Report of the 17th Session of the IPHC Scientific Review Board (SRB017)

Meeting held electronically, 22-24 September 2020

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ACRONYMS

AM	Annual Meeting
COVID-19	Novel Coronavirus 2019
DMR	Discard Mortality Rate
FISS	Fishery-Independent Setline Survey
IPHC	International Pacific Halibut Commission
MSAB	Management Strategy Advisory Board
MSE	Management Strategy Evaluation
NPUE	Number-Per-Unit-Effort
SA	Stock Assessment
SRB	Scientific Review Board
TCEY	Total Constant Exploitable Yield
U.S.A.	United States of America
WPUE	Weight-Per-Unit-Effort

DEFINITIONS

A set of working definitions are provided in the IPHC Glossary of Terms and abbreviations: https://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 17th Session of the International Pacific Halibut Commission (IPHC) Scientific Review Board (SRB017) was held electronically from 22 to 24 September 2020. The meeting was opened by the Chairperson, Dr Sean Cox (Canada).

The following are a subset of the complete recommendations/requests for action from the SRB017, which are provided in full at Appendix V.

RECOMMENDATIONS

IPHC Fishery-independent setline survey (FISS)

SRB017–Rec.01 (para. 14) The SRB **RECOMMENDED** that the Commission endorse the final 2021 FISS design as proposed by IPHC Secretariat, and provided at Appendix IVa.

Biological and ecosystem science program research updates

SRB017–Rec.02 (para. 31) **NOTING** the improved presentation of the research integration plan, the SRB **RECOMMENDED** that the research planning table shown in the meeting presentation for paper IPHC-2020-SRB017-08, be improved by adding clear prioritization of biological research needs for addressing uncertainties in the stock assessment and MSE programs. Ideally, this would be in the form of ranked biological uncertainties/parameters for the stock assessment and MSE operating model along with an explanation for deviations from this ranked list.

Management Strategy Evaluation

SRB017–Rec.06 (para. 57) The SRB **NOTED** three options for estimation error are available and currently the option of simulating estimation is the most appropriate option to evaluate results in 2020, but **RECOMMENDED** continuing work to incorporate actual estimation models, as in the third option, because that method would best mimic the current assessment process.

SRB017–Rec.07 (para. 59) The SRB **RECOMMENDED** using the current MSE results to compare and contrast management procedures incorporating scale and distribution elements, but **NOTED** that, current results are conditional on some parameters and processes that remain uncertain. The uncertainty in applying the untested current approach potentially creates greater risk than adopting a repeatable management procedure that has been simulation tested under a wide range of uncertainties.

REQUESTS

Biological and ecosystem science program research updates

SRB017–Req.07 (para. 33) The SRB **REQUESTED** that the IPHC Secretariat further develop planning for the remainder of the current 5-year planning period and to revise and submit a comparable synthesis planning document for review at SRB018. In terms of the current research activities and research outcomes, further detail is needed in several areas, including:

a) further detail for (i) specific research outcomes, (ii) specific relevance for stock assessment relevance, (iii) specific relevance for MSE (see Section 8.1 for examples);

b) prioritize research activities and research outcomes.

SRB017–Req.09 (para. 37) The SRB **REQUESTED** that the IPHC Secretariat include explicit statements describing how research activities and research outcomes for each of the five IPHC research areas have relevance to stock assessment and the MSE in all future SRB meeting briefing documents beginning with SRB018.

1. OPENING OF THE SESSION

1. The 17th Session of the International Pacific Halibut Commission (IPHC) Scientific Review Board (SRB017) was held electronically from 22 to 24 September 2020. The list of participants is provided at Appendix I. The meeting was opened by the Chairperson, Dr Sean Cox (Canada).

2. The SRB **RECALLED** its mandate, as detailed in Appendix VIII, Sect. I, para. 1-3 of the IPHC Rules of Procedure (2020):

    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/17th-session-of-the-iphc-scientific-review-board-srb017.

3. IPHC PROCESS

3.1 SRB annual workflow

4. The SRB **RECALLED** that the core purpose of the SRB017 is to review progress on the IPHC science and research program, including specific products, and to provide guidance for the delivery of products to the Commission at its Interim Meeting in November 2020, and Annual Meeting in January 2021.

3.2 Update on the actions arising from the 16th Session of the SRB (SRB016)

5. The SRB **NOTED** paper IPHC-2020-SRB017-03, which provided the SRB with an opportunity to consider the progress made during the intersessional period, on the recommendations/requests arising from the SRB016.

6. The SRB **NOTED** that most actions from SRB016 remain either 'In Progress' or 'Pending'.

7. The SRB **AGREED** to consider and revise the actions as necessary, and to combine them with any new actions arising from SRB017 into a consolidated list for future reporting.

3.3 Outcomes of the 96th Session of the IPHC Annual Meeting (AM096)

8. The SRB **NOTED** paper IPHC-2020-SRB017-04 which detailed the outcomes of the 96th Session of the IPHC Annual Meeting (AM096), 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

9. 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) potential differences between estimated movement rates (i.e. via previous research, tagging estimates, and assumptions for young fish) and MSE operating model values and the potential implications for MSE results; 2) ongoing challenges communicating MSE analyses and encouraged SRB input on approaches to improving this process.

10. The SRB **NOTED** valuable contributions by scientific observers to both the SRB and MSAB processes.

4. IPHC FISHERY-INDEPENDENT SETLINE SURVEY (FISS)

4.1 Preliminary results from the 2020 FISS

11. The SRB **NOTED** paper IPHC-2020-SRB017-05, which provides an update on space-time modelling data inputs for 2020 and preliminary results of 2020 FISS modelling, recognizing that FISS data are not yet finalized and therefore space-time modelling of IPHC Regulatory Areas surveyed in 2020 has not been undertaken at present.

