UPDATE ON THE ACTIONS ARISING FROM THE 16TH SESSION OF THE IPHC SCIENTIFIC REVIEW BOARD (SRB016)

PREPARED BY: IPHC SECRETARIAT (21 AUGUST 2020)

PURPOSE

To provide the Scientific Review Board (SRB) with an opportunity to consider the progress made during the intersessional period, on the recommendations/requests arising from the SRB016.

BACKGROUND

At the SRB016, the members recommended/requested a series of actions to be taken by the IPHC Secretariat, as detailed in the SRB016 meeting report (IPHC-2020-SRB016-R) available from the IPHC website, and as provided in Appendix A.

DISCUSSION

During the 17th Session of the SRB (SRB017), efforts will be made to ensure that any recommendations/requests for action are carefully constructed so that each contains the following elements:

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

RECOMMENDATION/S

That the SRB:

1) **NOTE** paper IPHC-2020-SRB017-03, which provided the SRB with an opportunity to consider the progress made during the inter-sessional period, in relation to the consolidated list of recommendations/requests arising from the previous SRB meeting (SRB016).
2) **AGREE** to consider and revise the actions as necessary, and to combine them with any new actions arising from SRB017.

APPENDICES

Appendix A: Update on actions arising from the 16th Session of the IPHC Scientific Review Board (SRB016)

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Update on actions arising from the 16th Session of the IPHC Scientific Review Board (SRB016)

RECOMMENDATIONS

(para. 4) ***NOTING*** *that the core purpose of the SRB016 is to review progress on the IPHC science program, and to provide guidance for the delivery of products to the SRB017 in September 2020, 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 SRB017.*

REQUESTS

Action No.	Description	Update
SRB016–Req.01 (para. 11)	***IPHC Fishery-independent setline survey (FISS)*** The SRB **NOTED** that many ecological processes that could be influencing the spatial distribution of the stock, and thus the performance of the FISS in providing a reliable index of relative abundance, are not adequately represented and uncertainty is underestimated when the spatial-temporal model is used to both simulate and analyse FISS data. One specific concern is that density-dependent habitat selection combined with preferential sampling of core habitat areas (to achieve cost goals) could lead to hyperstability in the index. As a first step, the SRB **REQUESTED** the IPHC Secretariat investigate the potential consequences and risk of FISS designs under density-dependent habitat selection (or other spatial processes) in future MSE work. Independent models could be developed for simulating FISS sampling data that could represent qualitatively different scenarios regarding ecological processes driving the spatial distribution of the stock.	**Pending**: MSE research will be done in the future after the delivery of the MSE results at AM097.
SRB016–Req.02 (para. 12)	The SRB **REQUESTED** that the IPHC Secretariat to develop a routine evaluation procedure following data collection to ensure that FISS designs adequately meet monitoring objectives (i.e. that projected FISS CVs represent realized future CVs).	**Pending**: Pending results of the 2020 FISS, projected CVs for sampled IPHC Regulatory Areas will be compared with CVs estimated from the 2020 space-time modelling."

Action No.	Description	Update
SRB016–Req.03 (para. 20)	***Pacific halibut stock assessment: 2020*** The SRB **REQUESTED** that the IPHC Secretariat continue to update data weighting on an annual basis, even for updated stock assessments, in order to maintain internal model consistency and to best reflect changes in existing and new data as they arise.	**In Progress**: Will be completed for the final 2020 stock assessment. See document **IPHC-2020-SRB017-07**.
SRB016–Req.04 (para. 21)	The SRB **AGREED** that data weighting approaches, including alternative error distributions (e.g. self-weighting), should be evaluated further in the context of the next full stock assessment, and should strive to make use of the best methods available, noting that there are a range of approaches in use for similar stock assessments. In particular, the SRB **REQUESTED** that the IPHC Secretariat investigate the feasibility of a logistic-normal distribution to incorporate correlated errors in age composition data (see Francis, R.I.C.C. 2014. Replacing the multinomial in stock assessment models: A first step. Fisheries Research 151: 70–84). This change may be technically challenging given the current assessment software, as well as having sexed age composition data, and could non-trivially affect the stock assessment estimates of biomass and recruitment. Therefore, the SRB does not expect new results until at least SRB018 in June 2021.	**In Progress**: See document **IPHC-2020-SRB017-07**.
SRB016–Req.05 (para. 22)	The SRB **REQUESTED** that the Secretariat staff 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.	**In Progress**: See document **IPHC-2020-SRB017-07**.
SRB016–Req.06 (para. 23)	The SRB **REQUESTED** an update at SRB017 on all data available at that time and any additional changes anticipated for the final 2020 stock assessment.	**Completed**: See document **IPHC-2020-SRB017-07**.

