TOUR DAY LUNCH PRESENTATION

January 2022 Round Table Meeting

Farm Foundation®

Remember: Round Table is off the record.

Terrie Bates

PRESIDENT

WATER RESOURCES CONSULTING INC.

Lake Okeechobee

Overview

WATER RESOURCES CONSULTING, INC.

Farm Foundation Tour
January 12, 2022

Terrie Bates, Principal
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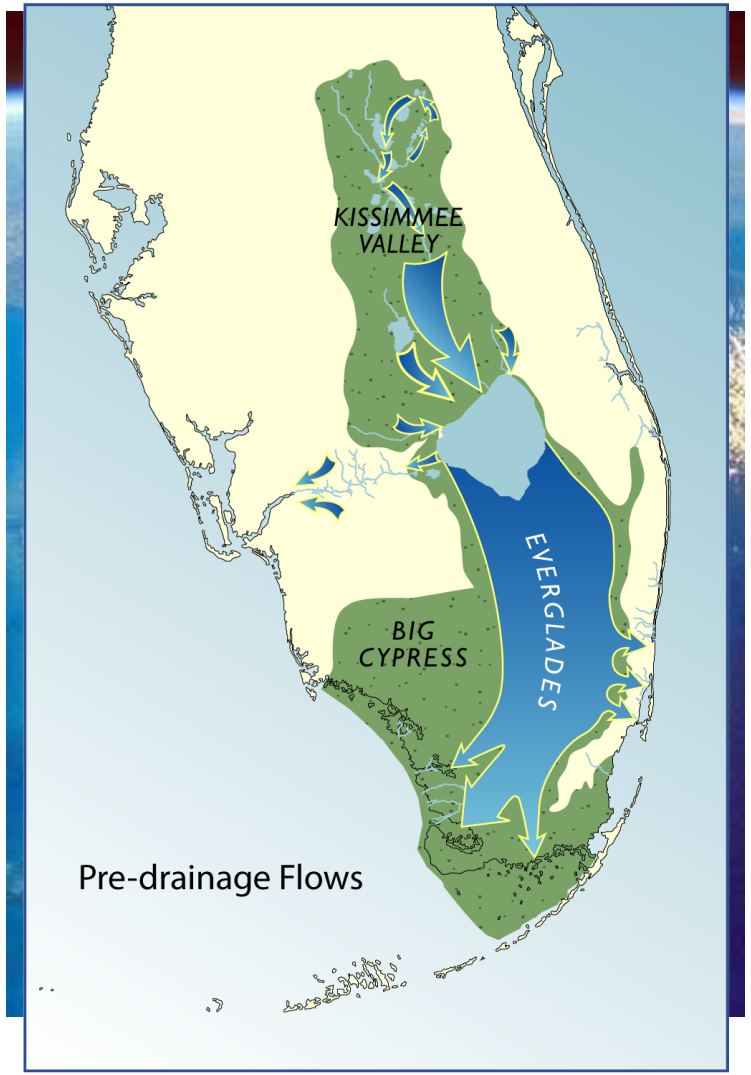
Water Defines and Drives the Environment of South Florida

