

Florida Department of Environmental Protection



Review of Phosphorus Water Quality Trends

South Florida Ecosystem Restoration Task Force
South Interior Building Auditorium



Wednesday, May 20, 2015
1:30 to 1:45 pm

Melissa R. Martin, Ph.D.
U.S. Fish and Wildlife Service
Arthur R. Marshall Loxahatchee National Wildlife Refuge

Edward C. Smith
Florida Department of Environmental Protection
Office of Ecosystem Projects



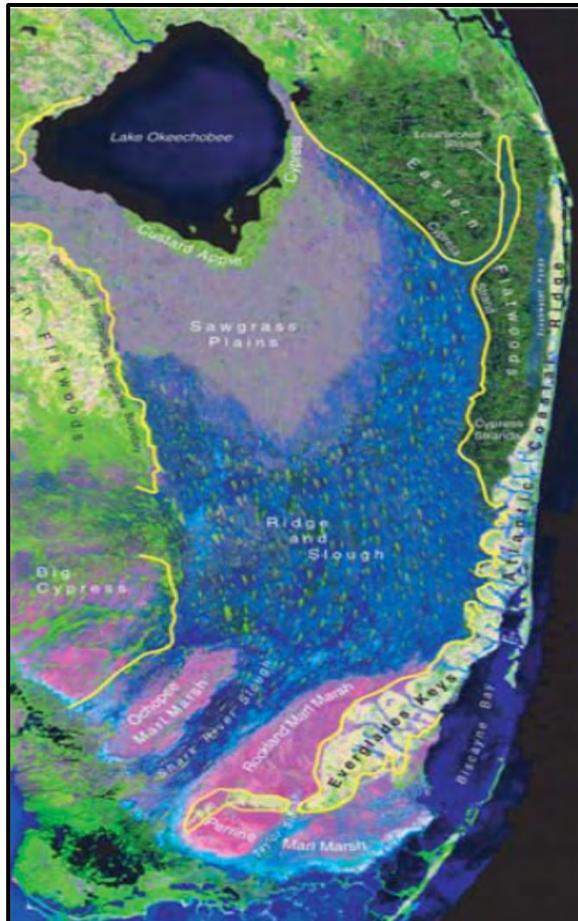


Phosphorus Trends in the Everglades Protection Area



Alterations to the Everglades

Historic



- Rainfall driven, interconnected wetland ecosystem

Current



- Managed system with altered quantity, quality, timing, and distribution of water