12. The SRB **NOTED** and applauded the IPHC Secretariat, field staff (Fisheries Data Specialists; Setline Survey Specialists), and contracted vessels for successfully executing the 2020 FISS under the potentially overwhelming circumstances of the COVID-19 pandemic. Despite such challenges, the FISS was still able to achieve the intended range of precision set in the FISS Objectives. This achievement speaks to both the dedication of the entire IPHC Secretariat and the flexibility of the spatio-temporal analysis framework to accommodate changes in FISS design.

4.2 Review: Rationalisation of the FISS following the 2014-19 expansion series

13. The SRB **NOTED** paper IPHC-2020-SRB017-06, which provided background on and review the methods for the IPHC's Fishery-Independent Setline Survey (FISS) rationalisation following the 2014-19 expansion series, along with discussion of the resulting FISS design proposals for the 2020-22 period and presentation of the proposed designs for 2021-23.

14. The SRB **RECOMMENDED** that the Commission endorse the final 2021 FISS design as proposed by IPHC Secretariat, and provided at Appendix IVa.

15. The SRB provisionally **ENDORSED** the 2022 and 2023 FISS design proposals provided at Appendix IVb and IVc, recognizing that these will be reviewed again at subsequent SRB meetings.

16. The SRB **REQUESTED** clarification of the FISS design workflow and timeline to make it clear that when FISS design proposals are presented to the SRB, the current year's FISS data will not be available, and therefore evaluation of design proposals for the subsequent three years will be based on past years' data only.

17. The SRB **REQUESTED** that at SRB018, the IPHC Secretariat present information on changes in space-time model parameters and output over time:

    a) covariate parameter estimates over several years should be provided in order to assess their sensitivity to the addition of each year's new data;

    b) comparison maps of estimates of WPUE or NPUE at each FISS station for the same calendar year based on models fitted in different years to determine how station estimates are affected by the addition of new data;

    c) estimates of the relative contributions of covariates vs. spatio-temporal interpolations in predictions at unsampled locations.

18. The SRB **REQUESTED** that the IPHC Secretariat present at SRB018, a review of the methods used for adjusting WPUE and NPUE indices for the effects of hook competition in the FISS, given the SRB's interest in the following:

a) the potential benefits of further analysis and/or hook timer experiments to better inform bait mortality rates used in FISS hook competition adjustments;

b) an evaluation of hook competition incorporated into the space-time model to account for potential spatio-temporal patterns in hook competition and linking the hook competition adjustment to covariates of competitor (e.g. dogfish) abundance;

c) a quantitative evaluation of the assumptions that the same hook competition adjustment factor can be applied to both NPUE and WPUE, as well as uniformly across regions, because the biomass to numbers (i.e. the mean weight) apparently changes over time.

5. PACIFIC HALIBUT STOCK ASSESSMENT: 2020

5.1 Updates on the development of the 2020 stock assessment

19. The SRB **NOTED** paper IPHC-2020-SRB017-07, which provided a summary of stock assessment development, including responses to previous SRB requests and an update on data sources and planning for the final 2020 stock assessment.

20. The SRB **AGREED** that the final 2020 stock assessment would include new data on recreational and commercial sex-ratios at age as well as updates to all standard data sources, including:

    a) 2020 FISS results: modelled trends and biological data;

    b) 2020 Commercial fishery logbook and biological sampling;

    c) Biological information from other sources (non-directed commercial and recreational);

    d) Mortality estimates for 2020 and updates to 2019 where necessary.

21. The SRB **REQUESTED** that the IPHC Secretariat continue to update data weighting on an annual basis, even for updated stock assessments (such as 2020), in order to maintain internal model consistency and to best reflect changes in existing and new data as they arise.

22. The SRB **NOTED** the IPHC Secretariat's review of the use of the logistic-normal likelihood for composition data in stock assessment, including the development challenges associated with treatment of a two-dimensional correlation structure (age and sex) and the associated resource requirement that are needed.

23. The SRB **REQUESTED** that the IPHC Secretariat first investigate the consequences of implementing a logistic-normal likelihood for composition data assuming no correlation structure. This would provide an initial estimate of the benefits of self-weighting fairly quickly compared to developing a full age/sex correlated version.

24. The SRB **REQUESTED** that the IPHC Secretariat continue to evaluate whether the Stock Synthesis modelling framework is the most efficient for Commission needs, and to coordinate future development with the MSE framework as features and technical needs evolve together for the two efforts.

6. PEER REVIEW OF THE IPHC MANAGEMENT STRATEGY EVALUATION PROCESS

25. The SRB **NOTED** the presentation provided by Dr Trevor Branch, the independent peer reviewer of the IPHC MSE process. Dr Branch presented his draft report, with the intention of seeking additional feedback from the SRB before finalising the report. The following is a summary of the report findings, as provided by Dr Branch:

    "*The management strategy evaluation (MSE) of IPHC is intended to simulation test rules for setting allowable catch for Pacific halibut and the allocation of catch and bycatch among IPHC Regulatory Areas. In my judgment the MSE is technically sound. Furthermore, the MSE team led by Allan Hicks was praised by all interviewed participants involved in the process for their technical work, collaboration with stakeholders in developing harvest control rules, and*

communication of results to stakeholders. However, the following issues need to be resolved to ensure the continued success and accuracy of MSE simulation for IPHC: (1) decide soon on the future of the MSE process beyond January 2021 and allocate necessary funding; (2) treat the MSE framework as an ongoing process that will be used over many years alongside the stock assessment, to test the effectiveness of data gathering, stock assessment assumptions, and catch - setting in IPHC; (3) require the Commission to codify the rules they used to adjust catch levels within each Regulatory Area after the harvest control rule is applied, so that the MSE framework accurately evaluates risk to the stock and catches within each such Area."

26. The SRB **AGREED** that the peer review was a thorough analysis, and met the desired objectives of providing a fully independent external review of the IPHC's Management Strategy Evaluation work undertaken to date.

