Suwannee River Basin Management Action Plan Updates

May 24, 2024 at 10:00 AM EDT

Via Webinar
Webinar Registration Link:
https://register.gotowebinar.com/register/4823848220942479189

Agenda

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

Please note the FTP site for documents pertaining to the various BMAPs:
publicfiles.dep.state.fl.us - /DEAR/BMAP/Outstanding Florida Springs BMAPs/
For more information on the Suwannee River BMAP, contact: Chandler Keenan at (850) 245-8555
Chandler.B.Keenan@FloridaDEP.gov.

WEBINAR HOUSEKEEPING

Attendee Participation

Open your control panel.

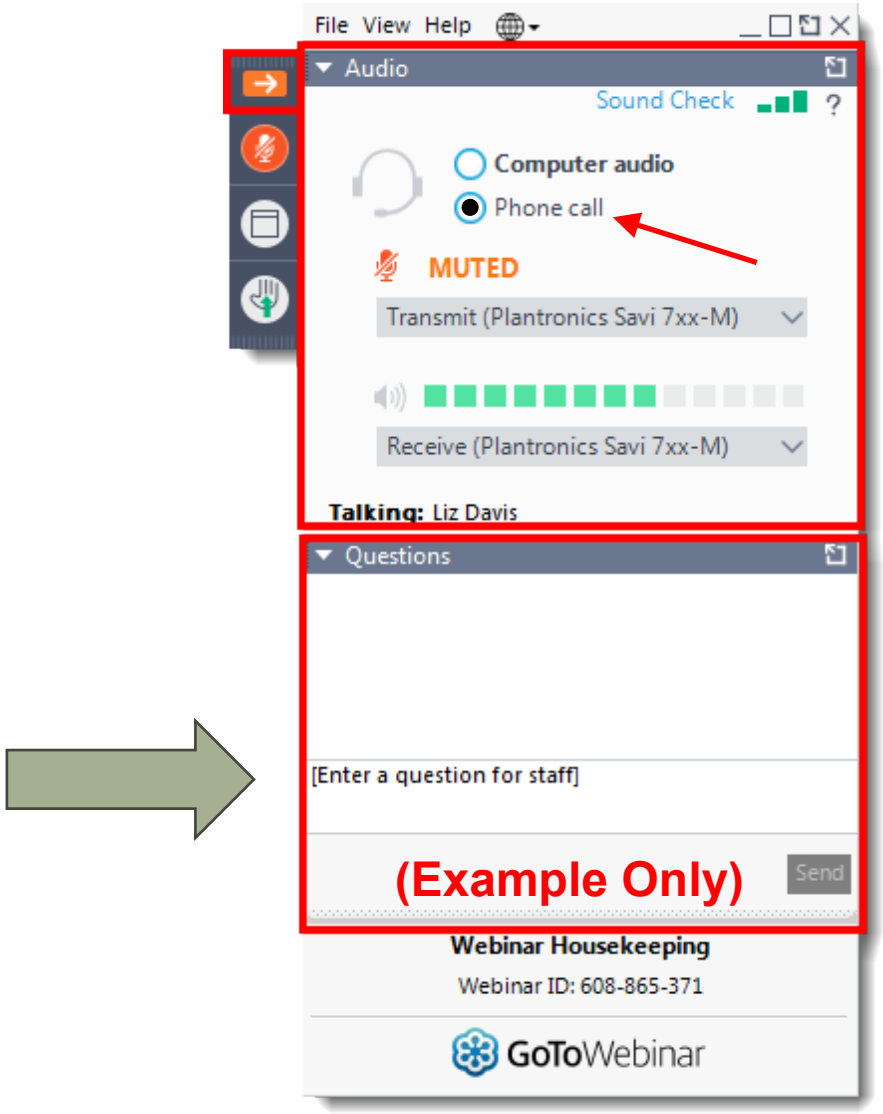
Join audio:

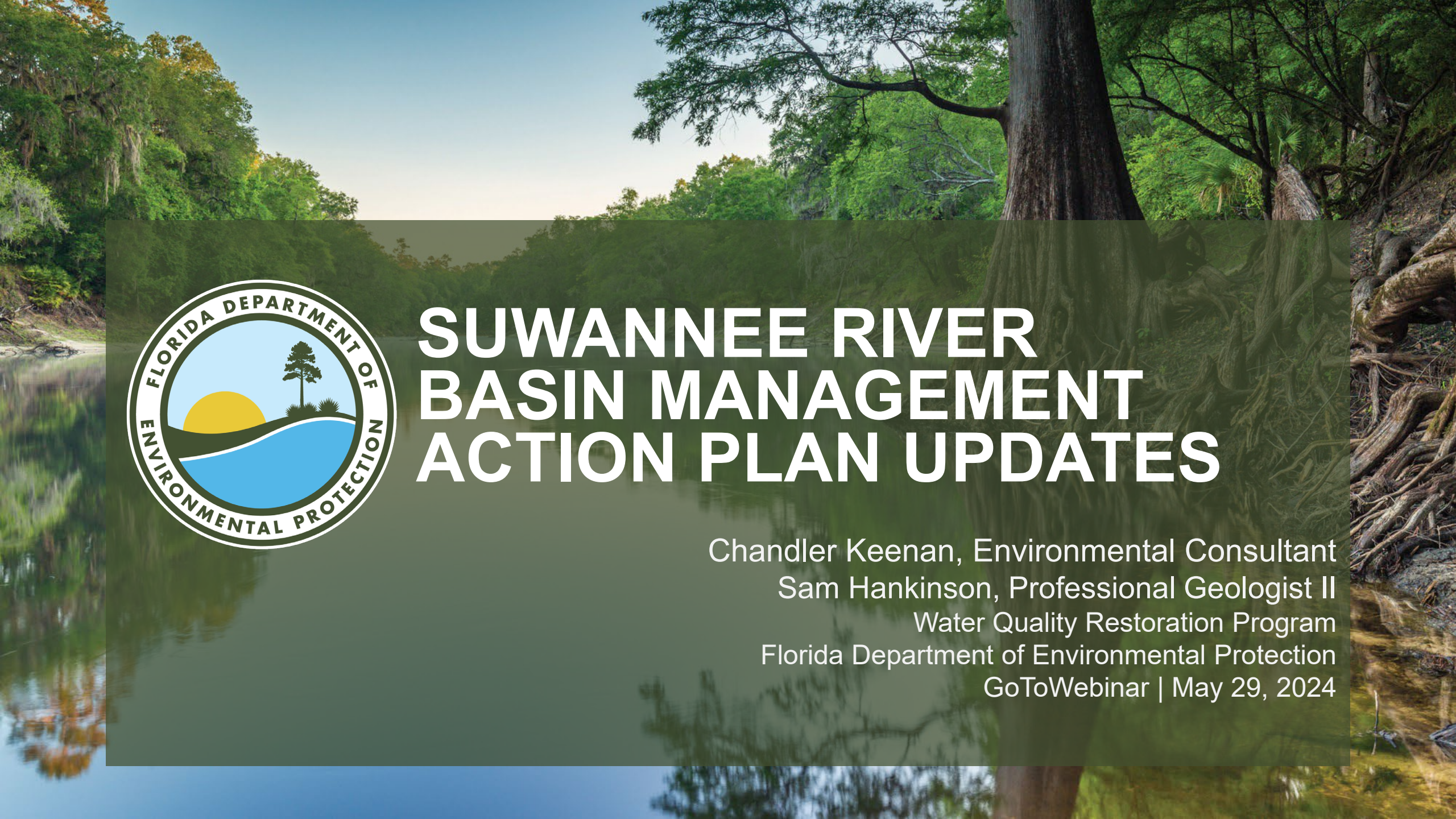
- Choose **Phone Call** and dial using the information provided.
- Or choose **Computer Audio** to use your computer's speakers for audio.
- Attendee audio will be muted.

Submit questions and comments via the Questions panel. If you would like to unmute and ask your questions, please specify that in the Questions Panel.

If viewing this webinar as a group, please provide a list of attendees via the Questions panel.

Note: Today's presentation is being recorded and will be provided on the FTP after the webinar.





SUWANNEE RIVER BASIN MANAGEMENT ACTION PLAN UPDATES

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Sam Hankinson, Professional Geologist II
Water Quality Restoration Program
Florida Department of Environmental Protection

GoToWebinar | May 29, 2024

AGENDA

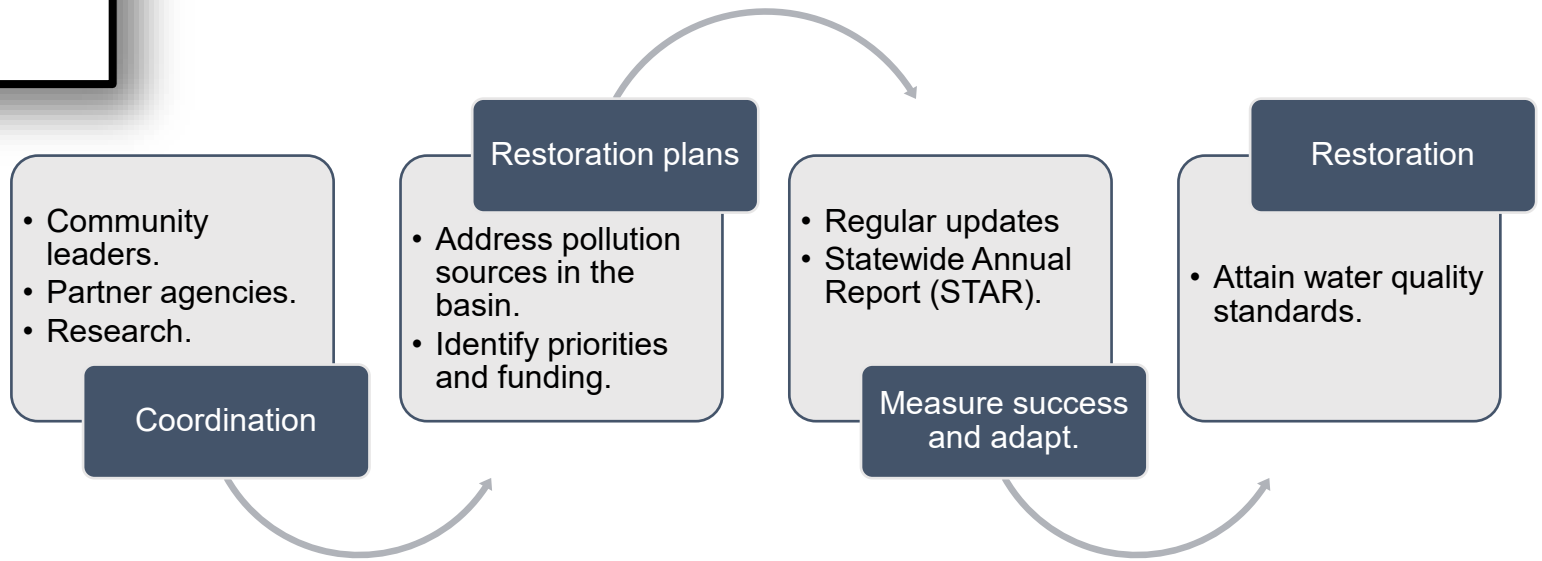
- Basin Management Action Plan (BMAP) Overview.
- Nitrogen Source Inventory Loading Tool (NSILT).
  - Updates.
  - Draft Results.
- Spring Vent Load Analysis.
- Next Steps - BMAP Updates.
  - Draft Allocation Approach.
  - Milestones.

BASIN MANAGEMENT ACTION PLANS (BMAPs)

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.
- 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:

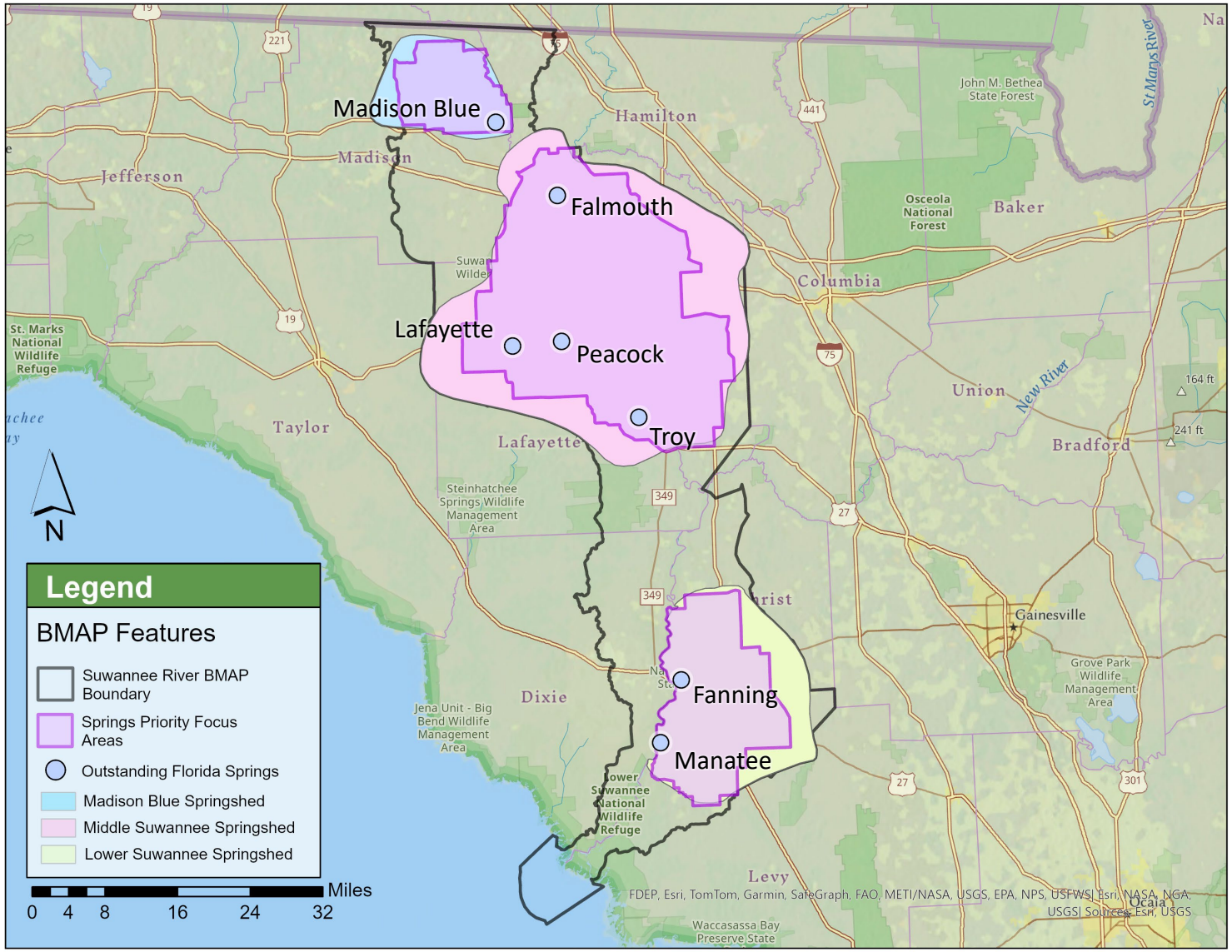
- Implementation timeline.
- Commitment to projects.
- Expected water quality improvement from projects and management strategies.

Process to assess progress toward achieving the TMDL:

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

SUWANNEE RIVER BMAP

- BMAP area is over 1 million acres.
- There are three subbasins:
  - Madison Blue (Withlacoochee).
  - Middle Suwannee.
  - Lower Suwannee.
- Impaired for the nitrate form of nitrogen.
- TMDL is 0.35 mg/L of nitrate.



STAKEHOLDERS
BACKGROUND

Responsible stakeholders:

Agricultural producers

Counties:

Dixie
Gilchrist
Hamilton
Lafayette
Levy
Madison
Suwannee
Taylor

Cities, Towns and Communities:

Bell
Branford
Chiefland
Fanning Springs
Lee
Live Oak
Madison
Mayo
Trenton

Responsible agencies:

- Florida Department of Agriculture and Consumer Services (DACS).
- Florida Department of Environmental Protection (DEP).
- Florida Department of Health.
- Florida Fish and Wildlife Conservation Commission.

Other interested stakeholders:

Homeowners/citizens, Suwannee River Partnership, Florida Farm Bureau Federation, Florida Onsite Wastewater Association, Florida Springs Council, Florida Springs Institute, Lafayette County Soil and Water Conservation District, Madison County Soil and Water Conservation District, Sierra Club, and University of Florida Institute of Food and Agricultural Sciences (UF IFAS).

CLEAN WATERWAYS ACT: TIMELINE

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.

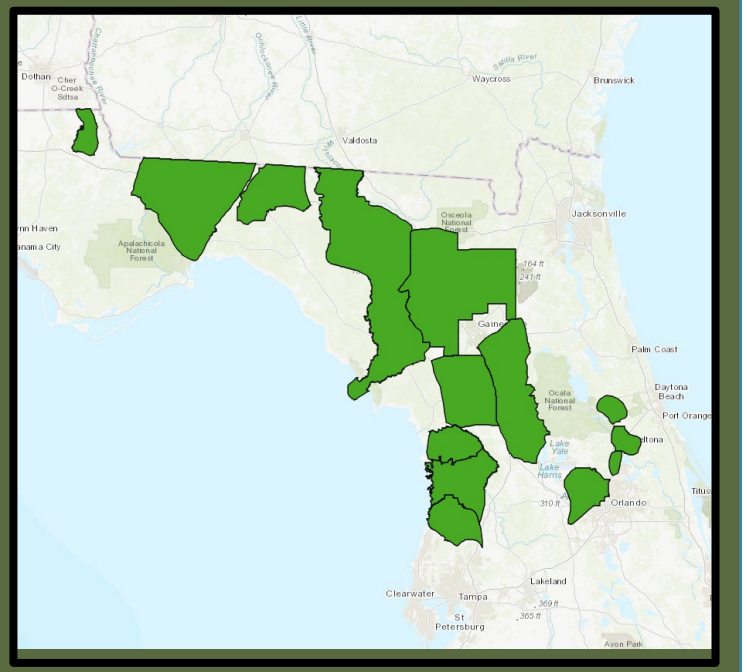
The nutrient BMAPs included in the Final Order require these plans.

HB 1379: ENVIRONMENTAL PROTECTION

HB1379

- Increased protection for Outstanding Florida Springs (OFS).
- Strengthens Water Quality Protections and BMAPs.
- Improves Local Government Long-Term Comprehensive Planning.
- Expands Funding Opportunities to Address Water Quality Impairments.

Expanded prohibitions in OFS to entire BMAP area (section 373.811, Florida Statutes [F.S.])

