



## **Report of the 14<sup>th</sup> Session of the IPHC Management Strategy Advisory Board (MSAB014)**

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Seattle, WA, USA, 21-24 October 2019

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Peter DeGreef	Richard Yamada

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IPHC 2019. Report of the 14<sup>th</sup> Session of the IPHC  
Management Strategy Advisory Board (MSAB014).  
Seattle, WA, USA, 21-24 October 2019.  
*IPHC-2019-MSAB014-R, 27 pp.*

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## ACRONYMS

AAV	Average Annual Variability
AC	Annual Change
RSB	Relative Spawning Biomass
FCEY	Fishery Constant Exploitation Yield
F <sub>SPR</sub>	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
RSB	Relative Spawning Biomass
SB	Spawning Biomass
SRB	Scientific Review Board
SPR	Spawning Potential Ratio
TCEY	Total Constant Exploitation Yield
USA	United States of America

## DEFINITIONS

A set of working definitions are provided in the IPHC Glossary of Terms and abbreviations: <https://www.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 14<sup>th</sup> Session of the International Pacific Halibut Commission (IPHC) Management Strategy Advisory Board (MSAB014) was held in Seattle, WA, USA from 21-24 October 2019. The MSAB consists of 22 board members, 17 of which attended the Session from the two (2) Contracting Parties. A total of 2 individuals attended the Session as Observers. In addition, 2 IPHC Commissioners were in attendance, Mr Peter DeGreef (Canada) and Mr Bob Alverson (USA).

The following are a subset of the complete recommendations/requests for action from the MSAB014, which are provided in full at [Appendix VIII](#).

## RECOMMENDATIONS

### *A review of the coastwide goals and objectives of the IPHC MSE process*

MSAB014–Rec.01 ([para. 34](#)) The MSAB **RECOMMENDED** a coastwide fishery objective, in response to a request from the Commissioners, to maintain the spawning biomass above a target reference point of  $RSB_{36\%}$ , 50% of the time over the long-term.

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

MSAB014–Rec.02 ([para. 41](#)) The MSAB **RECOMMENDED** the primary objectives and associated performance metrics detailed in [Appendix V](#) to be used for the evaluation of management procedures at MSAB015.

### *Performance metrics for evaluation*

MSAB014–Rec.03 ([para. 46](#)) **NOTING** the current progress on evaluating coastwide fishing intensity, the MSAB **RECOMMENDED** 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, and/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.

### *Management procedures for coastwide scale*

MSAB014–Rec.04 ([para. 49](#)) The MSAB **RECOMMENDED** that SPR values of 0.3, 0.34, 0.38, 0.40, 0.42, 0.46, and 0.50 with a 30:20 control rule be evaluated at MSAB015 along with constraints defined by a maximum change in the TCEY of 15%, a slow-up fast-down approach, and/or setting quotas every third year.

### *Management procedures for distributing the TCEY*

MSAB014–Rec.05 ([para. 56](#)) The MSAB **RECOMMENDED** that the management procedures listed in [Table 2 in Appendix VI](#) be evaluated at MSAB015.



## 1. OPENING OF THE SESSION

1. The 14<sup>th</sup> Session of the International Pacific Halibut Commission (IPHC) Management Strategy Advisory Board (MSAB014) was held in Seattle, WA, USA from 21-24 October 2019. The MSAB consists of 22 board members, 17 of which attended the Session from the two (2) Contracting Parties. A total of 2 individuals attended the Session as Observers. In addition, 2 IPHC Commissioners were in attendance, Mr Peter DeGreef (Canada) and Mr Bob Alverson (USA). The list of participants is provided at [Appendix I](#).
2. The MSAB **NOTED** apologies were received by the IPHC Secretariat and/or the Co-Chairpersons from the following three (3) board members: Mr Robert Hauknes, Mr Brad Mirau, and Ms Peggy Parker.
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 MSAB014 are listed at [Appendix III](#).

## 3. IPHC PROCESS

### 3.1 MSAB Membership

6. The MSAB **NOTED** paper IPHC-2019-MSAB014-03 which provided the current membership list and term expirations for the MSAB. The current full membership list is provided at [Appendix IV](#).
7. The MSAB **NOTED** that Mr Matt Damiano (USA Treaty Tribes representative) resigned on 26 June 2019. No replacement has yet been formally nominated by the US Treaty Tribes to the IPHC to-date.
8. The MSAB **NOTED** that Ms Rachel Baker was nominated and appointed by the NPFMC on 23 October 2019 to fill the vacant NPFMC position.



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9. The MSAB **NOTED** that in accordance with Appendix V, Sect III.5 of the IPHC Rules of Procedure (2019), Mr Adam Keizer (Canada) was nominated and re-elected as Co-Chairperson of the MSAB for a two-year period (ending 23 October 2021).
10. The MSAB **NOTED** that Dr Carey McGilliard (USA) appointment as Co-Chairperson of the MSAB will expire on 10 May 2020.

### 3.2 *Update on the actions arising from the 13<sup>th</sup> Session of the MSAB (MSAB013)*

11. The MSAB **NOTED** paper IPHC-2019-MSAB014-04 which provided the MSAB with an opportunity to consider the progress made during the inter-sessional period in relation to the recommendations and requests of the 13<sup>th</sup> Session of the IPHC Management Strategy Advisory Board (MSAB013).
12. The MSAB **RECALLED** paragraph 52 of IPHC-2019-MSAB013-R:
- 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.*

### 3.3 *Review of the outcomes of the 14<sup>th</sup> Session of the IPHC Scientific Review Board (SRB014)*

13. The MSAB **NOTED** paper IPHC-2019-MSAB014-05, which provided the outcomes of the 15<sup>th</sup> Session of the IPHC Scientific Review Board (SRB015) relevant to the mandate of the MSAB, which were provided for reference.
14. The MSAB **REQUESTED** further clarification from the SRB on paragraphs 40–41 of IPHC-2019-SRB015-R:

SRB015 (para. 40) *“The SRB NOTED the proposed objective to have annual mortality limits related to local abundances. While this could provide transparency from a policy perspective, it ignores the biological realities of movement and other processes that remain poorly understood at both coastwide and Regulatory Area scales.”*

SRB015–Rec.05 (para. 41) *“The SRB RECOMMENDED that if the original objective to have annual mortality limits related to local abundances was of broad interest to the Commission, then candidate management procedures be developed and tested in which regional mortality limits are set annually in proportion to modelled survey abundance trends by IPHC Regulatory Area (noting that splitting regions into Regulatory Areas would require assumptions about within-region abundance proportions).”*

### 3.4 *Outcomes of the 95<sup>th</sup> Session of the IPHC Annual Meeting (AM095)*

15. The MSAB **NOTED** paper IPHC-2019-MSAB014-06, which detailed the outcomes of the 95<sup>th</sup> Session of the IPHC Annual Meeting (AM095) relevant to the mandate of the MSAB.
16. The MSAB **RECALLED** para. 61 of IPHC-2019-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.”*

17. The MSAB **RECALLED** the following three (3) 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) *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) *A target SPR of 40% with a fishery trigger of 30% and a fishery limit of 20% in the control rule;*
- b) *An annual constraint of 15% from the previous year’s mortality limit.”*

AM095–Rec.04 (para. 66) *“The Commission RECOMMENDED evaluating and redefining TCEY to include the U26 component of discard mortalities, including bycatch, as steps towards more comprehensive and responsible management of the resource, in coordination with the IPHC Secretariat and Contracting Parties. The intent is that each Contracting Party to the Treaty would be responsible for counting its U26 mortalities against its collective TCEY. This change would be intended to take effect for TCEYs established at the 2020 Annual Meeting.”*

18. The MSAB **NOTED** that future Commission decisions may include all sources of mortality (e.g. TCEY and U26 non-directed fishing discard mortality) and that Management Procedures will accommodate the Commission decisions.

