

**COMMITTEE MEETING EXPANDED AGENDA**

**ENVIRONMENTAL PRESERVATION AND CONSERVATION**

**Senator Dean, Chair**

**Senator Abruzzo, Vice Chair**

**MEETING DATE:** Wednesday, December 11, 2013

**TIME:** 9:00 —11:00 a.m.

**PLACE:** *Toni Jennings Committee Room*, 110 Senate Office Building

**MEMBERS:** Senator Dean, Chair; Senator Abruzzo, Vice Chair; Senators Altman, Bullard, Gardiner, Grimsley, Latvala, Simpson, and Soto

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TAB	BILL NO. and INTRODUCER	BILL DESCRIPTION and SENATE COMMITTEE ACTIONS	COMMITTEE ACTION
		Presentation on Sediment Accumulation and Removal in the Indian River Lagoon by Dr. John Trefry, Professor, Marine and Environmental Systems, Florida Institute of Technology	
	Other related meeting documents		

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# **Muck Accumulation and Removal in the Indian River Lagoon System**

**John H. Trefry, Florida Institute of Technology**



**Presentation to The Florida Senate  
Environmental Preservation and Conservation Committee  
December 11, 2013**

(Photo Credit: NASA)

# Muck Accumulation and Removal in the Indian River Lagoon System

John H. Trefry, Florida Institute of Technology



156 mi  
(250 km)

Indian  
River  
Lagoon

Presentation to The Florida Senate  
Environmental Preservation and Conservation Committee  
December 11, 2013

(Photo Credit: NASA)

... one of the most biologically diverse estuaries in the continental United States with more than 3,500 species of animals, plants and fungi.





# Indian River Lagoon



**Economic value of \$3.7 billion/yr**

**11 million recreational users**

**15,000 full/part-time jobs**

# The New York Times

August 8, 2013

## Deaths of Manatees, Dolphins and Pelicans Point to Estuary at Risk

By Michael Wines

MELBOURNE, Fla. — The first hint that something was amiss here, in the shallow lagoons and brackish streams that buffer inland Florida from the Atlantic's salt water, came last summer in the Banana River, just south of Kennedy Space Center.

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**During the past year, the Indian River Lagoon received wide coverage by the local and national press.**

