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OUTSTANDING FLORIDA SPRINGS BASIN MANAGEMENT ACTION PLAN UPDATES

Water Quality Restoration Program
Florida Department of Environmental Protection
Jan. 23, 2024



AGENDA

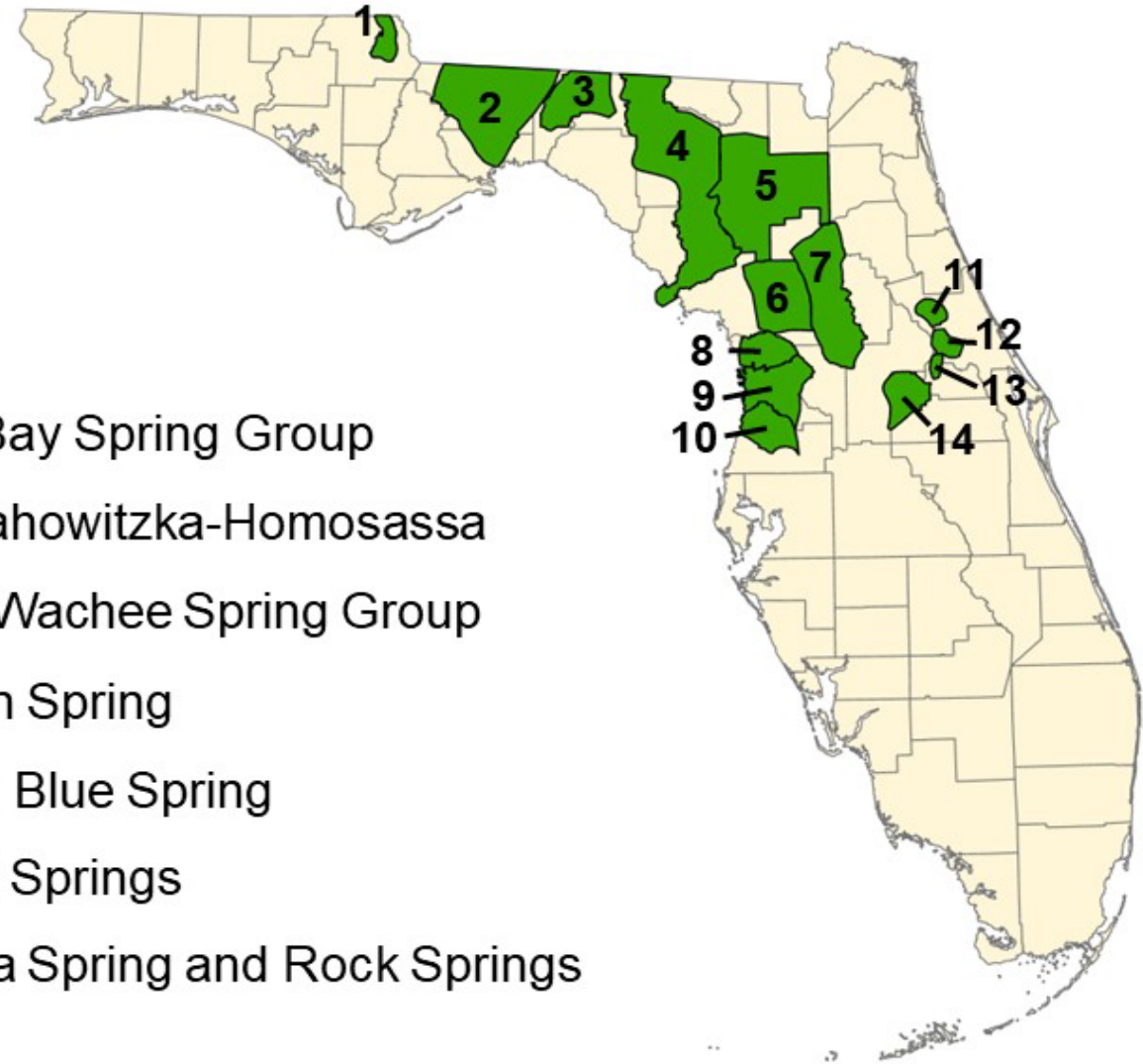
- Basin Management Action Plan (BMAP) Overview.
- Nitrogen Source Inventory Loading Tool (NSILT) Updates.
- Spring Vent Load Analysis.
- Next Steps - BMAP Updates.





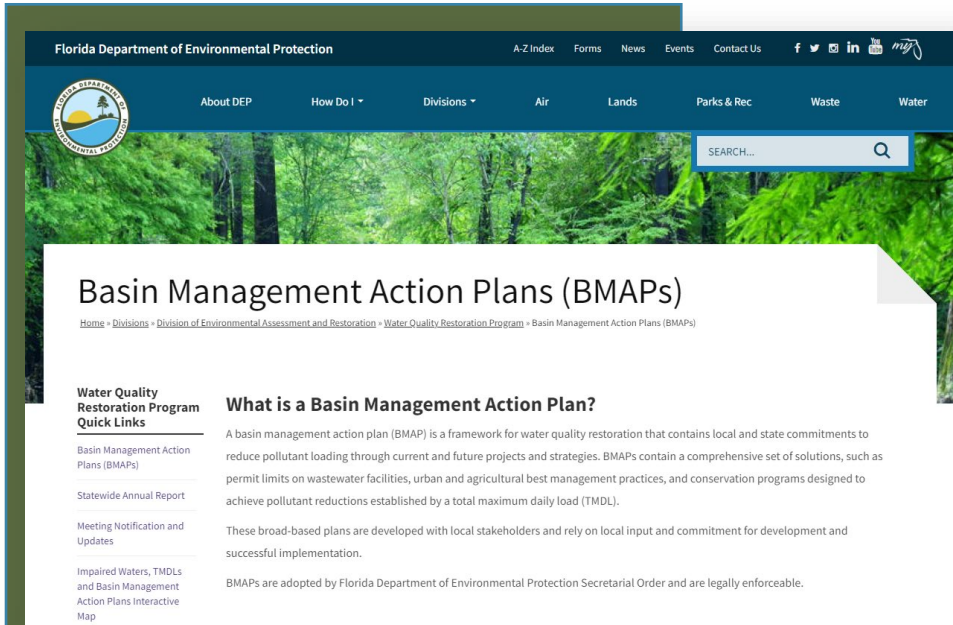
Outstanding Florida Springs BMAPs

- | | |
|------------------------|-----------------------------------|
| 1 Jackson Blue Spring | 8 Kings Bay Spring Group |
| 2 Wakulla Spring | 9 Chassahowitzka-Homosassa |
| 3 Wacissa Spring Group | 10 Weeki Wachee Spring Group |
| 4 Suwannee River | 11 DeLeon Spring |
| 5 Santa Fe River | 12 Volusia Blue Spring |
| 6 Rainbow Springs | 13 Gemini Springs |
| 7 Silver Springs | 14 Wekiwa Spring and Rock Springs |





