IPHC Secretariat Program of Work for MSAB Related Activities 2019-23

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PURPOSE

To update the IPHC Program of Work for MSAB related activities for the period 2019-23.

INTRODUCTION

This Program of Work is a description of activities related to the Management Strategy Advisory Board (MSAB) that IPHC Secretariat staff will engage in for the next five years. It describes each of the priority tasks, lists some of the resources needed for each task, and provides a timeline for each task. However, this work plan is flexible and may be changed throughout this period with the guidance of the MSAB, Science Review Board (SRB) members, and Commission. The order of the tasks in this work plan represents the sequential development of each task, and many subsequent tasks are dependent on the previous tasks.

It is important to have a set of working definitions, and this is especially true to the Management Strategy Evaluation (MSE) process since it involves many technical terms that may be interpreted or used differently by different people. A set of working definitions are provided in the IPHC Glossary of Terms and abbreviations: https://iphc.int/the-commission/glossary-of-terms-and-abbreviations

MANAGEMENT STRATEGY EVALUATION (MSE)

Management Strategy Evaluation (MSE) is a process to evaluate alternative management strategies. This process involves the following:

1. defining fishery goals and objectives with the involvement of stakeholders and managers,
2. identifying management procedures to evaluate,
3. simulating a halibut population with those management procedures,
4. evaluating and presenting the results in a way that examines trade-offs,
5. applying a chosen management procedure, and
6. repeating this process in the future in case of changes in objectives, assumptions, or expectations.

Figure 1 shows these different components and that the process is not necessarily a sequential process, but there may be movement back and forth between components as learning progresses. The involvement of stakeholders and managers in every component of the process is extremely important to guide the MSE and evaluate the outcomes.

BACKGROUND

Many important tasks have been completed or started and much of the work proposed will use past accomplishments to further the Management Strategy Evaluation (MSE) process. The past accomplishments include:

1. Familiarization with the MSE process.
2. Defining goals for the halibut fishery and management.
3. Developing objectives and performance metrics from those goals.
4. Development of an interactive tool (the Shiny application).

5. Discussions about coast-wide (single-area) and spatial (multiple-area) models.
6. Presentation of preliminary results investigating fishing intensity.
7. Discussions of ideas for distributing the TCEY to Regulatory Areas.

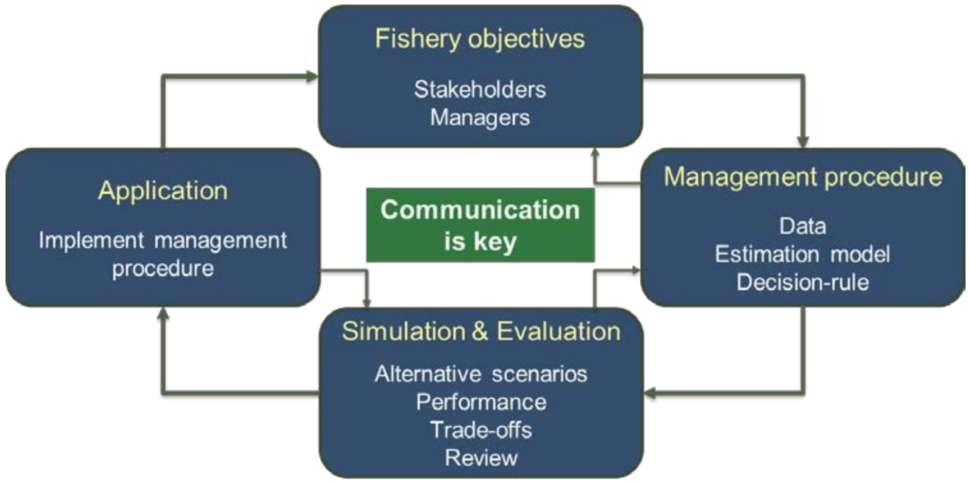

Fig. 1. A depiction of the Management Strategy Evaluation (MSE) process showing the iterative nature of the process with the possibility of moving either direction between most components.

Management Strategy Evaluation is a process that can develop over many years with many iterations. It is also a process that needs monitoring and adjustments to make sure that management procedures are performing adequately. Therefore, the MSE work for Pacific halibut fisheries will be ongoing as new objectives are addressed, more complex models are built, and results are updated. This time will include continued consultation with stakeholders and managers via the MSAB meetings, defining and refining goals and objectives, developing and coding models, running simulations, reporting results, and making decisions. Along the way, there will be useful outcomes that may be used to improve existing management and will influence recommendations for future work.

Overall, the plan is to use what has already been learned to continue making progress on the investigation of management strategies.

