SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Lake Okeechobee: Current and Future Management Challenges

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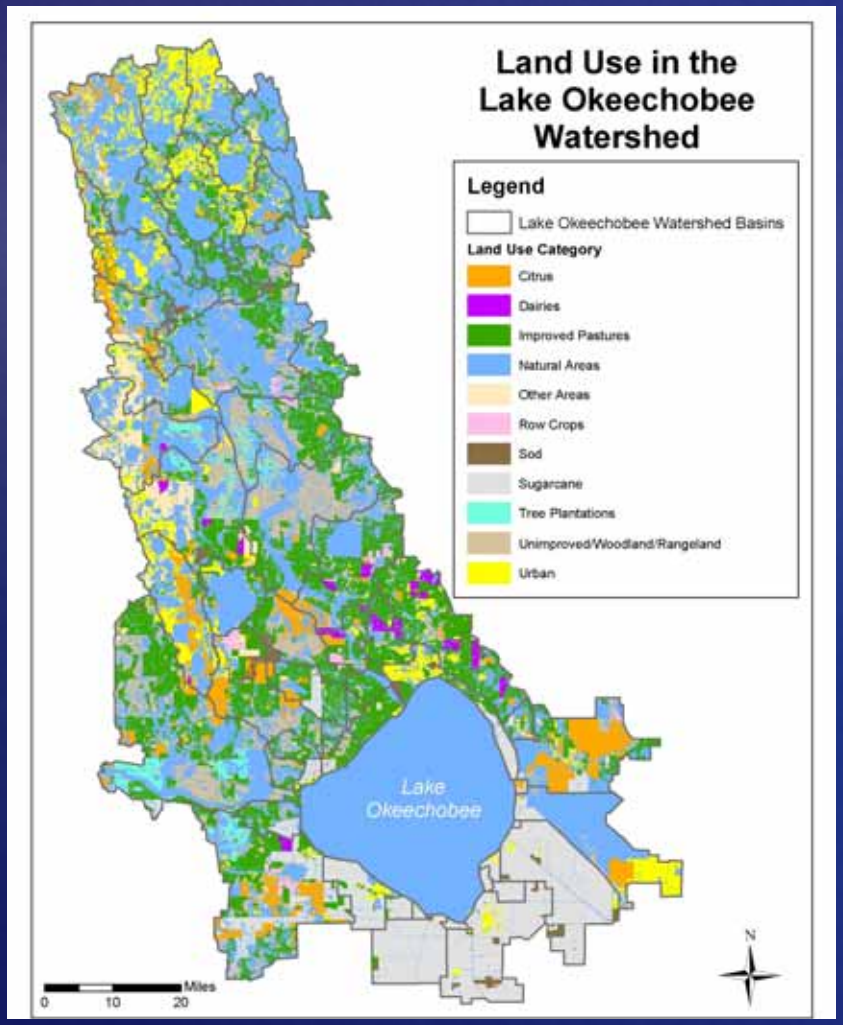
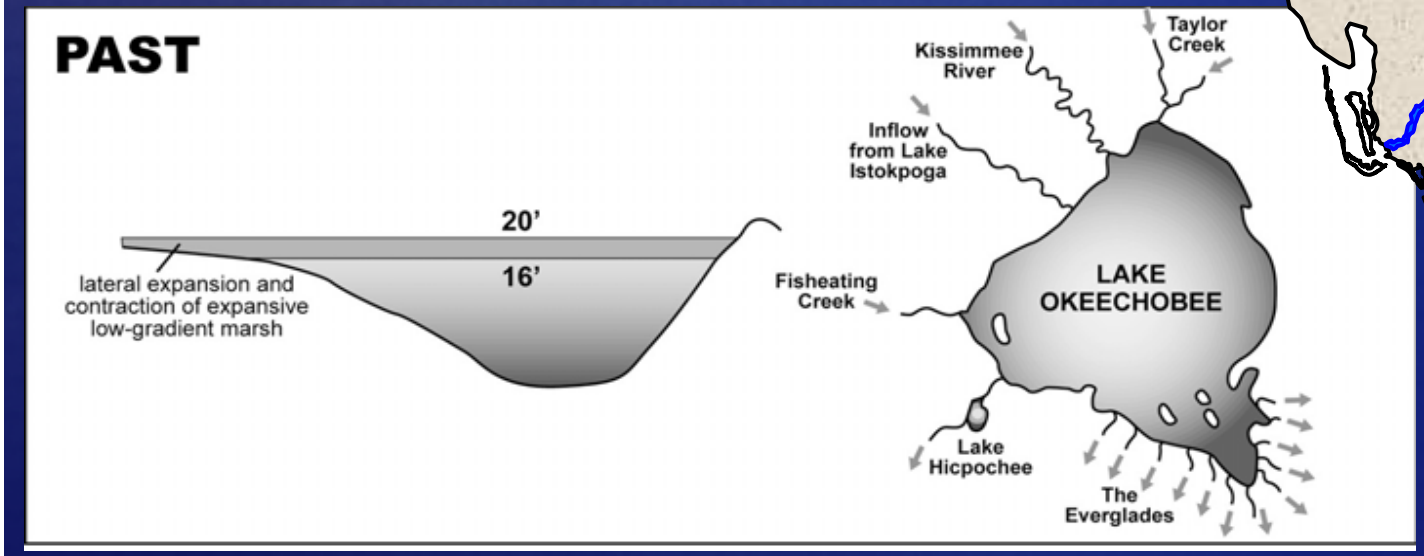
Lake Okeechobee – A Regional Multipurpose Water Resource

