



Report of the 13th Session of the IPHC Management Strategy Advisory Board (MSAB013)

Sitka, Alaska, U.S.A., 6-9 May 2019

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ACRONYMS

AAV	Average Annual Variability
RSB	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
MP	Management Procedure
MEY	Maximum Economic Yield
MSAB	Management Strategy Advisory Board
MSE	Management Strategy Evaluation
MSY	Maximum Sustainable Yield
NPUE	Numbers-Per-Unit-Effort
RSB	Relative Spawning Biomass
SB	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; ADOPTED** (formal); **REQUESTED; ENDORSED** (informal): A conclusion for an action to be undertaken, by a Contracting Party, a subsidiary (advisory) body of the Commission and/or the IPHC Secretariat.
- Level 2: AGREED:** Any point of discussion from a meeting which the Commission 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 Commission 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 13th Session of the International Pacific Halibut Commission (IPHC) Management Strategy Advisory Board (MSAB013) was held in Sitka, Alaska, U.S.A. from 6-9 May 2019. The MSAB consists of 23 board members, 20 of which attended the Session from the two (2) Contracting Parties. A total of ten (10) individuals attended the Session as Observers. In addition, one (1) IPHC Commissioner was in attendance, Mr Richard Yamada (USA). The list of participants is provided at [Appendix I](#).

The following are a subset of the complete recommendations/requests for action from the MSAB013, which are provided in full at [Appendix VII](#).

RECOMMENDATIONS

NOTING that the core purpose of the MSAB013 is to review progress on the MSE Program of Work, and to provide guidance for the delivery of products to the MSAB014 in October 2019, the MSAB RECALLED that formal recommendations to the Commission would not be developed at the present meeting, but rather, these would be developed at the MSAB014.

REQUESTS

Update on the actions arising from the 12th Session of the MSAB (MSAB012)

- MSAB013–Req.01 ([para. 12](#)) The MSAB **REQUESTED** that the IPHC Secretariat provide a report of IPHC research and other relevant research (to the extent possible) activities related to relationships between population dynamics and environmental conditions, noting that the IPHC 5-year research plan is available on the IPHC website, to aid in the discussion of hypotheses that are plausible to include in the MSE process. In particular, the MSAB would like to hear about research on the following topics:
- a) Migration patterns, stock structure, and consequences to area productivity;
 - b) Productivity by region;
 - c) Climate drivers of Pacific halibut ecology and movement (e.g. hypoxia events).

Goals, objectives, and performance metrics

- MSAB013–Req.02 ([para. 38](#)) The MSAB **REQUESTED** that the Scientific Review Board (SRB) and the IPHC Secretariat consider the draft objectives contained within [Table 1](#) and to provide advice to the MSAB on potential MSY and MEY proxy target reference points for objective 2.1B.

Other business

- [68](#). The MSAB **ENDORSED** the importance of scheduling time and providing opportunities to allow for Commissioner engagement in the evaluation of management procedures prior to reporting the final result at AM097.

1. OPENING OF THE SESSION

1. The 13th Session of the International Pacific Halibut Commission (IPHC) Management Strategy Advisory Board (MSAB013) was held in Sitka, Alaska, U.S.A. from 6-9 May 2019. The MSAB consists of 23 board members, 20 of which attended the Session from the two (2) Contracting Parties. A total of ten (10) individuals attended the Session as Observers. In addition, one (1) IPHC Commissioner was in attendance, Mr Richard Yamada (USA). The list of participants is provided at [Appendix I](#).
2. The MSAB **NOTED** apologies received from the following board members: Mr Jeff Kaufmann (USA Commercial harvester representative), and Mr Joe Morelli (USA Processor representative). Additional apologies were received from Glenn Merrill (USA Government agency representative) and Angel Drobnica (USA Processor representative) for Tuesday through Thursday.
3. The MSAB **RECALLED** that the primary role of the MSAB is to advise the Commission on the Management Strategy Evaluation (MSE) process. To meet this advisory role, the Commission has articulated the following specific objectives for the MSAB, as described in Appendix V, para. 2 of the IPHC Rules of Procedure (2019):
 - 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 the IPHC Secretariat 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.*
4. **NOTING** [paragraph 3](#), the MSAB **RECALLED** that the Management Strategy Evaluation process is a stakeholder informed, scientifically driven process.

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 MSAB013 are listed at [Appendix III](#).

3. IPHC PROCESS

3.1 MSAB Membership

6. The MSAB **NOTED** paper IPHC-2019-MSAB013-03 which provided the current membership list and term expirations for the MSAB. The full membership list is provided at [Appendix IV](#).
7. The MSAB **NOTED** that Mr Craig Cross (NPFMC representative) resigned on 29 Apr 2019. No replacement has yet been nominated by the NPFMC.
8. The MSAB **WELCOMED** the following new MSAB members appointed by the Commission on 17 April 2019 (terms: 17 April 2019 to 16 April 2023):
 - a) Mr. Chuck Ashcroft - Recreational/Sport fisheries (Canada)
 - b) Mr. Forrest Braden - Recreational/Sport fisheries - Alaska recreational (USA)
 - c) Mr. James Johnson - Commercial Harvester (USA)
 - d) Ms. Angel Drobnica - Processor (USA)

