Lake Harney, Lake Monroe, Middle St. Johns River (MSJR), and Smith Canal Basin Management Action Plan (BMAP)

Annual Meeting

Via Webinar
Webinar Registration Link:
https://attendee.gotowebinar.com/register/8605145378884419 41

May 6, 2026
1 PM EDT

Agenda

- Lake Harney, Lake Monroe, MSJR, and Smtih Canal Basin Management Action Plan (BMAP) Background.
- Annual Progress Update.
- Policy & Reporting Reminders.
- St. Johns River Water Management District Updates.
- St. Johns River Model Update.

Please note the site for documents relating to the Lake Harney, Lake Monroe, MSJR, and Smtih Canal BMAP:
BMAP Public Meetings | Florida Department of Environmental Protection

For more information on the Lake Harney, Lake Monroe, MSJR, and Smtih Canal BMAP, contact: Evelyn Becerra, 850-245-8547, Evelyn.Becerra@FloridaDEP.gov

WEBINAR HOUSEKEEPING

Attendee Participation

Open your control panel.

Join audio:

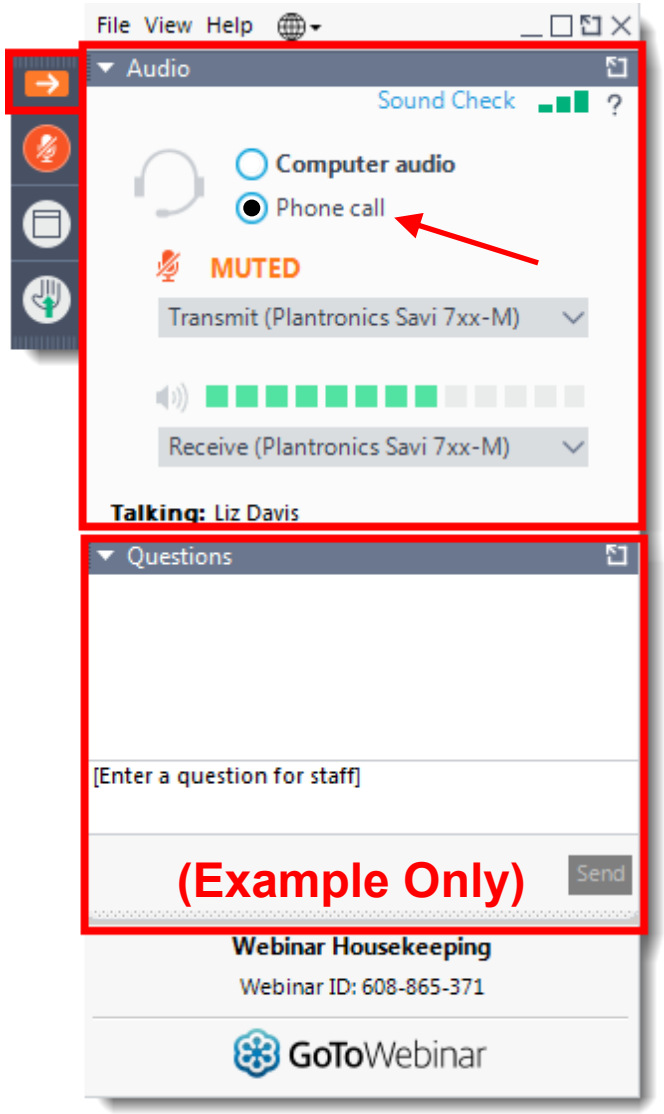
- Choose Computer Audio **or**
- Choose Phone Call and dial using the information provided with your registration.

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.



LAKE HARNEY, LAKE MONROE, MIDDLE ST JOHNS RIVER, AND SMITH CANAL BASIN MANAGEMENT ACTION PLAN (BMAP) ANNUAL MEETING

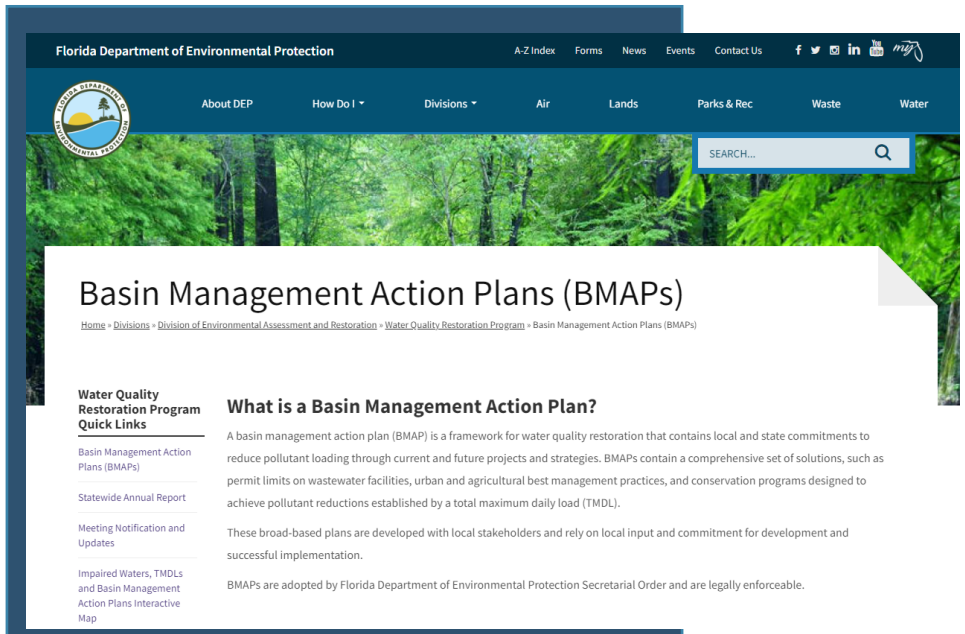
Evelyn Becerra
Water Quality Restoration Program
Division of Environmental Assessment and Restoration
Florida Department of Environmental Protection

GoToWebinar | May 6, 2026

AGENDA

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

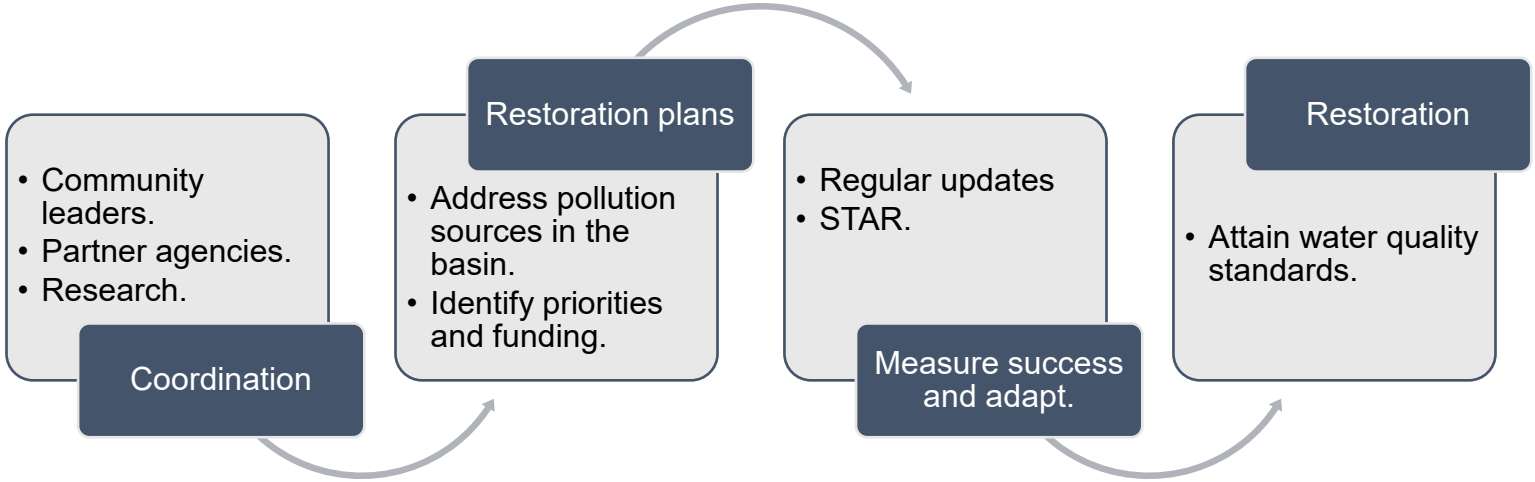
BMAPs



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:

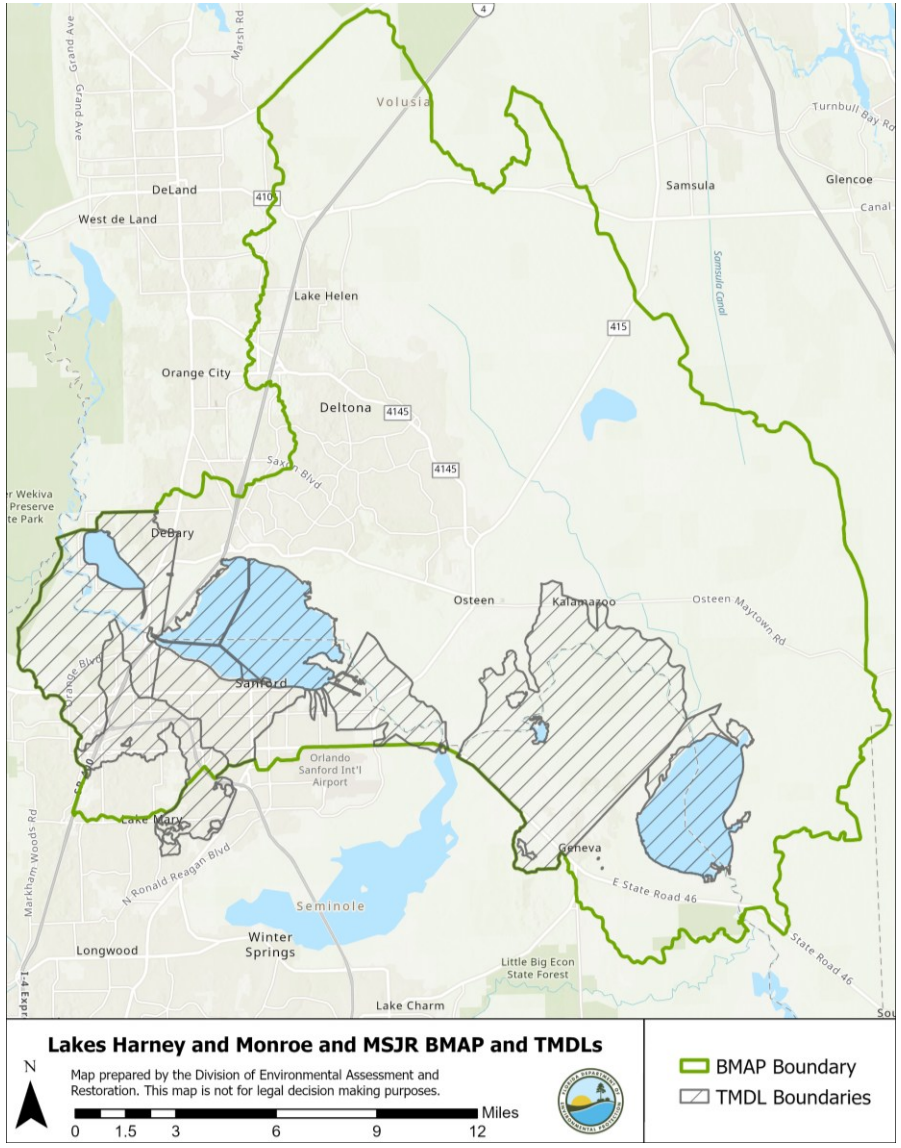
- Implementation timeline.
- Commitment to projects.
- Expected water quality improvement from projects and management strategies.

Process to assess progress toward achieving the TMDL:

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

BACKGROUND

LAKE HARNEY, LAKE MONROE, MIDDLE ST. JOHNS RIVER AND SMITH CANAL BMAP (HAMO)



HAMO TMDLs:

- Adopted in 2009 for total phosphorus (TP) and total nitrogen (TN) for lakes and river segments.

HAMO BMAP:

- Initially adopted April 2012 to implement the TMDLs.
- BMAP update adopted in 2025 to include new legislation.
- Total required reductions:
  - 87,656 lbs/yr TN.
  - 17,710 lbs/yr TP.

lbs/yr = pounds/year

BACKGROUND
HAMO BMAP STAKEHOLDERS

Type of Organization/Entity	Name	
Responsible Entities	Agriculture City of DeBary City of DeLand City of Deltona City of Lake Helen	City of Lake Mary City of Orange City City of Sanford Seminole County Volusia County
Responsible Agencies	County Health Departments Florida Department of Agriculture and Consumer Services (DACS) Florida Department of Environmental Protection (DEP) Florida Department of Transportation (DOT) District 5 Florida Turnpike Enterprise SJRWMD	
Other Interested Stakeholders	Agricultural Producers Citizens/Homeowners East Central Florida Regional Planning Council Florida Farm Bureau Florida Onsite Wastewater Association Septic System Contractors	

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 6 and 7 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 381.0065, 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**.

