



DeLeon Spring, Gemini Springs, and Volusia Blue Spring Basin Management Action Plan Updates

May 29, 2024 at 10:00 AM EDT

Via Webinar

Webinar Registration Link:

<https://register.gotowebinar.com/register/8372977197403250264>

Agenda

- DeLeon Spring, Gemini Springs, and Volusia Blue Spring 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/](https://publicfiles.dep.state.fl.us/-/DEAR/BMAP/Outstanding%20Florida%20Springs%20BMAPs/)
For more information on the DeLeon, Gemini, and Volusia Blue Spring BMAPs, contact:
Charles "Ryne" Nimmo at (850) 245- 8086, Charles.Nimmo@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.



The screenshot displays the webinar control interface. At the top, there is a 'File View Help' menu. Below it, the 'Audio' section is highlighted with a red box. It includes a 'Sound Check' indicator with three green bars and a question mark. Two radio buttons are visible: 'Computer audio' (unselected) and 'Phone call' (selected, indicated by a red arrow). Below the radio buttons, a microphone icon is shown with the word 'MUTED' in orange. There are two dropdown menus for audio devices: 'Transmit (Plantronics Savi 7xx-M)' and 'Receive (Plantronics Savi 7xx-M)'. A volume slider is also present. Below the audio section, the 'Questions' panel is also highlighted with a red box. It contains a text input field with the placeholder '[Enter a question for staff]' and a 'Send' button. The text '(Example Only)' is written in red above the 'Send' button. At the bottom of the interface, the text 'Webinar Housekeeping' and 'Webinar ID: 608-865-371' is displayed, along with the GoToWebinar logo.



DELEON SPRING, GEMINI SPRINGS, AND VOLUSIA BLUE SPRING BASIN MANAGEMENT ACTION PLAN UPDATES

Charles "Ryne" Nimmo, Environmental Consultant
Sam Hankinson, Professional Geologist II
Water Quality Restoration Program
Florida Department of Environmental Protection
GoTo Webinar | May 29, 2024



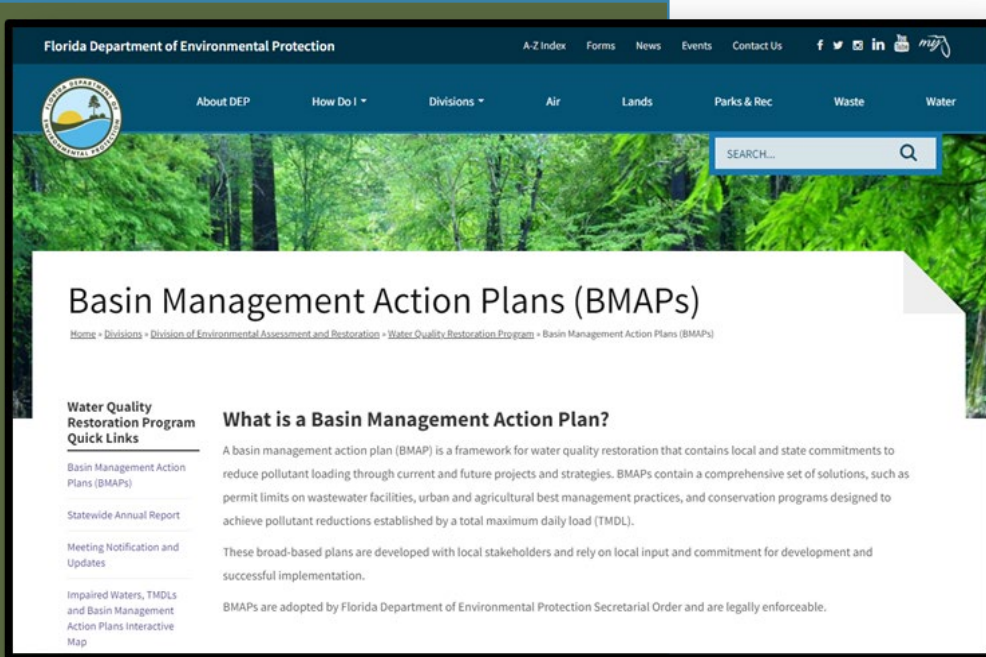
AGENDA

- 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.





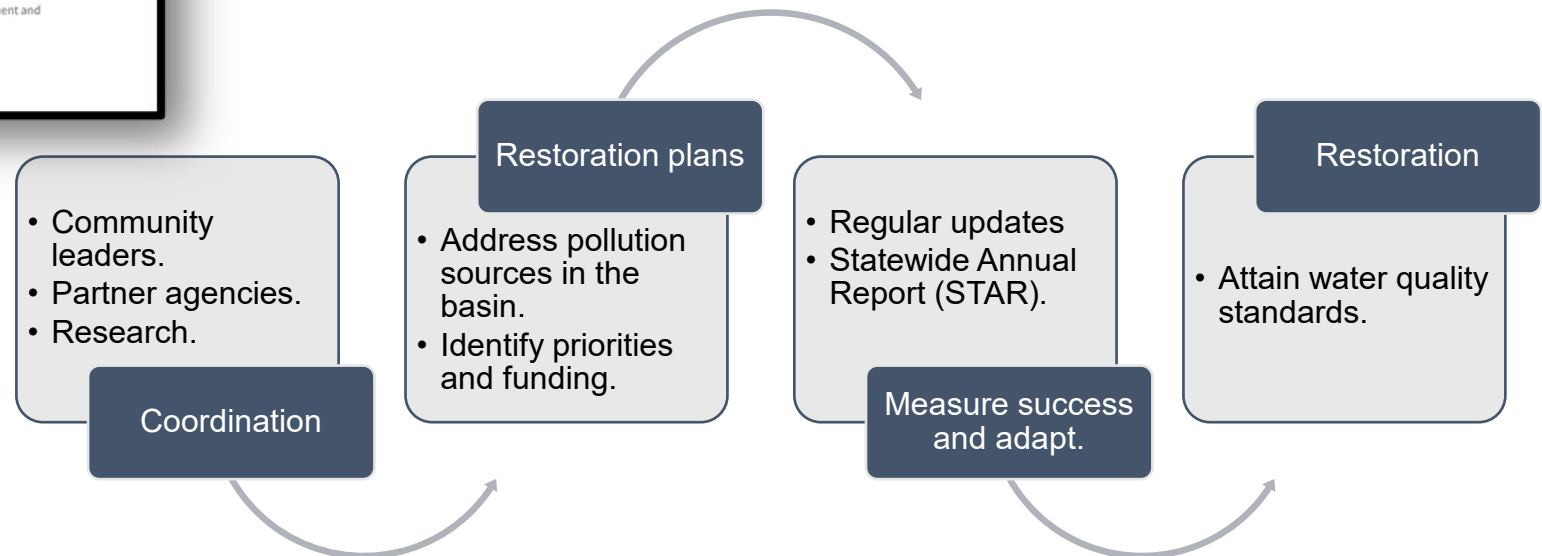
BASIN MANAGEMENT ACTION PLANS (BMAPs)



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.

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





KEY BMAP COMPONENTS

- Total maximum daily loads (TMDLs) being addressed.
- Area addressed by the restoration plan.
- Identify sources.
- Phased implementation approach.
- Milestones.
- Projects and management strategies.
- Future growth impacts.

Projects to meet the TMDL:

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

Process to assess progress toward achieving the TMDL:

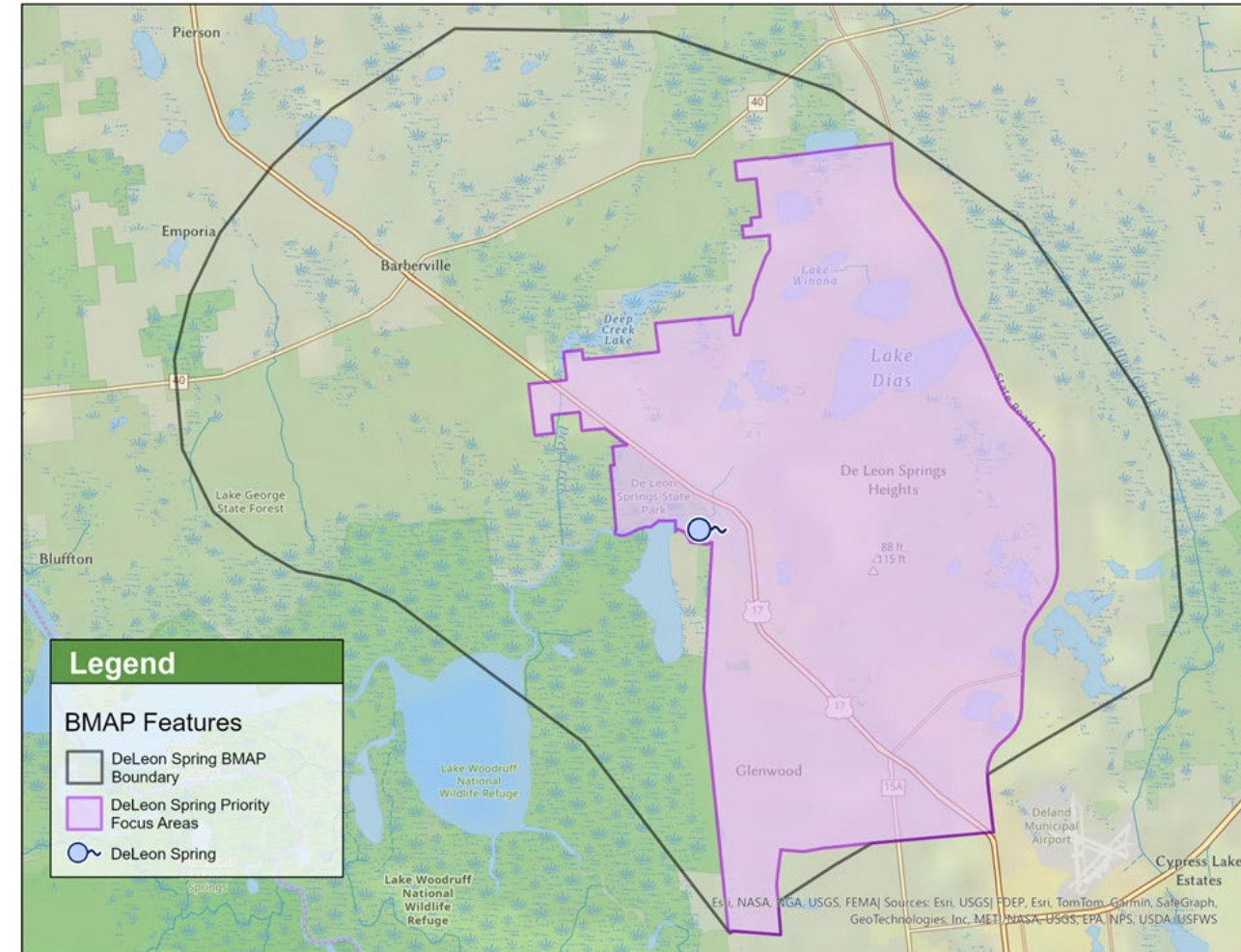
- Monitoring plan.
- Project reporting.
- Periodic follow-up meetings.
- Water quality analyses.



DELEON SPRING BMAP

- BMAP area is approximately 65,392 acres located in Volusia County.
- Impaired for the nitrate form of nitrogen.
- TMDL is a annual average target of 0.35 mg/L of nitrate.

