INTERNATIONAL PACIFIC HALIBUT COMMISSION

2025 and 2026-29 FISS Designs

Agenda item: 8.1

IPHC-2025-AM101-14

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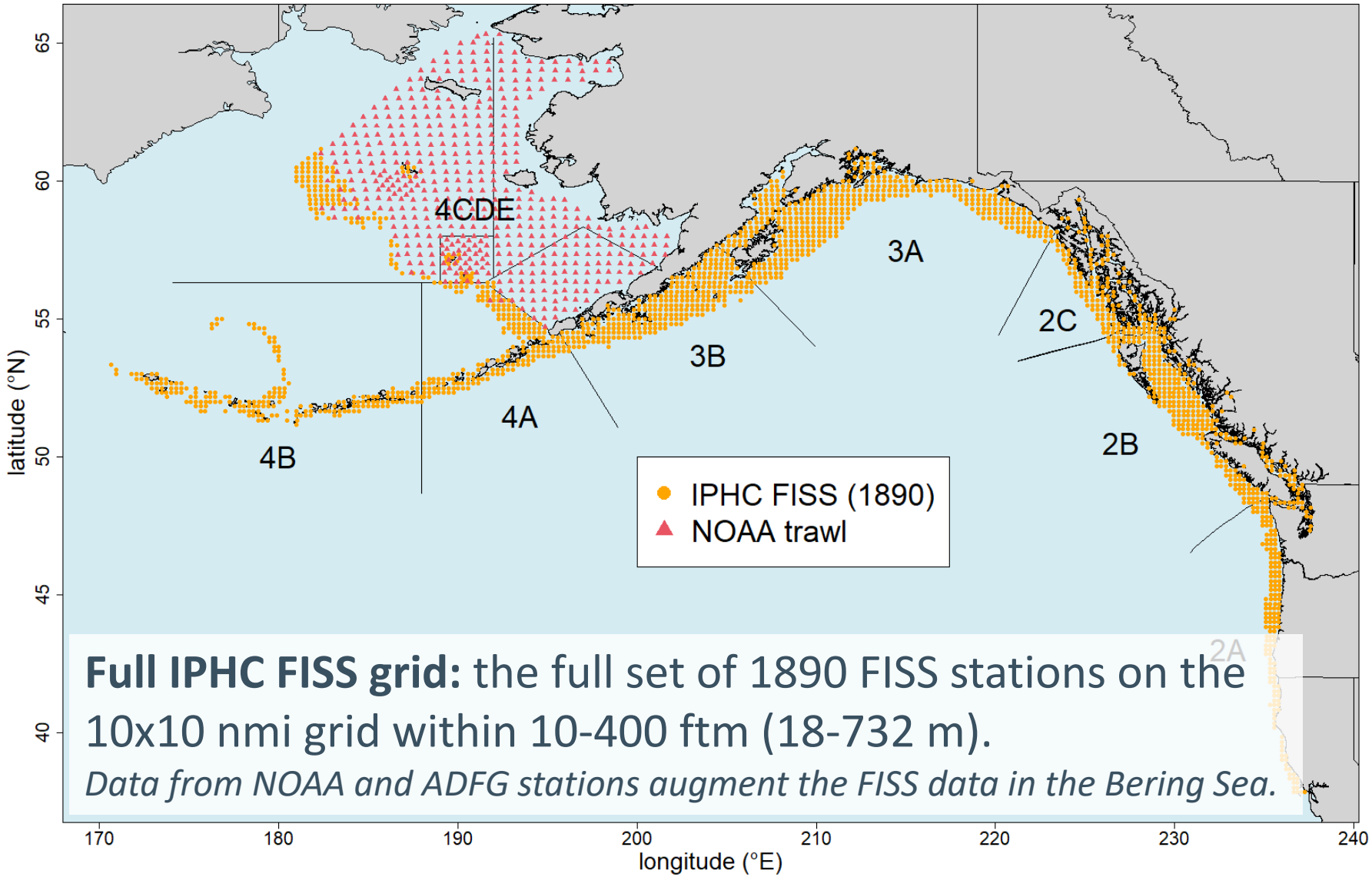
IPHC FISS

- 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



Full IPHC FISS grid: the full set of 1890 FISS stations on the 10x10 nmi grid within 10-400 ftm (18-732 m).

Data from NOAA and ADFG stations augment the FISS data in the Bering Sea.

