

INTERNATIONAL PACIFIC



HALIBUT COMMISSION

2024-28 FISS Design Evaluation

Agenda item: 8.1

IPHC-2024-AM100-13

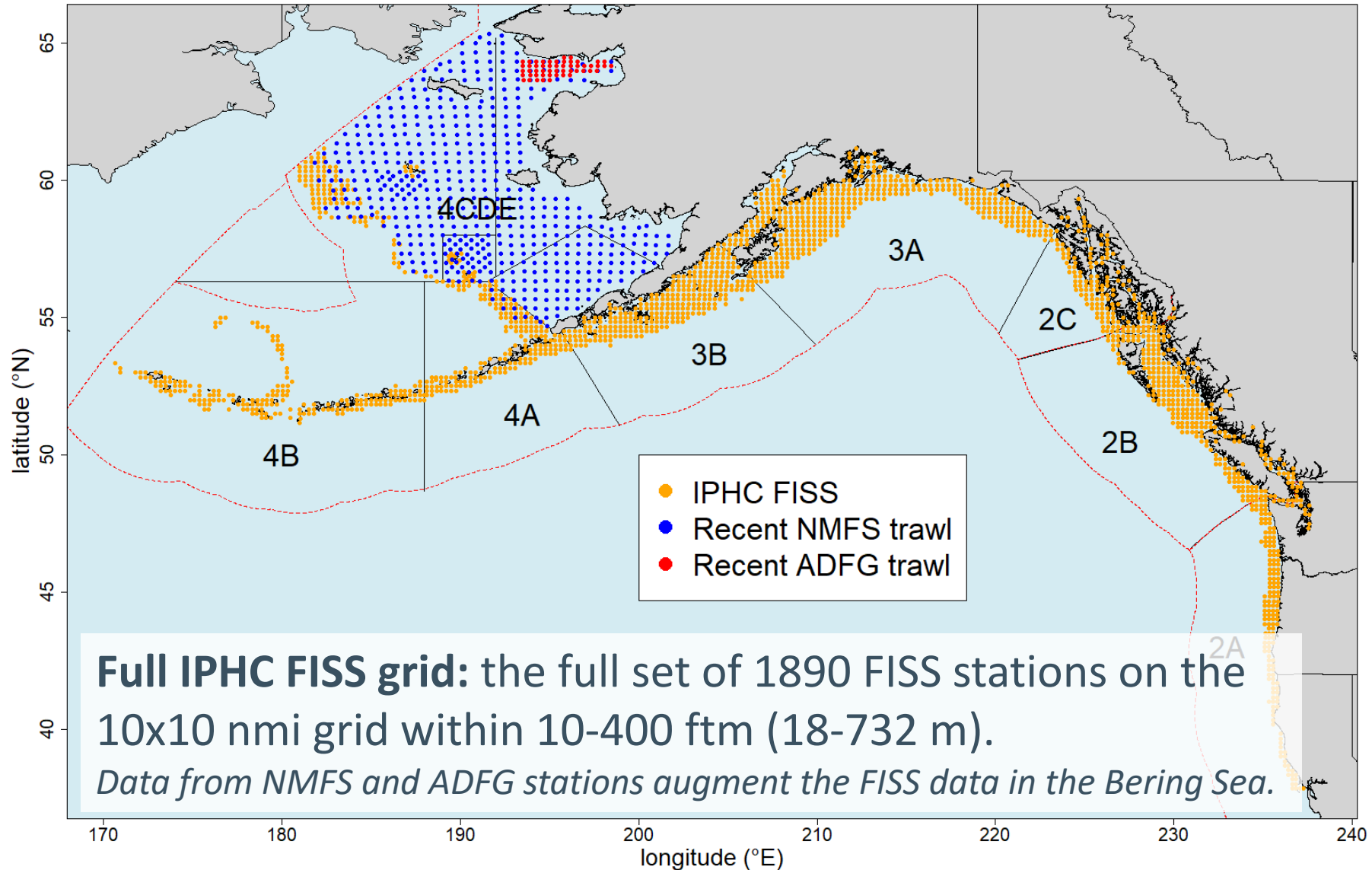
(R. Webster, I. Stewart, K. Ualesi, D. Wilson)



IPHC FISS

- Our most important source of data on Pacific halibut
- Provides data for estimating weight and numbers per unit effort (WPUE and NPUE) indices of density and abundance of Pacific halibut
 - Used to estimate stock trends
 - Used to estimate stock distribution
 - Important input in the IPHC stock assessment
- Provides biological data for use in the stock assessment
- An annual FISS has been undertaken since 1993
 - Design expanded from 1993-2000 to include sampling in all IPHC Regulatory Areas
 - Further expansion into previously unsampled waters during 2011-2019 period