9. The MSAB **NOTED** that the Commission re-appointed the following members for a further four (4) years on 17 April 2019 (terms: 9 May 2019 to 8 May 2023):
- Mr. Jeff Kauffman (USA Commercial)
 - Mr. Scott Mazzone (USA Treaty Tribes)
 - Ms. Peggy Parker (USA/CDN Processing)
 - Mr. Brad Mirau (CDN Processing)
 - Mr. Tom Marking (USA Sportfishing)
 - Mr. Adam Keizer (DFO) – Direct Canadian government appointment

3.2 *Update on the actions arising from the 12th Session of the MSAB (MSAB012)*

10. The MSAB **NOTED** paper IPHC-2019-MSAB013-04 which provided an opportunity to consider the progress made during the inter-sessional period in relation to the recommendations and requests of the 12th Session of the IPHC Management Strategy Advisory Board (MSAB012).
11. The MSAB **AGREED** to consider and revise as necessary, the actions arising from the MSAB012, and for these to be combined with any new actions arising from the MSAB013.
12. The MSAB **REQUESTED** that the IPHC Secretariat provide a report of IPHC research and other relevant research (to the extent possible) activities related to relationships between population dynamics and environmental conditions, noting that the IPHC 5-year research plan is available on the IPHC website, to aid in the discussion of hypotheses that are plausible to include in the MSE process. In particular, the MSAB would like to hear about research on the following topics:
- Migration patterns, stock structure, and consequences to area productivity;
 - Productivity by region;
 - Climate drivers of Pacific halibut ecology and movement (e.g. hypoxia events).

3.3 *Review of the outcomes of the 13th Session of the IPHC Scientific Review Board (SRB013)*

13. The MSAB **NOTED** paper IPHC-2019-MSAB013-05, which provided the outcomes of the 13th Session of the IPHC Scientific Review Board (SRB013) relevant to the mandate of the MSAB, which were provided for reference.

3.4 *Outcomes of the 95th Session of the IPHC Annual Meeting (AM095)*

14. The MSAB **NOTED** paper IPHC-2019-MSAB013-06, which detailed the outcomes of the 95th Session of the IPHC Annual Meeting (AM095) relevant to the mandate of the MSAB.
15. The MSAB **RECALLED** para. 61 of AM095-R,

“The Commission AGREED with the MSAB recommendation that the harvest strategy policy consist of a coast wide fishing intensity SPR should not be lower than 40% nor higher than 46%, with a target SPR of 42%-43% and with a 30:20 HCR.”

16. The MSAB **RECALLED** the following two recommendations from the Commission:

AM095–Rec.01 (para. 59c) *The Commission RECOMMENDED the MSAB develop the following additional objective, as well as prioritize this objective in the evaluation of management procedures, for the Commission’s consideration.*

- A conservation objective that meets a spawning biomass target.*

AM095–Rec.02 (para. 62) *The Commission RECOMMENDED that the MSAB and IPHC Secretariat continue its program of work on the Management Procedure for the Scale portion of the harvest strategy, NOTING that Scale and Distribution components will be evaluated and presented no later than at AM097 in 2021, for potential adoption and subsequent implementation as a harvest strategy. The management procedure that best meets the primary objectives for coastwide scale is:*

- A target SPR of 40% with a fishery trigger of 30% and a fishery limit of 20% in the control rule;*
- An annual constraint of 15% from the previous year’s mortality limit.*

17. The MSAB **NOTED** that the Commission considered a management procedure that best met the primary objectives that were defined at the time, as detailed in document IPHC-2019-AM095-12, and this management procedure was not evaluated at MSAB012, but was evaluated at the MSAB013.
18. The MSAB **NOTED** the revised IPHC Rules of Procedure (2019) adopted by the Commission, which includes updates to the MSAB terms of reference and rules of procedure. There remain some inconsistencies in terminology, such as ‘recreational’ versus ‘sport’ fisheries.

3.5 *Update on two-year Program of Work*

19. The MSAB **NOTED** that the full MSE is scheduled for delivery at the 97th Session of the IPHC Annual Meeting (AM097) in January of 2021 and that the agendas for MSAB013 and MSAB014 include clearly defining objectives, identifying management procedures, and reviewing the multi-area operating model. Results of the simulations will be evaluated at the MSAB meetings in 2020.

3.6 *A review of MSE (MSE 101)*

20. The MSAB **NOTED** paper IPHC-2019-MSAB013-INF01 describing the MSE process in general, and included a brief history of the IPHC harvest policy and management strategy (harvest strategy) at IPHC, a discussion of sources of uncertainty in fisheries modelling, an example of an MSE, and that MSE is a process not a product.

4. GOALS, OBJECTIVES, AND PERFORMANCE METRICS

21. The MSAB **NOTED** paper IPHC-2019-MSAB013-07 which provided the goals and objectives used in the Management Strategy Evaluation (MSE) related to overall scale and preliminary goals and objectives related to distributing the TCEY. The paper links goals and objectives with performance metrics, and defines a set of performance metrics to use for evaluating and ranking management procedures.
22. The MSAB **NOTED** a description by the IPHC Secretariat of the IPHC harvest strategy policy document. This is a draft framework developed by the IPHC Secretariat to guide the MSE process but not constrain the MSAB recommendations. The following paragraph is noted in the harvest strategy policy document: <https://www.iphc.int/the-commission/harvest-strategy-policy>

“The following is a Draft document based on an amalgamation of current IPHC practices and best practices in harvest strategy policy. It is not intended to be a definitive policy, noting that the IPHC is yet to adopt a formal harvest strategy for Pacific halibut. It is expected that over the coming two years, the IPHC will develop and implement a harvest strategy, and that this policy document will then be updated accordingly.”

