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Proceedings of the Pacific regional peer review on Widow Rockfish (*Sebastes entomelas*) stock assessment for British Columbia in 2019

June 18-19, 2019
Nanaimo, British Columbia

Chairperson: Greg Workman
Editors: Lindsay Dealy and Jill Campbell

Fisheries and Oceans Canada
Science Branch
3190 Hammond Bay Road
Nanaimo, BC V9T 6N7

November 2021

Canada

Foreword

The purpose of these Proceedings is to document the activities and key discussions of the meeting. The Proceedings may include research recommendations, uncertainties, and the rationale for decisions made during the meeting. Proceedings may also document when data, analyses or interpretations were reviewed and rejected on scientific grounds, including the reason(s) for rejection. As such, interpretations and opinions presented in this report individually may be factually incorrect or misleading, but are included to record as faithfully as possible what was considered at the meeting. No statements are to be taken as reflecting the conclusions of the meeting unless they are clearly identified as such. Moreover, further review may result in a change of conclusions where additional information was identified as relevant to the topics being considered, but not available in the timeframe of the meeting. In the rare case when there are formal dissenting views, these are also archived as Annexes to the Proceedings.

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SUMMARY

These Proceedings summarize the relevant discussions and key conclusions that resulted from a Fisheries and Oceans Canada (DFO), Canadian Science Advisory Secretariat (CSAS) Regional Peer Review meeting of June 18-19, 2019 at the Pacific Biological Station in Nanaimo, British Columbia (BC). The working paper focusing on the Widow Rockfish (*Sebastes entomelas*, WWR) stock assessment was presented for peer review.

In-person and web-based participation included personnel from Fisheries and Oceans Canada (DFO) Science and Fisheries Management, external participants from First Nations organizations, the commercial fishing sector, and environmental non-governmental organizations.

The conclusions and advice resulting from this review will be provided in the form of the Science Advisory Report providing advice to Fisheries Management to inform on harvest advice.

The Science Advisory Report and supporting Research Document will be made publicly available on the Canadian Science Advisory Secretariat (CSAS) website.

INTRODUCTION

A Fisheries and Oceans Canada (DFO) Canadian Science Advisory Secretariat (CSAS), Regional Peer Review (RPR) meeting was held on June 18-19, 2019 at the Pacific Biological Station in Nanaimo, BC to review the Widow Rockfish (*Sebastes entomelas*, WWR) stock assessment.

The Terms of Reference (TOR) for the science review (Appendix A) were developed in response to a request for advice from Fisheries Management. Notifications of the science review and conditions for participation were sent to representatives with relevant expertise from First Nations, commercial and recreational fishing sectors, and environmental non-governmental organizations.

The following working paper (WP) was prepared and made available to meeting participants prior to the meeting (working paper abstract is provided in Appendix B):

Widow Rockfish (Sebastes entomelas) stock assessment for British Columbia in 2019. Paul J. Starr and Rowan Haigh. 2019. CSAP Working Paper 2018GRF01

The meeting Chair, Greg Workman, welcomed participants, reviewed the role of CSAS in the provision of peer-reviewed advice, and gave a general overview of the CSAS process. The Chair discussed the role of participants, the purpose of the various RPR publications (Research Document, Science Advisory Report, and Proceedings), and the definition and process for achieving consensus decisions and advice. Everyone was invited to participate fully in the discussion and to contribute knowledge to the process, with the goal of delivering scientifically defensible conclusions and advice. It was confirmed with participants that all had received copies of the Terms of Reference, working papers, and draft Science Advisory Report (SAR).

The Chair reviewed the Agenda (Appendix C) and the Terms of Reference for the meeting, highlighting the objectives and identifying the Rapporteur for each review. The Chair then reviewed the ground rules and process for exchange, reminding participants that the meeting was a science review and not a consultation. The room was equipped with microphones to allow remote participation by web-based attendees, and in-person attendees were reminded to address comments and questions so they could be heard by those online.

