



Report of the 25th Session of the IPHC Scientific Review Board (SRB025)

Meeting held in Seattle, WA, USA, 24-26 September 2024

Commissioners

Canada	United States of America
Paul Ryall	Jon Kurland
Neil Davis	Robert Alverson
Peter DeGreef	Richard Yamada

Executive Director

David T. Wilson, Ph.D.

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Participants in the Session
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IPHC Secretariat

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Contact details:

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



ACRONYMS

AI	Artificial Intelligence	MSAB	Management Strategy Advisory Board
AM	Annual Meeting (of the IPHC)	MSE	Management Strategy Evaluation
CPUE	Catch-per-unit-effort	OM	Operating Model
FISS	Fishery-Independent Setline Survey	SRB	Scientific Review Board
IM	Interim Meeting (of the IPHC)	TCEY	Total Constant Exploitation Yield
IPHC	International Pacific Halibut Commission	U.S.A.	United States of America
MP	Management Procedure	WPUE	Weight-per-unit-effort

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; ACCEPTED** (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 25th Session of the International Pacific Halibut Commission (IPHC) Scientific Review Board (SRB025) was held in Seattle, WA, USA from 24-26 September 2024, and was open to online observer participation. The meeting was opened by the Chairperson, Dr Sean Cox (Canada), and the Executive Director, Dr David Wilson. The following are a subset of the complete recommendations/requests for action from the SRB025, that are provided in full at [Appendix IV](#).

RECOMMENDATIONS

IPHC 5-Year Program of Integrated Research and Monitoring (2022-26)

- SRB025–Rec.01 ([para. 14](#)) The SRB **RECOMMENDED** that the IPHC 5-year Program of Integrated Research and Monitoring be revised by SRB026 to reflect changing priorities in light of major progress on biological research and ongoing monitoring challenges.
- SRB025–Rec.02 ([para. 15](#)) The SRB **RECOMMENDED** incorporating evaluation of new technologies into the 5-year Program of Integrated Research and Monitoring. Initial examples include:
- testing samples of AI-generated age compositions in the assessment model as soon as is practicable to determine their potential value for that purpose;
 - using AI to support ageing requirements for gene-tagging and/or CKMR methods to estimate abundance. These ages would be required beyond ageing workloads for normal assessment purposes;
 - epigenetic ageing (a new project beginning 2025), which could provide more reliable and unbiased ages than AI and perhaps comparable in precision to human-read ages.

Pacific halibut stock assessment

- SRB025–Rec.03 ([para. 18](#)) The SRB **RECOMMENDED** considering the impact of alternative FISS designs not only on the coast-wide abundance estimates but also on our understanding of the stock distribution across regions.

Management strategy evaluation

- SRB025–Rec.04 ([para. 24](#)) **NOTING** the analysis of depensation, the SRB **RECOMMENDED** redoing this analysis in the future whenever estimated spawning stock biomass falls below the minimum level previously observed within the corresponding PDO regime.
- SRB025–Rec.05 ([para. 26](#)) The SRB strongly **RECOMMENDED** against using MSE (a strategic tool) in the annual TCEY setting process. Exceptional circumstances checks (on WPUE and CATCH) are used to judge whether management procedures are generating appropriate recommendations in a given year.
- SRB025–Rec.06 ([para. 27](#)) The SRB **RECOMMENDED** including performance metrics expressing impacts of alternative FISS designs and MP options in terms of the dollar value of foregone yield to more directly capture economic outputs. The SRB **RECOGNISED** that there is long-term price uncertainty and complicated economics. Nevertheless, it is not unreasonable to present economic performance for the short-term projections.
- SRB025–Rec.07 ([para. 30](#)) The SRB **RECOMMENDED** adopting realised coastwide catch as a fishery-dependent indicator for testing exceptional circumstances. Realised coastwide catch each



year can be compared to the projected distribution of future TCEY for that year to determine whether biological or management processes (e.g. decision variability) are leading to unexpected TCEY.

SRB025–Rec.08 ([para. 31](#)) The SRB **RECOMMENDED** adding a measurable objective related to absolute spawning biomass under the general objective 2.1 “maintain spawning biomass at or above a level that optimises fishing activities” to be included in the priority Commission objectives after, or in place of, the current relative biomass threshold objective.

Biology and ecology

SRB025–Rec.09 ([para. 35](#)) The SRB **RECOMMENDED** that when incorporating the new maturity ogive derived from the use of generalised additive models into the stock assessment, that the Secretariat consider using annual calculation of a regionally weighted ogive for years where FISS regional abundance estimates are available rather than one weighted by the 2023 FISS relative abundances by biological region.

