LAVACA RIVER WATERSHED PROTECTION PLAN

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Today's Outline

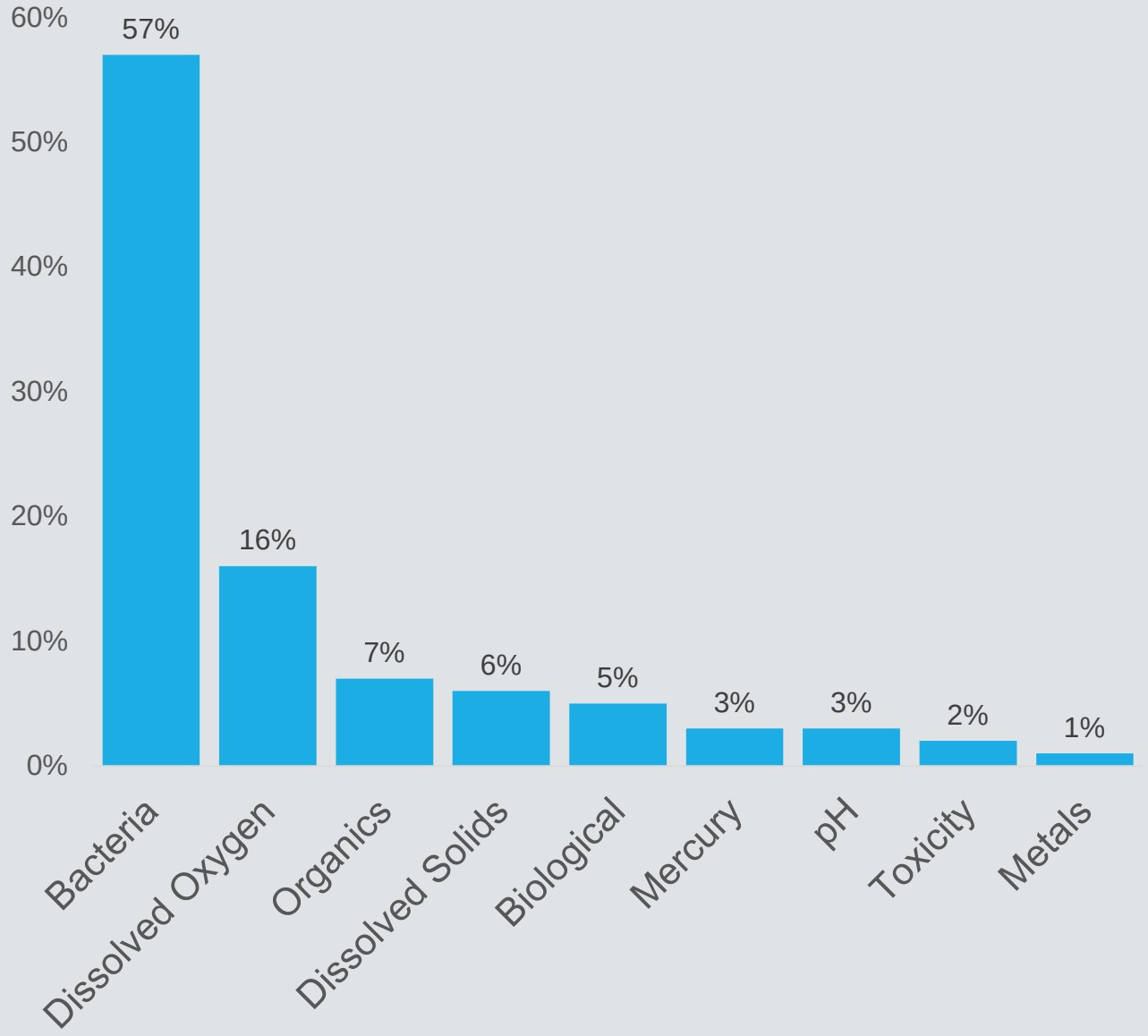
- Current water quality concerns
- Why does it matter
- What is being done
- Next steps

CURRENT WATER QUALITY

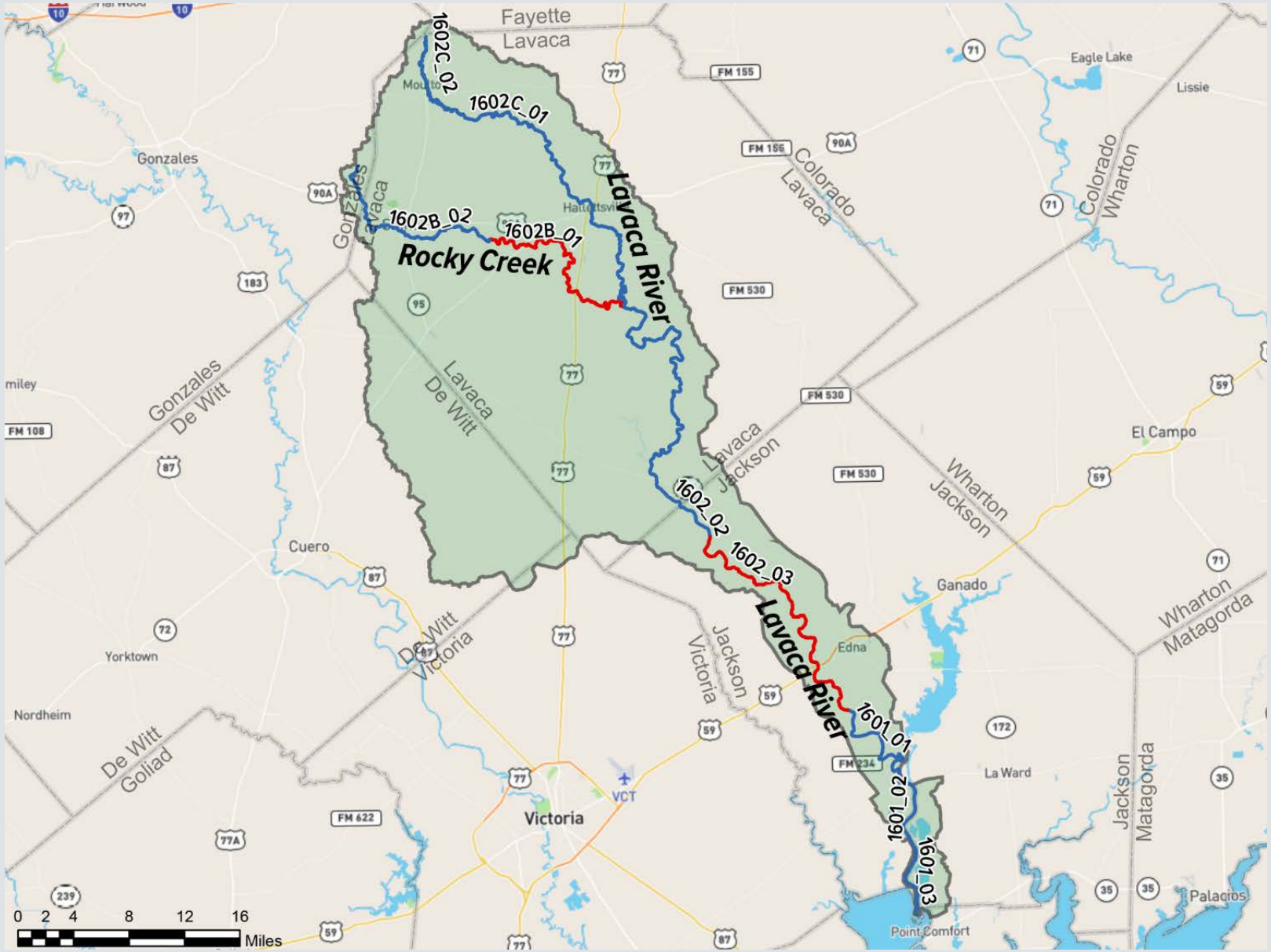
Background


Set Goals and Water Quality Standards (WQS)
Conduct Monitoring
Meeting WQS?
No
303(d)
Develop Strategies and Control (Total Maximum Daily Loads, etc.)
Implement Strategies
Yes
Apply Antidegradation

