



## **Wekiwa Spring and Rock Springs Basin Management Action Plan Updates**

**May 29, 2024 at 1:30 PM EDT**

### **Via Webinar**

Webinar Registration Link:

<https://register.gotowebinar.com/register/5539366407834301023>

### **Agenda**

- Wekiwa Spring and Rock Springs 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 Wekiwa and Rock Springs g BMAP, contact:  
Charles "Ryne" Nimmo at (850) 245-8086, [Charles.Nimmo@FloridaDEP.gov](mailto:Charles.Nimmo@FloridaDEP.gov).



# WEBINAR HOUSEKEEPING

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# CRYSTAL RIVER/KINGS BAY, HOMOSASSA/CHASSAHOWITZKA SPRINGS, AND WEEKI WACHEE BASIN MANAGEMENT ACTION PLAN UPDATES

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

GoTo Webinar | May 30, 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.







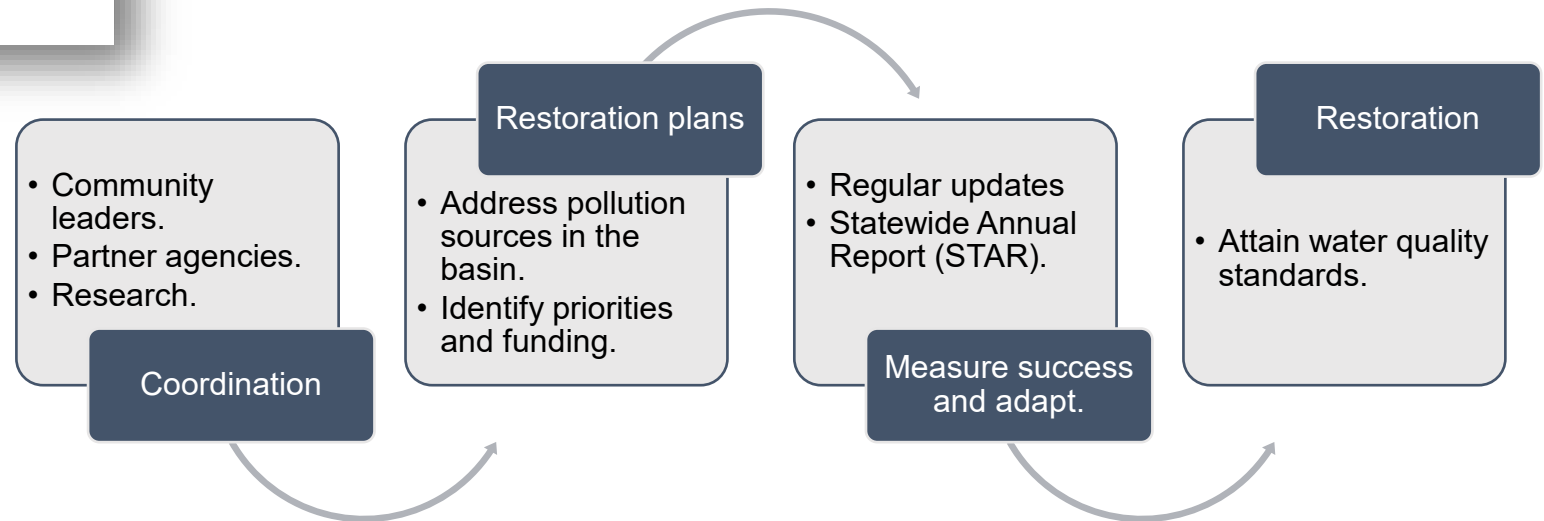
# BMAPs



## BMAPs are:

- Developed with stakeholder input.
- Adopted by The Florida Department of Environmental Protection's (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:**

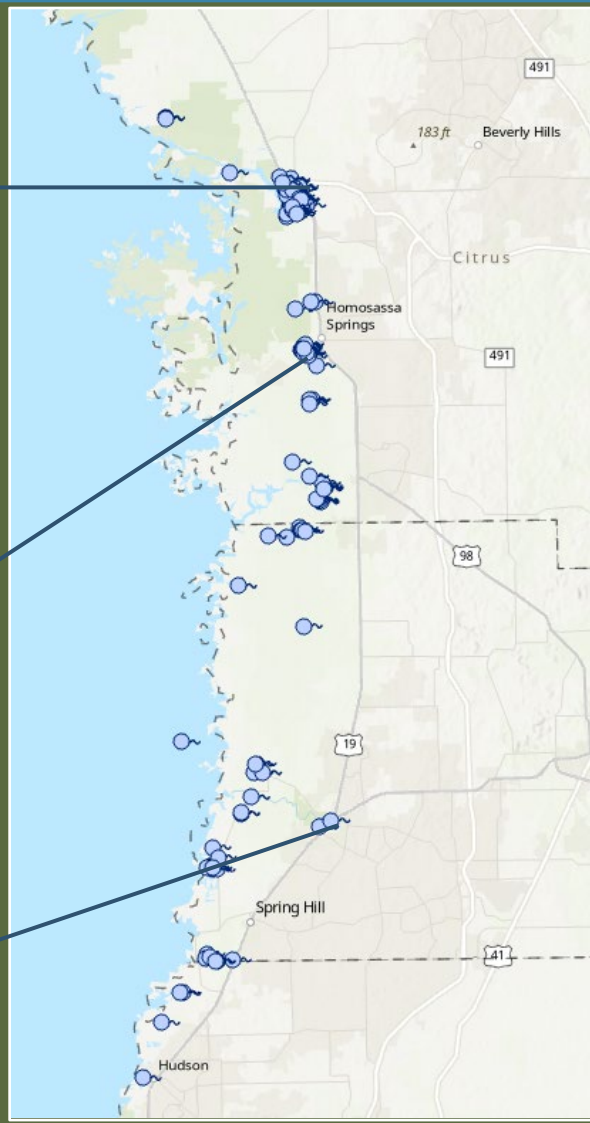
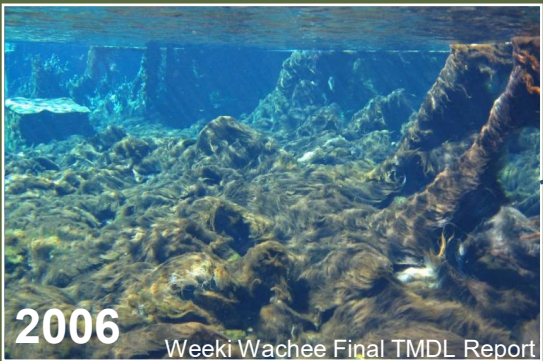
- Monitoring plan.
- Project reporting.
- Periodic follow-up meetings.
- Water quality analyses.





# BMAPs

## SPRINGS COAST OVERVIEW



## Background

**Early 2000s** - Many of Florida's freshwater springs determined to be impaired for nutrients.

**2014** - DEP adopted TMDLs for many waterbodies in Springs Coast basin.

**2016** - Florida Legislature designated 30 Outstanding Florida Springs (OFS) to require additional protections.

**2018** - BMAPs adopted as restoration framework to meet TMDLs.

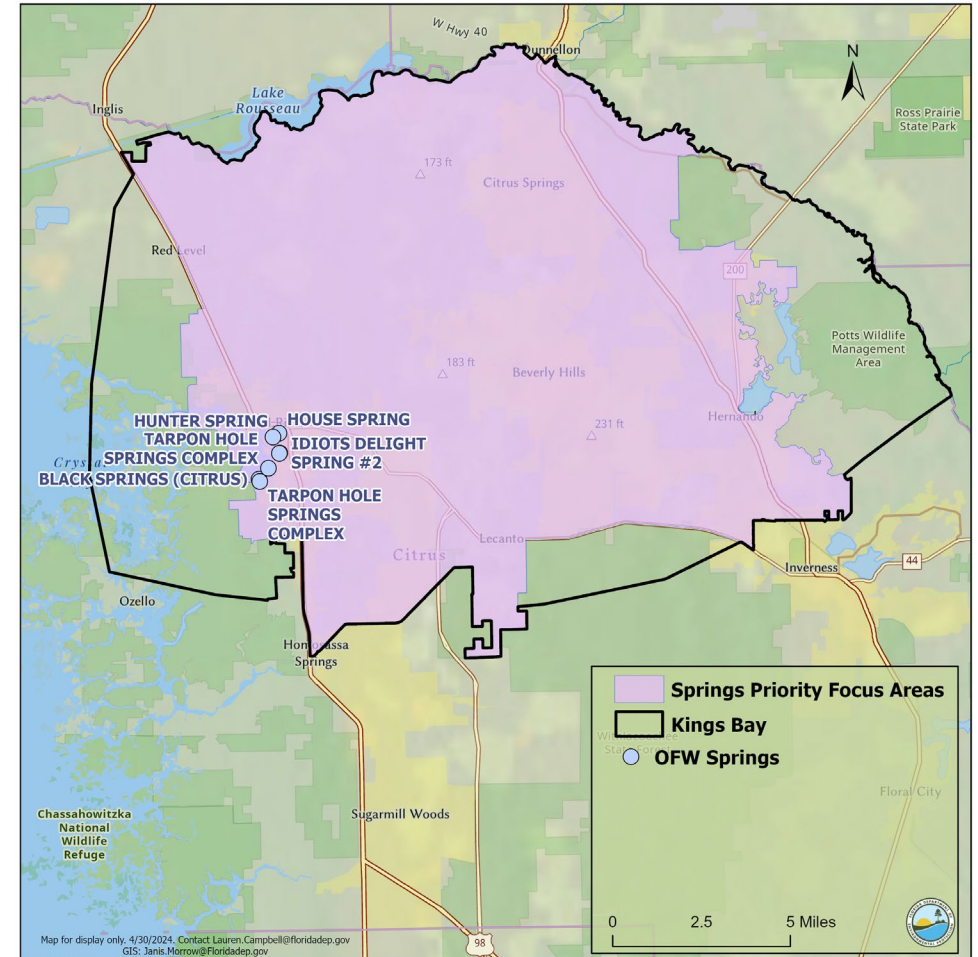
**Today** - Working on updates to the Springs BMAPs to be adopted by 2025.



# CRYSTAL RIVER / KINGS BAY BMAP

- BMAP area is approximately 178,753 acres and includes OFS including Kings Bay Group (Hunter, House, Black, Idiot’s Delight, and Tarpon Hole Springs).
- Impaired for the nitrate form of nitrogen and orthophosphate.
- Total maximum daily loads (TMDLs) are
  - Springs 0.23 mg/L nitrate annual average.
  - Kings Bay 0.28 mg/L nitrate annual average.
  - Springs 0.028 mg/L orthophosphate annual average.
  - Kings Bay 0.032 mg/L orthophosphate annual average.

Type of Entity	Name
Responsible Stakeholders	Citrus County
	City of Crystal River Agricultural producers Golf courses
Responsible Agencies	Florida Department of Agriculture and Consumer Services
	Florida Department of Environmental Protection
	Florida Department of Health
	Southwest Florida Water Management District
Other Interested Stakeholders	Citizens
	Duke Energy
	Florida Farm Bureau Federation
	Florida Onsite Wastewater Association
	Gulf Archeology Research Institute
	Homeowners/Citizens
	Kings Bay Rotary
	Kings Bay Springs Alliance
	Save Crystal River
	Save the Manatee Club
	St. Martins Marsh Aquatic Preserve
	University of Florida Institute of Food and Agricultural Sciences –
	Citrus County Extension Service
	U.S. Fish and Wildlife Service



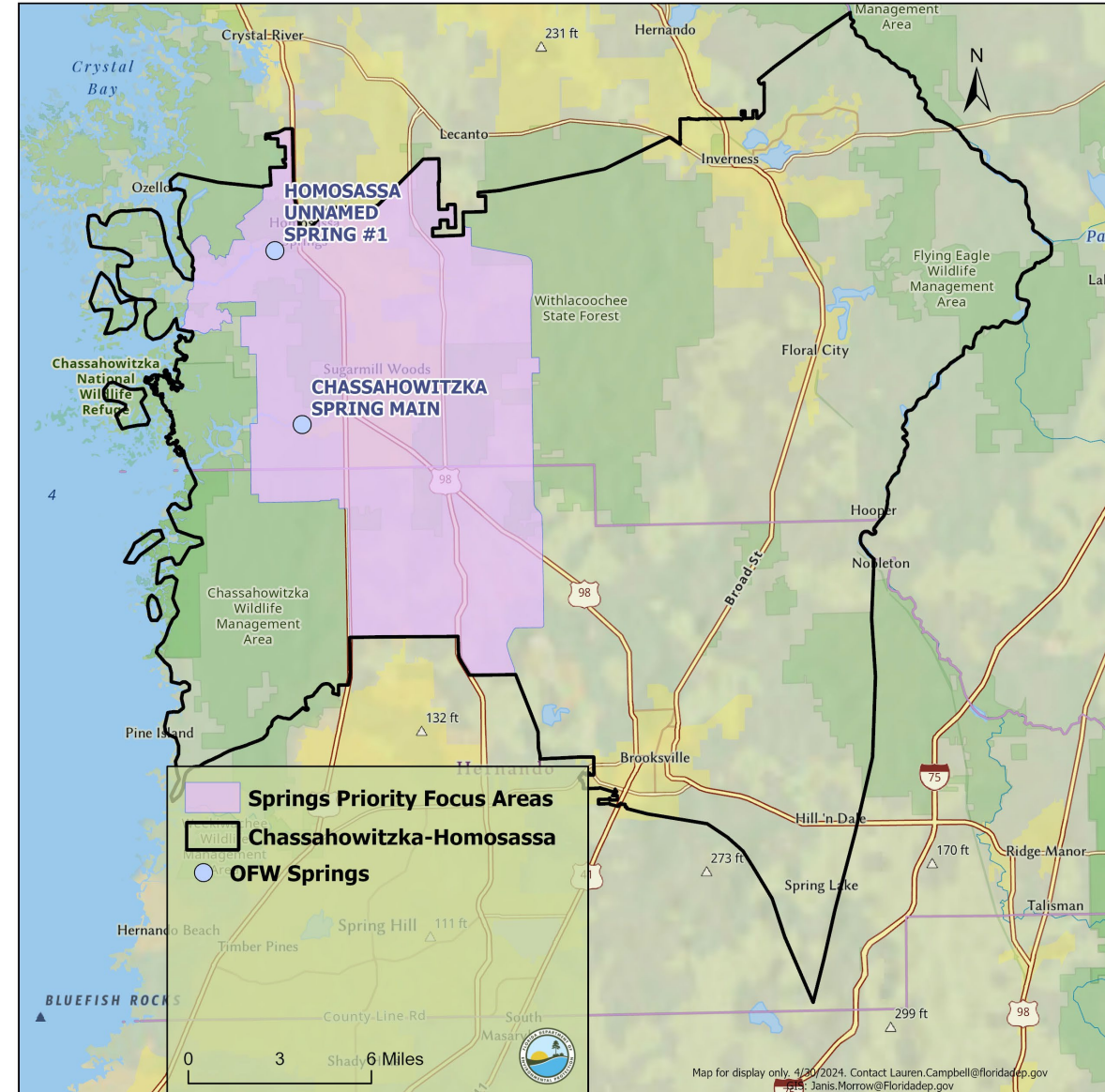




# HOMOSASSA/ CHASSAOWITZKA SPRINGS BMAP

- BMAP area is approximately 340,609 acres and include OFS Homosassa and Chassahowitzka Springs Groups.
- Impaired for the nitrate form of nitrogen.
- Total maximum daily loads (TMDLs) are nitrate annual averages of 0.23 mg/L for the springs and 0.25 mg/L for the rivers.

Type of Entity	Name
<b>Responsible Stakeholders</b>	Citrus County
	City of Brooksville
	City of Inverness
	Hernando County
	Agricultural producers Golf courses
<b>Responsible Agencies</b>	Florida Department of Agriculture and Consumer Services
	Florida Department of Environmental Protection
	Florida Department of Health Southwest Florida Water Management District
<b>Other Interested Stakeholders</b>	Citizens/Homeowners
	Florida Farm Bureau
	Florida Onsite Wastewater Association
	Florida Springs Council
	Hernando Beach Government Affairs Committee
	Hernando County Port Authority
	Hernando Environmental Land Protectors (HELP)
	Homosassa River Alliance
	Save the Manatee Club

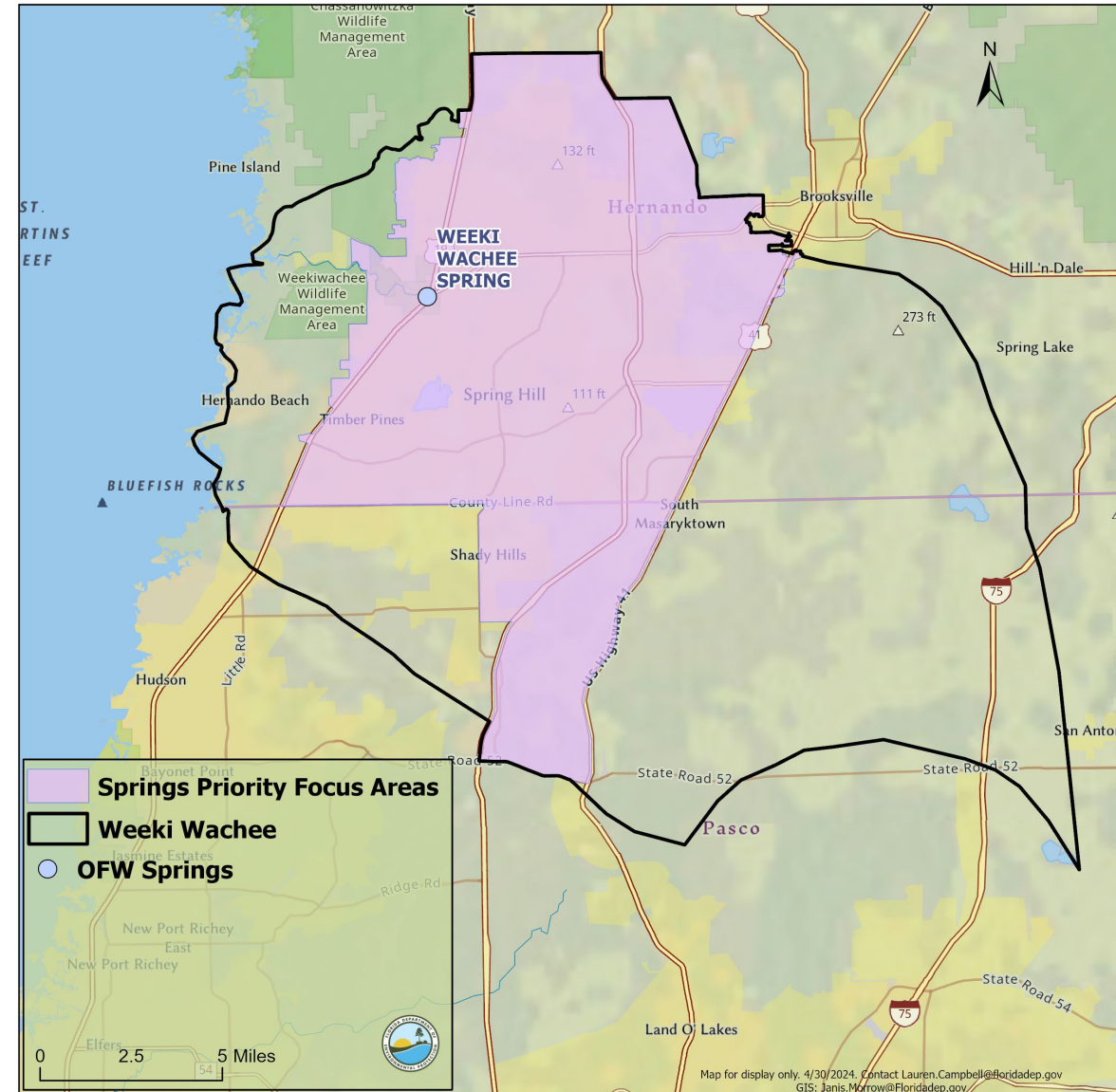




# WEEKI WACHEE BMAP

- BMAP area is approximately 200,474 acres and includes the Weeki Wachee OFS.
- Impaired for the nitrate form of nitrogen.
- Total maximum daily loads (TMDLs) are nitrate annual averages of 0.28 mg/L for Weeki Wachee Spring, 0.23 mg/L for the Magnolia-Aripeka Spring Groups, and 0.20 mg/L for the Weeki Wachee River.

