Report of the 13th Session of the IPHC Scientific Review Board (SRB013)

Agenda item 9

IPHC-2018-SRB013-R
Scientific Review Board (SRB) – 4 Members

Sean Cox
Simon Fraser University, Canada
(Chairperson)

Jim Ianelli
NMFS/NOAA, USA

Kim Scribner
Michigan State University, USA

Marc Mangel
University of California, Santa Cruz, USA
SRB process

1. OPENING OF THE SESSION
2. ADOPTION OF THE AGENDA AND ARRANGEMENTS FOR THE SESSION
3. IPHC PROCESS
   3.1. Update on the actions arising from the 12th Session of the SRB (SRB012) (D. Wilson)
   3.2. Outcomes of the 2018 IPHC Work Meeting (WM2018) (D. Wilson)
   3.3. SRB annual workflow (D. Wilson)
4. IPHC FISHERY-INDEPENDENT SETLINE SURVEY (FISS)
   4.1. Methods for spatial setline survey modelling – results to date for 2018 (R. Webster)
5. PACIFIC HALIBUT STOCK ASSESSMENT: 2018
   5.1. Data source development (I. Stewart)
   5.2. Modelling updates (I. Stewart)
6. MANAGEMENT STRATEGY EVALUATION: UPDATE
   6.1. Updates to MSE framework and closed-loop simulations (A. Hicks)
   6.2. MSE Simulation results (A. Hicks)
   6.3. Distribution procedures (A. Hicks)
7. BIOLOGICAL AND ECOSYSTEM SCIENCE RESEARCH UPDATES
   7.1. Biological research updates (J. Planas)
   7.2. Review of discussions on long-term research plans incorporating new research topics (J. Planas).
Fishery independent setline survey (FISS)

- SRB NOTED:
  - 6th review of space-time modeling (endorses)
  - Expanded stations helped reduce uncertainty
  - Cost-benefit on station density may be required
  - NBS data treated the same as EBS
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Pacific halibut stock assessment: 2018

- Routine assessment update
21. **NOTING** that the Commission has asked the IPHC Secretariat to develop a paper for consideration at the 94th Session of the IPHC Interim Meeting, that outlines both the current IPHC peer review process and areas for potential improvement, the SRB **RECOMMENDED** the following:

**Table 1. IPHC stock assessment peer review timeline 2018-26.**

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SRB RECOMMENDED Assessment Cycle

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Management Strategy Evaluation (MSE)

Systematic process for testing the expected performance of management procedures against fishery objectives
Management Strategy Evaluation (MSE)

Systematic process for testing the expected performance of management procedures against fishery objectives

- **Objectives** developed via stakeholder engagement (MSAB)

- **Operating models** represent plausible scenarios/uncertainties for stock dynamics, movement, and future data (SRB, MSAB)

- Testing via **computer simulation** (IPHC Secretariat, SRB-review, MSAB)
Management Strategy Evaluation (MSE)

MSE aims to choose a repeatable management procedure

Scientifically-defensible harvest strategy

Adapted over time in response to new information
Management Strategy Evaluation (MSE)

Program of Work

- January 2019: Recommendations on Scale
  - Coastwide fishing intensity (HCR)
- January 2021: Recommendations on Distribution (and Scale)
SRB013-Req.01 **(para 26)** – MSAB prioritize objectives

### Current Goals and Objectives (primary)

<table>
<thead>
<tr>
<th>General Objective</th>
<th>Measurable Objective</th>
<th>Measurable Outcome</th>
<th>Time-frame</th>
<th>Tolerance</th>
<th>Performance Metric</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.1. Keep biomass above a limit to avoid critical stock sizes</strong></td>
<td><strong>Biomass Limit</strong></td>
<td>Maintain a minimum female spawning stock biomass above a biomass limit reference point at least 90% of the time</td>
<td>SB &lt; Spawning Biomass Limit ($SB_{lim}$) $SB_{lim}=20%$ spawning biomass</td>
<td>Long-term</td>
<td>0.10</td>
</tr>
<tr>
<td><strong>2.1 Limit catch variability</strong></td>
<td></td>
<td>Limit annual changes in the coastwide TCEY</td>
<td>Average Annual Variability (AAV) &gt; 15%</td>
<td>Long-term</td>
<td>0.25</td>
</tr>
<tr>
<td><strong>2.2 Maximize directed fishing yield</strong></td>
<td></td>
<td>Maintain TCEY above a minimum level coastwide</td>
<td>Coastwide TCEY &lt; TCEY$_{min}$</td>
<td>Long-term</td>
<td>??</td>
</tr>
</tbody>
</table>
SRB013-Req.02 (para 29)

