Upper Ocklawaha River Basin Management Action Plan (BMAP) Annual Meeting

Via Webinar
Webinar Registration Link:
https://attendee.gotowebinar.com/register/4500446682013277278

April 21, 2026
10 AM EDT

Agenda

- Upper Ocklawaha River Basin Management Action Plan (BMAP) Background.
- Annual Progress Update.
- Policy & Reporting Reminders.
- SJRWMD Updates.
- SJR Model Update.

Please note the site for documents relating to the Upper Ocklawaha River BMAP:
BMAP Public Meetings | Florida Department of Environmental Protection

For more information on the Upper Ocklawaha River BMAP, contact: Jessica Fetgatter, 850-245-8107, Jessica.Fetgatter@FloridaDEP.gov

WEBINAR HOUSEKEEPING

Attendee Participation

Open your control panel.

Join audio:

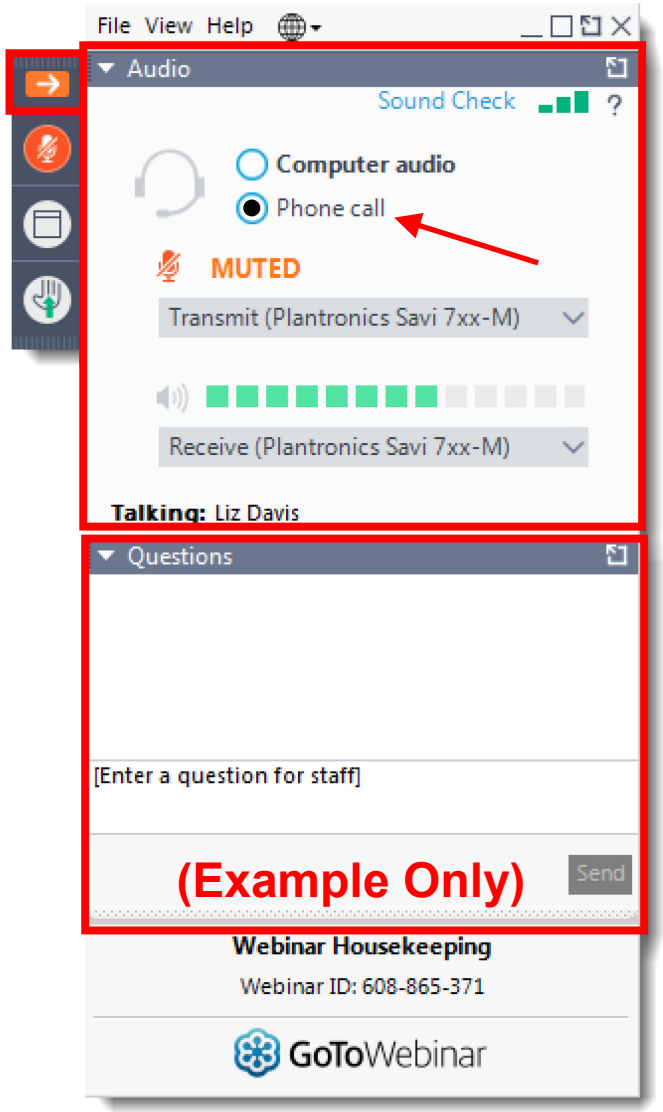
- Choose Computer Audio **or**
- Choose Phone Call and dial using the information provided with your registration.

Attendee audio will automatically be muted.

Submit questions and comments via the **Questions** panel.

If viewing this webinar as a group, please provide a list of attendees via the **Questions** panel.

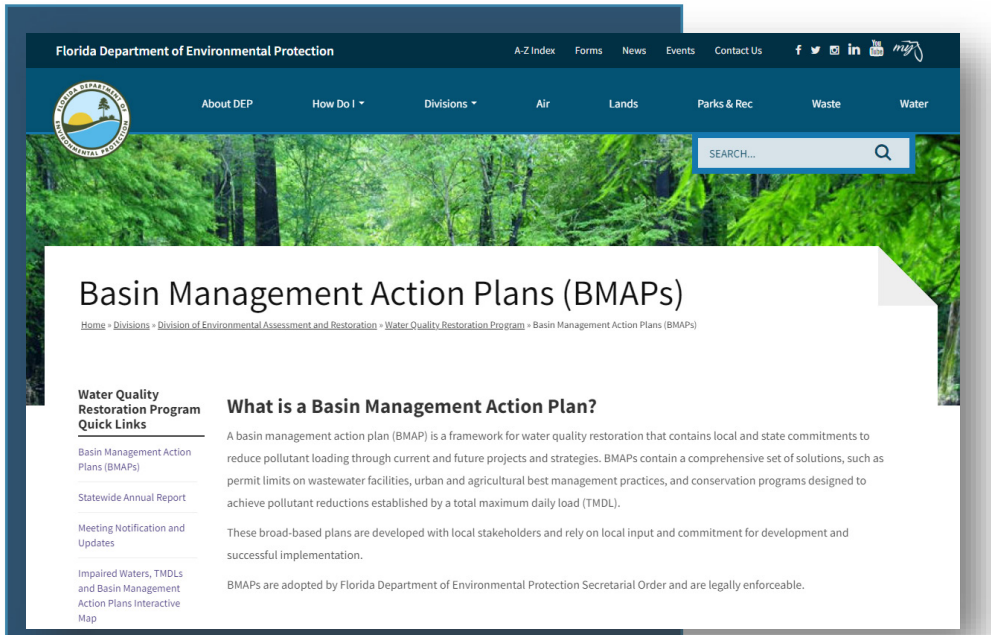
Note: Today's presentation is being recorded and will be provided after the webinar.



AGENDA

- Basin Management Action Plan (BMAP) Overview.
- Policy and Reporting Reminders.
- Statewide Annual Report (STAR).
- Progress.
- St. Johns River Water Management District (SJRWMD) Update.
- St. Johns River (SJR) Model Update.

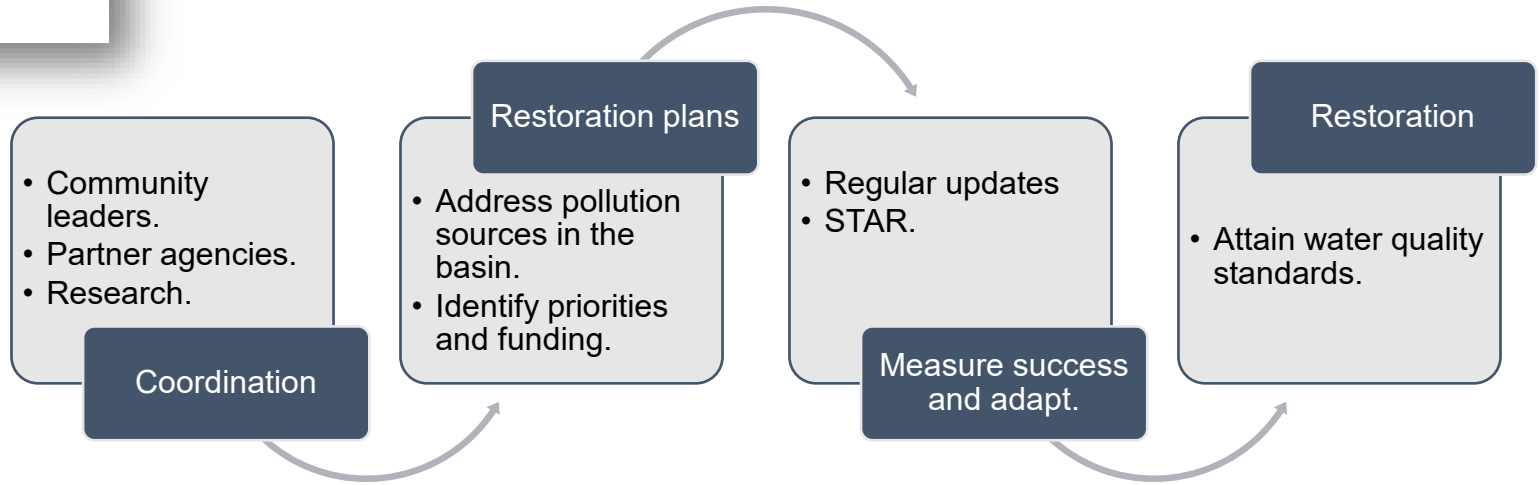
BMAPs



One of DEP's methods for **restoring water quality** in an impaired waterbody.

BMAPs are:

- Developed with stakeholder input.
- Adopted by the Florida Department of Environmental Protection's (DEP) Secretarial Order.
- Enforceable.
- Implemented through a phased approach.
- Reported on annually.
- Updated regularly.



KEY BMAP COMPONENTS

- Total maximum daily loads (TMDLs) being addressed.
- Area addressed by the restoration plan.
- Identify sources.
- Phased implementation approach.
- Milestones.
- Projects and management strategies.
- Future growth impacts.

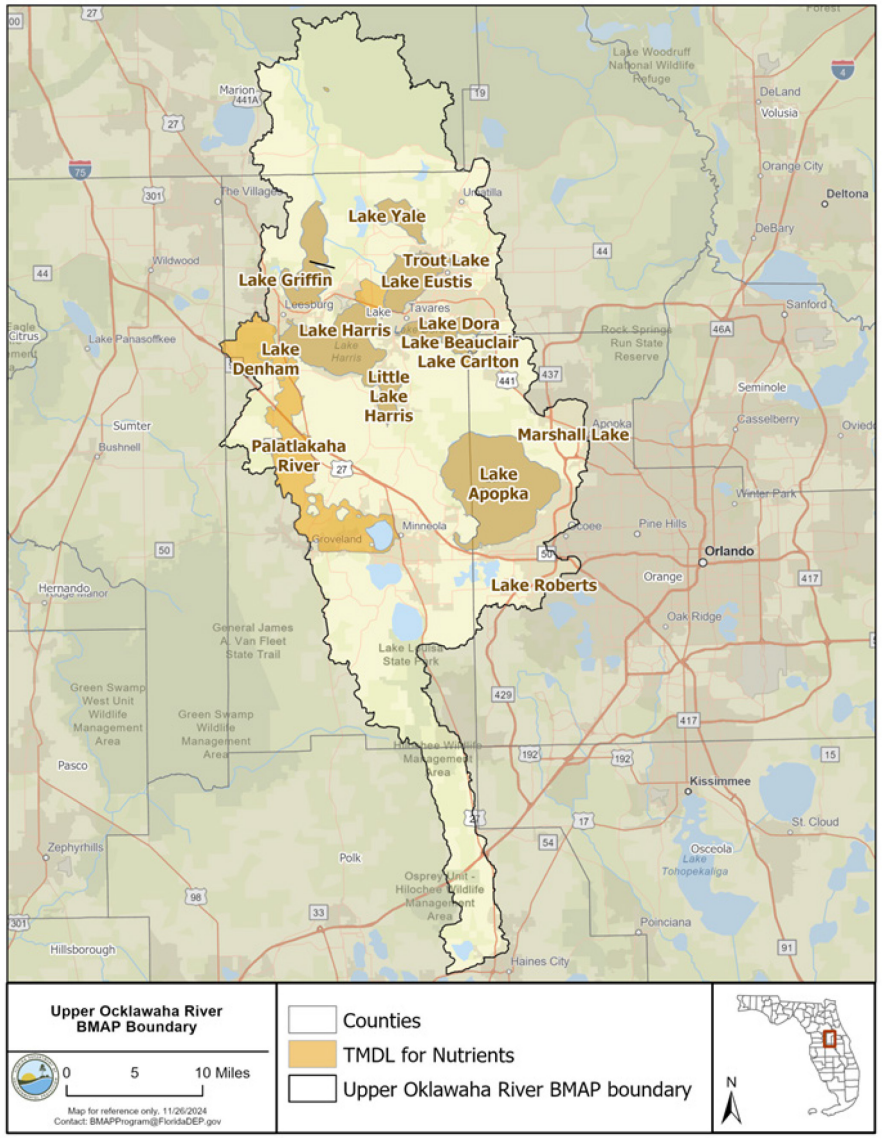
Projects to meet the TMDL:

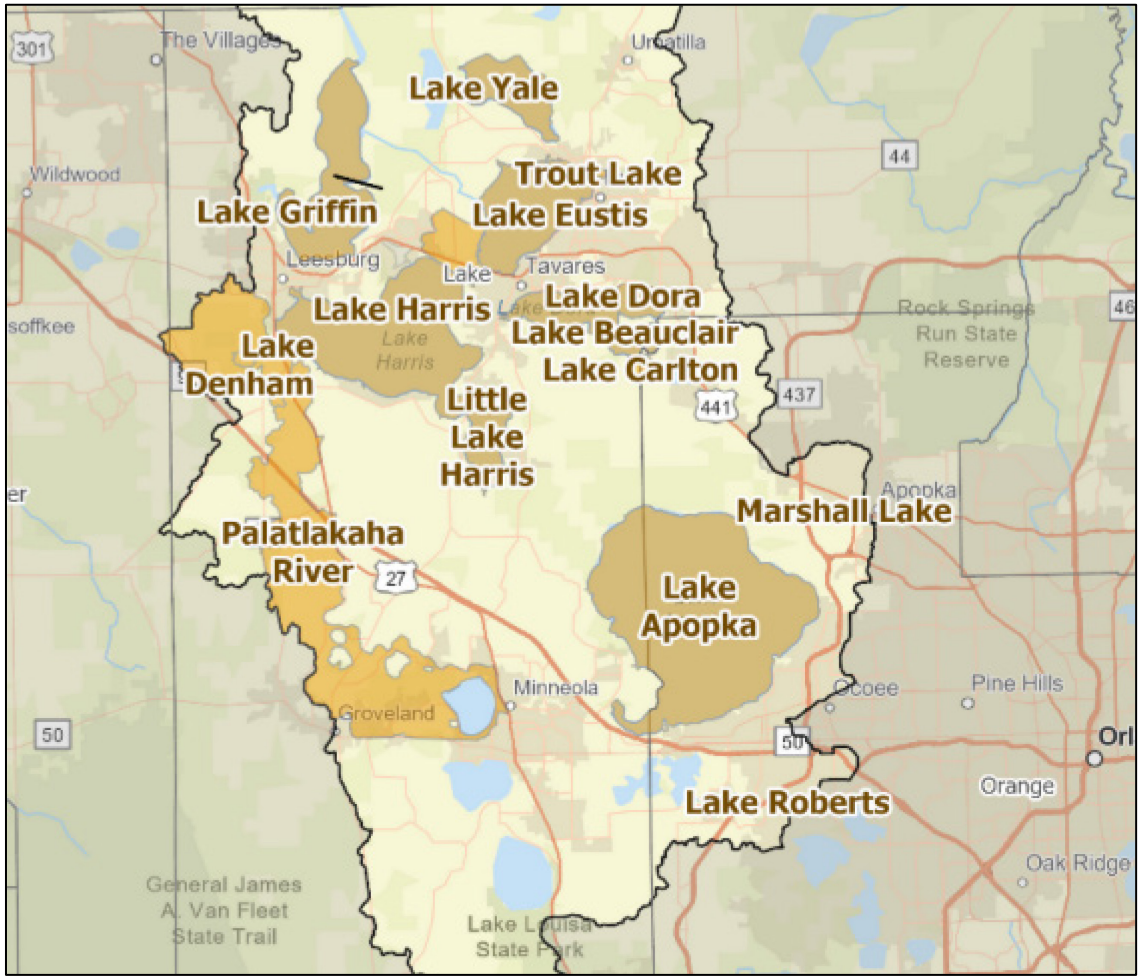
- Implementation timeline.
- Commitment to projects.
- Expected water quality improvement from projects and management strategies.

Process to assess progress toward achieving the TMDL:

- Monitoring plan.
- Project reporting.
- Periodic follow-up meetings.
- Water quality analyses.

BACKGROUND


Lake Yale
Trout Lake
Lake Griffin
Lake Eustis
Lake Harris
Lake Dora
Lake Beauclair
Lake Carlton
Lake Denham
Little Lake Harris
Marshall Lake
Palatlakaha River
Lake Apopka
Lake Roberts
Upper Ocklawaha River BMAP Boundary
0 5 10 Miles
Map for reference only. 11/26/2024
Contact: BMAPProgram@FloridaDEP.gov
Counties
TMDL for Nutrients
Upper Oklawaha River BMAP boundary
N


Lake Yale
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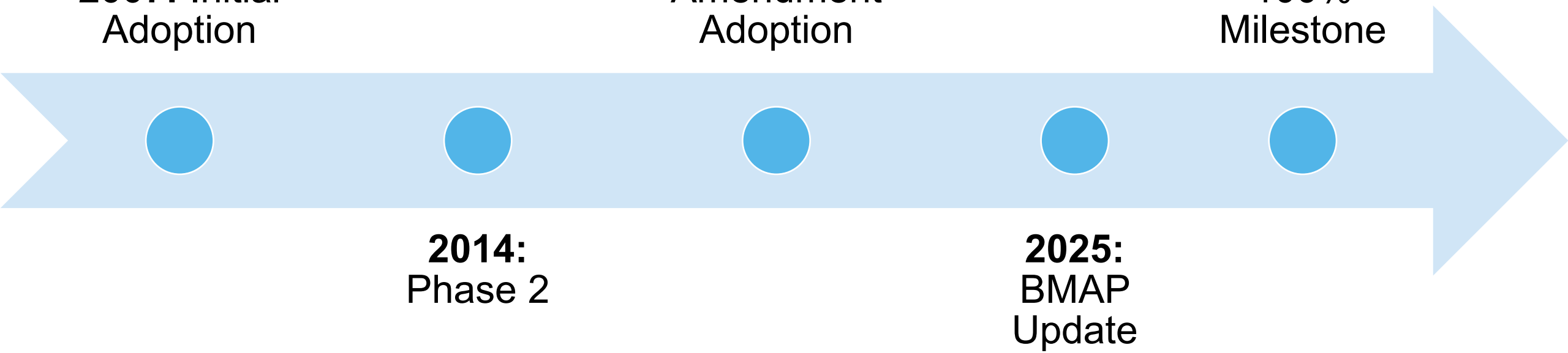
Lake Harris
Lake Dora
Lake Beauclair
Lake Carlton
Lake Denham
Little Lake Harris
Marshall Lake
Palatlakaha River
Lake Apopka
Lake Roberts
The Villages
Wildwood
Leesburg
Tavares
Minneola
Groveland
Pine Hills
Orange
Oak Ridge
Rock Springs Run State Reserve
General James A. Van Fleet State Trail

BMAP TIMELINE AND MILESTONES



BACKGROUND

UPPER OCKLAWAHA BMAP STAKEHOLDERS

Type of Entity/ Organization	Participant
Responsible Entities	Lake County Marion County Orange County Polk County City of Apopka Town of Astatula City of Clermont City of Eustis City of Fruitland Park City of Groveland Howey-in-the-Hills Town of Lady Lake City of Leesburg City of Mascotte City of Minneola Town of Montverde City of Mount Dora Town of Oakland City of Ocoee City of Tavares City of Umatilla City of Winter Garden City of Wildwood Agriculture Wastewater Treatment Facilities

Type of Entity/ Organization	Participant
Responsible Agencies	County Health Departments Central Florida Expressway Authority Florida Department of Agriculture and Consumer Services (DACS) Florida Department of Environmental Protection (DEP) Florida Department of Transportation (DOT), District 5 Florida Fish and Wildlife Conservation Commission Florida Turnpike Enterprise St. Johns River Water Management District (SJRWMD)
Other Government Entities and Special Districts	Lake County Water Authority Lake County Soil and Water Conservation District
Other Interested Stakeholders	Agriculture Oklawaha Valley Audubon Society Andreyev Engineering B&H Consulting Applied Sciences BCI Engineering Boyle Engineering Brown and Caldwell Eustis Chamber of Commerce Green Consultants HCBassMasters Jones Edmunds PEAR Professional Engineering Consultants Unaffiliated Citizens Stormwater 360 Trout Lake Nature Center

BACKGROUND

TOTAL PHOSPHORUS (TP) AND TOTAL NITROGEN (TN)

Upper Ocklawaha Target Concentrations		
Waterbody	TP (mg/L)	TN (mg/L)
Apopka	0.055	
Beauclair	0.032	
Carlton	0.032	
Denham	0.04	1.1
Dora	0.031	
Eustis	0.025	
Griffin	0.032	
Harris	0.026	
Marshall	0.037	0.9
Palatlakaha River	*	*
Roberts	0.044	1.02
Trout	0.028	0.78
Yale	0.02	

mg/L = milligrams/liter

*Targets for the Palatlakaha River are the applicable Numeric Nutrient Criteria and subject to the provisions of paragraph 62-302.531(2)(c), Florida Administrative Code (F.A.C.).

POLICY & REPORTING REMINDERS

Source	Topic	Requirement
Wastewater	Wastewater Effluent Limits	Where the law does not provide effluent limits or a compliance timeframe, new effluent standards **will take effect at the time of permit renewal or no later than five years after BMAP adoption**, whichever is sooner. Tables 23 and 24 in the BMAP document.
	Connection to Sewer	**Beginning February 2026 and every two years thereafter**, utilities with sewer lines in BMAPs must provide DEP a list of properties with existing OSTDS where sewer is available (as defined in 381.00655, F.S.) but have not connected.
Agriculture	Concentrated animal feeding operations (CAFOs) - Dairies	To minimize infiltration of liquid manure, if a dairy uses a clay liner or some other type of engineered waste storage pond system, **within two years of BMAP adoption,** the dairy must submit to DEP an evaluation identifying the environmental, technical, and economic feasibility of upgrading to a concrete or geosynthetic liner.

POLICY & REPORTING REMINDERS
CONT.

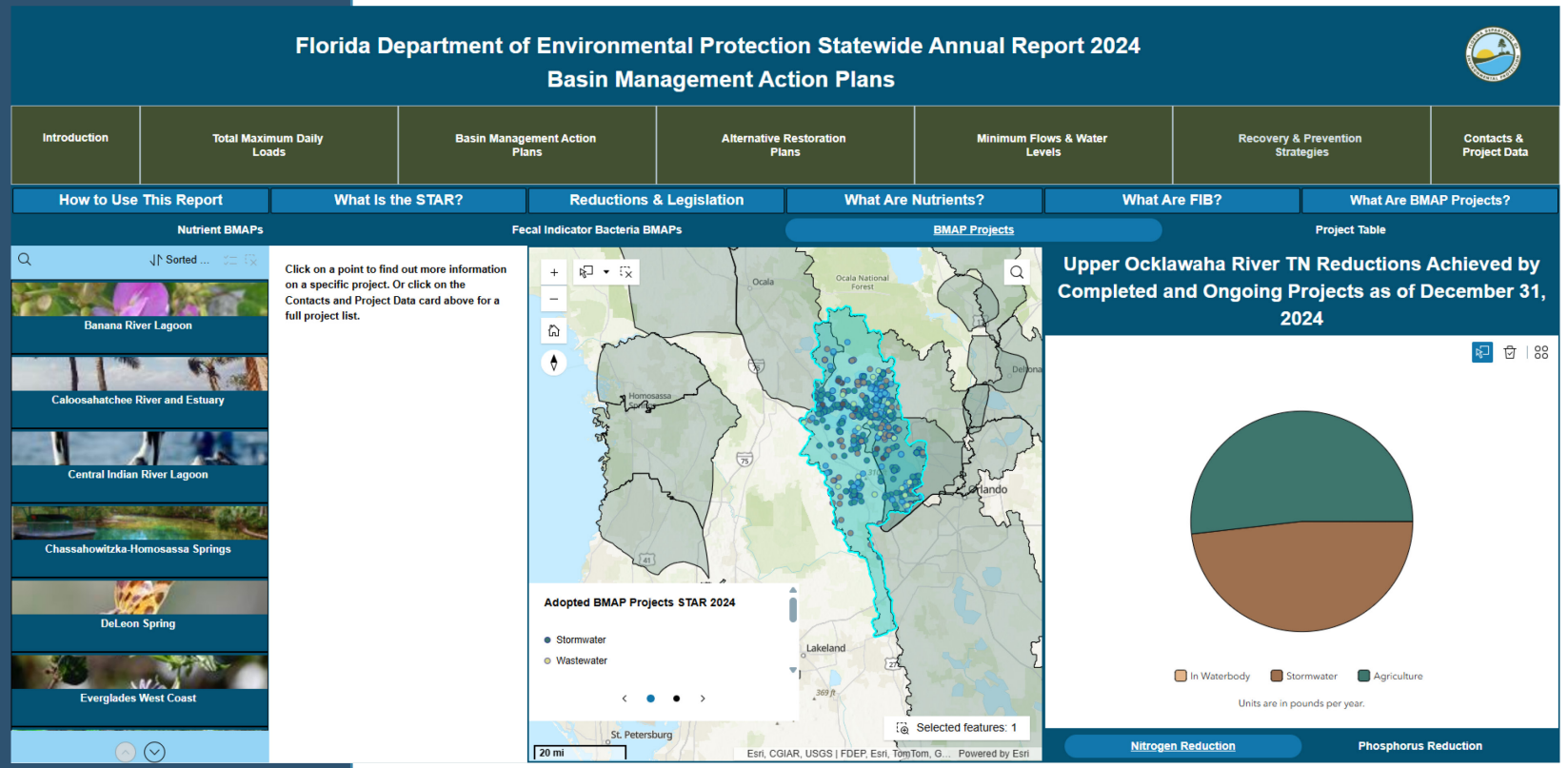
Source	Topic	Requirement
Sports Turf	Golf Courses	Draft nutrient management plan (NMP): **Due June 27, 2026.** Final NMP: **Due June 27, 2027**.
		Golf Course superintendents for publicly-owned courses (those owned/operated by local governments: counties, municipalities, CDDs...) must have obtained UF-IFAS Golf Course Best Management Practices Program certification by **Dec. 31, 2026**.
		Annual reporting begins **November 2028- January 2029**.

STATEWIDE ANNUAL REPORT (STAR)

PROJECT REPORTING

What is the STAR?

