# North Pacific Fishery Management Council

Dan Hull, Chairman
Chris Oliver, Executive Director
Telephone (907) 271-2809
www.npfmc.org

605 W. 4th Avenue, Suite 306
Anchorage, AK 99501-2252
Fax (907) 271-2817

February 15, 2017

Mr. Sam Rauch
Acting Assistant Administrator for Fisheries
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, MD 20910

Dear Mr. Rauch:

At its February 2017 meeting, the North Pacific Fishery Management Council (Council) received a report from Dr. Rick Methot on applying the National Stock Assessment Prioritization Plan (SAPP) to stocks in the North Pacific. In preparation for this review, the Council's Groundfish and Crab Plan Teams evaluated, on a stock-by-stock basis, target assessment frequencies generated by SAPP algorithms. Of the 53 groundfish stocks and ten crab stocks for which harvest limits are specified each year, the Council identified nine groundfish and five crab assessments for reduced frequency. The changes to our assessment schedule will go into effect for this year's harvest specifications cycle.

As you know, this Council has *always* placed a high priority on science-based management for our managed fisheries. The ongoing development and refinement of our stock assessments provides a steady and expanding stream of scientific information that is the basis of our long history of sustainable harvest and our role in leading the Nation in the advancement of forward thinking initiatives such as ecosystem-based fishery management. Additionally, and very importantly, the great trust of our constituents in the science supporting our management decisions, provides for a working relationship that cannot be over-valued.

Given these considerations, the Council is concerned that the SAPP would reduce the frequency with which we receive assessment updates rather than enhance the quantity of assessments as may occur in other regions. However, we also recognize that decreases in assessment frequency for a limited number of stocks could allow assessment scientists to direct effort toward other analytical priorities that are in need of attention. It is our interest in realizing this potential benefit that conditioned our willingness to apply the SAPP to our fisheries. Th motion (attached) that passed unanimously at the Council recommends a conditional implementation of the stock assessment prioritization process, and specifically defines success for this initiative in terms of an expectation of analytical advancement at minimal expense in terms of information quality.

Additionally, as stated in our March 6, 2016 letter to Eileen Sobeck and on many other occasions, we continue to be concerned that interest in achieving regional consistency will re-direct resources such that our current standards of data quality, especially from critically needed surveys, will be diminished. To that point, the motion includes as a requisite for continuing the adjusted assessment schedule beyond the current year, an explanation from the agency as to how stock assessment funding is prioritized. Given that

provision, and continued updates on the national initiative for improving stock assessments, we look forward to evaluating the outcome of this action after a complete adjusted cycle (four years) has occurred.

Thank you, and I look forward to continued progress and communication on this important issue.

Sincerely,

Chris Oliver
Executive Director

cc: Dr. Douglas DeMaster
Dr. Jim Balsiger
Dr. Rick Methot

Enclosures: (2)

# *February 2017 Council Motion on Assessment Prioritization*

Motion by Tweit/Mezirow - passed unanimously

1. Move that the Council recommend a conditional implementation of the stock assessment prioritization process. The Council remains concerned about any use of this prioritization process to allocate stock assessment resources between regions or to modify the timetable or extent of stock surveys. For that reason, the Council requests that the agency describe how it prioritizes stock assessment funding relative to other fishery research efforts, prior to the AFSC proceeding with the second year of the prioritization process. Additionally, the Council also requests updates on efforts being undertaken nationally to improve the efficiency of stock assessments.
2. The Council endorses the SSC's recommendations [attached] on stock assessment prioritization regarding the frequency and format of stock assessments, as well as their recommendations for further review and timely Plan Team development of an evaluation tool for measuring the costs and benefits of alternative assessment frequencies and a framework for risk assessment, prior to the AFSC proceeding with the second year of the prioritization process.
3. For purposes of evaluating this modification to our stock assessment process, the Council defines success, for alternative assessment frequencies, as follows:
   A reduction in the frequency of some targeted stock assessments should provide increased opportunity for stock assessment authors to address analytical priorities (listed below) that have been awaiting attention, while avoiding any significant decrease in the precision of assessment based products such as OFL and ABC.
4. A review of the degree of success achieved through the proposed target frequencies will be conducted after one complete cycle (4 years) of the modified assessment schedule.