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 or greater density
  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 Pacific halibut for stock assessment and stock distribution estimation	Minimum sampling requirements in terms of: • Station distribution • Station count • Skates per station
Secondary	Long term revenue neutrality	Logistics and cost: operational feasibility and cost/revenue neutrality
Tertiary	Minimize removals, and assist others where feasible 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

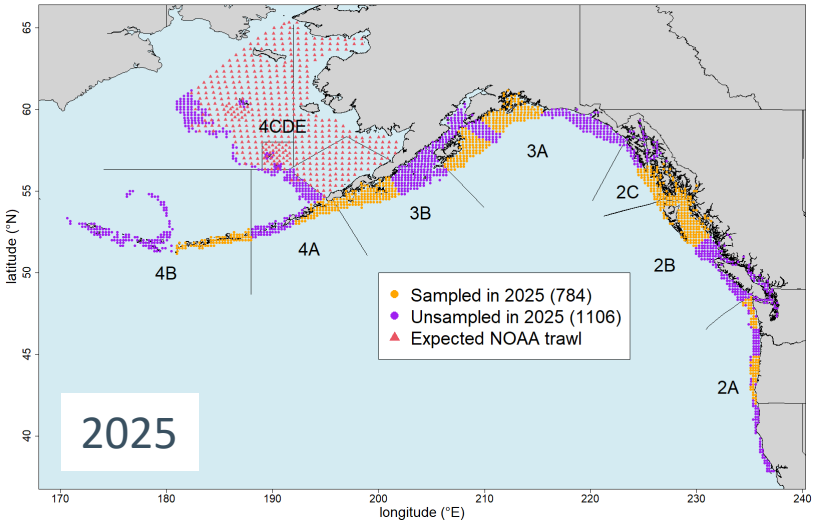
Background to 2025 design

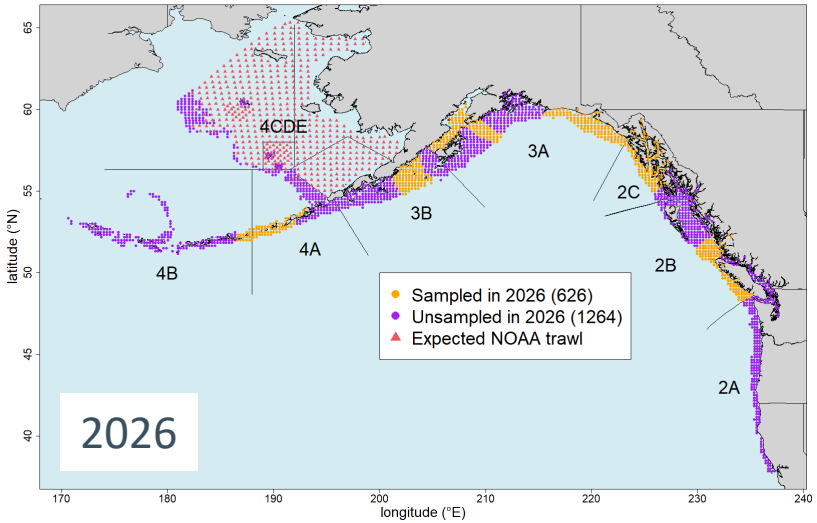
- In recent years, financial constraints due to reduced catch rates, lower sales prices and higher costs have led to the implementation of FISS designs with reduced spatial footprints (IPHC-2024-SRB024-06).
- FISS effort has been concentrated in IPHC Regulatory Areas 2B, 2C, 3A and 3B, with limited sampling in other areas in 2023-24.
- In 2024, only a relatively small proportion of stations was fished in IPHC Regulatory Areas 3A and 3B.

