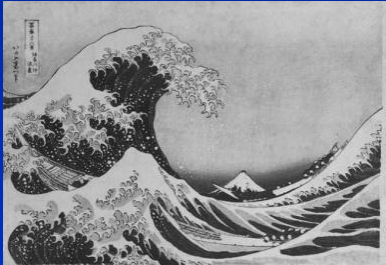
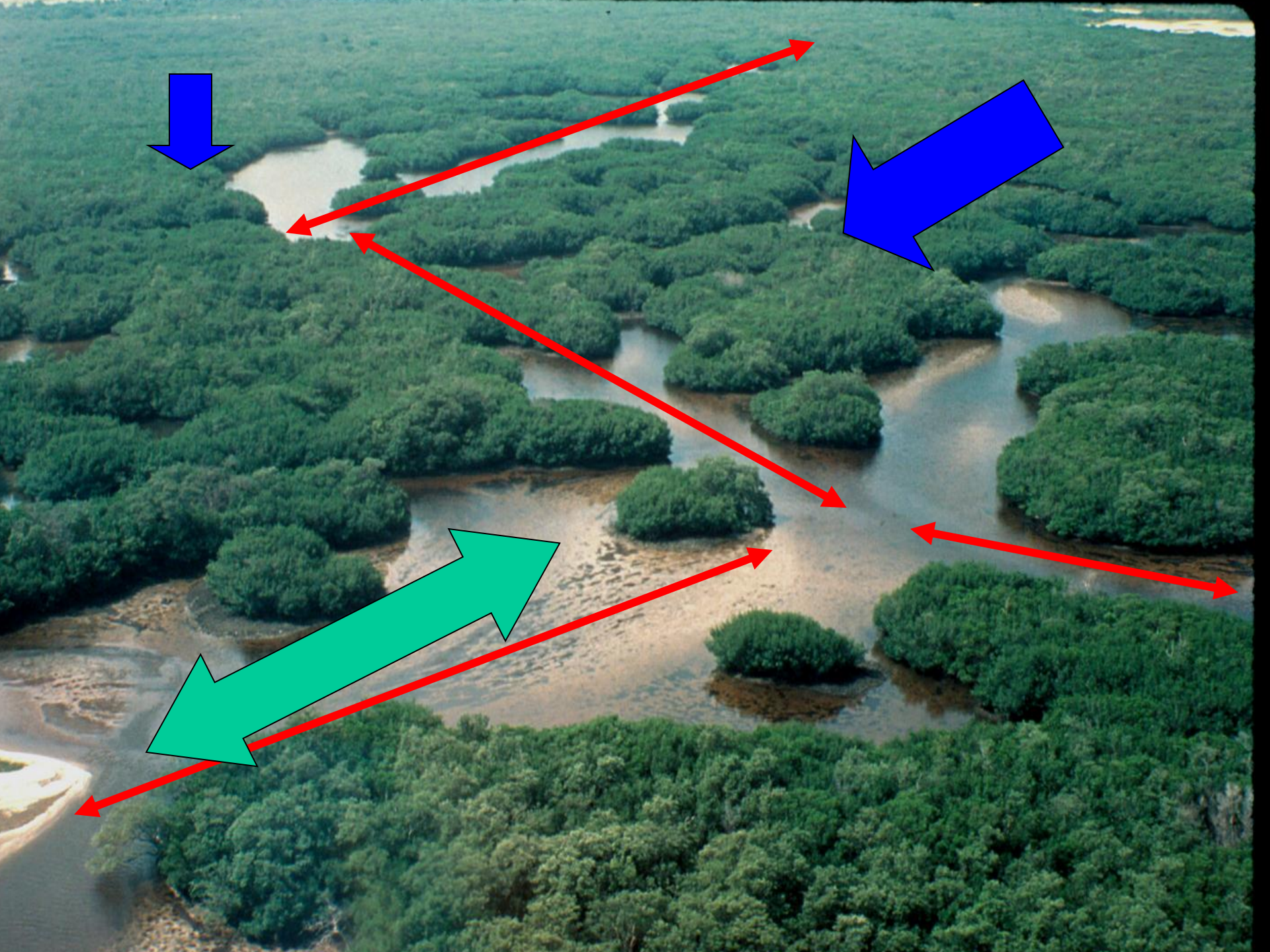


Ecohydrologic Characterization as an Essential Tool for Successful Mangrove Forest Management and Restoration

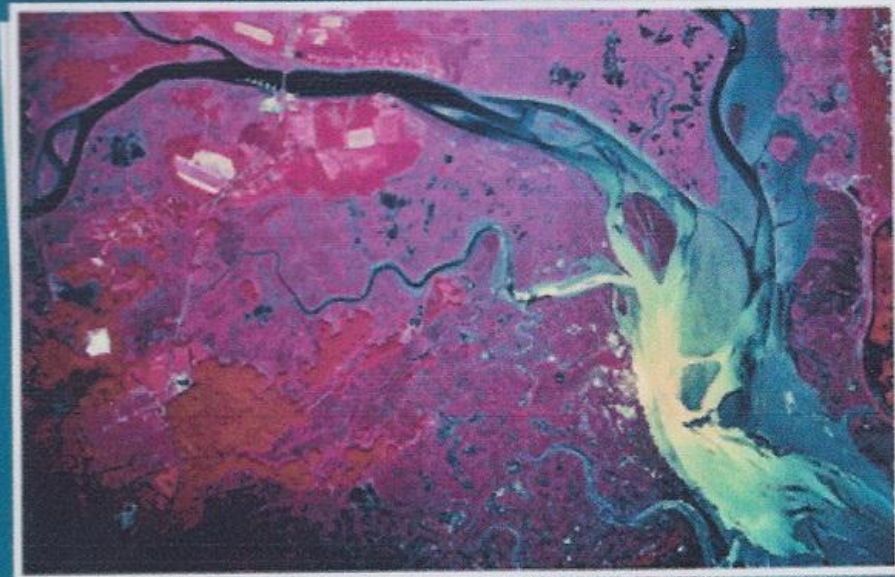


Roy R. “Robin” Lewis III, PWS
Coastal Resources Group, Inc., Salt Springs, Florida
June 8, 2012





ESTUARINE ECOHYDROLOGY



International Council for Science
Scientific Committee on Oceanic Research



Eric Wolanski

Mangroves: Ecological Functions

- 1. Direct Energy Sources
- 2. Habitat
- 3. Water Quality Maintenance – Sediment removal, nutrient retention and transformation, oxygen addition
- 4. Shoreline Stabilization and Erosion Control – RE: Green Coast Initiatives

10 AUG 94 – CLAM BAY, FLORIDA



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10 AUG 94 –CLAM BAY, FLORIDA