- Human Environment
- Agricultural Environment
- Natural Environment

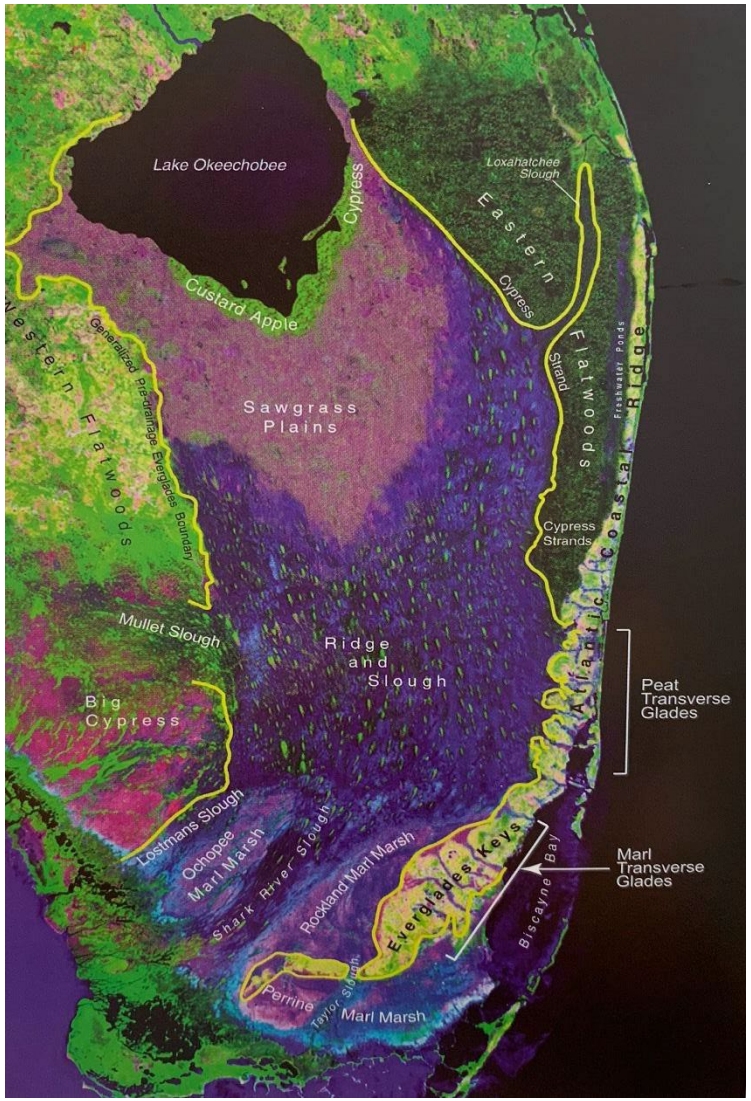
Average of 55” of rainfall annually

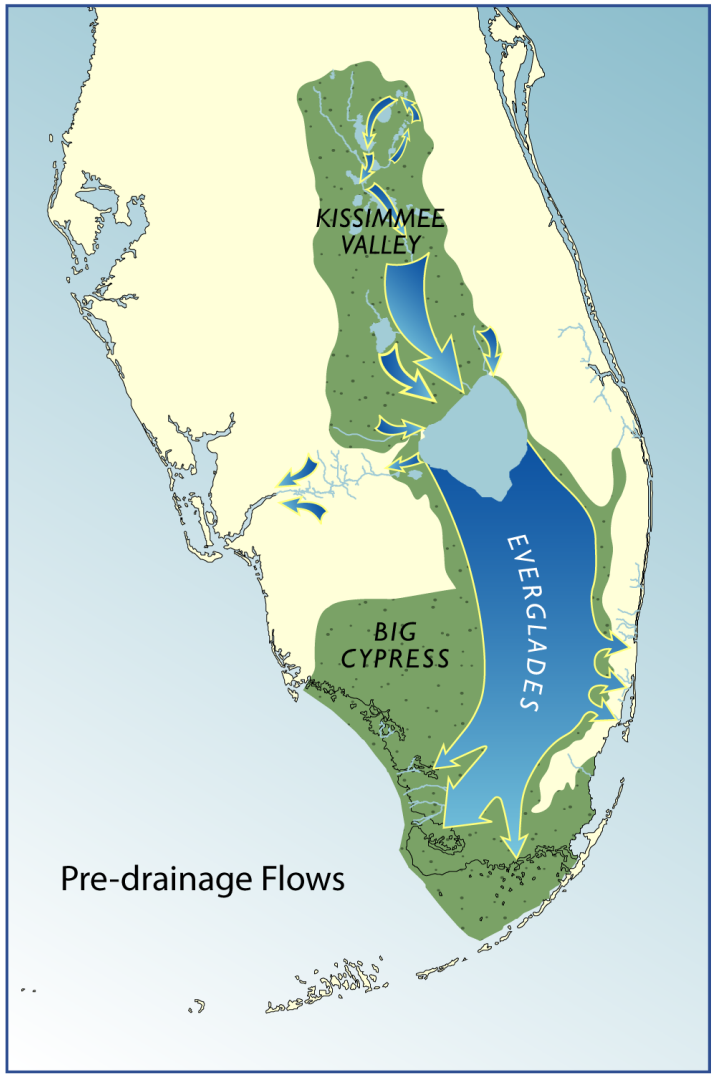
Lake Okeechobee is the 10th largest lake in the U.S. - 730 sq miles in size