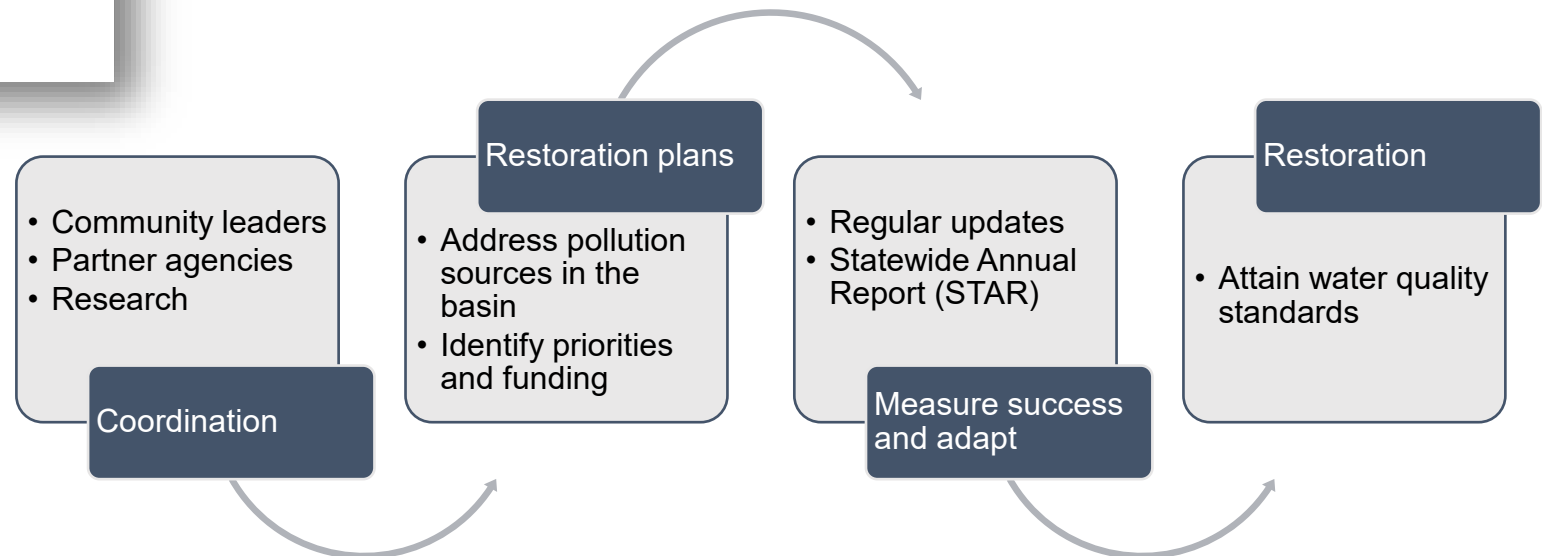
BASIN MANAGEMENT ACTION PLANS



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

Basin Management Action Plans (BMAPs) are:

- Developed with stakeholder input.
- Adopted by DEP Secretarial Order.
- Enforceable.
- Implemented through a phased approach.
- Reported on annually.





KEY BMAP COMPONENTS

- Total maximum daily loads (TMDLs) being addressed.
- Area addressed by the restoration plan.
- Identify sources of nutrients or bacteria.
- 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 towards achieving the TMDL:

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



STATUTORY REQUIREMENTS

Florida Watershed Restoration Act:

- Section 403.067, Florida Statutes (F.S.).
- All BMAPs (nutrient-related or fecal indicator bacteria).

Northern Everglades and Estuaries Protection Program (NEEPP):

- Section 373.4595, F.S.
- Lake Okeechobee and St. Lucie and Caloosahatchee Rivers and Estuaries.

Environmental Protection (HB 1379 (2023))

- Strengthens BMAPs.
- Expands and improves water quality protections.
- Indian River Lagoon Protection Program (section 373.469, F.S.).

Florida Springs and Aquifer Protection Act:

- Part VIII of Chapter 373, F.S.
- BMAPs for Outstanding Florida Springs (OFS) with nutrient TMDLs.

Clean Waterways Act (Senate Bill 712 (2020)):

- Nutrient BMAPs (surface water and springs BMAPs).

Environmental Protection (HB 1379 (2023)) (continued)

- Expands wastewater grant program.
- Improves local government long-term comprehensive planning.



CLEAN WATERWAYS ACT (SB 712)

(CHAPTER 2020-150, LAWS OF FLORIDA)

- **Purpose:** Promote resilient wastewater infrastructure and utilities.
- **Includes:** Water quality protection provisions to be undertaken by local governments intended to reduce the impact of nutrient pollution sources on Florida waters by strengthening certain BMAP requirements.



- Specifies that local governments within a nutrient BMAP must develop a wastewater treatment plan and/or an Onsite Sewage Treatment and Disposal System (OSTDS) remediation plan containing certain information, if the department “identifies domestic wastewater treatment facilities or OSTDS as contributors of at least 20 percent of point source or nonpoint source nutrient pollution or if the department determines remediation is necessary to achieve the TMDL.”



CLEAN WATERWAYS ACT: NEXT STEPS

June 12, 2023

Final Order signed by the Secretary.

July 12, 2023

Deadline for written explanation of potential exemption to be submitted to the department.

Feb. 1, 2024

Deadline for submitting draft OSTDS remediation and/or wastewater treatment plans for the department's review.

Aug. 1, 2024

Deadline for submitting complete OSTDS remediation and/or wastewater treatment plans to the department.

Which BMAPs will include these plans?

The nutrient BMAPs included in the Final Order.



HB 1379: ENVIRONMENTAL PROTECTION

(CHAPTER 2023-169, LAWS OF FLORIDA)

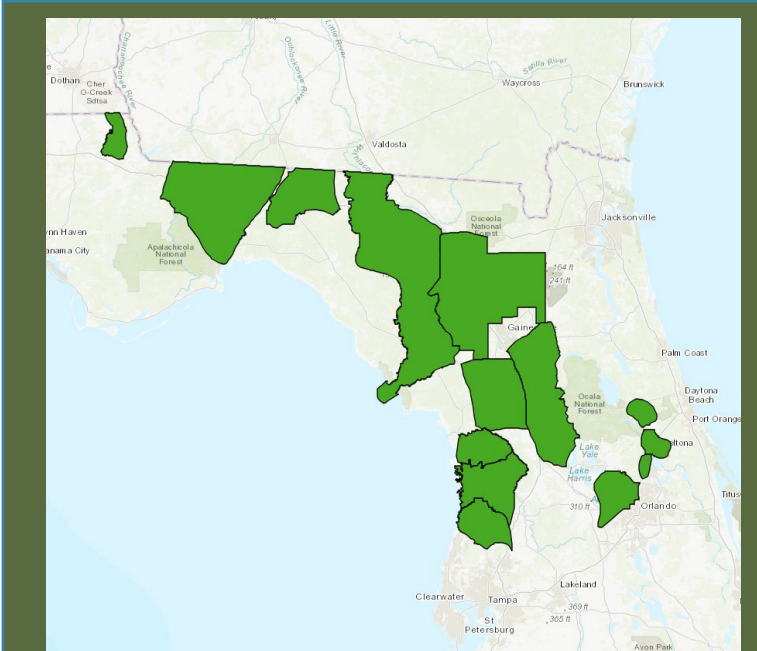
Enhances Water Quality Protection in the IRL.

