Collecting Rockfish Data in a Cooperative Survey to Improve Assessment Models in the Gulf of Alaska

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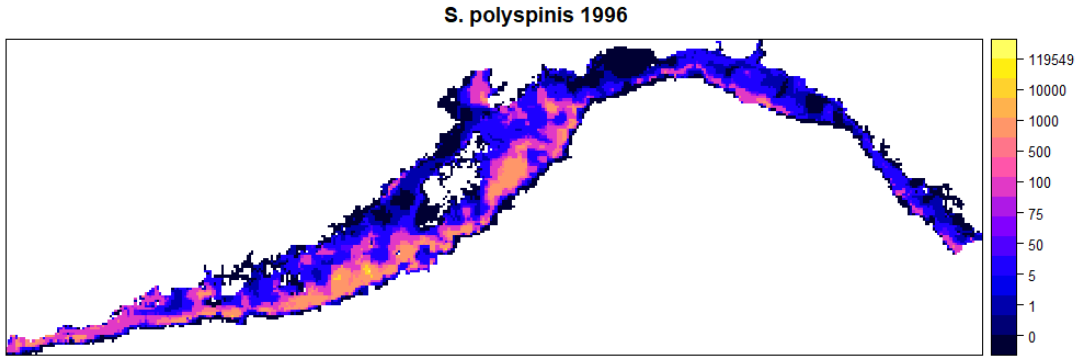
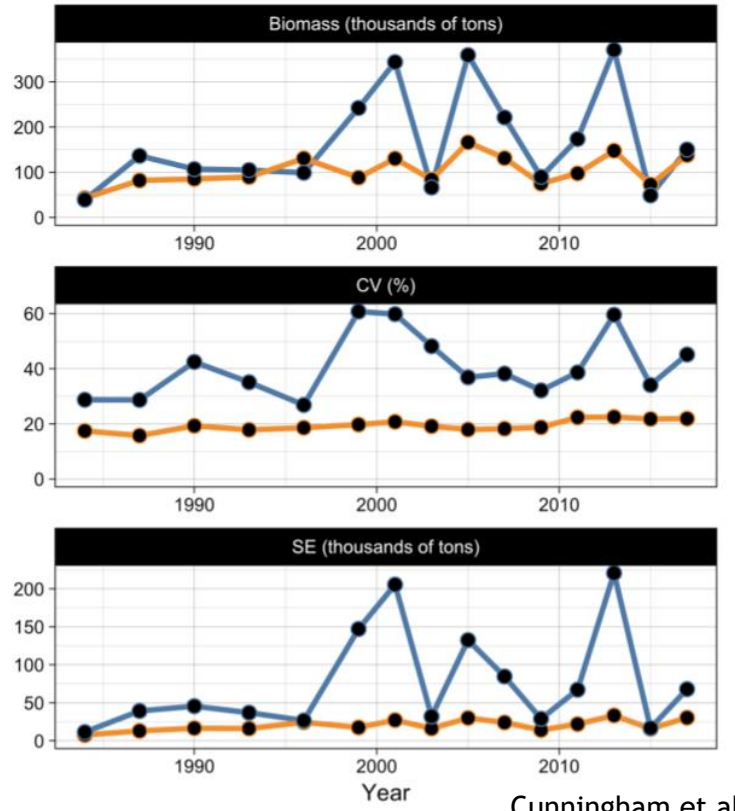
GROUNDFISH FORUM

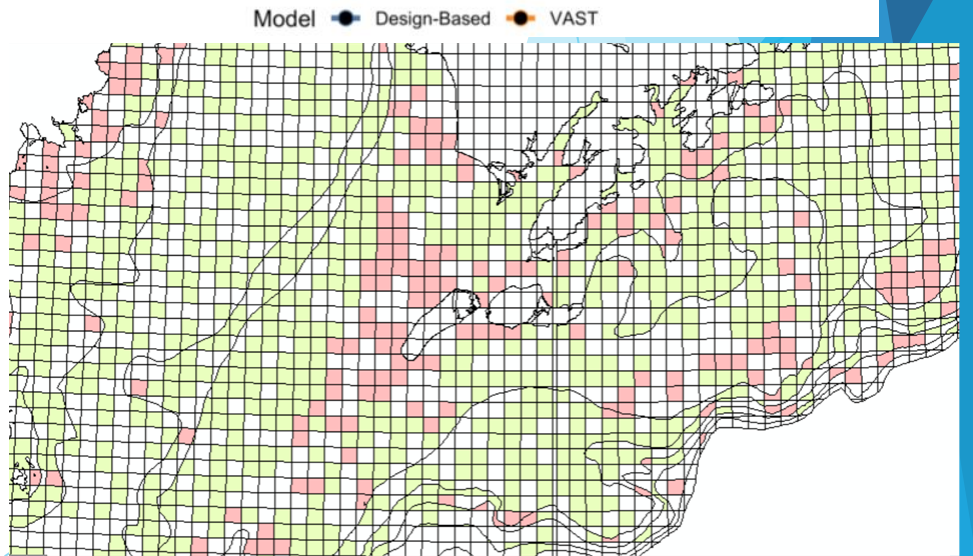
The problem

- Systematically eliminated rocky habitats
- Trawl surveys produce unstable estimates
  - large coefficients of variation for rockfish biomass
  - biologically unlikely changes in estimates (due to the long lived nature and low natural mortality in these species)
  - low confidence in some rockfish assessments



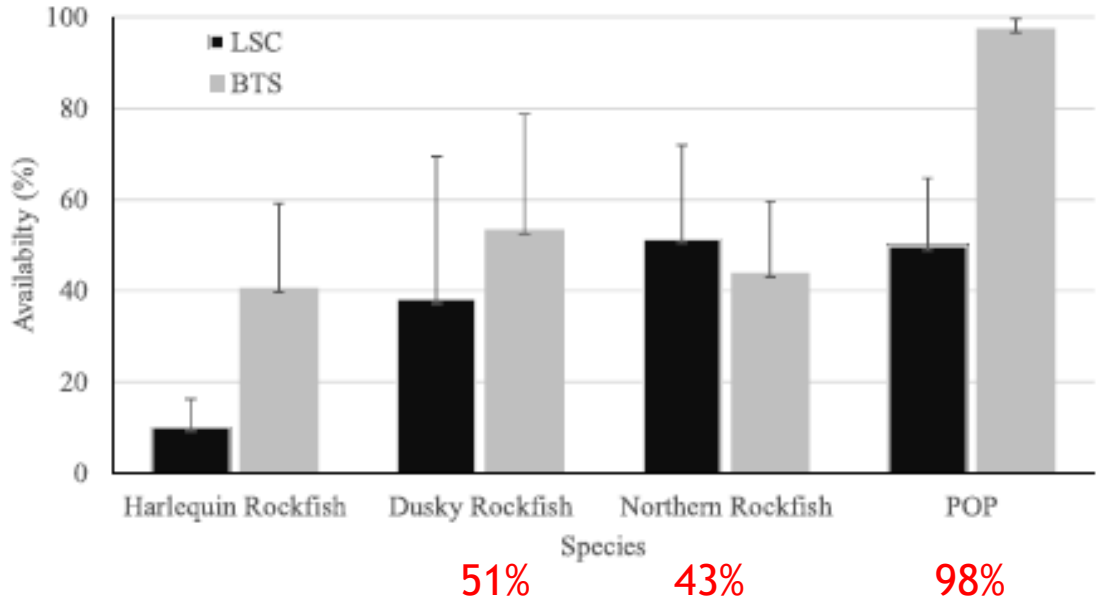


Cunningham et al 2018



The Issue with Rockfish Estimates

"… estimates for *Sebastes* [from the survey] are not simply imprecise, but inaccurate, because the trawl survey is generally unable to sample in areas where *Sebastes* are most abundant"



