

Photo by Ed Rhodes

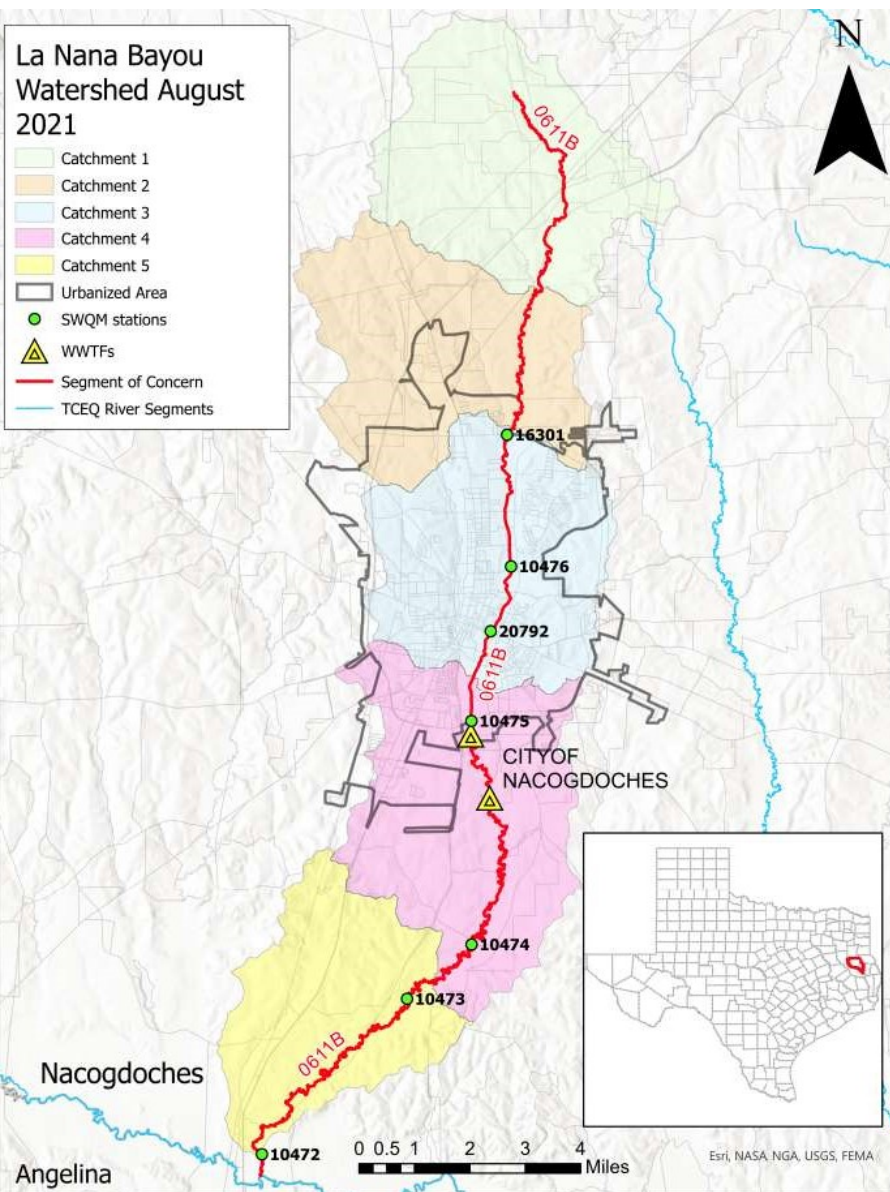
La Nana Bayou Watershed Protection Plan Development



Texas Water
Resources Institute
make every drop count

La Nana Bayou WPP Development Meeting #3 Agenda

- - I. Welcome & Meeting Overview
Emily Monroe, TWRI
 - II. Brief review of Meeting #2 Pollutant Sources and Adjustments
Lucas Gregory, TWRI
 - III. Pollutant Loading Estimates and Priority Areas
Lucas Gregory, TWRI
 - IV. Management Measures and Implementation Resources
Emily Monroe, TWRI
 - V. Discussion & Questions



Project Overview

La Nana Bayou on 303d List for bacteria since 2000

Characterization Report completed in 2019

Watershed Protection Plan (WPP) development project is funded by TCEQ as part of a Clean Water Act Section 319(h) Grant from the U.S. EPA

TWRI, ANRA, and SFASU leading WPP development with local stakeholders to address water quality through voluntary management measures

Watershed Website: [Tx.ag/LaNana](https://tx.ag/LaNana)



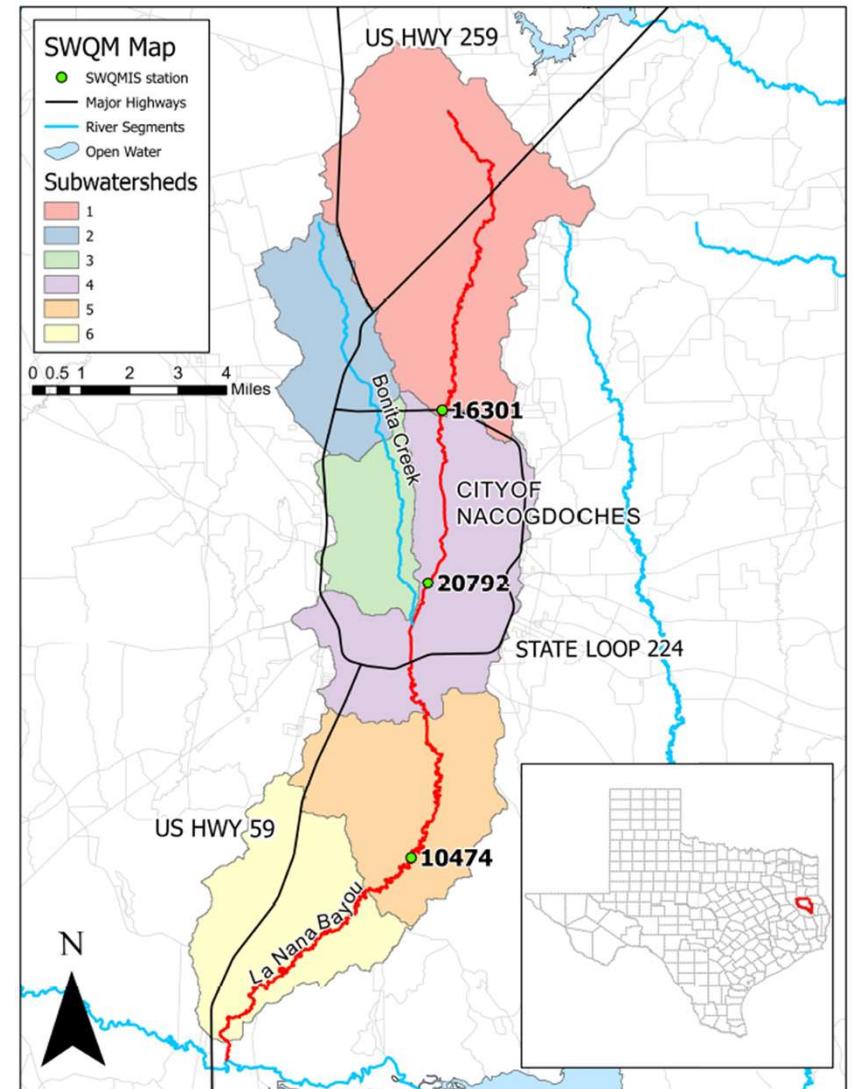
La Nana Bayou Pollution Sources and Load Estimates