Type of Entity	Name
Responsible Stakeholders	Volusia County
Responsible Agencies	Florida Department of Agriculture and Consumer Services Florida Department of Environmental Protection Florida Department of Health St. Johns River Water Management District
Other Interested Stakeholders	1000 Friends of Florida Agricultural Producers Blue Springs Alliance Citizens/Homeowners East Central Florida Regional Planning Council Florida Department of Transportation Florida Farm Bureau Florida Onsite Wastewater Association Save the Manatee Club Septic Contractors Volusia Water Authority

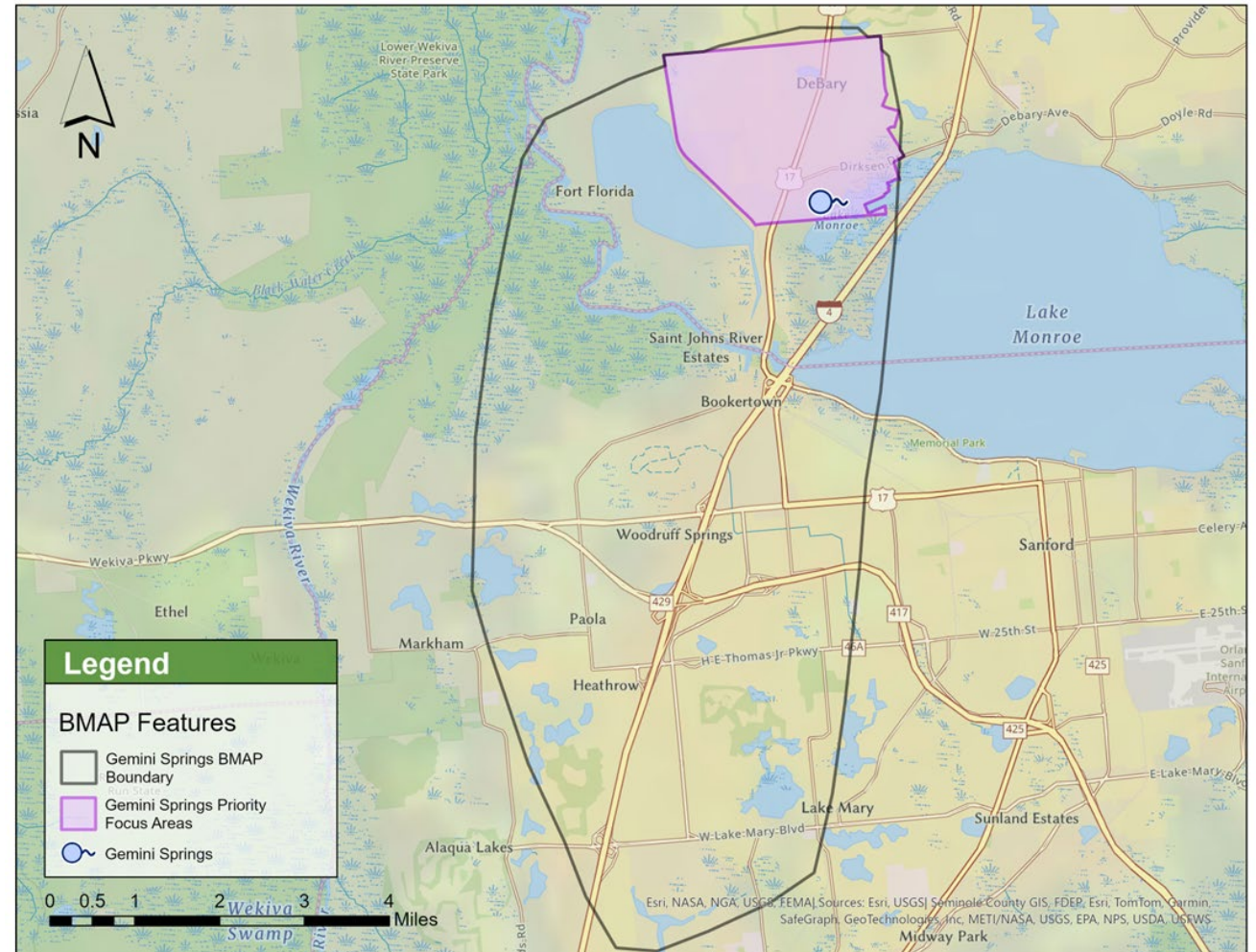




GEMINI SPRINGS BMAP

- BMAP area is approximately 27,290 acres in Seminole and Volusia Counties.
- Impaired for the nitrate form of nitrogen.
- TMDL is a annual average target of 0.35 mg/L of nitrate.

Type of Entity	Name
Responsible Stakeholders	City of DeBary City of Lake Mary City of Sanford Seminole County Volusia County
Responsible Agencies	Florida Department of Agriculture and Consumer Services Florida Department of Environmental Protection Florida Department of Health Florida Department of Transportation St. Johns River Water Management District
Other Interested Stakeholders	Agricultural Producers Blue Springs Alliance Citizens/Homeowners East Central Florida Regional Planning Council Florida Farm Bureau Florida Onsite Wastewater Association Save the Manatee Club Septic Contractors Volusia Blue Audubon Volusia Water Alliance

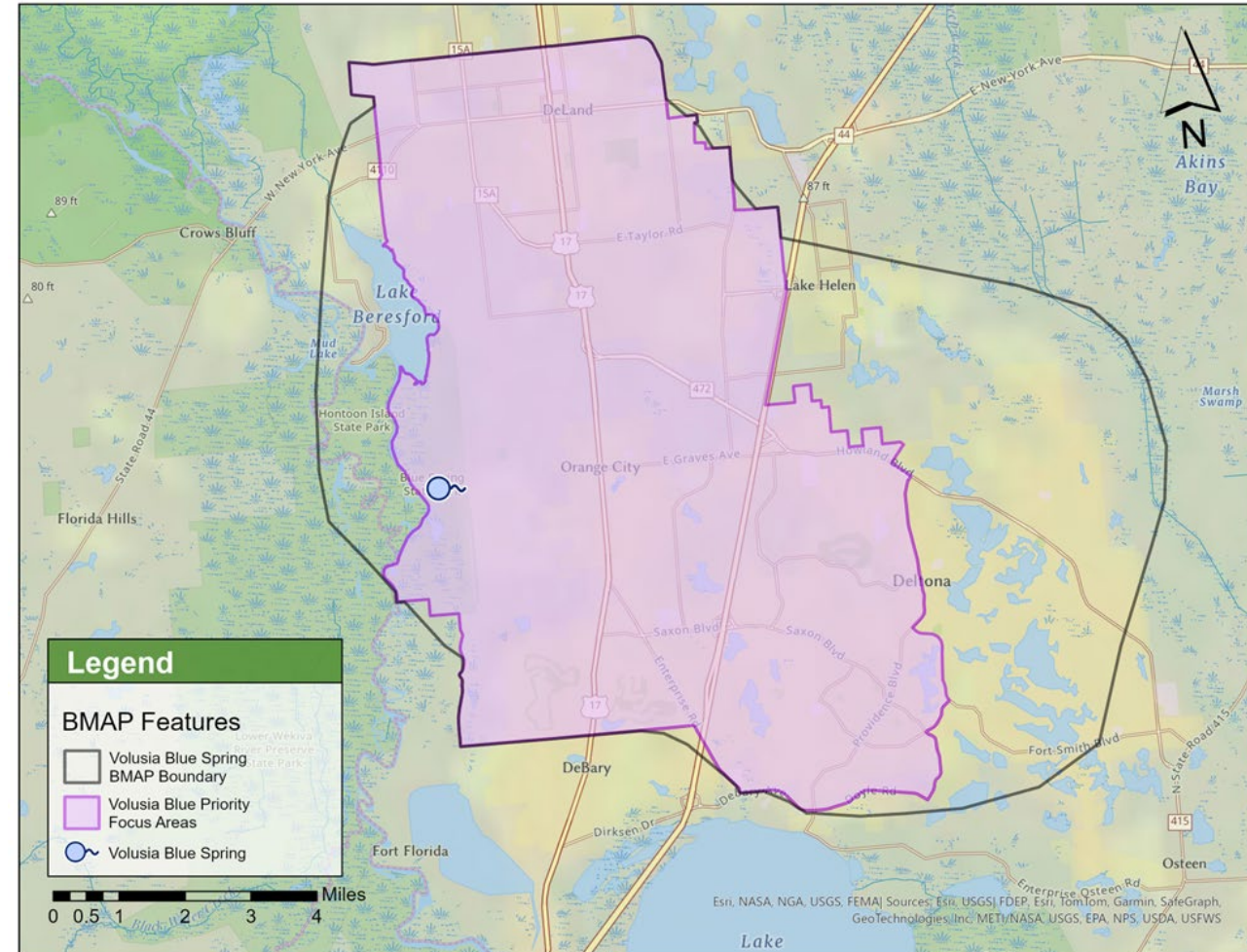




VOLUSIA BLUE SPRING BMAP

- BMAP area is approximately 69,102 acres in Volusia County.
- Impaired for the nitrate form of nitrogen.
- TMDL is a monthly average target of 0.35 mg/L of nitrate.

Type of Entity	Name
Responsible Stakeholders	City of DeBary
	City of DeLand
	City of Deltona
	City of Lake Helen
	City of Orange City
	Volusia County
Responsible Agencies	Florida Department of Agriculture and Consumer Services
	Florida Department of Environmental Protection
	Florida Department of Health
	Florida Department of Transportation
	St. Johns River Water Management District
Other Interested Stakeholders	Blue Spring Alliance
	Florida Fish and Wildlife Conservation Commission
	Florida Onsite Wastewater Association
	Homeowners/Citizens
	Save the Manatee Club
	Stetson University
	University of Florida Institute of Food and Agricultural Sciences





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 Onsite Sewage Treatment and Disposal System (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

Increased protection for Outstanding Florida Springs (OFS).

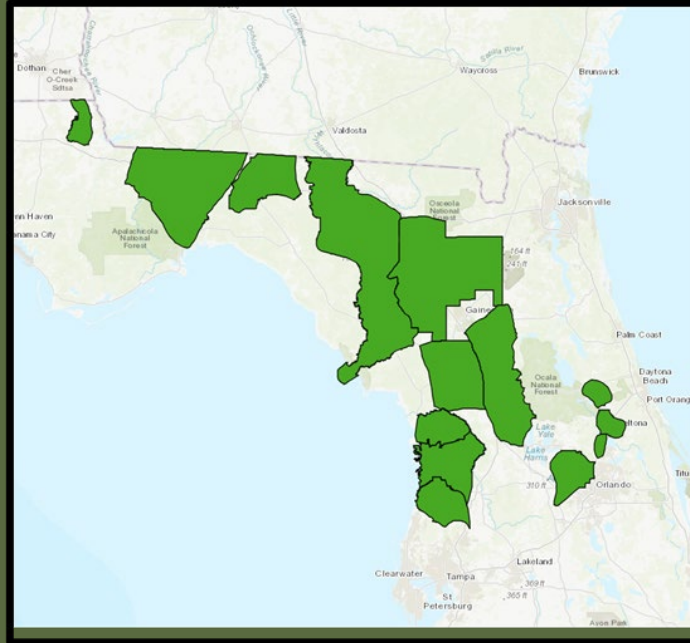
Strengthens Water Quality Protections and BMAPs.

HB1379

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 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.