27. The SRB **AGREED** with conclusions of the independent peer reviewer that:

    a) the MSE framework establishes a valuable new tool for formally evaluating and prioritizing research objectives;

    b) uncertainty regarding staffing for MSE work is inconsistent with the long-term role of MSE in addressing critical strategic needs of the Commission in setting and distributing Pacific halibut yield among regulatory areas;

    c) the IPHC Secretariat continue to improve and develop communication tools and participation in the MSE process;

    d) the IPHC Secretariat establish a formal process for determining whether Exceptional Circumstances exist in a given year that would justify deviating from the harvest control rule.

28. The SRB **NOTED** that the independent peer review suggested a further round of development may be necessary on the spatial allocation of TCEY.

7. BIOLOGICAL AND ECOSYSTEM SCIENCE PROGRAM RESEARCH UPDATES

7.1 Report on current and future biological research activities

29. The SRB **NOTED** paper IPHC-2020-SRB017-08 which provided the SRB with an update on progress on IPHC's five-year Biological and Ecosystem Sciences Research Plan (2017-21).

30. The SRB **NOTED** the efforts made by the IPHC Secretariat to address requests made by the SRB during the SRB016 meeting. Addressing remarks made during the Secretariat's presentation pertaining to each request.

31. **NOTING** the improved presentation of the research integration plan, the SRB **RECOMMENDED** that the research planning table shown in the meeting presentation for paper IPHC-2020-SRB017-08, be improved by adding clear prioritization of biological research needs for addressing uncertainties in the stock assessment and MSE programs. Ideally, this would be in the form of ranked biological uncertainties/parameters for the stock assessment and MSE operating model along with an explanation for deviations from this ranked list.

32. The SRB **RECALLED** the request from SRB016–Req.17, and that strides made by the IPHC Secretariat to better integrate the IPHC Biological and Ecosystem Sciences Research program to meet stock assessment and MSE needs. Placing the Research Activities and Research Outcomes for each of the five IPHC Research Areas into contexts of relevance to stock assessment and MSE was viewed positively by the SRB. However, such information was only presented in the oral presentation and not in paper IPHC-2020-SRB017-08. The brief description of species analysis input to stock assessment and MSE needs was also a useful step forward.

33. The SRB **REQUESTED** that the IPHC Secretariat further develop planning for the remainder of the current 5-year planning period and to revise and submit a comparable synthesis planning document for

review at SRB018. In terms of the current research activities and research outcomes, further detail is needed in several areas, including:

a) further detail for (i) specific research outcomes, (ii) specific relevance for stock assessment relevance, (iii) specific relevance for MSE (see Section 8.1 for examples);

b) prioritize research activities and research outcomes.

34. **NOTING** that a time line was presented by the IPHC Secretariat that provided information on likely periods in future years when research outcomes would be available for use by the Secretariat, the SRB **REQUESTED** further clarification on funding and staffing needs required to meet self-imposed deadlines.

35. The SRB **NOTED** the progress on ongoing research projects contemplated within the IPHC's five-year biological and ecosystem sciences research plan (2017-21) in each of five research areas.

36. The SRB **THANKED** the IPHC Secretariat for the presentation on progress in these studies, but **NOTED** that it was not always possible to discern the relevance of the findings in relation to the management process, because detail in the sampling design evaluation, hypotheses to be tested, and the potential scale of impact on the stock assessment and MSE processes were not usually included in the presentation. In some cases at least such information appeared to have been available and should have been included.

37. The SRB **REQUESTED** that the IPHC Secretariat include explicit statements describing how research activities and research outcomes for each of the five IPHC research areas have relevance to stock assessment and the MSE in all future SRB meeting briefing documents beginning with SRB018.

38. The SRB **NOTED** that this is the final opportunity for the SRB to input into the prioritisation of the new research plan prior to finalisation while the necessary information on use prioritization, methodological information and cost which would have allowed the SRB to assess the risks and benefits of the research plan, were not available. The SRB therefore **NOTED** that feedback on the five-year biological and ecosystem sciences research plan would be provided.

39. The SRB **NOTED** the progress on ongoing research projects contemplated within the IPHC's five-year biological and ecosystem sciences research plan (2017-21).

7.1.1 Migration and Distribution

40. The SRB **NOTED** the studies aimed at further understanding reproductive migration and identification of spawning times and locations as well as larval and juvenile dispersal.

41. The SRB **NOTED** and congratulated authors Sadorus et al. (2020) on acceptance for publication of their paper in Fisheries Oceanography pertaining to larval and juvenile dispersal in the Gulf of Alaska and the Bering Sea.

7.1.2 Reproduction

42. The SRB **NOTED** the studies aimed at providing information on the sex ratio of the commercial catch and to improve current estimates of maturity.

43. The SRB **REQUESTED** that the Secretariat should clarify how skip-spawning research contributes to stock assessment and MSE functions. In particular, future research should develop and present:

i. models for forecasting or estimating skip-spawning for Pacific halibut taking into account the timing of the sample collection, size / age and potentially condition factor of females;

ii. estimates of the potential impact of skip-spawning scenarios on management procedure performance;

iii. clear plans for analyses of histological data, including incorporation of age variation and locational variation;

iv. details of experimental and sampling designs, as well as expected analyses for "measures of fecundity".

7.1.3 Growth and Physiological Condition

44. The SRB **NOTED** ongoing studies 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. Studies in this research area would benefit from greater integration with the genomics area. The SRB **REQUESTED** that the Secretariat provide a plan for integration of research outcomes in this research area with outcomes in the genetics and genomics research area.

7.1.4 Discard Mortality Rates (DMRs) and Survival

45. The SRB **NOTED** ongoing studies aimed at providing updated estimates of DMRs in both the commercial longline and recreational fisheries.

