Pacific Halibut Multiregional Economic Impact Assessment (PHMEIA): update for SRB019

PREPARED BY: IPHC SECRETARIAT (B. HUTNICZAK; 19 AUGUST 2021)

PURPOSE

To provide the IPHC's Scientific Review Board (SRB) with an update on the development of the Pacific Halibut Multiregional Economic Impact Assessment (PHMEIA) and respond to comments made during the SRB18 (IPHC-2021-SRB018-R).

BACKGROUND

The goal of the IPHC economic study is to provide stakeholders with an accurate and all-sectors-encompassing assessment of the socioeconomic impact of the Pacific halibut resource that includes the full scope of Pacific halibut's contribution to regional economies of Canada and the United States of America. To that end, the Secretariat continues improving the Pacific Halibut Multiregional Economic Impact Assessment (PHMEIA) with an intention to inform stakeholders on the importance of the Pacific halibut resource and fisheries to their respective communities, but also broader regions and nations, and contribute to a wholesome approach to Pacific halibut management that is optimal from both biological and socioeconomic perspective, as mandated by the Convention.

The PHMEIA is a multiregional social accounting matrix-based model describing economic interdependencies between sectors and regions developed to assess three economic impact (EI) components pertaining to Pacific halibut. The **direct EIs** reflect the changes realized by the direct Pacific halibut resource stock users (fishers, charter business owners), as well as the forward-linked Pacific halibut processing sector (i.e., downstream economic activities). The **indirect EIs** are the result of business-to-business transactions indirectly caused by the direct EIs. The indirect EIs provide an estimate of the changes related to expenditures on goods and services used in the production process of the directly impacted industries. In the context of the PHMEIA, this includes an impact on upstream economic activities associated with supplying intermediate inputs to the direct users of the Pacific halibut resource stock. Finally, the **induced EIs** result from increased personal income caused by the direct and indirect effects. In the context of the PHMEIA, this includes economic activity generated by households spending earnings that rely on the Pacific halibut resource, both directly and indirectly. The model also accounts for interregional spillovers. These represent economic stimulus in regions other than the one in which the exogenous change is considered. This allows accommodation of increasing economic interdependence of regions and nations.

The current PHMEIA incorporates a series of improvements to the economic impact assessment[1] model introduced this year. These are as follows:

(1) The model uses an updated set of data, and estimates are now available for 2019. Previously, the estimates were available up to 2018.

[1] While this type of assessment is typically termed "economic impact assessment," calculated alongside impact in terms of output also impacts on employment and incomes, and households' prosperity, introduce a broader socioeconomic context.

(2) The estimates incorporate flows of earnings related to all Pacific halibut sectors in the model (commercial fishing, processing, and charter sector/Alaska only). See appendix for compilation of data on the flows of benefits in the Pacific halibut sectors in Alaska, from harvest location to buyer's headquarters (**Figure 2**), from the landing area to vessel owner residence and quota holder residence (**Figure 3**), and from sport fishing location to Charter Halibut Permit owner residence (**Figure 4**).

(3) The latest update of the PHMEIA provides preliminary estimates of community effects. The model informs on the county-level economic impacts in Alaska and highlights communities particularly dependent on Pacific halibut fishing-related economic activities. The results are available in the model app, tab "Community impacts in AK."

(4) The extended model (labeled PHMEIA-r) provides preliminary estimates for the Alaskan saltwater charter sector that is disaggregated from the services-providing industry. The results are available in the model app, tab "EI of charter fishing in AK." The inclusion of the British Columbia and US West Coast charter sector is underway, pending sufficient primary data submissions and/or compilation of necessary components from secondary data sources. Additional update on this component is anticipated ahead of the IM97.

