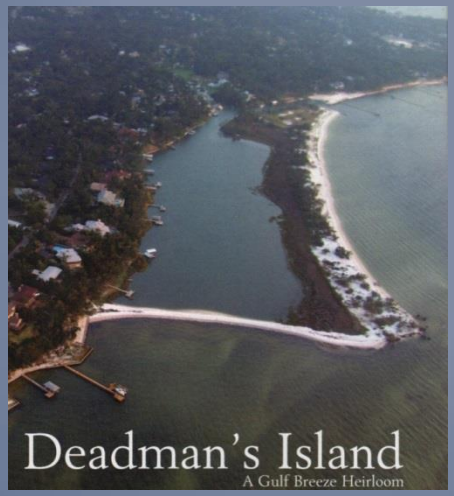
TIMELINES, DECISIONS AND THE EVOLUTION OF A LARGE SCALE OYSTER REEF AND SHORELINE PROTECTION RESTORATION PROJECT FOR THE CITY OF GULF BREEZE DEADMAN'S ISLAND, GULF BREEZE, FLORIDA



SARP'S 2014 NOAA COMMUNITY-BASED RESTORATION PROGRAM (CRP) PRESENTS:

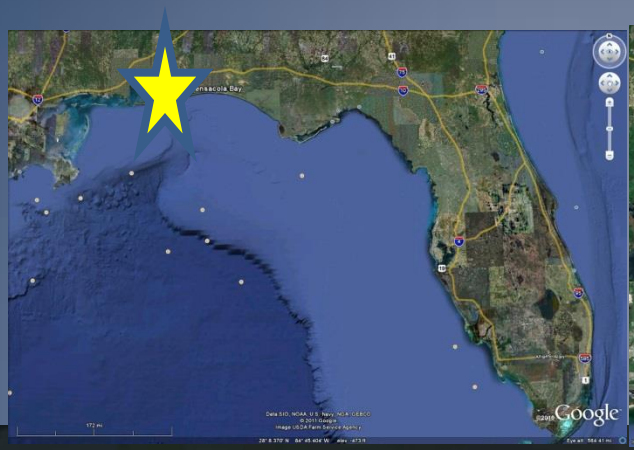
A LESSONS LEARNED WEBINAR SERIES ON COASTAL RESTORATION
ADDRESSING COASTAL RESTORATION PROJECT TIMELINE CHALLENGES".

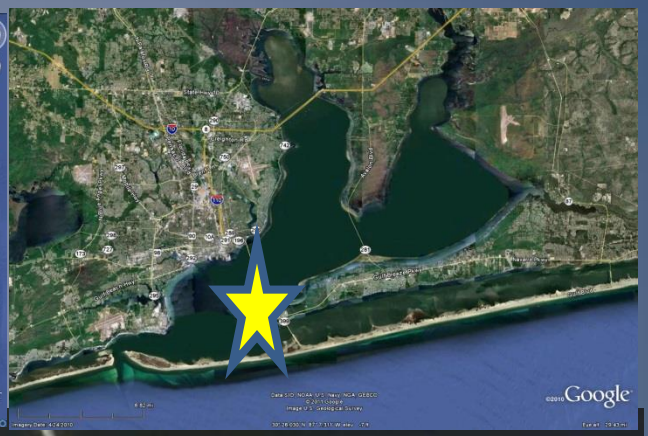
TUESDAY, JANUARY 14TH, 2014

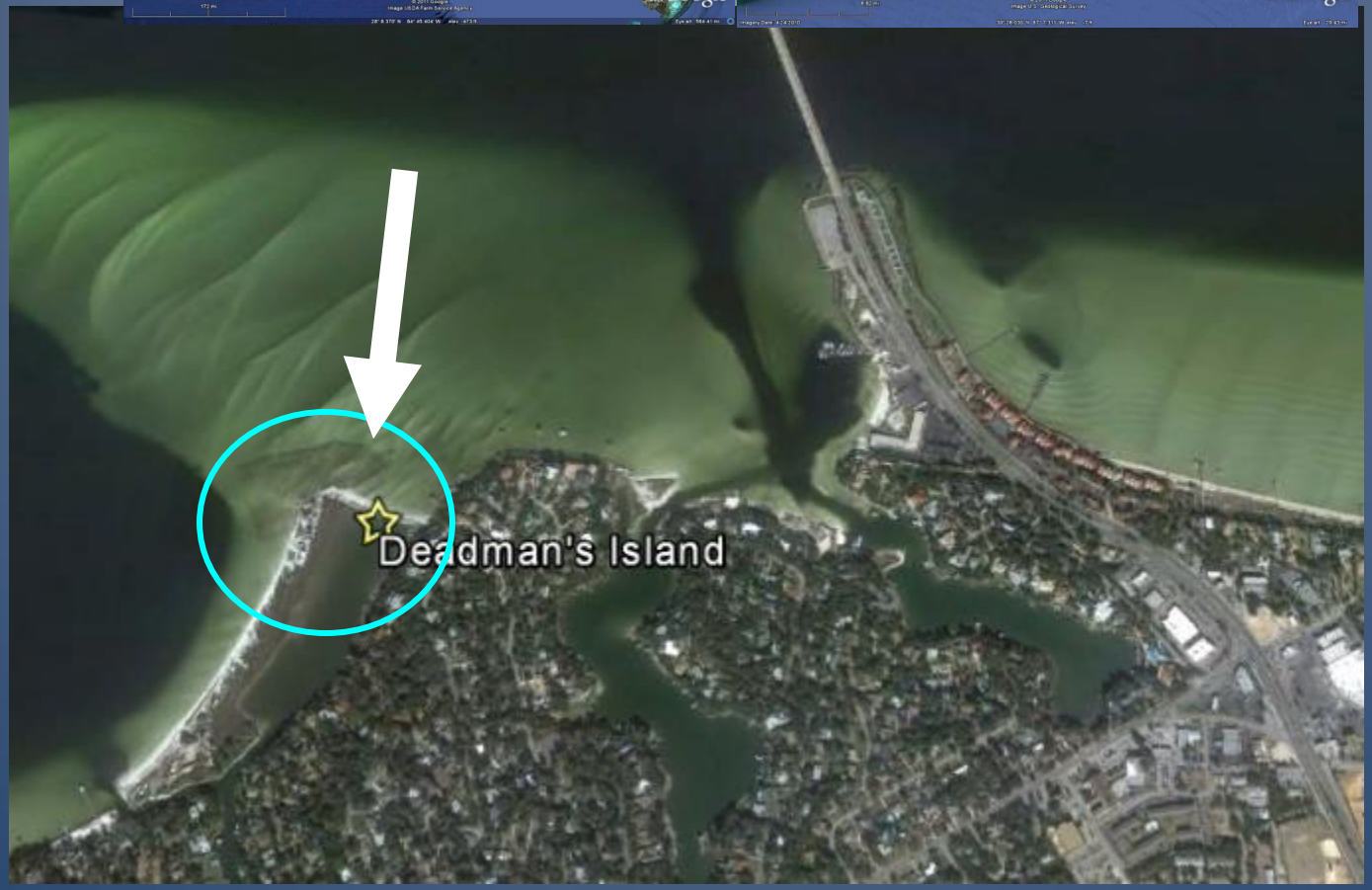
Heather Reed
Project Manager for the City of Gulf Breeze Deadman's Island Restoration Project