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

23. The MSAB **NOTED** that the Commission endorsed the three primary objectives and associated performance metrics used to evaluate management procedures in the MSE process at MSAB012 (as detailed in paper IPHC-2019-AM095-12) (AM095-R para. 59a).
24. The MSAB **NOTED** that:
- a) a management procedure to constrain the AAV at the coastwide level may not constrain AAV within regulatory areas to the same extent;
 - b) the Commission made an inter-sessional request of the MSAB on 4 October 2018 as follows:

“While it is recognized that the MSAB has spent considerable time and effort in developing objectives for evaluating management procedures, for the purpose of expediting a recommendation on the level of the coast-wide fishing intensity, and noting SRB11–Rec.02 to develop an objectives hierarchy, the MSAB is requested to evaluate management procedure performance against objectives that prioritize long-term conservation over short-/medium-term (e.g. 3-8 years) catch performance. Where helpful in accelerating progress on scale, the MSAB is requested to constrain objectives

to (1) maintain biomass above a limit to avoid critical stock sizes, (2) maintain a minimum average catch, and (3) limit catch variability.”

25. The MSAB **AGREED** that an objective of a coastwide minimum average catch may be better considered at the IPHC Regulatory Area level and will be explored in discussions about objectives for distribution.
26. The MSAB **AGREED** to maintain objective 2.2, leaving the threshold level of the AAV measurable outcome at 15% ([Table 1](#)).
27. The MSAB **NOTED** [Fig. 1](#), which illustrates a harvest control rule as part of a harvest strategy. 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>.

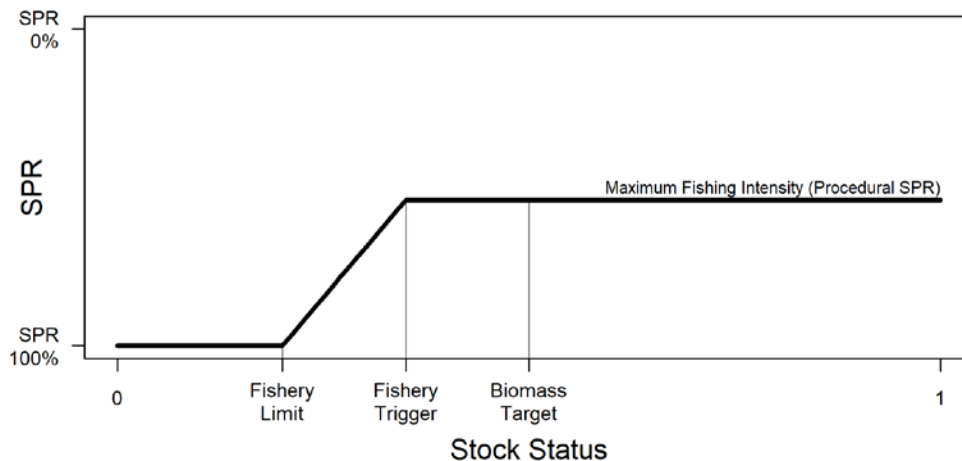


Fig. 1. An illustration of a harvest control rule as part of a harvest strategy.

28. The MSAB **NOTED** information from the IPHC Secretariat that 30% of unfished spawning biomass is currently a lower bound estimate of SB_{MSY} , and 41% is a high median estimate. The estimates of SB_{MSY} may be updated after further analysis.
29. The MSAB **NOTED** that avoiding low stocks sizes (below a fishery trigger as shown in [Fig. 1](#)) may be a useful means to optimise fishing activities by avoiding additional management action from the harvest control rule and potentially keeping the biomass in a range incorporating B_{MSY} .
30. The MSAB **AGREED** that additional consistent and accessible language describing stock status and control rules would be useful for communication and outreach.
31. The MSAB **NOTED** that a tolerance of 10% on the biological sustainability objective, as defined previously, implies a one in ten chance of being below that limit.
32. The MSAB **AGREED** that:
- SB_{Lim}**: the biological sustainability objective to keep the biomass above a limit should be updated to include a tolerance of 0.05 (5%) with the rationale that an SB_{Lim} of 0.20 (20%) is an appropriate biomass limit for Pacific halibut and a tolerance of 0.05 is an acceptable level of risk based on constituent input as reported by individual MSAB members. These values are also consistent with harvest policies and MSE's from many other fishery management bodies globally. The spawning biomass limit reference point relates to a dynamic unfished spawning biomass.
 - SB_{Trig}**: a fishery objective to maintain the biomass above a fishery trigger (trigger reference point) in the harvest control rule be incorporated as a primary objective. This objective should include a measurable outcome of being above $SB_{30\%}$ with a tolerance defined as 0.80 (0.75 and 0.90 were also considered), and would be considered over the long-term.
33. The MSAB **NOTED** a spawning biomass target reference point that is greater than the trigger reference point is consistent with many fishery management bodies globally.

