



## **Report of the 18<sup>th</sup> Session of the IPHC Research Advisory Board (RAB18)**

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Seattle, Washington, United States of America, 16 November 2016

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Contact details:

International Pacific Halibut Commission  
2320 W. Commodore Way, Suite 300  
Seattle, WA, 98199-1287, U.S.A.  
Phone: +1 206 634 1838  
Fax: +1 206 632 2983  
Email: [admin@iphc.int](mailto:admin@iphc.int)  
Website: <http://iphc.int/>

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**ACRONYMS**

DMR	Discard Mortality Rate
EEZ	Exclusive Economic Zone
IPHC	International Pacific Halibut Commission
NMFS	National Marine Fisheries Services, of NOAA
PAT	Pop-up Archival Transmitting (tag)
RAB	Research Advisory Board

**HOW TO INTERPRET TERMINOLOGY CONTAINED IN THIS REPORT**

The RAB18 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: *From a subsidiary (advisory) body of the Commission to the next level in the structure of the Commission:***  
**RECOMMENDED; RECOMMENDATION:** Any conclusion or request for an action to be undertaken, from a subsidiary (advisory) body of the Commission, which is to be formally provided to the next level in the structure of the Commission for its consideration/endorsement (e.g. from an Advisory Board to the Commission). The intention is that the higher body will consider the recommended action for endorsement under its own mandate, if the subsidiary body does not already have the required mandate. Ideally this should be task-specific and contain a timeframe for completion.

**Level 2: *From a subsidiary (advisory) body of the Commission to a Contracting Party, the IPHC Secretariat, or other body (not the Commission) to carry out a specified task:***  
**REQUESTED:** This term should only be used by a subsidiary (advisory) body of the Commission if it does not wish to have the request formally adopted/endorsed by the next level in the structure of the Commission. For example, if a Board wishes to seek additional input from a Contracting Party on a particular topic, but does not wish to formalise the request beyond the mandate of the body, it may request that a set action be undertaken. Ideally, this should be task-specific and contain a timeframe for the completion.

**Level 3: *For action by the subsidiary (advisory) body or for the Commission itself:***  
**AGREED:** Any point of discussion from a meeting which the IPHC body considers to be an agreed course of action covered by its mandate, which has not already been dealt with under Level 1 or level 2 above; a general point of agreement among delegations/participants of a meeting which does not need to be considered/adopted by the next level in the Commission's structure.

**Level 4: *General terms to be used for consistency:***  
**NOTED/NOTING; CONSIDERED; URGED; ACKNOWLEDGED:** Any point of discussion from a meeting which the IPHC body 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 4.

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## EXECUTIVE SUMMARY

The 18<sup>th</sup> Session of the Research Advisory Board (RAB) of the International Pacific Halibut Commission (IPHC) was held in Seattle, Washington, U.S.A. on 16 November 2016. The meeting was opened by the Chairperson, Dr. David Wilson (Executive Director, IPHC).

The following are a subset of the complete recommendations from the RAB18 to the Commission, which are provided within [Appendix IV](#).

### *Survey expansion*

RAB18-01 ([para. 11](#)) The RAB18 **RECOMMENDED** that the IPHC Staff develop an information paper associated with the survey expansion, which details the likely implications of periodic survey expansion on the stock assessment and apportionment, taking into consideration potential population variability of Pacific halibut in expansion areas which are infrequently surveyed.

### *Bycatch handling practices on all fleets catching Pacific halibut*

RAB18-02 ([para. 27](#)) The RAB18 **RECOMMENDED** that the IPHC Staff undertake a project to develop 'Best practice handling guidelines' for each of the primary gear types which catch Pacific halibut, both directed and non-directed.

### *IPHC Closed Area review*

RAB18-03 ([para. 37](#)) The RAB18 **RECOMMENDED** that as the IPHC Closed Area was designated to protect juvenile Pacific halibut, there is no scientific justification for retaining the closure in its current form. Thus, the IPHC Closed Area should either be removed, noting that it would be unlikely that much longline fishing would occur in the area as most fish are below the legal size limit, or it should only apply to gear which would interact with juvenile Pacific halibut.

### *Chalky Pacific halibut*

RAB18-04 ([para. 53](#)) The RAB18 **RECOMMENDED** that the IPHC Staff undertake research to answer the following:

- a. What causes chalky flesh in Pacific halibut? Are there particular environmental signatures (temperature, dissolved oxygen, etc.) that characterize areas with incidence of chalky flesh?
- b. Why does the occurrence of chalky flesh in Pacific halibut appear to be reappearing after a period of limited occurrence in regulatory areas 3A and 3B?
- c. Are there differences in the occurrence of chalky flesh in males and female, as well as fish of different sizes?