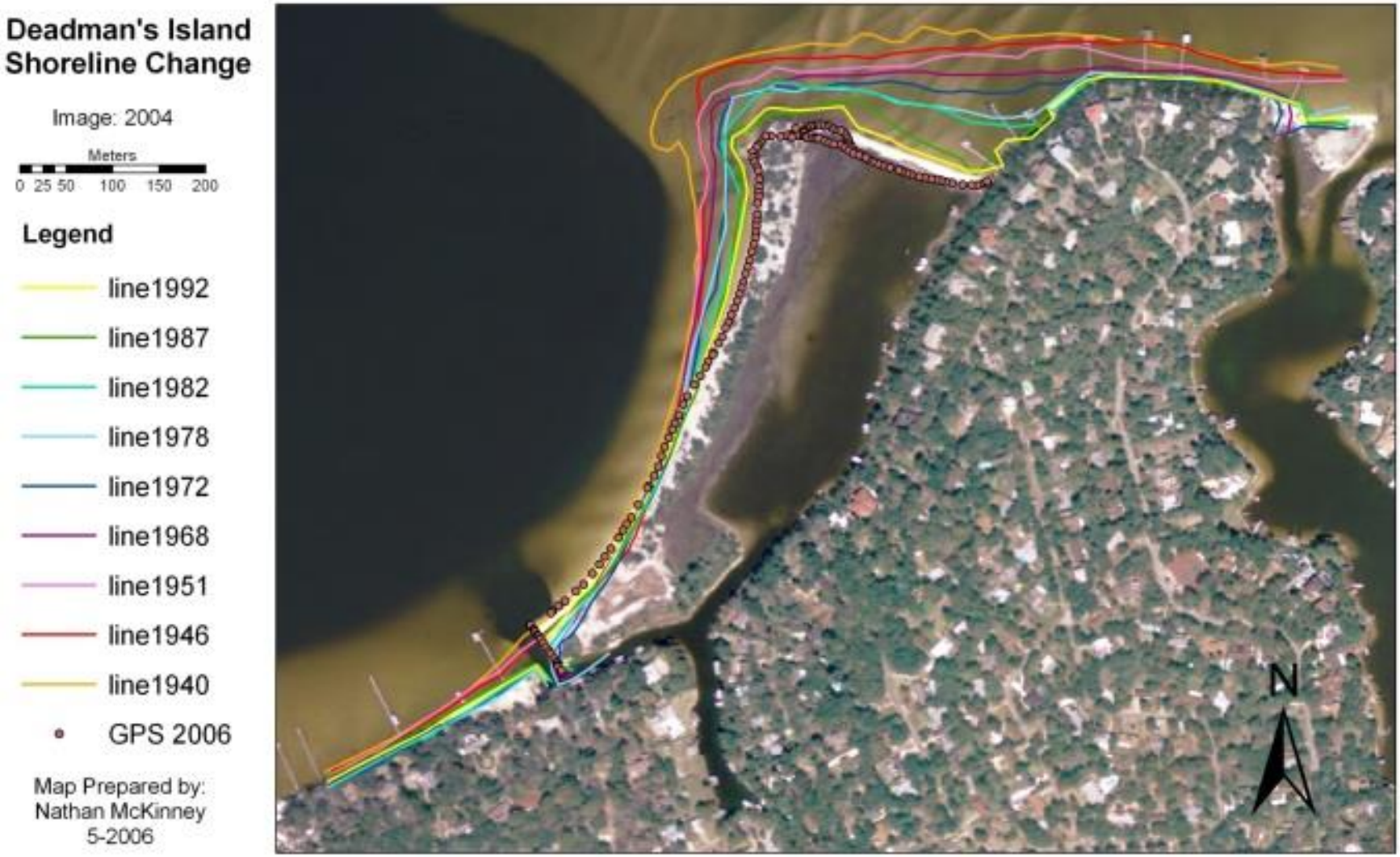
Ecological Consulting Services, Inc.

DEADMAN'S ISLAND








Deadman's Island
Shoreline Change
Image: 2004
Meters
0 25 50 100 150 200
Legend
line1992
line1987
line1982
line1978
line1972
line1968
line1951
line1946
line1940
GPS 2006
Map Prepared by:
Nathan McKinney
5-2006
N

SIGNIFICANT HISTORY

- *Previous archaeological investigations have documented that groups of Native Americans have occupied the Pensacola Bay area since the prehistoric Archaic Stage, approximately 8,000 B. C. NOrthwe5t Florida was occupied solely by aboriginal groups of people until approxi.mately A.D. 1500,*
- *The Early Pensacola Phase (A.D. 900 - 1,500) during the Early Mississippian Period*
- *The European Contact Phase (A.D. 1500 - 1698)*

- *Used by the Spanish and British as a careening ground (1698-1821)*
- *19th Century used to quarantine ships during yellow fever epidemics*
- *1891 Quarantine station was built (First reference of the term Deadman's Island)*
- *Fish Fertilizer Factory (Snapper Company)*
- *Glue Factory*

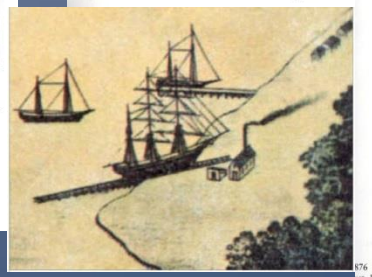
- *City of Gulf Breeze-*

Historic Pensacola Photographs Collection

The "Santa Rosa", a Corps of Engineers survey schooner involved in the surveying of the Intracoastal Waterway system between Pensacola and St. Marks, was tossed ashore in the Hurricane of 1906. Captain George Addison Duncan, Sr., was captain of "Santa Rosa" during the Hurricane of 1916. As the storm approached, Capt. Duncan, having the obligation to save the vessel under his command, stayed aboard and anchored her near the Pensacola waterfront to protect the ship from northerly winds. During the eye of the storm, Duncan motored the "Santa Rosa" to Old Navy Cove on the south side of the bay, in order to have a lee anchorage when the wind changed, thereby saving the ship from destruction.

Historic Pensacola Photographs Collection

In Spanish, the careening grounds at Town Point in Navy Cove were officially named "Carenero," indicating that the area was used to careen wooden ships over ont



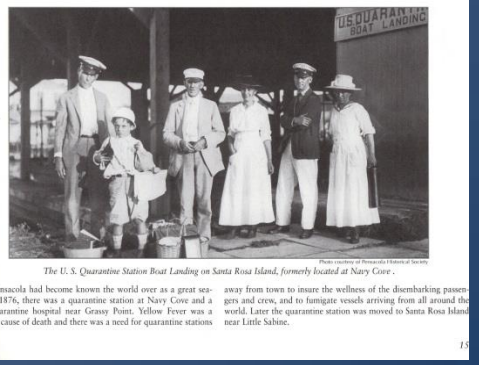


Photo courtesy of Pensacola Historical Society

The U. S. Quarantine Station Boat Landing on Santa Rosa Island, formerly located at Navy Cove .

876 Pensacola had become known the world over as a great sea- ort. In 1876, there was a quarantine station at Navy Cove and a nall quarantine hospital near Grassy Point. Yellow Fever was a ommon cause of death and there was a need for quarantine stations away from town to insure the wellness of the disembarking passen- gers and crew, and to fumigate vessels arriving from all around the world. Later the quarantine station was moved to Santa Rosa Island near Little Sabine.

15

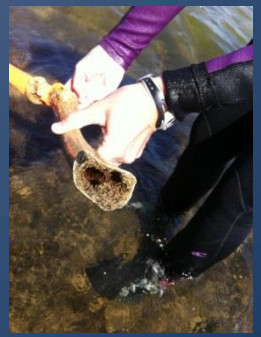
- *(Joy 1988, Bense 1983, T. T. Wentworth Florida State Museum)*

HURRICANE DENNIS (2005)

Courtesy of the University of West Florida and State Archeologist, Ryan Wheeler

Coffins dated from the 1800's were unearthed by erosion from Hurricane Dennis.