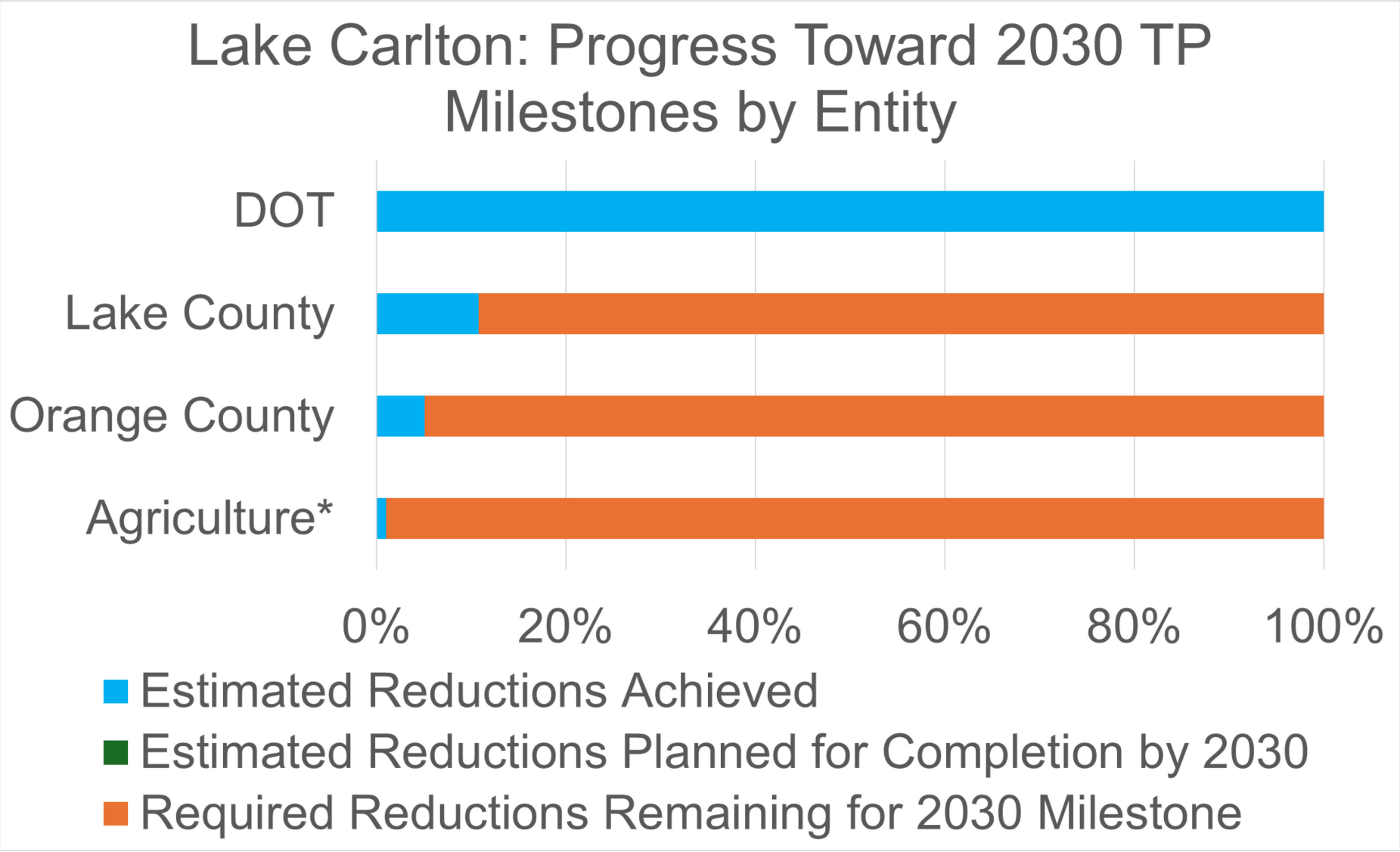
- Summarizes accomplishments in the BMAPs statewide.
- Reports on restoration projects and management strategies.
- Published July 1 of each year.
- Currently in the process of project updates and verification for STAR 2025.
  - Projects reported through Dec. 31, 2025.



https://floridadep.gov/STAR

PROGRESS THRU DEC. 31, 2025 (DRAFT)

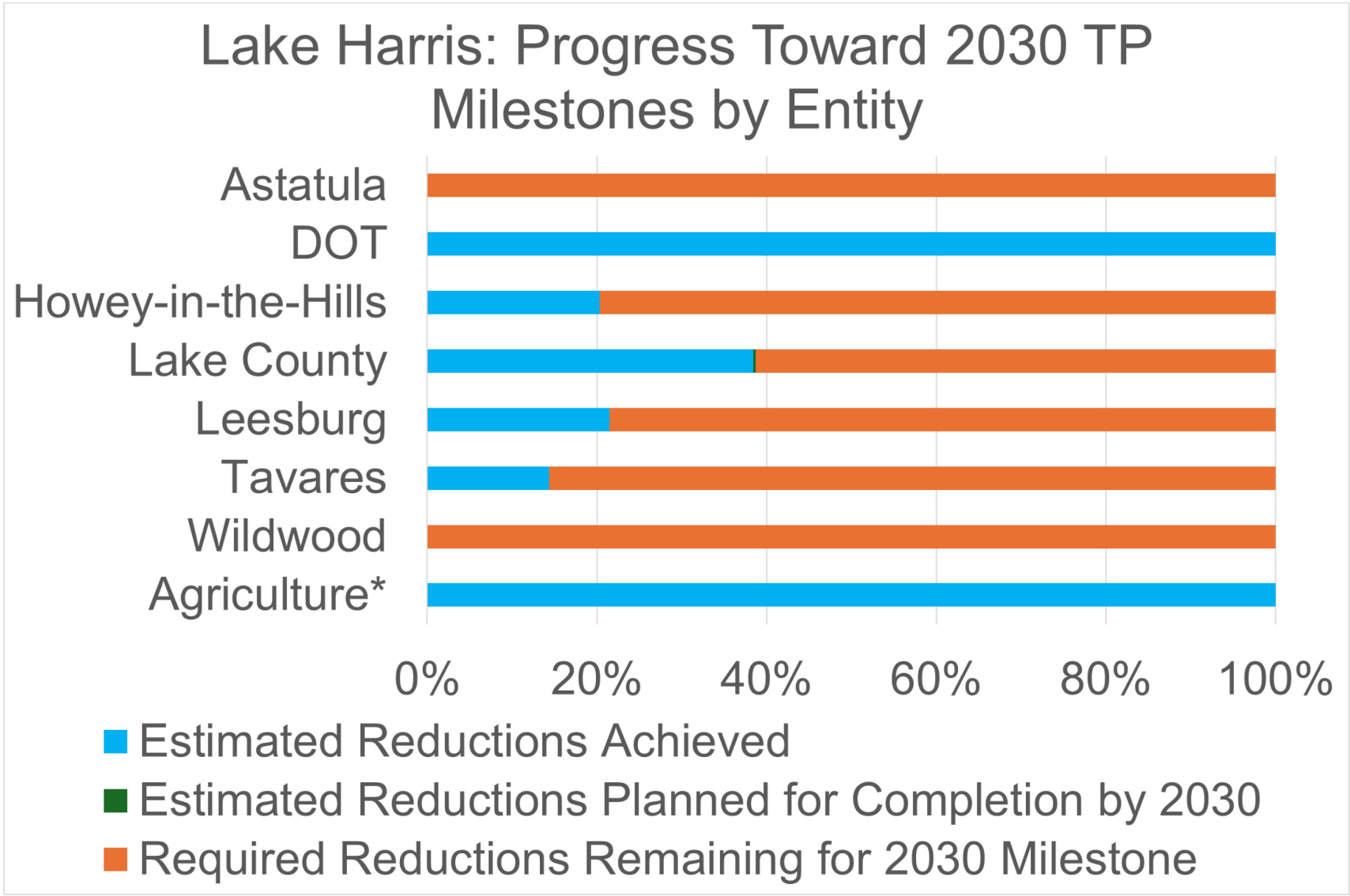
LAKE CARLTON



*These reductions are a combination of projects completed by DACS and the WMDs.

PROGRESS THRU DEC. 31, 2025 (DRAFT)

LAKE HARRIS



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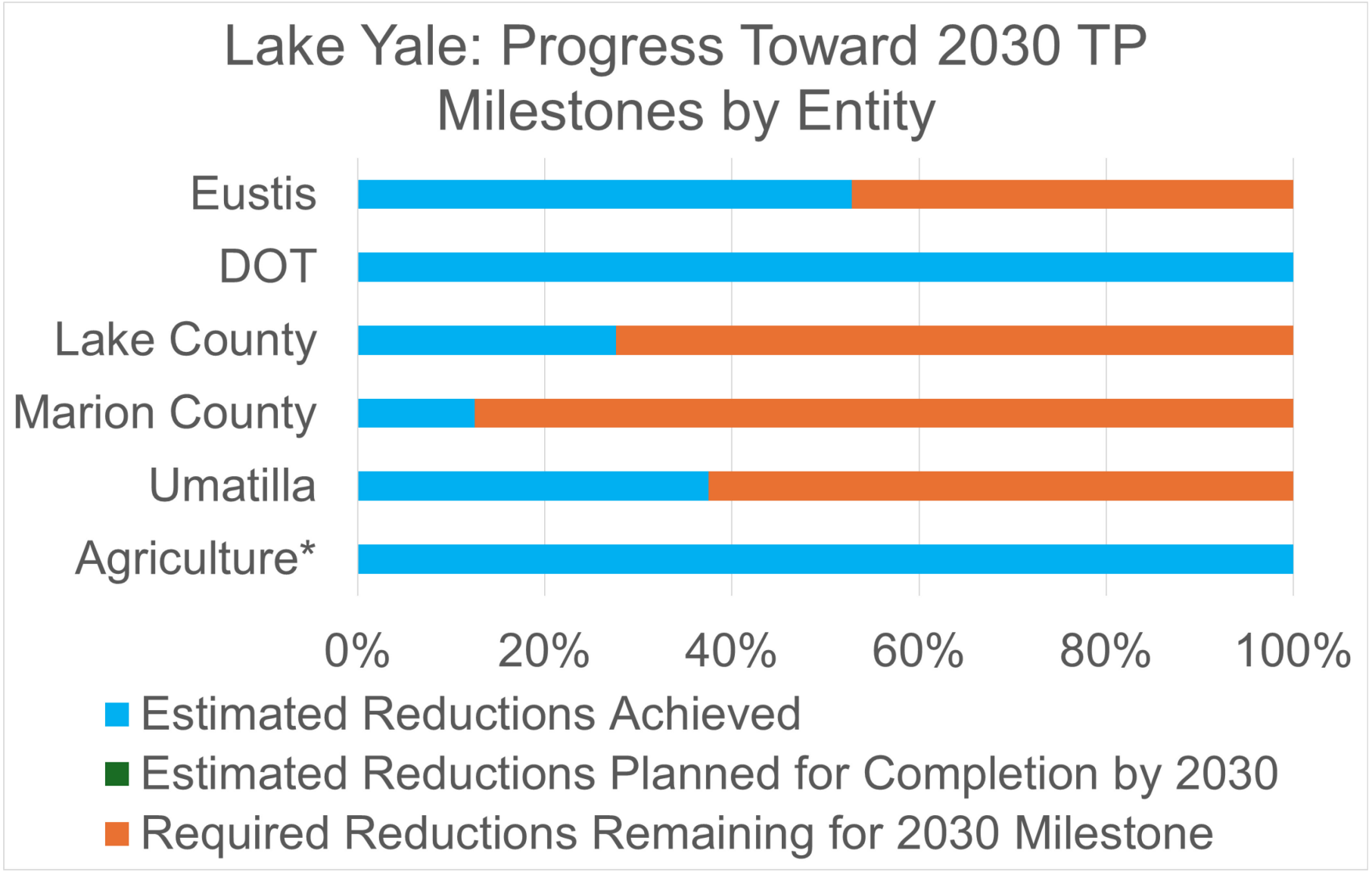
PROGRESS THRU DEC. 31, 2025 (DRAFT)

LAKE YALE



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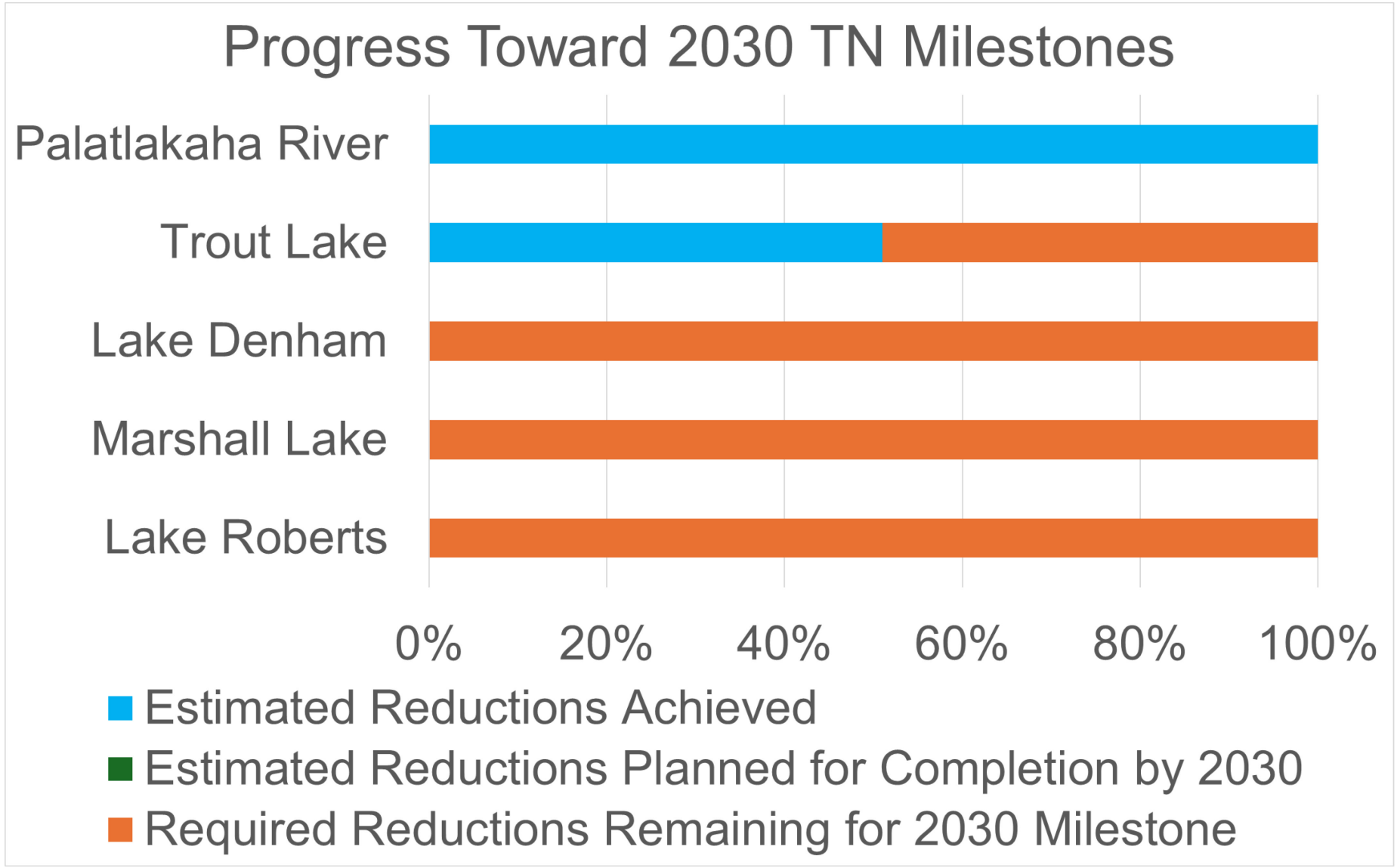
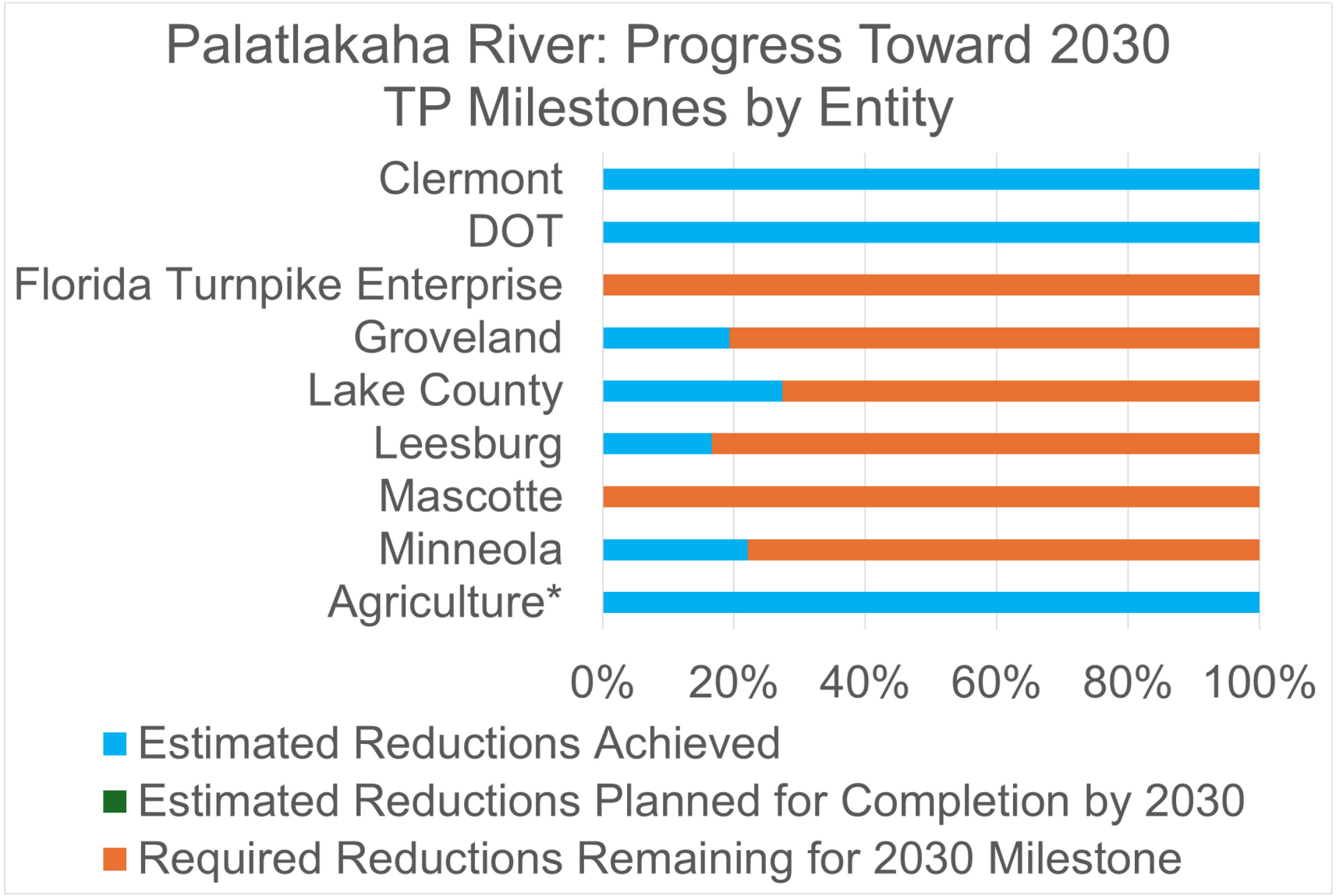
PROGRESS THRU DEC. 31, 2025 (DRAFT)

WATERSHED ALLOCATED REDUCTIONS



PROGRESS THRU DEC. 31, 2025 (DRAFT)

PALATLAKAHA RIVER



*These reductions are a combination of projects completed by DACS and the WMDs.

PROGRESS THRU DEC. 31, 2025 (DRAFT)

PALATLAKAHA RIVER

Total Required TN Reduction: 908 lbs/yr

Entities within the Watershed	Completed and Ongoing TN Reductions (lbs/yr)	Planned and Underway TN Reduction Estimates* (lbs/yr)
City of Clermont	840	0
City of Groveland	24	0
City of Leesburg	0	0
City of Mascotte	0	0
City of Minneola	8	0
Florida Turnpike Enterprise	0	0
DOT District 5	1494	0
Lake County	29	0
DACS	109	0
SJRWMD	5898	0
Total	**8402**	**0**

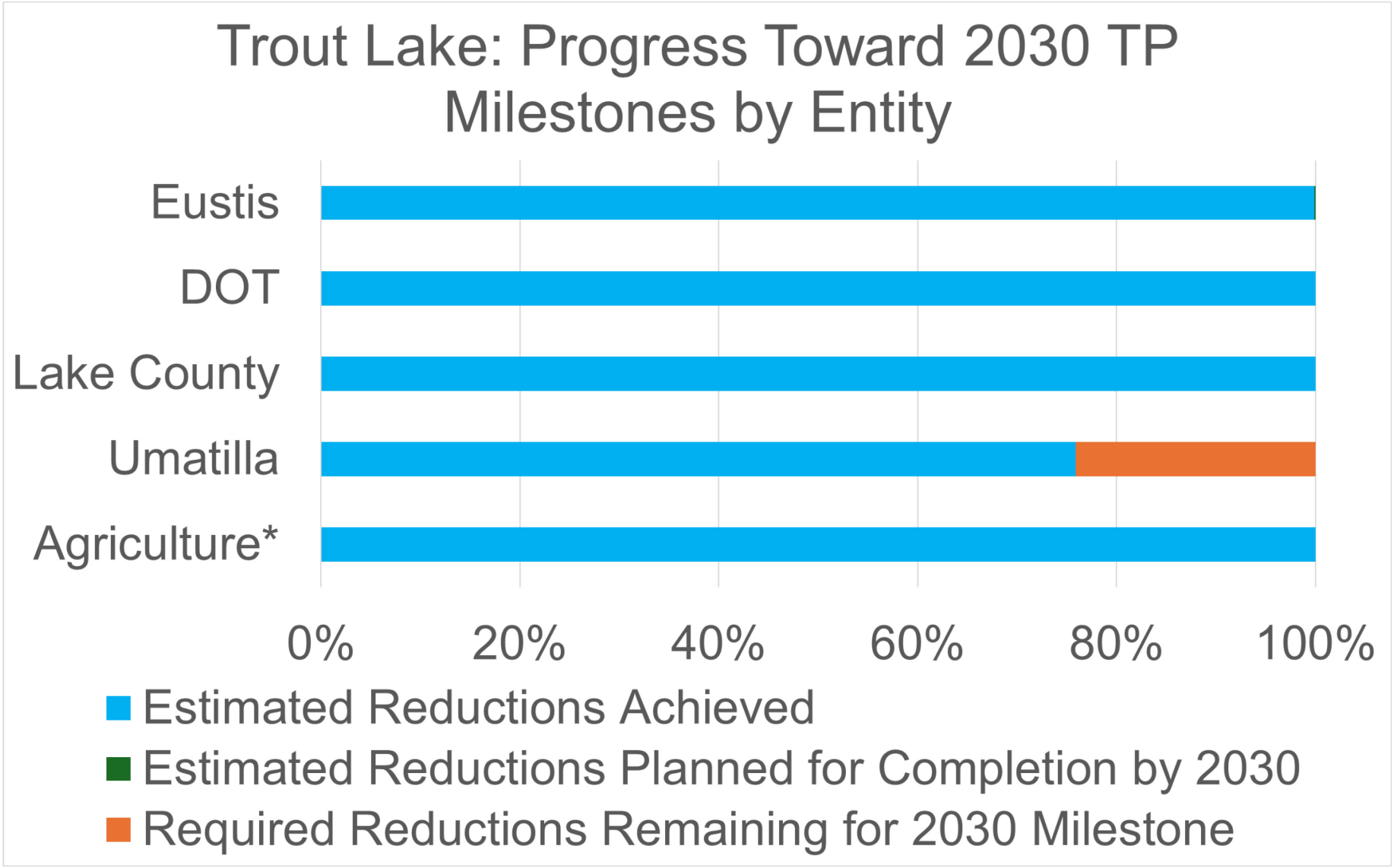
lbs/yr = pounds/year

Percent Achieved: 100%

*Planned and Underway project reductions are rough estimates. They are not included when calculating what has been achieved.

PROGRESS THRU DEC. 31, 2025 (DRAFT)

TROUT LAKE



*These reductions are a combination of projects completed by DACS and the WMDs.

PROGRESS THRU DEC. 31, 2025 (DRAFT)

TROUT LAKE

Total Required TN Reduction: 14,432 lbs/yr

Entities Within the Watershed	Completed and Ongoing TN Reductions (lbs/yr)	Planned and Underway TN Reduction Estimates* (lbs/yr)
City of Eustis	2,216	7
City of Umatilla	0	0
DOT District 5	578	0
Lake County	0	0
LCWA	0	0
DACS	3,562	0
SJRWMD	1,006	0
Total	**7,362**	**7**

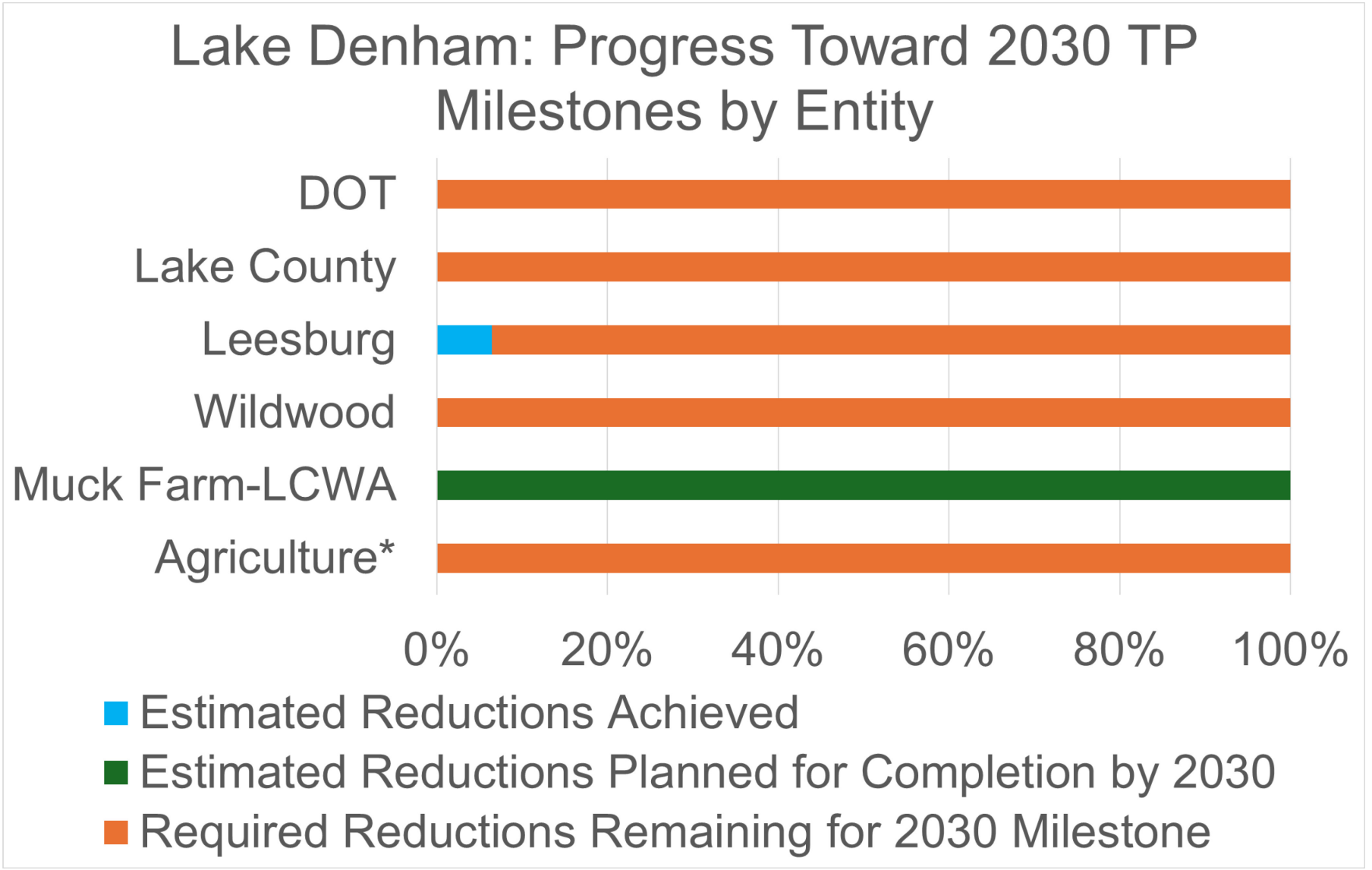
Percent Achieved: 51%

Required Reduction Remaining: 7,070 lbs/yr

*Planned and Underway project reductions are rough estimates. They are not included when calculating what has been achieved.

PROGRESS THRU DEC. 31, 2025 (DRAFT)

LAKE DENHAM



*These reductions are a combination of projects completed by DACS and the WMDs.