Image credits:
CISRERP, NRC
2007

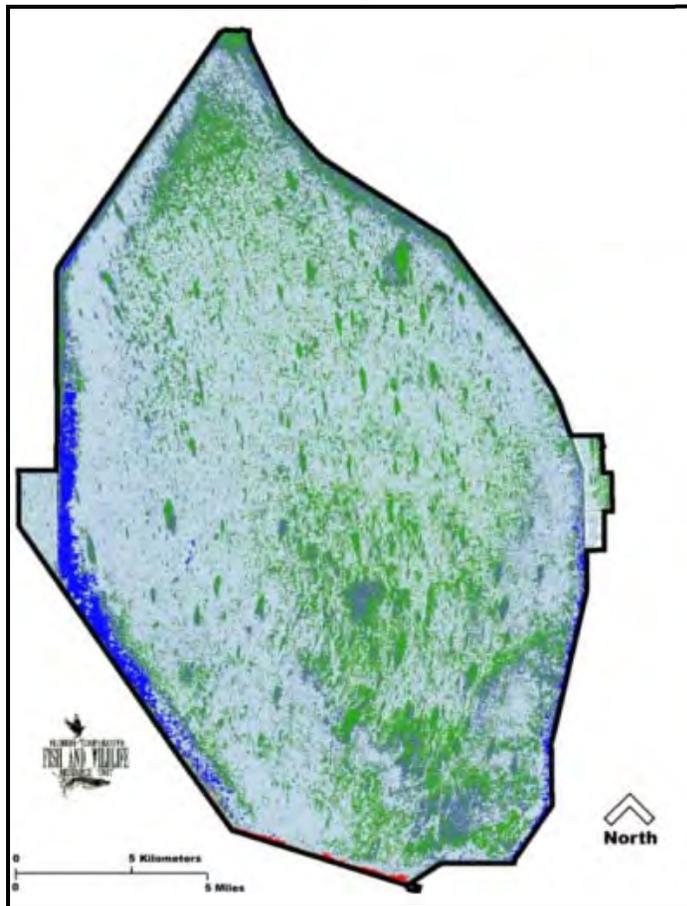


Phosphorus Trends in the Everglades Protection Area

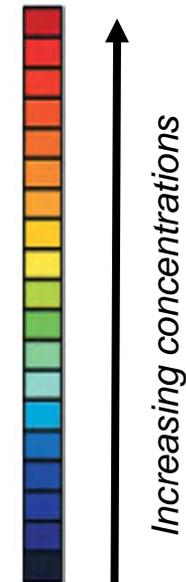
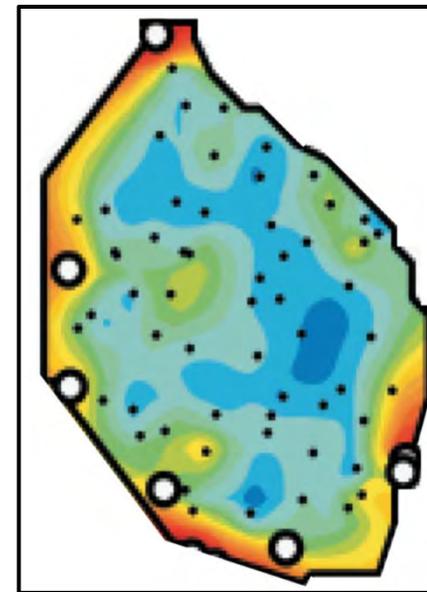


Ecological changes in the Everglades

Wetland community structure



Total phosphorus soil



- increased nutrient levels in surface waters and wetland soils,
