

OVERVIEW - BASIN MANAGEMENT ACTION PLANS (BMAPS)

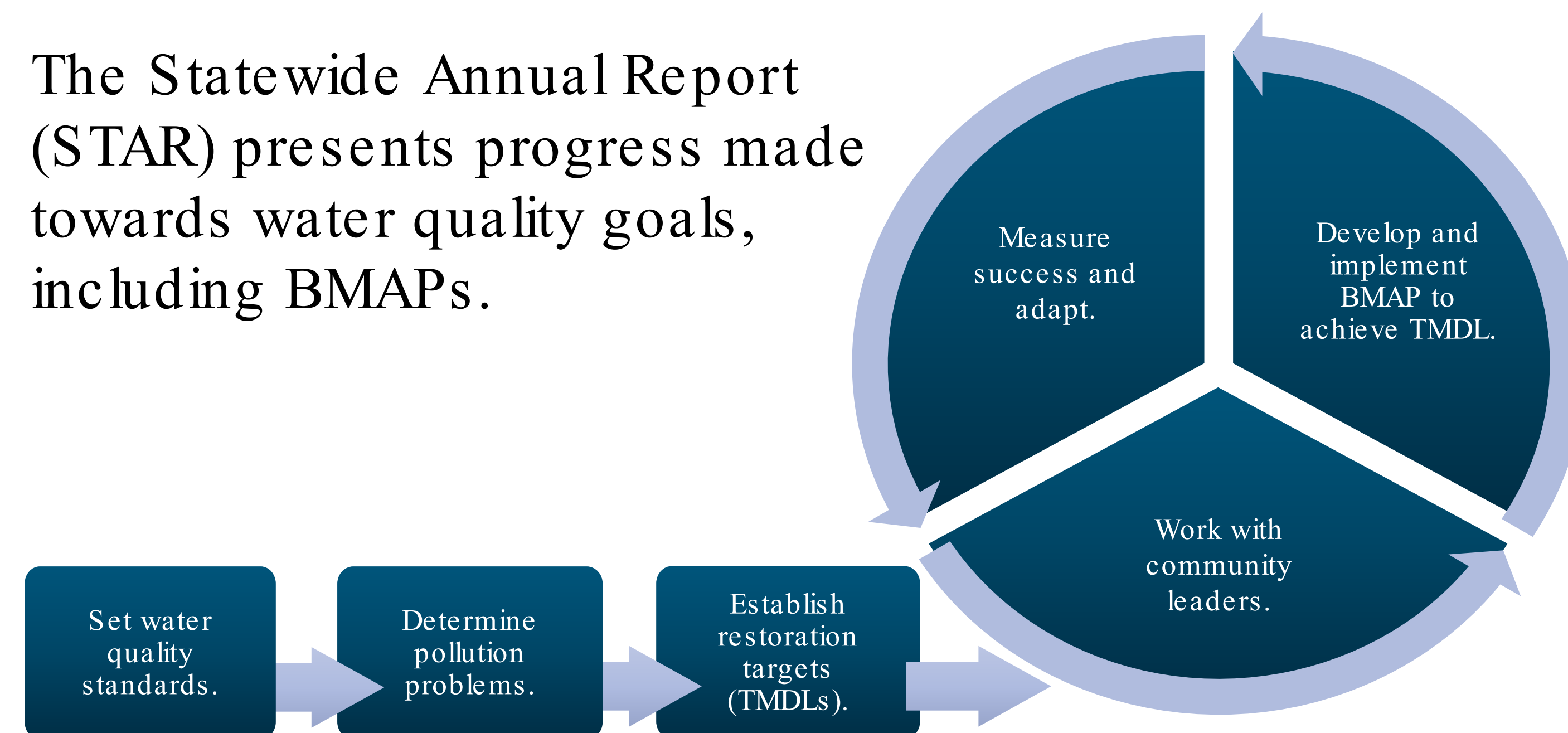
Outstanding Florida Springs Public Meetings, Fall 2024

Water Quality Framework

The Florida Department of Environmental Protection (DEP) monitors and assesses Florida's surface water and groundwater quality, including Outstanding Florida Springs.

DEP and partner agencies maintain and expand monitoring networks to provide water quality data for decision making.

The Statewide Annual Report (STAR) presents progress made towards water quality goals, including BMAPs.



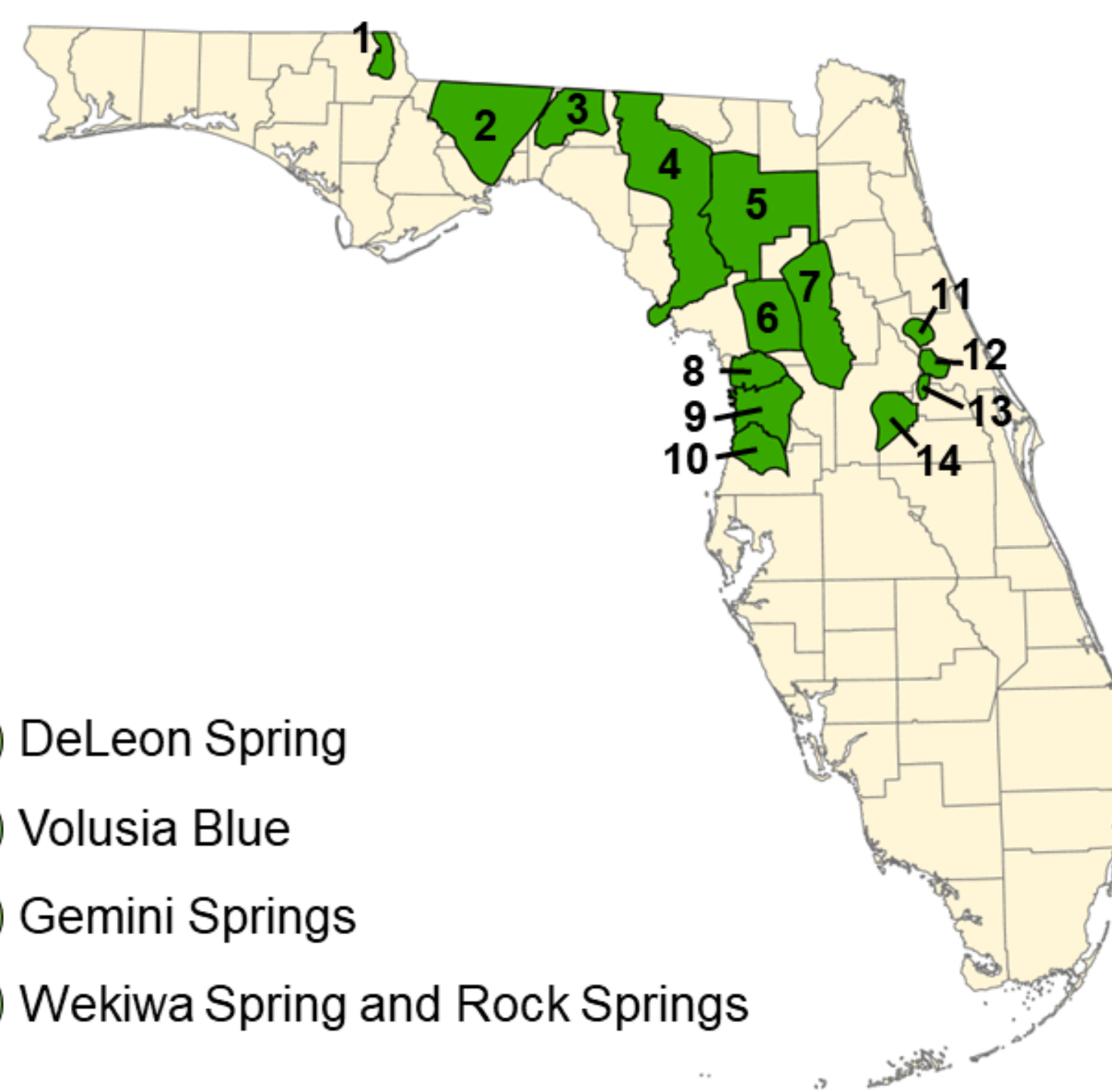
Outstanding Florida Springs BMAPs

A BMAP provides a water quality restoration framework to implement total maximum daily loads (TMDLs).

There are currently 13 BMAPs targeting the restoration of 24 Outstanding Florida Springs.

Springs BMAPs

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



BMAP Legislation

Authority and responsibility for BMAPs is outlined in the following Florida Statutes (F.S.):

Florida Watershed Restoration Act (section 403.067, F.S.) - Outlines the process for identifying impaired waters and the strategies to restore them, including cooperative plans, known as BMAPs.

Florida Springs and Aquifer Protection Act (sections 373.801 - .813, F.S.) - Provides for the protection and restoration of the state's Outstanding Florida Springs, which is comprised of 24 first-magnitude springs, six additional named springs and their associated spring runs.

Recent amendments to the above laws include:

2020 - Promotes resilient wastewater infrastructure and utilities; requires local governments to develop wastewater treatment facility (WWTF) plans and onsite sewage treatment and disposal system (OSTDS) remediation plans.

