Mapping and Monitoring Stressed Mangroves for Quantification of Recovery Following Restoration

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And

Laura L. Flynn

Coastal Resources Group, Inc. [501(c)(3)]

Salt Springs, Florida, USA

April 27, 2014 v. 14

Mangrove Forest Heart Attacks: Diagnosis and Treatment

Roy R. "Robin" Lewis III, MA, PWS

President

Coastal Resources Group, Inc. [501(c)(3)]

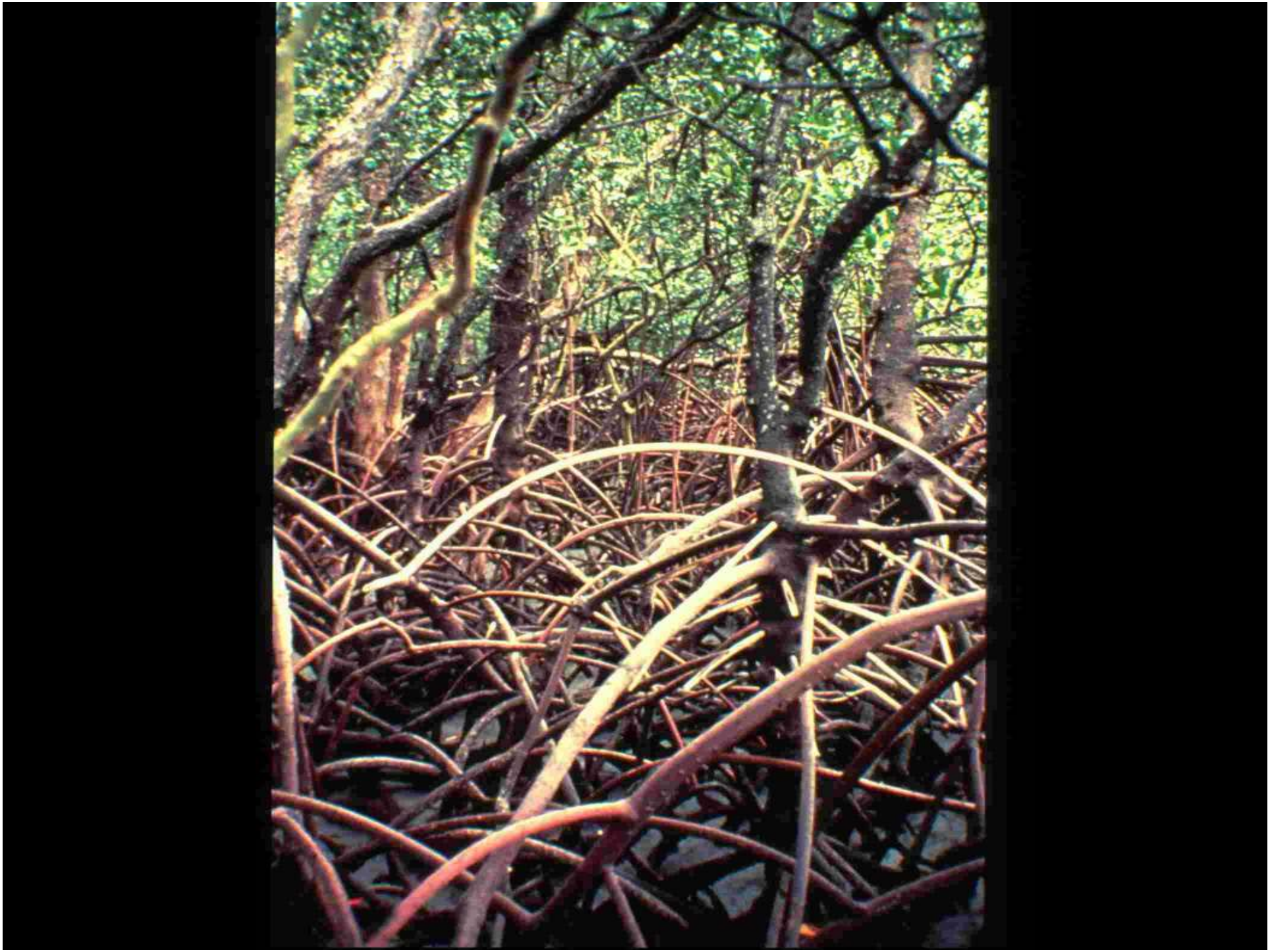
Salt Springs, Florida, USA

MANGROVE INDONESIA MAP ACTION PROJECT

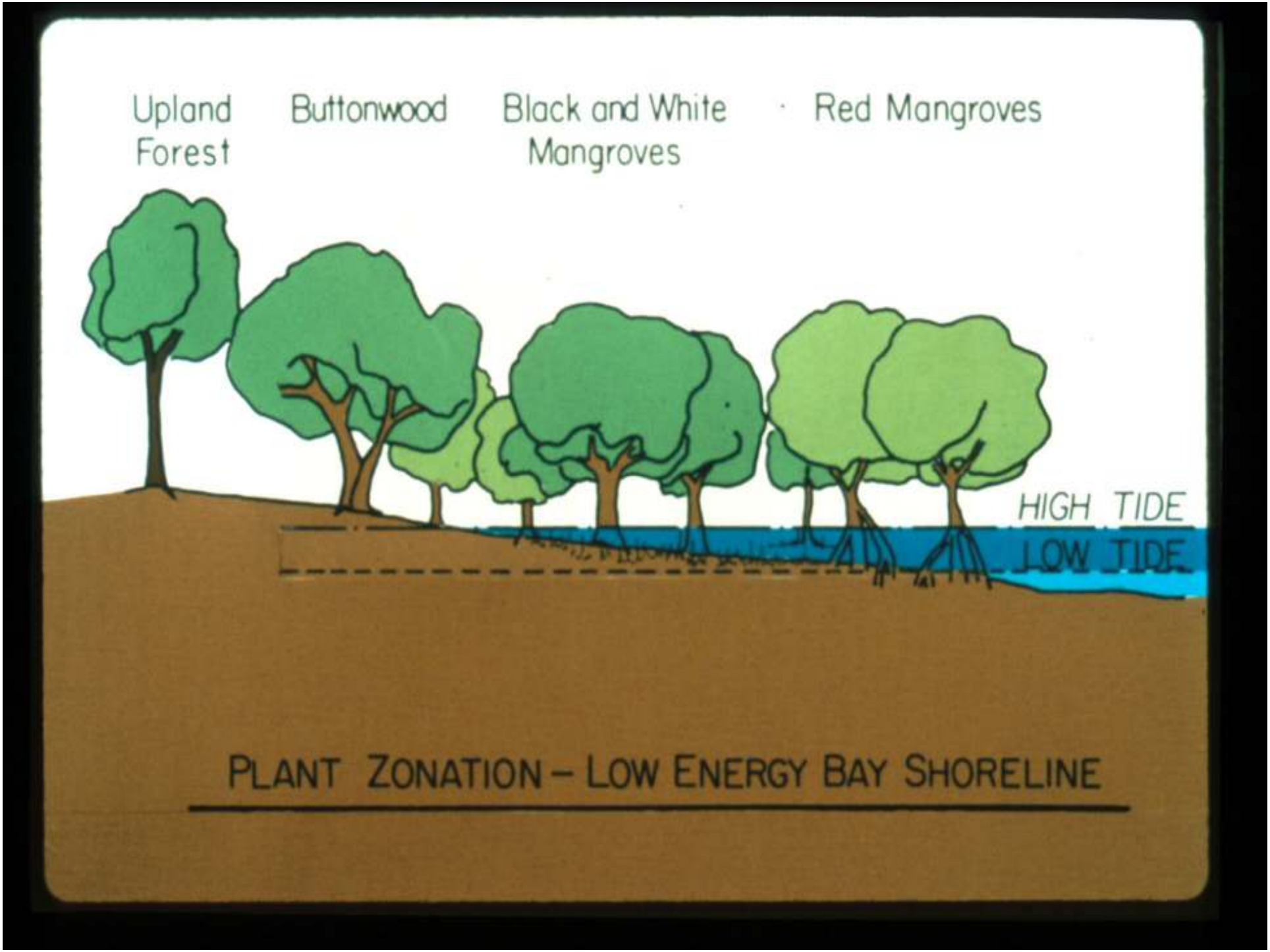
Oxfam

Canadian International Development Agency

March 29, 2014 v. 12



WWW.MANGROVEACTIONPROJECT.ORG
WWW.MANGROVERESTORATION.COM
WWW.MARCOMANGROVES.COM
LESRRL3@GMAIL.COM


Upland Forest
Buttonwood
Black and White Mangroves
Red Mangroves
HIGH TIDE
LOW TIDE
PLANT ZONATION – LOW ENERGY BAY SHORELINE

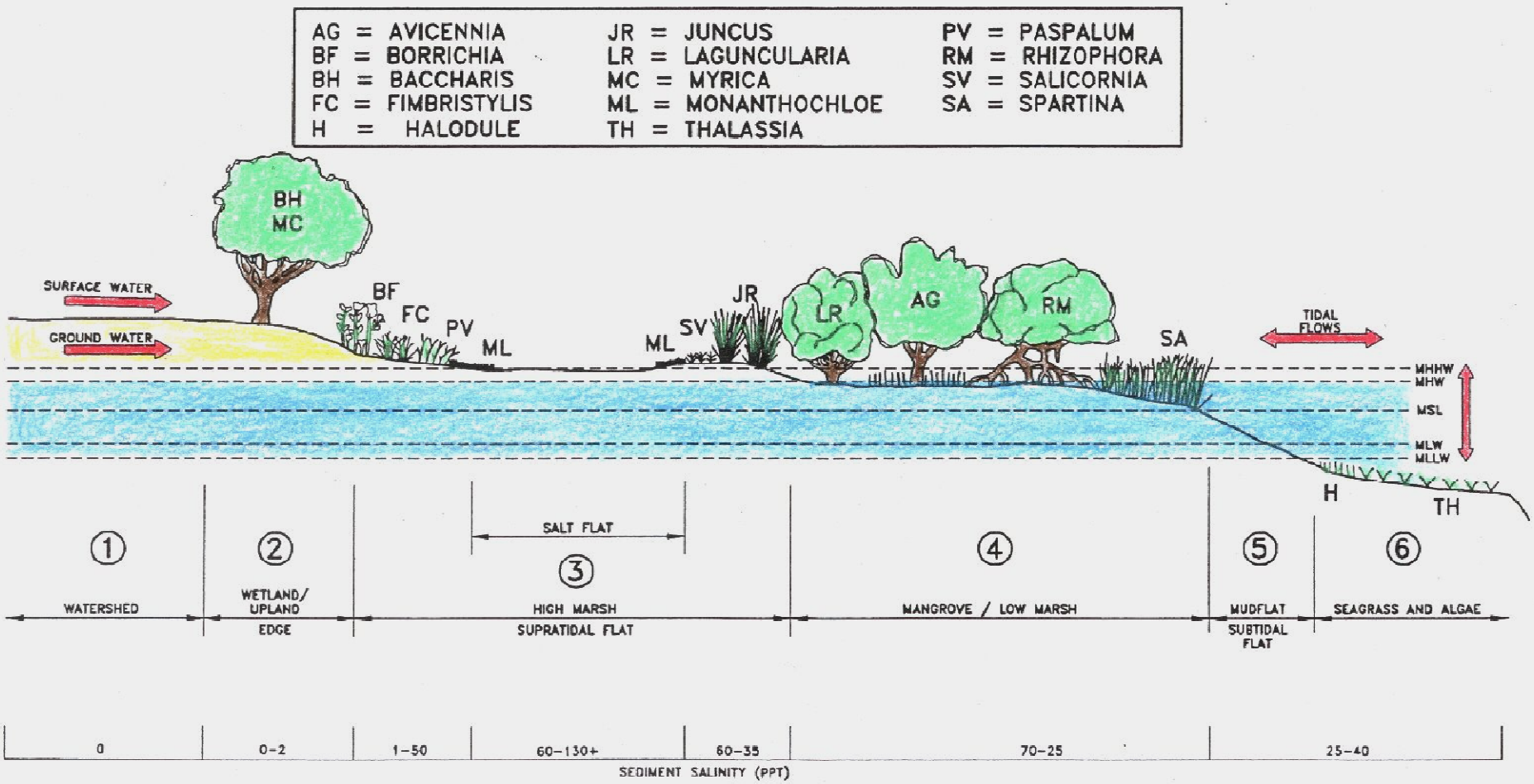


Figure 1. Schematic diagram of the six components of the tropical coastal shelf ecosystem (modified from Crewz and Lewis 1991).


