

INTERNATIONAL PACIFIC



HALIBUT COMMISSION

2025-29 FISS Design Evaluation

Agenda item: 4.2.2

IPHC-2024-SRB025-09

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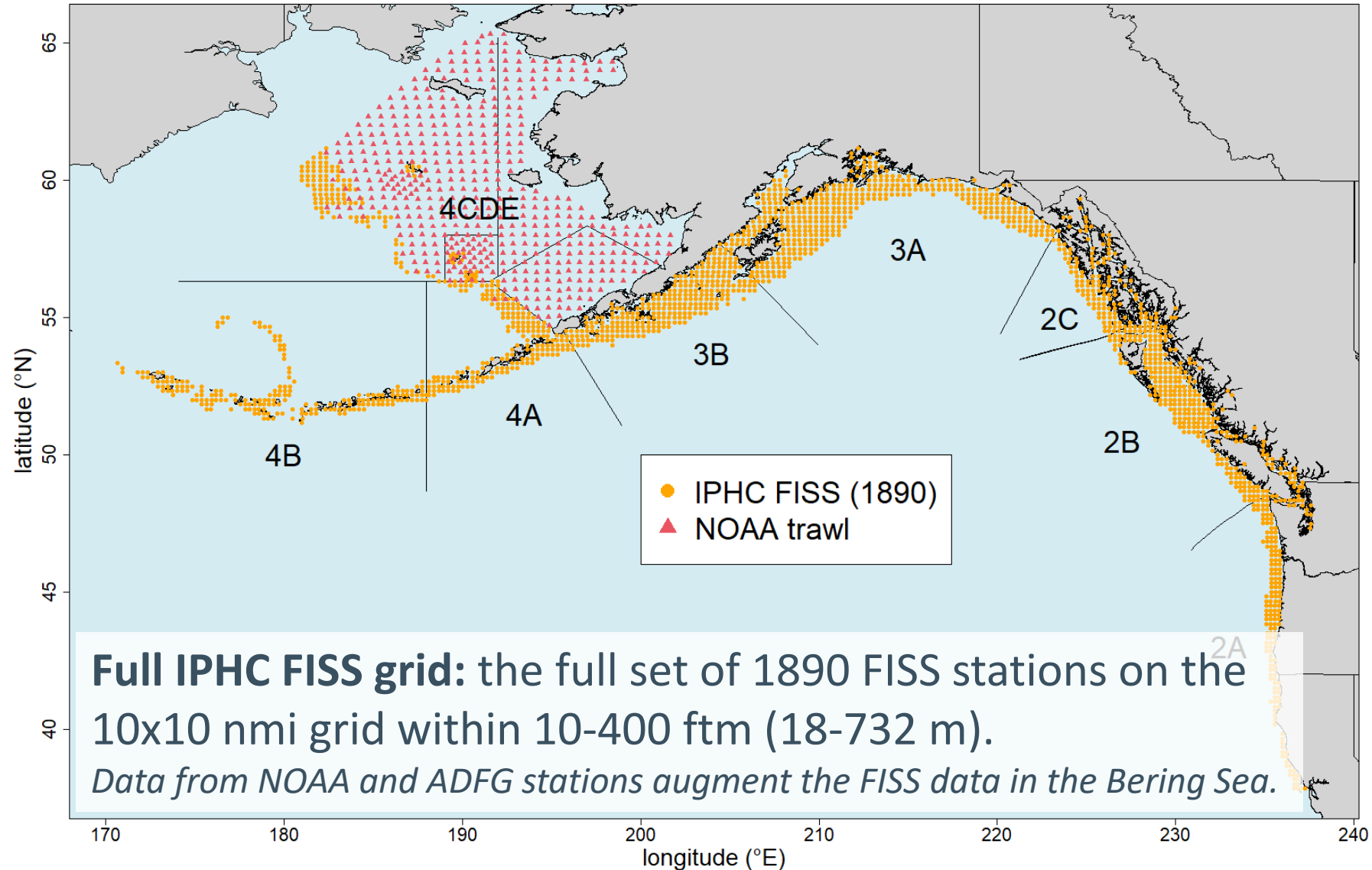


IPHC FISS

- 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



Finite survey resources

- The full FISS grid cannot be sampled each year
 - Logistically challenging and cost prohibitive
- We prioritize sampling effort based on:
 - 1. Scientific needs:**
 - Precise estimates of indices of abundance and stock distribution with low potential for bias
 - Requires more frequent sampling in areas with higher variability
 - 2. Long-term revenue neutrality:**
 - Increase effort in revenue-positive areas to offset cost of sampling low-density habitat
 - Potentially reduce effort in high-cost areas to avoid large deficits