2023 - Requires a list of identified projects to achieve the five-year milestones in BMAPs and agricultural cooperative regional water quality improvement elements; adds requirements for local comprehensive planning; requires more stringent domestic wastewater treatment standards; expands eligibility for grant opportunities; and expands prohibitions in springs BMAP areas.

2024 - Requires advanced treatment of reclaimed water within BMAPs and requires private domestic wastewater facilities to coordinate with local governments in the development of wastewater treatment plans.

BMAP Components and Updates

Key Elements of BMAPs:

- The TMDL(s) that define the restoration targets.
- Physical description of the waterbody and contributing area.
- Description of the monitoring network and water quality.
- Identification of the pertinent pollution sources.
- Identification of responsible stakeholders.
- List of projects and strategies to reduce nutrient loading.



USFWS_CCBY2.0

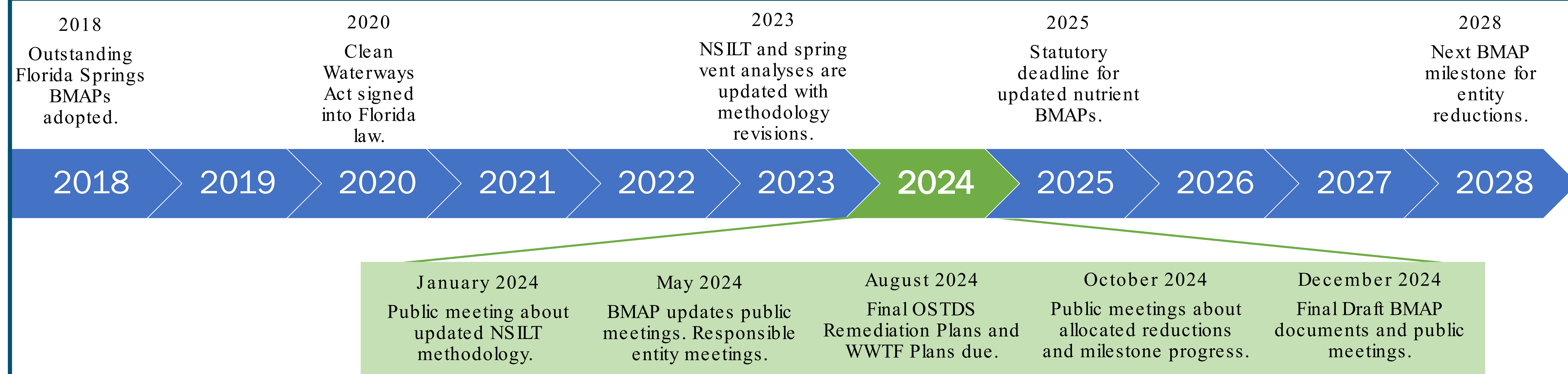
Recent Updates:

- 2023 Nitrogen Source Inventory Loading Tool (NSILT).
- Spring Vent Analyses.
- Evaluation and expansion of the monitoring network.
- Local OSTDS and wastewater remediation plans.
- Determination of entity allocations and milestones.
- Evaluation of milestone progress with stakeholders.

New Additions to the Springs BMAPs:

- More detailed groundwater analyses.
- Updated spring vent water quality analyses.
- Incorporation of law requirements adopted 2020-24.
- Entity allocations.

BMAP Timeline



FLORIDA SPRINGS – AN OVERVIEW

Outstanding Florida Springs Public Meetings, Fall 2024

Springshed Diagram

The diagram below represents an overview of the complex processes that impact water flow through a spring system. It also shows how human behaviors on the landscape affect nitrogen pollution in the groundwater. Eventually, groundwater flows back to the surface through the Outstanding Florida Springs (OFS). Pollutants from the surface can travel long distances, negatively impacting water quality and the biology of springs and rivers. The variable distances and underground conditions means it can take time to observe water quality improvements at the spring vent from restoration projects being implemented on the land surface across the springshed.

OFS

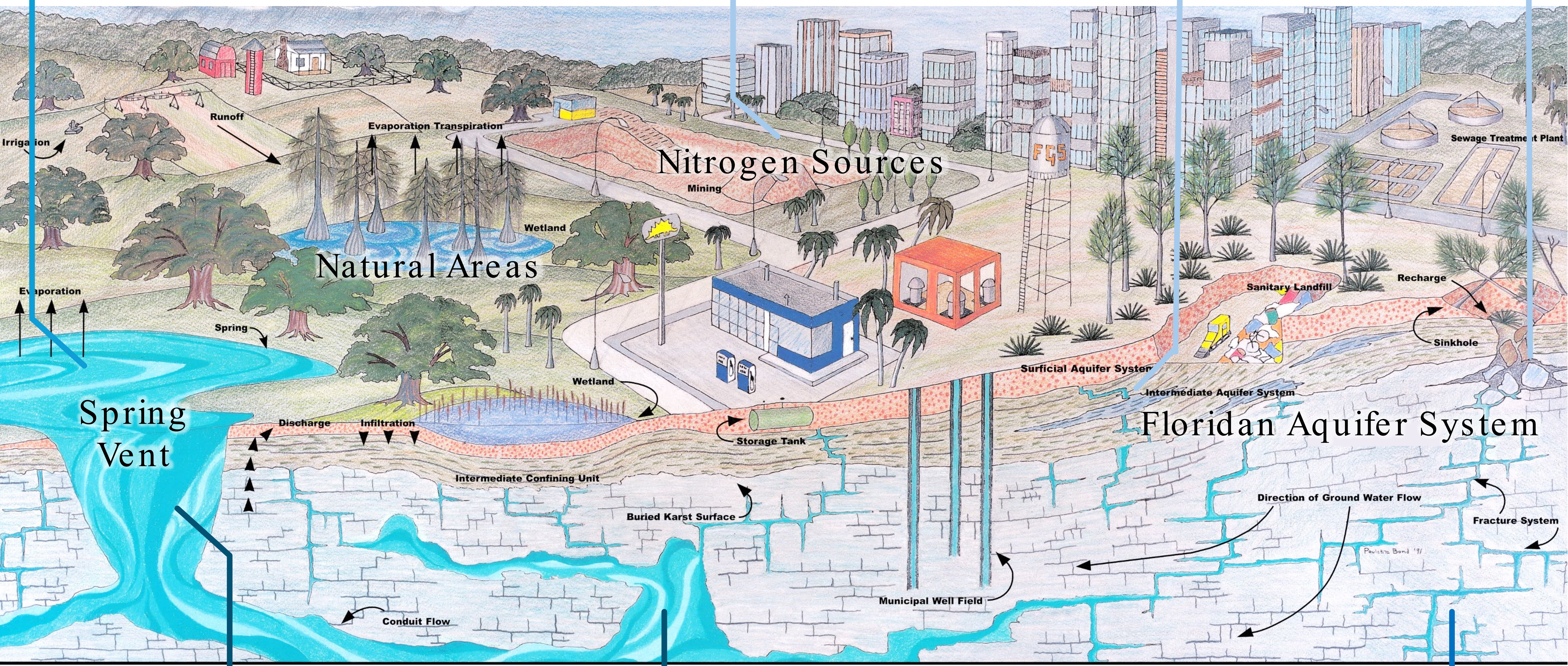
OFS includes all historic first magnitude springs and their associated spring runs as determined by DEP, using the most recent Florida Geological Survey springs bulletin (66), as well as the following additional springs and their associated spring runs: DeLeon Springs, Peacock Springs, Poe Springs, Rock Springs, Wekiwa Springs and Gemini Springs.

Impairment

Currently, 24 of the 30 OFS are impaired for the nitrate form of nitrogen. Anthropogenic sources of nitrogen such as human waste, livestock waste, farm fertilizer, urban fertilizer and other sources contribute to nitrate loading that results in an ecological imbalance.

Vulnerability evaluates how easily pollutants from the surface can impact groundwater quality.

Recharge occurs when rain or irrigation water infiltrates through the soil and enters an underlying aquifer system.



Monitoring

Spring vent monitoring is performed by DEP and partner agencies to measure progress towards meeting the total maximum daily loads (TMDLs).

Groundwater monitoring is performed by DEP and partner agencies to understand how nutrient loading and reduction activities impact water traveling to the spring vent.

