# **A tale of two surveys:**
# Comparing two bottom trawl surveys to assess the abundance and distribution of young-of-the-year groundfishes in nearshore soft-sediment habitats

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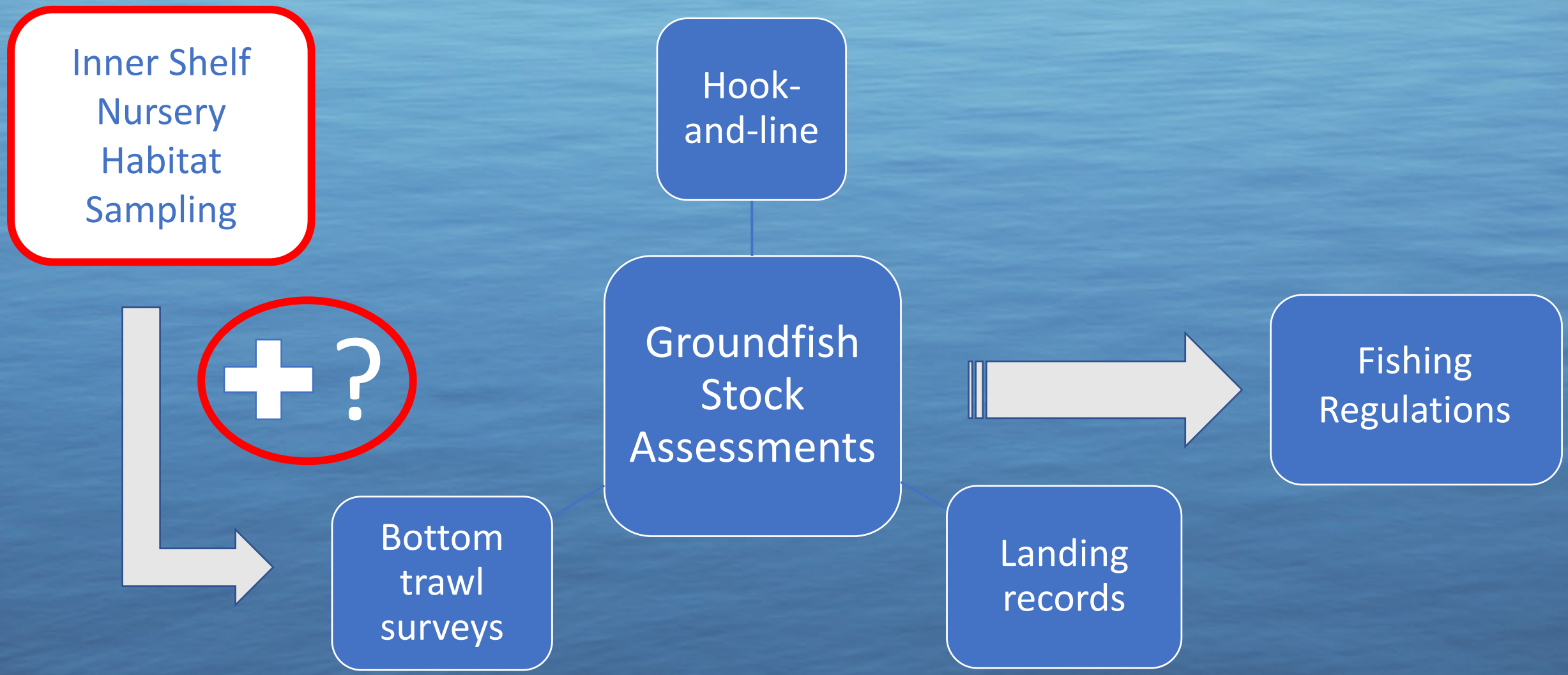
# Research Objectives

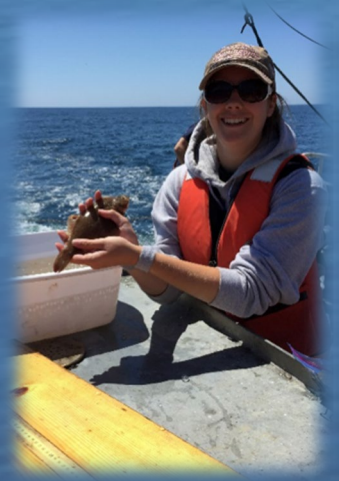
1. Characterize nearshore fish assemblages
2. Assess if additional nearshore sampling would enhance the current fishery-independent survey

# Incorporating Nearshore Sampling



# Beam Trawl Sampling

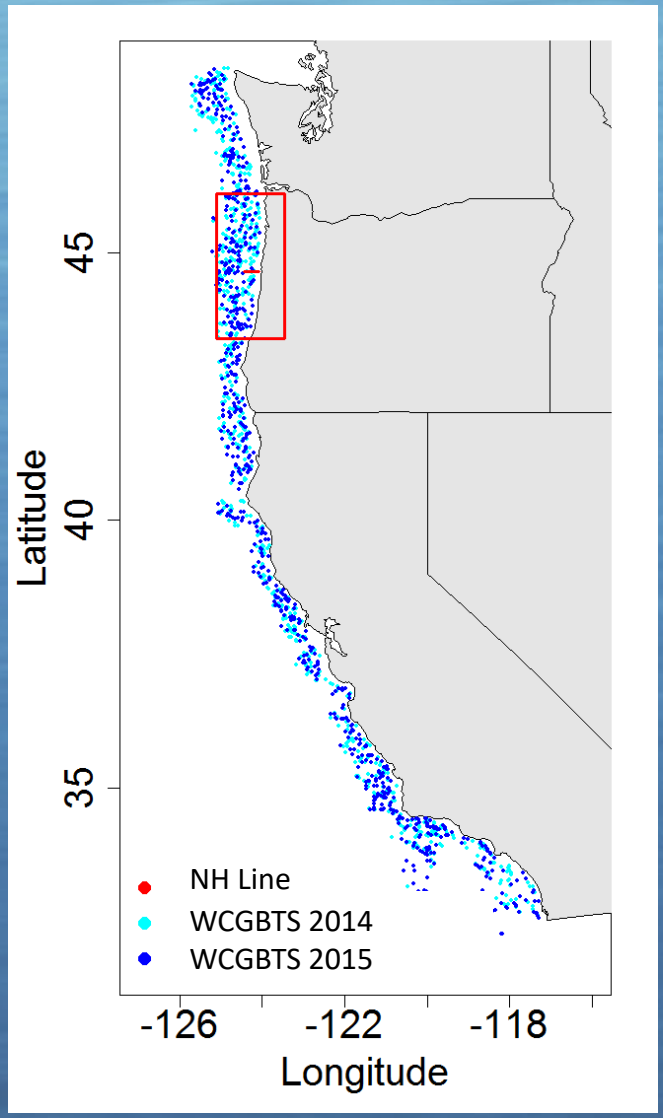
1. Net designed to sample juveniles
2. Conducted Monthly
3. Environmental Data with CTD
4. Ten-minute beam trawl tow
5. Depths towed: 30-100 m



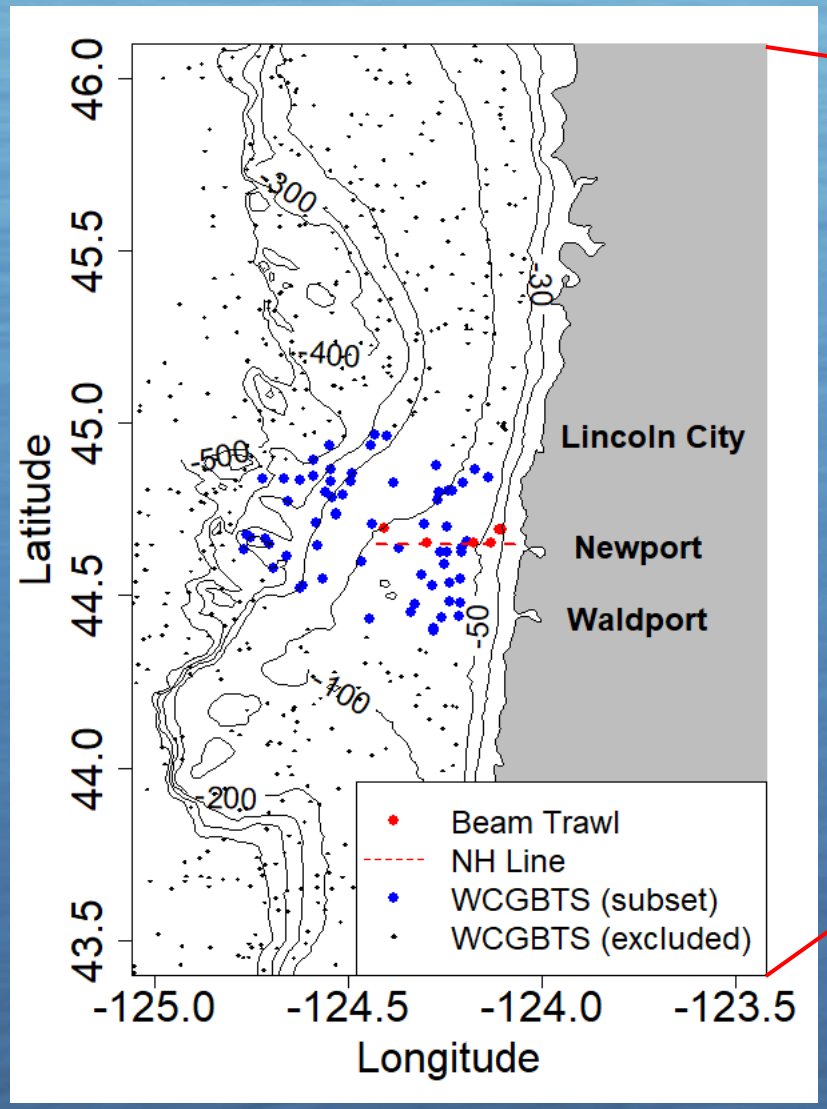
# West Coast Groundfish Bottom Trawl Survey (WCGBTS)