34. The MSAB **NOTED** a presentation by the IPHC Secretariat on potential target reference points including maximum sustainable yield (MSY) and maximum economic yield (MEY), as well as commonly applied proxies to represent those quantities. An $SB_{36-45\%}$ may be a proxy for MEY, assuming that SB_{MSY} is approximately $SB_{30-41\%}$ based on simulations to date (and taking into account the 30:20 control rule and past assessment models).
35. The MSAB **CONSIDERED** a draft fishery objective to maintain the spawning biomass around a target reference point that optimises fishing activities based on MEY.
36. The MSAB **AGREED** that MEY is an amalgamation of sector-specific values and has not yet been accurately estimated and requires further refinement before use as an objective.
37. The MSAB **NOTED** that the IPHC Secretariat is in the process of hiring a fishery economist to work on tasks including a fishery-wide MEY estimate.
38. The MSAB **REQUESTED** that the Scientific Review Board (SRB) and the IPHC Secretariat consider the draft objectives contained within [Table 1](#) and to provide advice to the MSAB on potential MSY and MEY proxy target reference points for objective 2.1B.
39. The MSAB **NOTED** that a fishery objective to maintain the biomass around a target (SB_{Targ}) may be a useful means to optimise fishing activities. This objective could include a measurable outcome which may be a proxy for SB_{MEY} . A biomass target that is greater than the fishery trigger reference point is consistent with many fishery management bodies globally. The tolerance would be defined as 0.50, and considered in the long-term.
40. The MSAB **AGREED** to the draft objectives detailed in [Table 1](#).

Table 1. DRAFT: Primary measurable objectives used for evaluation of MSE results for coastwide fishing intensity revised at MSAB013. **Items in development.*

GENERAL OBJECTIVE	MEASURABLE OBJECTIVE	MEASURABLE OUTCOME	TIME-FRAME	TOLERANCE	PERFORMANCE METRIC
1.1. KEEP SPAWNING BIOMASS ABOVE A LIMIT TO AVOID CRITICAL STOCK SIZES Biomass Limit	Maintain a minimum female spawning stock biomass above a biomass limit reference point at least 95% of the time	$SB < \text{Spawning Biomass Limit } (SB_{Lim})$ $SB_{Lim}=20\%$ unfished spawning biomass	Long-term	0.05	$P(SB < SB_{Lim})$
*2.1 MAINTAIN SPAWNING BIOMASS AROUND A LEVEL THAT OPTIMISES FISHING ACTIVITIES	2.1A SPAWNING BIOMASS TRIGGER Maintain the female spawning biomass above a trigger reference point at least 80% of the time	$SB < \text{Spawning Biomass Trigger } (SB_{Trig})$ $SB_{Trig}=SB_{30\%}$ unfished spawning biomass	Long-term	0.20	$P(SB < SB_{Trig})$
	*2.1B SPAWNING BIOMASS TARGET Maintain the female spawning biomass above a biomass target reference point at least 50% of the time	$SB < \text{Spawning Biomass Target } (SB_{Targ})$ $SB_{Targ}=SB_{36-45\%}$ unfished spawning biomass	Long-term	0.50	$P(SB < SB_{Targ})$
2.2. LIMIT CATCH VARIABILITY	Limit annual changes in the coastwide TCEY	Average Annual Variability (AAV) > 15%	Short-term	0.25	$P(AAV > 15\%)$
2.3. MAXIMIZE DIRECTED FISHING YIELD	Maximize average TCEY coastwide	Median coastwide TCEY	Short-term	STATISTIC OF INTEREST	Median \overline{TCEY}

4.2 *Identification of goals and objectives related to distributing the TCEY*

41. The MSAB **NOTED** four general objectives related to distributing the TCEY:
- a) Conserve spatial population structure;
 - b) Limit catch variability within a biological region;
 - c) Maximize directed fishing yield within a biological region;
 - d) Minimize potential of no catch for the directed fishery within a biological region.
42. The MSAB **NOTED** the IPHC Secretariat presentation explaining that the objective to conserve spatial population structure should be described as the proportion of spawning biomass in each biological region since a coastwide limit has been defined and biological regions are the appropriate scale for biological sustainability objectives.
43. The MSAB **NOTED** the draft objectives related to distributing the TCEY provided in [Appendix V](#).
44. The MSAB **NOTED** that the proportion of O26 Pacific halibut biomass in each IPHC Regulatory Area is an option for an objective and would be classified as a fishery objective rather than a conservation objective because it relates to biomass available to the directed fisheries.

4.3 *Performance metrics for evaluation*

45. **NOTING** that performance metrics are developed from the measurable objectives, the MSAB **AGREED** to use the performance metrics defined in [Table 1](#).
46. The MSAB **AGREED** to develop an additional performance metric related to catch stability to capture the non-averaged magnitude of change from the previous year. For example, the proportion of time that the inter-annual change is greater than 10%, 15%, and 30%.
47. The MSAB **AGREED** that an ad-hoc working group meet prior to the MSAB014 to review and suggest revisions to the draft objectives and performance metrics related to distributing the TCEY provided in [Appendix V](#). The ad-hoc working group will also refine objectives related to catch limit variability on a coastwide scale. The ad-hoc working group will consist of James Hasbrouck, Michele Culver, Scott Mazzone, Matt Damiano, Dan Falvey, Chris Sporer, Adam Keizer, Carey McGilliard, Peggy Parker, Jim Lane, and Glenn Merrill.