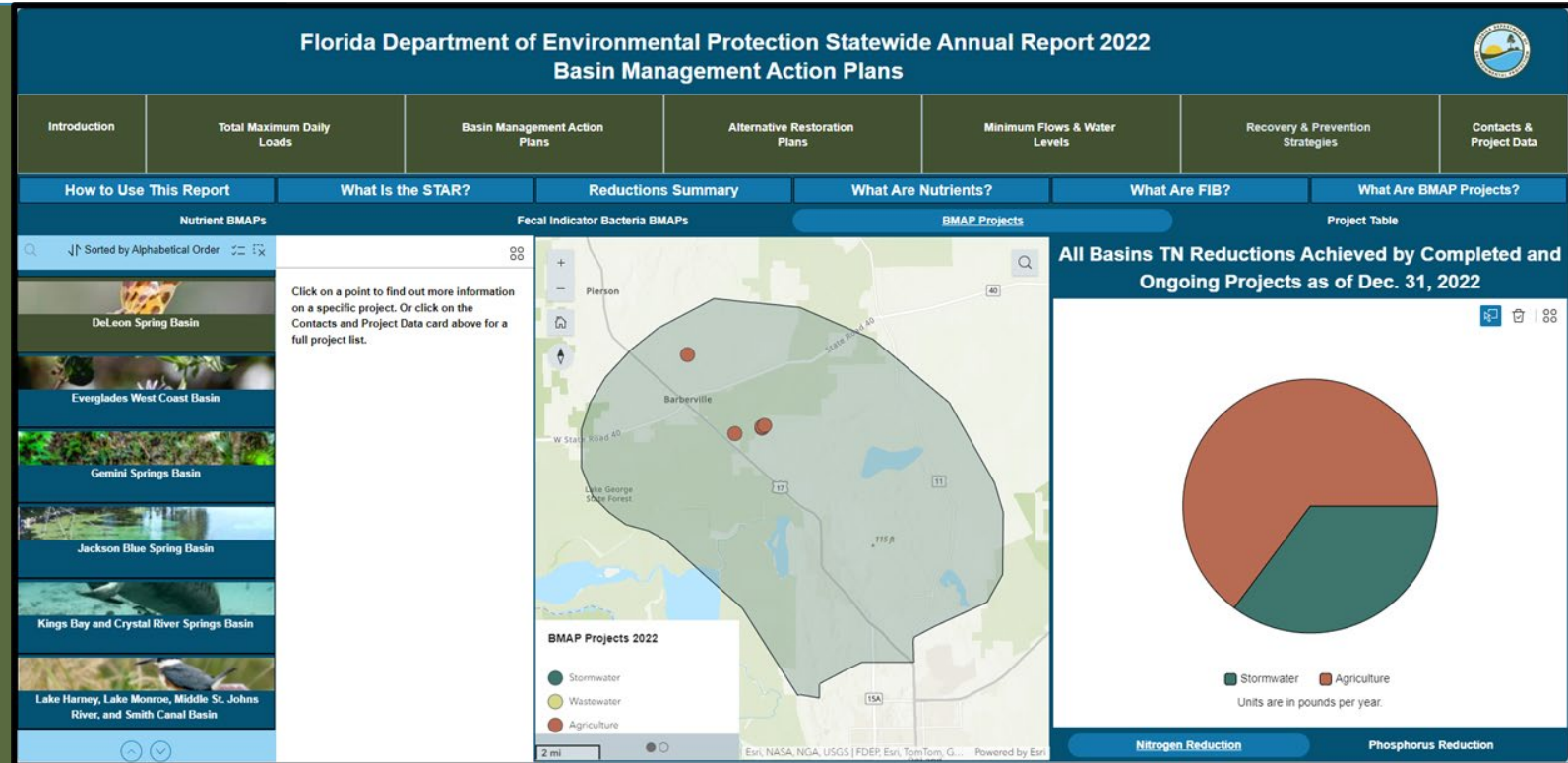


STAR

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

DELEON SPRING, GEMINI SPRINGS, VOLUSIA BLUE SPRING BMAPS

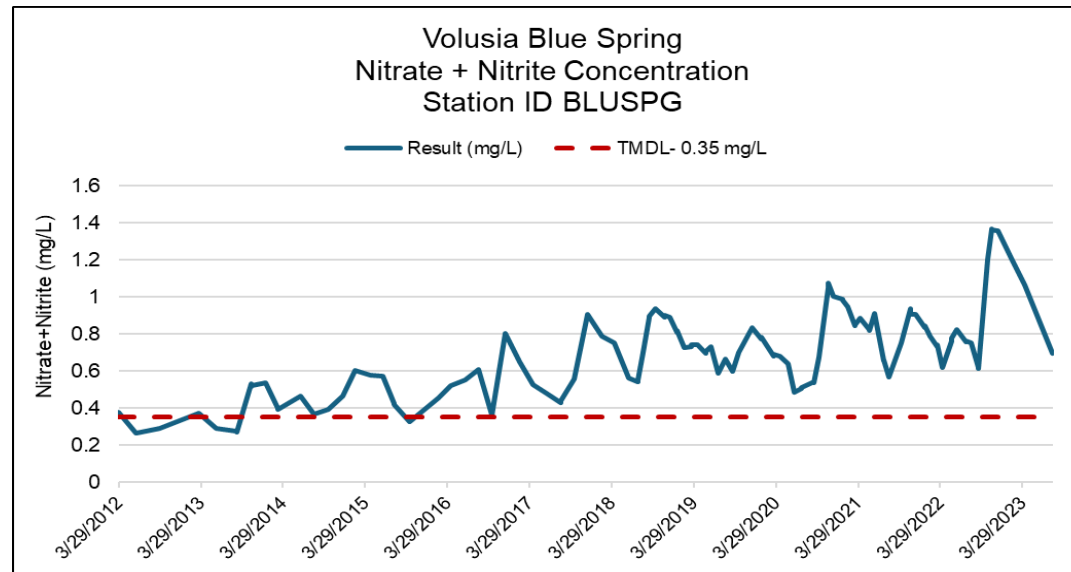
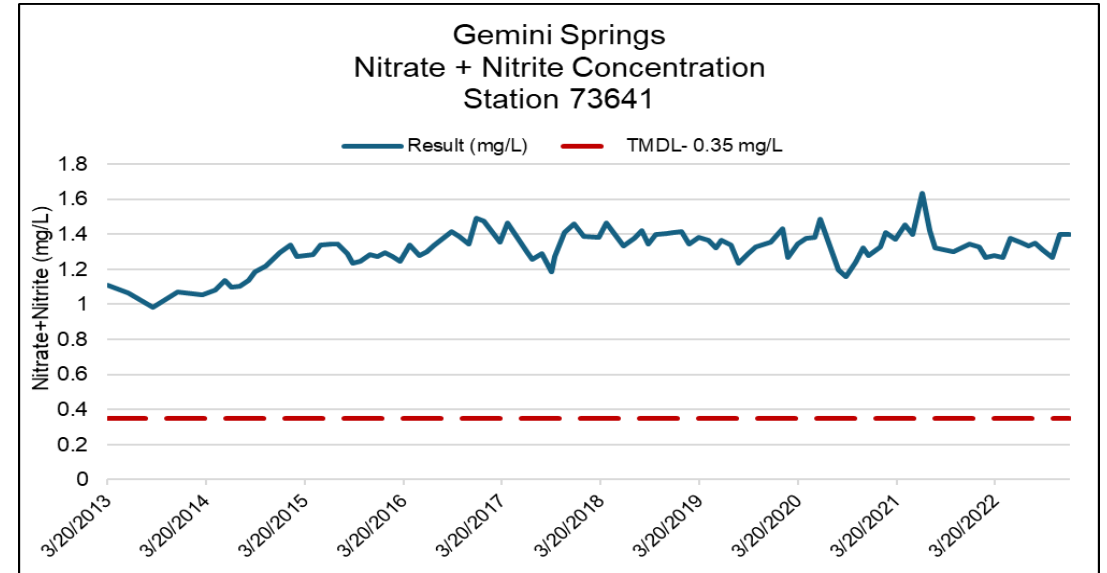
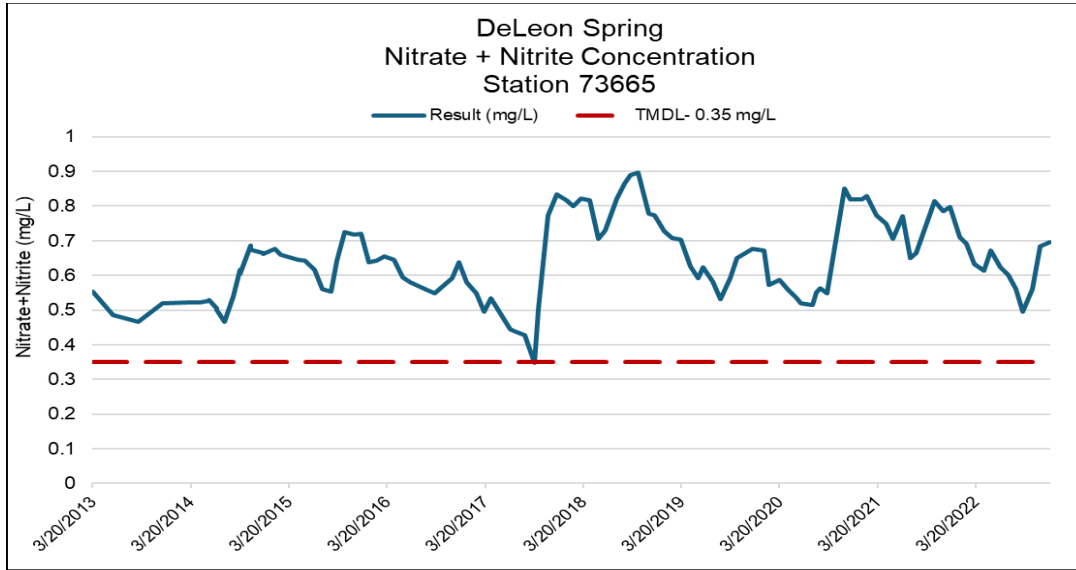
BMAP	Project Count *					Verified Project Reductions of Total Nitrogen
	Planned	Ongoing	Underway	Completed	Total	
DeLeon Spring	3	4	3	1	11	3,864 lbs./yr.
Gemini Springs	5	15	6	9	45	2,151 lbs./yr.
Volusia Blue Spring	25	18	10	34	87	20,186 lbs./yr.

*As of Dec. 31, 2023



WATER QUALITY DATA

NITRATE DATA





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 are used by DEP for standards development, Impaired Waters Rule (IWR) 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
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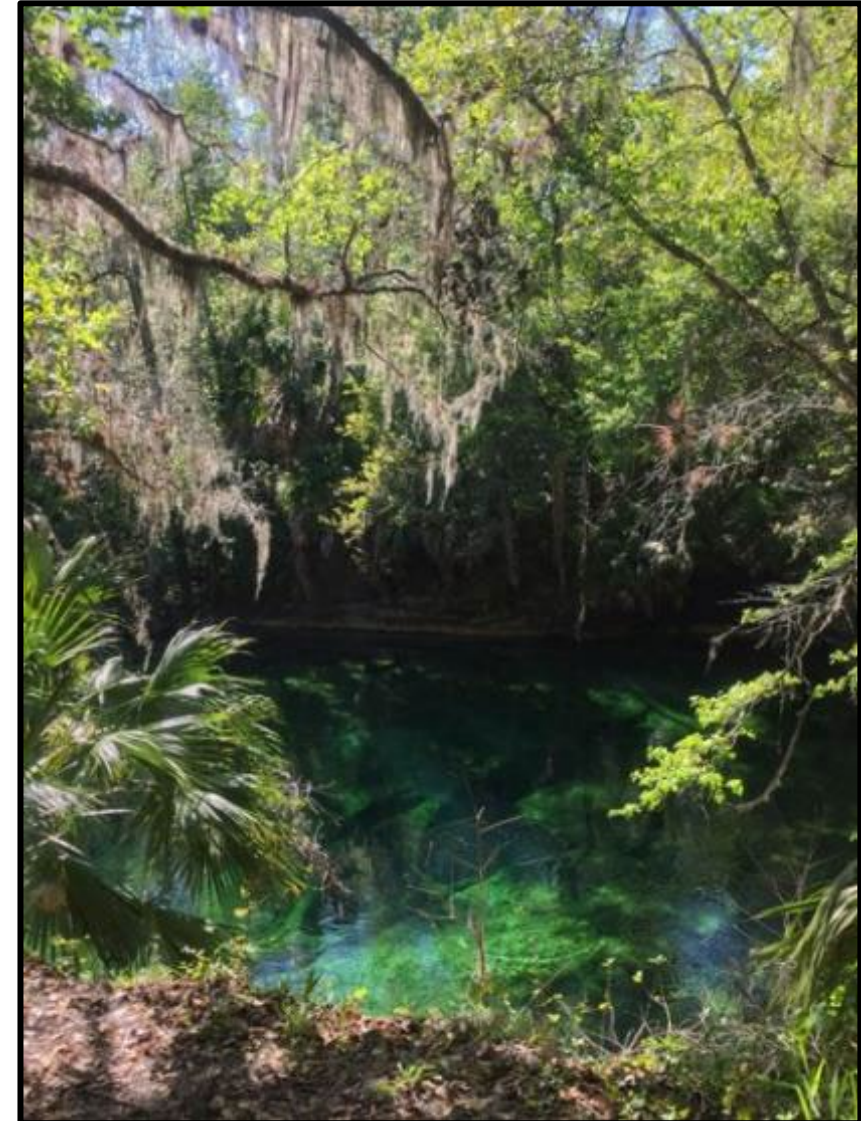


BMAP UPDATES

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 projects.
 - Incorporate Clean Waterways Act (SB 712) requirements.
 - Incorporate HB 1379 requirements.
 - Incorporate regional projects.

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



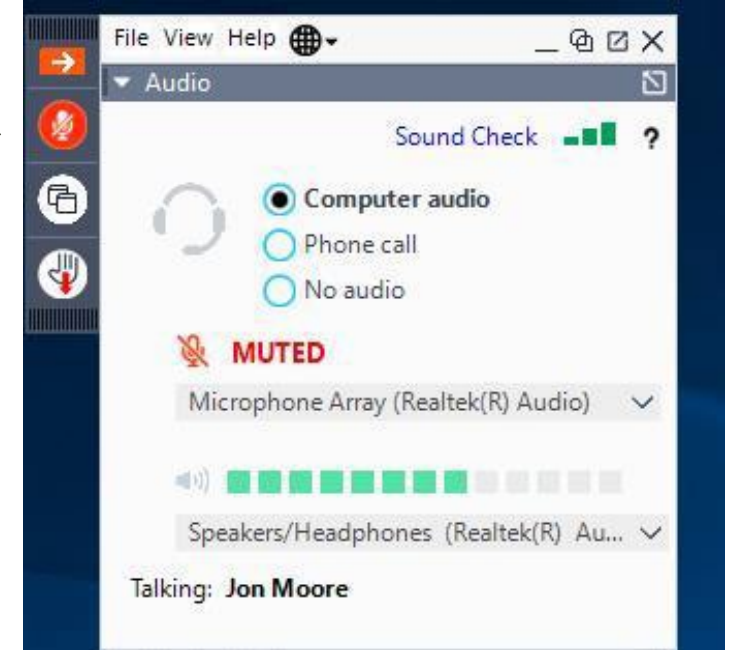


BMAP MEETING

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: BMAPPprogram@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.