MAIN TASKS FOR THE NEXT 1-2 YEARS (WITH PAGE NUMBER OF DESCRIPTION)

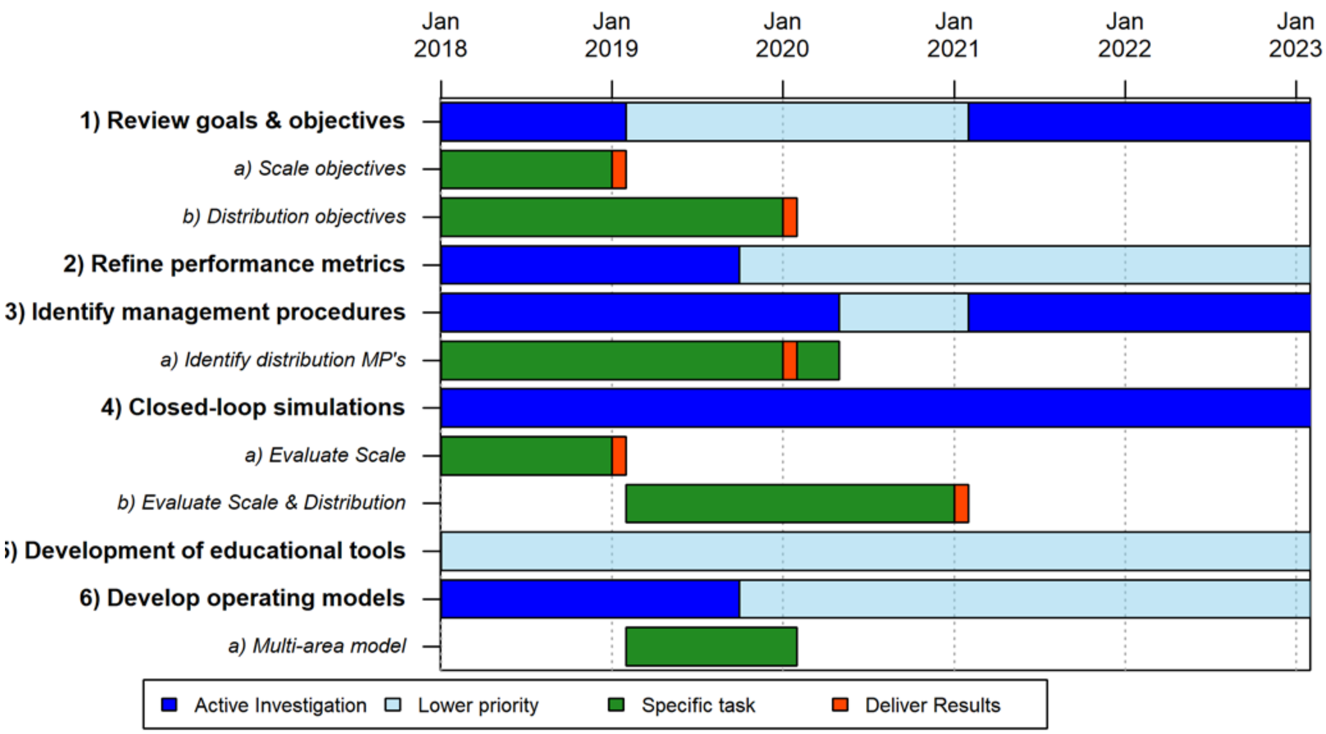

Fig. 2. Gantt chart for the five-year work plan. Tasks are listed as rows. Dark blue indicates when the major portion of the main tasks work will be done. Light blue indicates when preliminary or continuing work on the main tasks will be done. Dark green indicates when the work on specific sub-topics will be done. Red areas show when results will be presented.

Task 1. REVIEW, UPDATE, AND FURTHER DEFINE GOALS AND OBJECTIVES

Timeline: Ongoing

Deliverables: A list of goals important to the management of the halibut fishery, and a set of measureable objectives associated with those goals.

Relevance: Relevant goals and measureable objectives are essential to the MSE process. They are necessary to determine what types of models are needed and how to evaluate the management strategies.

Resources: Time to review past meetings, MSAB members to confirm and verify intent of existing goals and objectives, MSAB members to assist in the development of additional goals and objectives, MSAB members to assist with the development of measureable objectives and performance metrics.

Relation to other tasks: Defining goals and objectives is critical to developing useful performance metrics (Task 2), determining applicable management procedures (Task 3), and identifying the complexity needed in the operating model (Task 6).

Description: A very important part of the MSE process is to define goals (aspirational and realistic) and turn those into measureable objectives. The first step is to define a set of goals that are important to stakeholders and managers, which has been done at past MSAB meetings. It is important to verify that these aspirations are still of interest to all MSAB members, and to determine if additional goals should be added to the list. Currently, there are four overarching goals.