**PREVENT THIS FROM HAPPENING WITH
"PREEMPTIVE RESTORATION"**

3. Giants Camp, (GC) Tampa Bay

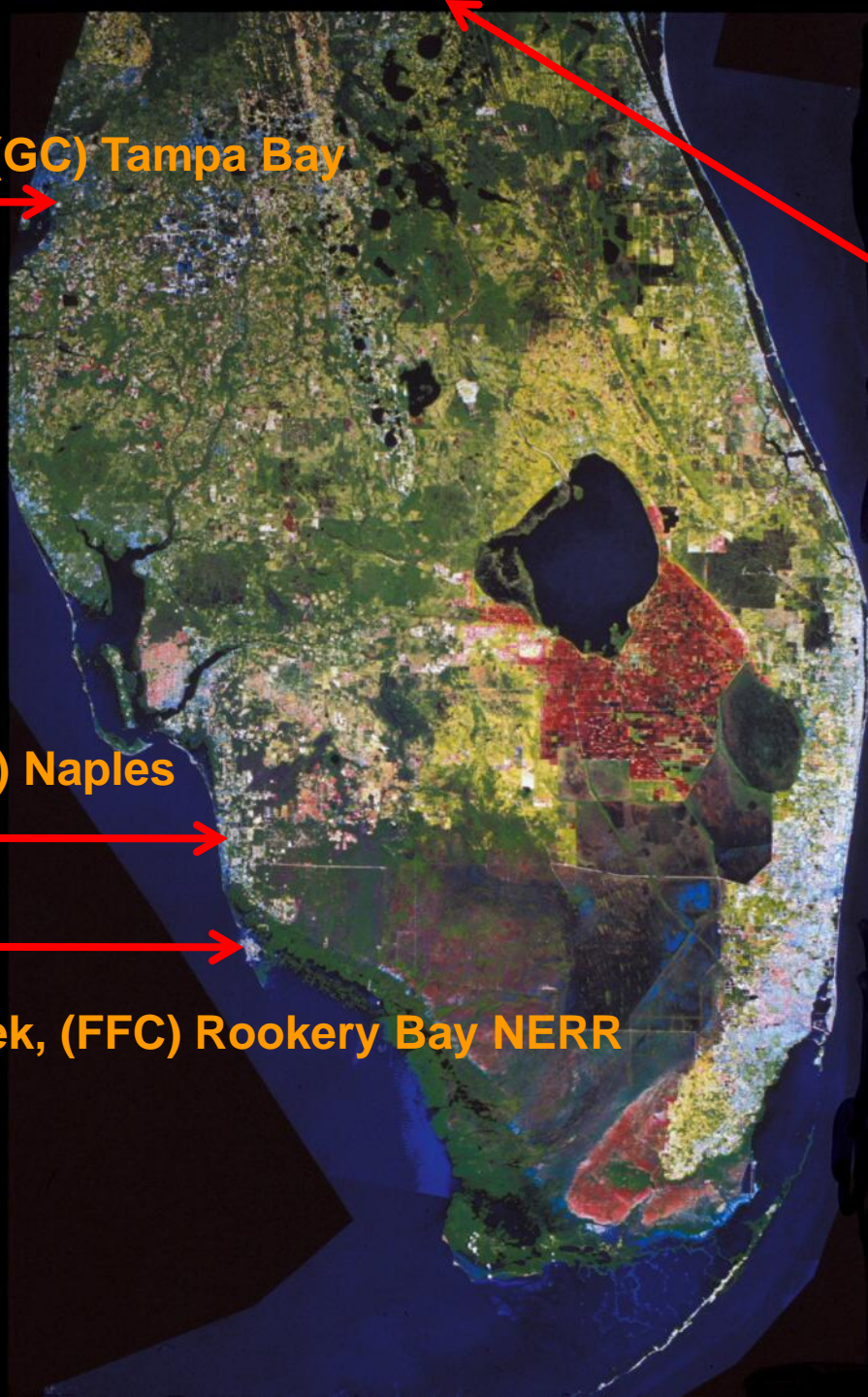
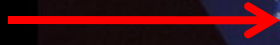


ORLANDO

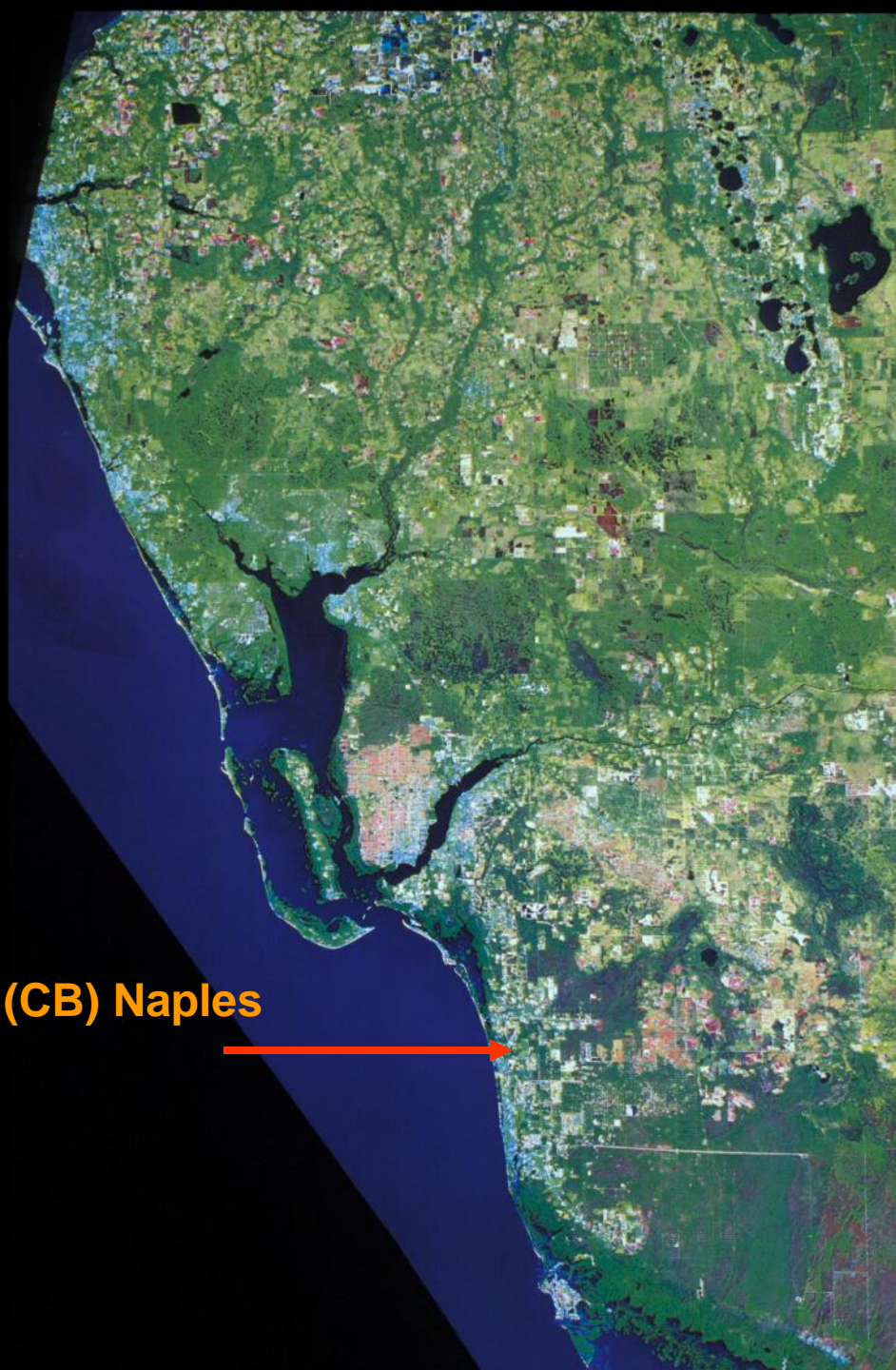
1. Clam Bay, (CB) Naples



2. Fruit Farm Creek, (FFC) Rookery Bay NERR



1. Clam Bay, (CB) Naples





10 AUG 94





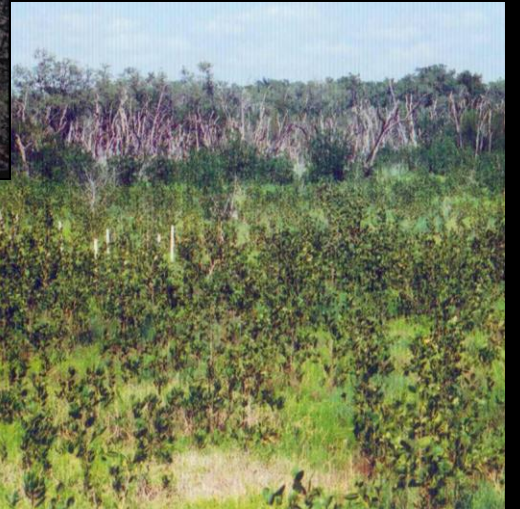
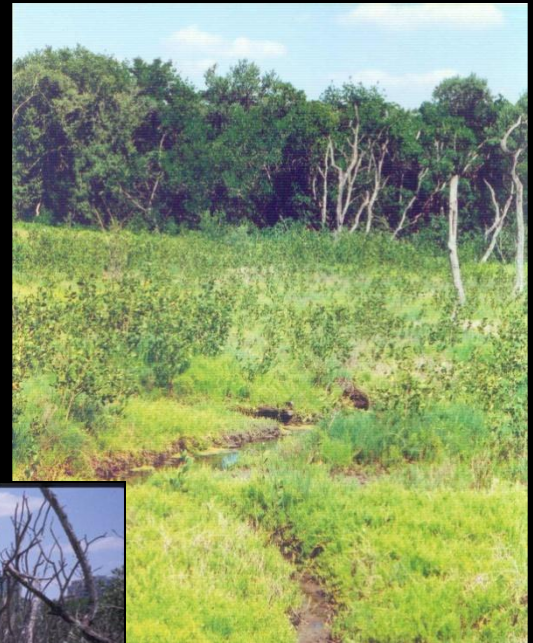















