SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON FISHERY MANAGEMENT PLAN 23 – ANNUAL CATCH LIMITS AND ACCOUNTABILITY MEASURES

Dr. Steve Ralston briefed the Scientific and Statistical Committee (SSC) on the proceedings of the SSC Groundfish and Coastal Pelagic Species (CPS) subcommittee meeting (held with the Groundfish and Coastal Pelagic Species Management Teams in January, 2009) that met for the purpose of discussing implementation of several new requirements of the Magnuson-Stevens Reauthorization Act. (See subcommittee report, attached).

The initial discussion focused on consideration of the various methodological changes that have been made since the SSC last reviewed the analysis described in the document "An approach to quantifying scientific uncertainty in west coast stock assessments "(Agenda Item E.4.b, Supplemental SSC Report 1). It was agreed that: (1) the variance statistic from the meta-analysis (sigma=0.36 from the analysis of 17 data rich stocks) is best characterized as a "total variance" statistic and (2) in cases where within-model variance is greater, that value should be used in lieu of the meta-analysis statistic. For example, the within-model variance for sardine (0.39) is higher than the sigma value of 0.36 derived from the meta-analysis. The report was ultimately approved and the methodology was endorsed by the SSC.

The SSC recognized that this analysis is only a first step, in part because it just considers uncertainty in biomass. Going forward, it will be important to consider other sources of uncertainty, such as F_{msy}. Because of that it was also recognized that the present analysis underestimates total variance. While biomass is most likely the dominant source of uncertainty, it is anticipated that other factors will need to be considered.

The SSC recommends that a table should be provided to the council to show how the information shown in Figure 7 could be used to establish a scientific uncertainty buffer for category 1 (data rich) species. The suggested process is: (1) the SSC determines a value of sigma (e.g. using the methodology described in Agenda Item E.4.b, Supplemental SSC Report 1) and (2) the GMT uses the recommended formulation to translate sigma to a range of p* values (the probability of overfishing). Each p* is then mapped to its corresponding buffer fraction. The Council then determines the preferred level of risk aversion by selecting an appropriate p* value.

The SSC discussed two options for application the 40:10 control rule with respect to application of buffers for scientific uncertainty. The SSC agreed that choosing between these options is a policy decision for the council to make based on its preferred level of risk aversion.

The SSC also heard a presentation by Dr. E.J. Dick describing methods for determining scientific uncertainty buffers for data poor situations (i.e., category 2 and 3 species). The SSC agreed that the method of depletion-based stock reduction analysis is a useful tool for developing overfishing level (OFL) recommendations for data-poor species in cases where the requisite catch history data are available. It was noted that this method is an improvement over current practice, and is likely to yield numbers more reliable than those in place now. The SSC recommends that this approach should be used on a stock specific basis to establish OFLs for the current specification process. In cases where stocks are in multiple complexes (e.g. north/south), the analysis should parse catches by region, where possible. It was also noted that, in principle, the method allows values of p* to be selected and buffers established to account for scientific uncertainty for these species, as well. Alternatively, it was suggested that buffers could simply be set in the range of a 25-50 percent reduction in OFL.

The SSC also discussed the need to assign categories to the species in the specification tables, but did not have sufficient time to accomplish this task at the present meeting.

PFMC
03/07/10

Attachment

SSC Groundfish & CPS Subcommittee Meeting Report
(Hotel Deca, Seattle, WA – January 26-28, 2010)

The Groundfish and Coastal Pelagic Species (CPS) subcommittees of the Scientific and Statistical Committee (SSC) met with the Groundfish Management Team (GMT) and the CPS Management Team (CPSMT) at the Hotel Deca in Seattle from January 26-28, 2010. The purpose of the meeting was to discuss implementation of several new requirements of the 2006 Magnuson-Stevens Reauthorization Act (MSRA). Members of the SSC in attendance included: Steve Ralston (chair), Bob Conrad, Ray Conser, Martin Dorn, Vladlena Gertseva, Owen Hamel, Tom Jagielo, Meisha Key (Barnes alternate), André Punt, Theresa Tsou, and Vidar Wespestad.

The agenda for the meeting is attached as Appendix A and included a number of specific issues that were discussed, including characterization of scientific uncertainty, harvest control rules, productivity-susceptibility analysis, definition of stock complexes, and the development of data-poor methods. The meeting began with Council staff (John DeVore and Mike Burner) outlining the process and timelines for implementation of Amendments 23 and 13 to the groundfish and CPS Fishery Management Plans, respectively. There is particular urgency for completion of Amendment 23 as groundfish management measures need to be developed between now and June so that regulations can be in place by January 1, 2011, as required by law. This summary report of the meeting is organized according to the sequence of agenda items, with individual headings for each topic.

