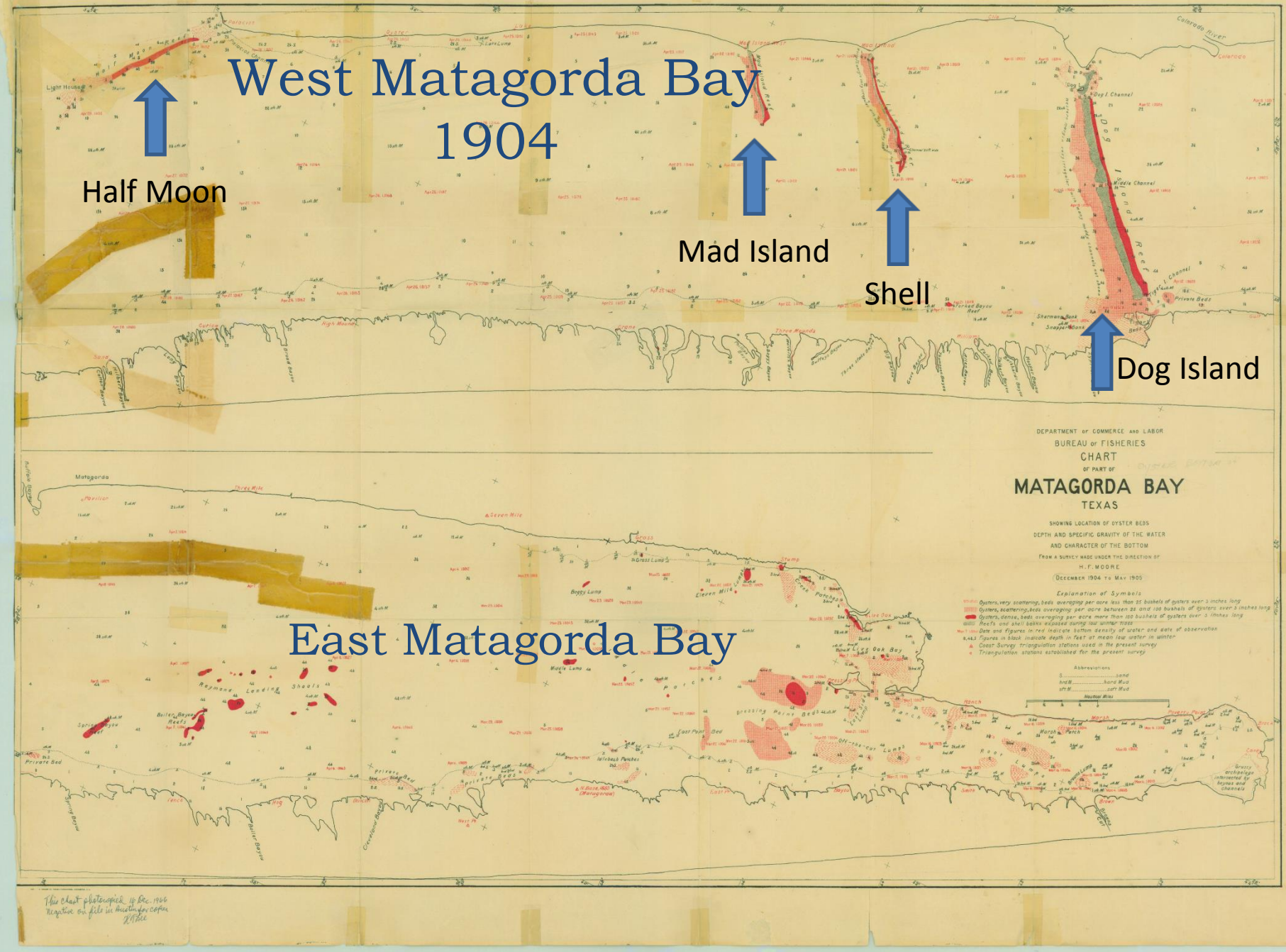
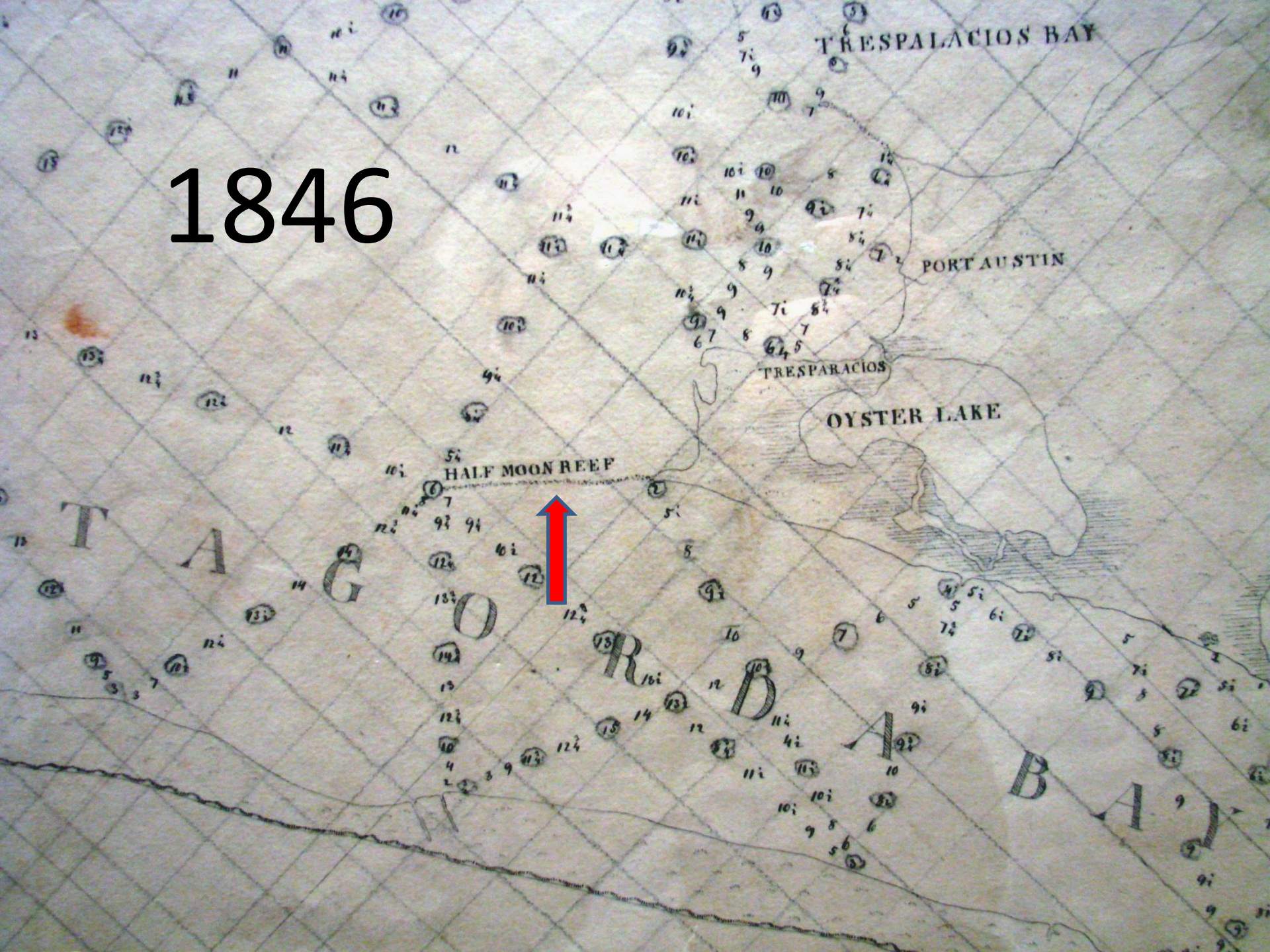
HALF MOON REEF RESTORATION