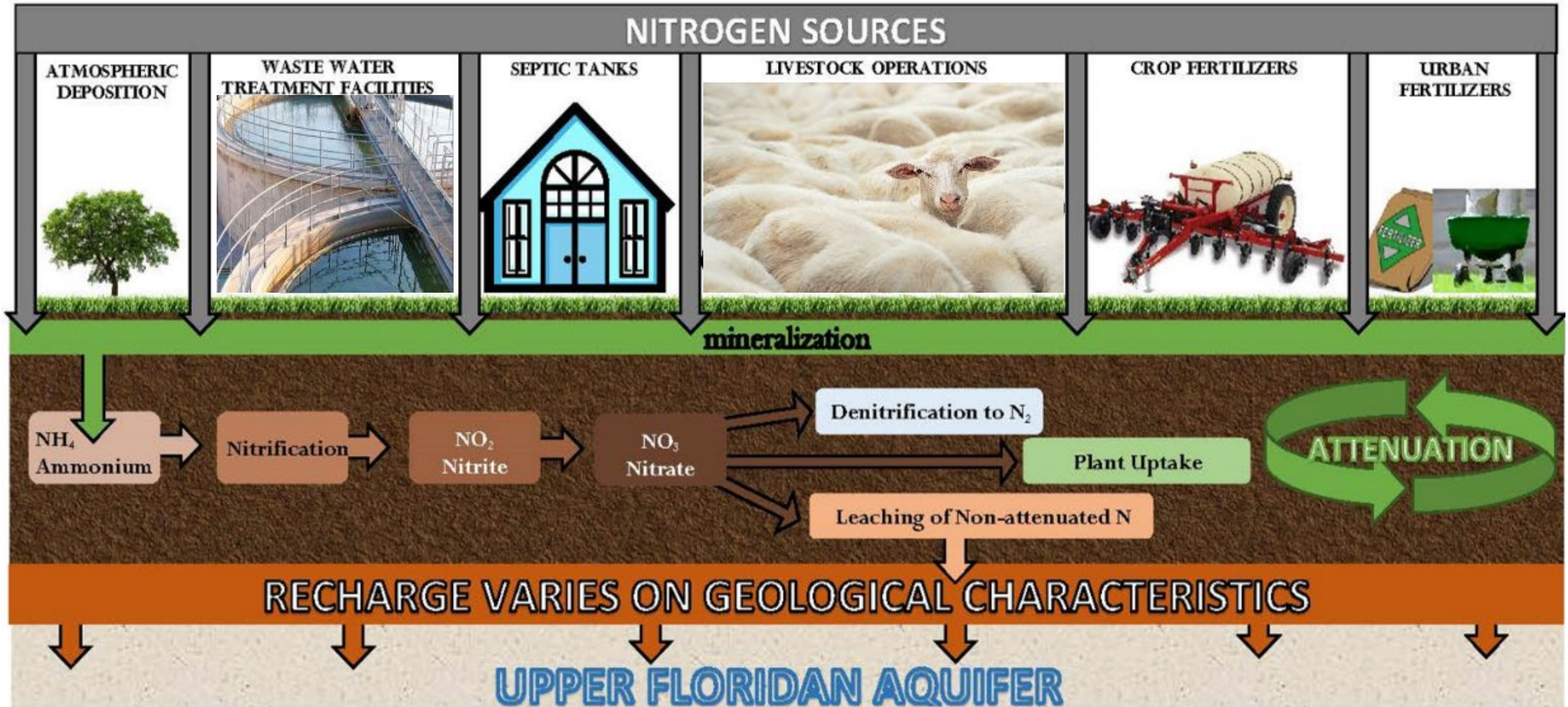
Apply a source specific, literature derived biochemical attenuation factor to surface loading estimate.

Apply a location specific recharge factor to surface loading estimate.

LOADING TO GROUNDWATER.

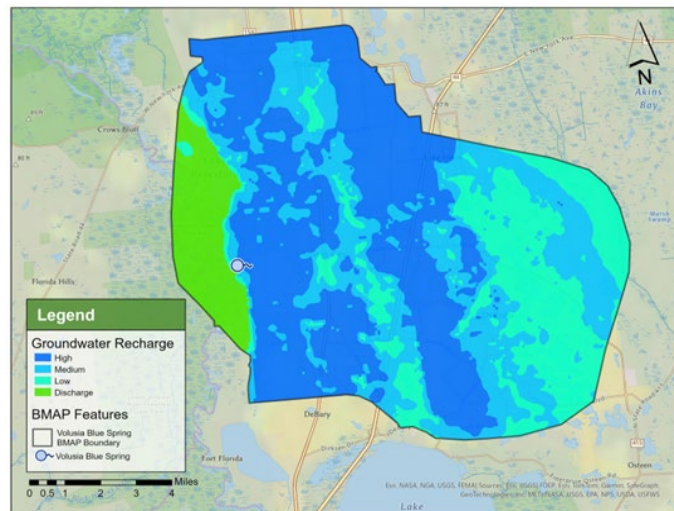
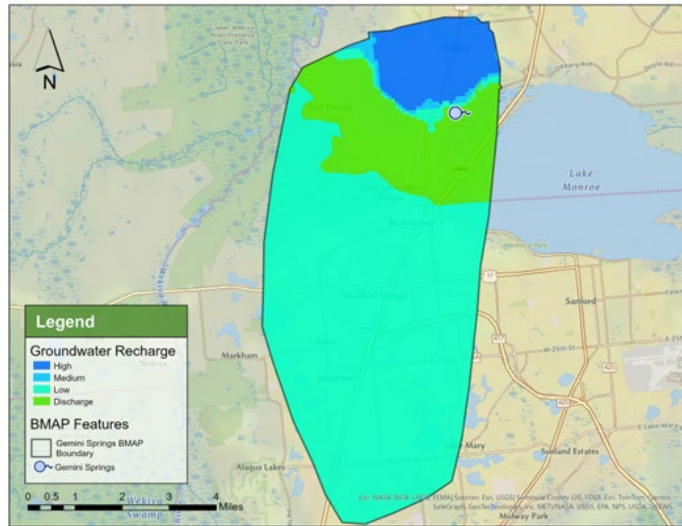
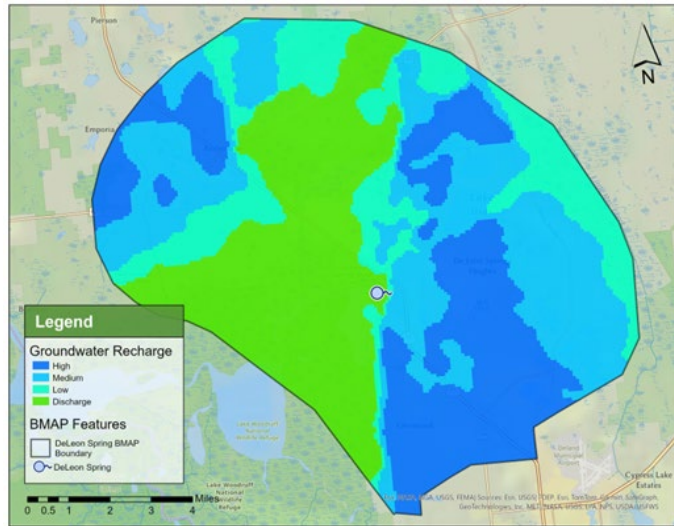


NITROGEN CYCLE AND ATTENUATION





RECHARGE TO GROUNDWATER



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

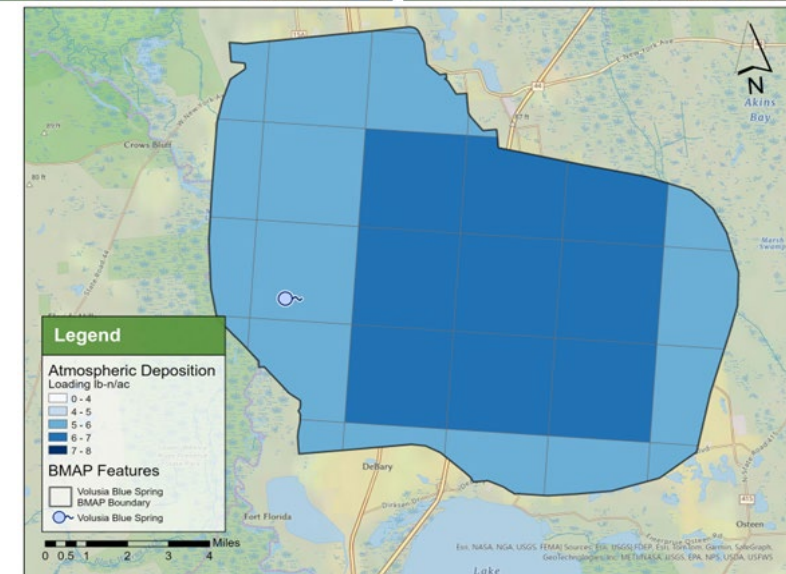
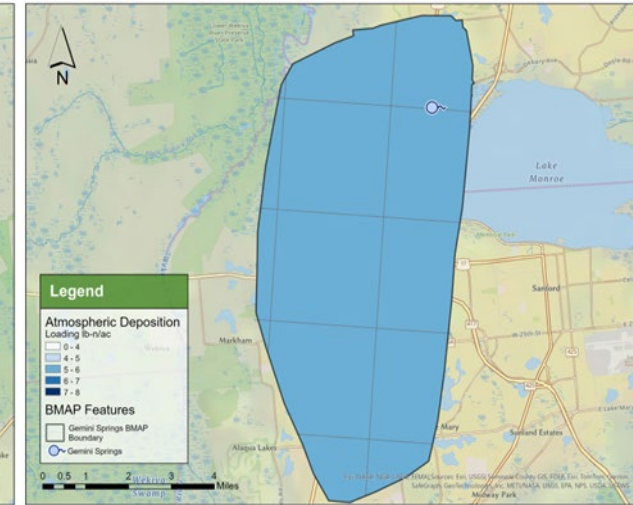
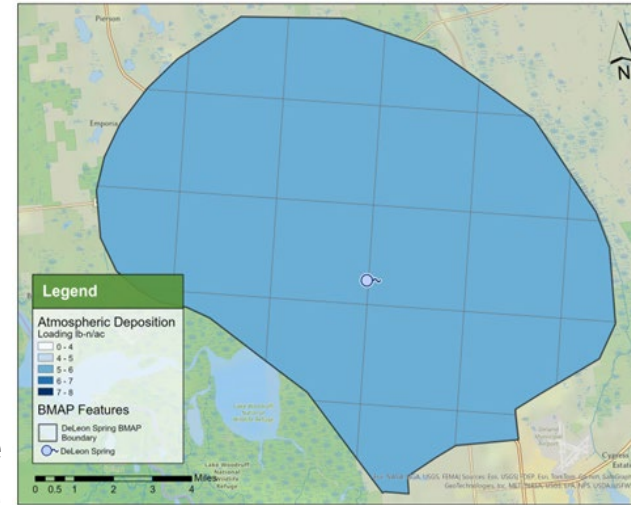
- Divided into four recharge categories based on a composite recharge map of the Floridan aquifer.
- The recharge amount evaluates the percent of nitrogen loading that is expected to impact spring vent after bioattenuation is considered. Recharge rates are summarized in the table below for each recharge 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.



ATMOSPHERIC DEPOSITION (AD)

- Atmospheric deposition (AD) of nitrogen was 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 BMAPs.
- The table below shows the estimated pounds of nitrogen applied annually to the land surface and the estimated loading to the Floridan aquifer after recharge and attenuation.
- Methodology is consistent with previous NSILT.

BMAP	Estimated Load to Surface (lbs-N/yr)	Estimated Load to Groundwater (lbs-n/yr)
Deleon Spring	245,442	13,224
Gemini Spring	129,553	2,612
Volusia Blue Spring	375,121	21,938





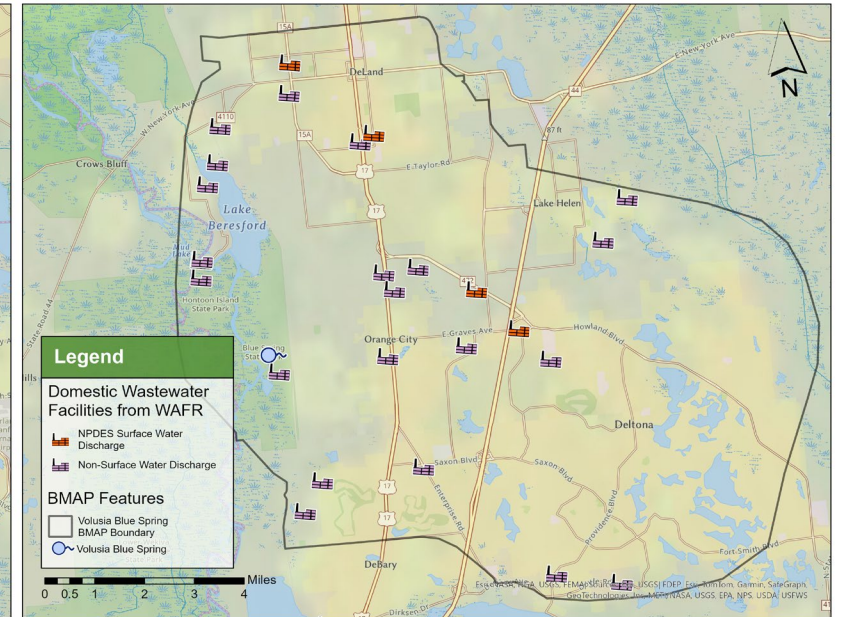
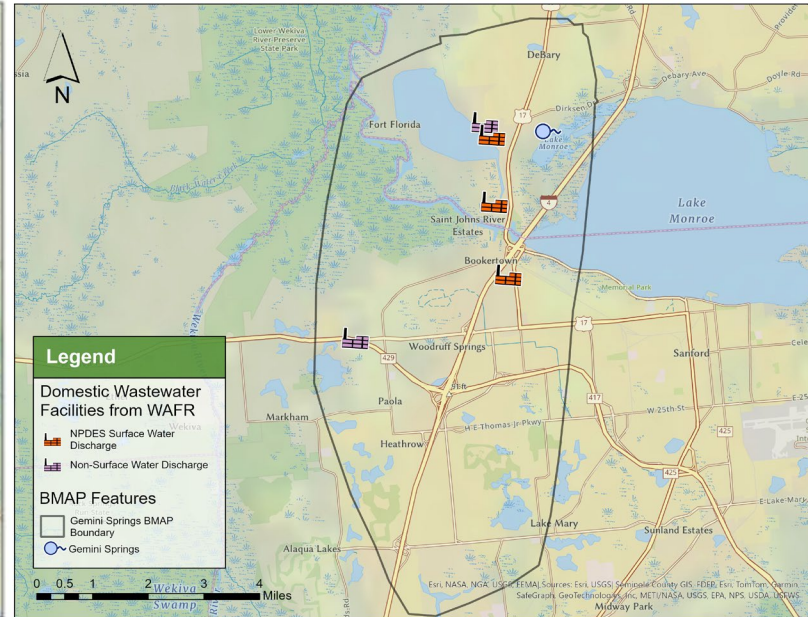
WASTEWATER TREATMENT FACILITIES

- Wastewater Facility Regulation (WAFR) information was reviewed to determine the location of all wastewater facilities (WWTFs), 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.
- The table on the next slides shows the estimated pounds of nitrogen applied annually to the land surface for all facilities and all disposal methods and the estimated loading to the Floridan aquifer after recharge and attenuation.