Strengthens Water Quality Protections and (BMAPs).

HB1379

Improves Local Government Long-Term Comprehensive Planning.

Expands Funding Opportunities to Address Water Quality Impairments.



Increased protection for Outstanding Florida Springs (OFS)

Expanded prohibitions in OFS to entire BMAP area

- New conventional OSTDS on lots one-acre or less.
- New domestic wastewater disposal facilities with permitted capacities of 100,000 gallons per day or more, unless they meet advanced wastewater treatment (AWT) standards.
- New HAZMAT disposal facilities.
- Land application of Class A or B biosolids not in accordance with a DEP-approved nutrient management plan.
- New agricultural operations not implementing BMPs.



HB 1379: ENVIRONMENTAL PROTECTION

Strengthening BMAPs:

- List of identified projects:
 - Achieve 5-year milestones.
 - Increase coordination.
- Agricultural Nonpoint Sources:
 - List of cooperative regional water quality improvement elements.

Improving Comprehensive Planning:

- Include BMAP projects in comprehensive plans prioritized implementation.
- Assess the feasibility of providing sanitary sewer for developments of more than 50 lots.
- Prioritization of advanced waste treatment (AWT) for wastewater treatment facilities in comprehensive plans.



HB 1379: ENVIRONMENTAL PROTECTION

Improving Domestic Wastewater:

- Wastewater facility upgrades to meet AWT.
- More stringent wastewater treatment standards if required to meet the TMDL.
- Onsite sewage treatment and disposal systems (OSTDS):
 - Required new OSTDS on lots one-acre or less within a BMAP to connect to sewer or upgrade to an enhanced system.

Expanding Grant Opportunities:

- Eligibility:
 - Now *also* allows waterbodies not attaining a nutrient related standard.
- Project Types:
 - Now *also* includes stormwater, regional agricultural projects, broader suite of wastewater projects.
- Project Prioritization:
 - Maximum nutrient load, demonstrate readiness, cost-effective and more.



STAR

STATEWIDE ANNUAL REPORT – 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 2023.

The Statewide Annual Report (STAR) 2022

Florida has wide-ranging efforts in place to protect and restore the water quality and the minimum flows and levels of the state's waters. The Florida Department of Environmental Protection (DEP) is pleased to present the 2022 Statewide Annual Report on these efforts in an interactive web application format which is best viewed using Google Chrome or Microsoft Edge. As required by Section 403.0675, Florida Statutes (F.S.) and to report on additional restoration efforts, this report updates the status of protection and restoration actions through total maximum daily loads (TMDLs), basin management action plans (BMAPs), alternative restoration plans (ARPs), minimum flows or minimum water levels (MFLs), and recovery or prevention strategies. We invite you to explore the topics of the most interest to you below by hovering and clicking on the pictures for more information. Data included in this report are available for download in the Contacts and Project Data section.



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

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BMAP UPDATES

NITROGEN SOURCE INVENTORY LOADING TOOL (NSILT) UPDATES

- NSILT Process.
- Methodology review for each loading source.
 - Atmospheric deposition.
 - Wastewater treatment facilities.
 - Onsite sewage treatment and disposal systems.
 - Urban turfgrass fertilizer.
 - Sports turfgrass fertilizer.
 - Farm fertilizer.
 - Livestock waste.
 - Biosolids.





NSILT GENERAL PROCESS SUMMARY

Estimate loading to land surface for each source category.

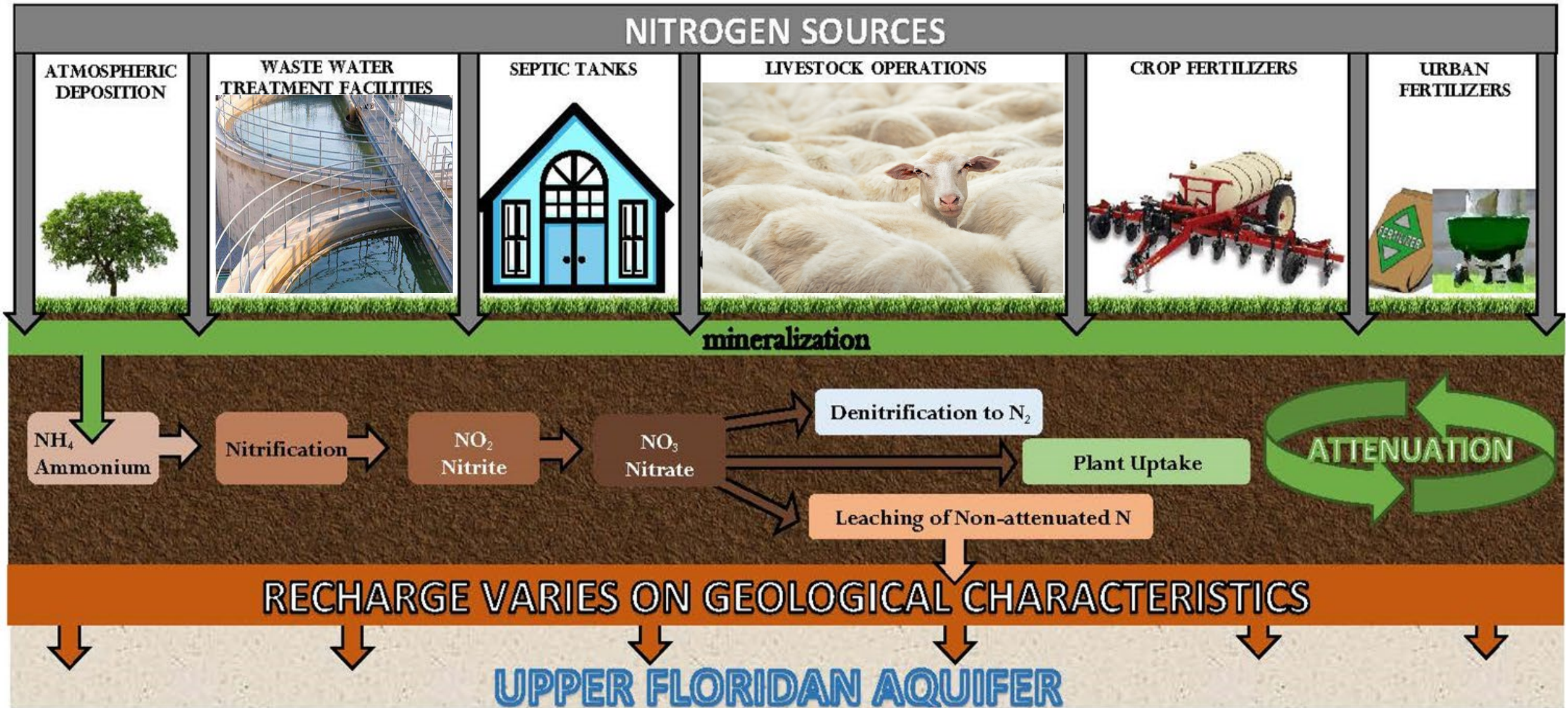
Apply a source specific, literature derived biochemical attenuation factor to surface loading estimate.