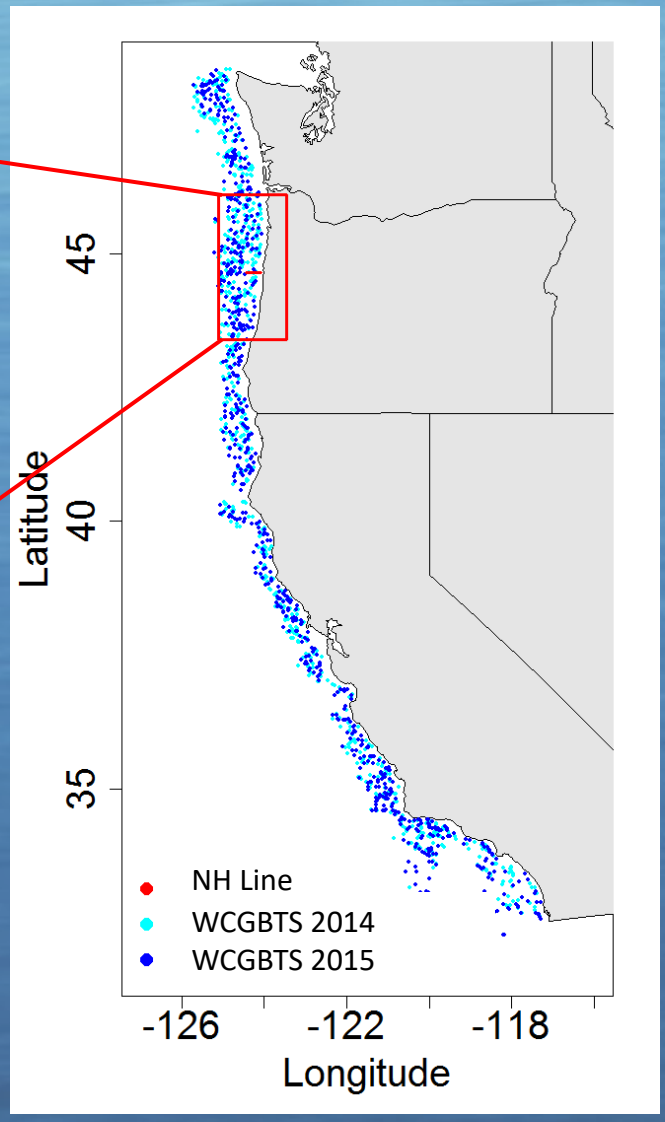
1. Net designed to sample adults
2. Conducted twice annually
3. Environmental Data with CTD
4. Fifteen-minute Aberdeen trawl tow
5. Depths: 55-1400 m (compare 55-500)


# Comparison of WCGBT and Beam Trawl Surveys

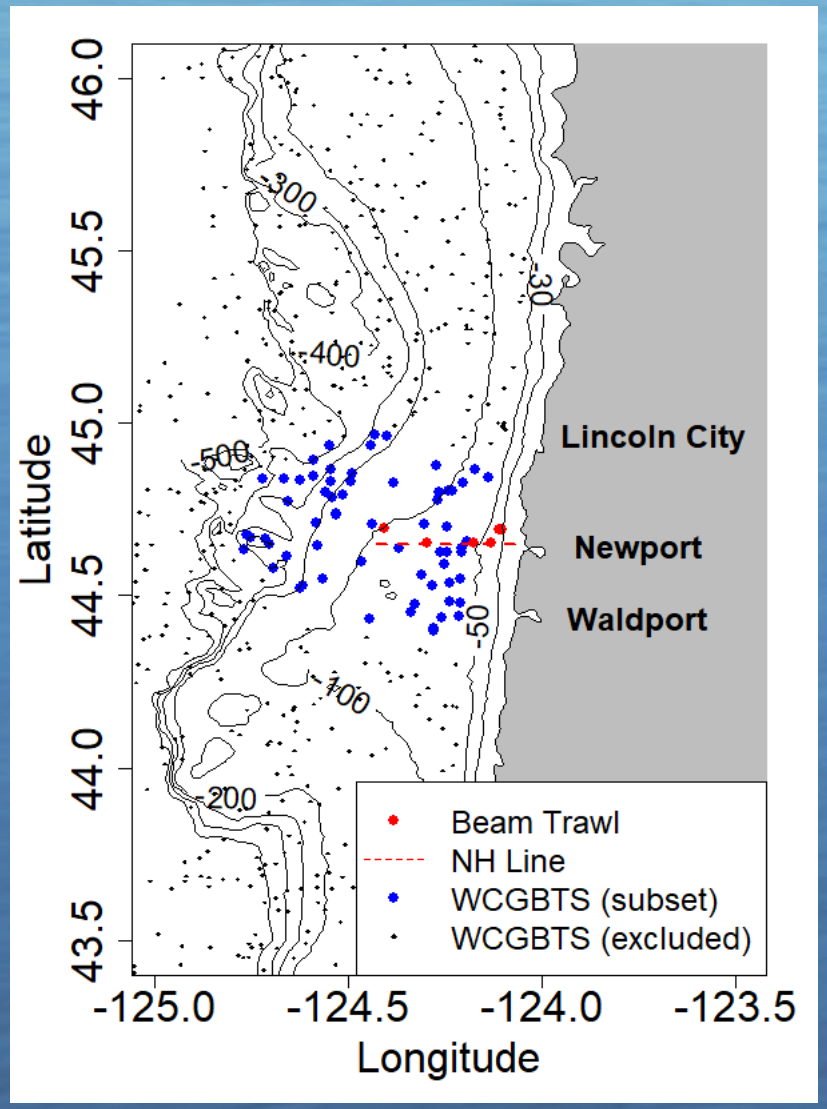


# Comparison of WCGBT and Beam Trawl Surveys



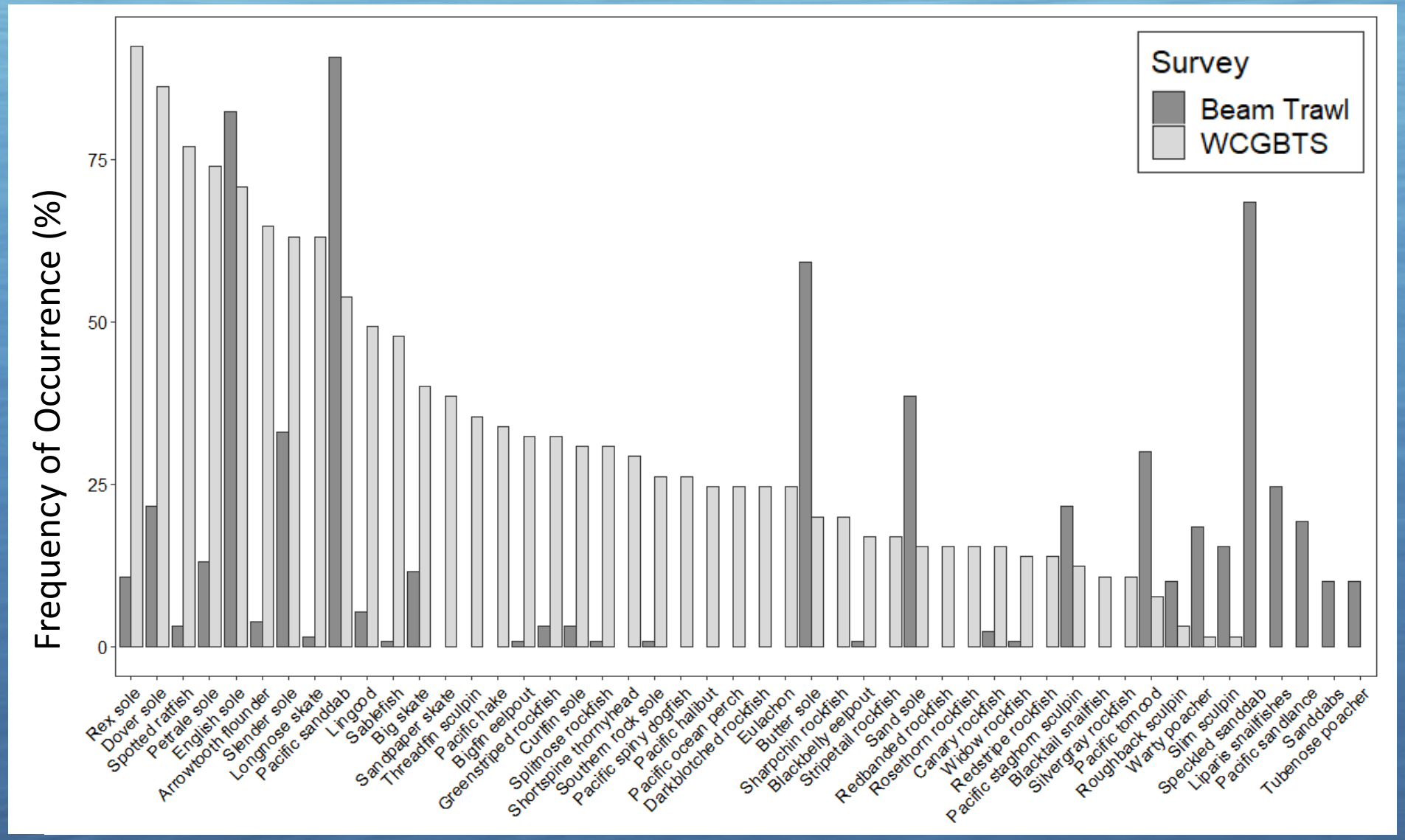
# Survey Comparison




| Beam Trawl Survey | |
|---|---|
| **Station Name** | **Target Depth** |
| MB 30 | 30 m |
| MB 40 | 40 m |
| NH 03 | 50 m |
| NH 05 | 60 m |
| NH 10 | 80 m |
| NH 15 | 100 m |
| N/A | N/A |

| WCGBTS | |
|---|---|
| **Bin Name** | **Depth Bin** |
| N/A | N/A |
| N/A | N/A |
| N/A | N/A |
| Bin 1 | 63 – 70 m |
| Bin 2 | 70 – 90 m |
| Bin 3 | 90 – 140 m |
| Bin 4 | 140 – 500 m |