Type of Entity	Name
<b>Responsible Stakeholders</b>	City of Brooksville Hernando County Pasco County Agricultural producers Golf courses
<b>Responsible Agencies</b>	Florida Department of Agriculture and Consumer Services Florida Department of Environmental Protection Florida Department of Health Southwest Florida Water Management District
<b>Other Interested Stakeholders</b>	Citizens City of Weeki Wachee Florida Farm Bureau Florida Onsite Wastewater Association Florida Springs Institute Hernando Beach Government Affairs Committee Hernando County Task Force Hernando Environmental Land Protectors (HELP) Save the Manatee Club







# 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.



# HOUSE BILL (HB) 1379: ENVIRONMENTAL PROTECTION

Increased protection for OFS.

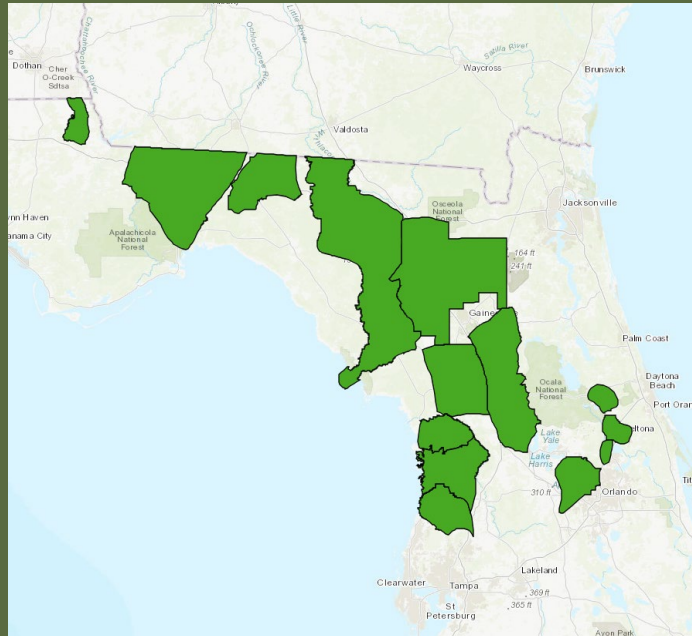
Strengthens Water Quality Protections and BMAPs.

**HB 1379**

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.





# 2024 DEP AGENCY BILL: HB 1557

Advances the protection of our environmental resources by:

- Enhancing protections for Florida's Coral Reef and aquatic preserves.
- Strengthening Florida's resilience planning.
- Furthering the Onsite Septic Program transfer.

## Improving Treatment of Reclaimed Water

Ensures that reclaimed water is treated to meet AWT or a more stringent treatment standard in certain BMAP areas, while still promoting its use to eliminate surface water discharges and meet water supply challenges.

## Expanding Wastewater Facility Plans

Supports the development of domestic wastewater treatment plans and OSTDS remediation plans within BMAP or other restoration areas by requiring facilities to provide information to the local entities developing these plans.

## Investing in Innovative Technologies

Creates a program to expeditiously review new and innovative enhanced nutrient-reducing OSTDS to reduce the nutrients entering Florida's waterways.



# 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.

Florida Department of Environmental Protection Statewide Annual Report 2022  
Basin Management Action Plans

Introduction	Total Maximum Daily Loads	Basin Management Action Plans	Alternative Restoration Plans	Minimum Flows & Water Levels	Recovery & Prevention Strategies	Contacts & Project Data
How to Use This Report	What Is the STAR?	Reductions Summary	What Are Nutrients?	What Are FIB?	What Are BMAP Projects?	
Nutrient BMAPs		Fecal Indicator Bacteria BMAPs		BMAP Projects		Project Table

Sorted by Alphabetical Order

**Kings Bay and Crystal River Springs Basin**

**Banana River Lagoon Basin**

**Caloosahatchee River and Estuary Basin**

**Central Indian River Lagoon Basin**

**Chassahowitzka-Homosassa Springs Basin**

**DeLeon Spring Basin**

**Indian Waters Sewer Expansion Phase I**

Indian Waters Sewer Expansion Phase I is in the Springshed- Inside PFA crediting location of the KING BMAP. The project is estimated to reduce total nitrogen loading by 410 lbs/yr and total phosphorus loading by 0 lbs/yr. This project is a OSTDS Phase Out and currently has a status of Completed with an estimated completion date of 2022. Stakeholder-reported costs for this project are \$2,200,000.00.

According to City of Crystal River, funding for this project was obtained through City; DEP for City - \$100,000.00; DEP - \$1,497,000.00.

City of Crystal River describes this project as: Installation of central sewer to remove approximately 86 septic systems.

*Projects listed with zero TN and TP reductions may not have enough information to verify the nutrient reduction credit or may be a project*

**BMAP Projects 2022**

- Stormwater
- Wastewater
- Agriculture

**All Basins TN Reductions Achieved by Completed and Ongoing Projects as of Dec. 31, 2022**

Stormwater Agriculture Wastewater

Units are in pounds per year.

TN Reduction







# PRELIMINARY STAR RESULTS FOR 2023

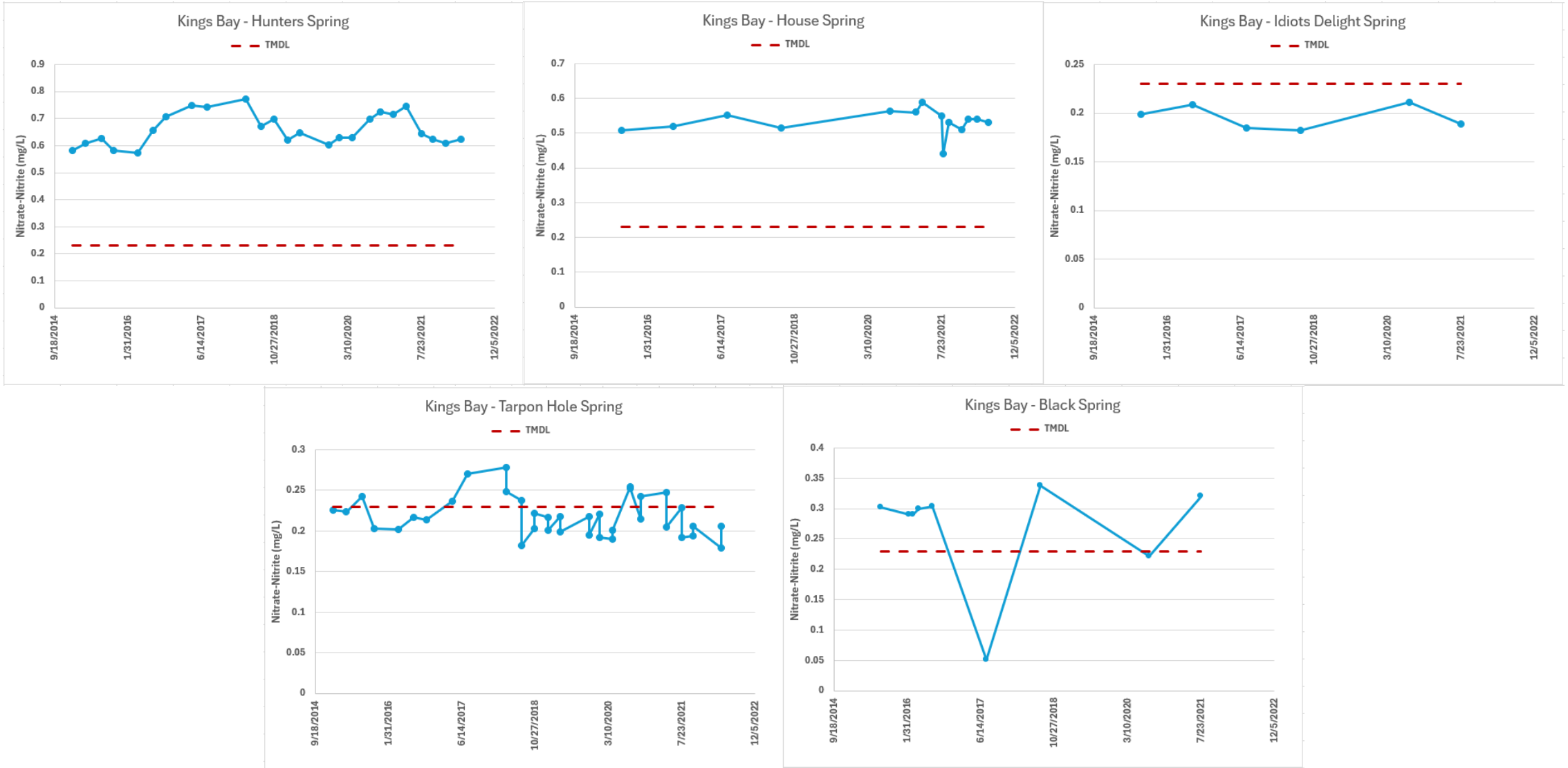
BMAP	Project Count *					Verified Project Reductions of Total Nitrogen
	Planned	Ongoing	Underway	Completed	Total	
<b>Kings Bay/ Crystal River</b>	20	7	10	34	71	23,770 lbs./yr.
<b>Homosassa/ Chassahowitzka</b>	12	12	19	25	68	19,056 lbs./yr.
<b>Weeki Wachee</b>	18	16	11	36	81	61,083 lbs./yr.

\*As of Dec. 31, 2023



# WATER QUALITY DATA

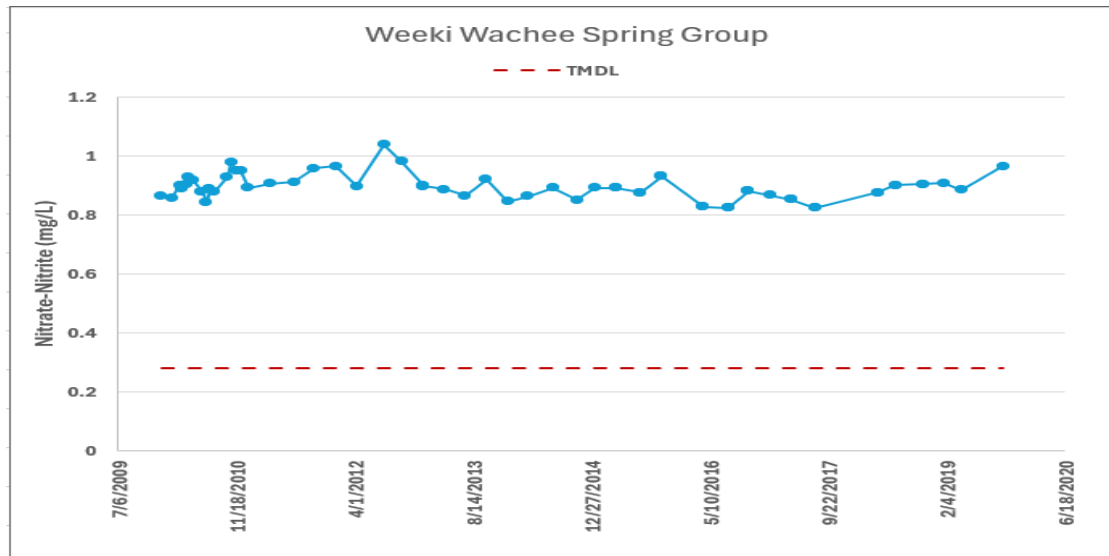
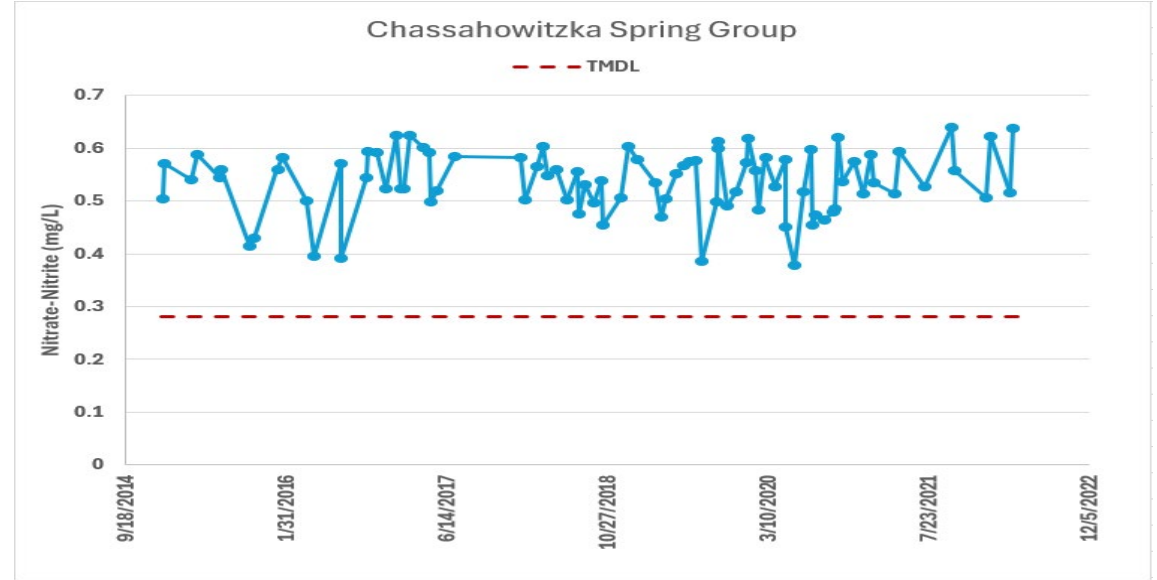
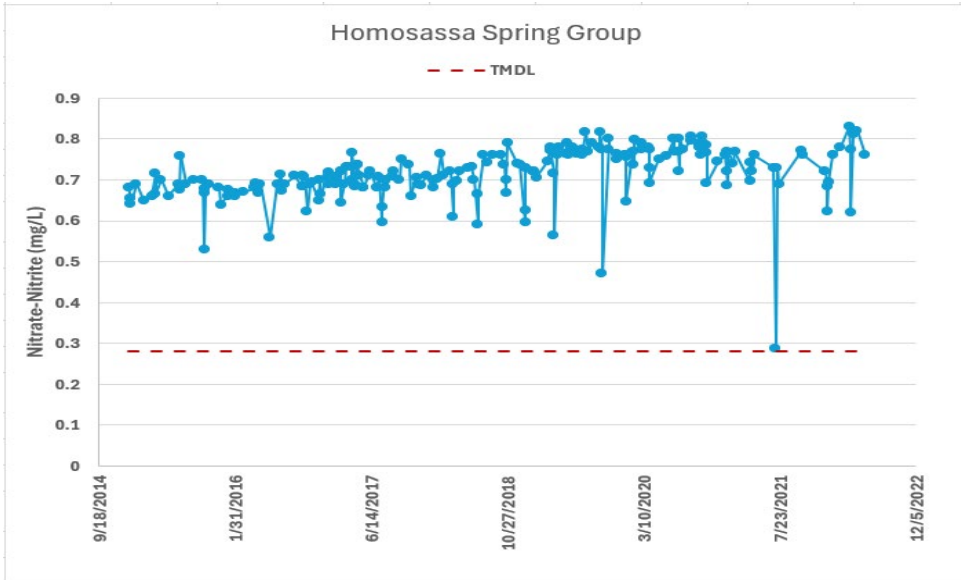
## KINGS BAY NITRATE DATA





# WATER QUALITY DATA

## HOMOSASSA/CHASSAHOWITZKA AND WEEKI WACHEE DATA







# DATA UPLOAD

## WATERSHED INFORMATION NETWORK (WIN)

- Through both the 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 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 (WMDs), 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	<a href="mailto:Justin.M.Nelson@FloridaDEP.gov">Justin.M.Nelson@FloridaDEP.gov</a>
Casey Marston	South, Southwest	850-245-8049	<a href="mailto:Casey.Marston@FloridaDEP.gov">Casey.Marston@FloridaDEP.gov</a>
Lisa Schwenning	SPA (STORET Public Access), WQX (U.S. EPA Water Quality Exchange)	850-245-8509	<a href="mailto:Lisa.Schwenning@floridaDEP.gov">Lisa.Schwenning@floridaDEP.gov</a>
Jason Storrs	Central, Statewide	850-245-8467	<a href="mailto:Jason.Storrs@FloridaDEP.gov">Jason.Storrs@FloridaDEP.gov</a>

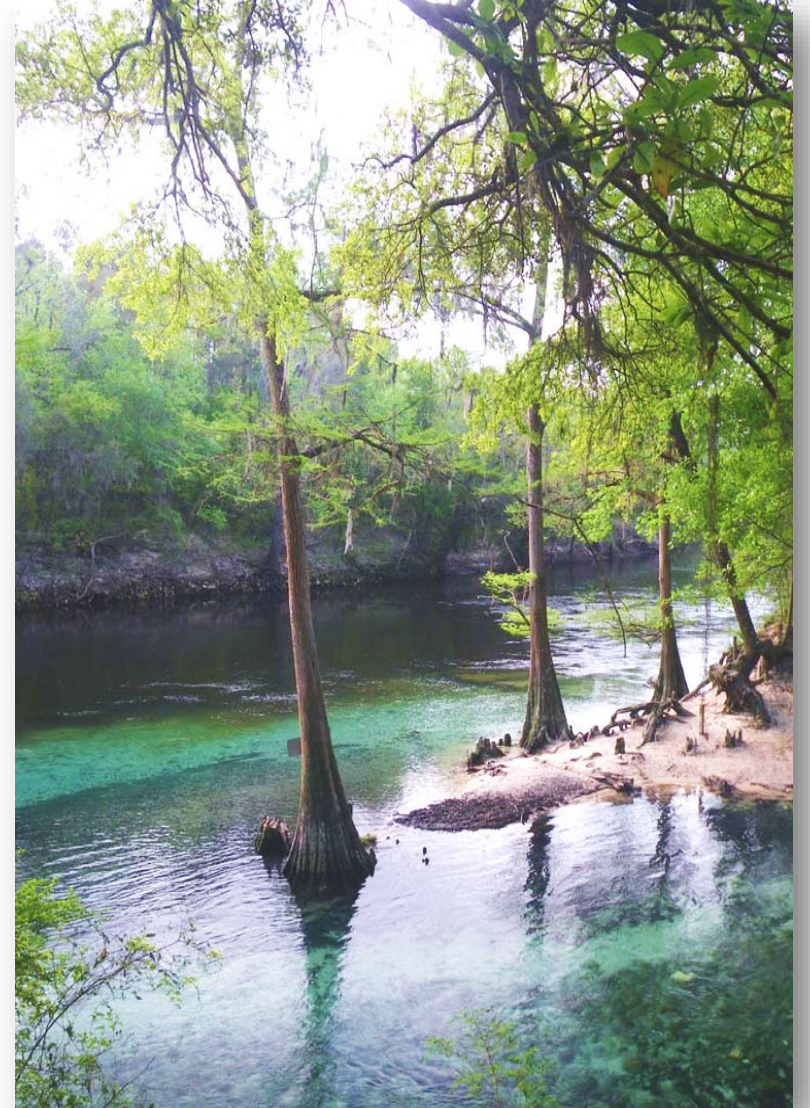


# BMAP UPDATES

## ADOPTED BY JULY 1, 2025

- 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 (Senate Bill 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.