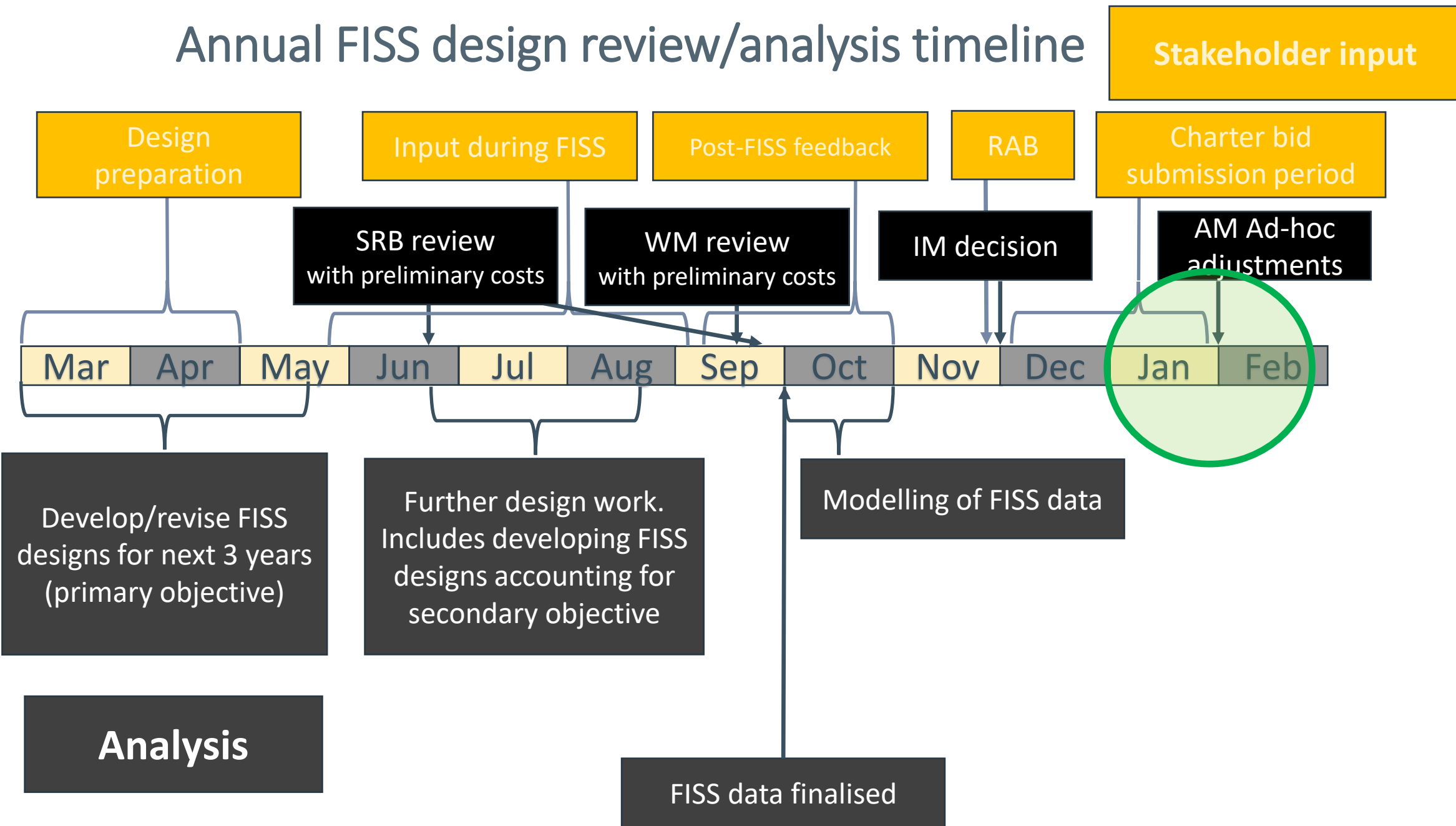
Full FISS grid



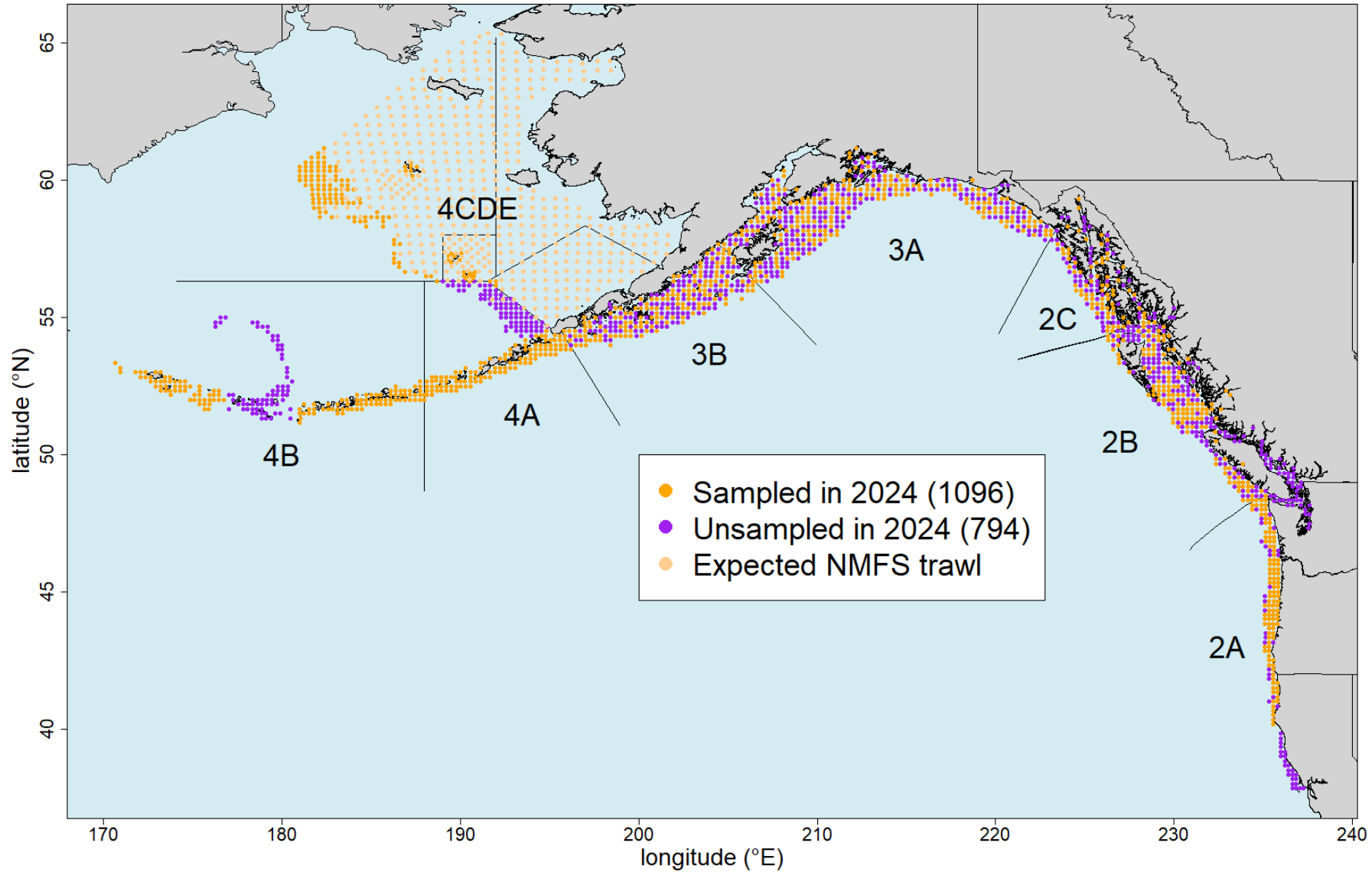
FISS objectives and design layers

| Priority | Objective | Design Layer |
|-----------|--|--|
| Primary | Sample <u>Pacific halibut</u> for stock assessment and stock distribution estimation | Minimum sampling requirements in terms of: <ul style="list-style-type: none"> • Station distribution • Station count • Skates per station |
| Secondary | Long term <u>revenue neutrality</u> | Logistics and cost: operational feasibility and cost/revenue neutrality |
| Tertiary | <u>Minimize removals</u> , and <u>assist others where feasible</u> on a cost-recovery basis. | Removals: minimize impact on the stock while meeting primary priority Assist: assist others to collect data on a cost-recovery basis IPHC policies: ad-hoc decisions of the Commission regarding the FISS design |

