

Rigs-to-Reefs Structures and Coral Community Development in the N. Gulf of Mexico: A First View

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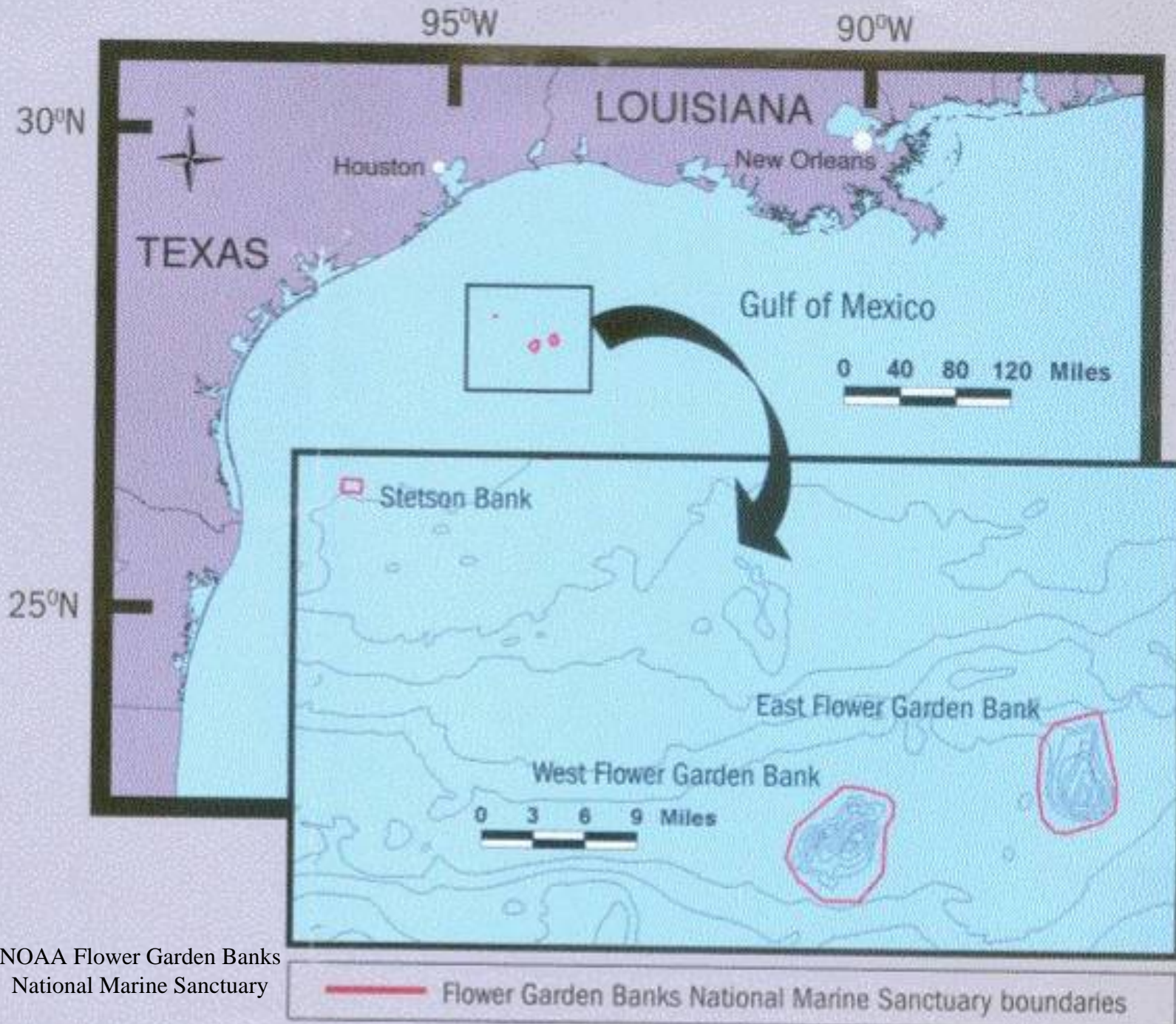
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Louisiana State University**



