DRAFT SUMMARY MINUTES
Scientific and Statistical Committee

Pacific Fishery Management Council
Crowne Plaza Hotel
Drake II
1221 Chess Drive
Foster City, CA 94404
650-570-5700

September 11-13, 2009

Call to Order and Scientific and Statistical Committee (SSC) Administrative Matters

The meeting was called to order at 8 a.m. on Friday, September 11, 2009. Dr. Don McIsaac briefed the SSC on priority agenda items.

Members in Attendance

Mr. Tom Barnes, California Department of Fish and Game, La Jolla, CA
Dr. Louis Botsford, University of California, Davis, CA
Mr. Robert Conrad, Northwest Indian Fisheries Commission, Olympia, WA
Dr. Ramon Conser, National Marine Fisheries Service, La Jolla, CA
Dr. Martin Dorn, National Marine Fisheries Service, Seattle, WA
Dr. Owen Hamel, National Marine Fisheries Service, Seattle, WA
Dr. Selina Heppell, Oregon State University, Corvallis, OR
Mr. Tom Jagielo, Alternate – Oregon Department of Fish and Wildlife
Dr. Peter Lawson, National Marine Fisheries Service, Newport, OR
Dr. Todd Lee, National Marine Fisheries Service, Seattle, WA
Dr. Charles Petrosky, Idaho Department of Fish and Game, Boise, Idaho
Dr. André Punt, University of Washington, Seattle, WA
Dr. Stephen Ralston, SSC Chair, National Marine Fisheries Service, Santa Cruz, CA
Ms. Cindy Thomson, National Marine Fisheries Service, Santa Cruz, CA
Dr. Theresa Tsou, Washington Department of Fish and Wildlife, Olympia, WA
Dr. Vidar Wespestad, Research Analysts International, Seattle, WA

Scientific and Statistical Committee Comments to the Council

Council Administrative Matters

J.3. Membership Appointments and Council Operating Procedures

The following is a compilation of September 2009 SSC reports to the Pacific Fishery Management Council (Council). (Related SSC discussion not included in written comment to the Council is provided in *italicized text*).

The Scientific and Statistical Committee (SSC) discussed the composition of the Ecosystem Fishery Management Plan Development Team (Team). This Team will be responsible for defining, scoping, and producing the Ecosystem Fishery Management Plan (EFMP) for the Pacific Fishery Management Council (Council). As such, members should be familiar with fisheries management institutions and processes, and have a good sense of how to create a plan that can effectively integrate policy considerations with existing FMPs and new National Standards. Because the new EFMP is primarily a policy document, rather than a technical document, Team members should have a broad view of their discipline and a demonstrated ability to integrate science and policy. Assuring breadth of expertise on the Team is as important as assuring regional and agency representation; social science and economics must be represented as well as ecology and fishery science. The SSC recommends the addition of up to two at-large members to meet these needs.

Groundfish Management

E.2. Stock Assessments for 2011-2012 Groundfish Fisheries

INTRODUCTION

The Scientific and Statistical Committee (SSC) completed a review of seven stock assessments and Stock Assessment Review (STAR) panel reports, including petrale sole, widow rockfish, yelloweye rockfish, greenstriped rockfish, bocaccio, cabezon, and lingcod. With the exception of petrale sole, these assessments were completed over the summer following the Council's June meeting. At that meeting the petrale sole assessment was referred to a SSC groundfish subcommittee meeting to be held later in the summer for further consideration and evaluation. Having now reviewed the entire set of full and updated stock assessments that were scheduled this year, the SSC is very pleased to inform the Council that the process performed very well this year. All the stock assessment teams submitted well-prepared documents in a timely manner and were responsive to all requests during the review process. As witness to that conclusion we note that no assessments were referred to the mop-up panel. For that reason the SSC would like to commend all the personnel and staff involved in this major effort for having performed at such a high level.

FULL STOCK ASSESSMENTS

Petrale Sole

At its June 2009 meeting, the SSC reviewed the new petrale sole assessment and, based on a number of concerns, was unable to endorse the assessment at that time. The STAR Panel report also recommended that the estimates of F_{MSY} and B_{MSY} produced by the assessment be

investigated as alternatives to the currently used proxies of $F_{40\%}$ and $B_{40\%}$. The SSC developed a list of analytical requests for the petrale sole Stock Assessment Team (STAT) to address these issues, and the SSC's groundfish subcommittee met with the STAT on August 31st to review the response to these requests.

Dr. Melissa Haltuch provided the SSC with a brief overview of the petrale sole assessment, and presented the STAT's response to the SSC groundfish subcommittee requests. Dr. Stephen Ralston presented the report of the SSC groundfish subcommittee, which endorsed the petrale sole model that was approved by the STAR panel, and recommended that proxies of $B_{25\%}$ for B_{MSY} and $F_{30\%}$ for F_{MSY} be established for west coast flatfish.

The SSC revisited the issues that had already been considered in detail during the subcommittee meeting. The SSC agreed that the base petrale sole model represents the best available scientific information, and endorsed its use for status determination and management in the Council process.

The SSC concluded that there is no basis for rejecting the assessment based on the estimate of catchability coefficient (q) for Northwest Fisheries Science Center (NWFSC) trawl survey. However the SSC encourages further investigation of the catchability coefficient of the survey by experimental evaluation of trawl performance, quantification of trawlable and untrawlable habitat off the west coast, or by synthesis of available information and expert knowledge through development of an informative prior, as had been anticipated from the 2008 survey catchability workshop.

The raw catch per unit of effort (CPUE) presented in the petrale sole assessment suggests a potential discrepancy between the assessment results and the experience of the groundfish fleet. It is important to note that limited conclusions can be drawn from un-standardized CPUE data, and that standardization of these data will be difficult due to the many management changes in the groundfish fishery. Nevertheless, the SSC encourages further evaluation of fishery CPUE data in the next petrale sole assessment, if only to better understand and potentially reconcile these differences.

During its meeting, the SSC groundfish committee addressed the suggestion of the petrale sole STAR Panel to investigate the species-specific estimates of F_{MSY} and B_{MSY} as alternatives to the currently used proxies. The SSC endorses the groundfish subcommittee's recommendation to establish new proxies of $B_{25\%}$ for B_{MSY} and $F_{30\%}$ for F_{MSY} for west coast flatfish. These values are based on a number of considerations, including evaluation of information on flatfish productivity (steepness) for assessed west coast flatfish, published meta-analyses of other flatfish stocks, and recommendations on appropriate proxies for B_{MSY} and F_{MSY} in the scientific literature. The SSC does not at this time endorse the use of species-specific estimates of B_{MSY} and F_{MSY} for petrale sole because of high variability in these estimates between repeat assessments for other stocks and the sensitivity of these estimates to assumptions concerning stock structure. Instead, the SSC recommends that this issue be dealt with in a comprehensive way, perhaps through development of guidelines during an off-year harvest policy workshop.

Other aspects of the Council's harvest policy, such as the overfished threshold and the point at which the precautionary reduction for optimum yield (OY) becomes zero (40-10), are policy

decisions that are at the discretion of the Council. A policy that mimics the Council's default proxies for groundfish would be to set the minimum stock size threshold (MSST) to $B_{15\%}$, which is 60 percent of the target stock size, and to implement a 25-6.25 precautionary adjustment for OY. Alternatively, the Council could set the MSST to 50 percent of $B_{25\%}$, which is the lowest value recommended by the National Standard 1 guidelines.

Finally, the SSC notes that the process of addressing a STAR panel recommendation with potentially broad ramifications has been less than ideal. Again, addressing harvest policy issues during an off-year science workshop would allow a more comprehensive approach to be developed. Such a workshop would also provide opportunity for outside review, which may be an important consideration given that SSC members are likely to be involved in technical analyses.

Widow Rockfish

Dr. Xi He presented the widow rockfish stock assessment to the Scientific and Statistical Committee (SSC). Dr. Martin Dorn summarized the report of the Stock Assessment Review (STAR) Panel of the widow rockfish assessment, held in Santa Cruz, California July 13-17, 2009.

The last full assessment of widow rockfish was conducted in 2005, 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 considered the current 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. Less time was available to explore alternative model configurations and tuning. For example, the SSC observed that length selectivity patterns were not consistent among data sources and selectivity patterns for the triennial and NWFSC trawl surveys were unexpected. The SSC recommends that the next assessment should be a full assessment because several key problems remain unresolved.