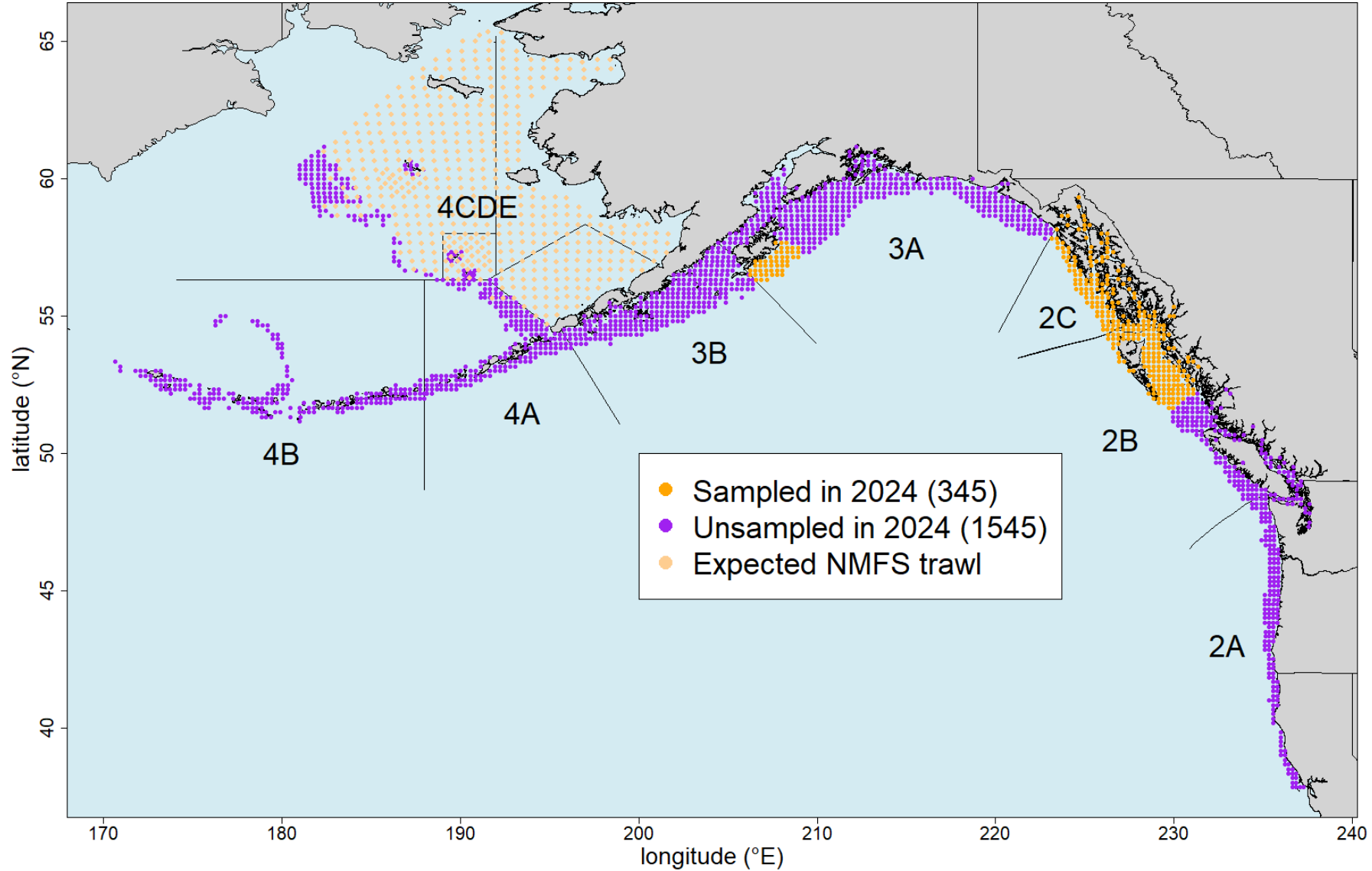
Annual FISS design review/analysis timeline



Presented to SRB in June 2023 (primary objective)



Revenue positive (with added efficiencies)



Added efficiencies

Several aspects of the standard FISS procedures were removed to achieve a revenue-positive design:

- No oceanographic monitoring;
- NOAA Fisheries trawl surveys will not be staffed by the IPHC;
- Reduce field staff on each vessel from two to one in two charter regions; only basic biological information (length, weight and sex) would be collected.

Added efficiencies

Additional changes were required to the standard FISS design in sampled areas:

- Allow for “vessel captain stations”, in which vessel captains can choose to fish up to one third of their sets at a location that is optimal in terms of catch rates or revenue. It is assumed that these stations will achieve 120% of the average catch rate of the usual fixed-station design stations
- Use less expensive pink salmon baits on 50% of sets

Add-on options

- IPHC Secretariat also projected costs of additional sampling and monitoring effort should supplementary funding become available.
- These were presented at IM099 as a series of modular options that can be added to the revenue positive design
 - All modular options were designed to include an entire charter region or comprise at least 60 stations to increase the likelihood of obtaining one or more competitive bids.
- Individual charter regions were added to the revenue neutral design one at a time, selecting the charter region that was closest to net revenue neutrality for each IPHC Regulatory Area.

Add-on options

- Exceptions:
 - IPHC Regulatory Area 2A, where 60 stations were selected to encompass higher catch-rate areas in both Washington and Oregon
 - IPHC Regulatory Areas 4A/4B, where 60 adjacent stations were clustered around the boundary between these areas.
- The choice of 60 stations was to provide sufficient work to make the travel required for most vessels worthwhile.