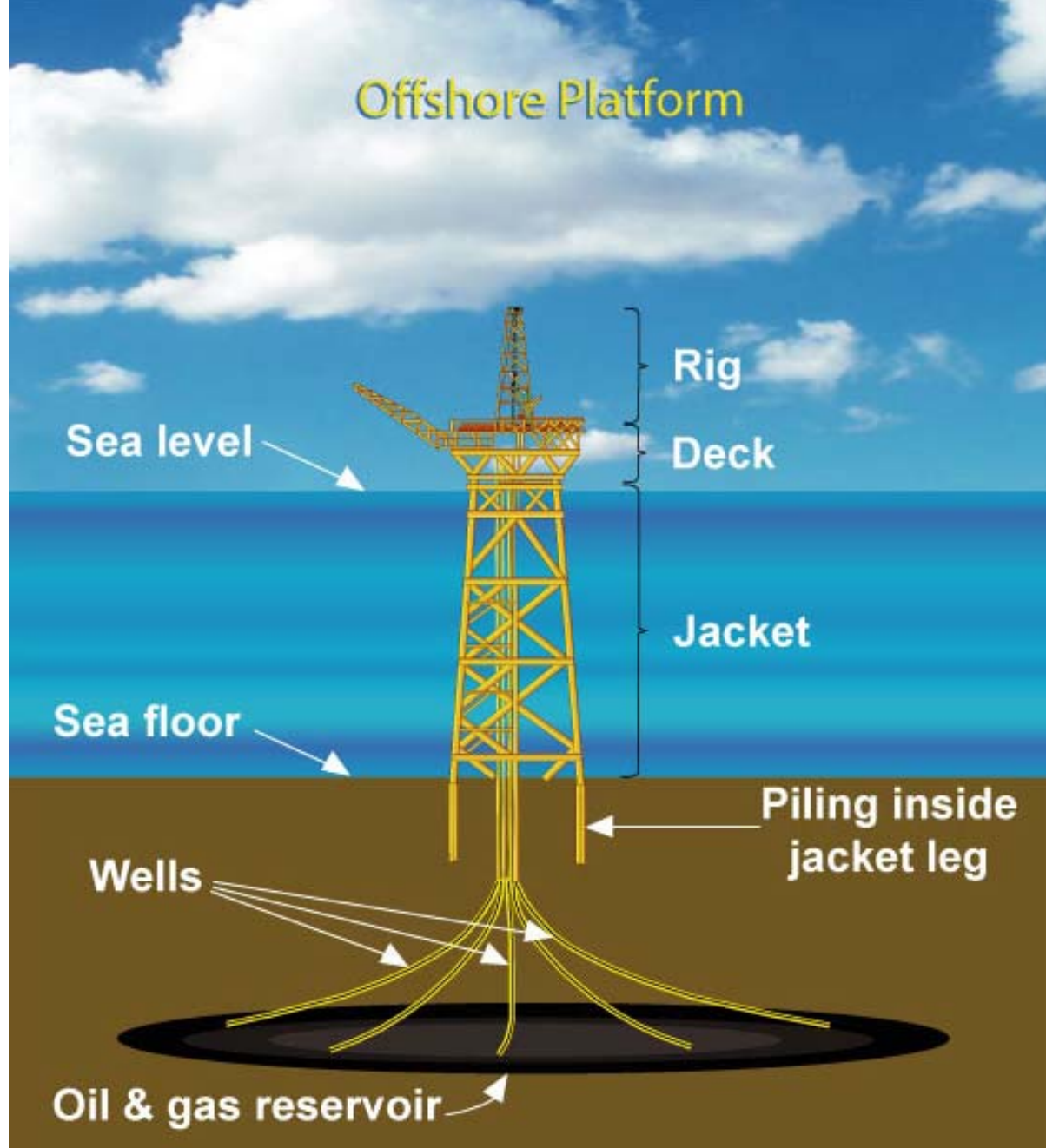


NOAA Flower Garden Banks
National Marine Sanctuary

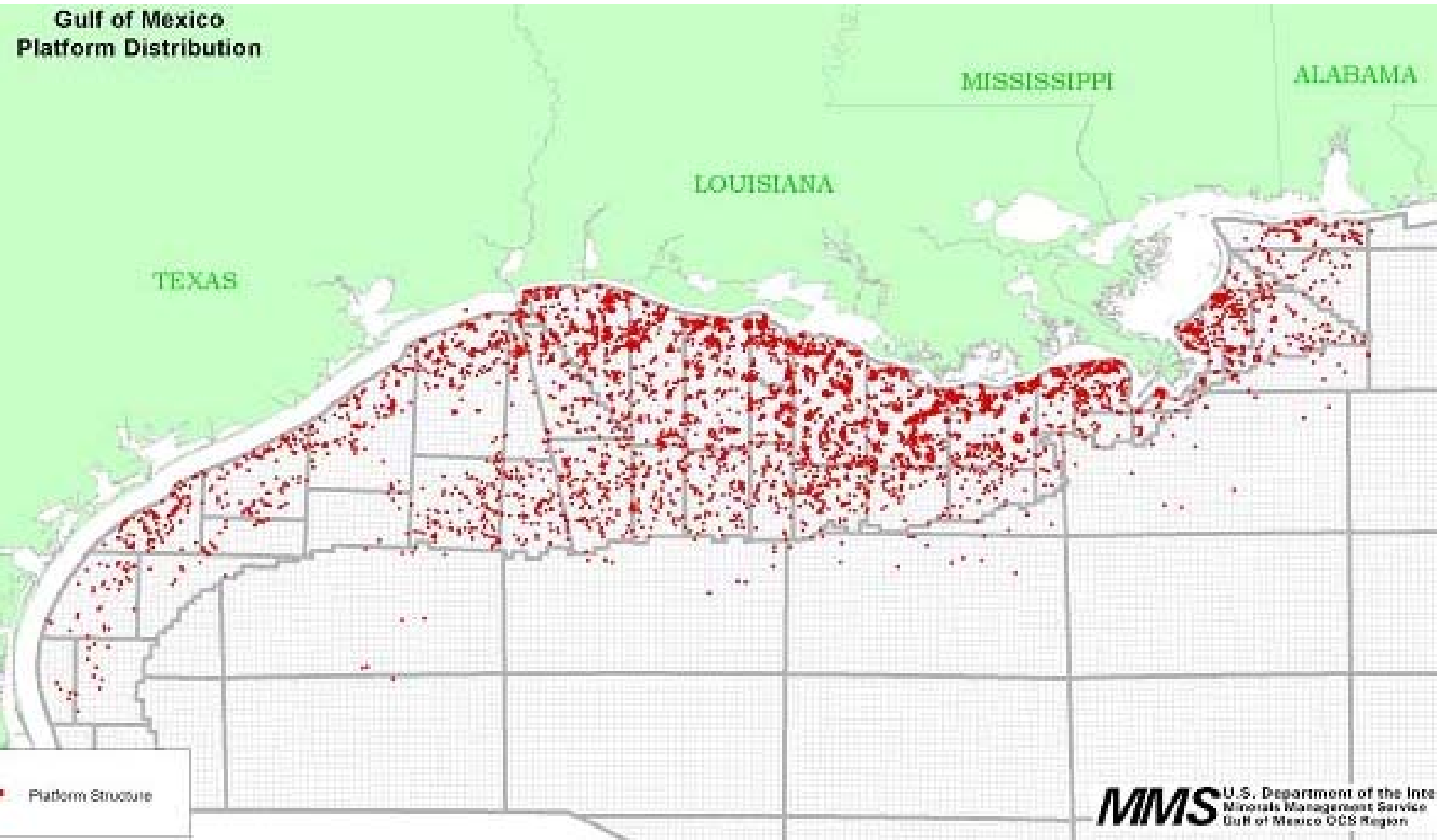
— Flower Garden Banks National Marine Sanctuary boundaries



Offshore Platform



**Gulf of Mexico
Platform Distribution**



Platform Structure

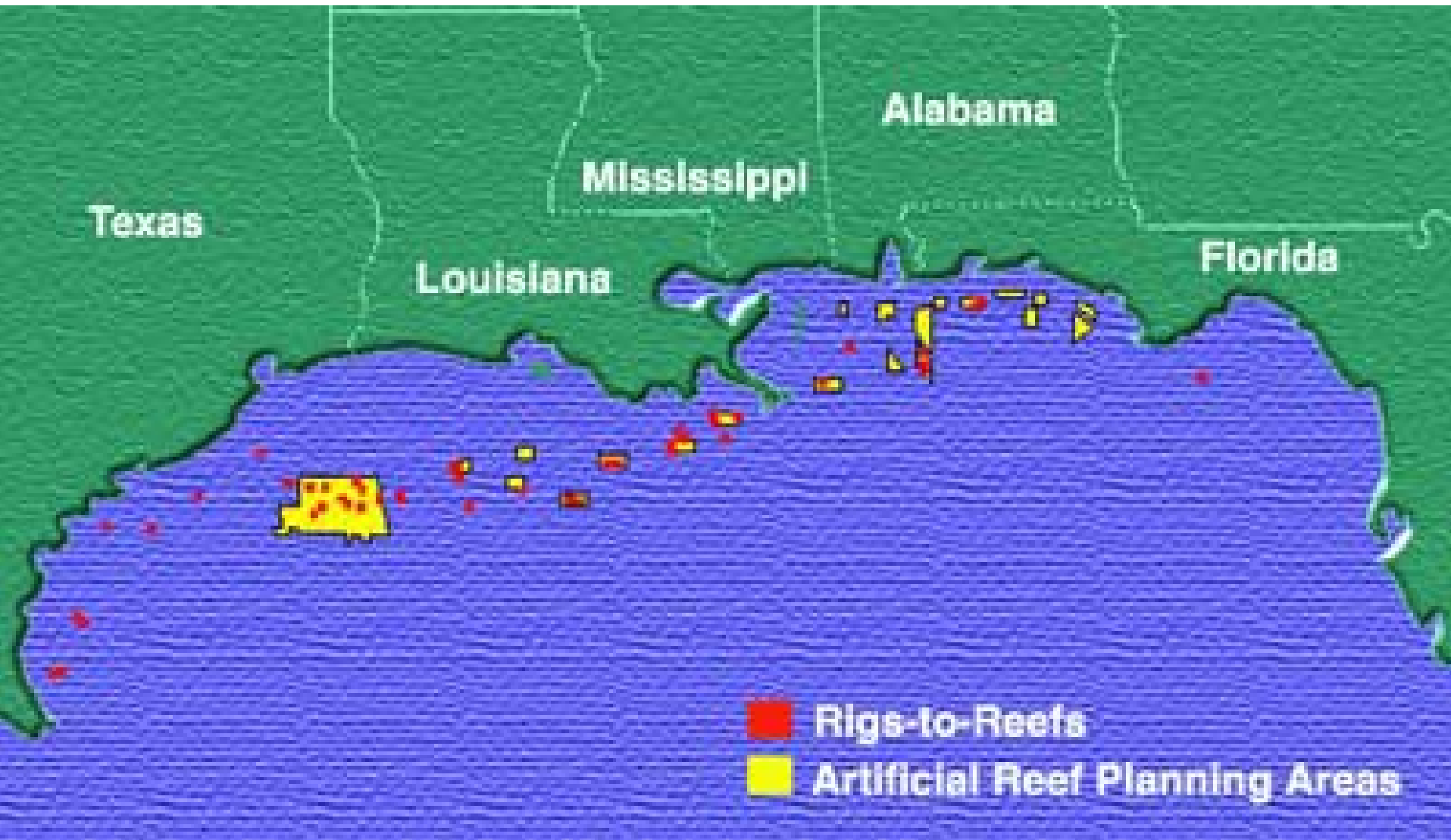
MMS U.S. Department of the Interior
Minerals Management Service
Gulf of Mexico OCS Region