D and N have low availability to the bottom trawl survey

Rooper and Martin 2012, Jones et al. 2021

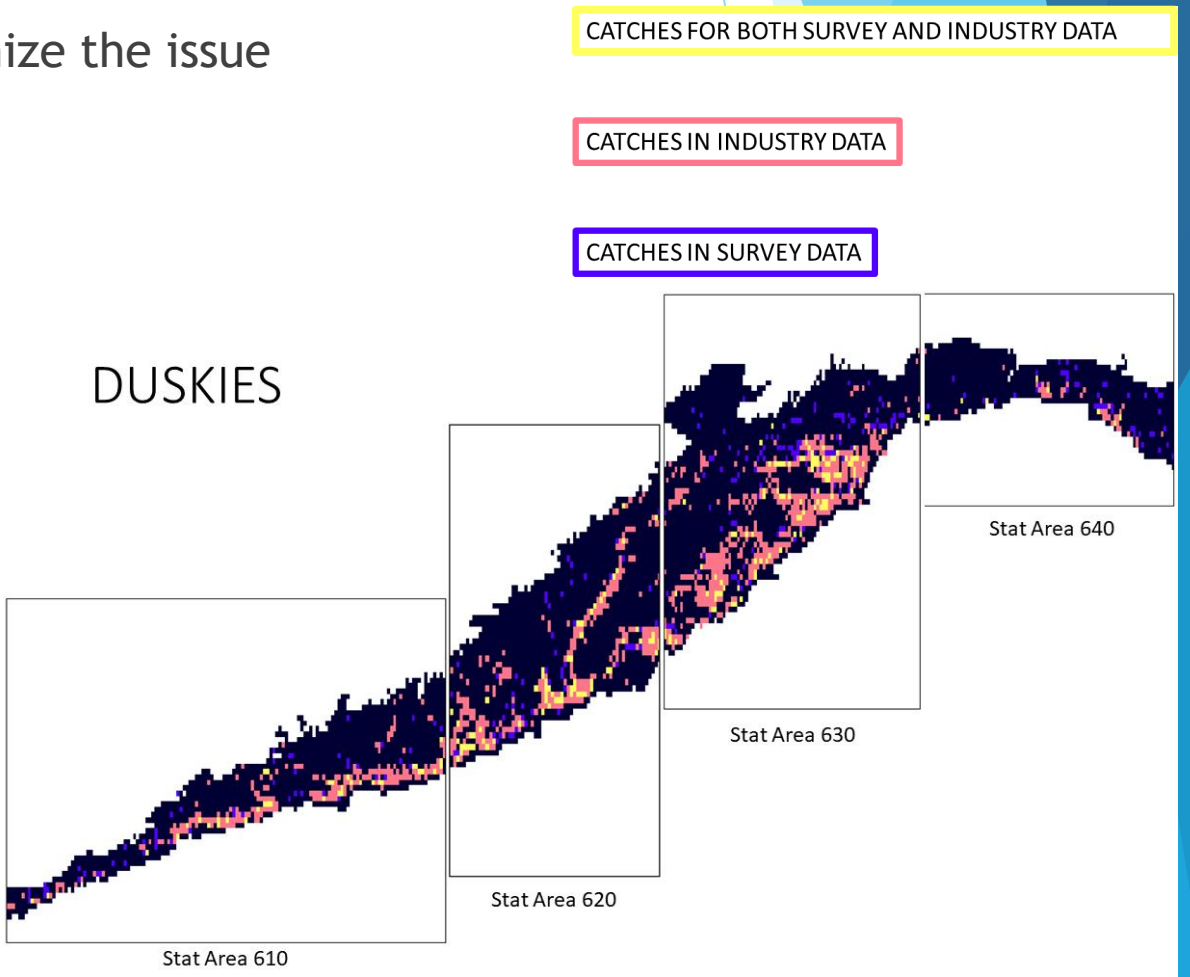
How our cooperative survey research began

ISSUE

- Standard survey methods work for the majority of examined species, but it seems they do not capture rockfish very well
- Industry, scientists in academia/management recognize the issue
- No easy fix this – can't alter the survey
  - Preserve time series
  - Expensive
  - Taxpayer funds

OPPORTUNITY

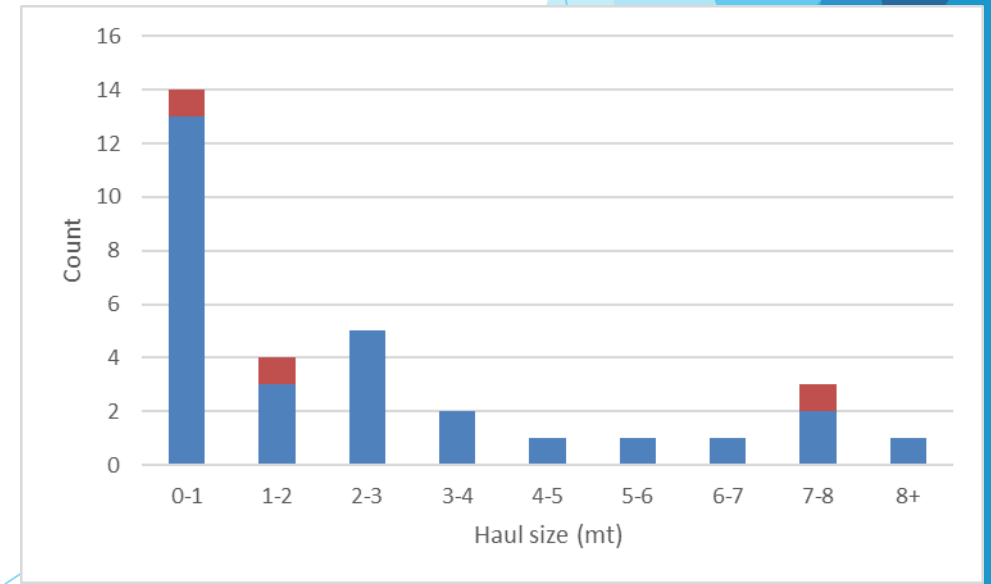
- Industry routinely fishes in omitted habitats
- Willing to help collect data



SIRRCA

(Science Industry Rockfish Research Collaboration in AK)

- Cooperative survey of rockfish in the GOA
  - Minimally standardized NOAA survey methods, industry boats, small teams
  - Data collection operating 2021 – present
    - 38 tows, 3 vessels, 2 seasons
    - Processed >50 mt of our 3 rockfish spp
      - Weight, counts, lengths

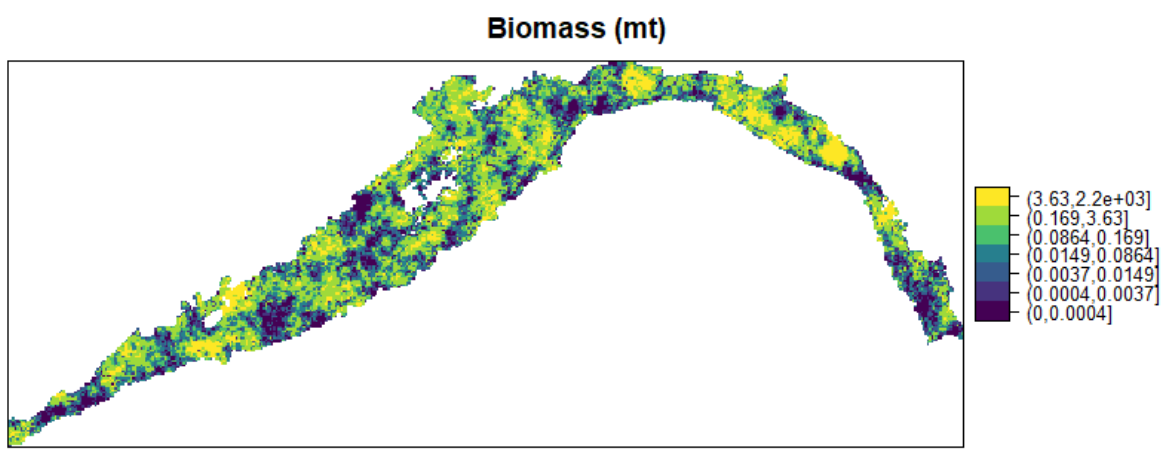


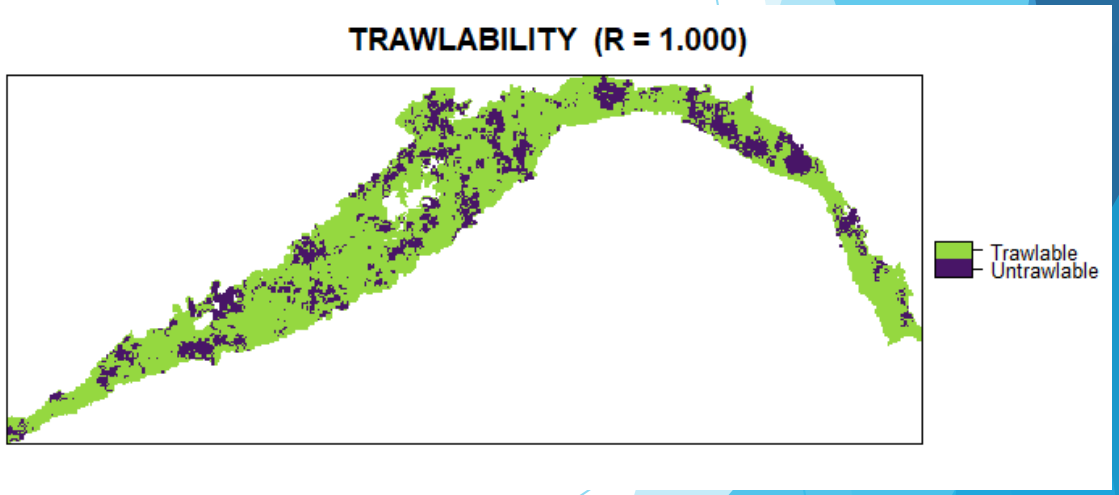
What we hope to accomplish

- Understand impacts of omitting rocky habitats from the survey
  - SIMULATION
- Build fishing calibration and selectivity ratios / proportions
  - Understand differences in survey gear vs industry gear, potential vessel effects
  - CALIBRATION TOWS – TRAWLABLE CELLS
- Data from untrawlable habitats used in assessment process
  - Catchability (gear efficiency X availability of taxa to gear)
  - **Index of abundance including rockfish in untrawlable habitats**
  - EXPERIMENTAL TOWS – UNTRAWLABLE CELLS
- Build a sustainable model for cooperative research in the GOA
  - Supplement to the survey
  - COOPERATION, CO-OWNERSHIP, SRP

