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Proceedings of the Pacific regional peer review on the pre-COSEWIC assessment for Yelloweye Rockfish

November 8, 2017
Nanaimo, British Columbia

Chairperson: Maria Cornthwaite
Editors: Vanessa Hodes and Jill Campbell

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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 November 8, 2017 at the Pacific Biological Station in Nanaimo, B.C. The working paper focusing on the pre-COSEWIC assessment of Yelloweye Rockfish was presented for peer review.

In-person and web-based participation included Fisheries and Oceans Canada (DFO) Science and Fisheries and Aquatic Management Sectors staff; and external participants from First Nations, the commercial and recreational fishing sectors, environmental non-governmental organizations, and the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

The conclusions and advice resulting from this review will be provided in the form of a Research Document providing advice to COSEWIC to inform their assessment of Yelloweye Rockfish conservation status.

The 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 November 8, 2017 at the Pacific Biological Station in Nanaimo to review the pre-COSEWIC assessment of Yelloweye Rockfish.

The Terms of Reference (TOR) for the science review (Appendix A) were developed in response to a request for advice from COSEWIC. Notifications of the science review and conditions for participation were sent to representatives with relevant expertise from COSEWIC, 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 provided in Appendix B):

Keppel, E. 2017. A Review of Yelloweye Rockfish (*Sebastes ruberrimus*) along the Pacific coast of Canada: biology, distribution and abundance trends. CSAP Working Paper 2015SAR13.

The meeting Chair, Maria Cornthwaite, 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 (Proceedings and Research Document), and the definition and process around 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 and working paper.

The Chair reviewed the Agenda (Appendix C) and the Terms of Reference for the meeting, highlighting the objectives and identifying the Rapporteur for the 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, 30 people participated in the RPR (Appendix D). Vanessa Hodes was identified as the Rapporteur for the meeting.

Participants were informed that Ashleen Benson and Dana Haggarty 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 Research Document to COSEWIC to inform an assessment of Yelloweye Rockfish conservation status. The supporting Research Document will be made publicly available on the Canadian Science Advisory Secretariat (CSAS) website.

REVIEW

Working Paper: Keppel, E. 2017. A Review of Yelloweye Rockfish (*Sebastes ruberrimus*) along the Pacific coast of Canada: biology, distribution and abundance trends. CSAP Working Paper 2015SAR13.

Rapporteur: Vanessa Hodes

Presenter: Elise Keppel

PRESENTATION OF WRITTEN REVIEWS

ASHLEEN BENSON

- The paper would benefit from a stronger focus on the data and surveys used and to highlight the stock structure uncertainty.
- The authors indicate the spatial extent of this stock is not expected to increase with stock abundance. The reviewer inquired if this is reflected in local knowledge or survey data. If this is so, it increases the bias for relative abundance trends.
- The multispecies fishery data poses problems for acquiring Yelloweye data. Previously, Yelloweye was targeted, now it is opportunistic catch. These catches are not necessarily representative of the stocks. Careful consideration of which surveys are used is necessary.
- Criteria for data used in survey design should be developed. Such criteria might include:
    - Identifying a set of requirements for data that are a reasonable indicator of Yelloweye abundance
    - Data there are concerns about
    - Data that are not useable
- Comparing surveys directly ignores the statistical literature and the work that has gone into survey design.
- Concerned that the rebuilding plan is not included in the paper. The authors will include this in the Research Document.
- The catch quotas did not look correct. As well, the ways the quota is distributed should be discussed in the paper.
- The assumption of average stock distribution should be discussed further as this is uncertain.
- There was some discussion around using habitat or catch as surrogates for distribution. The fishery has changed to an avoidance fishery and where Yelloweye are caught now might not necessarily be where they live. This should be discussed further in the paper.

DANA HAGGARTY

- The paper needs to be explicit of what surveys and what data are being used. Exact sources need to be identified.
- The data in Table 1 needs to be clarified.
- The line plots are not continuous—suggested bar plots or some other visualization.

