Florida Department of Environmental Protection

Division of Environmental Assessment and Restoration

Upper Wakulla River and Wakulla Springs Basin Management Action Plan (BMAP) Onsite Sewage Treatment and Disposal System (OSTDS) Remediation Plan

Moira R. Homann

August 2, 2016





Agenda

- Welcome and Opening Remarks.
- Sunshine Law Reminders.
- Recap Items.
  - Project Collection Process and Deadline Reminder (Existing/Known Projects).
  - Data Collection/Homework Assignment Review.
  - Boundary and Priority Focus Areas.
- New Items/Discussion.
  - Summarize and Review Lombardo Report Recommendations.
  - Draft Methodology for Load Reduction Calculations.
  - Public Education.
- Wrap Up.
- Adjourn.

Sunshine Law Reminders

- OSTDS Advisory Committee will operate under the Sunshine Laws (Article 1, Section 24, Florida Constitution and Section 286.011, F.S.).
- Discussion or any form of communication between committee members on matters reasonably expected to come before the committee is **prohibited** outside of a publicly noticed meeting.
  - Communication includes but not limited to phone calls, writing, texting, and emailing another committee member.
  - Discussion between a committee member and non-committee members, including staff, is permissible.
  - Discussion of committee topics between a committee member and their alternate representative is permissible.

Recap: Projects and Management Strategies Collection Process

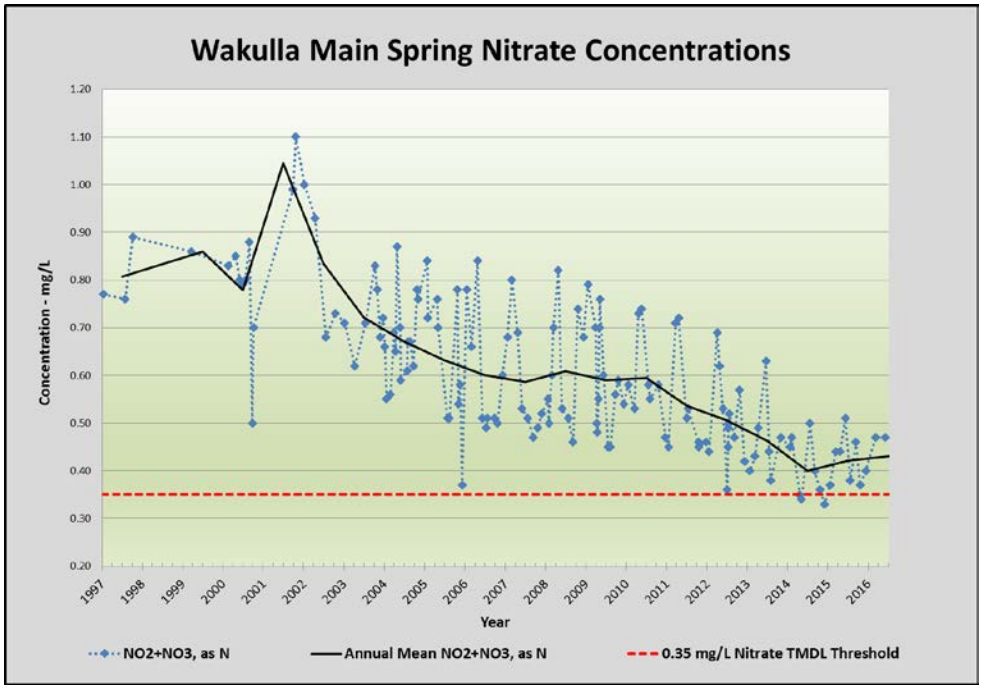
- Projects/management strategies collection process.
  - Updates on known or existing projects.
  - Submit by August 19, 2016.
    - Project collection instructions.
    - Management strategies collection spreadsheet (Wakulla Springs).
      - Fill out as completely as possible for each project/strategy.
  - Action item for next meeting:
    - Compile all updates.

Recap:
Data Collection/Homework Assignment Review

- Issues with assignment/review?
- Received updates/information from:
  - Leon County – Projects.
  - City of Tallahassee – Projects.
  - Wakulla Springs Alliance – Research/Studies.
  - Wakulla County – Land Use.
- Action item for next meeting:
  - Complete data matrix.

Recap: General Items

- Wakulla Main Spring Nitrate-Nitrite Trend 1997-2016



- Provided information regarding the delineation of the PFAs to Committee Members

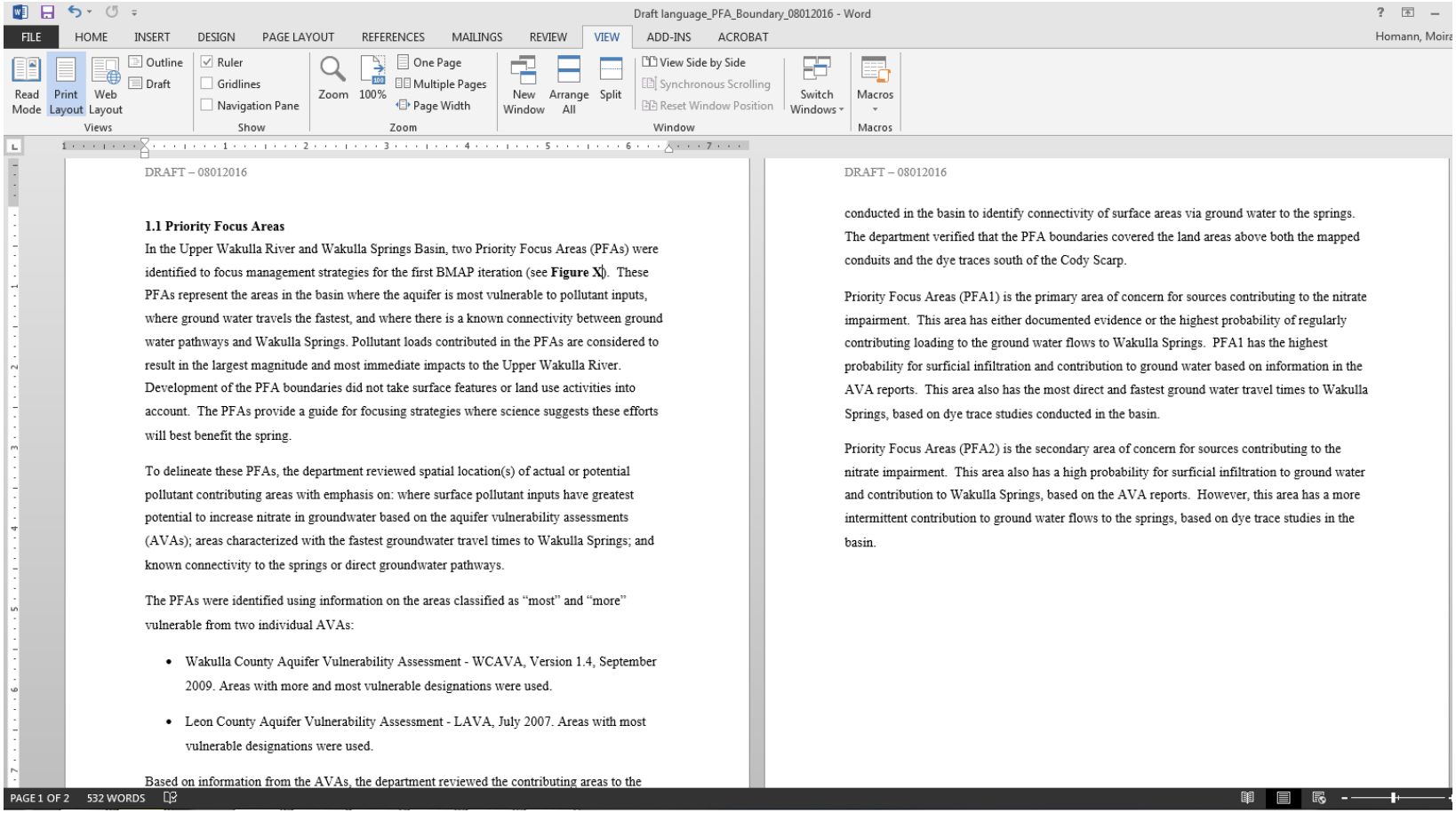
Recap:
Boundary and Priority Focus Areas

- Discussion on Priority Focus Area boundaries – completed.
  - PFAs:
    - Represent the areas in the basin where the aquifer is most vulnerable to inputs and where there are the most connections between groundwater and Wakulla Springs.
    - Identified using best available information on the most vulnerable aquifer areas and groundwater pathways.
    - Areas where efforts will be focused to reach 5-year target.

- Action item for next meeting:
  - Review text and maps provided.

Recap:
Boundary and Priority Focus Areas

Draft language for PFA section of Remediation Plan document for review



Draft language_PFA_Boundary_08012016 - Word

FILE HOME INSERT DESIGN PAGE LAYOUT REFERENCES MAILINGS REVIEW VIEW ADD-INS ACROBAT

Homann, Moira

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1.1 Priority Focus Areas

In the Upper Wakulla River and Wakulla Springs Basin, two Priority Focus Areas (PFAs) were identified to focus management strategies for the first BMAP iteration (see **Figure X**). These PFAs represent the areas in the basin where the aquifer is most vulnerable to pollutant inputs, where ground water travels the fastest, and where there is a known connectivity between ground water pathways and Wakulla Springs. Pollutant loads contributed in the PFAs are considered to result in the largest magnitude and most immediate impacts to the Upper Wakulla River. Development of the PFA boundaries did not take surface features or land use activities into account. The PFAs provide a guide for focusing strategies where science suggests these efforts will best benefit the spring.

To delineate these PFAs, the department reviewed spatial location(s) of actual or potential pollutant contributing areas with emphasis on: where surface pollutant inputs have greatest potential to increase nitrate in groundwater based on the aquifer vulnerability assessments (AVAs); areas characterized with the fastest groundwater travel times to Wakulla Springs; and known connectivity to the springs or direct groundwater pathways.

The PFAs were identified using information on the areas classified as "most" and "more" vulnerable from two individual AVAs:

- Wakulla County Aquifer Vulnerability Assessment - WCAVA, Version 1.4, September 2009. Areas with more and most vulnerable designations were used.
- Leon County Aquifer Vulnerability Assessment - LAVA, July 2007. Areas with most vulnerable designations were used.

Based on information from the AVAs, the department reviewed the contributing areas to the

PAGE 1 OF 2 532 WORDS

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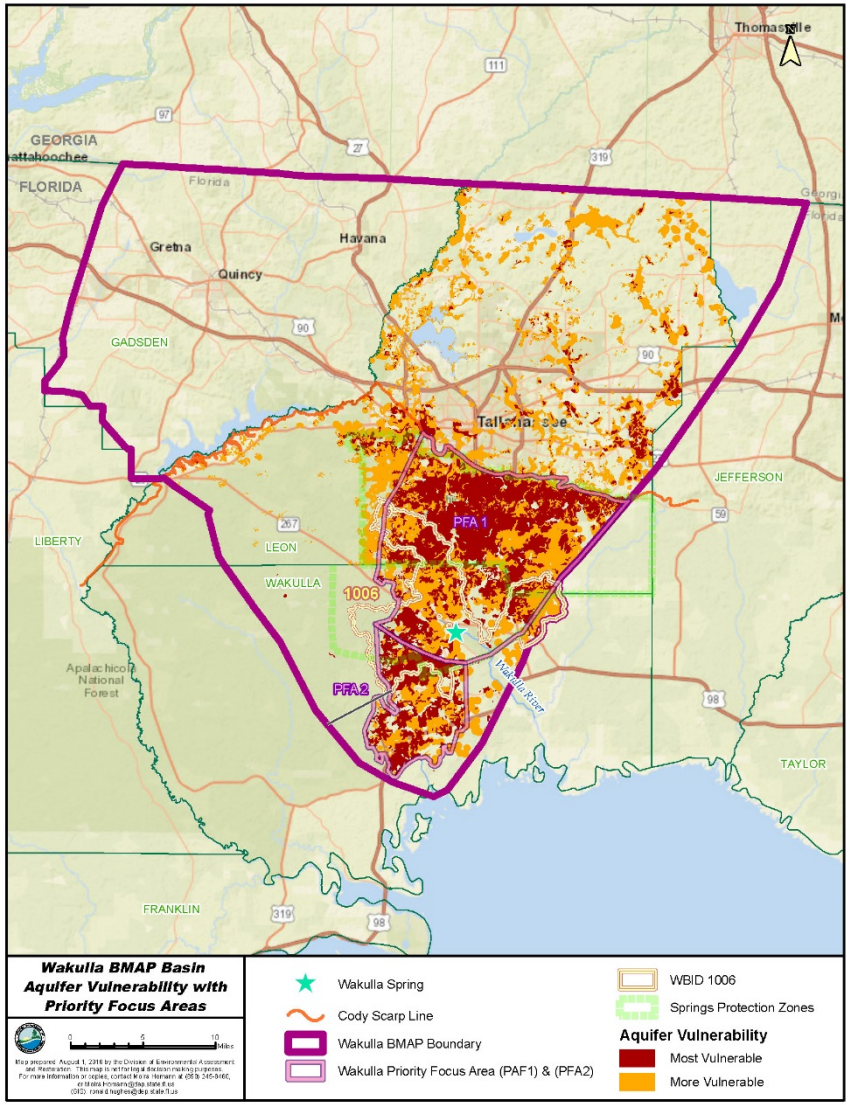
conducted in the basin to identify connectivity of surface areas via ground water to the springs. The department verified that the PFA boundaries covered the land areas above both the mapped conduits and the dye traces south of the Cody Scarp.