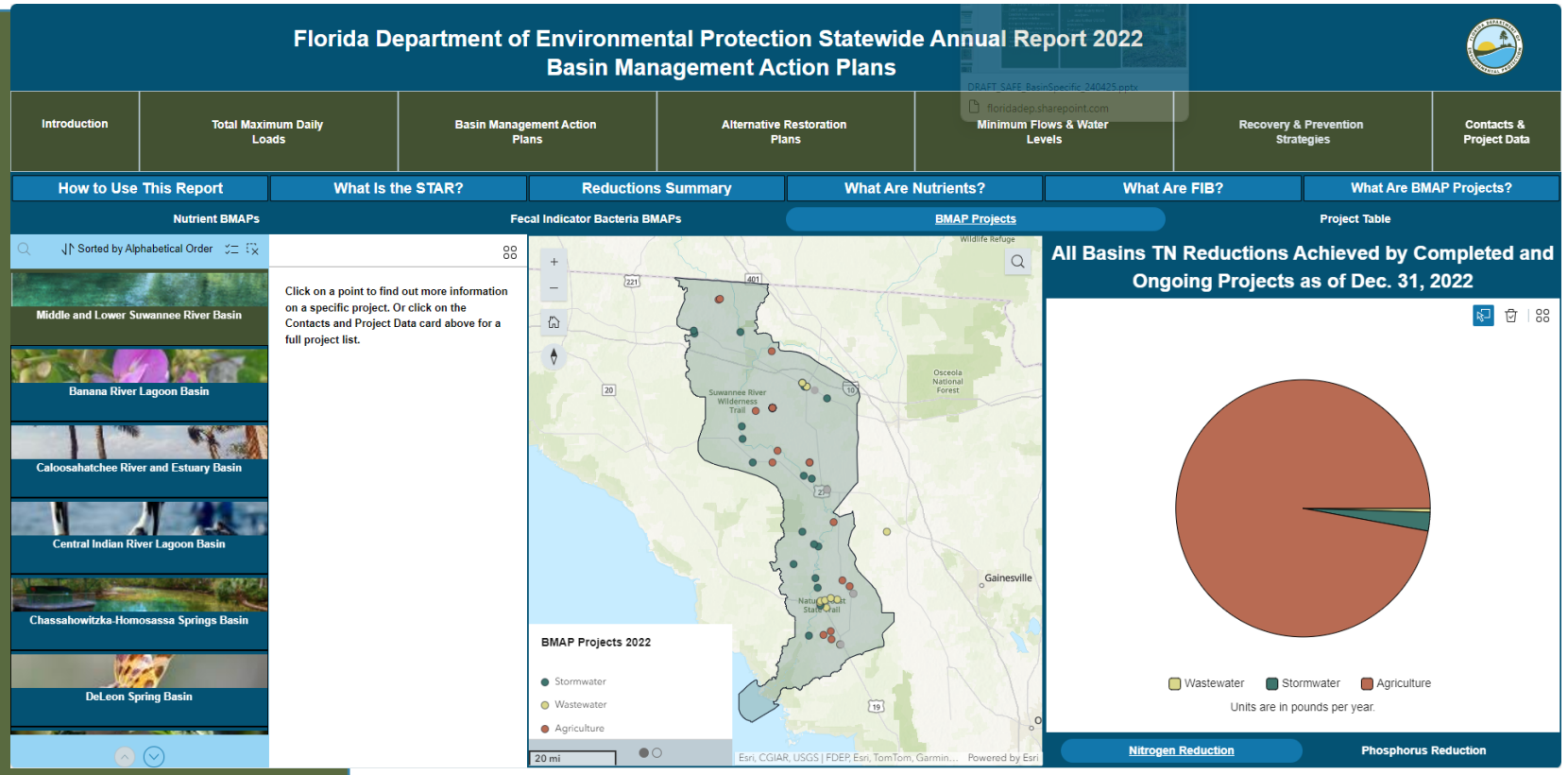


- New conventional onsite sewage and treatment disposal system (OSTDS) where sewer is available.
- New domestic wastewater disposal facilities with permitted capacities of 100,000 gallons per day or more, unless they meet Advanced Waste Treatment (AWT) standards.
- New HAZMAT disposal facilities.
- Land application of Class A or B biosolids not in accordance with a DEP-approved nutrient management plan.
- New agricultural operations not implementing best management practices (BMPs), measures necessary to achieve pollution reduction levels or groundwater monitoring plans.

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.



PRELIMINARY STAR RESULTS FOR 2023

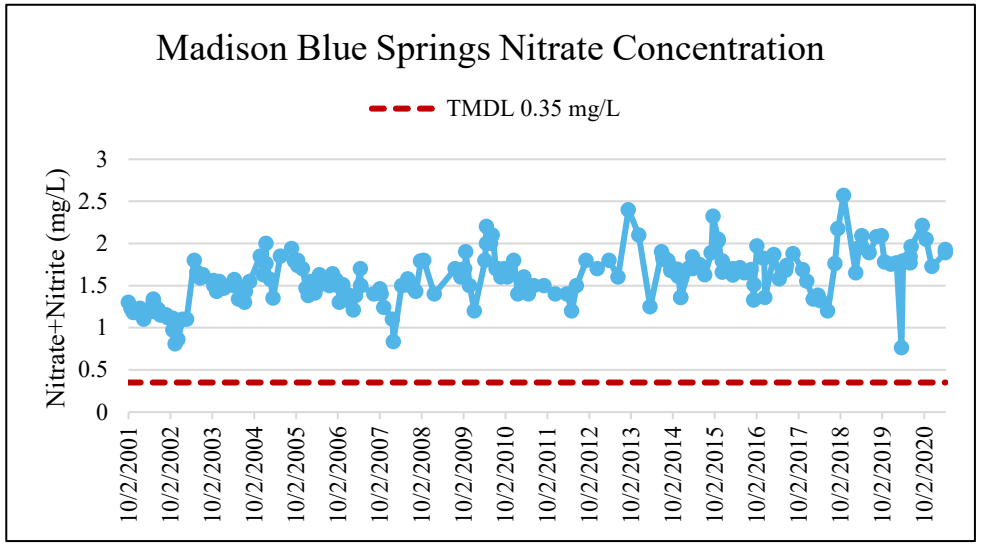
SUWANNEE RIVER BMAP

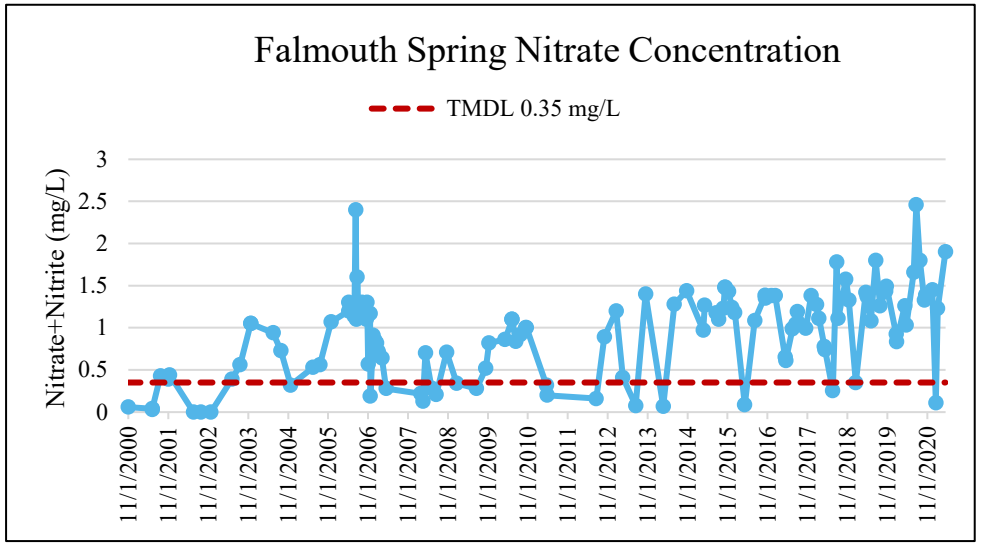
Project Status	Count of Projects
Planned	19
Ongoing	11
Underway	28
Completed	21
Total	**79**

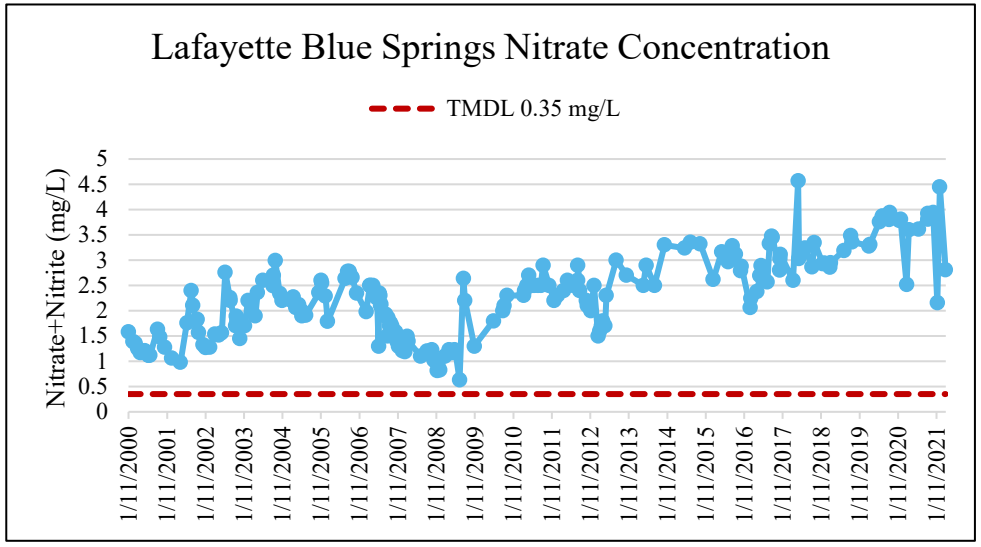
As of Dec. 31, 2023, verified projects in the Suwannee River BMAP have reduced **768,150 lbs./yr.** of total nitrogen (TN).

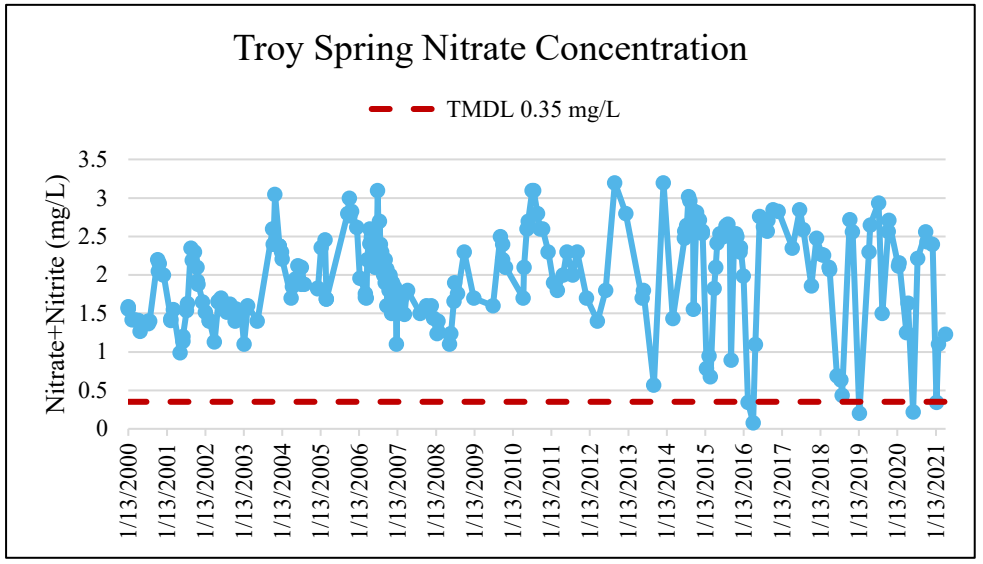
WATER QUALITY DATA

OUTSTANDING FLORIDA SPRING NITRATE DATA









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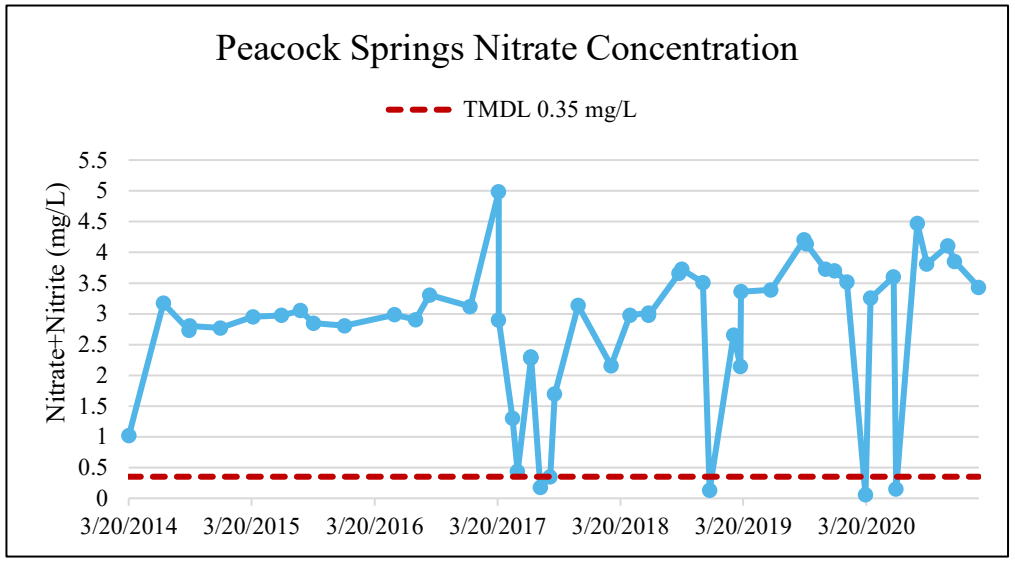
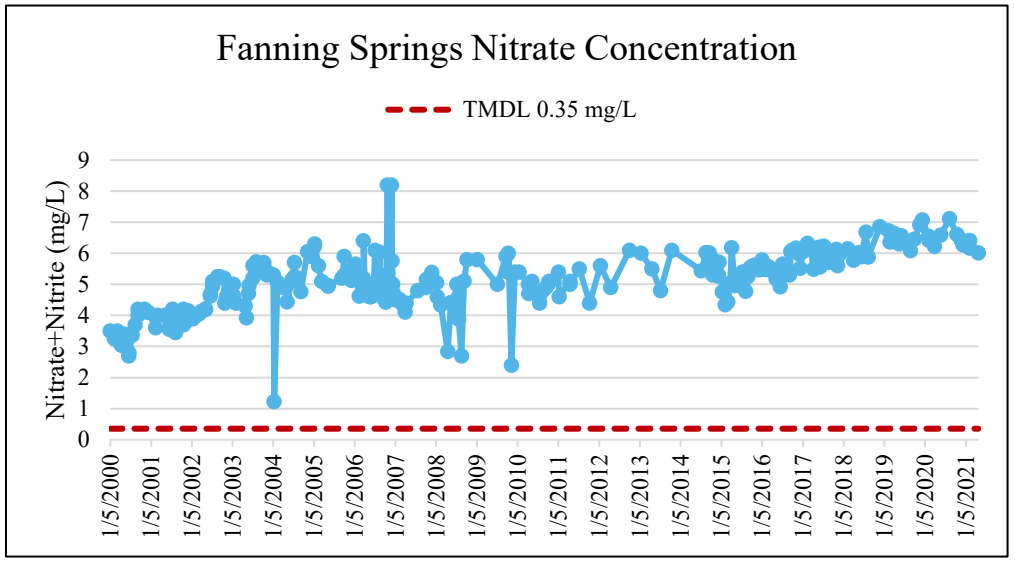
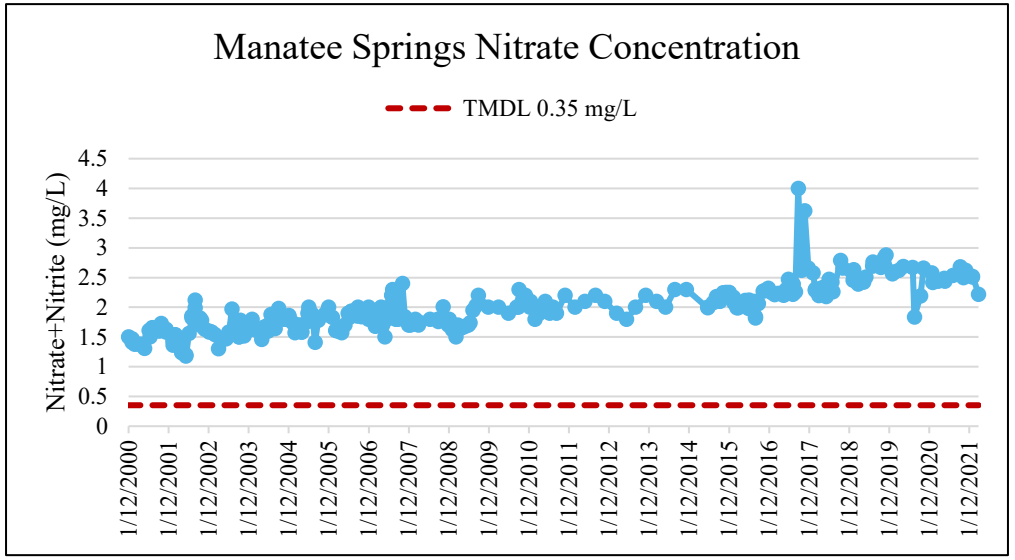


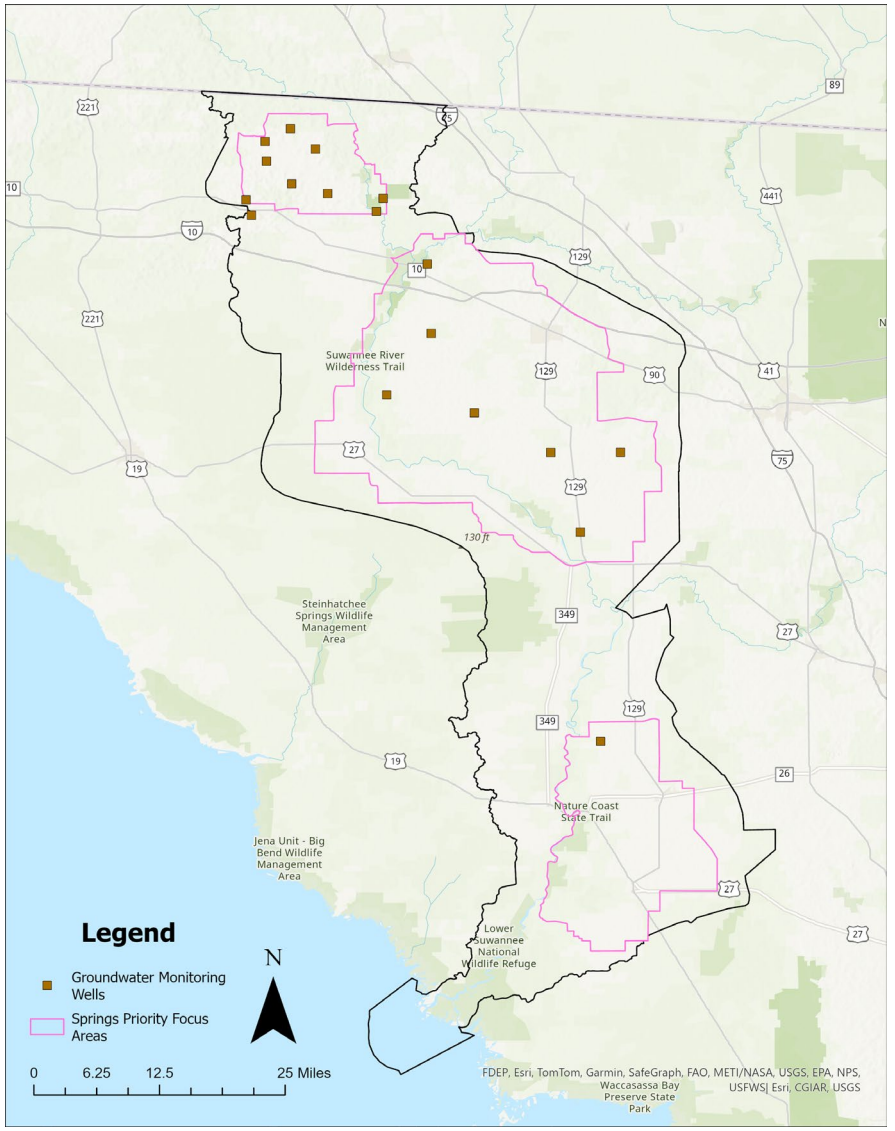




WATER QUALITY DATA

GROUNDWATER WELL NETWORK

Monitoring Location ID	Nitrate (mg/L) December 2023 Results	Nitrate (mg/L) Feburary 2024 Results
SUWA-R1	0.1	0.1
SUWA-R2	0.61	0.83
SUWA-R4	0.99	1.1
SUWA-R5	0.59	0.98
SUWA-R6	0.24	0.37
SUWA-R7	0.72	0.97
SUWA-R8	0.67	0.32
SUWA-R9		0.76
SUWA-R10	0.31	0.91
SUWA-R11	0.29	1
SUWA-R12	3.8	5
SUWA-R13	0.48	0.59
SUWA-R14	0.14	0.32
SUWA-R19	0.55	1.1
SUWA-R20	0.26	0.42
SUWA-R21	0.7	0.99
SUWA-R23		1.1
SUWA-R24	2.7	5.9



Eighteen new groundwater wells were drilled in the Suwannee BMAP area in 2022 and sampling started in 2023 to expand the groundwater monitoring well network to capture impacts from the land surface across diverse land uses and address spatial data gaps.