Lucas Gregory, PhD
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-
- Review Pollutant Sources and Adjustments from Meeting #2
 - Pollutant Loading Estimates & Priority Areas

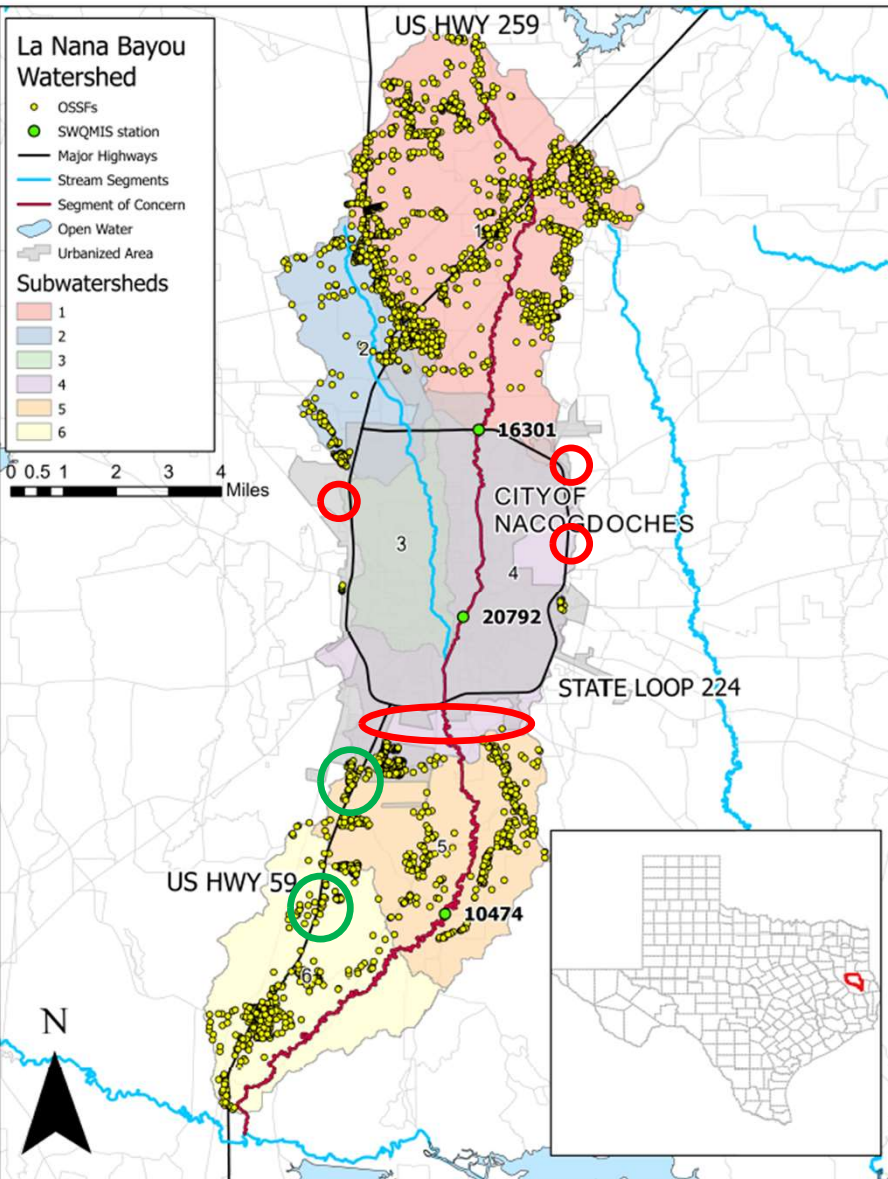
Subbasin Recommendations

- Divided into 6 watershed subbasins
- Based on hydrology and land cover/land use
 - Differentiates between rural and urban areas
- Attempted to keep relatively equal size



Updated On-Site Sewage Facilities (OSSFs) Estimate

- **2,838** OSSFs estimated in the watershed
 - Based on Nacogdoches County 911 address data outside of WWTF service areas and verification by ANRA, City of Nacogdoches, Water Supply Corporation, and County
- Slight overall increase from 2,773
 - Red circles served by WWTF; assumed OSSFs removed
 - Green circles had systems added



