Wastewater Feasibility Study for the Protection of Gemini Springs
INFORMATIONAL SESSION

January 27, 2021

WHY IS GEMINI SPRINGS IMPORTANT?

- Approximately 6.5 million gallons of water bubble up from the two springs each day in the 212-acre Gemini Springs Park.
- The second magnitude spring consists of two spring vents approximately 150 feet apart in the City of DeBary.
- Gemini Springs is one of more than 1,000 springs throughout Florida and one of 30 Outstanding Florida Springs as established in 2016 by the Florida Legislature.
- In 2016, the Florida Legislature identified Gemini Springs as an impaired second magnitude “Outstanding Florida Spring” that requires additional protections to ensure conservation and restoration for future generations.

STATE GOALS FOR OUR WATER

- State water quality goals are guided by the **Federal Clean Water Act.**
- The **Florida Department of Environmental Protection (FDEP)** is the agency responsible for implementing protections.
- A **Total Maximum Daily Load (TMDL)** establishes the maximum amount of a pollutant a water body can receive without exceeding water quality standards.
- **Basin Management Action Plans (BMAPs)** are used as roadmaps of projects for improving water quality based on the TMDL.

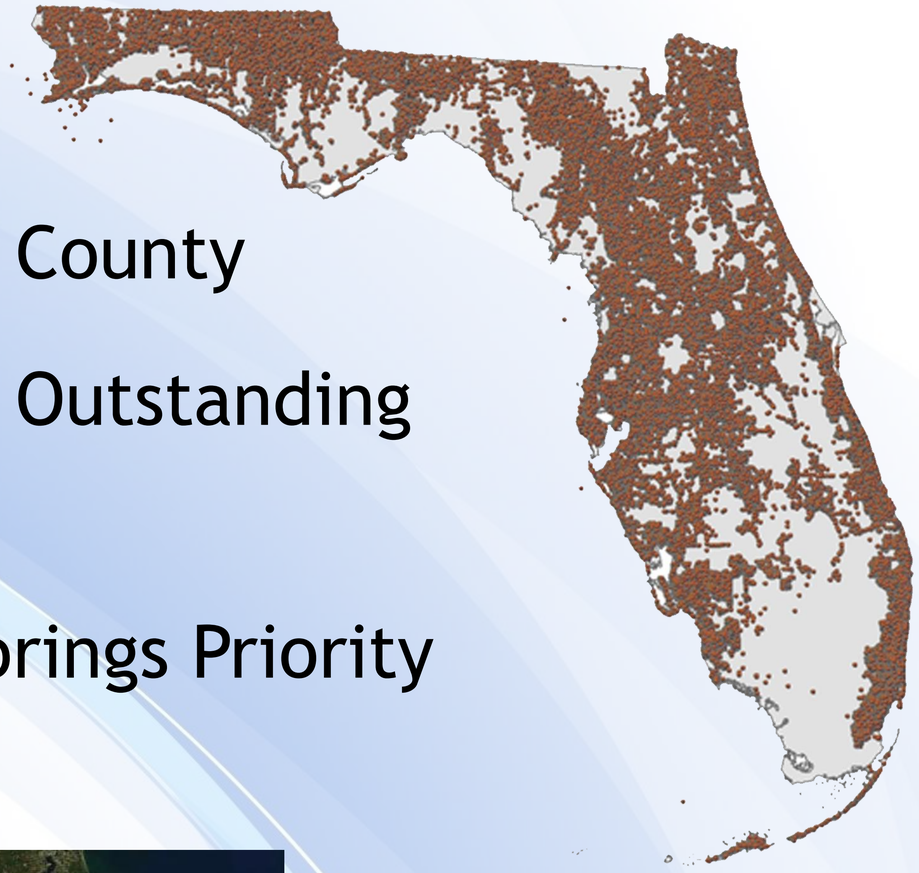
FLORIDA SPRINGS AND AQUIFER PROTECTION ACT

- Passed by State Legislature in 2016
- Requirements of the Act
  - TMDLs must be established for first magnitude springs by December 2018
  - Priority Focus Areas (PFAs) are the *area* where a *spring* is likely to be most adversely impacted by activities established for Outstanding Florida Springs

  - Onsite Sewage Treatment and Disposal Systems (OSTDS) Remediation Plan required for areas where septic systems have greater than 20% contribution to the nutrient load in the Priority Focus Area
- OSTDS/Septic systems were determined to contribute more than 40% of the nutrient load to Gemini Springs