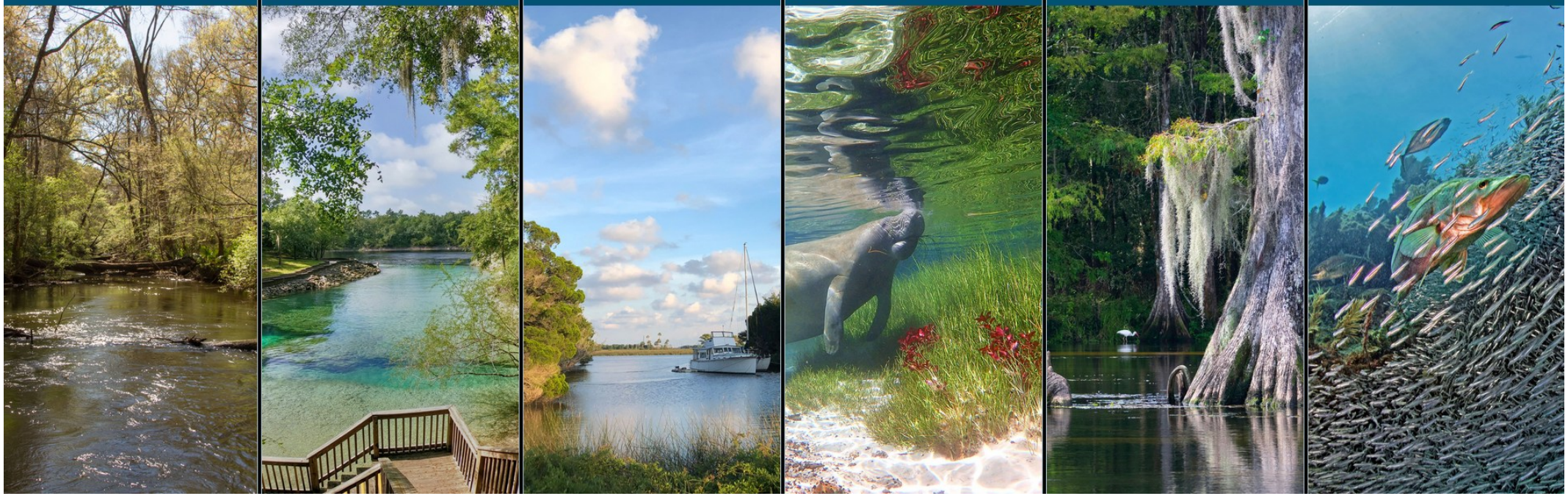
STATEWIDE ANNUAL REPORT (STAR)

OVERVIEW

The Statewide Annual Report 2024

The state of Florida is prioritizing the protection and restoration of our waterways by implementing sound, science-based solutions to current and future environmental challenges. Under the leadership of Governor Ron DeSantis, the Florida Department of Environmental Protection (DEP) is working with local, state and federal partners on short- and long-term strategies to protect water quality and quantity, including investment in long-term restoration projects. DEP has prepared the 2024 Statewide Annual Report (STAR) to detail the status of many of these strategies in an interactive application format, which is best viewed on a desktop computer screen using Google Chrome or Microsoft Edge. This application does not scale well on mobile devices and is optimized for viewing on larger format screens.

Total Maximum Daily Loads	Basin Management Action Plans	Alternative Restoration Plans	Minimum Flows and Water Levels	Recovery and Prevention Strategies	Contacts and Project Data

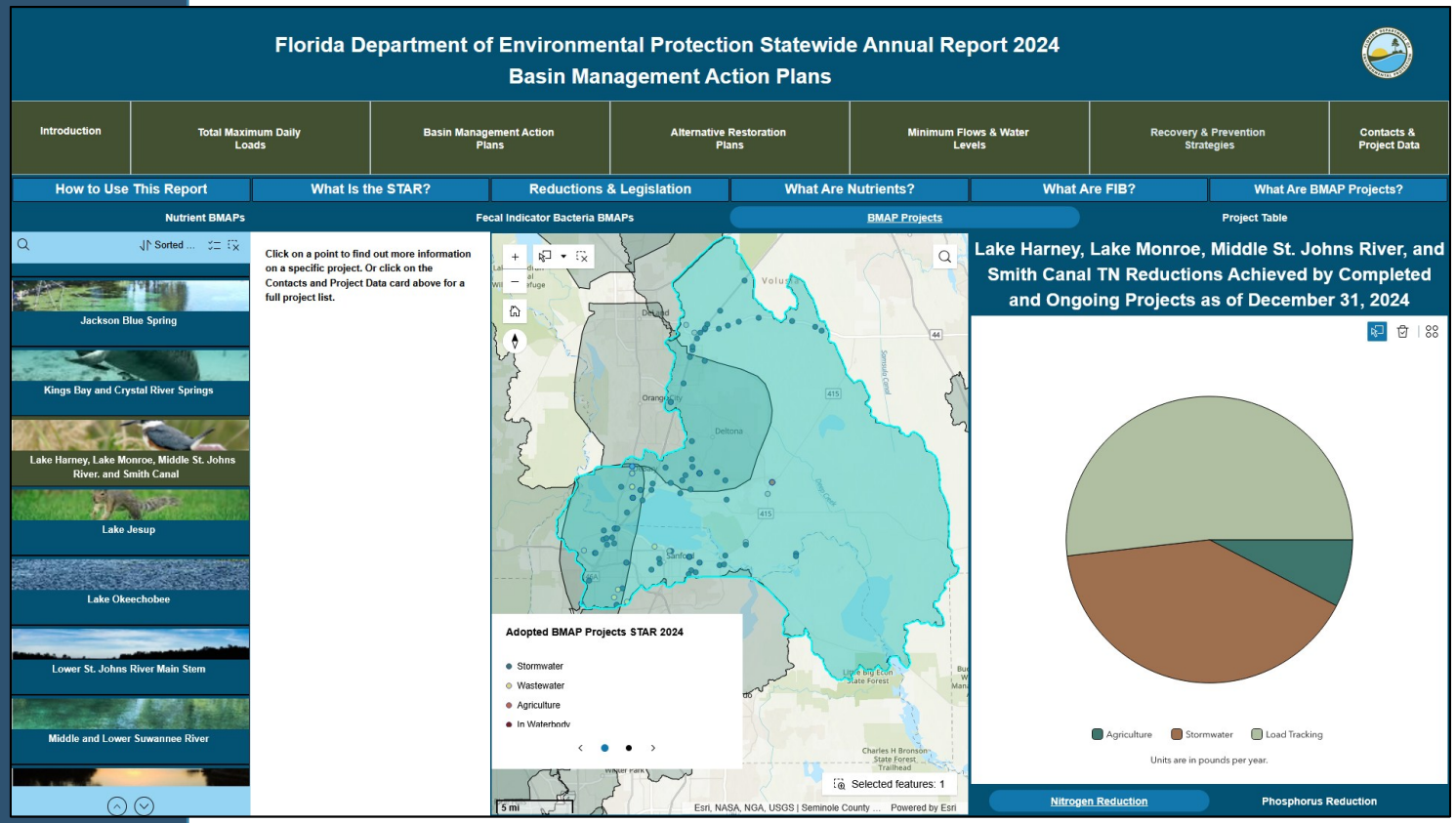


https://floridadep.gov/STAR

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.

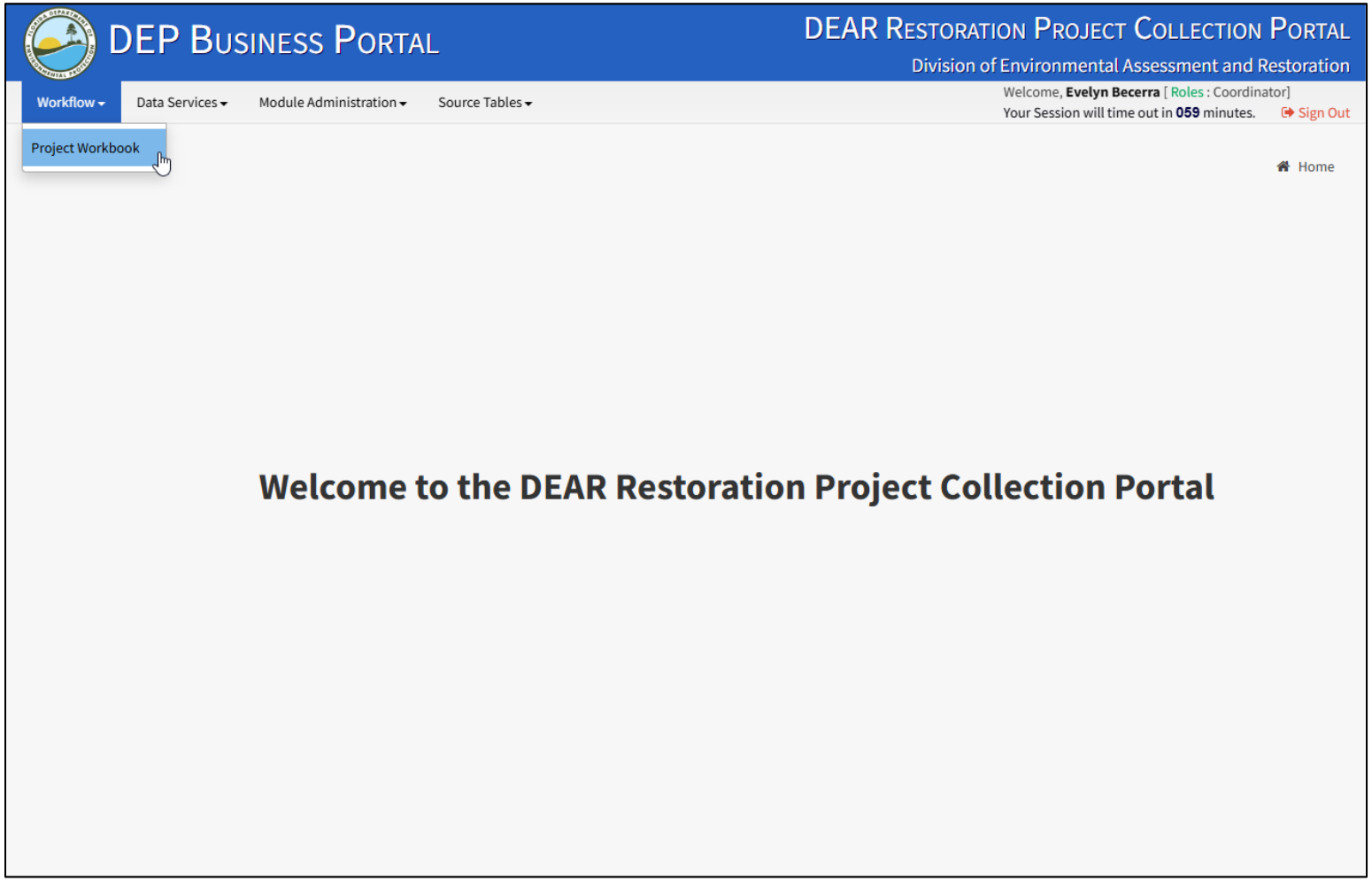


https://floridadep.gov/STAR

STAR

PROJECT COLLECTION

- Notify your BMAP coordinator if changes in access to project list are needed.