Apply a location specific recharge factor to surface loading estimate.

LOADING TO GROUNDWATER

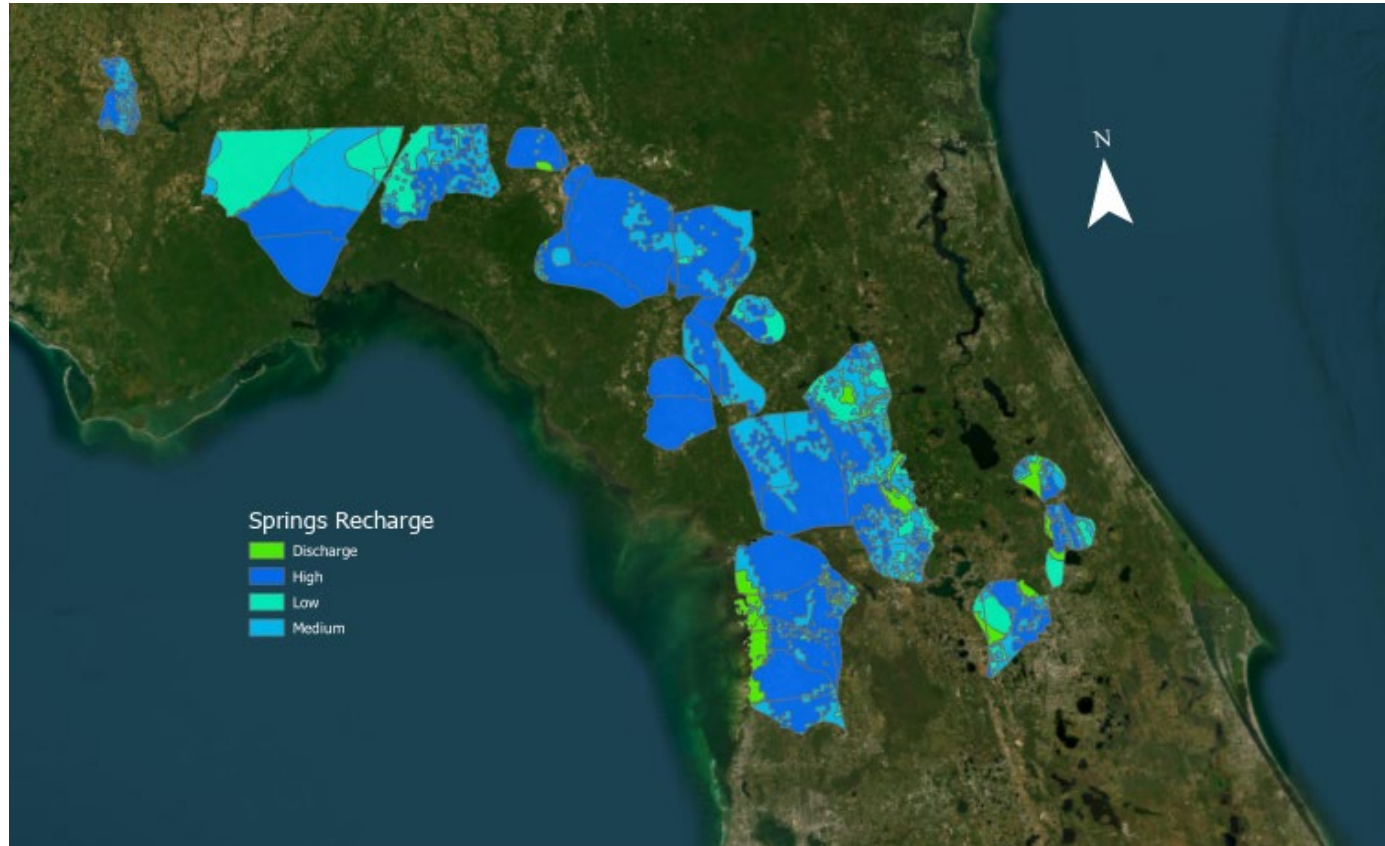


NITROGEN CYCLE AND ATTENUATION





RECHARGE TO GROUNDWATER



- Estimate the amount of water infiltrating from the surface to the Floridan Aquifer in BMAP areas:
 - High Recharge.
 - Medium Recharge.
 - Low Recharge.
- Recharge factors are applied to estimate loading potential for each source category.

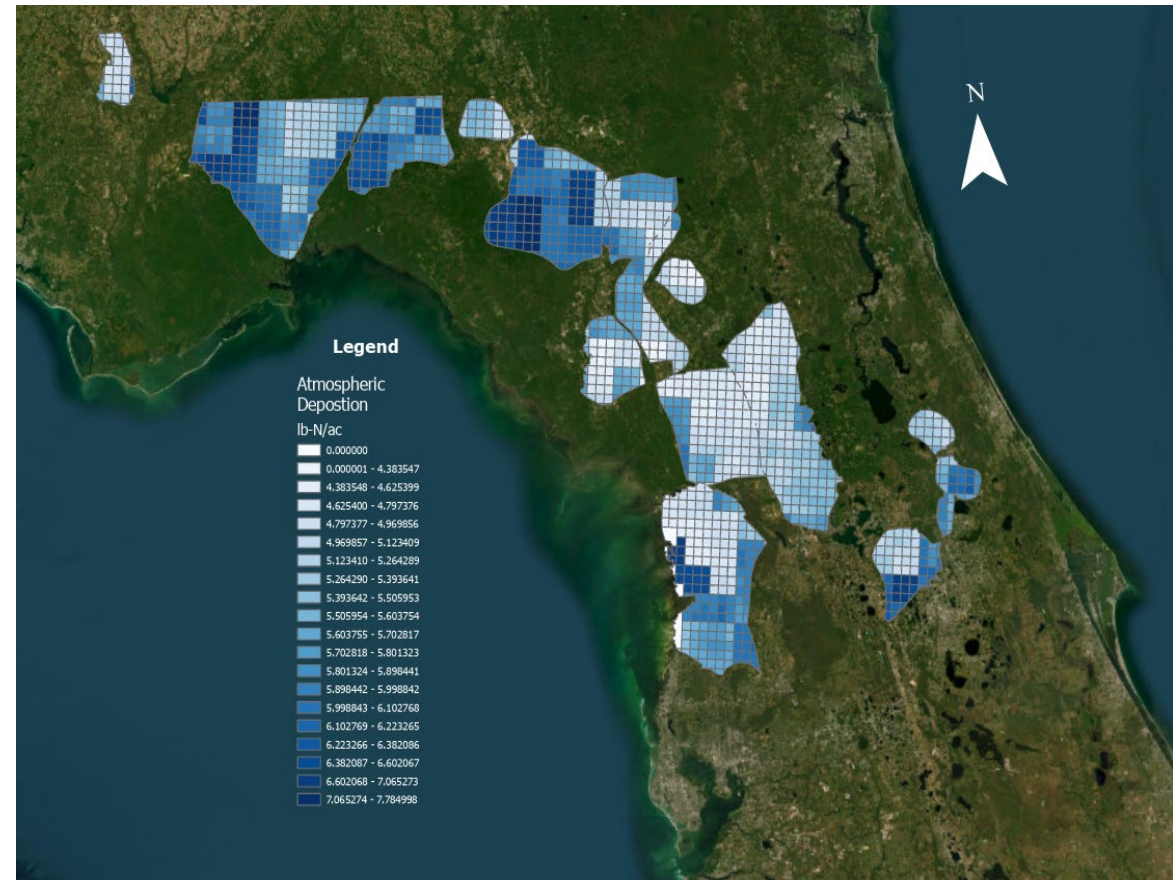
Recharge to Groundwater	
Category	Rate
High	90%
Medium	50%*
Low	10%

