



BASIN MANAGEMENT ACTION PLAN UPDATES

Chandler Keenan, Environmental Consultant
Water Quality Restoration Program
Florida Department of Environmental Protection

Southwest Florida Water Management District- Management Meeting | July 10, 2024



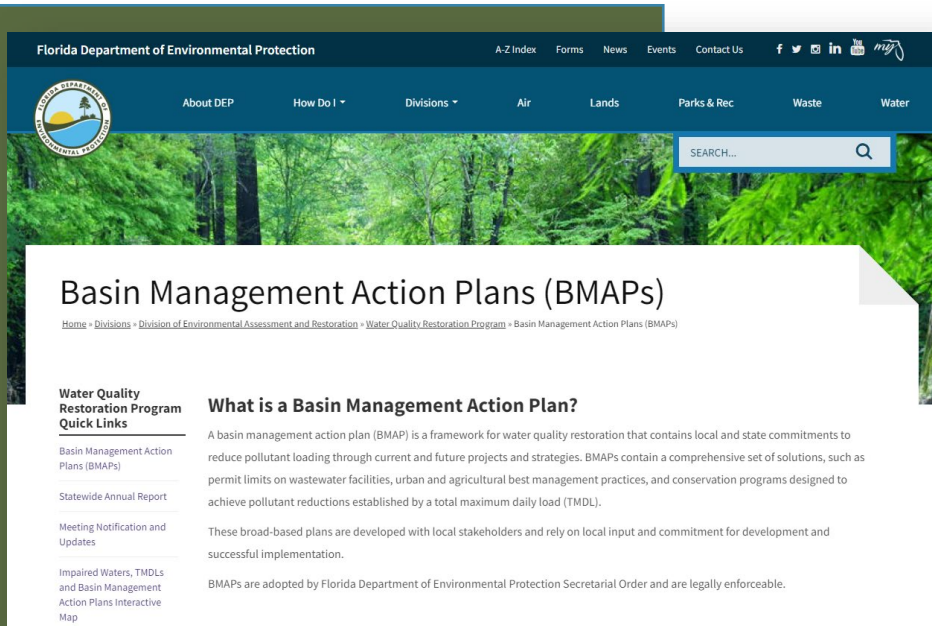
AGENDA

- Basin Management Action Plan (BMAP) Overview:
 - Project Highlights.
 - Spring Vent Water Quality.
- Basin Analyses:
 - Nitrogen Source Inventory Loading Tool (NSILT) Draft Results.
 - Spring Vent Load Analysis.
- Next Steps for BMAP Updates:
 - Project Prioritization.
 - Timeline.





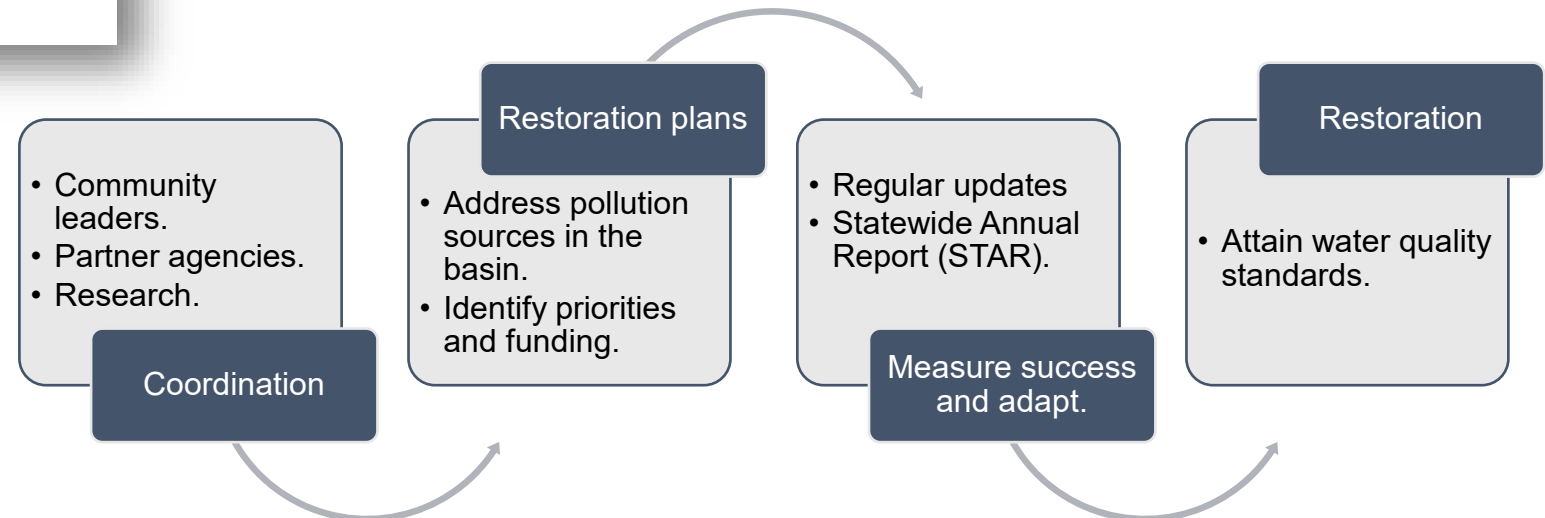
BMAPs



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.



BMAPs

SPRINGS COAST OVERVIEW

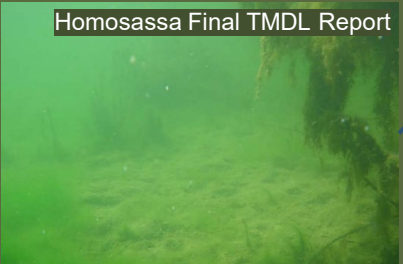
2009



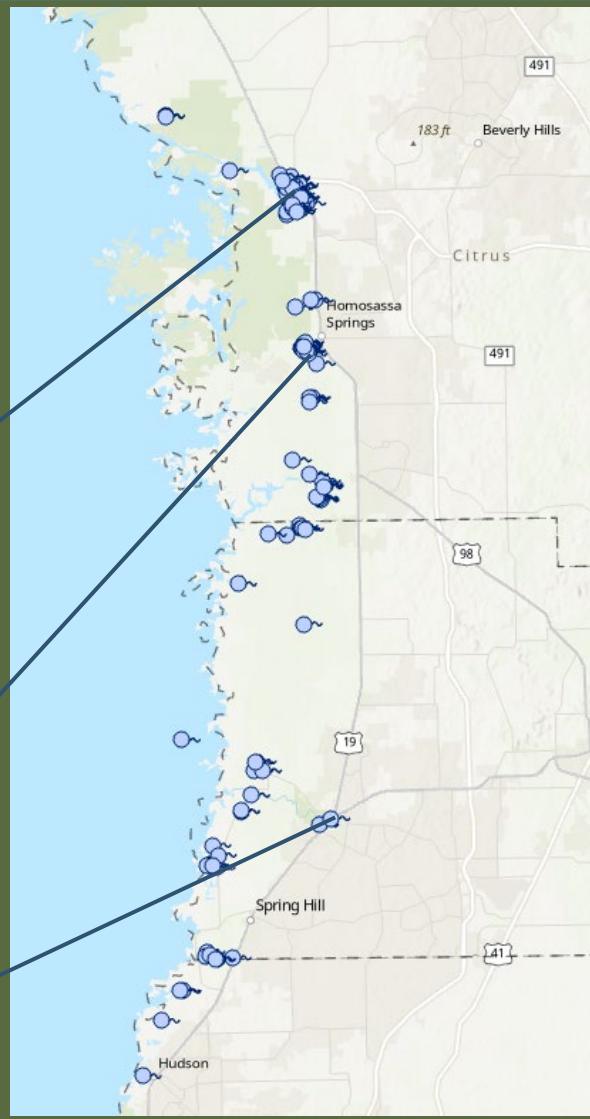
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2010



2006



Background

Early 2000s - Many of Florida's freshwater springs determined to be impaired for nutrients.

2014 - DEP adopted TMDLs for many waterbodies in Springs Coast basin.

2016 - Florida Legislature designated 30 Outstanding Florida Springs (OFS) to require additional protections.

2018 - BMAPs adopted as restoration framework to meet TMDLs.

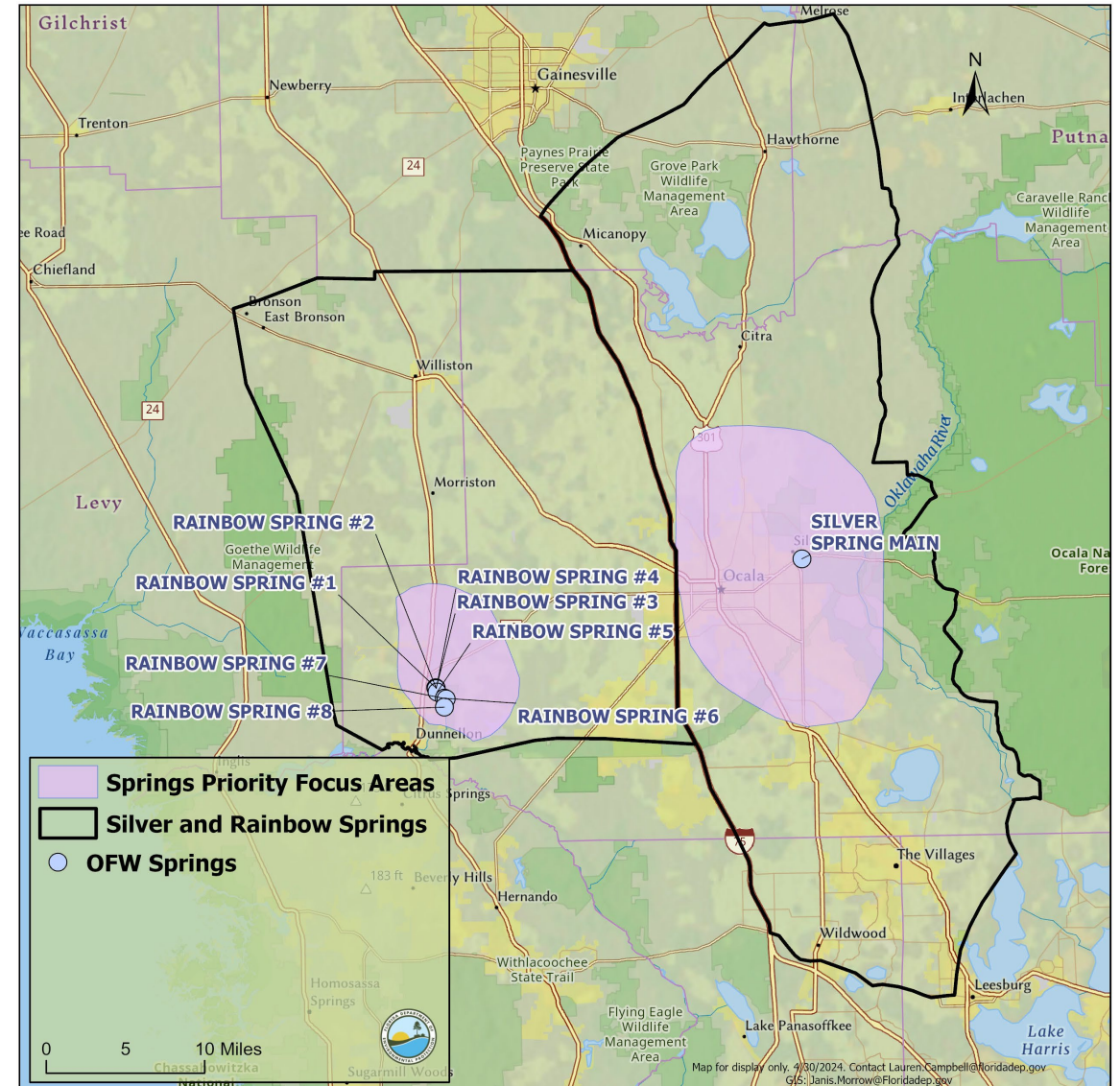
Today - Working on updates to the Springs BMAPs to be adopted by 2025.



RAINBOW SPRINGS AND RIVER BMAP AREA

- The Rainbow Spring Group and Rainbow River BMAP area is approximately 679 square miles.
- Impaired for the nitrate form of nitrogen.
- TMDL is 0.35 mg/L of nitrate, as monthly arithmetic mean target.

