OVERVIEW - BASIN MANAGEMENT ACTION PLANS (BMAPS)

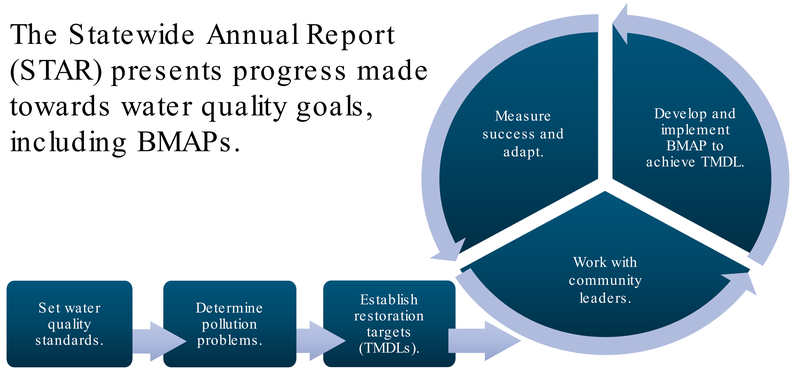
Outstanding Florida Springs Public Meetings, Fall 2024

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.



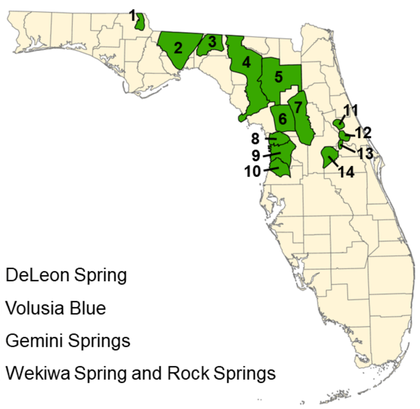
Outstanding Florida Springs BMAPs

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.

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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

2018 — Outstanding Florida Springs BMAPs adopted.

2020 — Clean Waterways Act signed into Florida law.

2023 — NSILT and spring vent analyses are updated with methodology revisions.

2025 — Statutory deadline for updated nutrient BMAPs.

2028 — Next BMAP milestone for entity reductions.

2018 | 2019 | 2020 | 2021 | 2022 | 2023 | **2024** | 2025 | 2026 | 2027 | 2028

January 2024 — Public meeting about updated NSILT methodology.

May 2024 — BMAP updates public meetings. Responsible entity meetings.

August 2024 — Final OSTDS Remediation Plans and WWTF Plans due.

October 2024 — Public meetings about allocated reductions and milestone progress.

December 2024 — Final Draft BMAP documents and public meetings.

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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

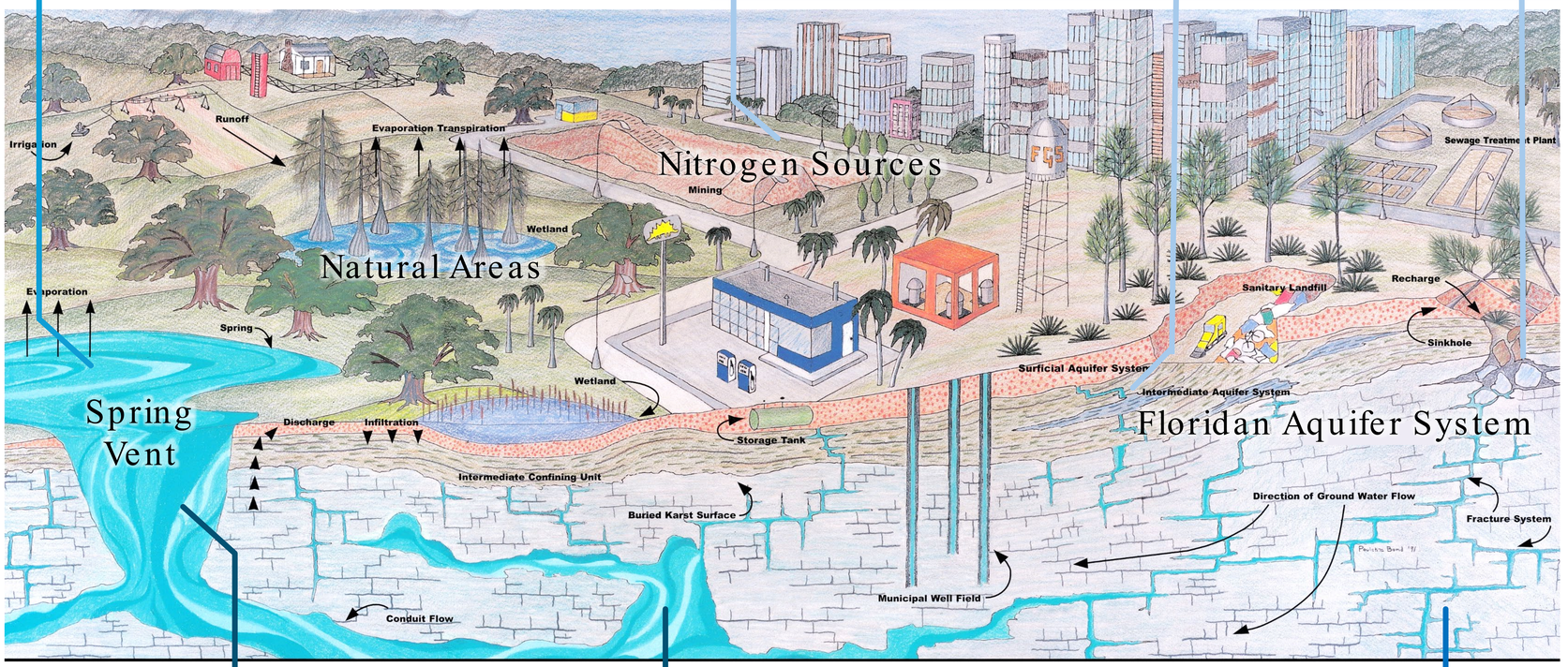
OFS includes all historic first magnitude springs and their associated spring runs as determined by DEP, using the most recent Florida Geological Survey springs bulletin (66), as well as the following additional springs and their associated spring runs: DeLeon Springs, Peacock Springs, Poe Springs, Rock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