Consequences of omitting rocky habitats

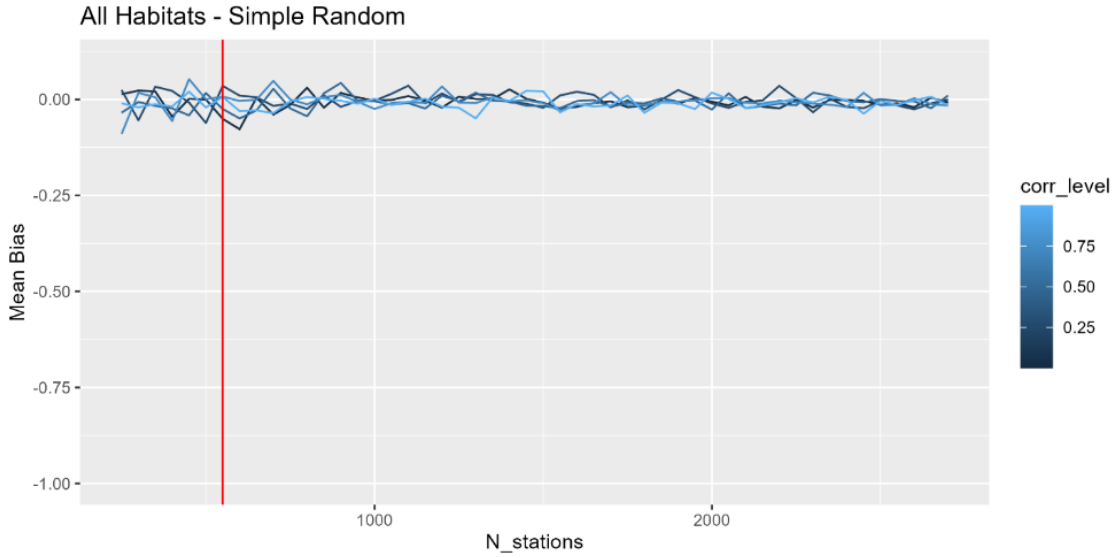
- Simulation exploring impacts (bias, cv) of omitting untrawlable cells from the survey
  - Output of *S. polyspinis* biomass (mt) at grid-cell level
  - Simulated trawl difficulty layer correlated to fish biomass layer at various strengths…
  - Simulated survey -> built biomass estimates
    - Trawlable habitats ONLY vs all habitats X corr. levels X more stations X replication = 50,000 models

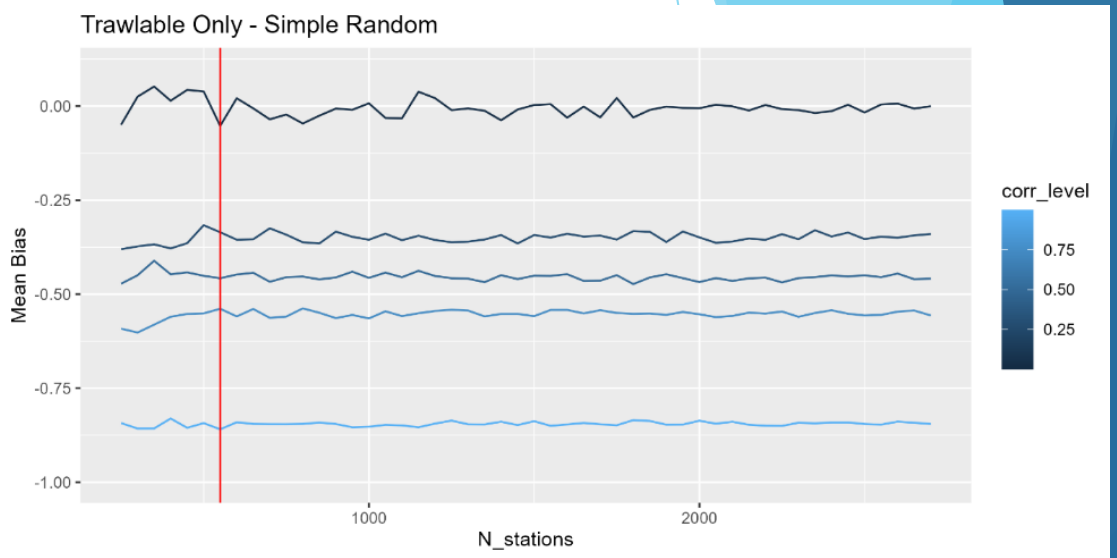


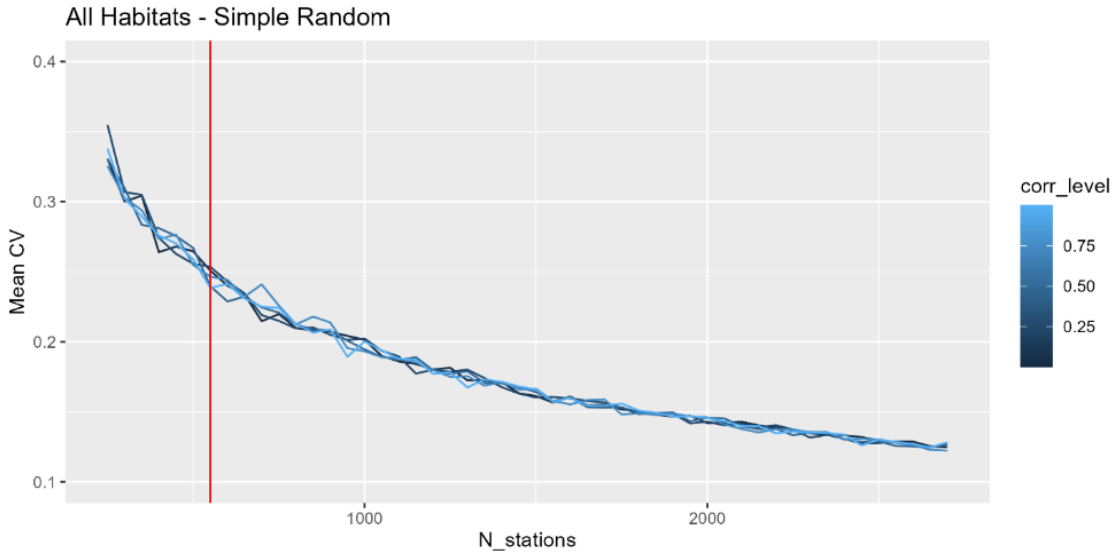


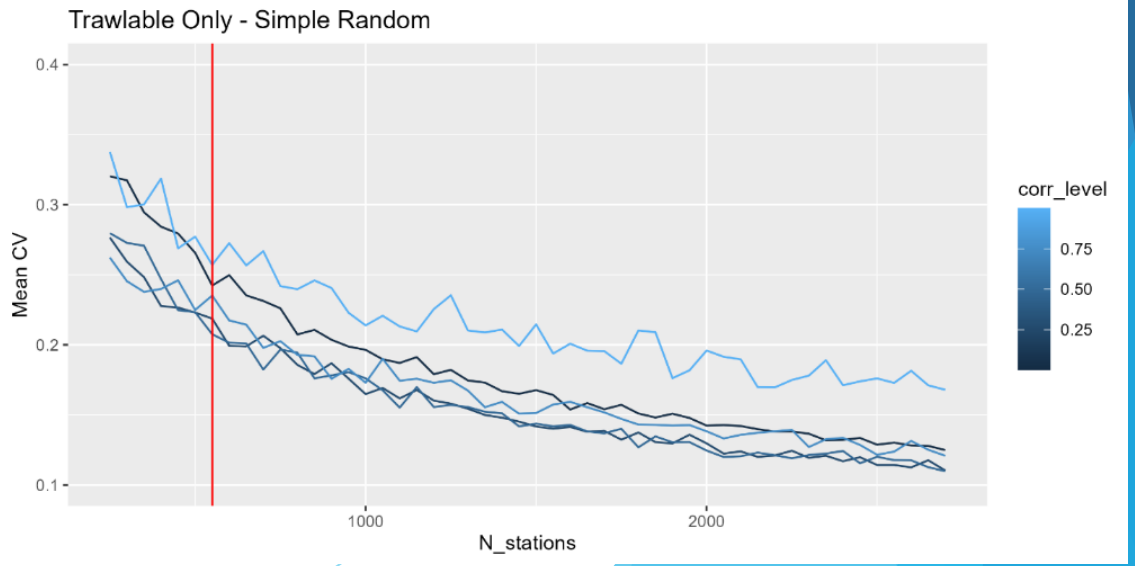
Correlation between a cell's simulated biomass and trawl difficulty

Simulation (effects of omitting untrawlable habitats)