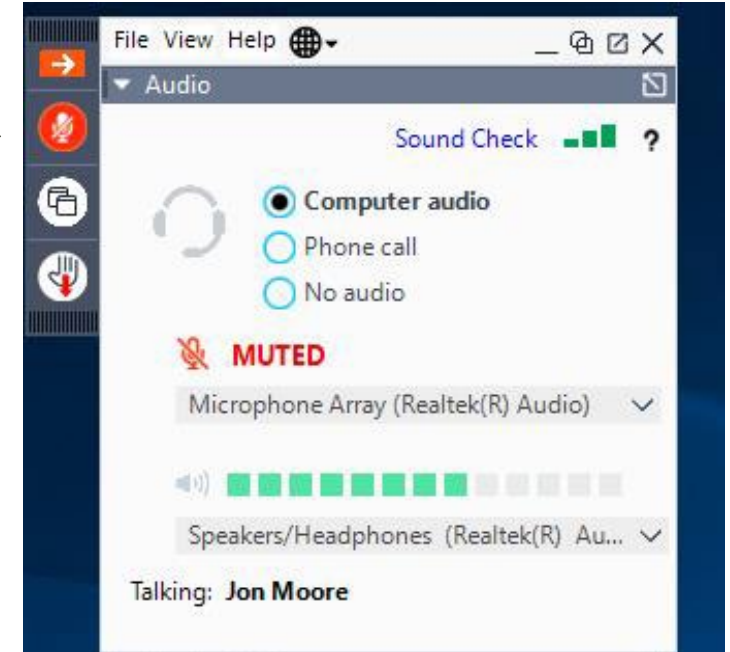


# BMAP MEETING

## PUBLIC QUESTIONS PERIOD

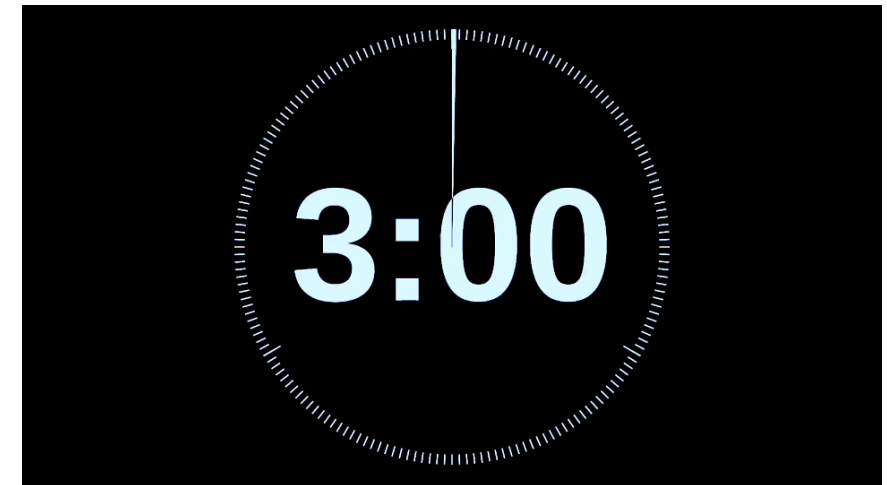
### Verbal Questions:

- We ask that questions and comments be limited to **3 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](mailto:BMAPPprogram@FloridaDEP.gov).





# NSILT UPDATES

- NSILT Process.
- Methodology review for sources.
  - Atmospheric deposition (AD).
  - Wastewater treatment facilities (WWTFs).
  - OSTDS.
  - Urban turfgrass fertilizer (UTF).
  - Sports turfgrass fertilizer (STF).
  - Farm fertilizer (FF).
  - Livestock waste (LW).
  - 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.

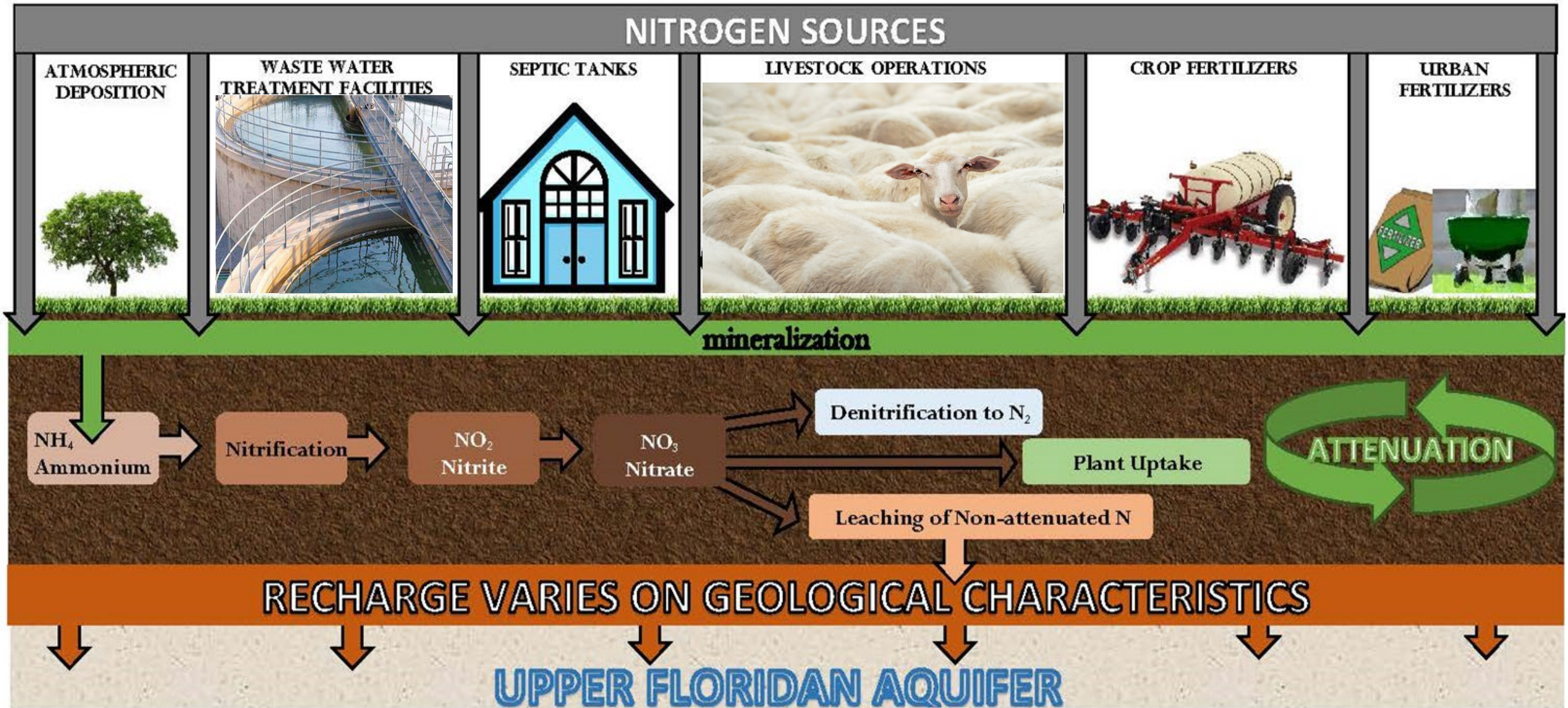
Apply a location specific recharge factor to surface loading estimate.

**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.

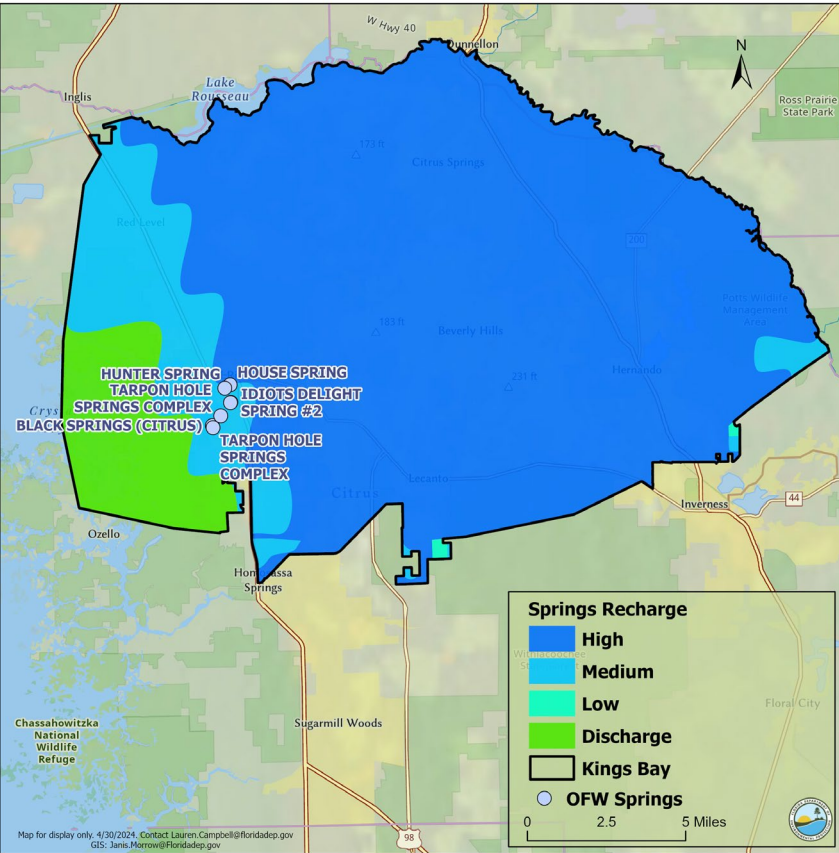
Recharge to Groundwater	
Category	Rate
High	90%
Medium	50%
Low	10%
Discharge	0%



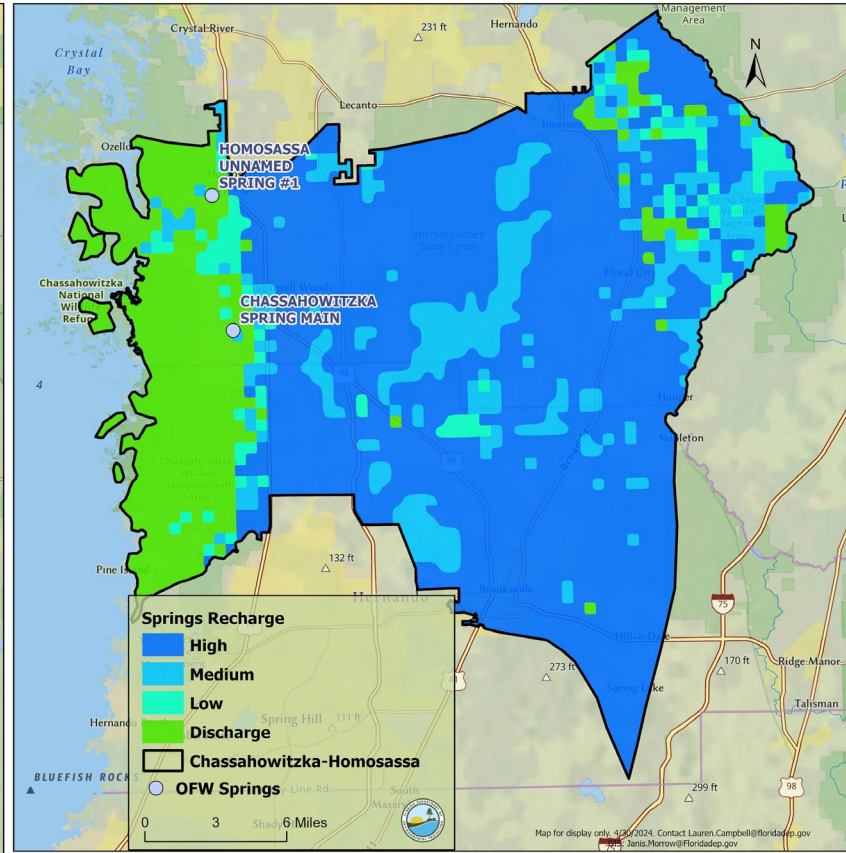


# RECHARGE TO GROUNDWATER

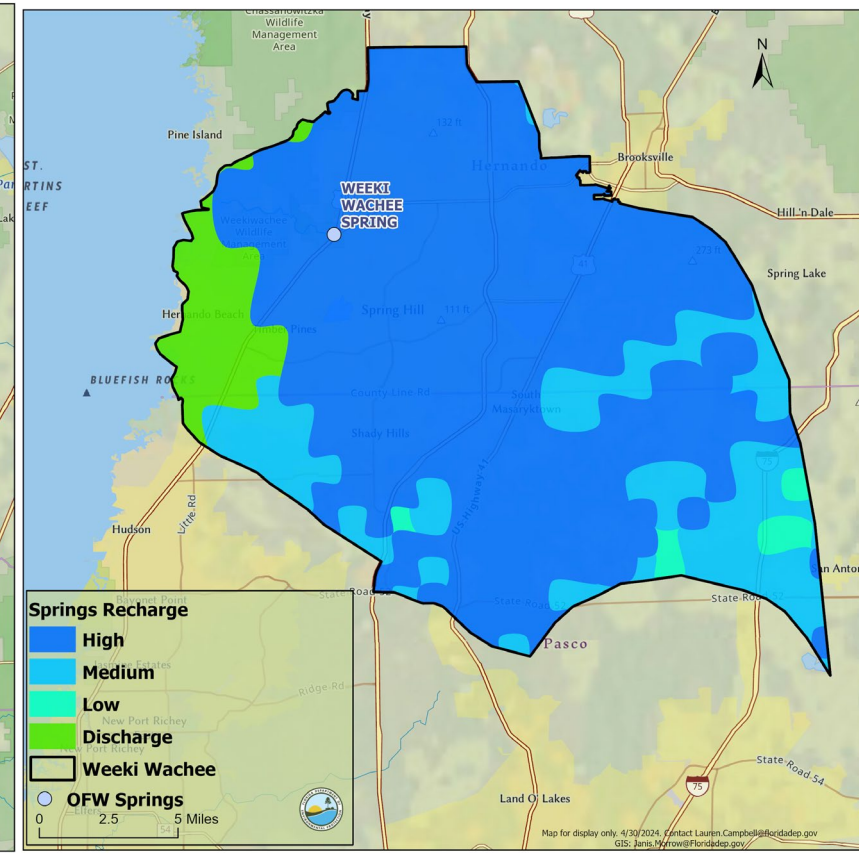
## Kings Bay/Crystal River



## Homosassa/Chassahowitzka Springs



## Weeki Wachee







# AD

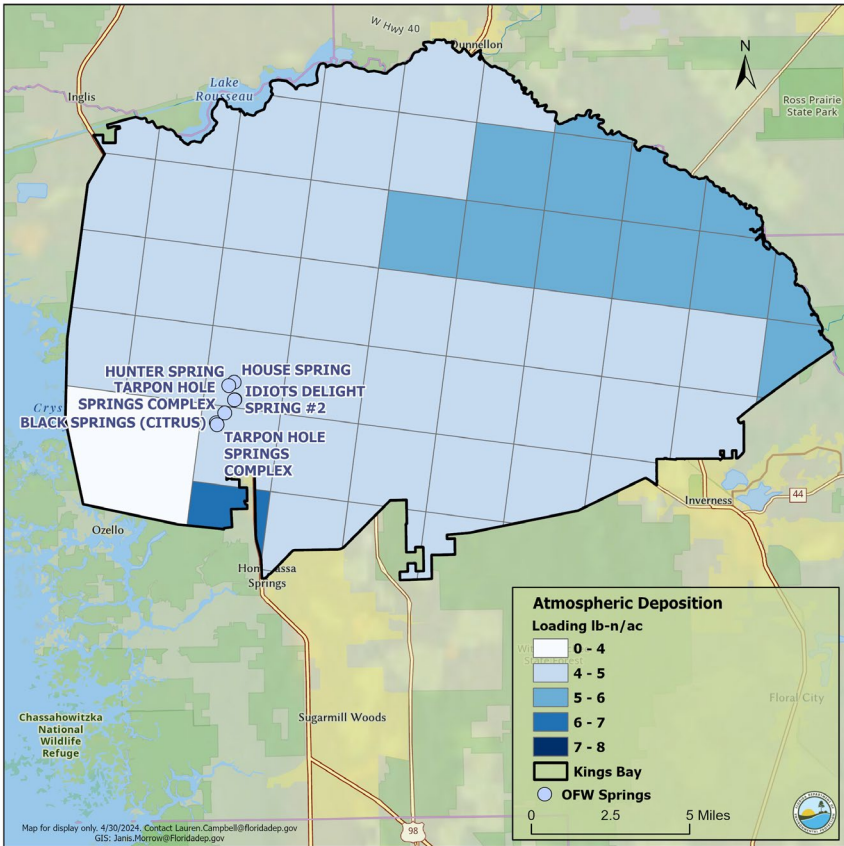
- Estimated using a nationwide model developed by the Total Deposition Science Committee and EPA called the Total Deposition (TDEP) model.
- AD estimates from 2019 and 2020 were averaged to estimate annual loading in the springsheds.
- Methodology is consistent with previous NSILT.

