---	0.1	1.2
1999	---	0.7	1.0	---	---	---	---	0.1	1.8
2000	---	2.7	0.8	---	---	1.2	0	0.9	5.6
2001	---	0.5	1.2	---	0.1	---	---	---	1.7
2002	---	1.9	1.8	---	0.1	---	---	1.4	5.3
GFCatch Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1979	0.7	---	---	0.2	---	0.9	---	---	1.8
1980	0	---	0.1	0.2	0.1	---	---	---	0.4
1981	---	---	---	---	---	---	---	---	---
1982	---	---	---	---	---	---	---	---	---
1983	---	---	---	---	---	0.1	0	---	0.1
1984	0	---	---	---	---	---	---	---	0
1985	---	---	---	---	---	---	---	---	---
1986	---	---	---	---	---	---	---	---	---
1987	---	---	---	---	---	---	---	---	---
1988	---	---	---	---	---	---	---	---	---
1989	---	---	---	---	---	---	---	---	---
1990	---	---	---	---	---	---	---	---	---
1991	---	---	---	---	---	---	---	0	0
1992	---	---	---	---	---	---	---	---	---
1993	---	---	---	---	---	---	---	---	---
1994	---	---	---	---	---	---	---	---	---
1995	---	---	---	---	---	---	---	0.5	0.5
GFFOS Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
2007	---	0.2	0.8	0	---	---	---	---	1.0
2008	---	---	0	0.1	---	---	---	0.7	0.8
2009	---	---	0	---	0	---	---	0.2	0.3
2010	---	0.1	---	0.2	---	---	---	0.2	0.5
2011	---	---	---	1.0	---	---	---	0.2	1.2

*Unspecified-area catch prorated across BC PMFC areas; catch in 2011 not complete.

Table 41. Yelloweye Rockfish **discarded** bycatch*(t) in the **Sablefish** fishery from **GFCatch** (1995), **PacHarvSable** (2001-2005), and **GFFOS** (2006-2011).

GFCatch Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1995	0	---	---	---	---	---	---	---	0
PacHarvSable Year	**4B**	**3C**	**3D**	**5A**	**5B**	**5C**	**5D**	**5E**	**Total**
2001	---	0	0	---	---	---	---	---	0
2002	---	---	---	---	---	---	---	---	---
2003	---	---	---	---	---	---	---	---	---
2004	---	---	---	---	0.2	---	---	0	0.2
2005	---	0	0	---	---	---	---	---	0
GFFOS Year	**4B**	**3C**	**3D**	**5A**	**5B**	**5C**	**5D**	**5E**	**Total**
2006	---	0	0	---	---	---	---	---	0
2007	---	0	0.1	---	---	---	---	---	0.1
2008	---	---	---	---	---	---	---	---	---
2009	---	---	---	0.1	0	---	---	0	0.1
2010	---	---	---	0	---	---	---	---	0
2011	---	---	---	0	---	---	---	---	0

*Unspecified-area catch prorated across BC PMFC areas; catch in 2011 not complete.

Table 42. Yelloweye Rockfish **landed** bycatch*(t) in the **Dogfish-Lingcod** fishery from **PacHarv3** (1982-2009), **PacHarvHL** (DMP 1996-2006), **PacHarvHL** (fisherlogs 1996-2006), and **GFFOS** (2006-2011).

PacHarv3 Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1982	14	10	9.3	---	1.1	0.2	1.5	0.9	37
1983	14	13	8.9	1.3	19	2.2	6.4	0.2	64
1984	8.4	52	7.5	70	1.9	3.0	7.5	3.1	153
1985	7.6	83	17	12	108	22	3.9	0.3	253
1986	10	43	60	13	74	45	6.3	2.0	253
1987	21	42	74	41	0.8	12	33	1.2	225
1988	25	45	39	57	4.8	29	26	22	248
1989	24	29	35	35	4.5	12	23	3.3	166
1990	18	56	25	50	9.6	18	14	5.3	195
1991	7.3	33	40	99	5.3	10	9.7	2.3	208
1992	2.0	21	43	42	2.4	15	15	5.4	145
1993	7.1	11	44	0.5	0.2	4.0	13	0.6	81
1994	2.9	19	38	5.9	0	1.7	7.1	11	86
1995	14	32	32	1.0	2.1	20	14	1.4	117
1996	0.3	0.3	0.8	0.1	0	---	0.3	---	1.7
1997	1.5	1.4	3.4	0.5	---	---	0.3	0	7.1
1998	1.4	0.4	1.8	0.2	0.1	---	0.3	0.2	4.3
1999	0.6	0.1	0.7	0.3	0	0.9	0.2	0.5	3.2
2000	0.1	4.1	0.8	0	---	0.2	0.7	2.3	8.2
2001	---	2.9	0.1	0.2	0.3	---	0	---	3.4
2002	---	---	1.0	---	---	0.2	0	---	1.3
2003	---	0	0	---	---	---	---	0	0
2004	---	---	0.2	---	---	---	0	---	0.2
2005	---	---	0	---	---	---	0	---	0
2006	---	0	0	---	---	---	0.1	---	0.1
2007	---	---	---	---	---	---	0	---	0
2008	---	---	0	---	0.1	---	0.1	---	0.2
2009	---	---	---	---	---	---	0.4	0.2	0.6
PacHarvHL (DMP) Year	**4B**	**3C**	**3D**	**5A**	**5B**	**5C**	**5D**	**5E**	**Total**
1996	0.1	---	---	0	---	---	---	---	0.1
1997	---	0.7	0.9	0.6	0.5	0.5	---	0.7	3.8
1998	0	0.5	1.4	0.5	---	0.4	---	0.8	3.6
1999	0	---	---	---	---	---	---	---	0
2000	---	---	---	---	---	---	---	---	---
2001	0.5	---	---	---	---	---	---	---	0.5

2002	---	---	---	---	---	---	---	---	---
2003	1.7	---	---	0	---	---	---	---	1.7
2004	1.7	0.1	0	0.4	0.1	0.1	0	---	2.5
2005	3.6	---	0.6	0.2	0.1	0	0.1	---	4.6
2006	0.4	---	---	0.2	0	0	---	---	0.7

PacHarvHL (fisherlogs) Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1996	0.3	---	---	---	---	---	---	---	0.3
1997	0	0.9	0.9	0.6	0.7	0.3	---	0.8	4.2
1998	0.2	0.4	1.4	0.6	0.5	1.1	---	0.8	5.0
1999	0.1	0.1	0.1	0.3	2.2	0.2	0.5	---	3.4
2000	---	---	---	---	---	0.1	0	---	0.1
2001	0.2	0	0.2	0.1	0	0	0	0	0.7
2002	0.3	0.1	0.2	---	---	---	---	---	0.6
2003	2.3	0.1	1.5	1.9	0.1	0	0	3.7	9.5
2004	3.2	0.1	0.6	0.1	0.1	---	---	0.1	4.0
2005	5.6	0	0.1	0.1	0	0	0	0	5.8
2006	0.4	---	---	0.1	---	---	---	---	0.4

GFFOS Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
2006	1.8	2.6	2.3	0.7	0.2	0.4	0.2	0.9	9.2
2007	2.4	6.8	5.1	1.5	0.7	0.3	0.3	1.5	19
2008	2.8	9.7	1.7	2.4	0.9	0.4	0.3	1.3	19
2009	2.9	9.8	3.5	1.6	0.8	0.9	0.1	1.8	21
2010	2.6	3.4	3.9	2.5	0.7	1.1	0.3	0.6	15
2011	0.1	0.4	1.6	0.6	0.3	0.1	0	0.2	3.3

*Unspecified-area catch prorated across BC PMFC areas; catch in 2011 not complete.

Table 43. Yelloweye Rockfish **discarded** bycatch*(t) in the **Dogfish-Lingcod** fishery from **PacHarvHL** (2001-2006), and **GFFOS** (2006-2010).

PacHarvHL (fisherlogs) Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
2001	0.3	0.1	0.3	0.1	0	0.1	0	---	0.9
2002	0.5	0.6	1.5	0.4	0.1	0.3	0.3	0.2	3.9
2003	0.6	2.2	1.3	0.4	0.5	1.0	0.3	1.5	7.9
2004	0.4	2.0	1.8	0.7	1.0	1.0	0.2	1.4	8.5
2005	1.0	3.2	4.1	1.7	0.7	0.7	0.4	2.6	14
2006	0	0.1	---	0	---	---	---	---	0.1

GFFOS Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
2006	0.1	0	0.1	0	---	0	---	0	0.3
2007	0.2	0.3	0	0.1	0	0	0	0.1	0.7
2008	0.2	0.2	0.1	0	0	0	---	0	0.5
2009	0.1	1.0	0	0	---	0	---	---	1.2
2010	0.2	0.1	0	0	0	---	0	---	0.3

*Unspecified-area catch prorated across BC PMFC areas.

Table 44. Yelloweye Rockfish **landed** catch*(t) by the **H&L Rockfish** fishery from **PacHarv3** (1982-2008), **GFCatch** (1979-1986), **PacHarvHL** (DMP 1995-2006), **PacHarvHL** (fisherlogs 1988-2006), and **GFFOS** (2004-2011).

PacHarv3 Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1982	4.1	0.3	---	---	---	---	---	---	4.5
1983	6.6	---	41	---	21	3.9	0.9	0	73
1984	9.4	1.7	25	0.6	1.7	1.3	9.6	---	49
1985	9.9	1.2	109	4.8	0.5	0.1	17	0	143
1986	31	24	170	22	2.4	62	3.7	42	357
1987	48	16	120	9.0	1.9	8.7	7.5	6.8	218
1988	46	10	51	26	5.5	32	27	0.1	198
1989	38	21	96	44	6.6	12	68	26	312
1990	52	9.4	62	70	26	42	69	11	342
1991	64	2.3	83	48	120	77	79	16	489
1992	7.2	12	70	63	56	44	59	177	489
1993	20	7.8	239	8.5	11	41	37	18	383
1994	76	---	30	3.2	17	16	8.2	64	214
1995	15	0.1	---	8.2	0.1	17	3.8	5.4	50
1996	---	---	0.4	0.2	0	0.1	---	---	0.8
1997	---	---	0.1	1.3	---	0.2	0.4	---	2.1
1998	0	---	0.4	0.3	0.1	0.1	0.4	---	1.4
1999	---	---	---	---	---	---	---	---	---
2000	---	---	---	---	---	0.2	0	0	0.3
2001	---	---	---	---	---	---	---	---	---
2002	---	---	---	---	---	---	---	---	---
2003	---	---	---	---	---	---	---	---	---
2004	---	---	---	---	---	---	---	---	---
2005	---	---	---	---	---	---	---	---	---
2006	---	---	---	---	---	---	---	---	---
2007	---	0	0.1	---	---	0	---	---	0.1

GFCatch Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1979	25	0	7.3	1.6	0.6	---	0.1	2.9	38
1980	11	---	4.5	1.6	0.1	---	1.1	0.8	19
1981	5.0	---	---	---	---	---	---	0.1	5.1
1982	13	---	---	---	---	---	---	---	13
1983	0.8	---	---	---	---	---	0.9	---	1.7
1984	1.2	---	12	0.9	---	---	1.2	21	36
1985	4.0	---	1.6	0.4	---	---	1.7	0.2	7.8
1986	0.2	0.1	---	1.5	0.7	---	---	---	2.5

PacHarvHL (DMP) Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1995	31	5.1	53	72	45	61	24	130	422
1996	19	9.1	90	65	50	62	27	105	427
1997	13	9.6	101	46	45	93	25	78	409
1998	22	11	66	62	37	66	12	63	340
1999	16	5.5	55	49	36	71	6.5	52	291
2000	22	15	33	48	40	29	13	65	266
2001	23	17	30	48	39	33	11	39	239
2002	2.9	3.9	14	25	30	37	6.7	17	137
2003	3.7	4.4	6.6	26	24	9.0	3.9	0.7	79
2004	1.9	2.9	7.6	24	15	8.6	2.7	0.5	64
2005	2.3	3.4	8.0	26	19	15	2.1	0	76
2006	0.2	---	1.1	5.1	9.2	20	1.1	---	36

PacHarvHL (fisherlogs) Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1988	---	183	---	14	---	160	57	---	413
1989	57	24	133	56	41	6.4	---	17	336
1990	30	67	314	273	108	59	113	267	1,230
1991	15	20	157	244	268	105	50	200	1,060
1992	5.9	30	75	135	78	98	16	234	672
1993	17	42	237	238	45	94	35	234	941
1994	83	13	81	138	25	80	32	211	662
1995	32	5.7	63	82	49	66	26	158	481
1996	21	9.5	101	75	49	62	25	113	457

1997	12	8.8	124	58	49	97	23	68	440
1998	23	8.8	82	81	37	77	17	70	396
1999	14	5.1	83	47	38	83	6.6	57	332
2000	18	10	33	56	58	35	11	70	290
2001	19	12	30	52	38	30	9.0	39	229
2002	3.3	6.9	18	33	28	36	5.5	23	153
2003	3.7	8.5	8.3	37	23	9.7	2.9	1.7	94
2004	2.8	4.7	14	33	20	9.5	2.4	0.0	87
2005	2.2	4.0	10	31	20	18	2.4	6.5	94
2006	0.1	---	1.0	5.2	7.2	22	1.2	0.2	36
GFFOS									
Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
2004	---	0	---	---	---	---	---	---	0
2005	---	---	---	---	---	---	---	---	---
2006	0.9	0.6	2.0	3.6	2.2	2.7	0.9	8.3	21
2007	4.3	2.0	2.6	11	7.7	5.8	0.9	7.7	41
2008	4.4	4.9	7.7	18	9.8	6.7	4.1	7.1	63
2009	2.7	0.3	3.1	18	12	14	0.2	3.3	53
2010	2.7	2.0	2.0	15	14	9.9	0.8	18	64
2011	0.5	0.7	2.3	3.9	3.5	9.4	0.2	12	33

*Unspecified-area catch prorated across BC PMFC areas; catch in 2011 not complete.

Table 45. Yelloweye Rockfish **discarded** catch*(t) by the **H&L Rockfish** fishery from **GFCatch** (1979), **PacHarvHL** (fisherlogs 2001-2006), and **GFFOS** (2006-2011).

GFCatch									
Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1979	0	---	---	---	---	---	---	---	0
PacHarvHL (fisherlogs)									
Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
2001	0.1	0	0.1	0.5	0.1	0.1	---	0.1	0.9
2002	---	0	0.1	0.1	0.1	0.2	0	---	0.5
2003	0	0.1	0	0.4	0	0	0	0	0.6
2004	---	0	0.1	0	0.4	0	0	---	0.6
2005	0	0	0	1.0	0.2	0	0.1	---	1.4
2006	---	---	---	---	---	0	---	---	0
GFFOS									
Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
2006	0	---	0	0.1	0	---	---	---	0.1
2007	0	---	---	0.1	0	0.1	0	0	0.2
2008	0	0.1	0.1	0.1	0	0	0	0	0.3
2009	0	0	0	0.1	0.1	0.1	---	0	0.3
2010	---	0	---	0.2	0.2	0.1	---	0	0.5
2011	---	---	0	---	0	0	---	0	0

*Unspecified-area catch prorated across BC PMFC areas; catch in 2011 not complete.

Table 46. Ratio α – proportion Pacific Ocean Perch and Yelloweye Rockfish landed in major PMFC area by fishery.

Pacific Ocean Perch	Trawl	Halibut	Sablefish	Dogfish-Lingcod	H&L Rockfish
4B	0.00017	0.00035	0	0	0.00452
3C	0.05072	0.01736	0.35570	0.01817	0.00085
3D	0.03620	0.36709	0.24161	0.02023	0.07522
5A	0.13307	0.03137	0	0.00670	0.10075
5B	0.54480	0.08064	0.32215	0.00235	0.19281
5C	0.05496	0.17363	0	0	0.01902
5D	0.02520	0.02879	0	0.26353	0.00263
5E	0.15488	0.30077	0.08054	0.68903	0.60421
Yelloweye Rockfish	**Trawl**	**Halibut**	**Sablefish**	**Dogfish-Lingcod**	**H&L Rockfish**
4B	0	0.00780	0	0.27363	0.05036
3C	0.14651	0.01630	0.41415	0.16235	0.03747
3D	0.17965	0.14216	0.34571	0.18942	0.18604
5A	0.11006	0.04160	0	0.07466	0.19749
5B	0.40738	0.10497	0.00975	0.06863	0.14527
5C	0.12369	0.12715	0.06908	0.05575	0.18381
5D	0.01411	0.21731	0.00145	0.03183	0.04108
5E	0.01859	0.34271	0.15985	0.14373	0.15848

Table 47. Ratio β – proportion Pacific Ocean Perch (POP) and Yelloweye Rockfish (YYR) caught in H&L fisheries for each major PMFC area.

POP	Halibut	Dogfish-Lingcod	H&L Rockfish	YYR	Halibut	Dogfish-Lingcod	H&L Rockfish
4B	0.02195	0	0.97805	4B	0.10679	0.11092	0.78229
3C	0.70242	0.17737	0.12021	3C	0.25620	0.07556	0.66825
3D	0.57820	0.00769	0.41411	3D	0.39611	0.01563	0.58826
5A	0.08145	0.00420	0.91435	5A	0.15529	0.00825	0.83646
5B	0.10678	0.00075	0.89247	5B	0.38614	0.00747	0.60639
5C	0.72315	0	0.27685	5C	0.37687	0.00489	0.61823
5D	0.28347	0.62595	0.09058	5D	0.82043	0.00356	0.17601
5E	0.11662	0.06446	0.81892	5E	0.65054	0.00808	0.34138

Table 48. Ratio γ – ratios of Pacific Ocean Perch (POP) landed to total rockfish landed (TRF) and Yelloweye Rockfish (YYR) landed to other rockfish (ORF excluding POP) landed in PMFC area by fishery.

Pacific ocean perch	Trawl	Halibut	Sablefish	Dogfish-Lingcod	H&L Rockfish
4B	0.06923	0.00029	0	0	0.00007
3C	0.13647	0.00099	0.00016	0.00080	0.00002
3D	0.05866	0.00135	0.00002	0.00038	0.00049
5A	0.19409	0.00107	0	0.00023	0.00065
5B	0.54206	0.00074	0.00018	0.00015	0.00146
5C	0.32452	0.00099	0	0	0.00025
5D	0.35436	0.00007	0	0.00349	0.00010
5E	0.39259	0.00035	0.00000	0.00451	0.00128
Yelloweye rockfish	**Trawl**	**Halibut**	**Sablefish**	**Dogfish-Lingcod**	**H&L Rockfish**
4B	0	0.73132	0	0.99659	0.25608
3C	0.00058	0.44682	0.17285	0.35496	0.25743
3D	0.00038	0.46188	0.18776	0.31759	0.22295
5A	0.00024	0.47685	0	0.49270	0.20950
5B	0.00112	0.53231	0.00623	0.43264	0.30411
5C	0.00133	0.49938	0.05047	0.39479	0.43062
5D	0.00056	0.45561	0.10976	0.06520	0.20803
5E	0.00013	0.42253	0.09062	0.18531	0.06259

Table 49. Ratio δ – discard rate (RRF discard / RRF landed) from observer logs for Pacific Ocean Perch and Yelloweye Rockfish in PMFC area by fishery.

Pacific Ocean Perch	Trawl	Halibut	Sablefish	Dogfish-Lingcod	H&L Rockfish
4B	0.08925	0	0	0	0
3C	0.15524	0	0.03587	0	0
3D	0.05422	0	0.03241	0	0
5A	0.04792	0.00442	0.01010	0	0
5B	0.05921	0.01820	0.03118	0	0
5C	0.22244	0	0	0	0
5D	0.02849	0	0	0	0
5E	0.01530	0.00124	0.00187	0	0
Yelloweye rockfish	**Trawl**	**Halibut**	**Sablefish**	**Dogfish-Lingcod**	**H&L Rockfish**
4B	0.08450	0	0	0.08386	0.00709
3C	0.02791	0.01029	0.05263	0.09335	0.00327
3D	0.04432	0.03526	0.06019	0.16031	0.00649
5A	0.04930	0.03268	0.02941	0.20141	0.00039
5B	0.05609	0.23081	0	0.29698	0.01082
5C	0.03965	0.10700	0	0.22448	0.06290
5D	0.00849	0.02759	0	0.27731	0.00862
5E	0.00340	0.08763	0.00071	0.72241	0

Table 50. Ratio δ – discard rate (RRF discard / TAR) from observer logs for Pacific Ocean Perch and Yelloweye Rockfish in PMFC area by fishery, where TAR = landings of a target species/group for the fishery.

Pacific Ocean Perch	Trawl	Halibut	Sablefish	Dogfish-Lingcod	H&L Rockfish
4B	0.02564	0	0	0	0
3C	0.01952	0	0.00016	0	0
3D	0.00580	0	0.00066	0	0
5A	0.01486	0.00001	0.00015	0	0
5B	0.01865	0.00007	0.00038	0	0
5C	0.03478	0	0	0	0
5D	0.01606	0	0	0	0
5E	0.00353	0.00000	0.00000	0	0
Yelloweye Rockfish	**Trawl**	**Halibut**	**Sablefish**	**Dogfish-Lingcod**	**H&L Rockfish**
4B	0	0	0	0.00179	0.00059
3C	0.00300	0.00024	0.00051	0.01058	0.00196
3D	0.00210	0.01395	0.00098	0.00272	0.00199
5A	0.00607	0.00887	0.00186	0.00743	0.00046
5B	0.00788	0.01703	0	0.02258	0.00123
5C	0.00418	0.00860	0	0.01016	0.01775
5D	0.00313	0.00262	0	0.01444	0.00296
5E	0.00002	0.01241	0.00000	0.04241	0

Table 51. Ratio λ – proportion of 1918-1950 rockfish catch by general gear type: pre-WWII (1918-1938) proportions reflect general estimates by the authors; post-WWII (1939-1950) proportions are calculated from 1951-1952 observations in sales slip data compiled by Obradovitch (p. 13).

Pre-WWII	H&L	Trap	Trawl	Post-WWII	H&L	Trap	Trawl
4B	0.9	0	0.1	4B	0.47423	0.01651	0.50926
3C	0.9	0	0.1	3C	0.07197	0	0.92803
3D	0.9	0	0.1	3D	0.90566	0	0.09434
5A	0.9	0	0.1	5A	0.63745	0	0.36255
5B	0.9	0	0.1	5B	0.47743	0	0.52257
5C	0.9	0	0.1	5C	0.53215	0	0.46785
5D	0.9	0	0.1	5D	0.32572	0	0.67428
5E	0.9	0	0.1	5E	1.00000	0	0

Table 52. Reconstructed total (landed + discarded) catch (t) for **Pacific Ocean Perch** from the **Trawl** fishery in PMFC major areas. Entries marked '---' indicate no catch reported or calculated; values of 0 indicate positive catch less than 0.05 t. Incomplete catch for 2011.

Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1918	0.6	0.3	0.1	0	3.3	0.8	1.8	0.8	7.7
1919	1.4	0.5	0.2	0.1	0.4	0.1	0.2	0.1	3.1
1920	0.7	0.3	0.1	0	0.6	0.2	0.3	0.1	2.4
1921	0.6	0.2	0.1	0	0	0	0	0	1.0
1922	0.8	0.4	0.1	0	0	0	0	0	1.4
1923	0.7	0.2	0.1	0	0.1	0	0	0	1.2
1924	0.8	0.2	0.1	0	0.2	0	0.1	0	1.5
1925	0.7	0.1	0	0	0.3	0.1	0.1	0.1	1.4
1926	0.8	0.2	0.1	0	0.6	0.1	0.3	0.1	2.3
1927	0.8	0.3	0.1	0	0.8	0.2	0.5	0.2	3.0
1928	0.9	0.3	0.1	0	0.6	0.2	0.3	0.1	2.5
1929	1.1	0.2	0.1	0	0.9	0.2	0.5	0.2	3.3
1930	1.0	0.2	0.1	0	0.5	0.1	0.3	0.1	2.2
1931	0.7	0.2	0.1	0	0.1	0	0	0	1.1
1932	0.8	0.1	0	0	0.1	0	0	0	1.1
1933	0.4	0.1	0	0	0	0	0	0	0.5
1934	0.4	0.1	0	0.1	0.6	0	0	0	1.4
1935	0.6	0.7	0.2	0.8	4.9	0.2	0.4	0.1	7.9
1936	0.6	0.9	0.3	1.1	6.4	0.2	0.6	0.2	10
1937	0.5	0.7	0.2	1.0	5.1	0.1	0.2	0	7.9
1938	1.6	1.6	0.5	1.5	7.4	0	0.3	0	13
1939	3.0	1.7	0.4	1.5	8.2	0.1	0.6	---	16
1940	3.3	2.8	0.8	3.3	18	0.2	1.0	---	29
1941	2.0	2.3	0.3	1.3	11	1.0	3.1	---	21
1942	4.7	21	5.7	24	127	1.3	6.3	---	190
1943	27	66	18	77	408	3.8	19	---	619
1944	40	36	8.0	32	179	3.7	14	---	313
1945	48	257	79	335	1,755	12	67	---	2,554
1946	32	133	40	169	904	10	47	---	1,337
1947	11	68	21	88	462	3.0	17	---	671
1948	15	110	34	143	749	4.8	28	---	1,084
1949	20	134	41	174	912	6.0	34	---	1,322
1950	10	131	45	202	871	6.1	52	---	1,317
1951	6.5	128	33	140	1,029	6.0	29	---	1,371
1952	5.0	145	34	137	895	3.8	34	---	1,254
1953	3.7	91	20	77	737	1.5	12	---	943
1954	9.1	174	25	87	1,703	3.4	14	---	2,017
1955	10	127	37	165	469	2.1	23	---	833
1956	0.5	755	58	425	974	88	0.9	---	2,301
1957	---	579	270	350	761	5.5	1.9	---	1,967
1958	---	138	50	285	693	19	5.6	---	1,191
1959	---	630	166	1,669	322	2.8	---	---	2,791
1960	---	824	215	769	1,000	36	---	---	2,844
1961	0.8	841	1,000	451	814	---	0.5	---	3,107
1962	---	2,475	999	482	1,460	---	---	---	5,415
1963	1.2	2,833	852	1,060	2,861	30	1.4	---	7,638
1964	2.5	1,424	462	1,717	1,979	16	5.8	---	5,606
1965	1.9	3,005	244	5,009	3,395	62	3,872	2,762	18,350
1966	3.9	5,544	2,319	14,821	8,464	0.6	5,970	4,257	41,379
1967	---	1,286	435	11,204	7,315	42	920	656	21,858
1968	0.1	1,065	614	7,373	6,163	---	1,120	799	17,133
1969	---	372	130	4,328	6,055	---	8.9	5.8	10,899
1970	2.0	1,751	340	3,975	4,393	0.6	41	9.4	10,511
1971	0.6	1,189	237	1,579	3,077	1.8	73	46	6,204
1972	0.6	544	228	2,904	4,149	---	14	---	7,839
1973	---	224	41	2,880	3,495	29	16	---	6,684
1974	---	279	24	6,074	3,695	26	15	---	10,114
1975	0	279	57	2,931	2,786	167	69	---	6,290
1976	0	1.5	---	1,319	1,553	60	38	80	3,051
1977	0.6	17	1.2	73	1,064	53	31	1,575	2,815
1978	1.2	56	7.4	172	1,202	84	10	2,466	3,999
1979	1.0	93	47	293	1,143	177	127	1,083	2,964
1980	0.1	330	152	139	1,823	2,482	51	976	5,952
1981	0.4	441	175	39	2,507	1,697	47	719	5,625
1982	7.6	485	119	314	2,908	2,085	453	971	7,342

Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1983	1.3	432	620	552	2,498	1,318	332	1,637	7,391
1984	0.3	564	356	118	2,589	579	2,568	3,074	9,847
1985	0.5	257	569	112	2,291	698	2,258	2,792	8,977
1986	0.2	149	1,244	400	841	130	2,973	3,419	9,157
1987	0.2	405	688	609	2,749	502	1,211	1,818	7,982
1988	32	213	697	591	3,197	2,843	1,164	1,883	10,620
1989	0.1	236	1,177	380	2,073	1,743	1,600	2,113	9,322
1990	0.6	212	1,098	494	1,914	1,605	1,230	1,786	8,340
1991	0.6	13	1,035	425	2,251	2,195	7.2	646	6,573
1992	0	332	941	398	2,158	1,746	22	380	5,978
1993	4.9	806	1,123	344	1,655	1,613	119	504	6,168
1994	0.1	1,330	607	671	3,091	1,635	127	325	7,787
1995	0	478	534	657	3,383	2,461	81	866	8,459
1996	0	119	502	411	4,223	566	33	701	6,556
1997	---	304	154	867	3,493	408	60	703	5,988
1998	---	323	218	950	3,243	500	292	792	6,319
1999	---	337	217	953	3,002	563	110	728	5,909
2000	---	281	231	572	3,488	417	228	1,040	6,258
2001	8.8	293	205	704	2,998	311	154	1,187	5,860
2002	---	298	245	709	3,112	325	144	1,111	5,943
2003	0	311	257	814	3,640	263	123	947	6,356
2004	0	321	227	735	3,610	129	76	956	6,055
2005	0	320	224	859	2,724	130	163	773	5,193
2006	0	306	210	537	3,447	98	93	829	5,520
2007	0.1	229	243	657	2,856	56	23	830	4,894
2008	0	426	324	500	2,368	30	76	841	4,565
2009	0	295	217	753	2,363	43	75	794	4,540
2010	0.1	217	202	900	3,191	22	72	927	5,531
2011	0	211	114	161	510	0	38	604	1,638

Table 53. Reconstructed total (landed + discarded) catch (t) for **Pacific Ocean Perch** from the **Halibut** fishery in PMFC major areas. Entries marked '---' indicate no catch reported or calculated; values of 0 indicate positive catch less than 0.05 t. Incomplete catch for 2011.

Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1918	0	0	0	0	0	0	0	0	0
1919	0	0	0	0	0	0	0	0	0.1
1920	0	0	0	0	0	0	0	0	0
1921	0	0	0	0	0	0	0	0	0
1922	0	0	0	0	0	0	0	0	0
1923	0	0	0	0	0	0	0	0	0
1924	0	0	0	0	0	0	0	0	0
1925	0	0	0	0	0	0	0	0	0
1926	0	0	0	0	0	0	0	0	0
1927	0	0	0	0	0	0	0	0	0
1928	0	0	0	0	0	0	0	0	0
1929	0	0	0	0	0	0	0	0	0
1930	0	0	0	0	0	0	0	0	0
1931	0	0	0	0	0	0	0	0	0
1932	0	0	0	0	0	0	0	0	0
1933	0	0	0	0	0	0	0	0	0
1934	0	0	0	0	0	0	0	0	0
1935	0	0	0	0	0	0	0	0	0
1936	0	0	0	0	0	0	0	0	0
1937	0	0	0	0	0	0	0	0	0
1938	0	0	0	0	0	0	0	0	0.1
1939	0	0	0	0	0	0	0	0	0
1940	0	0	0	0	0	0	0	0	0
1941	0	0	0	0	0	0	0	0	0
1942	0	0	0	0	0	0	0	0	0
1943	0	0	0	0	0	0	0	0	0.1
1944	0	0	0.1	0	0	0	0	0	0.1
1945	0	0	0	0	0	0	0	0	0.1
1946	0	0	0	0	0	0	0	0	0.1
1947	0	0	0	0	0	0	0	0	0
1948	0	0	0	0	0	0	0	0	0
1949	0	0	0	0	0	0	0	0	0
1950	0	0	0	0	0	0	0	0	0
1951	0	0	0	0	0	0	0	0	0.1
1952	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0
1954	0	0	0	0	0	0	0	0	0
1955	0	0	0	0	0	0	0	0	0
1956	0	0	0	0	0	0	0	0	0
1957	0	0	0	---	0	0	0	0	0
1958	0	0	0	---	0	0	0	0	0
1959	0	0	0	0	0	0	0	0	0
1960	0	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0.1
1963	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0.1
1971	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0.1
1973	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0.1
1975	0	0	0	0	0	0.1	0	0	0.1
1976	0	0	0	0	0	0	0	0	0.1
1977	0	0	0	0	0	0	0	0	0.1
1978	0	0	0	0	0	0	0	0	0.1
1979	0	0	0	0	0	0	0	0	0.1
1980	0	0	0	0	0	0	0	0	0.1
1981	0	0	0	0	0	0	0	0	0.1
1982	0	0	0	0	0	0	0	0	0.1

Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1983	0	0	0	0	0	0	0	0	0.1
1984	0	0	0.1	0	0	0	0	0	0.1
1985	0	0	0.1	0	0	0.1	0	0	0.2
1986	0	0.1	0.3	0	0	0.1	0	0	0.6
1987	0	0.1	0.3	0	0	0.2	0	0	0.6
1988	0.6	0.1	0.2	0	0	0.1	0	0	1.1
1989	0	0.1	0.2	0	0	0.1	0	0	0.5
1990	0	0.2	0.2	0	0	0.1	0	0	0.6
1991	0	0.1	0.3	0	0	0.1	0	0	0.6
1992	0	0.1	0.2	0	0	0.1	0	0	0.4
1993	0	0	0.5	0	0	0.1	0	0	0.7
1994	0	0	0.7	0	0	0.1	0	0	0.9
1995	---	---	---	0	0	0.3	0	0	0.3
1996	---	0	0	0	0	0	0	0	0.1
1997	---	0	0	0	0	0	0	0	0.1
1998	0	0	0	0	0.1	0.1	0	0	0.2
1999	---	0	0	0	0.1	0	0	0	0.2
2000	---	0	0	0	0.1	0	0.1	0.1	0.3
2001	---	0	0.1	0	0.1	0.3	0	0.3	0.9
2002	---	0	0.2	0	0.1	0.1	0	0.2	0.7
2003	0	0	0.2	0	0.1	0	---	0.2	0.6
2004	---	---	0.4	0	0.1	---	---	0.3	0.7
2005	---	---	0.3	0	0	---	0	0.1	0.4
2006	---	0.1	0.2	0	0.2	0	0	0	0.6
2007	---	0.1	0.3	0.1	0.1	0	0	---	0.7
2008	---	0.1	0.2	0	0.1	---	0	0	0.4
2009	---	0	0.1	0	0.1	---	---	0	0.2
2010	---	0.1	0.2	0	0	---	0	0	0.3
2011	---	---	0	0	0	---	0	0.1	0.2

Table 54. Reconstructed total (landed + discarded) catch (t) for **Pacific Ocean Perch** from the **Sablefish** fishery in PMFC major areas. Entries marked '---' indicate no catch reported or calculated; values of 0 indicate positive catch less than 0.05 t. Incomplete catch for 2011.

Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1918	---	---	---	---	---	---	---	---	---
1919	---	---	---	---	---	---	---	---	---
1920	---	---	---	---	---	---	---	---	---
1921	---	---	---	---	---	---	---	---	---
1922	---	---	---	---	---	---	---	---	---
1923	---	---	---	---	---	---	---	---	---
1924	---	---	---	---	---	---	---	---	---
1925	---	---	---	---	---	---	---	---	---
1926	---	---	---	---	---	---	---	---	---
1927	---	---	---	---	---	---	---	---	---
1928	---	---	---	---	---	---	---	---	---
1929	---	---	---	---	---	---	---	---	---
1930	---	---	---	---	---	---	---	---	---
1931	---	---	---	---	---	---	---	---	---
1932	---	---	---	---	---	---	---	---	---
1933	---	---	---	---	---	---	---	---	---
1934	---	---	---	---	---	---	---	---	---
1935	---	---	---	---	---	---	---	---	---
1936	---	---	---	---	---	---	---	---	---
1937	---	---	---	---	---	---	---	---	---
1938	---	---	---	---	---	---	---	---	---
1939	---	---	---	---	---	---	---	---	---
1940	---	---	---	---	---	---	---	---	---
1941	---	---	---	---	---	---	---	---	---
1942	---	---	---	---	---	---	---	---	---
1943	---	---	---	---	---	---	---	---	---
1944	---	---	---	---	---	---	---	---	---
1945	---	---	---	---	---	---	---	---	---
1946	---	---	---	---	---	---	---	---	---
1947	---	---	---	---	---	---	---	---	---
1948	---	---	---	---	---	---	---	---	---
1949	---	---	---	---	---	---	---	---	---
1950	---	---	---	---	---	---	---	---	---
1951	---	---	---	---	---	---	---	---	---
1952	---	---	---	---	---	---	---	---	---
1953	---	---	---	---	---	---	---	---	---
1954	---	---	---	---	---	---	---	---	---
1955	---	---	---	---	---	---	---	---	---
1956	---	---	---	---	---	---	---	---	---
1957	---	---	---	---	---	---	---	---	---
1958	---	---	---	---	---	---	---	---	---
1959	---	---	---	---	---	---	---	---	---
1960	---	---	---	---	---	---	---	---	---
1961	---	---	---	---	---	---	---	---	---
1962	---	---	---	---	---	---	---	---	---
1963	---	---	---	---	---	---	---	---	---
1964	---	---	---	---	---	---	---	---	---
1965	---	---	---	---	---	---	---	---	---
1966	---	---	---	---	---	---	---	---	---
1967	---	---	---	---	---	---	---	---	---
1968	---	---	---	---	---	---	---	---	---
1969	---	---	---	---	---	---	---	---	---
1970	---	---	---	---	---	---	---	---	---
1971	---	---	---	---	---	---	---	---	---
1972	---	0	---	---	---	---	---	---	0
1973	---	---	---	---	0	---	---	---	0
1974	---	---	---	---	---	---	---	---	---
1975	---	---	0	---	---	---	---	0	0
1976	---	---	---	---	---	---	---	---	---
1977	---	---	---	---	---	---	---	---	---
1978	---	---	---	---	---	---	---	---	---
1979	---	0	0	---	0	---	---	0	0
1980	---	---	0	---	0	---	---	0	0
1981	---	0	0	---	0	---	---	0	0
1982	---	0	0	---	54	---	---	---	54

Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1983	---	---	0.3	---	---	---	---	---	0.3
1984	---	0	---	---	---	---	---	---	0
1985	---	---	---	---	0	---	---	---	0
1986	---	0.6	0.5	0	0.4	---	---	0	1.6
1987	---	0.7	0.9	0	0.3	---	0	0	1.9
1988	---	0.2	0.8	0.1	0.4	---	---	0	1.5
1989	---	5.6	1.0	0.1	0.3	---	---	0	7.0
1990	---	0.1	0.9	0.1	0.3	---	---	0	1.3
1991	---	0	0.4	0	0.3	---	---	0	0.8
1992	---	0	0.2	0	0.2	---	---	0	0.5
1993	---	1.7	0.6	0.1	0.3	---	---	0	2.7
1994	---	0	0.8	0	0.3	---	---	0	1.2
1995	---	0.1	0.8	0.1	0.3	---	---	0	1.2
1996	---	0	0.6	0	0.2	---	---	0	0.9
1997	---	0.1	0.7	0	0.2	---	---	0	1.0
1998	---	0.1	0.7	0.1	0.2	---	---	0	1.2
1999	---	0.1	0.6	0.1	0.4	---	---	0	1.1
2000	---	0.1	0.4	0	0.3	---	---	0	0.8
2001	---	0.1	0.7	0.1	0.3	---	---	0	1.1
2002	---	0.1	0.3	0	0.2	---	---	0	0.7
2003	---	0	0.1	0	0.1	---	---	0	0.2
2004	---	0	0.2	0	0.1	---	---	0	0.4
2005	---	0.1	0.8	0	0.2	---	---	0	1.2
2006	---	0	---	---	0.6	---	---	---	0.6
2007	---	---	0	0	0.2	---	---	---	0.3
2008	---	---	---	---	---	---	---	---	---
2009	---	0	0	---	---	---	---	0	0
2010	---	---	0.7	---	0	---	---	---	0.7
2011	---	---	---	---	---	---	---	---	---

Table 55. Reconstructed total (landed + discarded) catch (t) for **Pacific Ocean Perch** from the **Dogfish-Lingcod** fishery in PMFC major areas. Entries marked '---' indicate no catch reported or calculated; values of 0 indicate positive catch less than 0.05 t. Incomplete catch for 2011.

Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1918	---	0	0	0	0	---	0.1	0	0.1
1919	---	0	0	0	0	---	0	0	0
1920	---	0	0	0	0	---	0	0	0
1921	---	0	0	0	0	---	0	0	0
1922	---	0	0	0	0	---	0	0	0
1923	---	0	0	0	0	---	0	0	0
1924	---	0	0	0	0	---	0	0	0
1925	---	0	0	0	0	---	0	0	0
1926	---	0	0	0	0	---	0	0	0
1927	---	0	0	0	0	---	0	0	0
1928	---	0	0	0	0	---	0	0	0
1929	---	0	0	0	0	---	0	0	0
1930	---	0	0	0	0	---	0	0	0
1931	---	0	0	0	0	---	0	0	0
1932	---	0	0	0	0	---	0	0	0
1933	---	0	0	0	0	---	0	0	0
1934	---	0	0	0	0	---	0	0	0
1935	---	0	0	0	0	---	0	0	0
1936	---	0	0	0	0	---	0	0	0
1937	---	0	0	0	0	---	0	0	0
1938	---	0	0	0	0	---	0	0	0
1939	---	0	0	0	0	---	0	0	0
1940	---	0	0	0	0	---	0	0	0
1941	---	0	0	0	0	---	0	0	0
1942	---	0	0	0	0	---	0	0	0
1943	---	0	0	0	0	---	0	0	0
1944	---	0	0	0	0	---	0	0	0
1945	---	0	0	0	0	---	0	0	0.1
1946	---	0	0	0	0	---	0.1	0	0.1
1947	---	0	0	0	0	---	0	0	0
1948	---	0	0	0	0	---	0	0	0
1949	---	0	0	0	0	---	0	0	0
1950	---	0	0	0	0	---	0	0	0
1951	---	0	0	0	0	---	0.1	0	0.1
1952	---	0	0	0	0	---	0	0	0
1953	---	0	0	0	0	---	0	0	0
1954	---	0	0	0	0	---	0	0	0
1955	---	0	0	0	0	---	0	0	0
1956	---	0	0	0	0	---	0	0	0
1957	---	0	0	---	0	---	0	0	0
1958	---	0	0	---	0	---	0	0	0
1959	---	0	0	0	0	---	0	0	0
1960	---	0	0	0	0	---	0	0	0
1961	---	0	0	0	0	---	0	0	0
1962	---	0	0	0	0	---	0	0	0
1963	---	0	0	0	0	---	0	0	0
1964	---	0	0	0	0	---	0	0	0
1965	---	0	0	0	0	---	0	0	0
1966	---	0	0	0	0	---	0	0	0
1967	---	0	0	0	0	---	0	0	0
1968	---	0	0	0	0	---	0	0	0
1969	---	0	0	0	0	---	0	0	0
1970	---	0	0	0	0	---	0	0	0
1971	---	0	0	0	0	---	0	0	0
1972	---	0	0	0	0	---	0	0	0
1973	---	0	0	0	0	---	0	0	0
1974	---	0	0	0	0	---	0.1	0	0.1
1975	---	0	0	0	0	---	0.1	0	0.1
1976	---	0	0	0	0	---	0	0	0
1977	---	0	0	0	0	---	0	0	0
1978	---	0	0	0	0	---	0.1	0	0.1
1979	---	0	0	0	0	---	0.1	0	0.1
1980	---	0	0	0	0	---	0.1	0	0.1

Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1981	---	0	0	0	0	---	0.1	0	0.1
1982	0.1	12	2.4	7.9	---	---	---	---	22
1983	0	119	4.6	39	31	---	---	---	193
1984	0.1	265	4.3	13	19	---	---	---	302
1985	0.4	109	0.7	---	134	1.2	---	---	246
1986	0.1	42	---	56	162	---	---	---	260
1987	0.1	70	---	1.4	10	---	---	---	82
1988	0.6	46	---	10	---	---	---	---	57
1989	0.1	20	0.1	224	27	---	---	---	270
1990	---	50	83	206	0.9	0	0.1	0.3	341
1991	---	2.5	3.8	12	29	---	---	---	47
1992	---	64	---	---	44	---	---	---	108
1993	---	244	---	0.1	11	18	0	---	274
1994	---	146	0.1	154	---	1.1	---	---	301
1995	0	87	0.1	32	1.8	0.3	---	---	122
1996	---	---	---	---	---	---	---	---	---
1997	---	0	0	---	---	---	---	---	0
1998	---	---	0	---	---	---	0.2	0	0.2
1999	---	0	---	---	---	---	---	0.6	0.6
2000	---	---	0	---	---	---	---	0	0
2001	---	0	0	---	---	---	---	---	0
2002	---	---	0	---	---	---	---	---	0
2003	---	---	0	---	---	---	---	---	0
2004	---	---	---	0	---	---	---	---	0
2005	---	---	0	0	0	---	---	---	0
2006	---	---	---	---	---	---	---	---	---
2007	---	---	---	---	---	---	---	---	---
2008	---	0	---	---	---	---	---	---	0
2009	---	---	0	---	---	---	---	---	0
2010	---	0	0	---	0	0	---	---	0
2011	---	---	---	---	---	---	---	---	---

Table 56. Reconstructed total (landed + discarded) catch (t) for **Pacific Ocean Perch** from the **H&L Rockfish** fishery in PMFC major areas. Entries marked '---' indicate no catch reported or calculated; values of 0 indicate positive catch less than 0.05 t. Incomplete catch for 2011.

Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1918	0	0	0	0	0.1	0	0	0	0.1
1919	0	0	0	0	0	0	0	0	0
1920	0	0	0	0	0	0	0	0	0
1921	0	0	0	0	0	0	0	0	0
1922	0	0	0	0	0	0	0	0	0
1923	0	0	0	0	0	0	0	0	0
1924	0	0	0	0	0	0	0	0	0
1925	0	0	0	0	0	0	0	0	0
1926	0	0	0	0	0	0	0	0	0
1927	0	0	0	0	0	0	0	0	0
1928	0	0	0	0	0	0	0	0	0
1929	0	0	0	0	0	0	0	0	0
1930	0	0	0	0	0	0	0	0	0
1931	0	0	0	0	0	0	0	0	0
1932	0	0	0	0	0	0	0	0	0
1933	0	0	0	0	0	0	0	0	0
1934	0	0	0	0	0	0	0	0	0
1935	0	0	0	0	0	0	0	0	0
1936	0	0	0	0	0	0	0	0	0
1937	0	0	0	0	0	0	0	0	0
1938	0	0	0	0	0	0	0	0	0
1939	0	0	0	0	0	0	0	0	0
1940	0	0	0	0	0	0	0	0	0
1941	0	0	0	0	0	0	0	0	0
1942	0	0	0	0	0	0	0	0	0
1943	0	0	0	0	0	0	0	0	0.1
1944	0	0	0	0	0	0	0	0	0.1
1945	0	0	0	0	0	0	0	0	0.1
1946	0	0	0	0	0.1	0	0	0	0.1
1947	0	0	0	0	0	0	0	0	0
1948	0	0	0	0	0	0	0	0	0
1949	0	0	0	0	0	0	0	0	0.1
1950	0	0	0	0	0	0	0	0	0
1951	0	0	0	0	0	0	0	0	0.1
1952	0	0	0	0	0	0	0	0	0.1
1953	0	0	0	0	0	0	0	0	0
1954	0	0	0	0	0	0	0	0	0
1955	0	0	0	0	0	0	0	0	0
1956	0	0	0	0	0	0	0	0	0
1957	0	0	0	---	0	0	0	0	0
1958	0	0	0	---	0	0	0	0	0
1959	0	0	0	0	0	0	0	0	0
1960	0	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0.1
1964	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0.1
1971	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0.1
1973	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0.1
1976	0	0	0	0	0	0	0	0	0.1
1977	0	0	0	0	0	0	0	0	0.1
1978	0	0	0	0	0	0	0	0	0.1
1979	0	0	0	0	0	0	0	0	0.1
1980	0	0	0	0	0	0	0	0	0.1
1981	0	0	0	0	0	0	0	0	0.1
1982	---	---	---	---	---	---	---	---	---

Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1983	---	---	3.7	---	---	---	0	---	3.7
1984	---	---	---	---	---	---	---	---	---
1985	---	---	26	---	---	---	---	---	26
1986	---	---	---	---	---	---	0	---	0
1987	0	---	---	---	---	---	---	---	0
1988	0	---	0	---	---	---	0.4	---	0.4
1989	0.1	0.1	0.3	0	---	---	---	---	0.5
1990	0	0.7	0.7	0.5	0	0	0	1.9	3.7
1991	---	5.0	8.4	0.1	0.6	0.2	0	1.2	15
1992	---	0	0.3	0.7	0	0.1	0.1	0.6	1.9
1993	---	0	0.1	0	1.7	0	---	0.5	2.3
1994	---	---	0.8	0	---	---	---	0	0.9
1995	---	---	0.1	0.1	0.1	0	0	0.6	1.1
1996	0.1	---	0.3	0.5	0	0	0	0.5	1.5
1997	0	---	0.2	0.7	0	0	0	0.4	1.3
1998	0	---	0	0	---	0	---	1.4	1.4
1999	0	0	0.5	0.2	0	0.1	0	0.6	1.4
2000	0	0	0.1	0.1	1.2	0.1	0	2.6	4.0
2001	0	0	0	0.1	1.2	0	0	2.0	3.3
2002	---	0	0	0	0	0	---	0.5	0.6
2003	---	---	0	0	0	---	0	0.1	0.2
2004	---	---	0	0.1	0	---	---	0.1	0.1
2005	---	0	0.1	0	0	---	---	0	0.1
2006	---	---	0	0	---	---	---	---	0
2007	---	---	---	---	---	---	---	0.1	0.1
2008	---	---	---	0.1	---	---	0	0.1	0.2
2009	---	---	---	---	---	---	---	0.2	0.2
2010	---	---	---	---	0	0	---	0.3	0.3
2011	---	---	---	---	---	---	---	0	0

Table 57. Reconstructed total (landed + discarded) catch (t) for **Pacific Ocean Perch** from all fisheries **combined** in PMFC major areas. Entries marked '---' indicate no catch reported or calculated; values of 0 indicate positive catch less than 0.05 t. Incomplete catch for 2011.

Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1918	0.6	0.3	0.1	0	3.4	0.9	1.9	0.8	8.0
1919	1.4	0.6	0.2	0.1	0.5	0.1	0.3	0.1	3.2
1920	0.7	0.3	0.1	0	0.6	0.2	0.4	0.1	2.5
1921	0.6	0.2	0.1	0	0	0	0	0	1.0
1922	0.8	0.4	0.2	0	0	0	0	0	1.4
1923	0.8	0.2	0.1	0	0.1	0	0	0	1.2
1924	0.9	0.2	0.1	0	0.2	0	0.1	0	1.5
1925	0.7	0.1	0	0	0.3	0.1	0.1	0.1	1.5
1926	0.8	0.2	0.1	0	0.6	0.1	0.3	0.1	2.3
1927	0.8	0.3	0.1	0	0.9	0.2	0.5	0.2	3.1
1928	0.9	0.3	0.1	0	0.6	0.2	0.3	0.1	2.6
1929	1.1	0.3	0.1	0	0.9	0.2	0.5	0.2	3.4
1930	1.0	0.2	0.1	0	0.5	0.1	0.3	0.1	2.3
1931	0.7	0.2	0.1	0	0.1	0	0	0	1.1
1932	0.8	0.1	0	0	0.1	0	0	0	1.1
1933	0.4	0.1	0	0	0	0	0	0	0.5
1934	0.4	0.1	0.1	0.1	0.6	0	0.1	0	1.5
1935	0.6	0.7	0.2	0.8	4.9	0.2	0.4	0.1	7.9
1936	0.6	1.0	0.3	1.1	6.4	0.2	0.6	0.2	10
1937	0.5	0.8	0.2	1.0	5.1	0.1	0.2	0	7.9
1938	1.6	1.6	0.6	1.5	7.4	0	0.3	0	13
1939	3.0	1.7	0.4	1.5	8.2	0.1	0.6	0	16
1940	3.3	2.8	0.8	3.3	18	0.2	1.0	0	29
1941	2.0	2.3	0.3	1.3	11	1.0	3.1	0	21
1942	4.7	21	5.8	24	127	1.3	6.3	0	190
1943	27	66	19	77	408	3.8	19	0	619
1944	40	36	8.0	32	179	3.7	14	0	313
1945	48	257	79	335	1,755	12	67	0	2,554
1946	32	133	40	169	904	10	48	0	1,337
1947	11	68	21	88	462	3.0	17	0	671
1948	15	110	34	143	749	4.8	28	0	1,084
1949	20	134	41	174	912	6.0	34	0	1,323
1950	10	131	45	202	871	6.1	52	0	1,317
1951	6.5	128	33	140	1,029	6.1	29	0	1,371
1952	5.0	145	34	137	895	3.8	34	0	1,254
1953	3.7	91	20	77	737	1.5	12	0	943
1954	9.1	174	25	87	1,703	3.4	14	0	2,017
1955	10	127	37	165	469	2.1	23	0	833
1956	0.5	755	58	425	974	88	0.9	0	2,301
1957	0	579	270	350	761	5.5	1.9	0	1,967
1958	0	138	50	285	693	19	5.6	0	1,191
1959	0	630	166	1,669	322	2.8	0	0	2,791
1960	0	824	215	769	1,000	36	0	0	2,844
1961	0.8	841	1,000	451	814	0	0.5	0	3,107
1962	0	2,475	999	482	1,460	0	0	0	5,416
1963	1.2	2,833	852	1,060	2,861	31	1.4	0	7,638
1964	2.5	1,424	462	1,717	1,979	16	5.8	0	5,606
1965	1.9	3,005	244	5,009	3,395	62	3,872	2,762	18,350
1966	3.9	5,544	2,319	14,821	8,464	0.6	5,970	4,257	41,379
1967	0	1,286	435	11,204	7,315	42	920	656	21,858
1968	0.1	1,065	614	7,373	6,163	0	1,120	799	17,133
1969	0	372	130	4,328	6,055	0	8.9	5.8	10,899
1970	2.0	1,751	340	3,975	4,393	0.6	41	9.4	10,511
1971	0.7	1,189	237	1,579	3,077	1.9	73	46	6,204
1972	0.6	544	229	2,904	4,149	0	14	0	7,840
1973	0	224	41	2,880	3,495	29	16	0	6,684
1974	0	279	24	6,074	3,695	26	15	0	10,114
1975	0	279	57	2,931	2,786	168	69	0	6,290
1976	0	1.5	0	1,319	1,553	60	38	80	3,051
1977	0.7	17	1.2	73	1,064	53	32	1,575	2,815
1978	1.2	56	7.5	172	1,202	84	10	2,466	3,999
1979	1.0	93	47	293	1,143	178	127	1,083	2,964
1980	0.1	330	152	139	1,823	2,482	51	976	5,952
1981	0.4	441	175	39	2,507	1,697	47	719	5,625
1982	7.8	496	121	321	2,962	2,085	453	971	7,418

Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1983	1.3	551	629	590	2,528	1,318	332	1,637	7,587
1984	0.4	829	360	131	2,608	579	2,568	3,074	10,149
1985	1.0	366	596	112	2,425	699	2,258	2,792	9,249
1986	0.4	191	1,245	457	1,003	130	2,973	3,419	9,420
1987	0.4	476	689	610	2,760	502	1,212	1,818	8,067
1988	33	259	698	602	3,198	2,843	1,164	1,883	10,680
1989	0.3	261	1,179	604	2,100	1,743	1,600	2,113	9,600
1990	0.6	263	1,183	701	1,915	1,605	1,230	1,788	8,687
1991	0.6	21	1,048	437	2,281	2,196	7.2	647	6,637
1992	0	396	942	399	2,202	1,747	22	381	6,088
1993	4.9	1,052	1,124	344	1,668	1,631	119	504	6,447
1994	0.1	1,476	610	825	3,092	1,636	127	325	8,091
1995	0	565	535	689	3,385	2,462	81	867	8,583
1996	0.2	119	503	412	4,223	566	33	702	6,559
1997	0	304	155	868	3,493	408	60	704	5,990
1998	0	323	218	951	3,243	501	293	793	6,322
1999	0	337	218	953	3,002	563	110	729	5,913
2000	0	281	232	572	3,490	417	228	1,043	6,264
2001	8.9	293	206	704	2,999	311	154	1,189	5,866
2002	---	298	246	709	3,112	325	144	1,112	5,945
2003	0	311	258	814	3,640	263	123	948	6,357
2004	0	321	228	735	3,610	129	76	957	6,056
2005	0	320	226	859	2,724	130	163	773	5,194
2006	0	306	210	537	3,447	98	93	829	5,521
2007	0.1	229	243	657	2,856	56	23	830	4,895
2008	0	426	324	500	2,368	30	76	841	4,566
2009	0	295	217	753	2,363	43	75	794	4,541
2010	0.1	217	202	900	3,191	22	72	927	5,533
2011	0	211	114	161	510	0	38	604	1,638

Table 58. Reconstructed total (landed + discarded) catch (t) for **Yelloweye Rockfish** from the **Trawl** fishery in PMFC major areas. Entries marked '---' indicate no catch reported or calculated; values of 0 indicate positive catch less than 0.05 t. Incomplete catch for 2011.

Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1918	---	0	0	0	0	0	0	0	0
1919	---	0	0	0	0	0	0	0	0
1920	---	0	0	0	0	0	0	0	0
1921	---	0	0	0	0	0	0	0	0
1922	---	0	0	0	0	0	0	0	0
1923	---	0	0	0	0	0	0	0	0
1924	---	0	0	0	0	0	0	0	0
1925	---	0	0	0	0	0	0	0	0
1926	---	0	0	0	0	0	0	0	0
1927	---	0	0	0	0	0	0	0	0
1928	---	0	0	0	0	0	0	0	0
1929	---	0	0	0	0	0	0	0	0
1930	---	0	0	0	0	0	0	0	0
1931	---	0	0	0	0	0	0	0	0
1932	---	0	0	0	0	0	0	0	0
1933	---	0	0	0	0	0	0	0	0
1934	---	0	0	0	0	0	0	0	0
1935	---	0	0	0	0	0	0	0	0
1936	---	0	0	0	0	0	0	0	0
1937	---	0	0	0	0	0	0	0	0
1938	---	0	0	0	0	0	0	0	0
1939	---	0	0	0	0	0	0	---	0
1940	---	0	0	0	0	0	0	---	0
1941	---	0	0	0	0	0	0	---	0
1942	---	0.1	0	0	0.2	0	0	---	0.3
1943	---	0.2	0.1	0.1	0.5	0	0	---	0.8
1944	---	0.1	0	0	0.2	0	0	---	0.4
1945	---	0.7	0.3	0.3	2.2	0	0.1	---	3.5
1946	---	0.3	0.2	0.1	1.1	0	0	---	1.8
1947	---	0.2	0.1	0.1	0.6	0	0	---	0.9
1948	---	0.3	0.1	0.1	0.9	0	0	---	1.5
1949	---	0.3	0.2	0.1	1.1	0	0	---	1.8
1950	---	0.3	0.2	0.2	1.1	0	0	---	1.8
1951	---	0.3	0.1	0.1	1.3	0	0	---	1.9
1952	---	0.4	0.1	0.1	1.1	0	0	---	1.8
1953	---	0.2	0.1	0.1	0.6	0	0	---	1.0
1954	---	0.3	0.1	0.1	0.9	0	0	---	1.5
1955	---	0.3	0.1	0.2	0.9	0	0	---	1.5
1956	---	0.2	0.2	0.2	0.4	0	0	---	1.0
1957	---	0.2	0.2	0.1	0.7	0	0	---	1.2
1958	---	0.3	0.1	0.1	0.9	0	0	---	1.4
1959	---	0.6	0.1	0.1	1.0	0	0	---	2.0
1960	---	0.6	0.1	0.1	0.9	0	0.1	---	1.9
1961	---	0.7	0.3	0.1	1.1	0	0.1	---	2.2
1962	---	0.8	0.4	0.2	1.5	0	0.1	---	3.0
1963	---	0.4	0.3	0.2	1.2	0	0	---	2.1
1964	---	0.3	0.1	0.2	0.9	0	0	---	1.6
1965	---	0.4	0.2	0.9	1.8	0	0.7	0.3	4.4
1966	---	2.2	1.8	2.1	3.0	0	1.1	0.5	11
1967	---	0.5	0.5	1.2	2.3	0	0.2	0.1	4.7
1968	---	0.8	0.7	1.0	2.1	0	0.2	0.1	4.8
1969	0	0.4	0.5	1.4	2.9	0	0.1	0	5.4
1970	---	0.5	0.6	0.7	2.2	0	0.1	0	4.1
1971	---	0.5	0.5	0.5	2.0	0	0.1	0	3.6
1972	---	0.3	0.4	0.9	2.8	0	0.2	---	4.7
1973	---	0.2	0.3	1.5	2.9	0	0.1	---	5.1
1974	---	0.1	0.4	2.5	1.9	0	0.2	---	5.1
1975	---	0.2	0.3	1.2	1.7	0	0.1	---	3.5
1976	---	0.1	0.1	0.7	2.6	0.2	0.3	0	3.9
1977	0.1	0.3	0.1	0.3	2.4	0.3	0.4	0.4	4.2
1978	0.2	1.4	0.7	0.8	3.7	0.5	0.4	0.5	8.2
1979	0	0.3	0.1	0.3	3.5	1.0	0.6	0.7	6.5
1980	---	0.2	0.2	0.3	4.0	2.8	0.5	0.2	8.2
1981	---	0.3	2.2	0.3	3.4	3.7	0.7	0.2	11
1982	5.9	0.9	0.2	4.9	1.5	0.6	0.7	2.0	17

Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1983	7.9	2.6	41	1.9	32	5.1	3.4	1.0	94
1984	30	6.3	92	125	181	15	5.3	6.5	461
1985	68	6.1	226	139	55	1.7	2.2	0.4	499
1986	53	8.0	144	28	61	3.3	17	4.5	318
1987	27	5.6	6.3	6.5	5.6	9.0	1.2	0.3	61
1988	61	2.4	1.9	4.6	11	2.5	0.7	11	94
1989	55	7.7	2.2	3.3	29	2.3	0.8	0.3	100
1990	65	7.6	3.4	12	26	6.3	2.2	12	136
1991	35	4.1	8.5	5.9	9.4	6.9	10	0.2	80
1992	20	5.3	2.6	13	17	5.1	2.5	0.3	66
1993	11	17	26	7.3	31	4.9	6.4	0.3	105
1994	11	12	91	18	44	27	17	2.9	223
1995	11	5.3	83	20	39	19	24	126	328
1996	0	4.1	4.9	3.7	5.9	1.1	0.3	0	20
1997	---	2.3	2.2	3.2	11	0.5	0.2	0.5	20
1998	---	1.2	2.9	2.9	7.7	0.7	0.3	0	16
1999	---	1.8	3.0	2.3	8.0	0.8	0.1	0	16
2000	---	1.4	4.1	2.4	7.1	1.9	0.6	0.5	18
2001	0	1.9	3.2	1.2	5.2	1.7	0	0	13
2002	---	2.1	1.5	1.4	6.9	0.7	0	0	13
2003	0	1.2	1.5	1.7	7.2	1.6	0.1	0.1	13
2004	---	1.3	1.7	0.9	3.6	1.7	0.1	0.2	10
2005	0	2.3	1.7	1.1	4.0	1.0	0	0.2	10
2006	---	0.9	1.3	1.2	3.5	1.0	0.1	0.1	8.1
2007	0	1.7	1.3	0.7	2.2	0.7	0.1	0	6.7
2008	0	1.8	2.2	0.6	1.5	0.4	0	0.1	6.7
2009	---	1.6	2.9	1.7	1.5	0.3	0	---	8.1
2010	---	1.5	3.1	2.8	3.9	0.2	0	0.1	11
2011	---	1.0	2.6	1.5	0.3	0	0	0	5.5

Table 59. Reconstructed total (landed + discarded) catch (t) for **Yelloweye Rockfish** from the **Halibut** fishery in PMFC major areas. Entries marked '---' indicate no catch reported or calculated; values of 0 indicate positive catch less than 0.05 t. Incomplete catch for 2011.

Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1918	3.4	1.3	1.6	0.1	6.7	2.6	10	2.8	28
1919	8.5	2.4	3.1	0.1	0.9	0.3	1.3	0.4	17
1920	4.3	1.4	1.8	0.1	1.3	0.5	1.9	0.5	12
1921	3.7	0.8	1.1	0	0.1	0	0.1	0	5.8
1922	4.6	1.8	2.3	0.1	0	0	0	0	8.8
1923	4.5	0.8	1.1	0	0.1	0.1	0.2	0.1	6.9
1924	5.1	0.8	1.0	0	0.3	0.1	0.5	0.1	8.1
1925	4.4	0.5	0.7	0	0.5	0.2	0.8	0.2	7.3
1926	5.0	0.9	1.2	0	1.1	0.4	1.6	0.5	11
1927	5.0	1.3	1.7	0.1	1.7	0.6	2.5	0.7	14
1928	5.1	1.2	1.6	0.1	1.2	0.5	1.8	0.5	12
1929	6.7	1.0	1.3	0.1	1.8	0.7	2.7	0.7	15
1930	6.0	0.8	1.0	0	1.0	0.4	1.4	0.4	11
1931	4.0	0.8	1.0	0	0.2	0.1	0.2	0.1	6.3
1932	4.5	0.4	0.5	0	0.1	0	0.2	0	5.8
1933	2.2	0.3	0.4	0	0	0	0	0	2.9
1934	2.6	0.3	0.4	0	0.1	0	0.2	0	3.6
1935	3.3	0.3	0.4	0	1.1	0.4	1.6	0.4	7.6
1936	3.6	0.7	0.9	0	1.6	0.6	2.4	0.7	11
1937	2.8	0.2	0.2	0	0.3	0.1	0.5	0.1	4.3
1938	10	2.5	3.2	0.1	0.1	0.1	0.2	0.1	16
1939	1.9	0	0.4	0	0.1	0	0.1	0.1	2.6
1940	2.0	0	0.2	0	0.1	0.1	0.1	0.1	2.7
1941	1.3	0.1	0.9	0	0.8	0.4	0.9	0.7	5.0
1942	2.9	0.1	2.2	0.1	0.7	0.3	0.7	0.6	7.7
1943	17	0.4	5.7	0.2	1.9	0.8	2.0	1.7	30
1944	25	0.5	7.6	0.2	2.6	1.1	2.7	2.3	42
1945	27	0.4	5.9	0.2	4.2	1.8	4.3	3.7	47
1946	18	0.3	5.2	0.2	6.1	2.6	6.2	5.3	44
1947	5.8	0.1	1.7	0	1.0	0.4	1.0	0.9	11
1948	8.8	0.2	2.5	0.1	1.5	0.7	1.5	1.3	17
1949	12	0.2	3.4	0.1	2.0	0.9	2.1	1.8	22
1950	5.0	0.1	1.4	0	0.9	0.4	0.9	0.7	9.4
1951	3.6	0.4	4.6	0.1	4.6	2.7	6.0	4.6	27
1952	2.8	0.1	3.4	0.2	4.2	1.1	3.0	3.1	18
1953	5.8	0.2	2.9	0.5	1.8	0.5	1.6	0.6	14
1954	3.6	0.3	3.6	0.3	1.8	0.3	2.2	1.2	13
1955	3.6	0.1	4.2	0.1	0.3	0.5	1.0	1.4	11
1956	3.4	0.4	4.0	0.1	0.8	0.2	0.2	0.4	9.5
1957	5.9	1.3	6.1	---	1.8	0.2	0.6	2.0	18
1958	8.6	0.4	6.1	---	0.4	0.1	0.1	0.1	16
1959	8.8	0.7	6.5	0.1	0.6	0	0.1	0.2	17
1960	7.2	0.7	7.3	0.4	1.0	1.1	1.4	0.6	20
1961	5.3	0.7	9.5	0.3	1.5	0.3	0.6	0.6	19
1962	8.6	1.9	11	0.4	1.5	2.6	0.1	0.5	27
1963	6.6	1.3	7.1	0.5	6.4	1.2	1.1	2.6	27
1964	4.0	0.5	5.1	0.1	2.0	0.5	0.1	0.2	12
1965	3.6	0.4	4.2	0.1	0.9	1.1	0.4	1.7	12
1966	2.9	0.3	5.1	0.3	1.4	0.5	1.2	0.8	12
1967	4.5	0.7	6.8	0.2	1.1	1.7	3.1	1.0	19
1968	4.8	0.5	5.6	0	1.4	0.2	0.6	0.1	13
1969	5.6	1.2	5.7	0.5	4.0	2.6	0.3	0.1	20
1970	6.8	2.3	6.7	0.2	7.8	7.5	4.3	0	36
1971	5.8	1.5	1.9	0.5	4.9	6.1	4.6	0.3	26
1972	6.5	2.7	10	0.6	5.8	4.2	6.3	0.6	37
1973	7.9	1.9	4.4	0.8	2.0	3.6	5.8	0.8	27
1974	3.9	4.4	5.3	0.6	1.4	10	8.7	0.1	34
1975	3.1	3.4	4.5	0.6	4.7	13	8.6	1.2	40
1976	3.8	3.1	4.9	0.5	6.3	3.8	6.4	1.2	30
1977	11	4.0	5.6	2.6	6.5	6.6	6.2	1.0	43
1978	12	3.3	5.2	1.3	5.9	8.8	15	3.8	55
1979	19	6.1	11	2.9	4.9	10	12	7.1	73
1980	14	5.2	11	2.1	3.7	7.7	17	8.8	69
1981	16	4.7	7.4	1.7	2.7	5.8	12	5.9	57
1982	22	3.9	7.0	4.3	3.6	18	7.4	5.2	71

Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1983	23	3.5	10	2.7	3.5	12	12	4.7	71
1984	27	3.0	17	3.5	3.3	21	15	22	112
1985	34	3.9	24	7.4	12	53	30	13	177
1986	41	21	64	10	11	53	29	27	256
1987	33	23	62	20	17	95	63	15	328
1988	39	19	41	29	27	52	69	28	304
1989	36	17	67	96	28	83	76	40	444
1990	37	30	61	91	39	66	115	55	494
1991	38	18	71	51	67	37	124	47	453
1992	14	10	42	38	49	47	89	86	376
1993	16	7.4	113	63	37	77	127	207	648
1994	22	5.8	86	35	60	55	96	98	457
1995	0.7	2.4	11	51	37	123	115	8.2	349
1996	3.9	2.9	28	27	31	51	88	35	267
1997	5.0	3.6	16	19	25	51	84	16	221
1998	6.3	6.5	39	40	46	70	80	13	301
1999	1.6	4.0	21	12	34	39	53	12	176
2000	0.7	5.9	54	10	54	46	90	126	387
2001	0.9	4.6	51	11	47	51	81	150	397
2002	0.1	5.9	43	7.1	33	55	53	110	308
2003	0.1	1.0	37	5.0	30	18	9.1	92	193
2004	0.2	0.1	29	3.0	19	14	12	90	168
2005	0	0.1	31	3.0	25	14	14	84	171
2006	0.6	5.4	9.3	13	35	32	12	33	141
2007	1.9	4.8	8.3	25	34	29	13	51	168
2008	2.4	9.0	9.0	44	46	33	20	61	225
2009	1.0	5.4	8.8	35	30	27	15	53	175
2010	1.3	8.9	7.0	25	31	32	10	45	160
2011	0.4	0.6	5.3	6.2	6.6	1.0	1.7	8.6	30

Table 60. Reconstructed total (landed + discarded) catch (t) for **Yelloweye Rockfish** from the **Sablefish** fishery in PMFC major areas. Entries marked '---' indicate no catch reported or calculated; values of 0 indicate positive catch less than 0.05 t. Incomplete catch for 2011.

Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1918	---	---	---	---	---	---	---	---	---
1919	---	---	---	---	---	---	---	---	---
1920	---	---	---	---	---	---	---	---	---
1921	---	---	---	---	---	---	---	---	---
1922	---	---	---	---	---	---	---	---	---
1923	---	---	---	---	---	---	---	---	---
1924	---	---	---	---	---	---	---	---	---
1925	---	---	---	---	---	---	---	---	---
1926	---	---	---	---	---	---	---	---	---
1927	---	---	---	---	---	---	---	---	---
1928	---	---	---	---	---	---	---	---	---
1929	---	---	---	---	---	---	---	---	---
1930	---	---	---	---	---	---	---	---	---
1931	---	---	---	---	---	---	---	---	---
1932	---	---	---	---	---	---	---	---	---
1933	---	---	---	---	---	---	---	---	---
1934	---	---	---	---	---	---	---	---	---
1935	---	---	---	---	---	---	---	---	---
1936	---	---	---	---	---	---	---	---	---
1937	---	---	---	---	---	---	---	---	---
1938	---	---	---	---	---	---	---	---	---
1939	---	---	---	---	---	---	---	---	---
1940	---	---	---	---	---	---	---	---	---
1941	---	---	---	---	---	---	---	---	---
1942	---	---	---	---	---	---	---	---	---
1943	---	---	---	---	---	---	---	---	---
1944	---	---	---	---	---	---	---	---	---
1945	---	---	---	---	---	---	---	---	---
1946	---	---	---	---	---	---	---	---	---
1947	---	---	---	---	---	---	---	---	---
1948	---	---	---	---	---	---	---	---	---
1949	---	---	---	---	---	---	---	---	---
1950	---	---	---	---	---	---	---	---	---
1951	---	---	---	---	---	---	---	---	---
1952	---	---	---	---	---	---	---	---	---
1953	---	---	---	---	---	---	---	---	---
1954	---	---	---	---	---	---	---	---	---
1955	---	---	---	---	---	---	---	---	---
1956	---	---	---	---	---	---	---	---	---
1957	---	---	---	---	---	---	---	---	---
1958	---	---	---	---	---	---	---	---	---
1959	---	---	---	---	---	---	---	---	---
1960	---	---	---	---	---	---	---	---	---
1961	---	---	---	---	---	---	---	---	---
1962	---	---	---	---	---	---	---	---	---
1963	---	---	---	---	---	---	---	---	---
1964	---	---	---	---	---	---	---	---	---
1965	---	---	---	---	---	---	---	---	---
1966	---	---	---	---	---	---	---	---	---
1967	---	---	---	---	---	---	---	---	---
1968	---	---	---	---	---	---	---	---	---
1969	---	---	---	---	---	---	---	---	---
1970	---	---	---	---	---	---	---	---	---
1971	---	---	---	---	---	---	---	---	---
1972	---	0	---	---	---	---	0.1	---	0.1
1973	---	---	---	---	0	---	---	---	0
1974	---	---	---	---	---	---	---	---	---
1975	---	---	0	---	---	---	0	0	0.1
1976	---	---	---	---	---	---	---	---	---
1977	---	---	---	---	---	---	---	---	---
1978	---	---	---	---	---	---	---	---	---
1979	0.7	0	0.2	0.2	0	0.9	0	0.1	2.1
1980	0	---	0.1	0.2	0.1	0	---	0	0.4
1981	---	0	0	---	0	0	0	0	0.1
1982	---	0	1.2	---	---	0	0.1	1.5	2.9

Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1983	---	---	17	---	---	0.1	0.3	---	17
1984	0	0	12	---	---	0	0.4	---	13
1985	---	0.7	6.7	---	0	---	---	3.0	10
1986	---	20	19	0.5	0.5	---	---	3.1	43
1987	---	5.8	10	2.7	---	3.9	10	1.8	34
1988	---	32	33	0.6	0.1	---	4.2	7.6	77
1989	---	16	33	0.6	3.2	---	---	3.1	56
1990	---	52	56	0.9	17	0.2	31	0	156
1991	---	7.0	54	0.4	23	1.3	---	7.4	93
1992	---	0.1	5.0	0.2	17	4.4	0.1	0.3	27
1993	---	7.4	33	1.1	---	0.7	---	2.4	45
1994	---	0.4	17	0.6	0	0.2	0.1	0.4	19
1995	---	0.4	6.3	1.1	0.5	0.8	0.4	2.9	12
1996	---	0.5	2.0	0.5	0.4	---	1.2	0.6	5.2
1997	---	0.6	1.9	0.5	---	---	---	0.1	3.1
1998	---	1.3	1.2	1.1	---	---	---	0.1	3.7
1999	---	1.0	1.8	0.6	---	---	---	0.1	3.5
2000	---	3.0	1.4	0.4	---	1.2	0	0.9	6.9
2001	---	0.7	2.2	1.0	0.1	---	---	0	3.9
2002	---	2.1	2.3	0.6	0.1	---	---	1.4	6.5
2003	---	0.1	0.2	0.1	---	---	---	0	0.3
2004	---	0.2	0.3	0.3	---	---	---	0	0.8
2005	---	0.4	1.2	0.6	---	---	---	0	2.2
2006	---	0	0	---	---	---	---	---	0
2007	---	0.2	0.9	0	---	---	---	---	1.1
2008	---	---	0	0.1	---	---	---	0.7	0.8
2009	---	---	0	0.1	0.1	---	---	0.3	0.4
2010	---	0.1	---	0.2	---	---	---	0.2	0.5
2011	---	---	---	1.0	---	---	---	0.2	1.2

Table 61. Reconstructed total (landed + discarded) catch (t) for **Yelloweye Rockfish** from the **Dogfish-Lingcod** fishery in PMFC major areas. Entries marked '---' indicate no catch reported or calculated; values of 0 indicate positive catch less than 0.05 t. Incomplete catch for 2011.

Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1918	4.9	0.3	0	0	0.1	0	0	0	5.4
1919	12	0.6	0.1	0	0	0	0	0	13
1920	6.0	0.3	0	0	0	0	0	0	6.4
1921	5.2	0.2	0	0	0	0	0	0	5.5
1922	6.5	0.4	0.1	0	0	0	0	0	7.0
1923	6.3	0.2	0	0	0	0	0	0	6.6
1924	7.2	0.2	0	0	0	0	0	0	7.4
1925	6.2	0.1	0	0	0	0	0	0	6.3
1926	7.1	0.2	0	0	0	0	0	0	7.4
1927	7.1	0.3	0	0	0	0	0	0	7.5
1928	7.3	0.3	0	0	0	0	0	0	7.6
1929	9.5	0.2	0	0	0	0	0	0	10
1930	8.6	0.2	0	0	0	0	0	0	8.8
1931	5.6	0.2	0	0	0	0	0	0	5.8
1932	6.4	0.1	0	0	0	0	0	0	6.5
1933	3.1	0.1	0	0	0	0	0	0	3.2
1934	3.7	0.1	0	0	0	0	0	0	3.8
1935	4.7	0.1	0	0	0	0	0	0	4.8
1936	5.1	0.2	0	0	0	0	0	0	5.4
1937	4.0	0	0	0	0	0	0	0	4.1
1938	14	0.6	0.1	0	0	0	0	0	14
1939	2.7	0	0	0	0	0	0	0	2.7
1940	2.9	0	0	0	0	0	0	0	2.9
1941	1.8	0	0	0	0	0	0	0	1.8
1942	4.1	0	0.1	0	0	0	0	0	4.2
1943	24	0.1	0.2	0	0	0	0	0	24
1944	36	0.1	0.2	0	0	0	0	0	36
1945	38	0.1	0.2	0	0.1	0	0	0	39
1946	26	0.1	0.1	0	0.1	0	0	0	26
1947	8.1	0	0	0	0	0	0	0	8.2
1948	12	0	0.1	0	0	0	0	0	13
1949	17	0	0.1	0	0	0	0	0	17
1950	7.0	0	0	0	0	0	0	0	7.1
1951	5.1	0.1	0.1	0	0.1	0	0	0	5.5
1952	3.9	0	0.1	0	0.1	0	0	0	4.2
1953	8.3	0.1	0.1	0	0	0	0	0	8.5
1954	5.1	0.1	0.1	0	0	0	0	0	5.4
1955	5.1	0	0.1	0	0	0	0	0	5.3
1956	4.8	0.1	0.1	0	0	0	0	0	5.1
1957	8.4	0.3	0.2	---	0	0	0	0	8.9
1958	12	0.1	0.2	---	0	0	0	0	12
1959	13	0.2	0.2	0	0	0	0	0	13
1960	10	0.2	0.2	0	0	0	0	0	11
1961	7.6	0.2	0.3	0	0	0	0	0	8.0
1962	12	0.4	0.3	0	0	0	0	0	13
1963	9.3	0.3	0.2	0	0.1	0	0	0	10
1964	5.6	0.1	0.1	0	0	0	0	0	5.9
1965	5.1	0.1	0.1	0	0	0	0	0	5.3
1966	4.1	0.1	0.1	0	0	0	0	0	4.3
1967	6.3	0.2	0.2	0	0	0	0	0	6.7
1968	6.8	0.1	0.2	0	0	0	0	0	7.1
1969	7.9	0.3	0.2	0	0.1	0	0	0	8.4
1970	10	0.5	0.2	0	0.1	0.1	0	0	11
1971	8.3	0.3	0.1	0	0.1	0.1	0	0	8.8
1972	9.1	0.6	0.3	0	0.1	0	0	0	10
1973	11	0.4	0.1	0	0	0	0	0	12
1974	5.5	1.0	0.1	0	0	0.1	0	0	6.9
1975	4.4	0.8	0.1	0	0.1	0.1	0	0	5.6
1976	5.4	0.7	0.1	0	0.1	0	0	0	6.4
1977	15	0.9	0.2	0.1	0.1	0.1	0	0	17
1978	17	0.8	0.1	0.1	0.1	0.1	0	0	18
1979	27	1.4	0.3	0.2	0.1	0.1	0	0	29
1980	20	1.2	0.3	0.1	0.1	0.1	0	0	21

Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1981	23	1.1	0.2	0.1	0	0.1	0	0	25
1982	14	10	9.3	---	1.1	0.2	1.5	0.9	37
1983	14	13	8.9	1.3	19	2.2	6.4	0.2	64
1984	8.4	52	7.5	70	1.9	3.0	7.5	3.1	153
1985	7.6	83	17	12	108	22	3.9	0.3	253
1986	11	69	61	17	97	46	7.2	2.8	310
1987	23	63	75	45	2.1	14	35	2.4	259
1988	27	82	40	59	5.9	33	27	26	300
1989	25	51	36	39	7.1	13	24	4.5	200
1990	19	88	26	59	20	18	15	6.3	250
1991	8.0	65	41	103	15	12	11	3.5	259
1992	2.5	41	44	43	6.6	20	17	6.7	179
1993	7.8	27	45	1.6	1.0	5.8	14	1.5	104
1994	4.1	30	40	10	0.4	2.6	7.6	13	108
1995	17	44	34	2.3	3.2	22	15	1.7	139
1996	0.4	0.5	0.9	0.2	0.4	0	2.1	0.4	4.9
1997	2.9	4.0	4.3	1.0	1.4	0.8	1.5	1.6	17
1998	3.0	2.4	2.5	0.7	1.1	1.7	1.4	2.1	15
1999	2.4	12	1.2	0.5	2.7	3.6	1.6	3.9	28
2000	1.3	12	1.4	0.2	0.5	1.2	3.1	5.9	25
2001	3.1	20	3.2	0.9	1.0	1.5	0.9	4.4	35
2002	3.7	8.7	5.1	0.8	0.8	2.5	1.5	1.6	25
2003	6.8	11	6.5	2.5	1.6	3.6	0.8	11	43
2004	6.6	18	4.5	1.4	1.5	1.3	2.7	4.7	40
2005	8.5	17	4.2	1.2	1.1	1.5	0.6	5.4	40
2006	2.4	2.7	2.4	1.0	0.2	0.5	0.2	0.9	10
2007	2.6	7.1	5.1	1.6	0.7	0.3	0.3	1.6	19
2008	3.0	10	1.8	2.4	0.9	0.4	0.3	1.3	20
2009	3.0	11	3.5	1.6	0.8	0.9	0.4	1.8	23
2010	2.7	3.5	3.9	2.5	0.7	1.1	0.3	0.6	15
2011	0.1	0.4	1.6	0.6	0.3	0.1	0	0.2	3.3

Table 62. Reconstructed total (landed + discarded) catch (t) for **Yelloweye Rockfish** from the **H&L Rockfish** fishery in PMFC major areas. Entries marked '---' indicate no catch reported or calculated; values of 0 indicate positive catch less than 0.05 t. Incomplete catch for 2011.

Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1918	8.8	1.9	1.2	0.2	6.0	3.6	1.0	0.2	23
1919	22	3.6	2.2	0.3	0.8	0.5	0.1	0	29
1920	11	2.1	1.3	0.2	1.1	0.7	0.2	0	17
1921	9.5	1.2	0.8	0.1	0.1	0	0	0	12
1922	12	2.6	1.6	0.2	0	0	0	0	16
1923	11	1.2	0.8	0.1	0.1	0.1	0	0	14
1924	13	1.2	0.7	0.1	0.3	0.2	0	0	16
1925	11	0.8	0.5	0.1	0.5	0.3	0.1	0	13
1926	13	1.4	0.9	0.1	1.0	0.6	0.2	0	17
1927	13	2.0	1.2	0.2	1.5	0.9	0.2	0.1	19
1928	13	1.8	1.1	0.1	1.1	0.7	0.2	0	18
1929	17	1.6	1.0	0.1	1.6	1.0	0.3	0.1	23
1930	16	1.1	0.7	0.1	0.9	0.5	0.1	0	19
1931	10	1.2	0.7	0.1	0.1	0.1	0	0	12
1932	12	0.6	0.4	0	0.1	0.1	0	0	13
1933	5.7	0.4	0.3	0	0	0	0	0	6.4
1934	6.7	0.4	0.3	0	0.1	0.1	0	0	7.6
1935	8.6	0.5	0.3	0	1.0	0.6	0.2	0	11
1936	9.3	1.0	0.6	0.1	1.5	0.9	0.2	0.1	14
1937	7.3	0.3	0.2	0	0.3	0.2	0	0	8.2
1938	25	3.8	2.3	0.3	0.1	0.1	0	0	31
1939	4.8	0	0.3	0	0.1	0.1	0	0	5.3
1940	5.3	0	0.2	0	0.1	0.1	0	0	5.7
1941	3.2	0.1	0.6	0.1	0.8	0.5	0.1	0.1	5.4
1942	7.5	0.2	1.6	0.1	0.7	0.4	0.1	0	11
1943	43	0.5	4.1	0.4	1.7	1.2	0.2	0.1	52
1944	64	0.7	5.4	0.5	2.4	1.6	0.3	0.2	76
1945	69	0.6	4.2	0.4	3.8	2.6	0.4	0.3	82
1946	46	0.5	3.7	0.4	5.5	3.7	0.6	0.4	61
1947	15	0.2	1.2	0.1	0.9	0.6	0.1	0.1	18
1948	23	0.2	1.8	0.2	1.4	0.9	0.2	0.1	27
1949	30	0.3	2.4	0.2	1.8	1.2	0.2	0.1	36
1950	13	0.1	1.0	0.1	0.8	0.5	0.1	0.1	15
1951	9.3	0.5	3.3	0.2	4.1	3.8	0.6	0.4	22
1952	7.1	0.2	2.4	0.4	3.7	1.5	0.3	0.2	16
1953	15	0.4	2.1	1.3	1.6	0.7	0.2	0	21
1954	9.3	0.4	2.6	0.6	1.6	0.4	0.2	0.1	15
1955	9.2	0.2	3.0	0.2	0.3	0.7	0.1	0.1	14
1956	8.8	0.7	2.9	0.3	0.7	0.2	0	0	14
1957	15	2.0	4.4	---	1.6	0.3	0.1	0.2	24
1958	22	0.6	4.3	---	0.4	0.1	0	0	28
1959	23	1.0	4.7	0.1	0.5	0	0	0	29
1960	18	1.1	5.2	1.0	0.9	1.5	0.1	0	28
1961	14	1.1	6.8	0.7	1.4	0.4	0.1	0	24
1962	22	2.9	7.9	1.0	1.4	3.6	0	0	39
1963	17	1.9	5.1	1.3	5.8	1.7	0.1	0.2	33
1964	10	0.8	3.6	0.3	1.8	0.6	0	0	17
1965	9.2	0.7	3.0	0.1	0.8	1.6	0	0.1	16
1966	7.4	0.5	3.6	0.6	1.2	0.7	0.1	0.1	14
1967	11	1.0	4.9	0.4	1.0	2.4	0.3	0.1	22
1968	12	0.8	4.0	0.1	1.3	0.3	0.1	0	19
1969	14	1.8	4.1	1.3	3.6	3.7	0	0	29
1970	18	3.5	4.8	0.4	7.0	11	0.4	0	44
1971	15	2.2	1.4	1.3	4.4	8.6	0.5	0	33
1972	17	4.0	7.5	1.5	5.2	5.9	0.6	0	41
1973	20	2.8	3.2	1.9	1.8	5.1	0.6	0.1	36
1974	10	6.6	3.8	1.4	1.3	14	0.9	0	38
1975	8.0	5.1	3.2	1.3	4.2	19	0.8	0.1	42
1976	10	4.7	3.5	1.1	5.7	5.4	0.6	0.1	31
1977	27	6.0	4.0	6.2	5.8	9.3	0.6	0.1	59
1978	31	5.0	3.7	3.1	5.3	13	1.4	0.3	62
1979	49	9.1	7.9	6.8	4.4	14	1.2	2.9	96
1980	36	7.8	7.6	5.0	3.3	11	1.6	0.8	73
1981	42	7.1	5.3	4.0	2.4	8.1	1.2	0.5	71
1982	13	0.3	---	---	---	---	---	---	13

Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1983	6.6	---	41	---	21	3.9	0.9	0	74
1984	9.4	1.7	25	0.9	1.7	1.3	10	21	70
1985	10	1.2	109	4.8	0.5	0.1	17	0.2	143
1986	31	24	171	22	2.4	66	3.7	42	363
1987	48	16	121	9.0	1.9	9.3	7.6	6.8	220
1988	47	183	51	26	5.5	170	57	0.1	540
1989	58	24	134	56	41	13	68	26	421
1990	53	67	316	273	109	62	114	267	1,261
1991	64	20	158	244	271	112	79	200	1,149
1992	7.3	30	76	135	78	105	59	234	725
1993	21	42	241	238	46	99	37	234	957
1994	84	13	82	138	25	85	32	211	669
1995	32	5.7	63	82	49	71	27	158	487
1996	22	10	102	75	51	66	27	113	465
1997	13	10	125	58	49	103	25	78	461
1998	23	11	83	81	38	82	17	70	404
1999	16	5.5	83	49	38	88	6.7	57	343
2000	23	15	34	56	59	37	13	70	305
2001	24	17	31	52	39	35	11	39	247
2002	3.3	6.9	18	33	31	39	6.8	23	161
2003	3.7	8.6	8.4	37	24	10	4.0	1.7	98
2004	2.9	4.7	14	33	21	10	2.7	0.5	89
2005	2.3	4.0	10	31	20	19	2.4	6.5	96
2006	1.1	0.6	3.1	8.9	11	24	2.1	8.4	60
2007	4.3	2.0	2.6	11	7.7	5.9	0.9	7.7	42
2008	4.4	5.0	7.8	18	10	6.7	4.1	7.1	63
2009	2.7	0.3	3.1	18	12	14	0.2	3.3	54
2010	2.7	2.1	2.0	15	14	10	0.8	18	64
2011	0.5	0.7	2.3	3.9	3.5	9.4	0.2	12	33

Table 63. Reconstructed total (landed + discarded) catch (t) for **Yelloweye Rockfish** from all fisheries **combined** in PMFC major areas. Entries marked '---' indicate no catch reported or calculated; values of 0 indicate positive catch less than 0.05 t. Incomplete catch for 2011.

Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1918	17	3.5	2.8	0.3	13	6.2	11	3.0	57
1919	43	6.5	5.4	0.4	1.7	0.8	1.4	0.4	59
1920	21	3.8	3.1	0.2	2.4	1.2	2.1	0.6	35
1921	18	2.3	1.9	0.1	0.1	0.1	0.1	0	23
1922	23	4.8	3.9	0.3	0	0	0	0	32
1923	22	2.3	1.9	0.1	0.3	0.1	0.2	0.1	27
1924	25	2.2	1.8	0.1	0.6	0.3	0.6	0.2	31
1925	22	1.4	1.2	0.1	1.0	0.5	0.8	0.2	27
1926	25	2.6	2.1	0.2	2.1	1.0	1.8	0.5	35
1927	25	3.6	3.0	0.2	3.2	1.6	2.7	0.7	40
1928	26	3.4	2.7	0.2	2.3	1.1	2.0	0.5	38
1929	33	2.9	2.3	0.2	3.4	1.7	3.0	0.8	48
1930	30	2.1	1.7	0.1	1.8	0.9	1.6	0.4	39
1931	20	2.1	1.7	0.1	0.3	0.1	0.3	0.1	25
1932	22	1.1	0.9	0.1	0.2	0.1	0.2	0	25
1933	11	0.8	0.6	0	0	0	0	0	12
1934	13	0.7	0.6	0	0.2	0.1	0.2	0.1	15
1935	17	0.9	0.7	0.1	2.1	1.0	1.8	0.5	24
1936	18	1.9	1.5	0.1	3.1	1.5	2.7	0.7	30
1937	14	0.5	0.4	0	0.6	0.3	0.5	0.1	17
1938	48	6.9	5.6	0.4	0.3	0.1	0.2	0.1	61
1939	9.4	0.1	0.6	0	0.2	0.1	0.1	0.1	11
1940	10	0	0.4	0	0.3	0.1	0.1	0.1	11
1941	6.2	0.2	1.5	0.1	1.6	0.9	0.9	0.8	12
1942	14	0.4	3.8	0.2	1.6	0.8	0.8	0.7	23
1943	84	1.1	10	0.6	4.2	2.0	2.2	1.8	106
1944	125	1.4	13	0.7	5.3	2.8	3.0	2.5	154
1945	134	1.7	11	0.8	10	4.4	4.8	4.0	171
1946	90	1.2	9.2	0.7	13	6.4	6.9	5.7	133
1947	29	0.5	3.0	0.2	2.5	1.0	1.1	0.9	38
1948	44	0.7	4.5	0.4	3.8	1.6	1.7	1.4	58
1949	58	0.9	6.0	0.5	5.0	2.1	2.3	1.9	77
1950	25	0.6	2.7	0.3	2.7	0.9	1.0	0.8	34
1951	18	1.3	8.2	0.3	10	6.6	6.6	5.0	56
1952	14	0.7	6.1	0.7	9.1	2.6	3.3	3.3	40
1953	29	0.9	5.2	1.9	4.1	1.2	1.7	0.7	45
1954	18	1.0	6.5	1.0	4.4	0.8	2.5	1.3	35
1955	18	0.7	7.5	0.5	1.5	1.2	1.1	1.5	32
1956	17	1.4	7.1	0.6	1.9	0.4	0.2	0.4	29
1957	29	3.8	11	0.1	4.1	0.5	0.6	2.1	52
1958	43	1.4	11	0.1	1.7	0.2	0.1	0.1	57
1959	44	2.5	12	0.3	2.1	0.1	0.1	0.2	61
1960	36	2.6	13	1.6	2.7	2.6	1.6	0.6	60
1961	27	2.6	17	1.1	4.0	0.7	0.7	0.7	53
1962	43	6.0	20	1.6	4.4	6.2	0.2	0.6	82
1963	33	3.8	13	2.0	14	3.0	1.3	2.8	72
1964	20	1.8	9.0	0.5	4.7	1.1	0.2	0.2	37
1965	18	1.6	7.6	1.1	3.5	2.8	1.2	2.1	38
1966	14	3.0	11	3.0	5.6	1.2	2.5	1.4	42
1967	22	2.4	12	1.7	4.4	4.2	3.6	1.1	52
1968	24	2.3	10	1.1	4.7	0.5	0.9	0.2	44
1969	28	3.6	10	3.3	10	6.3	0.4	0.1	62
1970	34	6.8	12	1.3	17	18	4.9	0.1	95
1971	29	4.5	3.8	2.3	11	15	5.2	0.3	71
1972	32	7.7	19	3.0	14	10	7.3	0.6	94
1973	40	5.4	8.1	4.2	6.8	8.8	6.6	0.9	80
1974	19	12	10	4.5	4.7	24	10	0.1	84
1975	16	9.4	8.1	3.0	11	32	10	1.4	90
1976	19	8.7	8.6	2.3	15	9.5	7.3	1.4	71
1977	53	11	10	9.2	15	16	7.2	1.5	123
1978	60	10	10	5.3	15	22	16	4.7	143
1979	96	17	19	10	13	27	14	11	207
1980	69	14	19	7.7	11	22	19	10	172
1981	82	13	15	6.1	8.5	18	14	6.6	163
1982	55	15	18	9.2	6.2	19	10	10	141

Year	4B	3C	3D	5A	5B	5C	5D	5E	Total
1983	51	19	118	5.9	75	23	23	6.0	321
1984	75	63	154	199	188	40	38	52	809
1985	120	94	383	163	176	76	53	17	1,083
1986	136	142	459	78	171	168	57	80	1,290
1987	131	113	274	83	27	131	116	26	902
1988	173	318	166	119	49	257	158	73	1,314
1989	173	117	273	195	109	111	169	74	1,222
1990	174	244	462	436	211	153	277	341	2,298
1991	145	114	333	404	385	170	225	258	2,034
1992	44	86	168	229	168	181	168	328	1,373
1993	55	101	458	311	115	188	185	445	1,859
1994	120	61	316	202	129	170	152	326	1,477
1995	60	58	197	157	129	236	182	297	1,316
1996	26	18	137	107	89	119	119	149	763
1997	21	20	150	82	87	156	111	96	723
1998	32	22	129	126	93	154	99	85	740
1999	20	24	110	64	83	131	61	73	567
2000	25	37	94	69	121	87	107	203	742
2001	28	44	90	66	93	89	93	193	696
2002	7.2	26	70	43	72	98	62	135	512
2003	11	21	54	46	63	34	14	104	347
2004	10	24	50	38	45	27	18	96	307
2005	11	24	49	37	50	36	17	96	319
2006	4.1	10	16	24	50	58	14	42	219
2007	8.8	16	18	38	45	36	15	60	236
2008	10	26	21	66	58	41	24	71	316
2009	6.7	18	18	56	44	43	15	58	259
2010	6.8	16	16	45	49	44	11	64	252
2011	1.1	2.7	12	13	11	11	2.0	21	73

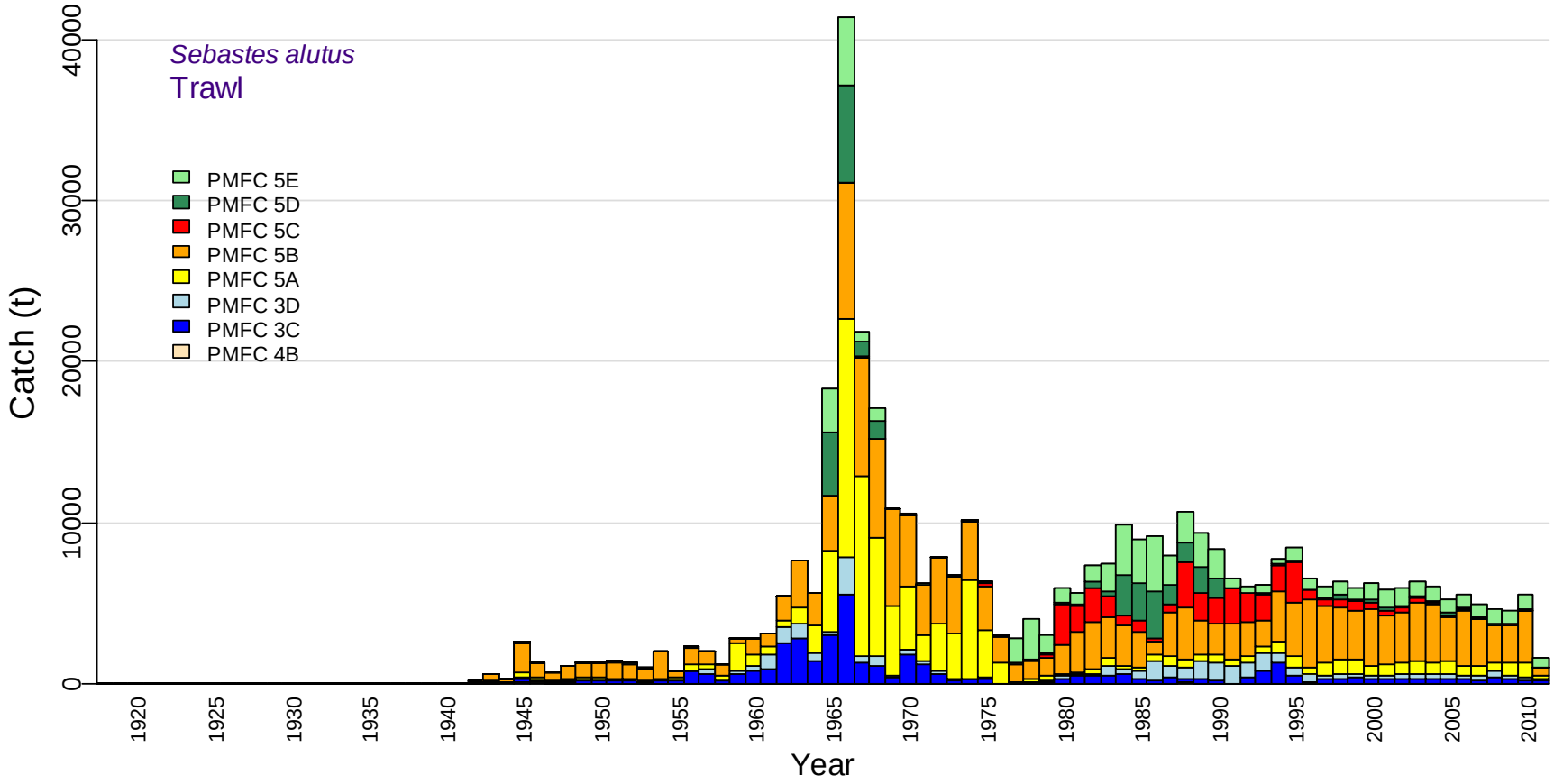

Figure 2. Reconstructed total (landed + discarded) catch (t) for Pacific Ocean Perch from the **Trawl** fishery in PMFC major areas.

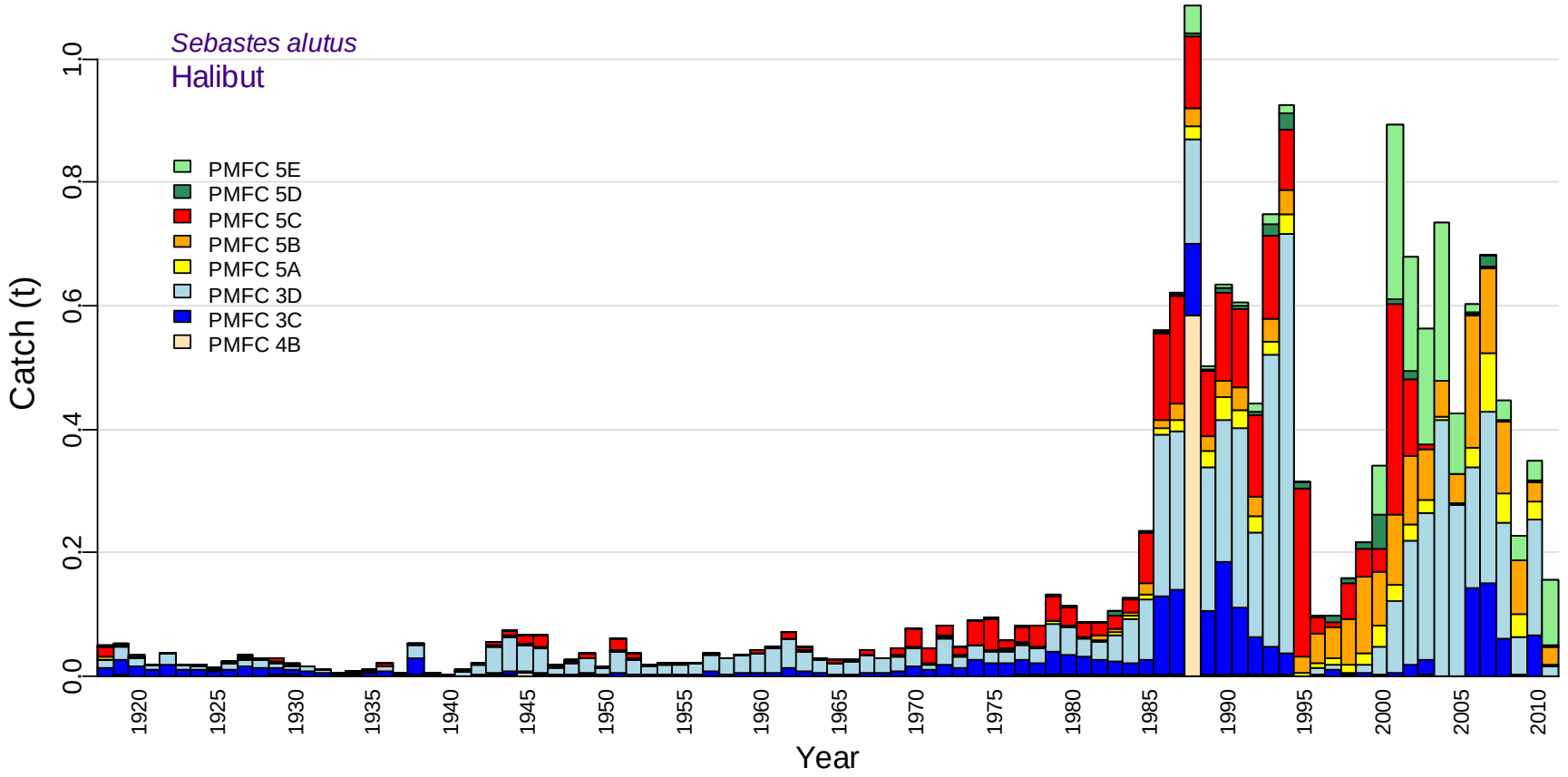

Figure 3. Reconstructed total (landed + discarded) catch (t) for Pacific Ocean Perch from the **Halibut** fishery in PMFC major areas.

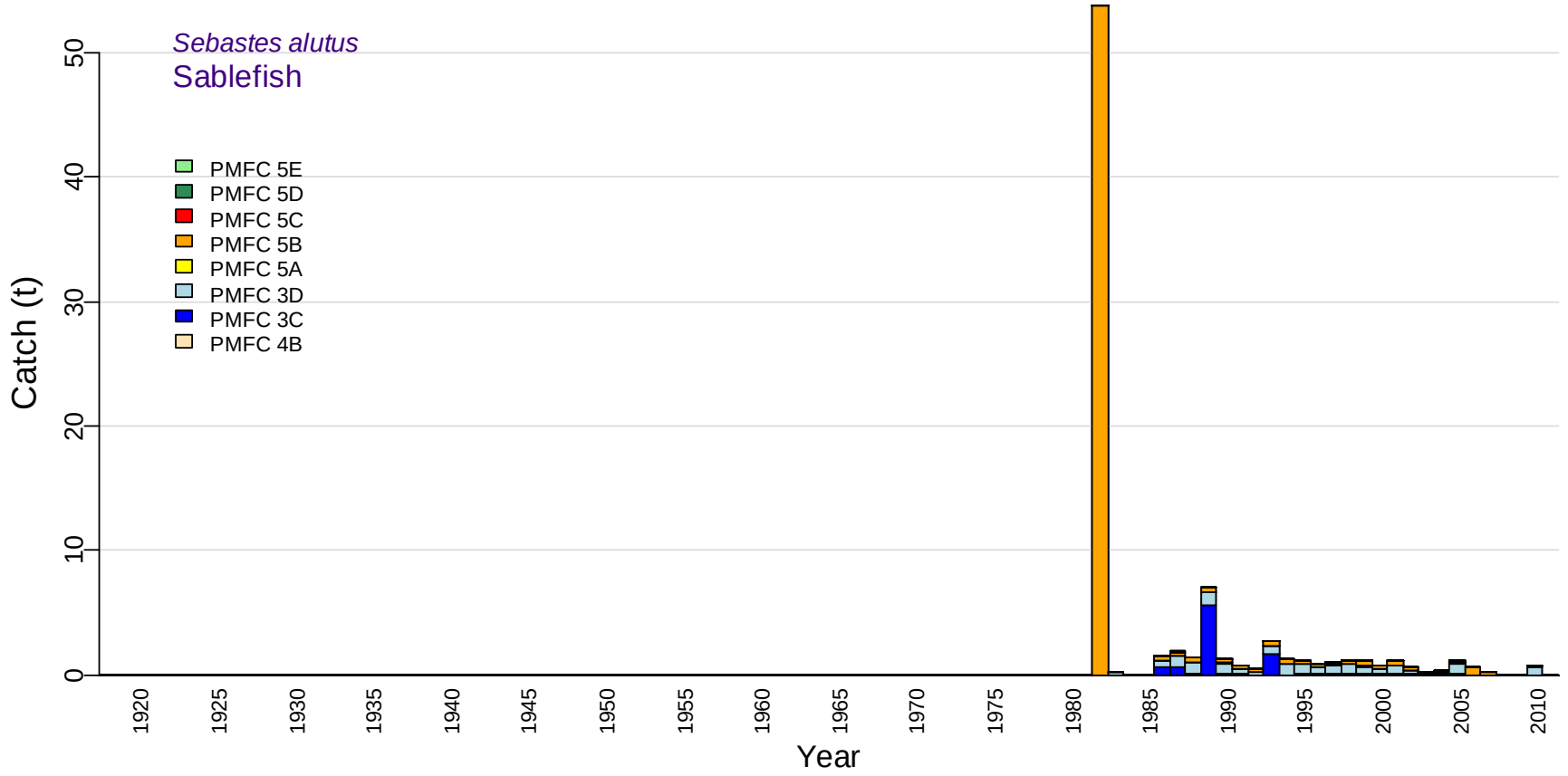

Figure 4. Reconstructed total (landed + discarded) catch (t) for Pacific Ocean Perch from the **Sablefish** fishery in PMFC major areas.

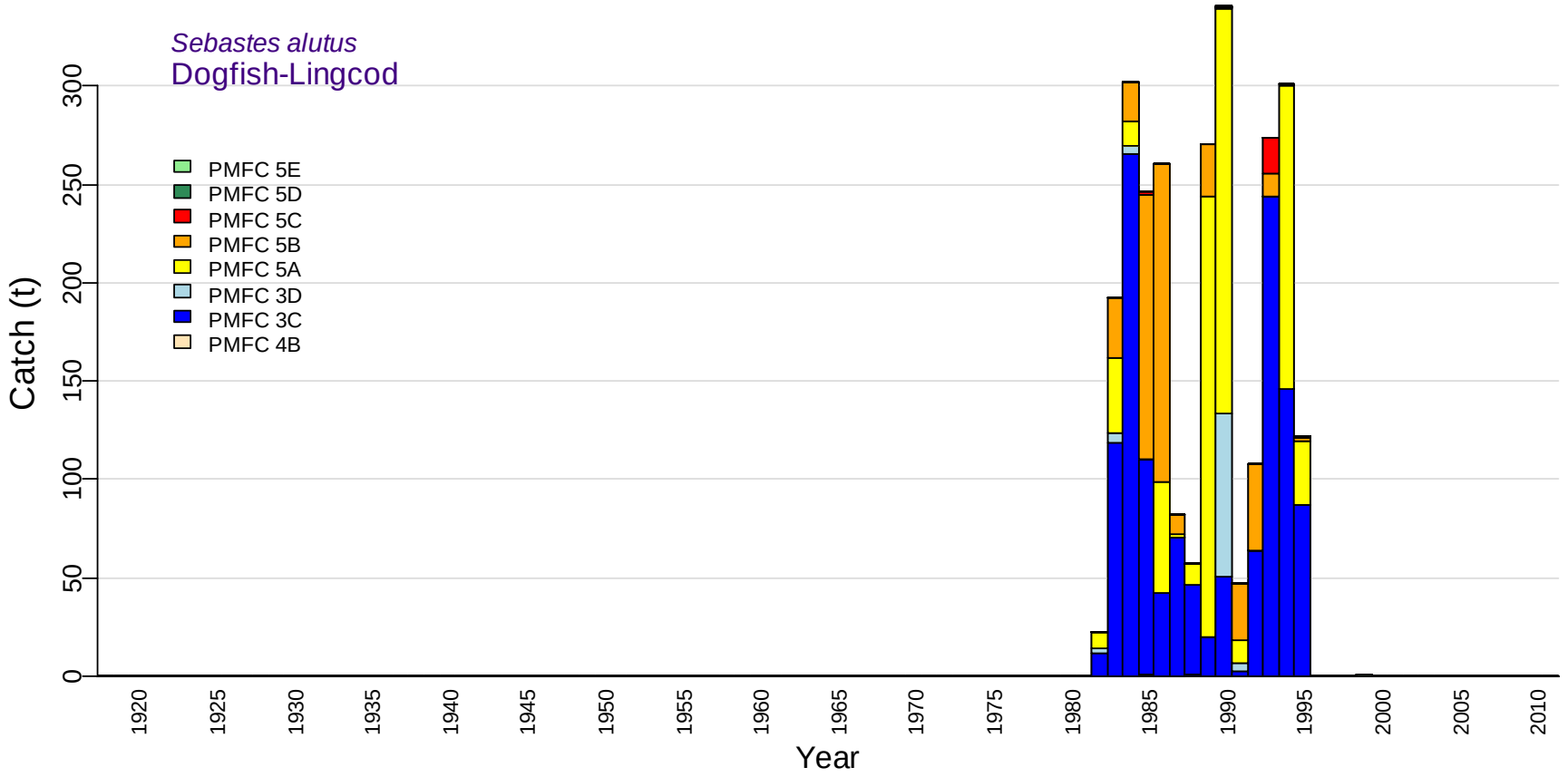

Figure 5. Reconstructed total (landed + discarded) catch (t) for Pacific Ocean Perch from the **Dogfish-Lingcod** fishery in PMFC major areas.

