CHAPTER 2 ALTERNATIVES

2.1 Harvest Specifications

Harvest specifications considered for the 2011-2012 biennial fishing period are analyzed under a new proposed harvest specification framework proposed under FMP Amendment 23 {PFMC 2010}. Amendment 23 is an amendment of the harvest specifications framework in the FMP to better meet new mandates in the Magnuson-Stevens Reauthorization Act (MSRA) of 2006 to prevent overfishing. The MSRA and amended National Standard 1 (NS1) guidelines introduce new fishery management concepts including overfishing limits (OFLs), an acceptable biological catch (ABC) to incorporate a scientific uncertainty buffer in specifications, annual catch limits (ACLs), annual catch targets (ACTs), and accountability measures (AMs) that are designed to better account for scientific and management uncertainty and to prevent overfishing. The proposed Amendment 23 action (under the Council's preliminary preferred alternative) is to adopt the harvest specification framework recommended in the new NS1 guidelines. Amendment 23 is scheduled for implementation in 2011, which is why the 2011-2012 harvest specifications analyzed assume the new framework.

The No Action alternative harvest specifications are the 2010 ABCs and total catch optimum yields (OYs) under the old harvest specification framework. The preliminary preferred alternative harvest specifications are the 2011 and 2012 OFLs, ABCs, and ACLs under the proposed Amendment 23 harvest specification framework. Table 2-1 depicts the 2010 No Action and the preliminary preferred 2011 and 2012 harvest specification alternatives. A more detailed description of alternative harvest specifications follows.

Table 2-1. Specified 2010 ABCs and OYs (mt) under the No Action alternative and preliminary preferred 2011 and 2012 OFLs, ABCs, and ACLs (mt) (overfished stocks in CAPS; stocks with new assessments in bold).

Stock	No Action Alternatives		Preliminary Preferred Alternatives					
	2010 ABC	2010 OY	2011 OFL	2012 OFL	2011 ABC	2012 ABC	2011 ACL	2012 ACL
OVERFISHED STOCKS								
BOCACCIO S. of 40^{0}10' N lat.	793	288	737	732	704	700	53-263	56-274
CANARY	940	105	614	622	586	594	102	107
COWCOD S. of 40^{0}10' N lat.	14	4	13	13	10	10	4	4
DARKBLOTCHED	440	291	508	497	485	475	332	329
PACIFIC OCEAN PERCH	1,173	200	1,026	1,007	981	962	180	183
WIDOW	6,937	509	5,097	4,923	4,872	4,705	600	600
YELLOWEYE	32	17	48	48	46	46	20	20
PETRALE SOLE	2,751	1,200	1,021	1,279	976	1,222	976	1,160

Stock	No Action Alternatives		Preliminary Preferred Alternatives					
	2010 ABC	2010 OY	2011 OFL	2012 OFL	2011 ABC	2012 ABC	2011 ACL	2012 ACL
NON-OVERFISHED STOCKS								
Lingcod – coastwide	4,829	4,829	NA	NA	NA	NA	NA	NA
Lingcod N. of 42º N lat. (OR & WA)	NA	NA	2,438	2,251	2,330	2,151	2,330	2,151
Lingcod S. of 42º N lat. (CA)	NA	NA	2,523	2,597	2,102	2,164	2,102	2,164
Pacific Cod	3,200	1,600	3,200	3,200	2,222	2,222	1,600	1,600
Sablefish (coastwide)	9,217	NA	8,808	8,623	8,418	8,242	NA	NA
Sablefish N. of 36º N lat.	NA	6,471	NA	NA	NA	NA	4,961	4,689
Sablefish S. of 36º N lat.	NA	1,258	NA	NA	NA	NA	1,167	1,103
Shortbelly	6,950	6,950	TBD	TBD	TBD	TBD		
Chilipepper	2,576	2,447	2,229	2,013	2,130	1,924	2,130	1,924
Splitnose S. of 40^{0}10' N lat.	615	461	1,529	1,610	1,461	1,538	1,461	1,538
Yellowtail N. of 40^{0}10' N lat.	4,562	4,562	4,566	4,573	4,364	4,371	4,364	4,371
Shortspine Thornyhead (coastwide)	2,411	NA	2,384	2,358	2,279	2,254	NA	NA
Shortspine Thornyhead - N. of 34º27' N lat.	NA	1,591	NA	NA	NA	NA	1,573	1,556
Shortspine Thornyhead - S. of 34º27' N lat.	NA	410	NA	NA	NA	NA	405	401
Longspine Thornyhead (coastwide)	3,671	NA	3,577	3,483	2,981	2,902	NA	NA
Longspine Thornyhead - N. of 34º27' N lat.	NA	2,175	NA	NA	NA	NA	2,119	2,064
Longspine Thornyhead - S. of 34º27' N lat.	NA	385	NA	NA	NA	NA	376	366
Black Rockfish (WA)	464	464	445	435	426	415	426	415
Black Rockfish (OR-CA)	1,317	1,000	1,217	1,169	1,163	1,117	1,000	1,000
California scorpionfish	155	155	141	132	135	126	135	126
Cabezon (CA)	111	79	187	176	179	168	179	168
Cabezon (OR)	NA	NA	52	50	50	48	50	48
Dover Sole	28,582	16,500	44,400	44,826	42,436	42,843	17,560	17,560
English Sole	9,745	9,745	20,675	10,620	19,761	10,150	19,761	10,150
Arrowtooth Flounder	10,112	10,112	18,211	14,460	15,174	12,049	15,174	12,049
Starry Flounder	1,578	1,077	1,802	1,813	1,502	1,511	1,352	1,360
Longnose skate	3,269	1,349	3,128	3,006	2,990	2,873	1,349	1,349
STOCK COMPLEXES								
Minor Rockfish North	3,678	2,283	3,611	3,680	2,507	2,555	2,283	2,283
Minor Nearshore RF North	NA	155	NA	NA	NA	NA	155	155
Minor Shelf RF North	NA	968	NA	NA	NA	NA	968	968
Minor Slope RF North	NA	1,160	NA	NA	NA	NA	1,160	1,160
Minor Rockfish South	3,382	1,990	4,302	4,291	2,987	2,979	1,990	1,990
Minor Nearshore RF South	NA	650	NA	NA	NA	NA	650	650
Minor Shelf RF South	NA	714	NA	NA	NA	NA	714	714
Minor Slope RF South	NA	626	NA	NA	NA	NA	626	626
Other Flatfish	6,731	4,884	10,146	10,146	7,044	7,044	4,884	4,884
Other Fish	11,200	5,600	11,150	11,150	7,742	7,742	5,575	5,575

2.1.1 Overfishing Limits

The OFL under the proposed Amendment 23 framework is equal to the ABC under the existing framework. Both specifications are the estimated or proxy maximum sustainable yield (MSY) harvest levels, which are the harvest thresholds above which overfishing is occurring.

The No Action 2010 ABCs and the 2011 and 2012 OFLs under all the action alternatives in this EIS are those recommended by the Council's Scientific and Statistical Committee (SSC) and adopted by the Council for all the stocks and stock complexes actively managed in the FMP.

Table 2-2 depicts the 2010 ABCs under the No Action alternative and the SSC-recommended and Council-adopted 2011 and 2012 OFLs under the proposed action for those stocks managed with stock-specific harvest specifications determined using results of quantitative assessments. These ABCs and OFLs were determined by applying proxy MSY harvest rates (F_{MSY}) to the exploitable biomass of each stock as estimated in the most recently adopted stock assessments. The proposed 2011-2012 proxy F_{MSY} harvest rates recommended by the SSC and adopted by the Council are specific to the different taxa in the FMP as follows: $F_{30\%}$ for assessed flatfish, $F_{40\%}$ for Pacific whiting, $F_{50\%}$ for rockfish (including thornyheads), and $F_{45\%}$ for all species such as sablefish and lingcod. These are the same proxy F_{MSY} harvest rates used to determine 2010 ABCs except for assessed flatfish where the proxy F_{MSY} harvest rate was $F_{40\%}$. The 2010 ABCs in

Table 2-2 were projected from assessments done in 2007 or earlier (except the 2010 Pacific whiting ABC was estimated from 2010 assessments). The 2011 and 2012 OFLs were projected from assessments done in 2009 or earlier (except Pacific whiting harvest specifications are determined annually from new assessments). While the OFL contributions for the cowcod stock south of $40^{0}10'$ N lat. from the Conception and Monterey areas are displayed in

Table 2-2, only the OFL for the entire stock south of $40^0 10'$ N lat. is specified in regulations. The area-specific OFL contributions for cowcod are shown since they were derived using different methodologies. The Conception area OFLs were projected from the 2009 assessment {Dick et al. 2009} and the Monterey area OFLs were derived using a depletion-based stock reduction analysis. Methodologies for determining the 2011 and 2012 OFLs are described in Chapter 4.

Table 2-3 depicts the No Action 2010 ABCs and the SSC-recommended and Council-adopted 2011 and 2012 OFLs under the proposed action for the actively managed stock complexes. The 2010 ABC and 2011 and 2012 OFL contributions of each of the stocks that comprise each complex are shown in italics in Table 2-3. The OFLs determined for the individual stocks that comprise a complex are not specified in regulations, but are shown in Table 2-3 to illustrate the fact that the OFL contributions of component stocks in a complex sum up to the complex OFL which is the specification codified in regulations. For both the 2010 ABCs and the 2011 and 2012 OFLs, the OFL in regulations are the summed contribution of all component stocks aggregated to the Minor Rockfish North and South complex levels. That is, the 2010 ABCs and proposed OFLs under the preliminary preferred alternative are not specified in regulations for the northern and southern Minor Nearshore, Shelf, and Slope subcomplexes.

Some notable differences between the 2010 ABCs and the proposed 2011 and 2012 OFLs include:

- A coastwide ABC was decided for lingcod in 2010 while two area-specific OFLs are proposed for 2011 and 2012 based on new lingcod area-specific assessments;
- A much more systematic and scientifically-defensible approach was used to determine 2011 and 2012 OFLs, especially for the stocks comprising the complexes, whereas only the major stocks contributing to the complexes were used to calculate the 2010 ABCs (see Chapter 4). Most of the complex ABCs (all except Other Flatfish) were set higher than the summed ABC contribution of component stocks and the historic record of how those ABCs were determined is incomplete. The proposed 2011 and 2012 complex OFLs have a complete and transparent approach for determining those values for all complexes than the Other Fish complex, which still has an incomplete contribution of component species;
- The 2010 ABC for chilipepper rockfish was inappropriately specified for the area south of $40^0 10'$ N lat. when it should have been specified as a coastwide ABC. The proposed 2011 and 2012 OFLs correct that error;
- A new assessment for the cabezon stock off Oregon was done in 2009. The Council proposes to remove this stock from the Other Fish complex and manage it in 2011 and 2012 with stock-specific harvest specifications; and
- 2010 ABCs for assessed flatfish stocks (i.e., petrale sole, Dover sole, English sole, arrowtooth flounder, and starry flounder) used a proxy F_{MSY} harvest rate of $F_{40\%}$ while an $F_{30\%}$ proxy was used to determine the proposed 2011 and 2012 OFLs.

Table 2-2. Specified 2010 ABCs (mt) and proposed 2011 and 2012 OFLs (mt) for stocks managed with stock-specific harvest specifications (overfish stocks in CAPS and stocks with new assessments in bold).

Stock	No Action Alternative	Preliminary Preferred Alternatives	
	2010 ABC	2011 OFL	2012 OFL
OVERFISHED STOCKS			
BOCACCIO S. of 40^{0}10' N latitude	793	737	732
CANARY	940	614	622
COWCOD S. of 40^{0}10' N latitude	14	13	13
COWCOD (Conception)	NA	*6*	*6*
COWCOD (Monterey)		*7*	*7*
DARKBLOTCHED	440	508	497
PACIFIC OCEAN PERCH	1,173	1,026	1,007
WIDOW	6,937	5,097	4,923
YELLOWEYE	32	48	48
PETRALE SOLE	2,751	1,021	1,279
NON-OVERFISHED STOCKS			
Lingcod – coastwide	4,829	NA	NA
Lingcod N. of 42º N latitude (OR & WA)	NA	2,438	2,251
Lingcod S. of 42º N latitude (CA)	NA	2,523	2,597
Pacific Cod	3,200	3,200	3,200
Pacific Whiting (U.S. + Canada)	455,550	TBD in 2011	TBD in 2012
Sablefish (coastwide)	9,217	8,808	8,623
Shortbelly	6,950	TBD	TBD
Chilipepper (coastwide)	NA	2,229	2,013
Splitnose S. of 40^{0}10' N latitude	615	1,529	1,610
Yellowtail N. of 40^{0}10' N latitude	4,562	4,566	4,573
Shortspine Thornyhead (coastwide)	2,411	2,384	2,358
Longspine Thornyhead (coastwide)	3,671	3,577	3,483
Black Rockfish (WA)	464	445	435
Black Rockfish (OR-CA)	1,317	1,217	1,169
California scorpionfish	155	141	132
Cabezon (CA)	111	187	176
Cabezon (OR)	NA	52	50
Dover Sole	28,582	44,400	44,826
English Sole	9,745	20,675	10,620
Arrowtooth Flounder	10,112	18,211	14,460
Starry Flounder	1,578	1,802	1,813
Longnose skate	3,269	3,128	3,006

Table 2-3. Specified 2010 ABCs (mt) and proposed 2011 and 2012 OFLs (mt) for stock complexes (species contributions to a stock complex specification in *italics*, stocks with new assessments in bold).

Stock	No Action Alternative	Preliminary Preferred Alternatives	
	2010 ABC	2011 OFL	2012 OFL
STOCK COMPLEXES			
Minor Rockfish North	3,678	3,611	3,680
Minor Nearshore Rockfish North	NA	NA	NA
Black and yellow		*0.0*	*0.0*
Blue (CA)	*28.0*	*27.7*	*27.5*
Blue (OR & WA)		*33.1*	*33.1*
Brown		*5.3*	*5.3*
Calico		*0.0*	*0.0*
China		*11.7*	*11.7*
Copper		*28.6*	*28.6*
Gopher	*0.0*	*0.0*	*0.0*
Grass		*0.6*	*0.6*
Kelp		*0.0*	*0.0*
Olive		*0.3*	*0.3*
Quillback		*8.7*	*8.7*
Treefish		*0.2*	*0.2*
Minor Shelf Rockfish North	NA	NA	NA
Bronzespotted		*0.0*	*0.0*
Bocaccio	*318.0*	*268.2*	*268.2*
Chameleon		*0.0*	*0.0*
Cowcod		*0.0*	*0.0*
Flag		*0.1*	*0.1*
Freckled		*0.0*	*0.0*
Greenblotched		*1.4*	*1.4*
Greenspotted		*20.9*	*20.9*
Greenstriped		*1,208.0*	*1,232.0*
Halfbanded		*0.0*	*0.0*
Harlequin		*0.0*	*0.0*
Honeycomb		*0.0*	*0.0*
Mexican		*0.0*	*0.0*
Pink		*0.0*	*0.0*
Pinkrose		*0.0*	*0.0*
Puget Sound		*0.0*	*0.0*
Pygmy		*0.0*	*0.0*
Redstripe	*576.0*	*288.3*	*288.3*
Rosethorn		*15.2*	*15.2*
Rosy		*2.5*	*2.5*
Silvergray	*38.0*	*180.0*	*180.0*
Speckled		*0.2*	*0.2*
Squarespot		*0.1*	*0.1*
Starry		*0.0*	*0.0*
Stripetail		*35.3*	*35.3*
Swordspine		*0.0*	*0.0*

Stock	No Action Alternative	Preliminary Preferred Alternatives	
	2010 ABC	2011 OFL	2012 OFL
Tiger		*1.1*	*1.1*
Vermilion		*11.1*	*11.1*
Minor Slope Rockfish North	NA	NA	NA
Aurora		*17.3*	*17.3*
Bank		*19.7*	*19.7*
Blackgill	*0.0*	*4.7*	*4.7*
Redbanded		*51.7*	*51.7*
Rougheye		*78.3*	*78.3*
Sharpchin	*307.0*	*231.9*	*231.9*
Shortraker		*21.8*	*21.8*
Splitnose	*242.0*	*852.2*	*897.3*
Yellowmouth	*99.0*	*184.7*	*184.7*
Minor Rockfish South	3,382	4,302	4,291
Minor Nearshore Rockfish South	NA	NA	NA
Shallow Nearshore Species	NA	NA	NA
Black and yellow		*26.8*	*26.8*
China		*19.8*	*19.8*
Gopher (N of Pt. Conception)	*193.0*	*175.0*	*165.0*
Gopher (S of Pt. Conception)		*26.0*	*26.0*
Grass		*55.6*	*55.6*
Kelp		*25.9*	*25.9*
Deeper Nearshore Species	NA	NA	NA
Blue (assessed area)	*211.0*	*191.3*	*189.5*
Blue (S of 34 ^{o}27' N latitude)		*74.0*	*74.0*
Brown		*197.4*	*197.4*
Calico		*0.0*	*0.0*
Copper		*156.0*	*156.0*
Olive		*189.5*	*189.5*
Quillback		*6.3*	*6.3*
Treefish		*12.9*	*12.9*
Minor Shelf Rockfish South	NA	NA	NA
Bronzespotted		*6.7*	*6.7*
Chameleon		*0.0*	*0.0*
Flag		*26.6*	*26.6*
Freckled		*0.0*	*0.0*
Greenblotched		*24.6*	*24.6*
Greenspotted		*195.3*	*195.3*
Greenstriped		*221.0*	*226.0*
Halfbanded		*0.0*	*0.0*
Harlequin		*0.0*	*0.0*
Honeycomb		*7.8*	*7.8*
Mexican		*2.8*	*2.8*
Pink		*2.8*	*2.8*
Pinkrose		*0.0*	*0.0*
Pygmy		*0.0*	*0.0*
Redstripe		*0.5*	*0.5*
Rosethorn		*2.5*	*2.5*
Rosy		*36.9*	*36.9*
Silvergray		*0.6*	*0.6*

Stock	No Action Alternative	Preliminary Preferred Alternatives	
	2010 ABC	2011 OFL	2012 OFL
Speckled		*42.9*	*42.9*
Squarespot		*5.8*	*5.8*
Starry		*70.5*	*70.5*
Stripetail		*20.6*	*20.6*
Swordspine		*12.9*	*12.9*
Tiger		*0.0*	*0.0*
Vermilion		*308.4*	*308.4*
Yellowtail	*116.0*	*1,248.9*	*1,248.9*
Minor Slope Rockfish South	NA	NA	NA
Aurora		*29.4*	*29.4*
Bank	*350.0*	*574.8*	*574.8*
Blackgill	*282.0*	*279.0*	*275.0*
Pacific ocean perch		*0.0*	*0.0*
Redbanded		*11.9*	*11.9*
Rougheye		*0.5*	*0.5*
Sharpchin	*45.0*	*10.6*	*10.6*
Shortraker		*0.1*	*0.1*
Yellowmouth		*0.8*	*0.8*
Other Flatfish	6,731	10,146	10,146
Butter sole	*5*	*5*	*5*
Curlfin sole	*8*	*8*	*8*
Flathead sole	*123*	*35*	*35*
Pacific sanddab	*3,172*	*4,943*	*4,943*
Rex sole	*2,902*	*4,309*	*4,309*
Rock sole	*46*	*66*	*66*
Sand sole	*376*	*781*	*781*
Other Fish	11,200	11,150	11,150
Big skate	*No Species-Specific Basis or Contribution to the Stock Complex Harvest Specifications*	*Unknown*	*Unknown*
California skate		*Unknown*	*Unknown*
Leopard shark		*164*	*164*
Soupfin shark		*62*	*62*
Spiny dogfish		*2,200*	*2,200*
Finescale codling			
Pacific rattail		*1,178*	*1,178*
Ratfish		*Unknown*	*Unknown*
Cabezon (OR in 2009-10)		*NA*	*NA*
Cabezon (WA)		*Unknown*	*Unknown*
Kelp greenling (CA)		*111*	*111*
Kelp greenling (OR & WA)		*Unknown*	*Unknown*

2.1.2 Acceptable Biological Catches

The new ABC specification proposed under Amendment 23 provides a buffer below the OFL to accommodate the scientific uncertainty in estimating the OFL. The ABC is decided by the Council based on its preferred level of overfishing (i.e., exceeding a specified OFL) risk aversion. Under the No Action harvest specification framework, scientific uncertainty, as well as management uncertainty, socioeconomic considerations, rebuilding considerations, etc. were used in deciding a buffer between the old ABC specification (i.e., overfishing level) and the total catch optimum yield (OY) which was the specification limiting annual fishing mortality. Under the proposed Amendment 23 framework, the new ABC specification is decided in consideration of the scientific uncertainty in estimating the OFL explicitly and the other considerations for deciding the OY are now used in determining the new ACL, which is analogous to the old total catch OY. Since scientific uncertainty was not considered explicitly under the old framework, this section will only discuss the new ABCs proposed for 2011 and 2012 under the Council's preliminary preferred alternative.

All actively managed stocks in the FMP are categorized according to the available data and relative uncertainty in estimating the OFL. Category 1 stocks are the most data-rich with quantitative assessments informing OFLs and other status determination criteria (SDC). Category 2 stocks are data-moderate with OFLs and other SDC based on less quantitative and more uncertain assessments. Category 3 stocks are relatively data-poor with OFLs based on even less quantitative or qualitative data, most often using an average catch approach. The scientific uncertainty buffers defining the ABC are therefore generally greater for category 2 stocks than for category 1 stocks, and even greater for category 3 stocks in recognition of the progressively greater scientific uncertainty for category 2 and 3 stocks. The SSC evaluated the information informing the 2011 and 2012 OFLs for all stocks and categorized each stock using the criteria in

Table 2-4.

Different approaches were recommended by the SSC for deciding scientific uncertainty buffers that define proposed ABCs depending on stock category. The SSC recommended an approach for deciding ABCs for category 1 stocks that incorporates an estimated probability of overfishing (P*) based on the uncertainty of the "true" OFL. Under the P* approach, scientific uncertainty associated with estimating an OFL (σ) is quantified by the SSC and the percentage reduction that defines the scientific uncertainty buffer and the ABC can be determined by translating the estimated σ to a range of P* values. Each P* value is then mapped to its corresponding buffer fraction[1]. The Council then determines the preferred level of risk aversion by selecting an appropriate P* value, accordingly. In cases where the P* approach is used, the upper limit of P* values considered will be 0.45 under the Council's proposed Amendment 23 action.

The SSC recommended that the extent of scientific uncertainty for each category 1 stock be quantified using a value for σ which is the greater of 0.36 (the result of a meta-analysis – see Chapter 4) and the coefficient of variation of the most recent estimate of abundance. The SSC noted that this approach divides the scientific aspects related to setting the ABC (specifying the extent of scientific uncertainty (σ)) from the policy decision (specifying the value of P*) The SSC also noted that $\sigma = 0.36$ is the current best estimate of scientific uncertainty, but that it likely underestimates the true extent of uncertainty by an unknown amount. The SSC will continue to refine this estimate in future management cycles.

The SSC agreed that ideally the approach recommended for setting ABCs for category 1 stocks should also be applied to category 2 and 3 stocks. However, there is at present no analysis available for determining the appropriate value of σ to represent scientific uncertainty for stocks in these categories, unlike the situation for category 1 stocks. In the absence of an analysis for category 2 and 3 stocks, the SSC suggested two interim approaches for computing ABCs from OFLs:

- Either use a 25% and 50% reduction from the OFL for deciding the ABC for category 2 and 3 stocks, respectively; or
- Use a P* approach using the σ values for category 2 and 3 stocks recommended by the SSC. The SSC noted that this approach allows the Council to express their views on overfishing risk aversion.

If a P* approach is used for deciding the ABC for category 2 and 3 stocks, the SSC recommended setting the value of σ for category 2 and 3 stocks to 0.72 and 1.44 respectively (i.e., two and four times the σ for category 1 stocks). The difference between 0.72 and 1.44 corresponds fairly closely to the difference between the current buffers for category 2 and 3 stocks (25% versus 50%) when P* is in the range 0.3 ~ 0.35. Table 2-5 shows the relationship between the proposed values for σ and the buffer for a range of values for P*. Exploration of the results from decision tables for some of the stocks in category 2d also indicates values for σ of approximately 0.72. However, the specific values of 0.72 and 1.44 are not based on a formal analysis of assessment outcomes and could change substantially when the SSC reviews additional analyses in future management cycles.

The Council decided to use the P* approach for deciding the 2011 and 2012 ABCs for all categories of stocks under their preliminary preferred alternative. They adopted the SSC-recommended σ values for each stock category and adopted a P* of 0.45 for category 1 stocks and a P* of 0.4 for category 2 and 3 stocks. The buffer amounts or percentage reductions from the OFL corresponding to these σ and P* values are 4.4%, 16.7%, and 30.6% for category 1, 2, and 3 stocks, respectively (Table 2-5).

[1] Since estimated OFLs are median estimates, there is a 50% probability that the OFL is overestimated. Therefore, a P* of 0.5 equates to no scientific uncertainty or, in other words, the ABC is set equal to the OFL.

Table 2-6 shows the SSC stock categorizations and preliminary preferred ABCs for those stocks managed with stock-specific harvest specifications. These ABCs are consistent with the preferred σ and P* values cited above. Table 2-7 shows the SSC stock categorizations and preliminary preferred ABCs for those stocks managed in stock complexes. The preliminary preferred ABCs in Table 2-7 assumed that all stocks managed in a stock complex were category 3 stocks despite the SSC categorizations. The resulting ABCs were also computed using the SSC-recommended σ of 1.44 for category 3 stocks. As in the case of proposed OFLs, the ABC contributions of the stocks comprising the complexes are shown in Table 2-7 in italics and are not specified in regulations. These component ABCs are calculated using the buffers shown in the P* - σ relationship (Table 2-5) using the SSC stock categorizations and the preferred P* values by category. However, the ABCs proposed to be specified in regulation under the preliminary preferred alternative are at the aggregate complex level (i.e., Minor Rockfish North, Minor Rockfish South, Other Flatfish, and Other Fish) assuming all stocks are category 3 (Table 2-7).

Table 2-4. Criteria used by the SSC to categorize stocks based on the quantity and quality of data informing the estimate of OFL. Stock categories are used in deciding 2011 and 2012 ABCs that accommodate the uncertainty in estimating OFLs.

Category	Sub-category	Criteria
Category 1 - Data rich stocks. OFL based on F_{MSY} or F_{MSY} proxy from model output. ABC based on P* buffer.		
1	c	Age/size structured assessment model with reliable estimation of the stock-recruit relationship.
1	b	As in 3a, but trend information also available from surveys. Age/size structured assessment model.
1	a	Reliable compositional (age and/or size) data sufficient to resolve year-class strength and growth characteristics. Only fishery-dependent trend information available. Age/size structured assessment model.
Category 2 - Data moderate. OFL derived from model output (or natural mortality).		
2	d	Full age-structured assessment, but results are substantially more uncertain than assessments used in the calculation of the P* buffer. The SSC will provide a rationale for each stock placed in this category. Reasons could include that assessment results are very sensitive to model and data assumptions, or that the assessment has not been updated for many years.
2	c	Historical catches, survey trend information, or at least one absolute abundance estimate. An aggregate population model is fit to the available information.
2	b	Historical catches, fishery-dependent trend information only. An aggregate population model is fit to the available information.
2	a	M*survey biomass assessment (as in Rogers 1996).
Category 3 - Data poor. OFL derived from historical catch.		
3	d	Reliable annual historical catches and approximate values for natural mortality and age at 50% maturity. Default analytical approach DB-SRA.
3	c	Reliable aggregate catches during period of fishery development and approximate values for natural mortality. Default analytical approach DCAC.
3	b	Reliable catch estimates only for recent years. OFL is average catch during a period when stock is considered to be stable and close to B_{MSY} equilibrium on the basis of expert judgment.
3	a	No reliable catch history. No basis for establishing OFL.

Table 2-5. Relationship between P* and the percent reduction of the OFL for deciding the 2011 and 2012 ABCs for category 1, 2, and 3 stocks based on σ values of 0.36, 0.72, and 1.44, respectively (values in bold font and outlined in bold borders are the preferred P* buffers).

P*	Assessment Uncertainty (σ)		
	Cat. 1	Cat. 2	Cat. 3
	0.36	0.72	1.44
0.45	**4.4%**	8.7%	16.6%
0.44	5.3%	10.3%	19.5%
0.43	6.2%	11.9%	22.4%
0.42	7.0%	13.5%	25.2%
0.41	7.9%	15.1%	27.9%
0.4	8.7%	**16.7%**	**30.6%**
0.39	9.6%	18.2%	33.1%
0.38	10.4%	19.7%	35.6%
0.37	11.3%	21.3%	38.0%
0.36	12.1%	22.7%	40.3%
0.35	13.0%	24.2%	42.6%
0.34	13.8%	25.7%	44.8%
0.33	14.6%	27.1%	46.9%
0.32	15.5%	28.6%	49.0%
0.31	16.3%	30.0%	51.0%
0.3	17.2%	31.4%	53.0%
0.29	18.1%	32.9%	54.9%
0.28	18.9%	34.3%	56.8%
0.27	19.8%	35.7%	58.6%
0.26	20.7%	37.1%	60.4%
0.25	21.6%	38.5%	62.1%
0.24	22.5%	39.9%	63.8%
0.23	23.4%	41.3%	65.5%
0.22	24.3%	42.6%	67.1%
0.21	25.2%	44.0%	68.7%
0.2	26.1%	45.4%	70.2%
0.19	27.1%	46.9%	71.8%
0.18	28.1%	48.3%	73.2%
0.17	29.1%	49.7%	74.7%
0.16	30.1%	51.1%	76.1%
0.15	31.1%	52.6%	77.5%
0.14	32.2%	54.1%	78.9%
0.13	33.3%	55.6%	80.2%
0.12	34.5%	57.1%	81.6%
0.11	35.7%	58.7%	82.9%
0.1	37.0%	60.3%	84.2%
0.09	38.3%	61.9%	85.5%
0.08	39.7%	63.6%	86.8%
0.07	41.2%	65.4%	88.1%
0.06	42.9%	67.4%	89.3%
0.05	44.7%	69.4%	90.6%

Table 2-6. Species categories and proposed 2011 and 2012 ABCs (mt) for stocks managed with stock-specific harvest specifications (overfish stocks in CAPS and stocks with new assessments in bold).

Stock	Species Category a/		Preliminary Preferred Alternatives	
	Category	Sub-category	2011 ABC	2012 ABC
OVERFISHED STOCKS				
BOCACCIO S. of 40^{0}10' N latitude	1		704	700
CANARY	1		586	594
COWCOD S. of 40^{0}10' N latitude			10	10
COWCOD (Conception)	2	c	*5*	*5*
COWCOD (Monterey)	3	d	*5*	*5*
DARKBLOTCHED	1		485	475
PACIFIC OCEAN PERCH	1		981	962
WIDOW	1		4,872	4,705
YELLOWEYE	1		46	46
PETRALE SOLE	1		976	1,222
NON-OVERFISHED STOCKS				
Lingcod – coastwide	NA	NA	NA	NA
Lingcod N. of 42º N latitude (OR & WA)	1		2,330	2,151
Lingcod S. of 42º N latitude (CA)	2	d	2,102	2,164
Pacific Cod	3	b	2,222	2,222
Pacific Whiting (U.S. + Canada)	1		TBD in 2011	TBD in 2012
Sablefish (coastwide)	1		8,418	8,242
Shortbelly	2	d	TBD	TBD
Chilipepper (coastwide)	1		2,130	1,924
Splitnose S. of 40^{0}10' N latitude	1		1,461	1,538
Yellowtail N. of 40^{0}10' N latitude	1		4,364	4,371
Shortspine Thornyhead (coastwide)	1		2,279	2,254
Longspine Thornyhead (coastwide)	2	d	2,981	2,902
Black Rockfish (WA)	1		426	415
Black Rockfish (OR-CA)	1		1,163	1,117
California scorpionfish	1		135	126
Cabezon (CA)	1		179	168
Cabezon (OR)	1		50	48
Dover Sole	1		42,436	42,843
English Sole	1		19,761	10,150
Arrowtooth Flounder	2	d	15,174	12,049
Starry Flounder	2	d	1,502	1,511
Longnose skate	1		2,990	2,873

Table 2-7. Species categories and proposed 2011 and 2012 ABCs (mt) for stocks managed in stock complexes (species contributions to a stock complex specification in *italics*, stocks with new assessments in bold).

