COASTAL PELAGIC SPECIES MANAGEMENT TEAM REPORT ON STOCK
ASSESSMENT PRIORITIZATION PROCESS

The Coastal Pelagic Species Management Team (CPSMT) provided the Pacific Fishery Management Council (Council) with a stock assessment prioritization (SAP) process (Agenda Item F.2.a, CPSMT Report 1) with a potential ranking matrix. This matrix was based on work by Methot (2015), which was presented to the Council in November 2015 for use with groundfish stocks (see Groundfish Agenda Item I.7.a Supplemental NMFS PowerPoint). The matrix provided by the CPSMT includes all four of the broad categories in the document by Methot (2015), but the CPSMT has adapted the specific lines for scoring and weighting for CPS fisheries and stocks.

In the following Attachment 1, the CPSMT provides more information about each line item in the matrix, the scoring proposed by Methot (2015), as well as a number of items that may need to be considered should the Council choose to move forward with this tool.

The CPSMT considers this matrix a working document, which may be updated or replaced by a different methodology as new information or a better approach become available. There are only five finfish stocks managed by the CPS fishery management plan, and another tool may more efficiently meet the need with less workload than that associated with the matrix. The matrix scores may be very similar for these five stocks and provide limited useful guidance.

In conclusion, the CPSMT notes that a benchmark assessment was just conducted for Pacific mackerel, and Pacific sardine is scheduled for a benchmark assessment in 2020. Therefore, the CPSMT recommends scheduling a CPS SAP as a biennial November agenda item beginning no earlier than 2020.

Attachment 1. Descriptions of SAP Matrix Factors and Scoring

<u>**Fishery Importance**</u>

Commercial Fishery Revenues: One measure of a stock's commercial importance is landings revenue. Methot (2015) suggests using a non-linear ranking based on the landed value as the metric for commercial fishery importance. The non-linear transformation scoring reduces the spread in scores assigned to each target species; preventing the stocks with the highest landing revenue values from overwhelming stocks with lower landing revenues for the commercial fishery revenue category.

The progressive commercial fishery importance score transforms the raw catch landings revenue values to reduce the range while preserving the relative ranking, and then scales against the most valuable regional stock on a scale of 0 to 5. Using the method proposed by Methot (2015), scores are calculated as follows:

$$\text{Commercial Fishery Importance (stock x)} = \left(\frac{\log_{10}(1 + \text{landed value of stock x})}{\log_{10}(1 + \text{landed value of most valuable regional stock})} \right) * 5$$

Aggregate coastwide landing revenue values for each stock could be obtained from the Pacific Coast Fisheries Information Network, but the CPSMT notes that "landings" from CPS live bait fisheries in California were not put on fish tickets in past years, so methods to include that segment of commercial CPS revenues would need to be worked out. It is noted that the landings revenue value metric does not explicitly account for differences in cost structures between fisheries for specific stocks, the substitutability of the target species in the production, or the end use of the target species.

Recreational Fishery Importance: The recreational fishery importance metric proposed by Methot (2015) is limited to the importance of fish stocks as target species and kept catch. The importance to recreational fisheries of stocks as forage for recreational caught target species and kept catch, bait, and indirect ecosystem services are not considered in this factor. Individual fish stocks can be rated by a facilitated working group of recreational fisheries experts. Recreational fishery landings information could be provided to the working group through the Recreational Fishery Information Network portal to serve as a starting point upon which to base scoring. Methot (2015) suggests each stock be scored using a scale from 0 to 5. A score of 0 indicates that the working group considers the fishery to be inconsequential to the recreational fishery in terms of the considerations outlined above. The score of 5 is expected to be assigned to just a few top recreational stocks and the rest of the stocks for which there is non-zero recreational catch should be assigned relative scores between 1 and 4. These proposed methods would need to be reviewed to ensure that there is "buy-in" for use with CPS stocks.

Constituent Demand: This category recognizes that some stocks have a particularly high constituent demand for stock assessments. This might include stocks in catch share programs, choke stocks that limit access to other stocks, stocks with controversy over the existing assessment, stocks with high sociocultural fishery importance to the region, or simply stocks for which regional or national constituents have come to expect high quality, timely stock assessments. Methot (2015) suggests that an expert regional panel assign scores ranging between 0 and 5 points for each stock

with regard to its importance due to constituent demand. Again, review of this method for CPS stocks seems appropriate to ensure public "buy in" for this process including the makeup of the expert regional panel that would be assigning scores.

Rebuilding Status: Stocks on rebuilding plans, or listed as endangered or threatened under the Endangered Species Act (ESA), experience depressed recent catch levels relative to the long-term potential yield. In addition, a substantial portion of the stock's total catch could occur as discarded bycatch that has no market value. Assessing stocks is important in order to track rebuilding and allow for catch to return to pre-rebuilding plan levels as soon as possible. Methot (2015) suggests assigning a score of 1 to stocks that are on rebuilding plans or listed under ESA, while a score of 0 be assigned to all other stocks.