- The inclusion of various surveys such as the Jig survey seems odd. Is there no contemporary data? The authors indicated this inclusion was an artifact of the report format.
- The change in extent of occurrence is not much of a point. Biases with various datasets, depths, and catchability of those surveys will affect the depths that are observed.
- Is there any biological reason we should expect the depths to be different on the inside and outside stocks? Surveys do not target juvenile fish, which are often shallow, so the data is biased on the outside. The reviewer wondered if the same depths should be used inside and outside but acknowledged that this may not matter due to changes in calculating the area.
- Habitat requirements and use needs to be discussed.
- Confused as to what pre-COSEWIC and COSEWIC papers were used in this work as it appears areas of literature have been missed. The reviewer added some additional papers in their review.
- Matt Seagle did a recent genetic analysis that should be included.
- Major omission in terms of US assessment for their inside Designatable Unit (DU), they have a recovery plan that includes Puget Sound and all of the Strait of Georgia (SOG). The recovery plan includes long-term monitoring in Washington state and Canadian waters. The reviewer has been working on developing a remotely operated vehicle (ROV) survey starting this year. This information should be included.
- Hecate Strait sponge reef was left out. The Bowie seamount marine protected area also has large Yelloweye populations. There are data Lynn Yamanaka, ROV, and submersible survey data that needs to be included.
- Threats calculator is not required (determined on the Canary Rockfish pre-COSEWIC assessment, Nov 7, 2017).
- Additional threats:
    - Bottom trawl fishery, long line, and trap fisheries have reports.
    - Lack of compliance from Recreational fishery in Rockfish Conservation Areas (RCAs). There has been no reduction by recreational fishers for both DU's. Alejandro Frid et al. 2016 paper outlines some of the problems along the central coast.
    - Recreational fishing should be included as threat. Recreational is given in pieces, commercial is done in weight. Dana Haggarty did an analysis using pieces. SOG 90% of catch is recreational fishery.

PRESENTATION FROM THE CENTRAL COAST INDIGENOUS RESOURCE ALLIANCE (CCIRA)

Alejandro Frid presented on the data the CCIRA uses for Yelloweye Rockfish.

- US stock assessments contribute to fecundity studies.
- Analyzed temporal trends in size and age with International Pacific Habilbut Commission (IPHC), Pacific Habliut Management Association (PHMA), and central coast First Nations data.
- Datasets were analysed separately.
- Shows rate of decline of age and fork length.

- Social science techniques to get lengths. Constant from 1950 to 1980 and then decreased in 2010.
- Compared 2010 FN estimation to fishery independent data, IPHC, PHMA data and sizes were current.
- Fishery independent data from Haida Lodge has smaller scale spatial variation in size. This may be due to distance to ports, fishing lodges, and/or environmental variables.
- Yelloweye are 21% larger inside RCA's than outside.
- Information about survey design and methodology can be found in papers published by Frid et al. 2006, 2007, 2016 and Wirsing et al. 2014. These data have not been compared to fishery data.
- This data set is not large enough or long enough to detect changes in the stock size. However, the tow and dive surveys are continuing to answer these questions in the future.

GENERAL DISCUSSION

SURVEYS AND INDICES OF ABUNDANCES

- More information is needed about all the surveys used. It is important for COSEWIC to understand which indices this assessment used, and which are of greater importance. The authors will create a table that should include the following information:
    - Potential sources of bias
    - Known data gaps
    - Issues with sampling
    - Sampling design that produced the data and any changes over time
    - Goals for the survey, what was the targeted information
    - Survey gear type
    - How these data were used in this assessment and past assessments
    - Caveats and explanations of indices used
- A few data sources (i.e. jig survey, shrimp trawl survey for the Outside DU) were included erroneously as an index and will be removed. However, the biological data from the jig survey is relevant.
- There was some discussion about the IPHC survey. The long-line gear length changes year by year, vessels need to set the gear through the station, and longer lines can go into different habitat. Therefore, the data looks different based on the number of skates used. It was clarified that the first four skates are standardized for the assessment and the rest are used for experiments. Andrew Edwards (DFO Science) is going to publish a paper on how to develop a new index to address this. It was recommended the authors use this data and index. PHMA also developed a method to address the longline saturation, however, as this is still in development, the authors are to use the index developed by Edwards.
- The authors will also create an appendix table with query codes and descriptions of how the data were extracted.
- COSEWIC indicated they would like to have a vector of population numbers or biomass over time.