Potential *E. coli* Loading Assessment

Considers watershed characteristics

- Soil, slope, land cover and land use

Hydrologic network

Populations

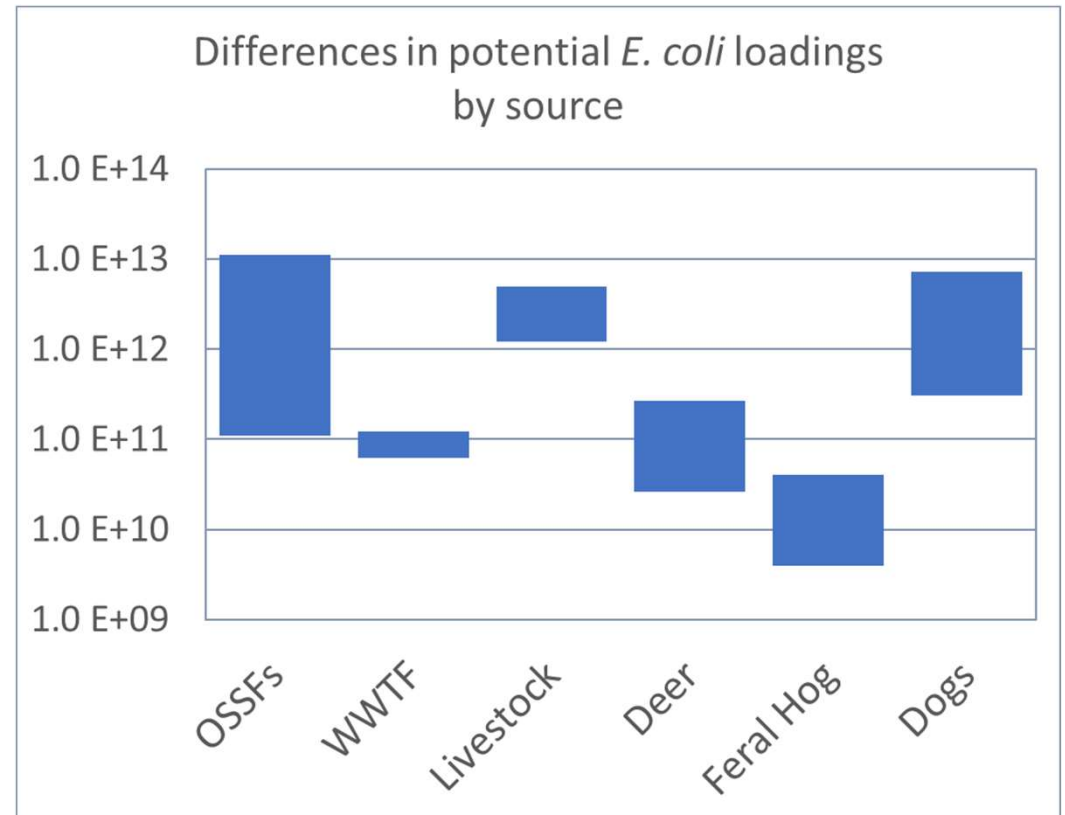
- Animal counts
- Human density

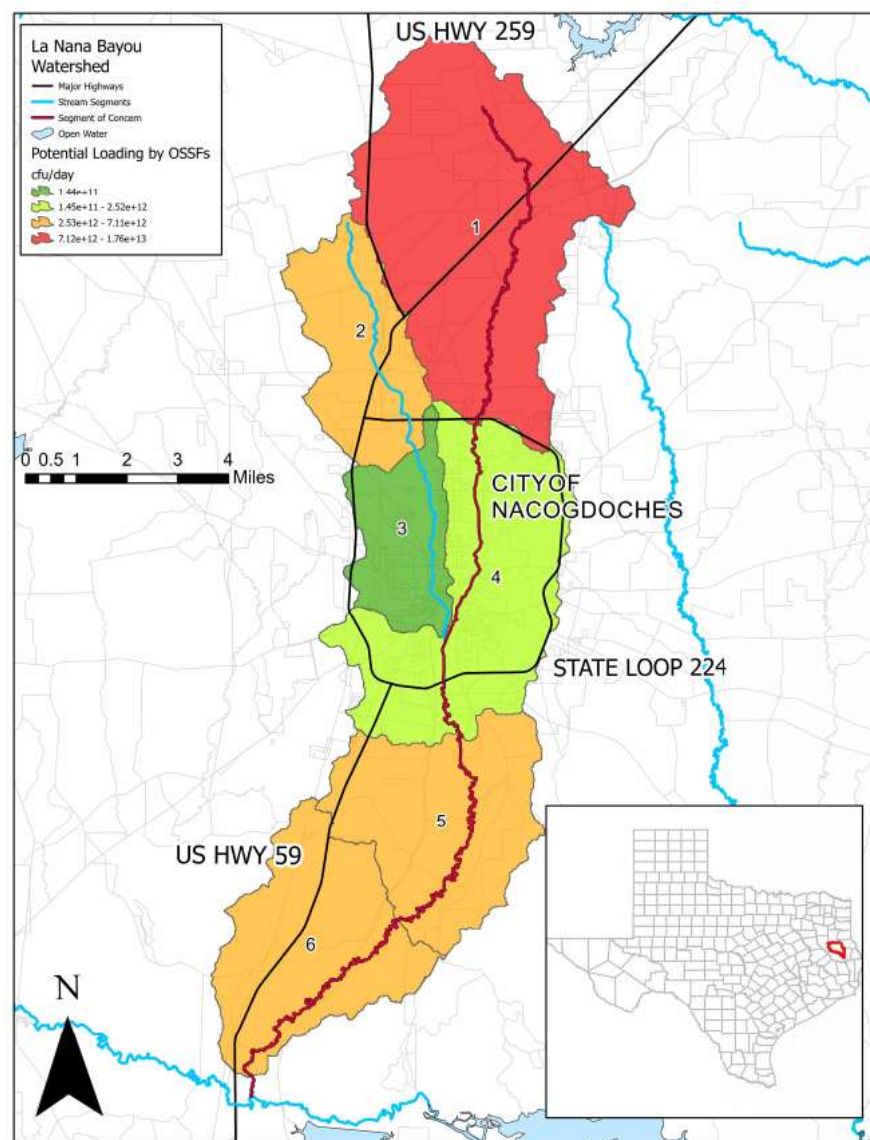
Published bacteria loading rates

Compares potential loads between watershed subbasins

- Relative potential difference between subbasins
 - Exact number of practices are not critical
- Useful in helping identify priority areas for management recommendations based on need

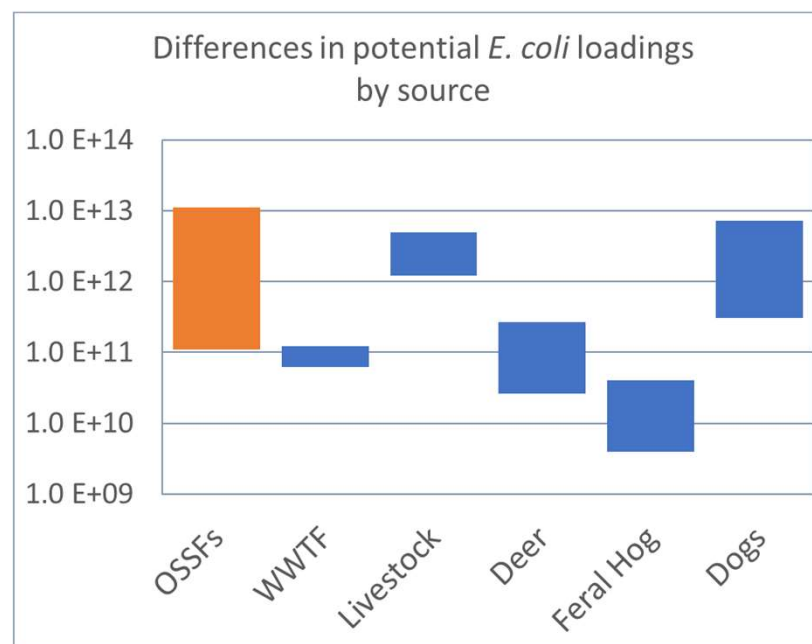
Potential *E. coli* Loading Assessment





OSSFs Load Estimate

- Nacogdoches County Environmental Services Department Designated Representative estimates that about **30% of OSSFs** in the county are failing
 - ~851 potentially failing OSSFs in the watershed