46. The SRB **NOTED** the new IPHC project pertaining to handling practices and stress within the recreational fishery, but that summary materials presented in paper IPHC-2020-SRB017-08 and in the meeting presentation were brief and did not provide sufficient detail for the SRB to comment on the efficacy of experimental methods or of the likelihood of achieving desired research outcomes.

47. The SRB **REQUESTED** that IPHC Secretariat provide the grant proposal funding the DMR work, and provide a more detailed presentation at SRB018.

7.1.5 Genetics and Genomics

48. The SRB **NOTED** ongoing studies 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.

49. **NOTING** IPHC Secretariat responses to SRB016-Req. 15 that requested additional methodological detail pertaining to ongoing genomics research, the SRB **RECOMMENDED** that the IPHC Secretariat work with collectors to develop a series of benchmark summary statistics that characterize the quality of the Pacific halibut genome developed.

50. The SRB **NOTED** that IPHC Secretariat comments on SRB016-Req. 18 to annotate the genome. A URL was provided.

51. **NOTING** SRB016-Req. 18 was addressed and that the Pacific halibut genome has been annotated, the SRB **REQUESTED** that the IPHC Secretariat prepare a research plan for describing and justifying how the knowledge (and all the resources expended in getting it) of the genome will be used to inform SA and MSE information needs (i.e. as per above request to further elaborate the research plan for this research area). This will likely require some form of interaction (e.g. collaborations, workshops) with outside researchers and/or agencies.

7.2 Research integration

52. The SRB **NOTED** that the IPHC Secretariat have embraced past SRB recommendations to integrate the research program with stock assessment and MSE information needs.

53. The SRB **RECOMMENDED** that the IPHC Secretariat incorporate prioritization of research activities, as well as the timeline of available research outputs as inputs into the stock assessment and MSE processes.

54. The SRB **RECOMMENDED** that the IPHC Secretariat identify those research areas with uncertainty and indicate research questions that would require the SRB to provide input and/or decision in future documentation and presentations provided to the SRB.

8. MANAGEMENT STRATEGY EVALUATION: UPDATE

8.1 An update on the IPHC Management Strategy Evaluation (MSE) process

55. The SRB **NOTED** paper IPHC-2020-SRB017-09 which provided the SRB with a description of the IPHC MSE framework, a description of the specifications of the multi-area operating model, results from conditioning the multi-area operating model, and an overview of the implementation of management procedures.

56. The SRB **NOTED** the MSE Explorer tool available online to present and evaluate MSE results. The SRB was impressed by the flexibility of the tool to facilitate stakeholder education of fishery management and MSE concepts, as well as the power to analyze complex outputs from the simulations.

57. The SRB **NOTED** three options for estimation error are available and currently the option of simulating estimation is the most appropriate option to evaluate results in 2020, but **RECOMMENDED** continuing work to incorporate actual estimation models, as in the third option, because that method would best mimic the current assessment process.

58. The SRB **NOTED** that results from the multi-region simulations showed a higher average TCEY and lower probabilities of low stock status for a given SPR than the previous coastwide MSE results, but average stock status was similar. This is consistent with the lower variability incorporated in the multi-region approach due to the use of a single operating model as opposed to the 2 used in the coast-wide operating model. Low biomass regionally and the need for the model to maintain all populations means the parameter space may be more restrictive resulting in greater stability.

59. The SRB **RECOMMENDED** using the current MSE results to compare and contrast management procedures incorporating scale and distribution elements, but **NOTED** that, current results are conditional on some parameters and processes that remain uncertain. The uncertainty in applying the untested current approach potentially creates greater risk than adopting a repeatable management procedure that has been simulation tested under a wide range of uncertainties.

60. The SRB **RECOMMENDED** that Exceptional Circumstances be defined to determine whether monitoring information has potentially departed from their expected distributions generated by the MSE. Declaration of Exceptional Circumstances may warrant re-opening and revising the operating models and testing procedures used to justify a particular management procedure.

61. The SRB **REQUESTED** that the IPHC Secretariat include plotting function in the MSE Explorer to visualize among-Regulatory Area trade-offs in various yield statistics.

9. REVIEW OF THE DRAFT AND ADOPTION OF THE REPORT OF THE 17TH SESSION OF THE IPHC SCIENTIFIC REVIEW BOARD (SRB017)

62. The report of the 17th Session of the IPHC Scientific Review Board (IPHC-2020-SRB017-R) was **ADOPTED** on 24 September 2020, including the consolidated set of recommendations and/or requests arising from SRB017, provided at Appendix V.

APPENDIX I
LIST OF PARTICIPANTS FOR THE 17TH SESSION OF THE IPHC SCIENTIFIC REVIEW BOARD (SRB017)

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APPENDIX II
AGENDA FOR THE 17TH SESSION OF THE IPHC SCIENTIFIC REVIEW BOARD (SRB017)

Date: 22-24 September 2020
Location: Electronic Meeting
Venue: Go-To-Meeting
Time: 12:00-17:00 (22nd), 09:00-16:00 (23rd), 09:00-12:00 (24th)
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 16th Session of the SRB (SRB016) (D. Wilson)
- 3.3. Outcomes of the 96th Session of the IPHC Annual Meeting (AM096) (D. Wilson)
- 3.4. Observer updates (e.g. Science Advisors)

4. IPHC FISHERY-INDEPENDENT SETLINE SURVEY (FISS)
- 4.1. Preliminary results from the 2020 FISS (R. Webster)
- 4.2. Review: Rationalisation of the FISS following the 2014-19 expansion series (R. Webster)

5. PACIFIC HALIBUT STOCK ASSESSMENT: 2020
- 5.1. Updates on the development of the 2020 stock assessment (I. Stewart)

6. PEER REVIEW OF THE IPHC MANAGEMENT STRATEGY EVALUATION PROCESS
- 6.1. Report on the peer review of the IPHC Management Strategy Evaluation process (T. Branch)