2003



January 11, 2007



ALTERNATIVE APPROACHES TO ECOLOGICAL MANGROVE RESTORATION (EMR v. GARDENING)

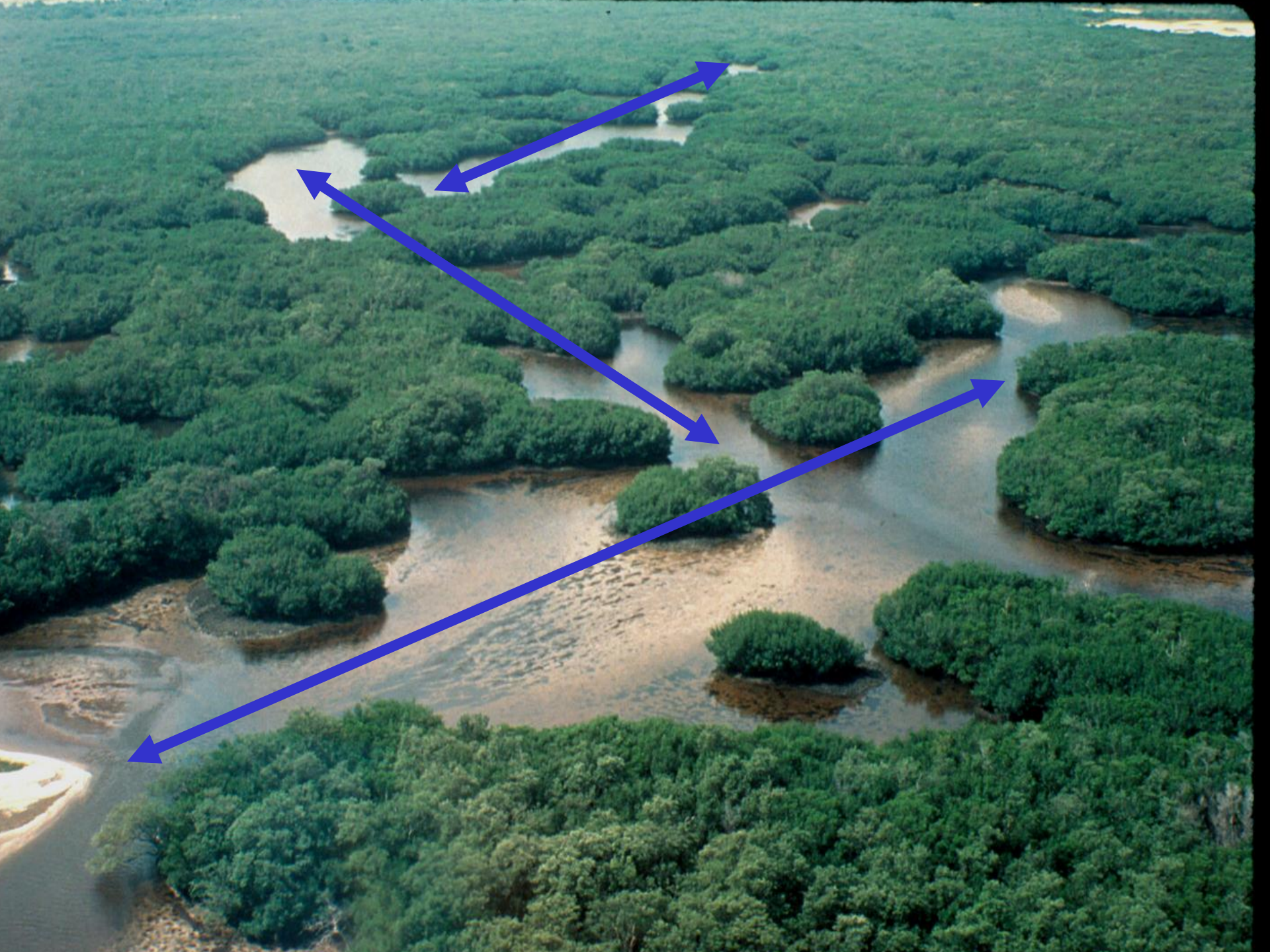
1. Understand the Autecology and Community Ecology of the Local Mangroves
2. Understand the Normal Hydrology of the Local Mangroves 
3. Assess Modifications to Hydrology or Added Stress? 
4. Select the Restoration Site
5. Restore or Create Normal Hydrology, or Remove or Reduce Stress 
6. Plant Mangroves Only As Needed

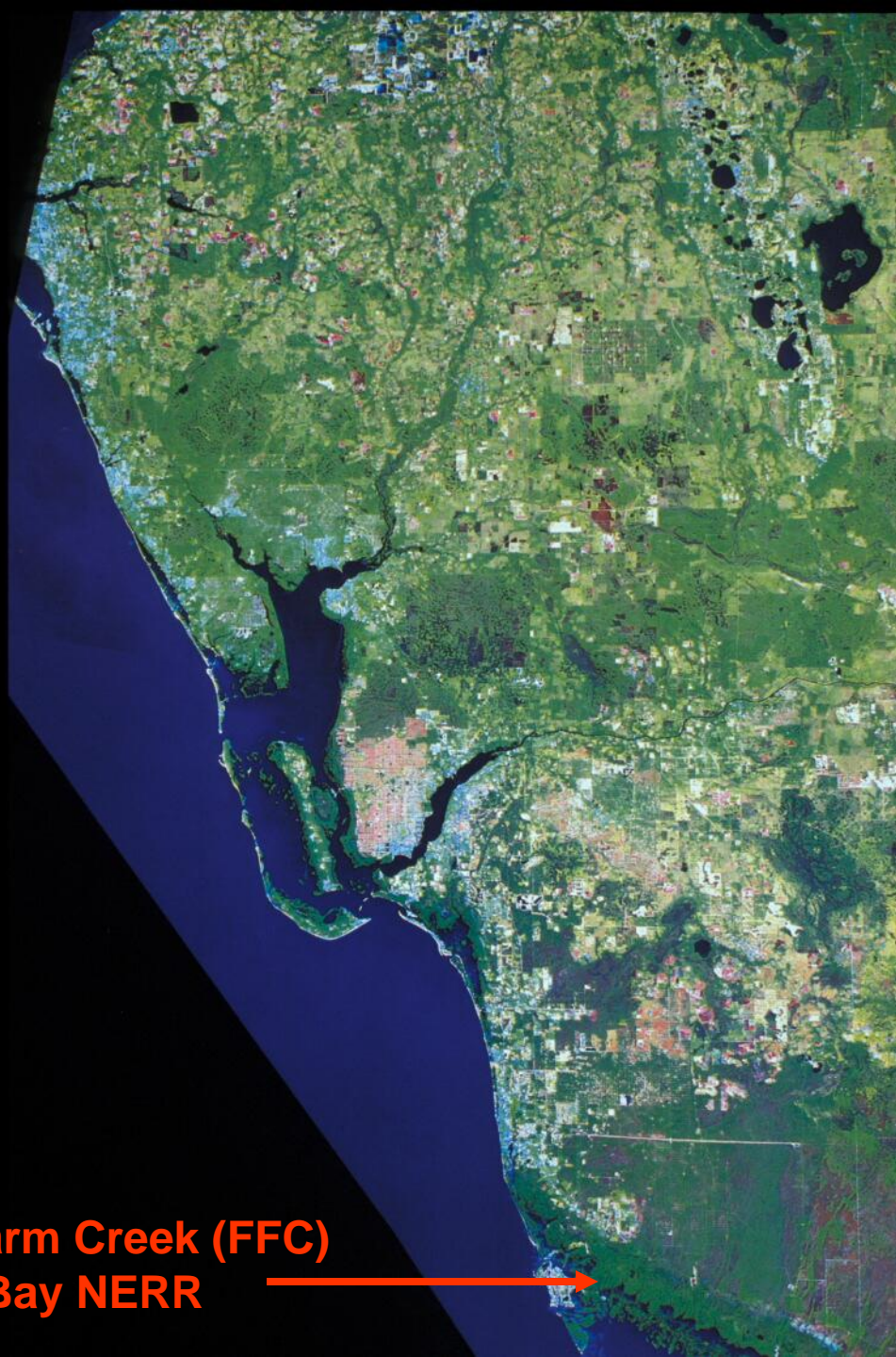
SUCCESS !



