



Report of the 18th Session of the IPHC Scientific Review Board (SRB018)

Meeting held electronically, 15-17 June 2021

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ACRONYMS

AM	Annual Meeting
ARIMA	Auto Regressive Integrated Moving Average
BS	Bering Sea
COVID-19	Novel Coronavirus 2019
CV	Coefficient of Variation
DMR	Discard Mortality Rate
DNA	Deoxyribonucleic Acid
FISS	Fishery-Independent Setline Survey
GOA	Gulf of Alaska
IPHC	International Pacific Halibut Commission
MSAB	Management Strategy Advisory Board
MSE	Management Strategy Evaluation
PCR	Polymerase Chain Reaction
SAA	Size-At-Age
SNP	Single Nucleotide Polymorphisms
SRB	Scientific Review Board
TCEY	Total Constant Exploitable Yield
U.S.A.	United States of America

DEFINITIONS

A set of working definitions are provided in the IPHC Glossary of Terms and abbreviations:
<https://www.iphc.int/the-commission/glossary-of-terms-and-abbreviations>

HOW TO INTERPRET TERMINOLOGY CONTAINED IN THIS REPORT

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

- Level 1: RECOMMENDED; RECOMMENDATION; ADOPTED** (formal); **REQUESTED; ENDORSED** (informal): A conclusion for an action to be undertaken, by a Contracting Party, a subsidiary (advisory) body of the Commission and/or the IPHC Secretariat.
- Level 2: AGREED:** Any point of discussion from a meeting which the Commission considers to be an agreed course of action covered by its mandate, which has not already been dealt with under Level 1 above; a general point of agreement among delegations/participants of a meeting which does not need to be elevated in the Commission's reporting structure.
- Level 3: NOTED/NOTING; CONSIDERED; URGED; ACKNOWLEDGED:** General terms to be used for consistency. Any point of discussion from a meeting which the Commission considers to be important enough to record in a meeting report for future reference. Any other term may be used to highlight to the reader of an IPHC report, the importance of the relevant paragraph. Other terms may be used but will be considered for explanatory/informational purposes only and shall have no higher rating within the reporting terminology hierarchy than Level 3.



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EXECUTIVE SUMMARY

The 18th Session of the International Pacific Halibut Commission (IPHC) Scientific Review Board (SRB018) was held electronically from 15 to 17 June 2021. 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 SRB018, which are provided in full at [Appendix IV](#).

RECOMMENDATIONS

([para. 4](#)) **NOTING** that the core purpose of the SRB018 is to review progress on the IPHC science program, and to provide guidance for the delivery of products to the SRB019 in September 2021, the SRB **RECALLED** that formal recommendations to the Commission would not be developed at the present meeting, but rather, these would be developed at the SRB019.

REQUESTS

IPHC Fishery-independent setline survey (FISS): 2022-24 FISS design evaluation

- SRB018–Req.1 ([para. 13](#)) The SRB **REQUESTED** plots by survey area of WPUE vs. depth from both FISS and commercial fisheries to help understand if there is part of the Pacific halibut stock in deeper waters not covered by the FISS.
- SRB018–Req.2 ([para. 14](#)) The SRB **REQUESTED** that the IPHC Secretariat conduct a preliminary comparison, to be presented at SRB020, between male, female, and sex-aggregated analysis of the FISS data using the spatial-temporal model.
- SRB018–Req.3 ([para. 15](#)) The SRB **REQUESTED** that the shiny-tool to investigate data and model outputs for the FISS be made available to the SRB by SRB019.

Pacific halibut stock assessment: 2021

- SRB018–Req.4 ([para. 24](#)) The SRB **REQUESTED** an analysis of annual surplus production and the fraction of that production harvested.

Management Strategy Evaluation: update

- SRB018–Req.7 ([para. 36](#)) The SRB **REQUESTED** that the IPHC Secretariat prioritize tasks for the MSE Program of Work that lead to adoption of a well-defined management procedure, taking into account interdependencies among tasks and presenting tasks as linked sets.

Biological and ecosystem sciences research

- SRB018–Req.9 ([para. 40](#)) The SRB **REQUESTED** that the IPHC Secretariat provide information on the age distribution of all females collected to characterize reproductive development throughout the annual cycle in order to refine efforts to identify potential skip-spawning females.
- SRB018–Req.10 ([para. 41](#)) The SRB **REQUESTED** that planned studies on fecundity assessment are prioritized and that the sampling design be developed in coordination with the SA to ensure that the results are as informative as possible for assessment purposes. Effective sample stratification along age, weight and length gradients that maximise the contrast in the effect of these variables will be key to precise estimates of fecundity. Oocyte diameter in contrast may be an important covariate to provide but cannot be used in stratification. The primary goal of the fecundity research should be to estimate the exponent of the fecundity vs. weight relationship for incorporation in the SA.
- SRB018–Req.12 ([para. 43](#)) The SRB **REQUESTED** that the Secretariat use these gene regions and align sequences to the whole genome sequence data. Specifically, the Secretariat should



investigate whether there is sequence variability within gene coding regions or in regions around gene coding regions that may be transcriptional modifiers (e.g. promoters). If genetic variation exists in or near these genes, these variable base pair position(s) (i.e. single nucleotide polymorphisms or SNPs) should be incorporated in other aspects of the Secretariat research; for example for research activities under the Migration and Population Dynamics Research area.

SRB018–Req.13 ([para. 44](#)) The SRB **REQUESTED** that the analysis of seasonal patterns in gonad development be explicitly tied to the development/improvement of the maturity ogive (the vector of proportion mature at age that SA requires).

Pacific halibut fishery economics update

SRB018–Req.14 ([para. 52](#)) The SRB **NOTED** that, without a clearer understanding of the Commissions purpose for future use of this work, it is difficult to provide guidance on prioritising model development (e.g. improve spatial resolution, incorporate dynamic / predictive processes, adding more detail on subsistence and recreational fisheries, including uncertainty in the assessment). The SRB therefore **REQUESTED** specific guidance and clarification from the Commission on the objectives and intended use of this study.

In addition, the SRB provided the following endorsement of the proposed FISS design for 2022:

([Para 16](#)) The SRB **ENDORSED** the final 2022 FISS design as presented in [Fig. 2](#), and provisionally **ENDORSED** the 2023-24 designs ([Figs. 3 and 4](#)), recognizing that these will be reviewed again at subsequent SRB meetings.