Potential add-on options

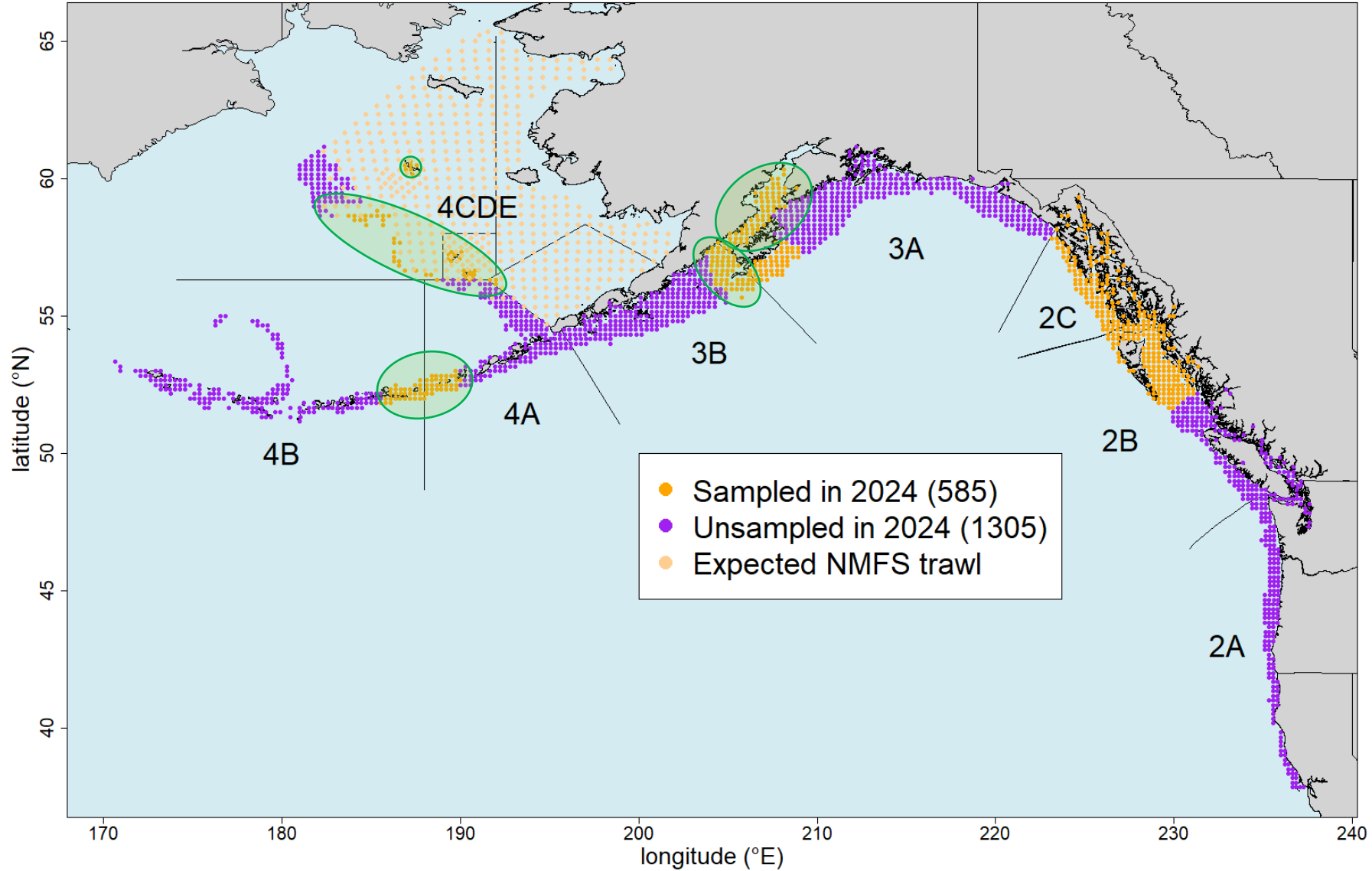
| Option | Design | IPHC Regulatory Areas sampled (charter regions) | Additional net cost |
|--------|--|--|------------------------|
| 1 | Revenue neutral with efficiencies | 2B (2), 2C (3), 3A (1) | -- |
| 2 | Add additional 3A to Option 1 | 2B (2), 2C (3), 3A (2) | (\$47,000) |
| 3 | Add 3B to Option 1 | 2B (2), 2C (3), 3A (1), 3B (1) | (\$62,000) |
| 4 | Add 4A/4B to Option 1 | 2B (2), 2C (3), 3A (1), 4A+4B (1) | (\$245,000) |
| 5 | Add 2A to Option 1 | 2B (2), 2C (3), 3A (1), 2A (1) | (\$134,000) |
| 6 | Add additional 2B to Option 1 | 2B (3), 2C (3), 3A (1) | (\$68,000) |
| 7 | Add oceanographic monitoring to Option 1 | 2B (2), 2C (3), 3A (1) | (\$55,000) |
| 8 | Add trawl survey staffing to Option 1 | 2B (2), 2C (3), 3A (1) | (\$120,000) |
| 9 | Add 4CDE to Option 1 | 2B (2), 2C (3), 3A (1), 4CDE (1) | (\$205,000) |

