

# THE ROLE OF LILA IN EVERGLADES RESTORATION:

*HARNESSING THE POWER  
OF A PHYSICAL MODEL*



Loxahatchee Impoundment Landscape Assessment (LILA)

**Fred H. Sklar**  
South Florida Water  
Management District

With

Eric Cline, Tom  
Dreschel, Rene Price,  
Pam Sullivan, Len  
Scinto, Mike Ross,  
Jennifer Rehage and  
Scot Hagerthey

April 20, 2016



[sfwmd.gov](http://sfwmd.gov)

# A SCULPTED RIVER OF GRASS:

## *Presentation Outline*

- 1. Why build LILA?*
- 2. LILA design*
- 3. The LILA Legacy*



Loxahatchee Impoundment Landscape Assessment (LILA)

**Fred H. Sklar**

Section Administrator

Everglades System  
Assessment Section

South Florida Water  
Management District

Presentation to  
the USACOE EAB  
and Chief

December 2, 2015



[sfwmd.gov](http://sfwmd.gov)

# WHY BUILD LILA?

- **Example: Tree Islands in the Everglades**

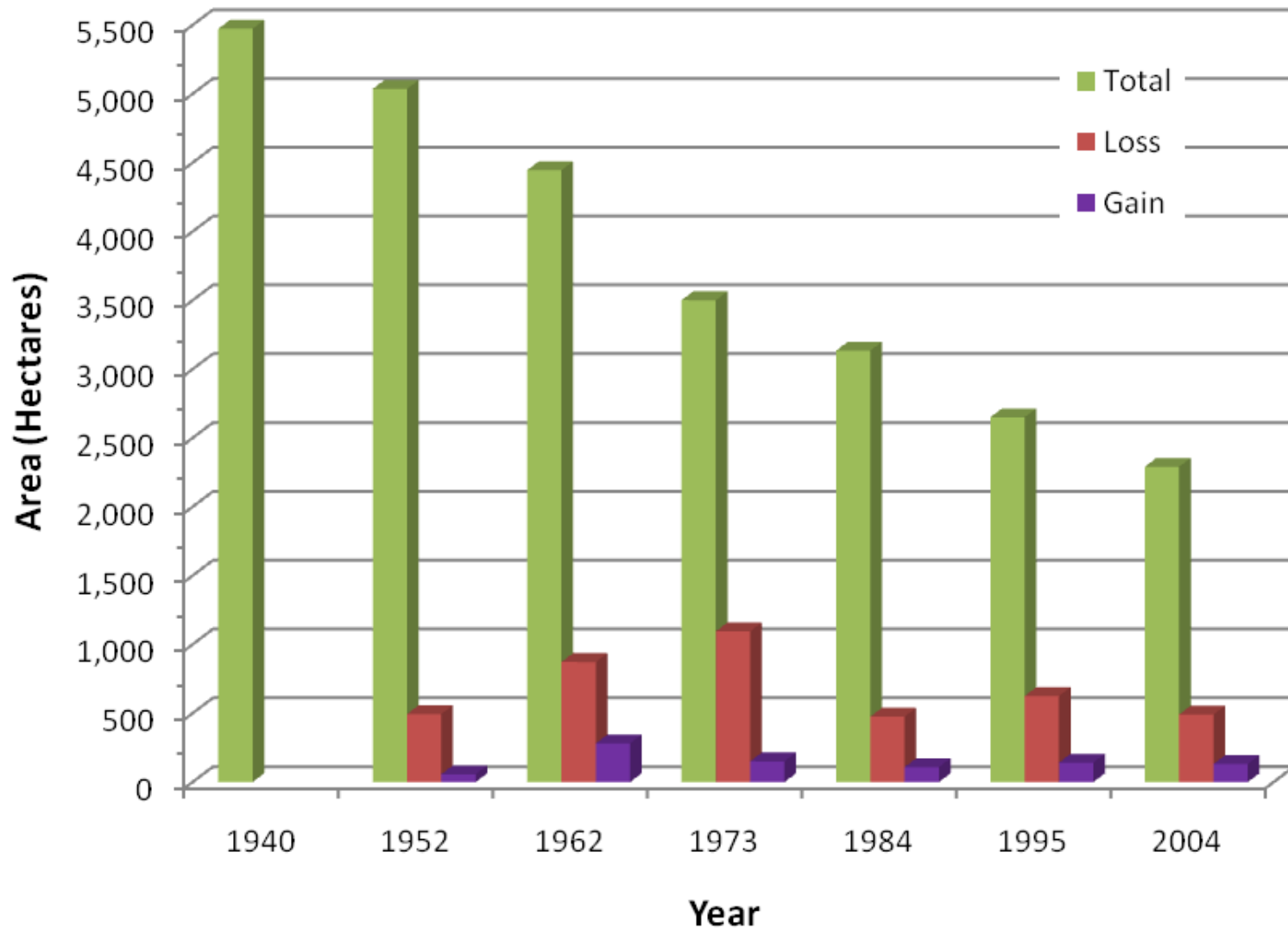


Left: a typical tree island of the Everglades in WCA-3. Right: A ghost tree island in WCA-2 with most of the trees having been replaced with herbaceous vegetation.