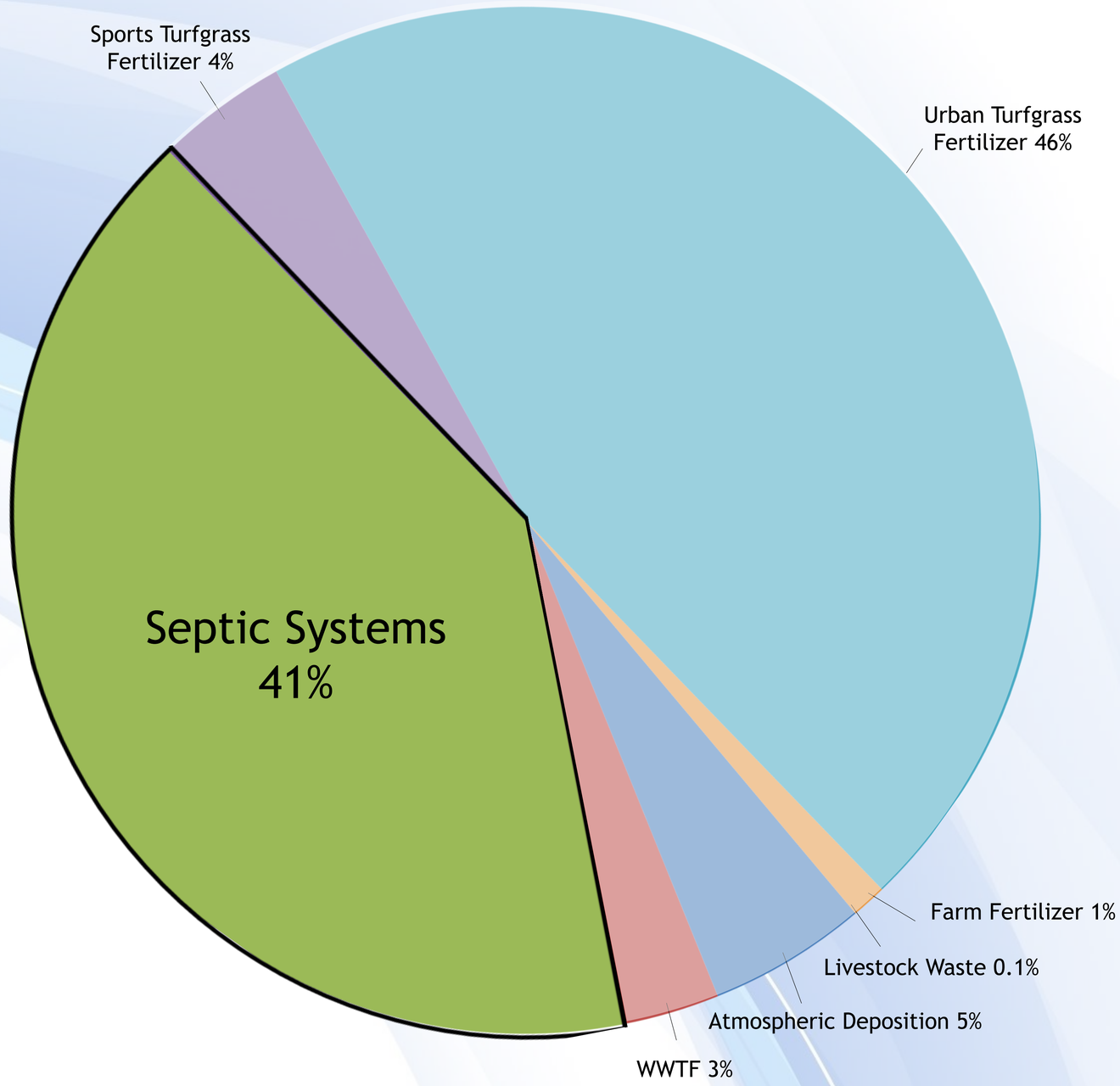
FLORIDA SEPTIC SYSTEMS BY THE NUMBERS

- More than 2.1 million in Florida
- More than 90,000 septic systems in Volusia County
- More than 50,000 septic systems in Volusia Outstanding Florida Springs BMAP boundaries
- Over 2,000 septic systems in the Gemini Springs Priority Focus Area