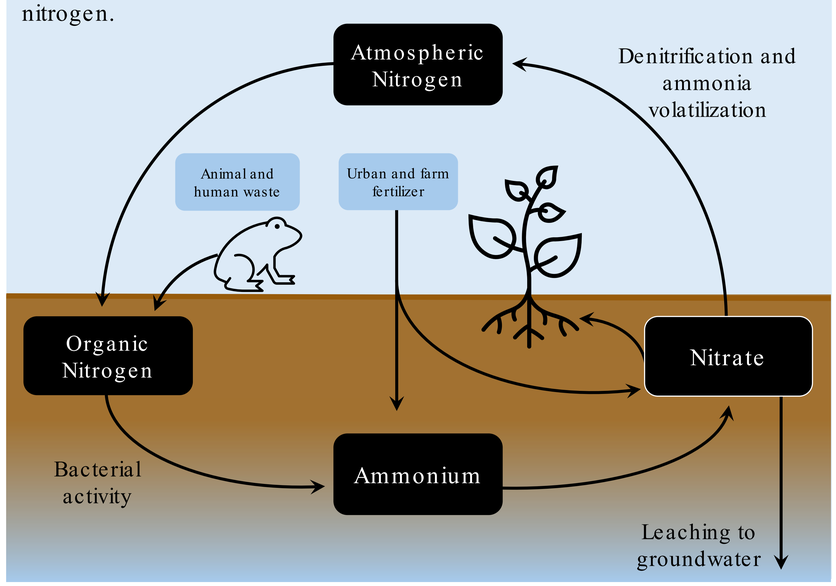
Karst Limestone

The Floridan 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.

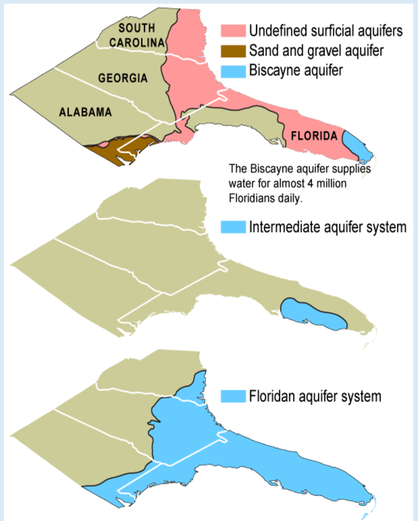
The Nitrogen Cycle

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 Floridan 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 Floridan Aquifer from the land surface.