STAR PROGRESS

PRELIMINARY 2025 STAR UPDATES

Projects by Entity through Dec. 31, 2025

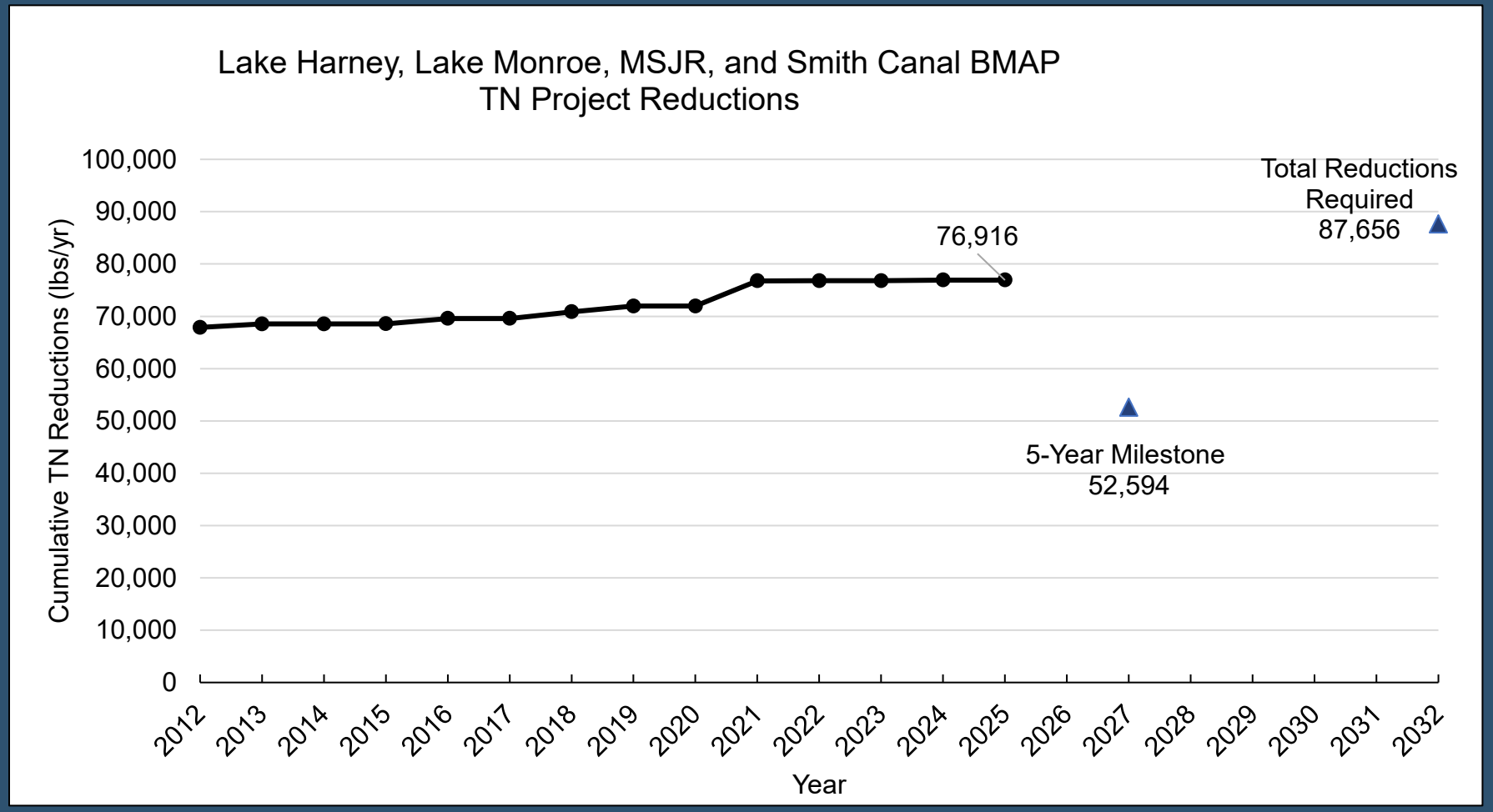
Lead Entity	Completed	Ongoing	Planned	Underway	Total
City of DeBary	2	4	3		**9**
City of DeLand		1		2	**1**
City of Deltona	8	2	4		**14**
City of Lake Helen	3	1			**4**
City of Lake Mary		2	3		**5**
City of Orange City		2			**2**
City of Sanford	5	2		1	**8**
DACS	3	1	1		**5**
DOT District 5	46	2			**48**
Seminole County	7	3	5	1	**16**
Turnpike Enterprise		2			**2**
Volusia County	7	4	6	2	**19**
SJRWMD	1				**1**
Total	**82**	**26**	**22**	**6**	**136**

As of Dec. 31, 2025, verified projects in the BMAP have reduced **76,916 lbs/yr TN** and **19,055 lbs/yr TP**.

STAR PROGRESS

PRELIMINARY 2025 STAR UPDATES

TN Reductions Achieved through Dec. 31, 2025



Completed and ongoing projects only.

STAR PROGRESS

PRELIMINARY 2025 STAR UPDATES

TN Milestone Progress Achieved by Entity through Dec. 31, 2025

Completed and ongoing projects only.

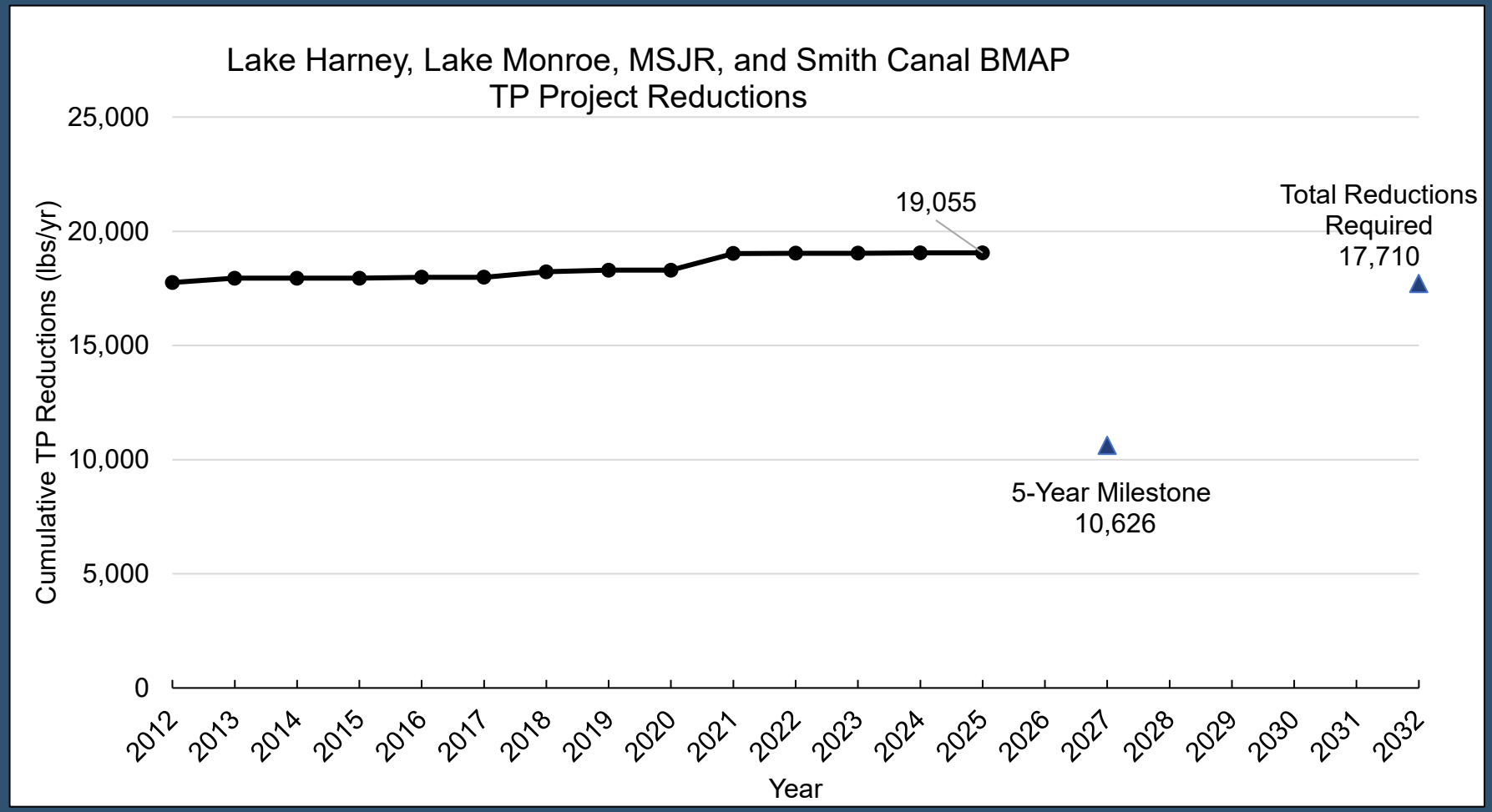
Lead Entity	Sum of TN Reductions (lbs/yr)	2027 TN Required Reduction (60% Milestone) (lbs/yr)	TN Reductions Needed to Meet 60% Milestone (lbs/yr)	2032 TN Required Reduction (100% Milestone) (lbs/yr)	TN Reductions Needed to Meet 100% Milestone (lbs/yr)
City of DeBary	14,135	2,256	-	3,760	-
City of DeLand	9	-	-	-	-
City of Deltona	8,410	4,330	-	7,217	-
City of Lake Helen	31	-	-	-	-
City of Lake Mary	372	-	-	-	-
City of Orange City	13	-	-	-	-
City of Sanford	14,454	12,432	-	20,720	6,266
DACS	21,335	25,369	4,034	42,282	20,947
DOT District 5	3,129	1,478	-	2,464	-
Seminole County	7,812	4,768	-	7,947	135
Turnpike Enterprise	1	-	-	-	-
Volusia County	7,215	1,960	-	3,266	-
Total	**76,916**	**52,594**	**4,034**	**87,656**	**27,348**

- Underway and Planned projects in the BMAP have an additional estimated **2,876 lbs/yr TN**.
- Underway and Planned projects need to be **completed** and **verified** to count towards TN achieved.

STAR PROGRESS

PRELIMINARY 2025 STAR UPDATES

TP Reductions Achieved through Dec. 31, 2025



Completed and ongoing projects only.

STAR PROGRESS

PRELIMINARY 2025 STAR UPDATES

TP Milestone Progress Achieved by Entity through Dec. 31, 2025

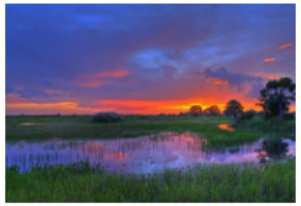
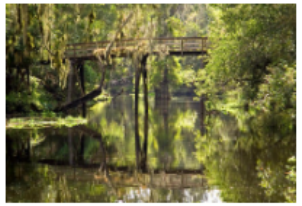
Completed and ongoing projects only.

Lead Entity	Sum of TP Reductions (lbs/yr)	2027 TP Required Reduction (60% Milestone) (lbs/yr)	TP Reductions Needed to Meet 60% Milestone (lbs/yr)	2032 TP Required Reduction (100% Milestone) (lbs/yr)	TP Reductions Needed to Meet 100% Milestone (lbs/yr)
City of DeBary	2,367	104	-	173	-
City of DeLand	1	-	-	-	-
City of Deltona	1,371	466	-	777	-
City of Lake Helen	4	-	-	-	-
City of Lake Mary	58	-	-	-	-
City of Orange City	4	-	-	-	-
City of Sanford	5,339	1,607	-	2,679	-
DACS	4,307	8,262	3,955	13,770	9,463
DOT District 5	632	-	-	-	-
Seminole County	1,940	187	-	311	-
Turnpike Enterprise	-	-	-	-	-
Volusia County	3,032	-	-	-	-
Total	**19,055**	**10,626**	**3,955**	**17,710**	**9,463**

- Underway and Planned projects in the BMAP have an additional estimated **25 lbs/yr TP**.
- Underway and Planned projects need to be **completed** and **verified** to count towards TP achieved.

RESOURCES
BMAP WEBSITE AND STORYMAPS

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

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.

RESOURCES
FUNDING OPPORTUNITIES

Florida Department of Environmental Protection
Funding Opportunities

FloridaDEP.gov/Funding

SUBSCRIBER PAGE

HOW TO CONTACT US

BMAPProgram@FloridaDEP.gov

Lakes Harney and Monroe Basin Management Action Plan Update

Shannon Salvatori, Environmental Scientist III

Division of Water Resources

Bureau of Environmental Sciences

St. Johns River
Water Management District

Water Quality Update

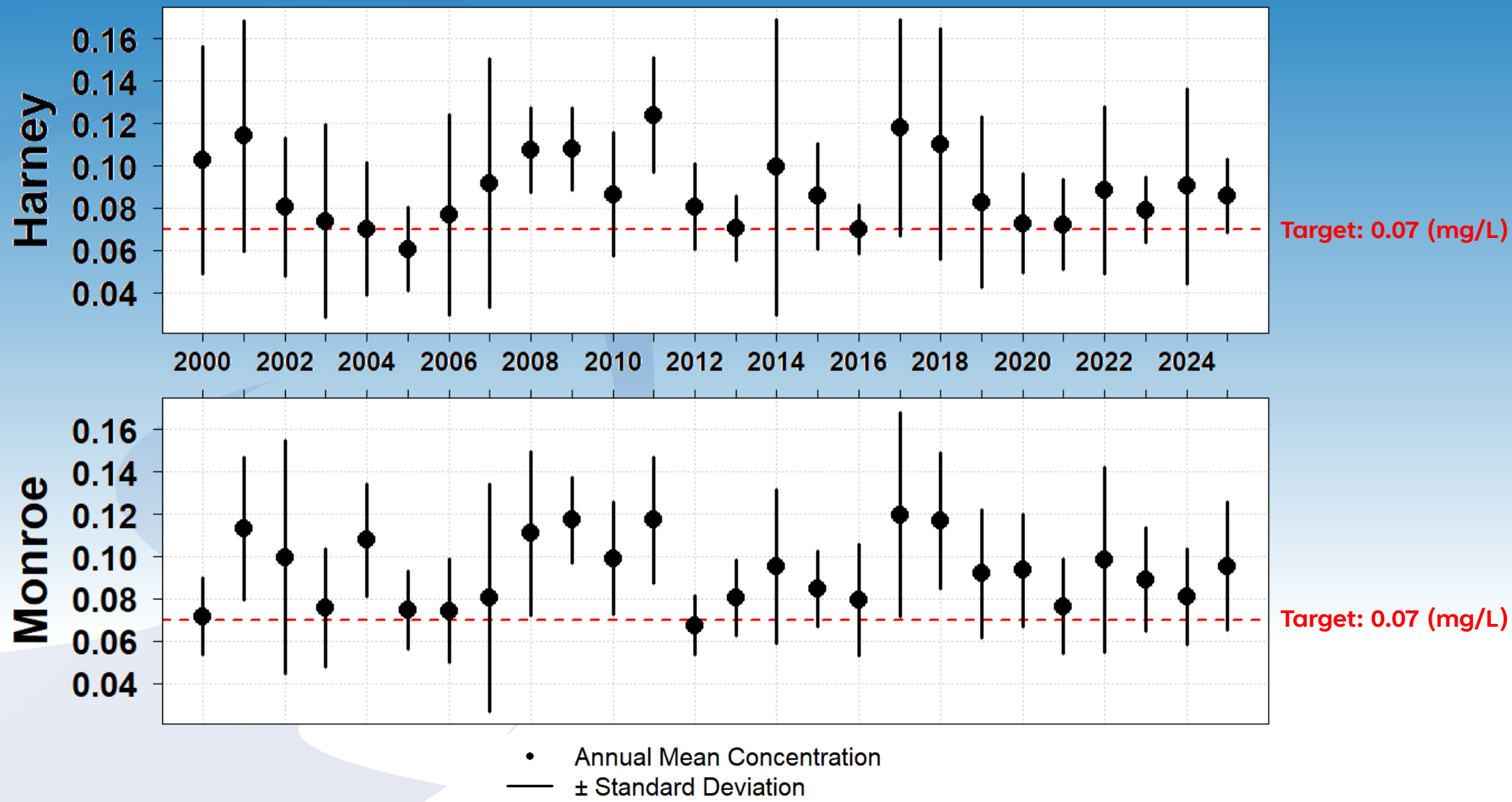
- Lakes Harney and Monroe impaired for **dissolved oxygen** and **nutrients**
- Total Maximum Daily Loads (TMDL) adopted for nutrients **total nitrogen (TN)** and **total phosphorus (TP)** for both lakes
- Target lake concentrations:
  - TN: **1.18 mg/L**
  - TP: **0.07 mg/L**
  - Chlorophyll-*a* (Chl-*a*):
    - Harney: **9.1 µg/L**
    - Monroe: **5.8 µg/L**