### **3.5 Brief review of the two-year Program of Work**

19. The MSAB **NOTED** that the full MSE is scheduled for delivery at the 97<sup>th</sup> Session of the IPHC Annual Meeting (AM097) in January of 2021 and that the agenda for MSAB014 will include clearly defining objectives, identifying management procedures, and reviewing the multi-area operating model. Results of the simulations will be evaluated during the MSAB meetings in 2020.
20. The MSAB **NOTED** that an independent external peer review of the MSE process will likely occur in 2020 as noted in the presentation associated with document IPHC-2019-MSAB014-09.

## **4. REVIEW THE FRAMEWORK TO INVESTIGATE DISTRIBUTING THE TCEY AMONG IPHC REGULATORY AREAS**

### **4.1 Review the framework**

21. The MSAB **NOTED** paper IPHC-2019-MSAB014-08 which provided the MSAB with an overview of the development of the MSE framework and the multi-area Operating Model (“OM”).

### **4.2 Development of a multi-area operating model**

22. The MSAB **NOTED** that the OM will be tuned to the stock assessment to be presented at AM096 which includes updated and new data.
23. The MSAB **NOTED** that the OM will be spatially specified by Biological Region with movement modelled between Biological Regions. Fishery sectors will be modelled at the IPHC Regulatory Area level with approximations of how those fisheries operate within a Biological Region. Additionally, performance metrics will be available by IPHC Regulatory Area. The methods for determining metrics by IPHC Regulatory Area are under development and may be done by modelling the proportion of biomass in each IPHC Regulatory Area within a Biological Region in some way. This means that population and fishery dynamics at the IPHC Regulatory Area level may not be fully captured.
24. The MSAB **NOTED** the general understanding about seasonal spawning and ontogenetic movements (i.e. movement related to specific life stages) of Pacific halibut. Several questions remain, for example:



- 
- a) degree of mixing between IPHC Regulatory Areas and Biological Regions, including areas outside of the IPHC Convention Area;
  - b) variability of movement from one year to the next;
  - c) changes in movement due to environmental variability, including climate change; and
  - d) relative contribution of spawning grounds to future recruitment.

## 5. GOALS, OBJECTIVES, AND PERFORMANCE METRICS FOR THE IPHC MSE PROCESS

25. The MSAB **NOTED** paper IPHC-2019-MSAB014-07 which provided an update on scale and distribution objectives, and defining management procedures related to distributing the TCEY for use in the MSE process.
26. The MSAB **NOTED** paper IPHC-2019-MSAB014-INF01 which provided a summary and outcomes of the MSAB *ad hoc* Working Group discussion on coastwide and distribution objectives. In particular:
- a) objectives reflecting biological sustainability and stability in catch limits (e.g. a result of natural variability and assessment uncertainty). These objectives apply to the coastwide or Biological Region level;
  - b) interaction objectives (the effect of one area on another). These objectives apply to the Biological Region, Management Zone, or IPHC Regulatory Area level; and
  - c) objectives within IPHC Regulatory Areas.
27. The MSAB **NOTED** primary objectives will be used for evaluation of the management procedures and presented to the Commission. Additional performance metrics and statistics of interest will be available for evaluation.
28. The MSAB **NOTED** two types of implementation variability that will be modelled:
- a) variability in the difference between the mortality limit from the management procedure and the implemented mortality limit; and
  - b) the difference between the implemented mortality limit and the realized mortality from all fisheries.
29. The MSAB **RECALLED** that the Commission made an informal inter-sessional request of the MSAB on 4 October 2018 (via email to the Co-Chairpersons) which included prioritizing conservation objectives over fishery objectives:

*“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.”*

### 5.1 A review of the coastwide goals and objectives of the IPHC MSE process

30. The MSAB **AGREED** that the coastwide 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 a spawning biomass limit of 20% is an appropriate biomass limit for Pacific halibut. Additionally, 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 from other fisheries management bodies and with the



Marine Stewardship Council's scoring guideline 100 to avoid falling below minimum stock sizes 95% of the time.

31. **RECALLING** paragraph 44 of IPHC-2019-SRB015-R, and realizing that a fishery objective using a biomass threshold may be redundant with a fishery objective using a biomass target, the MSAB **AGREED** to remove a biomass threshold from the primary objectives:

(para 44). *The SRB NOTED that candidate control rule development is an iterative process, and that:*

- a) *use of the trigger from the control rule in coastwide objective 2.1A (Maintain the female spawning biomass above a trigger reference point at least 80% of the time) conflates the objective and management procedure*

32. The MSAB **AGREED** that 30% of unfished spawning biomass is a precautionary proxy for  $RSB_{MSY}$  based on an analysis of dynamic reference points using an equilibrium model, the stock assessment ensemble, and the MSE operating model.
33. The MSAB **NOTED** that the consequences of exceeding  $MSY$  can introduce a considerable amount of risk to the spawning biomass. Additionally, multiple paradigms in fisheries science suggest that we cannot know  $MSY$  exactly for any stock, and that precautionary proxies address this uncertainty and also offer benefits of stability and conservation.
34. The MSAB **RECOMMENDED** a coastwide fishery objective, in response to a request from the Commissioners, to maintain the spawning biomass above a target reference point of  $RSB_{36\%}$ , 50% of the time over the long-term.
35. The MSAB **NOTED** that stakeholders are interested in both the annual change in catch limits from year to year and an average of the annual percent change over time. Therefore, both Annual Change (AC) and Average Annual Variability (AAV) will be reported as performance metrics for the primary stability objectives.

### **5.2** *An update from the ad hoc working group tasked to refine goal and objectives related to distribution*

36. The MSAB **NOTED** paper IPHC-2019-MSAB014-INF01 which provided a starting point for the discussion of objectives related to distributing TCEY.

