Gemini Springs and DeLeon Spring Basin Management Action Plans (BMAPs)

January 25, 2018

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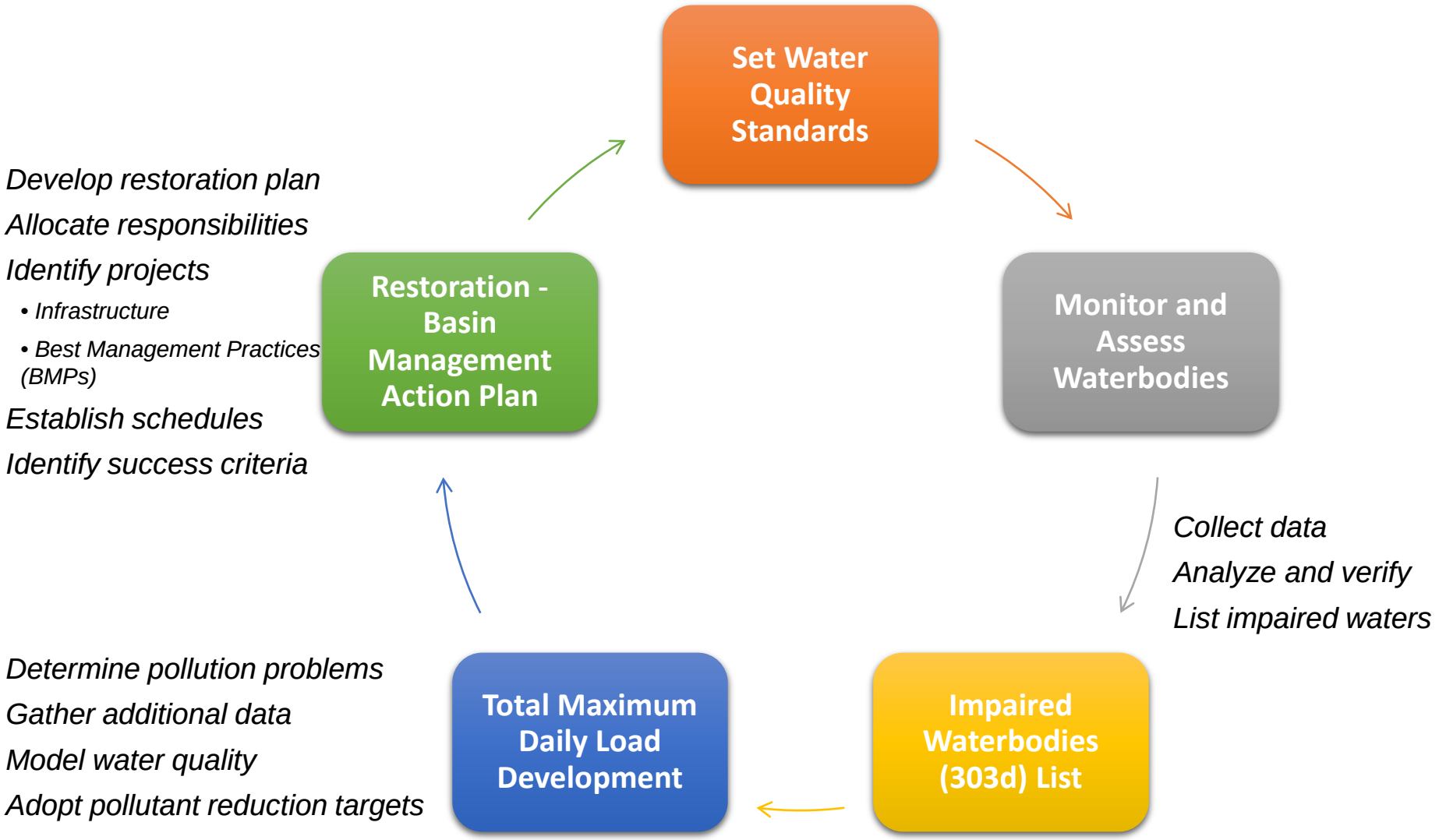
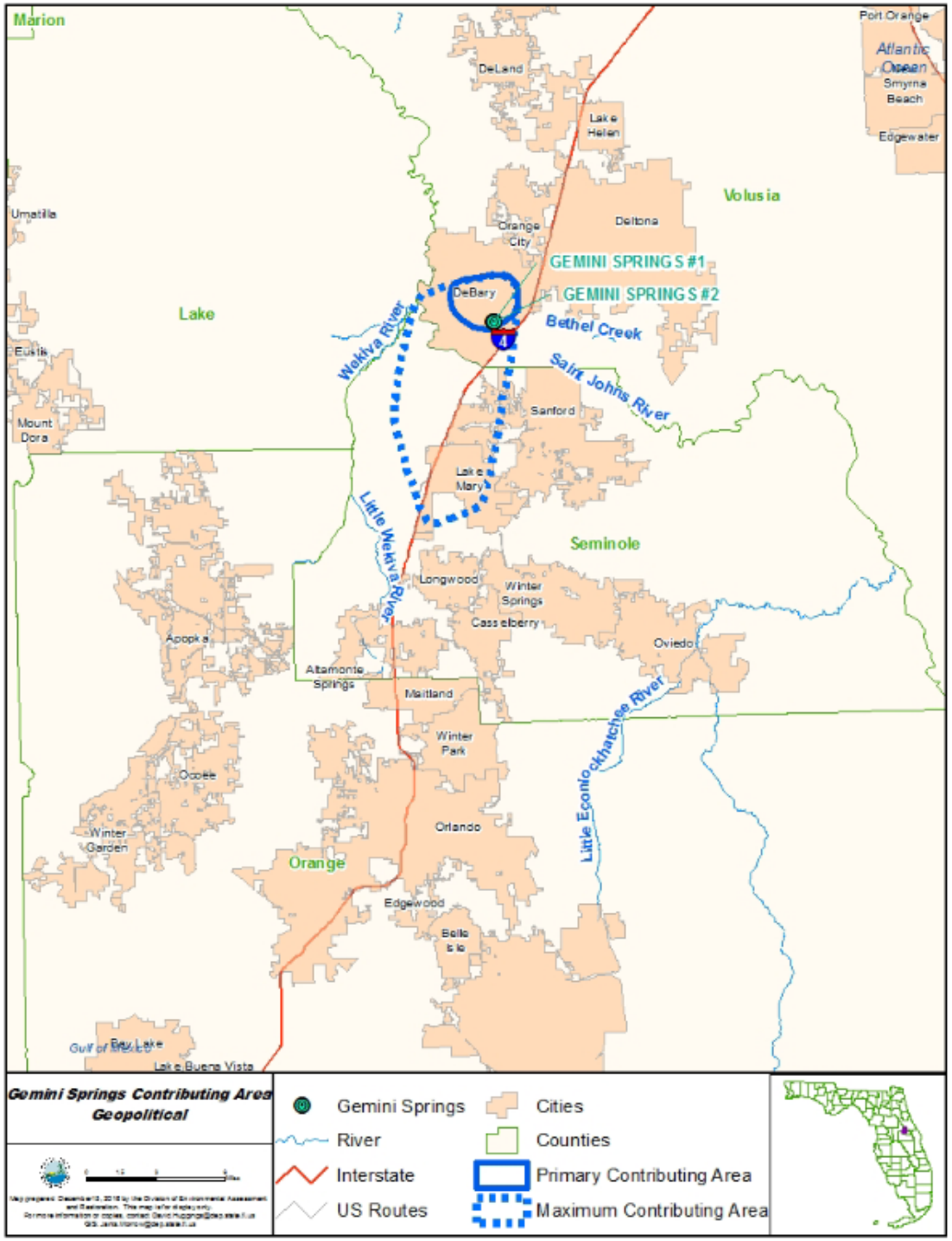
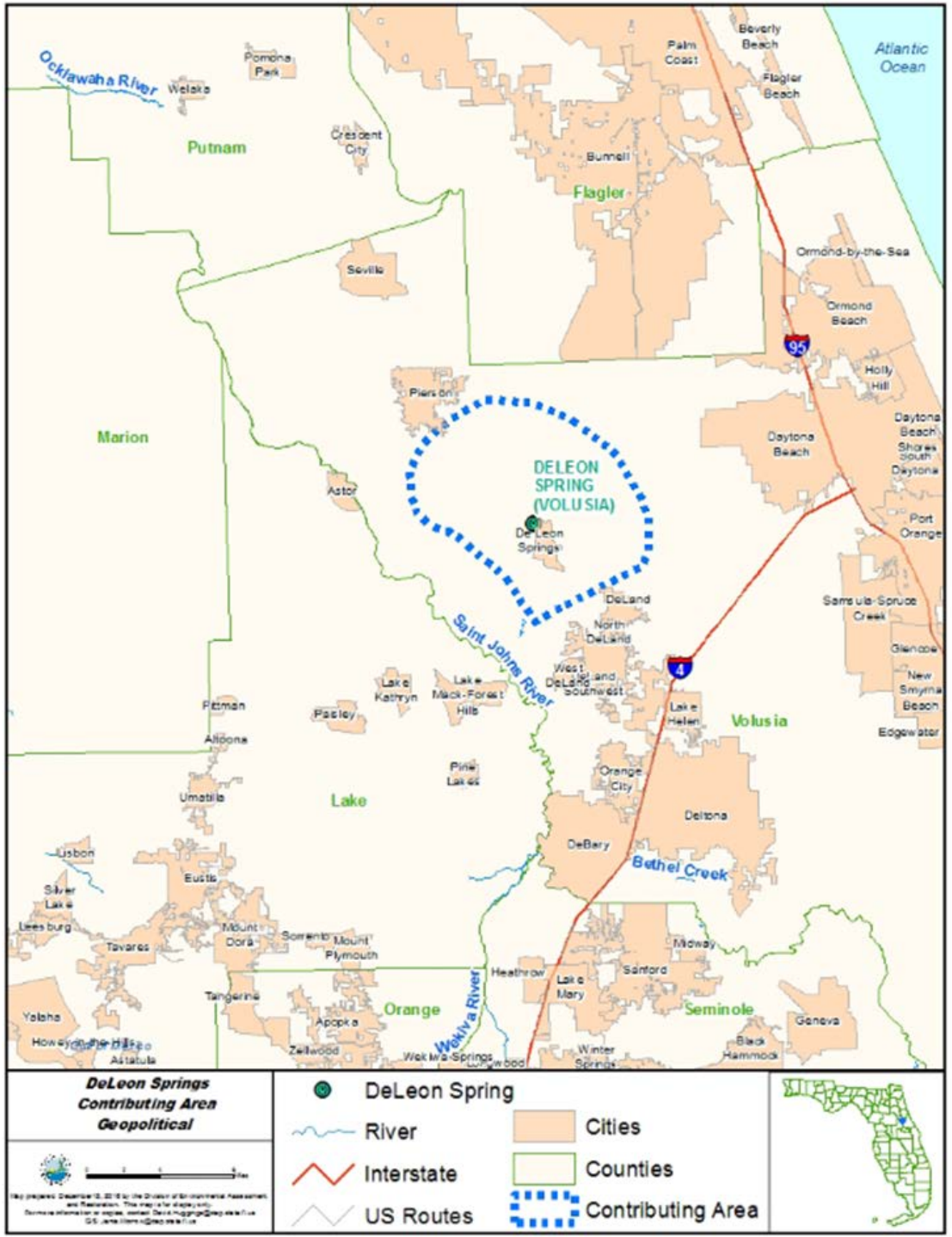
Water Quality Framework



Gemini Springs



DeLeon Spring



Florida Impaired Waters Rule (IWR) & Total Maximum Daily Loads (TMDLs)

Waterbody (WBID)	Parameter	TMDL[1] (mg/L)	TMDL % Reduction	Wasteload Allocation for Wastewater	Wasteload Allocation for NPDES Stormwater % Reduction[2]	Load Allocation % Reduction	MOS
DeLeon Spring (WBID 2921A)	Nutrients (Nitrate-Nitrite)	0.35	56	N/A	56	56	Implicit
Gemini Springs (WBID 2893)	Nutrients (Nitrate-Nitrite)	0.35	74	N/A	74	74	Implicit

N/A = Not applicable
[1] Nutrient concentrations represent AGM, not to be exceeded.
[2]-Applies to existing and future NPDES discharges, if they occur.

- TMDLs adopted in 2017.
- Both TMDLs are 0.35 milligrams per liter (mg/L) nitrate as an annual geomean value, which is not to be exceeded in any year.

BMAP

- The Florida Department of Environmental Protection (DEP) method for restoring water quality to an impaired water body.
- BMAPs are adopted by DEP through a Secretarial Order.
- BMAPs are enforceable.
- BMAPs are reviewed annually and may be updated every five years.

Key BMAP Components

- TMDLs being addressed.
- Defines area addressed by the restoration plan.
- Future growth impacts.
- Projects to meet the TMDL including:
  - Implementation timeline.
  - Commitment to project.
  - Expected water quality improvement.
- Process to assess progress towards achieving the TMDL, and includes:
  - Monitoring plan.
  - Project reporting.
  - Periodic follow-up meetings.

Regulatory Framework

- Section 403.067, Florida Statutes (F.S.), known as the Florida Watershed Restoration Act.
- The 2016 Florida Springs and Aquifer Protection Act (2016-1), Sub-Sections 373.801– 373.813, F.S.
  - Lists requirements for BMAPs for Outstanding Florida Springs (OFS). Including:
    - Priority Focus Area (PFA).
    - Identification and estimated pollutant load of each point source or category of non-point sources.
    - Onsite Sewage Treatment and Disposal Systems (OSTDS) Remediation Plan (if OSTDS >20% as source) or if DEP determines it necessary to meet the TMDL.