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



WASTEWATER TREATMENT FACILITIES



BMAP	Est. Load to Surface (lbs-N/yr)	Est. Load to Groundwater (lbs-N/yr)
DeLeon Spring	18,214	3,812
Gemini Springs	14,759	766
Volusia Blue Spring	92,266	23,461



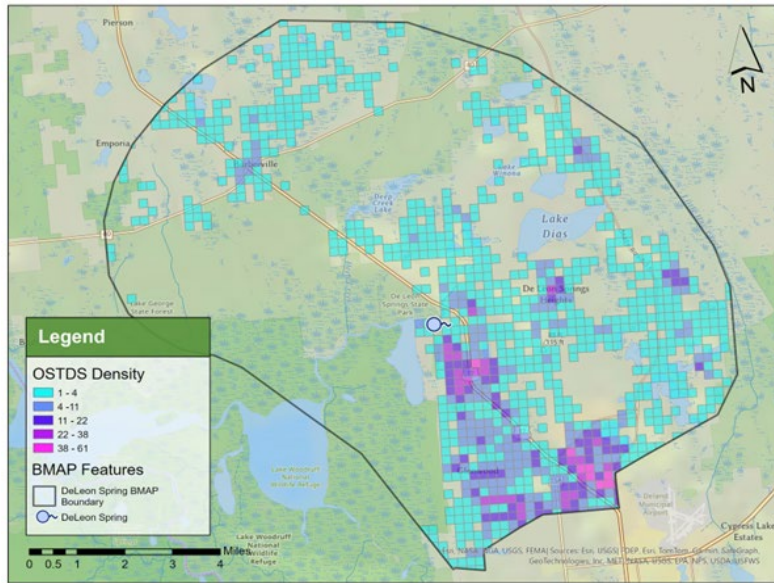
ONSITE SEWAGE TREATMENT AND DISPOSAL SYSTEMS (OSTDS)

- 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.
- 2020 U.S. Census data was used to estimate the average persons per household (pph) for the counties within the BMAPs.
- Estimated loading of 10 lb-N/year per person (Armstrong, 2015).
- Estimated load per tank is based on multiplying the average persons per household by loading per person.
- 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%.

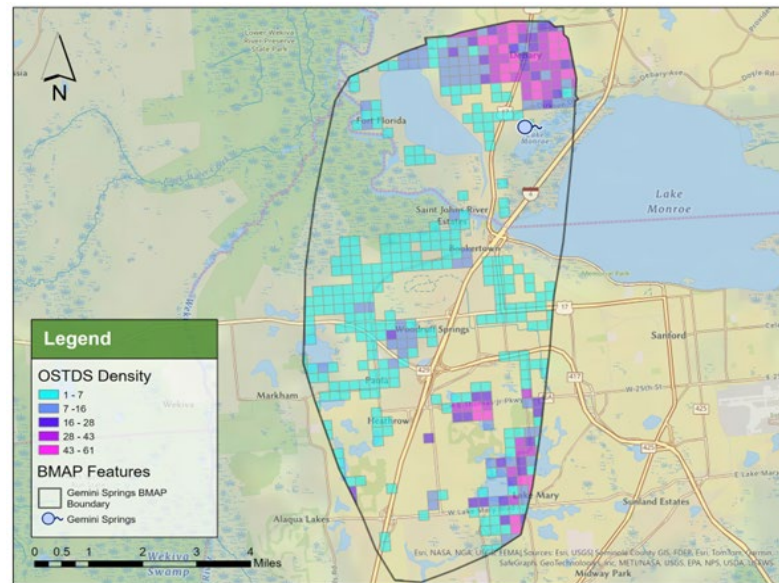


ONSITE SEWAGE TREATMENT AND DISPOSAL SYSTEMS (OSTDS)

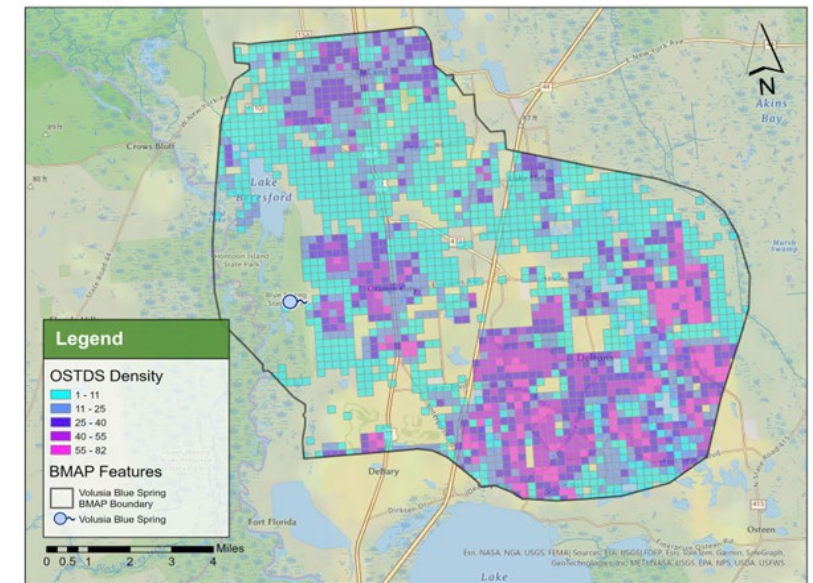
**DeLeon Spring BMAP
OSTDS Density**



**Gemini Springs BMAP
OSTDS Density**



**Volusia Blue Spring BMAP
OSTDS Density**



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

BMAP	Estimated Number of OSTDS	Estimated Number of Enhanced-Nutrient Reducing OSTDS
DeLeon Spring	4,724	14
Gemini Springs	4,710	11
Volusia Blue	44,198	16



ONSITE SEWAGE TREATMENT AND DISPOSAL SYSTEMS (OSTDS)

The results of the NSILT analysis for OSTDS in all three BMAPs are presented in the table below.

BMAP	Est. Load to Drainfield (lbs-N/yr)	Est. Load to Groundwater (lbs-N/yr)
DeLeon Spring	112,667	60,192
Gemini Springs	115,341	43,325
Volusia Blue Spring	1,063,247	437,414



URBAN TURF FERTILIZER (UTF)

- 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.



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 one acre maximum for fertilized area for single family residential parcels greater than one acre in these BMAPs.
- 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.

DeLeon and Gemini Springs Lawn Care Source	
Service	33%
Self	51%
None	16%

Volusia Blue Spring Lawn Care Source	
Service	34.40%
Self	49.60%
None	16%

DeLeon and Gemini Springs Application Rates			
Self Application Rates	Percent of Self Lawn Care Source	Application Rate (lbs/N/ac/application)	Number of Applications
BMP	20.00%	26.136	5.00
Low	75.00%	30.490	2.88
High	5.00%	43.560	2.88

Volusia Blue Spring Application Rates			
Self Application Rates	Percent of Self Lawn Care Source	Application Rate (lbs/N/ac/application)	Number of Applications
BMP	34.40%	26.136	5.000
Low	16.00%	0.000	0.000
High	49.60%	21.780	3.720



URBAN TURF FERTILIZER SINGLE FAMILY RESIDENTIAL

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

BMAP	Est. Load to Surface (lbs-N/yr)	Est. Load to Groundwater (lbs-N/yr)
DeLeon Spring	112,705	25,966
Gemini Springs	184,146	17,775
Volusia Blue Spring	653,285	82,037



URBAN TURF FERTILIZER NON-SINGLE FAMILY RESIDENTIAL

- Water management district 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.
- 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.

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%



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 3 lb-N/1,000 ft² to fertilized turfgrass in the region.
- The results of the NSILT analysis for non-single family residential UTF in all three BMAPs are presented in the table below.

BMAP	Est. Load to Surface (lbs-N/yr)	Est. Load to Groundwater (lbs-N/yr)
DeLeon Spring	8,336	1,838
Gemini Springs	52,867	2,443
Volusia Blue Spring	73,164	9,747



SPORTS TURFGRASS FERTILIZER (STF)

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

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

BMAP	Est. Load to Surface (lbs-N/yr)	Est. Load to Groundwater (lbs-N/yr)
DeLeon Spring	3,016	211
Gemini Springs	2,023	61
Volusia Blue Spring	5,933	962



Source: Pexels



SPORTS TURFGRASS FERTILIZER (STF)

- 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).
- It is estimated that 72,310 lb-N/year are applied to the land surface at golf courses in Volusia Blue and 52,547 lb-N/year in Gemini.
- When attenuation and recharge are considered, it is estimated that 11,329 lb-N/year is loaded to groundwater from golf courses in Volusia Blue and 1,627 lb-N/year in Gemini.

BMAP	County	Golf Course	Regional Rate or Site Specific Rate	Land Area (Ac)				N Input (lb-N/yr)			
				High	Medium	Low	Discharge	High	Medium	Low	Discharge
Gemini	Seminole	HEATHROW COUNTRY CLUB	Regional			192.159			-	18,415	
Gemini	Seminole	MAYFAIR COUNTRY CLUB	Regional			114.13			-	10,937	
Gemini	Seminole	TIMACUAN GOLF & COUNTRY CLUB	Regional			239.825			-	22,983	
Gemini	Volusia	DEBARY GOLF AND COUNTRY CLUB	Regional	0.269				26	-	-	
Gemini	Volusia	GLEN ABBEY GOLF CLUB	Regional	1.948				187	-	-	
Volusia	Volusia	DeBary Golf and Country Club	Regional	123.75	3.56			11,859	341	-	
Volusia	Volusia	Deltona Hills Golf & Country Club	Regional	86.65	76.61			8,304	7,342	-	
Volusia	Volusia	Glen Abbey Golf Course	Regional	114.32	23.33	7.86		10,955	2,236	753	
Volusia	Volusia	Victoria Hills Golf Course	Regional	235.9	64.43	18.15		22,607	6,175	1,739	

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



FARM FERTILIZER (FF)

- 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 (DACS), 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

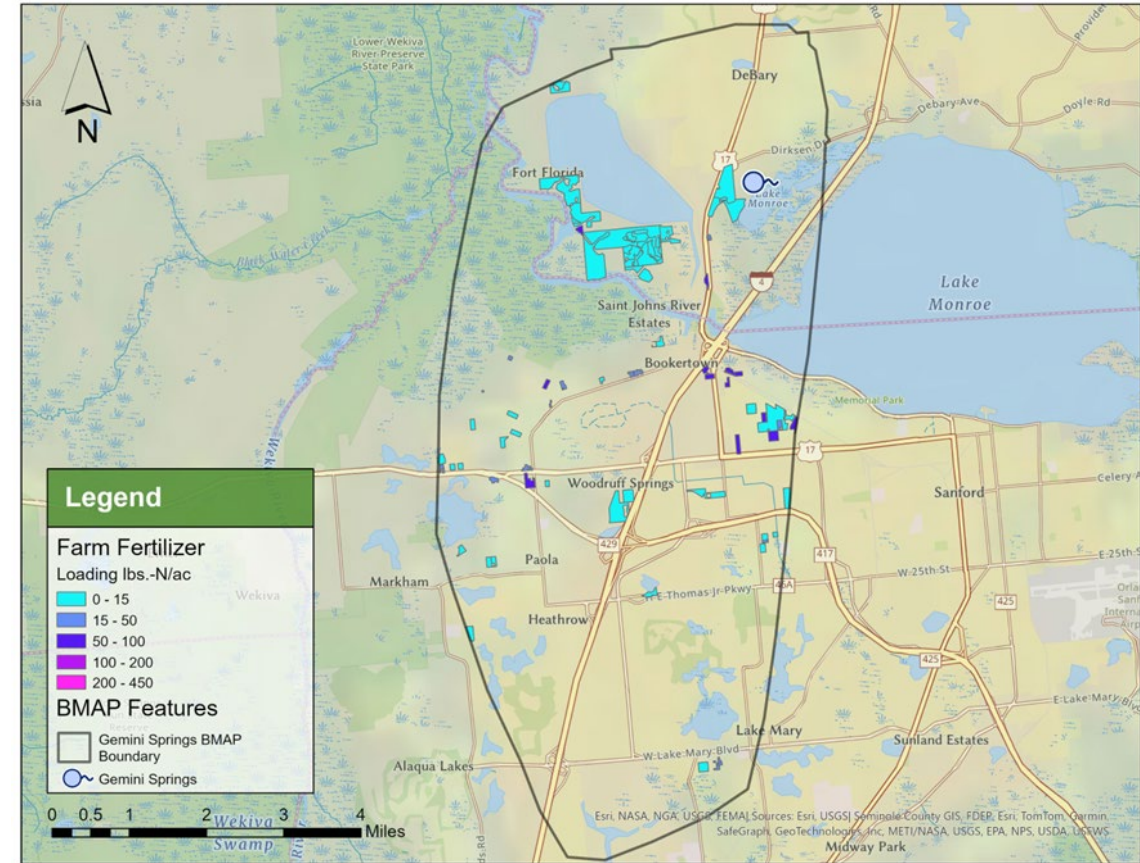
Crop	Fertilizer Application Rate (lb-N/acre)	Effective Application Rate (lb-N/acre)
Grass Pasture	80	16
Horse Farms	50	10
Improved Pastures	50	10
Pasture	50	10