**At the center of this attention were deaths of**

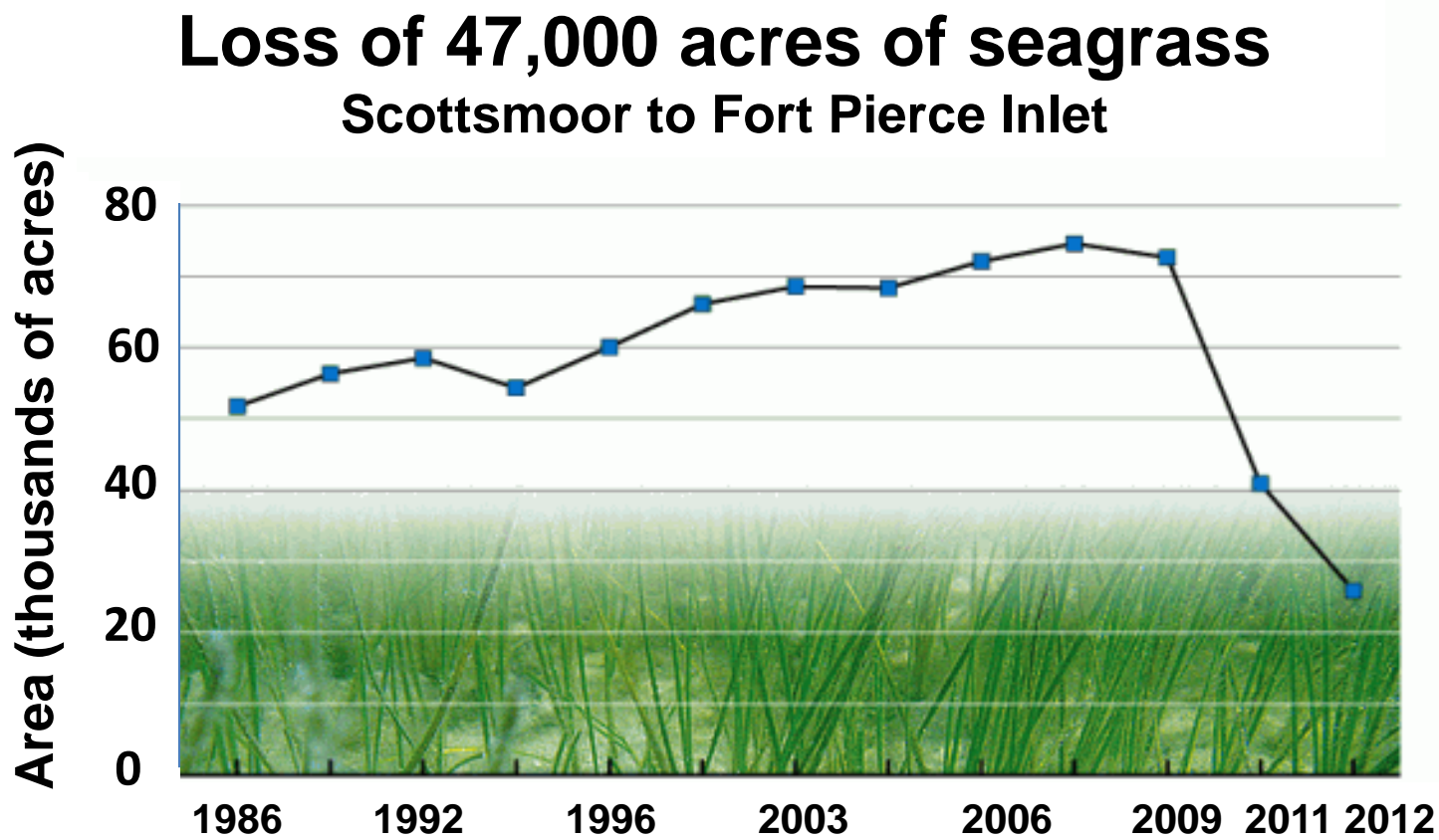
- **>100 dolphins**
- **>200 manatees**
- **>300 pelicans**

These recent impacts followed one superbloom of algae plus other algae blooms from 2011 to present.



(SJRWMD, 2013)

**The algae blooms block sunlight and have already destroyed 47,000 acres of seagrass.**



(SJRWMD, 2013)



For >6 decades, a variety of substances have been carried with runoff to the lagoon:

- Excessive freshwater
- Soil, grass cuttings, other vegetation
- Nutrients (nitrogen, phosphorus)
- Some heavy metals, pesticides