PHMEIA MODEL RESULTS

The PHMEIA model results suggest that Pacific halibut commercial fishing's total estimated impact in 2019 amounts to USD 194.2 mil. (CAD 257.7 mil.) in households' earnings,[2] including an estimated USD 42.5 mil / CAD 56.4 mil in direct earnings in the Pacific halibut fishing sectors, and USD 178.4 mil (CAD 236.7 mil.) in households income. Moreover, the results suggest that incorporating Pacific halibut-specific outflows has a considerable impact on results. While 1 USD of Pacific halibut output by the commercial sector in Alaska could generate USD 0.71 USD for Alaskan households, out-of-state employment, flows related to beneficial ownership of Pacific halibut fishing rights in Alaska (i.e., quota holdings), and corporate interests of processing sector entities cause this estimate to drop to USD 0.58. This also translates to the unevenness of earnings and economic impact between Alaskan counties (**Figure 1**). The highest economic impacts are estimated for Kenai Peninsula, Kodiak Island, and Petersburg counties.

The total contribution of the Pacific halibut charter sector in Alaska to households is assessed at USD 27.1.7 mil for 2019. This translates into 15% less per 1 USD of output in comparison with the commercial sector. This is not surprising since the commercial sector's production supports not only suppliers to the harvesting sector, but also the forward-linked processing sector. However, the economic impact of 1 lb of Pacific halibut removal counted against TAC in the stock assessment is 66% higher for the charter sector when compared with the commercial sector. It should also be noted that this assessment accounts for only a fraction of the Pacific halibut contribution to the economy through recreational fishing. At this time, the analysis does not account for the impact of anglers spending money on durable goods they use on the charter trips (e.g., fishing equipment) and expenditures by private anglers. The analysis should also not be used as an argument in sectoral allocations

[2] Earnings include both employee compensation and proprietors' income.

discussions because, as a snapshot analysis, it does not reflect the implications of shifting supply-demand balance.

It is important to note that the model continues to rely heavily on secondary data sources, and as such, the results are conditional on the adopted assumptions for the components for which up-to-date data are not available (summarized for Alaska in Appendix 1 of the IPHC-2021-SRB018-09; details for other regions available in IPHC-2021-ECON-02-R01). That said, the Secretariat strives to make the best use of data collection programs of national and regional agencies, academic publications on the topic, and grey literature reporting on fisheries in Canada and the United States.

A detailed description of the model is available in the economic study section of the IPHC website. Additional details on the methodology are available in IPHC-2021-ECON-03. The PHMEIA is accompanied by the economic impact visualization tool, which use can be guided by the PHMEIA app manual (IPHC-2021-ECON-04).

Looking forward, the Secretariat also identified a number of tasks that would enhance PHMEIA usability to the Commission. These are described in more detail in the *IPHC 5-year Program of Integrated Science and Research* (IPHC, 2021).

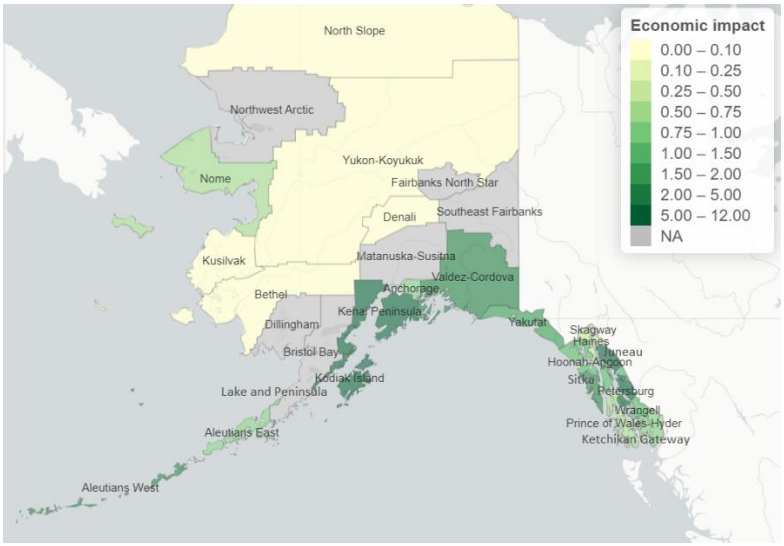


Figure 1 County-level economic impact estimates for Alaska in [mil. USD, 2019].