ECOHYDROLOGY

Duration of <u>Flooding</u> as a % of the Annual Tide Cycle?

View of the same part of an inner forest at high tide (*top*) and at low tide (*below*). It is assumed that both regular tidal fluctuations and extraordinary flooding events are vital for mangrove habitats as they wash out or dilute excessive salts, organic debris and toxic substances in the upper soil surface. If inundations are absent for long periods the soil gradually dries out. Then the mangrove area may be colonised by other halophytes that find the conditions favourable.

Duration of <u>Drying</u> as a % of the Annual Tide Cycle?

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#!!***

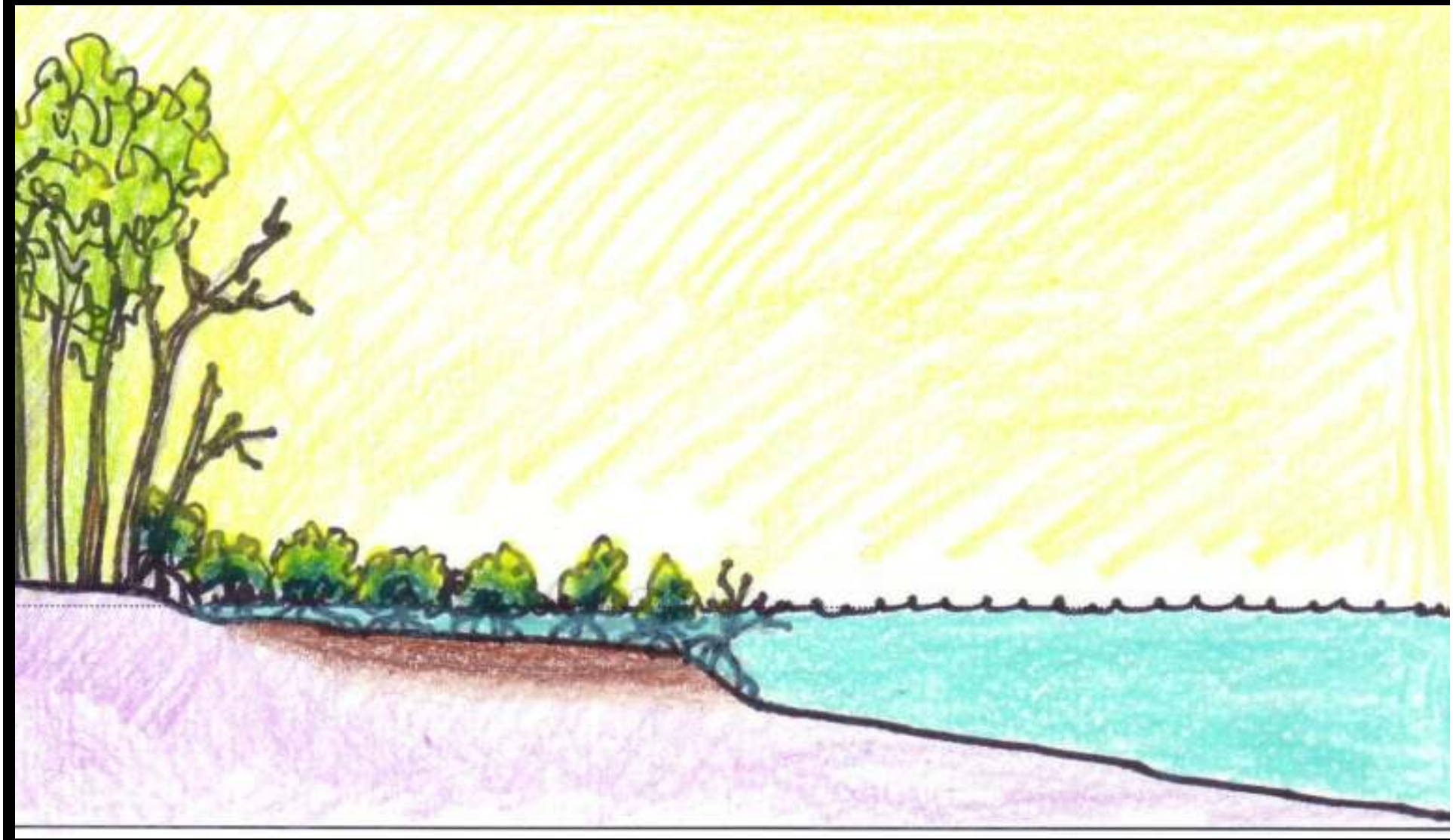
POLICY BRIEF

SECURING THE FUTURE OF MANGROVES

Hanneke Van Lavieren, Mark Spalding, Daniel M. Alongi, Mami Kainuma, Miguel Clüsener-Godt, Zafar Adeel