The 2007 assessment identified a large partially-recruited 2002 year class that led to predictions of rapid rebuilding by 2009. This year class was less evident in the recent data and is not now estimated to be a strong year class. Nonetheless, there has been a gradual rise in the modeled depletion rate to 38.5 percent, just short of the 40 percent rebuilding threshold. The SSC endorses the use of the 2009 widow rockfish stock assessment for status determination and management in the Council process.

In general the SSC notes that estimates of recruitment for the most recent years of an assessment are often the most uncertain, yet can have a considerable impact on the outcomes of rebuilding projections. The SSC recommends that the STAT and STAR Panels consider imposing constraints on the estimates of recent year-classes to the extent we have lower confidence in

these estimates.

The SSC is also generally concerned about the lack of data to inform the rate of stock rebuilding in recent years for several assessments of overfished rockfish. Specifically, fundamental assumptions about stock productivity are made in these models that will lead to a conclusion of stock recovery if catches are reduced markedly. The SSC notes that in a number of instances, recent predicted increases in abundance of overfished stocks are largely due to properties of the models and not to robust observational data.

Yelloweye Rockfish

Dr. Ian Stewart presented the yelloweye rockfish assessment to the Scientific and Statistical Committee (SSC). Dr. Stephen Ralston summarized the report of the Stock Assessment and Review (STAR) Panel of the yelloweye rockfish assessment, held in Seattle, Washington, August 3-6, 2009.

The last full assessment of yelloweye rockfish was conducted in 2006 with an assessment update in 2007. The 2009 assessment differed from these 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 are 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.

In contrast to the 2006 and 2007 assessments, the 2009 assessment makes use of data from the NWFSC and Triennial trawl surveys as well as data on discarded yelloweye rockfish collected by observers in the Oregon recreational charter fishery. However, the International Pacific Halibut Commission (IPHC) survey data remain the most important index in the assessment, although IPHC survey data are only available for Washington and Oregon and not California where the largest biomass of yelloweye rockfish is estimated to occur. Unlike previous assessments, the relationship between fishery-dependent catch-rates and abundance is allowed to be non-linear. The assessment authors also reviewed and updated assumptions regarding growth, maturity and fecundity.

The catch history was revised as part of the 2009 assessment. However, the revised time-series of catches was not markedly different from that on which the 2006 and 2007 assessments were based. Considerable uncertainty regarding the time-series of historical catches remains, and this was identified as a key source of uncertainty in the assessment.

The assessment estimates trends in abundance by region. The SSC cautions 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 endorses the research recommendations of the assessment authors and the STAR Panel, and identified two data sources which, if investigated, could provide additional indices of abundance: (a) the catch and effort data from the Oregon live-fish fishery, and (b) yelloweye rockfish catch rates from the recreational fishery for Pacific halibut. The SSC also highlights the continuing need for an index of abundance that can be used to reliably detect changes in yelloweye rockfish abundance. It also notes that visual survey techniques have the potential to index yelloweye rockfish abundance without inducing mortality which might hinder recovery.

The SSC recommends that the following be considered as potential items for workshops during the 2010 "off-year": (a) review of efforts to develop stock size indices based on the IPHC surveys, including how to add stations to augment the survey and, (b) analyses to construct indices of abundance for yelloweye rockfish and other groundfish. Given the potential importance of the IPHC index to the assessment of yelloweye rockfish, the SSC also recommends participation by IPHC scientists at any workshops to review the use of the IPHC data in yelloweye rockfish assessments and at future STAR Panels. Finally, the SSC highlights the value of collecting biological data, such as age-length and maturation information, for yelloweye rockfish during the IPHC surveys.

The SSC recommends that the yelloweye rockfish assessment be an update during the 2011 assessment cycle unless off-year research leads to a marked change to how the IPHC survey data are analyzed or the development of a new index of abundance based on the discards in Oregon recreational charter fishery. The SSC notes that the assessment author plans to refine how the IPHC survey data are analyzed. In principle, changing the analytical method used to summarize survey data falls outside of the terms of reference for an assessment update. However, given that this is a stable assessment, this change can be accommodated within the scope of an assessment update, but this will require extra time for review.

The SSC endorses the use of the 2009 yelloweye rockfish assessment for status determination and management in the Council process. The SSC also endorses the approach used to quantify uncertainty, which will form the basis for the rebuilding analysis for this species.

Greenstriped Rockfish

Mr. Allan Hicks and Dr. Melissa Haltuch presented the greenstriped rockfish assessment to the Scientific Statistical Committee (SSC). Dr. Stephen Ralston summarized the report of the Stock Assessment and Review (STAR) Panel of the greenstriped rockfish assessment, held in Seattle, Washington, August 3-6, 2009.

This is the first assessment of the greenstriped rockfish off the US West Coast from US/Canada

border to US/Mexico border. Greenstriped rockfish is a small, low-value bycatch species found in a wide range of habitats with a preference of mud or sand bottoms. The population is treated as one single stock in the assessment. There have been no fisheries targeting this species, thus discards constitute the main component of total fishing mortality on the stock. There is great uncertainty about historical discarding practices. Five fisheries and three fishery-independent surveys were modeled using Stock Synthesis 3.03a modeling framework.

An error in domestic catches was discovered and corrected after the STAR Panel. Revised results were presented to the SSC. In general, the revised results were very similar to those in the previous version. The estimated 2009 depletion remained the same at 81 percent, which is well above the Council's management target for groundfish (40 percent). Estimated total catches (landings plus estimated discards) in the past five years ranged between 3-78 mt and were substantially lower than the potential catch.

Uncertainty in states of nature was bracketed jointly by natural mortality and fraction discarded. There is only one harvest scenario in the decision table. The SSC noted that discards were not handled appropriately in two of the sensitivity runs (double and half of the landings) due to the fixed fraction of discards in model configuration. However, this does not affect the information provided in the decision table. It was also noted that the within assessment uncertainty is relatively high compared to other west coast groundfish assessments.

In this assessment, historical WA/OR catches were estimated by applying a fixed proportion to the documented landings of other rockfishes. However, due to the weighed-back issue of greenstriped catches, the historical removal requires further investigation.

The SSC noted that, in contrast to other rockfishes, trawl surveys provide reliable abundance indices for greenstriped rockfish. Given the high uncertainty in landings and discards in the assessment, establishing a tier system that allows a simpler approach for setting harvest control rules for greenstriped rockfish and other data-poor species is desired.

The SSC endorses the use of the 2009 greenstriped rockfish assessment for status determination and management in the Council process.

Bocaccio

Dr. John Field presented the bocaccio assessment and Dr. Martin Dorn summarized the report of the July 13-17, 2009 STAR Panel. The last full assessment of bocaccio was conducted in 2003, and it was subsequently updated in 2005 and 2007. The 2009 assessment: (a) used the SS3 modeling framework instead of SS1, (b) extended the northern boundary from Cape Mendocino to Cape Blanco, and (c) 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 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.

The SSC endorses the research and data collection recommendations of the assessment authors and the STAR Panel. While there are unresolved issues with the assessment, progress on these problems is likely to be difficult and incremental without additional biological data and information on stock structure. The SSC concurs with the STAR Panel recommendation that the next bocaccio assessment be an update rather than a full assessment.

The SSC endorses the use of the 2009 bocaccio assessment for status determination and management in the Council process.

The SSC supports extension of the assessment north of Cape Mendocino as biologically appropriate given our current understanding of stock structure, but also recognizes that this boundary extension raises issues with respect to area management. Approximately 6 percent of the coastwide bocaccio catch has occurred historically between Cape Mendocino and Cape Blanco while only 1 percent has been taken from the California/Oregon border to Cape Blanco. There is not a conservation issue at this time north of the $40^0$10' management boundary based on these low bocaccio catches in this area. Therefore, the SSC does not recommend changing the area where bocaccio are designated as overfished. Management should be based on a pro-rata allocation using the historical catch distribution north and south of $40^0$10'.

Cabezon

Dr. Jason Cope presented the cabezon stock assessment to the SSC. Dr. Vidar Wespestad presented the report of the Cabezon STAR Panel, held in Seattle, Washington on July 27-31, 2009.

The last full assessment of cabezon was conducted in 2005. The 2009 assessment extends the spatial range of the assessment to include Oregon as a third sub-stock, while retaining the two sub-stocks within California, north and south of Point Conception. Each of these sub-stocks was modeled separately, and a fourth scenario considered California as a single sub-stock. Several stock definition techniques support there being two or more stocks in California.

Notable changes in data from the 2005 assessment include a longer time series of catches and additional RecFIN length composition data prior to 1990. Conditional age-at-length data was used for the first time allowing for growth estimation internal to each model.