Members were reminded that everyone at the meeting had equal standing as participants and that they were expected to contribute to the review process if they had information or questions relevant to the paper being discussed. In total, 21 people participated in the RPR (Appendix D). Lindsay Dealy was identified as the Rapporteur for the meeting.

Participants were informed that Allan Hicks (International Pacific Halibut Commission) and Chris Rooper (DFO Science) had been asked before the meeting to provide detailed written reviews for the working paper to assist everyone attending the peer-review meeting. Participants were provided with copies of the written reviews.

The conclusions and advice resulting from this review will be provided in the form of a Science Advisory Report to DFO Fisheries Management to inform fishery planning for the above-noted stock. The Science Advisory Report and supporting Research Document will be made publicly available on the Canadian Science Advisory Secretariat (CSAS) website.

REVIEW

Working Paper:	Widow Rockfish (*Sebastes entomelas*) (WWR) stock assessment for British Columbia in 2019. Paul J. Starr and Rowan Haigh. 2019. CSAP Working Paper 2018GRF01
Rapporteur:	Lindsay Dealy
Presenters:	Paul Starr and Rowan Haigh

PRESENTATION OF WORKING PAPER

Catch per unit effort (CPUE) data: A standardisation procedure was followed to prepare a time series of CPUE indices based on catch and effort data reported to DFO over the period 1996 to 2018. This procedure estimates constant parameters associated with a range of explanatory factors offered to the model. The residual annual deviance that remains after these factors are evaluated is assumed to be an index of annual relative change in CPUE. Although WWR is captured at higher rates in midwater trawls than bottom trawls or in the hook and line fishery, this analysis was confined to the bottom trawl fishery where this species appears to be present as bycatch at relatively low but consistent levels. Because the bottom trawl fishery is 100% observed, there is strong confidence in the quality of these catch and effort data. This data set is pivotal to the model success. The coverage and depth distributions are good, and only the active vessels were used which accounted for 87% of the total catch.

Survey data: There are high coefficients of variation (CV) in all five surveys, leading to strong interannual variation within surveys. The schooling nature of Widow rockfish (WWR) results in many zero sample tows and few large sample tows which likely contribute to the high CVs. No process error was added to the models due to the large CVs. There are poor age data in the surveys. The authors recognized that these surveys are relatively uninformative for this species, given the large CVs and the short time series.

The authors inspected the available data for evidence that there may be multiple WWR stocks in BC. However, this evaluation did not result in any indication that there were distinct stocks along the BC coast, given the data. The mean weights are similar between north and south areas and there is no trend among lengths between the mid-water and bottom trawls.

Conclusions: The range of uncertainty in the estimated spawning biomass in the model is broad. Recruitment is estimated to be good in 2006 and 2008. Overall, this is a healthy stock coastwide and is expected to stay that way for the near future. Stock reassessment recommended for 2024. The survey data are lacking biological samples and the CPUE data are relatively stable.

There was some discussion about sampling protocol consistency among commercial fishing trips. It was noted that the commercial fishery has randomly selected tow samples with the dominant species sampled for length, sex, and age. Historically port samplers were used which made it difficult to get spatially explicit unsorted samples. Sampling is now conducted by on-board observers where samples are taken before the catch is sorted by size. The synoptic surveys sample all species that meet the criteria for length, weight, and sex and the dominant species is sampled for age. Sampling protocol for the surveys is specified by the custom software, which indicates when a sample should be taken.

A participant wanted to know why length data are not used in the age models and suggested that converting the lengths into weights might introduce some bias. A reviewer indicated that length data should only be used for making decisions on stock structure and should not be incorporated in the models. It was noted that age 10 (mature) fish are fully selected by the commercial fleet.

