Report of the 11th Session of the IPHC Management Strategy Advisory Board (MSAB011)

Seattle, Washington, U.S.A., 7-10 May 2018

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INTERNATIONAL PACIFIC HALIBUT COMMISSION

Contact details:

International Pacific Halibut Commission
2320 W. Commodore Way, Suite 300
Seattle, WA, 98199-1287, U.S.A.
Phone: +1 206 634 1838
Fax: +1 206 632 2983
Email: admin@iphc.int
Website: http://iphc.int/

ACRONYMS

AAV	Average Annual Variability
CPUE	Catch-per-unit-effort
CV	Coefficients of Variation
dRSB	dynamic Relative Spawning Biomass
FCEY	Fishery Constant Exploitation Yield
F_{SPR}	The Fishing Intensity that results in an equilibrium Spawning Potential Ratio
HCR	Harvest Control Rule
IPHC	International Pacific Halibut Commission
MSAB	Management Strategy Advisory Board
MSE	Management Strategy Evaluation
RSB	Relative Spawning Biomass
SRB	Scientific Review Board
SPR	Spawning Potential Ratio
TCEY	Total Constant Exploitation Yield
U.S.A.	United States of America
WPUE	Weight-per-unit-effort

DEFINITIONS

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

HOW TO INTERPRET TERMINOLOGY CONTAINED IN THIS REPORT

This Report has been written using the following terms and associated definitions so as to remove ambiguity surrounding how particular paragraphs should be interpreted.

Level 1: **RECOMMENDED**; **RECOMMENDATION** (formal); **REQUESTED** (informal): A conclusion for an action to be undertaken, by the Commission, a Contracting Party, a subsidiary (advisory) body of the Commission and/or the IPHC Secretariat. *Note*: Subsidiary (advisory) bodies of the Commission must have their Recommendations and Requests formally provided to the next level in the structure of the Commission for its consideration/endorsement (e.g. from an Advisory Board to the Commission). The intention is that the higher body will consider the action for endorsement under its own mandate, if the subsidiary body does not already have the required mandate. Ideally, this should be task-specific and contain a timeframe for completion.

Level 2: **AGREED**: Any point of discussion from a meeting, which the IPHC body considers to be an agreed course of action covered by its mandate, which has not already been dealt with under Level 1 above; a general point of agreement among delegations/participants of a meeting which does not need to be elevated in the Commission's reporting structure.

Level 3: **NOTED/NOTING**; **CONSIDERED**; **URGED**; **ACKNOWLEDGED**: General terms to be used for consistency. Any point of discussion from a meeting, which the IPHC body considers to be important enough to record in a meeting report for future reference. Any other term may be used to highlight to the reader of an IPHC report, the importance of the relevant paragraph. Other terms may be used but will be considered for explanatory/informational purposes only and shall have no higher rating within the reporting terminology hierarchy than Level 3.

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EXECUTIVE SUMMARY

The 11th Session of the International Pacific Halibut Commission (IPHC) Management Strategy Advisory Board (MSAB011) was held in Seattle, Washington, U.S.A. from 7 to 10 May 2018. The MSAB consists of 20 board members, 17 of which attended the Session from the two (2) Contracting Parties. A total of three (3) individuals attended the Session as Observers. In addition, one (1) IPHC Commissioner was in attendance, Mr Paul Ryall (Canada). The meeting was opened by Dr David Wilson, IPHC Executive Director.

The following are a subset of the complete recommendations/requests for action from the MSAB011, which are provided in full at Appendix VIII.

RECOMMENDATIONS

NOTING that the core purpose of the MSAB011 is to review progress on the MSE Program of Work, and to provide guidance for the delivery of products to the MSAB012 in October 2018, the MSAB AGREED that formal recommendations to the Commission would not be developed at the present meeting, but rather, these would be developed at the MSAB012.

REQUESTS

A review of the goals and objectives of the IPHC MSE process

MSAB011–Req.03 (para. 28) The MSAB **REQUESTED** that the IPHC Secretariat continue to discuss the Biological Sustainability (conservation) objectives with the IPHCs Scientific Review Board (SRB), including the appropriate female spawning biomass limit and female spawning biomass threshold.

Performance metrics for evaluation

MSAB011–Req.05 (para. 37) The MSAB **REQUESTED** that the IPHC Secretariat present the performance metrics determined from measurable objectives, as well as additional statistics listed in Appendix Va, at MSAB012.

Short-term, mid-term, and long-term performance metrics

MSAB011–Req.06 (para. 40) The MSAB **REQUESTED** that the IPHC Secretariat determine methods to present qualitative results describing the transition from the short-term to the long-term for various performance metrics as a way to describe medium-term performance.

A review of variability and scenarios

MSAB011–Req.09 (para. 48) **NOTING** that domestic management measures for the recreational fisheries often include size limits that differ to various levels of catch limits, the MSAB **REQUESTED** the IPHC Secretariat to consider alternative methods to simulate bycatch mortality at various Pacific halibut abundances, as noted in IPHC-2017-MSAB010-R, paragraph 21.

MSAB011–Req.10 (para. 49) The MSAB **REQUESTED** the IPHC Secretariat to consider alternative methods to simulate recreational mortality, and that the recreational mortality should continue to increase over the entire range of total mortality.

Simulation design for evaluations at MSAB012 of the Scale component of the harvest strategy policy

MSAB011–Req.13 (para. 60) The MSAB **REQUESTED** that the simulations incorporate:

a) SPR values from 30% to 56%, with higher resolution where change occurs in the performance metrics, and at values where IPHC feels the results are meeting the MSE objectives.

b) fishery trigger values of 30% and 40%, and that 45% is also used if time allows.

c) estimation error by jointly simulating the error in total mortality and stock status with coefficients of variation (CV) the same for each variable and equal to 0.15

with a correlation of 0.5. An CV of 0.0 (no estimation error) and 0.2 may be considered if time permits, and presented as a sensitivity as a minimum to understand the effects of the different levels of estimation error.

d) autocorrelation at a level determined appropriate by the IPHC Secretariat and the SRB.

e) a smoothing algorithm on the catch limit for a few simulations as an example to understand the effect on the performance metrics. The algorithm should be asymmetric (e.g. slow up/fast down) and reduce annual catch variability.

MSAB011–Req.14 (para. 61) The MSAB **REQUESTED** that when reporting results:

a) the long-term be represented by 100 simulated annual cycles from the Operating Model and performance metrics summarized over the 10 annual cycles.

b) short- and medium-term performance metrics be presented for management procedures that meet long-term objectives.

c) the short-term be represented by the assessment ensemble and performance metrics presented for the immediate three years. These performance metrics are not necessarily the same as for long-term metrics, and may be actual values (e.g. catch in 2019) instead of a summary over years.

d) the medium-term be summarized qualitatively by describing the transition from the short-term to the medium-term using the closed-loop simulations. Sensitivities (e.g. holding weight-at-age at low levels or constant) can help to inform the medium-term transitions.

e) phase-in procedures are considered when appropriate.

MSAB011–Req.16 (para. 63) The MSAB **REQUESTED** that the IPHC Secretariat consider the following improvements to the simulation framework:

a) investigate improvements to simulating weight-at-age with input from the SRB.

b) simulating bycatch be improved by linking it to abundance in some way.

c) investigate methods to improve time-varying selectivity in the commercial fleet, possibly linking it to abundance.

MSAB011–Req.18 (para. 65) The MSAB **REQUESTED** the following sensitivities:

a) Low and high states of weight-at-age.

b) Low and high regimes determining mean recruitment.

c) Implementation variability (variability associated with not exactly catching the quota or with departures during decision-making).

d) Higher and lower levels of mean bycatch.

e) Shift in bycatch selectivity to younger ages to address ongoing concerns on U26 mortality.