1. OPENING OF THE SESSION

1. The 18th Session of the International Pacific Halibut Commission (IPHC) Scientific Review Board (SRB018) was held electronically from 15 to 17 June 2021. 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 \(2021\)](#):
 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 all documents for the meeting were published on the IPHC website, 30 days prior to the Session: <https://www.iphc.int/venues/details/18th-session-of-the-iphc-scientific-review-board-srb018>

3. IPHC PROCESS

3.1 *SRB annual workflow*

4. **NOTING** that the core purpose of the SRB018 is to review progress on the IPHC science program, and to provide guidance for the delivery of products to the SRB019 in September 2021, the SRB **RECALLED** that formal recommendations to the Commission would not be developed at the present meeting, but rather, these would be developed at the SRB019.

3.2 *Update on the actions arising from the 17th Session of the SRB (SRB017)*

5. The SRB **NOTED** paper IPHC-2021-SRB018-03, which provided the SRB with an opportunity to consider the progress made during the intersessional period, on the recommendations/requests arising from the SRB017.
6. The SRB **AGREED** to consider and revise the actions as necessary, and to combine them with any new actions arising from SRB018 into a consolidated list for future reporting.

3.3 *Outcomes of the 97th Session of the IPHC Annual Meeting (AM097)*

7. The SRB **NOTED** paper IPHC-2021-SRB018-04 which detailed the outcomes of the 97th Session of the IPHC Annual Meeting (AM097), 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.



3.4 Observer updates

8. The SRB **NOTED** updates from the two science advisors, who provided brief overviews of some of the points of clarification being sought from the present SRB meeting. These included, but were not limited to: 1) COVID-19 impacts; 2) MSE timelines (to be considered at the SS011, 22 June 2021); 3) spatial dynamics of the stock, 4) fishery economics process for SRB review, 5) effects of past physical environment (temperature) and recruitment as potential importance to stock assessment; 6) expression of appreciation for IPHC Secretariat efforts to tie stock assessment and MSE needs to current and future biological and ecosystem science research initiatives.

4. IPHC FISHERY-INDEPENDENT SETLINE SURVEY (FISS)

4.1 2022-24 FISS design evaluation

9. The SRB **NOTED** paper IPHC-2021-SRB018-05, which proposed designs for the IPHC's Fishery-Independent Setline Survey (FISS) for the 2022-24 period, and an evaluation of those designs, for review by the Scientific Review Board.
10. The SRB appreciated the analysis of parameter stability and **NOTED** that changes in parameter estimates are minor and consistent with expectations based on new data being added each year.
11. The SRB **NOTED** the full FISS sampling grid which consists of 1890 stations ([Fig. 1](#)) from which an optimal subset of stations can be selected when devising annual FISS designs. In the Bering Sea, the full FISS design does not provide complete spatial coverage, and FISS data are augmented with calibrated data from NOAA-Fisheries and Alaska Department of Fish and Game (ADFG) trawl surveys (stations can vary by year – 2019 designs are shown in [Fig. 1](#)).

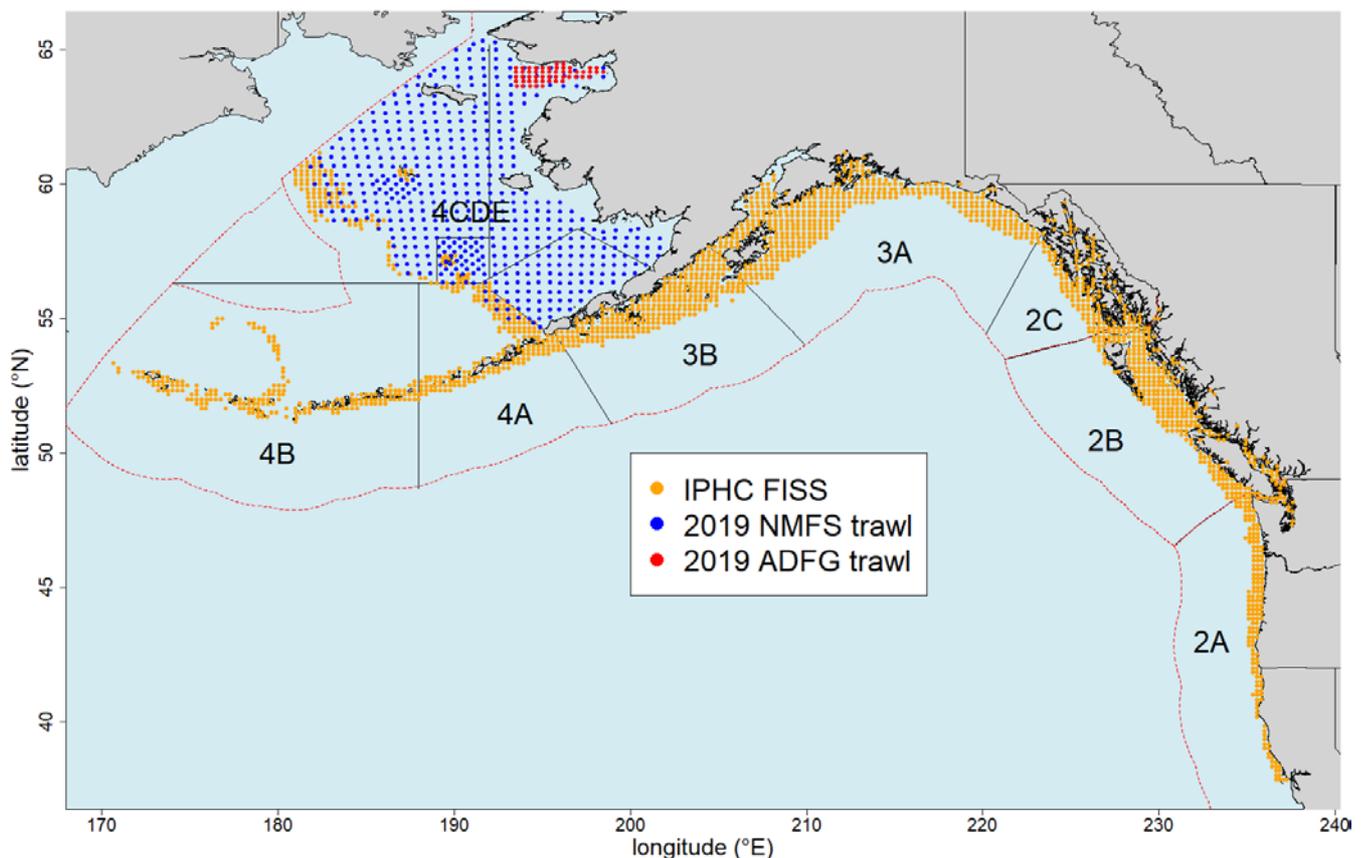


Figure 1. Map of the full 1890 station FISS design, with orange circles representing stations available for inclusion in annual sampling designs, and other colours representing trawl stations from 2019 NMFS and ADFG surveys used to provide complementary data for Bering Sea modelling.