Stock	Species Category		Preliminary Preferred Alternatives	
	Category	Sub-category	2011 ABC	2012 ABC
STOCK COMPLEXES				
Minor Rockfish North			2,507	2,555
Minor Nearshore Rockfish North			NA	NA
Black and yellow	3	d	*0.0*	*0.0*
Blue (CA)	2	d	*19.3*	*19.1*
Blue (OR & WA)	3	d	*23.0*	*23.0*
Brown	3	d	*3.7*	*3.7*
Calico	3	a	*0.0*	*0.0*
China	3	d	*8.1*	*8.1*
Copper	3	d	*19.9*	*19.9*
Gopher	3	a	*0.0*	*0.0*
Grass	3	d	*0.4*	*0.4*
Kelp	3	d	*0.0*	*0.0*
Olive	3	d	*0.2*	*0.2*
Quillback	3	d	*6.0*	*6.0*
Treefish	3	d	*0.1*	*0.1*
Minor Shelf Rockfish North			NA	NA
Bronzespotted	3	d	*0.0*	*0.0*
Bocaccio	3	d	*186.2*	*186.2*
Chameleon	3	a	*0.0*	*0.0*
Cowcod	3	a	*0.0*	*0.0*
Flag	3	d	*0.1*	*0.1*
Freckled	3	a	*0.0*	*0.0*
Greenblotched	3	c	*0.9*	*0.9*
Greenspotted	3	d	*14.5*	*14.5*
Greenstriped	2	d	*838.7*	*855.4*
Halfbanded	3	b	*0.0*	*0.0*
Harlequin	3	a	*0.0*	*0.0*
Honeycomb	3	c	*0.0*	*0.0*
Mexican	3	c	*0.0*	*0.0*
Pink	3	d	*0.0*	*0.0*
Pinkrose	3	b	*0.0*	*0.0*
Puget Sound	3	a	*0.0*	*0.0*
Pygmy	3	a	*0.0*	*0.0*
Redstripe	3	d	*200.2*	*200.2*
Rosethorn	3	d	*10.6*	*10.6*
Rosy	3	d	*1.7*	*1.7*
Silvergray	3	d	*125.0*	*125.0*
Speckled	3	d	*0.1*	*0.1*
Squarespot	3	c	*0.1*	*0.1*
Starry	3	d	*0.0*	*0.0*
Stripetail	3	d	*24.5*	*24.5*
Swordspine	3	d	*0.0*	*0.0*

Stock	Species Category		Preliminary Preferred Alternatives	
	Category	Sub-	2011 ABC	2012 ABC
Tiger	3	d	*0.8*	*0.8*
Vermilion	3	c	*7.7*	*7.7*
Minor Slope Rockfish North			NA	NA
Aurora	3	d	*12.0*	*12.0*
Bank	3	d	*13.7*	*13.7*
Blackgill	3	c	*3.3*	*3.3*
Redbanded	3	d	*35.9*	*35.9*
Rougheye	3	d	*54.3*	*54.3*
Sharpchin	3	d	*161.0*	*161.0*
Shortraker	3	d	*15.2*	*15.2*
Splitnose	1		*591.7*	*623.0*
Yellowmouth	3	d	*128.2*	*128.2*
Minor Rockfish South			2,987	2,979
Minor Nearshore Rockfish South			NA	NA
Shallow Nearshore Species	NA	NA	NA	NA
Black and yellow	3	c	*18.6*	*18.6*
China	3	c	*13.7*	*13.7*
Gopher (N of Pt. Conception)	1		*121.5*	*114.6*
Gopher (S of Pt. Conception)	3	c	*18.1*	*18.1*
Grass	3	d	*38.6*	*38.6*
Kelp	3	d	*18.0*	*18.0*
Deeper Nearshore Species	NA	NA	NA	NA
Blue (assessed area)	2	d	*132.8*	*131.6*
Blue (S of 34 ^{o}27' N latitude)	3	c	*51.4*	*51.4*
Brown	3	d	*137.0*	*137.0*
Calico	3	b	*0.0*	*0.0*
Copper	3	d	*108.3*	*108.3*
Olive	3	d	*131.6*	*131.6*
Quillback	3	d	*4.4*	*4.4*
Treefish	3	d	*9.0*	*9.0*
Minor Shelf Rockfish South			NA	NA
Bronzespotted	3	c	4.6	4.6
Chameleon	3	a	0.0	0.0
Flag	3	c	*18.5*	*18.5*
Freckled	3	a	*0.0*	*0.0*
Greenblotched	3	d	*17.1*	*17.1*
Greenspotted	3	d	*135.6*	*135.6*
Greenstriped	2	d	*153.4*	*156.9*
Halfbanded	3	b	*0.0*	*0.0*
Harlequin	3	a	*0.0*	*0.0*
Honeycomb	3	c	*5.4*	*5.4*
Mexican	3	c	*2.0*	*2.0*
Pink	3	d	*2.0*	*2.0*
Pinkrose	3	a	*0.0*	*0.0*
Pygmy	3	a	*0.0*	*0.0*
Redstripe	3	d	*0.4*	*0.4*
Rosethorn	3	d	*1.7*	*1.7*
Rosy	3	d	*25.7*	*25.7*

Stock	Species Category		Preliminary Preferred Alternatives	
	Category	Sub-	2011 ABC	2012 ABC
Silvergray	3	d	*0.4*	*0.4*
Speckled	3	d	*29.8*	*29.8*
Squarespot	3	c	*4.0*	*4.0*
Starry	3	d	*49.0*	*49.0*
Stripetail	3	d	*14.3*	*14.3*
Swordspine	3	d	*9.0*	*9.0*
Tiger	3	d	*0.0*	*0.0*
Vermilion	3	d	*214.1*	*214.1*
Yellowtail	3	d	*867.1*	*867.1*
Minor Slope Rockfish South			NA	NA
Aurora	3	c	*20.4*	*20.4*
Bank	2	a	*399.1*	*399.1*
Blackgill	1		*193.7*	*190.9*
Pacific ocean perch	3	a	*0.0*	*0.0*
Redbanded	3	d	*8.2*	*8.2*
Rougheye	3	d	*0.3*	*0.3*
Sharpchin	3	d	*7.4*	*7.4*
Shortraker	3	d	*0.1*	*0.1*
Yellowmouth	3	d	*0.6*	*0.6*
Other Flatfish			7,044	7,044
Butter sole	3	b	*3*	*3*
Curlfin sole	3	b	*6*	*6*
Flathead sole	3	b	*24*	*24*
Pacific sanddab	3	d	*3,432*	*3,432*
Rex sole	3	d	*2,992*	*2,992*
Rock sole	3	c	*46*	*46*
Sand sole	3	c	*542*	*542*
Other Fish	3		7,742	7,742
Big skate	3		*0*	*0*
California skate	3		*0*	*0*
Leopard shark	3	d	*164*	*164*
Soupfin shark	3	c	*62*	*62*
Spiny dogfish	3	d	*2,200*	*2,200*
Finescale codling	3		*Unknown*	*Unknown*
Pacific rattail	3	c	*1,178*	*1,178*
Ratfish	3		*Unknown*	*Unknown*
Cabezon (OR in 2009-10)	1		*NA*	*NA*
Cabezon (WA)	3		*Unknown*	*Unknown*
Kelp greenling (CA)	3	d	*111*	*111*
Kelp greenling (OR & WA)	3		*Unknown*	*Unknown*

2.1.3 Annual Catch Limits

Annual catch limits under the proposed Amendment 23 harvest specification framework are specified for each actively managed stock and stock complex. The ACL counts all sources of fishing-related mortality including landed catch, discard mortalities, research catches, and yield set-asides for exempted fishing permits (EFPs). In this regard, the ACL is analogous to the total catch OY specified in past years (and under the No Action alternative). Therefore, in this section, ACL alternatives analyzed for 2011 and 2012 are compared to 2010 OYs under the No Action alternative.

The ACL can be set equal to the ABC or below the ABC to create a buffer that accommodates management uncertainty, socioeconomic considerations, rebuilding considerations, or to meet any other management objectives. The new ABC control rules contemplated under Amendment 23 (e.g., the P* approach) were still being developed by the SSC in November 2009 when the initial range of ACL alternatives were adopted for analysis. It was acknowledged then that some of the ACL alternatives were likely to be higher than ABCs that were to be adopted as part of the preliminary preferred alternative in April 2010. There was also a wider range of ACL alternatives for the overfished species adopted for analysis in November 2009 than the range the Council adopted for more detailed analysis in April 2010. The ACL alternatives adopted for more detailed analysis, including the No Action and preliminary preferred alternatives, are shown in Table 2-8 for 2011 fisheries and Table 2-9 for 2012 fisheries.

The 2011 and 2012 ACL alternatives for sablefish vary by method for apportioning the estimated coastwide biomass, the two options for translating the 40-10 ACL harvest control rule under the new Amendment 23 framework (since the sablefish stock is in the precautionary zone), and whether an additional 50% reduction is applied south of 36° N lat. to account for greater scientific and management uncertainty (Table 2-10). The Council's preliminary preferred 2011 and 2012 sablefish ACL alternatives include a 68:32 north:south apportionment based on the 2003-2008 average swept area biomass by area estimated from the NMFS trawl survey, the option 2 40-10 rule (also the preliminary preferred Amendment 23 alternative), and application of an additional 50% uncertainty adjustment for the south.

Table 2-8. Range of 2011 annual catch limit (ACL) alternatives (mt) adopted for detailed analysis (overfished stocks in CAPS; stocks with new assessments in bold).

Stock	No Action Alternative	Status Quo Alternative a/	2011 Action Alternatives			
	2010 OY	2011 ACL	Prelim. Pref. ACL	Alt 1 ACL	Alt 2 ACL	Alt 3 ACL
OVERFISHED SPECIES						
BOCACCIO S. of 40°10' N lat.	288	263	TBD	53	109	263
CANARY	105	102	102	49	94	102
COWCOD S. of 40°10' N lat.	4	4	4	2	3	4
DARKBLOTCHED	291	332	332	222	298	332
PACIFIC OCEAN PERCH	200	180	180	80	111	180
WIDOW	509	352	600	200	400	600
YELLOWEYE	17	20	20	13	17	20
PETRALE SOLE	1,200	NA	976	459	776	976
NON-OVERFISHED SPECIES						
Lingcod – coastwide	4,829	NA	NA	NA	NA	NA
Lingcod N. of 42° N lat. (OR & WA)	NA	NA	2,330	1,219	2,172	2,330
Lingcod S. of 42° N lat. (CA)	NA	NA	2,102	1,262	1,421	2,102
Pacific Cod	1,600	NA	1,600	1,600		
Pacific Whiting (U.S.)	193,935	NA	NA	67,970	135,939	404,318
Sablefish N. of 36° N lat.	6,471	NA	4,961	See Table 2-10		
Sablefish S. of 36° N lat.	1,258	NA	1,167			
Shortbelly	6,950	NA	TBD	6,950		
Chilipepper b/	2,447	NA	2,130	2,130		
Yellowtail N. of 40°10' N lat.	4,562	NA	4,364	4,364		
Shortspine Thornyhead - N. of 34°27' N lat.	1,591	NA	1,573	1,573	1,573	
Shortspine Thornyhead - S. of 34°27' N lat.	410	NA	405	405	811	
Longspine Thornyhead - N. of 34°27' N lat.	2,175	NA	2,119	2,119	2,825	
Longspine Thornyhead - S. of 34°27' N lat.	385	NA	375	375	751	
Black Rockfish (WA)	464	NA	426	426		
Black Rockfish (OR-CA)	1,000	NA	1,000	1,000		
California scorpionfish	155	NA	135	133	135	
Cabezon (CA)	79	NA	179	102	160	179
Cabezon (OR)	NA	NA	50	29	50	-
Dover Sole	16,500	NA	17,560	16,500	17,560	42,436
English Sole	9,745	NA	19,761	7,158	19,761	
Arrowtooth Flounder	10,112	NA	15,174	9,109	15,174	
Starry Flounder	1,077	NA	1,352	1,130	1,352	1,502
Longnose skate	1,349	NA	1,349	1,349		
STOCK COMPLEXES						
Minor Rockfish North	2,283	NA	2,283			
Minor Nearshore Rockfish North	155	NA	155			
Minor Shelf Rockfish North	968	NA	968			
Minor Slope Rockfish North	1,160	NA	1,160			
Minor Rockfish South	1,990	NA	1,990			
Minor Nearshore Rockfish South	650	NA	650			
Minor Shelf Rockfish South	714	NA	714			
Minor Slope Rockfish South	626	NA	626			
Other Flatfish	4,884	NA	4,884			
Other Fish	5,600	NA	5,575			

a/ The status quo alternative are the ACLs under the current SPR harvest rates prescribed in rebuilding plans as applied to the estimated biomass for the stock. This alternative applies only to the overfished species with adopted rebuilding plans and differs from the No Action alternative, which is based on the 2010 OYs in regulation.

b/ Chilipepper rockfish specifications are projected from the 2007 assessment based on the population occurring in waters off CA and OR. They were specified for south of 40°10' N lat. in 2009-10, but should have been applied for the waters off CA and OR.

Table 2-9. Range of 2012 annual catch limit (ACL) alternatives (mt) adopted for detailed analysis (overfished stocks in CAPS; stocks with new assessments in bold).

Stock	No Action Alternative	Status Quo Alternative a/	2012 Action Alternatives			
	2010 OY	2011 ACL	Prelim. Pref. ACL	Alt 1 ACL	Alt 2 ACL	Alt 3 ACL
OVERFISHED SPECIES						
BOCACCIO S. of 40°10' N latitude	288	274	TBD	56	115	274
CANARY	105	107	107	51	99	107
COWCOD S. of 40°10' N lat.	4	4	4	2	3	4
DARKBLOTCHED	291	329	329	131	222	329
PACIFIC OCEAN PERCH	200	183	183	80	113	183
WIDOW	509	339	600	200	400	600
YELLOWEYE	17	21	20	13	17	20
PETRALE SOLE	1,200	NA	1,160	624	1,160	1,160
NON-OVERFISHED SPECIES						
Lingcod – coastwide	4,829	NA	NA	NA	NA	NA
Lingcod N. of 42° N latitude (OR & WA)	NA	NA	2,151	1,126	2,020	2,151
Lingcod S. of 42° N latitude (CA)	NA	NA	2,164	1,299	1,531	2,164
Pacific Cod	1,600	NA	1,600	1,600		
Pacific Whiting (U.S.)	193,935	NA	NA	67,970	135,939	404,318
Sablefish N. of 36° N latitude	6,471	NA	4,961	See Table 2-10		
Sablefish S. of 36° N latitude	1,258	NA	1,167			
Shortbelly	6,950	NA	TBD	6,950		
Chilipepper b/	2,447	NA	1,924	1,924		
Yellowtail N. of 40°10' N latitude	4,562	NA	4,371	4,371		
Shortspine Thornyhead - N. of 34°27' N latitude	1,591	NA	1,556	1,556	1,556	
Shortspine Thornyhead - S. of 34°27' N latitude	410	NA	401	401	802	
Longspine Thornyhead - N. of 34°27' N latitude	2,175	NA	2,064	2,064	2,751	
Longspine Thornyhead - S. of 34°27' N latitude	385	NA	366	366	731	
Black Rockfish (WA)	464	NA	415	415		
Black Rockfish (OR-CA)	1,000	NA	1,000	1,000		
California scorpionfish	155	NA	126	124	126	
Cabezon (CA)	79	NA	168	105	156	168
Cabezon (OR)		NA	48	29	48	
Dover Sole	16,500	NA	17,560	16,500	17,560	42,843
English Sole	9,745	NA	10,150	5,790	10,150	
Arrowtooth Flounder	10,112	NA	12,049	8,241	12,049	
Starry Flounder	1,077	NA	1,360	1,166	1,360	1,511
Longnose skate	1,349	NA	1,349	1,349		
STOCK COMPLEXES						
Minor Rockfish North	2,283	NA	2,283			
Minor Nearshore Rockfish North	155	NA	155			
Minor Shelf Rockfish North	968	NA	968			
Minor Slope Rockfish North	1,160	NA	1,160			
Minor Rockfish South	1,990	NA	1,990			
Minor Nearshore Rockfish South	650	NA	650			
Minor Shelf Rockfish South	714	NA	714			
Minor Slope Rockfish South	626	NA	626			
Other Flatfish	4,884	NA	4,884			
Other Fish	5,600	NA	5,575			

a/ The status quo alternative are the ACLs under the current SPR harvest rates prescribed in rebuilding plans as applied to the estimated biomass for the stock. This alternative applies only to the overfished species with adopted rebuilding plans and differs from the No Action alternative, which is based on the 2010 OYs in regulation.

b/ Chilipepper rockfish are projected from the 2007 assessment based on the population occurring in waters off CA and OR. They were specified for south of 40°10' N lat. in 2009-10, but should have been applied for the waters off CA and OR.

Table 2-10. Alternative 2011 and 2012 sablefish ACLs that vary by methods for apportioning the estimated coastwide biomass, two options for the 40-10 ACL harvest control rule, and whether a 50% uncertainty adjustment is applied in the south (N and S = north and south of 36° N lat.).

2011 ABC = 8,418							
Apportionment Method		40-10 (Opt. 1) 8,485			40-10 (Opt. 2) 7,296		
North/South Proportions	Basis	N ACL	S ACL	S ACL *.5	N ACL	S ACL	S ACL *.5
72/28	2003-06 survey	6,061	2,357	1,179	5,253	2,043	1,021
68/32	2003-08 survey	5,724	2,694	1,347	4,961	2,335	1,167
64/36	2003-08 survey (variance weighted)	5,388	3,030	1,515	4,669	2,627	1,313
2012 ABC = 8,242							
Apportionment Method		40-10 (Opt. 1) 8,227			40-10 (Opt. 2) 6,896		
North/South Proportions	Basis	N ACL	S ACL	S ACL *.5	N ACL	S ACL	S ACL *.5
72/28	2003-06 survey	5,923	2,304	1,152	4,965	1,931	965
68/32	2003-08 survey	5,594	2,633	1,316	4,689	2,207	1,103
64/36	2003-08 survey (variance weighted)	5,265	2,962	1,481	4,413	2,483	1,241

2.1.4 Harvest Specifications for Overfished Species and Rebuilding Concerns

Overfished groundfish species are those with spawning biomasses that have dropped below the Council's minimum stock size threshold (MSST) (i.e., 25 percent of initial spawning biomass or $B_{25\%}$ for all groundfish species other than flatfish where the proposed MSST is $B_{12.5\%}$). The FMP mandates these stocks need to be rebuilt through harvest restrictions and other conservation measures to a target biomass that supports maximum sustainable yield (i.e., B_{MSY} - $B_{40\%}$ for all groundfish species other than flatfish where the proposed target is $B_{25\%}$). Furthermore, the MSA mandates these rebuilding periods need to be the shortest time possible while taking into account the status and biology of the overfished stock, the needs of fishing communities, and the interaction of the overfished stock within the marine ecosystem. This mandate was underscored in an August 2005 ruling by the Ninth Circuit Court of Appeals in a challenge to the Council's darkblotched rockfish rebuilding plan. In accordance with that ruling, the Council decided to reconsider all adopted rebuilding plans under FMP Amendment 16-4 to ensure they comply with the MSA as interpreted by the courts. Amendment 16-4 was adopted in 2006. Modifications to some of the Amendment 16-4 rebuilding plans were made in 2008 as part of the 2009-2010 biennial specifications process. These modifications were largely due to changes in our understanding of stock status and/or productivity from assessments and rebuilding analyses done in 2007.

New full and updated assessments and rebuilding analyses done in 2009 inform the 2011 and 2012 harvest specifications for overfished species. Seven rockfish species (bocaccio south of $40^0$10' N lat., canary, cowcod south of $40^0$10' N lat., darkblotched, Pacific ocean perch (POP), widow, and yelloweye rockfish) are currently managed under rebuilding plans adopted under Amendment 16-4 as amended in regulations decided for the 2009-2010 biennial management cycle. An eighth species, petrale sole, was declared overfished based on the results of the new full assessment done in 2009 {Haltuch and Hicks 2009a}.

Progress towards rebuilding for the seven overfished rockfish species was reviewed in relation to the current year to rebuild (T_{TARGET}) and the SPR harvest rate specified in the respective rebuilding plans

(Table 2-11). Rebuilding is occurring for all species based on relative depletion (i.e., spawning biomass relative to estimated unfished spawning biomass) trends (Figure 2-1).

Two stocks (i.e., canary rockfish and POP) are behind schedule and are very unlikely to rebuild by the current T_{TARGET} as specified in their respective rebuilding plans. Canary rockfish is six years behind schedule, with a 26 percent probability of rebuilding by the current T_{TARGET} (2021) under the adopted harvest rate. Pacific ocean perch is only three years behind schedule (Table 2-11). However, the new $T_{F=0}$ (i.e., time to recover if harvest ceased in 2011) is 2018 and is greater than the adopted T_{TARGET} (2017). For canary rockfish this deviation from T_{TARGET} is due primarily to changes in our understanding of stock productivity and depletion due to re-estimation of the time-series of historical catches. In the case of POP, the change is due primarily to revised estimates of stock productivity and depletion arising from two Northwest Fisheries Science Center (NWFSC) survey indices that were low in 2007and 2008. These changes represent fundamental revisions to our understanding of the status of these species, which in turn warrant revisions to T_{TARGET}. Therefore, the proposed action includes modification of the canary rockfish and POP rebuilding plans by revising the T_{TARGET}. A slight lowering of the harvest rate specified in the yelloweye rebuilding plan is also proposed to maintain the T_{TARGET}.of 2084.

Table 2-11. Projected median year to rebuild each of the seven overfished rockfish species based on new 2009 rebuilding analyses at current SPR harvest rates specified in rebuilding plans.

Species	Total Catch / Total Cumulative OY During Rebuilding a/	Current SPR HR Adopted in Rebuilding Plan	Current T_{TARGET}	New $T_{F=0}$ b/	Median Year to Rebuild Under Adopted SPR HR	Difference in Years Between Current T_{TARGET} and New Median Year to Rebuild c/	New T_{MAX} d/
Bocaccio	50% (2000-2008)	77.7%	2026	2018	2022	4	2031
Canary	114% (2000-2007)	88.7%	2021	2024	2027	**-6**	2046
Cowcod	44% (2002-2007)	79.0%	2072	2060	2071	1	2097
Darkblotched	97% (2001-2007)	62.1%	2028	2016	2027	1	2037
POP	47% (2000-2008)	86.4%	2017	2018	2020	**-3**	2045
Widow	45% (2002-2007)	95.0%	2015	2010	2010	5	2025
Yelloweye	63% (2002-2007)	71.9%	2084	2047	2087	-3	2089

a/ The years considered are the years with reliable catch data since the stock was designated overfished and has been under rebuilding.

b/ New $T_{F=0}$ is the shortest time to rebuild and assumes all fishing-related mortality is eliminated beginning in 2011.

c/ Positive values reflect rebuilding being ahead of schedule, while negative values reflect delays. Values which are bolded indicate a substantial difference indicating a low probability of rebuilding by T_{TARGET} (<40%).

d/ New T_{MAX} **is** the new legal maximum time to rebuild based on the new stock assessment and rebuilding analysis.

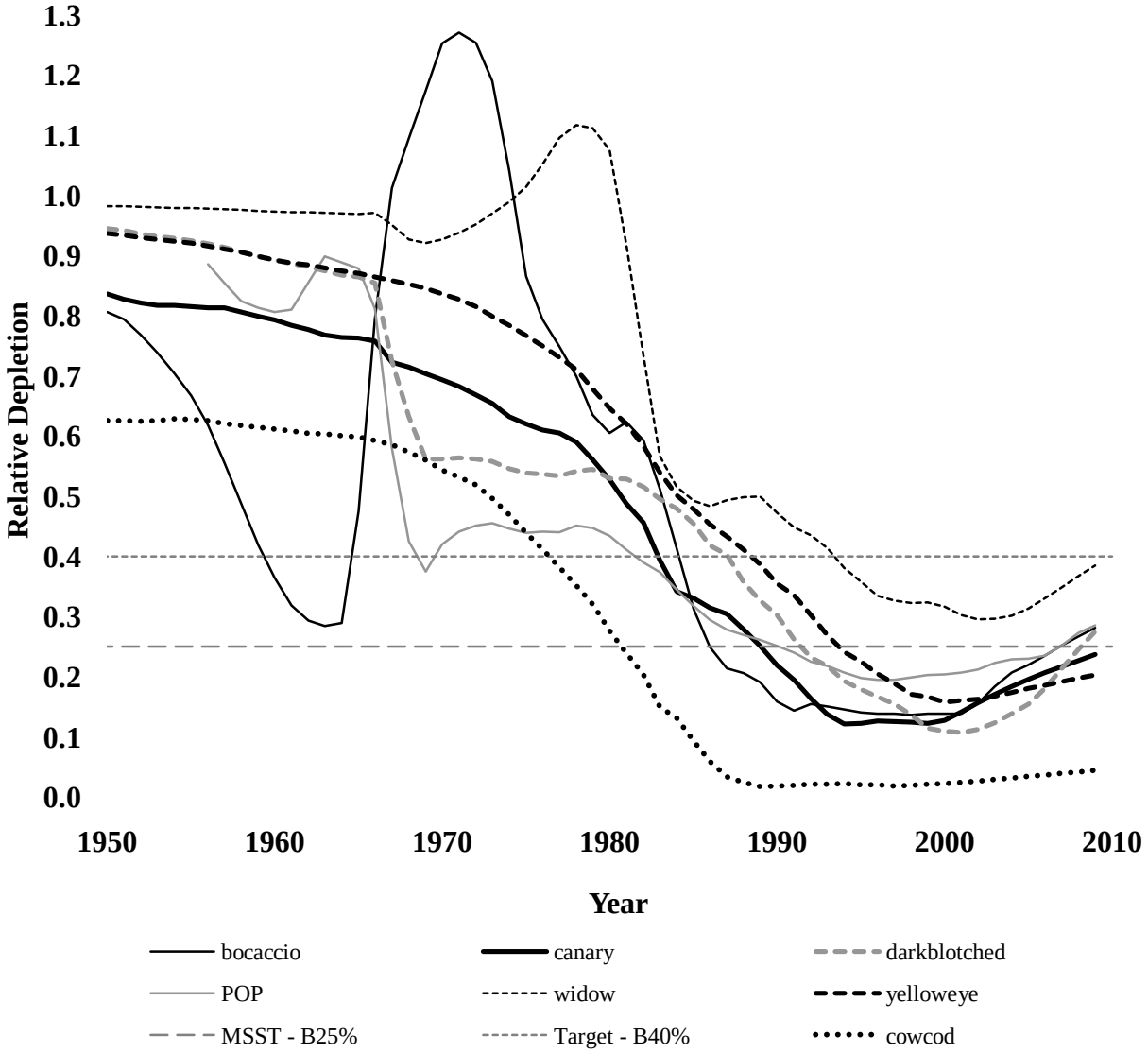

Figure 2-1. Relative depletion trends from 1950 to present for the seven overfished west coast rockfish species in relation to the MSST of $B_{25\%}$ and the B_{MSY} target of $B_{40\%}$.

A new assessment for petrale sole was done in 2009 {Haltuch and Hicks 2009a} that indicated the stock was overfished. This compelled the development of a petrale sole rebuilding analysis {Haltuch and Hicks 2009b}, which was used to develop the ACL alternatives for 2011 (Table 2-8) and 2012 (Table 2-9). The proposed action includes the adoption of a rebuilding plan for the petrale sole stock using information from the new assessment and rebuilding analysis.

Table 2-12 depicts the estimated median time to rebuild, current T_{TARGET}, and SPR harvest rate relative to alternative 2011-2012 ACLs for overfished west coast groundfish stocks. The discussion that follows details the basis of the ACL alternatives adopted for overfished species for detailed analysis. Alternatives for the seven overfished rockfish managed under adopted rebuilding plans are compared against the status quo alternative, which assumes the SPR harvest rates specified in rebuilding plans; and against $T_{F=0}$, the shortest time to rebuild the stock at this point by eliminating all harvest beginning in 2011 (i.e., an F100% SPR harvest rate is specified).

Table 2-12. Estimated time to rebuild, current target year to rebuild (T_{TARGET}), and SPR harvest rate relative to alternative 2011-2012 ACLs for overfished west coast groundfish stocks.

Stock	Current T_{TARGET}	ACL Alt.	Median Time to Rebuild	ACLs (mt)		SPR HR
				2011	2012	
Bocaccio S of 40°10' N lat.	2026		2019	0	0	F100%
		1	2019	53	56	F95%
		2	2020	109	115	F90%
		3	2022	263	274	F77.7%
			2024	373	384	F70%
			2028	539	545	F60%
			2031	605	609	F56%
Canary	2021		2024	0	0	F100%
		1	2025	49	51	F94.4%
			2026	69	72	F92.2%
		2	2026	94	99	F89.5%
		3; PPA	2027	102	107	F88.7%
			2027	129	135	F86%
			2028	155	162	F83.4%
			2031	253	263	F74.4%
			2035	308	318	F70%
			2043	396	408	F63.4%
			2046	415	426	F62.1%
Cowcod	2072		2060	0	0	F100%
		1	2064	2	2	F90%
		2	2068	3	3	F82.7%
		3; PPA	2071	4	4	F79%
			2074	5	5	F74.2%
			2097	9	9	F59.7%

Stock	Current T_{TARGET}	ACL Alt.	Median Time to Rebuild	ACLs (mt)		SPR HR
				2011	2012	
Darkblotched	2028		2016	0	0	F100%
		1	2018	130	131	F81.8%
		2	2022	222	222	F71.9%
			2025	298	296	F64.9%
		3; PPA	2027	332	329	F62.1%
			2028	364	360	F59.6%
			2037	461	453	F52.8%
POP	2017		2018	0	0	F100%
		1	2019	80	80	F93.6%
		2	2019	111	113	F91.2%
		3; PPA	2020	180	183	F86.4%
			2021	204	208	F84.8%
			2021	265	269	F81.1%
			2024	404	408	F73.6%
			2031	635	635	F63.6%
			2038	751	747	F59.5%
			2045	836	829	F56.8%
Widow	2015		2010	0	0	
		1	2010	200	200	
		2	2010	400	400	
		3; PPA	2010	600	600	
			2010	1,000	1,000	
			2010	3,000	3,000	

Stock	Current T_{TARGET}	ACL Alt.	Median Time to Rebuild	ACLs (mt)		SPR HR
				2011	2012	
Yelloweye	2084		2047	0	0	F100%
			2058	9	9	F86%
		1	2065	13	13	F80.7%
		2	2074	17	17	F76%
		3; PPA	2084	20	20	F72.8%
			2087	20	21	F71.9%
			2092	21	22	F70.9%
Petrale	NA		2014	0	0	F100%
		1	2014	459	624	F50%
		2	2015	776	1,160	25:5 rule
		3; PPA	2016	976	1,160	ABC in 2011; 25:5 rule thereafter
			2017	1,021	1,279	F30%

2.1.4.1 Bocaccio South of 40°10' N lat.

Bocaccio Stock Status

A new bocaccio assessment was conducted in 2009 {Field et al. 2009}. The last full assessment of bocaccio was conducted in 2003 (MacCall 2006b), and it was subsequently updated in 2005 and 2007 {MacCall, 2008 1428 /id}. The 2009 assessment used the SS3 modeling framework instead of SS1, extended the northern boundary from Cape Mendocino to Cape Blanco, and extended the period modeled from one beginning in 1951 to one beginning in 1892. There is evidence of two demographic clusters off the west coast centered off southern/central California and British Columbia. Although the bocaccio range extends considerably further north of Cape Blanco, abundance is low between Cape Mendocino and the Columbia River. Evidence also exists for a diffusion of young bocaccio from southern California (Conception area) northward as they age.

Major data changes for the 2009 assessment compared to previous assessments included a revised catch history and modeling of the trawl fishery as northern and southern components rather than as a single fishery. The 2009 assessment incorporated the NWFSC shelf-slope trawl survey for the first time, and also revised triennial trawl survey estimates. The 2009 assessment also used the NWFSC Southern California Bight hook and line survey and revised juvenile indices from the recreational pier index and juvenile trawl survey index.

The best estimate of current stock depletion in the 2009 assessment is 28 percent. The results of the 2009 assessment are consistent with those of the 2007 update, except for a smaller estimated starting biomass.

The change in the estimated starting biomass resulted primarily from extension of the assessment period back to 1892 when spawning output was estimated to be close to unfished levels.