PROGRESS THRU DEC. 31, 2025 (DRAFT)

LAKE DENHAM

Total Required TN Reduction: 26,287 lbs/yr

Entities Within the Watershed	Completed and Ongoing TN Reductions (lbs/yr)	Planned and Underway TN Reduction Estimates* (lbs/yr)
City of Leesburg	0	0
City of Wildwood	0	0
Lake County	0	0
LCWA	0	0
DACS	0	0
DOT	0	0
Total	**0**	**0**

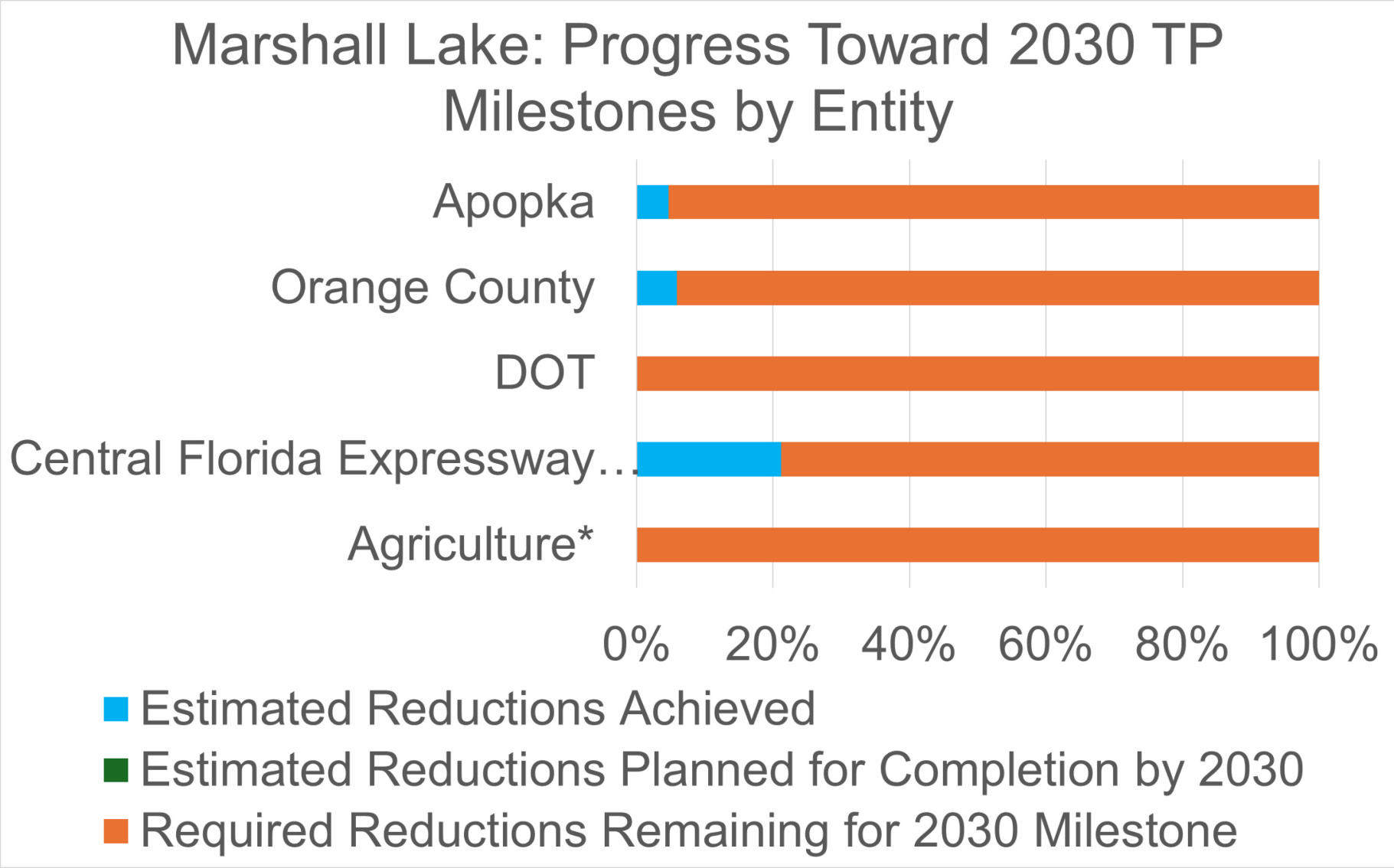
Percent Achieved: 0%

Required Reduction Remaining: 26,287 lbs/yr

*Planned and Underway project reductions are rough estimates. They are not included when calculating what has been achieved.

PROGRESS THRU DEC. 31, 2025 (DRAFT)

MARSHALL LAKE



*These reductions are a combination of projects completed by DACS and the WMDs.

PROGRESS THRU DEC. 31, 2025 (DRAFT)

MARSHALL LAKE

Total Required TN Reduction: 1,090 lbs/yr

Entities Within the Watershed	Completed and Ongoing TN Reductions (lbs/yr)	Planned and Underway TN Reduction Estimates* (lbs/yr)
City of Apopka	0	0
Orange County	0	0
Central Florida Expressway	0	0
DACS	0	0
DOT	0	0
Total	**0**	**0**

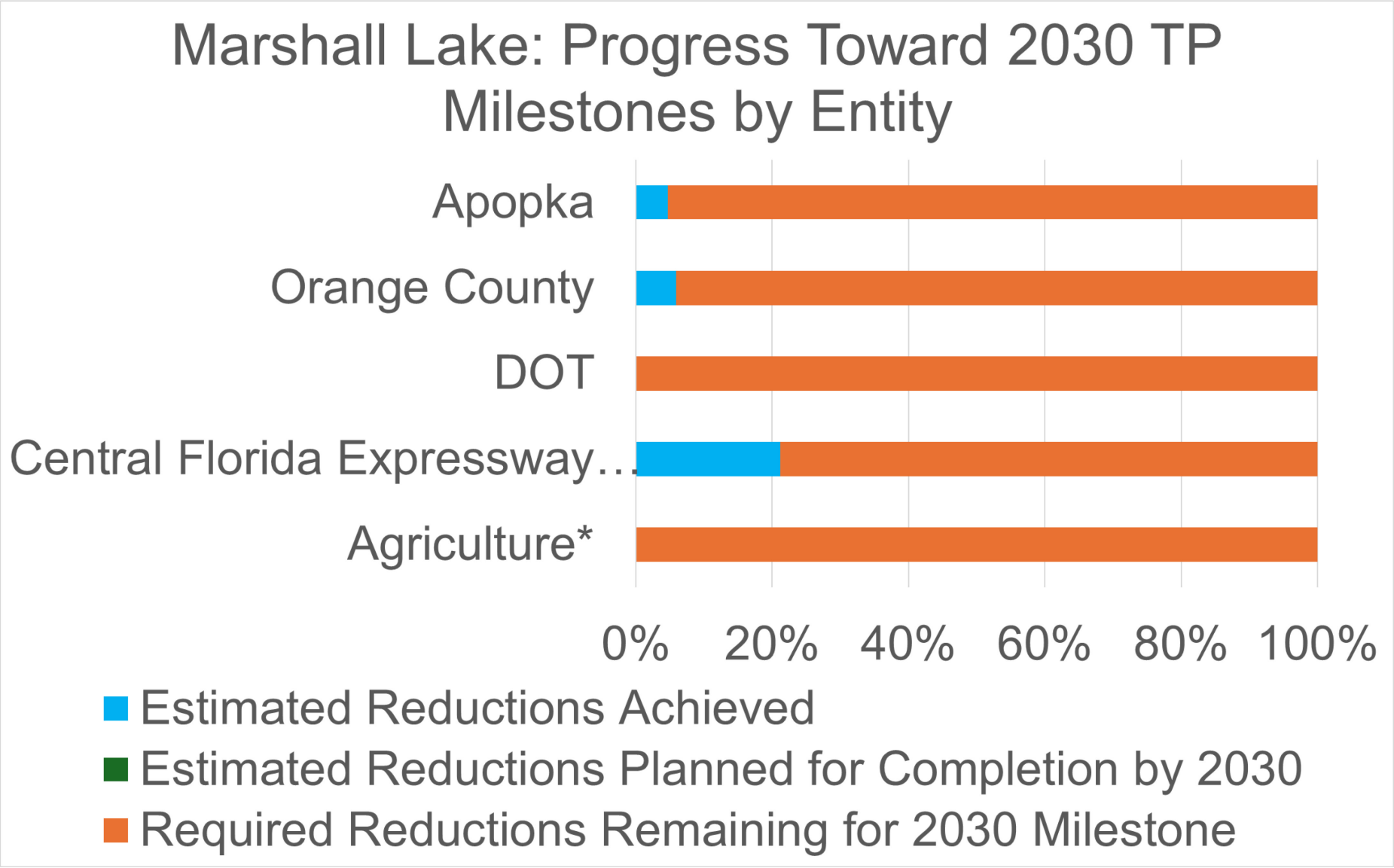
Percent Achieved: 0%

Required Reduction Remaining: 1,090 lbs/yr

*Planned and Underway project reductions are rough estimates. They are not included when calculating what has been achieved.

PROGRESS THRU DEC. 31, 2025 (DRAFT)

LAKE ROBERTS



*These reductions are a combination of projects completed by DACS and the WMDs.

PROGRESS THRU DEC. 31, 2025 (DRAFT)

LAKE ROBERTS

Total Required TN Reduction: 320 lbs/yr

Entities Within the Watershed	Completed and Ongoing TN Reductions (lbs/yr)	Planned and Underway TN Reduction Estimates* (lbs/yr)
City of Winter Garden	0	0
Orange County	0	0
DACS	0	0
Total	**0**	**0**

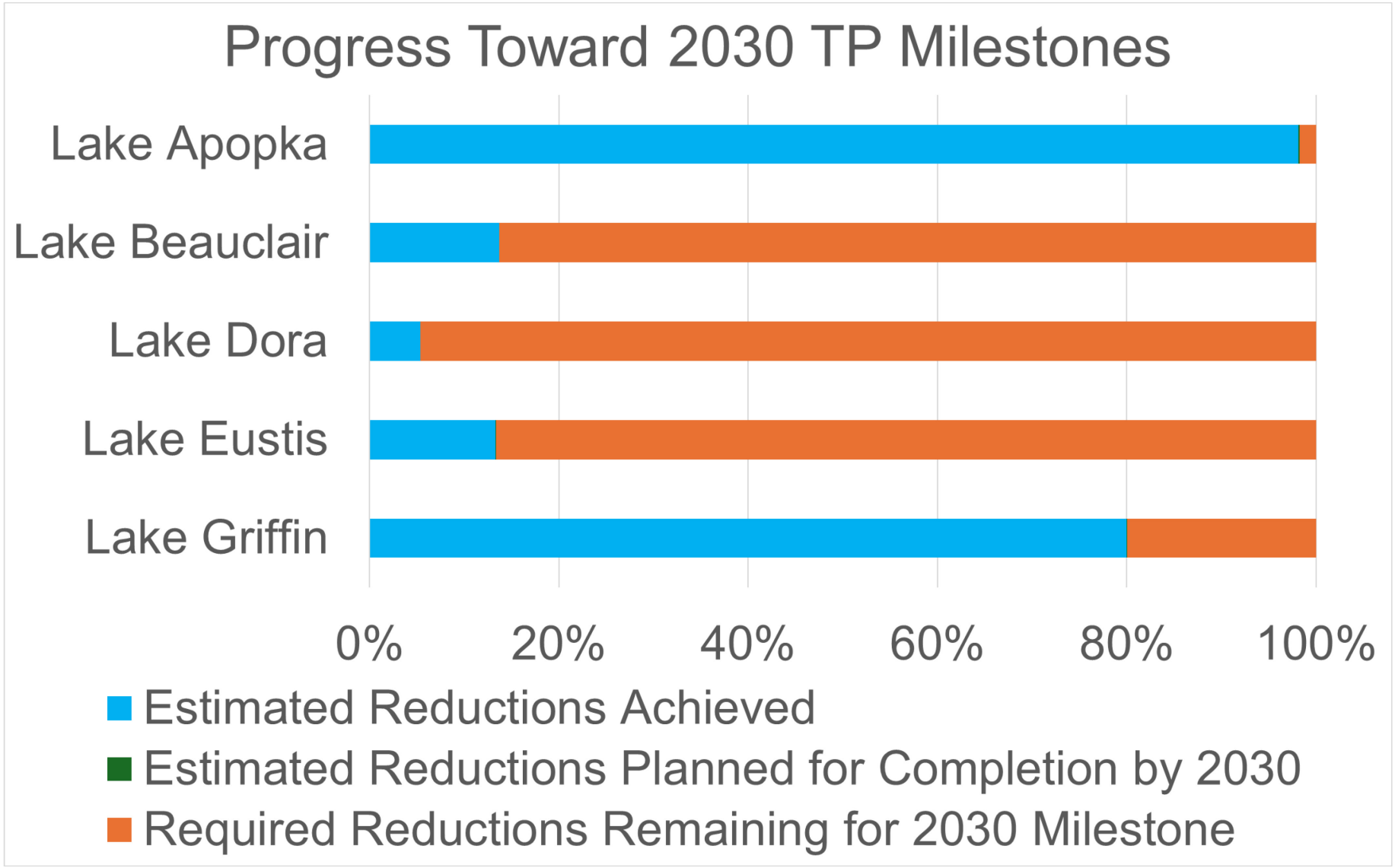
Percent Achieved: 0%

Required Reduction Remaining: 320 lbs/yr

*Planned and Underway project reductions are rough estimates. They are not included when calculating what has been achieved.

PROGRESS THRU DEC. 31, 2025 (DRAFT)

WATERSHED ALLOCATED REDUCTIONS



PROGRESS THRU DEC. 31, 2025 (DRAFT)

LAKE APOPKA

Entities Within the Watershed	Completed and Ongoing TP Reductions (lbs/yr)	Planned and Underway TP Reduction Estimates* (lbs/yr)
City of Apopka	557	0
City of Clermont	0	0
City of Minneola	17	0
City of Ocoee	263	0
City of Winter Garden	1,456	0
Lake County	0	0
Orange County	382	7
Town of Montverde	0	0
Town of Oakland	0	0
DOT District 5	2,740	0
DACS	0	0
SJRWMD	100,828	143
Total	**106,243**	**150**

Total Required TP Reduction: 108,258 lbs/yr

Percent Achieved: 98%

Required Reduction Remaining: 2,015 lbs/yr

*Planned and Underway project reductions are rough estimates. They are not included when calculating what has been achieved.

PROGRESS THRU DEC 31, 2025 (DRAFT)

LAKE BEAUCLAIR

Total Required TP Reduction: 40,940 lbs/yr

Entities Within the Watershed	Completed and Ongoing TP Reductions (lbs/yr)	Planned and Underway TP Reduction Estimates* (lbs/yr)
City of Tavares	0	0
Lake County	10	0
LCWA	5,000	0
Orange County	3	0
DACS	6	0
SJRWMD	588	0
Total	**5,607**	**0**

Percent Achieved: 14%

Required Reduction Remaining: 35,533 lbs/yr

*Planned and Underway project reductions are rough estimates. They are not included when calculating what has been achieved.

PROGRESS THRU DEC. 31, 2025 (DRAFT)

LAKE DORA

Total Required TP Reduction: 33,419 lbs/yr

Entities Within the Watershed	Completed and Ongoing TP Reductions (lbs/yr)	Planned and Underway TP Reduction Estimates* (lbs/yr)
City of Eustis	19	0
City of Mount Dora	892	0
City of Tavares	460	3
Lake County	257	0
DOT District 5	153	0
DACS	5	0
SJRWMD	0	0
Total	**1,785**	**3**

Percent Achieved: 5%

Required Reduction Remaining: 31,634 lbs/yr

*Planned and Underway project reductions are rough estimates. They are not included when calculating what has been achieved.

PROGRESS THRU DEC. 31, 2025 (DRAFT)

LAKE EUSTIS

Total Required TP Reduction: 22,757 lbs/yr

Entities Within the Watershed	Completed and Ongoing TP Reductions (lbs/yr)	Planned and Underway TP Reduction Estimates* (lbs/yr)
City of Eustis	855	0
City of Leesburg	4	0
City of Tavares	306	11
Lake County	1,591	0
DOT District 5	216	0
DACS	4	0
SJRWMD	53	0
Total	**3,029**	**11**

Percent Achieved: 13%

Required Reduction Remaining: 19,728 lbs/yr

*Planned and Underway project reductions are rough estimates. They are not included when calculating what has been achieved.

PROGRESS THRU DEC. 31, 2025 (DRAFT)

LAKE GRIFFIN

Total Required TP Reduction: 55,196 lbs/yr

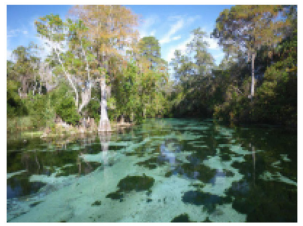
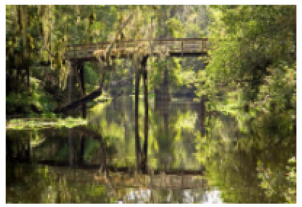
Entities Within the Watershed	Completed and Ongoing TP Reductions (lbs/yr)	Planned and Underway TP Reduction Estimates* (lbs/yr)
City of Fruitland Park	18	15
City of Leesburg	200	0
Lake County	177	0
Marion County	42	0
Town of Lady Lake	8	0
DEP	11	0
DOT District 5	227	0
DACS	2.03	0
SJRWMD	43,462	0
Total	**44,147**	**15**

Percent Achieved: 80%

Required Reduction Remaining: 11,049 lbs/yr

*Planned and Underway project reductions are rough estimates. They are not included when calculating what has been achieved.

RESOURCES
BMAP WEBSITE AND STORYMAPS

Nutrient BMAPs	Springs BMAPs	Fecal Bacteria Impaired BMAPs
		
Nutrient BMAPs contain a comprehensive set of solutions, such as permit limits on wastewater facilities, urban and agricultural best management practices, and conservation programs designed to achieve pollutant reductions established by a total maximum daily load	Springs BMAPs identify the sources of nutrient pollution, list the specific projects and programs necessary to reduce nutrient pollution, and establish priority focus areas where statutory prohibitions on certain activities apply (such as installation of new conventional septic systems).	Bacteria basin management action plans (BMAPs) include management strategies or projects, to be implemented by local stakeholders, that aim to eliminate and prevent the release of waste, containing pathogens, to natural waterbodies.

[Basin Management Action Plans (BMAPs) | Florida Department of Environmental Protection]

RESOURCES
FUNDING OPPORTUNITIES

Florida Department of Environmental Protection
Funding Opportunities

FloridaDEP.gov/Funding

SUBSCRIBER PAGE

HOW TO CONTACT US

BMAPProgram@FloridaDEP.gov

THANK YOU

Jessica Fetgatter
Water Quality Restoration Program
Division of Environmental Assessment and Restoration
Florida Department of Environmental Protection

Contact Information:
850-245-8107
Jessica.Fetgatter@FloridaDEP.gov

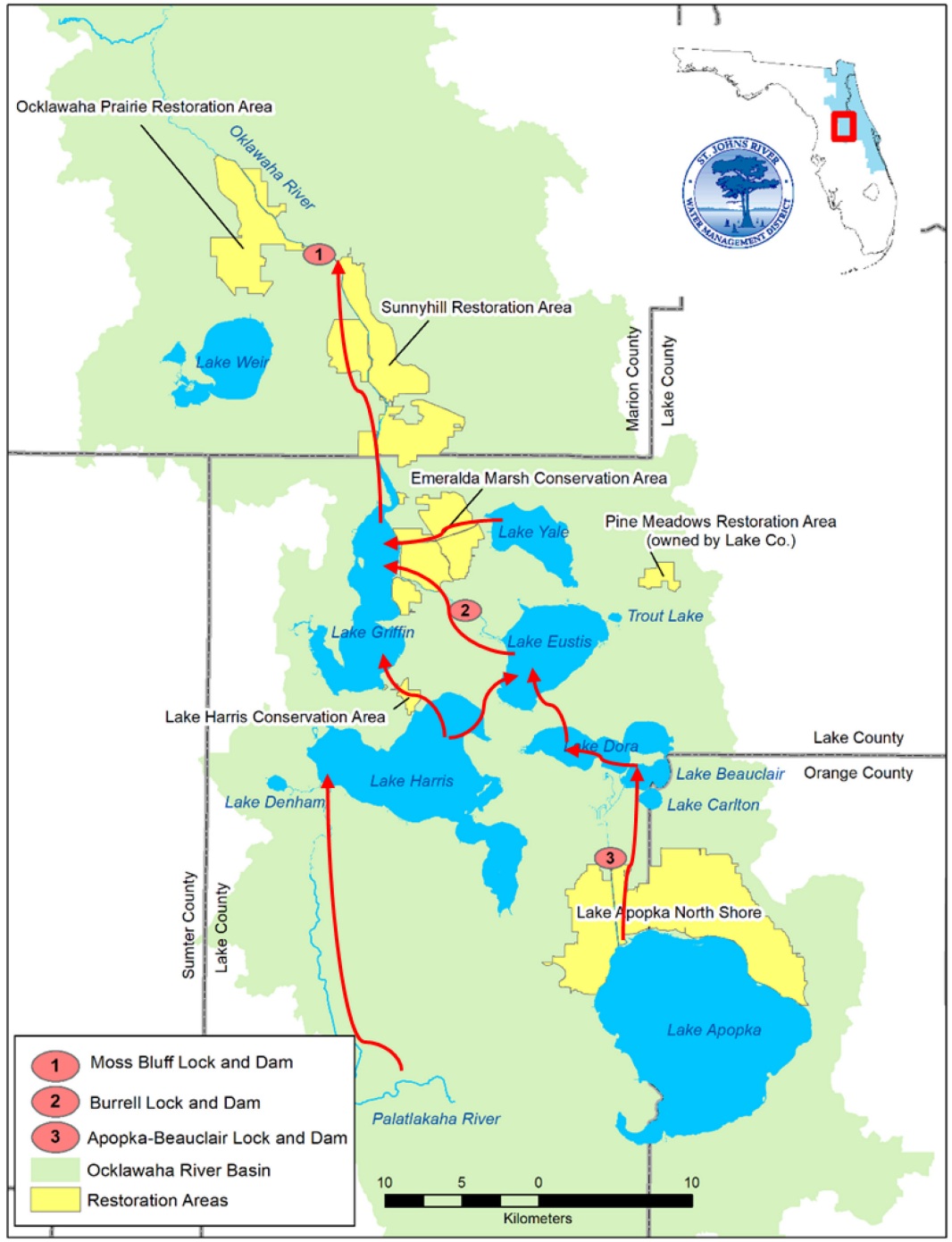
Nutrient Loading and Water Quality in the Upper Ocklawaha River Basin Lakes

Jian Di, Environmental Scientist V
Bureau of Environment Sciences

DEP BMAP meeting
April 21, 2026

St. Johns River
Water Management District

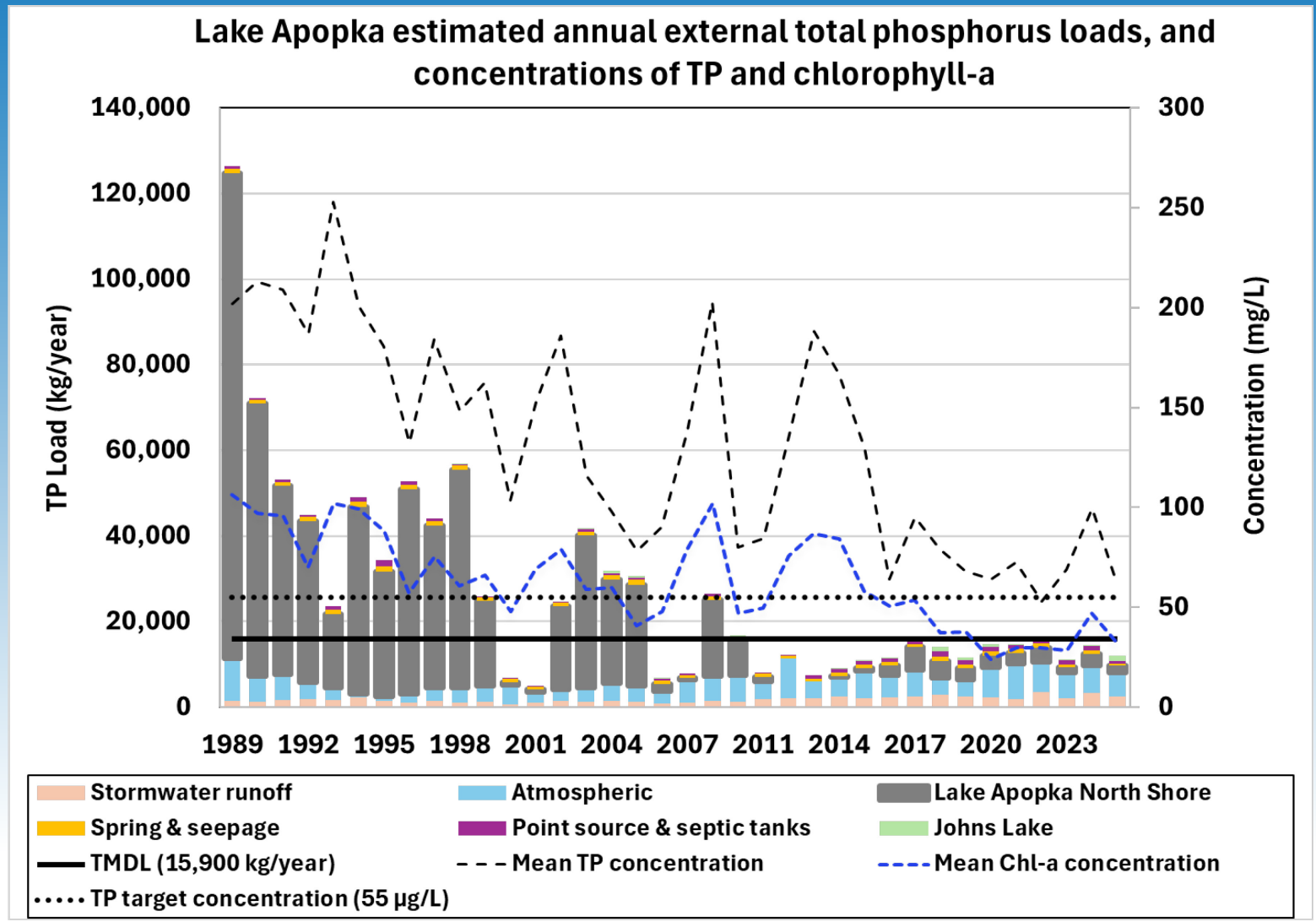
Upper Ocklawaha River Basin (UORB) Total Maximum Daily Load (TMDL) Lakes and Restoration Areas