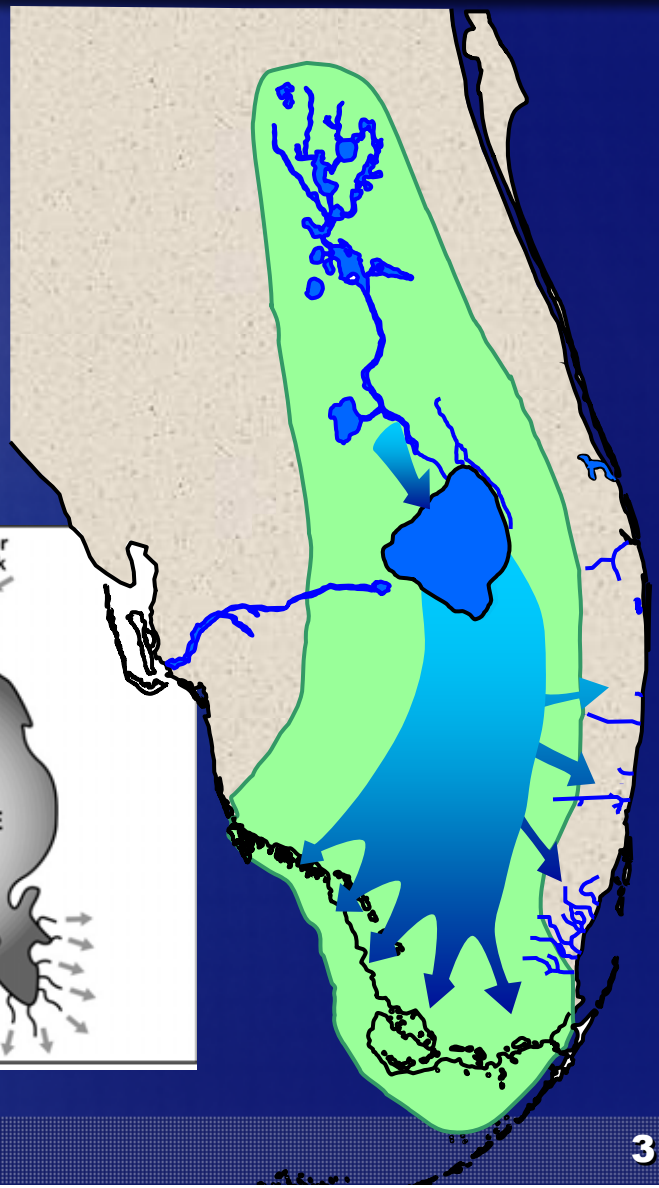


Lake Uses:

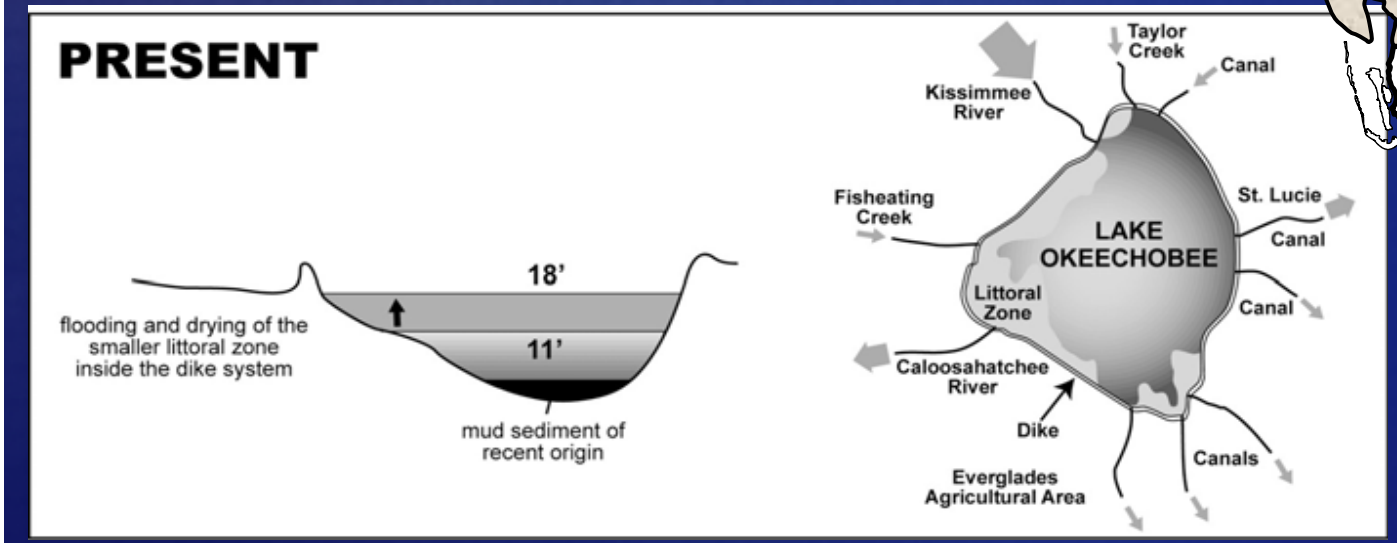
- Water Supply
- Flood Protection
- Navigation
- Fishing
- Recreation
- Wildlife