Type of Entity	Name
Responsible Stakeholders	Marion County Levy County City of Dunnellon City of Williston City of Ocala
Responsible Agencies	Florida Department of Agriculture and Consumer Services (including the Florida Forest Service and Office of Agriculture Water Policy) Florida Department of Environmental Protection (including the Central District Office and Rainbow Springs Aquatic Preserve) Florida Department of Health in Marion County Florida Department of Transportation, Districts 2 and 5 Florida Fish and Wildlife Conservation Commission Southwest Florida Water Management District Marion County/University of Florida – Institute of Food and Agricultural Sciences <u>Extension</u>
Other Interested Stakeholders	Rainbow River Conservation Private Sector Agriculture and Businesses General Public

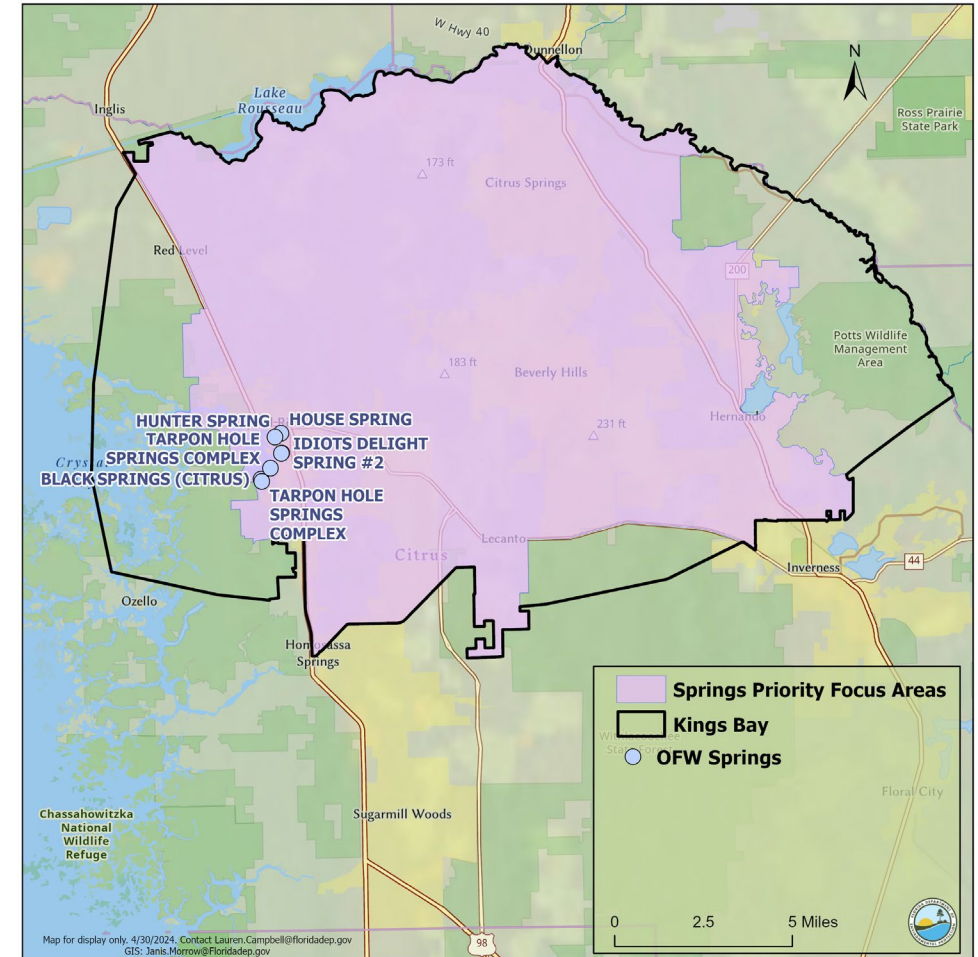




CRYSTAL RIVER/KINGS BAY BMAP

- BMAP area is approximately 178,753 acres and includes OFS including Kings Bay Group (Hunter, House, Black, Idiot's Delight and Tarpon Hole Springs).
- Impaired for the nitrate form of nitrogen and orthophosphate.
- TMDLs:
 - Springs 0.23 mg/L nitrate as an annual average.
 - Kings Bay 0.28 mg/L nitrate as an annual average.
 - Springs 0.028 mg/L orthophosphate as an annual average.
 - Kings Bay 0.032 mg/L orthophosphate as an annual average.

Type of Entity	Name
Responsible Stakeholders	Citrus County City of Crystal River Agricultural producers Golf courses
Responsible Agencies	Florida Department of Agriculture and Consumer Services Florida Department of Environmental Protection Florida Department of Health Southwest Florida Water Management District
Other Interested Stakeholders	Citizens Duke Energy Florida Farm Bureau Federation Florida Onsite Wastewater Association Gulf Archeology Research Institute Homeowners/Citizens Kings Bay Rotary Kings Bay Springs Alliance Save Crystal River Save the Manatee Club St. Martins Marsh Aquatic Preserve University of Florida Institute of Food and Agricultural Sciences – Citrus County Extension Service U.S. Fish and Wildlife Service

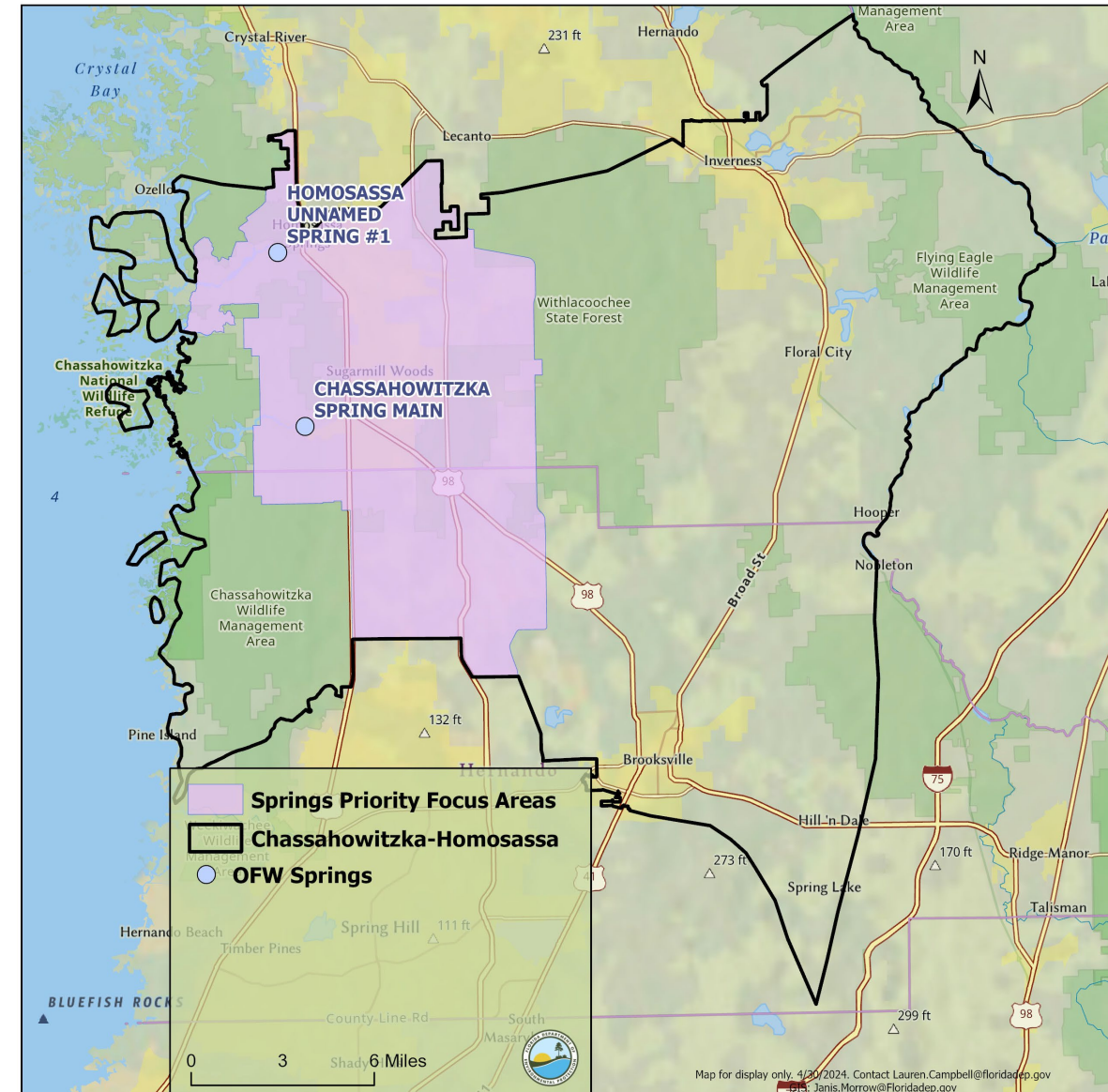




HOMOSASSA/CHASSAHOWITZKA SPRINGS BMAP

- BMAP area is approximately 340,609 acres and include OFS Homosassa and Chassahowitzka Springs Groups.
- Impaired for the nitrate form of nitrogen.
- TMDLs are nitrate annual averages of 0.23 mg/L for the springs and 0.25 mg/L for the rivers.

Type of Entity	Name
Responsible Stakeholders	Citrus County City of Brooksville City of Inverness Hernando County Agricultural producers Golf courses
Responsible Agencies	Florida Department of Agriculture and Consumer Services Florida Department of Environmental Protection Florida Department of Health Southwest Florida Water Management District
Other Interested Stakeholders	Citizens/Homeowners Florida Farm Bureau Florida Onsite Wastewater Association Florida Springs Council Hernando Beach Government Affairs Committee Hernando County Port Authority Hernando Environmental Land Protectors (HELP) Homosassa River Alliance Save the Manatee Club

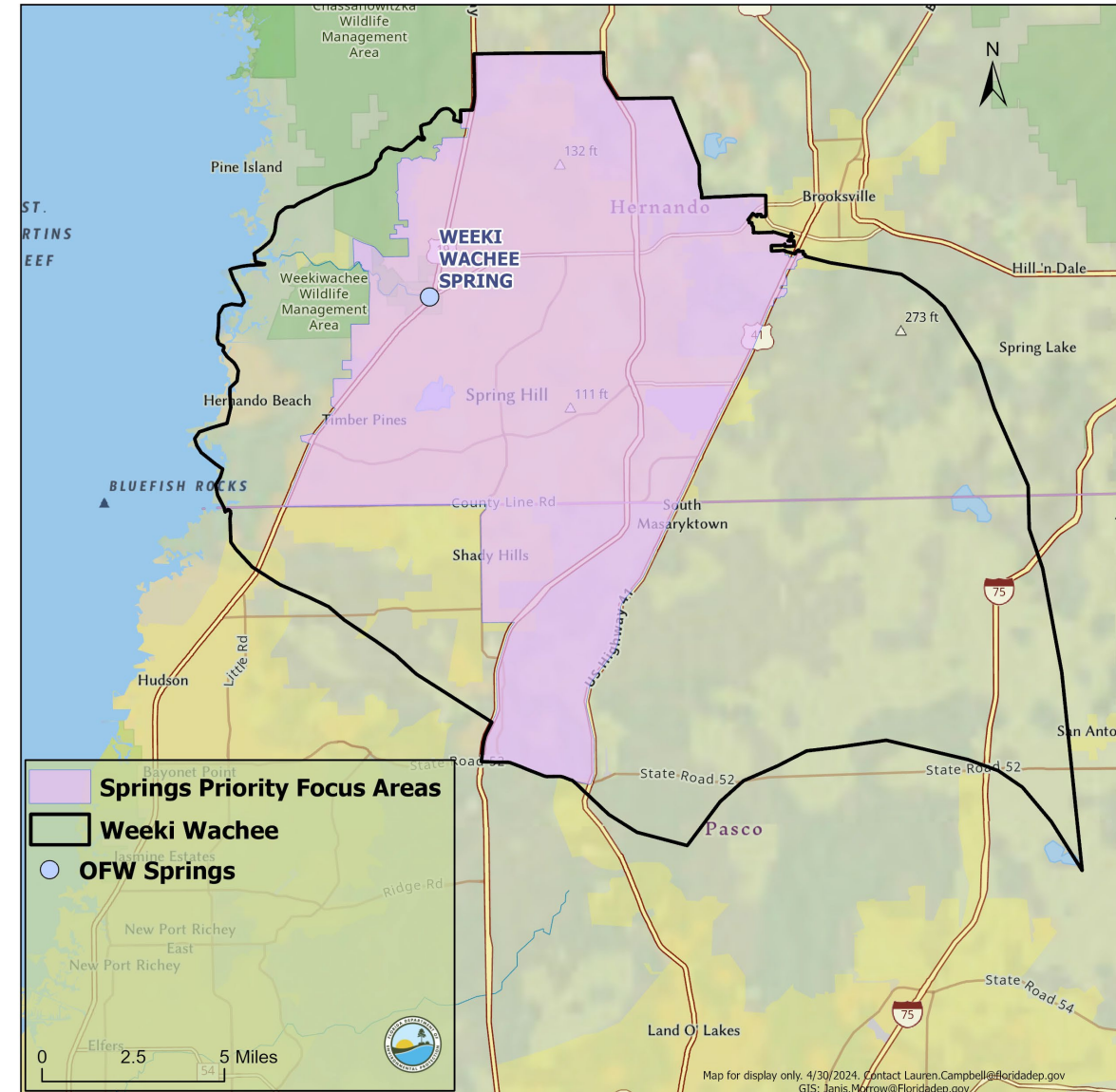




WEEKI WACHEE BMAP

- BMAP area is approximately 200,474 acres and includes the Weeki Wachee OFS.
- Impaired for the nitrate form of nitrogen.
- TMDLs are nitrate annual averages of 0.28 mg/L for Weeki Wachee Spring, 0.23 mg/L for the Magnolia-Apripeka Spring Groups and 0.20 mg/L for the Weeki Wachee River.