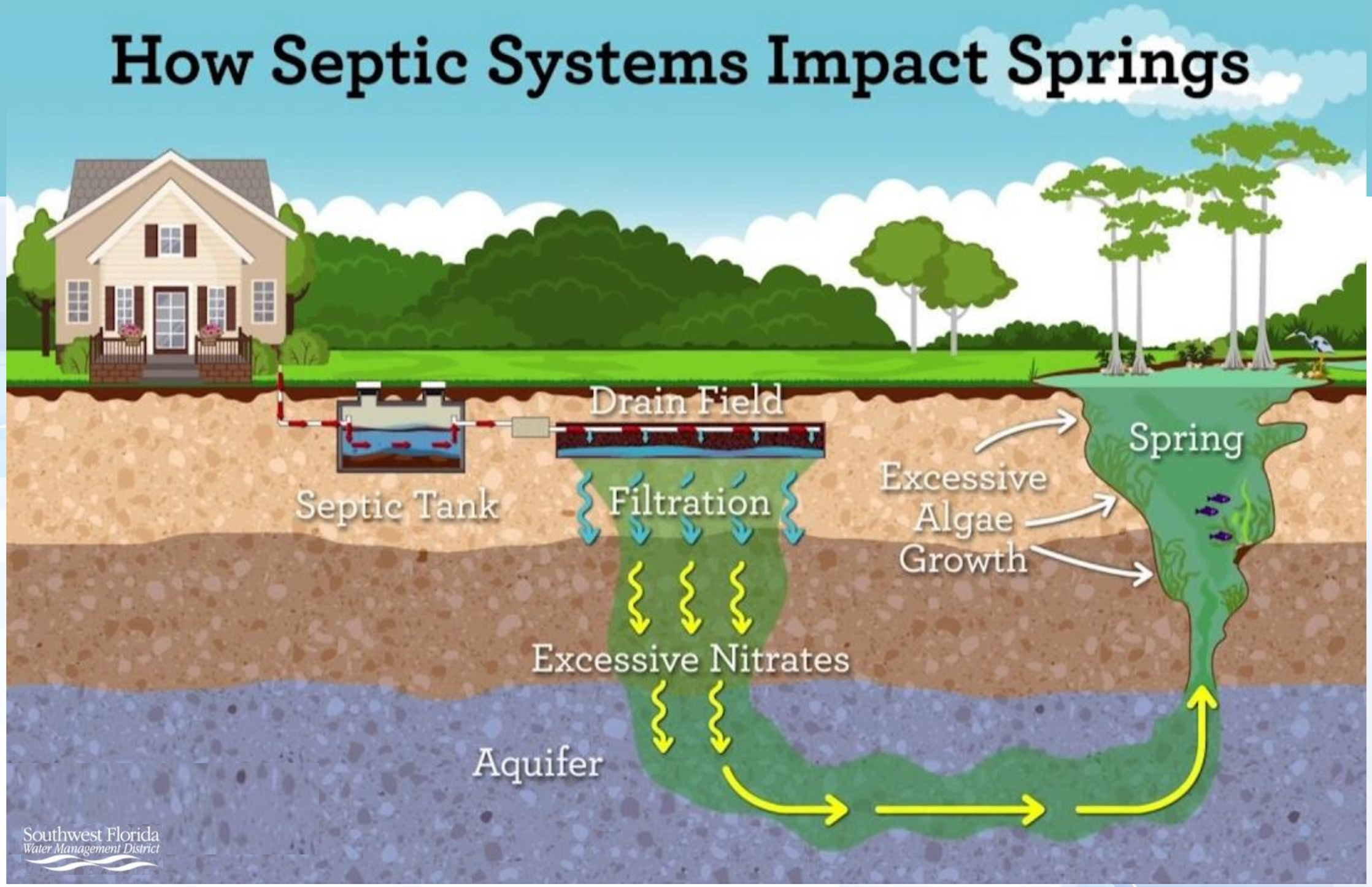


GEMINI SPRINGS TMDL AND BMAP

- Final TMDL adopted 2017
- Water quality impacts were identified
- BMAP finalized June 2018
- Total Current Load 20,496 lbs-N/year
- 14,270 lbs-N/year reduction required
- Major Nitrogen contributors:
  - Urban Turfgrass
  - Septic Systems

