

MSAB Meeting IV – Summary Minutes

October 20-21, 2014. IPHC offices, Seattle WA

Attending: John Woodruff, Scott Meyer, Scott Mazzone, Michelle Culver, Gary Robinson, Jim Lane, Brad Mireau, Paul Ryall, Jeff Kauffman, Dan Hull, Bruce Gabrys, Peggy Parker, Tom Marking, Greg Elwood, Per Odegaard, Chris Sporer, Bob Alverson, Jim Balsiger, Rachel Baker

Visiting: Allan Hicks (Northwest Fisheries Science Center)

Absent: Shane Halverson, Loh-Lee Low, Ryan Littleton, Adam Keizer, Robyn Forrest

IPHC staff: Steve Keith, Tom Kong, Bruce Leaman, Steve Martell, Ian Stewart, Jay Walker, Catarina Wor (UBC graduate student)

NOTES:

This meeting of the MSAB was webcast and recorded. These summary minutes therefore note highlights and salient points of discussion but do not attribute points to individual speakers. The detailed discussions from the meeting are available in recordings here:

Day 1 (currently unavailable)

Day 2

The agenda and presentations from this meeting are also posted on the MSAB webpage:

Agenda

MSAB IV

Table 1

Pacific Hake MSE Process

The IPHC MSE Tool, which is used to review equilibrium simulation results from the operating model, is found at:

<https://iphc.shinyapps.io/MSAB/>

Meeting Objectives

The objectives for the October 2014 MSAB meeting were:

- Update on the status of the MSE objectives.
- Current status of the coast-wide Operating Model.
- A new tool for exploring alternative policy options.
- Compare notes with the Pacific hake MSE process.
- Set research priorities.
- Selection of chairs and co-chairs, and develop procedures for reporting to the Commission

The agenda for the meeting is included in the Appendix.

Summary Review from MSAB Meeting III, May 2014

The meeting opened with a brief review of the previous MSAB meeting. (Summary minutes of the May 2014 meeting are posted here:

<http://www.iphc.info/MSAB%20Documents/MSABMay2014SummaryMinutes.pdf>)

Dr. Leaman presented the staff comments on the table of candidate MSE goals and objectives developed during the May meeting ([Table 1](#)). There was a brief discussion of the term “compensation” regarding bycatch mitigation in the list of candidate management procedures. In this instance, it refers to compensation in the biological sense, rather than in terms of fishery yield or regulations, and the group’s focus is on mitigation of impacts. The Board made no changes to the table at this point, noting that further refinement of the table will take place during the MSE process.

Dr. Martell reviewed the size-limit case study from the May meeting as an example of using an evaluation tool with the Operating Model to test candidate management procedures with different scenarios.

A review of highlights from the May meeting led to a discussion of the MSE process and its place in the IPHC decision-making framework, including whether the MSAB would displace other IPHC advisory bodies. Dr. Leaman noted that the MSE process is designed to fit into and inform the IPHC decision-making structure, and that this was a good reason to discuss the MSE governance process later in this meeting. Regarding bycatch impacts in particular, coordinated management of total mortality among the agencies involved will be desirable, and MSE will provide inputs to both assessment and harvest management decisions. Dr. Martell noted that we have likely reached a good plateau in the refinement of management objectives and procedures, and the task now is to proceed with developing the operating model and conduct detailed evaluations.

Conditioning the Operating Model

Dr. Martell presented the current status of the MSE Operating Model, which is now conditioned with halibut data. It is still in the developmental stage regarding the structures of the assessment ensemble models. The Operating Model currently operates at a coastwide level;

spatial data for a four-area model is now ready, and incorporating it to model downstream effects will be the subject of continued work in the coming year.

The Operating Model will be used to model a range of scenarios in three overlapping areas: biological (including such variables as stock recruitment, natural mortality, environmental effects, growth, and migration), management (variables such as data and assessment, harvest policy, allocation, control rules, and agency action), and fishing effort dynamics (variables such as the directed fishery, bycatch fisheries, other fisheries, selectivity, and the setline survey).

Dr. Martell reviewed the differences between procedures – things we can manage – and scenarios – things we cannot manage – both of which include a wide range of uncertainty (see illustration below).

	PROCEDURES	SCENARIOS
	Things we can manage	Things we cannot manage
Things were certain about	<ul style="list-style-type: none"> ● Size limits ● Catch limits ● Rate of TAC change ● Allocation among sectors ● ... 	<ul style="list-style-type: none"> ● PDO - recruitment variation ● Changes in size-at-age ● Migration, dispersal ● ...
Things were uncertain about	<ul style="list-style-type: none"> ● Bycatch ● Wastage ● Discard mortality rates ● ... 	<ul style="list-style-type: none"> ● Natural mortality ● Recent recruitment trends ● Range contraction ● ...

