

# Navasota River Watershed Plan Overview

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# Complete Draft of WPP

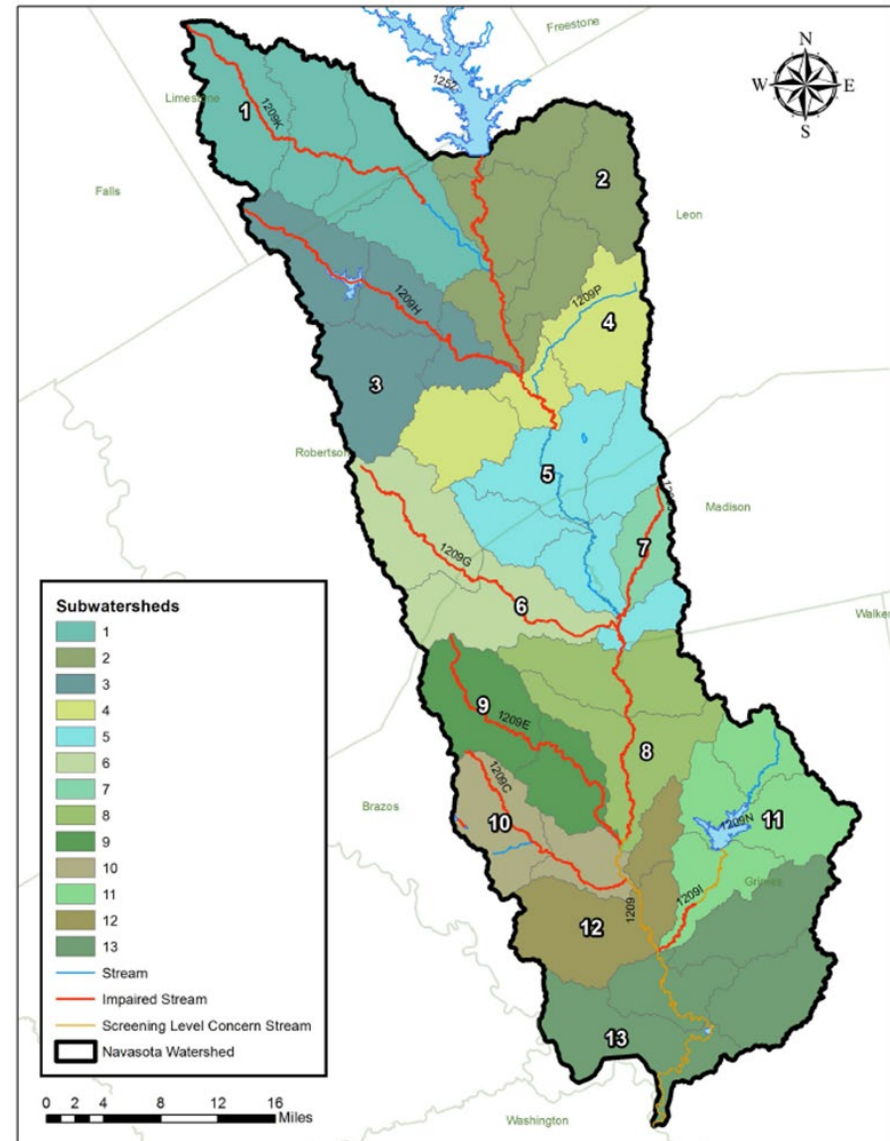
- ⦿ Includes all content discussed over course of the project
  - ⦿ *E. coli* source assessments
  - ⦿ Water quality assessment
  - ⦿ Management recommendations
  - ⦿ Reduction goals
  - ⦿ Implementation plan

# Chapter 1 – Watershed Management

- ⦿ Watershed definition and impacts
- ⦿ The watershed management approach
- ⦿ Navasota River watershed protection planning efforts

