



# Palm Beach County Lake Worth Lagoon Update

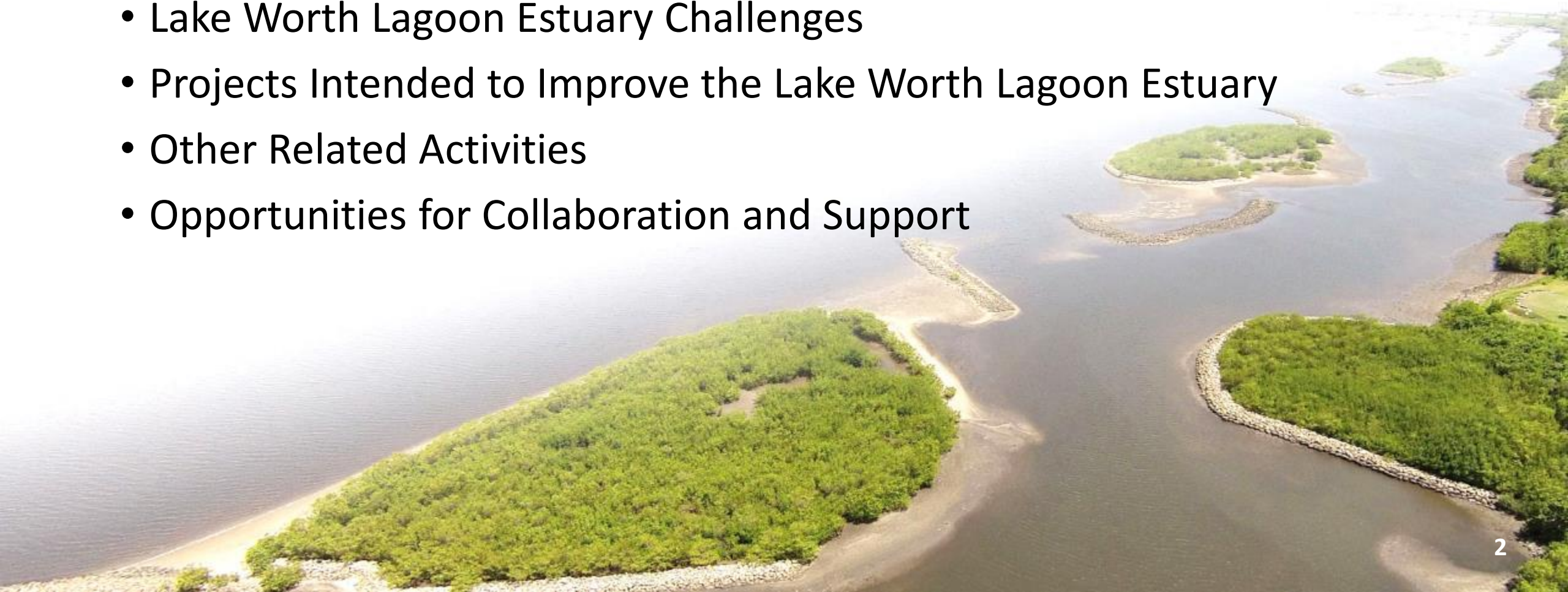


Palm Beach County Water Resources Task Force

April 29, 2021

# Agenda

- Background, Significance and Economic Value
- Estuary and Watershed Characteristics and Infrastructure
- Lake Worth Lagoon Estuary Challenges
- Projects Intended to Improve the Lake Worth Lagoon Estuary
- Other Related Activities
- Opportunities for Collaboration and Support







