Nitrate Load Management in the Wakulla Springshed

Upper Wakulla River BMAP

February 21, 2012

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Water Resources Division

CITY OF TALLAHASSEE

Nitrate Load Management

- Summary of Nitrate Problem & Needed Reductions.
- What Has the City of Tallahassee Done?
- What Remains to be Done?

The Problem

Algae and hydrilla covering the Wakulla Spring basin near the platform

- **Hydrilla and Algae at Wakulla Springs**
- **High Nitrate Concentration**
- **TMDL Regulation**

Milestones - Advancing Our Understanding of the Nitrate Problem at Wakulla Spring

2002	NWFWMD Study (Chelette and Pratt.)	• Identified and quantified sources of nitrogen loading to Wakulla Springs.
2005	Hydrogeology Consortium.	• Scientists concurred on the largest nitrate sources. • Land use issues led to LAVA Study.
2007	Leon CO. Aquifer Vulnerability Study (LAVA)	• Identified those areas in Leon Co. most susceptible to groundwater pollution from surface land uses. • Cody escarpment is apparent as a demarcation. • Leads to adoption of a Primary Spring Protection Zone (PSPZ) in Leon County.
2008	City Commits to AWT Project to Reduce City Nitrate Load.	• Results in 75% reduction in nitrate discharge by Dec 2012.

Milestones Continued …

2009	Tri-Party Memorandum on Regional Partnership.	• Executed by City, Leon Co., Wakulla Co. • Agreement to work at reducing nutrients from wastewater systems and to address system for better management of septic tanks. • Led to initiation of Lombardo Study.
2009	Second Regional Workshop on Wakulla Spring Restoration	• Discussion of progress and future work to reduce pollutants in the groundwater. • Septic tanks identified as next target.
2010	Primary Spring Protection Zone (PSPZ) Established in Comp. Plan	• Within Woodville and USA, AWT technology is preferred method for new development. • Where AWT not available, High Performance Septic Tanks required.
2011	COT Master Sewer Plan.	• Provides service plan and costs estimate to Leon Co. for target areas outside City without sewer service.
2011	Lombardo Report Completed.	• To achieve the Wakulla TMDL, maximum practicable nitrogen removal is needed when addressing existing septic tanks in the springshed south of the Cody Scarp. • In areas north of Cody Scarp, conventional septic tanks with proper inspection and maintenance is needed.

Recent Studies – USGS & Lombardo
Load Quantification Particularly Useful

2010 USGS (Hal Davis, et. al)

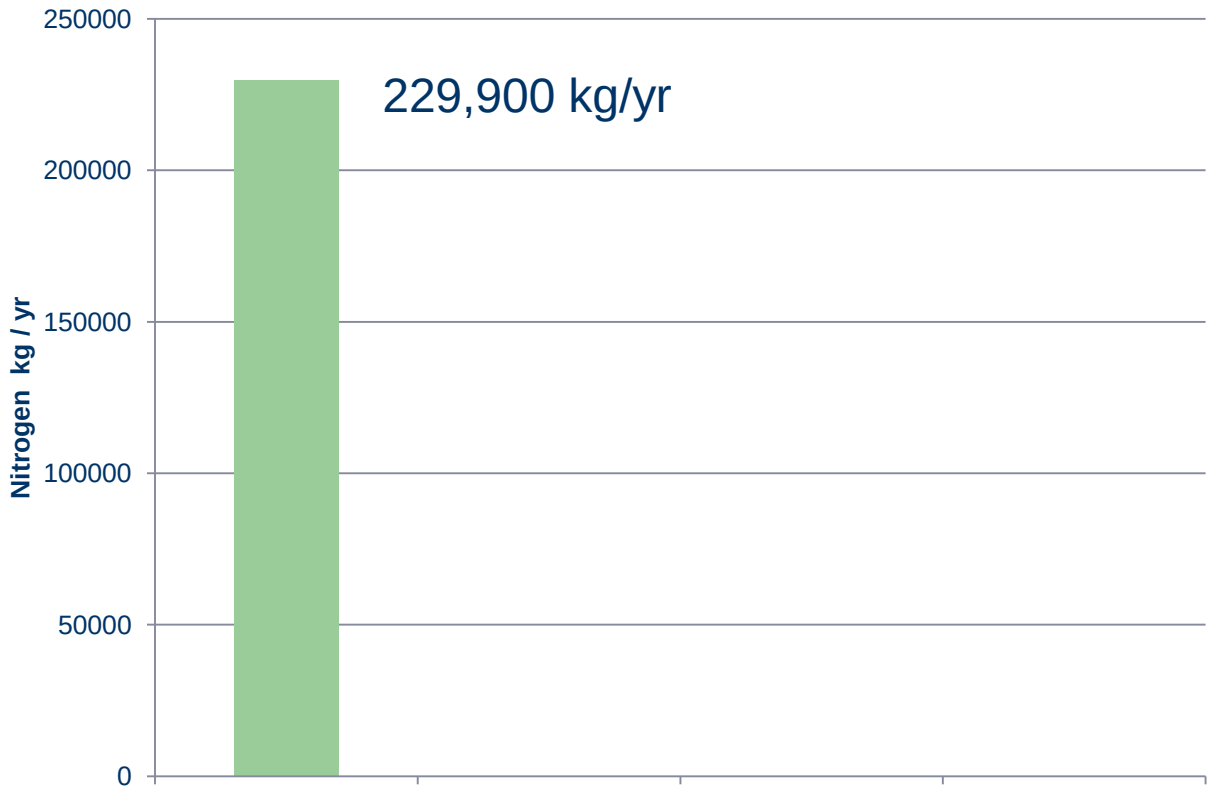
Modeled nitrate movement in groundwater from sprayfield, septic systems and other sources, comparing 2007 to 2018.