Water Quality Impairments in Texas



Bacteria Impairment in the Lavaca River Watershed



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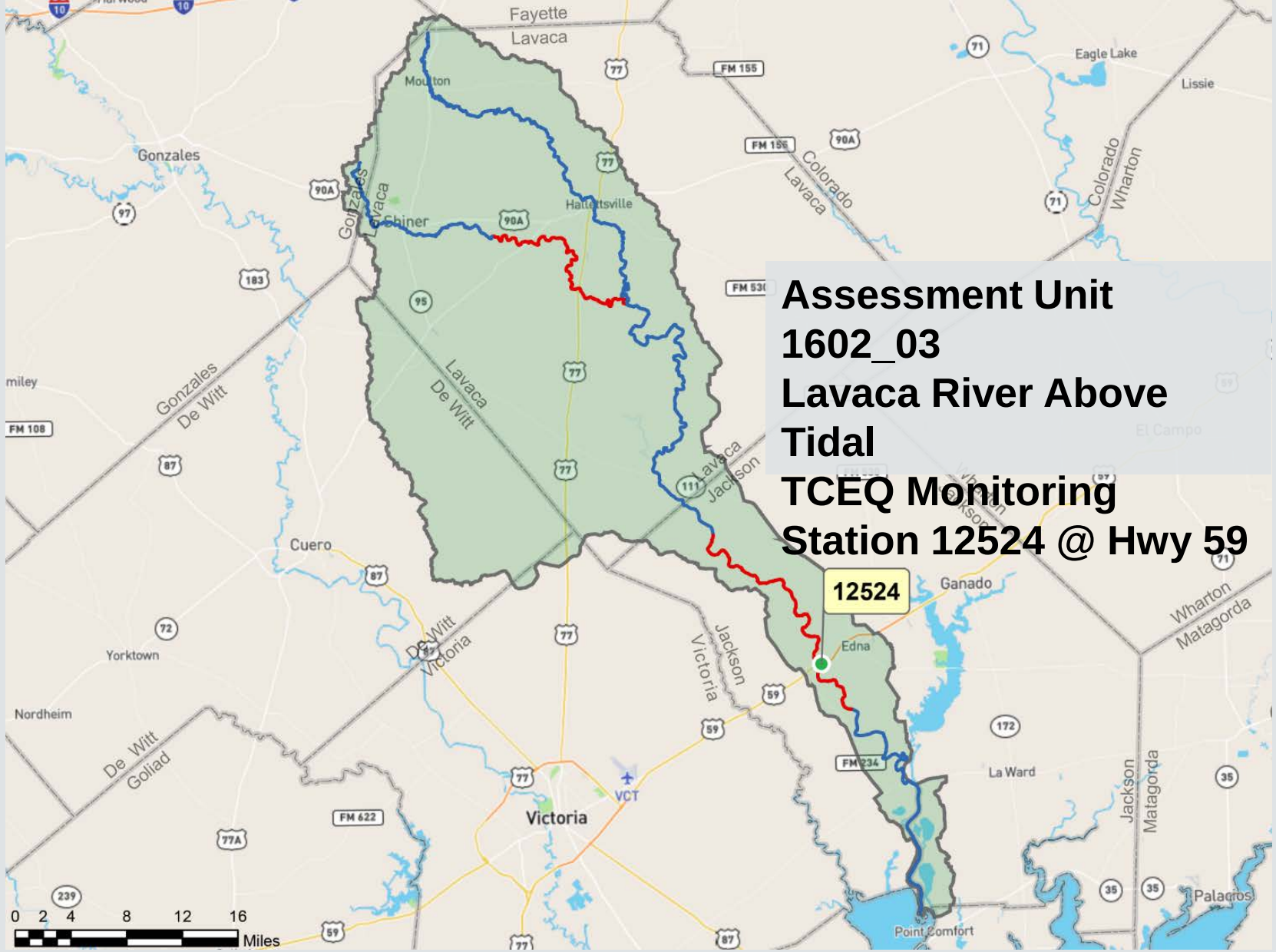
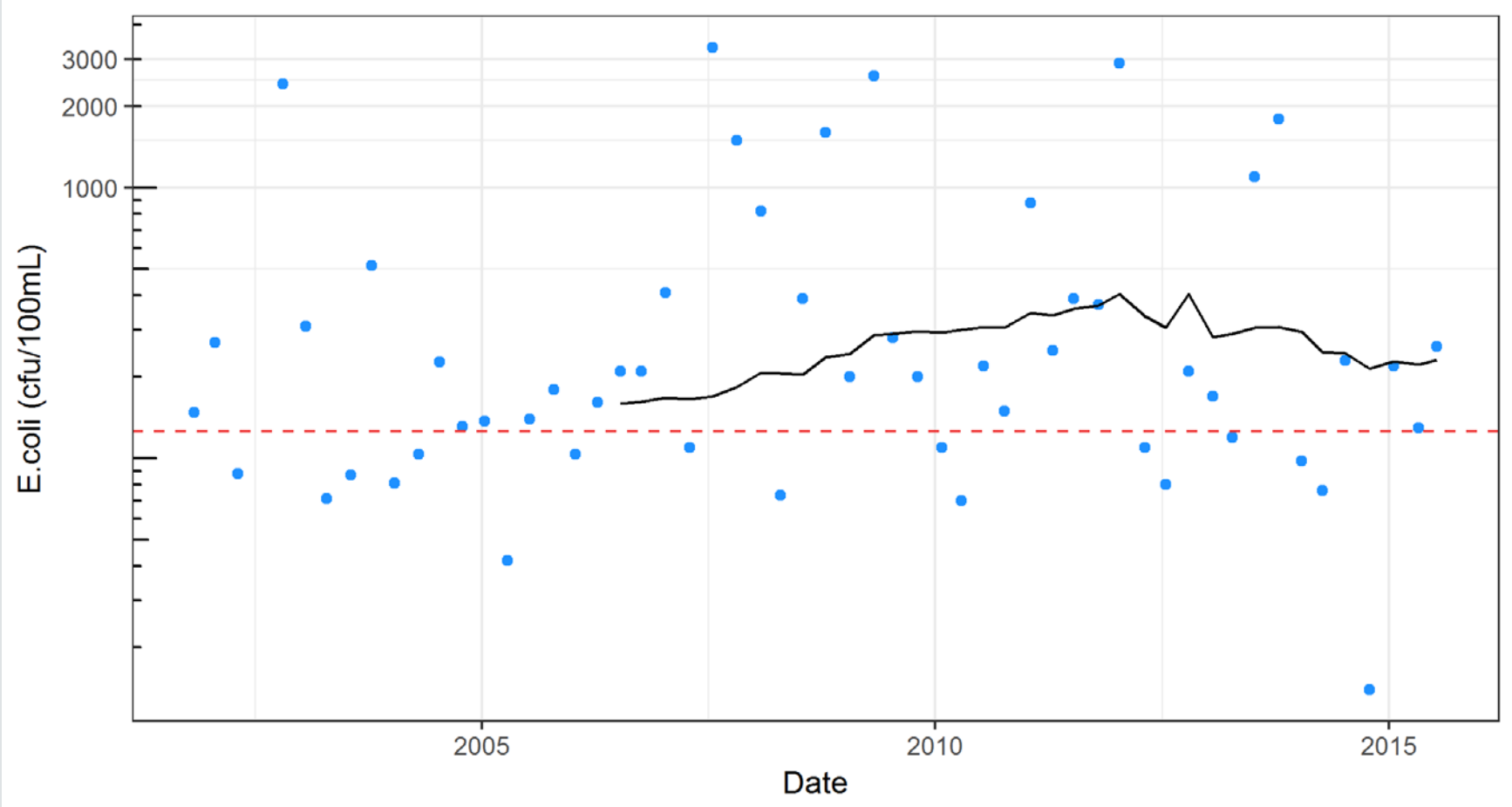
Bacteria Impairment in the Lavaca River