1. Biological sustainability
2. Fishery (all directed fisheries) sustainability, stability, and access
3. Minimize discard mortality
4. Minimize bycatch mortality

Measurable objectives can then be defined from these goals. Measurable objectives are objectives that have

1. an *outcome* (a specific and measurable description of what is desired),
2. a *time frame* (over what period of time is this outcome desired, which can be how far in the future and/or over a period of years), and
3. a *tolerance* (the tolerance for failure expressed as a probability).

An example of defining a measureable objective may be to take an objective such as “avoid stock sizes from which the stock may not recover” and define the measureable objective as the predicted spawning biomass from the assessment is less than 20% of unfished equilibrium spawning biomass (*outcome*) over a ten-year period far in the future (*time frame* incorporating both components) no more than 5% of the time (*tolerance*).

These measurable objectives are then used to define a performance metric that is used to evaluate alternative management strategies. Measureable objectives can also be used to develop the specifics of a MSE simulation framework. For example, what spatial resolution is needed to evaluate the objectives (e.g., coast-wide single area vs. spatial operating model). The development of measureable objectives may be iterative, in that they may be revised as the MSE evolves and more is understood about the relative performance of various management procedures.

Task 2. DEVELOP PERFORMANCE METRICS TO EVALUATE OBJECTIVES

Timeline: October 2018 and ongoing

Deliverables: A list of performance metrics that would be informative to stakeholders, managers, and scientists to effectively evaluate the performance of different management strategies and the trade-offs between them.

Relevance: The performance metrics are the key to evaluating management strategies and communicating outcomes to stakeholders. Determining important metrics and finding ways to present them effectively will help with the interpretation of the MSE results.

Resources: Time to review past meetings, MSAB members to confirm and verify current metrics, MSAB members to assist with the development of various performance metrics.

Relation to other tasks: Performance metrics are the key to presenting results from the management strategy evaluations and will be used in the outcomes from Task 4 (Closed-loop simulation programming).

Description: Measurable objectives guide the development of the simulation framework for an MSE, and performance metrics are needed to gauge the performance of a management strategy relative to those objectives. For example, a measurable objective may be to keep the average catch above a specific amount (the *outcome*), in the long-term over a 10-year period (the *time frame*), at least 95% of the time (the *probability*). The performance metric, framed as a risk, could then be the probability that the average catch was less than that level in this time period (average here refers to the average over the 10-year period and the probability accounts for the many replicated simulations). Another example is that a potential aspirational goal would be to have stability in yield, which could be translated to a measurable objective as keeping the annual change in catch to less than 10% (*outcome*) over a 10-year period (*time frame*) at least 90% of the time (*probability*). The performance metric may then be, again framed as a risk, the average number of years that the absolute change in catch exceeded 10% over that 10-year period (the average number of years refers to average over simulations and is used because many replicate simulations would be done).

Other performance metrics may not be directly associated with measureable objectives, but related to aspirational goals. These could be the average catch and the average annual variability in catch, and they do not have a probability associated with them. They do, however, provide a comparison between management procedures, but can be more ambiguous in interpretation (e.g., compare an average catch of 101 tons to 100 tons, as opposed to a defined probability threshold for achieving a particular catch). If the goal is to maximize average catch or minimize average annual variability, then these performance statistics could be used to measure achievement of those goals (or to examine the trade-offs between them), but it is more difficult to gauge the performance of a metric like average catch in light of uncertainty. An important component of performance metrics is the *distribution of outcomes* under different scenarios; some scenarios may confer much greater sensitivity of results than others and the understanding of this sensitivity is critical to the evaluation of the management procedures that are tested. This is also a key element in understanding the uncertainty associated with results.

Determining important and useful metrics, as well as how to present them, is key to communicating outcomes, interpreting MSE results, evaluating trade-offs, and making decisions on management procedures. Many performance metrics have already been defined, and this task will refine those, identify new metrics, and develop ways to present them. For example, Table 1 and Figure 3 show preliminary results from the IPHC MSE for Pacific halibut that were presented in IPHC document IPHC-2018-AM094-12. The probabilities and other details are apparent in Table 1, while the trade-offs are more easily seen in Figure 3. Additionally, performance metrics can be related to past performance, such as the observed average catch over the last 2 decades, and advice will be solicited to determine if there is a historical period for comparison.