Stock Status

Relative Stock Abundance: Methot (2015) suggests scores for this factor be based on most recent spawning biomass (SBC) information, as well as biomass targets (spawning biomass at maximum sustainable yield [SBMSY] or a suitable proxy such as 40% of SB unfished) and limits (Minimum Stock Size Threshold [MSST] or suitable proxy below which a stock is considered overfished) from stock assessment and management data stored in the Species Information System (SIS) database. Scores are assigned as follows:

- 1 point = stock biomass is above target (SBC > 1.25*SBMSY)
- 2 points = stock biomass is near target (MSST < SBC ≤ 1.25*SBMSY)
- 3 points = caution - SBC or MSST is unknown and status cannot be determined
- 4 points = stock is overfished (SBC ≤ MSST)
- 5 points = stock is overfished and show signs of decline

For CPS stocks for which the SBC or MSST is unknown it may prove useful to explore the use of Productivity and Susceptibility Analysis (Patrick et al. 2010) and/or Reliable Catch Only Stocks (Berkson et al. 2011) methods to assign scores.

Relative Fishing Mortality: Similar to Relative Stock Abundance described above, this factor is based on current fishing mortality rates (FC) and fishing mortality limits (FL, above which overfishing is occurring; set at FMSY or a suitable proxy) from stock assessment and management data stored in the SIS database. Scores for this factor are assigned as follows by Methot (2015):

- 1 point = low fisheries impact on stock (FC ≤ 0.25*FL)
- 2 points = moderate fisheries impact on stock (0.25*FL < FC ≤ 0.9*FL)
- 3 points = caution - FC or FL is unknown and status cannot be determined
- 4 points = high impact of fisheries on stock (FC > 0.9*FL)
- 5 points = stock has been determined to be experiencing overfishing

Ecosystem Importance

Role in Ecosystem: This factor is developed by scoring both bottom-up and top-down contributions to the ecosystem. Scores for this factor, ranging between 1 and 5 points, are assigned by regional experts as described below. Because scores for one component may cancel out scores from the other component (e.g. high for bottom-up and low for top-down, or vice versa), the maximum of the two components is used as the score for this factor rather than treating the two components separately.

> Bottom-Up (Forage or Habitat) Component
> - 1 point = stock is only a minor dietary or habitat provider for managed stocks (e.g. Pacific grenadier)
> - 2 to 4 points = stock is a moderate dietary or habitat component for one or more managed stocks (e.g. Pacific sardine, corals)
> - 5 points = stock is a major dietary or habitat component for a broad range of managed stocks, or critical to an endangered or otherwise protected and vulnerable stock (e.g. skipjack tuna, menhaden, krill, shrimp)

> Top-Down (Predator/Ecosystem Interaction) Component
> - 1 point = a change in the stock's abundance would likely have minor or unmeasurable impacts on other managed stocks (e.g. splitnose rockfish)
> - 2 to 4 points = a change in the stock's abundance would likely have notable changes in predation mortality, recruitment, or other vital rates for one or more managed stocks (e.g. lingcod, marlin)
> - 5 points = a change in the stock's abundance would likely result in substantive changes in predation mortality, recruitment, or other vital rates for one or several managed stocks (e.g. Gulf of Alaska arrowtooth flounder)

> The CPSMT notes that the appropriate regional experts that assign scores for this factor will need to be determined.

Assessment Information

Unexpected Changes in Stock Indicators: When the target interval between assessment updates is several years, it may be possible to make a quick evaluation of new information as it becomes available and adjust the stock's priority for assessment up or down based upon how closely the new data match expectations from forecasts from the previous assessment. A "traffic light" approach similar to this is already being used in some regions. While such indicators are intended to provide information on true changes in stock productivity and abundance, all indicators have some degree of measurement noise, so this approach should be applied cautiously. Note that timely assembly of indicators requires data preparation, staff analysis, and report writing that will compete with stock assessment program's capability to complete other assessment activities.

Nevertheless, good indicators can focus assessment efforts on stocks that are most in need of updating. Scores for this factor should be assigned as follows, with intermediate scores permissible:

- 0 points = new data are basically as expected from previous assessment forecasts
- 3 points = new data indicate that the stock is moderately deviating from past projections
- 5 points = new data indicate that the stock is strongly deviating from past projections

For data-limited/unassessed stocks, possible indicators of changes in status should be monitored. However, the existence of a relevant indicator means that an assessment is probably possible.

Years Since Last Assessment: Scores are based on the date of last assessment with 1 point assigned per year up to 5. For previously unassessed stocks, the number of years an assessment is overdue should be set at five initially upon implementation of prioritization.

References
Berkson, J., L. Barbieri, S. Cadrin, S.L. Cass-Calay, P. Crone, M. Dorn, C. Friess, D. Kobayashi, T.J. Miller, W.S. Patrick, S. Pautzke, S. Ralston, and M. Trianni. 2011. Calculating Acceptable Biological Catch for Stocks That Have Reliable Catch Data Only (Only Reliable Catch Stocks – ORCS). NOAA Technical Memorandum NMFS-SEFSC-616, 56 P.

Methot Jr., Richard D. (editor). 2015. Prioritizing fish stock assessments. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-F/SPO-152, 31 p.

Patrick, W.S., P. Spencer, J. Link, J. Cope, J. Field, D. Kobayashi, P. Lawson, T. Gedamke, E. Cortes, O. Ormseth, K. Bigelow, and W. Overholtz. 2010. Using productivity and susceptibility indices to assess the vulnerability of United States fish stocks to overfishing. Fish. Bull. 108:305–322.

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