1. OPENING OF THE SESSION

1. The 11th Session of the International Pacific Halibut Commission (IPHC) Management Strategy Advisory Board (MSAB011) was held in Seattle, Washington, U.S.A. from 7 to 10 May 2018. The MSAB consists of 20 board members, 17 of which attended the Session from the two (2) Contracting Parties. Apologies received from Mr Adam Keizer and Mr Bruce Gabrys. A total of three (3) individuals attended the Session as Observers. In addition, one (1) IPHC Commissioner was in attendance, Mr Paul Ryall (Canada). The list of participants is provided at Appendix I. The meeting was opened by Dr David Wilson, IPHC Executive Director.
2. The MSAB **RECALLED** that the primary objectives of MSAB, as described in Appendix V, para. 2 of the IPHC Rules of Procedure (2017) are as follows:

    a) define clear measurable objectives and performance measures for the fishery;

    b) define candidate management strategies, which include aspects of the fishery that can be managed (e.g. regulatory requirements); and

    c) advise IPHC staff about plausible scenarios for investigation, which include aspects of the fishery that cannot be managed by the IPHC (e.g. environmental conditions and removals under the management authority of a domestic management agency).

    d) gather and clearly articulate the interests and concerns of constituents and incorporate them into the MSAB's discussions;

    e) encourage and allow members to test tentative ideas and exploratory suggestions without prejudice to future discussions;

    f) represent information, views, and outcomes of the MSAB discussions to external parties accurately and appropriately;

    g) encourage the understanding and support of their constituencies for the MSAB process and for consensus positions developed by MSAB.

3. **NOTING** paragraph 2, the MSAB **RECALLED** that the Management Strategy Evaluation process is a stakeholder informed, scientifically driven process.
4. The MSAB **NOTED** apologies received from the following board members: Mr Adam Keizer (Canadian government representative, and Co-Chairperson), and Mr Bruce Gabrys (USA harvester representative).

2. ADOPTION OF THE AGENDA AND ARRANGEMENTS FOR THE SESSION

5. The MSAB **ADOPTED** the Agenda as provided at Appendix II. The documents provided to the MSAB011 are listed at Appendix III.

3. IPHC PROCESS

3.1 MSAB Membership and Officers

6. The MSAB **NOTED** paper IPHC-2018-MSAB011-03 which provided the current membership list and term expirations for the MSAB, and call for nominations for vacant posts.
7. The MSAB **NOTED** that Mr Neil Davis was in attendance at the MSAB011 as the Canadian government representative, DFO (Acting for Adam Keizer).
8. The MSAB **ENDORSED** the following new government MSAB members, and the membership list provided at Appendix IV:

    a) Ms Ann-Marie Huang: Canadian government science advisor (to replace Mr Rob Kronlund at the close of the current session)

    b) Trent Hartill: USA government representative, ADFG.

    c) Mr Glenn Merrill: USA government representative, NOAA-Fisheries.

9. The MSAB **AGREED** that an Expression of Interest (EOI) for the vacant MSAB member positions should be circulated by the IPHC Secretariat. At the close of a 30 day EOI period, the IPHC Secretariat shall provide the EOIs to the Commission, who will be asked to make an inter-sessional decision on MSAB membership. The MSAB would also be provided with the EOI's for information purposes.
10. The MSAB **NOTED** the following nominations received for the USA Processor member of the MSAB and encouraged a submission of an EOI through the process described in paragraph 9:
    a) Mr Joe Morelli (Seafood Producers Cooperative)
    b) Ms Angel Drobnica (Aleutian-Pribilof Island Community Development Association)
    c) Ms Jessie Keplinger (Icicle Seafoods)
11. The MSAB **NOTED** the following nomination received for one of the two vacant first nations/tribal representatives of the MSAB and encouraged a submission of an EOI through the process described in paragraph 9:
    a) Matt Damiano (Northwest Indian Fisheries Commission)
12. The MSAB **NOTED** that in accordance with the IPHC Rules of Procedure (2017), Dr Carey McGilliard was elected at the Co-Chairperson of the MSAB for the next biennium (USA).

3.2 Update on the actions arising from the 10th Session of the MSAB (MSAB010)

13. The MSAB **NOTED** paper IPHC-2018-MSAB011-04 which provided an opportunity to consider the progress made during the inter-sessional period in relation to the recommendations and requests of the 10th Session of the IPHC Management Strategy Advisory Board (MSAB010).
14. The MSAB **AGREED** to consider and revise as necessary, the actions arising from the MSAB010, and for these to be combined with any new actions arising from the MSAB011.

3.3 Review of the outcomes of the 11th Session of the IPHC Scientific Review Board (SRB011)

15. The MSAB **NOTED** paper IPHC-2018-MSAB011-05, which provided the outcomes of the 11th Session of the IPHC Scientific Review Board (SRB011) relevant to the mandate of the MSAB, which were provided for reference.

3.4 Outcomes of the 94th Session of the IPHC Annual Meeting (AM094)

16. The MSAB **NOTED** paper IPHC-2018-MSAB011-06 which outlined the outcomes of the 94th Session of the IPHC Annual Meeting (AM094) relevant to the mandate of the MSAB, and **AGREED** to consider how best to provide the Commission with the information it has requested, throughout the course of the current MSAB meeting.

4. GOALS, OBJECTIVES, AND PERFORMANCE METRICS

4.1 A review of the goals and objectives of the IPHC MSE process

17. The MSAB **NOTED** paper IPHC-2018-MSAB011-07 which provided a review of the goals and objectives of the IPHC MSE process, and to consider the directives from the Commission, including the consideration of additional objectives related to distributing the TCEY.
18. The MSAB **REQUESTED** that the IPHC Secretariat standardize the terminology for types of objectives (e.g. general, higher level objectives vs. measurable objectives).
19. The MSAB **AGREED** to separate management tactics from objectives and keep their intent as guiding principles for management procedures. The following guiding principles were determined:
    a) Define a limit below which no fishing will occur.
    b) Account for mortality of all sizes in the population.
    c) Reduce the harvest rate when below a threshold.

20. The MSAB **REQUESTED** that the objectives as defined in Appendix Va, be refined by an Ad-Hoc Working Group (composition: Peggy Parker; Chris Sporer; Glenn Merrill; Dan Falvey; Michelle Culver). The Ad-Hoc Working Group shall provide refined objectives to the IPHC Secretariat for distribution to the MSAB for consideration by 15 June 2018. Comments from the MSAB members would then be provided to the IPHC Secretariat by 30 June 2018. Some points of interest include determining appropriate reference catch levels, considering the use of "economically sufficient," and retaining the concepts of a minimum catch, a reference catch, and stability in catch (which may be stated as a rate of change). A further consideration may be to identify an objective related to taking advantage of high yield opportunities. Another consideration may be to look at what minimum catch is necessary to maintain markets.

21. The MSAB **NOTED** that the measurable objective of a minimum number of females may be redundant with the 'biomass' objective, but is important to retain a metric related to numbers, such as an absolute measure.

22. The MSAB **AGREED** that biological reference points (i.e. female spawning biomass limit and female spawning biomass threshold) should be defined for biological sustainability goals and have associated performance metrics, and that these are separate concepts from the SPR, fishing limit, and fishery trigger defined in the harvest control rule, which do not have performance metrics, as they are part of the management procedure whose performance against the objectives will be evaluated.

23. The MSAB **NOTED** the presentation on biocomplexity and its importance to biological sustainability for the Pacific halibut stock.

