INTERNATIONAL PACIFIC
HALIBUT COMMISSION

IPHC–2026–MSAB022–00
Last Update: 15 April 2026

22nd Session of the IPHC Management Strategy Advisory Board (MSAB022) – *Compendium of meeting documents*

12-14 May 2026, Electronic

Commissioners

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IPHC-2026-MSAB022-01

Last updated: 15 April 2026

DRAFT: AGENDA AND SCHEDULE FOR THE 22nd SESSION OF THE IPHC MANAGEMENT STRATEGY ADVISORY BOARD (MSAB022)

Dates: 12-14 May 2026
Location: Online/electronic
Link: TBD
Time (PDT): 12th = 13:00-17:00; 13th = 10:00-17:00; 14th = 10:00-16:00
Co-Chairpersons: Ms Gwyn Mason (Canada); Dr Pete Hulson (USA)

Notes:

- ***Document deadline**: 12 April 2026 (30 days prior to the opening of the Session)*

1. OPENING OF THE SESSION

2. ADOPTION OF THE AGENDA AND ARRANGEMENTS FOR THE SESSION

2.1. Adoption of the agenda

- ➢ *IPHC-2026-MSAB022-01: Agenda & Schedule for the 22nd Session of the IPHC Management Strategy Advisory Board (MSAB022)*
- ➢ *IPHC-2026-MSAB022-02: List of Documents for the 22nd Session of the IPHC Management Strategy Advisory Board (MSAB022)*

2.2. Election of co-chairpersons

3. IPHC PROCESS

3.1. MSAB Membership

- ➢ *IPHC-2026-MSAB022-03: MSAB Membership (IPHC Secretariat)*

3.2. Update on the actions arising from MSAB in 2025

- ➢ *IPHC-2026-MSAB022-04: Update on the actions arising from the 21st Session of the MSAB (MSAB021) (A. Hicks)*
- ➢ *IPHC-2026-MSAB022-INF01: Outcomes of the 2025 Informational Meeting of the Management Strategy Advisory Board*

3.3. Outcomes of the 102nd Session of the IPHC Annual Meeting (AM102)

- ➢ *IPHC-2026-MSAB022-05: Outcomes of the 102nd Session of the IPHC Annual Meeting (AM102) (A. Hicks)*

4. MANAGEMENT STRATEGY EVALUATION PROGRAM OF WORK (2026–2027)

4.1. Update on the IPHC MSE Program of Work for 2026

- ➢ *IPHC-2026-MSAB022-06: Updates to the IPHC MSE Program of Work for 2026 and a review of coastwide management procedures (A. Hicks & I. Stewart)*

4.2. Development of a Program of Work for 2026–2027

- ➢ *IPHC-2026-MSAB022-07: Considerations for the Management Strategy Evaluation Program of Work for 2026–2027 (A. Hicks & I. Stewart)*

5. OTHER BUSINESS

6. REVIEW OF THE DRAFT AND ADOPTION OF THE REPORT OF THE 22nd SESSION OF THE IPHC MANAGEMENT STRATEGY ADVISORY BOARD (MSAB022)

Tuesday 12 May 2026		
Time (PDT)	**Agenda item**	**Lead (support)**
13:00-13:10	**1. Opening of the Session**	Co-Chairperson & Secretariat
13:10-13:30	**2. Adoption of the agenda and arrangements for the Session** 2.1. Adoption of the agenda 2.2. Election of co-chairpersons	Co-Chairpersons
13:30-14:00	**3. IPHC Process** 3.1. MSAB Membership 3.2. Update on the actions arising from the MSAB in 2025 3.3. Outcomes of the 102nd Session of the IPHC Annual Meeting (AM102)	Secretariat Secretariat A. Hicks A. Hicks
14:00-15:00	**4. Management Strategy Evaluation Program of Work (2026–2027)** 4.1. Update on the IPHC MSE Program of Work for 2026	A. Hicks
15:00-15:15	Break	
15:15-15:45	**4. Management Strategy Evaluation Program of Work (2026–2027)** 4.1. Update on the IPHC MSE Program of Work for 2026 (continued)	A. Hicks
15:45-16:00	Review of Day 1	Co-chairpersons
16:00-17:00	MSAB Drafting Session	MSAB

Wednesday 13 May 2026		
Time (PDT)	**Agenda item**	**Lead (support)**
10:00-10:30	Review of Day 1 and discussion of draft report	Co-Chairpersons
10:30-11:15	**4. Management Strategy Evaluation Program of Work (2026–2027)** 4.1. Update on the IPHC MSE Program of Work for 2026 (continued)	A. Hicks
11:15-11:30	Break	
11:30-12:30	**4. Management Strategy Evaluation Program of Work (2026-2027)** 4.2. Development of a Program of Work for 2026-2027	A. Hicks
12:30-13:30	Lunch	
13:30-14:45	**4. Management Strategy Evaluation Program of Work (2026-2027)** 4.2. Development of a Program of Work for 2026-2027 (continued)	A. Hicks
14:45-15:00	Break	
15:00-15:30	Review of Day 2	Co-chairpersons
15:30-17:00	MSAB Drafting Session	MSAB

Thursday 14 May 2026		
Time (AKDT)	**Agenda item**	**Lead (support)**
10:00-11:00	Review of Day 2 and discussion of draft report	Co-Chairpersons
11:00-11:30	**6. Other Business**	A. Hicks
11:30-11:45	Break	
11:45-12:30	MSAB Drafting Session	MSAB
12:30-14:00	Lunch	
14:00-16:00	**7. Review of the Draft and Adoption of the Report of the 22nd Session of the IPHC Management Strategy Advisory Board (MSAB022)**	Co-Chairpersons

IPHC-2026-MSAB022-02

Last updated: 15 April 2026

LIST OF DOCUMENTS FOR THE 22nd SESSION OF THE IPHC MANAGEMENT STRATEGY ADVISORY BOARD (MSAB022)

Meeting documents	Title	Availability
IPHC-2026-MSAB022-01	Agenda & Schedule for the 22nd Session of the IPHC Management Strategy Advisory Board (MSAB022)	✓ 12 Feb 2026 ✓ 19 Mar 2026 ✓ 15 Apr 2026
IPHC-2026-MSAB022-02	List of Documents for the 22nd Session of the IPHC Management Strategy Advisory Board (MSAB022)	✓ 12 Feb 2026 ✓ 19 Mar 2026 ✓ 15 Apr 2026
IPHC-2026-MSAB022-03	MSAB membership (IPHC Secretariat)	✓ 19 March 2026
IPHC-2026-MSAB022-04	Update on actions arising from the 21st Session of the MSAB (MSAB021) (A. Hicks)	✓ 19 March 2026
IPHC-2026-MSAB022-05	Outcomes of the 102nd Session of the IPHC Annual Meeting (AM102) (A. Hicks)	✓ 19 March 2026
IPHC-2026-MSAB022-06	Updates to the IPHC MSE Program of Work for 2026 and a review of coastwide management procedures (A. Hicks & I. Stewart)	✓ 9 April 2026
IPHC-2026-MSAB022-07	Considerations for the Management Strategy Evaluation Program of Work for 2026-2027 (A. Hicks & I. Stewart)	✓ 8 April 2026
IPHC-2026-MSAB022-INF01	Outcomes of the 2025 Informational Meeting of the Management Strategy Advisory Board (A. Hicks)	✓ 15 Apr 2026

MSAB Membership 2026

PREPARED BY: IPHC SECRETARIAT (19 MARCH 2026)

PURPOSE

To provide the Management Strategy Advisory Board (MSAB) with an updated membership list as of 13 March 2026.

BACKGROUND

Rule II of Appendix V [Management Strategy Advisory Board (MSAB) – Terms of Reference and Rules of Procedure] of the IPHC Rules of Procedure (2025), states:

> *3. The MSAB will include the following interests (in alphabetical order): harvesters (commercial, sport, and subsistence), fisheries managers, processors, science advisors and other experts as required may be represented, and be facilitated by the IPHC Secretariat. Upon request, the IPHC shall cover the travel costs, in accordance with IPHC travel policies, for non-State and non-Federal board members, to attend one (1) MSAB session each year.*
>
> *a) Harvesters: Commercial fisheries (6-8, max 4 from each Contracting Party)*
>
> *b) First Nations/Tribal fisheries (2-4, max 2 from each Contracting Party)*
>
> *c) Government agencies (incl. domestic management representatives and science advisors to each Contracting Party) (4-8; max of 4 from each Contracting Party)*
>
> *d) Processors (2-4; max of 2 from each Contracting Party)*
>
> *e) Recreational/Sport fisheries (2-4; max of 2 from each Contracting Party)*
>
> *Representation may not be distributed throughout IPHC Regulatory Areas, but may be a consideration when determining membership.*
>
> *4. The term of MSAB members will be four years, and members may serve additional terms at the discretion of the IPHC.*

DISCUSSION

Provided at Appendix A are the current MSAB membership and term expirations.

RECOMMENDATION/S

That the MSAB **NOTE** paper IPHC-2026-MSAB022-03 which details the MSAB membership and term expirations, as of 19 March 2026.

APPENDICES

Appendix A: MSAB Membership as of 19 March 2026.

APPENDIX A
MANAGEMENT STRATEGY ADVISORY BOARD (MSAB) MEMBERSHIP

(*AS OF 19 MARCH 2026*)

Membership category	Member	Canada	U.S.A.	Current Term commencement	Current Term expiration
Commercial harvesters (6-8)					
1	Sporer, Chris	CDN Commercial		10-April-23	31-Dec-26
2	Hauknes, Robert	CDN Commercial		03-Apr-25	02-Apr-29
3	Grout, Angus	CDN Commercial		10-April-23	31-Dec-26
4	Vacant	CDN Commercial			Vacant
5	Behnken, Linda		USA Commercial	01-May-24	30-April-28
6	Elwood, Garrett		USA Commercial	03-Apr-25	02-Apr-29
7	Conrad, Michele		USA Commercial	01-May-24	30-Apr-28
8	Johnson, James		USA Commercial	03-Apr-25	02-Apr-29
First Nations/ Tribal fisheries (2-4)					
1	Lane, Jim	CDN First Nations		10-April-23	31-Dec-26
2	Vacant	CDN First Nations			Vacant
3	Mazzone, Scott		USA Treaty Tribes	03-Apr-25	02-Apr-29
4	Fitting, Emily		USA Treaty Tribes	25-Sept-24	24-Sept-28

Membership category	Member	Canada	U.S.A.	Current Term commencement	Current Term expiration
Government Agencies (4-8)					
1	Mason, Gwyn	DFO		16-April-24	15-April-28
2	Huang, Ann-Marie	CDN Science Advisor		1-Jan-25	31-Dec-28
3	Vacant	DFO			Vacant
4	Duncan, Doug		NOAA-Fisheries	10-Jul-25	09-Jul-29
5	Hulson, Pete		USA Science Advisor	1-Jan-25	31-Dec-28
6	Mattes, Lynn		PFMC	25-Jun-24	31-Dec-26
7	Bush, Karla		NPFMC	10-Jan-25	9-Jan-29
8	Joy, Philip		ADFG	1-Jan-25	31-Dec-28
Processors (2-4)					
1	Vacant	CDN Processing			Vacant
2	Vacant	CDN Processing			Vacant
3	Parker, Peggy		USA Processing	03-Apr-25	02-Apr-29
4	Drobnica, Angel		USA Processing	17-Apr-23	31-Dec-26
Recreational/ Sport fisheries (2-4)					
1	Fowler, Michael	CDN Sportfishing		01-May-24	30-April-28
2	Vacant	CDN Sportfishing			Vacant
3	Marking, Tom		USA Sportfishing (CA)	9-May-23	31-Dec-26
4	Braden, Forrest		USA sportfishing (AK)	03-Apr-25	02-Apr-29

IPHC-2026-MSAB022-04

Update on the Actions Arising from the 21st Session of the IPHC Management Strategy Advisory Board (MSAB021)

PREPARED BY: IPHC SECRETARIAT (19 MARCH 2026)

PURPOSE

To provide the Management Strategy Advisory Board (MSAB) with an opportunity to consider the progress made during the intersessional period, on the recommendations/requests arising from the 21st Session of the Management Strategy Advisory Board (MSAB021).

BACKGROUND

At the MSAB021, the members recommended/requested a series of actions to be taken by the IPHC Secretariat, as detailed in the MSAB021 meeting report (IPHC-2025-MSAB021-R) available from the IPHC website, and as provided in Appendix A.

DISCUSSION

During the 22nd Session of the MSAB (MSAB022), efforts will be made to ensure that any recommendations/requests for action are carefully constructed so that each contains the following elements:

1) a specific action to be undertaken (deliverable);
2) clear responsibility for the action to be undertaken (such as the IPHC Staff or MSAB officers);
3) a desired time frame for delivery of the action (such as by the next session of the MSAB or by some other specified date).

RECOMMENDATION/S

That the MSAB:

1) **NOTE** paper IPHC-2026-MSAB022-04, that provided the MSAB with an opportunity to consider the progress made during the inter-sessional period in relation to the consolidated list of recommendations/requests arising from the previous MSAB meeting (MSAB021).
2) **AGREE** to consider and revise the actions as necessary and to combine them with any new actions arising from MSAB022.

APPENDICES

Appendix A: Update on actions arising from the 21st Session of the IPHC Management Strategy Advisory Board (MSAB021)

APPENDIX A

Update on actions arising from the 21st Session of the IPHC Management Strategy Advisory Board (MSAB021)

RECOMMENDATIONS

Action No.	Description	Update
MSAB021–Rec.1 (para 44)	The MSAB **RECOMMENDED** the following wording for the objectives in the Harvest Strategy Policy: a) maintain the long-term coastwide Pacific halibut female relative spawning biomass above a biomass limit reference point (RSB20%) at least 95% of the time; b) maintain the long-term coastwide Pacific halibut female relative spawning biomass at or above a threshold reference point (RSB36%) at least 50% of the time; c) subject to meeting the previous two objectives, maximise the sustainable coastwide yield while minimising annual changes in the coastwide mortality limit.	**Status: Completed** The Commission considered this language prior to adoption of the Harvest Strategy Policy.
MSAB021–Rec.2 (para 48)	The MSAB **RECOMMENDED** that the 22nd Session of the MSAB (MSAB022) be held over two (2) to three (3) days during the week of 20 October 2025 with a virtual option.	**Status: Completed** An informational session was held virtually in October. MSAB022 is scheduled for 12-14 May (online only) and a summary of the informational session will be reviewed.

REQUESTS

Action No.	Description	Update
MSAB021–Req.1 (para 36)	The MSAB **REQUESTED** further evaluations of the following MP elements, after the OM is conditioned following the full 2025 stock assessment: a) fishing intensities including, but not limited to, SPRs of 40%, 43%, 46%, 52%, 55%, and 100% (no directed fishing); b) a triennial assessment frequency; c) various empirical rules to determine the reference coastwide TCEY in nonassessment years; d) control rules with triggers at higher values than RSB30% or based on absolute spawning biomass	**Status: In progress** These are part of the MSE workplan for 2026 and may be modified at MSAB022, if necessary.