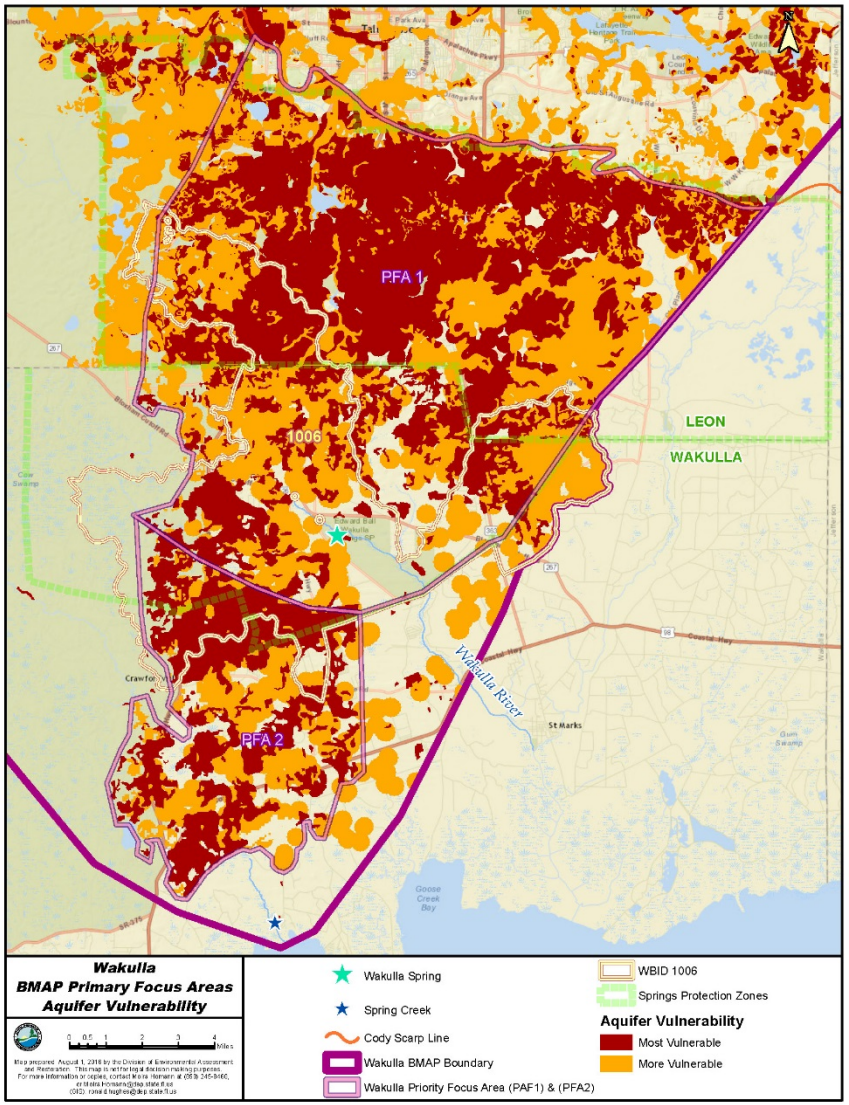
Priority Focus Areas (PFA1) is the primary area of concern for sources contributing to the nitrate impairment. This area has either documented evidence or the highest probability of regularly contributing loading to the ground water flows to Wakulla Springs. PFA1 has the highest probability for surficial infiltration and contribution to ground water based on information in the AVA reports. This area also has the most direct and fastest ground water travel times to Wakulla Springs, based on dye trace studies conducted in the basin.

Priority Focus Areas (PFA2) is the secondary area of concern for sources contributing to the nitrate impairment. This area also has a high probability for surficial infiltration to ground water and contribution to Wakulla Springs, based on the AVA reports. However, this area has a more intermittent contribution to ground water flows to the springs, based on dye trace studies in the basin.

Recap:
Boundary and Priority Focus Areas (cont'd)

Draft maps for PFA section of Remediation Plan document for review





Summarize and Review Lombardo Report Recommendations

Lombardo Study:
Management Options for OSTDS in the Wakulla Springshed

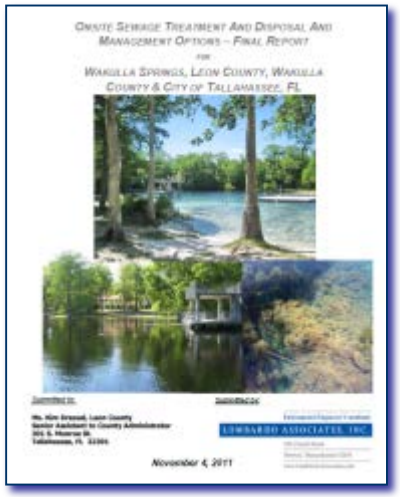
Wakulla BMAP
OSTDS Advisory Committee
August 2, 2016

John Buss, Manager
Water Resources Division

CITY OF TALLAHASSEE

Lombardo Study – Purpose

Assimilate 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 OSTDS in Leon and Wakulla counties.



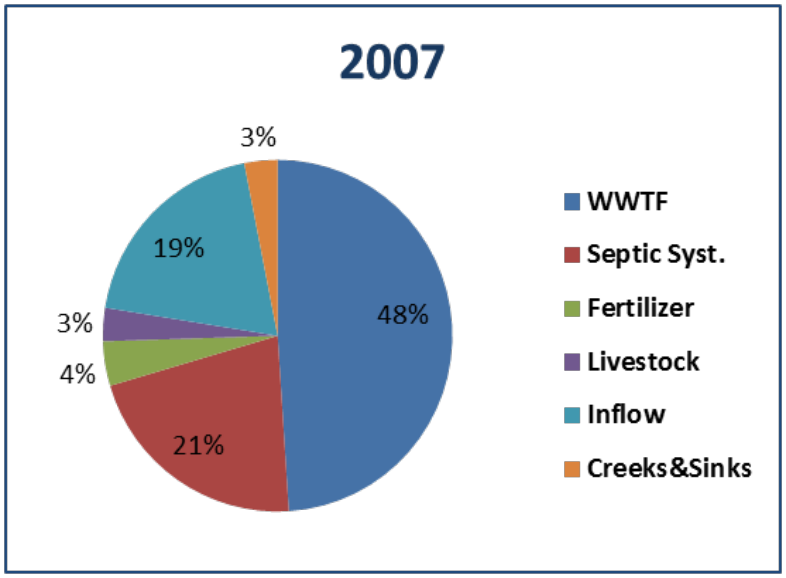
Milestones – Understanding the Nitrate Problem at Wakulla Springs

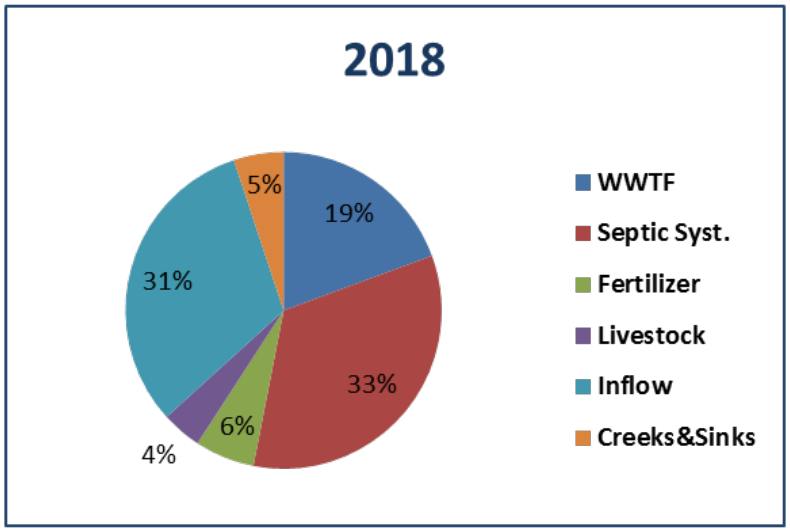
2002	NWFWMD Study (Chelette and Pratt.)	• Identified and quantified sources of nitrogen loading to Wakulla Springs.
2005	Hydrogeology Consortium.	• Scientists concurred on the largest nitrate sources. • Land use issues led to LAVA Study.
2007	Leon CO. Aquifer Vulnerability Study (LAVA)	• Identified those 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.

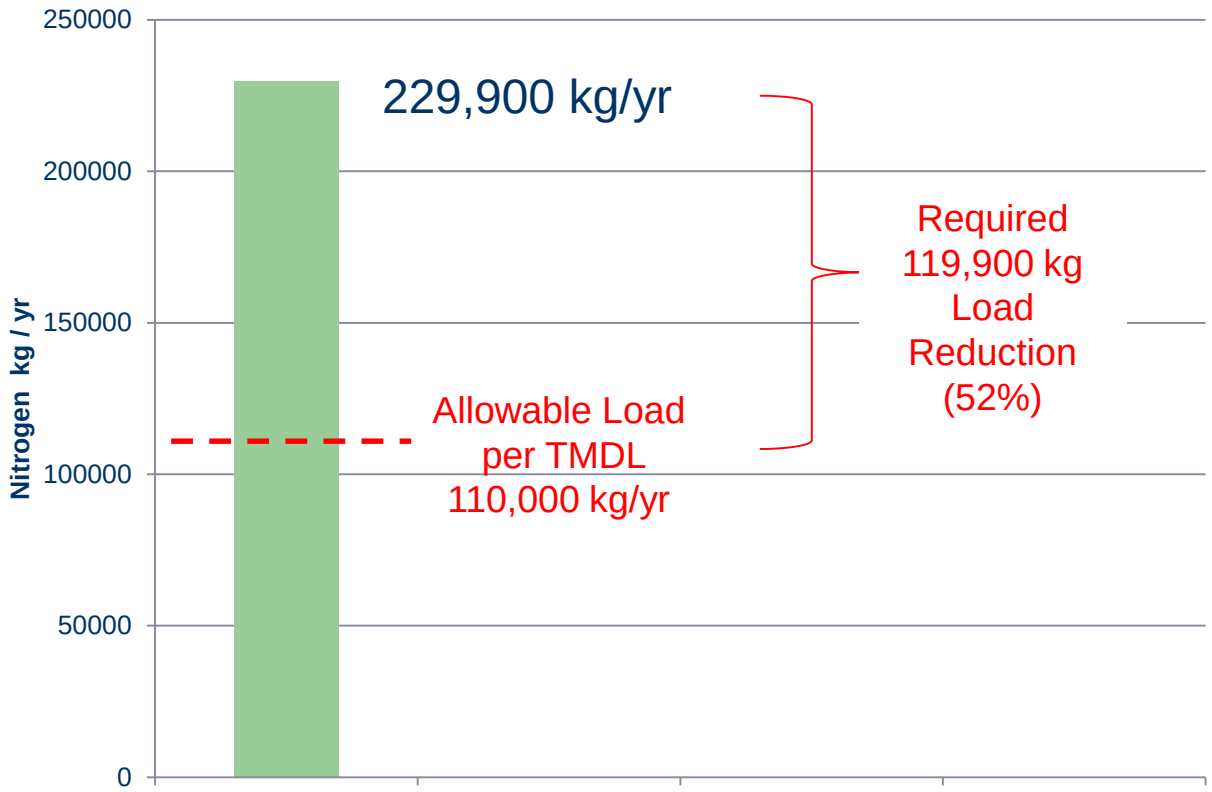
Post City AWT – New “Largest Contributor”