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



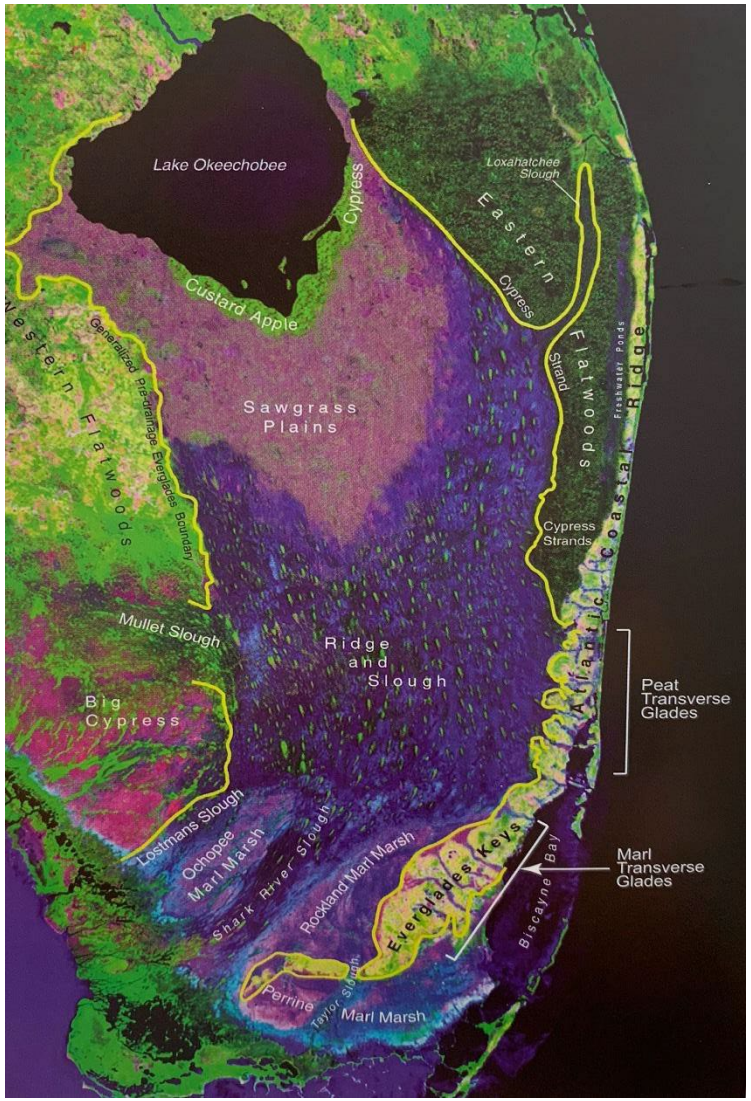
South Florida has evolved from the "River of Grass" …





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



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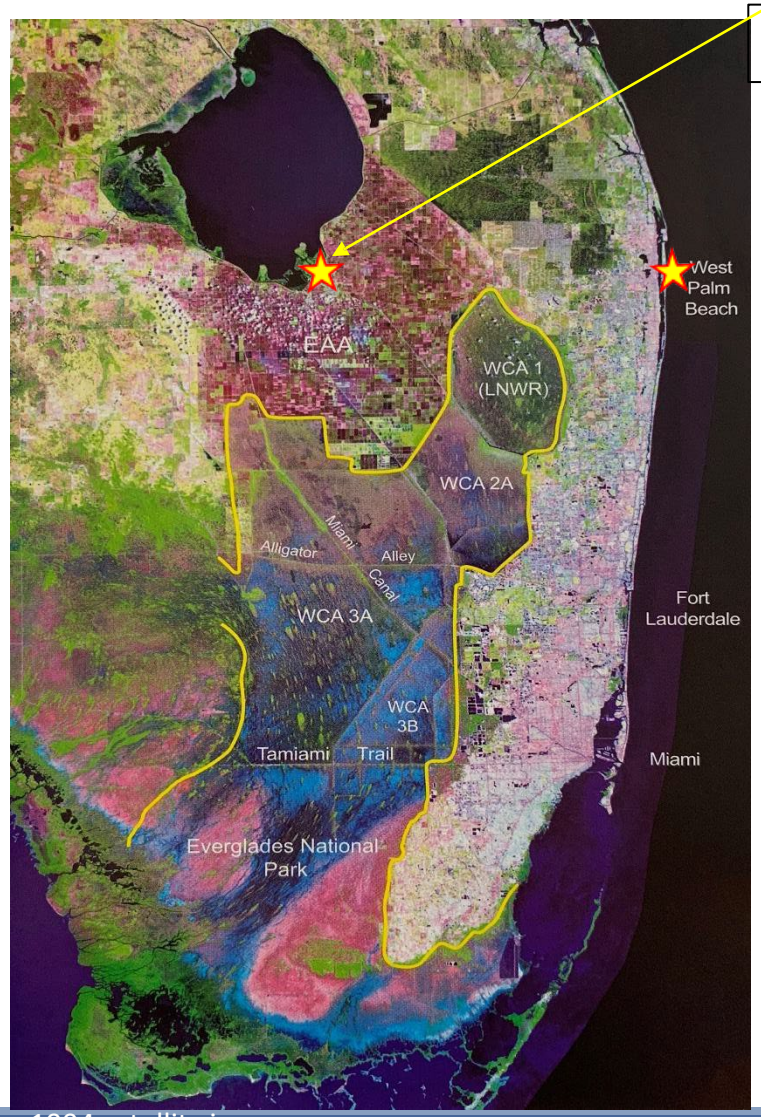