Action No.	Description	Update
	relative to the spawning biomass estimated at the beginning of 2024.	
MSAB021–Req.2 (para 37)	The MSAB **REQUESTED** evaluating constraints and smoothers, along with MP elements listed in para. 36, that would potentially reduce the interannual variability in the TCEY, including: a) a 3-year rolling average (arithmetic or geometric) on the FISS O32 WPUE used in the empirical rule in a triennial stock assessment frequency; b) constraints applied only to non-assessment years and/or applied only to assessment years; c) a phase-in approach for the change in TCEY in assessment years; d) using the trends in fishery CPUE and/or FISS WPUE to determine if a bigger reduction should be taken than suggested by the unconstrained reference TCEY to curtail further reductions in the SB.	**Status: In progress** These are part of the MSE workplan for 2026 and may be updated at MSAB022, if necessary.
MSAB021–Req.3 (para 38)	The MSAB **REQUESTED** the evaluation of some elements (e.g. SPR=43%, SPR=52%, and triennial assessment) in paras. 36 and 37 with each of the three FISS designs.	**Status: Completed** These evaluations will be completed as a subset of the 2026 workplan.
MSAB021–Req.4 (para 39)	The MSAB **REQUESTED** conducting simulations assuming the following productivity regimes with a subset of the MPs from paras. 36 and 37 and all other sources of variability: a) low recruitment and low weight-at-age; b) low recruitment and current weight-at-age; c) high recruitment and low weight-at-age.	**Status: In progress** These are part of the MSE workplan for 2026 and may be updated at MSAB022, if necessary. Initial results were presented at AM102.
MSAB021–Req.5 (para 40)	The MSAB **REQUESTED** conducting analyses of MPs, reference points, and the effects of recruitment regimes and variable weight-at-age after conditioning the OM following the full 2025 stock assessment.	**Status: Completed** The new OM is ready.
MSAB021–Req.6 (para 41)	The MSAB **REQUESTED** presenting dynamic unfished spawning biomass along with simulated spawning biomass, and trace plots (the purple plots in document IPHC-2025-MSAB021-06) with uncertainty for the productivity regimes at MSAB022 for productivity regimes described in para. 39, with SPRs of 43% and 52%.	**Status: Completed** These plots were presented at AM102 and will be updated with the new OM.

Action No.	Description	Update
MSAB021–Req.7 (para 43)	The MSAB **REQUESTED** that the Commission clarify the intent of the phrase “spatial and temporal scale relevant to the fishery” which is stated in the objective in the draft Harvest Strategy Policy (IPHC-2025-MSAB021-09) related to a threshold reference point, but is not in objective b) from AM099 (para. 16 above).	**Status: Completed** This was considered by the Commission and removed before the adoption of the HSP.

Outcomes of the 102nd Session Of The IPHC Annual Meeting (AM102)

PREPARED BY: IPHC SECRETARIAT (19 MARCH 2026)

PURPOSE

To provide the MSAB with the outcomes of the 102nd Session of the IPHC Annual Meeting (AM102) relevant to the mandate of the MSAB.

BACKGROUND

The agenda of the 102nd Session of the IPHC Annual Meeting (AM102) included items relevant to the MSAB.

DISCUSSION

During the course of the 102nd Session of the IPHC Annual Meeting (AM102) the Commission made no recommendations or requests regarding the Management Strategy Evaluation (MSE) and Harvest Strategy Policy (HSP) processes. However, a number of paragraphs noted the 2026 MSE and HSP Program of Work. Relevant sections from the report of AM102 (IPHC-2026-AM102-R), included these noted paragraphs are provided in Appendix A for the MSAB's consideration.

RECOMMENDATION

That the MSAB:

1) **NOTE** paper IPHC-2026-MSAB022-05, which details the outcomes of the 102nd Session of the IPHC Annual Meeting (AM102).

APPENDICES

Appendix A: Excerpts from the 102nd Session of the IPHC Annual Meeting (AM102) Report (IPHC-2026-AM102-R).

APPENDIX A
Excerpt from the 102nd Session of the IPHC Annual Meeting (AM102) Report (IPHC-2025-AM102-R)

RECOMMENDATIONS

Nil

REQUESTS

Nil

OTHER

IPHC-2026-AM102-R, para 55. The Commission **RECALLED** that a Harvest Strategy Policy (HSP) was adopted by the Commission in late 2025. The HSP can be found at https://www.iphc.int/research-monitoring/harvest-strategy-policy.

IPHC-2026-AM102-R, para 56. The Commission **NOTED** that the 2026 MSE and HSP Program of Work will include the following highpriority topics: a) Update and recondition the MSE Operating Model in accordance with the schedule defined in the Harvest Strategy Policy; b) Evaluate a range of SPR values to determine if the optimal reference coastwide fishing intensity is different than the current reference fishing intensity (F43%) defined in the HSP; c) Investigate productivity regimes to determine how the Pacific halibut population and fisheries respond to different productivity regimes, if the optimal reference fishing intensity differs across productivity regimes, and how productivity regimes may be incorporated into a Management Procedure; d) Further develop the Depleted concept and identify a limit reference point below which recovery of the Pacific halibut population would be uncertain.

IPHC-2026-AM102-R, para 57. The Commission **NOTED** that the 2026 MSE and HSP Program of Work will include the following lowpriority topics, which may not be completed before AM103: a) Improve the estimation model used in the MSE framework to better characterize the stock assessment in the simulations; b) Evaluate potential management actions to invoke when approaching a depleted limit reference point; c) Evaluate additional elements of Management Procedures which may include a triennial assessment frequency, constraints and smoothers on the interannual change in the TCEY, and empirical rules to determine the reference TCEY in years without a stock assessment; d) Determine reference points using the updated MSE Operating Model (e.g. FMSY and MSY); e) Develop guidance documents for the Harvest Strategy Policy (e.g. specifications of a rebuilding plan).

IPHC-2026-AM102-R, para 58. The Commission **NOTED** that the 2026 MSE and HSP Program of Work should not include topics related to the distribution of the TCEY, as this is part of the decision-making process and not part of the management procedure, as described in the Harvest Strategy Policy.

IPHC-2026-AM102-R, para 59. The Commission **NOTED** that outcomes of the 2026 MSE workplan (e.g. an optimal fishing intensity) may be used to update the Harvest Strategy Policy in the future.

INTERNATIONAL PACIFIC HALIBUT COMMISSION

IPHC-2026-MSAB022-06

Updates to the IPHC MSE Program of Work for 2026 and a review of coastwide management procedures

Prepared by: IPHC Secretariat (A. Hicks, I. Stewart; 09 April 2026)

PURPOSE

To provide the Management Strategy Advisory Board (MSAB) with an overview of work done since the 21st meeting of the Management Strategy Advisory Board (MSAB021) using the IPHC Management Strategy Evaluation (MSE) framework.

1 INTRODUCTION

Rapid investigation of various questions is possible with the fully developed MSE framework. The MSAB made a number of requests at MSAB021 for investigation with the MSE framework (IPHC-2025-MSAB021-R), but many of those requests were conditional on updating the operating model (OM). The conditioning of the operating model is part of the 2026–2027 Program of Work (IPHC-2026-MSAB022-07) and began in early 2026 using the 2025 full stock assessment to reflect new understanding of the Pacific halibut population and fishery dynamics. This document presents the preliminary results of that conditioning process along with the MSE work completed since MSAB021.

2 WORK PRESENTED AT OR BEFORE THE 102ND IPHC ANNUAL MEETING (AM102)

Most of the recommendations/requests of the MSAB and Scientific Review Board (SRB) were addressed in the MSE work that was completed in 2025. This included defining the concept of Depleted, comparing and contrasting Overfished with Depleted, determining potential thresholds for Depleted, investigating productivity regimes, and conducting simulations to compare fishing intensities in a low productivity regime. These topics are summarized below with additional information presented in IPHC-2026-AM102-11.

2.1 Definitions of overfished and depleted

The SRB noted that Overfished implies that fishing was the cause of a low biomass state, whereas Depleted is agnostic about the cause of low biomass. Both definitions are important to fisheries management because managers control fishing to avoid precariously low biomass, but the population may be at low biomass for reasons that cannot be controlled by management, yet may require management action to ensure recovery. The use of dynamic reference points allows for the separation of fishing effects from other effects on population size. A dynamic relative spawning biomass (as currently used by IPHC) is appropriate to determine if the population is overfished. An absolute spawning biomass is appropriate to determine if the population is at a low population state from which recovery could be compromised, which the SRB suggested calling Depleted following the New Zealand Harvest Strategy Standard[1]. Both concepts are defined in the IPHC Harvest Strategy Policy (HSP) and are shown in Figure 1. An example level for Depleted is shown, as it is not currently defined. Overfished is currently defined as 20% of unfished spawning biomass and changes over time when calculated as an absolute spawning biomass, depending on current stock conditions. Depleted is a constant absolute spawning biomass and varies in terms of relative spawning biomass.

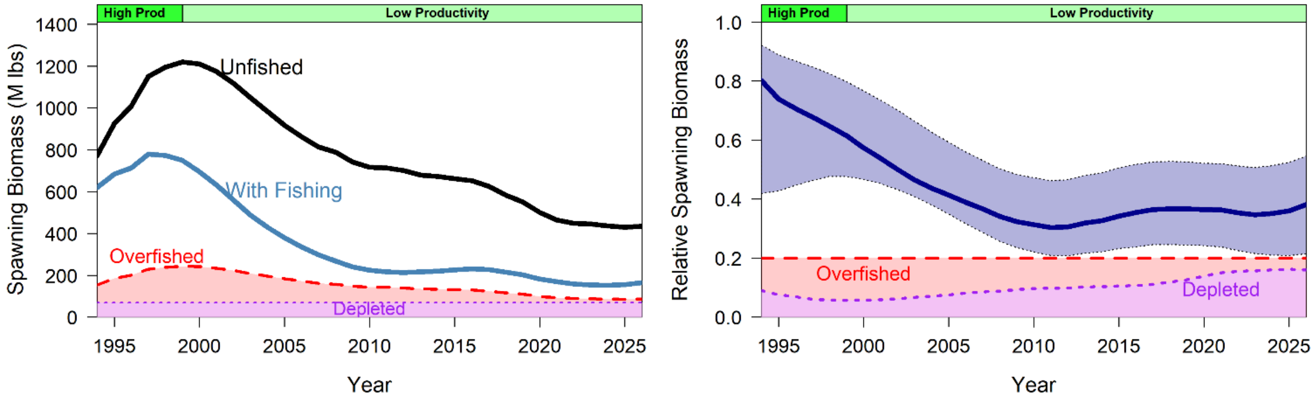

Figure 1. Estimated spawning biomass (left) if fishing had not occurred (unfished) and estimated spawning biomass from the 2025 stock assessment (with fishing). The Overfished threshold of 20% of unfished spawning biomass is shown as a dashed line and changes over time. An example "Depleted" threshold is shown as a straight horizontal line, assuming that it is defined as a constant absolute spawning biomass. The relative spawning biomass ("with fishing" divided by "unfished") is shown on the right with a 95% credible interval (accounting for the covariance in the biomass estimated with and without fishing). The Overfished threshold is shown at 20% and the example Depleted value is shown in purple.

The Secretariat has currently identified two possible approaches to identify an appropriate absolute spawning biomass reference point for Depleted. The first option is to use the lowest spawning biomass observed in the estimated time series from the ensemble stock assessment, which is 2024 according to the 2025 stock assessment. The estimated spawning biomass in the 1970s may have been at similar levels seen in recent years, but recent levels are estimated to be low with much greater certainty due to data available form the IPHC's Fishery Independent Setline Survey (FISS). The advantage of choosing a specific year to define the absolute reference point (or the lowest estimated spawning biomass over a range of years) is that it scales

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[1] https://fs.fish.govt.nz/Doc/16543/harveststrategyfinal.pdf.ashx.

to changes in the stock assessment due to updates to data and new assumptions, and it accounts for uncertainty.

Alternatively, simulation (via the MSE framework) could be used to determine this absolute spawning biomass reference point based on our scientific understanding of biological and reproductive dynamics. To explore this, we simulated the Pacific halibut population forward at a high fishing rate for 40 years under a 'worst-case' scenario, assuming low weight-at-age, low PDO (defining poor recruitment and alternative movement), and a depensation parameter in the stock-recruit curve equal to 5, which is very high for a fish stock (Liermann and Hilborn 1997). Depensation, or the Allee effect, is when recruitment of age-0 fish is further depressed when the spawning biomass is very low, resulting in low chance of recovery (Dennis 2002). This may occur because of difficulties finding mates, low fertilization rates with reduced spawning output, or increased predation with smaller numbers, and may differ across environmental regimes. Depensation is not likely to have occurred at the spawning biomass levels observed for Pacific halibut, but previous research estimated a range of potential depensation levels (see IPHC-2024-SRB025-07). After 40 years, simulated fishing stops, except for 3 million pounds representing a small amount of bycatch and subsistence fishing, and the population is simulated forward another 50 years. A bifurcation point in the spawning biomass where trajectories either recover or stabilize and those that continue to decline is then determined.

All trajectories with a spawning biomass greater than 90 M lbs recovered and no trajectories recovered when starting at a spawning biomass less than 40 M lbs (see IPHC-2025-SRB027-08 for details). A high proportion of the trajectories (greater than 50%) in the worst-case scenario recovered when above a spawning biomass near 70 M lbs. Additional simulations will be done using the reconditioned OM as part of the 2026–2027 Program of Work.

2.2 Effects of productivity regimes on the HSP

Pacific halibut exhibit high variability in weight-at-age and recruitment. Over the past 100 years, the average weight of an age 12 female Pacific halibut has ranged from below 20 pounds in recent years to near 40 pounds in the mid-1970's (Figure 2). In the last ten years, the weight of older fish has been declining or stable, but the weight of younger fish has been increasing. Recruitment is variable as well, and 1987 was one of the largest recruitments on record (Figure 3). The two long time-series models in the IPHC ensemble stock assessment (IPHC-2025-SA-01) estimated a link between the Pacific Decadal Oscillation (PDO, Mantua et al. (1997)) and average unfished equilibrium recruitment (R_0), with an estimated average recruitment more than 50% greater during a positive PDO. Previous analyses (Clark and Hare 2002; Stewart and Martell 2016) have also shown that a positive PDO phase is correlated with enhanced productivity, while productivity decreases in negative PDO phases. Although the PDO is strongly correlated with historical recruitments, it is unclear whether the effects of climate change and other recent anomalous conditions in both the Bering Sea and Gulf of Alaska are comparable to those observed in previous decades (Litzow et al. 2020).

To investigate the effects of these low and high weight-at-age and recruitment regimes, different scenarios were defined from past observations, and the population was projected 70 years with an SPR of 43%, assuming constant weight-at-age and constant average recruitment. Three levels were developed for weight-at-age: low weight-at-age was defined from a five-year period in the 2010s, high weight-at-age was defined from a five-year period in the 1970s, and current weight-at-age was defined as the most recent five-years (Figure 2). These three weight-at-age levels show different patterns and although the low weight-at-age and current weight-at-age scenarios were both low in general, they differed between the weight of young fish and older fish. The current weight-at-age scenario had larger young fish but smaller older fish. High and low recruitment regimes were defined based on the stock assessment estimates of average recruitment in positive and negative PDO regimes. The PDO is also modelled to affect movement and distribution of newly recruited (age-0) Pacific halibut. Overall, there were six scenarios crossing current, low, and high weight-at-age with low and high PDO.