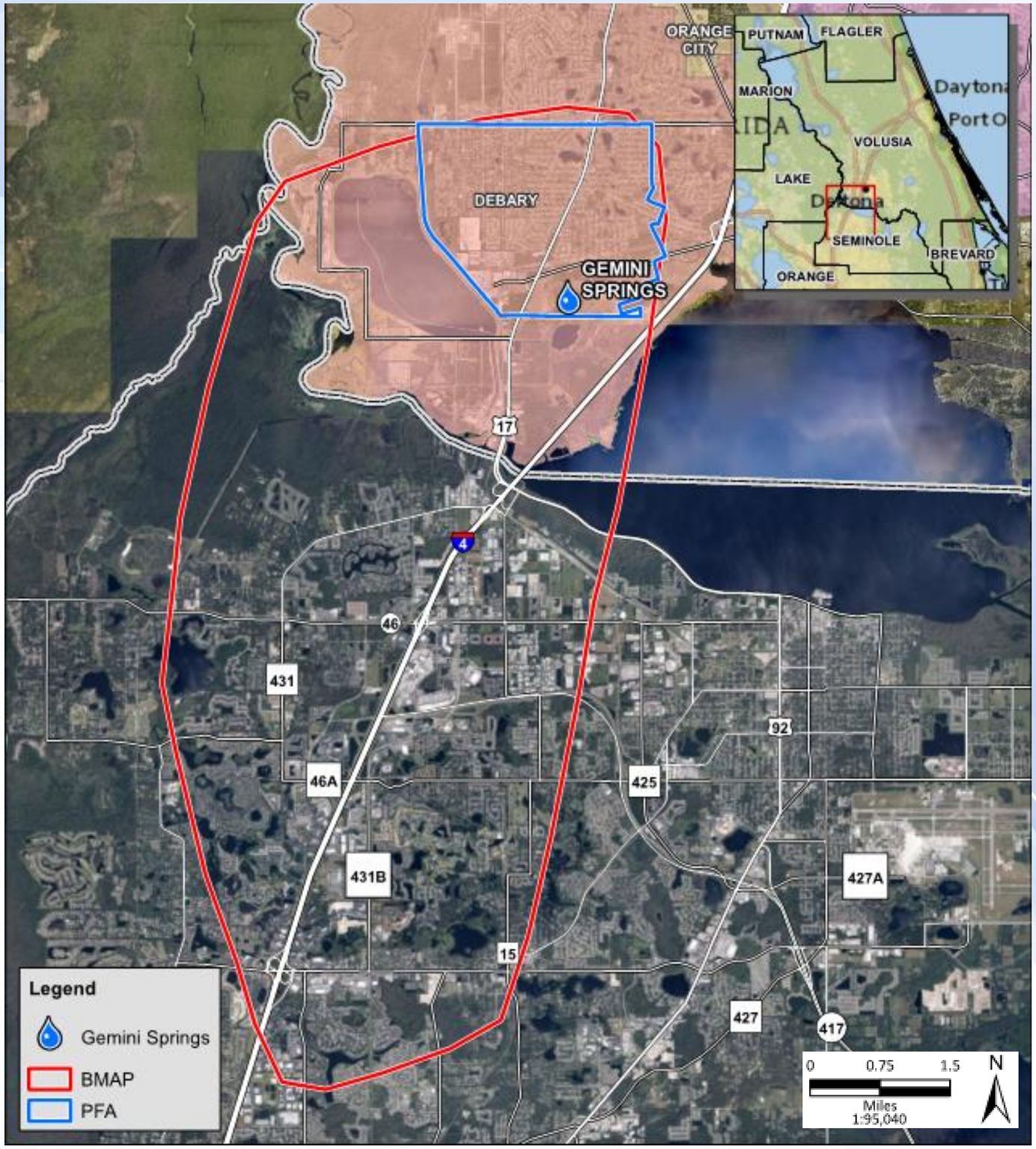


Nitrogen Loading in the Gemini Springs BMAP Area per FDEP's Gemini Springs BMAP (2018)