24. The MSAB **NOTED** that the IPHC Secretariat has identified biologically-based Regions based on various sex ratios, age composition, size-at-age, historical trends, genetic studies, and tagging studies, as well as consideration of IPHC Regulatory Area boundaries.

25. The MSAB **NOTED** that the addition of a general objective related to preserving biocomplexity, under the goal of Biological Sustainability, may be useful for identifying objectives related to distributing the TCEY.

26. The MSAB **AGREED** that some of the measurable objectives related to Fishery Sustainability, Stability, and Access are redundant and should be considered by the Ad-Hoc Working Group specified in paragraph 20.

27. The MSAB **NOTED** that the following subset of measurable objectives related to Fishery Sustainability, Stability, and Access of the coastwide stock may be sufficient:

    a) to maintain a minimum catch;

    b) maintain an average catch;

    c) provide opportunity for above average catches; and

    d) limit annual changes in TAC, coast-wide and/or by IPHC Regulatory Area.

28. The MSAB **REQUESTED** that the IPHC Secretariat continue to discuss the Biological Sustainability (conservation) objectives with the IPHCs Scientific Review Board (SRB), including the appropriate female spawning biomass limit and female spawning biomass threshold.

29. The MSAB **AGREED** that the goal "Serve Consumer Needs" is captured under the goal of Fishery Sustainability and Stability, and is not needed.

30. The MSAB **NOTED** the objectives related to distributing the TCEY presented in Circular IPHC-2017-CR022.

31. The MSAB **AGREED** that some objectives related to distributing the TCEY presented in Circular IPHC-2017-CR022 are 1) covered under current general objectives and are simply extensions to area-specific objectives, 2) require more discussion to understand the intent and meaning, 3) can be considered at a future time when it can be investigated, and 4) should be dropped and not considered. The MSAB's categorisations are shown in Appendix Vb.

32. The MSAB **AGREED** that Regulatory Area-specific objectives could be defined for Fishery Sustainability and Stability objectives and Discard Mortality objectives. Further consideration will be required to determine the measurability of some objectives with a spatial connotation, given the current coastwide operating model, which cannot evaluate performance against area specific objectives.

33. The MSAB **REQUESTED** that the objectives related to distributing the TCEY in Appendix Vb be the subject of further discussion by the Ad-Hoc Working Group (paragraph 20). The consideration of these objectives should be done after refinement of Scale objectives, as noted in paragraph 20. This task is to be completed no later than 1 September 2018, for consideration by the IPHC Secretariat and subsequent submission to the MSAB012 in accordance with the IPHC Rules of Procedure (2017).

34. The MSAB **AGREED** that the Commission should review and provide guidance on the revised goals, objectives, and performance metrics at AM095, as detailed at Appendix Va.

4.2 Classifying objectives in a hierarchy

35. The MSAB **NOTED** the following directive from the Commission:

> ***Review of fishery goals and objectives: Commission directive***
> AM094–Rec.01 (para. 36) *The Commission **RECOMMENDED** that the draft goals, objectives, and performance metrics, as detailed in Appendix IV, IPHC-2017-MSAB10-R be used for ongoing evaluation in the MSE process, and that they may be refined in the future. The objectives should be evaluated in a hierarchal manner, with conservation as the first priority.*

36. The MSAB **AGREED** that objectives should be hierarchical and if Biological Sustainability objectives are not met by a management procedure, additional objectives are not evaluated.

4.3 Performance metrics for evaluation

37. The MSAB **REQUESTED** that the IPHC Secretariat present the performance metrics determined from measurable objectives, as well as additional statistics listed in Appendix Va, at MSAB012.

4.3.1 Short-term, mid-term, and long-term performance metrics

38. The MSAB **NOTED** the following directive from the Commission:

> AM094–Rec.03 (para. 44) *The Commission **RECOMMENDED** that long- and mid-term performance metrics for conservation objectives be considered in the MSE process for conservation objectives, and that short-term metrics be included for fishery-related objectives in the MSE process, via the MSAB.*

39. The MSAB **AGREED** to consider long-term metrics related to Biological Sustainability objectives and short- and long-term metrics related to fishery objectives when evaluating management procedures. Short-term objectives will be determined using the current stock assessment process, and the long-term objectives will be determined using the MSE. There remains an interest in development of metrics for the medium-term, though there are clear challenges in producing medium-term modelling results.

40. The MSAB **REQUESTED** that the IPHC Secretariat determine methods to present qualitative results describing the transition from the short-term to the long-term for various performance metrics as a way to describe medium-term performance.

41. The MSAB **REQUESTED** that the IPHC Secretariat present the methods for producing short-, medium- and long-term results to the SRB for their review and comment.

5. HARVEST STRATEGY POLICY, PART 1: SIMULATIONS TO EVALUATE FISHING INTENSITY

42. The MSAB **NOTED** paper IPHC-2018-MSAB011-08 which provided an update on the progress of the IPHC Management Strategy Evaluation process to investigate fishing intensity, and seek recommendations from the MSAB related to the Management Strategy Evaluation simulation framework.

5.1 A description of the closed-loop simulation framework

43. The MSAB **NOTED** the simulation framework including the operating model (OM) composed of the two coastwide assessment models, the option to simulate estimation error, and the harvest control rule consisting of a procedural SPR, a fishery threshold where SPR begins to be linearly reduced, and a directed fishery catch limit is set to zero, realising that there are sources of fishing mortality that are outside of the IPHC harvest strategy.

5.2 A review of variability and scenarios

44. The MSAB **NOTED** that the assessment model has high utility for short-term predictions, the Operating Model has high utility for long-term characterization of uncertainty, and there is not a model that would adequately predict the medium-term.

45. The MSAB **REQUESTED** that the SRB clarify the meaning of paragraphs 24 and 28 in the SRB report, IPHC-2017-SRB011-R.

46. The MSAB **NOTED** that variability in the Operating Model is introduced through parameter uncertainty, variable recruitment, changes in mean recruitment due to regime shifts, variable size-at-age, and variability in the proportion of the Total Mortality allocated to each sector.

47. The MSAB **NOTED** that implementation variability (the deviation of realized total mortality from the procedure recommended total mortality) is not currently implemented.

48. **NOTING** that domestic management measures for the recreational fisheries often include size limits that differ to various levels of catch limits, the MSAB **REQUESTED** the IPHC Secretariat to consider alternative methods to simulate bycatch mortality at various Pacific halibut abundances, as noted in IPHC-2017-MSAB010-R, paragraph 21.

49. The MSAB **REQUESTED** the IPHC Secretariat to consider alternative methods to simulate recreational mortality, and that the recreational mortality should continue to increase over the entire range of total mortality.

5.3 Management Procedures related to fishing intensity

50. The MSAB **NOTED** that dynamic reference points (e.g. dRSB) in the Harvest Control Rule measure the effects of fishing but not other effects that cannot be controlled (e.g. changes in weight-at-age).

51. The MSAB **AGREED** that the Procedural SPR and the fishery trigger in the HCR are the focus for evaluation at MSAB012.

52. The MSAB **AGREED** that a performance metric related to “being on the ramp” of the HCR is not necessary and would be covered by catch variability performance metrics. However, the MSAB **REQUESTED** a statistic related to “being on the ramp” be reported.

5.4 Preliminary closed-loop simulations results to investigate SPR with estimation error

53. The MSAB **NOTED** that simulation of the assessment as an ensemble of models is too time consuming and that simulating the estimation error is more practical.

54. The MSAB **AGREED** that estimation error should be simulated from a joint distribution representing error in the estimated Total Mortality and the estimated stock status, with autocorrelation. The MSAB **REQUESTED** that the SRB review these methods to incorporate estimate error.

