



Progress Report on Planning the Next National Meeting of the Council Coordination Committee's Scientific Coordination Subcommittee

A subgroup of the Council Coordination Committee's Scientific Coordination Committee (SCS) was recently formed to begin planning the sixth national meeting of the SCS, which will be hosted by the Pacific Fishery Management Council (PFMC). Comprised of the chairs or designees from each Scientific and Statistical Committee and a staff member from each regional fishery management council, the SCS Planning Committee has met twice by webinar to begin planning the next national SCS meeting. This is a report on the progress of the SCS Planning Committee in planning the sixth national meeting of the SCS.

Proposed Dates and Location for the Next SCS Meeting

The proposed dates for the sixth SCS (SCS-6) meeting are January 17-19, 2018 with January 16 and 20 scheduled as travel dates. The SCS planning subgroup agreed those dates presented the least conflict with regional Council and SSC meetings and avoids a conflict with Martin Luther King Day (January 15, 2018). PFMC staff are currently exploring venues in San Diego, California for the meeting.

Proposed Theme and Subthemes for the Next SCS Meeting

The proposed theme for the SCS-6 meeting is, "Management Strategy Evaluations (MSEs) as Tools to Provide Management Advice in the Face of Uncertainty and Environmental Change". A general planning question that needs to be resolved is, how much should this meeting be about the practice of doing MSEs versus the specific role of the SSC with respect to MSEs? There is general agreement to focus on the practice of doing MSEs; however, we need to maintain some consistency on how SSCs conduct and evaluate MSEs.

Socioeconomic considerations are important attributes in an MSE. There should be some socioeconomic expertise from each SSC at the meeting.

Four subthemes are proposed under the MSE theme. Focus questions under each subtheme are suggested lines of inquiry that could be further explored at the meeting (the order of questions does not reflect any sort of ranking, and letters are only for ease of reference). The SCS Planning Committee does not expect every question will be specifically addressed at the meeting. Subthemes 2 and 3 are closely linked; the SCS Planning Committee emphasizes the

importance of structural/model uncertainty and the need to keep in mind that this necessarily impacts the uncertainty that needs to be conveyed in advice to the Council. It is acknowledged there is some overlap in the current list of questions; the SCS Planning Committee anticipates the list will be distilled before the agenda for SCS-6 will be finalized sometime in April. During the February 2017 planning call, it was agreed that representatives from the PFMC would take the lead on identifying a core set of focus questions, to be further refined by the full SCS.

General questions relevant to all subthemes

- a) How do we implement MSE into the decision-making process?
- b) What metrics can be used to prioritize the integration of MSEs into the Council workload (i.e., what characteristics lead to the determination that a particular stock is in greatest need of, or would benefit most from, an MSE)?
- c) How will the output of an MSE process be integrated into the Council process and what roles do the Council advisory bodies (i.e., SSC, plan/technical teams, and advisory panels) play in guiding Council decisions?
- d) Given that an MSE process is used to tune management procedures to balance the tradeoffs among conflicting fisheries management objectives, what roles will the Councils' advisory bodies play in developing quantifiable performance metrics that are related to each Councils' specific objectives, and those defined by National Standards and the Magnuson-Stevens Act (MSA)?
- e) What issues facing Councils and SSCs compel an MSE approach?

During the February 2017 planning call, it was agreed that these questions would likely best be addressed during a synthesis section near the end of the meeting.

Subtheme 1: Evaluating and modifying harvest control rules

Focus questions:

- a) How to use MSEs to derive alternative management procedures (e.g., adaptive strategies) consistent with the MSA?
- b) How to use MSEs to evaluate approaches to ecosystem-based fisheries management (EBFM) (e.g., spawning area closures, ecosystem/habitat impacts)?
- c) How to use MSEs to determine multispecies reference points?
- d) How should proposals to implement ecosystem and climate-related reference points under the EBFM roadmap and climate science strategy be reviewed and evaluated?
- e) Is it possible to evaluate or modify harvest control rules (HCRs) without the Council explicitly defining quantifiable objectives?
- f) Is there a core set of social and economic metrics that could be included in MSE that reflect the greatest impacts to the net benefit to the nation that should be used as a standard across SSCs?
- g) What socioeconomic performance metrics should be used to evaluate the tradeoffs of alternative harvest control rules, or to tune the chosen harvest control rule?
- h) How to elucidate objectives and performance metrics that are meaningful and useful to stakeholders and decision makers?
- i) How has your Council included stakeholder input to define MSE objectives, uncertainties, and performance metrics, and to review results?
- j) What is the best strategy for honing in on a key set of stakeholder social and economic priorities when conducting a stakeholder workshop to inform an MSE?
- k) When is it acceptable to conduct an MSE in the absence of explicit stakeholder input? If never, is there a threshold to determine what an adequate level of stakeholder input is?
- l) How can MSE be used to quantify the trade-off between maximizing socio-economic benefits and conservation of stocks?

- m) How to use MSEs to develop and evaluate multiyear TACs or carryover policies that might allow catch in one year to exceed the annual OFL, but keep catch under the OFL when averaged over two or more years?
- n) How have MSEs been used, and how can they be used, to evaluate trade-offs between competing objectives?
- o) In addition to HCRs, what other management measures have been evaluated using MSE by your Council? Did/should they involve social and/or economic analyses?

