IPHC Fisheries Dependent Data Collection Design and Implementation in 2025 – Port operations: Preliminary

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PURPOSE

To provide the Commission with the design and implementation of the IPHC fishery-dependent data collection activities in 2025 – Port Operations.

BACKGROUND

The International Pacific Halibut Commission (IPHC) undertakes fishery-dependent data collection activities coastwide to collect Pacific halibut biological data and catch per unit effort data in the form of vessel logbooks. The IPHC fishery-dependent data collection is the IPHC's primary data source providing extensive information on both spatial and temporal variation of commercial landings for Pacific halibut on an annual basis. With sampled ports receiving landings from across the spatial range of the fishery throughout the commercial fishing period, the IPHC is able to obtain representative data that allow us to characterize spatio-temporal patterns in Pacific halibut length, weight, age, sex and genetic information.

Historical logbooks have been provided to the IPHC dating back to 1907. Biological data collection from the commercial sector began in 1933 and continues to the present day. The sampling design and implementation of these data collections have changed in line with the changing fishery regulations, fleet behaviour and best scientific practices.

The Canadian and U.S.A. governments implemented an Individual Vessel Quota (IVQ) in Canada, and an Individual Fishing Quota (IFQ) program in Alaska, in 1991 and 1995, respectively. As a result of this change, the Pacific halibut fishery along the Canadian and USA Alaskan coasts went from a 'derby style race for fish' open from 1-22 days to a nearly year-round fishery lasting 245 days with a winter closure. The length of the fishing period has extended further to present day and in 2025 is 263 days. Prior to the implementation of IVQ/IFQ, the fishery-dependent data collection was accomplished by one or more Secretariat staff stationed in landing ports for up to a week. After implementation, it became necessary to staff major ports throughout the fishery's extended duration (8-9 months) to meet the spatio-temporal sampling objectives.

In addition to collecting data directly, the IPHC coordinates with other entities for standardised collection of fishery-dependent data. This includes provided training and materials for samplers from IPHC Regulatory Area 2A Tribes, California Department of Fish and Wildlife (CDFW), Oregon Department of Fish and Wildlife (ODFW), Washington Department of Fish and Wildlife (WDFW), and Alaska Department of Fish and Game (ADF&G).

FISHERIES DEPENDENT DATA COLLECTION DESIGN

The primary goal and objective of the IPHC port operations is to collect representative samples from Pacific halibut offloads from across the geographical range of the commercial fishery and throughout the commercial fishing period:

- To provide biological input data for the annual IPHC stock assessment;
- To ensure accurate estimation of quantities such as age composition of the landings, mean weights, size at age, and length-weight relationships;
- To provide data in support of the IPHC research goals, including the collection of biological samples for genetics;
- To field-verify commercial logbook information and reconcile incomplete or conflicting information with captains, where possible;

- To maintain field-based points of contact between the fishing industry and the IPHC headquarters Secretariat.

These goals are achieved through staffing major ports for Pacific halibut landings throughout the commercial fishing period and collaborating with other entities as mentioned above.

Methods for Pacific halibut data collection

The IPHC Secretariat collects data from commercial Pacific halibut landings in major ports. Individual fish are randomly sampled from each landing using prescribed sampling rates for each port and IPHC Regulatory Area, with the goal of sampling a constant proportion of the landed catch over the entire fishing period within each IPHC Regulatory Area. Sampling Pacific halibut consists of the collection of fish lengths, weights, otoliths, and fin clips as well as Pacific halibut logbook data. Biological sampling targets are established by IPHC Regulatory Area to ensure sample sizes are sufficient for the needs of the stock assessment. Prior to the start of each fishing period, landing patterns from each port (for the previous fishing period) are reviewed to ensure proportional sampling (by weight landed) by IPHC Regulatory Area and to ensure minimum data goals are met.

Canada 2025: The IPHC staffed two (2) ports in Canada (Port Hardy and Prince Rupert, BC) with Fisheries Data Specialists (Field, FDS(F)) (Fig. 1).

USA 2025: The IPHC staffed eight (9) ports in Alaska, (Dutch Harbor, St. Paul, Kodiak, Homer, Seward, Juneau, Sitka, Petersburg, and Yakutat) with Fisheries Data Specialists (Field, FDS(F)) (Fig. 1). The port of Yakutat was staffed from 3 to 23 August 2025. In addition, Pacific halibut landings in Bellingham, WA and Newport, OR were sampled by headquarters-based Secretariat. In 2025 assistance was also provided by IPHC Secretariat for sampling IPHC Regulatory Area 2A Tribal commercial landings in Neah Bay, Washington. Training and support was provided for 2A Tribal commercial fishery samplers, and eight (8) Washington Treaty Tribes were represented at training.