# RECOVER Tree Island Mapping – SRS Results

## Tree Islands of Shark River Slough: 1940 - 2004

(Minimum Mapping Unit  $\geq 1$  Hectare)



# WHY BUILD LILA?

## ■ Tree Islands:

- Why are 60% of the tree islands in the extant Everglades gone?
- What are the hydrologic requirements for a landscape of tree islands?
- How did these islands become P rich?

## ■ Ridge and Slough:

- Is the decline of slough habitat the cause of the 90% decline in wading birds?
- What is the role of flow?
- What hydroperiods prevent soil subsidence?



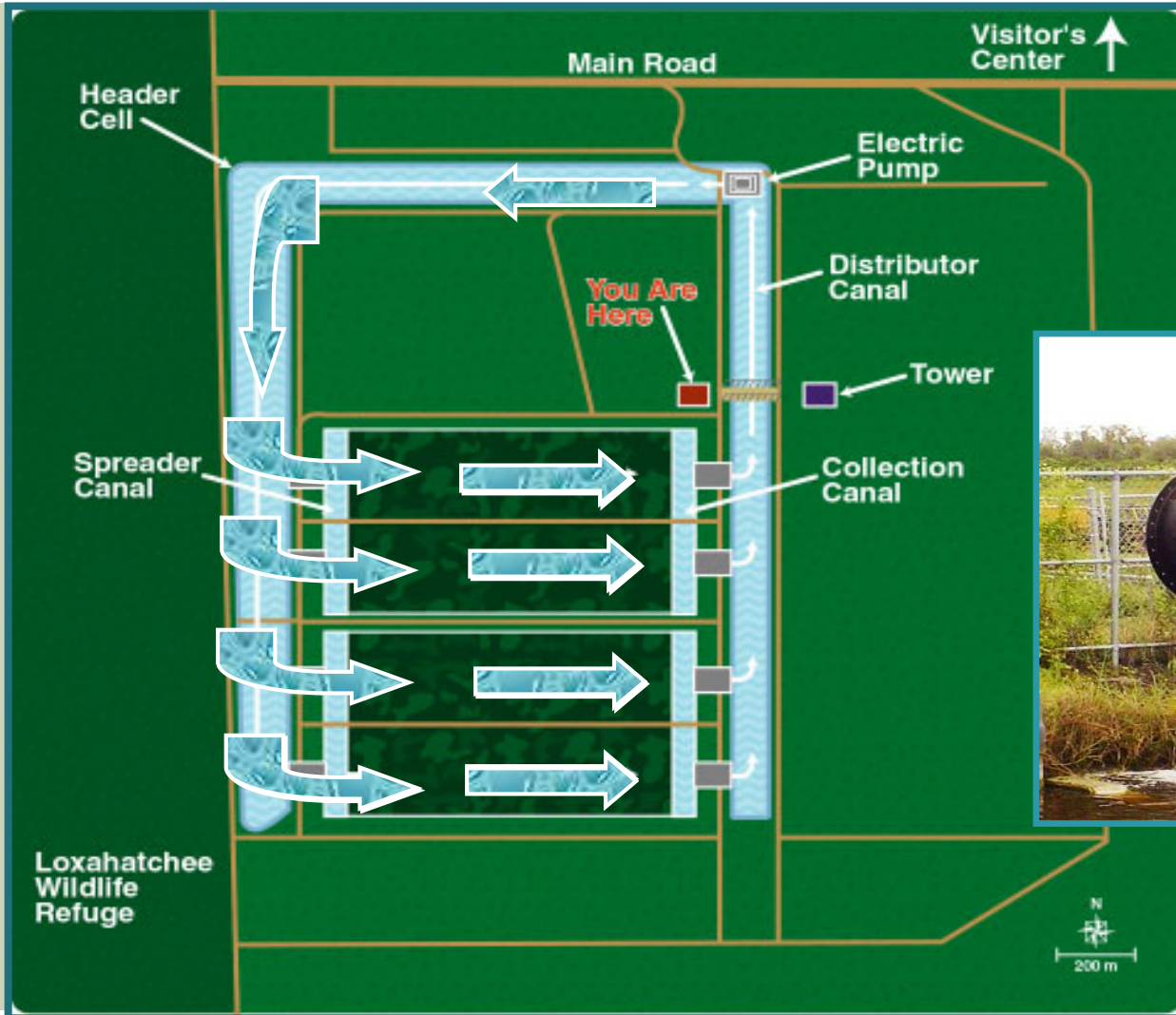
# LILA Objective

Define the hydrologic regimes that will sustain and restore a healthy Everglades landscape with an emphasis on tree islands, ridge and slough patterns and wading bird communities

