



# TOUR DAY LUNCH PRESENTATION

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January 2022 Round Table Meeting



*Remember: Round Table is off the record.*



# **Terrie Bates**

**PRESIDENT**

**WATER RESOURCES CONSULTING  
INC.**



# Lake Okeechobee Overview

Herbert Hoover Dike

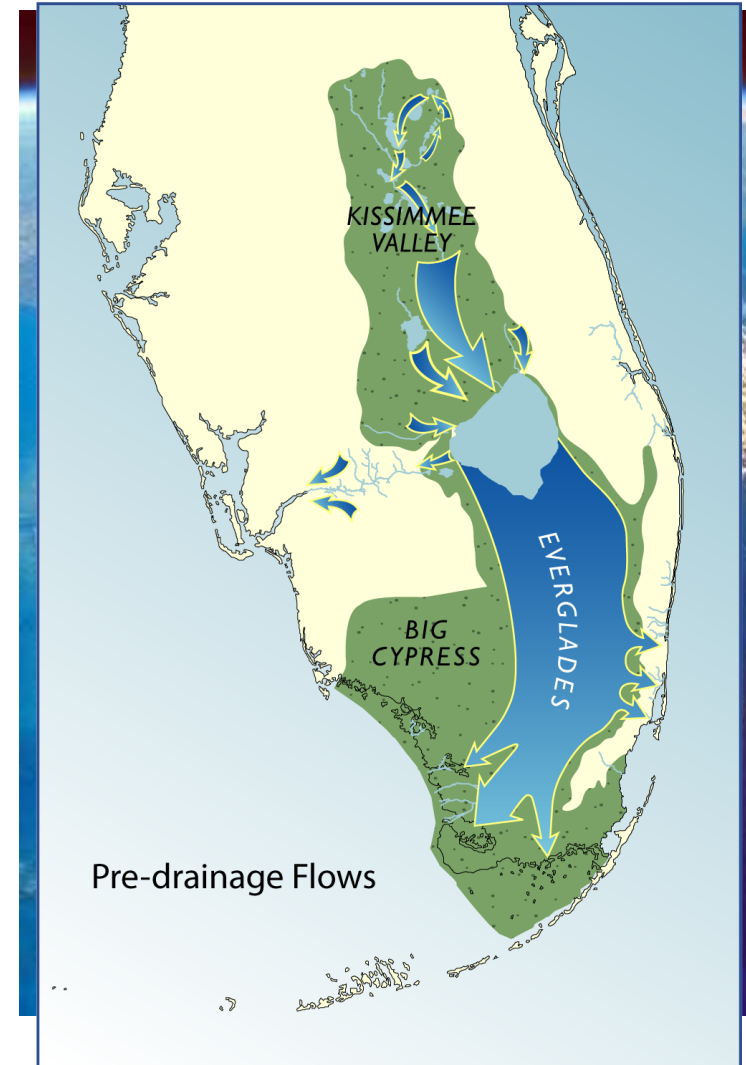
# Water Defines and Drives the Environment of South Florida