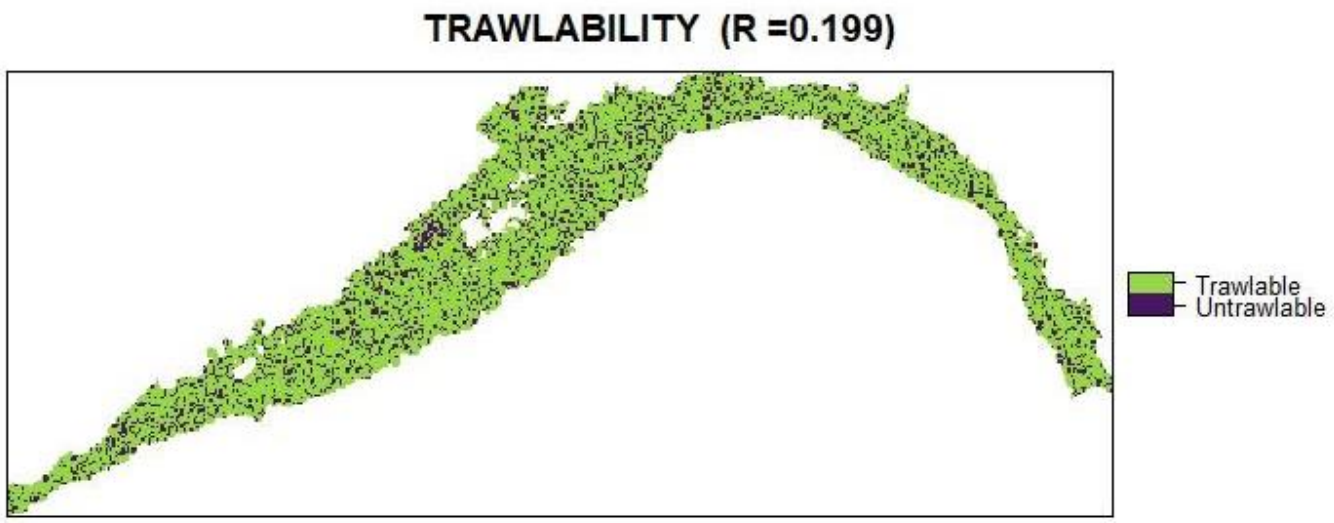


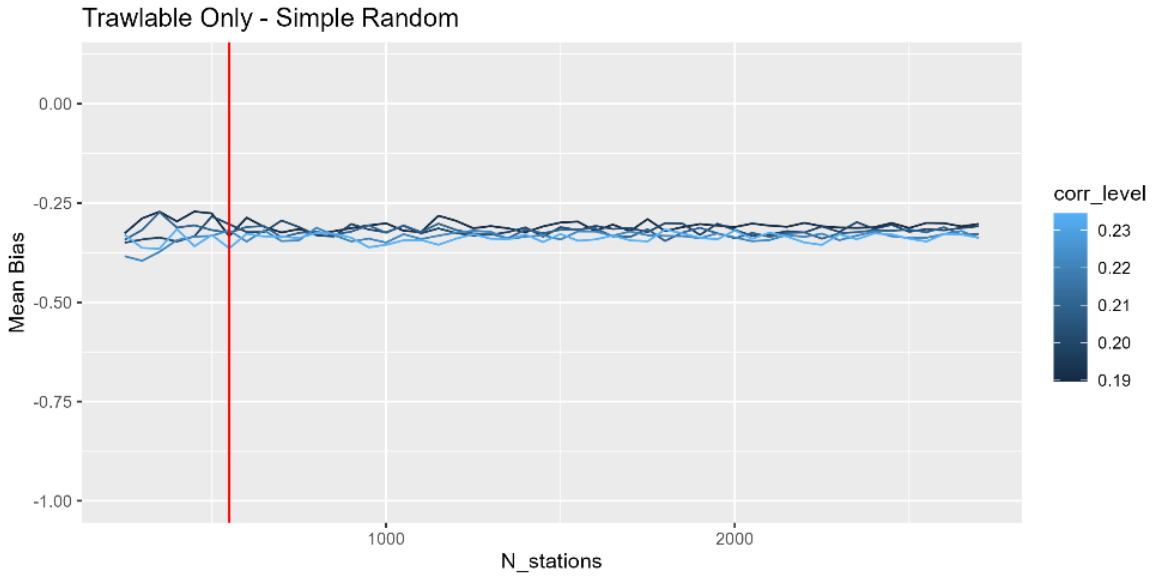






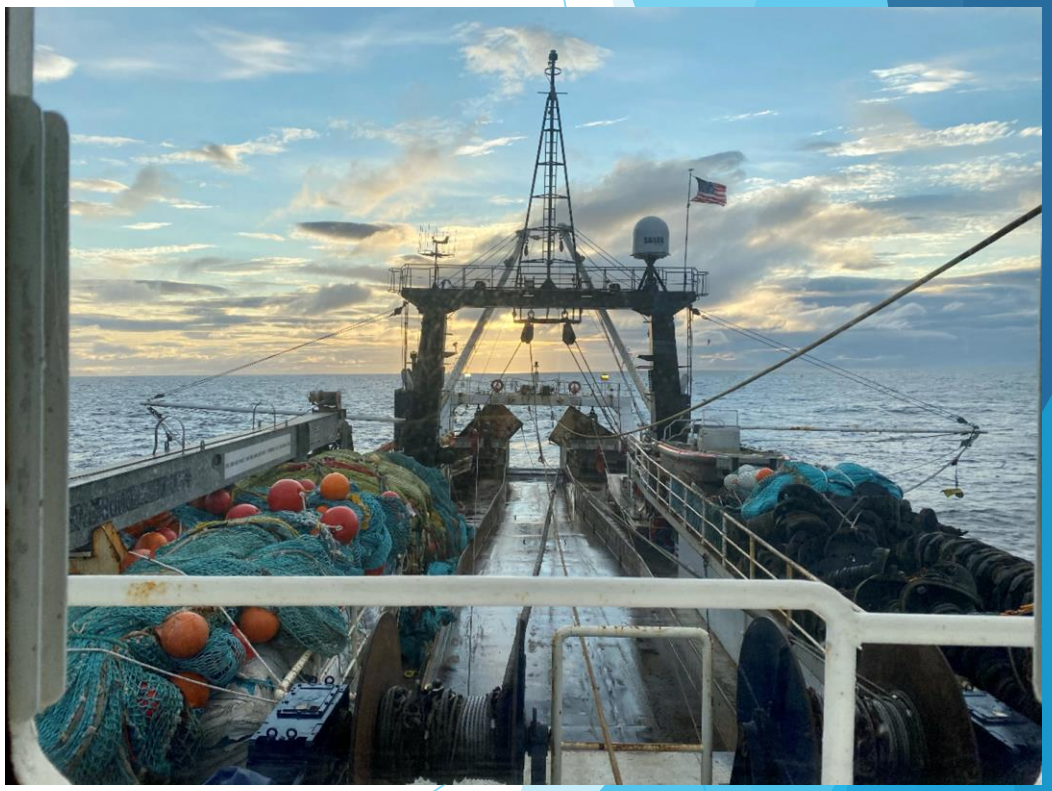
Simulation preliminary results – northern rockfish





- Availability in this scenario (~43%) matches best known estimates for northern rockfish (*S. polyspinis*)
- Underestimates biomass by 0.28 – 0.35 across survey sizes

