

# Science Informing Artificial Reefing

Key findings, knowledge gaps, and future direction  
from a Gulf of Mexico case study

# Program Goals:

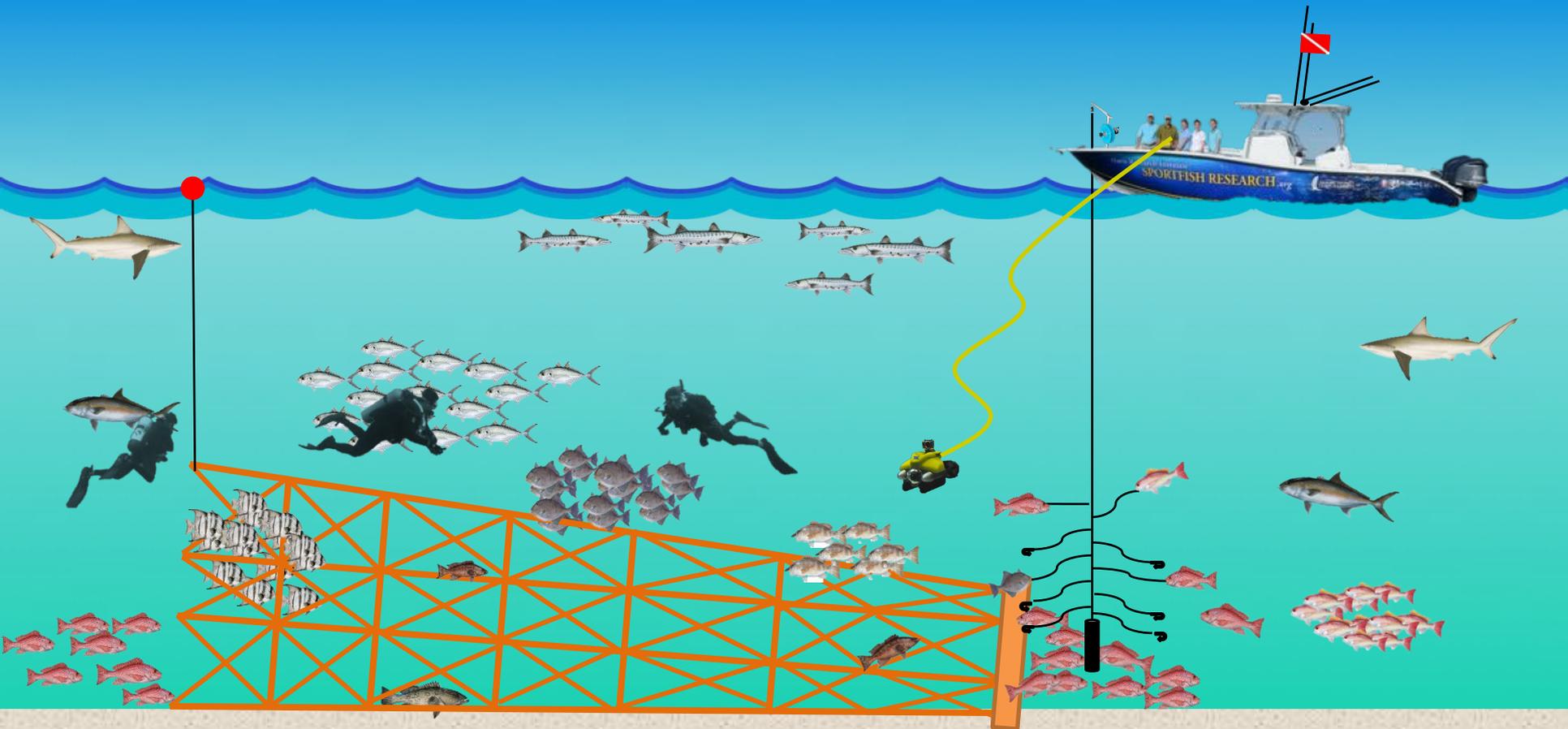
## Provide Best Science to:

- Enhancing Fisheries
- Diving and other Recreational Opportunities
- Ecological Performance (vs Natural Reefs)