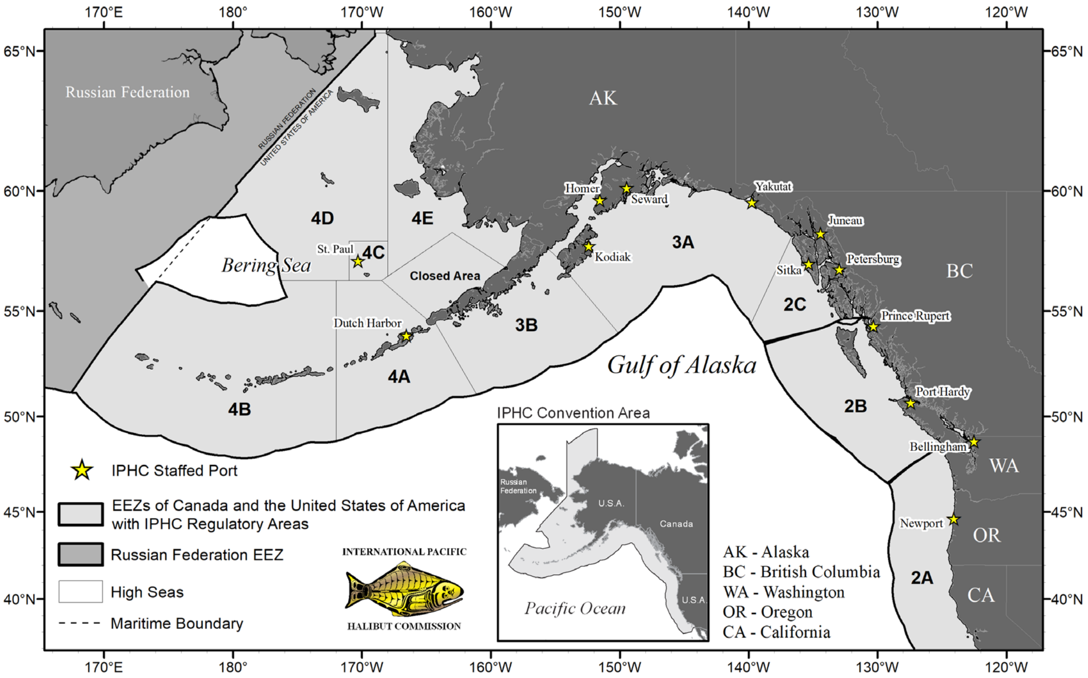

Figure 1. IPHC Fishery-Dependent Data Collection Ports 2025.

Sampling protocols

The IPHC Secretariat collects data according to protocols established in the 2025 International Pacific Halibut Commission Manual for Sampling Directed Commercial Landings (IPHC-2025-PSM01).

DATA COLLECTED IN 2025

Biological data were collected from randomly selected Pacific halibut during the 2025 fishing period. The following metrics were recorded for each sampled fish: left (blind side) sagittal otolith for age determination, fork length measured to the nearest centimeter, weight documented to the nearest tenth of a pound, and a fin clip collected for genetic sex determination.

Sampling targets were established to ensure adequate representation of the Pacific halibut population across all IPHC Regulatory Areas. The targets were set at 1,500 samples from each of the IPHC Regulatory Areas 2B, 2C, 3A, 3B, 4A, and the combined Areas 4CDE, and 1,000 samples from IPHC Regulatory Area 2A. Port and IPHC Regulatory Area-specific sampling rates were determined based on access to catch, spatial and temporal goals, and to meet minimum sampling target numbers. Rationalisation for these targeted minimums are detailed in Appendix I. The summary of biological sampling can be found in Table 1.

Table 1. Biological samples collected as of 29 October 2025 during the 2025 Pacific halibut commercial fishing period. Percent landed reported as of 15 October 2025.

IPHC Regulatory Area	Fish Sampled	Percent of Sampling Target	Percent Landed
2A	731	73%	94%
2B	1,444	96%	87%
2C	1,357	90%	81%
3A	1,426	95%	85%
3B	1,352	90%	80%
4A	1,165	78%	58%
4B	326	22%	*%
4CDE	1,238	83%	33%
Total	9,039		-

* Data not yet available or confidential, in accordance with IPHC Data Confidentiality Policy and Data Sharing Procedures

As seen in Table 1, sampling in IPHC Regulatory Areas 2B, 2C, 3A, 3B and 4A goals are similar to the percent landed and should be close to the targets for 2025. These areas have so far benefited from sufficient staffing to allow access to catch. Conversely, IPHC Regulatory Area 2A data collections may not meet the target due to reduced access to catch caused by staffing shortages, and the structure of the fishery. In IPHC Regulatory Area 2A, the fishery has multiple openers and ports for which we are unable to staff. IPHC Regulatory Areas 4A, 4B and 4CDE will likely not reach the sampling goals, likely due to lower amounts of fish landed, though we have maximized sampling rates and we do staff ports where most of those fish are landed.

Table 2 summarizes fishery logbook and biological data collection, as well as associated costs, by port as of 29 October 2025 for the 2025 fishing period. A total of 1,678 logbooks and 9,039 biological samples were collected across all ports, with a program-wide cost of $654,004 (estimated as of 30 September 2025), excluding costs of IPHC Secretariat staff based in Seattle as well as indirect costs associated such at technology, and administrative staff time.