Alternative Bocaccio Harvest Specifications

The 2011 and 2012 OFLs were projected from the 2009 bocaccio assessment by applying the proxy harvest rate of $F_{50\%}$ recommended by the SSC to the estimated exploitable biomass. The new bocaccio assessment extended the stock assessment north of $40^0$10' N latitude to Cape Blanco, Oregon at approximately 43^0 N lat. The Council decided, as a preliminary-preferred alternative, not to extend the bocaccio rebuilding plan north of $40^0$10' N latitude to Cape Blanco based on SSC and GMT advice that extending the rebuilding plan further north would not aid stock recovery and would only complicate current management. The STAT determined that six percent of the assessed biomass occurs north of $40^0$10' N lat. and the projected OFLs from the assessment were adjusted accordingly. The preferred OFLs for bocaccio are 737 ant 732 mt for 2011 and 2012 fisheries, respectively.

The SSC categorized bocaccio as a category 1 stock and recommended the assessment uncertainty (σ) value of 0.36 be used to determine ABCs following a P* approach. The Council decided the overfishing probability (P*) of 0.45 for determining preferred 2011 and 2012 ABCs of 704 and 700 mt, respectively.

There are three bocaccio ACL alternatives that were adopted for detailed analysis. These ACL alternatives were derived from the 2009 rebuilding analysis {Field and He 2009}, which used results from the new assessment. Alternative 1, 53 and 56 mt for 2011 and 2012, respectively, applies an F95% SPR harvest rate and has a predicted median time to rebuild of 2019, which equals $T_{F=0}$ (i.e., the shortest time to rebuild the stock at this point) (Table 2-12). Alternative 2 would apply an F90% SPR harvest rate to determine 2011 and 2012 ACLs of 109 and 115 mt, respectively, with a predicted median time to rebuild the stock of 2020 or one year longer than $T_{F=0}$. Alternative 3 is the status quo alternative by applying the F77.7% SPR harvest rate specified in the rebuilding plan to determine 2011 and 2012 ACLs of 263 and 274 mt, respectively. This alternative has a predicted median time to rebuild of 2022 or three years longer than $T_{F=0}$. The three ACL alternatives are predicted to rebuild the stock 7, 6, and 4 years, respectively before the current T_{TARGET} specified in the rebuilding plan (Table 2-12). The SSC did not recommend a change to the current rebuilding plan.

2.1.4.2 Canary Rockfish

Stock Status

Canary rockfish is a North American transboundary rockfish species distributed from central California to Alaska. The species is patchily distributed and difficult to sample well using bottom trawl gear. From the mid-1940s until it was declared overfished (1999), the average annual harvest was 2,500 mt. Since 1999, harvest has been greatly reduced with annual catches only in the range 172-287 mt.

An update of the last full assessment for canary rockfish in 2007 {Stewart, 2008 1424 /id} was provided in 2009 {Stewart 2009}. In 2007, the relative stock depletion was estimated to be 32.4 percent and the estimates of spawning stock biomass were indicating an upward trend. The 2009 assessment update updated fishery and survey data to include the years since the last assessment, as well as data for earlier years. Most of these data updates were minor with the exception of the use of a revised historical California catch time series for the years 1916-1980.

The update assessment results indicate that the current depletion percentage is 23.7 percent and stock projections show a slight increase in 2010 (24.5 percent). There is a high degree of uncertainty in the parameter estimates, especially steepness. Under the range of alternatives examined by the STAT, recent-

year depletion percentage is highly dependent on steepness. The management implications of the updated assessment are not qualitatively different from those of the 2007 assessment. The principal difference lies in the estimate of unfished spawning biomass (B_0). While the overall spawning biomass trends (over the past 50 years) are not greatly different, the updated assessment estimated a smaller spawning biomass with concomitantly lower depletion percentage in recent years. The overall result of the 2009 update is that our perception of the relative status and productivity of the canary rockfish stock has changed. The stock cannot rebuild by the current T_{TARGET} (2021) specified in the rebuilding plan given that the new median estimate of TF=0 is 2024 or three years longer. Therefore, a modification of the current canary rockfish rebuilding plan is recommended under the proposed action.

Alternative Harvest Specifications

The 2011 and 2012 OFLs under the preferred alternative were determined from the 2009 update assessment by applying the F_{MSY} proxy harvest rate of $F_{50\%}$ recommended by the SSC to the estimated exploitable biomass. The recommended 2011 and 2012 OFLs are 614 and 622 mt, respectively.

The SSC categorized canary rockfish as a category 1 stock and recommended the assessment uncertainty (σ) value of 0.36 be used to determine ABCs following a P* approach. The Council decided the overfishing probability (P*) of 0.45 for determining preferred 2011 and 2012 ABCs of 586 and 594 mt, respectively.

There are three canary ACL alternatives that were adopted for detailed analysis. These ACL alternatives were derived from the 2009 rebuilding analysis {Stewart 2009}, which used results from the new assessment. Our current understanding of canary rockfish stock status and productivity leads to the result that $T_{F=0}$ is longer than the current T_{TARGET}. Therefore, all ACL alternatives contemplate a change in the median time to rebuild the stock greater than the current T_{TARGET}. Alternative 1, 49 and 51 mt for 2011 and 2012, respectively, applies an F94.4% SPR harvest rate and has a predicted median time to rebuild of 2025, which is one year longer than $T_{F=0}$ (Table 2-12). Alternative 2 would apply an F89.5% SPR harvest rate to determine 2011 and 2012 ACLs of 94 and 99 mt, respectively, with a predicted median time to rebuild the stock of 2026 or two years longer than $T_{F=0}$. Alternative 3 is the preliminary preferred alternative and is the status quo alternative by applying the F88.7% SPR harvest rate specified in the rebuilding plan to determine 2011 and 2012 ACLs of 102 and 107 mt, respectively. This alternative has a predicted median time to rebuild of 2027 or three years longer than $T_{F=0}$. The three ACL alternatives are predicted to rebuild the stock 4, 5, and 6 years longer, respectively than the current T_{TARGET} specified in the rebuilding plan (Table 2-12). The SSC did recommend modifying the rebuilding plan out of the necessity to extend the current T_{TARGET} based on our changed understanding of stock status and productivity.

2.1.4.3 Cowcod South of 40°10' N lat.

Stock Status

The cowcod is a long-lived, large, heavily overfished species with a large conservation zone in the Southern California Bight (SCB). The species extends to the north, but is concentrated in SCB. In 1999, the first assessment of cowcod (Butler, *et al.* 1999b) indicated that the stock was overfished.

The 2009 update assessment {Dick et al. 2009} estimated the depletion percentage at 4.5 percent for the base model bounded by 3.8 percent (low state of nature) and 21.0 percent (high state of nature). The stock continues to display a slow upward trend but given that no new data are available, this result is little more than a stock projection. Cowcod remain on a multi-decadal rebuilding timeline. The 2009 assessment was an update to the full assessment done in 2007 {Dick, 2008 1433 /id}, which estimated the

depletion percentage at 3.8 percent. The trend in spawning biomass was increasing slowly mainly due to assumed low catch.

No new data sources were available for the update assessment. Catch reconstructions were done for both the commercial (1900-1968) and recreational fleets (1928-1980). However, the commercial reconstructions while slightly larger than those used in the assessment, were also for a larger area than the SCB, and therefore not directly comparable. The reconstructed recreational catches were lower than those used in the 2007 assessment and were adopted for the current update.

There is little change in the view of stock status as a result of the 2009 update assessment. However, the change in historical recreational catches did lower the estimate of B_0 and partly gave rise to the increase in the 2009 estimate of depletion percentage. The SSC did not recommend any changes to the current cowcod rebuilding plan.

Alternative Harvest Specifications

The 2011 and 2012 OFLs under the preferred alternative were determined from the 2009 assessment by applying the F_{MSY} proxy harvest rate of $F_{50\%}$ recommended by the SSC to the estimated exploitable biomass for the assessed portion of the stock in the Conception area. The OFLs for the Monterey area portion of the stock were determined using a DB-SRA approach. The OFLs for the Conception and the Monterey areas were summed to determine an OFL specification of 13 mt for 2011 and 2012 for the entire stock south of $40^0$10' N lat.

The SSC categorized the assessed portion of the stock (Conception area) as category 2 and recommended the assessment uncertainty (σ) value of 0.72 be used to determine the ABC following a P* approach. The Council used the overfishing probability (P*) of 0.4 for determining the Conception area contribution to the ABC. The Monterey portion of the stock was categorized as a category 3 stock since a catch-based approach was used to determine the ABC contribution. These ABC contributions were summed to determine an ABC of 10 mt for cowcod south of $40^0$10' N lat.

There are three cowcod ACL alternatives that were adopted for detailed analysis. These ACL alternatives were derived from the 2009 rebuilding analysis for the Conception area contribution {Dick and Ralston 2009}, which used results from the 2009 updated assessment. The GMT-recommended convention of doubling the assessed area ACLs to incorporate an appropriate harvest contribution for the unassessed Monterey area was done to develop alternative ACLs. Alternative 1, 2 mt for 2011 and 2012, applies an F90% SPR harvest rate and has a predicted median time to rebuild of 2064, which is four years longer than $T_{F=0}$ (Table 2-12). Alternative 2 would apply an F82.7% SPR harvest rate to determine a 2011 and 2012 ACL of 3 mt, with a predicted median time to rebuild the stock of 2068 or eight years longer than $T_{F=0}$. Alternative 3 is the preliminary preferred alternative and is the status quo alternative by applying the F79% SPR harvest rate specified in the rebuilding plan to determine a 2011 and 2012 ACL of 4 mt. This alternative has a predicted median time to rebuild of 2071 or eleven years longer than $T_{F=0}$. The three ACL alternatives are predicted to rebuild the stock 8, 4, and 1 year(s), respectively prior to the current T_{TARGET} (2072) specified in the rebuilding plan (Table 2-12). The SSC did not recommend a change to the current rebuilding plan.

2.1.4.4 Darkblotched Rockfish

Stock Status

Darkblotched rockfish is a long-lived (60-105 years) member of the slope rockfish assemblage. There were large removals by foreign fisheries during 1966-68, followed by moderate landings of 200-1000 mt

per year thereafter. The species was first fully assessed in 2000 (Rogers, *et al.* 2000) and declared overfished as a result of that assessment.

An update of the last full darkblotched assessment done in 2007 {Hamel, 2008 1434 /id} was done in 2009 {Wallace and Hamel 2009}. The update assessment estimated the depletion percentage of the spawning output at the start of 2009 was 27 percent. In the previous stock assessment in 2007, darkblotched rockfish was estimated to be gradually rebuilding from a low of 10 percent of unfished stock size in 2000. The stock was estimated at 22 percent of unfished stock in 2007. Fishery and survey data were updated in the 2009 assessment to include the years since the last assessment and minor updates for earlier years. The 2009 assessment result indicated fishing mortality rate on darkblotched rockfish has been greatly reduced, and darkblotched rockfish appear to be rebuilding gradually at close to previous rebuilding projections. In this update assessment, stock status in 2007 was estimated to be 21 percent of the unfished stock size, which is consistent with the previous assessment estimate of 22 percent. The estimate for the depletion percentage of the spawning output at the start of 2009 was 27 percent, indicating that the stock has increased by a factor of 2.7 since 2000. However, recent survey trends are noisy and relatively flat. The estimated increase in stock size is driven primarily by the assumption that darkblotched productivity is analogous to that of other similar species, and not on survey and fishery data indicating an upward trend.

Alternative Harvest Specifications

The 2011 and 2012 OFLs under the preferred alternative were determined from the 2009 updated assessment by applying the F_{MSY} proxy harvest rate of $F_{50\%}$ recommended by the SSC to the estimated exploitable biomass. The recommended 2011 and 2012 OFLs are 508 and 497 mt, respectively.

The SSC categorized darkblotched rockfish as a category 1 stock and recommended the assessment uncertainty (σ) value of 0.36 be used to determine ABCs following a P* approach. The Council decided the overfishing probability (P*) of 0.45 for determining preferred 2011 and 2012 ABCs of 485 and 475 mt, respectively.

There are three darkblotched ACL alternatives that were adopted for detailed analysis. These ACL alternatives were derived from the 2009 rebuilding analysis {Wallace 2009}, which used results from the new updated assessment. Alternative 1, 130 and 131 mt for 2011 and 2012, respectively, applies an F81.8% SPR harvest rate and has a predicted median time to rebuild of 2018, which is two years longer than $T_{F=0}$ (Table 2-12). Alternative 2 would apply an F71.9% SPR harvest rate to determine a 2011 and 2012 ACL of 222 mt, with a predicted median time to rebuild the stock of 2022 or six years longer than $T_{F=0}$. Alternative 3 is the preliminary preferred alternative and is the status quo alternative by applying the F62.1% SPR harvest rate specified in the rebuilding plan to determine 2011 and 2012 ACLs of 332 and 329 mt, respectively. This alternative has a predicted median time to rebuild of 2027 or eleven years longer than $T_{F=0}$. The three ACL alternatives are predicted to rebuild the stock 10, 6, and 1 year(s), respectively before the current T_{TARGET} specified in the rebuilding plan (Table 2-12). The SSC did not recommend any changes to the current darkblotched rockfish rebuilding plan.

2.1.4.5 Pacific Ocean Perch

Stock Status

Pacific Ocean perch (POP) were harvested almost entirely by U.S. and Canadian vessels in the Columbia and Vancouver INPFC areas prior to 1965. Large factory trawlers from the Soviet Union and Japan began fishing for POP in the Vancouver area and in the Columbia area in 1965 and 1966, respectively. Intense fishing pressure by these foreign fleets occurred from 1966 to 1975. Catches from all fleets

peaked in 1966-67. Passage of the MSA in 1976 ended foreign fishing within 200 miles of the U.S. coast. NMFS formally declared POP overfished in March 1999 on the basis of the Ianelli and Zimmerman (1998) assessment.

The last full assessment was conducted in 2003 (Hamel, *et al.* 2003). Assessments in 2005 (Hamel 2006), 2007 {Hamel, 2008 1429 /id}, and the 2009 assessment {Hamel 2009} were updates using the same forward projection, age-structured model as used in 2003. In the previous stock assessment in 2007, POP was estimated to be gradually rebuilding. The estimate of depletion percentage in 2007 was 27.5 percent. Fishery, survey, and observer data were updated in 2009 to include the years since the last assessment and some minor updates to the data from earlier years.

Results of the 2009 updated POP assessment indicate that the stock continues to rebuild albeit slowly. The updated estimates of the depletion percentage are 25.2 percent, 27.4 percent, and 28.6 percent in 2007, 2008, and 2009, respectively. Exploitation rates remain at a low level. However, the new $T_{F=0}$ is 2018 and is greater than the adopted T_{TARGET} (2017). This change in the predicted rebuilding duration is due primarily to revised estimates of stock productivity and depletion arising from two NWFSC survey indices that were low in 2007 and 2008. These changes represent fundamental revisions to our understanding of the status of POP, which in turn warrants revision to T_{TARGET}.

Alternative Harvest Specifications

The 2011 and 2012 OFLs for POP under the preferred alternative were determined from the 2009 updated assessment by applying the F_{MSY} proxy harvest rate of $F_{50\%}$ recommended by the SSC to the estimated exploitable biomass. The recommended 2011 and 2012 OFLs are 1,026 and 1,007 mt, respectively.

The SSC categorized POP as a category 1 stock and recommended the assessment uncertainty (σ) value of 0.36 be used to determine ABCs following a P* approach. The Council decided the overfishing probability (P*) of 0.45 for determining preferred 2011 and 2012 ABCs of 981 and 962 mt, respectively.

There are three POP ACL alternatives that were adopted for detailed analysis. These ACL alternatives were derived from the 2009 rebuilding analysis {Hamel 2009}, which used results from the new updated assessment. Our current understanding of POP stock status and productivity leads to the result that $T_{F=0}$ is longer than the current T_{TARGET}. Therefore, all ACL alternatives contemplate a change in the median time to rebuild the stock greater than the current T_{TARGET}. Alternative 1 is 80 mt for 2011 and 2012 is and is determined by applying an F93.6% SPR harvest rate and has a predicted median time to rebuild of 2019, which is one year longer than $T_{F=0}$ (Table 2-12). Alternative 2 would apply an F91.2% SPR harvest rate to determine 2011 and 2012 ACLs of 111 and 113 mt, respectively with a predicted median time to rebuild the stock of 2019 or one year longer than $T_{F=0}$. Alternative 3 is the preliminary preferred alternative and is the status quo alternative by applying the F86.4% SPR harvest rate specified in the rebuilding plan to determine 2011 and 2012 ACLs of 180 and 183 mt, respectively. This alternative has a predicted median time to rebuild of 2020 or two years longer than $T_{F=0}$. The three ACL alternatives are predicted to rebuild the stock 2-3 years longer than the current T_{TARGET} specified in the rebuilding plan (Table 2-12). The SSC did recommend modifying the rebuilding plan out of the necessity to extend the current T_{TARGET} based on our changed understanding of stock status and productivity.

2.1.4.6 Widow Rockfish

Stock Status

The new widow rockfish assessment {He et al. 2009a} indicates the stock is at 38.5 percent of unfished biomass, just short of the $B_{40\%}$ target. The previous assessment done in 2007 {He, 2008 1437 /id} had

projected the stock would be rebuilt to target levels by 2009. However, the new assessment indicated the 2002 year class was not as strong as previously estimated, resulting in the estimated current biomass falling short of the target level called for in the rebuilding plan. The 2009 rebuilding analysis {He et al. 2009b} projects the stock will be rebuilt by 2010. The SSC recommended another full assessment will be required to confirm that result.

The last full assessment of widow rockfish was conducted in 2005 (He, *et al*. 2006), with an update in 2007. The 2009 assessment differed from the previous assessment in several respects: a) the assessment used Stock Synthesis 3 (SS3) rather than a custom-designed model, b) the catch history was revised and extended back to 1916, c) catch, age, and survey data were updated with data from 2007 and 2008, and d) data from the NWFSC trawl survey were included in the assessment. Widow rockfish were modeled as a single stock with two areas and four fisheries. Additional work regarding how to model this species remains a priority given the sparseness of recent fishery data and the need to further explore spatial stock structure.

The STAR Panel {Dorn et al. 2009} and SSC considered the 2009 assessment to be the best available scientific information and recommended its use in management. Much attention was given during the STAR Panel to refining the new data sets so that the base model is reasonably well developed and less time was available to explore alternative model configurations and tuning. The SSC recommended that the next assessment should be a full assessment because several key problems remain unresolved. The SSC did not recommend any changes to the current widow rockfish rebuilding plan pending a new full assessment result confirming the stock is rebuilt.

Alternative Harvest Specifications

The 2011 and 2012 OFLs for widow rockfish under the preferred alternative were determined from the 2009 assessment by applying the F_{MSY} proxy harvest rate of $F_{50\%}$ recommended by the SSC to the estimated exploitable biomass. The recommended 2011 and 2012 OFLs are 5,097 and 4,923 mt, respectively.

The SSC categorized widow rockfish as a category 1 stock and recommended the assessment uncertainty (σ) value of 0.36 be used to determine ABCs following a P* approach. The Council decided the overfishing probability (P*) of 0.45 for determining preferred 2011 and 2012 ABCs of 4,872 and 4,705 mt, respectively.

There are three widow rockfish ACL alternatives that were adopted for detailed analysis. These ACL alternatives were derived from the 2009 rebuilding analysis {He et al. 2009b} recommended by the SSC, which used results from the new assessment. All ACL alternatives are based on constant catch scenarios that are well below the estimated MSY in the assessment and the ABCs preferred by the Council. All the ACL alternatives assume the stock is rebuilt in 2010 as projected in the assessment and rebuilding analysis; therefore, no median time to rebuild estimates are provided. Alternative 1, 2, and 3 are constant catch scenarios of 200, 400, and 600 mt for 2011 and 2012, respectively. Applying the status quo harvest rate specified in the current rebuilding plan would result in 2011 and 2012 ACLs of 352 and 339 mt, respectively. This level of harvest is lower than the preliminary preferred ACL of 600 mt and slightly lower than the 400 mt Alternative 2 ACLs. However, successful rebuilding is predicted by 2010 and all alternatives are predicted to accommodate a sustainable harvest of widow given the estimated MSY of about 3,000 mt.

2.1.4.7 Yelloweye Rockfish

Stock Status

A new full coastwide yelloweye assessment was conducted in 2009 {Stewart et al. 2009}, which estimated the stock depletion at 20.3 percent. The last full assessment of yelloweye rockfish was conducted in 2006 (Wallace, *et al.* 2006) with an assessment update in 2007 {Wallace, 2008 1431 /id}. The 2009 assessment differed from previous assessments in terms of assumed population structure and the data used to fit the model. The 2009 assessment was based on three regions (California, Oregon and Washington) under the assumptions that adults are sedentary, density-dependence is a function of coastwide egg production, and the proportion of recruits settling in each area is constant over time. This spatial structure is consistent with our understanding of the behavior of yelloweye rockfish, and reflects a compromise between a coastwide assessment and separate assessments for each state. This compromise allows for some regional differences to be captured within the model without requiring large numbers of additional parameters.

Even with a large number of changes to data inputs, the results from the 2009 yelloweye rockfish assessment were consistent with those from the 2006 and 2007 assessments. All of these assessments suggest that yelloweye rockfish experienced a substantial decline in abundance between 1980 and 2000, with a best estimate of stock depletion in 2009 from the current assessment of 20.3 percent.

The 2009 assessment estimated trends in abundance by region. The SSC cautioned against making use of these trends as the sole basis for the spatial allocation of harvest guidelines because the trend in abundance at the coastwide level is much more robust than those at the regional level. Reasons for this include that the time-series of historical catches by region are more uncertain than the coastwide totals and that the catch reconstructions for Washington are still somewhat incomplete. Given that the trends in abundance by region are driven to a considerable extent by the time-series of historical catches, uncertainty in the split of total catches to region will be reflected more in uncertainty in regional depletion than in total depletion.

The SSC endorsed the use of the 2009 yelloweye rockfish assessment for status determination and management in the Council process. The SSC also endorsed the approach used to quantify uncertainty, which formed the basis for the 2009 rebuilding analysis {Stewart 2009}.

Alternative Harvest Specifications

The 2011 and 2012 OFL for yelloweye rockfish under the preferred alternative was determined from the 2009 assessment by applying the F_{MSY} proxy harvest rate of $F_{50\%}$ recommended by the SSC to the estimated exploitable biomass. The resulting OFL is 48 mt for 2011 and 2012.

The SSC categorized yelloweye rockfish sole as a category 1 stock and recommended the assessment uncertainty (σ) value of 0.36 be used to determine ABCs following a P* approach. The Council decided the overfishing probability (P*) of 0.45 for determining a preferred 2011 and 2012 ABC of 46 mt.

There are three yelloweye ACL alternatives that were adopted for detailed analysis. These ACL alternatives were derived from the 2009 rebuilding analysis {Stewart 2009}, which used results from the new assessment. Alternative 1 is 13 mt for 2011 and 2012 is and is determined by applying an F80.7% SPR harvest rate and has a predicted median time to rebuild of 2065, which is 19 years before the current T_{TARGET} and 18 years longer than $T_{F=0}$ (Table 2-12). Alternative 2 would apply an F76% SPR harvest rate to determine an ACL of 17 mt for 2011 and 2012 and a predicted median time to rebuild the stock of 2074 or 10 years before the current T_{TARGET} and 27 years longer than $T_{F=0}$. Alternative 3 is the

preliminary preferred alternative and would apply an F72.8% SPR harvest rate to determine an ACL of 20 mt for 2011 and 2012 and a predicted median time to rebuild the stock of 2084, the current T_{TARGET} and 37 years longer than $T_{F=0}$. The status quo alternative is determined by applying the F71.9% SPR harvest rate specified in the rebuilding plan to determine 2011 and 2012 ACLs of 20 and 21 mt, respectively. This alternative has a predicted median time to rebuild of 2087 or three longer than the current T_{TARGET} and 40 years longer than $T_{F=0}$, which is why the Council is recommending a lower harvest rate (SPR = F72.8%) than is currently specified in the rebuilding plan.

A recent U.S. district court ruling in the Northern District of California, in a case challenging, among other things, the adopted modification to the yelloweye rebuilding plan in 2010 decided in 2008 {PFMC 2008} (NRDC et al. v Locke et al. - case C 01-0421 JL) was made in a summary judgment on April 22, 2010. The District court ordered NFMS:

> "to apply the yelloweye harvest levels the Agency set for 2009 and 2010 in the original "ramp-down" plan it approved for yelloweye in the 2007-2008 Specifications. This sets 2009 yelloweye harvests at 17 metric tons, and 2010 yelloweye harvests at 14 metric tons (rather than the 17 metric tons the Agency has allowed for 2010 under the 2009-2010 Specifications)".

Consequently, new yelloweye rebuilding analysis results assuming a 14 mt 2010 harvest rather than a 17 mt harvest were requested of Dr. Ian Stewart, NMFS NWFSC, the lead author of the 2009 assessment and rebuilding analysis. The additional rebuilding analysis results showed there was no difference in estimates of median year to rebuild the stock across all the alternatives considered, including the zero-harvest strategy used to predict $T_{F=0}$ (Table 2-13). Table 2-13 also shows no significant difference in SPR harvest rates or associated 2011 and 2012 ACLs from lowering the 2010 OY to 14 mt. The Council and NMFS have yet to decide whether to change the 2010 OY and/or appeal the ruling.

Table 2-13. Estimated time to rebuild and SPR harvest rate relative to alternative 2011-2012 ACLs for yelloweye rockfish that vary the 2010 OY by 3 mt.

ACL Alt.	Median Time to Rebuild	ACLs (mt)		SPR HR
		2011	2012	
Assuming a 17 mt OY in 2010				
	2047	0	0	F100%
	2058	9.0	9.0	F86%
1	2065	12.8	13.1	F80.7%
2	2074	16.7	17.0	F76%
3; PPA	2084	19.6	19.9	F72.8%
	2087	20.4	20.7	F71.9%
Assuming a 14 mt OY in 2010				
	2047	0	0	F100%
	2058	8.8	9.0	F86%
1	2065	12.8	13.1	F80.7%
2	2074	16.7	17.0	F76%
3; PPA	2084	19.6	19.9	F72.8%
	2087	20.4	20.8	F71.9%

2.1.4.8 Petrale Sole

Petrale Sole Stock Status

A new petrale sole assessment was done in 2009 {Haltuch and Hicks 2009a}, which indicated that the coastwide stock had declined to an overfished status at 11.6% of unfished biomass. Past assessments completed by {Demory 1984, Turnock et al. 1993, and Sampson and Lee 1999} considered petrale sole in the Columbia and U.S. Vancouver INPFC areas a single stock. Sampson and Lee (1999) assumed that petrale sole in the Eureka and Monterey INPFC areas represented two additional distinct socks. The most recent 2005 petrale sole assessment {Lai et al. 2006}assumed two stocks, northern (U.S. Vancouver and Columbia INPFC areas) and southern (Eureka, Monterey and Conception INPFC areas), to maintain continuity with previous assessments. Lai et al. (2006) estimated the relative depletion of the northern and southern stocks to be $B_{34\%}$ and $B_{29\%}$, respectively. The 2005 assessment introduced a significant amount of reconstructed historical catch extending the catch history back to 1876, which increased the estimate of unfished biomass and lowered the relative depletion of the stock.

The most significant change in the 2009 assessment was that a single coast-wide model was used, rather than independent assessments of northern and southern components of the stock. Other changes included incorporation of discard data in the model, addressing problems with petrale sole age data and ageing error information, and estimation of different natural mortality rates for the females and the males. Despite these changes, the new assessment estimates of stock size and trend are highly consistent with the previous assessment. The most notable exception is that the previous assessment showed a strong increase in stock size in the last years of the assessment. The current assessment now shows a recent decline in stock size that is driven by four consecutive years of decline in the Northwest Fisheries Science Center (NWFSC) trawl survey index since 2005.

The 2009 assessment indicates that, according to the No Action proxy reference points, fishing mortality on petrale sole has continually exceeded the target of $F_{40\%}$ since the 1940s, and that the stock has been below the $B_{25\%}$ overfished threshold since 1953 (Figure 2-2). These results are to a large degree driven by two basic pieces of information: 1) the high landings of petrale sole during the 1940s and 1950s, and 2) age and size composition data that are consistent with a high exploitation rate (e.g., the recent age composition data show that very few old fish are present in the population).

The SSC was concerned that certain assessment results were so extreme that the overall plausibility of the assessment was called into question. Attention focused primarily on the estimated catchability of the NWFSC survey, the estimate of stock-recruit steepness (0.95), and confounding of estimated model parameters. The assessment used two indices of abundance, the Alaska Fisheries Science Center (AFSC) triennial survey from 1980 to 2004, and NWFSC survey from 2003 to 2008. The estimated catchability of the AFSC survey was 0.52 and 0.72 for early and late periods, while the estimated catchability of the NWFSC survey was 3.07. A catchability of 1.0 would imply that the survey net captured all the fish in front of the net and that fish density is the same in trawlable and untrawlable areas. A catchability greater than 1.0 could be a result of two general processes: herding of fish into the net and lower densities of fish in untrawlable areas. Although it is reasonable to expect that these factors may be important for petrale sole, it is difficult to reconcile a catchability of 3.07 with likely magnitude of these factors inferred from studies of flatfish herding by research trawls in other areas, and initial estimates of trawlable and untrawlable areas off the west coast.

Alternative Status Determination Criteria for Petrale Sole and Other Flatfish Species

Status determination criteria (SDC) are the proxy or deterministic biomass and harvest rate reference points used to manage a stock. The current No Action reference points for petrale sole and other flatfish

species are a proxy F_{MSY} harvest rate of $F_{40\%}$ (i.e., maximum fishing mortality threshold or MFMT), beyond which overfishing is occurring; a B_{MSY} target of $B_{40\%}$, and a minimum stock size threshold (MSST) of $B_{25\%}$, below which the stock is considered overfished. Based on a meta-analysis of the relative productivity of assessed west coast flatfish species and other assessed Pleuronectid species internationally, the SSC recommends a change in these reference points used to manage west coast flatfish species. The preferred reference points for flatfish are an F_{MSY} proxy of $F_{40\%}$, a B_{MSY} target of $B_{25\%}$, and an MSST of $B_{12.5\%}$. Figure 2-2 depicts the depletion of petrale sole from 1945 to present relative to the No Action and Preferred reference points recommended by the SSC. The level of depletion estimated at the beginning of 2009 for the coastwide petrale sole stock is 11.6% of its unfished biomass, which is below the MSST under the SDC currently used to manage flatfish ($B_{25\%}$), as well as the new proposed MSST of $B_{12.5\%}$ for flatfish. Therefore, a new rebuilding plan for petrale sole (with 2011-2012 ACLs consistent with a new proposed rebuilding plan) is contemplated under Amendment 16-5 and analyzed in this EIS.

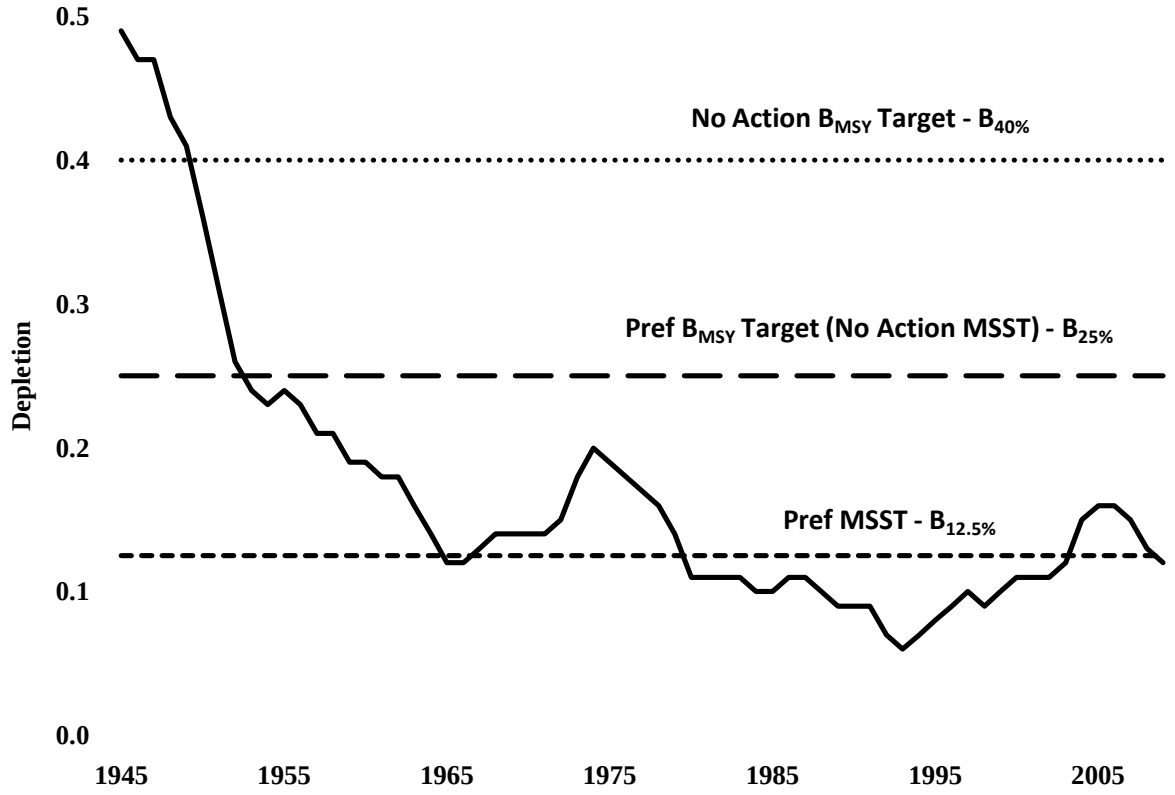

Figure 2-2. Petrale sole depletion time series, 1945 - present, relative to No Action and Preferred reference points proposed for petrale sole and other assessed flatfish species.

