GROUNDFISH MANAGEMENT TEAM (GMT) REPORT ON FISHERY MANAGEMENT PLAN AMENDMENT 23 – ANNUAL CATCH LIMITS AND ACCOUNTABILITY MEASURES

The Groundfish Management Team (GMT) discussed Amendment 23 and has the following comments for Council consideration.

In or Out of the Fishery and Ecosystem Component Species

Evaluation of Species Currently Managed in the FMP

As discussed in previous statements, the NS1 guidelines suggest that the Council set annual catch limits (ACLs) for target stocks, any non-target stocks that are overfished, or those non-target stocks potentially vulnerable to overfishing. A report detailing our initial analysis of vulnerability of each stock in the Fishery Management Plan (FMP) is reported in this agenda item (Agenda Item E.2.b, GMT Report).

Based on that analysis we do not recommend removing any species from the FMP other than dusky and dwarf-red rockfish at this time. These two species are included in the FMP based on very few occurrences. Dusky rockfish are distributed to the north of the U.S. west coast Exclusive Economic Zone (EEZ). We have record of only a few fish being landed into Washington. There is only one occurrence of dwarf-red rockfish in the Channel Islands when two individuals were observed following a Navy underwater demolition. Setting an ACL for these species would serve no purpose.

Ecosystem Component Species

On the question of designating ecosystem component (EC) species in the FMP, the GMT is generally in favor of their inclusion but is not prepared to do so at this time. Until a better understanding of how designation of EC species might benefit management and a more thorough consideration of species both in and out of the FMP as potential EC species is done, the GMT recommends deferring any EC species designation to the next management cycle.

Stock Complexes

As detailed in our vulnerability analysis (Agenda Item E.2.b., GMT Report), we also evaluated our current stock complexes under the revised NS1 guidelines by looking at latitudinal and depth distributions, vulnerability scores, and fishery interactions of each species currently managed within a complex. This analysis shows that improvements can be made in the composition of the stock complexes. Such changes include rearranging current complexes and possibly adding other species into the FMP and consideration for constructing the complexes around indicator species. The analyses needed to create annual catch limits (ACLs) for any new or reconfigured complexes are not likely feasible within the remaining timeframe.

The Other Fish complex is of most concern to the GMT given the lack of a quantitative basis for its current harvest specifications and the relatively high vulnerability of its component elasmobranch species. Preliminary discussions have identified various alternatives for decomposing this complex into a few new stock complexes.

Consideration of Non-FMP species

In November, the Council gave lower priority to the GMT's suggestion to the evaluation of species not in the FMP. Using publically available WCGOP reports on the non-whiting trawl fishery in 2007 and 2008, and a simple method for expanding total catch, the GMT was able to roughly compare the relative magnitude of total catch of FMP species versus species not in the FMP.[1] As shown in Table 1, some species not in the FMP are caught in greater amounts than FMP species.

Table 1. GMT Estimated Total Catch of Select FMP and Non-FMP species in the Non-Whiting Trawl Fisheries, 2007 and 2008.[1]

Other Flatfish	**2007**	**2008**
butter sole	0.7	0.3
curlfin sole/turbot	8.8	1.8
flathead sole	4.0	1.2
Pacific sanddab	395.9	235.1
rex sole	647.3	459.2
rock sole	8.3	0.1
sand sole	21.7	11.9
Non-FMP Flatfish	**2007**	**2008**
Deepsea sole	43.1	76.5
Slender sole	45.1	21.6

Select Other Fish	**2007**	**2008**
big skate	123.2	51.6
California skate	7.2	5.9
finescale codling/Pacific flatnose	14.7	4.7
Pacific rattail/grenadier	183.7	81.3
ratfish	183.7	169.9
Non-FMP Skates	**2007**	**2008**
Aleutian skate	5.9	14.0
Black skate	61.0	128.3
Other & Unidentified skate	422.2	308.2
Non-FMP Sharks	**2007**	**2008**
Brown cat shark	33.0	50.2
Shark (unidentified)	16.9	28.7
Non-FMP Grenadiers	**2007**	**2008**
Giant grenadier	265.4	144.8
Other & Unidentified grenadier	3.3	15.6

It is clear that the vulnerability scores of these species would be indistinguishable from those of the current FMP species.