Gemini Springs and DeLeon Spring Basin Management Action Plan (BMAP)

Technical Meeting

1/25/2017

Moira Homan
DEP Basin Coordinator

Mary Szafraniec,
Wood (Amec Foster Wheeler), Contractor

Data Construct and Load Calculation

- Data Collection
  - Spring Vent Discharge (cfs)- USGS
  - Surface water - Nitrate-Nitrite (NOx) – SJRWMD and STORET (with Volusia County stations)
  - Groundwater - NOx - SJRWMD monitoring wells in surrounding areas
- Data Processed Using QA/QC Methods
  - Fatal qualifier codes, statistical checks
- Data Analysis
  - Breakpoint analysis to determine period of record
  - Upper 95% confidence interval values for discharge and concentration
  - Calculated loads discharging from spring vents
- Comparison of NOx at Springs vs. Groundwater Wells
  - Higher concentrations in GW may suggest higher future NOx loads discharging from the springs
  - Too few GW datapoints to formulate conclusions, recommend increase in sampling frequency

Spring Vent Load and TMDL Calculations

Nitrate-Nitrite Loading at Spring Vents			
Waterbody	**Discharge (cfs)**	**NO2+NO3 (mg-N/L)**	**Loading (lb-N/yr)**
Gemini Springs	9.03	1.15	**20,496**
DeLeon Spring	21.27	0.76	**31,852**

Used upper 95% confidence interval values of data from 2011-2017

Nitrate-Nitrite TMDL Using Calculated Flows			
Waterbody	**Discharge (cfs)**	***NO2+NO3 (mg-N/L)**	**Loading (lb-N/yr)**
Gemini Springs	9.03	0.35	**6,226**
DeLeon Spring	21.27	0.35	**14,657**

Used same flows from spring vent loading analysis to calculate TMDL loads

**Used concentrations from TMDL document for Gemini Springs and DeLeon Spring*

Contact Information

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(Wood still operating as Amec Foster Wheeler)

Florida Department of Environmental Protection

Division of Environmental Assessment
and Restoration

Estimated Nitrogen Loading to the Upper Floridan Aquifer:

Nitrogen Source Inventory and Loading Tool for Gemini and DeLeon Springs

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David Huggins
Groundwater Management Section

January 25, 2018

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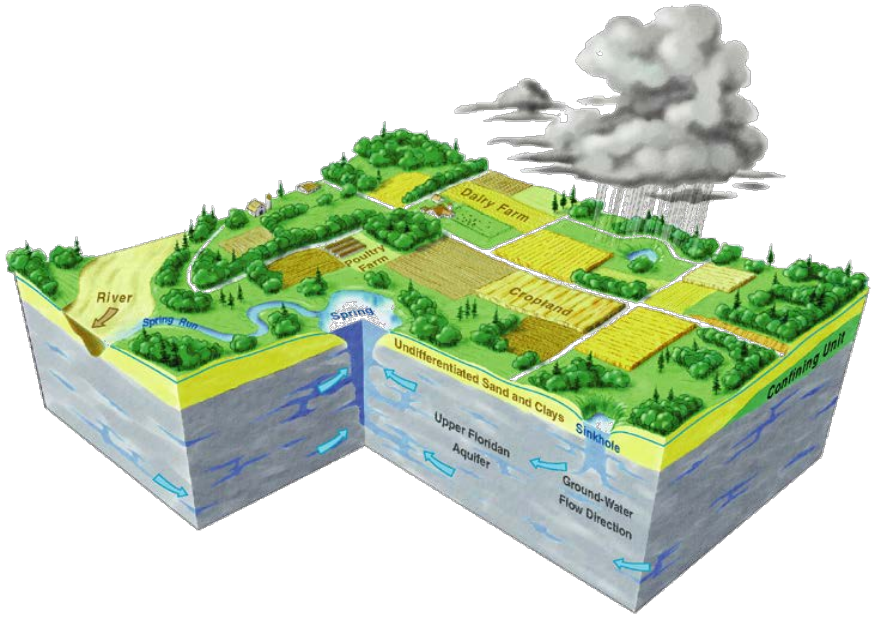
Nitrogen Inventories

- The Florida Springs and Aquifer Protection Act of 2016 requires DEP to develop nitrogen inventories for the contributing areas of all Outstanding Florida Springs that are impaired
- The information developed from the nitrogen inventory for the Gemini and DeLeon springsheds will be used to provide nitrogen load estimates for sources in the springshed (by source category)

Nitrate-Impaired Spring Waters

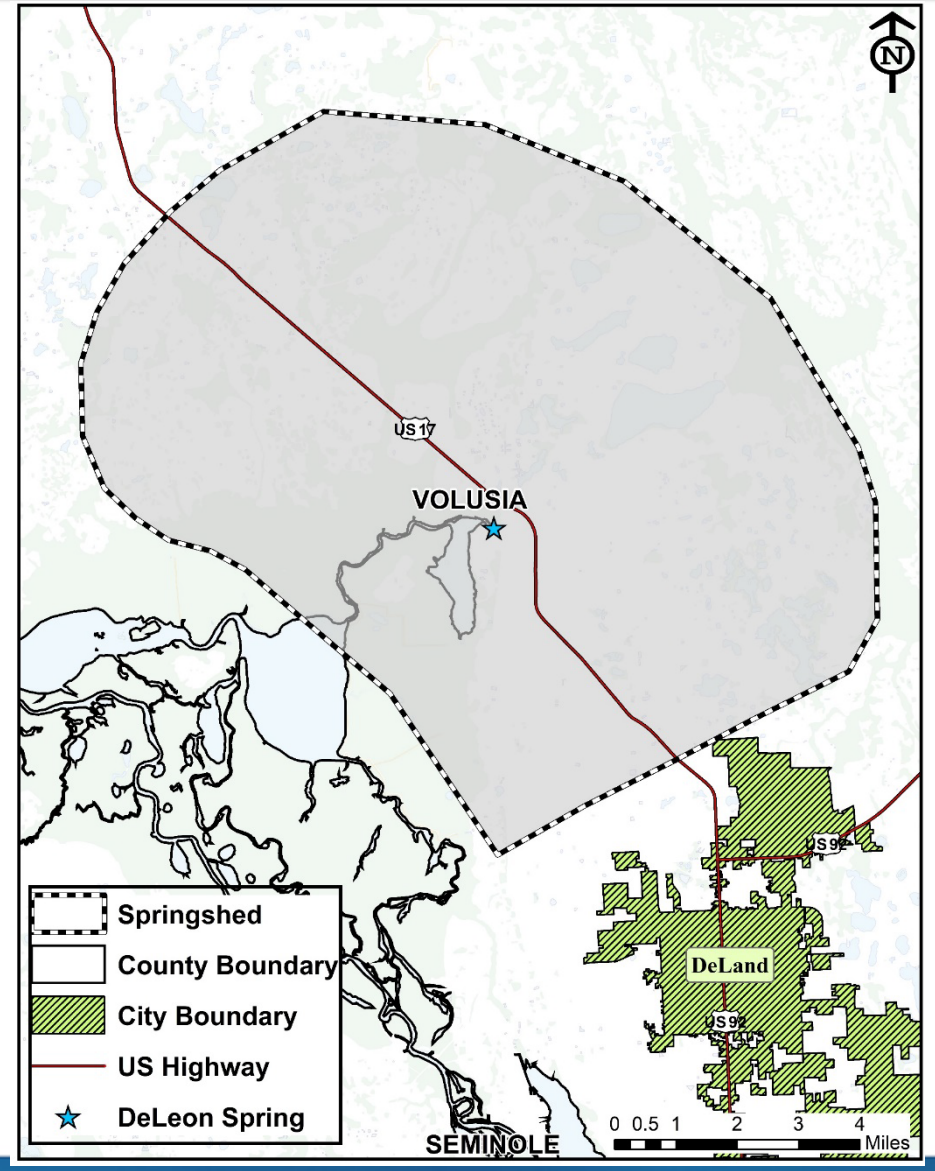
- The water quality in several Outstanding Florida Springs, including Gemini and DeLeon Springs, is impaired due to elevated nitrate concentrations
- Many sources contribute nitrogen in each springshed:
  - atmospheric deposition
  - urban turfgrass fertilizers
  - septic tanks
  - land application of wastewater
  - livestock manure
  - farm fertilizers



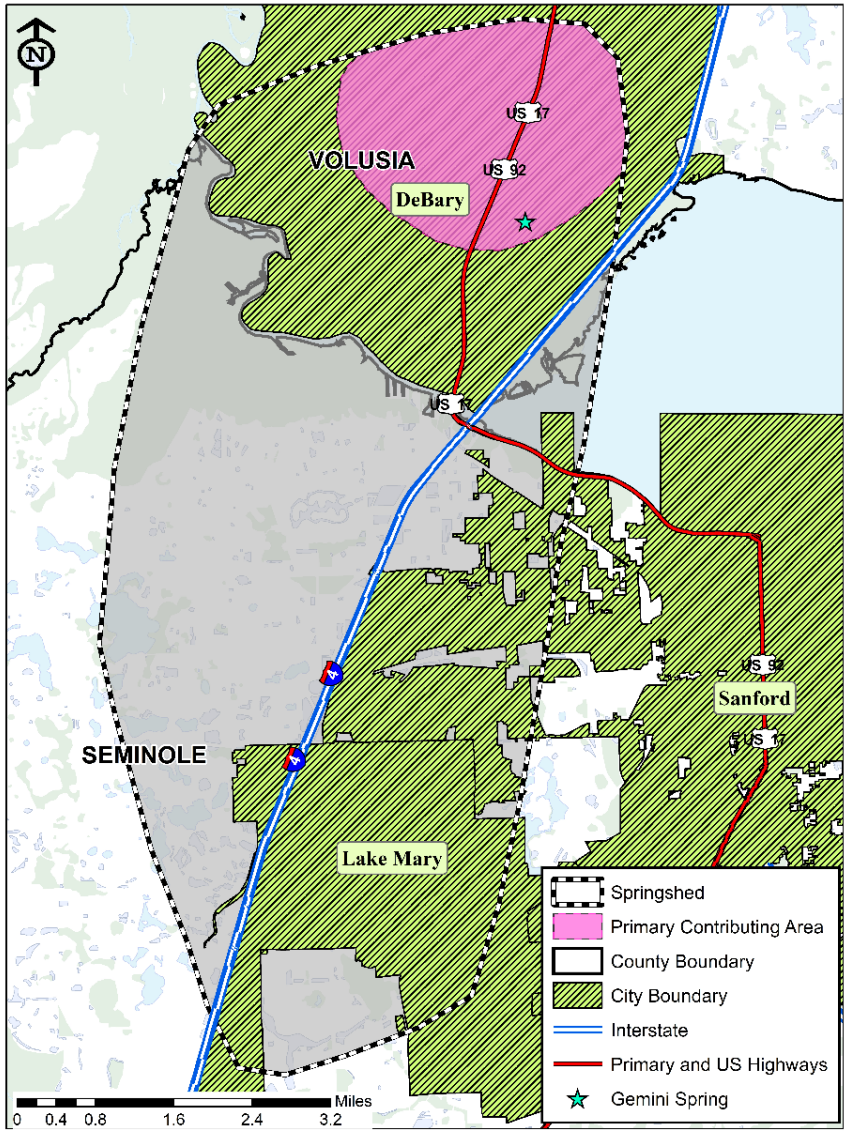
Nitrogen Source Inventory and Loading Tool

- Estimate N loading to groundwater with BMAP areas
- Identify sources for which reductions in N loading could achieve restoration of impaired waters
- We customize the inventory for each spring basin or BMAP area to account for hydrogeologic and land use differences
- Inventories have been completed for Wakulla, Jackson Blue, Volusia Blue, Silver, Rainbow, the Springs Coast Springs, Wekiwa/Rock, and springs in the Suwannee Basin

DeLeon Springshed



Gemini Springshed

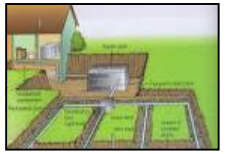


Estimating Nitrogen Loads to Groundwater

Steps:

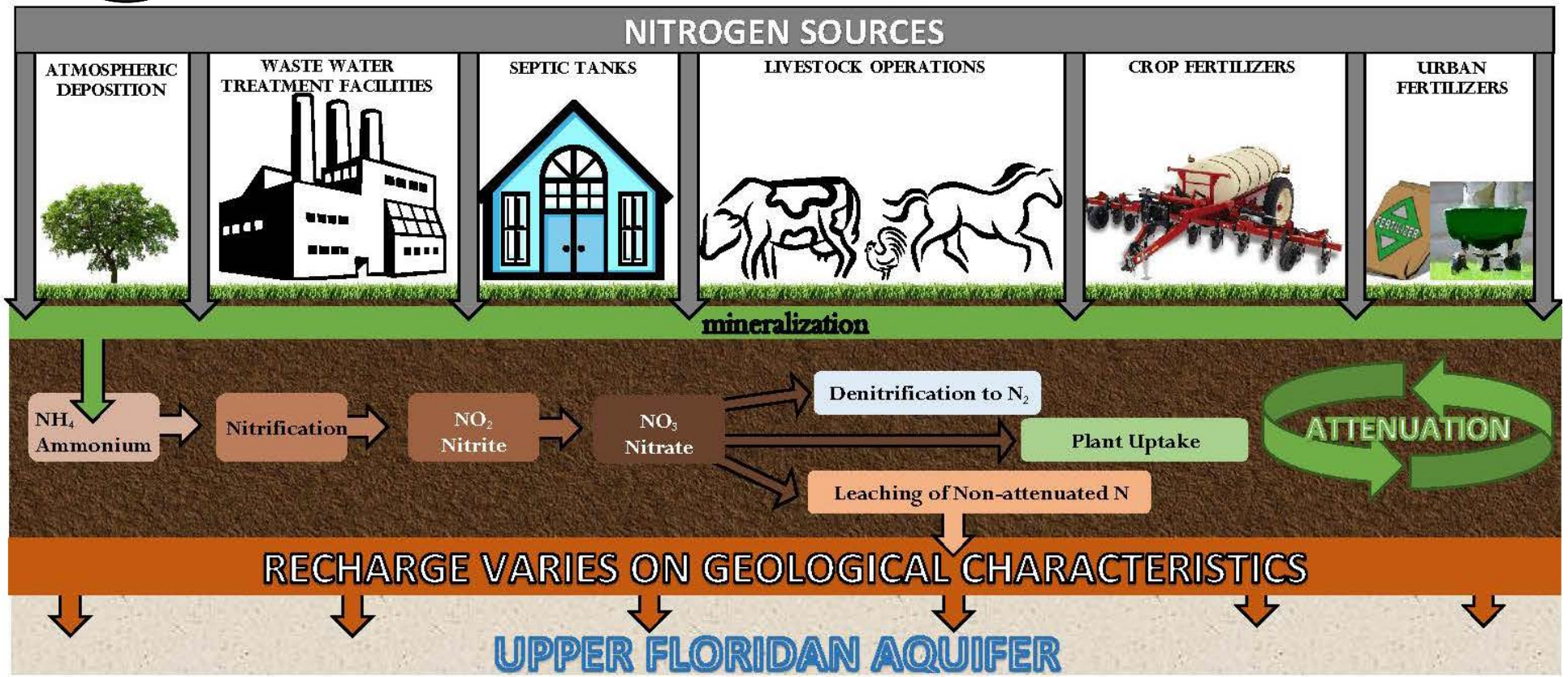
1. Estimate the inputs of nitrogen to the land surface from the source inventory information (best available and most current).
2. Apply attenuation factors based on the various environmental processes that could transform the various forms of nitrogen in the subsurface (such as denitrification, nitrification of ammonia, uptake by plants, mineralization of organic nitrogen).
3. Apply areal weighting factors that are based on the rate of recharge to groundwater to estimate nitrogen loads to groundwater.
4. Fine-tune estimates after getting feedback from stakeholders.