<http://www.gulfbase.org/project/photo/rtrp.jpg>

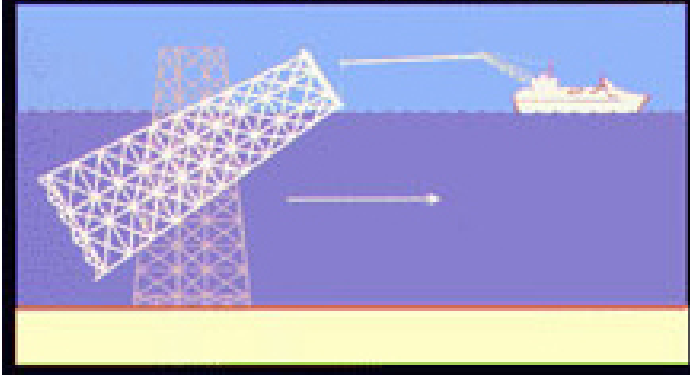


N. Gulf of Mexico Artificial Reef and Rigs-to-Reefs Zones



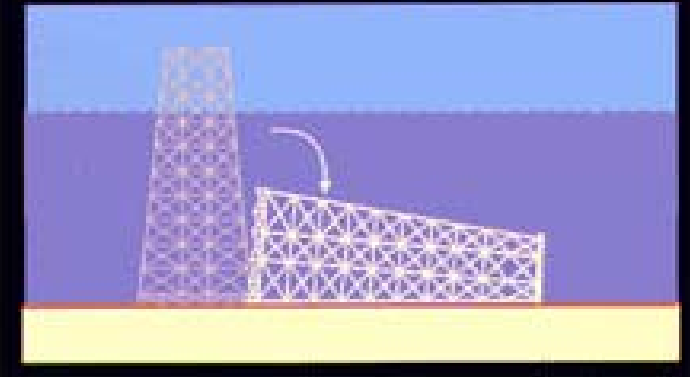
Options for Rigs to Reefs Program

The Tow-and-Place Platform Decommissioning Method



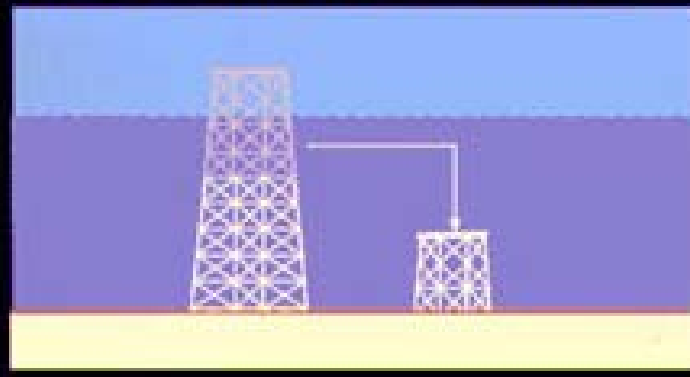
- **Cut, topple, and tow to R2R site**

The Topple-and-Place Platform Decommissioning Method

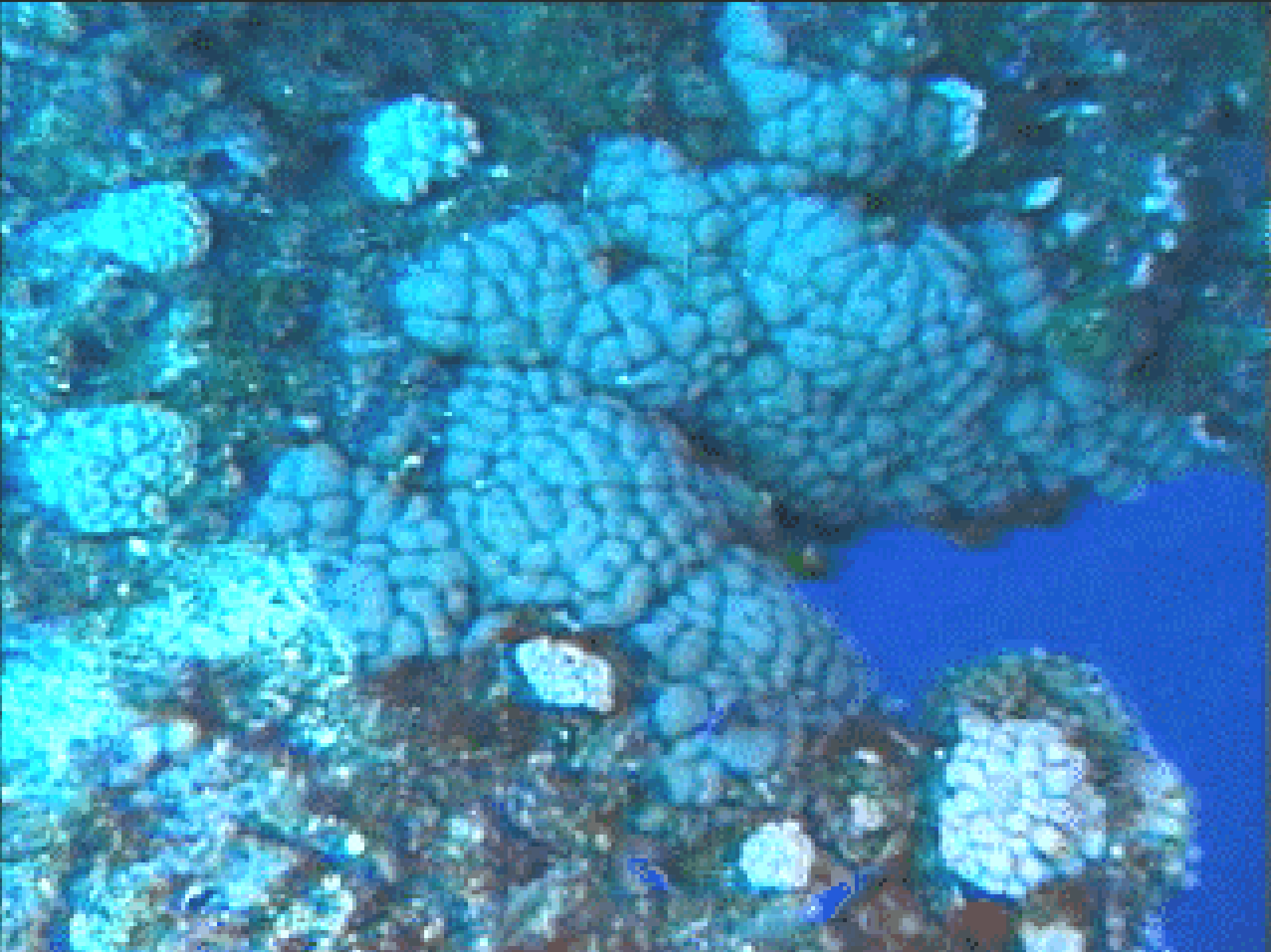


- **Cut and topple in place**

The Partial Removal Platform Decommissioning Method



- **Sever at ≥ 85 ft depth, remove top, and place on bottom**





Questions

- . Are toppled R2R structures facilitating coral community development in the N. Gulf of Mexico?**
- . Are there differences between coral communities on the Rigs-to-Reefs (R2R) structures vs. the standing oil/gas platforms?**
- . What are the genetic affinities of these populations? (in progress)**

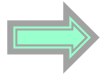
Phases I & II

SCUBA and Video Surveys

0 m



39 m
(max)



100 m



Re-drawn from - California Dept. Conservation

http://www.consrv.ca.gov/dog/picture_a_well/offshore_platform.htm

Phase III

0 m



30 m



39 m



100 m



Control:
SCUBA Video Surveys,
R2R Structures and Platforms

ROV Video Surveys
(same)

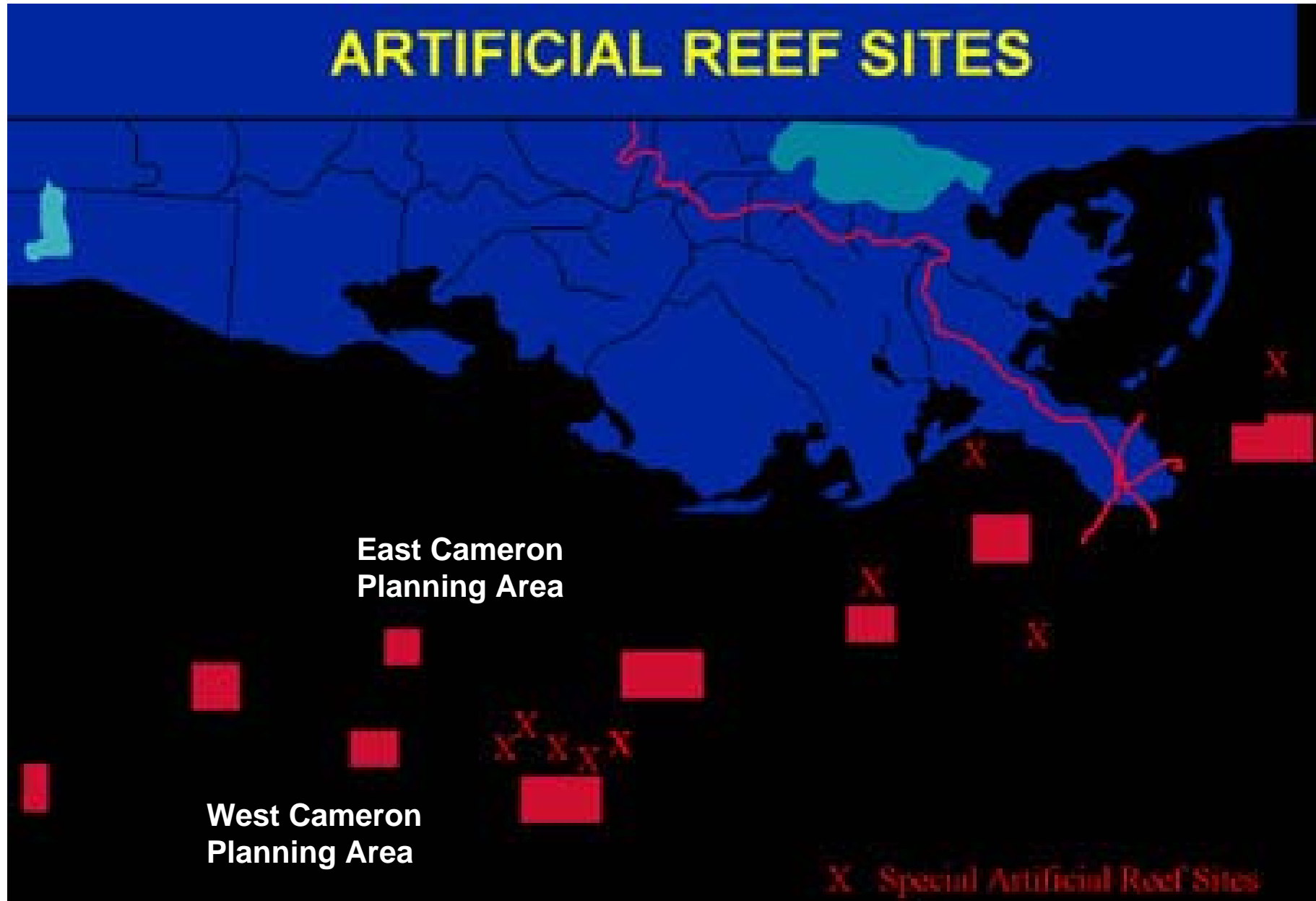
Re-drawn from - California Dept. Conservation