55. The MSAB **NOTED** that the MSE is focused on evaluating the application of a constant SPR (with adjustment at low stock status), and that a short-term MSE decision table will differ from the stock assessment decision table presented at the Annual Meeting because the MSE will apply a constant SPR and use performance metrics appropriate for the evaluation of the management procedure.

56. The MSAB **AGREED** that using the 2017 ensemble of models is useful in providing a reasonable idea of the estimation error for total mortality and stock status, as well as the correlation between the two.

57. The MSAB **NOTED** the comparison of long-term simulation results with estimation error compared to results with no estimation error. Specifically, with estimation error,

a) a higher fishing intensity than the target occurs,

b) stock status is lower and more often below the threshold,

c) median yield increases,

d) variability in yield greatly increases, and may be above the tolerance level of stability objectives.

58. The MSAB **NOTED** that estimation error in total mortality only resulted in minor changes to conservation and yield performance metrics, but increased the variability in yield by more than two-fold. Estimation error on both total mortality and stock status had a greater effect on all performance metrics.

59. **NOTING** that preliminary results will not include autocorrelation, the MSAB **AGREED** that autocorrelation should be included in the final simulation, and may result in a reduction of the variability in yield seen in the preliminary results without autocorrelation.

5.5 Simulation design for evaluations at MSAB012 of the Scale component of the harvest strategy policy

60. The MSAB **REQUESTED** that the simulations incorporate:

a) SPR values from 30% to 56%, with higher resolution where change occurs in the performance metrics, and at values where IPHC feels the results are meeting the MSE objectives.

b) fishery trigger values of 30% and 40%, and that 45% is also used if time allows.

c) estimation error by jointly simulating the error in total mortality and stock status with coefficients of variation (CV) the same for each variable and equal to 0.15 with a correlation of 0.5. An CV of 0.0 (no estimation error) and 0.2 may be considered if time permits, and presented as a sensitivity as a minimum to understand the effects of the different levels of estimation error.

d) autocorrelation at a level determined appropriate by the IPHC Secretariat and the SRB.

e) a smoothing algorithm on the catch limit for a few simulations as an example to understand the effect on the performance metrics. The algorithm should be asymmetric (e.g. slow up/fast down) and reduce annual catch variability.

61. The MSAB **REQUESTED** that when reporting results:

a) the long-term be represented by 100 simulated annual cycles from the Operating Model and performance metrics summarized over the 10 annual cycles.

b) short- and medium-term performance metrics be presented for management procedures that meet long-term objectives.

c) the short-term be represented by the assessment ensemble and performance metrics presented for the immediate three years. These performance metrics are not necessarily the same as for long-term metrics, and may be actual values (e.g. catch in 2019) instead of a summary over years.

d) the medium-term be summarized qualitatively by describing the transition from the short-term to the medium-term using the closed-loop simulations. Sensitivities (e.g. holding weight-at-age at low levels or constant) can help to inform the medium-term transitions.

e) phase-in procedures are considered when appropriate.

62. The MSAB **REQUESTED** that IPHC Secretariat discuss the time-frames detailed in paragraph 61, with the SRB.

63. The MSAB **REQUESTED** that the IPHC Secretariat consider the following improvements to the simulation framework:

a) investigate improvements to simulating weight-at-age with input from the SRB.

b) simulating bycatch be improved by linking it to abundance in some way.

c) investigate methods to improve time-varying selectivity in the commercial fleet, possibly linking it to abundance.

64. The MSAB **NOTED** that the Operating Model and how it is conditioned is adequate for the evaluation of the HCR, and **REQUESTED** that the IPHC Secretariat present these methods to the SRB.

65. The MSAB **REQUESTED** the following sensitivities:

a) Low and high states of weight-at-age.

b) Low and high regimes determining mean recruitment.

c) Implementation variability (variability associated with not exactly catching the quota or with departures during decision-making).

d) Higher and lower levels of mean bycatch.

e) Shift in bycatch selectivity to younger ages to address ongoing concerns on U26 mortality.

66. The MSAB **NOTED** that the MSE may be updated in the future as additional knowledge becomes available and objectives are updated.

67. The MSAB **AGREED** that the management procedure resulting from the MSE process would generate catch limit recommendations.

6. HARVEST STRATEGY POLICY, PART 2: ADDRESSING STOCK AND TOTAL CONSTANT EXPLOITATION YIELD (TCEY) DISTRIBUTION

68. The MSAB **NOTED** paper IPHC-2018-MSAB011-09 which provided an update on discussions and ideas related to science inputs and management procedures for distributing the Total Constant Exploitation Yield (TCEY) across the IPHC Convention Area.

6.1 Review framework to investigate distributing the TCEY among IPHC Regulatory Areas and evaluate against objectives

69. The MSAB **NOTED** that:

a) if the goal of a procedure is to maintain a constant SPR through all steps of distributing the TCEY, then a change in distribution may change the total coastwide mortality to maintain that SPR.

b) there are science-based and management-derived elements in the TCEY distribution procedure. Some distribution procedures may incorporate one or both elements.

c) stock distribution is science-based and is linked to biological sustainability objectives. WPUE from the space-time model is used to determine stock distribution to biological regions, and using “all sizes” in the calculation of WPUE is more congruent with the TCEY, while acknowledging that the IPHC fishery-independent setline survey catches a small number of Pacific halibut below 26 inches.

d) the IPHC Secretariat has described four biological Regions (consistent with IPHC Regulatory Area boundaries) based on the best available science, and will be used for stock distribution as the first step, after which distribution procedures would distribute the TCEY to meet fishery objectives.

e) relative harvest rates among Regions are science-based and management-derived, and within Regions are management-derived. Science-based foundations could include productivity analyses, while management-derived elements may include quantity and quality of data in each area and other area-specific objectives.

f) many more elements of the TCEY distribution procedure may be developed and include management-derived elements.

g) TCEY distribution procedures are to be evaluated against objectives and reported at AM097 in 2021. Biological sustainability objectives are related to biological Regions and Fishery

objectives are related to IPHC Regulatory Areas. Because IPHC Regulatory Areas are nested within Regions, distribution to Regions can affect fishery objectives.

70. The MSAB **NOTED** that the proposed TCEY distribution procedure contains four main components, each of which may contain multiple elements. These four components are listed below and have a computational outcome:

    a) **Coastwide Target Fishing Intensity**: this defines the TCEY to be distributed.

    b) **Regional Stock Distribution**: this distributes the TCEY to biological Regions to satisfy the Biological Sustainability objective of preserving biocomplexity.

    c) **Regional Allocation Adjustment (optional)**: this adjusts the distribution of the TCEY among Regions to account for additional Biological Sustainability objectives and fishery objectives.

    d) **Regulatory Area Allocation**: this distributes the TCEY from Regions to Regulatory Areas to satisfy fishery objectives.

71. The MSAB **NOTED** that the output of the TCEY distribution procedure will be a catch table describing proposed mortality (allocation) in each IPHC Regulatory Area (Appendix VI).

72. The MSAB **REQUESTED** that the proposed TCEY distribution framework described in paragraphs 69, 70 and 71, be reviewed by the SRB in 2018.

73. The MSAB **NOTED** the intent expressed by the Commission that the output from the management procedure (proposed mortality – allocation – by IPHC Regulatory Area) would then be subject to an annual Regulatory Area adjustment by the Commission, which may deviate from the harvest strategy by changing the distribution and the SPR.

74. The MSAB **NOTED** that the SPR is maintained after distributing the catch. A deviation from the SPR determined in the Harvest Control Rule due to distribution procedures may be useful to investigate, but there must be a minimum SPR which is not exceeded. This ensures that a maximum fishing intensity is not exceeded.