- Inside and Outside DU's started in 2011-2014 and this will impact the indices.

OTHER DATA SOURCES

- Other data sources include:
  - Recreational North Coast data
  - Visual surveys
  - ROV and submersible data
  - PHMA review: unpublished source from Ashleen Benson
  - COSEWIC has used unpublished information with correct citation
  - Bowie seamount for Yelloweye
  - Qualitative Food Social Ceremonial (FSC) information (COSEWIC to follow up)
  - DFO may be able to clarify dual fishing in data
  - Total Allowable Catch (TAC) allocations could be included (Treaty First Nations), potential catch
- These data will be included in the survey description table

COMMERCIAL CATCH DATA

- The catch reconstruction is different than the 2015 assessment. The authors will look at their analysis and update the figure.
- It was noted there were species ID errors in the 1984-1996 data, as well as in the halibut data. The authors will look further into the historical species ID.
- There is not a lot of data on Yelloweye before 2006. There is some commercial logbook data from 1983 but not all vessels reported.

RECREATIONAL FISHERY

- Additional sources of data include: Haida Lodge logbook program; Haida creel; Area 3 and 4 creel survey. The Haida logbook 2010 estimates start based on a subsample of the total catch. However, an estimate since 2010 could be derived.
- Species ID concerns. There has been a lot of education since 2000. The creel surveyors have been educated. Lodges are good at species ID.
- There are concerns about the spatial coverage of creel survey.
- Partial controllability and enforcement of RCA closures is a concern. Management information of RCA enforcement should be included in the report.
- Internet recreational effort and catch (iREC): there is a public document describing the proper methodology. An analysis was done on the consistency between iREC and creel data and found there is not much consistency. Therefore, caution should be used around the IREC data.
- A Fisher app has been created and all the data has been submitted.
- Recreational data was deemed to be flawed and removed from the 2015 assessment because they had used a volume of salmon to equal the amount of yelloweye catch. The authors indicated these data were not used in this assessment either.

- However, current recreational management practices need to be recognized in the document. Catch aggregates and bag limits have been used to assist with the reduction of Yelloweye catch. These data will be summarized and presented in 2016/17.
- The authors will add in the North Coast data for the most recent data.

FIRST NATIONS CATCH DATA

- There is no way to show the First Nation FSC data as there is no reporting requirement. The authors need to be explicit in explaining this in the paper as it is misleading as it is currently worded.
- COSEWIC is interested in knowing the FSC data, even in a qualitative sense. However, a participant noted a trust building process needs to occur for First Nations to share their food fisheries data. COSEWIC will work with their sub-committee to gather more information on First Nation fishery data.

MANAGEMENT

- More discussion around catch history and management changes was requested. The spatial avoidance of Yelloweye needs to be addressed. Lynn Yamanaka (DFO Science) will provide a document she created outlining the history of the fisheries.
- The total allowable catch cuts in 2015, 2016, and 2017 need to be discussed, as does the rebuilding plan. The quota reductions are allocated as a function of the relative abundance in the area and is very prescribed. As well, the First Nation Treaty allocations should be mentioned.
- It was noted that the management of the fishery is done on a finer spatial scale than the DUs.

HABITAT

- Extent of occurrence and area of occupancy terms require definitions.
    - Extent of occurrence: large ranges, may include unsuitable habitat
    - Area of occupancy: within extent of occurrence, actual area occupied using a 2 x 2 km grid
- The main point is to establish maximum possible areas, and this could be achieved by plotting all the available data points, including the visual surveys to capture the juveniles.
- Timeseries of the IPHC data should be used to determine changes in extent of occurrence and area of occurrence. No other survey has a long enough timeframe to do this. See appendix B of the 2015 assessment.
- The ‘green blob model’ was developed by Lisa Lacko and Lynn Yamanaka and could be used as a surrogate for habitat, however this might be beyond the scope of the COSEWIC process.
- The inclusion of the Bowie seamount will affect the extent of occurrence.
- COSEWIC asked the authors to describe which habitats Yelloweye occupy and where they might be found. These data are available from some of the published work by A. Frid.