- Human Environment
- Agricultural Environment
- Natural Environment

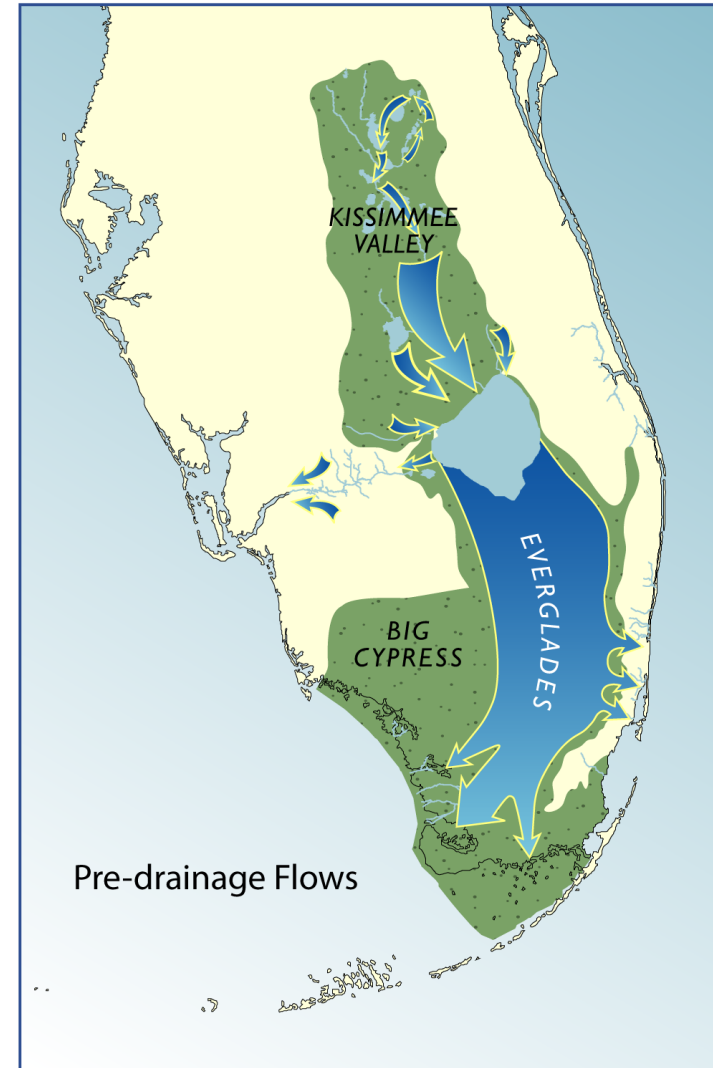
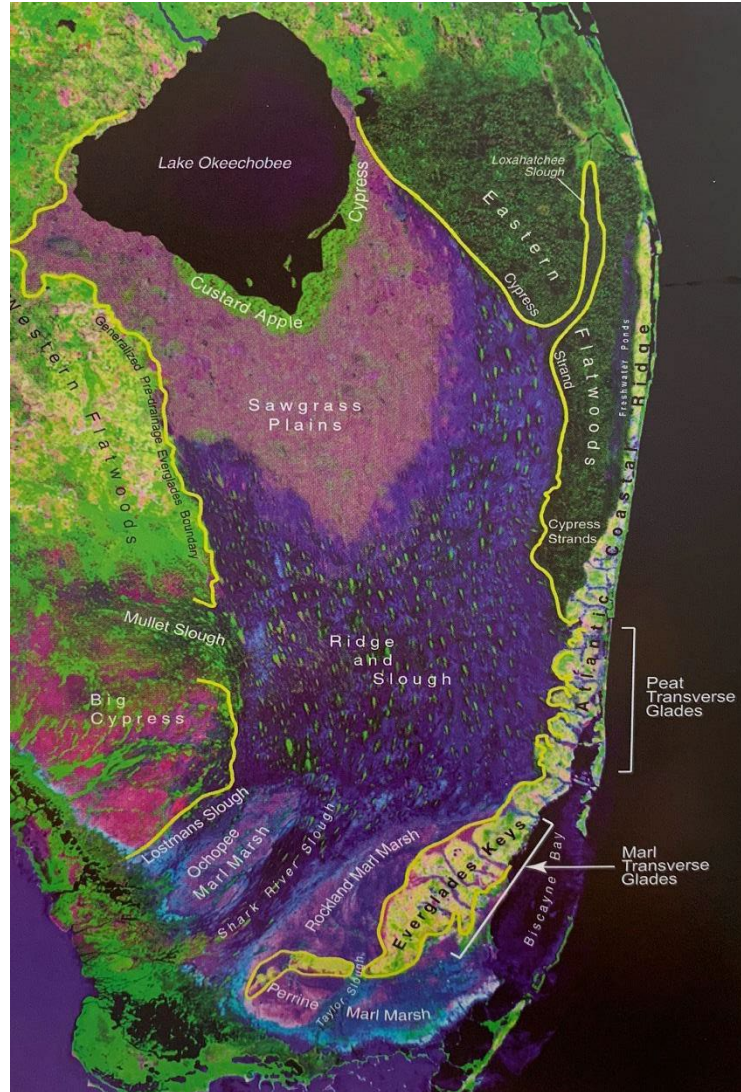
Average of 55" of rainfall annually

Lake Okeechobee is the 10<sup>th</sup> largest lake in the U.S. - 730 sq miles in size

Historically, water flowed from central Florida to Lake Okeechobee and south into Florida Bay

