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
Port Aransas, TX
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?

Ajemian et al. (2015), Fisheries Research
Application of ROV Data: Spatial Arrangement

“Sweet Spots”

Ajemian et al. (2015), PLoS ONE 10(5)
Application of ROV Data: Performance – Natural vs. Artificial Comparisons

Streich et al. (in review)
Application of ROV data: Red Snapper Abundance

Streich et al. (in review)
Application of ROV data: Community Structure

Streich et al. (in review)
Attraction vs Production
Red Snapper Abundance Over Time

Streich et al. (in review)
Performance Measures: Artificial vs Natural

Abundance

- Artificial
- Standing Habitat
- Natural

Weight

- TVW (kg)

Reproduction

- Average Oil
- Month

- Natun1
- Standing
- Reefel
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
Acknowledgements
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