

INTERNATIONAL PACIFIC



HALIBUT COMMISSION

MSE Program of Work

Agenda Item 3

IPHC-2021-SS011-03



AM097 requests

- **AM097, para. 70.** *The Commission REQUESTED that the IPHC Secretariat consider and develop a draft MSE Program of Work for review by the Commission. The MSE Program of Work should describe technical versus policy oriented issues, linkages between/among specific work products, and sequencing considerations between/among items. The MSE Program of Work should describe the resources required to complete items.*
- **AM097, para. 71.** *The Commission AGREED to meet intersessionally to review the draft MSE program of work for the IPHC Secretariat and provide direction on the prioritisation of tasks over the next 1-2 years, as well as the role of the MSAB in contributing to those tasks.*



Relevant SRB requests & recommendations



Alternative Operating Models

- **SRB016, para. 27.** *The SRB NOTED that stochasticity in Pacific halibut productivity is driven substantially by extrinsic factors (i.e. processes independent of Pacific halibut population size, structure, distribution, etc.). While the current approach is reasonable at this early stage of operating model development, the SRB REQUESTED that the IPHC Secretariat investigate intrinsic drivers (e.g. compensatory and dependant effect) for at least some of these processes.*



Weight-at-age

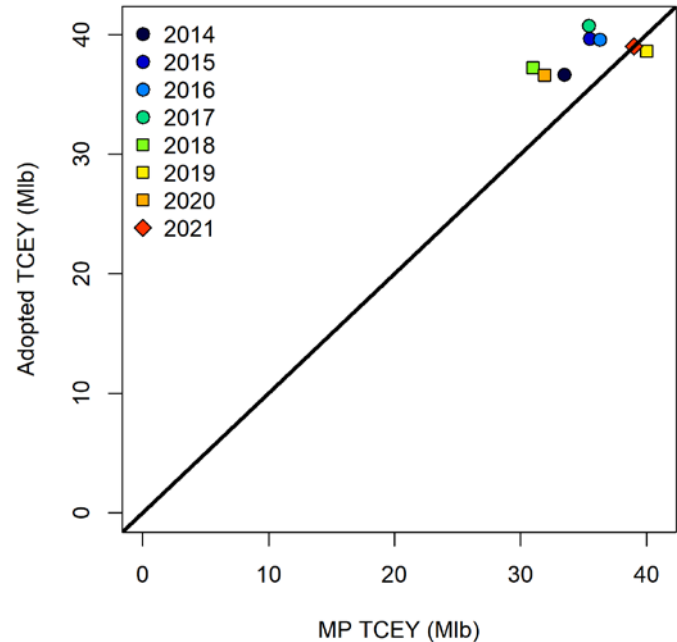
- **SRB016, para. 28.** ... *the SRB REQUESTED that a multivariate normal distribution be investigated (for SRB018 June 2021) for weight-at-age deviations in which these are correlated among ages.*



Decision-making variability

SRB016, para. 29. ... the SRB REQUESTED further investigation of decision-making variability, including empirical analysis of the relationship between recommended and implemented harvest levels

- Adopted coastwide TCEY (2014-2021)
 - Circles are “blue-line” harvest policy
 - Squares are $F_{SPR=46\%}$ harvest policy
 - Diamond is $F_{SPR=43\%}$ harvest policy



Implementation variability

Three types of implementation variability

1. **Decision-making variability** is the difference between the mortality limits determined from the MP and the mortality limits set by the Commission
2. **Realized variability** is the difference between the mortality limits set by the Commission and the actual mortality caused by fishing
3. **Perceived variability (observation error)** is the difference from the realized mortality that is a result of estimating the mortality rather than knowing the actual fishing mortality



Estimation Model

SRB017, para. 57. *The SRB ... RECOMMENDED continuing work to incorporate actual estimation models, ..., because that method would best mimic the current assessment process.*

- A balance between
 - fast for simulations
 - accurate with past assessments
 - representative of the future



Exceptional Circumstances

SRB017, para. 60. *The SRB RECOMMENDED that Exceptional Circumstances be defined to determine whether monitoring information has potentially departed from their expected distributions generated by the MSE...*

Potential topic areas

- Stock predictions (compared to assessment and data)
 - MSE population trajectories, distribution, etc.
- TCEY (compared to assessment and decisions)
 - MSE evaluated and produced similar range and trends