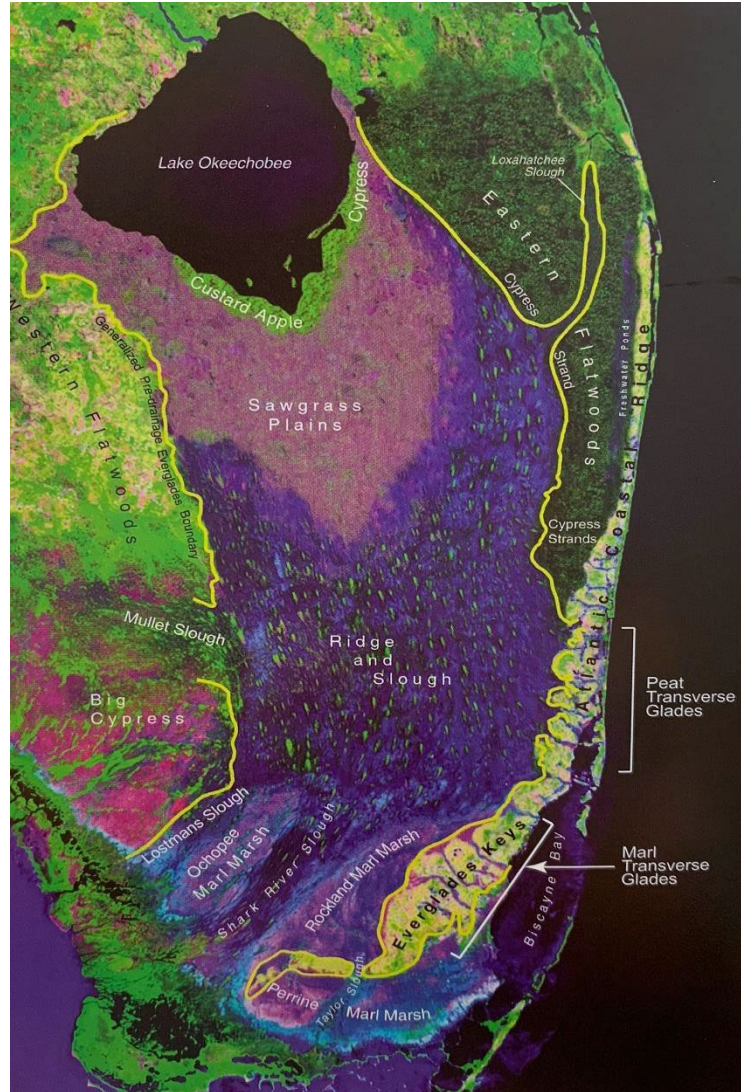


# South Florida has evolved from the “River of Grass” ...

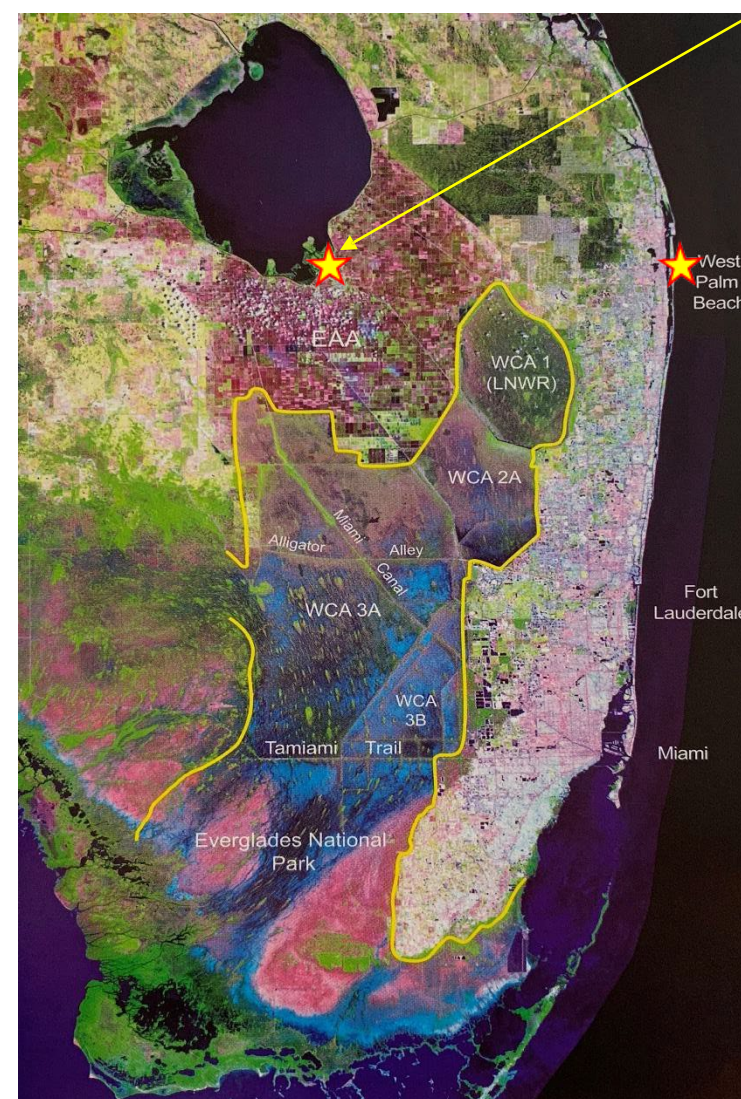


Pre-drainage Everglades 1850 satellite image simulation  
McVoy (2011)

# South Florida has evolved from the “River of Grass” ... to a highly urbanized and managed system



Pre-drainage Everglades 1850 satellite image simulation  
McVoy (2011)



1994 satellite image  
McVoy (2011)

You are here!