IM099 Report

- At IM099, the Commission agreed on an optimized version of the revenue positive design that includes Options 2 and 3, and potentially adds Options 4 and 9:

*IPHC-2023-IM099-R, para. 51: The Commission **AGREED** on an optimized design for the 2024 FISS as provided at Appendix IV, that balances the Commission's primary and secondary objectives for the FISS. Specifically, the 2024 design shall include Options 1, 2, and 3 from Table 2. In addition, Option 4 shall be included in the RFT process but is not yet endorsed. Once bids are received and evaluated in February 2024, the Commission will make a final decision on whether to proceed or not with Option 4, based on bids and logistical constraints at that time and potentially a new option [Option 9] for IPHC Regulatory Area 4CDE.*

Revenue positive + add-on Options 2-4 & 9



Implications of optimized revenue neutral design in 2024

- The optimized design improves over the revenue neutral design by including sampling in all IPHC Biological Regions and all IPHC Regulatory Areas except 2A.
- Precision of estimates of density indices and stock distribution is expected to be within acceptable levels in all sampled areas (CVs around 20% or less).
- A risk of bias remains outside of Areas 2B and 2C due to the potential for stock trends to differ between sampled and unsampled charter regions.

Implications of optimized revenue neutral design in 2024

- Compared to recent years, the 2024 spatial design will result in less information for the annual stock assessment and management supporting calculations such as stock distribution.
- Increased uncertainty is likely to cause the assessment model to rely much more heavily on the commercial fishery CPUE index.
- Given current variability and uncertainty in the magnitude of younger year classes (2012 and younger), limited biological information in the core of the stock distribution (Biological Region 3) makes it unclear that the stock assessment will detect a major change in year class abundance.
- A greater portion of the uncertainty in stock trend and demographics will not be able to be quantified due to missing FISS data from a large fraction of the stock's geographic range.