DATA UPLOAD
WATERSHED INFORMATION NETWORK (WIN)

- Through both the Watershed Information Network (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 is 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.

- WIN data can be retrieved through the WIN Reports and Extracts menu at: https://prodenv.dep.state.fl.us/DearWin/.

- Data providers to WIN and STORET include Division of Environmental Assessment and Restoration and other DEP entities, water management districts, cities, counties, other state agencies, universities, private and volunteer organizations.

- If your entity is collecting ambient water quality data, please upload it to WIN.

WIN COORDINATORS

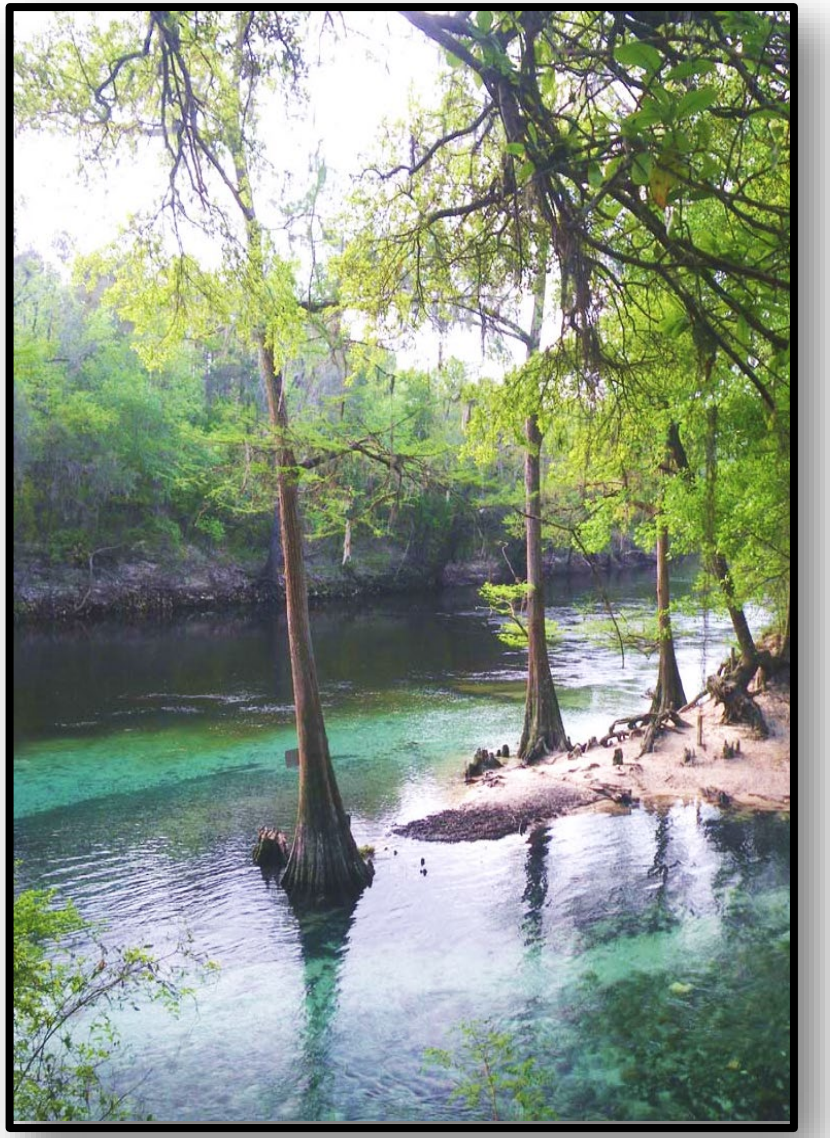
WIN Coordinator	DEP District Area or Role	Phone	Email
Justin Nelson	Northeast, Northwest, Southeast	850-245-8510	Justin.M.Nelson@FloridaDEP.gov
Casey Marston	South, Southwest	850-245-8049	Casey.Marston@FloridaDEP.gov
Lisa Schwenning	SPA (STORET Public Access), WQX (U.S. EPA Water Quality Exchange)	850-245-8509	Lisa.Schwenning@floridaDEP.gov
Jason Storrs	Central, Statewide	850-245-8467	Jason.Storrs@FloridaDEP.gov

BMAP UPDATES

ADOPTED BY JULY 1, 2025

- Nitrogen Source Inventory Loading Tool (NSILT) updates.
- Spring vent load analyses.
- Entity allocation development.
- Future growth.
- Establish five-year milestones for project implementation.
- Incorporate additional project s.
- Incorporate Clean Waterways Act (SB 712) requirements.
- Incorporate HB 1379 requirements.
- Incorporate regional projects.

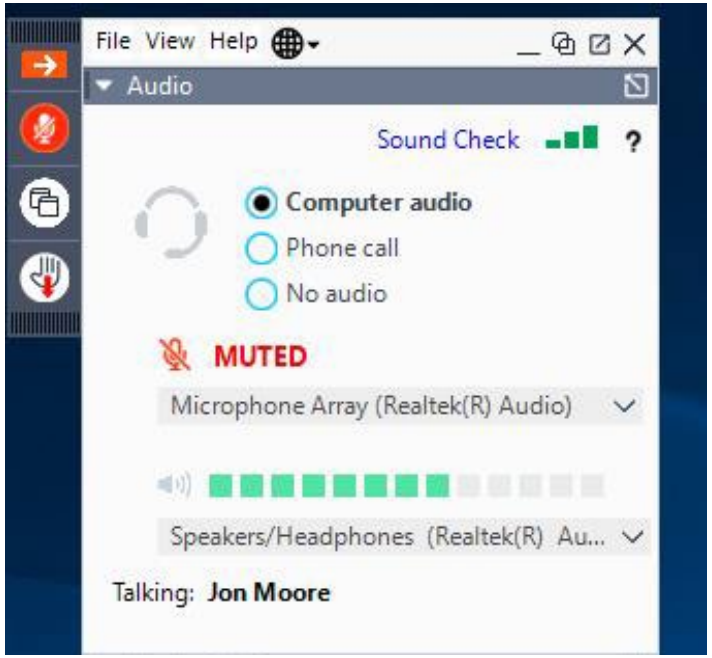
- Water quality data evaluation:
  - Evaluation of the monitoring network (spring vent and groundwater).
  - Water quality trend analyses.
- Evaluate further OSTDS provisions.
- Evaluate AWT or other more stringent effluent limits.
- Update the BMAP documents.



BMAP MEETING
PUBLIC QUESTIONS PERIOD

Verbal Questions

- We ask that questions and comments be limited to **three minutes** so that we may hear from everyone.
- Please type in the chat if you would like to unmute yourself and ask a question or comment.



Written Comments

- Submit written comments concerning today's meeting to: BMAPProgram@FloridaDEP.gov.

NITROGEN SOURCE INVENTORY LOADING TOOL (NSILT) UPDATES

- NSILT Process.
- Methodology review for sources.
  - Atmospheric deposition.
  - Wastewater treatment facilities.
  - OSTDS.
  - Urban turfgrass fertilizer.
  - Sports turfgrass fertilizer.
  - Farm fertilizer.
  - Livestock waste.
  - Biosolids.
- Draft results.

NSILT GENERAL PROCESS SUMMARY

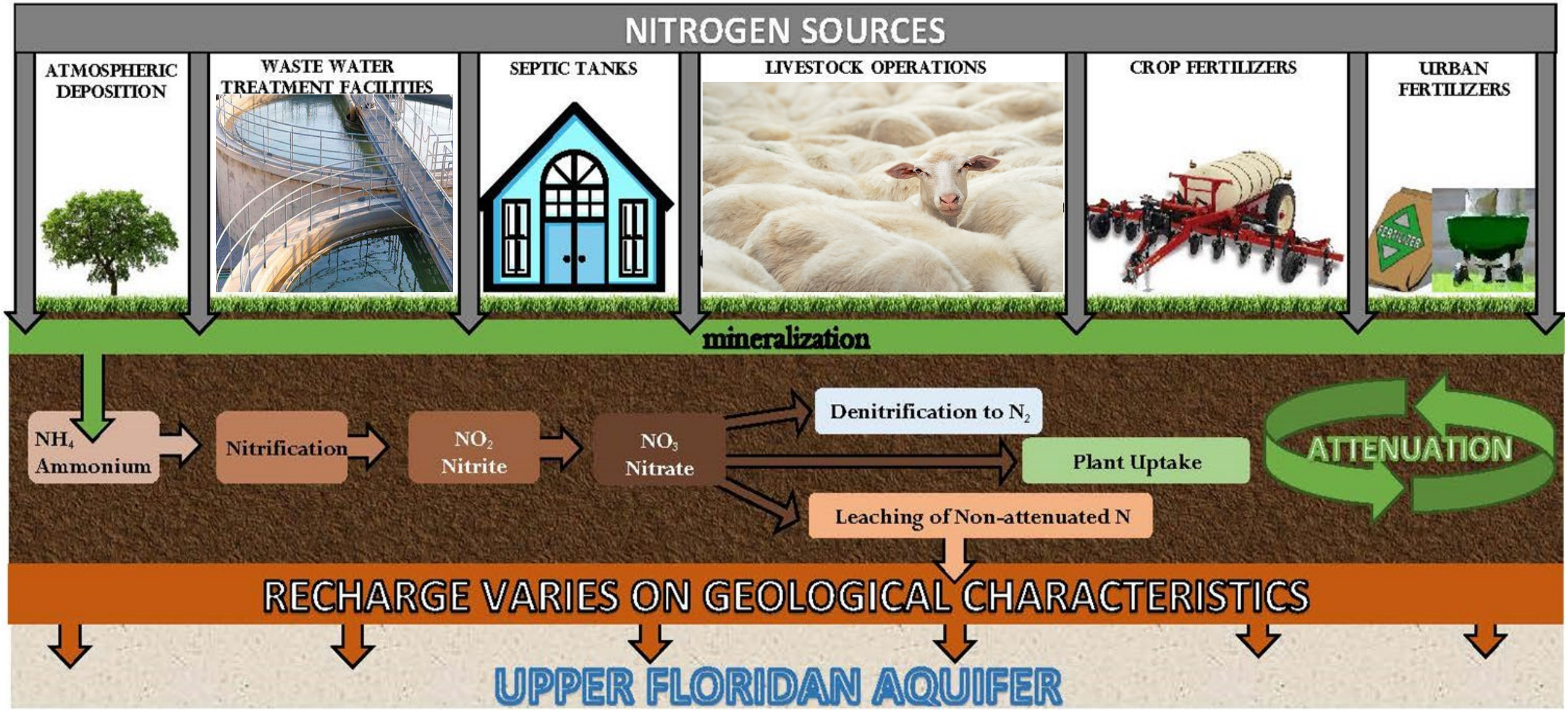
Estimate loading to land surface for each source category.

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

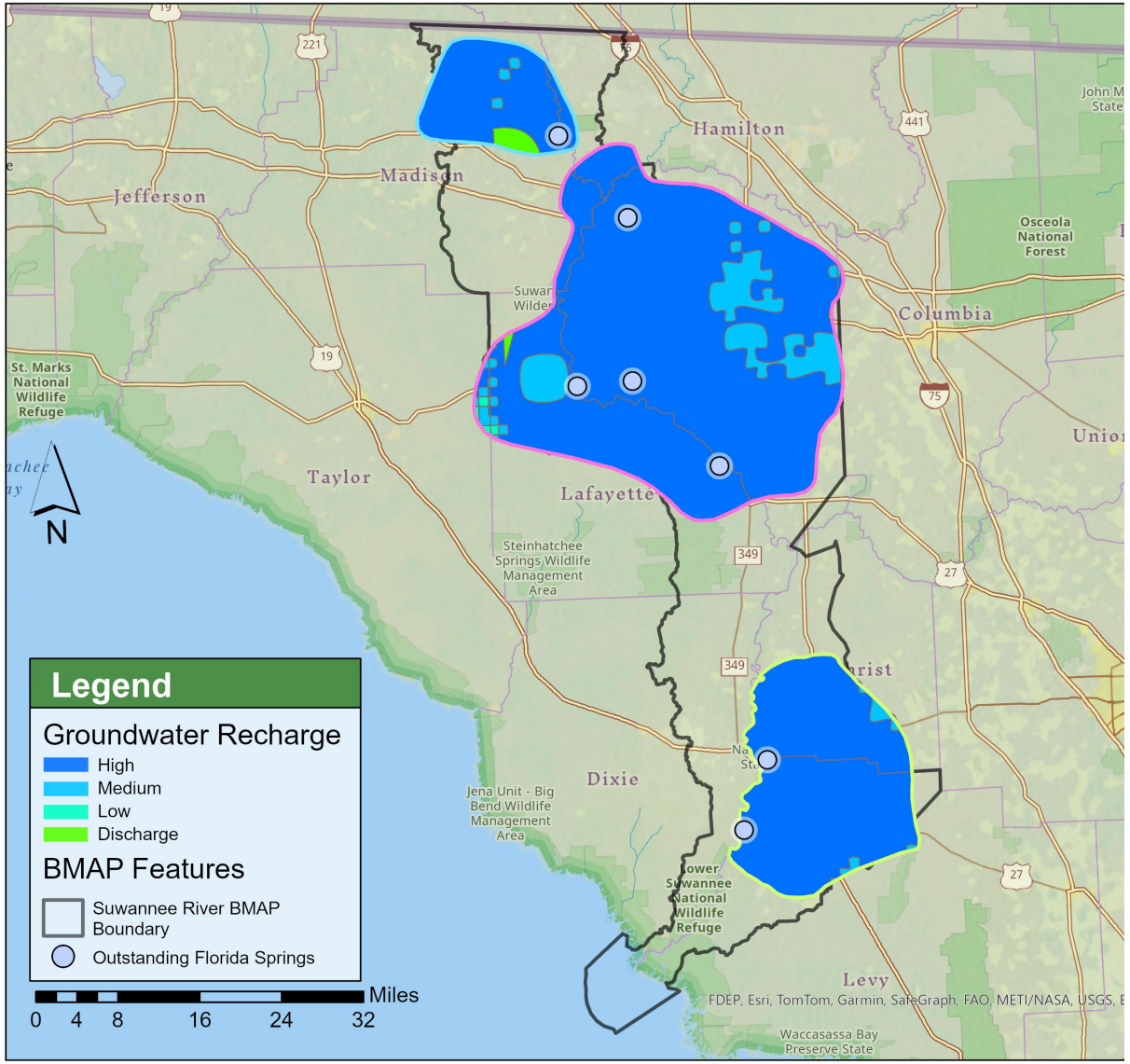
Apply a location specific recharge factor to surface loading estimate.

LOADING TO GROUNDWATER.

NITROGEN CYCLE AND ATTENUATION



RECHARGE TO GROUNDWATER



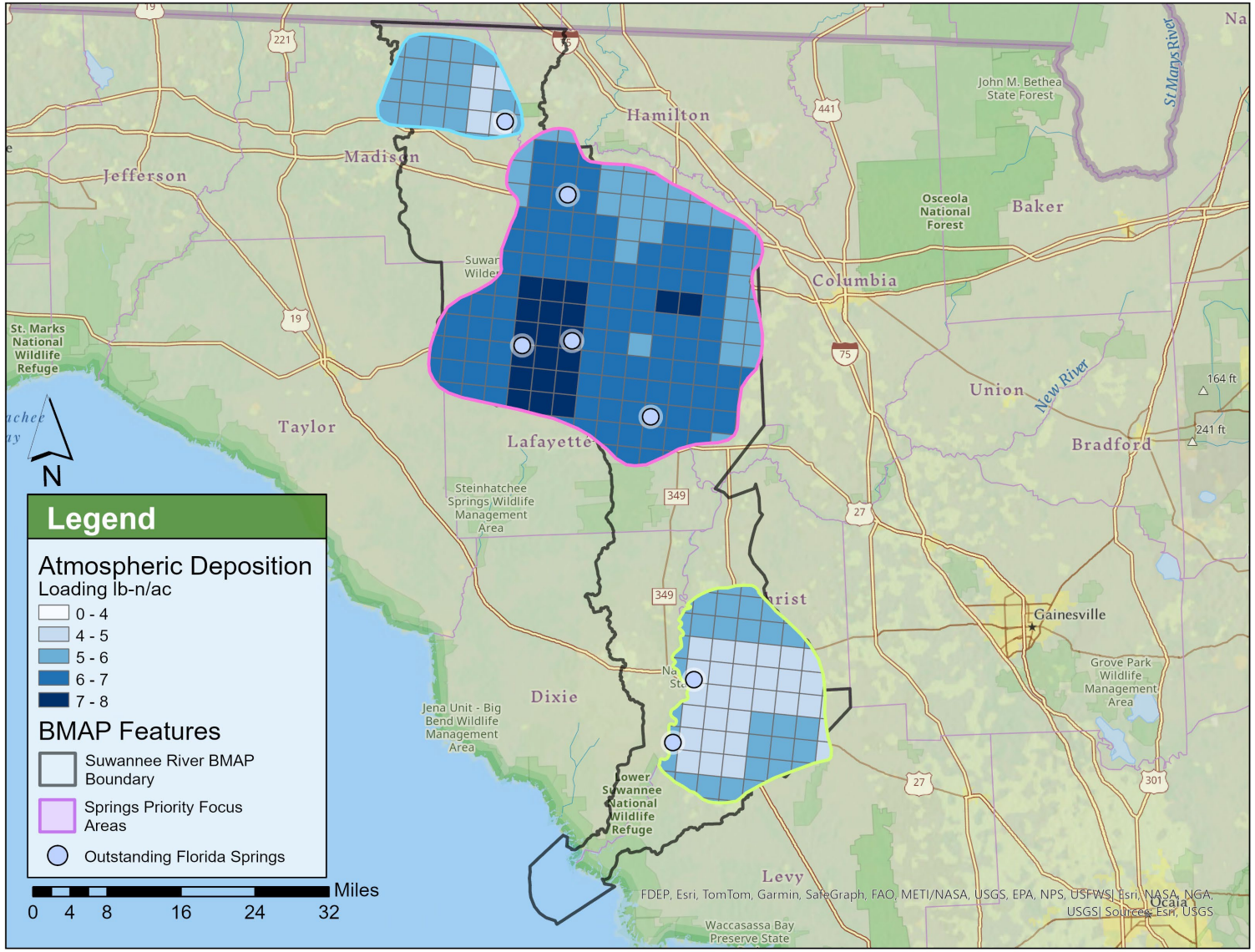
- Divided into four recharge categories based on a composite recharge map of the Floridan aquifer.
- The recharge amount evaluates the percent of nitrogen loading that is expected to impact spring vent after bioattenuation is considered. Recharge rates are summarized in the table below for each recharge category.
- Delineation of recharge areas and associated recharge rates are consistent with the previous NSILT report.
- Recharge factors are applied to estimate loading for all source categories based on location of deposition.