1. Build a Nursery, Grow Mangroves and Plant Mangroves
(GARDENING)

FAILURE#!*!**



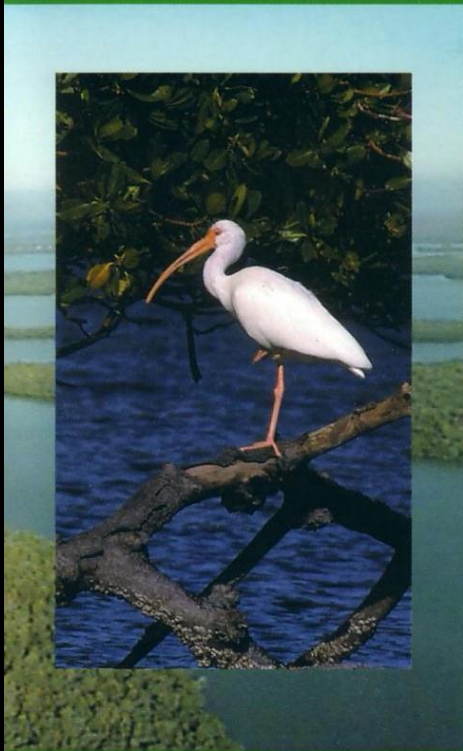


**2. Fruit Farm Creek (FFC)
Rookery Bay NERR**





National
Estuarine
Research
Reserve



Rookery Bay

Rookery Bay Fruit Farm Creek Proposed Restoration Site – 90 ha of Dead and Stressed Mangroves – January 21, 2011

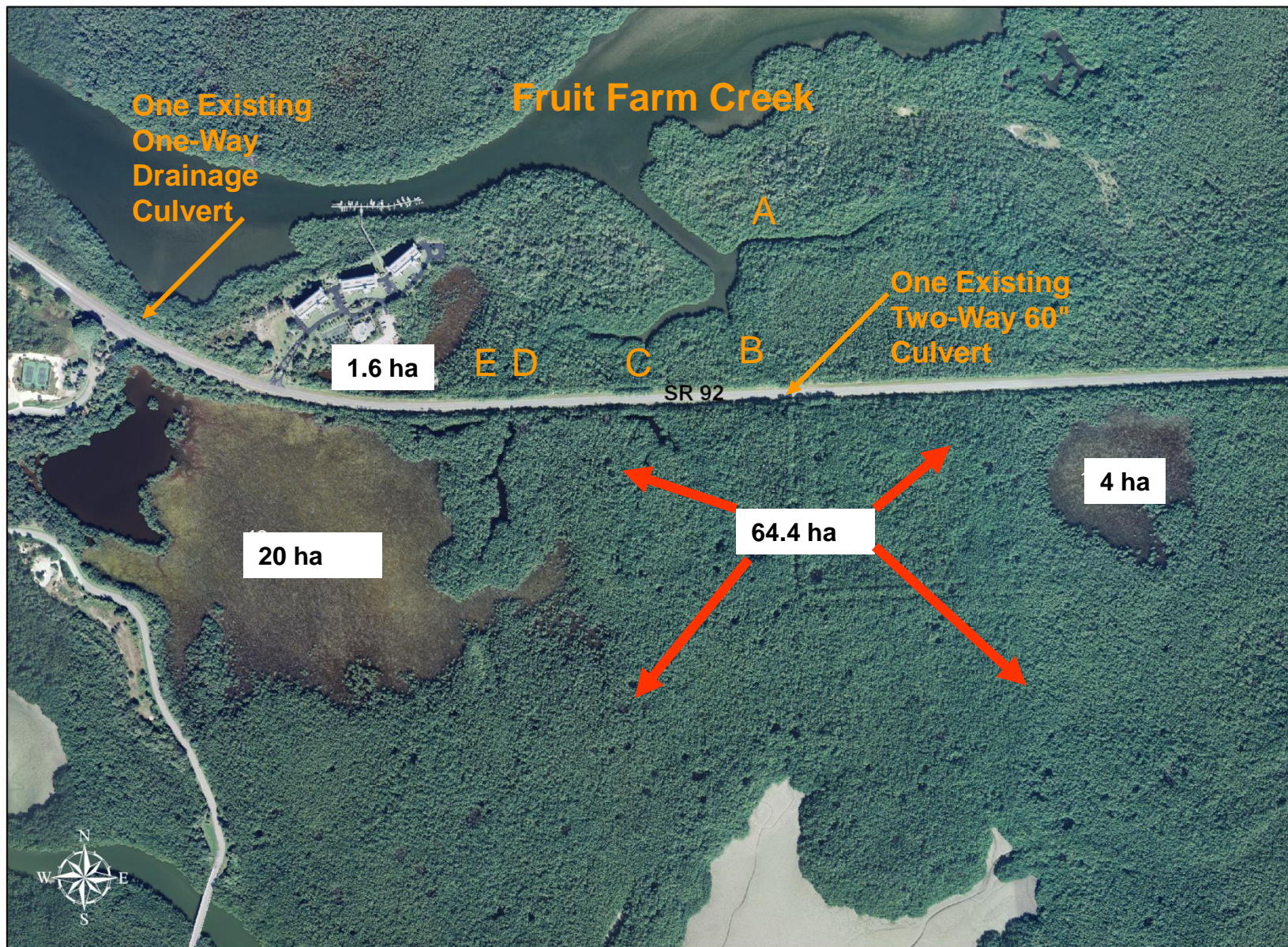


Ongoing Activities 2005-2012

- 1. EMR Training in Conjunction with Actual Restoration
- 2. Quantification of the Area of Both Obvious Mangrove Damage and Loss and Functional Loss
- 3. Design and Permit the Restoration Program
- 4. Construct the Restoration Project
- 5. Monitor the Restoration Project for Success
- 6. Find Funding for All of the Above