St. Johns River Water Management District

Lake Apopka

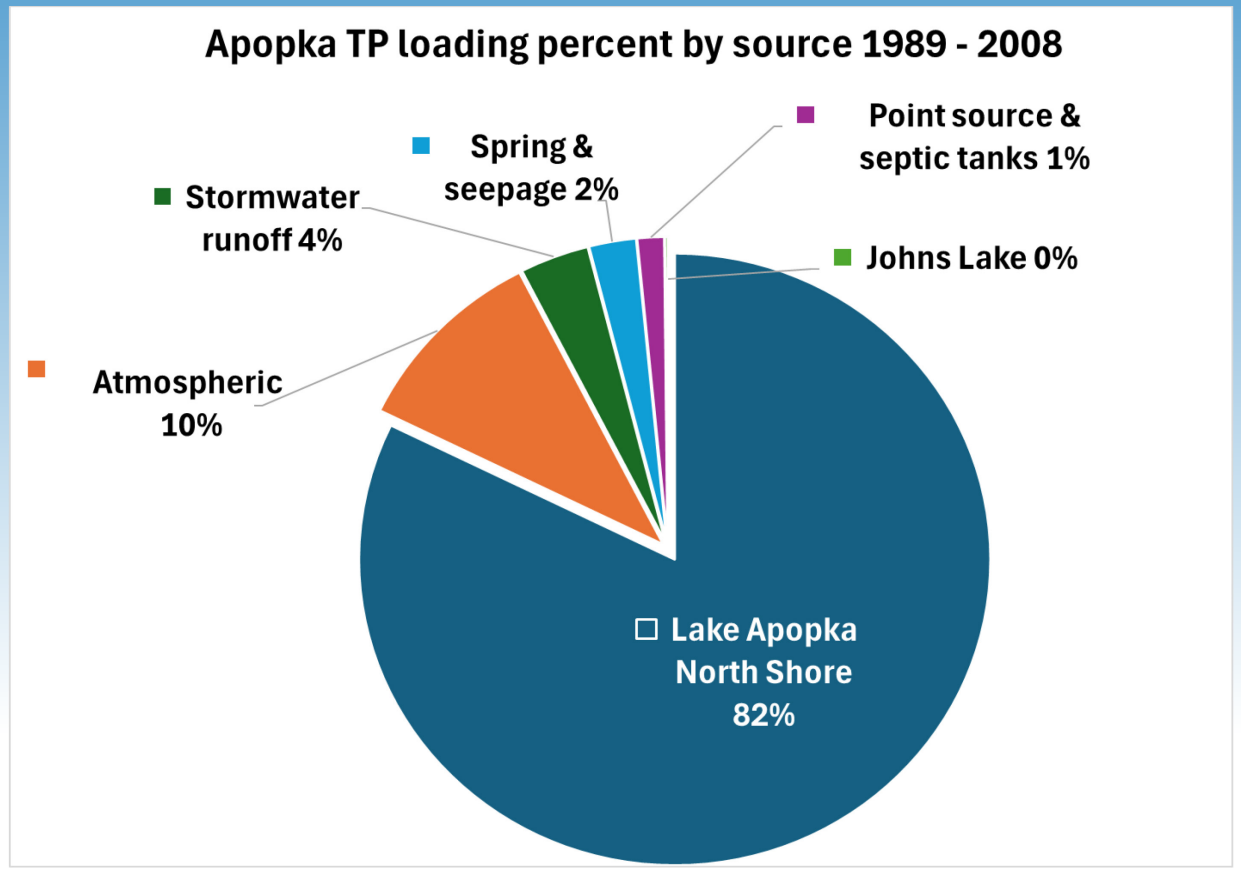
- Annual Total Phosphorus (TP) loads have remained stable since 2011, staying below the TMDL in most years
- Water quality continues to improve
- In-lake nutrient recycling is declining, driven by ongoing restoration projects (shad harvest, Marsh Flow-Way, and SAV expansion)

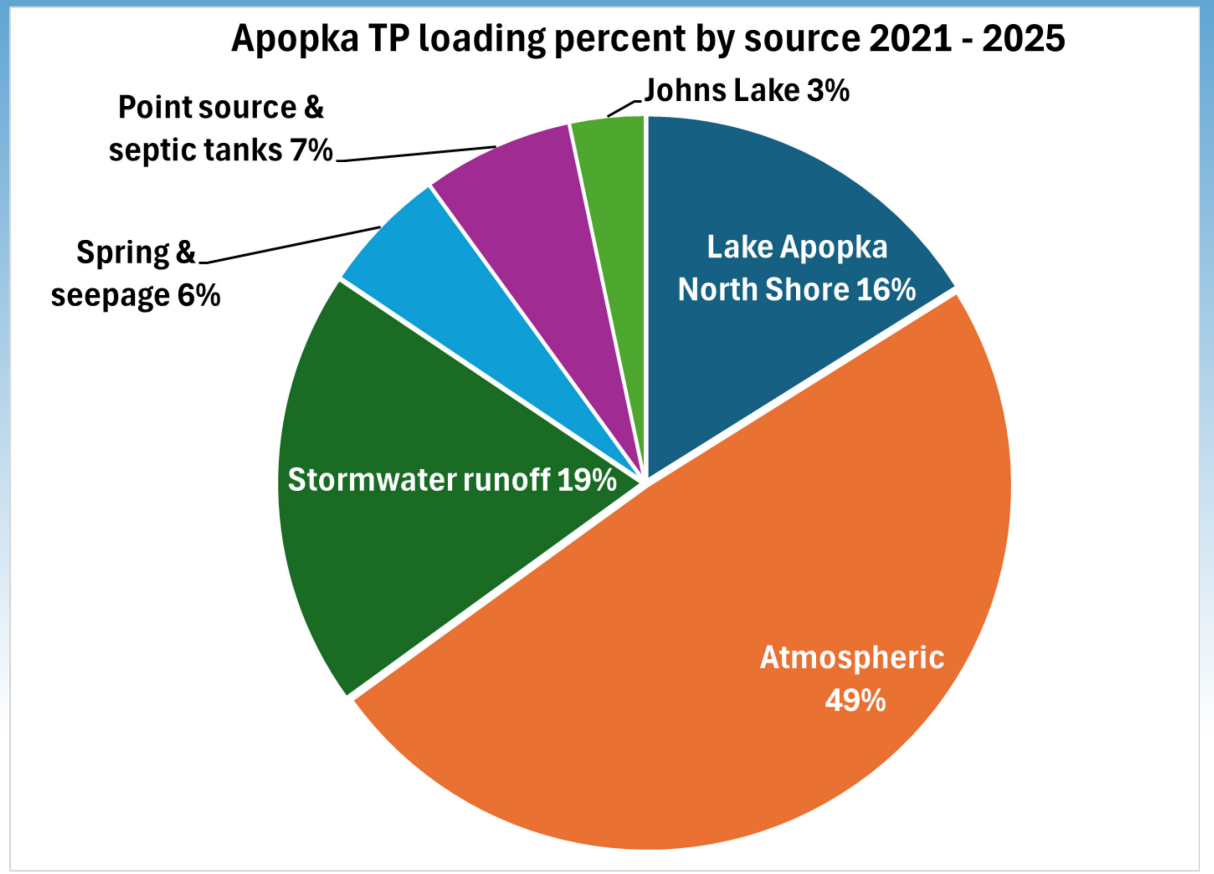


St. Johns River Water Management District

Lake Apopka (continuous)

- Primary external TP source has shifted from Lake Apopka North Shore (LANS) to atmospheric deposition

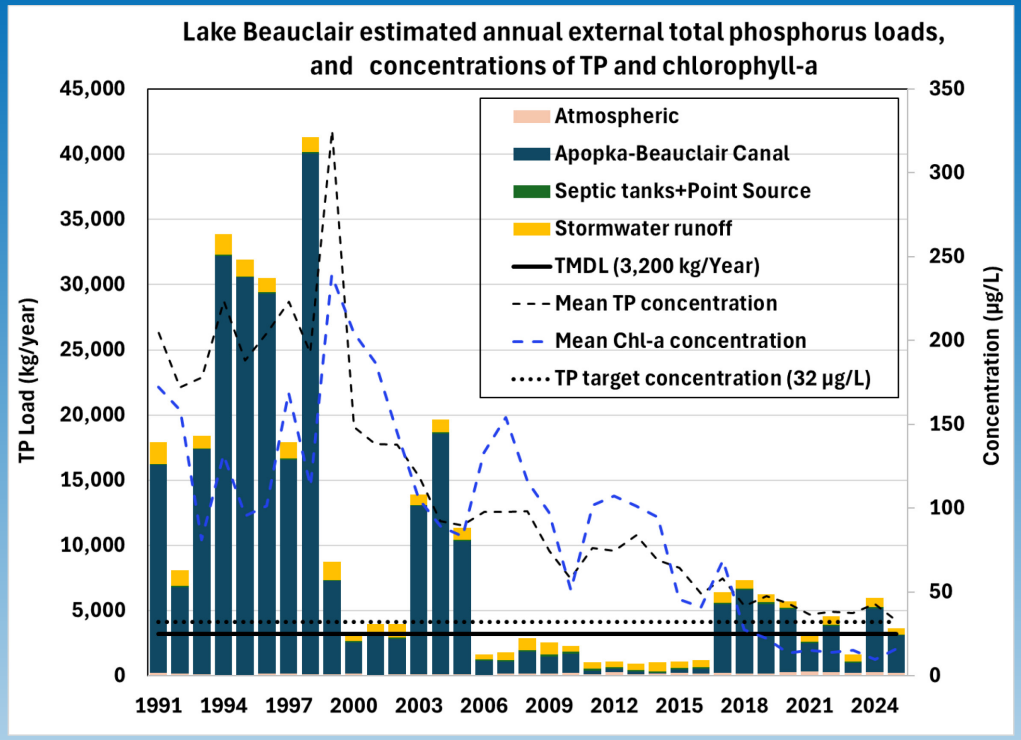


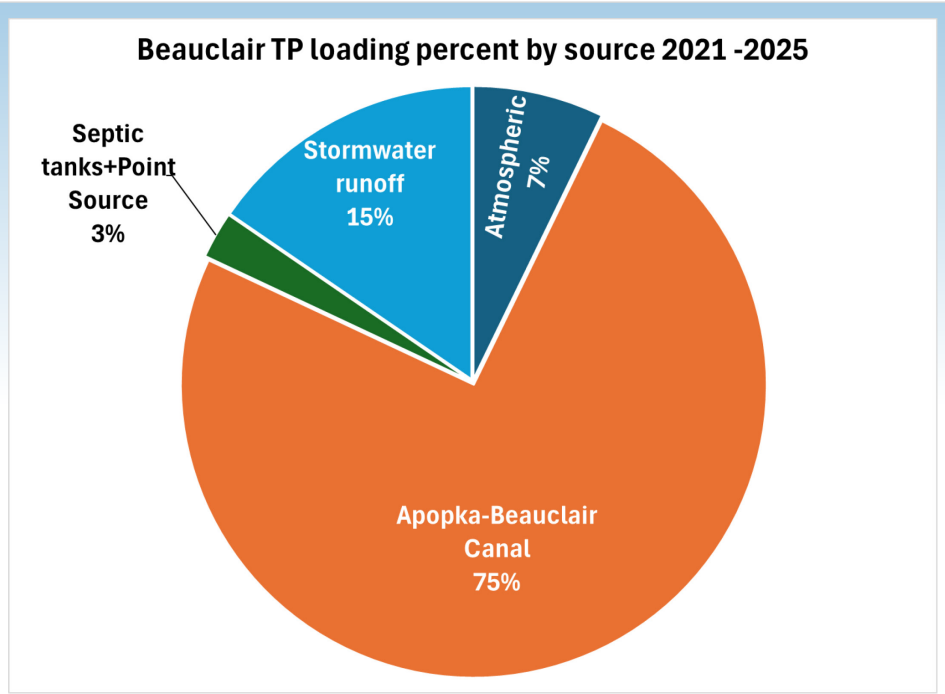


St. Johns River Water Management District

Lake Beauclair

- Annual TP loads exceed the TMDL most of the years since 2017, yet both TP and chlorophyll-a (Chl-a) concentrations continue long-term improving trends
- Improving water quality is linked to lower TP concentrations in Apopka inflows
- Lake Apopka is the dominant TP source in normal and wet years, while drought years greatly reduce loading and typically allow Lake Beauclair to meet the TMDL

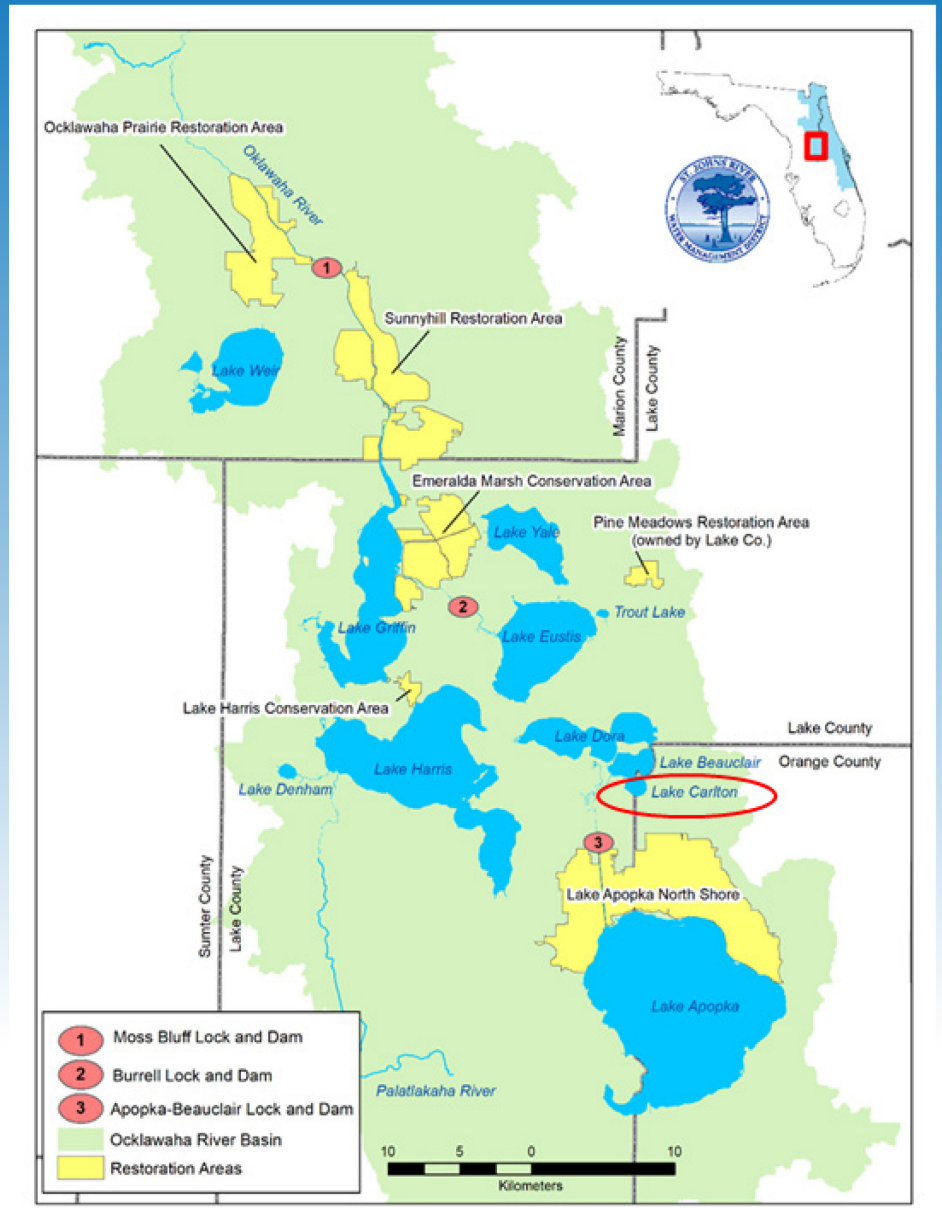




St. Johns River Water Management District

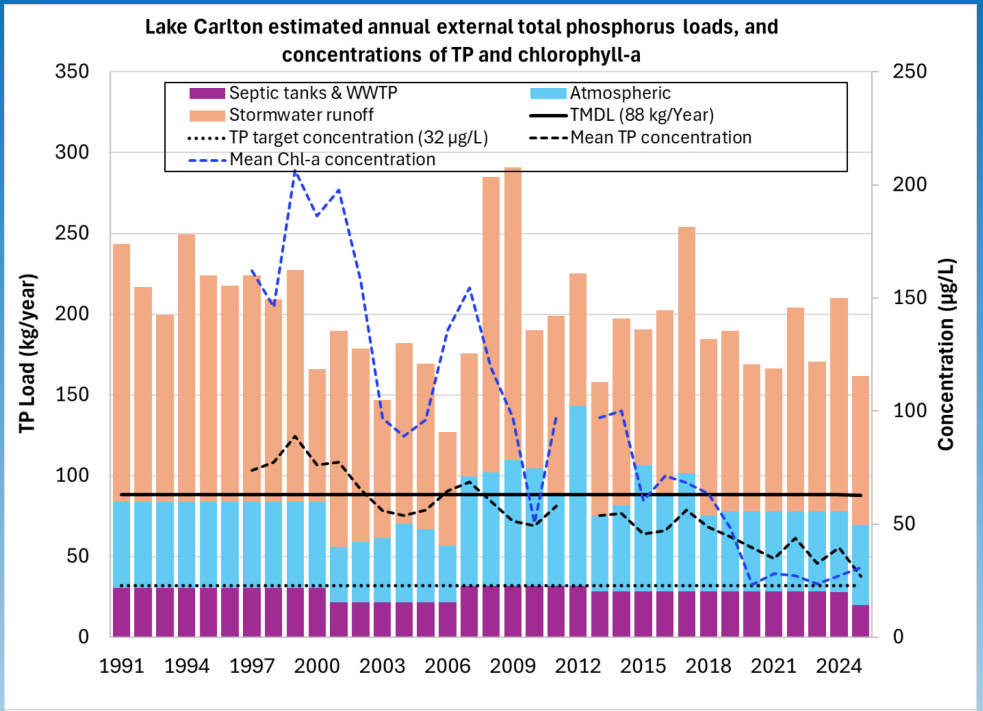
Lake Carlton

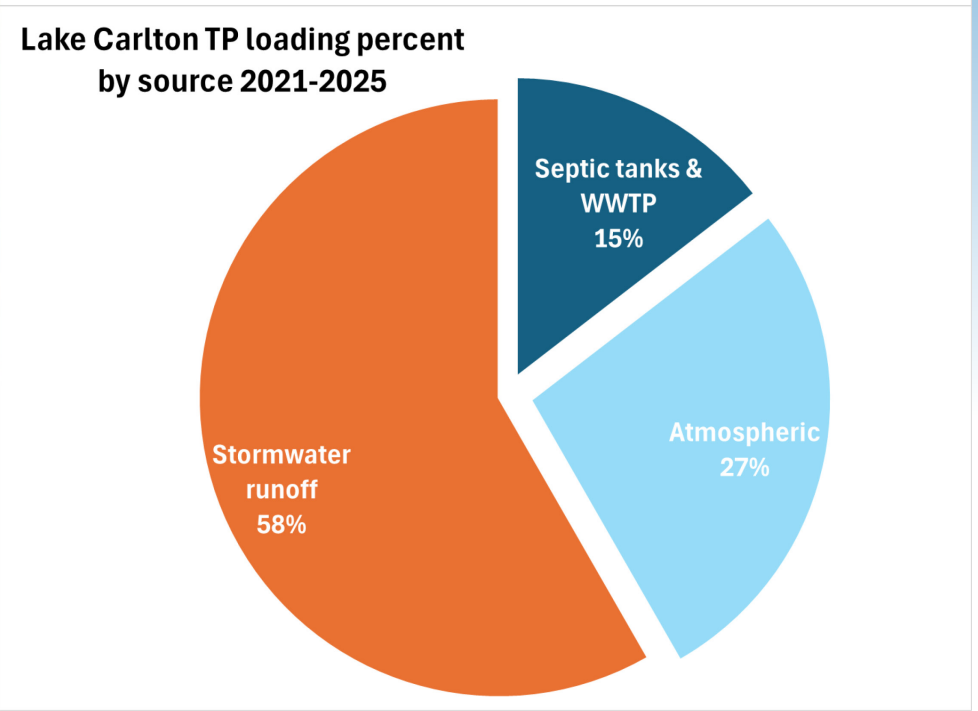
- A very small lake, about 380 acres, hydrologically connected to Lake Beauclair



Lake Carlton (Continuous)

- Annual TP load has remained relatively stable since the 1990s
- Both TP and Chl-a show improving trends
- Water quality in this lake is closely correlated with Lake Beauclair
- Main source loading is from stormwater runoff

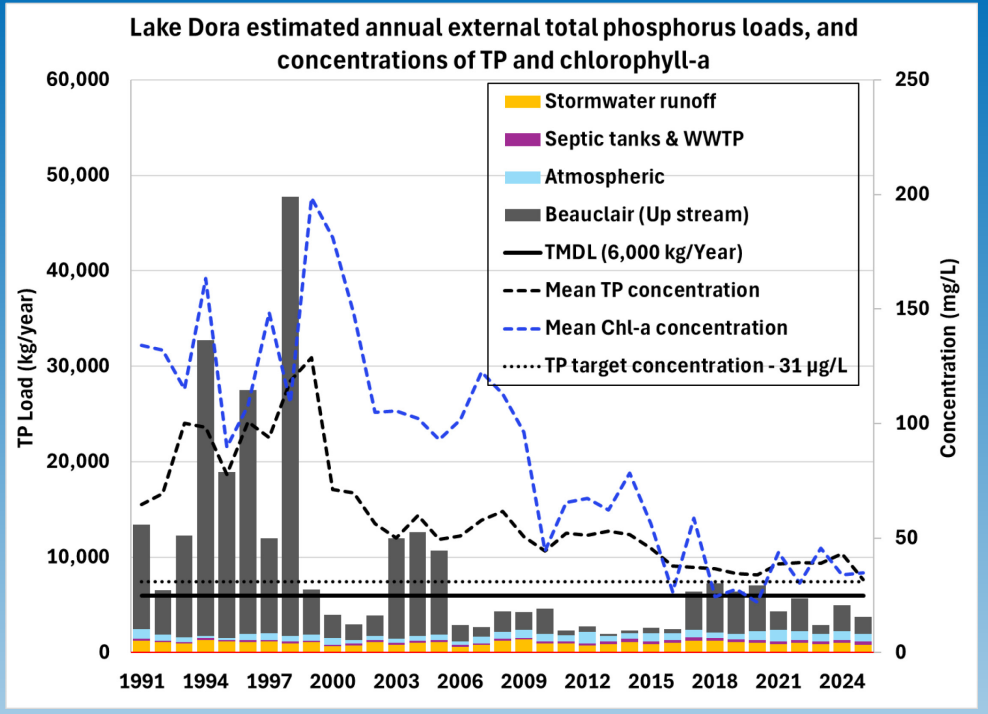


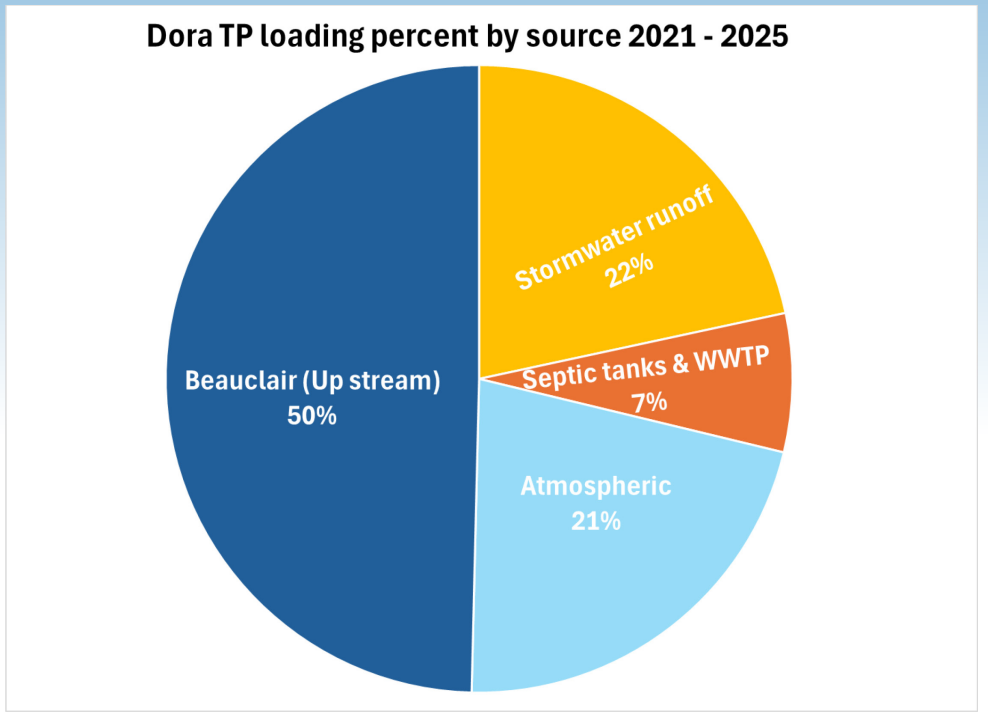


St. Johns River Water Management District

Lake Dora

- Annual TP loads has met the TMDL in most years since 2006
- Both TP and chlorophyll-a show long-term decreasing trends
- 2025 TP = 32 µg/L, very close to the restoration target of 31 µg/L.
- Upstream inflow is the primary TP loading source (50%)

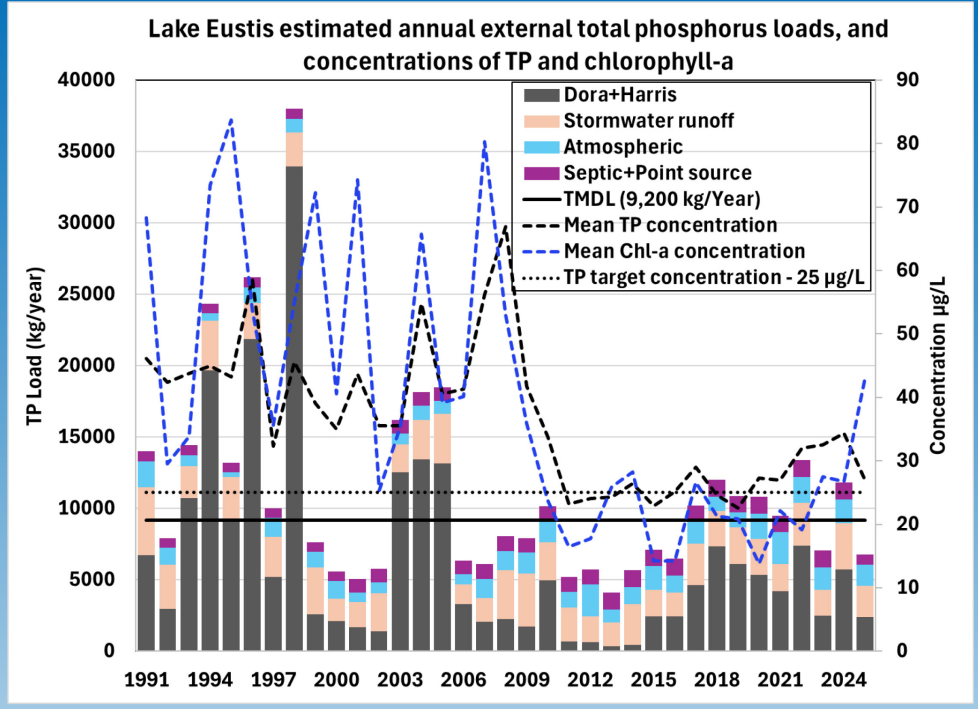


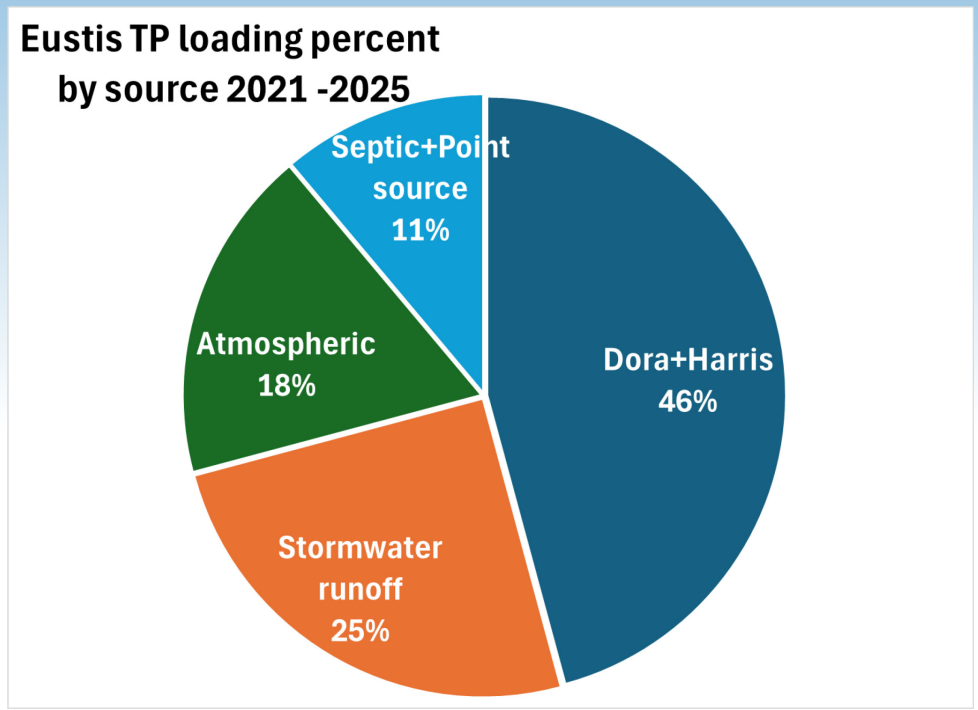


St. Johns River Water Management District

Lake Eustis

- Annual TP load met TMDL in 2025
- TP and Chl-a have shown increasing trends since 2011, with TP concentration exceeding the TMDL target since 2020
- Upstream inputs (Harris plus Dora) are the top TP loading source, contributing approximately 46% of the total external load