Creating Alternative Scenarios

Dr. Martell explained that scenarios for the Operating Model should bracket the range of hypothesized uncertainty. In contrast to assessment modeling, which aims to fit the available data, the Operating Model should encompass a variety of scenarios that result in divergent policy prescriptions. In response to the question of how to determine if a particular model is a good choice, Dr. Stewart and Dr. Martell discussed the ensemble of three models currently used for assessment, including their assumptions and the differences among them. Stock assessment modeling is focused on portraying the current state of the stock and historical trends. The Operating Model can be used to examine the range of possible outcomes going forward from the current state of the stock. They emphasized the need to limit the Operating Model scenarios to a manageable number, focusing on the largest sources of uncertainty and the greatest impact on harvest policy.

Dr. Stewart presented two examples of sensitivity in assessment modeling to illustrate the concept of focusing on factors with the greatest impact on harvest policy. He noted that a 10% change up or down in the sex ratio of the commercial catch translates into a 50-million-pound range of spawning biomass estimates. Thus the assessment, and by extension, the harvest policy, is very sensitive to variability in the sex ratio. In contrast, spawning biomass estimates are relatively insensitive to the doubling of wastage in the directed commercial fishery. Although greater wastage doesn't change the current state of the stock, it means the stock appears to be less productive from the perspective of directed yield, which leads to reduced optimal harvest rates. Thus, changes in wastage have a large impact on harvest policy even if they don't affect the assessment to a similar degree.

Because of these often counter-intuitive contrasts between sensitivity in the model and sensitivity in the policy, the challenge for MSE scenario modeling is to choose scenarios that fit the data equally well but which encompass alternative assumptions in the resulting policy prescription going forward. Dr. Martell noted that it is useful to focus on the sensitivity of the underlying production function (such as natural mortality, recruitment, and growth) and global scaling (such as B_{100} [unfished spawning biomass]) when considering possible scenarios.

Creating Alternative Procedures

In choosing alternative management procedures to examine, Dr. Martell noted that there are an infinite number of possible combinations of regulations, data, assumptions, and models, quoting Rob Kronlund of DFO: "The combinatorics will kill you." The key is to define a manageably small number of hierarchical objectives in advance, which can be used to screen candidate management procedures. The focus should be on what can be managed, and to pick a range of possibilities robust to changes in things we cannot control (the scenarios).

Dr. Martell introduced the IPHC MSE Tool, a web-based application that uses an equilibrium model to exploring candidate procedures using the MSE Operating Model: <https://iphc.shinyapps.io/MSAB/> (nicknamed "Shiny"). The objective of the equilibrium model interface is to better understand the relationship and tradeoffs between policy variables (such as fishing mortality, size limits, and discard mortality rates) and response variables (such as yield, discards, and wastage in the directed fishery) by reviewing simulation results from the Operating Model. It compares alternative procedures developed using the six different harvest variables that can be adjusted:

- Fisheries selectivity,
- Minimum and maximum size limits,
- Discard mortality rate (DMR) for the directed fishery,
- Average selectivity in bycatch fisheries,
- Bycatch mortality from all other fleets, and
- Price per pound for four different size grades.

The model output consists of graphical and tabular results that summarize the biological sustainability objectives, fisheries sustainability objectives, and economic metrics. The harvest policy variables can be set independently for the alternative scenarios and the resulting differences can be compared using the graphical or tabular outputs.

Dr. Martell explained that the IPHC MSE Tool is an equilibrium model, which predicts a steady-state equilibrium outcome given a particular set of input values that are held constant over a range of alternative fishing mortality rates in the directed fishery. It assumes static (or

stationary) underlying processes, but this relative simplicity makes it good for rapid response and analysis within this limitation. In contrast, a dynamic model that can account for processes (such as recruitment variation) or procedures (such as harvest control rules that are functions of stock status) that vary over time is much more complex both to develop and to use in a practical meeting. The process will be to use the equilibrium tools to better understand the long-term consequences of alternative policies, then filter candidate management procedures and further evaluate using a dynamic operating model (which is more computationally expensive than the simple equilibrium model).

The Board explored a series of examples using the tool, including changing selectivities and size limits. This allowed the Board to see the tool in action and better understand how to use it. The accompanying wide-ranging discussion encompassed topics as varied as size at age, the proportion of males in the catch, female fecundity and maternal effects, fishing behavior, wastage, economic incentives, and effects on future spawning biomass. Interactions among these variables were explored, noting which parameters are modeled and which are not, as well as what can be managed and what cannot.