2011



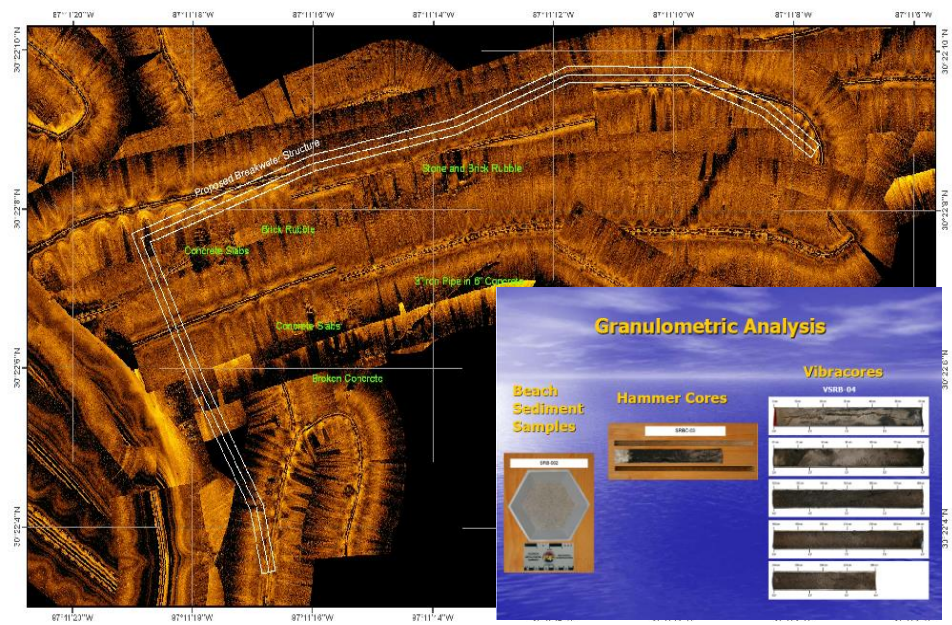


Figure 16 - Data example from side scan sonar mosaic: Area of proposed restoration

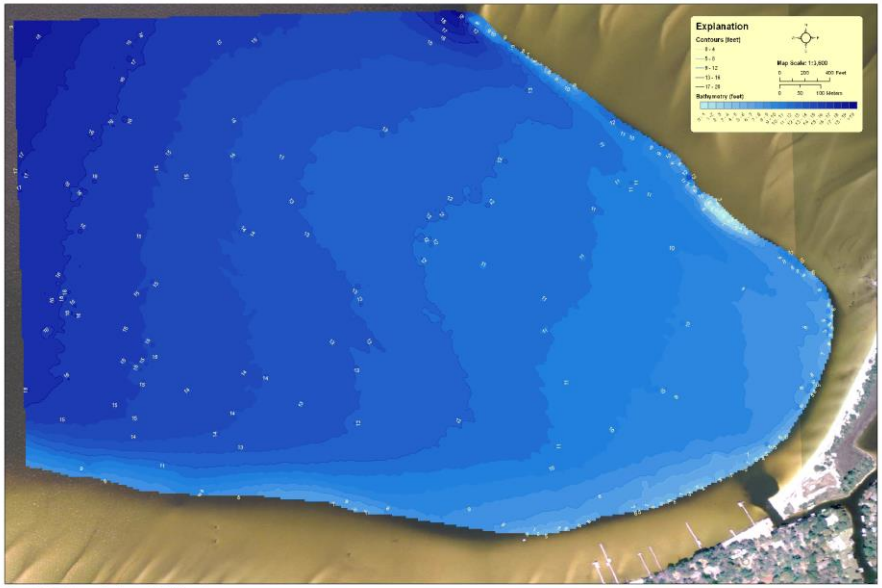
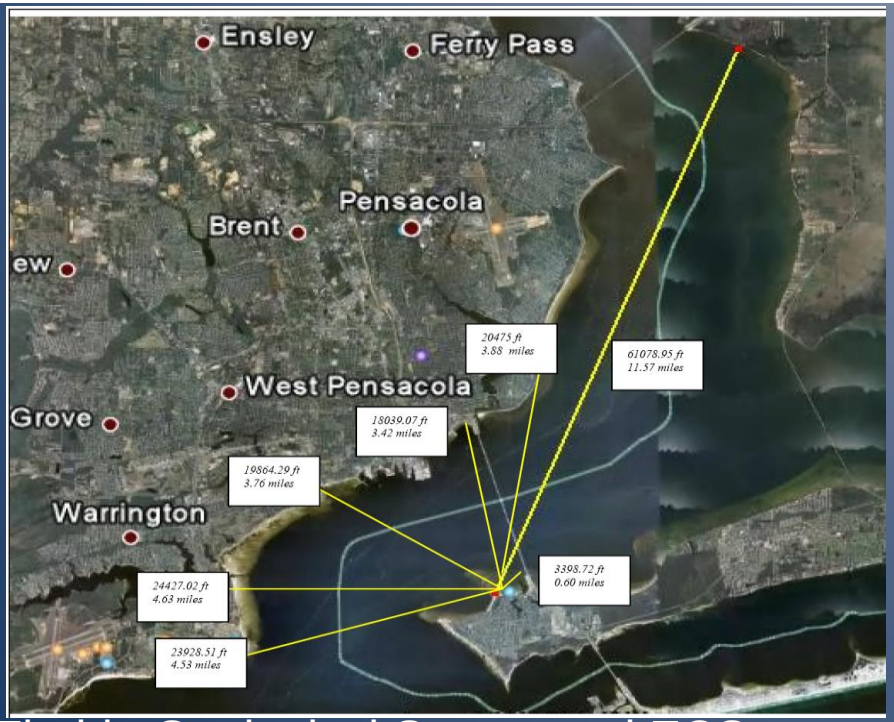
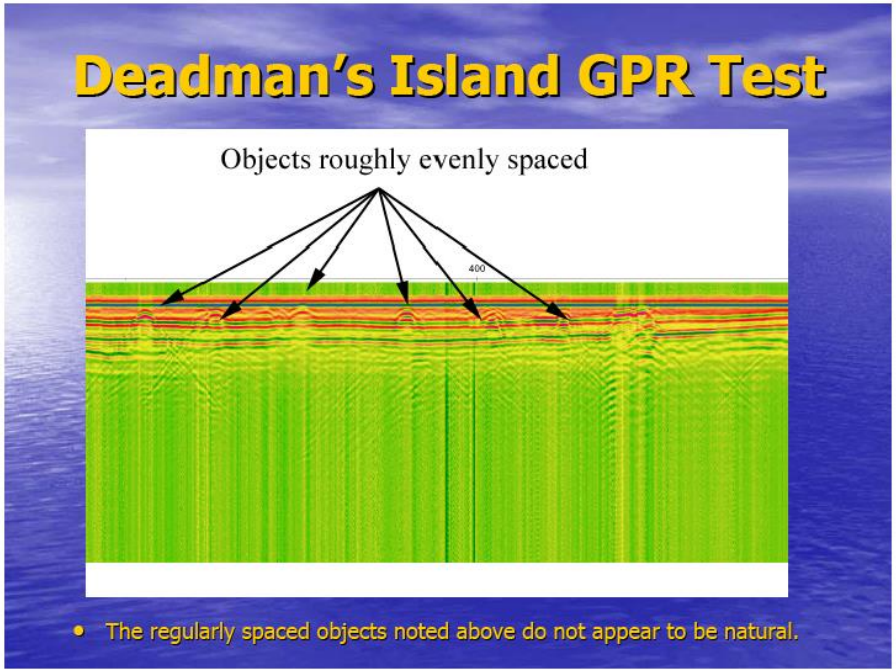
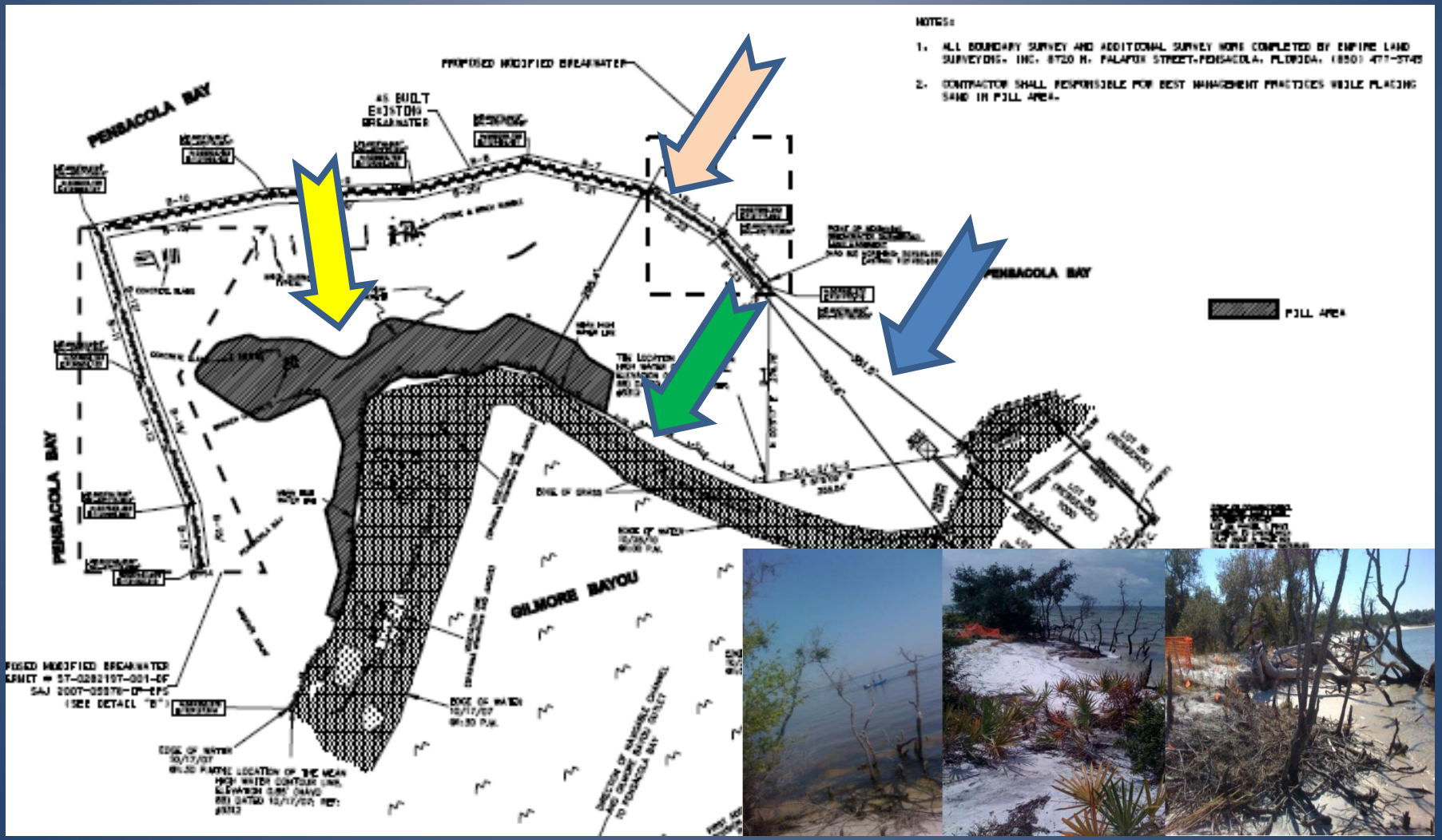