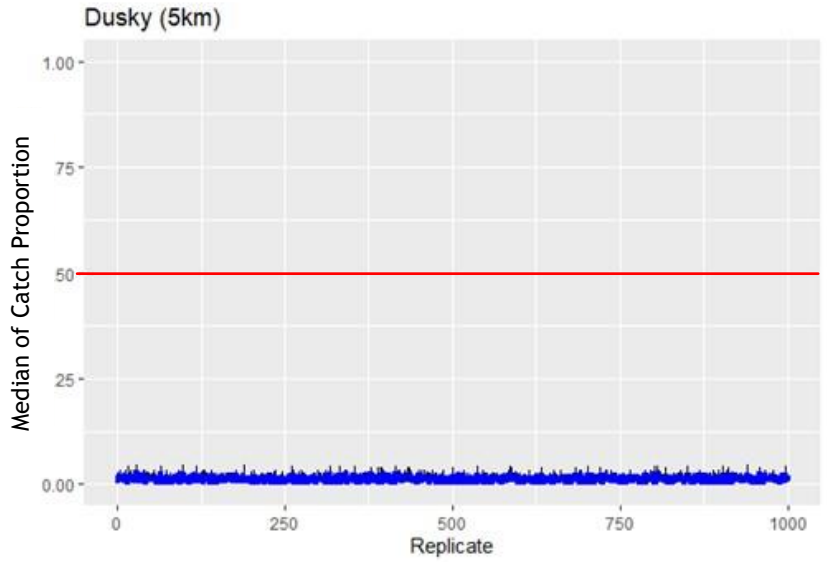
CPUE Calibration

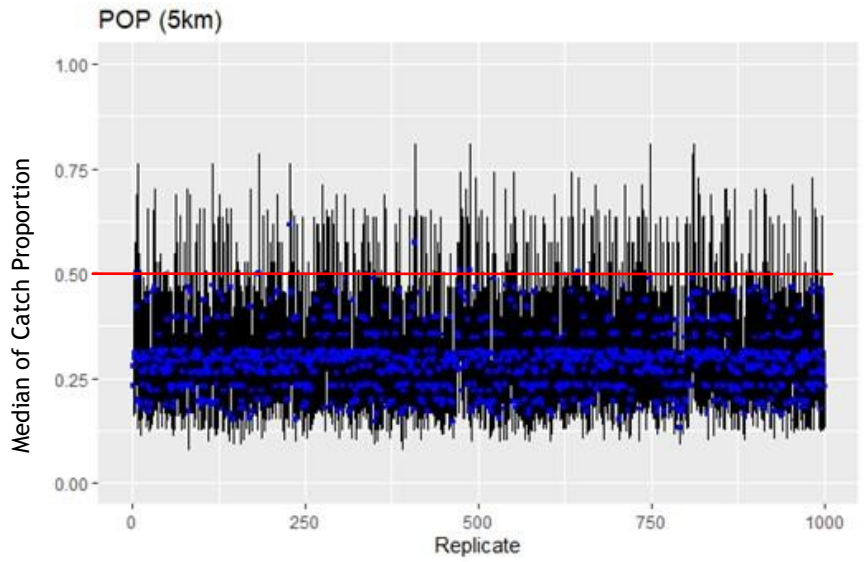


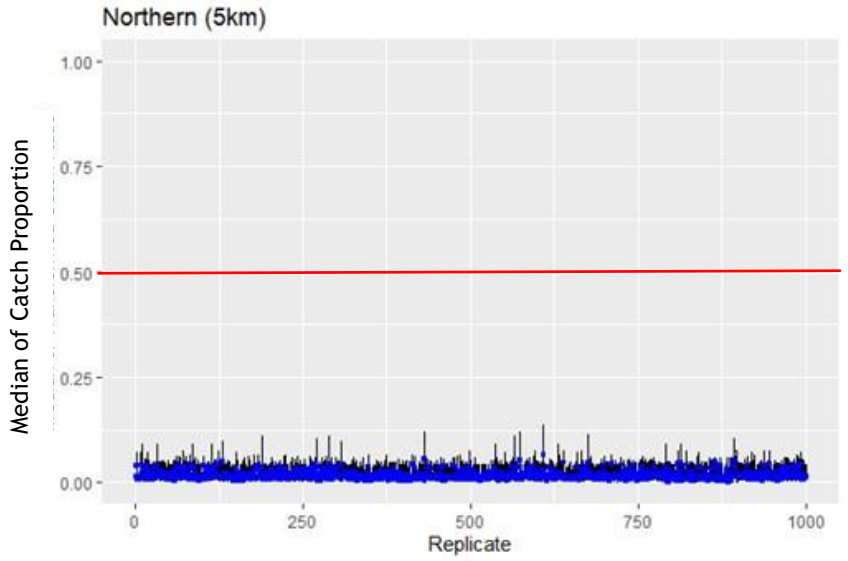
CPUE Calibration

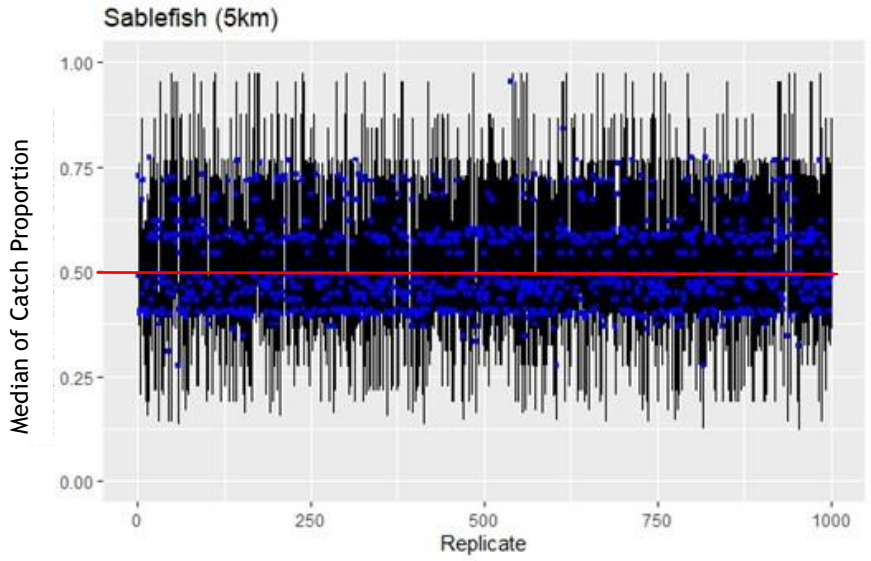
Vessel	Horsepower	Length overall	Max Crew	Beam
AK Provider	2160	171’	16	40’
Ocean Explorer	1850	155’	20	36’
America’s Finest	6434	264’	50	51’
Seafisher	~3000	230’	56	40’

Catch efficiency / CPUE Calibration (historical)