2004 Imagery Provided by CCPA
Map Produced By RBNERR
For Illustrative Purposes Only

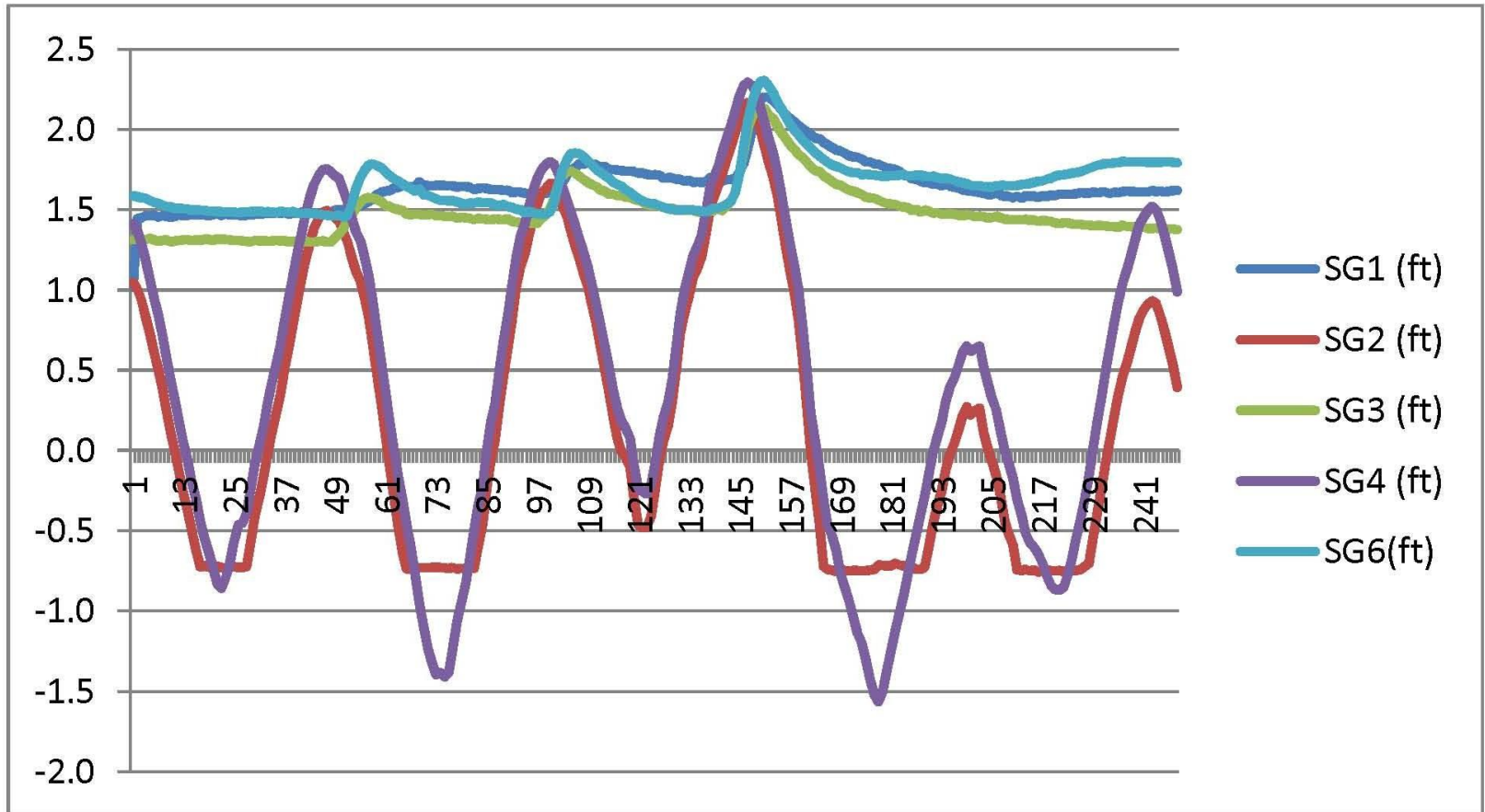
A man wearing a light-colored short-sleeved shirt, dark trousers, and a green cap is standing in a mangrove swamp. He is using an axe to install a white staff gauge into the ground. The swamp is filled with dense mangrove vegetation, including trees with prominent prop roots and various green shrubs. The water is dark and reflects the surrounding trees. The text "Surveyed Staff Gauge" is overlaid on the right side of the image.

Surveyed Staff Gauge

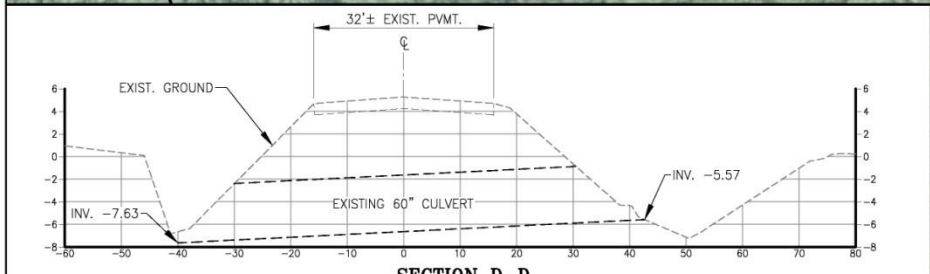
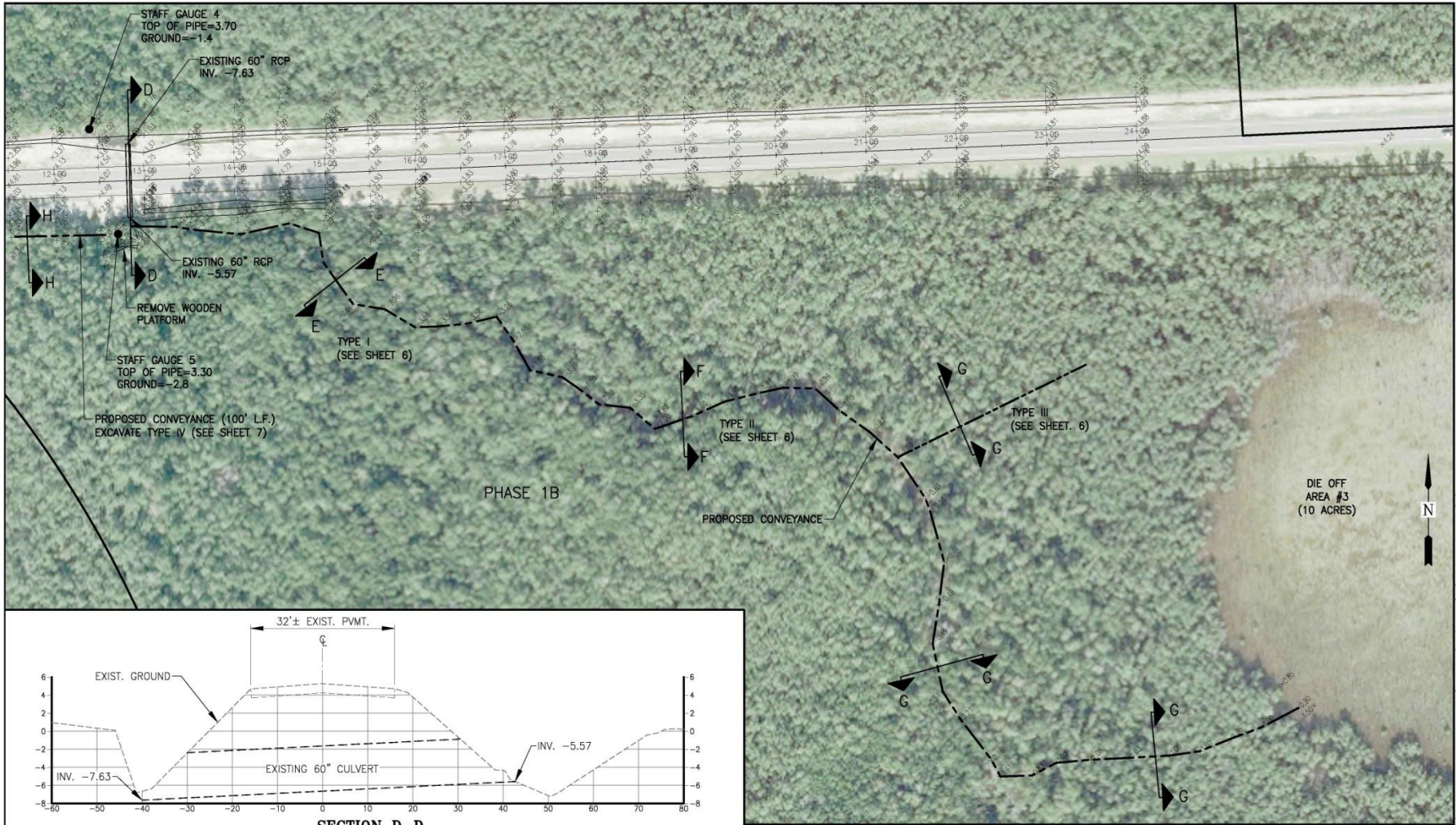
**HOBO Autonomous Water Level
Logger (1" X 6 ") – Titanium -
www.onsetcomp.com**



TIDE (FT NAVD 88) vs TIME (HOURS)







NOTE: ALL REFERENCE TO GRADE ARE IN NAVD88 (FT.)