One product of these inputs is  
Indian River Lagoon

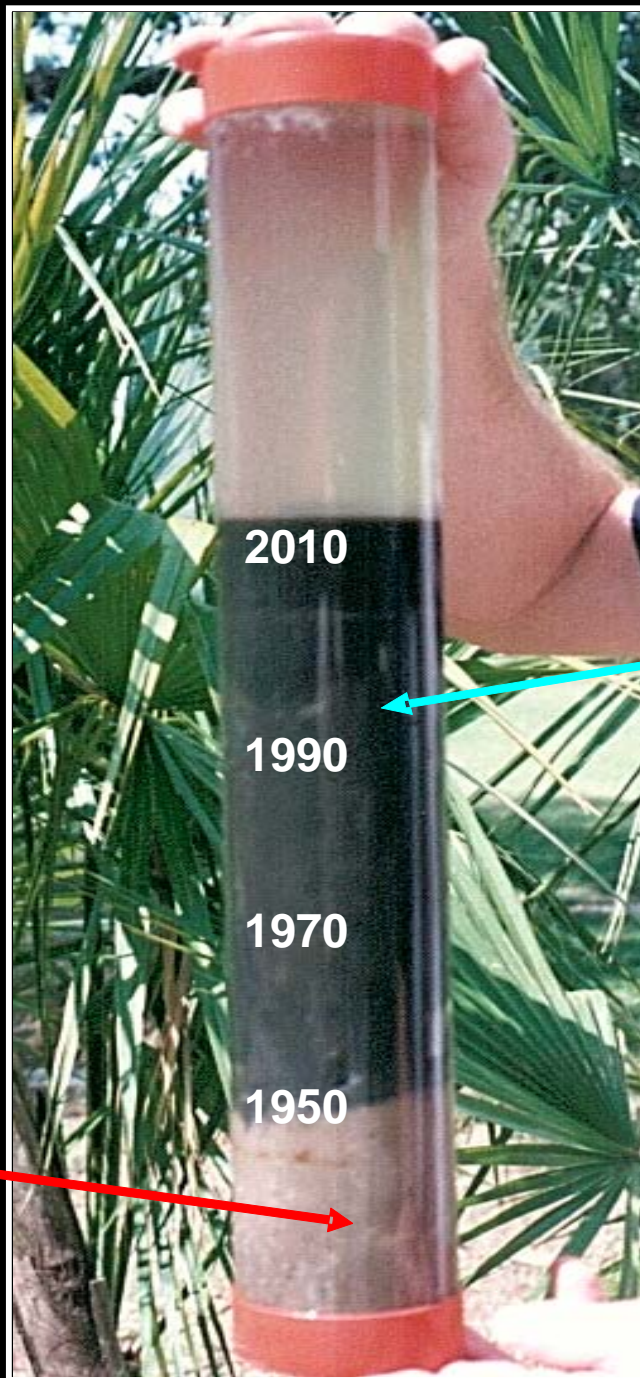
**MUCK**



(Photo Credit: Florida Today)

Indian  
River  
Lagoon  
**MUCK**

Natural sand  
and shell  
(pre-1950)



**Muck**  
(~1950-present)

>75% H<sub>2</sub>O (by wt.), ~90% H<sub>2</sub>O (by vol.). Solids are >60% silt + clay, >10% organic matter

(Trefry et al., 1987)



# Muck ...

A close-up photograph of a person's hands holding a large, dark, muddy sediment sample. The sediment is thick and dark brown/black, with some lighter, fibrous material visible. The person's hands are visible, and they are wearing a dark jacket. The background is blurred, showing what appears to be a body of water and some structures.

- Increases turbidity and inhibits seagrass growth.
- Promotes oxygen depletion in sediment and water.
- Stores and releases nutrients.
- Covers the natural bottom and destroys natural communities of organisms.
- Accumulates potential pollutants.