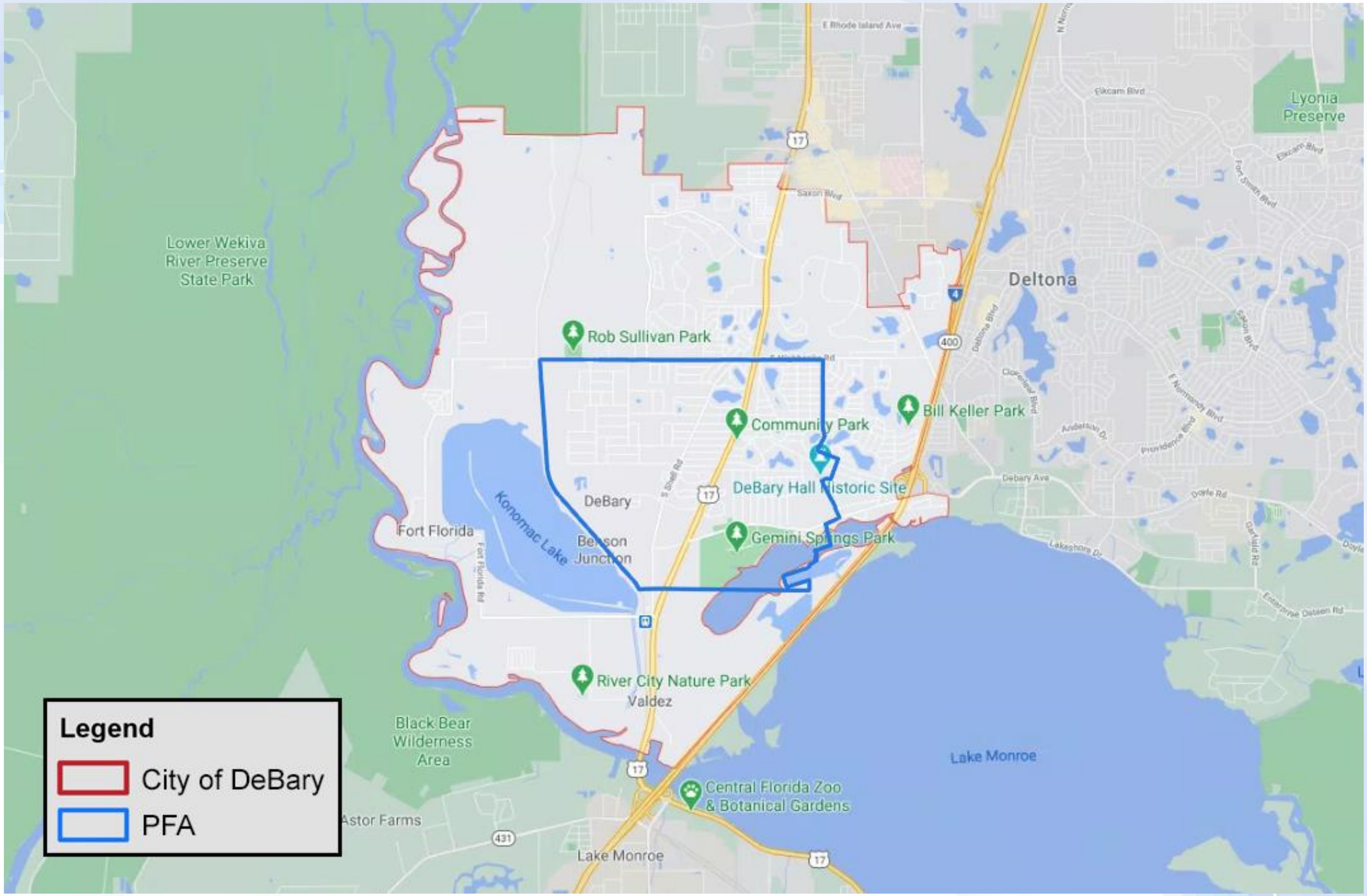


- Conventional septic systems are designed to protect human health, not to remove nutrient pollution.
- Septic systems on average contribute a load of 8.2 lbs-N/year per system to the springs.
- Septic systems work by slowly releasing wastewater through a drainfield, or soil absorption field.
- With over 2,000 septic systems currently in use in the Gemini Springs PFA, the nitrogen is polluting our springs and leaching into our groundwater - our drinking water source.

GEMINI SPRINGS REQUIRED REMEDIATION AREA



GEMINI SPRINGS PFA ENTIRELY WITHIN THE CITY OF DEBARY



WHAT IS AN OSTDS REMEDIATION PLAN?

A Plan to Reduce the Nutrient Load Coming from Septic Systems

- An **evaluation** of credible scientific information on the effect of nutrients, particularly forms of nitrogen, on springs and spring systems.

- **Options** for repair, upgrade, replacement, drain modification, the addition of effective nitrogen-reducing features, connection to a central sewer system, or other action.