- 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 GEMINI SPRINGS BMAP

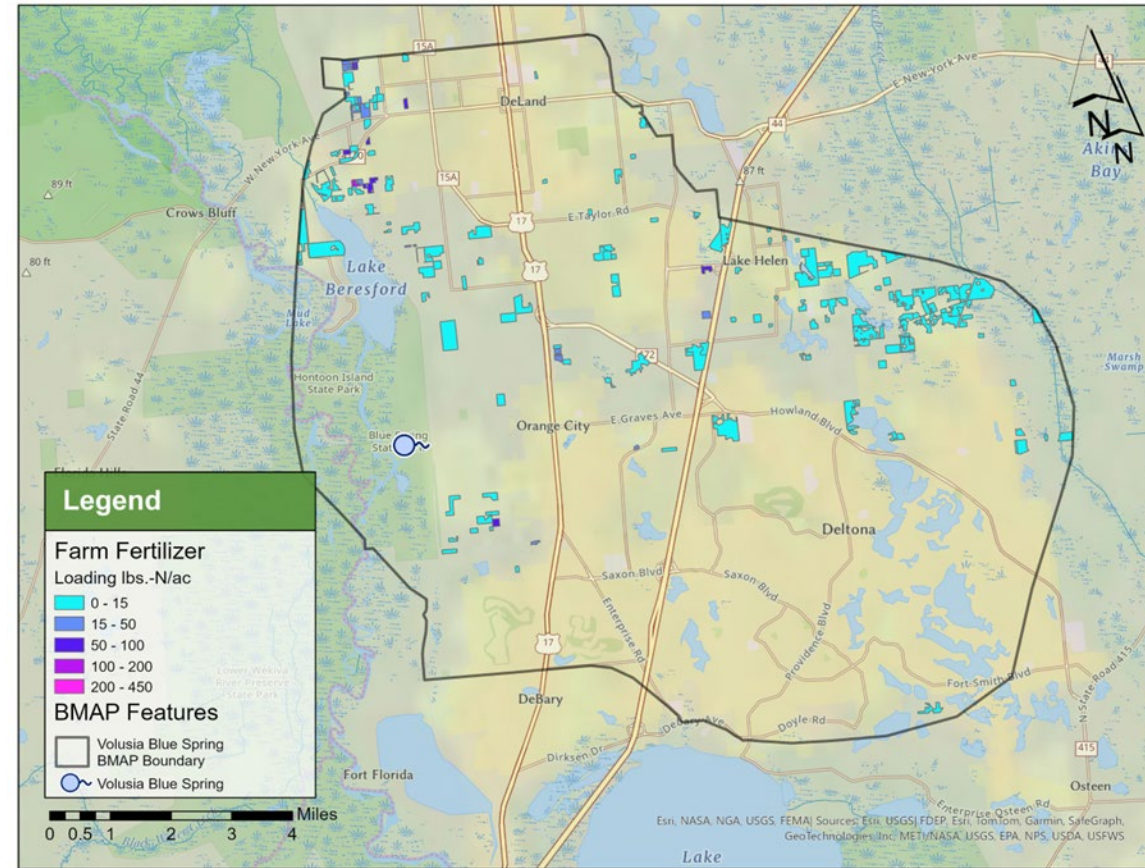
Crop	Fert Application Rate	Total Acres	Loading to Land Surface (lb-N/year)	Loading to Groundwater (lb-N/year)
Field Crops	90	66	5,935	102
Improved Pastures	50	401	4,012	48
Container Nursery	150	32	1,151	22
Row Crops	60	8	508	10
Horse Farms	50	42	418	8
Grass Pasture	80	5	74	1





FARM FERTILIZER VOLUSIA BLUE SPRING BMAP

Crop	Fert Application Rate	Total Acres	Loading to Land Surface (lb-N/year)	Loading to Groundwater (lb-N/year)
ImprovedPastures	50	1,483	14,830	1,486
FieldCrops	90	60	5,401	817
Leatherleaf	90	42	3,743	674
AsparagusFern	90	31	2,800	438
Citrus	140	7	931	153
HorseFarms	50	126	1,257	133
Pittosporum	90	7	598	108
Nursery	90	10	215	39
Liriope	90	1	84	15
Pasture	50	11	109	10.9





FARM FERTILIZER

The results of the NSILT analysis for FF in all three BMAPs are presented in the table below.

BMAP	Est. Load to Surface (lbs-N/yr)	Est. Load to Groundwater (lbs-N/yr)
DeLeon Spring	258,740	34,148
Gemini Springs	9,312	192
Volusia Blue Spring	29,077	3,885



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) DELEON SPRING BMAP

Livestock Type	Total Head Count	Loading to Land Surface (lb-N/year)	Loading to Groundwater (lb-N/year)
Beef Cattle	847	104,124	6,024
"Other" Cattle	349	39,501	2,285
Calves	644	8,011	463
Donkeys	53	1,882	111
Horses	548	54,612	3,216
Chicken, Broilers	25	18	1
Chicken, Layers	1,233	1,350	79
Goats	484	6,192	365
Hogs	91	6,364	375
Sheep	126	9,055	533
Turkeys	46	102	6

- The estimated total pounds of nitrogen per year deposited on the land surface from LW are 216,485.
- The estimated pounds of nitrogen loaded to groundwater annually after recharge and attenuation factors are applied are 13,459.



LIVESTOCK WASTE (LW) GEMINI SPRINGS BMAP

Livestock Type	Total Head Count	Loading to Land Surface (lb-N/year)	Loading to Groundwater (lb-N/year)
Beef Cattle	107	13,260	49
"Other" Cattle	37	4,297	11
Calves	78	977	3
Donkeys	5	169	1
Horses	45	4,516	16
Chicken, Broilers	2	1	0
Chicken, Layers	142	156	1
Goats	43	540	2
Hogs	7	527	2
Sheep	12	864	4
Turkeys	3	8	0

- The estimated total pounds of nitrogen per year deposited on the land surface from LW are 7,624.
- The estimated pounds of nitrogen loaded to groundwater annually after recharge and attenuation factors are applied are 89.



LIVESTOCK WASTE (LW) VOLUSIA BLUE SPRING BMAP

Livestock Type	Total Head Count	Loading to Land Surface (lb-N/year)	Loading to Groundwater (lb-N/year)
Beef Cattle	309	38,038	1,856
"Other" Cattle	128	14,431	704
Calves	235	2,927	143
Donkeys	18	639	32
Horses	187	18,542	925
Chicken, Broilers	8	6	0
Chicken, Layers	418	457	23
Goats	163	2,103	105
Hogs	31	2,161	108
Sheep	42	3,075	153
Turkeys	15	35	2

- The estimated total pounds of nitrogen per year deposited on the land surface from LW are 78,122.
- The estimated pounds of nitrogen loaded to groundwater annually after recharge and attenuation factors are applied are 4,051.



BIOSOLIDS

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

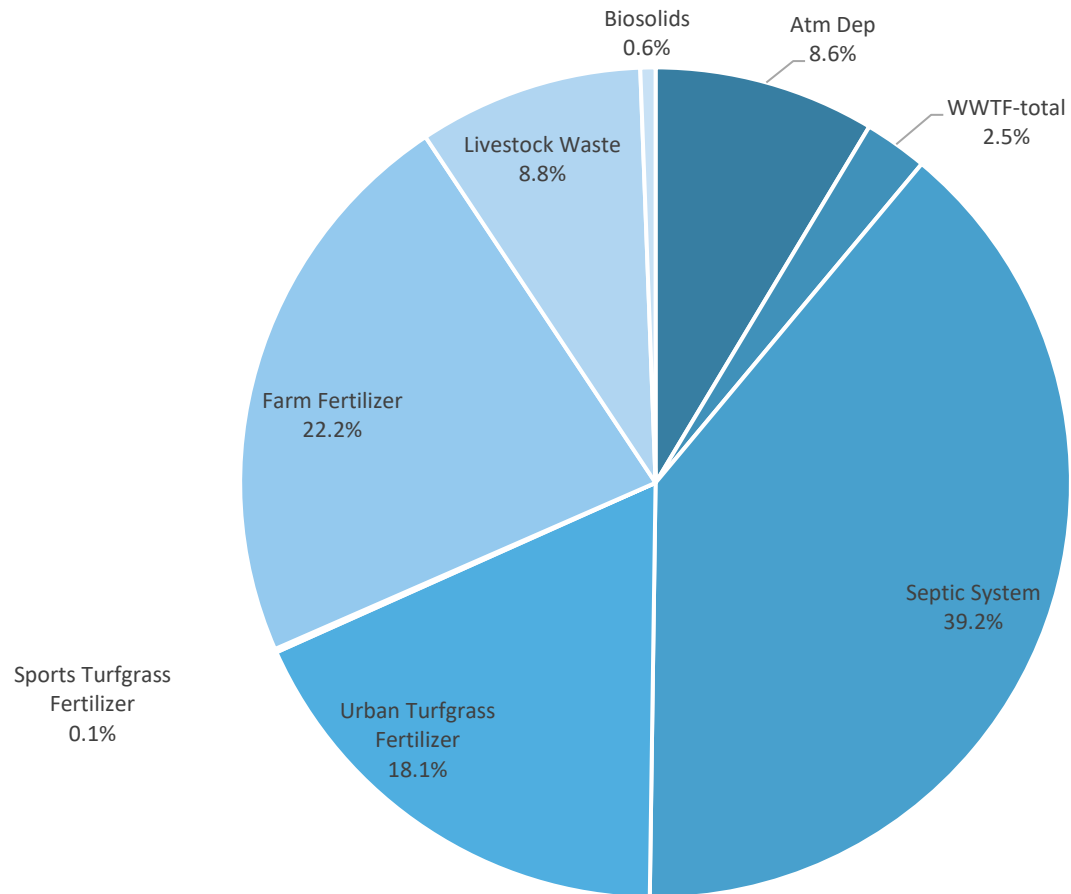
BMAP	Estimated Load to Surface (lbs-N/yr)	Estimated Load to Groundwater (lbs-n/yr)
Deleon Spring	2,013	906



DRAFT NSILT LOADING RESULTS

DELEON SPRING

DeLeon Spring (2023)

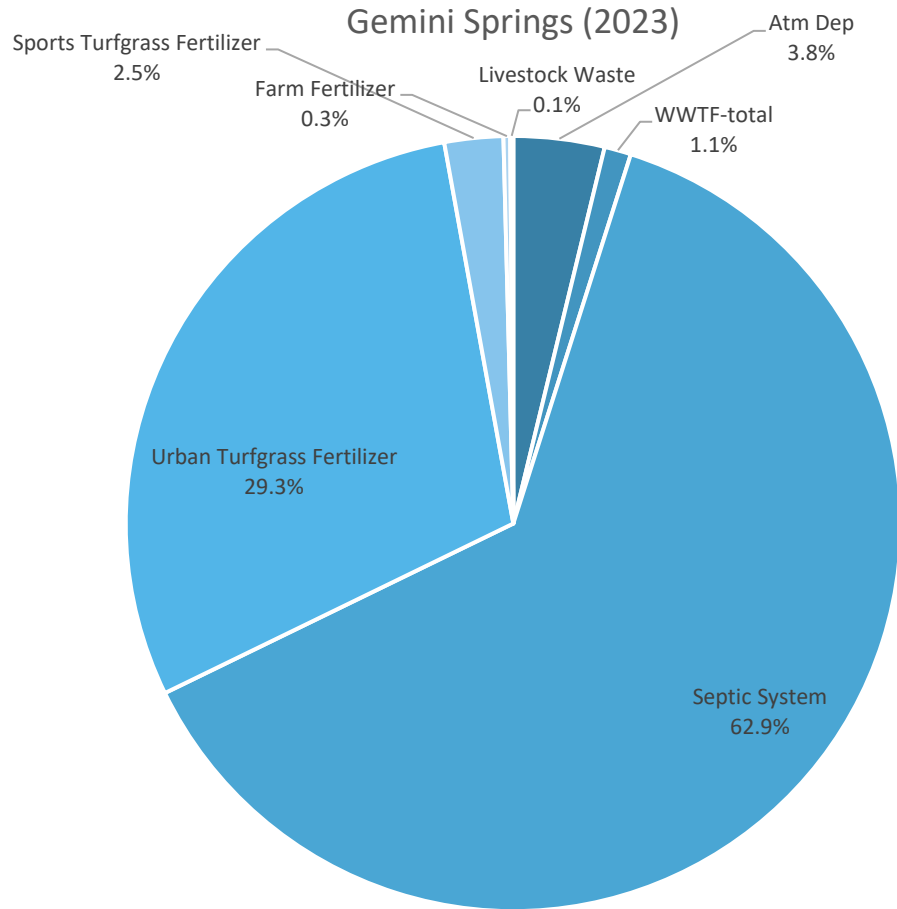


DeLeon BMAP Area	
Source	Annual Loading (lb-N/year)
Atm Dep	13,224
WWTF-total	3,812
Septic System	60,192
Urban Turfgrass Fertilizer	27,804
Sports Turfgrass Fertilizer	211
Farm Fertilizer	34,148
Livestock Waste	13,459
Biosolids	906
Total	153,756