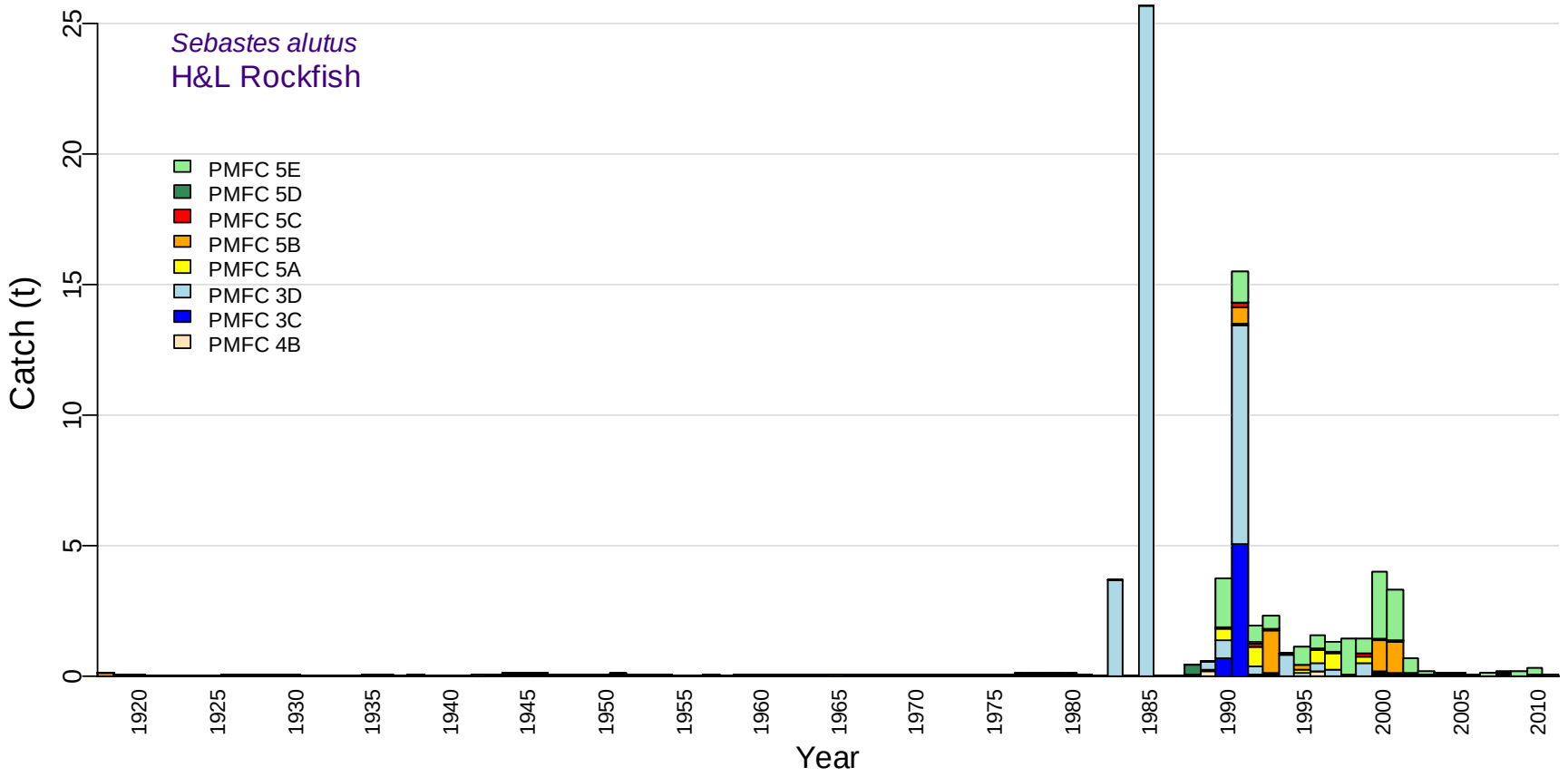

Figure 6. Reconstructed total (landed + discarded) catch (t) for Pacific Ocean Perch from the **H&L Rockfish** fishery in PMFC major areas.

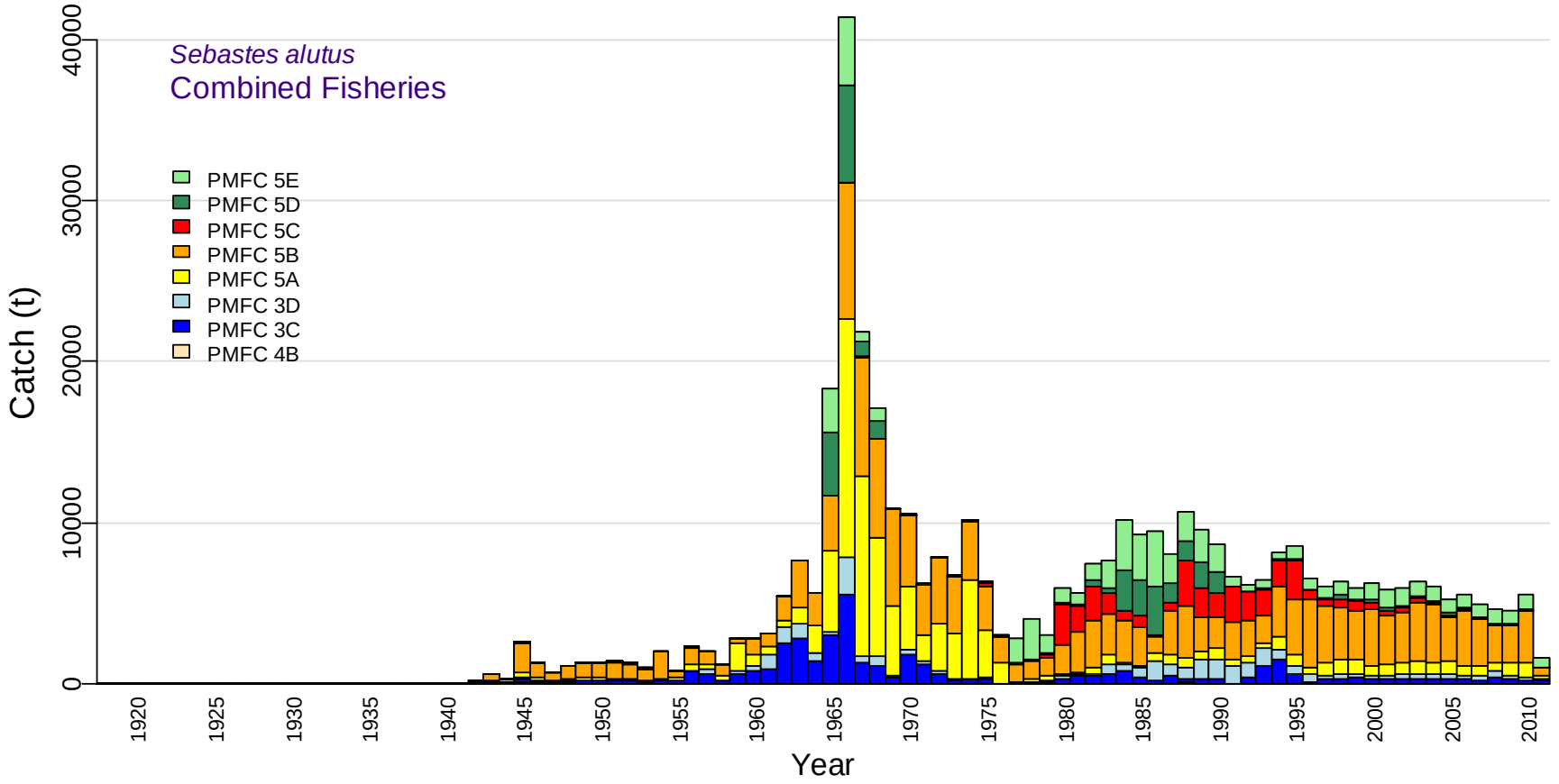

Figure 7. Reconstructed total (landed + discarded) catch (t) for Pacific Ocean Perch from all fisheries **combined** in PMFC major areas.

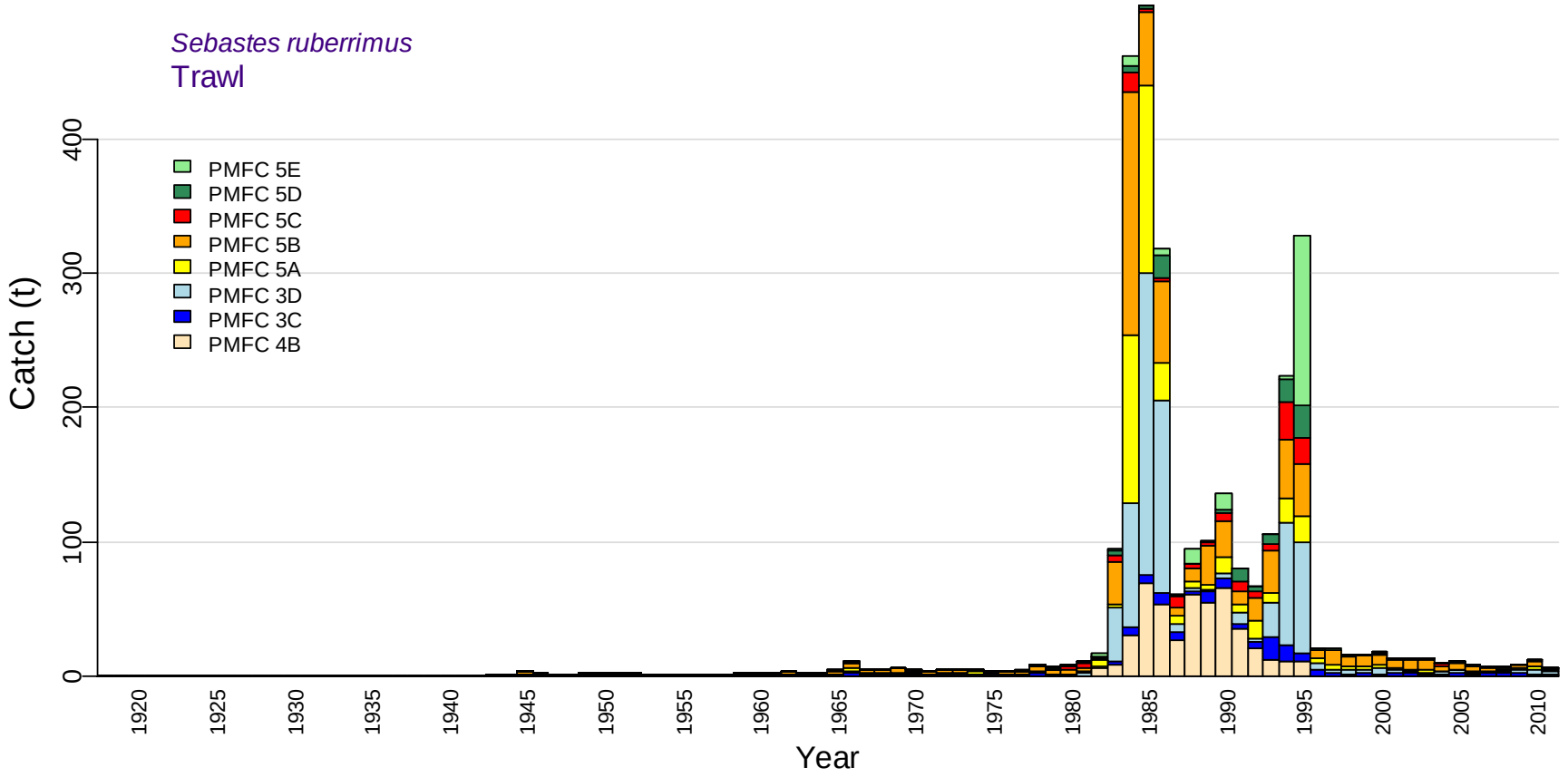

Figure 8. Reconstructed total (landed + discarded) catch (t) for Yelloweye Rockfish from the **Trawl** fishery in PMFC major areas.

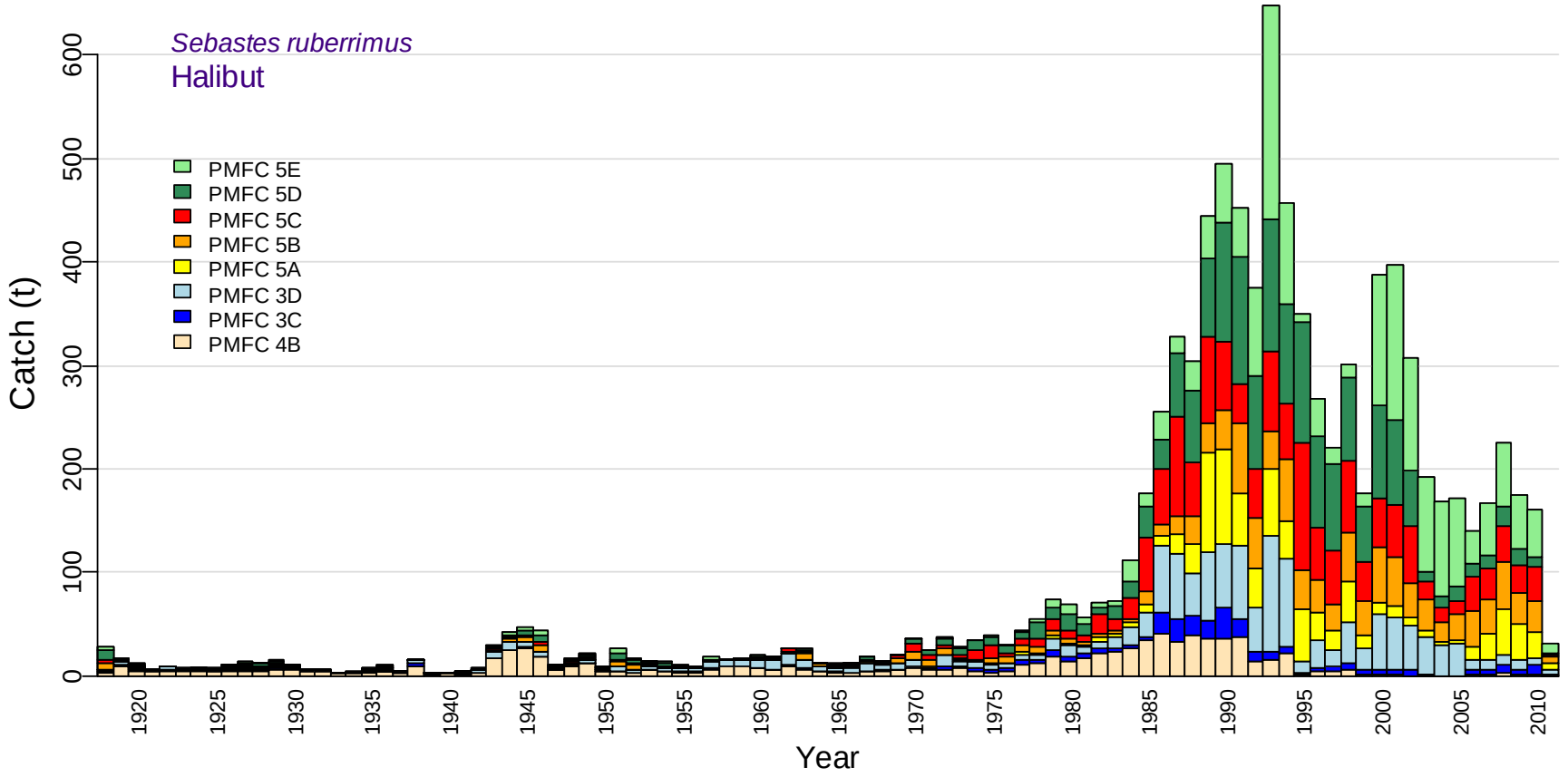

Figure 9. Reconstructed total (landed + discarded) catch (t) for Yelloweye Rockfish from the **Halibut** fishery in PMFC major areas.

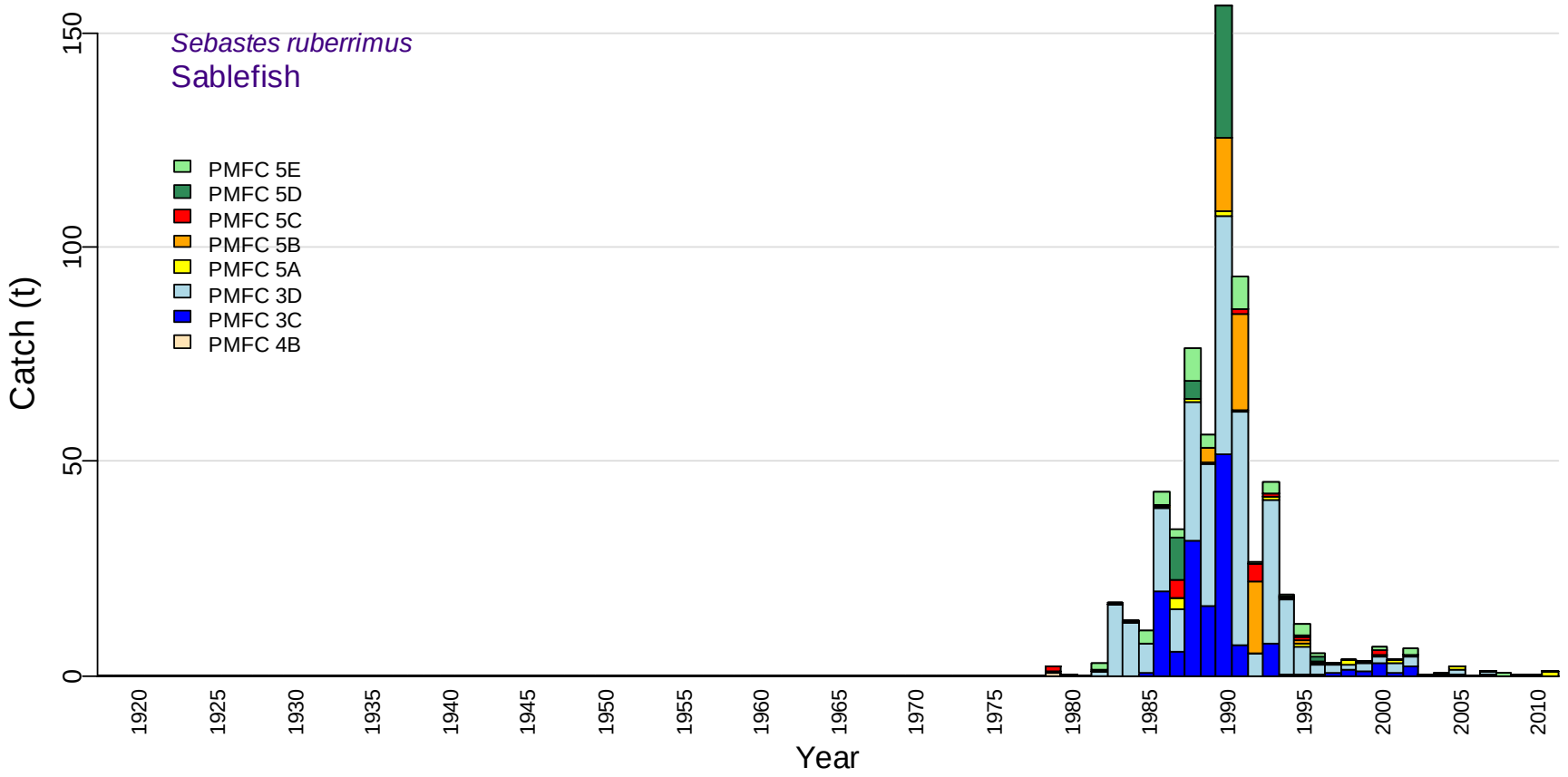

Figure 10. Reconstructed total (landed + discarded) catch (t) for Yelloweye Rockfish from the **Sablefish** fishery in PMFC major areas.

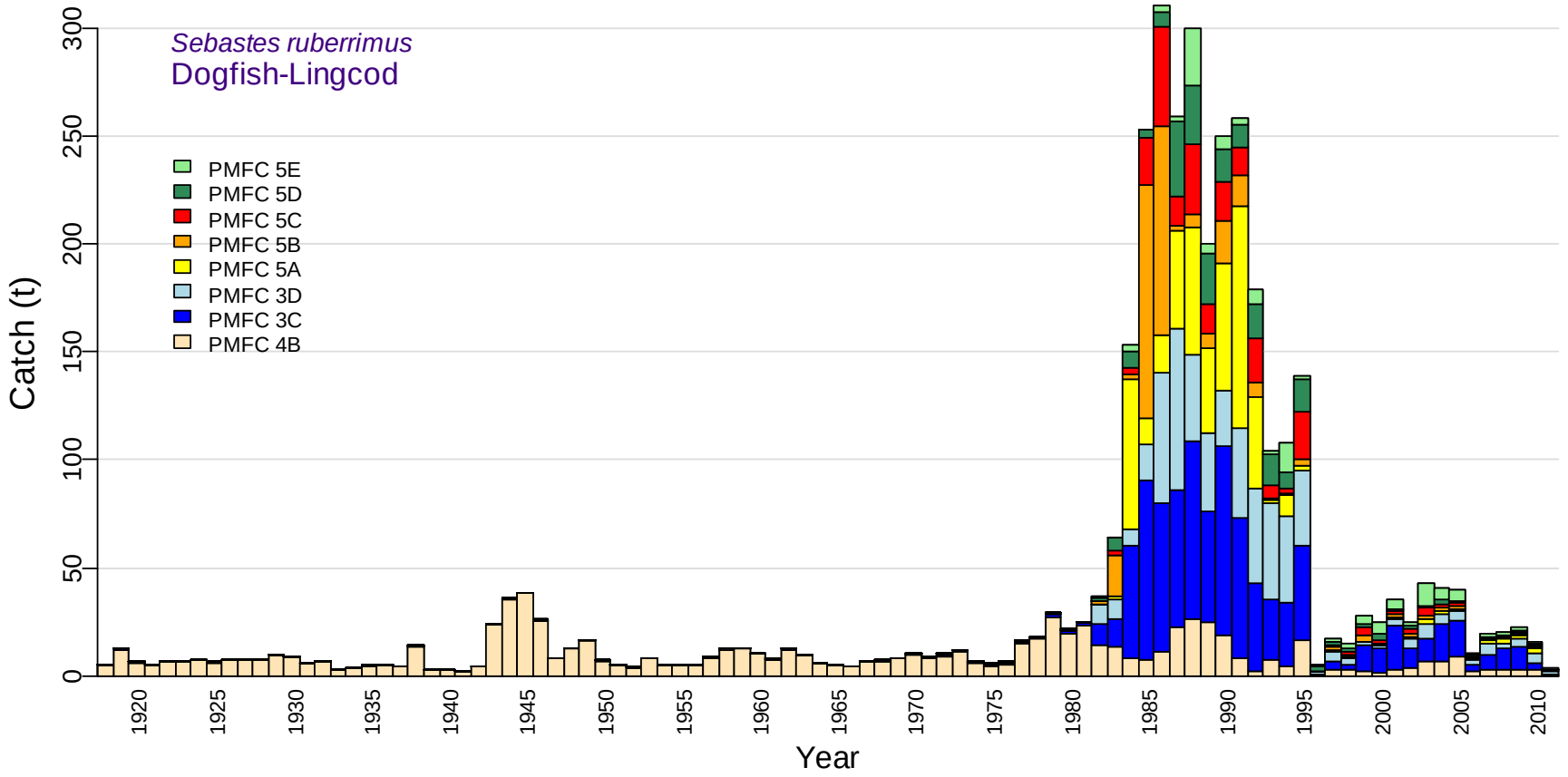

Figure 11. Reconstructed total (landed + discarded) catch (t) for Yelloweye Rockfish from the **Dogfish-Lingcod** fishery in PMFC major areas.

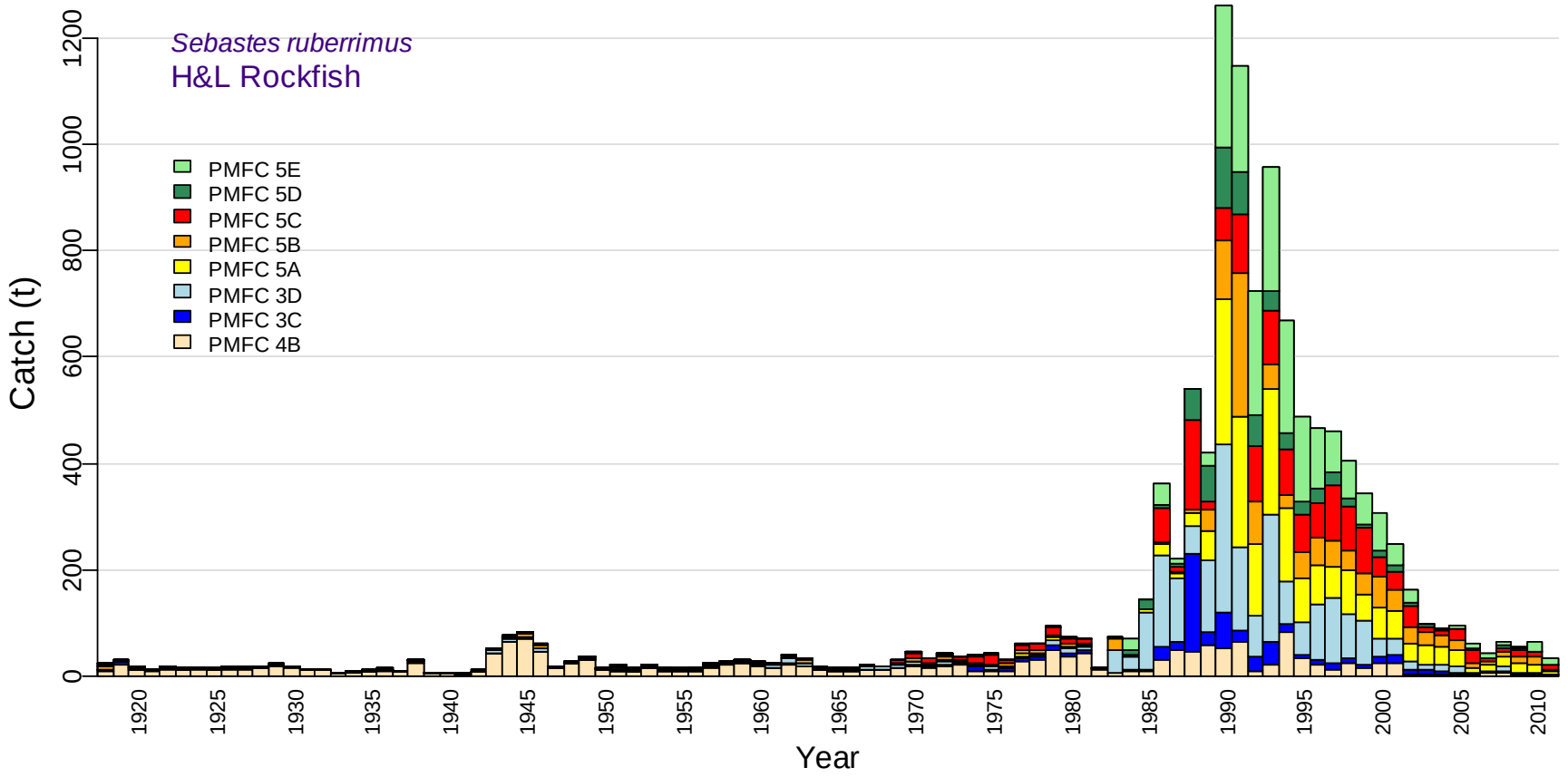

Figure 12. Reconstructed total (landed + discarded) catch (t) for Yelloweye Rockfish from the **H&L Rockfish** fishery in PMFC major areas.

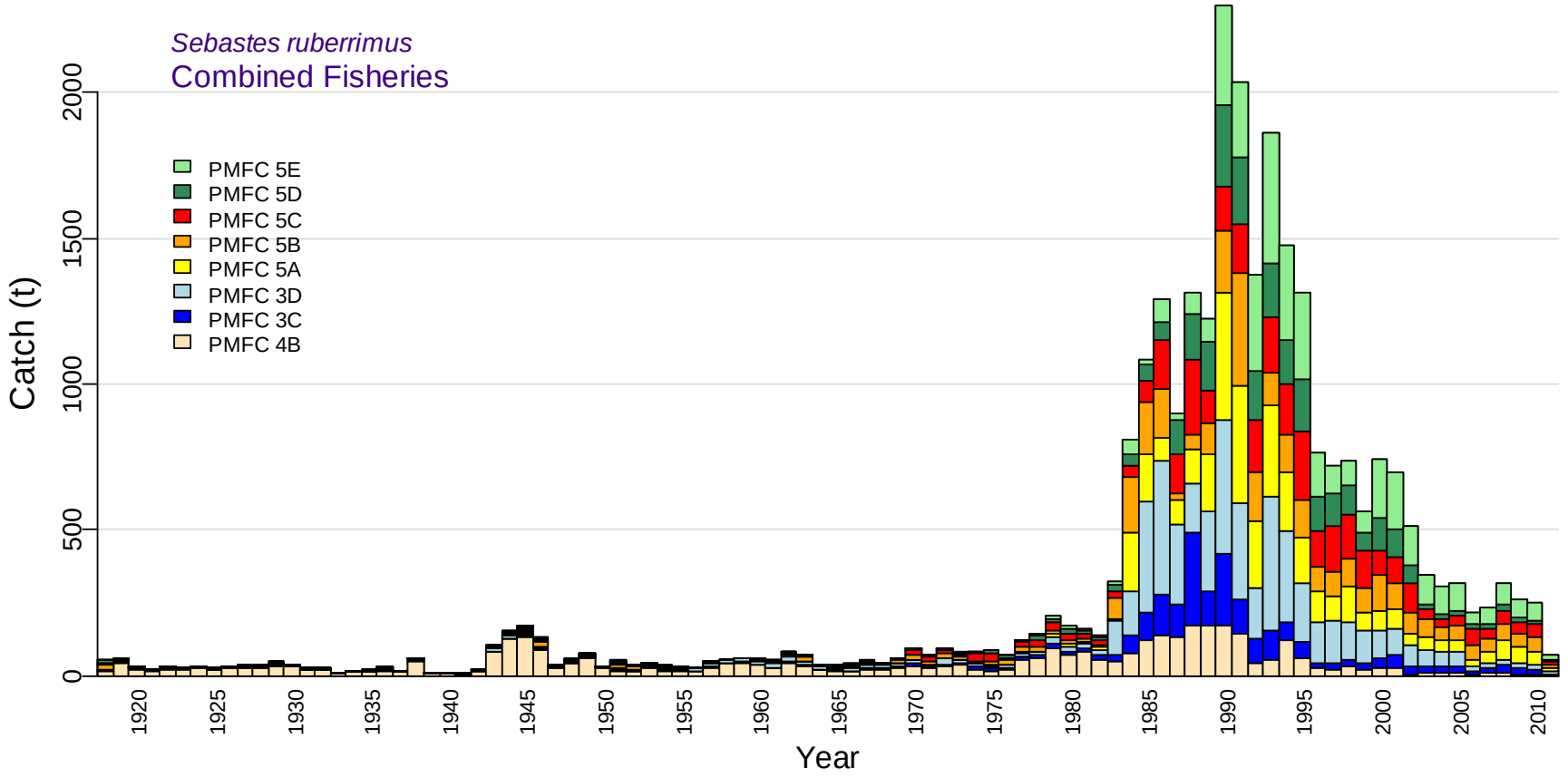

Figure 13. Reconstructed total (landed + discarded) catch (t) for Yelloweye Rockfish from all fisheries **combined** in PMFC major areas.

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APPENDIX A – RETRIEVAL OF HISTORICAL ROCKFISH LANDINGS DATA

1918 – 1950: LANDINGS (CANADA DOMINION BUREAU OF STATISTICS)

MSA Table: B4_Catch_1918-1971_Yamanaka

year	spp	region	nation	catch	units
1918	391	D1	CA	46200	lbs
1919	391	D1	CA	195900	lbs
1920	391	D1	CA	77900	lbs
1921	391	D1	CA	107100	lbs
1922	391	D1	CA	55900	lbs
1923	391	D1	CA	148900	lbs
1924	391	D1	CA	183700	lbs
1925	391	D1	CA	175700	lbs
1926	391	D1	CA	164100	lbs
1927	391	D1	CA	123100	lbs
1928	391	D1	CA	141300	lbs
1929	391	D1	CA	243100	lbs
1930	391	D1	CA	239600	lbs
1931	391	D1	CA	127700	lbs
1932	391	D1	CA	195700	lbs
1933	391	D1	CA	88100	lbs
1934	391	D1	CA	109300	lbs
1935	391	D1	CA	142700	lbs
1936	391	D1	CA	119400	lbs
1937	391	D1	CA	131700	lbs
1938	391	D1	CA	235700	lbs
1939	391	D1	CA	159300	lbs
1940	391	D1	CA	187500	lbs
1941	391	D1	CA	55000	lbs
1942	391	D1	CA	111900	lbs
1943	391	D1	CA	1208600	lbs
1944	391	D1	CA	1876900	lbs
1945	391	D1	CA	2196600	lbs
1946	391	D1	CA	1373300	lbs
1947	391	D1	CA	440575	lbs
1948	391	D1	CA	670364	lbs
1949	391	D1	CA	892668	lbs
1950	391	D1	CA	380104	lbs

year	spp	region	nation	catch	units
1918	391	D2	CA	347700	lbs
1919	391	D2	CA	46500	lbs
1920	391	D2	CA	66000	lbs
1921	391	D2	CA	3200	lbs
1922	391	D2	CA	1100	lbs
1923	391	D2	CA	7200	lbs
1924	391	D2	CA	17900	lbs
1925	391	D2	CA	26700	lbs
1926	391	D2	CA	57600	lbs
1927	391	D2	CA	87800	lbs
1928	391	D2	CA	64000	lbs
1929	391	D2	CA	94500	lbs
1930	391	D2	CA	50801	lbs
1931	391	D2	CA	8500	lbs
1932	391	D2	CA	5400	lbs
1933	391	D2	CA	1000	lbs
1934	391	D2	CA	6100	lbs
1935	391	D2	CA	56500	lbs
1936	391	D2	CA	85600	lbs
1937	391	D2	CA	16300	lbs
1938	391	D2	CA	7500	lbs
1939	391	D2	CA	10200	lbs
1940	391	D2	CA	13100	lbs
1941	391	D2	CA	83200	lbs
1942	391	D2	CA	72800	lbs
1943	391	D2	CA	191800	lbs
1944	391	D2	CA	260400	lbs
1945	391	D2	CA	414200	lbs
1946	391	D2	CA	598300	lbs
1947	391	D2	CA	98495	lbs
1948	391	D2	CA	149867	lbs
1949	391	D2	CA	199566	lbs
1950	391	D2	CA	84977	lbs

year	spp	region	nation	catch	units
1918	391	D3	CA	224400	lbs
1919	391	D3	CA	421500	lbs
1920	391	D3	CA	245300	lbs
1921	391	D3	CA	147500	lbs
1922	391	D3	CA	311300	lbs
1923	391	D3	CA	146800	lbs
1924	391	D3	CA	142300	lbs
1925	391	D3	CA	93600	lbs
1926	391	D3	CA	167400	lbs
1927	391	D3	CA	234500	lbs
1928	391	D3	CA	217200	lbs
1929	391	D3	CA	184800	lbs
1930	391	D3	CA	134400	lbs
1931	391	D3	CA	137300	lbs
1932	391	D3	CA	72500	lbs
1933	391	D3	CA	49100	lbs
1934	391	D3	CA	48900	lbs
1935	391	D3	CA	58600	lbs
1936	391	D3	CA	121600	lbs
1937	391	D3	CA	32100	lbs
1938	391	D3	CA	444200	lbs
1939	391	D3	CA	50800	lbs
1940	391	D3	CA	32200	lbs
1941	391	D3	CA	118400	lbs
1942	391	D3	CA	298100	lbs
1943	391	D3	CA	779600	lbs
1944	391	D3	CA	1026400	lbs
1945	391	D3	CA	804900	lbs
1946	391	D3	CA	705900	lbs
1947	391	D3	CA	225930	lbs
1948	391	D3	CA	343768	lbs
1949	391	D3	CA	457767	lbs
1950	391	D3	CA	194920	lbs

Note: MSA = Microsoft Access; species code 391 = “unspecified rockfish”

MSA pass-through SQL Query: PHHL_District_Majors

Allocates catch from historical Districts to PMFC areas.

```
SET NOCOUNT ON

SELECT
  HYD.Year AS 'year',
  HAC.Area AS 'region',
  CASE
    WHEN HAC.Area IN ('28','29','29A','29B','29C','29D','29E') THEN 'D1'
    WHEN HAC.Area IN ('1','2','3','4','5','6','7','8','9','10','2E','2W','30') THEN 'D2'
    WHEN HAC.Area IN
    ('11','12','13','14','15','16','17','18','19','20','21','22','23','24','25','26','27') THEN
    'D3'
    ELSE 'D0' END AS 'district',
  CASE
    WHEN HAC.Area IN
    ('12','13','14','15','16','17','18','19','20','28','29','29A','29B','29C','29D','29E') THEN 1
    WHEN HAC.Area IN ('C') THEN 2
    WHEN HAC.Area IN ('21','22','23','24') THEN 3
    WHEN HAC.Area IN ('25','26','27') THEN 4
    WHEN HAC.Area IN ('10','11') THEN 5
    WHEN HAC.Area IN ('7','8','9','30') THEN 6
    WHEN HAC.Area IN ('6','2E') THEN 7
    WHEN HAC.Area IN ('1','3','4','5') THEN 8
    WHEN HAC.Area IN ('2','2W') THEN 9
    ELSE 0 END AS 'major',
  HAC.[Round_Wt(lbs)]/2.20459 AS 'catKg'
INTO #Catch
FROM
  B21_Historic_Year_Details HYD INNER JOIN
  B22_Historic_Area_Catch HAC ON
    HYD.Id = HAC.Id
WHERE
  HYD.Year IN ('1951','1952')

SELECT
  C.district,
  Sum(C.catKg) AS 'dcatKg'
INTO #Dcatch
FROM #Catch C
GROUP BY C.district

SELECT
  C.district,
  C.major,
  Sum(C.catKg) / Avg(D.dcatKg) AS 'dmajor'
FROM
  #Catch  C INNER JOIN
  #Dcatch D ON
    C.district = D.district
GROUP BY
  C.district, C.major
ORDER BY
  C.district, C.major
```

MSA Query: ORF_Data_1918-1950

Creates data for the R object called `orfhistory`

```
SELECT
  [B4_Catch_1918-1971_Yamanaka].year,
  [B4_Catch_1918-1971_Yamanaka].spp,
  PHHL_Districts_Majors.major,
  [B4_Catch_1918-1971_Yamanaka].region,
```

```
  [B4_Catch_1918-1971_Yamanaka].nation,
  [dmajor]*
    IIf([units]="kg",[B4_Catch_1918-1971_Yamanaka].catch,
    IIf([units]="t",[B4_Catch_1918-1971_Yamanaka].catch*1000,
    IIf([units]="lbs",[B4_Catch_1918-1971_Yamanaka].catch/2.20459,0))) AS catch,
  "Yamanaka" AS source,
  "add" AS [action],
  "combined" AS fishery
FROM
  [B4_Catch_1918-1971_Yamanaka] INNER JOIN
  PHHL_Districts_Majors ON
  [B4_Catch_1918-1971_Yamanaka].region = PHHL_Districts_Majors.district
WHERE
  ((([B4_Catch_1918-1971_Yamanaka].year)<=1950) AND
  (([B4_Catch_1918-1971_Yamanaka].catch)<>0))
ORDER BY
  [B4_Catch_1918-1971_Yamanaka].year,
  PHHL_Districts_Majors.major,
  [B4_Catch_1918-1971_Yamanaka].region;
```

1930 – 1964: US LANDINGS FROM BC WATERS (STEWART, PERS. COMM.)