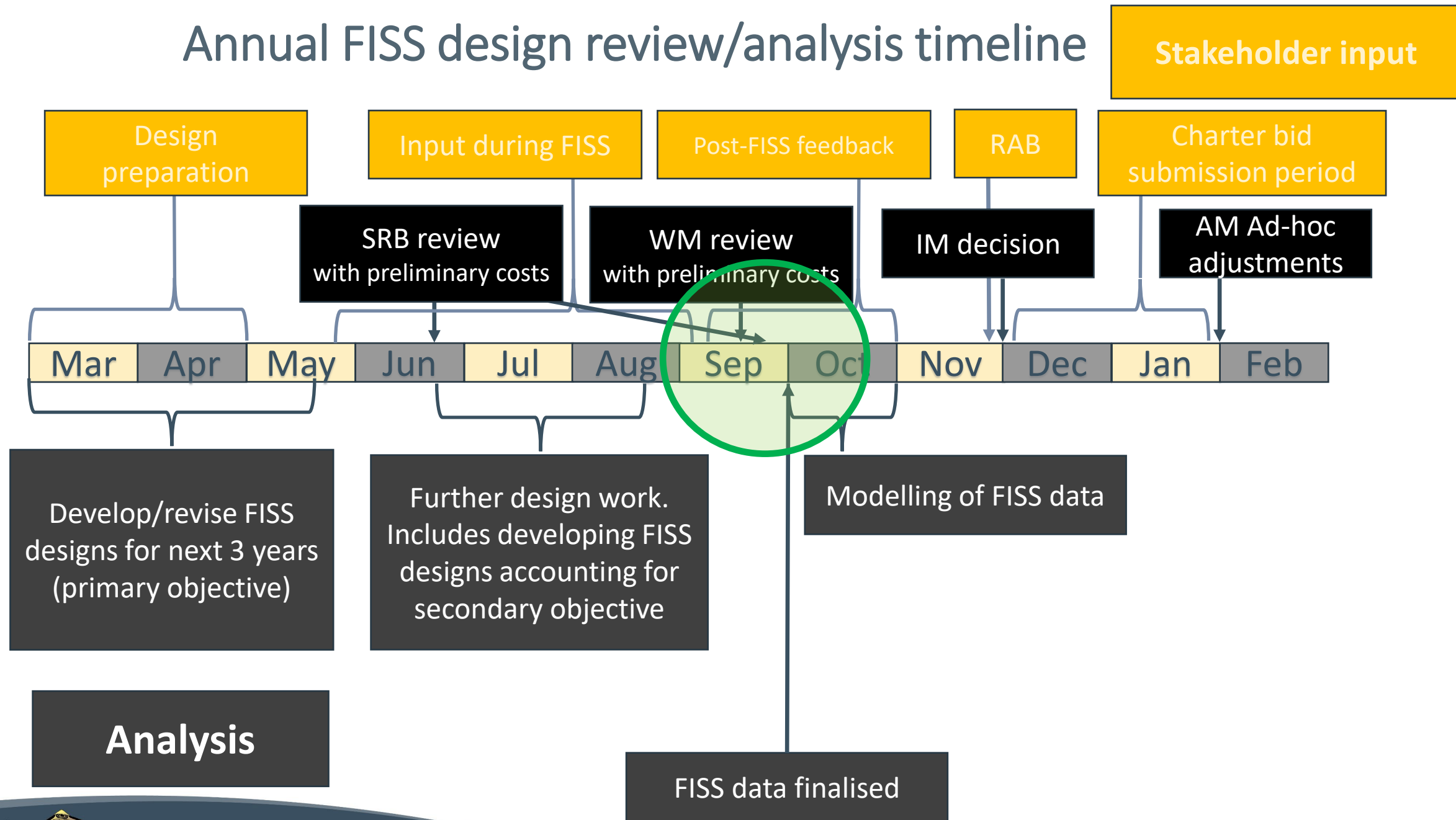


FISS objectives and design layers

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

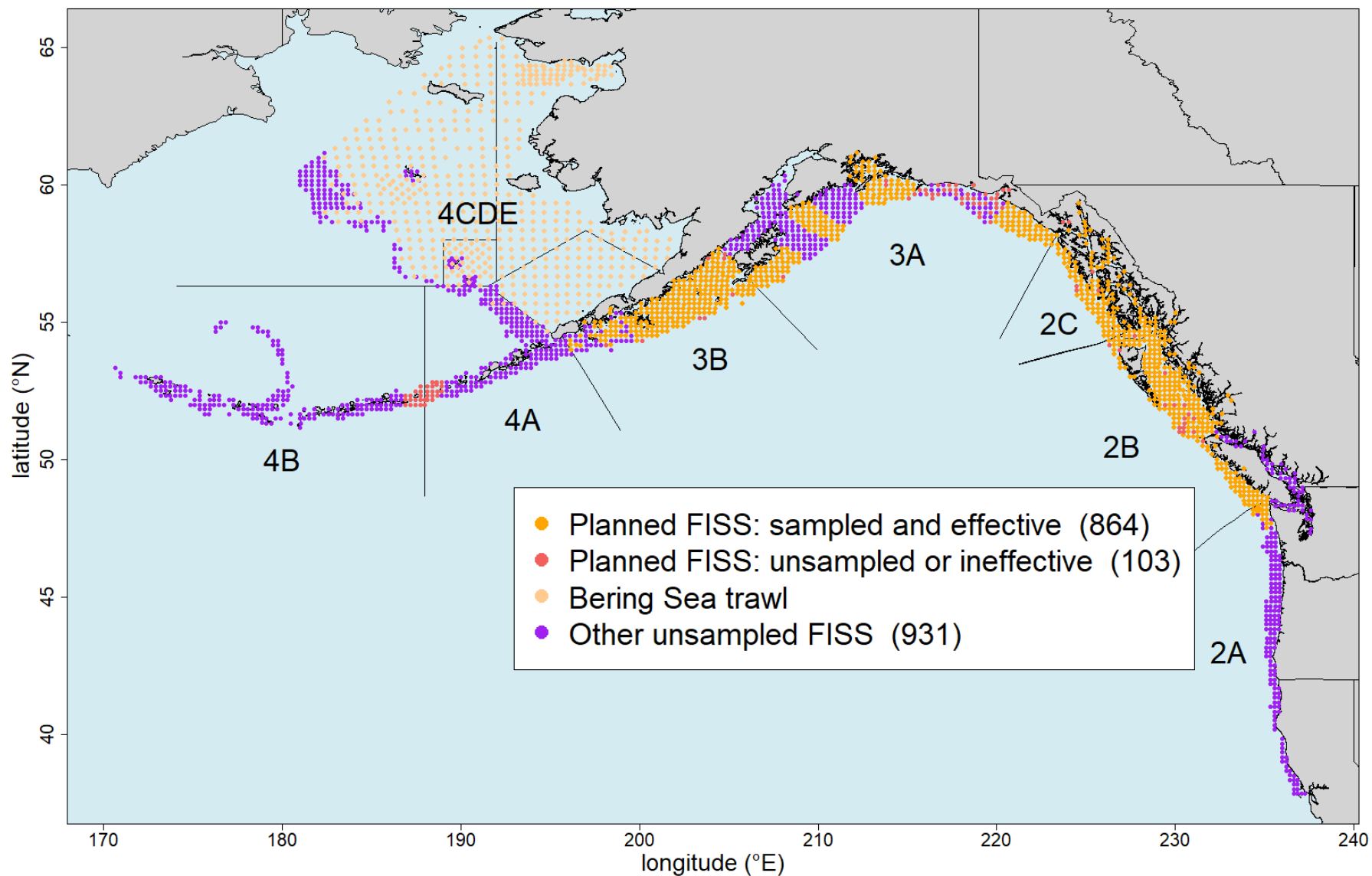


IPHC FISS 2020-24

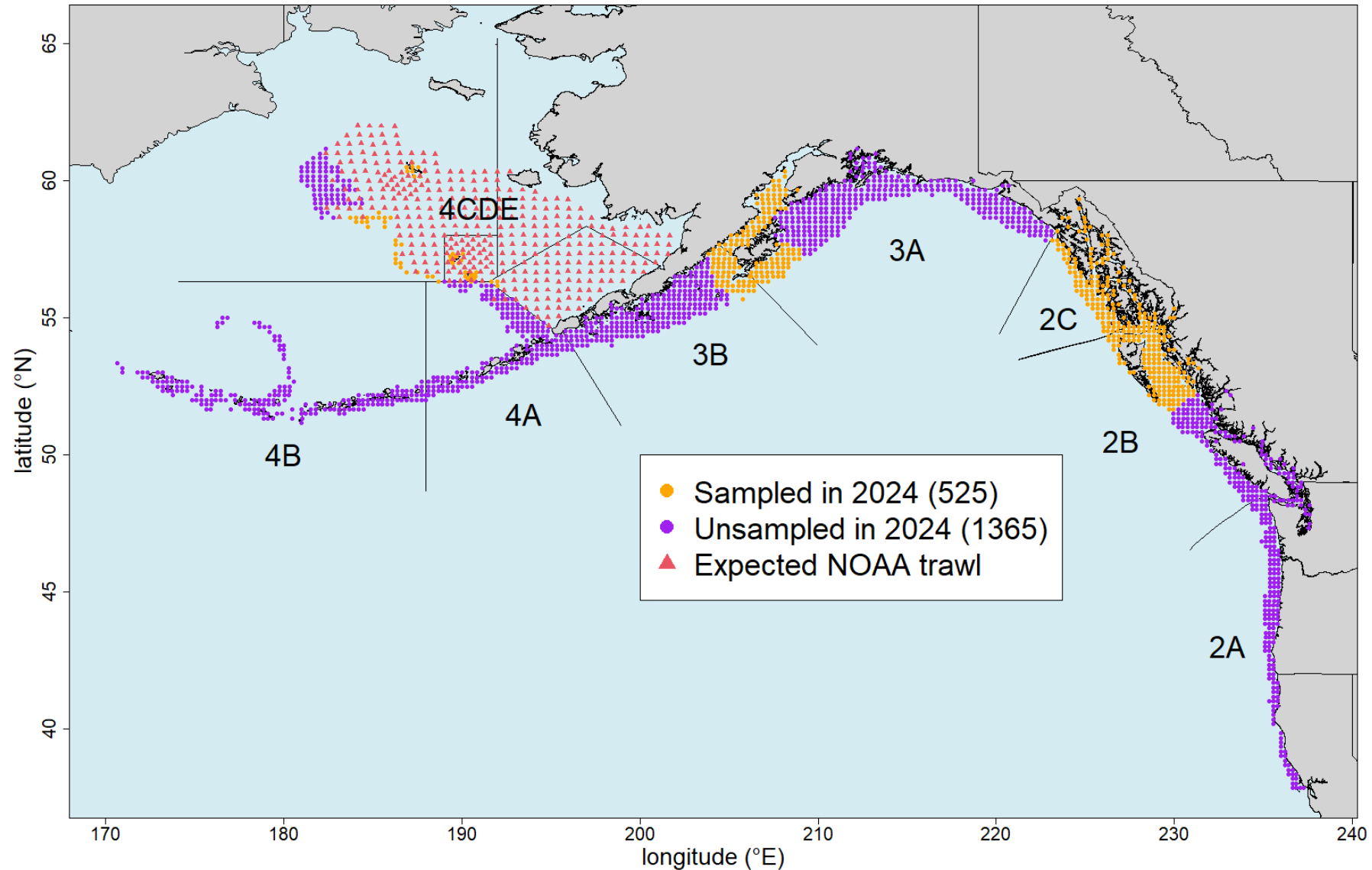
- 2020: Rationalized FISS design approved
 - Random sampling in core areas (2B, 2C, 3A, 3B)
 - Sampling of blocks of stations elsewhere prioritized to maintain precise estimates with low bias
 - FISS reduced to core areas only due to COVID19
- 2021-22: Proposed design largely implemented
 - Western 4B not sampled in 2022 due to lack of viable bids
- 2023-24: Reduced designs implemented to lower costs
 - Little sampling outside core areas in 2023, with no FISS sampling in 4A, 4B or 4CDE
 - Further reductions in 3A and 3B in 2024, but some sampling in 4CDE



Implemented 2023 design



Adopted 2024 design (with added efficiencies)



Potential designs for 2025-29

- 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, the Commission directed IPHC Secretariat 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.