Restoring Form and Function of a Historical Reef in Matagorda Bay

Mark Dumesnil, The Nature Conservancy

The Nature Conservancy
Protecting nature. Preserving life.™


West Matagorda Bay
1904
Half Moon
Mad Island
Shell
Dog Island
East Matagorda Bay
DEPARTMENT OF COMMERCE AND LABOR
BUREAU OF FISHERIES
CHART
OF PART OF
MATAGORDA BAY
TEXAS
SHOWING LOCATION OF OYSTER BEDS
DEPTH AND SPECIFIC GRAVITY OF THE WATER
AND CHARACTER OF THE BOTTOM
FROM A SURVEY MADE UNDER THE DIRECTION OF
H. F. MOORE
DECEMBER 1904 TO MAY 1905
Explanation of Symbols
Abbreviations
Nautical Miles
This chart photocopied 19 Dec. 1966
negative on file in Austin for copies


1846
TRESPALACIOS BAY
PORT AUSTIN
TRESPARACIOS
OYSTER LAKE
HALF MOON REEF
T A G O R B A
B A

HALF MOON REEF LIGHTHOUSE
1858 – 1942 (deactivated)

Oyster Reefs at Risk and Recommendations for Conservation, Restoration, and Management

Michael W. Beck, Robert D. Brumbaugh, Laura Airoldi, Alvar Carranza, Loren D. Coen, Christine Crawford, Omar Defeo, Graham J. Edgar, Boze Hancock, Matthew C. Kay, Hunter S. Lenihan, Mark W. Luckenbach, Caitlyn L. Torpova, Guofan Zhang, and Ximing Guo. (2011)

www.biosciencemag.org

"We examined the condition of oysters reefs across 144 bays and 44 ecoregions; our comparisons of past with present abundances indicate that more than 90% of them have been lost in bays (70%) and ecoregions (63%). In many bays, more than 99% of oyster reefs have been lost and are functionally extinct. Overall, we estimate that 85% of oyster reefs have been lost globally."