<b>Springshed</b>	<b>Estimated Load to Surface (lbs-N/yr)</b>	<b>Estimated Load to Groundwater (lbs-N/yr)</b>
Kings Bay	814,302	69,099
Homosassa	920,811	70,808
Chassahowitzka	545,574	43,944
Weeki Wachee	1,147,400	93,069

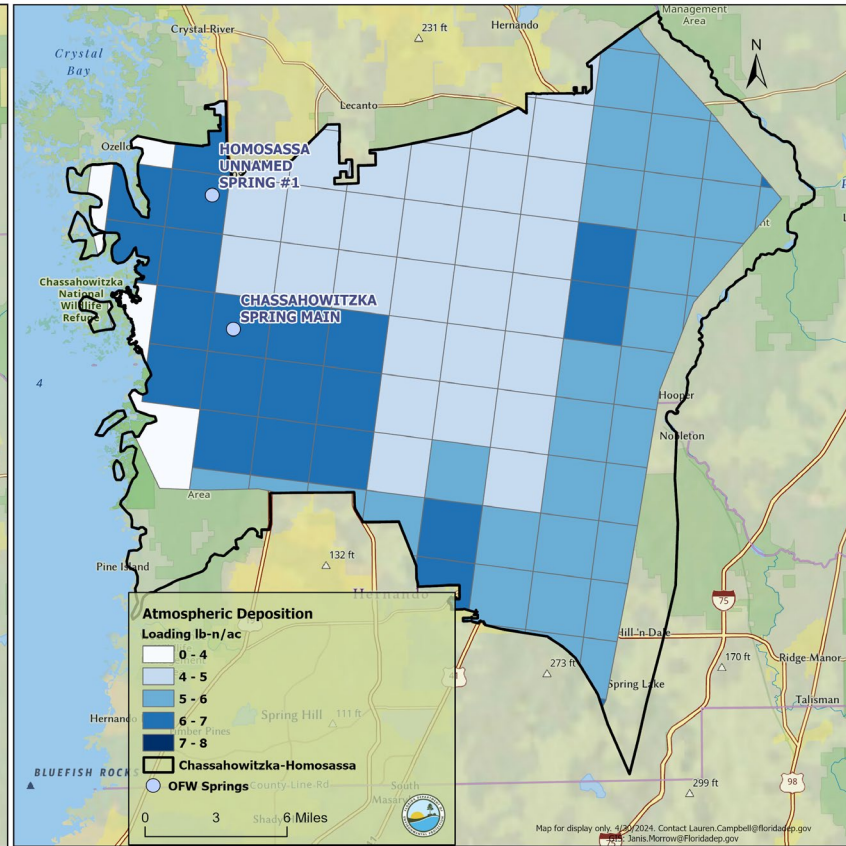


# AD

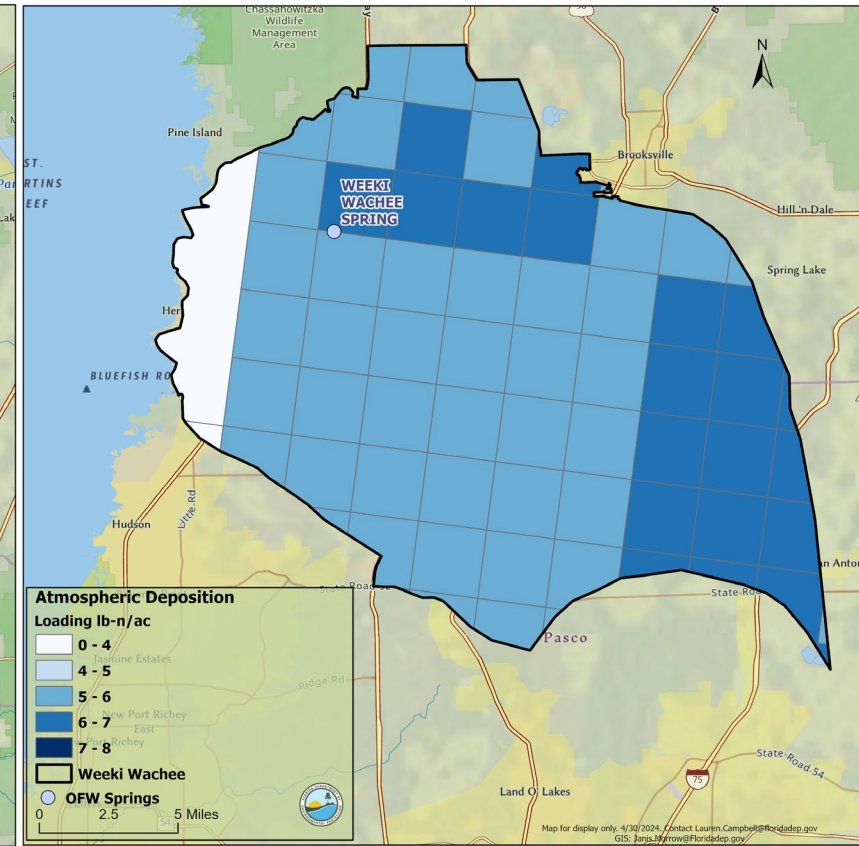
## Kings Bay/Crystal River



## Homosassa/Chassaowitzka Springs



## Weeki Wachee





# WWTFs

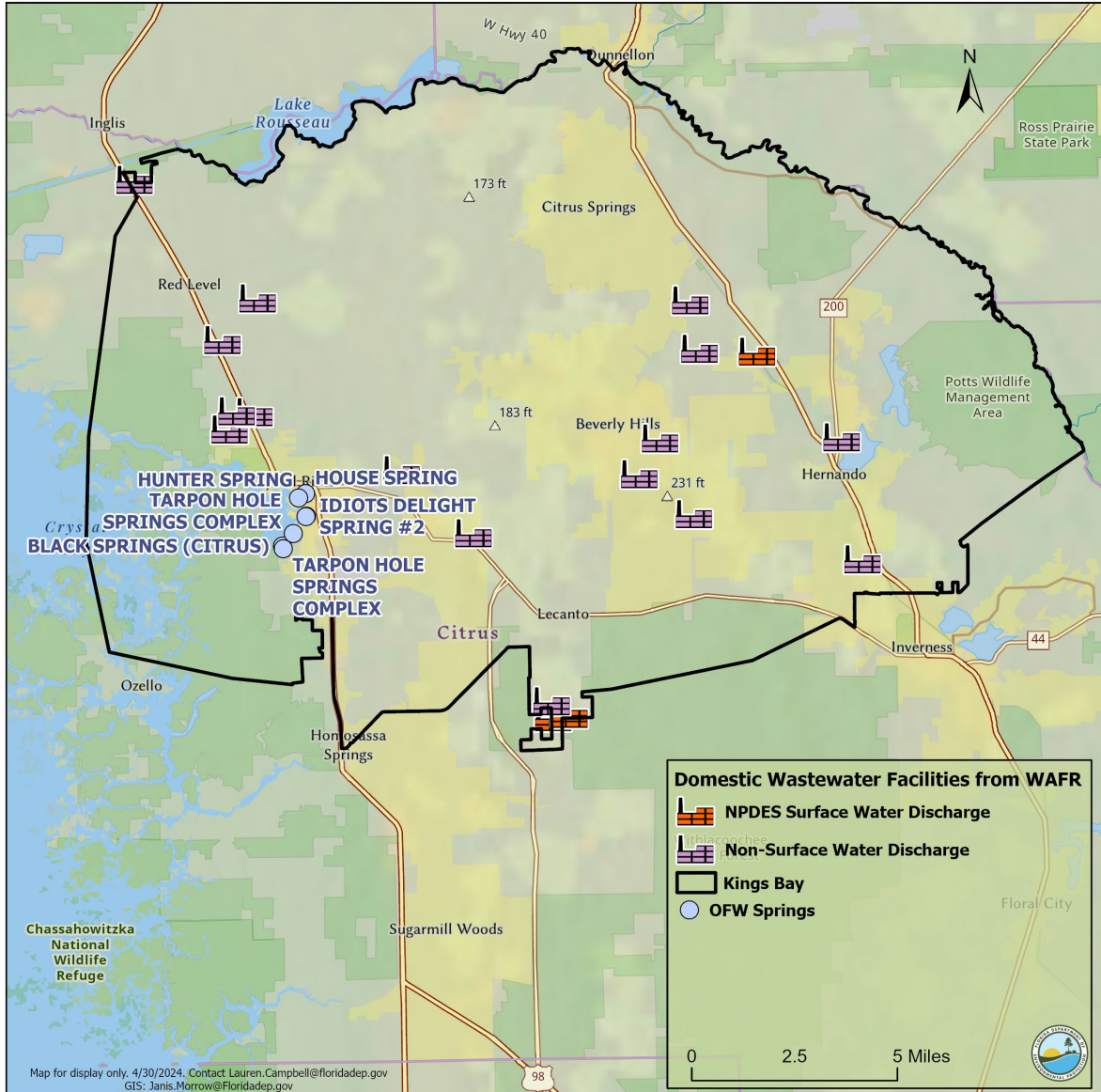
- Wastewater Facility Regulation information was reviewed to determine the location of all WWTFs, as well as their effluent application or disposal sites.
- Discharge monitoring report data collected by Wastewater Facility Regulation from 2019 to 2021 were reviewed to determine effluent discharge volume and total nitrogen (TN) concentration for each disposal stream.
- Effluent disposal sites evaluated include reuse, disposal in a rapid infiltration basin, sprayfield, absorption field or wetland. Each method has its own estimated attenuation factor.

Wastewater Treatment Effluent Attenuation				
Reuse	RIB	Sprayfield	Absorption Field	Wetland
75%	25%	60%	50%	85%





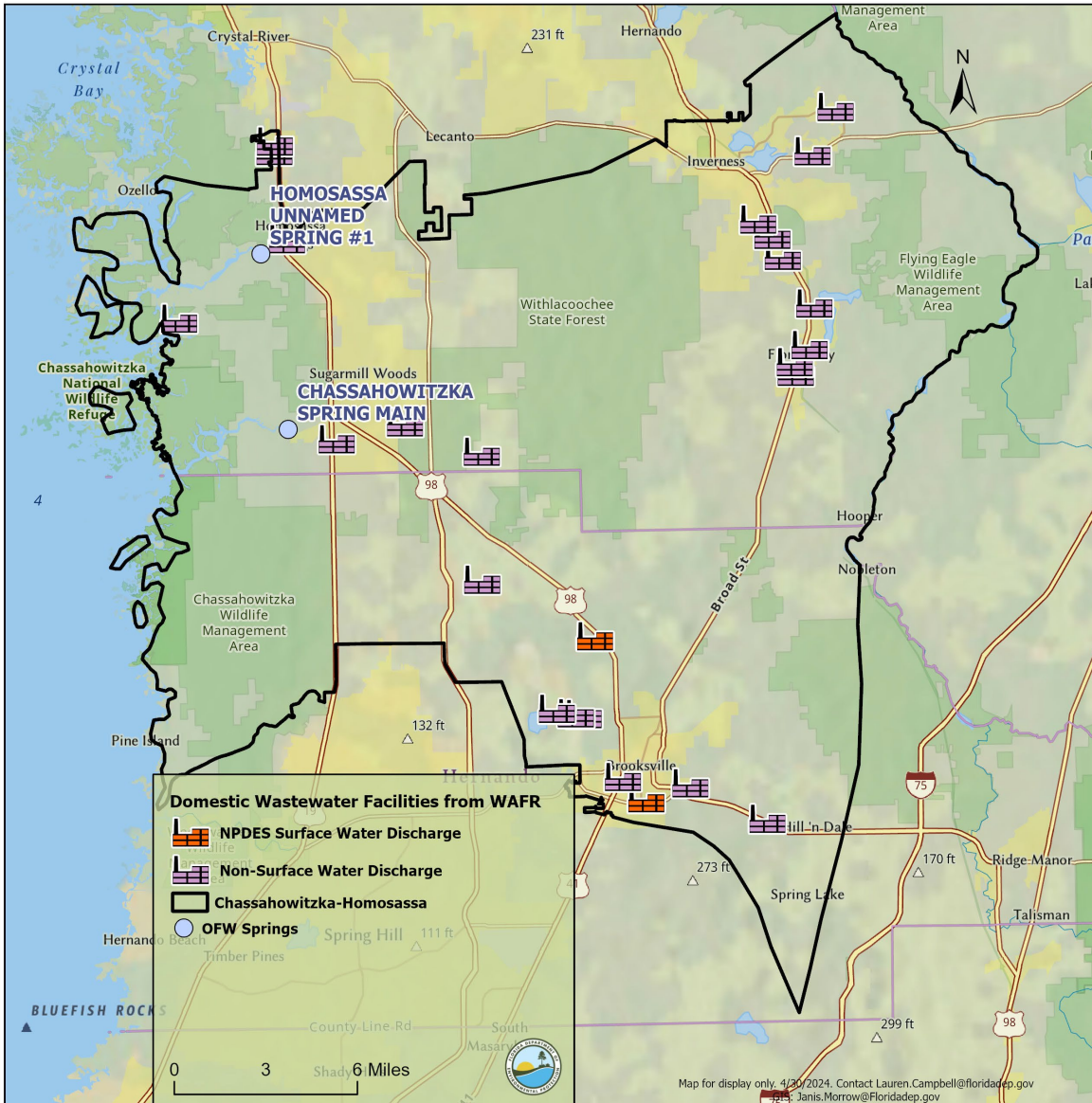
# WWTFs KINGS BAY/CRYSTAL RIVER



Kings Bay					
County	Facility ID	Facility Name	Disposal Type	Recharge Type at Disposal Site	Gross TN Average Load (lbs/yr)
Citrus	<a href="#">FLA011844</a>	Brentwood Regional WWTF	RIB	High	9731.73
Citrus	<a href="#">FLA011845</a>	Meadowcrest WWTF	RIB	High	10459.22
Citrus	<a href="#">FLA011845</a>	Meadowcrest WWTF	Reuse (golf, resi)	High	10030.46
Citrus	<a href="#">FLA011846</a>	New Horizons WWTF	RIB	High	196.42
Citrus	<a href="#">FLA011848</a>	Crystal River City Of WWTF	Sprayfield	High	8508.59
Citrus	<a href="#">FLA011848</a>	Crystal River City Of WWTF	Reuse (golf, resi)	High	7969.03
Citrus	<a href="#">FLA011849</a>	Crystal Acres MHP WWTF	RIB	High	80.88
Citrus	<a href="#">FLA011849</a>	Crystal Acres MHP WWTF	Sprayfield	High	40.67
Citrus	<a href="#">FLA011854</a>	Pelican Bay Apartments	RIB	Medium	239.41
Citrus	<a href="#">FLA011855</a>	Sandy Oaks RVP & MHC WWTF	Sprayfield	High	81.87
Citrus	<a href="#">FLA011855</a>	Sandy Oaks RVP & MHC WWTF	RIB	High	81.87
Citrus	<a href="#">FLA011861</a>	Bayfront Health Seven Rivers	RIB	Medium	554.05
Citrus	<a href="#">FLA011863</a>	Lake Rousseau Resort LLC	RIB	High	72.35
Citrus	<a href="#">FLA011869</a>	Beverly Hills WWTF	RIB	High	20508.95
Citrus	<a href="#">FLA011876</a>	Indian Springs Utilities	RIB	Medium	850.13
Citrus	<a href="#">FLA011895</a>	Thunderbird MHP WWTF	RIB	Medium	148.38
Citrus	<a href="#">FLA011914</a>	Greenbriar Of Citrus Hills	RIB	High	517.51
Citrus	<a href="#">FLA011918</a>	Citrus Center Shopping Center WWTF	RIB	High	443.91
Citrus	<a href="#">FLA011920</a>	Inverness Park	Sprayfield	High	210.6
Citrus	<a href="#">FLA011922</a>	Quality Inn	RIB	Medium	344.74
Citrus	<a href="#">FLA011924</a>	Lecanto Hills MHP WWTF	RIB	High	83.03
Citrus	<a href="#">FLA011928</a>	Ventura Village Apartments WWTF	Absorption Field	High	169.97
Citrus	<a href="#">FLA011872</a>	Imperial Gardens MHP	RIB	Medium	73.42