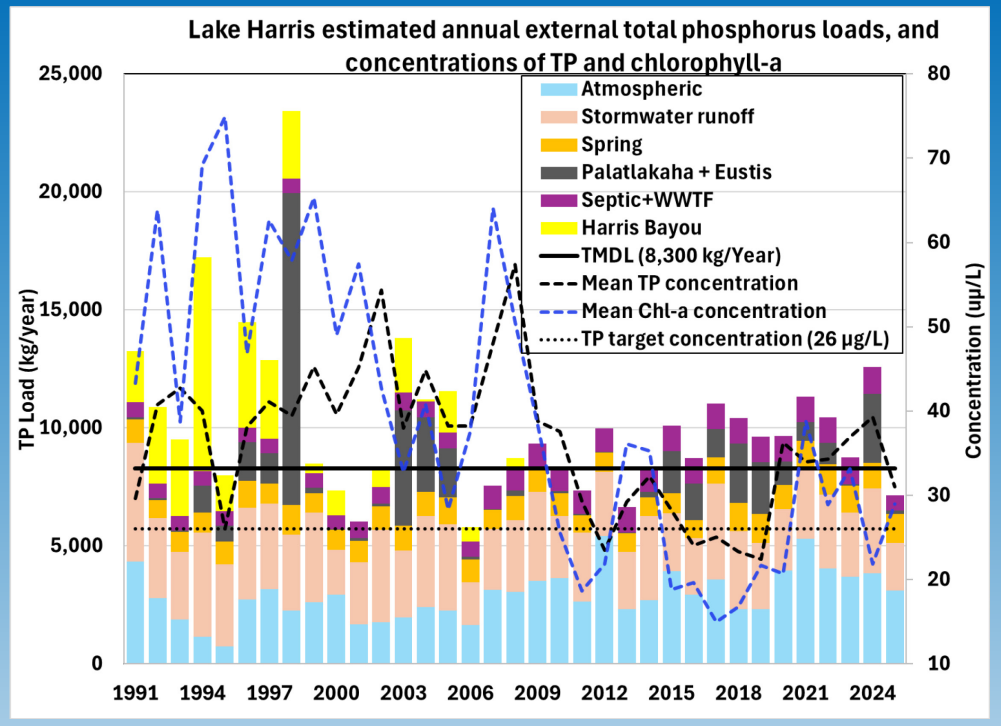


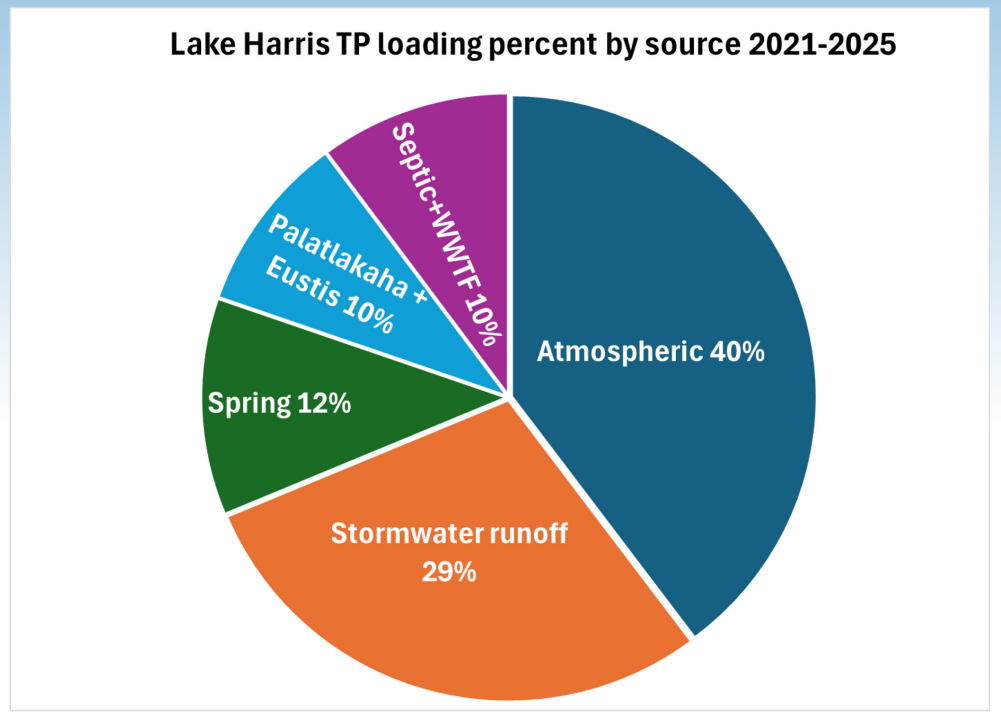


St. Johns River Water Management District

Lake Harris

- Annual TP load in 2025 met TMDL for the first time since 2014
- TP concentrations were above restoration target of 26 µg/L in the recent six (6) years and have shown an increasing trend since 2012
- Atmospheric deposition is the largest TP loading source, about 40% of the total external loading followed by stormwater runoff (29%)

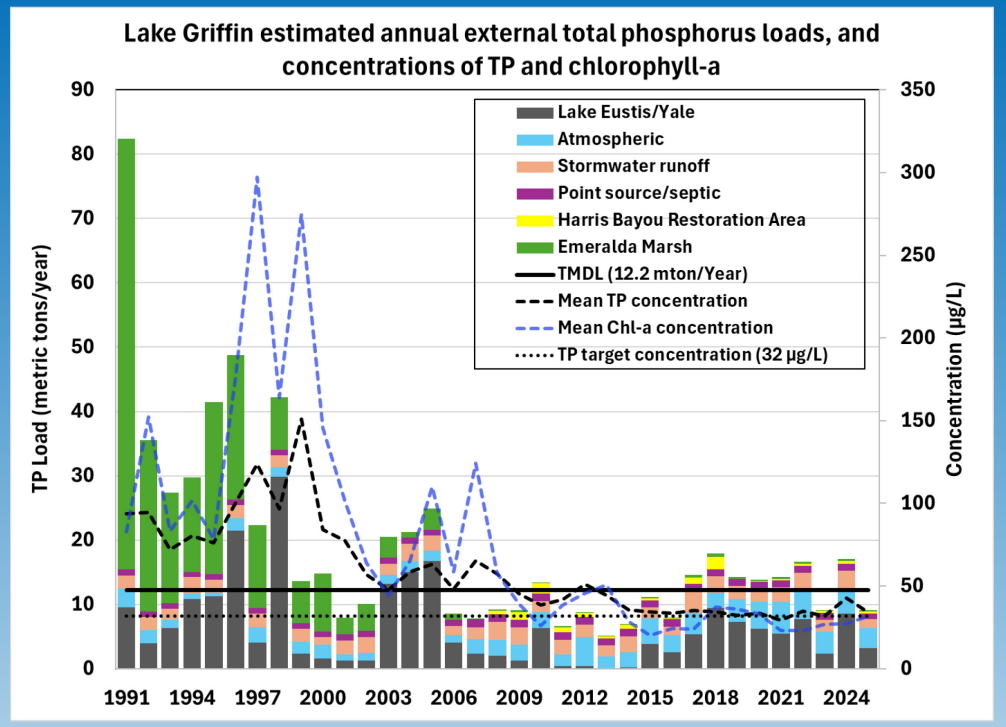


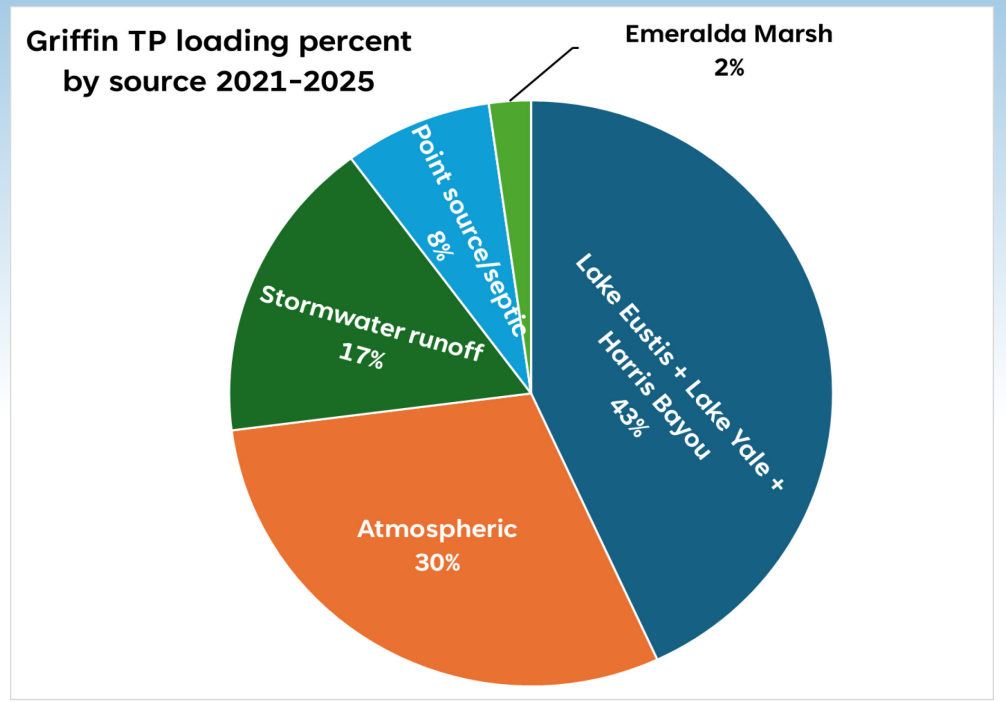


St. Johns River Water Management District

Lake Griffin

- Met TP TMDL in 2025, recent five (5) years average load exceeds TMDL
- TP concentration were fluctuated around the restoration target since 2015
- Upstream is the largest source of TP loading (Lake Eustis + Lake Yale + Harris Bayou)

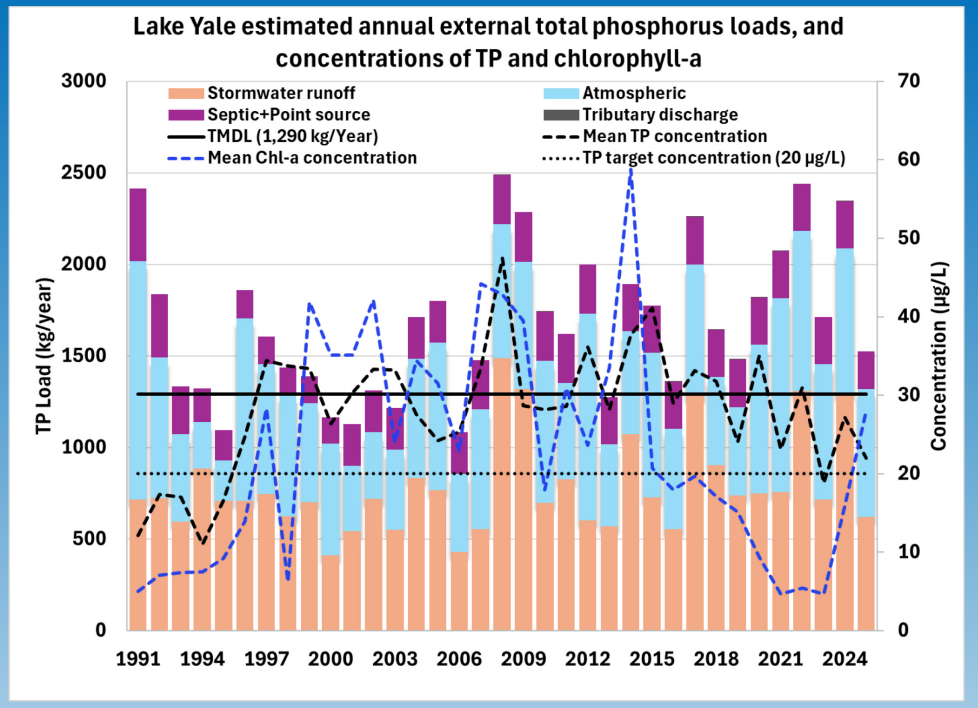


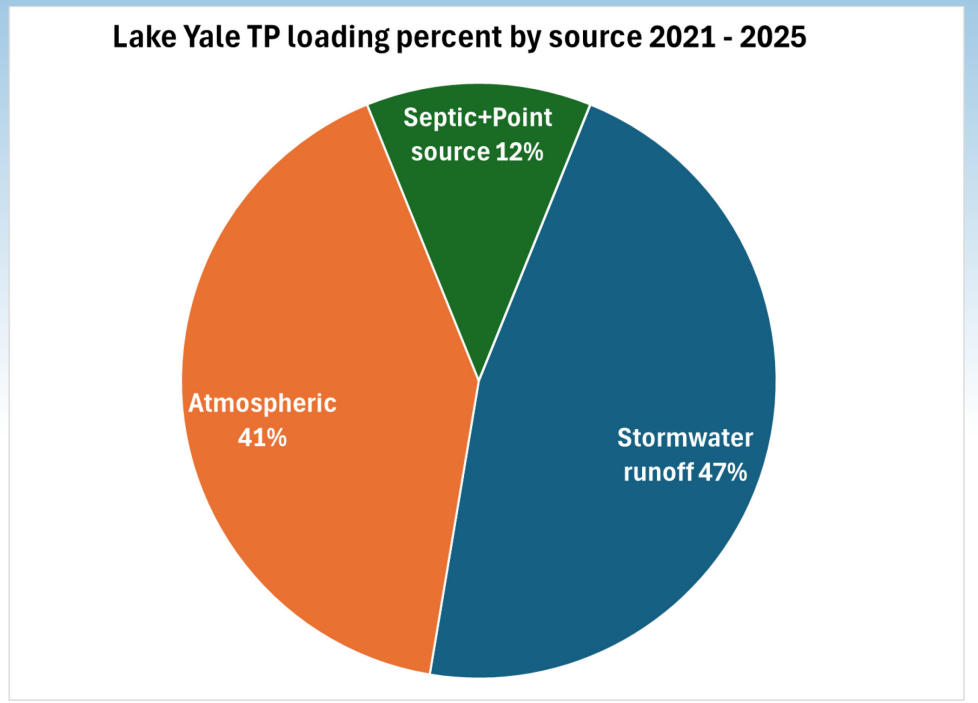


St. Johns River Water Management District

Lake Yale

- Annual TP loads to Lake Yale exceeded the TMDL in most years since 2004
- Although TP concentrations improved after 2015 and dipped below the 10 µg/L target in 2023, levels rose above the target again in 2024 and 2025.
- Stormwater runoff is the leading source of TP loading (≈47%), followed closely by atmospheric deposition (≈41%)

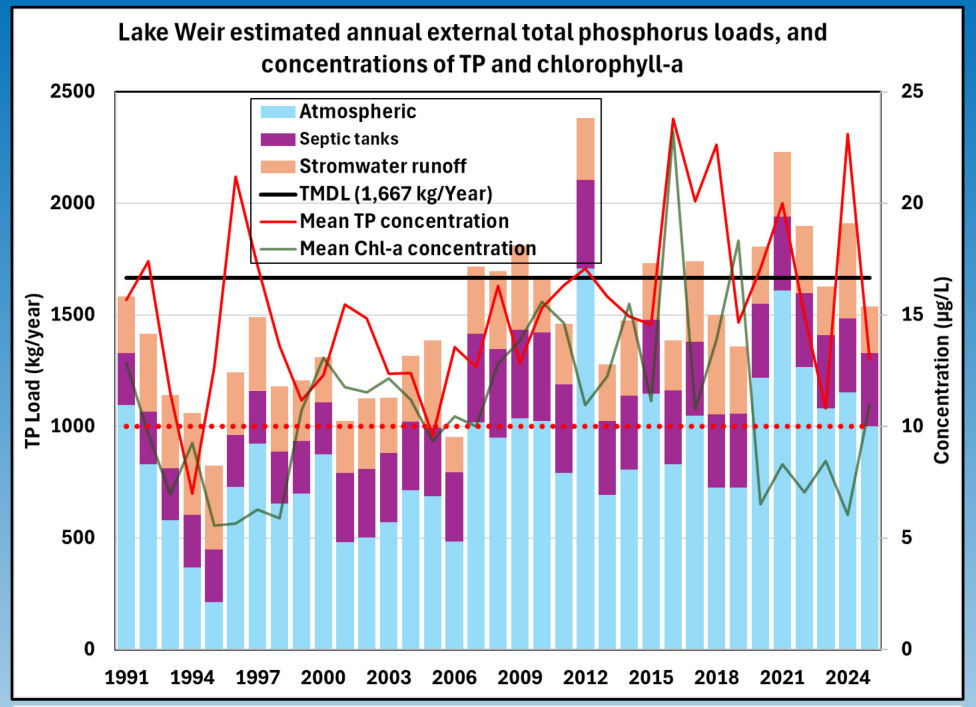


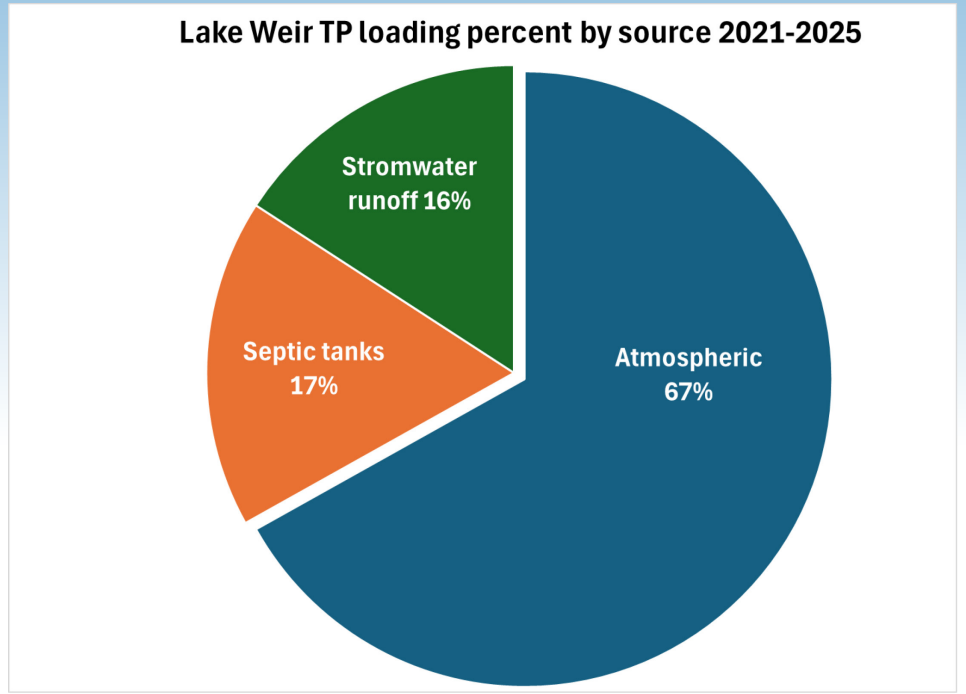


St. Johns River Water Management District

Lake Weir

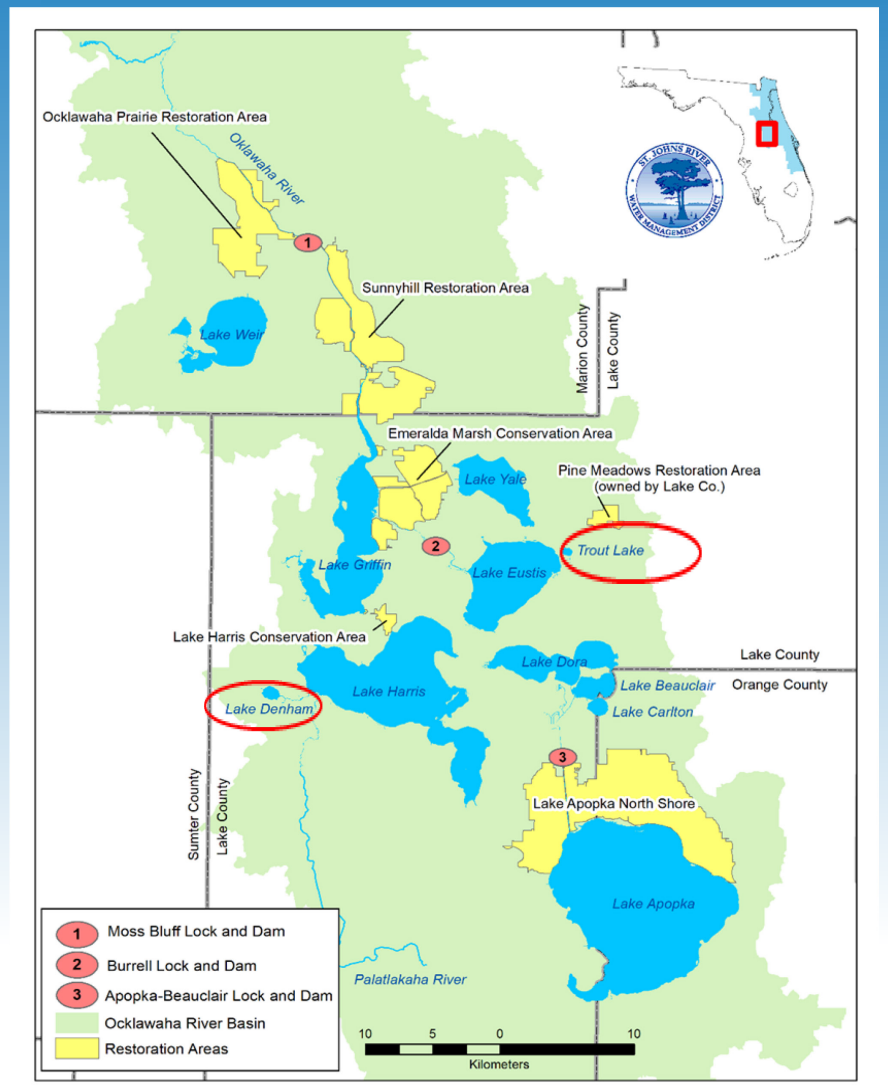
- TP loading has exhibited a long-term increasing trend over the past 30 years, although it was less than the TMDL target in 2025
- TP concentrations have remained above the target level of 10 µg/L and continue to show a long-term increasing trend
- Atmospheric deposition is the largest external TP source