#	DATE	PLAN REVISIONS

PROPERTY OWNER
 ROOKERY BAY NATIONAL ESTUARINE
 RESEARCH RESERVE
 300 TOWER ROAD, NAPLES, FLORIDA 34113
 PHONE: 239-417-6300
 FAX: 239-417-6315

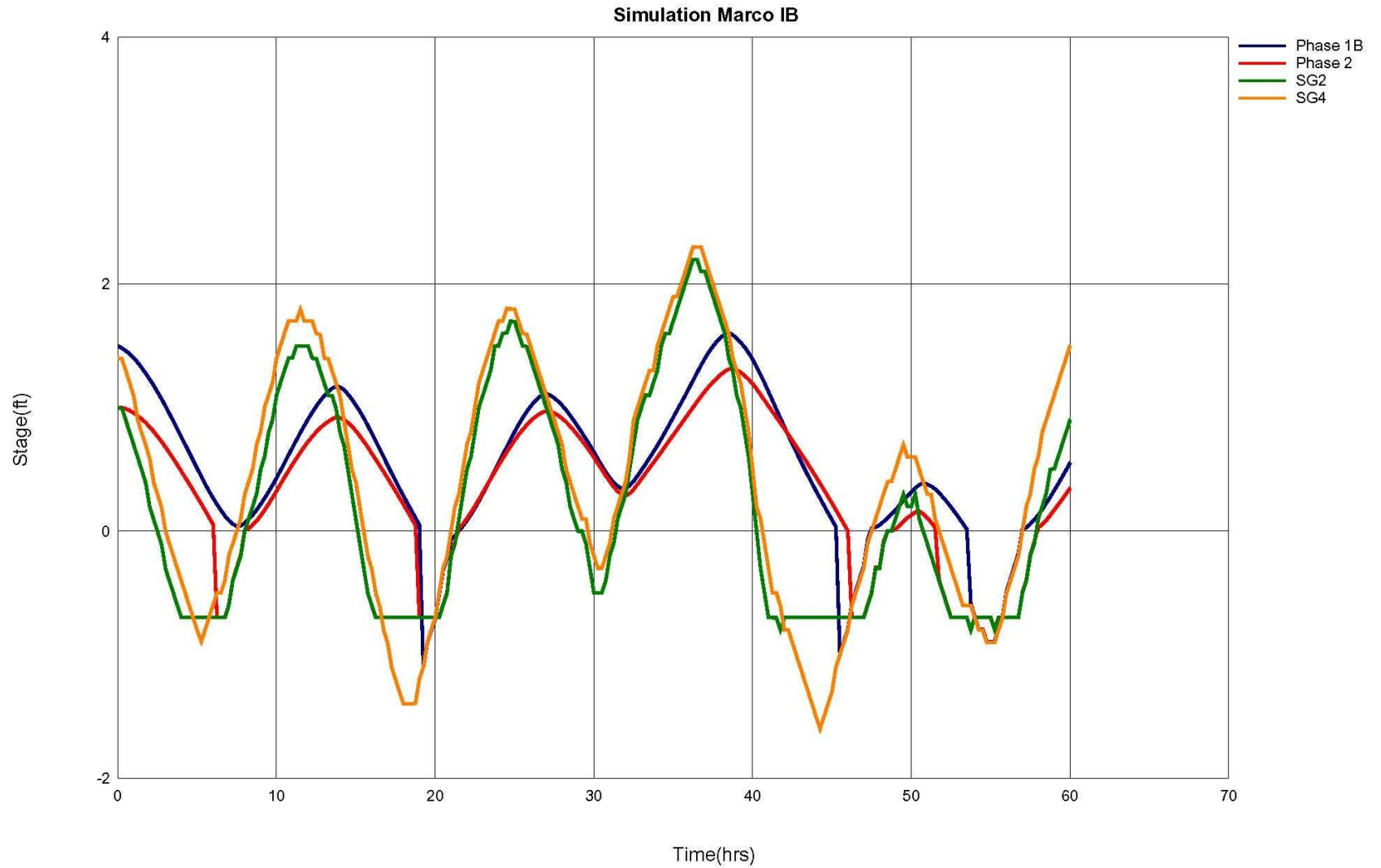
**RESTORATION OF MANGROVES
 AT FRUIT FARM CREEK**
 PHASE 1 B - RESTORATION PLAN
 DIE OFF #3

J.R. EVANS ENGINEERING, P.A.
 8891 BRIGHTON LANE, SUITE 115
 BONITA SPRINGS, FLORIDA 34135
 PHONE: (239) 390-1922
 FAX: (239) 390-1932
 JOSH@JREVAENGINEERING.COM

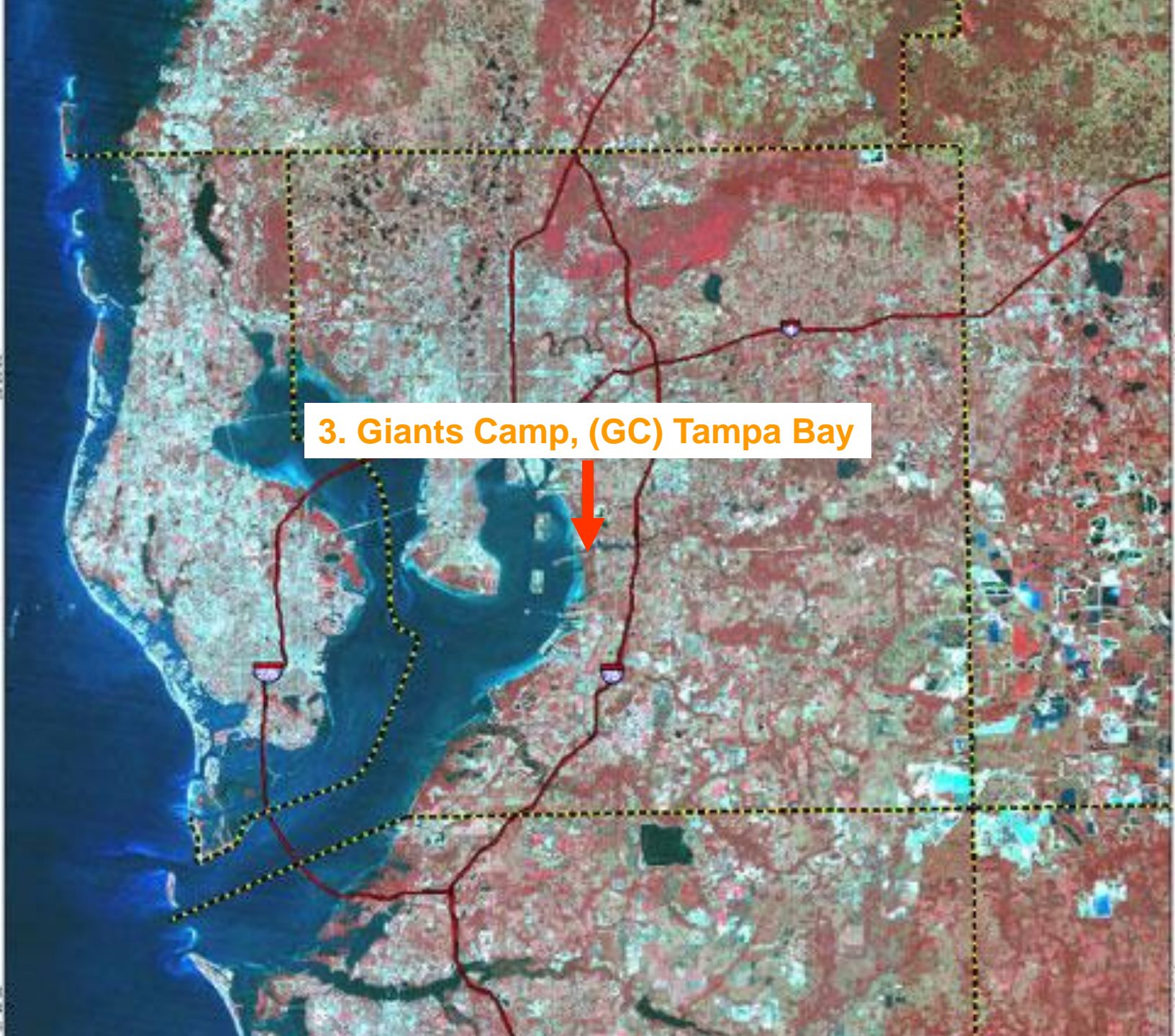
PROJECT #:	3-10RMFFC
FILE DATE:	11 / 2010
DESIGN BY:	JRE
DRAWN BY:	JRE
SEC. 10, 11, 13, 14 & 15, TWP. 52S, R. 26E	
SCALE:	PLAN: 1" = 100'