FINAL REMARKS

The PHMEIA model fosters stakeholders' better understanding of a broad scope of regional impacts of the Pacific halibut resource. Leveraging multiple sources of socioeconomic data, it provides essential input for designing policies with desired effects depending on regulators' priorities. By tracing the socioeconomic impacts cross-regionally, the model accommodates the transboundary nature of the Pacific halibut and supports joint management of a shared resource, such as the case of collective management by the IPHC. Moreover, the study informs on the community impacts of the Pacific halibut resource throughout its range, highlighting communities particularly dependent on economic activities that rely on Pacific halibut. A good understanding of the localized effects is pivotal to policymakers who

are often concerned about community impacts, particularly in terms of impact on employment opportunities and households' welfare.

Integrating economic approaches with stock assessment and MSE can assist fisheries in bridging the gap between the current and the optimal economic performance without compromising the stock biological sustainability. Economic performance metrics presented alongside already developed biological/ecological performance metrics would bring the human dimension to the MSE framework, adding to the IPHC's portfolio of tools for assessing policy-oriented issues (as requested by the Commission, IPHC-2021-AM097-R, AM097-Req.02). Moreover, the study can also inform on socioeconomic drivers (human behavior, human organization) that affect the dynamics of fisheries, and thus contribute to improved accuracy of the stock assessment and the MSE (Lynch, Methot and Link, 2018). As such, it can provide a complementary resource for the development of harvest control rules, thus directly contributing to Pacific halibut management.

Lastly, while the quantitative analysis is conducted with respect to components that involve monetary transactions, Pacific halibut's value is also in its contribution to the diet through subsistence fisheries and importance to the traditional users of the resource. To native people, traditional fisheries constitute a vital aspect of local identity and a major factor in cohesion. One can also consider the Pacific halibut's existence value as an iconic fish of the Pacific Northwest. While these elements are not quantified at this time, recognizing such an all-encompassing definition of the Pacific halibut resource contribution, the project echoes a broader call to include the human dimension into the research on the impact of management decisions, as well as changes in environmental or stock conditions.

COMMENTS FROM SRB18

The SRB "*AGREED that an economic impacts study provides considerable value and leverage to stakeholders in establishing the importance of the Pacific halibut resource and fisheries to their respective communities, both locally, regionally, and internationally*" (SRB18, para. 49). Recognizing that it is commonplace to consider socioeconomic factors when designing harvest policies without formal assessment, the SRB also made several comments focused on improving stakeholders' confidence in the model results.

The SRB "*NOTED improving the accuracy of the economic impact assessment of the Pacific halibut resource depends on broader stakeholders' active participation in developing the necessary data for analysis and ENCOURAGED additional outreach activities*" (SRB18, para. 50). The Secretariat is working on an improved strategy for primary data collection following the 2021 fishing season. Further simplification of the survey is anticipated ahead of the IM97. The Secretariat is also cautiously optimistic regarding engagement with stakeholders on economic data collection in post-covid times.

Further, the SRB "*NOTED that an external peer review of the economic study would be useful given the lack of economics expertise on the SRB and the importance of having a robust, well-vetted economic impact analysis*" (SRB18, para. 51). To that end, the Secretariat notes that it has initiated the development of terms of reference for external review of the PHMEIA model.

The Secretariat also informed the Commission that the SRB "*REQUESTED specific guidance and clarification from the Commission on the objectives and intended use of this study*"[3] (SRB18, para. 52) and "*AGREED that there is potential value in introducing socioeconomic performance metrics to the MSE framework*" (SRB18, para. 53).[4]

OBJECTIVES

Table 1 summarizes the progress to date against the IPHC economic study objectives.