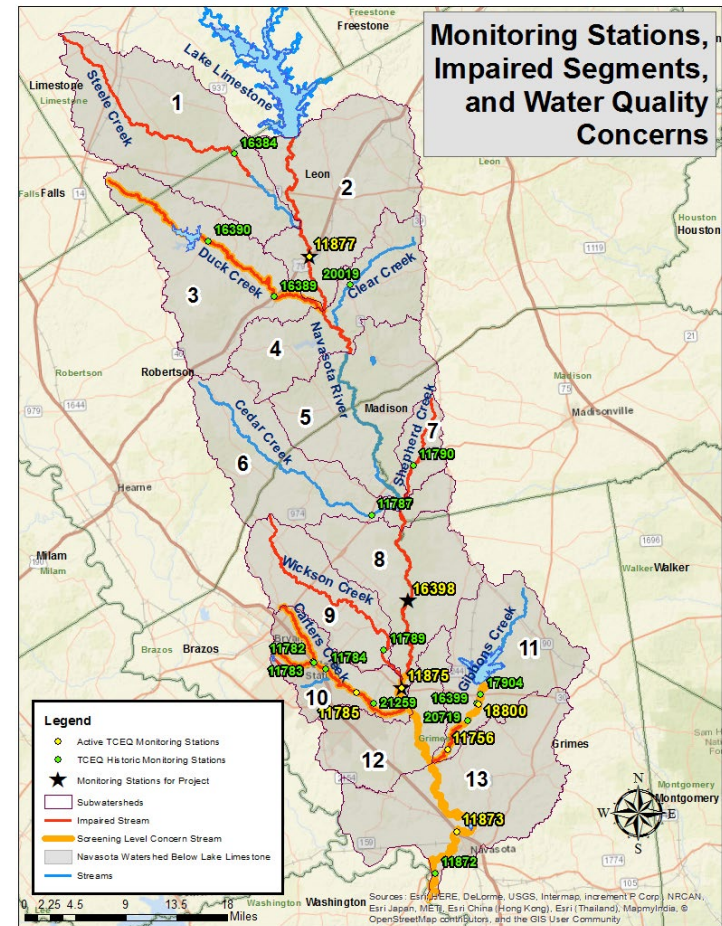
# Chapter 2 – The Navasota River Watershed

- ⦿ Watershed characteristics
  - ⦿ Physical characteristics
  - ⦿ Subwatersheds
  - ⦿ Landuse/landcover
  - ⦿ Population
  
- ⦿ Water resources
  - ⦿ Surface water
  - ⦿ Groundwater



# Chapter 3 – Water Quality

- Waterbody assessments
- Texas surface water quality standards
  - Dissolved oxygen
  - Bacteria (*E. coli*)
  - Nutrient screening levels
  - Other measurements
- Segment impairments and concerns
- TMDLs in the watershed



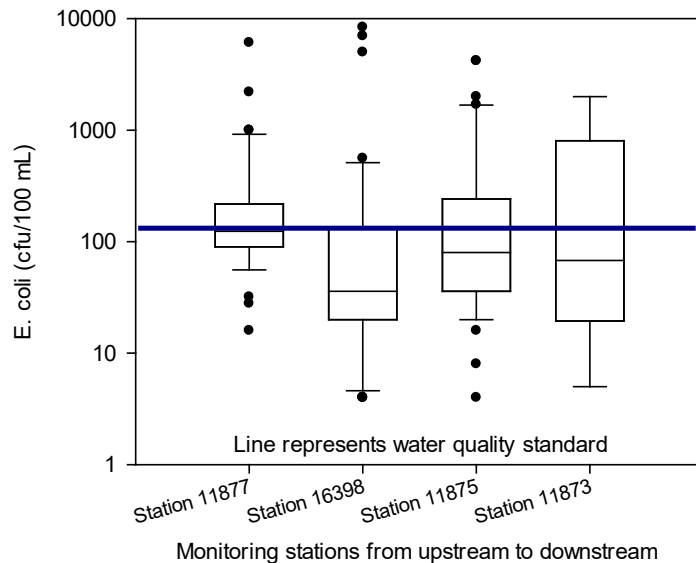
# Chapter 4 – Potential Sources of Pollution

- ⦿ Point sources
  - ⦿ WWTFs
  
- ⦿ Nonpoint sources
  - ⦿ OSSFs
  - ⦿ Pets and urban runoff
  - ⦿ Grazing livestock
  - ⦿ Commercial poultry
  - ⦿ Wildlife and feral hogs
  - ⦿ Illegal dumping