Alternative Petrale Sole Harvest Specifications

The 2011 and 2012 OFLs for petrale sole under the preferred alternative were determined from the 2009 assessment by applying the F_{MSY} proxy harvest rate of $F_{30\%}$ recommended by the SSC to the estimated exploitable biomass. The recommended 2011 and 2012 OFLs are 1,021 and 1,279 mt, respectively.

The SSC categorized petrale sole as a category 1 stock and recommended the assessment uncertainty (σ) value of 0.36 be used to determine ABCs following a P* approach. The Council decided the overfishing

probability (P*) of 0.45 for determining preferred 2011 and 2012 ABCs of 976 and 1,222 mt, respectively.

All the petrale sole ACL alternatives adopted for detailed analysis are predicted to rebuild the stock to the $B_{25\%}$ target well in advance of T_{MAX} (2021), which is the legal maximum rebuilding period of ten years. The shortest time to rebuild is T_{MIN} (2014), which is the estimated rebuilding period if all sources of fishing-related mortality were eliminated beginning in 2011. Table 2-12 shows that the petrale stock is predicted to successfully rebuild by T_{MIN} with some allowable harvest. The alternative 1 ACL is 459 and 624 mt in 2011 and 2012, respectively and is determined using an F50% SPR harvest rate. The median year estimated to rebuild the stock under alternative 1 is 2014, which is T_{MIN}. Alternative 2 would immediately apply the 25-5 precautionary harvest control rule in 2011 and results in ACLs of 776 and 1,160 mt in 2011 and 2012, respectively. Alternative 2 is estimated to rebuild the stock by 2015 or 1 year longer than T_{MIN}. The alternative 3 ACLs are the Council's preliminary preferred alternative. Alternative 3 would specify the ABC of 976 mt in 2011 and apply the 25-5 precautionary adjustment beginning in 2012, resulting in a 1,160 mt ACL in 2012. Alternative 3 is estimated to rebuild the stock by 2016 or two years longer than T_{MIN}.

Considerations for the Rebuilding Plan for Petrale Sole

At this meeting, the Council will make its final recommendation on the petrale sole rebuilding plan. To best inform that recommendation, this analysis contrasts the Council's preliminary preferred rebuilding alternative against the other rebuilding alternatives under consideration using the key legal criteria and questions identified in section 4.5.3 of the Council's FMP, the section identifying the Council's general policies on rebuilding overfished stocks. Analysis of the specific management measures necessary to maintain catch within the ACLs from these rebuilding alternatives is provided in a separate section of this document.

The analysis in this section was authored by a subgroup of the GMT for advanced publication in the June Briefing Book. The full team will review the analysis and will provide additional information and comments to the Council at the meeting.

The Council identified its preliminary preferred rebuilding alternative (PPA) rebuilding plan at the April meeting. Roughly two weeks later, the U.S. District Court for the Northern District of California issued an order pertaining to the Council's existing rebuilding plans and found some fault with certain aspects of the Council's approach.[2] The court's order involved interpretation of the 2005 decision from the Court of Appeals for the Ninth Circuit, which primarily took issue with the 2002 version of the Council's darkblotched rockfish rebuilding plan.[3]

At the time of writing, NMFS has not given the GMT an official interpretation of what the recent court order may or may not mean for the petrale rebuilding plan. The petrale rebuilding plan is new and so the court's order did not address it specifically. In addition, given petrale's productivity and the fact that it is caught almost exclusively by a single fishery sector, the tradeoffs presented to the Council by this rebuilding plan are more straightforward than those involved with the long-lived rockfish. Nonetheless, the Council's PPA does involve a delay from the shortest time to rebuild and a delay from the alternative that would allow some minimal, and most likely incidental only, harvest during rebuilding. The court was highly scrutinizing of such delays with the existing rebuilding plans. We are somewhat confused by the recent court decision and do not see clear guidance from the court on how the Council should weigh the Magnuson-Stevens Act's rebuilding factors. Here, we do our best to address the aspects of the court's

[2] *NRDC v. Locke*, No. C 01-0421 JL (N.D.Ca April 23, 2010).
[3] *NRDC v. NMFS*, 421 F.3d 872 (2005).

order that may apply to the Council's final recommendation on the plan to rebuild the petrale sole stock. The more detailed comments on aspects of the court's decision are placed in footnotes.

Goals and Objectives of Rebuilding

The Council's goals and objectives for rebuilding plans are identified stated in section 4.5.3.1 of the FMP:

> The overall goals of rebuilding programs are to (1) achieve the population size and structure that will support the maximum sustainable yield within a specified time period that is as short as possible, taking into account the status and biology of the stock, the needs of fishing communities, and the interaction of the stock of fish within the marine ecosystem; (2) minimize, to the extent practicable, the adverse social and economic impacts associated with rebuilding, including adverse impacts on fishing communities; (3) fairly and equitably distribute both the conservation burdens (overfishing restrictions) and recovery benefits among commercial, recreational, and charter fishing sectors; (4) protect the quantity and quality of habitat necessary to support the stock at healthy levels in the future; and (5) promote widespread public awareness, understanding and support for the rebuilding program.

These overall goals are derived from and consistent with the requirements of the Magnuson-Stevens Act (MSA). The first goal embodies MSA national standard 1 (NS1) and the requirements for rebuilding overfished stocks found at MSA section 304(e)(4)(A). The third goal is required by MSA section 304(e)(4)(B). The fourth and fifth goals represent additional policy preferences of the Council that recognize the importance of habitat protection to the rebuilding of some fish stocks and the desire for public outreach and education on the complexities—biological, economic, and social issue—involved with rebuilding overfished stocks.

The second goal appears to have caused some confusion in the recent court decision.[4] The goal to minimize adverse impacts to fishing communities is required by MSA national standard 8 (NS8).[5] The

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[4] *NRDC v. Locke*, at page 26:

> The Council began its analysis by considering the impacts on overfished species that would result from rebuilding in the shortest possible time period (F=0). NMFS argues that the MSA does not require the Agency to set optimal yields (OYs) at zero to expedite rebuilding; rather, that the Agency "must" consider the economic impact on fishing communities. 16 U.S.C. § 1851(a)(8). This is a significant mis-citation of the [Ninth Circuit's darkblotched] decision, which was that the Agency "may" consider the needs of fishing communities. (*all citations omitted except the citation to NS8*).

To characterize NMFS assertion as a "significant mis-citation" of the Ninth Circuit case law seems unfair. The court's purpose in making the point is also a bit perplexing. The Ninth Circuit's decision referred to the legal obligation as a "command":

> We are not prepared to accept NRDC's argument that once the 10-year cap is lifted because the biology of the fish dictates it, the Act in turn dictates that the Agency can no longer consider the short-term economic needs of fishing communities at all. Such an argument, although plausible, does not appear to give due consideration to the continuing operation of subsection (i)'s *command* to take the needs of fishing communities into account.

(NRDC vs. NMFS, 421 F. 3d at 881; *emphasis added*).

And as elaborated on below in footnote (FN) [5], the court also—on the very next page after the "significant mis-citation" passage— states that NMFS must consider economic impacts to communities and properly did so for Amendment 16-4. If the Council set a rebuilding plan without considering the needs of the fishing communities, it would seem an obvious violation of the statute. And, the Council could set rebuilding plan at zero catches if that was the strategy the Council believed was in the best long-term interests of fishing communities. Yet where such a strategy would be clearly against the short- and long- term interests of the community, as is the case with the rebuilding rockfish and petrale sole, it would seem contrary to the MSA for the Council to make such a recommendation.

confusion seems to arise from the relationship between NS8 and the MSA sec. 304(e)(4)(A)(i) provision on taking into account the "needs of fishing communities" when establishing a time to rebuild.

We attempt to clarify briefly how social and economic considerations factor into the Council's decision on rebuilding. First, we note that NS8 does not provide justification for delaying rebuilding or for emphasizing short-term economic needs over long-term benefits. We do not believe that the Council has intended to use NS8 as a justification for such purposes yet this seems to be an impression that the courts may perhaps hold. As we understand it, the Council has sought to promote the sustained participation of fishing communities and to minimize the social and economic impacts of the specific conservation and management measures while also achieving the objective of rebuilding, consistent with NS8.[6] Like for NS1, NMFS has created advisory guidelines to assist the regional fishery management councils with interpretation of NS8.[7] These guidelines and case law characterize NS8 as being relevant alternatives under consideration that are expected to "achieve similar conservation measures." [8] When such is the case, NS8 would argue for "the alternative that provides the greater potential for sustained participation of such communities and minimizes the adverse economic impacts on such communities."[9]

We further discuss the importance of economic and social factors to rebuilding plans in the section on taking into account the needs of fishing communities.

Time to Rebuild – General Considerations

The MSA and the FMP require the Council to consider the shortest time possible to rebuild and rebuilding alternatives to that shortest time. The length of time a stock may take to rebuild is a question of science. The methods and procedures for calculating estimates of the biological rebuilding parameters are detailed in section 4.5.2 of the FMP. In brief, the petrale stock assessment captures the best scientific understanding of the current status and biology of petrale.[10] The rebuilding analysis then takes parameters from the stock assessment and projects the future status of the stock based on the rebuilding

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[5] The court cites NS8 on the page immediately after the passage quoted in FN[4]:

> Consistent with the U.S. Court of Appeals for the Ninth Circuit's opinion – and with National Standard Eight, 16 U.S.C. § 1851(a)(8), which requires the Agency to consider the importance of fishery resources to fishing communities – the Agency evaluated whether Amendment 16-4 would result in disastrous short-term consequences for fishing communities.

NRDC v. Locke, at p. 27.

[6] This is the view recommended by NMFS. *See* NMFS' *Response to Comment 87* in the Supplementary Information section of the Federal Register notice announcing the final revisions NS1 guidelines:

> The objectives in NS8 for sustained participation of fishing communities and minimization of adverse economic impacts do not provide a basis for continuing overfishing or failing to rebuild stocks. The text of NS8 explicitly provides that conservation and management measures must prevent overfishing and rebuild overfished stocks. MSA does provide, however, for flexibility in the specific conservation and management measures used to achieve its conservation goals, and NMFS took this into consideration in developing the revised NS1 guidelines.

74 Fed. Reg. 3178, 3201 (January 16, 2009). Available through www.regulations.gov , docket ID: NOAA-NMFS-2008-0096.

[7] The NS8 guidelines can be found at 50 C.F.R. § 600.345. As with the NS1 guidelines, sec. 301(b) of the MSA states that the NS8 guidelines "shall not have the force and effect of law." The Council is free to make its own reasonable interpretation of NS8.

[8] Quotations are from *Natural Resources Defense Council v. Daley*, 209 F. 3d 747 (D.C. Cir. 2000).

[9] 50 C.F.R. § 600.345(b).

[10] Available at PFMC, September 2008 Briefing Book, Agenda Item E.2.a, Attachment 1: Draft Status of the U.S. Petrale Sole Resource in 2008 (http://www.pcouncil.org/bb/2009/0909/E2a_ATT1_0909.pdf).

alternatives being considered by the Council using Monte Carlo simulation techniques.[11] There is considerable scientific uncertainty involved with these projections, which the rebuilding analysis expresses as the probability of the stock being rebuilt in any given year.

There are a few rebuilding reference points or benchmarks that we use to compare rebuilding alternatives. We summarize those here, but they are, again, more fully explained in sec. 4.2 of the FMP. First, the estimated shortest time to rebuild is referred to as T_{MIN}. The rebuilding analysis estimates T_{MIN} using a "no fishing" scenario where it is assumed that all fishing caused mortality of petrale is ceased at the start of the rebuilding. T_{MIN} is defined as the year in which this no fishing scenario estimated to have reached target biomass with a 50 percent probability. For petrale, the estimate of T_{MIN} is 2014.

The longest possible rebuilding period is defined using T_{MAX}. Given that petrale sole would be expected to rebuild within 10 years in the absences of fishing mortality, the law requires the rebuilding period to "not exceed 10 years." MSA sec. 304(e)(4)(A)(ii).[12] T_{MAX} for petrale has thus been set at 2021.

The Council's policy for rebuilding is established with a T_{TARGET}. T_{TARGET} is the year in which the Council expects the stock to rebuild with at least a 50 percent probability under the chosen rebuilding strategy. A particular T_{TARGET} is determined by the productivity of the stock, its current status (a.k.a, "status and biology"), and the allowable harvest associated with a particular rebuilding strategy. As discussed more below, the T_{TARGET} and the stream of catches or harvest control rule that achieves it is meant to rebuild the stock back to the rebuilding target while achieving the goals and objectives identified at section 4.5.3.1 of the FMP.

Lastly, the target abundance for rebuilding is the biomass level that produces maximum sustainable yield (B_{MSY}). For petrale, the best available scientific estimate of that level is 25 percent of the estimate of unfished biomass ($B_{25\%}$).[13]

Times to Rebuild – Estimates of Petrale Rebuilding Times

The petrale rebuilding analysis estimates are summarized again in Table 2-14. Estimates are given for both the year-round and winter-only scenarios. The Council's preliminary preferred rebuilding alternative was for year-round fishing opportunity. Again, the shortest time possible to rebuild under the year-round fishery scenario is 2014.

[11] Available at PFMC, November 2009 Briefing Book, Agenda Item G.2.a, Attachment 8:2009 Petrale Sole Rebuilding Analysis (www.pcouncil.org/wp-content/uploads/bb_2009_11_G2a_ATT8_1109.pdf).

[12] *Also see* the National Standard 1 (NS1) guidelines at 50 C.F.R. (j)(3)(i)(C) :

> If T_{MIN} for the stock or stock complex is 10 years or less, then the maximum time allowable for rebuilding (T_{MAX}) that stock to its B_{MSY} is 10 years.

[13] *See* sec. 4.3 of the FMP for explanation; sec. 4.4 in the proposed Amendment 23 language. The $B_{25\%}$ MSY proxy is newly developed as part of Amendment 23 and the 2011-12 harvest specifications process.

Table 2-14. The 2011-12 ACLs for each rebuilding alternative and estimated ACLs and probabilities that the petrale stock will have rebuilt to $B_{25\%}$ from the rebuilding analysis for the years 2013 to 2021 (T_{MAX}) as estimated by the rebuilding analysis. The T_{TARGET} for each rebuilding alternative is shaded. We assume the stock reaches MSY in the year after rebuilding, which we approximate with an ACL of 2,100 mt.

"Year-Round" Fishery

No Fishing Strategy	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
ACL	0	0	0	0	*2,100*	*2,100*	*2,100*	*2,100*	*2,100*	*2,100*	*2,100*	14,700
P(rebuilt)	0%	0%	25%	75%	100%	100%	100%	100%	100%	100%	100%	--
Alternative 1	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	Total
ACL	459	624	791	945	2,100	*2,100*	*2,100*	*2,100*	*2,100*	*2,100*	*2,100*	17,519
P(rebuilt)	0%	0%	25%	75%	76%	100%	100%	100%	100%	100%	100%	--
Alternative 2	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	Total
ACL	776	1,160	1,481	1,720	1,883	*2,100*	*2,100*	*2,100*	*2,100*	*2,100*	*2,100*	19,620
P(rebuilt)	0%	0%	0%	25%	25%	56%	67%	74%	79%	84%	87%	--
Alternative 3 - PPA	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	Total
ACL	976	1,160	1,432	1,680	1,853	1,963	*2,100*	*2,100*	*2,100*	*2,100*	*2,100*	19,564
P(rebuilt)	0%	0%	25%	25%	25%	50%	63%	70%	76%	82%	86%	--
OFL/Fmsy Proxy	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	Total
ACL	1,021	1,279	1,507	1,690	1,824	1,919	1,984	*2,100*	*2,100*	*2,100*	*2,100*	19,624
P(rebuilt)	0%	0%	0%	25%	25%	38%	56%	65%	73%	79%	84%	--

"No Winter" Fishery

Alternative 1	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
ACL	586	732	866	*2,100*	*2,100*	*2,100*	*2,100*	*2,100*	*2,100*	*2,100*	*2,100*	18,983
P(rebuilt)	0%	0%	25%	75%	75%	100%	100%	100%	100%	100%	100%	--
Alternative 2	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	Total
ACL	900	1,232	1,482	1,662	1,784	1,869	*2,100*	*2,100*	*2,100*	*2,100*	*2,100*	19,429
P(rebuilt)	0%	0%	0%	0%	25%	37%	55%	66%	74%	80%	85%	--
Alternative 3 - PPA	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	Total
ACL	976	1,160	1,480	1,661	1,784	1,868	1,923	*2,100*	*2,100*	*2,100*	*2,100*	19,252
P(rebuilt)	0%	0%	25%	25%	25%	37%	54%	64%	72%	78%	84%	--
OFL/Fmsy Proxy	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	Total
ACL	1,170	1,369	1,528	1,653	1,744	1,816	1,868	*2,100*	*2,100*	*2,100*	*2,100*	19,547
P(rebuilt)	0%	0%	0%	0%	25%	26%	41%	55%	64%	71%	77%	--

Explanation of the Petrale Rebuilding Alternatives – Rebuilding strategies and their relation to standard control rules

The Council's preliminary preferred rebuilding alternative is a hybrid of the alternatives considered in April.

The first point of reference to consider was referred to as Alternative 4 in April. This alternative was based on the new standard, F_{MSY} harvest control rule for flatfish that the Council is implementing through this biennial harvest specifications process and Amendment 23 to the FMP. This F_{MSY} proxy control rule is the best scientific estimate of "the constant F control rule that is assumed to produce the maximum average yield over time while protecting the spawning potential of the stock."[14] In other words, this control rule is expected to increase or decrease stock abundance to $B_{25\%}$ depending on whether the stock is above or below that target biomass reference point and to keep the stock, on average, at that target biomass level. Importantly, this control rule also marks the overfishing level (OFL) and the highest level

[14] Sec. 4.2 of the FMP; sec. 4.3 in the proposed Amendment 23 version.

thus the upper legal limit of where the Council can set the ACL. In past cycles, we referred to this catch level as the ABC. With the changes being made through Amendment 23 and implemented in 2011-12 harvest specifications, the Council is now setting the ABC in consideration of scientific uncertainty in estimates of stock biomass and the risk of overfishing presented by that uncertainty using the P* approach. The estimates from this alternative do not include the P* adjustment and so should be characterized as the OFL rebuilding strategy. As mentioned above, the rebuilding analysis does account for uncertainty in rebuilding projections. These projections predict the stock has an 84 percent probability of rebuilding within 10 years if fished at the OFL. Whether the uncertainty considered by the rebuilding analysis is complementary or redundant to the P* adjustment is a question the SSC has not yet provided guidance to the Council.

Alternative 3 from April was based on the 25-5 control rule. The 25-5 control rule is the new flatfish-specific version of the Council's longstanding 40-10 control rule and is designed to increase stocks that are below B_{MSY} back to B_{MSY} more quickly than the standard harvest control rule. It is also the Council's default rebuilding strategy.[15] The Council is considering two options for applying the 40-10 and 25-5 control rules together with P*. The second option, which is the Council preliminary preferred option, would take the adjustment from the P* adjusted ABC. However, because the OFL alternative does not have a P* adjustment, this alternative was calculated using option 1, which takes the adjustment directly from the OFL. This alternative is before the Council in June as ACL alternative 2.

Alternative 2 from April was based on a constant harvest rate of 0.50.[16] For comparison, the standard F_{MSY} control rule for petrale equates to an SPR constant harvest rate of 0.30. The 25-5 control rule is based on a variable harvest rate that begins with a SPR of 0.35 in 2011 and then moves toward 0.30 as the biomass increases. With long-lived, less productive species like the rebuilding rockfish, the standard harvest and 40-10 control rules are not able to rebuild stocks back to B_{MSY} within the time period required by law. For this reason, the Council has pursued rebuilding strategies based on even more precautionary constant harvest rate policies. This alternative is now before the Council as ACL alternative 1.

The Council's PPA—ACL alternative 3—would set the ACL equal to the ABC with a P* adjustment of 0.45. This P* adjustment is consistent with the Council's preliminary preferred ABC control rule for category 1 stocks. The Council's April motion specifically identified the 2012 ACL as 1,160 mt, which is the ACL from Alternative 3 at the April meeting. The Council did not have an analysis of this alternative in April, yet chose it as the PPA on the rationale that it would be intermediary to the OFL rebuilding strategy and the 25-5 control rule. The actual 25-5 derived ACL in 2012 would differ from that specific amount because of the different ACL in 2011 (i.e., the rebuilding alternative 3 2012 ACL is based on a 2011 ACL of 776 mt, not the 976 mt from the Council's PPA). Here we assume that the 1,160 mt ACL is what represents the Council's PPA for 2012. The Council's April motion stated that its preliminary preferred rebuilding plan would continue with the 25-5 control rule in 2013 through the rebuilding period. This is the strategy analyzed in ACL alternative 3.[17]

[15] Sec. 4.5.1 of the FMP; sec. 4.6.1 in the proposed Amendment 23 version.

[16] *For more explanation, see* the operational definitions in sec. 3.2 of the FMP ; sec. 2.2 of the Amendment 23 version. The SPR constant harvest rate expressed as 'x percentage' (or $F_{X\%}$)is the "rate of fishing mortality that will reduce female spawning biomass per recruit to x percent of its unfished level. F100% is zero fishing mortality."

[17] We should note, however, that rebuilding alternative 5 is based on the "option 1" 25-5 control rule where the adjustment is based off of the OFL and not the ABC. The Council's intent may have been to use the "option 2" method instead consistent with its preliminary preferred alternative for the 40-10 control rule. Option 2 presents some technical difficulties for the rebuilding analysis because the scientific uncertainty estimate of sigma used to calculate the ABC control rule will be updated each biennial cycle. In addition, the Council may choose a different P-star value. This presents some difficulty for incorporating P-star into rebuilding projections.

Taking into Account the Needs of Fishing Communities – General Considerations

The other important legal requirement imposed by the MSA and the FMP is the command to take into account the needs of fishing communities when establishing rebuilding plans. Congress included this requirement in the criteria for setting rebuilding time periods as a means of providing the regional fishery management councils flexibility to tailor rebuilding plans to the particular circumstances of each fishery and each overfished species. The implied purpose of including this provision in the MSA was for Councils to consider delaying rebuilding from the shortest time possible if and when the needs of fishing communities might justify such delay. However, other than the 10-year cap for species biologically capable of rebuilding within 10 years, there is not much guidance on how much delay may be justifiable or on how to gauge the degree of delay that is most proper. This flexibility and the appropriate boundaries on its use have been the primary focus of litigation over the FMP of late.

Section 4.5.3.2 of the FMP provides the following general guidance on the needs of the fishing communities:

> Fishing communities need a sustainable fishery that: is safe, well-managed, and profitable; provides jobs and incomes; contributes to the local social fabric, culture, and image of the community; and helps market the community and its services and products.

The Council does not have the same level of objective, model-derived criteria to use in contrasting rebuilding alternatives against this general vision as it does in gauging rebuilding alternatives against estimated times to rebuild. Given the complexity of the groundfish fisheries and the limited economic and social science data and methodologies available, such objectivity has not really possible with the rebuilding rockfish stocks.

There are many reasons why the rockfish rebuilding plans have been challenging. Rockfish indirectly affect fishing opportunity by constraining the harvest of target stocks; they affect multiple commercial and recreational fishery sectors; it is difficult to lessen fishing impacts on one rockfish species without affecting another; some rockfish populations are so slow growing that even small increases in harvest can delay rebuilding for a number of years, and so on. The Council has approached this challenging situation using what we have characterized as a holistic approach to analyzing rebuilding alternatives and impacts to fishing communities. The court found that reliance on this holistic was within the scope of the Council's discretion.[18] Yet, it has been very difficult to judge what one rebuilding alternative means to fishing communities with any kind of precise quantification. It has been equally difficult to weigh these uncertain, qualitative benefits against the corresponding delay in rebuilding and to do so in a manner that achieves the FMP's fifth rebuilding goal of promoting "widespread public awareness, understanding and support for the rebuilding program." Indeed, although approving of the holistic approach, the court found that three of the rebuilding plans established as part of the holistic analysis approach to be illegal. As explained below, we believe the situation with petrale can be greatly simplified.[19]

Taking into Account the Needs of Fishing Communities – The Recent Court Decision

The recent court decision found fault with the Council's rebuilding plans for darkblotched, yelloweye, and cowcod. In the opinion of the authors, the court's rationale for finding fault with those three rebuilding plans has not leant much additional clarity on the appropriate way of taking into account the

[18] NRDC v. Locke, at p. 28.

[19] Petrale sole is also an important piece of the holistic approach. As discussed below, it is one of the most important sources of revenue to the non-whiting trawl fleet and thus a species prioritized for harvest within the constraints imposed by the restrictive rebuilding rockfish harvest levels.

needs of fishing communities. The court's specific reasoning for disapproving some rebuilding plans and approving of others is not easily discernible and does not seem well-grounded in the concepts of fisheries science or management that the MSA is based upon, nor appropriately appreciative of the level of uncertainty involved with estimating current stock status and projecting future rebuilding and how changes in our understanding can change from stock assessment to stock assessment. It seems that the complexity of our past analyses, the often difficult to understand science of fisheries stock assessment, and some possible misperceptions about the status of rockfish populations have lead to some confusing legal standards.

The best we can tell is that the courts are expecting the Council to use "measured proportionality" (also phrased as "proportionate weight") when using short-term considerations as a basis for delaying rebuilding from the shortest time possible to rebuild.[20] Stated in the negative, the courts have said that the Council cannot place disproportionate or improper emphasis on short-term economic benefits over conservation. [21] The problem, at least for the authors of this analysis, is that we have not seen a clear articulation of the line between what is acceptable and unacceptable emphasis. That boundary between acceptable and unacceptable is unclear.

Taking into Account the Needs of Fishing Communities – Short-term vs. Long-term Generally

The tradeoff between harvest in the short-term and harvest in the long-term is a central question of fisheries management.[22] In essence, this tradeoff involves a cost arising from harvesting too much in the short-term; namely, the yield that is lost by not fishing at a rate that produces maximum sustainable yield over the long-term ("forgone yield"). The recent court order recognizes this tradeoff to some degree:

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[20] NRDC v. NMFS, 421 F. 3d at 881:

> It is also reasonable to conclude that the needs of fishing communities may still be taken into account even when the biology of the fish dictates exceeding the 10-year cap—so long as the weight given is proportionate to the weight the Agency might give to such needs in rebuilding periods under 10 years. This interpretation would allow the Agency's rebuilding periods to account for short-term concerns such as bycatch in the same manner whether the rebuilding period exceeds 10 years or not.
>
> The 2002 darkblotched rockfish quota is patently unreasonable, however, and reflects no such measured proportionality.

[21] For example, here is the court's summation of why the darkblotched rebuilding plan was improper:

> In the Agency's analysis, the "status and biology of the stocks" in this context relate to conservation, the "needs of fishing communities" relate to short-term economic interests, and the "interaction of the overfished stock within the marine environment" also relates to short-term economic interests. Even though the third factor sounds environmental, it isn't. It is shorthand for the fact that overfished species are often found at the same depth and geographic location as some of the most commercially valuable fish, and for that reason the Agency is willing to postpone their rebuilding for the sake of the revenue from those more commercially valuable fish. Two out of three factors the Agency considered in setting the darkblotched harvest levels were economic. Thus the Agency gives priority to short-term economic interest over conservation, a violation of the MSA."

NRDC v. Locke, at p. 34. This characterization of the MSA's rebuilding criteria, and the calculus of "two of the three" criteria being economic criteria and two being more than one, so the "environmental" (a.k.a, conservation) loses to the "economic" is also perplexing. We may be, again, taking the court's statement too literally, yet the logic presented by the court's phrasing is an oversimplification of those three factors. We are unsure on how the court expects them to be applied. All three of the factors mentioned are relevant to the determination of how a particular rebuilding alternative balances the needs of fishing communities against the long-term conservation mandates of the MSA. Neither of the three is purely "environmental" or "economic" in nature.

[22] *E.g.*, "Easily the single most difficult and pervasive trade-off issue in fisheries management is between catching fish now versus leaving them in the water to produce surplus for harvesting in the future." Walters, Carl J. and Steven J. D. Martell. *Fisheries Ecology and Management* (2004).

> Part of the reason Congress elevated conservation over economic interests is that conserving fish populations yields the double benefit of both improving the environment and providing long-term economic return.
>
> The guidance of the court of appeals to this Court in reference to this same fishery is that the purpose of the Magnuson-Stevens Act is clearly to give conservation of fisheries priority over short-term economic interests. The Act sets this priority in part because the longer-term economic interests of fishing communities are aligned with the conservation goals set forth in the Act. Without immediate efforts to rebuild depleted fisheries, the very survival of those fishing communities is in doubt.[23]

The tradeoff between short-term and long-term yield is exactly what the MSA and the conservation standards in NS1 are intended to address. In fact, the whole of the MSA NS1 and the scientific concepts it is based on are focused on the question of how to optimize the long-term value of fisheries. And, as generally recognized by the courts, these conservation standards—preventing overfishing, achieving optimum yield on a continuing basis, and rebuilding overfished stocks— are designed specifically to give priority to conservation over short-term economic interests. Yet, what the courts have not seemed to recognize—probably because we have not effectively communicated as much—is that delaying rebuilding based on short-term concerns might have little to no cost to conservation and the long-term economic return to communities. In fact, in pure economic terms, some delay in rebuilding can be in the best long-term economic interests of fishing communities.

Again, we have apparently not communicated or analyzed this point effectively with regard to existing rebuilding plans. In evaluation of the darkblotched rebuilding plan, the recent court order observed that "there will always be some short-term economic gain associated with extending rebuilding periods to increase harvests." [24] Following that observation the court went on to reason and conclude that:

> [i]f section 304(e)(4)(A)(i) allowed the Agency to extend a species' rebuilding period whenever the Agency could identify some short-term economic benefit to fishing communities, it is hard to imagine circumstances under which the Agency could not delay rebuilding. That is precisely why, if it is to serve the MSA's overarching conservation mandate, the section's balance between rebuilding and the "needs of fishing communities" must remain heavily weighted towards rebuilding. Conservation has priority over short-term economic interests.[25]

The court is perhaps correct in that there will always be some short-term benefit to delay, yet this is simply a "slippery slope" argument that may be missing the bigger picture. Short-term benefits are only the first part of the central question involved with rebuilding. The second part involves comparing that short-term benefit against the long-term cost to conservation and fishing communities. Answering that question involves looking at delay from what to what, i.e. of the tradeoff between the short- and long-term benefits arising from one rebuilding alternative against another. Again, an analysis of that question might show that the short-term benefit leads to no appreciable long-term cost.