PRESENTATION OF WRITTEN REVIEWS

ALLAN HICKS, INTERNATIONAL PACIFIC HALIBUT COMMISSION

- Accumulator age – There was concern that the accumulator age (*A*) was an axis of uncertainty when the higher *A* values resulted in model stabilization. As well, the values of *M* (natural mortality) and *q* (catchability) may be impacted by the choice of accumulator age. The reviewer suggested looking at accumulator age values of 55 or 60 to see how that impacts *M*. The lack of data made the authors hesitant to use higher *A* values (only 11 fish older than age 50 in the data) and therefore a composite age model seemed like the most prudent option. The reviewer recommended more consideration be given to the accumulator age value.
- Steepness – The reviewer was concerned about how the prior for *h* had been derived. The prior used to estimate steepness was based on work by Robyn Forrest (DFO Science) and this prior has been used in stock assessments by the authors since 2010. This prior is quite broad and there appears to be little interaction between *M* and *h*.
- Natural mortality – Including *M* as an axis of uncertainty was a worthwhile option, but higher *M* values should be considered in future research.
- Comparison of posterior distributions to prior distributions – It was recommended that the authors add information or figures showing the comparison between these distributions.
- Calculations of weight-at-age – There appeared to be some biases in the weight at age. The authors indicated that each trip may have more than one sample and that all samples are representative of that trip. They are open to other suggestions of how to deal with this.
- Expansion of age compositions – The reviewers and authors agreed that coming up with standard practices of how to account for catch that was not sampled would be beneficial for future research.
- Model-based approach for survey data – Due to the lack of age data in the surveys, the reviewer suggested a model-based approach could be considered that would combine surveys across years and increase the impact they have on model outputs. The authors conducted a sensitivity run that did not include these survey data and their removal did not have a big effect. As well, infrequent large catches of WWR are common in these surveys and combining across years and areas may not improve survey precision.

CHRIS ROOPER, DFO SCIENCE

- TOR Objective 1 – A potential trigger for a new assessment could be a recruitment failure. The authors indicated that this was not practical because Widow Rockfish are not selected by the surveys until they are 5-8 years old so a recent recruitment failure would be difficult to detect. The authors also pointed out that ageing was only done in the context of a stock assessment, so there could be no inter-sessional consideration of recruitment.
- TOR Objective 2 – Continue to look for evidence of spatially distinct stocks.
- TOR Objective 4 – The treatment of the historic domestic fishery is uncertain. There is a time period where biomass declines, but catch is not very high. The authors indicated that estimating catches in the early domestic fishery data is highly uncertain with rockfish species lumped together and management at the time encouraged misreporting to get around trip limits. The authors responded to this point by stating "…the observation of declining biomass in the face of constant levels of catch is common in *Sebastes* stock assessments.

This is because these species appear to rely on occasional large episodic recruitments to maintain stock size, with little or no recruitment during interim periods. Thus, catches will often exceed the short term surplus production leading to a period of biomass decline."

- TOR Objective 5
    - Frequency of assessments – The limiting factor with re-running these models is the time-intensive nature of processing age data. A participant from DFO management indicated they would prefer more frequent updates on stock assessments. The authors said that adding more data to the models may not be informative unless there is some contrast in the observations. Stock assessment updates every 5-6 years appear to be reasonable. Management is concerned that the TACs are staying the same despite apparent increases in biomass and would prefer more frequent Science advice. The reviewer agreed but acknowledged the resources are not available.
    - Ecosystem considerations – The reviewer would like to see more ecosystem considerations incorporated in the models. The authors said that is not their area of expertise and the assessment is already very time consuming. There might be an opportunity for others to add environmental information working from these model results. Such work and any advice from this work would need to be reviewed by the CSAS process. A participant suggested a national working group could develop tools to incorporate ecosystem considerations into advice for managers.
    - Use of commercial CPUE data – For most rockfish species, including WWR, the survey CVs are very large due to infrequent large catches coupled with many zero-value or low-incidence tows. The sensitivity run on the central run of the composite base case without the CPUE data produced similar overall results to the run that included the CPUE. The reviewer suggested that the survey data could be analyzed through a standardization procedure that might result in more reliable biomass indices. It was agreed that this suggestion could become a future research recommendation. An author pointed out that with CVs of 50%, one cannot expect to have informative indices of abundance and the use of CPUE stabilized the model results. In addition, it was noted that the CPUE and available survey data are not in strong conflict. CPUE was not used in the Pacific Ocean Perch (POP) stock assessments because it is a target species, whereas WWR is bycatch. It is known that the POP fishery can maintain high catches even as the abundance declines because fishers can target aggregations. The reviewer would like to see the models rely less on the commercial fishery data. A participant noted the Franklin will have acoustic signals concurrent with bottom trawls which will be able to estimate the size of WWR schools when WWR are caught in the trawls. It was agreed that expanding the data for assessment using acoustic indices would be put forth as a future research recommendation.
    - Stock structure in the USA – A participant stated that an early WWR assessment indicated there may be separate stocks delineated by latitudinal cline, but their results were not very compelling. An assessment along the BC coast did not detect separate stocks.