*Varies in Wakulla and Jackson Springs



ATMOSPHERIC DEPOSITION

- Atmospheric deposition of nitrogen was estimated using a nationwide model developed by the Total Deposition Science Committee and U.S. Environmental Protection Agency (EPA) called the TDEP (Total Deposition) model.
- Deposition estimates from 2019 and 2020 were averaged to estimate annual loading in springsheds.
- Loading from atmospheric deposition is assumed to attenuate at 95%.





WASTEWATER TREATMENT FACILITIES (WWTFS)

- Wastewater Facility Regulation (WAFR) information was reviewed to determine the location of all wastewater facilities as well as their effluent application or disposal sites.
- Discharge monitoring report (DMR) data collected by WAFR from 2019 to 2021 were reviewed to determine effluent discharge volume and total nitrogen (TN) concentration for each disposal stream.
- Effluent handling methods evaluated include reuse, disposal in a Rapid Infiltration Basin (RIB), application to a sprayfield or absorption field or polishing treatment in a wetland. Each method has its own estimated attenuation factor.



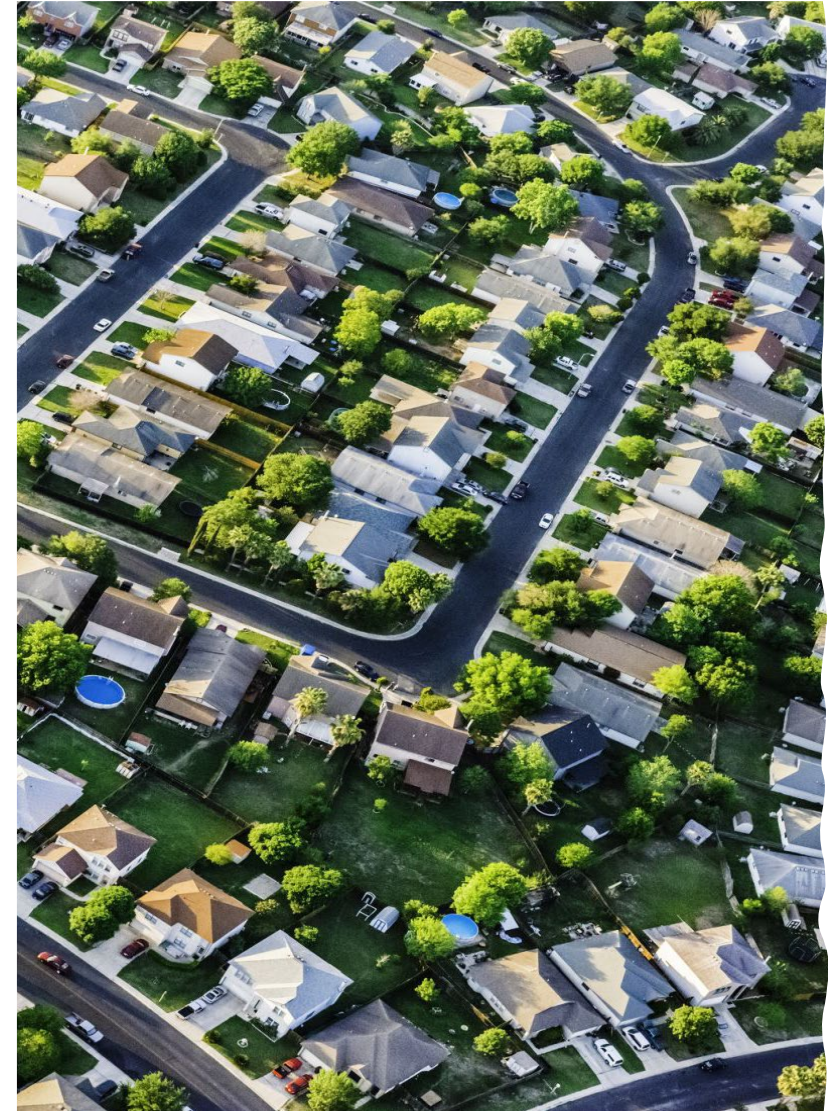
ONSITE SEWAGE TREATMENT & DISPOSAL SYSTEMS (OSTDS)

- Florida Water Management Inventory (FLWMI) data was used to estimate the number of OSTDS within each basin. FLWMI data year varies by county, but all data was updated between 2021 and 2023.
- 2020 U.S. Census data was used to estimate persons per household by county.
- Estimated loading of 10 lb-N/year per person (Armstrong, 2015).
- Estimated load per tank based on multiplying persons per household by loading per person.
- Credited enhanced systems with a 65% reduction in TN loading.
- Loading from OSTDS is estimated to attenuate at 50%.



URBAN TURFGRASS FERTILIZER (UTF)

- Urban turfgrass fertilizer loading was evaluated separately for single family residential, non-single family residential and sports turfgrass.
- Sports turfgrass loading includes the application of fertilizers to both sports fields and golf courses.
- Loading from urban turfgrass fertilizers are estimated to attenuate at 70%.





URBAN TURFGRASS FERTILIZER (UTF)

Single Family Residential Fertilization:

- 2021 Florida Department of Revenue Cadastral information was used to determine size and value of single-family residential parcels.
- Assumed 27.8% of parcel as impervious area (Tilley & Slonecker, 2006).
- Assumed one-acre maximum of fertilized area for single family residential parcels greater than one-acre in urban springsheds. Assumed 0.5-acres maximum fertilized area for single family residential parcels greater than one-acre for rural springsheds.
- Assumed likelihood to fertilize rate is based on home value. Three tiers of home value considered.
- Fertilizer application rates are informed by local survey information and the Green Industries Best Management Practice (GIBMP) manual.



UTF CONTD.