MSA Table: B4_Catch_1930-1964_Stewart

year	spp	major	region	nation	catch	units
1930	391	3	3C	US	3.772764954	lbs
1932	391	3	3C	US	157.1985398	lbs
1934	391	3	3C	US	1306.791461	lbs
1935	391	3	3C	US	9948.152391	lbs
1936	391	3	3C	US	12780.39848	lbs
1937	391	3	3C	US	11418.90193	lbs
1938	391	3	3C	US	16845.86712	lbs
1939	391	3	3C	US	17668.32988	lbs
1940	391	3	3C	US	39097.00602	lbs
1941	391	3	3C	US	14664.42298	lbs
1942	391	3	3C	US	284387.8783	lbs
1943	391	3	3C	US	919234.1812	lbs
1944	391	3	3C	US	382008.1715	lbs
1945	391	3	3C	US	4003579.57	lbs
1946	391	3	3C	US	2018224.893	lbs
1947	391	3	3C	US	1054314.886	lbs
1948	391	3	3C	US	1712049.297	lbs
1949	391	3	3C	US	2082251.858	lbs
1950	391	3	3C	US	2000995.933	lbs
1951	391	3	3C	US	1674085.849	lbs
1952	391	3	3C	US	1596571.249	lbs
1953	391	3	3C	US	692302.3691	lbs
1954	391	3	3C	US	993023.1757	lbs
1955	391	3	3C	US	937060.4956	lbs
1957	391	3	3C	US	740562.3209	lbs
1958	391	3	3C	US	937532.0912	lbs
1959	391	3	3C	US	1048042.665	lbs
1960	391	3	3C	US	947749.9963	lbs
1961	391	3	3C	US	1125069.949	lbs
1962	391	3	3C	US	1567583.839	lbs
1963	391	3	3C	US	1261989.877	lbs
1964	391	3	3C	US	931558.5467	lbs

year	spp	major	region	nation	catch	units
1930	391	4	3D	US	2.796046462	lbs
1932	391	4	3D	US	116.5019359	lbs
1934	391	4	3D	US	968.4805932	lbs
1935	391	4	3D	US	7372.708512	lbs
1936	391	4	3D	US	9471.723892	lbs
1937	391	4	3D	US	8462.700625	lbs
1938	391	4	3D	US	12484.69696	lbs
1939	391	4	3D	US	13094.23509	lbs
1940	391	4	3D	US	28975.31298	lbs
1941	391	4	3D	US	10867.99959	lbs
1942	391	4	3D	US	210763.6523	lbs
1943	391	4	3D	US	681256.7204	lbs
1944	391	4	3D	US	283111.3545	lbs
1945	391	4	3D	US	2967106.254	lbs
1946	391	4	3D	US	1495733.405	lbs
1947	391	4	3D	US	781366.834	lbs
1948	391	4	3D	US	1268822.584	lbs
1949	391	4	3D	US	1543184.643	lbs
1950	391	4	3D	US	1482964.792	lbs
1951	391	4	3D	US	1240687.366	lbs
1952	391	4	3D	US	1183240.262	lbs
1953	391	4	3D	US	513074.5258	lbs
1954	391	4	3D	US	735942.7292	lbs
1955	391	4	3D	US	694468.04	lbs
1957	391	4	3D	US	548840.6201	lbs
1958	391	4	3D	US	694817.5458	lbs
1959	391	4	3D	US	776718.4067	lbs
1960	391	4	3D	US	702390.1716	lbs
1961	391	4	3D	US	833804.3553	lbs
1962	391	4	3D	US	1161757.305	lbs
1963	391	4	3D	US	935277.5415	lbs
1964	391	4	3D	US	690390.4722	lbs

year	spp	major	region	nation	catch	units
1930	391	5	5A	US	3.582988045	lbs
1932	391	5	5A	US	149.2911686	lbs
1934	391	5	5A	US	1241.057484	lbs
1935	391	5	5A	US	9447.742311	lbs
1936	391	5	5A	US	12137.52129	lbs
1937	391	5	5A	US	10844.51048	lbs
1938	391	5	5A	US	15998.4895	lbs
1939	391	5	5A	US	16779.58089	lbs
1940	391	5	5A	US	37130.35582	lbs
1941	391	5	5A	US	13926.77595	lbs
1942	391	5	5A	US	270082.653	lbs
1943	391	5	5A	US	872995.0372	lbs
1944	391	5	5A	US	362792.4687	lbs
1945	391	5	5A	US	3802192.268	lbs
1946	391	5	5A	US	1916704.526	lbs
1947	391	5	5A	US	1001280.938	lbs
1948	391	5	5A	US	1625930.117	lbs
1949	391	5	5A	US	1977510.819	lbs
1950	391	5	5A	US	1900342.214	lbs

1951	391	5	5A	US	1589876.3	lbs
1952	391	5	5A	US	1516260.824	lbs
1953	391	5	5A	US	657478.3063	lbs
1954	391	5	5A	US	943072.3118	lbs
1955	391	5	5A	US	889924.6557	lbs
1957	391	5	5A	US	703310.6951	lbs
1958	391	5	5A	US	890372.5293	lbs
1959	391	5	5A	US	995324.2207	lbs
1960	391	5	5A	US	900076.4552	lbs
1961	391	5	5A	US	1068476.893	lbs
1962	391	5	5A	US	1488731.533	lbs
1963	391	5	5A	US	1198509.501	lbs
1964	391	5	5A	US	884699.4648	lbs

year	spp	major	region	nation	catch	units
1930	391	6	5B	US	6.647252539	lbs
1932	391	6	5B	US	276.9688558	lbs
1934	391	6	5B	US	2302.442098	lbs
1935	391	6	5B	US	17527.69707	lbs
1936	391	6	5B	US	22517.84494	lbs
1937	391	6	5B	US	20119.01768	lbs
1938	391	6	5B	US	29680.81349	lbs
1939	391	6	5B	US	31129.91455	lbs
1940	391	6	5B	US	68885.20109	lbs
1941	391	6	5B	US	25837.31668	lbs
1942	391	6	5B	US	501064.357	lbs
1943	391	6	5B	US	1619603.081	lbs
1944	391	6	5B	US	673062.0164	lbs
1945	391	6	5B	US	7053925.91	lbs
1946	391	6	5B	US	3555920.049	lbs
1947	391	6	5B	US	1857602.419	lbs
1948	391	6	5B	US	3016467.808	lbs
1949	391	6	5B	US	3668729.464	lbs
1950	391	6	5B	US	3525564.262	lbs
1951	391	6	5B	US	2949579.83	lbs
1952	391	6	5B	US	2813006.487	lbs
1953	391	6	5B	US	1219770.841	lbs
1954	391	6	5B	US	1749612.262	lbs
1955	391	6	5B	US	1651011.349	lbs
1957	391	6	5B	US	1304800.28	lbs
1958	391	6	5B	US	1651842.256	lbs
1959	391	6	5B	US	1846551.362	lbs
1960	391	6	5B	US	1669845.232	lbs
1961	391	6	5B	US	1982266.101	lbs
1962	391	6	5B	US	2761933.43	lbs
1963	391	6	5B	US	2223505.974	lbs
1964	391	6	5B	US	1641317.439	lbs

year	spp	major	region	nation	catch	units
1930	391	7	5C	US	0.046179048	lbs
1932	391	7	5C	US	1.924126996	lbs
1934	391	7	5C	US	15.99526772	lbs
1935	391	7	5C	US	121.7664528	lbs
1936	391	7	5C	US	156.4334489	lbs
1937	391	7	5C	US	139.768585	lbs
1938	391	7	5C	US	206.1952213	lbs
1939	391	7	5C	US	216.2622537	lbs
1940	391	7	5C	US	478.5515493	lbs
1941	391	7	5C	US	179.4941109	lbs
1942	391	7	5C	US	3480.938148	lbs
1943	391	7	5C	US	11251.52502	lbs
1944	391	7	5C	US	4675.821013	lbs
1945	391	7	5C	US	49004.24357	lbs
1946	391	7	5C	US	24703.28926	lbs
1947	391	7	5C	US	12904.92735	lbs
1948	391	7	5C	US	20955.66711	lbs
1949	391	7	5C	US	25486.98619	lbs
1950	391	7	5C	US	24492.40494	lbs
1951	391	7	5C	US	20490.99044	lbs
1952	391	7	5C	US	19542.20342	lbs
1953	391	7	5C	US	8473.85529	lbs
1954	391	7	5C	US	12154.71023	lbs
1955	391	7	5C	US	11469.72102	lbs
1957	391	7	5C	US	9064.562277	lbs
1958	391	7	5C	US	11475.4934	lbs
1959	391	7	5C	US	12828.15468	lbs
1960	391	7	5C	US	11600.56166	lbs
1961	391	7	5C	US	13770.97691	lbs
1962	391	7	5C	US	19187.3944	lbs
1963	391	7	5C	US	15446.89152	lbs
1964	391	7	5C	US	11402.37658	lbs

year	spp	major	region	nation	catch	units
1930	391	8	5D	US	0.309968952	lbs
1932	391	8	5D	US	12.91537299	lbs
1934	391	8	5D	US	107.3654956	lbs
1935	391	8	5D	US	817.336464	lbs
1936	391	8	5D	US	1050.032739	lbs
1937	391	8	5D	US	938.1726937	lbs
1938	391	8	5D	US	1384.050115	lbs
1939	391	8	5D	US	1451.623347	lbs
1940	391	8	5D	US	3212.195331	lbs
1941	391	8	5D	US	1204.823484	lbs
1942	391	8	5D	US	23365.20127	lbs
1943	391	8	5D	US	75523.93507	lbs
1944	391	8	5D	US	31385.64789	lbs
1945	391	8	5D	US	328932.5938	lbs
1946	391	8	5D	US	165816.5992	lbs
1947	391	8	5D	US	86622.11508	lbs
1948	391	8	5D	US	140661.3272	lbs
1949	391	8	5D	US	171077.0306	lbs
1950	391	8	5D	US	164401.0743	lbs
1951	391	8	5D	US	137542.2646	lbs
1952	391	8	5D	US	131173.6942	lbs
1953	391	8	5D	US	56879.30263	lbs
1954	391	8	5D	US	81586.41115	lbs
1955	391	8	5D	US	76988.53837	lbs
1957	391	8	5D	US	60844.32214	lbs
1958	391	8	5D	US	77027.28449	lbs
1959	391	8	5D	US	86106.7917	lbs
1960	391	8	5D	US	77866.78373	lbs
1961	391	8	5D	US	92435.32446	lbs
1962	391	8	5D	US	128792.0994	lbs
1963	391	8	5D	US	103684.6143	lbs
1964	391	8	5D	US	76536.50031	lbs

MSA Query: ORF_Data_1930-1964

Creates data for the R object called `orfhistory`

```
SELECT
  [B4_Catch_1930-1964_Stewart].year,
  [B4_Catch_1930-1964_Stewart].spp,
  [B4_Catch_1930-1964_Stewart].major,
  [B4_Catch_1930-1964_Stewart].region,
  [B4_Catch_1930-1964_Stewart].nation,
```

```
  IIf([units]="kg",[B4_Catch_1930-1964_Stewart].catch,
    IIf([units]="t",[B4_Catch_1930-1964_Stewart].catch*1000,
    IIf([units]="lbs",[B4_Catch_1930-1964_Stewart].catch/2.20459,0))) AS catch,
  "Stewart" AS source,
  "max" AS [action],
  "trawl" AS fishery
FROM
  [B4_Catch_1930-1964_Stewart]
WHERE
  ((([B4_Catch_1930-1964_Stewart].catch)<>0));
```

1945 – 1953: TABLE B3_CATCH_PRE54 (THOMSON & YATES 1960-61)

MSA pass-through SQL Query: B4_Catch_1945-1953_GFCatch

Creates an MSA View of the 1945-1953 catch data from GFCatch.

```
SELECT
  C.Year as 'year',
  C.Species AS spp,
  C.Major_Area AS major,
  A.PMFC_Area AS region,
  'nation'='CA',
  Sum(C.Catch_lbs) AS catch,
  'lbs' AS units,
  C.Utilization as utilize
FROM
  B3_Catch_Pre54 C INNER JOIN
  C_Major_Area A ON
  C.Major_Area = A.Major_Area
GROUP BY
  C.Year, C.Species, C.Major_Area, A.PMFC_Area,C.Utilization
ORDER BY
  C.Year, C.Species, C.Major_Area
```

MSA Query: ORF_Data_1945-1953

Creates data for the R object called `orfhistory`

```
SELECT
  [B4_Catch_1945-1953_GFCatch].year,
  [B4_Catch_1945-1953_GFCatch].spp,
  [B4_Catch_1945-1953_GFCatch].major,
  [B4_Catch_1945-1953_GFCatch].region,
  [B4_Catch_1945-1953_GFCatch].nation,
  IIf([units]="kg",[B4_Catch_1945-1953_GFCatch].catch,
    IIf([units]="t",[B4_Catch_1945-1953_GFCatch].catch*1000,
    IIf([units]="lbs",[B4_Catch_1945-1953_GFCatch].catch/2.20459,0))) AS catch,
  "GFCatch" AS source,
  "max" AS [action],
  "trawl" AS fishery
FROM
  [B4_Catch_1945-1953_GFCatch] INNER JOIN
  C_Species ON
  [B4_Catch_1945-1953_GFCatch].spp = C_Species.SPECIES_CDE
WHERE
  (((C_Species.Rockfish)=1) AND
  (([B4_Catch_1945-1953_GFCatch].utilize)<>4 And
  ([B4_Catch_1945-1953_GFCatch].utilize)<>6) AND
  (([B4_Catch_1945-1953_GFCatch].catch)>0));
```

1950 – 1975: CANADIAN AND US LANDINGS FROM BC WATERS (KETCHEN 1976)

MSA Table: B4_Catch_1950-1975_Ketchen76

year	spp	major	region	nation	catch	units
1950	391	1	4B	CA	63000	lbs
1951	391	1	4B	CA	208000	lbs
1952	391	1	4B	CA	138000	lbs
1953	391	1	4B	CA	116000	lbs
1954	391	1	4B	CA	97000	lbs
1955	391	1	4B	CA	73000	lbs
1956	391	1	4B	CA	60000	lbs
1957	391	1	4B	CA	73000	lbs
1958	391	1	4B	CA	56000	lbs
1959	391	1	4B	CA	85000	lbs
1960	391	1	4B	CA	76000	lbs
1961	391	1	4B	CA	113000	lbs
1962	391	1	4B	CA	87000	lbs
1963	391	1	4B	CA	83000	lbs
1964	391	1	4B	CA	120000	lbs
1965	391	1	4B	CA	80000	lbs
1966	391	1	4B	CA	132000	lbs
1967	391	1	4B	CA	37000	lbs
1968	391	1	4B	CA	74000	lbs
1969	391	1	4B	CA	68000	lbs
1970	391	1	4B	CA	95000	lbs
1971	391	1	4B	CA	64000	lbs
1972	391	1	4B	CA	85000	lbs
1973	391	1	4B	CA	54000	lbs
1974	391	1	4B	CA	46000	lbs
1975	391	1	4B	CA	63000	lbs

year	spp	major	region	nation	catch	units
1950	391	3	3C	CA	31000	lbs
1951	391	3	3C	CA	48000	lbs
1952	391	3	3C	CA	124000	lbs
1953	391	3	3C	CA	35000	lbs
1954	391	3	3C	CA	118000	lbs
1955	391	3	3C	CA	65000	lbs
1956	391	3	3C	CA	27000	lbs
1957	391	3	3C	CA	22000	lbs
1958	391	3	3C	CA	13000	lbs
1959	391	3	3C	CA	29000	lbs
1960	391	3	3C	CA	16000	lbs
1961	391	3	3C	CA	36000	lbs
1962	391	3	3C	CA	36000	lbs
1963	391	3	3C	CA	25000	lbs
1964	391	3	3C	CA	26000	lbs
1965	391	3	3C	CA	20000	lbs
1966	391	3	3C	CA	46000	lbs
1967	391	3	3C	CA	32000	lbs
1968	391	3	3C	CA	29000	lbs
1969	391	3	3C	CA	78000	lbs
1970	391	3	3C	CA	134000	lbs
1971	391	3	3C	CA	233000	lbs
1972	391	3	3C	CA	91000	lbs
1973	391	3	3C	CA	106000	lbs
1974	391	3	3C	CA	156000	lbs
1975	391	3	3C	CA	85000	lbs

year	spp	major	region	nation	catch	units
1950	391	4	3D	CA	7000	lbs
1951	391	4	3D	CA	10000	lbs
1952	391	4	3D	CA	4000	lbs
1953	391	4	3D	CA	1000	lbs
1954	391	4	3D	CA	10000	lbs
1955	391	4	3D	CA	13000	lbs
1956	391	4	3D	CA	2000	lbs
1958	391	4	3D	CA	2000	lbs
1960	391	4	3D	CA	4000	lbs
1961	391	4	3D	CA	6000	lbs
1962	391	4	3D	CA	31000	lbs
1963	391	4	3D	CA	1000	lbs
1964	391	4	3D	CA	13000	lbs
1965	391	4	3D	CA	72000	lbs
1966	391	4	3D	CA	24000	lbs
1967	391	4	3D	CA	18000	lbs
1968	391	4	3D	CA	108000	lbs
1969	391	4	3D	CA	198000	lbs
1970	391	4	3D	CA	173000	lbs
1971	391	4	3D	CA	131000	lbs
1972	391	4	3D	CA	47000	lbs
1973	391	4	3D	CA	79000	lbs
1974	391	4	3D	CA	77000	lbs
1975	391	4	3D	CA	44000	lbs

year	spp	major	region	nation	catch	units
1950	391	5	5A	CA	15000	lbs
1951	391	5	5A	CA	10000	lbs
1952	391	5	5A	CA	28000	lbs
1953	391	5	5A	CA	2000	lbs
1954	391	5	5A	CA	6000	lbs
1955	391	5	5A	CA	8000	lbs
1957	391	5	5A	CA	40000	lbs
1958	391	5	5A	CA	50000	lbs
1959	391	5	5A	CA	169000	lbs
1960	391	5	5A	CA	28000	lbs
1961	391	5	5A	CA	29000	lbs
1962	391	5	5A	CA	56000	lbs
1963	391	5	5A	CA	58000	lbs
1964	391	5	5A	CA	358000	lbs
1965	391	5	5A	CA	225000	lbs
1966	391	5	5A	CA	119000	lbs
1967	391	5	5A	CA	299000	lbs
1968	391	5	5A	CA	340000	lbs
1969	391	5	5A	CA	454000	lbs
1970	391	5	5A	CA	397000	lbs
1971	391	5	5A	CA	427000	lbs
1972	391	5	5A	CA	869000	lbs
1973	391	5	5A	CA	1390000	lbs
1974	391	5	5A	CA	475000	lbs
1975	391	5	5A	CA	361000	lbs

year	spp	major	region	nation	catch	units
1950	391	6	5B	CA	26000	lbs
1951	391	6	5B	CA	76000	lbs
1952	391	6	5B	CA	200000	lbs
1953	391	6	5B	CA	20000	lbs
1954	391	6	5B	CA	116000	lbs
1955	391	6	5B	CA	135000	lbs
1956	391	6	5B	CA	84000	lbs
1957	391	6	5B	CA	91000	lbs
1958	391	6	5B	CA	94000	lbs
1959	391	6	5B	CA	326000	lbs
1960	391	6	5B	CA	48000	lbs
1961	391	6	5B	CA	86000	lbs
1962	391	6	5B	CA	401000	lbs
1963	391	6	5B	CA	168000	lbs
1964	391	6	5B	CA	207000	lbs
1965	391	6	5B	CA	210000	lbs
1966	391	6	5B	CA	168000	lbs
1967	391	6	5B	CA	63000	lbs
1968	391	6	5B	CA	120000	lbs
1969	391	6	5B	CA	111000	lbs
1970	391	6	5B	CA	284000	lbs
1971	391	6	5B	CA	407000	lbs
1972	391	6	5B	CA	1407000	lbs

1973	391	6	5B	CA	488000	lbs
1974	391	6	5B	CA	580000	lbs
1975	391	6	5B	CA	1048000	lbs

year	spp	major	region	nation	catch	units
1951	391	7	5C	CA	2000	lbs
1952	391	7	5C	CA	1000	lbs
1956	391	7	5C	CA	6000	lbs
1957	391	7	5C	CA	1000	lbs
1958	391	7	5C	CA	12000	lbs
1959	391	7	5C	CA	5000	lbs
1960	391	7	5C	CA	1000	lbs
1964	391	7	5C	CA	3000	lbs
1965	391	7	5C	CA	10000	lbs
1966	391	7	5C	CA	8000	lbs
1967	391	7	5C	CA	1000	lbs
1968	391	7	5C	CA	17000	lbs
1969	391	7	5C	CA	23000	lbs
1970	391	7	5C	CA	26000	lbs
1971	391	7	5C	CA	21000	lbs
1972	391	7	5C	CA	7000	lbs
1973	391	7	5C	CA	40000	lbs
1974	391	7	5C	CA	41000	lbs
1975	391	7	5C	CA	76000	lbs
1950	391	8	5D	CA	91000	lbs

year	spp	major	region	nation	catch	units
1951	391	8	5D	CA	80000	lbs
1952	391	8	5D	CA	97000	lbs
1953	391	8	5D	CA	7000	lbs
1954	391	8	5D	CA	13000	lbs
1955	391	8	5D	CA	17000	lbs
1956	391	8	5D	CA	9000	lbs
1957	391	8	5D	CA	9000	lbs
1958	391	8	5D	CA	9000	lbs
1959	391	8	5D	CA	39000	lbs
1960	391	8	5D	CA	21000	lbs
1961	391	8	5D	CA	44000	lbs
1962	391	8	5D	CA	106000	lbs
1963	391	8	5D	CA	27000	lbs
1964	391	8	5D	CA	53000	lbs
1965	391	8	5D	CA	25000	lbs
1966	391	8	5D	CA	45000	lbs
1967	391	8	5D	CA	47000	lbs
1968	391	8	5D	CA	22000	lbs
1969	391	8	5D	CA	71000	lbs
1970	391	8	5D	CA	417000	lbs
1971	391	8	5D	CA	434000	lbs
1972	391	8	5D	CA	886000	lbs
1973	391	8	5D	CA	525000	lbs
1974	391	8	5D	CA	640000	lbs
1975	391	8	5D	CA	479000	lbs

year	spp	major	region	nation	catch	units
1950	391	3	3C	US	1919000	lbs
1951	391	3	3C	US	1867000	lbs
1952	391	3	3C	US	1439000	lbs
1953	391	3	3C	US	739000	lbs
1954	391	3	3C	US	769000	lbs
1955	391	3	3C	US	695000	lbs
1956	391	3	3C	US	630000	lbs
1957	391	3	3C	US	843000	lbs
1958	391	3	3C	US	635000	lbs
1959	391	3	3C	US	2331000	lbs
1960	391	3	3C	US	2350000	lbs
1961	391	3	3C	US	2392000	lbs
1962	391	3	3C	US	2943000	lbs
1963	391	3	3C	US	1308000	lbs
1964	391	3	3C	US	1237000	lbs
1965	391	3	3C	US	1453000	lbs
1966	391	3	3C	US	1405000	lbs
1967	391	3	3C	US	653000	lbs
1968	391	3	3C	US	1088000	lbs
1969	391	3	3C	US	1354000	lbs
1970	391	3	3C	US	1354000	lbs
1971	391	3	3C	US	1246000	lbs
1972	391	3	3C	US	783000	lbs
1973	391	3	3C	US	610000	lbs
1974	391	3	3C	US	193000	lbs
1975	391	3	3C	US	639000	lbs

year	spp	major	region	nation	catch	units
1950	391	4	3D	US	1654000	lbs
1951	391	4	3D	US	1056000	lbs
1952	391	4	3D	US	1174000	lbs
1953	391	4	3D	US	536000	lbs
1954	391	4	3D	US	614000	lbs
1955	391	4	3D	US	821000	lbs
1956	391	4	3D	US	892000	lbs
1957	391	4	3D	US	956000	lbs
1958	391	4	3D	US	652000	lbs
1959	391	4	3D	US	782000	lbs
1960	391	4	3D	US	821000	lbs
1961	391	4	3D	US	1530000	lbs
1962	391	4	3D	US	2428000	lbs
1963	391	4	3D	US	1862000	lbs
1964	391	4	3D	US	755000	lbs
1965	391	4	3D	US	1065000	lbs
1966	391	4	3D	US	1772000	lbs
1967	391	4	3D	US	1393000	lbs
1968	391	4	3D	US	1690000	lbs
1969	391	4	3D	US	2557000	lbs
1970	391	4	3D	US	3010000	lbs
1971	391	4	3D	US	1850000	lbs
1972	391	4	3D	US	1775000	lbs
1973	391	4	3D	US	1762000	lbs
1974	391	4	3D	US	2077000	lbs
1975	391	4	3D	US	1382000	lbs

year	spp	major	region	nation	catch	units
1950	391	5	5A	US	2246000	lbs
1951	391	5	5A	US	1266000	lbs
1952	391	5	5A	US	1439000	lbs
1953	391	5	5A	US	713000	lbs
1954	391	5	5A	US	568000	lbs
1955	391	5	5A	US	1417000	lbs
1956	391	5	5A	US	1485000	lbs
1957	391	5	5A	US	626000	lbs
1958	391	5	5A	US	918000	lbs
1959	391	5	5A	US	1037000	lbs
1960	391	5	5A	US	459000	lbs
1961	391	5	5A	US	902000	lbs
1962	391	5	5A	US	1394000	lbs
1963	391	5	5A	US	1237000	lbs
1964	391	5	5A	US	975000	lbs
1965	391	5	5A	US	1291000	lbs
1966	391	5	5A	US	3174000	lbs
1967	391	5	5A	US	1810000	lbs
1968	391	5	5A	US	3001000	lbs
1969	391	5	5A	US	5617000	lbs
1970	391	5	5A	US	3458000	lbs
1971	391	5	5A	US	3176000	lbs
1972	391	5	5A	US	3352000	lbs
1973	391	5	5A	US	4573000	lbs
1974	391	5	5A	US	2492000	lbs
1975	391	5	5A	US	1090000	lbs

year	spp	major	region	nation	catch	units
1950	391	6	5B	US	2736000	lbs
1951	391	6	5B	US	3774000	lbs
1952	391	6	5B	US	2987000	lbs
1953	391	6	5B	US	1011000	lbs
1954	391	6	5B	US	1065000	lbs
1955	391	6	5B	US	788000	lbs
1956	391	6	5B	US	696000	lbs
1957	391	6	5B	US	708000	lbs

1958	391	6	5B	US	429000	lbs
1959	391	6	5B	US	300000	lbs
1960	391	6	5B	US	535000	lbs
1961	391	6	5B	US	573000	lbs
1962	391	6	5B	US	1459000	lbs
1963	391	6	5B	US	1785000	lbs
1964	391	6	5B	US	1077000	lbs
1965	391	6	5B	US	1437000	lbs
1966	391	6	5B	US	1846000	lbs
1967	391	6	5B	US	2315000	lbs
1968	391	6	5B	US	2572000	lbs
1969	391	6	5B	US	4637000	lbs
1970	391	6	5B	US	3433000	lbs
1971	391	6	5B	US	3328000	lbs
1972	391	6	5B	US	3782000	lbs
1973	391	6	5B	US	4756000	lbs
1974	391	6	5B	US	2775000	lbs
1975	391	6	5B	US	1924000	lbs

year	spp	major	region	nation	catch	units
1950	391	7	5C	US	35000	lbs
1951	391	7	5C	US	13000	lbs
1952	391	7	5C	US	15000	lbs
1953	391	7	5C	US	10000	lbs
1954	391	7	5C	US	19000	lbs
1955	391	7	5C	US	7000	lbs
1956	391	7	5C	US	18000	lbs
1957	391	7	5C	US	8000	lbs
1960	391	7	5C	US	3000	lbs
1961	391	7	5C	US	1000	lbs
1963	391	7	5C	US	27000	lbs
1964	391	7	5C	US	17000	lbs
1965	391	7	5C	US	56000	lbs
1966	391	7	5C	US	3000	lbs
1967	391	7	5C	US	7000	lbs

year	spp	major	region	nation	catch	units
1950	391	8	5D	US	214000	lbs
1951	391	8	5D	US	98000	lbs
1952	391	8	5D	US	112000	lbs
1953	391	8	5D	US	66000	lbs
1954	391	8	5D	US	74000	lbs
1955	391	8	5D	US	115000	lbs
1956	391	8	5D	US	31000	lbs
1957	391	8	5D	US	33000	lbs
1958	391	8	5D	US	63000	lbs
1959	391	8	5D	US	85000	lbs
1960	391	8	5D	US	55000	lbs
1961	391	8	5D	US	21000	lbs
1962	391	8	5D	US	52000	lbs
1963	391	8	5D	US	10000	lbs
1964	391	8	5D	US	34000	lbs
1965	391	8	5D	US	40000	lbs
1967	391	8	5D	US	16000	lbs

year	spp	major	region	nation	catch	units
1955	396	1	4B	CA	1000	lbs
1964	396	1	4B	CA	5000	lbs
1966	396	1	4B	CA	2000	lbs
1970	396	1	4B	CA	4000	lbs
1971	396	1	4B	CA	1000	lbs
1972	396	1	4B	CA	1000	lbs

year	spp	major	region	nation	catch	units
1961	396	3	3C	CA	2000	lbs
1963	396	3	3C	CA	5000	lbs
1964	396	3	3C	CA	91000	lbs
1965	396	3	3C	CA	13000	lbs
1966	396	3	3C	CA	5000	lbs
1967	396	3	3C	CA	10000	lbs
1969	396	3	3C	CA	3000	lbs
1970	396	3	3C	CA	659000	lbs
1971	396	3	3C	CA	456000	lbs
1972	396	3	3C	CA	159000	lbs

year	spp	major	region	nation	catch	units
1975	396	3	3C	CA	12000	lbs
1961	396	4	3D	CA	10000	lbs
1962	396	4	3D	CA	5000	lbs
1964	396	4	3D	CA	4000	lbs
1965	396	4	3D	CA	1000	lbs
1967	396	4	3D	CA	6000	lbs
1969	396	4	3D	CA	3000	lbs
1970	396	4	3D	CA	12000	lbs
1971	396	4	3D	CA	25000	lbs
1972	396	4	3D	CA	99000	lbs
1974	396	4	3D	CA	6000	lbs

year	spp	major	region	nation	catch	units
1956	396	5	5A	CA	24000	lbs
1957	396	5	5A	CA	31000	lbs
1958	396	5	5A	CA	132000	lbs
1959	396	5	5A	CA	380000	lbs
1960	396	5	5A	CA	21000	lbs
1961	396	5	5A	CA	31000	lbs
1962	396	5	5A	CA	8000	lbs
1963	396	5	5A	CA	28000	lbs
1964	396	5	5A	CA	206000	lbs
1965	396	5	5A	CA	1035000	lbs
1966	396	5	5A	CA	1721000	lbs
1967	396	5	5A	CA	347000	lbs
1968	396	5	5A	CA	325000	lbs
1969	396	5	5A	CA	1307000	lbs
1970	396	5	5A	CA	2188000	lbs
1971	396	5	5A	CA	504000	lbs
1972	396	5	5A	CA	1341000	lbs
1973	396	5	5A	CA	376000	lbs
1974	396	5	5A	CA	107000	lbs
1975	396	5	5A	CA	202000	lbs

year	spp	major	region	nation	catch	units
1953	396	6	5B	CA	407000	lbs
1954	396	6	5B	CA	475000	lbs
1955	396	6	5B	CA	23000	lbs
1956	396	6	5B	CA	286000	lbs
1957	396	6	5B	CA	180000	lbs
1958	396	6	5B	CA	562000	lbs
1959	396	6	5B	CA	130000	lbs
1960	396	6	5B	CA	765000	lbs
1961	396	6	5B	CA	228000	lbs
1962	396	6	5B	CA	1164000	lbs
1963	396	6	5B	CA	966000	lbs
1964	396	6	5B	CA	717000	lbs
1965	396	6	5B	CA	2022000	lbs
1966	396	6	5B	CA	3484000	lbs
1967	396	6	5B	CA	500000	lbs
1968	396	6	5B	CA	1607000	lbs
1969	396	6	5B	CA	2001000	lbs
1970	396	6	5B	CA	1695000	lbs
1971	396	6	5B	CA	1918000	lbs
1972	396	6	5B	CA	3501000	lbs
1973	396	6	5B	CA	2623000	lbs
1974	396	6	5B	CA	3190000	lbs
1975	396	6	5B	CA	3835000	lbs

year	spp	major	region	nation	catch	units
1956	396	7	5C	CA	27000	lbs
1958	396	7	5C	CA	9000	lbs
1965	396	7	5C	CA	2000	lbs
1966	396	7	5C	CA	1000	lbs
1973	396	7	5C	CA	52000	lbs
1974	396	7	5C	CA	34000	lbs
1975	396	7	5C	CA	302000	lbs

year	spp	major	region	nation	catch	units
1955	396	8	5D	CA	5000	lbs
1956	396	8	5D	CA	2000	lbs
1957	396	8	5D	CA	4000	lbs