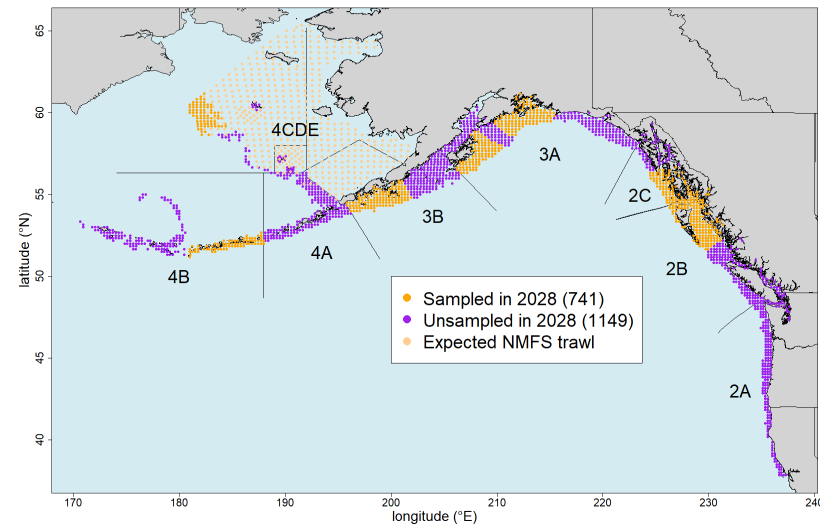
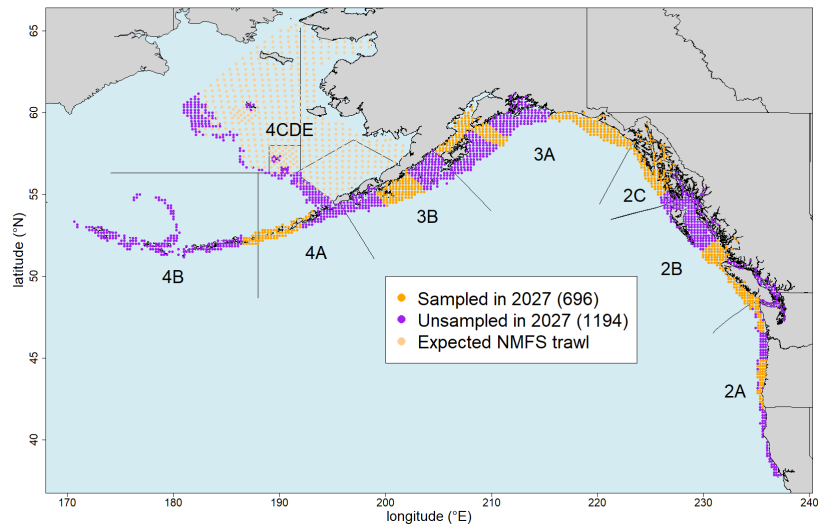
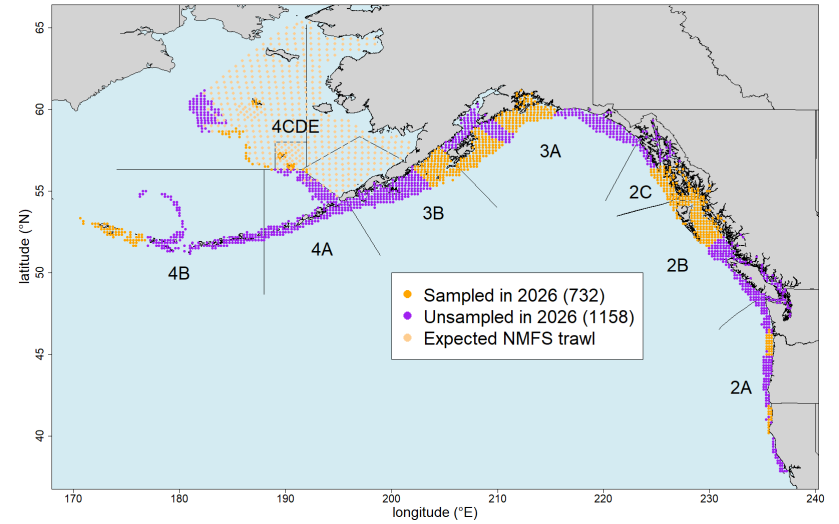
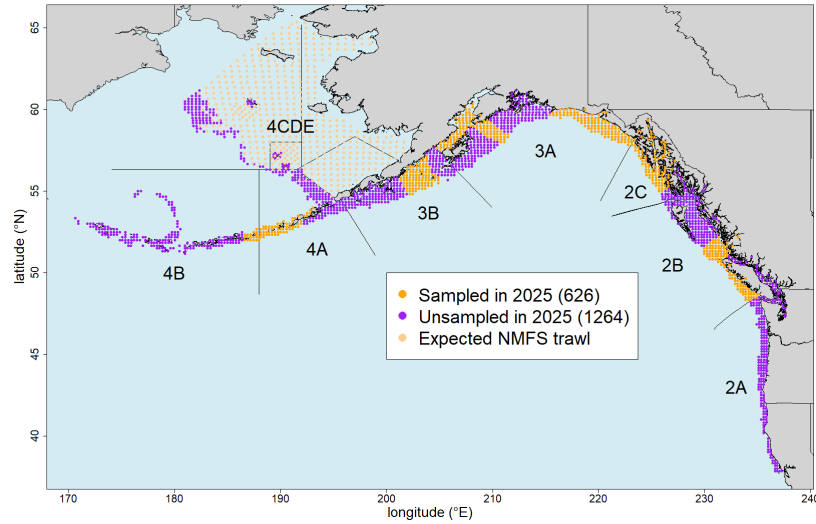
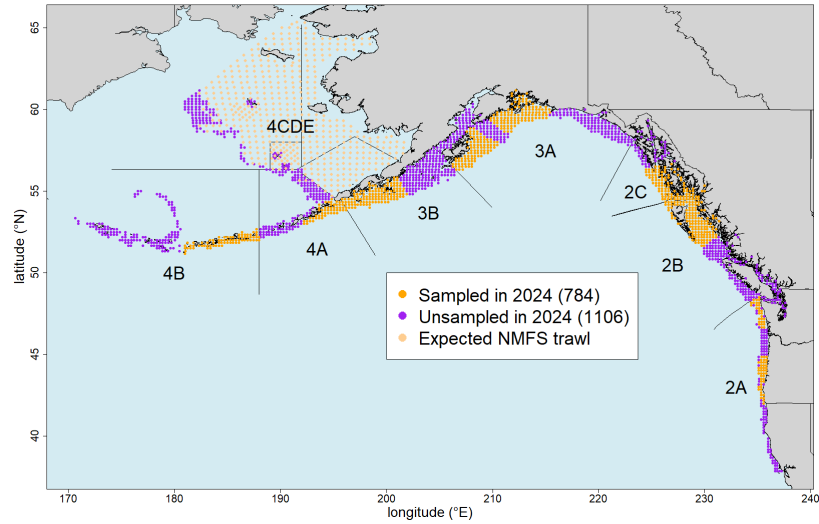
Future FISS designs

- In recent years, the FISS has fished a random selection of stations in the core IPHC Regulatory Areas (2B, 2C, 3A and 3B).
- This method for station selection was chosen in 2019 over a proposal to instead fish a selection of charter regions as blocks of stations.
- In September 2023, Commissioners directed IPHC Secretariat staff to evaluate potential block designs for future FISS sampling
 - Reduced running time between stations in a block design leads to greater operational efficiency, an important consideration in bringing these designs forward.