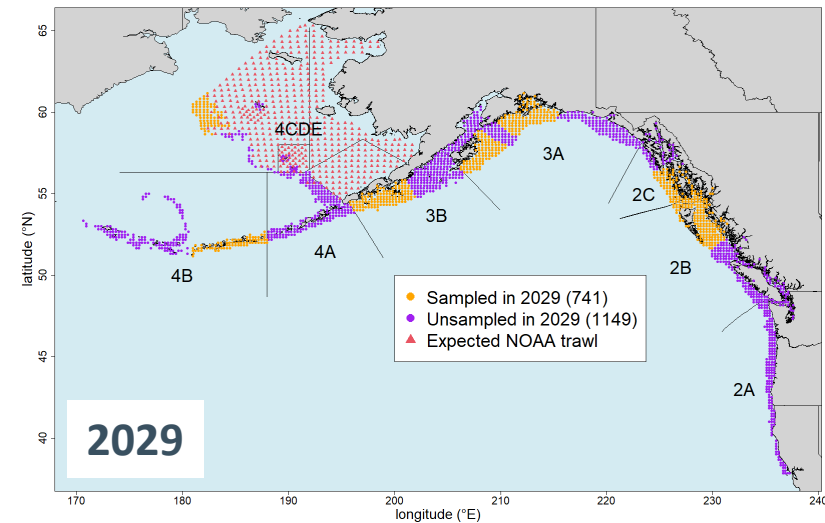
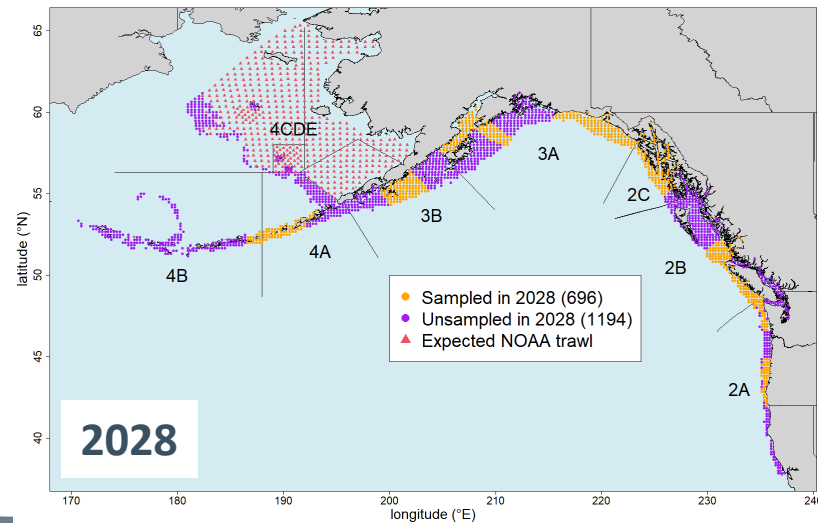
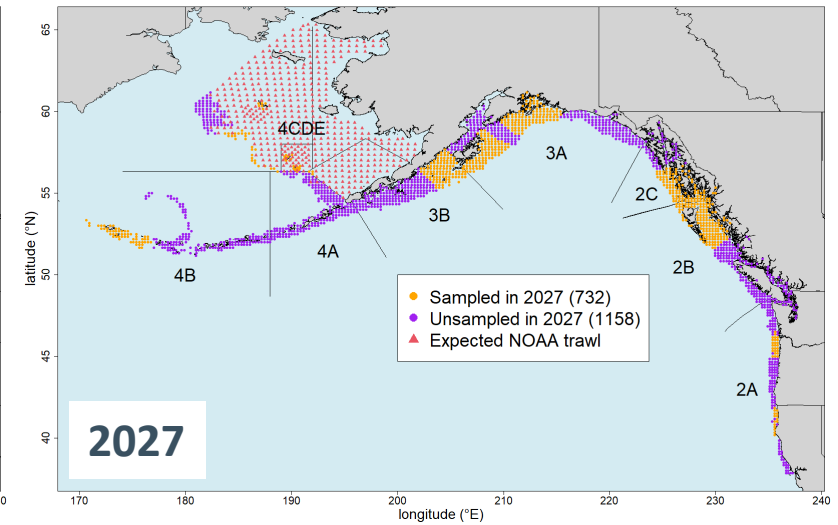
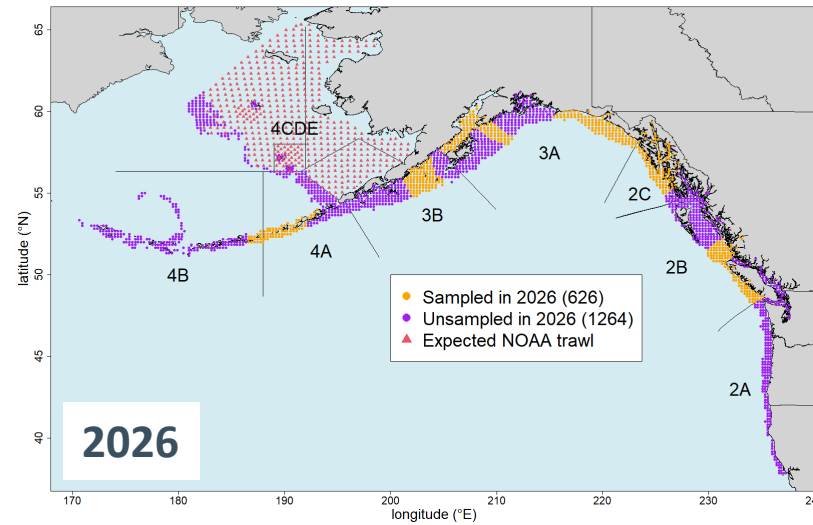
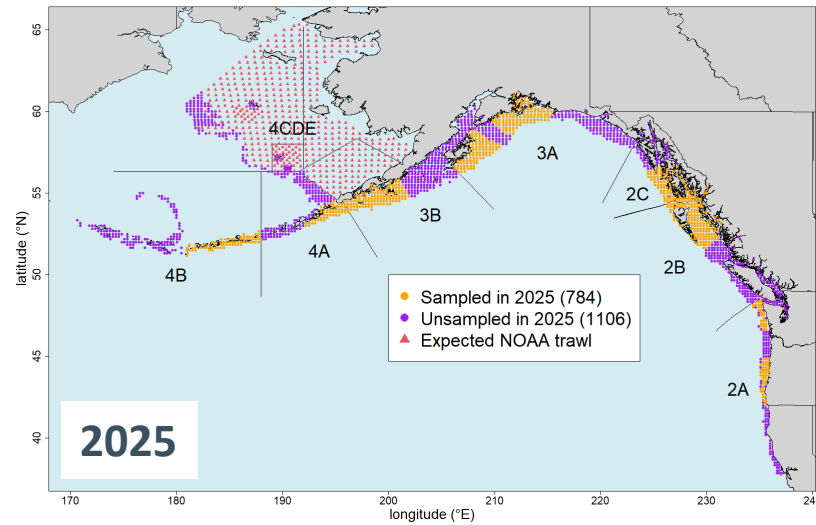