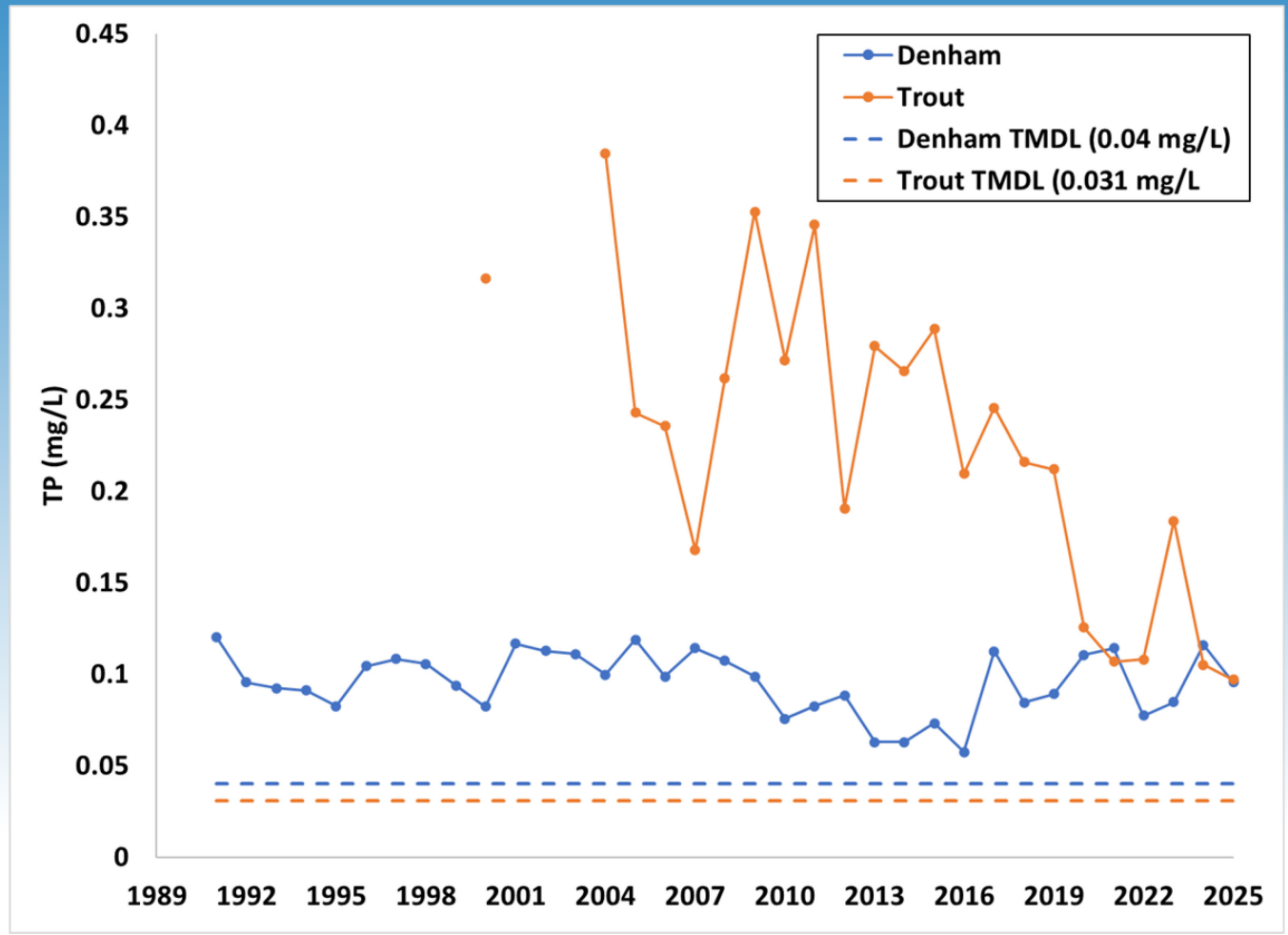


St. Johns River Water Management District

Trout Lake and Lake Denham

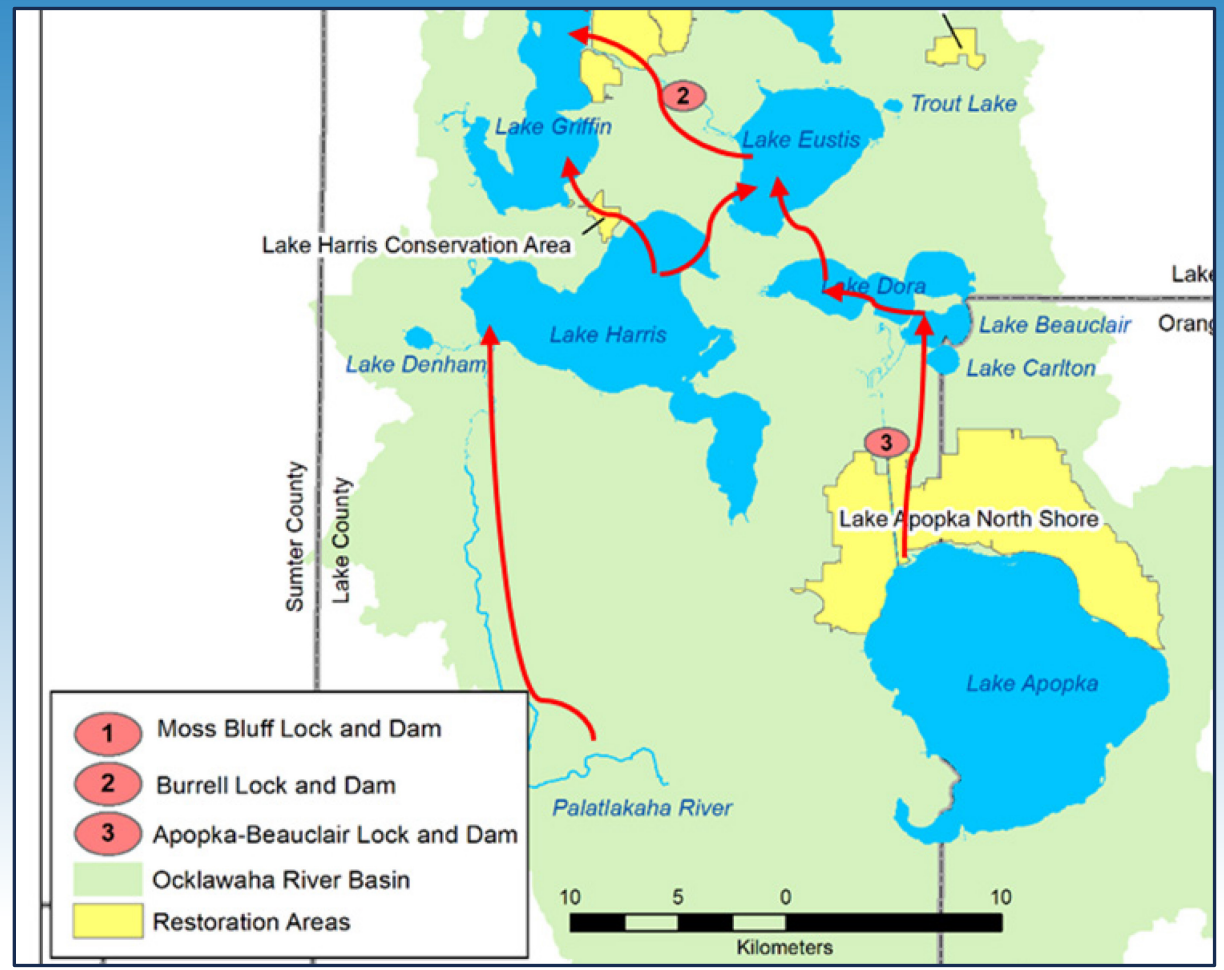


Annual average TP concentrations in Lake Denham & Trout Lake

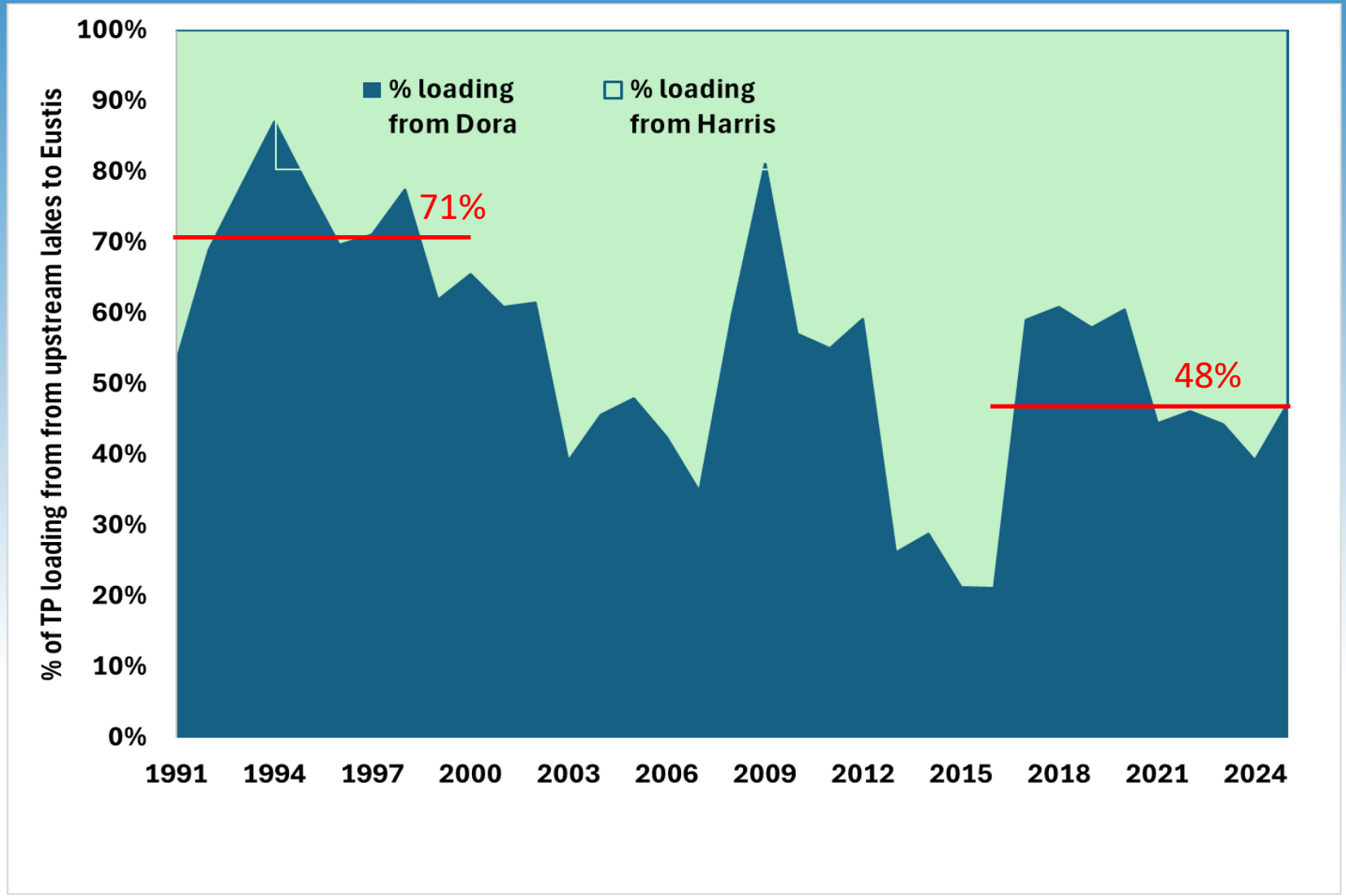


St. Johns River Water Management District

Influence of Upstream Lakes (Harris and Dora) on TP Concentrations in Lake Eustis



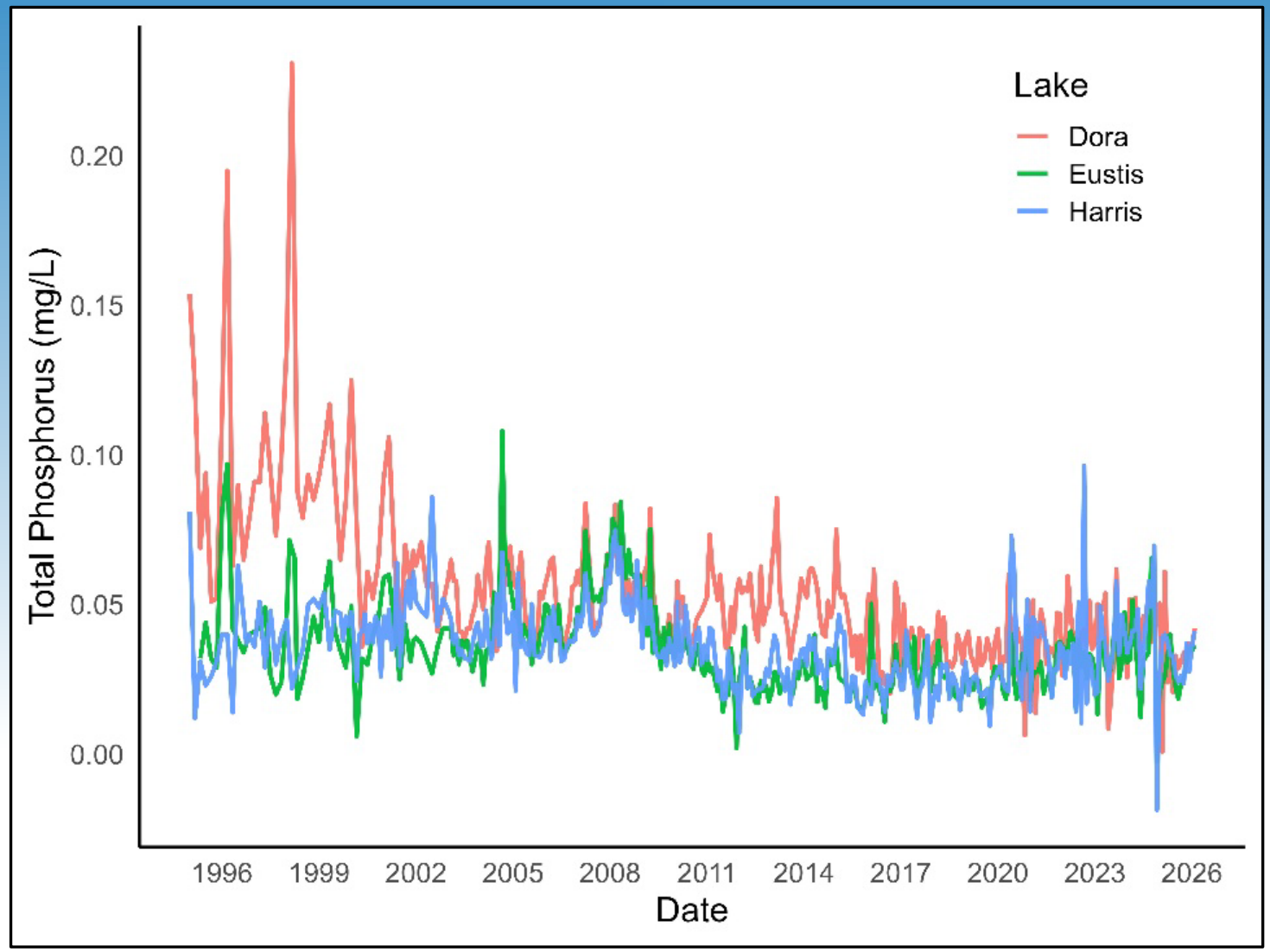
Proportion of TP Loading from Harris and Dora to Lake Eustis



St. Johns River Water Management District

Long-Term Trends in TP Concentrations for Lakes Dora, Eustis, and Harris

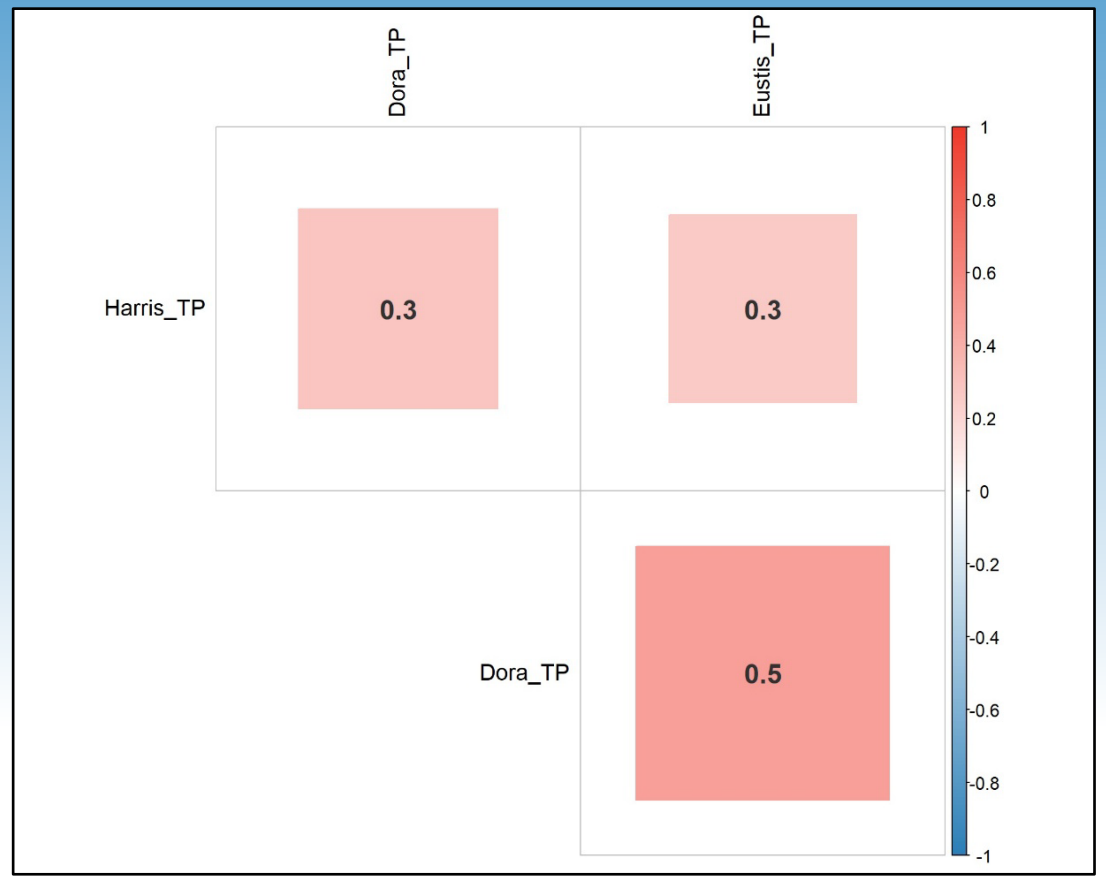
- Substantial TP concentration decreasing in Lake Dora
- Moderate declines in Lake Harris
- More subtle declines in Lake Eustis



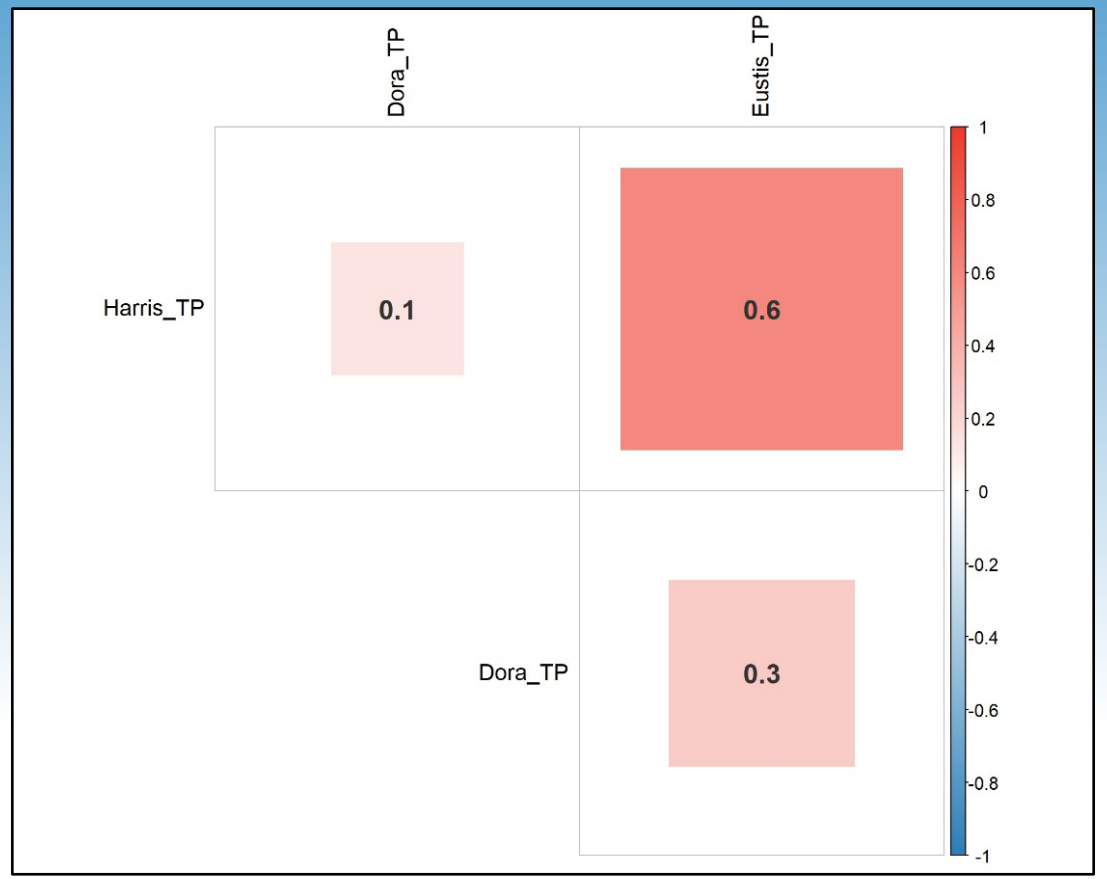
St. Johns River Water Management District

Correlation Matrices of TP Concentrations Among Lakes Dora, Eustis, and Harris for Two Time Periods

1991 – 2000 period



2016 -2025 period



St. Johns River Water Management District

Relative Influence of TP Concentration in Lakes Harris and Dora on TP Concentrations in Lake Eustis for Two Time Periods

1991–2000

- Dora > Harris
- Dora TP explained far more of Eustis TP variability

2016–2025

- Harris > Dora
- Harris TP now dominates as the source of variation explaining Eustis TP

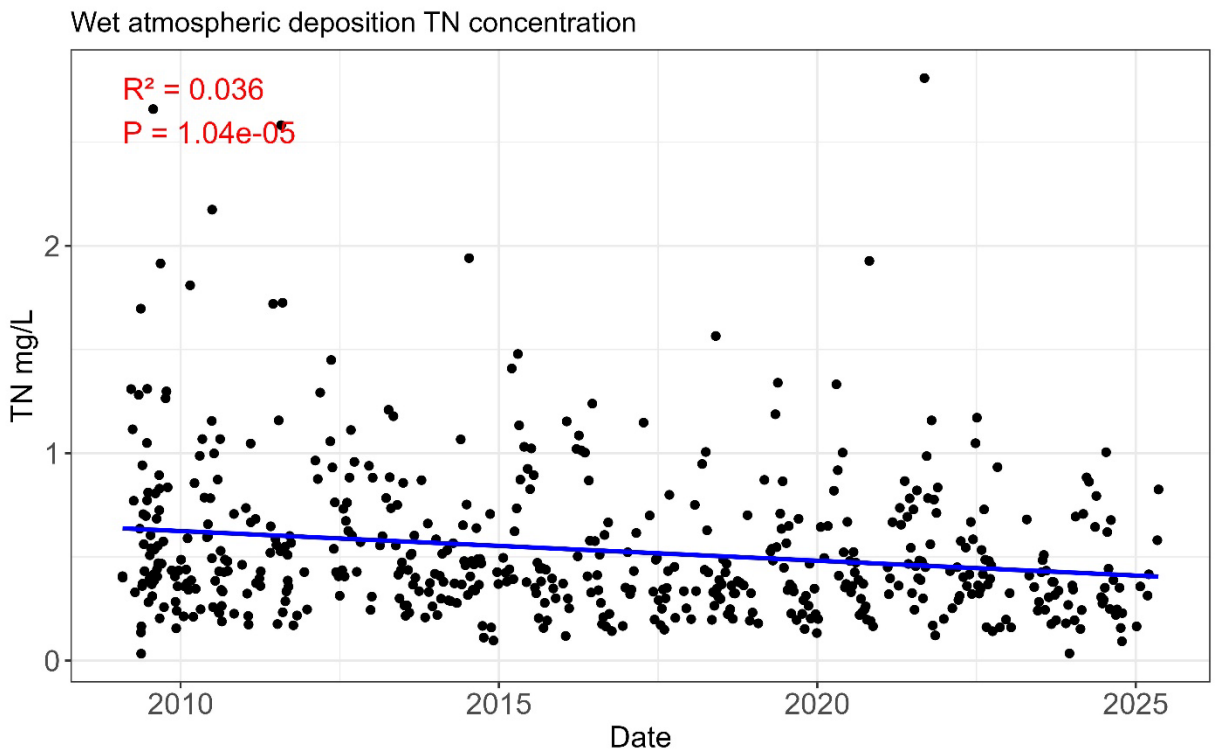
Eustis TP = b1(Harris TP) + b2(Dora TP)
standardized regression coefficients:

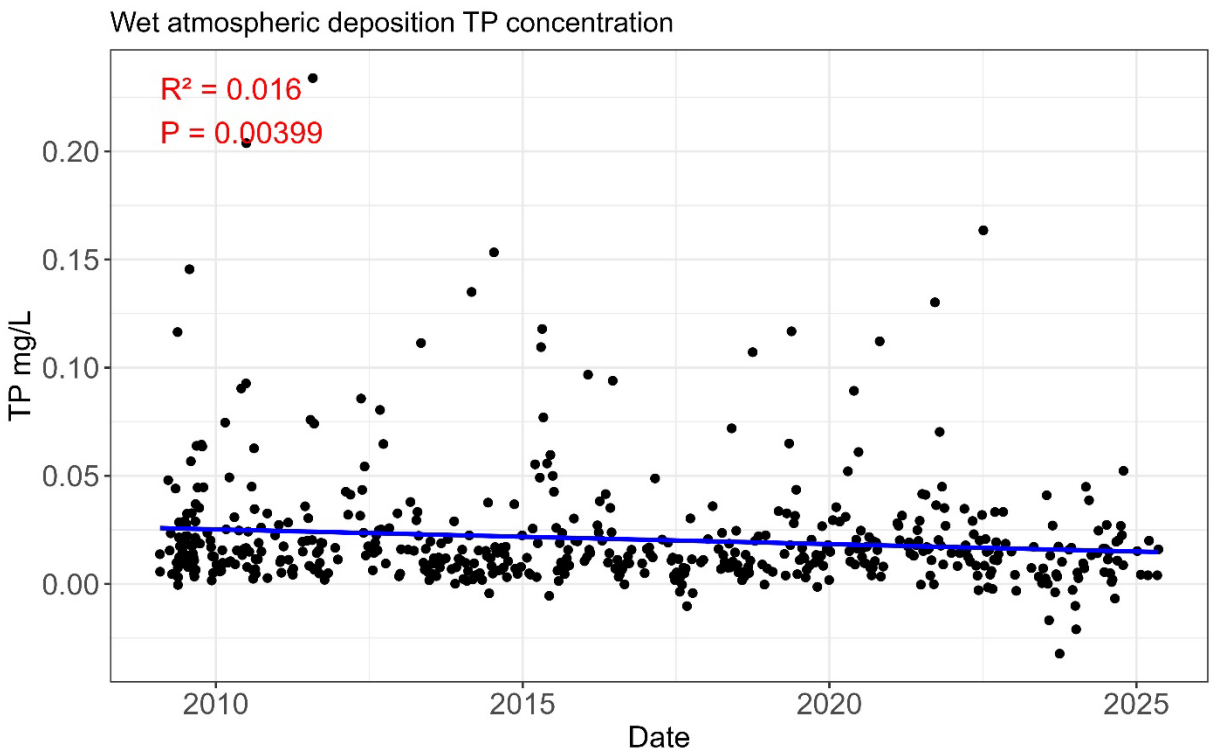
Period	Lake Harris (b1)	Lake Dora (b2)
1991 - 2000	0.13	0.44
2016 - 2025	0.57	0.18

Atmospheric Deposition Near Lake Apopka

1. TP and TN deposition rate (mg/m^2/Year) in dry atmospheric deposition
2. TP and TN concentration (mg/L) in rain-water (wet atmospheric deposition)
3. Monthly patterns for TN and TP concentrations in rain-water
4. Monthly patterns for TN and TP deposition rate in dry atmospheric deposition