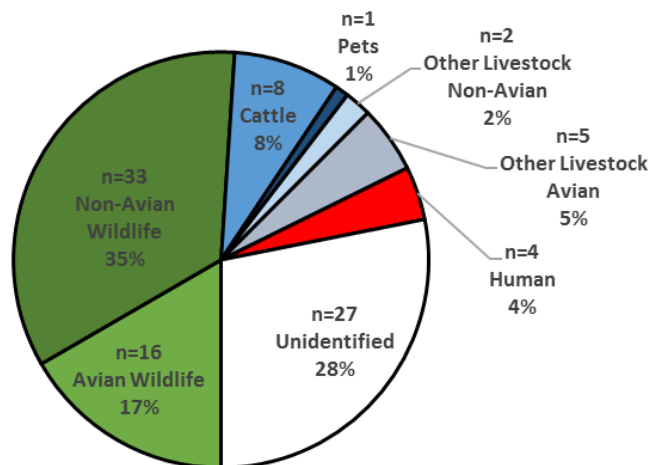




# Chapter 5 – Pollutant Source Assessment



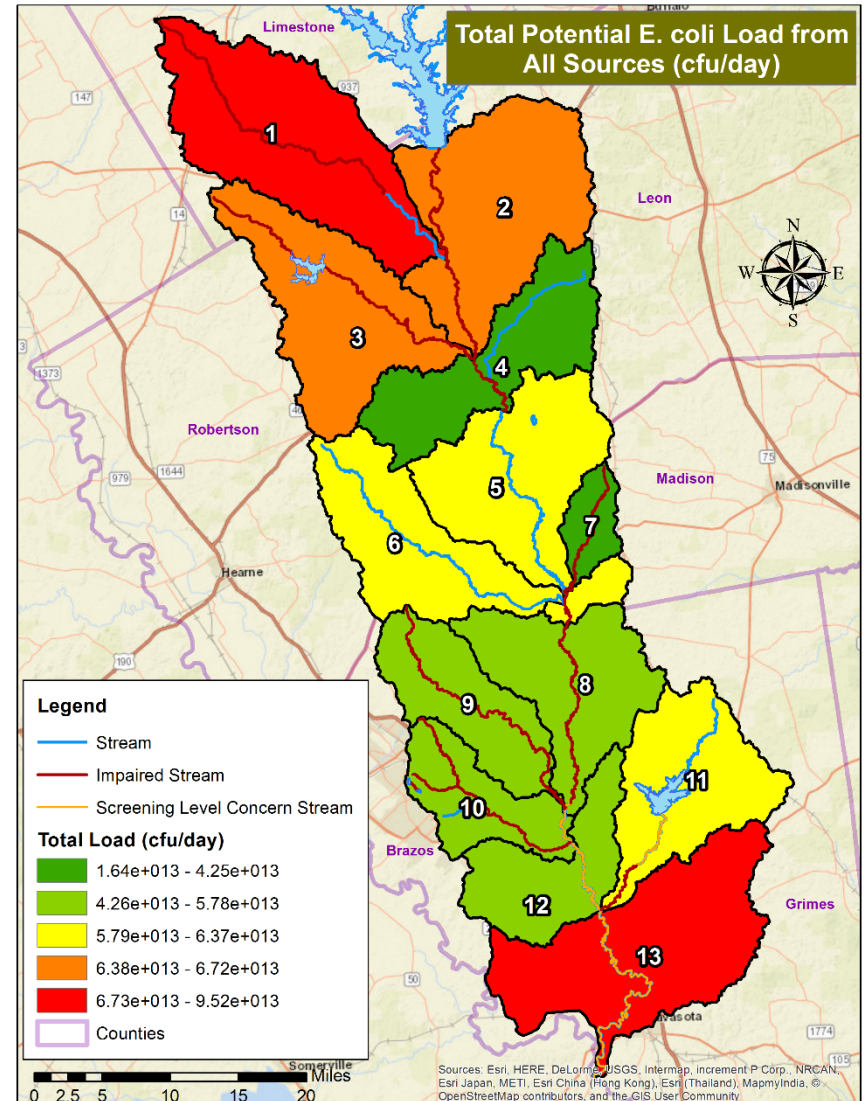
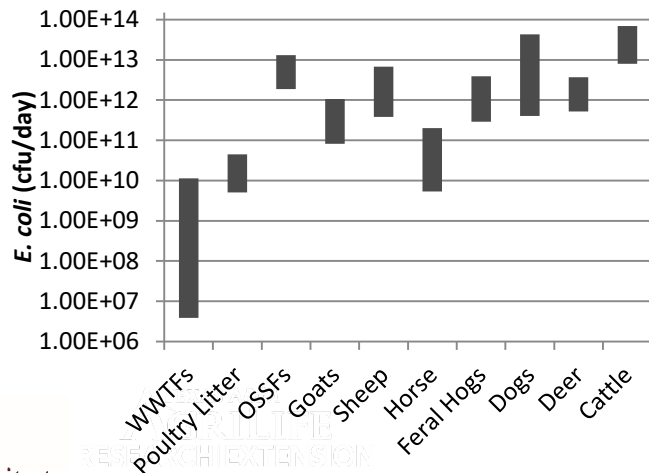
- ⊙ Water quality monitoring
  - ⊙ *E. coli*
  - ⊙ Dissolved oxygen
  - ⊙ Nutrients