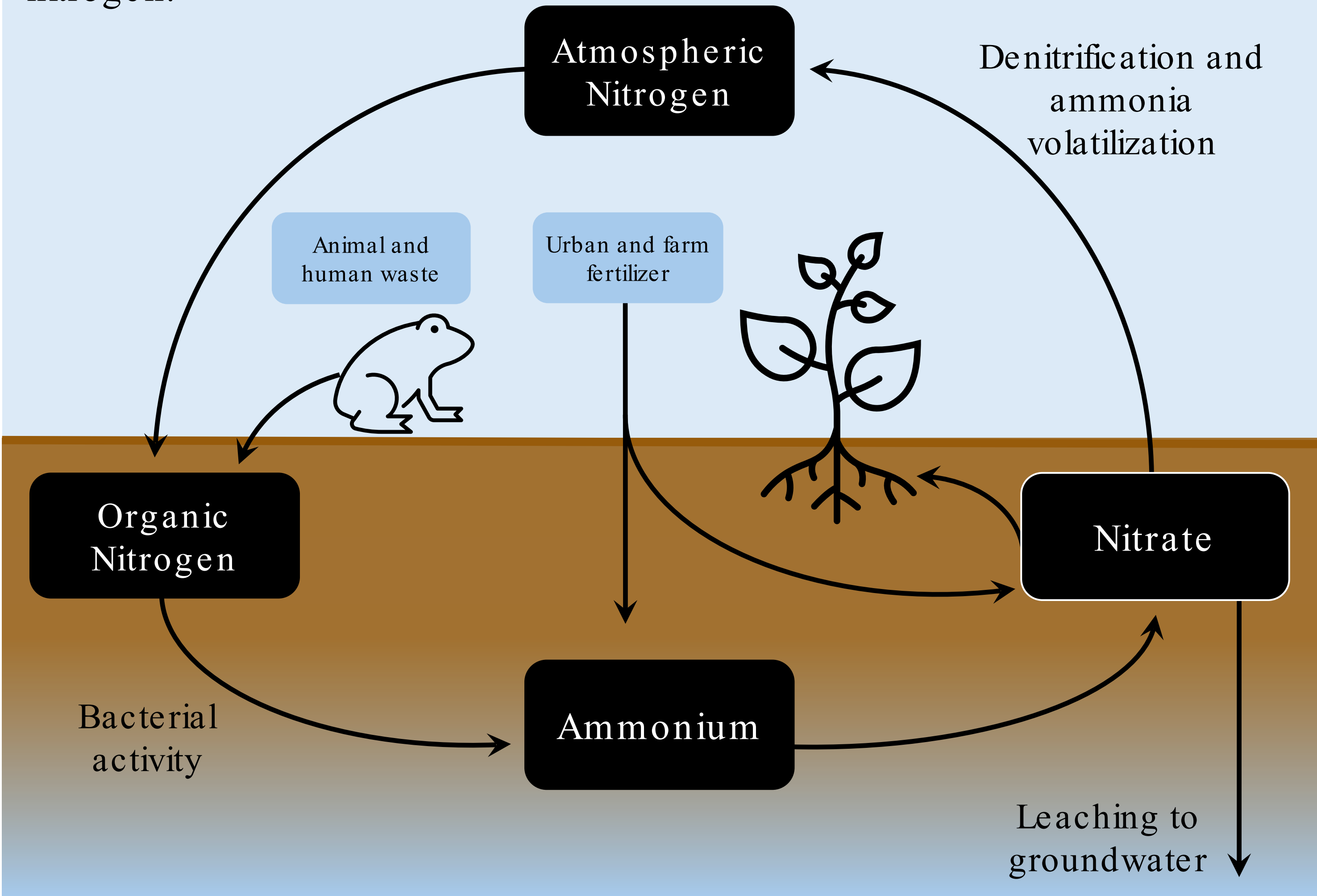
Karst Limestone

The Florian aquifer is contained in limestone units that underly the state. Karst limestone results from the dissolution of calcium carbonate rock by acidic rainwater, creating voids and channels that result in sinkholes, conduits and springs. Water can travel rapidly from high recharge areas to spring vents through karst features.

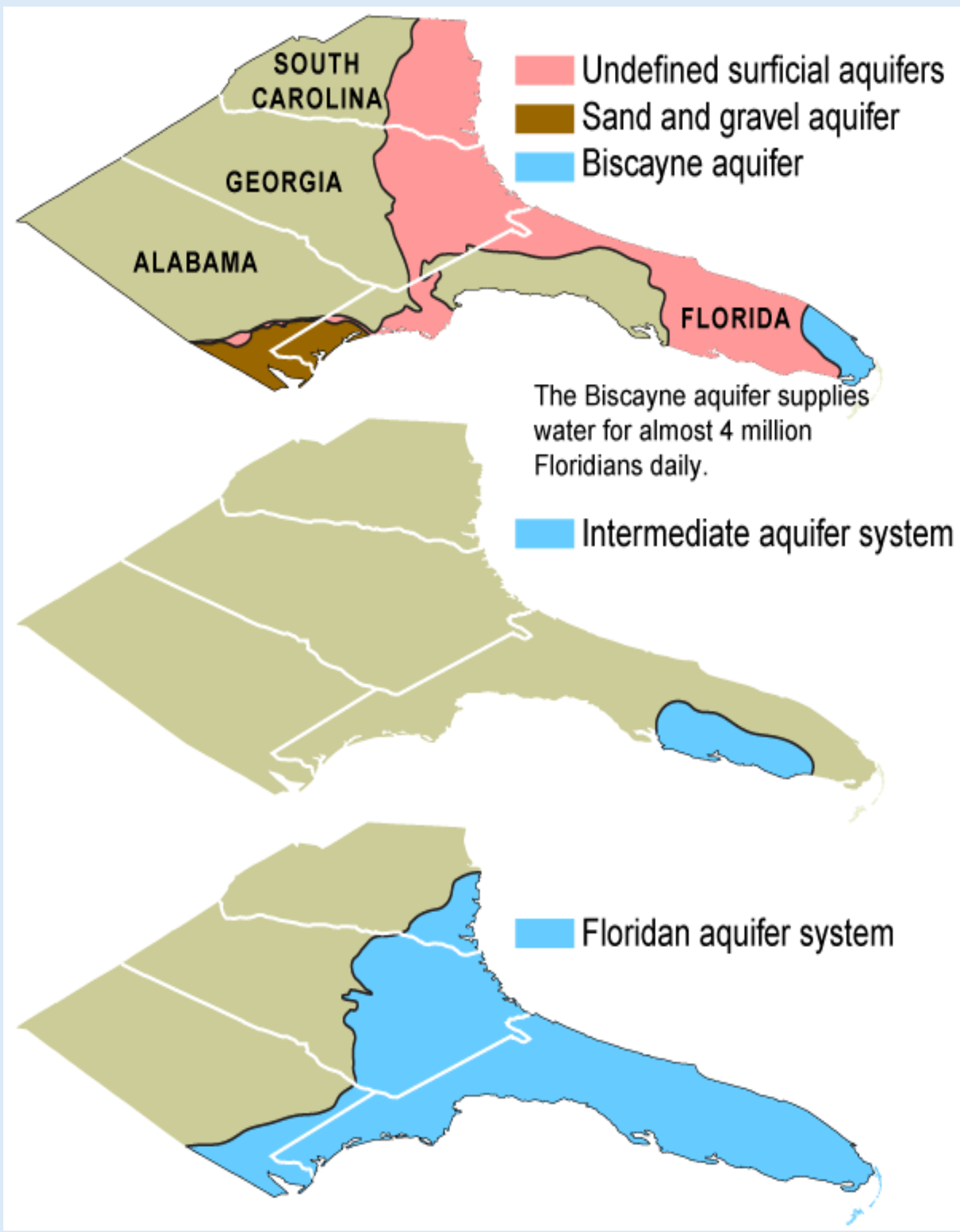
The Nitrogen Cycle

Nitrogen goes through biological, physical and chemical processes as it travels through the environment. This series of interactions is known as the nitrogen cycle.

Attenuation of nitrogen refers to the processes of immobilization, denitrification, volatilization and cation exchange that prevent leaching of nitrogen.



Florida's Aquifer Systems



The Florian Aquifer underlies the entire state of Florida and is the source water for the state's springs.

In some areas of the state, a surficial aquifer system separates the Florian Aquifer from the land surface.

In most OFS areas, the Florian Aquifer is largely unconfined and vulnerable to leaching of nitrogen from the land surface.