5. A REVIEW OF THE EVALUATION OF COASTWISE FISHING INTENSITY

48. The MSAB **NOTED** paper IPHC-2019-MSAB013-08 which provided additional results of the closed-loop simulations on investigation of coastwide fishing intensity. Results presented at MSAB012 were compared to results with an annual constraint on the TCEY.

5.1 *Closed-loop simulation results to investigate coastwide fishing intensity and constraints on the TCEY*

49. The MSAB **NOTED** that no management procedure without constraints met the stability objective of the AAV exceeding 15% no more than 25% of the time.
50. The MSAB **NOTED** that:
- a) only management procedures with constraints on change in mortality limits satisfied the catch stability objective;
 - b) management procedures that utilized a slow-up fast-down approach, a maximum change of 15% (up or down), and a multi-year limit were ranked highly among management procedures;
 - c) management procedures with a maximum change (up or down) between 15 and 20% were not evaluated but may be highly ranked;
 - d) some constrained management procedures with a 30:20 control rule and an SPR of 43% met objectives for biological sustainability, catch stability, and maintaining the biomass, at least 80% of the time, above the fishery trigger of SB_{30%}.

51. The MSAB **NOTED** that management procedures could be modified to incorporate additional variables, e.g. environmental variables, bycatch, and age structure, particularly by considering scale and distribution together.
52. The MSAB **AGREED** that:
- a) a coastwide fishing intensity SPR of 43%, with a 30:20 HCR, and with one of two constraints
1) +/-15% maximum change in total mortality, or 2) slow up, fast down, be used in harvest strategy development process; and
 - b) a range of management procedures including fishing intensity SPR of 40-46% be considered in light of implementation variability within the closed-loop simulations when investigating distribution.
53. The MSAB **NOTED** that future decisions made by the Commission (e.g. AM095-R Rec.04, para. 66) can be incorporated into the MSE process as time allows.

6. DEVELOPMENT OF A FRAMEWORK TO INVESTIGATE FISHING INTENSITY AND DISTRIBUTING THE TOTAL CONSTANT EXPLOITATION YIELD (TCEY) FOR PACIFIC HALIBUT FISHERIES

54. The MSAB **NOTED** paper IPHC-2019-MSAB013-08 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, as well as the development of simulation framework to evaluate these management procedures.
55. The MSAB **NOTED** that aspects of TCEY distribution can be considered as an objective and/or as a management procedure.

6.1 *Review the framework to investigate distributing the TCEY among IPHC Regulatory Areas*

56. The MSAB **NOTED** the distribution framework and the separation of scientific and management elements of distribution procedures.
57. The MSAB **NOTED** the design of a simulation framework to conduct the closed-loop simulations and report results. The design goals include performance, fidelity, ease of use, modularity, and being maintainable over the long-term.

6.2 *Development of a multi-area operating model*

58. The MSAB **NOTED** the development of a multi-area operating model that will be generalized and able to accommodate a wide range of specifications.
59. The MSAB **NOTED** that the operating will be parameterized using historical and current knowledge, will be conditioned to available data and informed assumptions, and be reviewed by the SRB.

6.3 *Identify management procedures related to distribution*

60. The MSAB **NOTED** the following potential elements of management procedures for the distribution of the TCEY:
- a) IPHC fishery-independent setline survey estimates by IPHC Regulatory Area, biological regions, or multi-area management zones;
 - b) relative harvest rates;
 - c) O32:O26 ratios or other proxies to represent discard mortality in directed fisheries;
 - d) trends in the IPHC fishery-independent setline survey WPUE/NPUE by IPHC Regulatory Area, biological regions, or multi-area management zones;
 - e) Trends in fishery CPUE by IPHC Regulatory Area, biological regions, or multi-area management zones;
 - f) Smoothing algorithms on area-specific catch limits;

- g) Percentage allocation to an IPHC Regulatory Area (e.g., a method to calculate a proportion of the TCEY for IPHC Regulatory Area 2B);
 - h) a floor on the TCEY (e.g. a minimum of 1.65 Mlbs in IPHC Regulatory Area 2A);
 - i) A maximum SPR with catch distribution by IPHC Regulatory Area determined from the IPHC fishery-independent setline survey WPUE;
 - j) Coastwide TCEY target and maximum calculated; distribution by target, but with ability to adjust TCEY up to the maximum;
 - k) Stair-steps to modify the TCEY at specific trigger reference points.
61. The MSAB **ENCOURAGED** the IPHC Secretariat to identify potential starting points and baselines for management procedure elements that incorporate trends or compare a current metric to a historical value.
62. The MSAB **NOTED** that the use of multi-area management zones (e.g., 2A/2B and 2C/3A) may be applied to any of the tools in [paragraph 60](#).
63. The MSAB **NOTED** that components of a management procedure could include the decisions made at AM095 in AM095-R para. 69 with respect to IPHC Regulatory Areas 2A and 2B.
64. The MSAB **NOTED** that management procedures may be developed to incorporate elements in various ways and at various scales. For example,
- a) determining area-specific mortality limits using survey results;
 - b) distributing the coastwide TCEY directly to IPHC Regulatory Areas, or to biological regions or management zones as an intermediate step;
 - c) determine the coastwide TCEY using survey results instead of a stock assessment model (AM095-R para. 52).