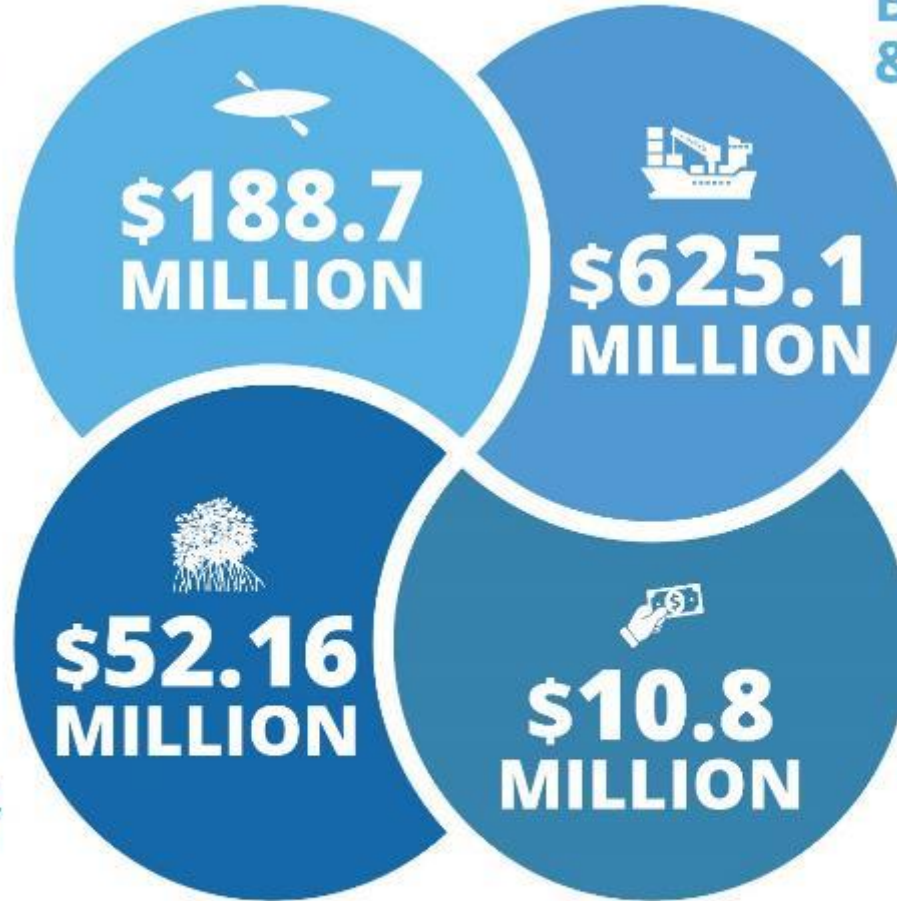




# Economic Value of Lake Worth Lagoon Estuary

## RECREATION

FISHING: \$3.4M  
DIVING: \$5.2M  
BOATING: \$7.3M  
BIRDBWATCHING: \$2M



## BUSINESS & COMMERCE

4,726 FULL TIME JOBS  
\$375 MILLION (60%) OF ECONOMIC ACTIVITY IS FROM THE PORT OF PALM BEACH

## VALUE OF LAGOON HABITATS

FOR FISH AND WILDLIFE, WATER QUALITY PROTECTION, CLIMATE MITIGATION

## INCREASED SPENDING IN THE LOCAL ECONOMY

DUE TO INCREASED RESIDENTIAL PROPERTY VALUE

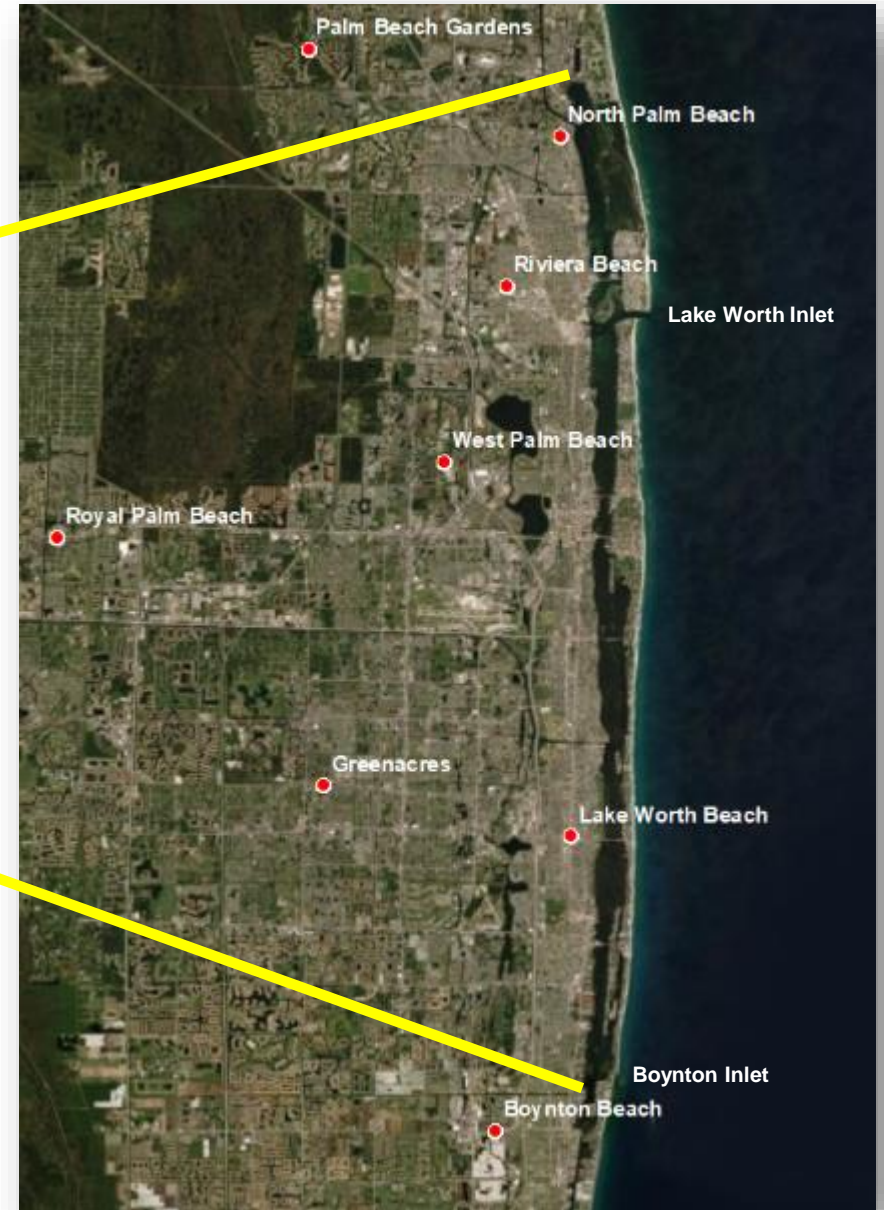
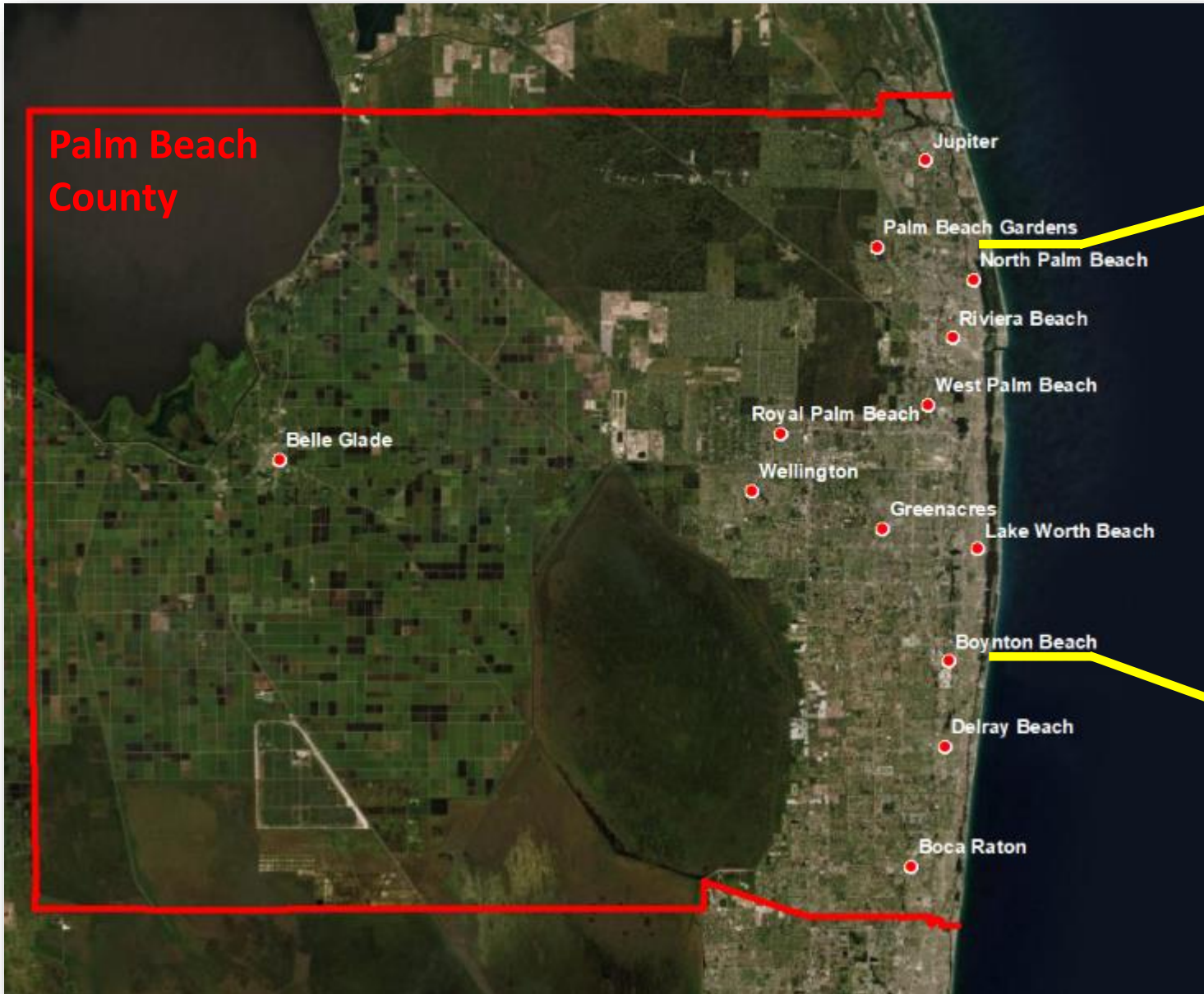
## ADDITIONAL REAL ESTATE VALUE ON LAGOON WATERFRONT:

SINGLE-FAMILY HOME: \$73,761    CONDOMINIUM UNIT: \$11,292

NOTE: Annual Figures  
DRAFT; Subject to Revision

SOURCE: Everglades Law Center & PFM Group Consulting LLC

# Lake Worth Lagoon Estuary

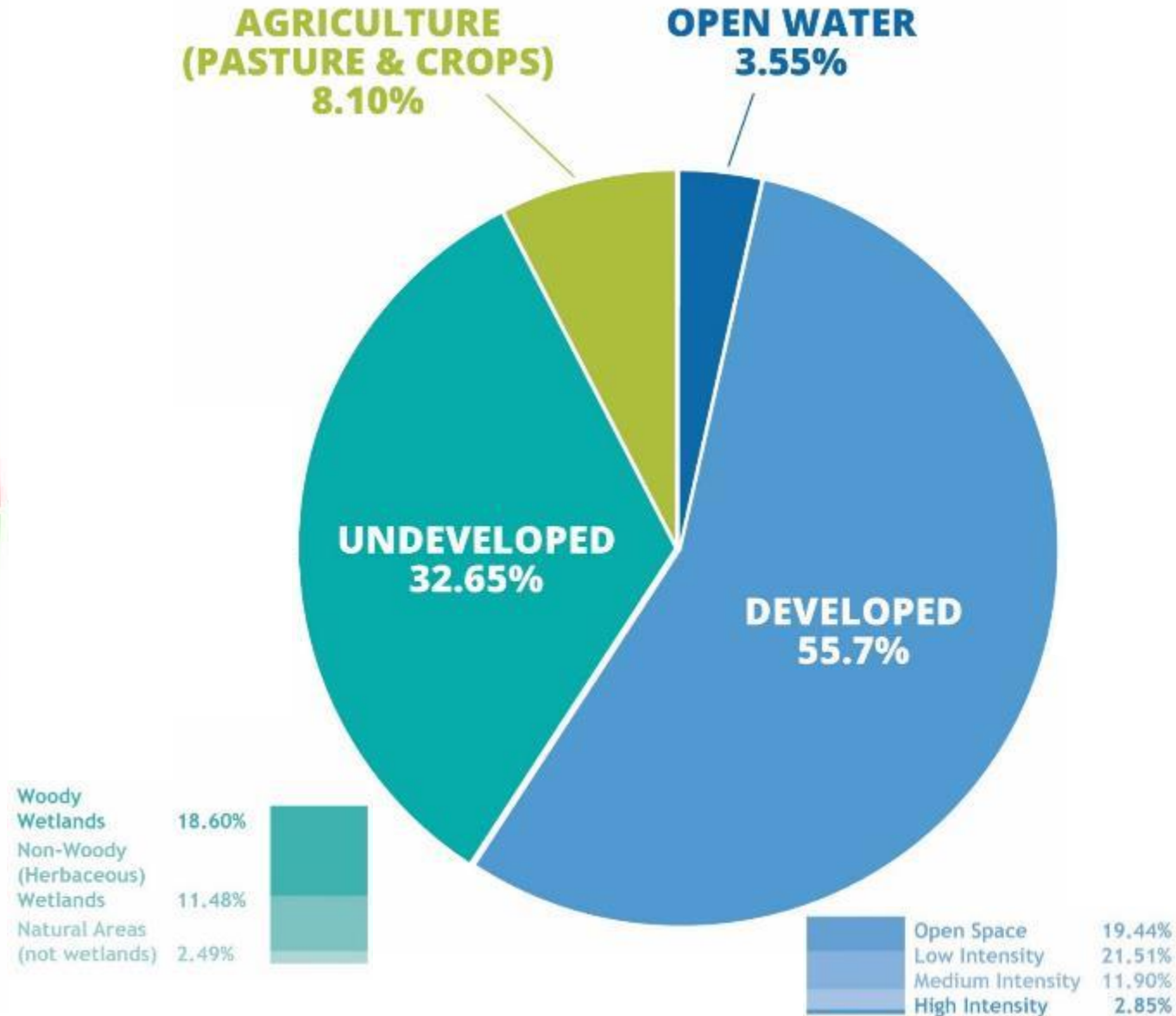




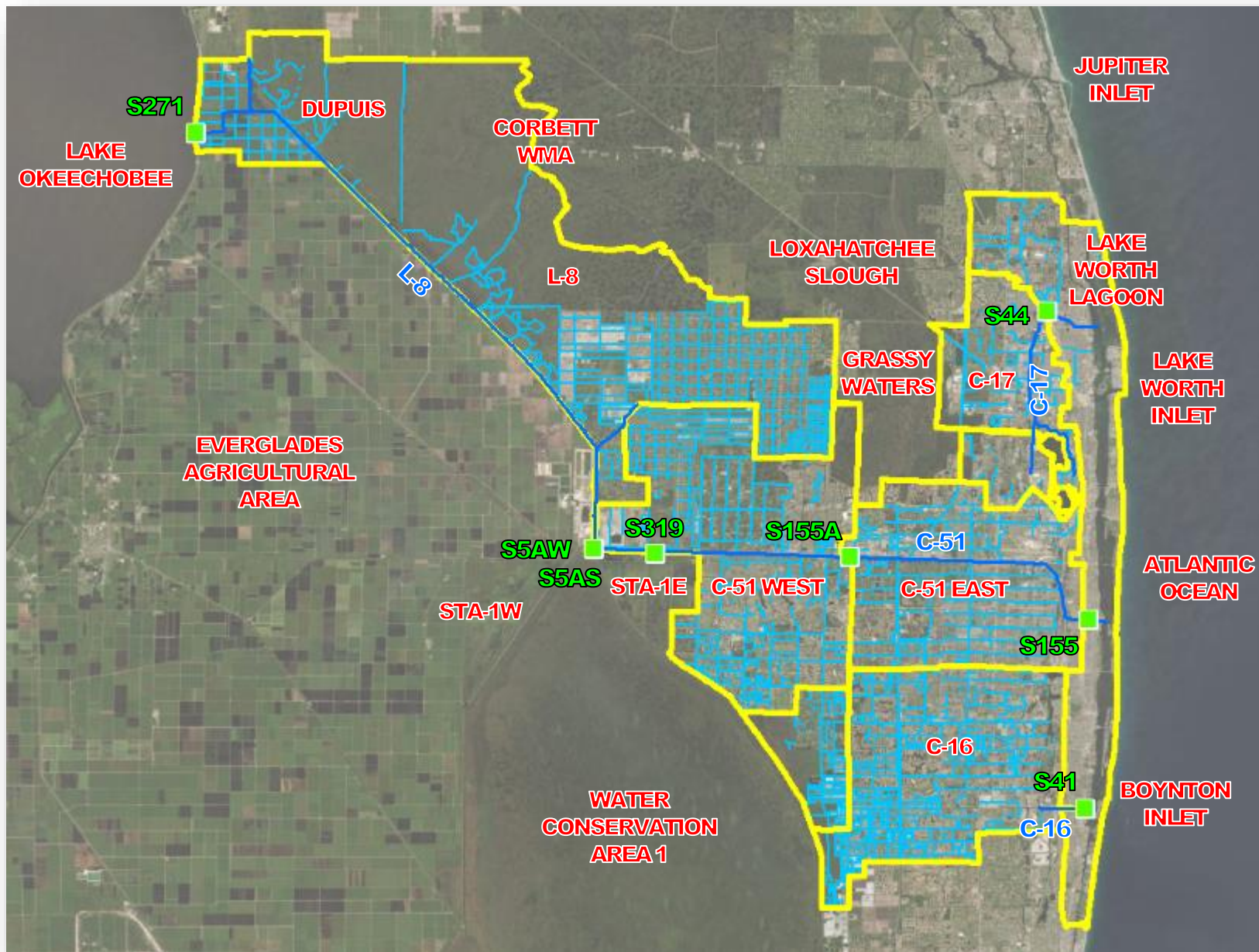
# LAKE WORTH LAGOON BY THE NUMBERS



# LAND USE IN THE WATERSHED



# Watershed Characteristics and Infrastructure



# Challenges

**Shoreline  
Hardening**



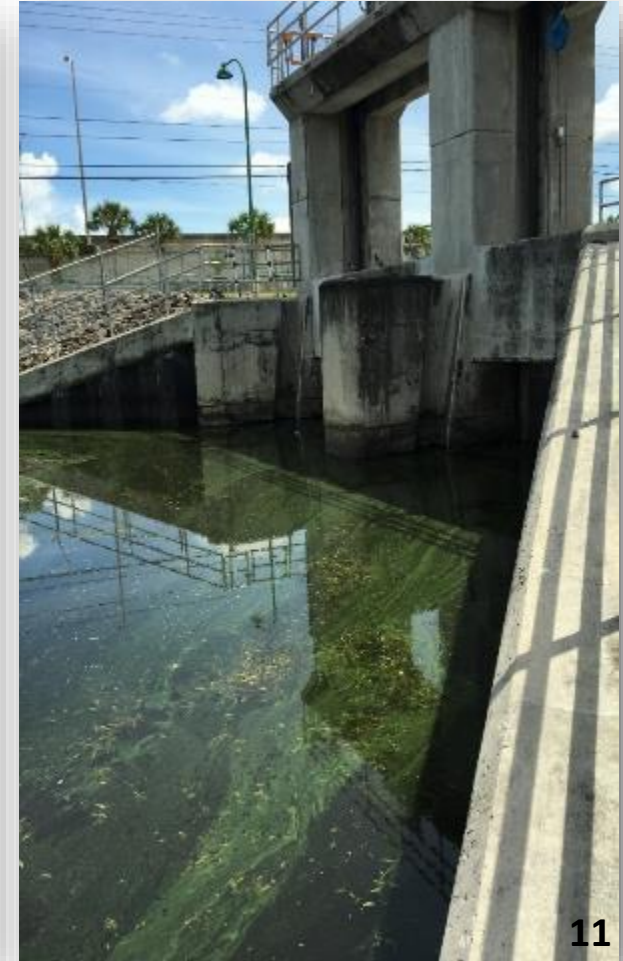
**Stormwater  
Discharges**



**Limited  
Flushing in  
Central Lagoon**



**Algae**



# Shoreline Hardening (aka Seawalls)



# Shoreline Hardening (Seawalls)





## 2020 Lake Worth Lagoon Shoreline Characterization

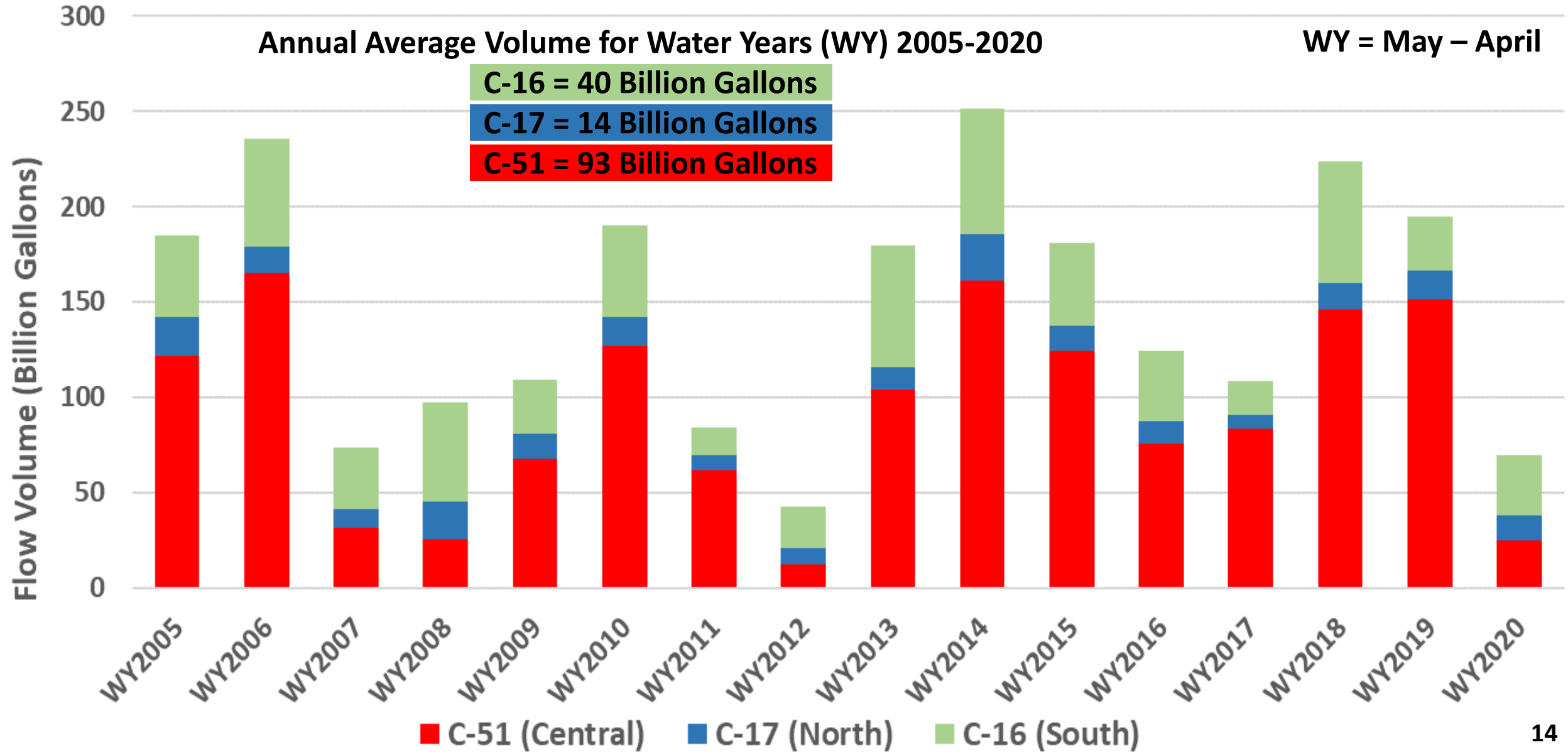