Potential designs for 2025-29

- In 2023, a **Base Block design** was evaluated for the Commission's consideration for 2024-26, and is presented here for 2025-29
 - 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.
- Not all regions that are currently revenue-positive are sampled each year
 - There is potential to increase revenue by adding such regions back into the design



Base block designs 2025-29

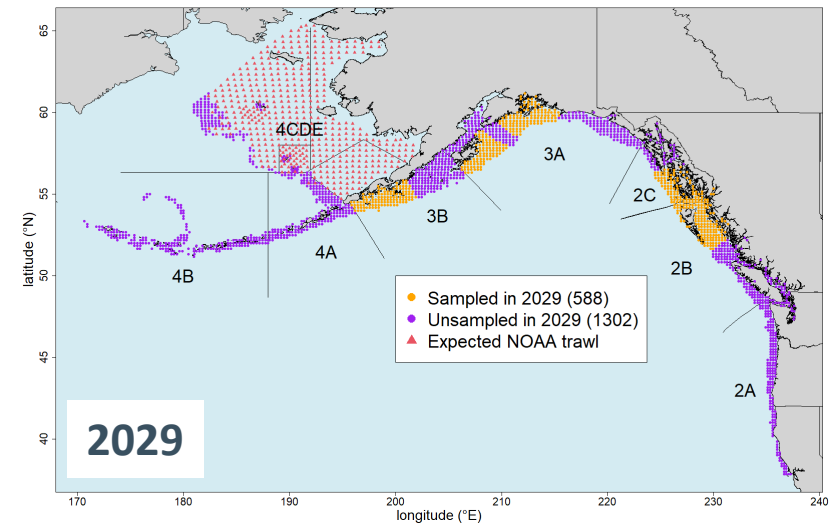
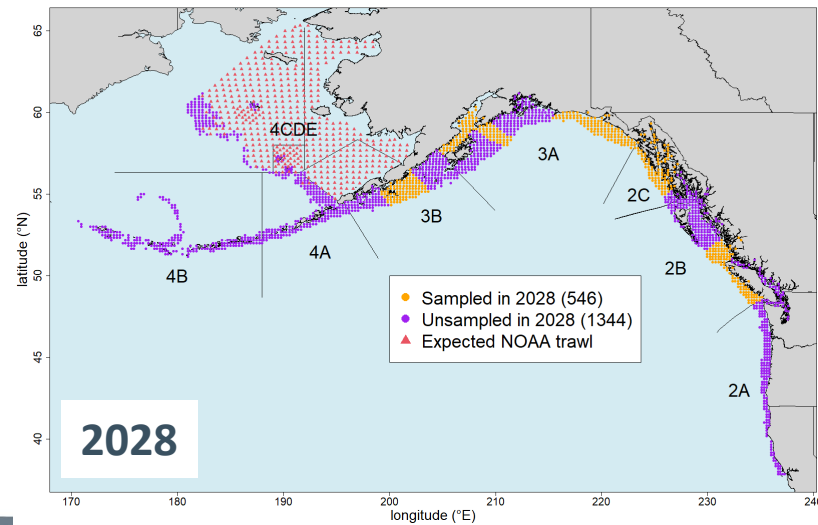
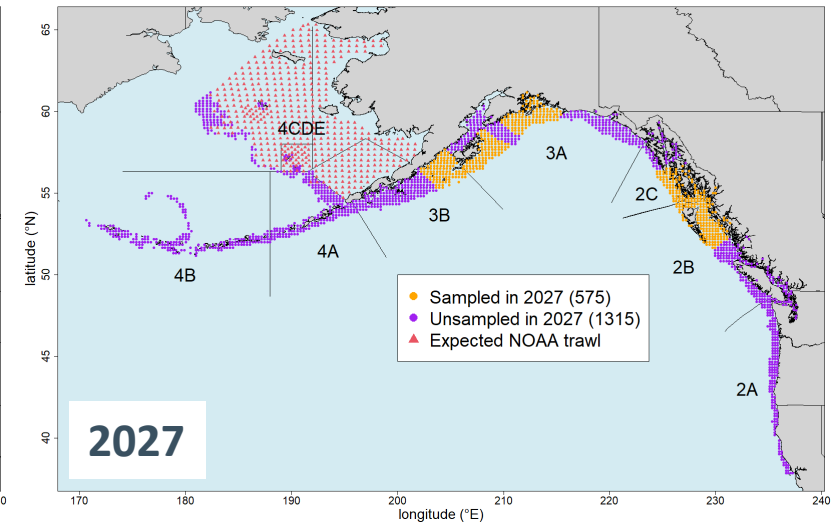
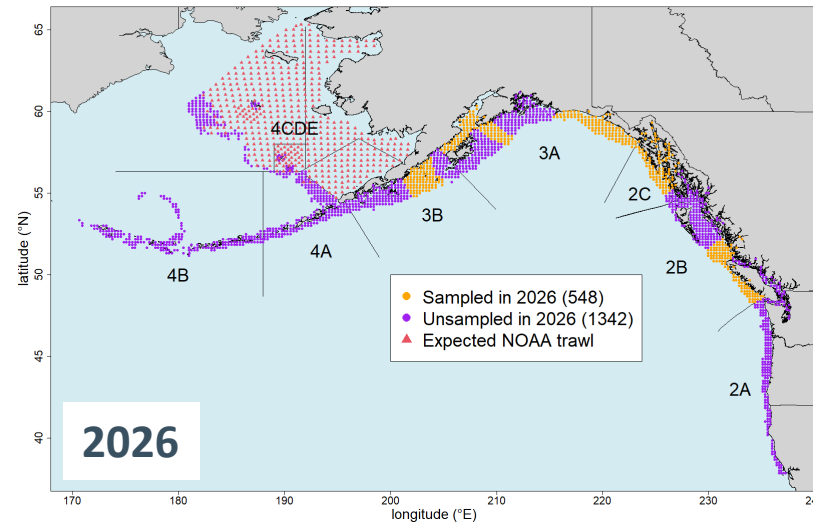
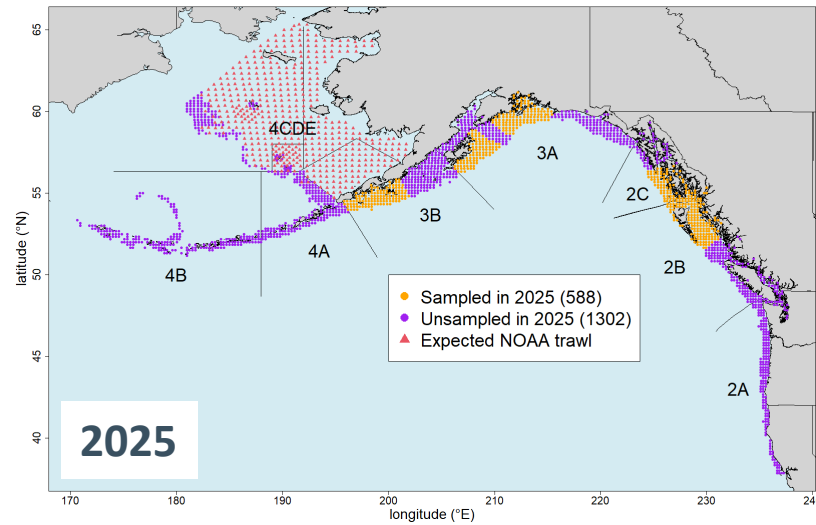