The stock assessment team (STAT) considered all available potential indices of abundance, but few were useful for assessment purposes due to a lack of appropriate spatial and temporal

coverage. Consequently, only one index of abundance was used for each sub-stock (CPFV for California and the Oregon Recreational Boat Survey (ORBS) for Oregon). The SSC discussed the need for further review of local indices of abundance and their incorporation into stock assessment models.

The results of the 2009 assessment are consistent with the 2005 assessment for the Northern California sub-stock (NCS), but somewhat different for the Southern California sub-stock (SCS) mainly due to additional length composition data from the 1980s for the latter. A California coast-wide model estimated current depletion to be below either of the sub-area estimates. The SSC agrees with the STAT and STAR Panel that the NCS and SCS models best reflect the dynamics in each area, and that the results of the two sub-stock models should be combined in providing management advice for California.

The SSC endorses the use of the 2009 cabezon assessment for status determination and management in the Council process. A full assessment is not recommended in the next few assessment cycles in the absence of additional appropriate survey indices or better estimates of the natural mortality rate and/or growth parameters.

Lingcod

Dr. Owen Hamel presented the lingcod stock assessment to the SSC. Dr. Vidar Wespestad presented the report of the Lingcod STAR Panel, held in Seattle, Washington during July 27-31, 2009.

The assessment utilized data from the entire west coast of the contiguous United States (waters off Washington, Oregon and California). The lingcod population in these areas was modeled as two stocks in two separate assessment models covering [1] waters off Oregon and Washington (northern stock) and [2] waters off California (southern stock). This spatial delineation differed slightly from that used in the last stock assessment (2005) in which the stocks were separated at Cape Blanco (43° N vs. 42° N). The spatial change was necessary to facilitate access to existing databases for an analysis of candidate stock structures that was carried out prior to the assessment modeling.

Notable data differences from the 2005 assessment were (i) inclusion of four additional years of fisheries data (2005-08), (ii) extension of the catch time series back to 1928 (vs. 1956), and (iii) use of two new indices of abundance (NWFSC trawl survey and recreational dockside CPUE). Modeling changes included use of the SS3 software and other model structure refinements.

Key results of the 2009 assessment of the northern stock (B_0=33,000mt and depletion=62 percent) are generally consistent with the 2005 assessment. Further, sensitivity analysis demonstrated that these results are quite robust to the inclusion/exclusion of the various indices of abundance and other data sources. In contrast, results of the 2009 assessment of the southern stock (B_0=25,000mt and depletion=74 percent) are considerably more optimistic than the 2005 assessment; but are not nearly as robust as results from the northern stock. For example, exclusion of the recreational CPUE index from the southern base case reduced the depletion ratio estimate to 38 percent – a level more comparable to that estimated in the 2005 assessment, while inclusion of the age sampling data increased the depletion ratio estimate to 90 percent. Given these differences in uncertainty of the northern and southern stock results, the SSC concurs with

the STAT that the respective decision tables should be structured differently. While natural mortality may serve as a reasonable major axis of uncertainty for the northern stock, the inclusion/exclusion of indices and data sources better characterizes the major uncertainty axis for the southern stock.

The NWFSC trawl survey index is highly variable and could not be well fit in either the northern or southern assessment model. The northern survey index is highly variable and without trend. However, while equally imprecise, the southern index exhibits a consistently declining trend over its six year history. As this trend is inconsistent with the assessment results, future work should investigate whether alternative model structures and/or assumptions can reproduce this trend; or whether re-analysis of the survey data may be warranted.

The considerable set of age sampling data was not incorporated in the base case for either the northern or southern lingcod assessment. The results for the southern stock were sensitive to the inclusion/exclusion of these data. Age validation and possible biases in age reading should be investigated. However, age sampling should continue until these issues can be resolved.

The SSC endorses the use of the 2009 lingcod assessment for status determination and management in the Council process. An updated assessment should be sufficient for the next lingcod assessment unless substantial progress can be made on ageing validation. Finally, the SSC endorses the research recommendations of the STAT and STAR Panel.

SSC Groundfish Subcommittee Report on Petrale Sole
AFSC, Seattle WA – August 31, 2009

Background

This year an assessment of the petrale sole (*Eopsetta jordani*) stock off the U.S. west coast was conducted and a scientific review was held at a Stock Assessment Review (STAR) panel meeting May 4-8th in Newport, OR. The assessment concluded that since 1943 the stock has experienced chronic annual overfishing, defined as fishing mortality rates in excess of $F_{40\%}$, which is the rate that would reduce the expected lifetime egg production of a new recruit to 40% of that expected to occur in the absence of fishing. Moreover, the assessment concluded that the abundance of the stock has been below the minimum stock size threshold (MSST) since 1953, which would require the development of a stock rebuilding plan. For all Council groundfish stocks, the MSST is defined to be 25% of the biomass if there were no fishing ($B_{25\%}$). In contrast to these conclusions, the assessment also showed that the stock has supported very steady annual catches in excess of 2,000 mt for the last half century. Moreover, the stock assessment team (STAT) argued that the Council's proxy flatfish reference points ($F_{40\%}$ and $B_{25\%}$) were inappropriate, given the estimated productivity of the stock. The STAR panel review concurred with the STAT's evaluation and recommended that the reference points (B_{msy} and F_{msy}) developed specifically for petrale sole be used by the Council in developing ABC and OY recommendations for the 2011-2012 biennial management cycle.

The SSC reviewed the stock assessment and the STAR panel report at the Council's June 2009 meeting in Spokane, WA and, based on a number of concerns that were identified at that time, was unable to endorse a re-definition of reference points specific to petrale sole. Instead, the

SSC developed a list of analytical requests and asked that the STAT conduct further analysis and report its findings to a meeting of the SSC's groundfish subcommittee to be held sometime later in the summer. This report summarizes the deliberations of the subcommittee meeting, which was held August 31st at the Alaska Fisheries Science Center in Seattle, WA and provides several recommendations regarding the petrale sole stock.

The Problem

The Council has used a harvest control rule for its assessed groundfish stocks since passage of Amendment 11 to the FMP in 1998. The control rule specifies proxy F_{msy} harvest rates for flatfish and Pacific whiting ($F_{40\%}$), roundfish ($F_{45\%}$), and rockfish ($F_{50\%}$)1. The Council adopted these three taxon-specific proxy fishing mortality rates, due to perceived differences in the productivity among these groups. However, at the same time the Council has used a single "target" stock biomass as its nominal B_{msy} proxy ($B_{40\%}$), as well as a single MSST ($B_{25\%}$). The use of proxy estimates of F_{msy} and B_{msy} was adopted by the Council due to inherent statistical difficulties in estimating these quantities in any single stock assessment and because of a well-developed scientific literature supporting the use of proxies. Nonetheless, the Council has previously been confronted with peculiarities associated with the use of its proxies. For example, in the case of Pacific whiting where, if fished at the proxy harvest rate, the spawning biomass would be expected to drop below the MSST with some regularity. Fundamentally, as the productivity of a stock increases, the fishing mortality rate that produces MSY increases and, concomitantly, the relative biomass of the stock when fished at that rate decreases. Hence, flatfishes would be expected to have a lower relative B_{msy} value than rockfishes and logically might have a lower MSST than rockfishes as well. However, all Council groundfish stocks are currently judged identically with respect to being overfished.

Requests to the Petrale Sole Analytical Team

In June the SSC developed a list of analyses for the petrale sole STAT that were divided into two major areas. The first set of analyses was designed to explore the extent of parameter confounding and the influence of Canadian catches on the stock assessment model, including: (1) generating MCMC outputs for key model parameters, (2) evaluating the effect of Canadian removals on stock status, (3) incorporating a new "prior" on spawner-recruit productivity, also termed steepness (h), and (4) altering the prior on the natural mortality rate (M) to make it more informative. The second set of requests dealt specifically with the use of generalized proxies versus petrale-specific management quantities, including: (1) characterization of uncertainty in estimates of B_0, B_{msy}, $B_{40\%}$, and F_{msy}, (2) evaluating the effect of time-blocked selectivities on the estimate of B_{msy}, and (3) providing a clear argument to support the use stock-specific estimates.