   *Itemized Analytical Priorities (Initial list, to be refined by the Plan Teams during their 2017 meetings, and then be re-reviewed by the SSC and Council)*

- Development and testing of Next Generation Stock Assessment methods including: climate-enhanced stock assessment models, multi-species models, and advanced analytical modeling approaches.
- Improved short- and long-term projection models to be used to evaluate the performance of alternative management strategies (e.g., MSEs). This might include evaluations of techniques to formally incorporate uncertainty based buffers for tier 3 stocks and strategies for addressing "choke" species' stock status including PSC caps.
- More rapid progress on innovative decision tables or decision theoretic approaches to management, including techniques for testing the utility of ensemble modeling approaches to groundfish management.
- Research to resolve specific modeling issues such as survey catchability, ideal sample sizes for core data sets.

# *February 2017 SSC Recommendations on Assessment Prioritization*

*Overview of Stock Assessment Prioritization Process:*

Richard Methot (NOAA Fisheries) gave a brief overview of the national effort to consider stock assessment prioritization issues. He noted that the Pacific Fishery Management Council was the first to implement the information. The NPFMC and the South Atlantic Fishery Management Council are at similar stages of the process. The focus on stock prioritization addresses the Timely, Efficient, and Effective element of NOAA's Next Generation Stock Assessment Enterprise. Guidelines for determining when stocks or stock complexes should be assessed are provided in Methot, 2015 (http://www.st.nmfs.noaa.gov/Assets/stock/documents/PrioritizingFishStockAssessments_FinalWeb.pdf). The core elements include: stock status, biological vulnerability to fishing pressure, fishery importance, assessment information, and ecosystem importance.

Dr. Methot noted that there are several benefits of this prioritization process. He recognized that NPFMC has successfully demonstrated a capability to process a considerable number of assessments in a timely, efficient, and effective manner. He agreed that the Plan Team's focus on target frequency is right-minded given the current capability of assessment authors to conduct assessments. He recommended that the NPFMC should weigh the benefits of more frequent iterative improvements to the models against the possible advancements in understanding that could emerge from a less frequent in-depth evaluation of structural, parameter, management and measurement uncertainty. The guidelines (Methot, 2015) identify data types that could be compiled to assist the Councils in selecting the balance between frequently incorporating new data into stock assessments and incorporating data into stock assessments on a less frequent basis, but allowing for expanded exploration of other model configurations including the development of multi-species, climate enhanced, or spatially explicit assessments, as well as studies of the performance of alternative harvest strategies (e.g., Management Strategy Evaluations) and advanced analytical methods.

Dr. Methot assured the SSC that the intent of this effort is not to re-purpose authors working on NPFMC assessments for other regions. Likewise he noted that although new data may become available (e.g., a new survey) this alone does not constitute Best Available Scientific Information and therefore, he did not see a conflict with reducing target frequency and National Standard 2.

*Review of Groundfish Plan Team Recommendations for Changes in Target Frequency:*

James Armstrong (NPFMC) and Grant Thompson (AFSC, BSAI PT Co-Chair) presented results of the Groundfish Plan Team stock assessment prioritization workshop which was held January 11-12, 2017. Diana Stram (NPFMC) presented results of the Crab Plan Team approach to stock prioritization.

The plan teams reviewed several informational documents including:

a) The National Stock Assessment Prioritization Process (SAPP) Technical Memorandum (Methot , 2015);
b) The AFSC white paper on options for changing NPFMC stock assessment frequency which was presented to the Groundfish Plan Teams in September 2017; and
c) Results of an opinion poll distributed to Groundfish Plan Team members and the authors and a statistical summary of the results.