[1] Estimates were produced using catch and coverage information published in two West Coast Groundfish Observer Program reports: Data Report and Summary Analyses of the U.S. West Coast Limited Entry Groundfish Bottom Trawl Fishery, Oct 2009; Data Report and Summary Analyses of the West Coast Limited Entry Groundfish Bottom Trawl Fishery, Oct 2008.

The discard portion of total catch was produced by multiplying the ratio of observed species specific discards to observed aggregate landings to total aggregate landings. The landed catch portion of t he estimate was produced by dividing species specific observed landings by the fraction of total observed aggregate landings. The calculations were performed separately for the areas north and south of 40°10' N. This is not the same methodology used to produce annual total mortality estimates.

Recommendations and Next Steps
In sum, with our 2011-12 biennial management workload, we do not believe we can complete the necessary analyses and discussion to fully implement the changes suggested by the NS1 guidelines on the timeline for implementing Amendment 23. We would recommend revisiting the "in the fishery" classification following this biennial cycle (e.g., implementation in the 2013-2014 cycle).

Categorization of Species (1, 2, or 3)

The categorization of species in the FMP is not a decision made through Amendment 23, rather it is the application of the acceptable biological catch (ABC) control rules to the categories that the GMT discussed and would be decided in the biennial specifications process. The categorization of each species in the FMP will determine the size of the scientific uncertainty buffers that define the ABCs. Once the Council accepts the Scientific and Statistical Committee's (SSC) ABC control rule recommendations, the control rules can then be applied according to the categorization of each stock. These categorizations will need to be decided at the April Council meeting so that ABCs can be decided at this meeting.

Because the categorization of a species determines which ABC control rule will apply, the GMT believes this is most appropriately an SSC determination. However, given that this is the first specifications cycle in which these new control rules are being applied, the GMT will work with the SSC and Council staff to comment on the presumptive species categories as listed in Agenda item E.4.a, Attachment 5. The GMT will attempt to complete this task prior to the April Council briefing book deadline.

Additionally, if the Council has any guidance on the definitions of category 1, 2, or 3 stocks as currently defined in the FMP, that guidance would best be given at this meeting because the category designation determines which ABC control will be applied to a stock.

Determining ABC values (incorporating scientific uncertainty buffers)

Category 1 species
The GMT discussed the use of the overfishing probability (P*) as a tool for the Council in setting the scientific uncertainty buffer from overfishing limit (OFL) to ABC. Because the ABC control rule for category one species has not been finalized by the Council, the GMT does not have specific recommendations but offers some initial thoughts for Council consideration.
Because choosing the P* value determines the ABC, the SSC has deferred this as a policy decision for the Council. The GMT feels it would be helpful for the Council to establish criteria for choosing a P*. These criteria would provide the Council with a basis and transparent rationale for setting P* values into the future. The GMT began discussing possible criteria the Council could consider when choosing a P* value but was unable to finalize any specific recommendations. The GMT plans to bring more specific recommendations for Council consideration at the April meeting. However, the GMT would like to offer the following initial thoughts on setting P* values. If the Council were to establish a P* value very close to 0.5, which is the maximum P* value recommended by the SSC, for example 0.499, this would equate to no buffer to account for scientific uncertainty for that particular species (Table 2). This would set the OFL equal to the ABC. The GMT would also like to point out that the criteria for

choosing a P* may be something the Council wishes to list in the FMP. Establishing criteria may aid the Council in differentiating P* values between category one species. Not all category one species assessments have the same level of certainty; therefore, using criteria to address those differences would help to acknowledge and account for that uncertainty. In their report on this issue (Agenda Item E.4.b, Supplemental SSC Report 2) the SSC recognizes that the current analysis on P* is only a first step because it does not cover all scientific uncertainty. This only reinforces the need for criteria in determining P* values to help the Council consider additional sources of scientific uncertainty. The Council would be aided in this decision by guidance from .a collaboration between the GMT and SSC on which stock may need a lower P* to address higher uncertainty.

Table 2. P* and CV values with their resulting percent reductions from the OFL.