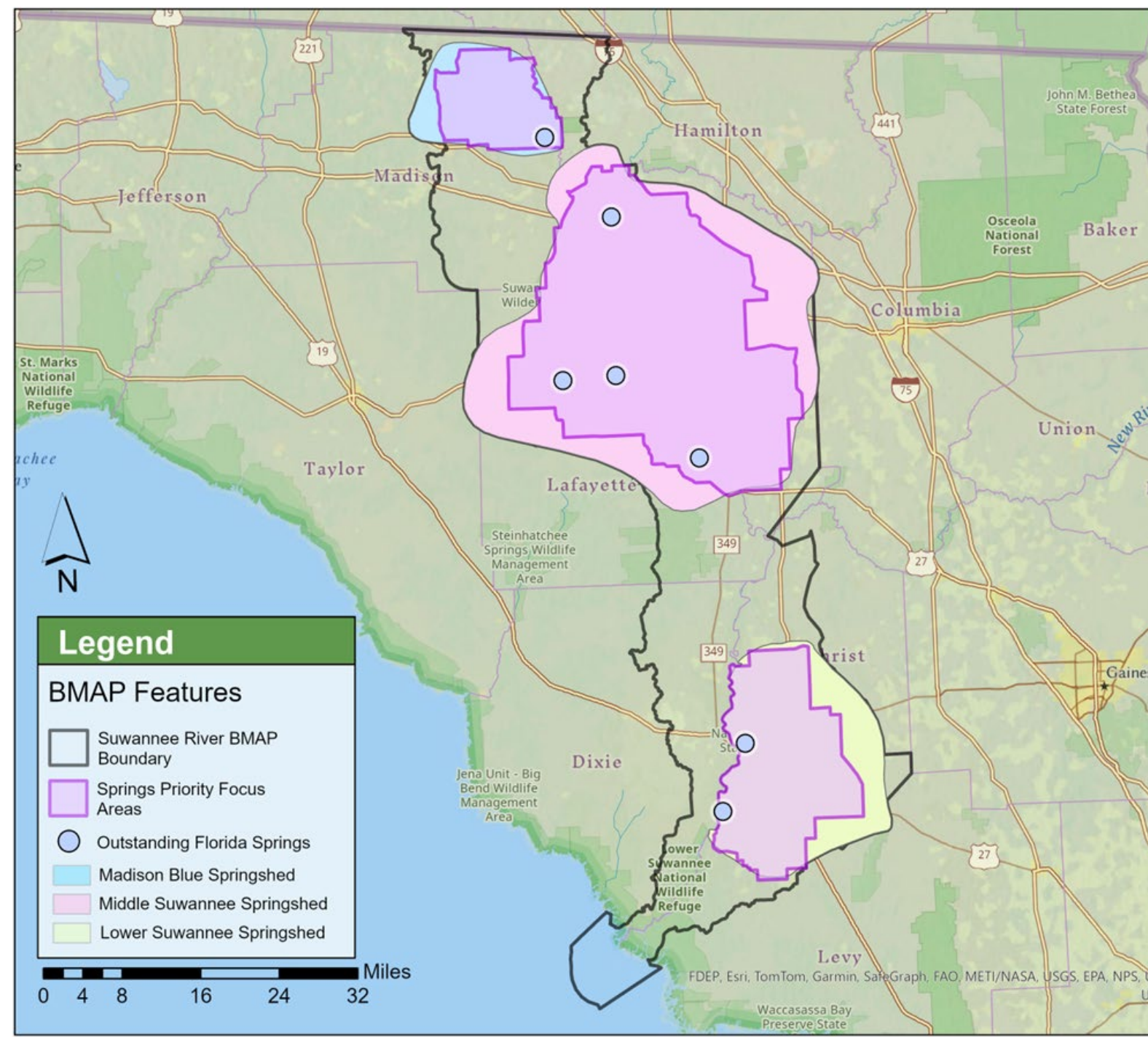




SUWANNEE RIVER BASIN MANAGEMENT ACTION PLAN (BMAP)

Outstanding Florida Springs Public Meetings 2024

Suwannee BMAP Background



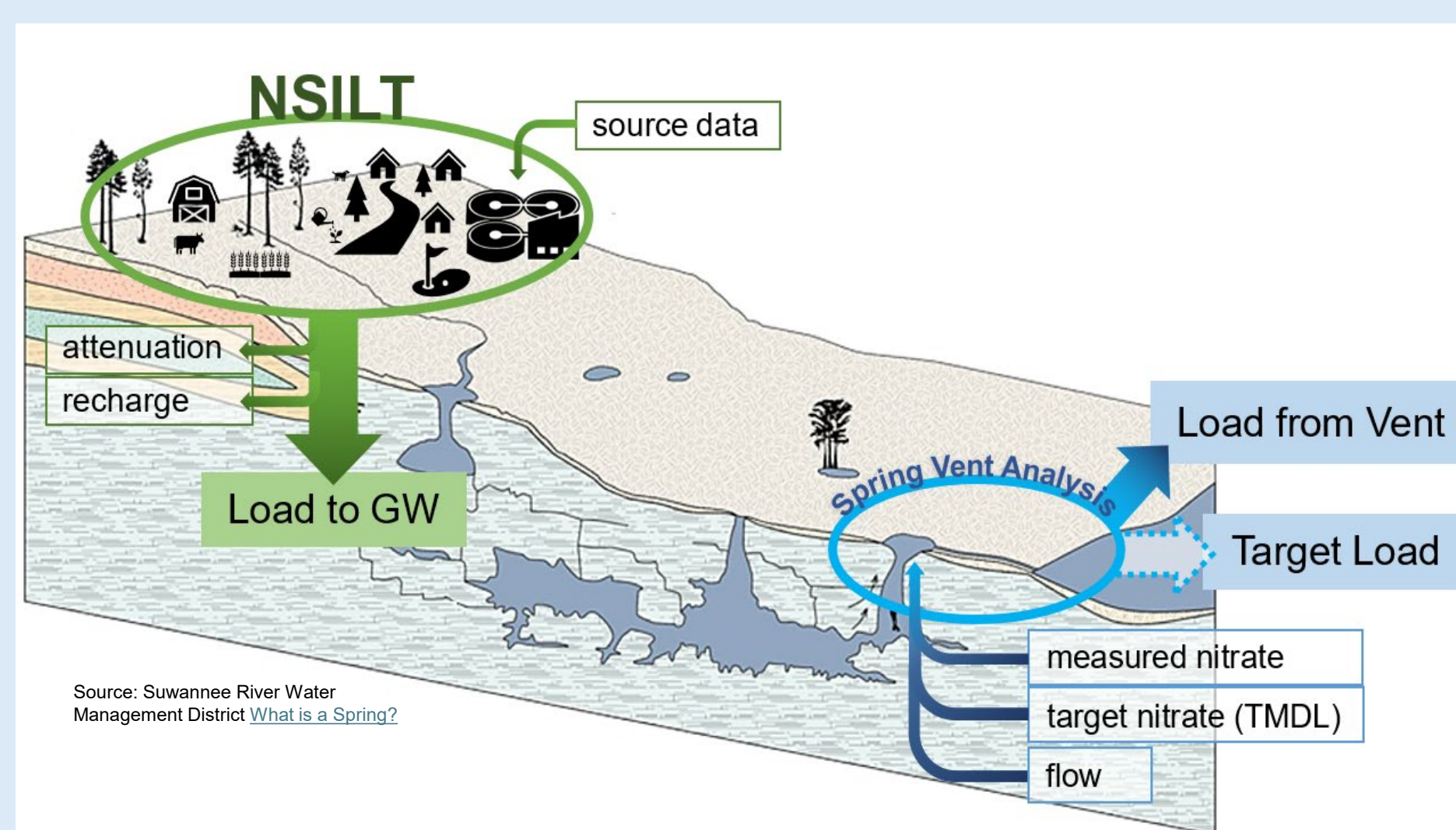
- The BMAP area is over 1 million square acres.
- There are four subbasins:
 - Madison Blue (Withlacoochee).
 - Middle Suwannee.
 - Lower Suwannee.
 - Surface water contributing area, which is the area outside the delineated springsheds.
- Impaired for the nitrate form of nitrogen.
- The total maximum daily load (TMDL) is 0.35 milligrams per liter (mg/L) of nitrate.

Spring Vent Analysis

Spring flows and nitrate concentration in data were reviewed to evaluate the total load (lb-TN/yr) of nitrate discharging from the spring. The percent reductions in the table below represent the proportional changes needed to achieve the water quality targets in each of the spring basins.

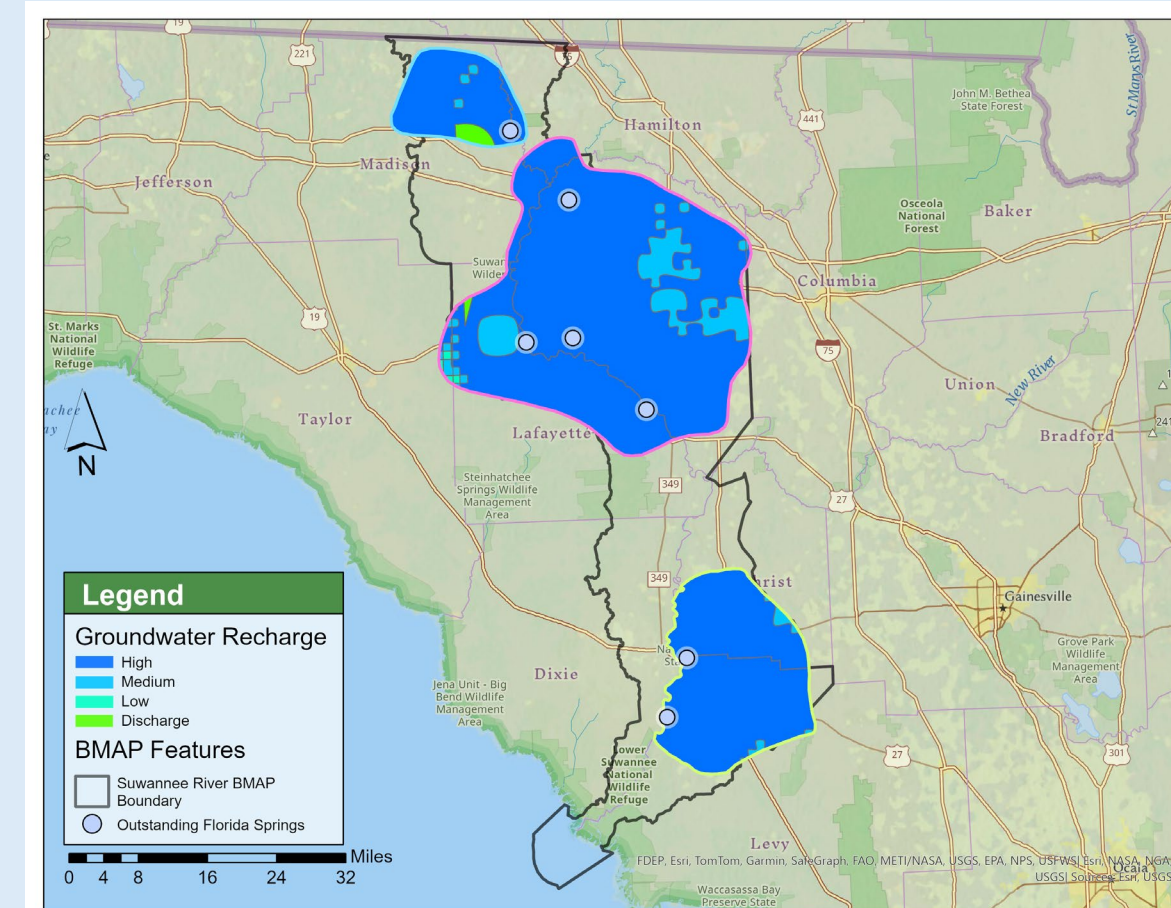
Spring	NO ₂ +NO ₃ (mg-N/L)*	Discharge (cfs)*	Total Load from Vents lb-N/yr	Total Load if Meeting TMDL lb-N/yr	Percent Reduction Needed
Madison Blue	1.72	107.50	364,088	73,979	80%
Troy	2.00	129.06			
Falmouth	1.22	73.91	1,382,888	218,665	84%
Lafayette Blue	3.02	90.72			
Peacock	3.38	24.06			
Fanning	5.82	72.61	1,593,042	162,212	90%
Manatee	2.38	163.11			