The NPFMC decisions are currently informed by the timely delivery of stock assessment advice. Therefore, the final step described in (Methot, 2015), of engaging the NPFMC in ranking suites of stock assessments that should be conducted in a given year is not a critical step. Given the current timely delivery of stock assessment advice for stocks managed by the NPFMC the GPT focused their review on issues related to target frequency. **The SSC agrees that a focus on target frequency is a good approach for the NPFMC.**

The AFSC provided the Groundfish Plan Teams with summaries of the information needed to assess fishery importance, target frequency (based on estimates of mean age), ecosystem importance and stock status (see white paper). Members of the Groundfish Plan Teams evaluated status quo relative to four alternative scenarios. Alternative scenarios were derived as modifications to the "Base Case" derived from the methods described in the Stock Assessment Prioritization Process (Methot, 2015). This method estimates target frequency as follows:

Target Frequency ($\rho$) is estimated as: $\rho$ = mean age * $\lambda$ (used default $\lambda = 0.5$).
Then $\rho$ was adjusted upward or downward for: +/-1 yr based on recruitment variability, +/- 1 yr based on fishery importance, +/- 1 yr based on ecosystem importance.

In September the GPT reviewed the following scenarios:

- **Status Quo**: Current assessment frequencies, annual and biennial schedule for all groundfish stocks
- **Scenario 1 (S1):** This scenario was the "Base Case" recommended in Methot (2015): Target Frequency ($\rho$) is estimated as $\rho$ = mean age * $\lambda$ (where the default $\lambda = 0.5$ was applied). Then $\rho$ was adjusted upward or downward for: +/-1 yr recruitment variability, +/- 1 yr fishery importance, +/- 1 yr ecosystem importance. In this scenario, $\rho$ is capped at a maximum value of 10 years and a minimum value of 1 year.
- **Scenario 2 (S2)**: Base Case (S1) with a maximum cap at 5 years.
- **Scenario 3 (S3):** S2 with fishery importance adjustment of +/- 2 years (using -2, -1, 0, 1, 2 based on quintiles of the fishery importance score)
- **Scenario 4 (S4):** S2 with regional scalar adjusted so that high commercial value stocks would be annual.
    - Total ex-vessel value of all the groundfish stocks was sorted.
    - "Highest Value Stocks (HVS)" were identified as the setoff stocks in the the top 75% of the cumulative catch value (EBS pollock, BS Pacific cod, AK sablefish, and BSAI yellowfin sole).
    - $\lambda$ set to make sure that the target frequency was annual "HVS" after having applied the standard adjustments (+/- 1 fishery, +/- 1 ecosystem, +/- 1 recruitment). $\lambda = 0.139$.
- **Scenario 5 (S5):** Combination of S3 and S4, fishery adjustment of +/-2 years with the regional scalar according to the high value stocks applied after taking adjustments into account. This resulted in a regional scalar of 0.209.

For the January GPT workshop, the team started their discussion with Scenario S4 as the base case. The authors and plan team members were provided the available information on Fishery Importance, Stock Status, Ecosystem Importance and Target Frequency. They then polled the authors and themselves as to their opinions () on what the desirable target frequency would be for each assessment. Using the results of the poll and Scenario S4, the GPT members discussed the target frequency for each stock or stock complex and ecosystem component species group. **The SSC agreed that the process used to identify candidates for changes in target frequency was a good exercise in deriving expert opinion on an important decision for the NPFMC.**

The Groundfish Plan Teams recommend changing the target frequency for the following stocks:

- AI pollock (1y to 4y)
- Six flatfish stocks were identified as candidates for reduced assessment frequencies: Greenland Turbot (1y to 2y); BSAI other flatfish (2y to 4y); GOA shallow water flatfish (2y to 4y); GOA northern/southern rock sole (2y to 4y); GOA deepwater flatfish (2y to 4y); and GOA flathead sole (2y to 4y).
- Five non-target stocks (Squid, BSAI and GOA sculpins and BSAI and GOA grenadiers) were candidates for movement to a 4 year cycle.
- Three rockfish stocks; GOA BS/RE (2y to 4y), BSAI shortraker rockfish (2y to 4y) and BSAI other rockfish (2y to 4y).