6.2 million  
people

# Central & Southern Florida Flood Control Project

50 : 50 partnership between federal government and South Florida Water Management District

- 2,100 miles of canals
- 2,000 miles of levees/berms
- 600+ water control structures
- 70+ pump stations

U.S. Army Corps of Engineers – operates major flood structures, Herbert Hoover Dike

South Florida Water Management District – operates & maintains most structures and canals; allocates water under State Law

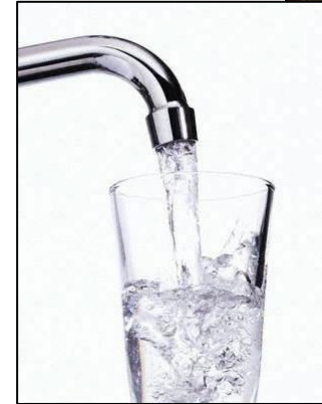
***Construction of the C&SF Project fundamentally and permanently changed South Florida***



# Central & Southern Florida Flood Control Project

## Congressionally authorized “Project Purposes”

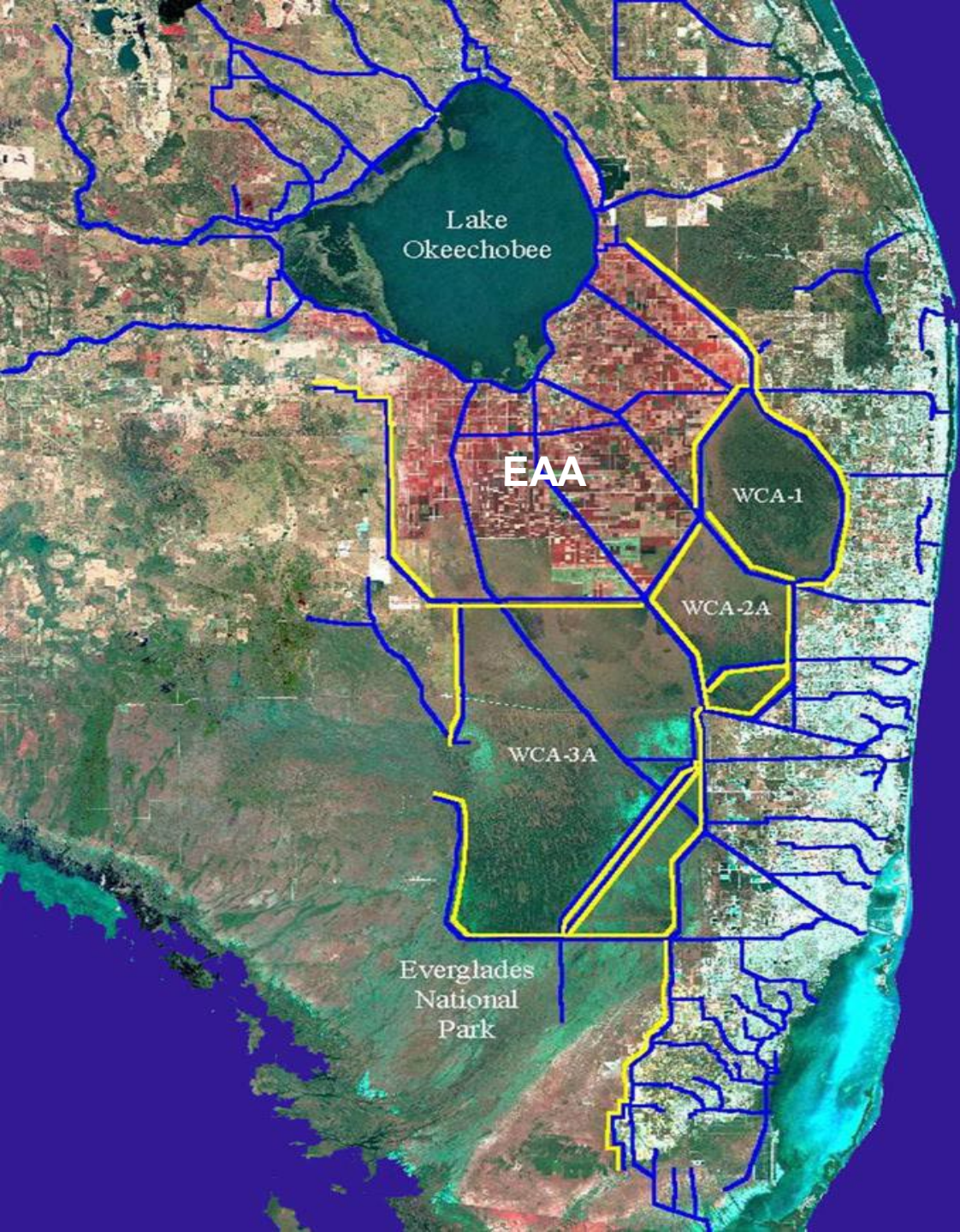
- Flood Control
- Water Supply
  - Agriculture
  - Urban
  - Everglades National Park
  - Saltwater Intrusion
- Navigation
- Protection of fish & wildlife resources



### Fundamental Challenge:

*Project purposes are often in conflict with each other*

# Lake Okeechobee is the Heart of the C&SF Project



- Flood Storage
- Important Ecological Resource
- Water Supply
  - Environmental Areas
  - **Agriculture**
  - Public Water Supply
  - Seminole & Miccosukee Tribes
  - Stormwater Treatment Areas
  - **Lower East Coast**