### **5.3** *Identification of goals and objectives related to distributing the TCEY*

37. The MSAB **AGREED** to an objective to conserve spatial population structure that is defined as a minimum proportion of the spawning biomass in each Biological Region as 5% in Region 2, 33% in Region 3, 10% in Region 4, and 2% in Region 4B. These proportions were proposed by the IPHC Secretariat after qualitatively investigating the modelled survey proportion of O32 stock distribution in each Biological Region since 1993 and may be updated following further review.
38. The MSAB **AGREED** that a distribution measurable objective to maintain a proportion of O26 Pacific halibut biomass in each area be classified as a secondary objective.
39. The MSAB **AGREED** that the same catch variability performance metrics listed in [paragraph 35](#) be defined at the IPHC Regulatory Area level.
40. **NOTING** that trade-offs will exist between IPHC Regulatory Areas for the same objective, the MSAB **AGREED** to a general objective to provide directed fishing yield, and to report performance metrics to evaluate variability and yield trade-offs within and between IPHC Regulatory Areas. Four performance metrics related to yield that will be reported are:
- median average proportion of TCEY in each IPHC Regulatory Area;
  - median minimum proportion of TCEY in each IPHC Regulatory Area;



- c) median average TCEY in each IPHC Regulatory Area;
- d) median minimum TCEY in each IPHC Regulatory Area.

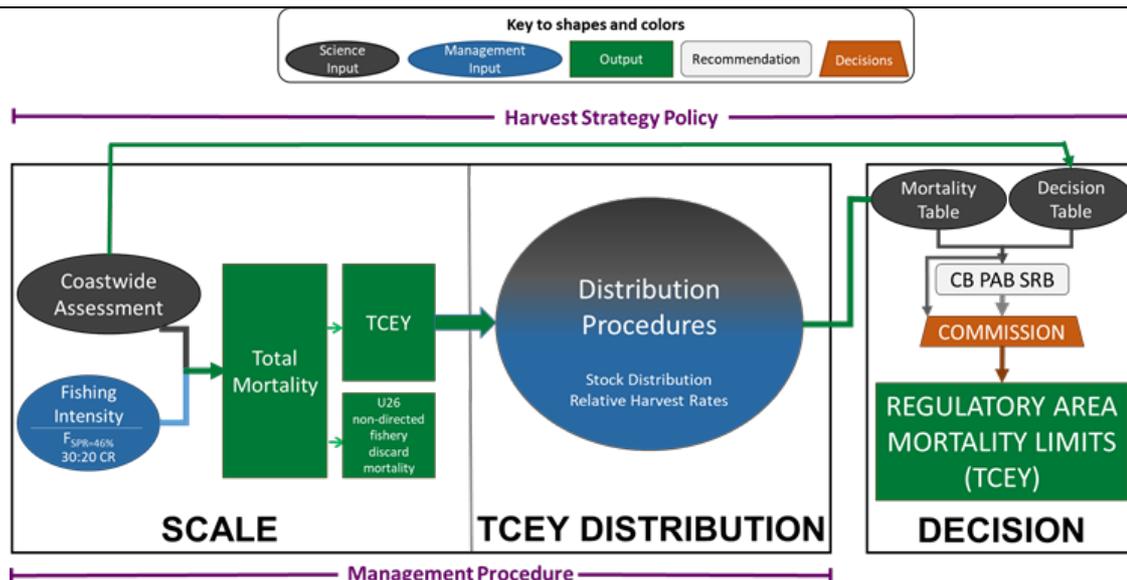
41. The MSAB **RECOMMENDED** the primary objectives and associated performance metrics detailed in [Appendix V](#) to be used for the evaluation of management procedures at MSAB015.
42. **NOTING** that objectives will be updated as management procedures are evaluated, the MSAB **AGREED** to pause discussion about primary objectives to facilitate evaluation of management procedures in 2020. New primary objectives will first be proposed in writing to the MSAB Co-Chairpersons and IPHC Secretariat where they will be reviewed for clarity, and potentially presented to the MSAB for inter-sessional comment.

#### 5.4 *Performance metrics for evaluation*

43. The MSAB **NOTED** that the IPHC Secretariat will report appropriate performance metrics for primary objectives, as well as additional metrics as needed to aid the evaluation of management procedures at MSAB015 and MSAB016.
44. The MSAB **AGREED** that:
- a) the type of constraint on the TCEY in the management procedure has different implications for the catch variability objectives. More specifically, a constraint of +/-15% maximum change in total mortality leads to lower probabilities that the annual change in the TCEY will exceed 15%, but a higher average annual change in the TCEY than the slow-up, fast-down constraint; and
  - b) sustained fishing intensities of SPR=40% will fail to satisfy the biomass target objective for management procedures without a catch constraint and some management procedures with catch constraints. A coastwide fishing of 43% is a precautionary buffer to allow for uncertainty given outcomes of distribution procedures.
45. The MSAB **NOTED** that changing the TCEY every third year (multi-annual setting of catch limits) met the primary objectives. However, this constraint has different properties in that there is no change in the TCEY for a three-year period followed by the possibility of a large change which leads to worse performance for probability that the annual change in any three years exceeds 15%.
46. **NOTING** the current progress on evaluating coastwide fishing intensity, the MSAB **RECOMMENDED** 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, and/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.

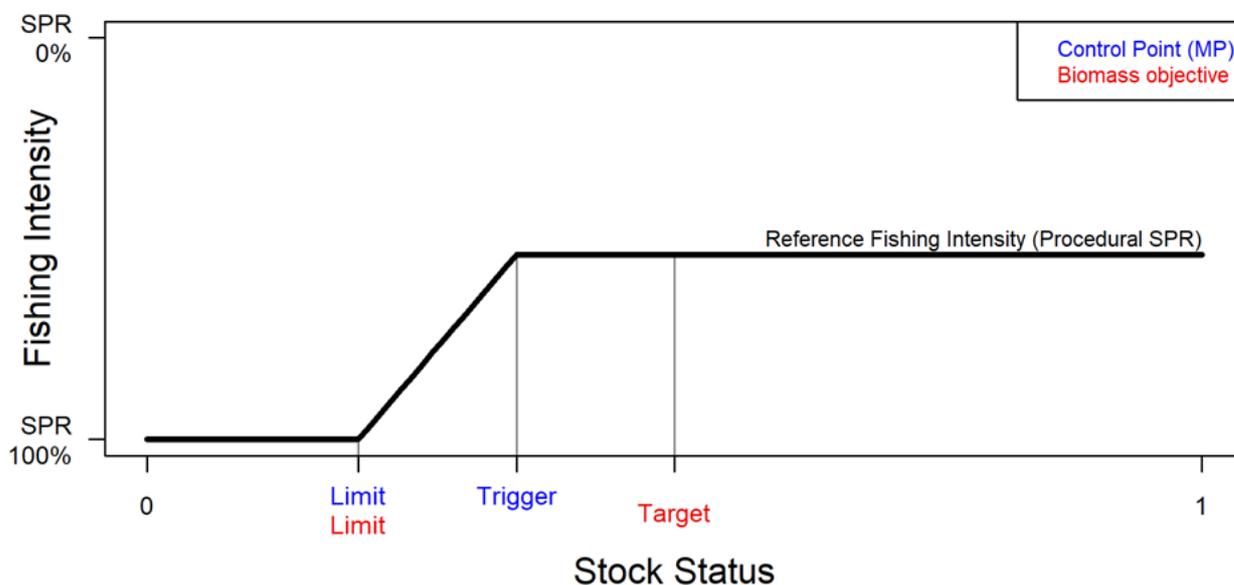
## 6. MANAGEMENT PROCEDURES TO DETERMINE THE TOTAL CONSTANT EXPLOITATION YIELD (TCEY) BY IPHC REGULATORY AREAS FOR PACIFIC HALIBUT FISHERIES

47. The MSAB **NOTED** paper IPHC-2019-MSAB014-07 which describes the coastwide scale and distribution components of the harvest strategy policy ([Fig. 1](#)), a framework for developing management procedures, and example management procedures.