DEPTHS

- More discussion in the paper is needed about how the depth ranges were determined. Shallower depth surveys need to be included. There were suggestions of not using the mid-water trawl data.
- Depth ranges differ for the Inside and Outside DU's. A reviewer suggested the same ranges be used for both.
- Juveniles were observed in the submersible survey data at shallower depths. The authors will include this information in the paper.
- Changes in the range of depth of capture might also represent a range contraction. However, another participant noted that to assume fish have changed ranges is a mistake when the fishing locations are what have changed. The IPHC survey has changed over time with RCA's being avoided. The Pacific Fishery Management Area (PFMA) data can better indicate where they live and the local changes.

GENERATION TIME CALCULATION

- Generation times (*m*) in the literature range from 0.02 – 0.06. A reasonable generation time should be estimated here. It was noted that the 2015 assessment used 0.04 and a generation time of about 33 years. A participant recommended the authors use honing effort = 0.038 and 0.039 respectively. The authors will revisit the 2015 assessment and update the paper.

THREATS

- A broader list of threats will be developed. The authors should include:
    - Fishing pressure
    - Pinniped predation
    - Climate change (however no data exist for Yelloweye)
    - Ocean acidification
    - Habitat degradation
    - Bottom contact from fishing gear

CONCLUSION

The working paper was accepted with the following major revisions:

- Include extra data
- Rely on published assessments 2015
- Survey table
- Description of rebuilding plan
- Some factual errors

Due to the nature of the changes requested some participants requested an additional meeting to review the paper. However, it was determined that the changes requested were not out of the ordinary and the timeline for COSEWIC was limited.

ACKNOWLEDGEMENTS

We wish to acknowledge Ashleen Benson and Dana Haggarty for their expertise in formal review and all the meeting participants for their contributions to discussions. We also thank Maria Cornthwaite as Chair of the meeting and Vanessa Hodes as the Rapporteur.

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APPENDIX A: TERMS OF REFERENCE

PRE-COSEWIC ASSESSMENT FOR YELLOWEYE ROCKFISH

Pacific Region Peer Review Meeting

November 8, 2017
Nanaimo, BC

Chairperson: Maria Cornthwaite

Context

The implementation of the federal *Species at Risk Act* (SARA), proclaimed in June 2003, begins with an assessment of a species' risk of extinction by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). COSEWIC is a non-government scientific advisory body that has been established under Section 14(1) of SARA to perform species assessments, which provide the scientific foundation for listing species under SARA. Therefore, an assessment initiates the regulatory process whereby the competent Minister must decide whether to accept COSEWIC's assessment and add a species to Schedule 1 of SARA, which would result in legal protection for the species under the Act. If the species is already on Schedule 1 of SARA, the Minister may decide to keep the species on the list, reclassify it as per the COSEWIC assessment, or to remove it from the list (Section 27 of SARA).

Fisheries and Oceans Canada (DFO), as a generator and archivist of information on marine species and some freshwater species, is to provide COSEWIC with the best information available to ensure that an accurate assessment of the status of a species can be undertaken.

The Yelloweye Rockfish (*Sebastes ruberrimus*) was listed on COSEWIC's 2015 Call for Bids to produce a status report, with the following justification:

Yelloweye Rockfish was originally assessed as a Species of Concern in 2008 (COSEWIC 2008) largely because two surveys in the southern part of its Canadian range were considered the most reliable indicators of population trend, and showed abundance index declines of 78% and 96% over 30 years and 17 years respectively. Survey indices from the northern part of the range and commercial catch per unit effort indices showed no consistent trends but were of relatively short duration and are in some cases based on methods which do not adequately sample areas inhabited by the species. There was uncertainty due to high variability in the various index series (characteristic of trawl surveys) and the unknown degree to which abundance trends in the southern part of the Canadian range reflect abundance trends throughout the species' range in Canadian waters.

Fishing is the most likely cause of the observed decline.

Yelloweye Rockfish are found only in the northeast Pacific and have been observed from Baja California to the Aleutian Islands. They are present throughout the coastal waters of B.C. (COSEWIC, 2008).