1963	396	8	5D	CA	2000	lbs
1964	396	8	5D	CA	12000	lbs
1966	396	8	5D	CA	2000	lbs
1967	396	8	5D	CA	1000	lbs
1969	396	8	5D	CA	1000	lbs
1970	396	8	5D	CA	57000	lbs
1971	396	8	5D	CA	17000	lbs
1972	396	8	5D	CA	30000	lbs
1973	396	8	5D	CA	33000	lbs
1974	396	8	5D	CA	33000	lbs
1975	396	8	5D	CA	147000	lbs

year	spp	major	region	nation	catch	units
1950	396	3	3C	US	123000	lbs
1951	396	3	3C	US	150000	lbs
1952	396	3	3C	US	783000	lbs
1953	396	3	3C	US	701000	lbs
1954	396	3	3C	US	1551000	lbs
1955	396	3	3C	US	1010000	lbs
1956	396	3	3C	US	1440000	lbs
1957	396	3	3C	US	1105000	lbs
1958	396	3	3C	US	264000	lbs
1959	396	3	3C	US	1202000	lbs
1960	396	3	3C	US	1572000	lbs
1961	396	3	3C	US	1602000	lbs
1962	396	3	3C	US	4723000	lbs
1963	396	3	3C	US	5401000	lbs
1964	396	3	3C	US	2626000	lbs
1965	396	3	3C	US	5722000	lbs
1966	396	3	3C	US	4247000	lbs
1967	396	3	3C	US	1416000	lbs
1968	396	3	3C	US	421000	lbs
1969	396	3	3C	US	685000	lbs
1970	396	3	3C	US	2494000	lbs
1971	396	3	3C	US	1407000	lbs
1972	396	3	3C	US	607000	lbs
1973	396	3	3C	US	428000	lbs
1974	396	3	3C	US	533000	lbs
1975	396	3	3C	US	521000	lbs

year	spp	major	region	nation	catch	units
1950	396	4	3D	US	37000	lbs
1951	396	4	3D	US	45000	lbs
1952	396	4	3D	US	114000	lbs
1953	396	4	3D	US	208000	lbs
1954	396	4	3D	US	271000	lbs
1955	396	4	3D	US	499000	lbs
1956	396	4	3D	US	121000	lbs
1957	396	4	3D	US	564000	lbs
1958	396	4	3D	US	105000	lbs
1959	396	4	3D	US	348000	lbs
1960	396	4	3D	US	449000	lbs
1961	396	4	3D	US	2081000	lbs
1962	396	4	3D	US	2084000	lbs
1963	396	4	3D	US	1781000	lbs
1964	396	4	3D	US	962000	lbs
1965	396	4	3D	US	509000	lbs
1966	396	4	3D	US	394000	lbs
1967	396	4	3D	US	180000	lbs
1968	396	4	3D	US	148000	lbs
1969	396	4	3D	US	253000	lbs
1970	396	4	3D	US	567000	lbs
1971	396	4	3D	US	186000	lbs
1972	396	4	3D	US	187000	lbs
1973	396	4	3D	US	85000	lbs
1974	396	4	3D	US	44000	lbs
1975	396	4	3D	US	119000	lbs

year	spp	major	region	nation	catch	units
1950	396	5	5A	US	30000	lbs
1951	396	5	5A	US	35000	lbs
1952	396	5	5A	US	90000	lbs
1953	396	5	5A	US	164000	lbs
1954	396	5	5A	US	242000	lbs
1955	396	5	5A	US	361000	lbs
1956	396	5	5A	US	870000	lbs
1957	396	5	5A	US	705000	lbs
1958	396	5	5A	US	467000	lbs
1959	396	5	5A	US	3132000	lbs
1960	396	5	5A	US	1597000	lbs
1961	396	5	5A	US	917000	lbs
1962	396	5	5A	US	1006000	lbs
1963	396	5	5A	US	2201000	lbs
1964	396	5	5A	US	3407000	lbs
1965	396	5	5A	US	4059000	lbs
1966	396	5	5A	US	4860000	lbs
1967	396	5	5A	US	2150000	lbs
1968	396	5	5A	US	3554000	lbs
1969	396	5	5A	US	3182000	lbs
1970	396	5	5A	US	3323000	lbs
1971	396	5	5A	US	2314000	lbs
1972	396	5	5A	US	2572000	lbs
1973	396	5	5A	US	941000	lbs
1974	396	5	5A	US	665000	lbs
1975	396	5	5A	US	400000	lbs

year	spp	major	region	nation	catch	units
1950	396	6	5B	US	274000	lbs
1951	396	6	5B	US	334000	lbs
1952	396	6	5B	US	452000	lbs
1953	396	6	5B	US	1560000	lbs
1954	396	6	5B	US	4884000	lbs
1955	396	6	5B	US	856000	lbs
1956	396	6	5B	US	1742000	lbs
1957	396	6	5B	US	1403000	lbs
1958	396	6	5B	US	880000	lbs
1959	396	6	5B	US	541000	lbs
1960	396	6	5B	US	1317000	lbs
1961	396	6	5B	US	1467000	lbs
1962	396	6	5B	US	1874000	lbs
1963	396	6	5B	US	4989000	lbs
1964	396	6	5B	US	3401000	lbs
1965	396	6	5B	US	3663000	lbs
1966	396	6	5B	US	8131000	lbs
1967	396	6	5B	US	9669000	lbs
1968	396	6	5B	US	7853000	lbs
1969	396	6	5B	US	8122000	lbs
1970	396	6	5B	US	6191000	lbs
1971	396	6	5B	US	4444000	lbs
1972	396	6	5B	US	4847000	lbs
1973	396	6	5B	US	4053000	lbs
1974	396	6	5B	US	4091000	lbs
1975	396	6	5B	US	1528000	lbs

year	spp	major	region	nation	catch	units
1955	396	7	5C	US	2000	lbs
1956	396	7	5C	US	132000	lbs
1957	396	7	5C	US	10000	lbs
1958	396	7	5C	US	25000	lbs
1959	396	7	5C	US	5000	lbs
1960	396	7	5C	US	65000	lbs
1963	396	7	5C	US	55000	lbs
1964	396	7	5C	US	29000	lbs
1965	396	7	5C	US	109000	lbs
1967	396	7	5C	US	75000	lbs
1970	396	7	5C	US	1000	lbs

year	spp	major	region	nation	catch	units
1955	396	8	5D	US	2000	lbs
1958	396	8	5D	US	12000	lbs
1961	396	8	5D	US	1000	lbs
1963	396	8	5D	US	1000	lbs

MSA Query: ORF_Data_1950-1975

Creates data for the R object called `orfhistory`

```
SELECT
  [B4_Catch_1950-1975_Ketchen76].year,
  [B4_Catch_1950-1975_Ketchen76].spp,
  [B4_Catch_1950-1975_Ketchen76].major,
  [B4_Catch_1950-1975_Ketchen76].region,
  [B4_Catch_1950-1975_Ketchen76].nation,
  IIf([units]="kg",[B4_Catch_1950-1975_Ketchen76].catch,
    IIf([units]="t",[B4_Catch_1950-1975_Ketchen76].catch*1000,
    IIf([units]="lbs",[B4_Catch_1950-1975_Ketchen76].catch/2.20459,0))) AS catch,
  "Ketchen76" AS source,
  "max" AS [action], "trawl" AS fishery
FROM
  [B4_Catch_1950-1975_Ketchen76]
WHERE
  ((([B4_Catch_1950-1975_Ketchen76].catch)<>0));
```

1951 – 1981: SALES SLIP DATA FOR RED FISH AND ROCKFISH (OBRADOVICH)

MSA pass-through SQL Query: B4_Catch_1951-1981_Obradovich

Creates an MSA View of the 1951-1981 sales slip catch data from PacHarvHL.

```
SELECT
  'year' = HD.Year,
  '389' AS 'spp',
  'major' = CASE
    WHEN HC.Area IN ('SG','12','13','14','15','16','17','18','19','20',
      '28','29','29A','29B','29C','29D','29E') THEN 1
    WHEN HC.Area IN ('C') THEN 2
    WHEN HC.Area IN ('21','22','23','24','121','123','124') THEN 3
    WHEN HC.Area IN ('WC','25','26','27','125','126','127') THEN 4
    WHEN HC.Area IN ('10','11','111') THEN 5
    WHEN HC.Area IN ('CC','7','8','9','107','108','109','110','130','30') THEN 6
    WHEN HC.Area IN ('6','102','106','2E','2B-EAST') THEN 7
    WHEN HC.Area IN ('PR','NC','1','3','4','5','101','103','104','105','2A-EAST') THEN 8
    WHEN HC.Area IN ('QC','2','142','2W','2A-WEST','2B-WEST') THEN 9
    ELSE 0 END,
  'region' = HC.Area,
  'CA' AS 'nation',
  'catch' = sum(HC.[Round_Wt(lbs)]),
  'lbs' AS 'units',
  'gear_code' = HD.Gear,
  'gear_desc' = GC.Gear_description,
  'gear' = CASE
    WHEN GC.Gear_cde='1' THEN 'trawl'
    WHEN GC.Gear_cde='2' THEN 'trap'
    WHEN GC.Gear_cde IN ('33', '5') THEN 'h&l'
    WHEN GC.Gear_cde IN ('22', '3', '6') THEN 'seine'
    ELSE 'unk' END
FROM
  (B21_Historic_Year_Details HD INNER JOIN
  B22_Historic_Area_Catch HC ON
  HD.Id = HC.Id) INNER JOIN
  C_Historic_Gear_Codes GC ON
  HD.Gear = GC.Gear_cde
GROUP BY
  HD.Year,
  CASE
    WHEN HC.Area IN ('SG','12','13','14','15','16','17','18','19','20',
```

```
      '28','29','29A','29B','29C','29D','29E') THEN 1
    WHEN HC.Area IN ('C') THEN 2
    WHEN HC.Area IN ('21','22','23','24','121','123','124') THEN 3
    WHEN HC.Area IN ('WC','25','26','27','125','126','127') THEN 4
    WHEN HC.Area IN ('10','11','111') THEN 5
    WHEN HC.Area IN ('CC','7','8','9','107','108','109','110','130','30') THEN 6
    WHEN HC.Area IN ('6','102','106','2E','2B-EAST') THEN 7
    WHEN HC.Area IN ('PR','NC','1','3','4','5','101','103','104','105','2A-EAST') THEN 8
    WHEN HC.Area IN ('QC','2','142','2W','2A-WEST','2B-WEST') THEN 9
    ELSE 0 END,
  HC.Area, HD.Gear,  GC.Gear_description,
  CASE
    WHEN GC.Gear_cde='1' THEN 'trawl'
    WHEN GC.Gear_cde='2' THEN 'trap'
    WHEN GC.Gear_cde IN ('33', '5') THEN 'h&l'
    WHEN GC.Gear_cde IN ('22', '3', '6') THEN 'seine'
    ELSE 'unk' END
ORDER BY
  HD.Year
;
```

MSA Query: ORF_Data_1951-1981

Creates data for the R object called `orfhistory`

```
SELECT
  [B4_Catch_1951-1981_Obradovich].year,
  [B4_Catch_1951-1981_Obradovich].spp,
  [B4_Catch_1951-1981_Obradovich].major,
  [B4_Catch_1951-1981_Obradovich].region,
  [B4_Catch_1951-1981_Obradovich].nation,
  IIf([units]="kg",[B4_Catch_1951-1981_Obradovich].[catch],
    IIf([units]="t",[B4_Catch_1951-1981_Obradovich].[catch]*1000,
    IIf([units]="lbs",[B4_Catch_1951-1981_Obradovich].[catch]/2.20459,0))) AS catch,
  "Obradovich" AS source,
  "max" AS [action],
  [B4_Catch_1951-1981_Obradovich].gear AS fishery
FROM
  [B4_Catch_1951-1981_Obradovich]
WHERE
  ((([B4_Catch_1951-1981_Obradovich].gear)="h&l" Or
  ([B4_Catch_1951-1981_Obradovich].gear)="trap" Or
  ([B4_Catch_1951-1981_Obradovich].gear)="trawl") AND
  (([B4_Catch_1951-1981_Obradovich].catch)<>0));
```

1954 – 1995: LOGBOOKS AND LANDINGS (GFCATCH)

MSA pass-through SQL Query: B4_Catch_1954-1995_GFCatch

Creates an MSA View of the 1954-1995 sales slip catch data from GFCatch.

```
SELECT
  'year' = Year(T.Date),
  'spp' = C.Species,
  'major' = E.Major_Area,
  'region' = A.PMFC_Area,
  'nation'=CASE WHEN T.Port = 'A' THEN 'US' ELSE 'CA' END,
  'catch' = Sum(C.Catch),
  'lbs' AS units,
  'fid' = T.Source,
  'gear' = E.Gear,
  'utilize' = C.Utilization
FROM
  B1_Trips T INNER JOIN B2_Events E ON
  T.Trip = E.Trip INNER JOIN
```

```
  B3_Catch C ON
  E.Trip = C.Trip AND
  E.Event = C.Event INNER JOIN
  C_Major_Area A ON
  E.Major_Area = A.Major_Area
GROUP BY
  Year(T.Date), C.Species, E.Major_Area, A.PMFC_Area,
  CASE WHEN T.Port = 'A' THEN 'US' ELSE 'CA' END,
  T.Source, E.Gear, C.Utilization
ORDER BY
  Year(T.Date), C.Species, E.Major_Area
```

MSA Query: ORF_Data_1954-1995

Creates data for the R object called `orfhistory`

```
SELECT
  [B4_Catch_1954-1995_GFCatch].year,
  [B4_Catch_1954-1995_GFCatch].spp,
  [B4_Catch_1954-1995_GFCatch].major,
  [B4_Catch_1954-1995_GFCatch].region,
  [B4_Catch_1954-1995_GFCatch].nation,
  IIf([units]="kg",[B4_Catch_1954-1995_GFCatch].catch,
    IIf([units]="t",[B4_Catch_1954-1995_GFCatch].catch*1000,
    IIf([units]="lbs",[B4_Catch_1954-1995_GFCatch].catch/2.20459,0))) AS catch,
  "GFCatch" AS source,
  "max" AS [action],
  IIf([fid]=1 Or [fid]=2,"trawl",
    IIf([fid]=3 Or [fid]=4,"h&l",
    IIf([fid]=5 Or [fid]=6,"trap","unk"))) AS fishery
FROM
  [B4_Catch_1954-1995_GFCatch] INNER JOIN
  C_Species ON
  [B4_Catch_1954-1995_GFCatch].spp = C_Species.SPECIES_CDE
WHERE
  ((([B4_Catch_1954-1995_GFCatch].catch)>0) AND
  ((C_Species.Rockfish)=1) AND
  (([B4_Catch_1954-1995_GFCatch].gear)<>8) AND
  (([B4_Catch_1954-1995_GFCatch].utilize)<>4 And
  ([B4_Catch_1954-1995_GFCatch].utilize)<>6));
```

1965 – 1976: RUSSIAN AND JAPANESE CATCH IN BC WATERS (KETCHEN 1980)

MSA Table: B4_Catch_1965-1976_Ketchen80

year	spp	major	region	nation	catch	units
1966	391	5	5A	JP	338	t
1967	391	5	5A	JP	580	t
1968	391	5	5A	JP	864	t
1969	391	5	5A	JP	2807	t
1970	391	5	5A	JP	1125	t
1971	391	5	5A	JP	180	t
1972	391	5	5A	JP	1474	t
1973	391	5	5A	JP	3104	t
1974	391	5	5A	JP	8518	t
1975	391	5	5A	JP	3843	t
1976	391	5	5A	JP	2132	t
1966	391	6	5B	JP	17	t
1967	391	6	5B	JP	64	t
1968	391	6	5B	JP	161	t
1969	391	6	5B	JP	277	t
1970	391	6	5B	JP	160	t
1971	391	6	5B	JP	1	t
1972	391	6	5B	JP	43	t
1973	391	6	5B	JP	100	t
1974	391	6	5B	JP	75	t
1975	391	6	5B	JP	88	t
1976	391	6	5B	JP	28	t

year	spp	major	region	nation	catch	units
1966	396	5	5A	JP	794	t
1967	396	5	5A	JP	1831	t
1968	396	5	5A	JP	2140	t
1969	396	5	5A	JP	2049	t
1970	396	5	5A	JP	1293	t
1971	396	5	5A	JP	165	t
1972	396	5	5A	JP	996	t
1973	396	5	5A	JP	2151	t
1974	396	5	5A	JP	5446	t
1975	396	5	5A	JP	2524	t
1976	396	5	5A	JP	1161	t
1966	396	6	5B	JP	94	t
1967	396	6	5B	JP	334	t
1968	396	6	5B	JP	732	t

1969	396	6	5B	JP	1113	t
1970	396	6	5B	JP	570	t
1971	396	6	5B	JP	3	t
1972	396	6	5B	JP	130	t
1973	396	6	5B	JP	271	t
1974	396	6	5B	JP	186	t
1975	396	6	5B	JP	198	t
1976	396	6	5B	JP	59	t

year	spp	major	region	nation	catch	units
1966	391	3	3C	UR	2924.363197	t
1967	391	3	3C	UR	475.1553974	t
1968	391	3	3C	UR	745.15873	t
1969	391	3	3C	UR	10.34592209	t
1970	391	3	3C	UR	86.80480972	t
1971	391	3	3C	UR	187.4882954	t
1972	391	3	3C	UR	125.917442	t
1966	391	4	3D	UR	3773.628199	t
1967	391	4	3D	UR	613.1453878	t
1968	391	4	3D	UR	961.5604515	t
1969	391	4	3D	UR	13.35048375	t
1970	391	4	3D	UR	112.0138149	t
1971	391	4	3D	UR	241.9368153	t
1972	391	4	3D	UR	162.4851559	t
1965	391	5	5A	UR	3010.621105	t
1966	391	5	5A	UR	6316.401143	t
1967	391	5	5A	UR	3088.798336	t
1968	391	5	5A	UR	1371.292443	t
1969	391	5	5A	UR	11.1681758	t
1971	391	5	5A	UR	31.90907372	t
1965	391	6	5B	UR	763.3788947	t
1966	391	6	5B	UR	1601.598857	t
1967	391	6	5B	UR	783.2016641	t
1968	391	6	5B	UR	347.707557	t
1969	391	6	5B	UR	2.831824199	t
1971	391	6	5B	UR	8.090926282	t
1965	391	8	5D	UR	1249.435405	t
1966	391	8	5D	UR	1925.745593	t
1967	391	8	5D	UR	296.7191004	t
1968	391	8	5D	UR	361.3966363	t
1969	391	8	5D	UR	2.617010125	t
1970	391	8	5D	UR	4.237064012	t
1971	391	8	5D	UR	20.81146147	t
1965	391	9	5E	UR	2292.61549	t
1966	391	9	5E	UR	3533.59138	t
1967	391	9	5E	UR	544.4561622	t
1968	391	9	5E	UR	663.1343429	t
1969	391	9	5E	UR	4.802007311	t
1970	391	9	5E	UR	7.774678503	t
1971	391	9	5E	UR	38.18739147	t

year	spp	major	region	nation	catch	units
1966	396	3	3C	UR	2870.136803	t
1967	396	3	3C	UR	466.3446026	t
1968	396	3	3C	UR	731.34127	t
1969	396	3	3C	UR	10.15407791	t
1970	396	3	3C	UR	85.19519028	t
1971	396	3	3C	UR	184.0117046	t
1972	396	3	3C	UR	123.582558	t
1966	396	4	3D	UR	2020.871801	t
1967	396	4	3D	UR	328.3546122	t
1968	396	4	3D	UR	514.9395485	t
1969	396	4	3D	UR	7.149516251	t
1970	396	4	3D	UR	59.98618513	t
1971	396	4	3D	UR	129.5631847	t
1972	396	4	3D	UR	87.01484413	t
1965	396	5	5A	UR	2469.762306	t
1966	396	5	5A	UR	10364.06714	t
1967	396	5	5A	UR	7728.377655	t
1968	396	5	5A	UR	3135.86422	t
1969	396	5	5A	UR	44.67270321	t
1971	396	5	5A	UR	63.81814744	t
1965	396	6	5B	UR	626.2376942	t
1966	396	6	5B	UR	2627.932856	t
1967	396	6	5B	UR	1959.622345	t
1968	396	6	5B	UR	795.1357803	t
1969	396	6	5B	UR	11.32729679	t
1971	396	6	5B	UR	16.18185256	t
1965	396	8	5D	UR	3763.564595	t
1966	396	8	5D	UR	5800.754407	t
1967	396	8	5D	UR	893.7808996	t
1968	396	8	5D	UR	1088.603364	t
1969	396	8	5D	UR	7.882989875	t
1970	396	8	5D	UR	12.76293599	t
1971	396	8	5D	UR	62.68853853	t
1965	396	9	5E	UR	2720.38451	t
1966	396	9	5E	UR	4192.90862	t
1967	396	9	5E	UR	646.0438378	t
1968	396	9	5E	UR	786.8656571	t
1969	396	9	5E	UR	5.697992689	t
1970	396	9	5E	UR	9.225321497	t
1971	396	9	5E	UR	45.31260853	t

MSA Query: ORF_Data_1965-1976

Creates data for the R object called `orfhistory`

```
SELECT
  [B4_Catch_1965-1976_Ketchen80].year,
  [B4_Catch_1965-1976_Ketchen80].spp,
  [B4_Catch_1965-1976_Ketchen80].major,
  [B4_Catch_1965-1976_Ketchen80].region,
  [B4_Catch_1965-1976_Ketchen80].nation,
  IIf([units]="kg",[B4_Catch_1965-1976_Ketchen80].catch,
    IIf([units]="t",[B4_Catch_1965-1976_Ketchen80].catch*1000,
    IIf([units]="lbs",[B4_Catch_1965-1976_Ketchen80].catch/2.20459,0))) AS catch,
  "Ketchen80" AS source,
  "add" AS [action],
  "trawl" AS fishery
FROM
  [B4_Catch_1965-1976_Ketchen80]
WHERE
  ((([B4_Catch_1965-1976_Ketchen80].catch)<>0));
```

1982 – 1994: SALES SLIP DATA (PACHARV3)

MSA pass-through ORACLE Query: B4_Catch_1982-1994_PacHarv3

Creates an MSA View of the 1982-1994 sales slip catch data from PacHarv3.

```
SELECT
  CS.STP_SPER_YR AS "year",
  CS.SP_SPECIES_CDE AS "spp",
  (CASE
    WHEN CS.SFA_MSFA_MIDSIZE_FA_CDE IN
    (12,13,14,15,16,17,18,19,20,28,29,9200,9791,9792,9793,9794) THEN 1
    WHEN CS.SFA_MSFA_MIDSIZE_FA_CDE IN (9508) THEN 2
    WHEN CS.SFA_MSFA_MIDSIZE_FA_CDE IN (21,22,23,24,121,123,124,9210,9230,9240) THEN 3
    WHEN CS.SFA_MSFA_MIDSIZE_FA_CDE IN (25,26,27,125,126,127,9250,9260,9270) THEN 4
    WHEN CS.SFA_MSFA_MIDSIZE_FA_CDE IN (10,11,111,9100,9110) THEN 5
    WHEN CS.SFA_MSFA_MIDSIZE_FA_CDE IN (7,8,9,107,108,109,110,130,30,9070,9080,9090) THEN 6
    WHEN CS.SFA_MSFA_MIDSIZE_FA_CDE IN (6,102,106,8021,9021,9060) THEN 7
    WHEN CS.SFA_MSFA_MIDSIZE_FA_CDE IN (1,3,4,5,101,103,104,105,9010,9031,9032,9033,9040,9050)
    THEN 8
    WHEN CS.SFA_MSFA_MIDSIZE_FA_CDE IN (2,142,8022,9022) THEN 9
    ELSE 0 END) AS "major",
  CONCAT(CONCAT(CS.SFA_MSFA_MIDSIZE_FA_CDE,'-'), CS.SFA_SMALL_FA_CDE) AS "region",
  'CA' AS "nation",
  CS.CATSUM_ROUND_LBS_WT AS "catch",
  'lbs' AS "units",
  CS.GR_GEAR_CDE AS "gear_code",
  (CASE
    WHEN CS.GR_GEAR_CDE IN (44,45,46,50,57,99) THEN 'trawl'
    WHEN CS.GR_GEAR_CDE IN (65,68,86,90,91,92,93,94,95,97,98) THEN 'trap'
    WHEN CS.GR_GEAR_CDE IN (40,30,31,32,33,43,7,36,41,42) THEN 'h&l'
    ELSE 'unk' END) AS "gear"
  FROM
    HARVEST_V2_0.CATCH_SUMMARY CS
  WHERE
    CS.SP_SPECIES_CDE IN
    ('388','389','394','396','398','400','401','403','405','406','407','408','409',
     '410','412','414','415','417','418','420','421','423','424','426','427','428',
     '429','431','433','435','437','438','439','440','442','443','444','446','448',
     '450','451','452','453') AND
    (CS.STP_SPER_YR >=1982 AND CS.STP_SPER_YR <=1994)
  ORDER BY
    CS.STP_SPER_YR
;
```

MSA Query: ORF_Data_1982-1994

Creates data for the R object called `orfhistory`

```
SELECT
  [B4_Catch_1982-1994_PacHarv3].year,
  [B4_Catch_1982-1994_PacHarv3].spp,
  [B4_Catch_1982-1994_PacHarv3].major,
  [B4_Catch_1982-1994_PacHarv3].region,
  [B4_Catch_1982-1994_PacHarv3].nation,
  IIf([units]="kg",[B4_Catch_1982-1994_PacHarv3].catch,
    IIf([units]="t",[B4_Catch_1982-1994_PacHarv3].catch*1000,
    IIf([units]="lbs",[B4_Catch_1982-1994_PacHarv3].catch/2.20459,0))) AS catch,
  "PacHarv3" AS source,
  "max" AS [action],
  [B4_Catch_1982-1994_PacHarv3].gear AS fishery
FROM
  [B4_Catch_1982-1994_PacHarv3]
WHERE
  ((([B4_Catch_1982-1994_PacHarv3].gear)="h&l" Or
  ([B4_Catch_1982-1994_PacHarv3].gear)="trap" Or
```

```
([B4_Catch_1982-1994_PacHarv3].gear)="trawl") AND
(([B4_Catch_1982-1994_PacHarv3].catch)<>0));
```

CONSOLIDATE THE HISTORICAL ORF-POP LANDINGS HISTORY

The final task consolidates the landings history by joining the data tables:

`ORF_Data_1918-1950`	(Canadian Dominion Bureau of Statistics);
`ORF_Data_1930-1964`	(Stewart, US NMFS);
`ORF_Data_1945-1953`	(Thomson & Yates 1960-61);
`ORF_Data_1950-1975`	(Ketchen 1976);
`ORF_Data_1951-1981`	(Obradovich);
`ORF_Data_1954-1995`	(GFCatch);
`ORF_Data_1965-1976`	(Ketchen 1980);
`ORF_Data_1982-1994`	(PacHarv3)

into one data table that can be imported to R uing the `RODBC` package. We call this R object `orfhistory` to highlight the fact that it remains primarily a catch landings history (prior to 1996) of rockfish (ORF) other than Pacific Ocean Perch (POP). The object also contains POP landings so that the sum of ORF and POP yields total rockfish (TRF) landings.

MSA Union Query: Union_ORF_Data

```
SELECT *
FROM [ORF_Data_1918-1950]
WHERE [catch]>0
UNION ALL SELECT *
FROM [ORF_Data_1930-1964]
WHERE [catch]>0
UNION ALL SELECT *
FROM [ORF_Data_1945-1953]
WHERE [catch]>0
UNION ALL SELECT *
FROM [ORF_Data_1950-1975]
WHERE [catch]>0
UNION ALL SELECT *
FROM [ORF_Data_1951-1981]
WHERE [catch]>0
UNION ALL SELECT *
FROM [ORF_Data_1954-1995]
WHERE [catch]>0
UNION ALL SELECT *
FROM [ORF_Data_1965-1976]
WHERE [catch]>0
UNION ALL SELECT *
FROM [ORF_Data_1982-1994]
WHERE [catch]>0;
```

APPENDIX B – SQL QUERIES TO RETRIEVE MODERN CATCH DATA

Modern landings (and sometimes discards) for RRF species are housed in a variety of catch databases. These databases are stored and manipulated using one of two software products: SQL Server or Oracle. Databases run by both systems can be queried using SQL (structured query language), which remains similar on the two systems but not identical.

Sending SQL instructions from R via **RODBC** works well. The most notable difference is that temporary tables can be created 'on the fly' using SQL Server but not in Oracle. This means that Oracle SQL code often contains messy embedded subqueries. Another nice feature of the SQL Server databases is that they can accept DFO logon credentials so that querying a database does not necessarily require the user to have a separate account and password. The Oracle administrators do require a separate user account. (As an aside, there are ways to query an Oracle database through an SQL Server using the server's credentials.)

The queries that follow are called by the function `getData` in the R package `PBSfishery` (http://code.google.com/p/pbs-fishery/). This function is essentially a wrapper that makes substitutions in the SQL code (e.g., **@sppcode** becomes **'396'** if the argument **strSpp="396"** in **getData**). The function also sends the SQL code (via **RODBC**) to the appropriate database with the appropriate connection channel and credentials. Other users might have their own methods of sending SQL queries to R. This can be done using these SQL queries, but the user must inspect the code for variables (always preceded by the '@' symbol) and either set the variables through their own query software or substitute the variables with fixed values.

ORACLE QUERY: PH3_FCATORF.SQL

Queries the database **HARVEST_V2_0** for annual catch summaries (all fisheries).

Usage in **PBSfishery**:

```
getData("ph3_fcatORF.sql",dbName="HARVEST_V2_0",strSpp="442",path=.getSpath(),
    server="ORAPROD",type="ORA",trusted=FALSE)
```

Code ('--' denotes commented text):

```
-- Sales slip catch summary from PacHarv3 (HARVEST_V2_0)
SELECT * FROM
(SELECT
  (CASE
    WHEN TAR.Target IN
    ('222','225','228','388','394','396','401','418','440','451','597','602','607',
    '621','626','628','631') THEN 1
    WHEN TAR.Target IN ('614') THEN 2
    WHEN TAR.Target IN ('455') THEN 3
    WHEN TAR.Target IN ('044','467') THEN 4
    WHEN TAR.Target IN ('424','407','431','433','442') THEN 5
    ELSE 0 END) AS \"fid\",
  CS.STP_SPER_YR AS \"year\",
```

```
  (CASE
    WHEN CS.SFA_MSFA_MIDSIZE_FA_CDE IN
    (12,13,14,15,16,17,18,19,20,28,29,9200,9791,9792,9793,9794) THEN 1
    WHEN CS.SFA_MSFA_MIDSIZE_FA_CDE IN (9508) THEN 2
    WHEN CS.SFA_MSFA_MIDSIZE_FA_CDE IN (21,22,23,24,121,123,124,9210,9230,9240) THEN 3
    WHEN CS.SFA_MSFA_MIDSIZE_FA_CDE IN (25,26,27,125,126,127,9250,9260,9270) THEN 4
    WHEN CS.SFA_MSFA_MIDSIZE_FA_CDE IN (10,11,111,9100,9110) THEN 5
    WHEN CS.SFA_MSFA_MIDSIZE_FA_CDE IN (7,8,9,107,108,109,110,130,30,9070,9080,9090) THEN 6
    WHEN CS.SFA_MSFA_MIDSIZE_FA_CDE IN (6,102,106,8021,9021,9060) THEN 7
    WHEN CS.SFA_MSFA_MIDSIZE_FA_CDE IN (1,3,4,5,101,103,104,105,9010,9031,9032,9033,9040,9050)
    THEN 8
    WHEN CS.SFA_MSFA_MIDSIZE_FA_CDE IN (2,142,8022,9022) THEN 9
    ELSE 0 END) AS \"major\",
  (CASE
    WHEN CS.SFA_MSFA_MIDSIZE_FA_CDE IN (142) AND CS.SFA_SMALL_FA_CDE IN (1) THEN 34 -- for POP in
    Anthony Island
    ELSE 0 END) AS \"minor\",
  Sum(CASE
    WHEN CS.SP_SPECIES_CDE IN (@sppcode) AND CS.CU_CATCH_UTLZTN_CDE NOT IN (6,22,23,24,27,28)
    THEN CS.CATSUM_ROUND_LBS_WT
    ELSE 0 END)/2.20459 AS \"landed\",
  Sum(CASE
    WHEN CS.SP_SPECIES_CDE IN (@sppcode) AND CS.CU_CATCH_UTLZTN_CDE IN (6,22,23,24,27,28)
    THEN CS.CATSUM_ROUND_LBS_WT
    ELSE 0 END)/2.20459 AS \"discard\",
  Sum(CASE
    WHEN CS.SP_SPECIES_CDE IN ('396')    AND CS.CU_CATCH_UTLZTN_CDE NOT IN (6,22,23,24,27,28)
    THEN CS.CATSUM_ROUND_LBS_WT
    ELSE 0 END)/2.20459 AS POP,
  Sum(CASE
    WHEN CS.SP_SPECIES_CDE IN (@orfcode) AND CS.CU_CATCH_UTLZTN_CDE NOT IN (6,22,23,24,27,28)
    THEN CS.CATSUM_ROUND_LBS_WT
    ELSE 0 END)/2.20459 AS ORF,
  Sum(CASE
    WHEN CS.SP_SPECIES_CDE IN ('614')    AND CS.CU_CATCH_UTLZTN_CDE NOT IN (6,22,23,24,27,28)
    THEN CS.CATSUM_ROUND_LBS_WT
    ELSE 0 END)/2.20459 AS PAH,
  Sum(CASE
    WHEN CS.SP_SPECIES_CDE IN ('455')    AND CS.CU_CATCH_UTLZTN_CDE NOT IN (6,22,23,24,27,28)
    THEN CS.CATSUM_ROUND_LBS_WT
    ELSE 0 END)/2.20459 AS SBF,
  Sum(CASE
    WHEN CS.SP_SPECIES_CDE IN ('042','044','467')  AND CS.CU_CATCH_UTLZTN_CDE NOT IN
    (6,22,23,24,27,28)
    THEN CS.CATSUM_ROUND_LBS_WT
    ELSE 0 END)/2.20459 AS DOG,
  Sum(CASE
    WHEN CS.SP_SPECIES_CDE IN ('424','407','431','433','442')  AND CS.CU_CATCH_UTLZTN_CDE NOT IN
    (6,22,23,24,27,28)
    THEN CS.CATSUM_ROUND_LBS_WT
    ELSE 0 END)/2.20459 AS RFA

FROM
  @table.CATCH_SUMMARY CS INNER JOIN
  (SELECT
    ZC.STP_SPER_YR,
    ZC.STP_SPER_PERIOD_CDE,
    ZC.SFA_MSFA_MIDSIZE_FA_CDE,
    ZC.GR_GEAR_CDE,
    ZC.SumCat,
    MIN(ZC.SP_SPECIES_CDE) AS Target
  FROM
    (SELECT
      CS.STP_SPER_YR,
      CS.STP_SPER_PERIOD_CDE,
      CS.SFA_MSFA_MIDSIZE_FA_CDE,
      CS.GR_GEAR_CDE,
      CS.SP_SPECIES_CDE,
      Sum(CS.CATSUM_ROUND_LBS_WT) AS SumCat
    FROM
      @table.CATCH_SUMMARY CS
```

```
  GROUP BY
    CS.STP_SPER_YR, CS.STP_SPER_PERIOD_CDE,
    CS.SFA_MSFA_MIDSIZE_FA_CDE, CS.GR_GEAR_CDE, CS.SP_SPECIES_CDE) ZC -- Species catch by year,
  period, and area

INNER JOIN
  (SELECT
    TC.STP_SPER_YR,
    TC.STP_SPER_PERIOD_CDE,
    TC.SFA_MSFA_MIDSIZE_FA_CDE,
    TC.GR_GEAR_CDE,
    Max(TC.SumCat) AS MaxCat
  FROM
    (SELECT
      YC.STP_SPER_YR,
      YC.STP_SPER_PERIOD_CDE,
      YC.SFA_MSFA_MIDSIZE_FA_CDE,
      YC.GR_GEAR_CDE,
      YC.SP_SPECIES_CDE,
      Sum(YC.CATSUM_ROUND_LBS_WT) AS SumCat
    FROM
      @table.CATCH_SUMMARY YC
    GROUP BY
      YC.STP_SPER_YR, YC.STP_SPER_PERIOD_CDE,
      YC.SFA_MSFA_MIDSIZE_FA_CDE, YC.GR_GEAR_CDE, YC.SP_SPECIES_CDE) TC   -- total catch
  GROUP BY
    TC.STP_SPER_YR, TC.STP_SPER_PERIOD_CDE,
    TC.SFA_MSFA_MIDSIZE_FA_CDE, TC.GR_GEAR_CDE) MC ON                     -- maximum catch

  ZC.STP_SPER_YR = MC.STP_SPER_YR AND
  ZC.STP_SPER_PERIOD_CDE = MC.STP_SPER_PERIOD_CDE AND
  ZC.SFA_MSFA_MIDSIZE_FA_CDE = MC.SFA_MSFA_MIDSIZE_FA_CDE AND
  ZC.GR_GEAR_CDE = MC.GR_GEAR_CDE AND
  ZC.SumCat = MC.MaxCat
GROUP BY
  ZC.STP_SPER_YR,
  ZC.STP_SPER_PERIOD_CDE,
  ZC.SFA_MSFA_MIDSIZE_FA_CDE,
  ZC.GR_GEAR_CDE,
  ZC.SumCat) TAR ON                -- target species

  CS.STP_SPER_YR = TAR.STP_SPER_YR AND
  CS.STP_SPER_PERIOD_CDE = TAR.STP_SPER_PERIOD_CDE AND
  CS.SFA_MSFA_MIDSIZE_FA_CDE = TAR.SFA_MSFA_MIDSIZE_FA_CDE AND
  CS.GR_GEAR_CDE = TAR.GR_GEAR_CDE

GROUP BY
(CASE
  WHEN TAR.Target IN
  ('222','225','228','388','394','396','401','418','440','451','597','602','607','621','626','6
  28','631') THEN 1
  WHEN TAR.Target IN ('614') THEN 2
  WHEN TAR.Target IN ('455') THEN 3
  WHEN TAR.Target IN ('044','467') THEN 4
  WHEN TAR.Target IN ('424','407','431','433','442') THEN 5
  ELSE 0 END),
CS.STP_SPER_YR,
(CASE
  WHEN CS.SFA_MSFA_MIDSIZE_FA_CDE IN
  (12,13,14,15,16,17,18,19,20,28,29,9200,9791,9792,9793,9794) THEN 1
  WHEN CS.SFA_MSFA_MIDSIZE_FA_CDE IN (9508) THEN 2
  WHEN CS.SFA_MSFA_MIDSIZE_FA_CDE IN (21,22,23,24,121,123,124,9210,9230,9240) THEN 3
  WHEN CS.SFA_MSFA_MIDSIZE_FA_CDE IN (25,26,27,125,126,127,9250,9260,9270) THEN 4
  WHEN CS.SFA_MSFA_MIDSIZE_FA_CDE IN (10,11,111,9100,9110) THEN 5
  WHEN CS.SFA_MSFA_MIDSIZE_FA_CDE IN (7,8,9,107,108,109,110,130,30,9070,9080,9090) THEN 6
  WHEN CS.SFA_MSFA_MIDSIZE_FA_CDE IN (6,102,106,8021,9021,9060) THEN 7
  WHEN CS.SFA_MSFA_MIDSIZE_FA_CDE IN (1,3,4,5,101,103,104,105,9010,9031,9032,9033,9040,9050)
  THEN 8
  WHEN CS.SFA_MSFA_MIDSIZE_FA_CDE IN (2,142,8022,9022) THEN 9
  ELSE 0 END),
(CASE
```

```
    WHEN CS.SFA_MSFA_MIDSIZE_FA_CDE IN (142) AND CS.SFA_SMALL_FA_CDE IN (1) THEN 34 -- for POP in
    Anthony Island
    ELSE 0 END)
  ) CSS
  WHERE
    CSS.\"landed\">0 OR CSS.\"discard\">0 OR CSS.POP>0 OR CSS.ORF>0 OR CSS.PAH>0 OR CSS.SBF>0 OR
    CSS.DOG>0 OR CSS.RFA>0
;
```

SQL SERVER QUERY: GFC_FCATORF.SQL

Queries the database **`GFCatch`** for catch records (Trawl, Sablefish, H&L Rockfish fisheries).