http://www.consrv.ca.gov/dog/picture_a_well/offshore_platform.htm



LOUISIANA

ARTIFICIAL REEF SITES

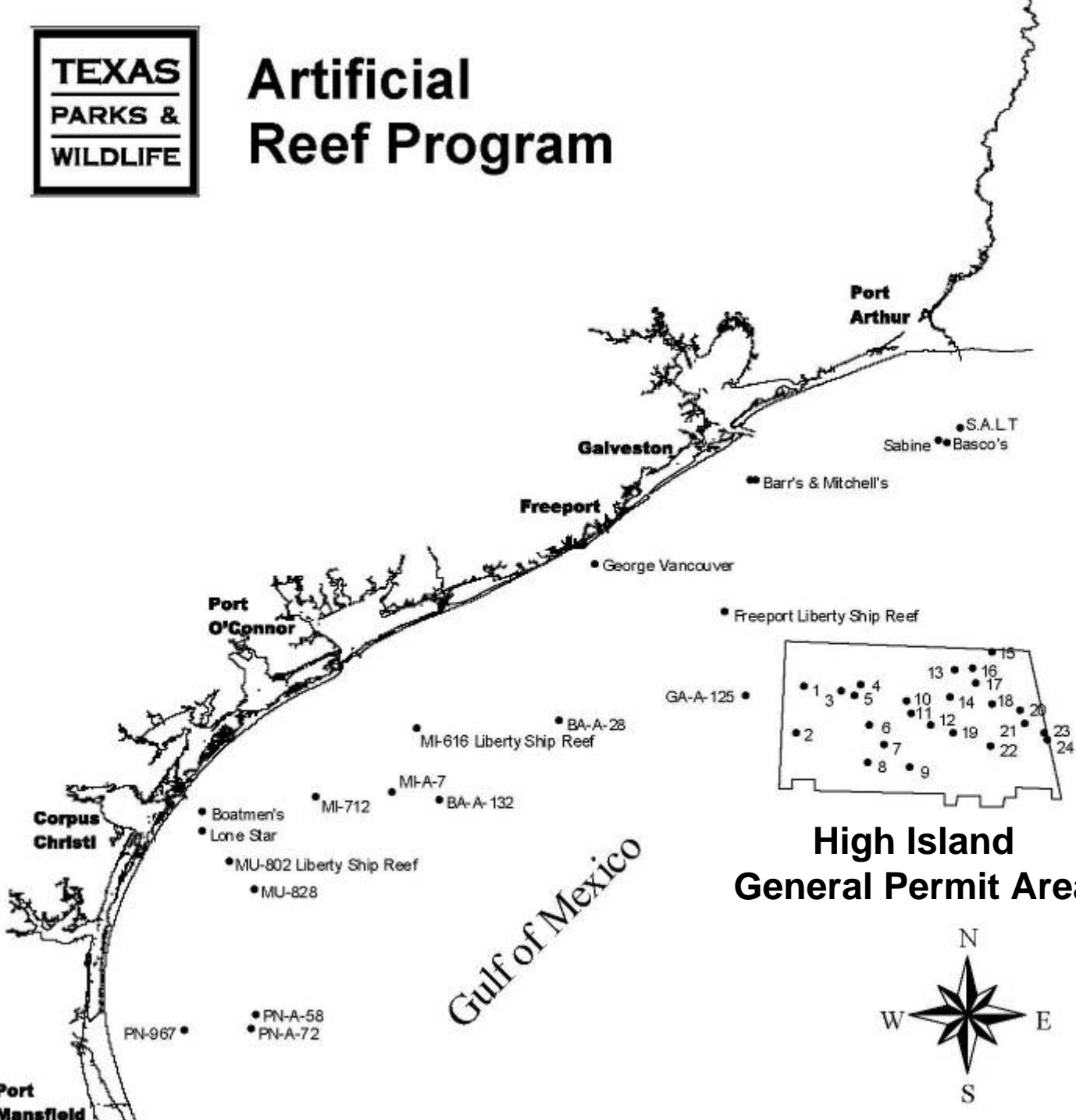




Artificial Reef Program

Texas Rigs-to-Reefs Planning Area

High Island



High Island General Permit Area

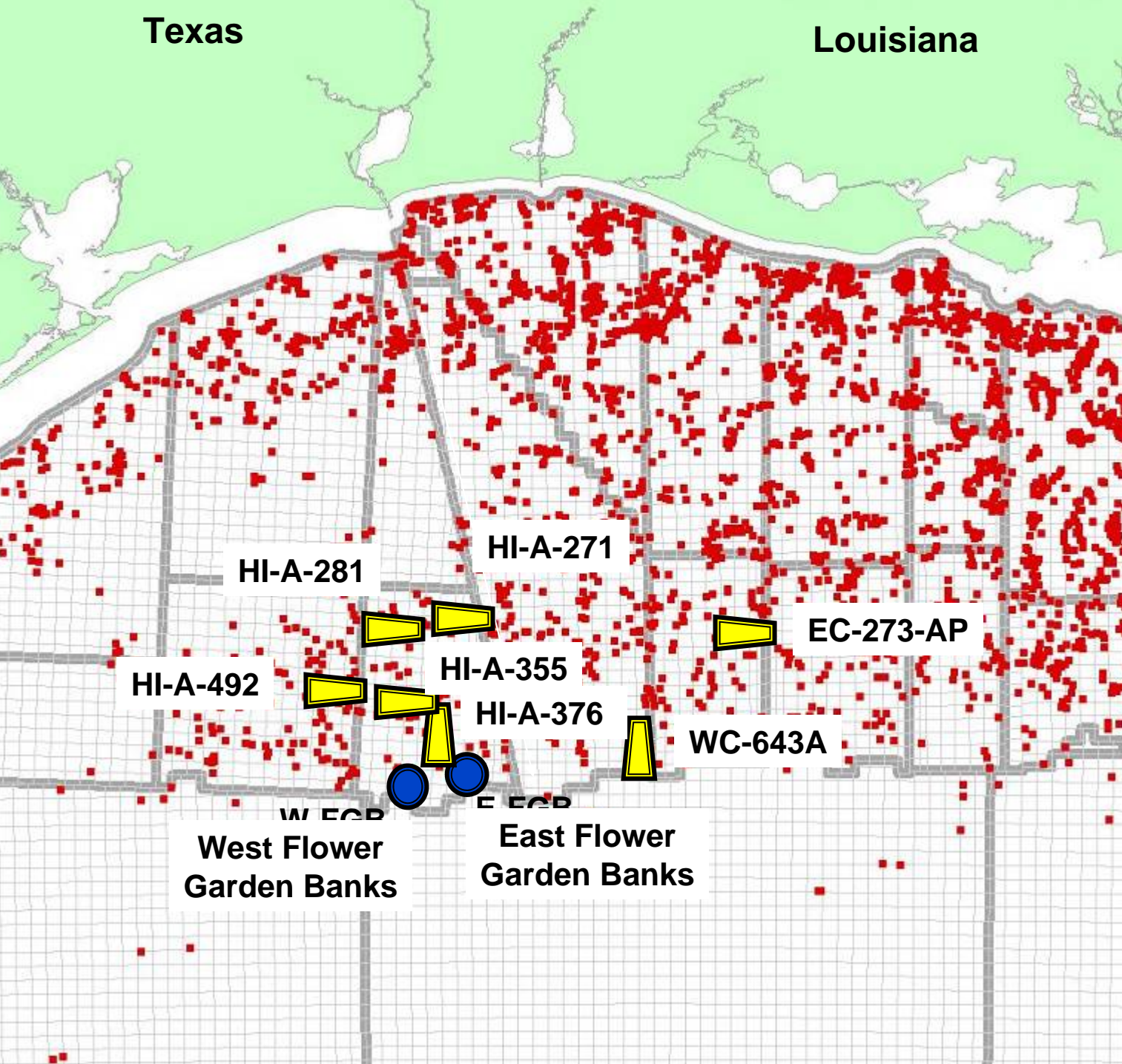


http://www.tpwd.state.tx.us/publications/nonpwdpubs/media/2003reef_map.pdf

Texas

Louisiana

Location of Study Sites



 = Platform

 = R2R Structure

SeaBotix LBV-300 ROV