Bacteria Impairment in the Lavaca River

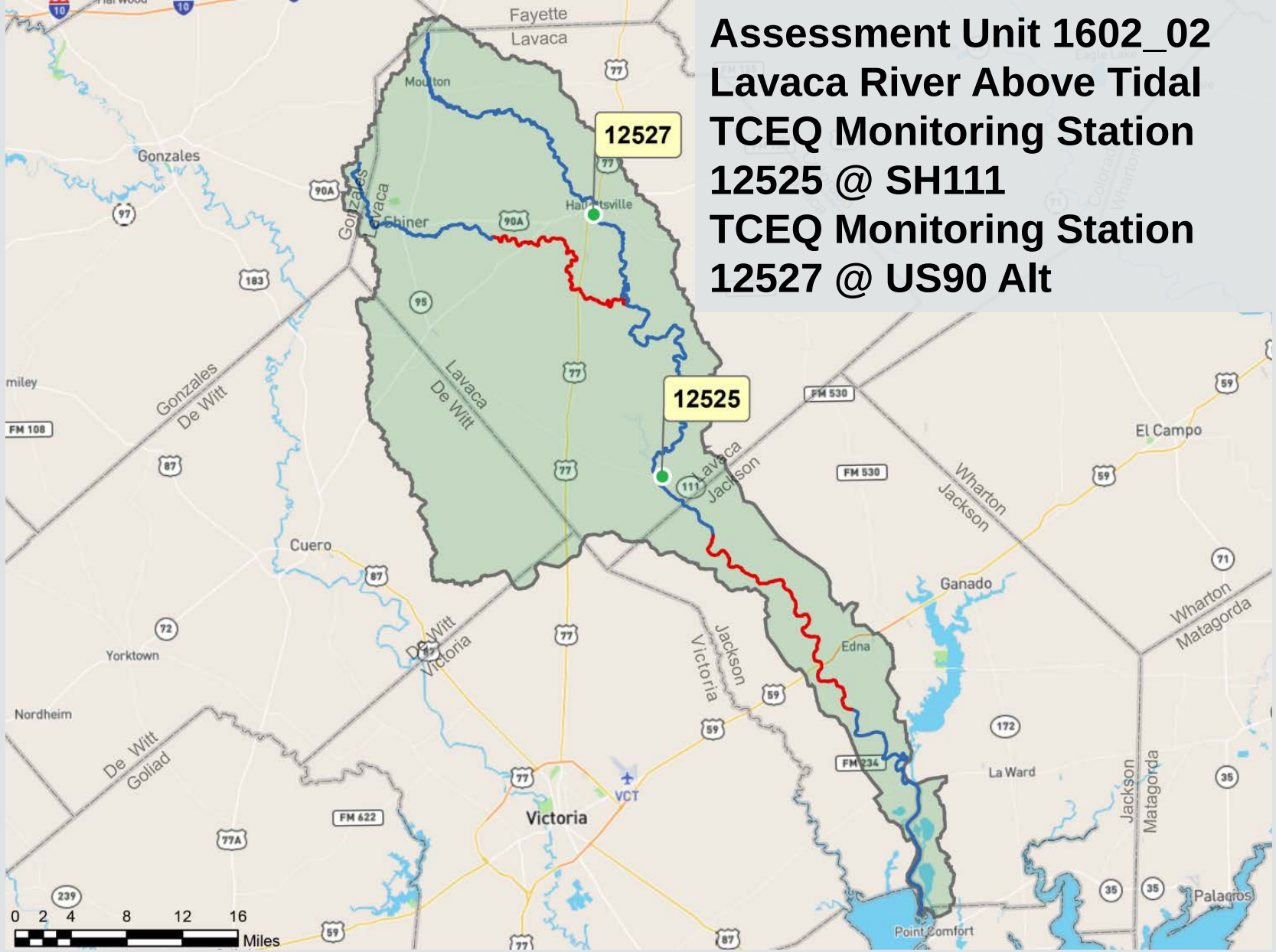


E. coli bacteria concentration in AU 1602_03

2005 through 2012: ***294.94 cfu per 100 mL***

Allowable: ***126 cfu per 100 mL***

Bacteria Impairment in the Lavaca River



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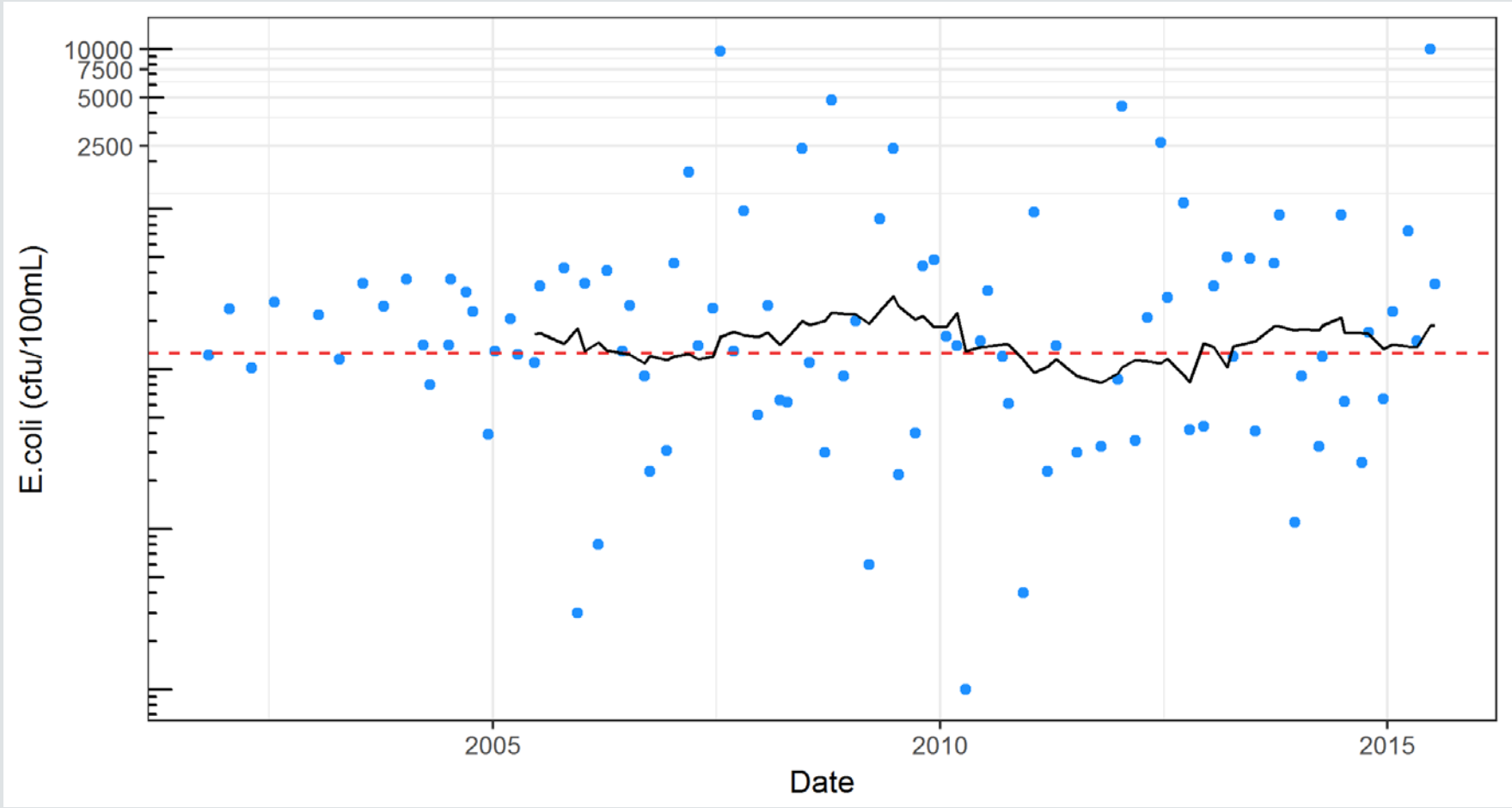
Bacteria Impairment in the Lavaca River