2011 Lombardo Associates

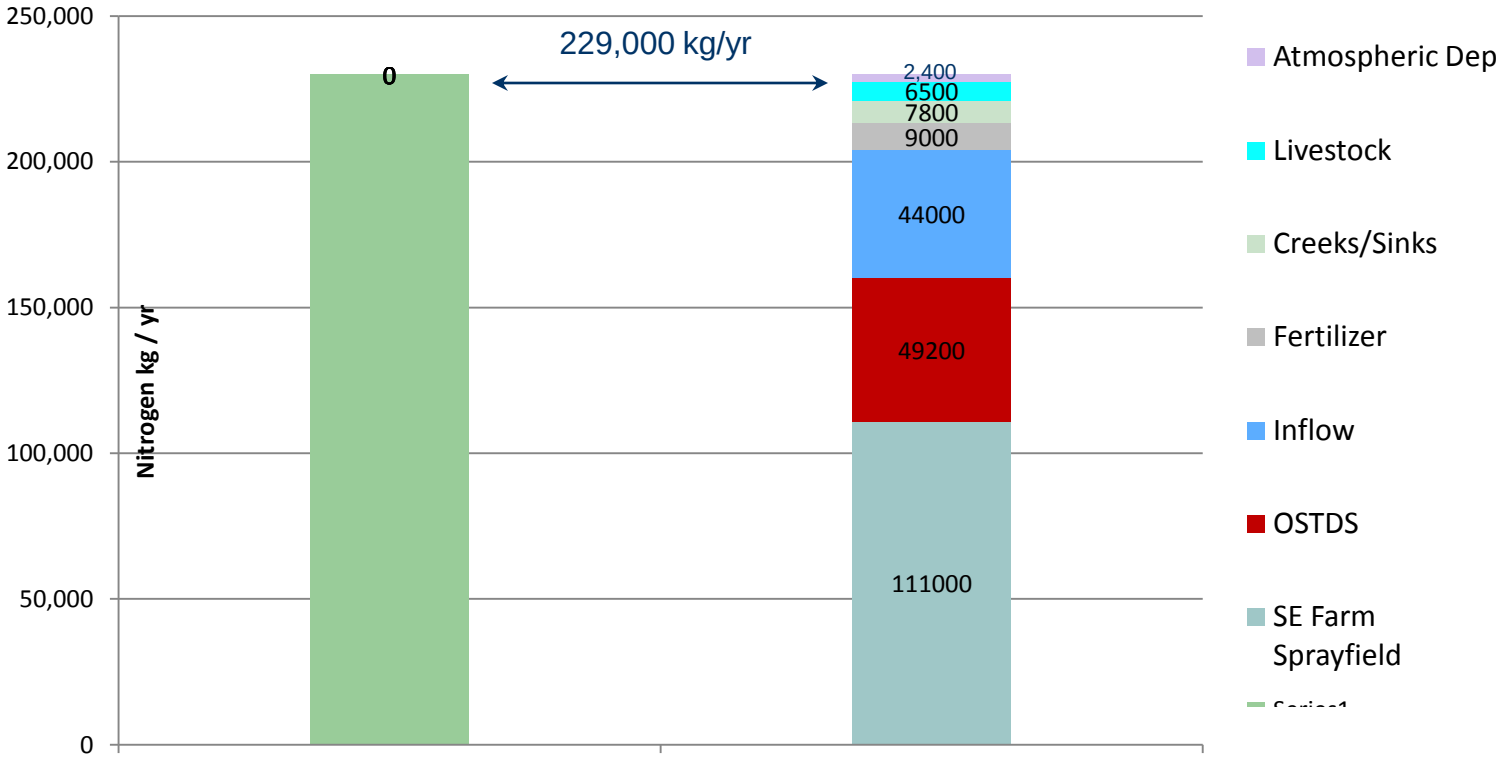
Assimilated the relevant data and conclusions from the previous work to formulate guidance on actions local government can take to better manage the wastewater load from the rural areas of Leon and Wakulla counties.

(Much of the data that follows is based on Lombardo, but USGS report is very similar.)

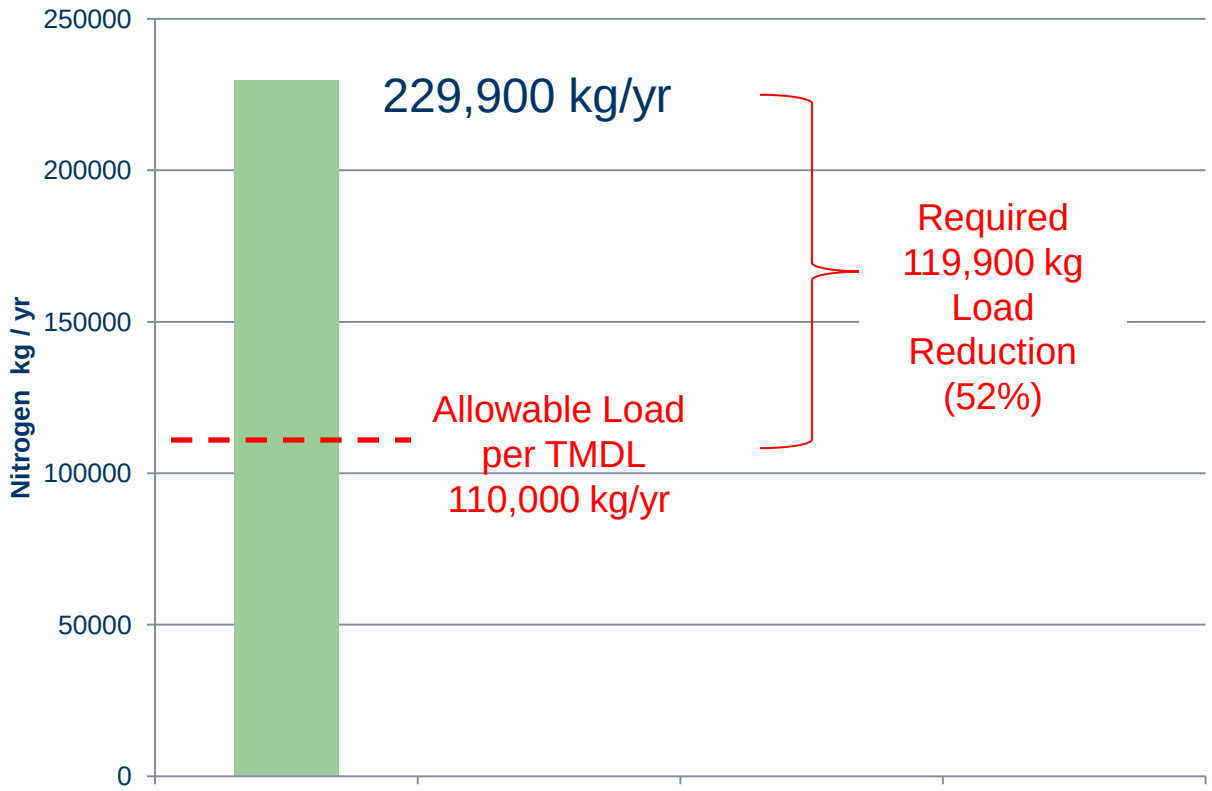
Annual Nitrogen Load to Wakulla Spring
(Pre- AWT)



Sources of Annual Nitrogen Load (Pre- AWT)



Allowable Nitrogen Load to Wakulla Spring (Pre- AWT)



Nitrate Load Management

- Summary of Nitrate Problem & Needed Reductions.
- What Has the City of Tallahassee Done?
- What Remains to be Done?

What Has the City Done?