- MMS
- ARACAR

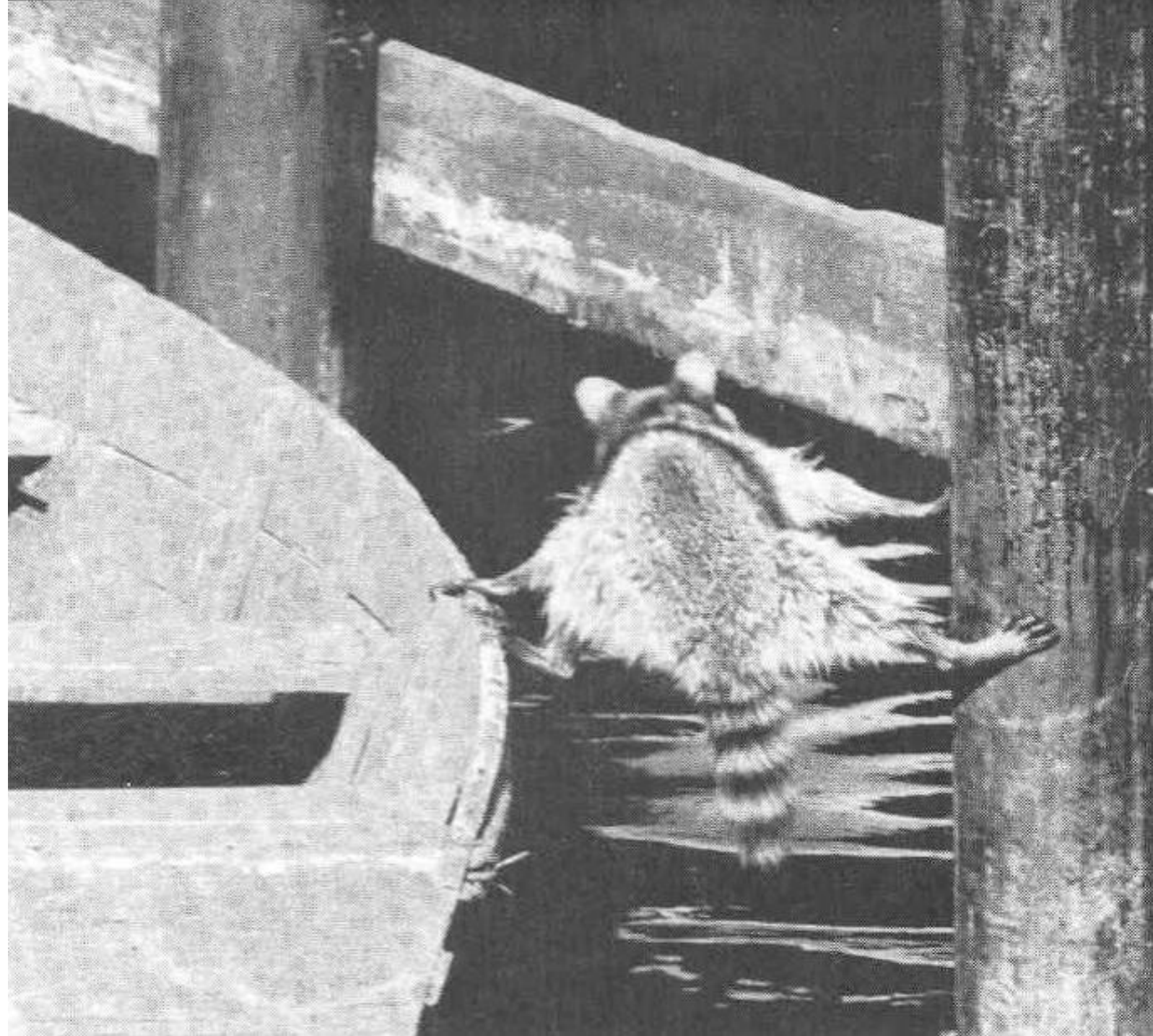
LUMCON



http://farm1.static.flickr.com/151/421351546_01b924e454.jpg?v=0



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Structures sampled and assessed for –

- . Species distribution and abundance**
- . Depth distribution**
- . Coral tissue – DNA samples**
 - For population genetic differentiation/affinities**
 - Technique - AFLPs**
 - Collected by hand and ROV**
 - In progress**