## 1. OPENING OF THE SESSION

1. The 18<sup>th</sup> Session of the Research Advisory Board (RAB) of the International Pacific Halibut Commission (IPHC) was held in Seattle, Washington, U.S.A. on 16 November 2016. A total of seven (7) members attended the Session from the two (2) Contracting Parties, as well as 18 IPHC staff as observers or officers. Four (4) RAB Members were absent. The list of participants is provided at [Appendix I](#). The meeting was opened by the Chairperson, Dr. David Wilson (IPHC Executive Director).
2. The RAB18 **RECALLED** its mandate as stated in the IPHC Rules of Procedure (2014) as follows:  
*Rule 10.5 (c) A Research Advisory Board, composed of members of the halibut community that shall suggest research ideas, review IPHC research, and provide the Staff with direct input and advice from industry during the development of research plans. The Board may also make recommendations to the Scientific Review Board concerning research plans and priorities. The Executive Director shall facilitate the Board's meetings, as well as communication with the Commission and the other IPHC advisory bodies on the Board's behalf.*

## 2. ADOPTION OF THE AGENDA AND ARRANGEMENTS FOR THE SESSION

3. The RAB18 **ADOPTED** the Agenda as provided at [Appendix II](#). The documents/presentations provided to the RAB18 are listed in [Appendix III](#).
4. The RAB18 **AGREED** that future agendas should include an item for Members to describe any technological advances by the fleet in the most recent fishing season.

## 3. OVERVIEW: IPHC 5-YEAR RESEARCH PROGRAM (2017-21)

5. The RAB18 **NOTED** paper IPHC-2016-RAB18-03 which provided the objectives of the Biological and Ecosystem Research Program and an overview of the 5-year research plan from 2017-21.
6. The RAB18 **NOTED** paper IPHC-2016-RAB18-03, as summarised by the author:  
*“The International Pacific Halibut Commission (IPHC) has a long history of research activities devoted to describe and understand the biology of the Pacific halibut (*Hippoglossus stenolepis*). Currently, the primary objectives of the biological research conducted by IPHC are (1) to identify and assess critical knowledge gaps in the biology of the Pacific halibut, (2) to understand the influence of environmental conditions, and (3) to apply the resulting knowledge to reduce uncertainty in current stock assessment models. Current and planned biological research activities over the next five-year period (2017-21) include studies in five major research areas: (1) reproduction (i.e. sex identification, maturity estimates), (2) growth (i.e. decrease in size-at-age, temperature effects), (3) discard mortality rates (i.e. physiological condition and survival post-release of bycatch), (4) migration (i.e. larval dispersal, adult and reproductive migrations) and (5) genetics and genomics (i.e. genetic population structure, genome characterisation)”.*
7. The RAB18 **NOTED** that while some of the proposed research elements will be paired with the IPHC fishery-independent setline survey, a rationalisation of research efforts and existing survey logistics would be required. As a result, some of the planned activities may need to be deferred until a later time.
8. The RAB18 **ENDORSED** the general approach to research detailed in paper IPHC-2016-RAB18-03 and encouraged the IPHC Staff to further elaborate the various projects for consideration at the Interim Meeting of the Commission.

## 4. ONGOING IPHC RESEARCH PROJECTS

### 4.1 Survey expansion

9. The RAB18 **NOTED** paper IPHC-2016-RAB18-04a which provided an overview of the IPHC fishery-independent setline survey expansion undertaken in 2016 and that planned for 2017, including the following abstract from the author:  
*“The third year of the International Pacific Halibut Commission’s fishery-independent setline survey expansion was carried out along the Area 4CDE continental shelf edge, with 84 additional stations fished in 2016 in this region. Several of the new stations close to the USA/Russia EEZ border had*

*average or above the average catch rate, indicating that halibut density does not strongly taper off approaching the border.”*

10. The RAB18 **NOTED** that the survey expansion into the 4CDE edge area, in regions not previously covered by the survey near the EEZ boundary found lower densities of Pacific halibut than elsewhere in the regulatory area.

#### **Recommendation/s**

11. The RAB18 **RECOMMENDED** that the IPHC Staff develop an information paper associated with the survey expansion, which details the likely implications of periodic survey expansion on the stock assessment and apportionment, taking into consideration potential population variability of Pacific halibut in expansion areas which are infrequently surveyed.

#### **4.2 Sex composition of the commercial catch from marking fish at sea**

12. The RAB18 **NOTED** paper IPHC-2016-RAB18-04b which provided an overview of IPHC research aimed at determining the sex composition of the commercial fishery catch via marking fish at the point of processing, including the following abstract from the author:

*“Declining size at age of Pacific halibut since ~2002 in conjunction with larger size in females and a constant minimum size limit have led to the expectation that directed halibut harvests have become increasingly composed of females. Understanding the sex ratio of commercial catches is critical for accurate estimation of parameters such as spawning biomass; but sex cannot be directly observed in landings due to the requirement that halibut be dressed at sea. In 2014, the IPHC initiated a program to generate commercial sex-ratio data including: the development of at-sea sex-marking protocols for commercial vessels (2014); voluntary testing of marking methods by commercial vessels, first in a single port (Homer: 2015) and then a single regulatory area (2B: 2016); and development of a genetic sex assay (2016-17). Voluntary sex-marking will be conducted in all IPHC-sampled ports in 2017, with the goal of regularly obtaining sex data for assessment purposes beginning in 2019.”*