**Shoreline**

- Armored 70%
- Natural 30%

0 0.5 1 2 3 Miles

# Stormwater Discharges to the Lake Worth Lagoon



# Stormwater Discharges: Structure S-155



## **Purpose:**

Maintain the C-51 Canal at 8 – 8.5 feet NGVD29; Prevent saline intrusion

## **Description:**

3-bay concrete spillway with 25-foot wide automatically-controlled vertical lift gates

## **Flow Capacity:**

4,800 cubic feet per second (cfs) with a downstream tide elevation of 1.0 feet NGVD29

## **Year Constructed:**

~1983

# Stormwater Discharges: Muck





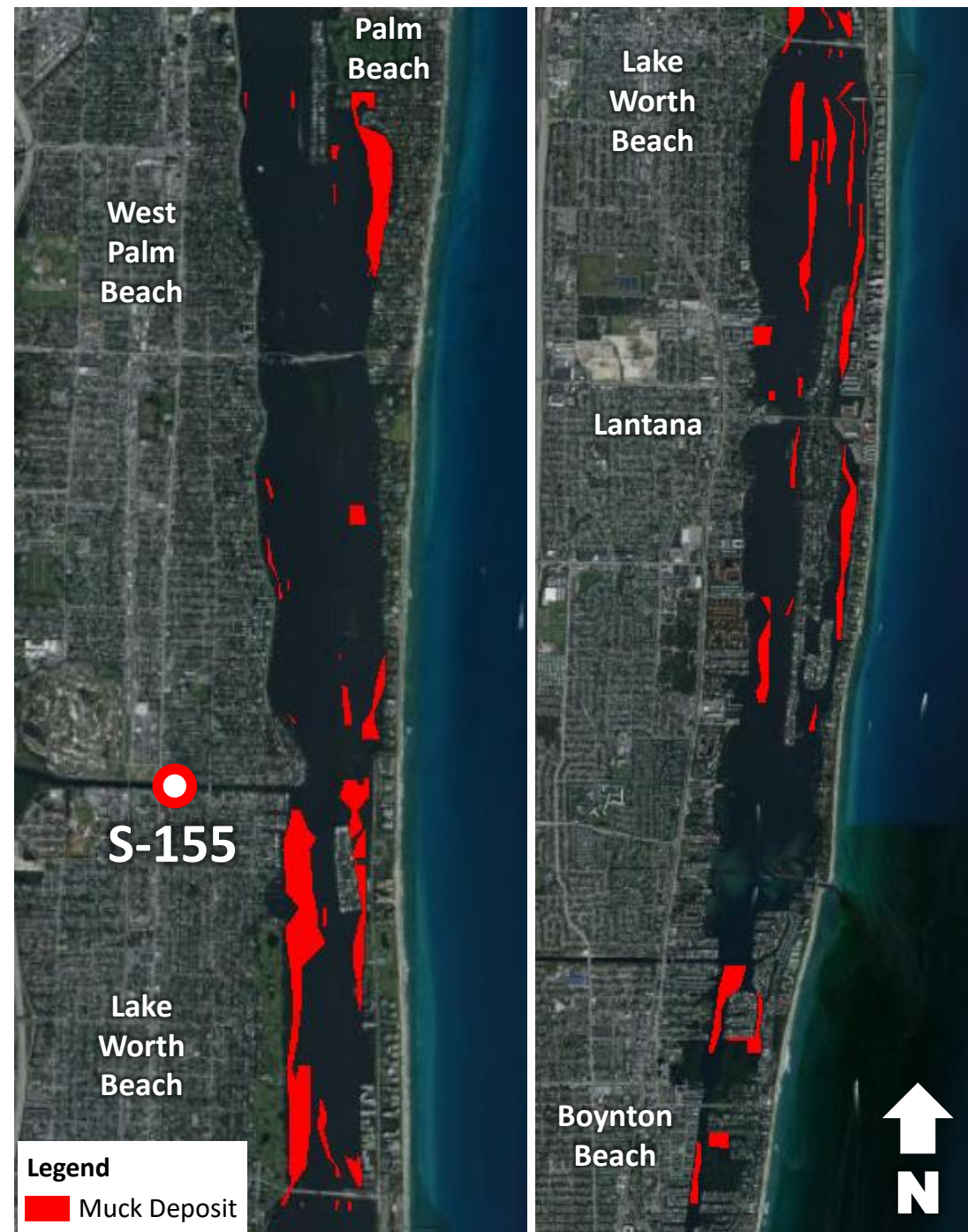
# What's the Problem with Muck?