Table 1. Performance metrics determined from outputs of the closed-loop simulations for various fishing intensities indicated by a procedural Spawning Potential Ratio (SPR) and a 30:20 threshold:limit in the harvest control rule. Table reproduced from IPHC document IPHC-2017-AM094-12

	30:20 Threshold:Limit										
	High Fishing Intensity										**Low Fishing Intensity**
Procedural SPR	**25%**	**30%**	**40%**	**42%**	**44%**	**46%**	**48%**	**50%**	**55%**	**60%**	**100%**
Median average realized SPR	39%	39%	42%	44%	46%	47%	49%	51%	56%	61%	93%
Biological Sustainability											
Median average dRSB	29%	29%	34%	36%	38%	41%	43%	45%	50%	56%	92%
Median Average # of Mature Females (million)	5.87	5.97	6.73	6.98	7.19	7.59	7.91	8.03	9.01	9.75	13.63
P(dRSB<20%)	3%	3%	3%	2%	2%	2%	2%	2%	1%	1%	0%
P(dRSB<30%)	78%	64%	19%	13%	10%	7%	6%	5%	3%	2%	0%
Fishery Sustainability											
Median average Total Mortality (Mlbs)	40.09	39.56	39.91	37.62	35.27	36.37	34.71	35.50	33.48	32.72	7.63
10^{th} & 90^{th} percentiles TM (Mlbs)	13 113	13 126	13 109	13 101	14 98	13 99	13 90	13 91	13 82	12 75	7 8
Median average FCEY (Mlbs)	32.86	32.69	32.72	30.76	28.31	29.23	27.57	28.14	26.33	25.38	0.50
P(No Commercial)	11%	9%	8%	8%	7%	8%	8%	8%	8%	10%	100%
P(FCEY < 50.6 Mlbs)	69%	66%	69%	69%	72%	73%	74%	74%	77%	80%	100%
P(decrease TM > 15%)	24%	17%	6%	5%	5%	5%	5%	4%	4%	3%	27%
Median catch variability (AAV of TM)	19%	13%	7%	7%	6%	6%	6%	6%	6%	6%	20%
Median catch variability (AAV of FCEY)	25%	17%	10%	10%	10%	10%	10%	10%	10%	10%	17%
Median catch variability (AAV of Commercial)	34%	23%	13%	13%	14%	13%	14%	14%	14%	14%	0%