Review of Existing Harvest Control Rules for CPS

The group discussed to what extent existing CPS harvest control rules already reflect adjustments for scientific uncertainty. The discussion initially focused on the *FRACTION* term of the Pacific sardine harvest control rule (HCR). The *FRACTION* term of the HCR has previously been referred to as F_{MSY}. This is a misnomer in the case of sardine because in certain instances the value used for *FRACTION* can be either lower or higher than the F_{MSY} value. For example, the original analysis that was used to motivate the temperature based HCR (Jacobson and MacCall 1995) specified F_{MSY} values of 0.04 for a cool water regime, 0.16 for a moderate temperature regime, and 0.26 for a warm regime. However, when the Council adopted the CPS FMP (1999), it constrained the *FRACTION* used for management such that $0.05 \leq FRACTION \leq 0.15$. The upper limit of the FMP-constrained range (*FRACTION* =0.15) was less than the best estimate of F_{MSY} during warm temperature regimes – in essence providing a buffer for OFL. During cool regimes, however, the lower limit of FMP-constrained range was greater than the best estimate of F_{MSY} – in essence allowing OFL to be exceeded. The conceptual work of Jacobson and MacCall was updated for use in the CPS FMP (Figure Sardine-1).

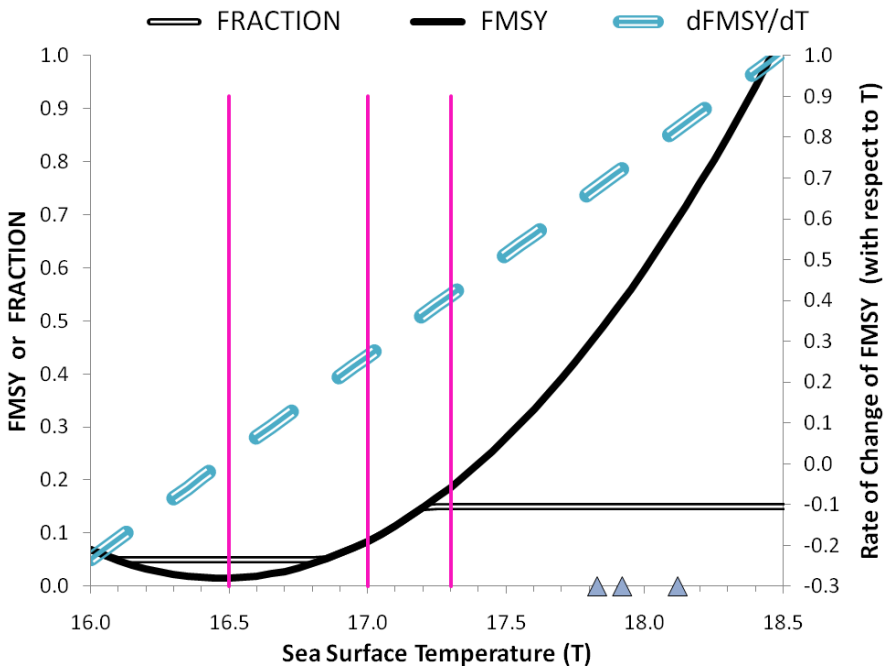


Figure Sardine-1. Pacific sardine F_{MSY} as a function of sea surface temperature (T) as used in the CPS FMP (1999). Note that while the function is conceptual based on Jacobson and MacCall (1995), it was updated for the FMP and differs somewhat from that given in Jacobson and MacCall (1995). *FRACTION* is the PFMC-imposed constraint on F that requires $0.05 \leq F \leq 0.15$. dF_{MSY}/dT is the derivative of F_{MSY} with respect to T. Vertical lines are the 25th, 50th, and 75th percentiles of SST from Jacobson and MacCall (1995). Triangles on the T axis show the SST for the last three years (from left to right: 2008, 2009, and 2007, respectively).

To evaluate the degree of buffer provided by the current HCR over the full span of temperature regimes, the SSC recommends conducting an analysis where OFL is computed using regime-specific best estimates of F_{MSY}. A comparison of those results with prospective ACLs, as they might be computed using the current HCR, would be useful in gauging the extent to which the HCR is more or less conservative than an OFL.