In addition to standard biological samples and to provide support for IPHC research goals, in 2025 female maturity samples were also collected in Sitka by IPHC Secretariat staff in collaboration with the commercial fishing fleet. These samples were collected from vessels which were able to collect the gonads of female Pacific halibut and maintain them cold until the offload. Once at the dock, IPHC Secretariat staff dissected the gonads and prepared samples to be shipped to IPHC HQ for histological assessment of maturity. These data will be used to supplement maturity data collected on the IPHC Fishery Independent Setline Survey and are collected outside of the regular survey season, providing valuable data outside of that temporal range at little to no additional cost to the IPHC.

Table 2. Fishery logbook and biological data collected by port as of 29 October 2025 during the 2025 fishing period and estimated program costs for FY2025 by port as of 1 October 2025. Costs do not include IPHC Secretariat staff based at the headquarters office in Seattle which directly assist with and manage IPHC fishery dependent data collection, or indirect costs such as technology or administrative staffing. Logbook counts in this table only include logs collected in 2025 and trips fished in 2025; they do not include logs from fishing trips completed in previous years that were collected this year.

Port	2025 Logbooks	Biological samples	Total Estimated Cost (USD)	Total Estimated Cost/Month (USD)	Total Estimated Operational Costs (USD)
Dutch Harbor	67	1,718	$93,500	$13,169	$43,000
Homer	254	1,450	$64,500	$7,062	$6,000
Juneau**	63	247	$63,500	$6,953	$6,000
Yakutat**	64	98	$5,000	N/A	$5,000
Kodiak	258	1,115	$74,000	$8,102	$18,000
Petersburg	216	801	$62,000	$6,788	$6,000
Seward	163	339	$81,000	$8,869	$17,000
Sitka	167	507	$69,000	$7,555	$6,000
St. Paul	111	589	$32,000	$11,163	$14,000
Prince Rupert	129	811	$55,000	$6,022	$9,500
Port Hardy	186	633	$49,000	$5,365	$4,000
2ATribal*	N/A	550	$1,488	N/A	$1,488
Bellingham	N/A	52	$400	N/A	$400
Newport*	N/A	129	$3,616	N/A	$3,616
TOTAL	**1,678**	**9,039**	**$654,004**		

*Indicates actual costs. **Same staff member for Juneau and Yakutat. Yakutat costs only include travel costs.

Data from IPHC Regulatory Areas 4A, 4B, and 4CDE were collected nearly solely from Dutch Harbor and St. Paul. These data were prioritized due to their critical role in understanding Pacific halibut stocks in this region. These areas experience variable sampling coverage by the IPHC Fishery-Independent Setline Survey, further emphasizing the importance of data collected through fishery-dependent programs. The higher monthly costs of sampling in Dutch Harbor and

St. Paul reflect the high cost of living, elevated travel expenses, and the shorter fishing periods compared to other ports. For example, St. Paul was staffed for 2.5 months, meaning travel costs are divided over a much shorter period than ports staffed for nine or more months.

Costs in the two Canadian ports, Prince Rupert and Port Hardy, are typically lower than those in Alaska ports, largely due to the reduced cost of employee benefits in Canada compared to the United States of America. Costs also vary across ports based on factors such as employee turnover, travel expenses, housing and transportation needs.

Sampling in IPHC Regulatory Area 2A was concentrated in Bellingham, Newport, and 2A Tribal locations. While logbook data were collected, these were handled by IPHC Secretariat staff based in Seattle and are not included in Table 2.

In 2025, there were an additional 54 logs collected from previous years in Yakutat, this is likely due to many of not staffing this port and highlights the need for consistent year over year sampling and staffing as many ports as possible. Previous year logs were collected across all ports, but much fewer in ports which staff are available yearly.

CHALLENGES

While sampling goals may be met in most areas, challenges remain in achieving adequate sampling coverage in IPHC Regulatory Areas 2A, 4A, 4B, and 4CDE due in part to limited access to catch. To address these challenges, increased staffing or alternative data collection strategies such collaboration with more external entities should be considered. Additional resources may be needed to support sampling in regions with historically low access.

RESULTS

Fishery-dependent data collected and verified prior to 30 October of this year will be used in 2025 the Pacific halibut stock assessment. Data collected and processed after 30 October will be used in the following year's stock assessment.

Commercial biological and catch data interactives including 2025 fishery limits reports which are updated bi-monthly can be found at this link https://www.iphc.int/data/.

RECOMMENDATION

That the Commission:

1) **NOTE** paper IPHC-2025-IM101-06 that provides the Commission with a preliminary summary of the IPHC fishery-dependent data collection design and implementation in 2025.