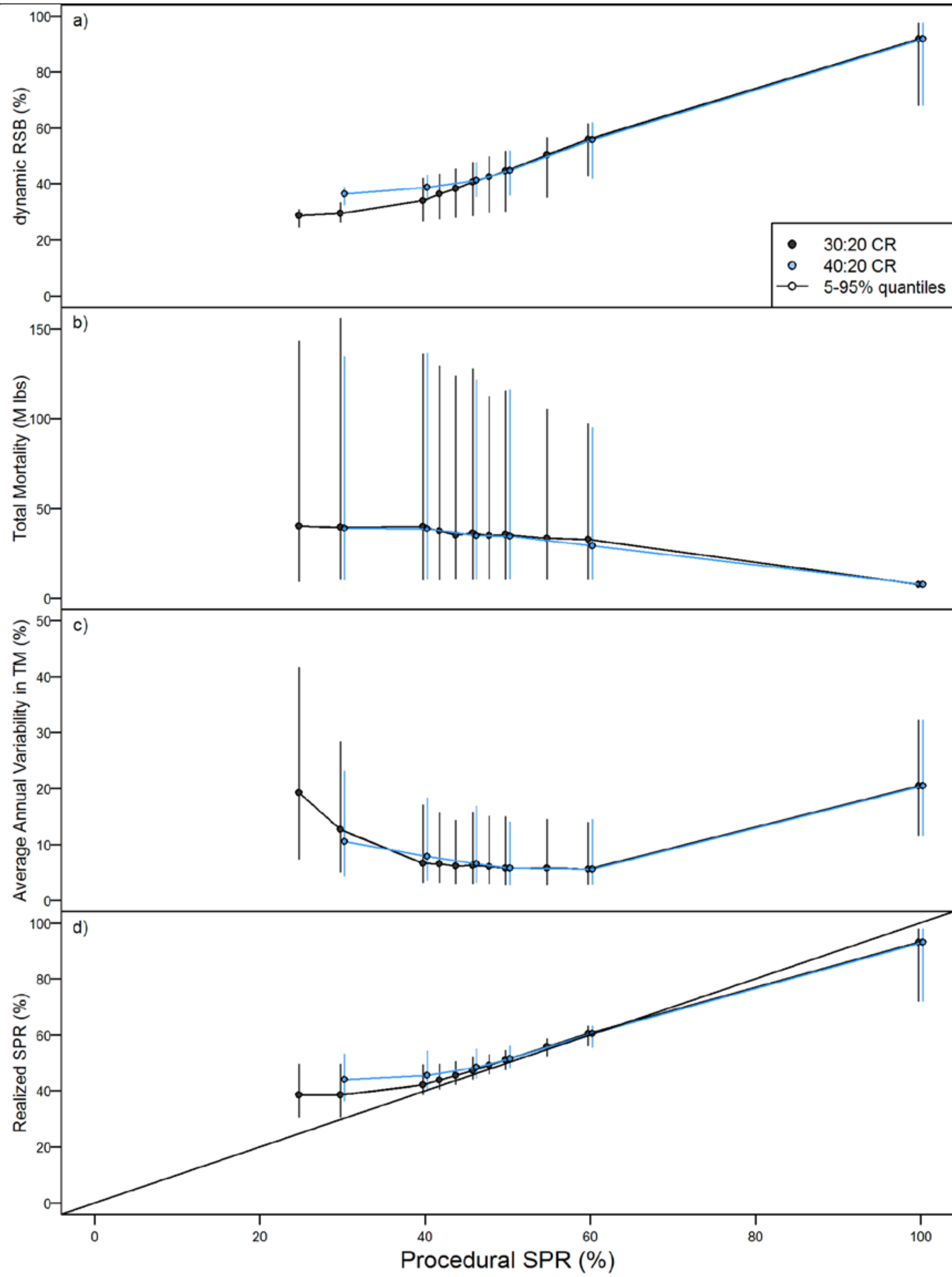

Fig. 3: Performance metrics plotted against the procedural SPR (horizontal axis) for different threshold:limit combinations (30:20 in black and 40:20 in blue). Panel a) shows the dynamic relative spawning biomass (biological sustainability goal), panel b) shows the total mortality (fishery sustainability goal), and panel c) shows the average annual variability for total mortality (fishery stability goal). Panel d) shows the realized SPR.

Task 3. Identify realistic management procedures of interest to evaluate with a closed-loop simulation framework

Timeline: 2018-19, and then ongoing.

Deliverables: Various management procedures related to scale and TCEY distribution to be tested using closed-loop simulations.

Relevance: Identifying realistic management procedures that are of interest to stakeholders, managers, and scientists will ensure that the results of the MSE are pertinent and useful to managing the Pacific halibut stock.

Resources: Discussions between IPHC staff and MSAB members.

Relation to other tasks: This task will rely on defined goals and objectives (Task 1) and will feed into the closed-loop simulation programming (Task 4).

Description: The purpose of MSE is to evaluate management procedures by examining and comparing the performance and trade-offs of each. A small enough set needs to be determined so that the simulations can be completed in a reasonable amount of time and be easily compared and contrasted. Management procedures can be identified by modifying the current one, consulting with stakeholders, or examining other fisheries. Initially, many may be identified, and then reduced to a manageable size, which can occur through further consultation and investigation with simpler models such as the equilibrium model.

A management procedure contains elements related to data collection, assessment, and harvest rules. Combined with objectives, this makes a management strategy. Some elements of management procedures that have been proposed by the MSAB are:

- **Total mortality**: Direct accounting by area for all sources of mortality in that area, including sub-legals and bycatch mortality.
- **Fishing Intensity**: SPR-based (spawning potential ratio).
- **Harvest rules**: 30:20 and 40:20 coast-wide control rules, reference harvest rate 21.5%/16.125% by IPHC Regulatory Area.

The management procedure that would be evaluated as part of the MSE process would contain all of the necessary elements to set catch levels for the stock. An example management procedure may be:

- Coast-wide F_{SPR} with a 30:20 control rule to determine coast-wide total removals
- Coast-wide directed fishery catch levels apportioned to regulatory areas based on proportion of survey biomass
- Status quo recreational, subsistence, and bycatch allocation
- Annual survey to inform the stock assessment
- Status quo fishery data collected
- Annual assessment to determine total catch

The Commission at its 2017 Annual Meeting (AM093) recommended investigating a management approach based-on Spawning Potential Ratio (SPR) to account for all mortality. Spawning Potential Ratio is the long-term equilibrium spawning biomass per recruit with fishing divided by the long-term equilibrium spawning biomass per recruit without fishing. An SPR-based approach is defining a fishing level that results in a specific SPR (reduction in spawning potential) and noted as $F_{SPR=XX\%}$, where XX% is the SPR. This $F_{SPR=XX\%}$ will be treated as an element of a management procedure and evaluated with closed-loop simulation to find a level that best satisfies the defined objectives.

Management procedures related to distribution of the TCEY will be evaluated in the future. In the meantime, discussions of potential management procedures are ongoing and will need to be finalized by May 2020 to ensure enough time to perform the closed-loop simulations.