However, the SSC's primary responsibility is in evaluating the OFL and ABC rather than the ACL. The temperature-dependent F_{MSY} for sardine (Figure Sardine-1) is unique among F_{MSY} definitions for Council-managed species. Sardine assessment uncertainty (a combination of within and among assessment variance) is the largest of all the Council-managed species that have been examined to date – implying the need for a significant buffer between OFL and ABC. After the SSC's work on "Quantifying Scientific Uncertainty in PFMC Stock Assessments" has been completed, it will be important to compare OFL, ABC (buffered for scientific uncertainty), and ABC (subject to the PFMC *FRACTION* constraint) over a range of P* values (say 0.2 – 0.5) for cool, intermediate, and warm temperature regimes. The likely outcome is that, should the Council continue to implement its *FRACTION* constraint on F, that process may provide adequate OFL buffers for some range of warmer SSTs. However, in cooler temperature regimes, additional buffering will likely be needed.

Finally, some consideration should be given to limiting the range of SST over which the F_{MSY} function can be considered reliable. Recent SSTs are well above the bulk of the data used for deriving the F_{MSY} function (Figure Sardine-1). While this may not be a major issue for a linear function, the nonlinear sardine F_{MSY} function at current SSTs exhibits appreciable differences in F_{MSY} for rather small changes in SST. While it may not be practical to revise and/or replace this F_{MSY} function on the Council's schedule for NS1-related FMP amendment, it may be possible to suggest some reasonable sideboards to limit its use, e.g., to restrict its use to SSTs that fall below the 75th percentile of SST from the Jacobson and MacCall (1995) work.

Update on Characterization of Variation in Stock Size Based on Variation Within and Among Stock Assessments

Dr. Steve Ralston presented a brief overview of "Quantifying Scientific uncertainty in PFMC Stock Assessments".

Two main assertions were made in pursuing quantification of scientific uncertainty in stock assessments: (1) data-poor assessments cannot be more certain than data-rich assessments and (2) variation among stock assessments captures a wide variety of sources of uncertainty. Some of those sources of uncertainty include: the modeling software, the types of data incorporated into the model, model specification issues, parameter priors, STAT team composition, and STAR panel composition.

The general method undertaken in the analysis was to compare previous full assessments (or the most recent update thereof), and consider the logarithms of the ratios of the biomass estimates for each pair of assessments and their reciprocals using the last 20 years from an assessment. This provides a distribution of stock size differences in log-space and, if this variation is averaged over species, provides a general view of total biomass variation that emerges among repeat assessments of stocks, while embracing a wide range of factors that affect variability in results. While the original standard deviation (σ) reported from this method was 0.48, a revision that incorporated a correction factor[1] for using paired points ($\sqrt{2}$), revised that value down to 0.34.

The analysis also considered the CV "within" assessments as an additional source of uncertainty that could be combined with the uncertainty calculated "among" assessments in some way. It was agreed that, due to some parameters being pre-specified in some assessments, which would reduce "within" variance estimates, the median value of the distribution for the CV "within" (0.15) should be used in lieu of the reported CV, if the reported value was less than the median.

Dr. André Punt presented work that considered the above method for estimating "among" assessment variance, along with three other methods. All four approaches gave generally similar results, even though there were differences in methodology. The attending SSC members agreed that the standard method of calculating "among" assessment variance

[1] Mohr, M.S. Groundfish ABC accounting for scientific uncertainty – derivation of biomass scalar. Unpublished document dated 17 November 2009, 4 p.

should be one that starts with the most recent stock assessment, goes back a fixed number of years (20), and compares all of the assessment biomass estimates in a year to the mean estimate of biomass for that year (based on averaging over the available data). It was recommended that the rest of the analysis be carried out in a manner analogous to that described above.

The notion that, in the adopted approach, "among" assessment variance is contaminated by "within" assessment variance was raised and was discussed at some length. It was argued that variation estimated by comparing past stock assessments in the manner described was better characterized as a "total" variance statistic. Several potential methods to estimate the extent of potential double counting were proposed and, based on that discussion, a recommendation was made that an analysis using assessment retrospectives should be pursued to further evaluate the issue. Dr. Owen Hamel, Dr. Punt, and Dr. Ralston agreed to follow-up on this topic.

A discussion of productivity/susceptibility analysis (PSA) metrics then transpired and it was concluded that such metrics would likely not add useful insights to the quantification of scientific uncertainty for data-rich stocks that have been evaluated with a full assessment.

Lastly, there was discussion about the merits of estimating the probability of exceeding the true OFL by 50% (1.5×) or 100% (2×). Example analysis of these probabilities is shown in the tables below. Given that most standard errors this year are likely to be less than 0.4, limiting a P* to a maximum of 0.4 would avoid either of the below limits in most cases.