Objective

The overall objective of this meeting is to peer-review existing DFO information relevant to the COSEWIC status assessment for Yelloweye Rockfish in Canadian waters, considering data related to the status and trends of, and threats to this species inside and outside of Canadian waters, and the strengths and limitations of the information. This information will be available to COSEWIC, the authors of the species status report, and the co-chairs of the applicable

COSEWIC Species Specialist Subcommittee. Publications from the peer-review meeting (see below) will be posted on the CSAS website.

Specifically, DFO information relevant to the following will be reviewed to the extent possible:

1. **Life history characteristics**
    - Growth parameters: age and/or length at maturity, maximum age and/or length
    - Total and natural mortality rates and recruitment rates (if data are available)
    - Fecundity
    - Generation time
    - Early life history patterns
    - Specialised niche or habitat requirements
2. **Review of designatable units**

Available information on population differentiation, which could support a COSEWIC decision of which populations below the species' level would be suitable for assessment and designation, will be reviewed. Information on morphology, meristics, genetics and distribution will be considered and discussed.

See COSEWIC Guidelines for recognizing Designatable Units.

3. **Review the COSEWIC criteria** for the species in Canada as a whole, and for each designatable units identified, if any. See Wildlife Species Assessment: COSEWIC Assessment Process, Categories and Guidelines.

COSEWIC Criterion – Declining Total Population

a. Summarize overall trends in population size (both number of mature individuals and total numbers in the population) over as long a period as possible and in particular for the past three generations (taken as mean age of parents). Additionally, present data on a scale appropriate to the data to clarify the rate of decline.

b. Identify threats to abundance— where declines have occurred over the past three generations, summarize the degree to which the causes of the declines are understood, and the evidence that the declines are a result of natural variability, habitat loss, fishing, or other human activity.

c. Where declines have occurred over the past three generations, summarize the evidence that the declines have ceased, are reversible, and the likely time scales for reversibility.

COSEWIC Criterion – Small Distribution and Decline or Fluctuation: for the species in Canada as a whole, and for designatable units identified, using information in the most recent assessments:

a. Summarise the current extent of occurrence (in km^2) in Canadian waters.

b. Summarise the current area of occupancy (in km^2) in Canadian waters

c. Summarise changes in extent of occurrence and area of occupancy over as long a time as possible, and in particular, over the past three generations.

d. Summarise any evidence that there have been changes in the degree of fragmentation of the overall population, or a reduction in the number of meta-population units.

e. Summarise the proportion of the population that resides in Canadian waters, migration patterns (if any), and known breeding areas.

COSEWIC Criterion - Small Total Population Size and Decline and Very Small and Restricted: for the species in Canada as a whole, and for designatable units identified, using information in the most recent assessments:

a. Tabulate the best scientific estimates of the number of mature individuals;

b. If there are likely to be fewer than 10,000 mature individuals, summarize trends in numbers of mature individuals over the past 10 years or three generations, and, to the extent possible, causes for the trends.

Summarise the options for combining indicators to provide an assessment of status, and the caveats and uncertainties associated with each option.

For transboundary stocks, summarise the status of the population(s) outside of Canadian waters. State whether rescue from outside populations is likely.

4. Describe the characteristics or elements of the species habitat to the extent possible, and threats to that habitat

Habitat is defined as “in respect of aquatic species, spawning grounds and nursery, rearing, food supply, migration and any other areas on which aquatic species depend directly or indirectly in order to carry out their life processes, or areas where aquatic species formerly occurred and have the potential to be reintroduced”.