# WWTFs HOMOSASSA/CHASSAHOWITZKA SPRINGS



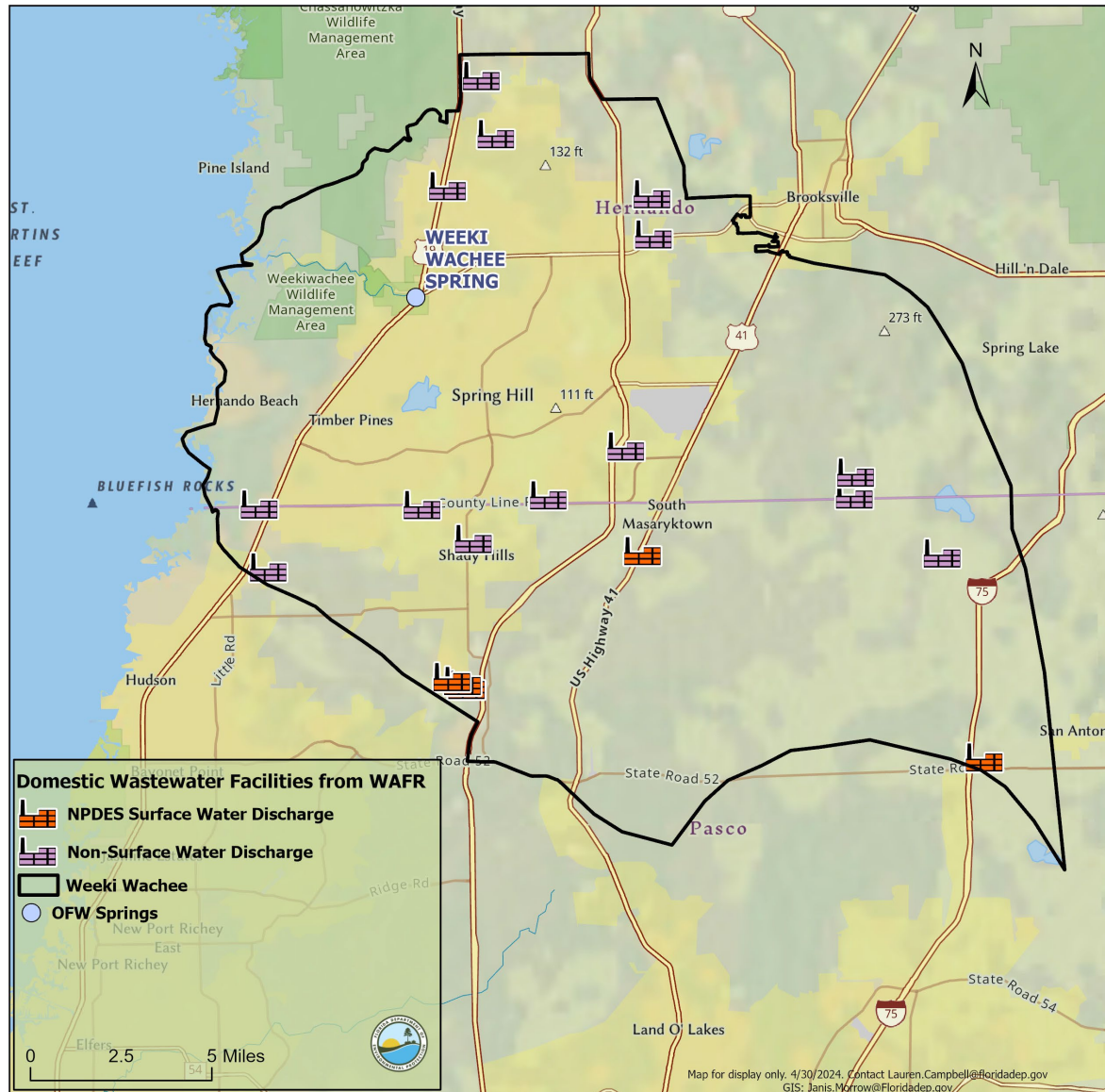
Homosassa Spring Group					
County	Facility ID	Facility Name	Disposal Type	Recharge Type at Disposal Site	Gross TN Average Load (lbs/yr)
Citrus	<a href="#">FLA011839</a>	Floral City Elementary School WWTF	RIB	High	44.48
Citrus	<a href="#">FLA011847</a>	Inverness, City of - WWTF	Sprayfield	High	2,712.03
Citrus	<a href="#">FLA011847</a>	Inverness, City of - WWTF	Reuse (golf, resi)	High	1,396.84
Citrus	<a href="#">FLA011847</a>	Inverness, City of - WWTF	Reuse (golf, resi)	Medium	52.83
Citrus	<a href="#">FLA011853</a>	Aunt Vera's Antique Store	RIB	Medium	4.23
Citrus	<a href="#">FLA011864</a>	Moonrise Resort	RIB	High	222.5
Citrus	<a href="#">FLA011879</a>	Oak Pond Mobile Home Estates	RIB	Low	126.99
Citrus	<a href="#">FLA011880</a>	Stoneridge Landing	RIB	High	309.33
Citrus	<a href="#">FLA011884</a>	Floral Oaks Apartments WWTF	RIB	High	51.08
Citrus	<a href="#">FLA011891</a>	Bedrock Singing Forest MHP WWTF	RIB	High	469.56
Citrus	<a href="#">FLA011893</a>	Point O Woods	RIB	High	346.83
Citrus	<a href="#">FLA011893</a>	Point O Woods	Reuse (golf, resi)	High	567.4
Citrus	<a href="#">FLA011898</a>	Harbor Lights Mobil Home Resort WWTP	Sprayfield	High	108.56
Citrus	<a href="#">FLA011899</a>	Cedar Lakes MHP WWTF	RIB	Medium	396.41
Citrus	<a href="#">FLA011900</a>	<b>Royal Oaks Manor</b>	RIB	High	423.83
Citrus	<a href="#">FLA011901</a>	Bell Villa MHP	RIB	Discharge	144.47
Citrus	<a href="#">FLA011901</a>	Bell Villa MHP	RIB	Low	30.42
Citrus	<a href="#">FLA011904</a>	Oasis Mobile Home and RV Park WWTF	RIB	High	60.08
Citrus	<a href="#">FLA011907</a>	Evanridge MHP	RIB	Low	167.41
Citrus	<a href="#">FLA011915</a>	Forest View MHP WWTF	RIB	Medium	700.78
Citrus	<a href="#">FLA011927</a>	Tarawood Adult Community	RIB	High	166.06
Citrus	<a href="#">FLA011902</a>	Palm Terrace Village WWTF	Sprayfield	High	186.68
Chassahowitzka Spring Group Spring Group					
County	Facility ID	Facility Name	Disposal Type	Recharge Type at Disposal Site	Gross TN Average Load (lbs/yr)
Citrus	<a href="#">FLA011903</a>	<b>Sugarmill Woods WWTF</b>	Sprayfield	High	10689.67
Citrus	<a href="#">FLA011903</a>	<b>Sugarmill Woods WWTF</b>	Sprayfield	Medium	2815.03
Citrus	<a href="#">FLA011903</a>	<b>Sugarmill Woods WWTF</b>	RIB	High	18177.11
Citrus	<a href="#">FLA011916</a>	Walden Woods MHP WWTF	RIB	High	741.98
Hernando	<a href="#">FLA012071</a>	Wesleyan Village	RIB	High	934.23
Hernando	<a href="#">FLA012071</a>	Wesleyan Village	Sprayfield	High	49.25
Hernando	<a href="#">FLA012062</a>	Countryside Estates WWTF	RIB	High	151.23
Hernando	<a href="#">FLA012046</a>	<b>Brooksville Golf &amp; Country Club WWTF</b>	RIB	High	58.6

Map for display only. 4/30/2024. Contact Lauren.Campbell@floridadep.gov  
 or Janis.Morrow@floridadep.gov





# WWTFs WEEKI WACHEE



Weeki Wachee Spring Group					
County	Facility ID	Facility Name	Disposal Type	Recharge Type at Disposal Site	Gross TN Average Load (lbs/yr)
Hernando	<a href="#">FLA012036</a>	William S. Smith Water Reclamation Facility	Reuse (golf, resid)	Medium	13731.60934
Hernando	<a href="#">FLA012036</a>	William S. Smith Water Reclamation Facility	Reuse (golf, resid)	High	10130.48234
Hernando	<a href="#">FLA012038</a>	Weeki Wachee North MHP WWTF	RIB	High	413.0892313
Hernando	<a href="#">FLA012039</a>	Eckerd Acedemy at Brooksville WWTF	RIB	High	152.1139462
Hernando	<a href="#">FLA012043</a>	Spring Hill WRF	RIB	Discharge	6861.160315
Hernando	<a href="#">FLA012043</a>	Spring Hill WRF	Reuse (golf, resid)	High	52957.23045
Hernando	<a href="#">FLA012044</a>	Camp - A - Wyle Resort WWTF	RIB	High	334.0131079
Hernando	<a href="#">FLA012045</a>	Camper's Holiday Association WWTF	RIB	Medium	221.4558765
Hernando	<a href="#">FLA012045</a>	Camper's Holiday Association WWTF	Absorption Field	Medium	222.2516069
Hernando	<a href="#">FLA012048</a>	Big Tree MH & RV Village	Absorption Field	High	333.8881498
Hernando	<a href="#">FLA012048</a>	Big Tree MH & RV Village	RIB	High	0
Hernando	<a href="#">FLA012054</a>	Frontier Campground MHP	RIB	High	306.4342082
Hernando	<a href="#">FLA012059</a>	Imperial Estates MHP WWTF	RIB	High	388.6142913
Hernando	<a href="#">FLA012059</a>	Imperial Estates MHP WWTF	Sprayfield	High	365.3332508
Hernando	<a href="#">FLA012065</a>	Topics RV Community WWTF	RIB	High	153.6426252
Hernando	<a href="#">FLA012066</a>	Camp Sunshine WWTF (fka Church of God of Pro	RIB	High	71.53348156
Hernando	<a href="#">FLA012069</a>	Glen Water Reclamation Facility	RIB	High	18971.44336
Hernando	<a href="#">FLA012069</a>	Glen Water Reclamation Facility	Sprayfield	High	11094.75397
Hernando	<a href="#">FLA012070</a>	Holiday Springs RV Resort WWTF	RIB	Discharge	194.6619633
Hernando	<a href="#">FLA012070</a>	Holiday Springs RV Resort WWTF	Sprayfield	Discharge	0
Hernando	<a href="#">FLA012719</a>	Shady Hills Elementary School WWTF	RIB	High	13.35052013
Pasco	<a href="#">FLA012741</a>	Pasco County - Shady Hills Subregional WWTF	Reuse (golf, resid)	Medium	293013.9162
Pasco	<a href="#">FLA012748</a>	Country Village MHP WWTF	RIB	Medium	87.53549638
Pasco	<a href="#">FLA012756</a>	Big Oaks RV Park WWTF	RIB	High	66.80682413
Pasco	<a href="#">FLA012819</a>	East Lake Landings MHP WWTF	RIB	High	268.8182339
Pasco	<a href="#">FLA012831</a>	Travelers Rest WWTF	RIB	High	1145.906526
Pasco	<a href="#">FLA012831</a>	Travelers Rest WWTF	Sprayfield	High	203.2149505
Pasco	<a href="#">FLA012832</a>	Aripeka West MHP	RIB	Discharge	104.4095179
Hernando	<a href="#">FLA017033</a>	Lakewood Retreat WWTF	Sprayfield	Medium	122.6042961
Hernando	<a href="#">FLA017223</a>	Hernando Airport Subregional WWTF	RIB	High	11069.81546
Hernando	<a href="#">FLA186830</a>	Eckerd Youth Challenge Program WWTF	Sprayfield	High	78.79736782





# WWTFs

- For the entire Springs Coast region, 84 domestic wastewater facilities and discharge sites were evaluated to determine contributions to groundwater loading.
- Rapid infiltration basin and sprayfield applications are the most common disposal method across BMAP areas.
- The results of the NSILT analysis for all WWTFs and disposal types in all four springsheds are presented in the table below.

<b>Springshed</b>	<b>Facilities</b>	<b>Est. Load to Surface (lbs-N/yr)</b>	<b>Est. Load to Groundwater (lbs-N/yr)</b>
Kings Bay	23	71,397	36,645
Homosassa	22	8,544	3,382
Chassahowitzka	8	33,617	17,972
Weeki Wachee	31	415,919	79,729



# OSTDS

- Florida Water Management Inventory 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%.

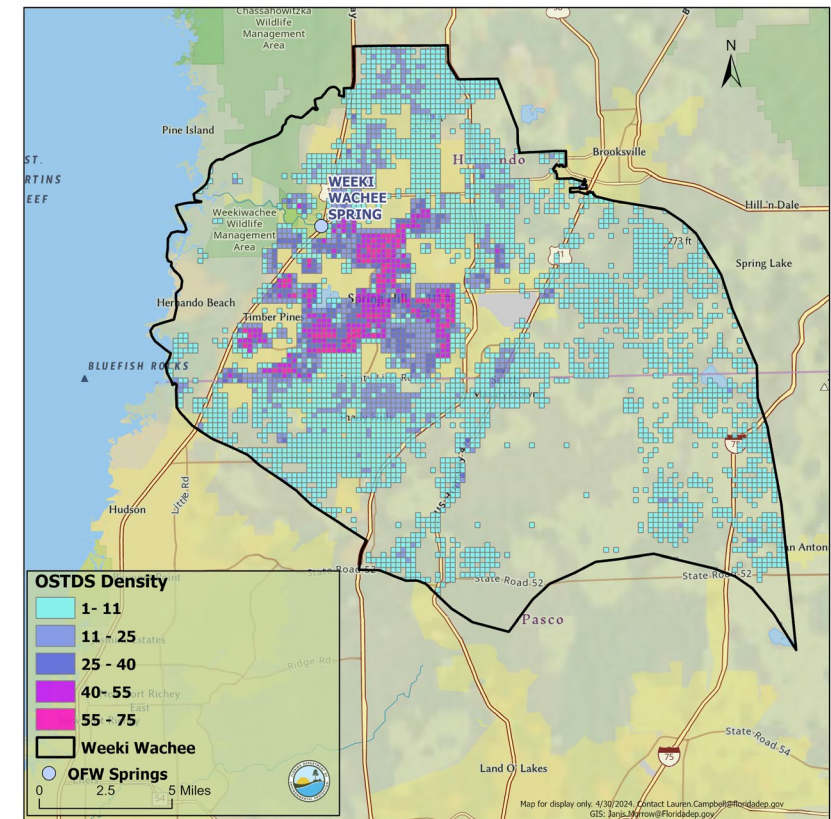
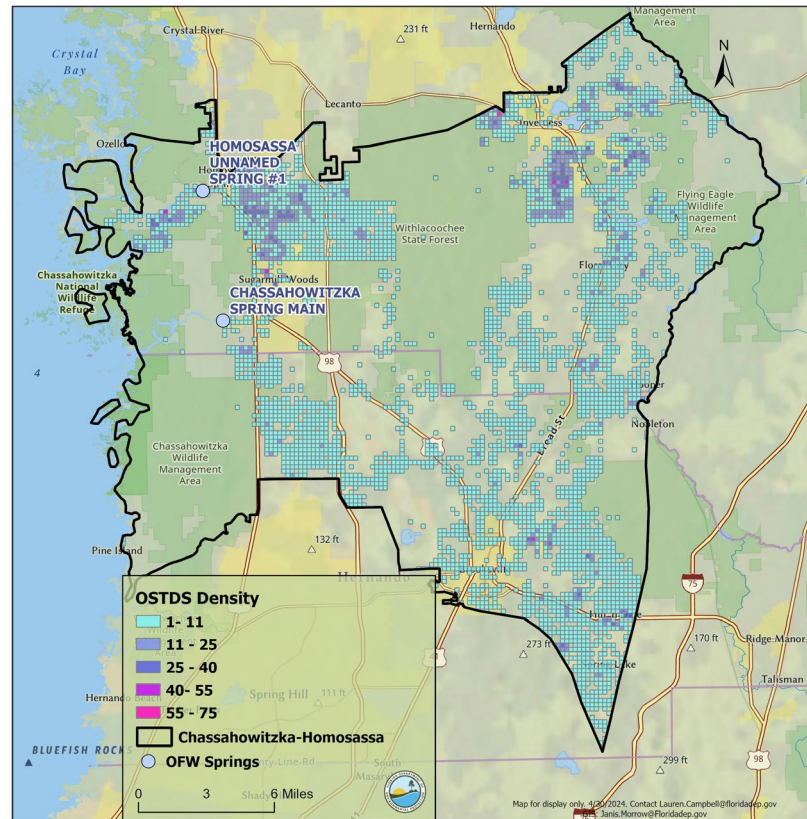
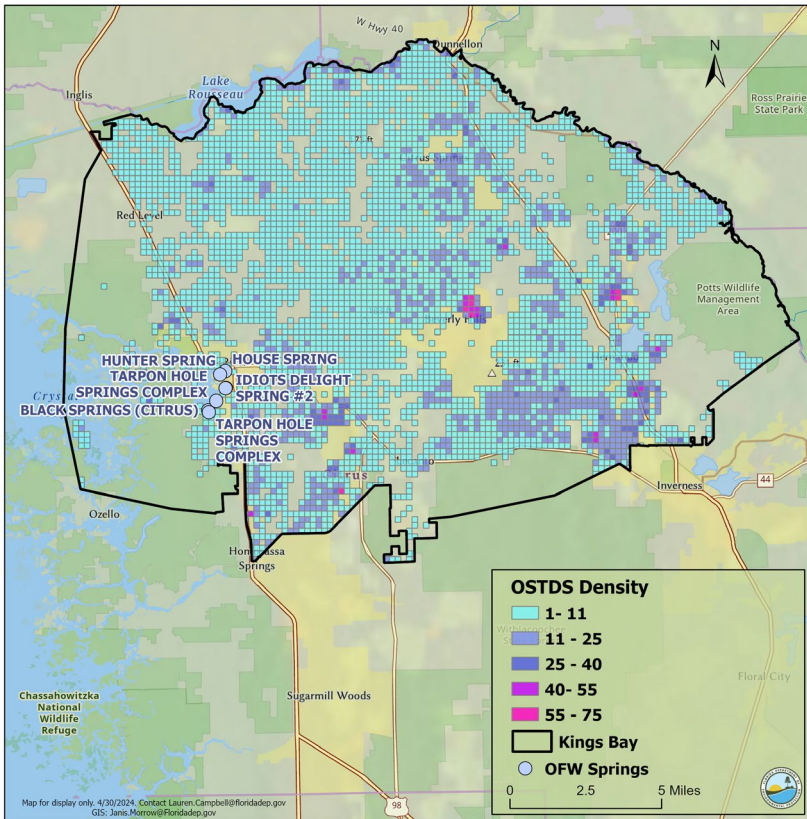


# OSTDS

## Kings Bay/ Crystal River

## Homosassa/ Chassaowitzka Springs

## Weeki Wachee



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



# OSTDS

The results of the NSILT analysis for OSTDS in all four springsheds are presented in the table below.

<b>Springshed</b>	<b>Number of OSTDS</b>	<b>Number of enhanced OSTDS</b>	<b>Est. Load to Drain Fields (lbs-N/yr)</b>	<b>Est. Load to Groundwater (lbs-N/yr)</b>
Kings Bay	30,256	638	673,211	413,555
Homosassa	16,947	56	364,522	215,178
Chassahowitzka	5,598	199	132,376	81,452
Weeki Wachee	44,726	1,114	1,048,663	641,621





# UTF

- 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 UTFs are estimated to attenuate at 70%.



Source: Pexels



# UTF

## 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 1 acre maximum for fertilized area for single family residential parcels greater than 1 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	5.00
Label	74%	34.78	2.98
None	11%	0.00	0.00



# UTF SINGLE FAMILY RESIDENTIAL

The results of the NSILT analysis for Single Family Residential UTF in all four springsheds are presented in the table below.