To limit to 10% the chance of exceeding the true OFL by 50%

σ (log space)	P*	Buffer Factor
0.10	0.50	1.00
0.20	0.50	1.00
0.30	0.50	1.00
0.40	0.39	0.90
0.50	0.32	0.79
0.60	0.27	0.70

To limit to 5% the chance of exceeding the true OFL by 100%

σ (log space)	P*	Buffer Factor
0.10	0.50	1.00
0.20	0.50	1.00
0.30	0.50	1.00
0.40	0.50	1.00
0.50	0.40	0.88
0.60	0.31	0.75

Reference Points and Control Rules for Monitored CPS

The monitored CPS species include jack mackerel, northern anchovy (central and northern sub-populations), market squid, and krill. Krill are a non-targeted (and currently prohibited) species that could reasonably be classified as an ecosystem component (EC) species. The lifecycle of market squid is shorter than one year and so status determination criteria are required but not an ACL. The fishery is managed by maintaining egg escapement > 30% calculated on a per-recruit basis.

Jack mackerel and Northern anchovy are targeted species that require an OFL. In the current FMP, OFL is the product of biomass, F_{MSY}, and a distribution fraction (portion vulnerable in the US) for these species. ABC is then established at 25% of OFL. The values used for biomass and F_{MSY} are quite dated and should be re-evaluated. The applicability of the 75% buffer should also be reviewed.

The specific values for jack mackerel are: OFL = 195,000mt × 0.65 = 124,800mt; ABC = OFL × 0.25 = 31,000mt. The group discussed the idea of setting an annual catch target (ACT) at 4,000mt (the highest recent catch). For northern anchovy (northern subpopulation), the biomass from a recent acoustic survey is 159,800mt, but F_{MSY} is unknown. For the central subpopulation, OFL = 123,000mt × 0.82. The group discussed the idea of setting an ACT at 19,000mt (highest recent catch).

Productivity and Susceptibility Analysis for Groundfish

Dr. Jason Cope reported on the progress made by the PFMC GMT and the NMFS Vulnerability Evaluation Work Group (VEWG) for determining the vulnerability of a stock. The vulnerability of a stock to becoming overfished is defined in the National Standard 1 (NS1) guidelines as a function of its productivity and susceptibility to the fishery. The guidelines note that the "vulnerability" of fish stocks should be considered when: (1) differentiating between stocks "in the fishery" and ecosystem component stocks, (2) assembling and managing stock complexes, and (3) creating management control rules.

The productivity and susceptibility of a stock was determined by providing a score ranging from 1 to 3 for a set of attributes related to each component. Currently there are 10 attributes for productivity that reflect stock life history and 12 attributes that reflect susceptibility to the impacts of fishing and management. The table below lists all attributes evaluated in the productivity-susceptibility analysis (PSA):

productivity attributes	**susceptibility attributes**
population intrinsic growth rate (r)	management strategy
maximum age	areal overlap
maximum size	geographic concentration
von Bertalanffy growth rate (k)	vertical overlap
natural mortality	fishing rate relative to M
measured fecundity	biomass of spawners (SSB) or other proxies
breeding strategy	seasonal migrations
recruitment pattern	schooling/aggregation and other behaviors
age at maturity	gear selectivity
mean trophic level	survival after capture and release
	desirability/value of the fishery
	Fishery impact to habitat

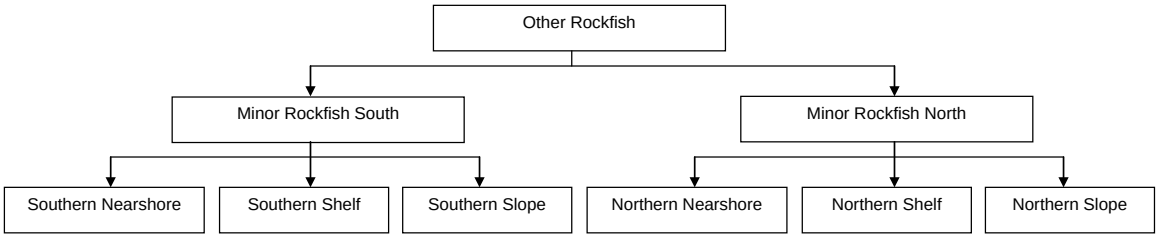
PSA scores have been calculated for all groundfish stocks and were graphically displayed on an x-y scatter plot. Stocks with a low productivity score and a high susceptibility score were considered to be more vulnerable, while stocks with a high productivity score and low susceptibility score were considered to be less vulnerable. Vulnerability is calculated as the Euclidean distance from the origin {3,1}. Each attribute score is also evaluated for the quality of the data used to determine the score. Data quality scores range from 1 to 5, where low numbers indicate better quality.