Nitrogen Cycle and Nitrogen Attenuation

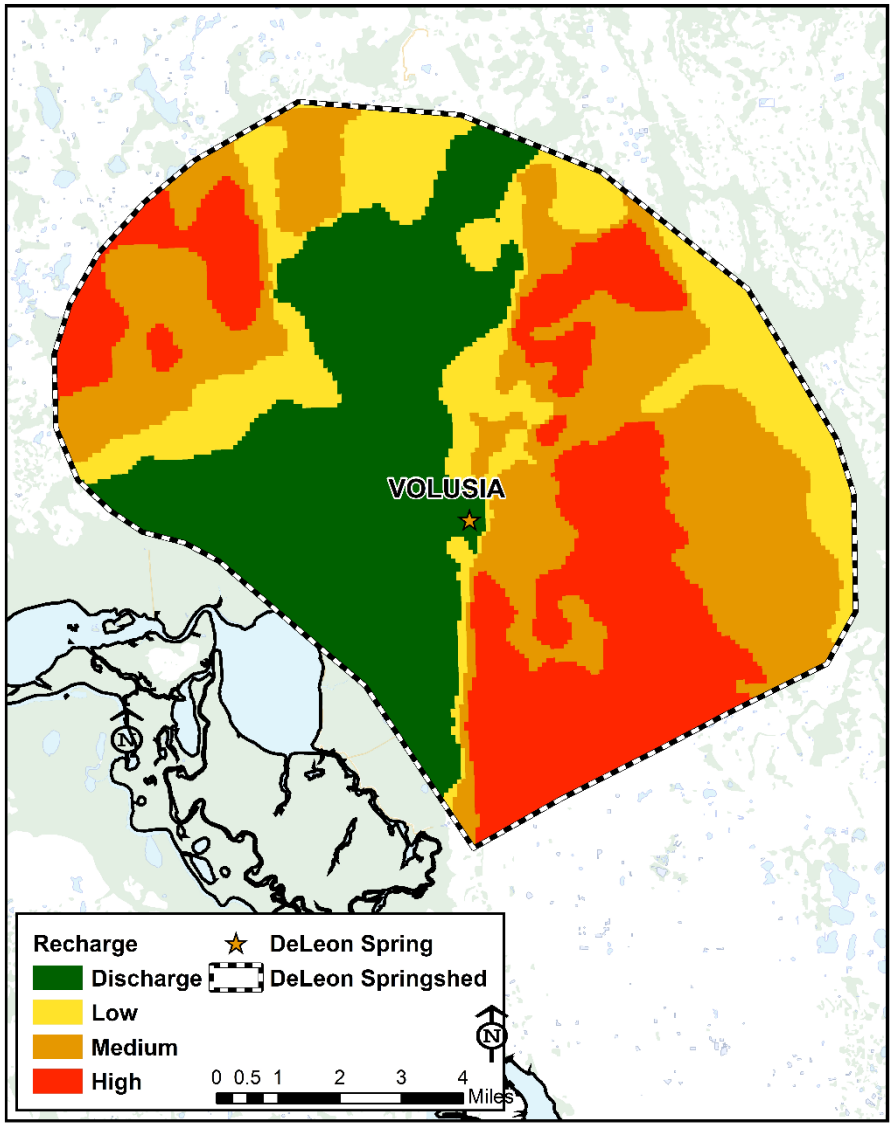


Processes that control the transformation of N in soils and the subsurface.

The wide ranges reflect variable soil conditions, fertilizer material, livestock, crop types, etc.,

ALL AFFECT LEACHING OF N TO GROUNDWATER

Groundwater Recharge Areas

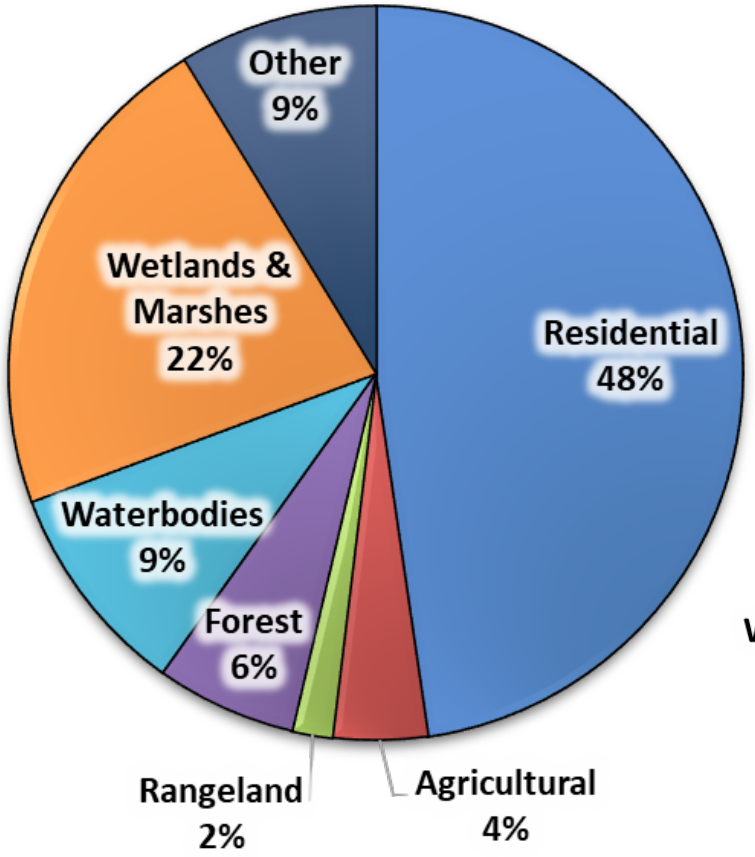


- Inputs to land and loads to groundwater are calculated by recharge region within the springshed
- SJRWMD (2015) mapped areas of relative recharge to the UFA based on geological properties
  - High Recharge: >10 in/yr
  - Medium Recharge: 3-10 in/yr
  - Low Recharge: 0-3 in/yr
- A weighting factor is assigned to recharge category to account for additional attenuation:
  - High, 0.9
  - Medium, 0.5
  - Low, 0.1

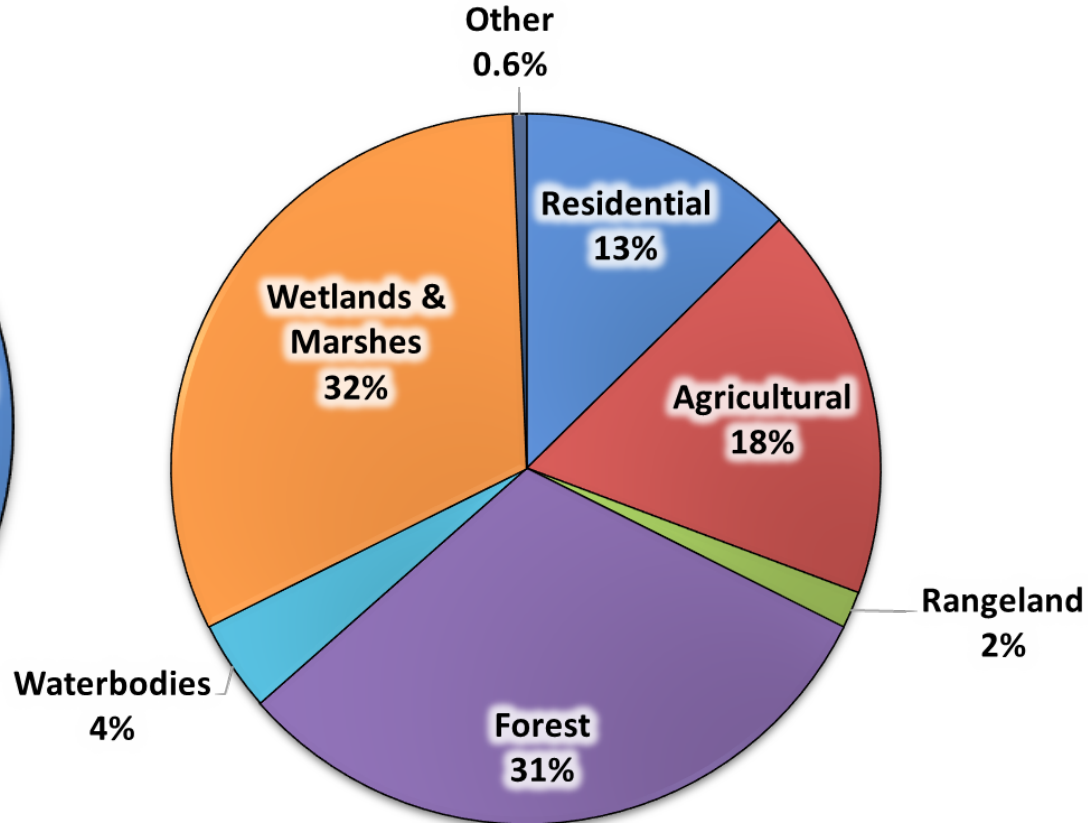
The amount of nitrate that is transported to the UFA in a given year is related to the rate of recharge to the aquifer