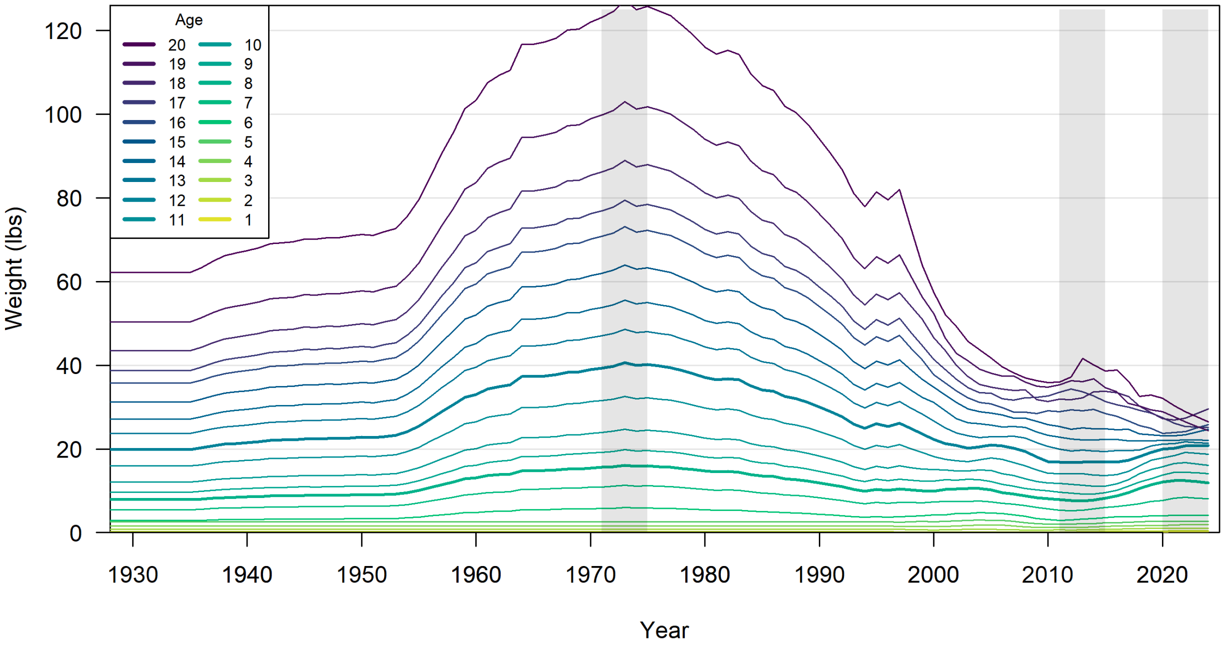

Figure 2. Average historical weight of female Pacific halibut for ages one to twenty as used in the 2024 stock assessment. Gray bands show three blocks of five years classified as *high* (1970s), *low* (2010s) and *current* (recent).

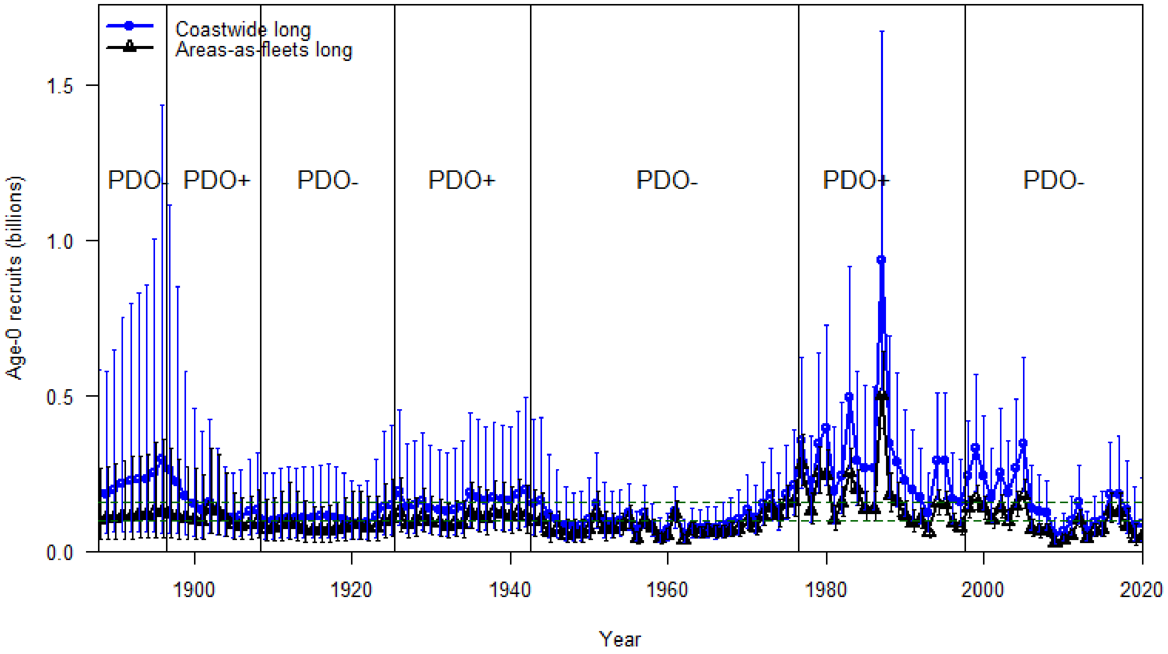

Figure 3. Trend in historical recruitment strengths (by birth year) estimated by the two long time-series stock assessment models, including the effects of the Pacific Decadal Oscillation (PDO) regimes. Figure reproduced from the 2025 stock assessment (IPHC-2026-SA-01).

The spawning biomass differed substantially across different scenarios, but the high weight-at-age scenarios showed a considerable higher spawning biomass than the others (Figure 4). The sudden increase in the spawning biomass when the projections began indicates that weight-at-age is an important driver to the spawning biomass in both the current year and future years (noting that these simulations immediately increased weight-at-age, while it is more likely to slowly change over time). Average recruitment had a significant effect as well but lagged in its effect on the spawning biomass since the fish must age into the spawning biomass. The differences due to average recruitment were more prevalent with higher weight-at-age. For a given recruitment regime, the current weight-at-age scenario resulted in a smaller spawning biomass than the low weight-at-age scenario. This indicates the importance of the older fish in the spawning biomass.

Simulated TCEYs showed the same pattern for high weight-at-age, but different patterns for low and current weight-at-age scenarios (Figure 4). Weight-at-age and recruitment both had a very large effect on the TCEY with the high weight-at-age and high recruitment scenario supporting TCEYs near 120 Mlb and the high weight-at-age and low recruitment scenario supporting TCEYs near 75 Mlb. The low and current weight-at-age scenarios resulted in TCEYs in the range of 30 to 60 Mlb, on average. The TCEY showed a different pattern in the low and current weight-at-age scenarios when compared to the spawning biomass. The TCEY was higher for the current weight-at-age scenario while the spawning biomass was higher for the low weight-at-age scenario. Young Pacific halibut are more influential to the TCEY than to the spawning biomass because many are harvested by the fishery before they become mature.

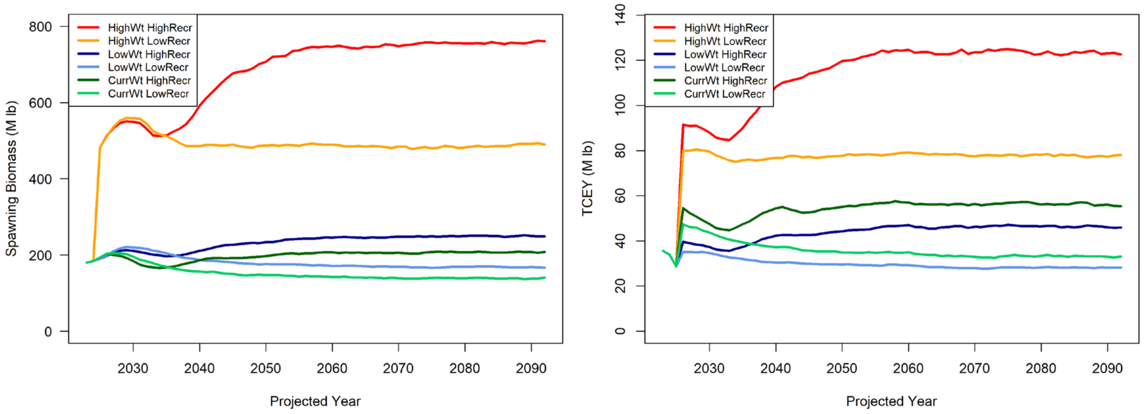

Figure 4. Simulated projections of spawning biomass (left) and TCEY (right) assuming six different regimes for combinations of weight-at-age and recruitment and an SPR of 43%. Each projection held the weight-at-age and average recruitment at the defined level for all projected years.

Pacific halibut have been in what can be called a low productivity period (e.g. low weight-at-age and low recruitment) for at least the last 15 years. MSE simulations integrating across the full range of observed biological characteristics for Pacific halibut assume that weight-at-age will likely increase and the PDO will soon switch to a positive regime, therefore spawning biomass and the TCEY have a high probability of increasing in the simulated future. However, simulations assuming that weight-at-age remains similar to the recent 5 years (current weight) and the PDO remains in a negative regime (low recruitment) show a potential further decline in the spawning biomass (Figure 5). The plot in Figure 5 is what the MSAB has referred to as trace plots (e.g. purple plots).

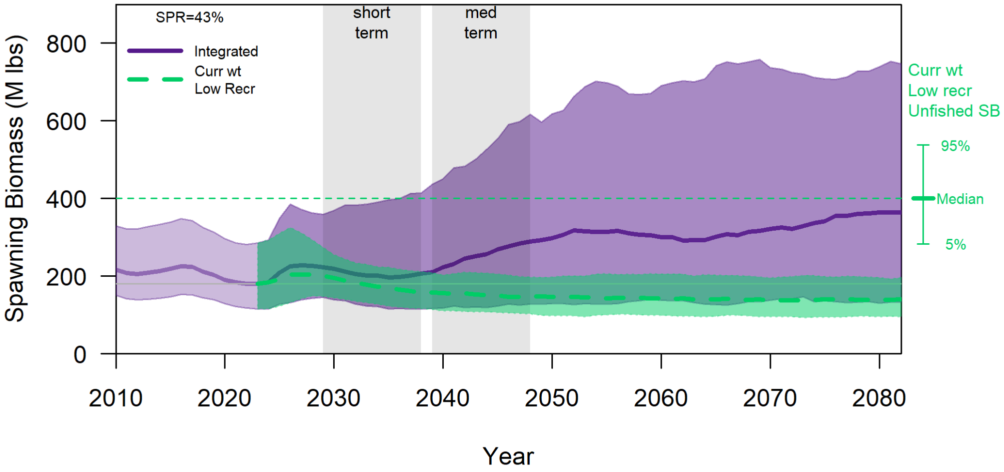

Figure 5. Simulated spawning biomass when fishing at an SPR=43% fishing intensity for productivity integrated over low and high levels (purple) and productivity assumed to remain at recent low levels (green). The 2023 median spawning biomass is shown as a horizontal grey line for reference, and the range of unfished spawning biomass for the low productivity scenario is shown on the right.

2.3 Reference fishing intensity under a low productivity scenario

The effect of the productivity regime on the optimal fishing intensity was investigated by conducting MSE simulations across various SPR values assuming a low productivity scenario (i.e. current weight-at-age and negative PDO) and comparing the performance metrics associated with the four priority objectives to the MSE results integrating over changes in weight-at-age and a cyclical PDO. The probability that the short-term spawning biomass will be less than the spawning biomass in 2023 was also compared for both sets of simulations (Table 1). The median TCEY is less for the low productivity scenario and the AAVs slightly higher. The probability that the relative spawning biomass is less than 36% is also higher for the low productivity scenario and this performance metric is not met with an SPR of 40% assuming constant low productivity. The short-term probability of being below the 2023 spawning biomass is also higher for the low productivity scenario with an approximate 1 in 2 chance for the low productivity scenario with an SPR of 43% versus an approximate 1 in 3 chance with integrated productivity (i.e. simulated low and high periods of productivity).

The trade-offs between the TCEY and variability in the TCEY (AAV) are similar for the integrated productivity and low productivity scenario (Figure 6). There are slight differences between the AAVs at different fishing intensities with the lowest AAVs occurring between SPRs of 43% and 52%. The AAV increased at a faster rate for lower SPRs in the low productivity scenario compared to integrated productivity. However, the TCEY increased by approximately 1 M lbs per every 1% reduction in SPR. Further defining what an optimal fishery is would help evaluate this trade-off.

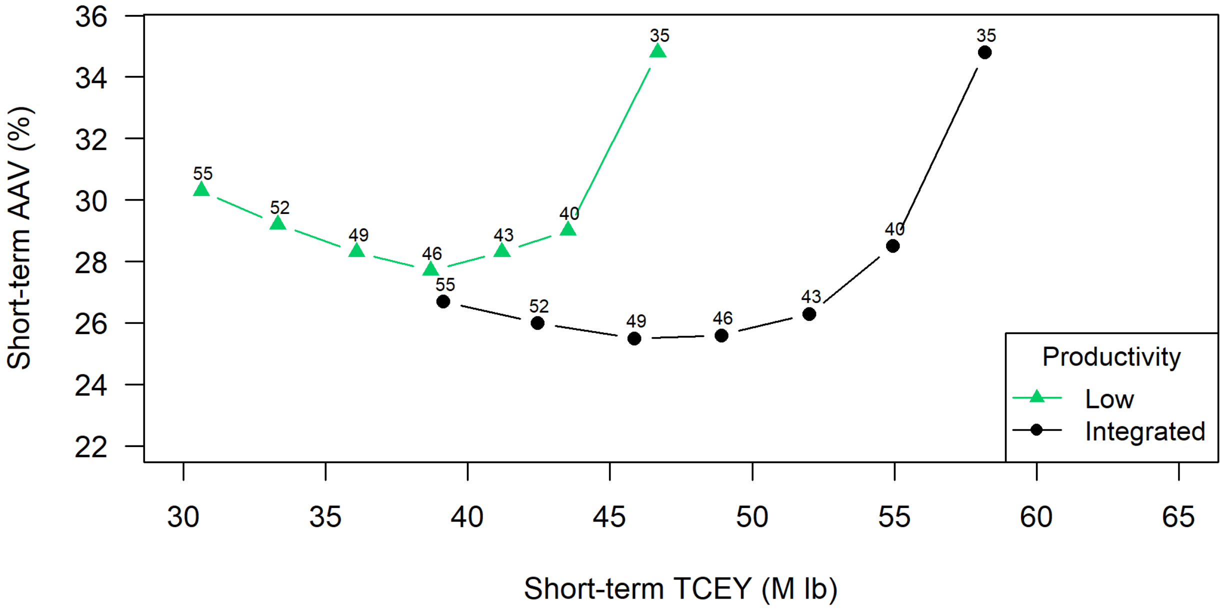

Figure 6. Trade-off between variability in the TCEY (AAV) and the TCEY for different fishing intensities (SPR labelling the points) when integrating over a range of productivity from low to high (black circles) and consistent low productivity similar to recent observations (green triangles).