Recharge to Groundwater	
Category	Rate
High	90%
Medium	50%
Low	10%
Discharge	0%

ATMOSPHERIC DEPOSITION (AD)

- Estimated using a nationwide model developed by the Total Deposition Science Committee and EPA called the Total Deposition (TDEP) model.
- AD estimates from 2019 and 2020 were averaged to estimate annual loading in the springsheds.
- Methodology is consistent with previous NSILT.

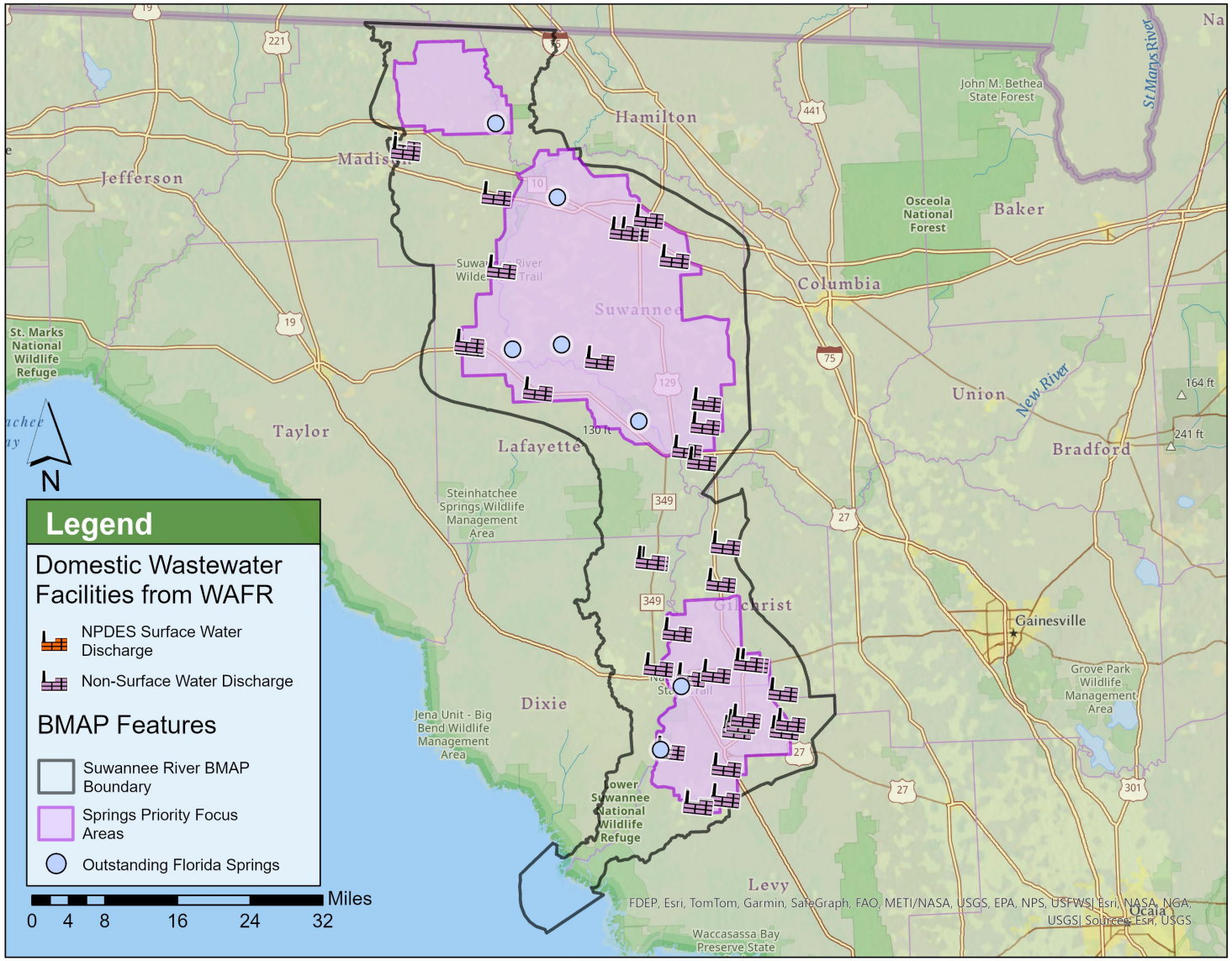
Springshed	Est. Load to Surface (lbs-N/yr)	Est. Load to Groundwater (lbs-N/yr)
Madison Blue	423,279	37,654
Middle Suwannee	3,487,265	297,758
Lower Suwannee	1,034,592	91,630



WASTEWATER TREATMENT FACILITIES

- 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 disposal sites evaluated include reuse, disposal in a rapid infiltration basin (RIB), sprayfield, or wetland.
  Each method has its own estimated attenuation factor.

Wastewater Treatment Effluent Attenuation			
Reuse	RIB	Sprayfield	Wetland
75%	25%	60%	85%



WASTEWATER TREATMENT FACILITIES

Middle Suwannee					
County	**Facility ID**	**Facility Name**	**Disposal Type**	**Recharge Type at Disposal Site**	**Gross TN Average Load (lbs/yr)**
Columbia	FLA011416	**FDOT I-10 WB Columbia Co Rest Area WWTF**	Sprayfield	High	243.32
Lafayette	FLA011643	**Mayo WWTF**	Sprayfield	High	2020.16
Lafayette	FLA011646	**Mayo Correctional Institution WWTF**	RIB	Medium	8906.39
Suwannee	FLA011805	**Live Oak WWTF**	Sprayfield	High	8397.55
Suwannee	FLA011805	**Live Oak WWTF**	Reuse (golf, resid	High	2559.21
Suwannee	FLA011805	**Live Oak WWTF**	RIB	High	4008.91
Suwannee	FLA011806	**Branford WWTF**	Sprayfield	High	2120.33
Suwannee	FLA011807	**Wayne Frier's Mobile Home Park WWTF**	RIB	High	468.51
Suwannee	FLA011812	**Econo Lodge Motel WWTF - Live Oak**	RIB	High	200.79
Suwannee	FLA011817	**Suwannee River Camp WWTF**	RIB	High	156.14
Suwannee	FLA011819	**Advent Christian Village WWTF**	RIB	High	1670.68
Lower Suwannee					
County	**Facility ID**	**Facility Name**	**Disposal Type**	**Recharge Type at Disposal Site**	**Gross TN Average Load (lbs/yr)**
Gilchrist	FLA011615	**Trenton WWTF**	Sprayfield	High	13,212.13
Gilchrist	FLA011620	**Lancaster Correctional Institution WWTF**	Sprayfield	High	8,956.17
Levy	FLA011648	**Chiefland, City of WWTF**	RIB	High	5,662.64
Levy	FLA011650	**Springside Mobile Home Park WWTF**	RIB	High	351.98
Gilchrist	FLA286613	**Hart Springs Park WWTF**	Sprayfield	High	212.71
Gilchrist	FLA683531	**Fanning Springs WWTF**	Sprayfield	High	1,727.39

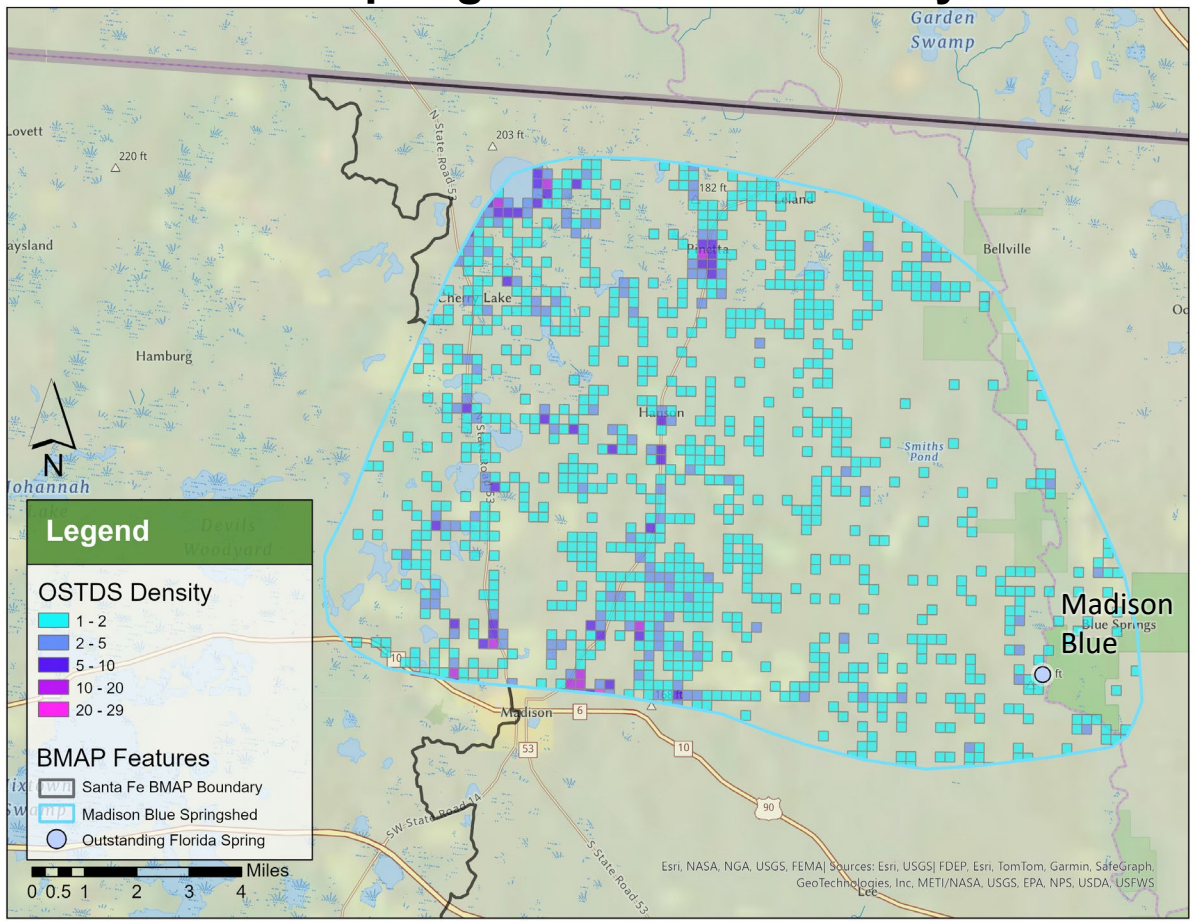
WASTEWATER TREATMENT FACILITIES

- Seventeen domestic wastewater facilities (WWTFs) were evaluated to determine contributions to groundwater loading.
- Sprayfield and RIB applications are the most common disposal method in the BMAP area.
- The results of the NSILT analysis for all WWTFs and disposal types in all three springsheds are presented in the table below.

Springshed	Facilities	Est. Load to Surface (lbs-N/yr)	Est. Load to Groundwater (lbs-N/yr)
Middle Suwannee	11	31,380	13,134
Lower Suwannee	6	30,123	12,739

ONSITE SEWAGE TREATMENT AND DISPOSAL SYSTEMS (OSTDS)

Madison Blue Springshed OSTDS Density

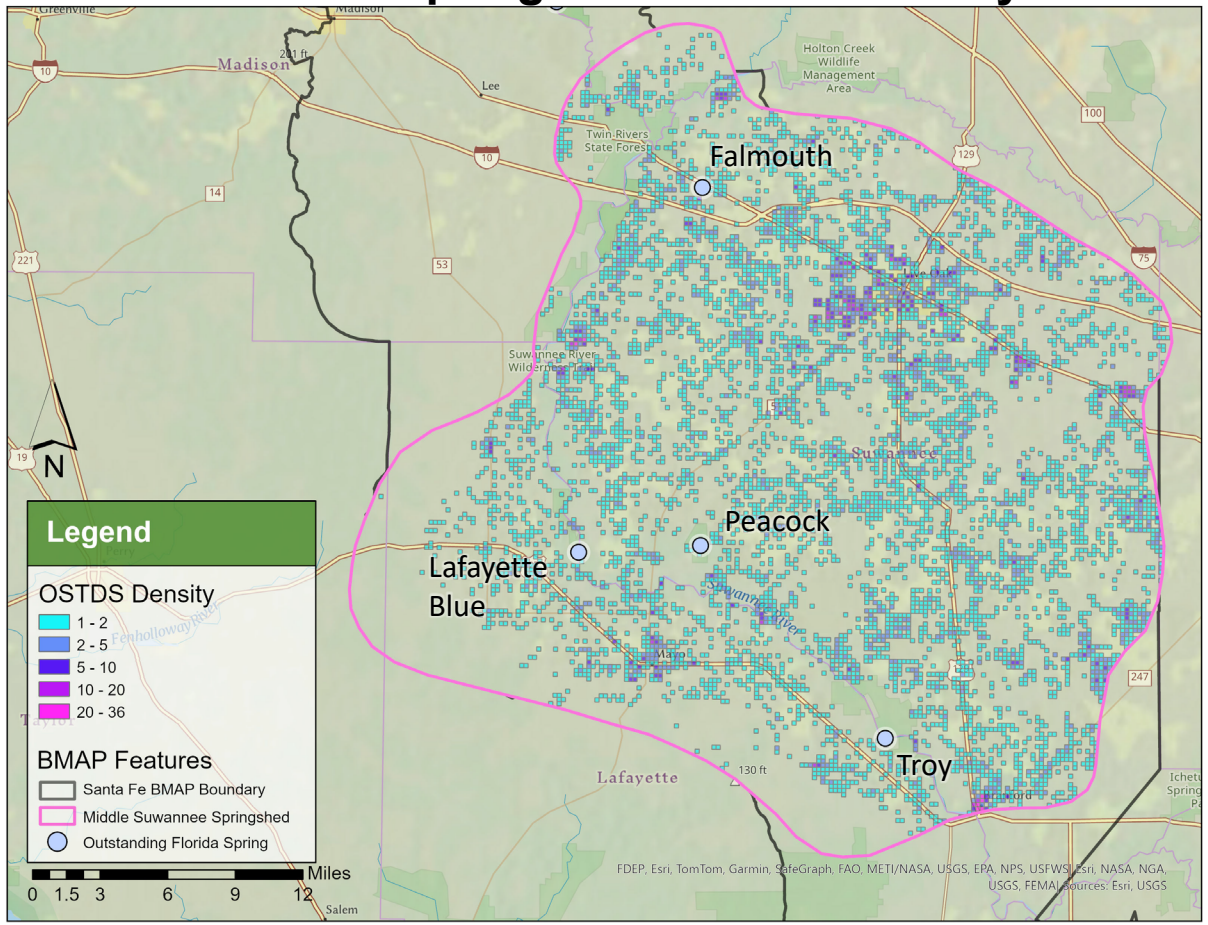


- Florida Water Management Inventory (FLWMI) data was used to estimate the number of OSTDS (updated 2021-2022).
- Parcels identified as "known septic", "likely septic", and "somewhat likely septic" were considered to have one septic system per parcel.
- Estimated load per tank is based on multiplying the average persons per household (2020 U.S. Census data) by loading per person, which is estimated to be 10 lbs/yr (Armstrong 2015).
- Credited enhanced nutrient reducing OSTDS with a 50% reduction in TN loading from the existing condition.
- Loading from OSTDS is estimated to attenuate at 30%.

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

ONSITE SEWAGE TREATMENT AND DISPOSAL SYSTEMS (OSTDS)

Middle Suwanee Springshed OSTDS Density



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- Loading from OSTDS is estimated to attenuate at 30%.