Updates to MSE framework and closed-loop simulations

SRB013–Req.02 (para. 29) The SRB REQUESTED that in future iterations of the MSE, the IPHC Secretariat and MSAB consider:

a) the use of estimation error in the proxy assessment method with coefficients of variation equal to 0.15, a correlation of 0.5, and autocorrelation equal to 0.2 represents one plausible scenario. A larger error and autocorrelation could be considered in robustness tests or as alternative scenarios;

b) a management procedure include a constraint on the TMq change to be consistent with the maximum change that has happened historically;

c) the current conditioned operating model be used to simulate a coast-wide survey index and that such data be used to consider an alternative survey-based management procedure (this may provide a more transparent TMq-setting algorithm than the current SPR based control-rule and help with MSAB deliberations).
SRB013-Req.02 (para 29)

a) Fine tune MSE simulations
b) Constraint catch variability to historical
c) Examine survey-based management procedures
SRB013-Rec.02 (para 30) - RECOMMENDATIONS

MSE Simulation results

SRB013–Rec.02 (para. 30) The SRB RECOMMENDED a clear separation between the current stock assessment process and MSE process, so that it is understood:

a) these two processes, including statistics and performance metrics, are distinct and not comparable;

b) the purpose of the current ensemble stock assessment approach is to develop a decision table to assist the Commission in setting an annual TCEY. This TCEY setting process lacks specificity and how decisions are made is unclear. Furthermore, repeated application of this process is difficult to evaluate relative to Commission objectives;

c) the purpose of the MSE is to compare alternative management procedures against Commission objectives over a wide range of plausible uncertainties within the operating model and management procedures. Therefore, these procedures by definition must be specific and repeatable.
Stock assessment and MSE are separate:

a) models and performance metrics are different
b) Ensemble assessment informs annual TCEY
c) MSE informs choice of repeatable MP
SRB process

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Biological research program
# Biological research program

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<th>Stock assessment</th>
<th>Stock assessment</th>
<th>MSE</th>
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<tbody>
<tr>
<td><strong>Research areas</strong></td>
<td><strong>Relevance for stock assessment</strong></td>
<td><strong>Inputs to stock assessment and MSE development</strong></td>
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<tr>
<td>Reproduction</td>
<td>Spawning biomass scale and trend</td>
<td>Sex ratio</td>
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<td>Stock productivity</td>
<td>Maturity schedule</td>
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<td>Recruitment variability</td>
<td>Fecondity</td>
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<td>Growth</td>
<td>Temporal and spatial variation in growth</td>
<td>Predicted weight-at-age</td>
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<td>Yield calculations</td>
<td>Mechanisms for changes in weight-at-age</td>
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<td>Effects of ecosystem conditions</td>
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<td>Effects of fishing</td>
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<td>Discard Survival</td>
<td>Scale and trend in mortality</td>
<td>Bycatch and discard mortality estimates</td>
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<tr>
<td></td>
<td>Scale and trend in productivity</td>
<td>Variability in bycatch and uncertainty in discard mortality estimates</td>
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<tr>
<td>Migration</td>
<td>Larval distribution</td>
<td>Information for structural choices</td>
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<td>Juvenile and adult migratory behavior and distribution</td>
<td>Recruitment indices</td>
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<td>Genetics and Genomics</td>
<td>Genetic structure of the population</td>
<td>Migration pathways and rates</td>
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<td>Sequencing of the Pacific halibut genome</td>
<td>Timing of migration</td>
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SRB REQUESTED: Integration specifics, e.g. how does population genetics and migration help identify/clarify movement and population structure hypotheses for consideration in MSE and stock assessment?
INTERNATIONAL PACIFIC
HALIBUT COMMISSION