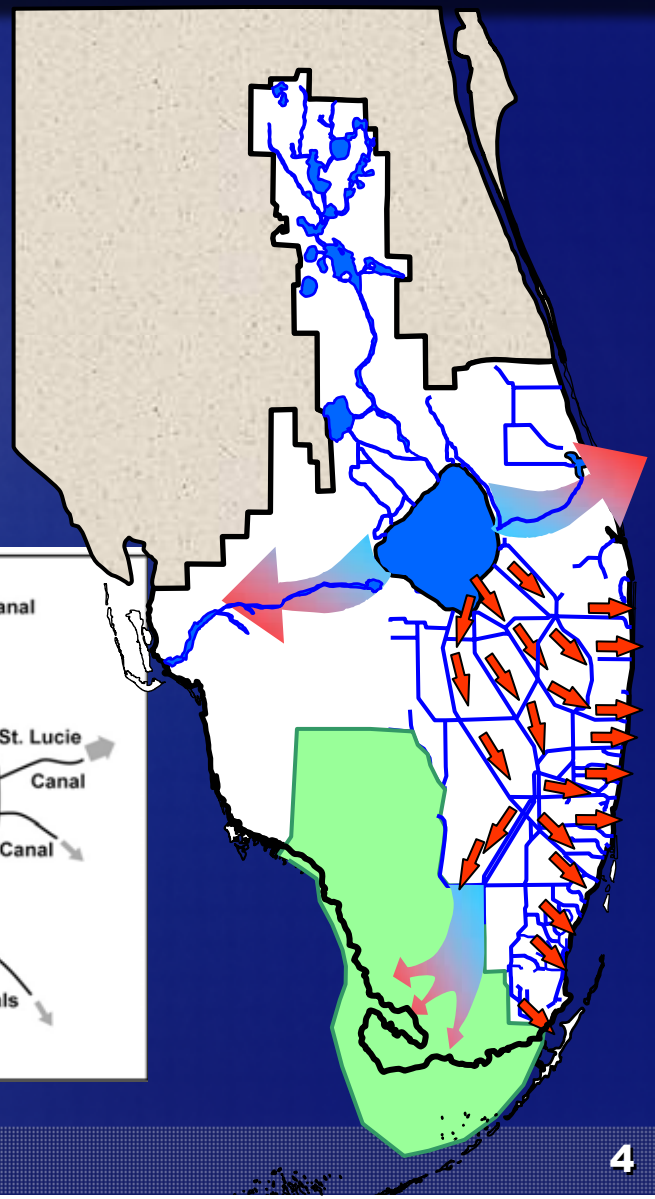
Lake Okeechobee – The Past





Lake Okeechobee – The Present





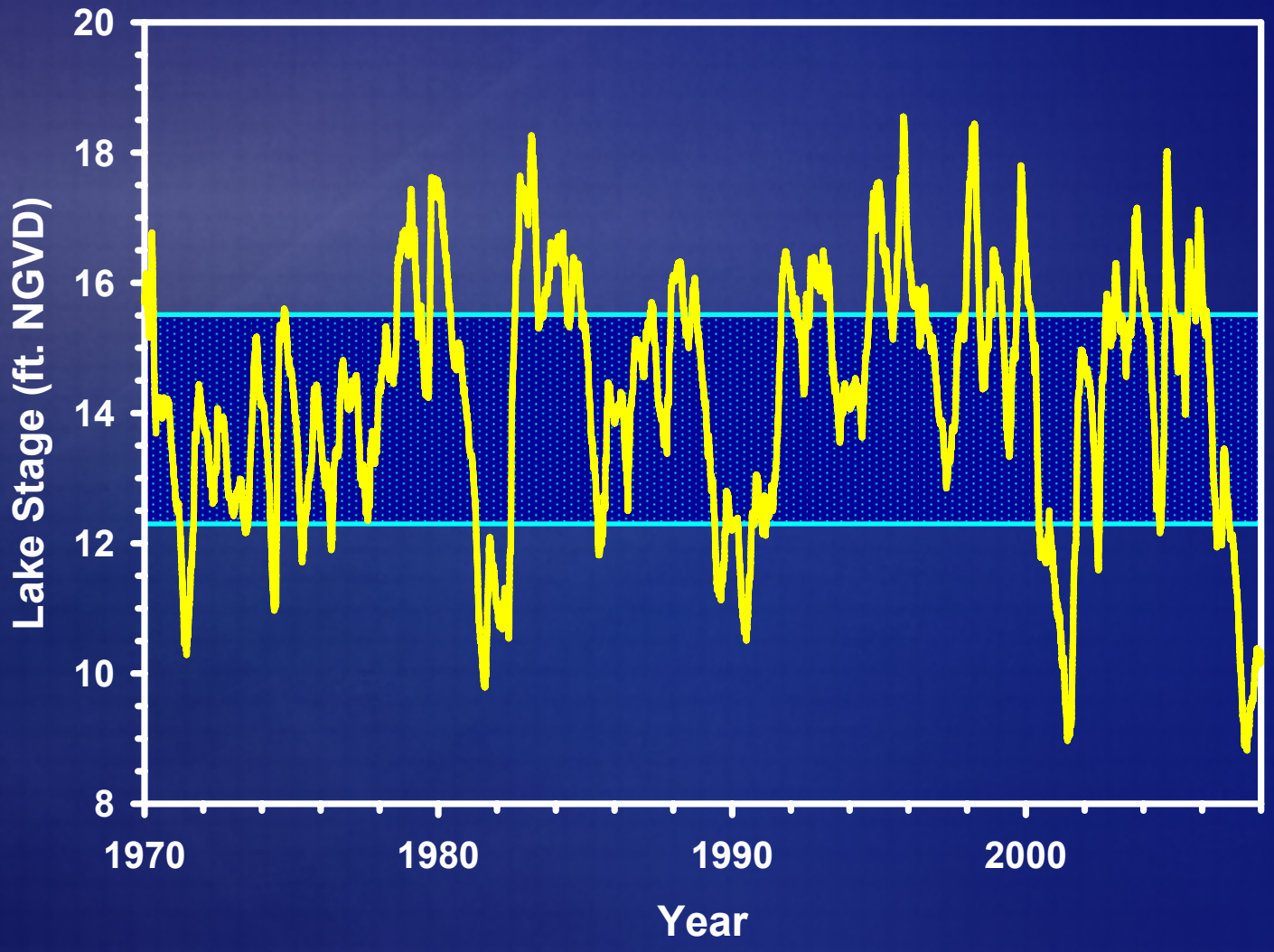
Rehabilitation, NOT Restoration

- Extent of landscape change precludes true restoration
- Rehabilitate lake to:
  - prevent water-quality impairments
  - improve in-lake biological conditions
    - *submerged and emergent vegetation*
    - *fisheries*
    - *wading birds*