Table 1. The study objectives – summary of progress

Objective	Status*
Item 1: Survey of previous studies and existing information	**---**
Item 1.a: Literature review	**COMPLETED**
Item 1.b: Description of ongoing regular data collection programs	**COMPLETED**
Item 1.c: Collection of primary data – commercial sector survey	**IN PROGRESS**
Item 1.d: Collection of primary data – charter sector survey	**IN PROGRESS**
Item 2: Comprehensive qualitative structural description of the current economics of the Pacific halibut resource	**---**
Item 2.a: Description of the economics of the Pacific halibut commercial sector	**COMPLETED**
Item 2.b: Description of the economics of the Pacific halibut recreational sector	**COMPLETED**
Item 2.c: Description of the economics of other Pacific halibut sectors (bycatch, subsistence, ceremonial, research, non-directed)	**IN PROGRESS**
Item 3: Quantitative analysis of the economic impact of the directed Pacific halibut fishery	**---**
Item 3.a: Methodology – a model of the economy	**COMPLETED**
Item 3.b: Methodology – inclusion of the commercial sector in the SAM	**COMPLETED(1)**
Item 3.c: Methodology – inclusion of the recreational sector in the SAM	**COMPLETED(1)**
Item 3.d: Methodology – economic value of the subsistence use	**IN PROGRESS(2)**
Item 4: Account of the geography of the economic impact of the Pacific halibut sectors	**---**
Item 4.a: Visualization of region-specific economic impacts	**COMPLETED(1)**
Item 5: Analysis of the community impacts of the Pacific halibut fishery throughout its range, including all user groups	**---**
Item 5.a: Community impacts assessment of the Pacific halibut fishery	**COMPLETED(1)**
Item 6: Summary of the methodology and results of the IPHC study in comparison to other economic data and reports for the Pacific halibut resource, other regional fisheries, and comparable seafood industry sectors	**---**
Item 6.a: Putting results into perspective	**IN PROGRESS**

* All items marked as COMPLETED are subject to updates based on the direction of the project and evolution of the situation in the Pacific halibut fisheries. (1)Subject to changes based on the data collected through the IPHC Economic survey. (2)Subject of collaborative research proposal with NOAA Alaska Fisheries Science Center.

[3] The SRB "*NOTED that, without a clearer understanding of the Commissions purpose for future use of this work, it is difficult to provide guidance on prioritising model development (e.g. improve spatial resolution, incorporate dynamic / predictive processes, adding more detail on subsistence and recreational fisheries, including uncertainty in the assessment)"* (SRB18, para. 52).

[4] The SRB also noted a caveat that "*there may be alternative methods to accomplish this specific task*" (SRB18, para. 53), but no potential alternatives approaches were mentioned.

RECOMMENDATION/S

That the SRB:

1) **NOTE** paper IPHC-2021-SRB019-09 which provides an update on the development of the Pacific Halibut Multiregional Economic Impact Assessment (PHMEIA) and responds to comments made during the SRB18.

LITERATURE

ADFG (2021) *Commercial Permit and License Holders Listing*. Available at: https://www.adfg.alaska.gov/index.cfm?adfg=fishlicense.holders.

CFEC (2021a) *CFEC Public Search Application - Permits*. Available at: https://www.cfec.state.ak.us/plook/#permits.

CFEC (2021b) *CFEC Public Search Application - Vessels*. Available at: https://www.cfec.state.ak.us/plook/#vessels.

IPHC (2021) *International Pacific Halibut Commission 5-Year program of integrated science and research (2021-26)*, *IPHC–2021–5YPISR*. Seattle, WA.

Lynch, P. D., Methot, R. D. and Link, J. S. (2018) 'Implementing a Next Generation Stock Assessment Enterprise: Policymakkers' Summary', *NOAA Technical Memorandum NMFS-F/SPO-183*.

NOAA (2021) *Charter (Sport) Halibut - Charter Halibut Permits List*. Available at: https://www.fisheries.noaa.gov/alaska/commercial-fishing/permits-and-licenses-issued-alaska#charter-(sport)-halibut.

APPENDIX

Income flows in the Pacific halibut commercial fishing sectors in Alaska

Figure 2 depicts the flow of revenue from the harvest location to the processing profit beneficiary. Here, nods represent spatial aggregation:

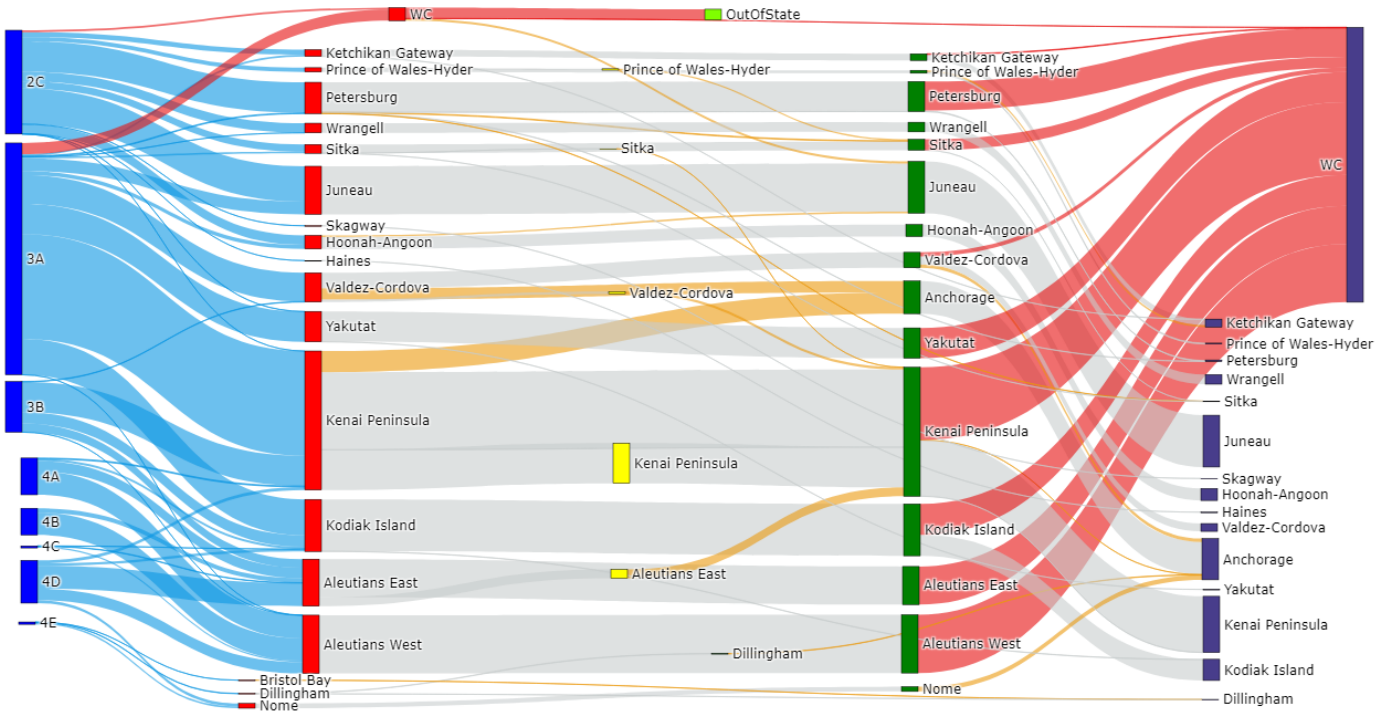
- Blue – harvest by IPHC Regulatory Areas;
- Red – county of the landing site;
- Yellow – if ordered, county of the custom processing;
- Green – county of the reported buyer, as reported in the ADFG's Commercial Permit and License Holders Listing (ADFG, 2021);
- Purple – location of the Fisheries Business License holder, based on the contact address reported in ADFG (2021b).

Ribbons represent flows in terms of the estimated value of landings (mil. USD) (i.e., landing value, not adjusted for value added through processing):

- Blue ribbons represent the flows from harvest grounds to landing sites in Alaska;
- Grey ribbons represent the flows between nodes that are located in the same Alaskan county;
- Orange ribbons represent the flows between nodes that are located in different counties;
- Red ribbons represent the flows out of Alaska.