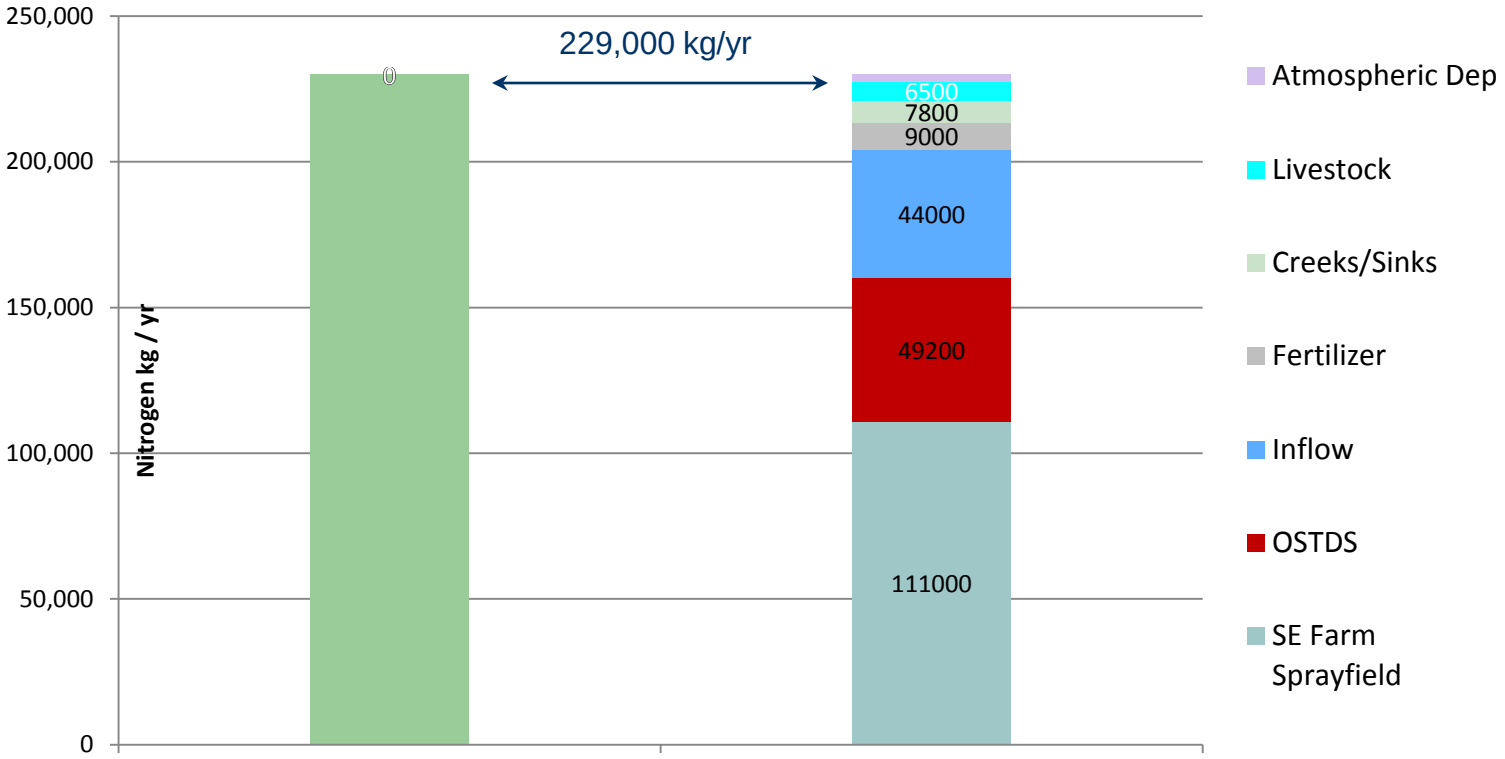


1. **Septic Systems**
2. **WWTF Sprayfield**
3. **Inflow**
4. **Fertilizer**
5. **Creeks & Sinks**
6. **Livestock**

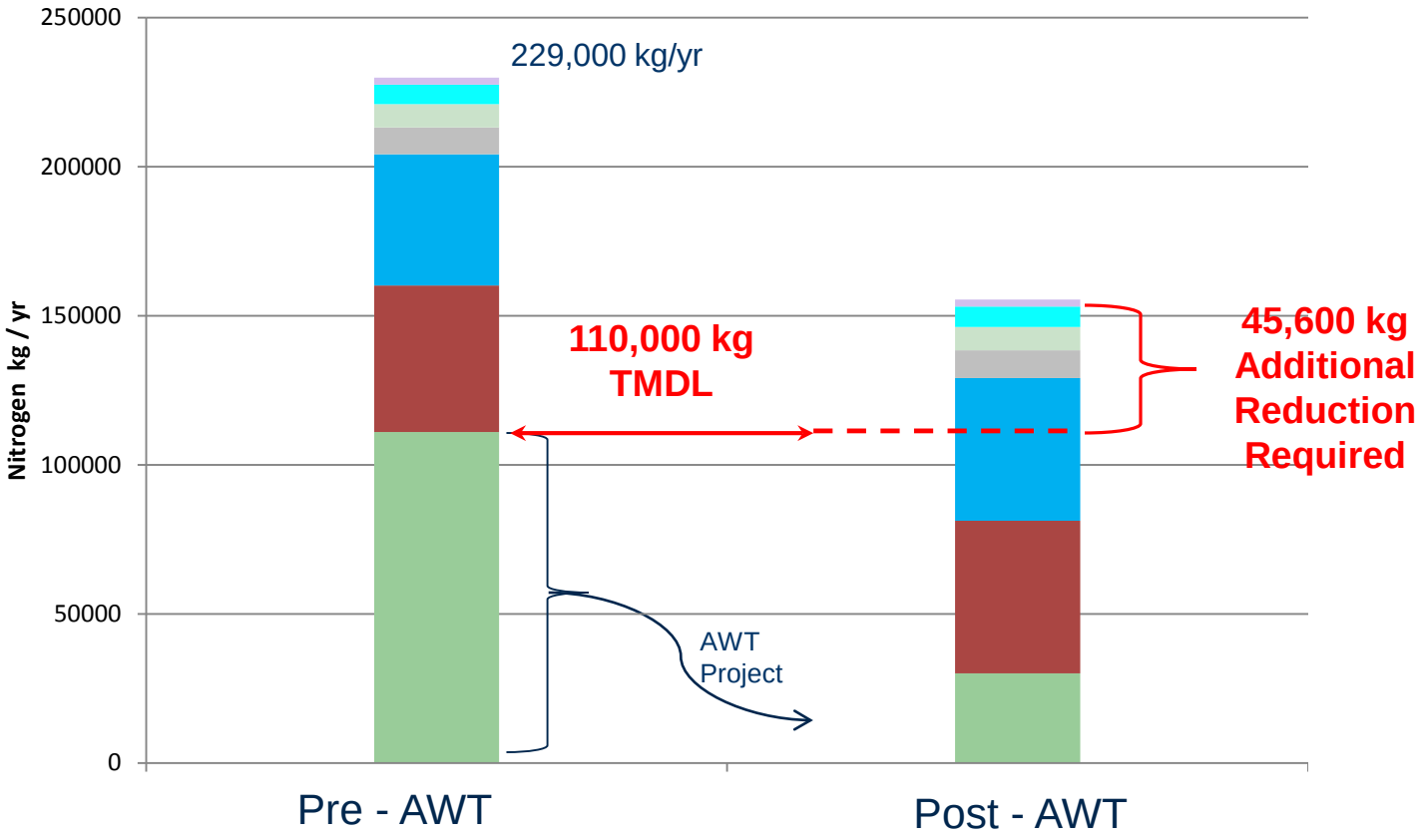
Allowable Nitrogen Load to Wakulla Spring (Pre- AWT)



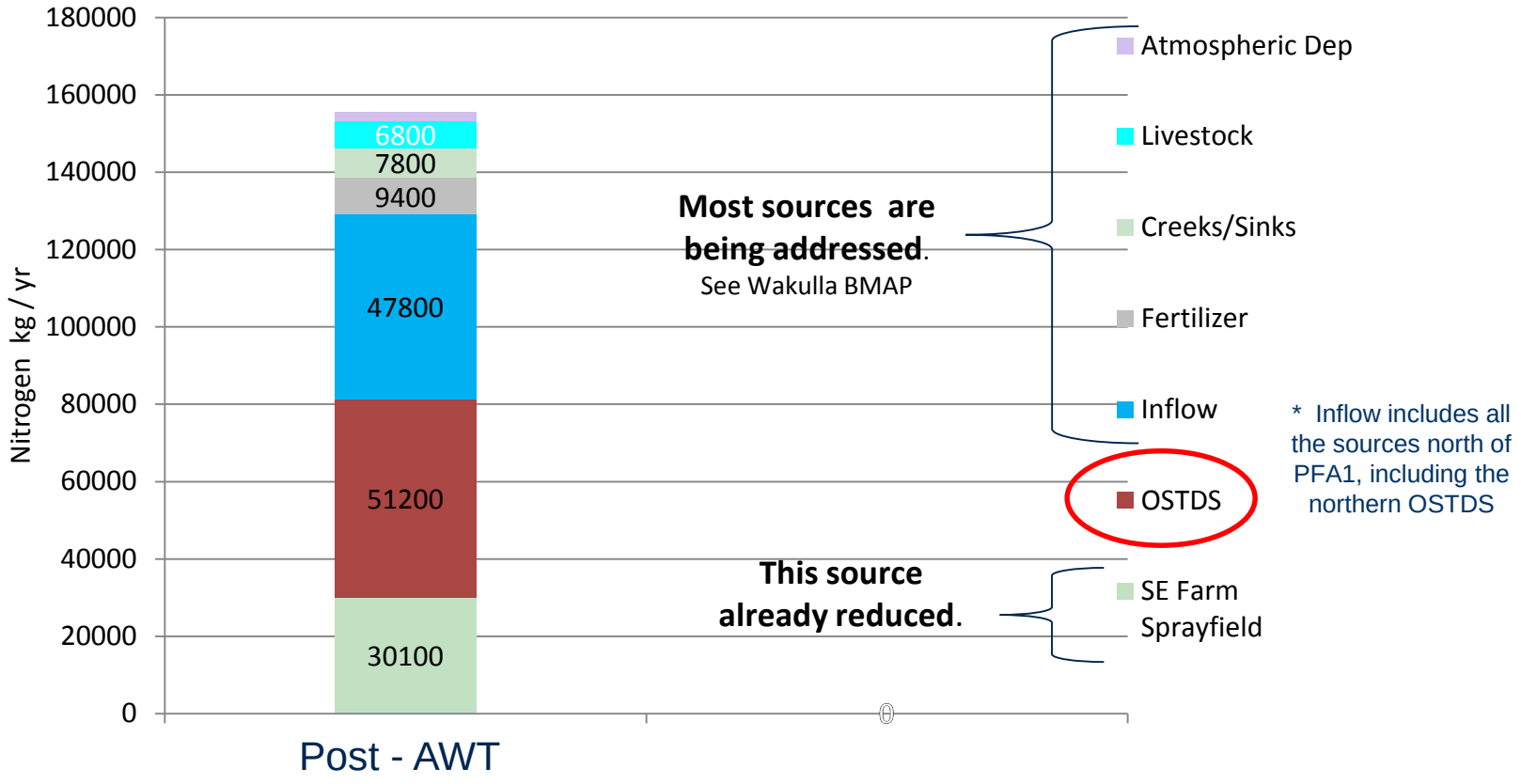
Sources of Annual Nitrogen Load
(Pre- AWT)