Coral Tissue Sample Collection by ROV



Delivering Coral Samples to Collection Basket



Madracis decactis

J. Collins



Tubastraea coccinea

Dinah Rogers,
Times-Picayune



Oculina diffusa

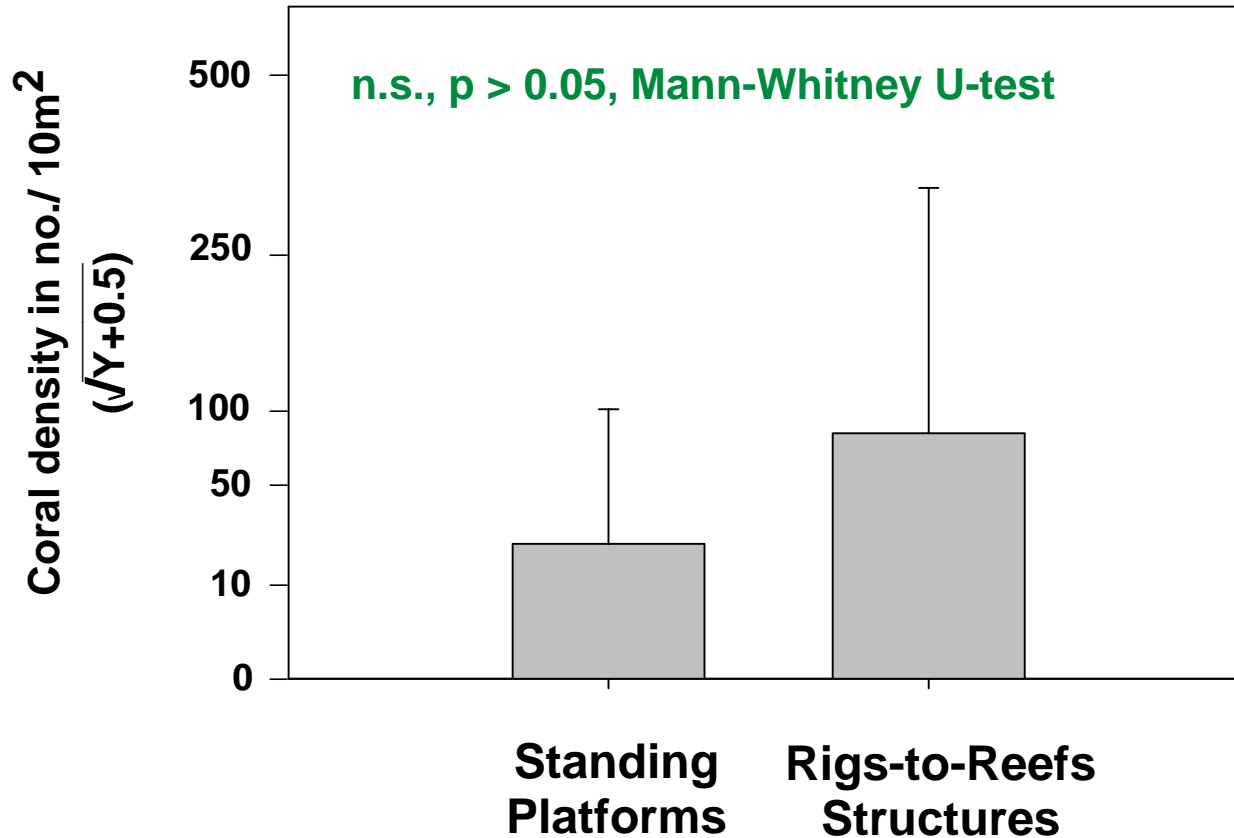


Phyllangia americana

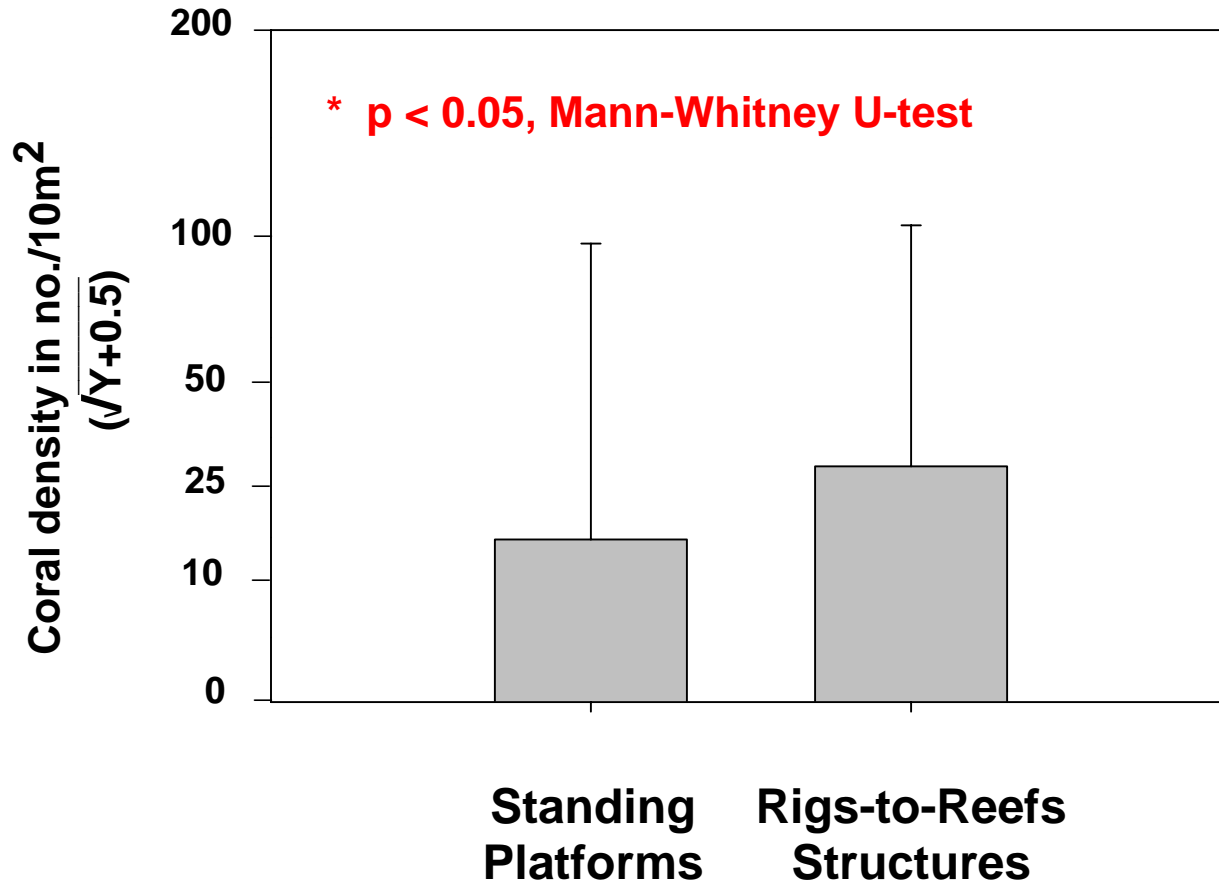


Paul Humann & Ned Deloach

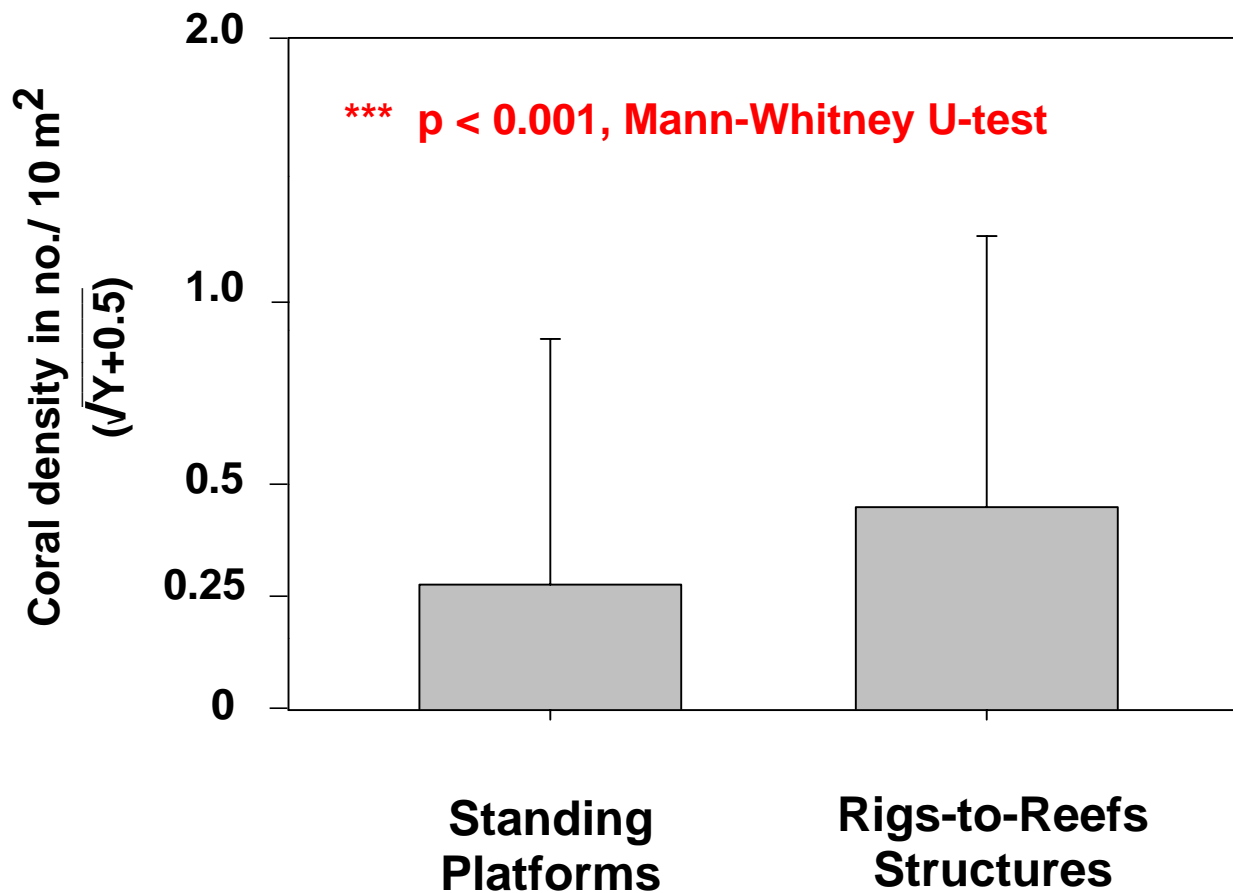
Total Coral Density Standing Platforms vs. Rigs-to-Reefs