- altered surface water chemistry,
- altered plant community structure, and
- altered food-web structure

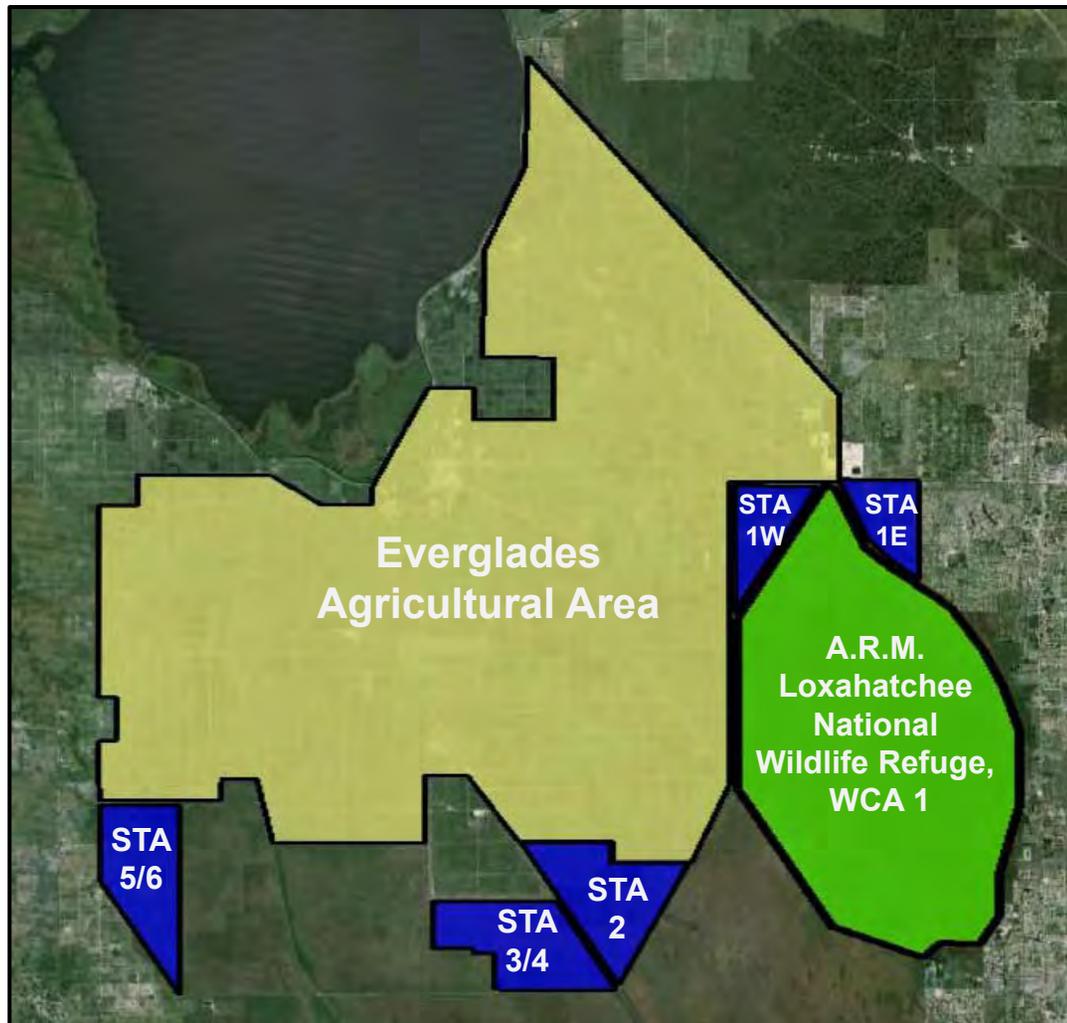
Image credits: (left) seen in 2002 A.R.M. Loxahatchee National Wildlife Refuge Comprehensive Conservation Plan (right) adapted from Scheidt and Kalla. 2007 USEPA, R-EMAP report