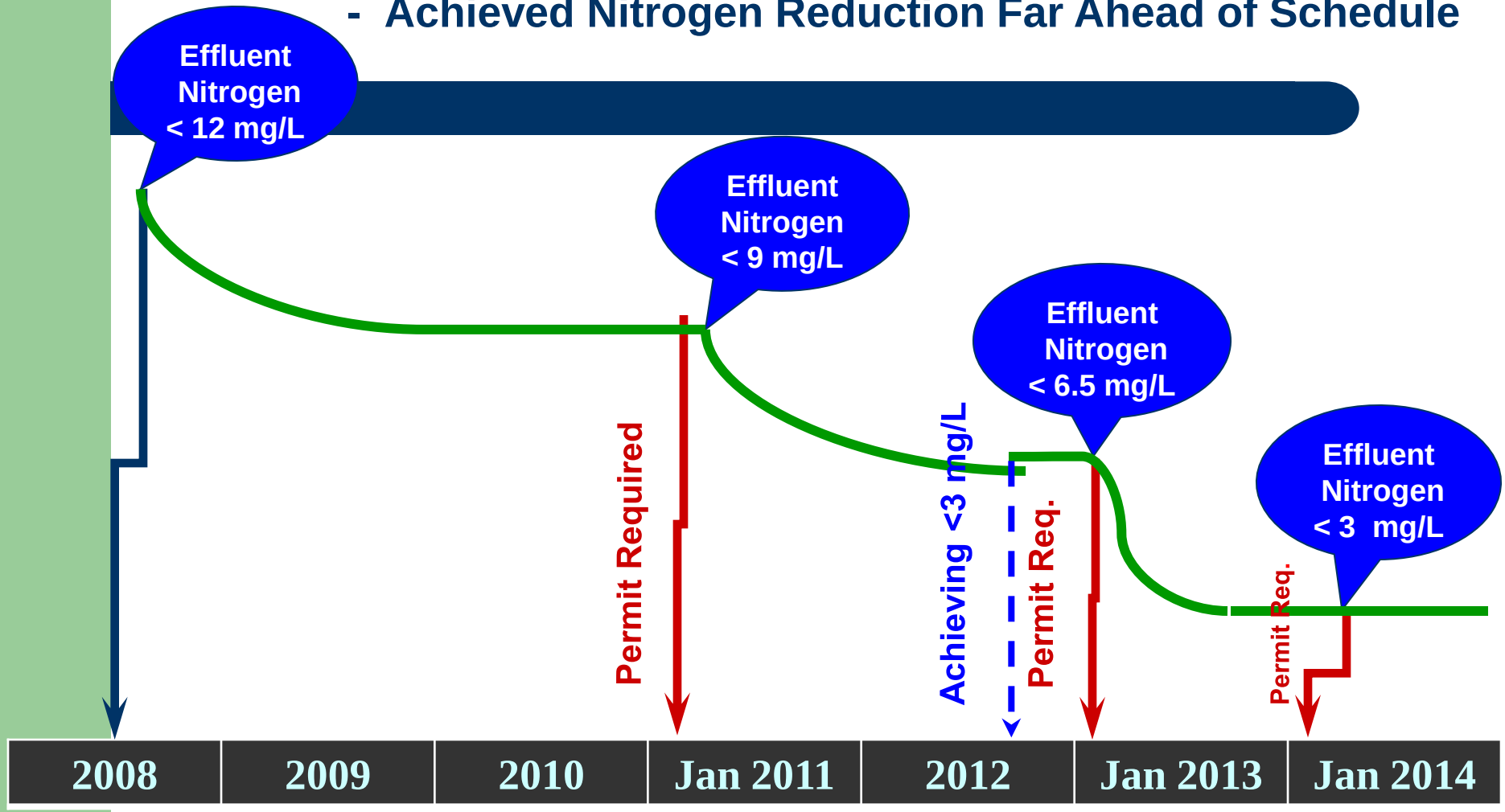
- **Implemented Source Controls through Ordinances and Educational Outreach**
  - **Fertilizer Ordinance; Pet Waste Ordinance; Fertilizer Applicator Certification Program; TAPP Program; PSPZ Ordinance**
- **Structural Projects**
  - **Millions in Stormwater Treatment**
  - **Millions in Wastewater Projects**
- **Operational Changes**
  - **Implemented Water Quality Charge in SW Fee**
  - **Eliminated Disposal of Bio-Solids in Springshed**
  - **Implemented Effluent Reuse.**
  - **Implemented Assessment and Upgrade of Collection System**

What Has the City Done?

- $227 million upgrade to Advanced Waste Water Treatment (AWT)
- Reducing Nitrate Concentration by 75% (Total Nitrogen < 3 mg/L)
- Compare to Septic System Discharge at approximately 30 mg/L
- Lowered Nitrogen “footprint” of 170,000 residents
  - far below per capita footprint of others in Springshed

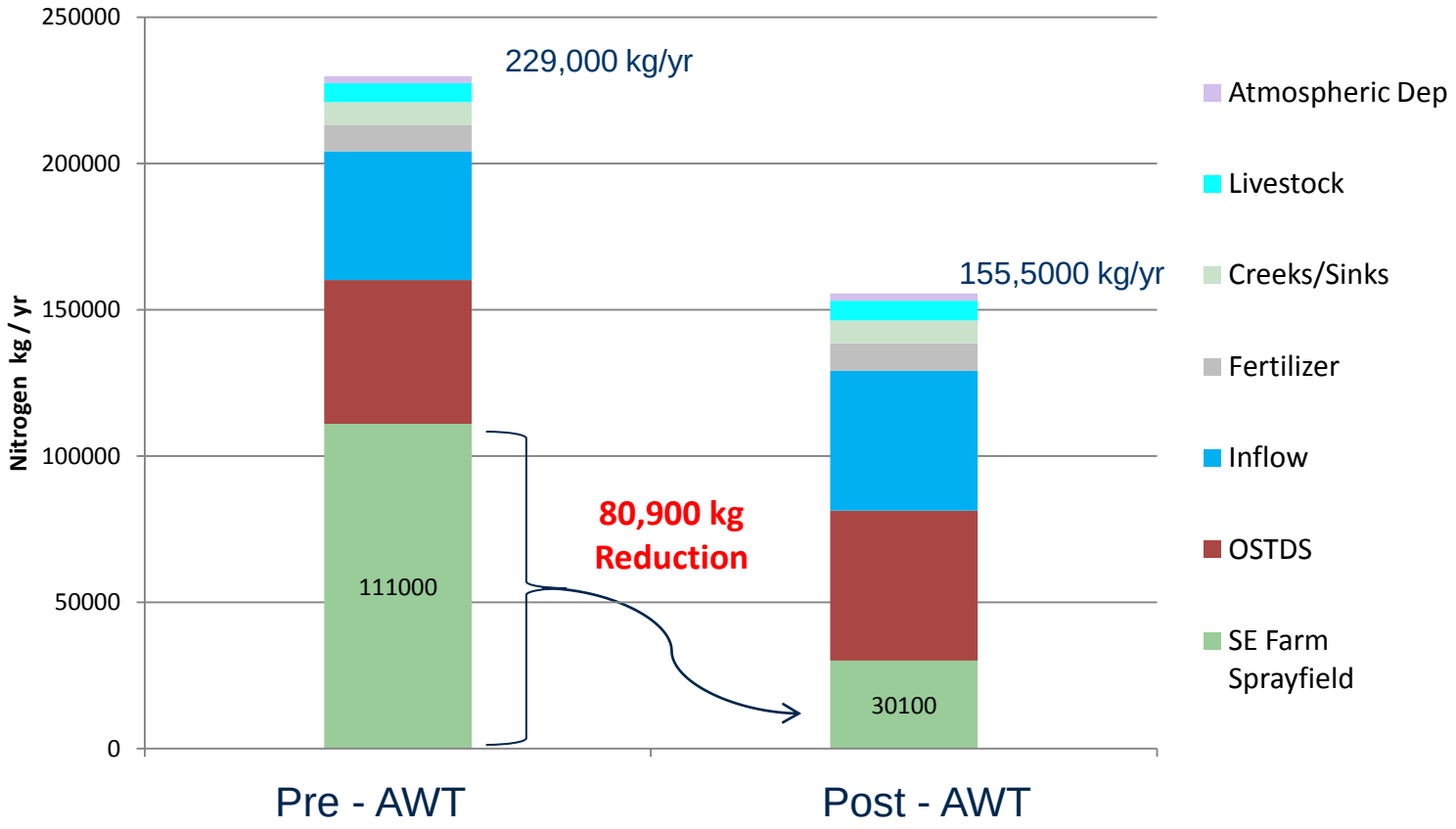
What Has the City Done?