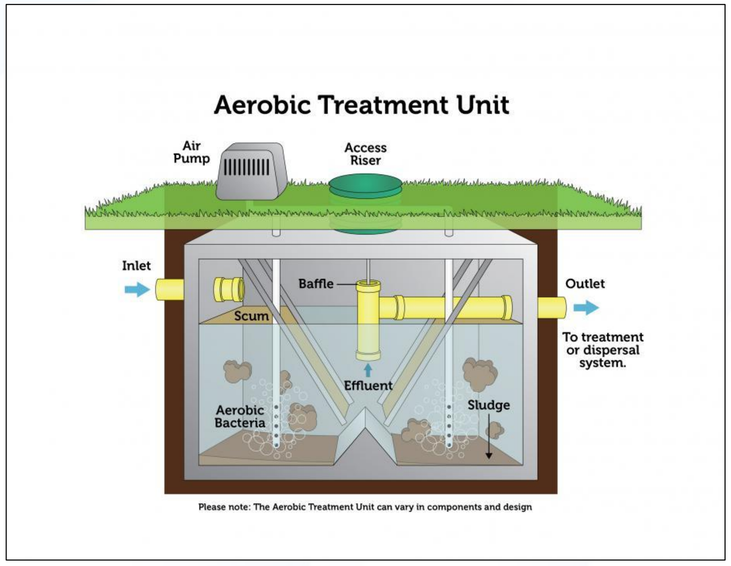
- A **public education plan** to provide area residents with reliable, understandable information about OSTDS (a.k.a. septic systems) and springs.

- **Cost-effective** and financially feasible **projects** necessary to reduce the nutrient impacts from OSTDS.

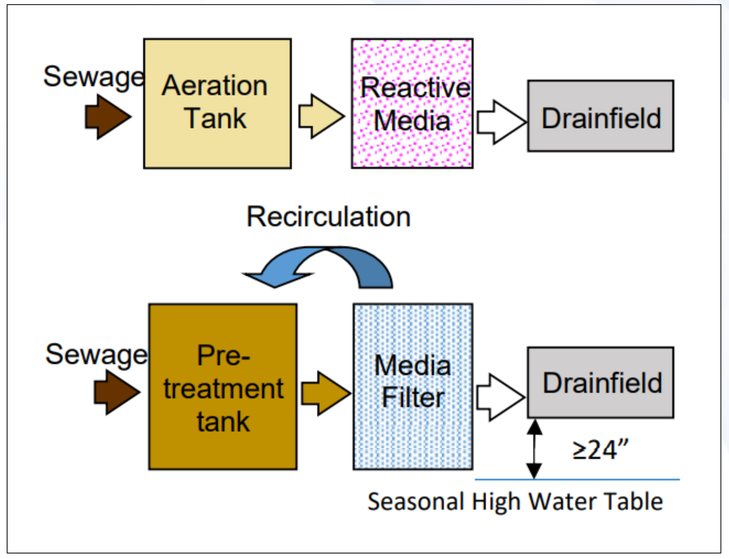
- A **priority ranking** for each project for funding contingent on appropriations in the General Appropriations Act.

DECENTRALIZED APPROACH

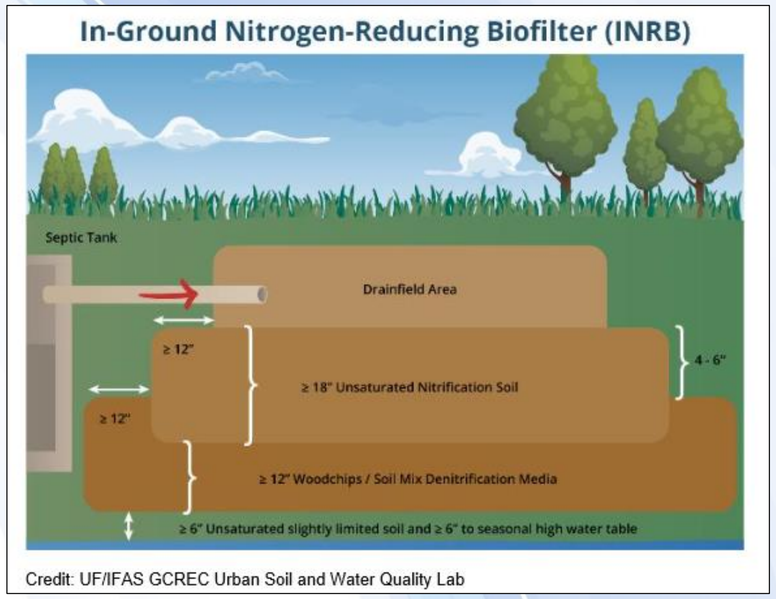
- Conventional septic systems cannot be used for lots less than one acre in the PFA for new homes or businesses with new septic systems and for existing systems when replacement is required unless sewer will be available within five years.
- Advanced Treatment Alternatives
  - Aerobic Treatment Units
  - Performance-Based Treatment System
  - In-Ground Nitrogen Reducing Biofilter (INRB)