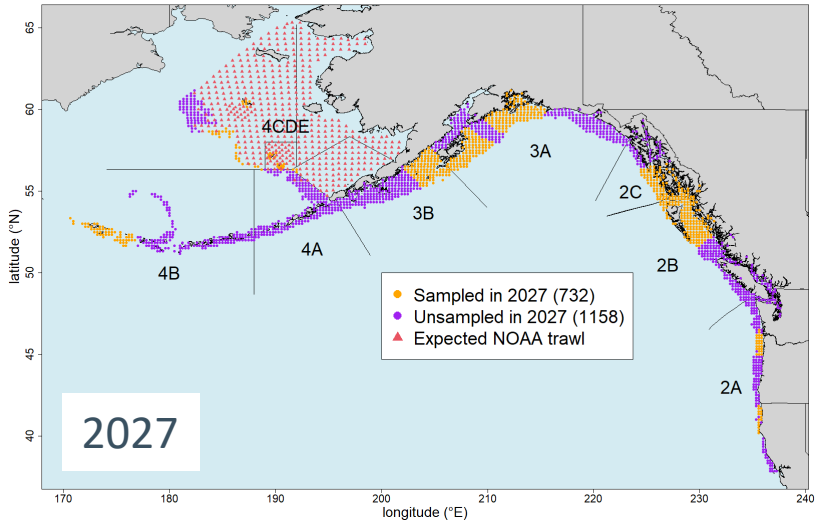
Optimal five-year rotational design

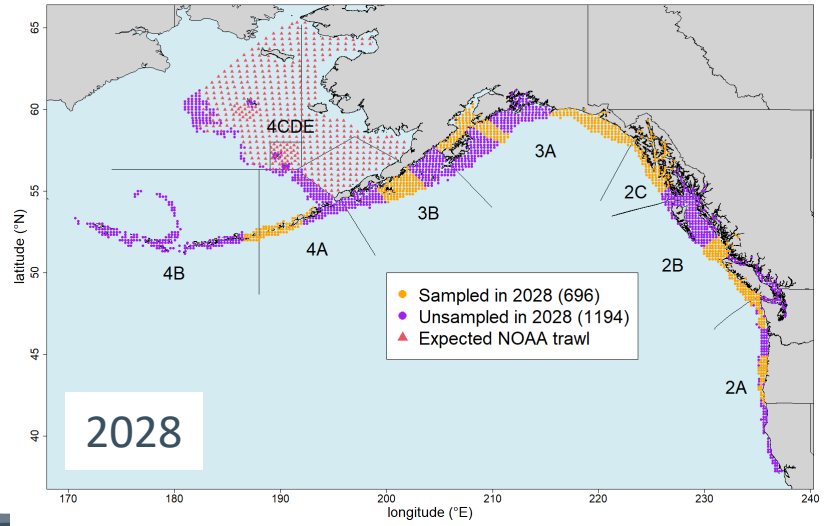
- During 2024, a **Base Block design** was presented to Commissioners for 2025-29
  - Prioritizes some annual sampling in each Biological Region for stock assessment purposes.
  - Ensures all charter regions in the core of the stock (2B, 2C, 3A and 3B) are sampled over a three-year period, resulting in CVs for abundance indices of no more than 15%
  - Coverage in other areas is prioritized to minimize bias potential and maintain CVs below 25%
- The sampled blocks (charter regions) are rotated over time.
- 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.
- The Secretariat believes that this design provides a strong scientific basis for all Commission analyses, while minimizing costs to the degree possible.