- Achieved Nitrogen Reduction Far Ahead of Schedule



Impact of City's AWT Project

73% Load Reduction - - Exceeded 56% Required



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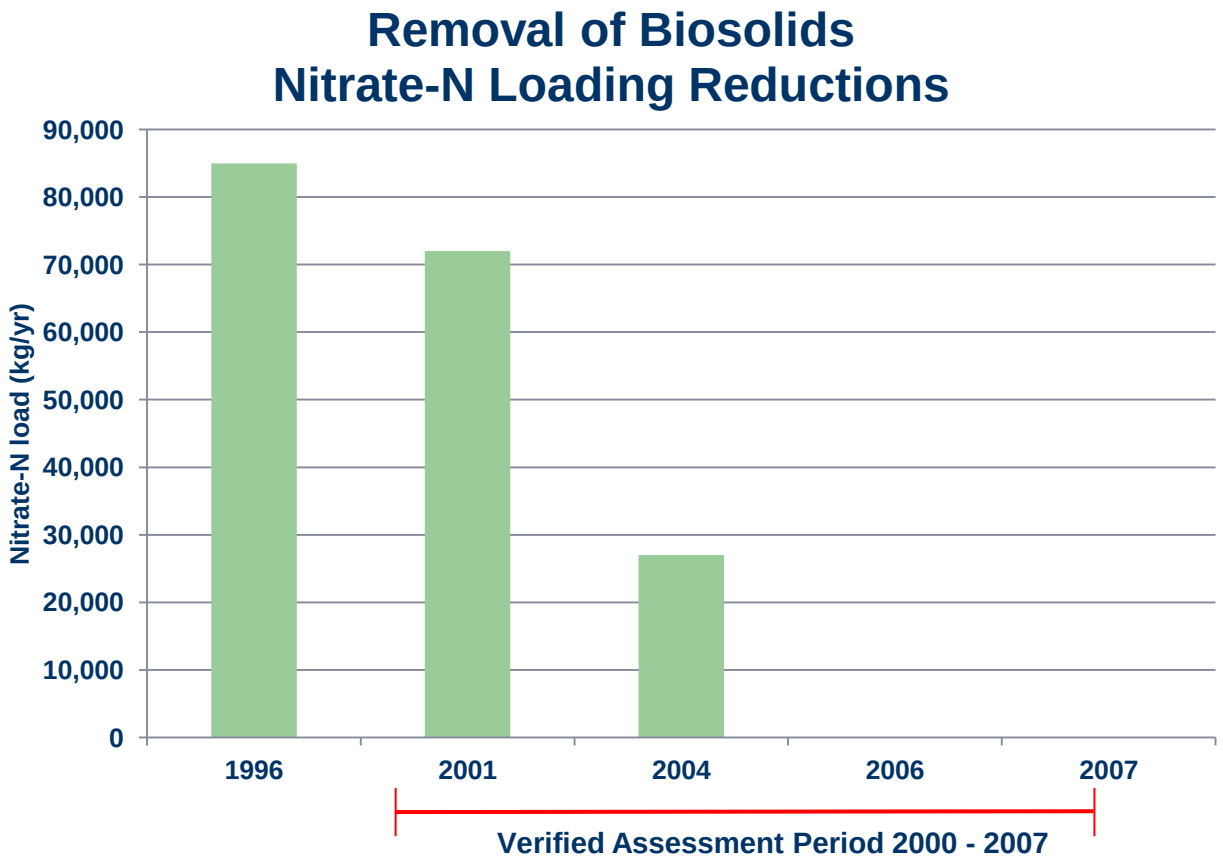


What Has the City Done?

Land Use Planning Initiatives

- The City, along with the County adopted Wakulla Springs protection Comprehensive Plan policies on January 7, 2009
- Both the City and County adopted Primary Springs Protection Zone (PSPZ) ordinances effective April 10, 2009

Sewage Collection System Assessment and Rehabilitation Program

Assessment & Rehabilitation of Older Sewers

- Initiated in 2011
- To date televised 380 mi of older systems (95% Complete)
- Repair & Replacement Projects Ongoing
- $10 million Program
- Completion 2021

Stormwater Capital Improvement Projects

Abbiegail Pond

Frenchtown Pond

Last 12 years
City-wide
$97.4 Million
149 Projects

Bond Pond

FSU-RSF

Reductions Through Source Control Public Education & Ordinances

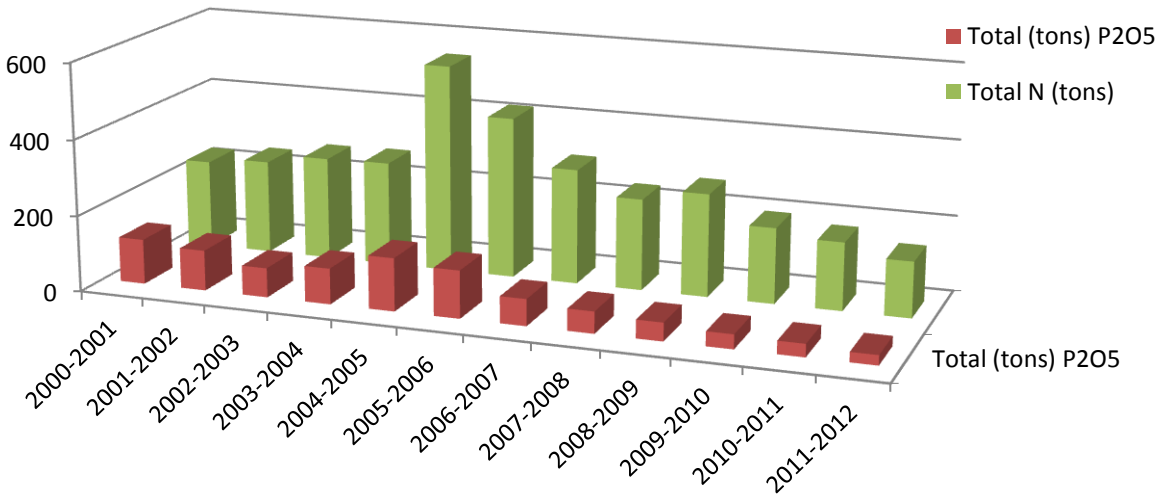
- TAPP (Think About Personal Pollution)
- $1.7 million since 2006
- Passed Pet Waste Ordinance (June 2008)
- Passed Fertilizer Applicator Ordinance (Jan 2009)
- City issued 557 certifications to applicators since 2009