Aerobic Treatment Units



Performance-Based Treatment Units



DECENTRALIZED APPROACH

System Type	System Description	Considerations	Lifecycle Costs (40-Years)
Aerobic Treatment Units	• Systems typically consist of a pump, pipes, and diffusers and include a process to promote biological denitrification.	• Requires electrical connection. • Requires a maintenance contract and operating permit from the county health department.	Installation - $12,500-$17,500 Annual - $1,000-$1,500 (includes required inspections, electricity, routine pump out and anticipated system maintenance)
Performance-based Treatment Units	• Vary widely but include nitrogen-reducing aerobic treatment units and other components.	• Must be engineer-designed and permitted. • Require a maintenance contract and operating permit from the county health department.	Installation - $15,000-$20,000 Annual - $1,000-$1,500 (includes required inspections, electricity, routine pump out and anticipated system maintenance)
In-Ground Nitrogen Reducing Biofilter	• Modifies an OSTDS drainfield with layers of soil specially designed to promote natural N cycling processes that convert NO_3^- to an N gas that is lost to the atmosphere, thus removing N from the soil and groundwater.	• Research is ongoing, early estimates are that the soil media in an INRB can function for 20+ years before they need to be replaced or replenished • Significant Land requirements make challenging for small lots.	Installation - $10,000-$12,500 Annual - $250-$500 2nd Installation approx. year 20

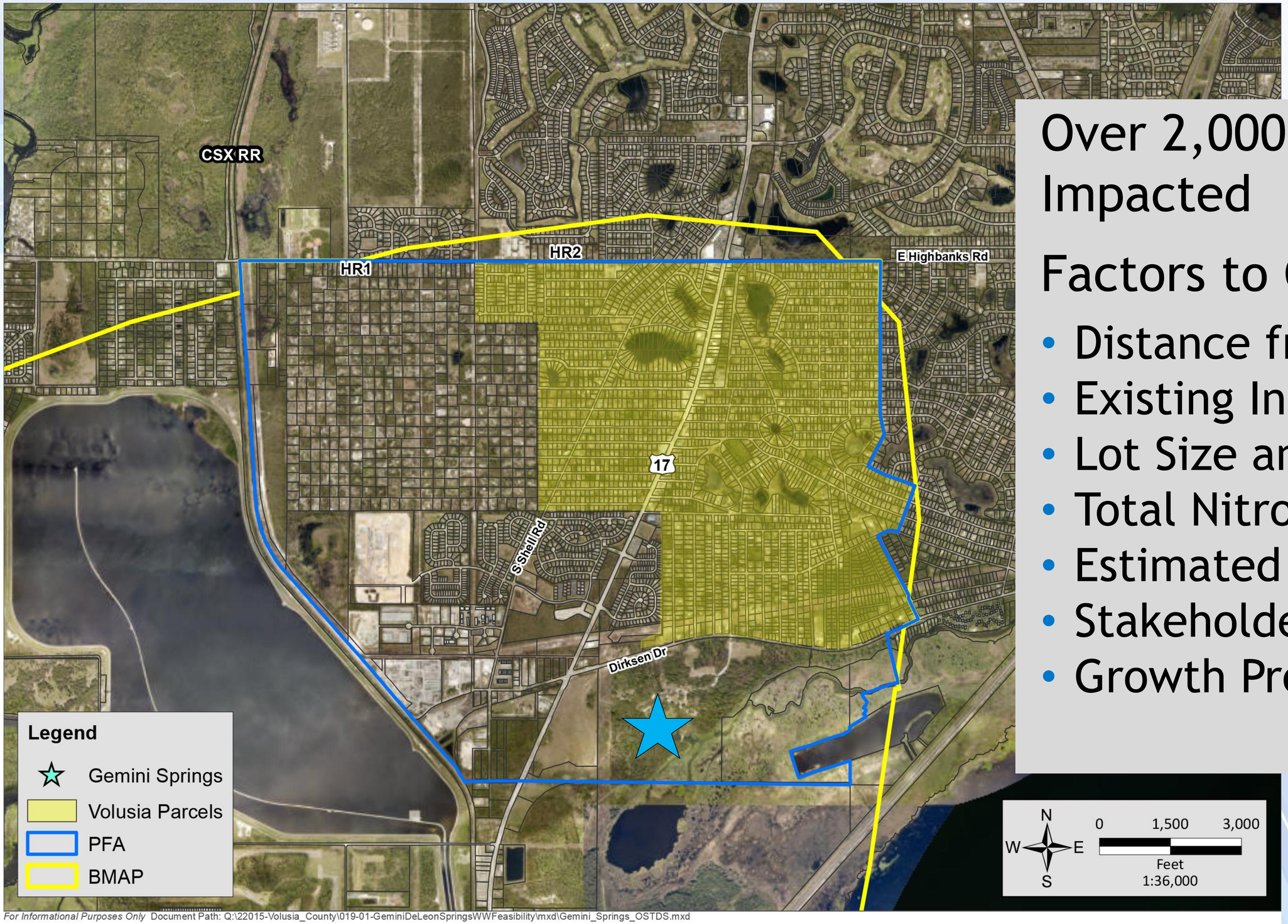
- Nitrogen reduction of up to approx. 5.3 lbs-N/yr/OSTDS removed.
- Estimated reduction of up to approx. 10,600 lbs-N/yr if all OSTDS on <1.0-acre parcels are upgraded in a decentralized approach