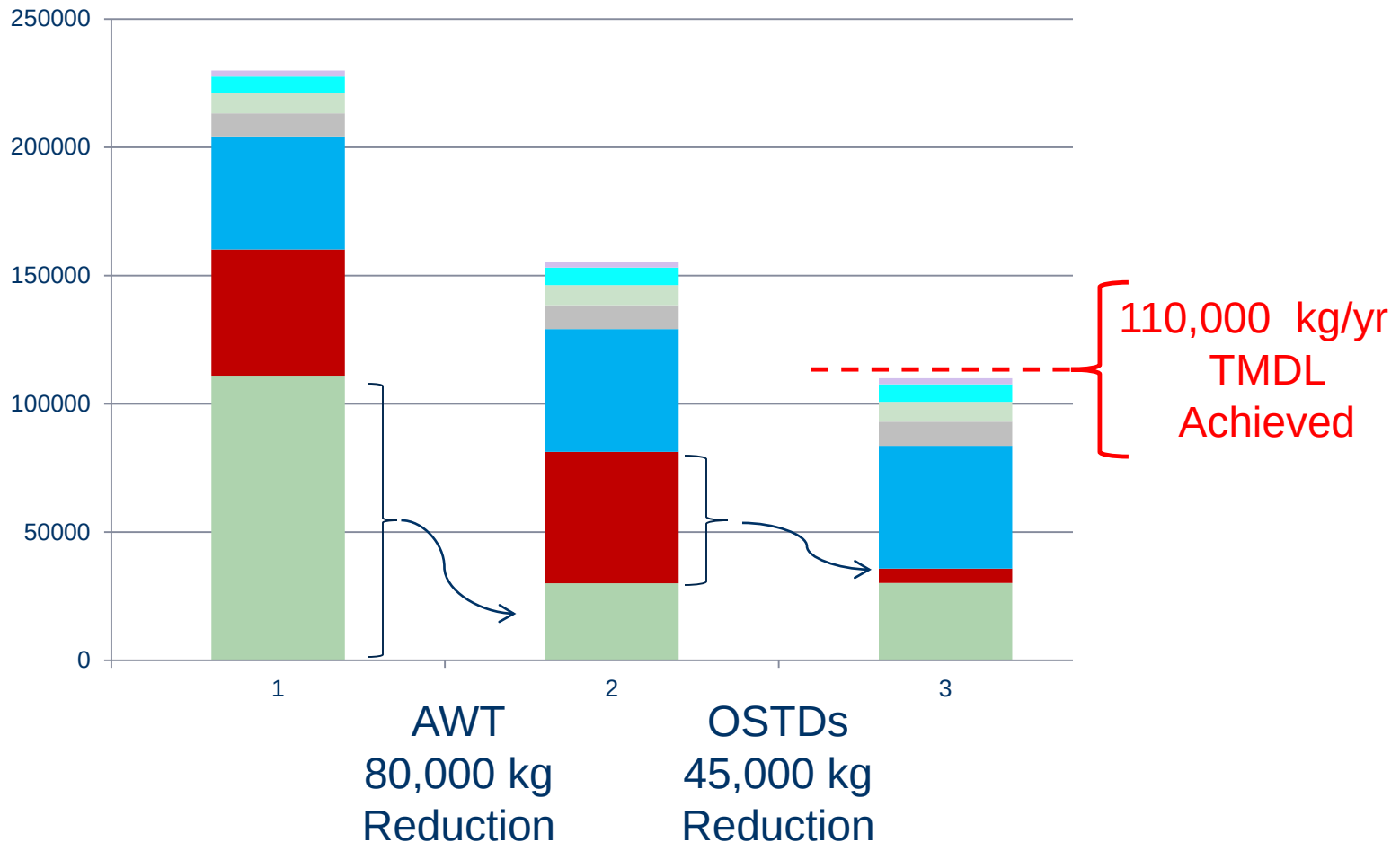
Even After City AWT
Additional Nitrate Reduction Required
(45,600 kg)



Post AWT Sources



TMDL Achieved Through Upgrade OSTDs in PSPZ to AWT



Specific Lombardo Study Tasks

Task 1: Assess and summarize existing data and prior work

Task 2: Identify treatment options, costs, pros, cons

Task 3: Identify & discuss wastewater management options

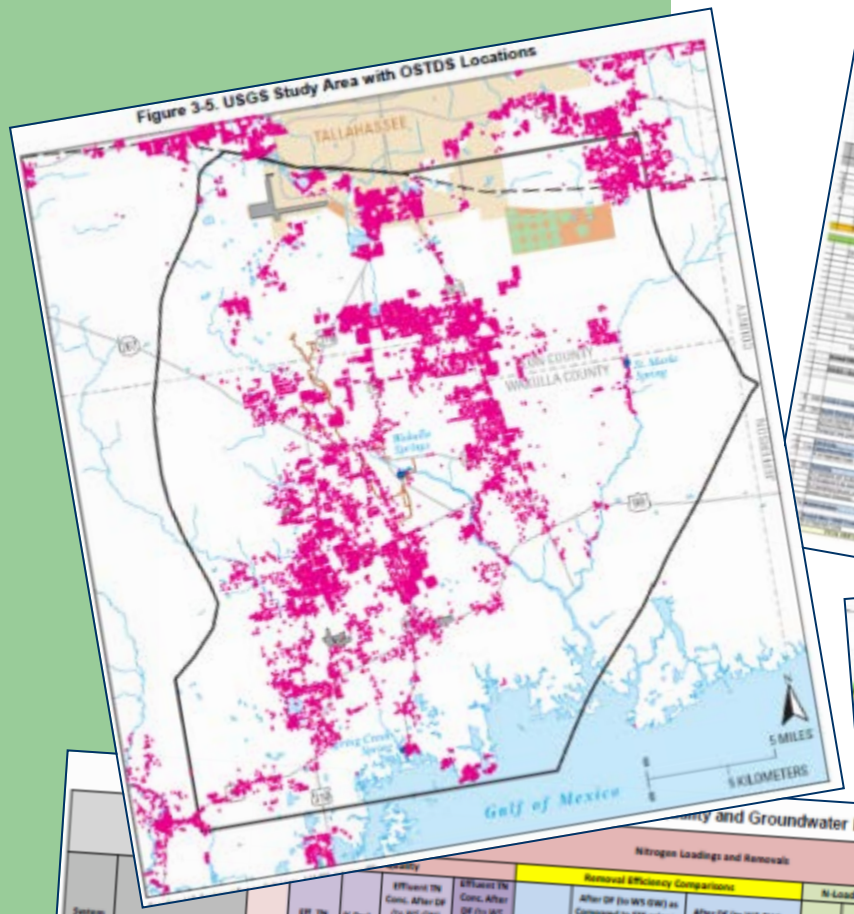
Task 4: Identify & discuss financing, affordability, fee collection, economic sustainability

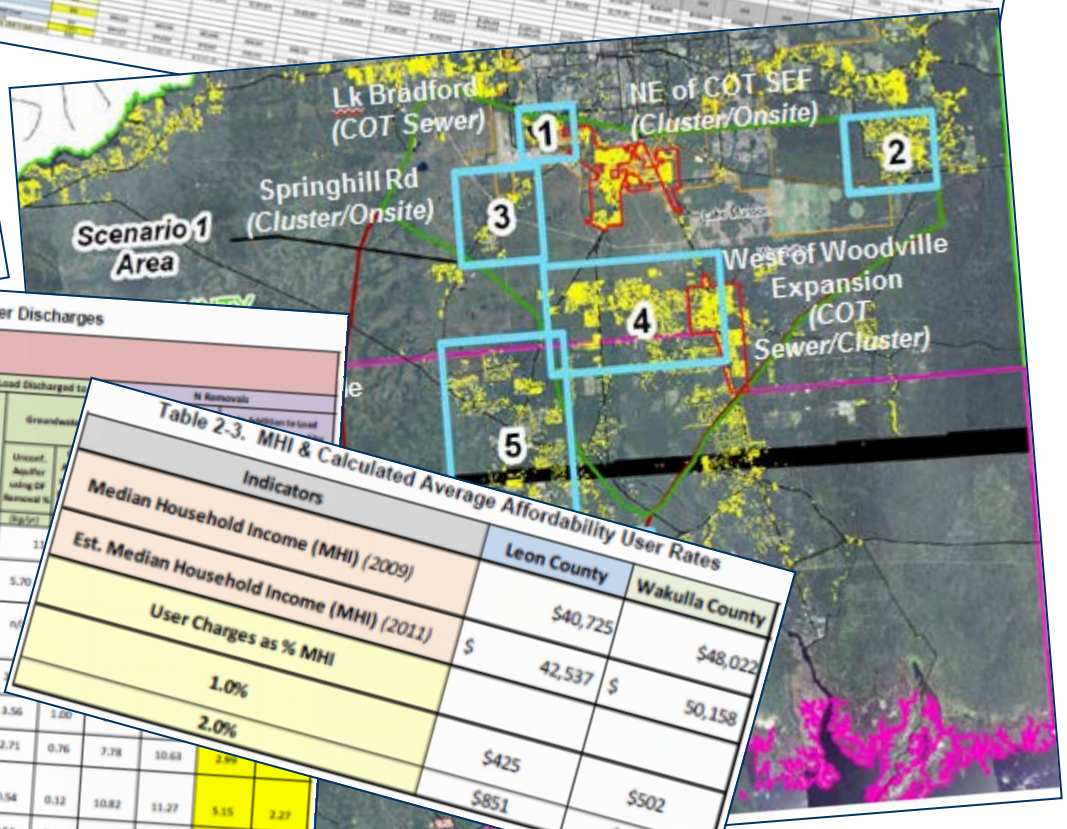
Task 5: Suggested hierarchy & phasing of treatment & management options

Task 6: Identification & recommendation of areas for central & clustered systems

Task 7: Recommended future work

https://www.talgov.com/Uploads/Public/Documents/planning/pdf/compln/onsite_sewage_mgt_rpt.pdf





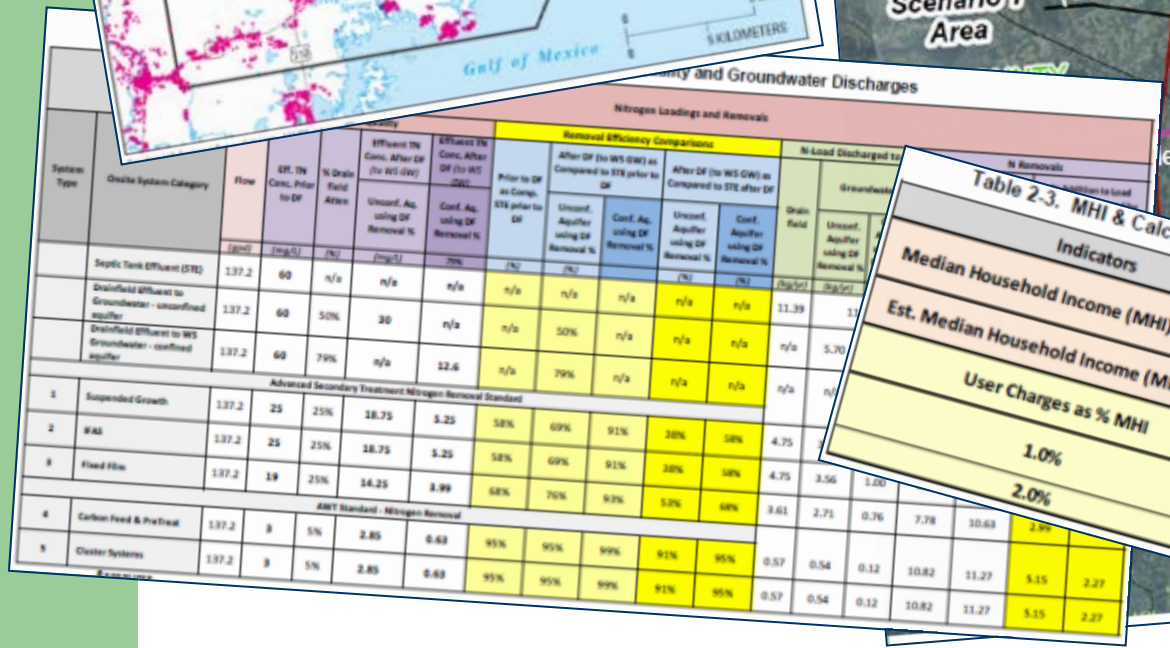


Table 2-3. MHI & Calculated Average Affordability User Rates

Indicators	Leon County	Wakulla County
Median Household Income (MHI) (2009)	$40,725	$48,022
Est. Median Household Income (MHI) (2011)	$ 42,537	$ 50,158
User Charges as % MHI		
1.0%	$425	$502
2.0%	$851	$1,003