**Figure 1.** An illustration of the current interim IPHC harvest strategy policy process showing the coastwide scale and TCEY distribution components that comprise the management procedure. The decision component is the Commission decision-making procedure, which considers inputs from many sources.

48. The MSAB **NOTED** that there is a difference between operational control points in the harvest control rule (Fig. 2) and biomass reference points used to define objectives, although they may be defined as the same value.



**Figure 2.** The harvest control rule showing the how the reference fishing intensity is adjusted, operational control points in the management procedure and how they related to reference points used in defining objectives.

### 6.1 Management procedures for coastwide scale

49. The MSAB **RECOMMENDED** that SPR values of 0.3, 0.34, 0.38, 0.40, 0.42, 0.46, and 0.50 with a 30:20 control rule be evaluated at MSAB015 along with constraints defined by a maximum change in the TCEY of 15%, a slow-up fast-down approach, and/or setting quotas every third year.



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**6.2 Management procedures for distributing the TCEY**

50. The MSAB **AGREED** that the distribution framework with the steps listed below is a useful method for developing management procedures to distribute the TCEY.
- determine a coastwide TCEY;
  - (optional) distribute the TCEY to Biological Regions or Management Zones;
  - distribute the TCEY to IPHC Regulatory Areas based on stock distribution, relative fishing intensities, allocation agreements, data, or other observations.
51. The MSAB **NOTED** that historical productivity differences between IPHC Regulatory Areas is one rationale for different relative harvest rates between IPHC Regulatory Areas.
52. The MSAB **NOTED** a presentation by the IPHC Secretariat to update estimates of productivity for each Biological Region (using a Yield-Per-Recruit analysis), which showed that productivity in 2018 appears to be similar among Biological Regions, except in 4B where the productivity was lower, suggesting a lower harvest rate for IPHC Regulatory Area 4B.
53. The MSAB **AGREED** on a number of candidate management procedures ([Table 1 in Appendix VI](#)) to be considered for evaluation. Various elements for distributing the TCEY to Biological Regions Management Zones, and/or IPHC Regulatory Areas, including relative harvest rates, abundance-based allocations, and minimum allocations. Management Zones are aggregated IPHC Regulatory Areas that do not necessarily align with Biological Regions.
54. The MSAB **NOTED** that some distribution procedures may change the coastwide TCEY associated with a particular reference fishing intensity ( $F_{SPR}$ ). In response, the IPHC Secretariat presented the idea of defining a buffer in the harvest control rule which would periodically allow for higher fishing intensities than the reference SPR. A potential limit of the buffer could be defined as the  $SPR_{MSY}$ .
55. The MSAB **REQUESTED** that a number of elements in distribution management procedures be included for evaluation at MSAB015:
- A coastwide constraint using a slow-up, fast-down approach with a maximum change in the TCEY of 15%;
  - evaluating different relative harvest rates across IPHC Regulatory Areas or Biological Regions;
  - distributing the TCEY directly to IPHC Regulatory Area;
  - A fixed shares concept for all or some IPHC Regulatory Areas, Biological Regions, or Management Zones with options to distribute the TCEY to the areas without a fixed share. The determination of these shares may be fixed or varying over time; and
  - A maximum fishing intensity defined by an SPR of 36% to act as a buffer when distributing the TCEY to IPHC Regulatory Areas.
56. The MSAB **RECOMMENDED** that the management procedures listed in [Table 2 in Appendix VI](#) be evaluated at MSAB015.
57. The MSAB **NOTED** additional elements for distribution procedures to consider as sensitivities when developing management procedures for evaluation at MSAB015 as follows:
- a constraint applied to the TCEY for each IPHC Regulatory Area using a slow-up, fast-down approach with a maximum change in the TCEY of 15%;
  - using O32 estimates of stock distribution or “all sizes” estimates of stock distribution from the modelled survey results;
  - evaluating different relative harvest rates across IPHC Regulatory Areas or Biological Regions (e.g. harvest rates for Biological Region 2, IPHC Regulatory Areas 2A and/or 4CDE);



- d) calculating shares across Biological Regions, Management Zones, or IPHC Regulatory Areas using approaches that blend multiple sources of information (e.g., using historical TCEYs and stock distribution results for all IPHC Regulatory Area, a 5-year window of estimated stock distribution, etc.);
- e) the importance the order of applying elements in the distribution procedure when limiting the maximum SPR (i.e. using a buffer).

58. The MSAB **NOTED** additional elements for distribution procedures to consider when developing management procedures for evaluation at MSAB016 as follows:

- a) a constraint applied to the TCEY for each IPHC Regulatory Area using a slow-up, fast-down approach;
- b) a constraint applied to the TCEY for each IPHC Regulatory Area implementing a maximum change in the TCEY of 15%;
- c) a maximum fishing intensity defined by an SPR of 40% to act as a buffer when distributing the TCEY to IPHC Regulatory Areas;
- d) adjusting relative harvest rates to reflect current stock productivity (note that this will be explored before MSAB015);
- e) using trends in fishery CPUE to adjust allocation percentages by IPHC Regulatory Area (note that this will be explored before MSAB015);
- f) additional approaches to first distribute the TCEY to Biological Region or Management Zone.

## 7. MSAB PROGRAM OF WORK (2019-23)

59. The MSAB **NOTED** paper IPHC-2019-MSAB014-09 which provided an update on the 5-year MSE Program of Work (2019-23), given current Commission directives.
60. The MSAB **NOTED** the delivery dates of January 2020 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.
61. The MSAB **NOTED** the Program of Work provided at [Appendix VII](#).

## 8. OTHER BUSINESS

### 8.1 IPHC meetings calendar (2019-21)

62. The MSAB **NOTED** the current 3-year meeting calendar and that the 15<sup>th</sup> Session of the MSAB will be held in Courtenay, or Nanaimo, BC, Canada from 11-14 May 2020.

## 9. REVIEW OF THE DRAFT AND ADOPTION OF THE REPORT OF THE 14<sup>TH</sup> SESSION OF THE IPHC MANAGEMENT STRATEGY ADVISORY BOARD (MSAB014)

63. The report of the 14<sup>th</sup> Session of the IPHC Management Strategy Advisory Board (IPHC-2019-MSAB014-R) was **ADOPTED** on 24 October 2019, including the consolidated set of recommendations and/or requests arising from MSAB014, provided at [Appendix VIII](#).