A four step approach was presented to define the relationship between fisheries and appropriate stock complexes: (1) calculate PSA scores for each species in the FMP, (2) identify the overlap in distributions of each species based on latitude and depth range, (3) assign each species to the various fisheries, and (4) overlay the groupings onto the PSA plot. The GMT is finalizing PSA vulnerability scores for west coast groundfish and completed a cluster analysis based on latitude and depth to identify spatial overlaps. Preliminary results indicate that there is a need to adjust the assignment of FMP stocks to complexes.

Description of Existing Methods for Determining ABCs for Stock Complexes

John Devore provided an overview of current groundfish stock complexes and existing harvest specifications (ABCs and OYs) for these complexes. There are currently six rockfish complexes and two non-rockfish complexes.

The "Other" rockfish complexes are classified as shown below:



These rockfish assemblages contain a large number of species. Some species with coastwide distributions may be managed in a complex in one region and stock-specifically in the other region. An example is bocaccio, which is managed in the "Minor Rockfish North – Northern Shelf" complex north of lat. 40°10'N and as a specific data-rich stock to the south of that management line. For some stocks considerable information is available; for many others we know very little.

For species with some fishery-independent survey information available, Rogers *et. al*. (1996) calculated species-specific harvest specifications (ABCs) using an approach where F_{MSY} was set equal to the natural mortality rate (M) applied to swept-area biomass. In 2000, these ABCs were reduced to account for scientific uncertainty by applying a 25% buffer (i.e., OY = 0.75 × ABC). For species with little information other than landings statistics, average historical catch was used to set ABCs, and OYs were calculated as either 25% or 50% of ABC (depending on the species).

Over time, several species were removed from the other rockfish complexes (for example, darkbloched and widow rockfish) and are currently managed as separate stocks. The harvest specifications for complexes are recalculated every time a species is removed. The "Other flatfish" complex includes species that have not been assessed (e.g., rex sole). Two species having somewhat more information have their ABCs set based on both average historical catch and survey abundance data (area-swept approach). Existing OYs for these two species were calculated as 25% of ABCs. The other species in the complex have their ABCs calculated based on average historical catch only, with OY set as 50% of ABC. Starry flounder was initially in the other flatfish complex, but was recently assessed (with species-specific ABCs and OYs calculated), and removed from the complex. The specifications for the complex were recalculated reliably, since the catches of starry flounder were monitored and well-documented.

The "Other Fish" complex is the most problematic. Harvest specifications were established to not to constrain the fishery, and species compositions were not monitored. Existing ABCs are based on average historical catch, and OY is calculated as 50% of ABC. Only one species in the Other Fish complex (longnose skate) has been assessed. There is no reliable way to estimate the historical contribution of longnose skate to the aggregate total for the complex because species compositions have not been monitored. There is, therefore, no way to remove it from the complex. Most species in the Other Fish complex are caught in small numbers, with some exceptions (e.g., spiny dogfish). Due to its life history characteristics this species is a cause for concern. There is consideration to remove all the elasmobranches from the "other fish" complex and to place them in their own assemblage. This would provide an opportunity for better monitoring and protection of those species, which is desirable given their life history characteristics.

It was noted that a major problem is that current harvest specifications for stock complexes have been used for decades without updating or reconsideration of ABCs. In addition, it is not clear exactly what methods and data were applied to calculate the original ABCs and OYs for each component stock in each complex. The GMT is now engaged in the process of trying to reconstruct the statistics that provide the basis for our existing harvest specifications.

In the short term, documentation of methods used to derive the existing ABCs and OYs for each component stock in each complex will be attempted by John DeVore, which should be available for review at the April Council meeting. In the long term, the goal is to determine whether stock complexes should be re-defined (based on the approaches such as PSA) and to explore new, more sensible approaches to set harvest specifications for complexes (see below).

Depletion-Corrected Average Catch (DCAC) Analysis for Groundfish

Dr. E.J. Dick presented results of recent work with Dr. Alec MacCall on estimating yield for data-poor stocks. His presentation compared yield distributions derived from two