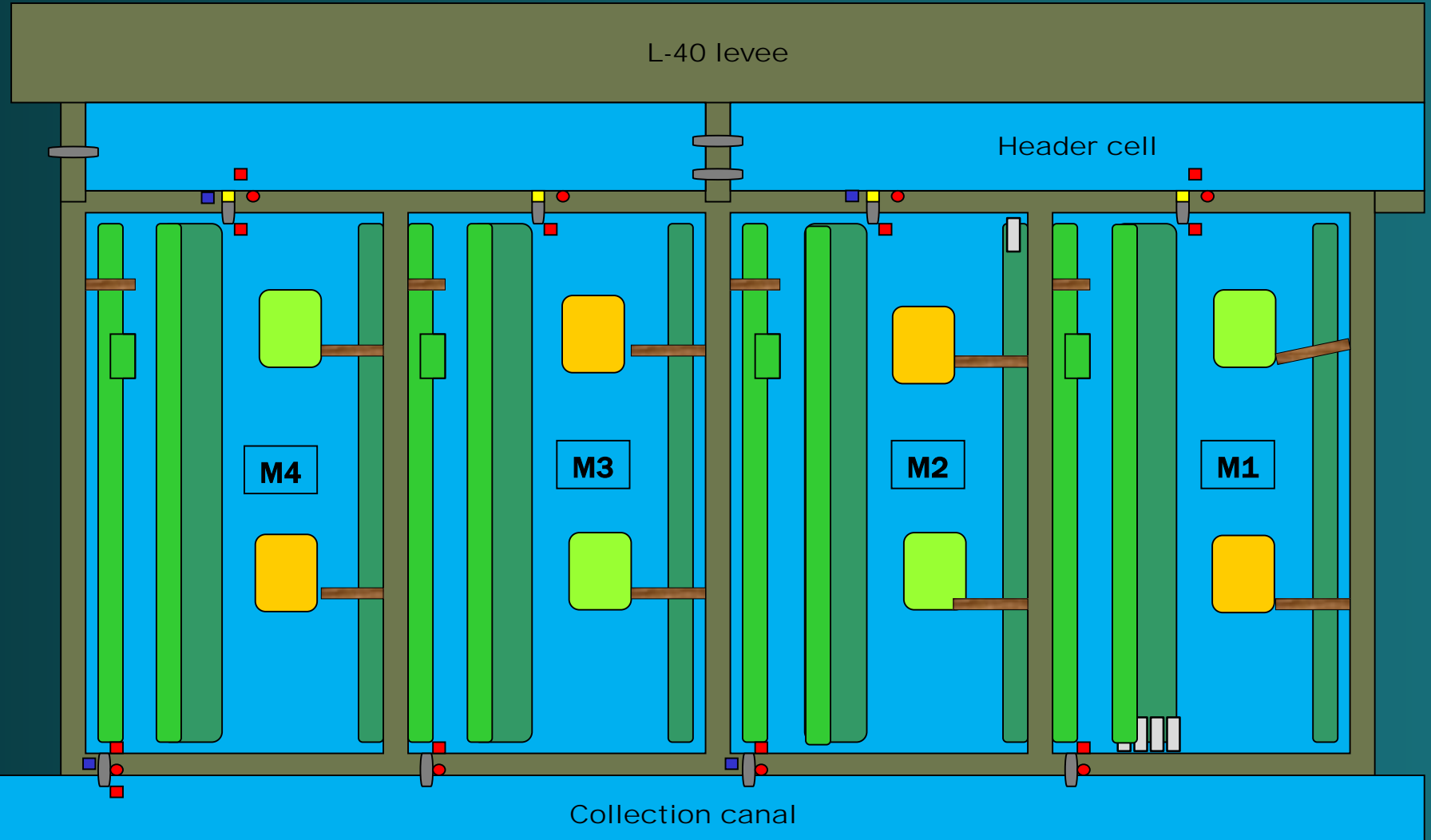




# LILA DESIGN



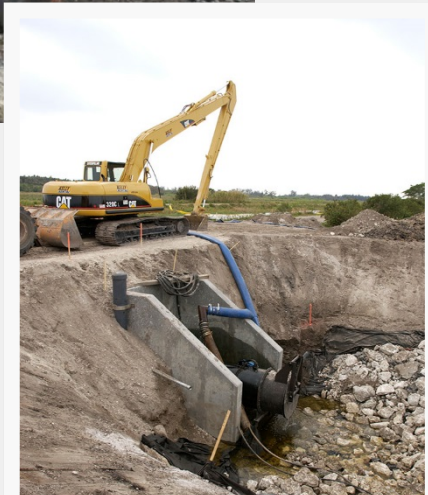
# LILA Design: Each Macrocosm (M1-M4) is 20 acres



- Gate sensor
- Stage gauge
- CR10
- Flow station
- Island
- Boardwalk
- ▭ Enclosure
- ◌ Culvert



# Construction of LILA Pump and Trash Rake





# Construction of LILA 2002 - 2003



March 2003

Peat soil from the deep slough is used to construct tree islands.