Tubastraea coccinea Density Standing Platforms vs. Rigs-to-Reefs

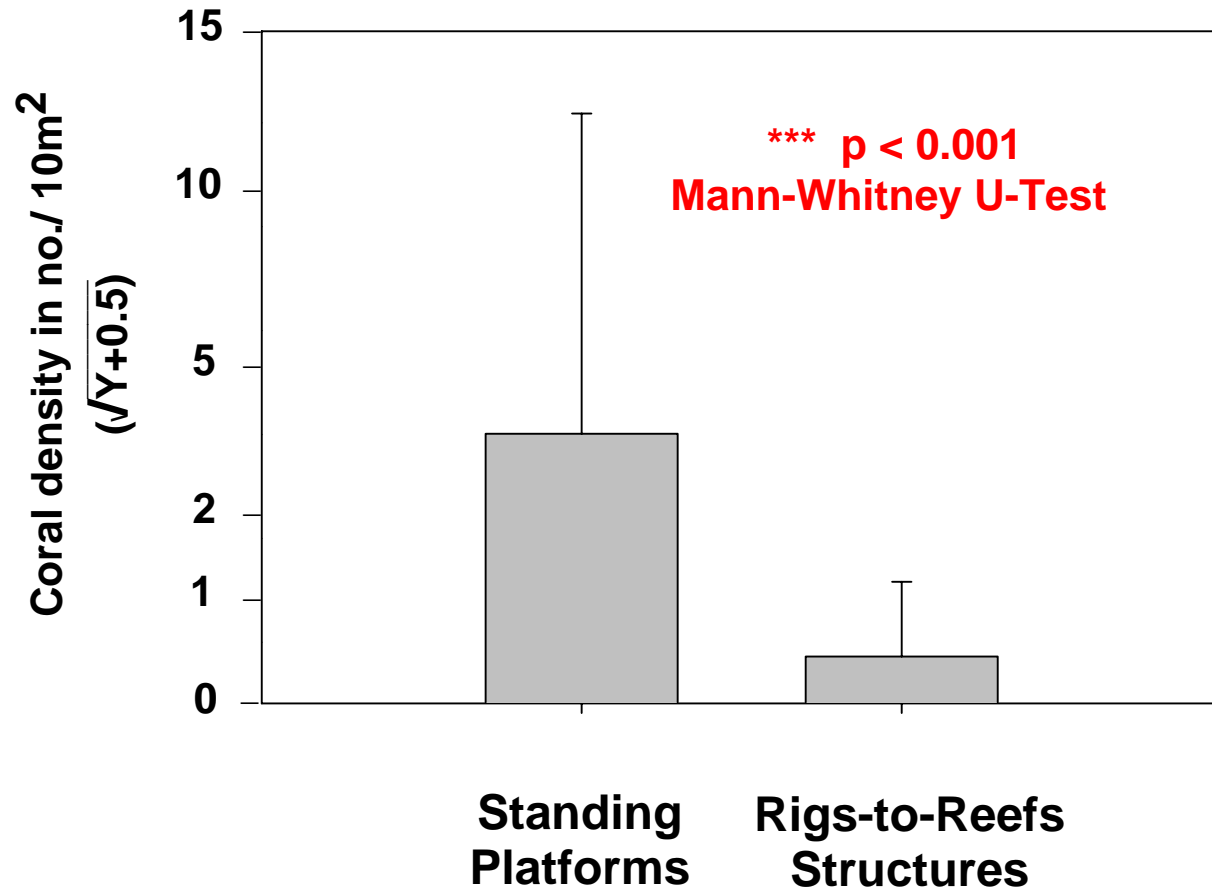


Madracis decactis Total Coral Density

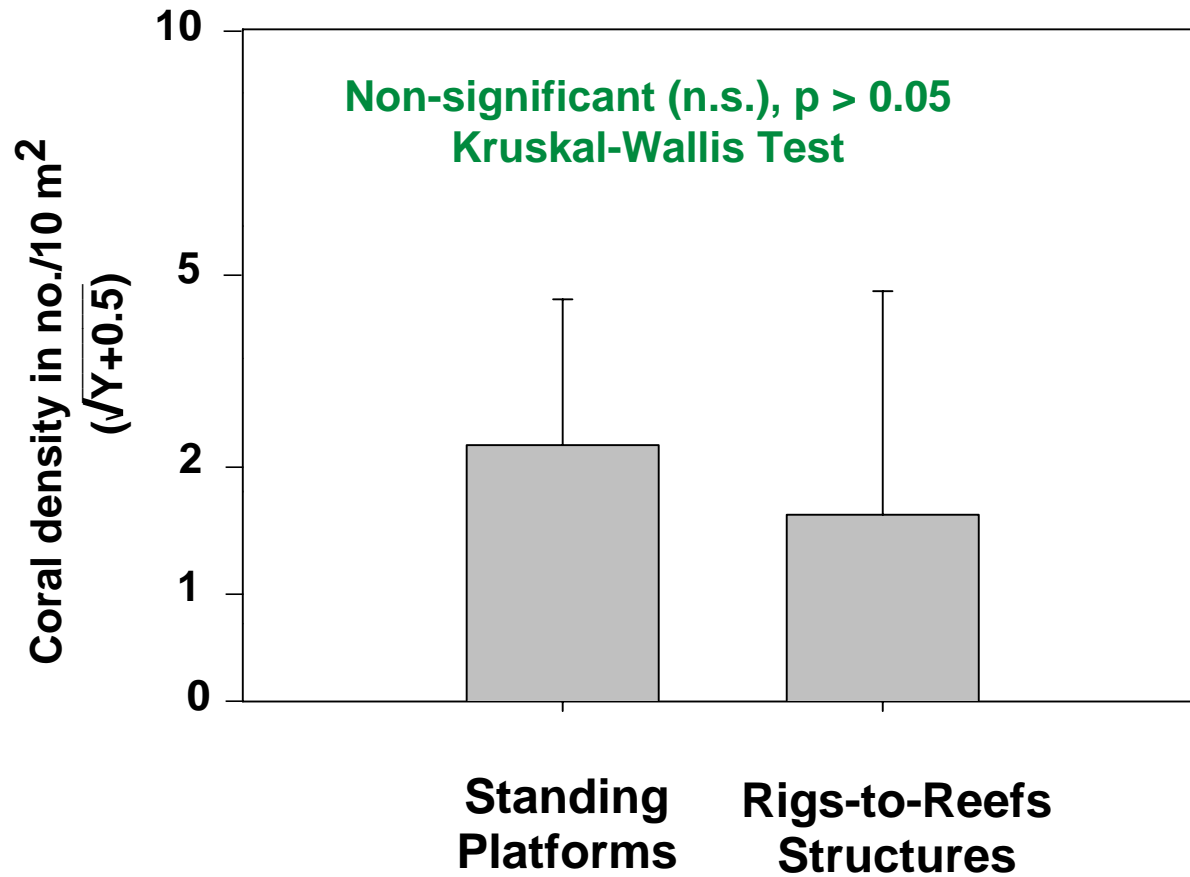


- **Total coral density – same on Rigs-to-Reefs structures vs. platforms**
- ***Tubastraea coccinea* (ahermatype) – density higher on R2R**
- ***Madracis decactis* (hermatype; reef-building coral) – density higher on R2R**

Phyllangia americana Density Standing Platforms vs. Rigs-to-Reefs



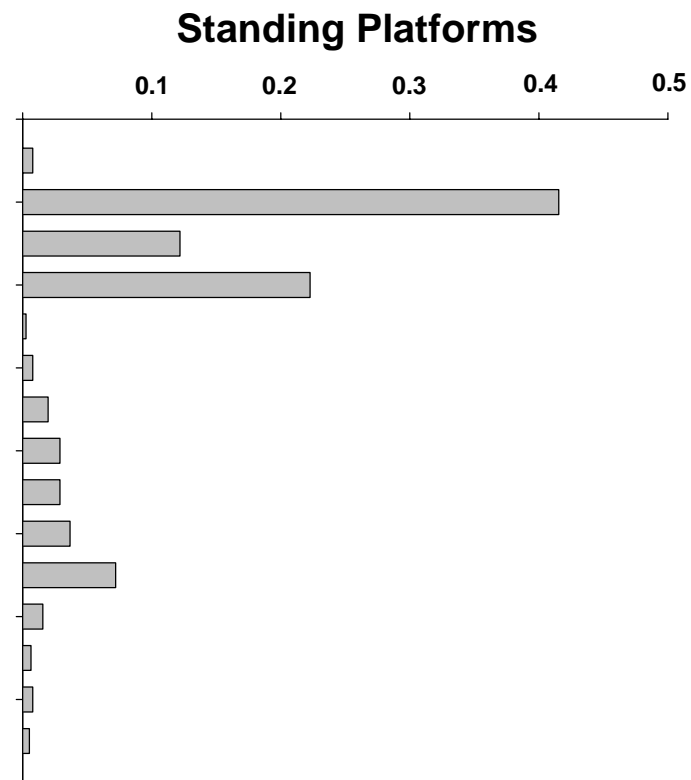
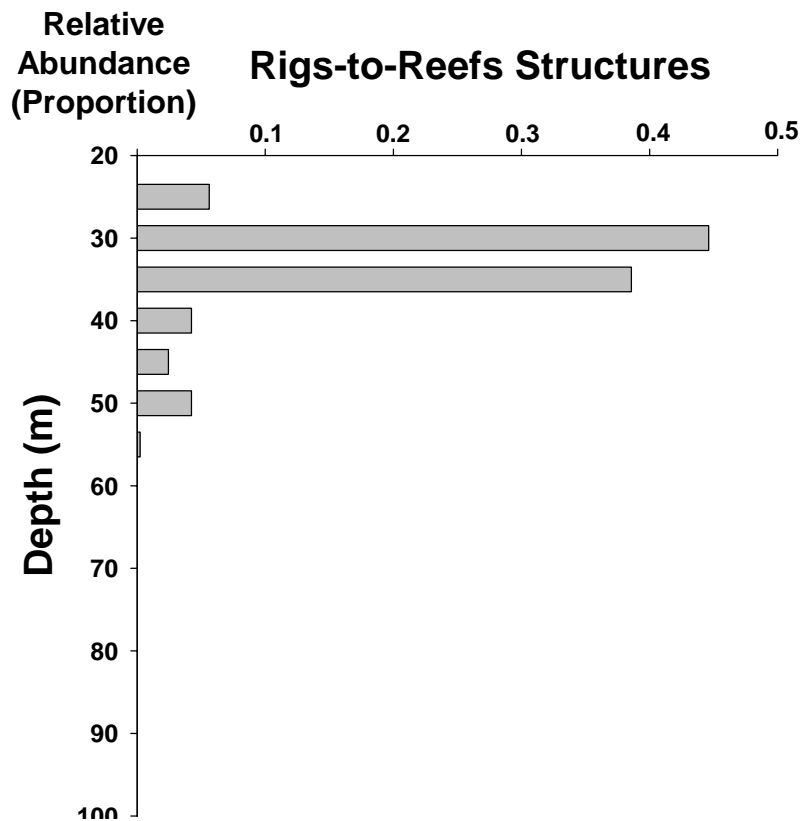
Oculina diffusa Density Standing Platforms vs. Rigs-to-Reefs



- . *Phyllangia americana* –
higher on standing platforms**
- . *Oculina diffusa* –
equivalent densities on both types
of structures**
- . Species-specific responses caused
lack of density differences when
considering all corals; averaged out**