Non-Single Family Residential Fertilization:

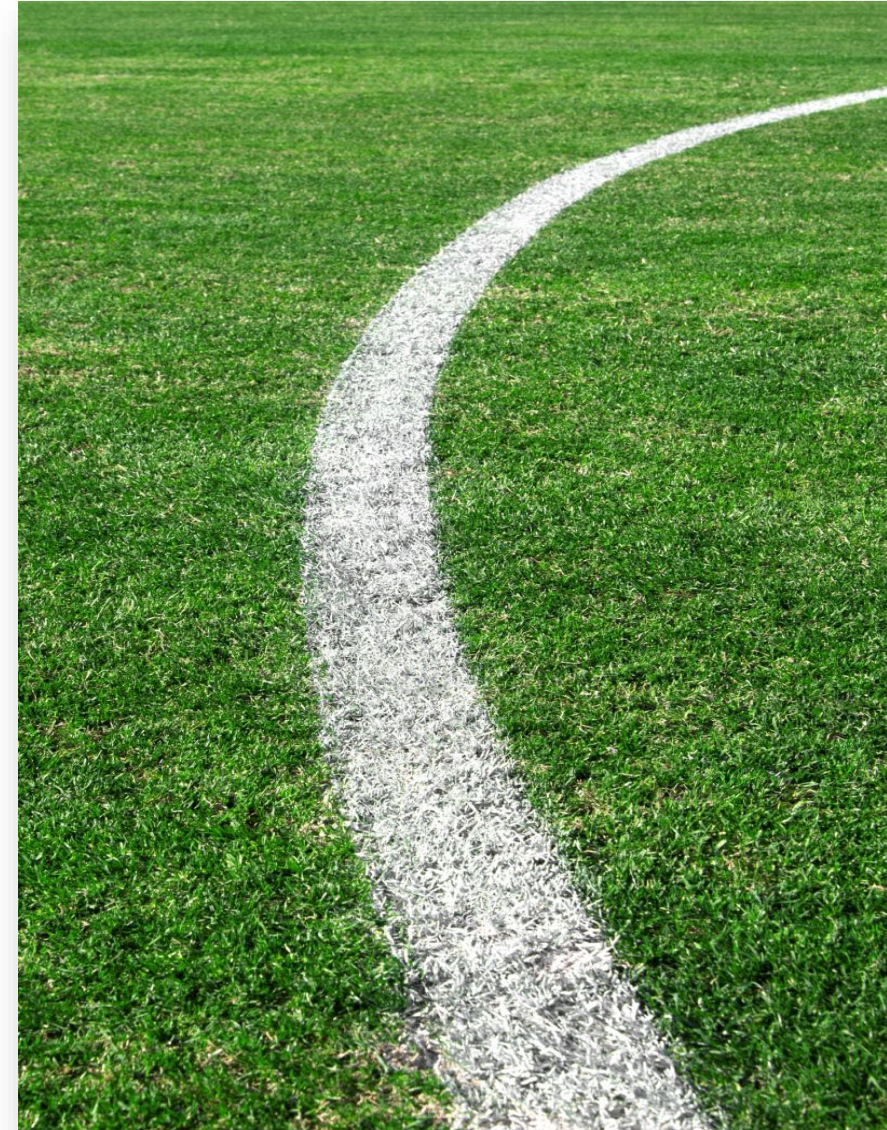
- Water management district land use/land cover data was used to estimate non-single family residential UTF application acreage estimates. 15 land cover codes were assumed to be likely to receive fertilizer. Land use data year is dependent on the water management district, but all data was updated between 2019 and 2022.
- Impervious area was estimated using a United States Geological Survey (USGS) study (Tilley & Slonecker, 2006). Percent impervious area was dependent on the land cover category.
- All pervious areas are assumed to be fertilized at the GIBMP application rate. GIBMP rates was evaluated regionally:
 - North Region: 108.9 pounds of nitrogen per acre per year.
 - Central Region: 130.69 pounds of nitrogen per acre per year.
 - South Region: No springs BMAPs.



SPORTS TURFGRASS FERTILIZER (STF)

Sports turfgrass fertilizer is a combination of golf course and other sports turfgrass areas:

- BMAP areas were evaluated to identify active golf courses.
- Previous NSILT estimates of other STF areas were used in this evaluation to estimate loading from this source.
- Fertilizer application rates and area from the previous NSILT were used to estimate current nutrient loading where information was available.





FARM FERTILIZER



- Florida Dept. of Agriculture and Consumer Services (FDACS) Florida Statewide Agricultural Irrigation Demand 9 (FSAID 9) data layer published in 2021 was analyzed to estimate acreage of all crop types within each recharge category in BMAP areas.
- Application rates previously used in the NSILT were reviewed by FDACS, water management districts, and University of Florida Institute of Food and Agricultural Science (IFAS) and updated to represent current estimates.
- For all crops besides pasture and nurseries, loading to land surface was calculated by multiplying the acreage of a given crop type by the estimated fertilizer application rate.
- Loading from farm fertilizer is estimated to attenuate at 80%.



FARM FERTILIZER

- For nursery crops, due to containerization and the need for access:
 - A reduction of 20% of the FSAID 9 land area was made to account for plant spacing.
 - A reduction of 70% of loading was estimated to account for the fact that fertilizer is applied to containers that will trap more of the nutrients for longer.
- Nursery calculations were not applied to fern crops within Volusia County as these crops are ground planted and the above assumptions would not be applicable.
- Adjustment to fertilizer application rates were made to pastureland (FSAID categories: grass/pasture, horse farms, improved pastures, and pasture) to account for field rotation.
 - Fertilizer was estimated to be applied to 20% of pasturelands annually.



LIVESTOCK WASTE

- Livestock populations were estimated using 2017 U.S. Dept. of Agriculture (USDA) census of agriculture data. USDA population estimates are provided by county.
- FSAID 9 land use was used to evaluate the proportion of livestock land within a BMAP area and adjust USDA population estimates.
- Waste factors were multiplied by the estimated animal population to calculate livestock waste loading.
- Loading from livestock waste is estimated to attenuate at 90%.
- Loading from dairy cattle was estimated separately.



DAIRIES

- Permitted and non-permitted dairies were reviewed and calculated separately.
- Information from FDACS for non-permitted dairies was used to estimate herd size and waste treatment system nutrient removal.
- For permitted dairies, loading was estimated from permit information. Herd size was estimated from an average of the last two annual reports (2020 and 2021). Nutrient removal was estimated based on the nutrient management plan included in the operation permit.
- Dairy waste was estimated to attenuate at 50% for most basins.



BIOSOLIDS

- Biosolid application quantity estimates were derived from calculating the average application quantity reported from 2018 to 2022, where data was available.
- Application quantities are provided in tons of material, it was assumed biosolid material has an estimated nitrogen content of approximately 5%.
- Loading to land surface was calculated by multiplying the average application quantity for the period of record by the estimated nitrogen content of 5%.
- Loading from biosolids is estimated to attenuate at 50%.



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.