    - *endangered species*
- Lake improvements benefit downstream ecosystems

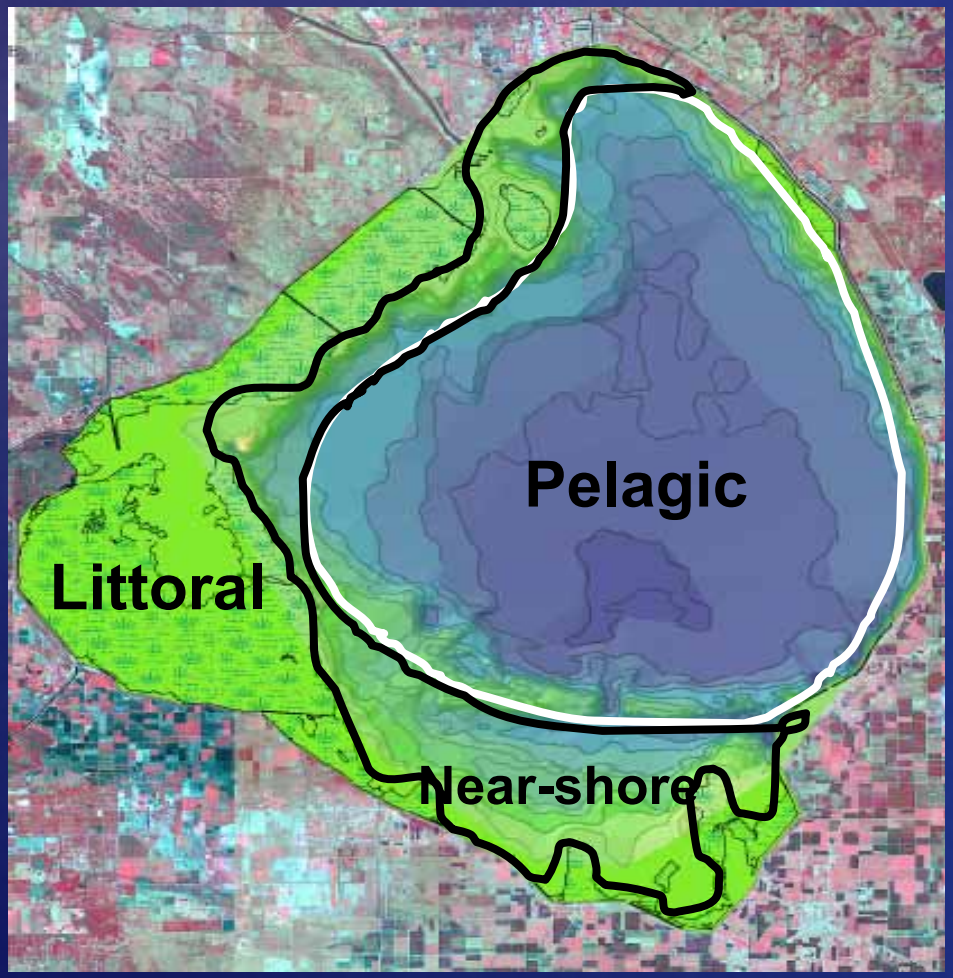
Three Critical Issues

- Extreme Water Levels
- Excessive Phosphorus Loads
- Exotic Species

Historic vs. Desirable Lake Stages



Impacts of Extreme High Water Levels



- Poor nearshore water quality
- Loss of submerged vegetation (SAV)
- Stressed emergent vegetation
- Accumulation of organic berm
- Algal blooms