It is important to understand that of the ACL alternatives the Council considers for rebuilding, including those under consideration for petrale, none are meant to delay rebuilding indefinitely (i.e., maintain the stock at a level lower than what would produce B_{MSY}) as was and still may be the case in the past or in other parts of the country or world. Rather, the slower-to-rebuild alternatives simply slow the trajectory

[23] NRDC v. Locke, at p. 9-10. The second passage quoted cites to NRDC v NMFS, 421 F.3d at 879.
[24] NRDC v. Locke, at p. 33.
[25] NRDC v. Locke, at p. 33. The last two sentences cite to NRDC v. NMFS , 421 F.3d at 879-82 and 878-870, respectively

at which the stock rebuilds back to B_{MSY}. In fact, the slowest alternatives to rebuild are usually based on the harvest control rule that is specifically designed to produce MSY over the long-term.[26] It is therefore not surprising that that delay to this degree often makes more economic sense than rebuilding more quickly. With the long-lived rockfish, small changes in the harvest rate can make large differences in the number of years to rebuild. Many of the rockfish are at the extreme end of fish life history and this has made the rebuilding legal standards tough to analyze.

More focus and articulation of long-term implications of rebuilding appears necessary to show that delays in rebuilding do not necessarily sacrifice conservation. NRDC's arguments and the court's perception that the Council has improperly emphasized short-term economics over conservation show that we have fallen short with our past analyses and articulation or rebuilding rationales:

> NMFS's economic analyses, according to NRDC, also neglected important and available information on the long-term economic benefits of faster rebuilding, as a lawful rebuilding alternative to prioritizing short-term benefits over rebuilding a species as quickly as biologically possible. . . Neither [the EIS for Amendment 16-4 or the 2009-10 harvest specifications and management measures] considers the economic effects of rebuilding alternative harvest levels over the length of the rebuilding periods the Agency actually adopted, which are many decades long for some species.[27]

The line between "measured" and improper emphasis on the short-term seems one that people can easily disagree upon, and a line that is difficult line for the analysts on the GMT and Council staff to advise the Council on where its policy discretion might begin and end. We believe one way of finding that line is to compare the short-term benefits conveyed by a rebuilding alternative against the long-term costs that the delay may have. This has been difficult for rockfish. We think it is possible for petrale.

Taking into Account the Needs of Fishing Communities – Finding Measured Proportionately Between Short-Term Concerns and Conservation in Rebuilding Petrale Sole

The court's recent interpretations of the MSA have created a strong presumption that delay in rebuilding is detrimental to conservation. That presumption can be rebutted for petrale. To do so here, we start with the court's observation that there are two major purposes to the MSA's conservation mandates: (1) long-term economic return to fishing communities; and, (2) improvement to the marine environment.

On the first prong, we again highlight that that there is no long-term economic return expected from rebuilding petrale in the shortest time possible. To better explain this, we briefly discuss the analysis shown in Table 2-14. Table 2-14 simply identifies the projected catches by year and the expected years in

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[26] That these "least conservative" alternatives considered by the Council are actually the scientifically-derived best available estimates of the harvest that produce a not only sustainable—but a maximally sustainable—yield is something we wonder is well-appreciated outside of fisheries management circles. There seems to be a tendency to associate overfished species with species that are threatened by the risk of extinction. Here is an example from the recent court order:

> This Court has made its ruling and the ruling should be implemented, due to the dire circumstances of several of the species.

Certain rockfish stocks are below, and in some cases, considerably below the target abundance levels. Yet, every alternative under consideration is projected—by the best available science—to increase the abundance of the stock. The situation does not seem dire to the authors of this analysis. Overharvest in the past may have caused the populations to drop to their current abundance. With petrale, this overharvest was unintentional and a symptom of stock assessment uncertainty. The best available science expects that lowering the harvest rate will correct the situation and increase abundance.

[27] NRDC v. Locke, at p. 23-2.4

which the stock rebuilds to the $B_{25\%}$ target from the rebuilding analysis. After each rebuilding alternative hits that $B_{25\%}$ target, the catches that result are equivalent to the catch at MSY, which we approximate that catch with a catch of 2,100 mt. The essential question examined by this analysis is: what is the economic benefit of reaching that MSY level of catch more quickly? The answer to that question is no benefit.

The "no fishing" rebuilding strategy would rebuild three years faster than OFL/F_{MSY} rebuilding strategy, the slowest to rebuild, yet it would also produce 25 percent less overall yield. Thus, there is no reasonable economic assumption that can turn the shortest possible time to rebuild into the rebuilding alternative that is in the best long-term economic interests of fishing communities. This logic applies to all the alternatives under consideration for petrale. If conservation for long-term economic return is the main criterion for setting rebuilding plans, the OFL/F_{MSY} rebuilding strategy is superior to all.[28]

This result is not surprising because, as explained above, the standard F_{MSY} proxy control rule is specifically designed to produce the long-term maximum sustainable yield for petrale and flatfish. We would need to analyze a more aggressive rebuilding alternative harvest rate to see a situation where delay for short-term benefit leads to a long-term cost in terms of foregone yield. Such a harvest rate would constitute overfishing and so would not be allowable under NS1.

As to the second prong of conservation benefit, the state of the science is such that we can only speculate on how the alternatives compare in terms of their benefit to the marine environment. It is a question that fisheries science and this Council are beginning to look at more closely with the transition towards ecosystem approaches to fisheries management. The role petrale plays in the marine environment, whatever that may be, is a function of its abundance. Differences between the rebuilding alternatives in terms of the expected population abundance are minor. Again, all rebuilding alternatives are designed to rebuild the stock to $B_{25\%}$, which the rebuild analysis estimates as a spawning biomass level of 6,334 mt. In 2014, the year rebuilding alternative 1 is expected to reach $B_{25\%}$, the rebuilding analysis projects that the stock would be at 5,461 mt (~$B_{22\%}$) under rebuilding alternative 4. The OFL/F_{MSY} rebuilding strategy would reach the same level of biomass—6,334 mt—three years later. This level of difference would not seem to raise concerns over ecological impact. Yet, again, the respective impact of the rebuilding alternatives on ecosystem structure and function is unknown to science at this time.

Evaluation of the Council's Preliminary Preferred Rebuilding Alternative

As explained above, the Council's preliminary preferred rebuilding alternative, ACL alternative 3, is based on an ACL equal to the P* adjusted ABC in 2011 and the rebuilding alternative 3 ACL for 2012 of 1,160 mt. The rebuilding plan would then follow the 25-5 harvest control strategy in 2013 through rebuilding. The Council identified the 25-5 control rule as its preliminary preferred rebuilding strategy yet believed that the needs of the fishing communities justified modifying that strategy for 2011-12.

We again use Table 2-14 and the "year-round" fishery scenario to compare the Council's PPA against the other rebuilding alternatives. The T_{TARGET} for rebuilding alternative 5 is 2016. This is two years later than the no fishing scenario (T_{MIN}), one year later than ACL alternative 1 and alternative 2, and one year faster than the OFL/F_{MSY} rebuilding strategy. The one year delay between T_{TARGET} for rebuilding alternative 2 and alternative 3 may overstate the difference between the two. The expected spawning biomass trajectories for the two rebuilding alternatives look very similar. For example, the spawning biomass level in for the Council's PPA is expected to be 6,060 mt in 2015 and then reach 6,347 mt in

[28] The GMT highlighted this dynamic to the Council in April**.** PFMC, April 2010 Briefing Book, Agenda Item I.4.b, Supplemental GMT Report 3, at p. 2 (www.pcouncil.org/wp-content/uploads/I4b_SUP_GMT_RPT3_APRIL_2010_BB.pdf).

2016. The projections for alternative 2 are just barely ahead, reaching 6,130mt in 2015 and hitting 6,399 mt in 2016.

In terms of long-term economic return to communities, the Council's PPA produces less expected yield than rebuilding alternative 2 and the OFL/F_{MSY} rebuilding strategy, yet the difference is miniscule and just ~0.3 percent less. The Council's PPA would produce 11.5 percent more overall yield than rebuilding alternative 1 and 24.9 percent more than a no fishing rebuilding strategy. In comparing the rebuilding alternatives by the probability of rebuilding, we highlight that the Council's PPA has an 86 percent chance of reaching $B_{25\%}$ by 2021 (T_{MAX}). This is slightly lower than alternative 2 (87 percent) and slightly higher than the OFL/F_{MSY} rebuilding strategy (84 percent). In contrast, the rebuilding analysis projects that rebuilding alternative 1 and a no fishing strategy would have a 100 percent chance of rebuilding by T_{MAX}.

The Importance of Petrale to Fishing Communities

That the Council's PPA shows measured proportionality between the short-term needs of fishing communities and the conservation goals of the MSA seems abundantly clear when comparing the a alternative rebuilding strategies over the 10-year rebuilding period. This strategy is based on the Council's precautionary 25-5 harvest control rule and default rebuilding strategy. The rebuilding analysis predicts no long-term cost from fishing at this control rule. In turn, rebuilding under alternative 1 or a no fishing strategy cannot be justified based on the rationale that rebuilding in as short as time as possible is in the long-term economic interests of fishing communities. The Council may choose to rebuild quicker based on the rationale that a more abundant petrale population is better for the marine environment, yet, again, we cannot provide the Council with a quantitative evaluation of the differences between the rebuilding alternatives in this regard. Of course, the Council may also prefer no fishing strategy or alternative 1 because of their higher probabilities of rebuilding by 2021.

The case that the Council's PPA shows measured proportionately between short-term concerns and long-term conservation would seem convincing even if petrale were of little importance to fishing communities. The fact of the matter though is that petrale sole is one of the most economically important stocks to the non-whiting trawl fishery. Petrale is the third most valuable species in terms over overall annual ex-vessel value, contributing, on average, 19 percent of total ex-vessel revenue in the non-whiting trawl fishery (Table 2-15 [A] & [B]). Dover sole is more valuable overall only because of its greater abundance and larger available harvest. On a price per pound basis, petrale sole is second only to sablefish and considerably more valuable than all other flatfish harvested in the fishery (Table 2-15 [C]).

All petrale rebuilding alternatives reduce the petrale harvest considerably from the levels shown in Table 2-15. The Council has already restricted the petrale OY for 2010 to 1,200 mt, a 50 percent decrease from the 2009 OY. We do not have the data to demonstrate this other than the high price-per-lb, yet the GAP and others in the trawl industry are likely to testify that petrale is so unique in its market desirability that it will be difficult if not impossible to make up the revenue by switching to the harvest of other groundfish species.

Additional information, including the needs of the tribal trawl fishery, will be provided to the Council at the June meeting. Petrale is caught by other sectors yet the non-tribal, non-whiting trawl has taken 98-99 percent of the catch in 2006-2008. The tribal trawl fishery makes up the vast majority of the remaining 1-2 percent.

Lastly, while specifics on impacts to communities are important, we close this analysis by highlighting that the central focus should be on comparing the rebuilding alternatives against one another for the relative emphasis they place on short-term economic needs and long-term conservation goals. This, we

believe, is the clearest way of demonstrating where the Council may or may not be improperly placing emphasis on the short-term economic needs at the expense of conservation.

Table 2-15. Basic revenue statistics for the non-whiting trawl fishery, 2004-2009. Data is from the PacFIN database.

A. Total annual coastwide ex-vessel value

	2004	2005	2006	2007	2008	2009	Average	Median
Sablefish	$5,302,020	$5,896,984	$7,381,783	$8,117,009	$11,451,380	$12,447,727	$8,432,817	$7,749,396
Dover sole	$5,375,612	$5,553,625	$4,852,421	$7,637,178	$9,200,367	$8,627,604	$6,874,468	$6,595,402
Petrale sole	$4,348,712	$5,509,846	$5,781,407	$4,961,114	$4,957,029	$3,550,946	$4,851,509	$4,959,072
Shortspine	$984,694	$887,779	$1,008,993	$1,248,540	$1,843,563	$1,700,771	$1,279,057	$1,128,767
Longspine	$657,198	$590,072	$874,584	$789,634	$1,202,900	$761,796	$812,697	$775,715
Other non-whiting	$5,451,899	$4,430,321	$3,809,725	$3,528,515	$3,568,699	$3,962,105	$4,125,211	$3,885,915
Total non-whiting	$22,120,135	$22,868,627	$23,708,913	$26,281,990	$32,223,938	$31,050,949	$26,375,759	$24,995,452

B. Percentage of total annual coastwide ex-vessel value

	2004	2005	2006	2007	2008	2009	Average
Sablefish	24.0%	25.8%	31.1%	30.9%	35.5%	40.1%	31.2%
Dover sole	24.3%	24.3%	20.5%	29.1%	28.6%	27.8%	25.7%
Petrale sole	19.7%	24.1%	24.4%	18.9%	15.4%	11.4%	19.0%
Shortspine	4.5%	3.9%	4.3%	4.8%	5.7%	5.5%	4.8%
Longspine	3.0%	2.6%	3.7%	3.0%	3.7%	2.5%	3.1%
Other non-whiting	24.6%	19.4%	16.1%	13.4%	11.1%	12.8%	16.2%

C. Average coastwide annual ex-vessel price-per-lb

	2004	2005	2006	2007	2008	2009	Average
Sablefish	$0.96	$1.02	$1.23	$1.38	$1.69	$1.65	$1.32
Petrale sole	$1.04	$0.95	$0.99	$1.14	$1.02	$0.98	$1.02
Shortspine	$0.72	$0.91	$0.84	$0.78	$0.95	$0.69	$0.81
Sand sole	$0.75	$0.73	$0.60	$0.67	$0.79	$0.72	$0.71
Longspine	$0.49	$0.49	$0.58	$0.51	$0.46	$0.36	$0.48
Starry flounder	$0.49	$0.48	$0.45	$0.41	$0.39	$0.38	$0.43
Pacific sandab	$0.33	$0.34	$0.41	$0.61	$0.38	$0.37	$0.41
Dover sole	$0.41	$0.37	$0.36	$0.38	$0.39	$0.44	$0.39
Rex sole	$0.39	$0.37	$0.35	$0.34	$0.36	$0.35	$0.36
English sole	$0.34	$0.35	$0.31	$0.33	$0.31	$0.34	$0.33
Arrowtooth	$0.11	$0.13	$0.14	$0.10	$0.11	$0.12	$0.12

2.1.5 Harvest Specifications for Non-Overfished Species

This section to be completed after the June briefing book deadline.

2.1.5.1 Lingcod

2.1.5.2 Pacific Cod

2.1.5.3 Pacific Whiting

2.1.5.4 Sablefish

Sablefish North of 36° N Lat.

Sablefish South of 36° N Lat.

2.1.5.5 Shortbelly Rockfish

2.1.5.6 Chilipepper Rockfish

2.1.5.7 Splitnose Rockfish South of 40°10' N lat.

2.1.5.8 Shortspine Thornyheads

Shortspine Thornyhead North of 34°27' N lat.

Shortspine Thornyhead South of 34°27' N lat.

2.1.5.9 Longspine Thornyheads

Longspine Thornyhead North of 34°27' N lat.

Longspine Thornyhead South of 34°27' N lat.

2.1.5.10 Black Rockfish off Washington

2.1.5.11 Black Rockfish off California and Oregon

2.1.5.12 California Scorpionfish

2.1.5.13 Cabezon off California

2.1.5.14 Cabezon off Oregon

2.1.5.15 Dover Sole

2.1.5.16 English Sole

2.1.5.17 Arrowtooth Flounder

2.1.5.18 Starry Flounder

2.1.5.19 Longnose Skate

2.1.6 Harvest Specifications for Stock Complexes

None of the groundfish stock complexes are proposed to be restructured under the preferred alternative, with the following exceptions:

- Dusky and dwarf-red rockfish are proposed to be removed from the FMP under a separate Amendment 23 action. These species were managed in the northern and southern minor shelf rockfish subcomplexes, but they contributed no harvest since they are not endemic to the west coast;
- Chilipepper rockfish south of $40^0$10' N lat. was managed with stock-specific harvest specifications and the northern portion of the coastwide stock occurring of northern California and Oregon was managed within the minor shelf rockfish north complex under the No Action alternative. The stock is proposed to be removed from the northern minor shelf rockfish complex and managed on a coastwide basis with stock-specific harvest specifications (see section 2.1.5.6); and
- The stock of cabezon off Oregon is proposed to be removed from the Other Fish complex and managed with stock-specific harvest specifications (see section 2.1.5.14).

There are four stock complexes for which 2010 ABCs and OYs have been specified under the No Action alternative. These are the minor rockfish complexes north and south of $40^0$10' N lat., Other Flatfish, and Other Fish complexes. Each of the north and south minor rockfish complexes are comprised of subcomplexes for nearshore, shelf, and slope rockfish. OYs have been specified for the rockfish subcomplexes under the No Action alternative, but not ABCs.

The preliminary preferred alternative for 2011 and 2012 harvest specifications for stock complexes proposes the SSC-recommended OFLs, ABCs that assume each component stock of a complex is a category 3 stock (P* = 0.4 and the resulting ABC buffer = 30.6% of OFL); and ACLs that are either status quo OYs or, for the Other Fish complex, minimally changed from status quo.

The 2010 ABCs under the No Action harvest specification framework and the preferred 2011 and 2012 OFLs under the proposed Amendment 23 framework were/are specified for the minor rockfish north, minor rockfish south, Other Flatfish, and Other complexes. The 2010 ABCs specified under the No Action alternative were based on the contribution of component stocks to the complexes; however, only the stocks with a known catch history tended to contribute to the ABC. ABCs were set higher than the summed contribution of the main component stocks with catch history to accommodate the unknown catch contribution of the other component stocks. The approaches used to determine the No Action ABCs are poorly documented except for the Other Flatfish complex, where a systematic approach was documented in the 2007-2008 biennial specifications EIS {PFMC 2006}. The Other Fish complex has no component species-specific basis for the 2010 ABC.

The 2011 and 2012 OFLs proposed for the stock complexes under the preliminary preferred alternative are based on the summed contribution of each component stock to the complex. These are the SSC-recommended OFLs and are based on improved data and analyses informing the MSY/overfishing threshold for each component stock to the complex. The analytical approach used to estimate an appropriate OFL contribution for each component stock varies by stock category/subcategory. The OFLs for category 1 and 2 stocks that are proposed to be managed in a complex (e.g., splitnose rockfish in the northern minor slope rockfish) are estimated by applying proxy F_{MSY} harvest rates to the exploitable biomass estimated in quantitative assessments. The approach for determining the OFLs for category 3 stocks, which are the vast majority of stocks managed in complexes, use catch-based approaches that vary by the sub-category of the stock (Table 2-7). The OFLs for most of these stocks are determined using a longer time series of catch data, following either a depletion-based stock reduction analysis, a depletion corrected average catch, or if catch data are sparse or less certain, an average catch approach. Category 3a stocks have a negligible catch history; therefore, a zero-harvest contribution to the OFL is assumed.

The proposed 2011 and 2012 ABCs under the preliminary preferred alternative assume all the component stocks to a stock complex are category 3 stocks and a P* of 0.4 is used to estimate a scientific uncertainty buffer of ~30.6% (see section 2.1.2). The preliminary preferred ABCs for stock complexes are the summed contribution of ABCs calculated for component stocks.

The preliminary preferred 2011 and 2012 ACLs for stock complexes are the No Action OYs for the four stock complexes, as well as the minor rockfish subcomplexes.

The preliminary preferred OFLs and ABCs are recommended for the northern and southern minor rockfish complexes, as well as the Other Flatfish and Other Fish complexes, but not the rockfish subcomplexes. This may be a problem given the need to set ACLs for the minor rockfish subcomplexes to accommodate other management needs (e.g., actions proposed under amendments 20 and 21). The NS1 guidelines and the FMP require an estimate of MSY for each stock complex, which are the proposed OFLs. The NS1 guidelines further state, "For stocks and stock complexes required to have an ABC, each Council must establish an ABC control rule based on scientific advice from its SSC. The determination of ABC should be based, when possible, on the probability that an actual catch equal to the stock's ABC would result in overfishing" … "The ABC control rule must articulate how ABC will be set compared to the OFL based on the scientific knowledge about the stock or stock complex and the scientific uncertainty in the estimate of OFL and any other scientific uncertainty." The NS1 guidelines further stipulate ACLs cannot

exceed ABCs. These are considerations for deciding a final preferred alternative for Amendment 23 and the 2011 and 2012 specifications.

Specifying the No Action OYs for the minor rockfish subcomplexes without an associated OFL and ABC under the preliminary preferred alternative may increase the risk of overfishing for some stocks managed in a complex. If the SSC and other advisors recommend specifying OFLs and ACLs for the minor rockfish subcomplexes, the summed contribution of OFLs and alternative ABCs for the rockfish subcomplexes could be considered (Table 2-16). The ABC alternatives for stock complexes provided in Table 2-16 vary by either:

- 1) calculating the ABC by summing the ABC contributions of component stocks assuming they are all category 3 stocks (assume a P* of 0.4 to apply a 30.6% scientific uncertainty buffer); or
- 2) calculating the ABC by summing the ABC contributions of component stocks assuming the preferred P* approach is applied to each stock according to the stock categories recommended by the SSC for each stock.

The second approach results in a higher ABCs for some of the rockfish complexes and subcomplexes because some of the component stocks are category 1 stocks (e.g., splitnose rockfish in the northern minor slope rockfish subcomplex) and category 2 stocks (e.g., blue rockfish in the southern minor nearshore rockfish subcomplex) with smaller scientific uncertainty buffers defining their ABC contribution.

The preliminary preferred alternative ACLs for the stock complexes and subcomplexes may only be problematic in cases where the ACL is greater than the summed contribution of the ABCs for each component stock managed within the complex (Table 2-16). There are two cases where the summed ABC contribution of component stocks is less than the preliminary preferred ACL:

- Minor Nearshore Rockfish North: The No Action OY of 155 mt proposed for managing the minor nearshore rockfish north complex in 2011 and 2012 is higher than the summed contribution of the ABCs of the component stocks (range of 81-85 mt using either stock category approach) and the summed OFL contribution of the component stocks (116 mt).
- Minor Slope Rockfish North: The No Action OY of 1,160 mt proposed for managing the minor slope rockfish north complex in 2011 and 2012 is higher than the summed ABC contribution of component stocks using the preliminary preferred ABC approach that assumes all component stocks are category 3.

Of these two cases, the minor nearshore rockfish north complex ACL is of most concern given that the ACL is greater than the summed OFL contribution of the component stocks. The minor slope rockfish north ACL is less than the summed ABC contribution of component stocks if the ABC contribution is calculated using the SSC-assigned stock categories and the Council's preferred P* approach (Table 2-16) and may therefore not be a concern.

The following sections describe each complex, the component stocks for each complex, and the relative vulnerability of these stocks according to the GMT's Productivity and Susceptibility Assessment (PSA) of each stock.

Table 2-16. The 2011 and 2012 harvest specifications for complexes assuming the summed contribution of the specifications of component stocks compared to the preliminary preferred ACLs.

Stock Complex and Component Stocks	Specifications Based on Stock Contribution							Preliminary Preferred	
	2010 OY	2011 OFL	2012 OFL	Using SSC Stock Cat.		Assume Stock Cat. 3		2011 ACL	2012 ACL
				2011 ABC	2012 ABC	2011 ABC	2012 ABC		
Minor Rockfish North	2,283	3,611	3,680	2,901	2,964	2,507	2,555	2,283	2,283
Minor Nearshore Rockfish North	155	116	116	85	84	81	81	155	155
Minor Shelf Rockfish North	968	2,032	2,056	1,578	1,598	1,411	1,428	968	968
Minor Slope Rockfish North	1,160	1,462	1,507	1,238	1,281	1,015	1,047	1,160	1,160
Minor Rockfish South	1,990	4,302	4,291	3,242	3,231	2,987	2,979	1,990	1,990
Minor Nearshore Rockfish South	650	1,156	1,145	875	864	803	795	650	650
Minor Shelf Rockfish South	714	2,238	2,243	1,584	1,588	1,554	1,558	714	714
Minor Slope Rockfish South	626	907	903	783	779	630	627	626	626
Other Flatfish	4,884	10,146	10,146	7,041	7,041	7,044	7,044	4,884	4,884
Other Fish	5,600	11,150	11,150	7,742	7,742	7,742	7,742	5,575	5,575

2.1.6.1 Minor Rockfish North of 40°10' N lat.

The Minor Rockfish North complex is the aggregate assemblage of three subcomplexes of nearshore, shelf and slope rockfish species that occur north of 40°10' N lat. The preliminary preferred OFLs for the minor rockfish north complex are 3,611 and 3,680 mt for 2011 and 2012, respectively. The proposed OFLs are the summed contribution of the SSC-recommended OFLs for the northern minor nearshore shelf, and slope rockfish species.

The ABCs recommended for the minor rockfish north complex are 2,507 and 2,555 mt for 2011 and 2012, respectively. The proposed ABCs are the summed contribution of the ABCs for the northern minor nearshore, shelf, and slope rockfish species assuming they are all category 3 stocks to determine the associated scientific uncertainty buffer under the Council's preferred alternative (Table 2-16).

The proposed 2011 and 2012 ACL of 2,283 mt for the minor rockfish north complex is the No Action 2010 OY specified for the complex. This ACL equals the sum of the 2010 OYs under the No Action alternative and the preliminary preferred ACLs proposed for the northern minor nearshore, shelf, and slope rockfish subcomplexes.

The relative vulnerability of stocks in the minor rockfish north complex as rated in the GMT's PSA analysis are shown in Table 2-17.

Table 2-17. The relative vulnerability of rockfish stocks as rated by the GMT in their PSA analysis managed in the minor rockfish complex north of 40°10' N lat. by stock subcomplex and relative level of vulnerability within the subcomplex.

Stock Complex and Component Stocks	PSA Results	
	Vulnerability	
	Score	Level
Minor Rockfish North	NA	NA
Minor Nearshore Rockfish North	NA	NA
China	2.23	High
Copper	2.27	High
Quillback	2.22	High
Blue (CA)	2.01	Med/High
Blue (OR & WA)	2.01	Med/High
Brown	1.99	Med/High
Grass	1.89	Med
Olive	1.87	Med
Black and yellow	1.70	Low
Calico	1.57	Low
Gopher	1.76	Low
Kelp	1.59	Low
Treefish	1.73	Low
Minor Shelf Rockfish North	NA	NA
Bronzespotted	2.12	High
Cowcod	2.13	High
Greenblotched	2.12	High
Redstripe	2.16	High
Speckled	2.10	High
Bocaccio	1.93	Med/High
Chameleon	2.03	Med/High

Stock Complex and Component Stocks	PSA Results	
	Vulnerability	
	Score	Level
Flag	1.97	Med/High
Greenspotted	1.98	Med/High
Harlequin	1.94	Med/High
Honeycomb	1.97	Med/High
Pink	2.02	Med/High
Rosethorn	2.09	Med/High
Silvergray	2.02	Med/High
Swordspine	1.94	Med/High
Tiger	2.06	Med/High
Vermilion	2.05	Med/High
Greenstriped	1.88	Med
Mexican	1.80	Med
Pinkrose	1.82	Med
Rosy	1.89	Med
Squarespot	1.86	Med
Stripetail	1.80	Med
Freckled	1.55	Low
Halfbanded	1.38	Low
Puget Sound	1.59	Low
Pygmy	1.55	Low
Starry	1.02	Low
Minor Slope Rockfish North	NA	NA
Aurora	2.10	High
Rougheye	2.27	High
Shortraker	2.25	High
Bank	2.02	Med/High
Blackgill	2.08	Med/High
Redbanded	2.02	Med/High
Sharpchin	2.05	Med/High
Yellowmouth	1.96	Med/High
Splitnose	1.82	Med

Minor Nearshore Rockfish North

The northern minor nearshore rockfish complex north of 40°10' N latitude is composed of the following species: black and yellow rockfish (*S. chrysomelas*); blue rockfish (*S. mystinus*); brown rockfish (*S. auriculatus*); calico rockfish (*S. dalli*); China rockfish (*S. nebulosus*); copper rockfish (*S. caurinus*); gopher rockfish (*S. carnatus*); grass rockfish (*S. rastrelliger*); kelp rockfish (*S. atrovirens*); olive rockfish (*S. serranoides*); quillback rockfish (*S. maliger*); and treefish (*S. serriceps*).

These are all unassessed species except for the portion of the blue rockfish stock occurring in waters off California (i.e., $40^0$10’ N lat. to the California-Oregon border at 42 N lat.). All stocks other than blue rockfish off California are category 3 stocks with catch-based approaches for determining the OFL contribution of the stock. The OFL contribution for blue rockfish off California is based on a 2007 assessment (Key et al. 2008) and is recommended as a category 2 stock based on relatively high assessment uncertainty.

No 2011 and 2012 OFLs or ABCs are proposed for the minor nearshore rockfish north complex under the preliminary preferred alternative. If an OFL were considered for the minor nearshore rockfish north complex, the summed contribution of OFLs of the component species is 116 mt (Table 2-18). The summed contribution of component species' ABCs under the preliminary preferred approach of assuming all component stocks are category 3 is 81 mt. If the ABC contribution was determined using stock-specific categories assigned by the SSC, then ABCs for 2011 and 2012 would be 85 and 84 mt, respectively.

The preliminary preferred ACL for minor nearshore rockfish north of 155 mt is the same as the No Action 2010 OY. This ACL is higher than the any of the ABC approaches summarized in Table 2-18 if stock contributions are used to determine an ABC. The preliminary preferred ACL for the complex is also higher than the summed OFL contribution of component stocks, which may pose an overfishing risk to one or more of the component stocks.

The GMT PSA analysis of the relative vulnerability of stocks to overfishing indicated that China, copper, and quillback rockfish have a relatively high vulnerability; and blue and brown rockfish have a medium to high relative vulnerability (Table 2-17). These are the stocks within the minor nearshore rockfish north subcomplex that are most at risk of overfishing. These stocks may be at a particularly high risk of overfishing given the ACL proposed for the subcomplex under the preliminary preferred alternative is higher than the summed ABC and OFL contributions of component stocks.

Table 2-18. The summed contribution of component stock specifications to the 2011 and 2012 OFLs and ABCs for the minor nearshore rockfish north complex relative to the preliminary preferred ACLs.

Stock Complex and Component Stocks	Specifications Based on Stock Contribution							Preliminary Preferred	
	2010 OY	2011 OFL	2012 OFL	Using SSC Stock Cat.		Assume Stock Cat. 3		2011 ACL	2012 ACL
				2011 ABC	2012 ABC	2011 ABC	2012 ABC		
Minor Nearshore Rockfish North	155	116	116	85	84	81	81	155	155
Black and yellow		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		
Blue (CA)		*27.7*	*27.5*	*23.1*	*22.9*	*19.3*	*19.1*		
Blue (OR & WA)		*33.1*	*33.1*	*23.0*	*23.0*	*23.0*	*23.0*		
Brown		*5.3*	*5.3*	*3.7*	*3.7*	*3.7*	*3.7*		
Calico		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		
China		*11.7*	*11.7*	*8.1*	*8.1*	*8.1*	*8.1*		
Copper		*28.6*	*28.6*	*19.9*	*19.9*	*19.9*	*19.9*		
Gopher		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		
Grass		*0.6*	*0.6*	*0.4*	*0.4*	*0.4*	*0.4*		
Kelp		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		
Olive		*0.3*	*0.3*	*0.2*	*0.2*	*0.2*	*0.2*		
Quillback		*8.7*	*8.7*	*6.0*	*6.0*	*6.0*	*6.0*		
Treefish		*0.2*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*		

Minor Shelf Rockfish North

The northern minor shelf rockfish complex north of 40°10' N latitude is comprised of the following species: bronzespotted rockfish (*S. gilli*); bocaccio (*Sebastes paucispinis*); chameleon rockfish (*S. phillipsi*); cowcod (*S. levis*); flag rockfish (*S. rubrivinctus*); freckled rockfish (*S. lentiginosus*); greenblotched rockfish (*S. rosenblatti*); greenspotted rockfish (*S. chlorostictus*); greenstriped rockfish (*S. elongatus*); halfbanded rockfish (*S. semicinctus*); harlequin rockfish (*S. variegatus*); honeycomb rockfish (*S. umbrosus*); Mexican rockfish (*S. macdonaldi*); pink rockfish (*S. eos*); pinkrose rockfish (*S. simulator*); pygmy rockfish (*S. wilsoni*); redstripe rockfish (*S. proriger*); rosethorn rockfish (*S. helvomaculatus*); rosy rockfish (*S. rosaceus*); silvergray rockfish (*S. brevispinis*); speckled rockfish (*S. ovalis*); squarespot rockfish (*S. hopkinsi*); starry rockfish (*S. constellatus*); stripetail rockfish (*S. saxicola*); swordspine rockfish (*S. ensifer*); tiger rockfish (*S. nigrocinctus*); and vermilion rockfish (*S. miniatus*). Chilipepper rockfish (*S. goodei*) caught in the north are managed under this complex under the No Action alternative, but are proposed to be removed from the complex and managed with coastwide stock-specific harvest specifications under the preliminary preferred alternative. Dusky (*S. ciliatus*) and dwarf-red rockfish (*S. rufianus*) are managed under this under the No Action alternative, but are proposed to be removed from the FMP under a separate Amendment 23 action.