One island in each macrocosm is constructed of limestone levee material

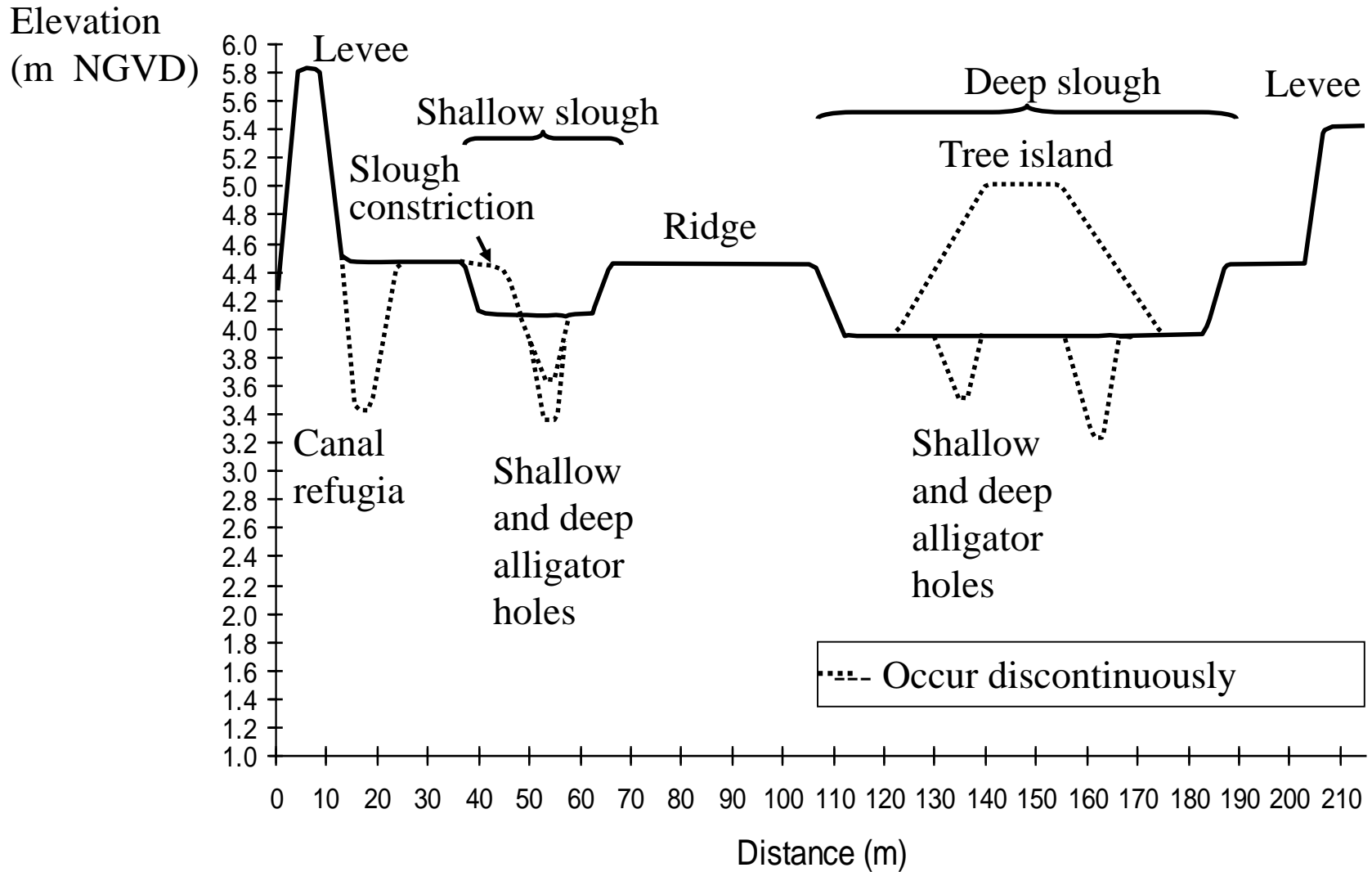


L-40

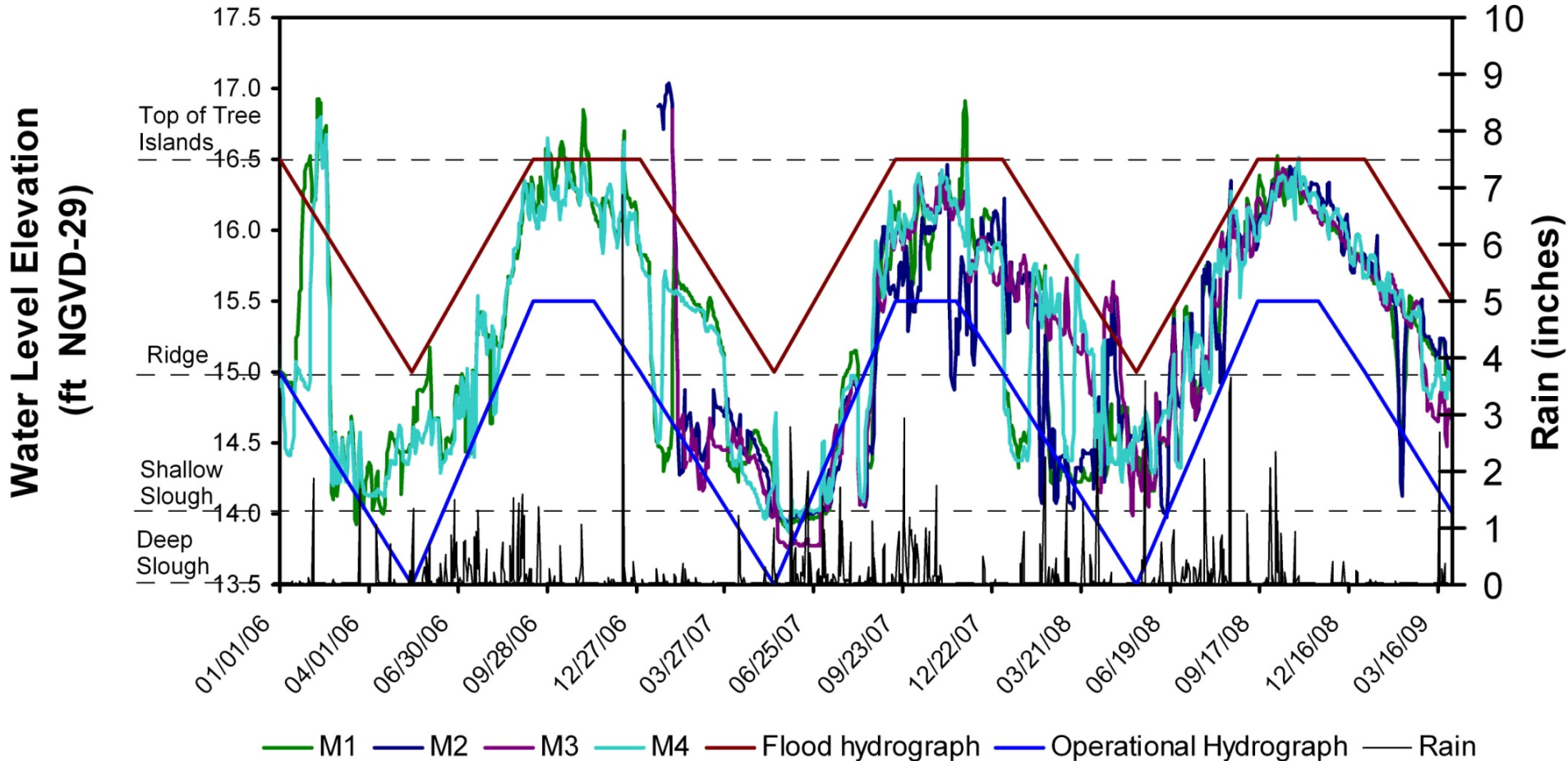
WCA-1



# Cross-section of a macrocosm



# LILA OPERATIONAL HYDROGRAPH





WCA-1

L - 40

Macrocosm 1

Macrocosm 2

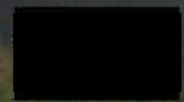