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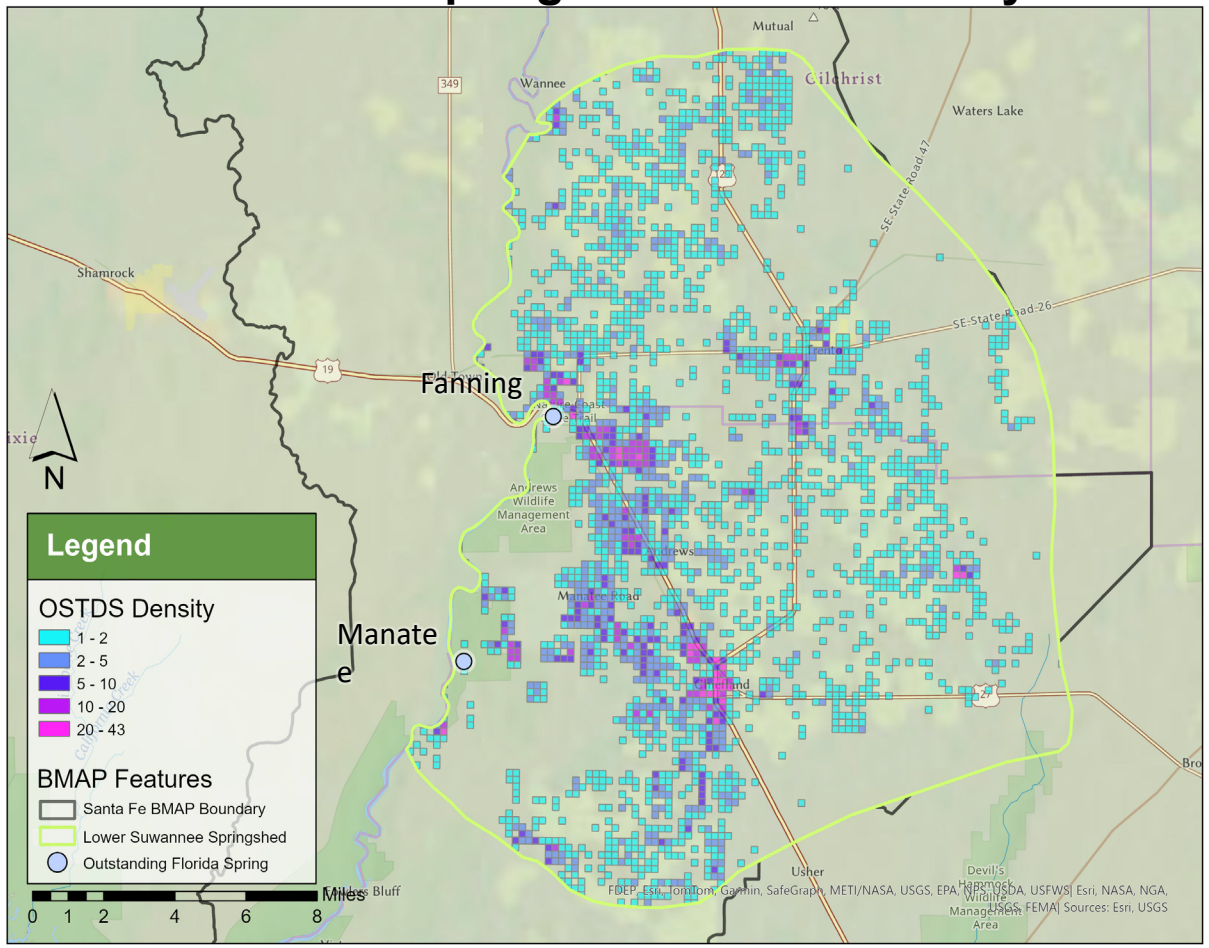
ONSITE SEWAGE TREATMENT AND DISPOSAL SYSTEMS (OSTDS)

Lower Suwannee SpringshedOSTDS Density



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- Credited enhanced nutrient reducing OSTDS with a 50% reduction in TN loading from the existing condition.
- Loading from OSTDS is estimated to attenuate at 30%.

ONSITE SEWAGE TREATMENT AND DISPOSAL SYSTEMS (OSTDS)

The results of the NSILT analysis for OSTDS in all three 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)
Madison Blue	1,894	1	45,153	26,922
Middle Suwannee	11,906	1	334,707	199,251
Lower Suwannee	6,841	1	166,165	104,646

URBAN TURF FERTILIZER

- Urban Turfgrass Fertilizer (UTF) 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%.

Source: Pexels

URBAN TURF FERTILIZER
SINGLE FAMILY RESIDENTIAL

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 0.5 acres maximum for fertilized area for single family residential parcels greater than 0.5 acres in these 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.

Lawn Care Source	
Service	32%
Self	68%

Self Application Rates	Percent	Application Rate (lbs/N/ac/applications)	Number of Applications
BMP	15%	26.136	4.17
Label	74%	34.78	2.98
None	11%	0.00	0.00

URBAN TURF FERTILIZER
SINGLE FAMILY RESIDENTIAL

The results of the NSILT analysis for single family residential UTF in all three springsheds are presented in the table below.

Springshed	Est. Load to Surface (lbs-N/yr)	Est. Load to Groundwater (lbs-N/yr)
Madison Blue	19,635	5,271
Middle Suwannee	133,773	34,532
Lower Suwannee	68,659	18,533

URBAN TURF FERTILIZER
NON-SINGLE FAMILY RESIDENTIAL

- SRWMD land use/land cover data was used to estimate non-single family residential UTF application acreage estimates. Land use data year is dependent on the water management district with all data updated between 2019 and 2022.
- Fifteen land cover codes were assumed to be likely to receive fertilizer.

WMD Land Cover Code	Percent Impervious	Percent of Pervious area Receiving Fertilizer
1220: Medium Density, Mobile Home Units	32.6%	17.7%
1230: Medium Density, Mixed Units (Fixed and Mobile Home Units)	32.6%	15.4%
1320: High Density, Mobile Home Units	44.4%	20.7%
1330: Multiple Dwelling Units, Low Rise	44.4%	27.8%
1340: High Density, Multiple Dwelling Units, High Rise (Four Stories or More)	44.4%	32.8%
1400: Commercial and Services	72.2%	31.3%
1411: Shopping Centers	72.2%	31.3%
1480: Cemeteries	8.3%	42.2%
1700: Institutional	34.4%	43.3%
1710: Educational	30.3%	60.6%
1720: Religious	39.9%	37.7%
1740: Medical and Health Care	72.2%	33.8%
1750: Governmental	35.4%	41.0%
1850: Parks and Zoos	12.5%	44.9%
1860: Community Recreational Facilities	12.5%	59.8%

- Impervious area was estimated using a United States Geological Survey (USGS) study (Tilley & Slonecker, 2006). Percent impervious area was dependent on the land use category.
- The area of pervious surface expected to receive fertilizer was evaluated by local land cover data. The percentage of pervious area evaluated to be bare ground or grass surface was applied to the estimated pervious areas of the 15 land cover codes to then estimate the area expected to receive fertilization.

URBAN TURF FERTILIZER
NON-SINGLE FAMILY RESIDENTIAL

- Estimated fertilizer application rates for non-single family residential fertilized areas were based on an evaluation of the GIBMP Manual. It is estimated that fertilizer is applied at a rate of 2.5 lb-N/1,000 ft^2 to fertilized turfgrass in the region.
- The results of the NSILT analysis for non-single family residential UTF in all three springsheds are presented in the table below.

Springshed	Est. Load to Surface (lbs-N/yr)	Est. Load to Groundwater (lbs-N/yr)
Madison Blue	4,465	1,206
Middle Suwannee	46,855	11,818
Lower Suwannee	37,351	10,085

SPORTS TURFGRASS FERTILIZER (STF)

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

- 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.

- Two golf courses operating within the springsheds were reviewed.
  - Acreage for operating courses were consistent with the previous NSILT evaluation.
  - Golf course application rates were updated based on a study of regional golf course practices published by HortTechnology (Shaddox, et al., 2023).

Golf Course Study Rate		
Application Rate	95.832	lb-N/ac
% fertilized	100%	

Source: Pexels

SPORTS TURFGRASS FERTILIZER (STF)

The results of the NSILT analysis for STF in all three springsheds are presented in the table below.

Springshed	Acres STF	Number of Golf Courses	Est. Load to Surface (lbs.-N/yr.	Est. Load to Groundwater (lbs.-N/yr.)
Middle Suwannee	43	1	7,778	2,096
Lower Suwannee	50	1	13,249	3,589

FARM FERTILIZER

- 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.
- Application rates previously used in the NSILT were reviewed by the Florida Department of Agriculture and Consumer Services (FDACS), water management districts, and University of Florida Institute of Food and Agricultural Science (UF/IFAS).

- 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 (FF) is estimated to attenuate at 80%.

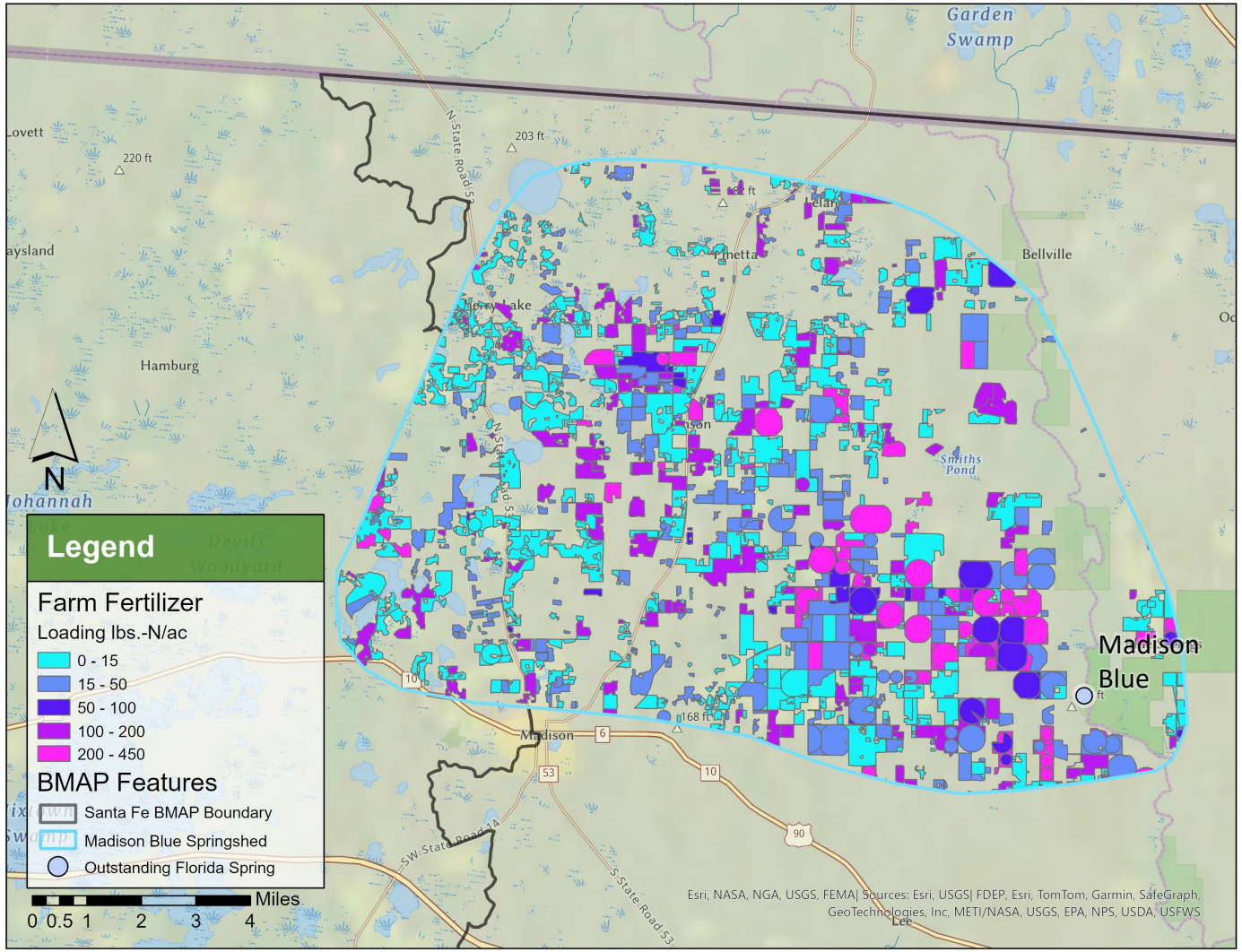
FARM FERTILIZER

Nursery Crops	Fertilizer Application Rate (lb-N/acre)	Effective Application Rate (lb-N/acre)
Asparagus Fern	90	21.6
Aspidistra	90	21.6
Container Nursery	150	36
Coontie Fern	90	21.6
Fern	90	21.6
Field Nursery	90	21.6
Leatherleaf	90	21.6
Liriope	90	21.6
Nurseries and Vineyards	90	21.6
Nursery	90	21.6
Ornamentals	90	21.6
Pittosporum	90	21.6
Timber Nursery	50	12
Tree Nurseries	90	21.6

Crop	Fertilizer Application Rate (lb-N/acre)	Effective Application Rate (lb-N/acre)
Grass Pasture	80	16
Horse Farms	50	10
Improved Pastures	50	10
Pasture	50	10

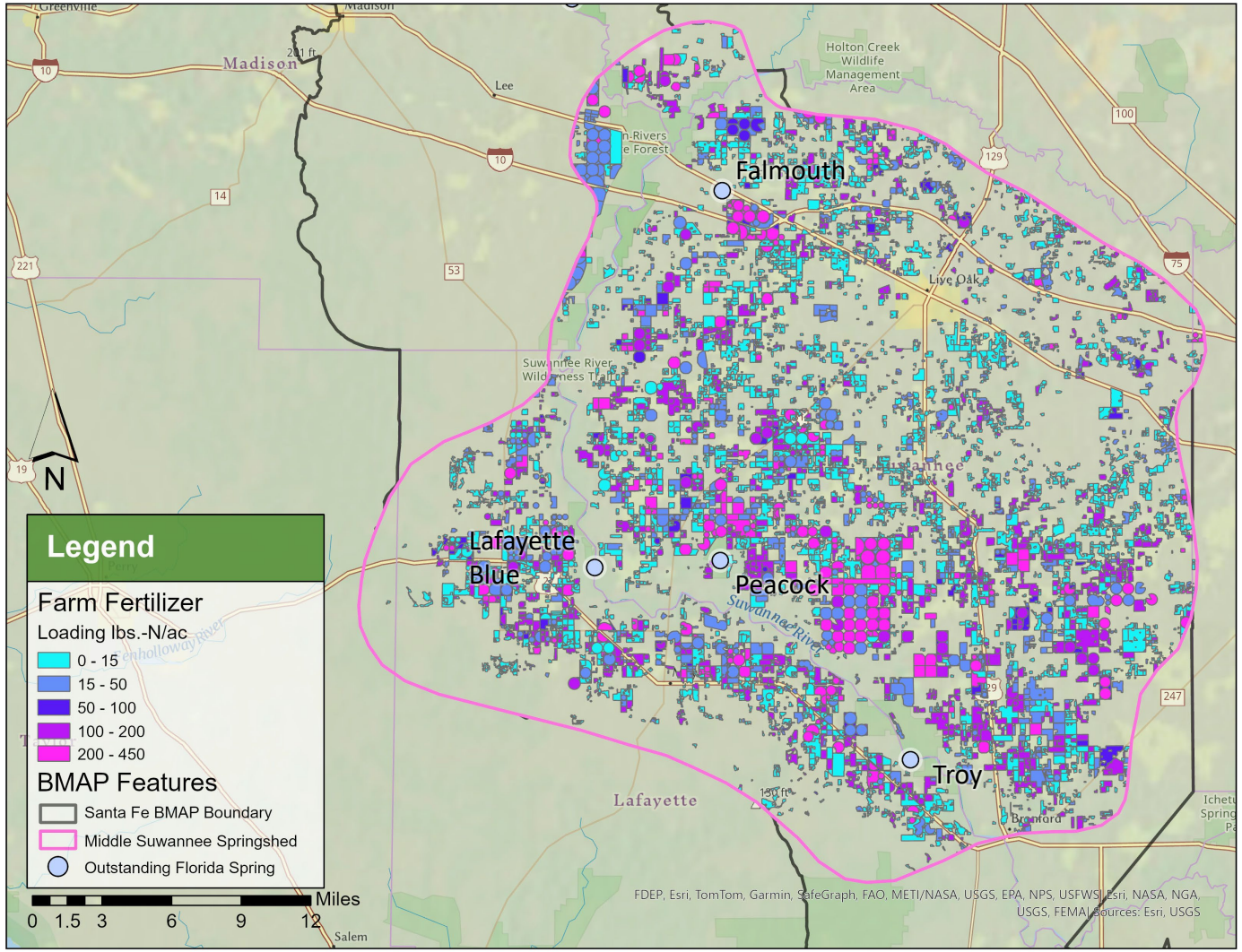
- For nurseries that use containers:
  - A reduction of 20% of the FSAID 9 land area was made to account for plant spacing.
  - A reduction of 70% of loading was estimated to account fertilizer being applied to containers that hold the nutrients longer.
- Adjustment to fertilizer application rates were made to pastureland that utilize field rotation.
  - Fertilizer was estimated to be applied to 20% of pasturelands annually.

FARM FERTILIZER



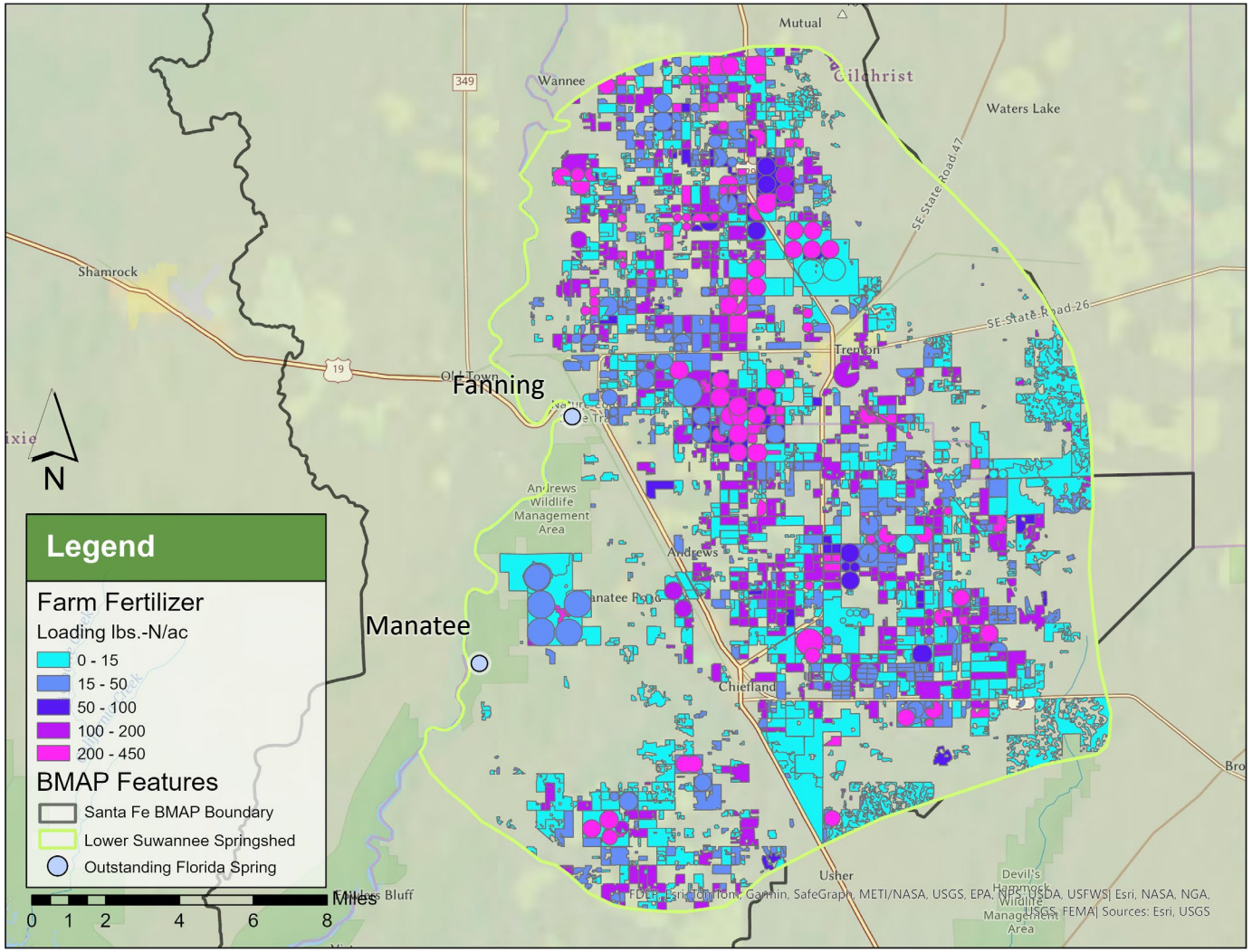
Crop	Total Acres	Loading to Land Surface (lb-N/year)	Loading to Groundwater (lb-N/year)
Hay	3,587	645,597	101,390
Corn	2,680	575,256	101,168
Field Corn	483	115,859	17,439
Cotton	868	95,431	17,094
Peanuts	4,915	98,299	13,719
Improved Pastures	7,732	77,316	12,010
Oats	656	45,885	8,259
Cropland Pastureland	929	46,431	7,585
Corn_Oats	131	36,803	6,625
Peanuts_Rye	558	33,467	6,024

FARM FERTILIZER



Crop	Total Acres	Loading to Land Surface (lb-N/year)	Loading to Groundwater (lb-N/year)
Hay	30,108	5,419,489	943,381
Corn	14,264	3,361,400	588,642
Improved Pastures	45,553	455,526	77,246
Field Corn	1,676	402,261	72,407
Peanuts	20,748	414,967	71,179
Vegetables	2,198	329,700	58,380
Potatoes	939	281,749	50,715
Corn Rye	990	277,175	46,218
Carrots Corn	743	222,876	40,118
Cropland Pastureland	3,963	198,138	34,937

FARM FERTILIZER



Crop	Total Acres	Loading to Land Surface (lb-N/year)	Loading to Groundwater (lb-N/year)
Hay	12,784	2,301,207	414,217
Corn	4,954	1,169,014	210,418
Field Corn	2,107	505,706	91,027
Watermelon	1,909	286,333	51,540
Peanuts	10,990	219,809	39,566
Improved Pastures	20,838	208,384	37,442
Vegetables	1,079	161,906	29,143
Other Hay Non Alfalfa	857	154,257	27,766
Cropland Pastureland	2,015	100,743	17,999
Row Crops	1,409	84,561	15,221

FARM FERTILIZER

The results of the NSILT analysis for farm fertilizer in the three springsheds are presented in the table below.