Usage in **`PBSfishery`**:

```
getData("gfc_fcatORF.sql","GFCatch",strSpp="442",path=.getSpath())
```

Code ('`--`' denotes commented text):

```
-- Query GFCatch landings for rockfish reconstruction.
SET NOCOUNT ON  -- prevents timeout errors

-- Create a temporary table with species catch and total catch
SELECT
  CC.Trip,
  CC.Event,
  Sum(CASE
    WHEN CC.Species IN (@sppcode) AND CC.Utilization NOT IN (4,6)
    THEN CC.Catch
    ELSE 0 END)/2.20459 AS \"landed\",
  Sum(CASE
    WHEN CC.Species IN (@sppcode) AND CC.Utilization IN (4,6)
    THEN CC.Catch
    ELSE 0 END)/2.20459 AS \"discard\",
  Sum(CASE
    WHEN CC.Species IN ('396')    AND CC.Utilization NOT IN (4,6)
    THEN CC.Catch
    ELSE 0 END)/2.20459 AS POP,
  Sum(CASE
    WHEN CC.Species IN (@orfcode) AND CC.Utilization NOT IN (4,6)
    THEN CC.Catch
    ELSE 0 END)/2.20459 AS ORF,
  Sum(CASE
    WHEN CC.Species IN ('614')    AND CC.Utilization NOT IN (4,6)
    THEN CC.Catch
    ELSE 0 END)/2.20459 AS PAH,
  Sum(CASE
    WHEN CC.Species IN ('454','455')  AND CC.Utilization NOT IN (4,6)
    THEN CC.Catch
    ELSE 0 END)/2.20459 AS SBF,
  Sum(CASE
    WHEN CC.Species IN ('042','044','467')  AND CC.Utilization NOT IN (4,6)
    THEN CC.Catch
    ELSE 0 END)/2.20459 AS DOG,
  Sum(CASE
    WHEN CC.Species IN ('424','407','431','433','442')  AND CC.Utilization NOT IN (4,6)
    THEN CC.Catch
    ELSE 0 END)/2.20459 AS RFA
  INTO #Catch
  FROM
    B3_Catch CC
  GROUP BY
    CC.Trip, CC.Event

-- Link all catch events above to fishing events
SELECT
```

```
  'fid' = (CASE
    WHEN T.Source IN (1,2) THEN 1
    WHEN T.Source IN (3,4) THEN 5
    WHEN T.Source IN (5,6) THEN 3
    ELSE 0 END),
  'log'  = (CASE
    WHEN T.Log_Source IN (2,3) THEN 1  -- observer logs
    WHEN T.Log_Source IN (1) THEN 2    -- fisher logs
    ELSE 0 END),
  'gear' = ISNULL(E.Gear,0),
  'date' = ISNULL(T.Date,Null),
  'major' = IsNull(E.Major_Area,0),
  'minor' = IsNull(E.Minor_Area,0),
  C.landed, C.discard,
  C.POP, C.ORF, C.PAH, C.SBF, C.DOG, C.RFA
FROM
  B1_Trips T RIGHT OUTER JOIN
  (B2_Events E RIGHT OUTER JOIN
  #Catch C ON
  E.Trip = C.Trip AND
  E.Event = C.Event ) ON
  T.Trip = E.Trip
  WHERE
    C.\"landed\">0 OR C.\"discard\">0 OR C.POP>0 OR C.ORF>0 OR C.PAH>0 OR C.SBF>0 OR C.DOG>0 OR
    C.RFA>0
```

SQL SERVER QUERY: PHT_TCATORF.SQL

Queries the database **`PacHarvest`** for catch records (Trawl fishery).

Usage in **`PBSfishery`**:

```
getData("pht_tcatORF.sql","PacHarvest",strSpp="442",path=.getSpath())
```

Code ('`--`' denotes commented text):

```
-- PacHarvest query for landed catch of a target species, POP, and ORF (other rockfish)
SET NOCOUNT ON  -- prevents timeout errors

SELECT
  MC.HAIL_IN_NO,
  MC.SET_NO,
  OC.OFFLOAD_DATE,
  OC.MAJOR_STAT_AREA,
  OC.MINOR_STAT_AREA,
  landed = Sum(CASE
    WHEN MC.SPECIES_CODE IN (@sppcode) THEN MC.LANDED
    ELSE 0 END ),
  discard = Sum(CASE
    WHEN MC.SPECIES_CODE IN (@sppcode) THEN MC.DISCARDED
    ELSE 0 END ),
  POP = Sum(CASE
    WHEN MC.SPECIES_CODE IN ('396') THEN MC.LANDED
    ELSE 0 END ),
  ORF = Sum(CASE   -- landings of all rockfish other than POP
    WHEN MC.SPECIES_CODE IN (@orfcode) THEN MC.LANDED
    ELSE 0 END ),
  TAR = Sum(CASE   -- target landings reference for discard calculations
    WHEN MC.SPECIES_CODE IN (@trfcode) THEN MC.LANDED
   ELSE 0 END)
  INTO #Catch
  FROM
    D_Merged_Catches MC LEFT OUTER JOIN
    D_Official_Catch OC ON
    MC.HAIL_IN_NO = OC.HAIL_IN_NO AND
    MC.SET_NO = OC.SET_NO AND
    MC.SPECIES_CODE = OC.SPECIES_CODE
  GROUP BY
```

```
    MC.HAIL_IN_NO, MC.SET_NO,
    OC.OFFLOAD_DATE, OC.MAJOR_STAT_AREA, OC.MINOR_STAT_AREA

SELECT
  'fid' = IsNull(E.OBFL_FISHERY_ID,1),
  'gear' = IsNull(E.OBFL_GEAR_SUBTYPE_CDE,0),
  'log' = CASE WHEN E.OBFL_LOG_TYPE_CDE='OBSERVRLOG' THEN 1 ELSE 2 END,
  CONVERT(char(10),COALESCE(E.Start_FE, E.OBFL_START_DT, E.OBFL_END_DT, C.OFFLOAD_DATE), 20) AS
    [date],
  COALESCE(E.OBFL_MAJOR_STAT_AREA_CDE, C.MAJOR_STAT_AREA, 0) AS major,
  COALESCE(E.OBFL_MINOR_STAT_AREA_CDE, C.MINOR_STAT_AREA, 0) AS minor,
  IsNull(E.Fishing_Depth, Null) AS fdep,
  IsNull(E.Duration, Null) AS eff,
  C.landed,
  C.discard,
  C.POP,
  C.ORF,
  C.TAR
  FROM
    B3_Fishing_Events E RIGHT OUTER JOIN
    #Catch C ON
      E.OBFL_HAIL_IN_NO = C.HAIL_IN_NO AND
      E.OBFL_SET_NO = C.SET_NO --) ON
      --T.OBFL_HAIL_IN_NO = E.OBFL_HAIL_IN_NO
  WHERE
    -- E.OBFL_GEAR_SUBTYPE_CDE=1 AND
    -- IsNull(E.OBFL_FE_SUCCESS_CDE,0) in (0,1) AND
    (C.landed>0 OR C.discard>0 OR C.POP>0 OR C.ORF>0 OR C.TAR>0)
```

SQL SERVER QUERY: PHHL_HCATORF.SQL

Queries the database **`PacHarvHL`** for catch records (Halibut fishery).

Usage in **`PBSfishery`**:

```
getData("phhl_hcatORF.sql","PacHarvHL",strSpp="442",path=.getSpath())
```

Code ('`--`' denotes commented text):

```
-- PacHarvHL query for validation catch (LBS) of halibut, POP, and ORF (other rockfish)
-- note: validation tables do not contain information at the tow level.
-- fisheryid: 2=Halibut, 3=Sablefish, 4=Schdeule II, 5=ZN,
--            6=Sablefish+ZN, 7=Sablefish+Halibut, 8=Dogfish, 9=Lingcod

SET NOCOUNT ON -- prevents timeout errors

SELECT
  VS.vrec_hail_in_no,
  VS.vrec_species_cde AS 'spp',
  CASE
    WHEN RTRIM(LTRIM(VA.vrec_mgmt_catch_area)) IN
    ('4B','SG','12','13','14','15','16','17','18','19','20',
        '28','29','29A','29B','29C','29D','29E') THEN 1
    WHEN RTRIM(LTRIM(VA.vrec_mgmt_catch_area)) IN ('4A','C') THEN 2
    WHEN RTRIM(LTRIM(VA.vrec_mgmt_catch_area)) IN
    ('3C','21','22','23','24','121','122','123','124') THEN 3
    WHEN RTRIM(LTRIM(VA.vrec_mgmt_catch_area)) IN ('3D','WC','25','26','27','125','126','127')
    THEN 4
    WHEN RTRIM(LTRIM(VA.vrec_mgmt_catch_area)) IN ('5A','10','11','111') THEN 5
    WHEN RTRIM(LTRIM(VA.vrec_mgmt_catch_area)) IN
    ('5B','CC','7','8','9','107','108','109','110','130','30') THEN 6
    WHEN RTRIM(LTRIM(VA.vrec_mgmt_catch_area)) IN ('5C','6','102','106','2E','2B-EAST') THEN 7
    WHEN RTRIM(LTRIM(VA.vrec_mgmt_catch_area)) IN
    ('5D','PR','NC','1','3','4','5','101','103','104','105','2A-EAST') THEN 8
    WHEN RTRIM(LTRIM(VA.vrec_mgmt_catch_area)) IN ('5E','QC','2','141','142','2W','2A-WEST','2B-
    WEST') THEN 9
    ELSE 0 END AS 'major',
  CASE
```

```
    WHEN (RTRIM(LTRIM(VA.vrec_mgmt_catch_area)) IN ('142') AND RTRIM(LTRIM(VA.vrec_mgmt_subarea))
    IN ('1')) OR
         (RTRIM(LTRIM(VA.vrec_mgmt_catch_area)) IN ('2') AND
          RTRIM(LTRIM(VA.vrec_mgmt_subarea)) IN
    ('31','32','33','34','35','36','37','38','39','40','41','42','43','44','45','46','47'))
      THEN 34
    ELSE 0 END AS 'minor',
  CAST(VA.vrec_weight_percentage as FLOAT)/100. AS 'pcat',
  VS.vrec_landed_weight AS 'lbs',
  (CAST(VA.vrec_weight_percentage as FLOAT)/100. * VS.vrec_landed_weight)/2.20459 AS 'catKg'
INTO #Catch
FROM
  B6_Validation_Species VS INNER JOIN  -- B6 Catch is in lbs (Lisa Lacko)
  B7_Validation_Areas VA ON
    VS.vrec_hail_in_no  = VA.vrec_hail_in_no AND
    VS.vrec_species_cde = VA.vrec_species_cde

SELECT
  VH.vrec_fishery_id AS 'fid',
  VH.vrec_ext_lic_option_cde AS 'lic',
  IsNull(VH.vrec_offload_dt,VH.vrec_departure_dt) AS 'date',
  C.major,
  C.minor,
  landed = Sum(CASE
    WHEN C.spp IN (@sppcode) THEN IsNull(C.catKg,0)
    ELSE 0 END ),
  discard = 0,
  -- target landings reference for discard calculations
  POP = Sum( CASE
    WHEN C.spp IN ('396') THEN IsNull(C.catKg,0)
    ELSE 0 END ),
  ORF = Sum(CASE -- all rockfish other than POP
    WHEN C.spp IN (@orfcode)
    THEN IsNull(C.catKg,0) ELSE 0 END ),
  PAH = Sum(CASE -- Pacific halibut
    WHEN C.spp IN ('614')
    THEN IsNull(C.catKg,0) ELSE 0 END),
  SBF = Sum(CASE  -- Sablefish
    WHEN C.spp IN ('454','455')
    THEN IsNull(C.catKg,0) ELSE 0 END),
  DOG = Sum(CASE  -- Spiny dogfish
    WHEN C.spp IN ('042','044')
    THEN IsNull(C.catKg,0) ELSE 0 END),
  LIN = Sum(CASE  -- Lingcod
    WHEN C.spp IN ('467')
    THEN IsNull(C.catKg,0) ELSE 0 END),
  RFA = Sum(CASE
    WHEN C.spp IN ('424','407','431','433','442')
    THEN IsNull(C.catKg,0) ELSE 0 END)
INTO #Hcat
FROM
  B5_Validation_Header VH INNER JOIN
  #Catch C ON
    VH.vrec_hail_in_no = C.vrec_hail_in_no
WHERE
    VH.vrec_fishery_id IN (2,7)
GROUP BY
  VH.vrec_hail_in_no,
  VH.vrec_fishery_id,
  VH.vrec_ext_lic_option_cde,
  IsNull(VH.vrec_offload_dt,VH.vrec_departure_dt),
  C.major,
  C.minor

SELECT * FROM #Hcat H
WHERE H.landed>0 OR H.POP>0 OR H.ORF>0 OR H.PAH>0 OR H.SBF>0 OR H.DOG>0 OR H.LIN>0 OR H.RFA>0
```

SQL SERVER QUERY: PHS_SCATORF.SQL

Queries the database **`PacHarvSable`** for fisherlog catch records (Sablefish fishery).

Usage in **`PBSfishery`**:

```
getData("phs_scatORF.sql","PacHarvSable",strSpp="442",path=.getSpath(),fisheryid=3,
    logtype="FISHERLOG")
```

Code ('`--`' denotes commented text):

```
-- PacHarvSable query for landed catch (KG) of a target species, POP, and ORF (other rockfish)
DECLARE @logtype VARCHAR(10)
SET @logtype   = @logtypeval

SET NOCOUNT ON -- prevents timeout errors

-- compile the landed catch stats for target, POP, & ORF
SELECT
  'fid' = IsNull(T.FISHERY_ID,3),
  'gear' = CASE OC.GEAR WHEN 'TRAP' THEN 2 WHEN 'LONGLINE' THEN 5 ELSE 0 END,
  'date' = CAST(OC.OFFLOAD_DT AS smalldatetime),
  'major' = IsNull(OC.MAJOR_STAT_AREA_CDE,0),
  'minor' = IsNull(OC.MINOR_STAT_AREA_CDE,0),
  'cfv' = CAST(COALESCE(OC.VRN,T.VSL_CFV_NO,'0') AS VARCHAR(6)),
  'landed' = Sum( CASE OC.SPECIES_CODE
    WHEN @sppcode THEN IsNull(OC.LANDED,0)
    ELSE 0 END ),
  'discard' = Sum( CASE OC.SPECIES_CODE
    WHEN @sppcode THEN IsNull(OC.DISCARDED,0)
    ELSE 0 END ),
  'POP' = Sum( CASE OC.SPECIES_CODE
    WHEN '396' THEN IsNull(OC.LANDED,0)
    ELSE 0 END ),
  'ORF' = Sum(  -- all rockfish other than POP
    CASE WHEN OC.SPECIES_CODE IN (@orfcode) THEN IsNull(OC.LANDED,0)
    ELSE 0 END ),
  'TAR' = Sum(   -- target landings reference for discard calculations
    CASE WHEN OC.SPECIES_CODE IN ('454','455') THEN IsNull(OC.LANDED,0)
   ELSE 0 END)
  INTO #Catch
  FROM
    B2_Trips T RIGHT OUTER JOIN
    D_Official_Catch OC ON
    OC.TRIP_ID = T.TRIP_ID
  WHERE
    IsNull(T.FISHERY_ID,3) IN (@fisheryid) AND
    OC.LOG_TYPE_CDE LIKE @logtype
  GROUP BY
    OC.HAIL_IN_NO, OC.SET_NO,
    IsNull(T.FISHERY_ID,3),
    CASE OC.GEAR WHEN 'TRAP' THEN 2 WHEN 'LONGLINE' THEN 5 ELSE 0 END,
    CAST(OC.OFFLOAD_DT AS smalldatetime),
    IsNull(OC.MAJOR_STAT_AREA_CDE,0),
    IsNull(OC.MINOR_STAT_AREA_CDE,0),
    CAST(COALESCE(OC.VRN,T.VSL_CFV_NO,'0') AS VARCHAR(6))

SELECT * FROM #Catch C
  WHERE
    (C.landed>0 OR C.discard>0 OR C.POP>0 OR C.ORF>0 OR C.TAR>0)
```

SQL SERVER QUERY: PHHL_FCATORF.SQL

Queries the database **`PacHarvHL`** for fisherlog records (Dogfish-Lingcod, H&L Rockfish fisheries).

Usage in **`PBSfishery`**:

```
getData("phhl_fcatORF.sql","PacHarvHL",strSpp="442",path=.getSpath(),
    logtype="FISHERLOG")
```

Code (‘**--**’ denotes commented text):

```
-- PacHarvHL query for fisherlog catch (KG) of a target species, POP, and ORF (other rockfish)
-- fisheryid: 2=Halibut, 3=Sablefish, 4=Schdeule II, 5=ZN,
--            6=Sablefish+ZN, 7=Sablefish+Halibut, 8=Dogfish, 9=Lingcod

DECLARE @logtype VARCHAR(10)
SET @logtype   = @logtypeval

SET NOCOUNT ON -- prevents timeout errors

-- Event info on FID and licence option
SELECT
  'hail_in' = FE.OBFL_HAIL_IN_NO,
  'set_no'  = FE.OBFL_SET_NO,
  'log'     = FE.OBFL_LOG_TYPE_CDE,
  'fid'     = FE.OBFL_FISHERY_ID,
  'lic'     = IsNull(RTRIM(LTRIM(VH.vrec_ext_lic_option_cde)),''),
  'date'    = CAST( COALESCE(FE.OBFL_START_DT,FE.Start_FE,FE.OBFL_END_DT,FE.OBFL_LOADED_DT) AS
    smalldatetime),
  'major'   = IsNull(FE.OBFL_MAJOR_STAT_AREA_CDE,0),
  'minor'   = IsNull(FE.OBFL_MINOR_STAT_AREA_CDE,0),
  'region'  = CASE FE.OBFL_MAJOR_STAT_AREA_CDE
    WHEN 9 THEN '5E'
    WHEN 8 THEN '5D'
    WHEN 7 THEN '5C'
    WHEN 6 THEN '5B'
    WHEN 5 THEN '5A'
    WHEN 4 THEN '3D'
    WHEN 3 THEN '3C'
    WHEN 1 THEN '4B'
    ELSE '' END,
  'fdep' = FE.Fishing_Depth,
  'eff'  = FE.Duration
  INTO #Events
  FROM
    B5_Validation_Header VH RIGHT OUTER JOIN
    B3_Fishing_Events FE ON
    FE.OBFL_HAIL_IN_NO = VH.vrec_hail_in_no
  WHERE
    --FE.OBFL_LOG_TYPE_CDE LIKE @logtype
    FE.OBFL_LOG_TYPE_CDE IN (@logtype)

-- Compile the catch stats for target, POP, ORF, TAR
SELECT
  E.hail_in, E.set_no, E.log, E.fid, E.lic,
  E.date, E.major, E.minor, E.region, E.fdep, E.eff,
  'landed' = Sum( CASE
    WHEN FC.OBFL_SPECIES_CDE IN (@sppcode) AND FC.OBFL_CATCH_UTILIZATION_CDE NOT IN
    (4,6,9,22,23,24,27,28)
    THEN IsNull(FC.OBFL_EST_WEIGHT,0)
    ELSE 0 END ),
  'discard' = Sum( CASE
    WHEN FC.OBFL_SPECIES_CDE IN (@sppcode) AND FC.OBFL_CATCH_UTILIZATION_CDE IN
    (4,6,9,22,23,24,27,28) -- discard codes
    THEN IsNull(FC.OBFL_EST_WEIGHT,0)
    ELSE 0 END ),
  'POP' = Sum( CASE
    WHEN FC.OBFL_SPECIES_CDE IN ('396') AND FC.OBFL_CATCH_UTILIZATION_CDE NOT IN
    (4,6,9,22,23,24,27,28)
    THEN IsNull(FC.OBFL_EST_WEIGHT,0)
    ELSE 0 END ),
  'ORF' = Sum(   -- all rockfish other than POP
```

```
    CASE WHEN FC.OBFL_SPECIES_CDE IN (@orfcode) AND FC.OBFL_CATCH_UTILIZATION_CDE NOT IN
    (4,6,9,22,23,24,27,28)
    THEN IsNull(FC.OBFL_EST_WEIGHT,0)
    -- CASE WHEN FC.OBFL_SPECIES_CDE <> '396' AND S.Rockfish=1 THEN IsNull(FC.OBFL_EST_WEIGHT,0)
    ELSE 0 END ),
  'TAR' = Sum( CASE  -- target landings reference for discard calculations
    WHEN E.fid=2 AND FC.OBFL_SPECIES_CDE IN ('614') AND FC.OBFL_CATCH_UTILIZATION_CDE NOT IN
    (4,6,9,22,23,24,27,28)
      THEN IsNull(FC.OBFL_EST_WEIGHT,0)
    WHEN E.fid=4 AND E.lic='D' AND FC.OBFL_SPECIES_CDE IN ('042','044') AND
    FC.OBFL_CATCH_UTILIZATION_CDE NOT IN (4,6,9,22,23,24,27,28)
      THEN IsNull(FC.OBFL_EST_WEIGHT,0)
    WHEN E.fid=4 AND E.lic='L' AND FC.OBFL_SPECIES_CDE IN ('467') AND
    FC.OBFL_CATCH_UTILIZATION_CDE NOT IN (4,6,9,22,23,24,27,28)
      THEN IsNull(FC.OBFL_EST_WEIGHT,0)
    WHEN E.fid=4 AND E.lic NOT IN ('D','L') AND FC.OBFL_SPECIES_CDE IN ('042','044','467') AND
    FC.OBFL_CATCH_UTILIZATION_CDE NOT IN (4,6,9,22,23,24,27,28)
      THEN IsNull(FC.OBFL_EST_WEIGHT,0)
    WHEN E.fid=5 AND FC.OBFL_SPECIES_CDE IN ('424','407','431','433','442') AND
    FC.OBFL_CATCH_UTILIZATION_CDE NOT IN (4,6,9,22,23,24,27,28)
      THEN IsNull(FC.OBFL_EST_WEIGHT,0)
    ELSE 0 END)
  INTO #Catch
  FROM
    #Events E RIGHT OUTER JOIN
    B4_Catches FC ON  -- B4 Catch is in kg (Lisa Lacko)
    E.hail_in = FC.OBFL_HAIL_IN_NO AND
    E.set_no = FC.OBFL_SET_NO AND
    E.log = FC.OBFL_LOG_TYPE_CDE
  WHERE
    FC.OBFL_LOG_TYPE_CDE IN (@logtype) AND
    E.fid IN (@fisheryid)
  GROUP BY
    E.hail_in, E.set_no, E.log, E.fid, E.lic,
    E.date, E.major, E.minor, E.region, E.fdep, E.eff

-- Create an events table based on unique hails
SELECT
  C.fid, C.lic,
  'date' = CAST( COALESCE(C.date, T.OBFL_OFFLOAD_DT) AS smalldatetime),
  C.major, C.minor, C.region, C.fdep,
  'cfv' = CAST(IsNull(T.OBFL_VSL_CFV_NO,'0') AS VARCHAR(6)),
  C.eff,
  'landed' = C.landed,
  'discard' = C.discard,
  'POP' = C.POP,
  'ORF' = C.ORF,
  'TAR' = C.TAR
FROM
    B2_Trips T RIGHT OUTER JOIN
    #Catch C ON
   T.OBFL_HAIL_IN_NO = C.hail_in
WHERE
  (C.landed>0 OR C.discard>0 OR C.POP>0 OR C.ORF>0 OR C.TAR>0)
```

SQL SERVER QUERY: PHHL_VCATORF.SQL

Queries the database **`PacHarvHL`** for validation records (Halibut, Dogfish-Lingcod, H&L Rockfish fisheries).

Usage in **`PBSfishery`**:

```
getData("phhl_vcatORF.sql","PacHarvHL",strSpp="442",path=.getSpath())
```

Code (‘**`--`**’ denotes commented text):

```
-- PacHarvHL query for validation catch (LBS) of a target species, POP, and ORF (other rockfish)
```

```
-- Note: validation tables do not contain information at the tow level.
-- fisheryid: 2=Halibut, 3=Sablefish, 4=Schdeule II, 5=ZN,
--            6=Sablefish+ZN, 7=Sablefish+Halibut, 8=Dogfish, 9=Lingcod

SET NOCOUNT ON -- prevents timeout errors

-- hails can fish in more than one PMFC major
SELECT
  E.OBFL_HAIL_IN_NO AS phhl_hail,
  IsNull(E.OBFL_MAJOR_STAT_AREA_CDE,0) AS phhl_major,
  IsNull(E.OBFL_MINOR_STAT_AREA_CDE,0) AS phhl_minor,
  Count(E.OBFL_SET_NO) AS phhl_mset
INTO #Msets
FROM B3_Fishing_Events E
GROUP BY
  E.OBFL_HAIL_IN_NO, E.OBFL_MAJOR_STAT_AREA_CDE, E.OBFL_MINOR_STAT_AREA_CDE
ORDER BY
  E.OBFL_HAIL_IN_NO

SELECT
  E.OBFL_HAIL_IN_NO AS phhl_hail,
  Count(E.OBFL_SET_NO) AS phhl_nset
INTO #Nsets
FROM B3_Fishing_Events E
GROUP BY
  E.OBFL_HAIL_IN_NO
ORDER BY
  E.OBFL_HAIL_IN_NO

SELECT
  M.*,
  N.phhl_nset,
  CAST(M.phhl_mset as FLOAT)/CAST(N.phhl_nset as FLOAT) AS 'phhl_pset',
  VS.vrec_species_cde AS 'spp',
  VS.vrec_landed_weight AS 'lbs',
  CAST(M.phhl_mset as FLOAT)/CAST(N.phhl_nset as FLOAT) * VS.vrec_landed_weight/2.20459 AS
    'catKg'
INTO #Catch
FROM
  (#Msets M INNER JOIN
  #Nsets N ON
    M.phhl_hail = N.phhl_hail) INNER JOIN
  B6_Validation_Species VS ON  -- B6 Catch is in lbs (Lisa Lacko)
  N.phhl_hail = VS.vrec_hail_in_no

SELECT
  VH.vrec_fishery_id AS 'fid',
  VH.vrec_ext_lic_option_cde AS 'lic',
  IsNull(VH.vrec_offload_dt,VH.vrec_departure_dt) AS 'date',
  C.phhl_major AS 'major',
  C.phhl_minor AS 'minor',
  landed = Sum(CASE
    WHEN C.spp IN (@sppcode) THEN IsNull(C.catKg,0)
    ELSE 0 END ),
  discard = 0,
  -- target landings reference for discard calculations
  POP = Sum( CASE
    WHEN C.spp IN ('396') THEN IsNull(C.catKg,0)
    ELSE 0 END ),
  ORF = Sum(CASE -- all rockfish other than POP
    WHEN C.spp IN (@orfcode)
    THEN IsNull(C.catKg,0) ELSE 0 END ),
  PAH = Sum(CASE -- Pacific halibut
    WHEN C.spp IN ('614')
    THEN IsNull(C.catKg,0) ELSE 0 END),
  SBF = Sum(CASE  -- Sablefish
    WHEN C.spp IN ('454','455')
    THEN IsNull(C.catKg,0) ELSE 0 END),
  DOG = Sum(CASE  -- Spiny dogfish
    WHEN C.spp IN ('042','044')
    THEN IsNull(C.catKg,0) ELSE 0 END),
```

```
  LIN = Sum(CASE  -- Lingcod
    WHEN C.spp IN ('467')
    THEN IsNull(C.catKg,0) ELSE 0 END),
  RFA = Sum(CASE
    WHEN C.spp IN ('424','407','431','433','442')
    THEN IsNull(C.catKg,0) ELSE 0 END)
INTO #Vcat
FROM
  B5_Validation_Header VH INNER JOIN
  #Catch C ON
    VH.vrec_hail_in_no = C.phhl_hail
WHERE
  VH.vrec_fishery_id IN (@fisheryid)
GROUP BY
  VH.vrec_hail_in_no,
  VH.vrec_fishery_id,
  VH.vrec_ext_lic_option_cde,
  IsNull(VH.vrec_offload_dt,VH.vrec_departure_dt),
  C.phhl_major,
  C.phhl_minor

SELECT * FROM #Vcat V
WHERE V.landed>0 OR V.POP>0 OR V.ORF>0 OR V.PAH>0 OR V.SBF>0 OR V.DOG>0 OR V.LIN>0 OR V.RFA>0
```

ORACLE QUERY: FOS_VCATORF.SQL

Queries the database **GFFOS** for validation records (all fisheries). For this query to run successfully, you will need access to the View Table **GFFOS.MEAN_SPECIES_WEIGHT_VW**, which requires permission by the **GFFOS** administrator, currently Norm Olsen.

Usage in **PBSfishery**:

```
getData("fos_vcatORF.sql",dbName="GFFOS",strSpp="442",path=.getSpath(),
    server="GFSH",type="ORA",trusted=FALSE)
```

Code ('**--**' denotes commented text):

```
-- Query FOS catch from the merged catch table GF_D_OFFICIAL_FE_CATCH
SELECT * FROM (
SELECT
  (CASE
    WHEN FC.FISHERY_SECTOR IN ('GROUNDFISH TRAWL') THEN 1
    WHEN FC.FISHERY_SECTOR IN ('HALIBUT','HALIBUT AND SABLEFISH') THEN 2
    WHEN FC.FISHERY_SECTOR IN ('SABLEFISH') THEN 3
    WHEN FC.FISHERY_SECTOR IN ('LINGCOD','SPINY DOGFISH') THEN 4
    WHEN FC.FISHERY_SECTOR IN ('ROCKFISH INSIDE','ROCKFISH OUTSIDE') THEN 5
    ELSE 0 END) AS \"fid\",
  FC.FISHERY_SECTOR AS \"sector\",
  CASE
    WHEN FC.GEAR IN ('TRAWL') AND FC.GEAR_SUBTYPE NOT IN ('MIDWATER TRAWL') THEN 1
    WHEN FC.GEAR IN ('TRAP') THEN 2
    WHEN FC.GEAR IN ('TRAWL') AND FC.GEAR_SUBTYPE IN ('MIDWATER TRAWL') THEN 3
    WHEN FC.GEAR IN ('HOOK AND LINE') THEN 4
    WHEN FC.GEAR IN ('LONGLINE') THEN 5
    WHEN FC.GEAR IN ('LONGLINE OR HOOK AND LINE','TRAP OR LONGLINE OR HOOK AND LINE') THEN 8
    ELSE 0 END AS \"gear\",
  NVL(FC.DATA_SOURCE_CODE,0) AS \"log\",
  TO_DATE(TO_CHAR(FC.BEST_DATE,'YYYY-MM-DD'),'YYYY-MM-DD') as \"date\",
  NVL(FC.MAJOR_STAT_AREA_CODE,'0') AS \"major\",
  NVL(FC.MINOR_STAT_AREA_CODE,'0') AS \"minor\",
  CC.landed AS \"landed\",
  CC.released + CC.liced + CC.bait AS \"discard\",
  CC.POP, CC.ORF, CC.TAR
FROM
  GFFOS.GF_D_OFFICIAL_FE_CATCH FC INNER JOIN
```

```
  (SELECT
    OC.TRIP_ID,
    OC.FISHING_EVENT_ID,
    Sum(CASE
      WHEN OC.SPECIES_CODE IN (@sppcode) THEN NVL(OC.LANDED_ROUND_KG,0)
      ELSE 0 END) AS landed,
    Sum(CASE
      WHEN OC.SPECIES_CODE IN (@sppcode) THEN
        COALESCE(OC.TOTAL_RELEASED_ROUND_KG,
        (NVL(OC.SUBLEGAL_RELEASED_COUNT,0) + NVL(OC.LEGAL_RELEASED_COUNT,0)) * FW.MNWT, 0)
      ELSE 0 END) AS released,
    Sum(CASE
      WHEN OC.SPECIES_CODE IN (@sppcode) THEN
        (NVL(OC.SUBLEGAL_LICED_COUNT,0) + NVL(OC.LEGAL_LICED_COUNT,0)) * FW.MNWT
      ELSE 0 END) AS liced,
    Sum(CASE
      WHEN OC.SPECIES_CODE IN (@sppcode) THEN
        (NVL(OC.SUBLEGAL_BAIT_COUNT,0) + NVL(OC.LEGAL_BAIT_COUNT,0)) * FW.MNWT
      ELSE 0 END) AS bait,
    SUM(CASE
      WHEN OC.SPECIES_CODE IN ('396') THEN NVL(OC.LANDED_ROUND_KG,0)
      ELSE 0 END) AS POP,
    SUM(CASE  -- all rockfish other than POP
      WHEN OC.SPECIES_CODE IN (@orfcode) THEN NVL(OC.LANDED_ROUND_KG,0)
      ELSE 0 END) AS ORF,
    SUM(CASE  -- target landings reference for discard calculations
      WHEN OC.FISHERY_SECTOR IN ('GROUNDFISH TRAWL') AND OC.SPECIES_CODE IN (@trfcode)
        THEN NVL(OC.LANDED_ROUND_KG,0)
      WHEN OC.FISHERY_SECTOR IN ('HALIBUT','HALIBUT AND SABLEFISH') AND OC.SPECIES_CODE IN
    ('614')
        THEN NVL(OC.LANDED_ROUND_KG,0)
      WHEN OC.FISHERY_SECTOR IN ('SABLEFISH') AND OC.SPECIES_CODE IN ('454','455')
        THEN NVL(OC.LANDED_ROUND_KG,0)
      WHEN OC.FISHERY_SECTOR IN ('SPINY DOGFISH') AND OC.SPECIES_CODE IN ('042','044')
        THEN NVL(OC.LANDED_ROUND_KG,0)
      WHEN OC.FISHERY_SECTOR IN ('LINGCOD') AND OC.SPECIES_CODE IN ('467')
        THEN NVL(OC.LANDED_ROUND_KG,0)
      WHEN OC.FISHERY_SECTOR IN ('ROCKFISH INSIDE','ROCKFISH OUTSIDE') AND OC.SPECIES_CODE IN
    ('424','407','431','433','442')
        THEN NVL(OC.LANDED_ROUND_KG,0)
      ELSE 0 END) AS TAR
  FROM GFFOS.GF_D_OFFICIAL_FE_CATCH OC INNER JOIN

-- FISH WEIGHTS FW
  GFFOS.MEAN_SPECIES_WEIGHT_VW FW ON
    OC.SPECIES_CODE = FW.SPP
  GROUP BY OC.TRIP_ID, OC.FISHING_EVENT_ID ) CC ON
    FC.TRIP_ID = CC.TRIP_ID AND
    FC.FISHING_EVENT_ID = CC.FISHING_EVENT_ID

WHERE
  FC.SPECIES_CODE IN (@sppcode) AND
  (FC.FISHERY_SECTOR IN ('GROUNDFISH TRAWL') OR
  (FC.FISHERY_SECTOR NOT IN ('GROUNDFISH TRAWL') AND NVL(FC.DATA_SOURCE_CODE,0) NOT IN
    (106,107)))

ORDER BY FC.TRIP_ID, FC.FISHING_EVENT_ID
) ORF
WHERE
  ORF.\"landed\">0 OR ORF.\"discard\">0 OR ORF.POP>0 OR ORF.ORF>0 OR ORF.TAR>0
;
```

APPENDIX C – CATCH RECONSTRUCTION ALGORITHM (R CODE)

```
# POP - Pacific Ocean Perch
x=buildCatch(sql=TRUE,strSpp="396",dfld="TRF",wmf=TRUE,pwd=c("pwd1","pw2"))

# YYR - Yelloweye Rockfish
x=buildCatch(sql=TRUE,strSpp="442",dfld="ORF",wmf=TRUE,pwd=c("pwd1","pwd2"))
```