<b>Springshed</b>	<b>Est. Load to Surface (lbs-N/yr)</b>	<b>Est. Load to Groundwater (lbs-N/yr)</b>
Kings Bay	642,269	168,375
Homosassa	309,218	78,814
Chassahowitzka	177,242	46,716
Weeki Wachee	866,028	222,374





# UTF NON-SINGLE FAMILY RESIDENTIAL

- WMD 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 WMD 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 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.



# UTF

## 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 ft<sup>2</sup> to fertilized turfgrass in the region.
- The results of the NSILT analysis for non-single family residential UTF in all four springsheds are presented in the table below.

<b>Springshed</b>	<b>Est. Load to Surface (lbs-N/yr)</b>	<b>Est. Load to Groundwater (lbs-N/yr)</b>
Kings Bay	53,212	13,042
Homosassa	33,444	8,143
Chassahowitzka	20,110	5,237
Weeki Wachee	68,165	17,686



# STF

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.

Thirty-one golf courses operating within the springsheds were reviewed.

- Where site specific data was not available, golf course application rates were updated based on a study of regional golf course practices published by HortTechnology (Shaddox, et al., 2023).



Source: Pexels

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





# STF

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
KING	Citrus	Citrus Hills	Regional	284				27,216	-	-	-
KING	Citrus	Citrus Springs	Regional	241				23,096	-	-	-
KING	Citrus	Skyview	Regional	203				19,454	-	-	-
KING	Citrus	Twisted Oaks	Regional	134				12,841	-	-	-
KING	Citrus	Plantation Inn	Regional		198			-	18,975	-	-
KING	Citrus	Black Diamond	Site Specific	544				1,130			-
KING	Citrus	Lakeside	Site Specific	185				2,483			-
CHHO	Citrus	Sugarmill Woods Country Club	Regional	142				13,576	-	-	-
CHHO	Citrus	Inverness Golf and Country Club	Regional	123	5			11,776	492	-	-
CHHO	Citrus	Point O'Woods Golf Club	Regional	20				1,879	-	-	-
CHHO	Citrus	Cypress/Oak/Pine Courses - Sugarmill Woods Country Club	Regional	119.2	0.1			11,420	8	-	-
CHHO	Citrus	Southern Woods Golf Club (Citrus National Golf Club)	Regional	153				14,662	-	-	-
CHHO	Citrus	Sweet Swing Driving Range	Regional		8			-	767	-	-
CHHO	Hernando	Brooksville Country Club	Regional	182				17,441	-	-	-
CHHO	Hernando	Cabot Citrus Farms Golf Club	Regional	577	154			55,291	14,751	-	-
WEEK	Hernando	Hernando Oaks Golf and Country Club	Regional	139				13,321	-	-	-
WEEK	Hernando	Oak Hills Golf Club	Regional	184				17,676	-	-	-
WEEK	Hernando	Rivard Golf Club	Regional	95				9,147	-	-	-
WEEK	Hernando	Silverthorn Country Club	Regional	176				16,866			
WEEK	Hernando	Southern Hills Plantation Club	Regional	162				15,499	-	-	-
WEEK	Hernando	Spring Hill Golf and Country Club	Regional	159				15,194	-	-	-
WEEK	Hernando	Brookridge Country Club	Site Specific	85				32,844			-
WEEK	Hernando	Glen Lakes Golf and Country Club	Site Specific	86				602			-
WEEK	Hernando	Heather Golf and Country Club	Site Specific	55				4,875			-
WEEK	Hernando	High Point Golf Club	Site Specific	80				5,489			-
WEEK	Hernando	Timber Pines Country Club	Site Specific	215			43	684			4,121
WEEK	Pasco	Heritage Pines Community	Regional	194				18,591	-	-	-
WEEK	Pasco	Travelers Rest RV Resort and Golf Course	Site Specific					268			-



# STF

The results of the NSILT analysis for STF, including golf courses, in all four springsheds are presented in the table below.

<b>Springshed</b>	<b>Acres STF</b>	<b>Number of Golf Courses</b>	<b>Est. Load to Surface (lbs-N/yr)</b>	<b>Est. Load to Groundwater (lbs-N/yr)</b>
Kings Bay	183	9	113,185	28,283
Homosassa	39	4	51,234	13,649
Chassahowitzka	99	4	100,152	25,178
Weeki Wachee	88	14	154,907	41,825



# 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, WMDs, and University of Florida Institute of Food and Agricultural Science
- 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 FF is estimated to attenuate at 80%.





FF

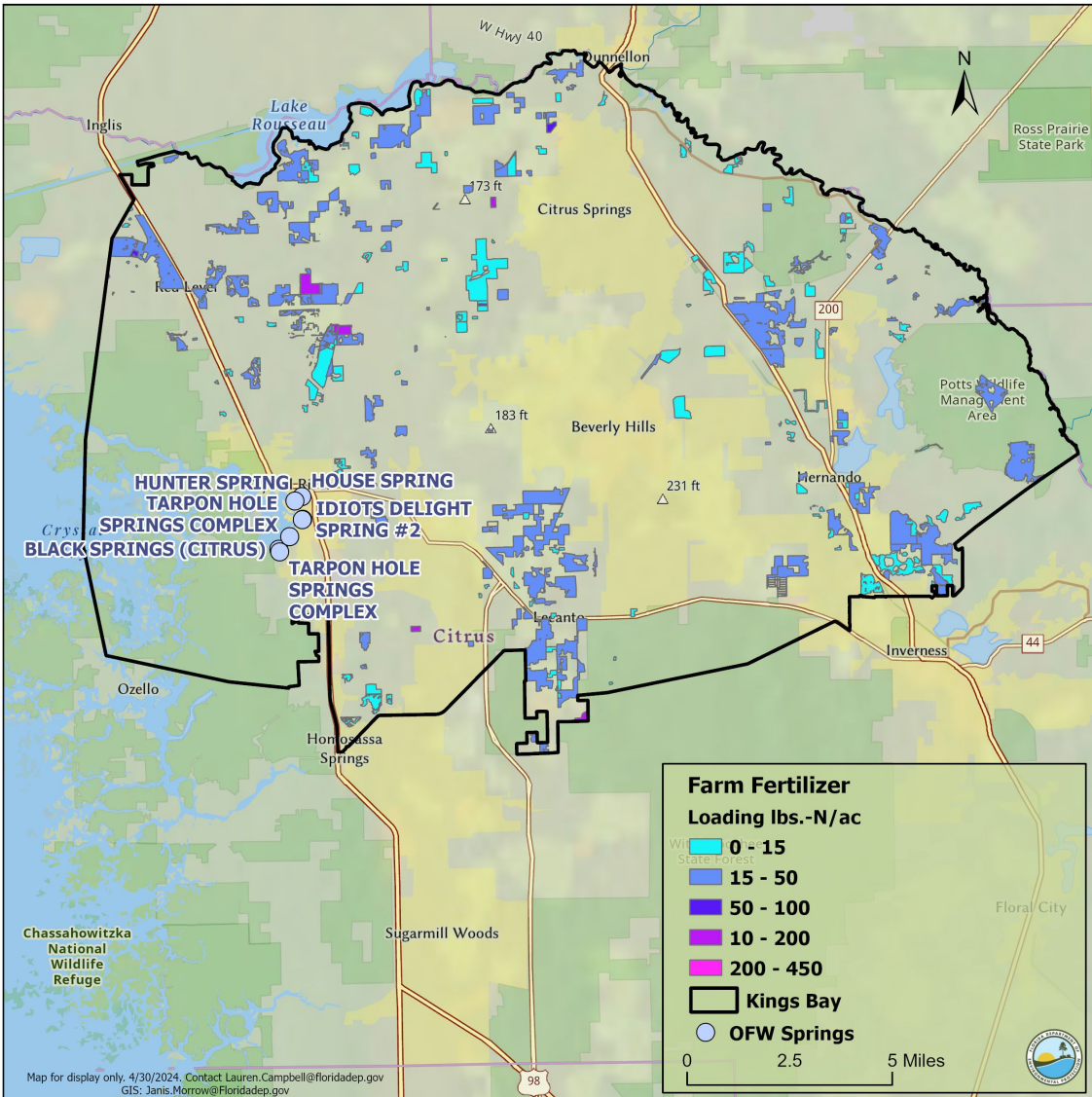
Nursery Crops	Fertilizer Application Rate (lb-N/acre)	Effective Application Rate (lb-N/acre)
Asparagus Fern	90	21.6
Aspidistra	90	21.6
Container Nursery	150	36
Coontie Fern	90	21.6
Fern	90	21.6
Field Nursery	90	21.6
Leatherleaf	90	21.6
Liriope	90	21.6
Nurseries and Vineyards	90	21.6
Nursery	90	21.6
Ornamentals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



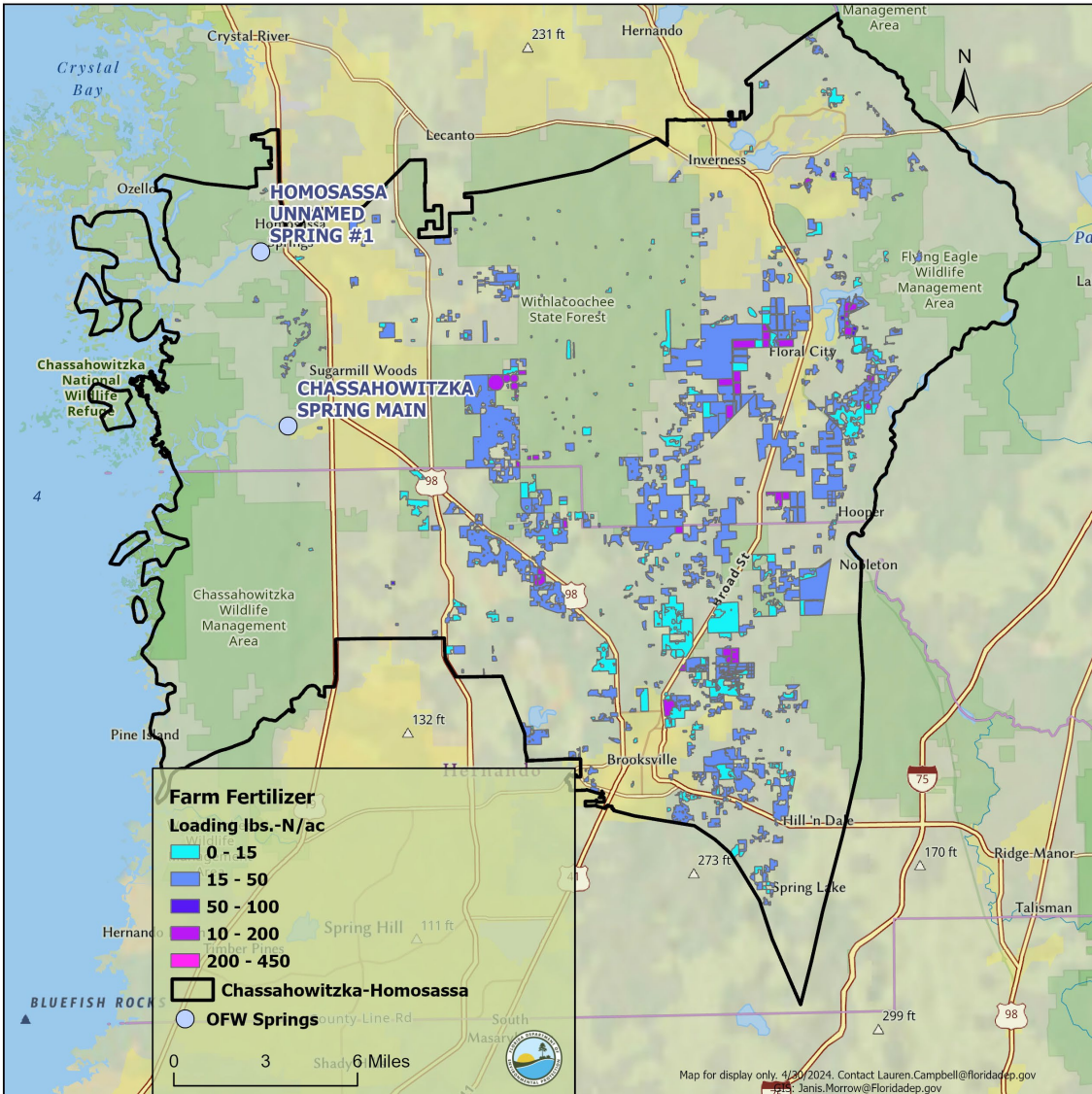
# FF KINGS BAY



Kings Bay			
Crop	Total Acres	Loading to Land Surface (lb-N/year)	Loading to Groundwater (lb-N/year)
Grass Pasture	7,452	119,226	19,923
Cropland Pastureland	1,863	93,135	15,710
Hay	242	43,528	7,238
Specialty Farms	349	10,484	1,887
Blueberries	38	3,775	679
Improved Pastures	112	1,122	202
Row Crops	17	1,002	100
Field Nursery	23	502	90
Nursery	14	294	53
Pasture	21	206	37



# FF HOMOSASSA-CHASSAHOWITZKA



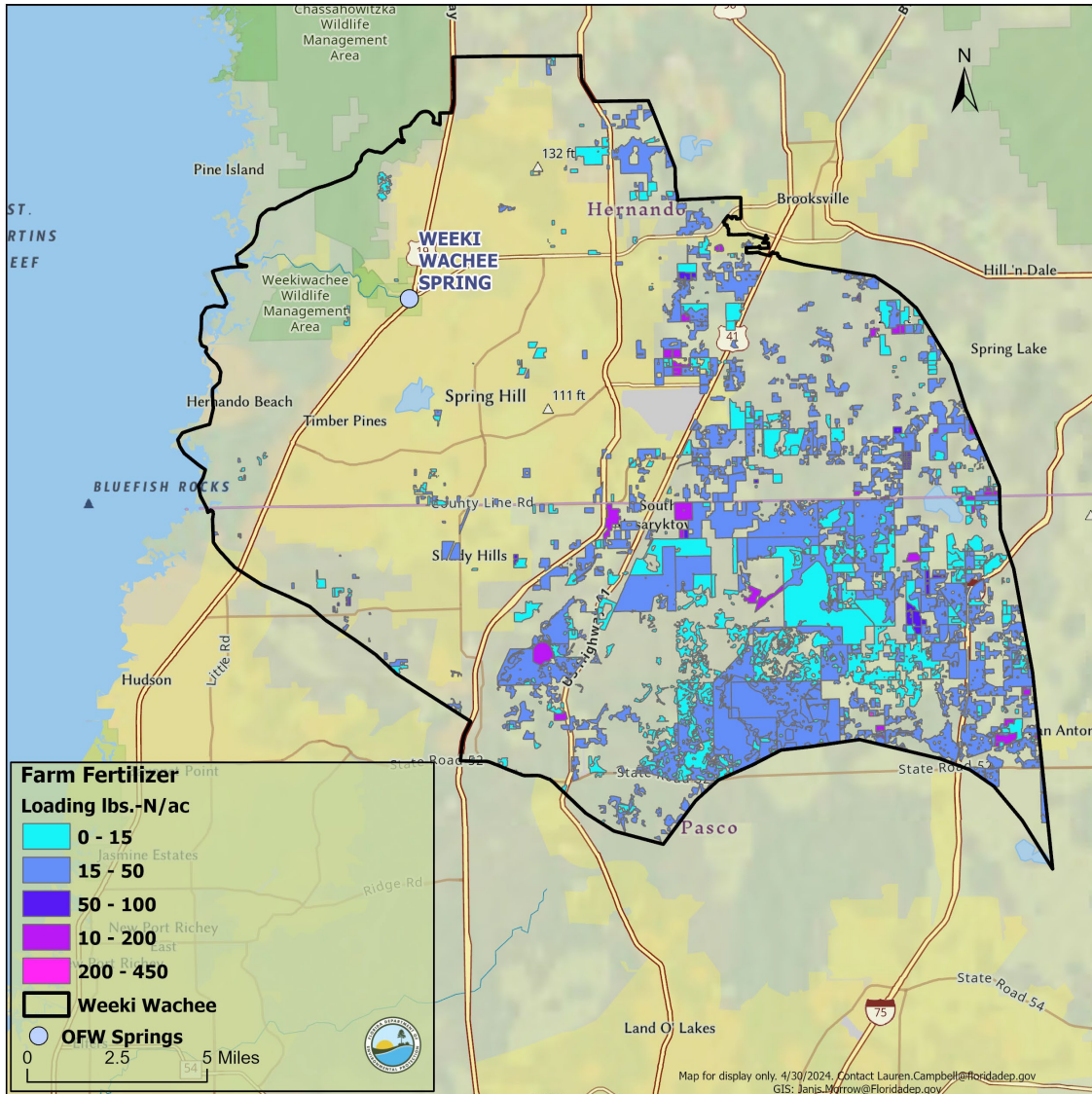
Homosassa			
Crop	Total Acres	Loading to Land Surface (lb-N/year)	Loading to Groundwater (lb-N/year)
Grass Pasture	16,334	261,346	45,932
Cropland Pastureland	2,957	147,852	23,737
Melons	453	67,964	12,234
Hay	288	51,917	9,344
Other Hay Non Alfalfa	184	33,047	5,585
Dry Beans Tomatoes Spring	62	12,362	2,225
Specialty Farms	374	11,226	1,977
Blueberries	137	13,736	1,866
Strawberries	92	13,869	1,812
Citrus	79	11,037	1,266

Chassahowitzka			
Crop	Total Acres	Loading to Land Surface (lb-N/year)	Loading to Groundwater (lb-N/year)
Grass Pasture	6,782	108,505	18,616
Cropland Pastureland	1,709	85,457	14,450
Other Hay (Non Alfalfa)	312	56,143	10,047
Hay	138	24,801	4,464
Pasture	1,684	16,840	2,985
Specialty Farms	411	12,316	2,122
Field Nursery	438	9,458	1,702
Citrus	36	5,085	915
Improved Pastures	259	2,589	466
Blueberries	22	2,214	399





# FF WEEKI WACHEE



Weeki Wachee			
Crop	Total Acres	Loading to Land Surface (lb-N/year)	Loading to Groundwater (lb-N/year)
Grass Pasture	25,662	410,588	60,389
Cropland Pastureland	3,938	196,925	30,017
Other Hay (Non Alfalfa)	606	109,070	19,381
Hay	622	111,953	13,050
Blueberries	442	44,220	7,141
Specialty Farms	672	20,172	3,176
Improved Pastures	1,371	13,713	1,748
Citrus	92	12,901	1,416
Nursery	434	9,384	967
Pasture	315	3,148	567



FF

The results of the NSILT analysis for FF in all four springsheds are presented in the table below.