* Average from the period of record (2012-2022).
cfs: Cubic feet per second.

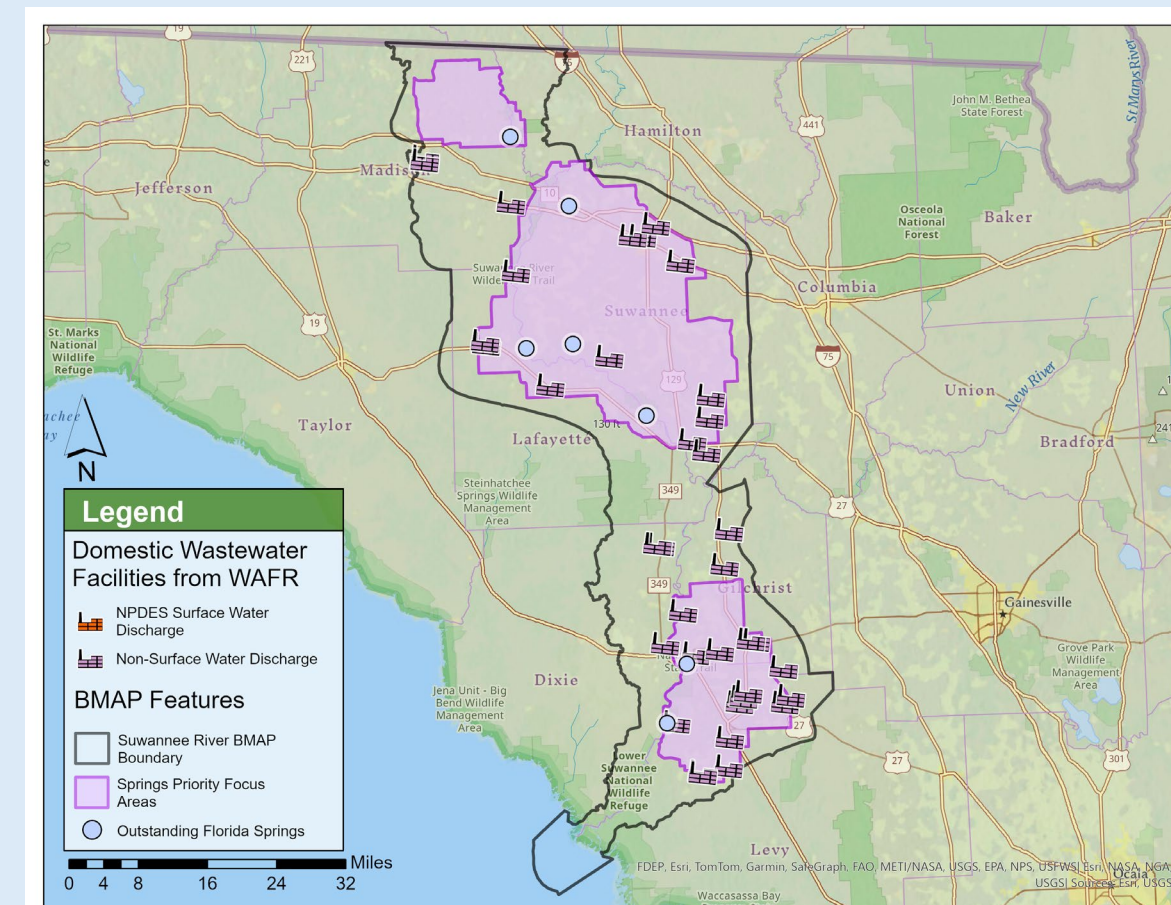


The spring vent analysis uses the measured nitrate loads at the spring vent compared with the TMDL loading based on a target nitrate concentration of 0.35 mg/L to determine the required reduction to meet the TMDLs. It is assumed a proportional reduction is needed from sources loading nitrogen into the groundwater (GW).

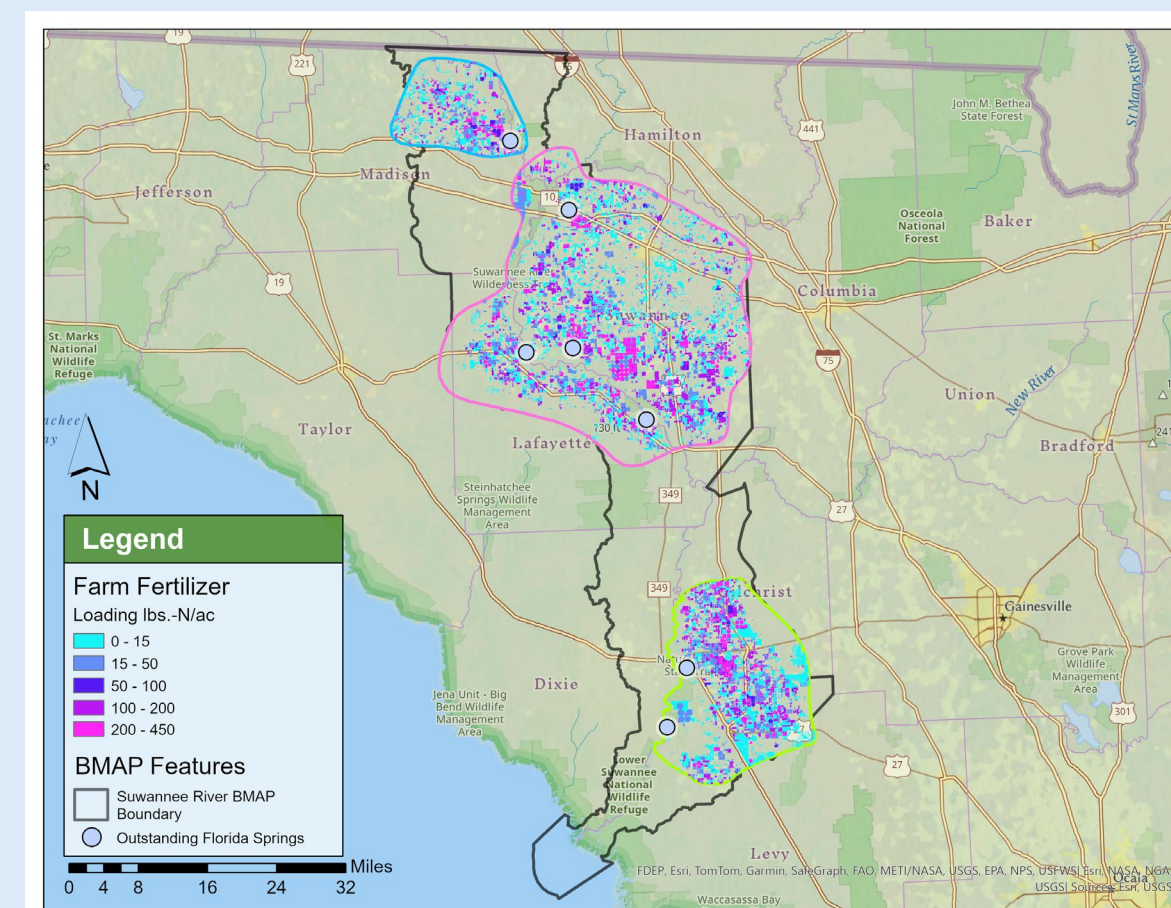
Springshed Loading: Nitrogen Source Inventory Loading Tool (NSILT)



The **NSILT** evaluates the loading of nitrogen from various sources within the springshed. Source-specific attenuation to groundwater was considered as well as the recharge potential based on spatial and geologic factors.



Urban sources include wastewater treatment facilities, onsite sewage treatment and disposal systems (OSTDS), and urban and sport turfgrass fertilizer.