7. BIOLOGICAL AND ECOSYSTEM SCIENCE RESEARCH UPDATES
- 7.1. Report on current and future biological research activities (J. Planas)

8. MANAGEMENT STRATEGY EVALUATION: UPDATE
- 8.1. An update on the IPHC Management Strategy Evaluation (MSE) process (A. Hicks, P. Carpi, S. Berukoff, I. Stewart)

9. REVIEW OF THE DRAFT AND ADOPTION OF THE REPORT OF THE 17TH SESSION OF THE IPHC SCIENTIFIC REVIEW BOARD (SRB017)

APPENDIX III
LIST OF DOCUMENTS FOR THE 17TH SESSION OF THE IPHC SCIENTIFIC REVIEW BOARD (SRB017)

Document	Title	Availability
IPHC-2020-SRB017-01	Agenda & Schedule for the 17th Session of the Scientific Review Board (SRB017)	✓ 26 Jun 2020 ✓ 20 Aug 2020 ✓ 22 Sep 2020
IPHC-2020-SRB017-02	List of Documents for the 17th Session of the Scientific Review Board (SRB017)	✓ 16 Aug 2020 ✓ 21 Aug 2020
IPHC-2020-SRB017-03	Update on the actions arising from the 16th Session of the SRB (SRB016) (IPHC Secretariat)	✓ 21 Aug 2020
IPHC-2020-SRB017-04	Outcomes of the 96th Session of the IPHC Annual Meeting (AM096) (D. Wilson)	✓ 20 Aug 2020
IPHC-2020-SRB017-05	Preliminary results of the 2020 FISS (R. Webster)	✓ 21 Aug 2020
IPHC-2020-SRB017-06	Review: Rationalisation of the FISS following the 2014-19 expansion series (R. Webster)	✓ 20 Aug 2020
IPHC-2020-SRB017-07	Updates on the development of the 2020 stock assessment (I. Stewart, A. Hicks)	✓ 20 Aug 2020
IPHC-2020-SRB017-08	Report on current and future biological research activities (J. Planas)	✓ 20 Aug 2020
IPHC-2020-SRB017-09	An update on the IPHC Management Strategy Evaluation (MSE) process for SRB017 (A. Hicks, P. Carpi, S. Berukoff, I. Stewart)	✓ 21 Aug 2020
IPHC-2020-SRB017-10	Technical details of the IPHC MSE framework (A. Hicks, P. Carpi, S. Berukoff)	✓ 21 Aug 2020
Information papers		
IPHC-2020-SRB017-INF01	Nil	-