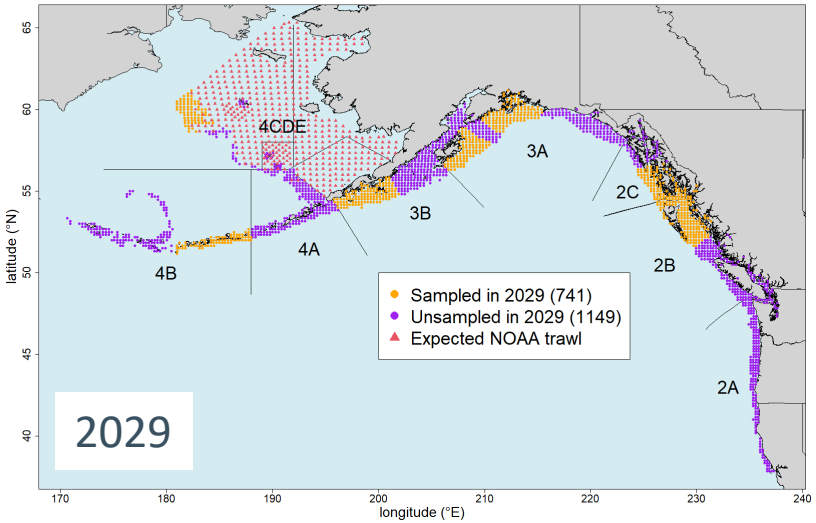
Base block designs 2025-29





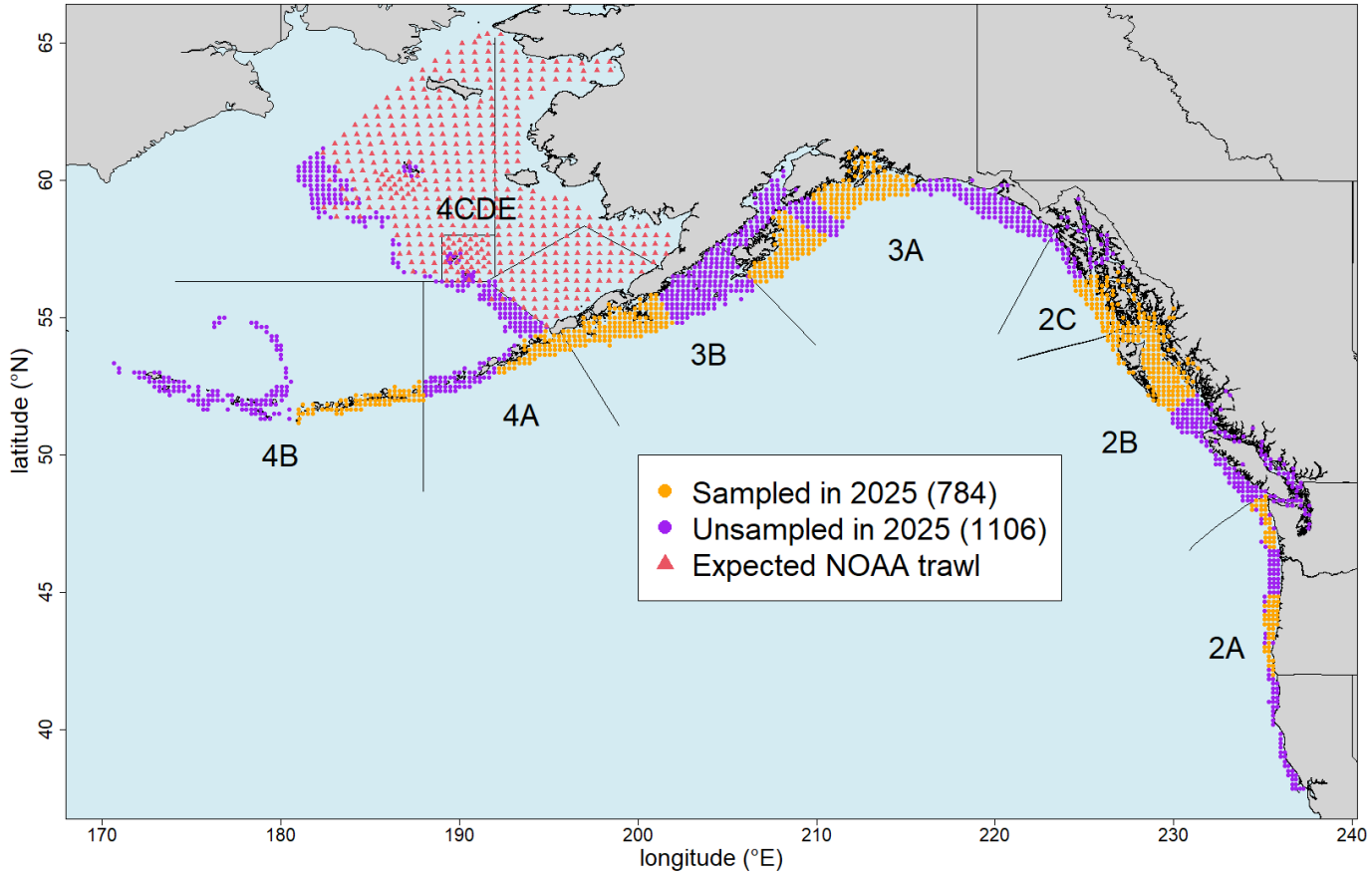






2025 Base Block Design

- The 2025 Base Block Design was projected to result in a net loss of around US$2 million and was therefore not considered fiscally viable (IPHC-2024-SS014-03).