APPENDICES

APPENDIX I – FISHERY DEPENDENT DATA SAMPLING TARGETS

Appendix I
Fishery Dependent Data Sampling Targets

PURPOSE

To provide clarification of IPHC's rationalised biological data collection targets.

INTRODUCTION

Biological sampling by the IPHC provides the primary source of biological information used for the annual stock assessment and management supporting analyses for Pacific halibut. Biological samples are collected by two primary resources; the Secretariat on the IPHC's Fishery-Independent Setline Survey (FISS) and commercial fishery landings in major landing ports coastwide.

In addition, the Alaska Department of Fish & Game (ADFG) collects data from the recreational fishery in Alaska, and both IPHC Secretariat [subject to funding] and National Oceanographic and Atmospheric Administration Fisheries (NOAA) staff collect data from fish captured on the fishery-independent NOAA trawl surveys conducted in Alaska.

This total comprises approximately:

1) 10,000-12,000 otoliths from the FISS (target collections include 2,000 per IPHC Regulatory Area, but are often lower due to actual vs projected catch rates and generally insufficient overall catch in Biological Region 4 even at a 100% sampling rate);
2) 11,500 otoliths from the directed commercial fishery landings (1,500 targeted per IPHC Regulatory Areas 2B, 2C, 3A, 3B, 4A, 4B and 4CDE combined, and 1000 from IPHC Regulatory Area 2A);
3) 1,500-2,000 from the recreational sector (collected in the previous year); and
4) 1,500-3,000 from the NOAA trawl surveys (collected in the previous year).

Ideally, all commercial Pacific halibut landings would have an equal chance of being sampled, creating a truly representative sampling frame across the entire fishery. In practice, this is not feasible. Instead, sampling is focused on ports with the highest landing volume except in the case of Dutch Harbor and St. Paul, which are essential for coverage of IPHC Regulatory Areas 4A, 4B, and 4CDE, respectively.

The Secretariat has undertaken a review and analysis of the IPHC capacity for sampling, aging and annual needs for stock assessment and provides the following information for general awareness.

ASSESSMENT OF THE EFFECTIVE SAMPLE SIZE

To inform future data collection priorities, the IPHC Secretariat conducted an analysis in early 2024 to assess how reductions in the number of otoliths aged from biological samples might impact the overall information content of the age dataset. This analysis relied on the concept of effective sample size (Hulson et al. 2023; Stewart and Hamel 2014), which is used as the starting point for weighting the age data in the IPHC's stock assessment models.

Effective sample size is calculated using a statistical method known as bootstrapping, which involves repeatedly resampling the observed age data thousands of times. These simulated datasets are then compared to the full dataset across the entire age range. This allows for an estimate of how much unique information the original sample contains. Unlike the total number of fish sampled, the effective sample size accounts for the fact that fish caught on the same trip tend to be more similar in age than fish from different trips (Pennington and Volstad 1994). As a result, individual fish are not truly independent observations. This means that increasing the number of trips sampled (or unique logbook entries) contributes more to statistical power than simply increasing the number of otoliths collected from a few trips, and conversely, decreasing the number of otoliths read is preferable to decreasing the number of trips sampled. However, the number of otoliths remains important, particularly when data are later subdivided by IPHC Regulatory Area, sex, or other relevant categories (e.g. in analyses of legal vs. sublegal fish under recent minimum size limits).

To evaluate effective sample sizes, we summarized commercial fishery age reading over the most recent five years of available data (2017-2021). Table A1 presents the average annual number of trips sampled, the average number of otoliths aged from those trips, and the resulting effective sample size for each Biological Region. To assess the impact of reduced age reading effort, the analysis was repeated using a random subsample of 50% of the original number of fish. Comparing the effective sample sizes between the full and reduced datasets helps answer the question: If we had aged only 50% of the collected otoliths in recent years, how much statistical information would have been lost?

While this analysis is based on historical data, the results provide insight into how future reductions in age reading or data collections could affect data quality. Biological Regions were used in this analysis because they represent the most detailed spatial scale at which data are applied in the stock assessment process.

Table A1. Summary of 2017-2021 commercial fishery fish ages by Biological Region and possible reductions for 2024. Values reported for effective sample size are the simulated sample size and percentage reduction from the actual effective sample sizes.

Biological Region	Average number of trips sampled	Average number of ages	Effective sample size	Effective sample size from 50% subsampling	Percentage reduction from actual
Region 2	366	4,436	1,525	1,069	30%
Region 3	169	2,552	905	646	29%
Region 4	81	1,866	629	478	24%
Region 4B	13	1,148	57	54	5%

As expected, the effective sample size is considerably lower than the number of fish because multiple fish are sampled from each unique trip. The largest effective sample sizes come from the commercial fishery in Biological Region 2. Regions 3, 4, and 4B follow in descending order. Simulated subsampling for age reading at 50% resulted in only a 5-30% reduction in effective sample size, respectively. Regions 2 and 3 could be subsampled at 50% and still outperform Regions 4 and 4B. Based on similar 2022 analyses and field staff capacity, Region 4B's sampling target was reduced in 2023, effectively implementing subsampling in the field with the goal of increasing trip coverage and therefore increasing the effective sample size.