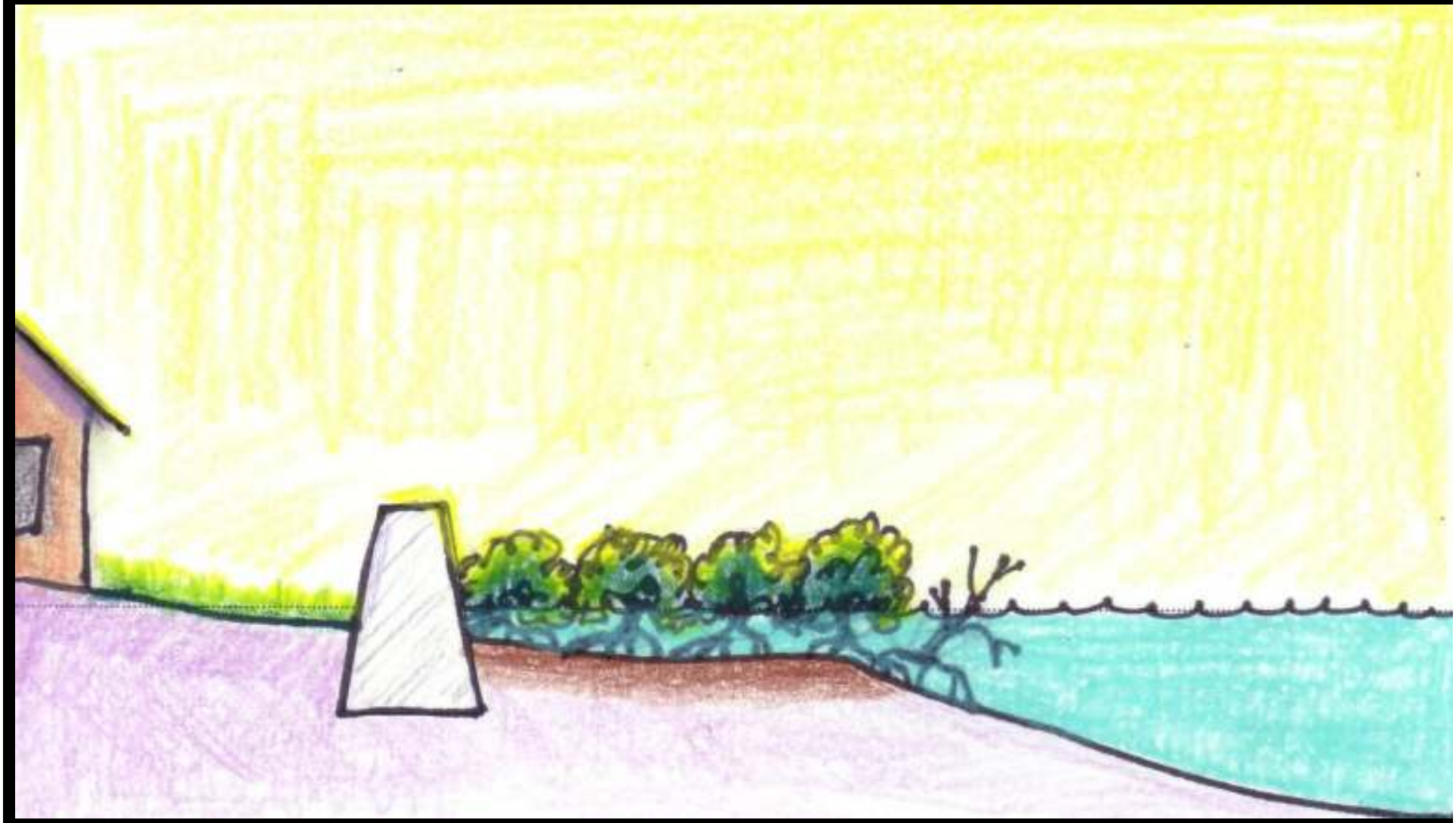
ISME UNEP WCMC The Nature Conservancy

1. Sea Level: Rising Sea Level Condition

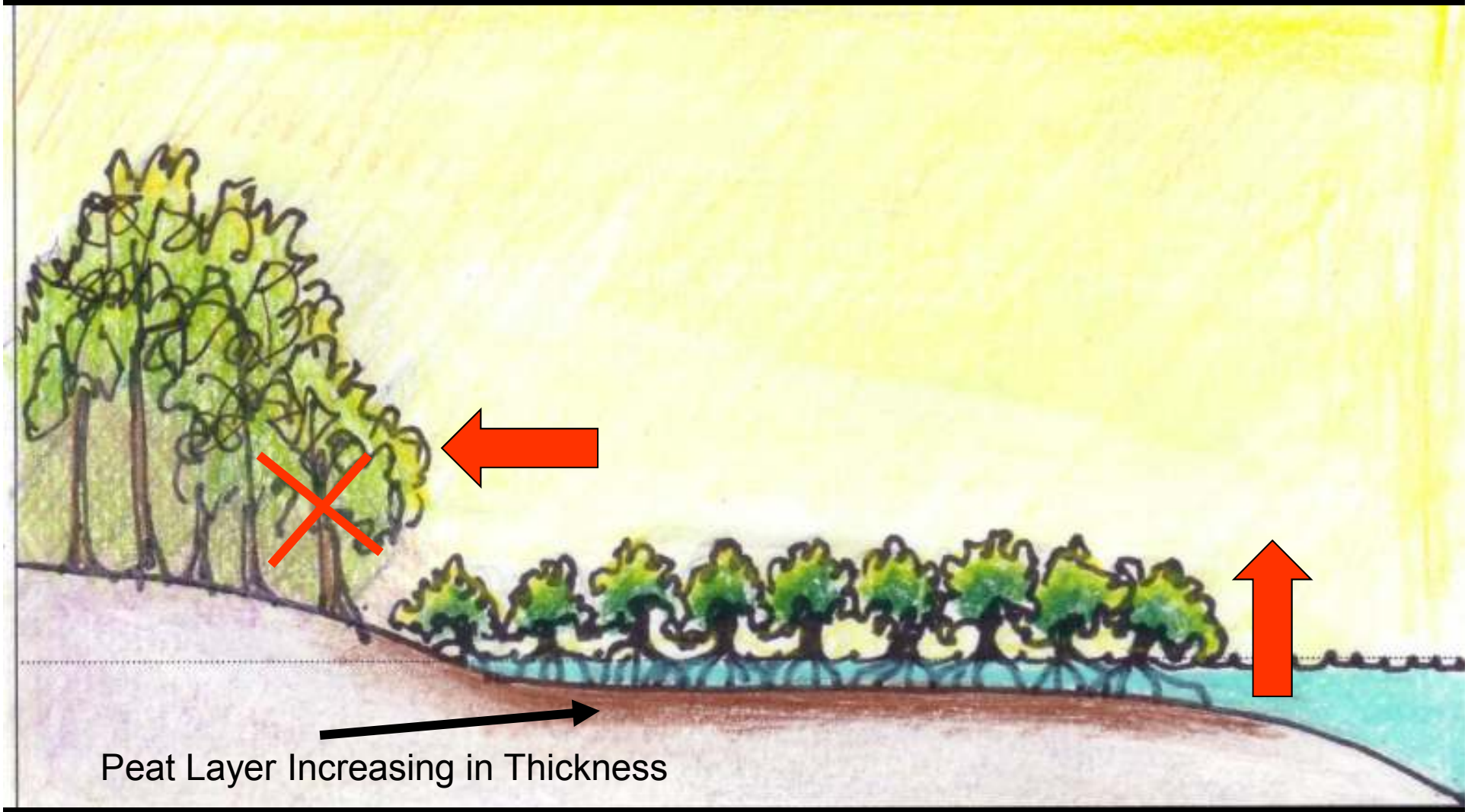


Transgressive Shoreline

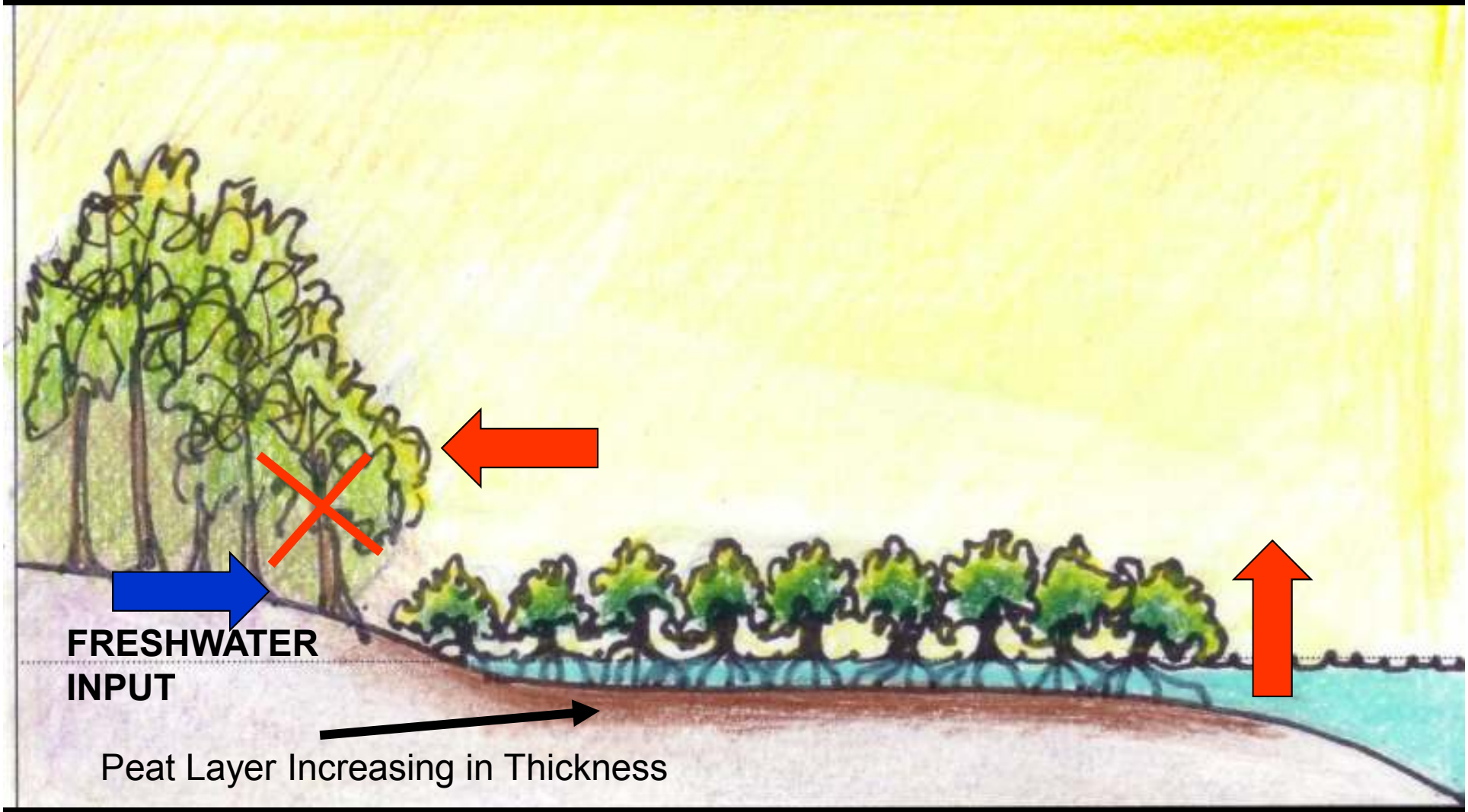
2. Sea Level: Rising Sea Level With Barrier



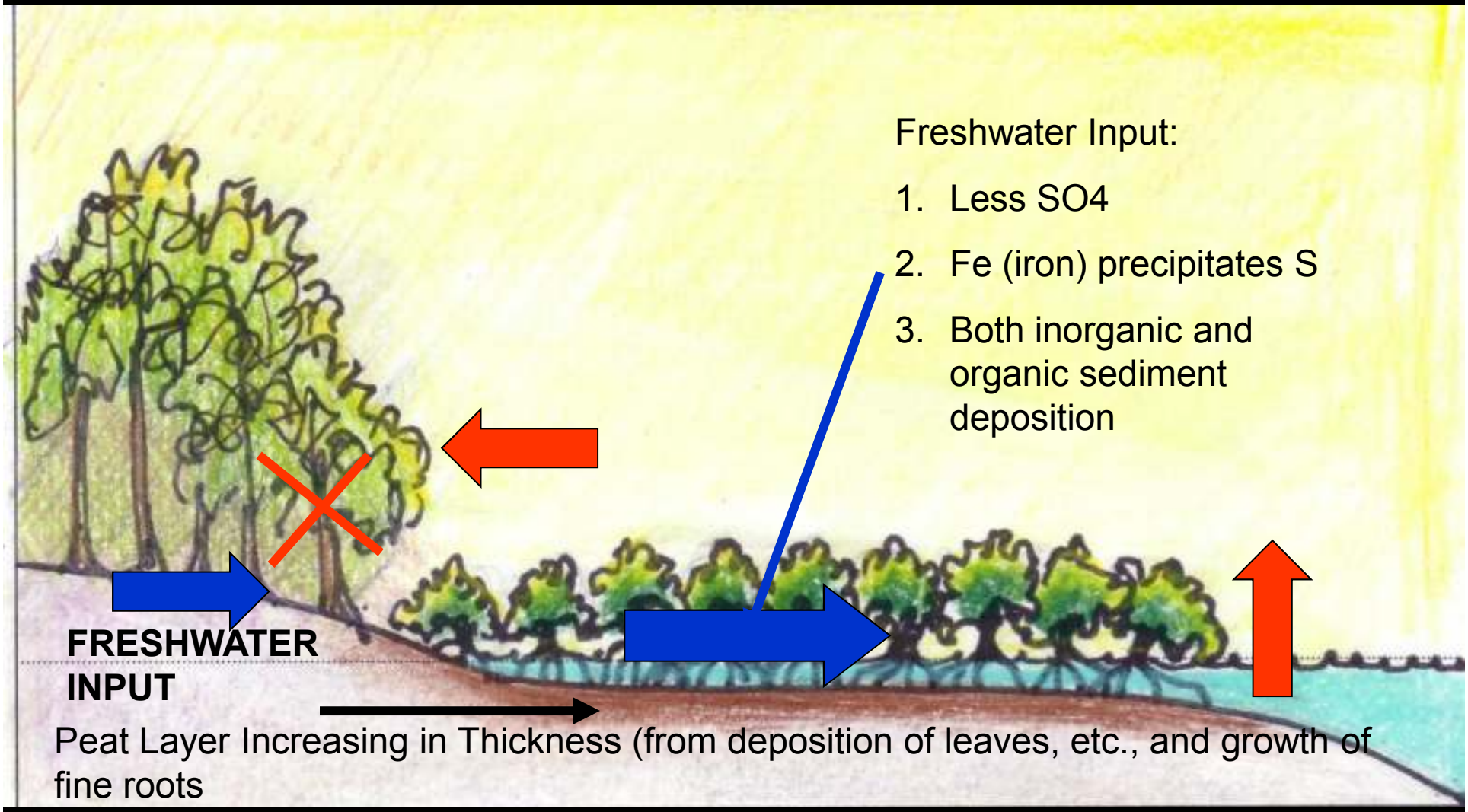
3. Sea Level: Rising Sea Level With Mangroves Keeping Pace