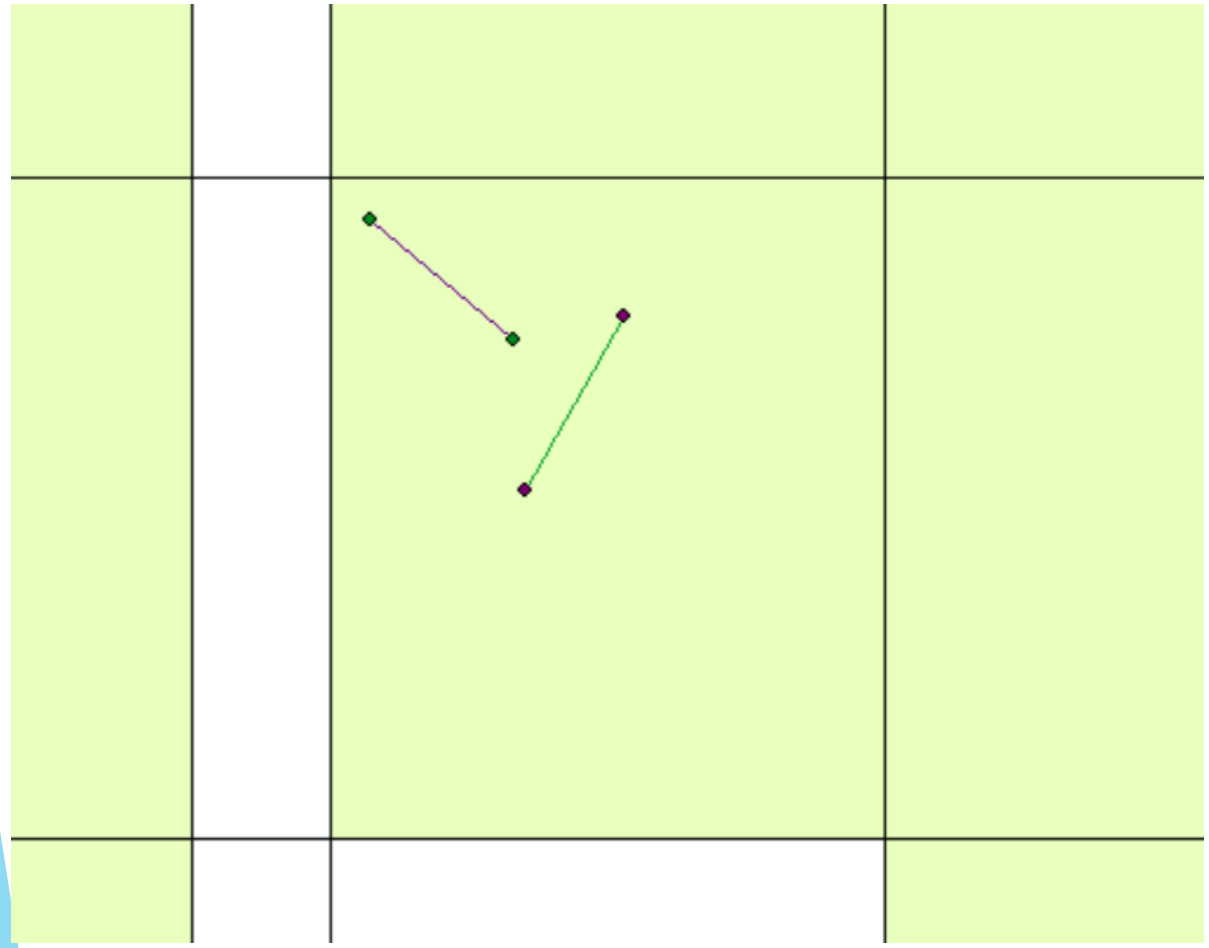


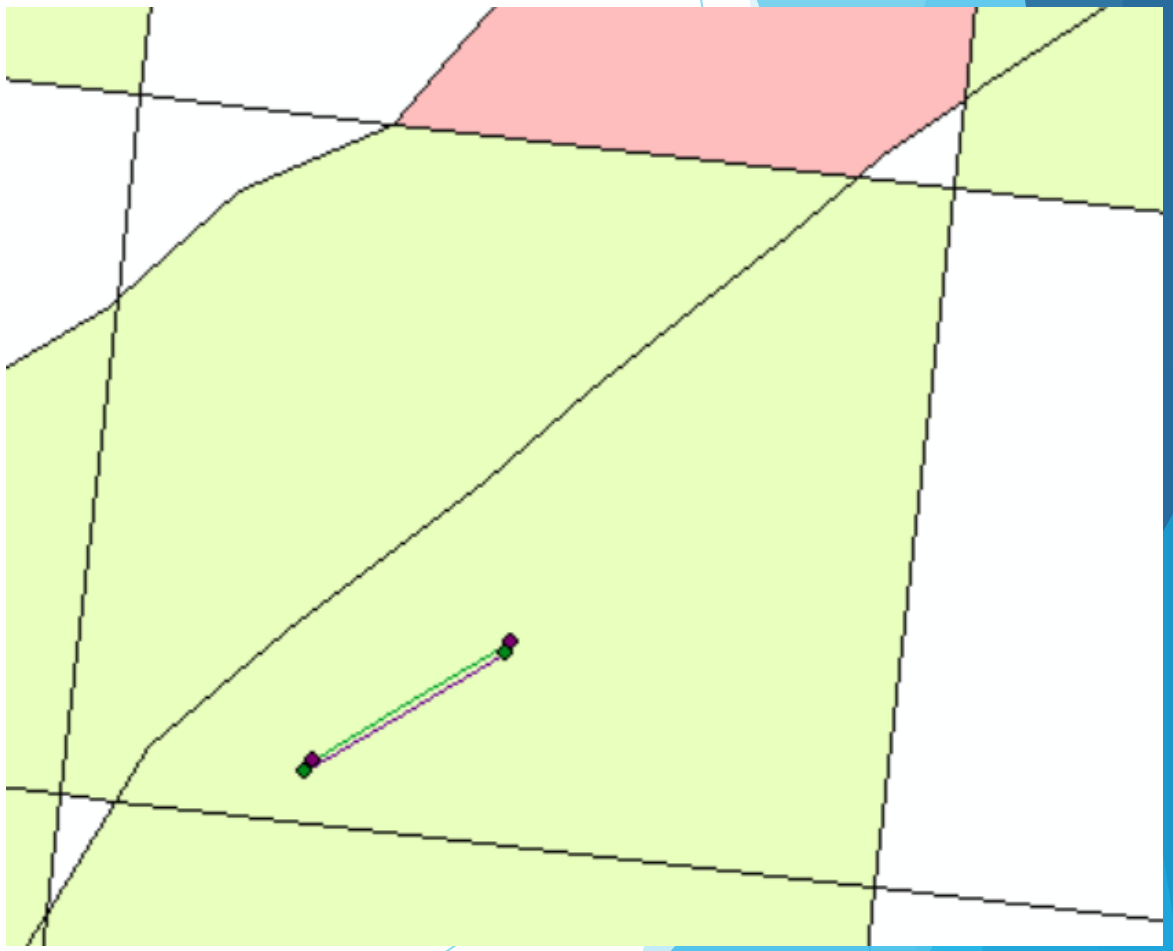




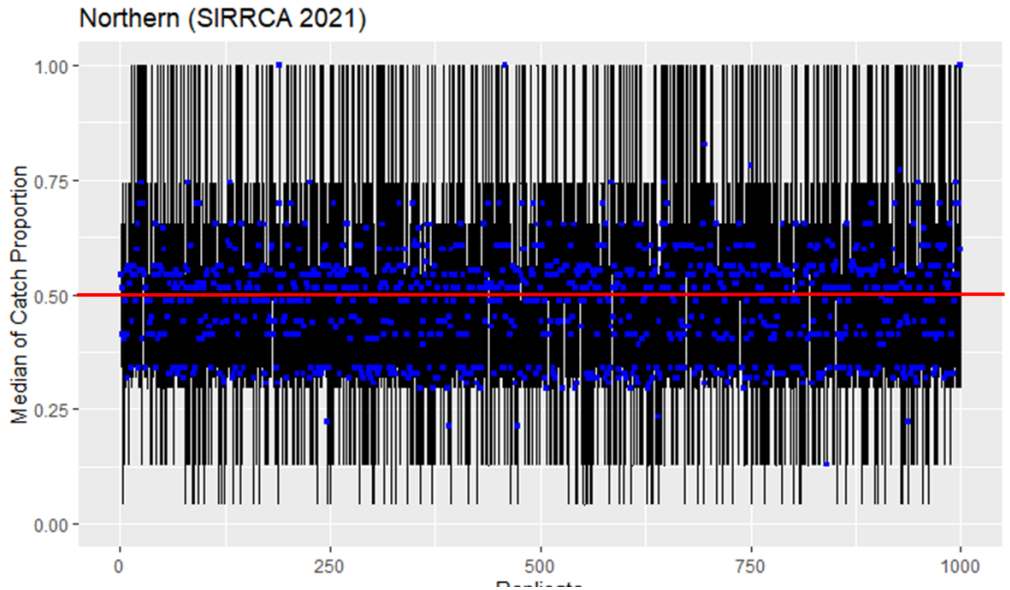


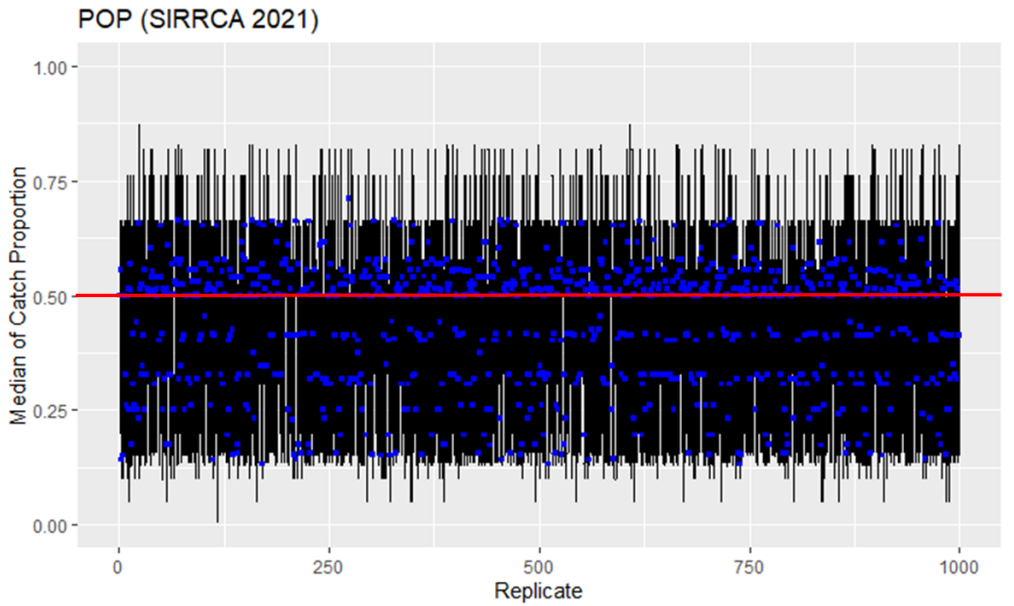
Calibration tows

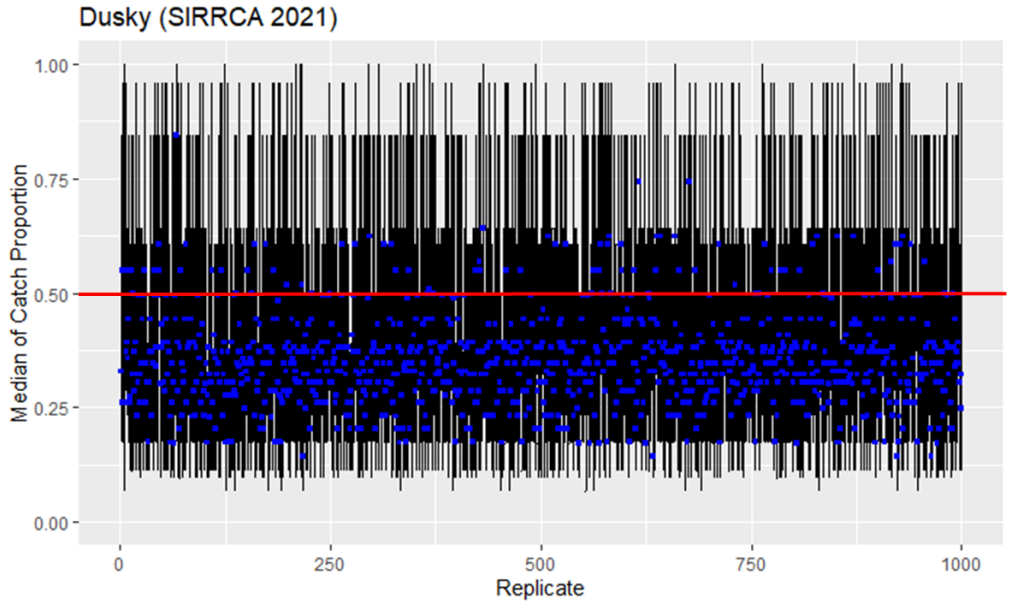




Different signal in 2021 CPUE Calibration results





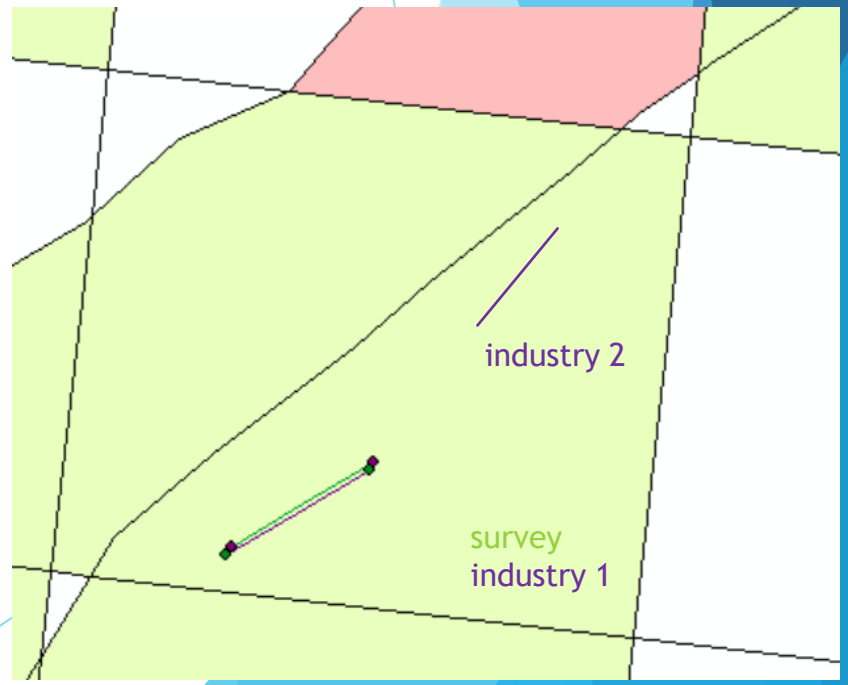


- Suggests we get different information even within GOA BTS grid cells based on who is selecting the tow path
- Perhaps multiple hauls necessary to capture true within cell variability, be meaningful for blending datasets

2023 SIRRCA survey

- 2 types of tows: Experimental & Calibration tows
  - Cal –understand impacts of gear/vessels on CPUE, selectivity
    - 15 stations defined as TRAWLABLE
    - Each calibration station will be sampled twice