JOSH R. EVANS P.E.
 FL. LICENSE #: 57436
 SET NUMBER:
 SHEET: 4 OF 7

Phase 1B (SG4) - 1 x 48" Culverts (proposed)
Phase 1B (SG4) - 1 x 60" Culvert (existing)
Phase 2 (SG2) - 3 x 48" Culverts (proposed)



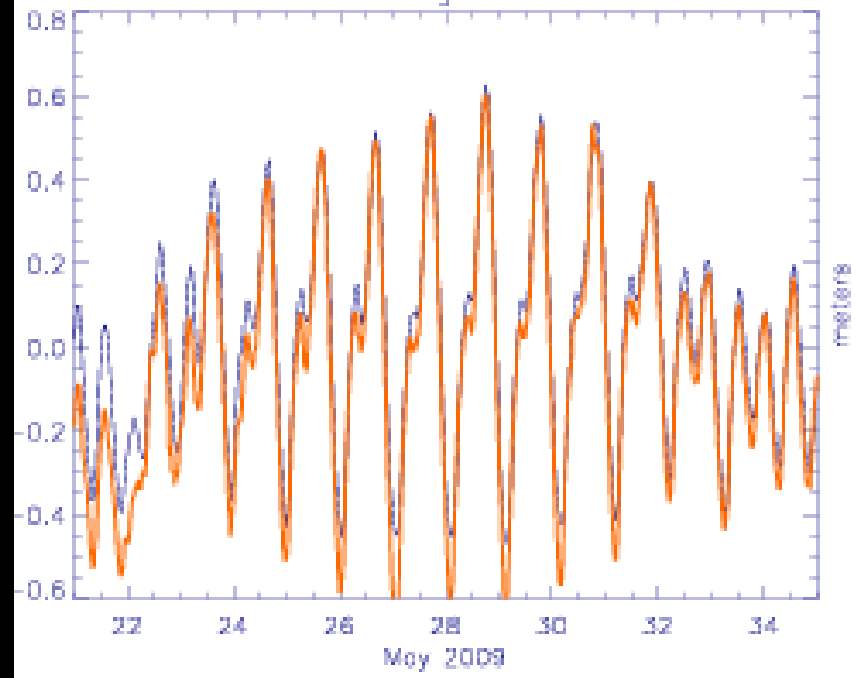
3. Giants Camp, (GC) Tampa Bay



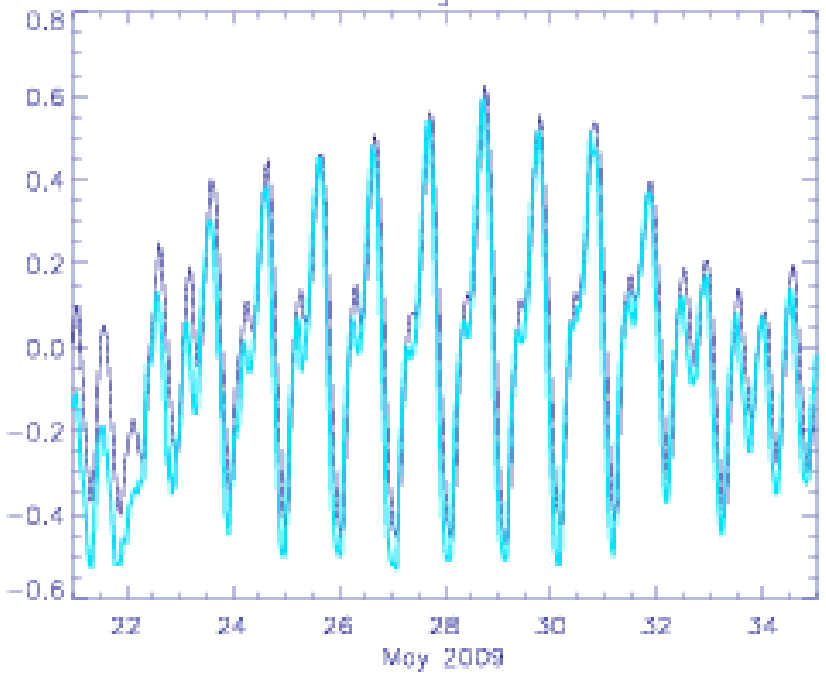




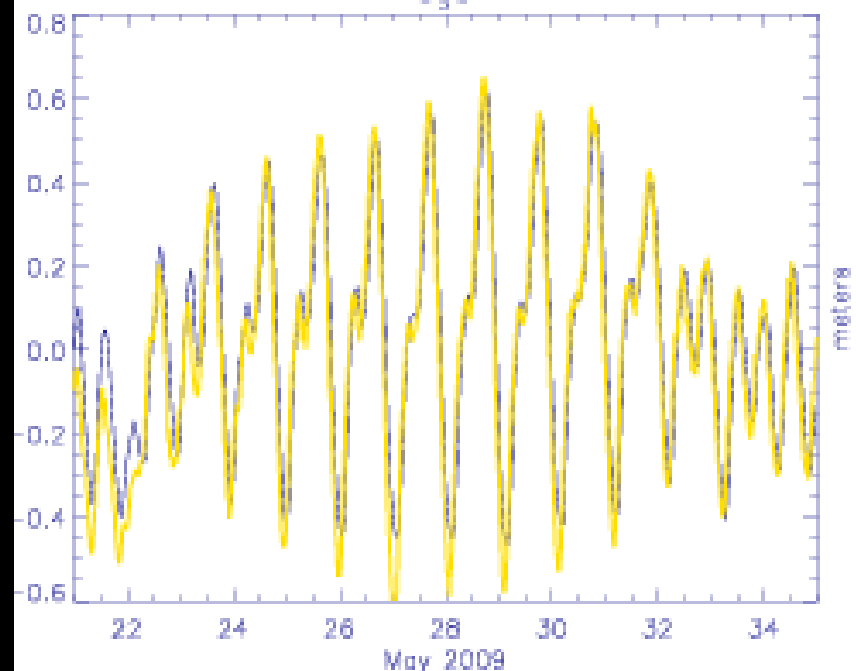
sg 1



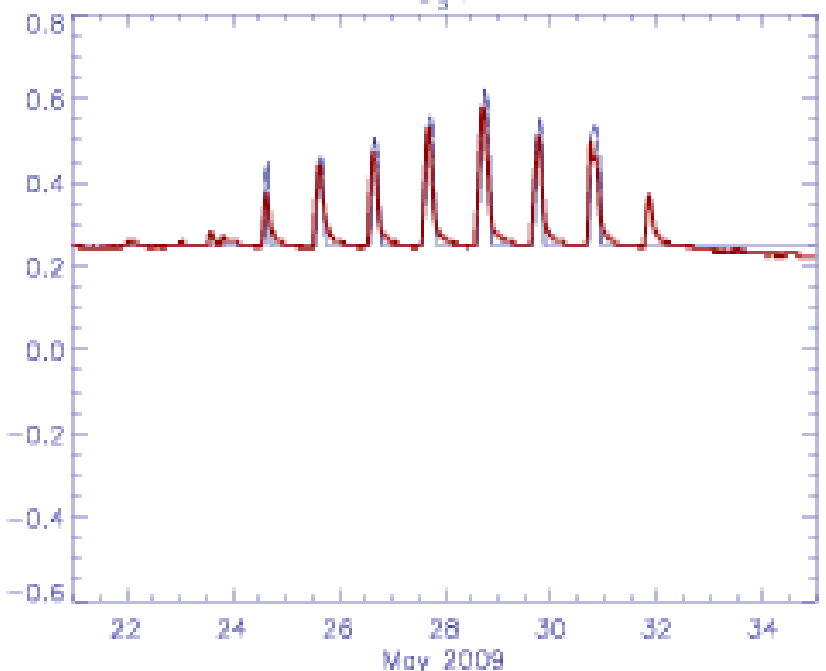
sg 2



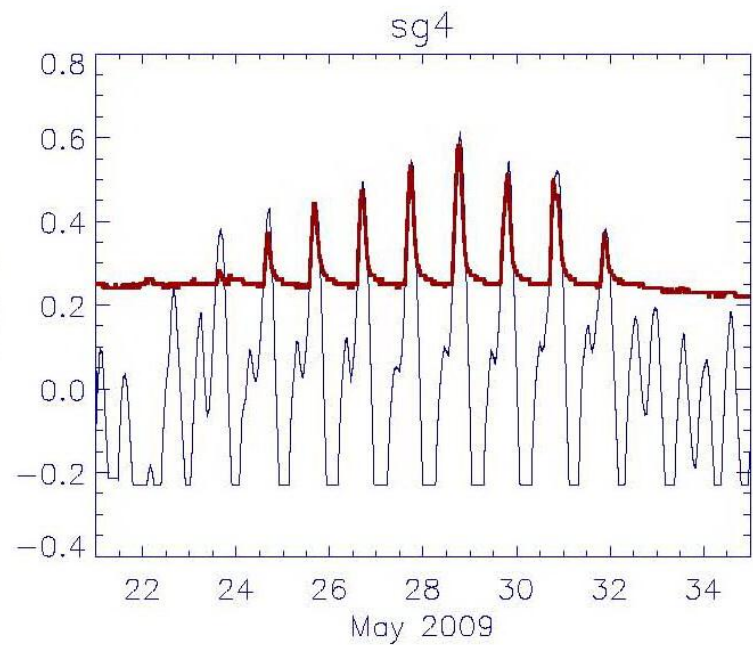