1994 satellite image
McVoy (2011)

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

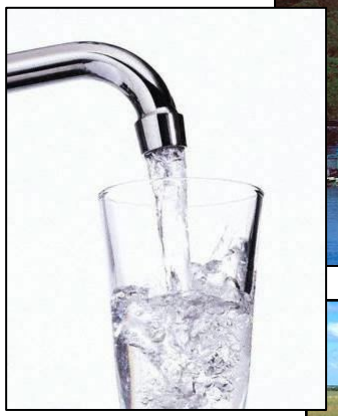
South Florida Water Management District – operates & maintains most structures and canals; allocates water under State Law

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

Central & Southern Florida Flood Control Project

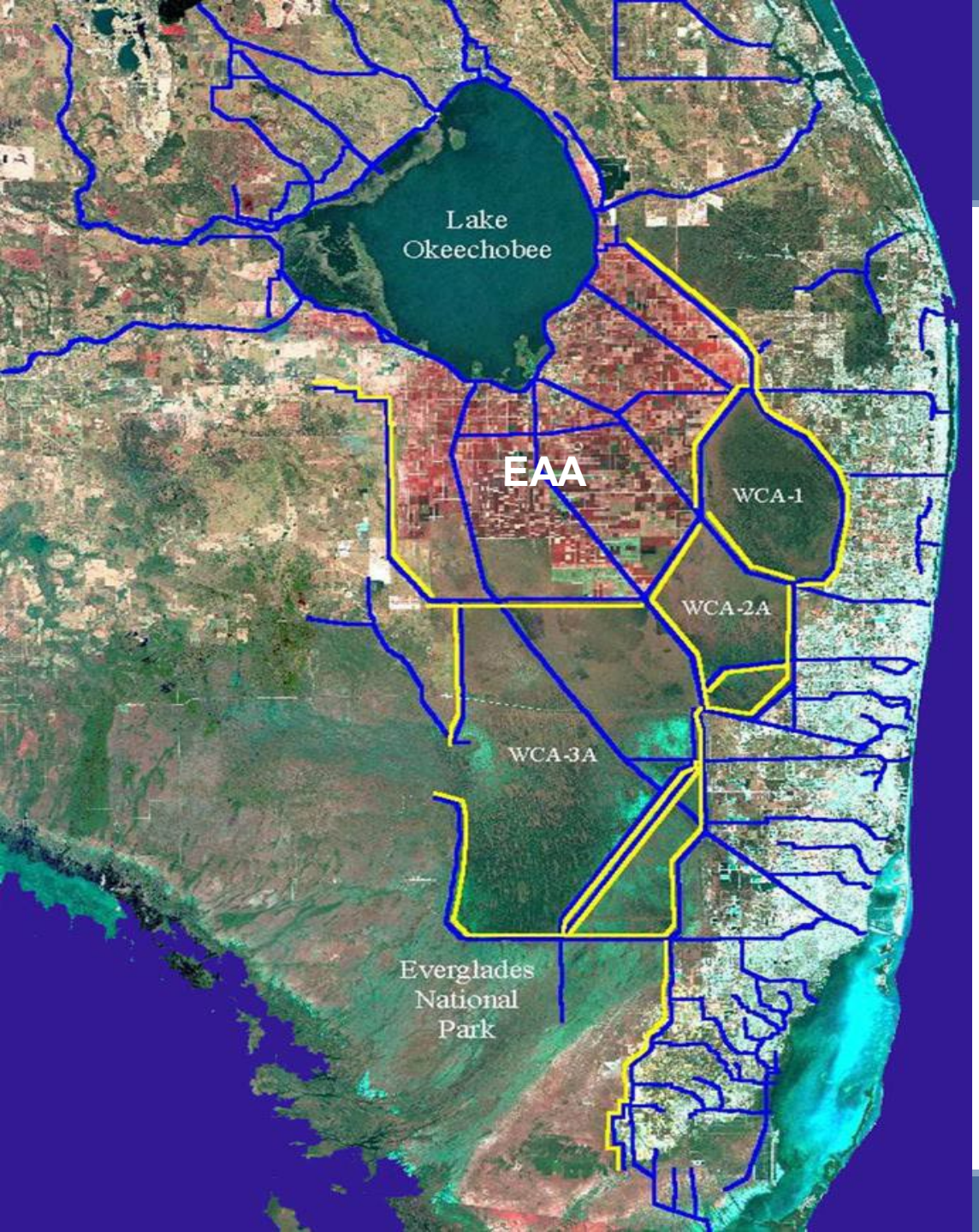
Congressionally authorized "Project Purposes"