Type of Entity	Name
Responsible Stakeholders	City of Brooksville Hernando County Pasco County Agricultural producers Golf courses
Responsible Agencies	Florida Department of Agriculture and Consumer Services Florida Department of Environmental Protection Florida Department of Health Southwest Florida Water Management District
Other Interested Stakeholders	Citizens City of Weeki Wachee Florida Farm Bureau Florida Onsite Wastewater Association Florida Springs Institute Hernando Beach Government Affairs Committee Hernando County Task Force Hernando Environmental Land Protectors (HELP) Save the Manatee Club





BILLS AND LEGISLATION

- Florida Watershed Protection Act, Section 403.067, Florida Statutes (F.S.).
- Florida Springs and Aquifer Protection Act, Part VIII of Chapter 373, F.S.
- Senate Bill (SB) 712 Clean Waterways Act.
- House Bill (HB) 1379 Environmental Protection.
- HB1557.

Summary of latest updates:

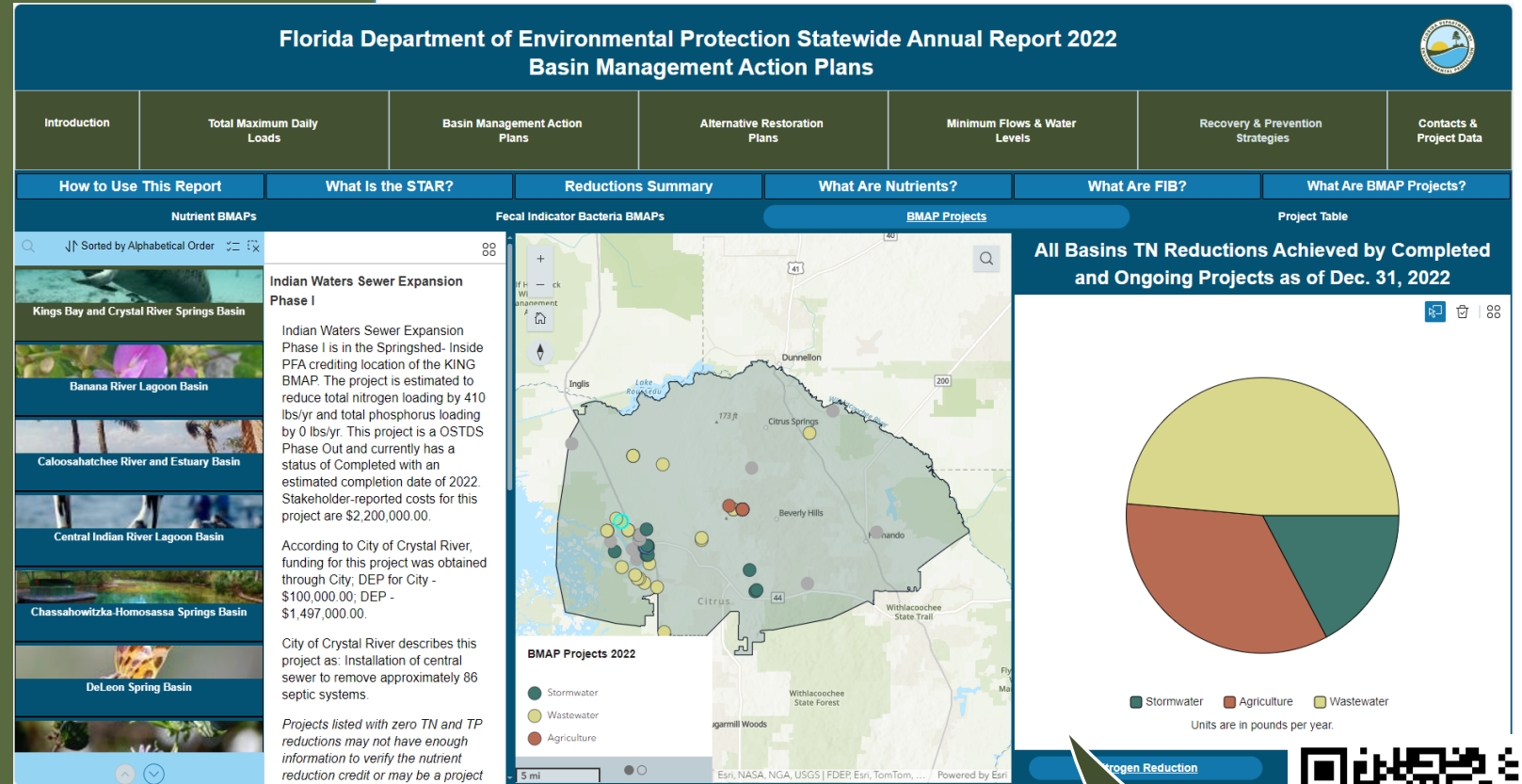
- Wastewater and Onsite Sewage Treatment and Disposal System (OSTDS) remediation plans from local governments.
- List of identified project to meet five-year milestones.
- Agricultural Cooperative Regional Elements.
- Prohibitions expanded from priority focus area (PFA) to entire BMAP.
- Advanced waste treatment (AWT) required for more treatment effluent, including reclaimed water.



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.





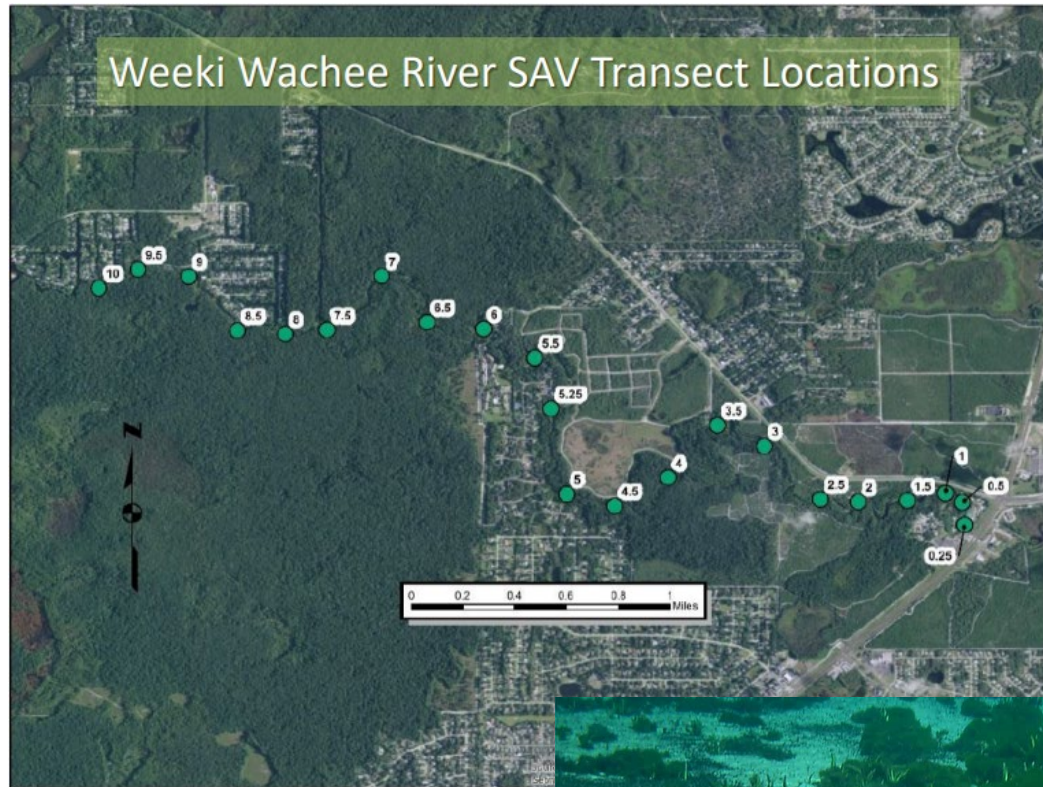
STAR RESULTS FOR 2023

BMAP	Project Count *					Verified Project Reductions of Total Nitrogen
	Planned	Ongoing	Underway	Completed	Total	
Rainbow	21	20	29	90	160	42,519 lbs./yr.
Kings Bay/ Crystal River	20	7	10	34	71	23,770 lbs./yr.
Homosassa/ Chassahowitzka	12	12	19	25	68	19,056 lbs./yr.
Weeki Wachee	18	16	11	36	81	61,083 lbs./yr.

*As of Dec. 31, 2023



PROJECT HIGHLIGHTS



Source: Southwest Florida Water Management District (SWFWMD)



Studies and Monitoring:

- Rainbow Spring algae growth and vegetation mapping.
- Weeki Wachee vegetation mapping.
- Recently published work on three different ecological zones within the spring-fed Chassahowitzka River.

In Water:

- Muck removal.
- Wetland restoration.



PROJECT HIGHLIGHTS

Wastewater Improvements:

- Hernando County – Upgrade and consolidation of Wastewater Treatment Facilities (WWTFs), septic to sewer phase conversion.
- Citrus County - Upgrading Meadowcrest WWTF, sewer line expansion north, south and east of the bay.