Lombardo – The Numbers

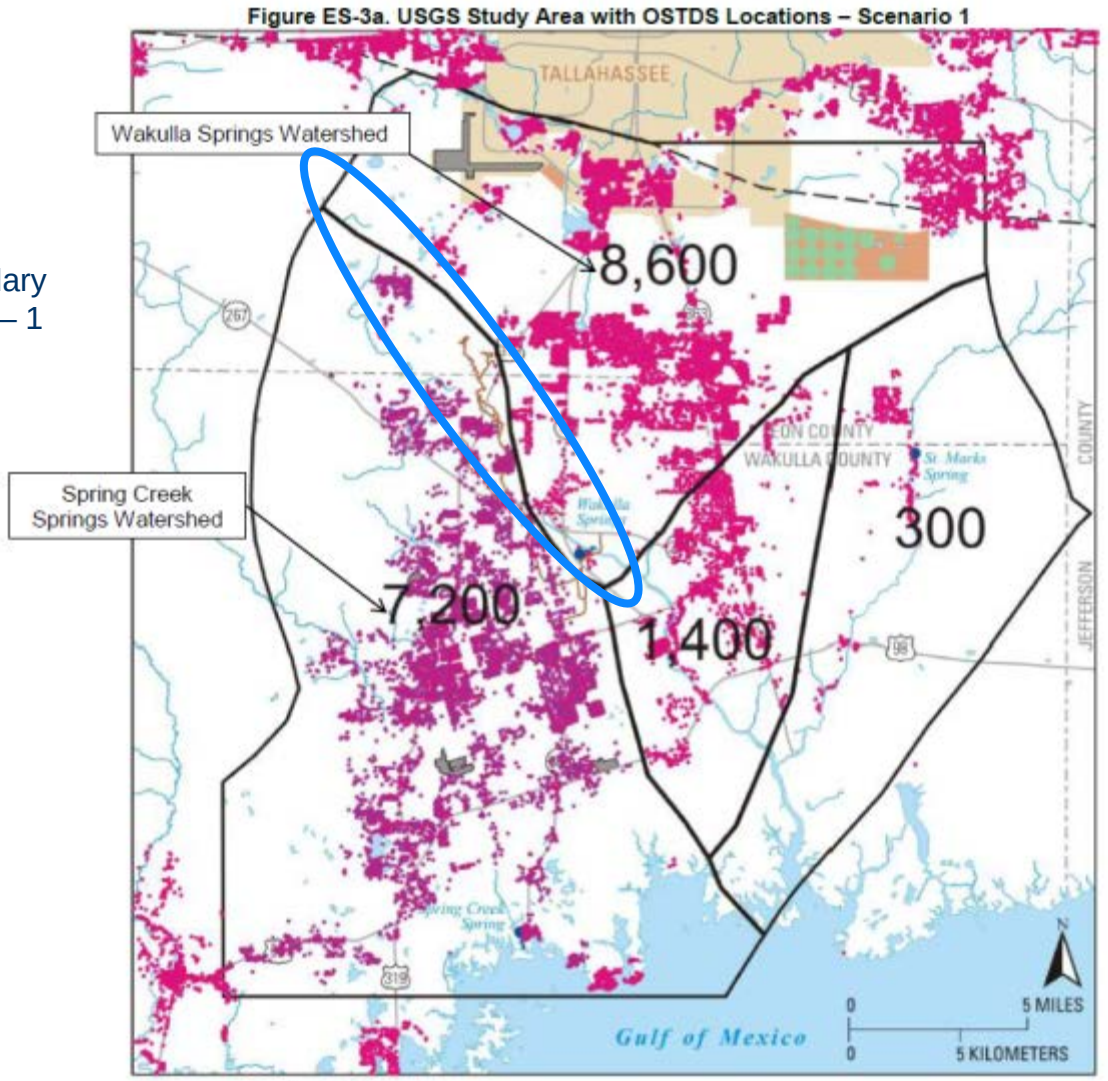
In Priority Area	Septic Systems
Leon County	7,500
Wakulla County	1,100
Tallahassee	118

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

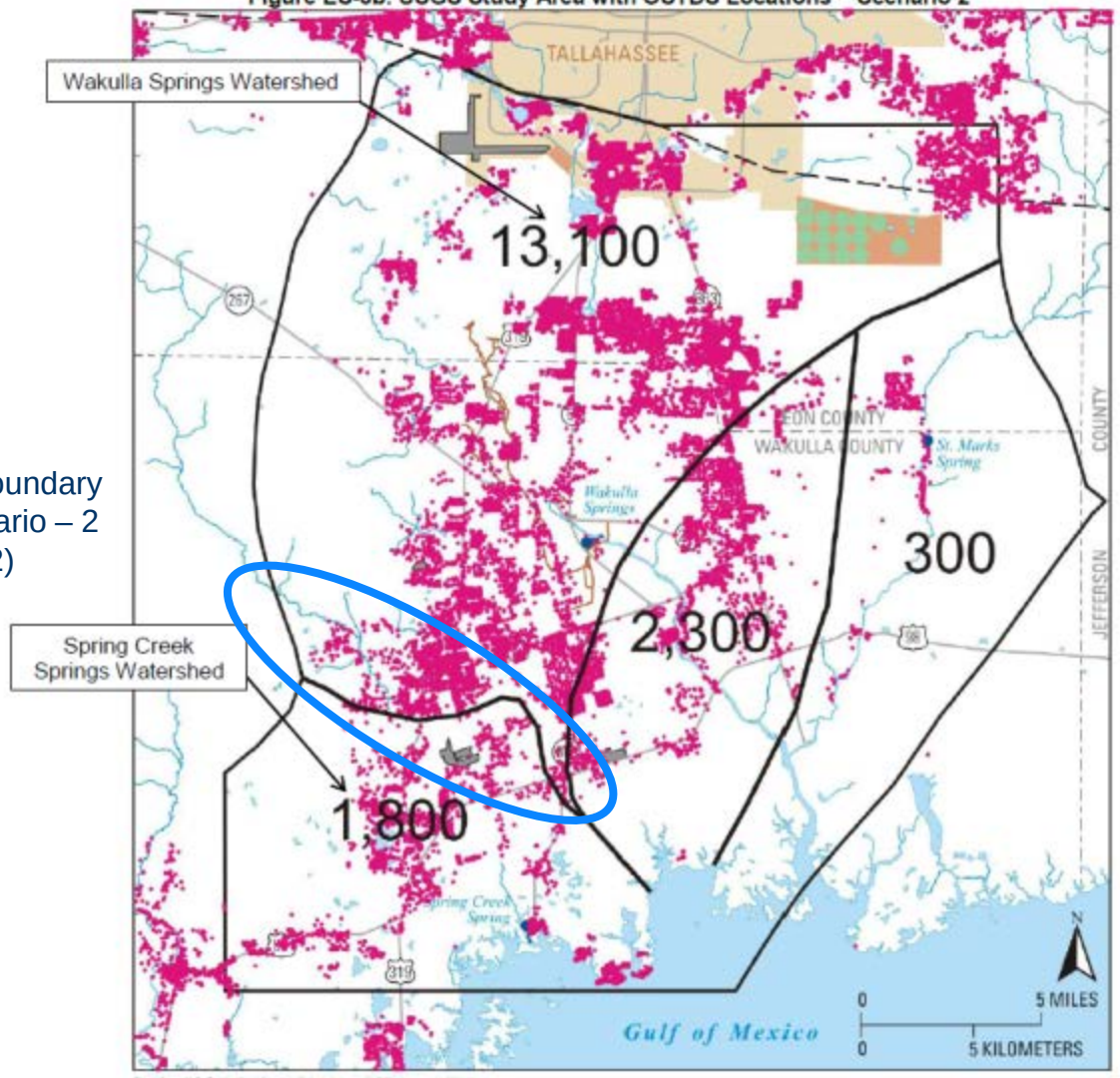
Leon and Wakulla Septic Tanks South of The Cody Scarp

Southern Boundary under Scenario – 1 (PFA1)



Leon and Wakulla Septic Tanks South of The Cody Scarp

Figure ES-3b. USGS Study Area with OSTDS Locations – Scenario 2



Southern Boundary under Scenario – 2 (PFA2)

Lombardo – Assimilation of USGS Model

- **Demonstrated required load reductions**
- **Accounted for current regional growth rate**

Description	Scenario	Nitrate Loads to Wakulla Springs Planned Growth Projection (kg/yr)										
		Inflow	OSTDS	*Fertilizer*	*Creeks / Sinks*	*Livestock*	*Atmospheric Deposition*	*SE Farm Spray field*	Total	W.Q. Standard Max. Nitrate Load	Nitrate Removal Rqmt.	% Total Nitrate Removal Rqmt.
2007 Mass Balance	1	44,000	49,200	9,000	7,800	6,500	2,400	111,000	229,900	110,000	119,900	52%
	2	52,000	74,900	15,000	31,000	10,800	4,000	111,000	298,700	235,000	63,700	21%
2018 Mass Balance	1	47,800	51,200	9,400	7,800	6,800	2,400	30,200	155,600	110,000	45,600	29%
	2	56,500	77,900	15,600	31,000	11,300	4,000	30,200	226,500	235,000	-8,500	-4%

Growth Rate - OSTDS/Fertilizer/Livestock	3.92%	Initial SESF NO_3	12	mg/L
Growth Rate - Inflow / SESF	8.57%	Final SESF NO_3	3	mg/L
		SESF % Nitrate Reduction	75.0%	

Lombardo Guidance

- **Due to significant natural attenuation, i.e., reduction, there is limited value in seeking additional nitrogen removal north of the Cody Scarp (not cost-effective $/lb nitrate reduction).**

- **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.**

An Important Point About Upgrading OSTDS to AWT

- When Lombardo refers to upgrading to AWT this does not necessarily mean connection to COT central sewer.
- Lombardo is just referring to achieving AWT treatment levels of 3 mg/l for total nitrogen (TN).
- Options include:
  - Connecting to central sewer systems that achieve AWT treatment.
  - Cluster systems (package plants that achieve AWT treatment for localized areas.
  - High performance onsite (septic) systems that achieve AWT treatment.

Cost of Alternative Treatment Methods are Similar in Magnitude

Table 3-3. Treatment Options Summary

WW Mgmt. Option	Capital Cost		O&M Cost		Life Cycle Cost		Life Cycle Cost Per kg/yr of Wastewater N Removed					
							Life Cycle Cost[2]		Life Cycle Cost[3]		Life Cycle Cost[4]	
	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
AWT Onsite[1]	$17,800	$21,000	$486	$596	$26,139	$31,227	$2,416	$2,886	$5,071	$6,059	$11,503	$13,742
AWT Cluster	$22,712	$25,044	$489	$548	$31,670	$34,297	$2,973	$3,219	$6,276	$6,796	$13,937	$15,093
Connection to AWT CoT System	$18,890	$20,974	$768	$768	$33,428	$35,512	$3,138	$3,333	$6,486	$6,890	$14,710	$15,627

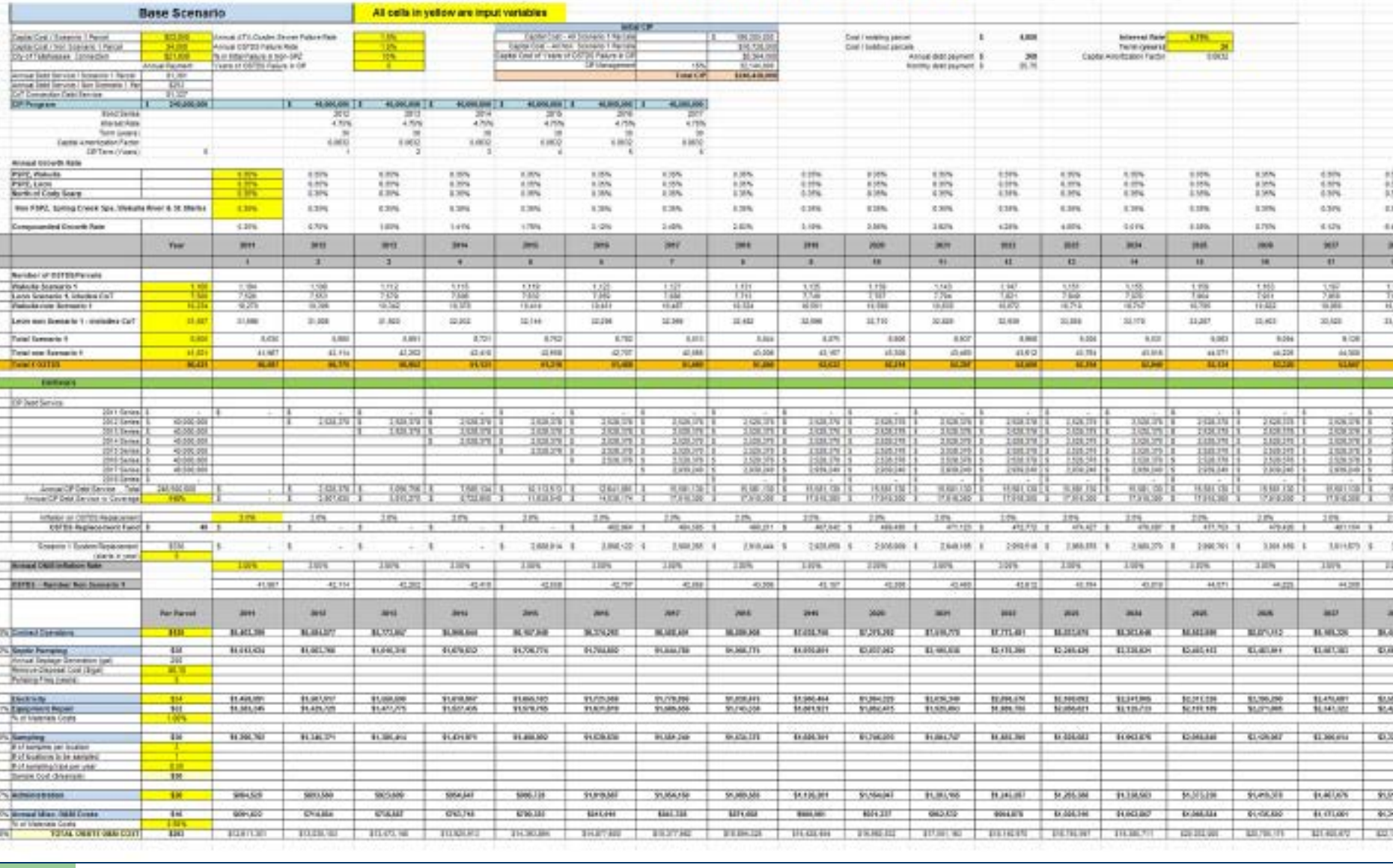
[1] *Carbon Feed and Pretreatment system used for this analysis*