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



<u>Fundamental Challenge:</u>

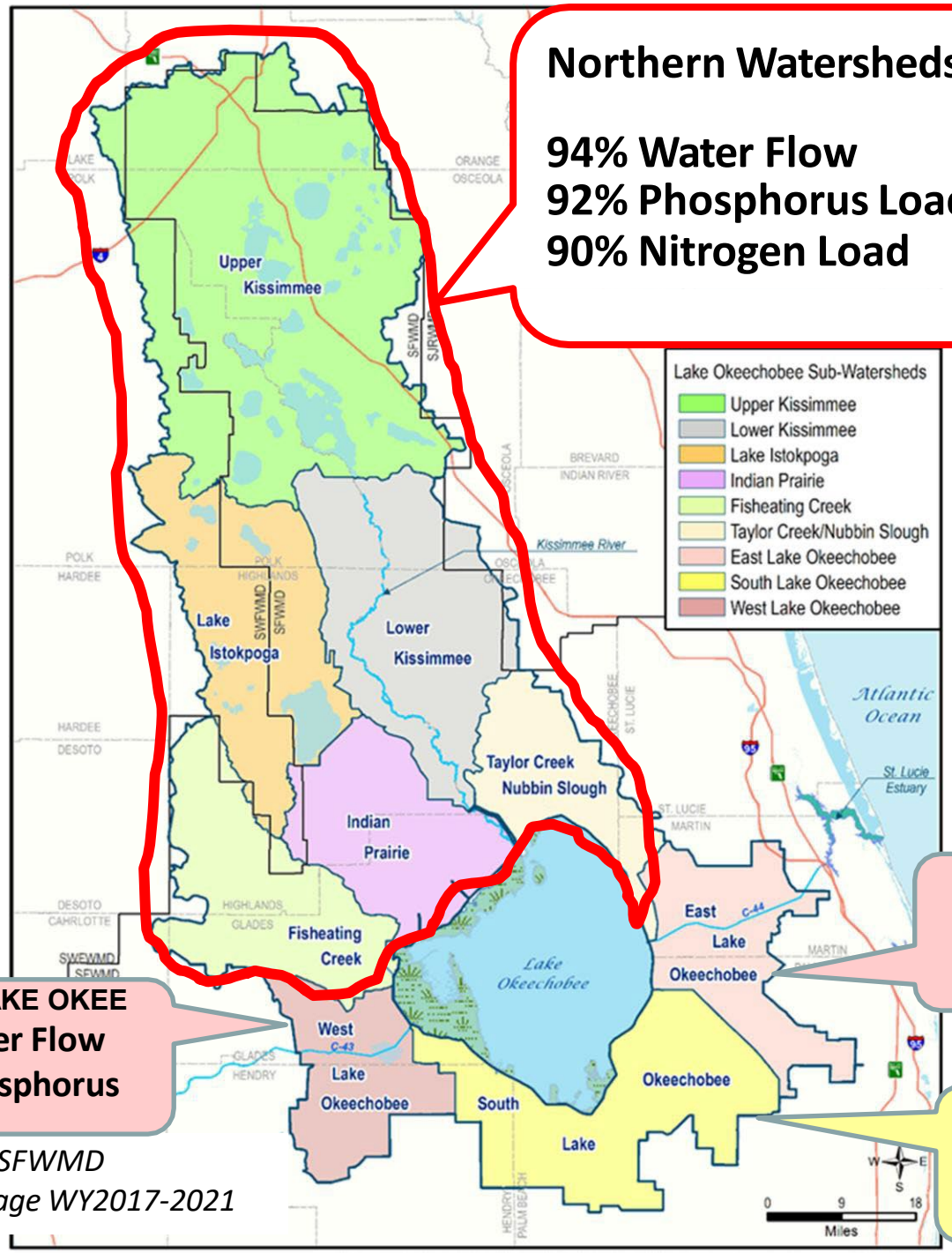
Project purposes are often in conflict with each other