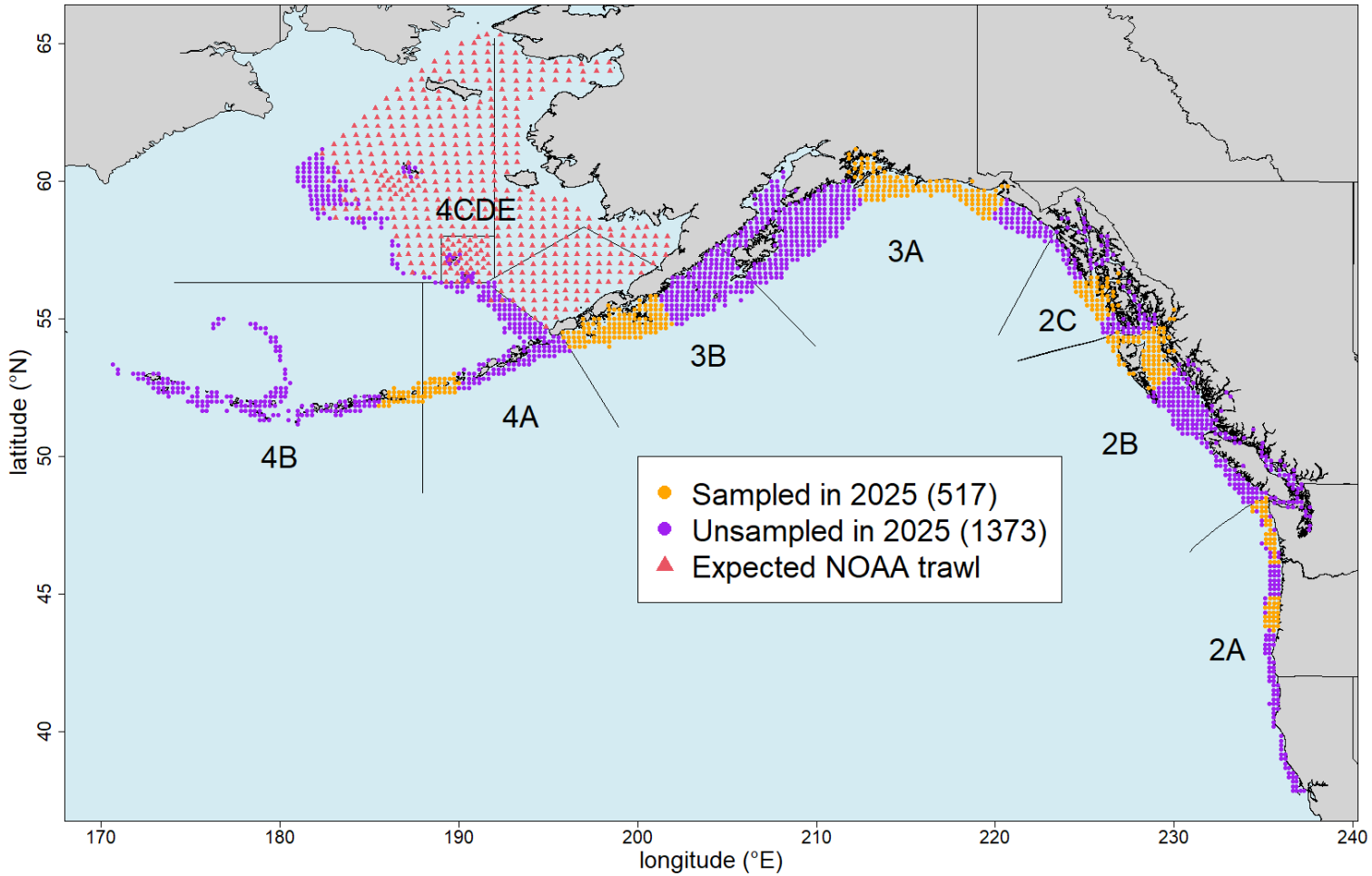
Commission decision for 2025 FISS

- At SS014, the Commission tentatively decided on a 2025 FISS:
  - One charter region in each of 2B and 2C
  - 60 stations in each of 2A and 4A/4B, covered by supplementary funding
  - Two charter regions in each of 3A and 3B, each previously sampled in 2022-23, and selected to reduce the bias risk over the short term
- The projected deficit is to be covered by a transfer from the IPHC Reserve Fund of $1,000,000.