The phrasing of the following guidelines would be adapted to each specific species and some could be dropped on a case-by-case basis if considered biologically irrelevant. However, these questions should be posed even in cases when relatively little information is expected to be available, to ensure that every effort is made to consolidate whatever knowledge and information does exist on an aquatic species’ habitat requirements, and made available to COSEWIC.

a. Describe the functional properties that a species’ aquatic habitat must have to allow successful completion of all life history stages:

   In the best cases, the functional properties will include both features of the habitat occupied by the species and the mechanisms by which those habitat features play a role in the survivorship or fecundity of the species. However, in many cases the functional properties cannot be described beyond reporting patterns of distribution observed (or expected) in data sources, and general types of habitat feature known to be present in the area(s) of occurrence and suspected to have functional properties. Information will rarely be equally available for all life history stages of an aquatic species, and even distributional information may be missing for some stages. Science advice needs to be carefully worded in this regard to clearly communicate uncertainties and knowledge gaps.

b. Provide information on the spatial extent of the areas that are likely to have functional properties:

   Where geo-referenced data on habitat features are readily available, these data could be used to map and roughly quantify the locations and extent of the species’ habitat. Generally however, it should be sufficient to provide narrative information on what is known of the extent of occurrence of the types of habitats identified. Many information sources, including Aboriginal Traditional Knowledge (ATK) and experiential knowledge, may contribute to these efforts.

c. Identify the activities most likely to threaten the functional properties, and provide information on the extent and consequences of those activities:

COSEWIC's operational guidelines require consideration of both the imminence of each identified threat, and the strength of evidence that the threat actually does cause harm to the species or its habitat. The information and advice from the Pre-COSEWIC review should provide whatever information is available on both of those points. In addition, the information and advice should include at least a narrative discussion of the magnitude of impact caused by each identified threat when it does occur.

d. Recommend research or analysis activities that are necessary:

   Usually the work on the other Guidelines will identify many knowledge gaps.

   Recommendations made and enacted at this stage in the overall process could result in much more information being available should a Recovery Potential Assessment be required for the species.

5. Describe to the extent possible whether the species has a residence as defined by SARA

SARA s. 2(1) defines Residence as "a dwelling-place, such as a den, nest or other similar area or place, that is occupied or habitually occupied by one or more individuals during all or part of their life cycles, including breeding, rearing, staging, wintering, feeding or hibernating."

6. Threats

A threat is any activity or process (both natural and anthropogenic) that has caused, is causing, or may cause harm, death, or behavioural changes to a species at risk or the destruction, degradation, and/or impairment of its habitat to the extent that population-level effects occur. See Threats and Limiting Factors section in Instructions for the Preparation of COSEWIC Status Reports

List and describe threats to the species considering:

- Threats need to pose serious or irreversible damage to the species. It is important to determine the magnitude (severity), extent (spatial), frequency (temporal) and causal certainty of each threat.
- Naturally limiting factors, such as aging, disease and/or predation that limit the distribution and/or abundance of a species are not normally considered threats unless they are altered by human activity or may pose a threat to a critically small or isolated population.
- Distinction should be made between general threats (e.g. agriculture) and specific threats (e.g. siltation from tile drains), which are caused by general activities.
- The causal certainty of each threat must be assessed and explicitly stated as threats identified may be based on hypothesis testing (lab or field), observation, expert opinion or speculation.

7. Manipulated Populations

An increasing number of wildlife species have seen their distribution or genetic make-up manipulated by humans, deliberately or accidentally. COSEWIC has developed guidelines to help determine the eligibility of populations for inclusion in wildlife species status assessments. Information available to DFO should be provided to facilitate such determination. See COSEWIC Guidelines on Manipulated Populations.

8. Other

Finally, as time allows, review status and trends in other indicators that would be relevant to evaluating the risk of extinction of the species. This includes the likelihood of imminent or

continuing decline in the abundance or distribution of the species, or that would otherwise be of value in preparation of COSEWIC Status Reports.

Working Paper

Keppel, E. 2017. A Review of Yelloweye Rockfish (*Sebastes ruberrimus*) along the Pacific coast of Canada: biology, distribution and abundance trends. CSAP Working Paper 2015SAR13.