Water Quality Stations

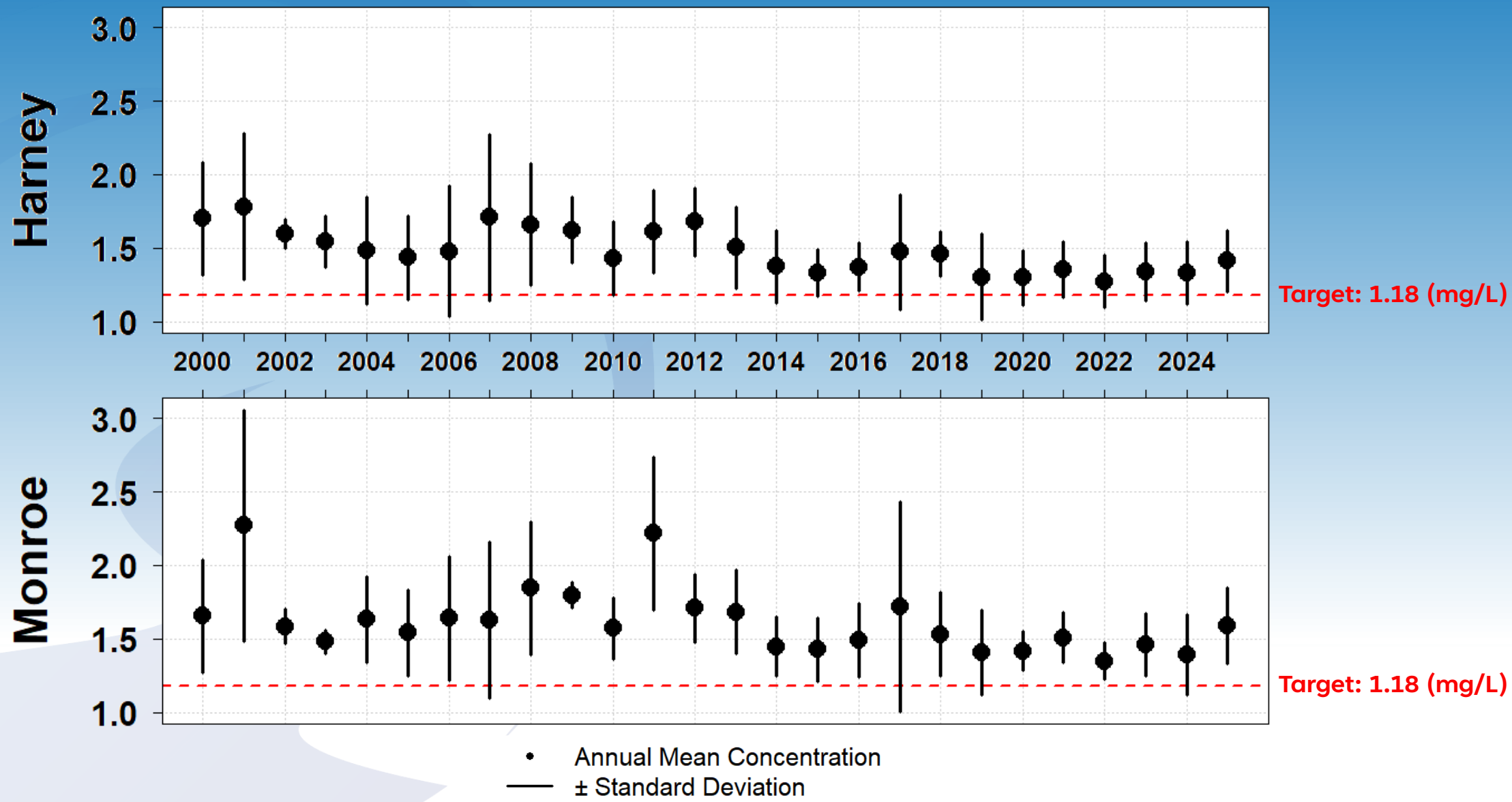
Lake Monroe

Lake Harney

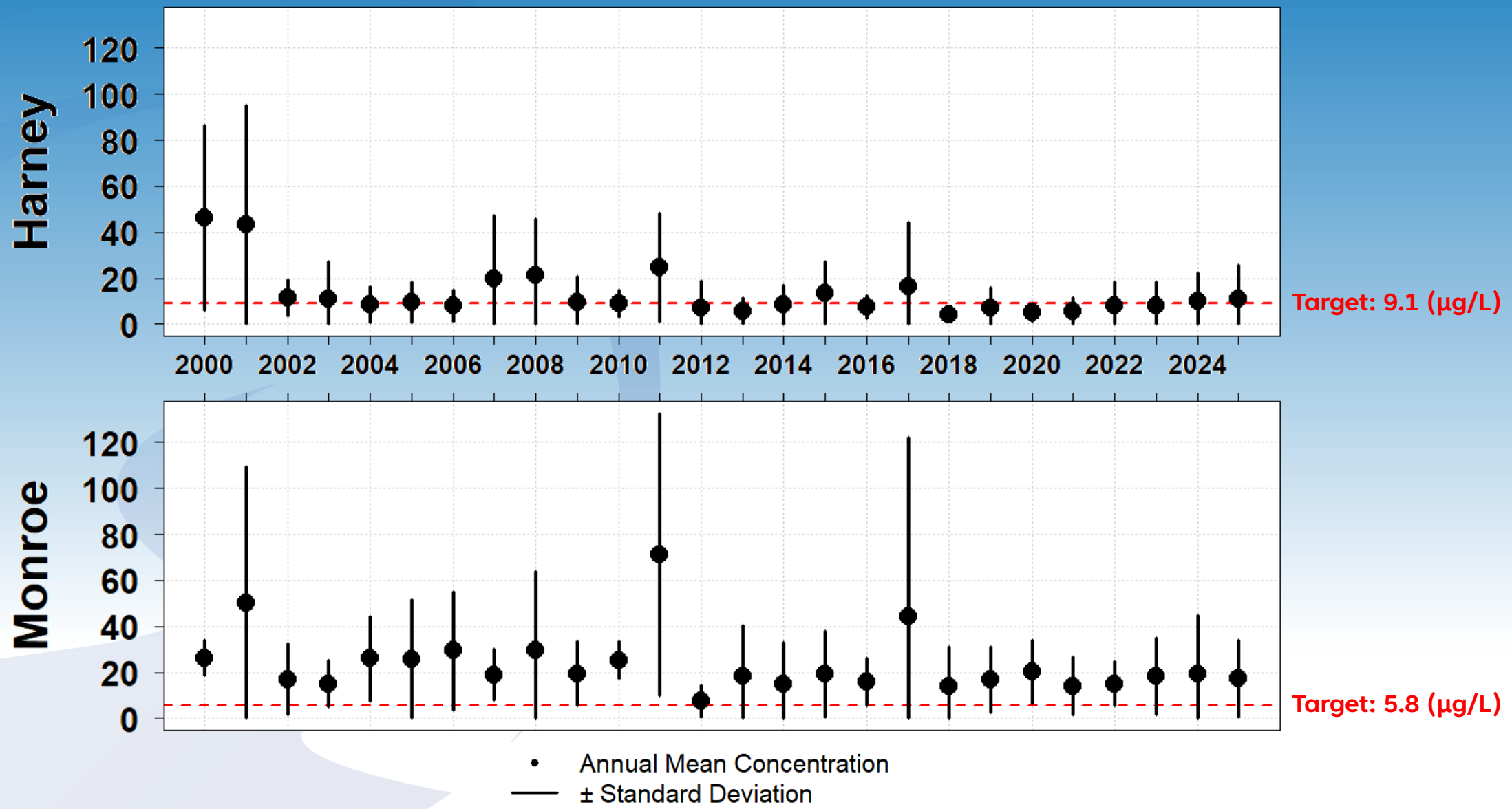
Lake TP Annual Concentrations (mg/L)



Lake TN Annual Concentrations (mg/L)

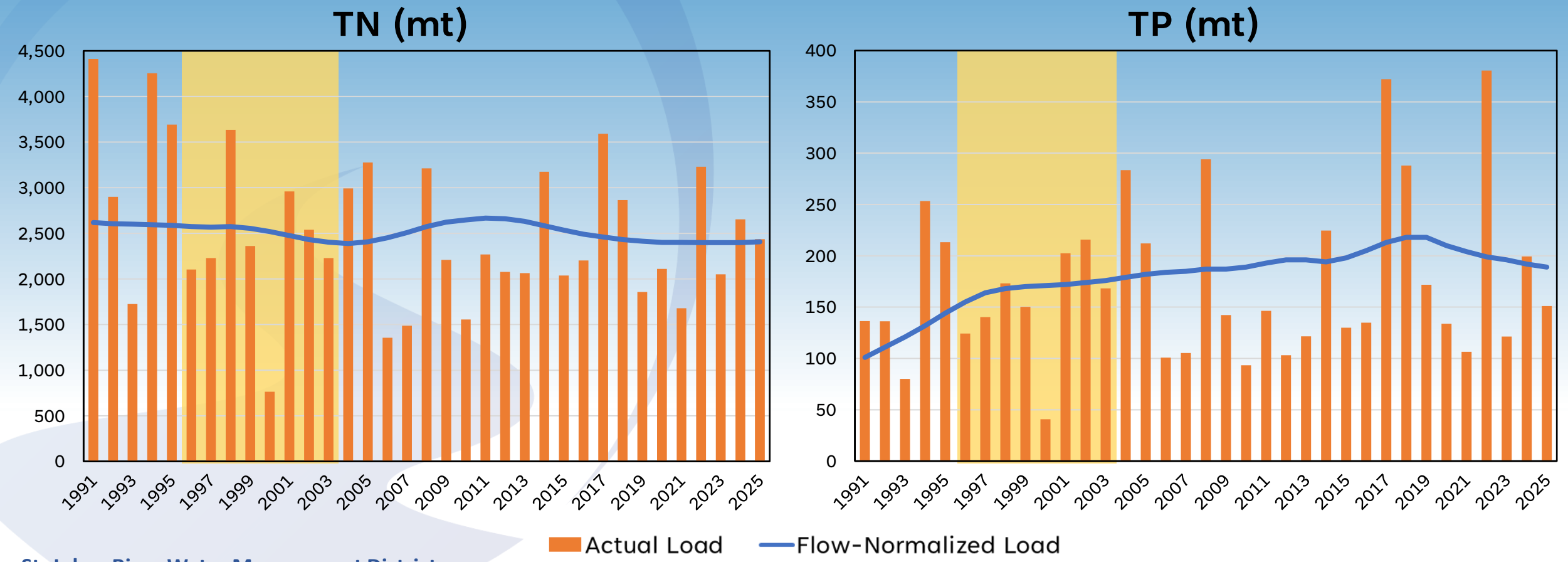


Lake Chl-*a* Annual Concentrations (µg/L)



Nutrient Loading from Upstream

- TMDL estimated loading from the St. Johns River Upper Basin + Econlockhatchee River accounted for 79% (TN) and 74% (TP) of the total watershed load to Harney
  - Analysis period highlighted in yellow in plots below
- Increase in TP load since that time; TN load remained relatively stable