APPENDIX IV

IPHC FISHERY-INDEPENDENT SETLINE SURVEY (FISS) DESIGN PROPOSED FOR 2021, AND TENTATIVELY PROPOSED FOR 2022-23

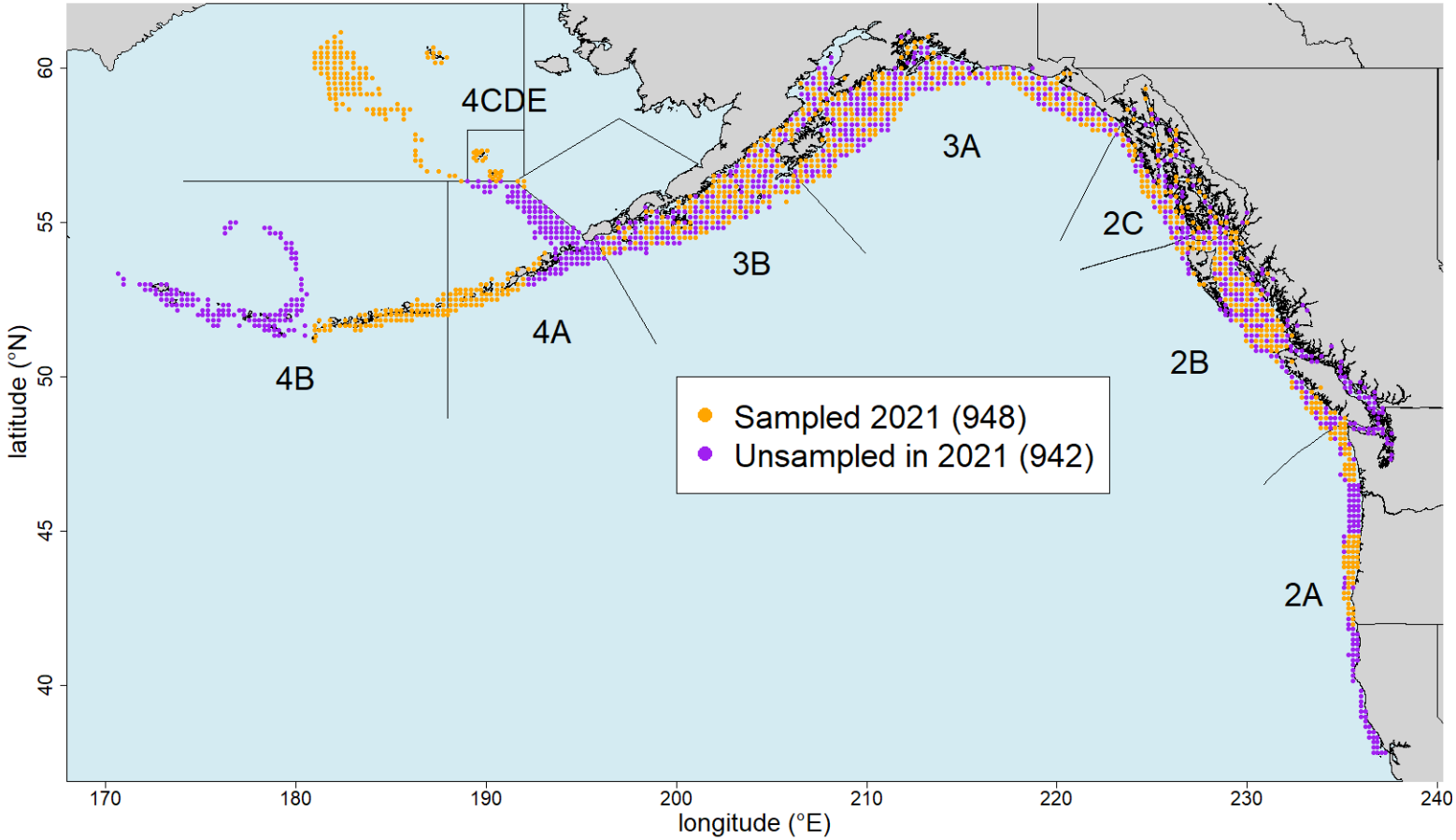

Figure a. Proposed minimum FISS design in 2021 (orange circles) based on randomized sampling in 2B-3B, and a subarea design elsewhere. Purple circles are optional for meeting data quality criteria.

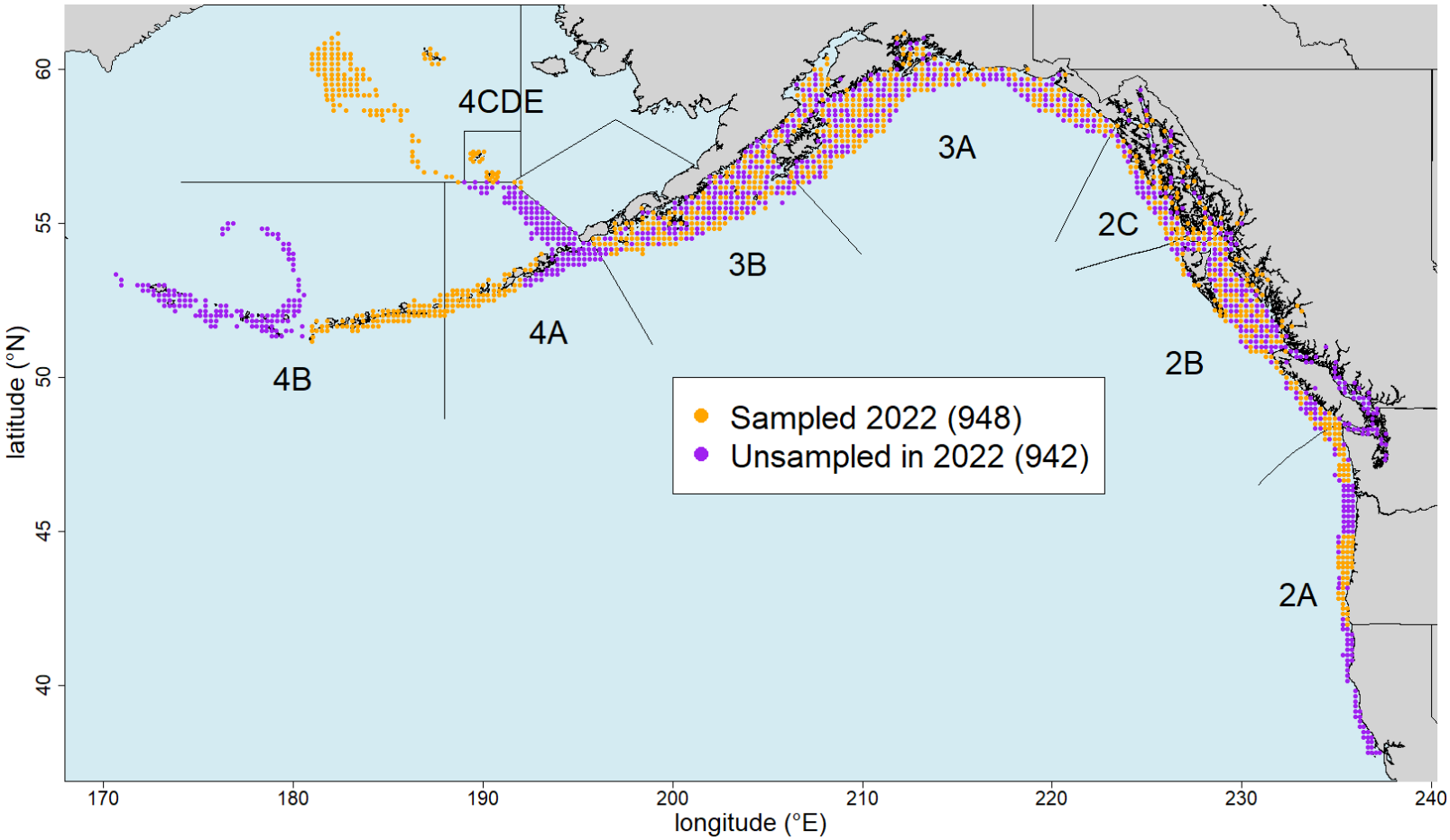

Figure b. Proposed minimum FISS design in 2022 (orange circles) based on randomized sampling in 2B-3B, and a subarea design elsewhere. Purple circles are optional for meeting data quality criteria. The proposed design for 2022 is subject to revision following analysis of data from the 2021 FISS.