Springshed	Est. Load to Surface (lbs.-N/yr.)	Est. Load to Groundwater (lbs.-N/yr.)
Madison Blue	1,773,630	316,508
Middle Suwannee	12,653,910	2,207,636
Lower Suwannee	5,610,080	1,007,899

LIVESTOCK WASTE (LW)

- Livestock populations were estimated using 2017 U.S. Department 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 and adjust USDA population estimates.
- Waste factors were multiplied by the estimated animal population to calculate livestock waste loading.
- Loading from livestock waste (LW) is estimated to attenuate at 90%.

Livestock Type	Waste Factor (lb-N/day)
Beef Cattle	0.337
"Other" Cattle	0.31
Calves	0.068
Dairy Cows	0.977
Donkeys	0.1
Horses	0.273
Chicken, Broilers	0.002
Chicken, Layers	0.003
Goats	0.035
Hogs	0.19
Sheep	0.198
Turkeys	0.006

LIVESTOCK WASTE (LW)

Madison Blue springshed:

Livestock Type	Total Head Count	Loading to Land Surface (lb-N/year)	Loading to Groundwater (lb-N/year)
Beef Cattle	3,025	372,188	29,357
"Other" Cattle	667	75,431	5,970
Calves	1,988	24,742	1,953
Donkeys	23	832	67
Horses	135	13,486	1,055
Chicken, Broilers	51,829	37,835	2,962
Chicken, Layers	11,091	12,144	946
Goats	253	3,236	254
Hogs	131	9,136	711
Sheep	60	4,263	334
Turkeys	14	30	2

Middle Suwannee springshed:

Livestock Type	Total Head Count	Loading to Land Surface (lb-N/year)	Loading to Groundwater (lb-N/year)
Beef Cattle	19,459	2,393,606	202,653
"Other" Cattle	13,390	1,515,065	127,956
Calves	17,688	220,111	18,617
Donkeys	428	15,626	1,329
Horses	1,588	158,328	13,456
Chicken, Broilers	1,275,485	931,104	78,980
Chicken, Layers	133,637	146,333	12,301
Goats	1,989	25,399	2,158
Hogs	457	31,677	2,674
Sheep	928	67,014	5,663
Turkeys	41	89	8

Lower Suwannee springshed:

Livestock Type	Total Head Count	Loading to Land Surface (lb-N/year)	Loading to Groundwater (lb-N/year)
Beef Cattle	7,954	978,407	87,279
"Other" Cattle	5,687	643,476	57,591
Calves	7,345	91,404	8,165
Donkeys	209	7,599	680
Horses	2,233	222,491	19,885
Chicken, Broilers	23	17	1
Chicken, Layers	1,685	1,845	165
Goats	1,626	20,780	1,863
Hogs	249	17,277	1,550
Sheep	224	16,146	1,446
Turkeys	349	764	69

LIVESTOCK WASTE (LW)

The results of the NSILT analysis for LW in the three springsheds are presented in the table below.

Springshed	Est. Load to Surface (lbs-N/yr)	Est. Load to Groundwater (lbs-N/yr)
Madison Blue	553,323	43,611
Middle Suwannee	5,504,352	465,792
Lower Suwannee	2,000,204	178,696

DAIRIES

- Eighteen dairies operate within the Suwannee springsheds and were evaluated to determine loading to groundwater.
- Ten dairy operations are Confined Animal Feeding Operation (CAFO) dairies operating under DEP permits.
  - To calculate loading from CAFO dairies, information in the nutrient management plans (NMPs) included in the operation permits were reviewed to determine the waste handling processes and expected loading per cow.
  - To determine the number of dairy cows at the operation, annual reports submitted for the permit were reviewed. An average of the 2020 and 2021 counts were used to estimate the dairy cows at the operation.
  - The loading per cow was multiplied by the number of cows, then nutrient removal processes as described in the NMPs were applied to determine the loading to land surface.
- Non-CAFO dairy information was provided by DACS, including information on herd size, waste handling practices, and animal confinement. If a dairy herd was identified as grazed, it was estimated that they would be confined for 15% of the time to account for time in the milking parlors.
  - A waste factor of 0.36 lb.-N/day for dairy cows and 0.15 lb.-N/day for non-milking cows was assumed. Annual loading was estimated by multiplying the number of cows by the daily waste factor multiplied by 365 days per year multiplied by application loss coefficients based on waste handling practices.
- Dairy waste was estimated to attenuate at 50% for the Suwannee River BMAP.

DAIRIES

The results of the NSILT analysis for dairies in the springsheds are presented in the table below.

Springshed	Est. Load to Surface (lbs.-N/yr.)	Est. Load to Groundwater (lbs.-N/yr.)
Middle Suwannee	1,116,976	446,711
Lower Suwannee	2,942,126	1,323,957

BIOSOLIDS

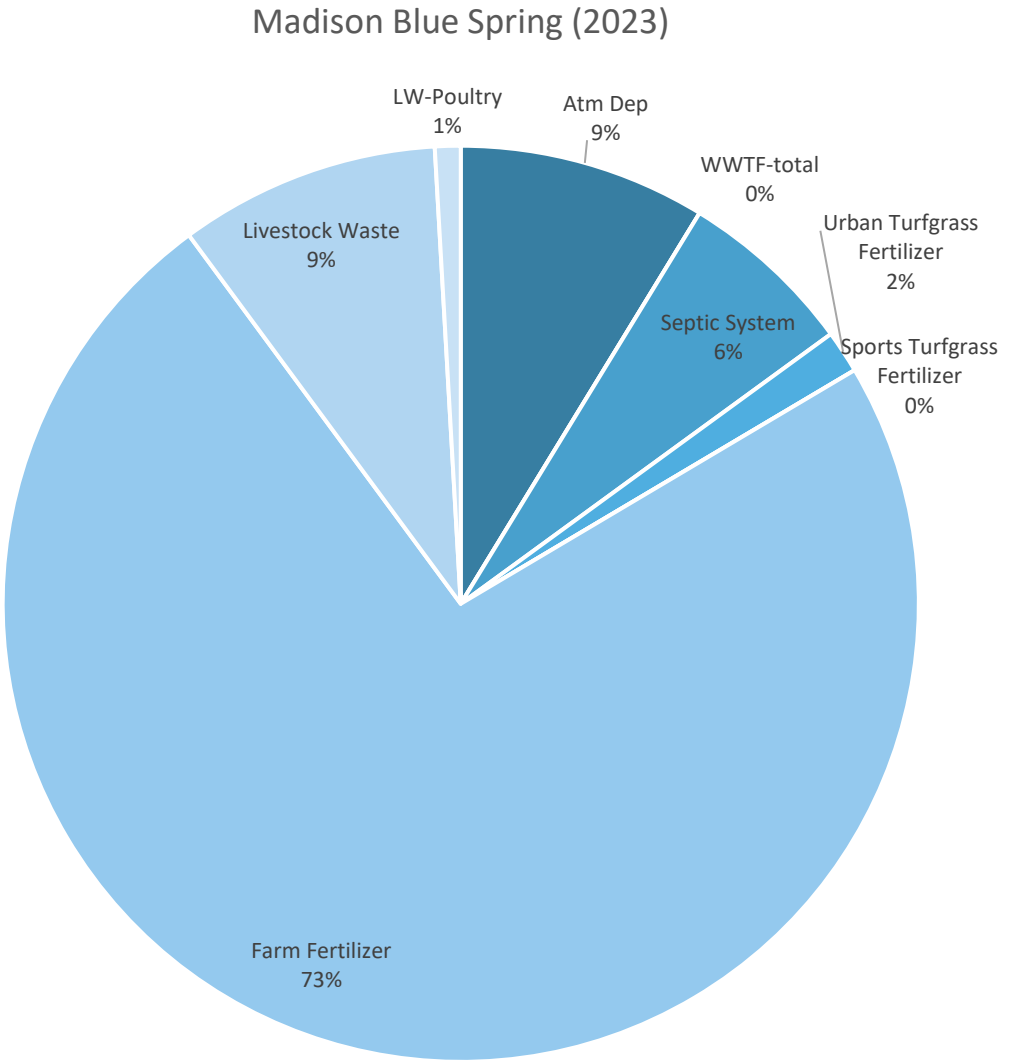
- Biosolid application quantity estimates were derived from calculating the average application quantity reported from 2018 to 2022, where data was available.
- Application quantities are provided in tons of material, it was assumed biosolid material has an estimated nitrogen content of approximately 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%.

Springshed	Est. Load to Surface (lbs.-N/yr.)	Est. Load to Groundwater (lbs.-N/yr.)
Middle Suwannee	29,145	13,102
Lower Suwannee	8,719	3,924

DRAFT NSILT LOADING RESULTS

MADISON BLUE

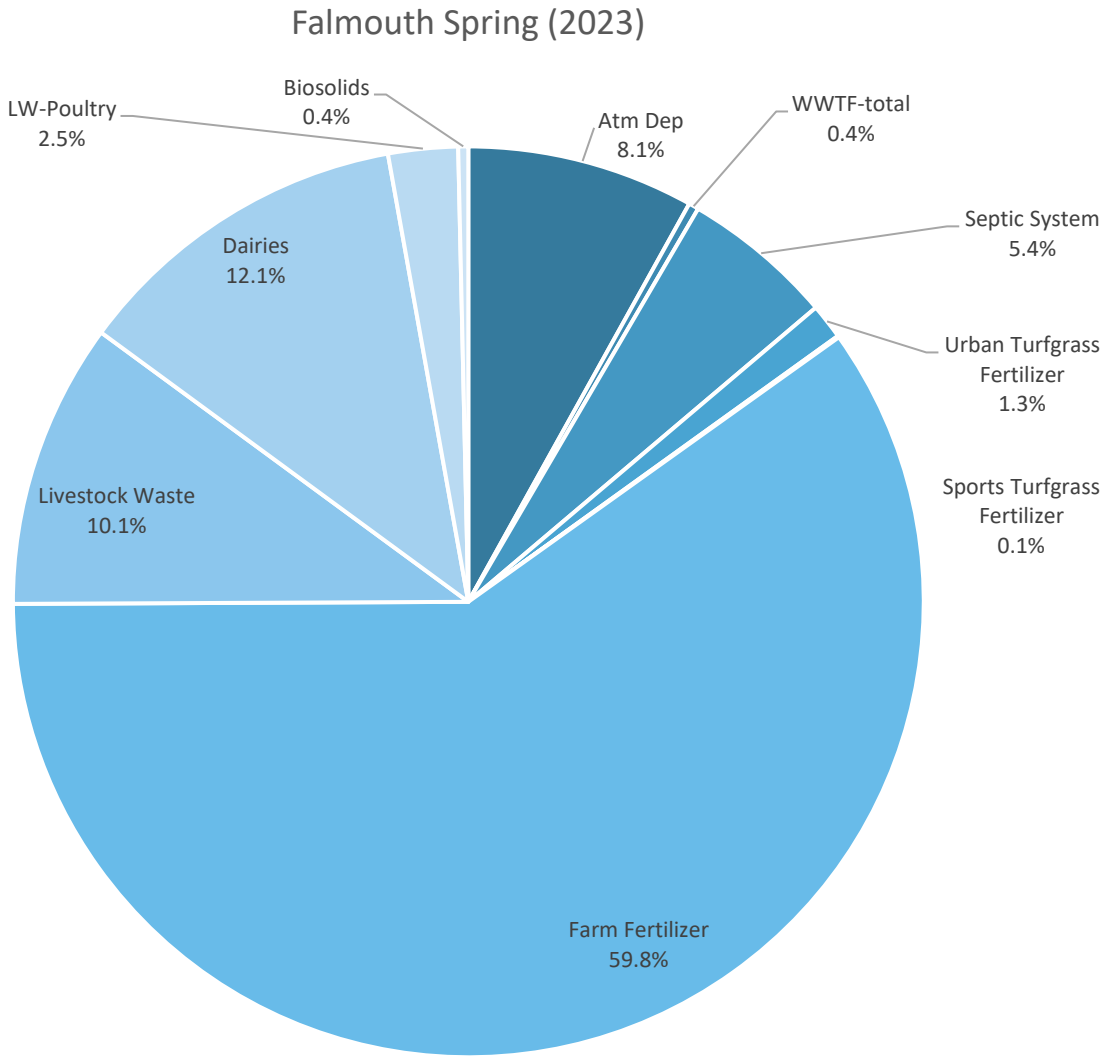
Madison Blue Springshed Area	
Source	**Annual Loading (lb-N/year)**
Atmospheric Deposition	37,654
Wastewater Treatment Facilities	0
OSTDS	26,922
Urban Turfgrass Fertilizer	6,476
Sports Turfgrass Fertilizer	0
Farm Fertilizer	316,508
Livestock Waste	43,611
Total	431,171



DRAFT NSILT LOADING RESULTS

MIDDLE SUWANNEE

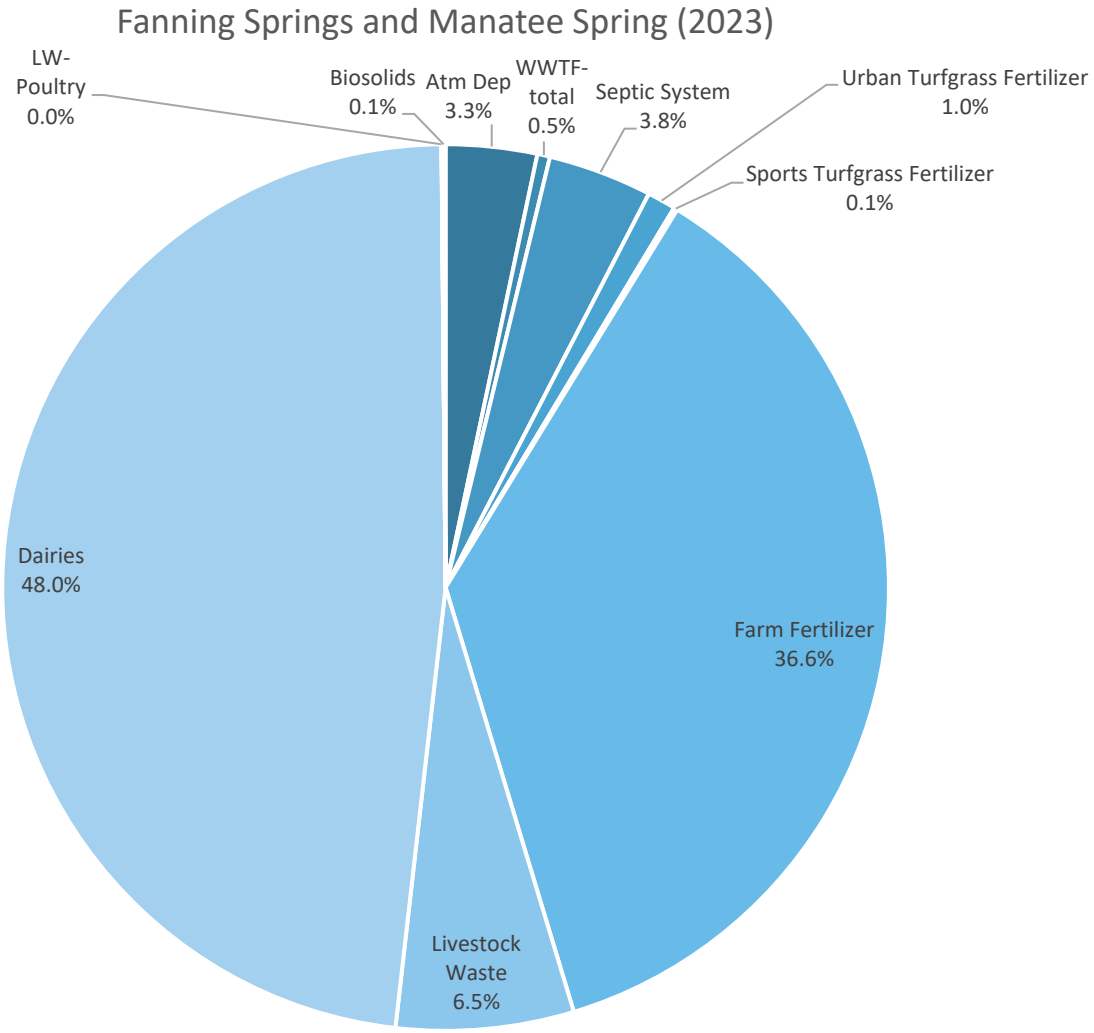
Middle Suwannee Springshed Area	
Source	**Annual Loading (lb-N/year)**
Atmospheric Deposition	297,758
Wastewater Treatment Facilities	13,134
OSTDS	199,251
Urban Turfgrass Fertilizer	46,351
Sports Turfgrass Fertilizer	2,096
Farm Fertilizer	2,207,636
Dairies	446,711
Livestock Waste	465,792
Biosolids	13,102
Total	3,691,831