12. The SRB **NOTED** that plots of forecast vs subsequently observed values scaled to their respective mean for a given year could also be added to the Space-time Model Explorer tool for review by the SRB.
13. The SRB **REQUESTED** plots by survey area of WPUE vs. depth from both FISS and commercial fisheries to help understand if there is part of the Pacific halibut stock in deeper waters not covered by the FISS.
14. The SRB **REQUESTED** that the IPHC Secretariat conduct a preliminary comparison, to be presented at SRB020, between male, female, and sex-aggregated analysis of the FISS data using the spatial-temporal model.
15. The SRB **REQUESTED** that the shiny-tool to investigate data and model outputs for the FISS be made available to the SRB by SRB019.
16. The SRB **ENDORSED** the final 2022 FISS design as presented in [Fig. 2](#), and provisionally **ENDORSED** the 2023-24 designs ([Figs. 3 and 4](#)), recognizing that these will be reviewed again at subsequent SRB meetings.
17. The SRB **NOTED** that following the changes to the endorsed design for 2020, changes to the 2022 design would increase the risk of the bias component in the model by an unknown quantity.

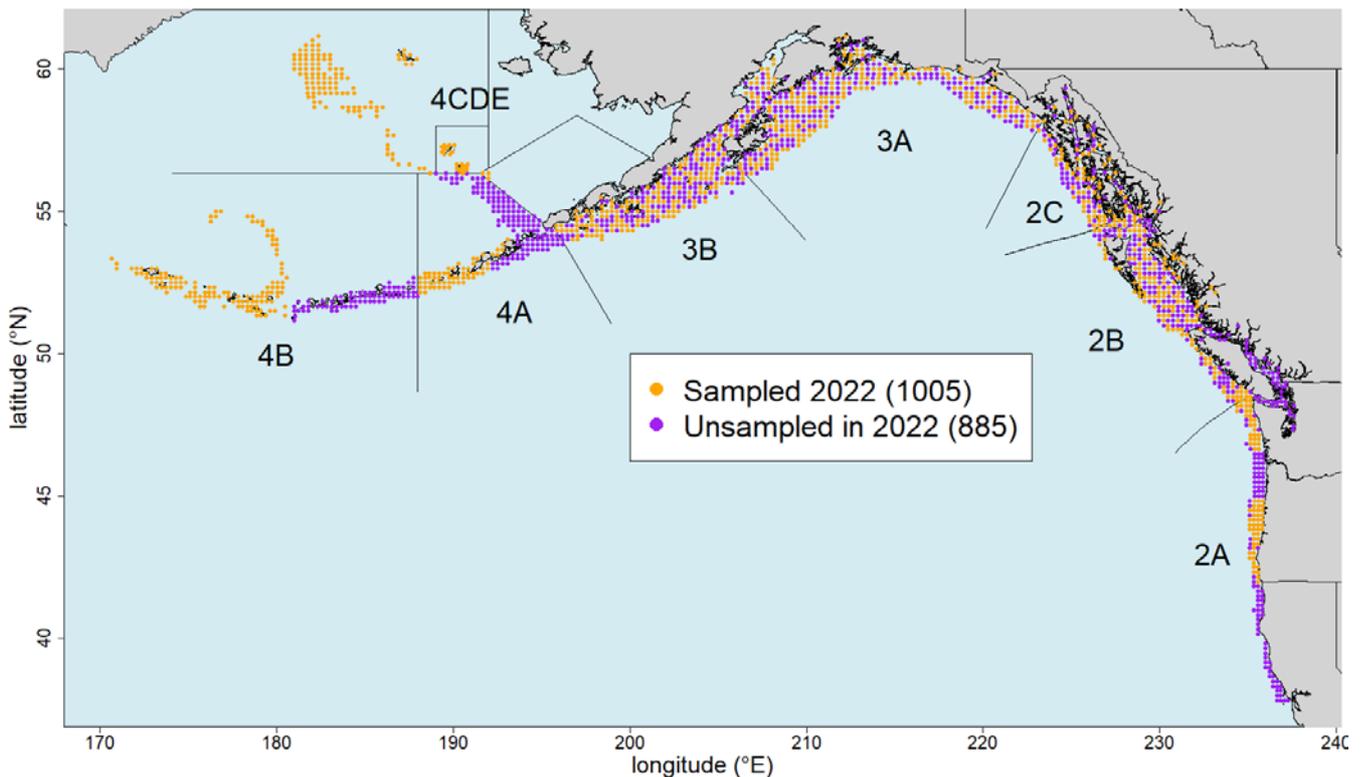


Figure 2. Endorsed minimum FISS design in 2022 (orange circles) based on randomized sampling in 2B-3B, and a subarea design elsewhere. Purple circles are optional for meeting data quality criteria.