4. Sea Level: Rising Sea Level With Mangroves Keeping Pace



5. Sea Level: Rising Sea Level With Mangroves Keeping Pace

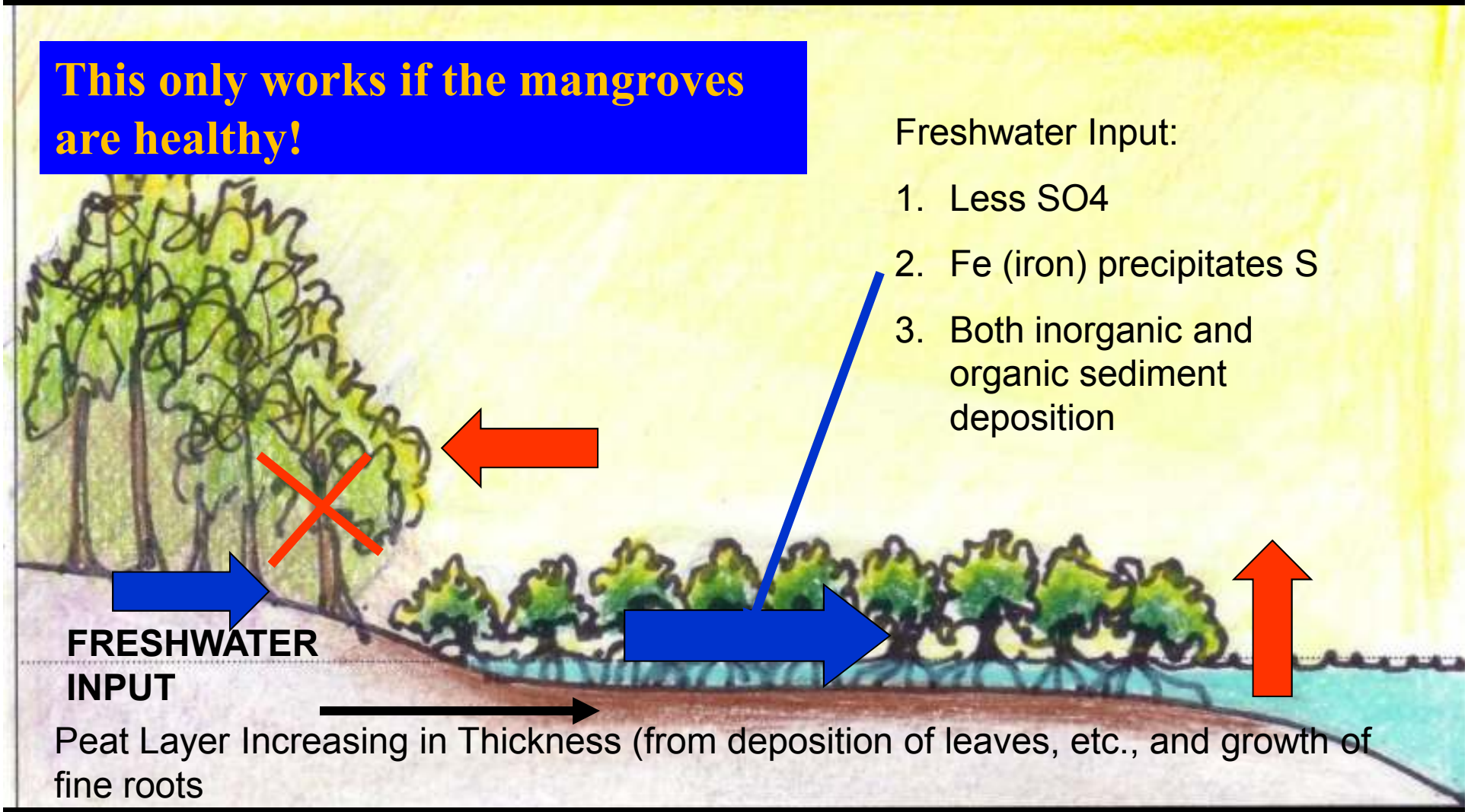


5. Sea Level: Rising Sea Level With Mangroves Keeping Pace

This only works if the mangroves are healthy!

Freshwater Input:

1. Less SO4
2. Fe (iron) precipitates S
3. Both inorganic and organic sediment deposition



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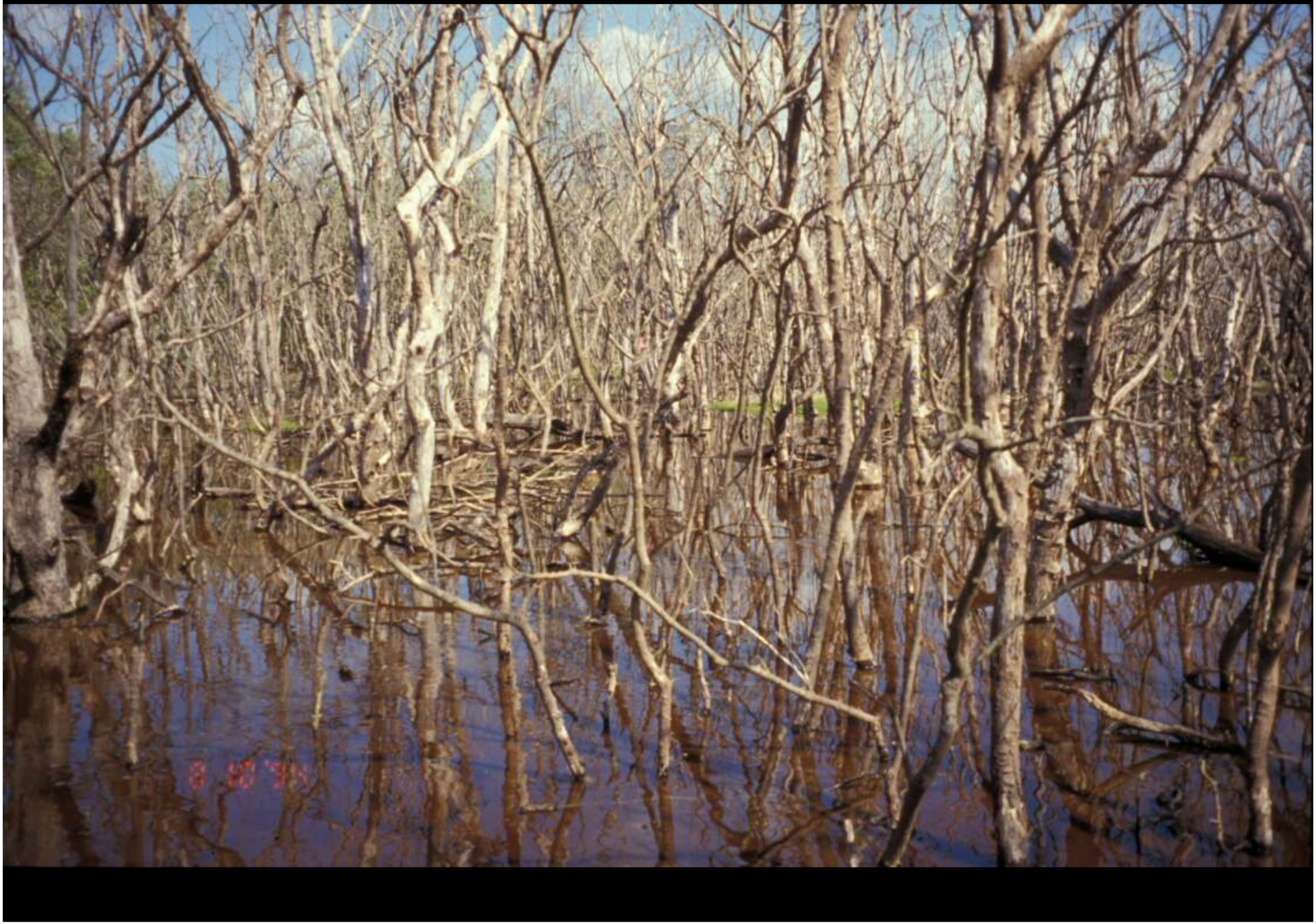



Alafia River, Tampa Bay
Fort Myers and Sanibel Island
Naples and Clam Bay
Everglades Wetland Research Park
Marco Island and Fruit Farm Creek, RBNERR
Everglades National Park
West Lake, Hollywood
Miami
Florida Keys

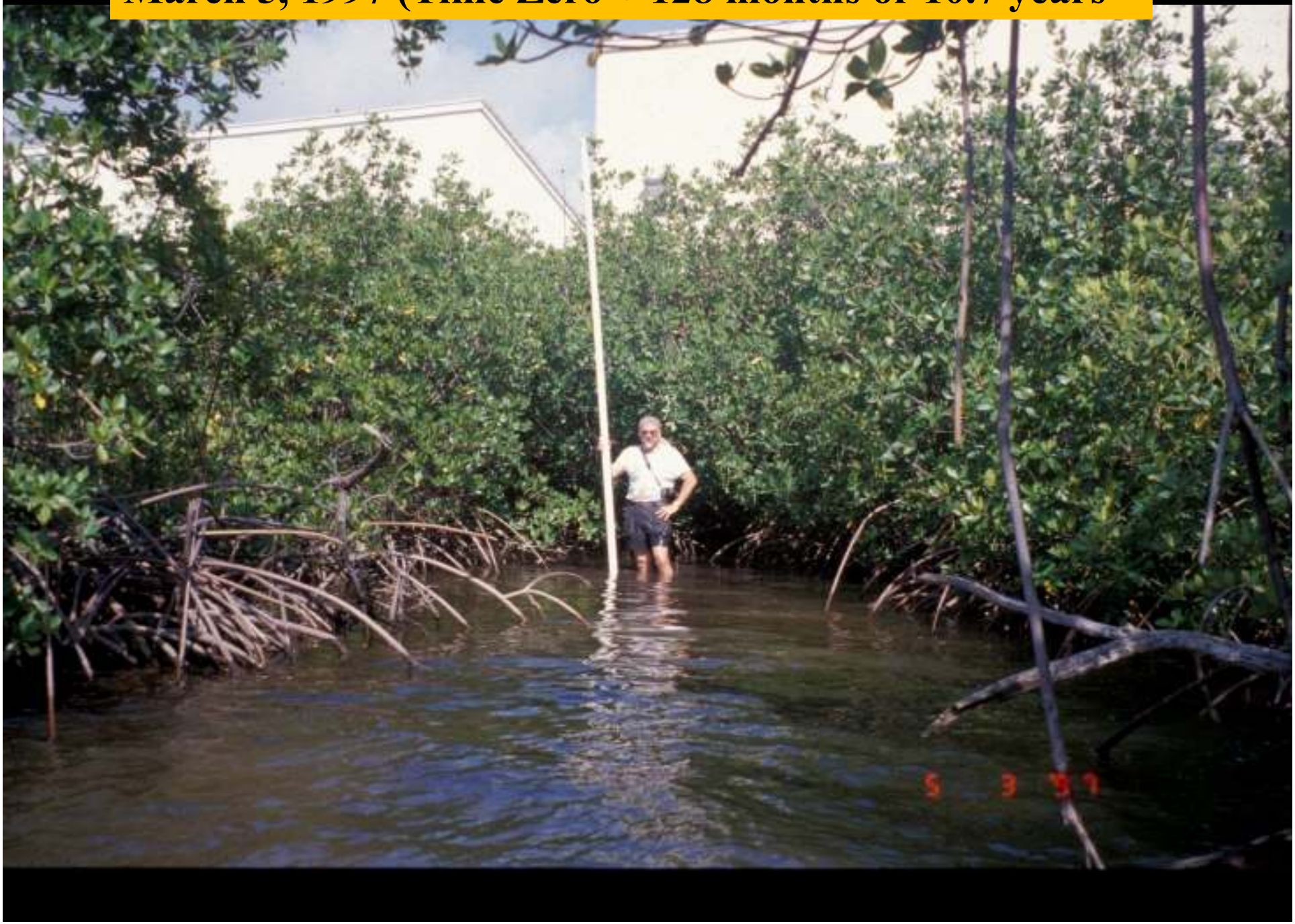

West Lake Mangrove Restoration Project, Ft. Lauderdale, FL, USA, 500 ha of hydrologic and major excavation methods of restoration, cost USD$6 million and the design and development of the $1 million Anne Kolb Mangrove Park and Environmental Education Center