6.2 Identify preliminary MPs related to distribution

75. The MSAB **NOTED** some potential tools for use as distribution procedures when distributing the TCEY:

    a) Relative harvest rates.

    b) O32:O26 ratios.

    c) trends in survey WPUE by IPHC Regulatory Area.

    d) Trends in modelled survey WPUE by biological region.

    e) trends in fishery CPUE.

    f) Smoothing algorithms on area-specific catch limits.

    g) Percentage allocation with a floor (i.e. minimums of 1.5 Mlbs in 2A and 1.7 Mlbs in 4CDE).

    h) A maximum SPR with catch distribution by IPHC Regulatory Area determined from the modelled survey WPUE.

    i) Coastwide TCEY target and maximum calculated; distribution by target, but with ability to adjust TCEY up to the maximum.

76. **NOTING** that these tools require further discussion, the MSAB **REQUESTED** that the IPHC Secretariat provide comments, and that further stakeholder feedback is elicited.

77. The MSAB **NOTED** that observations of stock and catch distribution during various reference periods should be considered when defining objectives for evaluation.

7. MSAB PROGRAM OF WORK 2019-23

78. The MSAB **NOTED** paper IPHC-2018-MSAB011-10 which provided an update on the 5-year MSE Program of Work (2019-23), given current Commission directives.

79. The MSAB **AGREED** to the updated Program of Work provided at Appendix VII, for the Commission's further consideration.

8. OTHER BUSINESS

8.1 IPHC meetings calendar (2018-23): MSAB

80. The MSAB **NOTED** the annual IPHC meetings calendar (2018-20) adopted by the Commission at its 94th Session in 2018 (IPHC-2018-AM094-R, Appendix VII).

81. The MSAB **AGREED** that due to scheduling conflicts with a number of MSAB members, that the 12th Session of the MSAB should be held from 22-25 October 2018.

8.2 Steering Committee

82. The MSAB **RECALLED** that the members of the MSAB Steering Committee are as follows, and that their terms shall expire at the close of the 13th Session of the MSAB in 2019:

Canada	United States of America
Mr Adam Keizer	Dr Carey McGilliard
Mr Jim Lane	Ms Michele Culver
Mr Chris Sporer	Ms Peggy Parker

9. REVIEW OF THE DRAFT AND ADOPTION OF THE REPORT OF THE 11TH SESSION OF THE IPHC MANAGEMENT STRATEGY ADVISORY BOARD (MSAB011)

83. The report of the 11th Session of the IPHC Management Strategy Advisory Board (IPHC-2018-MSAB011–R) was **ADOPTED** on 10 May 2018, including the consolidated set of recommendations and/or requests arising from MSAB011, provided at Appendix VIII.

APPENDIX I
LIST OF PARTICIPANTS FOR THE 11TH SESSION OF THE IPHC MANAGEMENT STRATEGY ADVISORY BOARD (MSAB011)

Officers

Co-Chairperson (Canada)	Co-Chairperson (United States of America)
Mr Neil **Davis** (A/g): neil.davis@dfo-mpo.gc.ca	Dr Carey **McGilliard**: Carey.McGilliard@noaa.gov

MSAB Members

Canada	United States of America
Mr Neil **Davis**: neil.davis@dfo-mpo.gc.ca	Mr Craig **Cross**: craigc@starboats.com
Mr Robert **Hauknes**: robert_hauknes@hotmail.com	Ms Michele **Culver**: Michele.Culver@dfw.wa.gov
Mr Allen (Rob) **Kronlund**: Allen.Kronlund@dfo-mpo.gc.ca	Mr Dan **Falvey**: myriadfisheries@gmail.com
Mr Jim **Lane**: jim.lane@nuuchahnulth.org	Trent **Hartill**: trent.hartill@alaska.gov
Mr Martin **Paish**: martinpaish1@gmail.com	Mr Jeff **Kauffman**: jeff@spfishco.com
Mr Chris **Sporer**: chris.sporer@phma.ca	Mr Tom **Marking**: tmmarking@gmail.com
	Mr Scott **Mazzone**: smazzone@quinault.org
	Dr Carey **McGilliard**: Carey.McGilliard@noaa.gov
	Mr Glenn **Merrill**: glenn.merrill@noaa.gov
	Mr Per **Odegaard**: vanseeodegaard@hotmail.com
	Ms Peggy **Parker**: peggyparker616@gmail.com
Absentees	**Absentees**
Mr Adam **Keizer**: adam.keizer@dfo-mpo.gc.ca	Mr Bruce **Gabrys**: gabryscpa@mtaonline.net
Mr Brad **Mirau**: brad@aerotrading.ca	

Commissioners

Canada	United States of America
Mr Paul **Ryall**: Paul.Ryall@dfo-mpo.gc.ca	

Observers

Canada	United States of America
Ms Ann-Marie **Huang:** Ann-Marie.Huang@dfo-mpo.gc.ca	Ms Ruth **Christiansen**, United Catcher Boats: ruth.christiansen78@gmail.com
	Mr Matt **Damiano**, Northwest Indian Fisheries Commission: mdamiano@nwifc.org
	Mr Jim **Hasbrouck**, ADFG: james.hasbrouck@alaska.gov
	Mr Frank **Lockhart**, NOAA-Fisheries: frank.lockhart@noaa.gov

IPHC Secretariat

Name	Position and email
Dr David **Wilson**	Executive Director, david@iphc.int
Mr Stephen **Keith**	Assistant Director, steve@iphc.int
Dr Allan **Hicks**	Quantitative Scientist, allan@iphc.int
Dr Ian **Stewart**	Quantitative Scientist, ian@iphc.int

APPENDIX II
AGENDA FOR THE 11TH SESSION OF THE IPHC MANAGEMENT STRATEGY ADVISORY BOARD (MSAB011)

Date: 07-10 May 2018
Location: Seattle, Washington, U.S.A.
Venue: IPHC Training Room
Time: 7th: 12:00-17:00; 8th-10th: 09:00-17:00 daily
Co-Chairpersons: Mr Neil Davis, A/g (Canada) and Dr Carey McGilliard (U.S.A.)

1. OPENING OF THE SESSION

2. ADOPTION OF THE AGENGA AND ARRANGEMENTS FOR THE SESSION
- 2.1. IPHC website and Office 365

3. IPHC PROCESS
- 3.1. MSAB Membership and Officers
- 3.2. Update on the actions arising from the 10th Session of the MSAB (MSAB010)
- 3.3. Review of the outcomes of the 11th Session of the Scientific Review Board (SRB011)
- 3.4. Outcomes of the 94th Session of the IPHC Annual Meeting (AM094)

4. GOALS, OBJECTIVES, AND PERFORMANCE METRICS
- 4.1. A review of the goals and objectives of the IPHC MSE process
- 4.2. Classifying objectives in a hierarchy
- 4.3. Performance metrics for evaluation
  - 4.3.1. Short-term, mid-term, and long-term performance metrics

5. HARVEST STRATEGY POLICY, PART 1: SIMULATIONS TO EVALUATE FISHING INTENSITY
- 5.1. A description of the closed-loop simulation framework
- 5.2. A review of variability and scenarios
- 5.3. Management procedures related to fishing intensity
- 5.4. Preliminary closed-loop simulations results to investigate SPR with estimation error
- 5.5. Simulation design for evaluations at MSAB012 of the Scale component of the harvest strategy policy

6. HARVEST STRATEGY POLICY, PART 2: ADDRESSING STOCK AND TOTAL CONSTANT EXPLOITATION YIELD (TCEY) DISTRIBUTION
- 6.1. Review framework to investigate distributing the TCEY among IPHC Regulatory Areas and evaluate against objectives
- 6.2. Identify preliminary MPs related to distribution