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

[Springshed diagram: FGS PR5]

[Aquifer diagram: St. Johns River Water Management District (SRJWMD)]

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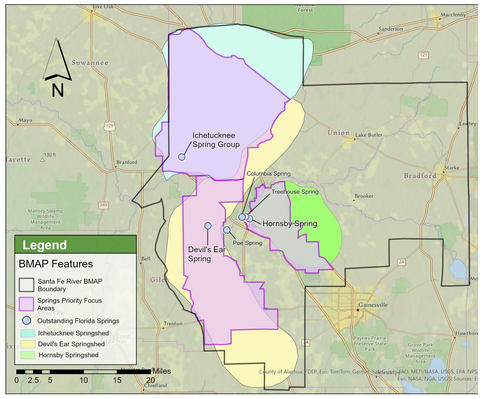
SANTA FE RIVER BASIN MANAGEMENT ACTION PLAN (BMAP)

Outstanding Florida Springs Public Meetings 2024

Santa Fe BMAP Background



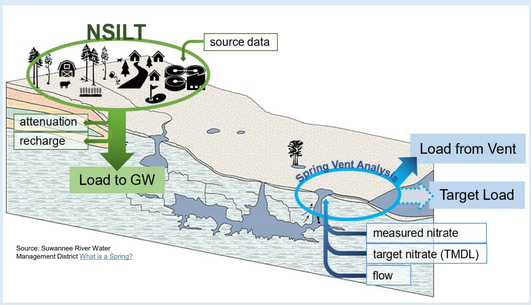
- The BMAP area is over 1 million square acres.
- There are four subbasins:
  - Ichetucknee.
  - Devil's Complex.
  - Hornsby.
  - Surface water contributing area, which is the area outside the delineated springsheds.
- Impaired for the nitrate form of nitrogen.
- The total maximum daily load (TMDL) is 0.35 milligrams per liter (mg/L) of nitrate.

Spring Vent Analysis

Spring flows and nitrate concentration 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.

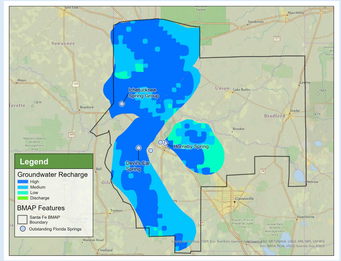
Spring	NO2+NO3 (mg-N/L)*	Discharge (cfs)*	Total Load from Vents lbs-N/yr	Total Load if Meeting TMDL lbs-N/yr	Percent Reduction Needed
Ichetucknee	1.72	107.50	347,612	177,042	49%
Blue Hole	2.00	129.06			
Five other associated springs					
Devil's Ear	1.80	138.00	2,249,219	617,388	73%
Gilchrist Blue	2.33	67.33			
Ginnie	1.70	40.44			
17 other associated springs					
Hornsby	0.65	160.69	652,823	474,374	27%
Treehouse	0.43	528.65			

- Average from the period of record (2012-22).
- cfs: Cubic feet per second.

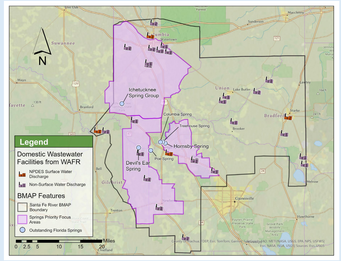


The spring vent analysis uses the measured nitrate loads at the spring vent compared with the TMDL loading based on a target nitrate concentration of 0.35 mg/L to determine the required reduction to meet the TMDLs. A proportional reduction is needed from nitrogen sources to the groundwater (GW).

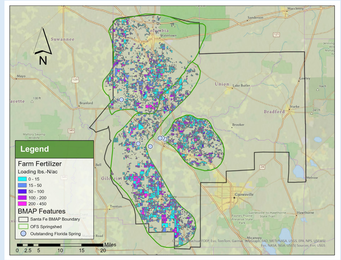
Springshed Loading: Nitrogen Source Inventory Loading Tool (NSILT)



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



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



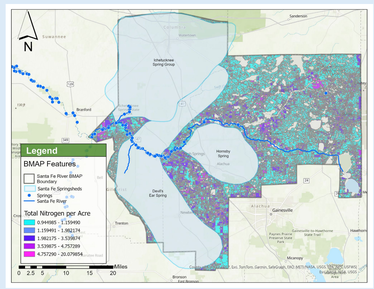
Agricultural sources include farm fertilizer and livestock waste. The Florida Department of Agriculture and Consumer Services' (FDACS) Florida Statewide Agriculture Irrigation Demand (FSAID) database and U.S. Department of Agriculture's (USDA) Census of Agriculture data were used to estimate agricultural 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 was clipped to each jurisdictional boundary, and total loading for all relevant land uses were summed.