7. MSAB PROGRAM OF WORK (2019-23)

65. The MSAB **NOTED** paper IPHC-2019-MSAB013-10 which provided an update on the 5-year MSE Program of Work (2019-23), given current Commission directives.
66. The MSAB **NOTED** the delivery dates of January 2019 for coastwide results and January 2021 for the MSE results, including Scale and Distribution components of the management procedure for potential adoption by the Commission and subsequent implementation.
67. The MSAB **NOTED** the Program of Work provided at [Appendix VI](#).

8. OTHER BUSINESS

68. The MSAB **ENDORSED** the importance of scheduling time and providing opportunities to allow for Commissioner engagement in the evaluation of management procedures prior to reporting the final result at AM097.

9. REVIEW OF THE DRAFT AND ADOPTION OF THE REPORT OF THE 13TH SESSION OF THE IPHC MANAGEMENT STRATEGY ADVISORY BOARD (MSAB013)

69. The report of the 13th Session of the IPHC Management Strategy Advisory Board (IPHC-2019-MSAB013-R) was **ADOPTED** on 9 May 2019, including the consolidated set of recommendations and/or requests arising from MSAB013, provided at [Appendix VII](#).

APPENDIX I

**LIST OF PARTICIPANTS FOR THE 13TH SESSION OF THE IPHC MANAGEMENT STRATEGY
ADVISORY BOARD (MSAB013)**

Officers

Co-Chairperson (Canada)	Co-Chairperson (United States of America)
Mr Adam Keizer : adam.keizer@dfo-mpo.gc.ca	Dr Carey McGilliard : Carey.McGilliard@noaa.gov

MSAB Members

Canada	United States of America
Mr Chuck Ashcroft : chuckashcroft@telus.net	Mr Forrest Braden : forrest@seagoalaska.org
Mr Robert Hauknes : robert_hauknes@hotmail.com	Ms Michele Culver : Michele.Culver@dfw.wa.gov
Ms Ann-Marie Huang : Ann-Marie.Huang@dfo-mpo.gc.ca	Mr Matt Damiano : mdamiano@nwifc.org
Mr Adam Keizer : adam.keizer@dfo-mpo.gc.ca	Ms Angel Drobnica : adrobnica@apicda.com
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	Ms Peggy Parker : peggyparker616@gmail.com
Absentees	Absentees
	Mr Jeff Kauffman : jeff@spfishco.com
	Mr Joseph Morelli : jmorelli@spsales.com

Commissioners

Canada	United States of America
	Mr Richard Yamada : richard@alaskareel.com

Observers

Canada	United States of America
	Ms Wendy Alderson , ALFA: wendyalderson@gci.net
	Ms Linda Behnken , ALFA: alfafish@acsalaska.net
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	Mr Terry Peransowich , ALFA: terry_joanna@yahoo.com
	Mr Stephen Rhoads , SPC: SRhoades@SpcSales.com
	Ms Diana Stram , NPFMC: diana.stram@noaa.gov
	Ms Sarah Webster , ADFG: sarah.webster@alaska.gov

IPHC Secretariat

Name	Position and email
Dr David Wilson	Executive Director, david.wilson@iphc.int
Dr Steven Berukoff	MSE Programmer, steven.berukoff@iphc.int
Dr Piera Carpi	MSE Researcher, piera.carpi@iphc.int
Mr Ed Henry	Fisheries Data Specialist, Edward.henry@iphc.int
Dr Allan Hicks	Quantitative Scientist, allan.hicks@iphc.int
Mr Keith Jernigan	Branch Manager (IT&DB), CIO, keith.jernigan@iphc.int
Dr Ian Stewart	Quantitative Scientist, ian.stewart@iphc.int

APPENDIX II**AGENDA FOR THE 13TH SESSION OF THE IPHC MANAGEMENT STRATEGY ADVISORY BOARD (MSAB013)****Date:** 6-9 May 2019**Location:** Sitka, Alaska, U.S.A.**Venue:** Harrigan Centennial Hall (HCH)**Time:** 09:00-17:00 daily**Co-Chairpersons:** Mr. Adam Keizer (Canada) and Dr. Carey McGilliard (U.S.A.)

- 1. OPENING OF THE SESSION**
- 2. ADOPTION OF THE AGENDA AND ARRANGEMENTS FOR THE SESSION**
- 3. IPHC PROCESS**
 - 3.1. MSAB Membership
 - 3.2. Update on the actions arising from the 12th Session of the MSAB (MSAB012)
 - 3.3. Review of the outcomes of the 13th Session of the Scientific Review Board (SRB013)
 - 3.4. Outcomes of the 95th Session of the IPHC Annual Meeting (AM095)
 - 3.4.1. IPHC Rules of Procedure (2019)
 - 3.5. Update on two-year Program of Work
 - 3.6. A review of MSE (MSE 101)
- 4. GOALS, OBJECTIVES, AND PERFORMANCE METRICS**
 - 4.1. A review of the coastwide goals and objectives of the IPHC MSE process
 - 4.2. Identification of goals and objectives related to distributing the TCEY
 - 4.3. Performance metrics for evaluation
- 5. A REVIEW OF THE EVALUATION OF COASTWIDE FISHING INTENSITY**
 - 5.1. Closed-loop simulation results to investigate coastwide fishing intensity and constraints on the TCEY
- 6. DEVELOPMENT OF A FRAMEWORK TO INVESTIGATE FISHING INTENSITY AND DISTRIBUTING THE TOTAL CONSTANT EXPLOITATION YIELD (TCEY) FOR PACIFIC HALIBUT FISHERIES**
 - 6.1. Review the framework to investigate distributing the TCEY among IPHC Regulatory Areas
 - 6.2. Development of a multi-area operating model
 - 6.3. Identify management procedures related to distribution
- 7. MSAB PROGRAM OF WORK (2019-23)**
- 8. OTHER BUSINESS**
- 9. REVIEW OF THE DRAFT AND ADOPTION OF THE REPORT OF THE 13th SESSION OF THE IPHC MANAGEMENT STRATEGY ADVISORY BOARD (MSAB013)**