7. MSAB PROGRAM OF WORK 2019-23

8. OTHER BUSINESS
- 8.1. IPHC meetings calendar (2018-23): MSAB

9. REVIEW OF THE DRAFT AND ADOPTION OF THE REPORT OF THE 11th SESSION OF THE IPHC MANAGEMENT STRATEGY ADVISORY BOARD (MSAB011)

APPENDIX III
LIST OF DOCUMENTS FOR THE 11TH SESSION OF THE MANAGEMENT STRATEGY ADVISORY BOARD (MSAB011)

Document	Title	Availability
IPHC-2018-MSAB011-01	Agenda & Schedule for the 11th Session of the IPHC Management Strategy Advisory Board (MSAB011)	✓ 06 Feb 2018 ✓ 22 Mar 2018 ✓ 19 Apr 2018
IPHC-2018-MSAB011-02	List of Documents for the 11th Session of the IPHC Management Strategy Advisory Board (MSAB011)	✓ 03 Apr 2018 ✓ 19 Apr 2018
IPHC-2018-MSAB011-03	MSAB Membership and Officers (IPHC Secretariat)	✓ 04 Apr 2018
IPHC-2018-MSAB011-04	Update on the actions arising from the 10th Session of the MSAB (MSAB010) (IPHC Secretariat)	✓ 07 Apr 2018
IPHC-2018-MSAB011-05	Outcomes of the 11th Session of the IPHC Scientific Review Board (SRB011) (IPHC Secretariat)	✓ 05 Apr 2018
IPHC-2018-MSAB011-06	Outcomes of the 94th Session of the IPHC Annual Meeting (AM094) (IPHC Secretariat)	✓ 05 Apr 2018
IPHC-2018-MSAB011-07	Goals, Objectives, and Performance Metrics for the IPHC Management Strategy Evaluation (MSE) (A. Hicks)	✓ 09 Apr 2018
IPHC-2018-MSAB011-08	IPHC Management Strategy Evaluation to Investigate Fishing Intensity (A. Hicks)	✓ 10 Apr 2018
IPHC-2018-MSAB011-09	Ideas on estimating stock distribution and distributing catch for Pacific halibut fisheries (A. Hicks & I. Stewart)	✓ 19 Apr 2018
IPHC-2018-MSAB011-10	IPHC Secretariat Program of Work for MSAB Related Activities 2019-23 (A. Hicks)	✓ 07 Apr 2018
Information papers		
Nil	Nil	Nil

APPENDIX IV
MSAB MEMBERSHIP

Membership category	Member	Canada	U.S.A.	Current Term commence-ment	Current Term expiration *
Commercial harvesters (6-8)					
1	Sporer, Chris	CDN Commercial		9-May-17	2021
2	Hauknes, Robert	CDN Commercial		9-May-17	2021
3	Vacant	CDN Commercial			
4	Vacant	CDN Commercial			
5	Gabrys, Bruce		USA Commercial	9-May-17	2021
6	Kauffman, Jeff		USA Commercial	9-May-17	2019
7	Odegaard, Per		USA Commercial	9-May-17	2021
8	Falvey, Dan		USA Commercial	9-May-17	2021
First Nations/Tribal fisheries (2-4)					
1	Lane, Jim	CDN First Nations		9-May-17	2021
2	Vacant	CDN First Nations			
3	Mazzone, Scott		USA Treaty Tribes	9-May-17	2019
4	Vacant		USA Treaty Tribes		
Government Agencies (4-8)					
1	Keizer, Adam	DFO		9-May-17	2019
2	Huang, Ann-Marie	CDN Science Advisor		10-May-18	2022
3	Vacant	DFO			
4	Merrill, Glenn		NOAA-Fisheries	7-May-18	2022
5	McGilliard, Carey		USA Science Advisor	9-May-17	2021
6	Culver, Michele		PFMC	9-May-17	2021
7	Cross, Craig		NPFMC	9-May-17	2021
8	Hartill, Trent		ADFG	7-May-18	2022
Processors (2-4)					
1	Parker, Peggy	US/CDN Processing	US/CDN Processing	9-May-17	2019
2	Mirau, Brad	CDN Processing		9-May-17	2019
3	Vacant		USA Processing		
4	Vacant				
Recreational/ Sport fisheries (2-4)					
1	Paish, Martin	CDN Sport Fishing Advisory Board		9-May-17	2021

Membership category	Member	Canada	U.S.A.	Current Term commence-ment	Current Term expiration *
2	Marking, Tom		USA Sportfishing (CA)	9-May-17	2019
3	Vacant		USA sportfishing (AK)		
4	Vacant				
*	MSAB member terms begin and end at the first MSAB meeting of the year, unless otherwise indicated				

APPENDIX VA
MEASURABLE OBJECTIVES AND ASSOCIATED PERFORMANCE METRICS

GOAL: Biological Sustainability

GENERAL OBJECTIVE	MEASURABLE OBJECTIVE	NEGATIVE OUTCOME	TIME-FRAME	TOLERANCE	PERFORMANCE METRICS
1.1. KEEP BIOMASS ABOVE A LIMIT TO AVOID CRITICAL STOCK SIZES	Maintain a minimum spawning stock biomass above a limit reference point	RSB < Biomass Limit	Long-term 10 year period	0.05	$P(dRSB < Limit)$
1.2. MITIGATE FOR UNCERTAINTY	Maintain spawning stock biomass mostly above a threshold reference point to avoid stock sizes that could become critical	RSB < Biomass Threshold	Long-term 10-year period	0.25	$P(dRSB < Threshold)$
	When the Estimated Biomass < Biomass Threshold, limit the probability of declines	SSB declines when RSB < Biomass Threshold	Long-term 10 year period	0.05-0.5	$P(SSB_{i+1} < SSB_i)$ given RSB < biomass threshold
ABSOLUTE MEASURE	An absolute measure	Number of mature female halibut	Long-term 10 year period	NA	Median $\overline{MatureFemales}$
ABSOLUTE MEASURE	An absolute measure	Spawning Biomass	Long-term 10 year period	NA	Median $\overline{RSB}$

GOAL : Fishery Sustainability, Stability, and Access

GENERAL OBJECTIVE	MEASURABLE OBJECTIVE	NEGATIVE OUTCOME	TIME-FRAME	TOLERANCE	PERFORMANCE METRICS
2.1. MAINTAIN AN ECONOMICALLY SUFFICIENT LEVEL OF CATCH (I.E, TARGET) ACROSS REGULATORY AREAS	Maintain an average catch		Long-term, 10 yr Short-term, 3 yr	?? ??	$P(FCEY < AvCatch)$
	Maintain a minimum catch	FCEY < min	Long-term, 10 yr Short-term, 3 yr	?? ??	$P(FCEY < min)$
	Maintain an above average catch	< 70% of historical 1993-2012 average	Long-term, 10 yr Short-term, 3 yr	0.1 ??	$P(FCEY < 70\%)$
	Maintain a consistent level of catch	Outside of ±10% of 1993-2012 average	Long-term, 10 yr Short-term, 3 yr	0.1 0.	$P(FCEY > 110\%$ or $FCEY < 90\%$
2.2. LIMIT CATCH VARIABILITY	Limit annual changes in TAC, coast-wide and/or by Regulatory Area	Change in Mortality > 15%	Long-term, 10 yr Short-term, 3 yr	?? ??	$P\left(\frac{FCEY_{i+1} - FCEY_i}{FCEY_i} > 15\%\right)$
		AAV > 15%	Long-term, 10 yr Short-term, 3 yr	?? ??	$P(AAV > 15\%)$
ABSOLUTE MEASURE	An absolute measure	Mortality (TM, TCEY, FCEY, Commercial)	Long-term, 10 yr Short-term, 3 yr	NA	Median $\overline{Mort}$
ABSOLUTE MEASURE	An absolute measure	Range of mortality	Long-term, 10 yr Short-term, 3 yr	NA	5th and 75th percentiles of mortality
ABSOLUTE MEASURE	An absolute measure	Variability in mortality (TM, TCEY, FCEY, Commercial)	Long-term, 10 yr Short-term, 3 yr	NA	Median Average Annual Variability (AAV)
STATISTIC	Chance of being "on the ramp"	Estimated stock status is below the fishery trigger	Long-term, 10 yr Short-term, 3 yr	NA	$P(\widehat{dRSB} < Trigger)$