**APPENDIX I**

**LIST OF PARTICIPANTS FOR THE 14<sup>TH</sup> SESSION OF THE IPHC MANAGEMENT STRATEGY  
ADVISORY BOARD (MSAB014)**

**Officers**

Co-Chairperson (Canada)	Co-Chairperson (United States of America)
Mr Adam <b>Keizer</b> : <a href="mailto:adam.keizer@dfo-mpo.gc.ca">adam.keizer@dfo-mpo.gc.ca</a>	Dr Carey <b>McGilliard</b> : <a href="mailto:Carey.McGilliard@noaa.gov">Carey.McGilliard@noaa.gov</a>

**MSAB Members**

Canada	United States of America
Mr Chuck <b>Ashcroft</b> : <a href="mailto:chuckashcroft@telus.net">chuckashcroft@telus.net</a>	Mr Forrest <b>Braden</b> : <a href="mailto:forrest@seagoalaska.org">forrest@seagoalaska.org</a>
Ms Ann-Marie <b>Huang</b> : <a href="mailto:Ann-Marie.Huang@dfo-mpo.gc.ca">Ann-Marie.Huang@dfo-mpo.gc.ca</a>	Ms Michele <b>Culver</b> : <a href="mailto:Michele.Culver@dfw.wa.gov">Michele.Culver@dfw.wa.gov</a>
Mr Adam <b>Keizer</b> : <a href="mailto:adam.keizer@dfo-mpo.gc.ca">adam.keizer@dfo-mpo.gc.ca</a>	Ms Angel <b>Drobnica</b> : <a href="mailto:adrobnica@apicda.com">adrobnica@apicda.com</a>
Mr Jim <b>Lane</b> : <a href="mailto:jim.lane@nuuchahnulth.org">jim.lane@nuuchahnulth.org</a>	Mr Dan <b>Falvey</b> : <a href="mailto:myriadfisheries@gmail.com">myriadfisheries@gmail.com</a>
Mr Chris <b>Sporer</b> : <a href="mailto:chris.sporer@phma.ca">chris.sporer@phma.ca</a>	Mr James <b>Johnson</b> : <a href="mailto:JimJ@glacierfish.com">JimJ@glacierfish.com</a>
	Mr Jeff <b>Kauffman</b> : <a href="mailto:jeff@spfishco.com">jeff@spfishco.com</a>
	Mr Tom <b>Marking</b> : <a href="mailto:tmmarking@gmail.com">tmmarking@gmail.com</a>
	Mr Scott <b>Mazzone</b> : <a href="mailto:smazzone@quinault.org">smazzone@quinault.org</a>
	Dr Carey <b>McGilliard</b> : <a href="mailto:carey.McGilliard@noaa.gov">carey.McGilliard@noaa.gov</a>
	Mr Joseph <b>Morelli</b> : <a href="mailto:jmorelli@spsales.com">jmorelli@spsales.com</a>
	Mr Per <b>Odegaard</b> : <a href="mailto:vanseeodegaard@hotmail.com">vanseeodegaard@hotmail.com</a>
	Ms Sarah <b>Webster</b> : <a href="mailto:sarah.webster@alaska.gov">sarah.webster@alaska.gov</a>
Absentees	Absentees
Mr Robert <b>Hauknes</b> : <a href="mailto:robert_hauknes@hotmail.com">robert_hauknes@hotmail.com</a>	Mr Glenn <b>Merrill</b> : <a href="mailto:glenn.merrill@noaa.gov">glenn.merrill@noaa.gov</a>
Mr Brad <b>Mirau</b> : <a href="mailto:brad@aerotrading.ca">brad@aerotrading.ca</a>	Ms Peggy <b>Parker</b> : <a href="mailto:peggyparker616@gmail.com">peggyparker616@gmail.com</a>

**Commissioners**

Canada	United States of America
Mr Peter <b>DeGreef</b> : <a href="mailto:peter.degreef@iphc.int">peter.degreef@iphc.int</a>	Mr Bob <b>Alverson</b> : <a href="mailto:Robert.alverson@iphc.int">Robert.alverson@iphc.int</a>

**Observers**

Canada	United States of America
Dr Luke <b>Rogers</b> (DFO)	Ms Maia <b>Sosa-Kapur</b> (UW)

**IPHC Secretariat**

Name	Position and email
Dr David <b>Wilson</b>	Executive Director, <a href="mailto:david.wilson@iphc.int">david.wilson@iphc.int</a>
Mr Stephen <b>Keith</b>	Assistant Director, <a href="mailto:stephen.keith@iphc.int">stephen.keith@iphc.int</a>
Dr Piera <b>Carpi</b>	MSE Researcher, <a href="mailto:piera.carpi@iphc.int">piera.carpi@iphc.int</a>
Dr Allan <b>Hicks</b>	Quantitative Scientist, <a href="mailto:allan.hicks@iphc.int">allan.hicks@iphc.int</a>
Dr Ian <b>Stewart</b>	Quantitative Scientist, <a href="mailto:ian.stewart@iphc.int">ian.stewart@iphc.int</a>



**APPENDIX II**  
**AGENDA FOR THE 14<sup>TH</sup> SESSION OF THE IPHC MANAGEMENT STRATEGY ADVISORY BOARD**  
**(MSAB014)**

**Date:** 21-24 October 2019

**Location:** Seattle, Washington, U.S.A.

**Venue:** IPHC Seattle Office

**Time:** 21<sup>st</sup>: 12:00-17:00; 22<sup>nd</sup>-24<sup>th</sup> 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 13<sup>th</sup> Session of the MSAB (MSAB013)
    - 3.3. Review of the outcomes of the 15<sup>th</sup> Session of the Scientific Review Board (SRB015)
    - 3.4. Brief review of the two-year Program of Work
  - 4. DEVELOPMENT OF A FRAMEWORK TO INVESTIGATE FISHING INTENSITY AND DISTRIBUTING THE TOTAL CONSTANT EXPLOITATION YIELD (TCEY) FOR PACIFIC HALIBUT FISHERIES**
    - 4.1. Review the framework to investigate distributing the TCEY among IPHC Regulatory Areas
    - 4.2. Development of a multi-area operating model
  - 5. GOALS, OBJECTIVES, AND PERFORMANCE METRICS FOR THE IPHC MSE PROCESS**
    - 5.1. A review of the coastwide goals and objectives of the IPHC MSE process
    - 5.2. An update from the ad hoc working group tasked to refine goal and objectives related to distribution
    - 5.3. Identification of goals and objectives related to distributing the TCEY
    - 5.4. Performance metrics for evaluation
  - 6. MANAGEMENT PROCEDURES TO DETERMINE THE TOTAL CONSTANT EXPLOITATION YIELD (TCEY) BY IPHC REGULATORY AREAS FOR PACIFIC HALIBUT FISHERIES**
    - 6.1. Management procedures for coastwide scale
    - 6.2. Management procedures for distributing the TCEY
  - 7. MSAB PROGRAM OF WORK (2019-23)**
  - 8. OTHER BUSINESS**
    - 8.1. IPHC meetings calendar (2019-21)
  - 9. REVIEW OF THE DRAFT AND ADOPTION OF THE REPORT OF THE 14<sup>th</sup> SESSION OF THE IPHC MANAGEMENT STRATEGY ADVISORY BOARD (MSAB014)**
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**APPENDIX III**