SRB025–Rec.10 ([para. 36](#)) The SRB **NOTED** a decrease in the coastwide A50, driven largely by changes in Biological Region 2 from 2022 to 2023 and **RECOMMENDED**:

- a) not to pool years to inspect potential decreasing trends in the age at maturity;
- b) investigating separately the maturity ogives and the age at the first maturity by determining, where possible, whether an individual has spawned previously.

2025 FISS design evaluation

SRB025–Rec.11 ([para. 44](#)) The SRB **RECOMMENDED** a preliminary analysis of potential alternative approaches to generating Pacific halibut abundance estimates in the future. For example, the MSE simulations could be used to generate projected survey deficits over the next 3-5 yrs to estimate the distribution of cumulative "supplemental funding" (CSF) required over that time. The CSF can then be compared to the estimated cost of developing and executing alternative abundance estimators such as gene-tagging and/or CKMR, which partially rely on less expensive commercial catch sampling. Genetic methods require up-front development costs that may look more reasonable against the prospect of the CSF. Annual CKMR costs could be substantially less than annual FISS costs, while providing reliable absolute biomass estimates regardless of stock status.

Age composition data (both fishery-dependent and fishery-independent)

SRB025–Rec.12 ([para. 47](#)) The SRB **RECOMMENDED** that the Secretariat investigate using the AI to identify region of collection. Otolith shape is sometimes used as a tool for understanding mixing and stock structure and the AI may have skill in identifying region of origin (and thus mixing and migration rates) from otolith images.

OTHER

([Para. 29](#)) The SRB **ACCEPTED** that 1) there are significant benefits of moving to a triennial assessment frequency in terms of freeing Secretariat resources to conduct other quantitative analyses (see [para. 22](#)); and 2) the MSE analysis showed no apparent cost of triennial assessment in terms of lost yield or increased interannual variability in TCEY.



1. OPENING OF THE SESSION

1. The 25th Session of the International Pacific Halibut Commission (IPHC) Scientific Review Board (SRB025) was held in Seattle, WA, USA from 24-26 September 2024, and was open to online observer participation. The list of participants is provided at [Appendix I](#). The meeting was opened by the Chairperson, Dr Sean Cox (Canada), and the Executive Director, Dr David Wilson.
2. The SRB **RECALLED** its mandate, as detailed in Appendix VIII, Sect. I, para. 1-3 of the IPHC Rules of Procedure (2024):
 1. *The Scientific Review Board (SRB) shall provide an independent scientific peer review of Commission science/research proposals, programs, and products, including but not limited to:*
 - a. *Data collection;*
 - b. *Historical data sets;*
 - c. *Stock assessment;*
 - d. *Management Strategy Evaluation;*
 - e. *Migration;*
 - f. *Reproduction;*
 - g. *Growth;*
 - h. *Discard survival;*
 - i. *Genetics and Genomics.*
 2. *Undertake periodic reviews of science/research strategy, progress, and overall performance.*
 3. *Review the recommendations arising from the MSAB and the RAB.*

2. ADOPTION OF THE AGENDA AND ARRANGEMENTS FOR THE SESSION

3. The SRB **ADOPTED** the Agenda as provided at [Appendix II](#). The documents provided to the SRB are listed in [Appendix III](#). Participants were reminded that in accordance with the [IPHC Rules of Procedure \(2024\)](#), all documents and presentations for the meeting were published on the IPHC website 30 days and 10 days prior to the Session, respectively: <https://www.iphc.int/meetings/25th-session-of-the-iphc-scientific-review-board-srb025/>

3. IPHC PROCESS

3.1 *SRB annual workflow*

4. The SRB **RECALLED** that the core purpose of the SRB025 is to review progress on the IPHC research and monitoring activities, including specific products, and to provide guidance for the delivery of products to the Commission at its Interim Meeting (IM100) in November/December 2024, and Annual Meeting (AM101) in January 2025.

3.2 *Update on the actions arising from the 24th Session of the SRB (SRB024)*

5. The SRB **NOTED** paper [IPHC-2024-SRB025-03](#) that provided the SRB with an opportunity to consider the progress made during the intersessional period on the recommendations/requests arising from the SRB024.
6. The SRB **AGREED** to consider and revise the actions as necessary, and to combine them with any new actions arising from SRB025 into a consolidated list for future reporting.



3.3 Outcomes of the 100th Session of the IPHC Annual Meeting (AM100)

7. The SRB **NOTED** paper [IPHC-2024-SRB025-04](#) that detailed the outcomes of the 100th Session of the IPHC Annual Meeting (AM100), relevant to the mandate of the SRB, and **AGREED** to consider how best to provide the Commission with the information it has requested, throughout the course of the current SRB meeting.
8. **NOTING** that at the 100th Session of the IPHC, the Commission adopted a Statement on Climate Change, that is available on the IPHC website: [IPHC-2024-PP-05](#), the SRB **AGREED** to consider and advise on the potential implications of climate change for the conservation and management of Pacific halibut, and any related impacts on the Contracting Parties, through responses to the 5YPIRM activities (see [Section 4](#)) where appropriate.