13. The RAB18 **ENDORSED** the objectives and presented project outline, noting that additional project development and expansion to include additional vessels was necessary.
14. The RAB18 **AGREED** that the marking technique developed was simple to implement, incurred little to no interference with normal processing activity, and was not considered to negatively affect the product for marketing purposes.
15. The RAB18 **AGREED** that the provision of incentives would likely result in improved voluntary uptake of the project and improve data quality.
16. The RAB18 **AGREED** that the likely project benefits, as well as ongoing results, should be continuously communicated to industry via direct outreach from IPHC Staff.

#### **4.3 Tagging updates**

##### **4.3.1 JUVENILE WIRE TAGGING ON SURVEYS: NMFS AND IPHC**

17. The RAB18 **NOTED** paper IPHC-2016-RAB18-04c (part I) which provided an overview of IPHC tagging research using wire tags, including the following abstract from the author:

*“Despite our understanding that Pacific halibut generally migrate to the southeast with age, the dynamics of juvenile migration remain poorly understood. Identifying sources of recruitment and rates at which juveniles migrate from nurseries to the locations at which they are vulnerable to capture is critical for understanding regional productivity and downstream bycatch impacts. Despite this, the IPHC has not conducted substantial tagging of pre-recruit Pacific halibut since its “small fish” studies of the 1980s. In 2015, the IPHC tagged 1,977 halibut, mostly of commercially-sublegal size (<82 cm fork length; “U32”), aboard NMFS trawl survey vessels in the Bering Sea and Gulf of Alaska using external wire tags. In 2016, a total of 594 Pacific halibut were wire-tagged aboard Bering Sea and Aleutian Islands trawl survey vessels and 169 at fishery-independent setline survey stations in Regulatory Area 4D; all halibut tagged in 2016 were U32. We expect to continue the expansion of this program in future years.”*

### 4.3.2 4D EDGE NORTH PAT TAGS

18. The RAB18 **NOTED** paper IPHC-2016-RAB18-04c (part II) which provided an overview of IPHC tagging research using PAT tags in the regulatory area 4D edge, including the following abstract from the author:

*“From 2002-10 the IPHC conducted pop-up archival transmitting (PAT) tag studies in the Bering Sea to identify halibut spawning locations, timing of seasonal movements, and mixing between the Bering Sea and Gulf of Alaska. However, tagging was not conducted north of 59° 50’ north latitude because these waters were not surveyed by the IPHC. In 2016, thirty-one Pacific halibut ranging from 82-167 cm fork length were PAT-tagged at fishery-independent setline survey expansion stations on the 4D Edge to complement the prior studies. Tagging locations spanned from 59° 30’ to 61° 10’ N latitude (i.e. Pervenets Canyon to Navarin Canyon). The sex of each tagged fish was determined by ultrasound and blood samples were collected for plasma hormone analysis. Twenty tags were programmed to detach during the subsequent spawning season (i.e. late December 2016 to mid-January 2017), report their locations, and download archived environmental data; 11 tags were programmed to report during June 2017.”*

19. The RAB18 **NOTED** that the addition of details on the depth of fish caught and subsequently tagged (i.e. if fish are brought up from shallow or deep water) may assist in determining if deep water fish stay deep water and vice-versa, or if depth mixing is homogenous.
20. The RAB18 **NOTED** that the tagging process may affect the fish’s behaviour, and thus the inferences that might be drawn from recovered tag data. The IPHC Staff may consider multi-year tagging programs in the future.

### 4.3.3 BERING SEA TRAWL DMR USING SURVIVAL-PATs

21. The RAB18 **NOTED** paper IPHC-2016-RAB18-04c (part III) which provided an overview of IPHC tagging research using PAT tags in the Bering Sea trawl fishery, including the following abstract from the author:

*“In 2015, supported by the North Pacific Research Board and the Saltonstall-Kennedy Grant Program, the IPHC entered into collaboration among the Amendment 80 trawl sector, FishNext Research, Spearfish Research, the University of Alaska, and Wildlife Computers Inc. to investigate discard mortality rates (DMRs) of trawl-caught Pacific halibut in the Bering Sea following expedited release. The work began with development of pop-up archival transmitting (PAT) tags capable of detecting fish vitality (i.e. swimming behaviour) using on-board accelerometers. These tags were then calibrated for use on Pacific halibut and to local current conditions via deployment on longline-captured Pacific halibut in excellent condition, fixed moorings, and dead Pacific halibut. During 2016, (160) Pacific halibut representing trawl discards and ranging from 51-95 cm fork length were tagged with PAT tags programmed to detach and report via satellite after 60 days: the standard survival period used to index trawl DMRs. All tag-broadcast data have been received and are currently being analysed.”*