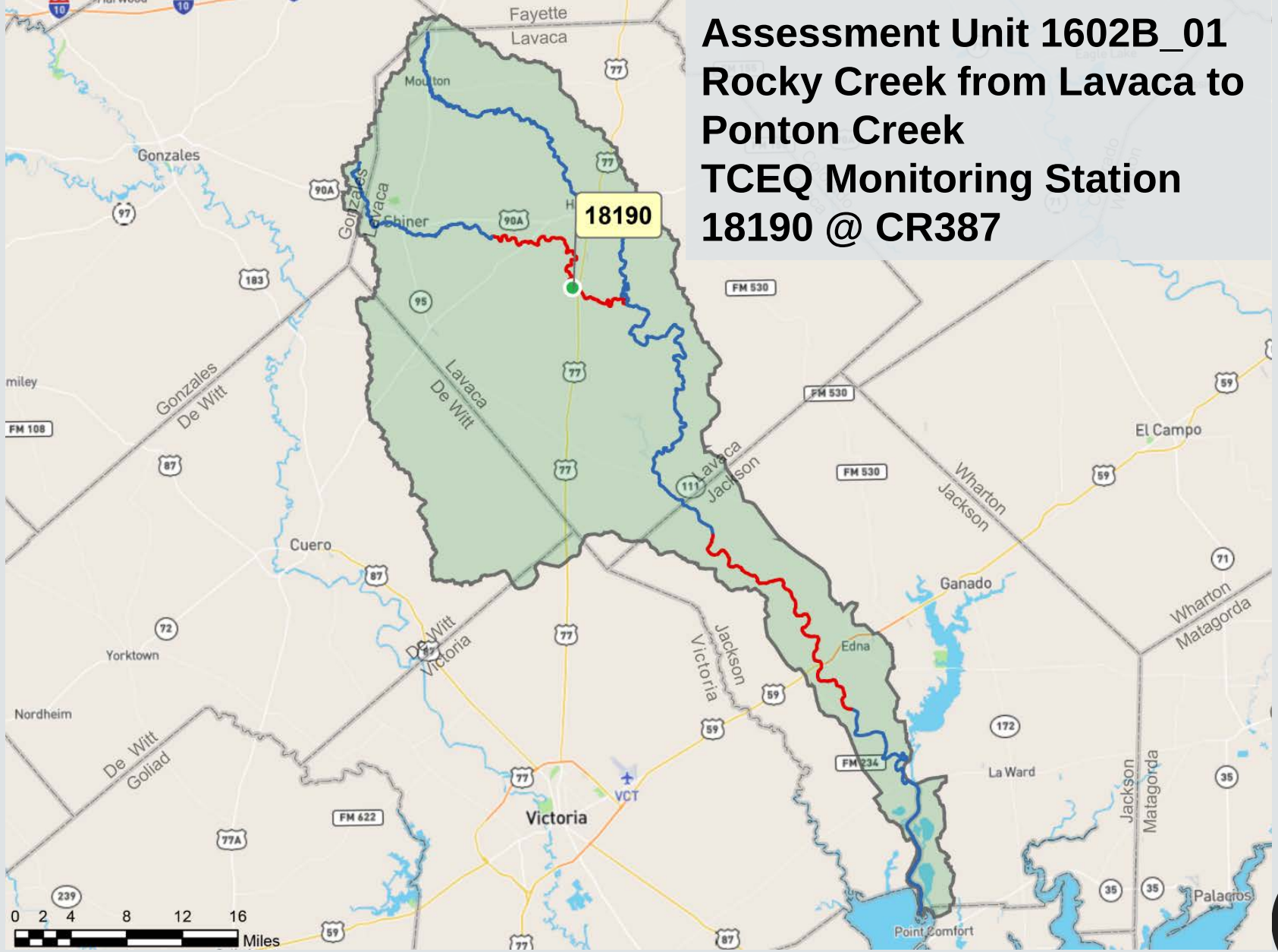


E. coli bacteria concentration in AU 1602_02

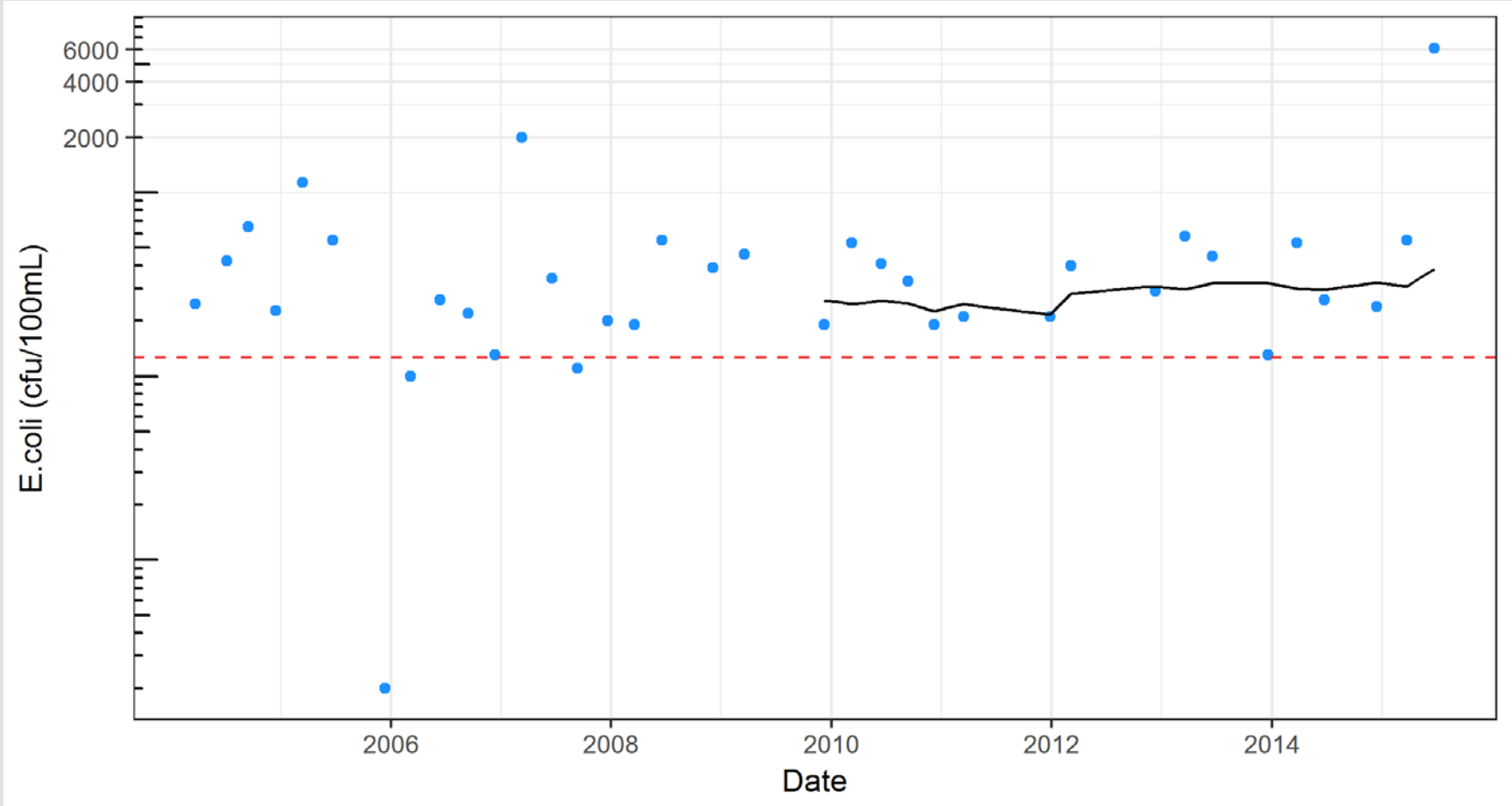
2005 through 2012: ***114.65 cfu per 100 mL***

Allowable: ***126 cfu per 100 mL***

Bacteria Impairment in Rocky Creek



Bacteria Impairment in Rocky Creek



E. coli bacteria concentration in AU 1602B_01
2005 through 2012: ***222.16 cfu per 100 mL***
Allowable: ***126 cfu per 100 mL***

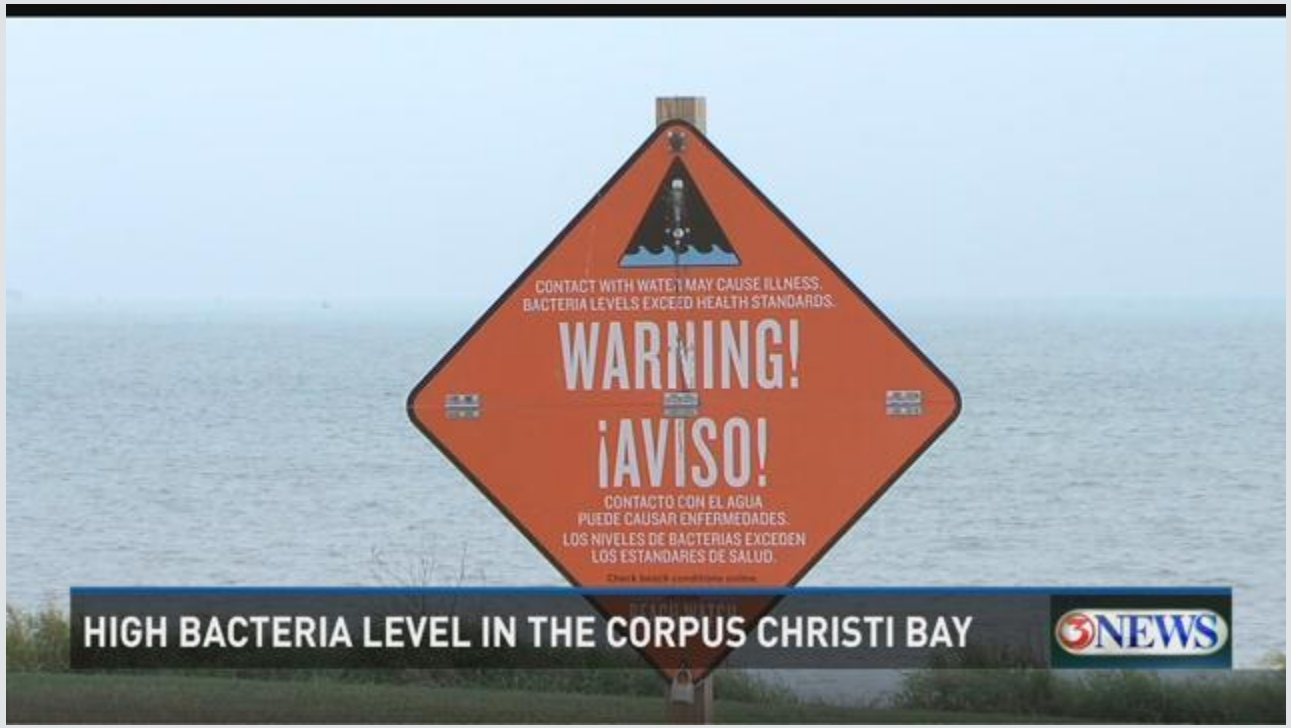
Why Are We Concerned?

Although *E. coli* bacteria is naturally occurring, it is used to **monitor for the presence of fecal matter** derived from warm blooded critters – anything with fur, feathers, or hair.

Why Are We Concerned?

High levels of *E. coli* can indicate a higher likelihood of pathogens dangerous to human health in the waterbody.

Pathogens such as norovirus, giardia, and cryptosporidium can be transferred to people when water is ingested during recreation

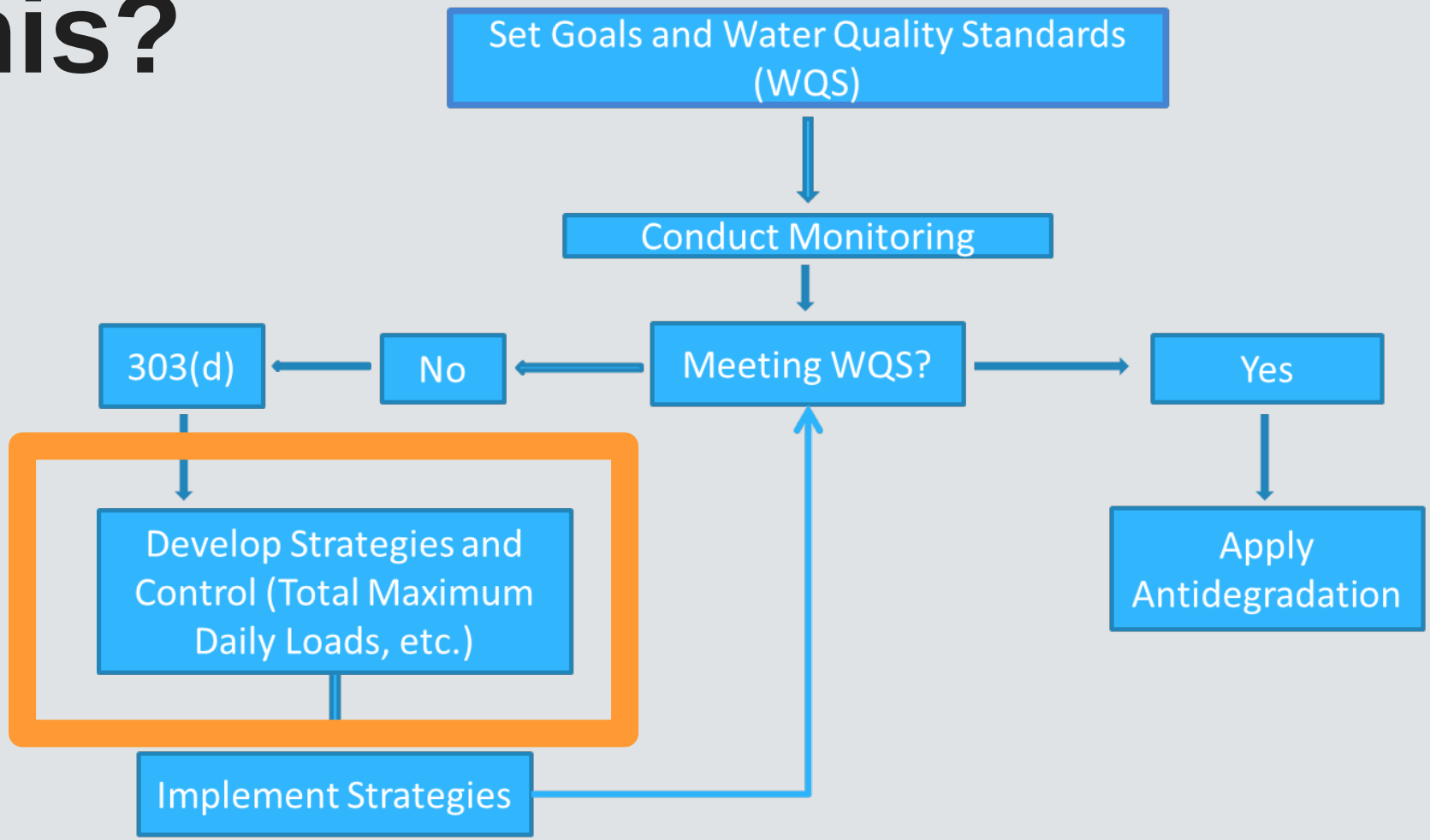


How does bacteria get into water?