% Reduction from OFL

	CV					
P*	0.36	0.4	0.45	0.5	0.55	0.6
0.5	0%	0%	0%	0%	0%	0%
0.4999	0%	0%	0%	0%	0%	0%
0.45	4%	5%	5%	6%	7%	7%
0.4	9%	10%	11%	12%	13%	14%
0.35	13%	14%	16%	18%	19%	21%
0.3	17%	19%	21%	23%	25%	27%
0.25	22%	24%	26%	29%	31%	33%
0.2	26%	29%	32%	34%	37%	40%
0.15	31%	34%	37%	40%	43%	46%
0.1	37%	40%	44%	47%	51%	54%
0.05	45%	48%	52%	56%	60%	63%
0	100%	100%	100%	100%	100%	100%

Probability of exceeding OFL by 50%

	CV					
P*	0.36	0.4	0.45	0.5	0.55	0.6
0.5	0.13	0.16	0.18	0.21	0.23	0.25
0.4999	0.13	0.16	0.18	0.21	0.23	0.25
0.45	0.11	0.13	0.15	0.17	0.19	0.21
0.4	0.08	0.10	0.12	0.14	0.16	0.18
0.35	0.07	0.08	0.10	0.12	0.13	0.14
0.3	0.05	0.06	0.08	0.09	0.10	0.12
0.25	0.04	0.05	0.06	0.07	0.08	0.09
0.2	0.02	0.03	0.04	0.05	0.06	0.06
0.15	0.02	0.02	0.03	0.03	0.04	0.04
0.1	0.01	0.01	0.01	0.02	0.02	0.03
0.05	0.00	0.00	0.01	0.01	0.01	0.01
0	0.00	0.00	0.00	0.00	0.00	0.00

Probability of exceeding OFL by 100%

	CV					
P*	0.36	0.4	0.45	0.5	0.55	0.6
0.5	0.03	0.04	0.06	0.08	0.10	0.12
0.4999	0.03	0.04	0.06	0.08	0.10	0.12
0.45	0.02	0.03	0.05	0.07	0.08	0.10
0.4	0.01	0.02	0.04	0.05	0.07	0.08
0.35	0.01	0.02	0.03	0.04	0.05	0.06
0.3	0.01	0.01	0.02	0.03	0.04	0.05
0.25	0.00	0.01	0.01	0.02	0.03	0.03
0.2	0.00	0.01	0.01	0.01	0.02	0.02
0.15	0.00	0.00	0.00	0.01	0.01	0.01
0.1	0.00	0.00	0.00	0.00	0.01	0.01
0.05	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00

The buffer between OFL and ABC is intended to represent scientific uncertainty. The SSC has provided a minimum estimate of scientific uncertainty. The Council's choice of P* will determine the buffer between OFL and ABC as a function of scientific uncertainty. In choosing P*, the GMT recommends that the Council consider several factors including, but not limited to economic concerns, stock status (e.g., stocks in the precautionary zone), and stock productivity driven by life history characteristics.

Category 2 and 3 Species

Buffers for category 3 species will be greater than for category 2 species which will be greater than buffers for category 1 species. Once the new ABC control rules are established for category 2 and 3 stocks the assignment of a species to either of these categories will essentially determine their ABC values. Because the ABC control rules for category 2 and 3 have not been finalized by the Council the GMT does not have recommendations on this issue. However, the GMT would like to, along with the SSC, recommend that the DB-SRA method be used for determining the OFL for data-poor stocks when the appropriate catch history is available. Council staff has made a preliminary suggestion that scientific uncertainty buffers could set for category 2 and 3 stocks between 25 and 50 percent reduction from the OFL. However, the SSC has not taken action taken action on this suggestion.

The 40-10 Control Rule

Integrating the scientific uncertainty buffer with the existing 40-10 harvest control rule

Above the target reference biomass ($B_{40\%}$), the ABC is the product of F_{MSY} (or its proxy), the exploitable biomass, and an uncertainty buffer derived from P* and scientific uncertainty in the biomass. The 40-10 rule was implemented to help rebuild the stock to the target level when the current biomass is below the target biomass, but above the minimum stock size threshold (MSST or $B_{25\%}$; below this level, the species is declared overfished and a rebuilding plan is initiated) (Figure 1). The addition of the scientific uncertainty buffer above the target biomass has made it necessary to redefine the interaction of the 40-10 harvest control rule with the newly calculated ABC. It is prudent to point out that the 40-10 harvest control rule is a self-imposed policy under the FMP, and is not recommended under NS1 guidelines as is the scientific uncertainty buffer.