3.4 Observer updates

9. The SRB **NOTED** the following updates (paraphrased) from the Canadian science advisor:
 - a) **Management Strategy Evaluation (MSE)**: *Commissioners will continue to make decisions (discretionary) that do not precisely match what would come from a formal management procedure and, therefore asked about how to make the MSE robust to this intended use.*
 - b) **Fishery-Independent Setline Survey (FISS)**: *How to balance data and assessment needs with financial constraints over the longer term? What would the minimum FISS design look like while longer-term stable funds are sought? What are acceptable CV and bias ranges?*
10. The SRB **NOTED** the following updates (paraphrased) from the USA science advisor (represented by the Policy Advisor in absentia):
 - a) General interest in the FISS discussions.

4. INTERNATIONAL PACIFIC HALIBUT COMMISSION 5-YEAR PROGRAM OF INTEGRATED RESEARCH AND MONITORING (2022-26)

11. The SRB **NOTED** paper [IPHC-2024-SRB025-05](#), that provided the SRB with the IPHC 5-year Program of Integrated Research and Monitoring (2022-26), including a research tracking tool.
12. The SRB **RECALLED** that:
 - a) the IPHC Secretariat conducts activities to address key issues identified by the Commission, its subsidiary bodies, the broader stakeholder community, and the IPHC Secretariat;
 - b) the process of identifying, developing, and implementing the IPHC's science-based activities involves several steps that are circular and iterative in nature, but result in clear project activities and associated deliverables;
 - c) the process includes developing and proposing projects based on direct input from the Commission, the experience of the IPHC Secretariat given its broad understanding of the resource and its associated fisheries, and concurrent consideration by relevant IPHC subsidiary bodies (including the SRB), and where deemed necessary, including by the Commission, additional external peer review;
 - d) the IPHC Secretariat commenced implementation of the new Plan in 2022 and will keep the Plan under review on an ongoing basis.
13. The SRB **RECALLED** that an overarching goal of the IPHC 5-year Program of Integrated Research and Monitoring (2022-26) is to promote integration and synergies among the various research and monitoring activities of the IPHC Secretariat in order to improve knowledge of key inputs into the Pacific halibut stock



assessment, and Management Strategy Evaluation (MSE) processes, thereby providing the best possible advice for management decision making processes.

14. The SRB **RECOMMENDED** that the IPHC 5-year Program of Integrated Research and Monitoring be revised by SRB026 to reflect changing priorities in light of major progress on biological research and ongoing monitoring challenges.
15. The SRB **RECOMMENDED** incorporating evaluation of new technologies into the 5-year Program of Integrated Research and Monitoring. Initial examples include:
 - a) testing samples of AI-generated age compositions in the assessment model as soon as is practicable to determine their potential value for that purpose;
 - b) using AI to support ageing requirements for gene-tagging and/or CKMR methods to estimate abundance. These ages would be required beyond ageing workloads for normal assessment purposes;
 - c) epigenetic ageing (a new project beginning 2025), which could provide more reliable and unbiased ages than AI and perhaps comparable in precision to human-read ages.

4.1 Research

4.1.1 Pacific halibut stock assessment

16. The SRB **NOTED** paper [IPHC-2024-SRB025-06](#), that provided a response to recommendations and requests made during SRB024 ([IPHC-2024-SRB024-R](#)) and to provide the Commission with an update on progress toward the 2024 stock assessment.
17. The SRB **NOTED** the informative assessment model projections of alternative FISS designs (with associated bias and precision) and spawning biomass trend scenarios. In particular, the analyses revealed how uncertainty associated with reduced FISS designs could lead to non-trivial short-term catch losses (provided that definitions of risk are the same as applied in recent TCEY decisions).
18. The SRB **RECOMMENDED** considering the impact of alternative FISS designs not only on the coast-wide abundance estimates but also on our understanding of the stock distribution across regions.
19. The SRB **NOTED** that projections of catch losses described above (in para. 16) may be sensitive (i.e., underestimated) to the assumptions of linearity in fishery CPUE and/or FISS WPUE under reduced survey designs.
20. The SRB **REQUESTED** an analysis of the relationship between commercial CPUE and the FISS WPUE at the coastwide and regional levels to investigate the strength of hyperstability/hyperdepletion in CPUE for the stock assessment in 2025. This analysis should include two scenarios: (i) the historical FISS WPUE estimates and (ii) FISS WPUE estimates calculated from reduced designs (i.e. subset the historical FISS data and recalculate WPUE from the reduced data set). The statistical model used for the analysis should account for uncertainty in the FISS index (the X-axis variable) using, for example, an error-in-variables approach like that in Harley et al. 2001 (CJFAS). This analysis represents a first step in including presumed hyperstability in scenarios that investigate the impacts of reduced FISS designs.
21. The SRB **NOTED** and approved of the priority areas planned for the 2025 full stock assessment, including the material requested in [paragraph 20](#), to be presented at SRB026.