Figure 7 - Bathymetric chart of Old Navy Cove






NOTES:
1. ALL BOUNDARY SURVEY AND ADDITIONAL SURVEY WORK COMPLETED BY EMPIRE LAND SURVEYING, INC. 8720 N. PALAFOX STREET-PENSACOLA, FLORIDA. (850) 477-5745
2. CONTRACTOR SHALL RESPONSIBLE FOR BEST MANAGEMENT PRACTICES WHILE PLACING SAND IN FILL AREA.
PROPOSED MODIFIED BREAKWATER
AS BUILT EXISTING BREAKWATER
PENSACOLA BAY
PENSACOLA BAY
PENSACOLA BAY
FILL AREA
GILMORE BAYOU
EDGE OF WATER
EDGE OF GRASS
DIRECTION OF NAVIGABLE CHANNEL INTO GILMORE BAYOU FROM PENSACOLA BAY

PERMITTING (THE MOST CHALLENGING FOR LARGE SCALE PROJECTS)

- *Riparian rights*
- *Public and Political Interest*
- *Benefits of the project outweighs cost*

(fish habitat, hurricane protection, preservation of natural resources)

- *Protection of historic cultural resources*
- *Project fits the rules*
- *Science*

✓ *Baseline assessments*

✓ *Design*

✓ *State Land Lease/Easement/Exemption*

ECS Permitted Project

Deadman's Island
1940 and 2011
(DEP State Land Lease)
ACOE (No Mitigation)

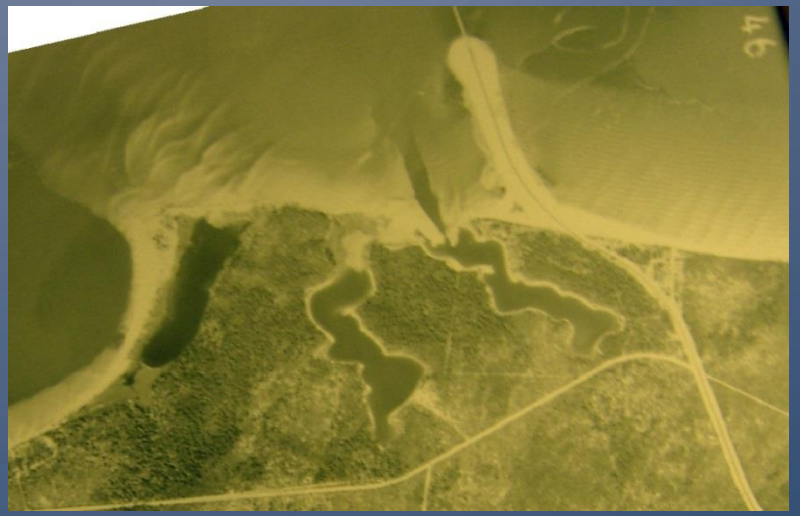
www.deadmansisland.org

Non- ECS Permitted Project
1940 and 2011

Port of Pensacola
Congress Legislative Decision
Shorelines of Port Cities belong to the City (all over Florida)
State lands are set lines today