## 5. GUIDANCE ON, AND DISCUSSION OF, POTENTIAL APPLIED RESEARCH PROJECTS

### 5.1 Discard mortality rate (DMR) validation on fixed-gear vessels

22. The RAB18 **RECALLED** that the longline fleet handles in excess of 1.5 million fish annually and as a result, the DMR assigned to those fish will likely have a significant effect on the stock assessment results. Currently, the DMR assignment is based on the condition/injury classification of the released fish, which in turn is based on injuries incurred during release.
23. The RAB18 **NOTED** that the IPHC Staff are working with the longline fleet to determine if there are improved ways to assess condition/injury classification relative to release methods, thereby providing improved data accuracy. This requires an ability to observe releases without influencing the handling of the fish.



## 5.2 *Electronic monitoring*

24. The RAB18 **NOTED** that the pilot program for electronic monitoring on smaller vessels in Alaska is in its third year. The fish release method, observable via electronic monitoring, may become a useful method to predict injury types such that discard mortality rates could be developed for use in electronic monitoring programs.

## 5.3 *Bycatch handling practices on all fleets catching Pacific halibut*

25. The RAB18 **AGREED** that there was merit in developing best practice guidelines for the handling of Pacific halibut at sea, prior to release/discard. The intention would be to maximise the likely survival rates of captured fish returned to the water.
26. The RAB **AGREED** that best practice guidelines would need to be gear-specific and may require sea trials. However, the absence of sea trials should not prohibit the development of best practice guidelines given the wealth of information held by fishing crews.

### *Recommendation/s*

27. The RAB18 **RECOMMENDED** that the IPHC Staff undertake a project to develop ‘*Best practice handling guidelines*’ for each of the primary gear types which catch Pacific halibut, both directed and non-directed.

## 5.4 *Seabird bycatch mitigation measures*

28. The RAB18 **AGREED** that there was merit in periodic examination of new options for seabird bycatch mitigation measures, and that where possible, IPHC may be able to undertake or assist in at-sea trials of potential new measures.
29. The RAB18 **NOTED** that the use of streamers (also known as Tori lines) is not considered effective if used in isolation. It was discussed that the use of line weighting has proven to be the most effective bycatch mitigation measure in other fisheries, as line weighting allows the bait to be taken to a depth beyond that normally taken by vulnerable seabirds in as short a period as possible. Line weighting is usually used in tandem with some other surface measure to dissuade initial interaction with the fishing gear as it’s being deployed.
30. The RAB18 **NOTED** that as all directed Pacific halibut fishing gear is already heavily weighted, at this time, only surface deterrents are likely to be necessary, such as the use of streamers or water sprayers. Water sprayers are only being actively considered in Canada at this time.
31. The RAB18 **AGREED** that it would be useful for the current line weighting of Pacific halibut gear to be described and paired with documented sink rates.
32. The RAB18 **AGREED** that sea trials of alternative seabird surface deterrents (such as water sprayers) would be a valuable applied research initiative, as long as they were paired with a study describing fishing gear used (i.e. gear weighting and sink rates).

## 5.5 *Review of minimum size limit and discussion of maximum size limit*

33. The RAB18 **NOTED** that both minimum and maximum size limits in the Pacific halibut fishery have been discussed at all recent Annual Meetings. This discussion is summarised in the following comments from the IPHC staff:
- 1) **Maximum size limit:** Because some of the released Pacific halibut would subsequently die, and the quota would be filled with other fish, this could have the unintended effect of increasing overall mortality on the stock. Large females comprise a very small fraction of the spawning biomass. Spawning biomass and subsequent recruitment are poorly coupled, and there is currently no evidence for maternal effects or differentially increased fecundity per body mass for larger females. These observations suggest future research but no direct support for a maximum size limit at present.
  - 2) **Minimum size limit:** The extensive analysis presented at the 2015 Annual Meeting (AM91) still represents the current understanding of the potential effects of changing the minimum size limit, namely that it is a trade-off between regulatory-induced discards and additional targeting of smaller Pacific halibut. Specifically, that it might shift wastage to even smaller fish, which, given current

observer coverage in the Pacific halibut fishery, would not be easily detected. It was also indicated that the minimum size limit provides a buffer against assessment and management uncertainty by flattening the top of the yield curve.

### 5.6 *Calibration of snap versus fixed gear*

34. The RAB18 **NOTED** that the IPHC Secretariat and one of its associated graduate students are conducting an extensive analysis of the use of different gears in the directed Pacific halibut fishery in an effort to refine existing calibration factors and to enable all available commercial fishery data to be used for assessment.
35. The RAB18 **NOTED** the IPHC Secretariat's request for information on new technologies and practices in the commercial Pacific halibut fishery, in order to ensure that IPHC data collection and analysis efforts remain up to date.