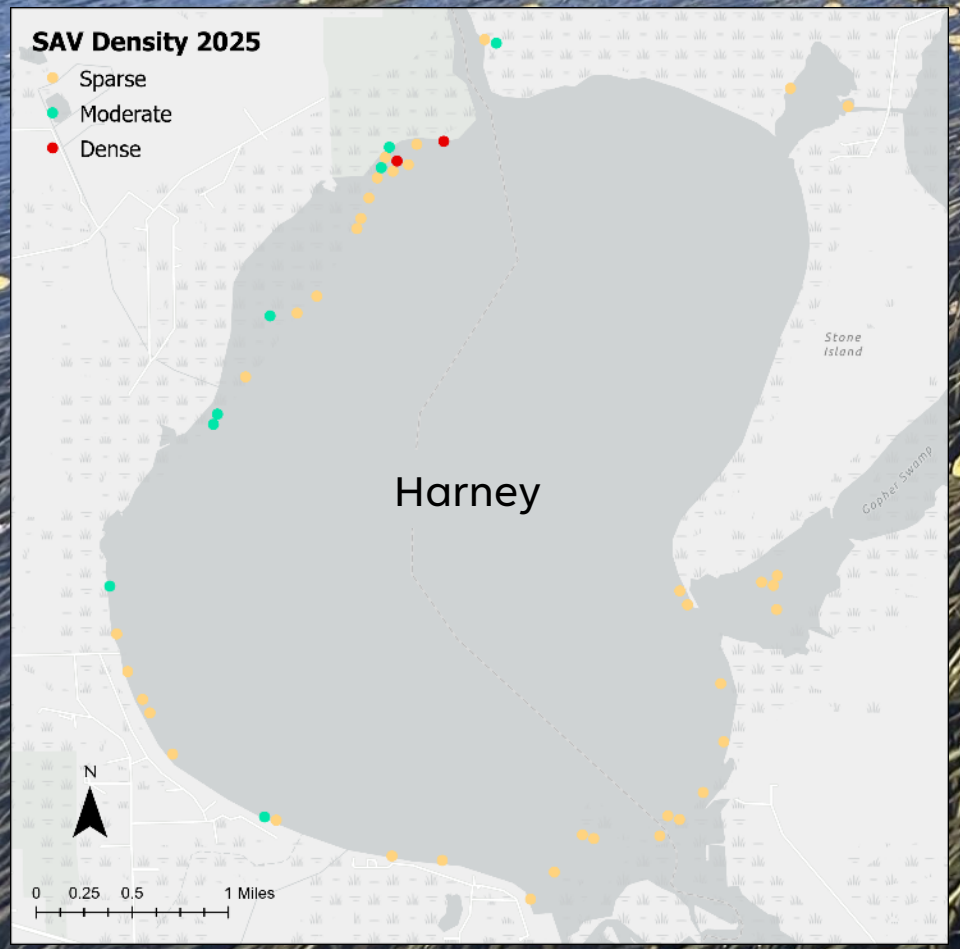
Harmful Algal Blooms - Monroe

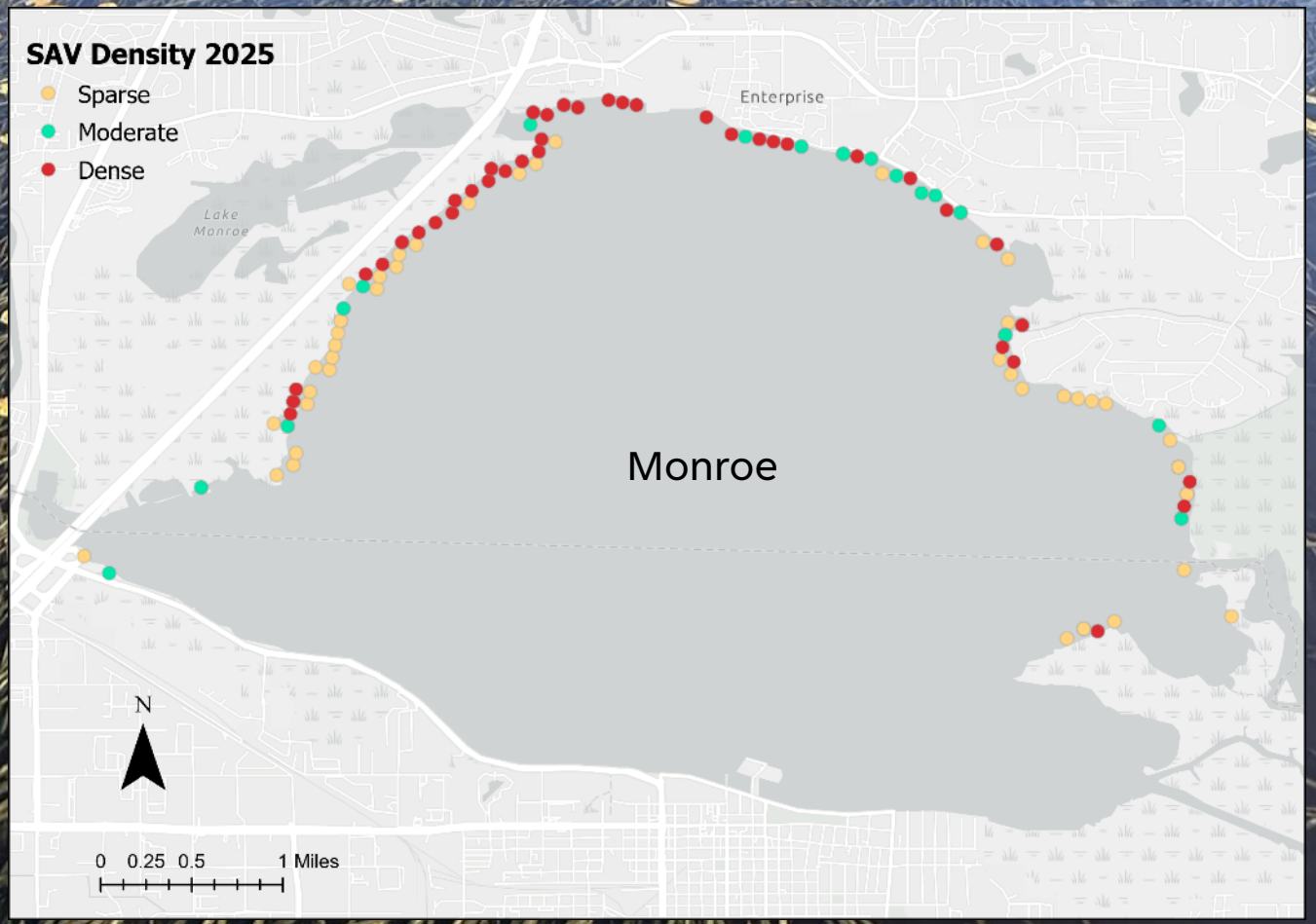
- **19** samples taken on Monroe for algae and toxin analysis in 2025
- **5** samples with toxin detection
  - Max Cylindrospermopsin = **0.41 µg/L**
  - No Microsystin, Anatoxin, Saxitoxin, or Nodularin detections
- All toxin detections were well below EPA's recommended recreational limits
- Few visible blooms
- Cyanobacterial (blue-green algae) dominance during late-spring to summer
- Most common taxa
  - *Microcystis aeruginosa*
  - *Planktolyngbya spp.*
  - *Raphidiopsis raciborskii*
- DEP Algal Bloom Dashboard: https://floridadep.gov/AlgalBloom

Photo taken by samplers at LMAC on 7/10/2025

Submerged Aquatic Vegetation (SAV) Report

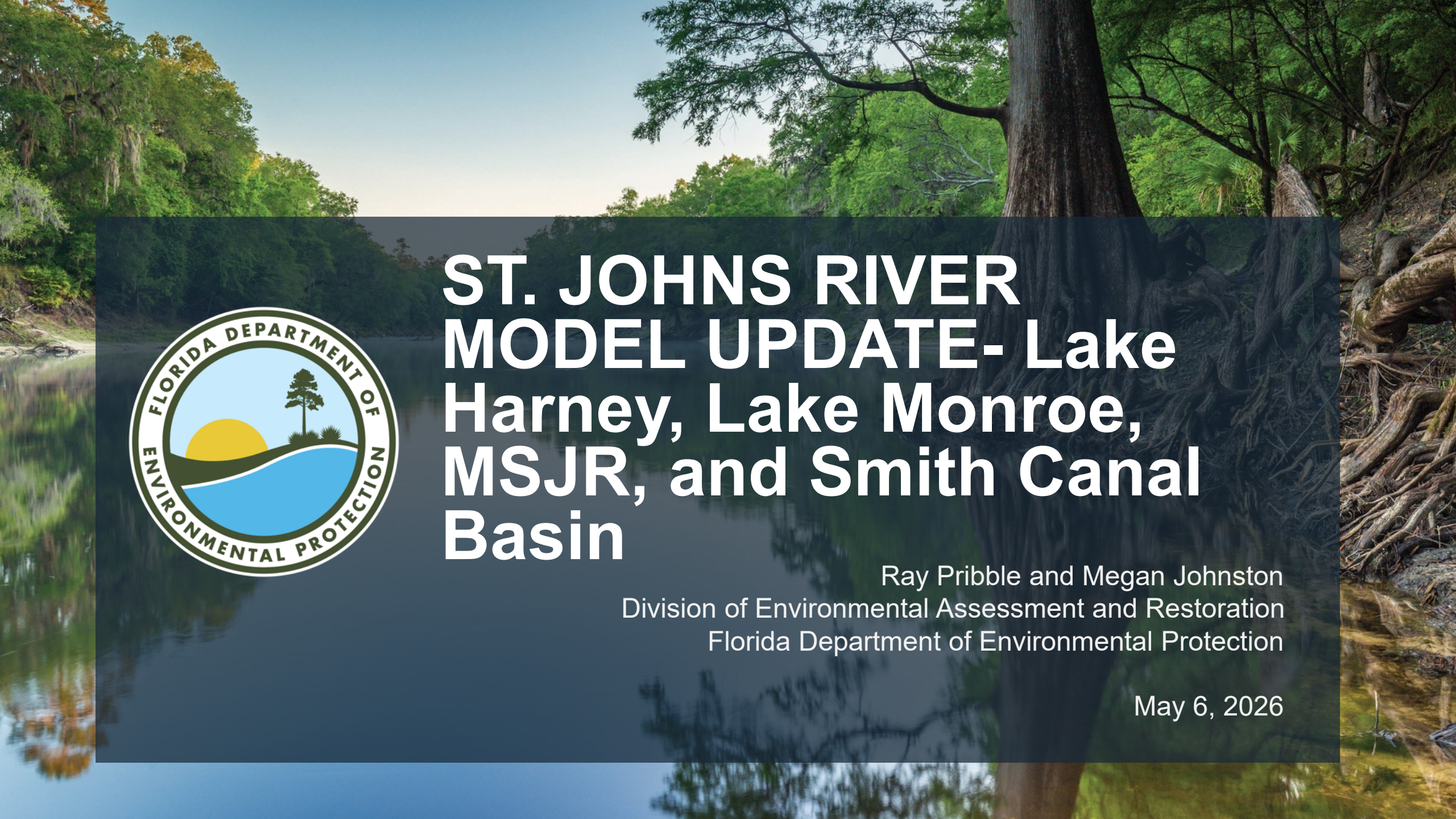
- Notable increases in Lake Monroe SAV since last survey in 2021





Data from FWC Freshwater Fisheries Long Term Monitoring Program, Lake Vegetation Mapping Project

St. Johns River
Water Management District



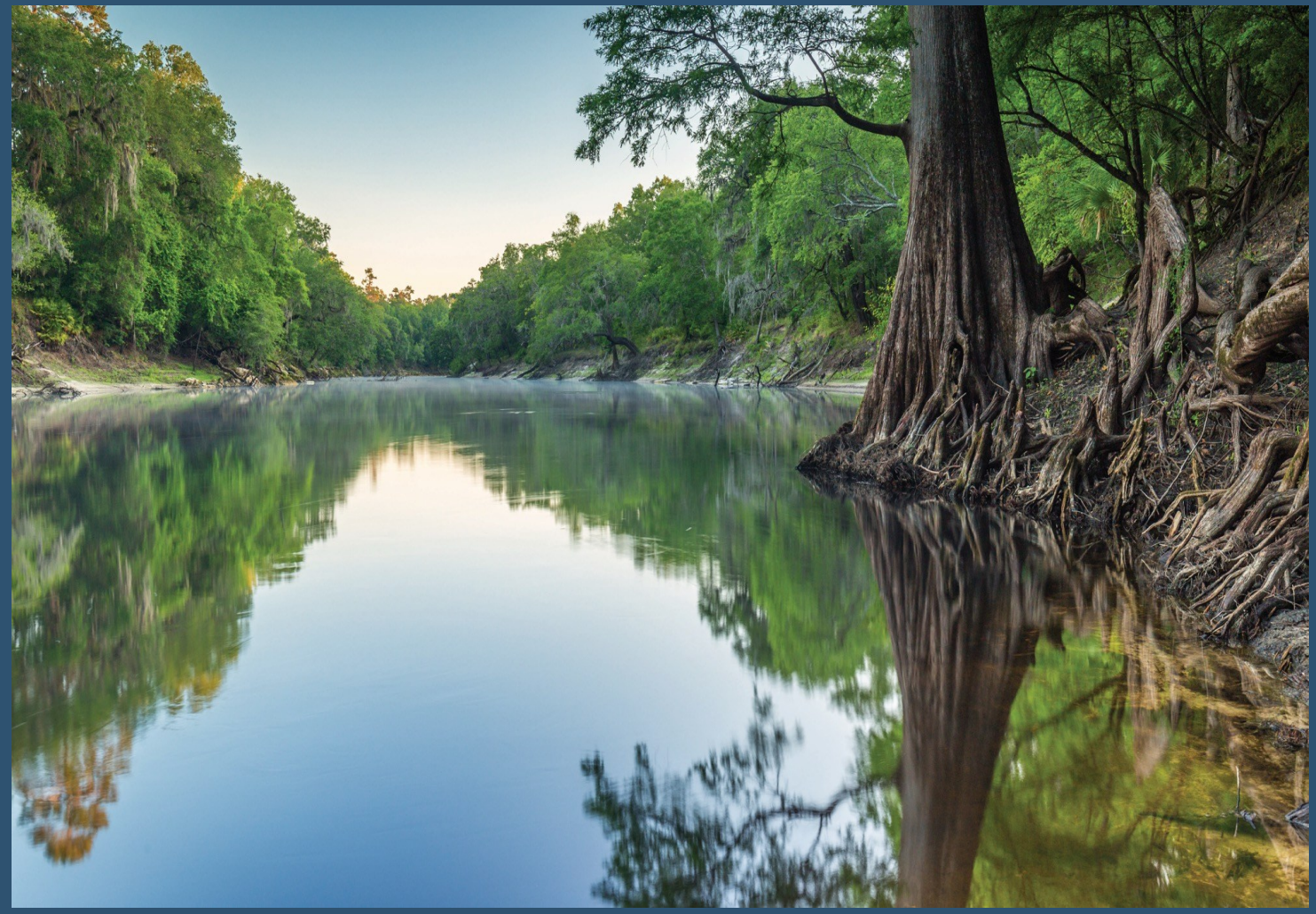
ST. JOHNS RIVER MODEL UPDATE- Lake Harney, Lake Monroe, MSJR, and Smith Canal Basin