Response to the SSC Groundfish Subcommittee

The petrale sole STAT attempted to complete all the requested analyses but was unable to generate a converged MCMC chain from the base model due to a technical difficulty with the Stock Synthesis modeling platform. This precluded a detailed evaluation of parameter

1 Note that an $F_{40\%}$ harvest rate is greater than an $F_{45\%}$ harvest rate, which in turn is greater than an $F_{50\%}$ harvest rate, i.e., flatfish are expected to achieve MSY at greater fishing pressure than rockfish.

confounding and prevented a thorough description of uncertainty in some of the key assessment outputs, including the stock-specific estimates of B_{msy} and F_{msy}. The STAT reported that the technical difficulty has now been solved but that there was insufficient time available to conduct an MCMC analysis before the subcommittee meeting. The team did succeed in developing a Canadian petrale sole catch history, but was unsuccessful in its attempt to incorporate those data into the base model, primarily because the Canadian compositional data were unavailable until just before the subcommittee meeting and when reviewed they differed markedly from the lengths and ages from Washington. The subcommittee agreed with the STAT that incorporation of the Canadian data in the assessment would require considerable additional work and should be done in collaboration with Canadian scientists. With respect to incorporating priors on *h* and *M*, the STAT was successful, but the effect of those analyses on the assessment was minimal, as was the effect of time-varying selectivity blocks on the model's estimate of B_{msy}.

Given the information and analyses that were presented, the subcommittee found no fault with the base petrale sole model that was approved by the STAR panel and recommends that it be used as the basis for setting an ABC and OY. However, in light of the base model's stock-specific estimates of B_{msy} (19% of B_0) and F_{msy} (equivalent to $F_{20\%}$) the subcommittee discussed at some length the wisdom of using the Council's flatfish harvest control rule proxies for petrale sole.

In addition, with respect to survey catchability, during the SSC review of the assessment in June, the catchability coefficient for the NWFSC combined trawl survey was considered. In particular, the parameter estimate was considered high (q = 3.07) and reasons for this were discussed. During the groundfish subcommittee meeting the STAT team presented additional information to help the subcommittee interpret the estimate, including video showing the Aberdeen trawl footrope and the response of flatfish and rockfish to the approaching net. Although the subcommittee concluded that there was no basis for rejecting the assessment based on the estimate of *q*, the development of a prior for survey catchability, as had been anticipated from the 2008 survey catchability workshop, may have been useful.

The subcommittee also received comment from industry representatives present at the meeting regarding petrale sole fishery-dependent logbook CPUE data that evidently have increased substantially. When petrale sole is next assessed, it would be helpful to document and reconcile this increase in CPUE with the trends estimated by the model.

SSC Groundfish Subcommittee Recommendations

The SSC groundfish subcommittee still endorses the use of proxies as a general practice for two important reasons. First, as noted previously, it is usually quite difficult to obtain reliable stock-specific estimates of B_{msy} and F_{msy} in any particular assessment (Haltuch *et al*. 2008). From a meta-analytical perspective there is no doubt that useful inference about stock productivity can be drawn by comparative analysis of information drawn from studies of related species in comparable habitats. Second, the use of proxies has a stabilizing influence on stock reference points, which is beneficial to the management process. However, given the marked discrepancies between the Council's existing flatfish proxies and the stock-specific reference points derived from the approved base model ($F_{20\%}$ and 19% depletion), the subcommittee recommends that new flatfish proxies be developed for Council management. To that end, the

subcommittee reviewed an analysis of productivity parameters for west coast flatfish (Dover sole, petrale sole, English sole, arrowtooth flounder, and starry flounder) developed by Dr. Martin Dorn and concluded that steepness was at least h = 0.80. Moreover, recent results presented in Punt *et al*. (2008) show that for a diverse set of west coast groundfish stocks (Pacific whiting, sablefish, petrale sole, and canary rockfish), a steepness value of 0.80 is associated with an F_{msy} value that is roughly equivalent to $F_{30\%}$ when the stock-recruit relationship has a Beverton-Holt form (see Figure 1). Moreover, the level of stock depletion associated with fishing at F_{msy} is approximately $B_{25\%}$ (see Figure 2). The subcommittee noted that use of the Beverton-Holt stock-recruitment relationship is appropriate in this case because: (a) all stock assessments for west coast groundfish are based on this relationship and (b) the data for petrale sole support the Beverton-Holt curve over the Ricker relationship.

Based on these considerations the SSC's groundfish subcommittee recommends that the Council tentatively adopt those values as new west coast flatfish MSY proxies. In addition, given that the current MSST ($B_{25\%}$) for groundfish is 62.5% of the target biomass ($B_{40\%}$), the subcommittee recommends that for west coast flatfish under Council management, the MSST be set at $B_{15\%}$, which is 60% of the target stock size. Because the estimate of petrale sole stock depletion in 2009 from the STAT's base model is 11.6%, if this MSST is adopted the stock would be declared overfished.

The subcommittee also recommends that a more comprehensive analysis of the PFMC's harvest control rule proxies be undertaken as soon as practicable, which may influence and/or supersede these recommendations. In particular, biomass targets and thresholds should be established that are consistent with expected stock productivities and in accordance with expected levels of intrinsic stock variability. The subcommittee recognizes that this will be a major undertaking, which logically should be conducted as a full management strategy evaluation, but these issues and concerns are fundamental to proper utilization, conservation, and stewardship of groundfish resources.

Haltuch, M.A., Punt, A.E. and M.W. Dorn. 2008. Simulation testing alternative estimators of unfished stock size. *Fish. Res.* 94:290-303.

Punt, A.E., M.W. Dorn, and M.A. Haltuch. 2008. Evaluation of threshold management strategies for groundfish off the U.S. west coast. *Fish. Res.* 94:251-266.

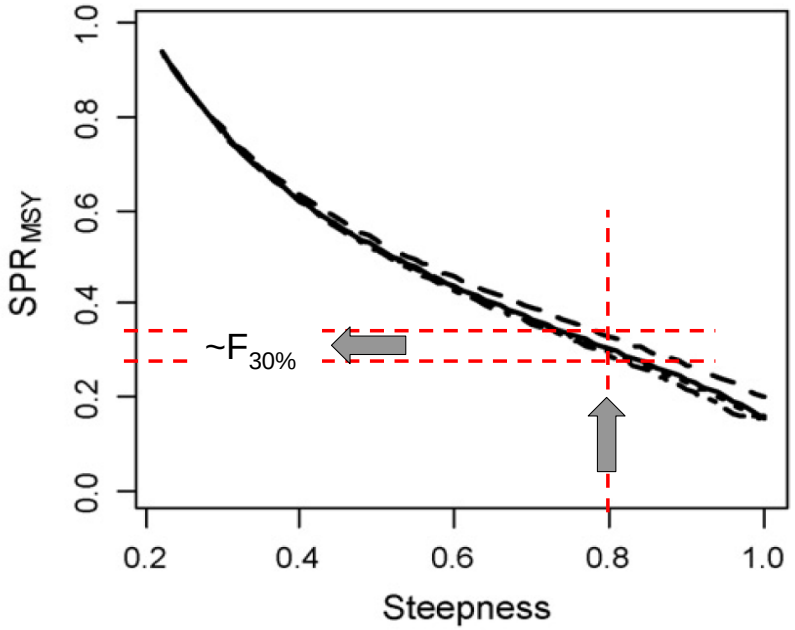

Figure 1. Relationship between spawner-recruit steepness (***h***) and the fishing mortality rate, expressed as spawning potential ratio (SPR), that maximizes sustainable yield among four west coast groundfish stocks (taken from Punt *et al*. 2008).

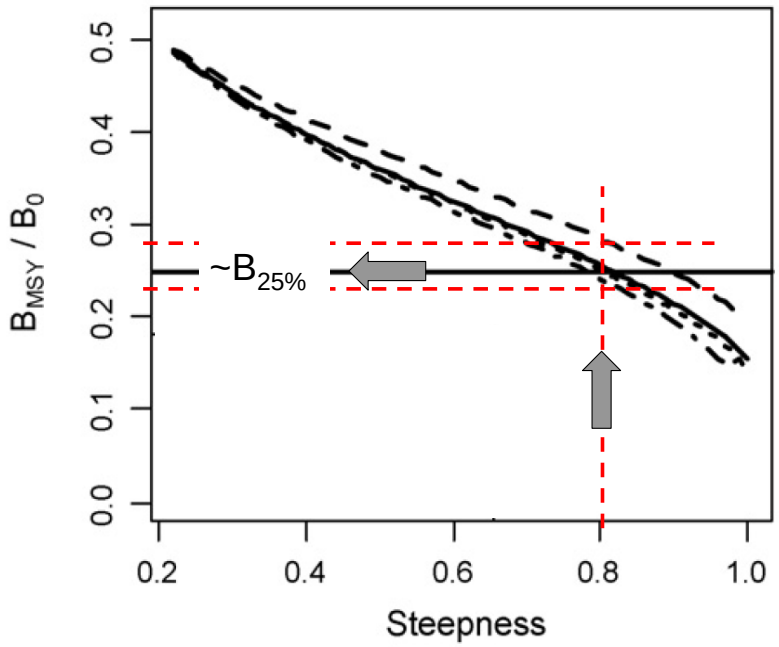

Figure 2. Relationship between spawner-recruit steepness (***h***) and the level of stock depletion that is consistent with attainment of MSY among four west coast groundfish stocks (taken from Punt *et al*. 2008).