- Comes from anything with feathers, fur, or hair
- Regulated sources
  - Improper wastewater discharges
  - Urban stormwater runoff
- Unregulated sources
  - Wildlife or livestock in streams
  - Rain washing animal waste and manure into streams
  - Illegal dumping
  - Failing septic systems

WATERSHED PLANNING

Remember this?



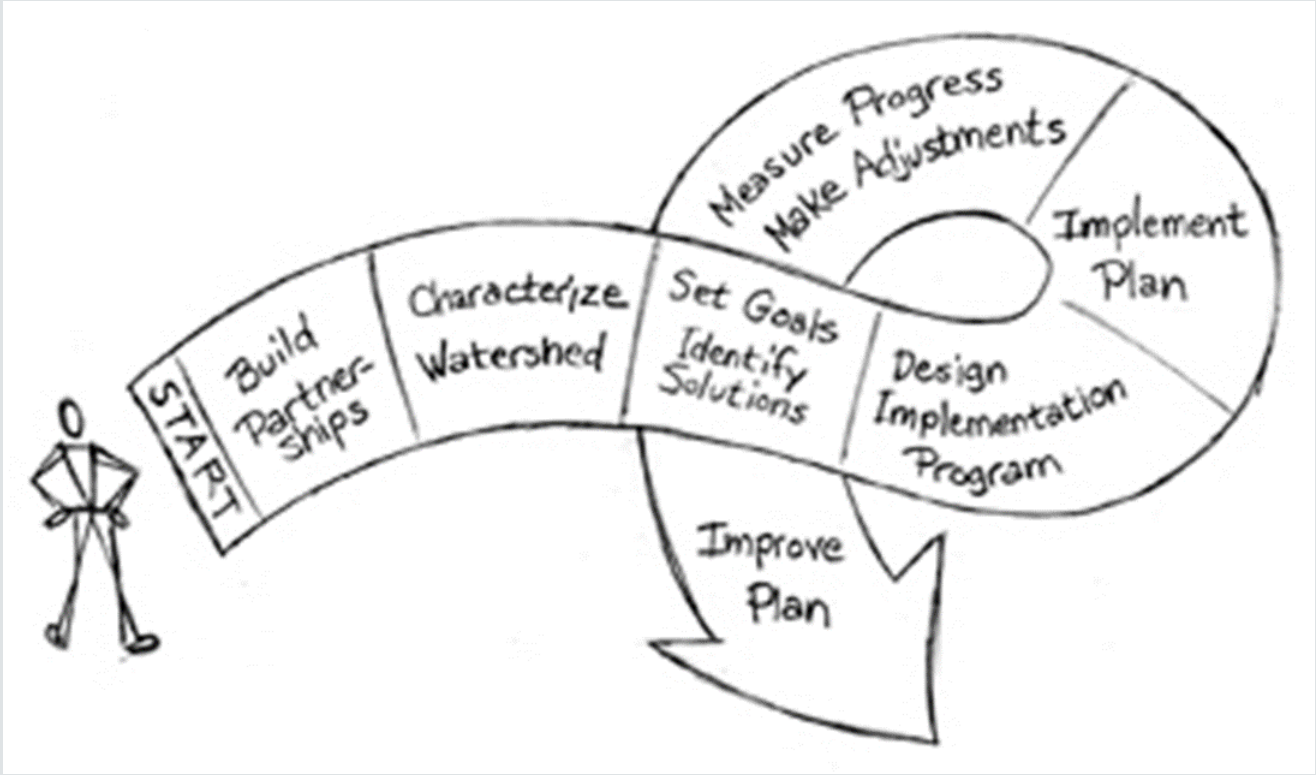
What are we doing?

Different strategies used to address water quality:

1. Total Maximum Daily Load (TMDL)

2. TMDL Implementation Plan

3. Watershed Protection Plan



Watershed Protection Plan

1. **Goal** – Secure Primary Contact Recreation Water Quality Standards in the Lavaca River Watershed (126 cfu/100mL)

2. **Identify Potential Sources** – Livestock, Wildlife, Pets, OSSFs, Urban Runoff, WWTPs, Illicit Dumping (Chapters 2, 3, and 4)

Watershed Protection Plan

- Chapter 1 – Introduction to Watershed Management
- Chapter 2 – Watershed Description/Characterization
- Chapter 3 – Current Water Quality/Potential Source Concerns
- Chapter 4 – Pollutant Source Assessment*
- Chapter 5 – Implementation Strategies*
- Chapter 6 – Education and Outreach*
- Chapter 7 – Technical/Financial Resources
- Chapter 8 – Measuring Success*

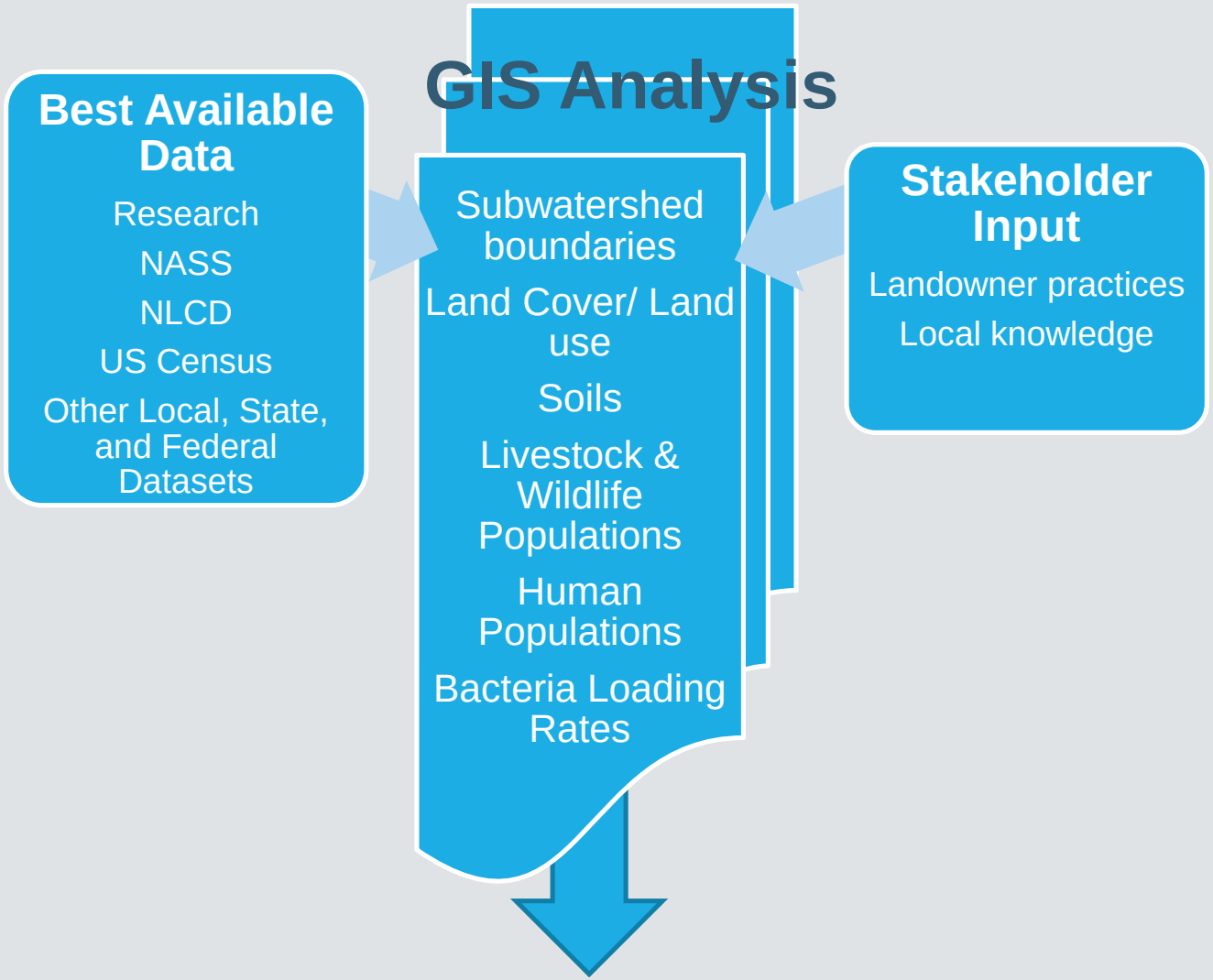
* Focus of the rest of tonight's meeting

CHAPTER 4 – POLLUTION SOURCE ASSESSMENT

Watershed Protection Plan

Chapter 4 – Potential Source Load Assessment

Identify the areas and sources with highest ***potential*** to impact water quality