22. **RECALLING** previous discussions at SRB020 ([IPHC-2022-SRB020-R](#)) and SRB021 ([IPHC-2022-SRB021-R](#)) regarding stock assessment research priorities and that several of the smaller topics have been addressed, the SRB **REQUESTED** an update on the list of larger topics larger topics that may require moving to a three-year schedule for stock assessment. Examples of such topics include the following:

- a) Exploration of alternative stock assessment model frameworks, e.g. state-space models like the Woods Holde Assessment Model (WHAM), Bayesian models, and spatially structured models beyond the Areas as Fleets model.

4.1.2 Management strategy evaluation

23. The SRB **NOTED** paper [IPHC-2024-SRB025-07](#) and [IPHC-2024-SRB025-INF01](#), that provided an update on Management Strategy Evaluation (MSE) progress in 2024, and work supporting the development of the IPHC Harvest Strategy Policy (HSP).

24. **NOTING** the analysis of depensation, the SRB **RECOMMENDED** redoing this analysis in the future whenever estimated spawning stock biomass falls below the minimum level previously observed within the corresponding PDO regime.

25. **NOTING** [paragraph 9a](#), the SRB **AGREED** that worst-case productivity operating model (OM) scenarios are the only way to test robustness of decision variability.

26. The SRB strongly **RECOMMENDED** against using MSE (a strategic tool) in the annual TCEY setting process. Exceptional circumstances checks (on WPUE and CATCH) are used to judge whether management procedures are generating appropriate recommendations in a given year.

27. The SRB **RECOMMENDED** including performance metrics expressing impacts of alternative FISS designs and MP options in terms of the dollar value of foregone yield to more directly capture economic outputs. The SRB **RECOGNISED** that there is long-term price uncertainty and complicated economics. Nevertheless, it is not unreasonable to present economic performance for the short-term projections.

28. The SRB **NOTED** that the MSE simulation results reveal the asymmetric costs of decision-making variability; that is, less decision variability associated with the 15% TCEY variability constraint results in higher average yield than procedures that combine that constraint with decision-making variability. The result may be even more profound if decision-variability is non-random and instead delays implementing TCEY reductions when they are warranted by stock declines.

29. The SRB **ACCEPTED** that 1) there are significant benefits of moving to a triennial assessment frequency in terms of freeing Secretariat resources to conduct other quantitative analyses (see [para. 22](#)); and 2) the MSE analysis showed no apparent cost of triennial assessment in terms of lost yield or increased interannual variability in TCEY.

30. The SRB **RECOMMENDED** adopting realised coastwide catch as a fishery-dependent indicator for testing exceptional circumstances. Realised coastwide catch each year can be compared to the projected distribution of future TCEY for that year to determine whether biological or management processes (e.g. decision variability) are leading to unexpected TCEY.

31. The SRB **RECOMMENDED** adding a measurable objective related to absolute spawning biomass under the general objective 2.1 “maintain spawning biomass at or above a level that optimises fishing activities” to be included in the priority Commission objectives after, or in place of, the current relative biomass threshold objective.

32. **NOTING** that the definitions of “overfished” and “overfishing” are consistent with the use of these terms in the USA federal fishery management systems under the Magnuson-Stevens Act, but differ from the terms and



definitions elsewhere, the SRB **REQUESTED** a broader investigating of terms and definitions related to B and F reference points used by fishery managements organisations throughout the world.

4.1.3 Biology and ecology

33. The SRB **NOTED** paper [IPHC-2024-SRB025-08](#) that provided a description of progress towards research activities described in the IPHC's 5-Year Program of Integrated Research and Monitoring (2022-2026).
34. The SRB **NOTED** the progress made by the IPHC Secretariat on genomic analyses of Pacific halibut stock structure and that the results of those analyses support the concept of a single genetic group in IPHC Convention Waters.
35. The SRB **RECOMMENDED** that when incorporating the new maturity ogive derived from the use of generalised additive models into the stock assessment, that the Secretariat consider using annual calculation of a regionally weighted ogive for years where FISS regional abundance estimates are available rather than one weighted by the 2023 FISS relative abundances by biological region.
36. The SRB **NOTED** a decrease in the coastwide A50, driven largely by changes in Biological Region 2 from 2022 to 2023 and **RECOMMENDED**:
 - a) not to pool years to inspect potential decreasing trends in the age at maturity;
 - b) investigating separately the maturity ogives and the age at the first maturity by determining, where possible, whether an individual has spawned previously.
37. The SRB **REQUESTED** a preliminary evaluation of the feasibility for using information on the genetic differentiation of Pacific halibut parasites as a possible stock structure marker.
38. The SRB **NOTED** a new project on epigenetic age estimation funded by Alaska Sea Grant in collaboration with Alaska Pacific University and the plans to explore avenues to study the mechanisms underlying the observed changes in weight-at-age for future grant opportunities.