Marine Protected Areas (MPAs)

C.3. National System of MPAs

The Scientific and Statistical Committee (SSC) reviewed background materials and a list of existing management areas currently nominated by National Marine Fisheries Service (NMFS) for inclusion in a national system of Marine Protected Areas (MPAs). This is the National Marine Protected Area Center's second round of site nomination review and the Council was asked to comment on the candidate area list for the West Coast by early November. The Council will review and comment on the nominations at the September meeting, followed by approval of the list at the November meeting. No representative from the MPA Center or its advisory board was available to present information to the SSC due to a scheduling conflict; however, Lisa Wooninck, Environmental Policy Specialist at the Monterey Bay National Marine Sanctuary was available to answer questions about the nomination process.

Executive Order 13158 (May 2000) requires the establishment of a national coordinated system of MPAs. The stated purpose of the national system of MPAs is to provide a framework for enhancing conservation objectives in marine managed areas and to improve coordination and communication among the many agencies that establish them. The MPA Center has no authority to alter fishery management activities in sites that are included in the national system.

The SSC was requested to review a list of potential sites for nomination developed by NMFS in August 2009. The list consists of areas managed as Essential Fish Habitat (EFH), including Habitat Areas of Particular Concern (HAPCs). National Wildlife Refuges, National Estuarine Reserves, Federal sites within the Marine Sanctuaries and National Park Service, and some state managed areas are already part of the national system. By adding EFH sites to the nomination list, current area management efforts will be explicitly evaluated in the selection of MPAs for the nationwide system, leading to a comprehensive inventory of managed sites. However, the SSC is concerned about costs to the Council process that may be incurred if EFH sites are considered critical components of a network of protected areas. Potential changes to both policy and procedure need to be articulated and considered.

The SSC was asked to comment on an upcoming gap analysis that will be conducted by the Center to evaluate whether the MPA System will meet all of its stated conservation and management objectives. Guidelines for MPA system design were provided in documents by Dr. Mark Hixon, Chair of the Federal MPA Science Advisory Board: "Guiding Principles for Ecological Gap Analysis of the National System of Marine Protected Areas" and "Ecological Resilience and Gap Analysis of the National System of Marine Protected "Areas." These documents provide guidance but not practical advice for choosing potential sites, and contain a number of conservation objectives that are different from the objectives of EFH designation. There are some overlaps in EFH criteria with the "Sustainable Production" objectives listed by the MPA Center, and some HAPC sites include habitat or diversity that meets the Center's stated "Natural Heritage" objectives. However, more information on scientifically-based criteria for site selection and the expectations for inclusion of additional sites to meet the MPA Center's objectives is needed.

In its February 13, 2007 letter to the National MPA Center, the Council lent its support for a comprehensive inventory of MPA sites "as ecosystem-based fishery management and place-based area management concepts are further investigated." The inventory concept has now taken the form of a National System with process requirements for initial nomination of sites and changes to sites once they are included in the System. The SSC has the following questions regarding the implications of Council nomination of MPAs to the National System:

- What is the basis for the MPA Center's choice of potential sites to be considered by NMFS and the Council for nomination to the National System?
- What are the implications of including certain areas in the National System and excluding others? For example, does exclusion of RCAs from the System imply that protections provided by Rockfish Conservation Areas (RCAs) will not be considered in the gap analysis?
- In cases of disagreement among the MPA Center, NMFS and/or the Council regarding the adequacy of justifications provided for site nomination and changes to sites once they are included in the National System, whose view will prevail?
- Will Council justification for changes to areas managed for fisheries be deemed adequate if it is based on the Council's management needs? Is such justification expected to address MPA Center objectives as well? For instance, if the MPA Center's gap analysis leads to future actions involving inclusion of Council-managed sites as part of an MPA network, would Council justification for modification to such sites require consideration of effects on the network?
- Future Council deliberations regarding modification to EFH and other existing area-based restrictions will need to adhere to the Council's public process requirements. Changes to Council-managed sites included in the National System would also trigger public process requirements. To what extent are the public process requirements for modifying the National System redundant with the Council's process or likely to slow or impede the Council decision making process?
- Are additional gap analysis documents being prepared that provide operational guidance?

In addition to receiving some comment from the Center on these questions, the SSC recommends that the Council continue dialogue with the MPA Center as it begins its first the gap analysis process on the west coast in 2009-2010. The SSC can assist the Council by providing feedback on documents intended to inform that process.

Groundfish Management, continued

E.3. Off-Year Science Improvements for Groundfish Fishery Management

The Scientific and Statistical Committee (SSC) reviewed a number of off-year research proposals submitted by Council Staff, National Marine Fisheries Service (NMFS) Fisheries Science Centers, and Stock Assessment Review (STAR) Panels. The SSC found a significant degree of overlap between proposals and grouped them into categories for analysis and response.

The SSC did not find it necessary to conduct a review of the STAR process as proposed by Council Staff. The 2009 Panels worked well with a high degree of consistency and the overall quality of stock assessments was much improved, followed the Terms of Reference and promptly produced the analyses and information needed by the SSC.

The second Council Staff proposal suggests a harvest policy evaluation workshop to review the current groundfish management framework. The SSC supports this proposal and notes that the idea is repeated in the STAR Panel recommendations contained in Item E.3.a, Attachment 1. The SSC places a high priority on a harvest policy workshop to evaluate a range of harvest control rules and to develop a management strategy evaluation (MSE). One area of interest is establishment of a tiered system of control rules based on data quantity and quality.

There are several recommendations related to the use and potential modification of the Stock Synthesis model. The recommended research relates to instituting changes and additions to the SS3 model. The SSC supports this as a high to medium priority and suggests that the proposed work be brought forward through a series of mini workshops of assessment scientists actively engaged in the topics.

The SSC places a high priority on the establishment of a working group to assess alternative assessment methods for data poor stocks. The SSC is seeking simpler, robust assessment methods to track data poor stocks.

The SSC endorses the NMFS Science Center proposal for standardization of the triennial trawl survey calendar date effect, and the STAR Panel proposal for the same work and an examination of q priors as high priority items. The SSC hopes this may reduce some of the uncertainty in trawl survey estimates.

The recommendation for catch reconstruction in Washington and Oregon is a high priority for the SSC. Catch reconstruction worked well for California and the SSC encourages Oregon and Washington to complete their reconstructions. High quality catch data is a critical element for stock assessment.

The SSC places medium priority on STAR Panel recommendations related to model development, but encourages further evaluation. A STAR Panel recommendation to explore model parameters and data treatment via simulations methods is an item that ought to provide insights into model performance.

The SSC in its review of the recommendations determined that here is a need for additional high priority items:

A workshop or working group to evaluate the use of the International Pacific Halibut Commission (IHPC) survey in the yelloweye rockfish assessment and to develop recommendations on how to incorporate supplemental samples being collected by the States of Oregon and Washington.

A working group to explore the development of spatial modeling methods. The SSC notes that spatial modeling and data handling was handled in several different ways in the assessments completed this year. More guidance is needed on establishing criteria for developing spatially explicit models.

The SSC notes that both the cabezon and lingcod assessments reported results of indices of local abundance produced by small-scale monitoring programs distributed along the coast. While these monitoring programs have potential utility for stock assessment, at present it unclear how this

information can be used in stock assessments, which typically are conducted at a larger scale than these local monitoring programs. A workshop to consider methods of incorporating this information in stock assessments, and promoting greater coordination of these monitoring programs would be valuable.

The SSC concurs with the STAR Panel recommendation regarding the need for a standardized repository of recreational data required for use by stock assessment analysts. These include catch per unit of effort (CPUE), age and length data, and total catch data. This is a long standing problem that once again should be brought to the attention on of RecFIN and the contributing agencies.