### 5.7 *IPHC Closed Area review*

36. The RAB18 **NOTED** that:
- a. In 1967, the IPHC designated an area in Bristol Bay as being closed to longline fishing (within the current regulatory Area 4E). The justification for the closure was that it was considered to be a nursery area for juvenile Pacific halibut.
  - b. In 1990, Area 4E was expanded into 'inner' Bristol Bay, reducing the closed area to its current boundaries.
  - c. At the time of the closure's implementation, limited trawling occurred in Bristol Bay. However, over the years, trawling has expanded substantially in the region, and now includes Bristol Bay.
  - d. That the Closed Area is open to other fisheries and is only effectively closed to the directed commercial Pacific halibut fishery.

### *Recommendation/s*

37. The RAB18 **RECOMMENDED** that as the IPHC Closed Area was designated to protect juvenile Pacific halibut, there is no scientific justification for retaining the closure in its current form. Thus, the IPHC Closed Area should either be removed, noting that it would be unlikely that much longline fishing would occur in the area as most fish are below the legal size limit, or it should only apply to gear which would interact with juvenile Pacific halibut.

### 5.8 *Impacts of management measures for other species*

38. The RAB18 **NOTED** that in Areas 2B (and potentially 2A), rockfish closures are affecting the Pacific halibut fishery because bycatch limits restrict where Pacific halibut can be effectively targeted. This produces heavier pressure on Pacific halibut in those areas where it can be caught, potentially causing localised depletion.
39. The RAB18 **NOTED** that localised depletion for Pacific halibut may have a minimal long term impact due to high mixing rates in the medium to long term.
40. The RAB18 **NOTED** that a current project titled "*Conservation benefits arising from changes in spatial distribution of fishing effort following the implementation of groundfish fishery integration*", being undertaken by the Canadian Department of Fisheries and Oceans (Principle Investigator: Dr. Robyn Forrest) in collaboration with the IPHC is focused on the spatial conservation objectives in multispecies groundfish fisheries. The project will provide the means to assess the extent of all area-based management measures for groundfish on the British Columbia (BC) coast, including those that emerge from non-spatially explicit management measures. The project will also: i) identify spatial fishing effort shifts since integration of BC's commercial groundfish fisheries; ii) analyse incentives for spatial shifts in fishing behaviour; iii) evaluate spatial conservation benefits of the integrated groundfish management program through identification of emergent refugia for groundfish arising from spatial shifts in fishing effort; iv) link spatial effort shifts with reductions in incidental catch and changes in fish species diversity; and v) integrate results into maps.

### 5.9 *Marine mammal depredation*

41. The RAB18 **NOTED** that the presence of marine mammals is likely to continue affecting Pacific halibut in several ways:
- Greater attention by marine mammals to Pacific halibut as the sablefish fishery shifts from longline gear to pot gear.
  - As a direct source of mortality (depredation) that is not observed or accounted for.
  - As an indirect effect on population analyses via changes in observed data, specifically fishery and survey catch rates.
  - The ability of marine mammals to learn behaviour and pass it on to their young, and the limited effectiveness of marine mammal avoidance or deterrence techniques.
  - Effects on fishing operations responding to whale depredation including increased operating time (effort), gear loss or damage, and reduced fishing opportunity.
42. The RAB18 **NOTED** that tracking of marine mammal activity on the IPHC fishery independent setline survey is ongoing. During gear retrieval, samplers record all damaged and missing hooks to establish a baseline rate of gear damage against which to compare stations with suspected interference from depredating species. If sea samplers observe any toothed whales or pinnipeds within 100 meters of a survey vessel, the samplers identify the individuals to species level, record the number present, position (in relation to the vessel, the gear, and the offal discharge), the hook number at first and last sighting, and the duration of the encounter. Samplers note all damaged Pacific halibut and damaged bycatch retrieved during these encounters.
43. The RAB18 **NOTED** that tracking of marine mammal activity on the commercial fleet will be reinitiated in 2017. The IPHC Secretariat worked with the National Marine Fisheries Service staff to develop questions to be posed to skippers fishing for sablefish or Pacific halibut for each set that is deployed: 1) marine mammals (no.) sighted while hauling – sperm, orca, other and; 2) number damaged – sablefish, Pacific halibut, other fish, hooks. The intent of these questions is to obtain some quantitative data on the impacts of marine mammal depredation.
44. The RAB18 **NOTED** that while fishing captains reacted to marine mammal presence differently, many ‘moved on’ once marine mammals were sighted to avoid bait/gear/fish loss.

### 5.10 *Russian collaboration*

45. The RAB18 **NOTED** that information obtained from the Russian longline fishery association (LFA) indicated that the 10-year average landings of Pacific halibut by vessels targeting Pacific cod and Alaska pollock were approximately 2000 mt annually (4.4 million pounds).
46. The RAB18 **AGREED** that given the recent survey expansion into the area adjacent to the Russian EEZ, the large catches of Pacific halibut taken within Russian waters, and the likely mixing of the stock across the EEZs, there was merit in undertaking collaborative research and encouraged the IPHC staff to explore options further.