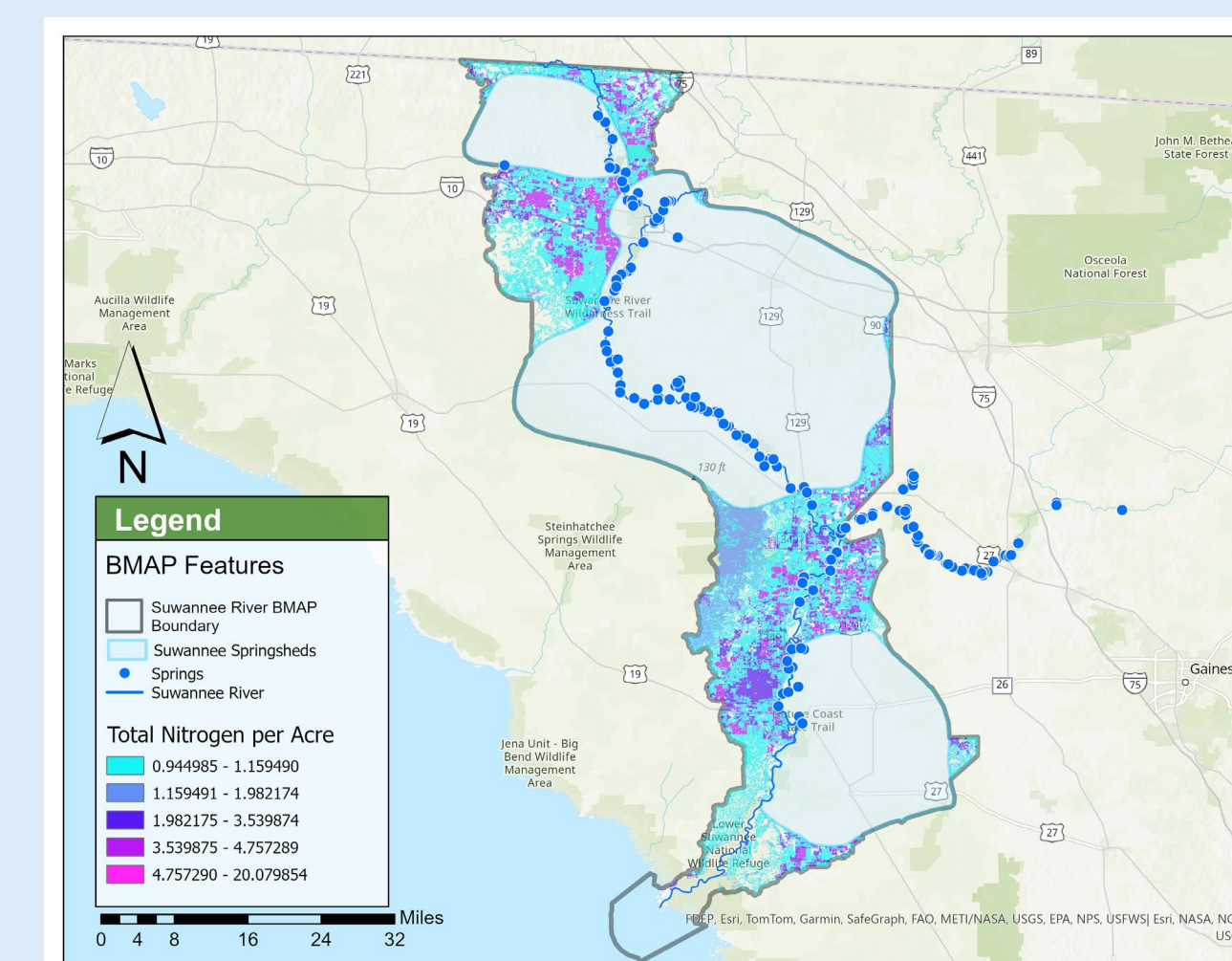
Agricultural sources include farm fertilizer and livestock waste. The Florida Department of Agriculture and Consumer Services' (FDACS) Florida Statewide Agriculture Irrigation Demand (FSAID) database and U.S. Department of Agriculture's (USDA) Census of Agriculture data were used to estimate agricultural loading.

Surface Water Loading: Pollutant Load Screening Model

Areas outside the springshed were treated as surface waters and assessed for runoff potential. Land use codes were assigned event mean concentrations and runoff coefficients to derive an average load per acre.

Land use data were clipped to each jurisdictional boundary and total loading for all relevant land uses were summed.

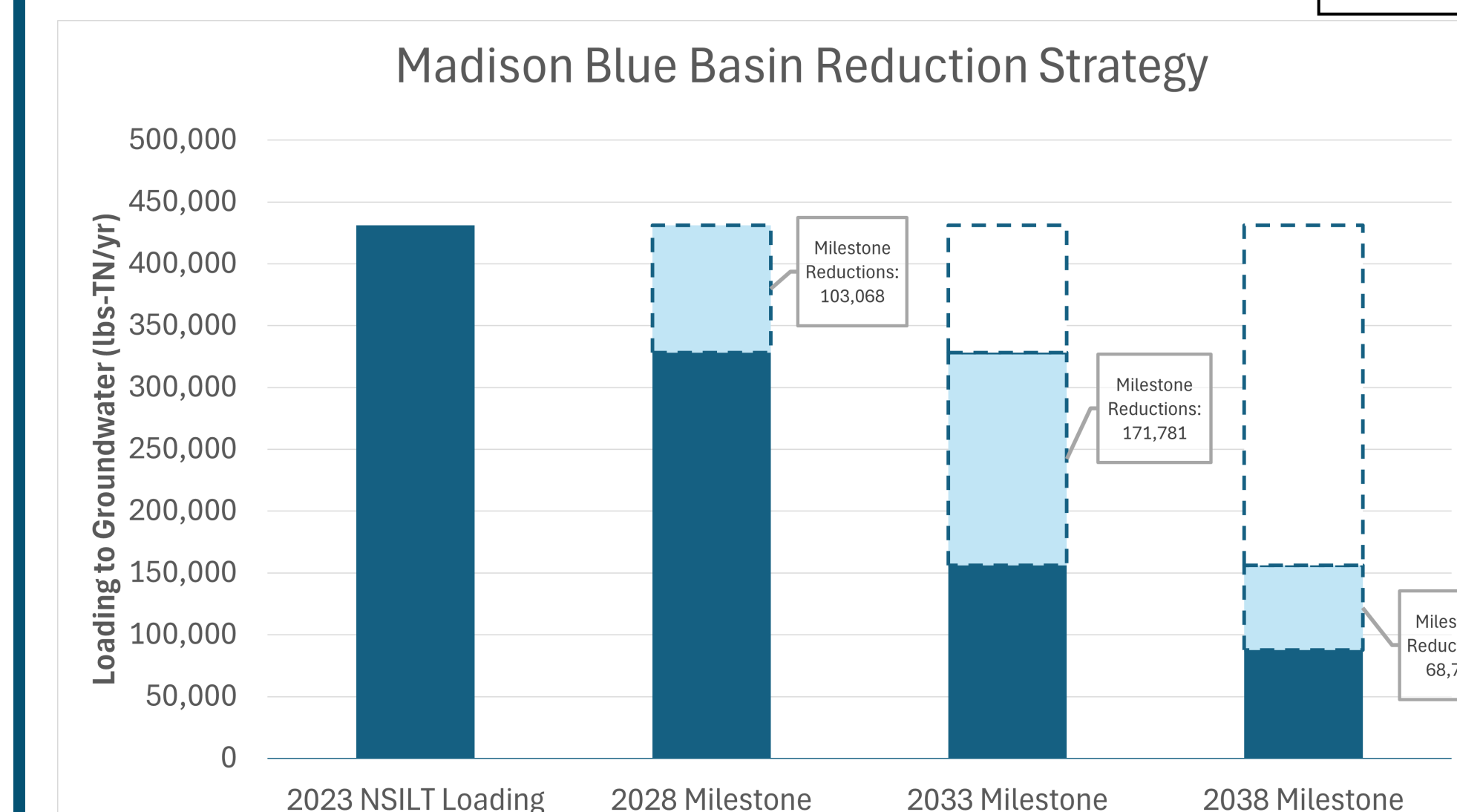
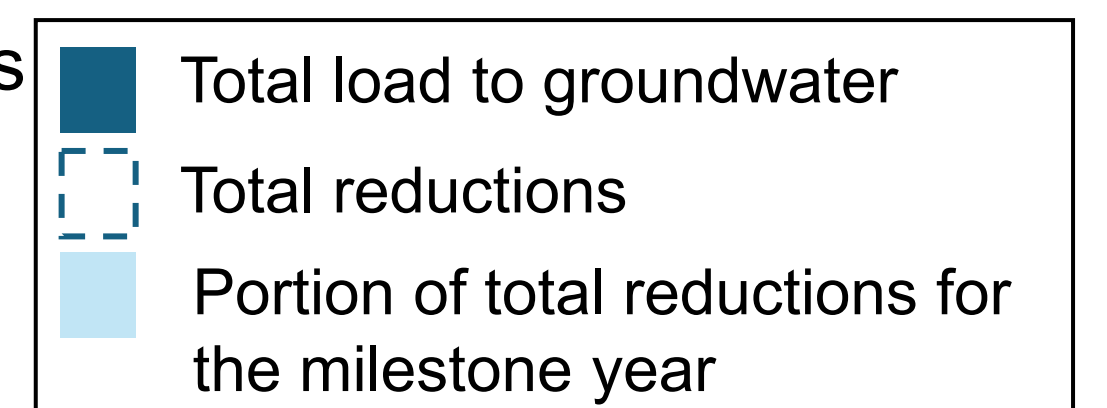
The reduction needed from the surface water contributing area is 85%.