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

May 6, 2026

AGENDA

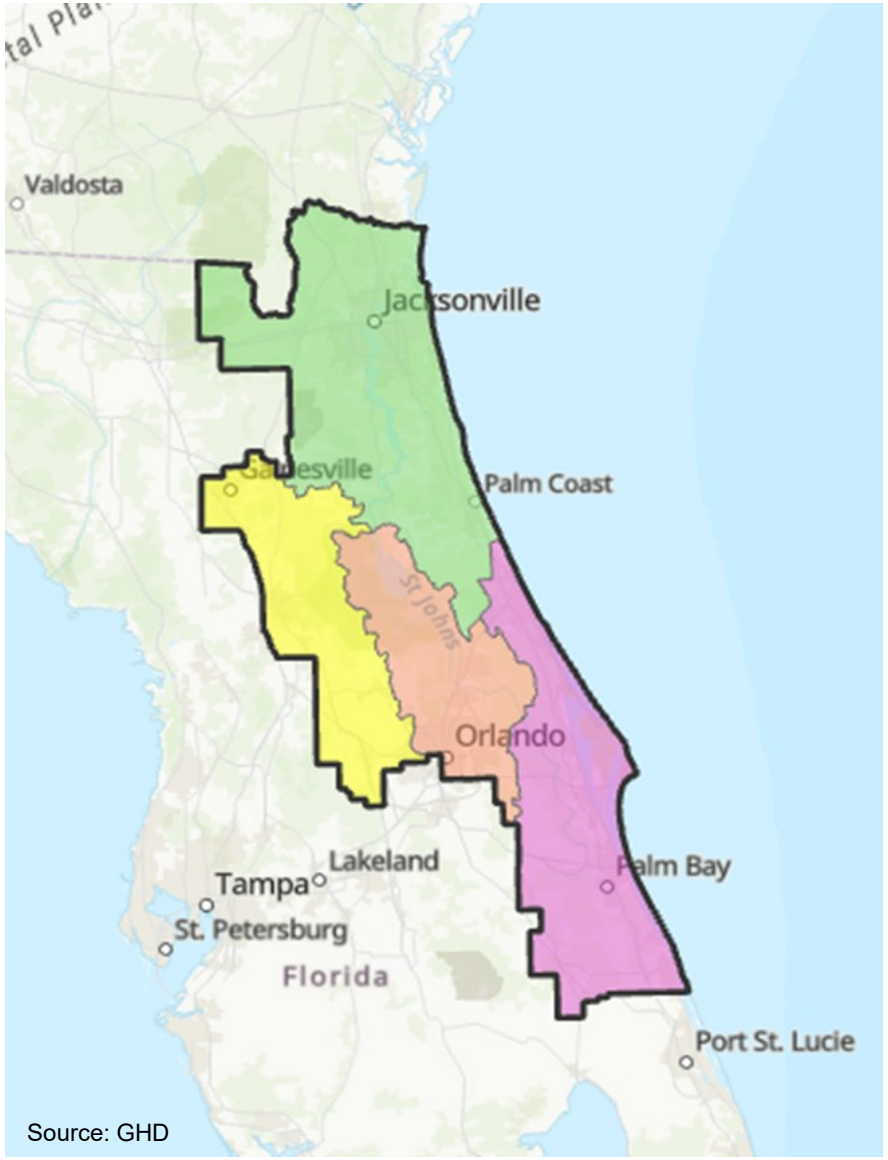
- Project Background.
  - Project Team.
  - Overview of Project.
- Project Schedule.
- Data Sharing and Knowledge.
  - Current Data Inventory.
- Model Details/Workflow.
- Current Status.
- Questions.



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: Update HSPF Model

July 2026: Update EFDC Model

July 2027: Build WASP Model

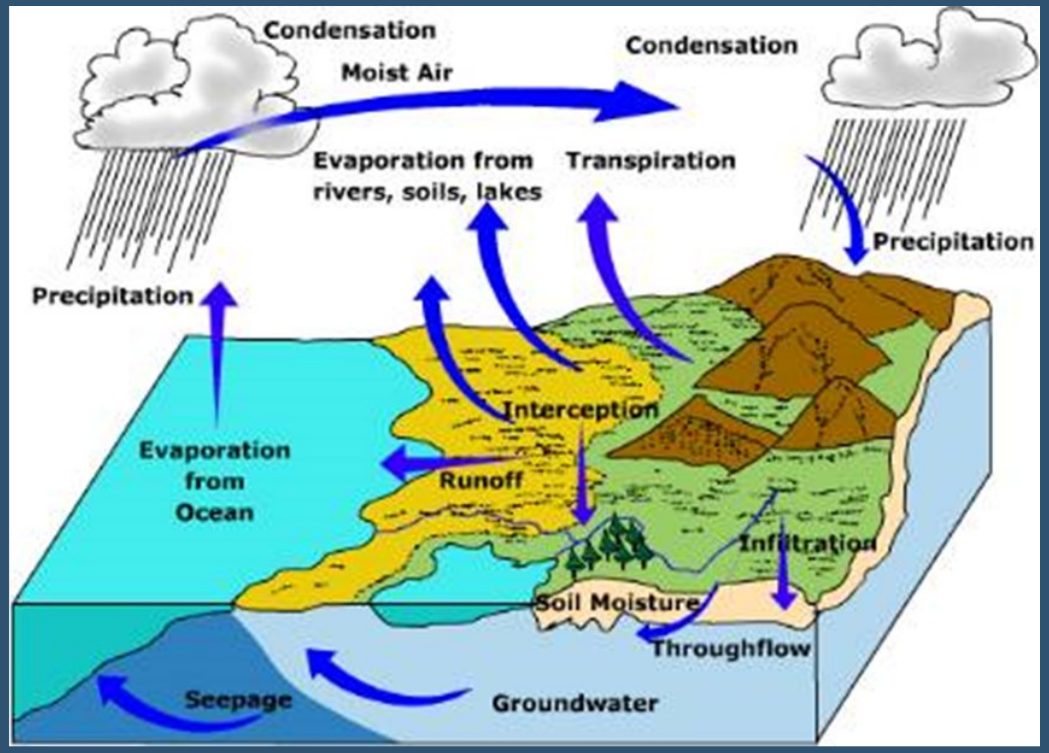
HSPF: Hydrologic Simulation Program FORTRAN
EFDC: Environmental Fluid Dynamics Code
WASP: Water Quality Analysis Simulation Program

CURRENT DATA INVENTORY

Land Cover	Florida Land Cover Classification System (FLUCCS) 2014 & 2020
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

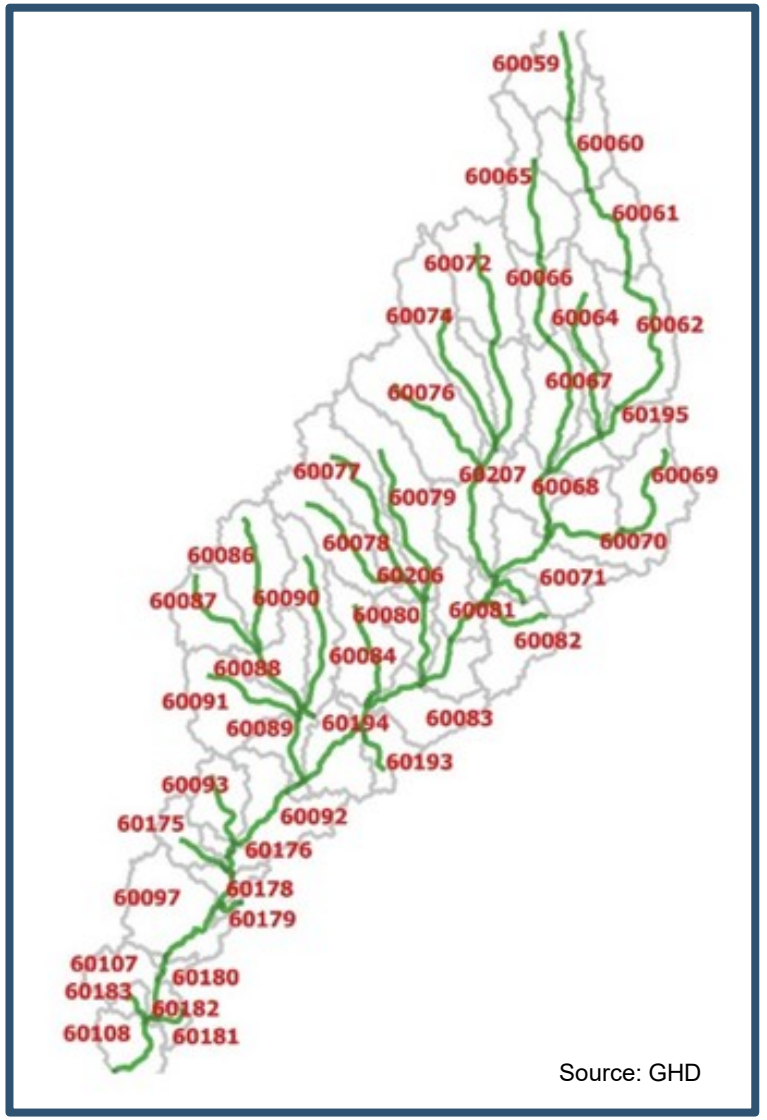


Source: Ritter, Michael E. The Physical Environment: an Introduction to Physical Geography.

- 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.
  - Temperature, total nitrogen (TN), total phosphorus (TP), carbonaceous biochemical oxygen demand (CBOD), dissolved oxygen (DO), sediment

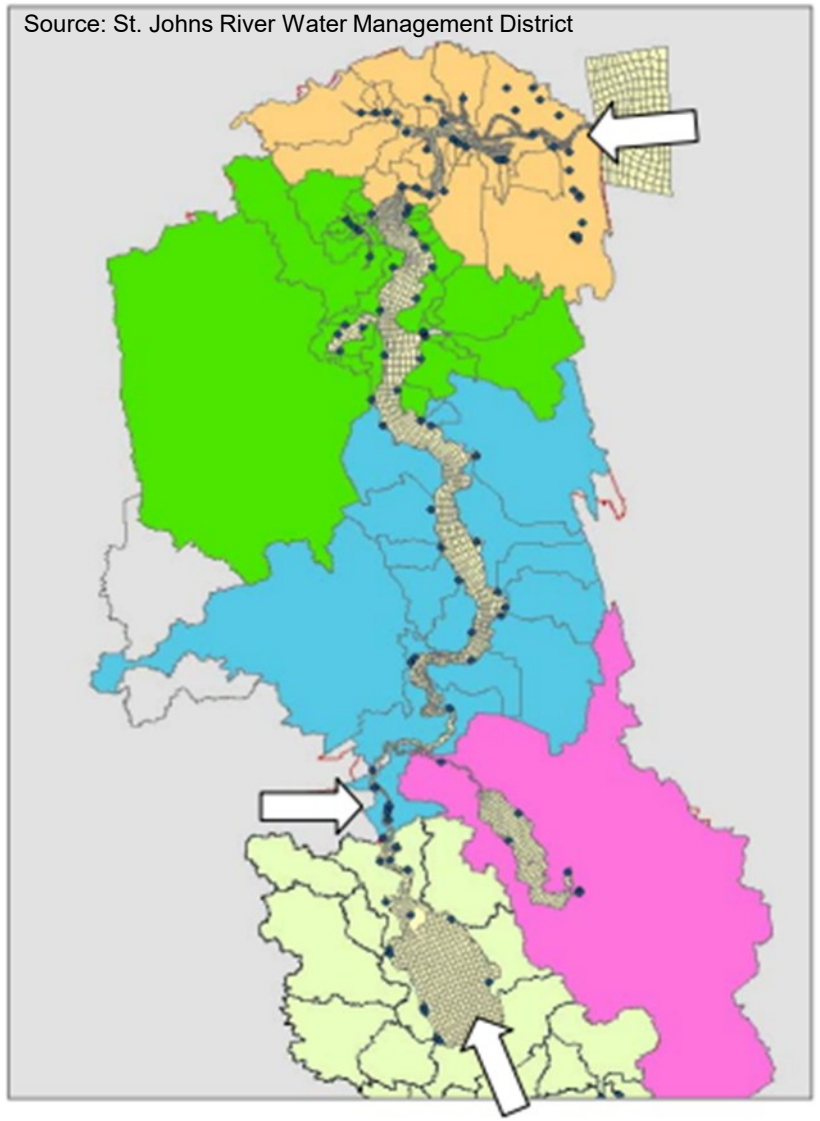
WASP RECEIVING WATERBODY MODEL

- 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.