Reductions Through Source Controls (Pet Waste)

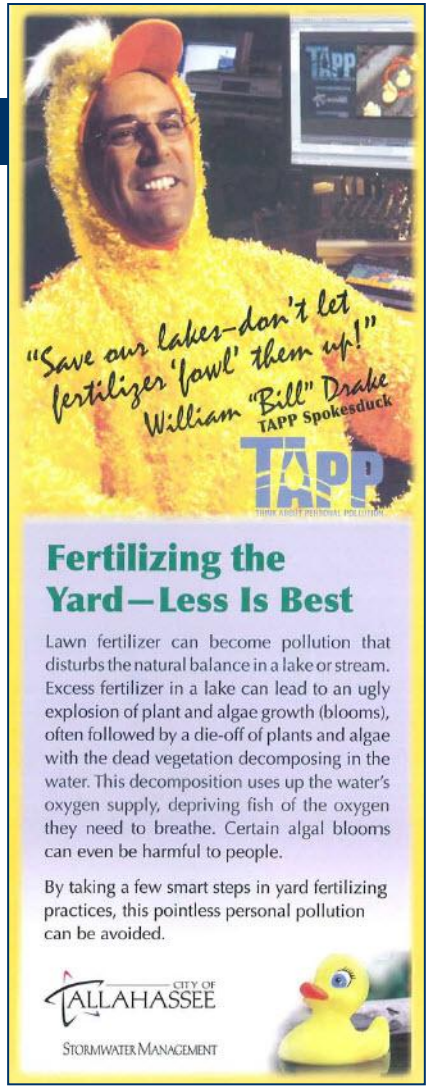
- Nitrogen content $2^{1}/_{2}$ times cow manure
- 39,350 dogs
  = 13.5 ton/da feces
- Nitrogen Load
  = 34 tons/yr.
- 30% of dog owners began picking up within the last 6-12 months

Reductions Through Source Controls (Fertilizer Use Citywide)

- Households that applied fertilizer (2007 vs. 2012) **decreased 49%.**
- Level of Nitrogen Applied per Household **decreased 27%**



Source: Florida Department of Agriculture & Consumer Services, Bureau of Compliance Monitoring



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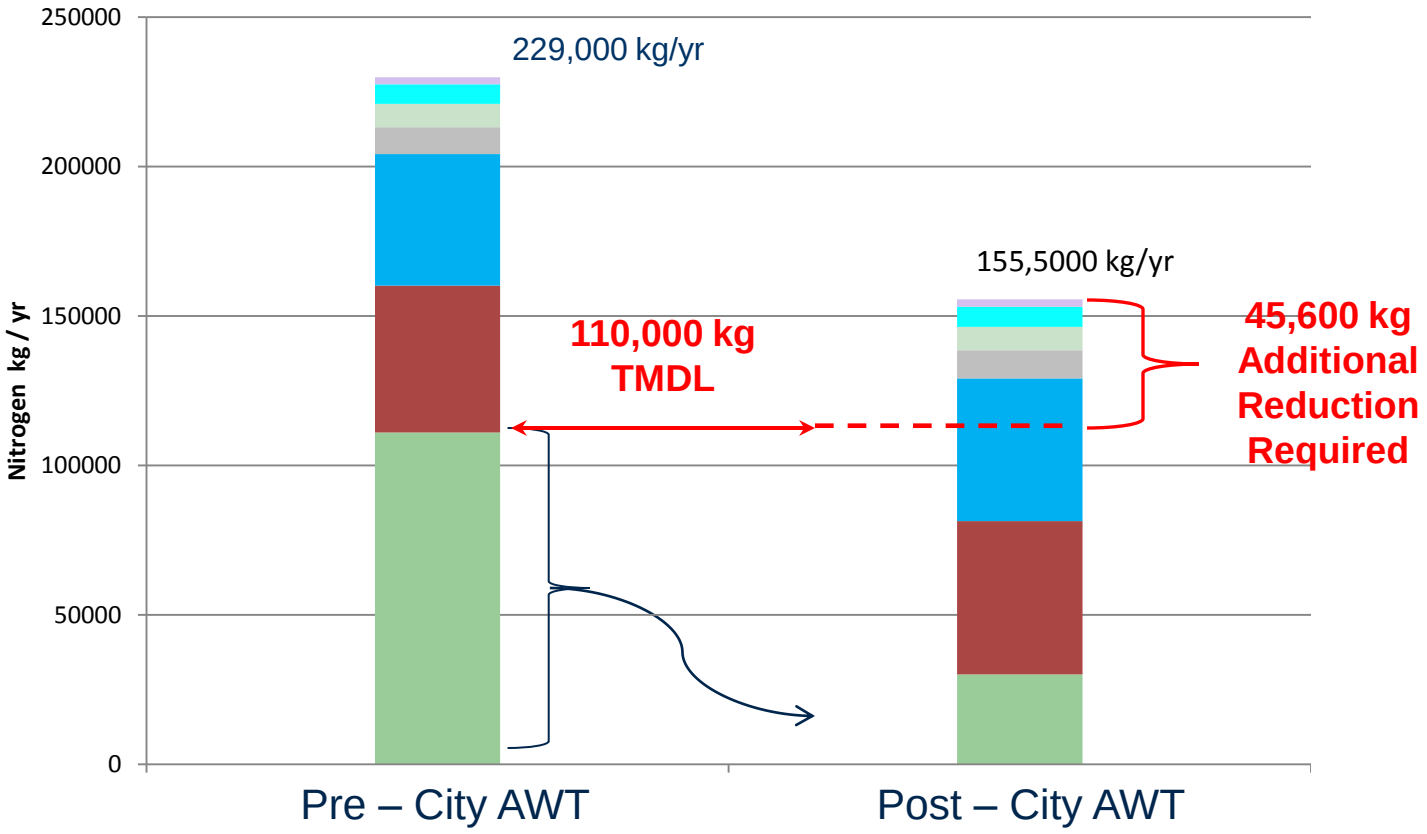
Additional Nitrate Reduction Required (45,600 kg)