The SSC has identified the following two options for reconciling the scientific uncertainty buffer and the 40-10 control rule:

Option 1: The 40-10 control rule and scientific uncertainty buffer should be applied to the OFL independently and the lower of the two resulting ACLs should be used for management (Figure **2**). This option provides more flexibility in setting the ACL because mandatory additional reductions are not required once stocks enters the precautionary zone, as shown in the example in Figure **2** where the ABC accounts for scientific uncertainty and is lower than the 40-10 throughout most of the precautionary zone. On the other hand, this option increases the likelihood of stocks becoming overfished relative to option 2 (Figure **3**) because, even though scientific uncertainty is accounted for in the ABC (Figure 2), the P* chosen to account for this scientific uncertainty may not be low enough to keep the stock out of the precautionary zone and potentially from being overfished.

Option 2: The 40-10 control rule would be applied in addition to the buffer for scientific uncertainty (Figure **3**). Option 2 always results in lower ACL values than under Option 1 for species in the precautionary zone. The SSC has provided some example ABCs and ACLs that would result from each option for the Council to use in weighing the magnitude of difference in the ABC that would result from each of the two options (Table 3).

The philosophy behind Option 1 is that the 40-10 control rule and scientific uncertainty buffer are precautionary adjustments which are both attempting to achieve the same thing, namely adjusting for uncertainty in stock status, and therefore the lower of the two should be used for management. The philosophy behind Option 2 is that the ACL rule adjusts for uncertainty in the absolute scale of biomass, whereas the 40-10 rule facilitates "rebuilding" towards the biomass target and the two should be applied separately to achieve both goals.

Under Option 1, there are instances when the uncertainty buffer is large enough to render the 40-10 adjustment unnecessary (i.e. the calculated scientific uncertainty buffer will always be lower than 40-10). Table 2 provides an analysis showing the maximum P* values under various F_{MSY} proxies, scientific uncertainty, and resultant buffers. The analysis demonstrates that the scientific uncertainty buffer is constant (0.80) across the different F_{MSY} proxies and scientific uncertainty measures. Different P* values relate to the constant buffer value because scientific uncertainty changes. As an example, for the minimum scientific uncertainty measure ($\sigma = 0.36$) prescribed by the SSC, a $P^* \leq 0.27$ will cause the 40-10 adjustment to be irrelevant.

However, the ABC buffer may accomplish the goal of the 40-10 adjustment by setting an ACL level at or below the 40-10 adjustment.

The decision on which option to apply hinges on whether one considers the scientific uncertainty buffer and 40-10 rule to be achieving the same (Option 1) or different (Option 2) purposes.