Subtheme 2: Dealing explicitly with model uncertainty

Focus questions:

- a) How to weight alternative operating models, are there metrics/diagnostics that can be used to aid in this determination?
- b) Should all alternative operating model combinations (simulation-estimation inclusive) be given equal weight in the risk assessment, or should they be weighted by the probability of the model?
- c) How have the effects of retrospective patterns been addressed?
- d) What is the best practice for including model retrospective patterns into MSE and how can this information be best used to inform risk management?
- e) Discussion of multi-model inference via 'ensemble' modeling: Given that model structural uncertainty (for an assessment or decision process such as an MSE) typically far outweighs parameter uncertainty when it comes to metrics important for management, why are ensemble models so rarely implemented in stock assessments?
- f) How should we evaluate competing models for data limited stocks?
- g) How to choose models (operating models for MSEs and/or assessment models?) of appropriate complexity?
- h) Can MSE output be used to determine when a stock assessment model is too uncertain and defaulting to data limited/data poor/model resistant procedures should occur?
- i) Are there a set of best practices for incorporating Bayesian statistical procedures into MSE to deal with model uncertainty? (potentially under subtheme 3 as well)
- j) How can the MSE process quantify the impacts of potentially costly experiments that would be required to resolve structural uncertainties? (e.g., what gains are there knowing if natural mortality is age-independent or age-dependent?)
- k) Is there an uncertainty tipping point where models based off current stock assessment procedures should be used by themselves and when additional procedures should be added in the MSE framework?

Subtheme 3: Estimating and accommodating uncertainty in overfishing limits, stock biomass, and fishing mortality

Focus questions:

- a) How to explain/communicate complex multi-dimensional outputs to stakeholders and decision/policy makers?
- b) How to accommodate management measures (buffers such as closed areas, seasonal closures) on the determination of OFLs, ABCs, and uncertainty?

- c) Can MSE incorporate both scientific and management uncertainty adequately thereby precluding the need for additional processes to account for either? If not, what uncertainty remains and what is the best strategy for accommodating that uncertainty?
- d) Should data limited/data poor procedures be routinely used to inform alternate operating models during MSE and if so, what is the best strategy for incorporating those results into determining uncertainty in OFL, stock biomass, and mortality outputs?
- e) Can we identify more rigorous alternatives to the P* framework for quantifying uncertainty in the OFL?
- f) Should there be a clear dichotomy between the SSC's role in Risk Assessment versus Risk Management when taking into consideration the MSE process?

Subtheme 4: Adjusting HCRs in changing environments / non-static maximum sustainable yield (MSY)

Focus questions:

- a) Synthesis of what is meant by adjusting HCRs in changing environments, where this is done, and why?
- b) What are the best practices for incorporating EBFM into developing HCRs and what is the role for MSE in determining those practices?
- c) Should we adjust HCRs as environmental conditions change, or design an HCR that is robust to changing environmental conditions?
- d) How precise does our understanding of the impacts of environmental variability on the productivity of each stock in an FMP have to be in order to successfully adjust the HCR to achieve the management objectives, and what are the costs of obtaining this precision relative to benefits?
- e) In the absence of explicit ecosystem modeling, is there a robust uncertainty level to incorporate into an MSE operating model for impacted metrics such as natural mortality, recruitment, etc.?
- f) Are the simple fixed-exploitation rate rules developed by Ana Parma and Carl Walters just as robust as dynamic rules?
- g) Can we provide guidance on dynamic reference points (in reality both spatial and temporal aspects) when it comes to MSEs/assessments, and do/should these differ depending on factors such as species life history?
- h) What time frames for catch advice are appropriate to keep pace with environmental change?
- i) Can / how can we tease out the effects of "environmental" (including climate) change vs. more directly human-induced changes in dynamic (or even recalculated static) reference points, or at least discern which might be fully or partially reversible?
- j) Should the problems or potential problems in the implementation of an MSE-based HCR that could affect the outcomes predicted by the models be considered or evaluated by the group that develops the MSE?

Recommendations for Invited Speakers and Meeting Conduct

The SCS Planning Committee recommends the following considerations for invited speakers and conduct of the meeting. No more than six MSE experts should be invited and presentations

should be no more than 45 minutes to emphasize SSC discussion over invited speaker presentations. There is no need for a presentation on how to conduct MSEs; such a primer can be offered in the background materials for the meeting. Reduce or forego round robin presentations from each SSC. Regional perspectives on the themes and subthemes can be provided in background materials.

The following experts are recommended candidates as invited speakers. They are listed in alphabetical order with no priority inference.

- Doug Butterworth (University of Cape Town) - *subthemes 1-3*
- Ian Cartwright (Thalassa Consulting Pty Ltd, Australian Fisheries Management Authority) - *subtheme 1, stakeholder involvement*
- Sean Cox (Simon Fraser University)
- Elizabeth Fulton (Commonwealth Scientific and Industrial Research Organisation (CSIRO))
- Helena Geromont (University of Cape Town) - *subthemes 1-3*
- Allan Hicks (International Pacific Halibut Commission)
- Mike Jones (Quantitative Fisheries Center, Michigan State University) - *subtheme 1, stakeholder involvement*
- Tom Miller (University of Maryland)
- Éva Plagányi (CSIRO)
- André Punt (University of Washington) - *subtheme 1 or 4 (1 preferred)*
- John Wiedenmann (Rutgers University)
- Michael Wilberg (University of Maryland)