Table 1. Performance metrics for different SPR values and simulations integrating over changes in weight-at-age and cyclical PDO and assuming a recent (i.e. low) productivity scenario (i.e. current weight-at-age and negative PDO). Green colors indicate that the performance metrics passes and red indicates that it does not.

	Integrated (low & high) Productivity						
	SPR (%)	**40**	**43**	**46**	**49**	**52**	**55**
Long-term	**P(RSB<20%)**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	P(RSB<36%)	0.372	0.195	0.066	0.014	0.001	<0.001
Short-term	**Median TCEY**	55.0	52.0	48.9	45.9	42.5	39.1
	AAV	28.5%	26.3%	25.6%	25.5%	26.0%	26.7%
	P(SB < SB_{2023})	0.401	0.350	0.297	0.254	0.214	0.179

	Recent (low) Productivity						
	SPR (%)	**40**	**43**	**46**	**49**	**52**	**55**
Long-term	**P(RSB<20%)**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	P(RSB<36%)	0.677	0.462	0.236	0.081	0.016	<0.001
Short-term	**Median TCEY**	43.5	41.2	38.7	36.1	33.3	30.6
	AAV	29.0%	28.3%	27.7%	28.3%	29.2%	30.3%
	P(SB < SB_{2023})	0.609	0.543	0.466	0.390	0.312	0.241

2.4 Harvest Strategy Policy Table

The 2025 stock assessment presented a harvest decision table that shows immediate-term risk metrics for 3-year projections at various fixed mortality limits. MSE simulations with a fixed fishing intensity (i.e. F_{SPR}) were conducted using the median SPR values from the 2025 stock assessment decision table and presented as the Harvest Strategy Policy table (HSP table). Short-term and long-term performance metrics associated with priority objectives are presented along with the probability that the relative spawning biomass (RSB) is less that 30% (the trigger in the 30:20 control rule), the probabilities that the long-term and short-term spawning biomass is greater than the 2023 estimated spawning biomass and 5th and 95th percentiles of the short-term TCEY. The table is intended to present risks associated with consistent application of a harvest strategy over the next 4 years and longer, as opposed to the immediate-term risks associated with mortality limits decisions presented in the stock assessment harvest decision table.

The HSP table can also be seen in the IPHC MSE Explorer (https://apps.iphc.int/MSE-Explorer/) along with results from other simulations and additional management procedures.

Table 2. Harvest Strategy Policy (HSP) table showing short-term and long-term performance metrics associated with priority objectives along with the probability that the relative spawning biomass (RSB) is less that 30% (the trigger in the 30:20 control rule), the probabilities that the long-term and short-term spawning biomass is greater than the 2023 estimated spawning biomass and 5th and 95th percentiles of the short-term TCEY for fixed fishing intensities (i.e. F_{SPR}) determined from the median fishing intensities presented in the 2025 stock assessment decision table.

2026 Alternative		***Status quo -10%***	***Status quo -5%***	***Status quo***	***Status quo +5%***	***Status quo +10%***	$F_{46\%}$	***3-year surplus/*** $F_{43\%}$	***MEY proxy***	***Overfishing limit***
Fixed SPR	**100%**	**54%**	**52%**	**51%**	**49%**	**48%**	**46%**	**43%**	**40%**	**35%**

Long-term Metrics										
P(RSB < 20%)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
P(RSB < 30%)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.007	0.032	0.161
P(RSB < 36%)	<0.001	<0.001	<0.001	0.001	0.014	0.023	0.066	0.195	0.372	0.692
P(SB<SB2023)	0.002	0.144	0.168	0.176	0.202	0.220	0.232	0.260	0.288	0.334

Short-term Metrics (2029-2038)										
Median TCEY	0.00	40.2	42.5	43.6	45.9	46.9	48.9	52.0	55.0	58.2
Median AAV	0%	26.5%	26.0%	25.9%	25.5%	25.5%	25.6%	26.3%	28.5%	34.8%
P(SB<SB2023)	0.034	0.354	0.378	0.394	0.416	0.434	0.470	0.534	0.576	0.632
TCEY interval	(0-0)	(20-73)	(21-77)	(21-79)	(21-83)	(22-85)	(23-89)	(24-94)	(25-101)	(27-108)

3 WORK COMPLETED SINCE THE 102ND IPHC ANNUAL MEETING (AM102)

The MSE work since AM102 has focused on conditioning the OM which used the following workflow.

1. Outcomes of each individual model of the ensemble stock assessment are summarized.
2. Parameters and assumptions in each individual model of the OM are linked to each individual model of the ensemble stock assessment and updated to match those in the stock assessment.
3. Mortality and weight-at-age for each fishery is extended to the most recent year.
4. Weight-at-age for the survey and population is updated and extended to the most recent year.
5. The Pacific Decadal Oscillation (PDO) is updated to the most recent year (and revised for this development cycle based on the new series used in the 2025 stock assessment).

6. An optimized OM executable is compiled and a directory structure for each individual model is created.
7. Parameters for each individual model (e.g. movement, recruitment distribution, average recruitment, initial fishing mortality) are estimated based on fits to regional stock distribution, regional indices of abundance, age compositions, and the estimated spawning biomass from the linked individual stock assessment model.
8. Individual historical trajectories are created for each individual model of the OM using estimated uncertainty and correlations between parameters.
9. Inputs and outputs for each individual trajectory is saved to the appropriate directory and a reduced set of necessary inputs is saved to GitHub for distribution among computers and for record keeping.

3.1 Conditioning the Operating Model (preliminary results)

The four individual models of the OM (OM1_longAAF, OM2_shortAAF, OM3_longCW, and OM4_shortCW) were conditioned through step 7. The conditioning process balanced the fits to the four sources of information (stock distribution, regional indices of abundance, age compositions, and the estimated spawning biomass from the stock assessment) in an ad hoc manner by determining the best parameter values when fitting to each source alone, and then adjusting weights of the likelihood component for each source such that no one source showed a severe lack of fit. Stock distribution and recent years of estimated spawning biomass were given the highest priority for good fits. The age compositions were given a low weight due to the number of observations potentially overwhelming the likelihood and less importance for evaluating coastwide management procedures (MPs).

Each model starts in 1958, even those based on the short assessment models, with estimated recruitment deviations from the long assessment models and an average fishing mortality informing the initial population. The population trajectory was then derived through 2025 based on the parameter set. Estimated parameters included the proportion of recruitment in each region for low and high PDO regimes, a scalar for the initial average fishing mortality, and movement parameters from Region 4 to 3 and 3 to 2 for low and high PDO regimes. Movement between other adjacent regions was fixed at empirical rates determined from historical data and it was assumed that movement did not occur between non-adjacent regions in an annual time-step (see the MSE Technical document).

Preliminary individual models of the OM are shown in each section below. These are the results through step 7 from above, and next steps will be to determine uncertainty for each model.

3.1.1 OM1_longAAF

OM1_longAAF is based on the parameters and estimated spawning biomass of the long areas-as-fleets (AAF) stock assessment model. This included natural mortality rates for age 3+ female and male Pacific halibut equal to 0.181 and 0.164, respectively.

The OM1_longAAF model closely matched the spawning biomass for the long AAF assessment model (Figure 7). The distribution of 'all sizes' (those selected by the FISS) biomass was also fit well except for Region 3 in recent years (Figure 8). This overprediction from OM1_longAAF was a result of a slight underfitting in all other Regions. The FISS index fit reasonably well although showed departures in the 1990s in Regions 2, 4, and 4B (Figure 8). The index was closely matched in recent years for all Regions.

A large proportion of the recruitment was distributed to Region 4 and was higher when the PDO was in a positive regime (Figure 9). Approximately 70% of the age-0 fish settled in Region 4 in low PDO regimes and approximately 85% in high PDO years. A very small proportion were distributed to Regions 2 and 4B.

Movement was only estimated from Region 4 to Region 3 and from Region 3 to Region 2 (Figure 9). Movement probabilities were similar across PDO regimes for Region 4 to 3, but was shifted to younger ages in the high PDO regime. Fewer Pacific halibut moved from Region 3 to 2 in the high PDO regime. A very small proportion of Pacific halibut 6 years and older moved from either of these regions.

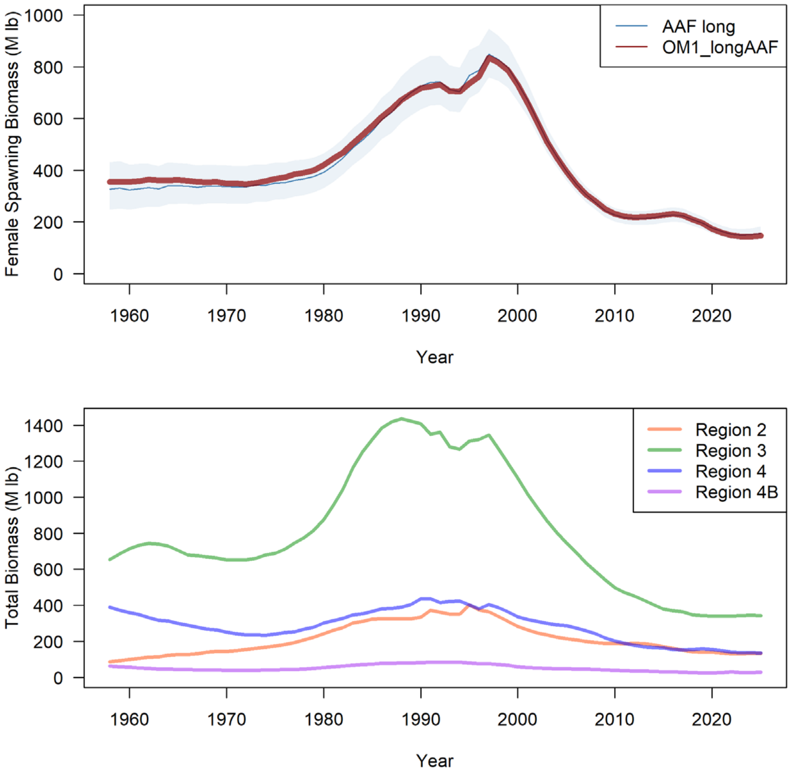

Figure 7. The spawning biomass from the OM1_longAAF model compared to the estimated spawning biomass from the long AAF assessment model (top). The bottom plot shows the total biomass (all ages) in each Region from the OM1_longAAF model.

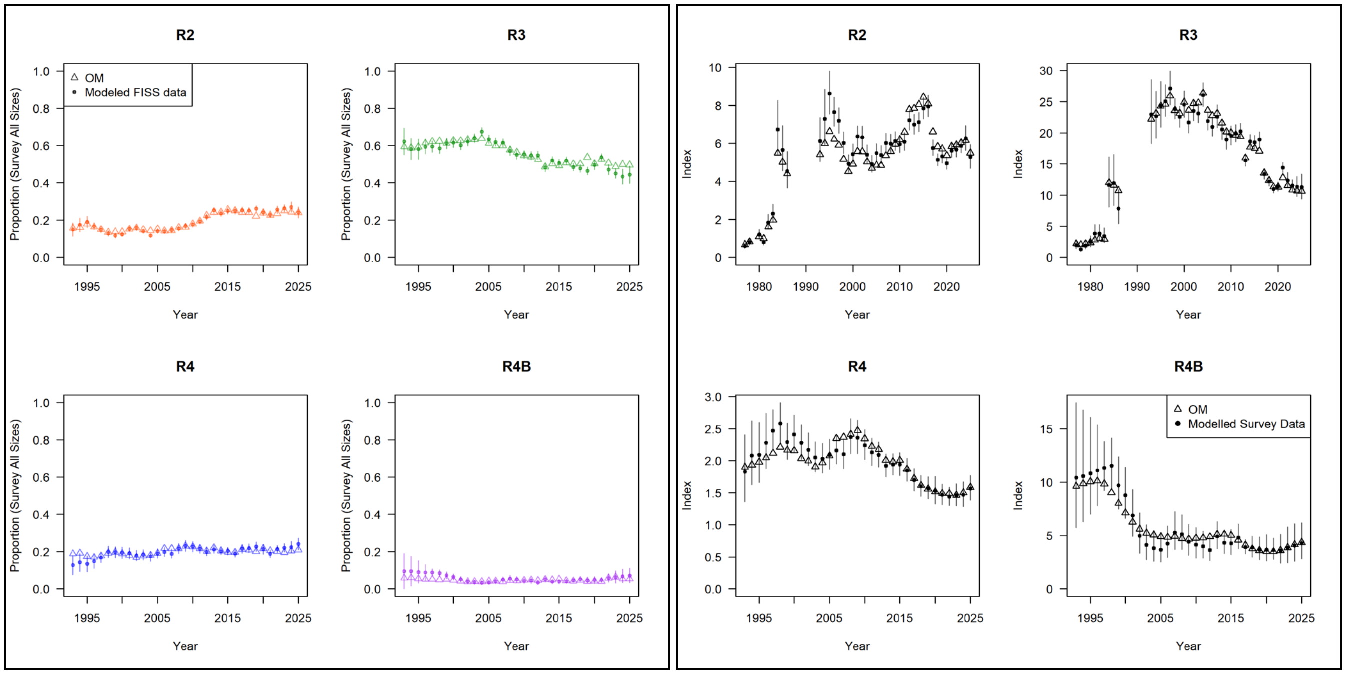

Figure 8. The left plots show the proportion of all sizes biomass in each Region from the OM1_longAAF model (triangles) and the FISS modelled output with 95% credible intervals (circles). The right plots show the predicted index from the OM1_longAAF model (triangles) and the FISS index (circles).

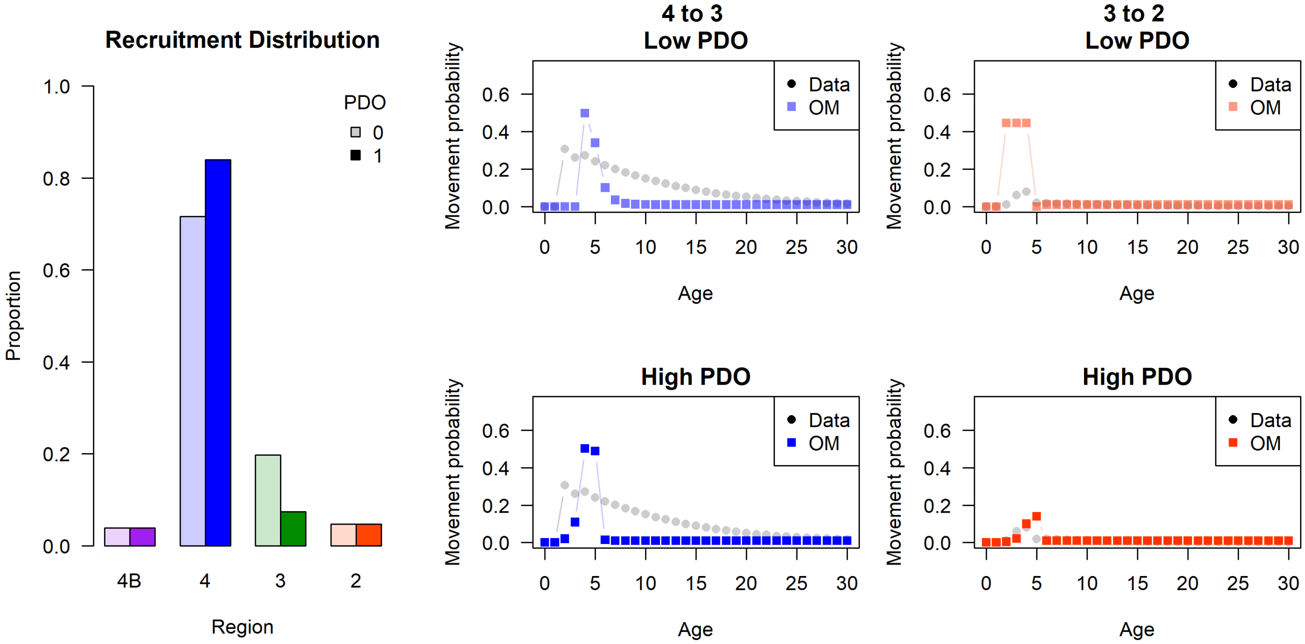

Figure 9. Distribution (proportion) of coastwide recruitment to each Region (leftmost plot) estimated in the OM1_longAAF model. The proportion of numbers of Pacific halibut estimated in OM1_longAAF that move from Region 4 to 3 (center) and from Region 3 to 2 (right) for low PDO regimes (top) and high PDO regimes (bottom). Light grey dots are movement probabilities inferred from empirical observations.