OSTDS Enhancements:

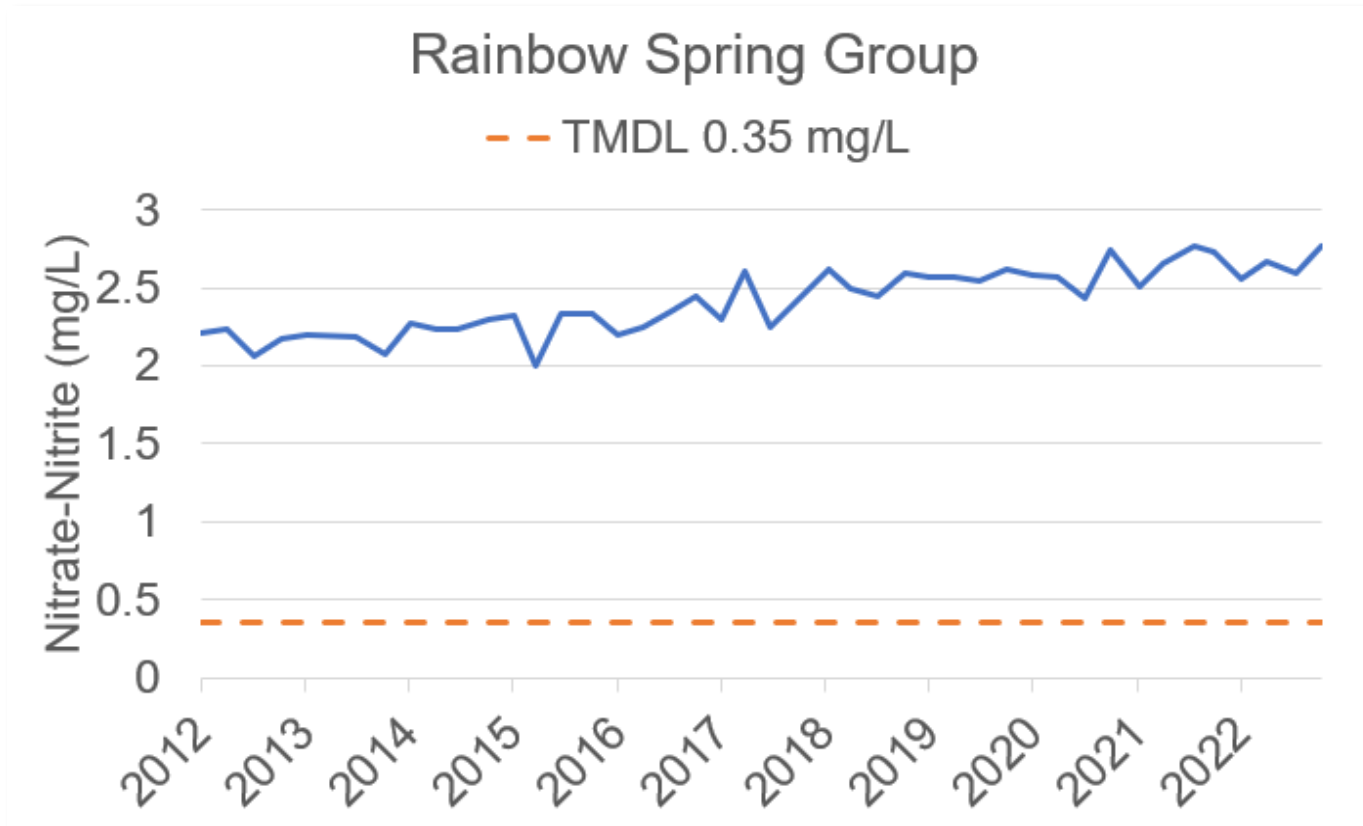
- Hernando and Citrus utilizing Septic Upgrade Incentive Program grant funds to switch out conventional to Enhanced Nutrient Reducing OSTDS (ENR-OSTDS) where sewer isn't available.





WATER QUALITY DATA

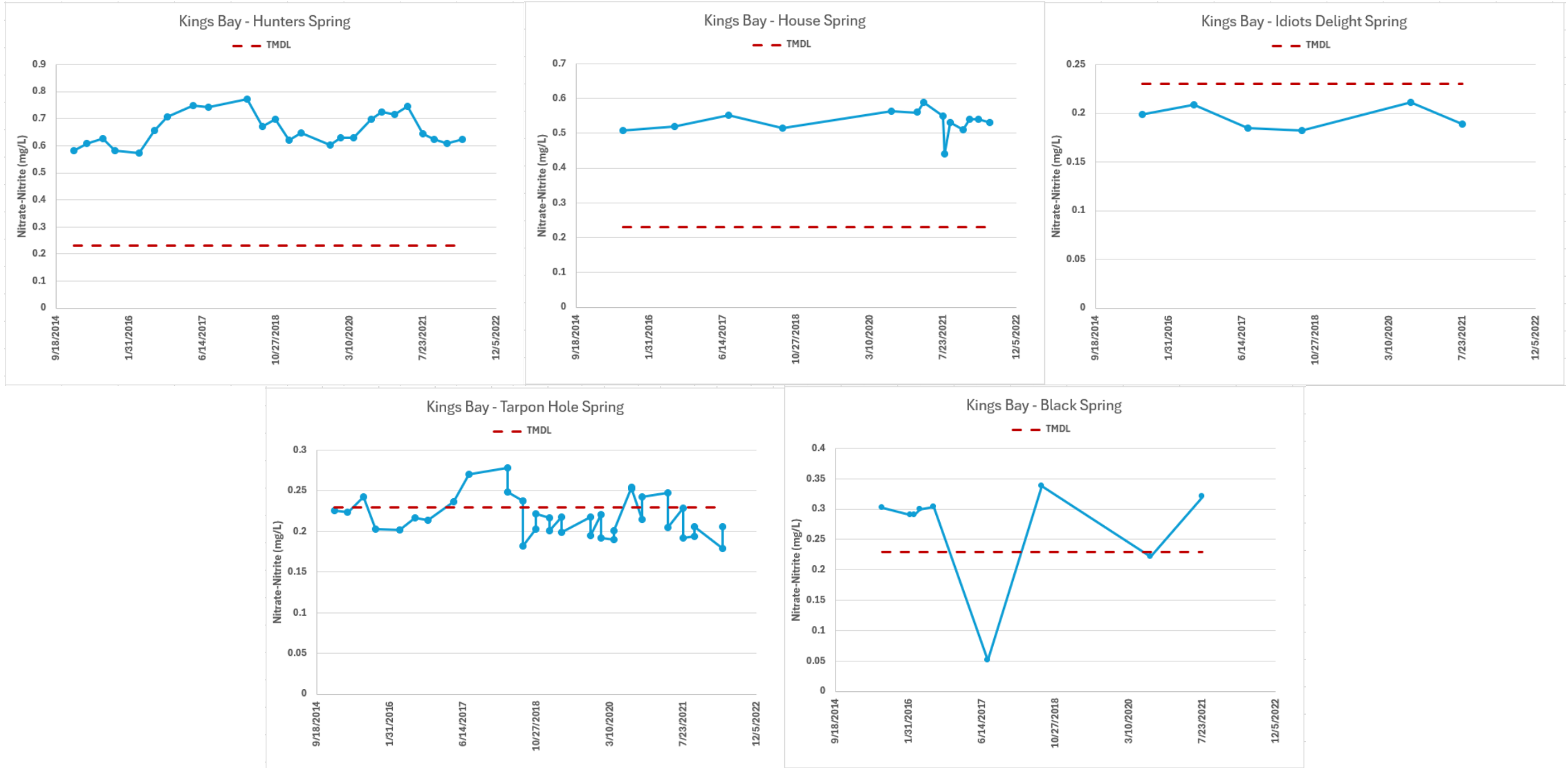
RAINBOW NITRATE DATA





WATER QUALITY DATA

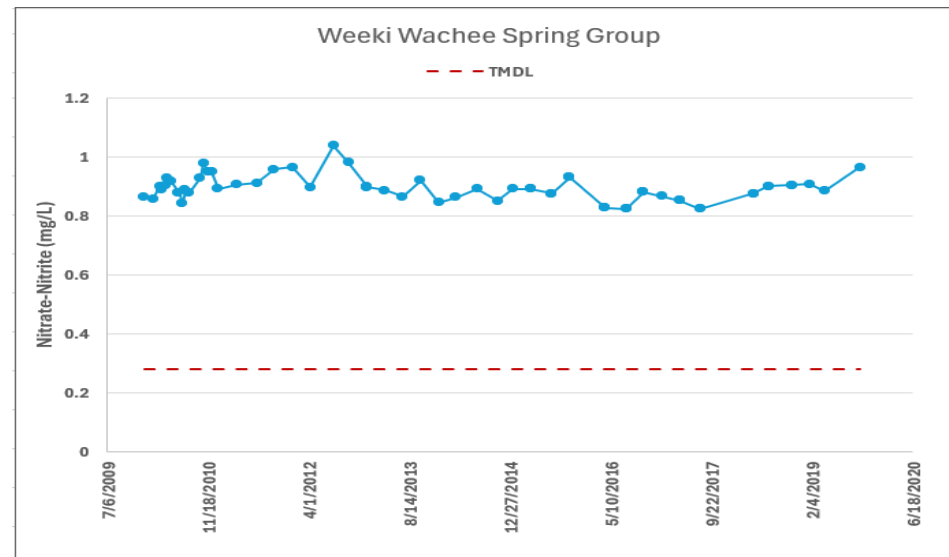
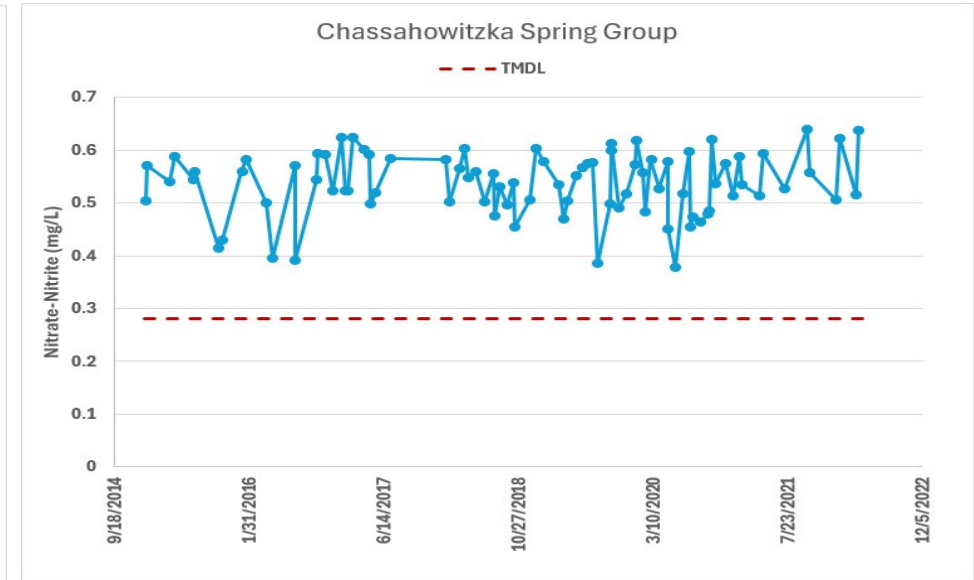
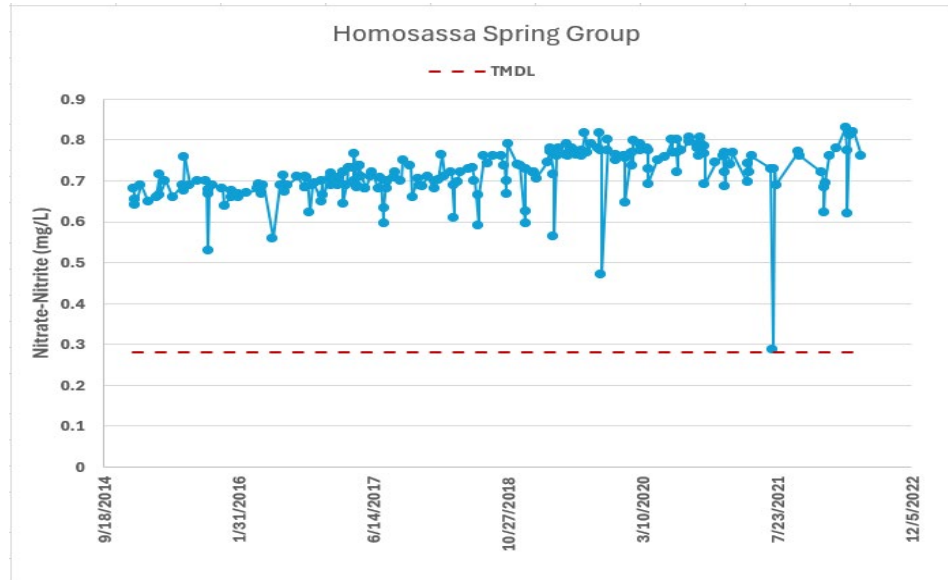
KINGS BAY NITRATE DATA





WATER QUALITY DATA

HOMOSASSA/CHASSAHOWITZKA AND WEEKI WACHEE DATA





SPRINGS BIOASSESSMENT WORKGROUP

Working group members:

- DEP's Division of Environmental Assessment and Restoration.
- St. Johns River Water Management District (SJRWMD).
- Southwest Florida Water Management District (SWFWMD).

Tasks:

- Provide recommendations for the use of bioassessment tools to support springs BMAP objectives.
- Identify and track biological responses in spring systems to assist in determining if water quality restoration strategies implemented to reduce nitrate loading to groundwater are effective in restoring healthy biological conditions.

Challenges:

- Need consistent bioassessment monitoring tools to assess condition and changes in plant and algal communities.
- Identify most appropriate tool or modification to assess unique conditions associated with spring systems.

Four pilot study springs were identified: Wakulla Springs, Wacissa Springs, Ichetucknee Springs and Wekiwa Springs.