Macrocosm 3

Tree Island

Tree Island

Macrocosm 4

Flow Path





May 2004

# Tree Planting I

3000 trees

3 days

30 people



Italia Gray

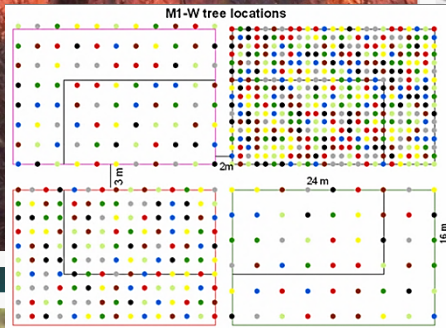


Eric Cline  
Site Manager





# Tree Planting II and III: March 2006 & March 2007



George Pelt

Len Scinto, Rene Price

Five -thousand seven-hundred and thirty-six (5,736) native trees



Mike Ross, Susanna Stoffella and volunteers

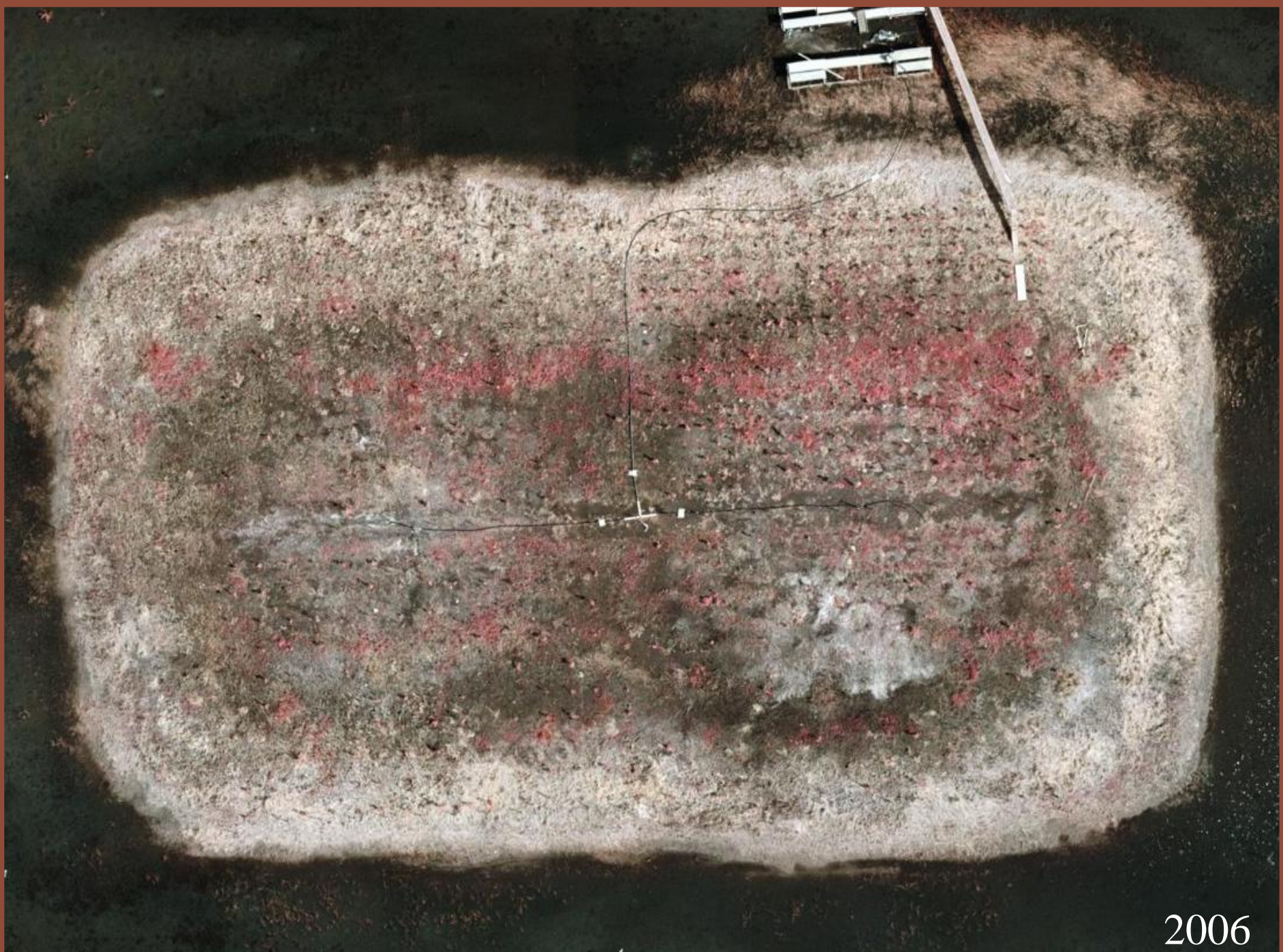






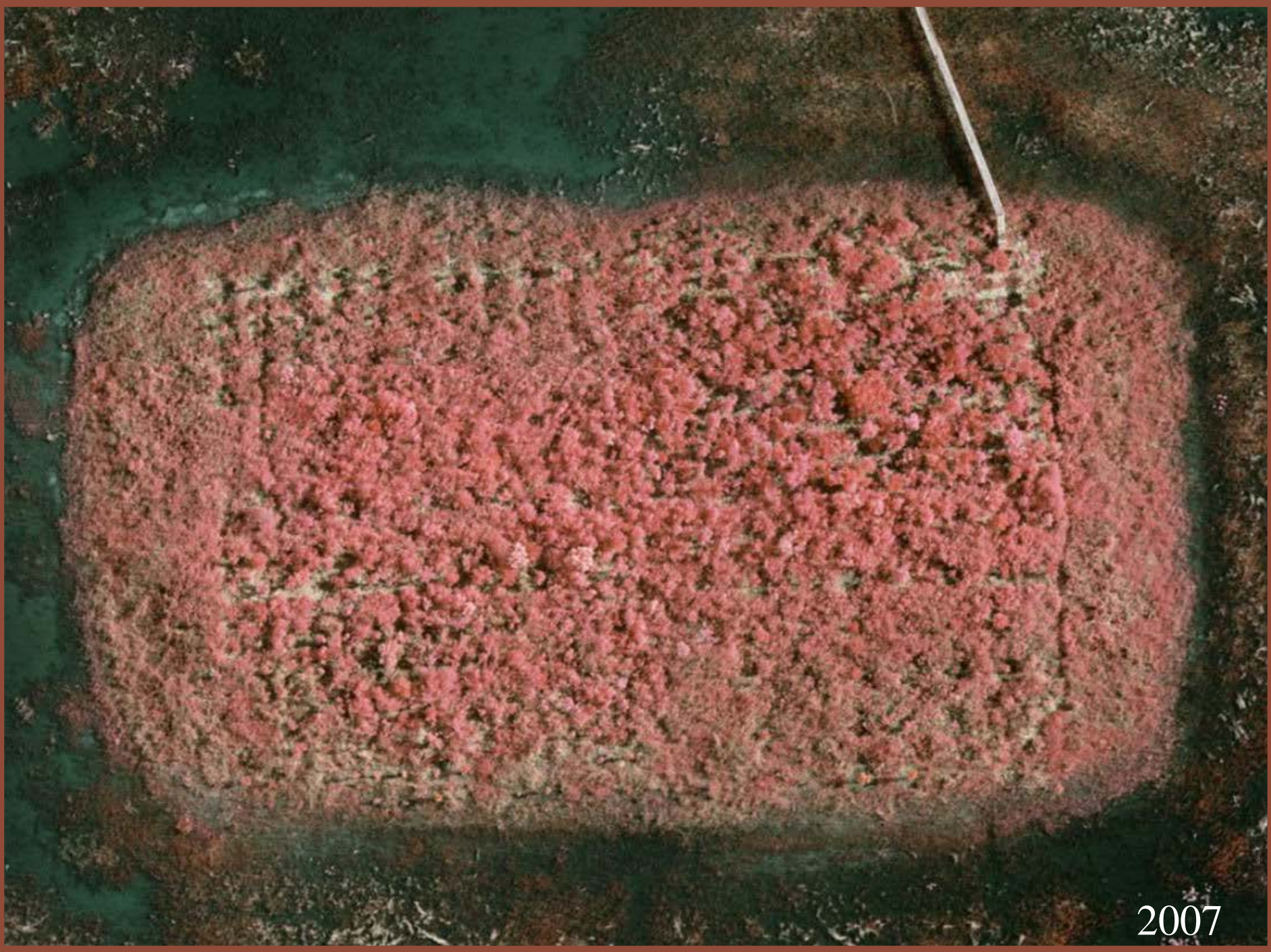
M1WVP





2006





2007





2008





2009





2010





2011





2014