# Survey Comparison – Catch Composition



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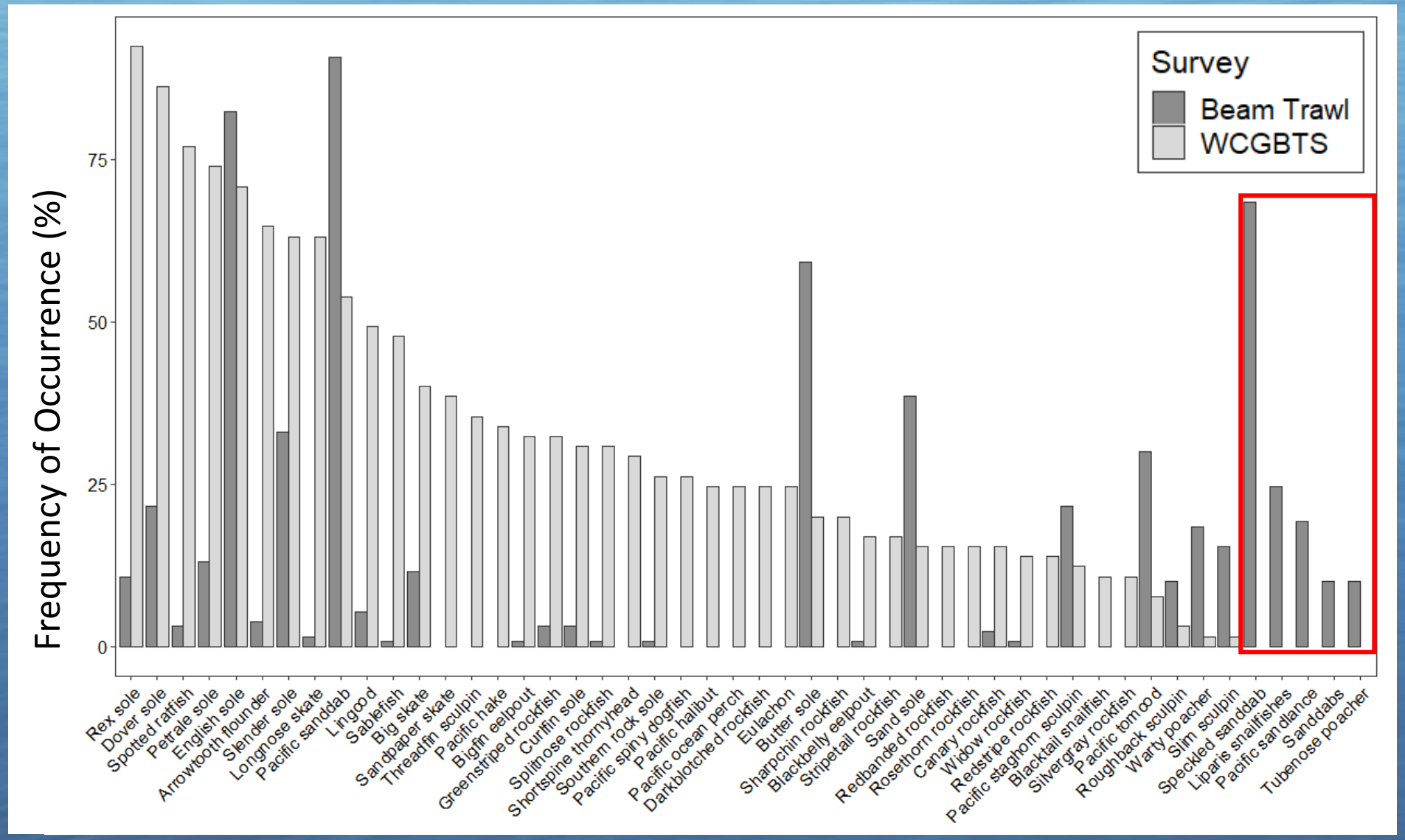

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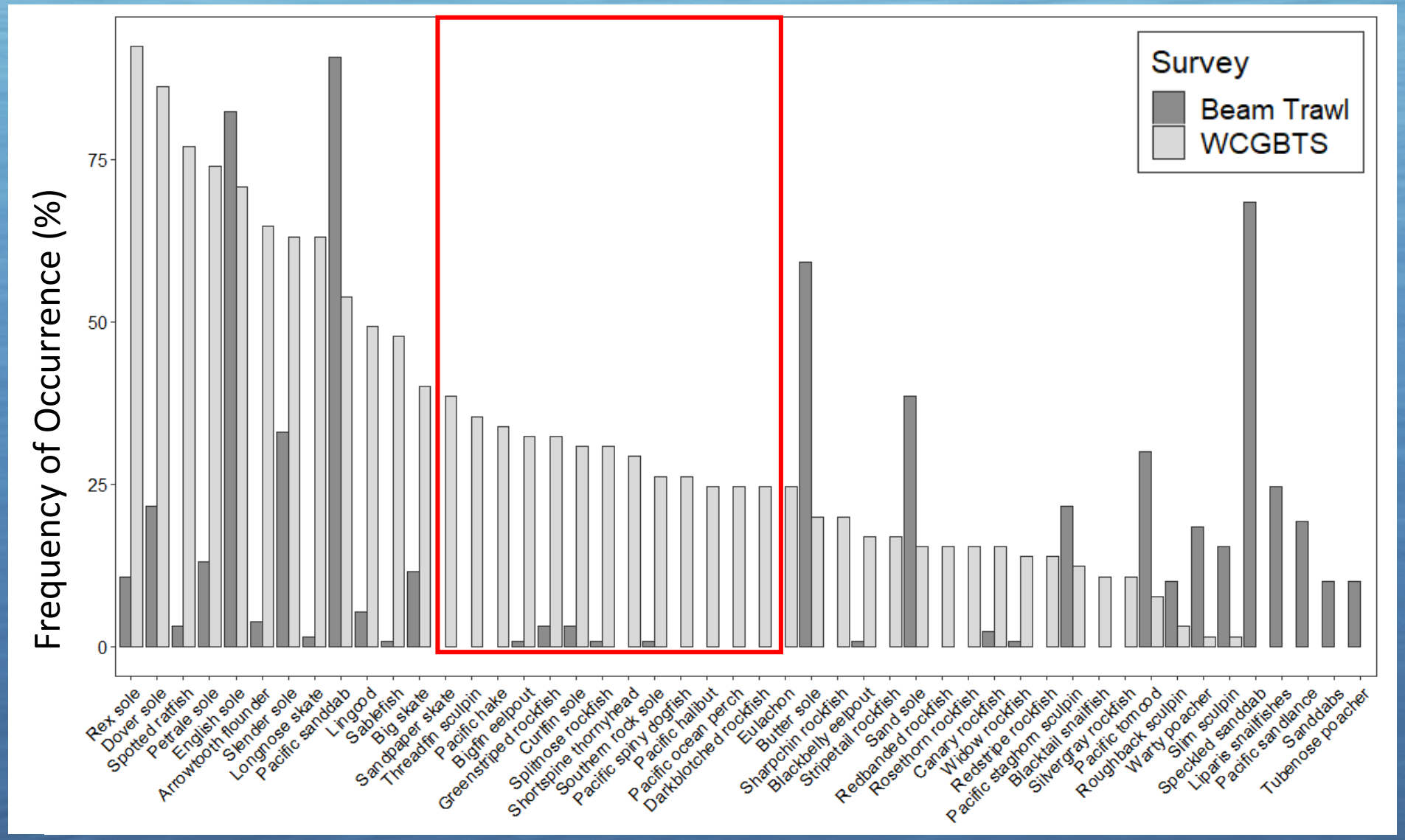

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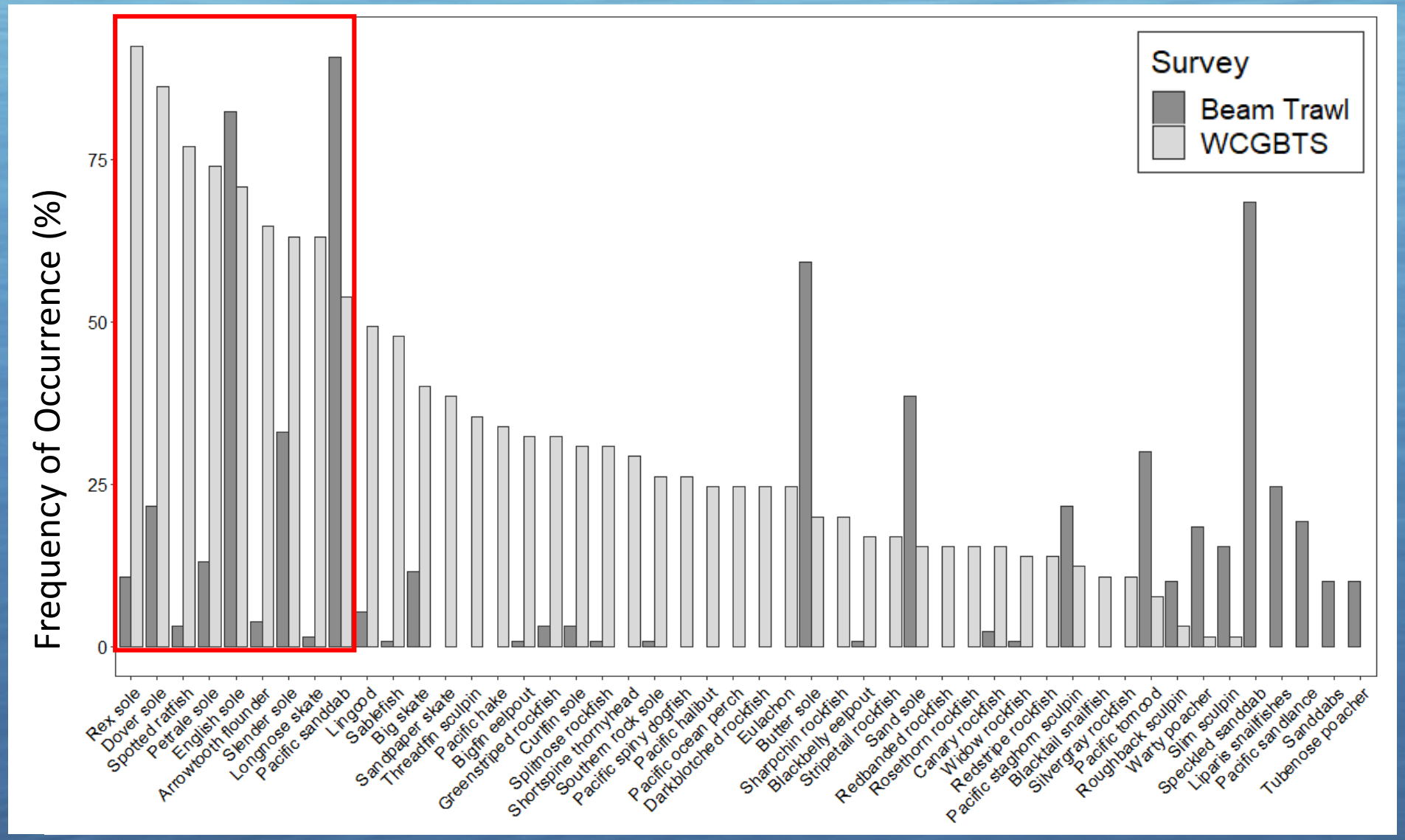
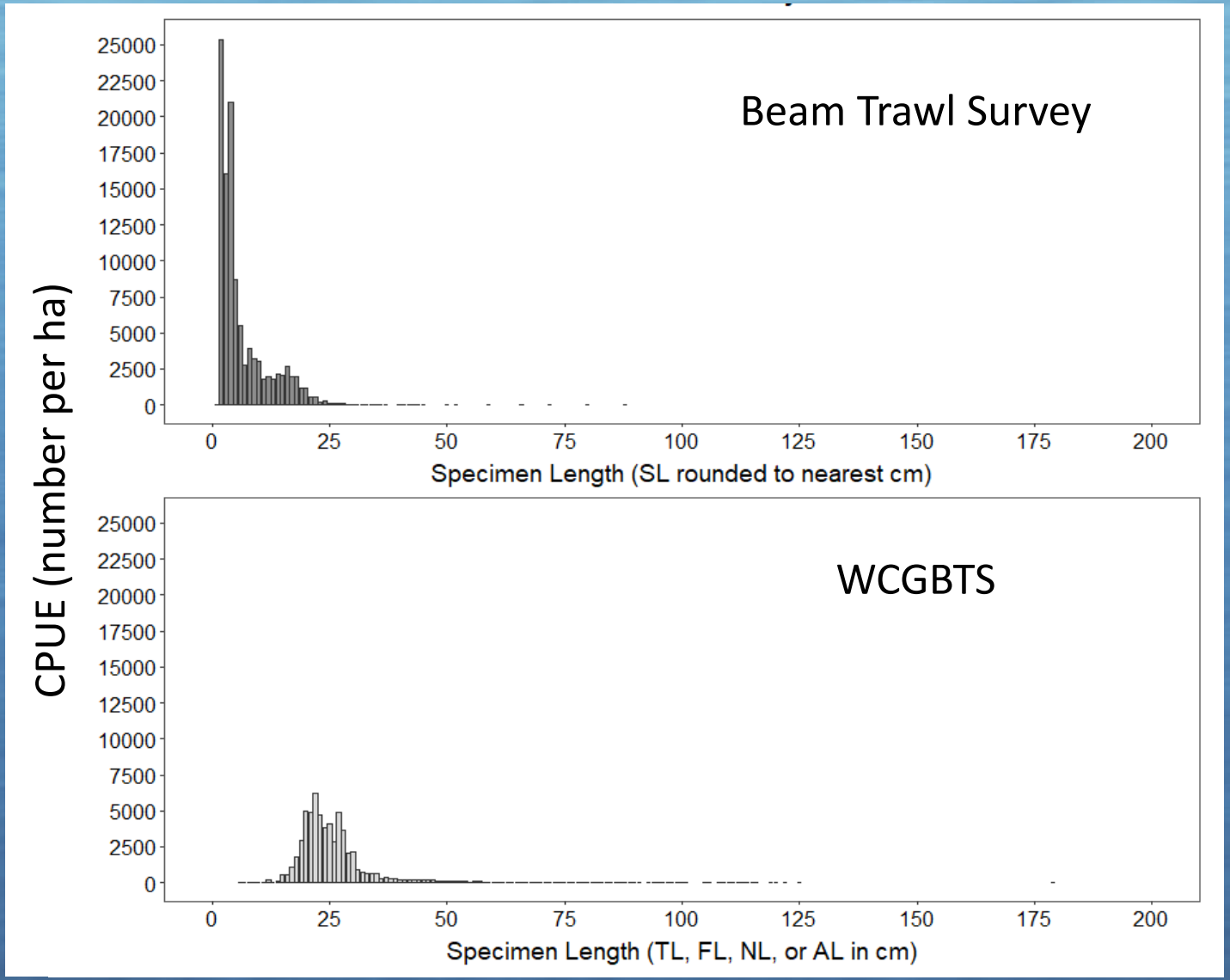