### 5.11 *Pacific halibut nursery ground mapping*

47. The RAB18 **AGREED** that the management of Pacific halibut would benefit from the mapping of Pacific halibut nursery grounds and that where time and resources permit, the IPHC Staff should undertake this work.

### 5.12 *Pot gear: new regulation allowing pots to be used as a fishing gear for O32 to be retained. (and whale depredation)?*

48. The RAB18 **NOTED** that the average size of Pacific halibut taken with pot gear may differ from that taken by longline gear. The IPHC’s port sampling program identifies pot landings and includes them in standard port sampling such that the data available for the assessment will adequately reflect these fish. The time-varying selectivity employed in the current set of stock assessment models can accommodate such changes, although harvest policy considerations could become important if a large fraction of the catch in the future were to come from pot gear.

49. The RAB18 **NOTED** that ideally, the abundance and depredation rate for marine mammals on pot gear should be estimated directly. In the absence of direct accounting for marine mammal depredation, it will exist as lost productivity that is not visible in assessment or harvest policy analyses. Strong trends in such mortality could create bias in assessment results, and the unobserved productivity cannot be accounted for properly in harvest policy analyses.

**5.13 Chalky Pacific halibut**

50. The RAB18 **NOTED** that from September-October 2016, industry encountered a high frequency of ‘chalky flesh’ in the fishery. Historically, high occurrence of chalky flesh was identified in regulatory areas 3A and 3B of the fishery, however the occurrence there had dissipated. No link with ‘mushy flesh’ has been found to date.

51. The RAB18 **NOTED** that the previously used pH (potential of hydrogen) testing of fish flesh, as an indication of chalky flesh, was no longer used for Pacific halibut due to the fact that the pH level described (>6.3) was not considered precise enough, given that many fish have pH 6.3 and are not subject to chalky flesh.

52. The RAB18 **NOTED** that as the occurrence of chalky flesh was thought to be related to animal stress, the IPHC condition study (via blood testing) may reveal a potential cause.

**Recommendation/s**

53. The RAB18 **RECOMMENDED** that the IPHC Staff undertake research to answer the following:

- a. What causes chalky flesh in Pacific halibut? Are there particular environmental signatures (temperature, dissolved oxygen, etc.) that characterize areas with incidence of chalky flesh?
- b. Why does the occurrence of chalky flesh in Pacific halibut appear to be reappearing after a period of limited occurrence in regulatory areas 3A and 3B?
- c. Are there differences in the occurrence of chalky flesh in males and female, as well as fish of different sizes?

**6. OTHER BUSINESS**

**6.1 Date and place of the 19<sup>th</sup> and 20<sup>th</sup> sessions of the IPHC Research Advisory Board**

54. **NOTING** the discussion on improving the timing of each session of the RAB to better feed into the annual review and development of the IPHC research program, which will be advanced in 2017 to commence soon after the Annual Meeting, the RAB18 **CONSIDERED** options to move the 19<sup>th</sup> and 20<sup>th</sup> Sessions of the RAB forward in the IPHC calendar. However, if this was not possible, then the default date and location would remain immediately prior to the Pacific Marine Expo, in Seattle, WA, U.S.A. ([Table 1](#)). The exact date and timings would be communicated by the IPHC Secretariat following Annual Meeting of the Commission.

**Table 1.** Draft meeting schedule for the RAB (2017 and 2018)

Meeting	2017			2018		
	Session	Date	Location	Session	Date	Location
Research Advisory Board (RAB)	19 <sup>th</sup>	3 <sup>rd</sup> week November (1 d); or February	Seattle, WA, U.S.A.	20 <sup>th</sup>	3 <sup>rd</sup> week November (1 d); or February	Seattle, WA, U.S.A.

**6.2 Rules of Procedure for the Research Advisory Board**

55. The RAB18 **NOTED** that the 1<sup>st</sup> Performance Review of the IPHC, completed in 2012, recommended that Rules of Procedure for all IPHC advisory bodies be developed. To date all of the Commission’s advisory bodies have either had their Rules of Procedure endorsed by the Commission, or are currently in development. At this time, the RAB is the only body without formal Rules of Procedure.

56. The RAB18 **AGREED** that the IPHC Secretariat should develop draft Rules of Procedure for the RAB, and for these to be circulated to the RAB for a two-week comment period. Subsequent to the RAB’s

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comment, the revised Rules of Procedure should be presentation to the Commission for adoption as part of the IPHC Rules of Procedure (2014).