Commission decision for 2025 FISS

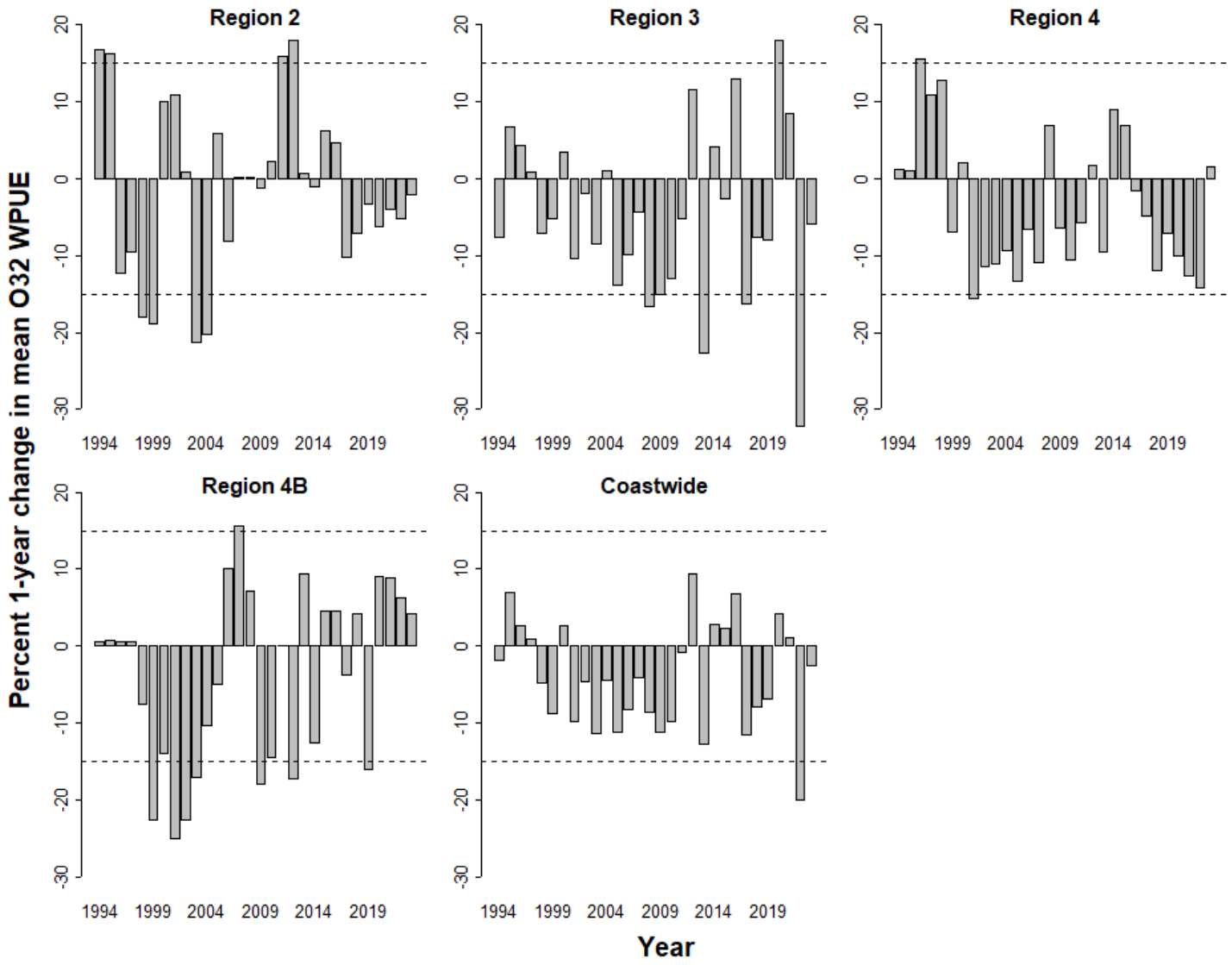
The Commission subsequently made a final decision via inter-sessional agreement (IPHC-2024-CR-030 and IPHC-2024-CR-031).

Implementing this design depends on successful recruitment of charter vessels.



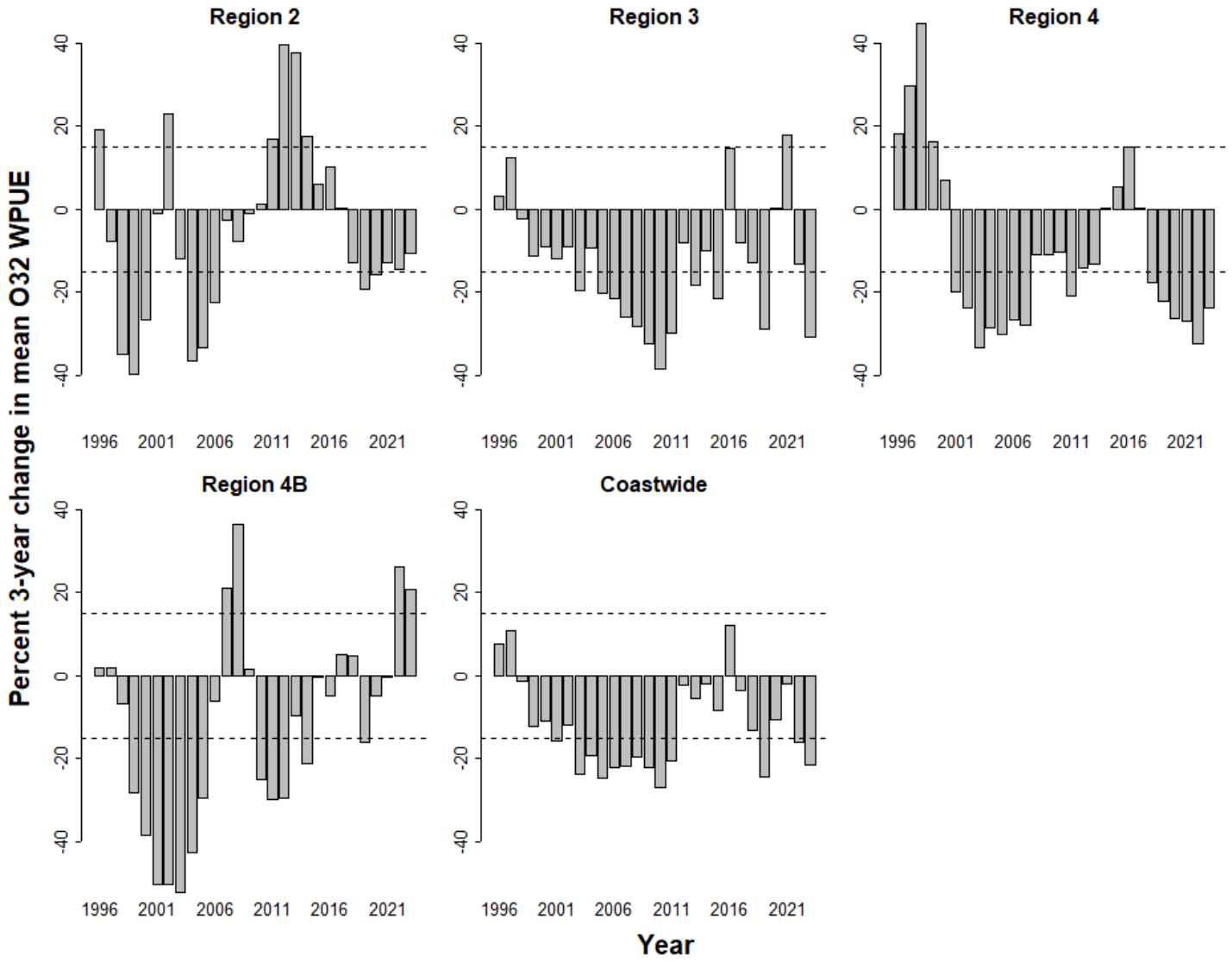
The potential for bias resulting from reduced FISS designs