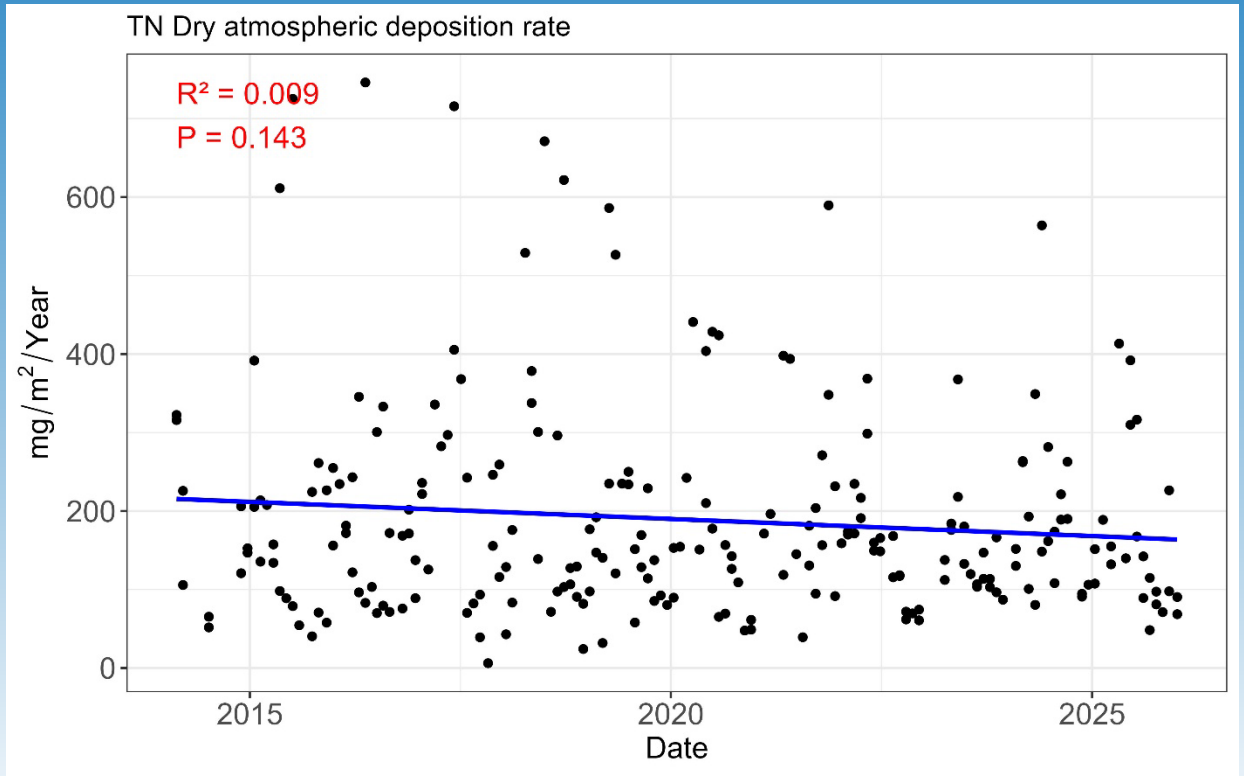
TP and TN Concentrations in Rain-Water

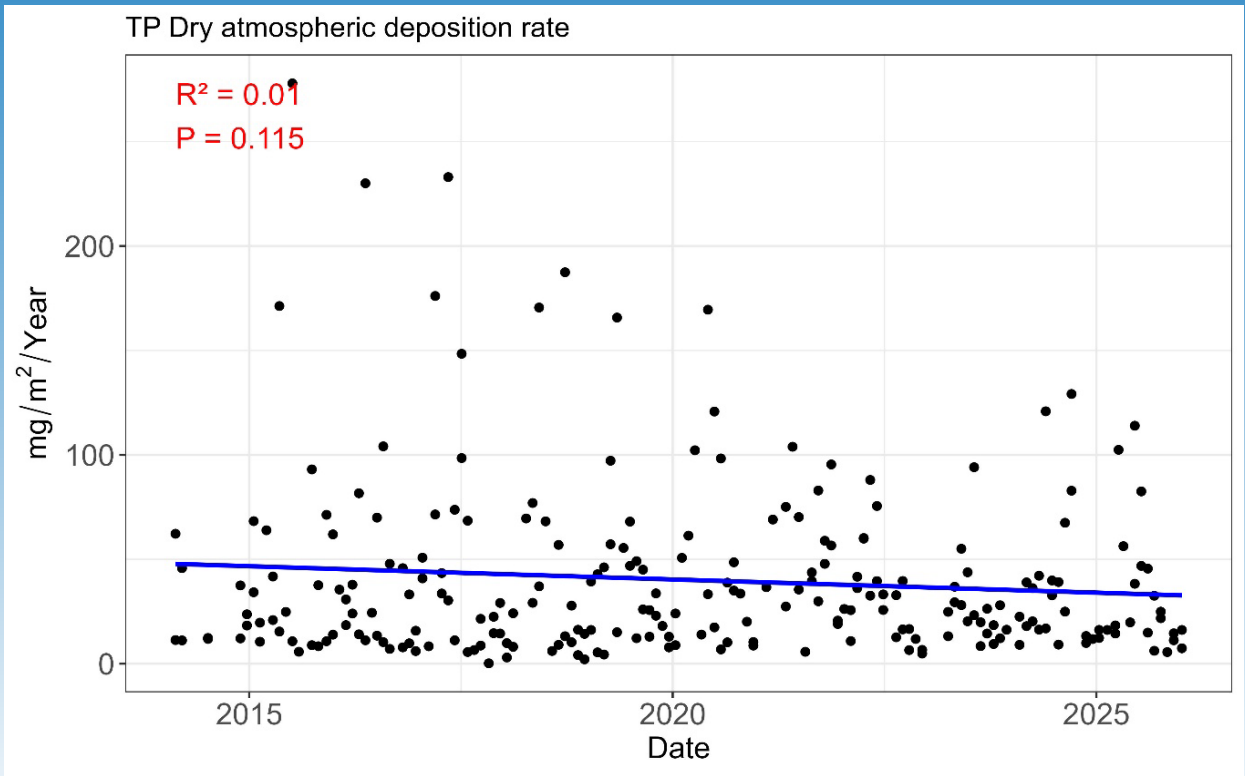




Statistics	TN (mg/L)	TP(mg/L)
Median	0.442	0.013
Mean	0.794	0.035
Std	2.329	0.135

TN and TP Dry Atmospheric Deposition Rate

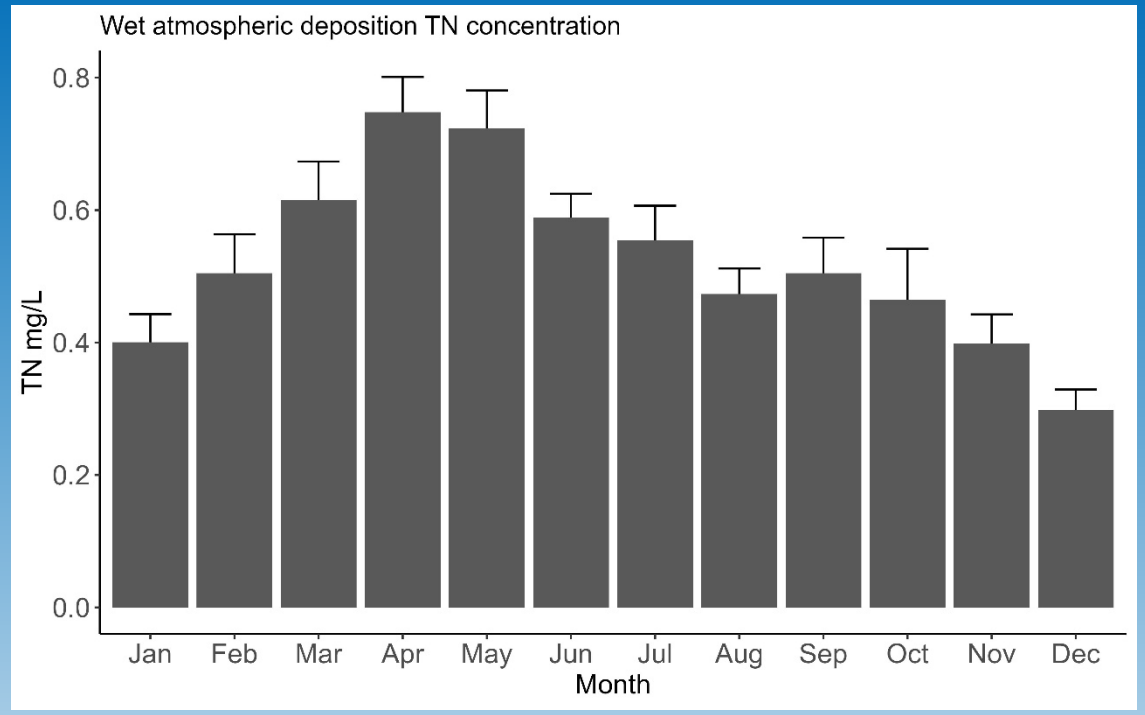


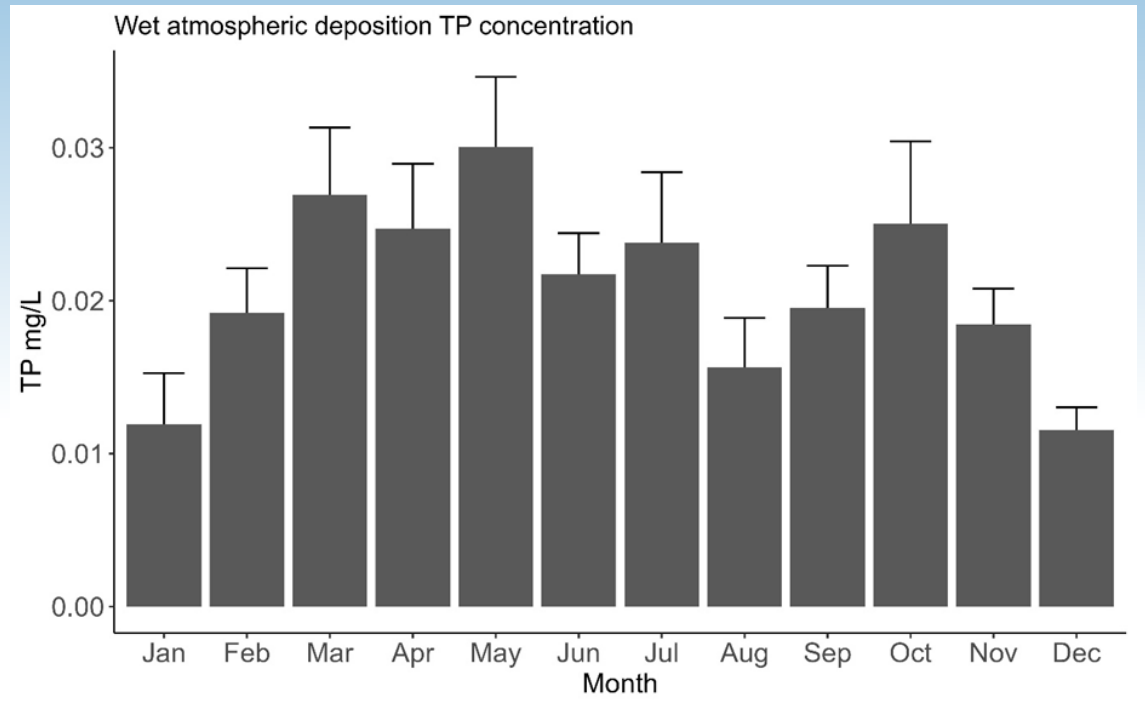


Statistics	TN (mg/m^2/Year)	TP (mg/m^2/Year)
Median	155	26
Mean	225	44
Std	237	60

St. Johns River Water Management District

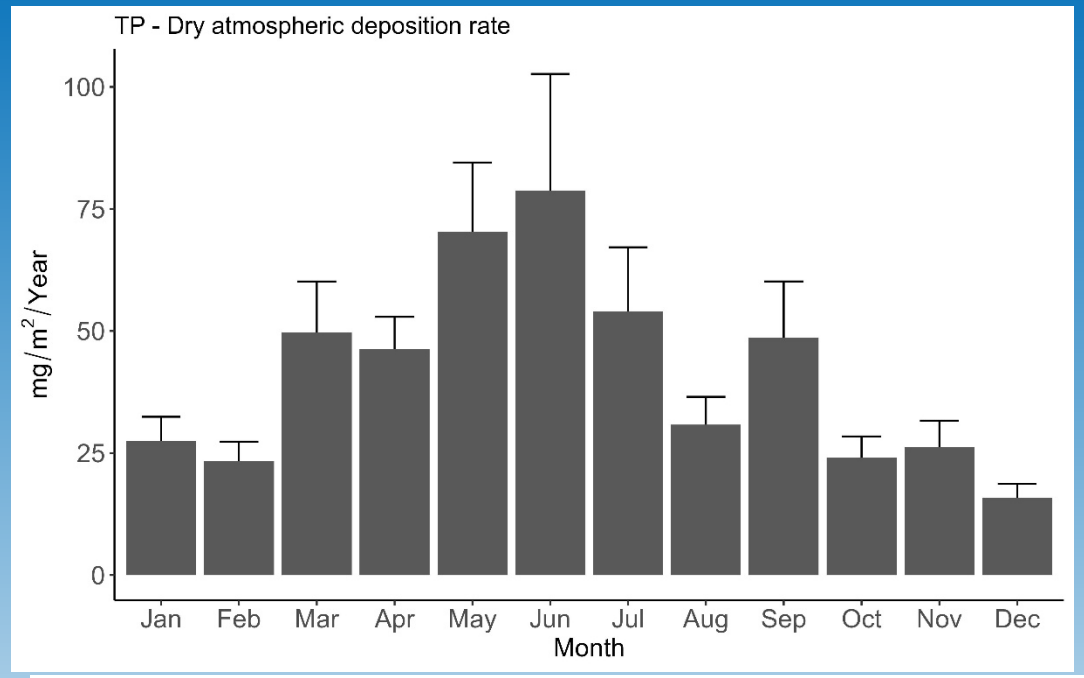
TN and TP Concentrations in Wet-Atmospheric Deposition by Month

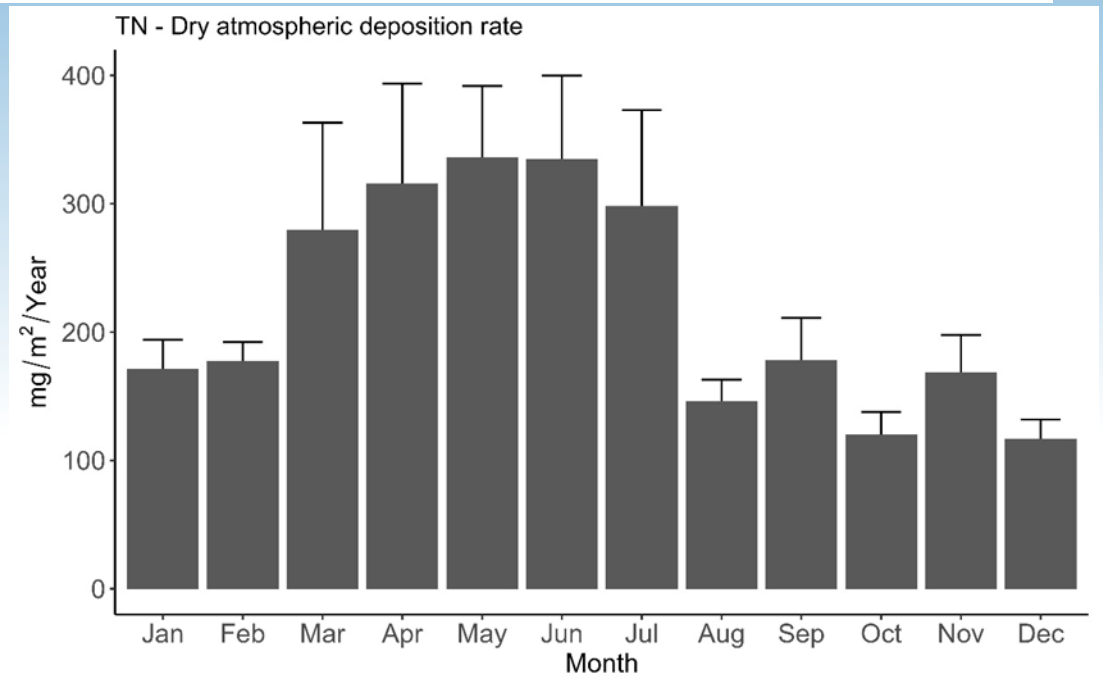




St. Johns River Water Management District

Dry atmospheric TN and TP Deposition Rates by Month





St. Johns River Water Management District

Summary: TP Loading and Concentration Status in Upper Ocklawaha River Lakes

- TP loadings in 2025 were below their TMDL limits in all lakes, except Beauclair, Carlton, and Yale.
- In 2025, the average TP concentrations exceeded restoration targets in every lake, except Lake Carlton.

Lake	TP load (kg/Year)			Lake	TP concentartion (µg/L)		
	TMDL	2025	2021-2025 average		TMDL target	2025	2021-2025 average
Apopka	15,900	11,981	13,700	Apopka	55	62	71
Beauclair	3,200	3,649	3,809	Beauclair	32	33	38
Dora	6,000	3,761	4,326	Dora	31	32	38
Carlton	88	162	183	Carlton	32	27	33
Eustis	9,200	6,766	9,702	Eustis	25	27	31
Harris	8,300	7,155	10,056	Harris	26	31	35
Griffin	12,200	9,081	13,245	Griffin	32	34	35
Weir	1,667	1,466	1,827	Weir	10	13	17
Yale	1,290	1,525	2,019	Yale	20	22	24
Denham	269			Denham	40	95	98
Trout	236			Trout	31	97	113

Summary: Upstream Water Quality Influence on Lake Eustis

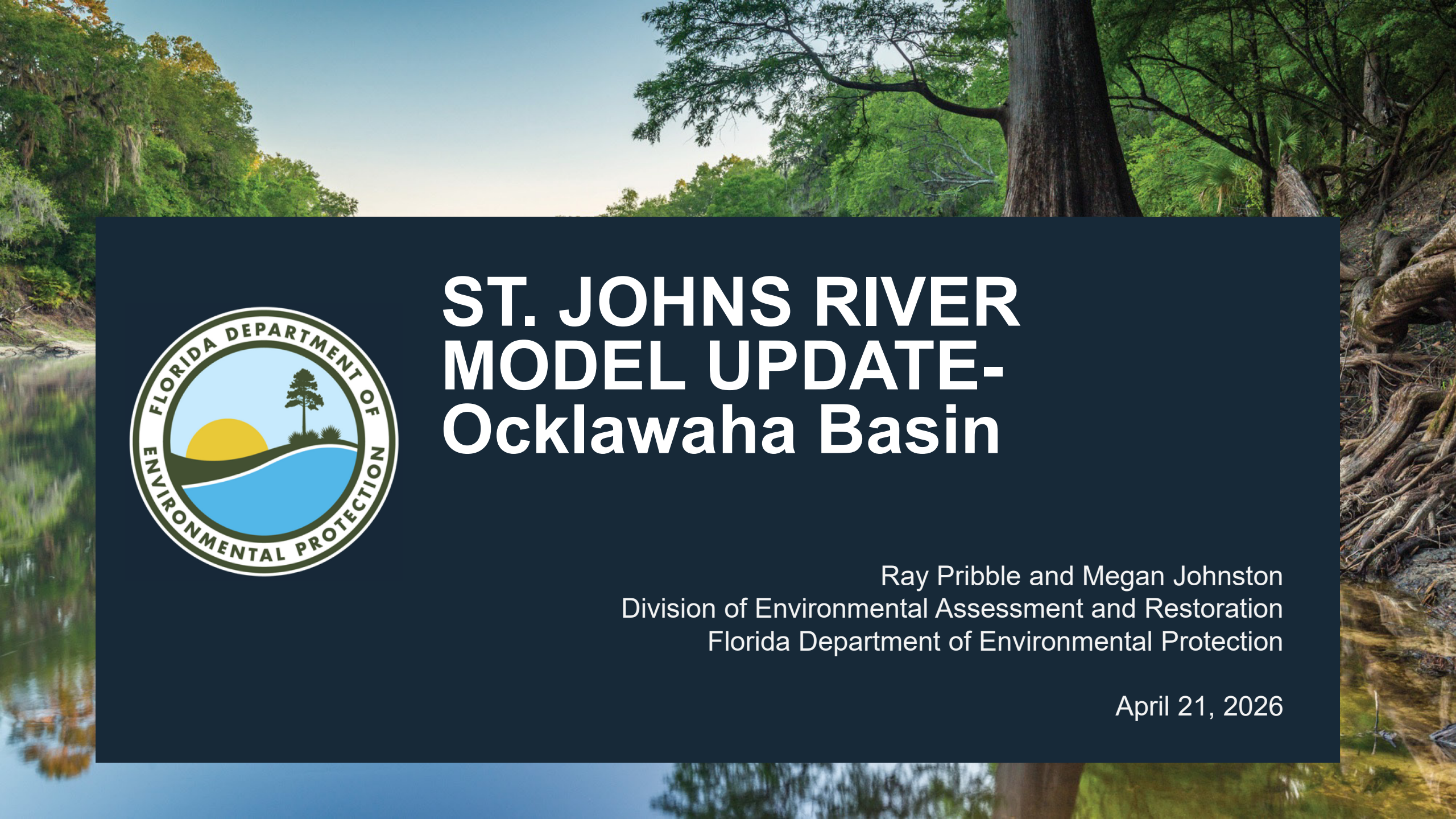
- Both correlation and regression results indicate that Harris—not Dora—is now the primary driver of TP variability in Lake Eustis
- Improving TP conditions in Lake Harris is now essential for supporting water quality improvements in both Harris and downstream Lake Eustis

Summary: Atmospheric Deposition

- Atmospheric deposition was the largest external P input to Apopka, Harris, and Weir (2021–2025), and the second largest to Griffin and Yale
- Wet-deposition TN and TP concentrations show significant declines since 2009; dry-deposition rates show no significant trend
- Wet-deposition for TN and TP peaks in spring (March–May) and are lowest in winter (Dec–Feb)
- Dry-deposition rates are highest in spring–early summer and lowest from late fall through winter (Oct–Feb)

Thank you!

Jian Di, Environmental Scientist V
jdi@sjrwmd.com
Bureau of Environment Sciences



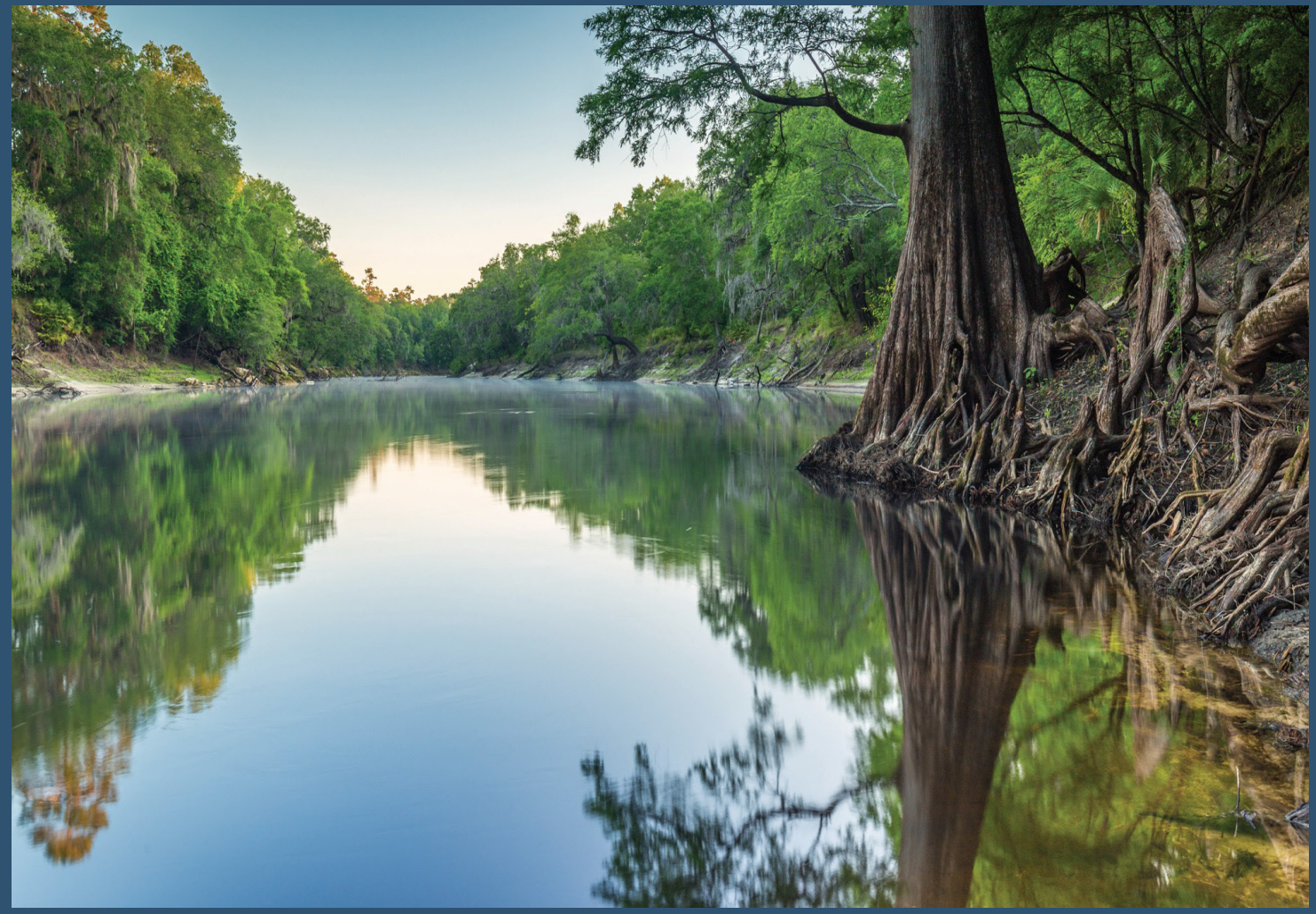
ST. JOHNS RIVER MODEL UPDATE- Ocklawaha Basin

Ray Pribble and Megan Johnston
Division of Environmental Assessment and Restoration
Florida Department of Environmental Protection

April 21, 2026

AGENDA

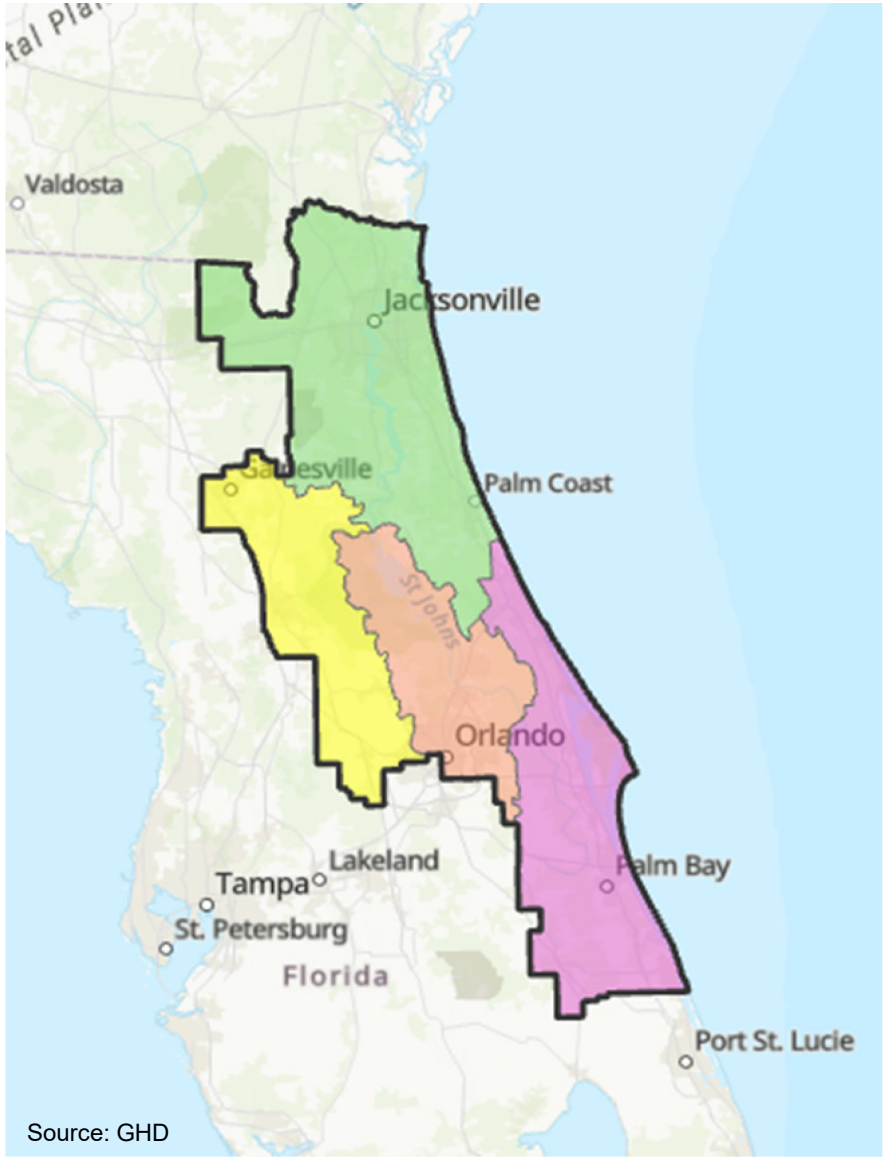
- Project Background.
  - Project Team.
  - Overview of Project.
- Project Schedule.
- Data Sharing and Knowledge.
  - Current Data Inventory.
- Model Details/Workflow.
- Current Status.
- Questions.



PROJECT BACKGROUND: OVERVIEW

Project overview:

- Sponsors:
  - Florida Department of Environmental Protection (DEP).
  - St. Johns River Water Management District (SJRWMD).
- Consulting team:
  - Environmental Science Associates (ESA).
  - GHD.
  - Wildwood Consulting.
- Phases of the project:
  - Phase I.
  - Phase II.