# Lake Okeechobee Inflows & Phosphorus Loads

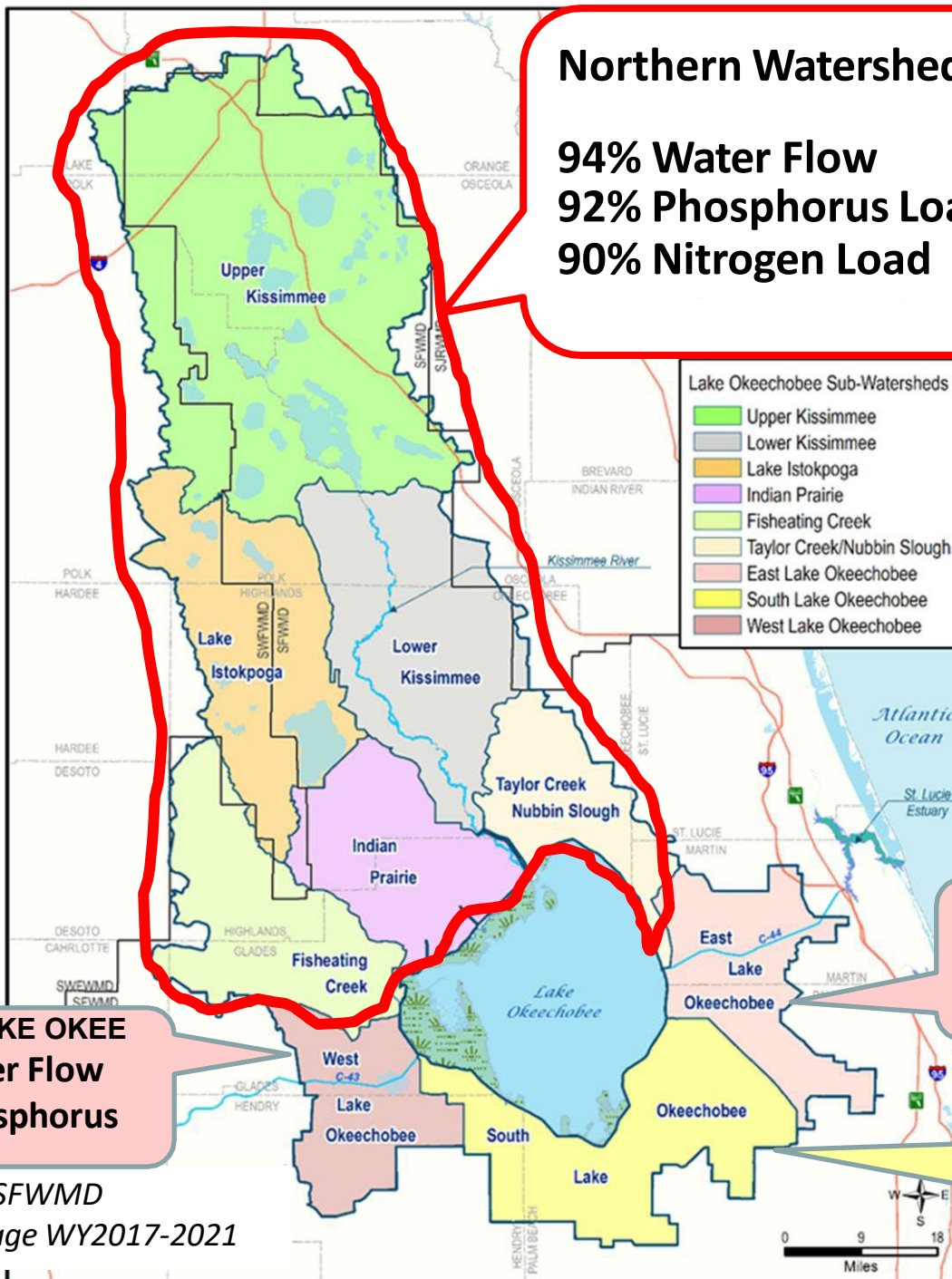
**Northern Watersheds**  
**94% Water Flow**  
**92% Phosphorus Load**  
**90% Nitrogen Load**