Depth Distribution of Corals

Depth Distribution All Corals

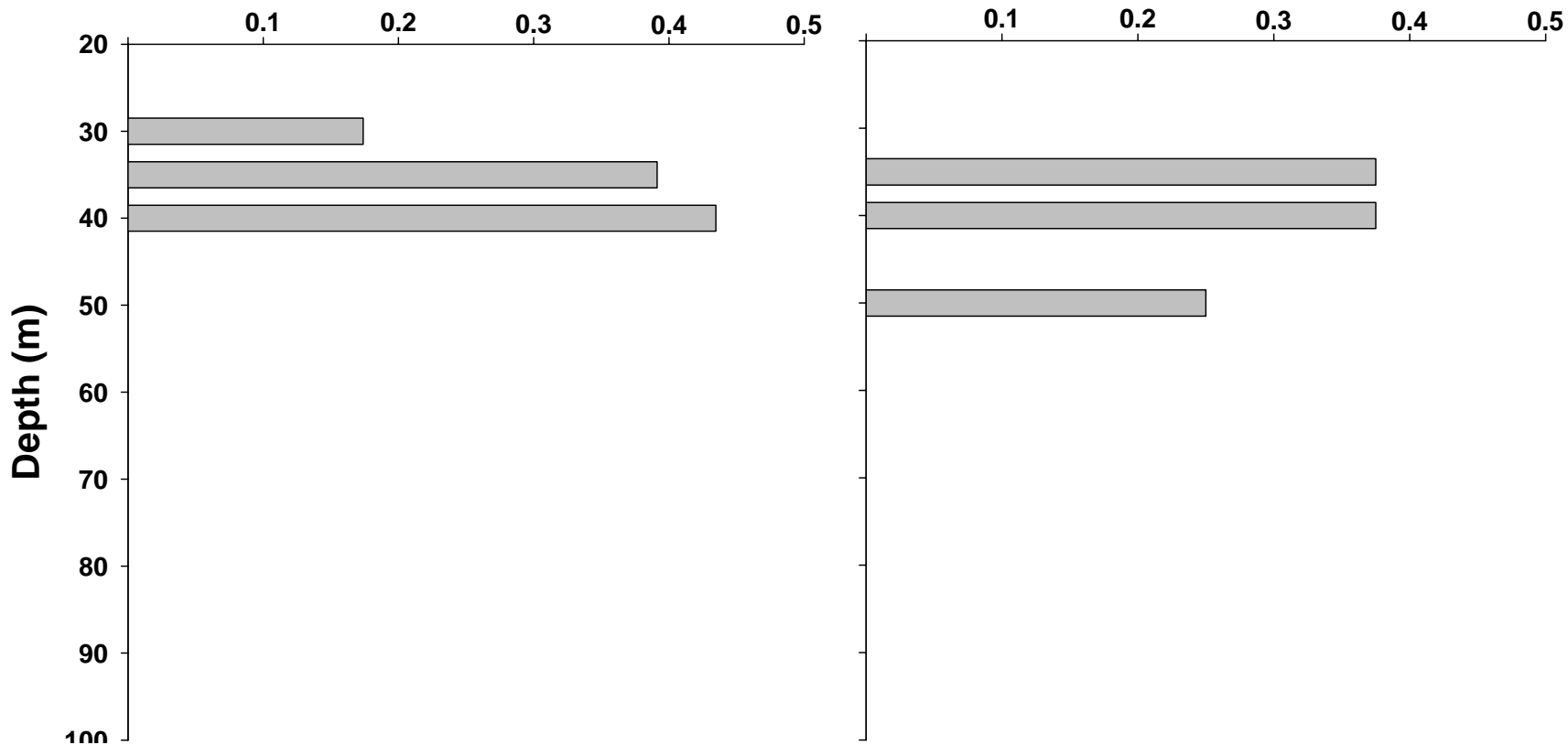


Depth Distribution *Madracis decactis*

Relative
Abundance
(Proportion)

Rigs-to-Reefs Structures

Standing Platforms

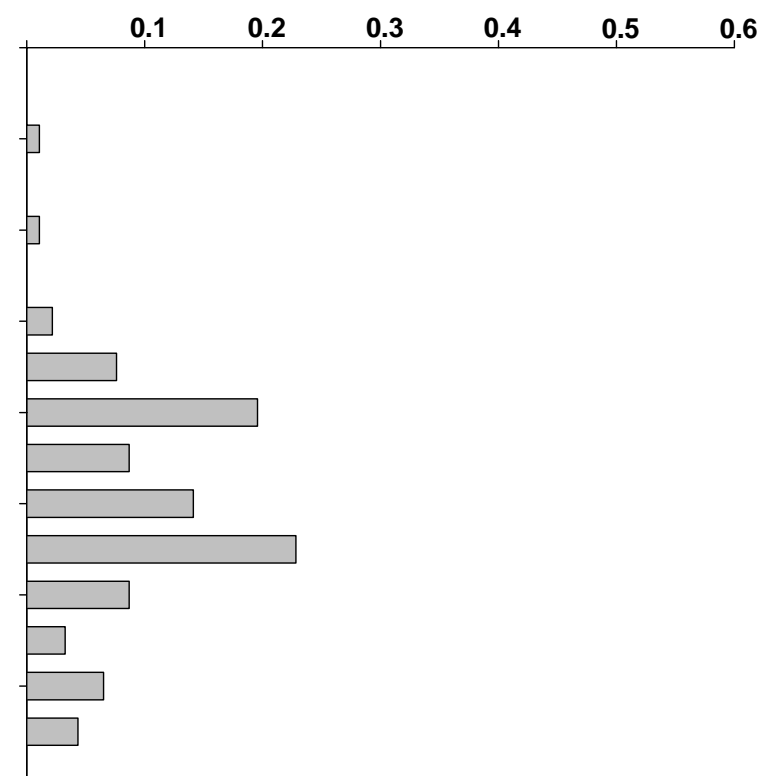
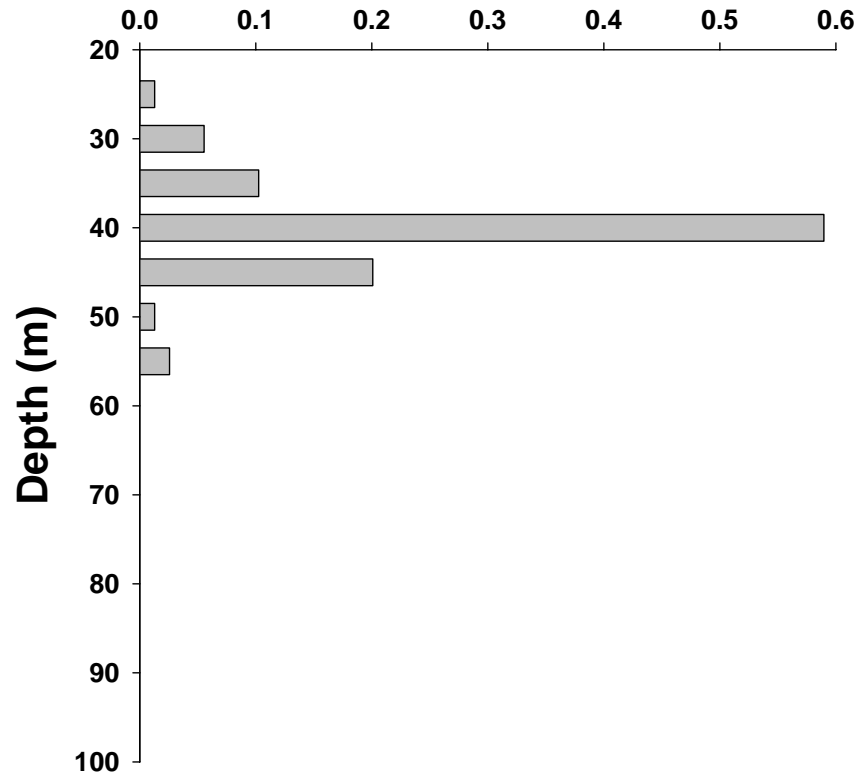


Depth Distribution *Oculina diffusa*

Relative
Abundance
(Proportion)

Rigs-to-Reefs Structures

Standing Platforms



Conclusions

- . Total coral density – same on Rigs-to-Reefs and standing platforms**
 - Due to opposing species-specific abundance patterns**
- . *Tubastraea coccinea* – higher on R2R structures**
- . *Madracis decactis* – hermatype – also thriving on R2R structures**

Conclusions (cont.)

- ***Phyllangia americana*** – opposing pattern – higher on standing platforms
- ***Oculina diffusa*** – same on R2R and standing platforms
- **Depth distributions**
 - **All corals shallower on R2R**
 - ***Madracis decactis* limited to shallows on R2R and standing platforms**
 - ***Oculina diffusa* – deep distribution on standing platforms**

Acknowledgments



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M/V Fling

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Additional Divers

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Cary Chauffe

Kelly Collins

Craig Gentry

Amanda Thronson

Reference

Rezak, R., T.J. Bright, and D.W. McGrail. 1985. Reefs and banks of the northwestern Gulf of Mexico: Their geological, biological, and physical dynamics. New York: John Wiley and Sons. 259 pp.