Source: GHD

PROJECT SCHEDULE

Completed:
Modeling Document/Quality Assessment (QA) Plan

July 2026:
HSPF Model

July 2026:
EFDC Model

July 2027:
WASP Model

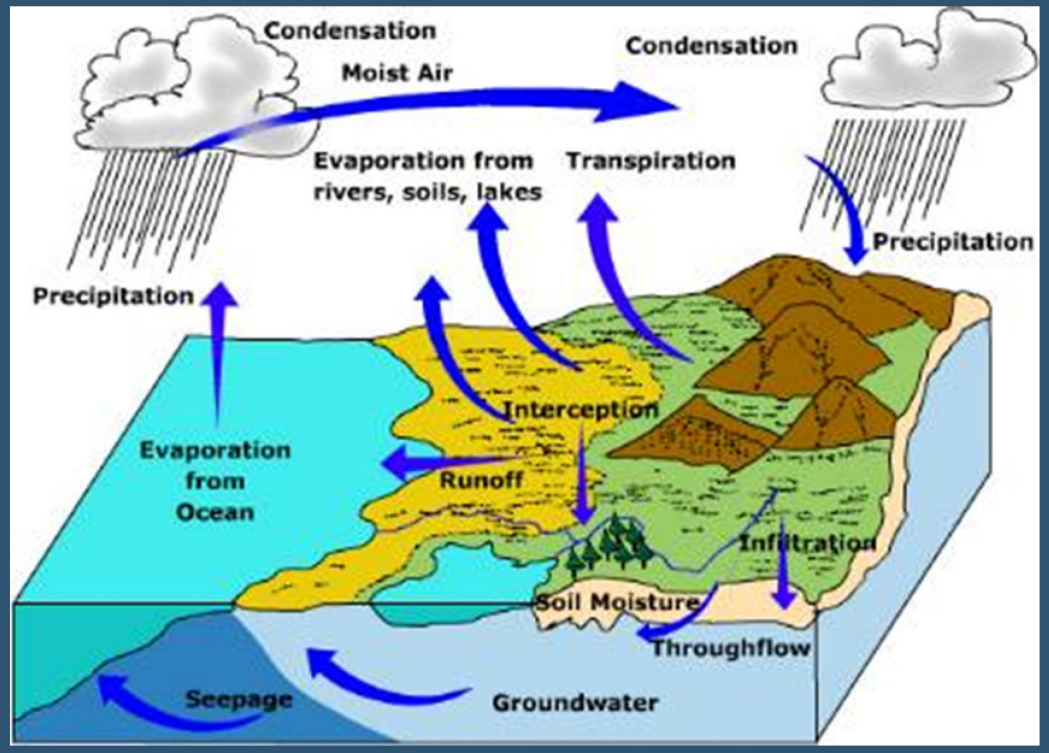
HSPF: Hydrologic Simulation Program FORTRAN
EFDC: Environmental Fluid Dynamics Code
WASP: Water Quality Analysis Simulation Program

CURRENT DATA INVENTORY

Land Cover	Florida Land Cover Classification System (FLUCCS) 2014
Meteorological	NCDC, NEXRAD, Rain Gages and other local data from SJRWMD
Boundaries (Planning Units, Subbasins, etc.)	SJRWMD Geospatial Open Data
Water Quality Ambient Data	Impaired Waters Rule (IWR) Database, Run 63
Flow Data	USGS, DEP and SJRWMD

NCDC: National Climatic Data Center
NEXRAD: Next Generation Weather Radar
USGS: U.S. Geological Survey

HSPF WATERSHED MODEL



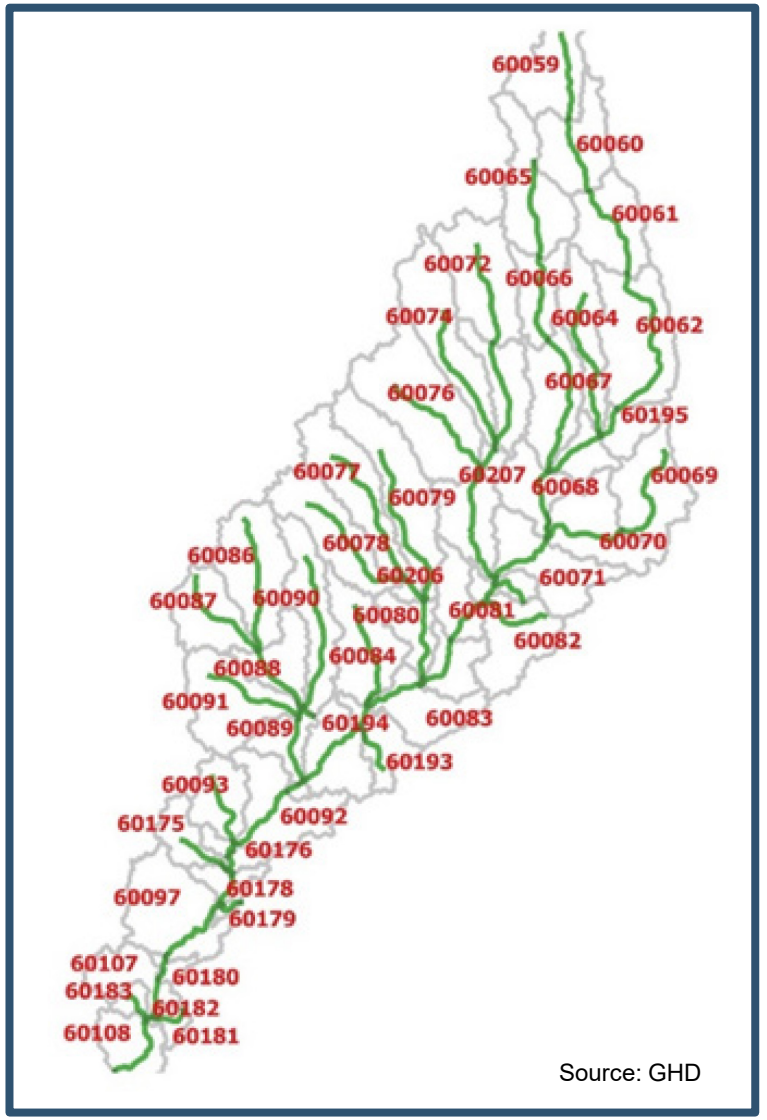
Source: Ritter, Michael E. The Physical Environment: an Introduction to Physical Geography.

This Photo by Michael Ritter is licensed under CC BY-SA

- SJRWMD HSPF Models:
  - Calibrated for flow.
- Model extends in time through 2023.
  - Updated meteorological data.
  - Point source flow data.
  - Re-calibrate flow.
- Pollutant Contribution from land surface added.
  - Total nitrogen (TN), total phosphorus (TP), carbonaceous biochemical oxygen demand (CBOD).
- Land Use Coverage updated to FLUCCS 2020.

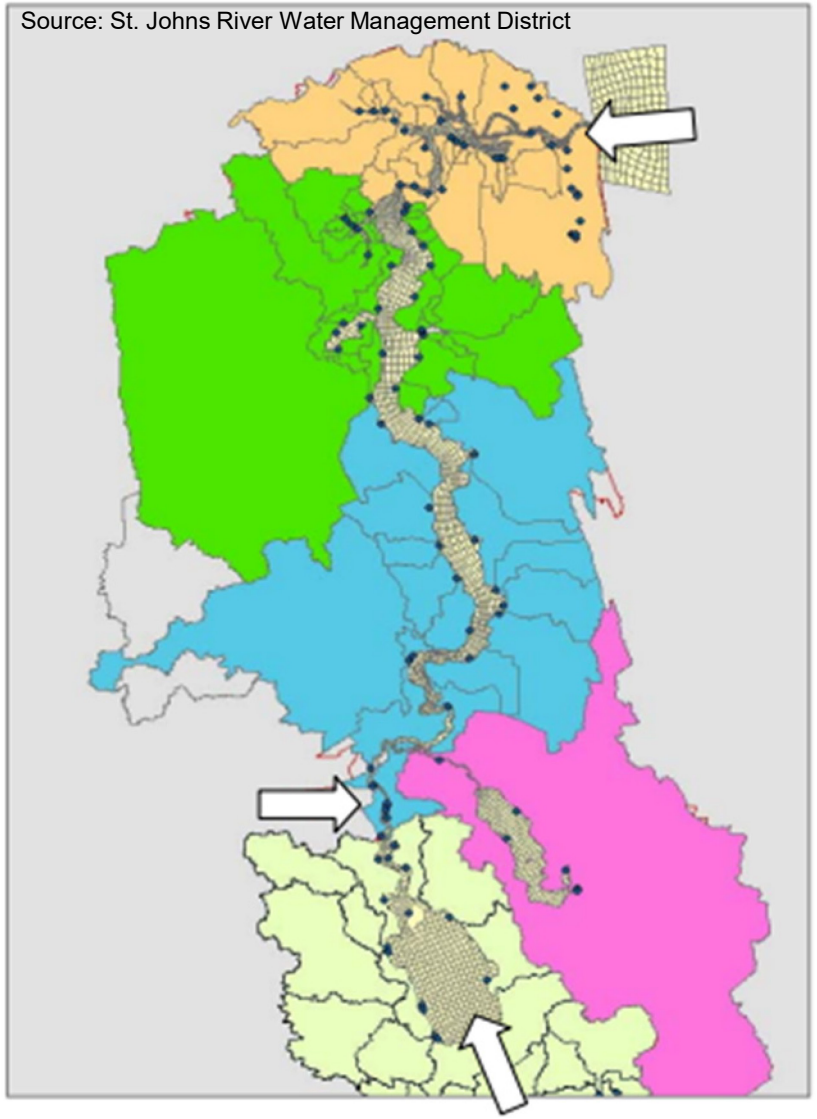
WASP RECEIVING WATERBODY MODEL

- Implement U.S. Environmental Protection Agency's (EPA) WASP Model.
- Develop WASP model network consistent with HSPF Reach Network.
- Develop WASP Models for major basins and tributaries.
- Integrate the flows and loads simulated by HSPF to predict water quality conditions as a function of varying meteorological conditions.



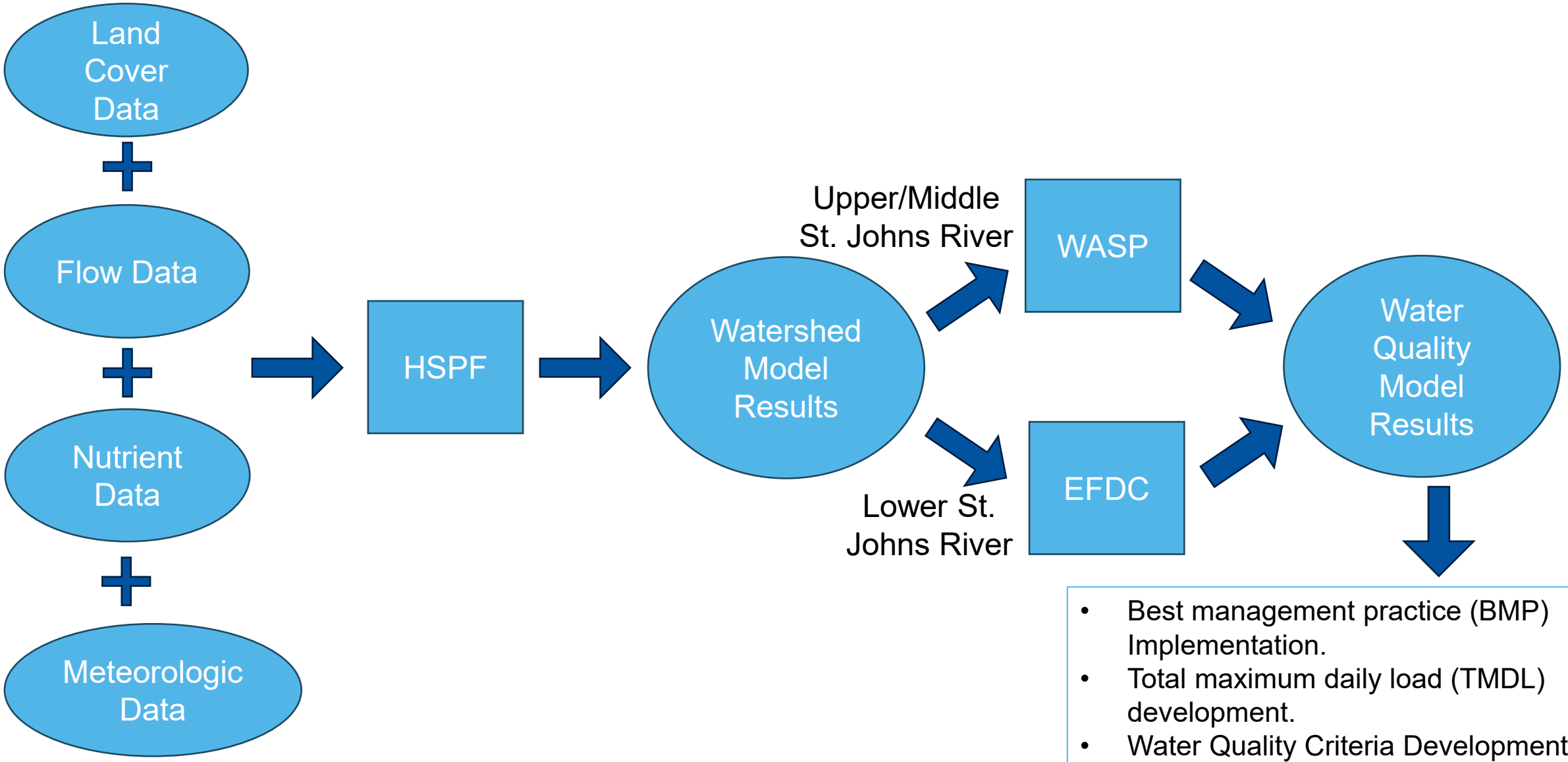
Source: GHD

EFDC HYDRODYNAMIC MODEL



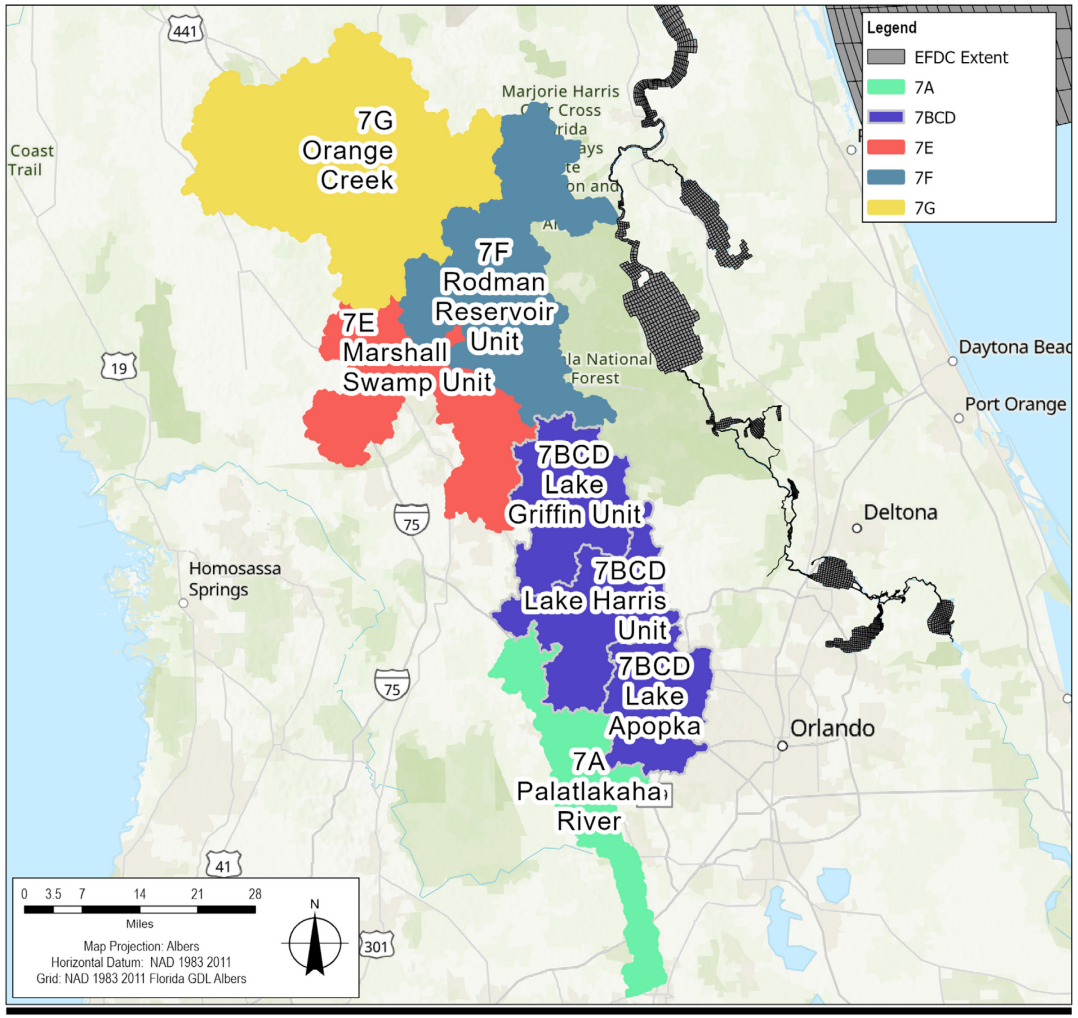
- Evaluated SJRWMD version of EFDC.
  - Updated to current version of EFDC.
- Extended EFDC through 2023.
- Investigate replacing current water quality model (CE-QUAL-ICM).
- Update flows and loads from HSPF/WASP models from the upstream basins.

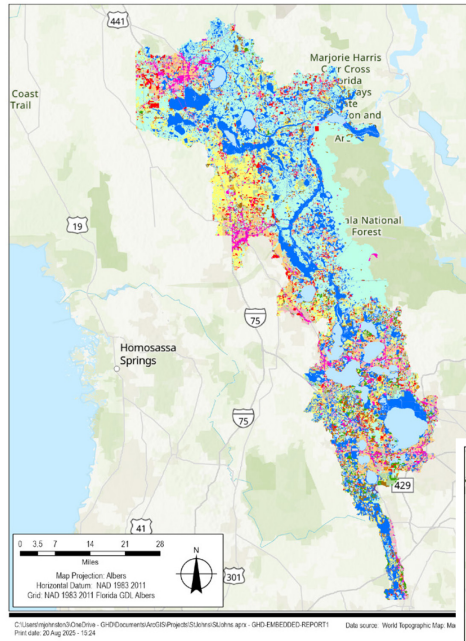
MODELING WORKFLOW

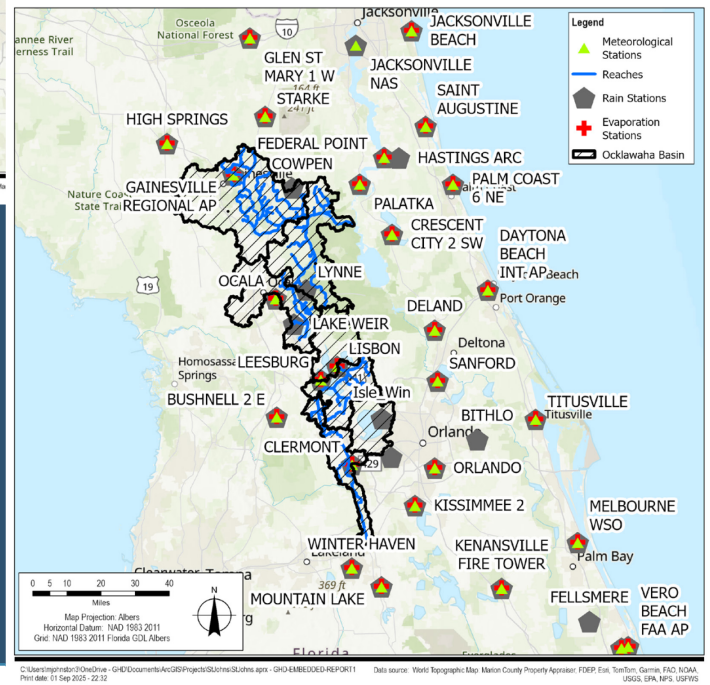


- Best management practice (BMP) Implementation.
- Total maximum daily load (TMDL) development.
- Water Quality Criteria Development

OCKLAWAHA BASIN







Source: GHD


FLORIDA DEPARTMENT OF
ENVIRONMENTAL PROTECTION
QUESTIONS?

THANK YOU

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FLORIDA DEPARTMENT OF
ENVIRONMENTAL PROTECTION

Annual Meeting Summary - Upper Ocklawaha Basin Management Action Plan (BMAP)

Florida Department of Environmental Protection (DEP)

April 21, 2026, via GoToWebinar

10:00 am – 11:40 am

Attendees

Leah Aidif, Halff
Kevin Anderson, Town of Lady Lake
Miranda Anderson, DEP
Lisa Bally, Geosyntec
Janelle Barriero, Florida Senate
Vanessa Bauzo, FDACS
Evelyn Becerra, DEP
Amanda Boone, Woodard & Curran
Julie Bortles, Orange County
Tiffany Busby, Wildwood Consulting
Jason Cambre, Marion County
Andy Canion, SJRWMD
Erin Carroll, Florida Senate
Claudia Castro, DEP
Stacy Cecil, SJRWMD
Carolin Ciarlariello, DEP
Melissa Conant, City of Eustis
Brenda Crosby, Florida Office of Economic and Demographic Research
Patricia Cruz, Orange County
Dan Dashtaki, City of Minneola
Susan Davis, SJRWMD
Briston De Armas, FDOT
Jian Di, SJRWMD
Kim Dinkins, 1000 Friends of Florida
Dean Dobberfuhl, SJRWMD
Lauren Dorval, FDACS
Ashley Dowdy, GrantWorks
Brian Dykes, City of Tavares
Julie Espy, SAS
Jessica Fetgatter, DEP
Danielle FitzPatrick, SJRWMD
Johanna Gambrell, Citizen
Kayla Goss, Citizen
Roxanne Groover, FOWA
Edgar Guerron Orejuela, USF
Samuel Hankinson, DEP
Tracy L Hauserman, Citizen
Joyce Heffington, City of Minneola
Jeremy Hockenbury, City of Wildwood
Robin Holland, FDACS
Moira Homann, DEP
Laila Hudda, EPA
Megan Johnston, GHD
Chandler Keenan, DEP
Clifford Kelsey, City of Leesburg
Brianne Kenny, Troon Golf
Adriana Kirwan, FDOT
Scott Knight, Wetland Solutions
Greg Knothe, Polk County
Natalie Kraft, FPL
Paul Larino, Town of Montverde
Emily Lawson, Orange County
Hai Le, City of Minneola
Heather Lindell, Orange County
Kristine Locke, DEP
Celeste Lyon, RES
Meghan Maly, DEP
Lori McCloud, SJRWMD
Matt McKinney, Duke Energy
Sarah Menz, DEP
Vaughan Nilson, City of Umatilla
Alejandra Nirenberg, Carr Riggs & Ingram
Kevin O'Donnell, DEP

David O'Steen, Integrity Sales and Marketing
Rick Owen, DEP
Josh Papacek, SJRWMD
Ben Pernezny, Ardurra
Jon Perry, ESA
Jim Peterson, SJRWMD
Nicolas Pisarello, ATM
David Prado, Integrity Sales and Marketing
Ray Pribble, ESA
Kathryn Quilty, Manatee County
A. Rays, Citizen
Joyce Rebar, FDOT
Callie Register, SJRWMD
Rob Renk, Orange County
Katherine Rogers, Orange County
Eric Schinsing, SC&A
Scott Shannon, Woodard & Curran
Eric Simpson, DEP
Jodi Slater, SJRWMD
Jennifer Spain, Volusia County
Andrew Stamper, Town of Astatula
Raymond Stuart, DEP
Tom Sweeting, Integrity Sales and Marketing
The Florida Channel
James Thompson, City of Clermont
Mark Tomczyk, Woolpert
Brenda Toscano, City of Leesburg
Zoe Tressel, St. Johns Riverkeeper
Diana Turner, DEP
Christine Vrabic, Marion County
Latisia Whittle, Lake County
Jesse Wineberg, Orange County
Nick Zurasky, FDACS
Jennifer Zwiener, City of Mount Dora

Questions and Answers (Q&A)

Q: How might weather explain some of the declines in wet deposition from atmospheric sources?
A: The more recent time period has seen more extreme weather events that have brought significant rainfall. While extreme rainfall brings some additional wet deposition, intense rainfall inputs from storms may have a dilution effect overall.

Q: Will the model be used to update the existing total maximum daily loads (TMDLs)?
A: The TMDLs are handled by a different group within DEP, so we cannot comment directly on their plans. However, it is worth noting that rarely are the TMDLs updated. BMAPs and the total reductions needed to meet the TMDLs are usually the main component that needs to be adjusted over time—particularly to account for population growth and associated land use changes. TMDLs set the assimilative capacity of the waterbody and that capacity does not change like the current loading levels might change over time. Updated models are usually used to revise the current loading estimates and, thus, the total reductions needed to meet the TMDLs. If and when the assimilative capacity part of the TMDLs are updated, the model could be useful for that as well, but the purpose of the model update was to update the current loading estimates—and the current reductions needed--for the BMAP.

Q: Are BMAP targets expected to change for lakes where the water quality is improving and the TMDL target is being met? If the one of the goals of the BMAP is to assist with waterbodies

achieving their TMDLs, can load allocations be modified once a waterbody achieves its TMDL? In particular, I am interested in Lake Carlton, which has achieved its TMDL TP target concentration, yet still has significant amounts of load reductions for responsible entities remaining in the BMAP. Also, is there a possibility of modifying load allocations for a particular waterbody in the BMAP once it has reached its TMDL target such as Lake Carlton and the percentage of sources for the load allocations based on updated studies/information?
A: DEP will not know how BMAP requirements may change until the modeling is completed and the water quality assessments are considered. BMAPs are designed to be iterative and to reflect if a lake is improving or worsening, so lakes that are doing well (or not) will be factored into any new management requirements. However, it is important to understand that the TMDLs rarely change (see answer to previous question) and must be met every year, not just for a single year or under certain conditions (e.g., drought periods). So, the BMAPs consider how to reduce loads and sustain those lower loads that are less than the assimilative capacity, even when there is additional development within the watershed. The TMDL does not dissolve when a waterbody meets the loading—it remains in place to protect from new loads being added. The BMAP process will consider when lakes are meeting the TMDL but the BMAP and TMDLs will continue to remain in effect to support those water quality improvements. It should be noted that the Upper Ocklawaha River BMAP has been in effect for almost 20 years and the current required reductions, based on the previous models/period of record, are required to be met by the time the new model will be ready for incorporation.

Q: Is there more recent statewide Florida Land Use, Cover, and Forms Classification System (FLUCCS) data available than 2014? I'm asking because it seems that land use has changed substantially from 2014 to more recent years.
A: The updated watershed model will use both 2014 and 2020 land use information. Because the model is calibrated hydrologically to 2014, the first period of the model (2000 through 2018) is run on the 2014 land use. For the 2019 to 2023 period, the 2020 land use data will be used.

Q: Can we get a copy of the presentation? I need more time to see the information on the phosphorus-impaired lakes.
A: Yes, a copy of today's presentation will be posted. A GovDelivery notice will be sent out via email when the meeting materials are available along with a link to their online location. To manage your DEP GovDelivery notifications, please visit https://floridadep.gov/dear/dear/content/subscribe.