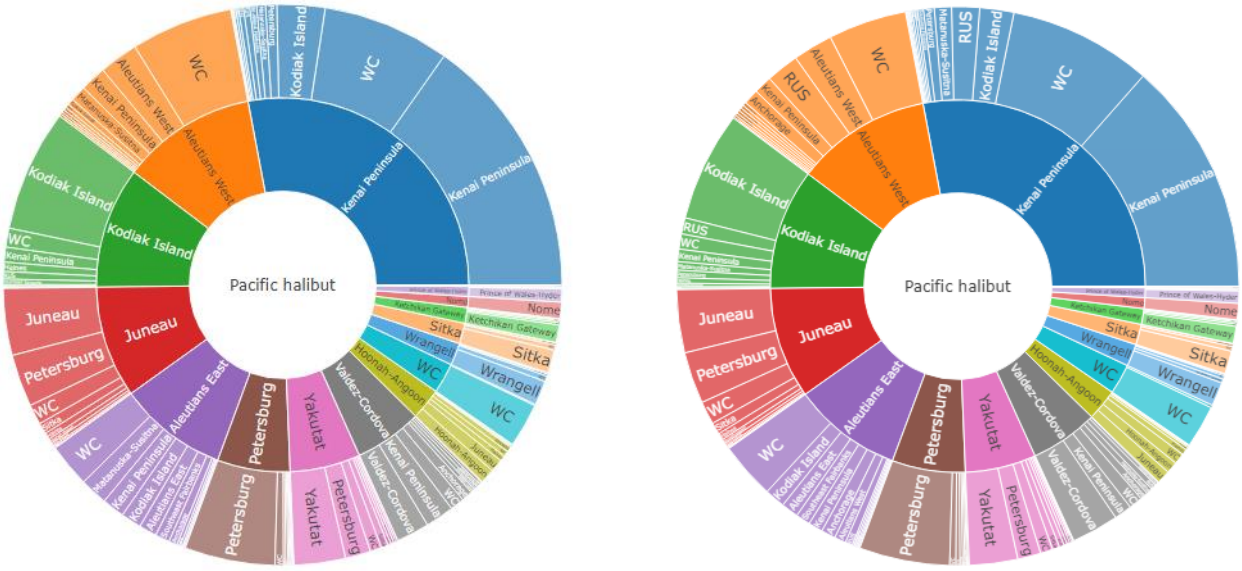
The direction of the flow of benefits from the landing area to vessel owner residence and quota holder residence is depicted in **Figure 3**. Here, the inner circle represents the county where the fish was landed, and the outer circle represents the county where (1) the vessel owner resides, as reported in CFEC (2021), and (2) where the quota owner resides, as reported in CFEC (2021a). The width of the ring section represents the estimated value of landings.

The cross-regional flows related to proprietors' income in the charter sector were assessed using permit holder addresses reported by NOAA (2021b) and approximated by the number of endorsed anglers associated with each permit. These flows are depicted in **Figure 4**.



WC represents US West Coast (WA, OR and CA)

Figure 2 Flow of Pacific halibut harvest from harvest location to buyer's headquarters (2020).



(1) Landing area vs. vessel owner residence

(2) Landing area vs. permit owner residence

Figure 3 Direction of the flow of benefits from the landing area to (1) vessel owner residence, (2) quota holder residence (2020).

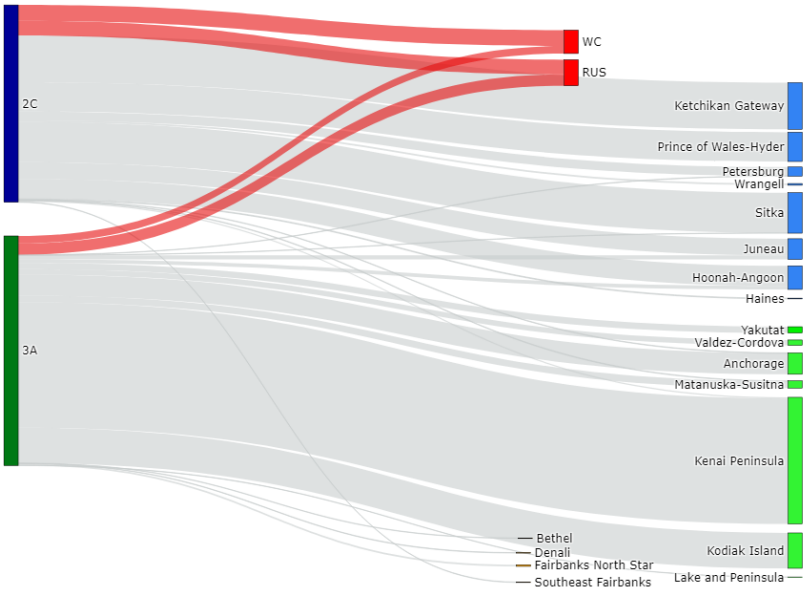


Figure 4 Benefit flows for Alaska charter sector (2020).