

BASIN MANAGEMENT ACTION PLAN UPDATES

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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



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.



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



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



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	
	Marion County	
	Levy County	
Responsible Stakeholders	City of Dunnellon	
	City of Williston	
	City of Ocala	
	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)	
Responsible Agencies	Florida Department of Health in Marion County	
Responsible Ageneies	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	
	Extension	
	Rainbow River Conservation	
Other Interested Stakeholders	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	
	Citrus County	
Despensible Stalkaholders	City of Crystal River	
Responsible Stakeholders	Agricultural producers	
	Golf courses	
	Florida Department of Agriculture and Consumer Services	
B asponsible Agencies	Florida Department of Environmental Protection	
Responsible Agencies	Florida Department of Health	
	Southwest Florida Water Management District	
	Citizens	
	Duke Energy	
	Florida Farm Bureau Federation	
	Florida Onsite Wastewater Association	
	Gulf Archeology Research Institute	
	Homeowners/Citizens	
Other Interested Stakeholders	Kings Bay Rotary	
Other Interested Stakeholders	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		
	Citrus County		
	City of Brooksville		
Posponsible Stakeholders	City of Inverness		
Responsible Stakeholders	Hernando County		
	Agricultural producers		
	Golf courses		
	Florida Department of Agriculture and Consumer		
	Services		
Responsible Agencies	Florida Department of Environmental Protection		
	Florida Department of Health		
	Southwest Florida Water Management District		
	Citizens/Homeowners		
	Florida Farm Bureau		
	Florida Onsite Wastewater Association		
	Florida Springs Council		
Other Interested Stakeholders	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		
	City of Brooksville		
	Hernando County		
Responsible Stakeholders	Pasco County		
	Agricultural producers		
	Golf courses		
	Florida Department of Agriculture and Consumer		
	Services		
Responsible Agencies	Florida Department of Environmental Protection		
	Florida Department of Health		
	Southwest Florida Water Management District		
	Citizens		
	City of Weeki Wachee		
	Florida Farm Bureau		
	Florida Onsite Wastewater Association		
Other Interested Stakeholders	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

RMAD	Project Count *					Verified Project
DIMAP	Planned	Ongoing	Underway	Completed	Total	Total Nitrogen
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

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.



DEP Employee photographs



PROJECT HIGHLIGHTS



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.



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).
 - \circ 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 (Ib-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 (Ib-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 (Ib-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 Spring Group (2023)

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			





DRAFT NSILT LOADING RESULTS WEEKI WACHEE



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			



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.







	Draft Nitrate Loads (Ib-N/yr)				
BMAP	Total Load at Spring Vent	TMDL Load	Required Reduction	Percent Required Reduction	
Rainbow ¹	2,852,259	452,543	2,399,716	84%	
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

²TMDL 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:
 - $\circ~$ 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.



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 (IbsN/yr.)	Est. Load to Groundwater (IbsN/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





SPRINGS BMAP UPDATES TIMELINE



THANK YOU

DEPARIMENTAL PROTECTION

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