Given staffing limits, IPHC reads otoliths from a subsample of those collected in the field at rates detailed in Table A2. The results presented here suggest that commercial fishery data from Biological Regions 2 and 3 subsampled at a rate of 50% still result in effective sample sizes only modestly reduced from recent levels.

In the long term, it is preferable to maintain current field sampling rates, even if only a subsample of otoliths is aged. Once staff are deployed to a port, collecting fewer otoliths offers little cost savings, while reducing ports staffed would significantly lower the number of trips sampled and, in turn, the effective sample size. Maintaining field sampling preserves the option to age additional otoliths later if needed or if an alternative ageing method is established, ensuring flexibility without permanently compromising the dataset, as would occur with reduced field sampling.

Table A2. Biological sampling rates in commercial fisheries for 2025, and the target size of the sample for ageing by IPHC Regulatory Area.

Regulatory Area	Rate	Ageing subsample
2A	1	1000
2B	0.5	750
2C	0.5	750
3A	0.5	750
3B	0.5	750
4A	1	1,500
4B	1	1,500
4C	1	750
4D	1	750
4E	1	NA
TOTAL		**8,000**

PORT-SPECIFIC PATTERNS IN BIOLOGICAL DATA

To further explore the need for sampling across a network of ports in Alaska, the IPHC Secretariat examined patterns in the fishery-dependent biological data collected between 2017 and 2022 in each port where samples were collected. The results provide supporting evidence that landings vary meaningfully by port, month, and season. These differences are biologically significant and would likely introduce bias into the data if sampling were reduced or eliminated in any location or season.

In recent years (2017-2022), the IPHC has sampled biological information from the directed commercial fishery in eight primary Alaskan ports, with a small number of samples also collected from deliveries made into ports in the state of Washington (Table A3). Two ports provide most of the samples for entire Regulatory Areas: Dutch Harbor supplies 96% of 4B and 85% of 4A samples, while St. Paul provides 52% of 4CDE (up to 76% when the local fleet is inactive). In contrast, samples from 2C, 3A, and 3B are spread across three main ports each; Juneau, Petersburg, and Sitka for 2C; Homer, Kodiak, and Seward for 3A and 3B.

Table A3. Distribution among ports of complete directed commercial fishery biological samples collected from each IPHC Regulatory Area in Alaska over 2017-2022.

Port	2C	3A	3B	4A	4B	4CDE
Dutch	0	0	95	5,236	6,005	1,709
Homer	0	2,293	3,074	415	177	394
Juneau	1,694	820	0	0	0	0
Kodiak	0	1,840	2,301	376	101	383
Petersburg	4,064	121	0	0	0	0
Seward	0	2,276	1,312	128	0	114
Sitka	2,709	643	0	0	0	0
St. Paul	0	0	0	0	0	2,783
Washington	153	661	0	0	0	0

To evaluate the potential loss of samples if coverage was reduced over certain time-periods during the fishing season, the distribution of all samples collected into each port was summarized by month (Table A4). Some ports have fewer landings at the beginning of the season (e.g. Homer, Kodiak, Seward), the end of the season (most ports) or months during the summer when fishing/processing focuses on other species (e.g. Juneau and Petersburg in July, Sitka in August). These months may be the best candidates if there is a need to reduce or eliminate sampling for a portion of the fishing season, though they may not lead to much cost savings due to increased travel costs for mid-year reductions (July, August).

Table A4. Samples collected from 2017-2022 by port and month

Port	March	April	May	June	July	August	September	October	November
Dutch	-	214	749	2,352	2,113	2,687	3,227	1,173	530
Homer	98	584	1,102	976	784	1,075	768	842	124
Juneau	359	495	563	254	77	241	258	177	90
Kodiak	38	484	951	377	595	630	667	840	419
Petersburg	389	704	789	530	173	553	591	353	103
Seward	86	655	640	447	447	716	418	274	147
Sitka	381	703	673	406	308	156	283	335	107
St. Paul	-	-	-	241	986	1,556	-	-	-
Washington	-	13	27	42	16	130	229	174	183

In addition to maintaining adequate sample sizes by IPHC Regulatory Area and Biological Region, it is critical that sampled landings reflect the full range of fish demographics; age, length, weight, and sex. This ensures that the data accurately represent the entire fishery.

The examples below illustrate how bias could be introduced if sampling were eliminated from a port or for an entire season by highlighting differences in age-structure, and sex composition across ports within IPHC Regulatory Areas and across seasons.