Groundfish Management Continued

E.5. Fishery Management Plan Amendment 23 – Annual Catch Limits

The Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006 (MSRA) established several new fishery management provisions pertaining to National Standard 1 (NS1) of the Magnuson-Stevens Fishery Conservation and Management Act. On January 16, 2009, the National Marine Fisheries Service (NMFS) published a final rule in the Federal Register to amend the guidelines for NS1 that provide guidance to the Councils in revising their Fisheries Management Plans (FMPs) to conform to the new MSRA requirements. Specifically, there is now a need to implement overfishing levels (OFLs), annual catch limits (ACLs), annual catch targets (ACTs), and accountability measures (AMs) by 2011 for most species, and by 2010 for those species designated as being subject to overfishing. The major task for the Scientific and Statistical Committee (SSC), however, is to satisfy provisions of the MSRA to redefine the Acceptable Biological Catch (ABC) to account for scientific uncertainty.

The Council has decided to framework how ABCs will be calculated in its groundfish and coastal pelagic species (CPS) fishery management plans (FMPs). The SSC provided a conceptual framework in April 2009 to account for scientific uncertainty when calculating ABCs for "data-rich" stocks with a history of multiple assessments. They recommended quantifying the variability in biomass estimates from stock assessments as a basis for evaluating the size of a scientific uncertainty buffer (i.e., the difference between the OFL and the ABC) and the risk of overfishing the stock.

The groundfish and coastal pelagic species subcommittees of the SSC met in Seattle, Washington September 1-2, 2009 to discuss implementation of the NMFS guidelines and, in particular, how to calculate the scientific uncertainty buffer that defines the difference between the OFL and the ABC. That meeting considered three general approaches to defining scientific buffers for groundfish and CPS species, and agreed that defining these buffers based on a value of P^* (the probability of exceeding the OFL) was most appropriate. This scientific buffer would be based on a tier system, with different tiers for species with different levels of information. The size of the buffer for data-rich stocks would be determined using information on "between" and "within" assessment variation in biomass estimates, and with buffers for data-poor species being set larger than data-rich species. While this is only a first step in quantifying scientific uncertainty, the SSC endorses this approach.

The SSC recommends that the method of translating a value of *P** into a scientific buffer should be frameworked in the environmental assessment (EA) because methods for doing this translation are still evolving and because no methods currently exist that can capture all sources of scientific uncertainty. The SSC intends to use the approach it outlined in April as the basis for providing ABC recommendations at the March 2010 meeting. While not perfect, in particular because it does not address assessment bias, this approach captures many key sources of scientific uncertainty to the extent currently possible. Specifically, two sources of scientific uncertainty will be computed: (a) the statistical uncertainty that is captured within each stock assessment and (b) a measure of the remaining scientific uncertainty which cannot be captured within a stock assessment, but can be inferred from changes over time in estimates of biomass from stock assessments. Dr Stephen Ralston and assessment authors will be working to collate the information needed to compute the between-assessment variation in biomass estimates for data-rich species, and hence the magnitude of this second source of uncertainty, with a view to providing an example at the November meeting of how the approach can be applied to calculate scientific buffers.

The SSC concurs with the need to revisit the OFL and ABC values for: (a) species with ABCs computed by multiplying survey swept-area biomass estimates by 0.75**M*, (b) Restrepo's method of computing 50% of the average catch over a period of years when catches are stable, and (c) species complexes that are aggregates of single species. This task will need to be completed at the March 2010 meeting and may involve a special meeting of the SSC groundfish subcommittee in early 2010.

The SSC notes that it has focused its attention on approaches for determining scientific uncertainty and calculating scientific buffers, given a measure of scientific uncertainty and a choice for *P**. The SSC expects that the Council will choose values of *P** for each tier level; the SSC is willing to work with Council staff to develop tools to illustrate the trade-offs between the probability of overfishing and the size of scientific buffers.

Finally, the SSC notes that it is in the somewhat unusual role of developing methods and also reviewing them. However, methods development has occurred primarily by members of the groundfish and CPS subcommittee and additional review can be provided by SSC members who are not on these subcommittees. The methodology will likely be presented at the National SSC meeting in November, and further review of the methods will also occur as part of the review of the EA.

SSC Notes

The sensitivity of the meta-analysis results should be examined to assuming that the most recent stock assessment is most correct and using information for only the last ten years of the assessment period to compute the distribution of differences.

SSC Groundfish and CPS Subcommittee Report on Implementation of National Standard 1 for West Coast Groundfish and Coastal Pelagic Species.

September 1-2, 2009 Seattle, WA

Background:

The Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006 (MSRA) established several new fishery management provisions pertaining to National Standard 1 (NS1) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), which states, "Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield (OY) from each fishery for the United States fishing industry." On January 16, 2009, the National Marine Fisheries Service (NMFS) published a final rule in the Federal Register to amend the guidelines for NS1 that provide guidance to the Councils in revising their Fisheries Management Plans (FMPs) to conform to the new MSRA requirements.

The MSRA and amended NMFS guidelines introduce new fishery management concepts including overfishing levels (OFLs), 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. These important aspects of the MSRA are required to be implemented by 2011 for most species and by 2010 for those species designated as being subject to overfishing. A new definition and control rules for specifying an Acceptable Biological Catch (ABC) which, under the new NS1 guidelines, factors scientific uncertainty into the specification, will likely take considerably more thought.

The Council decided to framework these guidelines in its groundfish and coastal pelagic FMPs under an ambitious amendment schedule targeting the November, 2009 Council meeting to synchronize with the groundfish biennial specifications process which starts at that meeting. The Scientific and Statistical Committee (SSC) provided a conceptual framework in April for factoring scientific uncertainty in the ABC rule for stocks with a history of multiple assessments. They recommended quantifying variability in assessment outcomes as a basis for evaluating the size of a scientific uncertainty buffer (i.e., the difference in yield between the OFL and the ABC) and the risk of overfishing the stock. The SSC and Council staff will also coordinate development of ABC control rules to synchronize with the 2011-12 biennial specifications process. Development of ABC control rules and ACL considerations for target and overfished species will be prioritized, with unassessed species as the next priority. The Council asked for ABC control rules that are based on relatively simple and understandable metrics.

Considerations:

The Groundfish and Coastal Pelagic Species (CPS) subcommittees of the Pacific Fisheries Management Council's (PFMC's) Scientific and Statistical Committee (SSC) met in Seattle Washington on September 1-2, 2009 to discuss implementation of the NMFS guidelines under the Council process, and particularly how to implement the scientific uncertainty buffer which defines the difference between OFL and ABC.

Dr. Richard Methot presented the NOAA Fisheries Office of Science and Technology view on how ABC, ACL and ACTs will relate to OFLs under the new NS1 guidelines. All of these are

expressed in terms of total catch (i.e. landings and discards combined), whether in biomass or numbers. The talk focused on incorporating scientific uncertainty to define the difference between the OFL and the ABC. Dr. Andre Punt presented methods considered for the Bering Sea and Aleutian Islands crab stock given uncertainty estimates.

The three general approaches to defining buffers for groundfish and CPS species considered were:

1. Create a Tier system whether the size of the buffer between the OFL and the ABC will the same for all species in each size but differ among tiers; the size of the buffer would increase with increasing tier number (from well-assessed Tier 1 species up through increasingly data poor species).
2. Use P* (a probability of exceeding "true" OFL (the OFL level which would be defined given perfect information about the stock and the proxy SPR fishing rate)). This can include a tier system as above. The relationship between P* and the size of the buffer would be calculated using the Tier 1 (well assessed) species.
3. Use a decision-theoretic approach.

The meeting agreed that the decision-theoretic approach required too much information and was too complex to implement in the limited timeframe. It was also not clear that the example presented for crab was defining its objective in a way that reflects avoidance of overfishing. The meeting also noted that adopting approach 1 (fixed buffers by tier) would mean that species would differ a tier in terms of the probability of exceeding "true" OFL which adopting approach 2 (fixed P* by tier) would mean that species within a tier would differ in terms of the buffer applied.

The P* approach associated with a tier system appears the most appropriate approach at this time. One additional difficulty is that currently projections can only correctly estimate buffer for a single year forecast. While methods to approximate the correct buffer in multi-year forecasts were discussed, the subcommittees concluded that forecasting while using the buffer for the single year forecast for multiple years would be acceptable until appropriate multi-year forecasting software is developed.

Dr. Stephen Ralston presented a method for estimating historical between-assessment variability as one component of uncertainty to consider. The subcommittees agreed that this was a reasonable way to estimate uncertainty external to individual assessments. However, a number of improvements to the method were suggested, and further discussion of the method is needed prior to it being used. These suggestions include:

1. using only full assessments (or the most recent update of a full assessment in lieu of the full assessment itself);
2. limiting the time frame for comparison between assessments (certainly not considering the earliest periods which may generally reflect B_0, and perhaps more limited than that); and
3. not including early assessments that used considerably less sophisticated assessment methods, or which were severely data limited.