### **6.3 IPHC Regulatory Proposals for 2017**

57. The RAB18 **NOTED** that the IPHC staff regulatory proposal to require all Pacific halibut to be landed, weighed, and reported with the head intact (head-on) could be done and understood the need, with some reservations. While most fishers already land their fish head-on, few fishers and some processors would have to make adjustments to their operations. For example, fishing operations that head and freeze fish at sea would have to adjust processing operations and processors that weigh fish after heading would have to adjust weighing operations. IPHC Staff clarified that quota would continue to be tracked using the head-off weight (net weight) with the fish landing receipt system applying the 10% deduction to the head-on weight.
58. The RAB18 **AGREED** that the IPHC staff regulatory proposal to remove the 24” head-off minimum size limit could be included as part of the head-on requirement and not as a separate proposal. Concern was voiced over it being a stand-alone proposal if head-off fish were allowed to be landed because there would be no way for dockside enforcement to determine if the fish was a legal size or not when it was originally caught.

## **7. THE PROCESS FOR ‘REVIEW OF THE DRAFT AND ADOPTION OF THE REPORT OF THE 18<sup>TH</sup> SESSION OF THE IPHC RESEARCH ADVISORY BOARD (RAB18)’**

59. The RAB18 **RECOMMENDED** that the Commission consider the consolidated set of recommendations arising from RAB18, provided at [Appendix IV](#).
60. The report of the 18<sup>th</sup> Session of the Research Advisory Board (IPHC–2016–RAB18–R) was **ADOPTED** via correspondence on 28 November 2016.

**APPENDIX I  
LIST OF PARTICIPANTS**

**RAB Officers**

Chairperson	Vice-Chairperson
<b>Dr David Wilson</b> Executive Director, International Pacific Halibut Commission Email: <a href="mailto:dave@iphc.int">dave@iphc.int</a>	<b>Dr Josep Planas</b> Program Head: Biological and Ecosystem Science, International Pacific Halibut Commission Email: <a href="mailto:josep@iphc.int">josep@iphc.int</a>

**RAB Members**

Canada	United States of America
<b>Mr Brad Mirau</b> Email: <a href="mailto:brad@aerotrading.ca">brad@aerotrading.ca</a>	<b>Mr Tony Blore</b> Email: <a href="mailto:tony@dfbcompany.com">tony@dfbcompany.com</a>
<b>Mr Art Davidson</b> Email: <a href="mailto:artdavidson@telus.net">artdavidson@telus.net</a>	<b>Mr Steve Daniels</b> Email: <a href="mailto:sdindigo@gmail.com">sdindigo@gmail.com</a>
	<b>Mr Jim Hubbard</b> Email: <a href="mailto:kruzof@ak.net">kruzof@ak.net</a>
	<b>Mr Charles McEldowney</b> Email: <a href="mailto:charlesM@icicleseafoods.com">charlesM@icicleseafoods.com</a>
	<b>Mr Bruce Gabrys</b> Email: <a href="mailto:gabryscpa@mtaonline.net">gabryscpa@mtaonline.net</a>
<b>Absent:</b> <b>Mr Richie Shaw</b> Email: <a href="mailto:SOIpow@recn.ca">SOIpow@recn.ca</a>	<b>Absent:</b> <b>Mr Al Pazar</b> Email: <a href="mailto:alpazar@gmail.com">alpazar@gmail.com</a>
	<b>Mr Lu Dochtermann</b> Email: <a href="mailto:DochtermannLudger@gmail.com">DochtermannLudger@gmail.com</a>
	<b>Mr Jay Hebert</b> Email: <a href="mailto:jjpeche@comcast.net">jjpeche@comcast.net</a>

**IPHC Secretariat**

Mr Claude Dykstra

Ms Lara Erikson

Ms Joan Forsberg

Ms Jamie Goen

Mr Ed Henry

Dr Allan Hicks

Mr Chris Johnston

Mr Stephen Keith

Dr Tim Loher

Ms Dana Rudy

Ms Lauri Sadorus

Mr Eric Soderlund

Dr Ian Stewart

Ms Aregash Tesfatsion

Mr Robert Tobin

Dr Ray Webster

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**APPENDIX II**  
**AGENDA FOR THE 18<sup>TH</sup> SESSION OF THE IPHC RESEARCH ADVISORY BOARD**  
**(RAB18)**