Time Zero – July 1989
7 19 89


Time Zero + 27 Months


Time Zero + 78 months- January 1996
'96 1 27

March 5, 1997 (Time Zero + 128 months or 10.7 years




Alafia River, Tampa Bay
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Everglades Wetland Research Park
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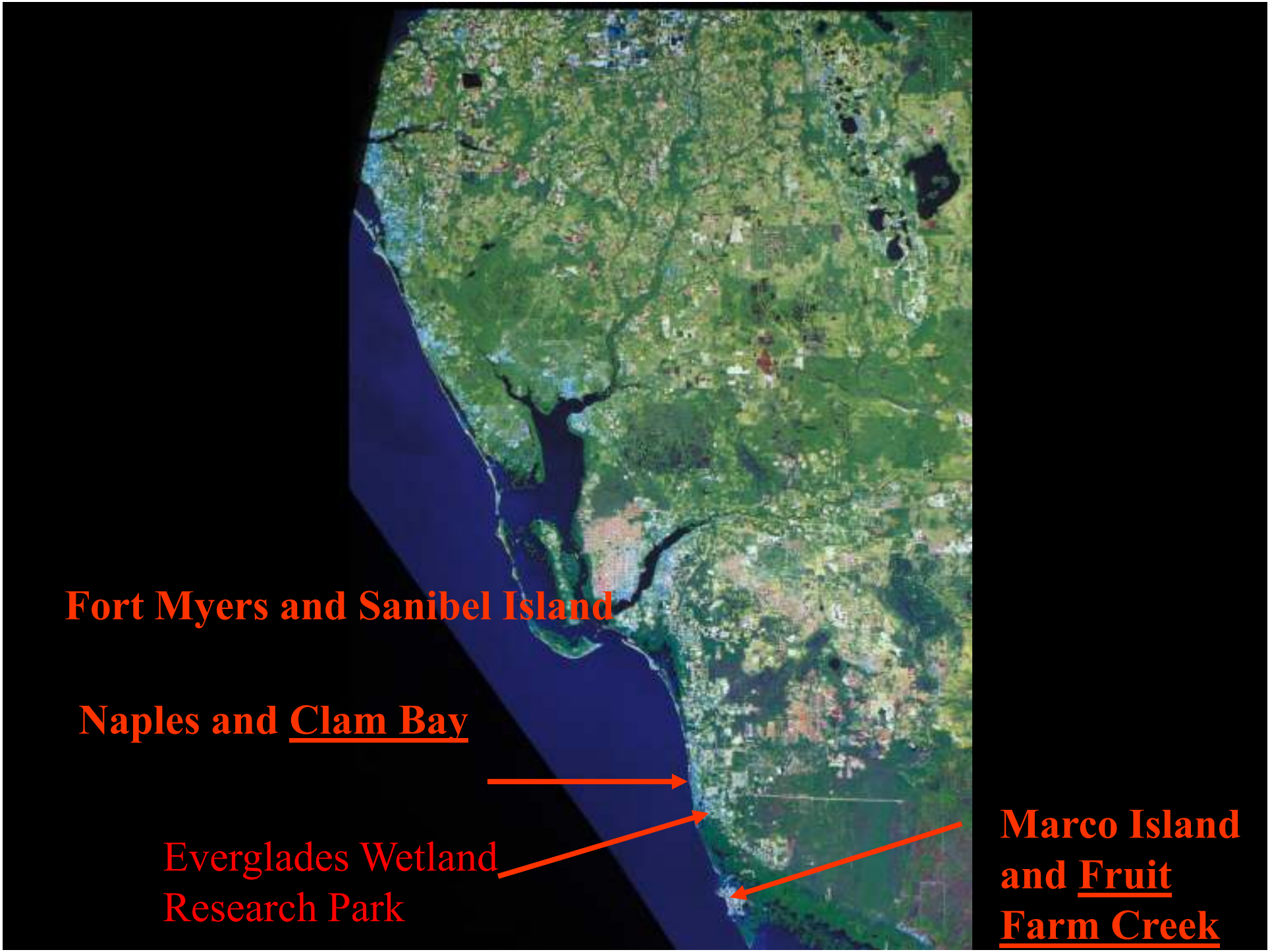
Fort Myers and Sanibel Island
Naples and Clam Bay
Everglades Wetland Research Park
Marco Island and Fruit Farm Creek

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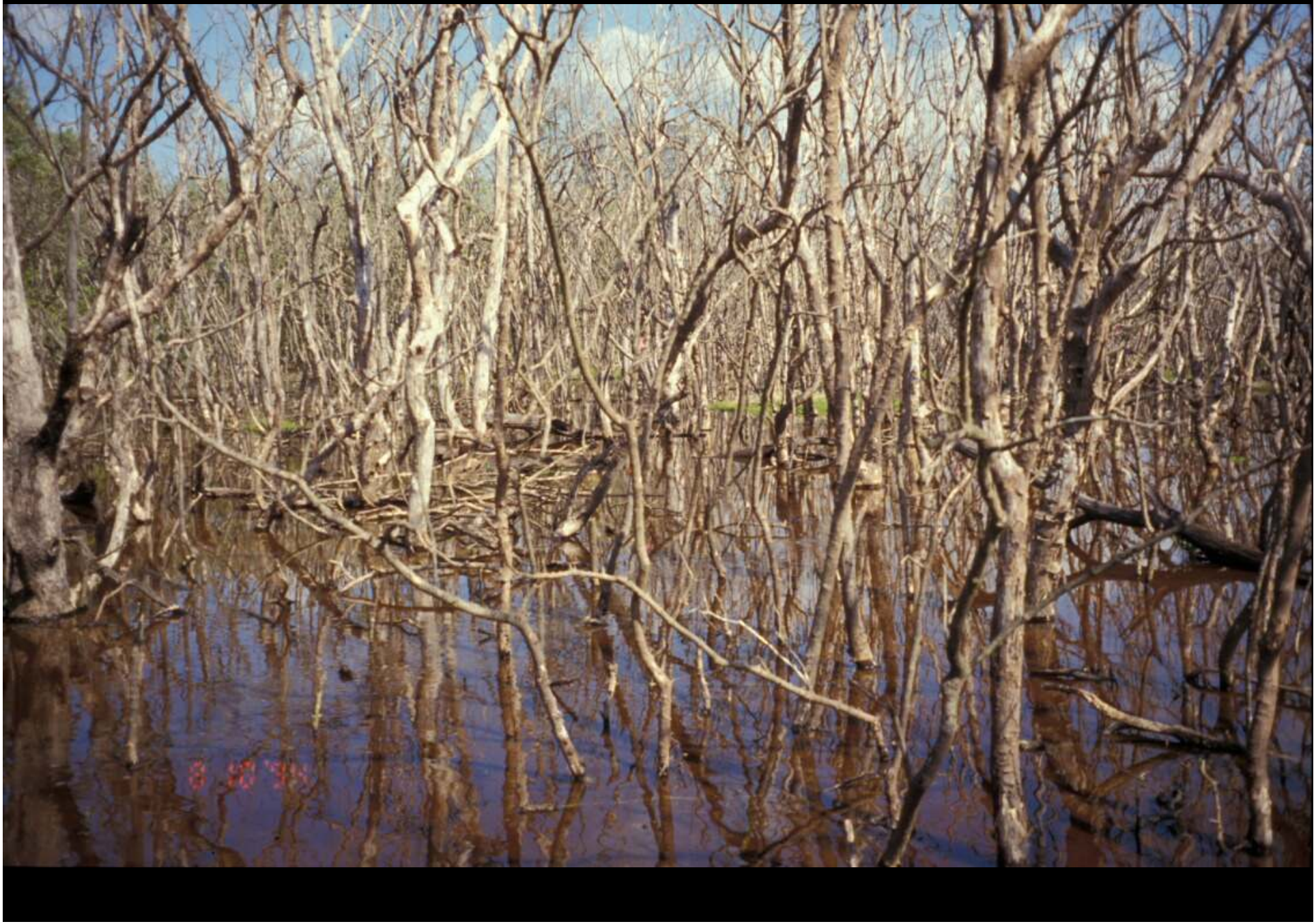