3.1.2 OM2_shortAAF

OM2_shortAAF is based on the parameters and estimated spawning biomass of the short AAF stock assessment model. This included natural mortality rates for age 3+ female and male Pacific halibut equal to 0.214 and 0.180, respectively.

The OM2_short AAF model closely matched the spawning biomass for the short AAF assessment model, except for the beginning of the assessment time-series, which is not well estimated in the stock assessment (Figure 10). The distribution of ‘all sizes’ biomass was also fit well except for Region 3 in recent years (Figure 11). The overprediction from OM2_shortAAF was a result of a slight underfitting in all other Regions. The FISS index fit reasonably well although showed departures in the 1990s in Regions 2, 4, and 4B (Figure 11). The index was closely matched in recent years for all Regions.

A large proportion of the recruitment was distributed to Region 4 and was higher when the PDO was in a positive regime (Figure 12). Approximately 75% of the age-0 fish settled in Region 4 in low PDO regimes and almost 90% in high PDO years. A very small proportion were distributed to Regions 2 and 4B.

Movement was only estimated from Region 4 to Region 3 and from Region 3 to Region 2 (Figure 12). Movement probabilities were similar across PDO regimes for Region 4 to 3, but peaked slightly higher in the high PDO regime. A similar proportion of Pacific halibut moved from Region 3 to 2 in the low PDO regime and less moved in the high PDO regime. A very small proportion of Pacific halibut 8 years and older moved from either of these regions.

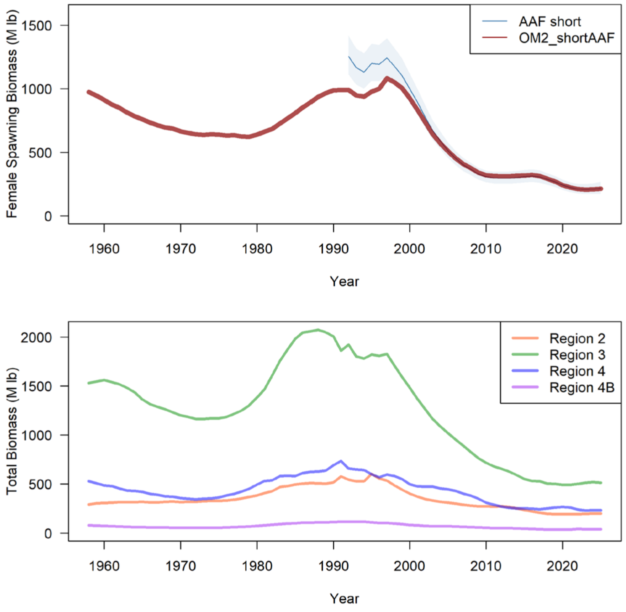

Figure 10. The spawning biomass from the OM2_shortAAF model compared to the estimated spawning biomass from the long AAF assessment model (top). The bottom plot shows the total biomass (all ages) in each Region from the OM2_shortAAF model.

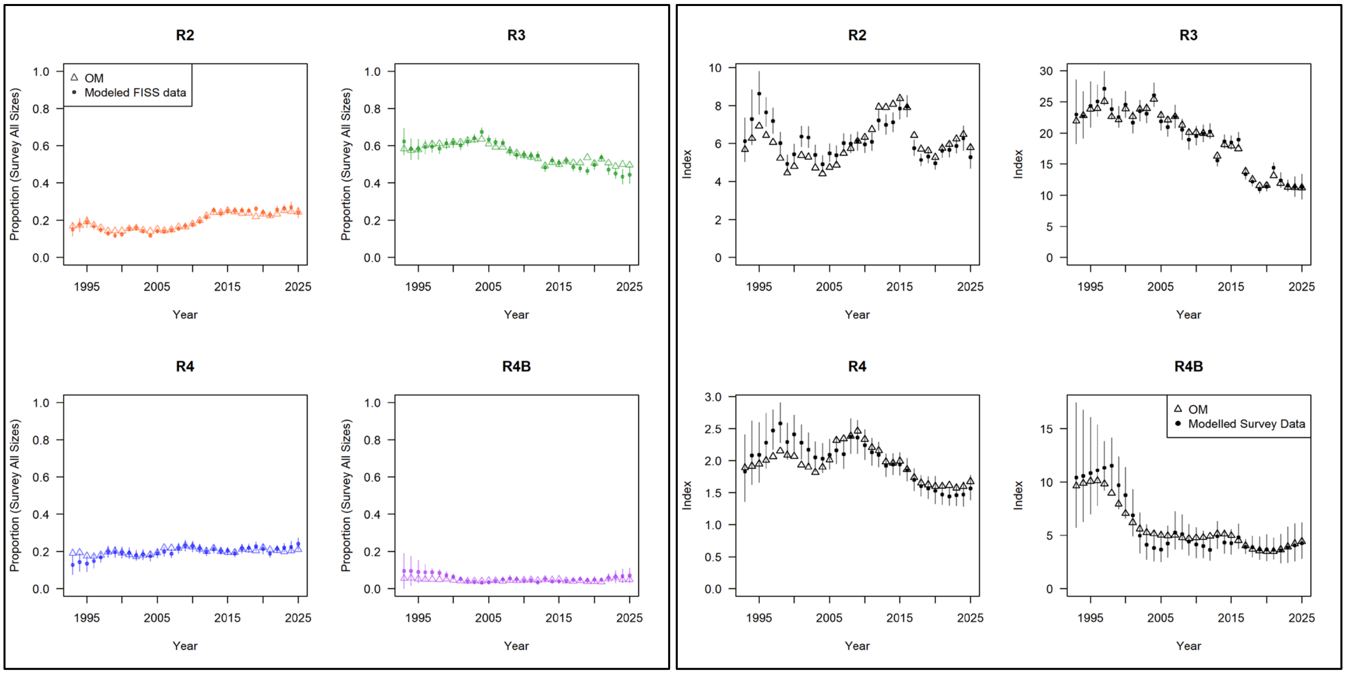

Figure 11. The left plots show the proportion of all sizes biomass in each Region from the OM2_shortAAF model (triangles) and the FISS modelled output with 95% credible intervals (circles). The right plots show the predicted index from the OM2_shortAAF model (triangles) and the FISS index (circles).

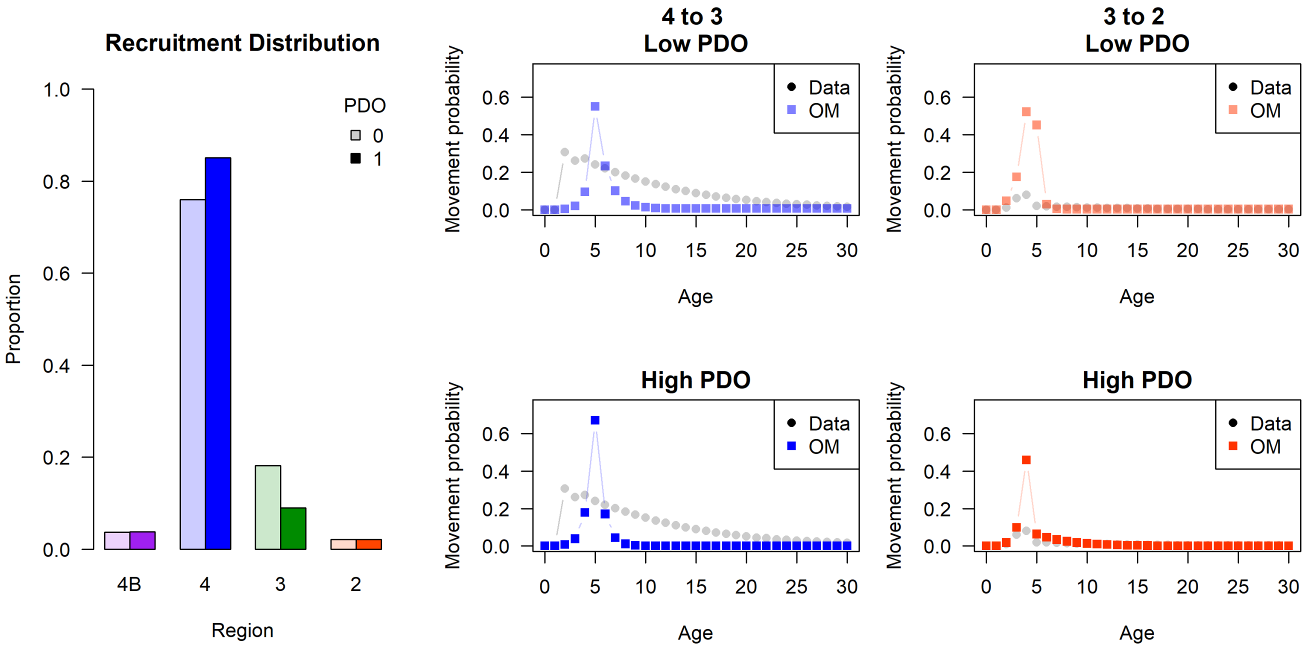

Figure 12. Distribution (proportion) of coastwide recruitment to each Region (leftmost plot) estimated in the OM2_shortAAF model. The proportion of numbers of Pacific halibut estimated in OM2_shortAAF that move from Region 4 to 3 (center) and from Region 3 to 2 (right) for low PDO regimes (top) and high PDO regimes (bottom). Light grey dots are movement probabilities inferred from empirical observations.

3.1.3 OM3_longCW

OM3_longCW is based on the parameters and estimated spawning biomass of the long coastwide stock assessment model. This included natural mortality rates for age 3+ female and male Pacific halibut equal to 0.229 and 0.199, respectively.

The OM3_longCW model closely matched the spawning biomass for the long coastwide assessment model (Figure 13) with a slight departure at the beginning of the series. The distribution of 'all sizes' biomass was also fit well except for Region 3 in recent years (Figure 14). The overprediction from OM3_longCW was a result of a slight underfitting in all other Regions. The FISS index fit reasonably well although showed departures in the 1990s in Regions 2, 4, and 4B (Figure 14). The index was closely matched in recent years for all Regions.

A large proportion of the recruitment was distributed to Region 4 and was higher when the PDO was in a positive regime (Figure 15). Approximately 75% of the age-0 fish settled in Region 4 in low PDO regimes and just over 80% in high PDO years. A very small proportion were distributed to Regions 2 and 4B, except that a larger proportion was in Region 2 in low PDO years.

Movement was only estimated from Region 4 to Region 3 and from Region 3 to Region 2 (Figure 15). Movement probabilities were similar across PDO regimes for Region 4 to 3 with a broader range of ages moving in low PDO regimes. Similar movement rates were estimated for Region 3 to 2. A very small proportion of Pacific halibut 6 years and older moved from either of these regions, except that from 4 to 3 in the low PDO higher movement rates were observed for Pacific halibut up to 10 years old.

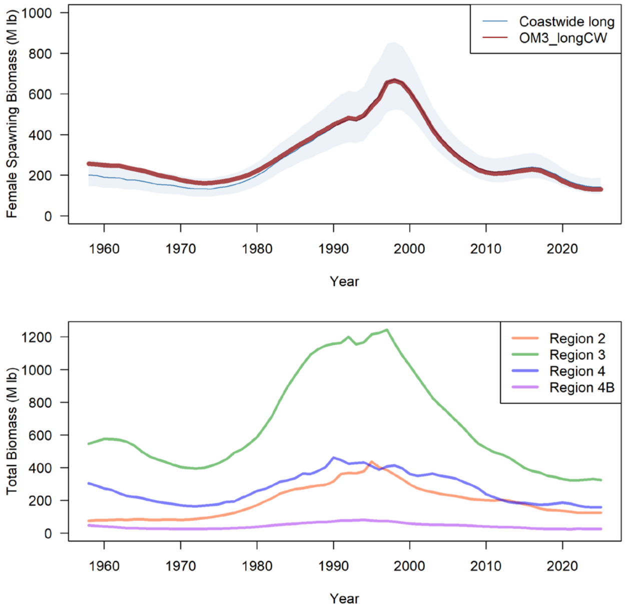

Figure 13. The spawning biomass from the OM3_longCW model compared to the estimated spawning biomass from the long AAF assessment model (top). The bottom plot shows the total biomass (all ages) in each Region from the OM3_longCW model.

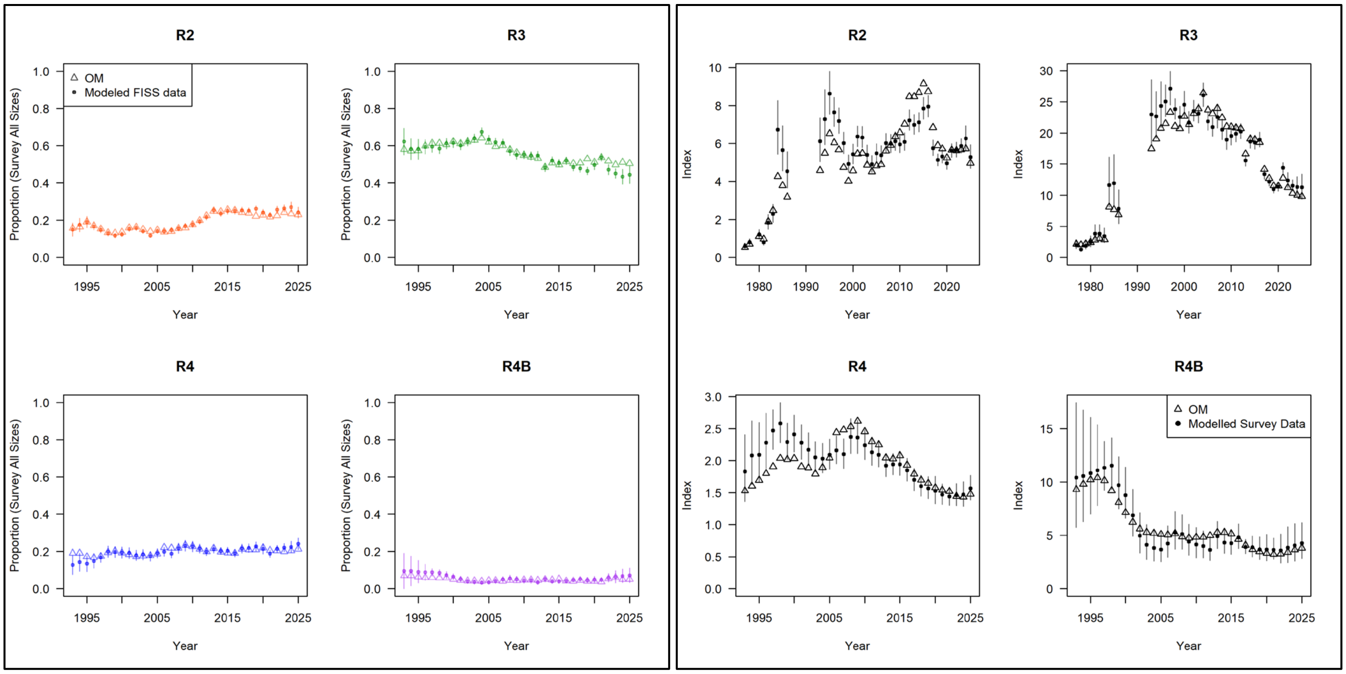

Figure 14. The left plots show the proportion of all sizes biomass in each Region from the OM3_longCW model (triangles) and the FISS modelled output with 95% credible intervals (circles). The right plots show the predicted index from the OM3_longCW model (triangles) and the FISS index (circles).