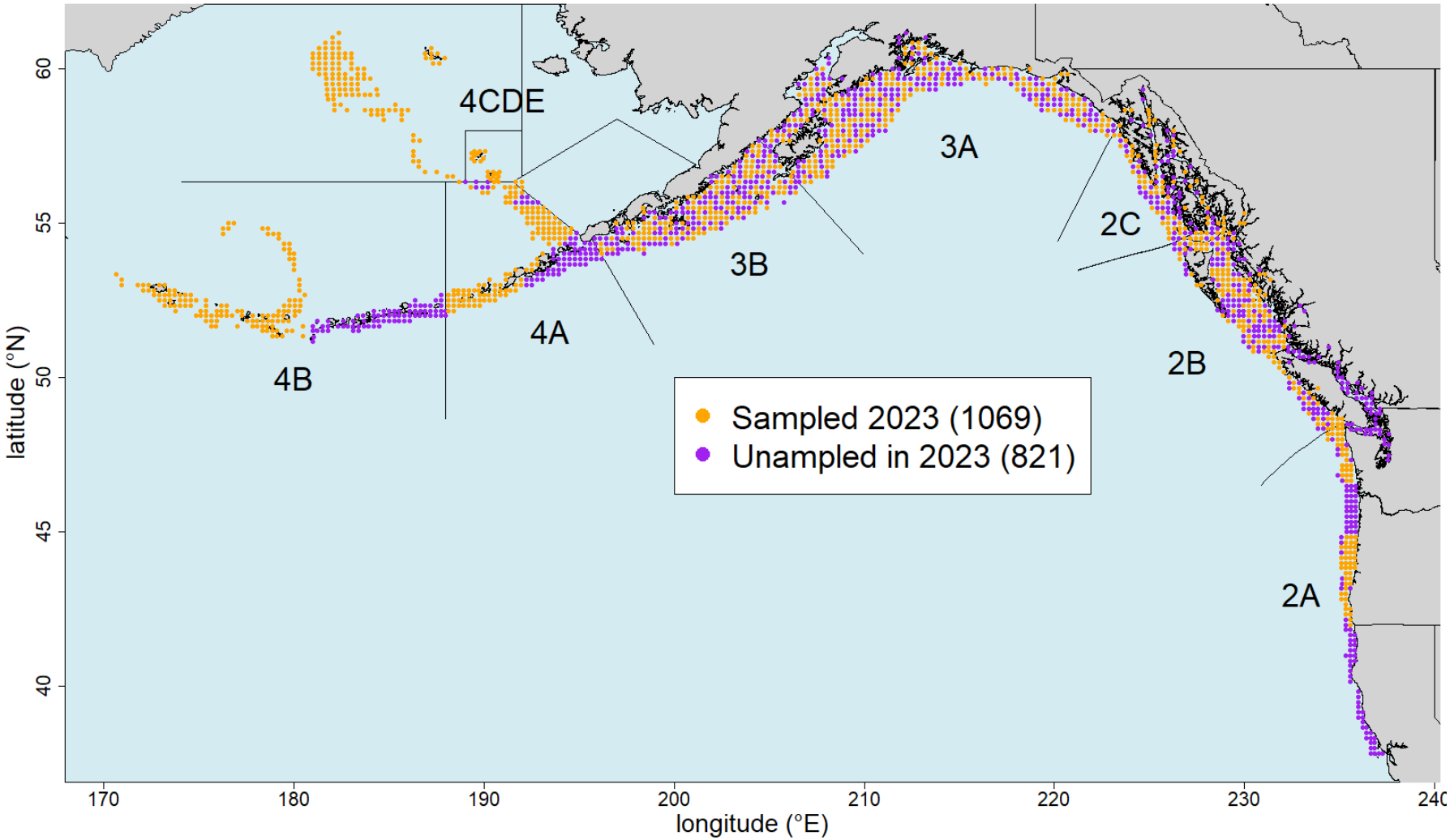

Figure c. Proposed minimum FISS design in 2023 (orange circles) based on randomized sampling in 2B-3B, and a subarea design elsewhere. Purple circles are optional for meeting data quality criteria. The proposed design for 2023 is subject to revision following analysis of data from the 2021 and 2022 FISS.

APPENDIX V

CONSOLIDATED SET OF RECOMMENDATIONS AND REQUESTS OF THE 17TH SESSION OF THE IPHC SCIENTIFIC REVIEW BOARD (SRB017)

RECOMMENDATIONS

IPHC Fishery-independent setline survey (FISS)

SRB017–Rec.01 (para. 14) The SRB **RECOMMENDED** that the Commission endorse the final 2021 FISS design as proposed by IPHC Secretariat, and provided at Appendix IVa.

Biological and ecosystem science program research updates

SRB017–Rec.02 (para. 31) **NOTING** the improved presentation of the research integration plan, the SRB **RECOMMENDED** that the research planning table shown in the meeting presentation for paper IPHC-2020-SRB017-08, be improved by adding clear prioritization of biological research needs for addressing uncertainties in the stock assessment and MSE programs. Ideally, this would be in the form of ranked biological uncertainties/parameters for the stock assessment and MSE operating model along with an explanation for deviations from this ranked list.

Genetics and Genomics

SRB017–Rec.03 (para. 49) **NOTING** IPHC Secretariat responses to SRB016-Req. 15 that requested additional methodological detail pertaining to ongoing genomics research, the SRB **RECOMMENDED** that the IPHC Secretariat work with collectors to develop a series of benchmark summary statistics that characterize the quality of the Pacific halibut genome developed.

Research integration

SRB017–Rec.04 (para. 53) The SRB **RECOMMENDED** that the IPHC Secretariat incorporate prioritization of research activities, as well as the timeline of available research outputs as inputs into the stock assessment and MSE processes.

SRB017–Rec.05 (para. 54) The SRB **RECOMMENDED** that the IPHC Secretariat identify those research areas with uncertainty and indicate research questions that would require the SRB to provide input and/or decision in future documentation and presentations provided to the SRB.

Management Strategy Evaluation

SRB017–Rec.06 (para. 57) The SRB **NOTED** three options for estimation error are available and currently the option of simulating estimation is the most appropriate option to evaluate results in 2020, but **RECOMMENDED** continuing work to incorporate actual estimation models, as in the third option, because that method would best mimic the current assessment process.

SRB017–Rec.07 (para. 59) The SRB **RECOMMENDED** using the current MSE results to compare and contrast management procedures incorporating scale and distribution elements, but **NOTED** that, current results are conditional on some parameters and processes that remain uncertain. The uncertainty in applying the untested current approach potentially creates greater risk than adopting a repeatable management procedure that has been simulation tested under a wide range of uncertainties.