Historical ecology with real numbers: past and present extent and biomass of an imperiled estuarine habitat

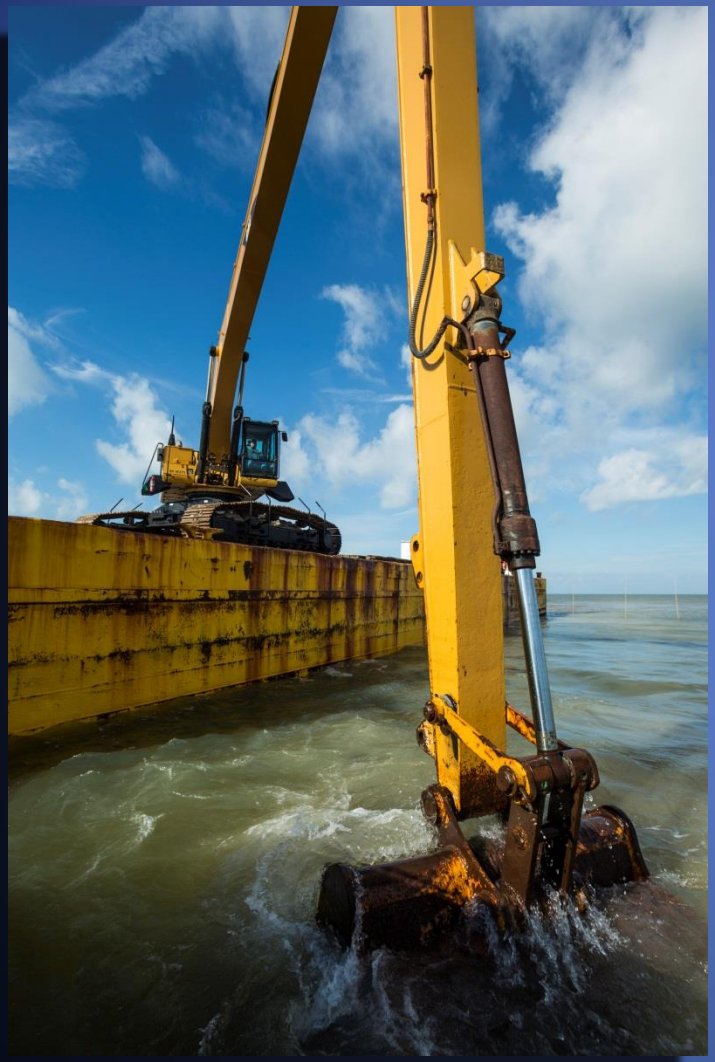
Philine S. E. Ermgassen, Mark Spalding, Brady Blake, Loren D. Coen, Brett Dumbauld, Steve Geiger, Jonathan H. Grabowski, Raymond Grizzel, Mark Luckenbach, Kay McGraw, William Rodney, Jennifer L. Ruesink, Sean P. Powers and Robert Brumbaugh. (2012)

rspb.royalsocientypublishing.org

"Data from 24 estuaries allowed comparison of historic to present extent and biomass. We found evidence for a 64 percent decline in the spatial extent of oyster habitat and an 88 percent decline in oyster biomass over time. The difference between these two numbers illustrates that current aerial extent measures may be masking significant loss of habitat through degradation."

What did we want our restored reef to accomplish?

Half Moon Reef Restoration



OTHER OBJECTIVES:

Long-term Structural Stability

Long-term Sustainability

Advance Reef Restoration Science

Monitoring Innovation

Enhanced Ecosystem Services

Reef Restoration Purpose (Design)