Land Use in the Springshed

Gemini

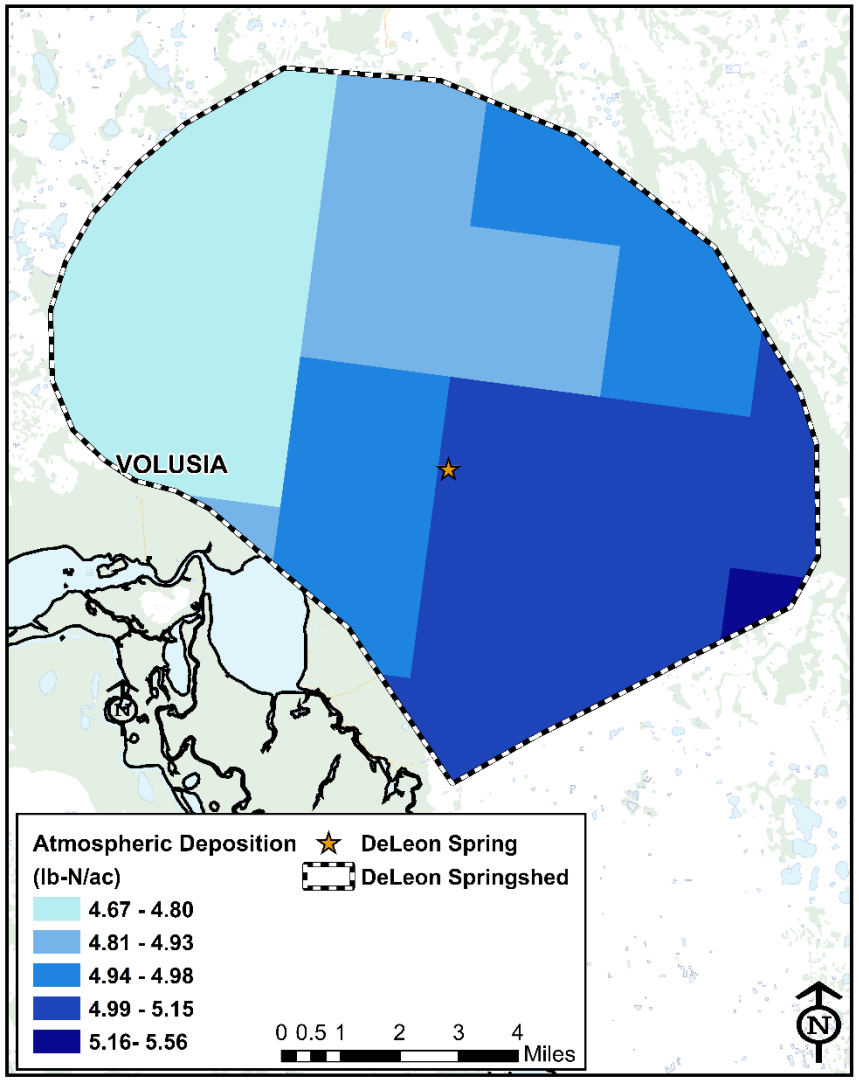


DeLeon



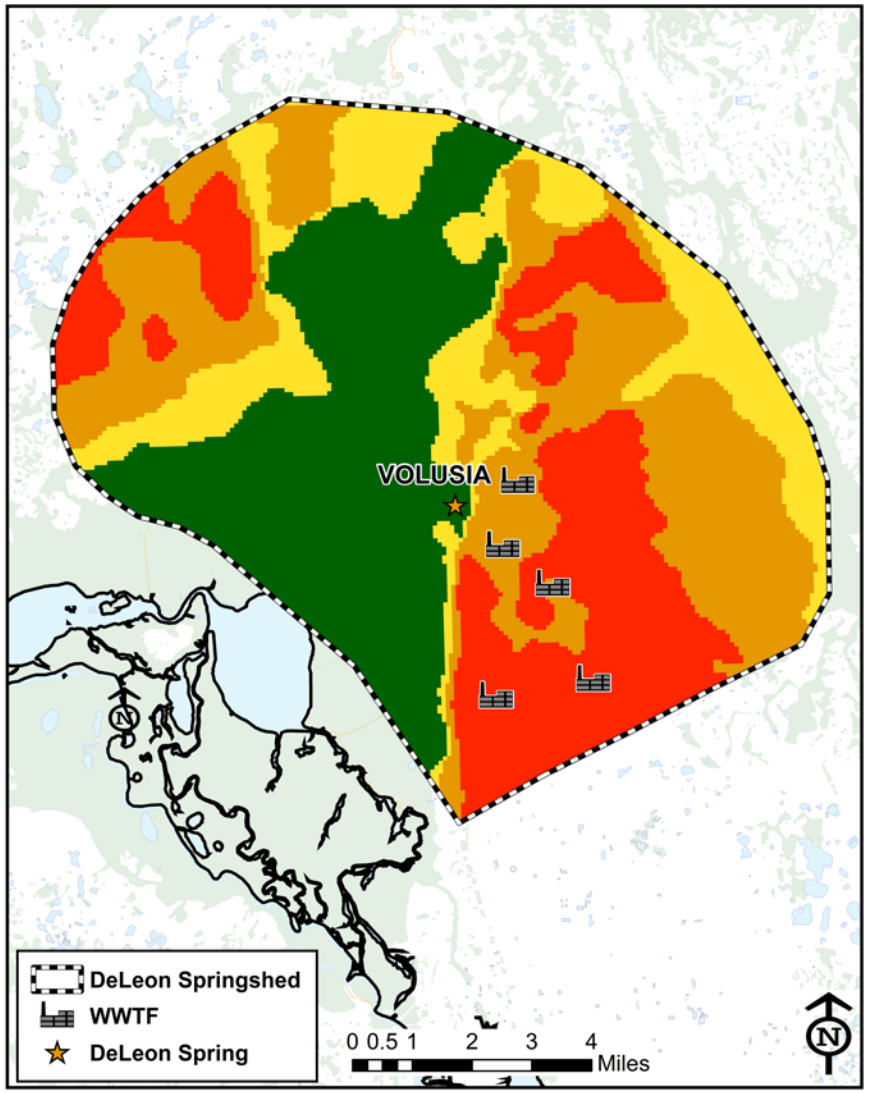
- Majority of N inputs occur within agricultural and urban land areas
- These categories represent 52% and 31% of the land use within each respective springshed

Nitrogen Input: Atmospheric Deposition



- TDEP model
  - U.S. EPA method to estimate spatially continuous atmospheric deposition
  - Nationwide total deposition model for N and S
  - Estimated deposition based on monitoring stations and modeled atmospheric concentrations
  - Model year is an average from 2011 to 2013
  - Average TN deposition
    - Range 4.67 - 5.56 lb-N/ac/yr

Nitrogen Input: Domestic Wastewater

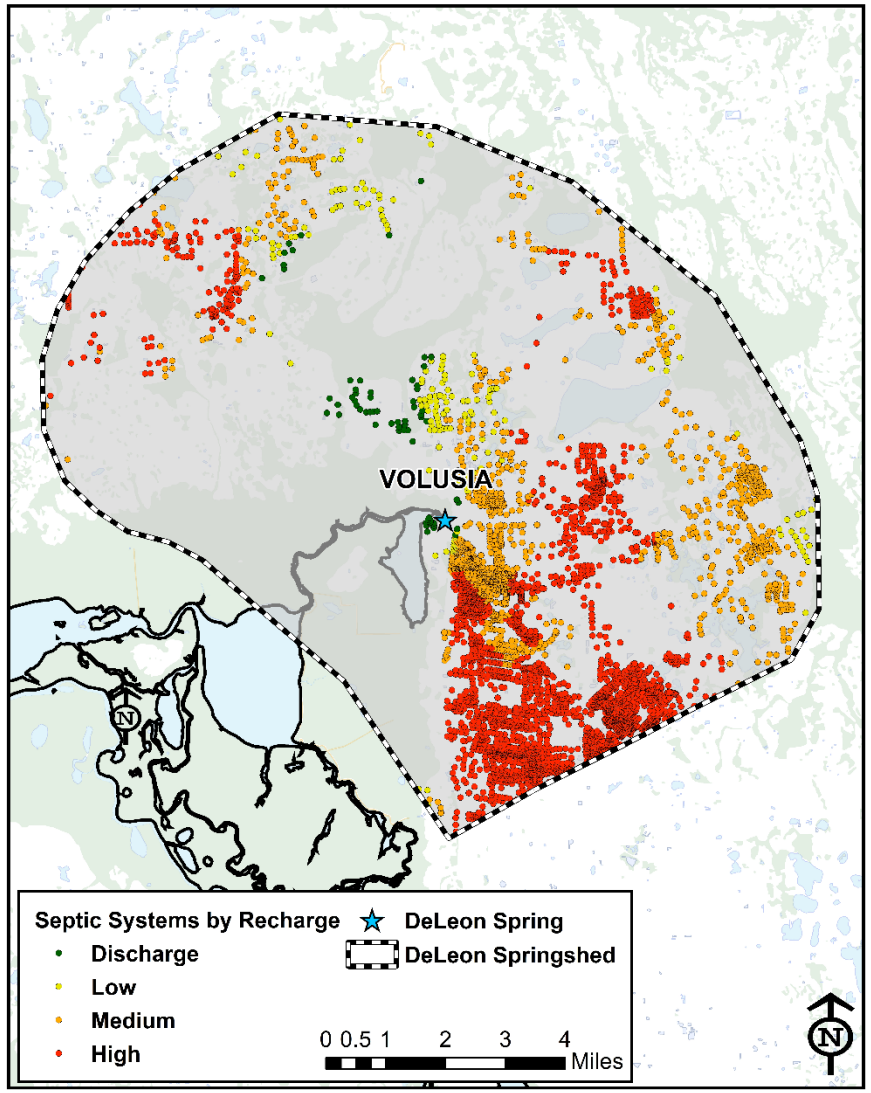


- Inventory includes domestic WWTF application sites in the springshed
- TN effluent concentrations as reported to DEP
- NO_3 used to project TN data, if necessary
- Effluent data separated based on treatment type
  - RIBs, Absorption Fields
  - Sprayfields
  - Reclaimed Water Application
- 5 permitted facilities apply wastewater in the DeLeon springshed
- 6 permitted facilities apply wastewater in the Gemini springshed

Nitrogen Input: Septic Systems (OSTDS)

- Septic count taken from DOH's Florida Water Management Inventory (FLWMI)
- Accuracy of this data was verified using an aerial analysis

- Calculate # of people relying on septic tanks
  - Volusia County = 2.03 people per household
  - Seminole County =2.05 people per household
  - Average annual input to septic tank = 9.012 lb-N/person (US EPA)



Nitrogen Input: Livestock Waste

Literature review provided information on common livestock animals in Florida

- Animal waste factors

2012 Census of Agriculture (CoA)

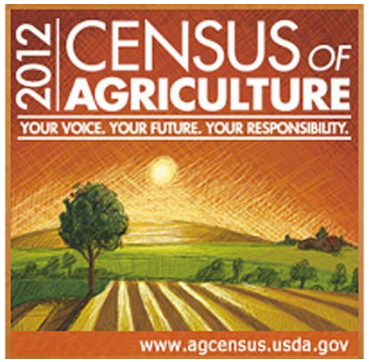
- # of livestock (categorized by animal)
- Full county data ONLY

2016 USDA Survey

- # of beef cattle

Use County-level land use information from FSAID to estimate livestock population within the springshed

Land Use Description
Horse Farms
Improved Pastures
Specialty Farms
Unimproved Pastures



Livestock	Waste Factor (lb-N/day)
Beef Cows	0.337
Other Beef Cattle	0.31
Dairy Cow	0.997
Chicken, broilers	0.002
Chicken, layers	0.003
Calves	0.068
Equine	0.273
Goats	0.035
Hogs	0.19
Sheep	0.198
Turkeys	0.006

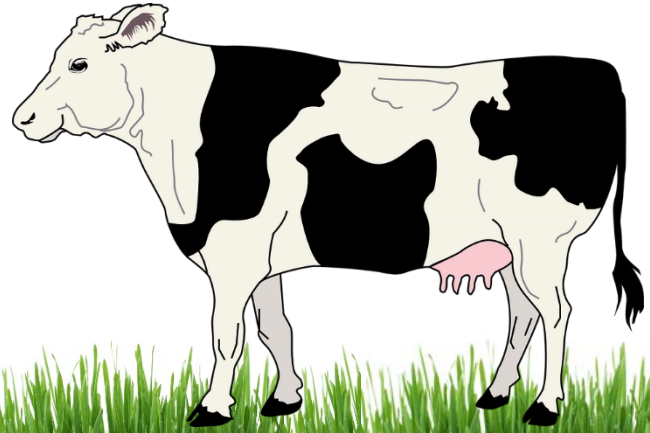
USDA

Horse Farm

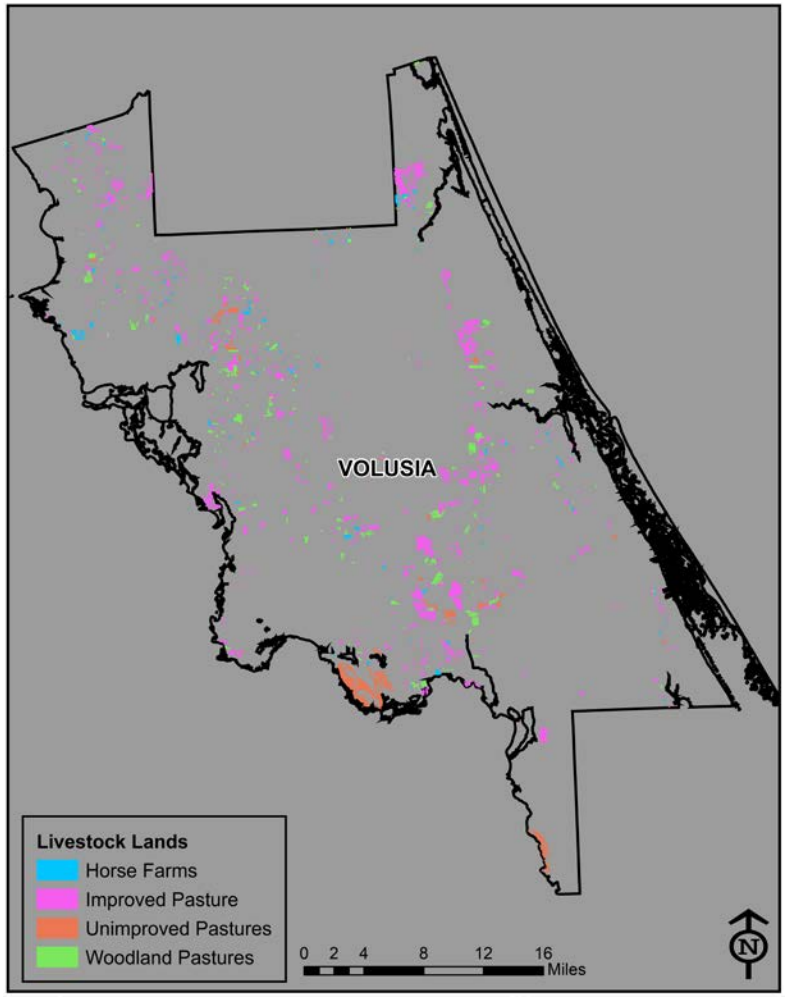
- Used FSAID coverage to determine acreage of operation
- Per FDACS, there is no additional pasture fertilizer applied
- Half of horse population from facility was subtracted out from the BMAP horse population.
  - Assumed that not all “visiting” horses at the facility are included in the countywide census
- Daily waste factor was applied to the annual average number of horses kept at the facility to estimate input
  - Estimated input was added into “Livestock Waste” category

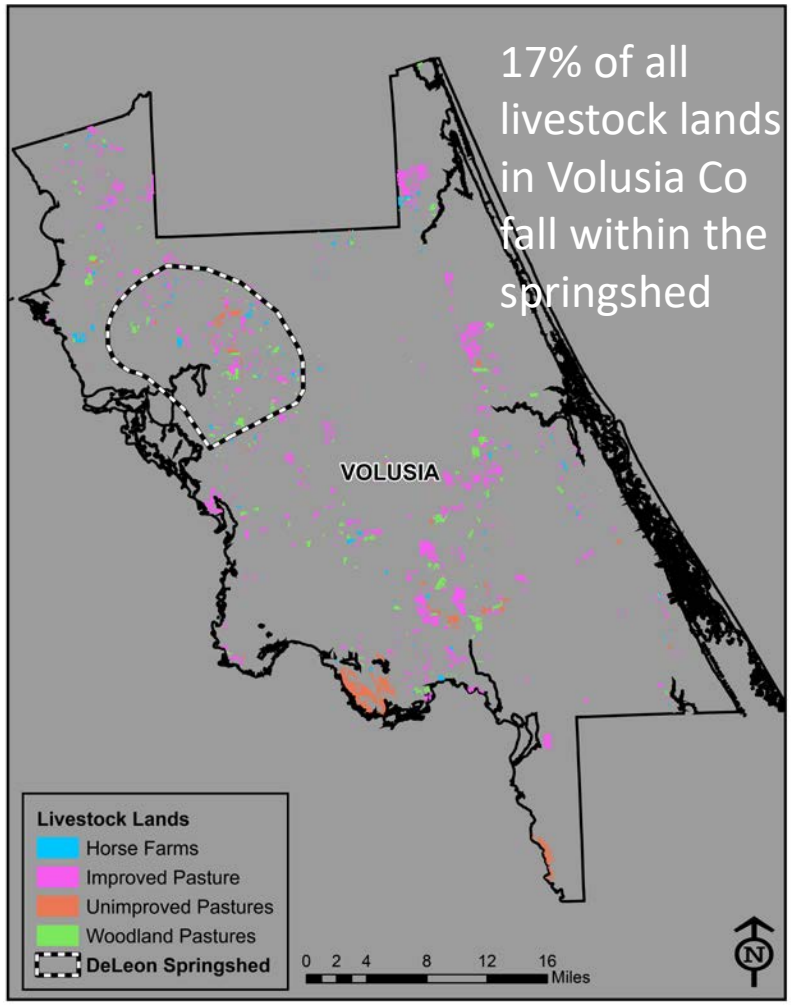
Dairy Operation

- Used FSAID coverage to determine acreage of operation
- Average herd size, confinement times, and manure management practices obtained from FDACS
- Daily waste factor was applied to the annual average herd size and refined based on site specific waste handling methods
  - Final contribution from dairy cattle was added into “Livestock Waste” category