Dr. Ralston agreed to work on the method and to produce results for a larger suite of species using several approaches, while assessment authors and others would be tasked with producing

the retrospective time series as well as the measures of uncertainty from the most recent assessments.

General Conclusions:

The SSC subcommittees propose the following method for determining the scientific uncertainty in OFL values: for species with successful assessments develop estimates of between (external) assessment uncertainty (using retrospective multi-species meta-analyses) and within (internal) assessment uncertainty (using asymptotic estimates of uncertainty) within individual assessments. For CPS stocks, consider grouping with groundfish or analyzing separately (the latter less likely to be successful due to the few assessed species within CPS).

The SSC subcommittees suggest providing the council with graphs of isopleths for the relationship of P* to buffer (proportion of catch) given internal and external variance estimates, using log-normal approximation (see figures 1 and 2 for examples) to aid in Council decision making. These figures could be annotated with lines denoting the internal assessment uncertainty.

While the P* values chosen by the Council will determine buffers for future assessments, there should be some flexibility for specific decisions about ABC within this framework to account for perceived unaccounted for of uncertainties. Given greater uncertainty with a greater number of forecast years, there is more incentive to do new assessments for species important to the fishery.

The SSC subcommittees suggest revisiting OFL and ABC values for species with ABCs defined via Roger's method of considering survey area swept biomass estimates and applying $F = 0.75*M$ or Restrepo's method of half of average catch over a period of years, and for species complexes which are made up largely of such species. Revisiting, updating and improving these methods, as well as examining uncertainty associated with them would be a key off-year science project. The results of the uncertainty examination will provide a stronger basis for developing buffers which are at least as risk-averse as those developed based on assessment uncertainty. Since OFL and ABC values for many data-poor species are based on analyses that have not been updated for some time, consideration should be given to establishing an additional buffer that reflects the timeliness of the information used to establish the OFL and ABC values.

There are species for which only one full assessment has been conducted. The buffer for these species will also be computed using the outcome of the further application of Ralston's method.

For many species within complexes, discard, often from fisheries without observers, is the largest component of catch which may therefore be poorly known. For those species with low vulnerability due to closures and other fishery management actions, this may be of little concern in the near term.

The SSC subcommittees note that vulnerability scores would affect ACLs rather than ABCs, and factors such as in-season tracking issues would affect ACTs. Since being in the precautionary zone of relative spawning output is in a sense an indication of increased vulnerability, the 40-10 rule and similar catch-reduction rules could be applied to ABCs as part of the determination of the ACLs.

Finally, the SSC subcommittees note that any system for defining scientific uncertainty is necessarily approximate. Specifically, although the method outlines attempt to capture all quantifiable scientific uncertainty, there are sources of uncertainty (e.g. caused by climate change, stock structure uncertainty, the validity of F_{MSY} proxies, etc.) which cannot be addressed at present (and probably not in the foreseeable future). Many of these sources of uncertainty should be more important on a longer time-scale.

Near-term Approach:

The following stock assessment authors and Council Staff will be asked to provide retrospective assessment time series as well as biomass CV's from the most recent assessments and a description of parameters estimated or fixed within those assessments to Steve Ralston by October 2, 2009:

- Jason Cope: Cabezon
- Paul Crone: Pacific mackerel
- John DeVore: Sablefish and Dover sole
- John Field: Chilipepper rockfish and Bocaccio
- Melissa Haltuch: Petrale sole
- Owen Hamel: Darkblotched rockfish, Pacific ocean perch, shortspine thornyhead and lingcod
- Xi He: Widow rockfish
- Kevin Hill: Pacific sardine
- Ian Stewart: Pacific hake and canary rockfish
- John Wallace: Yellowtail rockfish

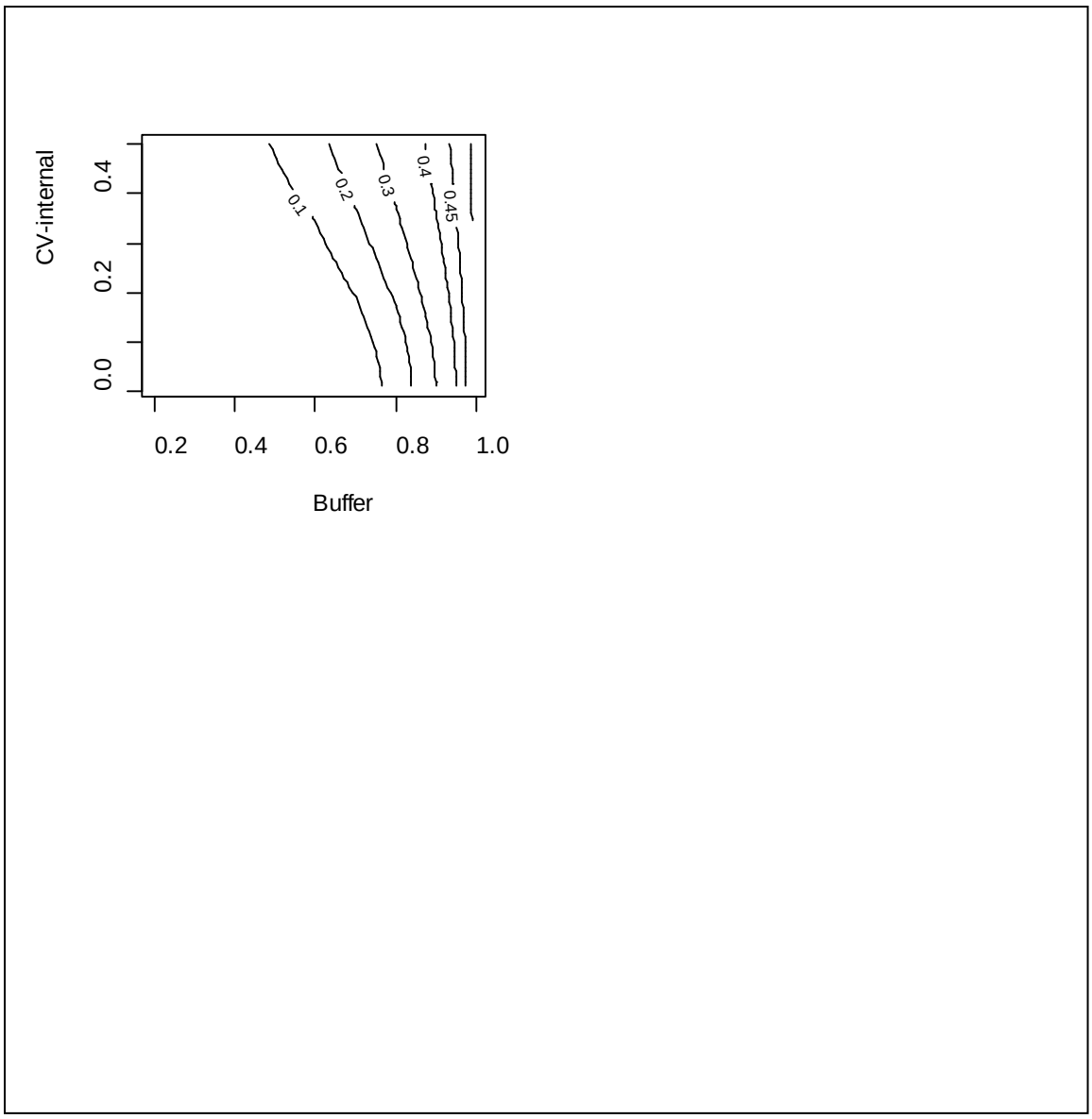

Figure 1. Isopleths of P* values associated with a buffer (Proportion that ABC is of OFL) and the internal (to the assessment) CV and the external CV (to be provided by Ralston's analysis).

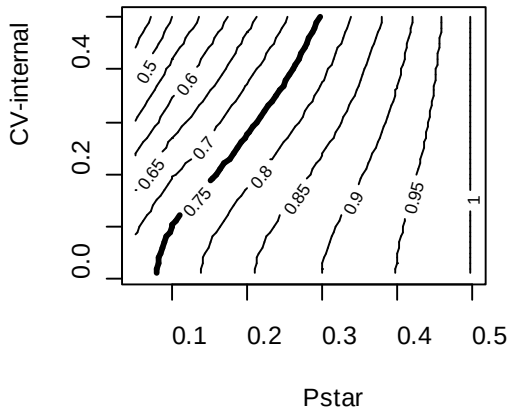

Figure 2. Isopleths of buffer values associated with P* values and the internal (to the assessment) CV and the external CV (to be provided by Ralston's analysis). The buffer of 0.75 is bolded in each graph for ease of comparison.