## Develop Standardized Survey Methods:

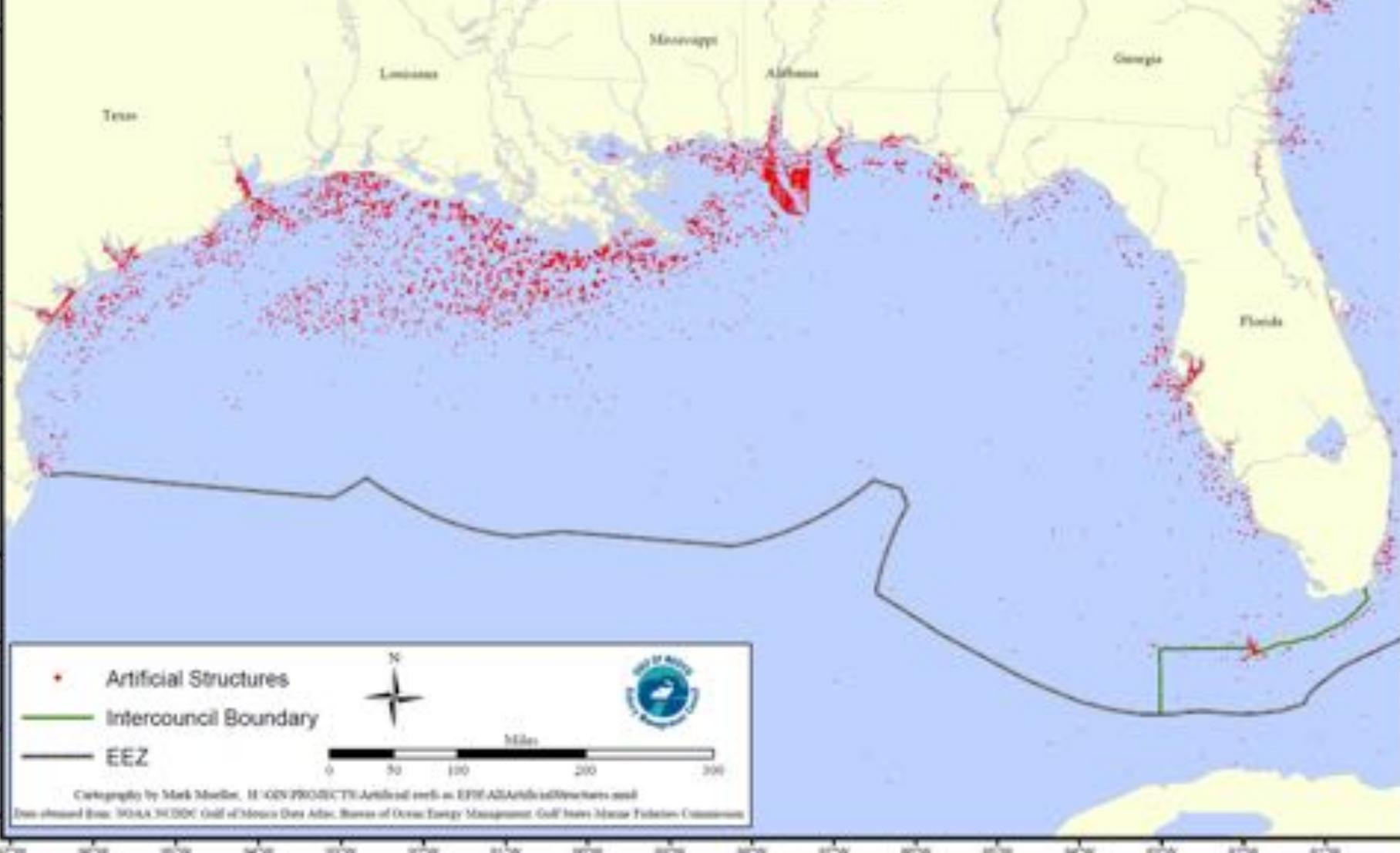
- Stock Assessment “Friendly”