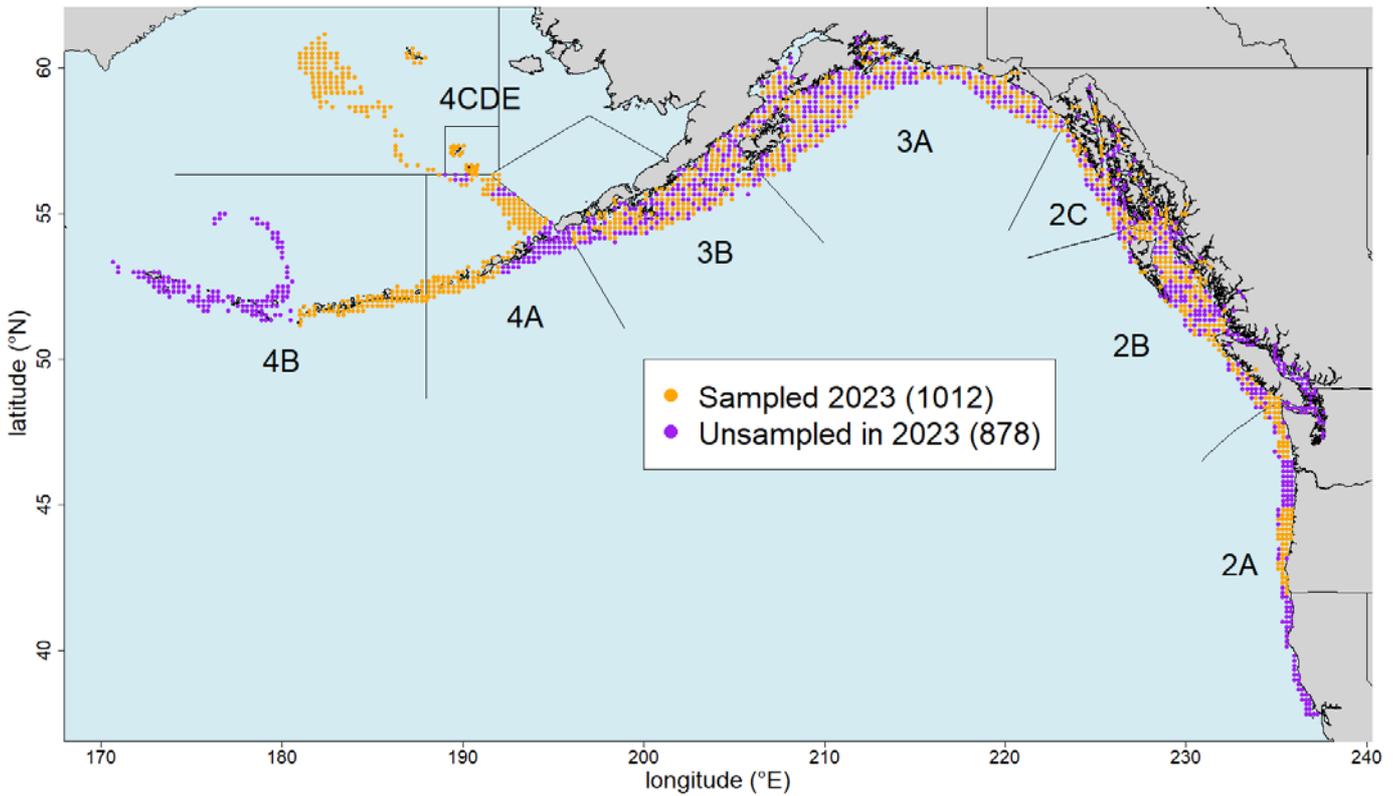


Figure 3. Proposed minimum FISS design in 2023 (orange circles) based on randomized sampling in 2B-3B, and a subarea design elsewhere. Purple circles are optional for meeting data quality criteria.

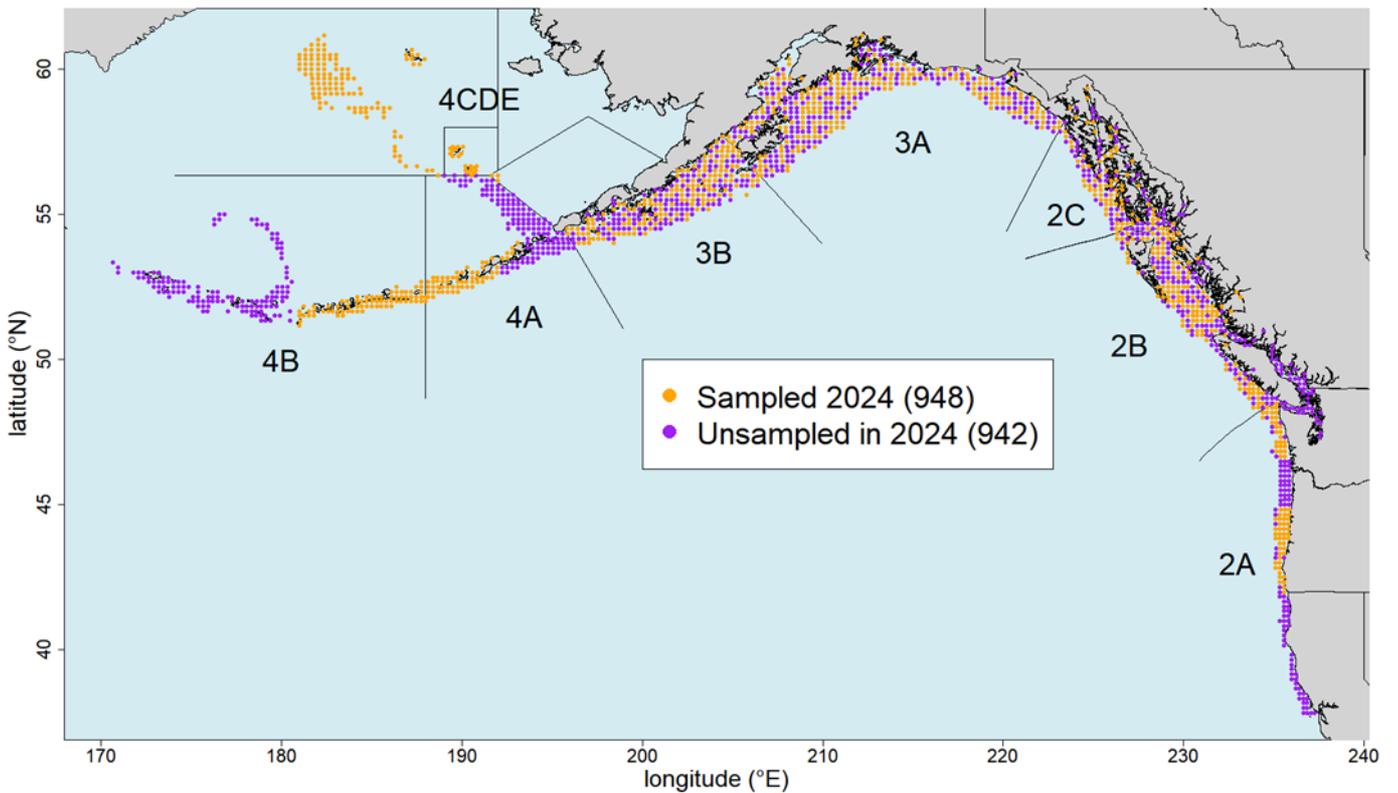


Figure 4. Proposed minimum FISS design in 2024 (orange circles) based on randomized sampling in 2B-3B, and a subarea design elsewhere. Purple circles are optional for meeting data quality criteria.