Phosphorus Trends in the Everglades Protection Area



Water quality improvement projects



Everglades Agricultural Area Regulatory Program:

- on-farm best management practices have reduced the total load of phosphorus moving downstream by 55% since 1996

Stormwater Treatment Areas:

- Five large-scale treatment wetlands have reduced the total load of phosphorus moving downstream by 75% since 1994

Source: South Florida Water Management, 2015 South Florida Environmental Report



Phosphorus Trends in the Everglades Protection Area



Interagency evaluation of phosphorus trends

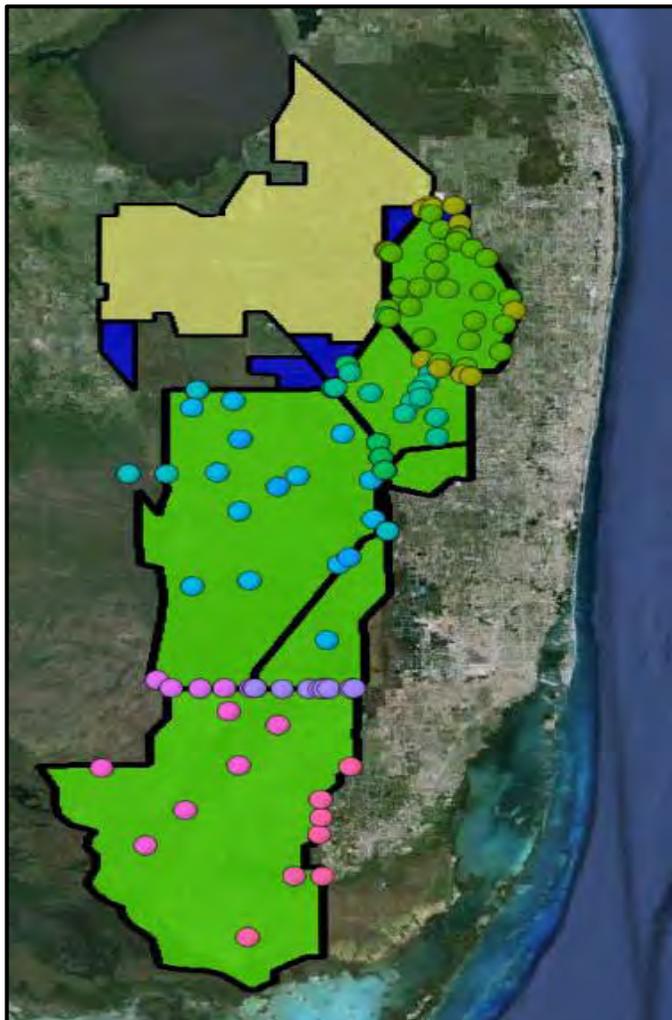


Image and analysis credit: Walker and Walker 2015

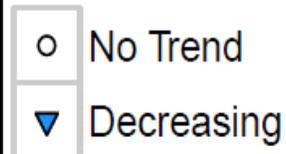
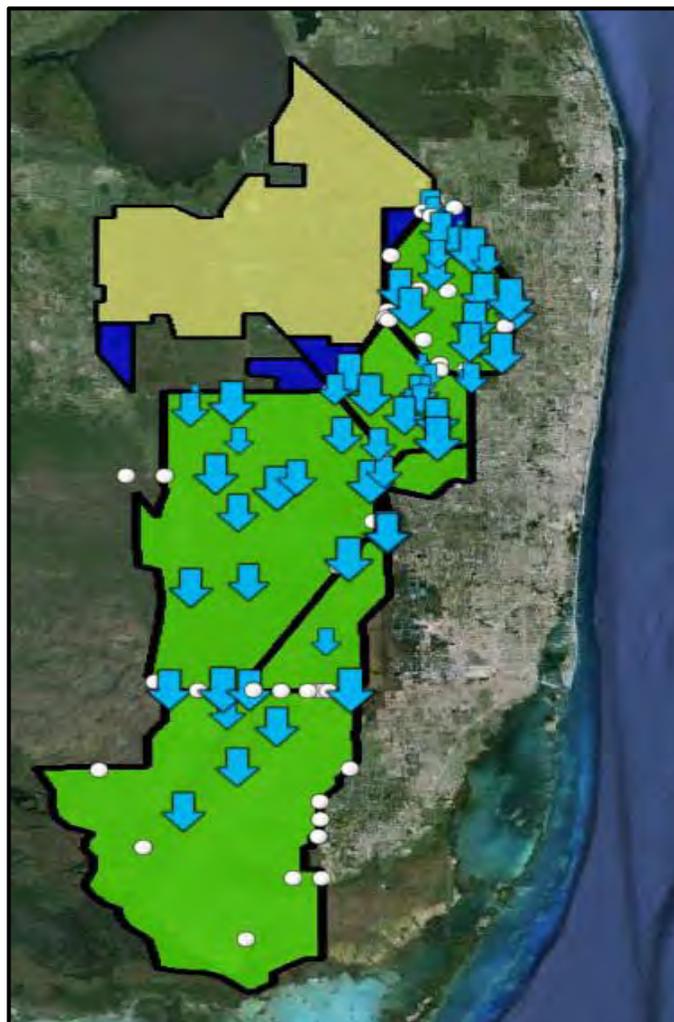
- Interagency teams are currently evaluating water quality conditions throughout the South Florida system to support multiple on-going programs and projects
- Technical analyses of recent phosphorus trends in the Everglades Protection Area show the benefits of the water quality improvement projects to the downstream ecosystem



Phosphorus Trends in the Everglades Protection Area



Phosphorus trends in the Everglades Protection Area



- Water quality improvement projects have reduced the total load of phosphorus entering the downstream ecosystem
- Technical analyses of water quality conditions in the Everglades Protection Area show downward trends in total phosphorus levels within the downstream ecosystem
- Analyses inform on-going interagency management and restoration efforts