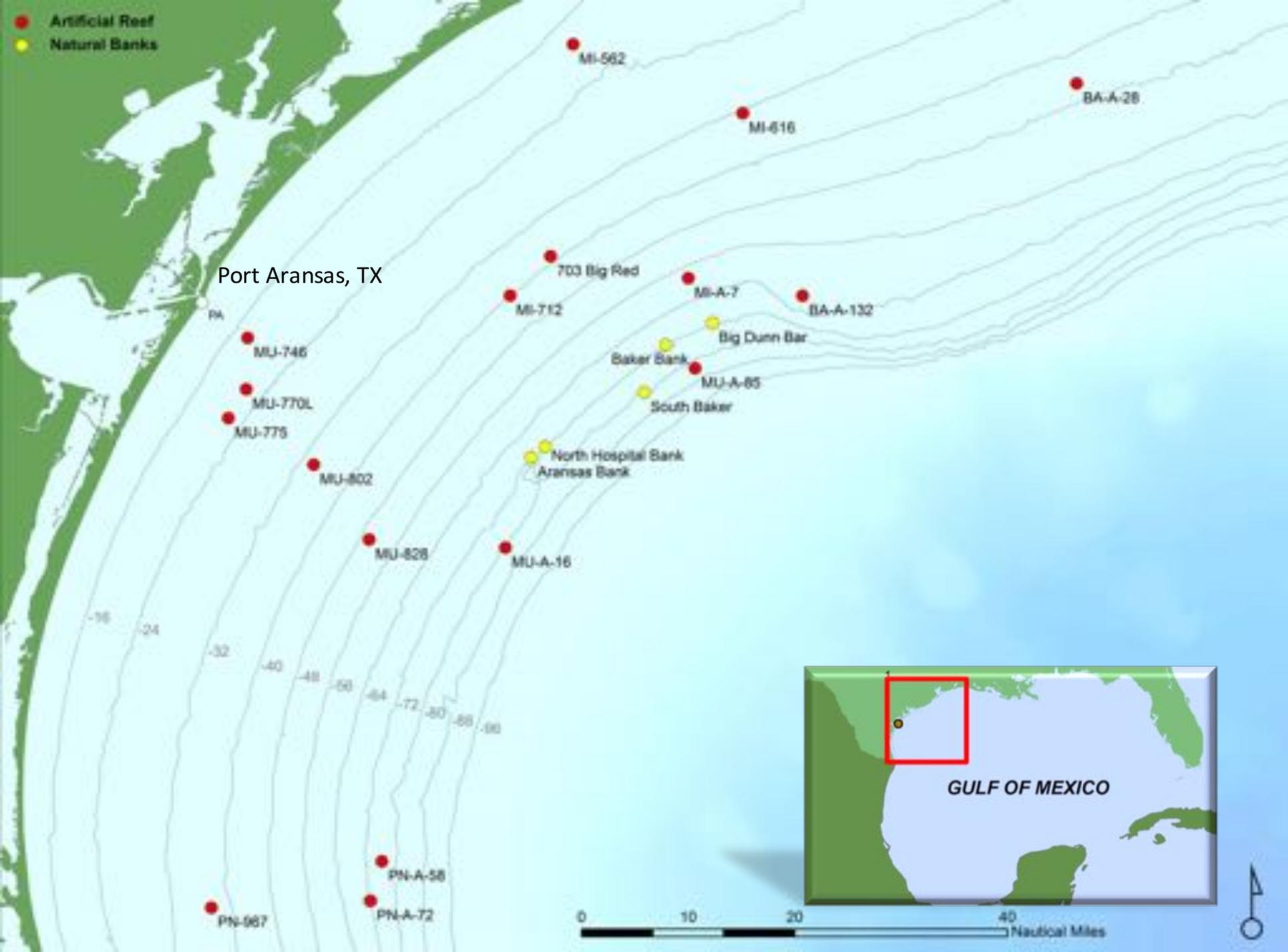
# Artificial Reef Monitoring Methods



Schematic by M.Z. Sluis

# All Known Artificial Structures

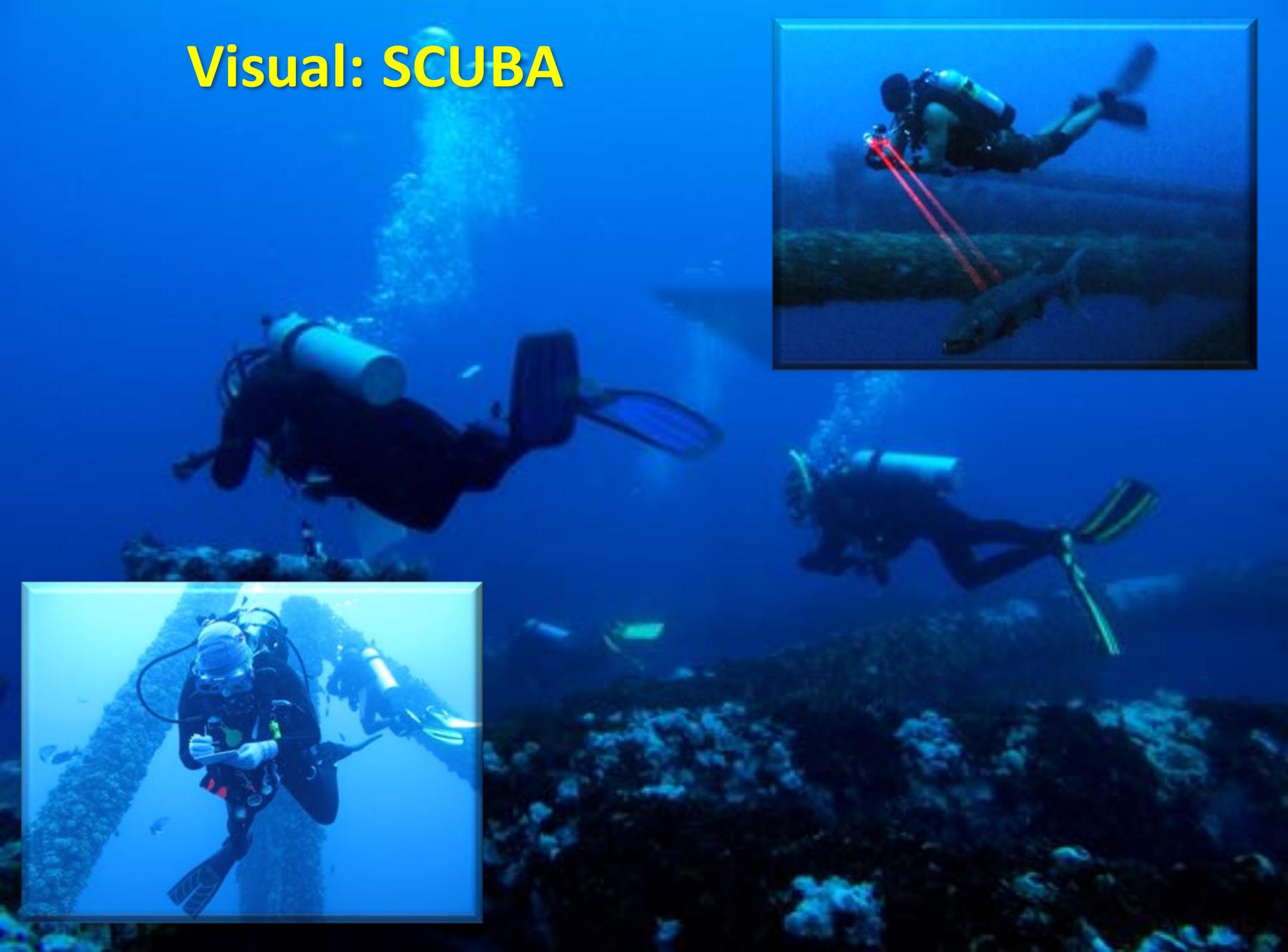




# Challenges:

- Variety of structure/habitat types and size (platforms, pyramids, ships, natural banks) – inherent biases
- Water clarity/visibility – Nepheloid layer
- Cryptic species vs. fisheries species
- NEED: Cost-effective, efficient data collection that is comparable across habitat types and region