- ⊙ Load duration curves
- ⊙ Bacterial source tracking

# Chapter 5 – Pollutant Source Assessment

- ⊙ Spatial analysis of potential *E. coli* loads
- ⊙ Recreational use attainability analysis
- ⊙ Assessment reconciliation





# Chapter 6 – Management Strategies

## ⦿ Water quality goal:

- ⦿ To meet the applicable contact recreation standard for *E. coli* in terms of concentration and load
  - ⦿ Annual reduction =  $1.11 \text{ E}+15 \text{ cfu}$

## ⦿ Management Approach

- ⦿ Address the sources that can be reasonably managed
  - ⦿ Feral Hogs
  - ⦿ Livestock
  - ⦿ Human
  - ⦿ Pets

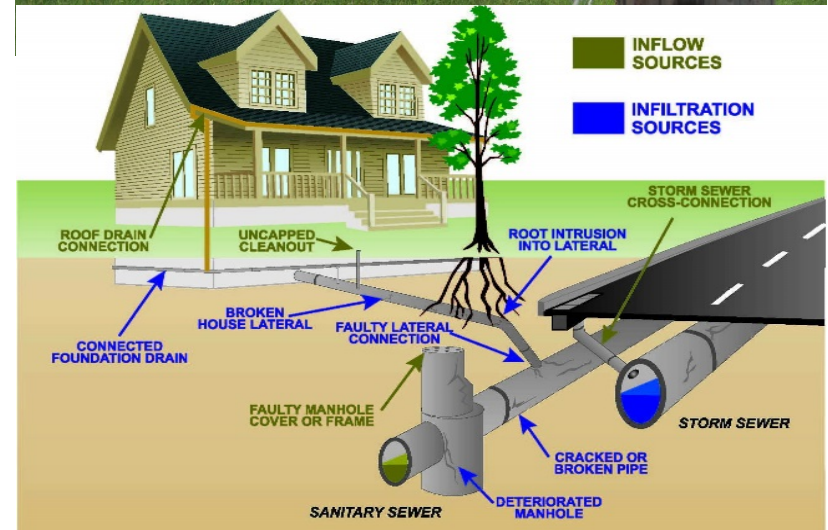
## ⦿ Feral hogs

- ⦿ Remove 5,524 hogs annually
- ⦿ Trap, shoot, snare, dogs
- ⦿ Fence around deer feeders to limit food access
- ⦿ Deliver education programs regarding trapping techniques and hog biology



# Chapter 6 – Management Strategies

- ⦿ Livestock
  - ⦿ Goal is to modify resource usage with voluntary practice implementation
  - ⦿ Implement 130 plans
- ⦿ Wastewater
  - ⦿ OSSFs
    - ⦿ Repair and replace failing systems: ~ 150 systems
    - ⦿ Education and outreach programs
  - ⦿ Centralized systems
    - ⦿ Address inflow and infiltration issues



# Chapter 6 – Management Strategies

- ◎ Pets & Urban Stormwater
  - ◎ Reduce dog waste not properly disposed of in the watershed
    - ◎ Information
      - ◎ Utility bill inserts
      - ◎ Signage in dog parks
    - ◎ Pet waste stations
      - ◎ Keep them stocked and maintained