data-poor methods, Depletion-Corrected Average Catch (DCAC) and Depletion-Based Stock Reduction Analysis (DB-SRA), with point estimates of yield from 28 data-rich groundfish stock assessments. Both data-poor methods require time series of historical catch and four prior distributions (M, F_{MSY}/M, B_{MSY}/B_0, and relative stock status). DB-SRA also requires an estimate of age at 50% maturity. DCAC distributions are yields that were likely to be sustainable over the time period of historical catch, and these were compared to SPR proxy MSY values from the data-rich assessments. Median DCAC values for most stocks were typically below MSY (as expected), but sometimes exceeded the proxy values. The subcommittee discussed the distribution of DCAC across stocks, relative to MSY proxy values from the assessments, and the potential use of this ratio as an empirical bias-correction factor for applications to unassessed species. DB-SRA extends DCAC by using draws from the prior distributions to fully specify a delay-difference production model. This extension generates distributions of MSY, B_{MSY}, B_0, and OFL that are conditioned on the time series of catch. Dr. Dick presented two sets of results comparing yield distributions: (1) when expected relative abundance (depletion) was assumed known (set equal to that estimated in the stock assessments for the species being compared) and (2) when expected relative abundance was unknown, but was assumed to be at 40% of the unfished biomass level. The second comparison was intended to evaluate the effect of uncertainty in stock status on yield estimates. Distributions of OFL generated using DB-SRA were generally consistent with assessment results, with evidence of a slight negative bias. The subcommittee discussed how integrated (across species) DB-SRA distributions of OFL and MSY, relative to their respective assessment results, could be used to correct for potential bias.

The SSC's groundfish subcommittee inquired about the relative influence of each prior distribution on the results. The subcommittee agreed that a better understanding of which distributions have the greatest effect on model outputs would be beneficial. Factors that may determine the direction of bias relative to SPR proxy reference points should also be investigated. It was suggested that relative yield distributions be plotted against spawner-recruit steepness to evaluate its effect on yield estimates. Rejection rates, i.e., the fraction of implausible (negative) biomass trajectories, differed among species and further explanation of these differences was also considered important by the subcommittee. Interpretation of P^* for stock complexes was also discussed. In this context, P^* might be considered as the fraction of stocks within a stock complex that would likely experience overfishing.

The groundfish subcommittee endorsed application of DCAC and DB-SRA, if possible, to unassessed stocks in the groundfish FMP. Dr. Dick agreed to compile the time series of historical catch and life history information needed as inputs to the models, and will present his results to the SSC at the March 2010 meeting in Sacramento, CA.

Overfishing Limits (OFLs) for Groundfish Including Revisions due to New Harvest Proxy for Flatfish Species

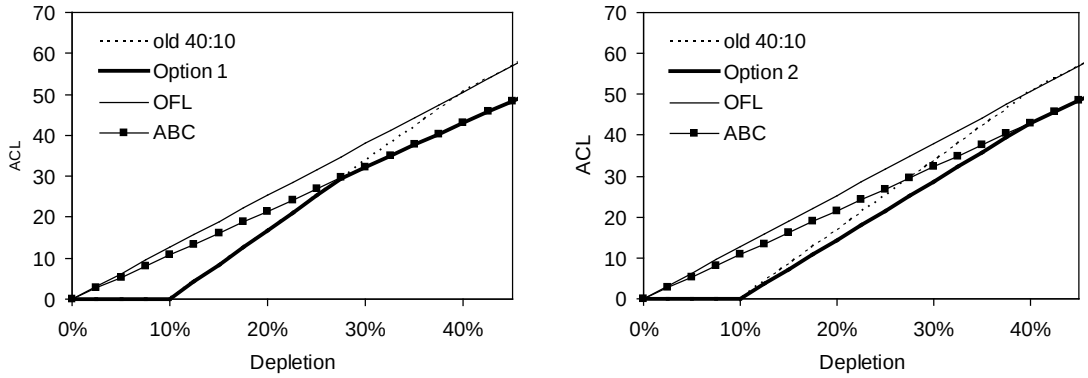
John Devore presented the list of OFLs for groundfish species, these OFLs will be discussed in detail during the March SSC meeting.

Application of the Groundfish 40-10 Rule

The SSC regards the "40-10" and analogous rules as aids in setting the ACL when stocks fall below their biomass target (B_{MSY} or its proxy). The SSC, moreover, considers the decision on how to apply the "40-10" rule in conjunction with the new ABC definition as a policy decision that should be made by the Council. The two options to consider, along with their underlying supporting philosophies/arguments, are outlined and diagrammed below. In addition, an analogous rule for flatfish is described and arguments for and against implementing such an analogous rule are presented.

Option 1: The 40-10 rule and the ABC rule would be applied separately to the OFL and the lower of the two would be the maximum acceptable ACL. The philosophy behind this approach is that the 40-10 rule and the new ABC rule (applying an offset from the OFL) are precautionary adjustments which are both attempting to achieve the same thing, namely adjusting for uncertainty in stock status and F_{MSY}, and therefore the minimum of the two should be taken.