Project Implementation Challenges

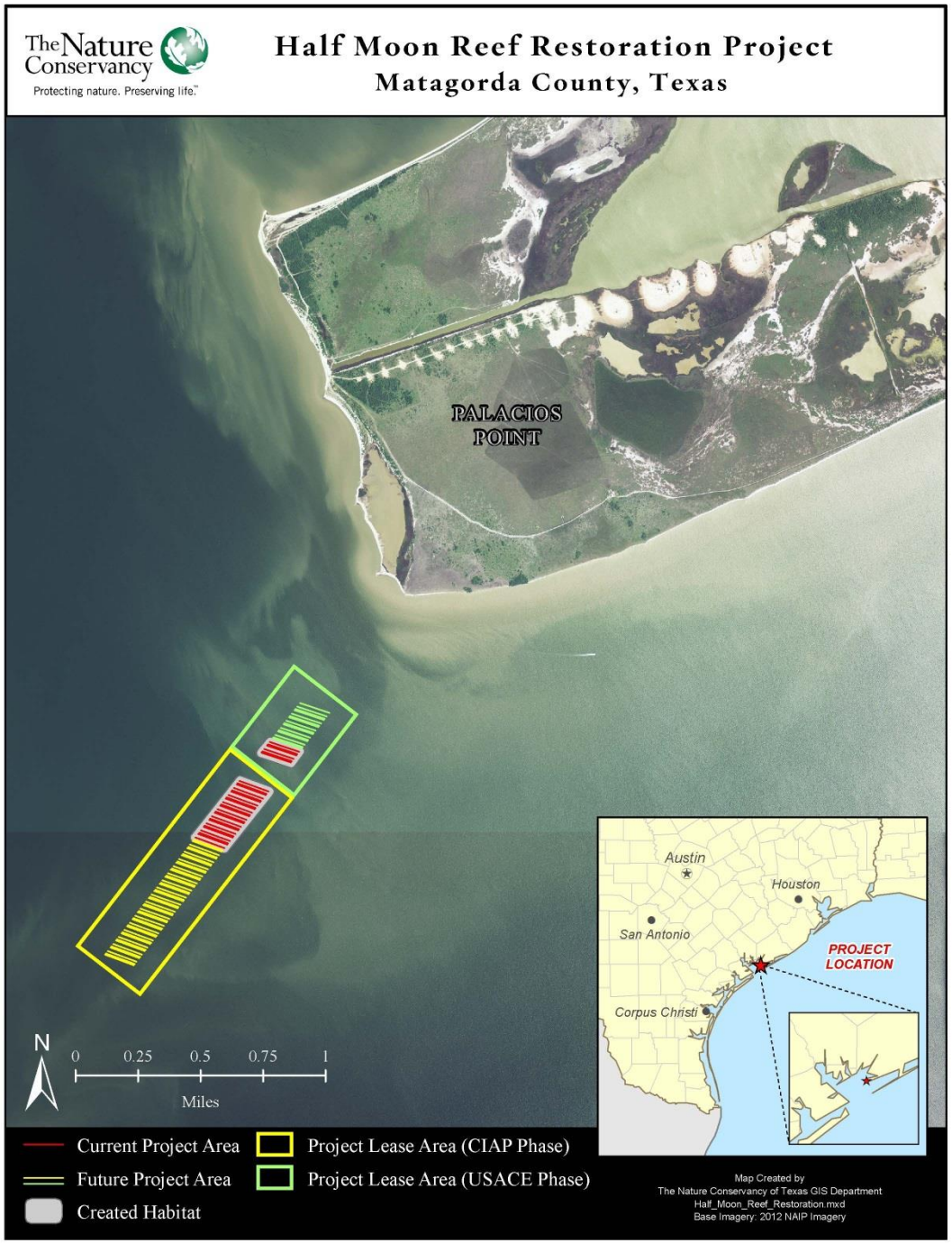
EXTERNAL

Planning, Engineering, Design
USACE Construction Permitting
Environmental Assessment Reviews
State Leasing of Subsurface
Harvest Closures
Project Partners Expectations
Navigational Issues

INTERNAL (TNC)