Designs that reduce net losses

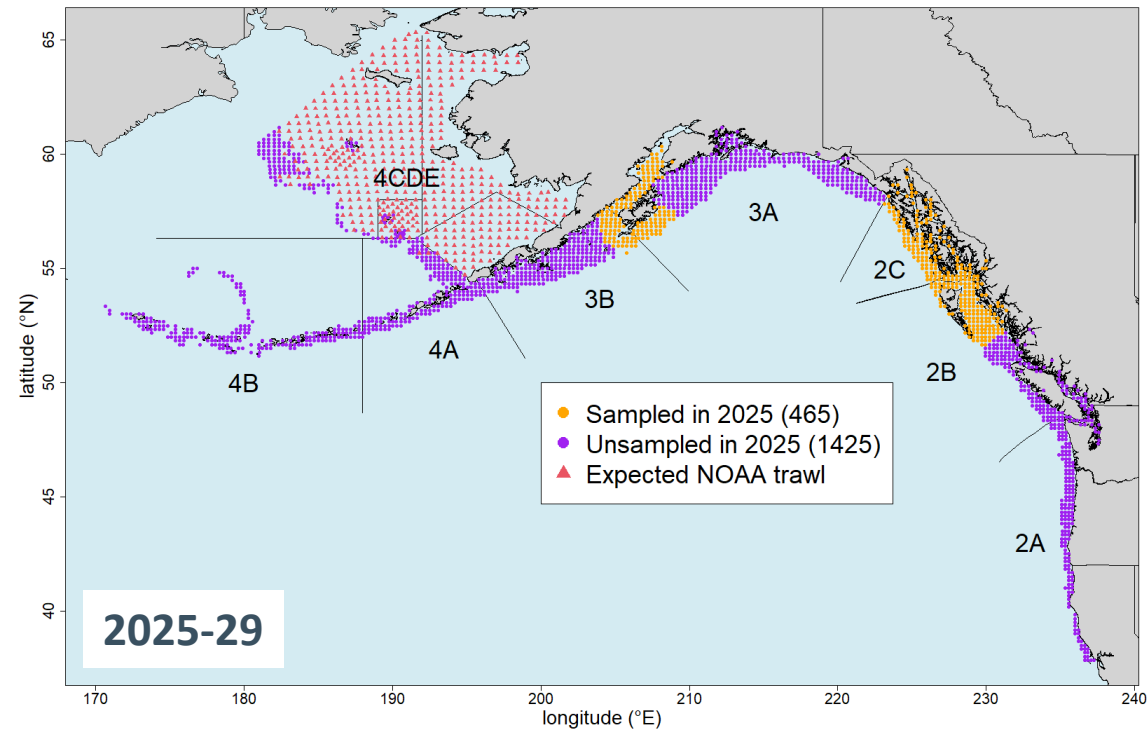
- The Base Block design is projected to result in a substantial operating loss for the FISS and would require supplementary funding
- Therefore, we compared this design with two others that would achieve lower net costs through reduced spatial coverage:
 - **Core Block design:** Maintain the same rotating block coverage in the core IPHC Regulatory as the Base Block design but remove sampling outside of the core areas.
 - Not all regions that are currently revenue-positive are sampled each year
 - **Reduced Core design:** Sample only the FISS charter regions in the core areas that are planned for 2024 as these are likely to result in relatively low net losses for the FISS overall.
 - While the more profitable charter regions will vary over time, this design is intended to be representative of similar low-coverage designs.