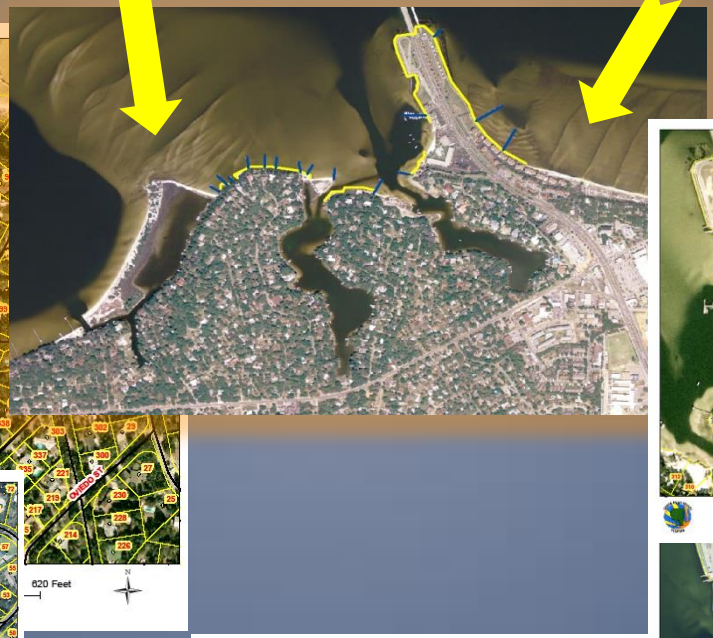
ACOE Mitigation
(Bruce's Beach)

A donor site for seagrass and emergent grass propagation for DEP Ecosystem Restoration Section and their greenhouses)



ECS

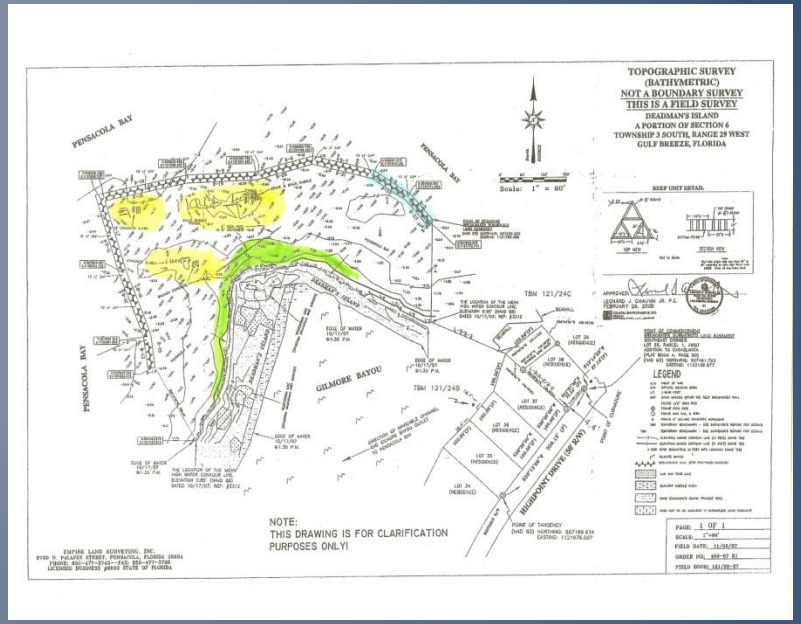
ACCELERATED EROSION VS NON ACCELERATED EROSION



County Survey Dept

PROJECT SETBACKS

- *One Homeowner objection*
- *Negotiation-changes to the plans according to the homeowners needs*
- *Deep Water Horizon Oil Spill*



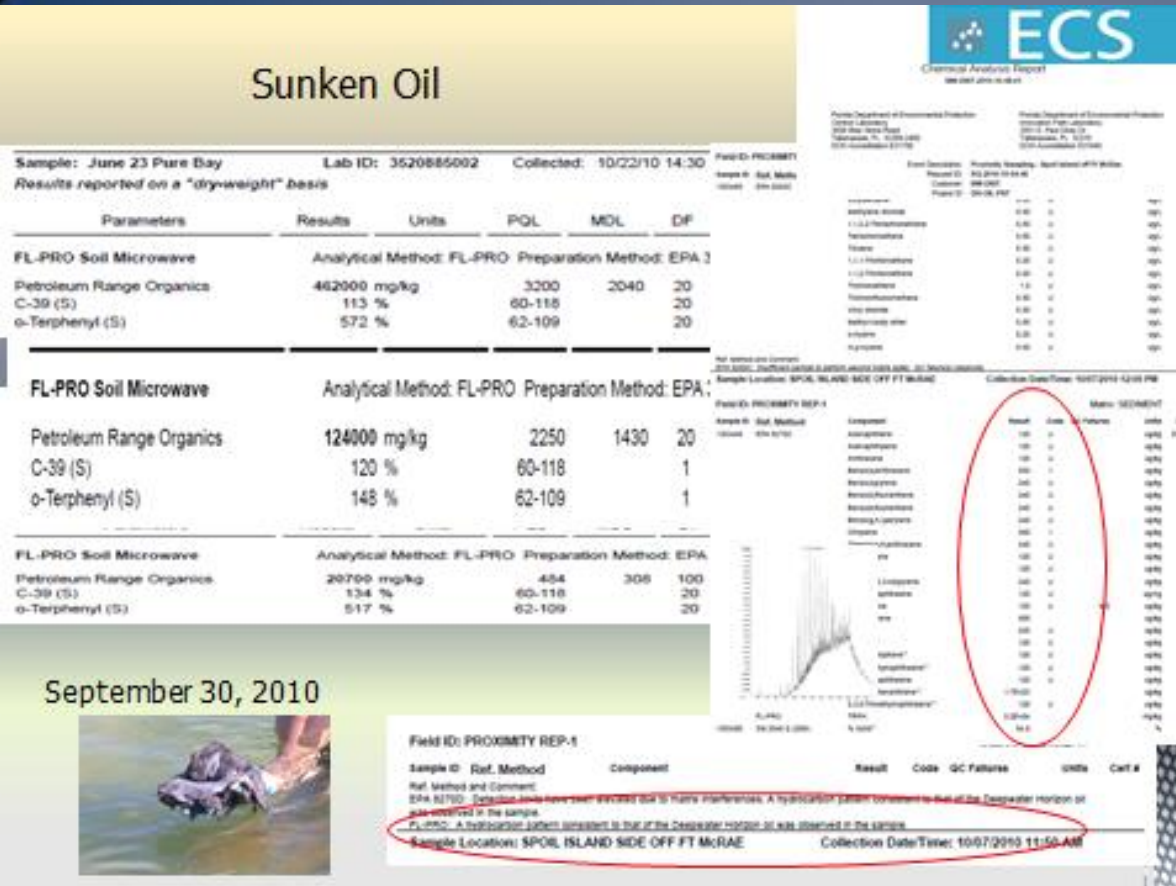
2010

DWH Oil Spill

Located and reported oil in the bay to unified command, the coast guard and worked with BP

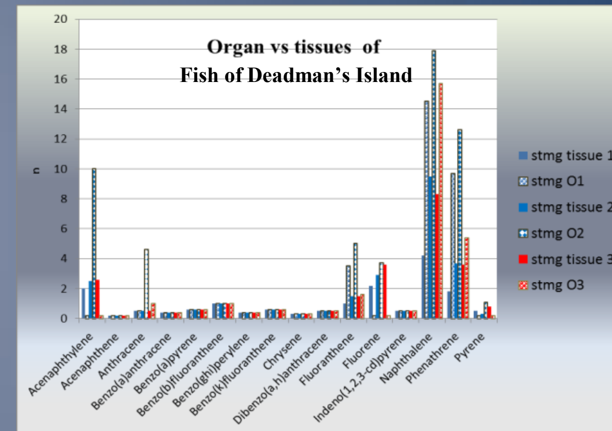
Project surrounded by boomed and delayed a year

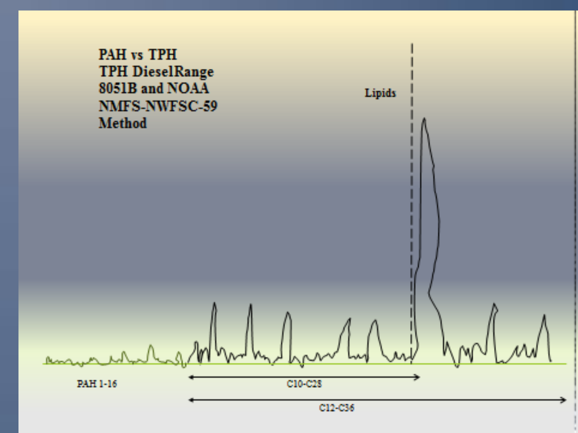
Grant agreements delayed and modified



Conflicting lab results of the same sample of the sunken oil found at Fort Mcrae.