Project Risk Assessments
- Financial
- Environmental
- Organizational

Grant Administration ($5.5M)
Adequate Performance Monitoring



DESIGN ENGINEERING

PHASE I

FWS/GLO/TNC PARTNERSHIP

$3,800,000

34 acres

PHASE II

USACE/TNC PARTNERSHIP

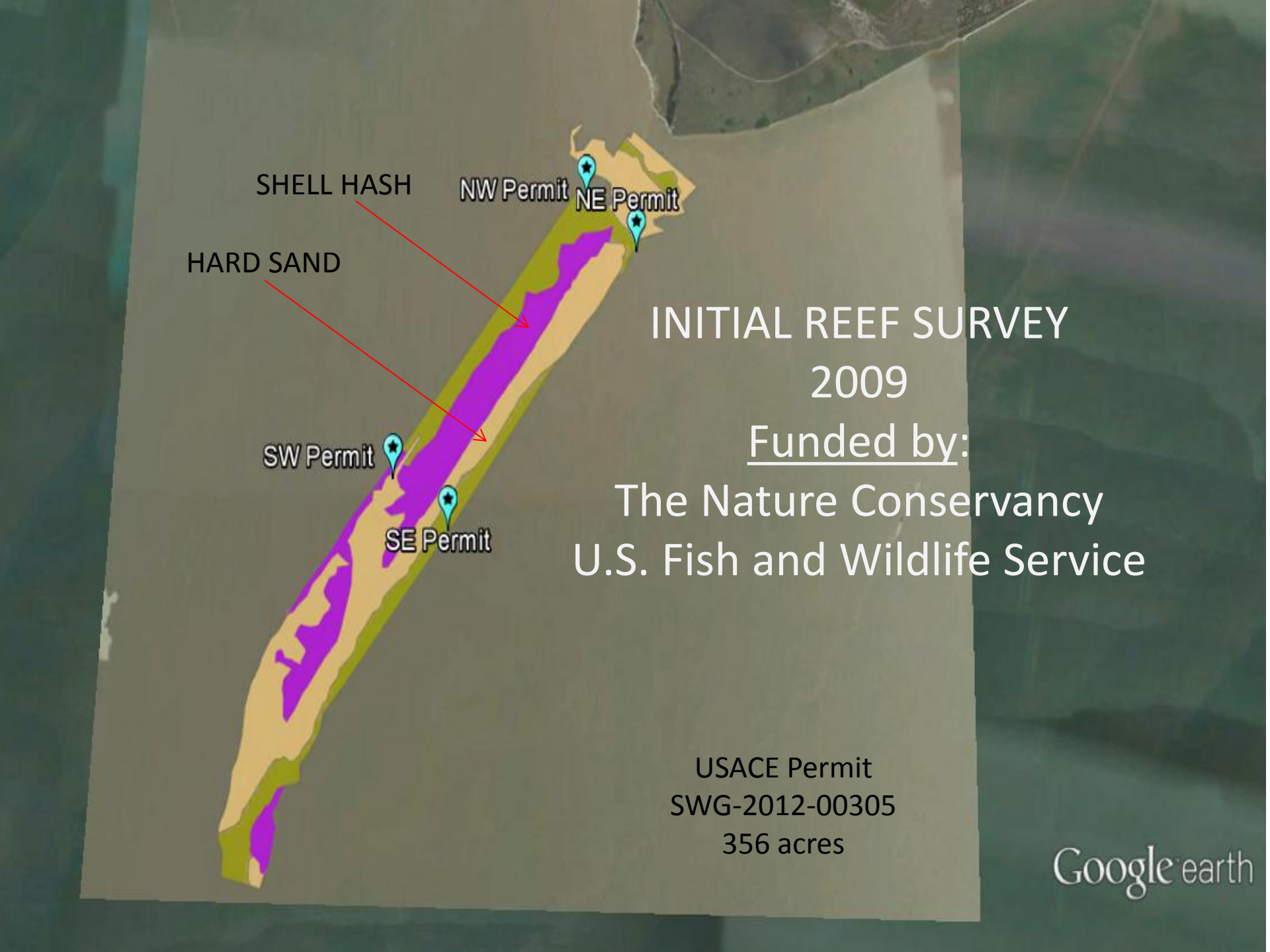
$1,600,000

15 acres

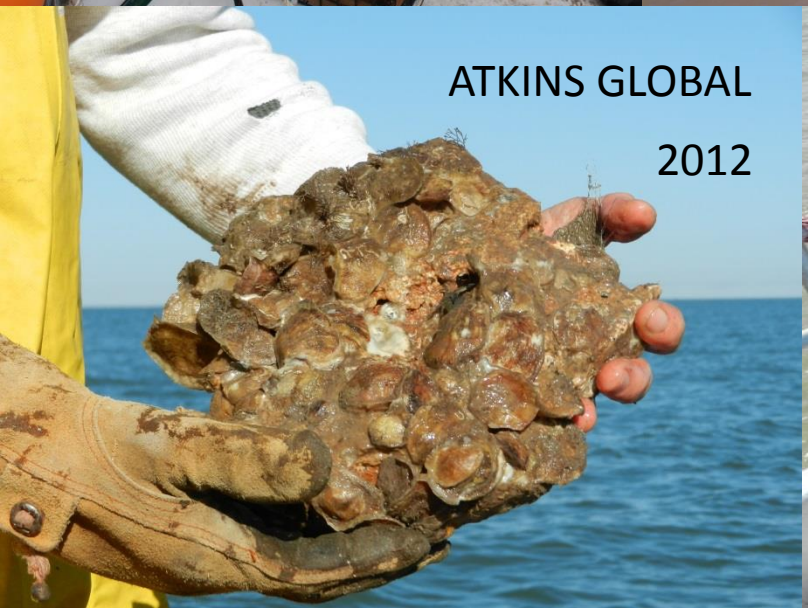
MONITORING

Texas A&M University

Dr. Jennifer Pollack


SHELL HASH
HARD SAND
NW Permit
NE Permit
SW Permit
SE Permit
INITIAL REEF SURVEY
2009
Funded by:
The Nature Conservancy
U.S. Fish and Wildlife Service
USACE Permit
SWG-2012-00305
356 acres
Google earth