Action No.	Description	Update
SRB016–Req.07 (para. 26)	***Management Strategy Evaluation: update*** The SRB **REQUESTED** that the IPHC Secretariat carefully (i.e. narrowly) scope the MSE work for 2020 to questions that are reasonably determined given the rapid expansion of uncertainties in a more complex model. The MSE timelines for delivery is short; therefore, results will need to be presented conditional on some parameters and processes remaining highly uncertain. For example, processes that remain highly uncertain be collected in a "reference grid" of plausible scenarios and a "robustness grid" of processes that currently lack evidence based on historical data.	**In Progress**: The MSE is focused to meet the recommendations of the Commission and MSAB as outlined in document **IPHC-2020-SRB017-09**.
SRB016–Req.08 (para. 27)	The SRB **NOTED** that stochasticity in Pacific halibut productivity is driven substantially by extrinsic factors (i.e. processes independent of Pacific halibut population size, structure, distribution, etc.). While the current approach is reasonable at this early stage of operating model development, the SRB **REQUESTED** that the IPHC Secretariat investigate intrinsic drivers (e.g. compensatory and depensatory effect) for at least some of these processes. Further integration of the IPHC's biological and ecosystem sciences research plan into the MSE operating model development could be used to sensitivity-test such scenarios. Given the existing MSE timelines, however, more complex operating models could be delayed until SRB018 in June 2021.	**Pending**: The MSE framework is generalized and will be expanded to encompass additional questions after the first complete results are presented to the Commission.
SRB016–Req.09 (para. 28)	The SRB **NOTED** autocorrelation structure in projected Pacific halibut weight-at-age in the spatial operating model. While such a structure adequately captures the smoothness of historical patterns, it is not clear whether it captures the correlation structure among ages. Therefore, the SRB **REQUESTED** that a multivariate normal distribution be investigated (for SRB018 June 2021) for weight-at-age deviations in which these are correlated among ages. This would involve fitting a multivariate time-series model instead of	**Pending**: This will be investigated for SRB018

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	the ARIMA. Other forms of growth deviations (e.g. cohort-dependence) could also be used to better represent changes in weight-at-age over time.	
SRB016–Req.10 (para. 29)	The SRB **NOTED** that the operating model includes decision-making variability or implementation uncertainty. This is an important addition to the MSE because, while some management procedures may perform reasonably well if fully implemented, large inter-annual adjustments could be made in practice in response to anticipated economic and social disruptions to the fishery. Thus, the SRB **REQUESTED** further investigation of decision-making variability, including empirical analysis of the relationship between recommended and implemented harvest levels.	**In Progress**: A small amount of implementation variability is included, but is not related to the decision-making process. This will be investigated in 2021.
SRB016–Req.11 (para. 36)	***Migration and distribution*** **NOTING** that the genetic data may be complimentary to data collected using other methods, for example, stock structure at the genetic level could be reflected in individual differences in otolith chemistry (if primary otolith annuli are interrogated), the SRB **REQUESTED** that a portion of individuals that are selected for otolith chemistry also be used for whole genome sequencing.	**Pending**: Future planning of studies involving otolith chemistry will incorporate the collection of tissue (fin clip) samples for whole genome sequencing
SRB016–Req.12 (para. 37)	**NOTING** the issues of Gulf of Alaska (GOA) and Bering Sea (BS) connectivity relative to juvenile dispersal, the SRB **REQUESTED** that the IPHC Secretariat include individuals of different ages and locations in the GOA and BS in their whole genome sequencing analysis, including individuals from different places in GOA and BS.	**In Progress**: Tissue (fin clip) samples from juvenile Pacific halibut collected in the GOA and BS are currently being selected for age and capture location for whole genome sequencing analysis. A sample summary will be presented at the SRB017.