Core Block designs 2025-29



Reduced Core design: same design 2025-29



Evaluation of potential designs

- **Base Block design:**

- Projected terminal year CVs 25% or less for all IPHC Regulatory Areas; 15% or less for core areas (2B, 2C, 3A and 3B).
- All Biological Region CVs except Region 4B projected below 10%.
- Coastwide CV is projected to be 4% in all years.
- Therefore, this design is **projected to maintain precise estimates** of indices of Pacific halibut density and abundance across the range of the stock.
- By rotating the sampled blocks, almost all FISS stations are sampled within a 5-year period (2-3 years within the core areas) resulting in **a low risk of large bias** in estimates of trend and stock distribution.



Evaluation of potential designs

- **Core Block design:**

- Projected terminal year CVs of 15% or less for core areas (2B, 2C, 3A and 3B).
- CVs rapidly increasing to 31-44% by 2027 for 2A, 4A and 4B.
- This also leads to increasing CVs in Biological Regions 4 and 4B.
- This design is **not projected to maintain precise estimates** of indices of Pacific halibut density and abundance outside the core of the stock.
- With a large proportion of the stock unsampled for 2025-27, **the risk of bias also increases over time** in unsampled areas and regions, as well as coastwide.
 - Bias expected in age composition information, as well as stock trend and distribution estimation



Evaluation of potential designs

- **Reduced Core design:**

- Projected terminal year CVs of 10% or less in 2B and 2C
 - These are the only areas with spatially extensive sampling
- CVs increasing annually to 15 and 26% by 2027 in 3A and 3B due to limited sampling.
- CVs rapidly increasing to 33-44% by 2027 for 2A, 4A and 4B.
- Leads to steadily increasing coastwide CVs and for all IPHC Biological Regions except Region 2.
- This design is **not projected to maintain precise estimates** of indices of Pacific halibut density and abundance outside of Region 2.
- **Very high risk of bias** in coastwide and regional estimates of density and distribution due to very large unsampled proportion of the stock.
 - Bias also expected in age composition information



Preliminary net revenue projections for 2025

Assumptions:

1. Designs are optimized for numbers of skates, with 4, 6 or 8 skate-sets used, depending on projected catch rates and bait costs.
2. 2025 Pacific halibut price and catch rates decline by 5% per year from those used to develop the 2024 design.
3. Chum and pink salmon bait each continue to be used on approximately 50% of the stations and prices remain similar to those for 2024.

Design	With Seacat*	Without Seacat
Base Block	-\$2,539,000	-\$2,399,000
Core Block	-\$1,741,000	-\$1,641,000
Reduced Core	-\$1,344,000	-\$1,264,000