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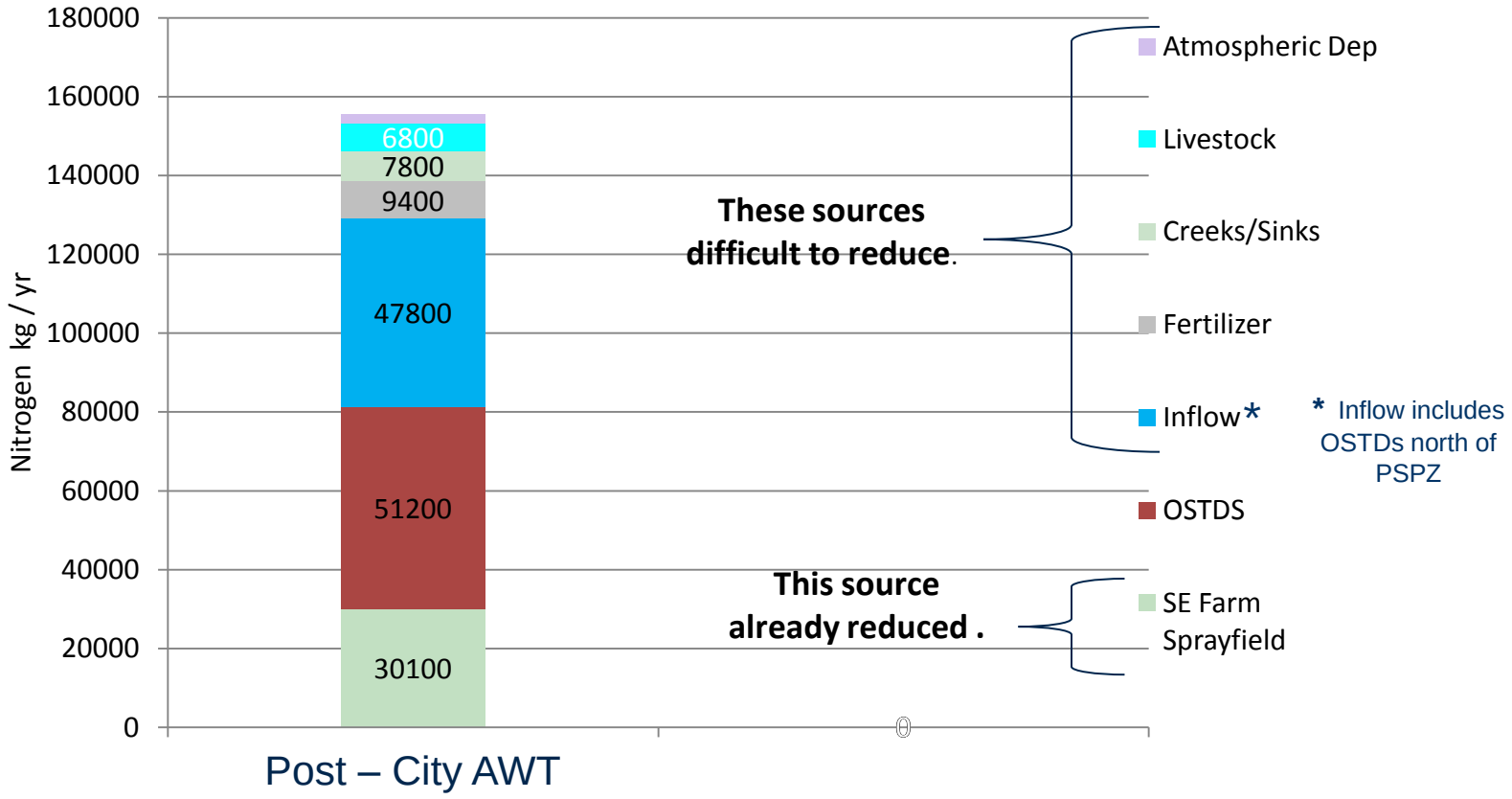