Pre-Construction Sampling



POST CONSTRUCTION MONITORING

Structural Monitoring

- Vertical and Horizontal Reef Stability

Ecological Monitoring

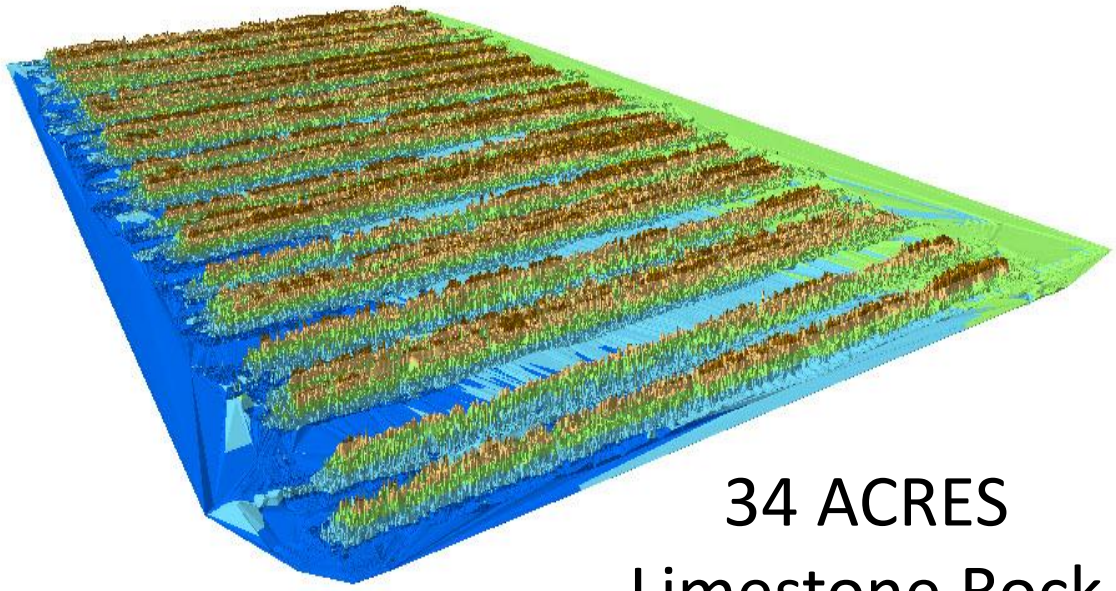
- Oyster Colonization and Recruitment
- Oyster Size Class Distribution, Density and Disease
- Reef Resident Density and Diversity
- Epibenthic Density and Diversity
- Water Quality Measurements
- Recreational Fish Usage