**Date:** 16 November 2016

**Location:** Seattle, Washington, U.S.A.

**Venue:** IPHC Board Room, Salmon Bay

**Time:** 09:00-17:00

**Chairperson:** Dr David T. Wilson (IPHC Executive Director)

**Vice-Chairperson:** Dr Josep Planas (IPHC Biological & Ecosystem Science Program Head)

- 1. OPENING OF THE SESSION** (Chairperson)
- 2. ADOPTION OF THE AGENDA AND ARRANGEMENTS FOR THE SESSION** (Chairperson)
- 3. OVERVIEW: IPHC 5-YEAR RESEARCH PROGRAM (2017-2021)** (Josep Planas)
- 4. ONGOING IPHC RESEARCH PROJECTS** (Project leaders)
  - 4.1 Survey expansion (R. Webster)
  - 4.2 Sex composition of the commercial catch from marking fish at sea (T. Loher & I. Stewart)
  - 4.3 Tagging updates (T. Loher)
    - Juvenile wire tagging on surveys: NMFS trawl and IPHC setline
    - 4D Edge North PAT tags
    - Bering Sea trawl DMR using survival-PATs
- 5. GUIDANCE ON, AND DISCUSSION OF, POTENTIAL APPLIED RESEARCH PROJECTS** (Chairperson)
  - 5.1 Discard mortality rate (DMR) validation on fixed-gear vessels (C. Dykstra, J. Planas & B. Mirau)
  - 5.2 Electronic monitoring (All)
  - 5.3 Bycatch handling practices on all fleets catching Pacific halibut (D. Wilson)
  - 5.4 Seabird bycatch mitigation measures (B. Mirau)
  - 5.5 Review of minimum size limit and discussion of maximum size limit (B. Mirau)
  - 5.6 Calibration of snap versus fixed gear (All)
  - 5.7 IPHC closed area review (D. Wilson)
  - 5.8 Impacts of management measures for other species (B. Mirau)
  - 5.9 Marine mammal depredation (All)
- 6. OTHER BUSINESS**
  - 6.1 Date and place of the 19<sup>th</sup> and 20<sup>th</sup> Sessions of the IPHC Research Advisory Board (Chairperson)
  - 6.2 Rules of Procedure for the Research Advisory Board (Chairperson)
  - 6.3 IPHC Regulatory proposals for 2017 (J. Goen, L. Erikson)
- 7. THE PROCESS FOR ‘REVIEW OF THE DRAFT AND ADOPTION OF THE REPORT OF THE 18<sup>th</sup> SESSION OF THE IPHC RESEARCH ADVISORY BOARD (RAB18)’** (Chairperson)

**APPENDIX III**  
**LIST OF DOCUMENTS**

<b>Document</b>	<b>Title</b>	<b>Availability</b>
IPHC-2016-RAB18-01	<u>Draft</u> : Agenda & Schedule for the 18 <sup>th</sup> Session of the IPHC Research Advisory Board (RAB18)	✓ 28 Oct 2016
IPHC-2016-RAB18-02	<u>Draft</u> : List of Documents for the 18 <sup>th</sup> Session of the IPHC Research Advisory Board (RAB18)	✓ 14 Nov 2016
IPHC-2016-RAB18-03	Overview: IPHC 5-year research program (2017-2021) (J. Planas)	✓ 14 Nov 2016
IPHC-2016-RAB18-04	Ongoing IPHC research projects (Project leaders)	✓ 14 Nov 2016
IPHC-2016-RAB18-05	Guidance on, and discussion of, potential applied research projects (all)	✓ 14 Nov 2016



## APPENDIX IV

CONSOLIDATED SET OF RECOMMENDATIONS OF THE 18<sup>TH</sup> SESSION OF THE IPHC  
RESEARCH ADVISORY BOARD (16 NOVEMBER 2016) TO THE COMMISSION*Survey expansion*

RAB18–01 ([para. 11](#)) The RAB18 **RECOMMENDED** that the IPHC Staff develop an information paper associated with the survey expansion, which details the likely implications of periodic survey expansion on the stock assessment and apportionment, taking into consideration potential population variability of Pacific halibut in expansion areas which are infrequently surveyed.

*Bycatch handling practices on all fleets catching Pacific halibut*

RAB18–02 ([para. 27](#)) The RAB18 **RECOMMENDED** that the IPHC Staff undertake a project to develop ‘*Best practice handling guidelines*’ for each of the primary gear types which catch Pacific halibut, both directed and non-directed.

*IPHC Closed Area review*

RAB18–03 ([para. 37](#)) The RAB18 **RECOMMENDED** that as the IPHC Closed Area was designated to protect juvenile Pacific halibut, there is no scientific justification for retaining the closure in its current form. Thus, the IPHC Closed Area should either be removed, noting that it would be unlikely that much longline fishing would occur in the area as most fish are below the legal size limit, or it should only apply to gear which would interact with juvenile Pacific halibut.

*Chalky Pacific halibut*

RAB18–04 ([para. 53](#)) The RAB18 **RECOMMENDED** that the IPHC Staff undertake research to answer the following:

- a. What causes chalky flesh in Pacific halibut? Are there particular environmental signatures (temperature, dissolved oxygen, etc.) that characterize areas with incidence of chalky flesh?
- b. Why does the occurrence of chalky flesh in Pacific halibut appear to be reappearing after a period of limited occurrence in regulatory areas 3A and 3B?
- c. Are there differences in the occurrence of chalky flesh in males and female, as well as fish of different sizes?

*The report of the 18<sup>th</sup> Session of the IPHC Research Advisory Board (RAB18)*

RAB18–05 ([para. 59](#)) The RAB18 **RECOMMENDED** that the Commission consider the consolidated set of recommendations arising from RAB18, provided at [Appendix IV](#).