4.2 Monitoring

4.2.1 Fishery-dependent data

39. Nil.

4.2.2 Fishery-independent data

4.2.2.1 2025 FISS design evaluation

40. The SRB **NOTED** paper [IPHC-2024-SRB025-09](#) that provided an opportunity to comment on potential FISS design alternatives for 2025-29 in order to inform Commission decision making regarding the FISS. A revised preliminary cost evaluation of the 2025 designs is included.
41. The SRB **NOTED** that FISS designs more or less reduced from the Reduced Core Design would generate comparable precision (CV) at the coastwide level but higher and rapidly increasing CVs and potentially higher undetected biases, especially at the Bioregion level.
42. The SRB **NOTED** that, although a revenue-neutral FISS sounds good in theory, in practice it has the undesirable property of linking FISS reliability to uncontrolled fluctuations in abundance, prices, and quota availability of other species (e.g. sablefish).
43. The SRB **NOTED** that FISS funding shortfalls may not resolve in the near future regardless of further changes to FISS designs, which are already reduced to uneconomical levels. Low CPUE, low fish prices, lack of contract FISS vessels, and high costs should be expected to continue at least over the next few years.



44. The SRB **RECOMMENDED** a preliminary analysis of potential alternative approaches to generating Pacific halibut abundance estimates in the future. For example, the MSE simulations could be used to generate projected survey deficits over the next 3-5 yrs to estimate the distribution of cumulative "supplemental funding" (CSF) required over that time. The CSF can then be compared to the estimated cost of developing and executing alternative abundance estimators such as gene-tagging and/or CKMR, which partially rely on less expensive commercial catch sampling. Genetic methods require up-front development costs that may look more reasonable against the prospect of the CSF. Annual CKMR costs could be substantially less than annual FISS costs, while providing reliable absolute biomass estimates regardless of stock status.

4.2.3 Age composition data (both fishery-dependent and fishery-independent)

45. The SRB **NOTED** paper [IPHC-2024-SRB025-10](#) that summarised the information available on the use of artificial intelligence (AI) for determining the age of fish from images of collected otoliths and provides an update on the exploratory work of implementing an AI-based age determination model for Pacific halibut.

46. The SRB **NOTED** the ongoing advancement of AI technologies in the field of marine science offers considerable potential to enhance the efficiency of age determination of Pacific halibut using otolith images. Preliminary results presented here suggest that AI could serve as a promising alternative to the current ageing protocol, which relies entirely on manual age reading. However, cost-benefit analysis will be key and this will depend in large part on the ability of an AI trained on images from one year to predict ages of images from another year.

47. The SRB **RECOMMENDED** that the Secretariat investigate using the AI to identify region of collection. Otolith shape is sometimes used as a tool for understanding mixing and stock structure and the AI may have skill in identifying region of origin (and thus mixing and migration rates) from otolith images.

5. MANAGEMENT SUPPORTING INFORMATION

48. Nil

6. OTHER BUSINESS

49. The SRB **AGREED** that the 26th Session of the SRB (SRB026) should be held from 10-12 June 2025, and that the 27th Session of the SRB (SRB027) should tentatively be scheduled for 23-25 September 2025.

7. REVIEW OF THE DRAFT AND ADOPTION OF THE REPORT OF THE 25TH SESSION OF THE IPHC SCIENTIFIC REVIEW BOARD (SRB025)

50. The Report of the 25th Session of the IPHC Scientific Review Board ([IPHC-2024-SRB025-R](#)) was **ADOPTED** on 26 September 2024, including the consolidated set of recommendations and/or requests arising from SRB025, provided at [Appendix IV](#).



APPENDIX I
LIST OF PARTICIPANTS FOR THE 25TH SESSION OF THE
IPHC SCIENTIFIC REVIEW BOARD (SRB025)

SRB Members

Dr Sean Cox :	spcox@sfu.ca ; Professor, School of Resource and Environmental Management, Simon Fraser University, 8888 University Dr., Burnaby, B.C., Canada V5A 1S6
Dr Olaf Jensen :	olaf.p.jensen@gmail.com ; Associate Professor, Center for Limnology, University of Wisconsin - Madison, 680 N Park St., Madison, WI 53706
Dr Anna Kuparinen :	anna.k.kuparinen@jyu.fi ; Professor, University of Jyväskylä (Finland), PO Box 35 FI-40014