- **Blankets the natural sand substrate**
- **Reduces available benthic and oyster habitat**
- **Decreases biodiversity**
- **Easily re-suspended**
  - Increased turbidity
  - Decreased light penetration
  - Reduced photic zone
- **Prevents colonization/expansion of Submerged Aquatic Vegetation (SAV)**



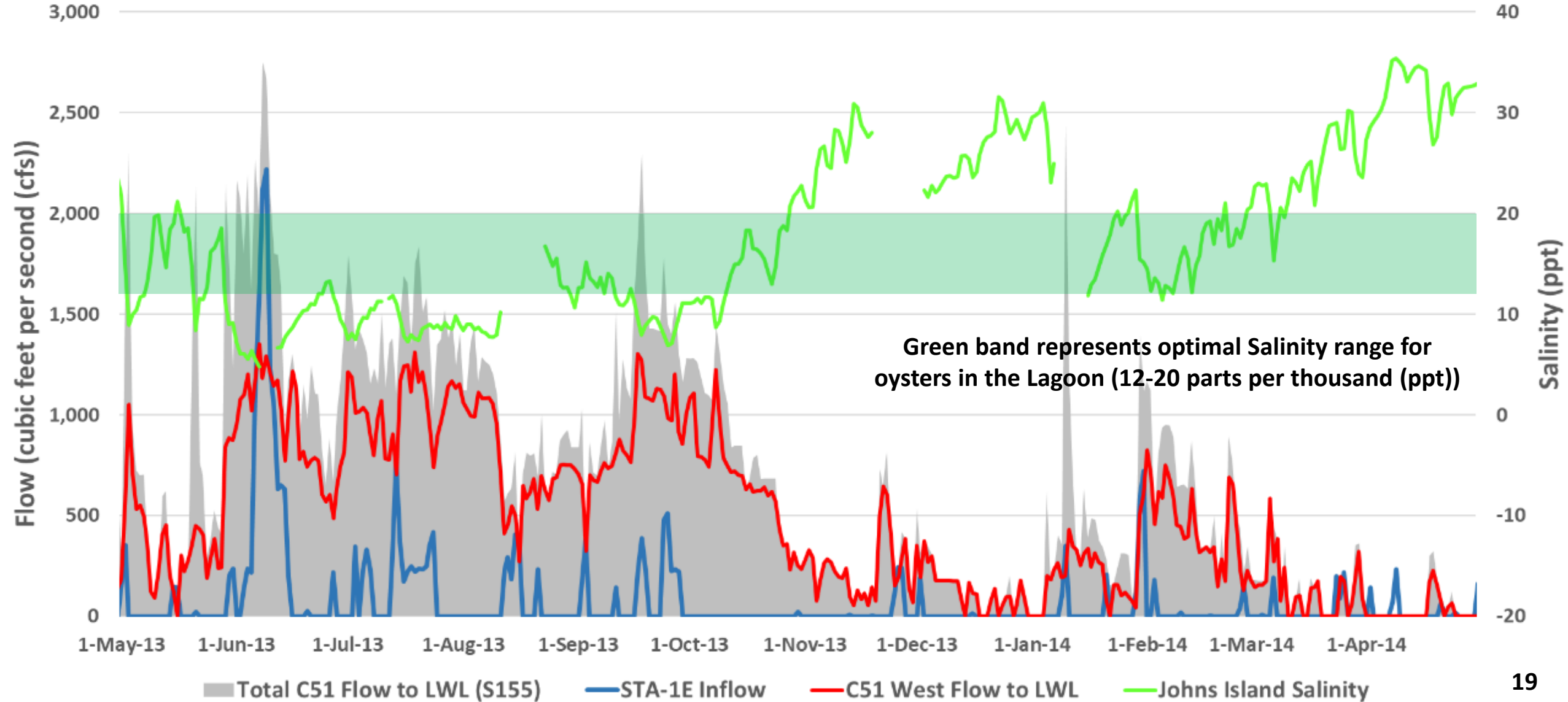
# Muck Distribution (2003)

- 425 acres of Muck >1 foot deep in a 12 mile long area
- $\pm$  42% of muck deposits are found within a 2 mile radius of C-51 Canal discharge location
- $\pm$  1.2 million cubic yards of muck near C-51 Canal discharge location
- Accumulation rate  $\sim$ 0.9 centimeters per year



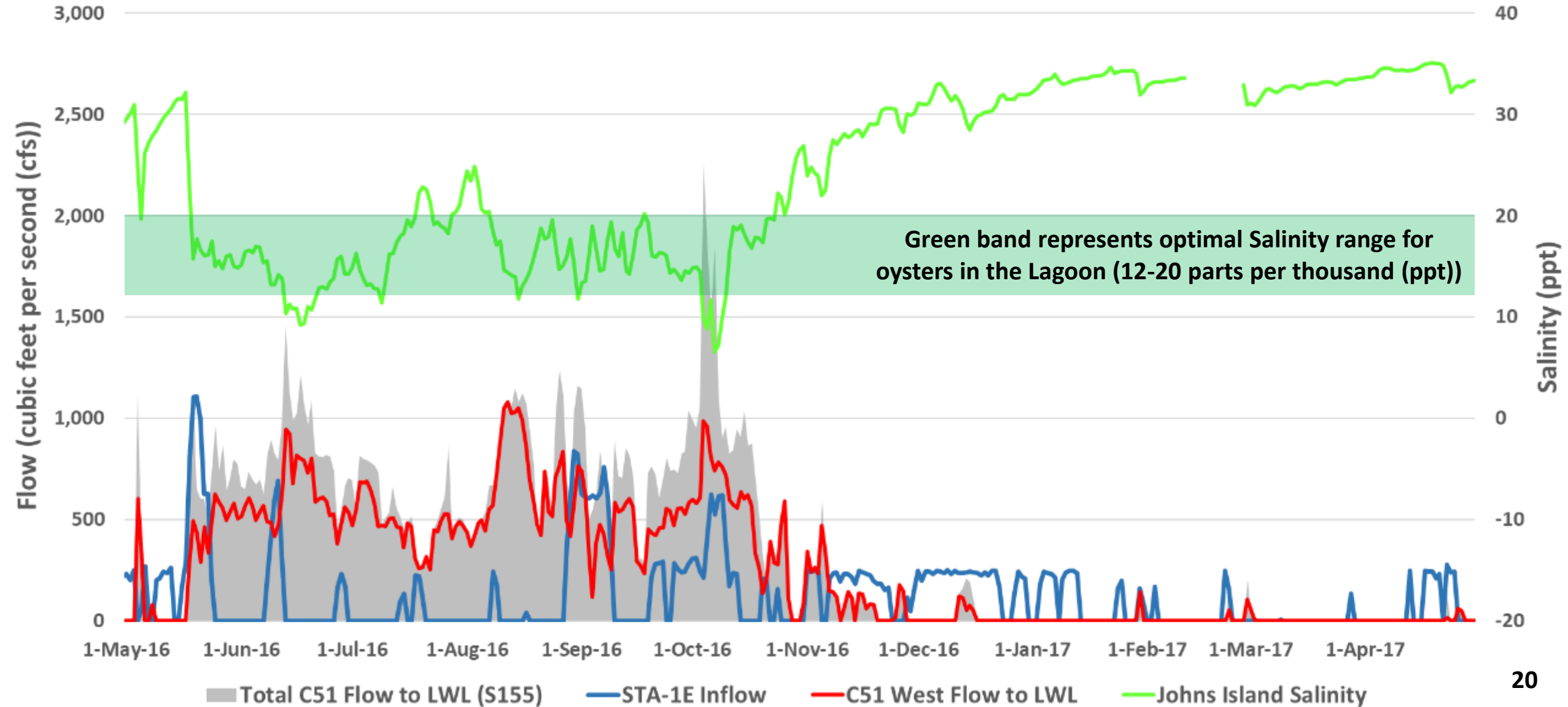
# Stormwater Discharges: Salinity near S-155

Water Year 2014 (May 2013 – April 2014)



# Stormwater Discharges: Salinity near S-155

Water Year 2017 (May 2016 – April 2017)