GOAL : Minimize Discard Mortality

GENERAL OBJECTIVE	MEASURABLE OBJECTIVE	NEGATIVE OUTCOME	TIME-FRAME	TOLERANCE	PERFORMANCE METRICS
3.1. HARVEST EFFICIENCY	Discard mortality is a small percentage of the longline fishery annual catch limit	>10% of annual catch limit	Long-term, 10 yr Short-term, 3 yr	0.25	$P(DM > 10\%FCEY)$
ABSOLUTE MEASURE	Absolute	Discard Mortality (DM)	Long-term, 10 yr Short-term, 3 yr	**NA**	Median $\overline{DM}$

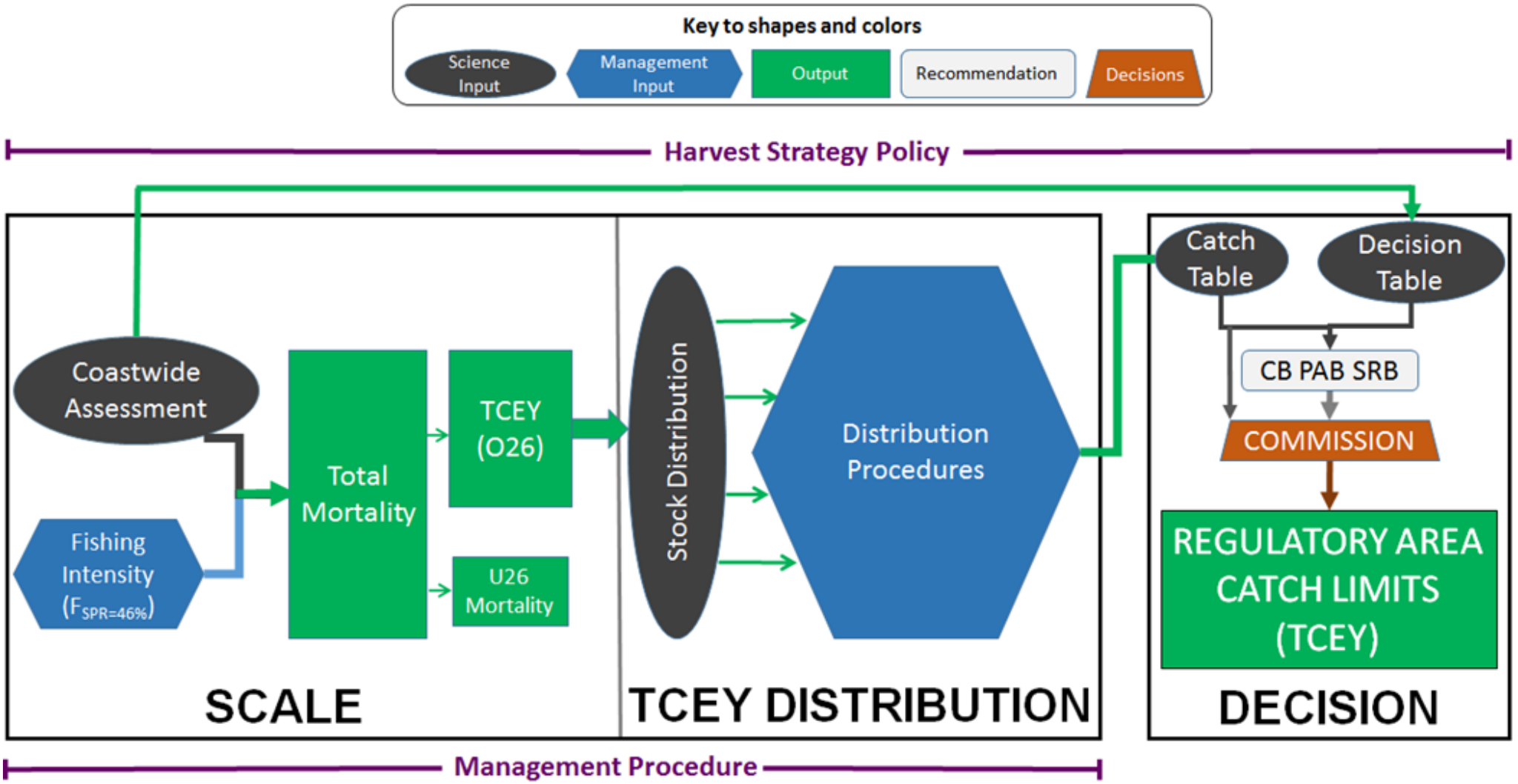
GOAL : Minimize Bycatch and Bycatch Mortality

GENERAL OBJECTIVE	MEASURABLE OBJECTIVE	NEGATIVE OUTCOME	TIME-FRAME	TOLERANCE	PERFORMANCE METRICS

APPENDIX VB
OBJECTIVES FROM CIRCULAR IPHC-2018-CR022 AND MSAB RECOMMENDATIONS

GOAL	GENERAL OBJECTIVE	MSAB RECOMMENDATION
Biological sustainability: Preserving bio-complexity	Maintaining diversity in the population across IPHC biologically-based Areas.	MORE DISCUSSION NEEDED
	Prevent local depletion at IPHC Regulatory Area scale.	MORE DISCUSSION NEEDED
Fisheries Sustainability: Maintain access and serve consumer needs.	Maintain commercial, recreational and subsistence fishing opportunities in each IPHC Regulatory Area.	EASILY EXTENDED TO AREAS
	~~Maintain processing opportunities in each IPHC Regulatory Area.~~	DROP
Fisheries Sustainability: Maximize yield by regulatory area	Distribution is responsive to IPHC Regulatory Area abundance trends and stock characteristics (ex. Fishery WPUE, age structure, size at age etc.).	MORE DISCUSSION NEEDED
	Distribution is responsive to management precision in each IPHC Regulatory Area.	MORE DISCUSSION NEEDED
	Minimize impact on downstream migration areas.	MORE DISCUSSION NEEDED
	Minimize discard mortality and bycatch.	MORE DISCUSSION NEEDED (DISCARD) PARKING LOT (BYCATCH)
Fisheries Sustainability: Minimize variability,	Limit annual TCEY variability due to stock distribution in both time and scale.	EASILY EXTENDED TO AREAS
	Avoid zero sum distribution policy.	MORE DISCUSSION NEEDED

APPENDIX VI
REVISED: HARVEST STRATEGY POLICY PROCESS (10 MAY 2018)



A revised harvest strategy policy showing the separation of scale and distribution of fishing mortality. The decision step is when policy (not a procedure) influences the final outcome.

APPENDIX VII
MSE PROGRAM OF WORK (2019-23)

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 (Distribution 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
Present to the Commission preliminary Management Procedures
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

APPENDIX VIII
CONSOLIDATED SET OF RECOMMENDATIONS AND REQUESTS OF THE 11TH SESSION OF THE IPHC MANAGEMENT STRATEGY ADVISORY BOARD (MSAB011)

RECOMMENDATIONS

NOTING that the core purpose of the MSAB011 is to review progress on the MSE Program of Work, and to provide guidance for the delivery of products to the MSAB012 in October 2018, the MSAB AGREED that formal recommendations to the Commission would not be developed at the present meeting, but rather, these would be developed at the MSAB012.