Task 4. DESIGN A CLOSED-LOOP SIMULATION FRAMEWORK AND CODE A COMPUTER PROGRAM TO EXTEND THE CURRENT SIMULATION FRAMEWORK

Timeline: 2018, and ongoing improvement after that

Deliverables: A design for a computer program that can perform closed-loop simulations for various operating models and management procedures. Once the design and framework are determined, the computer program will be written and tested. Updates will then occur as needed.

Relevance: A computer program to perform closed-loop simulations is the engine for the MSE. It will perform the simulations and create the output needed to calculate performance metrics. A good design will ensure that the code is useful to address current questions and flexible to accommodate future questions.

Resources: IPHC staff, computer programmer, MSE researcher, computing time

Relation to other tasks: This task will incorporate performance metrics (Task 2), management procedures (Task 3), and spatial model complexity and operating models (Task 6).

Description: Prior to 2017, the MSAB used an equilibrium model to introduce the concepts of a MSE. This model was used in a web-based application (the Shiny tool) because it produced results quickly and allowed MSAB members to change a few management options and see equilibrium outcomes related to biomass and yield. Those equilibrium outcomes are long-term averages of quantities that have natural variation (e.g., catches) if the fishery took place for an infinite amount of time.

Understanding the variability of the outcomes, such as yield and spawning biomass, is an important aspect of a MSE, but cannot be assessed with an equilibrium model. The equilibrium model is very useful because it produces results quickly and can be used to see the general patterns of various management strategies. However, this equilibrium model does not include the variability around the long-term equilibrium values, and does not incorporate a closed-loop simulation framework.

A closed-loop evaluation is the process of simulating the population dynamics with an operating model, as well as the feedback from the management strategy and decision-making process (Figure 4). The operating model consists of concepts that we cannot, or choose not to, control. The management procedure is what we can and choose to control. For example, the operating model will contain the population dynamics and some of the fishery dynamics that are not a part of the management process. The management procedure consists of data gathering, estimation models, and harvest rules, as well as anything else that informs the decisions affecting the fishery and fish population. Figure 4 attempts to show the annual process of a closed-loop simulation.

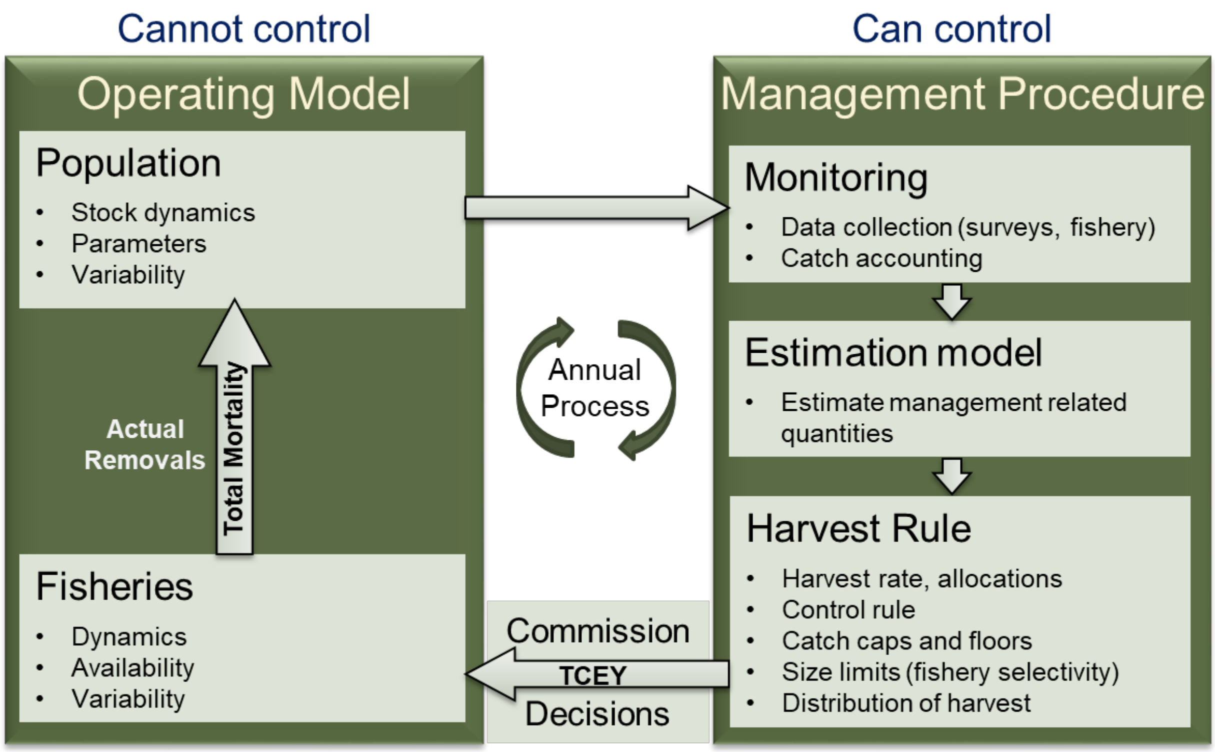

Fig. 4. A flow chart of how the annual process is simulated in a closed-loop simulation.