* For oceanographic monitoring



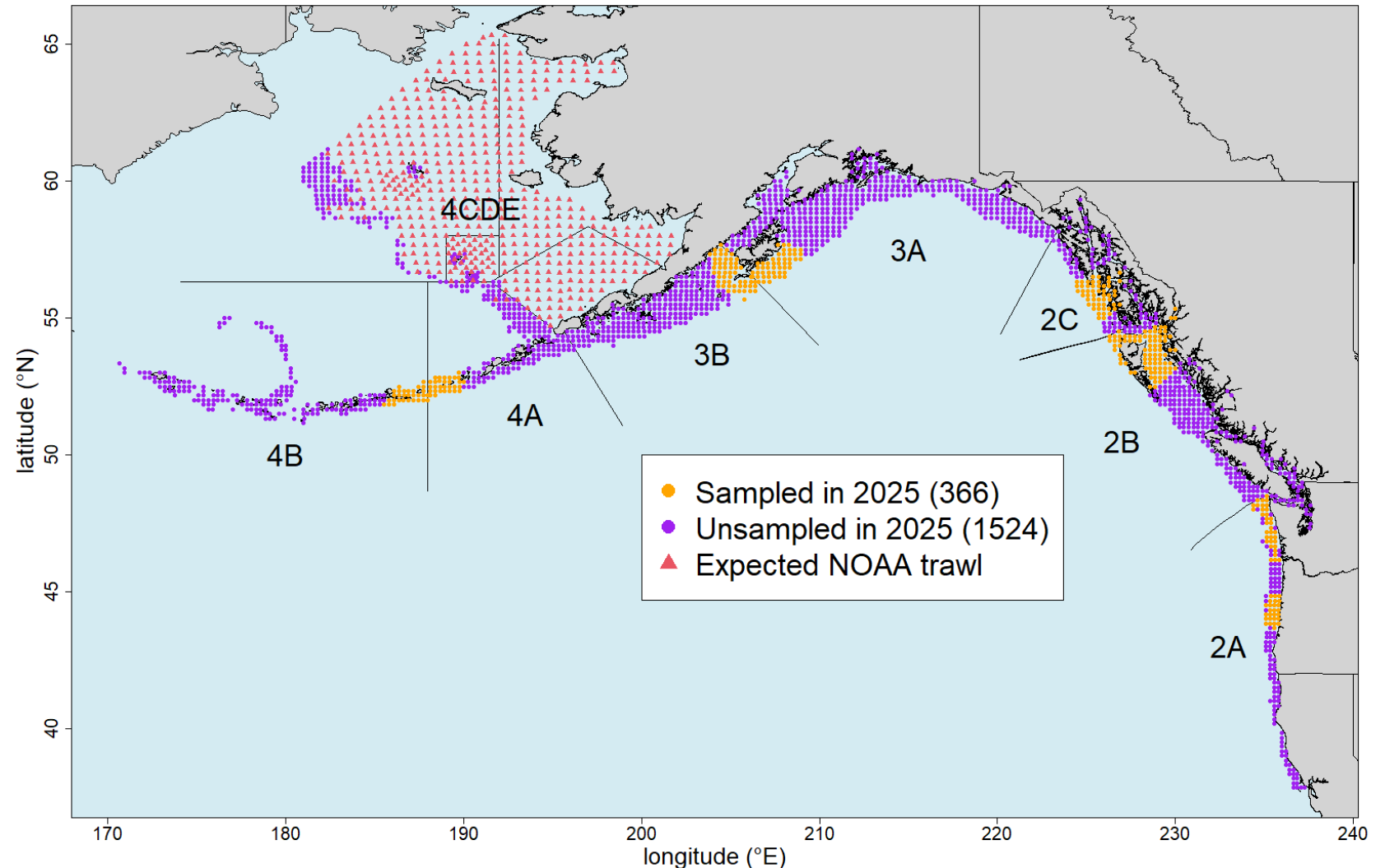
Discussion

- Like the adopted 2024 FISS design, the **Core Block and Reduced Core designs** will result in less information available for the annual stock assessment and management supporting calculations such as stock distribution than in years prior to 2024:
 - The increased uncertainty in the index of abundance is likely to cause the assessment model to rely more heavily on the commercial fishery catch-per-unit-effort index.
 - Limited biological information from Biological Region 3 makes it unclear whether the stock assessment will detect a major change in year class abundance.
 - Basic stock assessment methods can remain unchanged, but a greater portion of the uncertainty in stock trend and demographics will not be quantified due to missing FISS data from a large fraction of the Pacific halibut stock's geographic range.
 - The implications for the assessment would be of increasing concern if Core Block or Reduced Core designs were implemented beyond 2025 due to increasing uncertainty and risk of bias in stock trend estimates and the unrepresentativeness of the biological samples.
 - Reduced stakeholder confidence in the FISS results and in the aggregate scientific information from the stock assessment (as was already evident at AM100) will result from FISS designs that do not fully inform stock distribution with annual sampling in all IPHC Regulatory areas.



Starting design for 2025

- One charter region in each of 2B and 2C
 - Projected to reduce losses relative to no FISS
- One charter region in each of 3A and 3B
 - Maintains some sampling in Region 3
- 60 stations in each of 2A and 4A/4B covered by supplementary funding
- Commissioners will also be presented with a series of optional charter regions and their costs in case additional funding becomes available



Discussion

- Preliminary 2025 FISS cost projections account for continued increased costs and decreased catch rates.
 - Note that the preliminary projections will be revised once all 2024 information has been compiled.
- These changes have further elevated the need for supplementary funding for the long-term viability of the FISS under all stock and market conditions.
- The Secretariat is developing a design for fecundity sampling in autumn 2024 (near the spawning season) for comparison with summer samples:
 - A top priority in the current five-year research plan.
 - Expected to generate additional revenue to offset losses incurred on the 2024 FISS.



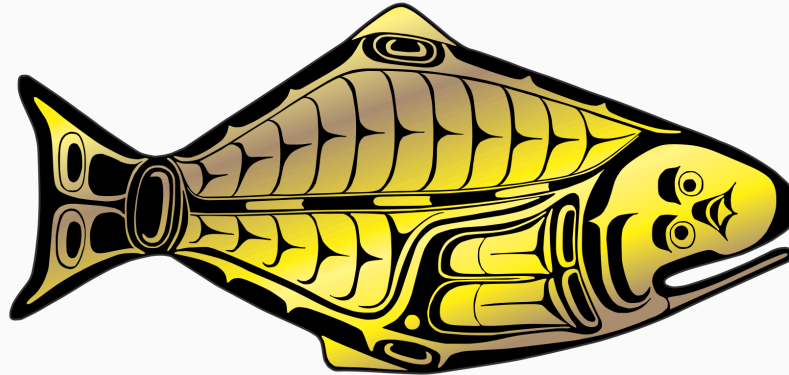
Recommendation

That the SRB:

1) **NOTE** paper IPHC-2024-SRB025-09 that presents potential FISS design options for 2025-29 and preliminary cost evaluations of potential 2025 designs. Secretariat staff request that the SRB provide scientific guidance to the Commission regarding the design options to assist Commission decision making for the FISS in 2025 and subsequent years.



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Projected coefficients of variation* (CVs)

Regulatory Area	Base Block			Core Block			Reduced Core		
	2025	2026	2027	2025	2026	2027	2025	2026	2027
2A	17	22	23	29	29	31	29	31	34
2B	8	10	7	8	10	7	9	9	9
2C	6	6	6	6	6	6	5	5	5
3A	9	7	7	9	7	7	11	13	15
3B	13	12	15	13	12	15	19	21	26
4A	19	13	20	26	29	33	28	31	33
4B	15	20	18	35	39	44	35	39	44
4CDE	8	8	8	8	9	9	8	9	9
Biological Region									
Region 2	5	6	5	5	6	5	5	5	6
Region 3	7	7	8	7	7	8	10	12	14
Region 4	8	7	9	11	12	14	11	14	15
Region 4B	15	20	18	35	39	44	35	39	44
Coastwide	4	4	4	5	5	6	6	7	8