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

EAST LAKE OKEE
2% Water Flow
3% Phosphorus

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

SOUTH LAKE OKEE
3% Water Flow
5% Phosphorus

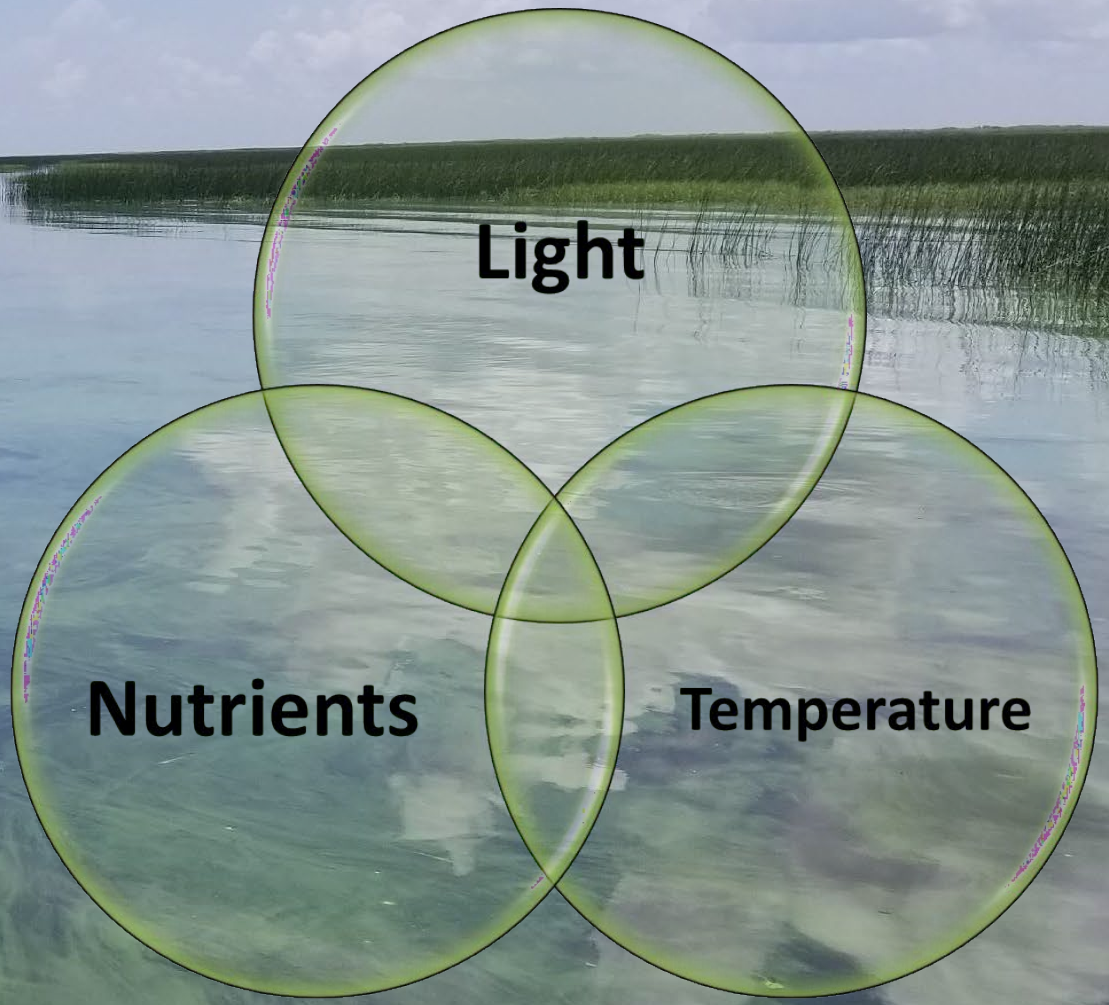
Data Source: SFWMD
**5-Year Average WY2017-2021*