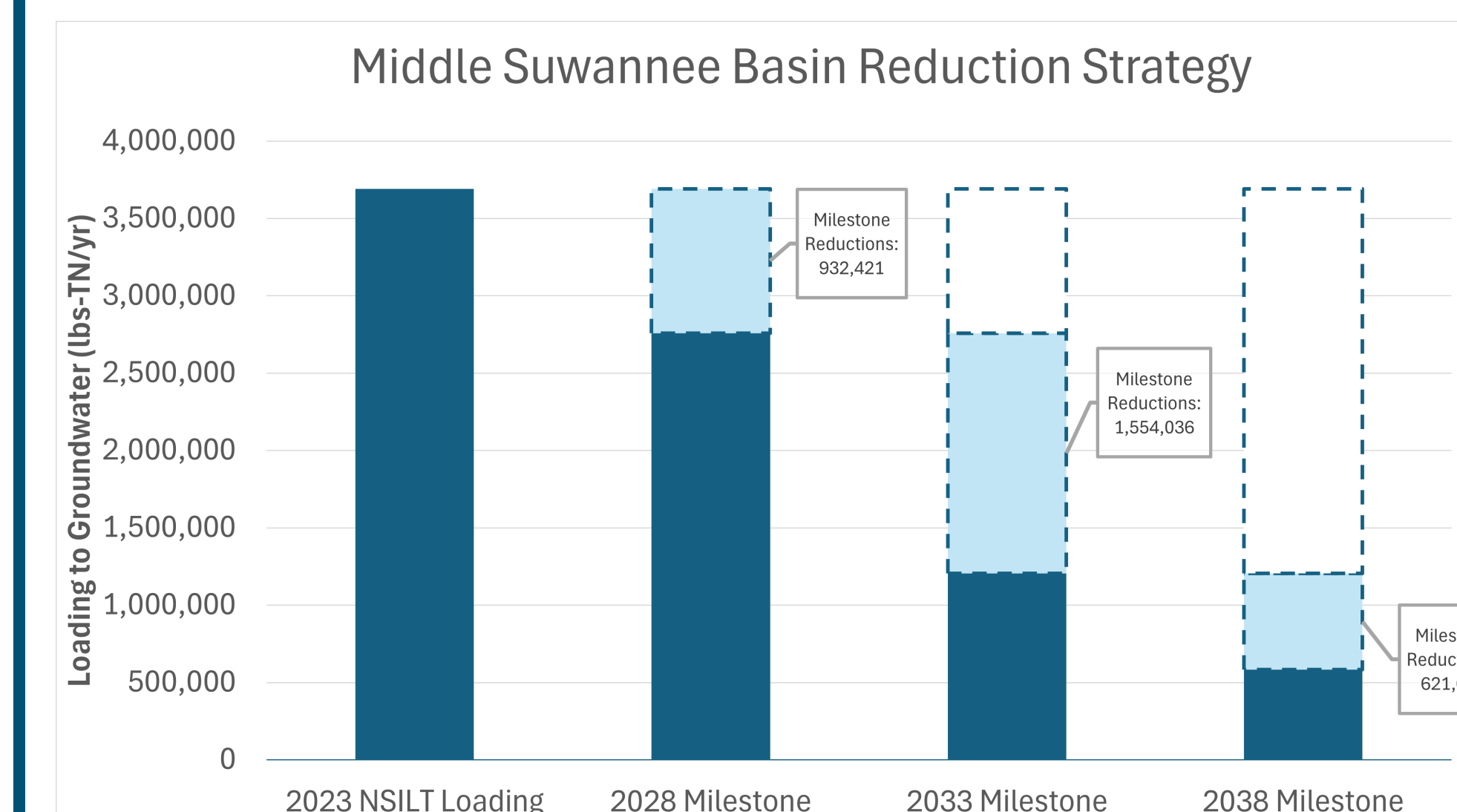
Putting It All Together

The results of the NSILT are summarized for each springshed in the first bar in the figure below, with different sources contributing to the total estimated load to groundwater. The percent reduction on the far right reflects the outcomes from the spring vent analysis. It is assumed that a proportional reduction in loading is needed from the nitrogen sources. Therefore, the reduction percentage was applied to the total load to groundwater.

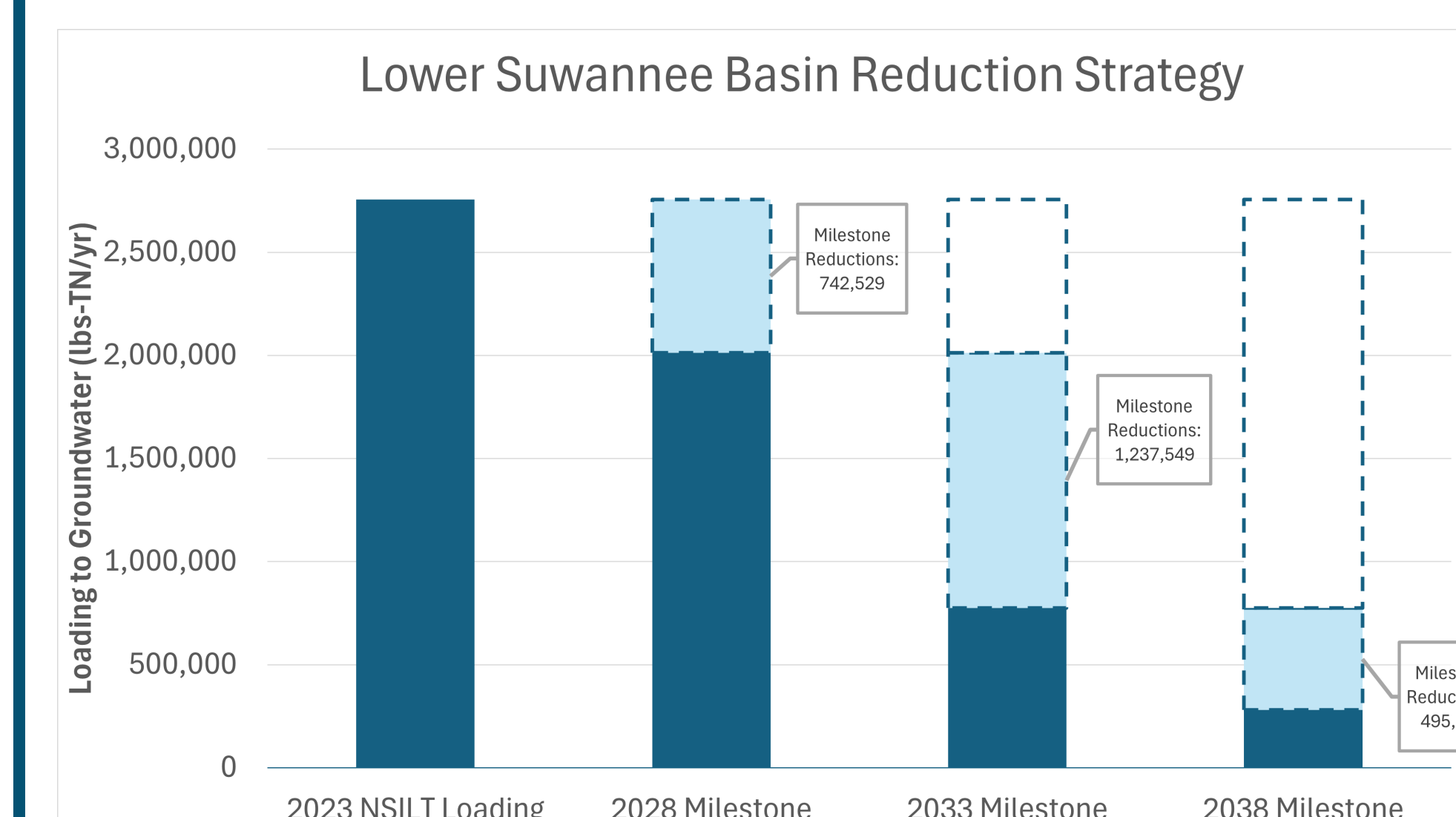
The intermediate bars show the basin-wide targets for all entities and sources for the 2028, 2023 and 2038 milestones.



BMAP Target:
80% Reduction in Loading to Groundwater (343,562 lb-N/yr)



BMAP Target:
84% Reduction in Loading to Groundwater (3,108,072 lbs-N/yr)



BMAP Target:
90% Reduction in Loading to Groundwater (2,475,089 lb-N/yr)





SUWANNEE RIVER BASIN MANAGEMENT ACTION PLAN (BMAP)

Allocated Reductions, Milestones and Progress

Projects

Responsible entities are required to identify, plan, complete and report on projects that reduce the loading of nitrogen from various sources.