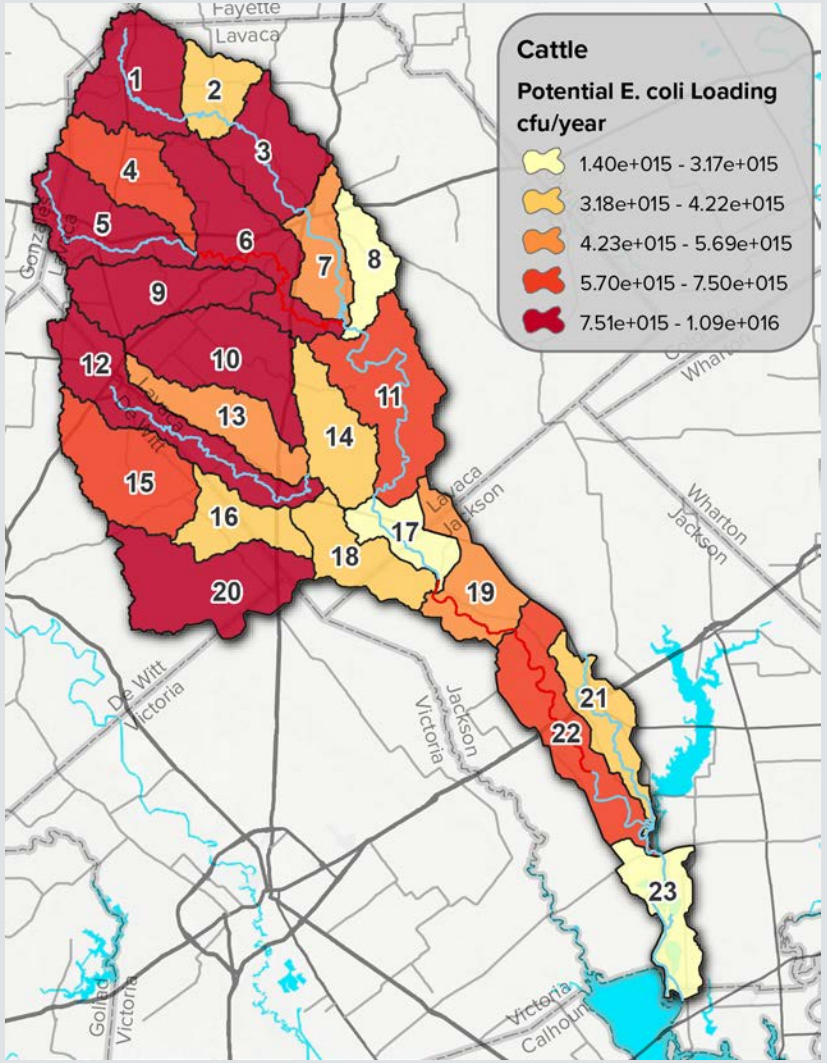


Watershed Protection Plan Chapter 4 – Potential Source Load Assessment

GIS Analysis – Livestock

Assumptions – 73,948 animal units

Potential Loadings – 1.45×10^{17} cfu per year



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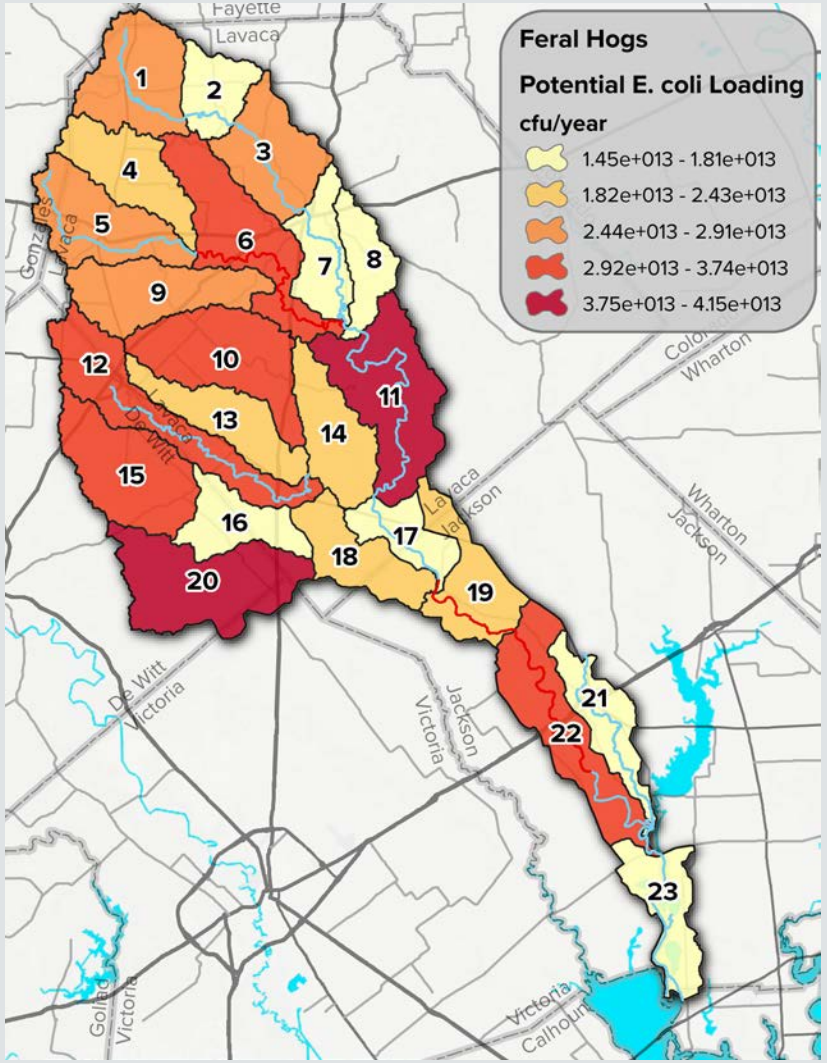
Watershed Protection Plan

Chapter 4 – Potential Source Load Assessment

GIS Analysis – Feral Hogs

Assumptions – 16,259 feral hogs

Potential Loadings – 6.03×10^{14} cfu per year



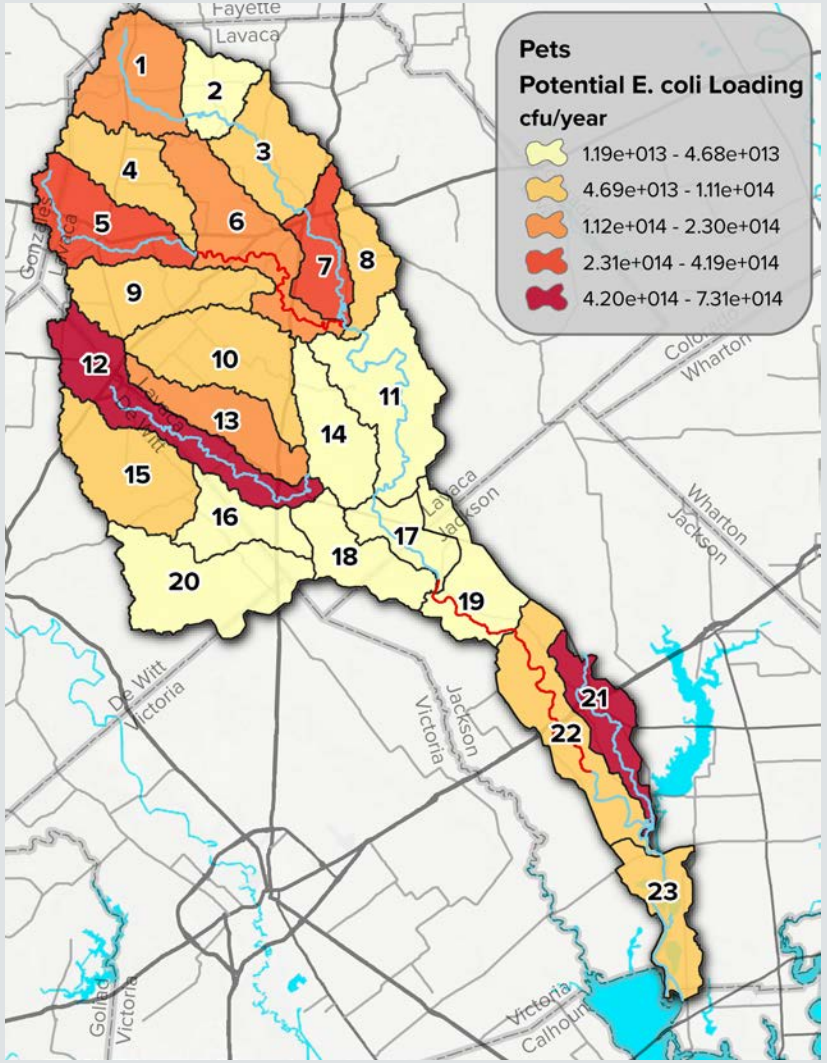
Watershed Protection Plan

Chapter 4 – Potential Source Load Assessment

GIS Analysis – Household Pets

Assumptions – 8,069 dogs, 40% of waste may reach waterbodies

Potential Loadings – 3.71 × 10^{15} cfu per year



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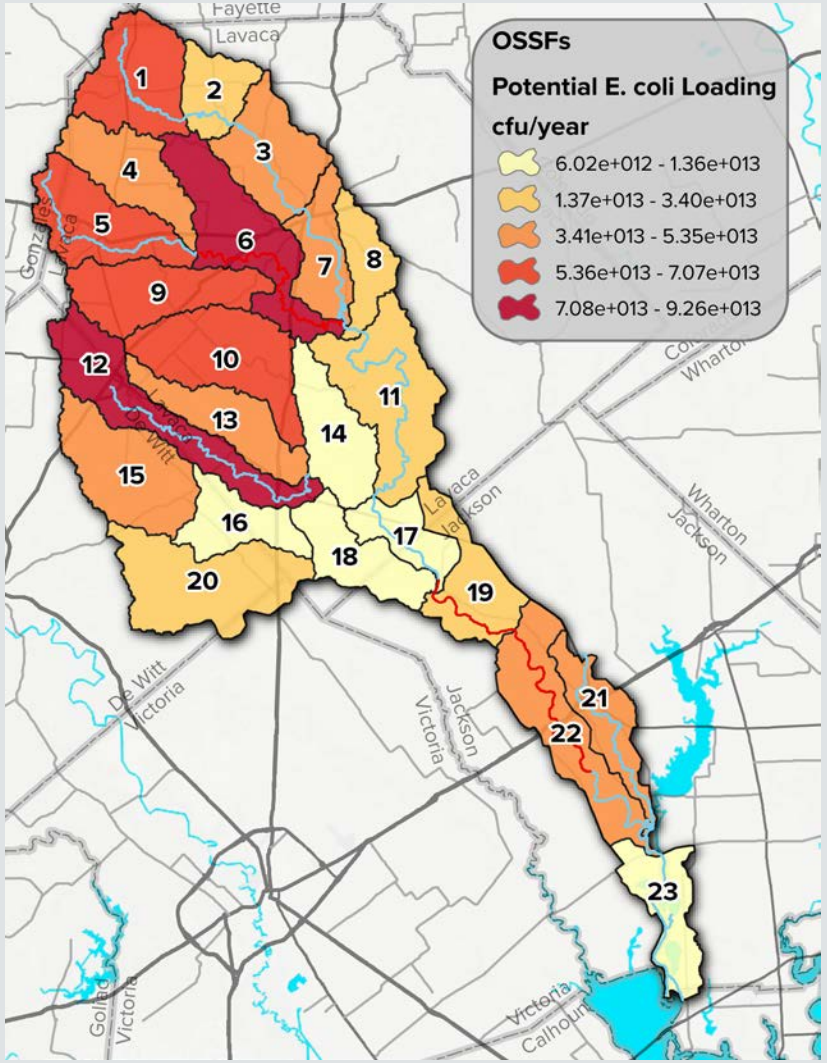
Chapter 4 – Potential Source Load Assessment