Groundfish Management Continued

E.8. Report on Catch of Unidentified Rockfish in Recreational Fisheries

Mr. Russell Porter of the Pacific States Marine Fisheries Commission briefed the Scientific and Statistical Committee (SSC) on the treatment of unidentified rockfish within the Recreational Fisheries Information Network (RecFIN), including a historical perspective and differences among States in the way that this catch category is tracked and recorded. Mr. John Budrick (California Department of Fish and Game [CDFG]) and Ms. Lynn Mattes (Oregon Department of Fish and Wildlife [ODFW]) of the Groundfish Management Team (GMT) were present to answer questions regarding written materials that were provided by ODFW and CDFG. The SSC also received a written report from Washington Department of Fish and Wildlife on this subject.

Unidentified rockfish catches from recreational fisheries are currently not taken into account in stock assessments, the setting of optimum yields (OY), or the tracking of catches against limits. The amount of unidentified rockfish in each state is small, but not insignificant, compared to identified catches, and the proportion of unidentified catch has been trending down in recent years, apparently due to angler education efforts and public awareness that overfished species may not be retained. Preliminary analyses presented in the State reports indicate that this unaccounted catch is probably not of sufficient magnitude to have caused the OY for any overfished rockfish to have been exceeded in recent years.

It is consistent with the goal of total catch accounting for this source of additional impacts to be included in rockfish management. However, there does not appear to be an immediate conservation concern related to this issue, and development of a solution represents a significant additional workload. There is a range of possible ways to apportion this catch by species, and differences exist in the data collected among States that complicate potential solutions. Therefore, the SSC recommends that the RecFIN staff be asked to work with state representatives to partition the unidentified rockfish catch to species so that the results can be incorporated into management as soon as is practical. The SSC suggests that any proposed analytical protocols should be reviewed by the RecFIN Statistical Committee before they are considered for use in stock assessments or management decisions.

Salmon Management

G.1Fishery Management Plan Amendment 16 – Annual Catch Limits

The Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006 (MSRA) established several new fishery management provisions pertaining to National Standard 1 (NS1). On January 16, 2009, the National Marine Fisheries Service (NMFS) published a final rule in the Federal Register to amend the guidelines for NS1 that provide guidance to the Councils in revising their Fisheries Management Plans (FMPs) to conform to the new MSRA requirements. Specifically, there is now a need to implement overfishing levels (OFLs), annual catch limits (ACLs), annual catch target (ACTs), and accountability measures (AMs) by 2011 for most species, and by 2010 for those species designated as being subject to overfishing. The major task for the SSC, however, is to satisfy provisions of the MSRA to redefine the Acceptable

Biological Catch (ABC) to account for scientific uncertainty.

The Salmon Amendment Committee (SAC) has met several times to consider Amendment 16 to bring salmon management into conformance with the MSRA. Dr. Peter Dygert presented their progress to date to the SSC.

Their major conclusions regarding the task ahead of them are that: (1) meeting the requirements of Amendment 16 is going to require a major rewrite of the salmon FMP, (2) there are going to be substantial changes to Status Determination Criteria (i.e., overfished and overfishing), and (3) there will be substantial changes to salmon management south of Cape Falcon.

The SSC discussed these issues with members of the SAC and provided them with information on how other species groups, including groundfish and coastal pelagic species, had approached the new guidelines. The SSC offered to work closely with the SAC so that our review of Amendment 16 will go smoothly.

Salmon Management

G.22009 Salmon Methodology Review

At the April meeting, the Council identified the following six priority items that the Scientific and Statistical Committee (SSC) should consider for the 2009 Salmon Methodology Review.

- Assessment of the September 1 maturity boundary assumption for Klamath River fall Chinook (KRFC).
- Forecasting impact rates in fall fisheries for KRFC and Sacramento River fall Chinook.
- Evaluation of the Oregon Coastal Natural (OCN) coho abundance predictor.
- Sensitivity analyses of the Chinook and Coho Fishery Regulation Assessment Models (FRAM) to major assumptions, including sensitivity to parameters related to mark selective fisheries.
- Characterization of bias in the mark selective Chinook and Coho FRAM.
- Development of ocean abundance predictors for Columbia River Fall Chinook stocks.

Reports on the following four items will be ready for review at the methodology meeting:

1. Assessment of the September 1 maturity boundary assumption for KRFC.
2. Forecasting impact rates in fall fisheries for KRFC and Sacramento River fall Chinook.
3. Characterization of bias in the mark selective Chinook and Coho FRAM.
4. An update on the progress in developing ocean abundance predictors for Columbia River Fall Chinook stocks.

In addition, the Washington Department of Fish and Wildlife and Puget Sound Treaty tribes will be giving a report on the methods used to establish conservation objectives for Puget Sound coho. Currently these methods are the basis for management of Puget Sound coho stocks under the Pacific Salmon Treaty and/or the Comprehensive Coho agreement but they are not formally included in the current Salmon Fishery Management Plan (FMP). The intent is to incorporate them into the Salmon FMP prior to the 2010 management season. Consequently, they require review in the Council process. In addition, incorporating these stocks in this time frame will help facilitate the Amendment 16 process.

The SSC looks forward to reviewing reports on these topics at the November meeting. The SSC Salmon Subcommittee and Salmon Technical Team (STT) will hold a joint meeting on October 5 and 6 in Portland to review these issues. As always, the SSC requires good documentation and ample review time to make efficient use of the SSC Salmon Subcommittee's time. Materials to be reviewed should be submitted at least two weeks prior to the scheduled review. Agencies should be responsible for ensuring that materials submitted to the SSC are technically sound, comprehensive, clearly documented, and identified by author.

Pacific Halibut Management

H.2. Halibut Bycatch Estimates for International Pacific Halibut Commission

Dr. Jim Hastie (NWFSC) briefed the Scientific and Statistical Committee (SSC) on Pacific halibut bycatch estimates for the 2008 groundfish bottom trawl fishery. The SSC also received a document on September 13 pertaining to halibut bycatch in the longline fishery. However, SSC comments are limited to the trawl bycatch estimates because the longline estimates arrived too late for the SSC to review

The catch weight of halibut taken in the trawl fishery was estimated on the basis of bycatch rates provided by the West Coast Groundfish Observer Program (WCGOP), stratified by season, depth, latitude, and arrowtooth flounder catch rate categories. Each bycatch rate was multiplied by the corresponding stratum estimate of 2008 trawl effort, as determined from Oregon and Washington trawl logbooks.

Bycatch mortality is based on WCGOP observer data pertaining to the viability of discarded halibut, which uses a condition key originally developed by the International Pacific Halibut Commission for observers in North Pacific fisheries. The bycatch mortality rates associated with each condition ("dead", "poor", "excellent") are 90 percent, 55 percent and 20 percent respectively. A sensitivity analysis was conducted using alternative methods of stratification, but it did not isolate the effects of viability and bycatch on aggregate halibut mortality.

The SSC endorses the Pacific halibut bycatch mortality estimate (280,515 pounds) for the 2008 trawl fishery. The SSC recommends that in next year's analysis of alternative approaches to stratification, the effect of viability alone on aggregate halibut mortality be distinguished.

Public Comment

Mr. Ralph Brown and Mr. Brad Pettinger provided comments on the petrale sole assessment speaking in favor or the assessment model estimate of BMSY as the best available science rather than the proxy level as recommended by the SSC Groundfish subcommittee. They noted the long-term harvest and productivity of the stock and its importance to the economics of the trawl fishery.

Adjournment The SSC adjourned at approximately 5:30 p.m., Sunday September 13, 2009.

SSC Subcommittee Assignments, September 2009

Salmon	Groundfish	CPS	HMS	Economic	Ecosystem-Based Management
Bob Conrad	**Owen Hamel**	**André Punt**	**Ray Conser**	**Cindy Thomson**	**Selina Heppell**
Loo Botsford	Loo Botsford	Tom Barnes	Tom Barnes	Todd Lee	Tom Barnes
Owen Hamel	Ray Conser	Ray Conser	Robert Conrad		Ray Conser
Pete Lawson	Martin Dorn	Owen Hamel	Selina Heppell		Martin Dorn
Charlie Petrosky	André Punt	Selina Heppell	André Punt		Pete Lawson
	Steve Ralston	Steve Ralston	Vidar Wespestad		Todd Lee
	Theresa Tsou				André Punt
	Vidar Wespestad				Steve Ralston
					Cindy Thomson
					Theresa Tsou

Bold denotes Subcommittee Chairperson

PFMC
10/16/09