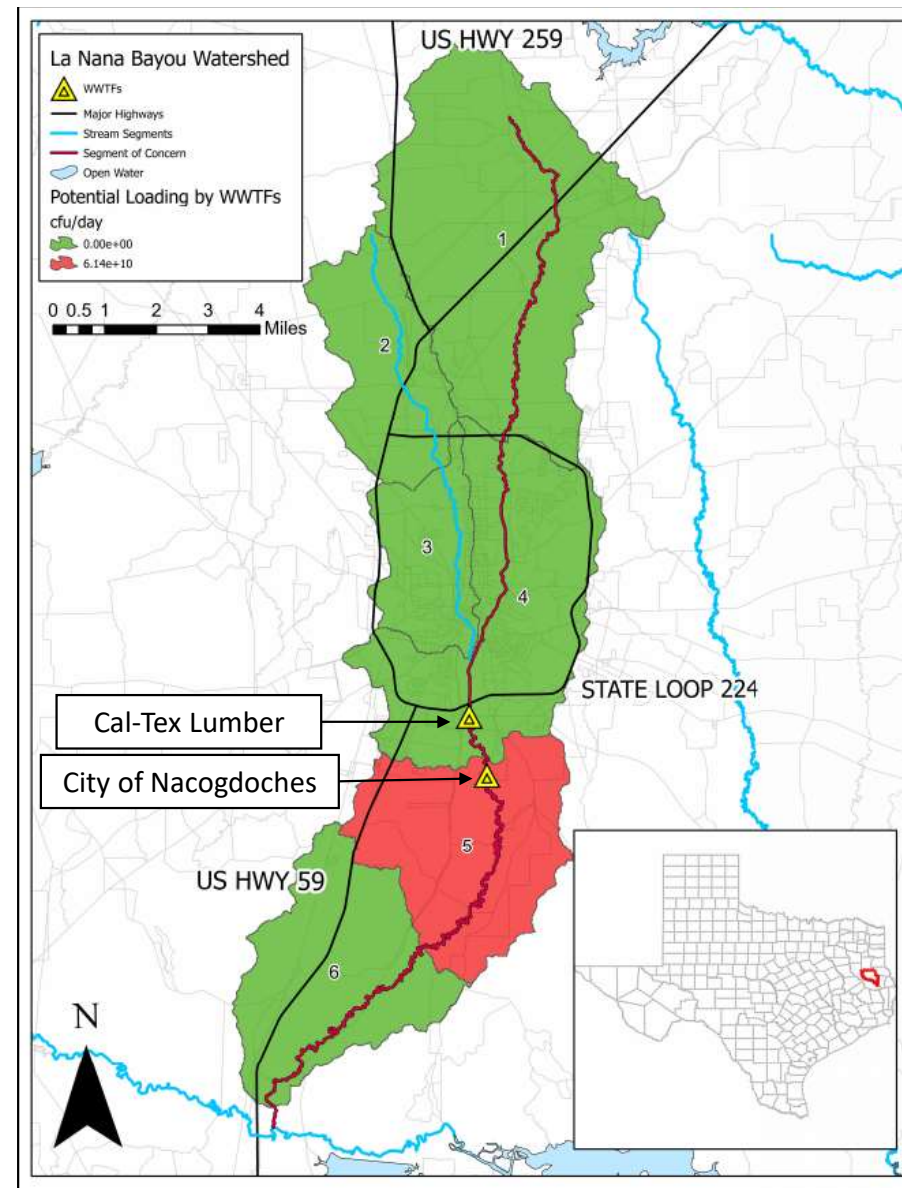
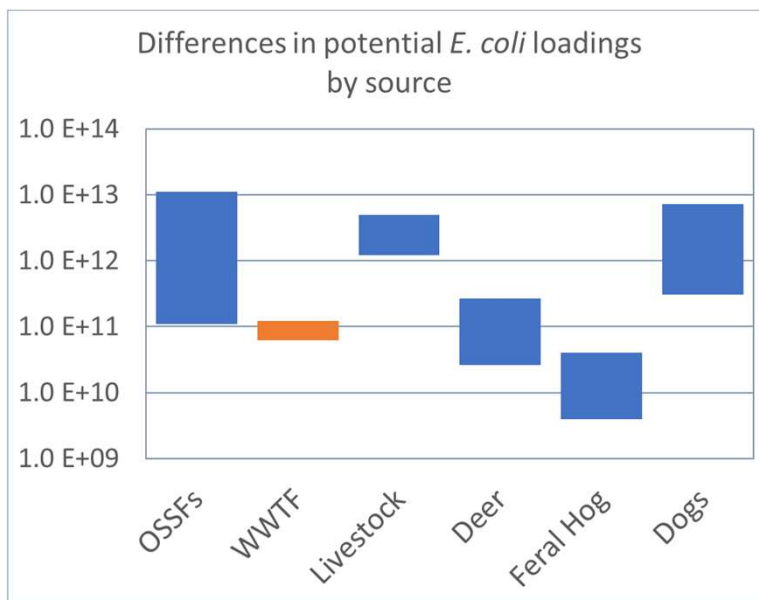
Permitted Wastewater Treatment (WWTFs)

Cal-Tex Lumber

- Intermittent flow
- Industrial cooling, storm, and wash water

City of Nacogdoches

- 12.88 MGD of municipal wastewater



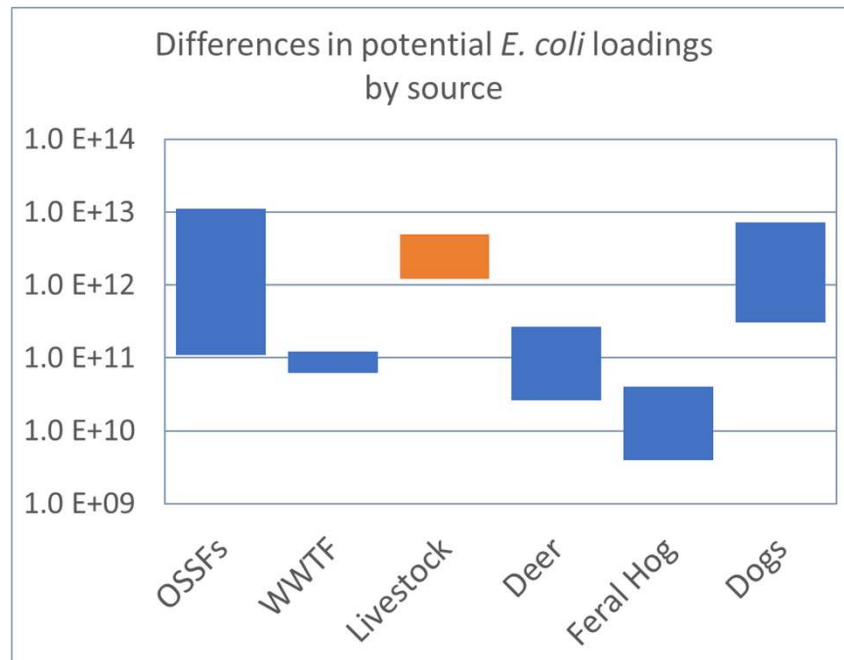
Livestock Population Estimate

- Based on estimates from livestock statistics obtained from the USDA National Agricultural Statistics Survey
- County-based populations scaled down to watershed area
- Applied to hay/pastures, herbaceous, shrub/scrub land uses

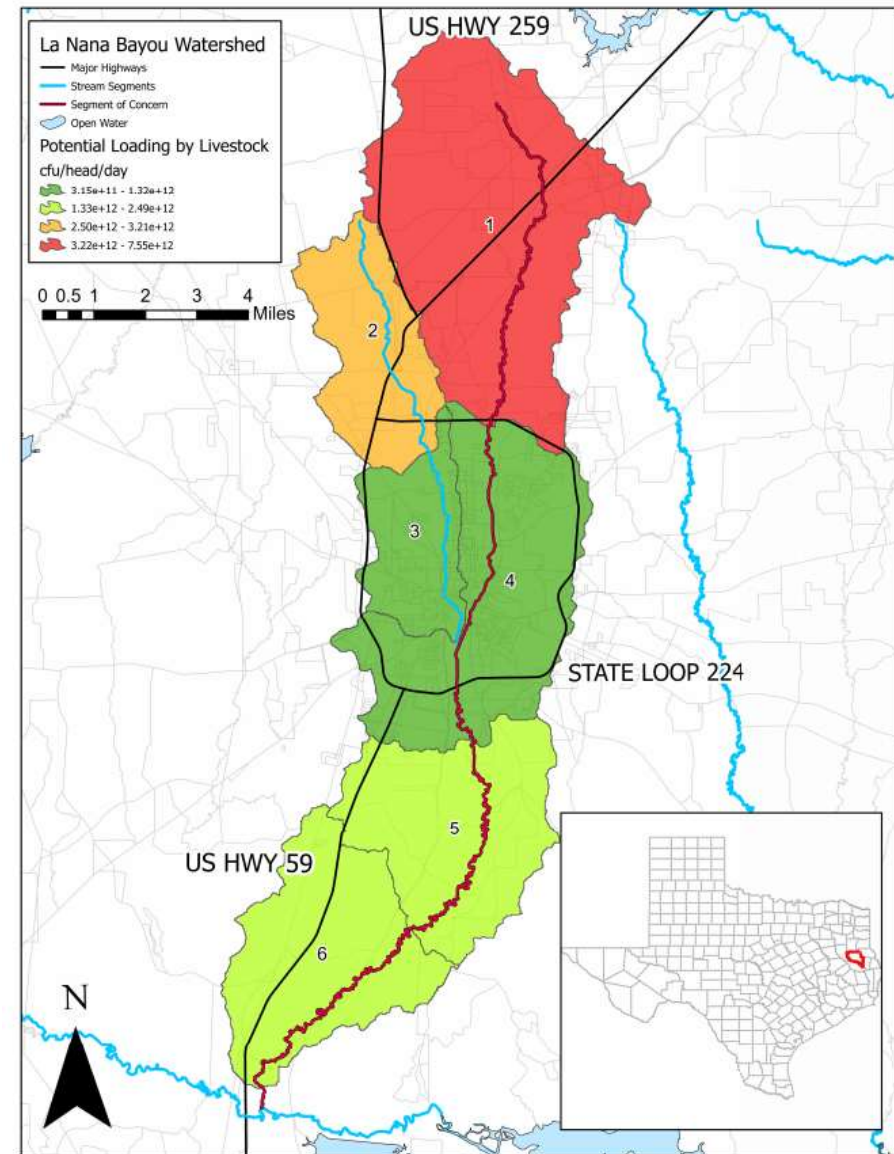
	Watershed Total
Cattle	2900
Goat	40
Horse	98
Pigs	4
Sheep	17