Impacts of Extreme Low Water Levels

Negative Impacts:

- Loss of littoral zone habitat
- Loss of key fauna
- Increased spread of exotic plants

Positive Impacts:

- Regeneration of emergent plant species
- Oxidation, burning, and removal of accumulated detritus
- Improved control of exotic plants

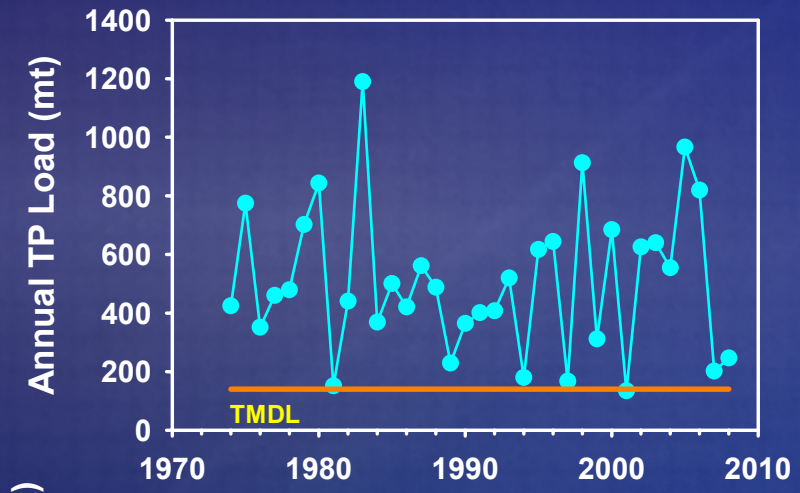
Water Level Extremes – Solution

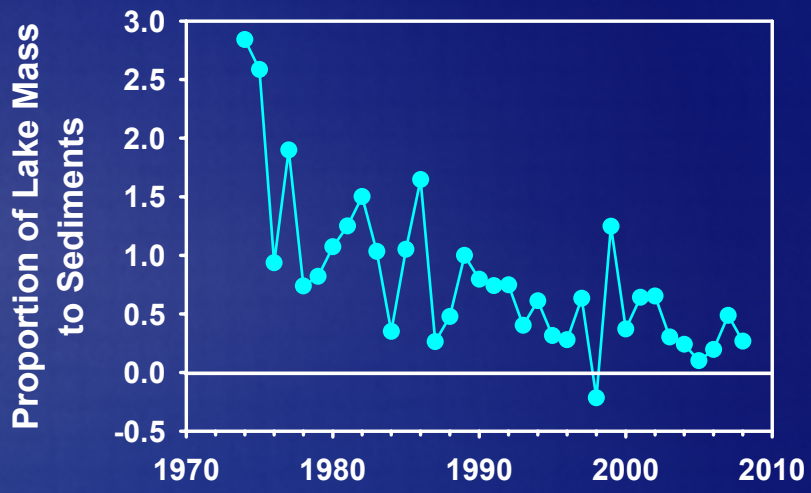
Alternative storage for ~ 1 million acre-ft of water