# Visual: SCUBA



# Vertical Line Sampling



# Vertical "Long-line"



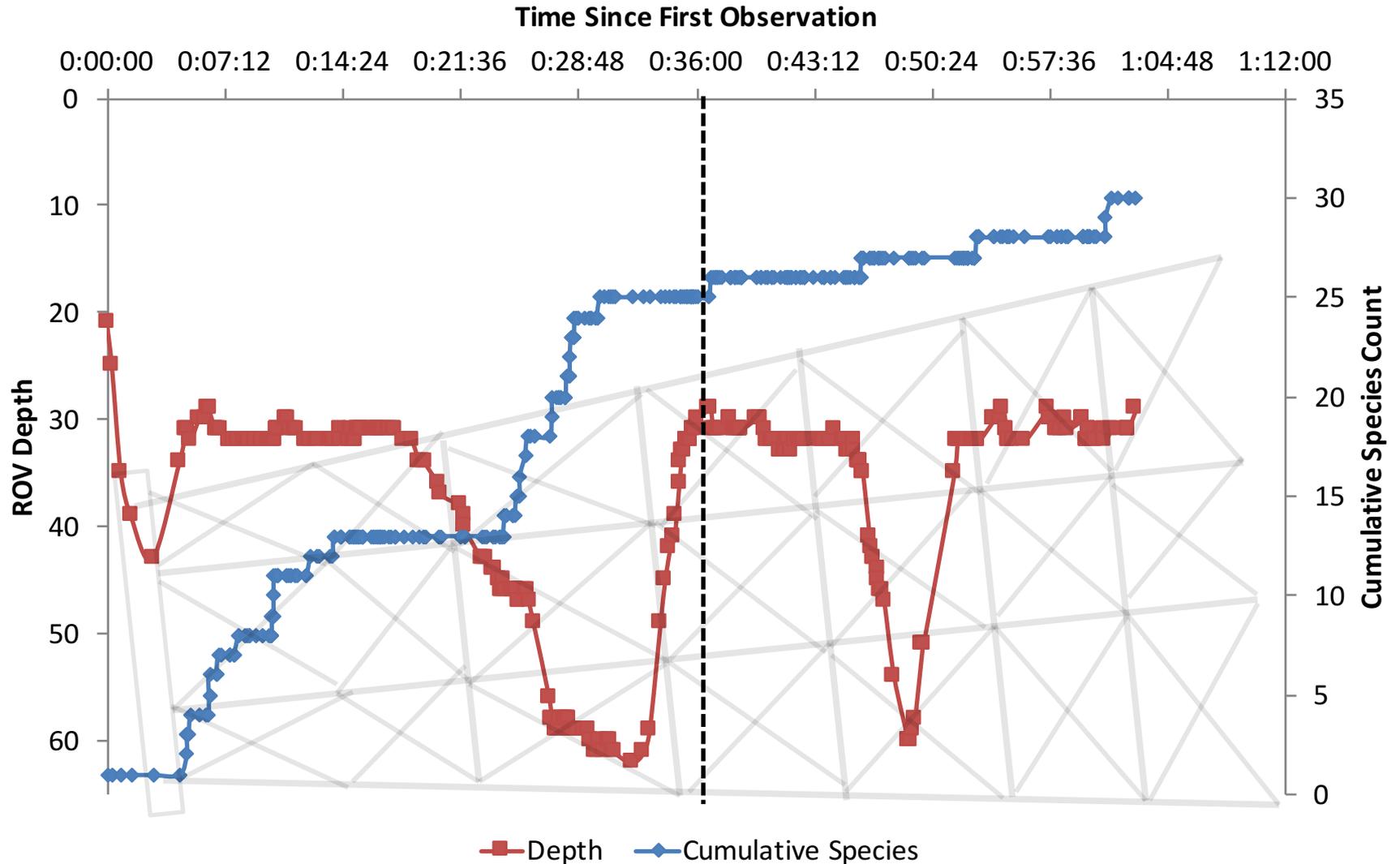
# Roving Transect



**So... what is the science telling us?