DATA UPLOAD

WATERSHED INFORMATION NETWORK (WIN)

- Through both the WIN and Florida STORET (STOrage and RETrieval) data repositories, DEP implements Florida statutory requirements, DEP rule requirements and U.S. Environmental Protection Agency (EPA) funding requirements for management of environmental (non-regulatory) data for the state.
- Data from WIN are used by DEP for standards development, Impaired Waters Rule assessments, TMDL development, reasonable assurance plans, alternative restoration plans, **BMAP development and assessment** and for providing data as required to EPA and to the public.
- Data providers to WIN and STORET include DEP entities, water management districts (WMDs), cities, counties, other state agencies, universities, private and volunteer organizations.
- For any assistance, contact WIN Coordinator Jason.Storrs@FloridaDEP.gov.



BMAP UPDATES

ADOPTED BY JULY 1, 2025

- NSILT updates.
- Spring vent load analyses.
- Entity allocation development.
- Future growth.
- Establish five-year milestones for project implementation.
- Incorporate additional projects.
- Incorporate Clean Waterways Act (SB 712) requirements.
- Incorporate HB 1379 requirements.
- Incorporate regional projects.
- Water quality data evaluation:
 - Evaluation of the monitoring network (spring vent and groundwater).
 - Water quality trend analyses.
- Evaluate additional OSTDS provisions.
- Evaluate AWT or other more stringent effluent limits.
- Update the BMAP documents.



NSILT GENERAL PROCESS SUMMARY

Estimate loading to land surface for each source category.

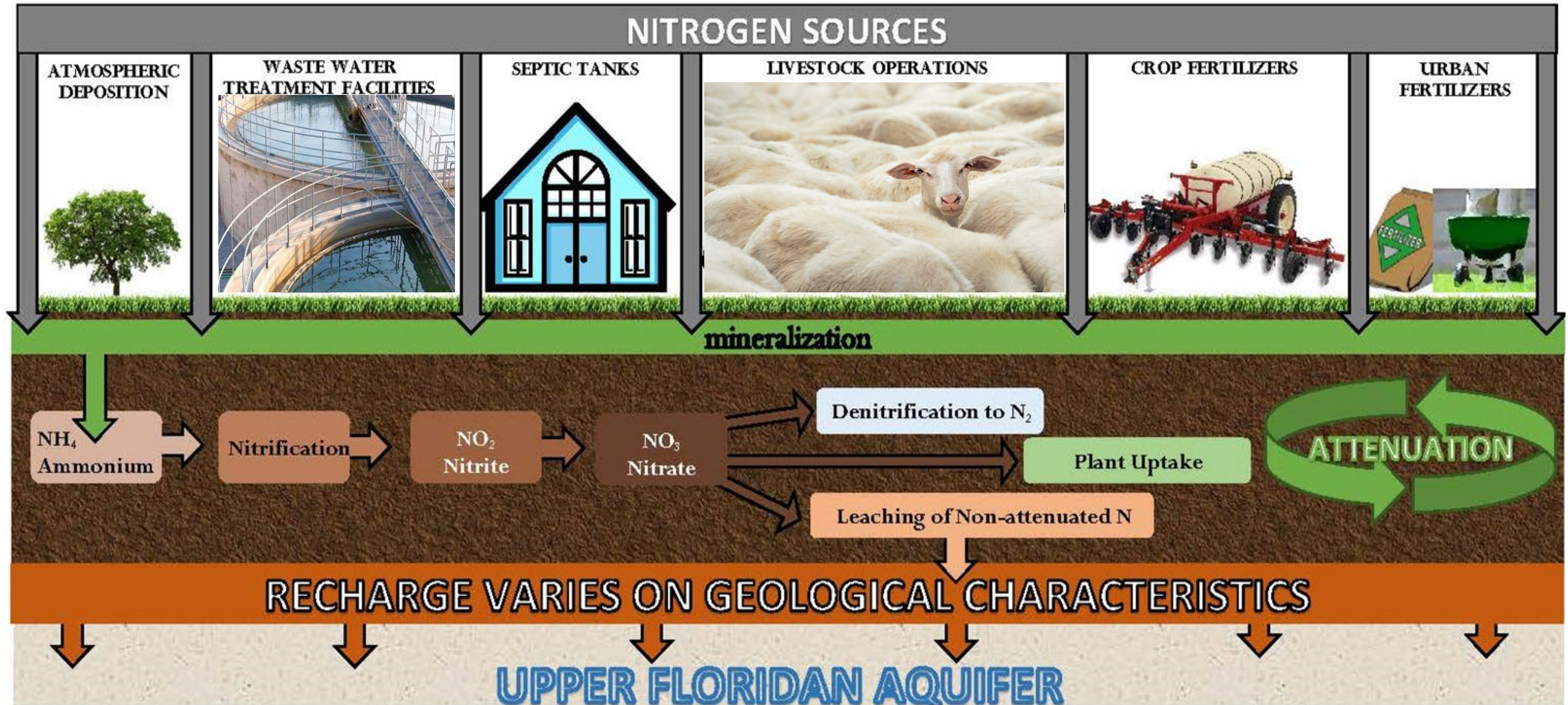
Apply a source specific, literature derived biochemical attenuation factor to surface loading estimate.

Apply a location specific recharge factor to surface loading estimate.

LOADING TO GROUNDWATER.



NITROGEN CYCLE AND ATTENUATION





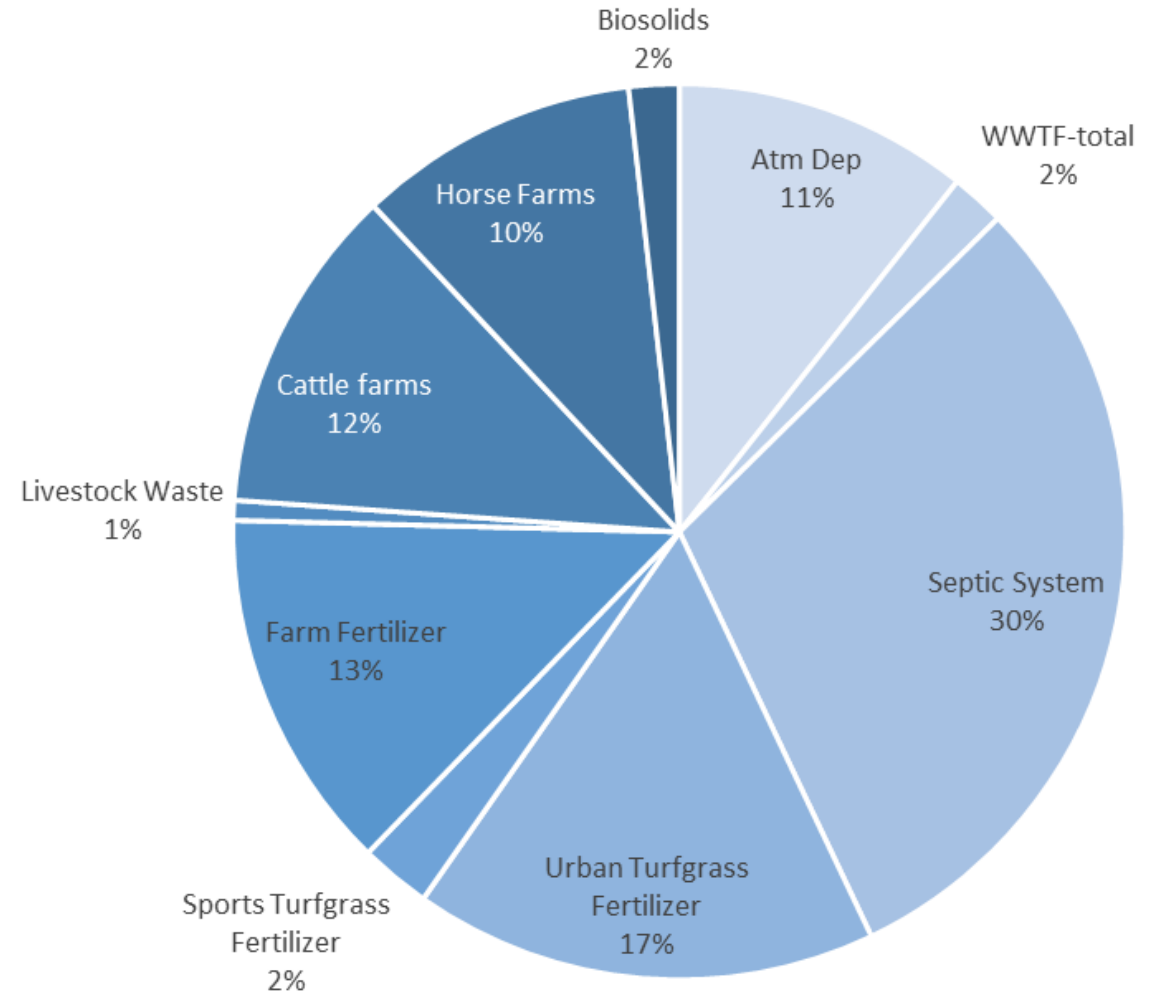
DRAFT NSILT LOADING

RAINBOW SPRINGS BMAP

Rainbow Spring Group and Rainbow River BMAP Area

Source	Estimated Annual Loading (lb-N/yr)
Atm Dep	169,993
WWTF-total	31,135
Septic Systems	480,981
Urban Turfgrass Fertilizer	267,009
Sports Turfgrass Fertilizer	40,734
Farm Fertilizer	208,523
Livestock Waste	11,462
Cattle Farms	188,215
Horse Farms	162,060
Biosolids	28,948
Total	1,589,060

Rainbow Spring Group (2023)

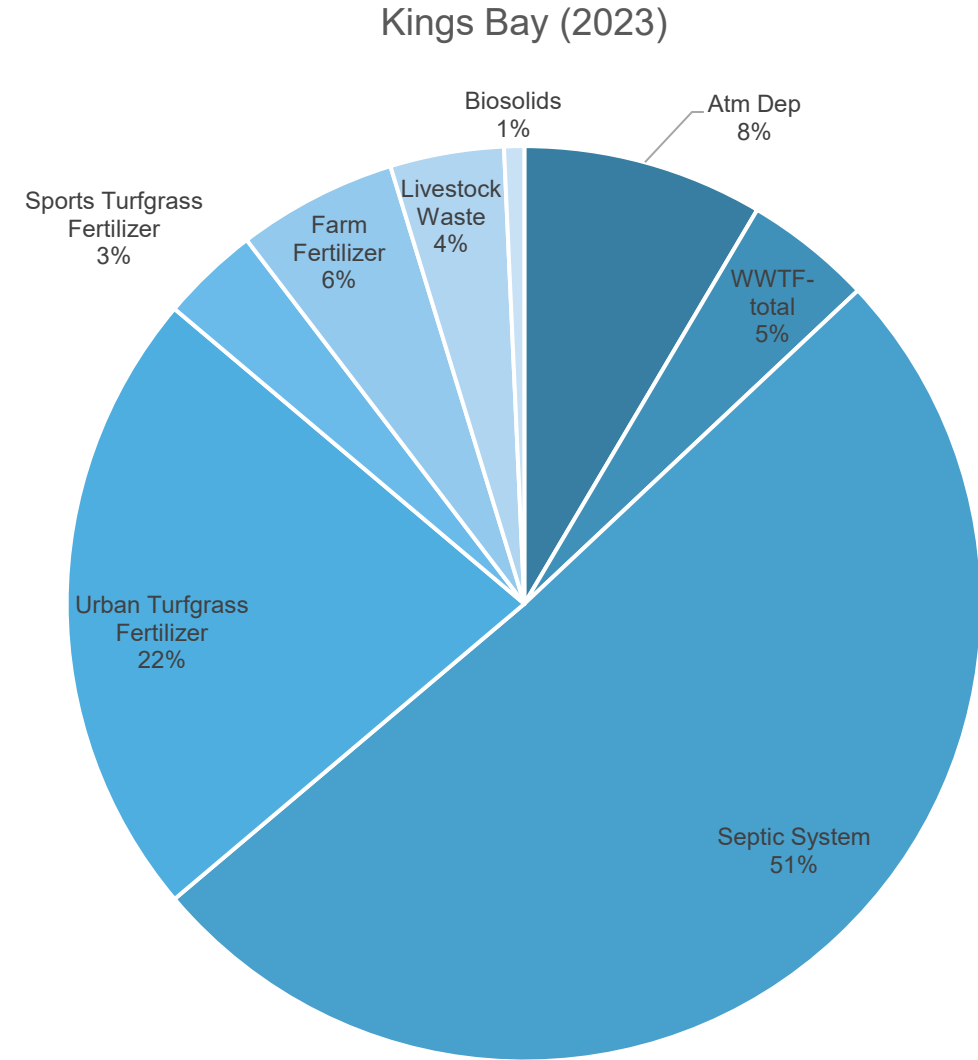




DRAFT NSILT LOADING RESULTS

KINGS BAY/CRYSTAL RIVER

Kings Bay	
Source	Annual Loading (lb-N/year)
Atmospheric Deposition	69,099
Wastewater Treatment Facilities	36,645
OSTDS	413,555
Urban Turfgrass Fertilizer	181,417
Sports Turfgrass Fertilizer	28,283
Farm Fertilizer	45,930
Livestock Waste	32,668
Biosolids	5,782
Total	813,379