Action No.	Description	Update
SRB016–Req.13 (para. 38)	***Reproductive assessment*** The SRB **REQUESTED** a preliminary analysis of existing data on 'skipped spawning'.	**In Progress**: Representative histological characteristics of skipped spawning are being investigated. This information will be presented at the SRB017.
SRB016–Req.14 (para. 39)	The SRB **REQUESTED** that work on size- and age-specific fecundity be incorporated in the next 5-year research plan.	**In Progress**: Studies on size- and age-specific fecundity are being planned for execution in 2021. This information will be presented at the SRB017.
SRB016–Req.15 (para. 41)	***Genetics and genomics*** The SRB **NOTED** that the text in this section of paper IPHC-2020-SRB016-09 was not consistent. A high level of detail was provided in some areas and much less detail was provided in others. At one level, the SRB requires more information on (a) objectives and (b) methods to evaluate study design and the quality of data, however this was not possible given the information provided. For example in the first section on whole genome sequencing there was a major gap in methods. The SRB **REQUESTED** specific information on how the sequence data would be mapped to the reference genome.	**In Progress**: Methods similar to those used by Clucas et al. (2019) will be used to align raw sequence reads to the Pacific halibut reference genome. This information will be presented at the SRB017.

Action No.	Description	Update
SRB016–Req.16 (para. 42)	**NOTING** the importance of genetically determined sex information to stock assessment, the SRB **REQUESTED** that the IPHC Secretariat conduct a pilot study to determine whether DNA and PCR amplification of sex-linked SNP loci can be obtained from archived otoliths of different collection periods to demonstrate feasibility to develop a more comprehensive spatial and temporal sex ratio data base.	**In Progress**: The IPHC Secretariat is conducting studies to determine whether DNA can be extracted from otoliths and whether sex information can be generated. This information will be presented at the SRB017.
SRB016–Req.17 (para. 44)	***Research integration*** The SRB **REQUESTED** an updated presentation on the plan and timelines for integrating research and results from biological and ecosystem science research plan into specific functions and parameters of the assessment and MSE.	**In Progress**: The IPHC Secretariat is updating the plan and timelines of the integration between research activities and stock assessment and MSE needs. This information will be presented at the SRB017
SRB016–Req.18 (para. 49)	The SRB **REQUESTED** that the IPHC Secretariat contact the National Center for Biological Information to annotate the genome. Subsequently, existing and newly discovered SNPs be mapped onto the existing Pacific halibut genome.	**Completed**: The IPHC Secretariat requested genome annotation from NCBI and the annotation has now been completed and available as NCBI Hippoglossus stenolepis Annotation Release 100.
SRB016–Req.19 (para. 52)	**NOTING** that a common theme in programmatic studies is a need to understand growth, the maturation process and size and age at sexual maturity, and to incorporate this understanding into the assessment and MSE programs. The SRB reiterated its previous **REQUEST** that the IPHC Secretariat hire a PhD-level life history modeller with expertise in the areas that include life history and quantitative genetics. The SRB was advised	**Pending**: The IPHC does not intend on hiring a life-history modeller for the foreseeable future.

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	that at this point in time, the hiring of a life-history modeller is not financially feasible unless either 1) additional contributions were appropriated by the Contracting Parties, or 2) a current FTE was replaced with a life-history modeller.	