# Survey Comparison – Specimen Size



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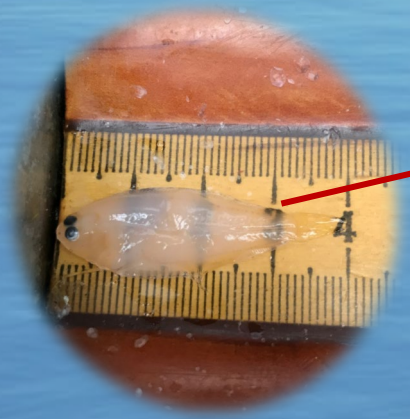
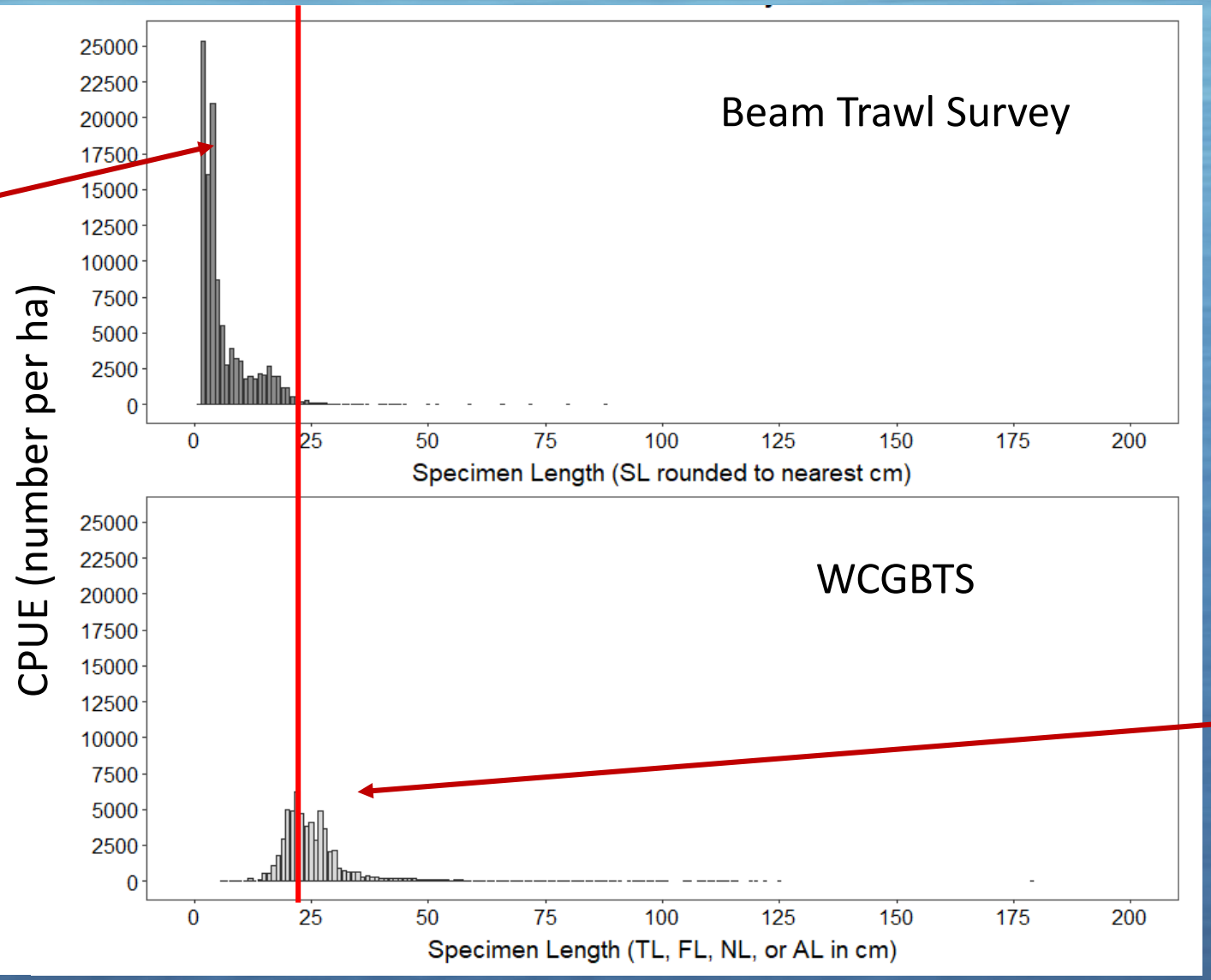
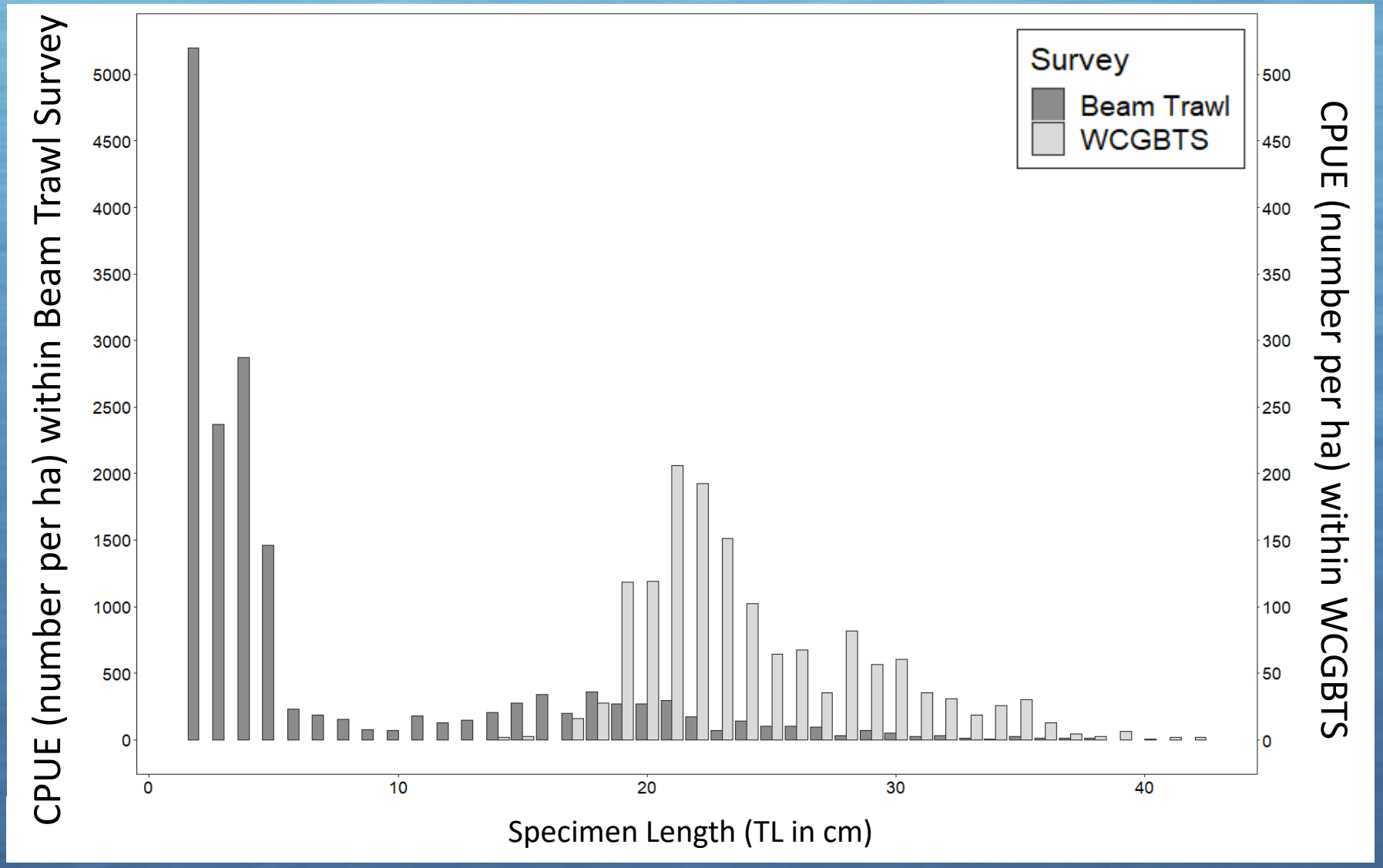
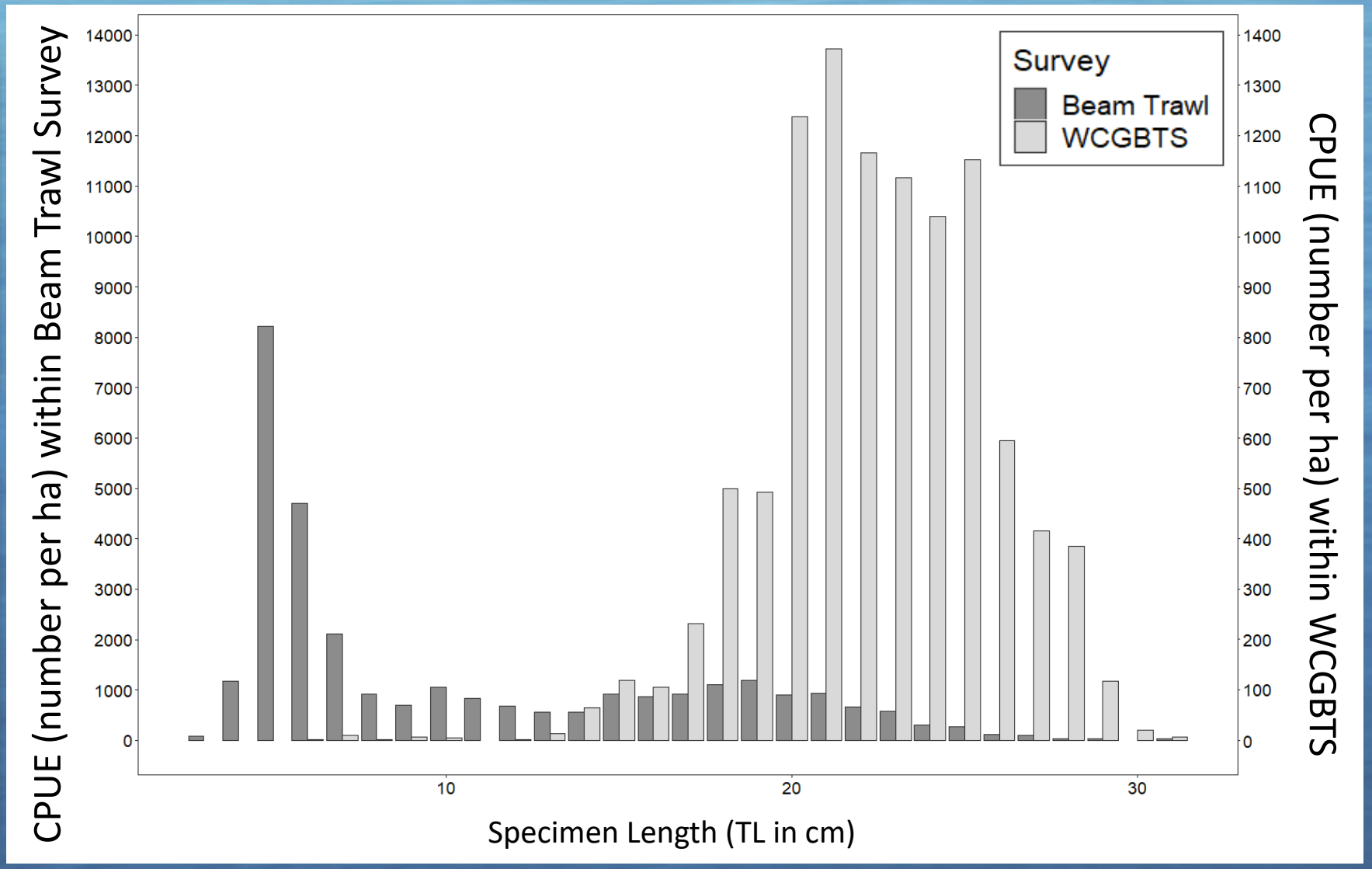