- For Regulatory Area 3A, landings into Southeast Alaska ports (Juneau and Sitka) include fewer males than those in 3A ports (Seward, Homer and Kodiak) (Figure A1).
- For Regulatory Area 3A, fish sampled in Kodiak tend to be younger than those from other ports, and the relative strength of specific age classes varies by port in which they are landed (Figure A1).
- For Regulatory Area 3B, females landed in Seward tend to be slightly older than those landed in Homer and Kodiak (Figure A2).
- In 2017, Sitka landings showed a much stronger 2002 year-class (age-15) than Petersburg or Juneau (Figure A3).
- Very few males are seen in the summer fishery in Area 4CDE (Figure A4).
- In Area 2C, older fish are mostly absent from landings until August (Figure A5).

These seasonal differences tend to persist across months, so minor adjustments to sampling effort within a month or port may not introduce significant bias. However, because Pacific halibut are highly migratory, landings may reflect different segments of the population depending on whether fish are encountered during spawning migrations or summer feeding.

Both spatial and seasonal patterns in age and sex composition suggest that further reductions in biological sampling at ports would likely introduce bias. The extent of the impact depends on the availability and quality of other data (e.g., FISS) and whether reductions in sampling are short-term or persist over multiple years.

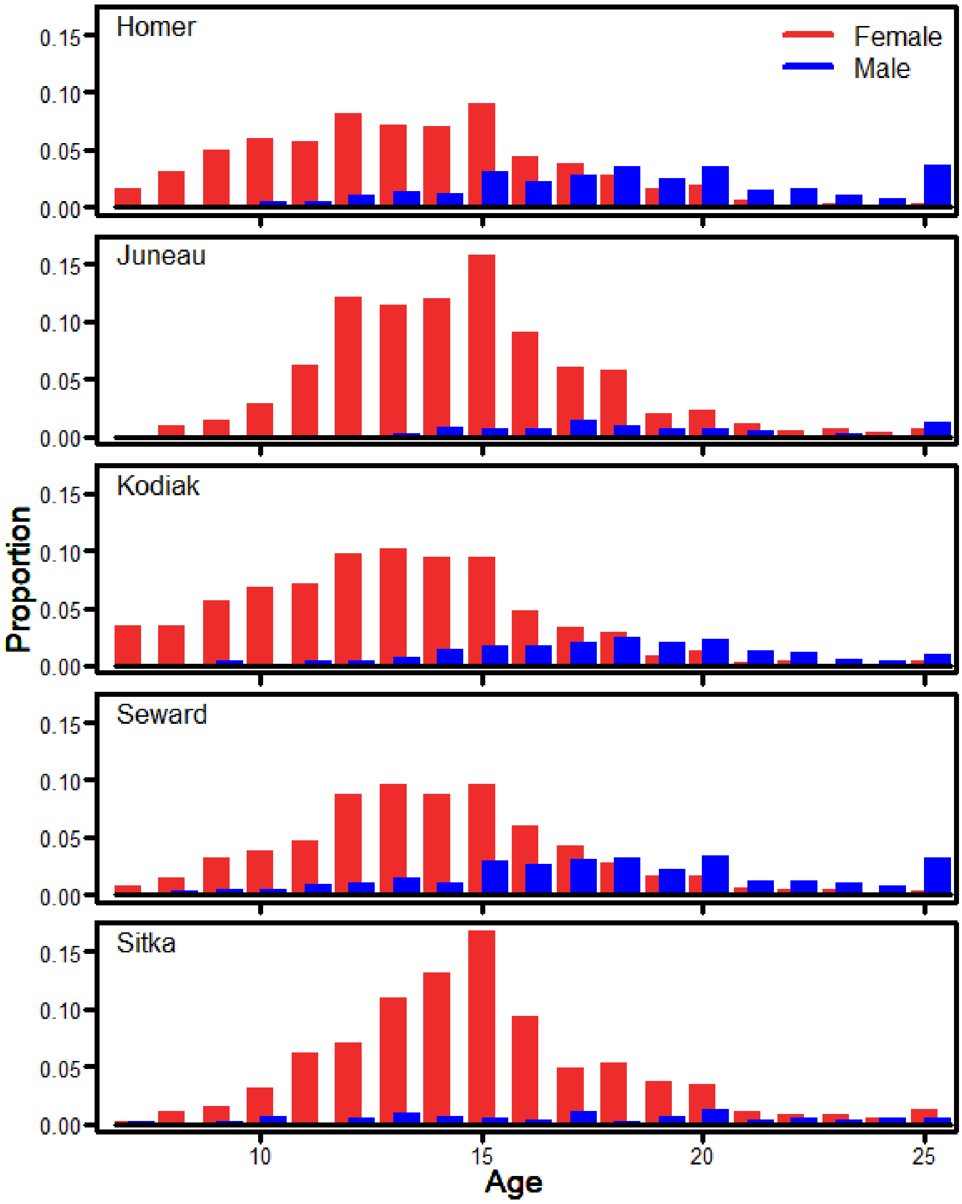

Figure A1. Age frequency distributions for 2017-2022 from IPHC Regulatory Area 3A landings by the port in which they were sampled. Red bars represent the proportion of the landings (by number of fish) that were female at each age (age-7 includes all fish up to age-7 and age-25 includes all fish 25 or older), and blue bars represent the proportion of males at each age.