Expected Publications

- Proceedings
- Research Document

Expected Participation

- DFO: Science, Resource Management and SARA program
- COSEWIC sub-committee chairs
- Industry
- Province of BC

References

COSEWIC. 2008. COSEWIC assessment and status report on the Yelloweye Rockfish *Sebastes ruberrimus,* Pacific Ocean inside waters population and Pacific Ocean outside waters population, in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 75 pp

APPENDIX B: WORKING PAPER ABSTRACT

This review presents data on Yelloweye Rockfish (*Sebastes ruberimmus*) for use in a COSEWIC status report. Yelloweye Rockfish were listed as a species of special concern by COSEWIC in 2008. They occur from the Aleutian Islands in Alaska to Baja California, including all coastal BC waters. Two designated units are found in BC, one in the inside waters between Vancouver Island and mainland BC, the "inside" population, and one occurring in all other BC waters, the "outside" population. The inside population ranges in depth from 18-236 m and are caught over an approximate area of 2,858 km², while the outside population is found at depths of 33-322 m and are caught over an approximate area of 51,115 km². The maximum length of Yelloweye Rockfish caught in BC is 84 cm, and the maximum weight is 10.9 kg. BC Yelloweye are aged to 121 years, with an estimated age of 17 when 50% of individuals are mature. Natural mortality is estimated at 0.02. Average generation time is 67.1 years for the inside population and 67.25 for the outside population. Yelloweye Rockfish are caught in commercial, recreational and First Nation's fisheries in BC. Quotas have been reduced since 2001 to a current sector total of 277 t. Commercial catches are influenced heavily by quota reductions and are not informative for population trends. In 2006 100% monitoring was implemented for BC fisheries. Research surveys have increased for groundfish in BC over the last 10 years providing abundance indices for inferring population trends. These time series' are still relatively short and will benefit from continuing surveys.

APPENDIX C: AGENDA

Centre for Science Advice Pacific

Regional Peer Review Meeting (RPR)

Pre-COSEWIC Assessments for Yelloweye Rockfish

November 8, 2017
Nanaimo, BC

Chair: Maria Cornthwaite

Wednesday November 8, 2017

Time	Subject	Presenter
0900	Introductions (*if necessary*) Review Agenda, Housekeeping, Procedures, TOR	Chair
0915	Presentation of Working Paper	Author
1015	***Break***	
1030	Overview of written reviews	Chair + Reviewers and Author
1130	Presentation of additional material for consideration	Alejandro Frid
1145	Identify Key Issues for Group Discussion	Chair, Group
1215	***Lunch Break***	
1315	Discussion	RPR Participants
1445	***Break***	
1500	Discussion	RPR Participants
1645	Next Steps – Chair to review • Research Document & Proceedings timelines • Other follow-up or commitments (*as necessary)*	Chair
1700	Adjourn for the Day	

APPENDIX D: PARTICIPANTS

Last Name	First Name	Affiliation
Acheson	Schon	DFO Science, Offshore Assessment
Acheson	Chris	Canadian Sablefish Association
Ashcroft	Chuck	Sport Fishing Advisory Board (SFAB)
Bannar-Martin	Catherine	DFO Science
Benson	Ashleen	Landmark Fisheries
Bocking	Bob	Maa Nulth Fisheries Committee
Boyes	Tiare	DFO Science
Christensen	Lisa	DFO Science, Centre for Science Advice Pacific
Cornthwaite	Maria	DFO Science, Fishery & Assessment Data
Dealy	Lindsay	DFO Science
Forrest	Robyn	DFO Science – Quantitative Assessment Methods
Frid	Alejandro	Central Coast Indigenous Resource Alliance
Gardner	Lindsay	DFO Fisheries Management (Groundfish)
Govender	Rhona	DFO Resource Management (Species at Risk)
Grandin	Chris	DFO Science, Offshore Assessment
Grant	Paul	DFO Science, SARA
Haggarty	Dana	DFO Science, Offshore Assessment
Haigh	Rowan	DFO Science, Offshore Assessment
Hodes	Vanessa	DFO Science
Keppel	Elise	DFO Science, Quantitative Assessment
Lacko	Lisa	DFO Science, Quantitative Assessment
MacDougall	Lesley	DFO Science, Centre for Science Advice Pacific
Neilson	John	COSEWIC
Neufeld	Chris	COSEWIC
Sporer	Chris	Pacific Halibut Management Association
Starr	Paul	Canadian Groundfish Conservation Society & External Expert
Tadey	Robert	DFO Resource Management (Groundfish)
Turris	Bruce	BC Groundfish Conservation Society
Whelan	Christie	DFO Science
Yamanaka	Lynne	DFO Science, Inshore Assessment