# Size of English sole (*Parophrys vetulus*)



# Size of Pacific sanddab (*Citharichthys sordidus*)



# Summary:
# Survey Comparison & Nearshore Communities

- Differences between surveys
  - Inner shelf vs. outer shelf
  - Flatfish vs. rockfish
  - Size of caught individuals
- Overlap between surveys
  - Common species
  - Larger juveniles caught in both
- Beam trawl sampling is a good complement to the WCGBTS

# Future Work

- Expand the beam trawl survey to the North and South
  - Inner shelf juvenile fish assemblages along the coast
- Compare the beam trawl survey to ichthyoplankton surveys
  - Is recruitment variability determined at the pre- or post-settlement stage?
- Develop an index of abundance for juvenile benthic fish assemblages

# Acknowledgements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- Various funding groups:
  - National Oceanic & Atmospheric Administration
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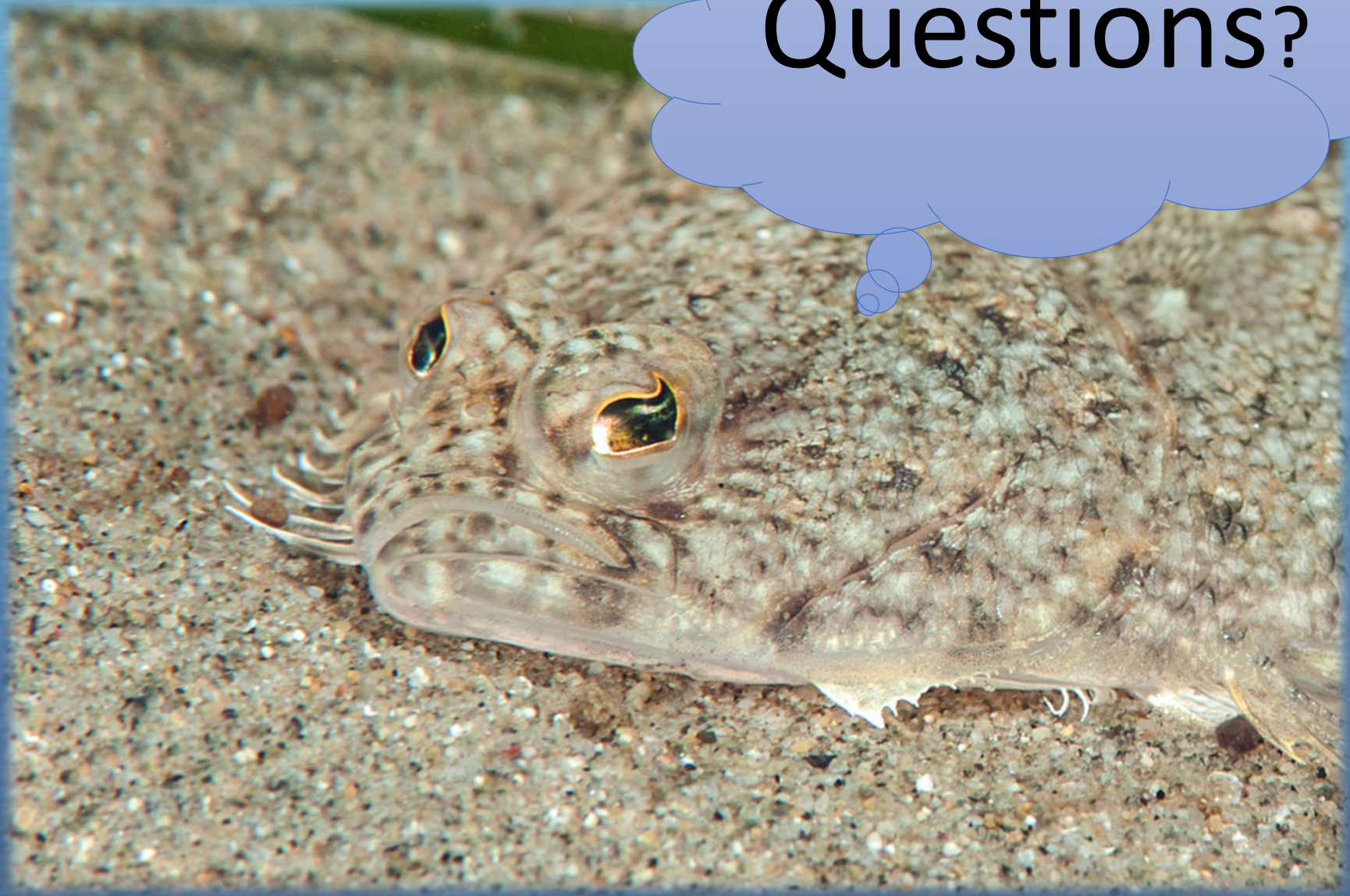
- Jason Phillips, Matthew Yergey, Morgan Bancroft, Toby Auth, Jennifer Fisher, Kathryn Sobocinski, Jay Peterson, and the crews of the R/V Elakha and F/Vs Miss Yvonne, Lady Law, and Michele Ann
- Researchers and volunteers on the Northwest Fisheries Science Center's West Coast Groundfish Bottom Trawl Survey (WCGBTS) team