Option 2: The 40-10 rule would be applied directly to the newly defined ABC and that value would be the maximum acceptable ACL. This would result in two reductions for stocks depleted below the target level of $0.4B_0$, one for scientific uncertainty to provide an ABC, as buffered from the OFL, and a second (the 40-10 adjustment) to provide the ACL based on the 40-10 rule. The philosophy behind this approach is that the ABC rule adjusts for uncertainty in the absolute scale of biomass or the correct F_{MSY}, whereas the 40-10 rule facilitates "rebuilding" towards the biomass target.



The SSC suggests an analogous rule to 40-10 for flatfish be the "25-5" rule, which would essentially ramp down catches linearly from 25% of B_0 to zero catch at 5% of B_0. This rule results in a 20% reduction in fishing mortality at the overfished threshold (12.5% of B_0), which is the same reduction seen in the 40-10 rule at 25% of B_0 (the overfished threshold) for rockfish. The use of such a rule in determining ACLs would achieve the same benefits as the 40-10 rule for rockfish. Given the higher productivity, in general, for flatfish compared to rockfish, the 25-5 rule should be sufficient, even given the lower absolute proportion of virgin biomass. The treatment of the 25-5 rule in conjunction with

ABCs should be equivalent to the treatment of the 40-10 rule, i.e. the choice of options 1 and 2 above should apply to flatfish as well.

An example of the ABC and ACL levels under options 1 and 2 over a range of depletion levels and scientific uncertainty buffers is given in the table below.

Example - OFL at target (B40) is 1000 mt						
			Depletion Level			
Buffer Factor		25%	30%	35%	40%	
1	ABC	625	750	875	1000	(Current ABC)
1	ACL Option 1	500	667	833	1000	
1	ACL Option 2	500	667	833	1000	(Current 40-10 rule)
0.95	ABC	594	713	831	950	
0.95	ACL Option 1	500	667	831	950	
0.95	ACL Option 2	475	633	792	950	
0.9	ABC	563	675	788	900	
0.9	ACL Option 1	500	667	788	900	
0.9	ACL Option 2	450	600	750	900	
0.85	ABC	531	638	744	850	
0.85	ACL Option 1	500	638	744	850	
0.85	ACL Option 2	425	567	708	850	
0.8	ABC	500	600	700	800	
0.8	ACL Option 1	500	600	700	800	
0.8	ACL Option 2	400	533	667	800	
0.75	ABC	469	563	656	750	
0.75	ACL Option 1	469	563	656	750	
0.75	ACL Option 2	375	500	625	750	

<u>OFLs, ABCs, and Annual Catch Limits (ACLs) for Groundfish Stock Complexes & ABC Control Rules for Category 1, 2, and 3 Groundfish Stocks</u>

Species in the Groundfish FMP are placed into one of three categories. Stocks in category 1 are those with quantitative assessments that allow harvest control rules and status determination criteria to be applied. Stocks in category 2 are generally those with some quantitative basis for estimating stock abundance (i.e., a time series of survey biomass estimates), while category 3 stocks are those where only estimates of landed catch are available. These categories are somewhat fuzzy in their definition, which has hampered consistent application of the framework in the past.

The Groundfish Management Team (GMT) has applied a policy of setting the OY to 75% of the ABC for category 2 stocks, and setting the OY to 50% of the ABC for category 3 stocks. Bringing management practices for category 2 and 3 stock into compliance with

the new National Standard 1 guidelines will require some changes in nomenclature, but the buffers already in place were implemented to account for scientific uncertainty, and presumably reflect Council's risk preferences for data-poor species. The larger buffer for category 3 stocks reflects the greater scientific uncertainty associated with these stocks. Under such an approach, the current ABC would be designated as the new OFL, and old OY would be designated as the new ABC.

The SSC's role in making ABC recommendations for category 2 and 3 stocks would be to review the assignment of stocks to category, and to review the methods used to determine the OFLs and ABCs. The SSC, as a review body, will not be responsible for producing estimates of OFL and ABC, but will provide recommendations on the methods that are applied, and review the estimates to determine whether they represent the best scientific information.

Many of the ABCs and OYs for category 2 and 3 stocks have been established for a long time, and have been carried over from one assessment cycle to the next without further review. The basis for some of the ABCs and OYs is not readily available, and those based on Rogers *et al*. (1996) do not make use of the groundfish assessment surveys that have occurred in recent years. Given the compressed schedule for Amendment 23 and the groundfish biennial specifications process, it is unlikely that all OFL and ABC estimates for category 2 and 3 stocks can be updated and reviewed by the SSC for the 2011-12 management cycle. However, as a first step, the SSC requests that that the GMT or Council staff prepare a list of each species in the FMP with the following information:

1. Species category
2. Basis for category assignment
3. OFL
4. Basis for OFL.
5. Species complex (if any).
6. Whether the species is a candidate for the ecosystem component category.