Future FISS designs

- We evaluated a ‘base block design’ for 2024-28 based on sampling selected FISS charter regions in the stock’s core:
 - Prioritizes some annual sampling in each Biological Region for stock assessment purposes.
 - Ensures all charter regions in the core of the stock (2B, 2C, 3A and 3B) are sampled over a three-year period
 - Coverage in other areas is prioritized to minimize bias potential and maintain CVs below 25%
- The sampled blocks (charter regions) are rotated over time.

Base block designs 2024-28



Comments on based block design

- For the **base block design**, 2026 CVs for mean O32 WPUE are projected to be 5-9% for Biological Regions 2-4, with a 5% CV for the coastwide mean.
- The base block designs provides high spatial coverage over a two to three-year period, resulting in high precision and low bias for estimates obtained from the data (e.g. stock trends & distribution).

Discussion

- The IPHC Secretariat staff recommends using block designs for all future planning as a viable alternative to the randomised sampling currently in use in the core of stock. Block designs will increase efficiency by reducing vessel travel time among stations.
- Sampling effort should not be lower than the levels presented in the base block design.
- Based on current FISS cost estimates, the Secretariat recommends that consistent supplementary funding of approximately \$1.5 million per year would be needed to allow implementation of the base block designs reported here over 2024-2028.

IM099 Report

*IPHC-2023-IM099-R, para. 52: The Commission **AGREED** that the base block design (Figs. 2.1 to 2.5 of paper IPHC-2023-IM099-13 Rev_1) or a block design with similar sampling effort looks promising for implementation as an alternative to FISS designs based on random sampling in the core of the stock.*

Recommendations

That the Commission:

- 1) **NOTE** paper IPHC-2024-AM100-13 that presents potential design options for the IPHC's Fishery-Independent Setline Survey (FISS) for the 2024-28 period and cost projections for 2024 design options considered during 2023;
- 2) **ENDORSE** proceeding with the revenue neutral design for 2024 proposed here in order to cover all fixed headquarters costs, and to provide data for basic trend estimation and biological data for use in the 2024 stock assessment. Specifically, the Secretariat recommends fishing two charter regions in IPHC Regulatory Area 2B, three regions in IPHC Regulatory Area 2C and one region in IPHC Regulatory Area 3A (Option 1, Table 2; Figure 5), with added efficiencies as described above;

Recommendations

That the Commission:

3) **ENDORSE** sampling additional charter regions in IPHC Regulatory Areas 3A (1) and 3B (1) (Options 2 and 3, Table 2) as agreed by the Commission at IM099, and prioritize the addition of Option 4 to the 2024 FISS design so that data are obtained from all four biological regions and the potential for bias in trend estimates is further reduced.

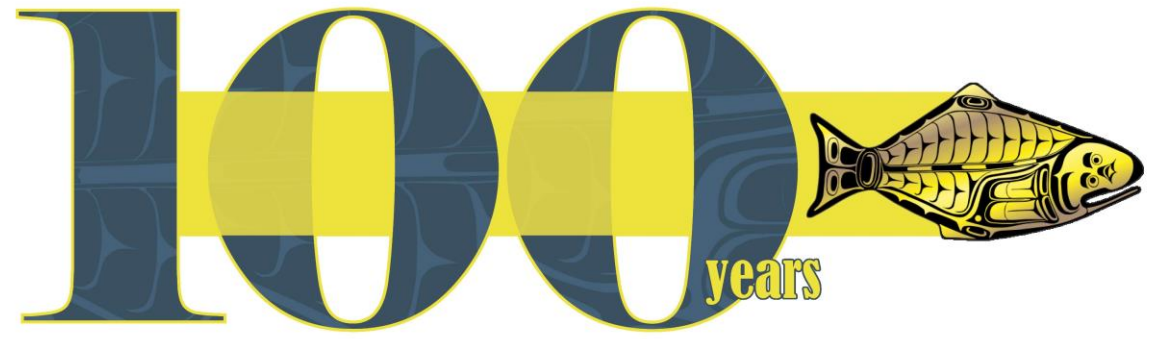
4) **ENDORSE** the use of the base block design (Figures 7 to 11 of IPHC-2024-AM100-13) for future planning or a block design with similar sampling effort as an alternative to FISS designs based on random sampling in the core of the stock.

Recommendations (cont.)

5) **ENDORSE** maintaining sufficient FISS sampling to ensure a maximum annual CV of 25% in each IPHC Regulatory Area, decreasing to 15% as financial considerations allow, and including FISS biological sampling in all Biological Regions each year.

6) **NOTE** that stock assessment and MSE simulation analyses will be conducted in 2024 to further explore the effect on annual tactical and strategic decision-making of reduced FISS designs in the future.

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