Oregon State University
College of Earth, Ocean, and Atmospheric Sciences

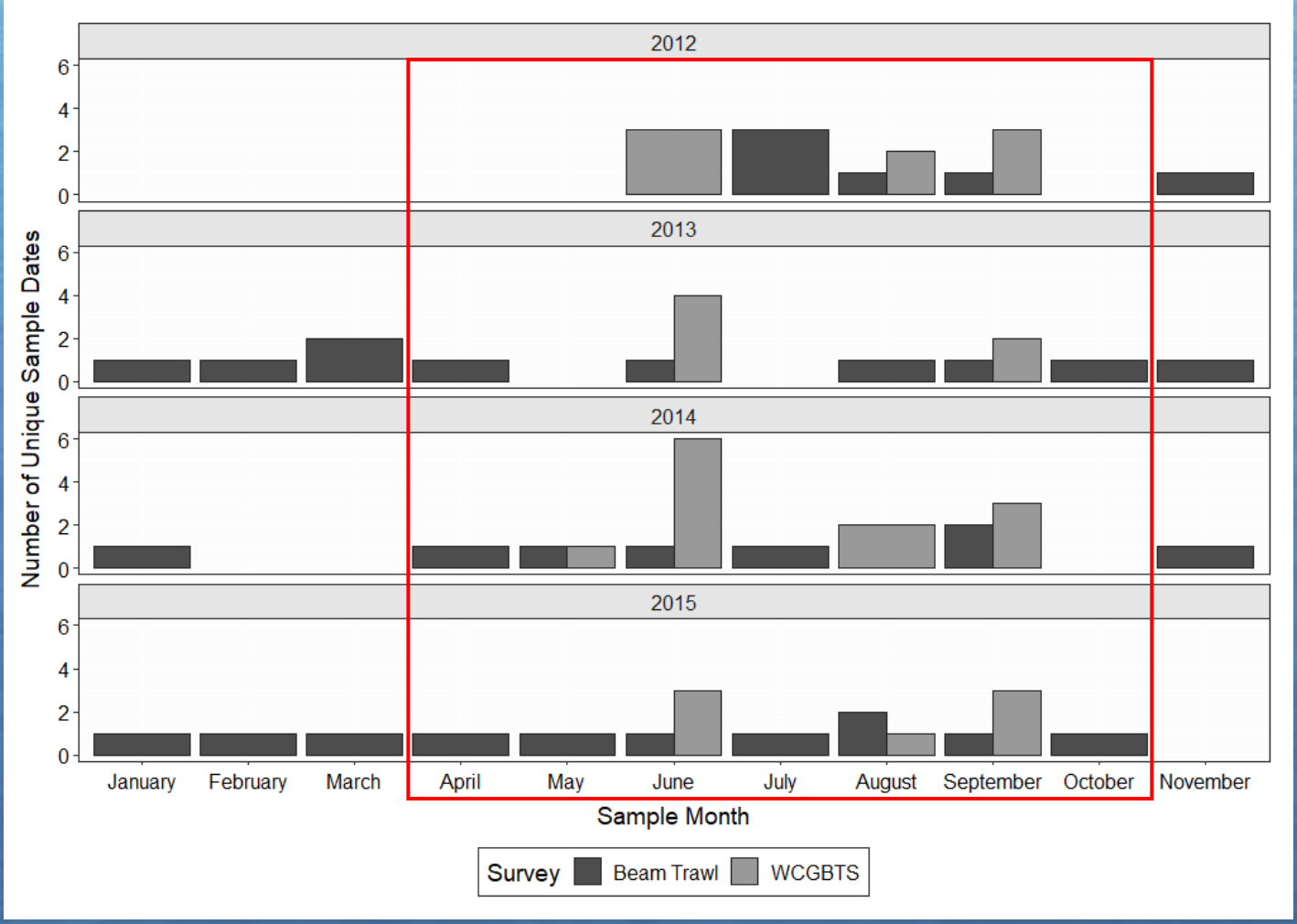
NOAA Northwest Fisheries Science Center

Oregon Fish & Wildlife Marine Resources

# Questions?



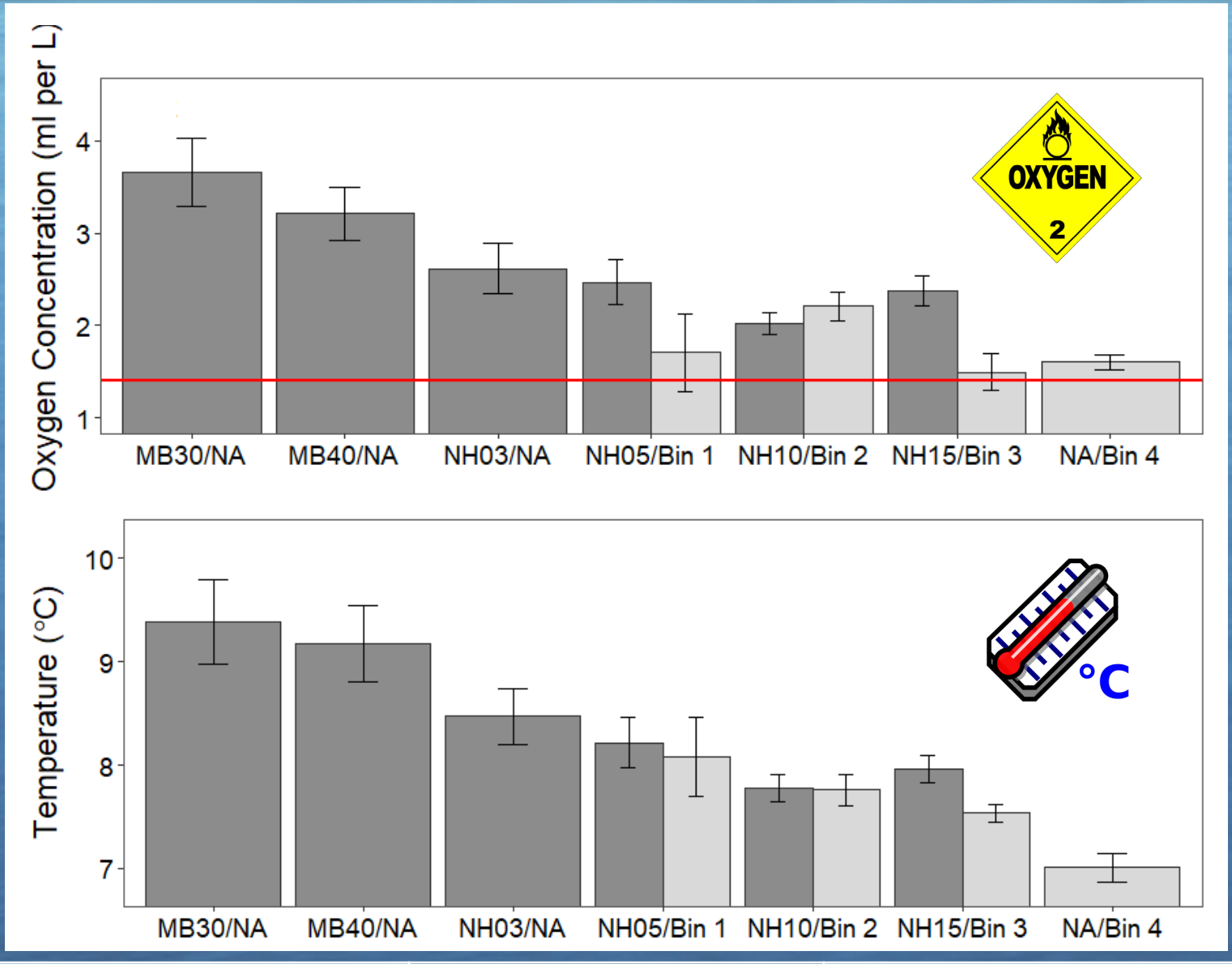
# Sampling periods



# Survey Comparison – Environmental Data

Survey:

- Beam Trawl
- WCGBTS



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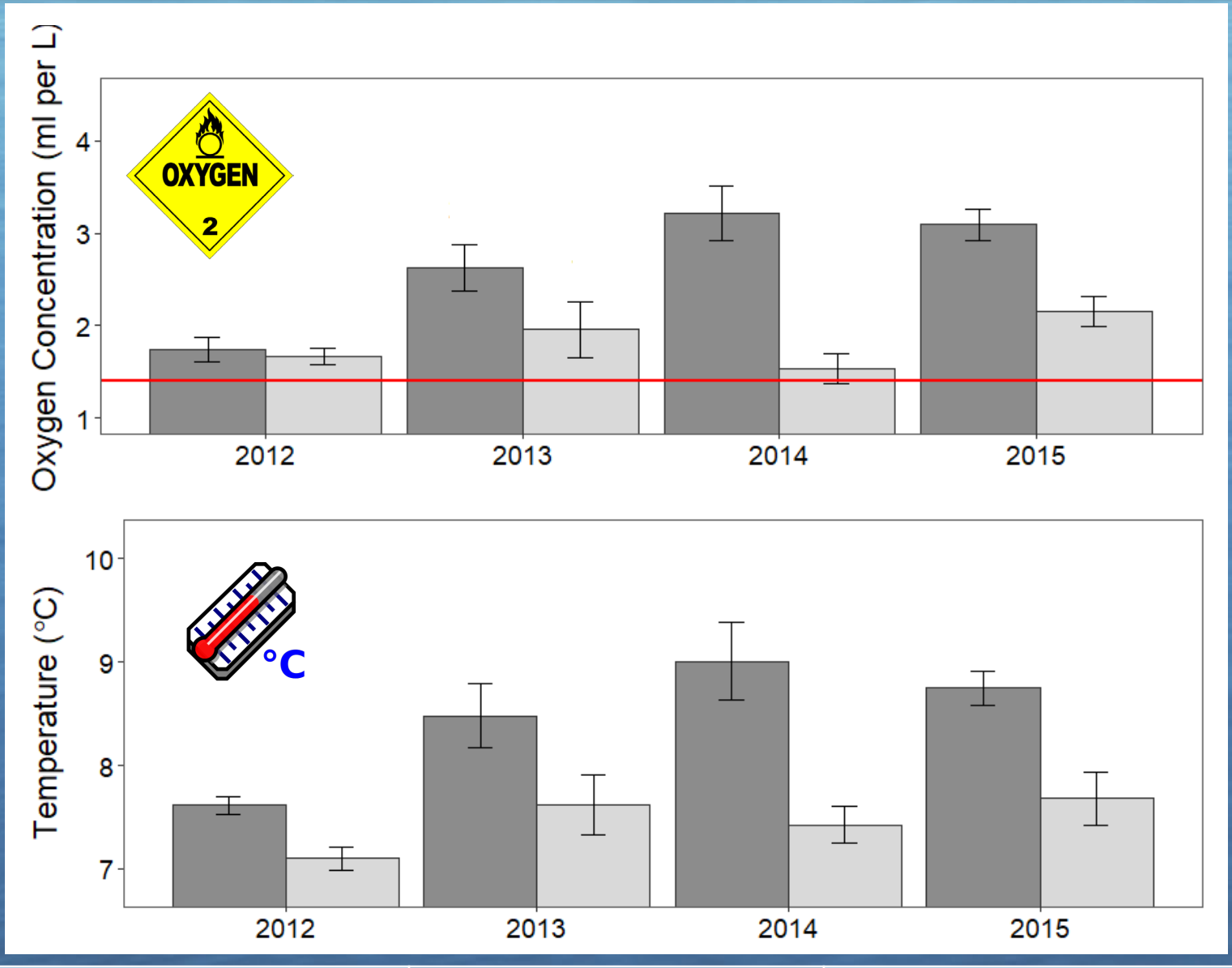
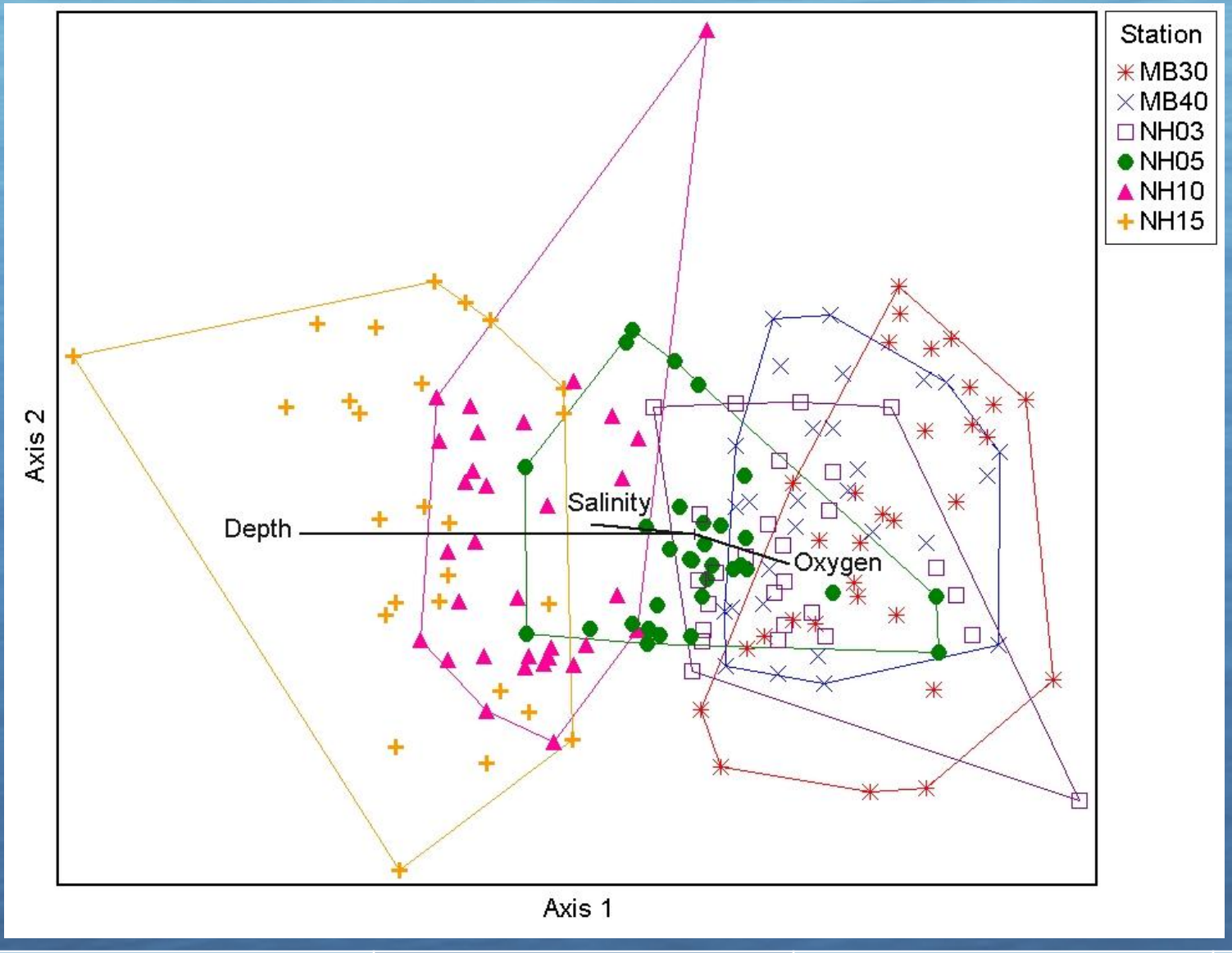