DRAFT NSILT LOADING RESULTS

GEMINI SPRINGS

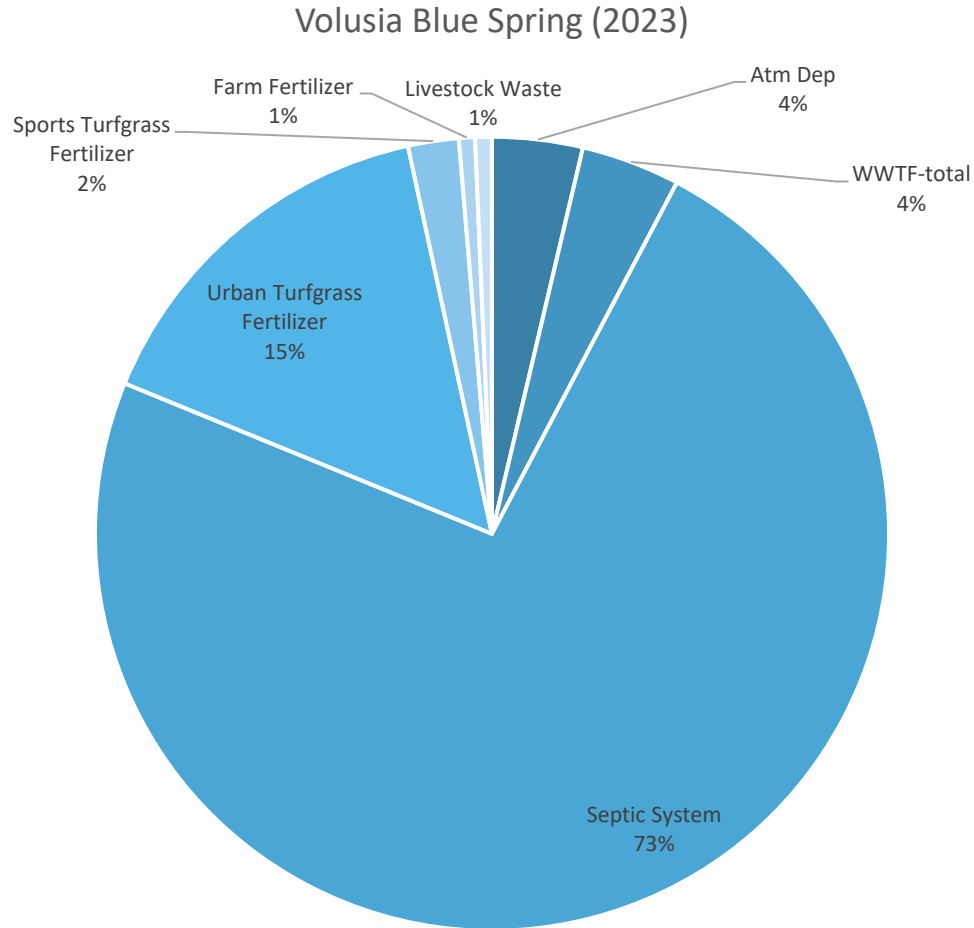


Gemini BMAP Area	
Source	Annual Loading (lb-N/year)
Atm Dep	2,612
WWTF-total	766
Septic System	43,325
Urban Turfgrass Fertilizer	20,218
Sports Turfgrass Fertilizer	1,688
Farm Fertilizer	192
Livestock Waste	89
Total	68,891



DRAFT NSILT LOADING RESULTS

VOLUSIA BLUE SPRING



Volusia Blue BMAP Area	
Source	Annual Loading (lb-N/year)
Atm Dep	21,938
WWTF-total	23,461
Septic System	437,414
Urban Turfgrass Fertilizer	91,784
Sports Turfgrass Fertilizer	12,291
Farm Fertilizer	3,885
Livestock Waste	4,051
Total	594,825

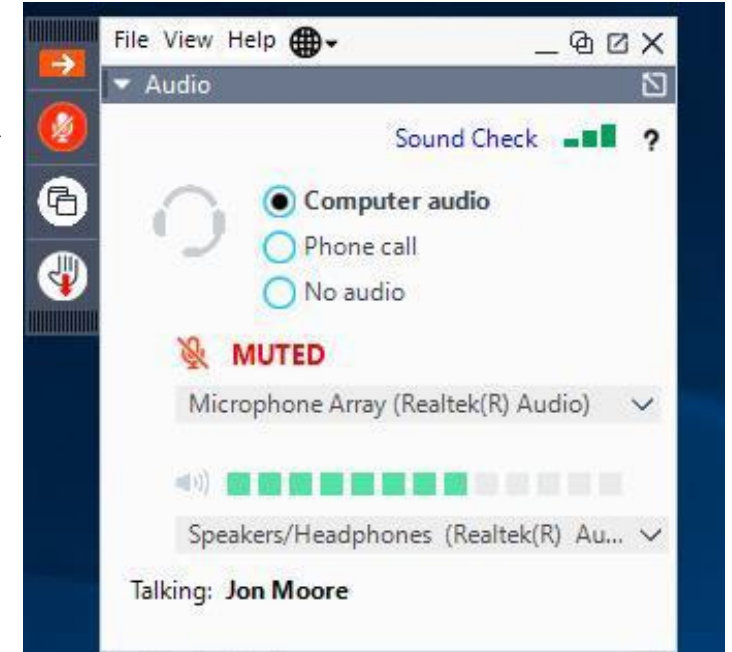


BMAP MEETING

PUBLIC QUESTIONS PERIOD

Verbal Questions

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Written Comments

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





BMAP UPDATES

DRAFT SPRING VENT LOAD ANALYSIS

BMAP	Draft Nitrate Loads (lb-N/yr)			
	Total Load at Spring Vent *	TMDL Load #	Required Reduction	Percent Required Reduction
DeLeon Spring	30,556	16,278	14,278	47%
Gemini Springs	26,467	6,948	19,520	74%
Volusia Blue Spring	196,247	96,649	99,598	51%

*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

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.

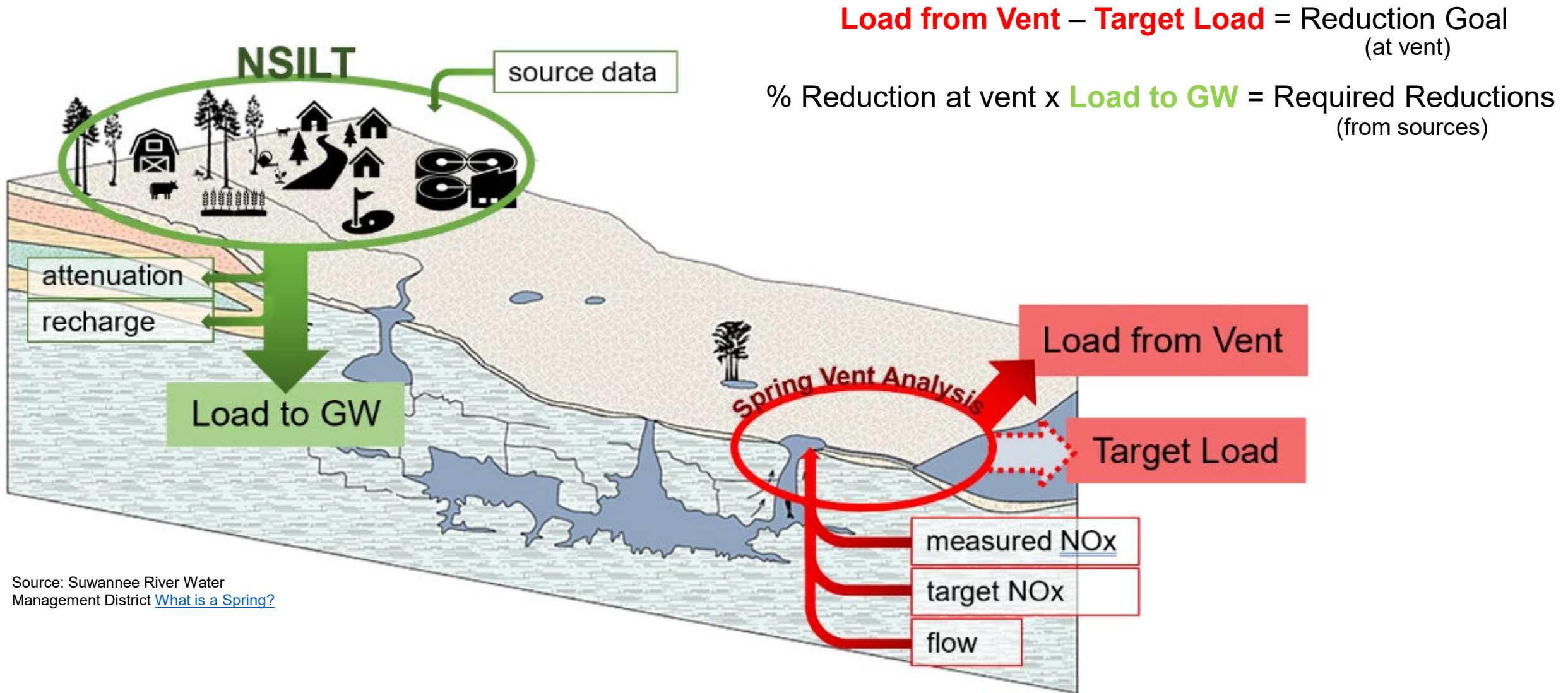
Applied the spring vent percent reduction to the updated NSILT loading.

Estimate the total reduction needed to meet the TMDL.



BMAP UPDATES

SPRING VENT LOAD ANALYSIS



Source: Suwannee River Water Management District [What is a Spring?](#)



BMAP UPDATES

ALLOCATION AND REDUCTION APPROACH

- The percent reduction calculated from the spring vent analysis is applied to the estimated NSILT load to determine the overall required reduction needed in the basin.
- Each source will be evaluated for a reduction strategy.
- Responsible entities will receive an allocation based on the combined necessary reductions estimated by source for their area based on the NSILT loading.



BMAP UPDATES

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, 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.

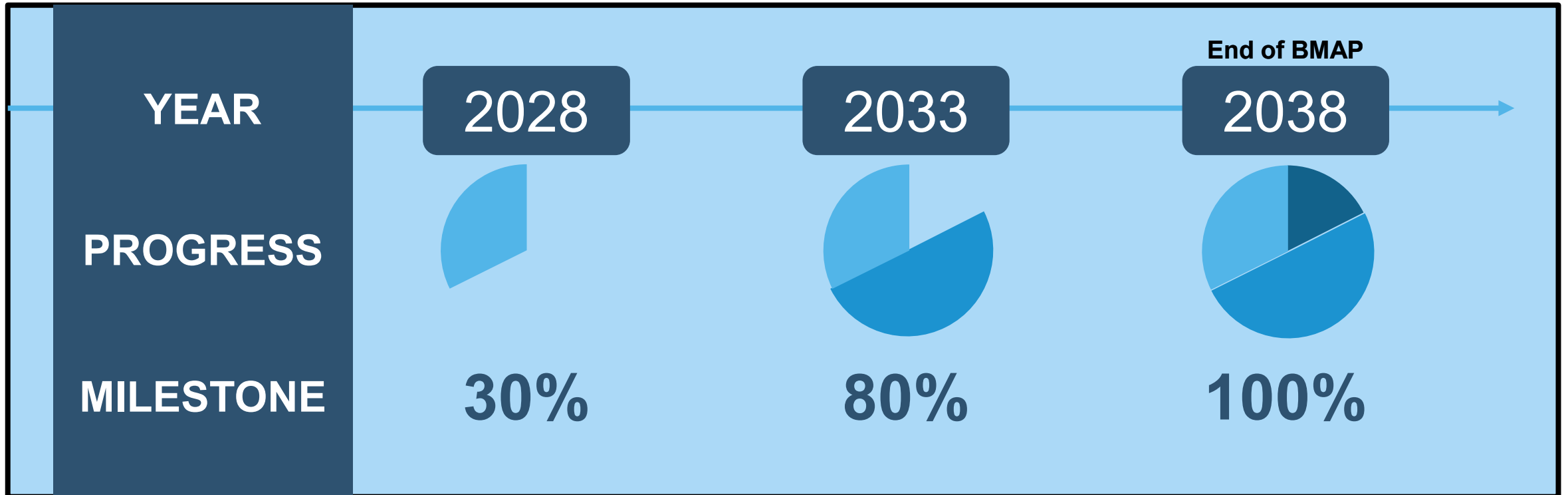
Golf Courses

- Reduction based on requirement of all golf courses to submit information on BMP implementation and a nutrient management plan (NMP) to address nutrient loading.