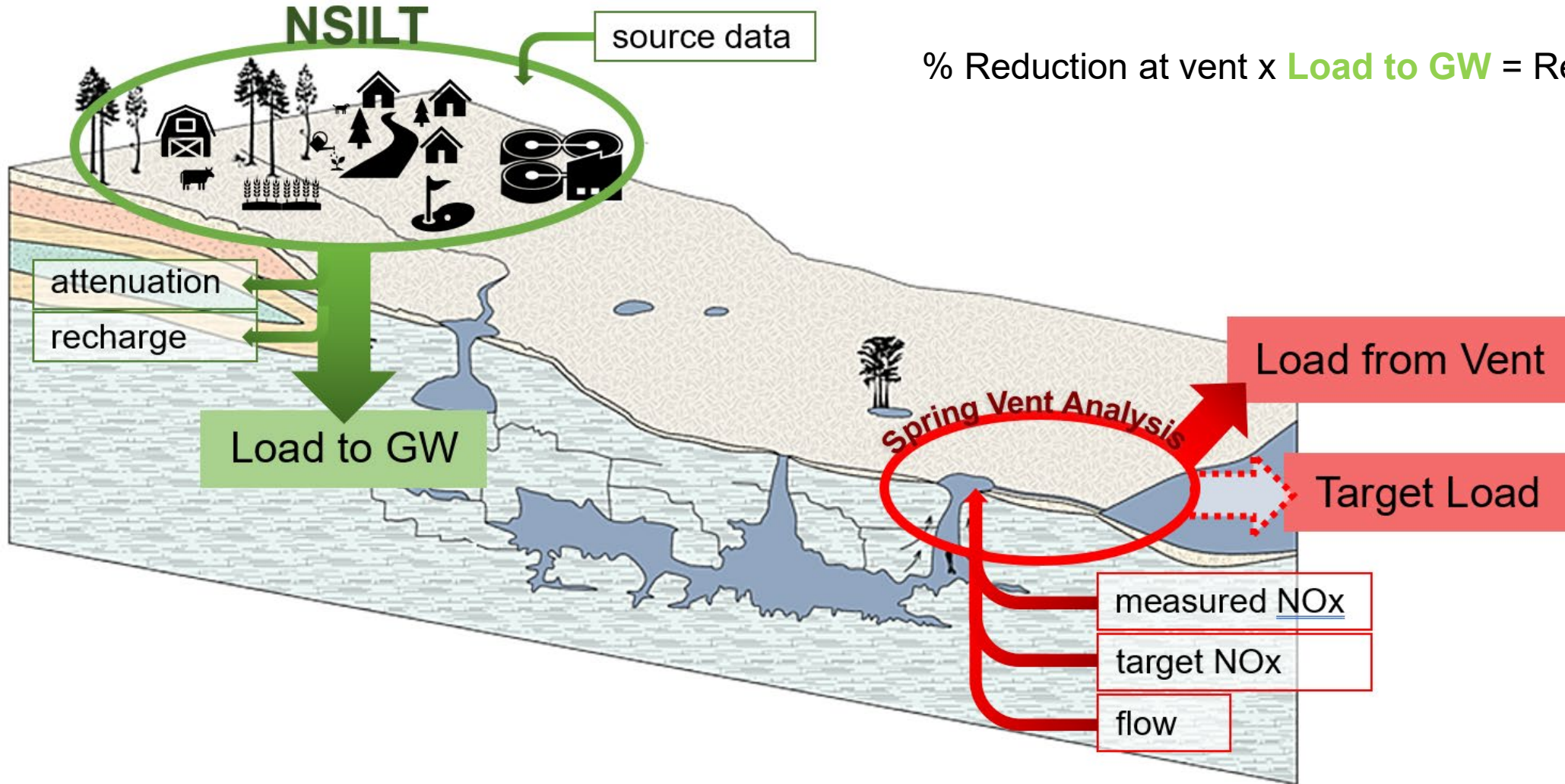
Applied the spring vent percent reduction to the updated NSILT loading.

Determine the total reduction needed to meet the TMDL.



BMAP UPDATES

SPRING VENT LOAD ANALYSIS



$$\text{Load from Vent} - \text{Target Load} = \text{Reduction Goal (at vent)}$$

$$\% \text{ Reduction at vent} \times \text{Load to GW} = \text{Required Reductions (from sources)}$$



BMAP UPDATES

NEXT STEPS

Entity allocation
Development.

Establish 5-year
milestones for project
implementation and
water quality
improvement.

Incorporate
additional projects to
meet reductions.

Incorporate Clean Waterways Act (SB 712) and HB 1379 Requirements.

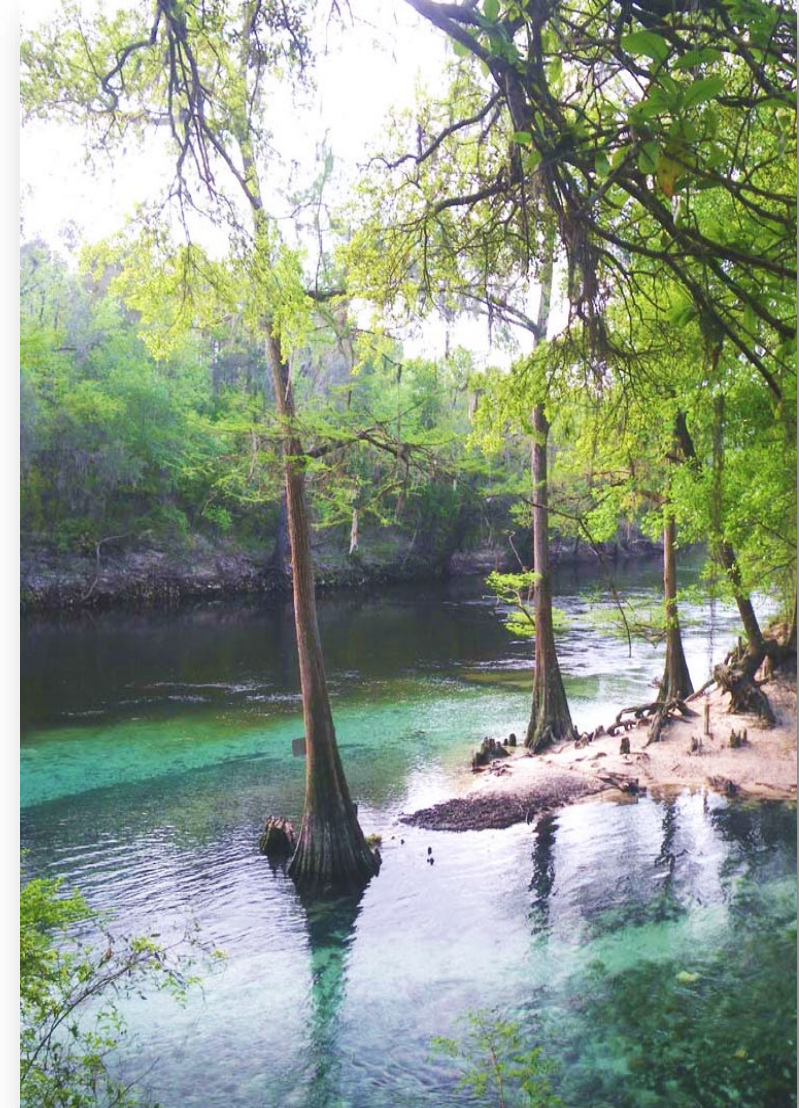


BMAP UPDATES

DUE BY JULY 1, 2025

- NSILT updates.
- Spring vent load analyses.
- Entity allocation development.
- Establish 5-year milestones for project implementation and water quality improvement.
- Incorporate additional projects.
- Incorporate Clean Waterways Act (SB 712) requirements.
- Incorporate HB 1379 requirements.
- Incorporate regional projects.