SRB017–Rec.08 (para. 60) The SRB **RECOMMENDED** that Exceptional Circumstances be defined to determine whether monitoring information has potentially departed from their expected distributions generated by the MSE. Declaration of Exceptional Circumstances may warrant re-opening and revising the operating models and testing procedures used to justify a particular management procedure.

REQUESTS

IPHC Fishery-independent setline survey (FISS)

SRB017–Req.01 (para. 16) The SRB **REQUESTED** clarification of the FISS design workflow and timeline to make it clear that when FISS design proposals are presented to the SRB, the current year's FISS data will

not be available, and therefore evaluation of design proposals for the subsequent three years will be based on past years' data only.

SRB017–Req.02 (para. 17) The SRB **REQUESTED** that at SRB018, the IPHC Secretariat present information on changes in space-time model parameters and output over time:

a) covariate parameter estimates over several years should be provided in order to assess their sensitivity to the addition of each year's new data;

b) comparison maps of estimates of WPUE or NPUE at each FISS station for the same calendar year based on models fitted in different years to determine how station estimates are affected by the addition of new data;

c) estimates of the relative contributions of covariates vs. spatio-temporal interpolations in predictions at unsampled locations.

SRB017–Req.03 (para. 18) The SRB **REQUESTED** that the IPHC Secretariat present at SRB018, a review of the methods used for adjusting WPUE and NPUE indices for the effects of hook competition in the FISS, given the SRB's interest in the following:

a) the potential benefits of further analysis and/or hook timer experiments to better inform bait mortality rates used in FISS hook competition adjustments;

b) an evaluation of hook competition incorporated into the space-time model to account for potential spatio-temporal patterns in hook competition and linking the hook competition adjustment to covariates of competitor (e.g. dogfish) abundance;

c) a quantitative evaluation of the assumptions that the same hook competition adjustment factor can be applied to both NPUE and WPUE, as well as uniformly across regions, because the biomass to numbers (i.e. the mean weight) apparently changes over time.

Pacific halibut stock assessment: 2020

SRB017–Req.04 (para. 21) The SRB **REQUESTED** that the IPHC Secretariat continue to update data weighting on an annual basis, even for updated stock assessments (such as 2020), in order to maintain internal model consistency and to best reflect changes in existing and new data as they arise.

SRB017–Req.05 (para. 23) The SRB **REQUESTED** that the IPHC Secretariat first investigate the consequences of implementing a logistic-normal likelihood for composition data assuming no correlation structure. This would provide an initial estimate of the benefits of self-weighting fairly quickly compared to developing a full age/sex correlated version.

SRB017–Req.06 (para. 24) The SRB **REQUESTED** that the IPHC Secretariat continue to evaluate whether the Stock Synthesis modelling framework is the most efficient for Commission needs, and to coordinate future development with the MSE framework as features and technical needs evolve together for the two efforts.

Biological and ecosystem science program research updates

SRB017–Req.07 (para. 33) The SRB **REQUESTED** that the IPHC Secretariat further develop planning for the remainder of the current 5-year planning period and to revise and submit a comparable synthesis planning document for review at SRB018. In terms of the current research activities and research outcomes, further detail is needed in several areas, including:

a) further detail for (i) specific research outcomes, (ii) specific relevance for stock assessment relevance, (iii) specific relevance for MSE (see Section 8.1 for examples);

b) prioritize research activities and research outcomes.

SRB017–Req.08 (para. 34) **NOTING** that a time line was presented by the IPHC Secretariat that provided information on likely periods in future years when research outcomes would be available for use by

the Secretariat, the SRB **REQUESTED** further clarification on funding and staffing needs required to meet self-imposed deadlines.

SRB017–Req.09 (para. 37) The SRB **REQUESTED** that the IPHC Secretariat include explicit statements describing how research activities and research outcomes for each of the five IPHC research areas have relevance to stock assessment and the MSE in all future SRB meeting briefing documents beginning with SRB018.

Reproduction

SRB017–Req.10 (para. 43) The SRB **REQUESTED** that the Secretariat should clarify how skip-spawning research contributes to stock assessment and MSE functions. In particular, future research should develop and present:

i. models for forecasting or estimating skip-spawning for Pacific halibut taking into account the timing of the sample collection, size / age and potentially condition factor of females;

ii. estimates of the potential impact of skip-spawning scenarios on management procedure performance;

iii. clear plans for analyses of histological data, including incorporation of age variation and locational variation;

iv. details of experimental and sampling designs, as well as expected analyses for "measures of fecundity"

Growth and Physiological Condition

SRB017–Req.11 (para. 44) The SRB **NOTED** ongoing studies 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. Studies in this research area would benefit from greater integration with the genomics area. The SRB **REQUESTED** that the Secretariat provide a plan for integration of research outcomes in this research area with outcomes in the genetics and genomics research area.

Discard Mortality Rates (DMRs) and Survival

SRB017–Req.12 (para. 47) The SRB **REQUESTED** that IPHC Secretariat provide the grant proposal funding the DMR work, and provide a more detailed presentation at SRB018.

Genetics and Genomics

SRB017–Req.13 (para. 51) **NOTING** SRB016-Req. 18 was addressed and that the Pacific halibut genome has been annotated, the SRB **REQUESTED** that the IPHC Secretariat prepare a research plan for describing and justifying how the knowledge (and all the resources expended in getting it) of the genome will be used to inform SA and MSE information needs (i.e. as per above request to further elaborate the research plan for this research area). This will likely require some form of interaction (e.g. collaborations, workshops) with outside researchers and/or agencies.

Management Strategy Evaluation

SRB017–Req.14 (para. 61) The SRB **REQUESTED** that the IPHC Secretariat include plotting function in the MSE Explorer to visualize among-Regulatory Area trade-offs in various yield statistics.