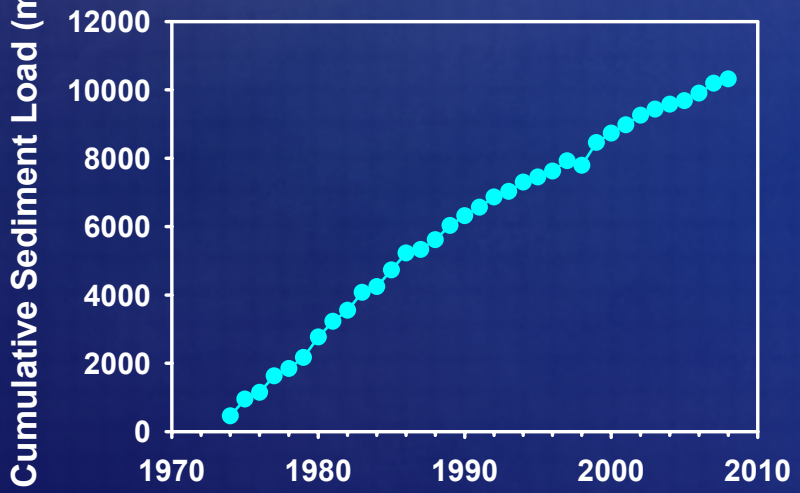
Options:

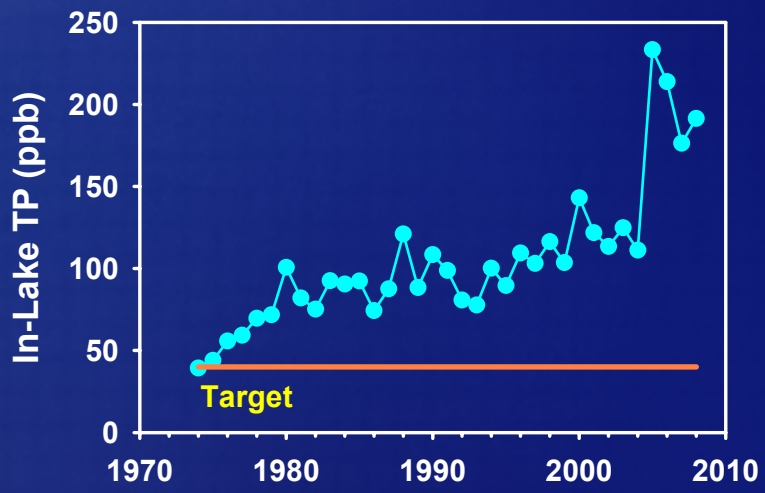
- Surface-water reservoirs
- Aquifer Storage and Recovery (ASR)
- Private lands

Phosphorus Loads and Concentrations: Historical Trends









Phosphorus Impacts

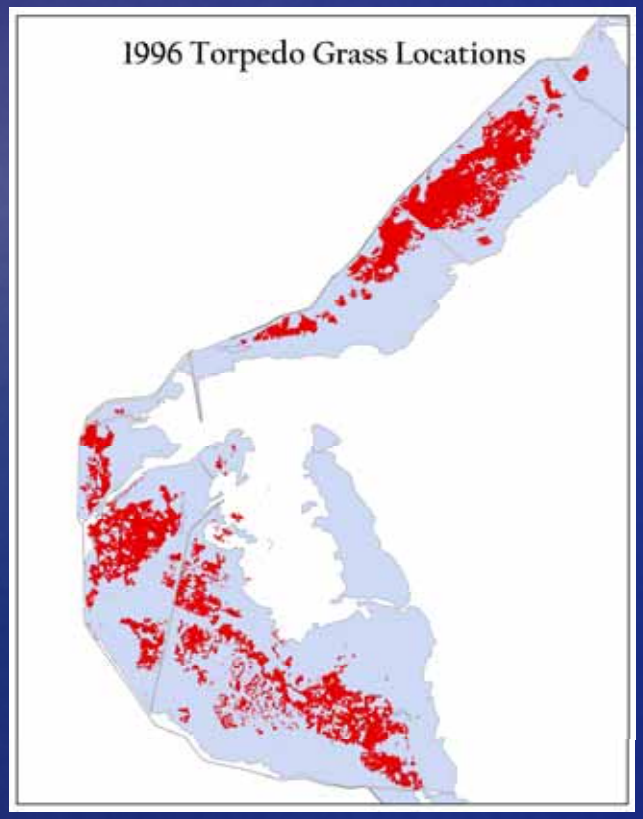
- Increased in-Lake P concentrations and lower N:P ratios
- Increased frequency of cyanobacterial blooms
- Loss of benthic invertebrate biodiversity
- Expansion of cattail in the lake's wetland
- Increased P export downstream