# Chapter 6 – Expected Load Reductions

⊙ Annual reduction goal is 1.11 E+15 cfu

Management Measure	Expected <i>E. coli</i> Load Reduction
<b>Agricultural Management Measures</b>	
Water Quality Management Plans (TSSWCB/Local SWCDs)	1.83 x 10 <sup>15</sup> cfu/year
Conservation Plans (NRCS)	
Livestock Management Education and Outreach	
<b>Feral Hog Management</b>	
Feral Hog Removal	3.49 x 10 <sup>15</sup> cfu/year
Supplemental Feeding Enclosures	
Feral Hog Education and Outreach Programming	
<b>OSSF Management</b>	
OSSF Repair and Replacement	1.05 x 10 <sup>15</sup> cfu/year
OSSF Owner Education and Outreach	
OSSF Installer and Service Provider Education and Outreach	
<b>Urban Stormwater Management</b>	
Dog Waste Management and Disposal	4.84 x 10 <sup>15</sup> cfu/year
Dog Waste Management Education and Outreach	
General Stormwater Management Education and Outreach	

# Chapter 7 – Plan Implementation

- ⦿ Schedule
  - ⦿ 3 implementation windows
    - ⦿ Yrs 1 – 3; 4 – 6; 7 – 10
  
- ⦿ Milestones
  - ⦿ Numeric implementation targets
    - ⦿ Livestock plans
    - ⦿ OSSF repairs/replacements and inspections
  
- ⦿ Estimated Costs
  - ⦿ Costs per unit and total where definable



# Chapter 8 – Assistance Needs

- ⦿ Technical assistance
  - ⦿ OSSF inspections, repairs/replacements
  - ⦿ Livestock management planning
  - ⦿ Feral hog control methods
  - ⦿ Centralized wastewater
- ⦿ Education and outreach
  - ⦿ Experts to deliver content
- ⦿ Financial assistance
  - ⦿ Prospective sources of funding for various projects



# Chapter 9 – Implementation Support and Success

- ⦿ Watershed coordinator role
- ⦿ Water quality monitoring needs
  - ⦿ Routine water quality monitoring
  - ⦿ Targeted water quality monitoring
- ⦿ Implementation Success
  - ⦿ Track level of implementation
  - ⦿ Water quality assessments



# Appendix A – WPP Elements

- ⊙ A – ID impairment sources
- ⊙ B – Expected load reductions
- ⊙ C – Management measures
- ⊙ D – Assistance needs
- ⊙ E – Education
- ⊙ F – Implementation schedule
- ⊙ G – Implementation milestones
- ⊙ H – Measuring success
- ⊙ I – Monitoring needs

# Appendix B – Land Use/Land Cover

- ⊙ Developed
- ⊙ Barren land
- ⊙ Cultivated crops
- ⊙ Forest
- ⊙ Wetlands
- ⊙ Hay/pasture
- ⊙ Herbaceous
- ⊙ Open water
- ⊙ Shrub/scrub

## Appendix C – OSSF Estimates and Analysis

- ⊙ Maps
  - 911 addresses
  - 2010 Census counts for housing units per Census block
  - Aerial imagery
  - WWTF service areas
  
- ⊙ Failure rates
  - County DR information
  - Applied appropriately to subwatersheds

## Appendix D – Spatial Analysis Development

- ⊙ Numbers of animals or OSSFs per subwatershed
  
- ⊙ *E. coli* loads from published literature
  
- ⊙ Management effects
  
- ⊙ Calculations

## Appendix E – LDC Development

- ⊙ Flow volumes multiplied by *E. coli* concentrations
- ⊙ Compare to flow volumes multiplied by *E. coli* water quality standard
- ⊙ Difference is the needed load reduction

## Appendix F – Load Reduction Calculations

- ⊙ Equations used to calculate anticipated load reductions
- ⊙ Assumptions used in each calculation
- ⊙ Value for each source
  - ⊙ Feral Hogs
  - ⊙ Livestock
  - ⊙ OSSFs
  - ⊙ Dogs





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**Questions or Comments about the WPP?**



# Next Steps

- ⦿ Receive stakeholder comments through December 16<sup>th</sup>
  - ⦿ Send comments to [LFGregory@ag.tamu.edu](mailto:LFGregory@ag.tamu.edu)
- ⦿ Address all comments and revise WPP appropriately; send out a response to comments sheet to watershed stakeholders
  - ⦿ December 19<sup>th</sup>
- ⦿ If needed host another meeting to discuss comments received and revisions
- ⦿ Send complete WPP to EPA for their consistency review
  - ⦿ December 20<sup>th</sup> (assuming no major revisions are needed)





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