**LIST OF DOCUMENTS FOR THE 14<sup>TH</sup> SESSION OF THE MANAGEMENT STRATEGY ADVISORY BOARD (MSAB014)**

<b>Document</b>	<b>Title</b>	<b>Availability</b>
IPHC-2019-MSAB014-01	Draft: Agenda & Schedule for the 14 <sup>th</sup> Session of the IPHC Management Strategy Advisory Board (MSAB014)	✓ 22 Jul 2019
IPHC-2019-MSAB014-02	List of Documents for the 14 <sup>th</sup> Session of the IPHC Management Strategy Advisory Board (MSAB014)	✓ 04 Sept 2019 ✓ 20 Sept 2019 ✓ 15 Oct 2019
IPHC-2019-MSAB014-03	MSAB Membership (D. Wilson)	✓ 20 Sept 2019
IPHC-2019-MSAB014-04	Update on the actions arising from the 13 <sup>th</sup> Session of the MSAB (MSAB013) (A. Hicks)	✓ 20 Sept 2019
IPHC-2019-MSAB014-05	Outcomes of the 15 <sup>th</sup> Session of the IPHC Scientific Review Board (SRB015) (IPHC Secretariat)	✓ 15 Oct 2019
IPHC-2019-MSAB014-06	Outcomes of the 95 <sup>th</sup> Session of the IPHC Annual meeting (AM095) (D. Wilson & A. Hicks)	✓ 20 Sept 2019
IPHC-2019-MSAB014-07	Objectives and management procedures for the IPHC Management Strategy Evaluation (MSE) (A. Hicks, P. Carpi, & I. Stewart)	✓ 20 Sept 2019
IPHC-2019-MSAB014-08	Development of a framework to investigate fishing intensity and distributing the total constant exploitation yield (TCEY) for Pacific halibut fisheries (A. Hicks, S. Berukoff, P. Carpi)	✓ 20 Sept 2019
IPHC-2019-MSAB014-09	IPHC Secretariat Program of Work for MSAB Related Activities 2019-23 (A. Hicks, P. Carpi, S. Berukoff)	✓ 20 Sept 2019
<b><i>Information papers</i></b>		
IPHC-2019-MSAB014-INF01	Ad-hoc Working Group ideas to Refine Goals, Objectives, and Performance Metrics for the IPHC Management Strategy Evaluation (MSE) (A. Hicks, P. Carpi, MSAB Ad-Hoc Working Group)	✓ 20 Sept 2019
IPHC-2019-MSAB014-INF02	Technical details of the IPHC MSE framework (A. Hicks, P. Carpi, S. Berukoff)	✓ 20 Sept 2019



**APPENDIX IV  
MSAB MEMBERSHIP**

<b>Membership category</b>	<b>Member</b>	<b>Canada</b>	<b>U.S.A.</b>	<b>Current Term commencement</b>	<b>Current Term expiration</b>
<b>Commercial harvesters (6-8)</b>					
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
<b>First Nations/ Tribal fisheries (2-4)</b>					
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	Vacant		USA Treaty Tribes		
<b>Government Agencies (4-8)</b>					
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	Baker, Rachel		NPFMC	23-Oct-19	22-Oct-21
8	Hasbrouck, James		ADFG	12-Oct-18	11-Oct-22
<b>Processors (2-4)</b>					
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



Membership category	Member	Canada	U.S.A.	Current Term commencement	Current Term expiration
<b>Recreational/ Sport fisheries (2-4)</b>					
<b>1</b>	Ashcroft, Chuck	CDN Sport Fishing Advisory Board		17-Apr-19	16-Apr-23
<b>2</b>	Vacant	CDN Sportfishing			
<b>3</b>	Marking, Tom		USA Sportfishing (CA)	9-May-19	08-May-23
<b>4</b>	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
1.1. KEEP FEMALE SPAWNING BIOMASS ABOVE A LIMIT TO AVOID CRITICAL STOCK SIZES AND CONSERVE SPATIAL POPULATION STRUCTURE	Maintain a 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	$P(SB < SB_{Lim})$
	Maintain a defined minimum proportion of female spawning biomass in each Biological Region	$p_{SB,2} > 5\%$ $p_{SB,3} > 33\%$ $p_{SB,2} > 10\%$ $p_{SB,2} > 2\%$	Long-term	0.05	$P(p_{SB,R} < p_{SB,R,min})$
2.1 MAINTAIN SPAWNING BIOMASS AROUND A LEVEL THAT OPTIMISES FISHING ACTIVITIES	Maintain the coastwide female spawning biomass above a biomass target reference point at least 50% of the time	$SB < \text{Spawning Biomass Target } (SB_{Targ})$ $SB_{Targ} = SB_{36\%}$ unfished spawning biomass	Long-term	0.50	$P(SB < SB_{Targ})$
2.2. LIMIT CATCH VARIABILITY	Limit annual changes in the coastwide TCEY	Annual Change (AC) > 15% in any 3 years	Short-term		$P(AC_3 > 15\%)$
		Median coastwide Average Annual Variability (AAV)	Short-term		Median AAV
	Limit annual changes in the Regulatory Area TCEY	Annual Change (AC) > 15% in any 3 years	Short-term		$P(AC_3 > 15\%)$
		Average AAV by Regulatory Area (AAV <sub>A</sub> )	Short-term		Median AAV <sub>A</sub>
2.3. PROVIDE DIRECTED FISHING YIELD	Optimize average coastwide TCEY	Median coastwide TCEY	Short-term		Median $\overline{TCEY}$
	Optimize TCEY among Regulatory Areas	Median TCEY <sub>A</sub>	Short-term		Median $\overline{TCEY_A}$
	Optimize the percentage of the coastwide TCEY among Regulatory Areas	Median %TCEY <sub>A</sub>	Short-term		Median $\left(\frac{TCEY_A}{TCEY}\right)$
	Maintain a minimum TCEY for each Regulatory Area	Minimum TCEY <sub>A</sub>	Short-term		Median Min(TCEY)
	Maintain a percentage of the coastwide TCEY for each Regulatory Area	Minimum %TCEY <sub>A</sub>	Short-term		Median Min(%TCEY)