- The report did not address the forage fish complex, but it did address capelin (2y to 4y).

The SSC accepted the PTs recommendations with the following exceptions:

- The SSC did not support moving any rockfish stock or stock complex to a 4 year cycle. Despite the longevity of rockfish, the SSC felt that the current two year should be continued. Our rationale was that a two year cycle was needed to address the following issues: several non-target rockfish have relatively low abundance and therefore have the potential to become a choke species; several species have relatively high market value; several stocks show evidence of stock structure; and many stocks exhibit a patchy distribution which could result in high survey CVs.

- The SSC recommended that the current two year cycle for squid assessments should be continued to evaluate the implications of the pending shift of this species complex to the ecosystem component. The SSC also requests that the time trend in catch is closely monitored and provided to the SSC on an annual basis.

- The SSC notes that the GPT did not provide a recommendation for target frequency for the forage fish complex, but it did recommend a 4 year target frequency for capelin. The SSC recognizes that the MRA for forage fish is set quite low (2%) which serves as a deterrent to targeting. However, given the high turnover rate and high level of ecosystem importance, the SSC recommends that capelin is assessed as part of the forage fish assessment every two years.

- The SSC did not support the recommendation for moving AI pollock to a target frequency of 4 years. The SSC recommends that this stock is assessed on a biennial time step based on the importance of this species in the ecosystem and the importance of data products derived in the assessment with respect to questions of pollock stock structure.

The SSC reviewed and accepted the GPTs recommendations for the delivery of information to the NPFMC on "off years". **The SSC agreed with the GPTs recommendation that Partial assessments for Tiers 1-3 should be an expanded version of the current off-year executive summaries**, *including catch/biomass ratios for all species in addition to re-running the projection model with updated catch information, and also including updated survey biomass trends when available (note that partial assessments for Tiers 1-3 do not involve re-running the assessment model; only the projection model). Authors would be expected to respond to Team/SSC comments during full assessments only, unless the comments pertain to features that are normally included in partial assessments.* The SSC requests that the GPTs clarify whether the catch/biomass ratios should be based on survey biomass or projected biomass. **The SSC agreed with the GPTs recommendation that Partial assessments for Tiers 4-5 should be an expanded version of the current off-year executive summaries**, *including catch/biomass ratios for all species in addition to re-running the random effects model. Authors would be expected to respond to Team/SSC comments during full assessments only, unless the comments pertain to features that are normally included in partial assessments*.

*Review of Crab Plan Team Recommendations for Changes in Target Frequency:*

Diana Stram presented the Crab Plan Team's discussions regarding Target Frequency. Given the life history characteristics and high market value of Bering Sea crab stocks, the CPT limited their discussions to options for 1, 2, or 3 year assessment cycles. Given the small number of stocks under consideration for changes in target frequency, the CPT used expert opinion to rank Fishery Importance, Ecosystem Importance, Stock Status, and Target Frequency. As a test of the CPTs ability to rank Fishery Importance, they compared their Fishery Importance scores to those generated by the expert groups for groundfish as a check of their expert opinions. Their scores agreed favorably with the groundfish scores.

The CPT recommended the following target frequencies for Bering Sea crab stocks.

**Annual Assessments:**
Bristol Bay red king crab, snow crab, Tanner crab, St. Matthews blue king crab, Aleutian Island golden king crab.