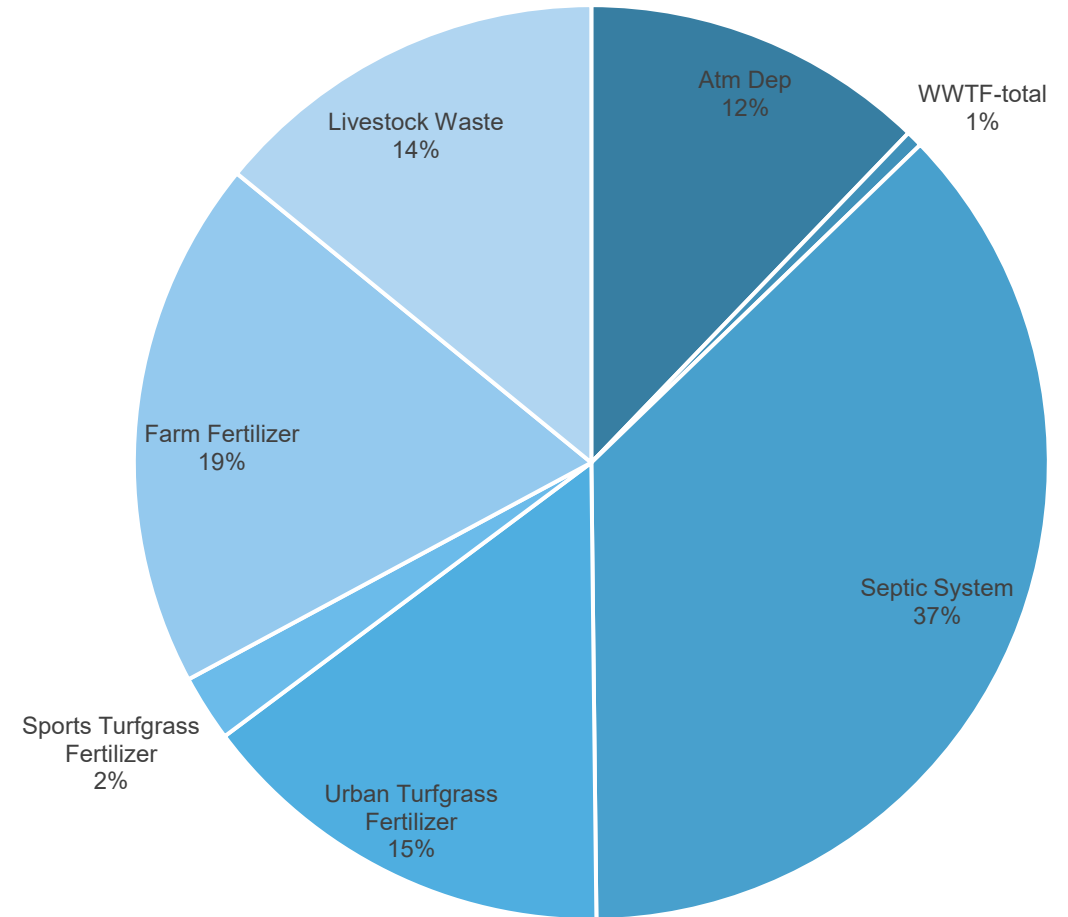


DRAFT NSILT LOADING RESULTS

HOMOSASSA/CHASSAHOWITZKA

Homosassa Spring Group (2023)

Homosassa	
Source	Annual Loading (lb-N/year)
Atmospheric Deposition	70,808
Wastewater Treatment Facilities	3,382
OSTDS	215,178
Urban Turfgrass Fertilizer	86,957
Sports Turfgrass Fertilizer	13,649
Farm Fertilizer	108,876
Livestock Waste	81,944
Total	580,794



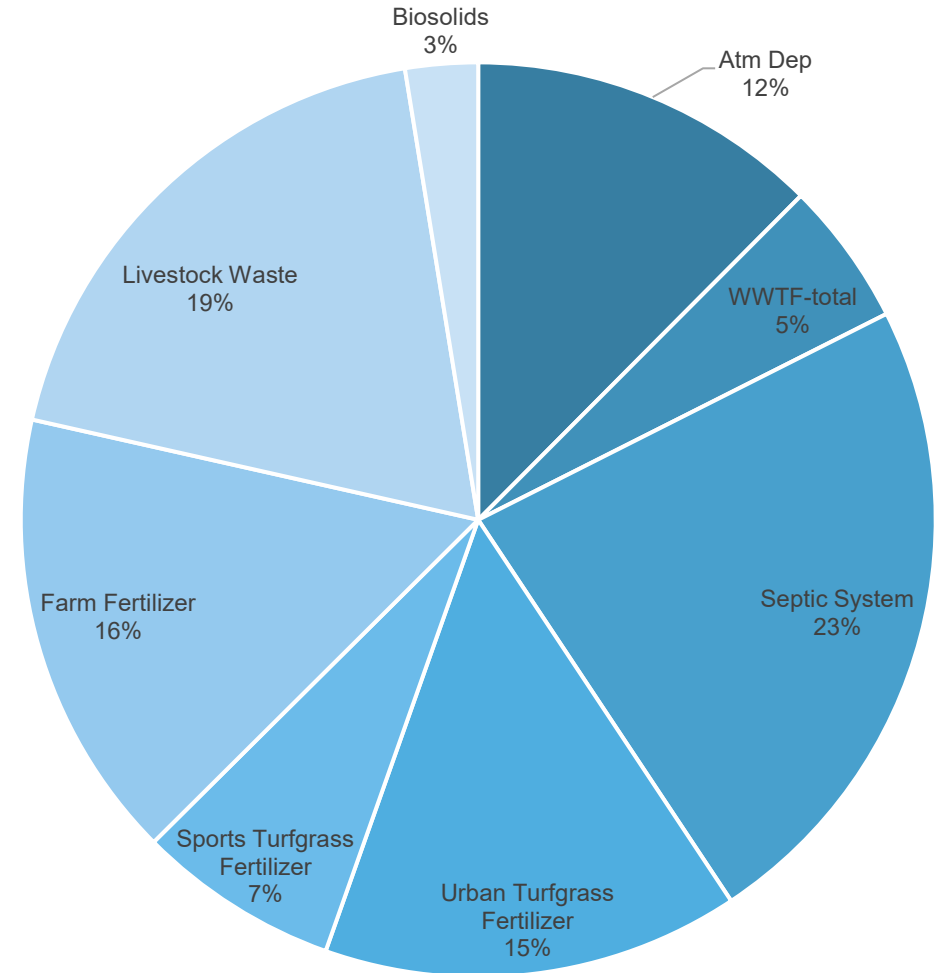


DRAFT NSILT LOADING RESULTS

HOMOSASSA/CHASSAHOWITZKA

Chassahowitzka	
Source	Annual Loading (lb-N/year)
Atmospheric Deposition	43,944
Wastewater Treatment Facilities	17,972
OSTDS	81,452
Urban Turfgrass Fertilizer	51,953
Sports Turfgrass Fertilizer	25,178
Farm Fertilizer	56,274
Livestock Waste	66,674
Biosolids	9,043
Total	352,490

Chassahowitzka Spring Group (2023)



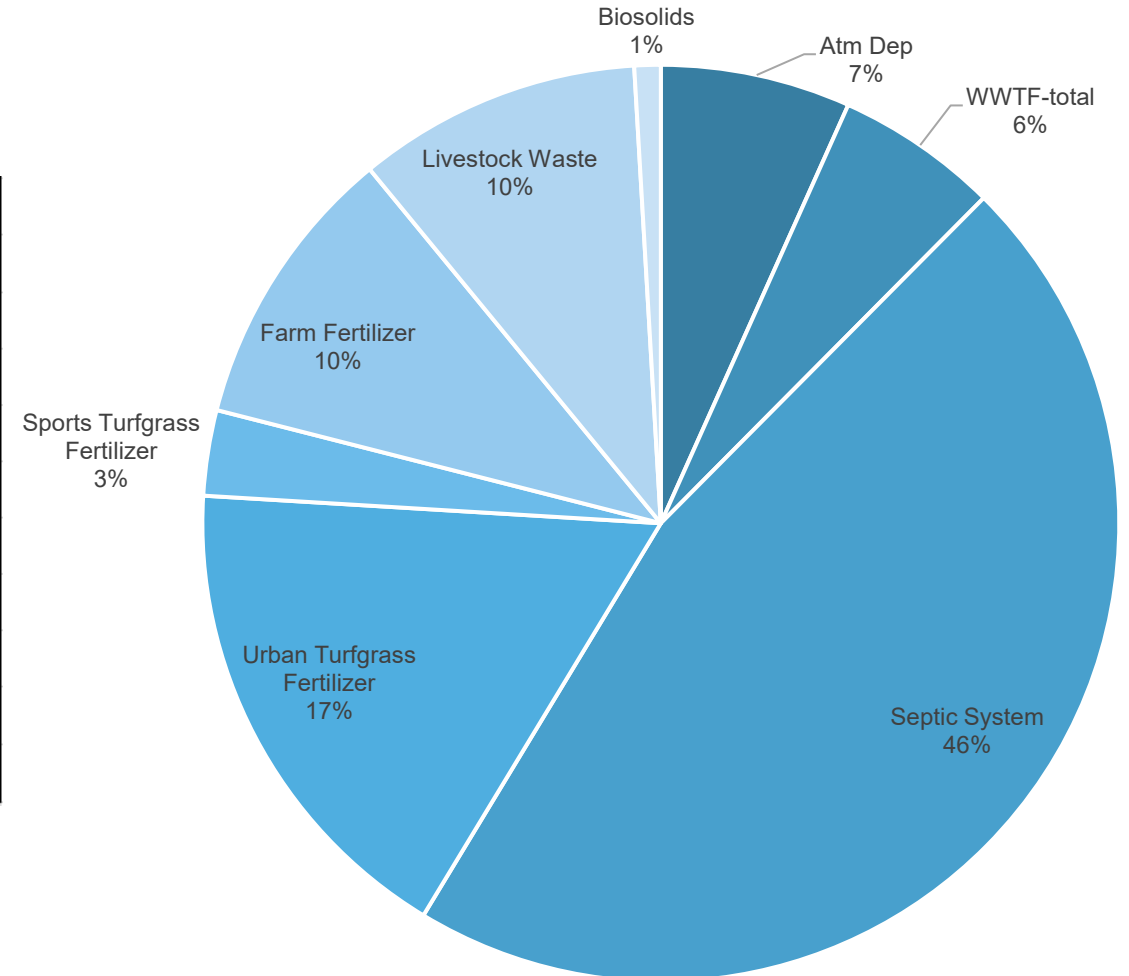


DRAFT NSILT LOADING RESULTS

WEEKI WACHEE

Weeki Wachee Spring Group (2023)

Weeki Wachee Spring Group	
Source	Annual Loading (lb-N/year)
Atmospheric Deposition	93,069
Wastewater Treatment Facilities	79,729
OSTDS	641,621
Urban Turfgrass Fertilizer	240,059
Sports Turfgrass Fertilizer	41,825
Farm Fertilizer	139,819
Livestock Waste	139,175
Biosolids	12,878
Total	1,388,175





BMAP UPDATES

SPRING VENT LOAD ANALYSIS

Calculated the current loading using the most recent 10 years of nitrate and discharge data.

Calculated the percent reduction using the TMDL and current loading.

