



IPHC research topics selected for 2018

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PURPOSE

To provide the Commission with a description of the new research projects proposed by IPHC Secretariat for 2018 and contemplated within the 5-year Biological and Ecosystem Science Research Program.

BACKGROUND

Since its inception, the IPHC has had a long history of research activities devoted to describing and understanding the biology of the Pacific halibut (*Hippoglossus stenolepis*). At the present time, the main objectives of the Biological and Ecosystem Science Research Program at IPHC are to:

- 1) identify and assess critical knowledge gaps in the biology of the Pacific halibut;
- 2) understand the influence of environmental conditions; and
- 3) apply the resulting knowledge to reduce uncertainty in current stock assessment models.

Traditionally, IPHC staff propose new projects annually that are designed to address key biological issues as well as the continuation of certain projects initiated in previous years. Proposals are based on their own input as well as input from the Commissioners, stakeholders, and specific subsidiary bodies to the IPHC such as the Scientific Review Board (SRB) and the Research Advisory Board (RAB). Proposed research projects are presented to the Commissioners for feed-back and subsequent approval. Importantly, biological research activities at IPHC are guided by a Five-Year Research Plan that is put forward by the Program Head identifying key research areas that follow Commission objectives. As described in the Five-Year Research Plan for the period 2017-2021, the primary biological research activities at IPHC can be summarized in five main areas:

- 1) Reproduction
- 2) Growth and Physiological Condition
- 3) Discard Mortality and Survival
- 4) Distribution and Migration
- 5) Genetics and Genomics

These research areas have been selected for their important management implications. The studies conducted on Reproduction are aimed at providing information on the sex ratio of the commercial catch and to improve current estimates of maturity. The studies conducted on Growth are aimed at describing the role of some of the factors responsible for the observed changes in size-at-age and to provide tools for measuring growth and physiological condition in Pacific halibut. The proposed work on Discard Mortality and Survival is aimed at providing updated estimates of discard mortality rates in both the longline and the trawl fisheries. The studies conducted on Distribution and Migration are aimed at further understanding larval and juvenile dispersal, distribution of all life stages in relation to the environment, and reproductive

and seasonal migration and identification of spawning times and locations. The studies conducted on Genetics and Genomics are aimed at describing the genetic structure of the Pacific halibut population and at providing the means to investigate rapid adaptive changes in response to fishery-dependent and fishery-independent influences.

In this document, we present an outline of the new projects proposed by IPHC staff for the coming year.

DISCUSSION

For 2018, four new projects are proposed that cover specific research needs ([Appendix I](#)).

Project 2018-01 ("*Influence of thermal history on growth*") proposes to study the thermal profile experienced by fish at sea as assessed by electronic archival tagging and otolith microchemistry in order to investigate the relationship between growth patterns (or productivity) and both spatial and temporal variability in environmental conditions for growth. These studies will allow to relate temperature histories to individual growth patterns and to extend thermal analyses to untagged Pacific halibut via otolith analysis.

Project 2018-02 ("*Adult captive holding studies*") proposes performing studies on captive adult Pacific halibut to establish or validate measures or protocols required for other ongoing projects (Appendix II), such as (1) determining the permanence of individual tail markings for tracking individual movement rates (Project 675.11, "*Tail pattern recognition*"), (2) calibrating measures of fat content for condition factor determinations (Project 672.12, "*Condition factors for tagged U32 fish*") and of stable isotope (C¹³ and N¹⁵) ratios for inferring growth and dietary information (Project 673.14, "*Identification and validation of markers for growth*") and (3) calibrating O¹⁸ otolith signatures with environmental temperature (Project 673.14 "*Identification and validation of markers for growth*").

Project 2018-3 ("*Whale detection methods*") proposes testing electronic monitoring-based methods to detect whale presence in the directed longline Pacific halibut fishery. Specifically, this project aims at testing acoustic, optical and thermal technologies for whale detection. A second objective is to relate whale detection with longline Pacific halibut captures.

Project 2018-04 ("*Larval connectivity*") proposes to study the movement and connectivity of Pacific halibut larvae both within and between the Gulf of Alaska and the Bering Sea. Larval abundance and size distribution in the Gulf of Alaska and the Bering Sea will be modeled over time and over oceanographic and environmental conditions.

RECOMMENDATION/S

That the RAB:

- 1) **NOTE** paper IPHC-2018-RAB019-12 which outlined the new research projects proposed by IPHC staff.

APPENDICES

Appendix I: Summary of new research projects proposed for 2018.

APPENDIX I
Summary of research projects proposed for 2018

| Project # | Project Name | Priority | Budget (\$US) | Management implications |
|------------------------------------|--|-----------------|----------------------|---|
| 2018-01 | Influence of thermal history on growth | High | 136,004 | Changes in biomass/size-at-age |
| 2018-02 | Adult captive holding studies | High-Medium | 58,395 | Changes in biomass/size-at-age/distribution |
| 2018-03 | Whale detection methods | High | 37,511 | Mortality estimation |
| 2018-04 | Larval connectivity | High | 20,000 | Larval distribution |
| Total - New Projects (\$US) | | | \$251,910 | |