**Biennial:**
Pribilof red king crab, Norton Sound red king crab

**Triennial:**
Pribilof Islands blue king crab, Pribilof Islands golden king crab, western Alaska red king crab.

**The SSC agreed with the recommended target frequency for all stocks except for Norton Sound Red King Crab**. In the case of Norton Sound, the SSC requests that the State reviews the costs and benefits of changing the Target Assessment Frequency to a biennial time step.

The SSC noted that changes in target frequency could cause potential conflicts with the State harvest specifications if the State bases the Guideline Harvest Level on updated data and the Federal process does not update its information. This potential conflict would be a rare event given that the most valuable stocks will be assessed annually.

The SSC discussed what types of information should be delivered in the "off years". Dr. Stram informed the SSC that projection models are not currently utilized for Bering Sea crab stocks. The SSC recommends that the authors review the methods currently used to project groundfish stocks to evaluate what would be needed to develop a similar modeling tool for crab. As was the case for groundfish the SSC would like to receive a updated reports on the results of new NMFS and ADF&G surveys.

Dr. Stram informed the SSC that implementation of revisions to the target frequency for Bering Sea crab stocks would not occur until the 2017/18 cycle.

*Other Issues and Summary:*

The SSC noted that criteria should be established that could be used to trigger an "off cycle" assessment, noting that extending the lag between assessments may result in more 'surprises' than have been seen in the past.

We identified the following possible criteria but recognize that this is not an exhaustive list:

- Unexpected change in survey biomass or other data (perhaps standardized by +/- xx standard deviations);
- Evidence of a new environmental link to time trends in growth, recruitment, or mortality that substantially alters the estimation of biological reference points or stock status;
- Evidence of a marked change in retrospective bias or residuals that would indicate a change in productivity;
- Availability of new information on vital rates (M, maturity, growth) that alters estimation of biological reference points or stock status;
- Availability of new information on survey performance (selectivity, Q);
- Change in catch suggesting targeting a member of a complex;
- Evidence of stock structure and possibility of overharvest of a sub-population;
- Change in catch to ABC ratio;
- Change in management regulations that would alter fishing behavior such as rationalization of GOA groundfish fisheries;
- Distributional shifts that would change catchability or types of fleet targeting the resources.

**The SSC requests that the authors and the Plan Teams develop guidelines for when an off-year assessments should be developed.**

The SSC also noted that there is a general need to address the treatment of uncertainty in the current tier system. Specific to assessment frequency, the SSC recommends an evaluation of how projected OFL-to-ABC buffers should increase in the intervening years between full assessments be brought forward before the changes are implemented.

The SSC agrees that the proposed change in target frequency should be considered a trial and we expect to receive an evaluation of the action in 4 years. The SSC recognizes that an advantage of proposed changes in target frequency is that the analysts time could be freed up to address four categories of stock assessment related analytical tools:

- Development and testing of Next Generation Stock Assessment methods including: climate enhanced stock assessment models, multispecies models, and advanced analytical modeling approaches.
- Improved short- and long-term projection models to be used to evaluate the performance of alternative management strategies (e.g., MSEs). This might include evaluations of techniques to formally incorporate uncertainty based buffers for tier 3 stocks and strategies for addressing choke species stock status including PSC caps.
- More rapid progress on innovative decision tables or decision theoretic approaches to management, including techniques for testing the utility of ensemble modeling approaches to groundfish management.
- Research to resolve specific modeling issues such as survey catchability, ideal sample sizes for core data sets.

These four categories of research illustrate the range possible innovations that could be addressed in response to shifts in Target Frequency.

**The SSC recognized that a framework for evaluating the costs and benefits of changing the Target Frequency for the stocks identified above will be needed before the changes are implemented.** This cost-benefit analysis framework would allow the NPFMC to evaluate the performance of the change in target frequency at the end of the 4 year trial period. The SSC also requests a more quantitative evaluation of the potential risks of changing the target frequency of the GOA flatfish stocks to a 4 year cycle. **The SSC would like to receive the performance analysis framework and the risk assessment for GOA flatfish and crab stocks before implementing the change in target frequency.**