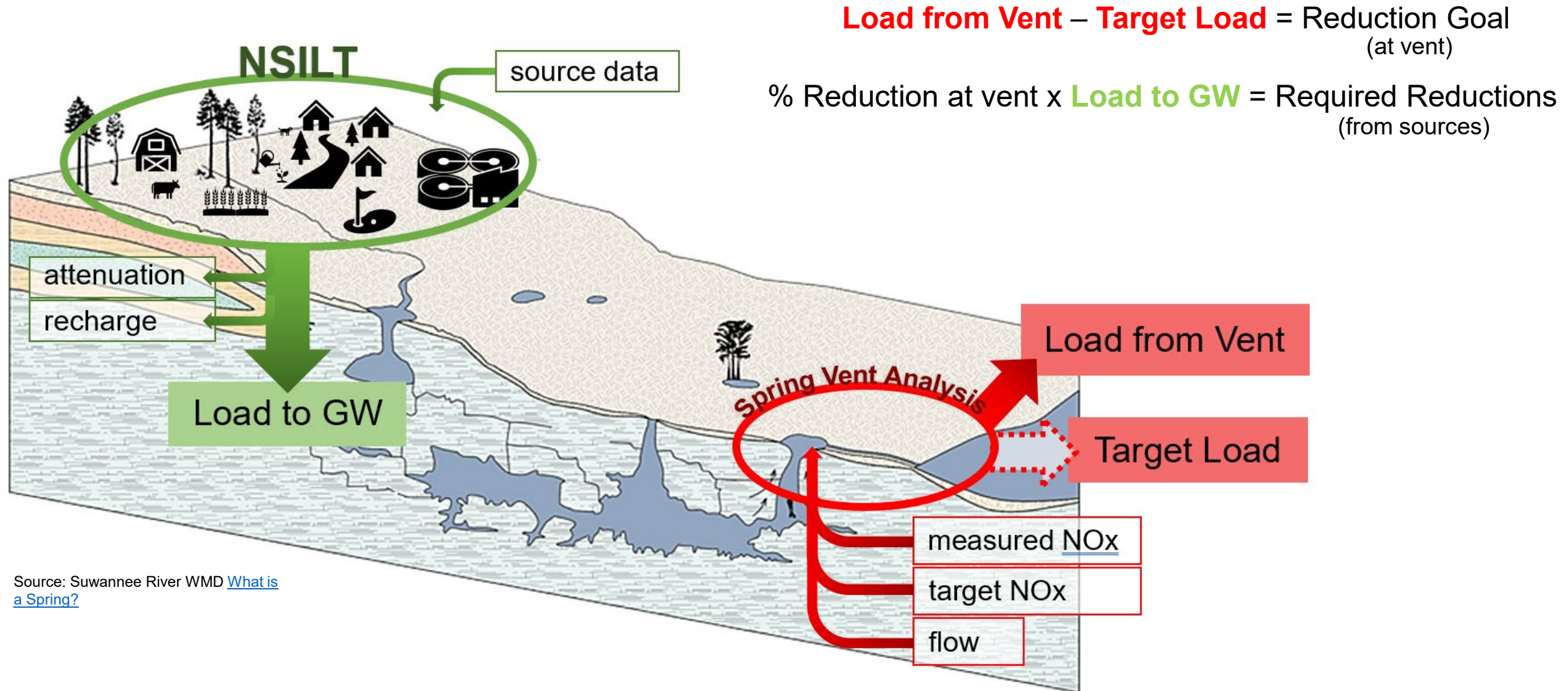
Applied the spring vent percent reduction to the updated NSILT loading.

Estimate the total reduction needed to meet the TMDL.



BMAP UPDATES

SPRING VENT LOAD ANALYSIS



Source: Suwannee River WMD [What is a Spring?](#)



BMAP UPDATES

SPRING VENT LOAD ANALYSIS

BMAP	Draft Nitrate Loads (lb-N/yr)			
	Total Load at Spring Vent	TMDL Load	Required Reduction	Percent Required Reduction
Rainbow ¹	1,461,175	420,139	1,041,036	71%
Crystal River / Kings Bay ²	453,400	259,009	194,392	43%
Homosassa Spring Group ²	271,301	94,924	176,376	65%
Chassahowitzka Spring Group ²	207,128	82,543	124,585	60%
Weeki Wachee Spring Group ³	308,909	95,265	213,644	69%

Upper 95% confidence interval - nitrate data from 2012 to 2022.

¹ TMDL target is 0.35 mg/L

² TMDL target is 0.23 mg/L

³ TMDL target is 0.28 mg/L



BMAP UPDATES

ALLOCATION AND REDUCTION APPROACH

- The percent reduction calculated from the spring vent analysis is applied to the estimated NSILT load to determine the overall required reduction needed in the basin.
- Each source will be evaluated for a reduction strategy.
- Responsible entities will receive an allocation based on the combined necessary reductions estimated by source for their area based on the NSILT loading.



BMAP UPDATES

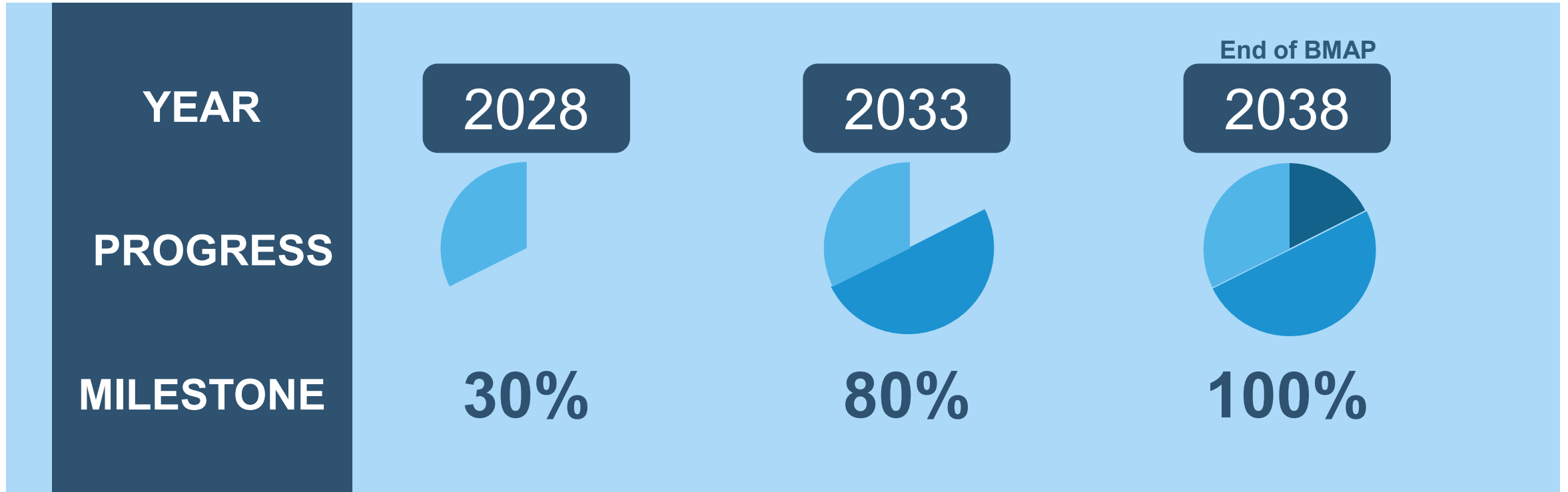
FUTURE GROWTH

- **Domestic Wastewater Projections:**
 - Use wastewater to estimate future growth projections.
 - Start with population growth for each county from Bureau of Economic and Business Research:
 - 2040 Medium Growth Projections.
 - Proportion growth for each entity based on land area.
 - Distinguish the future population expected to be served by sewer versus those with OSTDS based on the most recent Florida Water Management Inventory for each BMAP county.
 - Use per person calculations to estimate future loads from WWTF and OSTDS.
- **Agriculture Projections:**
 - Exploring different tools to estimate future changes in agricultural acreage in the BMAPs to estimate changes in agricultural loading.



BMAP UPDATES

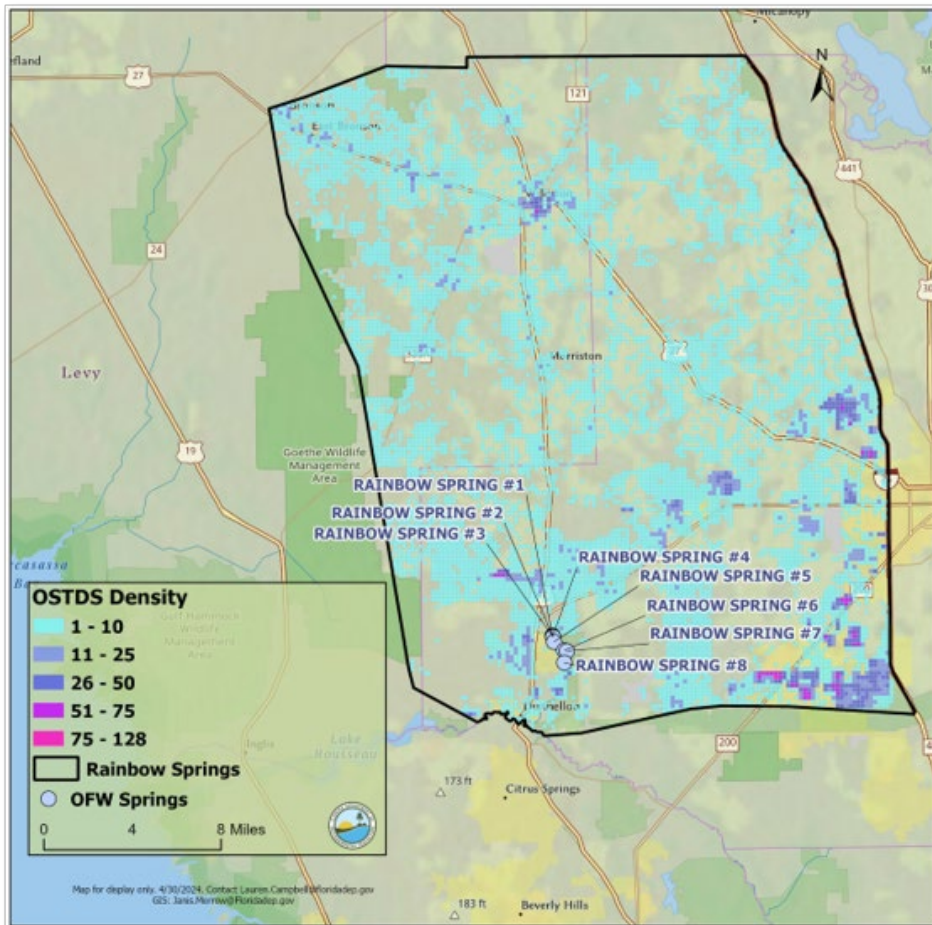
5-, 10- AND 15-YEAR MILESTONES/REDUCTION SCHEDULE