Observers

Canada	United States of America
Ms Ann-Marie Huang (remote): Ann-Marie.Huang@dfo-mpo.gc.ca	Ms Heather Fitch (remote): heather.fitch@noaa.gov
Ms Evelyn Roozee (remote): evelyn.roozee@mail.mcgill.ca	Mr Brian Hoffman (remote): brian.hoffman@hohtribe-nsn.org
-	Mr Kurt Iverson (remote): kurt.iverson@noaa.gov

IPHC Secretariat - participants

Name	Position	Email
Dr David T. Wilson	Executive Director	david.wilson@iphc.int
Dr Josep Planas	Biological and Ecosystem Sciences Branch Manager	josep.planas@iphc.int
Dr Barbara Hutniczak	Fisheries Regulations and Data Services Branch Manager	barbara.hutniczak@iphc.int
Dr Allan Hicks	Quantitative Scientist (Management Strategy Evaluation)	allan.hicks@iphc.int
Dr Ian Stewart	Quantitative Scientist (Stock Assessment)	ian.stewart@iphc.int
Dr Ray Webster	Quantitative Scientist (Biometrician)	ray.webster@iphc.int
Mr Claude Dykstra	Research Biologist (Mortality & Survival)	clauded.dykstra@iphc.int
Mr Andy Jasonowicz	Research Biologist (Genetics)	andy.jasonowicz@iphc.int
Mr Colin Jones	Research Biologist (Life History)	colin.jones@iphc.int

IPHC Secretariat – support/observers

Ms Andrea Keikkala	Assistant Director	andrea.keikkala@iphc.int
Mr Mohammed Arian	Administrative Specialist (Accounting)	mohammed.arian@iphc.int
Ms Kelly Chapman	Administrative Coordinator	kelly.chapman@iphc.int
Mr Kevin Coll	Setline Survey Specialist	kevin.coll@iphc.int
Ms Tara Coluccio	Administrative Specialist / Publications, Snr	tara.coluccio@iphc.int
Ms Joan Forsberg	Otolith Laboratory Technician, Snr	joan.forsberg@iphc.int
Mr Chris Johnston	Otolith Laboratory Technician	chris.johnston@iphc.int
Ms Phoenix Keane	Fisheries Data Specialist (Field)	phoenix.keane@iphc.int



Mr Thomas Kong	Fisheries Data Specialist / GIS	tom.kong@iphc.int
Ms Kelsey Magrane	Fisheries Data Specialist (HQ)/Otolith Technician	kelsey.magrane@iphc.int
Ms Rachel Rillera	Setline Survey Specialist	rachel.rillera@iphc.int
Ms Crystal Simchick	Biological Science Laboratory Technician	crystal.simchick@iphc.int
Mr Afshin Taheri	Information Technology Specialist (Application Developer)	afshin.taheri@iphc.int
Ms Monica Thom	Port Operations Coordinator	monica.thom@iphc.int
Ms Huyen Tran	Fisheries Data Coordinator	huyen.tran@iphc.int
Mr Kenneth Wickham	Administrative Specialist	kenneth.wickham@iphc.int
Ms Ola Wietecha	Administrative Specialist	ola.wietecha@iphc.int



APPENDIX II

AGENDA FOR THE 25TH SESSION OF THE IPHC SCIENTIFIC REVIEW BOARD (SRB025)

Date: 24-26 September 2024

Location: Seattle, WA, USA, & Remote Meeting

Venue: IPHC HQ & Adobe Connect

Time: 09:00-17:00 (24-25th), 09:00-11:00 (26th) PDT

Chairperson: Dr Sean Cox (Simon Fraser University)

Vice-Chairperson: Nil

- 1. OPENING OF THE SESSION**
- 2. ADOPTION OF THE AGENDA AND ARRANGEMENTS FOR THE SESSION**
- 3. IPHC PROCESS**
 - 3.1. SRB annual workflow (D. Wilson)
 - 3.2. Update on the actions arising from the 24th Session of the SRB (SRB024) (D. Wilson)
 - 3.3. Outcomes of the 100th Session of the IPHC Annual Meeting (AM100) (D. Wilson)
 - 3.4. Observer updates (e.g. Science Advisors)
- 4. INTERNATIONAL PACIFIC HALIBUT COMMISSION 5-YEAR PROGRAM OF INTEGRATED RESEARCH AND MONITORING (2022-26)**
 - 4.1. RESEARCH**
 - 4.1.1. Pacific halibut stock assessment
 - 4.1.2. Management strategy evaluation
 - 4.1.3. Biology and ecology
 - 4.2. MONITORING**
 - 4.2.1. Fishery-dependent data
 - 4.2.2. Fishery-independent data
 - IPHC Fishery-Independent Setline Survey (FISS)
 - 2024 FISS design evaluation (R. Webster)
 - Updates to space-time modelling (R. Webster)
 - 4.2.3. Age composition data (both fishery-dependent and fishery-independent)
- 5. MANAGEMENT SUPPORTING INFORMATION**
- 6. OTHER BUSINESS**
- 7. REVIEW OF THE DRAFT AND ADOPTION OF THE REPORT OF THE 25TH SESSION OF THE IPHC SCIENTIFIC REVIEW BOARD (SRB025)**