**APPENDIX VI**  
**PROPOSED AND RECOMMENDED MANAGEMENT PROCEDURES**

**Table 1.** Management procedures proposed by MSAB members.

Proposed MP	Coastwide	Regional	IPHC Regulatory Area
Commission Interim MP	SPR 30:20		<ul style="list-style-type: none"> <li>• O32 stock distribution</li> <li>• Proportional Relative harvest rates (starting with 1.0 for 2-3A, 0.75 for 3B-4) relative to below</li> <li>• 1.65 Milbs floor in 2A (para 69c <a href="#">AM095-R</a>)</li> <li>• Formula percentage for 2B (para 69b <a href="#">AM095-R</a>)</li> </ul>
MP 1	SPR 30:20 Max FI = 36% 15% max change		<ul style="list-style-type: none"> <li>• 15% maximum change</li> <li>• O32 stock distribution with 3 year weighted average (50:30:20)</li> <li>• Relative HR (1 for 2-3A, 0.75 for 3B-4)</li> </ul>
MP 2	SPR 30:20 Max FI = 36% 15% max change		<ul style="list-style-type: none"> <li>• 15% maximum change</li> <li>• O32 stock distribution with 3 year weighted average (50:30:20)</li> <li>• Relative HR using YPR-type analysis every 5 years</li> </ul>
MP 3	SPR 30:20 Max FI =36% 15% max change		<ul style="list-style-type: none"> <li>• 15% maximum change</li> <li>• O32 stock distribution with 3 year weighted average (50:30:20)</li> <li>• Relative HR (1 for 2-3A, 0.75 for 3B-4)</li> <li>• 3-year average trend in CPUE informs an up to 5% change in allocation percentage if allowed by buffer after above points</li> </ul>
MP 4	SPR 30:20 Max FI =36% 15% max change		<ul style="list-style-type: none"> <li>• 15% maximum change</li> <li>• O32 stock distribution with 3 year weighted average (50:30:20)</li> <li>• Adjust relative harvest rates every 5 years using productivity analyses</li> <li>• 3-year average trend in CPUE informs an up to 5% change in allocation percentage if allowed by buffer after above points</li> </ul>
MP 5	SPR 30:20 SUFDD 15% max change		<ul style="list-style-type: none"> <li>• % of TCEY = 70% of 5-year adopted TCEY (moving window starting with 2015–2019) + 30% O32 modelled survey stock distribution</li> </ul>
MP 6	SPR 30:20	National Zones (20% to 2B, 80% to other)	<ul style="list-style-type: none"> <li>• Other Reg Areas distributed using               <ul style="list-style-type: none"> <li>○ the modelled O32 stock distribution</li> <li>○ Proportional Relative harvest rates (starting with 1.0 for 2-3A, 0.75 for 3B-4) relative to Regional allocation</li> </ul> </li> </ul>



Proposed MP	Coastwide	Regional	IPHC Regulatory Area
MP 7	SPR 30:20 15% max change	National Zones (20% to 2B, 80% to other)	<ul style="list-style-type: none"> <li>Other Reg Areas distributed using               <ul style="list-style-type: none"> <li>the modelled O32 stock distribution</li> <li>Proportional Relative harvest rates (starting with 1.0 for 2-3A, 0.75 for 3B-4) relative to Regional allocation</li> </ul> </li> </ul>
MP 8	SPR 30:20 15% max change	<ul style="list-style-type: none"> <li>Trends in the all sizes stock distribution averaged over recent 3 years</li> <li>Relative harvest rates based on uncertainty in bycatch (TBD)</li> </ul>	<ul style="list-style-type: none"> <li>Proportion of adopted TCEYs from 2013–2017</li> </ul>
MP 9	SPR 30:20 15% max change		<ul style="list-style-type: none"> <li>O32 stock distribution</li> <li>Proportional Relative harvest rates (starting with 1.0 for 2-3A, 0.75 for 3B-4) relative to below</li> <li>1.65 Mlbs floor in 2A (para 69c AM095-R)</li> <li>Formula percentage for 2B (para 69b AM095-R)</li> </ul>
MP 10	SPR 30:20	<ul style="list-style-type: none"> <li>Relative harvest rates               <ul style="list-style-type: none"> <li>Reg 2 = 1.25</li> <li>Reg 3 = combine 3AB (TBD)</li> <li>Reg 4 = 0.75</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>All sizes stock distribution</li> </ul>
MP 11	SPR 30:20	<ul style="list-style-type: none"> <li>Relative harvest rates               <ul style="list-style-type: none"> <li>Reg 2 = 1.25</li> <li>Reg 3 = combine 3AB (TBD)</li> <li>Reg 4ACDE = 1.0</li> <li>Reg 4B = 0.75</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>All sizes stock distribution</li> </ul>
MP 12	SPR 30:20	<ul style="list-style-type: none"> <li>Zone 2AB = status quo 2B formula + 4%</li> <li>All sizes stock distribution for zones 2C3A, 3B4A, 4B, 4CDE</li> <li>Relative harvest rates of 1.0, 1.0, 0.75, 0.75, 0.75</li> </ul>	<ul style="list-style-type: none"> <li>TBD</li> </ul>
MP 13	SPR 30:20	<ul style="list-style-type: none"> <li>Zone 2AB = status quo 2B formula + 4%</li> <li>All sizes stock distribution for zones 2C3A, 3B4A, 4B, 4CDE</li> <li>Relative harvest rates of 1.0, 0.75, 0.75, 0.75, 0.75</li> </ul>	<ul style="list-style-type: none"> <li>TBD</li> </ul>
MP 14	SPR 30:20		<ul style="list-style-type: none"> <li>O32 stock distribution</li> <li>Proportional Relative harvest rates (starting with 1.0 for 2-3A, 0.75 for 3B-4) relative to below</li> <li>1.65 Mlbs floor in 2A (para 69c AM095-R)</li> <li>Formula percentage for 2B (para 69b AM095-R)</li> </ul>



Proposed MP	Coastwide	Regional	IPHC Regulatory Area
MP 15	SPR 30:20		<ul style="list-style-type: none"> <li>• O32 stock distribution</li> <li>• Relative harvest rates not applied</li> <li>• 1.65 Mlbs floor in 2A (para 69c AM095-R)</li> <li>• Formula percentage for 2B (para 69b AM095-R)</li> </ul>
MP16	SPR 30:20		<ul style="list-style-type: none"> <li>• O32 stock distribution (fixed from 2015-2019 initially, adjusted every 5 years)</li> </ul>
MP17	SPR 30:20	National Zones (2B and Other): O32 stock distribution (over 5 year periods)	<ul style="list-style-type: none"> <li>• O32 stock distribution (fixed from 2015-2019 initially, adjusted every 5 years)</li> </ul>