REQUESTS

A review of the goals and objectives of the IPHC MSE process

MSAB011–Req.01 (para. 18) The MSAB **REQUESTED** that the IPHC Secretariat standardize the terminology for types of objectives (e.g. general, higher level objectives vs. measurable objectives).

MSAB011–Req.02 (para. 20) The MSAB **REQUESTED** that the objectives as defined in Appendix Va, be refined by an Ad-Hoc Working Group (composition: Peggy Parker; Chris Sporer; Glenn Merrill; Dan Falvey; Michelle Culver). The Ad-Hoc Working Group shall provide refined objectives to the IPHC Secretariat for distribution to the MSAB for consideration by 15 June 2018. Comments from the MSAB members would then be provided to the IPHC Secretariat by 30 June 2018. Some points of interest include determining appropriate reference catch levels, considering the use of "economically sufficient," and retaining the concepts of a minimum catch, a reference catch, and stability in catch (which may be stated as a rate of change). A further consideration may be to identify an objective related to taking advantage of high yield opportunities. Another consideration may be to look at what minimum catch is necessary to maintain markets.

MSAB011–Req.03 (para. 28) The MSAB **REQUESTED** that the IPHC Secretariat continue to discuss the Biological Sustainability (conservation) objectives with the IPHCs Scientific Review Board (SRB), including the appropriate female spawning biomass limit and female spawning biomass threshold.

MSAB011–Req.04 (para. 33) The MSAB **REQUESTED** that the objectives related to distributing the TCEY in Appendix Vb be the subject of further discussion by the Ad-Hoc Working Group (paragraph 20). The consideration of these objectives should be done after refinement of Scale objectives, as noted in paragraph 20. This task is to be completed no later than 1 September 2018, for consideration by the IPHC Secretariat and subsequent submission to the MSAB012 in accordance with the IPHC Rules of Procedure (2017).

Performance metrics for evaluation

MSAB011–Req.05 (para. 37) The MSAB **REQUESTED** that the IPHC Secretariat present the performance metrics determined from measurable objectives, as well as additional statistics listed in Appendix Va, at MSAB012.

Short-term, mid-term, and long-term performance metrics

MSAB011–Req.06 (para. 40) The MSAB **REQUESTED** that the IPHC Secretariat determine methods to present qualitative results describing the transition from the short-term to the long-term for various performance metrics as a way to describe medium-term performance.

MSAB011–Req.07 (para. 41) The MSAB **REQUESTED** that the IPHC Secretariat present the methods for producing short-, medium- and long-term results to the SRB for their review and comment.

A review of variability and scenarios

MSAB011–Req.08 (para. 45) The MSAB **REQUESTED** that the SRB clarify the meaning of paragraphs 24 and 28 in the SRB report, IPHC-2017-SRB011-R.

MSAB011–Req.09 (para. 48) **NOTING** that domestic management measures for the recreational fisheries often include size limits that differ to various levels of catch limits, the MSAB **REQUESTED** the IPHC Secretariat to consider alternative methods to simulate bycatch mortality at various Pacific halibut abundances, as noted in IPHC-2017-MSAB010-R, paragraph 21.

MSAB011–Req.10 (para. 49) The MSAB **REQUESTED** the IPHC Secretariat to consider alternative methods to simulate recreational mortality, and that the recreational mortality should continue to increase over the entire range of total mortality.

Management Procedures related to fishing intensity

MSAB011–Req.11 (para. 52) The MSAB **AGREED** that a performance metric related to "being on the ramp" of the HCR is not necessary and would be covered by catch variability performance metrics. However, the MSAB **REQUESTED** a statistic related to "being on the ramp" be reported.

Preliminary closed-loop simulations results to investigate SPR with estimation error

MSAB011–Req.12 (para. 54) The MSAB **AGREED** that estimation error should be simulated from a joint distribution representing error in the estimated Total Mortality and the estimated stock status, with autocorrelation. The MSAB **REQUESTED** that the SRB review these methods to incorporate estimate error.

Simulation design for evaluations at MSAB012 of the Scale component of the harvest strategy policy

MSAB011–Req.13 (para. 60) The MSAB **REQUESTED** that the simulations incorporate:

a) SPR values from 30% to 56%, with higher resolution where change occurs in the performance metrics, and at values where IPHC feels the results are meeting the MSE objectives.

b) fishery trigger values of 30% and 40%, and that 45% is also used if time allows.

c) estimation error by jointly simulating the error in total mortality and stock status with coefficients of variation (CV) the same for each variable and equal to 0.15 with a correlation of 0.5. An CV of 0.0 (no estimation error) and 0.2 may be considered if time permits, and presented as a sensitivity as a minimum to understand the effects of the different levels of estimation error.

d) autocorrelation at a level determined appropriate by the IPHC Secretariat and the SRB.

e) a smoothing algorithm on the catch limit for a few simulations as an example to understand the effect on the performance metrics. The algorithm should be asymmetric (e.g. slow up/fast down) and reduce annual catch variability.

MSAB011–Req.14 (para. 61) The MSAB **REQUESTED** that when reporting results:

f) the long-term be represented by 100 simulated annual cycles from the Operating Model and performance metrics summarized over the 10 annual cycles.

g) short- and medium-term performance metrics be presented for management procedures that meet long-term objectives.

h) the short-term be represented by the assessment ensemble and performance metrics presented for the immediate three years. These performance metrics are not necessarily the same as for long-term metrics, and may be actual values (e.g. catch in 2019) instead of a summary over years.

i) the medium-term be summarized qualitatively by describing the transition from the short-term to the medium-term using the closed-loop simulations. Sensitivities (e.g. holding weight-at-age at low levels or constant) can help to inform the medium-term transitions.

j) phase-in procedures are considered when appropriate.

MSAB011–Req.15 (para. 62) The MSAB **REQUESTED** that IPHC Secretariat discuss the time-frames detailed in paragraph 61, with the SRB.

MSAB011–Req.16 (para. 63) The MSAB **REQUESTED** that the IPHC Secretariat consider the following improvements to the simulation framework:

d) investigate improvements to simulating weight-at-age with input from the SRB.

e) simulating bycatch be improved by linking it to abundance in some way.

f) investigate methods to improve time-varying selectivity in the commercial fleet, possibly linking it to abundance.

MSAB011–Req.17 (para. 64) The MSAB **NOTED** that the Operating Model and how it is conditioned is adequate for the evaluation of the HCR, and **REQUESTED** that the IPHC Secretariat present these methods to the SRB.

MSAB011–Req.18 (para. 65) The MSAB **REQUESTED** the following sensitivities:

f) Low and high states of weight-at-age.

g) Low and high regimes determining mean recruitment.

h) Implementation variability (variability associated with not exactly catching the quota or with departures during decision-making).

i) Higher and lower levels of mean bycatch.

j) Shift in bycatch selectivity to younger ages to address ongoing concerns on U26 mortality.

Review framework to investigate distributing the TCEY among IPHC Regulatory Areas and evaluate against objectives

MSAB011–Req.19 (para. 72) The MSAB **REQUESTED** that the proposed TCEY distribution framework described in paragraphs 69, 70 and 71, be reviewed by the SRB in 2018.

Identify preliminary MPs related to distribution

MSAB011–Req.20 (para. 76) **NOTING** that these tools require further discussion, the MSAB **REQUESTED** that the IPHC Secretariat provide comments, and that further stakeholder feedback is elicited.