# The LILA Legacy: Tree Islands

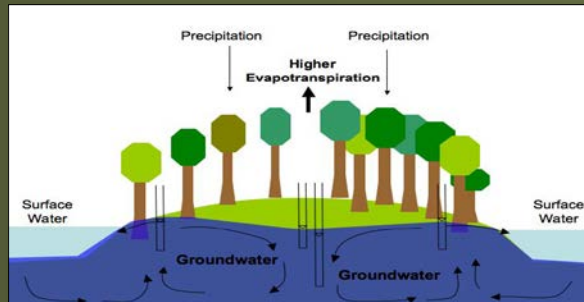
Survival and growth of eight tree species along an hydrologic gradient on two tree island types

Mike Ross  
 Susanna Stoffella  
 Tom Dreschel



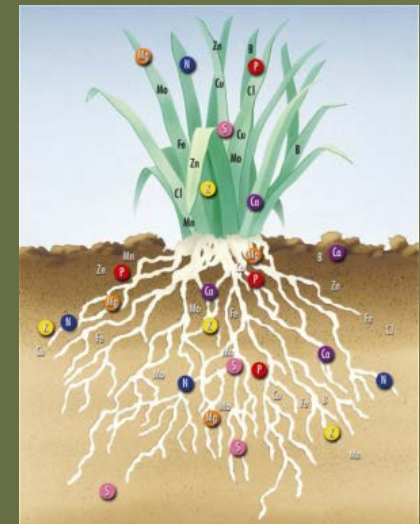
A Physical Investigation of Groundwater-Surface Water Interaction