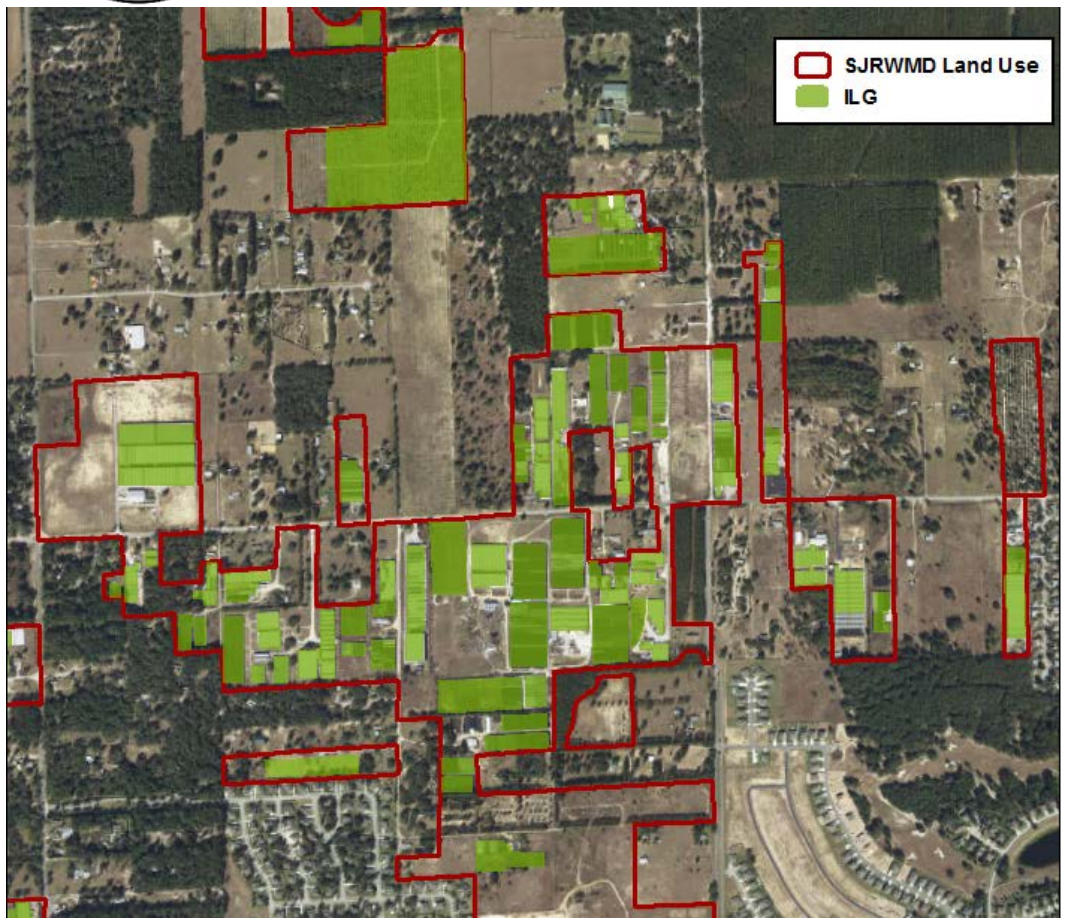


Land use Percentages: Livestock





Farm Fertilizer



Irrigated lands and crop type based on FSAID irrigated lands geodatabase (ILG).

Outside of ILG, agriculture areas based on WMD land use and Property Appraiser Data.

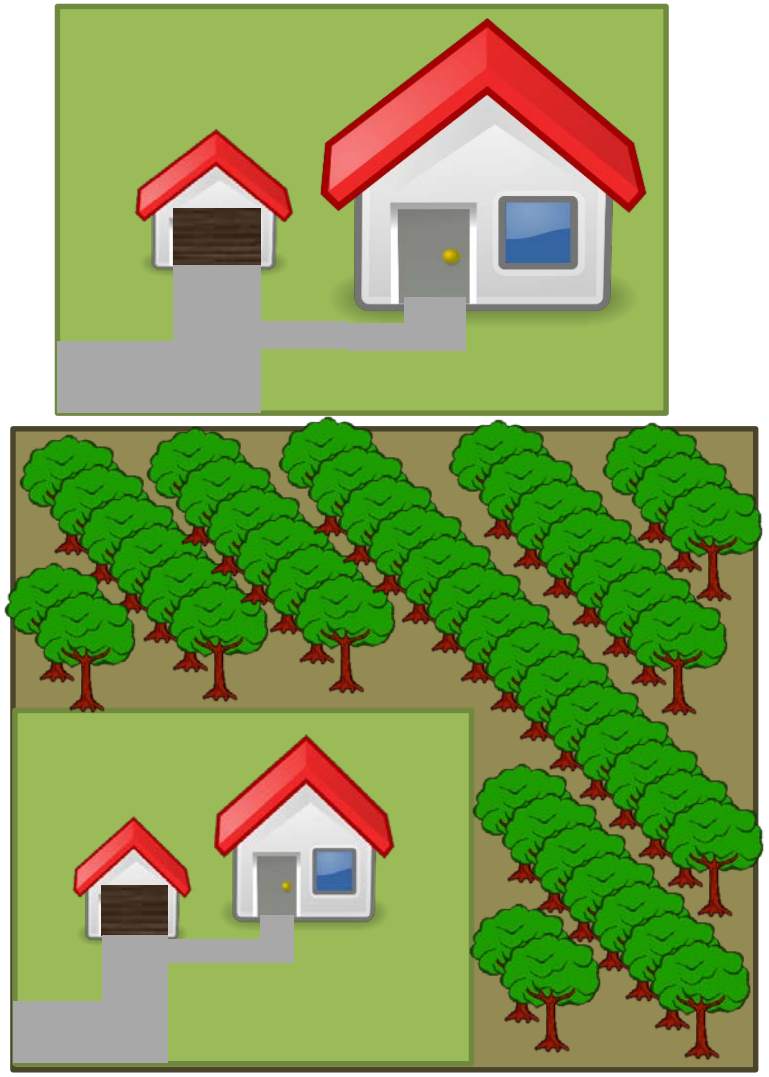
Crop fertilizer application rates were applied to the acreages identified within springsheds based on crop type.

Application rates based on UF-IFAS recommended rates as well as producer feedback.

Only 80% of nursery operation acreage was assessed in order to account for spacing between liners and rows

Urban Turfgrass Fertilizers

- Acreage likely to receive fertilizer estimated from PA data and property values
  - Residential
  - Non-residential
- Maximum fertilizable acreage was capped at 1 acre
- Property values used to assess probability of fertilization
- Annual Application Rates based on 2009 study by UCF in the Wekiva area
  - 51% fertilized by owners
    - 2.88 times year
  - 33% fertilized by lawn service
    - 4.76 times a year
  - 16% non-fertilized

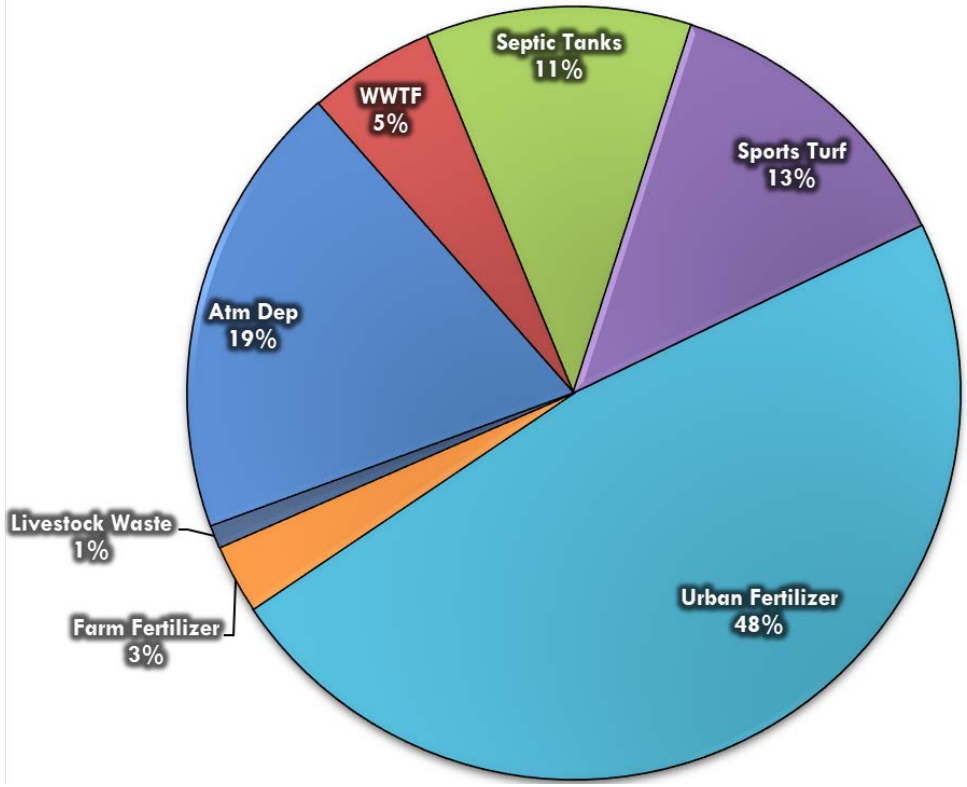


Sports Turfgrass Fertilizers

- Sports fields
  - Acreage estimates from aerial analysis of PA land use data
  - Application rates based on commercial turf maintenance estimates
- Golf Courses
  - Acreage estimated through PA land use data
  - Application rates based on data provided by golf courses
  - Annual application rate = 4.5 lb-N/1,000 sq ft