Indices of Pacific halibut density can change by large amounts over short periods, with annual changes of 15% or more regularly observed at the level of Biological Region and Regulatory Area.



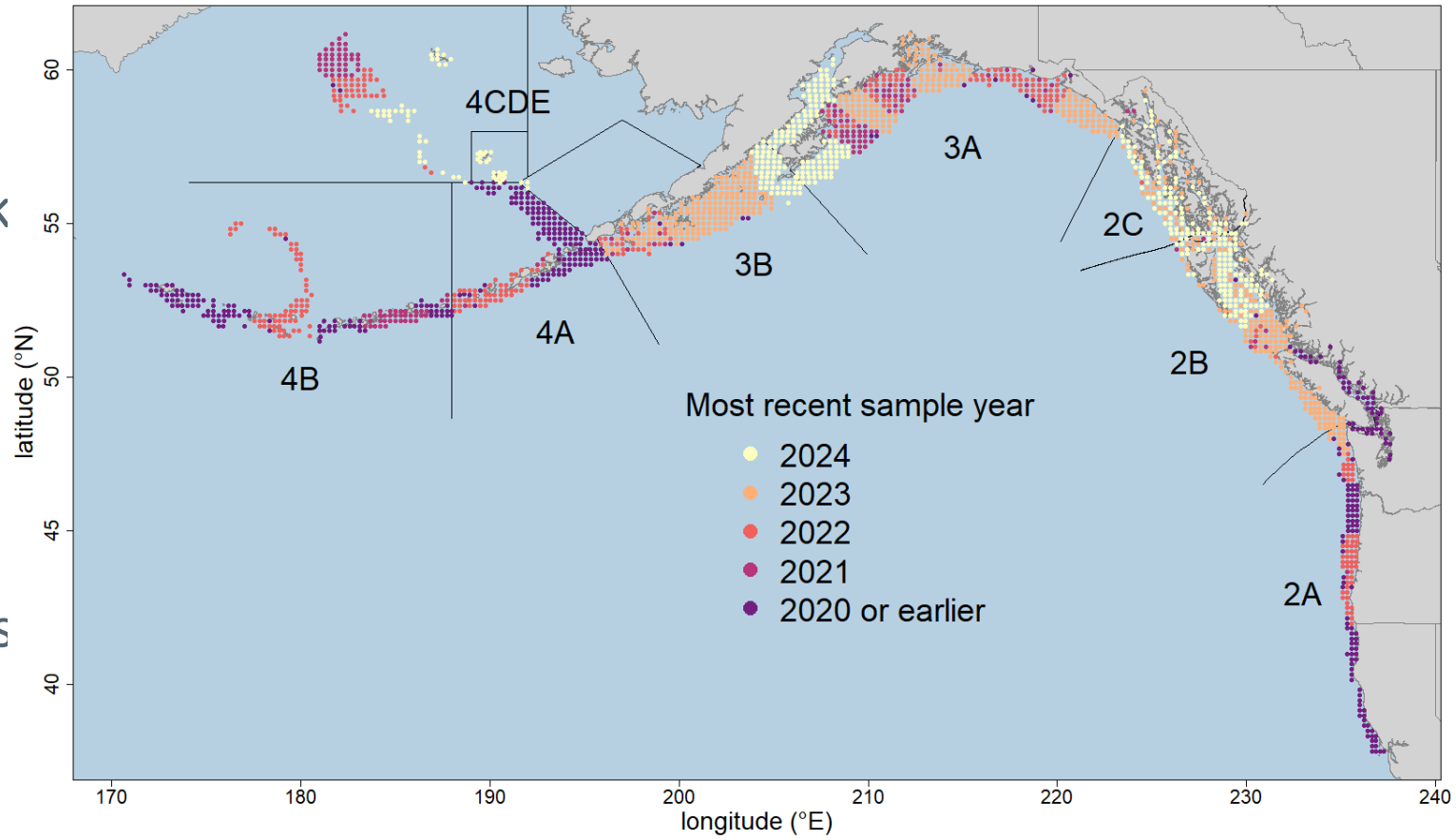
Bias potential (cont.)