# Muck Distribution

Indian R. Lagoon

Banana R. Lagoon



# Muck Distribution

Indian R. Lagoon

Port Canaveral

Banana R. Lagoon

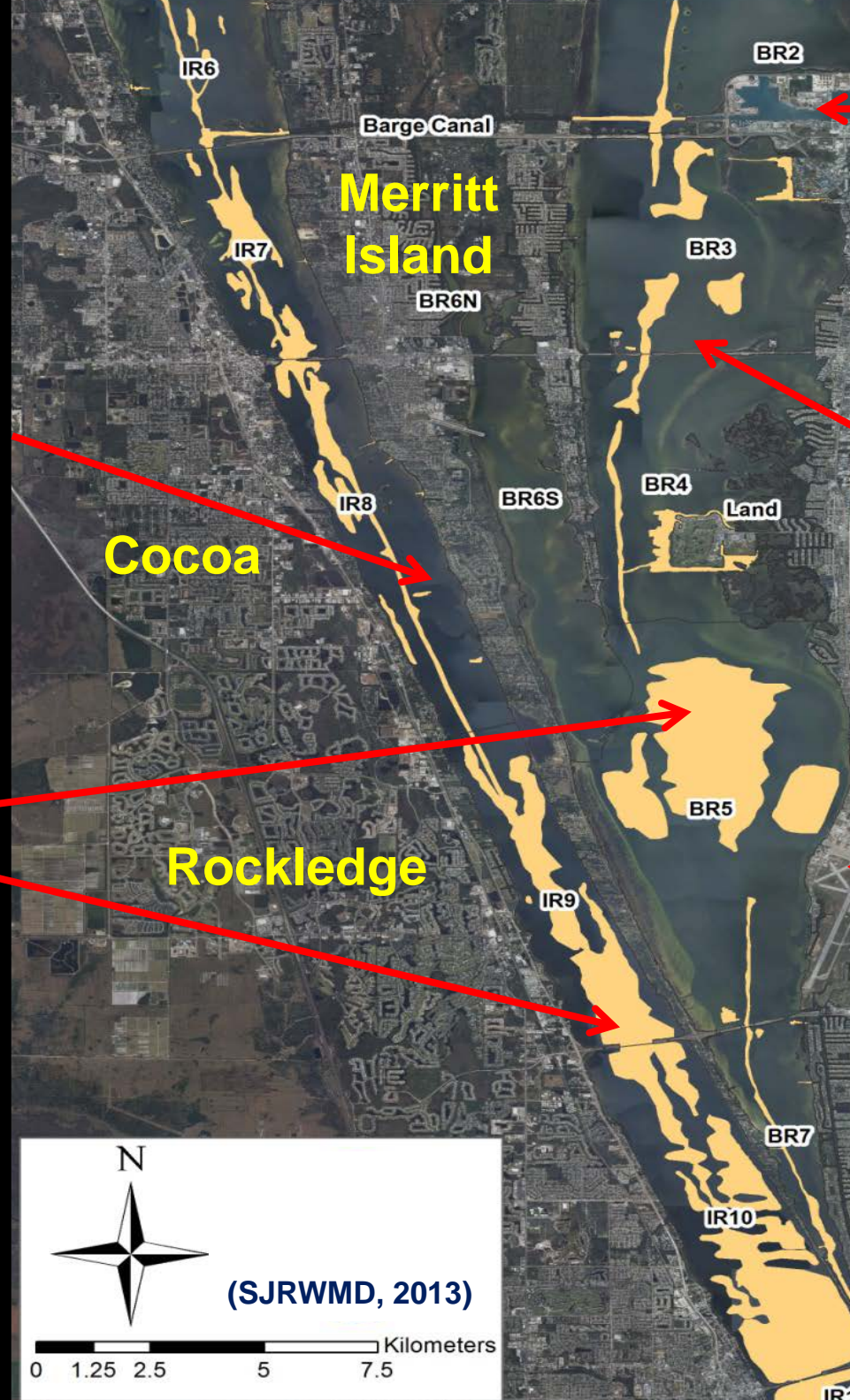
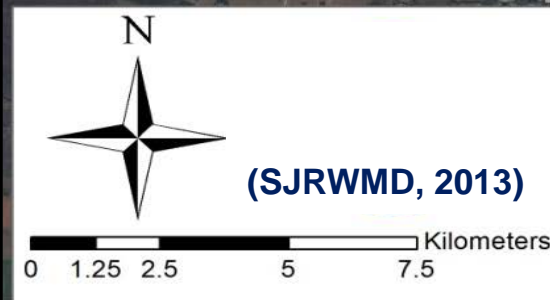


Cocoa

Rockledge

Merritt Island

Patrick AFB



Muck maps are a composite of surveys by Trefry et al. (1990, 2007) and Riegl et al. (2009).





**Banana R. Lagoon**

**An estimated 5-7 million yd<sup>3</sup> of muck cover the bottom of the northern and central lagoon system.**



**A step forward in solving our problem is to begin a multi-year process of dredging muck from the Indian River Lagoon.**