**

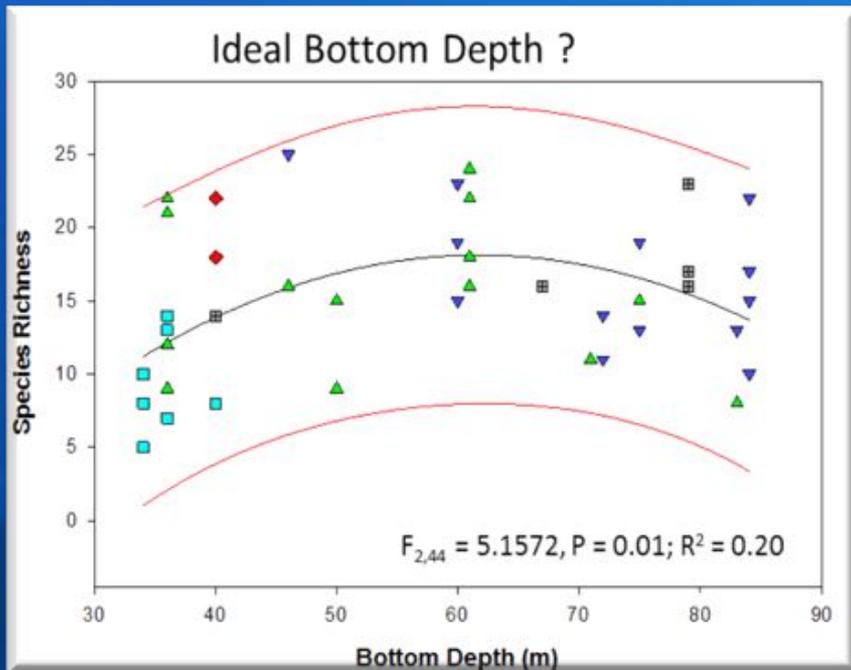


# Where and how long to sample?



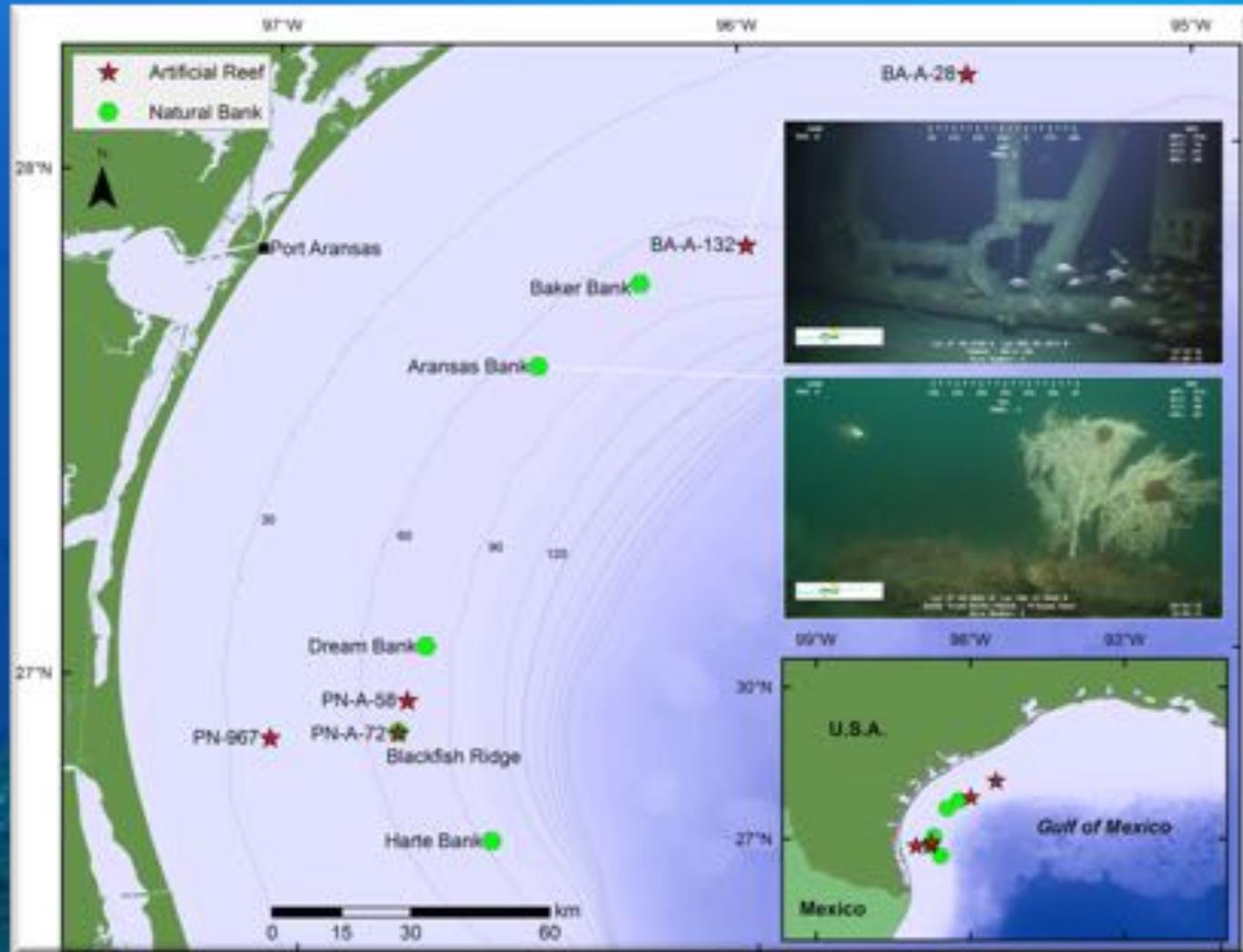
# Application of ROV Data: *Spatial Arrangement*