# Limited Flushing in Central Lake Worth Lagoon

**Boynton  
Inlet**

**S-155**

**Palm Beach  
Inlet**



# Blue-Green Algae Blooms



# Summa Beach Park – West Palm Beach – June 2016



**HEALTH ALERT**

**TOXIC ALGAE CONCERNS  
WEST PALM BEACH**

Source:  
WPEC/CBS12

# Summa Beach Park – West Palm Beach – June 2016



**HEALTH ALERT**

**TOXIC ALGAE CONCERNS  
WEST PALM BEACH**

Source:  
WPEC/CBS12



# Projects Intended to Improve the Lake Worth Lagoon Estuary

**Restoring Tidal Flats**



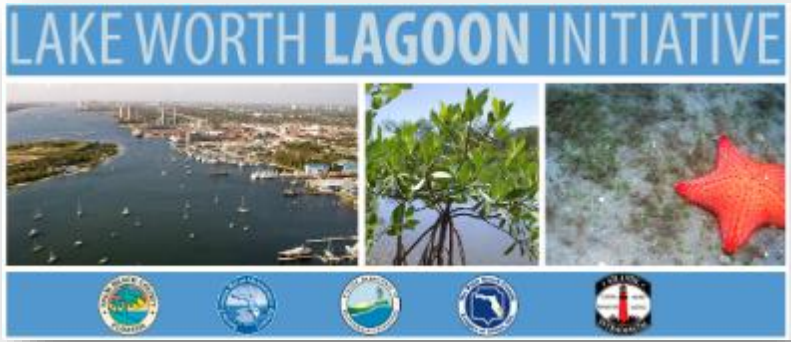
**Creating Living Shorelines**



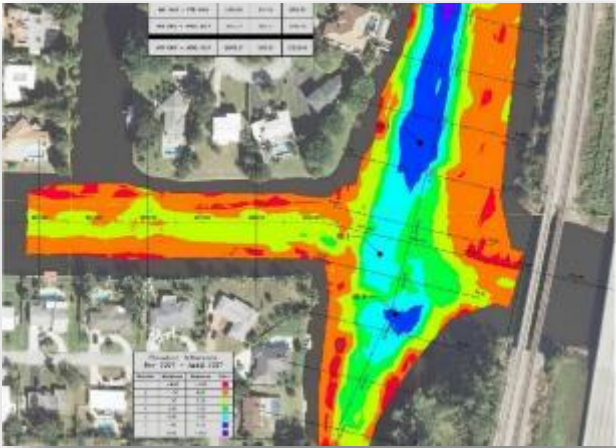
**Constructing Islands**



**Lake Worth Lagoon Initiative**



**C-51 Sediment Trap**



**Comprehensive Everglades Restoration Plan (CERP)**



# Restoring Tidal Flats



# Creating Living Shorelines



**Before**



**After**

# Creating Living Shorelines (cont'd)



# Constructing Islands



**Snook Islands (east of Lake Worth Beach Golf Course)**



# Constructing Islands (cont'd)

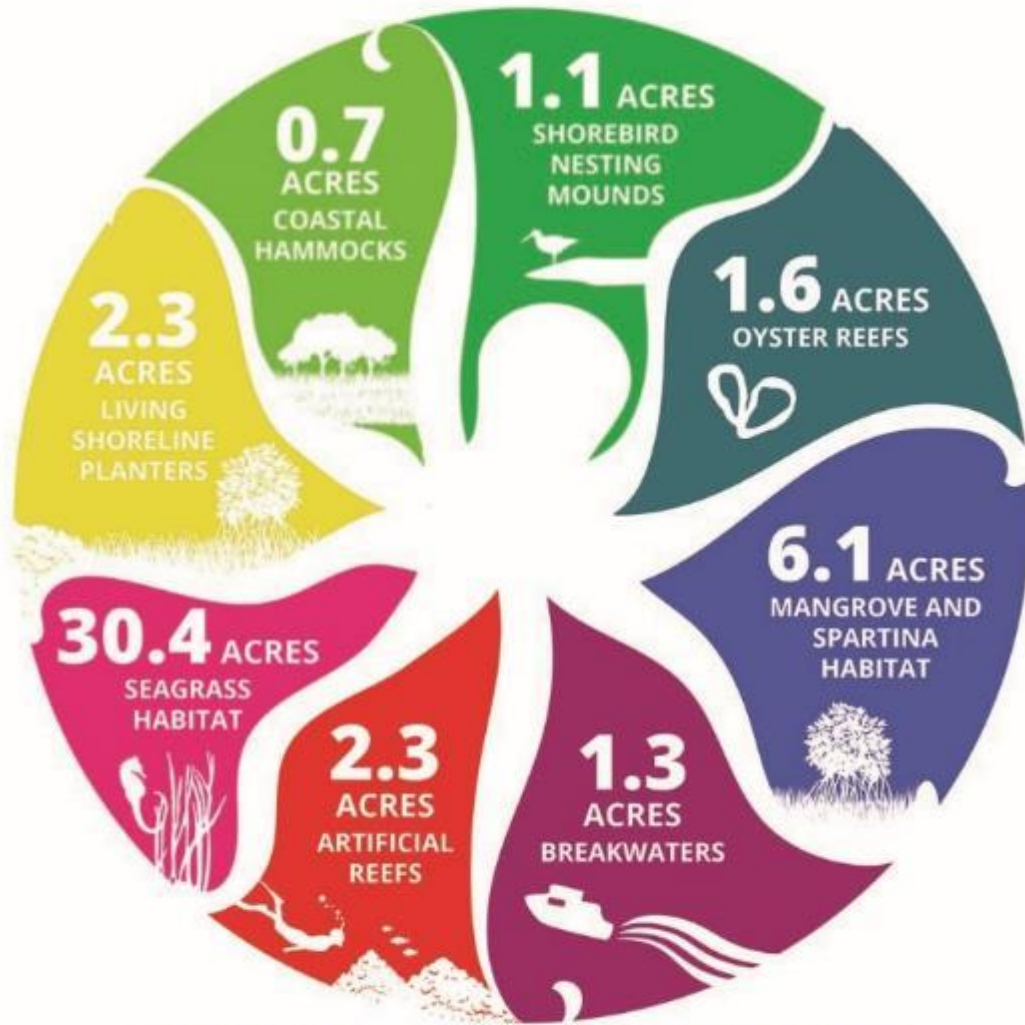


# Lake Worth Lagoon Initiative



# LIVING SHORELINE AND HABITAT RESTORATION PROJECTS

FROM 2014-2019



**+6** ADDITIONAL RESTORATION PROJECTS planned or underway in the next 3 years

# FINANCING LAGOON IMPROVEMENTS

FLORIDA LEGISLATURE

\$22M

\$88M

LOCAL AND FEDERAL MATCH



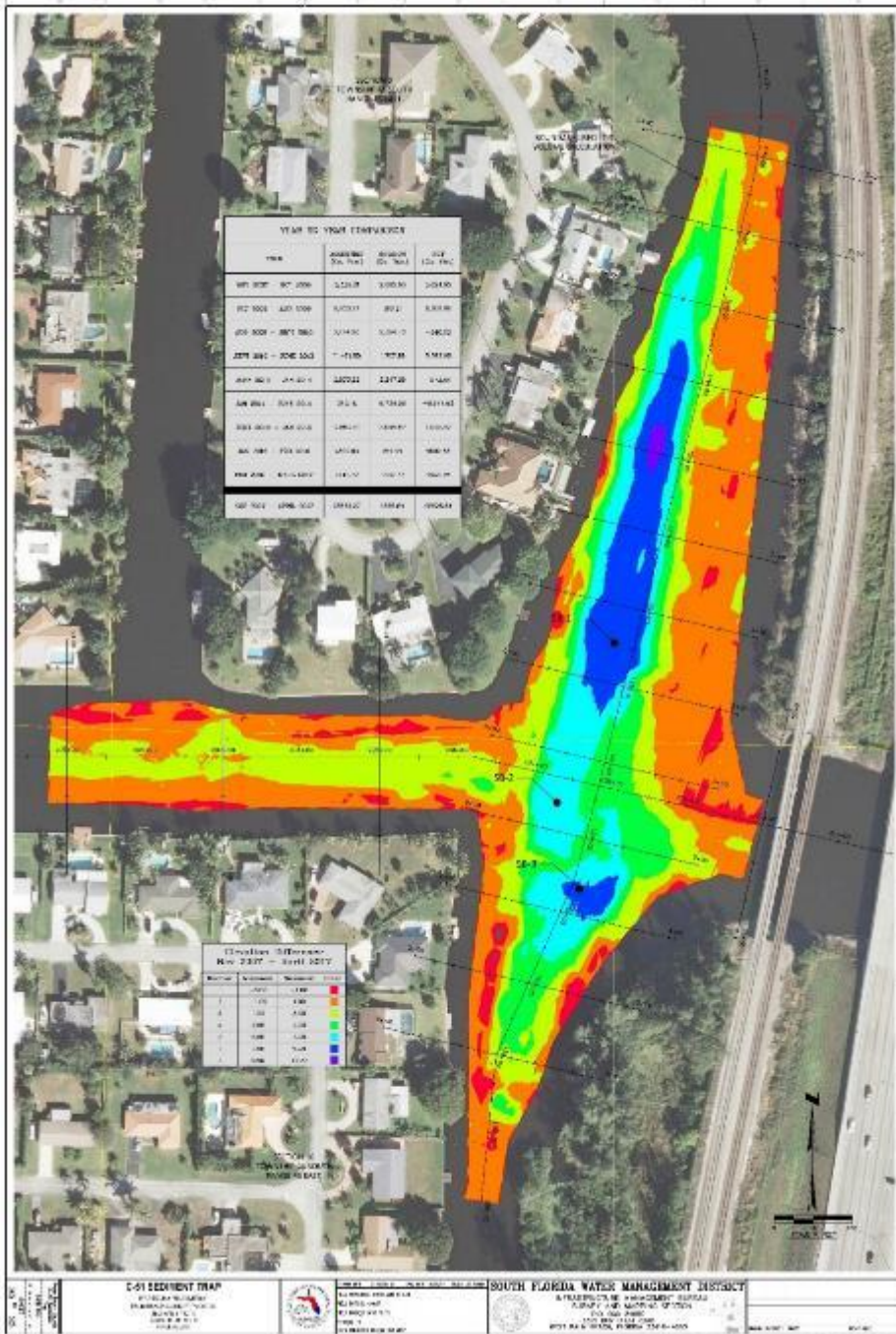
**\$110M TOTAL**

USED FOR **65** PROJECTS RESULTING IN

**>250 ACRES** OF HABITAT RESTORED



# C-51 Canal Sediment Trap



- Pilot Project identified in 1999 Restudy (CERP)