Dr. Martell emphasized that the current tool is a good early realization, but not to over-interpret the results, as time-varying parameters and more detailed economic behaviors or incentives are not modeled. He noted the value of using the tool with an open and organic discussion like this, where the staff can respond directly to questions and the Board can investigate scenarios in real time without having to wait weeks or months to explore model results. He also noted that an equilibrium spatial model is in development, which will further enhance the value of the tool in analyzing candidate management procedures with respect to impacts of migration on harvest policy.

Research Priorities

Dr. Martell opened the discussion of research priorities by noting that MSE is being identified as the vehicle for solving a large number of questions, not all of which are realistic at this time. With so many possibilities to pursue, research priorities need to be listed and ranked.

There are a huge number of moving parts to reconcile in modeling and managing halibut. The “Shiny” equilibrium tool can be used to help construct and evaluate procedures to run later in the dynamic Operating Model. The tool currently models only two fisheries, directed commercial and bycatch, but will eventually include other fisheries relevant to halibut. The four-area model in development will offer an area-specific equilibrium approach where parameters such as migration and DMR can be modeled on an area-specific basis. In the future it will be desirable to consider control rules against a more dynamic background, but in the meantime alternative scenarios in the equilibrium model can be chosen to approximate the range of dynamic inputs. This process can help uncover gaps in knowledge and identify needed research.

The Board engaged in a wide-ranging discussion of research questions, including the following points:

- Some parameters are more important than others. Perhaps sideboards could be developed to focus on the more promising areas. The Board asked for staff advice on key sensitivities and the staff asked for Board feedback from using the tool.
- Suggested possible scenarios included missing fish (under-reporting of catch), variations in migration, change in size at age, and minimum size limits.

- The precision of modeling is limited by the precision of data. In order to avoid false comfort from model results, management procedures need to be robust to the underlying data being wrong. A priority is to capture the big errors well and avoid chasing minor issues. The question of whether a larger, healthier stock should be used in modeling led to a discussion of the derivation of the current harvest control rules, which were based on modeling of both good and poor recruitment. The Board discussed the derivation of the current harvest policy limit and threshold points, as well as the different harvest rates used in the IPHC regulatory areas. [The background to the current harvest policy was presented at the October 2013 MSAB meeting:
http://www.iphc.int/documents/MSAB/201310/IPHC_HP_MSAB_Oct13_v2.pdf]
- DMR was discussed in detail, including its significance to determining yield and its influence on harvest policy. Sources of discard rates and DMR information were reviewed, as well as gaps, assumptions, and biases associated with these data. The challenges and benefits of improving these data sources and the resulting DMR estimates were discussed. Efforts to reduce DMR in different sectors were noted.
- The critical importance of data collection to test any change in management procedures was emphasized. Absence of data means an absence of any ability to evaluate the impacts of procedures.
- Despite the gaps in current knowledge, developments on the status quo can nevertheless be more productive than waiting for perfect information.

The MSE Process for Pacific Hake (Whiting)

The Board heard an informative presentation by Dr. Allan Hicks on the MSE process for Pacific hake (whiting). The hake experience provides a useful comparison and reference for the halibut MSE process. The hake process has a great many similarities to what the halibut MSE is doing. Dr. Hicks indicated that the hake MSE process would also benefit from this interchange.

MSE Priorities and Objectives

With the five overarching objectives in mind, the Board discussed the priorities for investigating candidate management procedures, beginning with the five management procedures from the previous meeting.

The Five Overarching Objectives

- Biological sustainability.
- Fishery sustainability and stability.
- Assurance of access.
- Minimize bycatch mortality.
- Serve consumer needs.

The Five Management Procedures

- Accounting for total mortality from all sources, by area.

- Size limits.
- Harvest strategies: the 30:20 control rule and the reference removal rates (21.5% and 16.125%), coastwide and by area.
- National shares by allocation rather than apportionment.
- Bycatch mitigation.

Regarding this list of procedures and how they might be developed, the discussion highlighted the following points:

- These management procedures are very broad, and some are more tractable than others. All can be tuned in order to achieve management objectives. For example, various size limits or removal rates can be considered and adjusted such that the biological objectives are met.
- The first item on this list is about accounting for total mortality, and is not necessarily a specific management action.
- It will be helpful to include what operational steps would be required to implement a particular management measure – how to get from here to there. The transition from status quo to a new management procedure could involve a series of small changes over a number of years. Multiple management entities may be involved, as well as monitoring and enforcement outside the IPhC.
- The effects, benefits, and trade-offs among the procedures and how they affect different sectors and areas should be considered. Some may have positive or negative relationships with others, and unintended consequences should be avoided.
- It would be valuable to have the Shiny tool incorporate how well various procedures address the stated objectives. It was recognized that this would be a useful output but that it will take some time to develop.
- In considering how to investigate national shares and bycatch mitigation with coastwide tools, it was noted that national shares could be negotiated among the Parties to the Convention. Bycatch analysis will depend on a spatial structure to measure, so it will remain on the wish list until the future Operating Model can support it.