The basin-wide reductions are assessed by source and then allocated to responsible entities.

Project collection and reporting are crucial to the successful implementation and management of BMAPs. Projects are reported to the Florida Department of Environmental Protection (DEP) annually through the BMAP Project Collection Portal, and project lists with associated reductions are published in the Statewide Annual Report (STAR).

Spring Basins Reductions

Nitrogen Source	Madison Blue		Middle Suwannee		Lower Suwannee	
	Allocations by Source (lb-N/yr)	Percent of Total Reduction	Allocations by Source (lb-N/yr)	Percent of Total Reduction	Allocations by Source (lb-N/yr)	Percent of Total Reduction
Atmospheric Deposition*	30,003	8.73%	250,676	8.07%	82,300	3.33%
Onsite Sewage Treatment and Disposal System	21,452	6.24%	167,487	5.39%	93,993	3.80%
Wastewater Treatment Facility	0	0.00%	8,245	0.27%	11,744	0.47%
Farm Fertilizer (BMP Enrollment)	47,476	13.82%	331,145	10.65%	151,185	6.11%
Livestock Waste-NonCAFO (BMP Enrollment)	4,361	1.27%	57,915	1.86%	17,870	0.72%
Livestock Waste-CAFO (BMP Enrollment)	0	0.00%	33,335	1.07%	132,396	5.35%
Other Agriculture	235,109	68.43%	2,215,275	71.27%	1,955,297	79.00%
Urban Turfgrass Fertilizer	5,160	1.50%	38,937	1.25%	25,703	1.04%
Sports Turf-Golf	0	0.00%	1,333	0.04%	2,878	0.12%
Sports Turf-Other	0	0.00%	431	0.01%	346	0.01%
Regional Projects*	0	0.00%	3,292	0.11%	1,386	0.06%
Total	343,562	100.00%	3,108,072	100.00%	2,475,098	100.00%

*Not allocated to entities.
CAFO: Confined animal feeding operations.

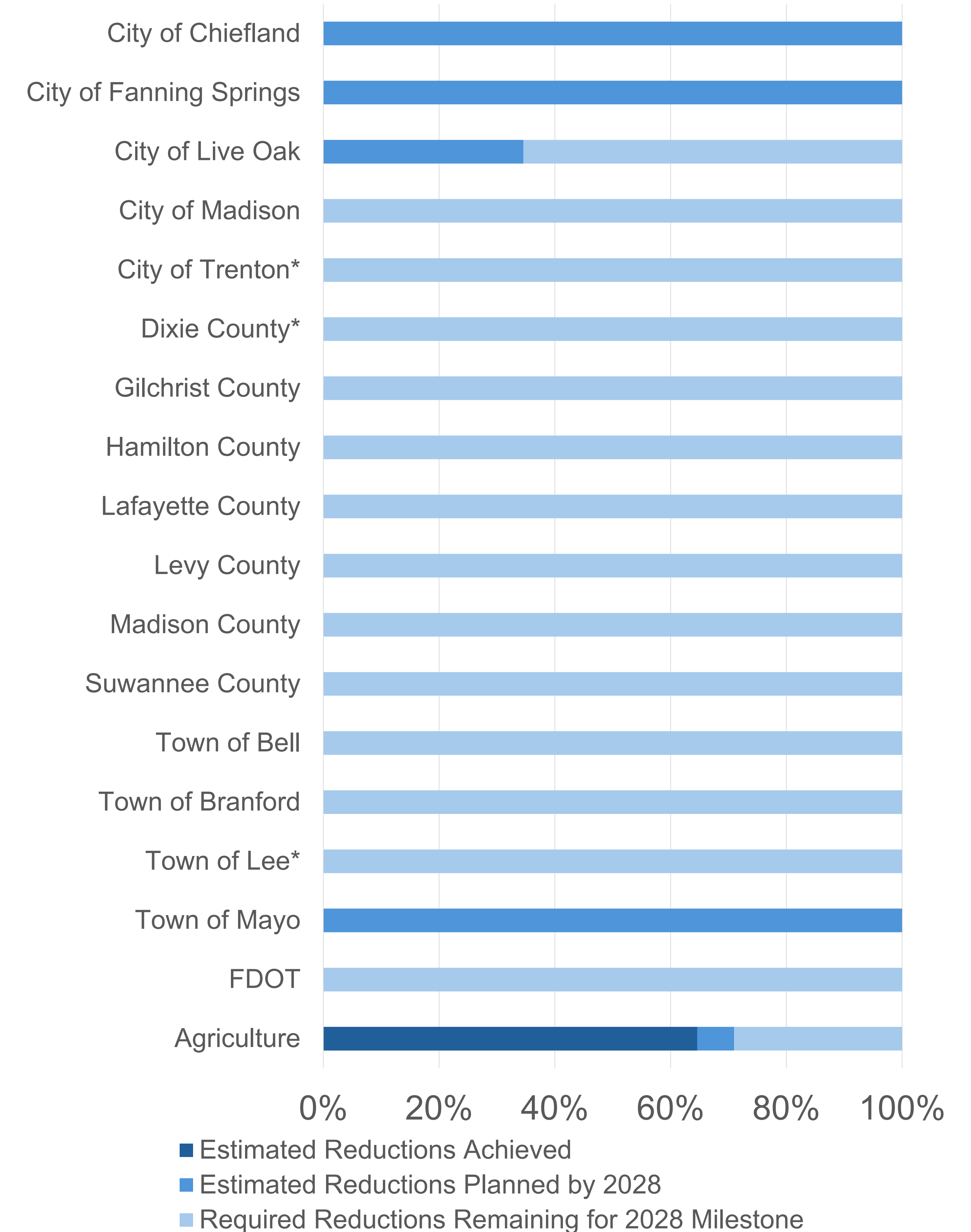
Entity 2028 Milestones

Stakeholders are required to report projects that are being implemented or planned to achieve reduction targets, along with an estimate of expected nutrient reduction benefits and financial costs.

It is important that all projects needed to achieve milestones are included in the STAR, even if a funding mechanism is not currently identified. This information gives the state an understanding of the funding needed to achieve BMAP goals and assists in prioritizing projects.

Estimated reductions in the progress chart below reflect projects entered through December 2023.

Progress Toward 2028 Milestones by Entity



BMAP Management Strategies

General Approach for Entity Allocations and Reductions

While the loading evaluation and entity allocations were determined by source, nutrient reduction credits can be earned through implementing projects that address any nutrient source in the entity's jurisdiction. Reduction milestones must be met to ensure sufficient progress towards meeting the total maximum daily load (TMDL) target.

Source-Specific Management Strategies

- Atmospheric Deposition:** Air regulation has led to downward trend in nitrogen deposition since 2005 (Himes & Dawson, 2017).
- Onsite Sewage Treatment and Disposal Systems (OSTDS):** No new installation of conventional septic systems on lots 1 acre or less. All OSTDS within the priority focus areas will need to be enhanced nutrient reducing OSTDS or connected to central sewer.
- Wastewater Treatment Facilities:** All domestic facilities must meet advanced wastewater treatment standards, as determined by DEP.
- Farm Fertilizer Best Management Practice (BMP) Enrollment:** An estimated decrease in nitrogen loading of 15% when a crop producer enrolls in the Florida Department of Agriculture and Consumer Services (FDACS) BMP program and implements BMPs. Enrollment in this program or water quality monitoring is mandatory in BMAP areas.
- Livestock Waste BMP enrollment:** An estimated decrease in nitrogen loading of 10% when a livestock producer enrolls in the FDACS BMP program and implements BMPs. This program or water quality monitoring is mandatory in BMAP areas.
- Other Agriculture:** The remainder of reductions allocated to agricultural sources that are not addressed through BMP enrollment will need to be addressed through a combination of regional projects, agricultural cooperative regional elements, innovative technologies and cost share projects.
- Urban Turfgrass Fertilizer:** Ordinances, education, street sweeping and structural stormwater improvements.

Entity Required Reductions

Reductions in this table reflect overall allocated reductions across subbasins. Many entities will have responsibilities in multiple springsheds or in the springs and surface water portions of the basin.

Entity	2028 Milestone (30%)	2033 Milestone (80%)	2038 Milestone (100%)
City of Chiefland	5,863	15,635	19,544
City of Fanning Springs	2,656	7,082	8,852
City of Live Oak	4,651	12,403	15,504
City of Madison	617	1,644	2,055
City of Trenton	3,491	9,310	11,638
Dixie County	9,502	25,339	31,674
Gilchrist County	10,328	27,541	34,426
Hamilton County	1,939	5,170	6,462
Lafayette County	8,958	23,887	29,859
Levy County	18,930	50,481	63,101
Madison County	12,154	32,411	40,514
Suwannee County	50,222	133,926	167,408
Town of Bell	409	1,090	1,362
Town of Branford	1,448	3,862	4,828
Town of Lee	231	615	769
Town of Mayo	349	931	1,164
FDOT	2,004	5,345	6,681
Agriculture	1,622,226	4,325,935	5,407,419
Private WWTFs*	2,171	5,790	7,238
Private Golf Courses*	1,263	3,369	4,211

*Reductions for these entities will largely be tracked through permits and compliance actions.