The reductions needed for the surface water loading area are 50%.

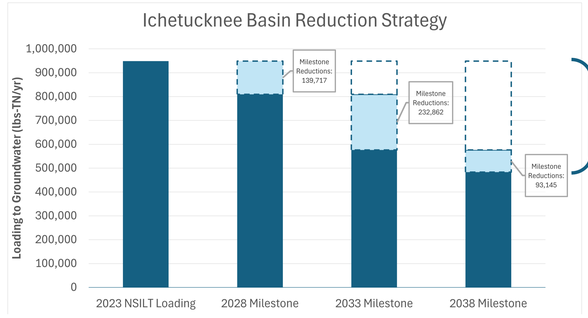


Putting It All Together

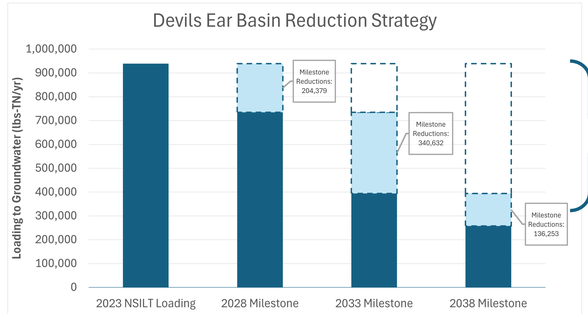
The results of the NSILT are summarized for each springshed in the first bar in the figure below, with different sources contributing to the total estimated load to groundwater. The percent reduction on the far right reflects the outcomes from the spring vent analysis. A proportional reduction in loading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

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

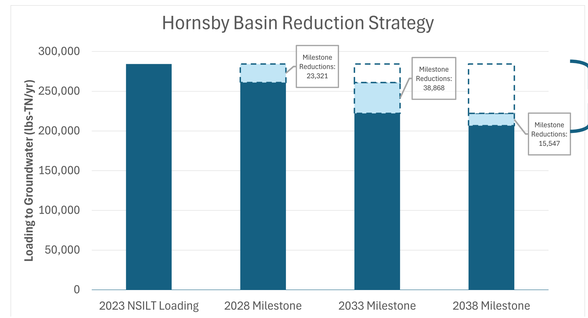
Total load to groundwater
Total reductions
Portion of total reductions for the milestone year



BMAP Target: 49% Reduction in Loading to Groundwater (465,725 lb-N/yr)



BMAP Target: 73% Reduction in Loading to Groundwater (681,266 lb-N/yr)



BMAP Target: 27% Reduction in Loading to Groundwater (77,736 lb-N/yr)

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SANTA FE RIVER BASIN MANAGEMENT ACTION PLAN (BMAP)
Allocated Reductions, Milestones and Progress

Overview

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 basin management action plans (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	Ichetucknee		Devils Complex		Hornsby	
	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*	49,464	10.62%	60,018	8.80%	5,104	6.56%
Onsite Sewage Treatment and Disposal System	105,326	22.62%	69,739	10.23%	7,312	9.40%
Wastewater Treatment Facility	1,808	0.39%	4,012	0.59%	960	1.23%
Farm Fertilizer (BMP Enrollment)	59,527	12.78%	85,732	12.58%	28,592	36.74%
Livestock Waste-NonCAFO (BMP Enrollment)	13,886	2.98%	16,780	2.46%	3,734	4.80%
Livestock Waste-CAFO (BMP Enrollment)	0	0.00%	0	0.00%	0	0.00%
Other Agriculture	189,454	40.68%	433,893	63.65%	29,985	38.53%
Urban Turfgrass Fertilizer	40,592	8.72%	11,389	1.67%	1,768	2.27%
Sports Turf-Golf	4,919	1.06%	0	0.00%	331	0.43%
Sports Turf-Other	412	0.09%	113	0.02%	28	0.04%
Regional Projects*	338	0.07%	0	0.00%	0	0.00%
Total	465,725	100.00%	681,676	100.00%	77,814	100.00%