APPENDIX III
LIST OF DOCUMENTS FOR THE 25TH SESSION OF THE
IPHC SCIENTIFIC REVIEW BOARD (SRB025)

Document	Title	Availability
IPHC-2024-SRB025-01	Agenda & Schedule for the 24 th Session of the Scientific Review Board (SRB025)	✓ 12 Jun 2024
IPHC-2024-SRB025-02	List of Documents for the 25 th Session of the Scientific Review Board (SRB025)	✓ 12 Jun 2024 ✓ 23 Aug 2024
IPHC-2024-SRB025-03	Update on the actions arising from the 24 th Session of the SRB (SRB024) (IPHC Secretariat)	✓ 22 Aug 2024
IPHC-2024-SRB025-04	Outcomes of the 100 th Session of the IPHC Annual Meeting (AM100) (D. Wilson)	✓ 20 Aug 2024
IPHC-2024-SRB025-05	International Pacific Halibut Commission 5-Year program of integrated research and monitoring (2022-26) (D. Wilson, J. Planas, I. Stewart, A. Hicks, R. Webster, & B. Hutniczak)	✓ 20 Aug 2024
IPHC-2024-SRB025-06	Development of the 2024 Pacific halibut (<i>Hippoglossus stenolepis</i>) stock assessment (I. Stewart & A. Hicks)	✓ 20 Aug 2024
IPHC-2024-SRB025-07	MSE update on progress in 2024 and development of a revised Harvest Strategy Policy (A. Hicks, I. Stewart, & D. Wilson)	✓ 22 Aug 2024
IPHC-2024-SRB025-08	Report on current and future biological and ecosystem science research activities (J. Planas, C. Dykstra, A. Jasonowicz, C. Jones)	✓ 23 Aug 2024
IPHC-2024-SRB025-09	2025-29 FISS design evaluation (R. Webster, I. Stewart, K. Ualesi, T. Jack & D. Wilson)	✓ 23 Aug 2024
IPHC-2024-SRB025-10	Using artificial intelligence (AI) for supplementing Pacific halibut age determination from collected otoliths (B. Hutniczak, J. Forsberg, K. Sawyer Van Vleck, & K. Magrane)	✓ 22 Aug 2024
<i>Information papers</i>		
IPHC-2024-SRB025-INF01	Interim: IPHC Harvest Strategy Policy IPHC-2024-HSP (IPHC)	✓ 21 Aug 2024



APPENDIX IV

CONSOLIDATED SET OF RECOMMENDATIONS AND REQUESTS OF THE 25TH SESSION OF THE
IPHC SCIENTIFIC REVIEW BOARD (SRB025)

RECOMMENDATIONS

IPHC 5-Year Program of Integrated Research and Monitoring (2022-26)

- SRB025–Rec.01 ([para. 14](#)) The SRB **RECOMMENDED** that the IPHC 5-year Program of Integrated Research and Monitoring be revised by SRB026 to reflect changing priorities in light of major progress on biological research and ongoing monitoring challenges.
- SRB025–Rec.02 ([para. 15](#)) The SRB **RECOMMENDED** incorporating evaluation of new technologies into the 5-year Program of Integrated Research and Monitoring. Initial examples include:
- testing samples of AI-generated age compositions in the assessment model as soon as is practicable to determine their potential value for that purpose;
 - using AI to support ageing requirements for gene-tagging and/or CKMR methods to estimate abundance. These ages would be required beyond ageing workloads for normal assessment purposes;
 - epigenetic ageing (a new project beginning 2025), which could provide more reliable and unbiased ages than AI and perhaps comparable in precision to human-read ages.

Pacific halibut stock assessment

- SRB025–Rec.03 ([para. 18](#)) The SRB **RECOMMENDED** considering the impact of alternative FISS designs not only on the coast-wide abundance estimates but also on our understanding of the stock distribution across regions.