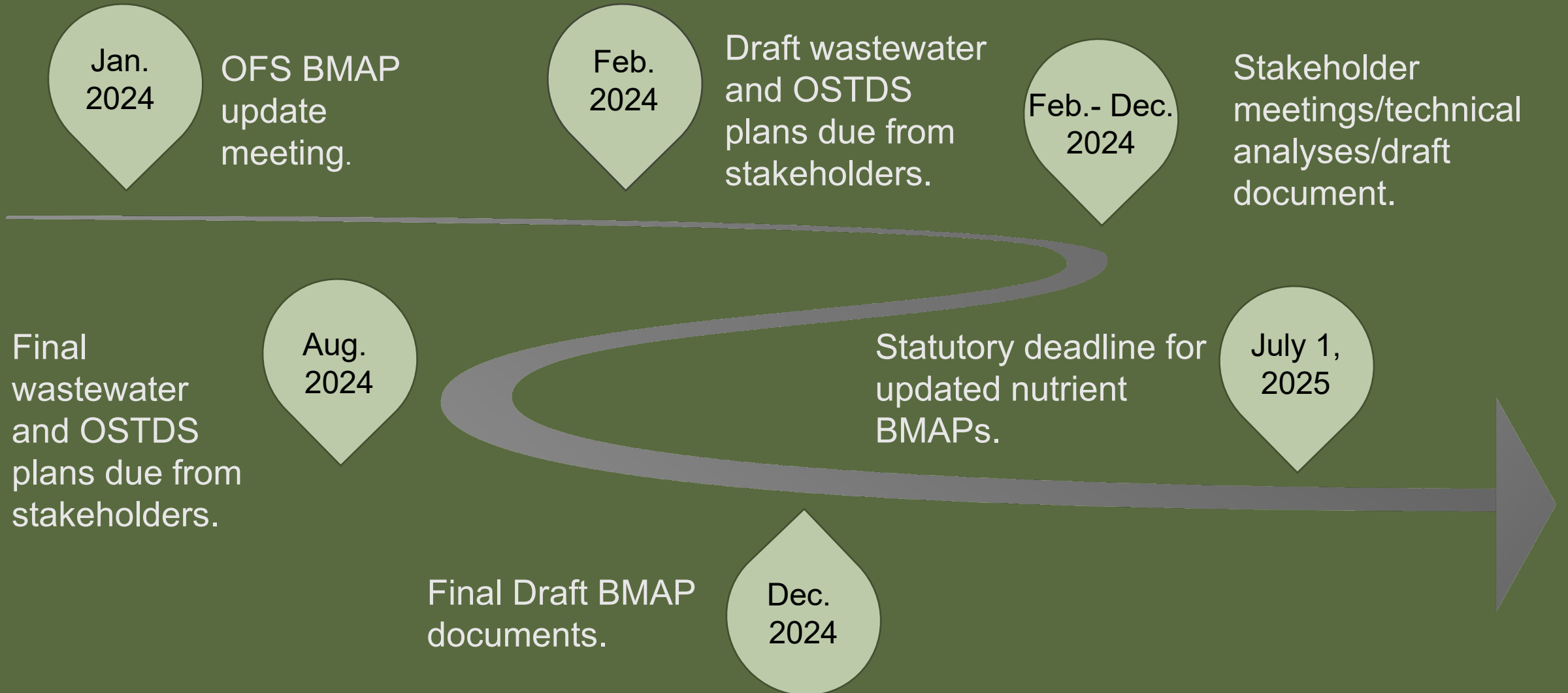
- Water quality data evaluation:
 - Evaluation of the monitoring network (spring vent and groundwater).
 - Water quality trend analyses.
- Evaluate further OSTDS provisions.
- Evaluate AWT or other more stringent effluent limits.
- Update the BMAP documents.





SPRINGS BMAP UPDATES TIMELINE

NEXT STEPS





REFERENCES

- Armstrong, J.H., 2015, Florida Onsite Sewage Nitrogen Reduction Strategies Study Final Report.
- Eller, Kirstin T., and Brian G. Katz, 2017, "Nitrogen Source Inventory and Loading Tool: An integrated approach toward restoration of water-quality impaired karst springs." *Journal of Environmental Management*.
- Helgeson, T., and McNeal, M., 2009, A Reconnaissance-Level Quantitative Comparison of Reclaimed Water, Surface Water, and Groundwater.
- Tilley, J.S., and Slonecker, E.T., 2006, Quantifying the Components of Impervious Surfaces: U.S. Geological Survey Open-File Report 2006-1008.
- [GI-BMP Manual](#), UF/IFAS Extension, (ufl.edu).



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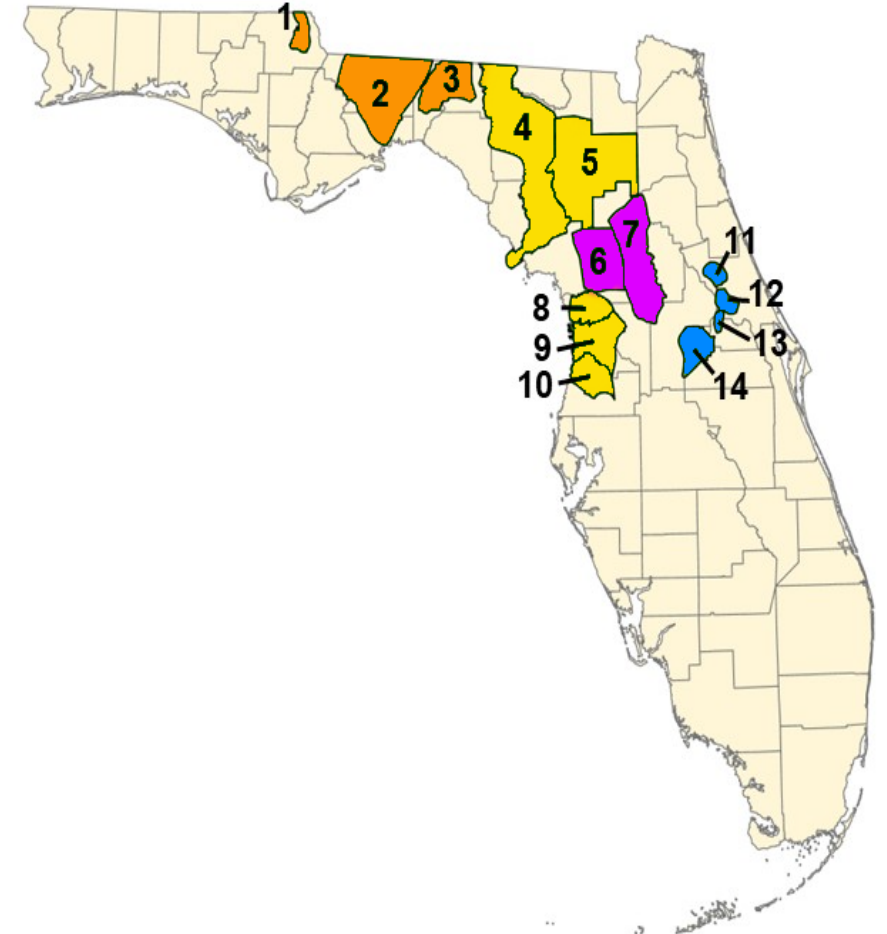
- 11 DeLeon Spring
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THANK YOU

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