<b>Springshed</b>	<b>Est. Load to Surface (lbs-N/yr)</b>	<b>Est. Load to Groundwater (lbs-N/yr)</b>
Kings Bay	273,328	45,930
Homosassa	631,905	108,876
Chassahowitzka	320,023	56,274
Weeki Wachee	946,876	139,819



# 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 LW loading.
- Loading from 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





# LW

Kings Bay			
Livestock Type	Total Head Count	Loading to Land Surface (lb-N/year)	Loading to Groundwater (lb-N/year)
Beef Cattle	2,005	246,602	21,797
"Other" Cattle	22	2,520	223
Calves	1,092	13,583	1,201
Donkeys	81	2,965	265
Horses	590	58,773	5,259
Chicken, Broilers	18	13	1
Chicken, Layers	2,156	2,361	211
Goats	749	9,562	856
Hogs	152	10,547	944
Sheep	294	21,195	1,897
Turkeys	72	158	14

Homosassa			
Livestock Type	Total Head Count	Loading to Land Surface (lb-N/year)	Loading to Groundwater (lb-N/year)
Beef Cattle	3,668	451,099	35,977
"Other" Cattle	62	7,066	589
Calves	2,008	24,991	1,995
Donkeys	92	3,356	290
Horses	619	61,694	5,313
Chicken, Broilers	15	11	1
Chicken, Layers	2,086	2,285	196
Goats	729	9,314	801
Hogs	145	10,105	868
Sheep	272	19,695	1,690
Turkeys	89	193	17

Weeki Wachee			
Livestock Type	Total Head Count	Loading to Land Surface (lb-N/year)	Loading to Groundwater (lb-N/year)
Beef Cattle	12,370	1,521,536	115,942
"Other" Cattle	174	19,740	1,546
Calves	6,755	84,053	6,407
Donkeys	188	6,872	526
Horses	1,512	150,701	11,376
Chicken, Broilers	282	207	15
Chicken, Layers	684	749	63
Goats	799	10,217	783
Hogs	126	8,785	677
Sheep	332	23,974	1,810
Turkeys	179	394	30

Chassahowitzka			
Livestock Type	Total Head Count	Loading to Land Surface (lb-N/year)	Loading to Groundwater (lb-N/year)
Beef Cattle	4,901	602,982	53,001
"Other" Cattle	162	18,252	1,604
Calves	2,726	33,928	2,982
Donkeys	134	4,882	429
Horses	705	70,277	6,180
Chicken, Broilers	0	0	0
Chicken, Layers	1,606	1,759	155
Goats	584	7,461	656
Hogs	106	7,295	642
Sheep	156	11,295	993
Turkeys	157	344	30



# DAIRIES

- Non-Confined Animal Feeding Operation dairy information was provided by Florida Department of Agriculture and Consumer Services, 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 BMAP.



# LW

The results of the NSILT analysis for livestock waste in all four springsheds are presented in the table below.

<b>Springshed</b>	<b>Est. Load to Surface (lbs-N/yr)</b>	<b>Est. Load to Groundwater (lbs-N/yr)</b>
Kings Bay	368,278	32,668
Homosassa	642,973	81,944
Chassahowitzka	755,071	66,674
Weeki Wachee	1,827,226	139,175





# 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%.

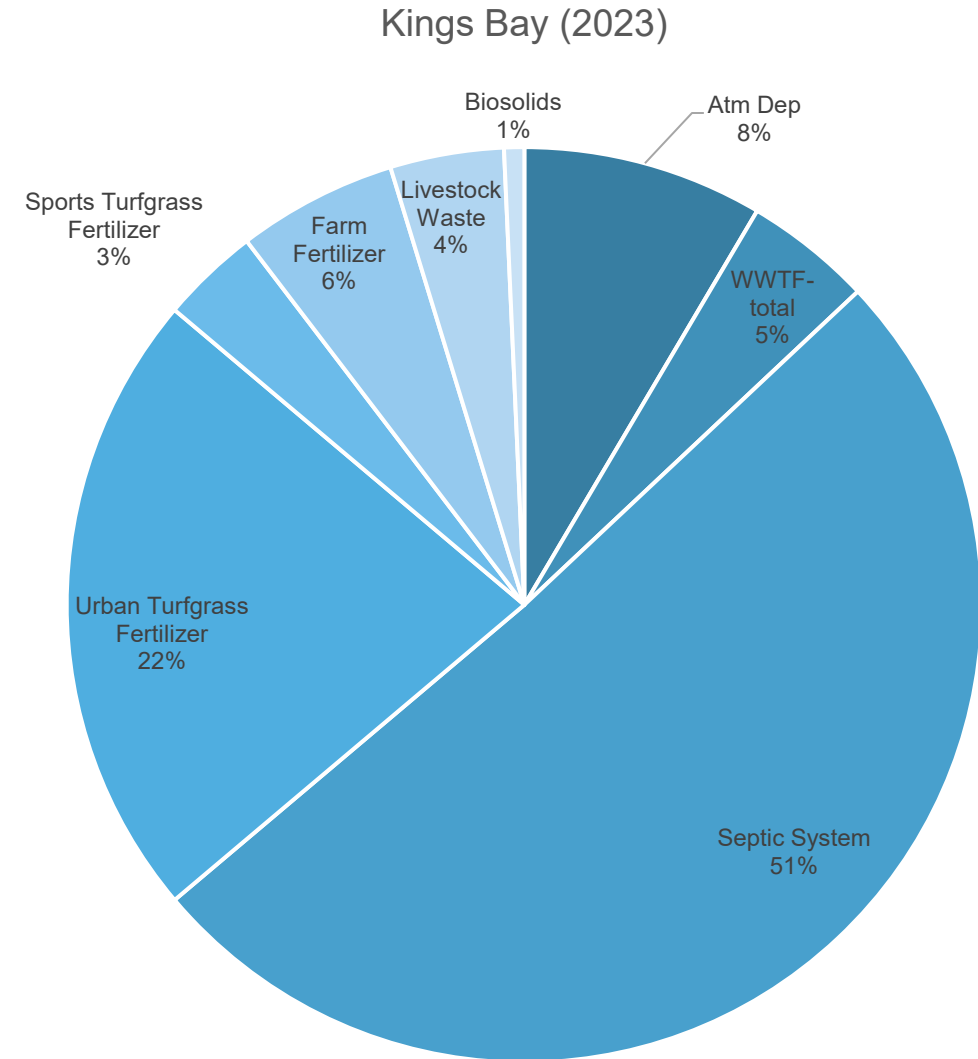
<b>Springshed</b>	<b>Est. Load to Surface (lbs-N/yr)</b>	<b>Est. Load to Groundwater (lbs-N/yr)</b>
Kings Bay	12,920	5,782
Chassahowitzka	20,096	9,043
Weeki Wachee	28,618	12,878



# DRAFT NSILT LOADING RESULTS

## KINGS BAY/CRYSTAL RIVER

Kings Bay	
Source	Annual Loading (lb-N/year)
Atmospheric Deposition	69,099
Wastewater Treatment Facilities	36,645
OSTDS	413,555
Urban Turfgrass Fertilizer	181,417
Sports Turfgrass Fertilizer	28,283
Farm Fertilizer	45,930
Livestock Waste	32,668
Biosolids	5,782
<b>Total</b>	<b>813,379</b>



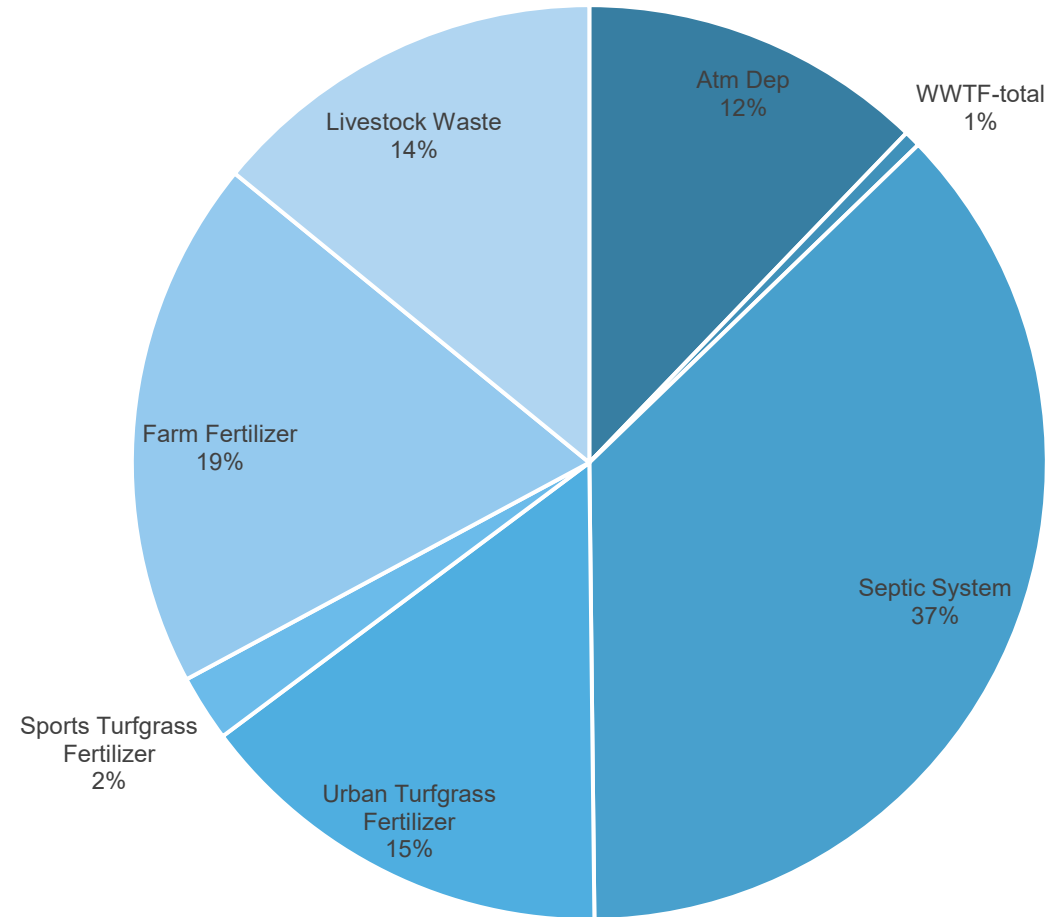


# DRAFT NSILT LOADING RESULTS

## HOMOSASSA/CHASSAHOWITZKA

Homosassa	
Source	Annual Loading (lb-N/year)
Atmospheric Deposition	70,808
Wastewater Treatment Facilities	3,382
OSTDS	215,178
Urban Turfgrass Fertilizer	86,957
Sports Turfgrass Fertilizer	13,649
Farm Fertilizer	108,876
Livestock Waste	81,944
<b>Total</b>	<b>580,794</b>

Homosassa Spring Group (2023)





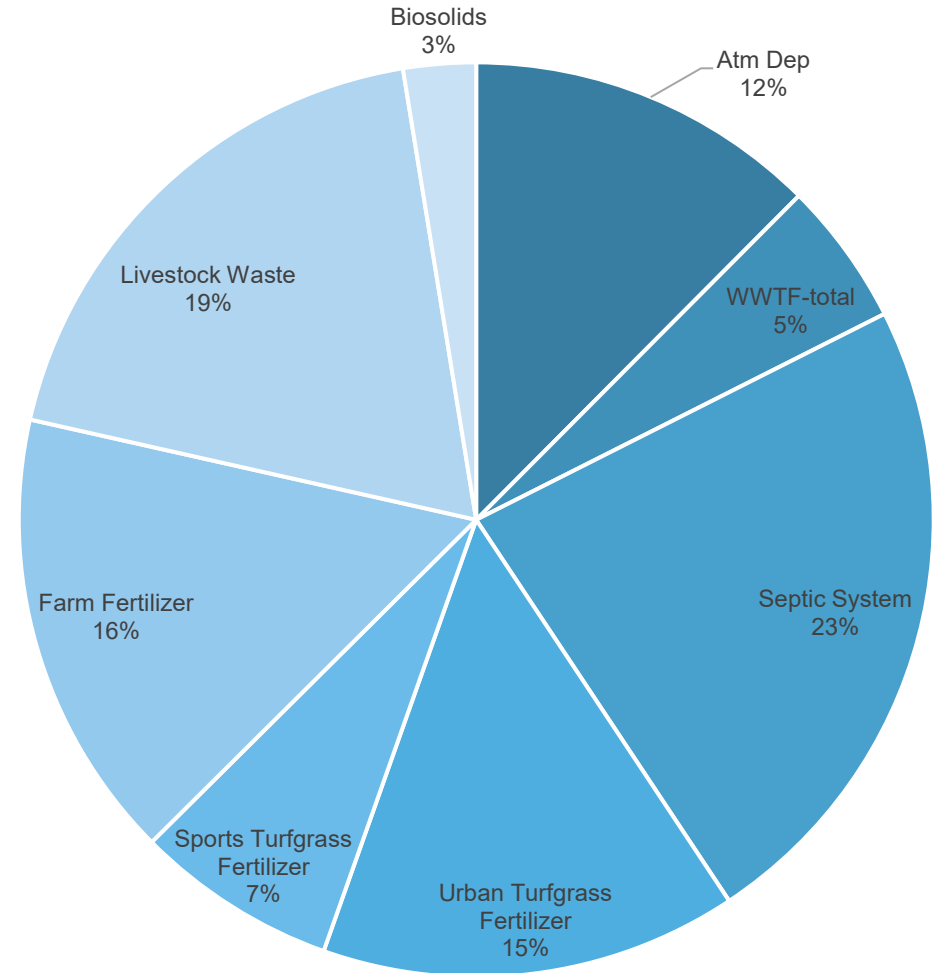
# DRAFT NSILT LOADING RESULTS

## HOMOSASSA/CHASSAHOWITZKA

### Chassahowitzka

Source	Annual Loading (lb-N/year)
Atmospheric Deposition	43,944
Wastewater Treatment Facilities	17,972
OSTDS	81,452
Urban Turfgrass Fertilizer	51,953
Sports Turfgrass Fertilizer	25,178
Farm Fertilizer	56,274
Livestock Waste	66,674
Biosolids	9,043
<b>Total</b>	<b>352,490</b>

Chassahowitzka Spring Group (2023)







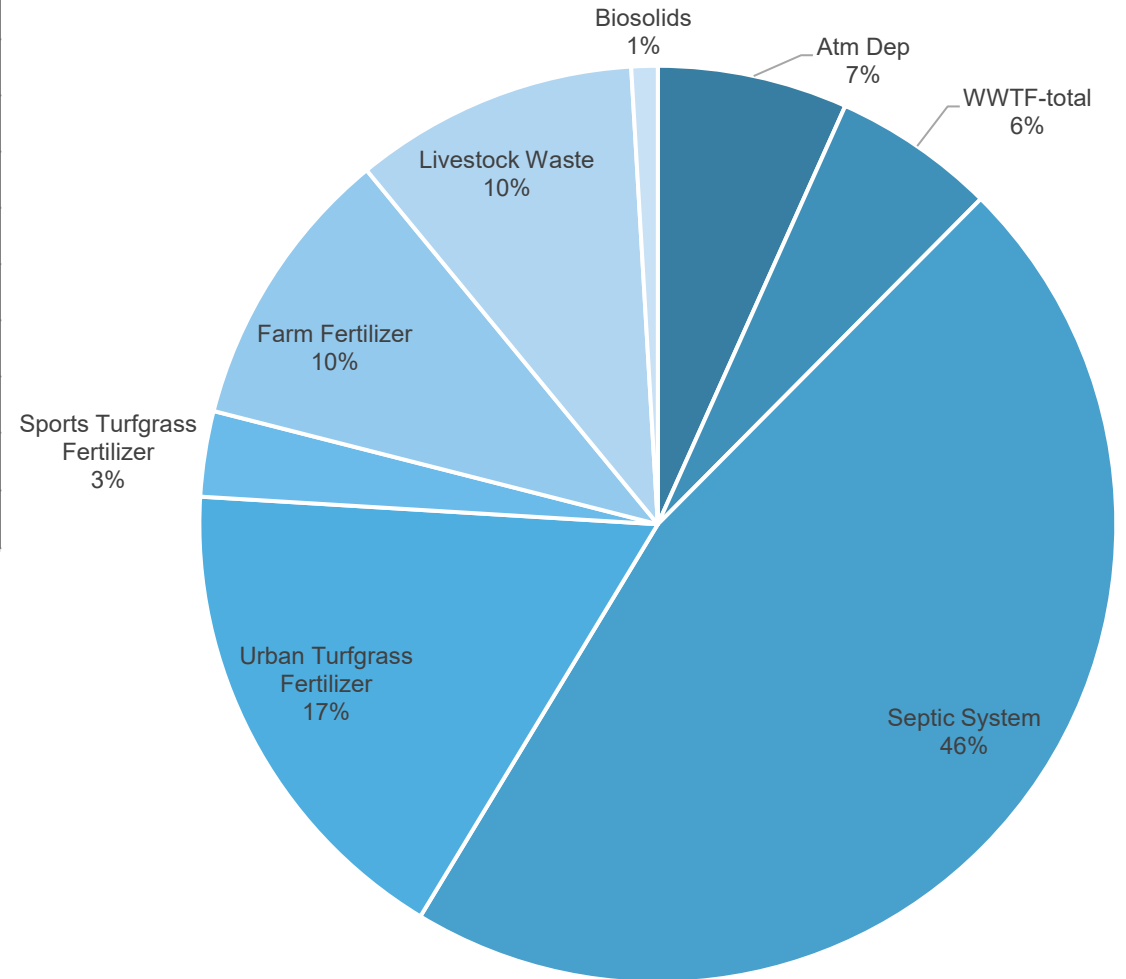
# DRAFT NSILT LOADING RESULTS

## WEEKI WACHEE

### Weeki Wachee Spring Group

Source	Annual Loading (lb-N/year)
Atmospheric Deposition	93,069
Wastewater Treatment Facilities	79,729
OSTDS	641,621
Urban Turfgrass Fertilizer	240,059
Sports Turfgrass Fertilizer	41,825
Farm Fertilizer	139,819
Livestock Waste	139,175
Biosolids	12,878
<b>Total</b>	<b>1,388,175</b>

Weeki Wachee Spring Group (2023)



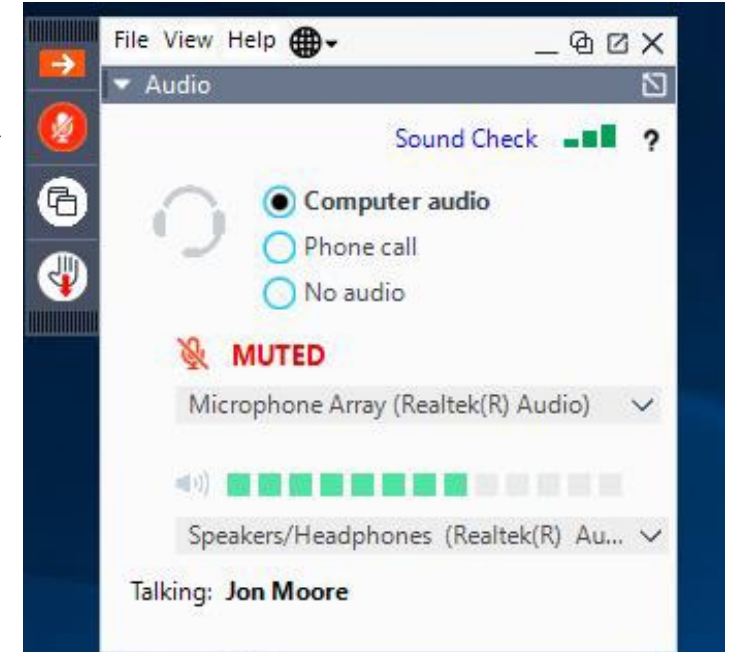


# BMAP MEETING

## PUBLIC QUESTIONS PERIOD

### Verbal Questions:

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### Written Comments:

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# 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.