5. PACIFIC HALIBUT STOCK ASSESSMENT: 2021

18. The SRB **NOTED** paper IPHC-2021-SRB018-06, which provided a response to requests made during SRB016 and SRB017 ([IPHC-2020-SRB016-R](#), [IPHC-2020-SRB017-R](#)) and to provide an update of the 2021 assessment development.
19. The SRB **NOTED** paper IPHC-2021-SRB018-06, which provided a response to requests made during SRB016 and SRB017 ([IPHC-2020-SRB016-R](#), [IPHC-2020-SRB017-R](#)) and to provide an update of the 2021 assessment development.
20. The SRB **NOTED** that the 2021 stock assessment will be an update, including extending the time-series' for standard data sources (fishing mortality estimates, FISS index and age compositions, commercial fishery CPUE and age compositions, weight-at-age, etc.) and adding an additional year (2020) of sex-specific fishery age compositions based on genetic assays.
21. The SRB **NOTED** the evaluation of the logistic-normal likelihood in comparison with the Dirichlet-multinomial and multinomial, and was supportive of the IPHC Secretariat suggestion for a studentship in this area of research.
22. The SRB **NOTED** that the updated data weighting for 2020 was similar to that from the 2019 full assessment analysis and **AGREED** that the assessment should continue to update the data weighting, for both updates and full assessments, and to report the historical changes in data weightings.
23. The SRB **AGREED** that the choice of software and the research focus for further development of the stock assessment are dependent on both the MSE development and the Commission's pending adoption of a formal Management Procedure.
24. The SRB **REQUESTED** an analysis of annual surplus production and the fraction of that production harvested.
25. The SRB **NOTED** the explicit research priorities linked to critical sources of stock assessment uncertainty in the three categories of: data collection and processing, biological inputs, and fishery yield.
26. The SRB **ACKNOWLEDGED** and welcomed the explanation on how these topics linked to the work in other research areas as well as a guide to direct future research presented in IPHC-2021-SRB018-10.

6. MANAGEMENT STRATEGY EVALUATION: UPDATE

6.1 *A summary of the MSE outcomes to date*

27. The SRB **NOTED** paper IPHC-2021-SRB018-07 which provided the SRB with an update of the IPHC Management Strategy Evaluation (MSE) and an evaluation of management procedures for coastwide scale and distributing the TCEY to IPHC Regulatory Areas, as well as a response to requests made during SRB016 and SRB017 ([IPHC-2020-SRB016-R](#), [IPHC-2020-SRB017-R](#)) and potential topics for a program of work.
28. The SRB **NOTED** that integrating the various scientific areas and activities within the IPHC has been an on ongoing challenge, which is understandable to some degree as the main focus has been annual stock assessments and MSE development. In the past, the SRB has, therefore, strongly recommended that IPHC complete an initial round of MSE development that ends in clear recommendations for a harvest strategy without getting too bogged down in details of the operating models. The strong support and teamwork put into the MSE could now be bearing fruit, so we congratulate the Secretariat for that.
29. The SRB **NOTED** that there are many performance metrics reported from the MSE simulations and there are alternative ways to summarize them.
30. The SRB **REQUESTED** that the IPHC Secretariat present a revised system diagram of the MSE, showing components of variability and their implementation within MSE.



31. The SRB **AGREED** that Exceptional Circumstances (EC) should be defined around empirical, directly observable quantities to ensure transparency. ECs are meant to define unambiguous boundaries for acceptable system behaviour regardless of perspective (i.e. modeller, Commissioner, stakeholder).
32. The SRB **REQUESTED** that the Secretariat review potential indicators for use in defining ECs.
33. The SRB **AGREED** that the MSE is a useful tool to prioritize research topics with respect to their potential to improve management performance.
34. The SRB **URGED** continued development of the MSE over the next 5-year Plan to ready the MSE for providing such research prioritisation advice.
35. The SRB **NOTED** that the tasks in the MSE Program of Work collectively represent more work than can be accomplished in the next two years.
36. The SRB **REQUESTED** that the IPHC Secretariat prioritize tasks for the MSE Program of Work that lead to adoption of a well-defined management procedure, taking into account interdependencies among tasks and presenting tasks as linked sets.