Species complexes are used extensively for Category 2 and 3 stocks. Determining the OFL and ABCs for species complexes is a simple matter of summing the OFLs and ABCs for the species in the complex. An initial review of the current grouping of stocks into complexes showed no serious deficiencies, but suggested that further refinements may be possible. Ongoing work with PSA may provide a more objective approach to grouping species with similar life history, vulnerability to the fishery, and geographic distribution (see discussion above).

Depletion-corrected average catch (DCAC) and depletion-based stock reduction analysis (DB-SRA) offer advantages over the methods that have been used in the past to estimate ABC and OFL for category 2 and 3 stocks. The SSC encourages application of these methods to as many stocks as is feasible, but would need to review the results before recommending changes from the existing methods.

For rebuilding stocks, no additional analysis is required, as the OFL is already calculated for the rebuilding analysis. A rebuilding OY is functionally equivalent to an ACL, which must be less than or equal to the ABC.

Rogers, J.B., Wilkins, M.E., Kamikawa, D., Wallace, F., Builder, T., Zimmerman, M., Kander, M., and Culver, B. 1996. Appendix E: status of the remaining rockfish in the Sebastes complex in 1996 and recommendations for management in 1997. In Appendix Volume II to the Status of the Pacific Coast groundfish fishery through 1996 and recommended acceptable biological catches for 1997. Pac. Fish. Manag. Council, Portland, OR 97201.

Appendix A:

PROPOSED AGENDA
Management Teams and Scientific and Statistical Subcommittees for Coastal Pelagic Species and Groundfish

Pacific Fishery Management Council
Hotel Deca
4507 Brooklyn Avenue Northeast
Seattle, Washington 98105
(800) 899-0251

January 26-28, 2010

Management Team and Scientific and Statistical Committee (SSC) Subcommittee meetings for Groundfish (GF) and Coastal Pelagic Species (CPS) are open to the public and public comments will be taken at the discretion of the meeting Chair. Agenda times are approximate and are subject to change.

TUESDAY, JANUARY 26, 2010

8:30 a.m.	Welcome and Introductions
8:35 a.m.	Approval of the Agenda
8:45 a.m.	Rapporteur assignments
9:00 a.m.	Process and timelines for Groundfish FMP Amendment 23 (Devore)
9:30 a.m.	Process and timelines for CPS FMP Amendment 13 (Burner)
10:00 a.m.	Coffee Break
10:15 a.m.	Review of existing harvest control rules for CPS (Hill/Burner)
12:00 noon	Lunch
1:15 p.m.	Update on characterization of variation in stock size based on variation within and among stock assessments (Punt/Ralston)
2:15 p.m.	Expressing uncertainty – Acceptable Biological Catch (ABC) Control Rules for CPS (Hill/Burner)
3:15 p.m.	Coffee Break
3:30 p.m.	Reference points and control rules for monitored CPS (CPSMT/Burner)
5:00 p.m.	Adjourn for the day

WEDNESDAY, JANUARY 27, 2010

8:30 a.m.	Productivity and Susceptibility Analysis for groundfish (Cope)
10:00 a.m.	Coffee Break
10:15 a.m.	Description of existing methods for determining ABCs for stock complexes (Devore)
10:30 a.m.	Depletion-Corrected Average Catch (DCAC) analysis for groundfish (Dick)
12:00 noon	Lunch
1:00 p.m.	Overfishing Limits (OFLs) for groundfish including revisions due to new harvest proxy for flatfish species
3:00 p.m.	Coffee Break
3:15 p.m.	Application of the groundfish 40-10 rule (DeVore)
4:14 p.m.	ABCs and Annual Catch Limits (ACLs) for groundfish stock complexes
5:00 p.m.	Adjourn

THURSDAY, JANUARY 28, 2010

8:30 a.m.	ABC control rules for category 1, 2, and 3 groundfish stocks
10:00 a.m.	Coffee Break
10:15 a.m.	ABC recommendations for all groundfish stocks (continued)
12:00 noon	Lunch
1:00 p.m.	ACL and Annual Catch Target Strategies for groundfish stocks/complexes
2:00 p.m.	Preparation of report for SSC consideration
3:00 p.m.	Coffee Break
3:15 p.m.	Preparation of report for SSC consideration (continued)
5:00 p.m.	Adjourn

PFMC
01/25/2010