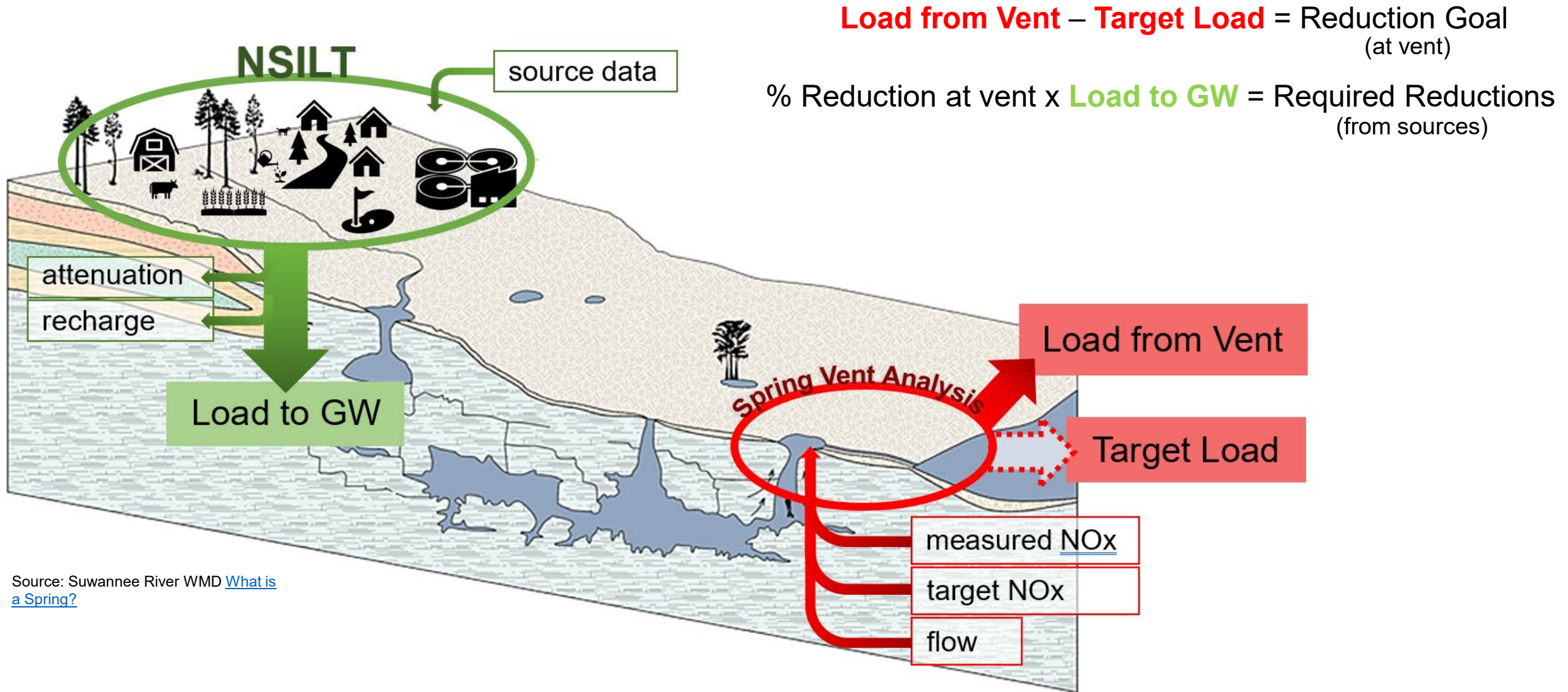
Applied the spring vent percent reduction to the updated NSILT loading.

Estimate the total reduction needed to meet the TMDL.



# BMAP UPDATES

## SPRING VENT LOAD ANALYSIS



Source: Suwannee River WMD [What is a Spring?](#)





# BMAP UPDATES

## SPRING VENT LOAD ANALYSIS

BMAP	Draft Nitrate Loads (lb-N/yr)			
	Total Load at Spring Vent	TMDL Load	Required Reduction	Percent Required Reduction
<b>Crystal River / Kings Bay</b> <sup>1</sup>	453,400	259,009	194,392	43%
<b>Homosassa Spring Group</b> <sup>1</sup>	271,301	94,924	176,376	65%
<b>Chassahowitzka Spring Group</b> <sup>1</sup>	207,128	82,543	124,585	60%
<b>Weeki Wachee Spring Group</b> <sup>2</sup>	308,909	95,265	213,644	69%

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

<sup>1</sup> TMDL target is 0.23 mg/L

<sup>2</sup> TMDL target is 0.28 mg/L



# 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

### OSTDS

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

### WWTFs

- 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 FF load to groundwater.
  - BMP enrollment using a 10% reduction applied to (LW and dairies).
  - Any remaining agricultural reductions will be allocated to agricultural cooperative elements, which could include regional projects, cost-share practices and innovative technologies.

### AD

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



# BMAP UPDATES

## ALLOCATION AND REDUCTION APPROACH

### UTF

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

### 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 implementation of BMPs and a nutrient management plan to address the nutrient loading.





# BMAP UPDATES

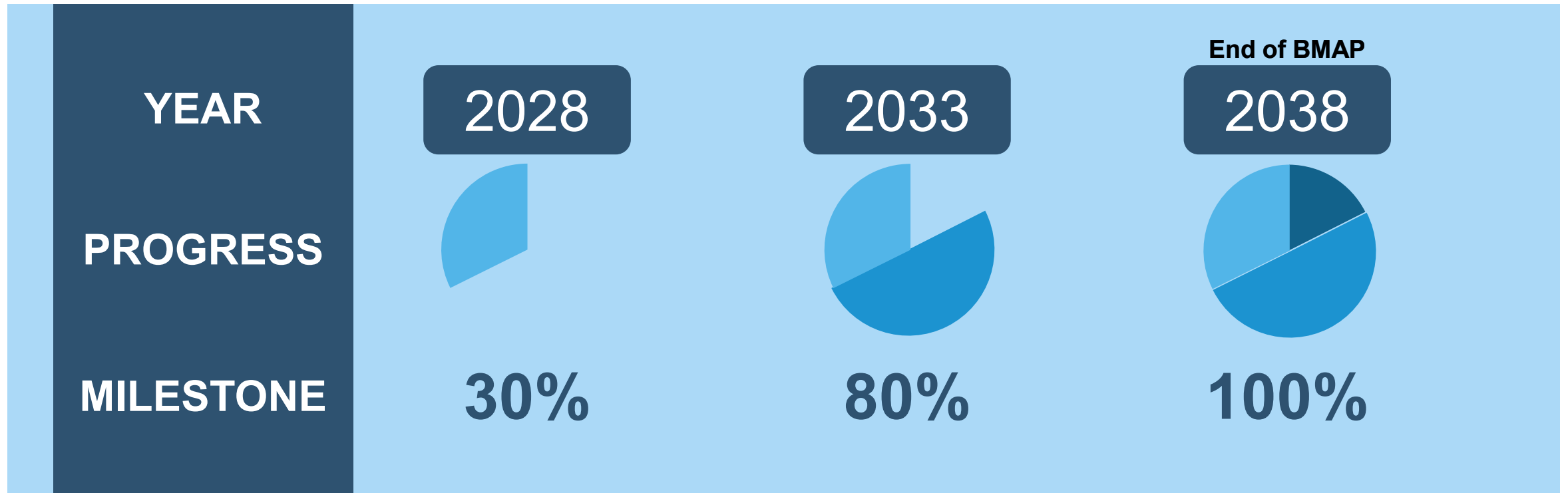
## FUTURE GROWTH

- **Domestic Wastewater Projections:**
  - Use wastewater to estimate future growth projections.
  - Start with population growth for each county from Bureau of Economic and Business Research:
    - 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 Florida Water Management Inventory 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

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.

June-  
Dec. 2024

Technical analysis and drafting the BMAP documents.

Final Draft BMAP documents.

Dec.  
2024

Statutory deadline for updated nutrient BMAPs.

July 1,  
2025



# RESOURCES

## BMAP WEBSITE AND STORYMAPS



### Basin Management Action Plans

[Home](#) » [Divisions](#) » [Division of Environmental Assessment and Restoration](#) » [Water Quality Restoration Program](#) » Basin M

#### 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 strict 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 linked to the

#### Water Quality Protection Grant

DEP has launched an [online grant portal](#) to provide eligible entities with information about 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...



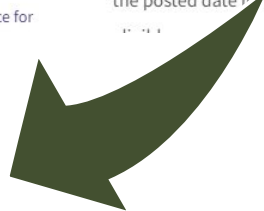
7 (COPY) Jackson Blue and Merritts Mill Pond BMAP Stor...



8 (COPY) Santa Fe River BMAP Story Map



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







# RESOURCES

## FUNDING OPPORTUNITIES



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





# SUBSCRIBER PAGE

## HOW TO CONTACT US



[BMAPPProgram@FloridaDEP.gov](mailto: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*.
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- 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](#), Florida Institute of Food and Agricultural Science Extension, (ufl.edu).

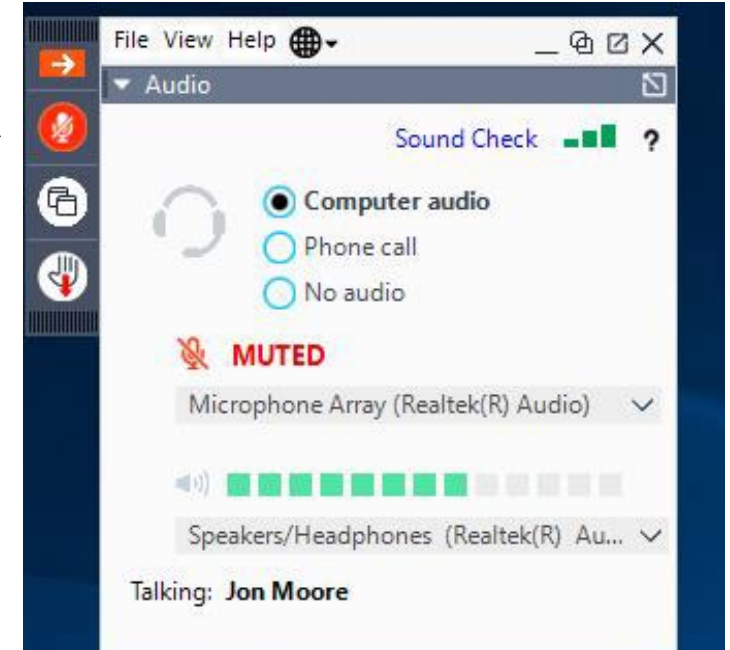


# BMAP MEETING

## PUBLIC QUESTIONS PERIOD

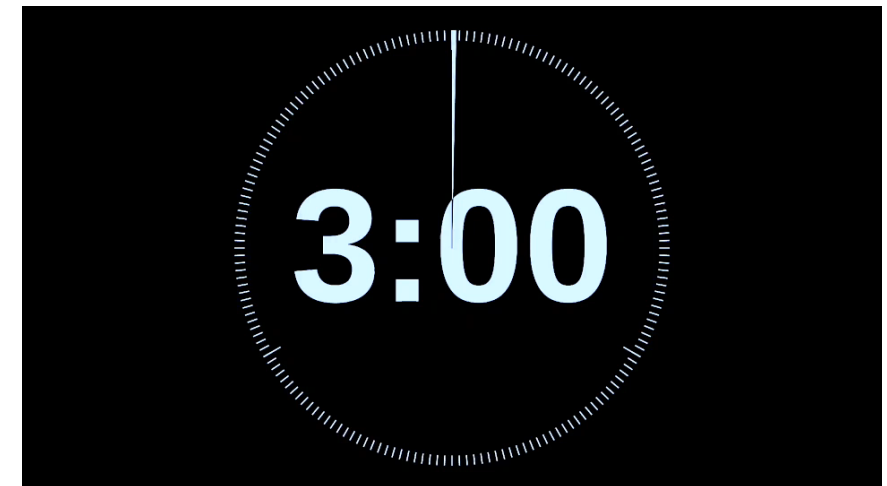
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# THANK YOU

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**Florida Department of Environmental Protection (DEP)**  
**Wekiwa Spring and Rock Springs Basin Management Action Plan (BMAP)**  
**Question and Answer (Q&A) Summary**  
**Public Meeting on May 29, 2024**  
**1:30 pm – 2:18 pm**  
**Via GoToWebinar**

**Attendees**

Arlene Acevedo, DEP	Raichel Gulde, RES
Alison Adams, Citizen	Sam Hankinson, DEP
Dustin Allen, DEP	Margarita Hernandez, DEP
Suzanne Archer, SJRWMD	Barbara Howell, DEP
Erica Atkinson, City of Apopka	Bryan Hummel, EPA
Lisa Bally, ATM	Nathan Jagoda, DEP
Michael Barr, DEP	Chandler Keenan, DEP
Janelle Barrierio, FL Senate	Joy Kokjohn, SJRWMD
Sean Beaudet, Lake County	Ashley Konon, Friends of Wekiva
Evelyn Becerra, DEP	Emily Lawson, Orange County
Marcelo Blanco, DEP	Charles Legros, DEP
Julie Bortles, Orange County	Heather Lindell, Orange County
Kellie Bracht, City of Altamonte Springs	Jeff Littlejohn, OnSyte Performance
Beth Brady, Save the Mantee	Lisa Lotti, City of Orlando
Kayla Brunson, DEP	Sarah Louissaint, DEP
Brandon Bryant, Orange County	Mary Beth Lupo, DEP
Thomas Calhoun, Seminole County	Celeste Lyon, RES
Cathie Catusus, Lake County	Tom Mayton, SJRWMD
Carolin Ciarlariello, DEP	Max Mcamis, Pasco County
Michael Cliburn, Friends of Wekiva	Karen Mclaughlin, Citizen
Stephen Cribb, City of Apopka	Cindy Newton, Citizen
Veronica Dau, Citizen	Charles Nimmo, DEP
Susan Davis, SJRWMD	Kevin O'Donnell, DEP
Cammie Dewey, SJRWMD	Kim Ornberg, Seminole County
Lauren Dorval, FDACS	Josh Papacek, SJRWMD
Chloe Dougherty, Florida Springs Council	Charles Parker, Orange County
Kim Duffek, DEP	Timothy Perry, Gardner Bist
Katie Durham, DEP	Wendy Poag, Lake County
Jeff Earhart, Lake County	Nancy Prine, Citizen
Justin Elkins, Lake County	Roderick Reardon, Citizen
Yesenia Escribano, FDACS	Eb Roeder, DEP
Chris Farrell, Audubon Florida	Mark Romagosa, DEP
Eka Febrina, Seminole County	Kristin Rubin, Citizen
Jessica Fetgatter, DEP	Shannon Salvatori, SJRWMD
Tina Gordon, Wildwood Consulting	Scott Santos, Citizen
Roxanne Groover, FOWA	Stacey Simmons, FDACS

Ryan Smart, Florida Springs Council  
Victoria Steinnecker, Corollo Engineers  
Ken Storey, ECFPRC  
Jennifer Thera, FDACS  
Rory Trumbore, Citizen  
Diana Turner, DEP  
Unknown, The Florida Channel  
Lisa Van Houdt, DEP

Ken Weaver, DEP  
Tanya Welborn, DEP  
Brenda Wells, Florida Springs Council  
Shannon Wetzell, Seminole County  
Joseph Whyte, RES  
Michael Wolcott, Citizen  
Nick Zurasky, FDACS

### **Wekiwa Spring and Rock Springs BMAP Overview**

Q: Did the water quality slide show no real changes over time? How does that match up with nutrients removed? I am interested in a discussion of project results (reductions in loading) compared with actual water quality changes in the springs.

A: There is a lot of uncertainty in the subsurface regarding flow and impact of a particular project on the vent, so it is hard to make a one-to-one comparison. We are reviewing groundwater data at the vent and upstream, but this is still ongoing. We will also be looking closely at groundwater well data to give us a more immediate idea of water quality from projects on the land surface and to see how quickly we can track progress.

### **Nitrogen Source Inventory Loading Tool (NSILT) Results**

Q: What was the wastewater treatment loading percentage?

A: The wastewater loading is estimated at 134,595 pounds of nitrogen per year (lb-N/year), which is about 11% of the total estimated nitrogen load.

Q: You have a slide that shows an onsite sewage treatment and disposal system (OSTDS) density map and there is discretion about using NSILT for the contribution calculation based on estimated loading, census data, etc. There were also high, medium, and low recharge factors. I didn't notice how density factor is applied to the loading calculation. Is the density factor being factored into the NSILT somewhere that you did not discuss?

A: The density is not factored into the OSTDS loading equation; it was for visual representation. The OSTDS loading estimate is based on the county's persons per household and the estimated load per person, and the number of OSTDS. This loading is adjusted with a recharge factor based on the location of each OSTDS.

Q: If there is a direct swap from a conventional OSTDS to an enhanced, nutrient-reducing OSTDS, do you apply 50% reduction for TN loading at that location (and depending on whether it is located in a high, medium, or low recharge area)?

A: Yes, that is correct.

### **Spring Vent Load Analysis Results**

There were no questions during this section.



**Next Steps - BMAP Updates**

There were no questions during this section.

**Adjournment**

The meeting ended at 2:18 pm.