APPENDIX III**LIST OF DOCUMENTS FOR THE 13TH SESSION OF THE MANAGEMENT STRATEGY ADVISORY BOARD (MSAB013)**

Document	Title	Availability
IPHC-2019-MSAB013-01	Draft: Agenda & Schedule for the 13 th Session of the IPHC Management Strategy Advisory Board (MSAB013)	✓ 04 February 2019 ✓ 05 April 2019
IPHC-2019-MSAB013-02	Draft: List of Documents for the 13 th Session of the IPHC Management Strategy Advisory Board (MSAB013)	✓ 04 February 2019 ✓ 05 April 2019 ✓ 06 May 2019
IPHC-2019-MSAB013-03	MSAB Membership (IPHC Secretariat)	✓ 04 April 2019
IPHC-2019-MSAB013-04	Update on the actions arising from the 12 th Session of the MSAB (MSAB012) (A Hicks)	✓ 05 April 2019
IPHC-2019-MSAB013-05	Outcomes of the 13 th Session of the IPHC Scientific Review Board (SRB013) (D Wilson)	✓ 05 April 2019
IPHC-2019-MSAB013-06	Outcomes of the 95 th Session of the IPHC Annual meeting (AM095) (D Wilson & A. Hicks)	✓ 05 April 2019
IPHC-2019-MSAB013-07	Goals, objectives, and performance metrics for the IPHC Management Strategy Evaluation (MSE) (A. Hicks)	✓ 05 April 2019
IPHC-2019-MSAB013-08	Further investigation of management procedures related to coastwide fishing intensity (A. Hicks & I. Stewart)	✓ 05 April 2019
IPHC-2019-MSAB013-09	Development of a framework to investigate fishing intensity and distributing the total constant exploitation yield (TCEY) for Pacific halibut fisheries (A. Hicks, S. Berukoff & I. Stewart)	✓ 05 April 2019
IPHC-2019-MSAB013-10	IPHC Secretariat Program of Work for MSAB Related Activities 2019-23 (A. Hicks)	✓ 05 April 2019
<i>Information papers</i>		
IPHC-2019-MSAB013-INF01	A brief overview of Management Strategy Evaluation (MSE)	✓ 06 May 2019

**APPENDIX IV
MSAB MEMBERSHIP**

Membership category	Member	Canada	U.S.A.	Current Term commencement	Current Term expiration
Commercial harvesters (6-8)					
1	Sporer, Chris	CDN Commercial		9-May-17	08-May-21
2	Hauknes, Robert	CDN Commercial		9-May-17	08-May-21
3	Vacant	CDN Commercial			
4	Vacant	CDN Commercial			
5	Johnson, James		USA Commercial	17-Apr-19	16-Apr-23
6	Kauffman, Jeff		USA Commercial	9-May-19	08-May-23
7	Odegaard, Per		USA Commercial	9-May-17	08-May-21
8	Falvey, Dan		USA Commercial	9-May-17	08-May-21
First Nations/ Tribal fisheries (2-4)					
1	Lane, Jim	CDN First Nations		9-May-17	08-May-21
2	Vacant	CDN First Nations			
3	Mazzone, Scott		USA Treaty Tribes	9-May-19	08-May-23
4	Damiano, Matt		USA Treaty Tribes	20-Jun-18	19-Jun-22
Government Agencies (4-8)					
1	Keizer, Adam	DFO		9-May-19	08-May-23
2	Huang, Ann-Marie	CDN Science Advisor		10-May-18	09-May-22
3	Vacant	DFO			
4	Merrill, Glenn		NOAA-Fisheries	7-May-18	06-May-22
5	McGilliard, Carey		USA Science Advisor	9-May-17	08-May-21
6	Culver, Michele		PFMC	9-May-17	08-May-21
7	Vacant		NPFMC		
8	Hasbrouck, James		ADFG	12-Oct-18	11-Oct-22
Processors (2-4)					
1	Parker, Peggy	US/CDN Processing	US/CDN Processing	9-May-19	08-May-23
2	Mirau, Brad	CDN Processing		9-May-19	08-May-23
3	Morelli, Joseph		USA Processing	29-Aug-18	28-Aug-22
4	Drobnica, Angel		USA Processing	17-Apr-19	16-Apr-23
Recreational/ Sport fisheries (2-4)					
1	Ashcroft, Chuck	CDN Sport Fishing Advisory Board		17-Apr-19	16-Apr-23
2	Vacant	CDN Sportfishing			