7. BIOLOGICAL AND ECOSYSTEM SCIENCES RESEARCH

7.1 *IPHC-5-year biological and ecosystem science research plan*

37. The SRB **NOTED** paper IPHC-2021-SRB018-08 which provided the SRB with an update on current progress on research projects conducted and planned within the IPHC's five-year research plan (2017-21).
38. The SRB **NOTED** that good progress has been made by the IPHC Secretariat working in Stock Assessment (SA), Management Strategy Evaluation (MSE), and Biological and Ecosystem Sciences Research groups to better justify and focus Biological Science research program objectives and projects on SA and MSE needs. The appendices I, II, III, IV, and VI (in the paper) represent substantial improvements over materials presented previously. Likewise, Materials presented in SA meeting briefing document IPHC-2021-SRB018-06 and MSE briefing document IPHC-2021-SRB018-07 communicated needs that were consistent with information provided in the aforementioned Appendices.
39. The SRB **REQUESTED** that the IPHC Secretariat focus future reproductive biology studies on the development of updated regulatory area-specific maturity ogives (schedules of percent maturity by age).
40. The SRB **REQUESTED** that the IPHC Secretariat provide information on the age distribution of all females collected to characterize reproductive development throughout the annual cycle in order to refine efforts to identify potential skip-spawning females.
41. The SRB **REQUESTED** that planned studies on fecundity assessment are prioritized and that the sampling design be developed in coordination with the SA to ensure that the results are as informative as possible for assessment purposes. Effective sample stratification along age, weight and length gradients that maximise the contrast in the effect of these variables will be key to precise estimates of fecundity. Oocyte diameter in contrast may be an important covariate to provide but cannot be used in stratification. The primary goal of the fecundity research should be to estimate the exponent of the fecundity vs. weight relationship for incorporation in the SA.
42. The SRB **NOTED** that growth marker genes identified in transcriptomic profiling studies can be informative in future genome scans. However, the SRB **REQUESTED** that the Secretariat explicitly describe how the gene regions identified as 'over' or 'under' expressed would be used. For example, research has yet to determine mechanisms for transcriptional differences other than there is over- or under-representation of mRNA transcripts associated with different treatment groups (e.g. warm vs. cool water) from a heterogeneous set of individuals collected from a single location. The Secretariat has not yet established that results can be generalized to other regions in the species range. Neither has the transcriptional patterns been generalized to individuals of different size/age. These questions should be investigated.



43. The SRB **REQUESTED** that the Secretariat use these gene regions and align sequences to the whole genome sequence data. Specifically, the Secretariat should investigate whether there is sequence variability within gene coding regions or in regions around gene coding regions that may be transcriptional modifiers (e.g. promoters). If genetic variation exists in or near these genes, these variable base pair position(s) (i.e. single nucleotide polymorphisms or SNPs) should be incorporated in other aspects of the Secretariat research; for example for research activities under the Migration and Population Dynamics Research area.
44. The SRB **REQUESTED** that the analysis of seasonal patterns in gonad development be explicitly tied to the development/improvement of the maturity ogive (the vector of proportion mature at age that SA requires).
45. The SRB **NOTED** with respect to the discard mortality study that the injury profile information should be combined with the electronic tag survival data in a conditional logic framework to estimate fishery-level discard mortality.

7.2 Progress on ongoing research projects

46. The SRB **NOTED** the progress on ongoing research projects contemplated within the IPHC's five-year research plan (2017-21) involving:
 - a) **Migration and Distribution.** Studies are aimed at further understanding reproductive migration and identification of spawning times and locations as well as larval and juvenile dispersal.
 - b) **Reproduction.** Studies are aimed at providing information on the sex ratio of the commercial catch and to improve current estimates of maturity.
 - c) **Growth and Physiological Condition.** Studies are aimed at describing the role of some of the factors responsible for the observed changes in size-at-age and to provide tools for measuring growth and physiological condition in Pacific halibut.
 - d) **Discard Mortality Rates (DMRs) and Survival.** Studies are aimed at providing updated estimates of DMRs in both the longline and the trawl fisheries.
 - e) **Genetics and Genomics.** Studies are aimed at describing the genetic structure of the Pacific halibut population and at providing the means to investigate rapid adaptive changes in response to fishery-dependent and fishery-independent influences.
47. The SRB **NOTED** that progress had been made to complete research in each of the five main research areas (Migration and Distribution, Reproduction, Growth and Physiological Condition, Discard Mortality rates (DMRs) and Survival), and Genetics and Genomics. Indeed, during the intersessional period, a number of manuscripts had been drafted and published in the peer review literature. The SRB views peer review and publication in the scientific literature as a fundamental indicator of acceptance of the Secretariat's research agenda and a prerequisite to incorporation into the IPHC SA and MSE programs.

8. PACIFIC HALIBUT FISHERY ECONOMICS UPDATE

48. The SRB **NOTED** paper IPHC-2021-SRB018-09 which provided an update on the IPHC economic study, including progress on developing the economic impact assessment model, state of the collection of primary economic data from Pacific halibut dependent sectors, and most recent results on regional and community economic impacts.
49. **NOTING** the considerable effort that has gone into the development of the economic model, especially given the challenging circumstance under which the project began, the SRB **AGREED** that an economic impacts study provides considerable value and leverage to stakeholders in establishing the importance of the Pacific halibut resource and fisheries to their respective communities, both locally, regionally, and internationally.



50. The SRB **NOTED** improving the accuracy of the economic impact assessment of the Pacific halibut resource depends on broader stakeholders' active participation in developing the necessary data for analysis and **ENCOURAGED** additional outreach activities.
51. The SRB **NOTED** that an external peer review of the economic study would be useful given the lack of economics expertise on the SRB and the importance of having a robust, well-vetted economic impact analysis.
52. The SRB **NOTED** that, without a clearer understanding of the Commissions purpose for future use of this work, it is difficult to provide guidance on prioritising model development (e.g. improve spatial resolution, incorporate dynamic / predictive processes, adding more detail on subsistence and recreational fisheries, including uncertainty in the assessment). The SRB therefore **REQUESTED** specific guidance and clarification from the Commission on the objectives and intended use of this study.
53. The SRB **AGREED** that there is potential value in introducing socioeconomic performance metrics to the MSE framework, though there may be alternative methods to accomplish this specific task.

9. INTERNATIONAL PACIFIC HALIBUT COMMISSION 5-YEAR PROGRAM OF INTEGRATED SCIENCE AND RESEARCH (2021-26)

54. The SRB **NOTED** paper IPHC-2021-SRB018-10 which provided the SRB with the current draft of the new IPHC 5-year program of integrated science and research (the Plan).
55. The SRB **NOTED** and appreciates that the Plan prioritises integration across the core research areas, which has been a recurring recommendation of the SRB.
56. The SRB **AGREED** to be available intersessionally to provide feedback and advice as the plan continues to develop.
57. The SRB **REQUESTED** that the forward-looking document on future integrated science and research priorities (IPHC-2021-SRB018-10) incorporate the following elements:
- Previous research priorities of stock assessment;
 - How the Biological Division of the IPHC prioritized their research agenda in the previous 5-year plan to produce data to meet stock assessment needs;
 - Introspective assessment of the success of the previous 5-year plan;
 - Changing/New needs for stock assessment and MSE;
 - Direction of new 5-year plan to continue unfinished objectives of the previous 5-yr plan and justification for goals and objectives of the proposed 5-year plan.
58. The SRB **REQUESTED** that Measures of Success (sub-section 5 of IPHC-2021-SRB018-10) be cast in metrics of quantifiable improvements to MSE and SA performance, particularly subsections 5.1 and 5.2.
59. The SRB **REQUESTED** that the Secretariat provide explicit statements of the direction of external funding grant requests and the justification based on MSE and SA needs. For example:
- What is the IPHC contributing to the Biological and Ecosystem Science Branch budget?
 - What is needed in terms of additional resources and personnel and in which areas to support the proposed direction stated in the next 5-year plan?
 - What are the grant priorities, what are the targeted granting agencies, who will be tasked to write the grants, what intellectual resources are needed to be successful (i.e. research agency or academic partners with desired technical and/or analytical skills)?
 - Where could the SA and MSE analytical staff provide analytical support to the Biological Sciences section?