Oyster and fish tissue and organ testing





Summary:

Premonitoring 2010 of 155 units – showed a healthy reef

July and August 2010 showed fish die off, and oyster mortality we can show events were linked to oil spill

2011- showed no resident fish, increase in predators and decline in live oysters

New SARP reefs 2012- showed increase in fish population and 1% live oyster

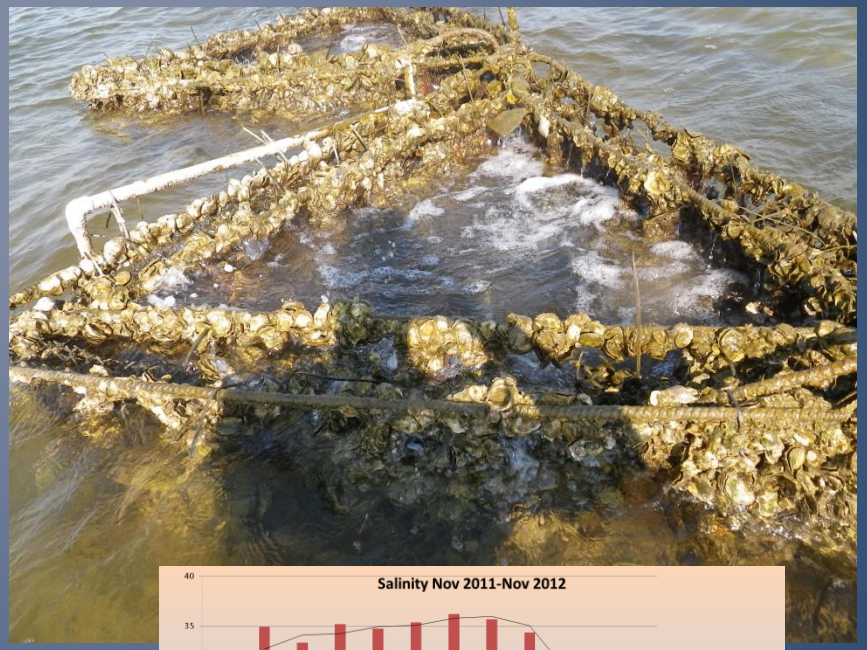
2013-showed oysters on SARP reefs and no oysters on old reefs

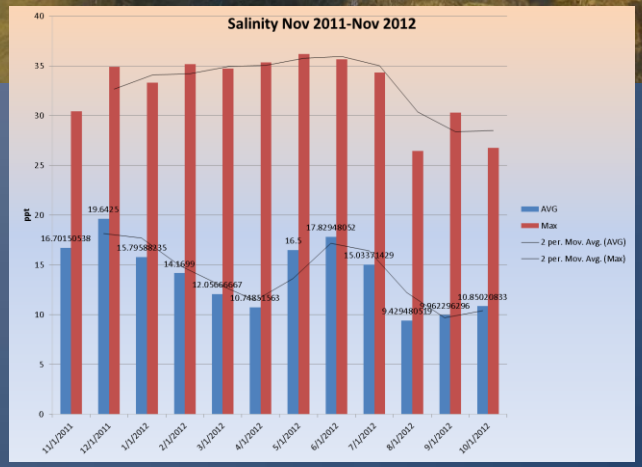
PREOIL SPILL 2010-2013

- *2013- covered with algae, shell worn down and fell through bags- no oysters or fish habitat (2013 60% loss in wave attenuation)*

OBSERVATIONS
REEFBLK (LIVE OYSTER DEPENDENT)

- *Height limited Depth limited- 3ft breakwater in 2-6ft water*
- *Exposure to tides- oysters can remain closed for over eight hours but this is at risk- leaving them open to potential stress and disease*
- *Unsure if the salinity can sustain the reef (spat settlement, predator sustainability)*
- *Lost ALL oysters in 2011-2012 (domino effect)*
- *And uncertain of direct and indirect recovery from environmental impacts*





Needed an non live oyster dependent innovative breakwater to address these issues

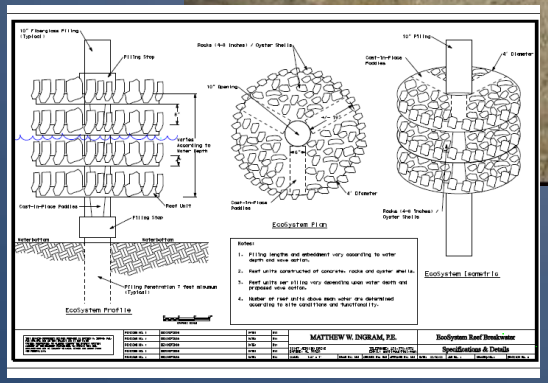
Observations Ecosystems

- Flow through system circulation/filter feeding
- Can stack according to depth to create a uniform Height (also anchored)
- Not salinity or live oyster dependent (creates diverse habitat and promotes oyster growth)
- Can withstand higher wave impact without breaking down
- More surface area for settlement and habitat
- Embed Natural oyster shell to promote higher rate of settlement

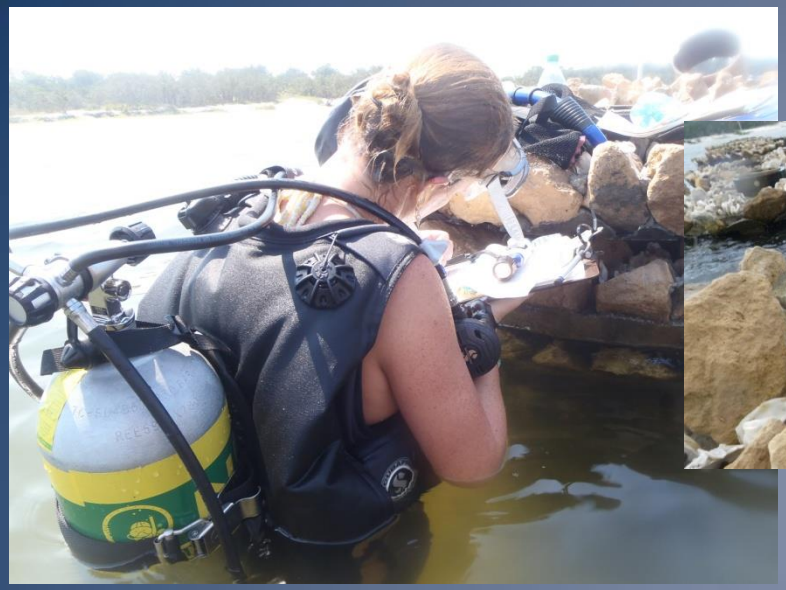
✓ Modify permit to change design to above water- only permit for this design

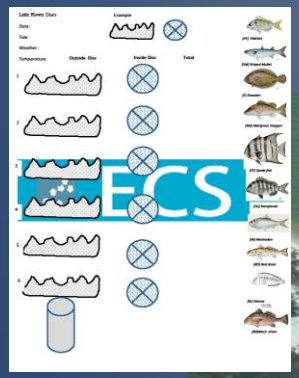
✓ Request the grant modification (SARP)