These are all unassessed species except for greenstriped rockfish, which was newly assessed in 2009 {Hicks et al. 2009}. All stocks other than greenstriped rockfish are category 3 stocks with catch-based approaches for determining the OFL contribution of the stock. The OFL contribution for greenstriped rockfish is based on the new assessment and is recommended as a category 2 stock based on relatively high assessment uncertainty. The greenstriped assessment was a coastwide assessment and the harvest specifications were apportioned using the mean of the 2003-2008 swept area biomass estimates north of 40.5^0 N lat. (84.5%) from the NMFS trawl survey.

No 2011 and 2012 OFLs or ABCs are proposed for the minor shelf rockfish north complex under the preliminary preferred alternative. If an OFL were considered for the minor shelf rockfish north complex, the summed contribution of OFLs of the component species are 2,032 and 2,056 mt for 2011 and 2012, respectively (Table 2-19). The summed contribution of component species' ABCs under the preliminary preferred approach of assuming all component stocks are category 3 are 1,411 and 1,428 mt. If the ABC contribution was determined using stock-specific categories assigned by the SSC, then ABCs for 2011 and 2012 would be 1,578 and 1,598 mt, respectively.

The preliminary preferred ACL for minor shelf rockfish north of 968 mt is the same as the No Action 2010 OY. This ACL is lower than the any of the ABC approaches summarized in Table 2-19 if stock contributions are used to determine an ABC.

The GMT PSA analysis of the relative vulnerability of stocks to overfishing indicated that a number of the component rockfish stocks have a medium to high relative vulnerability to overfishing (Table 2-17). However, the RCAs implemented to reduce mortality on overfished species greatly protect shelf rockfish leading to few concerns regarding overfishing.

Table 2-19. The summed contribution of component stock specifications to the 2011 and 2012 OFLs and ABCs for the minor shelf rockfish north complex relative to the preliminary preferred ACLs.

Stock Complex and Component Stocks	Specifications Based on Stock Contribution							Preliminary Preferred	
	2010 OY	2011 OFL	2012 OFL	Using SSC Stock Cat.		Assume Stock Cat. 3		2011 ACL	2012 ACL
				2011 ABC	2012 ABC	2011 ABC	2012 ABC		
Minor Shelf Rockfish North	968	2,032	2,056	1,578	1,598	1,411	1,428	968	968
Bronzespotted		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		
Bocaccio		*268.2*	*268.2*	*186.1*	*186.1*	*186.2*	*186.2*		
Chameleon		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		
Cowcod		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		
Flag		*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*		
Freckled		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		
Greenblotched		*1.4*	*1.4*	*0.9*	*0.9*	*0.9*	*0.9*		
Greenspotted		*20.9*	*20.9*	*14.5*	*14.5*	*14.5*	*14.5*		
Greenstriped		*1,208.0*	*1,232.0*	*1,006.3*	*1,026.3*	*838.7*	*855.4*		
Halfbanded		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		
Harlequin		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		
Honeycomb		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		
Mexican		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		
Pink		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		
Pinkrose		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		
Puget Sound		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		
Pygmy		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		
Redstripe		*288.3*	*288.3*	*200.1*	*200.1*	*200.2*	*200.2*		
Rosethorn		*15.2*	*15.2*	*10.6*	*10.6*	*10.6*	*10.6*		
Rosy		*2.5*	*2.5*	*1.7*	*1.7*	*1.7*	*1.7*		
Silvergray		*180.0*	*180.0*	*124.9*	*124.9*	*125.0*	*125.0*		
Speckled		*0.2*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*		
Squarespot		*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*		
Starry		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		
Stripetail		*35.3*	*35.3*	*24.5*	*24.5*	*24.5*	*24.5*		
Swordspine		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		
Tiger		*1.1*	*1.1*	*0.8*	*0.8*	*0.8*	*0.8*		
Vermilion		*11.1*	*11.1*	*7.7*	*7.7*	*7.7*	*7.7*		

Minor Slope Rockfish North

The northern minor slope rockfish complex north of 40°10' N latitude is comprised of the following species: aurora rockfish (*S. aurora*); bank rockfish (*S. rufus*); blackgill rockfish (*S. melanostomus*); redbanded rockfish (*S. babcocki*); rougheye rockfish (*S. aleutianus*); sharpchin rockfish (*S. zacentrus*); shortraker rockfish (*S. borealis*); splitnose rockfish (*S. diploproa*); and yellowmouth rockfish (*S. reedi*).

These are all unassessed species except for splitnose rockfish, which was newly assessed in 2009 {Gertseva et al. 2009}. All stocks other than splitnose rockfish are category 3 stocks with catch-based approaches for determining the OFL contribution of the stock. The OFL contribution for splitnose rockfish is based on the new assessment and is recommended as a category 1 stock by the SSC.

No 2011 and 2012 OFLs or ABCs are proposed for the minor slope rockfish north complex under the preliminary preferred alternative. If an OFL were considered for the minor slope rockfish north complex, the summed contribution of OFLs of the component species are 1,462 and 1,507 mt for 2011 and 2012, respectively (Table 2-20). The summed contribution of component species' ABCs under the preliminary preferred approach of assuming all component stocks are category 3 species are 1,015 and 1,047 mt for 2011 and 2012, respectively. If the ABC contribution was determined using stock-specific categories assigned by the SSC, then ABCs for 2011 and 2012 would be 1,238 and 1,281 mt, respectively.

The preliminary preferred ACL for minor slope rockfish north of 1,160 mt is the same as the No Action 2010 OY. This ACL is higher than the preliminary preferred ABC approach that assumes all component stocks are category 3. However, if the stock-specific categories recommended by the SSC are used to determine the ABC contributions of component stocks, then the preferred ACL is less than the summed ABC contribution (Table 2-20). The difference between these two ABC approaches is the fact that splitnose rockfish are a category 1 stock with a smaller scientific uncertainty buffer and this stock's OFL is the primary contributor to the complex summed OFL.

The GMT PSA analysis of the relative vulnerability of stocks to overfishing indicated that most of these rockfish stocks have a medium to high vulnerability to overfishing (Table 2-17). These are the stocks within the minor slope rockfish south subcomplex that are most at risk of overfishing.

Table 2-20. The summed contribution of component stock specifications to the 2011 and 2012 OFLs and ABCs for the minor slope rockfish north complex relative to the preliminary preferred ACLs.

Stock Complex and Component Stocks	Specifications Based on Stock Contribution							Preliminary Preferred	
	2010 OY	2011 OFL	2012 OFL	Using SSC Stock Cat.		Assume Stock Cat. 3		2011 ACL	2012 ACL
				2011 ABC	2012 ABC	2011 ABC	2012 ABC		
Minor Slope Rockfish North	1,160	1,462	1,507	1,238	1,281	1,015	1,047	1,160	1,160
Aurora		*17.3*	*17.3*	*12.0*	*12.0*	*12.0*	*12.0*		
Bank		*19.7*	*19.7*	*13.7*	*13.7*	*13.7*	*13.7*		
Blackgill		*4.7*	*4.7*	*3.3*	*3.3*	*3.3*	*3.3*		
Redbanded		*51.7*	*51.7*	*35.9*	*35.9*	*35.9*	*35.9*		
Rougheye		*78.3*	*78.3*	*54.3*	*54.3*	*54.3*	*54.3*		
Sharpchin		*231.9*	*231.9*	*160.9*	*160.9*	*161.0*	*161.0*		
Shortraker		*21.8*	*21.8*	*15.1*	*15.1*	*15.2*	*15.2*		
Splitnose		*852.2*	*897.3*	*814.7*	*857.8*	*591.7*	*623.0*		
Yellowmouth		*184.7*	*184.7*	*128.2*	*128.2*	*128.2*	*128.2*		

2.1.6.2 Minor Rockfish South of 40°10' N lat.

The Minor Rockfish North complex is the aggregate assemblage of three subcomplexes of nearshore, shelf and slope rockfish species that occur south of 40°10' N lat. The preliminary preferred OFLs for the minor rockfish south complex are 4,302 and 4,291 mt for 2011 and 2012, respectively. The proposed OFLs are the summed contribution of the SSC-recommended OFLs for the southern minor nearshore shelf, and slope rockfish species.

The ABCs recommended for the minor rockfish south complex are 2,987 and 2,979 mt for 2011 and 2012, respectively. The proposed ABCs are the summed contribution of the ABCs for the northern minor nearshore, shelf, and slope rockfish species assuming they are all category 3 stocks to determine the associated scientific uncertainty buffer under the Council's preferred alternative (Table 2-16).

The proposed 2011 and 2012 ACL of 1,190 mt for the minor rockfish south complex is the No Action 2010 OY specified for the complex. This ACL equals the sum of the 2010 OYs under the No Action alternative and the preliminary preferred ACLs proposed for the northern minor nearshore, shelf, and slope rockfish subcomplexes.

None of the ACLs recommended for the minor rockfish south complex and sub-complexes exceed the ABC contributions of the respective component stocks regardless of the approach used to calculate the ABCs (Table 2-16).

The relative vulnerability of stocks in the minor rockfish south complex as rated in the GMT's PSA analysis are shown in Table 2-21.

Table 2-21. The relative vulnerability of rockfish stocks as rated by the GMT in their PSA analysis managed in the minor rockfish complex south of 40°10' N lat. by stock subcomplex and relative level of vulnerability within the subcomplex.

Stock Complex and Component Stocks	PSA Results	
	Vulnerability	
	Score	Level
Minor Rockfish South	NA	NA
Minor Nearshore Rockfish South	NA	NA
China	2.23	High
Copper	2.27	High
Quillback	2.22	High
Blue (assessed area)	2.01	Med/High
Blue (S of 34°27' N latitude)	2.01	Med/High
Brown	1.99	Med/High
Grass	1.89	Med
Olive	1.87	Med
Black and yellow	1.70	Low
Calico	1.57	Low
Gopher (N of Pt. Conception)	1.76	Low
Gopher (S of Pt. Conception)	1.76	Low
Kelp	1.59	Low
Treefish	1.73	Low
Minor Shelf Rockfish South	NA	NA
Bronzespotted	2.12	High

Stock Complex and Component Stocks	PSA Results	
	Vulnerability	
	Score	Level
Greenblotched	2.12	High
Redstripe	2.16	High
Speckled	2.10	High
Chameleon	2.03	Med/High
Flag	1.97	Med/High
Greenspotted	1.98	Med/High
Harlequin	1.94	Med/High
Honeycomb	1.97	Med/High
Pink	2.02	Med/High
Rosethorn	2.09	Med/High
Silvergray	2.02	Med/High
Swordspine	1.94	Med/High
Tiger	2.06	Med/High
Vermilion	2.05	Med/High
Greenstriped	1.88	Med
Mexican	1.80	Med
Pinkrose	1.82	Med
Rosy	1.89	Med
Squarespot	1.86	Med
Stripetail	1.80	Med
Yellowtail	1.88	Med
Freckled	1.55	Low
Halfbanded	1.38	Low
Pygmy	1.55	Low
Starry	1.02	Low
Minor Slope Rockfish South		
Aurora	2.10	High
Rougheye	2.27	High
Shortraker	2.25	High
Bank	2.02	Med/High
Blackgill	2.08	Med/High
Redbanded	2.02	Med/High
Sharpchin	2.05	Med/High
Yellowmouth	1.96	Med/High
Pacific ocean perch	1.69	Low

Minor Nearshore Rockfish South

The southern minor nearshore rockfish complex south of 40°10' N latitude is further subdivided into the following management categories: 1) shallow nearshore rockfish [comprised of black and yellow rockfish (*S. chrysomelas*); China rockfish (*S. nebulosus*); gopher rockfish (*S. carnatus*); grass rockfish (*S. rastrelliger*), and kelp rockfish (*S. atrovirens*)]; and 2) deeper nearshore rockfish: [comprised of black rockfish (*S. melanops*), blue rockfish (*S. mystinus*); brown rockfish (*S. auriculatus*); calico rockfish (*S. dalli*); copper rockfish (*S. caurinus*); olive rockfish (*S. serranoides*); quillback rockfish (*S. maliger*); and treefish (*S. serriceps*)].

These are all unassessed species except for the portion of the blue rockfish stock occurring in waters off California north of Pt. Conception (i.e., $34^{0}27'$ N lat. to $40^{0}10'$ N lat.) and gopher rockfish north of Pt.

Conception (i.e., $34^0$27' N lat. to $40^0$10' N lat.) . All stocks other than the assessed portions of the blue and gopher rockfish stocks off California are category 3 stocks with catch-based approaches for determining the OFL contribution of the stock. The OFL contribution for blue rockfish off California is based on a 2007 assessment (Key et al. 2008) and is recommended as a category 2 stock based on relatively high assessment uncertainty. The OFL contribution for gopher rockfish is based on a 2005 assessment (Key, *et al.* 2006) and is recommended as a category 1 stock by the SSC.

No 2011 and 2012 OFLs or ABCs are proposed for the minor nearshore rockfish south complex under the preliminary preferred alternative. If an OFL were considered for the minor nearshore rockfish south complex, the summed contribution of OFLs of the component species are 1,156 and 1,145 mt for 2011 and 2012, respectively (Table 2-22). The summed contribution of component species' ABCs under the preliminary preferred approach of assuming all component stocks are category 3 species are 803 and 795 mt for 2011 and 2012, respectively. If the ABC contribution was determined using stock-specific categories assigned by the SSC, then ABCs for 2011 and 2012 would be 875 and 864 mt, respectively.

The preliminary preferred ACL for minor slope rockfish north of 650 mt is the same as the No Action 2010 OY. This ACL is lower than the either approach used to determine summed ABC contributions for the complex (Table 2-22). The difference between these two ABC approaches is the fact that blue and gopher rockfish are assessed species and therefore have smaller scientific uncertainty buffers.

The GMT PSA analysis of the relative vulnerability of stocks to overfishing indicated that China, copper, and quillback rockfish have a relatively high vulnerability; and blue and brown rockfish have a medium to high relative vulnerability (Table 2-21). These are the stocks within the minor nearshore rockfish north subcomplex that are most at risk of overfishing

Table 2-22. The summed contribution of component stock specifications to the 2011 and 2012 OFLs and ABCs for the minor nearshore rockfish south complex relative to the preliminary preferred ACLs.

Stock Complex and Component Stocks	Specifications Based on Stock Contribution							Preliminary Preferred	
	2010 OY	2011 OFL	2012 OFL	Using SSC Stock Cat.		Assume Stock Cat. 3		2011 ACL	2012 ACL
				2011 ABC	2012 ABC	2011 ABC	2012 ABC		
Minor Nearshore Rockfish South	650	1,156	1,145	875	864	803	795	650	650
Shallow Nearshore Species		NA	NA	NA	NA	NA	NA		
Black and yellow		*26.8*	*26.8*	*18.6*	*18.6*	*18.6*	*18.6*		
China		*19.8*	*19.8*	*13.7*	*13.7*	*13.7*	*13.7*		
Gopher (N of Pt. Conception)		*175.0*	*165.0*	*167.3*	*157.7*	*121.5*	*114.6*		
Gopher (S of Pt. Conception)		*26.0*	*26.0*	*18.1*	*18.1*	*18.1*	*18.1*		
Grass		*55.6*	*55.6*	*38.6*	*38.6*	*38.6*	*38.6*		
Kelp		*25.9*	*25.9*	*18.0*	*18.0*	*18.0*	*18.0*		
Deeper Nearshore Species		NA	NA	NA	NA	NA	NA		
Blue (assessed area)		*191.3*	*189.5*	*159.3*	*157.9*	*132.8*	*131.6*		
Blue (S of 34 ^{o}27' N latitude)		*74.0*	*74.0*	*51.4*	*51.4*	*51.4*	*51.4*		
Brown		*197.4*	*197.4*	*137.0*	*137.0*	*137.0*	*137.0*		
Calico		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		
Copper		*156.0*	*156.0*	*108.2*	*108.2*	*108.3*	*108.3*		
Olive		*189.5*	*189.5*	*131.5*	*131.5*	*131.6*	*131.6*		
Quillback		*6.3*	*6.3*	*4.4*	*4.4*	*4.4*	*4.4*		
Treefish		*12.9*	*12.9*	*9.0*	*9.0*	*9.0*	*9.0*		

Minor Shelf Rockfish South

The southern minor shelf rockfish complex south of 40°10' N latitude is composed of the following species: bronzespotted rockfish (*S. gilli*); chameleon rockfish (*S. phillipsi*); dusky rockfish (*S. ciliatus*); dwarf-red rockfish (*S. rufianus*); flag rockfish (*S. rubrivinctus*); freckled rockfish (*S. lentiginosus*); greenblotched rockfish (*S. rosenblatti*); greenspotted rockfish (*S. chlorostictus*); greenstriped rockfish (*S. elongatus*); halfbanded rockfish (*S. semicinctus*); harlequin rockfish (*S. variegatus*); honeycomb rockfish (*S. umbrosus*); Mexican rockfish (*S. macdonaldi*); pink rockfish (*S. eos*); pinkrose rockfish (*S. simulator*); pygmy rockfish (*S. wilsoni*); redstripe rockfish (*S. proriger*); rosethorn rockfish (*S. helvomaculatus*); rosy rockfish (*S. rosaceus*); silvergray rockfish (*S. brevispinis*); speckled rockfish (*S. ovalis*); squarespot rockfish (*S. hopkinsi*); starry rockfish (*S. constellatus*); stripetail rockfish (*S. saxicola*); swordspine rockfish (*S. ensifer*); tiger rockfish (*S. nigrocinctus*); vermilion rockfish (*S. miniatus*); and yellowtail rockfish (*S. flavidus*).

These are all unassessed species except for greenstriped rockfish, which was newly assessed in 2009 {Hicks et al. 2009}. All stocks other than greenstriped rockfish are category 3 stocks with catch-based approaches for determining the OFL contribution of the stock. The OFL contribution for greenstriped rockfish is based on the new 2009 assessment and is recommended as a category 2 stock based on relatively high assessment uncertainty. The greenstriped assessment was a coastwide assessment and the harvest specifications were apportioned using the mean of the 2003-2008 swept area biomass estimates south of 40.5^0 N lat. (15.5%) from the NMFS trawl survey.

No 2011 and 2012 OFLs or ABCs are proposed for the minor shelf rockfish south complex under the preliminary preferred alternative. If an OFL were considered for the minor shelf rockfish south complex, the summed contribution of OFLs of the component species are 2,238 and 2,243 mt for 2011 and 2012, respectively (Table 2-23). The summed contribution of component species' ABCs under the preliminary preferred approach of assuming all component stocks are category 3 species are 1,554 and 1,558 mt for 2011 and 2012, respectively. If the ABC contribution was determined using stock-specific categories assigned by the SSC, then ABCs for 2011 and 2012 would be 1,584 and 1,588 mt, respectively.

The preliminary preferred ACL for minor slope rockfish north of 714 mt is the same as the No Action 2010 OY. This ACL is lower than the either approach used to determine summed ABC contributions for the complex (Table 2-23). The difference between these two ABC approaches is the fact that greenstriped rockfish is an assessed species and therefore has a smaller scientific uncertainty buffer.

The GMT PSA analysis of the relative vulnerability of stocks to overfishing indicated that a number of the component rockfish stocks have a medium to high relative vulnerability to overfishing (Table 2-21). However, the RCAs implemented to reduce mortality on overfished species greatly protect shelf rockfish leading to few concerns regarding overfishing.

Table 2-23. The summed contribution of component stock specifications to the 2011 and 2012 OFLs and ABCs for the minor shelf rockfish south complex relative to the preliminary preferred ACLs.

Stock Complex and Component Stocks	Specifications Based on Stock Contribution							Preliminary Preferred	
	2010 OY	2011 OFL	2012 OFL	Using SSC Stock Cat.		Assume Stock Cat. 3		2011 ACL	2012 ACL
				2011 ABC	2012 ABC	2011 ABC	2012 ABC		
Minor Shelf Rockfish South	714	2,238	2,243	1,584	1,588	1,554	1,558	714	714
Bronzespotted		*6.7*	*6.7*	*4.6*	*4.6*	4.6	4.6		
Chameleon		*0.0*	*0.0*	*0.0*	*0.0*	0.0	0.0		
Flag		*26.6*	*26.6*	*18.5*	*18.5*	*18.5*	*18.5*		
Freckled		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		
Greenblotched		*24.6*	*24.6*	*17.1*	*17.1*	*17.1*	*17.1*		
Greenspotted		*195.3*	*195.3*	*135.5*	*135.5*	*135.6*	*135.6*		
Greenstriped		*221.0*	*226.0*	*184.1*	*188.3*	*153.4*	*156.9*		
Halfbanded		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		
Harlequin		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		
Honeycomb		*7.8*	*7.8*	*5.4*	*5.4*	*5.4*	*5.4*		
Mexican		*2.8*	*2.8*	*2.0*	*2.0*	*2.0*	*2.0*		
Pink		*2.8*	*2.8*	*2.0*	*2.0*	*2.0*	*2.0*		
Pinkrose		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		
Pygmy		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		
Redstripe		*0.5*	*0.5*	*0.4*	*0.4*	*0.4*	*0.4*		
Rosethorn		*2.5*	*2.5*	*1.7*	*1.7*	*1.7*	*1.7*		
Rosy		*36.9*	*36.9*	*25.6*	*25.6*	*25.7*	*25.7*		
Silvergray		*0.6*	*0.6*	*0.4*	*0.4*	*0.4*	*0.4*		
Speckled		*42.9*	*42.9*	*29.8*	*29.8*	*29.8*	*29.8*		
Squarespot		*5.8*	*5.8*	*4.0*	*4.0*	*4.0*	*4.0*		
Starry		*70.5*	*70.5*	*49.0*	*49.0*	*49.0*	*49.0*		
Stripetail		*20.6*	*20.6*	*14.3*	*14.3*	*14.3*	*14.3*		
Swordspine		*12.9*	*12.9*	*9.0*	*9.0*	*9.0*	*9.0*		
Tiger		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		
Vermilion		*308.4*	*308.4*	*214.0*	*214.0*	*214.1*	*214.1*		
Yellowtail		*1,248.9*	*1,248.9*	*866.7*	*866.7*	*867.1*	*867.1*		

Minor Slope Rockfish South

The southern minor slope rockfish complex south of 40°10' N latitude is composed of the following species: aurora rockfish (*S. aurora*); bank rockfish (*S. rufus*); blackgill rockfish (*S. melanostomus*); Pacific ocean perch (*S. alutus*); redbanded rockfish (*S. babcocki*); rougheye rockfish (*S. aleutianus*); sharpchin rockfish (*S. zacentrus*); shortraker rockfish (*S. borealis*); and yellowmouth rockfish (*S. reedi*).

These are all unassessed species except for bank rockfish, which was last assessed in 2000 {Piner, 2000 1463 /id}, and blackgill rockfish, which was assessed in 2005 (Helser 2006). All stocks other than bank and blackgill rockfish are category 3 stocks with catch-based approaches for determining the OFL contribution of the stock. The OFL contribution for bank rockfish is based on the 2000 assessment and is recommended as a category 2 stock by the SSC. The OFL contribution for blackgill rockfish is based on the 2005 assessment and is recommended as a category 1 stock by the SSC.

No 2011 and 2012 OFLs or ABCs are proposed for the minor slope rockfish south complex under the preliminary preferred alternative. If an OFL were considered for the minor slope rockfish south complex, the summed contribution of OFLs of the component species are 907 and 903 mt for 2011 and 2012, respectively (Table 2-23). The summed contribution of component species' ABCs under the preliminary preferred approach of assuming all component stocks are category 3 species are 630 and 627 mt for 2011 and 2012, respectively. If the ABC contribution was determined using stock-specific categories assigned by the SSC, then ABCs for 2011 and 2012 would be 783 and 779 mt, respectively.

The preliminary preferred ACL for minor slope rockfish south of 626 mt is the same as the No Action 2010 OY. This ACL is lower than the either approach used to determine summed ABC contributions for the complex (Table 2-24). The difference between these two ABC approaches is the fact that blackgill and rockfish is an assessed species and therefore has a smaller scientific uncertainty buffer.

The GMT PSA analysis of the relative vulnerability of stocks to overfishing indicated that most of these rockfish stocks have a medium to high vulnerability to overfishing (Table 2-21). These are the stocks within the minor slope rockfish south subcomplex that are most at risk of overfishing.

Table 2-24. The summed contribution of component stock specifications to the 2011 and 2012 OFLs and ABCs for the minor slope rockfish south complex relative to the preliminary preferred ACLs.

Stock Complex and Component Stocks	Specifications Based on Stock Contribution							Preliminary Preferred	
	2010 OY	2011 OFL	2012 OFL	Using SSC Stock Cat.		Assume Stock Cat. 3		2011 ACL	2012 ACL
				2011 ABC	2012 ABC	2011 ABC	2012 ABC		
Minor Slope Rockfish South	626	907	903	783	779	630	627	626	626
Aurora		*29.4*	*29.4*	*20.4*	*20.4*	*20.4*	*20.4*		
Bank		*574.8*	*574.8*	*478.8*	*478.8*	*399.1*	*399.1*		
Blackgill		*279.0*	*275.0*	*266.7*	*262.9*	*193.7*	*190.9*		
Pacific ocean perch		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		
Redbanded		*11.9*	*11.9*	*8.2*	*8.2*	*8.2*	*8.2*		
Rougheye		*0.5*	*0.5*	*0.3*	*0.3*	*0.3*	*0.3*		
Sharpchin		*10.6*	*10.6*	*7.4*	*7.4*	*7.4*	*7.4*		
Shortraker		*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*		
Yellowmouth		*0.8*	*0.8*	*0.6*	*0.6*	*0.6*	*0.6*		

2.1.6.3 Other Flatfish

The Other Flatfish complex contains all the unassessed flatfish species in the Groundfish FMP. These species include butter sole (*Isopsetta isolepis*), curlfin sole (*Pleuronichthys decurrens*), flathead sole (*Hippoglossoides elassodon*), Pacific sanddab (*Citharichthys sordidus*), rex sole (*Glyptocephalus zachirus*), rock sole (*Lepidopsetta bilineata*), and sand sole (*Psettichthys melanostictus*).

An OFL of 10,146 mt for 2011 and 2012 is recommended for the Other Flatfish complex and is based on the summed contribution of OFLs determined for the component stocks (Table 2-25). These stocks are all category 3 relying on catch-based approaches for determining the OFL contribution.

The proposed 2011 and 2012 ABC for the Other Flatfish complex is 7,044 mt and is based on applying a 30.6% scientific uncertainty buffer consistent with a P* approach for category 3 stocks under a P* of 0.4. The ABC contributions of the component stocks are summed to derive the ABC for the complex.

The preliminary preferred 2011 and 2012 ACL for the Other Flatfish complex of 4,884 mt is the No Action 2010 OY and is recommended given there has been no significant change in the status or management of stocks managed within the complex.

Table 2-25. The summed contribution of component stock specifications to the 2011 and 2012 OFLs and ABCs for the Other Flatfish complex relative to the preliminary preferred ACLs.

Stock Complex and Component Stocks	Specifications Based on Stock Contribution					Preliminary Preferred	
	2010 OY	2011 OFL	2012 OFL	Assume Stock Cat. 3		2011 ACL	2012 ACL
				2011 ABC	2012 ABC		
Other Flatfish	4,884	10,146	10,146	7,044	7,044	4,884	4,884
Butter sole		*5*	*5*	*3*	*3*		
Curlfin sole		*8*	*8*	*6*	*6*		
Flathead sole		*35*	*35*	*24*	*24*		
Pacific sanddab		*4,943*	*4,943*	*3,432*	*3,432*		
Rex sole		*4,309*	*4,309*	*2,992*	*2,992*		
Rock sole		*66*	*66*	*46*	*46*		
Sand sole		*781*	*781*	*542*	*542*		

The Other Flatfish complex is the most reasonably constructed complex since all the species have similar life history characteristics, distributions, and low relative vulnerabilities to overfishing (Table 2-26). There may be no reason to restructure this complex in the 2013-2014 biennial cycle unless a new assessment of one of the component species (e.g., rex sole) is done next year that compels removing the stock from the complex. The GMT did a systematic overhaul of the Other Flatfish complex in 2004, which is documented in the 2055-2005 biennial specifications EIS {PFMC 2004}.

Table 2-26. The relative vulnerability of stocks managed under the Other Flatfish complex as rated by the GMT in their PSA analysis.

Stock Complex and Component Stocks	PSA Results	
	Vulnerability	
	Score	Level
Other Flatfish		
Butter sole	1.18	Low
Curlfin sole	1.23	Low
Flathead sole	1.03	Low
Pacific sanddab	1.25	Low
Rex sole	1.28	Low
Rock sole	1.42	Low
Sand sole	1.23	Low

2.1.6.4 Other Fish

The Other Fish stock complex contains all the unassessed Groundfish FMP species that are neither rockfish (family *Scorpaenidae*) nor flatfish. These species include big skate (*Raja binoculata*), California skate (*Raja inornata*), leopard shark (*Triakis semifasciata*), soupfin shark (*Galeorhinus zyopterus*), spiny dogfish (*Squalus acanthias*), finescale codling (*Antimora microlepis*), Pacific rattail (*Coryphaenoides acrolepis*), ratfish (*Hydrolagus colliei*), cabezon (*Scorpaenichthys marmoratus*) (off Washington), and kelp greenling (*Hexagrammos decagrammus*). The cabezon stock off Oregon is managed under the Other Fish complex under the No Action alternative. A new assessment of the cabezon stock off Oregon was done in 2009 {Cope and Key 2009} and the stock is proposed to be managed with stock-specific harvest specifications under the preferred alternative.

The SSC recommended the No Action ABC for the 2011 and 2012 OFL modified by removing 50 mt that represents the contribution of the Oregon cabezon stock. The 11,150 mt OFL is recommended for managing the Other Fish complex in 2011 and 2012.

All the component stocks in the Other Fish complex are category 3 stocks and the ABC is calculated accordingly using a P* approach. The ABC is calculated by applying the P* buffer amount of 30.6% under a P* of 0.4. The resulting ABC for 2011 and 2012 is 7,742 mt.

The preliminary preferred ACL for the Other Fish complex (5,575 mt) is based on the No Action 2010 OY of 5,600 mt minus half the OFL contribution of the Oregon stock of cabezon.

The No Action and preliminary preferred harvest specifications for the Other Fish complex specifications do not have an analytical basis and the component species are a dissimilar assemblage of species, many with high vulnerabilities to overfishing (Table 2-27). The GMT and SSC recommend a complete overhaul of the Other Fish complex for the 2013-2014 biennial cycle. The recommended approach to doing this is consideration for adding new species related to the component species of the complex into the FMP and re-grouping species with similar vulnerabilities, ecological interactions, and distributions. This will require an FMP amendment and is not considered in this cycle due to workload.

Table 2-27. The relative vulnerability of stocks managed under the Other Fish complex as rated by the GMT in their PSA analysis.

Stock Complex and Component Stocks	PSA Results	
	Vulnerability	
	Score	Level
Other Fish		
California skate	2.12	High
Leopard shark	2.00	High
Soupfin shark	2.02	High
Spiny dogfish	2.13	High
Big skate	1.99	Med/High
Pacific rattail	1.82	Med
Cabezon (WA)	1.68	Low
Finescale codling	1.48	Low
Kelp greenling	1.56	Low
Ratfish	1.72	Low

2.2 Description of the Integrated Alternatives

The alternatives for the 2011-2012 groundfish fisheries have been restructured and integrated such they are composed of the following elements

- an analytical scenario that explains how the alternative is structured,
- strategic combinations of overfished rockfish species ACLs,
- ranges of petrale sole ACLs,
- estimates of the overall harvest of non-overfished species, given the overfished species constraints,
- sector allocations of overfished species, and
- management measures necessary to stay within the sector allocations or ACLs (e.g., alternative seasons, size and bag limits, specific areas closed or open to fishing, trip limits, gear restrictions, etc.).

2.2.1 Analytical Scenario

The analytical scenario explains the purpose of the alternative. For example, the No Action alternative analyzes the impacts if no action were taken by the Council and the 2010 OYs and management measures currently specified in Federal regulations prevailed for the 2011-2012 fisheries. The remaining alternatives are structured around overfished species constraints.