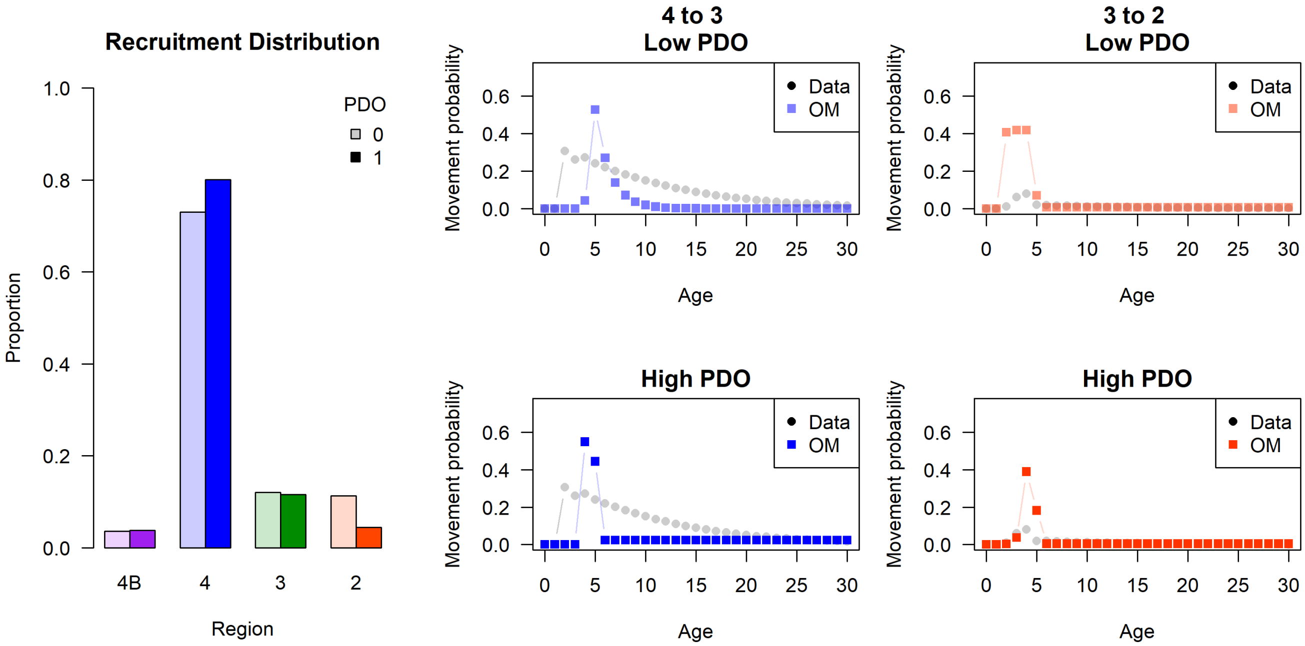

Figure 15. Distribution (proportion) of coastwide recruitment to each Region (leftmost plot). The proportion of numbers of Pacific halibut estimated in OM3_longCW that move from Region 4 to Region 3 (center) and from Region 3 to Region 2 (right) for low PDO regimes (top) and high PDO regimes (bottom). Light grey dots are movement probabilities inferred from empirical observations.

3.1.4 OM4_shortCW

OM4_shortCW is based on the parameters and estimated spawning biomass of the short coastwide stock assessment model. This included natural mortality rates for age 3+ female and male Pacific halibut equal to 0.150 and 0.163, respectively.

The OM4_shortCW model spawning biomass was similar to the short coastwide assessment model spawning biomass, but showed overfitting in the 1990s and a downward trend in recent years (Figure 16). The distribution of 'all sizes' biomass was also fit well except for Region 3 in recent years (Figure 17). The overprediction from OM4_shortCW was a result of slight underfitting in all other Regions. The FISS index fit was not as good as other models and showed departures throughout the time-series in all regions (Figure 17). Overall, the OM4_shortCW model was unable to fit the data as well as the other models.

Similar proportions of recruitment were distributed to Regions 4 and 3, but was slightly higher in Region 4 (and thus lower in Region 3) when the PDO was in a positive regime (Figure 18). Between 50% and 60% of the age-0 fish settled in Region 4 and between 40 and 50% in Region 3. A very small proportion were distributed to Regions 2 and 4B.

Movement was only estimated from Region 4 to Region 3 and from Region 3 to Region 2 (Figure 18). Movement probabilities were similar across PDO regimes for Region 4 to 3, but was slightly higher in high PDO regimes. Fewer Pacific halibut moved from Region 3 to 2 in the high PDO regime. A very small proportion of Pacific halibut 6 years and older moved from either of these regions, except that Pacific halibut up to age 9 showed some movement from Region 4 to 3 in high PDO years.

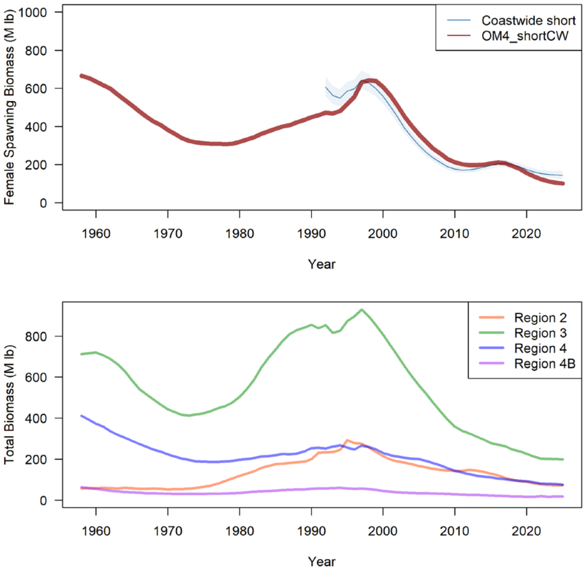

Figure 16. The spawning biomass from the OM4_shortCW model compared to the estimated spawning biomass from the long AAF assessment model (top). The bottom plot shows the total biomass (all ages) in each Region from the OM4_shortCW model.

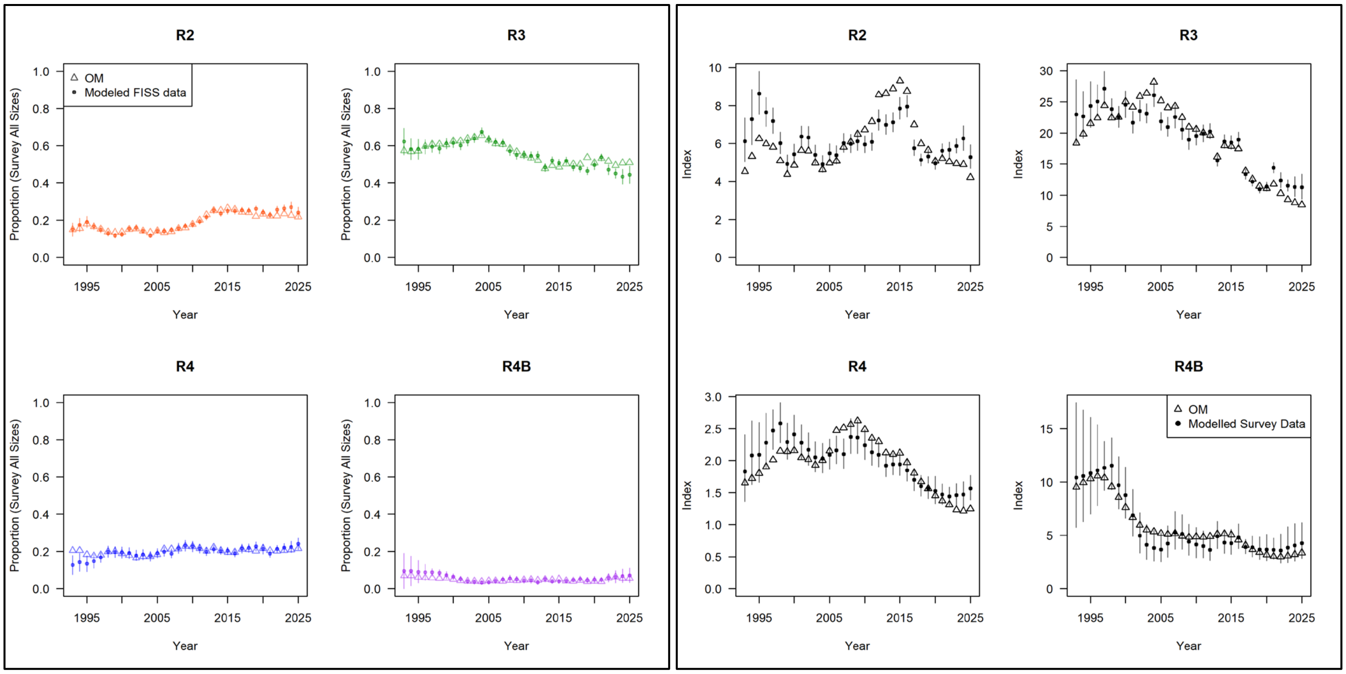

Figure 17. The left plots show the proportion of all sizes biomass in each Region from the OM4_shortCW model (triangles) and the FISS modelled output with 95% credible intervals (circles). The right plots show the predicted index from the OM4_shortCW model (triangles) and the FISS index (circles).

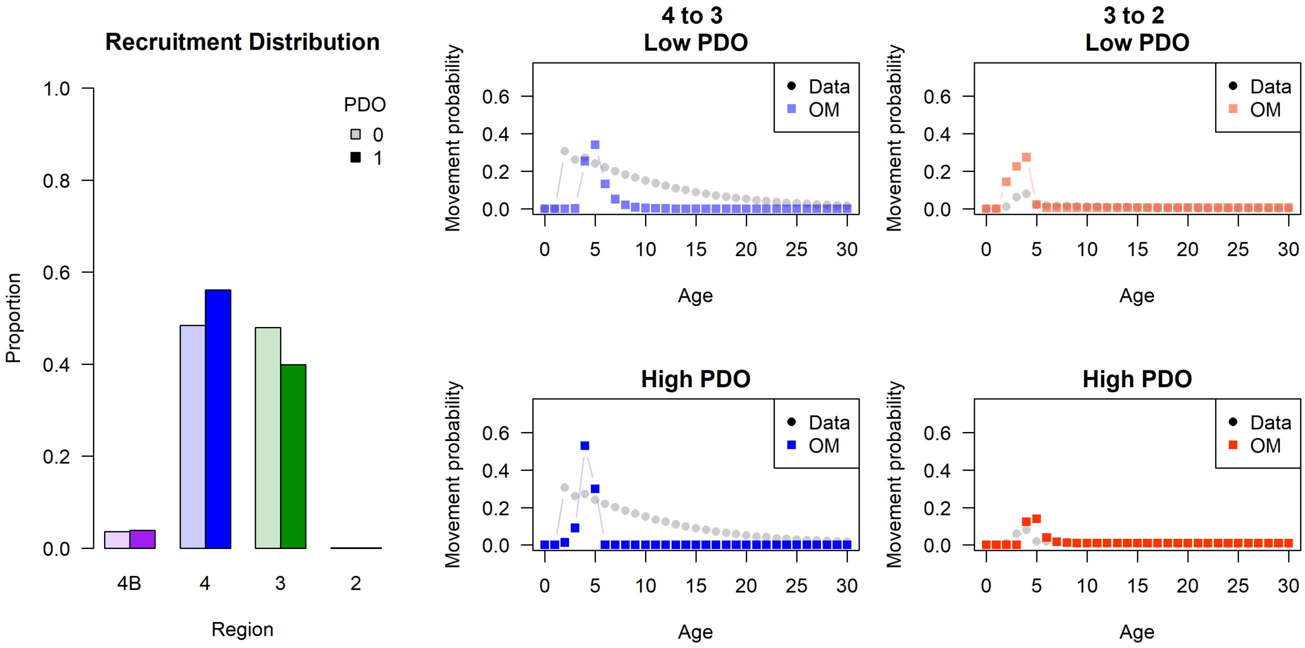

Figure 18. Distribution (proportion) of coastwide recruitment to each Region (leftmost plot). The proportion of numbers of Pacific halibut estimated in OM4_shortCW that move from Region 4 to Region 3 (center) and from Region 3 to Region 2 (right) for low PDO regimes (top) and high PDO regimes (bottom). Light grey dots are movement probabilities inferred from empirical observations.

3.1.5 Discussion of conditioning

These are preliminary results of the first steps of the conditioning process, and although major revisions to these individual models are not expected, some minor changes may occur when adding variability to the estimated parameters and other process such as steepness of the stock-recruitment relationship. Additionally, the SRB will review these results at the 28th Session of the Scientific Review Board (SRB028) and may make some recommendations for improvement.

All of the models captured the recent trends in the spawning biomass but showed consistent overfitting to the distribution in Region 3 in recent years. It is not certain why this occurs, and no combination of parameters could be found that rectified this while simultaneously fitting all the data sources reasonably well. For example, fitting to only stock distribution data with the OM1_longAAF model still showed this overfitting (Figure 19). It is possible that the response of Pacific halibut dynamics to the environment (e.g. PDO) has changed in recent years, whether through movement, recruitment distribution, or some other factor. The 2025 stock assessment has classified the PDO in a low regime since 1998, and recent years have seen the lowest annual average PDO in the entire time-series (Figure 20). However, the North Pacific Ocean has been recently experiencing warmer regional temperatures and novel relationships between climate variables and the PDO (Litzow et al. 2020). It is possible that these novel processes are causing a change in population parameters that the OM models are unable to capture. It will be important to capture this uncertainty when determining variability in the OM.