- Constructed in 2007 by Palm Beach County
- Located just west of I-95 south of Forest Hill Blvd. between West Palm Beach and Lake Clarke Shores
- ~100,000 cubic yards of muck removed
- Total Cost = \$2.7 million (SFWMD = \$1.5 M, PBC = \$1.2 M)
  - Dredging = \$1.7 million
  - Trucking and Material Handling = \$600,000
  - Site Preparation = \$200,000
  - Project Management = \$200,000
- 50-year Agreement with SFWMD, Palm Beach County and the City of West Palm Beach signed in 2006
- SFWMD is responsible for operation, management and maintenance

An aerial photograph showing a wide canal (C-51 Canal) that acts as a sediment trap. The canal is flanked by a multi-lane highway with traffic and a set of railroad tracks. The surrounding area includes residential neighborhoods with houses and palm trees on the left, and a large green field on the right. In the far distance, a city skyline is visible under a clear blue sky.

# C-51 Canal Sediment Trap

# Comprehensive Everglades Restoration Plan (CERP)

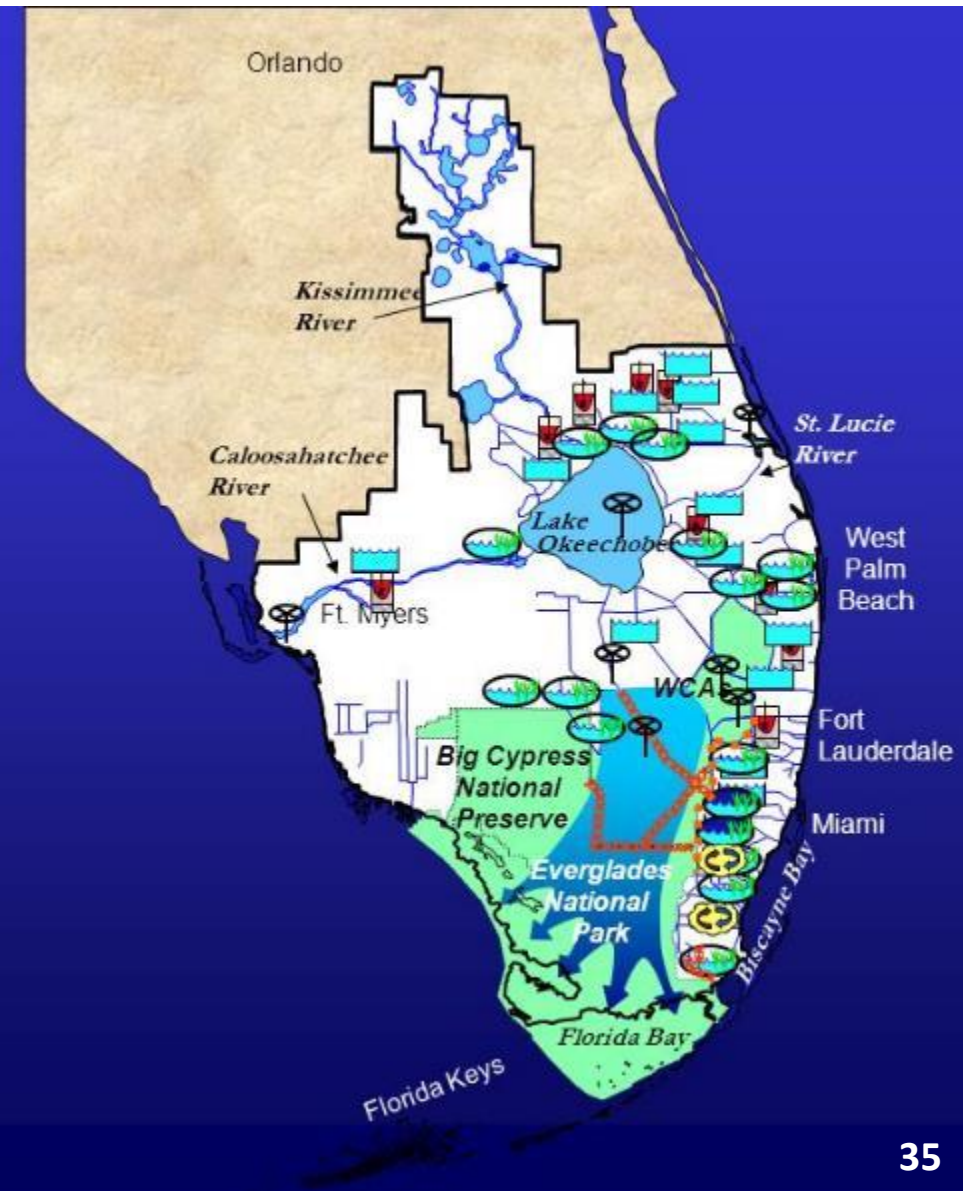
*Rescuing an Endangered Ecosystem:  
The Plan to Restore America's Everglades*



*The Central and Southern Florida Project  
Comprehensive Review Study  
(The Restudy)*

## 68 CERP Components

-  Aquifer Storage & Recovery – 330 Wells
-  Surface Water Storage Reservoir – 170,000 acres
-  Stormwater Treatment Areas (STAs) – 36,000 acres
-  Reuse Wastewater at 2 Regional Plants
-  Seepage Management
-  Removing 240 miles of Barriers to Sheetflow
-  Operational Changes