GIS Analysis – OSSFs

Assumptions – 5,246 OSSFs, 15% failure rate

Potential Loadings – 9.29×10^{14} cfu per year



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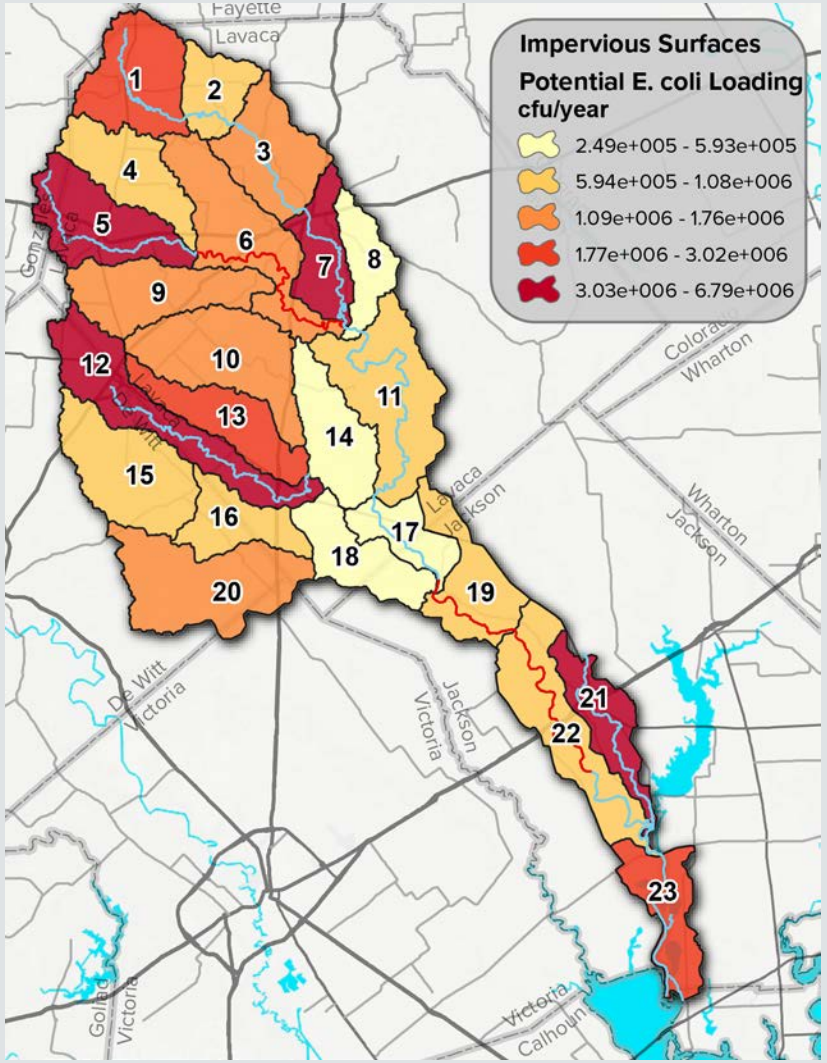
Watershed Protection Plan Chapter 4 – Potential Source Load Assessment

GIS Analysis – Urban and Impervious Surface Stormwater Runoff

Assumptions – 35,607 acres

Potential Loadings – 4.27 × 10^7 cfu per year



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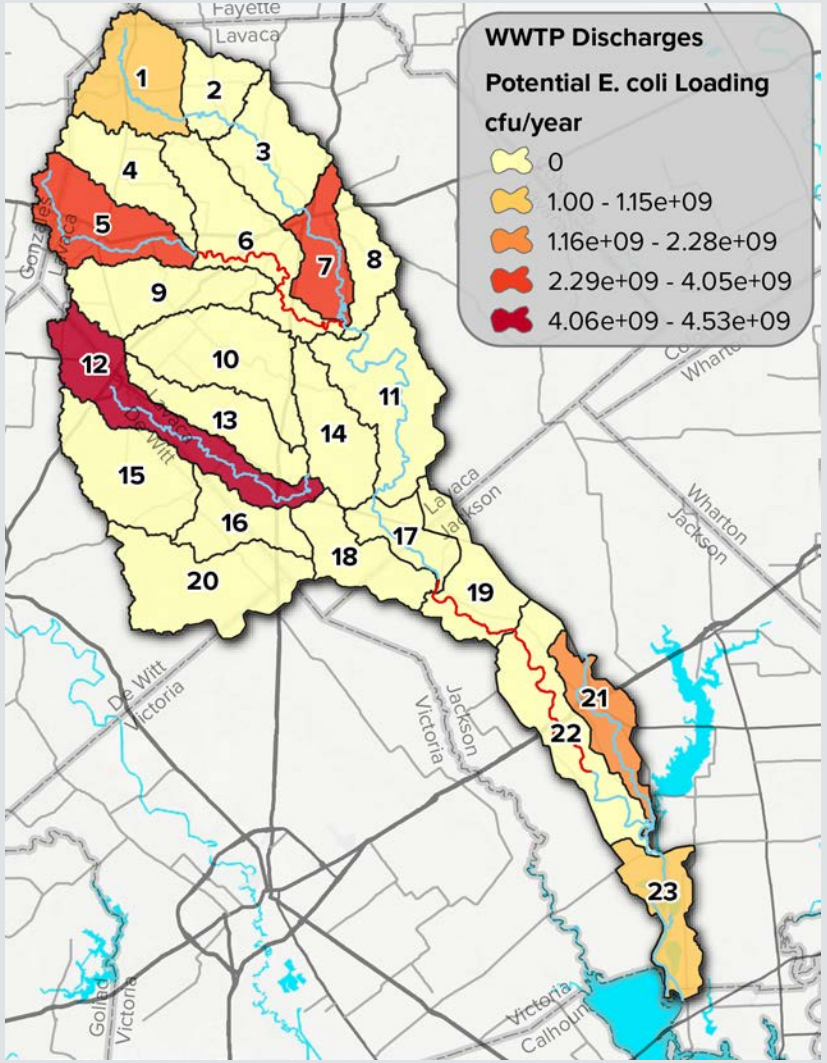
Chapter 4 – Potential Source Load Assessment

GIS Analysis – WWTP Discharges

Assumptions – maximum permitted discharge @ permitted concentration (typically lower)

Potential Loadings – 1.62×10^{10} cfu per year



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Watershed Protection Plan

GIS Analysis

Summary

Source	Lavaca		Rocky Creek	
	Potential Load†	Highest Priority Subwatersheds	Potential Load†	Highest Priority Subwatersheds
Cattle	1.45×10^{17}	1, 3, 5, 6, 9, 10, 12, 20	3.53×10^{16}	5, 6, 9
Feral Hogs	6.03×10^{14}	11, 20	1.18×10^{14}	6
Dogs	3.71×10^{15}	5, 7, 12, 21	7.34×10^{14}	5
OSSFs	9.29×10^{14}	6, 12	2.67×10^{14}	6
Urban Stormwater	4.27×10^{7}	5, 7, 12, 21	8.48×10^{6}	5
WWTFs	1.62×10^{10}	1, 5, 7, 12, 21, 23	4.05×10^{9}	5

† in units of cfu E. coli per year

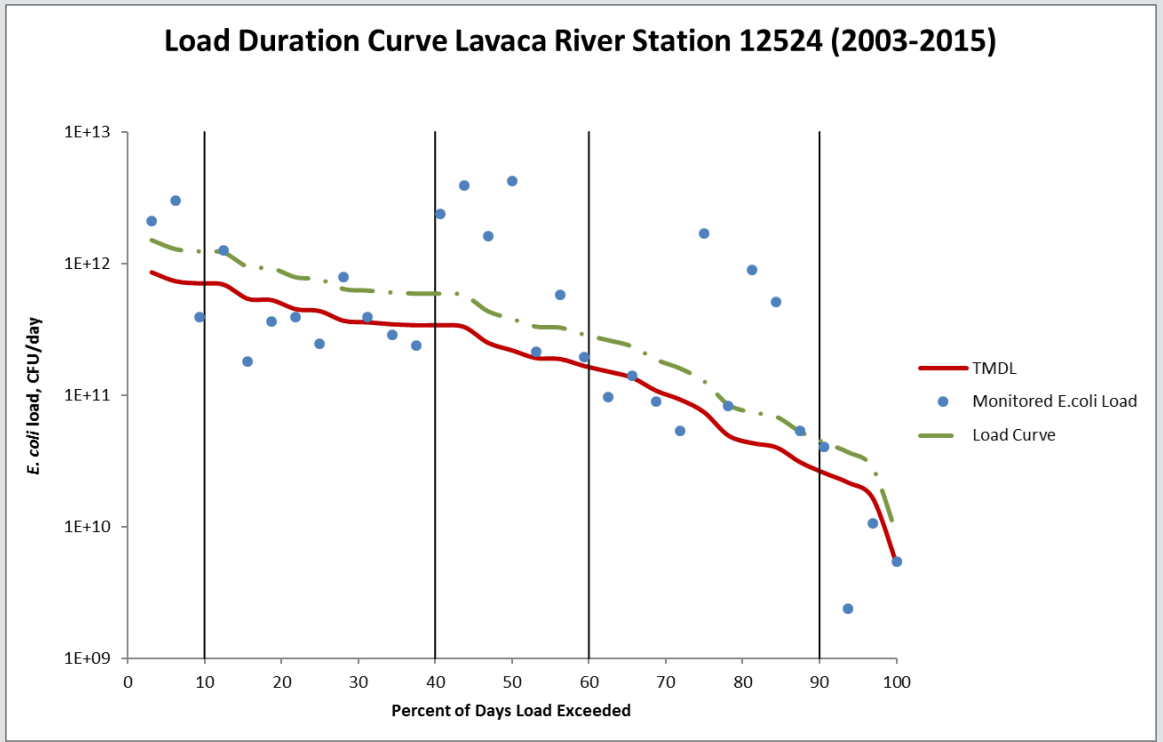
Watershed Protection Plan

- So far:
  - Identified the water quality concern
  - Identified potential sources
  - Identified where and how much potential loads are by source
  - Next – identify how much bacteria reduction needs to be achieved (also in Chapter 4)