BMAP UPDATES

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





RESOURCES

FUNDING OPPORTUNITIES



Florida Department of Environmental Protection
Funding Opportunities
[FloridaDEP.gov/Funding](https://www.floridadep.gov/Funding)





RESOURCES

BMAP WEBSITE AND STORYMAPS



Basin Management Action Plans

Home » Divisions » Division of Environmental Assessment and Restoration » Water Quality Restoration Program » Basin Management Action Plans

Water Quality Restoration Program Quick Links

Basin Management Action Plans (BMAPs)

Statewide Annual Report

Water Quality Grant Opportunities 2023-24

BMAP Public Meetings

Impaired Waters, TMDLs and Basin Management Action Plans Interactive Map

Tools and Guidance for

What is a Basin Management Action Plan

A basin management action plan (BMAP) is a framework for water quality management that reduces pollutant loading through current and future projects and sets permit limits on wastewater facilities, urban and agricultural best management practices. BMAPs are developed in partnership with stakeholders and rely on local input and commitment for development. BMAPs are required by Department of Environmental Protection Secretarial Order and are

Water Quality Protection Grant

DEP has launched an [online grant portal](#) to provide eligible entities access to grant programs. Eligible entities include local governments, academic institutions, and non-profit organizations. An [application portal](#) opened July 5, 2023. Closing dates for individual grant programs are listed on the posted date for each grant program. Applicants are encouraged to



Florida Springs Basin Management Action Plans (BMAPs)

Welcome to the Florida Springs Basin Management Action Plan (BMAP) StoryMap

The springs BMAPs are developed with specific provisions for the protection and restoration of the state's Outstanding Florida Springs. This story map focuses on the springs-related BMAPs; for more details about other BMAPs or more information about the BMAP program in general, visit <https://floridadep.gov/bmaps>.

* The story map will display differently depending on the screen size and resolution being used. Story map best viewed in Chrome or Firefox.

Overview



1 (COPY) Nitrogen Source Inventory and Loading Tool...



2 (COPY) Statutes & Bills



3 (COPY) Crystal River - Kings Bay BMAP Story Map



4 (COPY) DeLeon Spring BMAP Story Map



5 (COPY) Gemini Springs BMAP Story Map



6 (COPY) Homosassa and Chassahowitzka Springs Group...



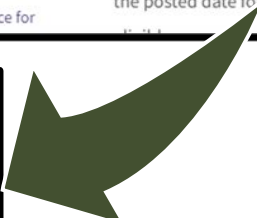
7 (COPY) Jackson Blue and Merritts Mill Pond BMAP Stor...



8 (COPY) Santa Fe River BMAP Story Map



9 (COPY) Silver Springs, Upper Silver Springs, and Rainbow...





SPRINGS BMAP UPDATES TIMELINE

May-
Aug. 2024

Individual meetings on allocations and milestones with BMAP stakeholders.

Aug. 1,
2024

Final wastewater and OSTDS plans due from stakeholders.

June-
Sept. 2024

Two more public meetings on allocations, milestones, and the draft BMAP document.

Technical analysis and drafting the BMAP documents.

June-
Dec. 2024

Final Draft BMAP documents.

Dec.
2024

Statutory deadline for updated nutrient BMAPs.

July 1,
2025



SUBSCRIBER PAGE

HOW TO CONTACT US



BMAPPprogram@FloridaDEP.gov



REFERENCES

- Armstrong, J.H., (2015). Florida Onsite Sewage Nitrogen Reduction Strategies Study Final Report.
- Eller, K. T., & Katz, B. G. (2017). Nitrogen Source Inventory and Loading Tool: An integrated approach toward restoration of water-quality impaired karst springs. *Journal of Environmental Management*.
- Helgeson, T., & McNeal, M., (2009). A Reconnaissance-Level Quantitative Comparison of Reclaimed Water, Surface Water, and Groundwater.
- Shaddox, T.W., Unruh, B.J., Johnson, M.E., Brown, C.D., & Stacey, G. (2023). Nutrient Use and Management Practices on United States Golf Courses. HortTechnology.
- Tilley, J.S., & Slonecker, E.T. (2006). Quantifying the Components of Impervious Surfaces: U.S. Geological Survey Open-File Report 2006-1008.
- [GI-BMP Manual](#), UF/IFAS Extension, (ufl.edu).



THANK YOU

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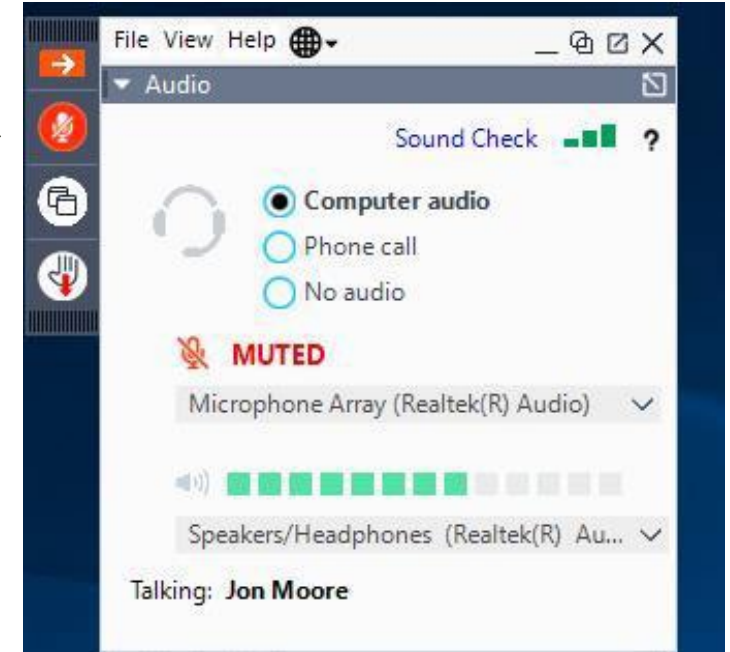


BMAP MEETING

PUBLIC QUESTIONS PERIOD

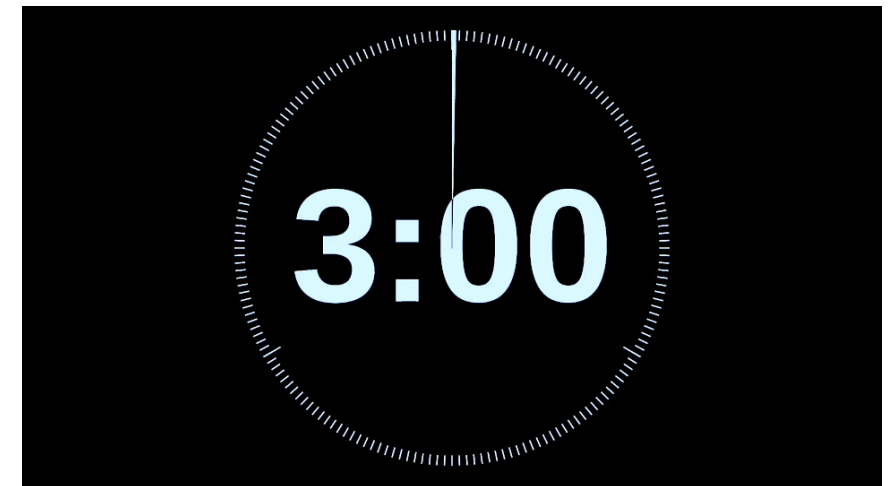
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Florida Department of Environmental Protection (DEP)
DeLeon Spring, Gemini Springs, and Volusia Blue Spring Basin Management Action Plans
(BMAPs)

Question and Answer (Q&A) Summary

Public Meeting on May 29, 2024

10:00 am – 11:00 am

Via GoToWebinar

Attendees

Ginger Adair, Volusia County	Megan Hunnicutt, FDACS
Alison Adams, Citizen	Chandler Keenan, DEP
Jim Ailes, City of Deland	Joy Kokjohn, SJRWMD
Dustin Allen, DEP	Charles Legros, DEP
Jon Ayscue, Citizen	Celeste Lyon, RES
Deborah Baldwin, Citizen	Allison M Chancy, DEP
Lisa Bally, ATM	Tom Mayton, SJRWMD
Evelyn Becerra, DEP	Max Mcamis, Pasco County
Connie Becker, DEP	Karen McLaughlin, Citizen
Beth Brady, Save The Manatee	Jessica Meinhofer, Citizen
Tiffany Busby, Wildwood Consulting	Gabrielle Milch, St. Johns Riverkeeper
Andy Canion, SJRWMD	Jessica Mostyn, DEP
Nancy Church, Volusia County	Mark Nelson, Jones Edmunds
Carolin Ciarlariello, DEP	Ryne Nimmo, DEP
Patricia Coffey, FDACS	Kevin O'Donnell, DEP
Susan Davis, SJRWMD	Josh Papacek, SJRWMD
Cammie Dewey, SJRWMD	Jim Parrish, City of Deltona
Lauren Dorval, FDACS	Wendy Poag, Lake County
Chloe Dougherty, Florida Springs Council	Roderick Reardon, Citizen
Katie Durham, DEP	Erin Reed, Volusia County
Jeff Earhart, Lake County	Eb Roeder, DEP
Yesenia Escribano, FDACS	Shannon Salvatori, SJRWMD
Holly Giles, Volusia County	Suzanne Scheiber, Citizen
Tina Gordon, Wildwood Consulting	Stacey Simmons, FDACS
Roxanne Groover, FOWA	Ryan Smart, Florida Springs Council
Matt Guzinski, Mead & Hunt	Jennifer Spain, Volusia County
Sam Hankinson, DEP	Anita Stine, DEP
Janet Hearn, ATM	Jennifer Thera, FDACS
Clay Henderson, Stetson University	Diana Turner, DEP
Cori Hermle, SJRWMD	Michael Ulrich, Volusia County
Margarita Hernandez, DEP	Lisa Van Houdt, DEP
Danielle Honour, CDM Smith	Oscar Vera, Liquid Solutions Group
Barbara Howell, DEP	Connor Wagner, DEP
Bryan Hummel, EPA	Ken Weaver, DEP

Tanya Welborn, DEP
Brenda Wells, Florida Springs Council
Samantha West, Volusia County

Shannon Wetzel, Seminole County
Kelly Young, Volusia County
Unknown, The Florida Channel

DeLeon Spring, Gemini Springs, and Volusia Blue Spring Basin Management Action Plan (BMAP) Overview

Q: On a previous slide with the table of the number of projects, there was a reference to the nitrogen shown being the reduction goal. Can you clarify to what this is related?

A: The numbers shown were actually the verified reductions for projects submitted as a part of the statewide annual report (STAR) process.

Nitrogen Source Inventory Loading Tool (NSILT) Results

Q: On the slide regarding loading for onsite sewage and disposal systems (OSTDS), can you explain why the percentage of load to groundwater versus surface water is different among the three springs?

A: This is due to the recharge factors applied to the loading estimate at the land surface to estimate the load to groundwater and the proportion of OSTDS located in the various recharge types (i.e., high, medium, low, and discharge) in each spring. The proportion of OSTDS located in each recharge type varies among the three springs.

Q: Are the estimated total nitrogen loads in the springsheds consistent with the measured nitrate/nitrite concentrations at the spring vents?

A: The NSILT springshed estimate and the spring vent estimate are two different evaluations. There is a lot of uncertainty in estimating when the loading at the land surface reaches the spring vent, including the age of the water, and so there is often some delay to when the surface loading changes are expected to influence the spring vent concentrations. The NSILT is a Geographic Information System (GIS) spreadsheet tool designed to estimate, to the best of our ability and the data availability, the load to the land surface currently. It is not a model to predict exactly what the load is at the spring vent is. We have not tried to calibrate the NSILT loading to the spring vent analysis due to the variability to the loading at that land surface, what comes out at the spring vent, and when. We will be going over the spring vent analysis later in the presentation. It is a combination of both the NSILT estimate and the spring vent measurements that allows us to examine the loading and estimate the needed reductions.

Spring Vent Load Analysis Results

Q: Will there be any “what we are doing to improve this or how citizens can get involved” sections to the presentations today?

A: This will be addressed during a future meeting when we get into more details on projects and management strategies. Citizens can participate in upcoming meetings and visit the StoryMaps to learn more.

Q: Has the accuracy of the analyses (NSILT and spring vent) been estimated?

A: Regarding the NSILT, it is not a model but a spreadsheet tool. The tool is used to identify and quantify the loading and proportion the nitrogen sources. For the spring vent analysis, we used data from the Watershed Information Network (WIN) to summarize loading at the spring vent. These measurements are used to determine the proportion of loading that needs to be reduced in order to meet the total maximum daily load (TMDL). The percent reduction needed was based on actual flow and concentration data at the spring vents.

Next Steps - BMAP Updates

There were no additional questions or comments.

Adjournment

The meeting ended at 11:00 am.