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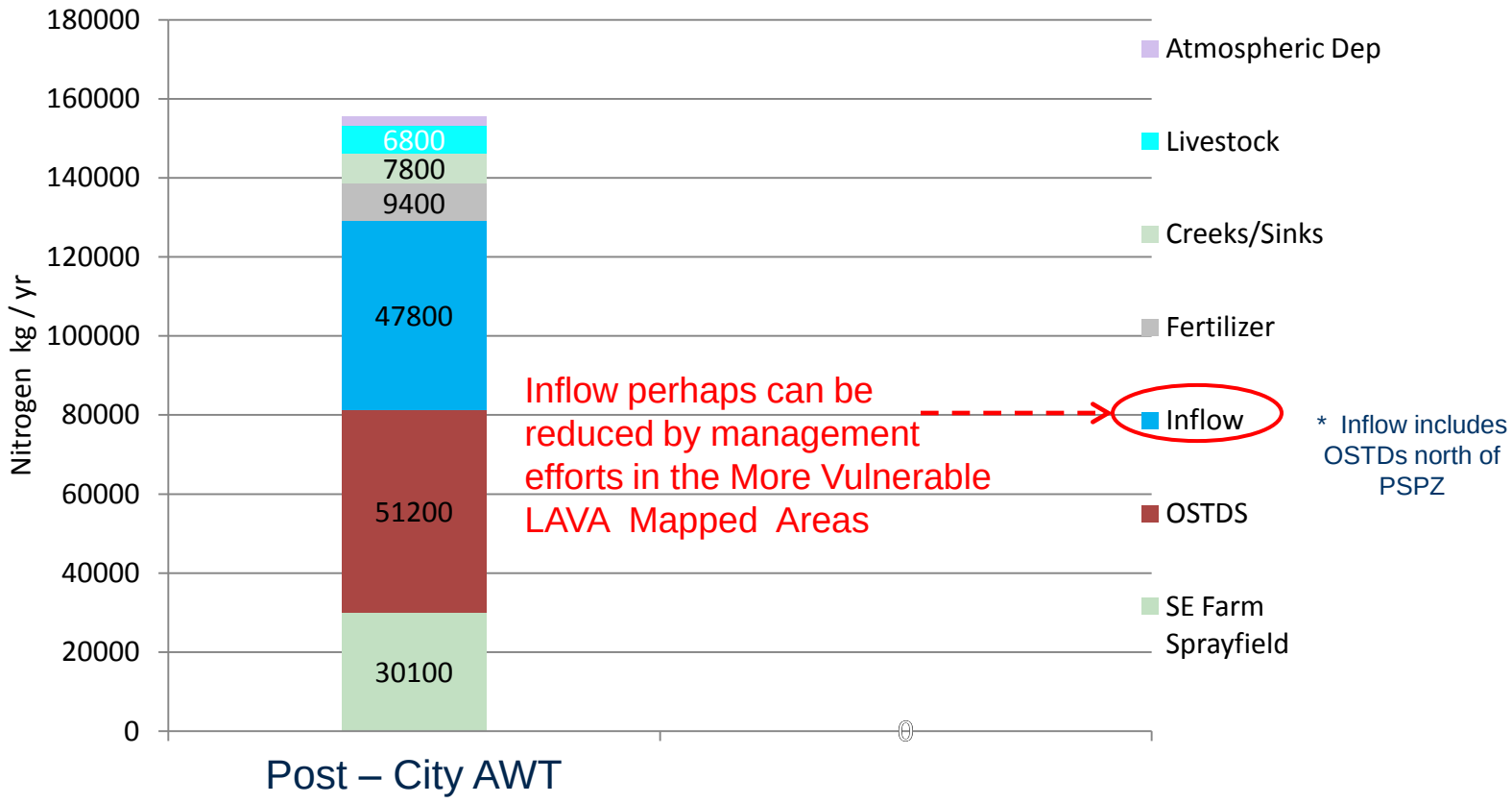
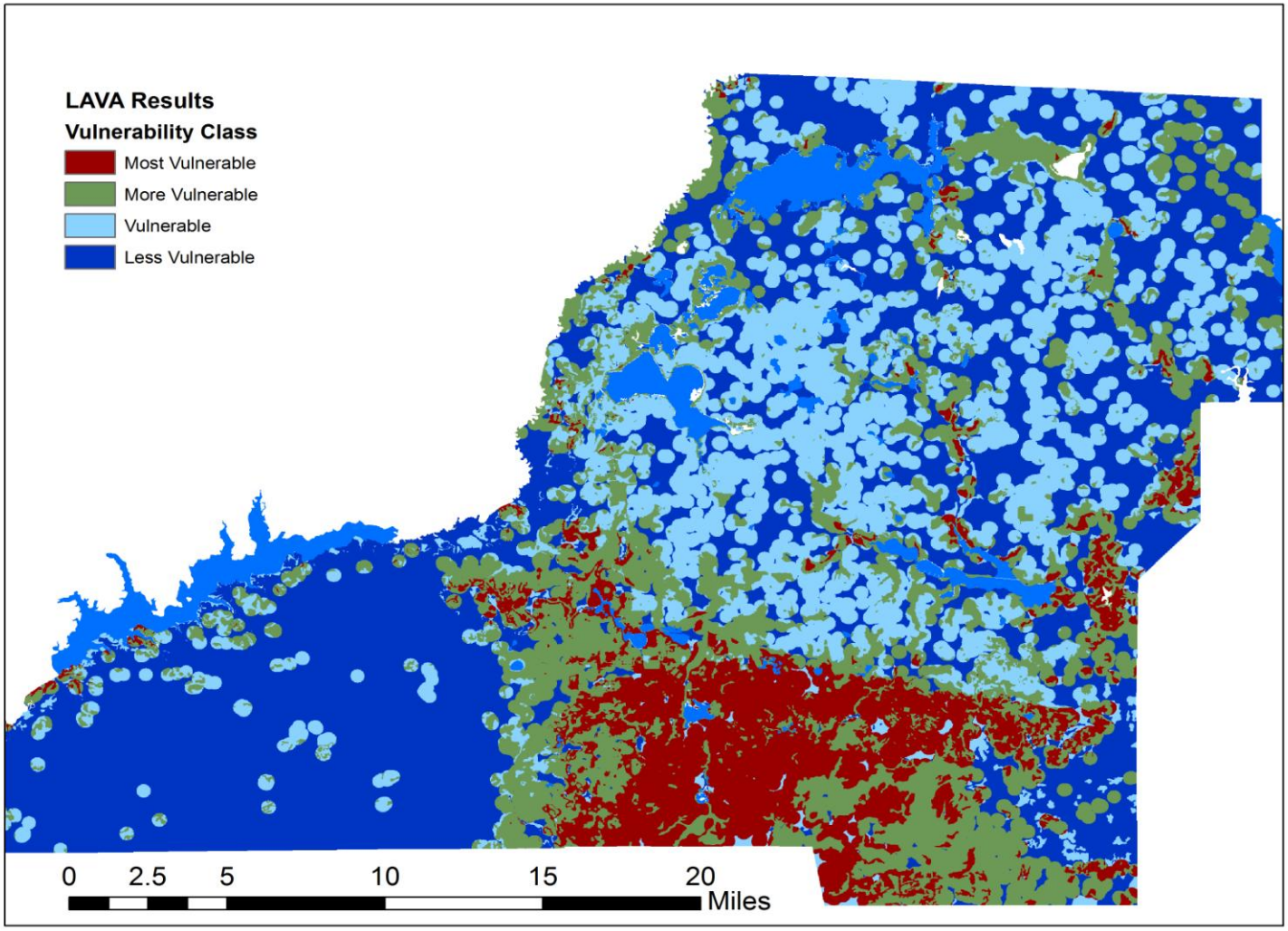
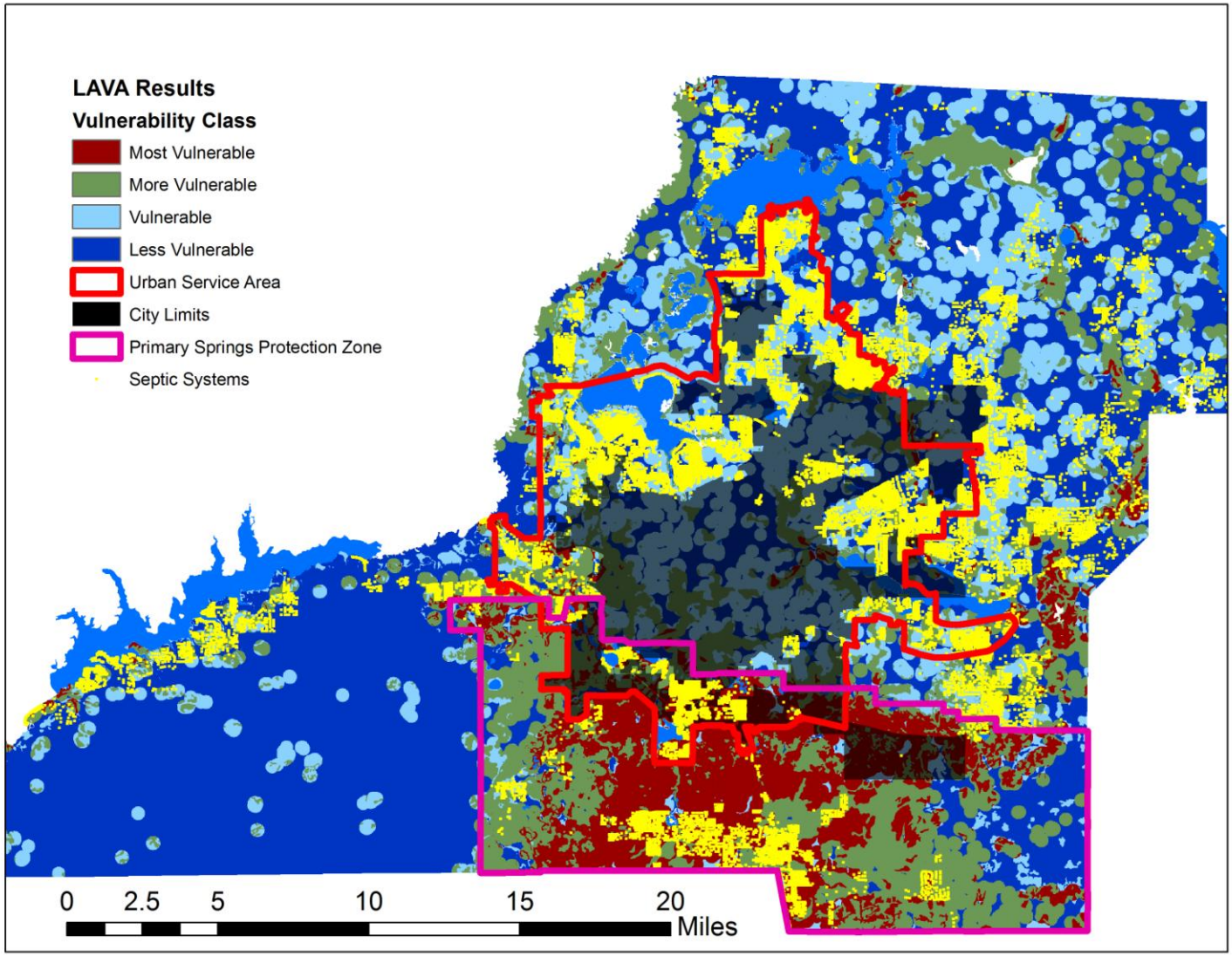