2.2.2 Overfished Species ACLs

The remaining alternatives, in addition to the No Action alternative, represent combinations of overfished rockfish species ACLs that were developed by arranging the range of depleted species' ACLs in various combinations in order to understand how rebuilding plans for different species interact to constrain fishing opportunities (Table 2-28 and Table 2-29). In previous cycles, these arrangements were known as the strategic rebuilding alternatives. In the current structure of the alternatives, these harvest limits for overfished species are integrated into the more comprehensive alternatives described here. The overfished species ACLs are strategically arrayed to illuminate how each species might differentially constrain

fishing opportunities by sector (or gear type) and region along the west coast, depending on the amount of allowable harvest of each species.

Table 2-28. Range of overfished species alternatives for 2011 for more detailed analysis.

Species	Association	No Action 2010 OY (mt)	Alt 1 PPA (mt)	Alt 2 Intermediate (mt)	Alt 3 Low (mt)
Bocaccio	Shelf, south	288	263	109	53
Canary	Shelf, north	105	102	94	49
Cowcod	Shelf, south	4	4	3	2
Darkblotched	Slope, north	291	332	298	222
Petrale	Slope, shelf	1,200	976	776	459
POP	Slope, north	200	180	111	80
Widow	Midwater	509	600	400	200
YE	Shelf, north	17	20	17	13

Table 2-29. Range of overfished species alternatives for 2012 for more detailed analysis.

Species	Association	No Action 2010 OY (mt)	Alt 1 PPA (mt)	Alt 3 Intermediate (mt)	Alt 4 Lower (mt)
Bocaccio	Shelf, south	288	274	115	56
Canary	Shelf, north	105	107	99	51
Cowcod	Shelf, south	4	4	3	2
Darkblotched	Slope, north	291	329	296	222
Petrale	Slope, shelf	1,200	1160	1160	624
POP	Slope, north	200	183	113	80
Widow	Midwater	509	600	400	200
YE	Shelf, north	17	20	17	13

In developing the management measures to keep petrale catches within the ACL, the Council, as part of their preliminary preferred decision, recommended a year-round fishery. Further, the Council recommended that the rebuilding strategy affect the sectors proportionate to the allocation percentages under Amendment 21: Intersector Allocation, which are 95% trawl and 5% non-trawl (i.e., fixed gear commercial and recreational). The results of this analysis can be found in Agenda Item B.3.a Attachment 1.

2.2.3 Projected Harvest of Selected Non-Overfished Species

With regard to the projected total harvest of selected non-overfished species under each alternative, the analyses performed by the GMT will estimate how much target species could be accessed, given the overfished species constraints within the alternative. The Council should not consider these point estimates of target species catch but rather an approximation given the assumptions and changing

variables. For example, estimates of target species catch is heavily influenced by the West Coast Groundfish Observer Program (WCGOP) bycatch rates, which are updated with the latest available data between the time in which the biennial cycle decisions are made (i.e., June) and the first month of the biennial cycle (i.e., January). The overfished species bycatch rates (generated from WCGOP and state recreational sampling data) vary as a result of changing fishery behaviors as well as differences in stock distributions (e.g., rebuilding, ecosystem dynamics, etc.). For both the commercial and recreational fisheries, complex dynamics relative to other fishing opportunities (e.g., salmon and tuna) affect effort estimates and thus total groundfish take. Additionally, the estimates are generated by imprecise modeling platforms which contain assumptions of how the sectors perform under the variables contained within the action alternatives. In summary, the estimates are useful for conceptually understanding how the overfished species ACLs affect access to target stocks but should not be considered point estimates.

2.2.4 Sector Allocations for Overfished Species

Under Amendment 21, formal allocations of the trawl-dominant non-overfished species and overfished species (darkblotched rockfish, Pacific ocean perch, and widow rockfish) were decided for the non-treaty trawl (hereinafter trawl sector) and non-treaty non-trawl sectors (hereinafter non-trawl sector), as well as for each non-treaty trawl sector (i.e., shoreside non-whiting, shoreside whiting, catcher-processor, and mothership). Since Amendment 21 is scheduled to be implemented January 1, 2011, these allocations were used in the analysis of the alternatives.

The Council must decide two-year allocations for the non-Amendment 21 overfished species (yelloweye, canary, cowcod, and bocaccio) during the harvest specifications and management measures process. Historically, these allocations were flexible such that the Council had the ability to move fish between sectors through inseason action as needed. For example, the sector projections of estimated bycatch are frequently updated with new WCGOP data, which often changes the sector allocations relative to the decision made under the harvest specifications and management measures process. In these situations, the Council had the option of constraining the sector to within the initial allocation, implementing inseason action if there was concern for exceeding the OY, or accommodating the increased overfished species interactions by moving fish between sectors within the balance of the OY.

The consideration of a rationalized trawl fishery for 2011-2012 reduces the inseason flexibility to move fish between the trawl and non-trawl sectors since the trawl allocation will be converted into quota pounds and co-op allocations. It would be very difficult, if not impossible, to reduce the trawl allocation mid-year if need arises or an overage occurs in the non-trawl sector. As such, it is anticipated that the two-year allocation between the trawl and non-trawl sectors for yelloweye, canary, cowcod, and bocaccio will be a very difficult and complex decision. Within the non-trawl sector, it is still anticipated that the Council will have inseason flexibility to move fish between sectors (e.g., recreational and fixed gear commercial) as need arises.

The Council must strike a delicate balance when considering the trawl allocation in a rationalized fishery. First, the trawl sector has not yet operated under a rationalized system and it is difficult to precisely estimate the predicted overfished species impacts. While one objective of the rationalized fishery is to promote practices that reduce bycatch and discard mortality, it is expected that there will be a learning curve as the fleet adjusts to this new management regime. Further, while rationalized fisheries have a worldwide history of success, the west coast groundfish trawl fishery has the unique challenge of interacting with eight overfished stocks. The quota pounds and co-op allocations for the overfished species are expected to be scarce, especially for yelloweye and canary rockfish. The Council may consider that the two-year trawl allocation is somewhat of a performance standard and thus the fleet should be given an allocation to reasonably accommodate fishing operations.

The overfished species allocations to the trawl sector likely cannot flow into the non-trawl sector if need arises or if excess should become available (e.g., the at-sea whiting sector harvests all of their whiting allocation and has remaining overfished species quota). If unused, the trawl allocation of quota pounds to permits will rollover (if 10 percent or less) for the second year of the biennium (2012) or remain stranded in the trawl sector in the final year of the biennial cycle. As such, the Council should ensure that the non-trawl sector also has sufficient allocation to reasonably accommodate fishing operations.

2.2.5 Management Measures

In a parallel process to the 2011-2012 harvest specifications and management measures action, the Council is working on Amendment 23: Annual Catch Limits, which is creating a new framework for deciding groundfish harvest specifications consistent with new National Standard 1 (NS1) guidelines. Decisions made under Amendment 23 provide the foundation upon which the 2011-2012 harvest specifications and management measures action will be made. Essentially, the Council is writing the "rules" under Amendment 23 and, at the same time, applying those rules for the first time through this harvest specifications and management measures process.

The new NS1 guidelines identify two primary sources of management uncertainty: 1) uncertainty in the ability of managers to constrain catch so the ACL is not exceeded; and, 2) uncertainty in quantifying the true catch amounts. In other words, management uncertainty involves consideration of the effectiveness of management measures at stopping catch at desired levels, and at the same time, an examination of the accuracy and precision of the estimates used to quantify catch. The new NS1 guidelines recommend consideration of the annual catch target (ACT), which can be set below the ACL if there is uncertainty in the ability of the management system to effectively keep total fishing mortality below the prescribed ACL.

Under the No Action alternative, the Council uses harvest guidelines for some sectors (e.g., recreational) as a tool to constrain catch below the OY. The regulatory definition of a harvest guideline is "a specified numerical harvest objective that is not a quota. Attainment of a harvest guideline does not require closure of a fishery." The Council also uses sector specific bycatch limits in the whiting fishery to constrain catches of overfished species. As specified in regulation, the National Marine Fisheries Service has the authority to close the whiting fishery upon projected attainment of a bycatch limit. In defining use of an ACT, the Council should consider whether action is required to prevent catches exceeding the ACL or if the tool is intended to be more of a guideline.

At its March 2010 meeting, the Council adopted draft Groundfish Fishery Management Plan (GFMP) amendatory language which included the ACT concept. A report on the performance of the current management system was prepared in March 2010 (Agenda Item E.4.a Attachment 4) and should assist the Council in determining whether ACTs or other management measures should be used to ensure catches stay within the ACLs and the Amendment 21 sector allocations. The GMT may also provide the Council with additional advice on the use of ACTs in the 2011-2012 management cycle.

With regard to uncertainty in quantifying the true catch amounts, the GMT is aware of the estimation error inherent in the modeling platforms and estimation process and has begun some initial scoping to address estimation error within the model platforms. However, given workload and the complexities in resolving this issue it is unlikely that uncertainty will be fully evaluated in this cycle. Rather, it is a consideration that should be continually evaluated and improved upon during every biennial cycle.

2.2.5.1 Yield Set Asides for Overfished Species

Set asides are used to account for groundfish mortality in tribal fisheries, incidental open access fisheries, research and exempted fishing permits (EFPs). Set aside amounts are an important consideration for the Council to use as an accountability measure to prevent fisheries from exceeding the ACLs. The Council does not have direct management control over treaty tribal fisheries, incidental open access fisheries, or scientific research activities, nevertheless, the catch must be considered in the accounting of total mortality. Further, if EFPs are to be accommodated there has to be enough set aside available to answer the question at hand.

Under status quo trip limit management of the trawl fishery, the set aside amounts can be adjusted prior to the start of the year with the most recent information on the previous year's impacts. However, under a rationalized fishery structure static set asides for calculating trawl allocation under Amendment 21 is required. The rationale for an unchanging trawl allocation is to have a "one time" quota pound calculation that remains for 2011-2012, which would provide some certainty to quota holders. The static trawl allocation makes the set aside consideration for fully prescribed species, like the overfished species, challenging. If the set aside is higher than necessary, the remaining poundage can be assigned to non-trawl fisheries fairly easily, but cannot be reassigned to the trawl fishery without recalculating quota pounds for the year. Assuming the Council wants to minimize the disruption caused by recalculating QP inseason, and the set aside is too low, the burden of such restrictions would fall on the non-trawl fisheries.

The Amendment 21 framework specifies that the tribal, research, and incidental open access fishery mortality be taken "off the top" prior to the sector allocations. For EFPs, the Council has the option of accommodating mortality either "off the top" or within the sector allocation (i.e., trawl or non-trawl allocation). Under a rationalized trawl fishery, EFPs may still be needed to allow for innovative gear use, for example, but those could be prosecuted with an individual's existing quota pounds. However, it is also possible that a trawl EFP could be designed and the Council may wish to provide access to greater amounts than the applicant's current quota pounds holdings. As such the Council may want to consider establishing EFP set asides for the trawl or non-trawl sectors based on the expected benefit of the EFP research. For example, if the EFP project ultimately benefits the trawl sector, the set aside could come out of the trawl allocation. Alternatively, the amount could be taken "off the top" of the ACL.

At its April 2010 meeting, the Council adopted preliminarily preferred set asides for seven overfished rockfish species and petrale sole (Table 2-30). For the purposes of the analysis, the set asides were taken "off the top". Details behind the projected impacts are described in the following sections.

Table 2-30. The Council's preliminary preferred set asides for overfished species.

Category	Bocaccio South 40°10	Canary	Cowcod South 40°10	DRK	POP	Widow	YE	Petrale
Tribal Whiting Trawl		4.3		0.1	7.2	5	0	
Tribal Mid-water Trawl		3.6			0	40	0	
Tribal Bottom Trawl		0.8			3.7	0	0	45.4
Tribal Troll		0.5			0		0	
Tribal Fixed Gear		0.3			0	0	2.3	
Open Access Incidental	0.8	1.7	0	15	0	3.3	0.3	43.2
Research	1.7	4.5	0.1	2.1	1.8	1.6	3.3	10
EFP	11	1.3	0.2	1.5	0.1	11	0.4	6
Total	**13.5**	**17**	**0.3**	**18.7**	**12.8**	**60.9**	**6.3**	**104.6**

Tribal

The following description of set asides for the tribal fisheries gives some of the rationale behind the numbers found in the GMT scorecard to estimate bycatch by fishery and sector. The methods used to estimate these impacts represent the best judgment of tribal fishery managers based on both past performance and anticipated potential impacts in the coming season(s). Though the impact estimates are divided by fishery for the sake of precision in estimating overfished species impacts, tribal managers typically manage to stay within overall projected impacts (i.e., across fisheries).

Whiting Fishery

The GMT updated the 2010 set asides for the tribal whiting fishery at the March 2010 Council meeting. This was based on the whiting set aside amounts described in the proposed rule for 2010 Tribal Fishery for Pacific Whiting (75 FR 11829, March 12, 2010). Using the methodology described in the 2009-2010 harvest specifications and management measures EIS, the GMT calculated 4.3 mt for canary, 0 mt for darkblotched, 7.2 mt for POP, 5 mt for widow, and 0 mt for yelloweye rockfish (Table 2-31). This methodology used a weighted average approach for calculating Makah's bycatch rate assuming recent years are more representative of bycatch. Those rates are tripled to provide a conservative estimate of potential bycatch for the Quileute Tribe's developing fishery.

Table 2-31. Estimated bycatch (mt) in the tribal whiting fisheries for 2010.

Sector	Canary	Darkblotched	POP	Widow	Yelloweye
Makah	1.78	0.02	2.99	2.06	0.00
Quileute	2.52	0.03	4.22	2.92	0.00
Total Tribal	**4.30**	**0.05**	**7.21**	**4.99**	**0.00**

Non-Whiting Midwater Trawl Fishery

The Makah Tribe is the only tribe that conducts a midwater trawl fishery. The fishery targets yellowtail rockfish and the combined fleet is subject to a limit of 180,000 lbs/2 months. Overfished species bycatch in this fishery consists of widow and canary rockfish. Widow rockfish are subject to an annual limit of 10 percent of the weight of yellowtail landed and may be changed inseason to stay within projected impacts. This was changed from a per-landing limit in 2010 in response to increasing encounters of widow rockfish on some trips. The widow rockfish set aside of 40 mt is based on the maximum expected catch of yellowtail (490 mt) as well as recent bycatch in the fishery (Table 2-32). Canary rockfish is subject to a limit of 300 lbs/trip. As reflected in Agenda Item F.9.c, Supplemental GMT Report, June 2008 the canary set aside was changed beginning in 2009:

> The GMT notes that one change in the set asides for overfished species from these fisheries compared to status quo is the increased estimate of canary rockfish in the Makah midwater trawl fishery targeting yellowtail rockfish. Due to higher encounters of canary bycatch in recent years, particularly 2007 and 2008, the Tribe has been unable to successfully prosecute the fishery while remaining within the canary estimate provided in the scorecard. The Makah Tribe is proposing a doubling of those estimated impacts (from 1.8 mt to 3.6 mt) to allow for resumption of the fishery given increased availability of canary rockfish yield in 2009-2010.

Table 2-32. Catch in metric tons of canary, widow, and yellowtail rockfish in the Makah midwater trawl fishery for 2005-2009.

Species	2005	2006	2007	2008	2009
Canary	1.9	0.9	0.0	0.6	1.3
Widow	25.6	9.2	0.5	13.0	35.1
Yellowtail	480.0	111.2	7.3	155.5	429.1

Bottom Trawl Fishery

The Makah Tribe is also the only tribe conducting a bottom trawl fishery. Overfished species bycatch is primarily canary rockfish and POP. The Makah Tribe also targets petrale sole, which has been declared as overfished. The Makah indicated that their expected catch of petrale in 2011-2012 is 45.4 mt based on effort projections and recent catch (Table 2-33). The canary set aside of 0.8 mt is based on recent average catch which has remained fairly consistent (Table 2-33). The high catch in 2009 was the result of increased encounters associated with Pacific cod availability (as well as commensurate lower impacts from other Makah fisheries). POP bycatch is more variable in recent years. The set aside for POP is 3.7 mt based on the highest year of landings (2006).

Table 2-33. Catch in metric tons of canary rockfish, Pacific ocean perch, and petrale in the Makah bottom trawl fishery for 2005-2009.

Species	2005	2006	2007	2008	2009
Canary	0.8	0.5	0.8	0.6	1.5
POP	3.2	3.7	1.8	0.6	0.2
Petrale	30	26	45	44	69

Salmon Troll Fishery

These estimates include catch from all tribes participating in the treaty troll fishery. The canary set aside of 0.5 mt is based on the highest recent landings from 2004-2005 (Table 2-34). Using a similar approach for yelloweye would lead to a set aside of 0.2 mt while using the average of recent years would result in 0.1 mt. The tribes are not recommending a set aside specific to the treaty troll fishery as the scorecard currently contains a conservative estimate of yelloweye impacts (see below) for the long line fisheries for Pacific halibut and sablefish and tribes will manage all fisheries to stay within that estimate.

Table 2-34. Catch in metric tons of canary and yelloweye rockfish in the treaty troll fishery for 2005-2009.

Species	2005	2006	2007	2008	2009
Canary	0.5	0.2	0.1	0.1	0.0
Yelloweye	0.2	0.1	0.1	0.1	0.0

Fixed Gear Fishery

The coastal tribes participate in longline fisheries for Pacific halibut and sablefish. Set asides for these fisheries are based on combined past performance of these closely related fisheries (Table 2-35). The set aside for canary is 0.3 mt and is based on average historical catch from 2001-2009. An average is used for canary given they are not predictably associated with target species and the trend across this time

period is generally decreasing. For yelloweye, bycatch is more strongly associated with target species, especially when they are located on the shelf. Another factor in estimating bycatch is the lack of a trip limit during open competition halibut fisheries. The set aside for yelloweye is 2.3 mt, representing the highest amount of bycatch from a year when yelloweye were classified as overfished and when the status quo halibut plan under a recent court ruling in *U.S. v Washington* was in place (i.e., 2002). The status quo halibut plan that was in place for 2001-2003, and includes an open competition fishery, is the same plan that is in effect for the 2010 fishery and likely to be in place for 2011-2012.

Table 2-35. Catch in metric tons of canary and yelloweye rockfish in treaty longline fisheries for 2001-2009.

Species	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Canary	1.1	0.3	0.5	0.5	0.2	0.2	0.0	0.1	0.1
Yelloweye	2.9	2.3	0.2	0.7	0.6	0.4	0.3	0.1	0.1

Incidental Open Access

California Halibut trawl fishery

The California halibut trawl fishery is a state permitted fishery that operates in southern California. Commercial trawling is prohibited in all state waters except for the California halibut trawl grounds located south of Point Conception. Conservation measures such as minimum mesh sizes, minimum poundage limits, closed seasons, and Federal observer coverage have been implemented to reduce bycatch of species other than California halibut.

The GMT reviewed the Estimated Discard and Total Catch of Selected Groundfish Species in the 2008 U.S. West Coast Fisheries (hereinafter 2008 Total Mortality report) and examined state landing receipts to determine the best estimate of overfished rockfish species impacts from this fishery. Observer data from the limited entry and open access fisheries indicate no discards of any overfished species in this fishery except canary rockfish, which was miniscule. State landing receipts from 2004 -2008 indicate trace landings of bocaccio rockfish. Impacts to overfished species are not expected in this fishery because it occurs in an area with low overfished species encounters because it takes place and over sandy bottom habitat. The best estimates of impacts to this fishery have been updated in Table 2-36.

Estimates of petrale sole catch in the California halibut trawl fishery are 43 mt from 2004-2006 (Table 2-37).

California Gillnet Fishery

The California gillnet fishery is a state permitted fishery that occurs in California. This fishery is not observed under the Federal groundfish observer program. State landing receipts from 2004-2008 indicate small landings of bocaccio (0.3 mt) and widow rockfish (2.9 mt) in this fishery. Minimal impacts to overfished species are expected in this fishery because this gear is not allowed inside the Rockfish Conservation Areas (RCAs) and is subject to depth restrictions which preclude them from fishing in nearshore waters. The best estimates of impacts to this fishery based on state landing receipts have been updated in Table 2-36.

Estimates of petrale sole impacts in the California gillnet fishery are 0.1 mt (Table 2-37).

California Sheephead Fishery

The California sheephead fishery is a state permitted fishery that is primarily taken by trap gear in southern California. This fishery is not observed under the Federal groundfish observer program. State landing receipts from 2004-2008 indicate trace amounts of bocaccio rockfish in this fishery. Impacts to overfished species are not expected in this fishery because it occurs in an area of low overall bycatch of overfished species.

Coastal Pelagic Species (CPS) – Wetfish Fishery

The CPS fishery for wetfish is a limited entry fishery that occurs coastwide. In California, this fishery primarily occurs in Monterey and southern California. CPS (sardine, anchovy, jack mackerel, Pacific mackerel) are targeted with "round-haul" gear including purse and drum seines.

In the sardine fishery, 2009 landings data indicate no catch of overfished species (however groundfish species are not required to be landed). In California, state landing receipts from 2004 -2008 indicate trace landings of bocaccio rockfish in this fishery. In Oregon reported logbook and observed catches of non-target species caught in the Oregon sardine fishery showed no catch of rockfish (Table 13 of the 2008 SAFE document). Washington at-sea observer data also indicates miniscule amounts of bycatch. Impacts to overfished species are not expected in this fishery because it occurs in an area of low overall bycatch of overfished species.

Coastal Pelagic Species – Squid Fishery

The CPS fishery for squid is a limited entry fishery that is focused around two major fishery areas in California: northern California (Monterey Bay) and southern California (ports of Ventura, Port Hueneme, San Pedro, and Terminal Island). Targeting occurs on shallow-water spawning aggregations with "round-haul" gear similar to the CPS wetfish fishery. This fishery is not observed under the Federal groundfish observer program. State landing receipts from 2004-2008 indicate trace amounts of bocaccio rockfish in this fishery. Impacts to overfished species are not expected in this fishery, because targeting occurs over sandy bottom habitat. Rocky reef areas (where many overfished groundfish species occur) are avoided due to gear conflicts. The Council's SAFE reports also have bycatch information for some of the other CPS fisheries (based on Observer or logbook information). For example, the report showed that the frequency of bycatch in observed loads of California market squid (2003-2007) was less than 1% for bocaccio rockfish (the highest annual incidence rate was 0.8%).

Dungeness Crab Fishery

The Dungeness crab fishery is a restricted access fishery that occurs on the west coast. This fishery targets Dungeness crab using trap gear in shallow waters. Conservation measures such as gear modifications have been implemented to reduce bycatch, specifically crab pots are constructed with escape rings designed to let small fish and small crab escape and pots are made with a release mechanism to allow escapement of all animals that are caught by lost pots. These measures have been implemented to reduce bycatch of species other than crab. Fishermen in this fishery are not permitted to land incidental species except for octopus, so information on groundfish species is limited.

This fishery is not observed under the Federal groundfish observer program. California state landing receipts from 2004-2008 indicate trace landings of bocaccio and darkblotched rockfish in this fishery. Impacts to overfished species are not expected in this fishery due to the selectivity of the gear.

Highly Migratory Species (HMS) Fishery

The fishery for HMS is an open access fishery on the West Coast, with the exception of the swordfish drift gillnet fishery off California. Targeting of tunas, sharks, billfish/swordfish, and other pelagic species occurs with a variety of gears (troll gear, drift gillnets, pelagic longline, purse seines) and in waters ranging from the nearshore to outside the 200-mile zone. This fishery is not observed under the Federal groundfish observer program. State landing receipts from 2004 -2008 indicate small landings of bocaccio rockfish and trace landings of darkblotched rockfish in this fishery. Impacts to overfished species are not expected in this fishery, because most of the targeting occurs in the offshore, in the open ocean where few overfished rockfish species are expected to occur.

Ridgeback prawn Fishery

The ridgeback prawn trawl fishery is a state permitted fishery that primarily occurs in southern California within the California halibut trawl grounds. This fishery is not observed under the Federal groundfish observer program. State landing receipts from 2004-2008 indicate no landings of overfished species in this fishery. Impacts to overfished species are not expected in this fishery because it occurs in an area of low overall bycatch of overfished species and over sandy bottom habitat. The best estimates of impacts to this fishery have been updated in Table 2-36.

Sea Cucumber Trawl Fishery

The Sea Cucumber trawl fishery is a state permitted fishery that primarily occurs in southern California within the California halibut trawl grounds. This fishery is not observed under the Federal groundfish observer program. State landing receipts from 2004-2008 indicate trace landings of bocaccio rockfish in this fishery. Impacts to overfished species are not expected in this fishery because it occurs in an area of low overall bycatch of overfished species and over sandy bottom habitat.

Estimates of petrale sole impacts in the sea cucumber trawl fishery are 0.1 mt.

Spot Prawn Fishery

The spot prawn fishery is a state permitted fishery that is taken by trap gear in California. The fishery occurs from just north of Monterey Bay to southern California. This fishery is not observed under the Federal groundfish observer program. State landing receipts from 2004-2008 indicate no landings of overfished species in this fishery. Impacts to overfished species are not expected in this fishery because it occurs in an area of low overall bycatch of overfished species.

Pink Shrimp trawl fishery

The pink shrimp trawl fishery is not restricted by an RCA, but approved bycatch reduction devices or fish excluders in shrimp trawls are mandated to minimize incidental groundfish bycatch. 2007 was the first year that observer discard ratios from the pink shrimp fishery were used to estimate fleet-wide amounts of groundfish discards. The Total Mortality reports for darkblotched rockfish at 18 mt (2007) and 11 mt (2008), therefore for 2011-2012 the GMT recommends using a yearly set aside amount of 15 mt for darkblotched rockfish which is the mean of the 2007 and 2008 observed catch rounded to the nearest whole metric ton. Given the results of the 2007 and 2008 Total Mortality reports, the GMT recommends yearly set asides for POP of 0.1 mt because this is the amount landed in both 2007 and 2008 and 0.4 for canary rockfish, there was 0.4 mt landed in 2007 and 0.3 mt in 2008, 0.4 is the average rounded up accordingly. The best estimates of impacts to this fishery have been updated in Table 2-36.

Salmon Troll Fishery

The salmon troll fishery operates all along the west coast, however in recent years the fishery has been severely restricted because of salmon abundance and the set asides recommended by the GMT have been reduced accordingly. Currently the salmon troll fishery is exempted from RCA restrictions and groundfish species, including lingcod, are allowed to be retained while fishing in the non-trawl RCA. Salmon trollers are required to have VMS on their vessels and there are two mandatory yelloweye rockfish conservation areas (YRCAs) and two voluntary YRCAs that apply to salmon trollers. Currently there are set aside amounts in the salmon troll fishery for canary, bocaccio, widow and yelloweye rockfish. The canary impacts that the GMT accounts for in the salmon troll fishery changed after 2005 because the salmon fishery was shifting from one with higher Chinook quotas to higher coho quotas, and canary bycatch in that fishery was most associated with Chinook targeting. The yield set asides were 1.6 mt (2005), 2 mt (2007/2008) and 0.8 mt (2009/2010). Because of the possible higher Chinook opportunities in the north for 2011-2012 the GMT recommends using 1.6 mt as the canary yield set aside in the salmon troll fishery. The other overfished species set aside amounts should remain the same as 2009/2010 because the GMT does not have any new information which would indicate a change in impacts. The best estimates of impacts to this fishery have been updated in Table 2-36.

Table 2-36. Projected incidental open access impacts for rockfish.

	Bocaccio b /	Canary	Cowcod	Dkbl	POP	Widow	Yelloweye
Open Access: Incidental Groundfish TOTAL	**0.8**	**1.7**	**0.0**	**15.0**	**0.0**	**3.3**	**0.3**
CA Halibut	0.0						
CA Gillnet c/	0.3					2.9	
CA Sheephead c/	0.0						
CPS- wetfish c/	0.1					0.0	
CPS- squid d/	0.0						
Dungeness crab c/	0.0			0.0			
HMS b/	0.1			0.0			
Pacific Halibut c/							
Pink shrimp	0.1	0.1	0.0	15.0	0.0	0.1	0.1
Ridgeback prawn							
Salmon troll	0.2	1.6				0.3	0.2
Sea Cucumber	0.0						
Spot Prawn (trap)							

Table 2-37. Projected incidental open access fishery impacts for petrale sole.

Fishery	**Impact (mt)**
California halibut trawl	43
California gillnet fishery	0.1
California sea cucumber trawl	0.1

Research

Overfished groundfish species are caught in scientific research projects off the west coast. Annually, in the Total Mortality reports, National Marine Fisheries Service (NMFS) Northwest Region (NWR) provides the NWFSC with the best available estimates of groundfish species mortality in scientific research. These best estimates of research are deducted "off the top" before any allocations are made to

groundfish fisheries. Table 2-38 summarizes overfished rockfish groundfish species mortality in scientific research from 2005-2008. Table 2-39 summarizes research catches of petrale sole.

Given the variation in the research catches the GMT recommends using the maximum amounts seen for each species from 2005-2008, except for yelloweye which is discussed below. For example, canary rockfish impacts are highly variable and the Council might want to be more precautionary in establishing the set aside given that "lightning strikes" have forced the Council to restrict other fisheries in the past and canary rockfish is a constraining species; however, the Council may also want to weigh the likelihood of similar high impact events in calculating the set aside (i.e., as in the 2010 scorecard). Additionally, darkblotched catches in research have been close to 1 mt from 2005-2008 (except for 2005), however the GMT currently has a remainder of 18.4 mt in the scorecard for darkblotched. If the Council chooses to leave some residual of darkblotched in the scorecard for 2011-2012, then keeping the research set aside at 1.0 will most likely accommodate fisheries; whereas if the research were to take twice that much and the rest of the darkblotched ACL were fully subscribed, then it might be best to establish the set aside as the maximum that is currently in the scorecard.

At the March 2010 meeting the Council chose to use 1.1 mt for yelloweye in the IPHC survey (see Agenda Item E.5.b, Supplemental GMT Report), which along with other yelloweye research catches results in a research set aside for yelloweye of 3.3 mt. Therefore the GMT recommends using a yelloweye set aside in research of 3.3 mt, rather than the highest amount from the 2005-2008 Total Mortality reports.

Table 2-38. Research catches of overfished rockfish species (mt) from 2005-2008 and the median, average, maximum and minimum by species.

Year	Bocaccio	Canary	Cowcod	Dkbl	POP	Widow	Yelloweye
2008	1.2	1.8	0	1	1	1	1
2007	1	3	0	1	1	0	2
2006	0.2	7.2	0	0.9	1.2	0.2	0.1
2005	1.7	2.3	0.1	2.1	1.8	1.6	0.6
Median	1.1	2.7	0.0	1.0	1.1	0.6	0.8
Average	1.0	3.6	0.0	1.3	1.3	0.7	0.9
Max	1.7	7.2	0.1	2.1	1.8	1.6	2.0
Min	0.2	1.8	0.0	0.9	1.0	0.0	0.1

The GMT also examined recent research catches of petrale sole (Table 2-39).

Table 2-39. Research catches (mt) for petrale sole from 2001-2009, including maximum, minimum, and average catch.

Year	MT
2005	1.73
2006	2.30
2007	17.00
2008	2.00
Min	**17.0**
Max	**1.73**
Avg.	**5.8**

Exempted Fishing Permits (EFPs)

In November 2009, the Council recommended catch limits for overfished rockfish species in five non-whiting EFPS that would operate in 2010 and, in some cases, continue for a 12-month period that may extend into 2011 (Table 2-40). The set asides for non-whiting EFPs may change for 2011-2012, depending on projected impacts to overfished species in non-EFP fisheries, the number and type of EFP projects that are recommended. For analytical purposes, we assume the same catch limits are adopted in 2011-2012 as were adopted for the 2010 EFPs (Table 2-40).

Table 2-40. Council approved EFPs and bycatch caps for 2010.

EFP	Bocaccio	Canary	Cowcod	Darkblotched	POP	Widow	Yelloweye
Trolled longline for chilipepper in CA	3.300	0.027	0.015	0.400	*	3.000	0.005
Morro Bay/Port San Luis regional fishing assoc.	5.000	0.023	0.200	1.000	0.136	2.000	0.068
OR recreational yellowtail	*	1.000	*	*	*	3.000	0.200
CA recreational chilipepper	2.700	0.200	0.023	0.100	*	3.000	0.023
ODFW yelloweye	*	*	*	*	*	*	0.060
Total all EFP's	**11.000**	**1.250**	**0.237**	**1.500**	**0.136**	**11.000**	**0.356**

Note: "*" = no proposed EFP cap.