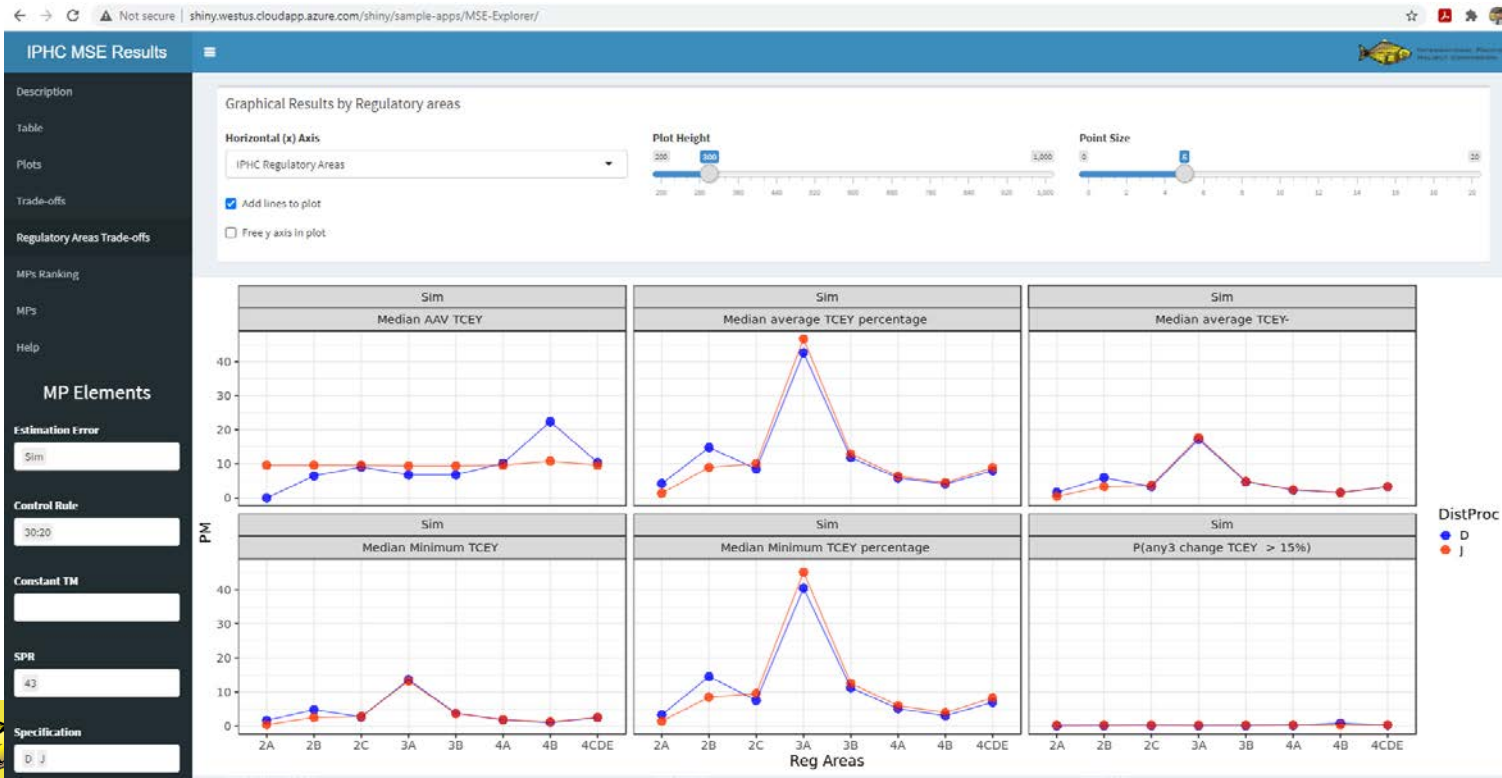
Other triggers for an updated MSE

- Changes in data collection
- Changes in fisheries



Presentation of results

SRB017, para. 61. *The SRB REQUESTED that the IPHC Secretariat include plotting function in the MSE Explorer to visualize among-Regulatory Area trade-offs in various yield statistics*



MSE Integration with Research



Biological parameterization and evaluation of movement estimates

1. Distribution of life stages and stock connectivity
 2. Spatial spawning patterns and connectivity
 3. Understanding growth variation
- Benefits to MSE
 - Spatial and temporal patterns in recruitment
 - Movement of juvenile and adult stages
 - Stock structure
 - Modelling weight-at-age



Fishery Parameterization

- Discard mortality rates
- Benefits to MSE
 - Improved characterization of fisheries
 - Better spatial accounting of fishery mortality



MSE Program of Work tasks for 2021-2022



Categories for the MSE PoW

1. Objectives
 2. Management Procedures (MPs)
 3. Framework
 4. Evaluation
 5. Application
- **Time:** the amount of time for that task (10 is a full schedule up to IM097)
 - **Total time:** the amount of time for that task plus any prerequisite tasks



MSE tasks (High priority)

ID	Category	Task	Deliverable	Time	Total Time	
F.1	Framework	Develop migration scenarios	Develop OMs with alternative migration scenarios	3–7	3–7	SRB Rsrch
F.2	Framework	Implementation variability	Incorporate additional sources of implementation variability in the framework	2–4	2–4	SRB
F.3	Framework	Develop more realistic simulations of estimation error	Improve the estimation model to more adequately mimic the ensemble stock assessment	3–8	3–8	SRB
F.5	Framework	Develop alternative OMs	Code alternative OMs in addition to the one already under evaluation.	3–4	5–8	SRB Rsrch

All of these tasks relate to SRB recommendations and would improve the robustness of the MSE