GENERAL DISCUSSION

- Accumulator age/natural mortality – There is no statistical procedure for determining the optimal accumulator age in this type of model. *M* values are higher in southern US Pacific waters, which may be due to latitudinal clines (*M* = 0.15 in US vs 0.11 in BC, from the single sensitivity run where *M* was estimated).

- Continuation of the conversation from Chris Rooper's review regarding the historic declines in abundance coinciding with large catches in BC and USA – A participant suggested comparing the USA and Canada recruitment and catch data. The sporadic recruitment of this species can support the fishery for a long time. A joint Canada-USA assessment could be useful to explore.
- Sampling effort – It was acknowledged that there is a lack of age and length data, and that the survey sampling protocol may need to be revised to reduce the minimum sample size rules. It was unclear whether the lack of older individuals in the data was due to poor sampling or a lack of those individuals in the population.
- Sorted vs unsorted samples – A participant was not sure combining the sorted and unsorted samples was the best decision. The authors said these two were separated for age composition and that not combining them results in losing data because only sorted data are available before 1996. It is likely that not much sorting of WWR is occurring, because tows usually contain mostly larger fish. More clarification on the difference between sorted and unsorted and how they were handled in the model were requested. The author indicated that it is impossible to reconstruct old data if all they have is sorted data. Sorted catch refers to the small fish being discarded, and the large fish being retained.
- Reference points – Clarification around the use of reference points and what they are is needed, as the current wording is not clear. The reference points are not equivalent in terms of what they represent. The authors pointed out that B_{MSY} is only suggested in the DFO 2009 Precautionary Approach; therefore, $0.2B_0$ and $0.4B_0$ are given in this assessment as alternatives. Because MSY is a model-based reference point which may not be useful for rockfish species with episodic recruitment; proxies may be more informative.
- Geostatistical model vs design-based model – A participant presented on the use of other models to estimate survey biomass indices. The geostatistical model appeared to account for some of the WCVI outliers and may be used as a diagnostic tool to detect locality-year interactions in the CPUE data.

CONCLUSIONS

The working paper was accepted with minor revisions.

RECOMMENDATIONS & ADVICE

RECOMMENDED CHANGES TO THE WORKING PAPER

- Clarify how the age accumulator values were chosen and how they impact the model.
- Compare posterior distributions to prior distributions. It was recommended that the authors add information (a figure or table) showing the comparison between these distributions.
- Clarify what sorted and unsorted catch means and how this was handled in the model.
- Provide a better explanation of the reference points used and what they mean.
- Include a table of the exploitation rates probabilities to Appendix F.
- Suggest that recruitment figures, and possibly the GIG sensitivity run be added.

FUTURE RESEARCH RECOMMENDATIONS

- Higher *M* values should be considered in the models.
- Develop standard practices for age proportion data which account for catch that was not sampled.
- Expand the data sets that can be used in the assessment, such as including acoustic data from the Franklin, less reliance on commercial CPUE data, and using additional historic data (e.g., Triangle Island ageing records from acoustic surveys).
- Survey protocols may need to be revised to collect better length and age data, perhaps through changes to the minimum sample size rules.