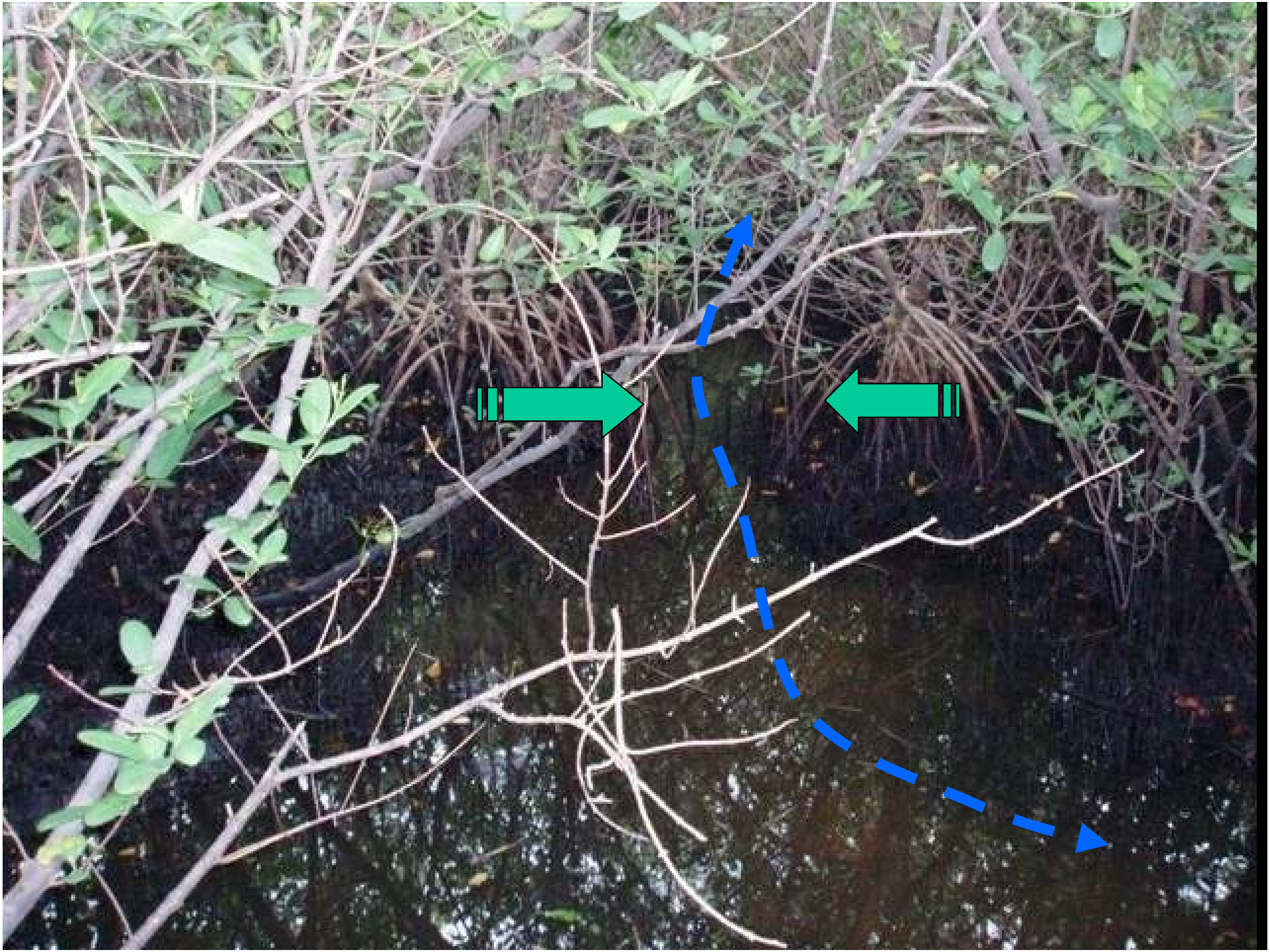

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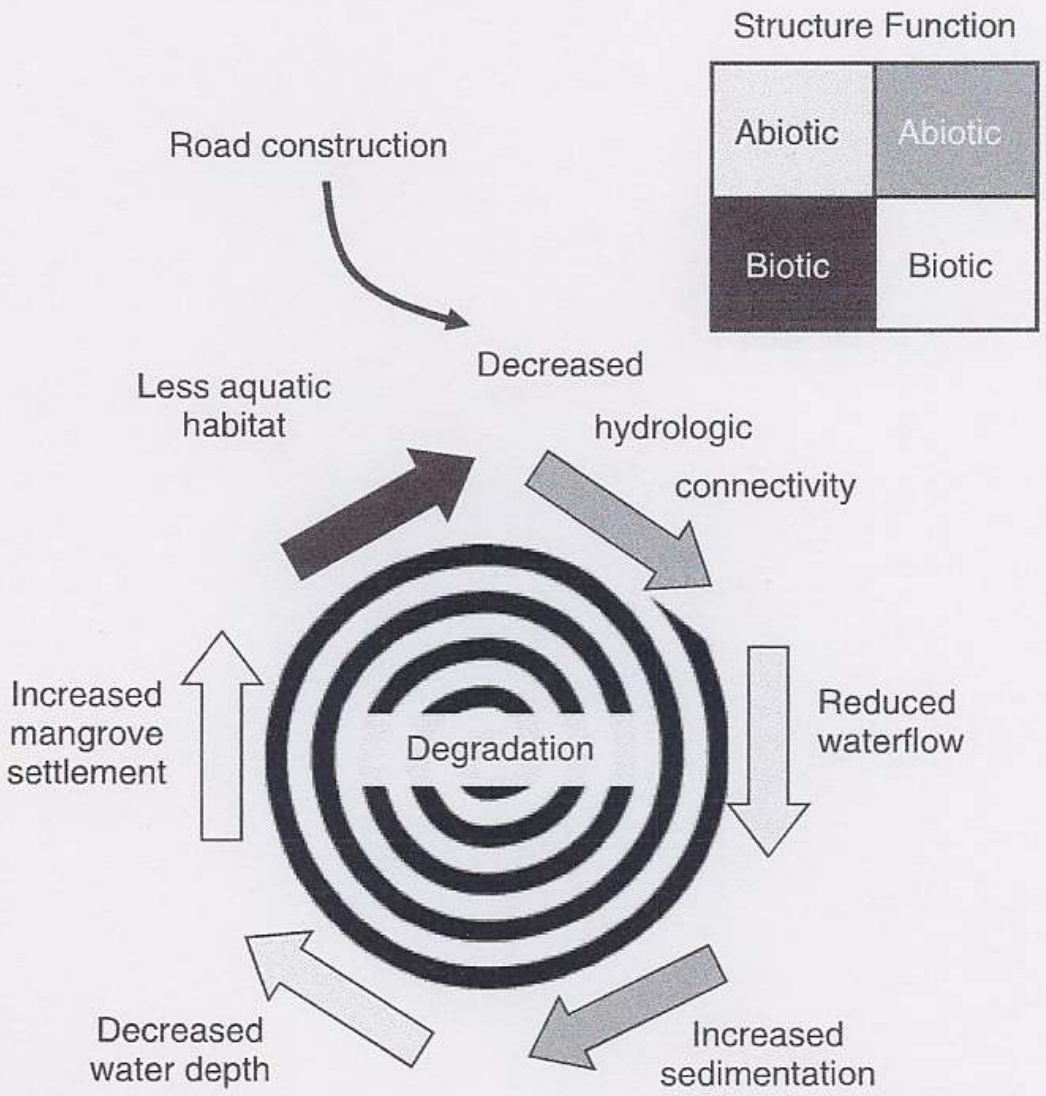


Figure 1. Conceptual model, modified from King and Hobbs (2006) and Whisenant (1999, 2002), demonstrating the degradation feedback cycle following anthropogenic fragmentation of tidal creeks. The shading of the arrows represents the category of the effect following the box in the upper right hand corner.

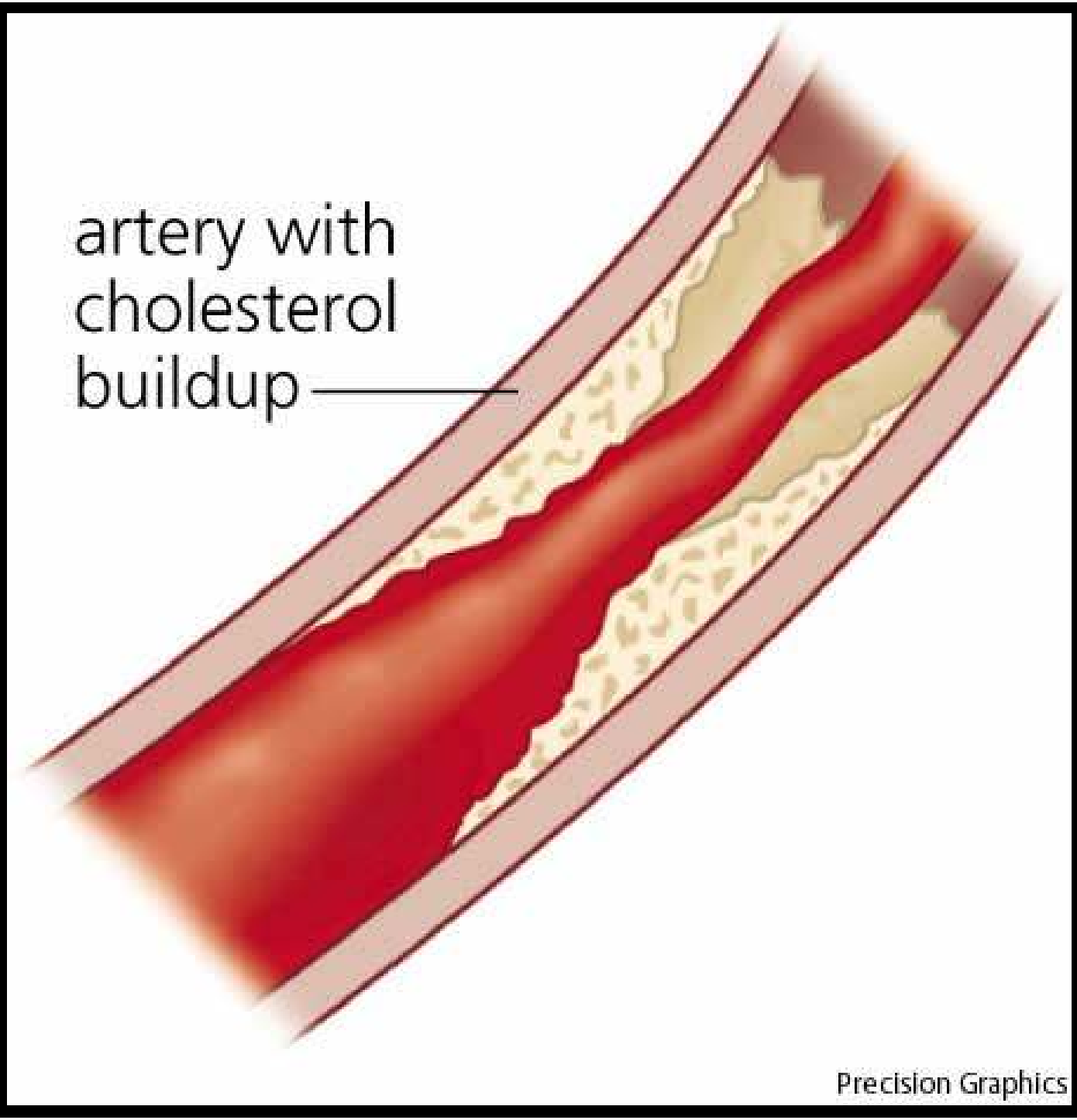
From Valentine-Rose and Lyman 2011

(A)

(B)

Figure 2. Pre- and post-restoration in (A) MOW and (B) CS.