R FUNCTION: BUILDCATCH

```
#buildCatch-----------------------------2011-06-02
# Catch reconstruction algorithm for BC rockfish.
# Use ratios of species catch to ORF catch for multiple fisheries.
# Matrix indices: i=year, j=major, k=fid, l='spp'
#-----------------------------------------------RH
buildCatch=function(dbdat, sql=FALSE, strSpp="424", dfld="ORF",
     major=c(1,3:9), refyrs=1997:2005, fidout=c(1:5,10),
     saveinfo=TRUE, wmf=FALSE, uid=Sys.info()["user"], pwd=uid,
     reconstruct=TRUE){

    ### Global list object 'PBSfish' stores results from the analysis
    assign("PBSfish",list(call=match.call(),args=args(buildCatch),module="M03_Fishery",
        spp=strSpp),envir=.GlobalEnv)
    ### Function to convert numbers to proportions
    pcalc=function(x){if (all(x==0)) rep(0,length(x)) else x/sum(x)}
    sysyr=as.numeric(substring(Sys.time(),1,4)) ### maximum possible year

    ### -------------------------------------------------------
    ### 1. Compile the historical catches for POP, ORF and TRF
    ### -------------------------------------------------------

    getFile(orfhistory,use.pkg=TRUE,scope="G"); dat=orfhistory ### catch in kg
    hisyrs=sort(unique(dat$year))
    HISYRS=hisyrs[1]:hisyrs[length(hisyrs)]
    majhis=sort(unique(dat$major))
    sou=sort(unique(dat$source))
    act=sort(unique(dat$action))
    fsh=sort(unique(dat$fishery))

    htab=array(0,dim=c(length(HISYRS),length(majhis),length(sou),length(act),length(fsh),3),
        dimnames=list(HISYRS,majhis,sou,act,fsh,c("POP","ORF","TRF")))
    names(dimnames(htab))=c("year","major","source","action","fishery","catch")

    for (a in act) {
        adat=dat[is.element(dat$action,a),]
        if(nrow(adat)==0) next
        for (b in fsh) {
            bdat=adat[is.element(adat$fishery,b),]
            if(nrow(bdat)==0) next
            for (i in sou) {
                ii=as.character(i)
                idat=bdat[is.element(bdat$sou,i),]
                if(nrow(idat)==0) next
                for (j in majhis) {
                    jj=as.character(j)
                    jdat=idat[is.element(idat$major,j),]
                    if(nrow(jdat)==0) next
                    z=is.element(jdat$spp,"396")
                    if (any(z)) {
                        POP= sapply(split(jdat$catch[z],jdat$year[z]),sum,na.rm=TRUE)/1000
                        htab[names(POP),jj,ii,a,b,"POP"]=POP }
                    ORF= sapply(split(jdat$catch[!z],jdat$year[!z]),sum,na.rm=TRUE)/1000
                    TRF= sapply(split(jdat$catch,jdat$year),sum,na.rm=TRUE)/1000
                    htab[names(ORF),jj,ii,a,b,"ORF"]=ORF
```

```
              htab[names(TRF),jj,ii,a,b,"TRF"]=TRF
} } } } ### close loops j,i,b,a

### For the years 1918 to 1949, no records exist to delineate POP, ORF, and TRF.
### In essence TRF = ORF for Dominion Bureau Stats and Stewart's US catch of BC rockfish
### Therefore, use empirical data from 1951 to 1995 to estimate ORF from TRF (the difference
is POP).
sARF = apply(htab,c(1,6),sum)                                          ### sum of all
rockfish
zUNK = is.element(rownames(sARF),as.character(1918:1952))              ### unknown ORF and
POP
zOBS = is.element(rownames(sARF),as.character(c(1953:1965,1967:1995)))  ### exclude anomalous
1966 observation
oTRF = sARF[zOBS,"TRF"]
oORF = sARF[zOBS,"ORF"]
lmo  = lm(log2(oORF)~log2(oTRF))
alp  = lmo$coeff[1]; bet = lmo$coeff[2]
htab[zUNK,,,,,"ORF"] = pmin(htab[zUNK,,,,,"TRF"],2^(alp+bet*log2(htab[zUNK,,,,,"TRF"])))
    ### ORF cannot be bigger than TRF
htab[zUNK,,,,,"POP"] = htab[zUNK,,,,,"TRF"] - htab[zUNK,,,,,"ORF"]

htabmax=htab[,,,"max",,]
### historical maximum catch (POP,ORF,TRF) by year, major, gear (i.e. comparative):
hismax=apply(htabmax,c(1:2,4:5),max,na.rm=TRUE)
htabadd=htab[,,,"add",,]
### historical unique catch (POP,ORF,TRF) by year, major, gear (i.e. additive):
hisadd=apply(htabadd,c(1:2,4:5),sum,na.rm=TRUE)
if (saveinfo)
    packList(c("htab","htabmax","htabadd","hismax","hisadd"),"PBSfish")
### Historical used again on line 335

### ------------------------------------------------
### 2. Gather the RRF catches (landed and discarded)
### ------------------------------------------------

if (missing(dbdat) && sql==FALSE) {
    mess=paste("Either provide a list object 'dbdat' or set 'sql=TRUE'.\n\n",
        "Ideally, 'dbdat' should contain data frames:\n",
        "'ph3cat' = PacHarv3 database (all fisheries)\n",
        "'gfcdat' = GFCatch database (trawl, trap, h&l)\n",
        "'phtdat' = PacHarvest database (groundfish trawl)\n",
        "'phhdat' = PacHarvHL database (halibut bycatch from DMP validated landings)\n",
        "'phsdat' = PacHarvSable database (sablefish trap)\n",
        "'phvdat' = PacHarvHL database (validated landings Sched II & ZN)\n",
        "'phfdat' = PacHarvHL database (fisherlog records Sched II & ZN)\n",
        "'fosdat' = GFFOS database on the GFSH server (all fisheries)\n",
        "with fields:\nc( 'fid', 'date', 'major', 'landed', 'discard', 'POP', 'ORF', 'TAR'
)",sep="")
    showError(mess,as.is=TRUE,x=0.05,adj=0,cex=1.2) }

lenv=sys.frame(sys.nframe()) ### local environment
cflds = c("landed","discard","POP","ORF","TAR")
keep  = c("fid","date","major","minor",cflds)
ufos  = c("POP","PAH","SBF","DOG","RFA","RFA","PAH","DOG","LIN")
dbs   = c("ph3cat","gfccat","phtcat","phhcat","phscat","phvcat","phfcat","foscat")

if (sql) {
    if (isThere("PBSdat")) rm(PBSdat) ### remove from current environment
    uid=rep(uid,2)[1:2]; pwd=rep(pwd,2)[1:2]

    ###-----Start querying the databases-----

    ### PacHarv3 catch summary for fids 1:5 and 0 (unknown)
    getData("ph3_fcatORF.sql",dbName="HARVEST_V2_0",strSpp=strSpp,path=.getSpath(),
        server="ORAPROD",type="ORA",trusted=FALSE,uid=uid[1],pwd=pwd[1])
        assign("ph3dat",PBSdat); rm(PBSdat,envir=.GlobalEnv) ### just to be safe
        dimnames(ph3dat)[[1]]=1:nrow(ph3dat)
        save("ph3dat",file="ph3dat.rda")

    ### GFCatch records for fids (1,3,5)
    getData("gfc_fcatORF.sql","GFCatch",strSpp=strSpp,path=.getSpath())
```

```
        assign("gfcdat",PBSdat); rm(PBSdat,envir=.GlobalEnv) ### just to be safe
        gfcdat$year=as.numeric(substring(gfcdat$date,1,4))
        dimnames(gfcdat)[[1]]=1:nrow(gfcdat)
        save("gfcdat",file="gfcdat.rda")

    ### PacHarvest records for fids (1)
    getData("pht_tcatORF.sql","PacHarvest",strSpp=strSpp,path=.getSpath())
        assign("phtdat",PBSdat); rm(PBSdat,envir=.GlobalEnv) ### just to be safe
        save("phtdat",file="phtdat.rda")

    ### PacHarvHL halibut validation records for fids (2,7)
    getData("phhl_hcatORF.sql","PacHarvHL",strSpp=strSpp,path=.getSpath())   ### validated
(DMP) catch
        assign("phhdat",PBSdat); rm(PBSdat,envir=.GlobalEnv) ### just to be safe
        save("phhdat",file="phhdat.rda")

    ### PacHarvSable fisherlogs for fids (3)
    getData("phs_scatORF.sql","PacHarvSable",strSpp=strSpp,path=.getSpath(),fisheryid=3,
        logtype="FISHERLOG")
        assign("phsdat",PBSdat); rm(PBSdat,envir=.GlobalEnv) ### just to be safe
        save("phsdat",file="phsdat.rda")

    ### PacHarvHL validation records for fids (2,4,5)
    getData("phhl_vcatORF.sql","PacHarvHL",strSpp=strSpp,path=.getSpath())   ### validated
(DMP) catch
        assign("phvdat",PBSdat); rm(PBSdat,envir=.GlobalEnv) ### just to be safe
        save("phvdat",file="phvdat.rda")

    ### PacHarvHL fisherlog records for fids (4,5)
    getData("phhl_fcatORF.sql","PacHarvHL",strSpp=strSpp,path=.getSpath(),
        logtype="FISHERLOG") ### fisherlog catch
        assign("phfdat",PBSdat); rm(PBSdat,envir=.GlobalEnv) ### just to be safe
        save("phfdat",file="phfdat.rda")

    ### FOS catch from all fisheries (fid=1:5)
    getData("fos_vcatORF.sql",dbName="GFFOS",strSpp=strSpp,path=.getSpath(),
        server="GFSH",type="ORA",trusted=FALSE,uid=uid[2],pwd=pwd[2])
        assign("fosdat",PBSdat); rm(PBSdat,envir=.GlobalEnv) ### just to be safe
        dimnames(fosdat)[[1]]=1:nrow(fosdat)
        save("fosdat",file="fosdat.rda")

    ### Wrap up the fisheries landings into a list object
    blob=list(ph3dat=ph3dat,gfcdat=gfcdat,phtdat=phtdat,phhdat=phhdat,phsdat=phsdat,
        phvdat=phvdat,phfdat=phfdat,fosdat=fosdat)
    eval(parse(text=paste("dbdat=\"cat",strSpp,"orf\"",sep="")))
    expr=paste(dbdat,"=blob; save(\"",dbdat,"\",file=\"",dbdat,".rda\")",sep="")
    eval(parse(text=expr))
    ###-----Stop querying the databases-----
}
else {
    dbdat=as.character(substitute(dbdat)) ### database list object name
    expr=paste("getFile(",dbdat,",try.all.frames=TRUE,scope=\"G\");
        fnam=names(",dbdat,"); unpackList(",dbdat,")",sep="")
    eval(parse(text=expr))
}

### Consolidate PacHarv3 records (fid=c(1:5))
ph3cat = as.data.frame(t(apply(ph3dat,1,function(x){
    ufos=c("POP","PAH","SBF","DOG","RFA"); ufid=1:5; names(ufid)=ufos
    f = x["fid"]
    if (f==0) {
        z = x[ufos]==max(x[ufos],na.rm=TRUE)
        utar = ufos[z][1]; fid = ufid[utar]; ucat = x[utar]
    }
    else { fid=f; ucat=x[ufos[f]] }
    out = c(x["year"],fid,date=as.Date(paste(x["year"],"-07-01",sep="")),
        x[c("major","minor","landed","discard","POP","ORF")],ucat)
    return(out) } )))
names(ph3cat) = c("year",keep)
ph3cat$date = as.Date(paste(ph3cat$year,"-07-01",sep=""))
ph3cat = ph3cat[,-1] ### get rid of 'year'
```

```
save("ph3cat",file="ph3cat.rda")

### Consolidate GFCatch records (fid=c(1,3,5))
gfccat = gfcdat
gfccat$TAR = rep(0,nrow(gfccat))
for (i in 1:5) {
    ii = is.element(gfccat$fid,i)
    if (any(ii)) gfccat$TAR[ii] = gfccat[,ufos[i]][ii]
}
gfccat = gfccat[,keep]
trash  = apply(gfccat[,cflds],1,function(x){all(x==0)})
gfccat = gfccat[!trash,] ; dimnames(gfccat)[[1]] = 1:nrow(gfccat)
save("gfccat",file="gfccat.rda")

### Consolidate PacHarvest landings (fid=1)
phtcat = phtdat[,keep]
trash  = apply(phtcat[,cflds],1,function(x){all(x==0)})
phtcat = phtcat[!trash,] ; dimnames(phtcat)[[1]] = 1:nrow(phtcat)
save("phtcat",file="phtcat.rda")

### Consolidate PacHarvHL halibut bycatch (fid=2)
phhcat = phhdat
phhcat$TAR = phhcat$PAH
phhcat = phhcat[,keep]
phhcat$fid = rep(2,nrow(phhcat))  ### because there are a few fid=7 (halibut + sablefish)
trash  = apply(phhcat[,cflds],1,function(x){all(x==0)})
phhcat = phhcat[!trash,] ; dimnames(phhcat)[[1]] = 1:nrow(phhcat)
save("phhcat",file="phhcat.rda")

### Consolidate PacHarvSable landings (fid=3)
phscat = phsdat[,keep]
trash  = apply(phscat[,cflds],1,function(x){all(x==0)})
phscat = phscat[!trash,] ; dimnames(phscat)[[1]] = 1:nrow(phscat)
save("phscat",file="phscat.rda")

### Consolidate PacHarvHL validation landings (fid=c(2,4,5))
phvcat = phvdat
phvcat$TAR = rep(0,nrow(phvcat))
for (i in 1:9) {
    ii = is.element(phvcat$fid,i)
    if (any(ii)) {
        phvcat$TAR[ii] = phvcat[,ufos[i]][ii]
        if (i==4) phvcat$TAR[ii] = phvcat$TAR[ii] + phvcat$LIN[ii] ### add lingcod to dogfish
if Sched II
        if (i==6) phvcat$fid[ii] = 5                               ### Sablefish/ZN
        if (i==7) phvcat$fid[ii] = 2                               ### Sablefish/Halibut
        if (any(i==c(8,9))) phvcat$fid[ii] = 4                     ### Dogfish or lingcod
    }
}
phvcat = phvcat[,keep]
trash  = apply(phvcat[,cflds],1,function(x){all(x==0)})
phvcat = phvcat[!trash,] ; dimnames(phvcat)[[1]] = 1:nrow(phvcat)
save("phvcat",file="phvcat.rda")

### Consolidate PacHarvHL fisherlog records (fid=c(4,5))
phfcat = phfdat[,keep]
trash=apply(phfcat[,cflds],1,function(x){all(x==0)})
phfcat=phfcat[!trash,]; dimnames(phfcat)[[1]]=1:nrow(phfcat)
save("phfcat",file="phfcat.rda")

### Consolidate GFFOS records (fid=1:5)
z = fosdat$date >= as.POSIXct("2000-01-01") & fosdat$date <= Sys.time()  ### up to the
current date
#z = fosdat$date >= as.POSIXct("2000-01-01") & fosdat$date <= as.POSIXct("2010-06-30") ###
for 2010 POP assessment
foscat = fosdat[z,keep]
trash=apply(foscat[,cflds],1,function(x){all(x==0)})
foscat=foscat[!trash,]; dimnames(foscat)[[1]]=1:nrow(foscat)
save("foscat",file="foscat.rda")

modyrs = majmod = fid = NULL
```

```
for (i in dbs) {
    if(!isThere(i,envir=lenv)) next
    icat=get(i)
    modyrs=c(modyrs,unique(as.numeric(substring(icat$date,1,4))))
    majmod=c(majmod,unique(icat$major))
    fid=c(fid,unique(icat$fid)) }
modyrs=sort(unique(modyrs)); majmod=sort(unique(majmod)); fid=sort(unique(fid))
modyrs=modyrs[is.element(modyrs,1945:sysyr)]

if (isThere("refyrs") && !is.null(refyrs) && length(intersect(refyrs,modyrs))==0)
    showError("refyrs","nodata")
MODYRS=modyrs[1]:modyrs[length(modyrs)]

### Need to reconcile majors (remove concept of referrence majors)
majmax=intersect(majhis,majmod)  ### maximum available overlap in majors from data
if (is.null(major))
    MM=majmax
else
    MM=intersect(major, majmax)
mm = as.character(MM)
Cflds=c("landed","discard","POP","ORF","TRF","TAR")

### Collect modern landings (t), including those in unknown areas
catmod0=array(0,dim=c(length(MODYRS),length(majmod),length(fid),length(Cflds),length(dbs)),
    dimnames=list(year=MODYRS,major=majmod,fid=fid,catch=Cflds,dbs=dbs))
for (a in dbs) {
    if(!isThere(a,envir=lenv)) next
    acat=get(a)
    acat$year = as.numeric(substring(acat$date,1,4))
    acat$TRF  = acat[["POP"]] + acat[["ORF"]]  ### total rockfish
    if (is.null(acat$discard)) acat$discard = rep(0,nrow(acat))
    for (k in fid) {
        kk=as.character(k)
        kdat=acat[is.element(acat$fid,k),]
        if(nrow(kdat)==0) next
        for (j in majmod) {
            jj=as.character(j)
            jdat=kdat[is.element(kdat$major,j),]
            if(nrow(jdat)==0) next
            landed=sapply(split(jdat$landed,jdat$year),sum,na.rm=TRUE)/1000.
            POP=  sapply(split(jdat$POP,jdat$year),sum,na.rm=TRUE)/1000.
            ORF=  sapply(split(jdat$ORF,jdat$year),sum,na.rm=TRUE)/1000.
            TRF=  sapply(split(jdat$TRF,jdat$year),sum,na.rm=TRUE)/1000.
            TAR=  sapply(split(jdat$TAR,jdat$year),sum,na.rm=TRUE)/1000.
            catmod0[names(landed),jj,kk,"landed",a] = landed
            catmod0[names(POP),jj,kk,"POP",a]       = POP
            catmod0[names(ORF),jj,kk,"ORF",a]       = ORF
            catmod0[names(TRF),jj,kk,"TRF",a]       = TRF
            catmod0[names(TAR),jj,kk,"TAR",a]       = TAR
            if (!is.null(jdat$discard)){
                discard=sapply(split(jdat$discard,jdat$year),sum,na.rm=TRUE)/1000.
                catmod0[names(discard),jj,kk,"discard",a] = discard }
} } } ### close loops j & k & i

### Allocate catch (t) from unknown major (code=0) to user-specified majors (mm)
catmod1=catmod0[,is.element(dimnames(catmod0)[[2]],mm),,,,drop=FALSE]
for (aa in dimnames(catmod1)$dbs) {          ### databases
    for (kk in dimnames(catmod1)$fid) {       ### fishery IDs
        for (ll in dimnames(catmod1)$catch) {  ### catch categories
            pmaj=apply(catmod1[,mm,kk,ll,aa],1,pcalc)
            allo=apply(pmaj,1,function(x,u){x*u},u=catmod0[,"0",kk,ll,aa])
            catmod1[,mm,kk,ll,aa] = catmod1[,mm,kk,ll,aa] + allo
} } }

### Merge modern landings from various databases (ie, collapse DB sources)
catmod=array(0,dim=rev(rev(dim(catmod1))[-1]), dimnames=rev(rev(dimnames(catmod1))[-1]))
ii = dimnames(catmod)$year
jj = dimnames(catmod)$major
ll = dimnames(catmod)$catch
for (kk in dimnames(catmod)$fid) {  ### fishery IDs
    k = as.numeric(kk)
```

```
    dbmerge = switch(k,
        dbs[c(1,2,3,8)], dbs[c(1,4,6,8)], dbs[c(1,2,5,8)], dbs[c(1,6,7,8)], dbs[c(1,2,6,7,8)])
    ### adjust for quirks in DB transitions
    fcat = apply(catmod1[ii,jj,kk,ll,dbmerge,drop=FALSE],1:4,max)
    catmod[ii,jj,kk,ll]=fcat
    if (any(k==c(1,3))) {
        if (k==1) { iii="2007"; aaa=c("phtcat","foscat") }
        if (k==3) { iii="2006"; aaa=c("phscat","foscat") }
        qcat=apply(catmod1[iii,jj,kk,ll,aaa,drop=FALSE],1:4,sum) }
    if (any(k==c(2,4,5))) {
        iii = "2006"
        if (k==2) { aaa=c("phhcat","phvcat","foscat") }
        if (any(k==c(4,5))) { aaa=c("phvcat","phfcat","foscat") }
        qcat=apply(catmod1[iii,jj,kk,ll,aaa,drop=FALSE],1:4,function(x){ max(x[1:2]) + x[3] })
}
    catmod[iii,jj,kk,ll] = qcat
}
expr=paste("cat",strSpp,"mod=catmod;
save(\"cat",strSpp,"mod\",file=\"cat",strSpp,"mod.rda\")",sep="")
eval(parse(text=expr))

if (isThere("refyrs") && !is.null(refyrs) )
    ctab = catmod[as.character(refyrs),,,,drop=FALSE]
else ctab=catmod

### Get three historical time lines : trawl, trap, & H&L
tmp0=hismax[,mm,,,drop=FALSE]
allhis=array(0,dim=dim(tmp0),dimnames=dimnames(tmp0)) ### initialize the POP/ORF/TRF array
for (l in dimnames(allhis)[[4]]) {
    for (k in fsh) {
        tmp1=hismax[,,k,l]
        tmp1=tmp1[,mm,drop=FALSE]  ### use only specified majors
        tmp2=hisadd[,,k,l]
        tmp2=tmp2[,mm,drop=FALSE]  ### use only specified majors
        allhis[,,k,l]=tmp1+tmp2
    }
}
orfhis=allhis[,,,dfld]
if (any(strSpp==c("396"))) rawhis=allhis[,,,"POP"]
if (saveinfo)
    packList(c("catmod","catmod0","catmod1","ctab","MM","mm","allhis"),"PBSfish")
### Terminate here if all you want are the modern landings
if (!reconstruct) return(list(catmod0=catmod0,catmod1=catmod1,catmod=catmod))

### -------------------
### 3. Calculate ratios
### -------------------

### Catch reference summary tables
cref=ctab[,mm,,,drop=FALSE]                ### catch reference
catMF=apply(cref,2:4,sum,na.rm=TRUE)       ### total catch by major and fid
catYM=apply(cref,c(1:2,4),sum,na.rm=TRUE)  ### total catch by year and major
catYF=apply(cref,c(1,3:4),sum,na.rm=TRUE)  ### total catch by year and fid
if (saveinfo)
    packList(c("cref","catYM","catMF","catYF"),"PBSfish")

### alpha - Proportion RRF caught in a major area for each fid
alpha=apply(catMF[,,"landed"],2,function(x){
    if (all(x==0)) rep(0,length(x)) else x/sum(x)}) ### columns (fids) sum to 1
dimnames(alpha)=dimnames(catMF)[1:2]

### beta - Proportion RRF caught in H&L fisheries for each major
dnam=intersect(c("2","4","5"),dimnames(alpha)[[2]]) ### dimnames for H&L
beta=t(apply(catMF[,dnam,"landed",drop=FALSE],1,function(x){
    if (all(x==0)) rep(0,length(x)) else x/sum(x)})) ### columns (fids) sum to 1
dimnames(beta)[[2]]=dnam
### Ratio RRF catch to other catch (rtar)
rtar=list()
### Use cref instead of catMF
for (i in c("POP","ORF","TRF","TAR")) {
    z0  = cref[,,"landed"]==0
```

```
    z1  = cref[,,,i]==0
    z2  = z0&z1
    rtmp = cref[,,,"landed"]/cref[,,,i]
    ### order is important here (process equalities, zero-denominator, then zero-numerator)
    rtmp[z2]=0; rtmp[!z2&z1]=1; rtmp[!z2&!z1&z0]=0
    rmat = apply(rtmp,2:3,mean)
    rtar[[i]] = rmat }

### gamma - Ratio of RRF to a larger group (e.g., other rockfish)
rfac=rtar[[dfld]]
gamma=rfac[mm,,drop=FALSE]  ### use only specified majors

### delta - Discard rate of landed species per ORF from observer logs
assign("PBSfish",PBSfish) ### remember global collection object because 'calcRatio'
overwrites it
drSpp=list(c("discard","landed"),c("discard","TAR"),c("discard","ORF"))
drate=sapply(drSpp,function(x){paste(x,collapse=":")}) ### discard ratio description
drN=length(drSpp)                                      ### number of discard rates
dfac=array(0,dim=c(length(mm),length(fid),drN+1),
    dimnames=list(major=mm,fid=fid,rate=c(drate,"dr")))
ologs=as.list(rep(NA,length(fid))); names(ologs)=fid
for (k in fid) {
    kk=as.character(k); jj=dimnames(dfac)[[1]]; j=as.numeric(jj)
    if (k==1) {
        discat=phtcat[is.element(phtdat$log,1),]
        dyrs=1996:2006 }
    else if (any(k==c(2:5))) {
        if (any(k==c(2,4,5)))
            getData("phhl_fcatORF.sql","PacHarvHL",strSpp=strSpp,
                path=.getSpath(),fisheryid=k,logtype="OBSERVRLOG")
        if (k==3)
            getData("phs_scatORF.sql","PacHarvSable",strSpp=strSpp,
                path=.getSpath(),fisheryid=k,logtype="OBSERVRLOG")
        discat=PBSdat; dyrs=2000:2004 }
    if (nrow(discat)==0) next
    ologs[[kk]] = discat

    for (d in 1:drN) { ### discard ratio combos 'drSpp'
        dd=drate[d]
        ### if denominator is landed catch, allow zero-value denominators:
        dzero=nzero=ifelse(drSpp[[d]][2]=="landed",TRUE,FALSE)
        DRAT=calcRatio(discat,drSpp[[d]][1],drSpp[[d]][2],major=j,dzero=dzero,quiet=TRUE)
        if (is.null(DRAT)) next
        drat=apply(DRAT[is.element(rownames(DRAT),as.character(dyrs)),,drop=FALSE],
            2,mean,na.rm=TRUE)
        drat=drat[intersect(names(drat),jj)]
        dfac[names(drat),kk,dd]=drat
    }
    if (any(k==c(1,5)))
        dfac[jj,kk,"dr"]=dfac[jj,kk,"discard:landed"]
    if (any(k==c(2,3,4)))
        dfac[jj,kk,"dr"]=dfac[jj,kk,"discard:TAR"]
}
assign("PBSfish",PBSfish,envir=.GlobalEnv); rm(PBSfish) ### restore to global and remove
local
save("ologs",file=paste("ologs",strSpp,".rda",sep=""))  ### save observerlogs  with discard
information
dfac[is.na(dfac)] = 0; delta = dfac
if (saveinfo)
    packList(c("alpha","beta","rtar","gamma","delta"),"PBSfish")

fidnam=c("trawl","halibut","sablefish","sched2","zn","sabzn","sabhal","dogfish","lingcod","co
mbined")
fshnam=c("trawl","h&l","trap",rep("h&l",6),"combined")  ### general category vector

### -------------------------------------------------
### 4. Allocate the ancient rockfish catch by unknown
###    gear type to RRF by fishery.
### -------------------------------------------------

### Get sector allocation for very early series from sales slip data (Obradovich)
```

```
ancyrs=1918:1950; prewar=ancyrs[1]:1938; postwar=1939:rev(ancyrs)[1]
gear=c("h&l","trap","trawl")
epoch=c("prewar","postwar")
cobra=htab[as.character(1951:1952),mm,"Obradovich","max",gear,"ORF"]
major.gear=t(apply(apply(cobra,2:3,sum),1,function(x){
    if (all(x==0)) rep(0,length(x)) else x/sum(x)}))

### lambda – Proportion of early catch by general gear type
lambda=array(0,dim=c(dim(major.gear),2),dimnames=list(major=mm,gear=gear,epoch=epoch))
lambda[,"h&l","prewar"]=0.9; lambda[,"trap","prewar"]=0; lambda[,"trawl","prewar"]=0.1
lambda[rownames(major.gear),colnames(major.gear),"postwar"]=major.gear

ancient=array(0,dim=c(length(ancyrs),length(mm),length(fid)),
    dimnames=list(year=ancyrs,major=mm,fid=fid))

oldies=sapply(epoch,function(x){get(x)},simplify=FALSE)
for (i in names(oldies)) {
    oldyrs=oldies[[i]]
    ii=as.character(oldyrs); jj=mm
    L245=lambda[,"h&l",i] * beta  ### expand h&l contribution to fid (2,4,5)
    LAMBDA=cbind(lambda[,"trawl",i],L245[,"2"],lambda[,"trap",i],L245[,c("4","5")]) ### prop.
combined ORF by major and fid
    dimnames(LAMBDA)[[2]]=fid
    gamma.lambda = gamma * LAMBDA ### prop. of combined ORF comprising RRF by PMFC and FID

    ### Partition the 'combined' rockfish catch to fids
    for (k in fid) {
        kk=as.character(k)
        decon = t(apply(orfhis[ii,jj,"combined"],1,function(x,gala){
            x*gala},gala=gamma.lambda[,kk]))
        ancient[ii,jj,kk]=ancient[ii,jj,kk] + decon
    }
}
if (saveinfo)
    packList(c("cobra","lambda","gamma.lambda","fidnam","fshnam","ancient"),"PBSfish")

### ----------------------------
### 5. Reconstruct the RRF catch
### ----------------------------

ALLYRS=sort(union(HISYRS,MODYRS)); nyrs=length(ALLYRS)
sppnew=array(0,dim=c(nyrs,length(mm),length(fid)+1),
    dimnames=list(year=ALLYRS,major=mm,fid=c(fid,10))) ### initilaize the catch array for the
reconstruction

### Add the ancient RRF
sppnew[as.character(ancyrs),mm,as.character(fid)]=ancient

### Allocation matrix from K to k
BETA=cbind(rep(1,length(mm)),beta[,"2"],rep(1,length(mm)),beta[,c("4","5")])
dimnames(BETA)[[2]]=fid
beta.gamma = BETA * gamma  ### Expansion of RRF:ORF from K to k

for (k in fid) {
    kk=as.character(k)
    ### Reconstruct catch history form data with gear type K.
    ### Years to estimate landings of 'strSpp' from ORF/TRF
    estYRS=HISYRS
    if (strSpp=="396" && k==1) {
        ### POP trawl catch relatively well known back to 1956
        estYRS=HISYRS[1]:1955; useYRS=1956:rev(HISYRS)[1] }
    if (any(strSpp==c("442","396")) && any(k==c(4,5))) {
        ### YYR H&L catch relatively well known back to 1982
        estYRS=HISYRS[1]:1981; useYRS=1982:rev(HISYRS)[1] }
    ii=as.character(estYRS)
    recon=t(apply(orfhis[ii,,fshnam[k]],1,function(x,bega){x*bega},bega=beta.gamma[,kk]))

    ### Combine estimated RRF landings with reported RRF landings
    if (strSpp=="396" && k==1) {
        rawcat=rawhis[as.character(useYRS),,fshnam[k]]
        recon=rbind(recon,rawcat) }
```

```
    if (any(strSpp==c("442","396")) && any(k==c(4,5))) {
        rawcat=catmod[as.character(useYRS),jj,kk,"landed"]
        recon=rbind(recon,rawcat) }
    ii=dimnames(recon)[[1]]; jj=dimnames(recon)[[2]]
    sppnew[ii,jj,kk] = sppnew[ii,jj,kk] + recon[ii,jj,drop=FALSE]

    ### Mesh modern RRF landings with reconstructed RRF landings
    modern = catmod[,jj,kk,"landed"]
    imod   = dimnames(modern)[[1]]
    zmod   = (modern - sppnew[imod,jj,kk]) > 0
    sppnew[imod,jj,kk][zmod] = modern[zmod]   ### use maximum values

    ### Add in the RRF discards
    ### discard rate - either RRF discard:RRF landed or RRF discard:TAR landed
    dr=delta[,kk,"dr"]
    ### inone = years when RRF discards assumed reported in landings
    ### icalc = years when RRF discards calculated by rates
    ### idata = years when RRF discards reported as data
    discard.regimes = switch( k,
        list(inone=ALLYRS[1]:1953, icalc=1954:1995, idata=1996:ALLYRS[nyrs]),  ### trawl
        list(inone=ALLYRS[1]:1978, icalc=1979:2005, idata=2006:ALLYRS[nyrs]),  ### halibut
        list(inone=ALLYRS[1]:1985, icalc=1986:2005, idata=2006:ALLYRS[nyrs]),  ### sablefish
        list(inone=ALLYRS[1]:1985, icalc=1986:2005, idata=2006:ALLYRS[nyrs]),  ### schedule II
        list(inone=ALLYRS[1]:1985, icalc=1986:2005, idata=2006:ALLYRS[nyrs]))  ### ZN rockfish
    unpackList(sapply(discard.regimes,as.character))

    ### Calculate/retrieve the RRF discards
    if (any(k==c(1,5))) {
        icalc=intersect(dimnames(sppnew)[[1]],icalc)
        kcalc=sppnew[,,kk] }
    if (any(k==c(2,3,4))) {
        icalc=intersect(dimnames(catmod)[[1]],icalc)
        kcalc=catmod[,,kk,"TAR"] }
    kcalc = kcalc[icalc,jj,drop=FALSE]
    disC  = t(apply(kcalc,1,function(x,dr){x*dr},dr=dr))
    idata = intersect(dimnames(catmod)[[1]],idata)
    disD  = catmod[,,kk,"discard"]
    disD  = disD[idata,jj,drop=FALSE]

    ### Add in the RRF discards
    sppnew[icalc,jj,kk]  = sppnew[icalc,jj,kk]   + disC[icalc,jj]
    sppnew[idata,jj,kk]  = sppnew[idata,jj,kk]   + disD[idata,jj]
}
sppnew[,,"10"] = apply(sppnew[,,as.character(fid)],1:2,sum)  ### sum across fisheries
expr=paste("cat",strSpp,"rec=sppnew;
save(\"cat",strSpp,"rec\",file=\"cat",strSpp,"rec.rda\")",sep="")
eval(parse(text=expr))

if (saveinfo) packList(c("HISYRS","MODYRS","ALLYRS","inone","icalc","idata",
    "disC","disD","sppnew"),"PBSfish")

###-----Plot results-----
fidlab=c("Trawl","Halibut","Sablefish","Dogfish-Lingcod"," H&L Rockfish","Sablefish + ZN",
    "Sablefish + Halibut","Dogfish","Lingcod","Combined Fisheries")
MAJ=dimnames(hismax)$major
clrs=rep("gainsboro",length(MAJ)); names(clrs)=MAJ
clrs[as.character(c(1,3:9))]=c("moccasin","blue","lightblue","yellow","orange","red","seagree
n","lightgreen")
mclrs=clrs[mm]
data(pmfc,species);

### ADMB catch data file for the combined fishery
admdat = paste("admb-cat",strSpp,".dat",sep="")
cat(paste("# Catch History",species[strSpp,"latin"],sep=" - "),"\n\n",sep="",file=admdat)
mess = c(
    "# number of years of catch data 'NYearCat'\n", ALLYRS[nyrs]-ALLYRS[1]+1, "\n",
    "# start year 'tilde{t}' in model\n", ALLYRS[1], "\n",
    "# end year\n", ALLYRS[nyrs], "\n",
    "# number of areas\n", length(mm), "\n",
    "# areas (column headings of matrix), areas 5, 6 and 7 give QCS.\n",
    paste(mm,collapse="   "), "\n\n",
```

```
        "# catch history in tonnes (all fisheries combined)\n",
        "#  first column lists the years, each row gives the\n",
        "#  catch in corresponding area that year. Size is therefore\n",
        "#  (end year - start year + 1) * (number of areas + 1)\n\n")
    cat(paste(mess,collapse=""),file=admdat,append=TRUE)
    for (i in 10){
        ii = as.character(i)
        cat("# ",fidlab[i],"\n",sep="",file=admdat,append=TRUE)
        mess = cbind(year=as.numeric(rownames(sppnew)),
            apply(sppnew[,,ii],1,function(x){

        paste(show0(format(round(x,3),scientific=FALSE,width=12,justify="right"),3,add2int=TRUE),
    collapse="") } ) )
        cat(paste(apply(mess,1,paste,collapse=""),collapse="\n"),sep="",file=admdat,append=TRUE)
        cat("\n\n",file=admdat,append=TRUE) }

    ### Output specified FID catch (fidout) as both CSV and WMF
    onam=paste("Catch-History-",strSpp,".csv",sep="")  ### output file name
    cat(paste("Catch History",species[strSpp,"latin"],sep=" - "),"\n",sep="",file=onam)
    #warn=options()$warn; options(warn=-1)
    xlab=dimnames(sppnew)[[1]];  xpos=(1:length(xlab))-.5
    for (i in fidout){
        ii=as.character(i)
        cat(fidlab[i],"\n",sep="",file=onam,append=TRUE)
        cat("year,",paste(colnames(sppnew),collapse=","),"\n",sep="",file=onam,append=TRUE)

        apply(cbind(year=rownames(sppnew),sppnew[,,ii]),1,function(x){cat(paste(x,collapse=","),"
    \n",sep="",file=onam,append=TRUE)})
        cat("\n",file=onam,append=TRUE)
        plotname=paste(strSpp,"-Catch-History-",fidnam[i],sep="")
        if (wmf) win.metafile(paste(plotname,".wmf",sep=""),width=10,height=5)
        else  resetGraph()
        expandGraph(mar=c(3,3,.5,.5))
        barplot(t(sppnew[,,ii]),col=0,space=0,xaxt="n",yaxt="n",xaxs="i")
        yaxp=par()$yaxp; yint=yaxp[2]/yaxp[3]; hlin=seq(yint,yaxp[2],yint)
        segments(rep(0,length(hlin)),hlin,rep(length(xpos),length(hlin)),hlin,col="gainsboro")

        barplot(t(sppnew[,,ii]),col=mclrs,space=0,cex.names=.8,mgp=c(1.5,.5,0),xaxt="n",xaxs="i",
    add=TRUE)
        axis(1,at=xpos,labels=xlab,tick=FALSE,las=3,mgp=c(0,.2,0),cex.axis=.7,hadj=1)
        legend("topleft",fill=rev(mclrs),legend=rev(pmfc[mm,"gmu"]),
            bty="n", cex=0.8, xjust=0, inset=.05)
        addLabel(.5,.97,species[strSpp,"latin"],font=3,cex=1,col="#400080")
        addLabel(.5,.92,fidlab[i],cex=1.2,col="#400080")
        mtext("Year",side=1,line=1.75,cex=1.2)
        mtext("Catch (t)",side=2,line=2,cex=1.3)
        if (wmf) dev.off()
    }
    #options(warn=warn)
    if (saveinfo) {
        packList(c("plotname","clrs","mclrs","fidlab"),"PBSfish")
        save("PBSfish",file=paste("PBSfish",strSpp,".rda",sep="")) }
    invisible(sppnew) }
#---------------------------------------buildCatch
```