# Comprehensive Everglades Restoration Plan (CERP)

ID	CERP Component Name	Storage (acre-feet)	Aquifer Storage and Recovery (ASR)	Water Quality Treatment	Purpose
K and GGG	Water Preserve Areas / L-8 Basin	48,000	50 million gallons per day (mgd)	Yes	reduce high discharges to Lake Worth Lagoon (LWL); restore Loxahatchee Slough and River; augment regional water supply
X	C-17 Backpumping and Treatment			2,200 acre-feet STA	capture and store excess water discharged to LWL; restore Loxahatchee Slough; augment regional water supply
Y	C-51 Backpumping and Treatment			2,400 acre-feet STA	
LL	C-51 Regional Groundwater ASR		170 mgd	Yes	capture and store excess water discharged to LWL; augment regional water supply
VV	Palm Beach County Agricultural Reserve Reservoir and ASR	20,000	75 mgd	Yes	
N/A	Lake Worth Lagoon Restoration			Yes	sediment removal / trapping in C-51 Canal or LWL; improve water quality; enable success for additional County habitat restoration and enhancement projects

# CERP Project Re-Scoping in 2015 Removes Lake Worth Lagoon Estuary

## North Palm Beach County Part 1 Project (2010)

### Planning Objectives

- Reduce or reverse saltwater intrusion and related impacts to northwest fork of the Loxahatchee River
- Improve environmental and public water supply by utilizing freshwater sources lost to tide
- Restore wetland hydroperiods
- Restore hydrologic and spatial connectivity of natural areas
- Reduce adverse impacts of accumulated sediment and reduce sediment loading to Lake Worth Lagoon from C-51 Canal
- Maintain current level of flood protection in the L-8 Basin

Source: SFWMD presentation to Palm Beach County Water Resources Task Force, January 2010 (Presenter: Beth Kacvinsky)

## Loxahatchee River Watershed Restoration Project (2020)

### Project Purpose

- Restore and sustain the overall quantity, quality, timing and distribution of freshwaters to the federally-designated National Wild and Scenic Northwest Fork of the Loxahatchee River
- Restore, sustain and reconnect the area's wetlands and watersheds that form the historic headwaters for the river

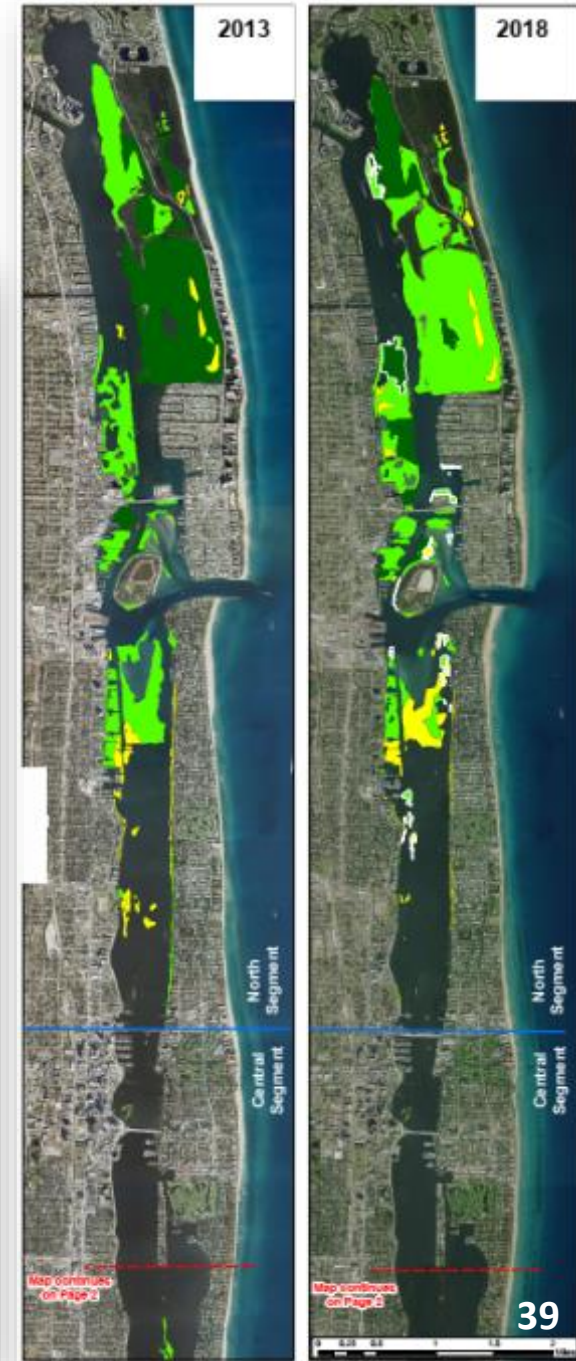
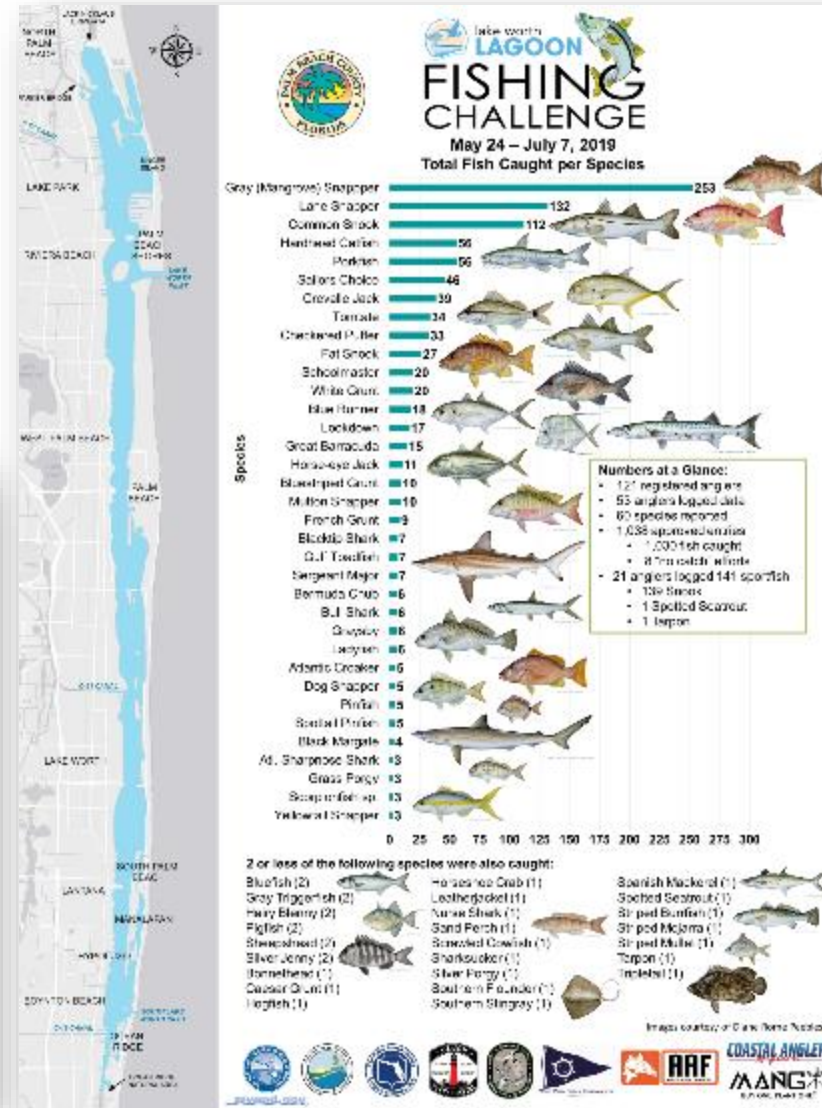
Source: Final Integrated Project Implementation Report and Environmental Impact Statement, January 2020 (Section 1.3)

# Lake Okeechobee System Operating Manual (LOSOM) Potential Impacts to Lake Worth Lagoon



# Water Quality and Habitat Monitoring

- Water Quality
- Oysters
- Salinity
- Seagrass
- Fish
- Sea Turtles
- Shorebirds





lake worth  
**LAGOON**



# LAKE WORTH LAGOON **MANAGEMENT PLAN**



# Opportunities for Collaboration and Support

- Request that the Water Resources Task Force, through their associated organizations, continue to recognize the value and needs of the Lake Worth Lagoon Estuary
- Support future state appropriations requests to implement Lake Worth Lagoon Initiative projects
- In LOSOM process, advocate for recognizing Lake Worth Lagoon Estuary with meaningful performance measures as requested by Palm Beach County
- Support interim projects to achieve restoration benefits in advance of CERP implementation





# Palm Beach County Lake Worth Lagoon Update



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