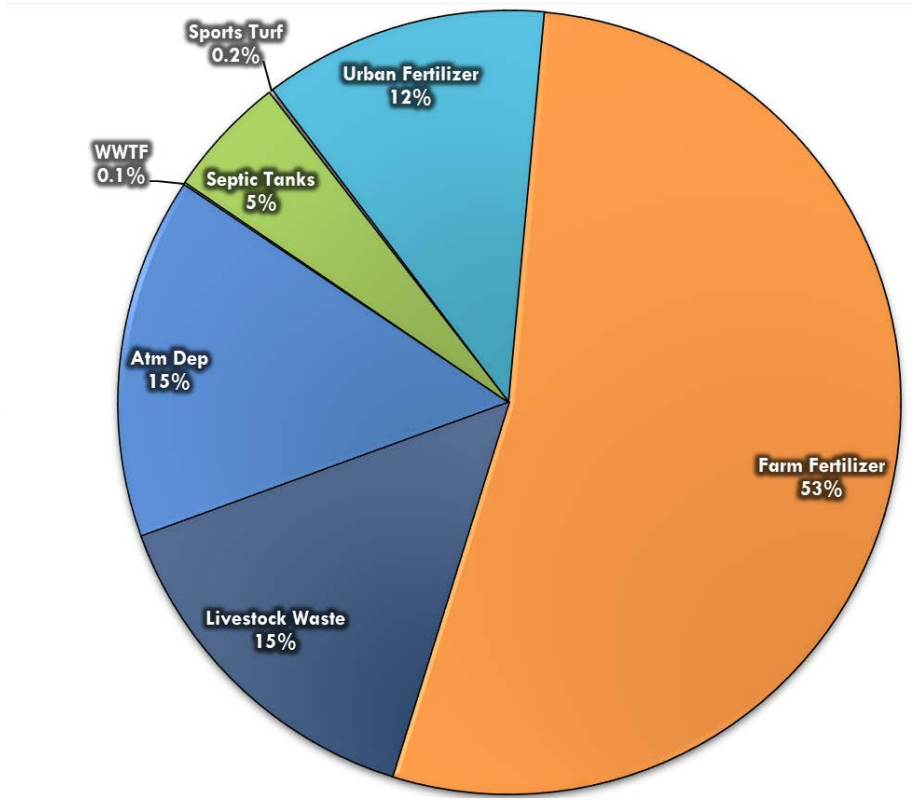
Nitrogen Input to Surface

Gemini



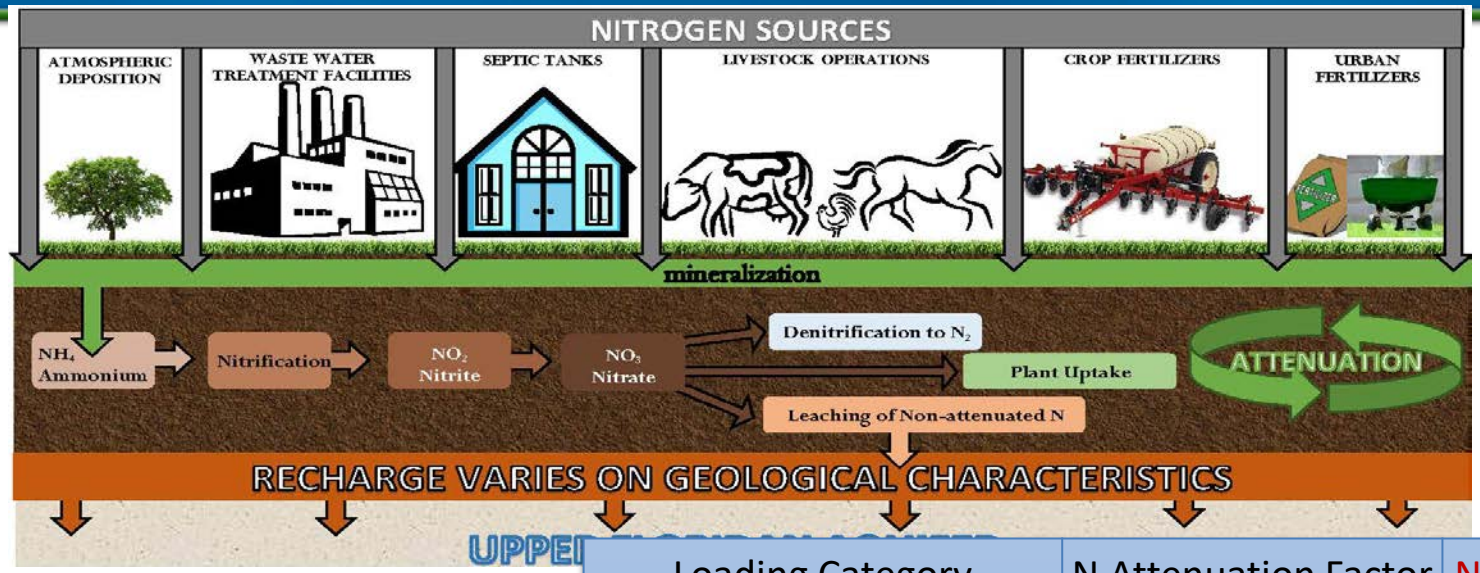
614,819 lb-N

DeLeon



1,567,211 lb-N

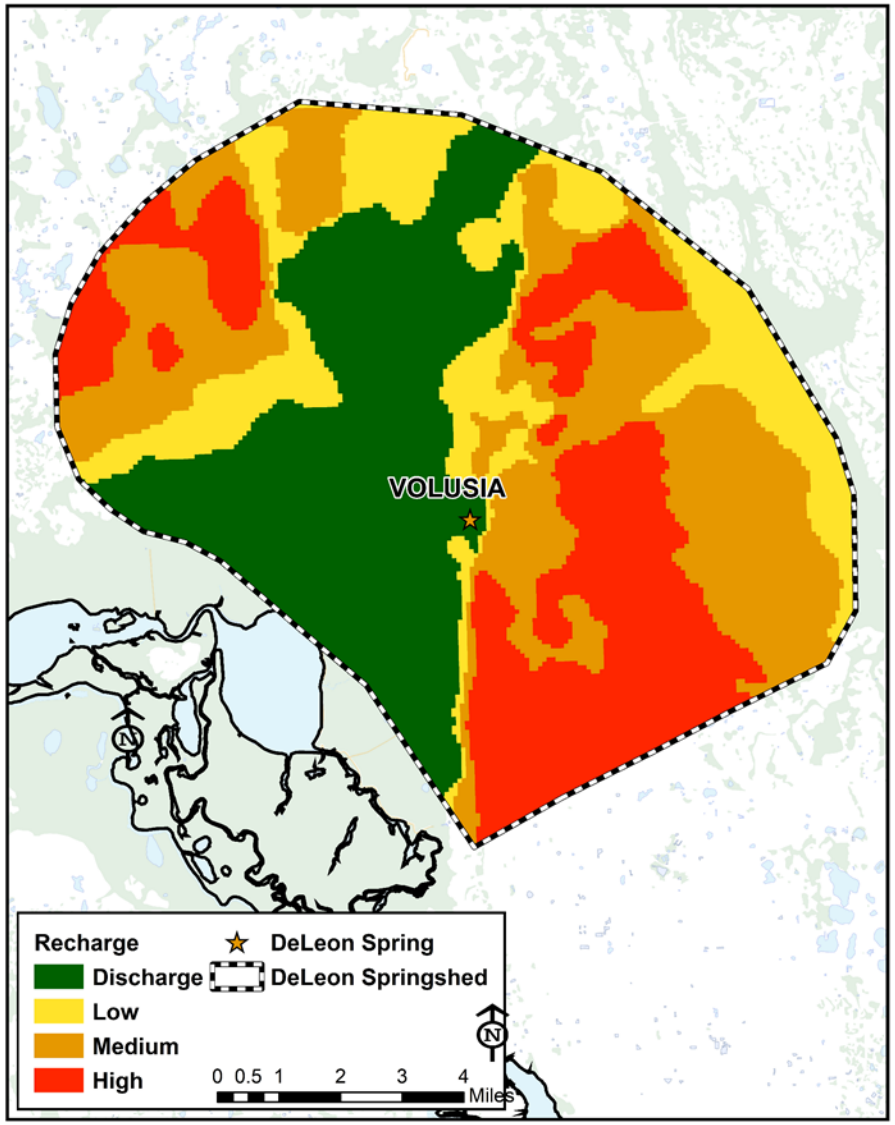
Biochemical Attenuation Factors



- Represent the percentage of N removed and therefore not available for leaching to groundwater
- Based on factors used in similar past studies and found in relevant literature

Loading Category	N Attenuation Factor	N Leaching
Atmospheric Deposition	90%	10%
Septic Systems	50%	50%
WWTF-RIB	25%	75%
WWTF-Sprayfield	60%	40%
WWTF-Drainfield	50%	50%
Urban Turfgrass Fertilizers	70%	30%
Sports Turfgrass Fertilizers	70%	30%
Farm Fertilizers	80%	20%
Livestock	90%	10%
Dairies	50%	50%

Hydrogeological Attenuation Factors Based on Recharge to UFA



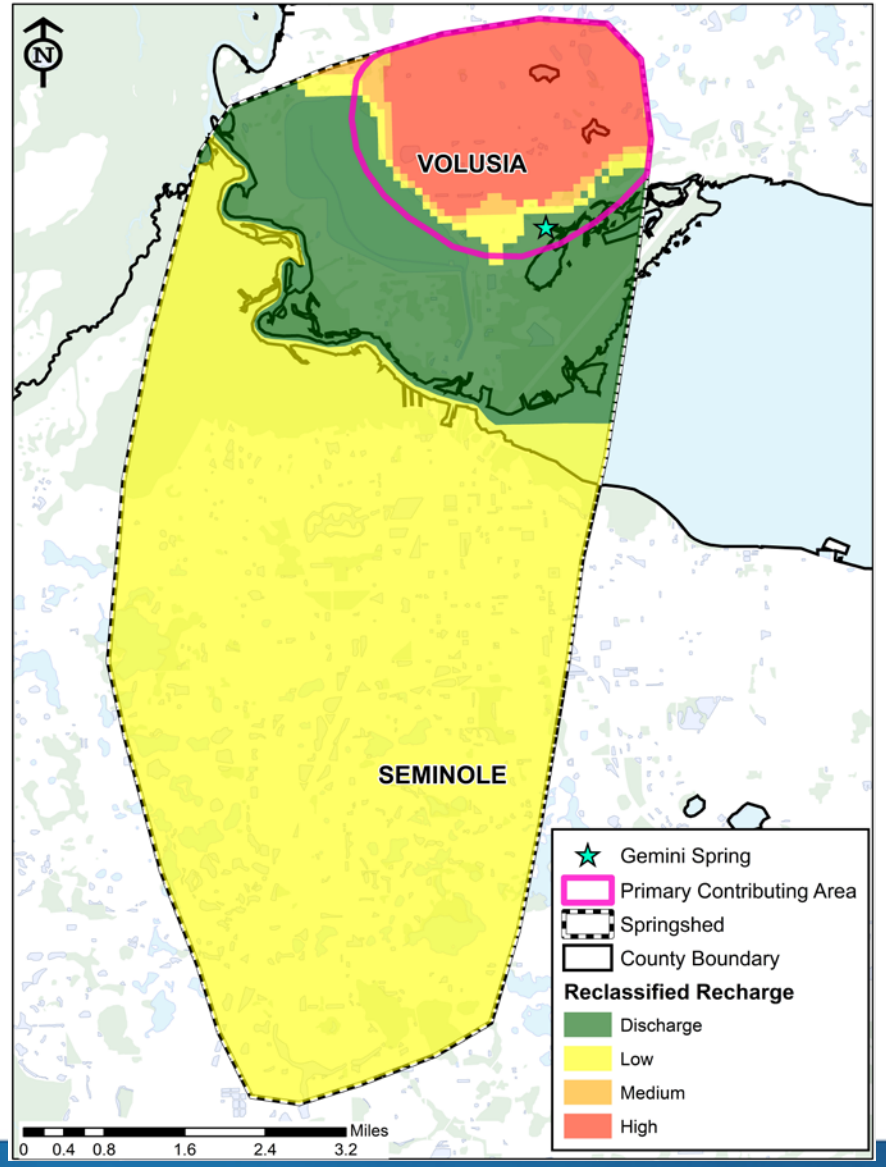
- Recharge factors are used to estimate the percentage of the non-attenuated nitrogen expected to reach the aquifer in a year

10%

50%

90%

Hydrogeological Attenuation Factors Based on Recharge to UFA



- Original recharge layer provided by SJRWMD shows a discharge area north of the river
- Reclassified the recharge layer to indicate that anything south of the river is not significantly recharging the groundwater that is discharged at the spring vent