PHASE 2 BREAKWATER DESIGN



2011





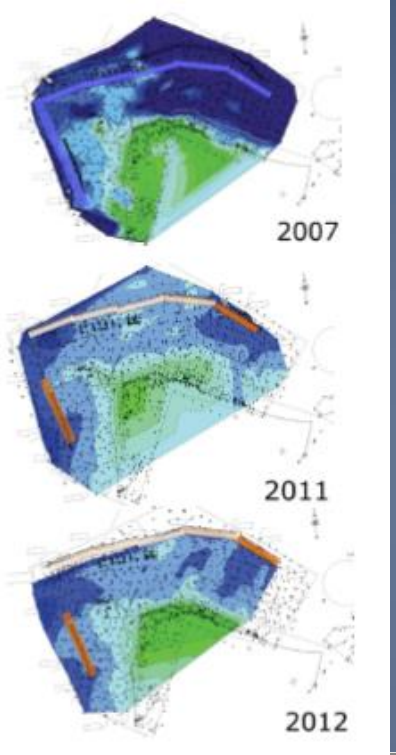
Monitoring (QUEST) methods- Quantitative Underwater Ecological Survey Techniques

Coral Reef monitoring methods modified for oyster reef

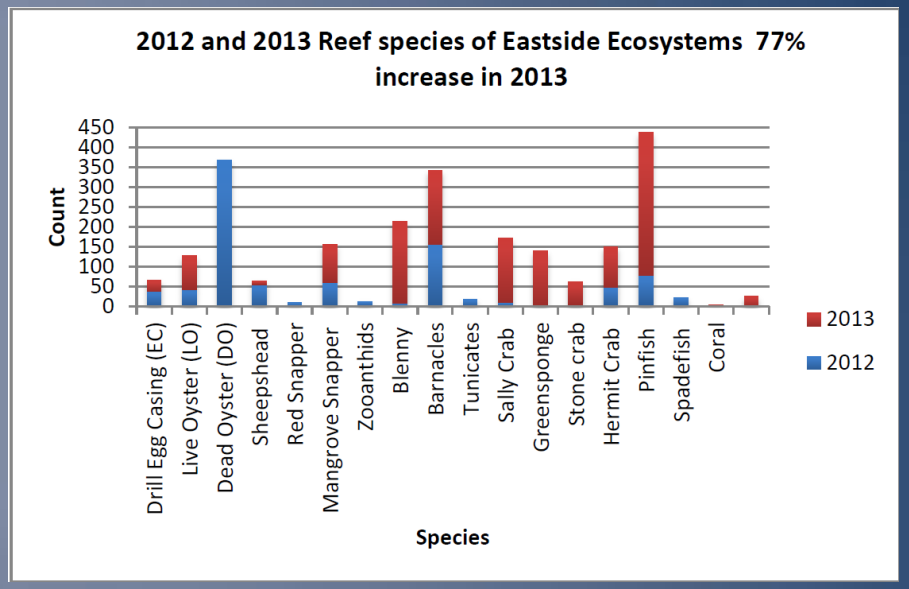
- % coverage / biodiversity/species competition/ mortality
- Relative Fish abundance- Relative Species Abundance
- Fixed Quadrats / Rebar Reefblks
- Ecosystems/ changed design and spacing to accommodat monitoring
- Growth Rate
- Fish Surveys
- Tissue Testing (Oil Spill)
- Accretion/Scouring/shifting
- Yearly bathymetric survey
- Structure Testing/Comparison
- Birds
- Gulf Sturgeon monitoring

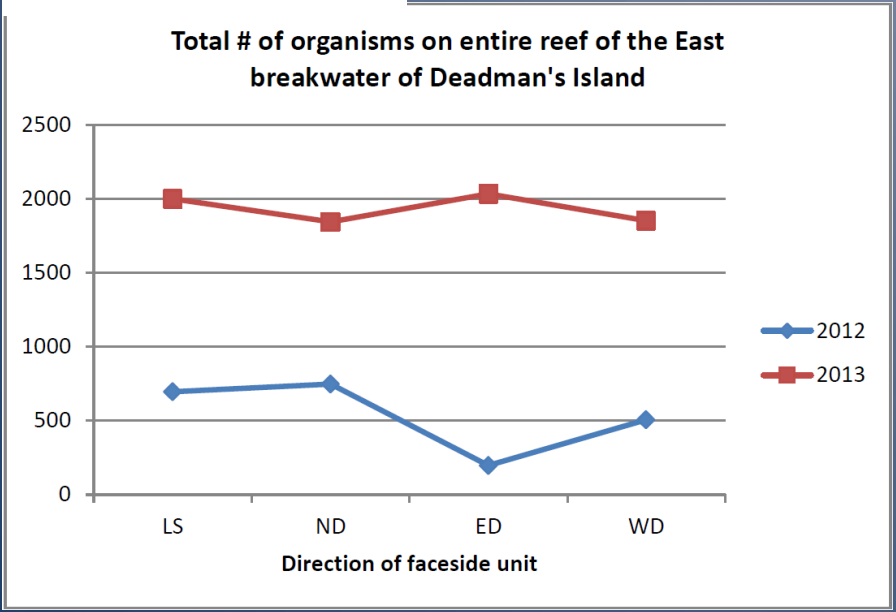
Gulf Sturgeon Monitoring

- Paid/trained technicians – End of year BS or post graduate
- Monitoring data from volunteer training is reviewed and taken into consideration but not used for QA purposes



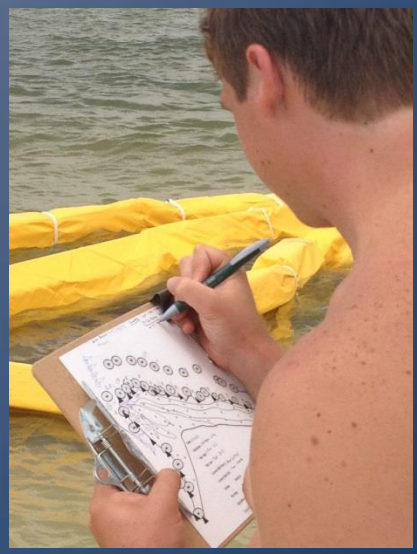
- Yearly Comparison
- Bathymetric
- Increase/Decrease
- Survival/mortality





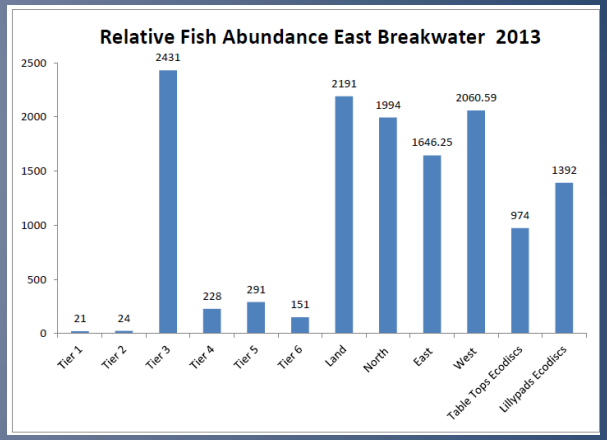
- Reef facing direction

Landside (LS)
North Direction (ND)
East Direction (ED)
West Direction (WD)