Algal Blooms on Lake Okeechobee

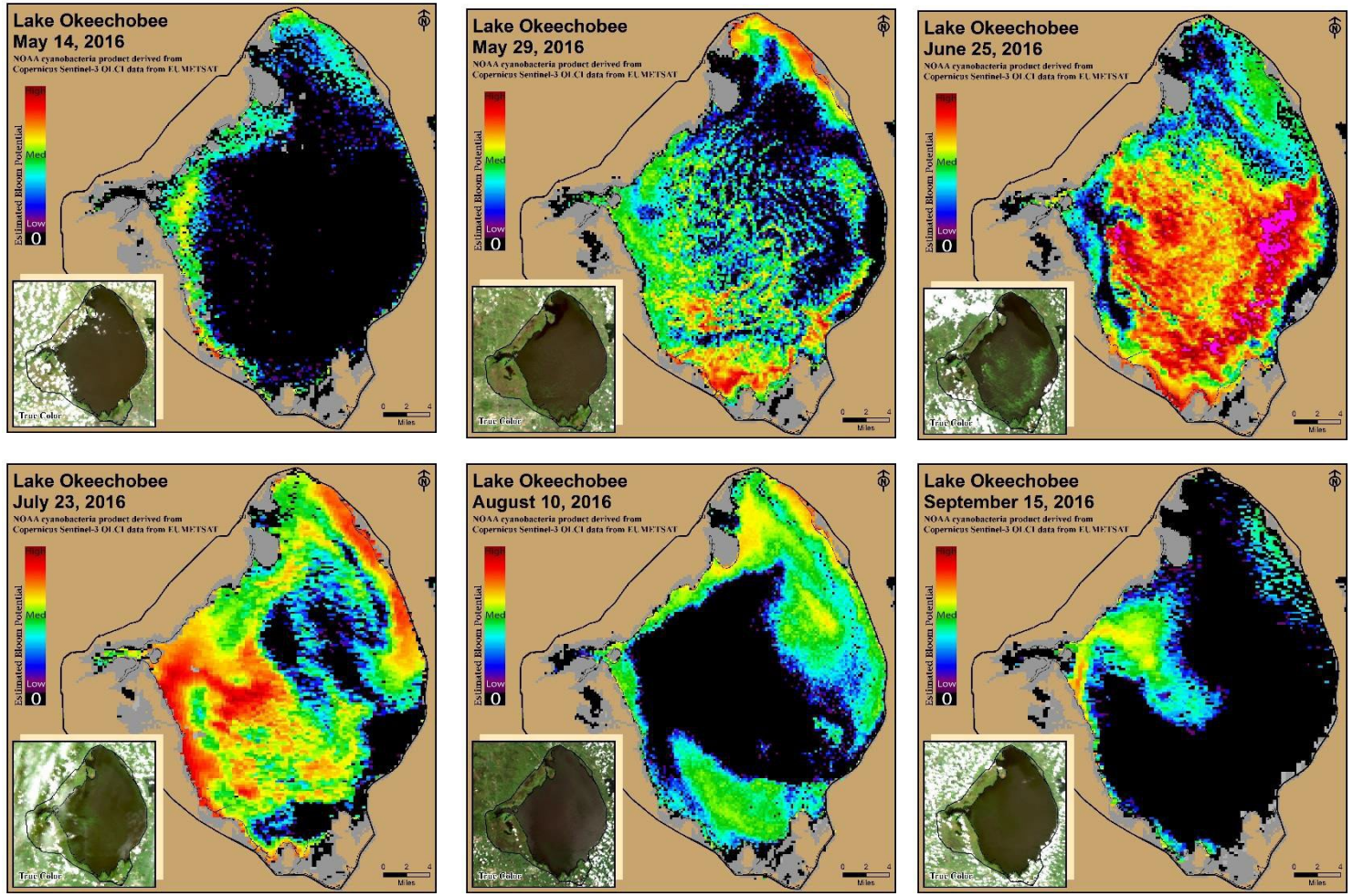
Lake is highly eutrophic: periodic algal blooms since the 1980's

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

ACOE Changing How Lake Okeechobee Will Be Managed

- 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

Questions?

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