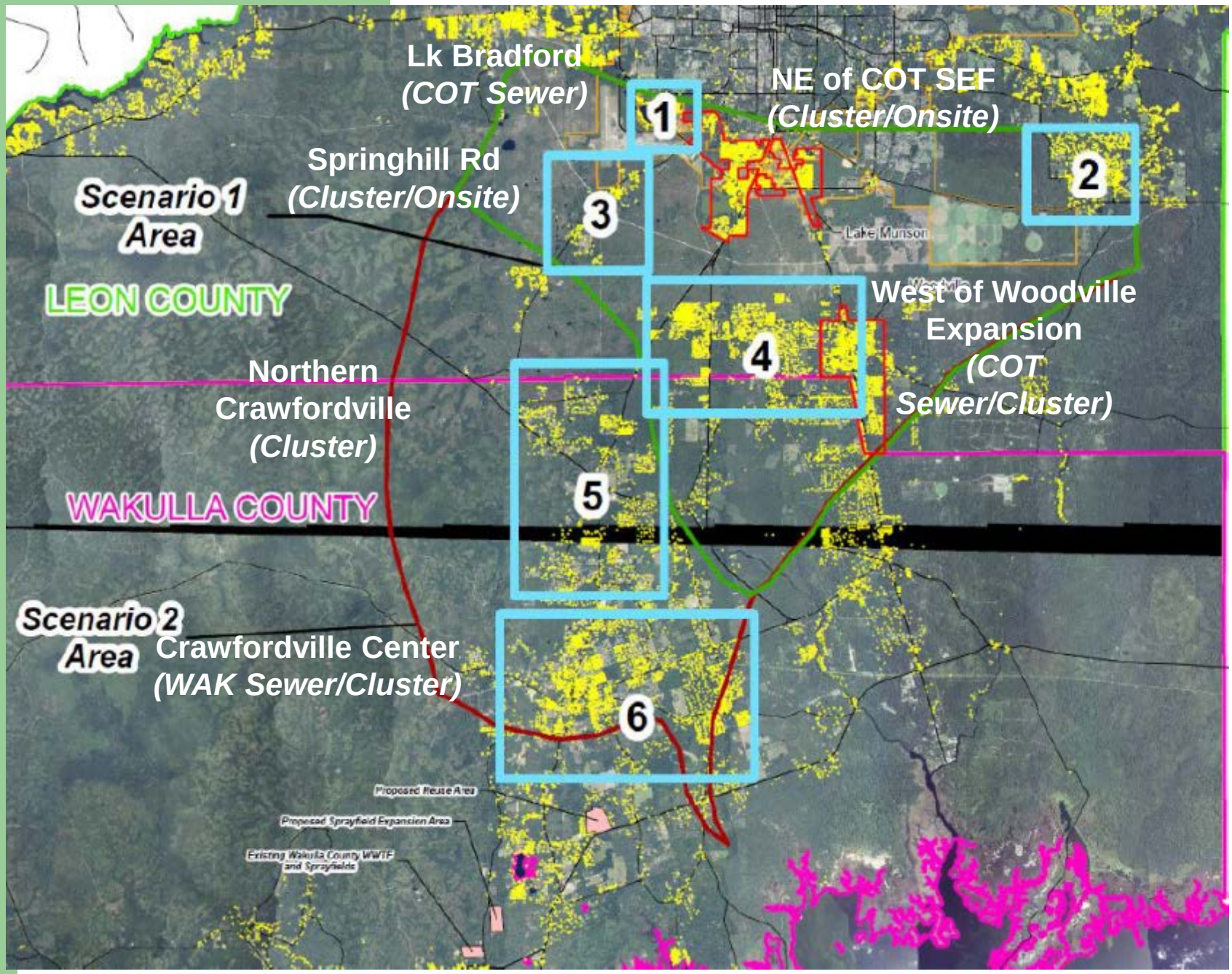
[2] *Per kg/yr as compared to raw wastewater*

[3] *Per kg/yr above what conventional septic system achieves in unconfined aquifer*

[4] *Per kg/yr above what conventional septic system achieves North of Cody Scarp*

Table 4-1. Preliminary Financial Pro Forma




Lk Bradford
(COT Sewer)
NE of COT SEF
(Cluster/Onsite)
Springhill Rd
(Cluster/Onsite)
Scenario 1
Area
LEON COUNTY
West of Woodville
Expansion
(COT
Sewer/Cluster)
Northern
Crawfordville
(Cluster)
WAKULLA COUNTY
Scenario 2
Area
Crawfordville Center
(WAK Sewer/Cluster)
1
2
3
4
5
6
Lake Munson
Proposed Reuse Area
Proposed Sprayfield Expansion Area
Existing Wakulla County WWTF
and Sprayfields

Lombardo Guidance
The Way Forward

Treatment Guidance

- AWT Treatment of Scenario 1 area
  (Leon County Scenario 1 = Primary Springs Protection Zone)
- Nitrate removal systems for Most Vulnerable Areas North of the Cody Scarp, if applicable
- Conventional OSTDs for remaining areas of Leon and Wakulla Counties

The Next Steps

1. Wastewater Management Plan
   - Financial plan for RME to support facilities and OSTDs management
   - 15 Months to Develop and Adopt
2. Wastewater Facilities Plan
   - Engineering plan for wastewater systems
   - 24 Months to Develop and Adopt

Lombardo Guidance
Initial Capital to Organize RME

- **The Lombardo Report also discusses a Start-Up Initial Capitalization Option**

- **Basic idea is that a detailed plan will be needed as the basis for legal establishment of the RME and currently there is no funding mechanism identified to do this.**

- **Initial Capitalization would involve a small initial annual fee on septic tank users via a Municipal Service Benefit Unit (MSBU).**

Initial Capital to Organize a RME

Number of OSTDS by Political Subdivision					
Sub-Area	Leon			Wakulla	Total
	CoT	Other	Total		
Scenario 1 - Wakulla Springs	118	7,382	7,500	1,100	8,600
Scenario 2 Outside Scenario 1 - Wakulla Springs	0	300	300	4,200	4,500
North of Cody Scarp	1,100	29,917	31,017	0	31,017
Other Watersheds	0	270	270	4,130	4,400
Confined Aquifer	0	0	0	1,904	1,904
Total	1,218	37,869	39,087	11,334	50,421
Annual Revenue Estimates					
Annual Fee	$ 20.00	$ 20.00	$ 20.00	$ 20.00	$ 20.00
Annual Revenue	$ 24,360	$ 757,380	$ 781,740	$ 226,680	$ 1,008,420

TLH/Leon Sales Tax Project - Very Similar to Lombardo's WW Mgm't Plan

Implementation of Lombardo Report
Recommendation for Phase II for Management Alternatives

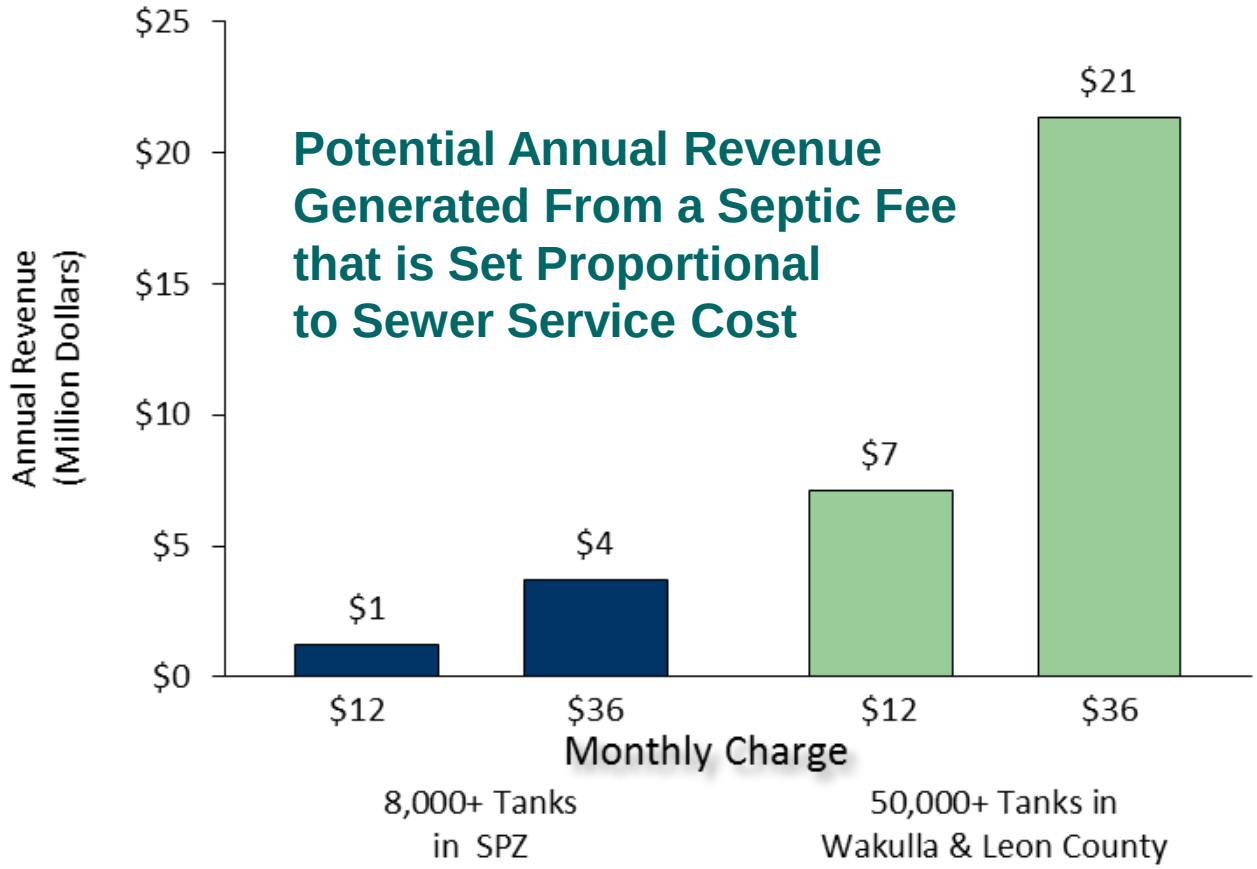
Part I: Wastewater Management Plan and Execution
Cost: $2,800,000

This component starts with a study to determine the scope, responsibilities and funding for a Responsible Management Entity (RME) that would be tailored to the specific needs of the unincorporated portion of Leon County that is not served by a sewer utility. We have stated priorities as we believe are reflected in the Comprehensive Plan and other County policies.