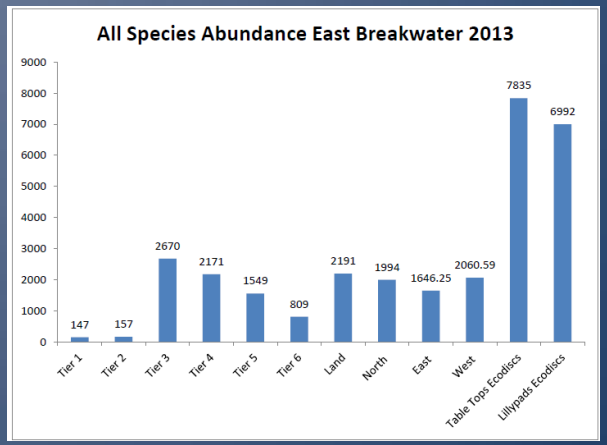


Tiers (Stackable sections) and unit type

	#units	Total All Species abundance	Live Oyster Relative Abundance	Fish relative abundance	Shannon Weiner Diversity Index	Simpson's Diversity Index
Tier 1	62	111	0	71	1.04437692	0.53833171
Tier 2	62	185	3	111	1.16156894	0.59352085
Tier 3	62	690	18	438	1.06182216	0.61406365
Tier 4	62	467	13	59	1.129841	0.69497569
Tier 5	62	376	8	76	0.93666305	0.58145499
Tier 6	62	122	0	51	1.0575529	0.76209186
Land	62	736	20	736	1.70784715	0.68301339
North	62	816	10	816	1.43075945	0.58030494
East	62	165	1	165	1.35476194	0.57184035
West	62	514	12	514	1.29067669	0.61304147
Table Tops Ecodiscs	36	2027	38	974	1.64909462	-1.7145199
Lillypads Ecodiscs	26	1392	41	1392	1.70979866	0.17563693



	#units	Total All Species abundance	Live Oyster Relative Abundance	Fish relative abundance	Shannon Weiner Diversity Index	Simpson's Diversity Index
Tier 1	62	147	1	21	0.71301372	0.39278839
Tier 2	62	157	1	24	0.76118801	0.46384146
Tier 3	62	2670	7	2431	0.40887499	0.29888058
Tier 4	62	2171	26	228	0.38278848	0.39267518
Tier 5	62	1648	34	390	0.49808366	0.52386057
Tier 6	62	809	20	151	0.34035705	0.45417067
Land	62	2191	25	2191	0.81299854	0.39983041
North	62	1994	30	1994	0.91150908	0.41261351
East	62	1745.25	19	1745.25	0.76903017	0.5067202
West	62	2060.59	11	2060.59	0.52539577	0.38244855
Table Tops Ecodiscs	36	7934	84	4270	0.68188919	0.01839816
Lillypads Ecodiscs	26	7091	77	3706	0.81307993	0.35092313



Two Types of vertical breakwater

Reefblk

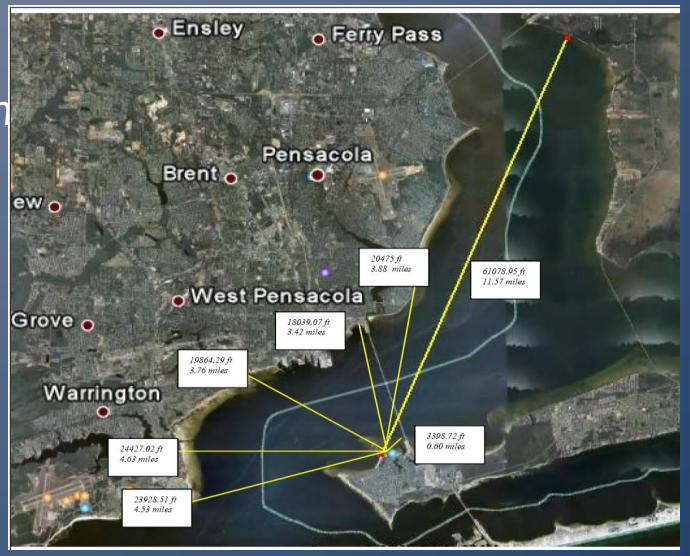
Ecosystems

- Both are good habitat formation and reef builders in site specific areas
- Both attenuate waves
- Both were anchored
- What is your goal? If the reef dies off for two years will this impact the goal of the project.

LESSONS LEARNED

- *Be prepared for unexpected delays (objections, natural events)*

- *Evolution of projects if not all funding is available*
- *Educate homeowners*
- *Appropriate Science and monitor according to size of the project to help determine transferability for other projects – be able to show other alternatives if your project doesn't fit the rules*
- *Accelerated erosion versus normal erosion*
- *"Responsible restoration" "Considerate creation*



DETERMINE THE NEED AND BENEFITS

- ***Oyster dependent reef versus non-oyster dependent reef***
- *Despite oil spill-other fluke disasters (predation, salinity, temperature)*
- *Research before the permit preparation*
- *Know historical data and development trends- research-*
- *You CANNOT dump oyster shell anywhere in the water and produce reefs-*

(salinity regimes, currents, depth etc)

When reviewing projects be aware of Money Projects and possible lack of resources - 3 million dollars in oyster shell – where are 3 million dollars in oyster shell?

–- waste of precious natural resources -we cannot ever replace if placed in the wrong area and does not survive – Only the environment loses out

Additional benefits – what are the additional benefits to your goals (reduce maintenance, promotes education awareness and community involvement).

2007-PRESENT DEADMAN'S ISLAND COMMUNITY INVOLVEMENT









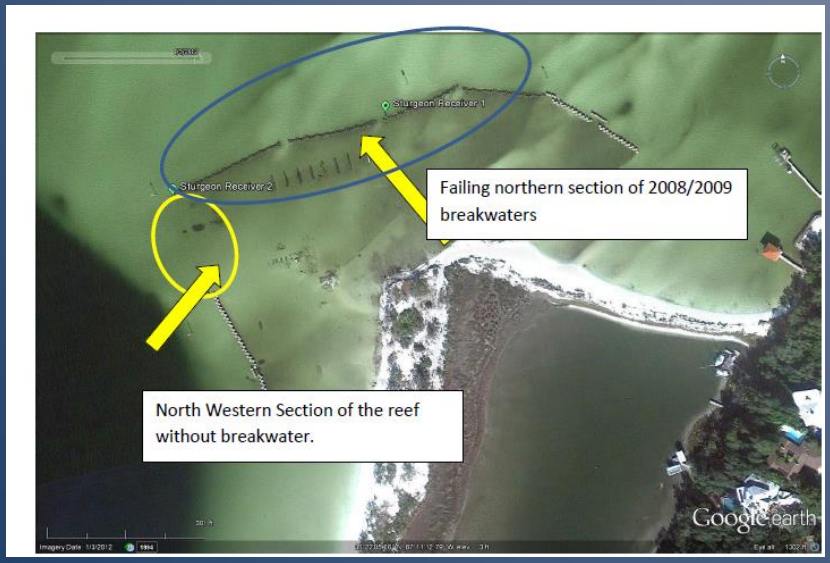




Five Year project (Large scale)
Limited funding- evolving needs- LOTS of PROGRESS!!

Lots of educational lessons and opportunities for volunteers and students

Future plans:
Finish Breakwater footprint
Replace failing breakwaters



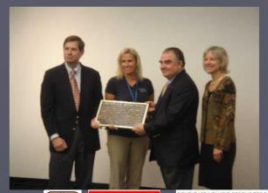
QUESTIONS?

www.deadmansisland.org

Thank You Partners!

NOAA/Southeastern Aquatic Resources Partnership

- Army Corps of Engineers
- FLDEP Coastal Aquatic Managed Areas
- NOAASARP
- National Fish and Wildlife Foundation
- Five Star Partners
- UWF Archeology Dept
- Escambia County Board of Education
- Georgestone Technical School
- Santa Rosa County
- US Fish and Wildlife



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