DRAFT NSILT LOADING RESULTS

LOWER SUWANNEE

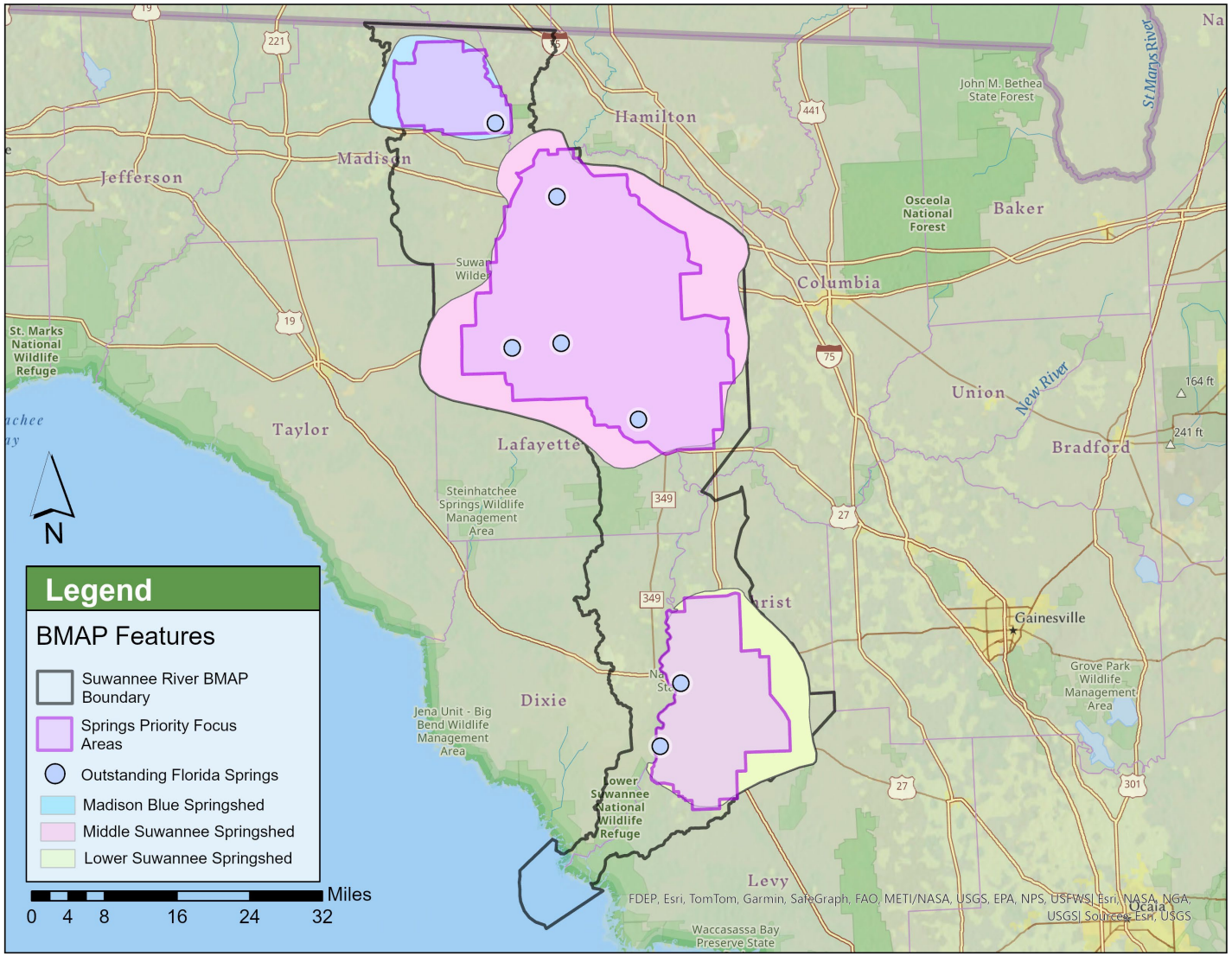
Lower Suwannee Springshed Area	
Source	**Annual Loading (lb-N/year)**
Atmospheric Deposition	91,630
Wastewater Treatment Facilities	12,739
OSTDS	104,646
Urban Turfgrass Fertilizer	28,617
Sports Turfgrass Fertilizer	3,589
Farm Fertilizer	1,007,899
Dairies	1,323,957
Livestock Waste	178,696
Biosolids	3,924
Total	2,755,697



DRAFT SURFACE WATER LOADING RESULTS

OUTSIDE THE SPRINGSHED BOUNDARIES

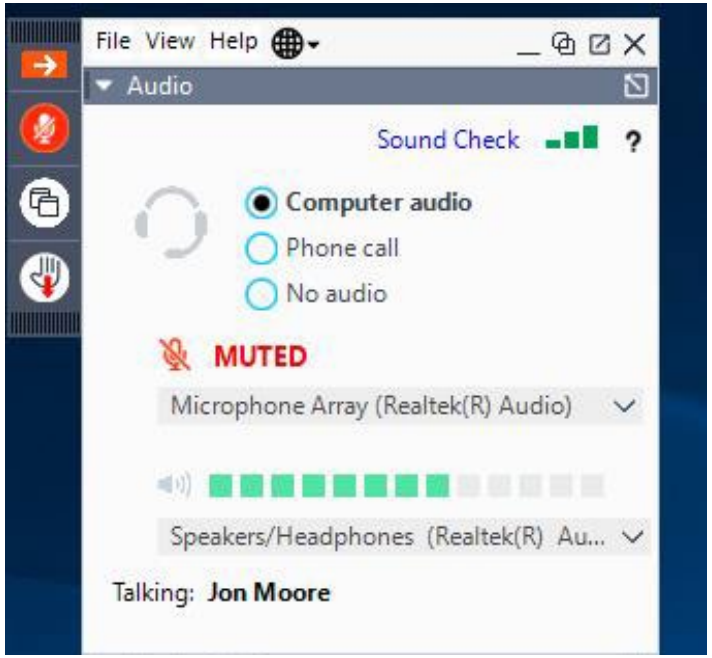
- Annual nutrient loading estimates for outside the Suwannee River springsheds were calculated using a similar approach to the Pollutant Load Screening Model (PLSM).
  - Statewide Land Use Cover Data-Level 2 Codes.
  - Event Mean Concentrations (EMCs).
  - Runoff Coefficients (ROCs).



BMAP MEETING
PUBLIC QUESTIONS PERIOD

Verbal Questions

- We ask that questions and comments be limited to **three minutes** so that we may hear from everyone.
- Please type in the chat if you would like to unmute yourself and ask a question or comment.



Written Comments

- Submit written comments concerning today's meeting to: BMAPProgram@FloridaDEP.gov.

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.

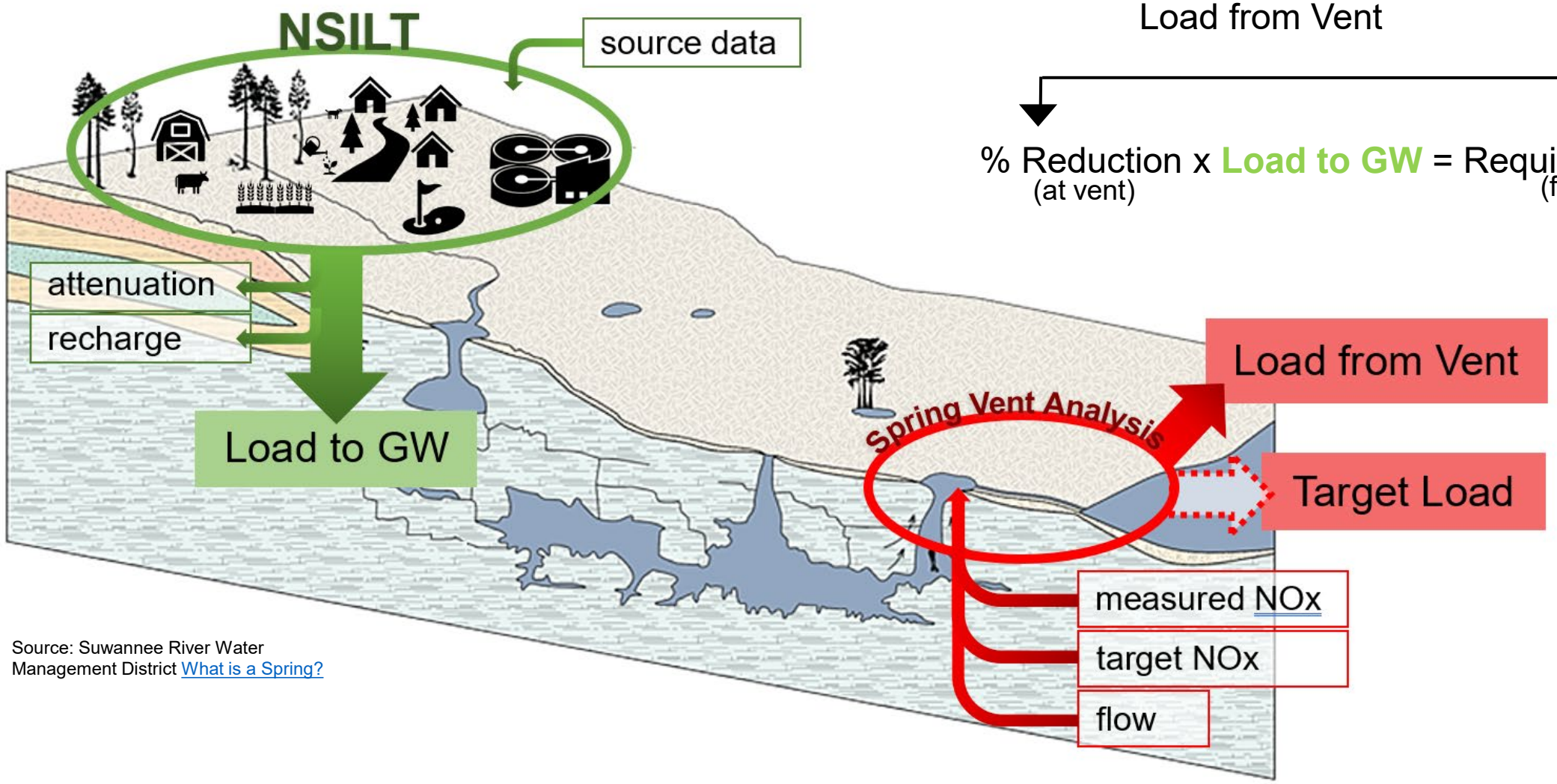
Applied the spring vent percent reduction to the updated NSILT loading.

Estimate the total reduction needed to meet the TMDL.

BMAP UPDATES
SPRING VENT LOAD ANALYSIS

(Load from Vent – Target Load) / Load from Vent = % Reduction (at vent)

% Reduction (at vent) x **Load to GW** = Required Reductions (from sources)



Source: Suwannee River Water Management District What is a Spring?

BMAP UPDATES
DRAFT SPRING VENT LOAD ANALYSIS

Springshed	Draft Nitrate Loads (lb-N/yr)			
	Total Load at Spring Vent *	TMDL Load #	Required Reduction	Percent Required Reduction
Madison Blue	364,088	73,979	290,110	80%
Middle Suwannee	1,382,888	218,665	1,164,223	84%
Lower Suwannee	1,593,042	162,212	1,430,830	90%

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

TMDL target is 0.35 mg/L and using the same flow data from 2012 to 2022.

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.
- Responsible entities will receive an allocation based on the combined necessary reductions estimated by source for their area based on the NSILT loading.
- Reduction strategies for each source will also be evaluated.

BMAP UPDATES

ALLOCATION AND REDUCTION APPROACH

Onsite Sewage Treatment and Disposal Systems (OSTDS)

- Reduction strategy is initially based on BMAP OSTDS requirements in Appendix D, with additional reductions based on actual loading from OSTDS.

Wastewater Treatment Facilities (WWTF)

- Reduction strategy is based on BMAP effluent requirements in the BMAP document and requirements in Florida law established 2021-2024.

Agriculture

- Reduction strategy based on:
  - BMP enrollment using a 15% reduction applied to farm fertilizer (FF) load to groundwater.
  - BMP enrollment using a 10% reduction applied to livestock waste (LW) and dairies.
  - Any remaining agricultural reductions will be allocated to agricultural regional cooperative elements, which could include regional projects, landowner initiatives, cost-share practices and innovative technologies.

Atmospheric Deposition (AD)

- Anticipate reductions to be addressed by reductions from other sources or regional projects.

BMAP UPDATES

ALLOCATION AND REDUCTION APPROACH

Urban Turf Fertilizer (UTF)

- Apply the spring vent percent reduction to the total UTF load to groundwater and allocate to the applicable local governments.

Sports Turf Fertilizer (STF)

- Apply the spring vent percent reduction to the STF load to groundwater and allocate to the applicable governments.

Golf Courses

- Reduction based on requirement of all golf courses to submit information on the implementation of BMPs and a NMP to address nutrient loading.

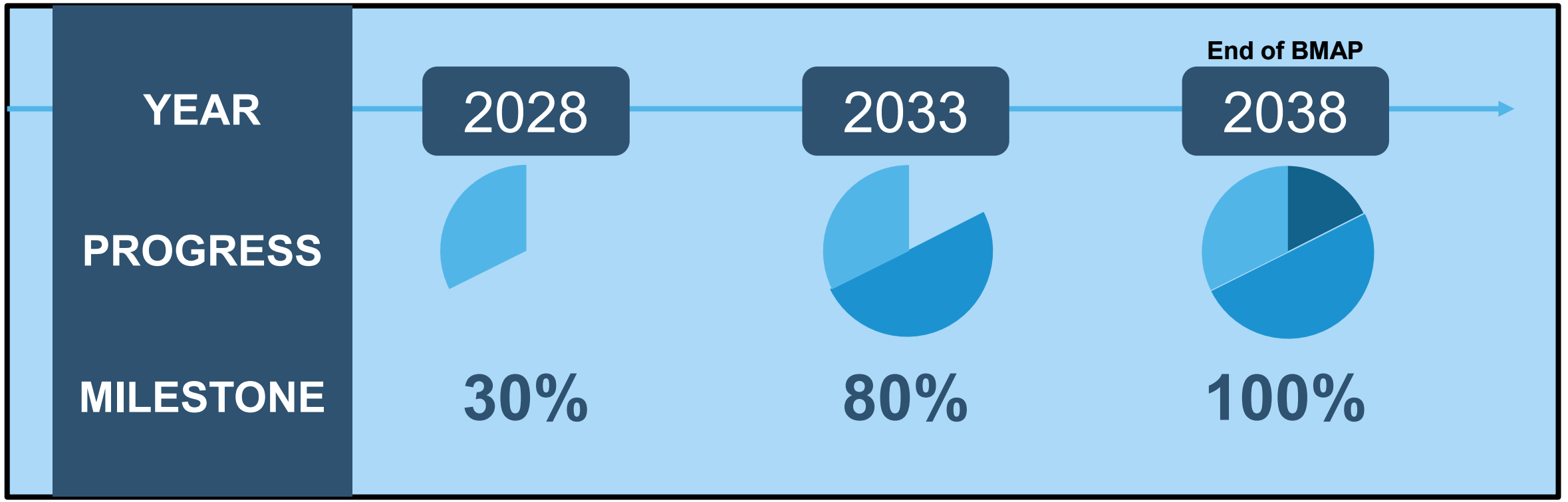
BMAP UPDATES
FUTURE GROWTH

- **Domestic Wastewater Projections:**
  - Use wastewater to estimate future growth projections.
  - Start with population growth for each county from Bureau of Economic and Business Research (BEBR):
    - 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 FLWMI for each BMAP county.
  - Use per person calculations to estimate future loads from WWTF and OSTDS.

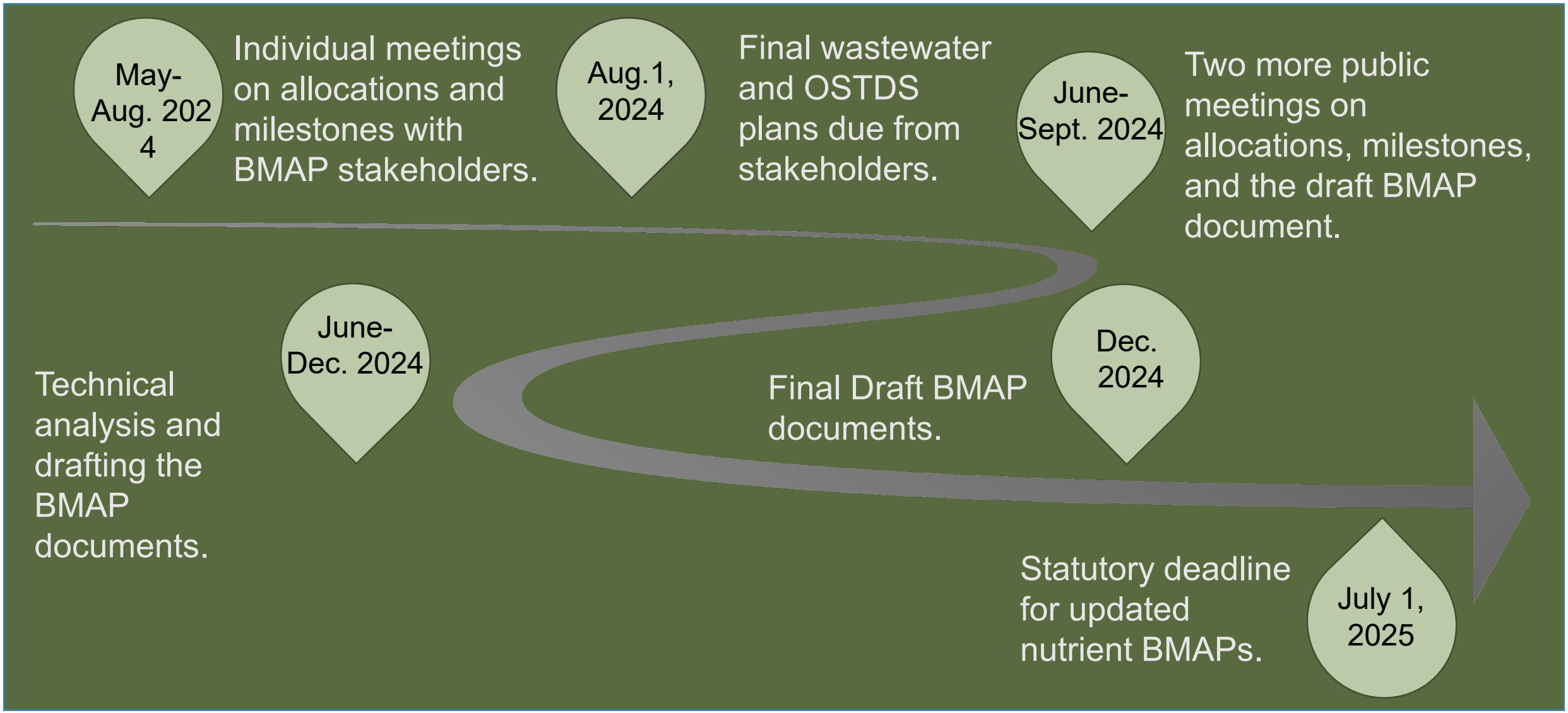
- **Agriculture Projections:**
  - Exploring different tools to estimate future changes in agricultural acreage in the BMAPs to estimate changes in agricultural loading.