Livestock Load Estimate



Note: Several animal feeding operations (AFOs) exist in the watershed. These operations are required to obtain a Water Quality Management Plan (WQMP) from the Texas State Soil and Water Conservation Board (TSSWCB) before operations can begin. WQMPs are reviewed and agreed to by local soil and water conservation districts and NRCS. Discharge of animal waste is not allowed through the plans.

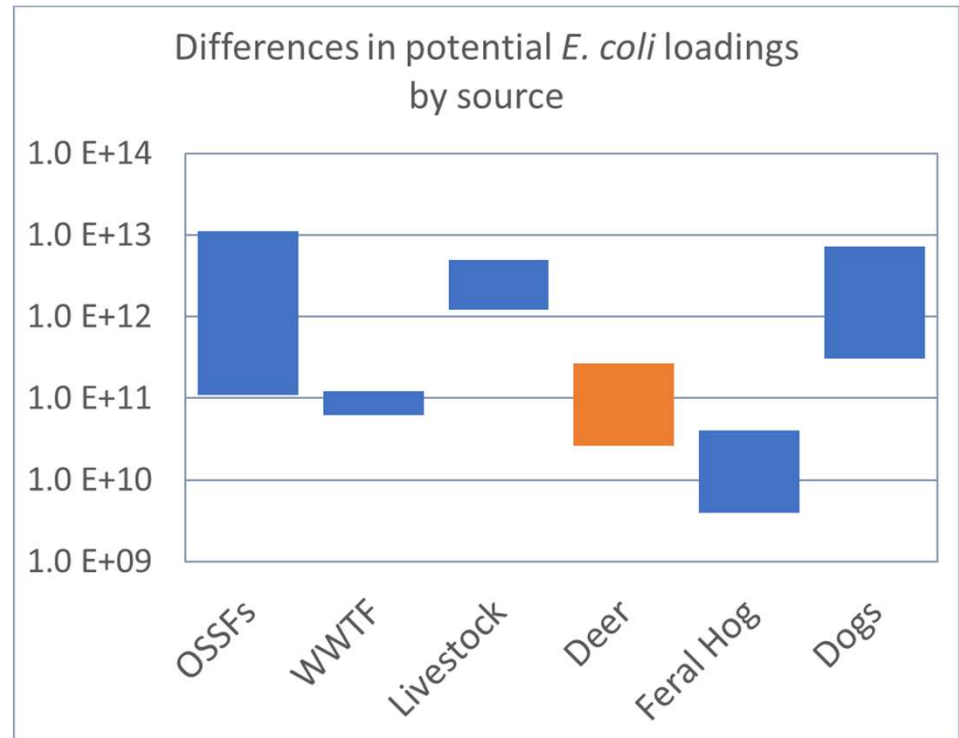
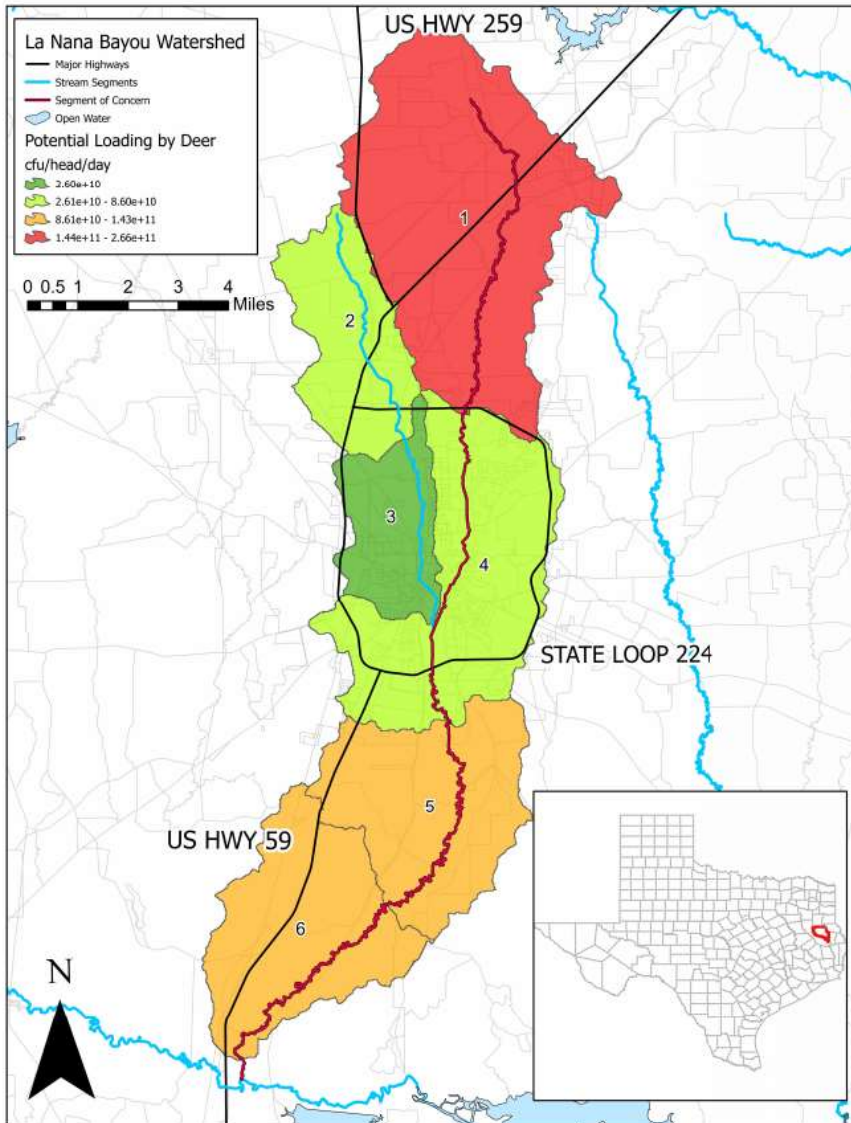