## “Sweet Spots”



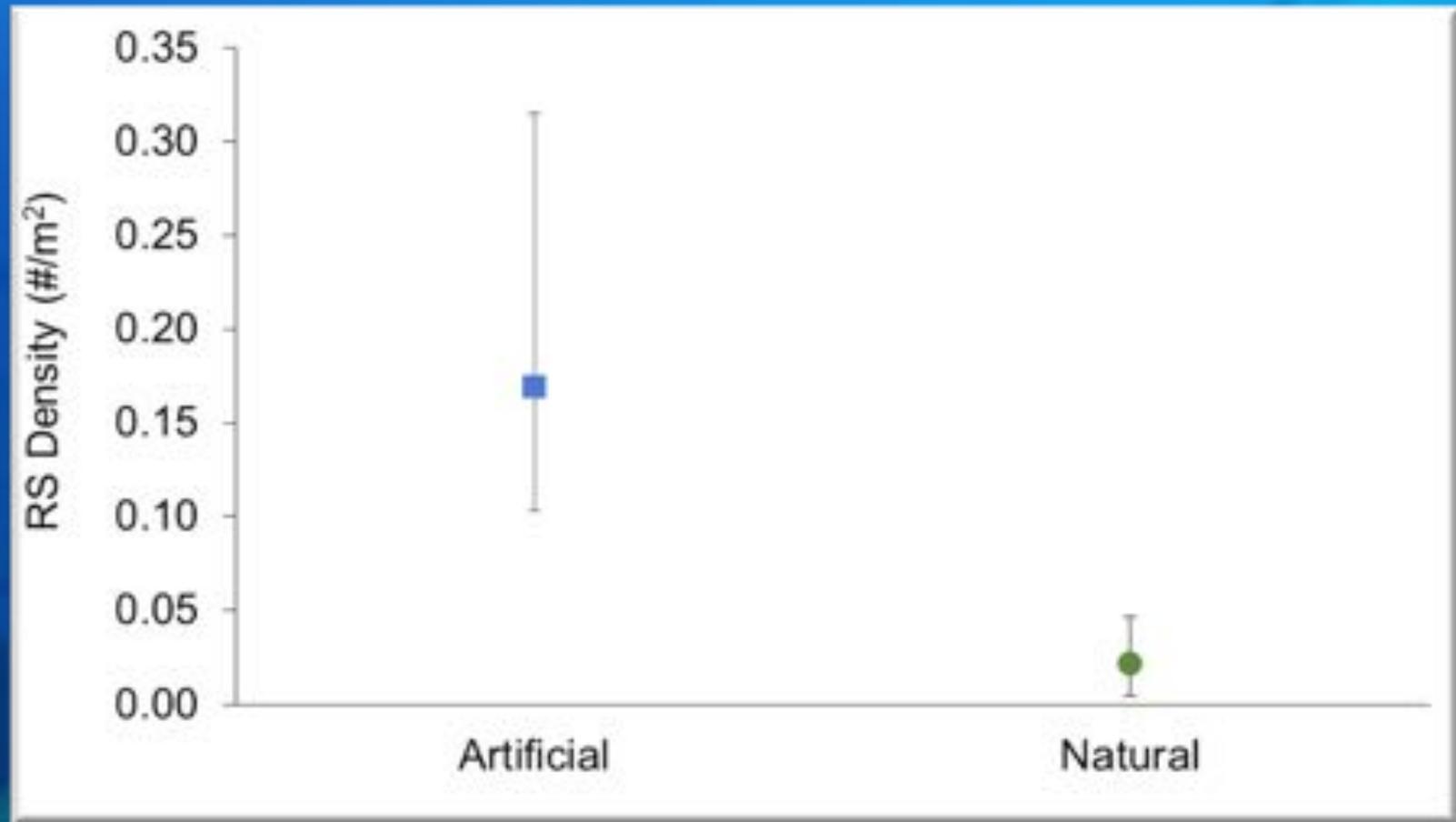
All structures - height

# Application of ROV Data: *Performance – Natural vs. Artificial Comparisons*

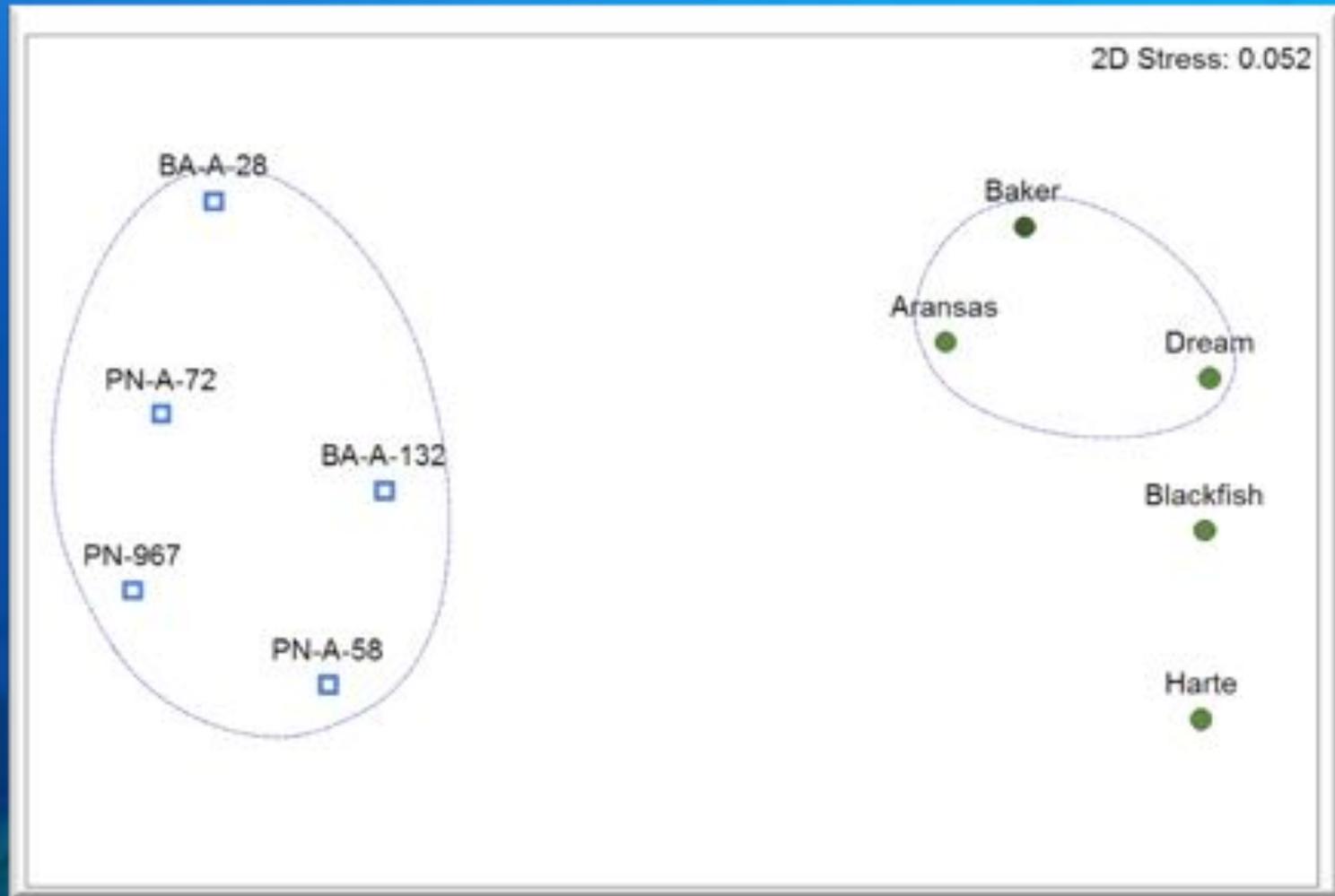