LAVA Model Results



Septic Tanks Located North and South of The Cody Scarp



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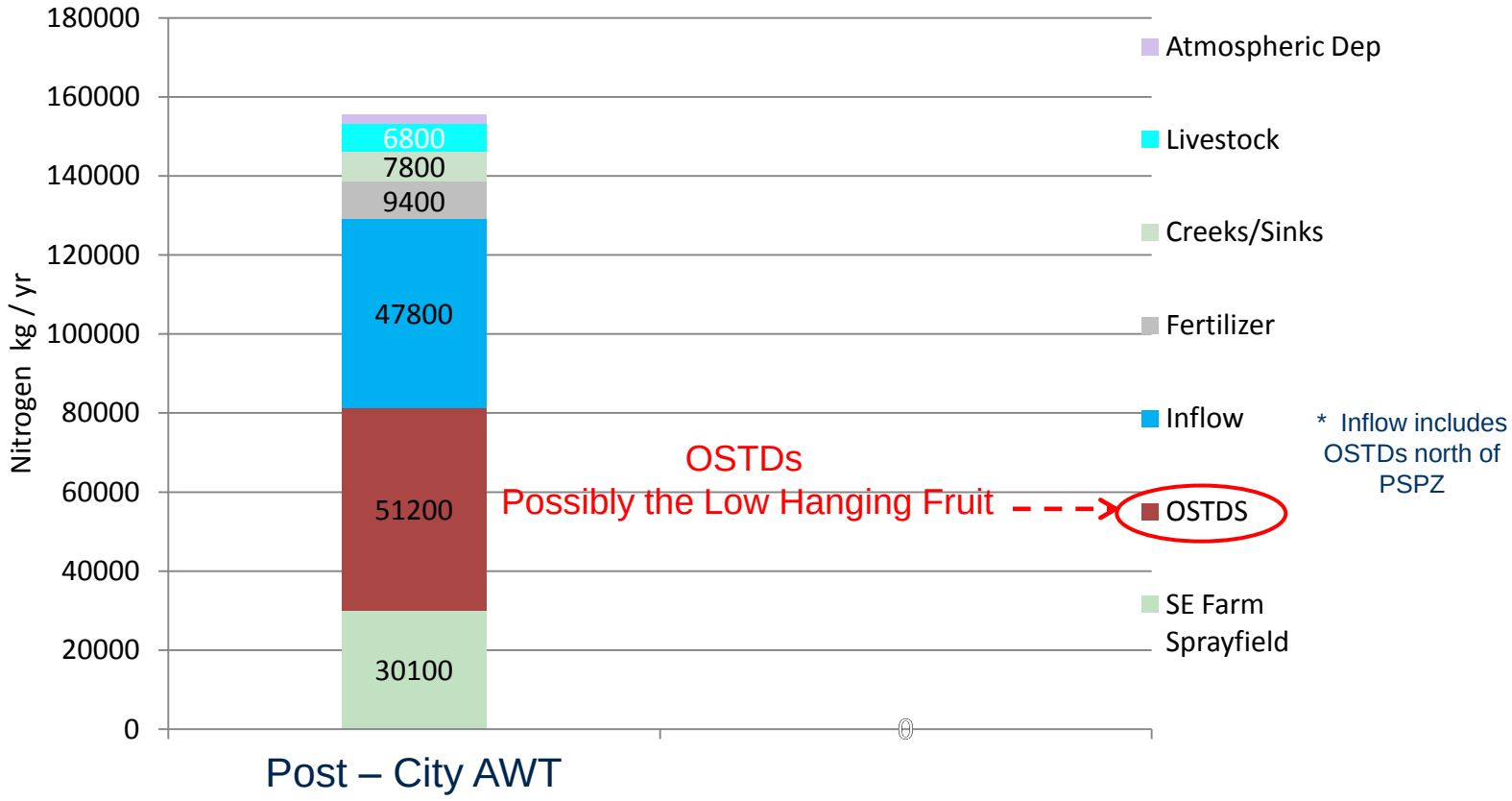

Lombardo Guidance

- **Due to significant natural attenuation , there is limited value in seeking additional nitrogen removal north of the Cody Scarp.**
- **To achieve 0.35 mg/L nitrate in Scenario 1, the maximum practicable nitrogen removal is required for all septic systems in the Scenario 1 area.**
- **That means either central sewer or advanced or performance-based septic systems as opposed to conventional septic systems.**

OSTDs – The Numbers

In Priority Area	Septic Systems
Leon County	7,500
Wakulla County	1,100
Tallahassee	118

Table ES-1a. OSTDS in Leon and Wakulla Counties, by Scope Defined Areas

Data Source	Wakulla	Leon								Leon - PSPZ Only			Total Leon and Wakulla Counties
		COT			Other				Total	COT	Other	Total	
		PSPZ	Semi conf.	Total	PSPZ	Other Unconf.	Semi conf.	Total					
OSTDS	11,334	118	1,100	1,218	7,682	270	29,917	37,869	39,087	118	7,952	8,070	50,421

Questions ?