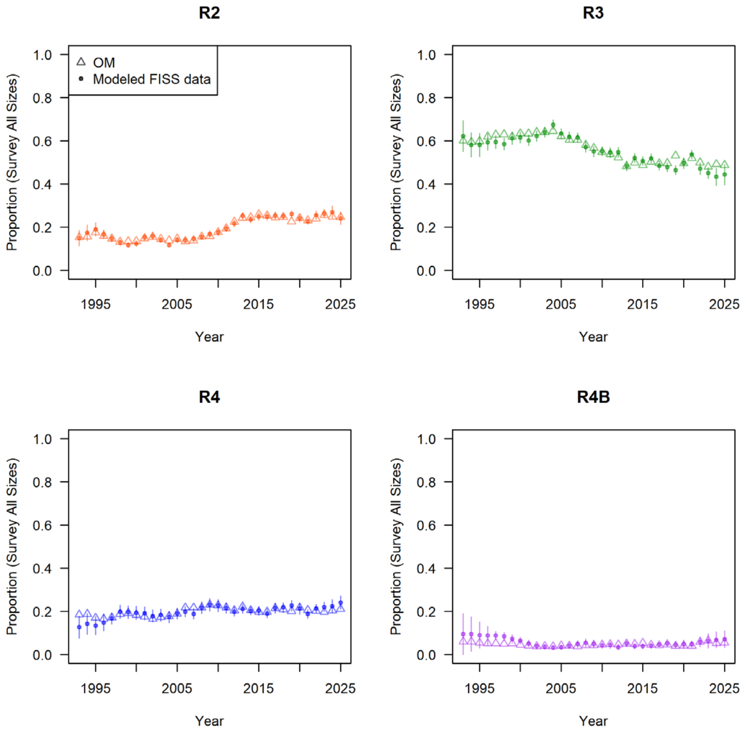

Figure 19. Results of fits to stock distribution in each Region when fitting to only stock distribution data using the OM1_longAAF model. This model is not considered for use as a conditioned model in the MSE framework but is useful to understand model fitting.

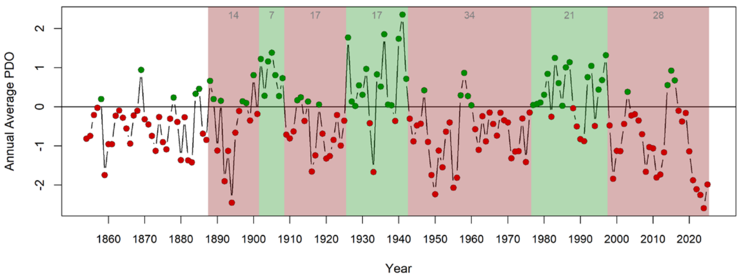

Figure 20. Annual PDO determined by averaging monthly values as of April 2026 (https://www.ncei.noaa.gov/pub/data/cmb/ersst/v5/index/ersst.v5.pdo.dat). Red and green shaded areas indicate low and high regimes, respectively, as used in the 2025 stock assessment and OM. Numbers in the shaded areas indicate the number of years for that regime.

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5 RECOMMENDATION/S

That the MSAB:

1) **NOTE** paper IPHC-2026-MSAB022-06 that describes MSE work completed in 2025 and early 2026, including definitions of overfished and depleted, investigations of effects of productivity regimes on the management of Pacific halibut, evaluations of fishing intensity under low productivity, and conditioning of the OM following the full stock assessment.

6 APPENDICES

Nil

IPHC-2026-MSAB022-07

Considerations for the Management Strategy Evaluation Program of Work for 2026-2027

Prepared by: IPHC Secretariat (A. Hicks, I. Stewart; 08 April 2026)

PURPOSE

To provide the Management Strategy Advisory Board (MSAB) with an overview of work topics for the IPHC Management Strategy Evaluation (MSE) in 2026–2027.

1 INTRODUCTION

Items from the MSE Program of Work for 2025-2026 that have been completed are reported in documents IPHC-2025-SRB027-08, IPHC-2025-AM102-11, and IPHC-2026-MSAB022-06. These include examining simulations with autocorrelated recruitment, conducting pilot simulations to determine an appropriate definition of a 'depleted' stock state, examining the effects of productivity on stock size and management outcomes, and preparing the IPHC Harvest Strategy Policy (HSP) for adoption. This document describes items noted by the Commission for the 2026–2027 MSE Program of Work as well as potential additional items noted in past meetings of the MSAB and IPHC Scientific Review Board (SRB).

2 MSE PROGRAM OF WORK FOR 2026–2027

The IPHC HSP (adopted in December 2025) defines a 3-year timeline for the MSE process. The Operating Model (OM) is updated every third year, following the full stock assessment. After updating the OM, management procedures (MPs) are re-evaluated to ensure that they continue to meet the objectives of the Commission. Other tasks, pending the updated OM, are described below.

The Commission noted prioritized topics for the 2026–2027 MSE Program or Work.

> **IPHC-2026-AM102-R, para. 56**. *The Commission NOTED that the 2026 MSE and HSP Program of Work will include the following high priority topics:*
>
> *a) Update and recondition the MSE Operating Model in accordance with the schedule defined in the Harvest Strategy Policy;*
>
> *b) Evaluate a range of SPR values to determine if the optimal reference coastwide fishing intensity is different than the current reference fishing intensity (F43%) defined in the HSP;*
>
> *c) Investigate productivity regimes to determine how the Pacific halibut population and fisheries respond to different productivity regimes, if the optimal reference fishing intensity differs across productivity regimes, and how productivity regimes may be incorporated into a Management Procedure;*

d) Further develop the Depleted concept and identify a limit reference point below which recovery of the Pacific halibut population would be uncertain.

IPHC-2026-AM102-R, para. 57. *The Commission NOTED that the 2026 MSE and HSP Program of Work will include the following low priority topics, which may not be completed before AM103:*

a) Improve the estimation model used in the MSE framework to better characterize the stock assessment in the simulations;

b) Evaluate potential management actions to invoke when approaching a depleted limit reference point;

c) Evaluate additional elements of Management Procedures which may include a triennial assessment frequency, constraints and smoothers on the interannual change in the TCEY, and empirical rules to determine the reference TCEY in years without a stock assessment;

d) Determine reference points using the updated MSE Operating Model (e.g. FMSY and MSY);

e) Develop guidance documents for the Harvest Strategy Policy (e.g. specifications of a rebuilding plan).

IPHC-2026-AM102-R, para. 58. *The Commission NOTED that the 2026 MSE and HSP Program of Work should not include topics related to the distribution of the TCEY, as this is part of the decision-making process and not part of the management procedure, as described in the Harvest Strategy Policy.*

IPHC-2026-AM102-R, para. 59. *The Commission NOTED that outcomes of the 2026 MSE workplan (e.g. an optimal fishing intensity) may be used to update the Harvest Strategy Policy in the future.*

2.1 High priority tasks

The Commission identified four (4) high priority tasks for the MSE Program of Work, which are either defined by the HSP or essential to ensuring that the HSP reflects the current knowledge of the Pacific halibut stock and fisheries.

2.1.1 Condition the MSE Operating Model

Immediately following a full stock assessment, which occurs every three years, the MSE operating model is conditioned using updated data streams, newly estimated parameters from the stock assessment, and improved understanding of processes driving Pacific halibut population dynamics and fisheries. This is also an opportunity to implement improved and updated OM code incorporating current best practices.

The process is time-consuming and involves the following workflow.

1. Outcomes of each individual model of the ensemble stock assessment are summarized.
2. Parameters and assumptions in each individual model of the OM are linked to each individual model of the ensemble stock assessment and updated to match those in the stock assessment.
3. Mortality and weight-at-age for each fishery is extended to the most recent year.
4. Weight-at-age for the FISS and population is updated and extended to the most recent year.
5. The Pacific Decadal Oscillation (PDO) is updated to the most recent year (and revised for this development cycle based on the new series used in the 2025 stock assessment).
6. An optimized OM executable is compiled and a directory structure for each individual model is created.
7. Parameters for each individual model (e.g. movement, recruitment distribution, average recruitment, initial fishing mortality) are estimated based on fits to stock distribution, regional indices of abundance, age compositions, and the estimated spawning biomass from the linked individual stock assessment model.
8. Individual historical trajectories are created for each individual model of the OM using estimated uncertainty and correlations between parameters.
9. Inputs and outputs for each individual trajectory is saved to the appropriate directory and a reduced set of necessary inputs is saved to GitHub for distribution among computers and for record keeping.

The four individual models of the OM (OM1_longAAF, OM2_shortAAF, OM3_longCW, and OM4_shortCW) were conditioned through step 7 in early 2026 and details are reported in IPHC-2026-MSAB022-06. The variability for each individual model is currently being determined.

Once the OM is conditioned, the process does not need to be repeated until after the next full stock assessment, or an exceptional circumstance occurs (see Section 3.8 of the IPHC HSP). However, after each update stock assessment, mortality, weight-at-age and other data or inputs may be updated to reflect recent realizations (steps 1–5).

2.1.2 Evaluate a range of SPR values

The IPHC HSP defines a reference fishing intensity ($F_{SPR=43\%}$) that was determined to meet the Commission’s objectives using past MSE simulations. With an updated OM, it is useful to ensure that the reference fishing intensity continues to be the optimal fishing intensity to meet those objectives. Therefore, a range of fishing intensities (i.e. SPR values) should be evaluated.

At MSAB022, and recommendation was made to evaluate a range of SPR values.

> **IPHC-2025-MSAB021-R, para. 36**: *The MSAB REQUESTED further evaluations of the following MP elements, after the OM is conditioned following the full 2025 stock assessment:*

> *a) fishing intensities including, but not limited to, SPRs of 40%, 43%, 46%, 52%, 55%, and 100% (no directed fishing); …*

This is a reasonable range to determine an optimal reference fishing intensity.

2.1.3 Investigate productivity regimes

Recent MSE work has involved investigating the effects of low or high productivity on management outcomes (see IPHC-2025-AM102-11 and IPHC-2026-MSAB022-06), and has found that the range of productivity historically observed for Pacific halibut has profound effects on the magnitude of biomass and mortality limits. Weight-at-age and average recruitment are currently identified as the two major components influencing historical productivity. Low and high PDO regimes have been linked to low and high average recruitment, respectively, and are modelled in the OM. PDO regimes are also parameterized to change the distribution of age-0 recruits and movement of all ages in the OM. Environmental or density-dependent linkages have not been determined for weight-at-age, but low, current, and high periods have been identified from historical observations. There are three main concepts to explore when investigating productivity regimes: determine 1) how the Pacific halibut population and fisheries respond to different productivity regimes, 2) if the optimal reference fishing intensity differs across productivity regimes, and 3) how productivity regimes may be incorporated into a Management Procedure. The MSAB has also requested to investigate productivity.

> **IPHC-2026-MSAB021-R, para 19**. *The MSAB AGREED that it would be useful to explore productivity regimes, their effect on the MSE results, and how it may assist in the selection of a management procedure.*

> **IPHC-2026-MSAB021-R, para 31**. *The MSAB NOTED that simulation results with fixed weight-at-age and high or low Pacific Decadal Oscillation (PDO) (i.e. productivity regimes) were helpful to understand the variability, current stock status, and the implication of different MPs under different productivity regimes.*

> **IPHC-2026-MSAB021-R, para 39**. *The MSAB REQUESTED conducting simulations assuming the following productivity regimes with a subset of the MPs from paras. 36 and 37 and all other sources of variability:*
>
> *a) low recruitment and low weight-at-age;*
>
> *b) low recruitment and current weight-at-age;*
>
> *c) high recruitment and low weight-at-age.*

> **IPHC-2026-MSAB021-R, para 41.** *The MSAB REQUESTED presenting dynamic unfished spawning biomass along with simulated spawning biomass, and trace plots (the purple plots in document IPHC-2025-MSAB021-06) with uncertainty for the productivity regimes at MSAB022 for productivity regimes described in para. 39, with SPRs of 43% and 52%.*

Using the newly conditioned OM, productivity regimes will be defined and fixed in the projections. The Secretariat will work with the MSAB to identify the most effective ways to present these results to better understand the effects that changing productivity has on the Pacific halibut population and fisheries. A range of SPR values will be used in these projections to gain an understanding of the effect of productivity on the optimal fishing intensity. Finally, the Secretariat will work with the MSAB, SRB, and Commissioners to identify potential MPs to evaluate that directly incorporate and respond to productivity.

2.1.4 Further develop the Depleted concept and identify a limit reference point

The IPHC HSP defines two limit biomass reference points (Figure 1) where going below either is to be avoided with a high probability. The first is a dynamic relative spawning biomass that measures only the effect of fishing. The second, called the Depleted limit reference point, is an absolute spawning biomass that measures the effect of fishing and the environment. The potential for recovery of the population is uncertain if it is below the Depleted limit reference point.

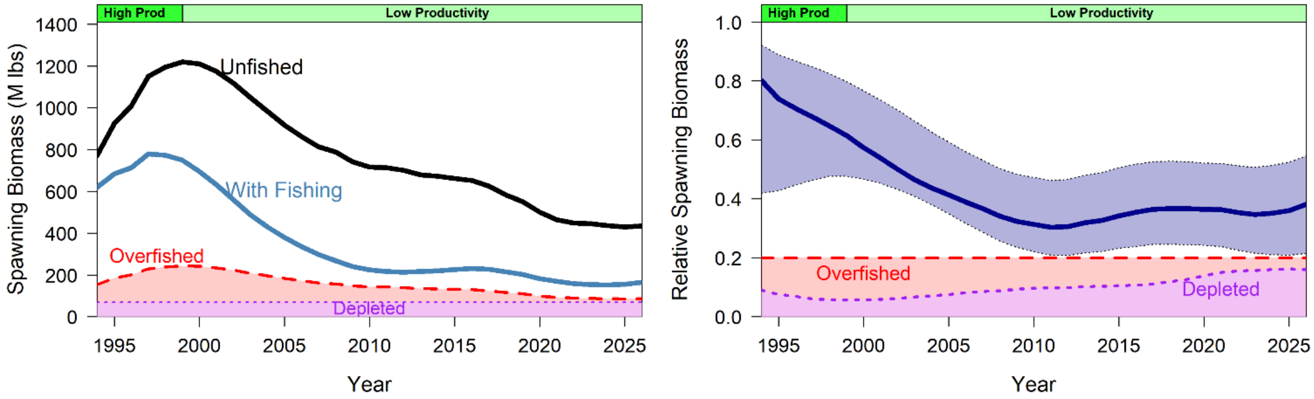

Figure 1. Estimated spawning biomass (left) if fishing had not occurred (unfished) and estimated spawning biomass from the 2025 stock assessment (with fishing). The Overfished threshold of 20% of unfished spawning biomass is shown as a dashed line and changes over time. An example "Depleted" threshold is shown as a straight horizontal line, assuming that it is defined as a constant absolute spawning biomass. The relative spawning biomass ("with fishing" divided by "unfished") is shown on the right with a 95% credible interval (accounting for the covariance in the biomass estimated with and without fishing). The Overfished threshold is shown at 20% and the example Depleted value is shown in purple.