In 2010, two EFPs were approved that had petrale sole impacts. The Morro Bay/Port San Luis Regional Fishing Association (TNC) EFP is expected to take 6 mt, unless a proportional reduction is applied, in which case the impacts would be 2 mt. The shoreside Pacific whiting EFPs were estimated to take trace amounts of petrale sole (0.02 mt).

Historically, EFPs have been issued for the shoreside whiting fishery and overfished species bycatch caps were taken "off the top" annually in March. However, under rationalized trawl fishery the traditional EFP for the shoreside whiting fishery would not be necessary. Further, Amendment 21, which is scheduled for implementation January 1, 2011, specifies allocations for all whiting sectors, including the shoreside

sector. As such, with Amendment 21 in place under both trawl management regimes (rationalized or trip limit management), there is no longer a need to specify overfished species allocations annually and thus no need to determine a set aside. There was no Amendment 21 allocation of petrale to the whiting sectors and to date the Council has not recommended any petrale allocation to the whiting sectors, given that it occurs in trace amounts. As such, it appears that it is unnecessary to calculate a petrale sole set aside for the whiting fishery.

2.2.5.2 Yield Set Asides for Non-Overfished Species

In preparation for the Council's final preferred groundfish harvest specifications and management measures for 2011-2012, the following set asides were calculated for non-overfished species based on the highest impacts seen in recent years (Table 2-41, Table 2-42, Table 2-43, and Table 2-44). Documentation for the projected impacts is further described below. These amounts were also used to determine the trawl and non-trawl allocations when analyzing integrated alternatives and management measures for 2011-2012 fisheries.

Table 2-41. Non-Overfished Species Set asides Assumed for Modeling 2011 Fisheries.

Species/Species Group/Area	2011 PPA ACL	Tribal	EFP	Research	Incidental OA	Fishery HG	Trawl A21%	Non-trawl A21%	Trawl A21 mt	Non-Whiting A21 %	Whiting A21 %	Non-Whiting A21 mt	Whiting A21 mt	Non-trawl A21 mt
Lingcod N. of 42º N. lat. (OR & WA)	2,330	250	0	5	16	2,059	45%	55%	927	99.7%	0.3%	924	3	1,132
Lingcod S. of 42º N. lat. (CA)	2,102	0	0	0	7	2,095	45%	55%	943	99.7%	0.3%	940	3	1,152
Pacific Cod	1,600	400	0	0	0	1,200	95%	5%	1,140	99.9%	0.1%	1,139	1	60
Sablefish S of 36º N. lat.	1,167	0	26	2	6	1,133	42%	58%	476	100.0%		476	0	657
Dover sole	17,560	1497	0	38	55	15,970	95%	5%	15,172	100.0%		15,172	0	799
English sole	19,761	91	0	5	4	19,661	95%	5%	18,678	99.9%	0.1%	18,659	19	983
PETRALE SOLE	976	45.4	6	10	43.2	871	95%	5%	828	100.0%		828	0	44
Arrowtooth flounder	15,174	2041	0	7	30	13,096	95%	5%	12,441	100.0%		12,441	0	655
Starry Flounder	1,352	2	0	0	5	1,345	50%	50%	673	100.0%		673	0	673
Other flatfish	4,884	60	0	13	125	4,686	90%	10%	4,217	99.9%	0.1%	4,213	4	469
PACIFIC OCEAN PERCH	180	10.9	0.10	2	0	167	95%	5%	159	The rest	17% or	129	30	8
WIDOW	600	45	11	2	3	539	91%	9%	491	The rest	52.0%	235	255	49
Chilipepper (coastwide)	2,130	1		9	5	2,115	75%	25%	1,586	100.0%		1,586	0	529
Splitnose S. of 40°10' N. lat.	1,461	0	0	7	0	1,454	95%	5%	1,381	100.0%		1,381	0	73
Yellowtail N. of 40°10' N. lat.	4,364	490	2	4	3	3,865	88%	12%	3,401	The rest	300	3,101	300	464
Shortspine thornyhead N. of 34° 27' N. lat.	1,573	38	0	5	2	1,528	95%	5%	1,452	99.9%	0.1%	1,450	1	76
Shortspine Thornyhead S. of 34 27' N. lat.	405	0	0	1	41	363	50 mt	The Rest	50	100.0%		50	0	313
Longspine thornyhead N. of 34°27' N. lat.	2,119	30	0	13	1	2,075	95%	5%	1,971	100.0%		1,971	0	104
DARKBLOTCHED	332	0.1	2	2	15	313	95%	5%	298	The rest	mt	271	27	16
Minor Slope Rockfish North 40°10' N. lat.	1,160	36	2	11	19	1,092	81%	19%	885	98.6%	1.4%	872	12	207
Minor Slope Rockfish South 40°10' N. lat.	626	0	2	8	17	599	63%	37%	377	100.0%		377	0	222

***Bold** indicates overfished species with A:21 allocations. These set-asides were adopted by the Council April 2010.

Table 2-42. Non-Overfished Species Set asides Assumed for Modeling 2012 Fisheries.

Species/Species Group/Area	2012 PPA ACL	Tribal	EFP	Research	Incidental OA	Fishery HG	Trawl A21%	Non-trawl A21%	Trawl A21 mt	Non-Whiting A21 %	Whiting A21 %	Non-Whiting A21 mt	Whiting A21 mt	Nontrawl A21 mt
Lingcod N. of 42º N. lat. (OR & WA)	2,151	250	0	5	16	1,880	45%	55%	846	99.7%	0.3%	843	3	1,034
Lingcod S. of 42º N. lat. (CA)	2,164	0	0	0	7	2,157	45%	55%	971	99.7%	0.3%	968	3	1,186
Pacific Cod	1,600	400	0	0	0	1,200	95%	5%	1,140	99.9%	0.1%	1,139	1	60
Sablefish S of 36º N. lat.	1,103	0	26	2	6	1,069	42%	58%	449	100.0%		449	0	620
Dover sole	17,560	1497	0	38	55	15,970	95%	5%	15,172	100.0%		15,172	0	799
English sole	10,150	91	0	5	4	10,050	95%	5%	9,548	99.9%	0.1%	9,538	10	503
PETRALE SOLE	1,160	45.4	6	10	43.2	1,055	95%	5%	1,003	100.0%		1,003	0	53
Arrowtooth flounder	12,049	2041	0	7	30	9,971	95%	5%	9,472	100.0%		9,472	0	499
Starry Flounder	1,360	2	0	0	5	1,353	50%	50%	677	100.0%		677	0	677
Other flatfish	4,884	60	0	13	125	4,686	90%	10%	4,217	99.9%	0.1%	4,213	4	469
PACIFIC OCEAN PERCH	183	10.9	0.10	2	0	170	95%	5%	162	The rest	17% or 30 mt	132	30	9
WIDOW	600	45	11	2	3	539	91%	9%	491	The rest	52.0%	235	255	49
Chilipepper (coastwide)	1,924	1		9	5	1,909	75%	25%	1,432	100.0%		1,432	0	477
Splitnose S. of 40°10' N. lat.	1,538		0	7	0	1,531	95%	5%	1,454	100.0%		1,454	0	77
Yellowtail N. of 40°10' N. lat.	4,371	490	2	4	3	3,872	88%	12%	3,407	The rest	300	3,107	300	465
Shortspine thornyhead N. of 34° 27' N. lat.	1,556	38	0	5	2	1,511	95%	5%	1,435	99.9%	0.1%	1,434	1	76
Shortspine Thornyhead S. of 34 27' N. lat.	401		0	1	41	359	50 mt	The Rest	50	100.0%		50	0	309
Longspine thornyhead N. of 34°27' N. lat.	2,064	30	0	13	1	2,020	95%	5%	1,919	100.0%		1,919	0	101
DARKBLOTCHED	329	0.1	2	2	15	310	95%	5%	295	The rest	9% or 25 mt	268	27	16
Minor Slope Rockfish North 40°10' N. lat.	1,160	36	2	11	19	1,092	81%	19%	885	98.6%	1.4%	872	12	207
Minor Slope Rockfish South 40°10' N. lat.	626	0	2	8	17	599	63%	37%	377	100.0%		377	0	222

***Bold** indicates overfished species with A:21 allocations. These set-asides were adopted by the Council April 2010.

Table 2-43. Sablefish north of 36° N. latitude allocations, given the Council's preliminary preferred ACL decision.

Year	Sablefish OY N of 36° N lat	Tribal Share*	Research, Rec., EFP, and Inc. OA Set-Aside	Non-Tribal Comm. Share	LE Share	LE Trawl Share	LE FG			OA Share
							LE FG Share	LE FG Primary	LE FG DTL	
2009	7,052	705	200	6,147	5,569	3,230	2,339	1,988	351	578
2010	6,471	647	200	5,624	5,095	2,955	2,140	1,819	321	529
2011	4,961	496	39.3	4,426	4,010	2,326	1,684	1,431	253	416
2012	4,689	469	39.3	4,181	3,788	2,197	1,591	1,352	239	393

*This is the total tribal share, which is reduced by 1.6% to account for discard mortality. See 2010 regs. footnote g. for Table 2a.

Table 2-44. Non-overfished species allocations determined through the biennial harvest specifications and management measures, based on the Council's preliminary preferred decisions.

Species/Species Group/Area	2011/2012 PPA ACL	Tribal	EFP	Research	Incidental OA	Fishery HG	Trawl SPEX %	Non-trawl SPEX %	Trawl SPEX mt	Within Trawl (%)		Within Trawl (MT)		Nontrawl SPEX mt
										Whiting	Non-whiting	Whiting	Non-whiting	
Longnose Skate	1,349	56	0	8	65	1,220	95%	5%	1,159	5%	95%	58	1101	61
Minor Shelf N. of 40 10' N. lat.	968	9	4	4	26	925	60.2%	39.8%	557	17.4%	82.6%	97	460	368
Minor Shelf S. of 40 10' N. lat.	714	0	2	2	9	701	12.2%	87.8%	86	N/A	N/A	N/A	N/A	615

Non-overfished species set asides are most important for species where the non-overfished species ACL is nearly fully prescribed. Table 2-45 outlines species where greater than 80 percent of the ACL was harvested from 2005-2008, which the Council may wish to consider as fully prescribed. For comparison, the 2011-2012 PPA ACL is included. For some stocks (e.g., Dover sole and black rockfish) the 2011-2012 ACL is significantly higher and due to overfished species constraints or other limiting factors it is not anticipated that it would be fully prescribed in 2011-2012. It appears that cabezon in California, nearshore rockfish north and south of 40°10 N. latitude, sablefish, and shortspine thornyhead north of 34°27 have the potential to be fully prescribed in 2011-2012. As such, the Council should pay particular attention to calculating these set asides to prevent an ACL overage.

Table 2-45. Species from 2005-2008 where the OY was attained by 80 percent or greater, compared to the 2011-2012 PPA ACL.

Species	**Year**	**Catch/OY**	**11-12 PPA ACL**
Black rockfish s. 46°16	2007	577/722	1,000
Black rockfish s. 46°16	2008	593/722	
Cabezon CA	2005	80/69	179 - 168
Cabezon CA	2006	106/69	
Dover Sole	2005	7,507/7,476	17,560
Dover sole	2006	7,730/7,564	
Nearshore rockfish coastwide	2005	590/737	805*
Nearshore rockfish N 40°10	2007	133/142	155
Nearshore rockfish S 40°10	2006	711/615	650
Nearshore rockfish S 40°10	2007	466/564	650
Sablefish	2005	6,543/7,761	5,858 - 5792*
Sablefish	2006	6,470/,7634	
Sablefish	2007	5,545/5,934	
Sablefish	2008	6,078/5,934	
Shortspine thornyhead (coastwide)	2005	796/999	1,978-1,957 *
Shortspine thornyhead (coastwide)	2006	853/1018	1,978-1,957 *
Shortspine thornyhead n. 34°27	2008	1,313/1,634	1,573 - 1,556

*The Council's preliminary preferred decision for nearshore rockfish, sablefish, and shortspine thornyhead does not contain the specification of a coastwide ACL. For the purposes of this comparison the ACLs north and south were summed to represent a coastwide ACL.

2.2.5.3 Tribal

Set asides for treaty tribal fisheries were estimated based on catches of all non-overfished species and complexes in recent years (i.e., since 2004). This represents a period of time with effort levels that are expected to be similar to the next two years (i.e. 2011-2012). Recommended set asides are based on the maximum catch for this time period for all stocks except for those with specific allocations, harvest guidelines, or existing set asides and the following species (Table 2-46).

For Dover sole, arrowtooth flounder, and longspine thornyhead the Makah Tribe has managed their fisheries with annual fleet limits for the past several years (i.e. bimonthly limits are multiplied by the

number of vessels in the fleet and summed across periods to create an annual harvest target). Using cumulative limits similar to those in place in 2010 and an estimated 5 non-whiting trawl vessels, the set asides for Dover sole and arrowtooth flounder are 1,497 mt and 2,041 mt respectively. For longspine thornyhead the cumulative fleet limit would represent a significant departure from anything seen in recent years or anticipated in the next biennium. As such the fleet limit that would result from status quo bimonthly limits is reduced to 30 mt (~ 10 % of the fleet limit). The yellowtail estimate is also based on the sum of total fleet limits for the Makah midwater fishery as reflected in Agenda Item I.4.b, Supplemental Tribal Report, April 2010.

Table 2-46. Tribal set asides for 2011-2012 Fisheries.

Species	Amount (mt)
Dover sole	1,497
English sole	91
Arrowtooth flounder	2,041
Starry flounder	2
Other flatfish	60
Chilipepper	1
Shortspine Thornyhead N. 34°27' N.	38
Longspine Thornyhead N. 34°27' N.	30
Minor slope north 40°10 N. lat.	36
Minor shelf north 40°10 N. lat.	9
Longnose skate	56

2.2.5.4 Scientific Research

Generally, scientific research is not regulated at the Federal level under the Magnuson-Stevens Act. Therefore, higher than expected catches in scientific research activities may necessitate inseason restrictions to fisheries to keep total mortality within an ACL. Based on the relative inability to manage scientific research catch, as well as the potential for some unreported research mortality, the Council should use the maximum catch during scientific research activities, as estimated in 2005-2008, for set asides in 2011-2012.

The NMFS NWR compiled the best estimates of catch of groundfish in scientific research projects that were Federally permitted from 2005-2008. Unlike most other species, sablefish (north of 36°N. lat. and south of 36°N. lat.) and the minor rockfish complex (north of 40°10' N. lat. and south of 40°10' N. lat.) mortality estimates for scientific research are those reported in the WCGOP annual Total Mortality reports from 2005-2008. Further discussion on the research mortality estimates for sablefish and minor rockfish are provided below.

The best estimates do not include scientific research impacts to groundfish species that go unpermitted and unreported. It is most likely that these catches only occur in small amounts; however there is no way to quantify them.

Most 2009 research catches have been reported to NMFS, however the data have not yet been compiled and synthesized nor have they been quality assured. No 2009 catches reported so far have caused concern that using 2005-2008 would be unrepresentative.

Sablefish: The Total Mortality reports do not separate total mortality estimates for sablefish north and south of 36° N. lat. For use in calculating set asides for the sablefish ACLs, which are separated north

and south of 36° N. lat., NMFS provided the area-specific mortality estimates for sablefish taken in scientific research activities for 2005-2008.

Minor Rockfish: The scientific research catch estimates for the minor rockfish complex were accounted for differently between years in the Total Mortality reports. Therefore, to provide the Council with the best estimates to use for determining the appropriate set aside amounts for the 2011-2012 harvest specifications and management measures, the scientific research catch data were reviewed to ensure that research catches of species within the minor rockfish complex were not being double counted, or not counted at all at the complex and sub-complex levels.

In 2005 minor rockfish (shelf, slope and nearshore) research catch were all made on a coastwide basis. Due to difficulties in accurately apportioning this catch north and south, the few research estimates available for 2005 were not used. Therefore, for estimating appropriate scientific research set asides for the minor rockfish complexes, data from only 2006-2008 were used.

Review of 2006-2008 research catch data revealed some inconsistencies in the reporting on research catch for the complex and sub-complexes between the Total Mortality reports and the best estimates of research catch, as depicted in Table 2-47 .

Table 2-47. Considerations for the scientific research set asides for the minor rockfish complex. Bold numbers indicate the highest catch in the 2006-2008 period.

	2008		**2007**		**2006**	
	Total Mortality Report (mt)	Best Estimate for set aside (mt)	Total Mortality Report (mt)	Best Estimate for set aside (mt)	Total Mortality Report (mt)	Best Estimate for set aside (mt)
Minor rockfish North[29]	12.8	12.8	11.5	11.8	Not reported	7.5
Nearshore	0	**0**	0	0	0	0
Shelf	13.6	1.9	6.0	3.7	4.6	**3.8**
Slope	3.9	**10.9**	5.5	8.1	2.5	3.8
Minor rockfish South[1]	7.8	7.8	3.8	5.7	Not reported	6.0
Nearshore	0	0	0	0	0	0
Shelf	0	**2.0**	3.0	1.4	3.1	0.4
Slope	0	**5.9**	0.7	4.3	1.3	5.6

The discrepancies between the Total Mortality reports and NMFS's best estimates of research catch are mostly due to how catches were incorporated into the Total Mortality estimates in the reports. The NWR has thoroughly reviewed the scientific catch information for the minor rockfish complex from 2006-2008 and presents the values in Table 2-47 as the best estimates of documented catch. The maximum values recommended by the NWR for set asides for each sub-complex are bolded.

Note that a portion of the research catch was reported as "remaining rockfish" or "other rockfish" rather than the management units (i.e. sub-complex) that they belong to. For purposes of estimating set asides those were attributed to the minor shelf and minor slope subcomplexes pro-rata. Those conducting research in the future will be encouraged to report to these categories in the future.

[29] Rockfish reported as remaining or other rockfish were attributed to the sub-complexes on a pro-rata basis.

2.2.5.5 Incidental Open Access fisheries

Estimates of the amount of groundfish taken in the incidental open access fisheries for establishing set asides from 2011-2012 ACLs were taken from the highest amounts published in the 2007-2008 Total Mortality reports (sum of CA halibut, Pink shrimp, remaining incidental fishery landings). Mortality estimates from incidental open access fisheries were not broken out by sector in Total Mortality reports prior to 2007.

The "remaining incidental fishery landings" in the Total Mortality Report also include landings that occur under the non-whiting EFPs. Since the Council considers EFPs separately and on an annual basis, the EFP catches (e.g., for sablefish, chilipepper, etc.) were subtracted from the incidental open access estimates expressed in the Total Mortality reports and are presented separately (see EFP section).

2.2.5.6 Exempted Fishing Permits

For 2011-2012 it will also be necessary to estimate EFP set asides as part of the harvest specifications process. Given the need to allocate a set amount for the trawl fishery for rationalization, the Council should consider potential needs of EFP applicants as well as effects on existing fisheries in establishing these set asides. As described in section 2.2.5.2, the Council has the option of taking the EFP set asides "off the top" or off of the trawl allocation. Table 2-48 contains the EFP removals from the 2008 non-whiting EFP permits, from NMFS NWR. The 2009 data has not yet been processed. Of interest is the 26 mt of sablefish from the Morro Bay/Port San Luis Regional Fishing Association (TNC) EFP. It is unclear at this point whether this EFP, should it be continued in the future would require a set aside of sablefish or whether such impacts would be accommodated within the permit holder's existing quota pounds.

Table 2-48. EFP catches of non-overfished species for 2008, provided by NMFS NWR.

Species/Species Group/Area	EFP
Sablefish S of 36° N. lat.	26
Chilipepper (coastwide)	0.1
Minor Slope Rockfish North 40°10' N lat.	2

2.2.6 Two Year Allocations for Overfished Species

Under Amendment 21, formal allocations of the trawl-dominant non-overfished species and overfished species (darkblotched rockfish, Pacific ocean perch, and widow rockfish) were decided for the non-treaty trawl (hereinafter trawl sector) and non-treaty non-trawl sectors (hereinafter non-trawl sector), as well as for each non-treaty trawl sector (i.e., shoreside non-whiting, shoreside whiting, catcher-processor, and mothership). Since Amendment 21 is scheduled to be implemented January 1, 2011, these allocations were used in the analysis of the alternatives (Table 2-41 and Table 2-42).

The Council must decide two-year allocations for the non-Amendment 21 overfished species (yelloweye, canary, cowcod, and bocaccio) during the harvest specifications and management measures process. Historically, these allocations were flexible such that the Council had the ability to move fish between sectors through inseason action as needed. For example, the sector projections of estimated bycatch are frequently updated with new WCGOP data, which often changes the sector allocations relative to the decision made under the harvest specifications and management measures process. In these situations, the

Council had the option of constraining the sector to within the initial allocation, implementing inseason action if there was concern for exceeding the OY, or accommodating the increased overfished species interactions by moving fish between sectors within the balance of the OY.

The consideration of a rationalized trawl fishery for 2011-2012 reduces the inseason flexibility to move fish between the trawl and non-trawl sectors since the trawl allocation will be converted into quota pounds and co-op allocations. It would be very difficult, if not impossible, to reduce the trawl allocation mid-year if need arises or an overage occurs in the non-trawl sector. As such, it is anticipated that the two-year allocation between the trawl and non-trawl sectors for yelloweye, canary, cowcod, and bocaccio will be a very difficult and complex decision. Within the non-trawl sector, it is still anticipated that the Council will have inseason flexibility to move fish between sectors through routine inseason actions (e.g., recreational and fixed gear commercial) as need arises.

The Council must strike a delicate balance when considering the trawl allocation in a rationalized fishery. First, the trawl sector has not yet operated under a rationalized system and it is difficult to precisely estimate the predicted overfished species impacts. While one objective of the rationalized fishery is to promote practices that reduce bycatch and discard mortality, it is expected that there will be a learning curve as the fleet adjusts to this new management regime. Further, while rationalized fisheries have a worldwide history of success, the west coast groundfish trawl fishery has the unique challenge of interacting with eight overfished stocks. The quota pounds and co-op allocations for the overfished species are expected to be scarce, especially for yelloweye and canary rockfish. The Council may consider that the two-year trawl allocation is somewhat of a performance standard and thus the fleet should be given an allocation to reasonably accommodate fishing operations.

The overfished species allocations to the trawl sector cannot flow into the non-trawl sector if need arises or if excess should become available (e.g., the at-sea whiting sector harvests all of their whiting allocation and has remaining overfished species quota). If unused, the allocation will remain stranded in the trawl sector. As such, the Council should ensure that the non-trawl sector also has sufficient allocation to reasonably accommodate fishing operations.

At its November 2009 and April 2010 meeting, the Council considered a wide range of two year allocations for bocaccio, cowcod, canary rockfish and yelloweye rockfish. In April, the Council narrowed that range for further analysis. Results of the Council's preliminary preferred allocation scheme is found in **Table 2-49**.

Table 2-49. The Council's Preliminary Preferred Two Year Allocations of Overfished Rockfish Species.

Bocaccio Preliminary Preferred Allocations: 2009-2010 SPEX

Alternative	***No Action***	**Alt. 1**		**Alt. 2**		**Alt. 3**	
	Apr-10	2011	2012	2011	2012	2011	2012
Sector	*288 mt*	263 mt	274 mt	109 mt	115 mt	53 mt	56 mt
LE Trawl- Non-Whiting	*16.1*	29.6	30.9	11.3	12	4.7	5
LE Trawl- Whiting	*0*	0	0	0	0	0	0
OA: Directed	*5.3*	26	27.1	9.9	10.6	4.1	4.4
LE Fixed Gear	*0*	32.2	33.6	12.3	13.1	5.1	5.5
Rec: WA	*0*	0	0	0	0	0	0
Rec: OR	*0*	0	0	0	0	0	0
Rec: CA	*67.3*	161.8	168.9	61.9	65.8	25.6	27.6

Canary Preliminary Preferred Allocations: April 2010 Scorecard

Alternative	***No Action***	**Alt. 1**		**Alt. 2**		**Alt. 3**	
	Apr-10	2011	2012	2011	2012	2011	2012
Sector	*105 mt*	102 mt	107 mt	94 mt	99 mt	49 mt	51 mt
LE Trawl- Non-Whiting	*21.3*	21.3	22.5	19.3	20.5	8	8.5
LE Trawl- Whiting	*14*	14	14.8	12.7	13.5	5.3	5.6
Nearshore Fixed Gear	*3.6*	3.6	3.8	3.3	3.5	1.4	1.4
Non-nearshore Fixed Gear	*2.5*	2.5	2.6	2.3	2.4	0.9	1
Rec: WA	*4.9*	4.9	5.2	4.4	4.7	1.8	2
Rec: OR	*16*	16	16.9	14.5	15.4	6	6.4
Rec: CA	*22.9*	22.9	24.2	20.7	22	8.6	9.1

Cowcod Preliminary Preferred Allocations: 2009-2010 SPEX

Alternative	***No Action***	**Alt. 1**		**Alt. 2**		**Alt. 3**	
	Apr-10	2011	2012	2011	2012	2011	2012
Sector	*4 mt*	4 mt	4 mt	3 mt	3 mt	2 mt	2 mt
LE Trawl- Non-Whiting	*1.5*	3.4	3.4	2.5	2.5	1.6	1.6
LE Trawl- Whiting	*0*	0	0	0	0	0	0
OA: Directed	*0*	0	0	0	0	0	0
LE Fixed Gear	*0*	0	0	0	0	0	0
Rec: WA	*0*	0	0	0	0	0	0
Rec: OR	*0*	0	0	0	0	0	0
Rec: CA	*0.3*	0.3	0.3	0.2	0.2	0.1	0.1

Cowcod Alternative Allocations: 2008 Total Mortality Report

Alternative	***No Action***	**Alt. 1**		**Alt. 2**		**Alt. 3**	
	Apr-10	2011	2012	2011	2012	2011	2012
Sector	*4 mt*	4 mt	4 mt	3 mt	3 mt	2 mt	2 mt
LE Trawl- Non-Whiting	*1.5*	1.9	1.9	1.4	1.4	0.9	0.9
LE Trawl- Whiting	*0*	0	0	0	0	0	0
OA: Directed	*0*	0	0	0	0	0	0
LE Fixed Gear	*0*	0	0	0	0	0	0
Rec: WA	*0*	0	0	0	0	0	0
Rec: OR	*0*	0	0	0	0	0	0
Rec: CA	*0.3*	1.9	1.9	1.4	1.4	0.9	0.9

Yelloweye Preliminary Preferred Allocation: 2009-2010 SPEX EIS

Alternative	***No Action***	**Alt. 1**		**Alt. 2**		**Alt. 3**	
Sector	*Apr-10*	2011	2012	2011	2012	2011	2012
	17 mt	20 mt	20 mt	17 mt	17 mt	13 mt	13 mt
LE Trawl- Non-Whiting	*0.6*	0.7	0.7	0.6	0.6	0.4	0.4
LE Trawl- Whiting	*0*	0	0	0	0	0	0
OA: Directed	*1.3*	1.3	1.3	1	1	0.6	0.6
LE Fixed Gear	*0.9*	1.7	1.7	1.3	1.3	0.8	0.8
Rec: WA	*2.7*	3.3	3.3	2.6	2.6	1.6	1.6
Rec: OR	*2.4*	3	3	2.4	2.4	1.5	1.5
Rec: CA	*2.8*	3.4	3.4	2.6	2.6	1.6	1.6

2.2.7 Two Year Allocations of Non-Overfished Species

2.2.7.1 Black Rockfish in Oregon and California

[Decision to be made at the June 2010 Council meeting]

2.2.7.2 Minor Shelf Rockfish North and South of 40°10 N. Latitude

The GMT analyzed Amendment 21 and the Total Mortality report data in order to inform two-year allocations of the minor shelf rockfish complex north and south of 40°10 N. latitude. At its April 2010 meeting, the Council chose preliminary preferred allocations for minor shelf rockfish which were used in the analysis of the integrated alternatives (Table 2-50). Documentation for the allocations is described below.

Table 2-50. The Council's preliminary preferred two year allocations for the trawl and non-trawl sectors. Additionally, a onetime allocation between whiting and non-whiting trawl is recommended for the initial allocation of trawl rationalization.

Complex	Trawl	Non-trawl
Minor shelf rockfish north 40°10 N. lat.	60.2% Whiting: 17.4% Non-Whiting: 82.6%	39.8%
Minor shelf rockfish north 40°10 N. lat.	12.2%	87.8%

Background

In its final alternative under Amendment 21, the Council chose long term allocations for trawl dominant species based on the years 2003-2005. The GMT used this as a starting place relative to informing a decision on two-year allocations for minor shelf rockfish north and south of 40°10' N lat. Table 2-51 shows a range of percentages the Council could consider.

Table 2-51. Summary of shelf rockfish catches in 2003-2007.

	2003	2004	2005	2006	2007	03-05 avg	05-07 avg
Shelf rockfish north of 40°10 N. lat.							
trawl	9.2%	27.7%	31.5%	66.1%	88.1%	22.8%	61.9%
non-trawl	90.8%	72.3%	68.5%	33.9%	11.9%	77.2%	68.5%
Shelf rockfish north of 40°10 N. lat.							
trawl	1.3%	4.1%	3.7%	0.0%	80.1%	3.0%	27.9%
non-trawl	98.7%	95.9%	96.3%	100.0%	19.9%	97.0%	72.1%

In addition, the Council will need to make a onetime allocation between the non-whiting and whiting trawl sectors for initial issuance of trawl individual quotas. Table 2-52 shows a short and longer term average of sector catch shares of shelf rockfish in the non-whiting and whiting sector.

Table 2-52. Percent of total shoreside trawl catches caught by the whiting and non-whiting sectors, 1995-2005 (Intersector Allocation EIS)

Stocks and Stock Complexes	Shoreside Trawl Sectors			
	1995-05 %		2003-05 %	
	Non-whiting	Whiting	Non-whiting	Whiting
Minor Shelf RF north of 40°10 N. lat.	96.5%	3.5%	81.7%	18.3%
Minor Shelf RF South 40°10 N. lat.	100.0%	0.0%	100.0%	0.0%

The GMT also examined total catch using the Total Mortality reports as another way to inform two year allocations for those species not formally allocated under Amendment-21. Table 2-53 shows these results as well as possible percentages to inform non-whiting and whiting trawl sectors allocations for initial issuance of IQ.

Table 2-53. Summary of total mortality of shelf rockfish based on Total Mortality reports.

	2005	2006	2007	2008	Average
Shelf rockfish north of 40°10 N. lat					
trawl	59.8%	66.1%	70.5%	44.4%	60.2%
non-whiting	74.0%	*96.8%*	*89.5%*	*70.0%*	*82.6%*
whiting	*26.0%*	*3.2%*	*10.5%*	*30.0%*	*17.4%*
non-trawl	40.2%	33.9%	29.5%	55.6%	39.8%
Shelf rockfish south of 40°10 N. lat					
trawl	20.6%	6.6%	9.9%	11.8%	12.2%
non-trawl	79.4%	93.4%	90.1%	88.2%	87.8%

2.2.7.3 Longnose Skate

Longnose skate has not been routinely sorted to species due to the lack of specified sorting requirement and many were landed as unspecified skate, making reconstructing historical landings more difficult. Longnose skate is caught primarily as bycatch in trawl fisheries, where most are discarded. In deciding two-year allocations for this species, the GMT scoped the availability of data to inform a decision but was unable to use the Total Mortality reports as a basis to inform a decision due to the lack of species specific sorting. For trawl dominant species under Amendment-21, trawl:non-trawl allocations were set at 95%:5%. The Council's preliminary preferred decision was to employ this ratio for longnose skate.

2.2.8 Unallocated Species

The following species do not yet have allocations specified. Several species (e.g., cabezon, California scorpionfish, and black rockfish) are nearshore species and subject to state management. As such, allocations may be done at the state level.

Table 2-54. Groundfish species without allocations.

Species	2011 PPA ACL (MT)	2012 PPA ACL (MT)
Cabezon Oregon	50	48
Cabezon S of 42º N. lat. (CA)	179	168
Shortbelly rockfish	6,950	6,950
Longspine Thornyhead S. of 34° 27 N. lat.	376	366
California Scorpionfish	135	126
Black Rockfish N .of 46°16 N. lat.	426	415

2.2.9 New Management Lines

The GMT reviewed selected RCA coordinates in order to propose changes that more closely approximate the RCA with depth contours, which should result in better estimates of overfished species bycatch and provide improved and more efficient access to target species while protecting overfished species. The results of these analyses are provided in Agenda Item B.3.a Attachment 1.