## Phosphorus Loading to the Lake

**Total Maximum Daily Load = 140 metric tons**  
**WY2017-2021 = 571 metric tons**

**Concentration Goal = 40 ug/liter**  
**WY2017-2021 = 160 ug/liter**

**“BMAP” – Basin Management Action Plans implemented**



**WEST LAKE OKEE**  
**<1% Water Flow**  
**<1% Phosphorus**

**EAST LAKE OKEE**  
**2% Water Flow**  
**3% Phosphorus**

**SOUTH LAKE OKEE**  
**3% Water Flow**  
**5% Phosphorus**

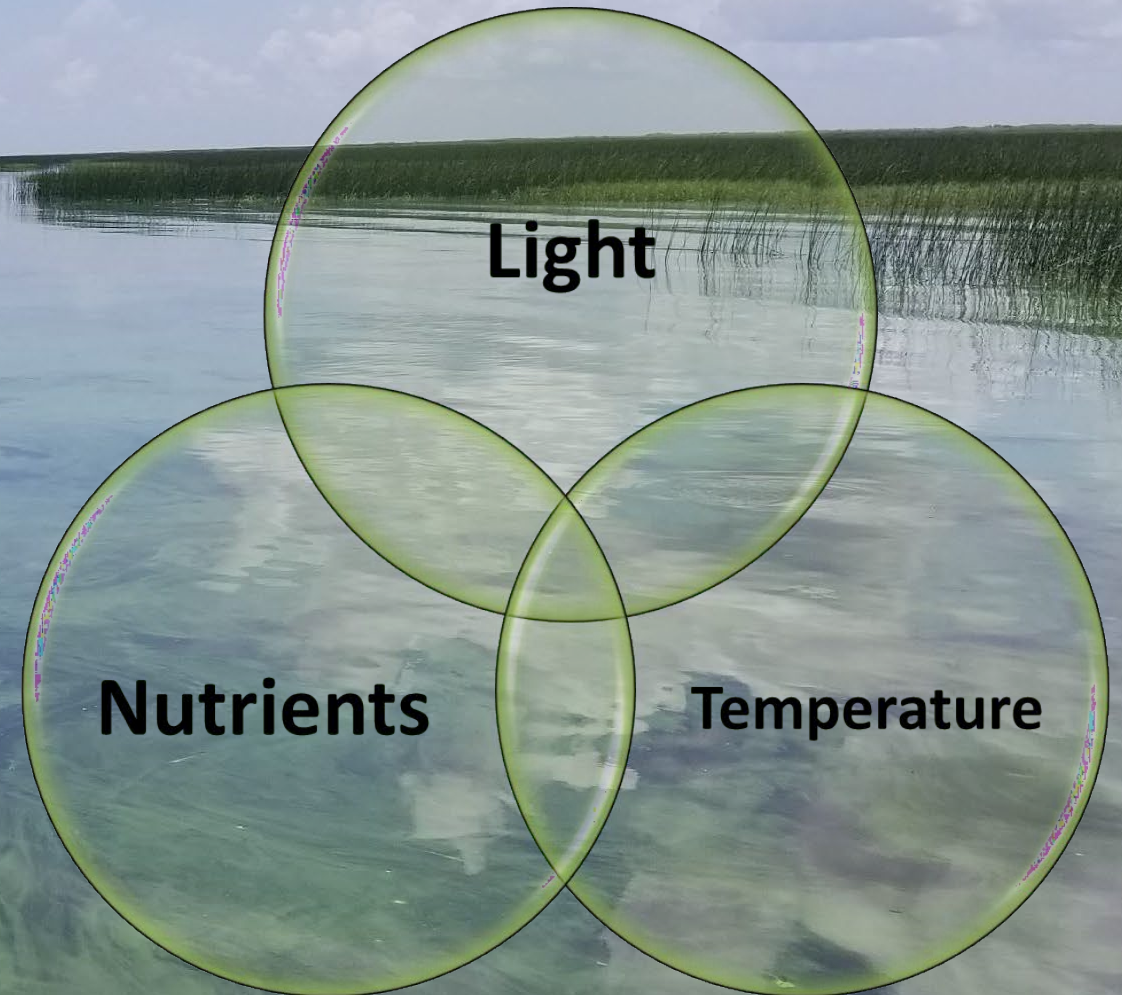
Data Source: SFWMD  
 \*5-Year Average WY2017-2021