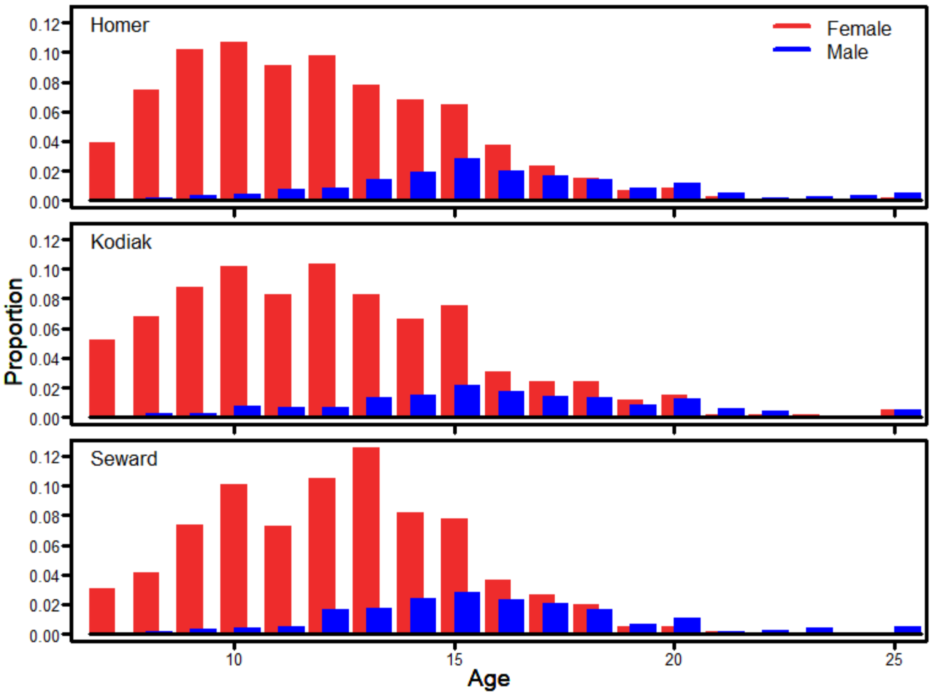

Figure A2. Age frequency distributions for 2017-2022 from IPHC Regulatory Area 3B landings by the port in which they were sampled. Red bars represent the proportion of the landings (by number of fish) that were female at each age (age-7 includes all fish up to age-7 and age-25 includes all fish 25 or older), and blue bars represent the proportion of males at each age.

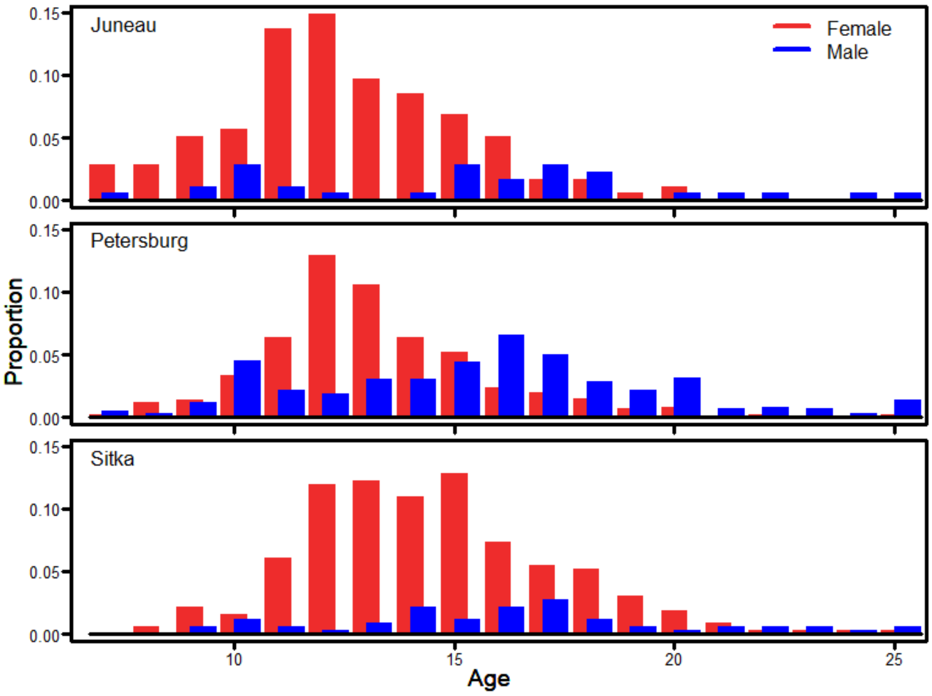

Figure A3. Age frequency distributions from IPHC Regulatory Area 2C landings in 2017 by the port in which they were sampled. Red bars represent the proportion of the landings (by number of fish) that were female at each age (age-7 includes all fish up to age-7 and age-25 includes all fish 25 or older), and blue bars represent the proportion of males at each age.