Membership category	Member	Canada	U.S.A.	Current Term commencement	Current Term expiration
3	Marking, Tom		USA Sportfishing (CA)	9-May-19	08-May-23
4	Braden, Forrest		USA sportfishing (AK)	17-Apr-19	16-Apr-23

**APPENDIX V
PRIMARY OBJECTIVES AND ASSOCIATED PERFORMANCE METRICS**

General Objective	Measurable Objective	Measurable Outcome	Time-frame	Tolerance	Performance Metric
1.1A CONSERVE SPATIAL POPULATION STRUCTURE	Maintain a defined minimum proportion of spawning biomass in each Biological Region	$p_{SB,R} < p_{SB,R,min}$	Med-term Long-term		$P(...)$
	Proportion of Pacific halibut spawning biomass in each Biological Region	Proportion of O26 Pacific halibut biomass in each Biological Region	Long-term	STATISTIC OF INTEREST	$\frac{SB_A}{SB}$
2.1A MAINTAIN BIOMASS AROUND A TARGET THAT OPTIMISES FISHING ACTIVITIES	Maintain a proportion of O26 Pacific halibut in each area within the range observed by the IPHC fishery-independent setline survey (FISS)	$p_{B_{O26,A},min} < p_{B_{O26,A}} < p_{B_{O26,A},max}$	Long-term Short-term		$P(...)$
	Proportion of O26 Pacific halibut biomass in each area	Proportion of O26 Pacific halibut biomass in each area	Long-term Short-term	STATISTIC OF INTEREST	$\frac{B_{O26,A}}{B_{O26}}$
2.2A LIMIT CATCH VARIABILITY	Limit annual changes in the TCEY for each Regulatory Area	Average Annual Variability by Regulatory Area (AAVA) > 15%	Long-term Short-term	0.25	$P(AAV > 15\%)$
		AAVA	Long-term Short-term	STATISTIC OF INTEREST	AAV and variability
		Change in TCEY by Regulatory Area > 15% in any year	Long-term Short-term	STATISTIC OF INTEREST	$\frac{TCEY_{i+1} - TCEY_i}{TCEY_i}$
2.3A MAXIMIZE DIRECTED FISHING YIELD	Maximize average TCEY by Regulatory Area	Median Reg Area TCEY	Long-term Short-term	STATISTIC OF INTEREST	Median \overline{TCEY}

	Maintain TCEY above a minimum level by Regulatory Area	$TCEY_A < TCEY_{A,min}$	Long-term Short-term	?? ??	$P(TCEY < TCEY_{A,min})$
	Maximize high yield (TCEY) opportunities by Regulatory Area	$TCEY_A > ?? \text{ Mlbs}$	Long-term Short-term	STATISTIC OF INTEREST	$P(TCEY < ?? \text{ Mlbs})$
	Present the range of TCEY by Regulatory Area that would be expected	Range of TCEY by Regulatory Area	Long-term Short-term	STATISTIC OF INTEREST	5th and 75th percentiles of TCEY
2.4A MINIMIZE POTENTIAL OF NO CATCH LIMIT FOR DIRECTED FISHERY	Maintain catch limit for directed fishery in each Regulatory Area above zero	$DirectedYield_A = 0$	Long-term Short-term	?? ??	$P(DirY_A = 0)$

APPENDIX VI
MSE PROGRAM OF WORK (2019-23)

May 2019 MSAB Meeting
Evaluate additional Scale MP's
Review Goals
Spatial Model Complexity
Identify MP's (Distn Scale)
Review Framework
October 2019 MSAB 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 MSAB Meeting
Review Goals
Review multi-area model
Review final results to be presented at AM097
October 2020 MSAB Meeting
Review Goals
Review final results
Annual Meeting 2021
Presentation of first complete MSE product to the Commission
Recommendations on Scale and Distribution MP

APPENDIX VII**CONSOLIDATED SET OF RECOMMENDATIONS AND REQUESTS OF THE 13TH SESSION OF THE
IPHC MANAGEMENT STRATEGY ADVISORY BOARD (MSAB013)****RECOMMENDATIONS**

NOTING that the core purpose of the MSAB013 is to review progress on the MSE Program of Work, and to provide guidance for the delivery of products to the MSAB014 in October 2019, the MSAB RECALLED that formal recommendations to the Commission would not be developed at the present meeting, but rather, these would be developed at the MSAB014.

REQUESTS***Update on the actions arising from the 12th Session of the MSAB (MSAB012)***

- MSAB013–Req.01 ([para. 12](#)) The MSAB **REQUESTED** that the IPHC Secretariat provide a report of IPHC research and other relevant research (to the extent possible) activities related to relationships between population dynamics and environmental conditions, noting that the IPHC 5-year research plan is available on the IPHC website, to aid in the discussion of hypotheses that are plausible to include in the MSE process. In particular, the MSAB would like to hear about research on the following topics:
- a) Migration patterns, stock structure, and consequences to area productivity;
 - b) Productivity by region;
 - c) Climate drivers of Pacific halibut ecology and movement (e.g. hypoxia events).

Goals, objectives, and performance metrics

- MSAB013–Req.02 ([para. 38](#)) The MSAB **REQUESTED** that the Scientific Review Board (SRB) and the IPHC Secretariat consider the draft objectives contained within [Table 1](#) and to provide advice to the MSAB on potential MSY and MEY proxy target reference points for objective 2.1B.