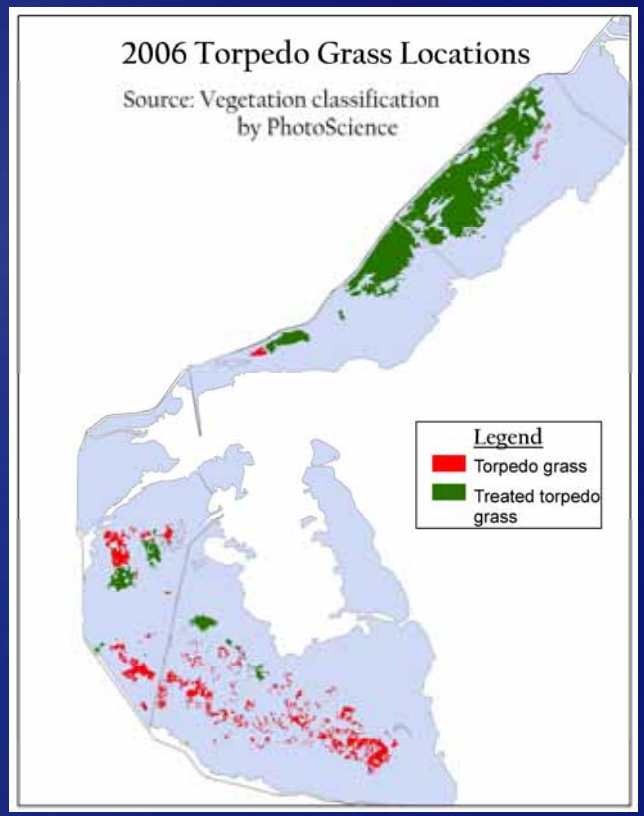
Phosphorus Control

- Lake Okeechobee TMDL
  - in-lake TP = 40 ppb
  - algal bloom frequency < 5%
  - External load = 140 mt P/yr
- Watershed P Control Programs
- Challenges:
  - Legacy P
    - 176,000 mt
    - ~50% potentially mobile
  - Internal P Loading
    - 35,000 mt sediment P
    - Internal P load ~ external load

Exotic Species – Success Stories

Exotic Species – Success Stories





Exotic Species – New Invaders

The South American watergrass, *Luziola subintegra*

Welcome to south Florida!

Exotic Animals – A Source of Concern?

Exotic fishes in Lake Okeechobee

Blue tilapia(Oreochromis aurus)
Peacock bass (Cichla ocellaris)
Callichtyid catfish (Hoplosternum littorale)
Common carp (Cyprinus carpio)
Convict cichlid (Cichlasoma nigrofasciatum)
Grass carp (Ctenopharyngodon idella)
Green sunfish (Lepomis cyanellus)
Jack Dempsey (Cichlasoma octofasciatum)
Jewelfish (Hemichromis bimaculatus)
Sailfin catfish (Liposarcus multiradiatus)
Mayan cichlid (Cichlasoma urophthalmus)
Oscar (Astronotus ocellatus)
Pacu (Colossoma sp.)
Spotted tilapia (Tilapia mariae)
Suckermouth catfish (Hypostomus plecostomus)
Walking catfish (Clarias batrachus)

Progress to date

- Development and implementation of watershed P-reduction programs
  - Dairy buy-outs and remediation
  - BMPs
  - Dairy BATs
- Critical construction projects (STAs)
- Control of exotic vegetation
- Improvements to Lake Regulation Schedule

Performance Measures – A "Report Card"

Performance Measure	Goal	WY'04-'08 Average
TP Load	140 mt/yr (by 2015)	558 mt/yr
Pelagic TP	40 ppb	184 ppb
Nearshore TP	40 ppb	114 ppb
Algal Bloom Frequency	<5% of samples	4.8% of samples
SAV cover	>40,000 acres	25,602 acres
Spring recession	~15.5' in Jan to ~12.5' in June	Not consistently attained

Future Challenges

- Alternatives for water storage
- Achieve TMDL by 2015
- Sediment management
- Population growth and urbanization
- Maintaining a long-term commitment
- Confronting uncertainty and surprise

Questions?