The Board discussed particular aspects of bycatch, including what mitigation means, the impact of bycatch, how bycatch can be reduced, and the trade-offs involved. The example of the Canadian integrated fisheries and other efforts to reduce bycatch were considered.

Returning to a previous discussion, the Board considered how DMR fits into the MSE evaluation. Is it a scenario or a procedure? Dr. Martell demonstrated an example of changing management procedures and testing the sensitivity of the results to DMR. The Board discussed ways to minimize excess handling and maximize efficiency in the fishery, as well as how to measure the value of these measures to the stock and the fishery.

Size limits were discussed as a way to leaving more older fish in the water and not to get more quota, and what this would represent in terms of trade-offs for future yield.

The Board considered whether any procedures needed to be added to the current list. Procedures relating to the recreational sector are desirable, but will need to wait until area-specific analysis is available.

It was stressed that the Shiny tool is for identification and screening of promising procedures, and not the final tool to choose procedures. It can be used by all the Board members, in real time, as they map the rough contours and trade-offs of candidate procedures, which can then be further refined in spatial and eventually dynamic testing. The task for Board members is to go forth and work with colleagues to explore the possibilities. In the meantime, the staff will be working on building the spatial and dynamic models, as well as developing a feedback process for Board members' experiences with evaluations using the MSE tool.

MSE Governance

The Board discussed governance of the MSE process in order to best serve the process and the Commission.

Initial discussion focused on the upcoming IPHC meeting cycle and how the work of the MSAB would be reported to the Commission, the other advisory bodies, and the public. This progressed to the larger topic of who should lead MSAB meetings and how they should be run. Noting that MSE should be a stakeholder-driven process, both Board and staff members acknowledged that it is awkward for staff members to present stakeholder views. This is more than a reporting issue; a successful MSE process requires buy-in among stakeholders, and the Commissioners and other stakeholders want to hear directly from the Board members. In addition, having staff members lead the meetings as they do now limits their personal participation in the process.

Various possible leadership options were presented and discussed, including a single chair, co-chairs, a panel, a chair and a rapporteur, and a chair or facilitator who is not a stakeholder. Aside from running meetings and reporting out, the leader(s) could also provide more coordination between meetings to move the process along and reduce the time spent at meetings catching up. If the chair or facilitator were not a stakeholder, it would be preferable to have someone with MSE experience.

Returning to the immediate future, the Board agreed that it would go one more round with staff reporting at the coming Interim and Annual Meetings, backed up by MSAB members in attendance. As the MSAB is still in a learning phase, there may not be much to report now, but in the future it will be much more important for the Board to clearly communicate its policy analyses and recommendations.

At the 2014 Interim Meeting, the staff will give the technical presentation and the Commissioners in attendance at this MSAB meeting will comment. The Commissioners will discuss options for MSAB leadership, and recommendations for MSAB facilitators should be forwarded to the lead Commissioners.

At the 2015 Annual Meeting, the staff will give the technical presentation and the MSAB members from the Conference Board and the Processor Advisory Group will report to those bodies. An outreach memo will be prepared by the staff to support complete and consistent reporting. The Board considered whether to convene a short MSAB meeting during the Annual Meeting, but decided against it.

The MSAB's next meeting is tentatively set for May 2015.

Appendix – Agenda

Monday October 20, 2014

- 12:30 PM: Welcome, introductions, meeting objectives and questions.
- 1:00 PM: Summary review from MSAB Meeting 3 (May 5-6, 2014).
- 1:30 PM: Conditioning the coast wide operating model with Pacific halibut data.
- 2:30 PM: BREAK
- 2:45 PM: Process of creating alternative scenarios.
- 3:30 PM: Process of creating alternative management procedures.
- 4:30 PM: Discussion about research priorities & the list of questions to address.
- 5:00 PM: ADJOURN

Tuesday October 21, 2014

- 8:00 AM: COFFEE & PASTRIES
- 8:30 AM: Recap from previous day, questions & discussion.
- 9:00 AM: Long-term vs short-term objectives (equilibrium vs. dynamic models).
- 10:00 AM: BREAK
- 10:15 AM: Developments on status quo versus perfect information.
- 11:00 AM: Allan Hicks on MSE process for Pacific hake.
- 12:00 PM: LUNCH
- 1:00 PM: MSE laundry list (priorities and objectives for the MSE process).
- 2:00 PM: Selection of MSAB Chairs and Co-chairs & procedures for reporting to the Commission at Interim and Annual meetings.
- 2:30 PM: Discussion & feedback, and closing remarks.
- 3:15 PM: ADJOURN