# Algal Blooms on Lake Okeechobee

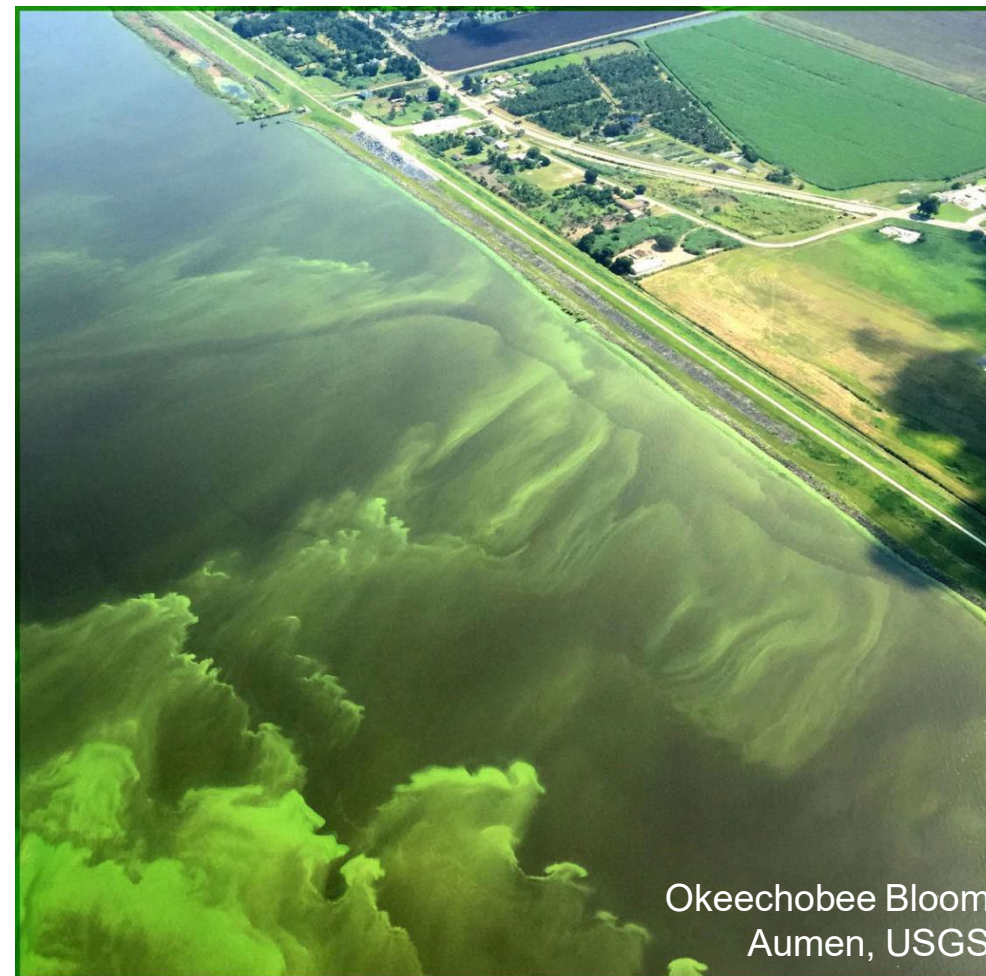
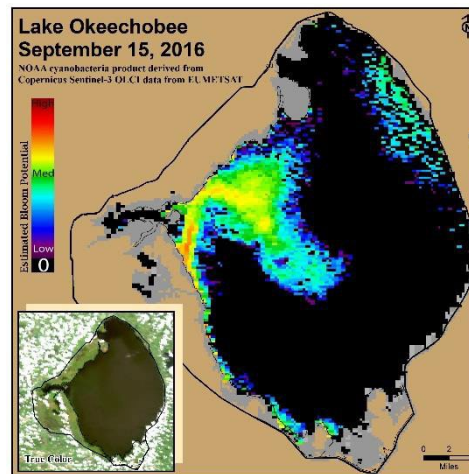
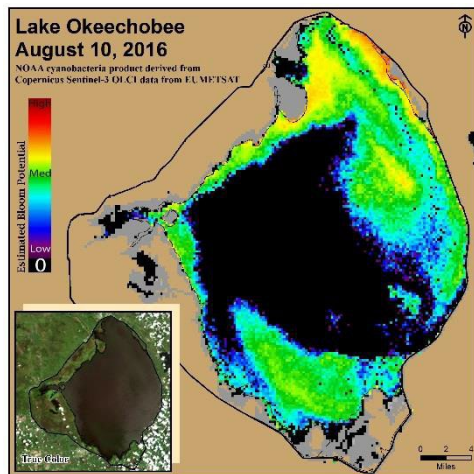
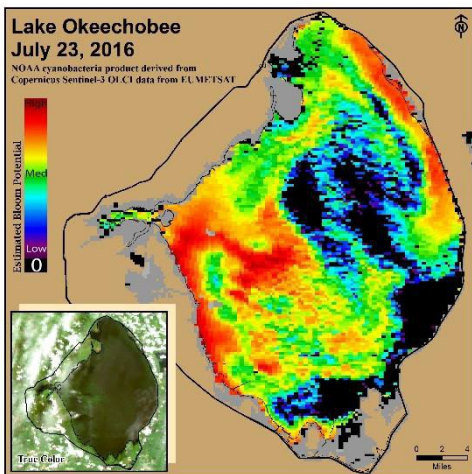
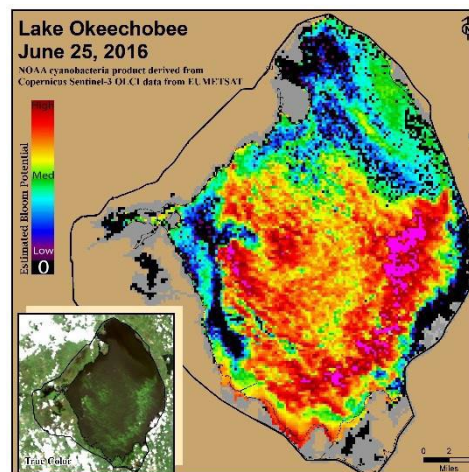
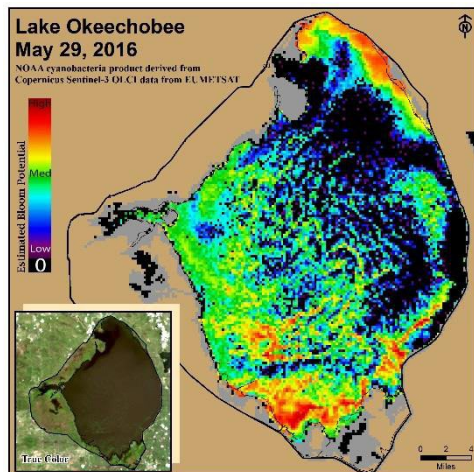
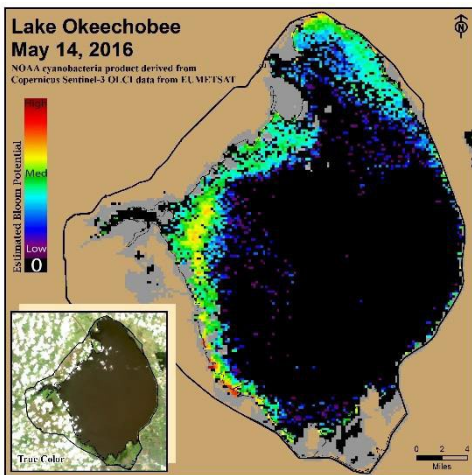
Lake is highly eutrophic: periodic algal blooms since the 1980's