Over a **three-year period**, large changes in indices of density are the norm, including at the coastwide level.



Bias potential (cont.)

- Lack of sampling or low spatial coverage in an area or region means such changes are fully or largely unobserved, leading to biased estimates of indices, stock trends and stock distribution.
- Designs such as that implemented in 2024 and the design approved for 2025 have high potential for bias in area, regional and coastwide estimates
  - Note that 2025 will be the second or third year with reduced FISS coverage for much of the stock.



Bias potential (cont.)

- The approved FISS design will result in 63% of habitat being covered by either IPHC FISS or NOAA trawl sampling in 2025
- With this coverage and observed levels of change shown in previous slides, **we could expect coastwide indices of abundance to have bias of up to +/-13% following the 2025 FISS**.
- However, **bias could be much higher in Biological Regions 3 and 4B**, which will have had lower levels of sampling than the coast as a whole for two or more years following completion of the 2025 FISS design.
- We note that if the Base Block design is implemented annually after 2025, FISS coverage over 2026-27 is expected to be sufficient to reduce the potential amount of bias to low levels in each Biological Region.

Bias in stock assessment

- Recent simulation analyses explored the effect on stock assessment results of a cumulative bias in the FISS index of 15% over the upcoming period from 2025-2027 (IPHC-2024-SRB025-06).
- If the true FISS trend was a 15% decrease, but due to a reduced design the FISS index was estimated to be flat over this same period, resulting estimates would be biased:
  - 2-3% overestimate of spawning biomass
  - 1% overestimate of SPR (underestimate of fishing intensity)
  - 9% underestimate of the probability of stock decline in 2028
- To account for a 9% underestimate of the probability of stock decline, the coastwide TCEY would need to be reduced by about 4 million pounds, or around US$24 million in landed catch.
- Thus, accounting for potential bias in management decisions could have a significant impact on short-term fishery yields and revenue.

Recommendation

That the Commission **NOTE** paper IPHC-2025-AM101-14 that reviews an optimal long-term FISS design and the approved 2025 FISS design, and discusses the potential for biases that may result from non-optimal designs.

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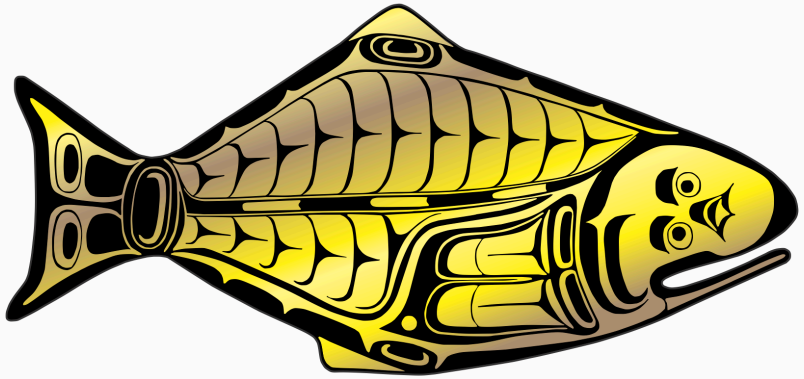

HALIBUT COMMISSION

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