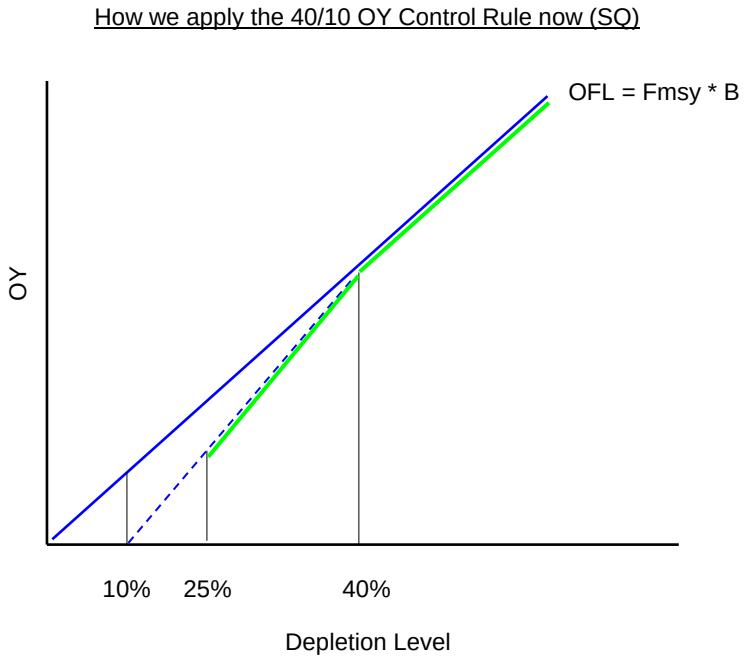

Figure 1. 40-10 harvest control rule as currently applied to stocks in the precautionary zone. The green line represents the ABC resulting from the application of the rule.

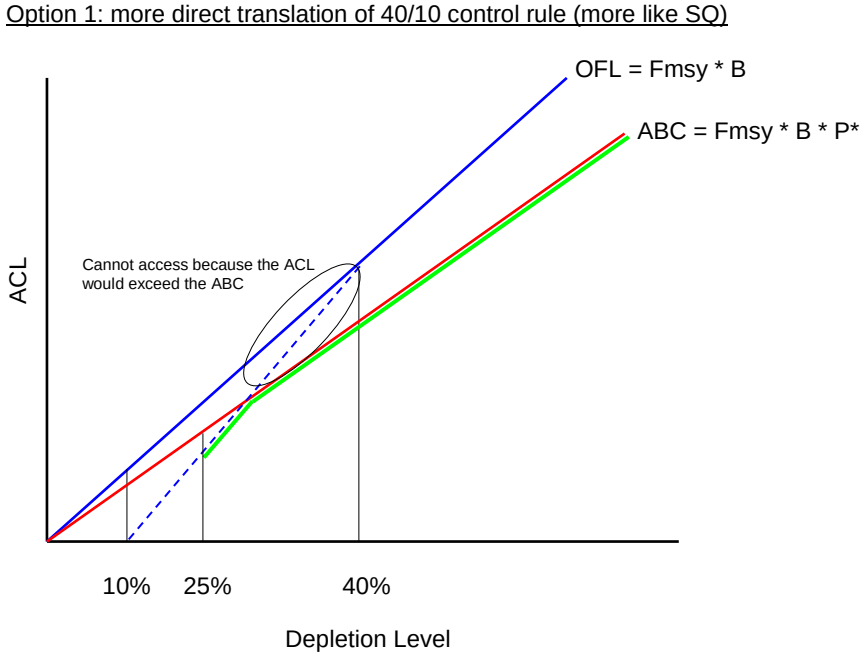

Figure 2. Option 1. Selection of the lower ABC produced from either the 40-10 rule (blue line) or from the application of scientific uncertainty buffer P* (green line).