10. REVIEW OF THE DRAFT AND ADOPTION OF THE REPORT OF THE 18TH SESSION OF THE IPHC SCIENTIFIC REVIEW BOARD (SRB018)

60. The report of the 18th Session of the IPHC Scientific Review Board ([IPHC-2021-SRB018-R](#)) was **ADOPTED** on 17 June 2021, including the consolidated set of recommendations and/or requests arising from SRB018, provided at [Appendix IV](#).



APPENDIX I

**LIST OF PARTICIPANTS FOR THE 18TH SESSION OF THE
IPHC SCIENTIFIC REVIEW BOARD (SRB018)**

SRB Members

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Observers

Canada	United States of America
Ms Ann-Marie Huang: Ann-Marie.Huang@dfo-mpo.gc.ca	Dr Carey McGilliard: carey.mcgilliard@noaa.gov

IPHC Secretariat

Name	Position and email
Dr David T. Wilson	Executive Director, david.wilson@iphc.int
Dr Josep Planas	Biological and Ecosystem Sciences Branch Manager, josep.planas@iphc.int
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APPENDIX II
AGENDA FOR THE 18TH SESSION OF THE
IPHC SCIENTIFIC REVIEW BOARD (SRB018)

Date: 15-17 June 2021

Location: [Electronic Meeting](#)

Venue: Adobe Connect

Time: 12:00-17:00 (15th), 09:00-17:00 (16-17th)

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 17th Session of the SRB (SRB017) (D. Wilson)
 - 3.3. Outcomes of the 97th Session of the IPHC Annual Meeting (AM097) (D. Wilson)
 - 3.4. Observer updates (Science Advisors)
- 4. IPHC FISHERY-INDEPENDENT SETLINE SURVEY (FISS)**
 - 4.1. 2022-24 FISS design evaluation (R. Webster)
- 5. PACIFIC HALIBUT STOCK ASSESSMENT: 2021**
 - 5.1. Modelling updates (I. Stewart)
- 6. MANAGEMENT STRATEGY EVALUATION: UPDATE**
 - 6.1. A summary of the MSE outcomes to date (A. Hicks)
 - 6.2. IPHC Secretariat MSE Program of Work (2021-23) (A. Hicks)
- 7. BIOLOGICAL AND ECOSYSTEM SCIENCES RESEARCH**
 - 7.1. IPHC 5-Year biological and ecosystem science research plan (2017-21) (J. Planas)
 - 7.2. Progress on ongoing research projects (J. Planas)
- 8. PACIFIC HALIBUT FISHERY ECONOMICS UPDATE**
- 9. INTERNATIONAL PACIFIC HALIBUT COMMISSION 5-YEAR PROGRAM OF INTEGRATED SCIENCE AND RESEARCH (2021-26)**
- 10. REVIEW OF THE DRAFT AND ADOPTION OF THE REPORT OF THE 18TH SESSION OF THE IPHC SCIENTIFIC REVIEW BOARD (SRB018)**



APPENDIX III
LIST OF DOCUMENTS FOR THE 18TH SESSION OF THE
IPHC SCIENTIFIC REVIEW BOARD (SRB018)

Document	Title	Availability
IPHC-2021-SRB018-01	Agenda & Schedule for the 18 th Session of the Scientific Review Board (SRB018)	✓ 29 Mar 2021
IPHC-2021-SRB018-02	List of Documents for the 18 th Session of the Scientific Review Board (SRB018)	✓ 29 Mar 2021 ✓ 15 May 2021 ✓ 15 June 2021
IPHC-2021-SRB018-03	Update on the actions arising from the 17 th Session of the SRB (SRB017) (IPHC Secretariat)	✓ 11 May 2021
IPHC-2021-SRB018-04	Outcomes of the 97 th Session of the IPHC Annual Meeting (AM097) (D. Wilson)	✓ 10 May 2021
IPHC-2021-SRB018-05 Rev_1	2022-24 FISS Design evaluation (R. Webster)	✓ 15 May 2021 ✓ 15 June 2021
IPHC-2021-SRB018-06	2021 Pacific halibut (<i>Hippoglossus stenolepis</i>) stock assessment: Development (I. Stewart & A. Hicks)	✓ 10 May 2021
IPHC-2021-SRB018-07	An update on the IPHC Management Strategy Evaluation (MSE) process for SRB018 (A. Hicks & I. Stewart)	✓ 11 May 2021
IPHC-2021-SRB018-08	Report on current and future biological and ecosystem science research activities (J. Planas)	✓ 12 May 2021
IPHC-2021-SRB018-09	Pacific Halibut Multiregional Economic Impact Assessment (PHMEIA): update for SRB018 (B. Hutniczak)	✓ 11 May 2021
IPHC-2021-SRB018-10	International Pacific Halibut Commission 5-Year program of integrated science and research (2021-26) (D. Wilson, J. Planas, I. Stewart, A. Hicks, R. Webster, B. Hutniczak)	✓ 14 May 2021
Information papers		
Nil to-date	Nil to-date	



APPENDIX IV

**CONSOLIDATED SET OF RECOMMENDATIONS AND REQUESTS OF THE 18TH SESSION OF THE
IPHC SCIENTIFIC REVIEW BOARD (SRB018)**

RECOMMENDATIONS

(para. 4) **NOTING** that the core purpose of the SRB018 is to review progress on the IPHC science program, and to provide guidance for the delivery of products to the SRB019 in September 2021, the SRB **RECALLED** that formal recommendations to the Commission would not be developed at the present meeting, but rather, these would be developed at the SRB019.