# Multivariate Community Analysis

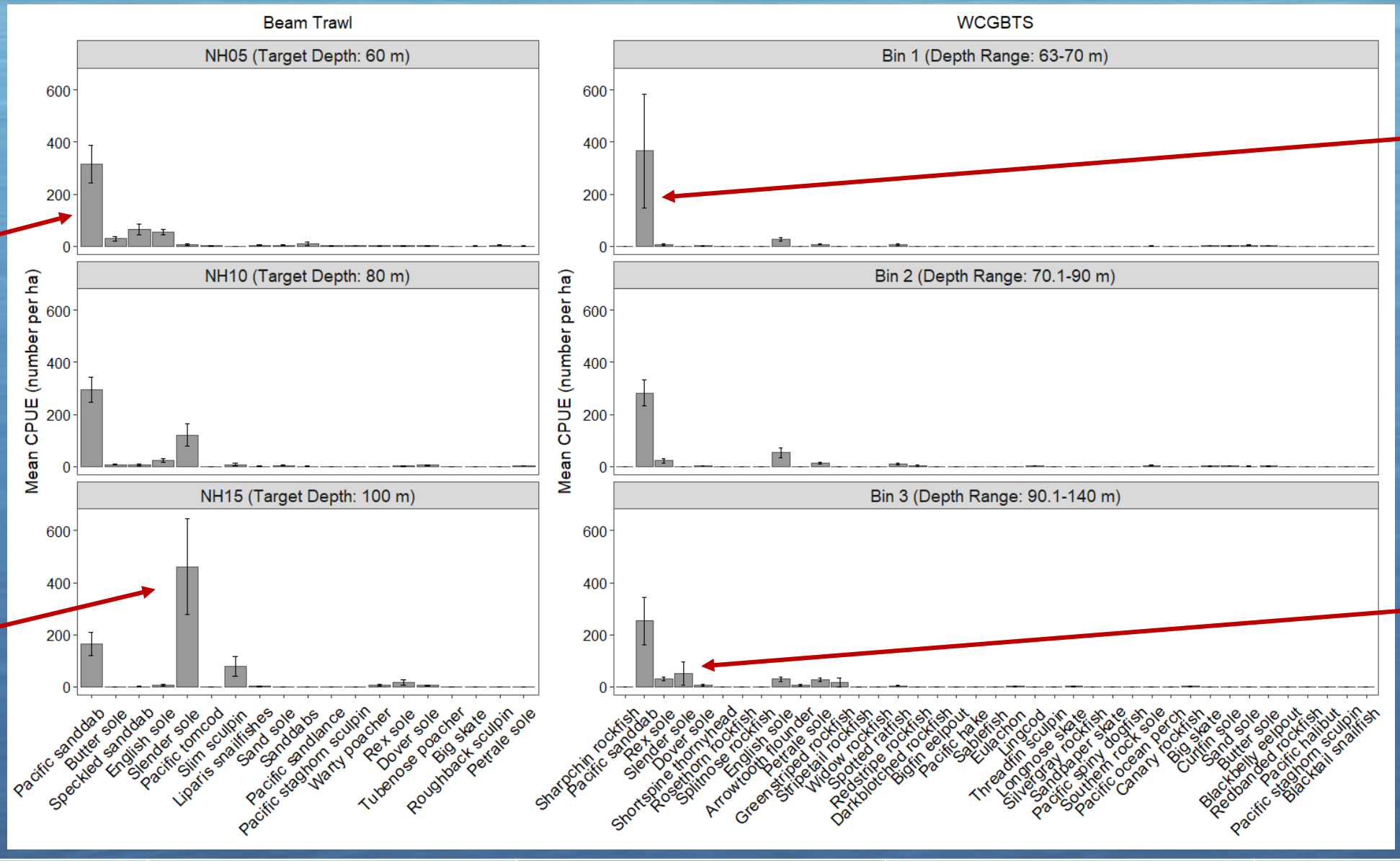
A 2-D Nonmetric Multidimensional Scaling (NMS) Ordination of Sample Units in Species Space.

- Depth transition ~ 60 m




Distances between points ≈ Dissimilarity in species composition.

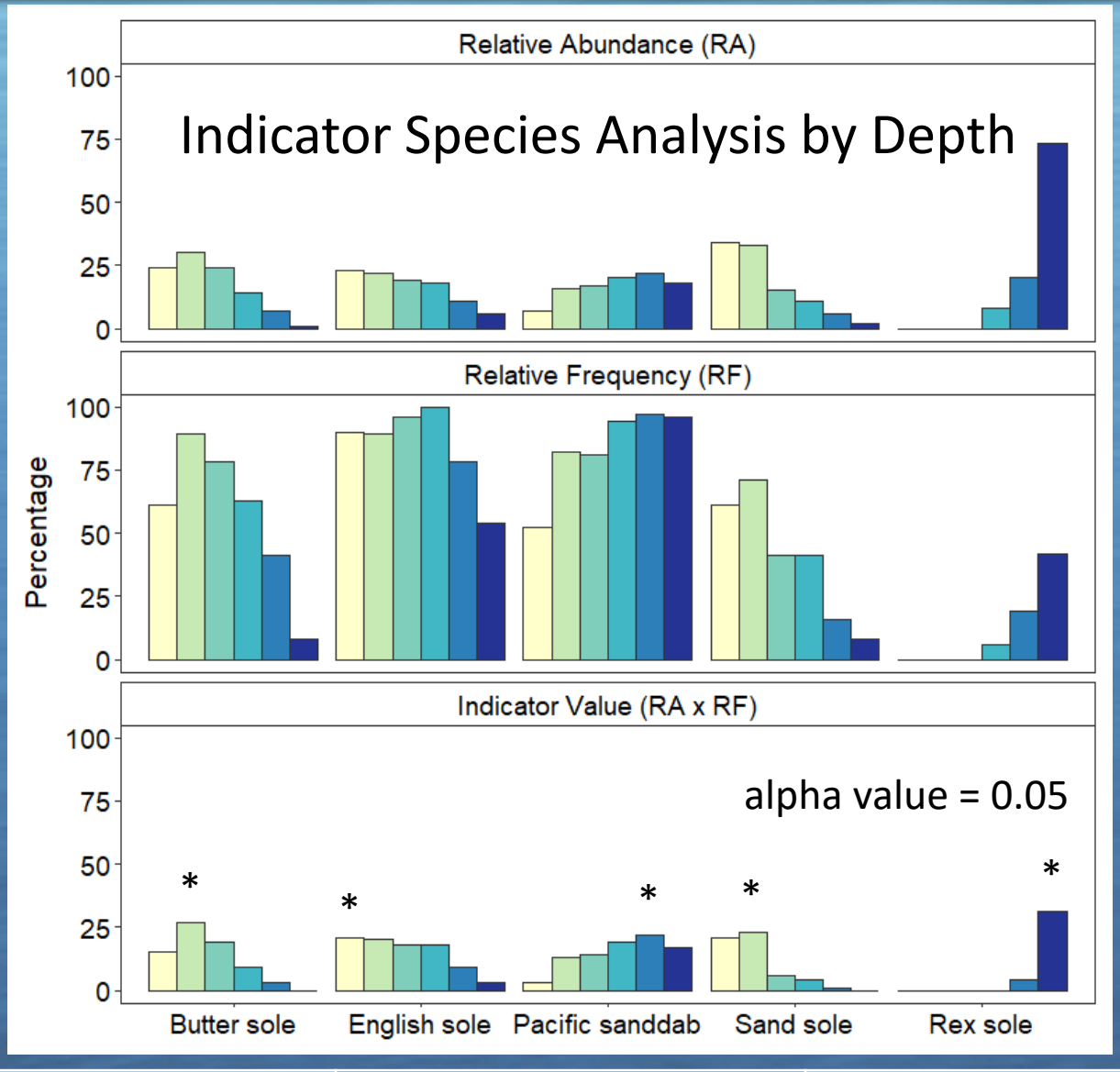
# Survey Comparison – Catch by Depth Strata

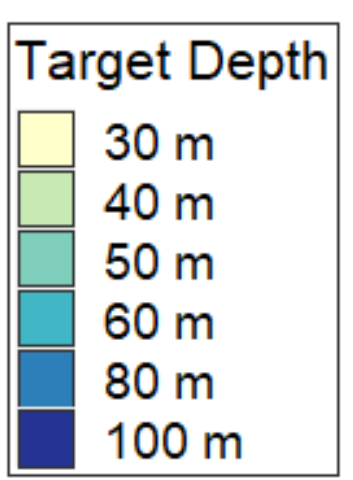


# Multivariate Community Analysis

MRPP Groups:

- Depth
- Season
- Year



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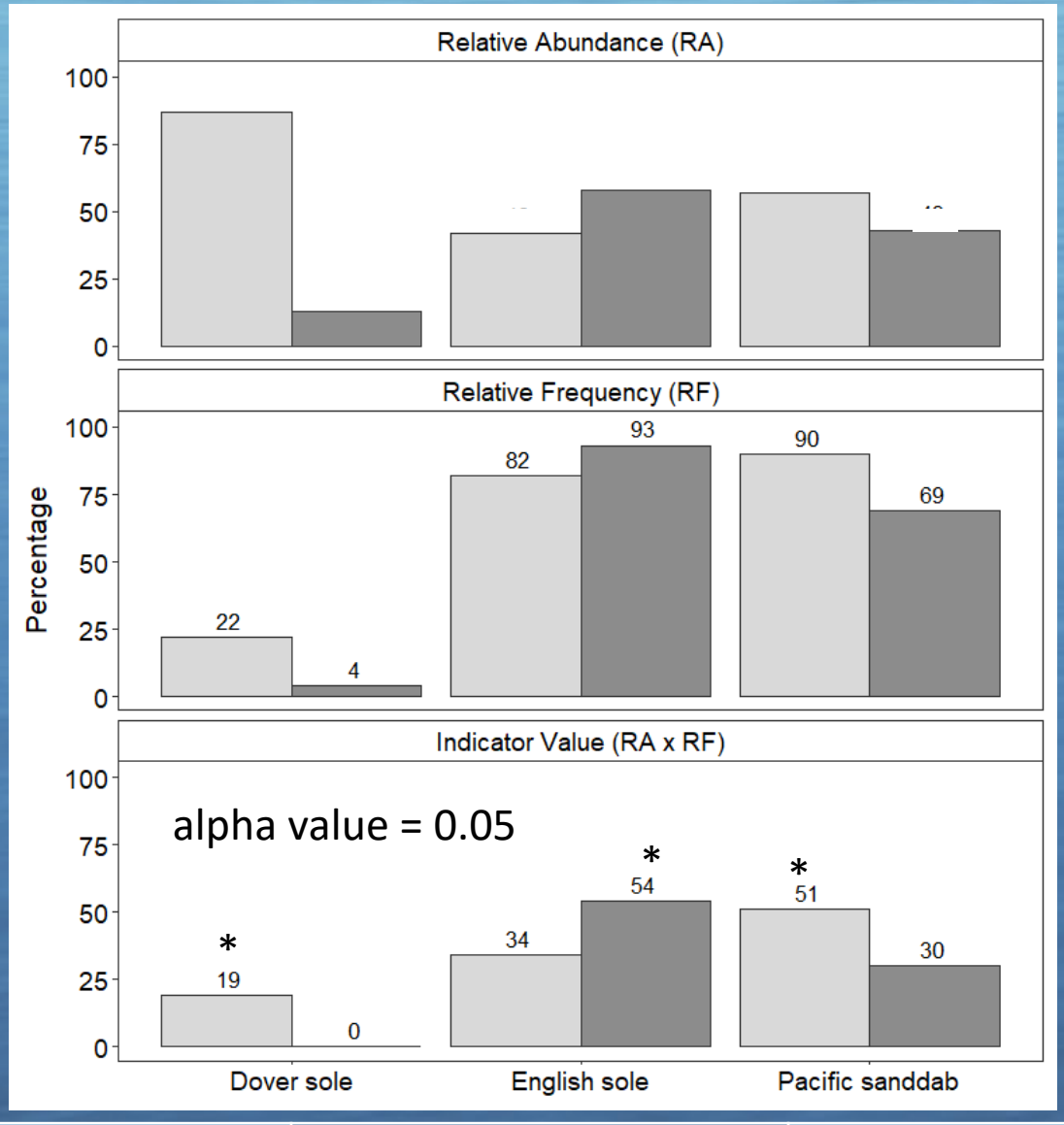
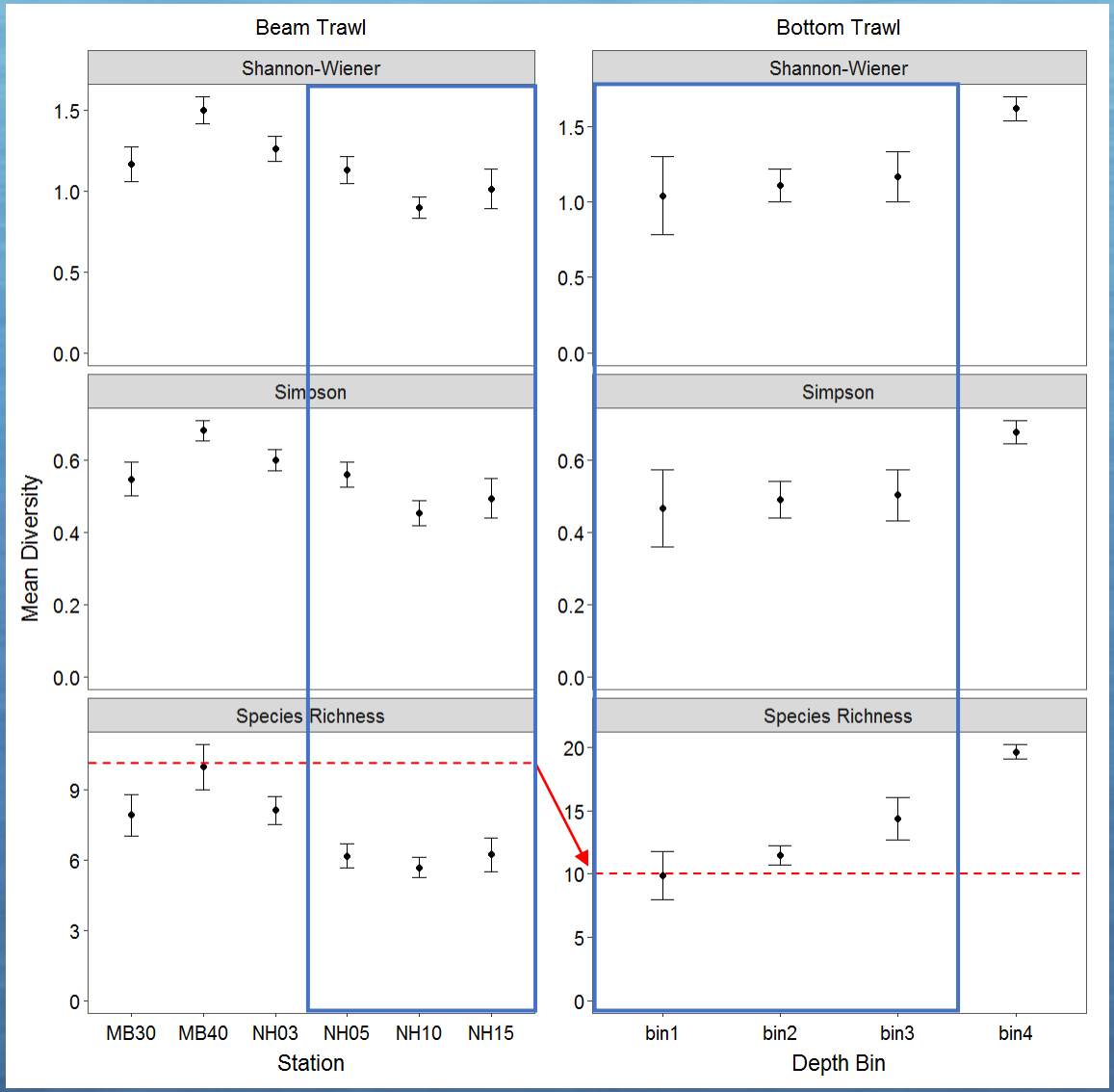



Indicator Species Analysis by Season

# Survey Comparison – Sample Biodiversity

Nearshore Diversity: Beam trawl > Bottom trawl



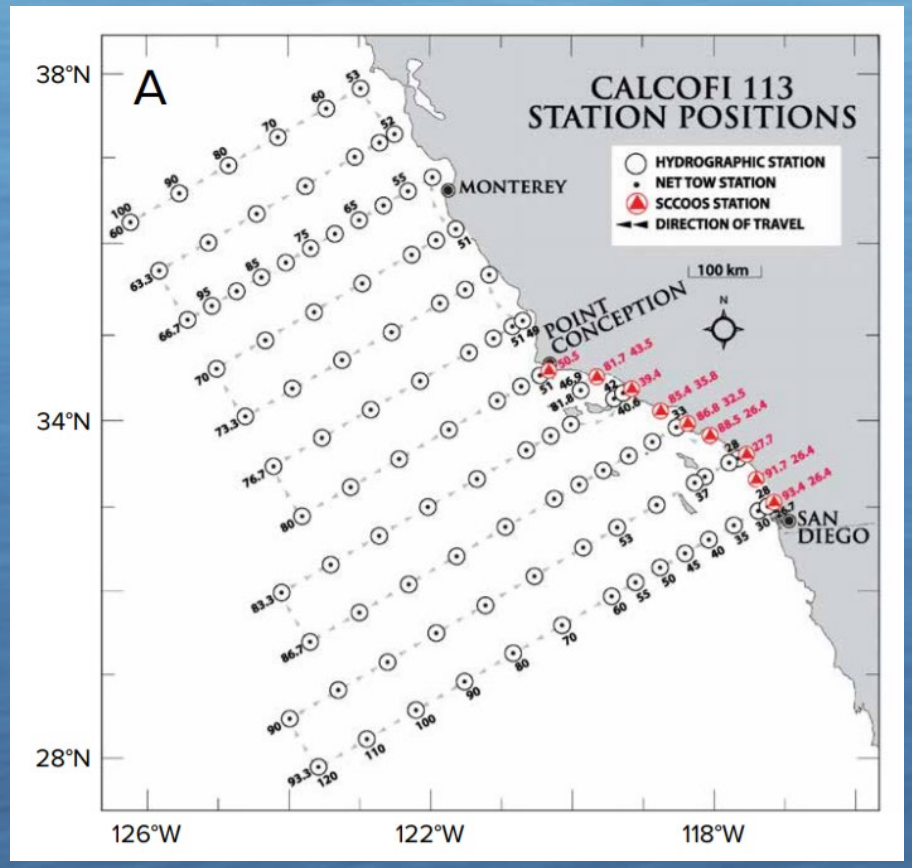

Overall Diversity: Bottom trawl > Beam trawl

# Feasibility of incorporating nearshore sampling into the WCGBTS or stock assessments

- Do current policies or frameworks allow/call for nearshore sampling?
  - Magnuson-stevens fishery conservation & management act (MSA)
    - Best Available Science (BAS)
    - Essential Fish Habitat (EFH)
  - Ecosystem-Based Management (EBM)
- Previous early life history surveys incorporated into Stock Assessments
- Tradeoffs/roadblocks → potential solutions

# Feasibility: Previous Studies to Build On

## California Cooperative Oceanic Fisheries Investigations (CalCOFI)




Adapted from McClatchie et al., 2014

## Rockfish Recruitment & Ecosystem Assessment Survey (RREAS)