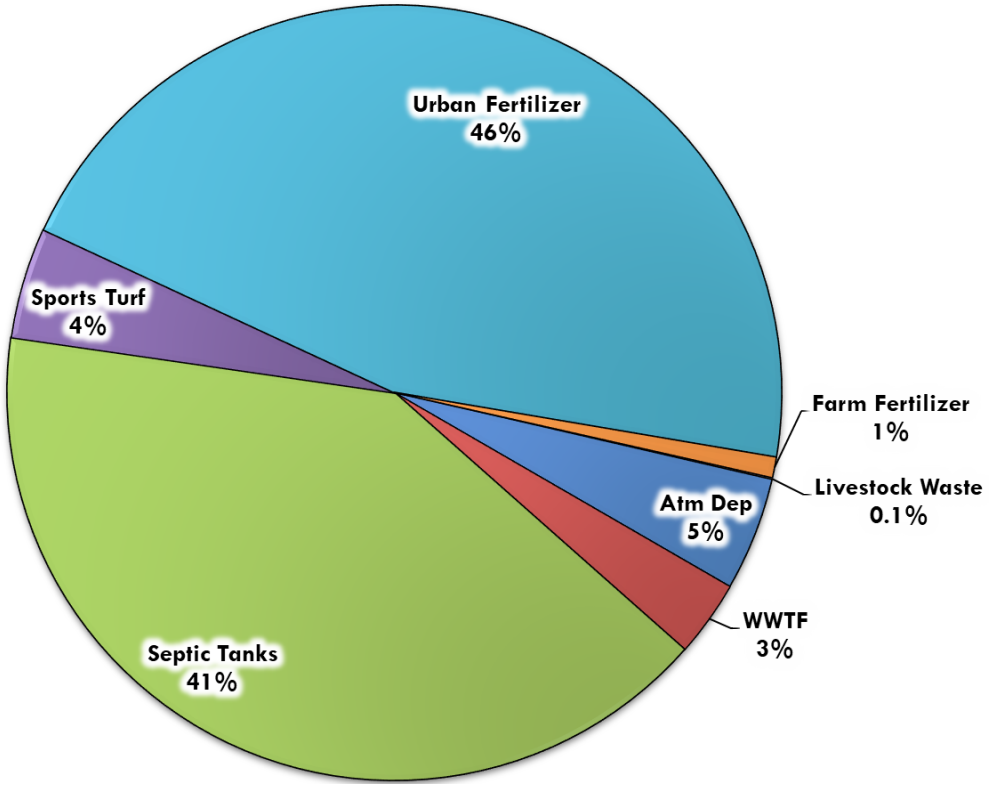
10%

50%

90%

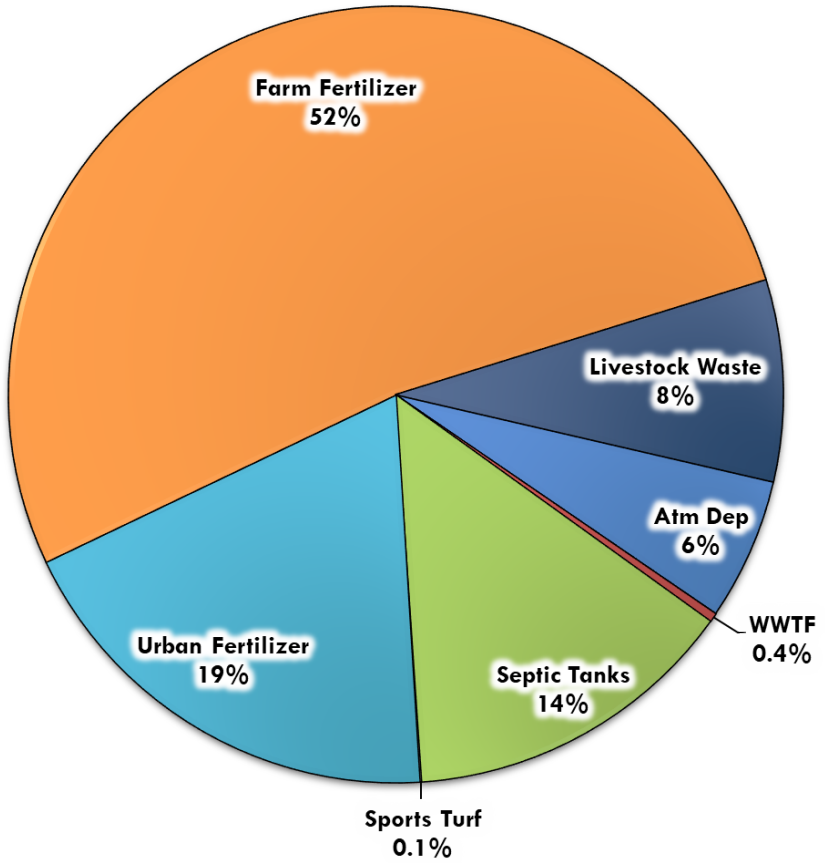
Nitrogen Load to Groundwater

Gemini



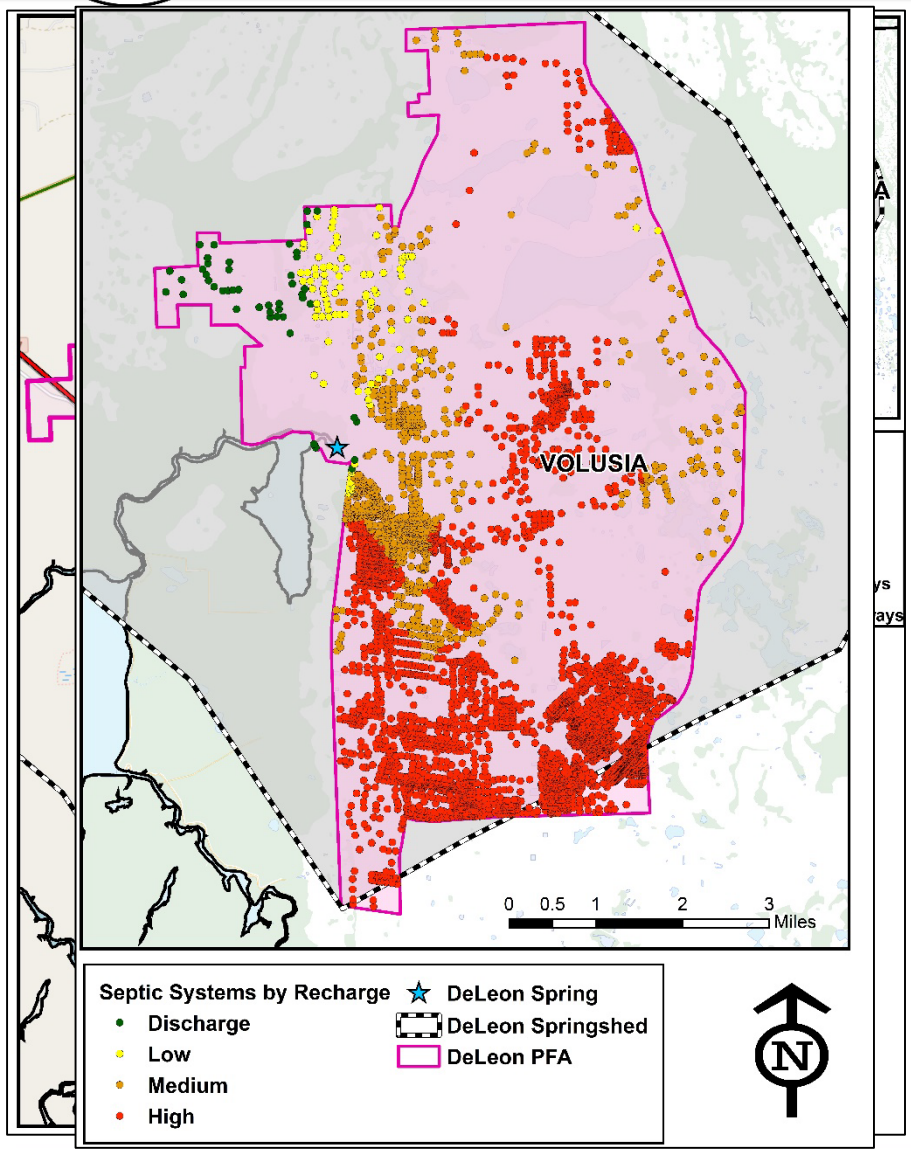
53,086 lb-N

DeLeon

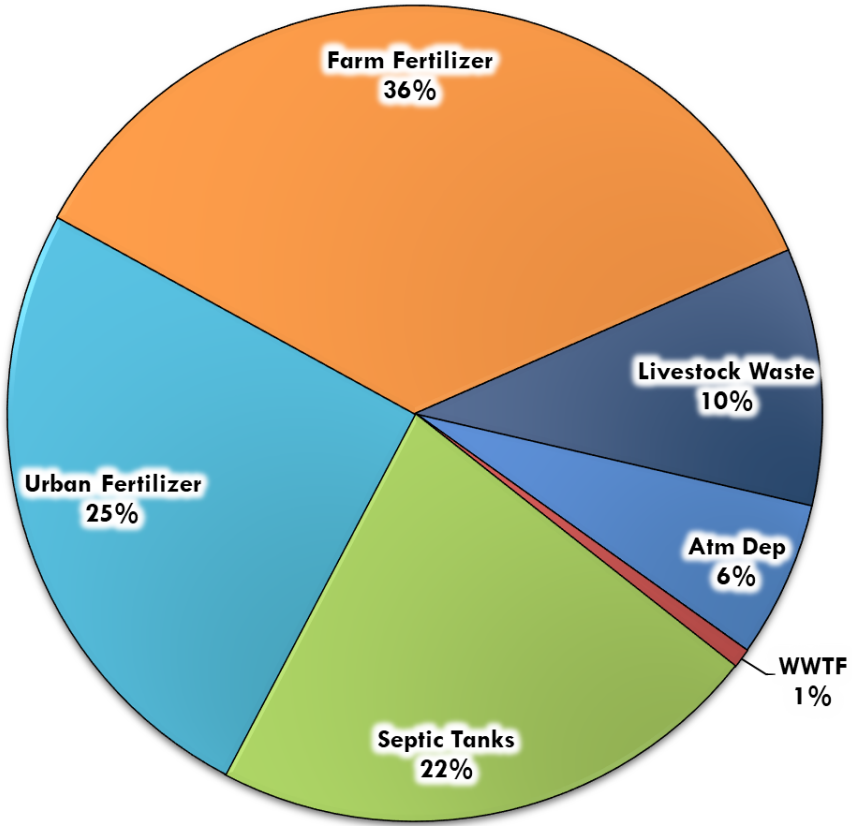


205,707 lb-N

Priority Focus Areas

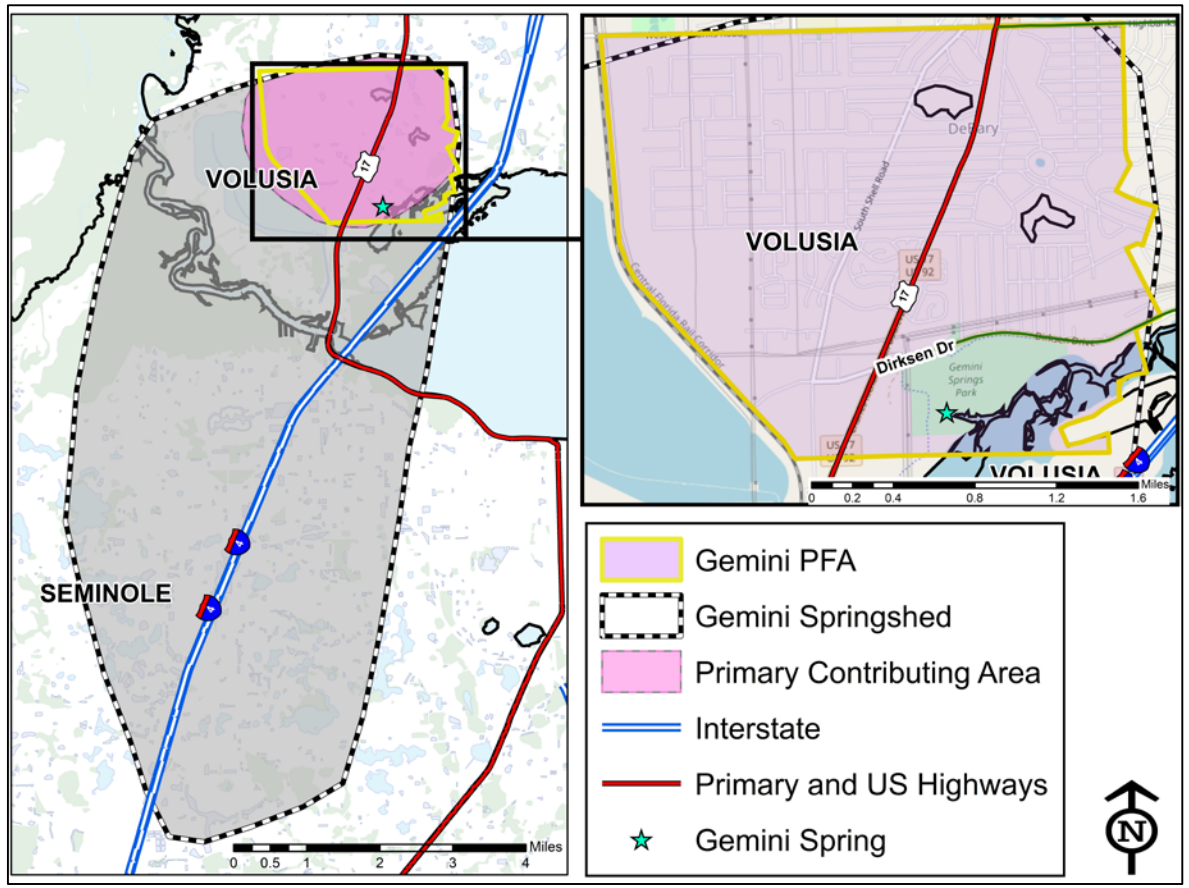


DeLeon

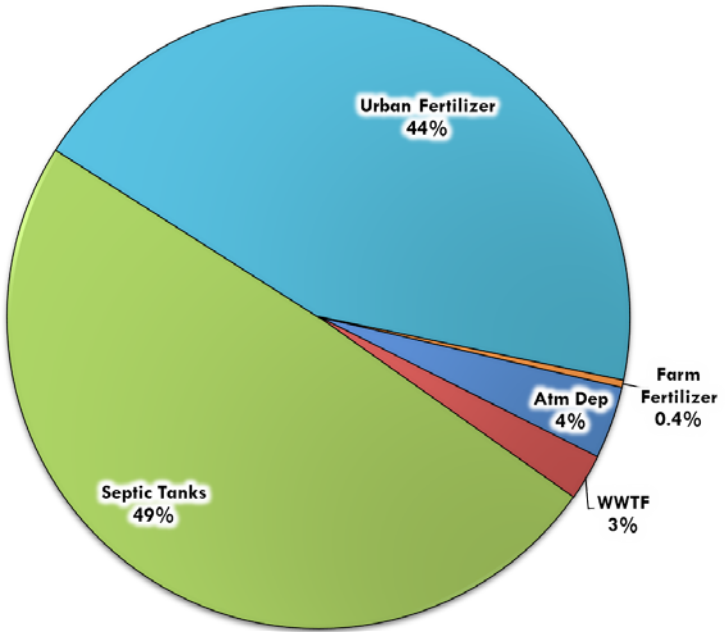


124,475 lb-N

Priority Focus Areas



Gemini



37,387 lb-N

QUESTIONS??

Division of Environmental Assessment and Restoration
Groundwater Management Section

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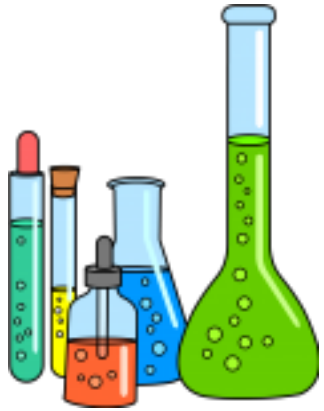
OSTDS Remediation Plan

- The Florida Springs and Aquifer Protection Act mandates that a BMAP with OSTDS contributing at least 20 % of nonpoint source load within a PFA include an OSTDS Remediation Plan (41 % in Gemini; 22 % in DeLeon)
  - Gemini Springs is required to have an OSTDS Remediation Plan.
  - DeLeon Spring will include an OSTDS Remediation Plan.
- The OSTDS Remediation Plan is included as an appendix in the BMAPs.

OSTDS Remediation Plan Components

- Both plans will include:
  1. Public education plan.
  2. Confirmation that a review of the scientific information on effect of nutrients on springs has been performed.
  3. Projects designed to reduce nutrient impacts from OSTDS.



Public Education

- Inventory of public education components.
  - Ongoing education efforts?
  - Education needs?
- Overall goal:
  - What do we need in order to increase public education/awareness about:
    - Springs.
    - Local groundwater systems and nutrient connections.
    - Septic tanks, etc.
- Action item for next meeting
  - Complete public education inventory.

Public Education Discussion

- Discussion objectives:
  - Confirm key audiences.
  - Further refine who are the audiences.
  - Identify some major themes for communications/education.
  - Identify major misconceptions.
  - “Piggyback” opportunities.
- Future discussion:
  - Prioritize actions.
  - Measuring improvements in knowledge.

Public Education

- Who are the key audiences to target with the Gemini/DeLeon public education plans?
  - Homeowners.
  - Elected officials/leadership.
- What specific points do you think we need to convey about OSTDS nitrogen loads?
- Are there additional misperceptions we need to overcome? What are they?
- Are there existing public education efforts with which we could piggyback communications?