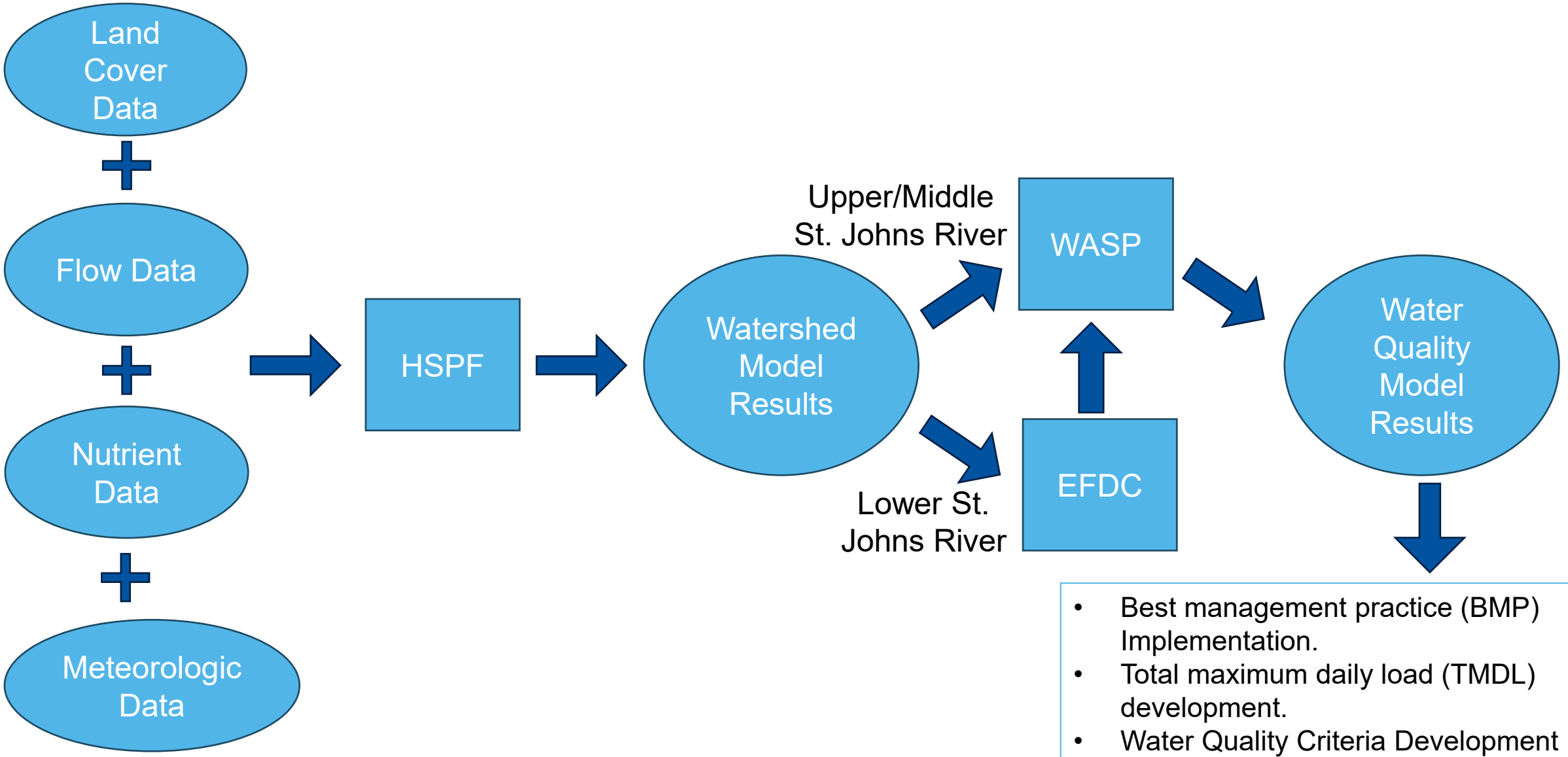
Source: GHD

EFDC HYDRODYNAMIC MODEL



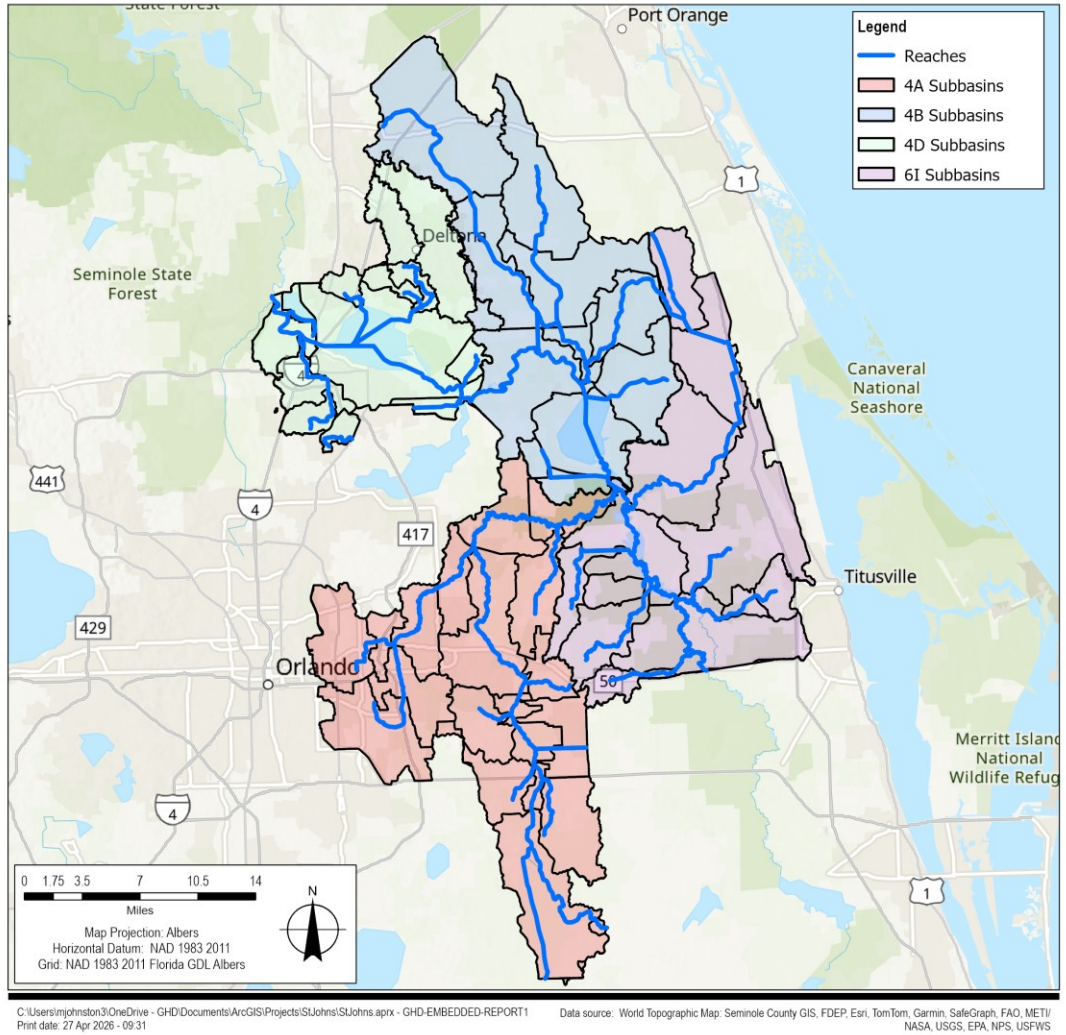
- Evaluated SJRWMD version of EFDC.
  - Updated to current version of EFDC.
- Extended EFDC through 2023.
- Add point source contributions.
- Update flows and loads from HSPF/WASP models from the upstream basins.