Deer

- Estimated population: 700 deer
 - Resource Management Unit density survey estimates density
 - 56.49 acres per deer
 - Applied to all land covers but barren, developed, open water
 - Used average of most recent 10 years

Deer Load Estimate

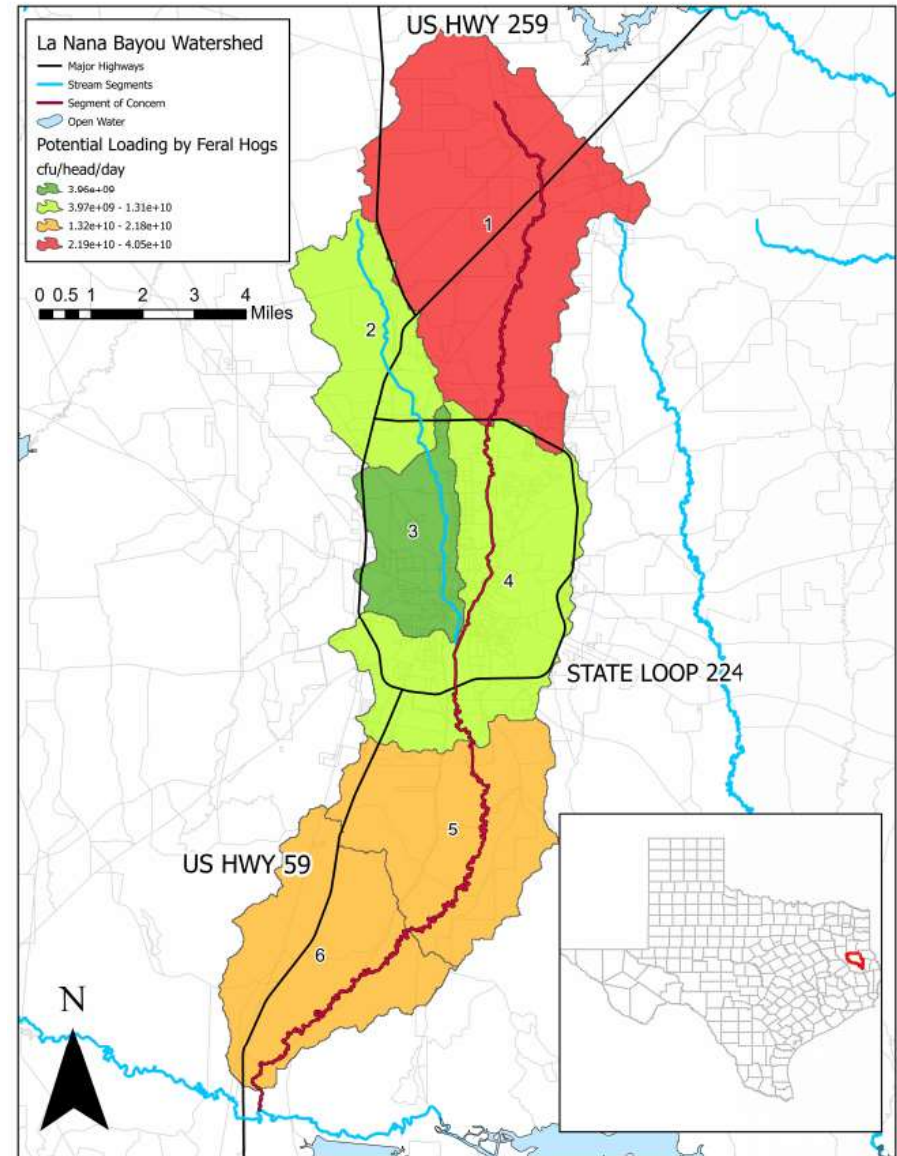
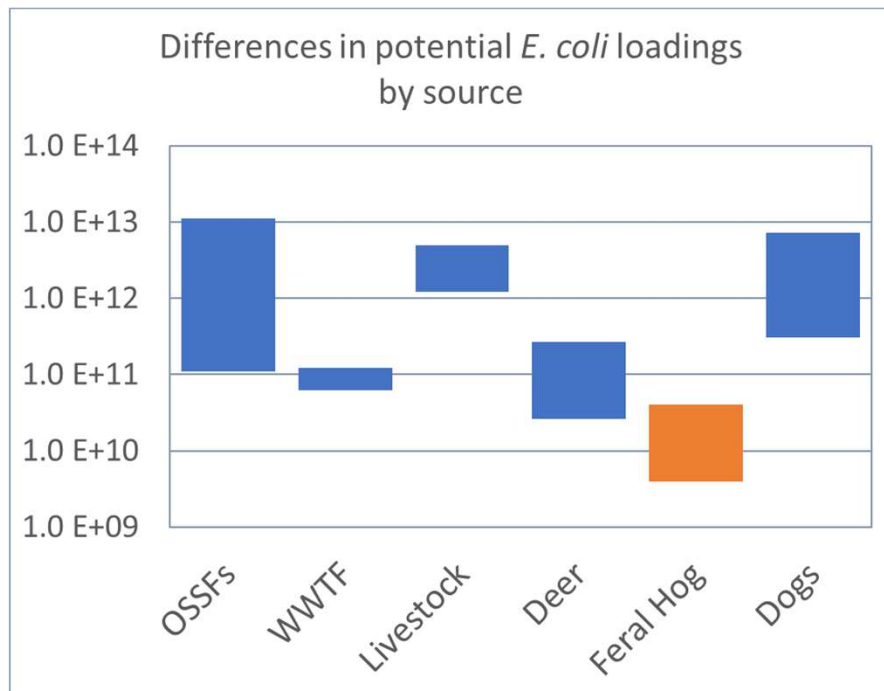


Feral Hogs

- Estimated population: 1,187 feral hogs
 - Texas A&M Natural Resources Institute Method:
33.3 ac/hog applied to all land cover but barren, developed,
open water