      - Tow 1) repeat survey towpath
      - Tow 2) captains select towpath
  - Exp –biomass info from rocky, previously unsampled areas
    - 45 stations defined as UNTRAWLABLE
      - Tow 1) captains select towpath
- Sampling covered under Scientific Research Permit
  - Important for data integrity, project longevity
  - 5 potential vessels
    - 3 participants, 2 alternates

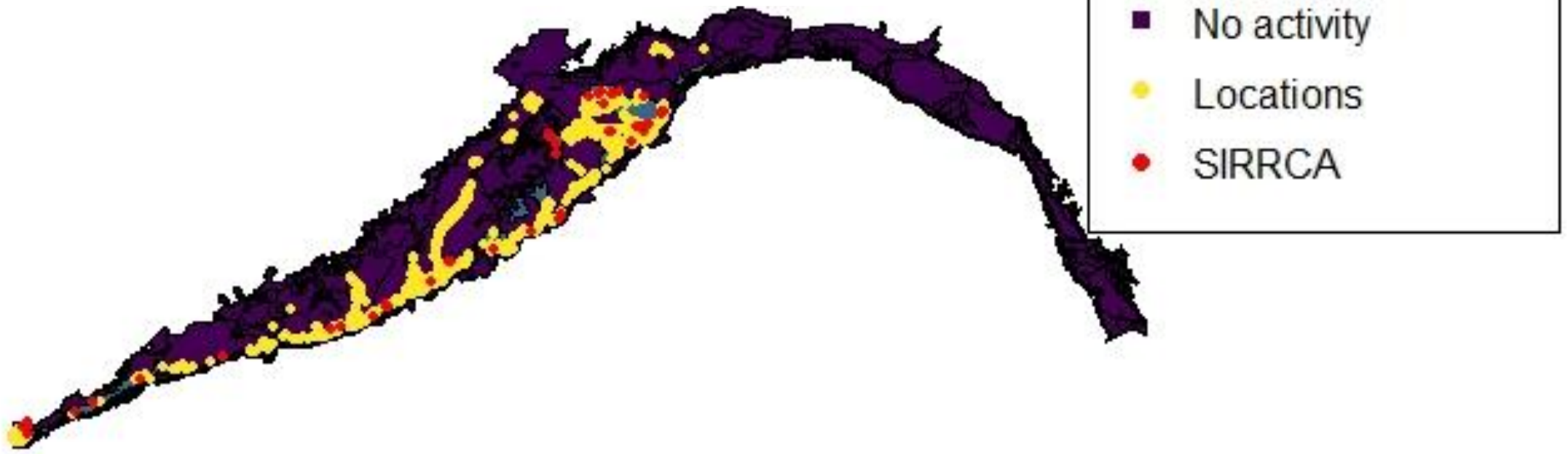
Calibration sampling



Experimental Station Selection

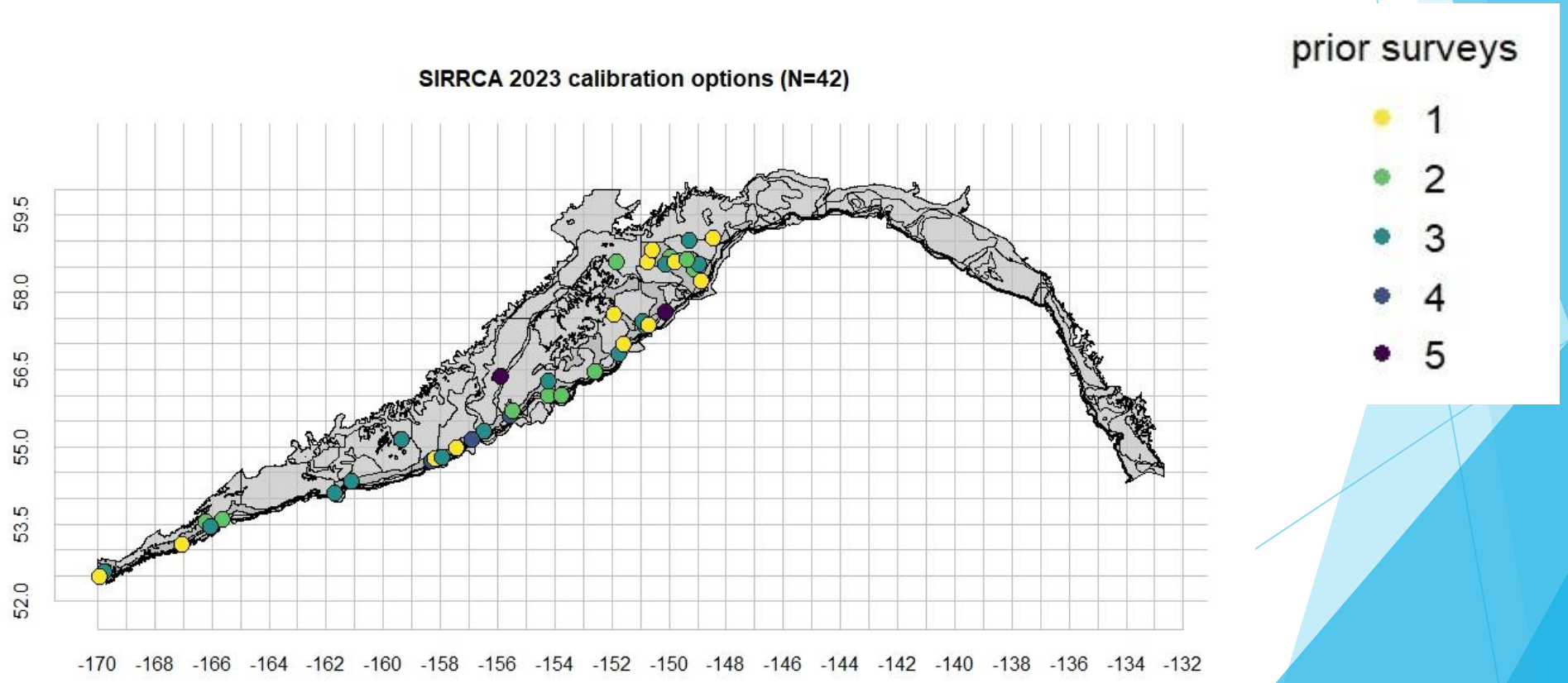
Stratified random station selection

- Strata between 100-300m
- Active summer fishing 2020-2022 for 5 SRP vessels
- at least 10% biomass proportion
- removed 121 and 133, random selections consistently too far away from the fishing locations
- Sample 45/45 stations