MSE tasks (Medium priority)

ID	Category	Task	Deliverable	Time	Total Time	
M.1	MPs	Size limits	Identification, evaluation of size limits	2–3	10–20	
M.2	MPs	Survey-based MPs	Identification, evaluation of empirical MPs using FISS data directly	2–4	4–6	SRB
M.3	MPs	Multi-year assessments	Evaluation of multi-year assessments	1–2	2–4	Review
M.4	MPs	Non-directed discard mortality	Evaluation of management procedures related to non-directed discard mortality.	2–4	3–6	
M.5	MPs	Additional MPs with scale and distribution	Evaluation of additional MPs with scale and distribution elements	1–5	3–8	
F.4	Framework	Time-varying parameters	Code into the OM the option for more time-varying parameters.	2–4	2–4	Rsrch
F.6	Framework	Improve framework code	A more usable framework	1–10	1–10	
F.7	Framework	Model length-at-age	OM that can model length specifically	6–10	6–10	

MSE tasks (Low priority)

ID	Category	Task	Deliverable	Time	Total Time	
O.1	Objectives	Revisit sustainability objectives	Updated coastwide & regional objectives	1–2	1–2	
O.2	Objectives	Revisit fishery objectives	Updated coastwide & regional objectives	2–4	2–4	
E.1	Evaluation	Develop conservation & fishery performance metrics (PMs)	PMs linked to primary objectives. Additional performance metrics for evaluation beyond primary objectives	1	1–2	
E.2	Evaluation	Add economic performance metrics	Develop economic PMs to link with economic study and bring in the human dimension	2-3	2-4	
E.3	Evaluation	Presentation of results	Develop methods and outputs that are useful for presenting outcomes to stakeholders and Commissioners	1–2	1–3	SRB
A.1	Application	Develop exceptional circumstances	A list of exceptional circumstances that would result in additional MSE evaluations	1–3	1–3	SRB

Linkages

FRAMEWORK

F.2
Variability

F.3
Est Err

F.6
Framework

F.7
LenAtAge

F.4
Time-vary

F.1
Migration

F.5
OMs

APPLICATION

A.1
Except
Circums

MPs

M.1
Size
Limits

M.2
Survey
based

M.3
Multi
Year

M.4
Non-
directed

M.5
Scale
Distn

OBJECTIVES & EVALUATION

O.1
Cons

O.2
Fishery

E.1
PMs

E.2
Econ

E.3
Present



SRB018

The SRB **AGREED** that the MSE is a useful tool to prioritize research topics with respect to their potential to improve management performance.

- In the upcoming 5-year program of integrated science and research
 - develop the MSE framework such that it is ready to be used to prioritize research topics in the following 5-year program



SRB018: Tasks to assist in adoption of a MP

The SRB **REQUESTED** that the IPHC Secretariat prioritize tasks for the MSE Program of Work that lead to adoption of a well-defined management procedure, taking into account interdependencies among tasks and presenting tasks as linked sets

- Interim agreements expire in 2023



SRB018: Tasks to assist in adoption of an MP

- F.1, F.2, F.3, F.5
 - Any of the high priority Framework tasks will provide a more robust evaluation
- M.5
 - Use what we have learned to refine MPs
- M.2, M.3
 - Evaluate different paradigms for MPs
- E.1, E.2, E.3
 - Assist evaluation and ranking MPs

ID	Task
F.1	migration scenarios
F.2	Implementation var
F.3	estimation error
F.5	alternative OMs
M.2	Survey-based MPs
M.3	Multi-year assess
M.5	Additional MPs
E.1	performance metrics
E.2	economic metrics
E.3	Presentation of results

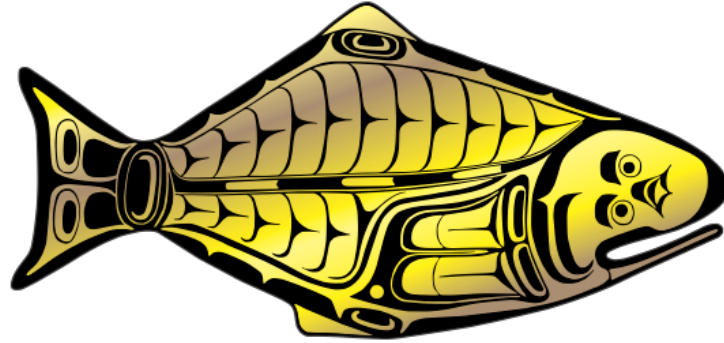


Recommendations

- 1) **NOTE** paper IPHC-2021-SS011-03 which lists tasks that may be considered in the development of a Management Strategy Evaluation (MSE) Program of Work (2021-23) for the IPHC Secretariat;
- 2) **RECOMMEND** connecting the MSE with economics outcomes from the Pacific Halibut Multiregional Economic Impact Assessment (PHMEIA);
- 3) **RECOMMEND** and prioritize tasks for inclusion in a Program of Work for MSE related activities by the IPHC Secretariat.



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