Simulations were conducted in 2025 with the previously conditioned OM (see Section 3 of IPHC-2025-SRB027-08) to determine an absolute biomass below which the potential for recovery would be uncertain. These simulations assumed a 'worst-case' scenario of low productivity and a depensatory spawner-recruit relationship at low spawning biomass. This work was incomplete and will be expanded in 2026 using the newly conditioned OM and further determination of scenarios. The SRB suggested the following.

> **IPHC-2025-SRB027-R. para 23**. *The SRB RECOMMENDED increasing simulation sample sizes to achieve a smooth curve so that a "depleted" threshold can be identified as the lowest spawning stock biomass that results in near 100% probability of recovery.*

Furthermore, the SRB recommended defining an exceptional circumstance if the stock is estimated to be below the Depleted limit reference point because the MP determined from the MSE process should avoid this with high probability and thus would be theoretically unlikely. If the stock was depleted, it may indicate a misspecification within the MSE framework that should be investigated. A definition for this type of exceptional circumstance will be determined with assistance from the MSAB and SRB, and then presented to the Commission for adoption into the IPHC HSP.

> **IPHC-2025-SRB027-R. para 21.** *The SRB RECOMMENDED defining an "exceptional circumstance" if the stock is determined to be "depleted" as this state is unlikely to occur under the circumstances in which the HSP is implemented and may be indicative of a need for model revision*

2.2 Low priority tasks

The Commission, MSAB, and SRB identified additional tasks which are a lower priority than those defined above. These may be possible to complete in 2026 or 2027, but may also be extended into the next MSE Program of Work.

2.2.1 Improve the estimation model in the MSE framework

The closed-loop simulations in the MSE framework consist of an OM and an MP (Figure 2). Within the MP there are three subcomponents. The monitoring subcomponent determines what data are sampled and with what precision. The estimation model uses those data to determine outputs necessary for management (e.g. stock status, mortality limits, etc.). The harvest rule consists of other items necessary for the management of Pacific halibut, such as size limits, distribution of the harvest, and control rules.

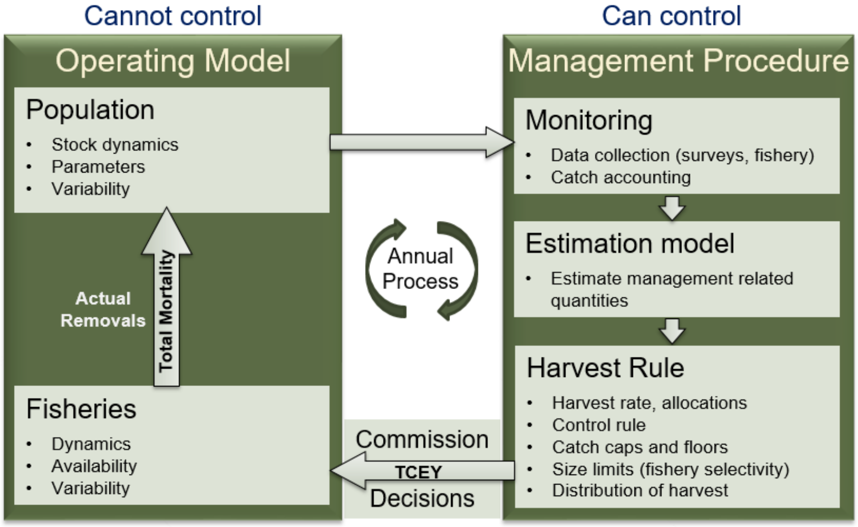

Figure 2. An illustration of the closed-loop simulation within the MSE framework.

Implementing a full ensemble stock assessment in a simulation framework is not technically feasible at this time. Therefore, estimation models in MSE frameworks are typically simplifications of the actual stock assessment to reduce the simulation time but still mimic the behaviours of the stock assessment. The current estimation model mimics the stock assessment with a simple approach of adding correlated random variability to stock status and the mortality limit, which was tuned to outputs of past stock assessments. This method, however, is not capturing potential lags and biases in estimated quantities and cannot simulate different assumptions in the stock assessment. Following an SRB recommendation, work has begun on better mimicking the stock assessment within the MSE framework.

> **IPHC-2025-SRB027-R, para 24.** *The SRB RECOMMENDED considering the development of an assessment model within the MSE framework. This would have multiple benefits including:*
>
> *a) facilitating analysis of the economic consequences of reduced FISS sampling and the associated increased potential for bias in assessment-relevant metrics such as WPUE, the maturity schedule, size-at-age, and age composition.*
>
> *b) Understanding the impacts of uncertainty in natural mortality on management performance.*

2.2.2 Evaluate potential management actions when approaching the depleted limit reference point

Once a depleted limit reference point is determined (see Section 2.1.4), specific management actions to incorporate into a management procedure if this reference point is reached will be evaluated using the MSE framework. This may be a control rule that reduces fishing intensity as the stock approaches a limit reference point to complement the current 30:20 control rule that uses stock status as its operational control points. Other management actions to investigate include adjusting the reference fishing intensity based on the perceived productivity regime.

2.2.3 Evaluate additional elements of Management Procedures

The MSE framework has been used to evaluate many elements of management procedures other than fishing intensity (i.e. SPR). These include constraints or smoothers on the annual change in the TCEY, assessment frequencies other than annual, and alternative control rules. The MSAB has found the investigations useful and has made a number of requests to continue evaluating these as well as new elements.

> **IPHC-2025-MSAB021-R, para 23**. *The MSAB AGREED that a constraint would help to reduce interannual variability in the TCEY when using an annual or triennial assessment frequency.*

> **IPHC-2025-MSAB021-R, para 36**. *The MSAB REQUESTED further evaluations of the following MP elements, after the OM is conditioned following the full 2025 stock assessment:*
>
> *a) fishing intensities including, but not limited to, SPRs of 40%, 43%, 46%, 52%, 55%, and 100% (no directed fishing);*
>
> *b) a triennial assessment frequency;*
>
> *c) various empirical rules to determine the reference coastwide TCEY in non-assessment years;*

d) control rules with triggers at higher values than $RSB_{30\%}$ or based on absolute spawning biomass relative to the spawning biomass estimated at the beginning of 2024.

IPHC-2025-MSAB021-R, para 37. *The MSAB REQUESTED evaluating constraints and smoothers, along with MP elements listed in para. 36, that would potentially reduce the interannual variability in the TCEY, including:*

a) a 3-year rolling average (arithmetic or geometric) on the FISS O32 WPUE used in the empirical rule in a triennial stock assessment frequency;

b) constraints applied only to non-assessment years and/or applied only to assessment years;

c) a phase-in approach for the change in TCEY in assessment years;

d) using the trends in fishery CPUE and/or FISS WPUE to determine if a bigger reduction should be taken than suggested by the unconstrained reference TCEY to curtail further reductions in the SB.

The Secretariat will work with the MSAB and SRB to clearly identify candidate MPs incorporating these elements for evaluation.

2.2.4 Update estimates of reference points

The Secretariat last conducted an in-depth analysis of reference points in 2019 and reported the results in IPHC-2019-SRB015-11 Rev_1. That analysis reported estimates of MSY-based reference points that were used in the development of objectives and the definition of overfishing. Since 2019, there have been many updates to the stock assessment and the OM, as well as new data. Repeating this analysis with the updated OM and stock assessment will ensure that the HSP reflects the most up-to-date information.

2.2.5 Develop guidance documents for the Harvest Strategy Policy

The HSP document is a high-level description of the harvest strategy policy that does not describe all concepts in detail. Therefore, the development of supplementary guidance documents describing some concepts in more detail is necessary for the management of Pacific halibut. Supplementary documents to be developed may include

1. Guidelines for developing a rebuilding plan for Pacific halibut that would apply if it was determined to be overfished;
2. Other guideline documents as determined by the Commission.

Guideline documents will be developed and adopted after input from the MSAB, SRB, and Commission.

2.2.6 Incorporate autocorrelated recruitment in projections

The Secretariat reported results of investigations of autocorrelated recruitment for Pacific halibut and its use in the MSE framework in document IPHC-2025-SRB027-08. This was in response to an SRB request.

> **IPHC-2025-SRB026-R , para 24**. *The SRB RECOMMENDED that recruitment projections in the stock assessment and Management Strategy Evaluation (MSE) incorporate a random-walk starting from the most recent reliable recruitment estimate to constrain expected short-term recruitment around recent estimates rather than immediately reverting to the stock-recruitment relationship.*

These results showed some evidence of autocorrelated recruitment that may be useful to model. MSE simulations with and without autocorrelated projected recruitment showed slight differences in performance metrics. The MSE framework is capable of including autocorrelated recruitment and further discussion with the SRB will determine if this is appropriate for testing and selection of MPs.

2.2.7 Update objectives and performance metrics

The three priority Commission objectives are defined in the HSP and additional objectives considered by the MSAB are presented in Appendix A. It is useful to occasionally revisit objectives to clarify them or add new ones. For example, there have been recent discussions regarding the development of an objective related to absolute spawning biomass or a depleted level (see Section 2.1.4).

It is also useful to review the performance metrics related to the objectives. This ensures that MSE results are presented using applicable and understandable metrics. The SRB suggested considering fishery performance metrics.

> **IPHC-2025-SRB027-R, para 22.** *The SRB RECOMMENDED considering some fishery performance indicators that represent metrics directly observable by stakeholders, e.g. fishery CPUE.*

These types of fishery performance indicators would be best associated with general objective 2.2: Provide Directed Fishery Yield (Appendix A).

3 DISCUSSION

Tasks for the 2026–2027 MSE Program of Work are divided into high priority and low priority. High priority tasks are already underway, and some low priority tasks require completion of high priority tasks. A list of all tasks is provided below.

1. High priority tasks
    1.1. Condition the MSE Operating Model
    1.2. Evaluate a range of SPR values
    1.3. Investigate productivity regimes
    1.4. Further develop the depleted concept and identify a limit reference point
2. Low priority tasks
    2.1. Improve the estimation model in the MSE framework
    2.2. Evaluate potential management actions when approaching the depleted limit reference point
    2.3. Evaluate additional elements of the Management Procedures

2.4. Update estimates of reference points
2.5. Develop guidance documents for the Harvest Strategy Policy
2.6. Incorporate autocorrelated recruitment in projections
2.7. Update objectives and performance metrics

4 RECOMMENDATION/S

That the MSAB:

1) **NOTE** paper IPHC-2026-MSAB022-07 that describes tasks included in the MSE Program of Work for 2026–2027.
2) **REQUEST** additional tasks to be included in the MSE Program of Work for 2026–2027, for consideration by the Commission.

5 APPENDICES

Appendix A: Primary objectives used by the Commission for the MSE evaluations

APPENDIX A

PRIMARY OBJECTIVES USED BY THE COMMISSION FOR THE MSE EVALUATIONS

Table A1. Primary objectives, evaluated over a simulated ten-year period, accepted by the Commission at the 7th Special Session of the Commission (SS07). Objective 1.1 is a biological sustainability (conservation) objective and objectives 2.1, 2.2, and 2.3 are fishery objectives. Priority objectives are shown in green text.

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 the long-term coastwide female relative spawning biomass above a biomass limit reference point ($RSB_{20\%}$) at least 95% of the time	RSB < Spawning Biomass Limit (RSB_{Lim}) RSB_{Lim}=20% unfished spawning biomass	Long-term	0.05	$P(RSB < RSB_{Lim})$ Fail if greater than 0.05
	Maintain a defined minimum proportion of female spawning biomass in each Biological Region	$p_{SB,2} > 5\%$ $p_{SB,3} > 33\%$ $p_{SB,4} > 10\%$ $p_{SB,4B} > 2\%$	Long-term	0.05	$P(p_{SB,R} < p_{SB,R,min})$
2.1 MAINTAIN SPAWNING BIOMASS AT OR ABOVE A LEVEL THAT OPTIMIZES FISHING ACTIVITIES	Maintain the long-term coastwide female relative spawning biomass at or above a biomass reference point ($RSB_{36\%}$) 50% or more of the time	RSB<Spawning Biomass Reference (RSB_{Thresh}) RSB_{Thresh}=$RSB_{36\%}$ unfished spawning biomass	Long-term	0.50	$P(RSB < RSB_{Thresh})$ Fail if greater than 0.5
2.2. PROVIDE DIRECTED FISHING YIELD	Optimize average coastwide TCEY	Median coastwide TCEY	Short-term		Median $\overline{TCEY}$
	Optimize TCEY among Regulatory Areas	Median $TCEY_A$	Short-term		Median $\overline{TCEY_A}$
	Optimize the percentage of the coastwide TCEY among Regulatory Areas	Median $\%TCEY_A$	Short-term		Median $\left(\overline{\frac{TCEY_A}{TCEY}}\right)$
	Maintain a minimum TCEY for each Regulatory Area	Minimum $TCEY_A$	Short-term		Median Min(TCEY)
	Maintain a percentage of the coastwide TCEY for each Regulatory Area	Minimum $\%TCEY_A$	Short-term		Median Min(%TCEY)
2.3. LIMIT VARIABILITY IN MORTALITY LIMITS	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_A)	Short-term		Median AAV_A

$$AAV_t = \frac{\sum_{t+1}^{t+9}|TCEY_t - TCEY_{t-1}|}{\sum_{t}^{t+9} TCEY_t} \qquad AC_t = \frac{|TCEY_t - TCEY_{t-1}|}{TCEY_{t-1}}$$

Outcomes of the 2025 Informational Meeting of the Management Strategy Advisory Board

PREPARED BY: IPHC SECRETARIAT (A. HICKS, 15 APRIL 2026)

PURPOSE

To provide the MSAB with the outcomes 2025 Informational Meeting of the Management Strategy Advisory Board.

BACKGROUND

An informational session was held on 21 October 2025 via MS-Teams.

OUTCOMES

1. The stock assessment presents 3-year projections, which can be characterized as "immediate-term". The MSE results are presented as short-term (4-13 years) and long-term.
2. The MSAB noted that the definition of overfishing recently changed, and is now determined annually as opposed to probabilistically based on projections. The existing HSP should be read through for consistency and to avoid unintended consequences.
3. In the current draft HSP, overfishing is defined as exceeding a fishing intensity associated with an SPR of 35%, but the estimated realised SPR in any year is uncertain. Therefore, if this definition is retained, the probability of overfishing should be presented.
4. The MSAB discussed the concept of depleted and how it relates to overfished. They realised that it may have implications as a conservation tool and look forward to future research defining depleted and associated concepts.
5. The MSAB feels that trace plots (e.g. "purple plots") are useful for visualizing short- and long-term spawning biomass projections at given SPR values, along with trade-off plots that compare AAV and TCEY values at differing spawning biomass levels. The MSAB thinks that these will be useful to the Commission decision-making process, but suggests that the Commission be given an example and notified that additional plots at differing SPR levels can be produced as requested.
6. The section on the rebuilding plan needs additional specification, including a) ensuring this section and other sections in the HSP are consistent (e.g. clarifications of fishing activities when at an overfished state), b) describing the actions for the directed fishery if the stock is declared overfished before a rebuilding plan is in place and when a rebuilding plan is implemented.
7. The MSAB is in favour of scheduling a Spring 2026 meeting (MSAB022) in April or May of 2026, preferably after the PFMC meeting (7-12 April) and before SRB028 (19-21 May). The week of April 20th should be avoided, as the Seafood Expo Global is taking place that week in Barcelona, Spain.