Socio-Economic Monitoring and Evaluation

- Angler Usage, Satisfaction, and Economic Impact

HALF MOON REEF – POST CONTRUCTION MONITORING

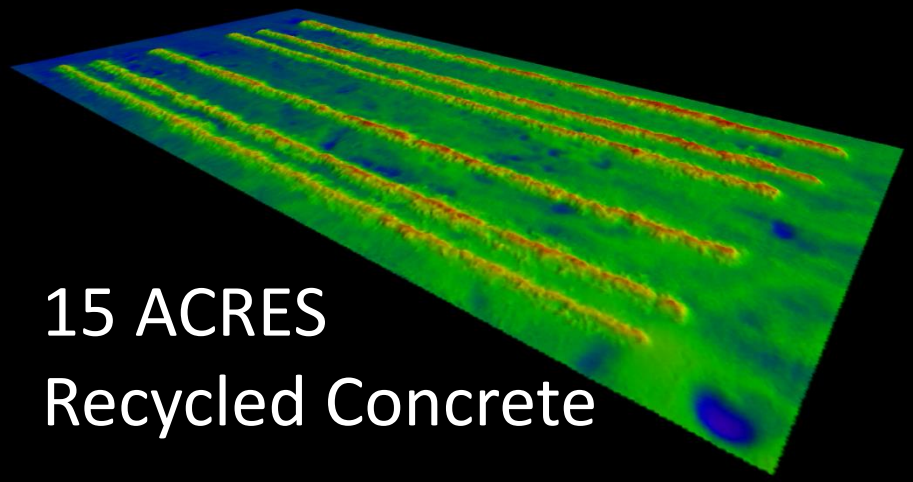
STRUCTURAL MONITORING



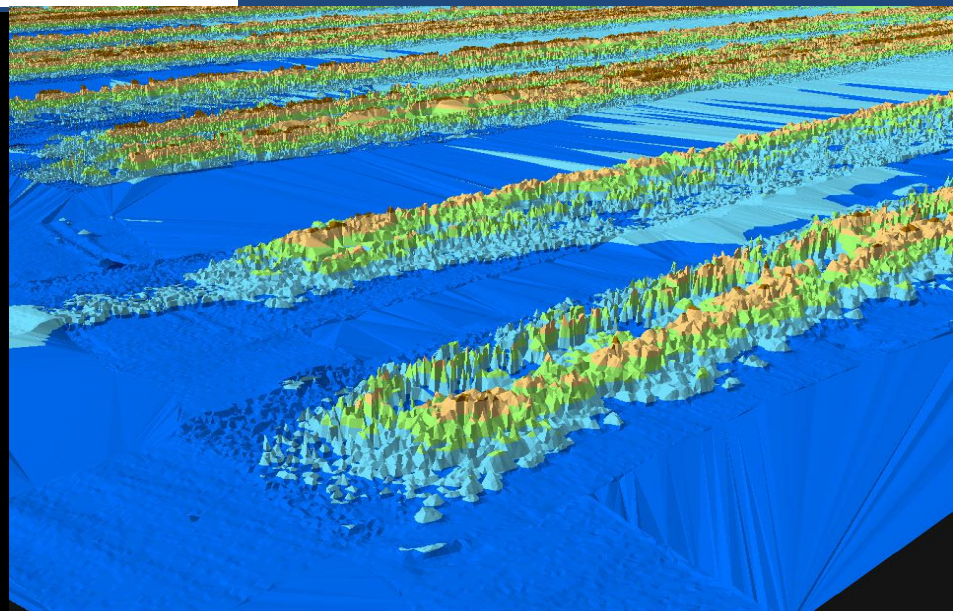
34 ACRES
Limestone Rock

Multi-beam Side Scan
Bathymetric Survey
369,698 xyz cells
1.5 x 1.5 ft.

SAM
SURVEYING + AERIAL MAPPING + ENGINEERING



15 ACRES
Recycled Concrete



POST CONSTRUCTION MONITORING

SUCTION SAMPLING

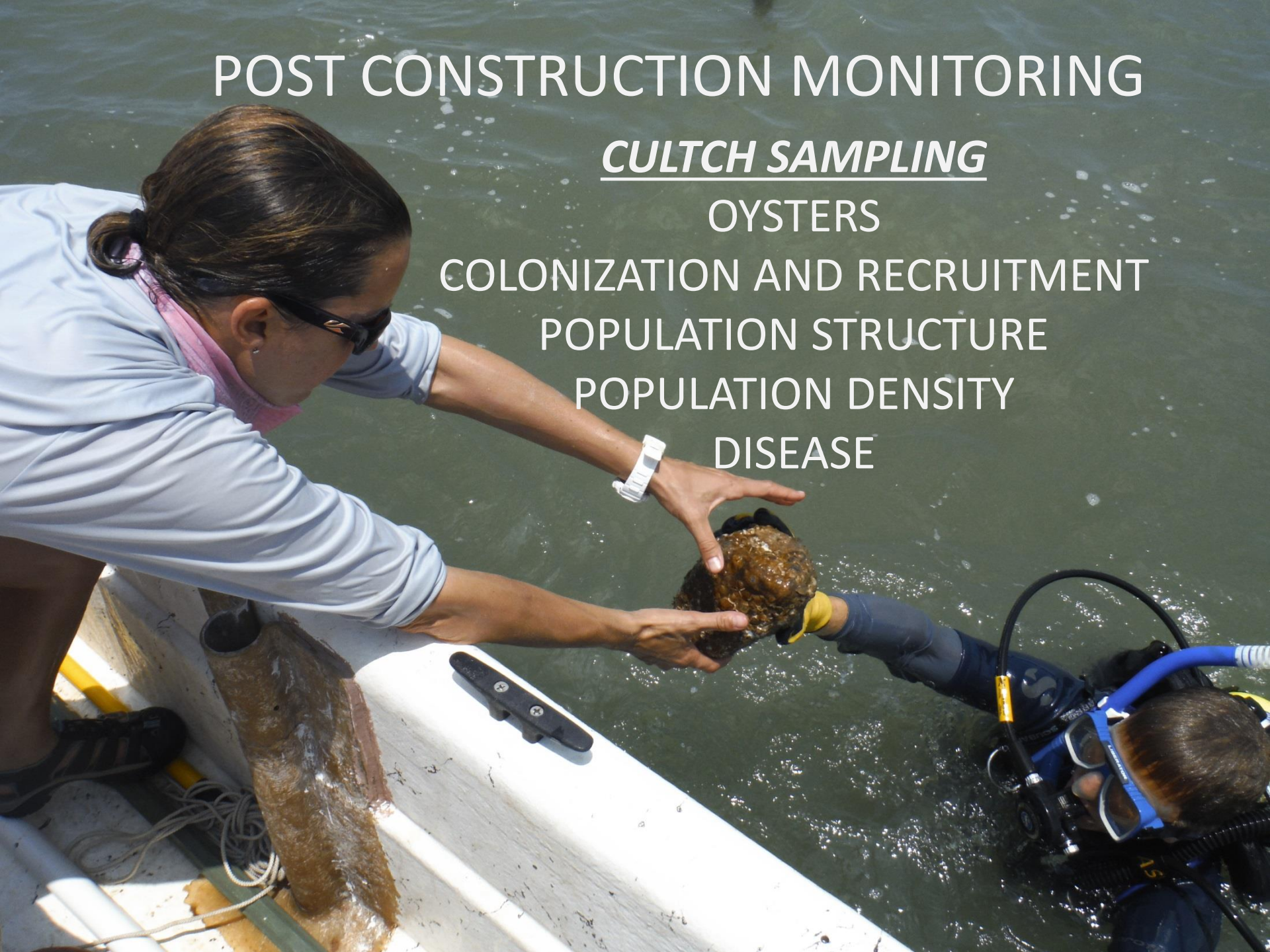
Quantifying
Density and Diversity of Reef-Dependent
Finfish and Macroinvertebrates