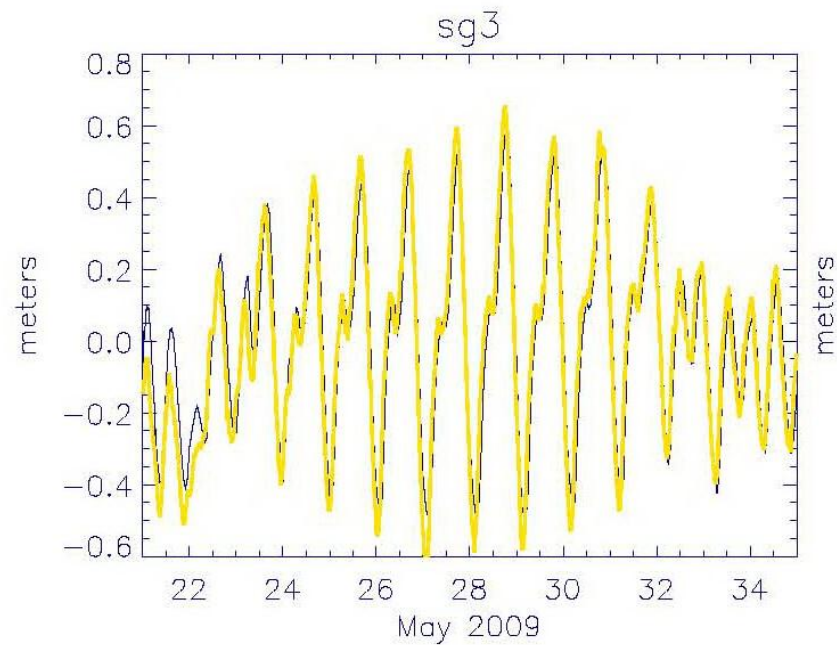
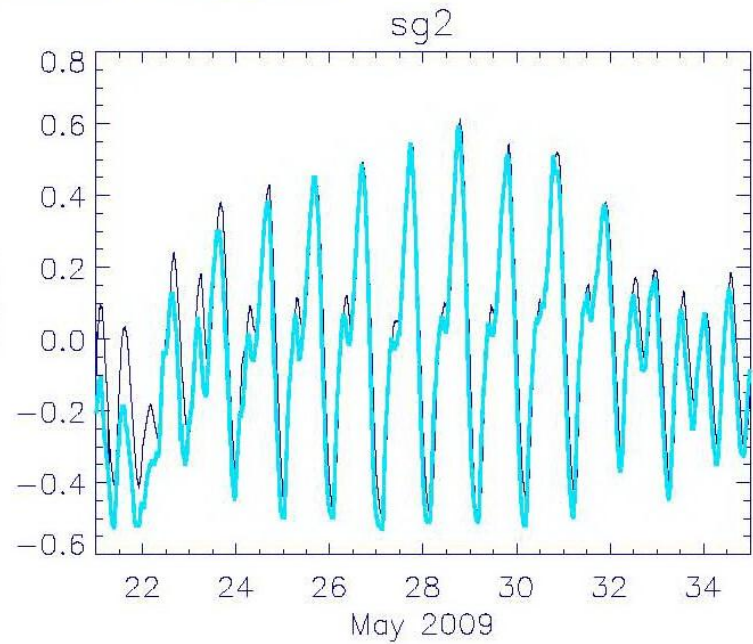
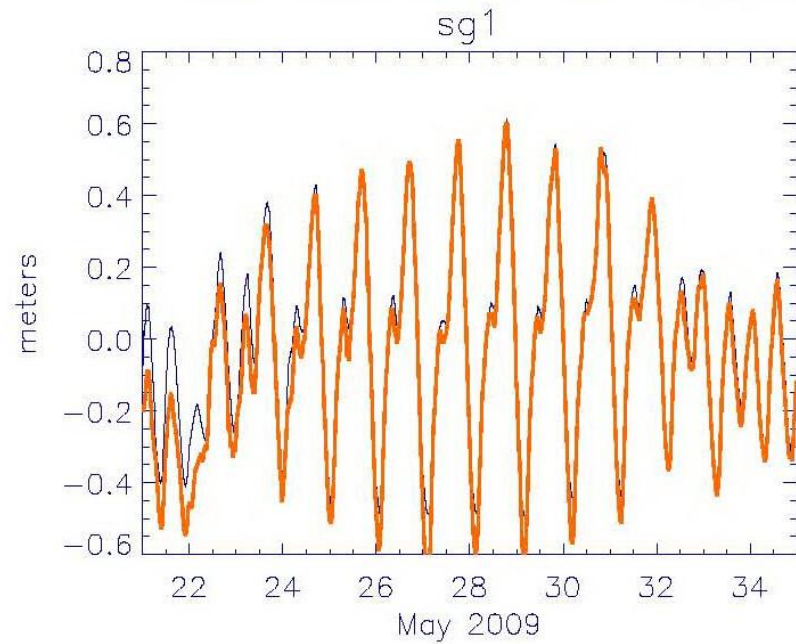
sg 3



sg 4



Water Elevation at HOB0 Locations: _poc



Ecohydrologic Characterization of Mangroves

- 1. Better Design for Restoration Projects
- 2. Prevent Mangrove Deaths with Preemptive Monitoring and Hydrologic Restoration
- 3. Preemptive Restoration is Less expensive
- 4. Preemptive Restoration Insures Maintenance of Existing Ecological Functions