**Table 2.** Recommended management procedures for evaluation at MSAB015.

MP	Coastwide	Regional	IPHC Regulatory Area
MP A	SPR 30:20		<ul style="list-style-type: none"> <li>O32 stock distribution</li> <li>Proportional Relative harvest rates (starting with 1.0 for 2-3A, 0.75 for 3B-4) relative to below</li> <li>1.65 Mlbs floor in 2A (para 69c AM095-R)</li> <li>Formula percentage for 2B (para 69b AM095-R)</li> </ul>
MP B	SPR 30:20 Slow-up, fast-down MaxChange15%		<ul style="list-style-type: none"> <li>O32 stock distribution</li> <li>Proportional Relative harvest rates (starting with 1.0 for 2-3A, 0.75 for 3B-4) relative to below</li> <li>1.65 Mlbs floor in 2A (para 69c AM095-R)</li> <li>Formula percentage for 2B (para 69b AM095-R)</li> </ul>
MP C	SPR 30:20		<ul style="list-style-type: none"> <li>O32 stock distribution</li> <li>Relative harvest rates (1.0 for 2-3A, 0.75 for 3B-4)</li> </ul>
MP D	SPR 30:20 Slow-up, fast-down MaxChange15%		<ul style="list-style-type: none"> <li>O32 stock distribution</li> <li>Relative harvest rates (1.0 for 2-3A, 0.75 for 3B-4)</li> </ul>
MP E	SPR 30:20		<ul style="list-style-type: none"> <li>O32 stock distribution</li> <li>Relative harvest rates (0.75 for 4B, 1 for others)</li> <li></li> </ul>
MP F	SPR 30:20	Biological Regions, O32 stock distribution Rel HRs: R2=1, R3=1, R4=0.75, R4B=0.75	<ul style="list-style-type: none"> <li>O32 stock distribution</li> <li>Relative harvest rates not applied</li> <li>1.65 Mlbs floor in 2A (para 69c AM095-R)</li> <li>Formula percentage for 2B (para 69b AM095-R)</li> </ul>
MP G	SPR 30:20	Biological Regions, O32 stock distribution Rel HRs: R2=1, R3=1, R4=1, R4B=0.75	<ul style="list-style-type: none"> <li>O32 stock distribution</li> <li>Relative harvest rates not applied</li> <li>1.65 Mlbs floor in 2A (para 69c AM095-R)</li> <li>Formula percentage for 2B (para 69b AM095-R)</li> </ul>
MP H	SPR 30:20 Max FI (36%)		<p>First</p> <ul style="list-style-type: none"> <li>O32 stock distribution</li> <li>Relative harvest rates (1.0 for 2-3A, 0.75 for 3B-4)</li> </ul> <p>Second within buffer</p> <ul style="list-style-type: none"> <li>1.65 Mlbs floor in 2A (para 69c AM095-R)</li> <li>Formula percentage for 2B (para 69b AM095-R)</li> </ul>
MP I	SPR 30:20		<ul style="list-style-type: none"> <li>5-year shares determined from 5-year O32 stock distribution (vary over time)</li> </ul>
MP J	SPR 30:20	National Shares: 20% to 2B, 80% to other	<ul style="list-style-type: none"> <li>O32 stock distribution</li> </ul>



**APPENDIX VII**  
**MSE PROGRAM OF WORK (2019-21)**

<b>13<sup>th</sup> Session of the IPHC MSAB (MSAB013) - May 2019</b>	<b>Status</b>
Evaluate additional Scale management procedures	Completed
Review goals and objectives	Completed
Spatial model complexity	Completed
Identify management procedures (Scale & Distribution)	Completed
Review Framework	Completed
<b>14<sup>th</sup> Session of the IPHC MSAB (MSAB014) - October 2019</b>	
Review Framework	Completed
Review multi-area model development	Completed
Spatial Model Complexity	Completed
Define Goals and Objectives (Scale & Distribution)	Completed
Identify management procedures (Scale & Distribution)	Completed
<b>96<sup>th</sup> Session of the IPHC Annual Meeting (AM096) – January 2020</b>	
Update on progress	
<b>15<sup>th</sup> Session of the IPHC MSAB (MSAB015) - May 2020</b>	
Review goals and objectives (Scale & Distribution)	
Review simulation framework	
Review multi-area model	
Review preliminary results	
Identify management procedures (Scale & Distribution)	
<b>16<sup>th</sup> Session of the IPHC MSAB (MSAB016) - October 2020</b>	
Review final results	
Provide recommendations on management procedures	
<b>97<sup>th</sup> Session of the IPHC Annual Meeting (AM097) – January 2021</b>	
Presentation of complete MSE product to the Commission	
Recommendations on Scale and Distribution management procedures	



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**APPENDIX VIII**

**CONSOLIDATED SET OF RECOMMENDATIONS AND REQUESTS OF THE 14<sup>TH</sup> SESSION OF THE  
IPHC MANAGEMENT STRATEGY ADVISORY BOARD (MSAB014)**

***RECOMMENDATIONS***

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

MSAB014–Rec.01 ([para. 34](#)) The MSAB **RECOMMENDED** a coastwide fishery objective, in response to a request from the Commissioners, to maintain the spawning biomass above a target reference point of  $RSB_{36\%}$ , 50% of the time over the long-term.

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

MSAB014–Rec.02 ([para. 41](#)) The MSAB **RECOMMENDED** the primary objectives and associated performance metrics detailed in [Appendix V](#) to be used for the evaluation of management procedures at MSAB015.

***Performance metrics for evaluation***

MSAB014–Rec.03 ([para. 46](#)) **NOTING** the current progress on evaluating coastwide fishing intensity, the MSAB **RECOMMENDED** 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, and/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.

***Management procedures for coastwide scale***

MSAB014–Rec.04 ([para. 49](#)) The MSAB **RECOMMENDED** that SPR values of 0.3, 0.34, 0.38, 0.40, 0.42, 0.46, and 0.50 with a 30:20 control rule be evaluated at MSAB015 along with constraints defined by a maximum change in the TCEY of 15%, a slow-up fast-down approach, and/or setting quotas every third year.

***Management procedures for distributing the TCEY***

MSAB014–Rec.05 ([para. 56](#)) The MSAB **RECOMMENDED** that the management procedures listed in [Table 2 in Appendix VI](#) be evaluated at MSAB015.

***REQUESTS***

***Review of the outcomes of the 14<sup>th</sup> Session of the IPHC Scientific Review Board (SRB014)***

MSAB014–Req.01 ([para. 14](#)) The MSAB **REQUESTED** further clarification from the SRB on paragraphs 40–41 of IPHC-2019-SRB015-R:

SRB015 (para. 40) “*The SRB NOTED the proposed objective to have annual mortality limits related to local abundances. While this could provide transparency from a policy perspective, it ignores the biological realities of movement and other processes that remain poorly understood at both coastwide and Regulatory Area scales.*”



SRB015–Rec.05 (para. 41) “*The SRB RECOMMENDED that if the original objective to have annual mortality limits related to local abundances was of broad interest to the Commission, then candidate management procedures be developed and tested in which regional mortality limits are set annually in proportion to modelled survey abundance trends by IPHC Regulatory Area (noting that splitting regions into Regulatory Areas would require assumptions about within-region abundance proportions).*”

***Management procedures for distributing the TCEY***

MSAB014–Req.02 ([para. 55](#)) The MSAB **REQUESTED** that a number of elements in distribution management procedures be included for evaluation at MSAB015:

- a) A coastwide constraint using a slow-up, fast-down approach with a maximum change in the TCEY of 15%;
- b) evaluating different relative harvest rates across IPHC Regulatory Areas or Biological Regions;
- c) distributing the TCEY directly to IPHC Regulatory Area;
- d) A fixed shares concept for all or some IPHC Regulatory Areas, Biological Regions, or Management Zones with options to distribute the TCEY to the areas without a fixed share. The determination of these shares may be fixed or varying over time; and
- e) A maximum fishing intensity defined by an SPR of 36% to act as a buffer when distributing the TCEY to IPHC Regulatory Areas.