BMAP UPDATES

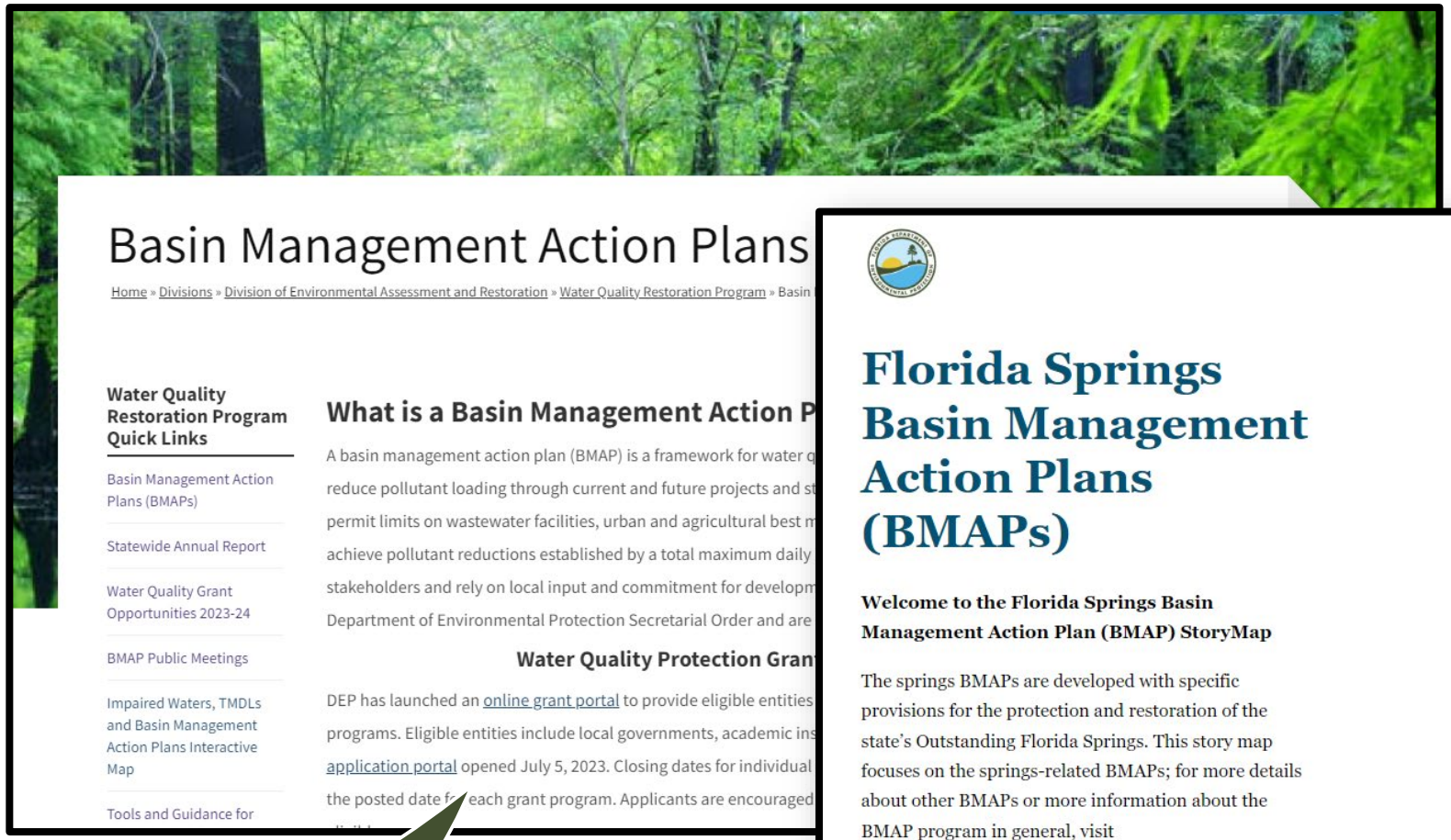
5-, 10-, AND 15-YEAR MILESTONES/REDUCTION SCHEDULE

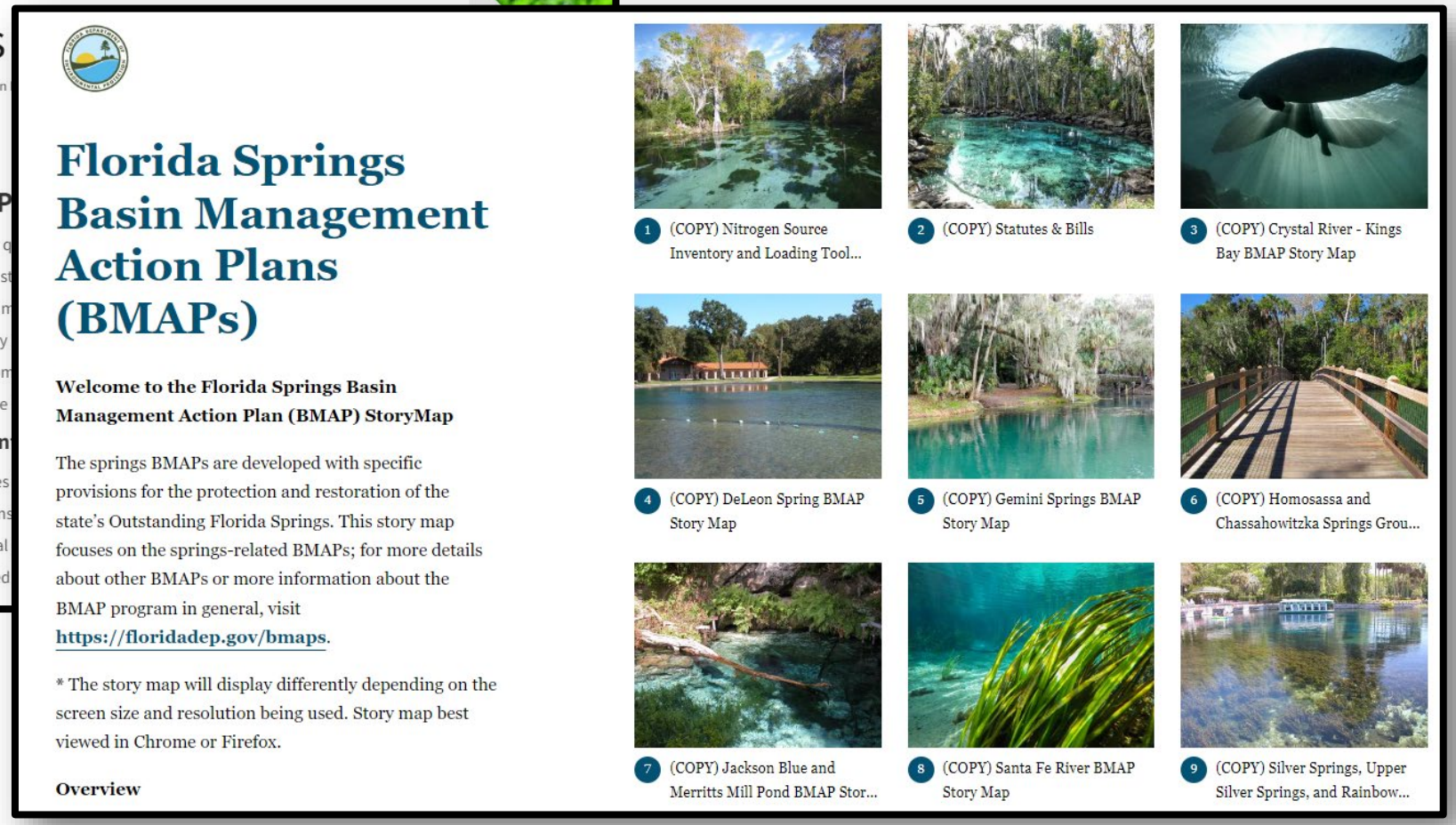


SPRINGS BMAP UPDATES TIMELINE



RESOURCES
BMAP WEBSITE AND STORYMAP





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Florida Department of Environmental Protection
Funding Opportunities

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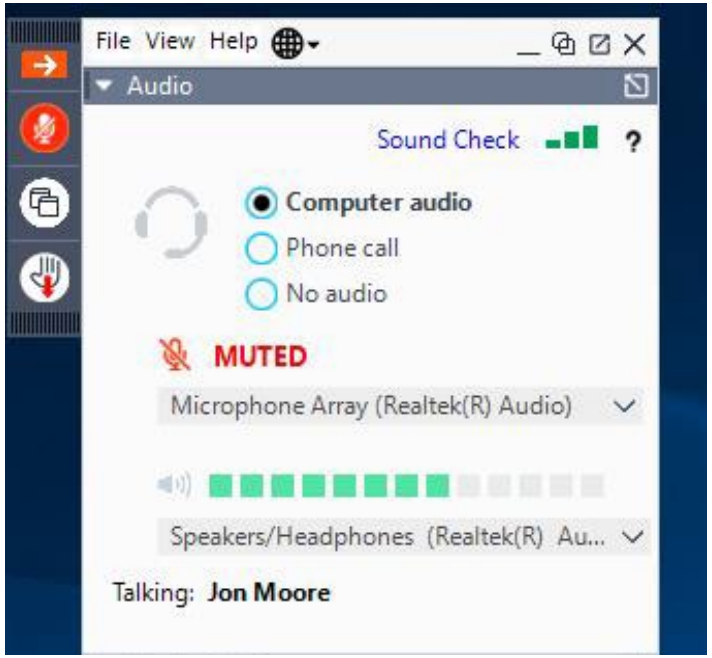

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THANK YOU

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FLORIDA DEPARTMENT OF
ENVIRONMENTAL PROTECTION

Florida Department of Environmental Protection (DEP)
Suwannee River Basin Management Action Plan (BMAP)
Question and Answer (Q&A) Summary
Public Meeting on May 24, 2024
10:00 am – 11:24 am
Via GoToWebinar

Attendees

Richmond Abellera, DEP
Eesa Ali, Applied Sciences
Mitchell Allen, State Representative Allison Tant's Office
Stephanie Armstrong, SRWMD
Kelly Aue, University of Florida
Nicki Bailey, Levy County
Lisa Bally, ATM
Emily Beach, University of Florida
Evelyn Becerra, DEP
Connie Becker, DEP
JP Bell, Florida Realtors
Marcelo Blanco, DEP
Eric Blount, Palm Bay
Del Bottcher, SWET
Amy Brown, SRWMD
Lynette Brown, BDA
Tiffany Busby, Wildwood Consulting
Andrew Carswell, Levy County
Leidyane Carter, SRWMD
Laura Catlow, Citizen
Stacy Cecil, SJRWMD
Unknown, The Florida Channel
Sandra Chupinsky, DEP
Daniel Corbett, DEP
Chris Dawson, Gray Robinson
Mary Diaz, SRWMD
Paul Donsky, University of Florida
Chloe Dougherty, Florida Springs Council
Kim Duffek, DEP
Michael Dukes, University of Florida
Douglas Dycus, FDOT
Kristine Eskelin, SRWMD
Amanda Exposito-Ferree, Atkins Realis
Chris Fagerstrom, Pond Co.
Chris Farrell, Audubon Florida
Jessica Fetgatter, DEP
Casey Fitzgerald, Citizen
Sher Gache, Citizen
Meriah Gannon, CDM Smith
Diane Garte, Citizen
Tina Gordon, Wildwood Consulting
Trisha Green, DEP
Jade Greene, DEP
Roxanne Groover, FOWA
Sam Hankinson, DEP
Kira Hansen, Kimley-Horn
Madeline Hart, FDACS
Kenny Hayman, DEP
Janet Hearn, ATM
Stacey Hectus, Levy County
Ray Hodge, United Dairy Farmers
Robin Holland, FDACS
Moira Homann, DEP
Jason Icerman, City of Tallahassee
Merrillee Jipson, Citizen
Andrew Johnston, Citizen
Dustin Jones, FDOH
Chandler Keenan, DEP
Chuck Key, Citizen
Sean King, SRWMD
Scott Knight, Wetland Solutions
Jacob Landfield, SFWMD
Greg Lang, Mittauer & Associates
Celeste Lyon, RES
Leroy Marshall, SRWMD
Max McAmis, Pasco County
Kelsey McDaid, University of Florida
Morgan Morrow, FDACS
Jim Myles, DB Environmental
Ryne Nimmo, DEP
Trevor Noyes, NFPS
Brittney O'Neal, FDACS
Alan Obaigbena, Citizen
Kevin O'Donnell, DEP
Michael Osborn, Lake County
Robert Palmer, Citizen
Lindsey Pavao, Alachua County

John Petrohovich, Mittauer & Associates
Henry Phillips, Citizen
Elizabeth Pickett Gray, Citizen
Nicolas Pisarello, ATM
Paul Plourde, Citizen
Marty Proctor, Citizen
John S. Quarterman, Citizen
Lorna Radcliff, SRWMD
Joanna Reilly-Brown, Alachua Conservation Trust
Alden Rosner, Suwannee Parks
Kristin Rubin, Citizen
Kimberly Shugar, DEP
Ryan Smart, Florida Springs Council
Patricia Spellman, University of South Florida
John Spencer, Geosyntec
Jennifer Thera, FDACS
John Thomas, Citizen
Debby Tipton, DEP
Joanne Tremblay, Citizen
Jonathan Turner, FDOT
Shreya Vuttaluru, Tampa Bay Times
Brandon Wanner, Stantec
Ken Weaver, DEP
Stefani Weeks, Holloway
Tanya Welborn, DEP
Brenda Wells, Florida Springs Council
Benita Whalen, Dispersed Water
Kim Wheeler, Citizen
Barton Wilder, FDACS
Kevin Wright, Oak River Farms
Sarah Younger, Citizen

Suwannee River BMAP Overview

Q: Are written public comments and questions that were posted going to be addressed today?
A: We will be specifically addressing questions that are directly related to the material presented today.

Q: Is this the only public meeting scheduled for this basin before the new BMAP is determined?
A: No, DEP will have additional public meetings for this and the various other springs BMAPs.

Q: Can you repeat what "DEAR" represents?
A: DEAR is the Division of Environmental Assessment and Restoration within DEP.

Q: On the charts shown, why does the nitrate concentration data stop in late 2020 or early 2021? Where is the most recent data?
A: The charts shown in the presentation represent two decades of data in the Impaired Waters Rule (IWR) database, which is used for assessments. More recent data is available in the Watershed Information Network (WIN) database.

Q: Is the WIN database available if someone wanted to do a comparison over time? How difficult is WIN to use if you are not a professional?
A: Yes, the WIN database is user friendly. If you have issues, you can reach out to DEP staff for assistance. Also, feedback on how to improve WIN is always welcome.

Q: What is the time period between samples provided in WIN and what is the frequency?
A: For questions about WIN, please contact Justin Nelson at Justin.M.Nelson@FloridaDEP.gov. He is the WIN Coordinator for the northeast region of the state.

Nitrogen Source Inventory Loading Tool (NSILT) Results

Q: A portion of the Floridan Aquifer recharge area lies in Georgia. Is any attention being given to nitrate sources beyond the Florida-Georgia state line?
A: Being in Florida, we have only evaluated the Florida component of the basins. DEP has not looked at incorporating any loading estimates coming from Georgia. We need to address the source loading from Florida.

Q: Where does the percentage of load impacting the spring come from for each recharge area (high, medium, low)?
A: The recharge rates are consistent with what was used in the previous NSILTs and are based on literature review that considers aquifer confinement, vulnerability, and connectivity to the spring head.

Q: How are the surface water map perimeters determined and why are some connected watersheds, including the Ocklawaha River, not included in the BMAP perimeter boundary?
A: The Upper Ocklawaha River Basin has its own BMAP that provides for the protection and restoration of those surface waters.

Q: Have the attenuation assumptions changed from the 2018 analyses?
A: The attenuation rates have remained the same in this BMAP, with the exception of the onsite sewage treatment and disposal systems (OSTDS) (or "septic systems") attenuation factor being updated based on Florida-specific studies and feedback from the DEP OSTDS group.

Q: Are the loading rate units in total nitrogen?
A: The loading here is based on nitrate being the primary form of nitrogen.

Q: Is geographic information systems (GIS) information available for the NSILT analysis?
A: Please send an email to BMAPProgram@FloridaDEP.gov letting us know which files you are interested in, and we can provide them to you.

Q: Why would livestock waste (90%) attenuate more than farm fertilizer (80%)?
A: Discussion with Florida Department of Agriculture and Consumer Services (FDACS) indicated that livestock waste is an organic source with less movement through the soil column.

Q: How are contributions of nutrient loads considered as the Santa Fe River flows into the Lower Suwannee?
A: For the NSILT loading, we are assessing the groundwater loading at the spring vents, so the surface flows are outside the scope of the NSILT process. There is a Santa Fe River BMAP and if there is an interconnection between the rivers, reductions done for the Santa Fe BMAP will also benefit the Suwannee River watershed.

Q: Regarding DEP-permitted dairies and wastewater facilities, is dairy loading calculated as dairy or wastewater?
A: Loads from DEP-permitted dairies are considered dairy contributions. The NSILT considers confined animal feeding operations (CAFO)-permitted dairies as well as non-CAFO dairies. Different evaluations are used for non-CAFO dairies that do not have nutrient management plans (NMPs).

Q: How has the NSILT predicted the nitrogen loads to groundwater compared to the measured loads at the spring vent to see how they compare?
A: The NSILT does not model groundwater transport and spring vent loading, it is a GIS based tool to estimate loading from various anthropogenic sources. We have done a spring vent analysis review, but it is difficult to compare the two directly due to unknown transport dynamics, lag time, legacy loading, and other complex dynamics of the groundwater systems. The NSILT and spring vent analysis together allow us to estimate loading to groundwater and needed reductions at the spring vent.

Q: Can you go into more detail on how NMPs are used to evaluate nitrogen from dairies?

A: The NMPs provide details on the loading expected from animals on site and waste handling practices. The plans determine the expected loading left and applied at the end of the waste handling practices. These factors were used to directly estimate the loading from CAFO dairies.

Q: Have the atmospheric depositions calculations in and around poultry farms shown higher nutrient loading in surface waters and the spring vent discharges? Has clear cutting had a calculation in atmospheric deposition?
A: The atmospheric deposition data that was used for this analysis will capture atmospheric deposition from the different sources, such as poultry, throughout the basin.

Spring Vent Load Analysis Results
Q: Since agriculture is the source of the greatest loading, why are the reductions not greater? The 10% to 15% reduction for an industry that is a primary contributor seems low.
A: While agriculture is a large contributor in this area, all sources need to be addressed. Producers are required by statute to enroll in best management practices (BMPs) or perform monitoring; the 10% to 15% reduction estimate is related to BMP enrollment. There are several other initiatives that DEP will be using to reduce agricultural loading, such as regional projects and cost-shares. Those other mechanisms will help further address fertilizer loading beyond those estimated from BMP enrollment.

Q: DEP mentioned meeting with the different entities. Will DEP work with individual producers?
A: DEP will be coordinating that with FDACS who have working relationships with producers, as well as the water management districts and University of Florida Institute of Food and Agricultural Science (UF-IFAS) to determine the best strategies to meet those allocations.

Next Steps - BMAP Updates
The meeting adjourned at 11:24 am.