REQUESTS

IPHC Fishery-independent setline survey (FISS): 2022-24 FISS design evaluation

SRB018–Req.1 ([para. 13](#)) The SRB **REQUESTED** plots by survey area of WPUE vs. depth from both FISS and commercial fisheries to help understand if there is part of the Pacific halibut stock in deeper waters not covered by the FISS.

SRB018–Req.2 ([para. 14](#)) The SRB **REQUESTED** that the IPHC Secretariat conduct a preliminary comparison, to be presented at SRB020, between male, female, and sex-aggregated analysis of the FISS data using the spatial-temporal model.

SRB018–Req.3 ([para. 15](#)) The SRB **REQUESTED** that the shiny-tool to investigate data and model outputs for the FISS be made available to the SRB by SRB019.

Pacific halibut stock assessment: 2021

SRB018–Req.4 ([para. 24](#)) The SRB **REQUESTED** an analysis of annual surplus production and the fraction of that production harvested.

Management Strategy Evaluation: update

SRB018–Req.5 ([para. 30](#)) The SRB **REQUESTED** that the IPHC Secretariat present a revised system diagram of the MSE, showing components of variability and their implementation within MSE.

SRB018–Req.6 ([para. 32](#)) The SRB **REQUESTED** that the Secretariat review potential indicators for use in defining ECs.

SRB018–Req.7 ([para. 36](#)) The SRB **REQUESTED** that the IPHC Secretariat prioritize tasks for the MSE Program of Work that lead to adoption of a well-defined management procedure, taking into account interdependencies among tasks and presenting tasks as linked sets.

Biological and ecosystem sciences research

SRB018–Req.8 ([para. 39](#)) The SRB **REQUESTED** that the IPHC Secretariat focus future reproductive biology studies on the development of updated regulatory area-specific maturity ogives (schedules of percent maturity by age).

SRB018–Req.9 ([para. 40](#)) The SRB **REQUESTED** that the IPHC Secretariat provide information on the age distribution of all females collected to characterize reproductive development throughout the annual cycle in order to refine efforts to identify potential skip-spawning females.

SRB018–Req.10 ([para. 41](#)) The SRB **REQUESTED** that planned studies on fecundity assessment are prioritized and that the sampling design be developed in coordination with the SA to ensure that the results are as informative as possible for assessment purposes. Effective sample stratification along age, weight and length gradients that maximise the contrast in the effect of these variables will be key to precise estimates of fecundity. Oocyte diameter in contrast



may be an important covariate to provide but cannot be used in stratification. The primary goal of the fecundity research should be to estimate the exponent of the fecundity vs. weight relationship for incorporation in the SA.

SRB018–Req.11 ([para. 42](#)) The SRB **NOTED** that growth marker genes identified in transcriptomic profiling studies can be informative in future genome scans. However, the SRB **REQUESTED** that the Secretariat explicitly describe how the gene regions identified as ‘over’ or ‘under’ expressed would be used. For example, research has yet to determine mechanisms for transcriptional differences other than there is over- or under-representation of mRNA transcripts associated with different treatment groups (e.g. warm vs. cool water) from a heterogeneous set of individuals collected from a single location. The Secretariat has not yet established that results can be generalized to other regions in the species range. Neither has the transcriptional patterns been generalized to individuals of different size/age. These questions should be investigated.

SRB018–Req.12 ([para. 43](#)) The SRB **REQUESTED** that the Secretariat use these gene regions and align sequences to the whole genome sequence data. Specifically, the Secretariat should investigate whether there is sequence variability within gene coding regions or in regions around gene coding regions that may be transcriptional modifiers (e.g. promoters). If genetic variation exists in or near these genes, these variable base pair position(s) (i.e. single nucleotide polymorphisms or SNPs) should be incorporated in other aspects of the Secretariat research; for example for research activities under the Migration and Population Dynamics Research area.

SRB018–Req.13 ([para. 44](#)) The SRB **REQUESTED** that the analysis of seasonal patterns in gonad development be explicitly tied to the development/improvement of the maturity ogive (the vector of proportion mature at age that SA requires).

Pacific halibut fishery economics update

SRB018–Req.14 ([para. 52](#)) The SRB **NOTED** that, without a clearer understanding of the Commission's purpose for future use of this work, it is difficult to provide guidance on prioritising model development (e.g. improve spatial resolution, incorporate dynamic / predictive processes, adding more detail on subsistence and recreational fisheries, including uncertainty in the assessment). The SRB therefore **REQUESTED** specific guidance and clarification from the Commission on the objectives and intended use of this study.

International Pacific Halibut Commission 5-year program of integrated science and research (2021-26)

SRB018–Req.15 ([para. 57](#)) The SRB **REQUESTED** that the forward-looking document on future integrated science and research priorities (IPHC-2021-SRB018-10) incorporate the following elements:

- f) Previous research priorities of stock assessment;
- g) How the Biological Division of the IPHC prioritized their research agenda in the previous 5-year plan to produce data to meet stock assessment needs;
- h) Introspective assessment of the success of the previous 5-year plan;
- i) Changing/New needs for stock assessment and MSE;
- j) Direction of new 5-year plan to continue unfinished objectives of the previous 5-yr plan and justification for goals and objectives of the proposed 5-year plan.

SRB018–Req.16 ([para. 58](#)) The SRB **REQUESTED** that Measures of Success (sub-section 5 of IPHC-2021-SRB018-10) be cast in metrics of quantifiable improvements to MSE and SA performance, particularly subsections 5.1 and 5.2.



SRB018–Req.17 ([para. 59](#)) The SRB **REQUESTED** that the Secretariat provide explicit statements of the direction of external funding grant requests and the justification based on MSE and SA needs. For example:

- e) What is the IPHC contributing to the Biological and Ecosystem Science Branch budget?
- f) What is needed in terms of additional resources and personnel and in which areas to support the proposed direction stated in the next 5-year plan?
- g) What are the grant priorities, what are the targeted granting agencies, who will be tasked to write the grants, what intellectual resources are needed to be successful (i.e. research agency or academic partners with desired technical and/or analytical skills)?
- h) Where could the SA and MSE analytical staff provide analytical support to the Biological Sciences section?