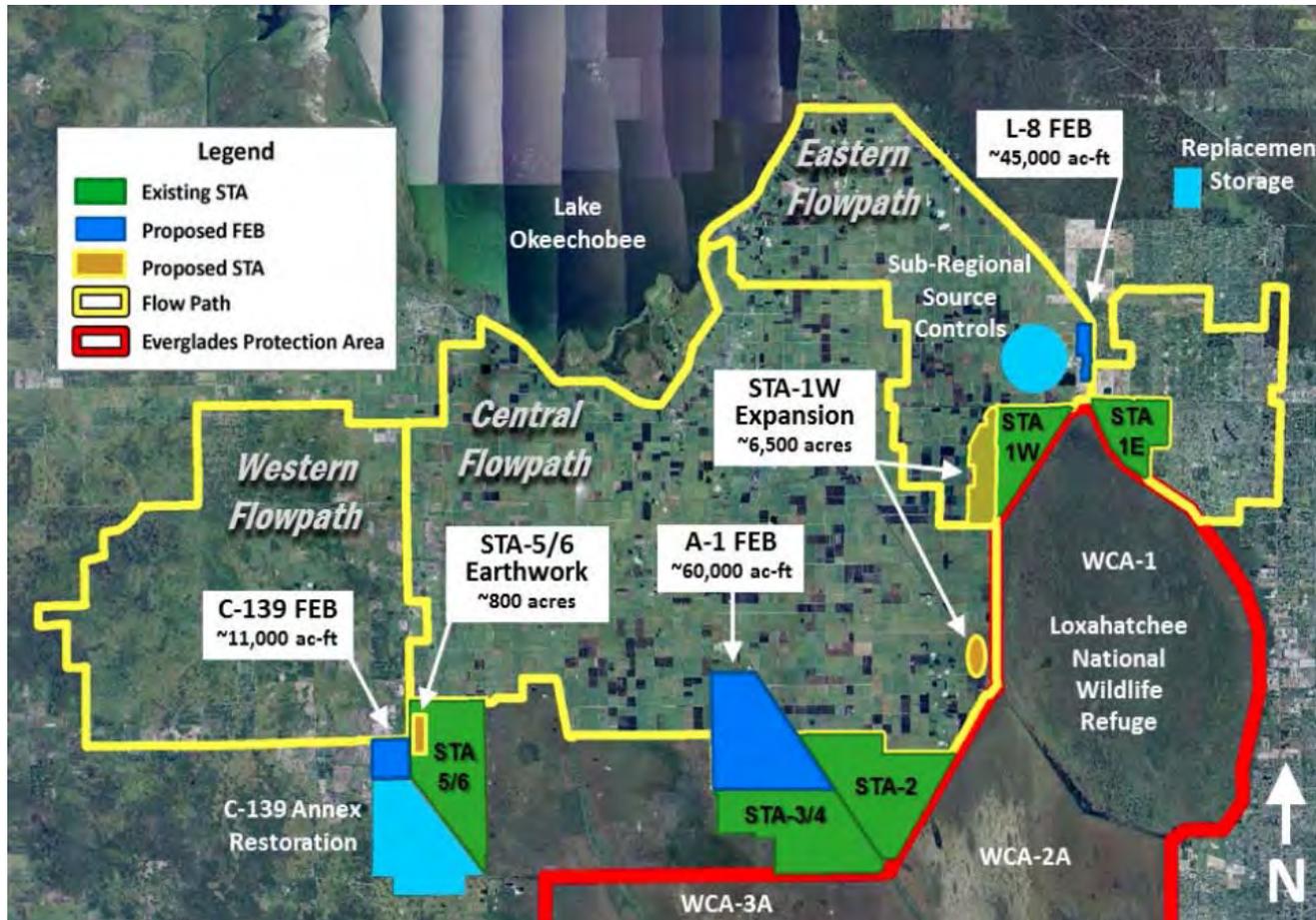
Image and analysis credit: Walker and Walker 2015



Phosphorus Trends in the Everglades Protection Area



Restoration Strategies Key Projects



L-8 FEB: Operational Fall -2015

STA-1W Exp: Begin Construction - 2015

A-1 FEB: Operational Summer - 2015

C-139 Annex: Initial site preparation - 2014

C-139 FEB: Begin - 2018

Projects to be complete and projected to achieve WQ limit by **2025**.