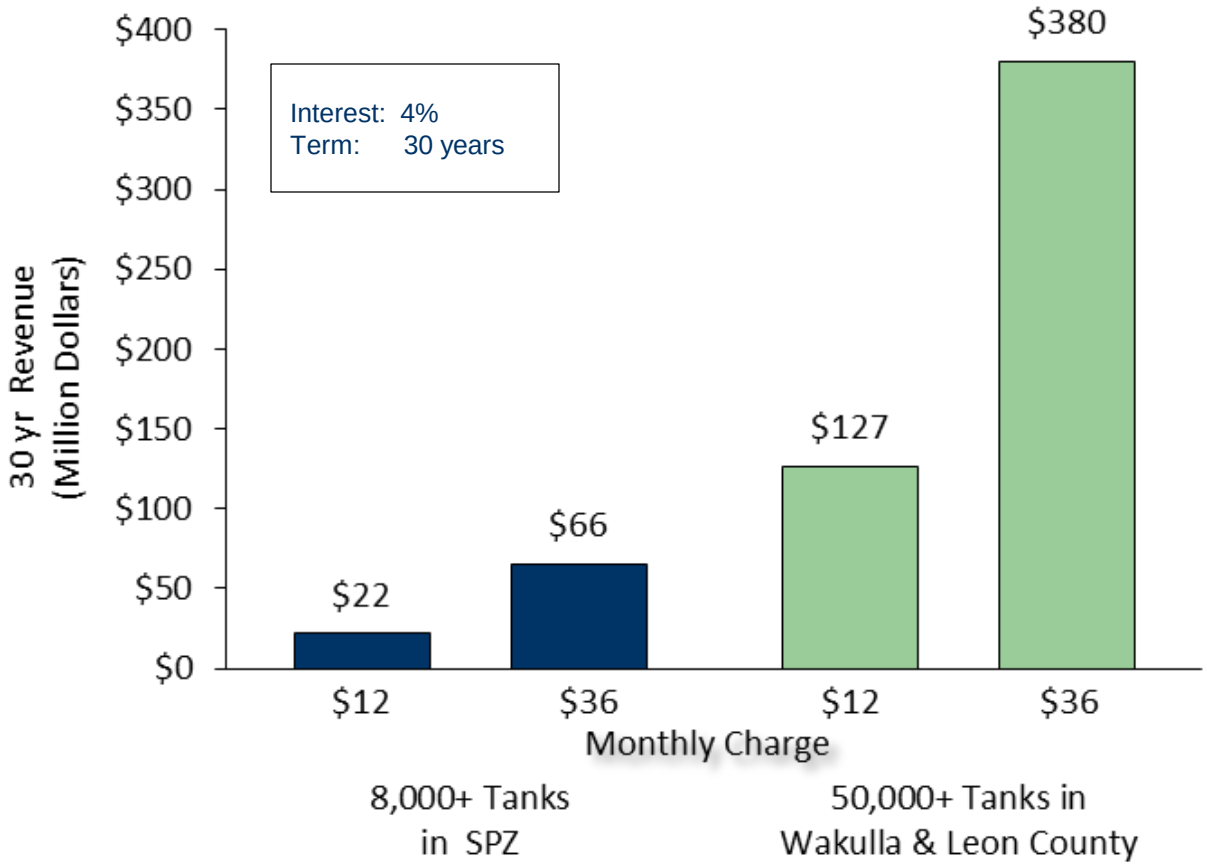
No Longer a Technical Issue…

The issue is now financial and political.

Revenue for OSTDS Management Program From Fees Set Proportional to Sewer Fees



Bonding Capacity on 30 Year OSTDS Fee Revenue Stream



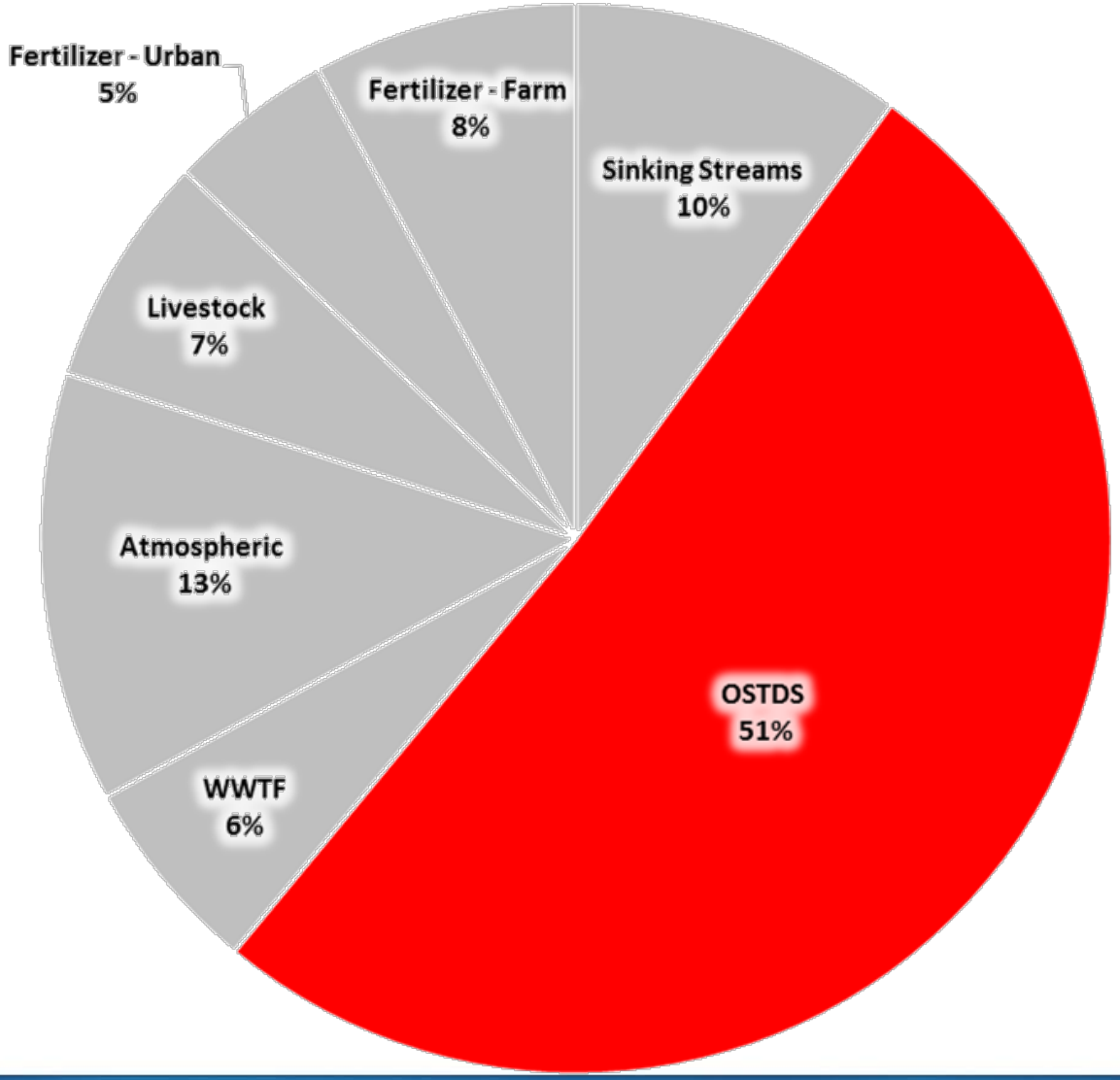
Take the Plunge!

Photo: D.A. Robin/Democrat

Questions

Draft Methodology for Load Reduction Calculations

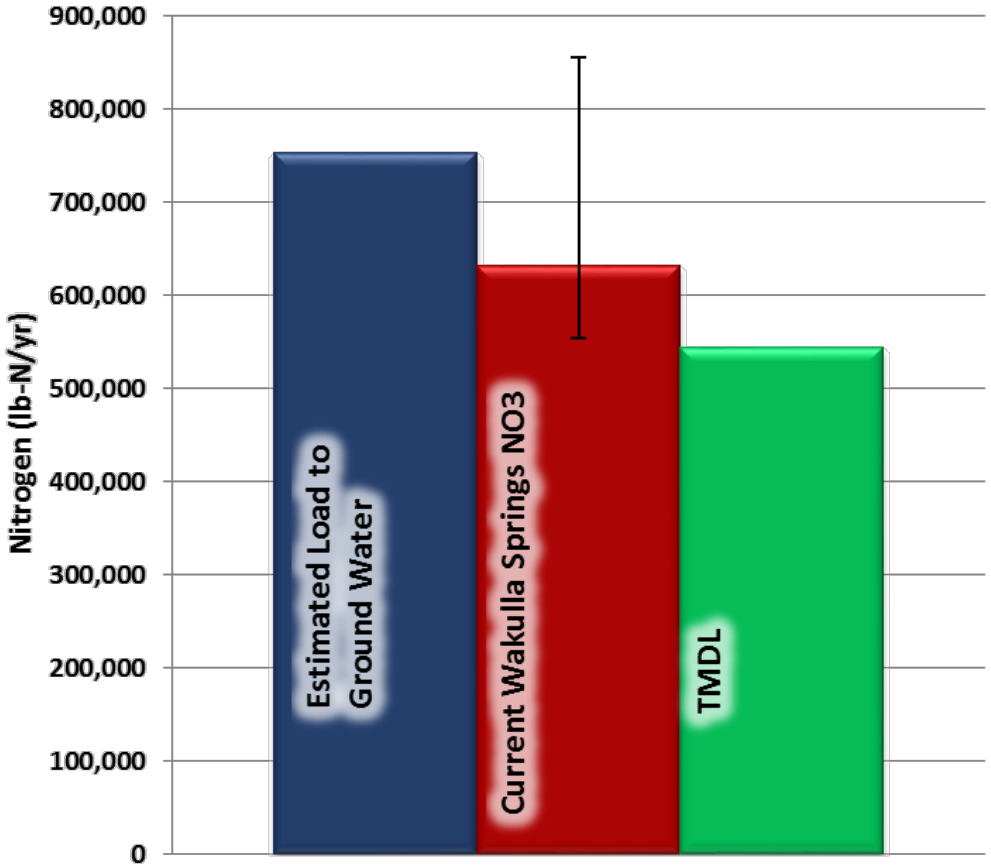
Wakulla Springs
Load to Groundwater



341,847 kg/yr or
752,063 lbs-N/yr

Wakulla Springs Discharge of Nitrogen

- NSILT (blue):
  - Load = **752,063 pounds of nitrogen per year (lbs-N/yr).**
- Current 10/2014-10/2015 (red):
  - Discharge = 789 cubic feet per second (ft^3/sec).
  - TN = 0.41 milligrams per liter (mg/L).
  - Load = **631,077 lbs-N/yr**.
- TMDL (green):
  - Using current discharge.
  - TN = 0.35 mg/L.
  - Load = **543,140 lbs-N/yr**.



Draft Load Reduction Ranges

NSILT Load x % Reduction = Total Load Reduction Needed (TLR)
TLR x % OSTDS NSILT Load to Groundwater = OSTDS Load to be Remediated
Adjust OSTDS Load to be remediated for unconfined area (PFAs)

Low Range - Current*		
% Reduction	Total Load Reduction Needed for all Sources (lbs-N/yr)	OSTDS Load to be Remediated in all BMAP Area (lbs-N/yr)
14	105,288	53,697

High Range – TMDL		
% Reduction	Total Load Reduction Needed for all Sources (lbs-N/yr)	OSTDS Load to be Remediated in all BMAP Area (lbs-N/yr)
56.2	422,659	215,556

- NSILT estimated load to groundwater: 752,063 lbs-N/yr
  - Starting load for all load reduction calculations

* Based on data from October 2014 – October 2015

Example:
Loads to Groundwater Using High Range Numbers

Load Estimates to Groundwater		
NSILT Load to Groundwater (lbs-N/yr)	Total Load Reduction Needed (lbs-N/yr)	OSTDS Load to be Remediated (lbs-N/yr)
752,063	422,659	215,556

Estimates per System	
Estimated Load (lbs-N/yr)	Estimated Load Reaching Groundwater (lbs-N/yr)
26.68	12

We need to estimate the final TN concentration of the possible projects to determine the minimum number of OSTDS remediation (additional *in situ* treatment or sewer) needed to meet the TMDL target.