*Streich et al. (in review)*

# Application of ROV data: Red Snapper Abundance



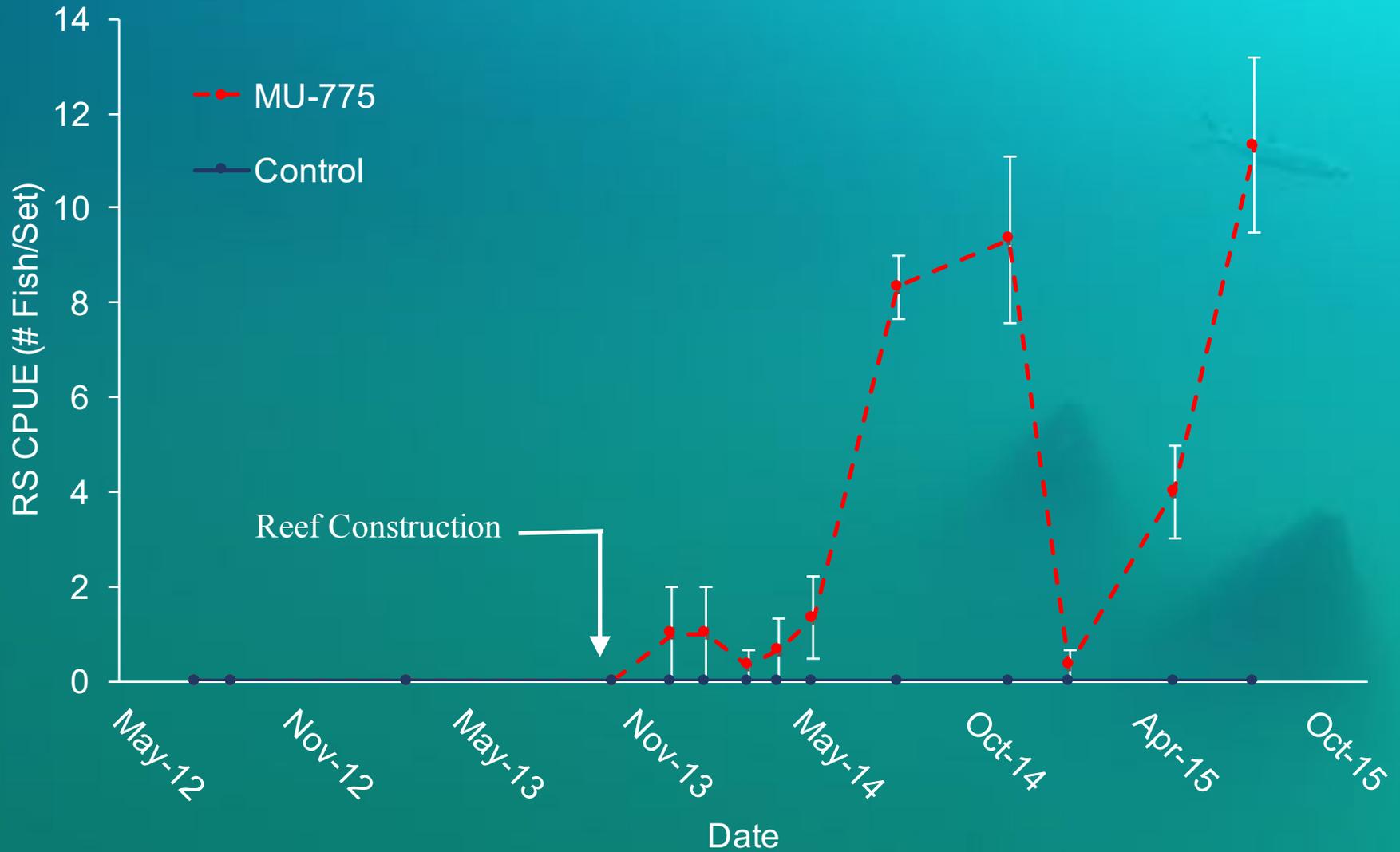
# Application of ROV data: *Community Structure*