Management strategy evaluation

- SRB025–Rec.04 ([para. 24](#)) **NOTING** the analysis of depensation, the SRB **RECOMMENDED** redoing this analysis in the future whenever estimated spawning stock biomass falls below the minimum level previously observed within the corresponding PDO regime.
- SRB025–Rec.05 ([para. 26](#)) The SRB strongly **RECOMMENDED** against using MSE (a strategic tool) in the annual TCEY setting process. Exceptional circumstances checks (on WPUE and CATCH) are used to judge whether management procedures are generating appropriate recommendations in a given year.
- SRB025–Rec.06 ([para. 27](#)) The SRB **RECOMMENDED** including performance metrics expressing impacts of alternative FISS designs and MP options in terms of the dollar value of foregone yield to more directly capture economic outputs. The SRB **RECOGNISED** that there is long-term price uncertainty and complicated economics. Nevertheless, it is not unreasonable to present economic performance for the short-term projections.
- SRB025–Rec.07 ([para. 30](#)) The SRB **RECOMMENDED** adopting realised coastwide catch as a fishery-dependent indicator for testing exceptional circumstances. Realised coastwide catch each year can be compared to the projected distribution of future TCEY for that year to determine whether biological or management processes (e.g. decision variability) are leading to unexpected TCEY.
- SRB025–Rec.08 ([para. 31](#)) The SRB **RECOMMENDED** adding a measurable objective related to absolute spawning biomass under the general objective 2.1 “maintain spawning biomass at or above a



level that optimises fishing activities” to be included in the priority Commission objectives after, or in place of, the current relative biomass threshold objective.

Biology and ecology

SRB025–Rec.09 ([para. 35](#)) The SRB **RECOMMENDED** that when incorporating the new maturity ogive derived from the use of generalised additive models into the stock assessment, that the Secretariat consider using annual calculation of a regionally weighted ogive for years where FISS regional abundance estimates are available rather than one weighted by the 2023 FISS relative abundances by biological region.

SRB025–Rec.10 ([para. 36](#)) The SRB **NOTED** a decrease in the coastwide A50, driven largely by changes in Biological Region 2 from 2022 to 2023 and **RECOMMENDED**:

- a) not to pool years to inspect potential decreasing trends in the age at maturity;
- b) investigating separately the maturity ogives and the age at the first maturity by determining, where possible, whether an individual has spawned previously.

2025 FISS design evaluation

SRB025–Rec.11 ([para. 44](#)) The SRB **RECOMMENDED** a preliminary analysis of potential alternative approaches to generating Pacific halibut abundance estimates in the future. For example, the MSE simulations could be used to generate projected survey deficits over the next 3-5 yrs to estimate the distribution of cumulative "supplemental funding" (CSF) required over that time. The CSF can then be compared to the estimated cost of developing and executing alternative abundance estimators such as gene-tagging and/or CKMR, which partially rely on less expensive commercial catch sampling. Genetic methods require up-front development costs that may look more reasonable against the prospect of the CSF. Annual CKMR costs could be substantially less than annual FISS costs, while providing reliable absolute biomass estimates regardless of stock status.

Age composition data (both fishery-dependent and fishery-independent)

SRB025–Rec.12 ([para. 47](#)) The SRB **RECOMMENDED** that the Secretariat investigate using the AI to identify region of collection. Otolith shape is sometimes used as a tool for understanding mixing and stock structure and the AI may have skill in identifying region of origin (and thus mixing and migration rates) from otolith images.

REQUESTS

Pacific halibut stock assessment

SRB025–Req.01 ([para. 20](#)) The SRB **REQUESTED** an analysis of the relationship between commercial CPUE and the FISS WPUE at the coastwide and regional levels to investigate the strength of hyperstability/hyperdepletion in CPUE for the stock assessment in 2025. This analysis should include two scenarios: (i) the historical FISS WPUE estimates and (ii) FISS WPUE estimates calculated from reduced designs (i.e. subset the historical FISS data and recalculate WPUE from the reduced data set). The statistical model used for the analysis should account for uncertainty in the FISS index (the X-axis variable) using, for example, an error-in-variables approach like that in Harley et al. 2001 (CJFAS). This analysis represents a first step in including presumed hyperstability in scenarios that investigate the impacts of reduced FISS designs.



SRB025–Req.02 ([para. 22](#)) **RECALLING** previous discussions at SRB020 ([IPHC-2022-SRB020-R](#)) and SRB021 ([IPHC-2022-SRB021-R](#)) regarding stock assessment research priorities and that several of the smaller topics have been addressed, the SRB **REQUESTED** an update on the list of larger topics larger topics that may require moving to a three-year schedule for stock assessment. Examples of such topics include the following:

- a) Exploration of alternative stock assessment model frameworks, e.g. state-space models like the Woods Holde Assessment Model (WHAM), Bayesian models, and spatially structured models beyond the Areas as Fleets model.

Management strategy evaluation

SRB025–Req.03 ([para. 32](#)) **NOTING** that the definitions of “overfished” and “overfishing” are consistent with the use of these terms in the USA federal fishery management systems under the Magnuson-Stevens Act, but differ from the terms and definitions elsewhere, the SRB **REQUESTED** a broader investigating of terms and definitions related to B and F reference points used by fishery managements organisations throughout the world.

Biology and ecology

SRB025–Req.04 ([para. 37](#)) The SRB **REQUESTED** a preliminary evaluation of the feasibility for using information on the genetic differentiation of Pacific halibut parasites as a possible stock structure marker.