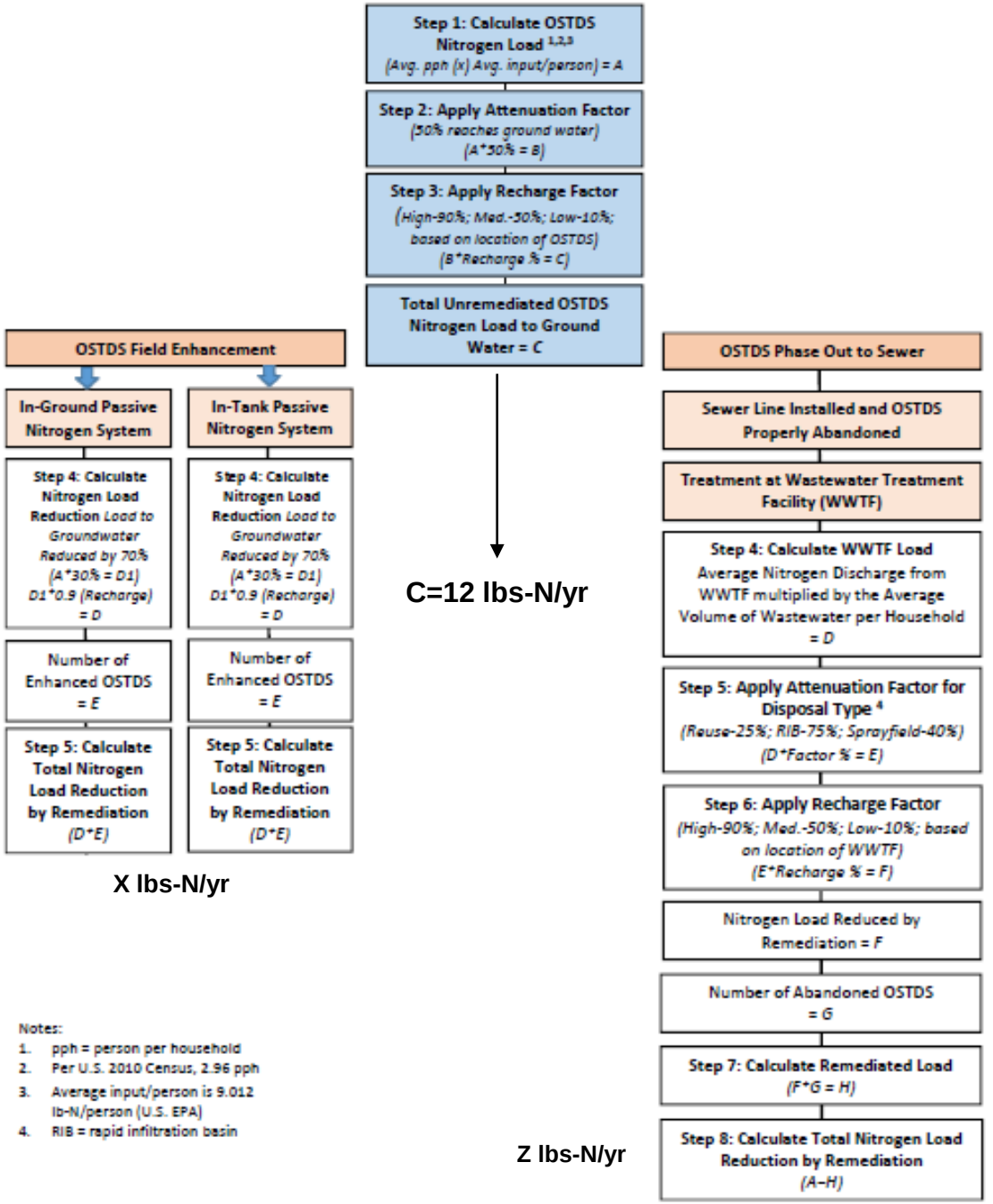
Draft Calculations for OSTDS Load Reductions

Example:

High range load

Example 1:
OSTDS load to be remediated in
all BMAP area 215,556 lbs-N/yr (T):

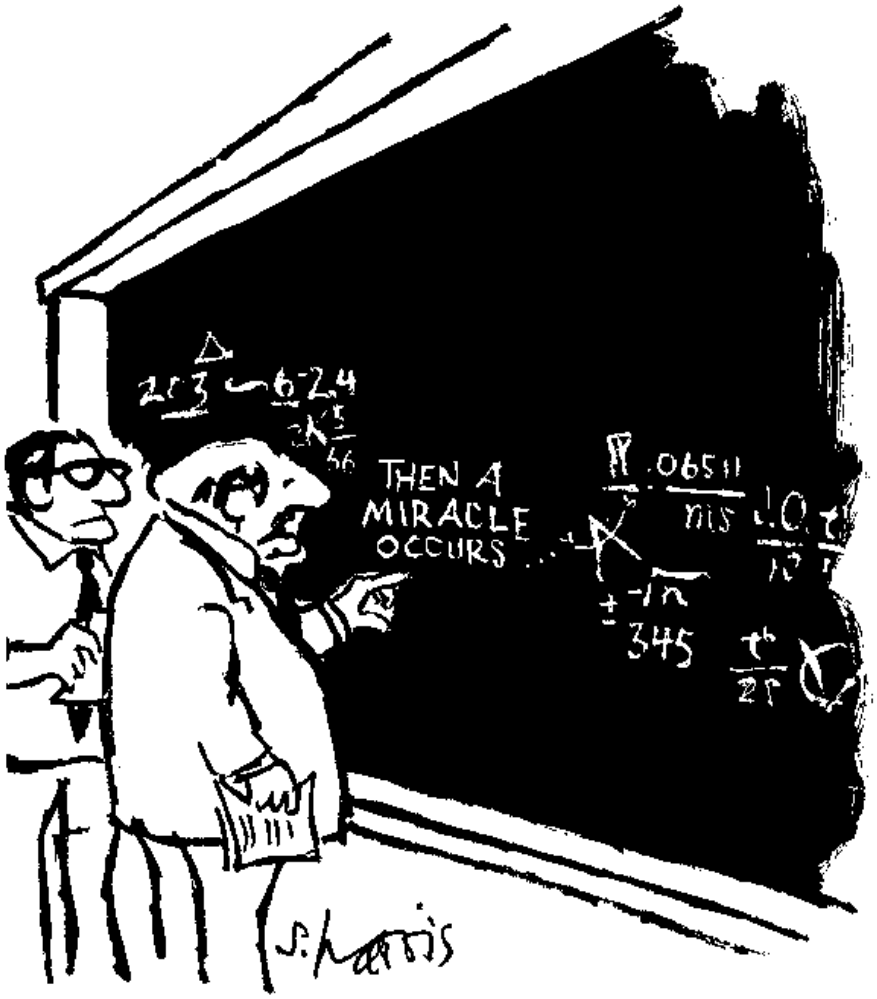
X lbs/yr + Z lbs/yr = 215,556 lbs-N/yr (T)



Reduction Calculations

- OSTDS estimated loading will be averaged—not specific to each individual system.
  - Average people per household.
  - Conservative reduction estimate of field enhancements.
- Wastewater facility loading will be estimated (if applicable):
  - Treatment level/remaining nitrogen concentration.
  - Disposal method (reuse, rapid infiltration basin [RIB] or sprayfield).
  - Recharge rate at disposal site.
- Reduction benefits will be estimated, not individually measured—approach may need refinement over time.

Questions About Calculations?



"I think you should be more explicit here in step two."

Public Education

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.

TAPP: Environmental Crossroads for Wakulla Springs (4:54)

Public Education

- Who are the key audiences to target with the Wakulla Springs public education plan?
  - 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?
- Can we set high, medium, and low priority actions?

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

Possible Topics for Next Meeting

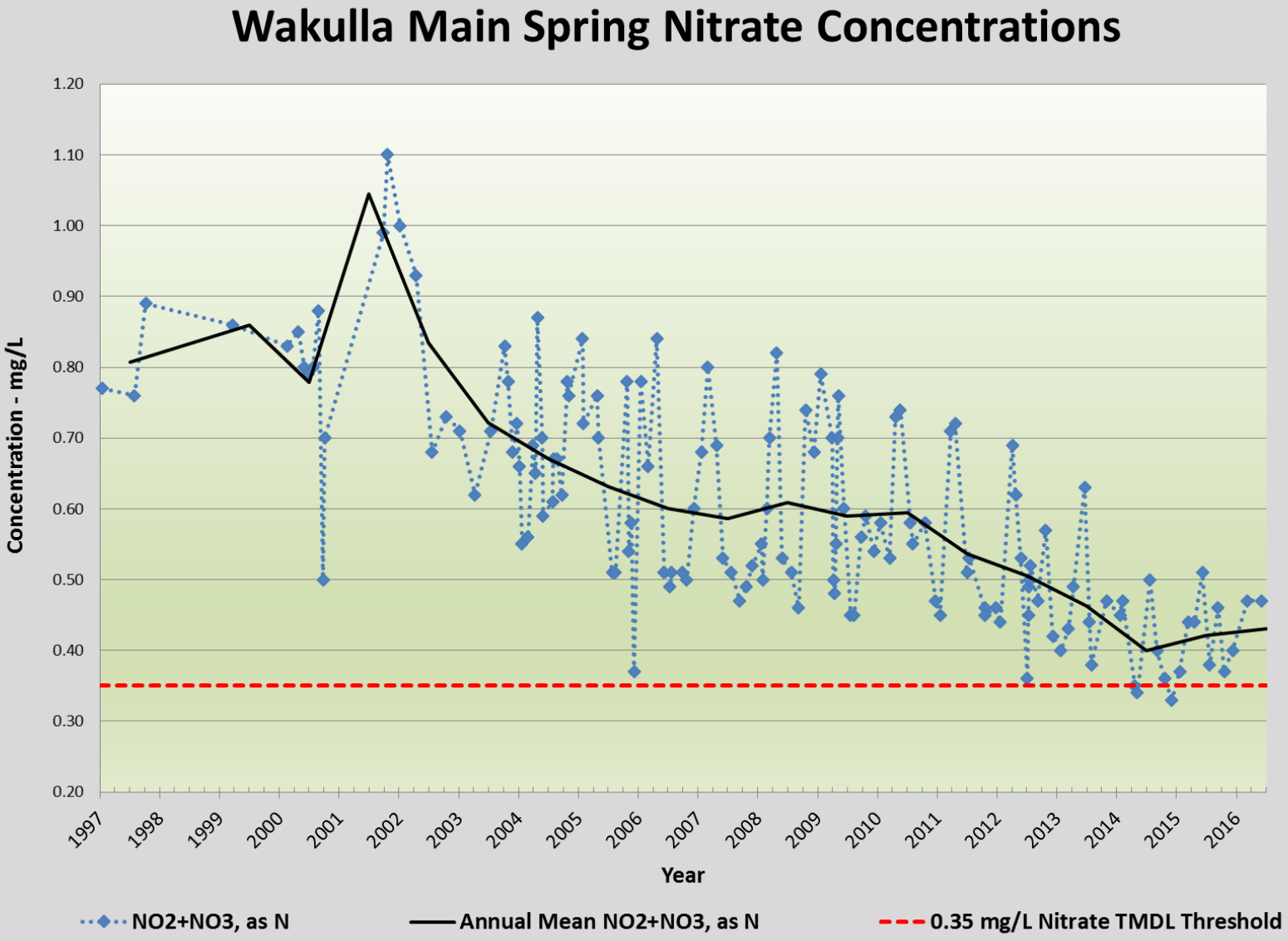
- Follow up on action items from today's meeting.
- Start discussions on
  - FDOH updates on rule-making
  - Discuss vulnerability and how information can be used to identify priority areas
  - Technologies
  - Possible approaches to address septic systems and implications associated with each:
    - Sewering
    - Alternatives to sewering
      - DOH
      - FOWA

Wrap Up

- Next meeting date.
- Other comments/announcements.
- Action items.
- Prepare for next meeting.

Source: http://wakullaspringsalliance.org/

Wakulla Main Spring Nitrate-Nitrite Trend 1997-2016



Wakulla – Period of Record/Verified Period/Post-Verified Period

STATION	SAMPLING PERIOD	n	MEAN	MEDIAN	MIN	MAX
Wakulla Main	4/25/1972 - 3/8/2016	167	0.67	0.62	0.25	1.60
Wakulla B-Tunnel	11/24/1987 - 3/8/2016	53	0.87	0.89	0.64	1.30
Wakulla C-Tunnel	11/22/1987 - 3/8/2016	54	0.80	0.80	0.52	1.40
Wakulla D-Tunnel	4/12/2004 - 3/8/2016	28	0.75	0.78	0.52	0.96
Wakulla K-Tunnel	4/12/2004 - 3/8/2016	28	0.38	0.37	0.19	0.57
Wakulla River @ CR 365	10/4/2005 - 8/11/2012	56	0.44	0.43	0.30	0.76

Period of Record

STATION	SAMPLING PERIOD	n	MEAN	MEDIAN	MIN	MAX
Wakulla Main	1/1/2000 - 6/30/2007	58	0.70	0.70	0.37	1.10
Wakulla B-Tunnel	1/1/2000 - 6/30/2007	13	0.95	0.94	0.81	1.10
Wakulla C-Tunnel	1/1/2000 - 6/30/2007	13	0.88	0.89	0.80	1.00
Wakulla D-Tunnel	1/1/2000 - 6/30/2007	13	0.84	0.87	0.66	0.96
Wakulla K-Tunnel	1/1/2000 - 6/30/2007	13	0.43	0.41	0.28	0.57
Wakulla River @ CR 365	1/1/2000 - 6/30/2007	3	0.52	0.54	0.44	0.57

Verified Period (1/1/2000-6/30/2007)

STATION	SAMPLING PERIOD	n	MEAN	MEDIAN	MIN	MAX
Wakulla Main	7/1/2007 - 3/8/2016	79	0.52	0.50	0.33	0.82
Wakulla B-Tunnel	7/1/2007 - 3/8/2016	39	0.83	0.85	0.64	1.00
Wakulla C-Tunnel	7/1/2007 - 3/8/2016	40	0.75	0.76	0.52	0.97
Wakulla D-Tunnel	7/1/2007 - 3/8/2016	15	0.68	0.65	0.52	0.89
Wakulla K-Tunnel	7/1/2007 - 3/8/2016	15	0.34	0.33	0.19	0.50
Wakulla River @ CR 365	7/1/2007 - 3/8/2016	50	0.42	0.41	0.30	0.62

Post-Verified Period