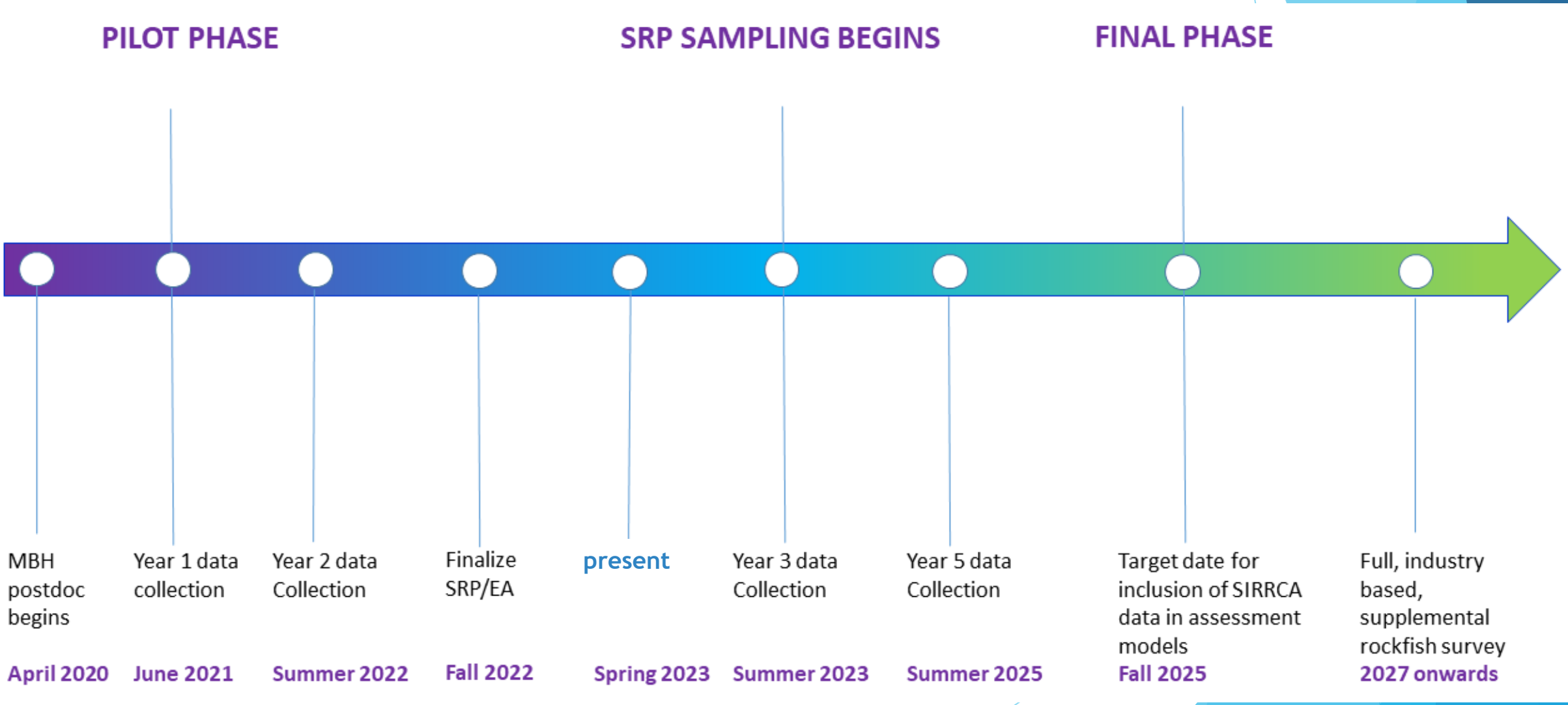


Calibration Station Options

- Repeat stations with highest survey catches for POP/N/D by weight
- Sample 15/ 42 – more flexibility for captains



Where we are in our project timeline



Thank you

- **SIRRCA team**
  - Brad Harris
  - Mark Zimmermann
  - Stan Kotwicki
  - Pete Hulson
  - Jim Thorson
  - Julie Bonney
  - John Gauvin
  - Suresh Sethi
  - Curry Cunningham
- **FAST lab colleagues**
  - Cara Hesselbach
  - Anita Kroska
  - Felipe Restrepo
- **Industry collaborators**
  - Amendment 80 fleet
  - Evie Grace crew
  - America's Finest crew
  - Seafisher crew
  - Capt Rob Langdon
  - Capt Bob Hezel
  - Capt Pat Haley
  - Capt Darin Vanderpol
  - Nathan Lewis
  - Marcus Pascual
  - Noelani Davis
  - Todd Loomis
  - Annika Saltman
- Janelle Morano (Cornell)
- Daniel Joram (Nobeltec)
- Chris Siddon (ADFG)
- Matt Baker (NPRB)
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  - Susanne McDermott
  - Sean Rooney
  - Nate Raring
  - Cecilia O'Leary
  - Zack Oyafuso
  - Lewis Barnett
  - Wayne Palsson
  - Chris Lunsford
  - Pat Malecha

FISHERIES, AQUATIC SCIENCE & TECHNOLOGY LABORATORY

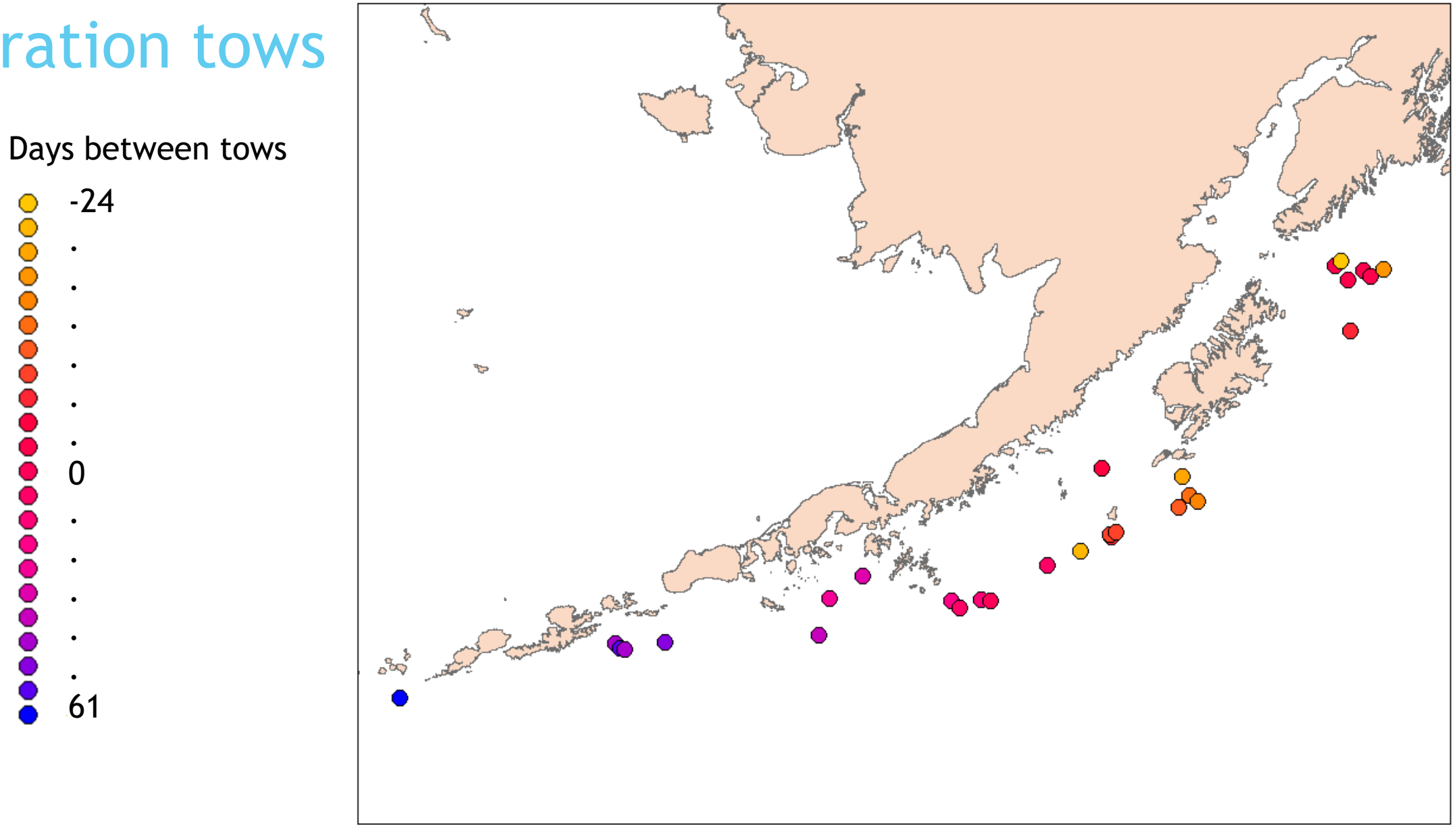
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION NOAA U.S. DEPARTMENT OF COMMERCE

GROUNDFISH FORUM

ALASKA SEAFOOD COOPERATIVE
Wild Seafood Harvested Responsibly

Questions?

Calibration tows



Calibration Tows