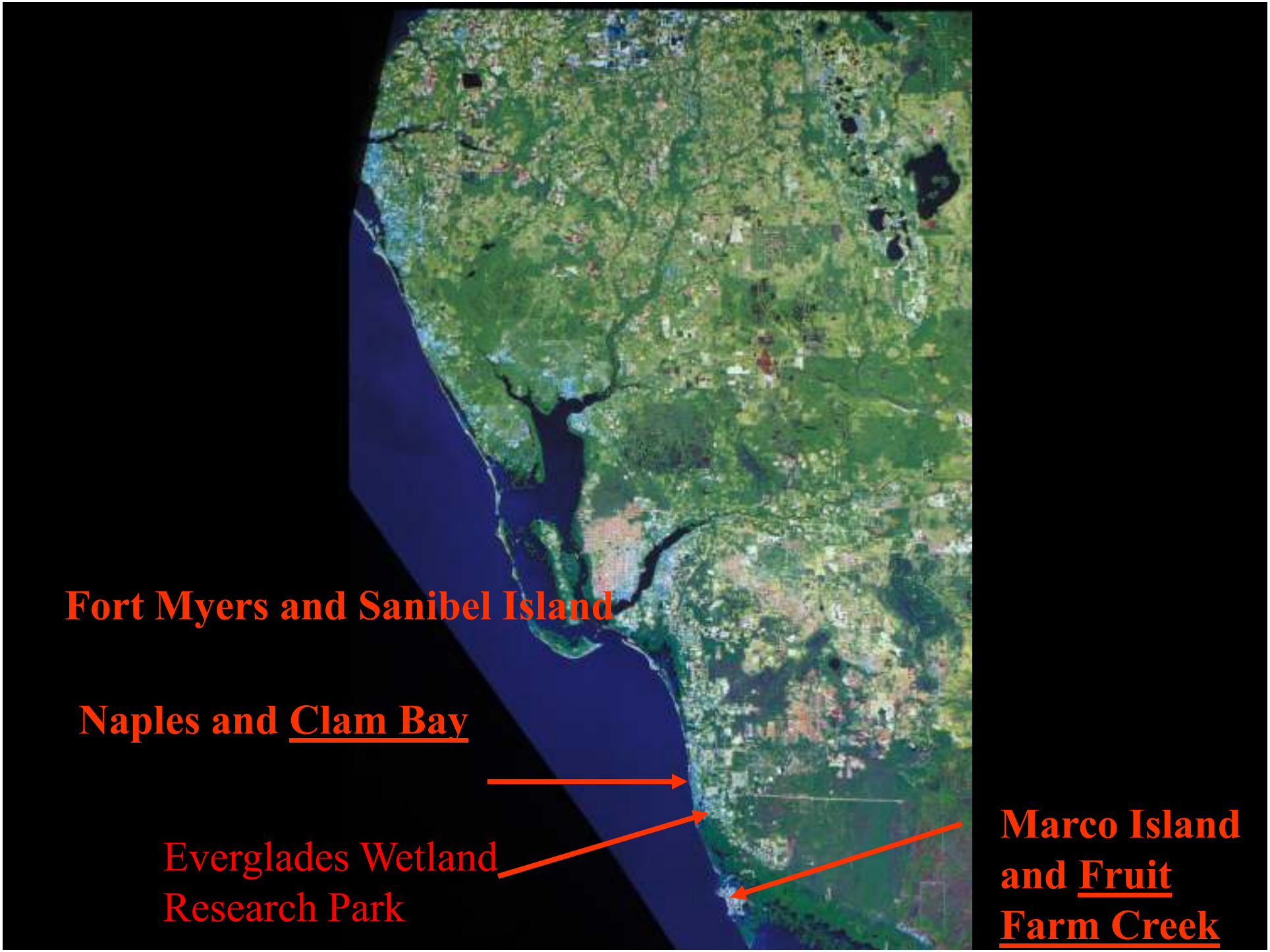
From Valentine-Rose and Lyman 2011


artery with
cholesterol
buildup
Precision Graphics


© LEWIS ENVIRONMENTAL SERVICES, IN

2003


January 11, 2007

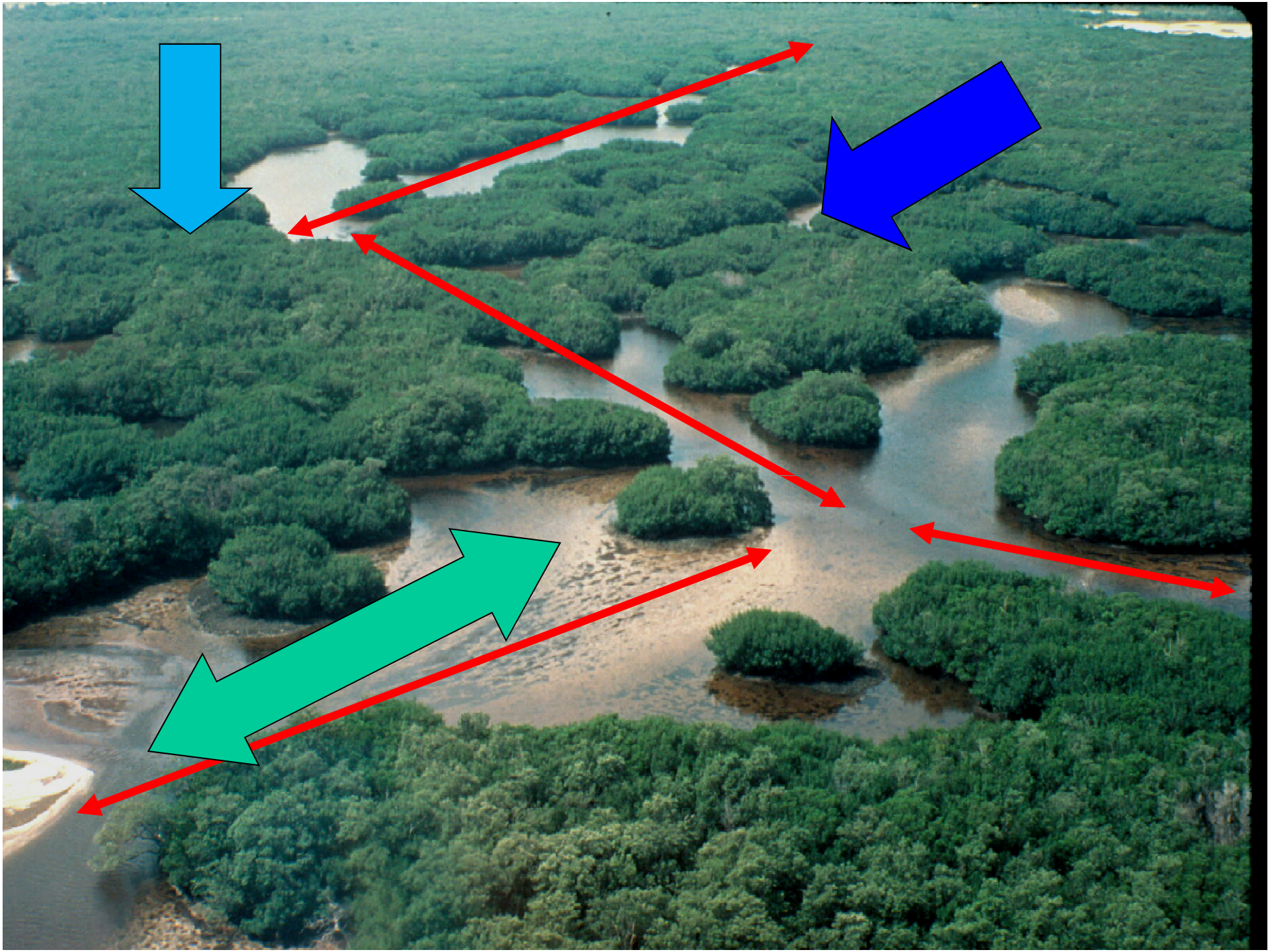

Fort Myers and Sanibel Island
Naples and Clam Bay
Everglades Wetland Research Park
Marco Island and Fruit Farm Creek