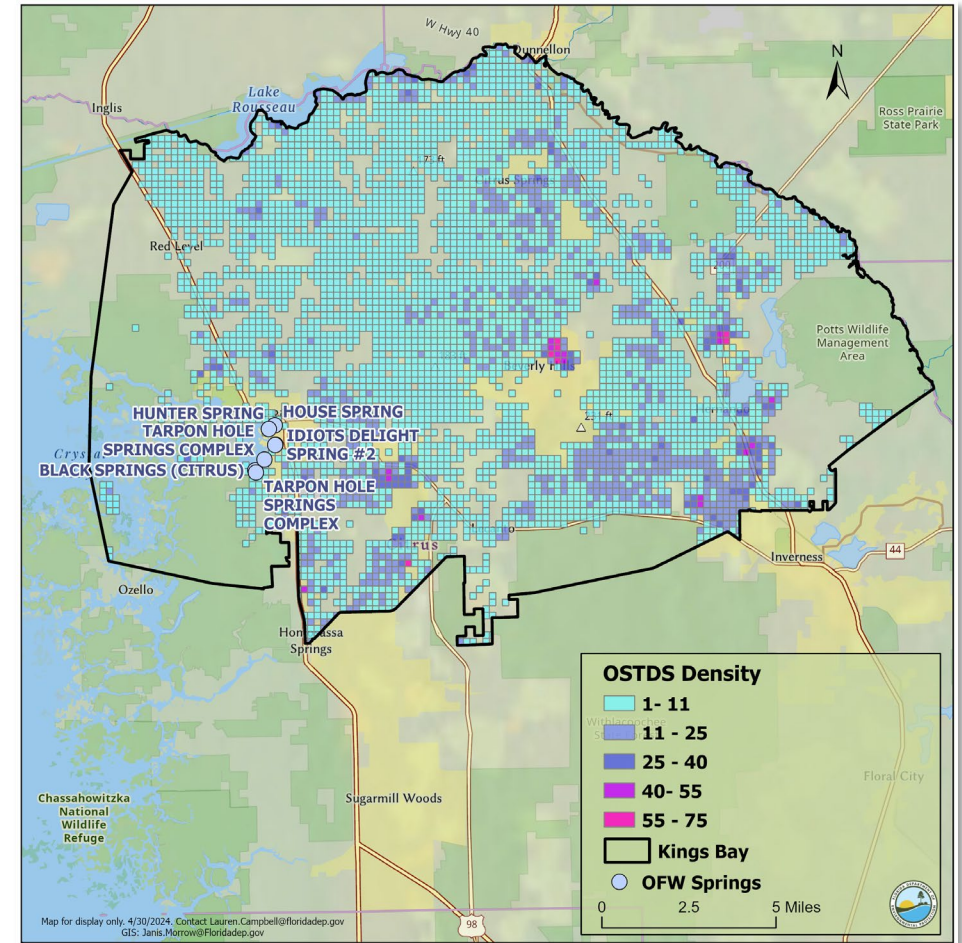


OSTDS PROJECT IMPORTANCE

Rainbow Springs BMAP



Kings Bay/Crystal River BMAP

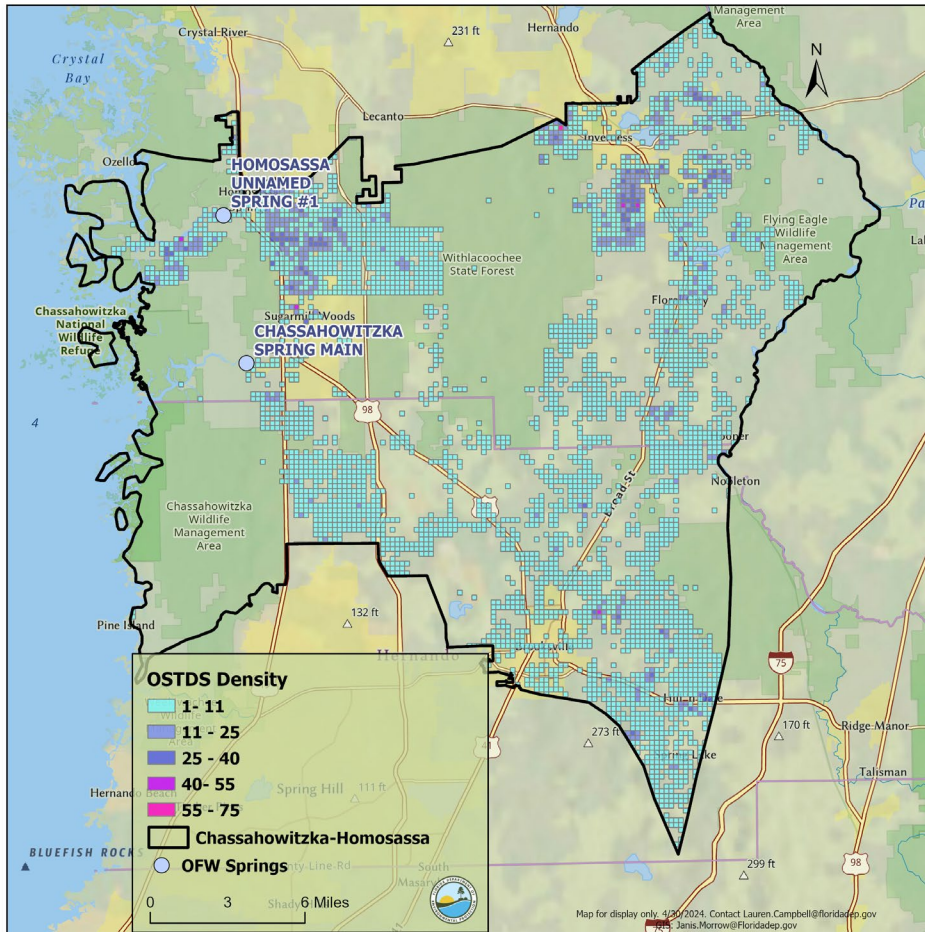


*Density is per 300-meter by 300-meter grid cell.

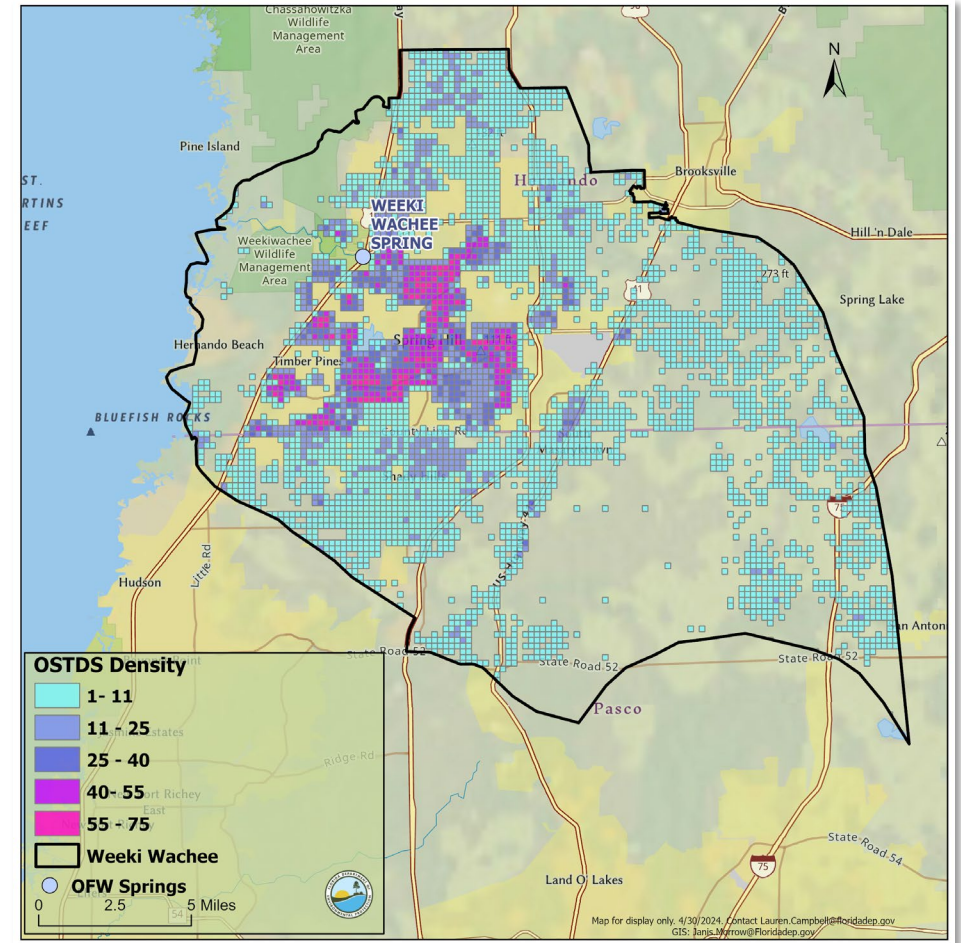


OSTDS PROJECT IMPORTANCE

Homosassa/Chassahowitzka Springs BMAP



Weeki Wachee BMAP



*Density is per 300-meter by 300-meter grid cell.



OSTDS

PROJECT IMPORTANCE

The results of the NSILT analysis for OSTDS in all five springsheds are presented in the table below.

Springshed	Number of OSTDS	Number of enhanced OSTDS	Est. Load to Drain Fields (lbs.-N/yr.)	Est. Load to Groundwater (lbs.-N/yr.)
Rainbow	34,569	13	1,682,149	784,228
Kings Bay	30,256	638	673,211	413,555
Homosassa	16,947	56	364,522	215,178
Chassahowitzka	5,598	199	132,376	81,452
Weeki Wachee	44,726	1,114	1,048,663	641,621



RESOURCES

FUNDING OPPORTUNITIES



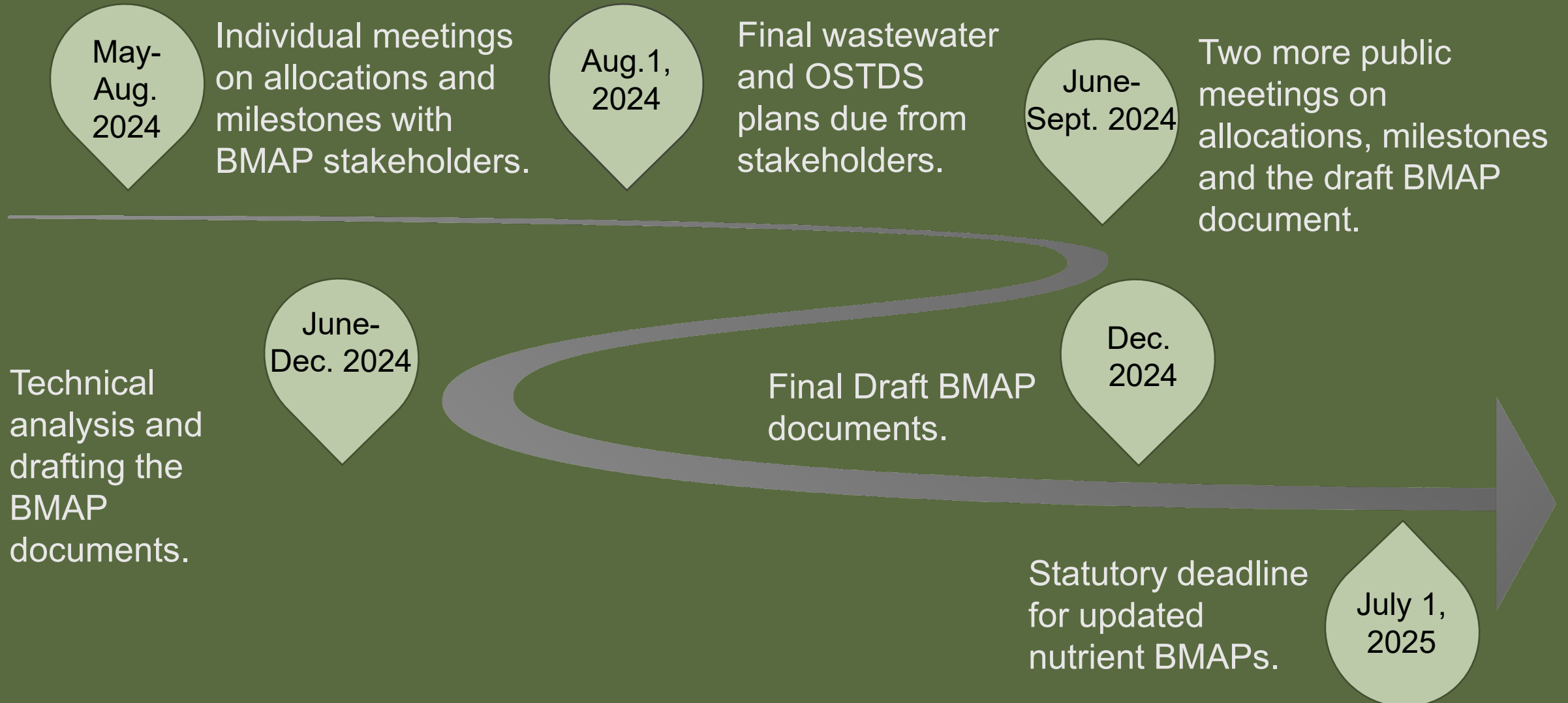
Florida Department of Environmental Protection
Funding Opportunities

[FloridaDEP.gov/Funding](https://www.floridadep.gov/funding)





SPRINGS BMAP UPDATES TIMELINE



THANK YOU



Chandler Keenan

Environmental Consultant

850-245-8555

Chandler.B.Keenan@FloridaDEP.gov

Jessica Fetgatter

Environmental Consultant

850-245-8107

Jessica.Fetgetter@FloridaDEP.gov

Lauren Campbell, Ph.D.

Environmental Administrator

850-245-8083

Lauren.Campbell@FloridaDEP.gov