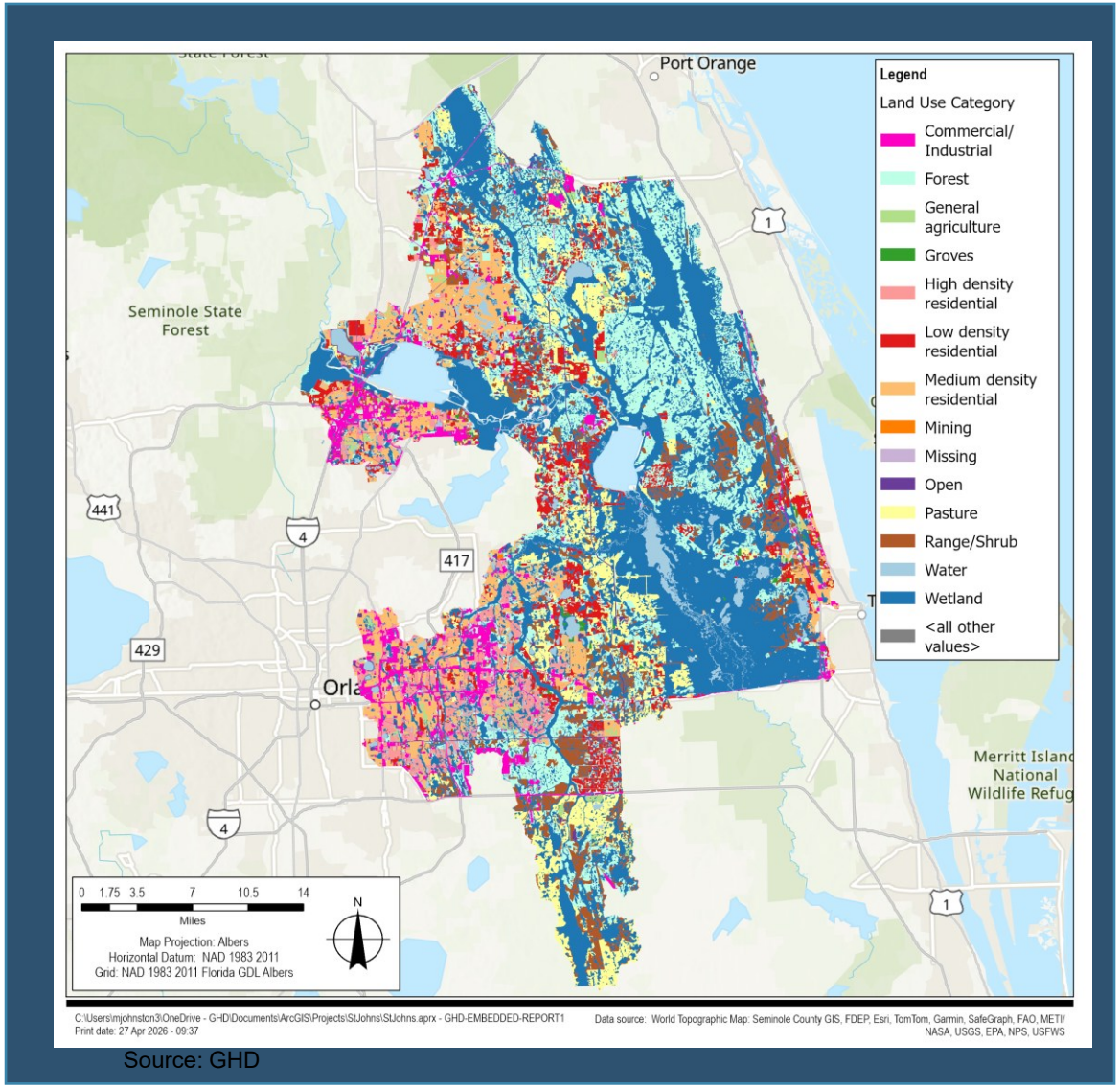
MODELING WORKFLOW



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

LAKES MONROE & HARNEY BASINS

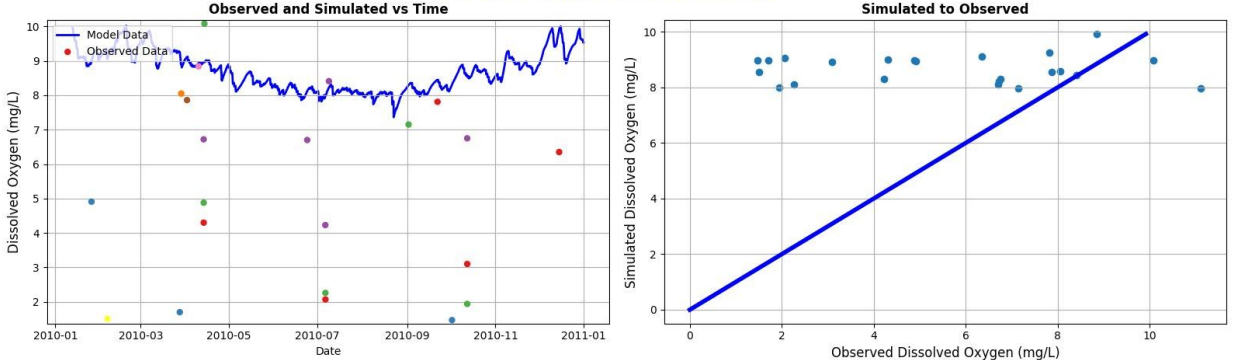




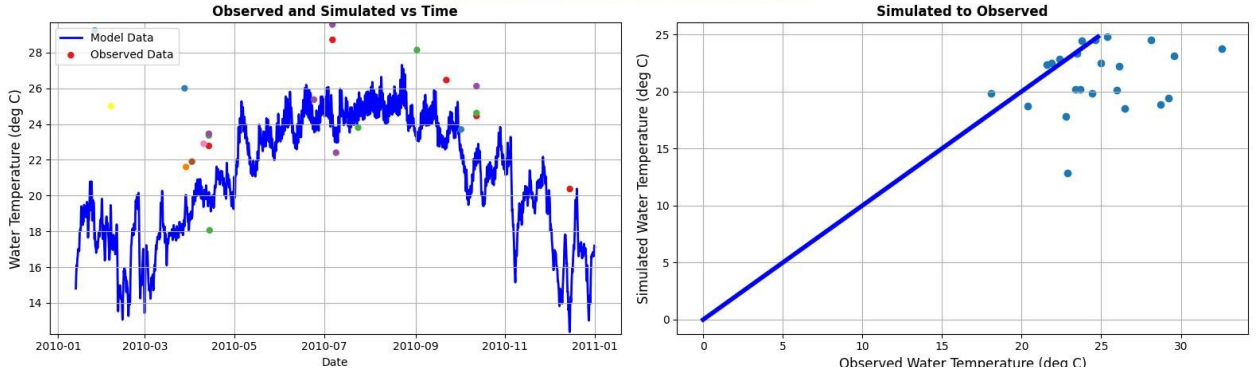
Source: GHD

LAKE MONROE (4D)- HSPF RESULTS

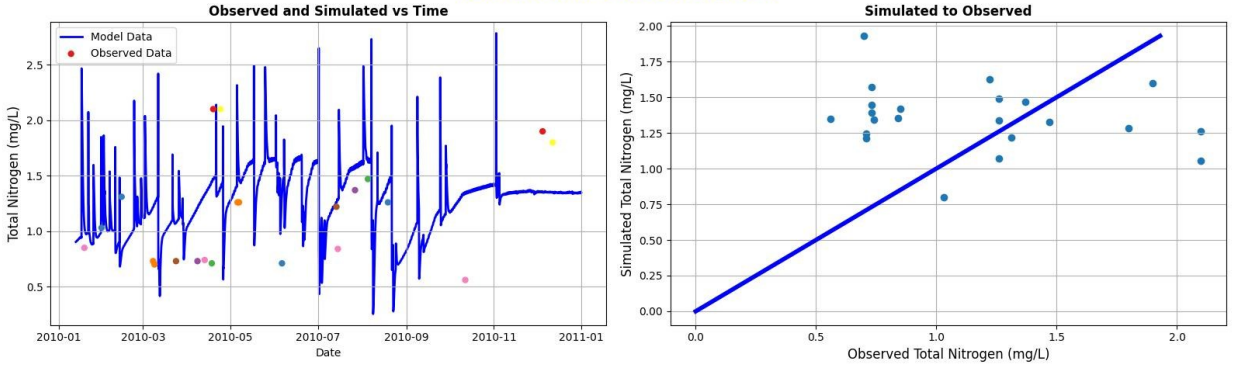
Dissolved Oxygen vs. Observed 4D-5



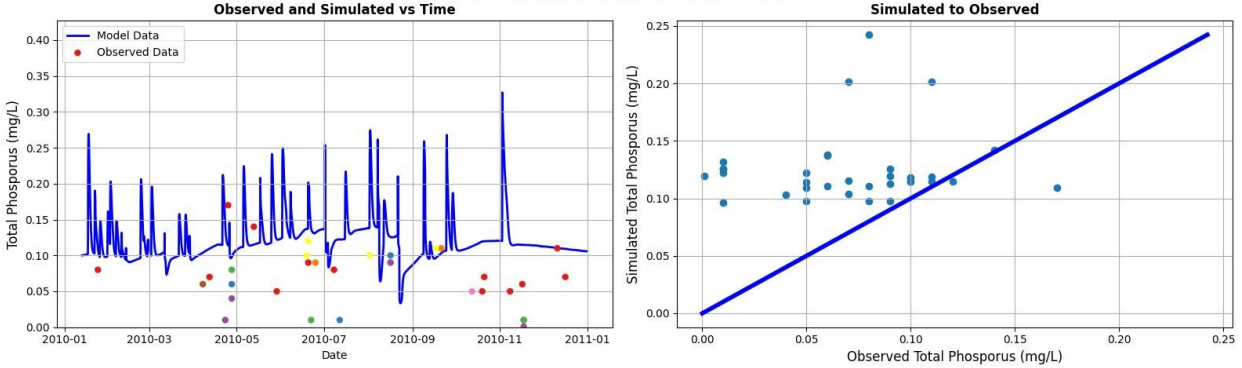
Water Temperature vs. Observed 4D-5

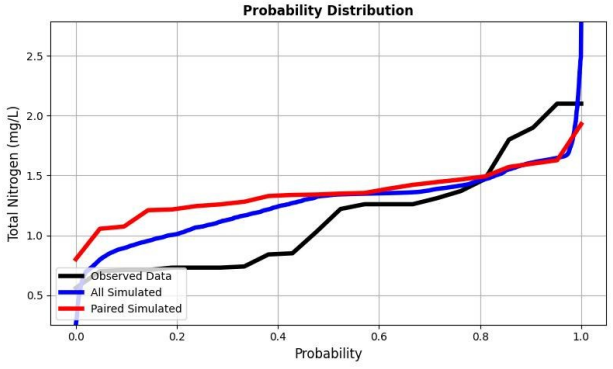


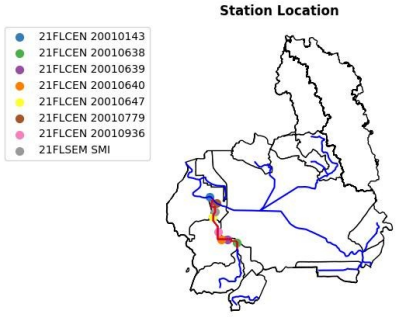
Total Nitrogen vs. Observed 4D-6

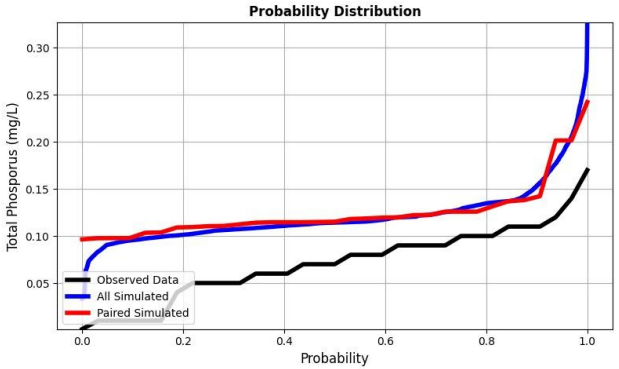


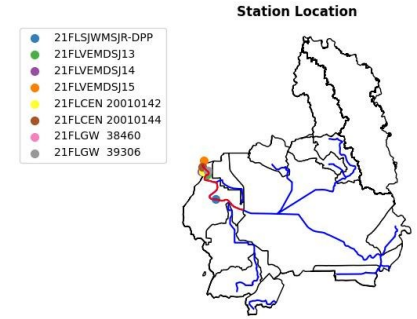
Total Phosporus vs. Observed 4D-8












FLORIDA DEPARTMENT OF
ENVIRONMENTAL PROTECTION
QUESTIONS?

THANK YOU

Ray Pribble
Environmental Science Associates (ESA)
RPribble@esassoc.com

Megan Johnston
GHD
Megan.Johnston@ghd.com

Moira Homann
Division of Environmental Assessment and Restoration
Department of Environmental Protection
Moira.Homann@FloridaDEP.gov

THANK YOU

Evelyn Becerra
Water Quality Restoration Program
Division of Environmental Assessment and Restoration
Florida Department of Environmental Protection

Contact Information:
Evelyn.Becerra@FloridaDEP.gov
Office: 850-245-8547


FLORIDA DEPARTMENT OF
ENVIRONMENTAL PROTECTION

Annual Meeting Summary – Lake Harney, Lake Monroe, Middle St. Johns River, Smith Canal Basin Management Action Plan (BMAP)

Florida Department of Environmental Protection (DEP)

May 6, 2026, via GoToWebinar

1:00 pm – 2:14 pm

Attendees

Miranda Anderson, DEP
Cora Aossey, DEP
Michelle Arnold, DEP
Lisa Bally, Geosyntec
Janelle Barriero, Florida Senate
Evelyn Becerra, DEP
Nicole Belian, FDOT
Kellie Bracht, Altamonte Springs
Michelle Brescia, Sanford
Jazmyn Broxton, DEP
Stacy Burke, Volusia County
Tiffany Busby, Wildwood Consulting
Hannah Byers, Sanford
Andy Canion, SJRWMD
Keeli Carlton, Seminole County
Carolin Ciarlariello, DEP
Susan Davis, SJRWMD
Chad Day, Seminole County
Cammie Dewey, SJRWMD
Dean Dobberfuhl, SJRWMD
Lauren Dorval, FDACS
Robert Falk, Volusia County
Agustin Francisco, FDACS
Pedro Galarreta, Sanford
Carl Greene, FWD
Roxanne Groover, FOWA
Raichel Gulde, RES
Cheyenne Hammell, Seminole County
Brian Icerman, Jones Edmunds
Jennifer Johnson, FDOT
Megan Johnston, GHD
Katie Joseph, Prime Plumbing
Chandler Keenan, DEP
Brianne Kenny, Troon
Natalie Kraft, FPL
Victoria (Vicki) Kroger, SJRWMD
Stephanie Lambert, Flovac
Erich Marzolf, SJRWMD
Lori McCloud, SJRWMD
Bach McClure, Brevard County
Sarah Menz, DEP
Gabrielle Milch, Citizen
Matthew Mosquera, Orlando
Casey Mullen, Seminole County
Josh Papacek, SJRWMD
Joe Parish, Seminole County
Ben Pernezny, Ardurra
Nicolas Pisarello, ATM
Ray Pribble, ESA
Rob Renk, Orange County
Leylah Saavedra, Pegasus Engineering
Shannon Salvatori, SJRWMD
Mark Sees, Orlando
Niyati Shah, St. Johns Riverkeeper
Michelle Shelton, Seminole County
Eric Simpson, DEP
Jennifer Spain, Volusia County
WFSU TV, The Florida Channel
Tony Tomalewski, DEP
John Van Bergen, DEP
Shannon Wetzel, Seminole County

Questions and Answers (Q&A)

Lakes Harney-Monroe BMAP Updates

Q: On the total nitrogen (TN) milestone progress achieved table, why are there dashes (no amounts) in the columns for future TN reductions needed to meet the milestone?
A: The "Sum of TN Reductions" column reflects reductions achieved through 2025. The 100% milestone column shows a dash because the entity has already exceeded that requirement. Any reductions beyond the current milestone are carried forward and applied to the next milestone.

Q: On the total phosphorus (TP) project reductions graph, does the Y-axis scale indicate that all project reductions were between 15,000–20,000 pounds per year?
A: Yes.

St. Johns River Water Management District Updates

Q: Are toxins being measured during non-bloom periods?
A: Yes. During warmer months, monitoring occurs twice a month, and once a month the rest of the year. Every sample is analyzed for toxins.

Q: What portion of the Upper St. Johns River load comes from biosolids leaching, and is there a plan to address it?
A: Biosolids are a contributor to the total watershed load in the Upper Basin. They will be a consideration in the upcoming St. Johns River Model update. Unlike the Middle St. Johns River Basin, there is no BMAP for the Upper St. Johns River Basin, but the updated model will provide the loading information to better understand the impairments in the Upper Basin and their effect on the Middle Basin.

St. Johns River Model Update

Q: How can stakeholders best use this model?
A: Once finished, the model can be adapted for individual BMAPs at a finer resolution using more detailed land use and other data. It uses 2020 land use data for more current loading estimates. Another use will be estimating project credits to calculate load reductions from best management practices — which should be really helpful for stakeholders with required load reductions in their BMAPs.