CENTRALIZED APPROACH

System Type	System Description	Considerations	Lifecycle Costs (40-Years)
Gravity Sewer Systems	•Involves gravity service laterals that connect to gravity sewer mains and then flows to localized lift stations. This system of lift stations pump into force mains used to transport the wastewater to a WWTF for treatment	-typically results in a greater disturbance to the residents -generally more reliable and less maintenance-intensive than other types of systems -service laterals are generally the customers' responsibility to maintain on their property	Installation - $30,000-$40,000 Annual - $400-$600
Vacuum Sewer Systems	•Includes a valve pit serving several customers, a vacuum collection system, and a vacuum collection station. Sewage flows by gravity from the homes/structures into a valve pit with pneumatic valve that operate by pressure (no electrical power is required). The valve pit pneumatic valve opens automatically when a given quantity of sewage accumulates in the valve pit.	-Disturbance to developed land resulting from construction is typically less than the disturbance from constructing a gravity collection system. -very little inflow and infiltration (I&I) occurs compared to gravity systems. -requires more O&M for the Utility than a gravity system since the pneumatic valve pits need to be inspected & maintained.	Installation - $17,500-$22,500 Annual - $400-$600
Low Pressure/ Grinder Pump Systems	•Uses a grinder pump station for each customer, installed on each customer's property or in ROW. Includes automatic pumps and control devices to convey the wastewater into a low-pressure collection system.	-low-pressure systems capital costs are generally lower than gravity or vacuum systems, operation and maintenance (O&M) costs are generally higher. -customers may be required to maintain the septic effluent pump, or provide an easement dedicated to the local government/utility to allow access onto the property to maintain the system.	Installation - $12,500-$17,500 Annual - $800-$1,000 Annual costs assume homeowner maintains the grinder pump.

- Nitrogen reduction of approx. 8.2 lbs-N/yr/OSTDS removed.
- Converting approx. 1,750 septic tanks to centralized sewer achieves the required nitrogen reduction.

CRITERIA USED TO ASSESS POTENTIAL PROJECT AREAS



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Over 2,000 Parcels Impacted

Factors to Consider

- Distance from Spring
- Existing Infrastructure
- Lot Size and Density
- Total Nitrogen Load
- Estimated Cost
- Stakeholder Input
- Growth Projections

BMAP TIMELINE

- BMAP implementation is intended to be a 20-year process with defined nitrogen reduction cumulative milestones.
  - 5-year - 30%
  - 10- year - 80%
  - 15-year - 100%
- TMDL will be met no later than the 20-year goal with a total reduction requirement of 14,270 lbs-N/year

Nitrogen Removal 2018 – 2023	Nitrogen Removal 2023 – 2028	Nitrogen Removal 2028 – 2033	Total Nitrogen Removal by 2038
4,281 lbs	7,135 lbs	2,854 lbs	14,270 lbs

NEXT STEPS?

- **Obtain** feedback from the City
- **Hold** public meeting to present information to residents
- **Evaluate** information received from public outreach
- **Receive** feedback from FDEP on proposed plan and address regulatory needs
- **Continue** City and County investment in nutrient reduction projects
- **Pursue** grant dollars to offset financial impacts to City and County residents

QUESTIONS OR COMMENTS

If you have questions or comments, please call or email

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