ACKNOWLEDGEMENTS

We appreciate the time contributed to the RPR process by all participants. In particular, we thank the reviewers, Allan Hicks and Chris Rooper, for their time and expertise. The CSAP office also wishes to thank Greg Workman for chairing the meeting, Lindsay Dealy who rapporteured, and Jill Campbell who helped to draft the Proceedings.

APPENDIX A: TERMS OF REFERENCE

WIDOW ROCKFISH *(SEBASTES ENTOMELAS*) STOCK ASSESSMENT FOR BRITISH COLUMBIA IN 2019

Regional Peer Review Process – Pacific Region

June 18-19, 2019
Nanaimo, BC
Chairperson: Greg Workman

Context

Widow Rockfish (*Sebastes entomelas*) ranges from the Gulf of Alaska to Baja California and is most abundant in waters from British Columbia (BC) to northern California. Widow Rockfish is a key species caught in the BC multi-species integrated groundfish fishery. This species is primarily intercepted by midwater trawl gear directed at mixed rockfish (*Sebastes* spp.), with less than 20% of catch coming from bottom trawl gear. The species is also caught as a non-target species in the midwater trawl fishery directed at Pacific Hake (*Merluccius productus*). Annual coastwide landings of Widow Rockfish over the last 23 years (1996-2018) account for about 10% of the total weight of rockfish landed by trawl.

Conventional stock assessments typically use fishery time series data to estimate current stock size and productivity. Although good catch and biological data series are available for Widow Rockfish in BC, the lack of reliable fishery-independent indices of relative abundance has hampered stock reconstruction. Existing abundance indices derived from modern surveys conducted in collaboration with industry use bottom trawl gear, which is not ideal for species like Widow Rockfish that exhibit pelagic behaviour. The survey indices for widow rockfish are imprecise and display large inter-annual shifts in index values suggesting survey catchability varies widely making bottom trawl survey indices unsuitable for tracking widow rockfish abundance. Targeted commercial catch rates using midwater gear are also unsuitable as a basis for indexing abundance because pelagic species are searched for acoustically. Indices derived from bycatch in the bottom trawl commercial fishery have been successfully used in recent stock assessments for species which also show pelagic behaviour. Examples include Redstripe Rockfish (*S. proriger*) and Walleye Pollock (*Theragra chalcogramma*), making this approach a possible source of abundance indices to be used with the available survey indices.

There are no published studies that have examined the genetic population structure of Widow Rockfish in northeastern Pacific waters. After an evaluation of available data by a technical working group, it was agreed that this species should be treated as one coastwide BC stock.

In the absence of updated science advice, there is uncertainty about the risks posed to the BC stock by current levels of catch. DFO Fisheries Management has requested that DFO Science provide advice regarding the assessment of the Widow Rockfish stock relative to reference points that are consistent with the DFO's *Fishery Decision-Making Framework Incorporating the Precautionary Approach* (DFO 2009), including the implications of various harvest strategies on expected stock status. The advice arising from this Canadian Science Advisory Secretariat (CSAS) Regional Peer Review (RPR) will be used to inform fisheries management decisions to establish catch levels for the species. This work may also inform and supplement decisions external to DFO, including Marine Stewardship Council certification of the Pacific Hake fishery.

Objectives

The following working paper will be reviewed and provide the basis for discussion and advice on the specific objectives outlined below:

Widow Rockfish (Sebastes entomelas) stock assessment for British Columbia in 2019. Paul J. Starr and Rowan Haigh. 2019. CSAP Working Paper 2018GRF01

The specific objectives of this review are to:

1. Recommend reference points consistent with the DFO Precautionary Approach (PA), including the biological considerations and rationale used to make such a determination.
2. Assess the current status of Widow Rockfish in BC waters relative to the recommended reference points. If necessary, provide evidence to support the separation of this species into spatially distinct stocks, and if required, provide advice on the status of these stocks.
3. Using probabilistic decision tables, evaluate the consequences of a range of constant catch harvest policies to projected biomass relative to the reference points and additional stock metrics, including projected biomass relative to current biomass. If the data are insufficient to quantitatively evaluate BC Widow Rockfish in terms of PA reference points and decision tables, summarise what is known about the status of this species, and discuss the implications for harvest advice.
4. Describe sources of uncertainty related to the model (e.g. model parameter estimates, assumptions regarding catch, productivity, carrying capacity and population status).
5. Recommend an appropriate interval between formal stock assessments, indicators used to characterize stock status in the intervening years, and/or triggers of an earlier than scheduled assessment. Provide a rationale if indicators and triggers cannot be identified.

Expected Publications

- Science Advisory Report
- Proceedings
- Research Document

Expected Participation

- Fisheries and Oceans Canada (DFO) (Science and Fisheries Management)
- Commercial and Recreational Fishing Representatives
- Environmental Non-government Organizations
- First Nations
- Province of BC
- USA Government Agencies (NOAA, Alaska Fish & Game)

References

DFO 2009. A Fishery Decision-Making Framework Incorporating the Precautionary Approach.

APPENDIX B: WORKING PAPER ABSTRACT

Widow Rockfish (*Sebastes entomelas*, WWR) is ubiquitous along the British Columbia (BC) coast (at ~100-500 m depth) and occurs in high densities along the west coast of Vancouver Island (WCVI) and off the shelf edge between the top of Vancouver Island and south of Cape St. James. Shoals of WWR have been studied near Triangle Island using acoustic surveys. This species exhibits diel migration from near bottom during the day to midwater at night, feeding on shrimps, euphausiids, salps, and fish. Night time aggregations make WWR very susceptible to capture by commercial midwater trawl nets.

This species supports the fourth largest rockfish fishery in BC with an annual coastwide 'total allowable catch' (TAC) in 2017 of 2,358 t (98% allocated to the trawl fishery) and an average annual catch by all fisheries combined of 2001 t from 2014-2018. This stock assessment evaluates a BC coastwide population harvested by multiple fisheries aggregated into a single modelled fishery. Analyses of biology and distribution did not support separate regional stocks for WWR. A single coastwide stock was assumed for the last WWR stock assessment in 1998.

We use an annual catch-at-age model tuned to fishery-independent trawl survey series, a bottom trawl CPUE series, annual estimates of commercial catch since 1940, and age composition data from survey series (five years of data from four surveys) and the commercial fishery (30 years of data). The model starts from an assumed equilibrium state in 1940, and the survey data cover the period 1967 to 2018 (although not all years are represented). Nine base runs using a two-sex model were implemented in a Bayesian framework (using the Markov Chain Monte Carlo procedure) under a scenario that fixed natural mortality (M) to three levels (0.07, 0.08, 0.09) and set the accumulator age (A) to three values (40, 45, 50 y) while estimating steepness of the stock-recruit function (h), catchability (q) for surveys and CPUE, and selectivity (μ) for surveys and the commercial trawl fleet. These nine runs were combined into a composite base case which explored the major axes of uncertainty in this stock assessment. Twelve sensitivity analyses were performed to test the effect of alternative model assumptions.

The composite base case suggests that low exploitation in the early years, including that by foreign fleets, coupled with several strong recruitment events (in 1961 and 1990) have sustained the population to the present. Exploitation rates were high during a period of heavy fishing by the domestic fleet extending from the mid-1980s to the mid-1990s, causing the stock size to diminish. Exploitation rates dropped with the implementation of 100% observer coverage in 1996 and the introduction of catch limits coupled with IVQs in 1997.

The spawning biomass (mature females only) at the beginning of 2019 is estimated to be 0.37 (0.26, 0.54) of unfished biomass (median and 5th and 95th quantiles of the Bayesian posterior distribution). This biomass is estimated to be 1.51 (0.92, 2.61) of the spawning biomass at maximum sustainable yield, B_{MSY}.