Increased cyanobacteria corresponds to increased phosphorus concentrations

Blue-green algae (cyanobacteria) can, but do not always, produce toxins that can be harmful to humans, pets and wildlife



# Blooms can be Localized or Lake-wide, Peak in Summer Months



NOAA cyanobacteria product derived from Copernicus Sentinel-3 OLCI data from EUMETSAT

Unvalidated and Experimental Data

# Algal Blooms Galvanized (Coastal) Public Engagement in Lake Operations

Excess nutrients and algal blooms are problems all over the country

In 2016 and 2018 it was a nightmare for South Florida as discharges from the lake carried algae to the coastal estuaries, furthered fueled by septic tanks



**EPA** United States Environmental Protection Agency

**Harmful Algal Blooms (HABs) Newsletter**

July 2021

**EPA Updates!**  
Major Research, Technology, and Policy

**In this issue**

- EPA Updates P.1
- News P.2
- Upcoming Events P.3
- Useful Resources P.3
- HABs Advisories P.3
- Recently Published Articles P.4

**Useful Resources to Manage HABs in Drinking and Recreational Waters**

- Health Advisories for Consumers of Drinking Water
- Recommendations for Public Water Systems to Manage Contaminants in Surface Water
- Analytical Methods for Cyanobacteria
- Treatment Techniques for Cyanobacteria in Drinking Water
- Water Treatment Optimization for Cyanobacteria
- Drinking Water Contaminant Risk Communication Toolkit
- EPA HABs Incident Action Checklist
- Recommendations for Health, Environmental, and Water Quality Science to Inform Subsequent Risk Assessments and Decision-Making
- Recommendations for Cyanobacteria and Cyanobacterium Monitoring in Recreational Waters
- Recreational Water Contaminant Toolkit for Cyanobacterial Blooms
- Control Measures for Cyanobacteria in Surface Water
- List of Laboratories Conducting Cyanobacteria Analysis
- Cyanobacteria Phenotypic and Response Toolkit (CART)

For more resources please visit the EPA Cyanobacteria website <https://www.epa.gov/cyanobacteria>



# ACOE Changing How Lake Okeechobee Will Be Managed

## LAKE OKEECHOBEE SYSTEM OPERATING MANUAL (LOSOM)

PROJECT DELIVERY TEAM (PDT)

September 26, 2019  
Webmeeting

U.S. Army Corps of Engineers  
Jacksonville District



US Army Cor  
of Engineers



## PROJECT AREA VS. STUDY AREA

Project Area

Study Area (Area of Effects)



- After 2-year planning process, Army Corps of Engineers has selected a new lake management schedule - the Lake Okeechobee System Operating Manual (LOSOM)
- Many competing objectives & stakeholders:
  - Water Supply – public supply, agriculture, environment
  - St. Lucie Estuary
  - Caloosahatchee Estuary
  - Lake Ecology
  - Everglades Ecology
  - Navigation

An aerial photograph showing a coastal region. In the foreground, there are green agricultural fields with a network of roads and a canal. A river flows from the bottom left towards the center, then turns right to meet a large body of water. The water is a deep blue, and the coastline is visible in the distance under a clear sky.

Questions?