# Attraction vs Production



# Red Snapper Abundance Over Time



# Red Snapper Size Structure

Summer 13

Fall 13

Winter 14

Spring 14

Summer 14

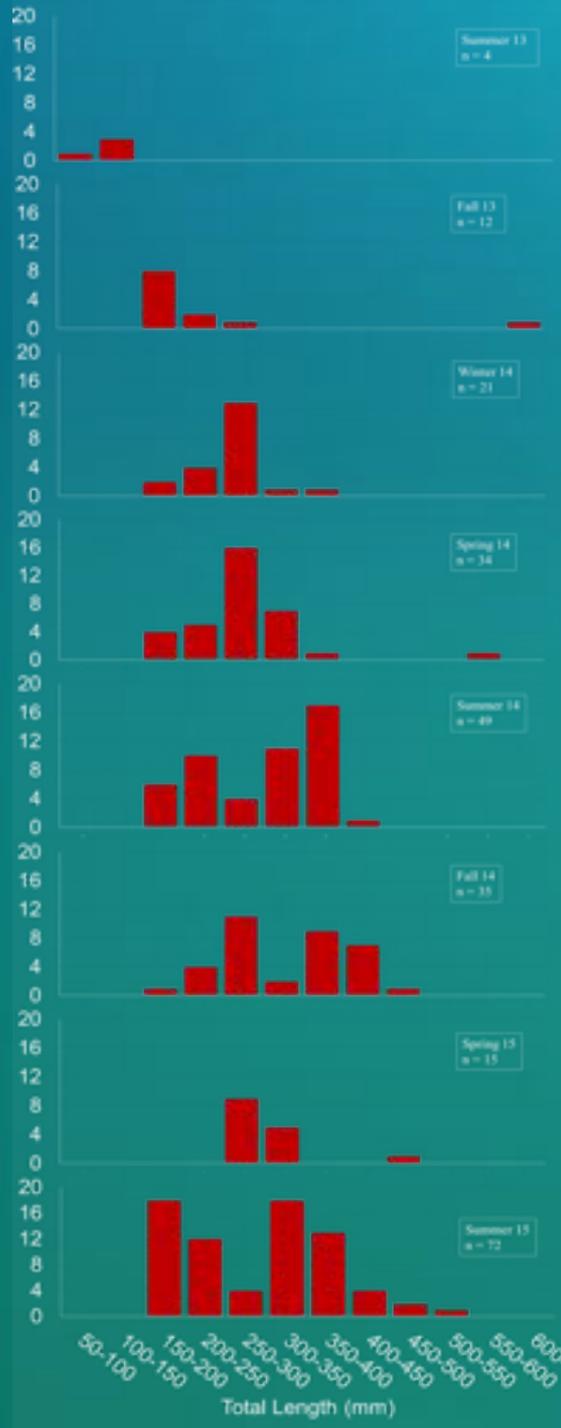
Fall 14

Spring 15

Summer 15

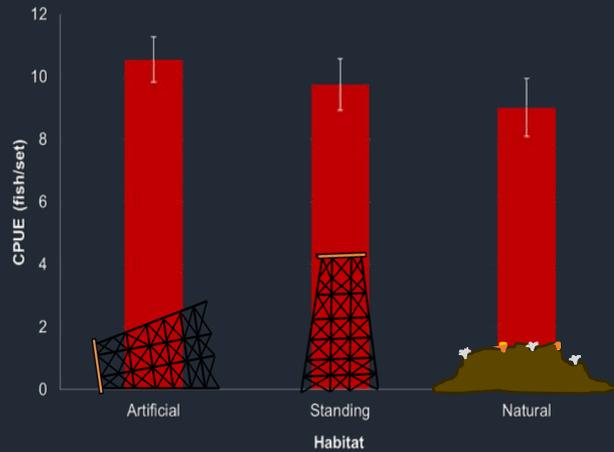


# of Red Snapper

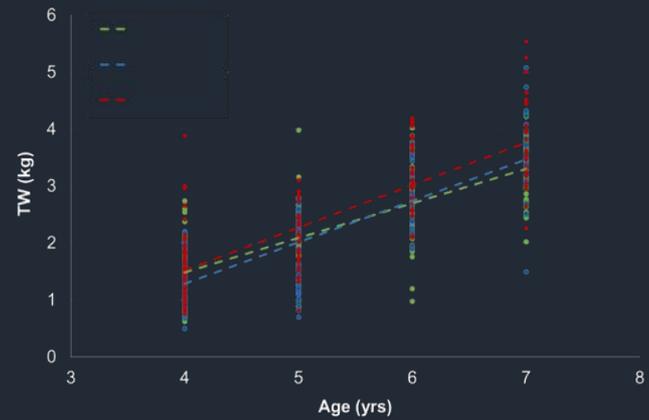


# Performance Measures: Artificial vs Natural

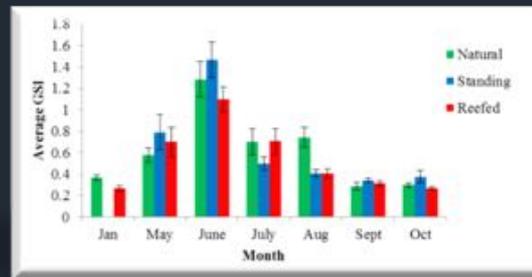
## Abundance



## Weight



## Reproduction



# Trigger Questions:

- Limited resources (materials/cost) – maximize
- Goals: Fishing, Diving, Nursery Habitat (low relief)
- Size, distance from shore, spatial arrangement
- Even if no A&P - removes pressure from more sensitive areas

# Center for Sportfish Science and Conservation

## PROFESSIONAL STAFF



Megan Robillard, M.S.  
Program Manager



Matt Ajemian, Ph.D.  
Research Scientist



Judd Curtis, Ph.D.  
Post-doc Associate



Jennifer Wetz, M.S.  
Project Manager



Jason Williams, M.S.  
Research Specialist



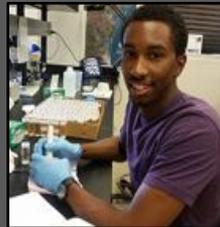
Tara Topping, M.S.  
Research Specialist



Rachel Brewton, M.S.  
Research Specialist



Ashley Ferguson, B.S.  
Research Tech



David Norris, B.S.  
Research Tech

## STUDENTS

### Ph.D. Students



Matt Streich



Kesley Gibson



Zach Olsen

### Master's Students



Quentin Hall



Chas Downey



Alex Tompkins

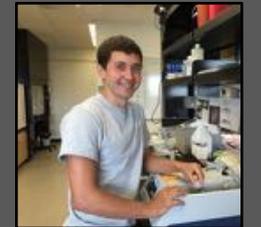
### Undergraduate Students



Lily Walker



Meghan Hargis



Zach Crain

# Acknowledgements

CAGE  
THR: 0



ROV  
DPT: 32m  
ALT: 4m  
TLT: 00  
ROL: 06



Lat 26 52.0102 N Lon 097 02.9732 W  
FK005C / PN-967  
Dive Number: 2

10/15/12  
14:52:37



*Center for*  
**SPORTFISH SCIENCE  
& CONSERVATION**



Extras

# Nepheloid?



# Absolute Abundance Estimation

## Tritech MicronNav USBL Positioning System:

- Transponder fits into ROV float block
- Allows real-time tracking of ROV and recordable GPS positions
- Estimates of distance covered