Advice to managers is presented as decision tables that provide probabilities of exceeding limit and upper stock reference points for five-year projections across a range of constant catches. The DFO provisional 'Precautionary Approach compliant' reference points were used, which specify a 'limit reference point' (LRP) of $0.4B_{MSY}$ and an 'upper stock reference point' (USR) of $0.8B_{MSY}$. The estimated spawning biomass at the beginning of 2019 has a probability of 1 of being above the LRP, and a probability of 0.98 of being above the USR. Five-year projections using a constant catch of 2000 t/y indicate that, in 2024, the spawning biomass has probabilities of 0.99 of remaining above the LRP, and 0.91 of remaining above the USR. Catches greater than 2250 t/y will cause u_{2024} to exceed the u_{MSY} reference point with a probability of > 0.5.

APPENDIX C: AGENDA

Canadian Science Advisory Secretariat

Centre for Science Advice Pacific

Regional Peer Review Meeting (RPR)

Widow Rockfish (*Sebastes entomelas*) stock assessment for British Columbia in 2019

June 18-19, 2019

Seminar Room, Pacific Biological Station

3190 Hammond Bay Road, Nanaimo BC.

Chair: Greg Workman

DAY 1 – Tuesday, June 18

Time	Subject	Presenter
0900	Introductions Review Agenda & Housekeeping CSAS Overview and Procedures	Chair
0915	Review Terms of Reference	Chair
0930	Presentation of Working Paper	Authors
1030	***Break***	
1045	Overview Written Reviews	Chair +Reviewers & Authors
12:00	***Lunch Break***	
1300	Identification of Key Issues for Group Discussion	Group
1330	Discussion & Resolution of Technical Issues	RPR Participants
1445	***Break***	
1500	Discussion & Resolution of Results & Conclusions	RPR Participants
1630	Develop Consensus on Paper Acceptability & Agreed-upon Revisions (TOR objectives)	RPR Participants
1700	Adjourn for the Day	

DAY 2 - Wednesday, June 19

Time	Subject	Presenter
0900	Introductions Review Agenda & Housekeeping Review Status of Day 1 (*As Necessary*)	Chair
0915	Carry forward outstanding issues from Day 1	RPR Participants
1030	***Break***	
1045	*Science Advisory Report (SAR)* Develop consensus on the following for inclusion: • Summary bullets • Sources of Uncertainty • Results & Conclusions • Figures/Tables • Additional advice to Management (as warranted)	RPR Participants
1200	***Lunch Break***	
1300	*Science Advisory Report (SAR) cont'd*	RPR Participants
1445	***Break***	
1500	Next Steps – Chair to review • SAR review/approval process and timelines • Research Document & Proceedings timelines • Other follow-up or commitments (*as necessary)*	Chair
1545	Other Business arising from the review	Chair & Participants
1600	***Adjourn meeting***	

APPENDIX D: PARTICIPANTS

Last Name	First Name	Affiliation
Anderson	Sean	DFO Science
Candy	John	DFO Science, Centre for Science Advice Pacific (CSAP)
Cornthwaite	Maria	DFO Science
Dealy	Lindsay	DFO Science
Grandin	Chris	DFO Science
Haggarty	Dana	DFO Science
Haigh	Rowan	DFO Science
Hicks	Allan	International Pacific Halibut Commission
Holt	Carrie	DFO Science
Holt	Kendra	DFO Science
Keppel	Elise	DFO Science
Kronlund	Rob	DFO Science
Lane	Jim	Nuu-chah-nulth Tribal Council
Mose	Brian	Groundfish Technical Advisor Committee
Olmstead	Melissa	DFO Science
Rooper	Chris	DFO Science
Starr	Paul	Canadian Groundfish Research and Conservation Society
Tadey	Rob	DFO Resource Management
Turris	Bruce	Canadian Groundfish Research and Conservation Society
Wallace	Scott	David Suzuki Foundation
Workman	Greg	DFO Science