Scientific Information

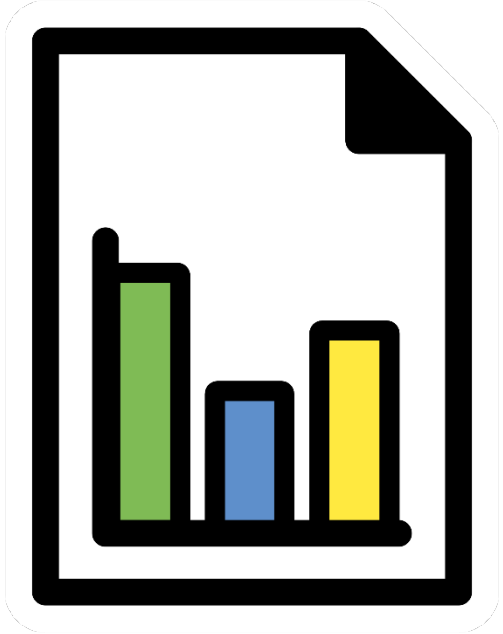
Action	Lead Entity
Estimate Nitrogen Loads	
Develop Nitrogen Source Inventory and Loading Tool	DEP
Monitoring and Research	
Improve understanding of the ecological responses to nutrient enrichment and reductions	DEP/St. Johns River Water Management District (SJRWMD)/ Universities
Maintain and expand water quality monitoring programs	SJRWMD/DEP
Report annual status and trends	SJRWMD
Evaluate new and emerging technologies	SJRWMD
Research and develop advanced septic tank systems	Florida Department of Heath (FDOH)/DEP/University of Florida-Institute of Food and Agricultural Science
Ongoing Projects	
Spring water quality monitoring	SJRWMD/DEP/Volusia County
Completed Projects	
Florida Onsite Sewage Nitrogen Reduction Strategies Study	FDOH
Proposed Projects	
Groundwater quality monitoring for BMAP assessment	DEP/SJRWMD
Others??	

OSTDS Projects

- Identify cost-effective and financially feasible projects necessary to reduce the nutrient impacts from OSTDS.
  - Examples
    - Upgrades to wastewater treatment plants.
    - Enhancing OSTDS treatment levels.
    - Sewering of areas served by OSTDS.
- Include a priority ranking for each project for funding contingent on appropriations in the General Appropriations Act.

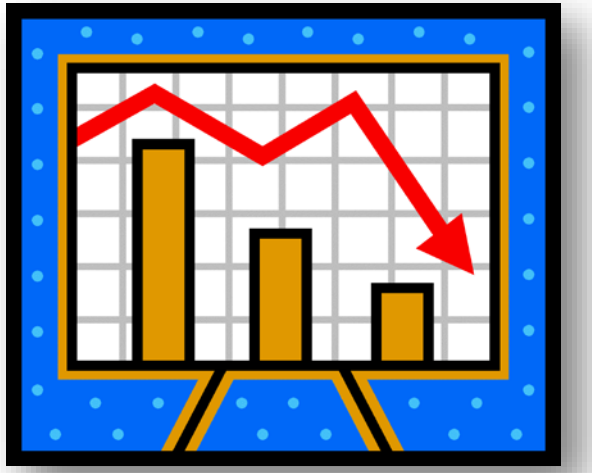
Draft Approaches to Achieve Reductions and Restoration

- Reductions.
- BMAP Policies.



Determining Reductions

- Calculate 3 numbers:
  1. Total load reduction required to meet TMDL.
  2. Reductions from projects.
     - Estimated reductions resulting from projects submitted by stakeholders.
       - Existing and planned efforts
  3. Remaining reduction balance (Gap).
     - Estimated by subtracting the total reduction required from the estimated reductions from projects submitted.



Reduction to Meet the TMDLs

Description	Nitrogen Loads (lb-N/yr)		Notes Regarding Data Used
	Gemini	DeLeon	
Total Load at Spring Vents	20,496	31,852	Upper 95 % confidence interval - Nitrate and flow data from 2011-2017 (1.2 mg/L and 9 cfs) for Gemini 2011-2017 (0.61 mg/L and 21.3 cfs)
TMDL Load	6,226	14,657	TMDL target is 0.35 mg/L and using the same flow data from years 2011 to 2017 for Gemini and 2013-2017 fro DeLeon
Required Reduction to Meet TMDL	14,270	17,195	

cfs = cubic feet per second
mg/L = milligrams per liter

TMDL/BMAP Plan

- To achieve TMDL, BMAP implementation will be a 20-year process.
- Plan will define nitrogen reduction milestones:
  - 30% reduction within 5 years.
  - 50% reduction within 10 years.
  - 20% reduction within 15 years.
  - Use last 5 years to finish up and see results.

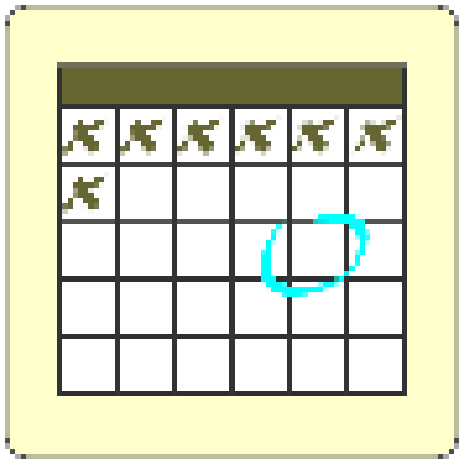
TMDL/BMAP Plan

Gemini Reduction Milestones (lb-N/yr)			
5 Years (30%)	**10 Years (50%)**	**15 Years (20%)**	**20 Years**
4,281	7,135	2,854	14,270

Table 3a. Reduction Milestones (lb-N/yr)			
5 Years (30%)	**10 Years (50%)**	**15 Years (20%)**	**20 Years**
5,159	8,598	3,439	17,195

Projects/Management Strategies for Gemini Springs and DeLeon Spring

- Stakeholders are asked to submit management strategies for the BMAP.
  - *Please submit information by* ***February 16, 2018.***
- Identify completed, ongoing, and planned management strategies.
- Consider identification of additional projects or management strategies.



Gemini Springs and DeLeon Spring Projects

- Completed or planned projects to address major source categories:
  - Agriculture - Implement and document BMPs.
  - Urban Fertilizer - Fertilizer ordinance and public education.
  - Wastewater Treatment Facilities (WWTFs) - Treatment upgrade projects.
  - Stormwater - Treatment upgrade projects.
  - Golf Courses/Urban Turfgrass - ?
  - OSTDS - ?

Gemini Springs and DeLeon Spring BMAP Projects Entering Data

- Structural projects completed since **January 1, 2009** can be listed in the BMAP.
- Ordinances, public education/outreach, and street sweeping can be listed in the BMAP regardless of when these strategies were implemented.
- Project collection instructions and management strategies collection spreadsheet can be accessed by clicking on each basin:
  - Gemini
  - DeLeon
- Fill out as completely as possible for each project/strategy.
- In addition, if available, the following information should be submitted:
  - Geographic information system (GIS) file; or
  - Computer-aided design (CAD) file; or
  - Keyhole Markup Language (KML) Google Earth file.

Example – Crystal River/ Kings Bay

Gap Analysis		
Nitrogen Source	**Credits Based on Projects Submitted (lb-N/yr)**	**Description**
OSTDS	103,868	Credits identified for stakeholder OSTDS projects (enhancement or sewer)
UTF (Urban Turfgrass)	4,050	DEP approved credits (up to 6%) for public education activities as well as credits identified for stakeholder stormwater projects
AD (Atmospheric Deposition)	–	No projects/reductions
FF (Farm Fertilizer)	10,604	15% BMP credit on FF load to groundwater, assuming 100% owner-implemented BMPs on all fertilized lands
STF (Sports Turfgrass)	4,886	6% BMP credit for sports fields and 10% BMP credit for golf courses on STF load to groundwater, assuming 100% BMP implementation on golf courses and sports fields
Livestock	3,079	10% BMP credit on load to groundwater, assuming 100% owner-implemented BMPs at all livestock facilities
WWTF (Wastewater Treatment Facility)	9,322	Achieved by BMAP WWTF policy if BMAP-wide (achieving 3 or 6 mg/L)
Total Credits	135,810	
Required Reduction	274,000	
Load Remaining	138,190	**GAP**

How to address the remaining 138,190 lbs/yr?

How do we address the Gap?

GEMINI

Recharge	PFA lots less than 1 acre			PFA lots greater than 1 acre			Total OSTDS in PFA	Total Load Reduction Through AWT All Lots in PFA	Total Load Reduction Through Sewer All Lots in PFA
	Number of OSTDS	Load Reductions Through AWT	Load Reduction Through Sewering	Number of OSTDS	Load Reductions Through AWT	Load Reduction Through Sewering			
High	1889	10,009	14,628	391	2,072	3,028	**2,280**	12,080	17,656
Medium	38	112	163	3	9	13	**41**	121	176
Low	10	6	9	3	2	3	**13**	8	11
Total	**1,937**	**10,126**	**14,800**	**397**	**2,082**	**3,043**	**2,334**	**12,209**	**17,843**

Recharge	Entire BMAP lots less than 1 acre			Entire BMAP lots greater than 1 acre			Total OSTDS in BMAP	Total Load Reduction Through AWT All Lots in BMAP	Total Load Reduction Through Sewer All Lots in BMAP
	Number of OSTDS	Load Reductions Through AWT	Load Reduction Through Sewering	Number of OSTDS	Load Reductions Through AWT	Load Reduction Through Sewering			
High	2148	11,381	16,634	396	2,098	3,067	**2,544**	13,479	19,700
Medium	71	209	305	12	35	52	**83**	244	357
Low	1348	794	1,160	551	324	474	**1,899**	1,118	1,634
Total	**3,567**	**12,383**	**18,099**	**959**	**2,458**	**3,592**	**4,526**	**14,841**	**21,691**

DeLeon

Recharge	PFA lots less than 1 acre			PFA lots greater than 1 acre			Total # of OSTDS in PFA by Recharge Area	Total Load Reduction Through AWT All Lots in PFA	Total Load Reduction Through Sewer All Lots in PFA
	Number of OSTDS	Load Reductions Through AWT	Load Reduction Through Sewering	Number of OSTDS	Load Reductions Through AWT	Load Reduction Through Sewering			
High	2,028	10,531	15,392	946	4,913	7,180	2,974	15,444	22,572
Medium	436	1,258	1,838	387	1,116	1,632	823	2,374	3,470
Low	13	8	11	82	47	69	95	55	80
Total	**2,477**	**11,797**	**17,241**	**1,415**	**6,076**	**8,881**	**3,892**	**17,873**	**26,122**

Recharge	Entire BMAP lots less than 1 acre			Entire BMAP lots greater than 1 acre			Total # of OSTDS by Recharge Area	Total Load Reduction Through AWT All Lots Entire BMAP	Total Load Reduction Through Sewer All Lots Entire BMAP
	Number of OSTDS	Load Reductions Through AWT	Load Reduction Through Sewering	Number of OSTDS	Load Reductions Through AWT	Load Reduction Through Sewering			
High	2,092	10,864	15,878	1,136	5,899	8,622	3,228	16,763	24,499
Medium	537	1,549	2,264	690	1,991	2,909	1,227	3,540	5,174
Low	14	8	12	165	95	139	179	103	151
Total	**2,643**	**12,421**	**18,154**	**1,991**	**7,985**	**11,670**	**4,634**	**20,406**	**29,824**

Restoration Approaches to Achieve Remaining Reduction (con't)

- *Urban Turfgrass.*
  - Sources have the option to collect and provide monitoring data to quantify reduction credits for additional measures.
- *Agriculture.*
  - *Farm Fertilizer.*
    - Additional credits could be achieved through better documentation of reductions achieved through BMP implementation or,
    - Implementation of advanced agricultural practices, such as precision irrigation, soil moisture probes, and cover crops.
  - *Livestock Waste.*
    - Additional credits could be achieved through advanced cost-share BMPs if data are available.

Estimated Reduction Credits for Advanced Agricultural Practices DeLeon

Action	Estimated Reduction Credit (lb-N/yr) High Recharge	Estimated Reduction Credit (lb-N/yr) Medium Recharge
Precision Fertilizer	167	93
Precision Irrigation	175	97
Soil Moisture Probes	13,689	7,605
Cover Crops	6,819	3,788
Total	**20,851**	**11,584**

Estimated Reduction Credits for Advanced Agricultural Practices Gemini

Action	Estimated Reduction Credit (lb-N/yr) High Recharge	Estimated Reduction Credit (lb-N/yr) Medium Recharge
Precision Fertilizer	17	9
Precision Irrigation	0	0
Soil Moisture Probes	51	29
Cover Crops	2,055	1,142
Total	**2,124**	**1,180**

Closing the OSTDS Gap

- BMAP will contain an OSTDS Remediation Plan.
- DEP & FDOH will work together to implement it.
- To be most successful, local funding needs to be available to homeowners:
  - For example: grant programs for assisting homeowners, with costs administered by county.
  - Best if administered at the local level.
  - State funding for such grant programs is available.

OSTDS Options

- OSTDS **enhancement** (defined as 65+ % nitrogen reduction).
- FDOH approved options in Florida:
  - Aerobic Treatment Units (ATU) meeting the NSF 245 standard.
  - Passive nitrogen-reducing, in-tank systems tested by FDOH study:
    Florida Onsite Sewage Passive Nitrogen Reduction Strategies Study.
- FDOH innovative system testing process is evaluating more options, such as:
  - Performance based treatment systems (PBTS).
  - Media filter systems.
  - http://www.floridahealth.gov/environmental-health/onsite-sewage/products/_documents/pbts-components.pdf
- OSTDS **sewering.**
  - BMAP has new wastewater disposal requirements for nitrogen.

OSTDS Remediation Plan

- Which systems must be enhanced or sewered?
- What is the deadline for enhancing or sewering?
  - Upon needing a permit for new, modified, or repaired OSTDS.
  - Unless sewer is available or described as becoming available in a BMAP project.
  - Backstop: In areas where enhancement or sewer is required, all OSTDS loads must be reduced no later than 20 years after BMAP adoption.
- When does this start?
  - As soon as the BMAP is adopted.
  - By law, BMAP must be adopted before July 1, 2018.

Next Steps

- Technical meeting – late February/early March
  - Present Gap Analysis
  - Discuss
    - OSTDS BMAP Policy
    - Nitrogen reduction strategies for remaining source reduction categories
- Public meeting to discuss draft BMAP – late March/early April 2018


Thank you!
Questions?