The operating model incorporates variability in the system and additional variability can be added to various parts of the management procedure (e.g., sampling error, assessment uncertainty, and implementation error). This variability is characterized by replicate simulations, resulting in a distribution of outcomes, which can be described with summary statistics (such as the mean) or by probabilities (such as the proportion of time the catch was below a certain level). It is important to note that closed-loop simulations are different than assessment projections because they incorporate hypotheses about the system that may be beyond what is useful for tactical decision making.

The management procedure must be able to be coded in a computer program, although implementation error can be introduced to mimic a real process more closely (e.g., not consistently following the management procedure). The average of a long-term closed-loop simulation with a consistent management procedure should be very similar to the results of an equilibrium model. However, the closed-loop simulation will also provide an insight into the variability of the process.

The development of a closed-loop simulation framework (see IPHC-2017-MSAB10-09 for more details) has involved coding a program that will incorporate the following:

1. Operating model (OM). The OM is meant to represent reality, including the uncertainty about it. Multiple models making up the OM will allow for structural uncertainty and alternative hypotheses of reality. They will have to be selected, coded, and conditioned. Conditioning an operating model is to tune it such that it is the best representation of reality possible (as indicated by fits to data). Currently, the two coastwide assessment models (short and long) are used as an operating model. In the future, the fleets-as-areas models may be incorporated as well as other individual models yet to be developed.
2. Management Procedure
    a. Data monitoring. This represents the types of data that are collected (e.g., fishery age compositions, survey index), how and how often they are collected, and the processes that generate them.
    b. Estimation model. The method to assess the population can range from simple (e.g., an average of recent survey observations) to complex (e.g., an ensemble of age-structure stock assessment models using multiple sources of data), but its main purpose is to use the simulated data to provide an input for the harvest rule. The current assessment approach (ensemble modelling) is likely too time-consuming for a simulation framework, so simplifications will need to be made. The simplest approach to mimic the assessment process is to add bias and variability to the outcomes of the operating model.
    c. Harvest rule. This is a common focus of a MSE and is the set of procedures that defines how the total removals are determined. Currently, an SPR of 46% defines the fishing intensity which may be modified by a 30:20 control rule. This is not always exactly followed, so introducing implementation error will more closely mimic the current paradigm.

The framework will have to be flexible and compartmentalized to allow changes to be made for each component.

An equilibrium model still has a role in MSE and can be used, as it has been already, to quickly narrow the choices of prospective management procedures. Once the candidate management procedures are narrowed to a plausible number for simulation testing, the closed-loop simulations can be used to further investigate them and characterize the distribution of results.

The closed-loop simulation framework will first be used to evaluate management procedures related to coastwide fishing intensity to be presented at the 95th Annual Meeting in 2019. After the development of multi-area models to include in an operating model, the updated framework will be used to evaluate distribution management procedures for presentation at the 97th Annual Meeting in 2021. See Appendix A for a more specific timeline.

Task 5. DEVELOP EDUCATIONAL TOOLS THAT WILL ENGAGE STAKEHOLDERS AND FACILITATE COMMUNICATION

Timeline: 2018 and ongoing

Deliverables: Materials, programs (web-based or installed), examples, etc. that will allow users to understand the MSE process through reading or interaction.

Relevance: For a stakeholder driven process to be effective, an understanding of the process and how to interpret results is necessary. These educational tools will facilitate communication and allow users to understand trade-offs between performance metrics given alternative management procedures.

Resources: IPHC staff, MSE researcher, computer programmer

Relation to other tasks: Effective understanding and communication is key to interpreting results and fostering communication between science, stakeholders, and management. Therefore, educational tools will be useful for all tasks.

Description: An interactive tool has been developed using the equilibrium model (called the Shiny tool) and has been useful for education and the investigation of some management procedures. The development of a similar tool that incorporates closed-loop simulation results, including variability, will be developed. Incorporating closed-loop simulations and introducing variability will necessitate the output to be changed to reflect the uncertainty in the results by reporting performance metrics, and results will be shown using various graphics and tables.

In addition, the development of materials that are useful to MSAB members and their constituents to assist with understanding the MSE process and facilitate communication will be done with the guidance of MSAB members.

Task 6. FURTHER THE DEVELOPMENT OF OPERATING MODELS

Timeline: October 2019 and ongoing

Deliverables: Individual models to make up various operating models (a collection of models depicting uncertainty) that will satisfy the objectives defined by MSAB members will be supplied.