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

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 addressing any source. 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 at least 2005 (Himes & Dawson, 2017).
- **Onsite Sewage Treatment and Disposal Systems (OSTDS):** No new installation or repair permits for conventional OSTDS systems on lots 1 acre or less. All OSTDS within priority focus areas will need to be enhanced nutrient reducing OSTDS or connected to sewer.
- **Wastewater Treatment Facilities:** All facilities must meet advanced water treatment standards, as determined by DEP.
- **Farm Fertilizer Best Management Practice (BMP) Enrollment:** BMP enrollment and implementation or monitoring is mandatory in BMAP areas. BMP implementation is estimated to reduce nitrogen loading by 15%.
- **Livestock Waste BMP enrollment:** BMP enrollment or water quality monitoring is required in BMAP areas. BMP implementation is estimated to reduce nitrogen loading by 10%.
- **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%)
Alachua County	12,150	40,499	50,624
Bradford County	5,575	18,585	23,231
City of Alachua	1,205	4,016	5,020
City of Archer	880	2,932	3,665
City of Gainesville	1,043	3,477	4,346
City of Hampton	76	252	315
City of High Springs	1,486	4,954	6,193
City of Lake Butler	383	1,277	1,596
City of Lake City	2,296	7,653	9,566
City of Lawtey	126	420	525
City of Newberry	1,220	4,068	5,085
City of Starke	857	2,855	3,569
City of Waldo	60	201	251
Columbia County	39,135	130,450	163,062
Gilchrist County	6,803	22,676	28,345
Suwannee County	1,012	3,373	4,216
Town of Brooker	42	141	176
Town of Fort White	914	3,048	3,810
Town of La Crosse	48	159	199
Town Raiford	36	120	150
Town Worthington Springs	135	450	562
Union County	3,363	11,211	14,014
FDOT	1,278	4,258	5,323
Agriculture	230,871	769,569	961,961
Private WWTFs*	256	854	1,068
Private Golf Course*	1,288	4,293	5,366

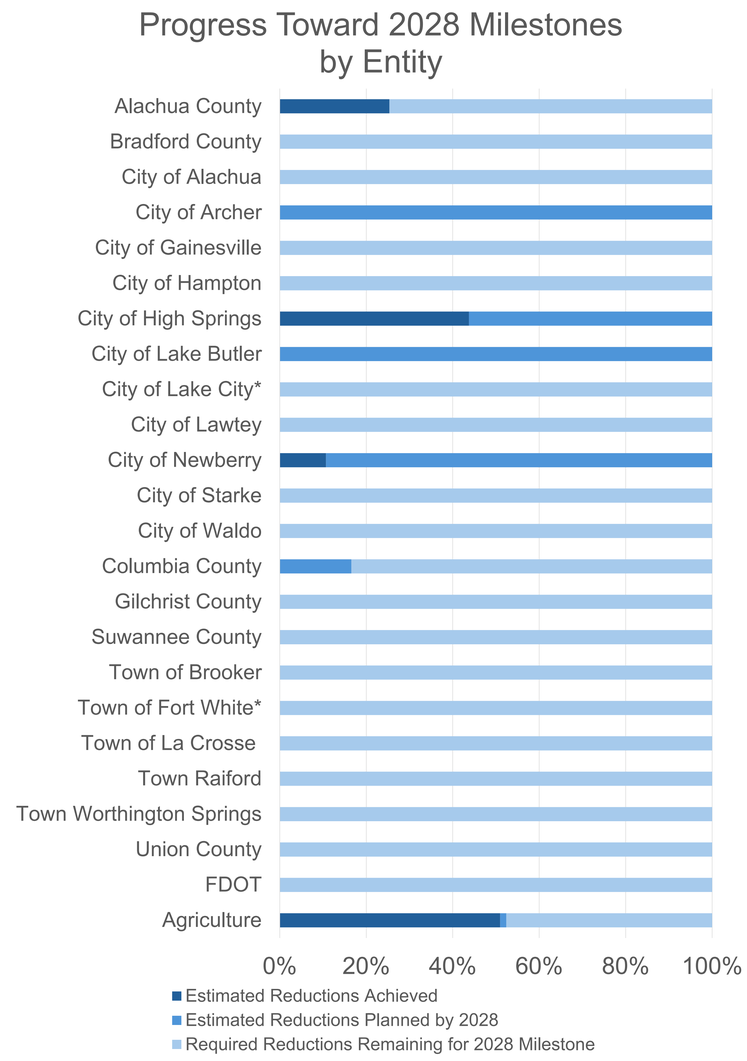
*Reductions for these entities will largely be tracked through permits and compliance actions.

Entity 2028 Milestones

Stakeholders are required to report projects that are being implemented or planned that will be required 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.



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