TEXAS A&M UNIVERSITY CORPUS CHRISTI

POST CONSTRUCTION MONITORING

BENTHIC TOWS

Quantify Density and Diversity of Macroinverebrates and Finfish



POST CONSTRUCTION MONITORING

CULTCH SAMPLING

OYSTERS

COLONIZATION AND RECRUITMENT

POPULATION STRUCTURE

POPULATION DENSITY

DISEASE

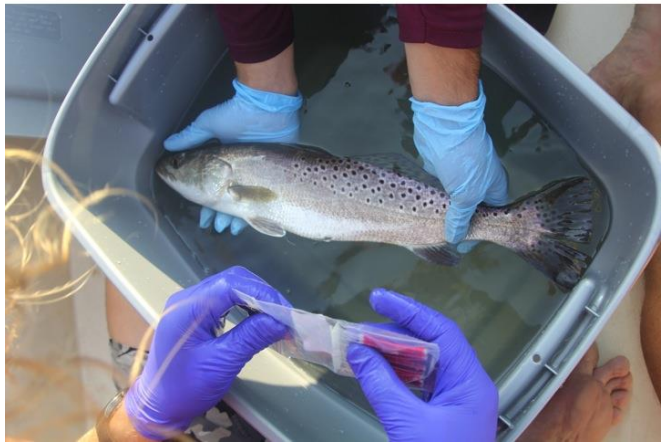

LIMESTONE ROCK JULY 22, 2014
HALF MOON REEF

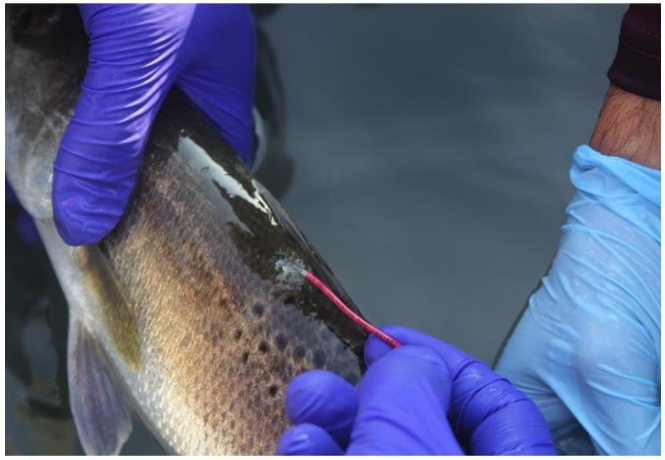

LIMESTONE
HALF MOON REEF
July 13, 2015

RECYCLED CONCRETE JULY 22, 2014

HALF MOON REEF


Concrete
HALF MOON R.
July 13, 2015





Passive Acoustic Telemetry

Texas A&M University - Galveston

Angler Surveys

2015-2016

Sea Grant Texas

AT TEXAS A&M UNIVERSITY

TexasSeaGrant.org

Knowledge
Of Half Moon Reef

Support for Reef
Restoration

Angler Satisfaction

Economic Analysis

Online Surveys


END
HALF MOON REEF RESTORATION MATAGORDA BAY