Total Storage:
125,000 ac-ft

Total Cost:
\$880M (2012)

Source: South Florida Water Management, 2015 R.S. Principal's Meeting



Phosphorus Trends in the Everglades Protection Area

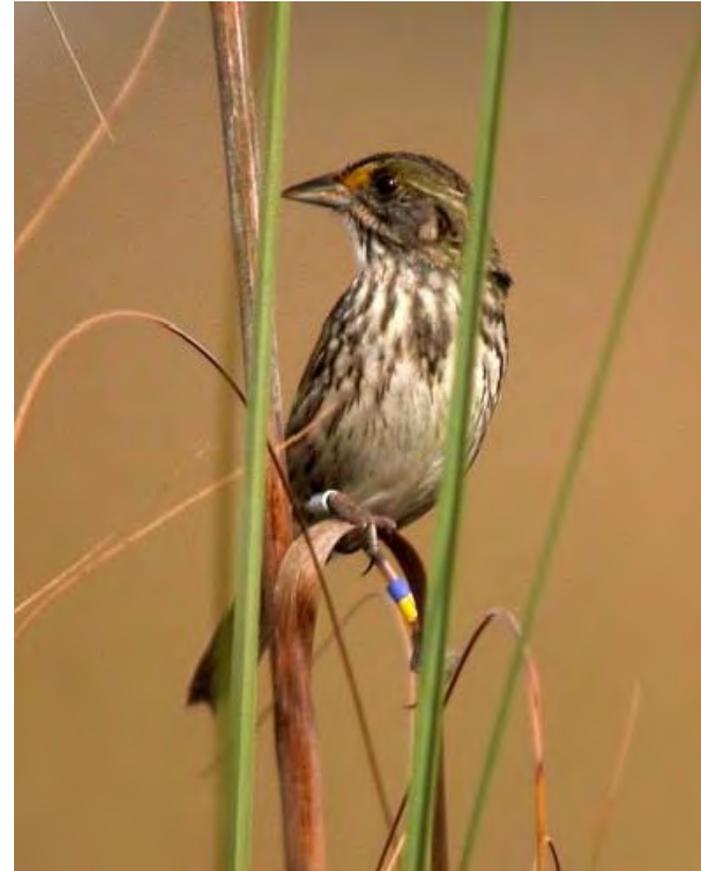


Considerations/Challenges

- Stakeholder Needs
- Endangered Species
- Water Quality vs Water Quantity
- System constraints
- Ancillary Challenges



Source: Audubon Florida



Source: USGS



Phosphorus Trends in the Everglades Protection Area



Acknowledgements

- (NPS) Donatto Surratt, Joffre Castro, Robert Johnson, Kevin Kotun (FWS) Kyle Douglas-Mankin (DOI) William Walker, Robert Kadlec (USEPA) Dan Scheidt (USACE) Sean Smith, Mark Schaffer
- (DEP) Paul Julian, Frank Powell (SFWMD) Stuart Van Horn, Jeremy McBryan

References

- CISRERP, NRC (2007) Committee on Independent Scientific Review of Everglades Restoration Progress, National Research Council, Progress Toward Restoring the Everglades: The First Biennial Review, 2006. Available at <<http://www.nap.edu/catalog/11754.html> >
- 2002 A.R.M. Loxahatchee National Wildlife Refuge Comprehensive Conservation Plan. Available at <<http://www.fws.gov/southeast/planning/CCP/Loxahatchie%20Final%20Pg.html>>
- Scheidt, D.J., and P.I. Kalla. 2007. Everglades ecosystem assessment: water management and quality, eutrophication, mercury contamination, soils and habitat: monitoring for adaptive management: a R-EMAP status report. USEPA Region 4, Athens, GA. EPA 904-R-07-001. 98 pp. Available at <<http://www.epa.gov/region4/sesd/reports>>
- 2015 South Florida Environmental Report. West Palm Beach, FL: South Florida Water Management District. Available at < <http://my.sfwmd.gov/portal/page/portal/xweb%20about%20us/agency%20reports>>
- W.W. Walker and J.D. Walker. 2015. Trends in Total Phosphorus Concentration. Available at <http://www.wwwalker.net>
- Restoration Strategies Regional Water Quality Plan. 2012

Questions?