Feral Hogs



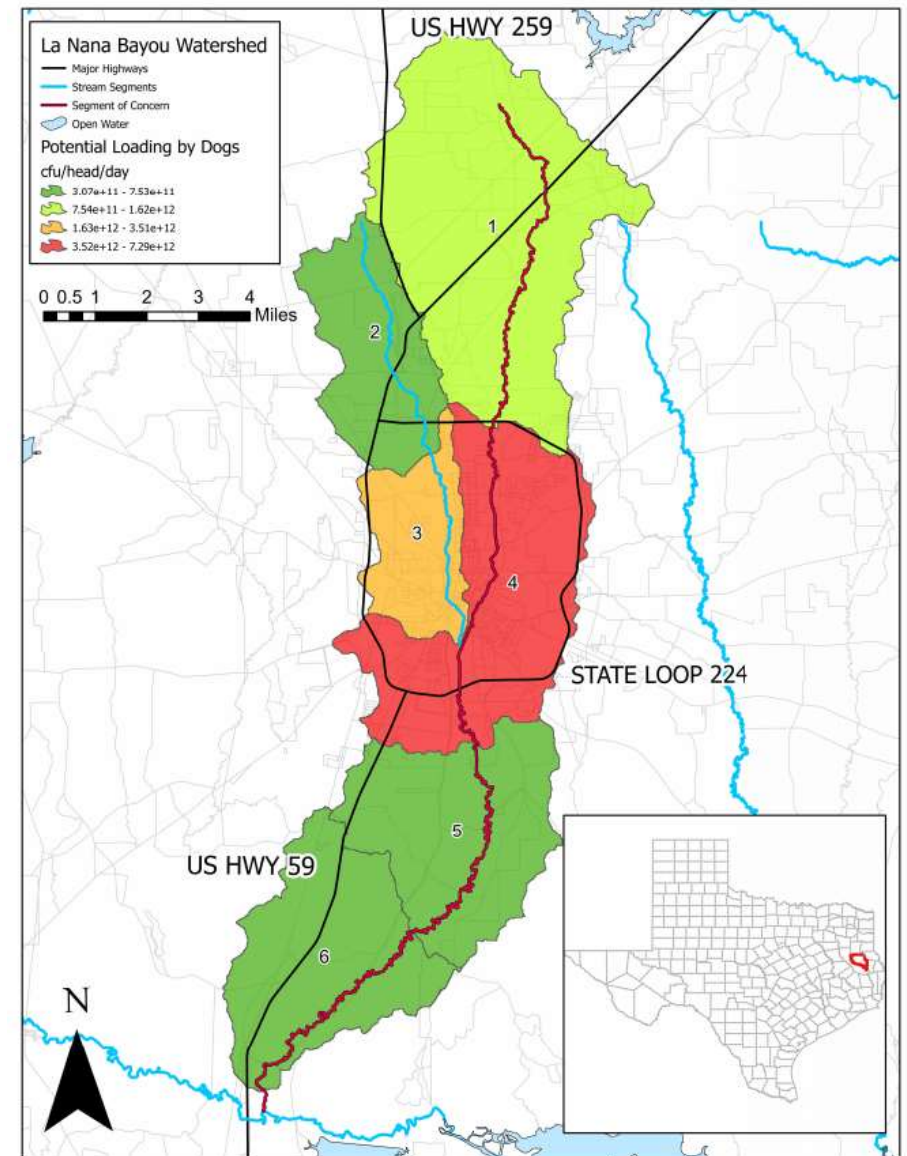
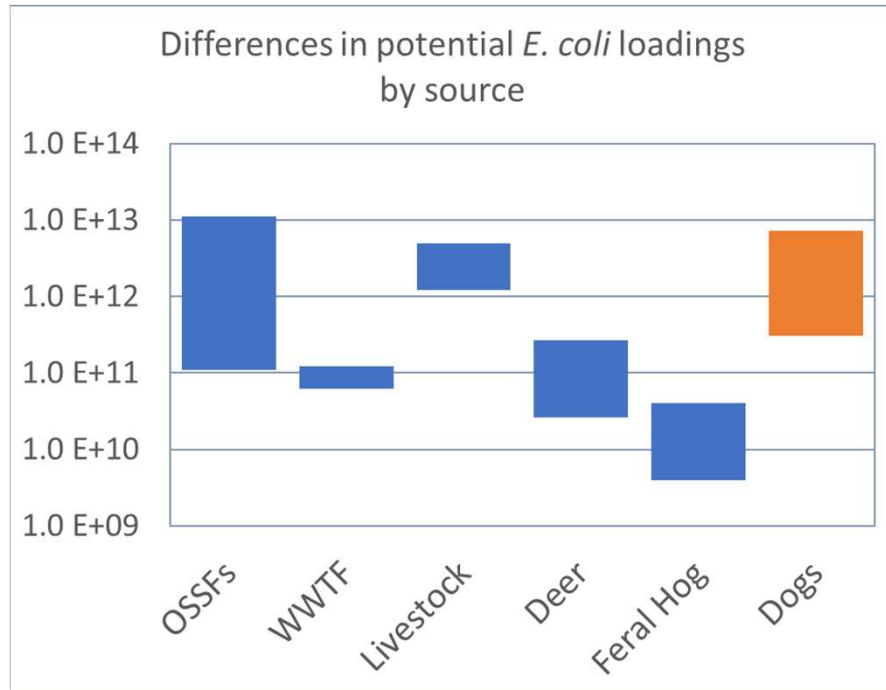
Pet Estimates

Estimated population: 11,079 dogs

- Nationwide Survey estimates 0.614 dogs per US household
- Major contributor to *E. coli* if pet waste not properly discarded



Pet Estimates



Management Measures for the La Nana Bayou

Emily Monroe

Program Specialist, TWRI



Management Measures



Comprised of activities that address pollution sources



Includes quantifiable goals (typically over 10 years), costs, and participants



Can include financial and technical assistance, education programs, citizen science programs, etc.



Your input helps us calculate our estimated load reduction

Table 13.1. Management recommendations, implementation schedule, responsible party and cost estimates

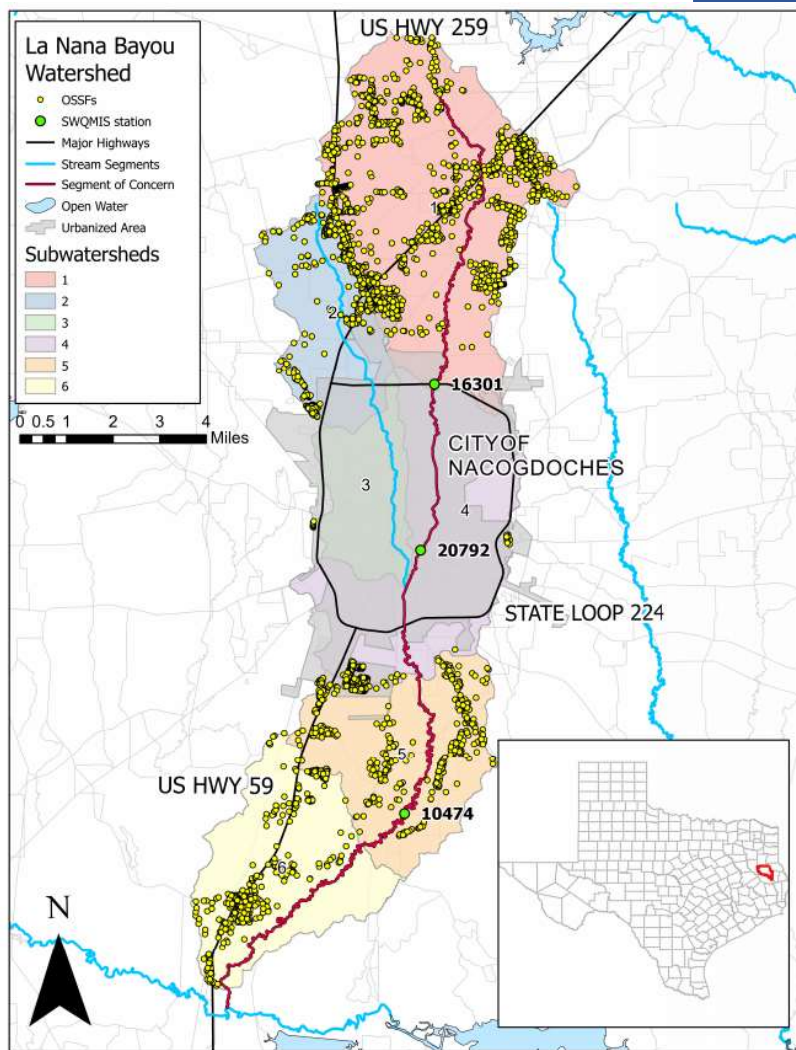
Management Measure	Responsible Party	Planned Implementation Goal			Unit Cost	Total Cost
		Year 0–3	Year 4–6	Year 7–10		
Agricultural Management Measures						
Water Quality Management Plans	SWCDs/ Landowner	20	30	50	\$15,000 ea.	\$1,500,000
Feral Hog Management Measures						
Fencing Deer Feeders	Landowners/ Lessees	As Many As Possible			\$200 ea.	N/A*
Voluntary Feral Hog Removal	Landowners/ Lessees	1,015 hogs/yr.			N/A*	N/A*
Promote Online Tracking Tool Use	County/ Extension	Continually			\$1,000/yr.	\$10,000
OSSF Management Measures						
Existing OSSF ID and Inspection	County/ ANRA	236	300	---	\$40,000/yr.	\$240,000
Develop Watershed OSSF Database	County/ ANRA	1		---	\$50,000	\$50,000
Administer OSSF Repair/Replace Program	County/ ANRA	3	3	4	\$15,000/yr.	\$150,000
Repair/Replace OSSFs as funding allows	OSSF Owners	20	30	50	\$5,000 – \$10,000 ea.	\$500,000 – \$1,000,000
ID and Inspect Hunting Camp OSSFs	County/ ANRA	As Many As Possible			Included in Existing OSSF ID Costs Above	
Install/Repair Hunting Camp OSSFs	Hunting Camp Owners	3	3	4	\$5,000	\$50,000
Total Management Recommendation Cost						\$3,000,000