Relevance: Operating models are necessary to examine structural uncertainty and to answer specific management questions.

Resources: IPHC staff, MSE researcher, computer programmer, computing time

Relation to other tasks: The further development of operating models will be guided by the tasks necessary to complete (Appendix A). In particular, expanding the spatial complexity will be necessary to appropriately evaluate management procedures (Task 3) related to TCEY distribution against goals and objectives (Task 1). These operating models will be used within the closed-loop simulation framework (Task 4).

Description: Management advice for Pacific halibut is currently developed using an ensemble of four different models to account for structural uncertainty. This same concept extends to MSE, and using various operating models with different assumptions can help to properly characterize the overall uncertainty in the management of a fish stock.

Currently, the operating model consists of coastwide models and cannot be used to evaluate area-specific objectives, which can only be answered with a multi-area model. For example, investigating the yield in each IPHC Regulatory Area would require simulating the biomass and fishery in each Area. The spatial complexity of the model depends on the questions being asked, thus before developing an operating model it is useful to determine the extent of the objectives. This will determine the structure of the operating model; for example, whether it needs to be flexible to incorporate different area specifications, or if it can have a fixed set of areas with simple movement between them. Once the level of complexity is decided, the next step is to determine how to best model space, movement, and time. After the design of the model is complete, programming can begin. Finally, the model will need to be conditioned to halibut data before being used in an MSE to ensure that it is a reasonable depiction of reality (or at least what we understand of it), and that we have enough data and knowledge to actually define the complexity of the operating model.

Taking the time to develop the specifications of an operating model is very important. The development of a multi-area model was part of the annual assessment process, and a multi-area model developed in Stock Synthesis as part of that process may be useful to begin to investigate various hypotheses related to movement between broad areas. That progress will provide some of the framework for future operating model development. Given the complexity of this task, a fully developed multi-area model is not likely to be completed before 2020.

There are many questions that can be answered with a single-area model before transitioning to a multi-area model and using a single-area model to answer those questions will be much more efficient. Therefore, evaluations of coastwide fishing intensity using coastwide operating models will occur in the meantime.

RECOMMENDATION/S

That the MSAB:

1) **NOTE** paper IPHC-2018-MSAB012-09 which updates the IPHC Program of Work for MSAB related activities for the period 2019-23.
2) **NOTE** the delivery dates January 2019 for coastwide results and January 2021 for the first complete MSE results including Scale and Distribution components of the management procedure for potential adoption by the Commission and subsequent implementation.
3) **CONSIDER** the six tasks, descriptions, and timeline.
4) **SUGGEST** additions or deletions to this Program of Work, or changes to the timeline, priorities, and deliverables.

ADDITIONAL DOCUMENTATION / REFERENCES

IPHC. 2017. Report of the 93rd Session of the IPHC Annual Meeting (AM093). Victoria, British Columbia, Canada, 23-27 January 2017. IPHC-2017-AM093-R, 61 pp. https://iphc.int/venues/details/94th-session-of-the-iphc-annual-meeting-am094

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IPHC. 2018. Report of the 94th Session of the IPHC Annual Meeting (AM094). Portland, Oregon, United States of America, 22-26 January 2018. IPHC-2018-AM094-R. https://iphc.int/venues/details/94th-session-of-the-iphc-annual-meeting-am094 46 pp.

MSAB 2017. Report of the 10th Session of the IPHC Management Strategy Advisory Board (MSAB10). IPHC-2017-MSAB10-R. https://iphc.int/venues/details/10th-session-of-the-iphc-management-strategy-advisory-board-msab10

APPENDIX A: MSE PROGRAM OF WORK (2018-22): TIMELINE (FROM IPHC-2017-MSAB10-R)

May 2018 Meeting
Review Goals
Look at results of SPR
Review Performance Metrics
Identify Scale MP's
Review Framework
Identify Preliminary Distribution MP's
October 2018 Meeting
Review Goals
Complete results of SPR
Review Performance Metrics
Identify Scale MP'S
Verify Framework
Identify Distribution MP's
Annual Meeting 2019
Recommendation on Scale Present possible distribution MP’s
May 2019 Meeting
Review Goals
Spatial Model Complexity
Identify MP's (Distn Scale)
Review Framework
October 2019 Meeting
Review Goals
Spatial Model Complexity
Identify MP's (Distn Scale)
Review Framework
Review multi-area model development
Annual Meeting 2020
Update on progress
May 2020 Meeting
Review Goals
Review multi-area model
Review preliminary results
October 2020 Meeting
Review Goals
Review preliminary results
Annual Meeting 2021
Recommendations on Scale and Distribution