Option 2: more precautionary approach to application of the 40/10 control rule

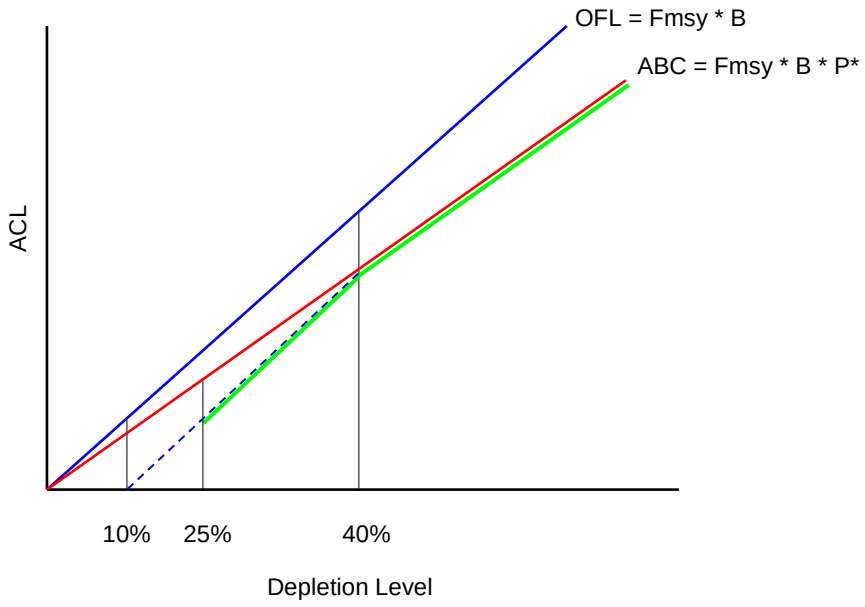

Figure 3. Option 2. ABC resulting from the combined application of the 40-10 rule and the scientific uncertainty buffer P*, represented by the green line. The 40-10 rule would be applied to the ABC, as it is now, and that value would be the maximum acceptable ACL. This would result in two reductions beginning at 40% depletion, one for scientific uncertainty to provide ABC, as buffered from the OFL, and a second (the 40-10 adjustment) to provide the ACL based on the 40-10 rule.

Table 3. Hypothetical ABC and ACL levels under options 1 and 2 over a range of depletion levels and buffer factors is given in the table below.

Example - OFL at target (B40) is 1000 mt

		Depletion Level				
Percent reduction from the OFL	Option	25%	30%	35%	40%	
0%	ABC	625	750	875	1000	(Current ABC)
0%	ACL Option 1	500	667	833	1000	
0%	ACL Option 2	500	667	833	1000	(Current 40-10 rule)
5%	ABC	594	713	831	950	
5%	ACL Option 1	500	667	831	950	
5%	ACL Option 2	475	633	792	950	
15%	ABC	531	638	744	850	
15%	ACL Option 1	500	638	744	850	
15%	ACL Option 2	425	567	708	850	
25%	ABC	469	563	656	750	

25%	ACL Option 1	469	563	656	750	
25%	ACL Option 2	375	500	625	750	

Table 4. Maximum P* values and the associated percent reduction under different measures of scientific uncertainty (CV) for two different F_{MSY} proxies that will cause the 40-10 adjustment to become irrelevant under control rule option 1.

Adjustment component	F_{MSY} proxy = 0.4 or 0.5			
P*	0.27	0.29	0.33	0.36
CV	0.36	0.40	0.50	0.60
% Reduction from OFL	0.20	0.20	0.20	0.20

Adoption of Harvest Control Rules for Flatfish

A revised corollary to the 40-10 harvest control rule, 25-5 control rule, has been developed for flatfish and reviewed by the SCC groundfish subcommittee. This minimum stock threshold is a slight reduction from the 25-6.25 control rule originally approved by the Council. This difference from the original 40-10 control rule reflects the higher productivity of flatfish stocks relative to other groundfish species, allowing a lower relative threshold as evidenced by the Council's decision on setting MSST at 50% of the B_{MSY} target. The overfished threshold biomass would still be 12.5% of unfished biomass for flatfish species.

Between 12.5% and 25% of unfished biomass, the interaction between the scientific uncertainty buffer and the 25-5 harvest control rule should be addressed in a way that is analogous to the decision regarding the 40-10 control rule for other ground fish species. The changes to the harvest control rule should be established in the FMP language.

Other Management Tools

Annual Catch Targets (ACTs)

It has been demonstrated that the current management system in the Pacific Ocean off Washington, Oregon, and California has resulted in catches exceeding optimum yield (OY) for eight species since 2000 (Agenda Item E.4.a, Attachment 4). Although management in this region has improved since the early 2000s, annual harvest in excess of OYs continues to occur. Reasons for these overages include delayed catch reporting, imprecise catch projections, interannual variability of catches, and other reasons that are related to management uncertainty. Hence, after the implementation of Amendment 23, the GMT acknowledges that certain groundfish fisheries off Washington, Oregon, and California will benefit from the implementation of accountability measures (AMs) such as annual catch targets (ACTs) to keep from exceeding ACLs (see Agenda Item G.5.b, Supplemental GMT Report, November 2009). ACTs will be beneficial as targets set below ACLs to ensure that ACLS are not exceeded due to management uncertainty, or as harvest guidelines (Agenda Item E.4.a, Attachment 4).

Therefore, the GMT recommends that (a) Amendment 23 continue to include ACTs in the management of west coast groundfish fisheries and (b) make the term “harvest guideline” equivalent to the term “annual catch targets.”

PFMC
3/08/10