Rene' Price; Pamela Sullivan  
 Tom Dreschel



Determination of nutrient limitation on trees growing on tree islands

Mike Ross  
 Suresh Subedi  
 Eric Cline



# The LILA Legacy: Role of flow on the distribution of sediments

Flow in the Everglades is  $<1$  cm/sec  
However: CET = 2.5 – 3.5 cm/sec



Scot Hagerthey  
(SFWMD) and  
Kevin Black  
(PARTRAC, Ltd)



# The LILA Legacy: Ridge and Slough

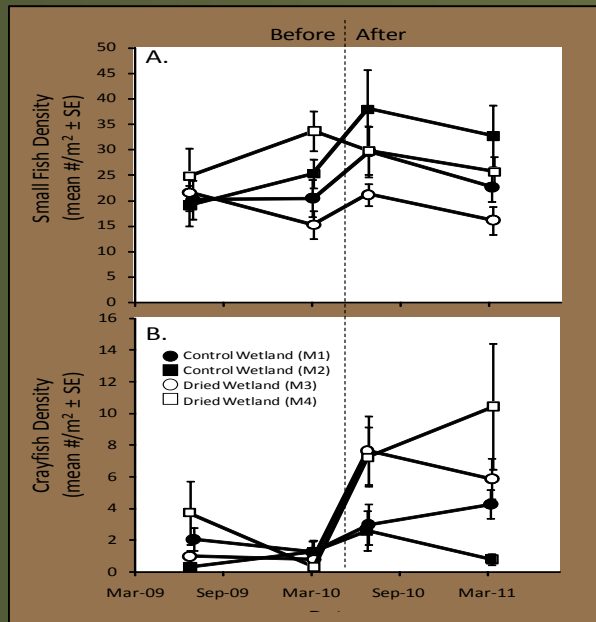
## Ridge and Slough Transplant (RAST) Study

Leonard Scinto  
 Ryan Desliu  
 Eric Cline



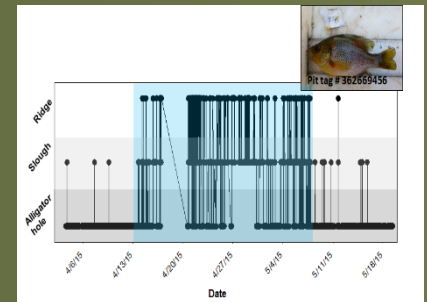
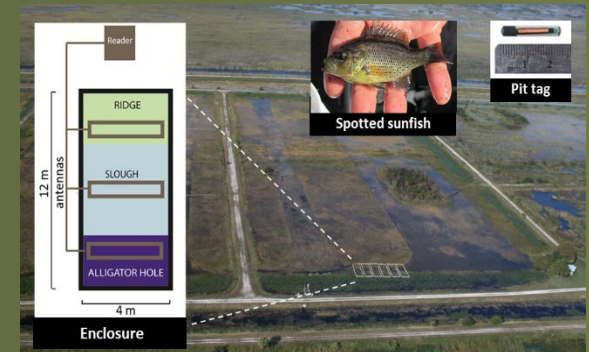
## Crayfish population studies in LILA: Drought Response / Predator Release

Nate van Dorn  
 Craig der Heiden  
 Mark Cook



## Tracking fish movement using passive integrated transponder (PIT) technology.

Jennifer Rehage,  
 Mark Cook, ??



# The LILA Science is Cutting Edge

Tracking wading bird prey: Jennifer Rehage





## The LILA Budget is Modest:

Name	FUND	Amount
LILA Imagery	101	\$6,000
Veg Mgmt. (Contract Service)	101	\$7,500
Maintenance & Repair	101	\$25,000
COOP with LNWR	101	\$15,000
Ridge & Slough Science	220	\$170,000
Faunal Response to Hydrology	220	\$30,000
Pump Fuel	101	\$1,500
Tools and Equipment	101	\$6,000
Pump Electricity	101	\$8,800
<b>TOTAL</b>		<b>\$269,800</b>

# The LILA Future is Bright

Study	Objective
<b>Tree Islands</b>	Nursery techniques for creation of tree islands.
<b>Tree Islands</b>	Determine the processes and hydrology that accounts for prevalence of tree island elevation loss
<b>Ridge &amp; Slough</b>	Develop appropriate techniques for measuring elevation change in sawgrass and slough habitats.
<b>Wildlife</b>	Determine the effect of deep water refugia, such as canals, on native, exotic and invasive species of fish and invertebrates utilized by wading birds.
<b>Wildlife</b>	Hydrologic needs of small heron species
<b>Resilience</b>	Determine climate change tolerance and adaptation mechanisms in relation to hydrologic management