**Proposed Dredging for Eau Gallie R. (625,000 yd<sup>3</sup>, \$20+M)**





**Banana R. Lagoon**

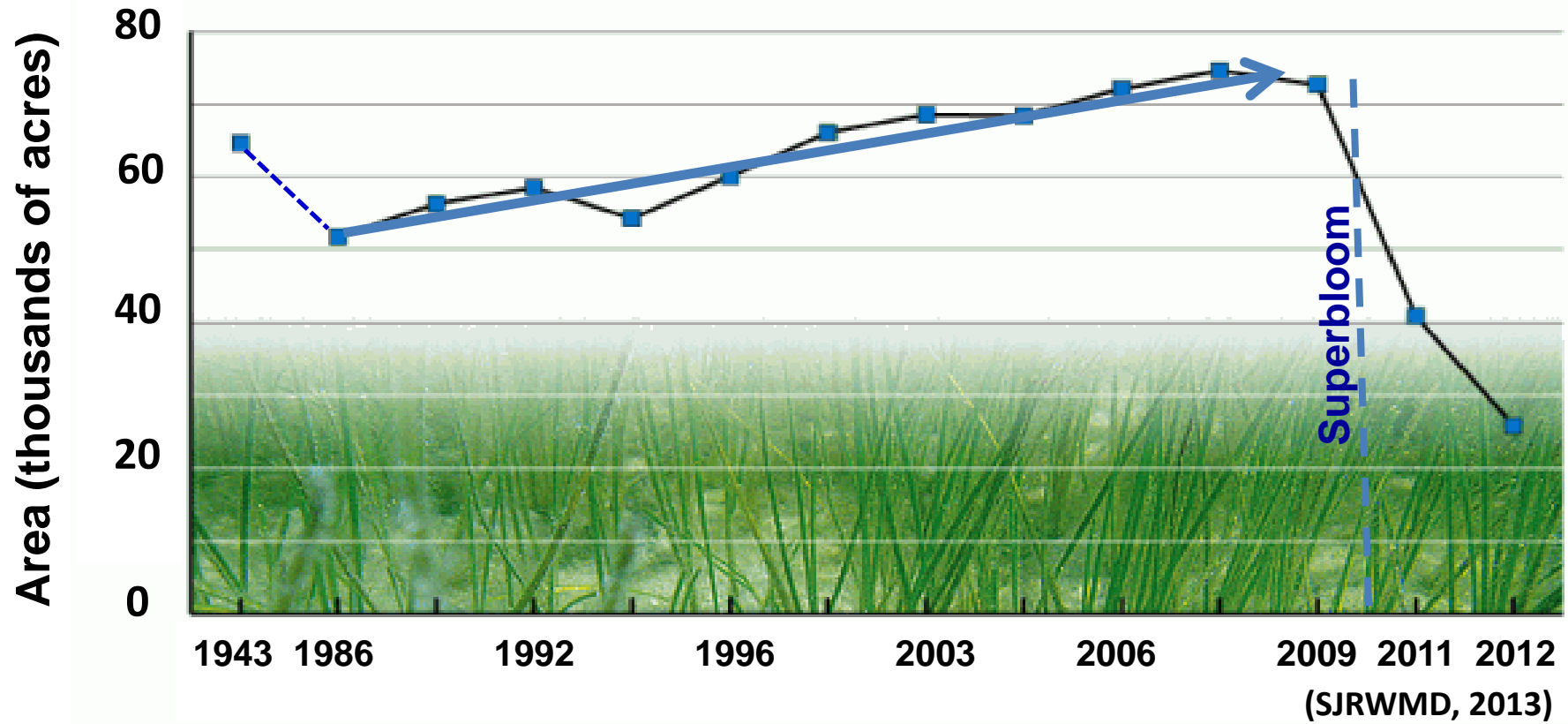
## As dredging proceeds:

- Upland inputs of muck must be further decreased.
- Regular scientific assessment should be carried out to evaluate and optimize the dredging process.



# Reasons for Optimism

## Loss of 47,000 acres of seagrass Scottsmoor to Fort Pierce Inlet



## Take-Home Message

- The Indian River Lagoon is in a period of critical decline.
- Muck has been accumulating in the lagoon for decades.
- A multi-year effort of removing muck is needed now along with continued reduction of inputs of muck components to help restore the system.





## **Acknowledgements for funding and collaboration in muck studies**

**St. Johns River Water Management District  
South Florida Water Management District  
Indian River Lagoon National Estuary Program  
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Brevard County  
Florida Inland Navigation District**



**Thank you!**