National
Estuarine
Research
Reserve

Rookery Bay

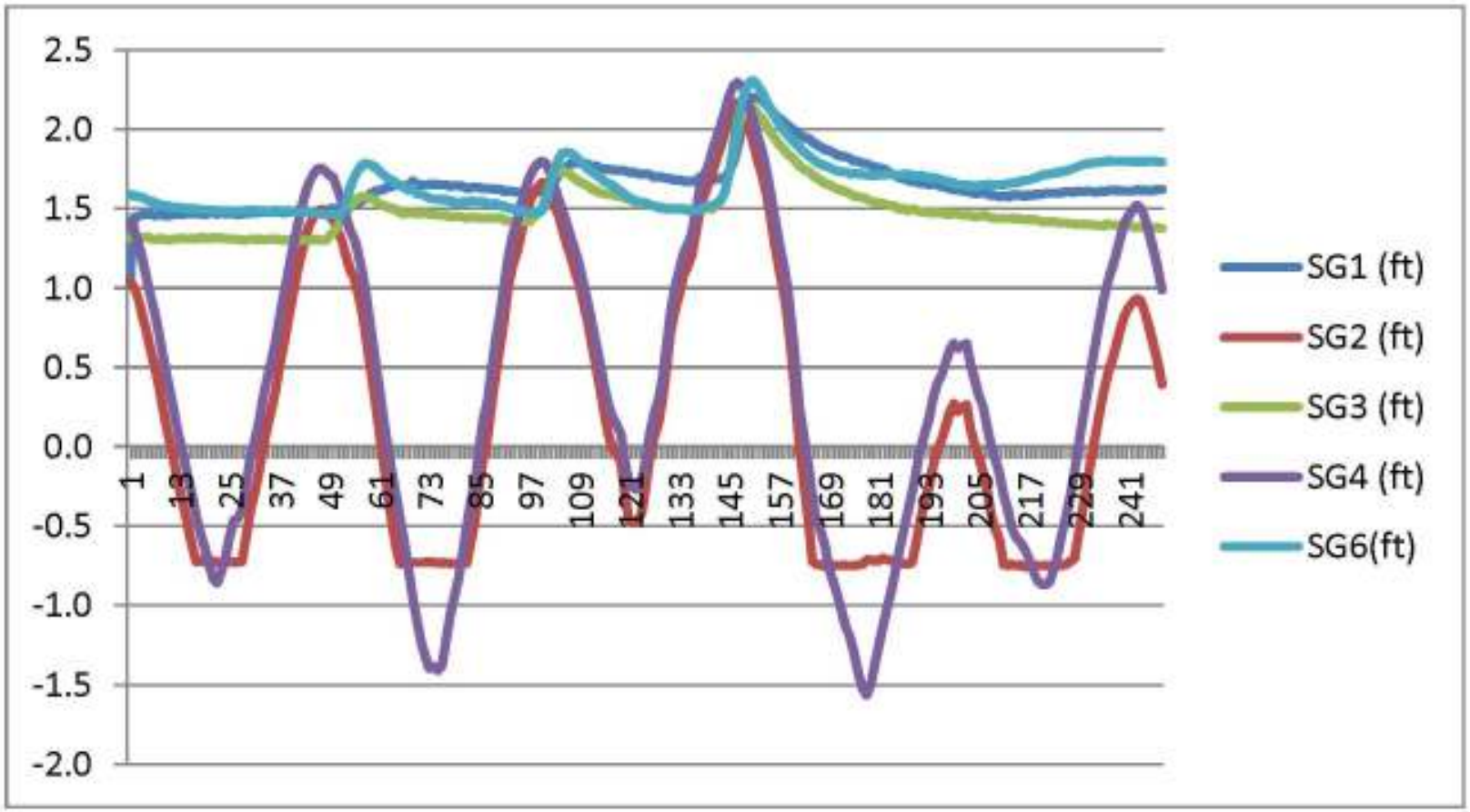
May 28, 2012

Rookery Bay Fruit Farm Creek Proposed Restoration Site – January 21, 2011

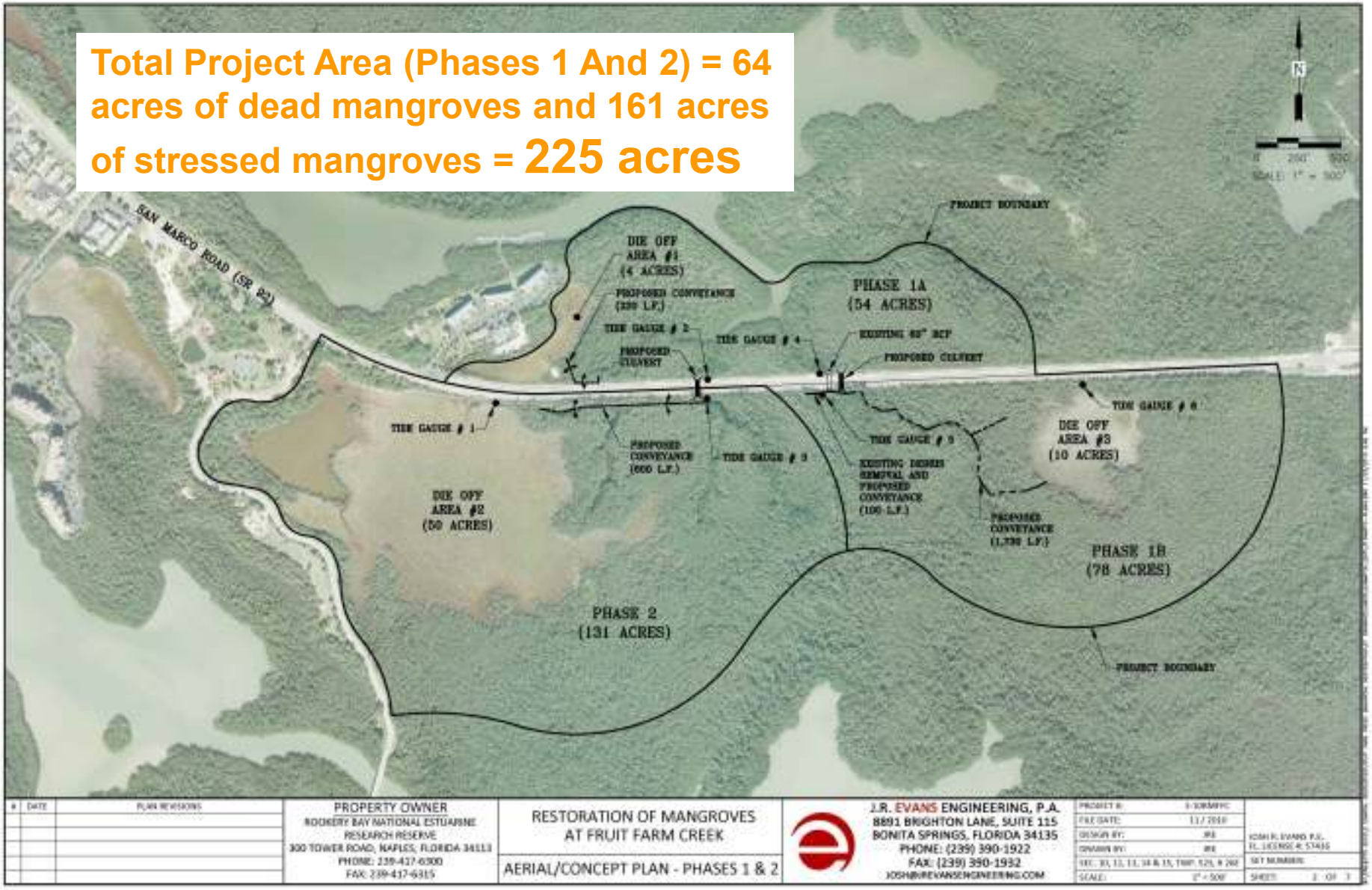



HOBO Water Level Logger (1" X 6 ") www.onsetcomp.com
HOBO
Water Level Logger
Titanium
Onset

TIDE (FT NAVD 88) vs TIME (HOURS)



Total Project Area (Phases 1 And 2) = 64 acres of dead mangroves and 161 acres of stressed mangroves = 225 acres



#	DATE	PLAN REVISIONS

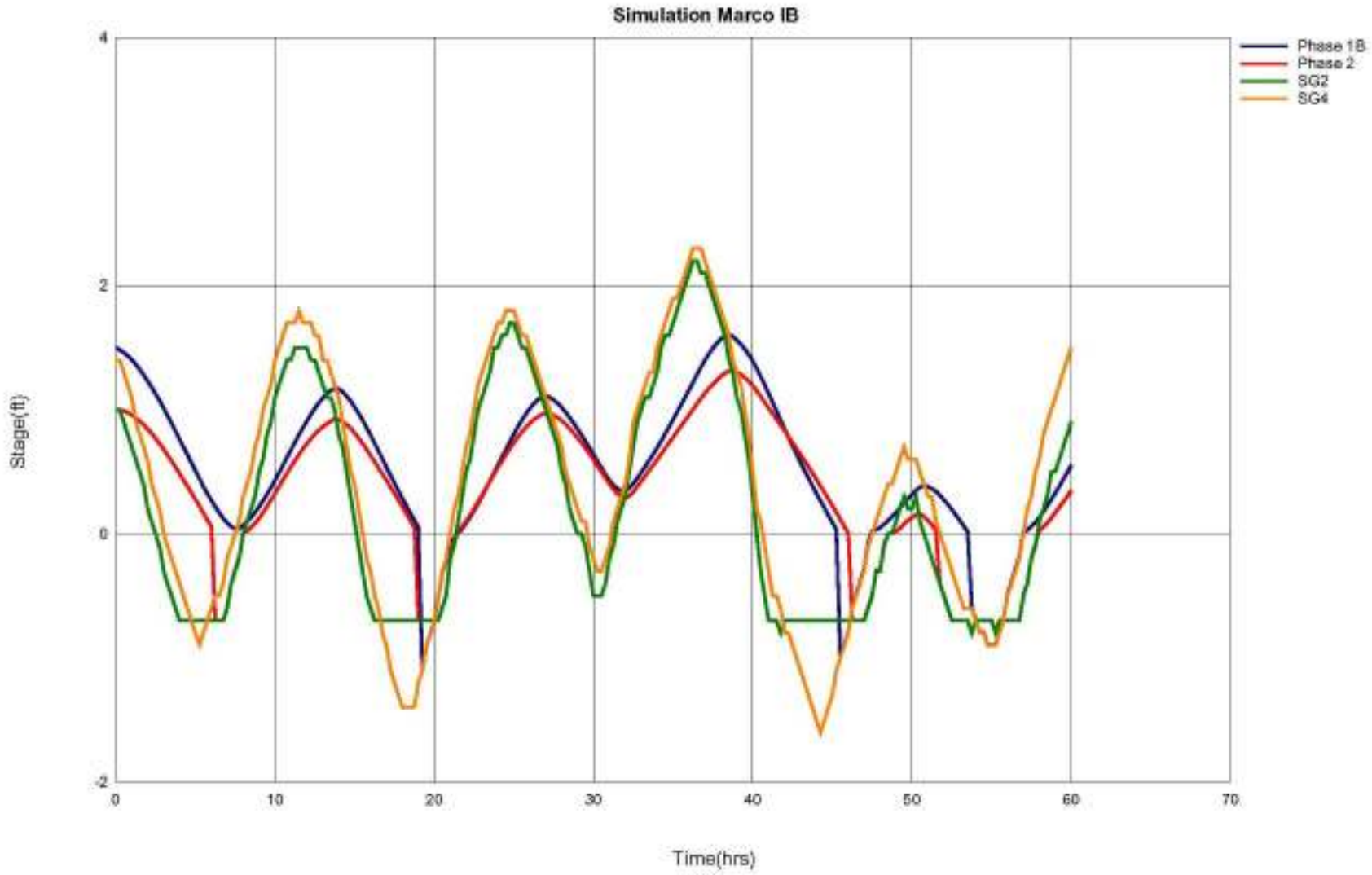
PROPERTY OWNER
ROOKERY BAY NATIONAL ESTUARINE RESEARCH RESERVE
300 TOWER ROAD, NAPLES, FLORIDA 34113
PHONE: 239-417-6300
FAX: 239-417-6315

RESTORATION OF MANGROVES AT FRUIT FARM CREEK

AERIAL/CONCEPT PLAN - PHASES 1 & 2

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

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

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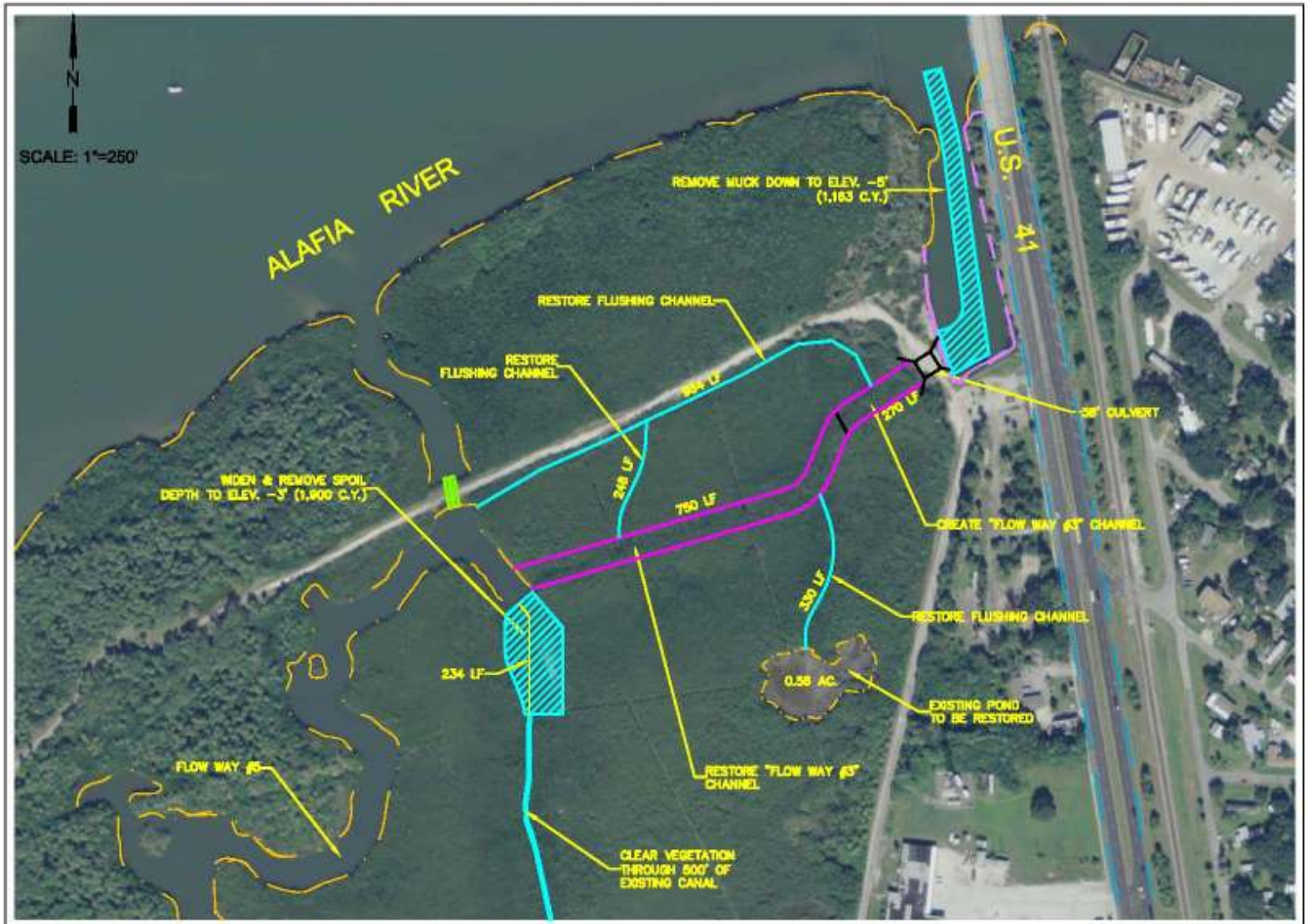
Giant's Camp Project

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