* Costs will be incurred by the landowner and will vary depending on specific methods and actual number implemented

Waste Management: pet waste & illegal dumping

- Educational signs remind folks to clean up after themselves
- Host “Trash Clean Up” days at parks and along riparian areas; pass out pet waste bags at events in the watershed
 - Clean areas tend to stay clean, trashed areas stay trashed!
- Maintain and expand pet waste stations
- Promote spay/neuter programs
 - Strays contribute to a multitude of environmental problems





On-Site Sewage Facilities (OSSFs)

- Remediation Programs
- Education & Outreach:
 - Homeowner maintenance classes
 - OSSF Professional CEUs
 - Targeted mailing (educational publications)



Stormwater Runoff

- Excess fertilizers and pesticides used in lawn care contribute to bacteria and nutrient issues
- Slow down overland transport
 - Riparian restoration projects to prevent erosion
 - Retrofit existing stormwater detention ponds where possible
- Education & Outreach:
 - Ensure restaurant/commercial trash bins are covered
 - Education Programs: Riparian (Urban and Landowner), Healthy Lawns Healthy Waters

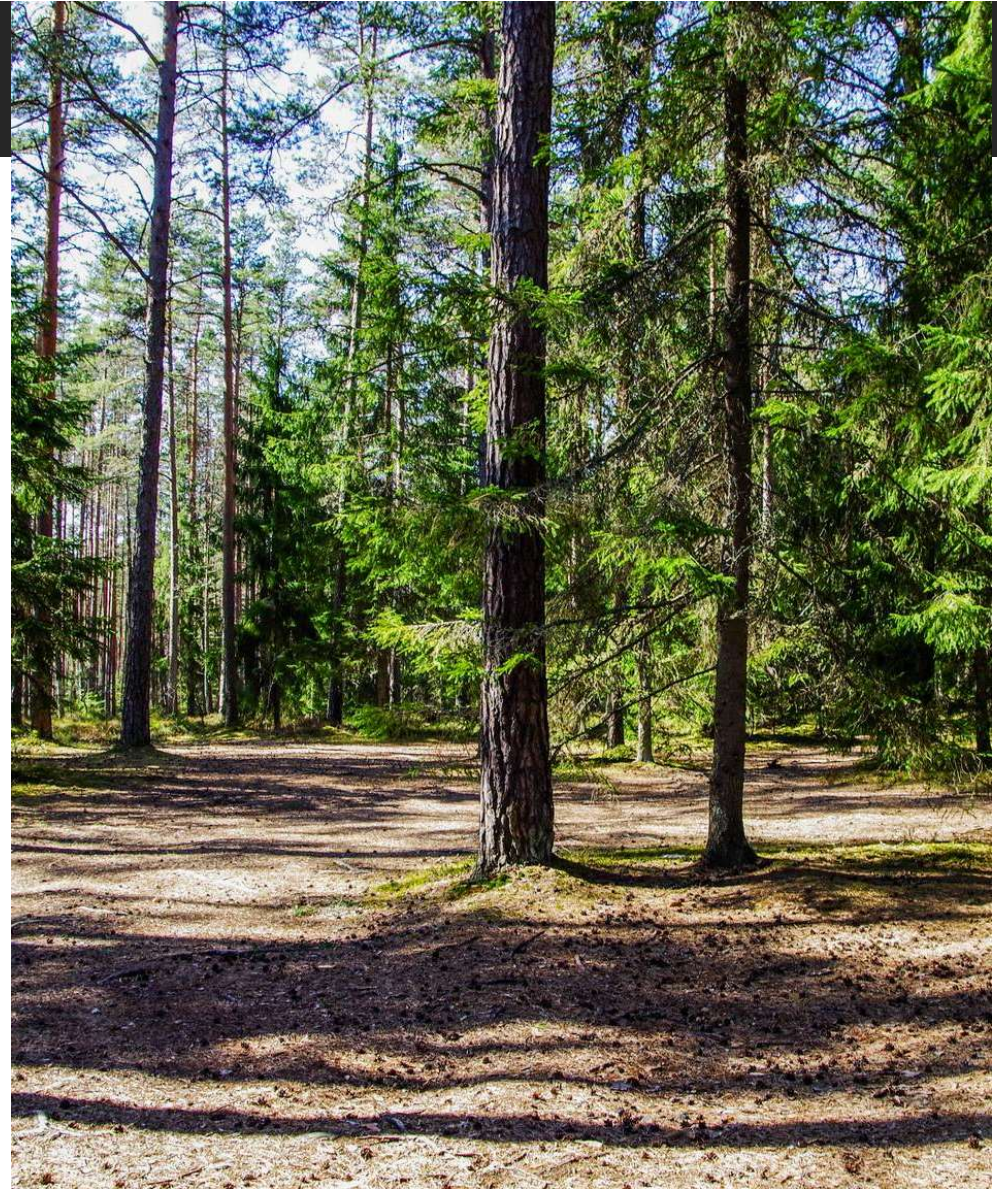


Feral Hogs / Wild Pigs

- Provide technical support to landowners for feral hog management
 - Exclusion fencing, habitat manipulation, etc
- Promote removal of feral hogs
 - Trapping, snaring, etc
- Education & Outreach
 - <https://wildpigs.nri.tamu.edu/>

Cost-share & Technical Assistance Programs

- Variety of programs available for Texas
 - TSSWCB Water Quality Management Plans (WQMP)
 - Texas Landowner Incentive Program (LIP)
 - NRCS Environmental Quality Incentive Program (EQIP)
 - Farm Service Agency Conservation Reserve Program (CRP)
- Popular activities in the area:
 - rotational grazing
 - fencing
 - brush management
 - tree planting
 - controlled burns
 - designated watering area





Livestock Management

- Promoting adoption of WQMPs & Conservation Plans
- Education & Outreach
 - Landowner Riparian
 - Lone Star Healthy Streams



- Questions?
- Next steps:
 - Review drafted chapters & provide feedback
 - Set date for next meeting

THANK YOU!

Watershed Website: Tx.ag/LaNana

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Emily Monroe

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