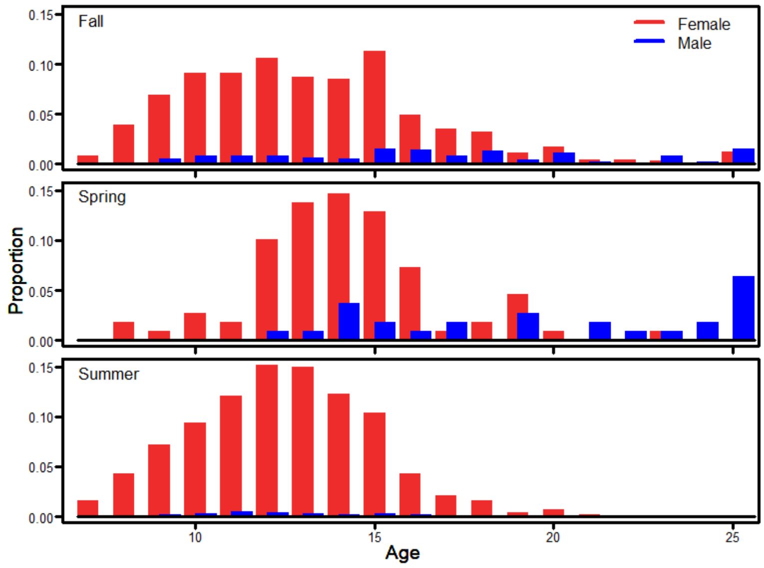

Figure A4. Age frequency distributions for 2017-2022 from IPHC Regulatory Area 4CDE by season in which they were sampled. Spring indicates March-May, Summer June-August, and Fall September-December. Red bars represent the proportion of the landings (by number of fish) that were female at each age (age-7 includes all fish up to age-7 and age-25 includes all fish 25 or older), and blue bars represent the proportion of males at each age.

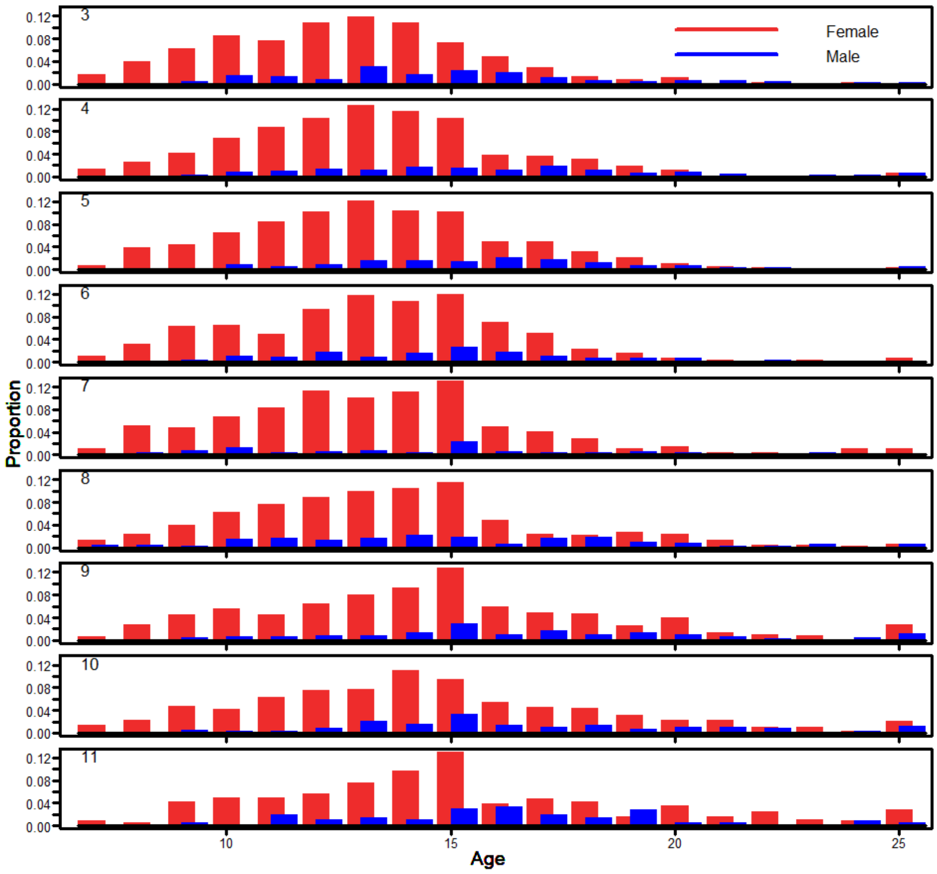

Figure A5. Age frequency distributions for 2017-2022 from IPHC Regulatory Area 2C by the month in which they were sampled. Red bars represent the proportion of the landings (by number of fish) that were female at each age (age-7 includes all fish up to age-7 and age-25 includes all fish 25 or older), and blue bars represent the proportion of males at each age.

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