Watershed Protection Plan

Chapter 4 – Source and Load Determination

- Load Duration Curve
  - Method to visualize and assess pollutant loads in relation to streamflow
  - Used to estimate pollutant capacity of the stream, and estimate needed reductions
  - More details: https://www.epa.gov/sites/production/files/2015-07/documents/2007_08_23_tmdl_duration_curve_guide_aug2007.pdf

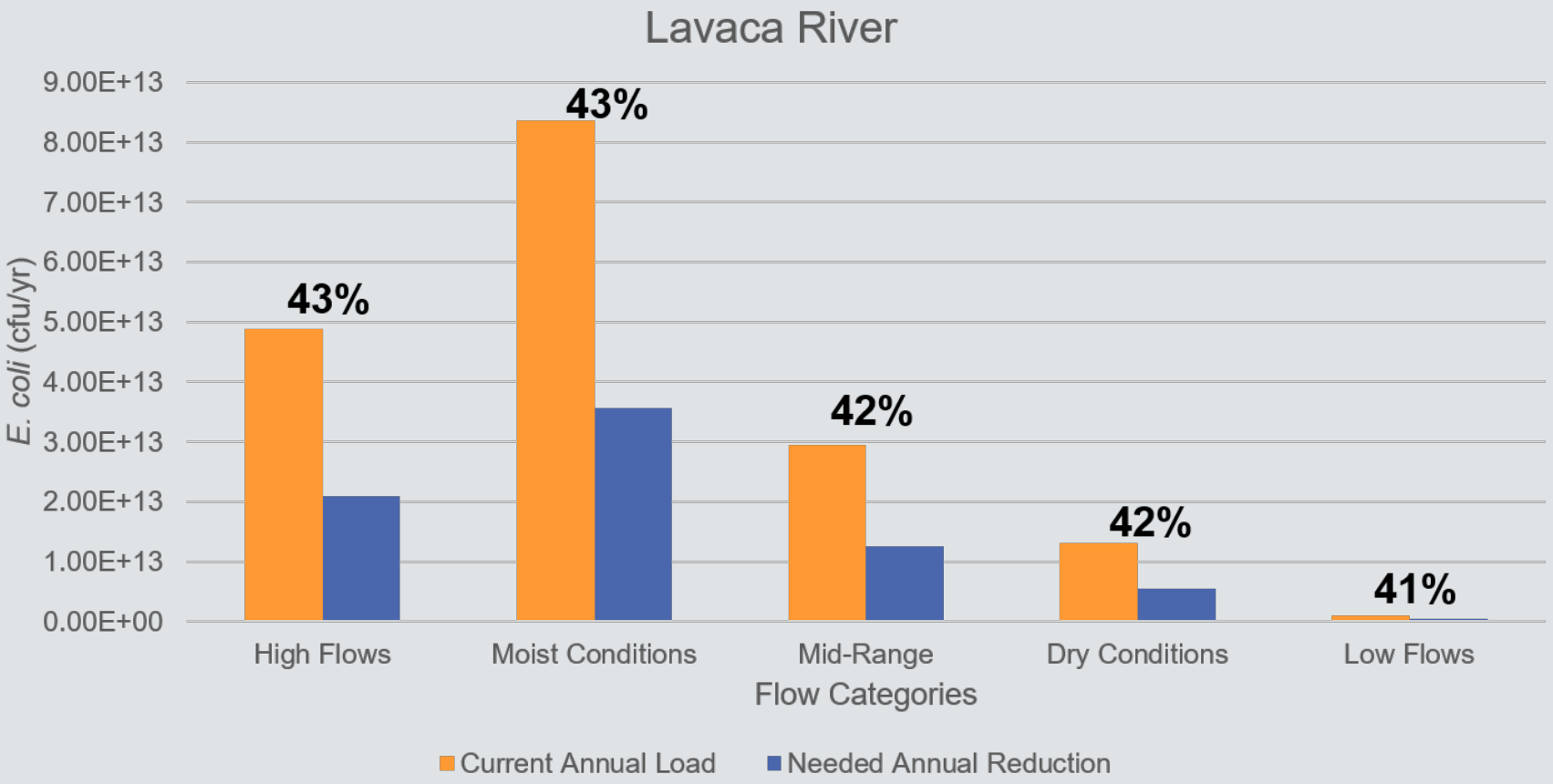


Watershed Protection Plan

Chapter 4 – Source and Load Determination

LDC Results

- Lavaca River Above Tidal
  - Total reduction of 7.51×10^{13} cfu/yr

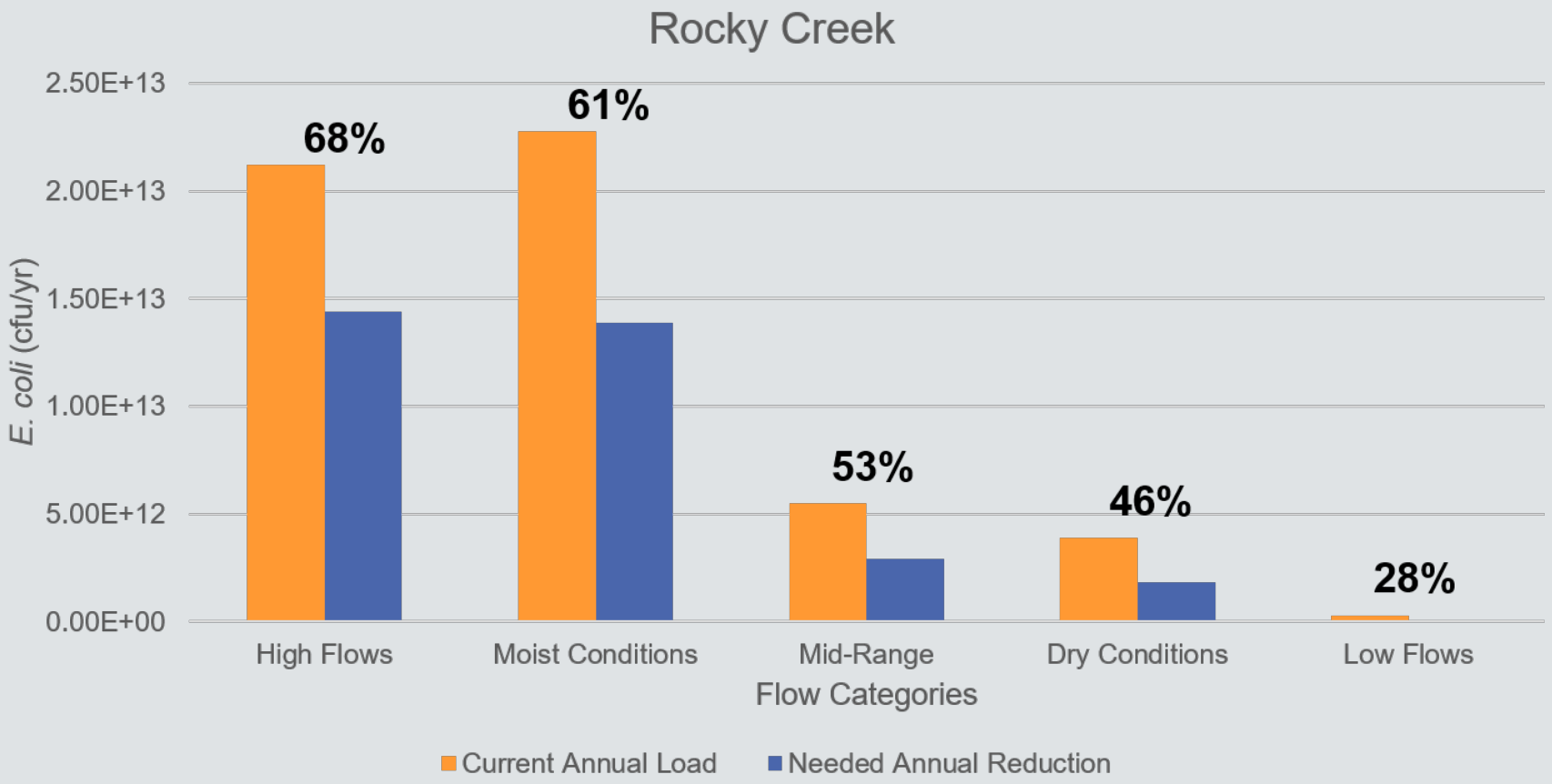


Watershed Protection Plan

Chapter 4 – Source and Load Determination

LDC Results

- Rocky Creek
  - Total reduction of 3.31×10^{13} cfu/yr



CHAPTER 5 – MANAGEMENT MEASURES

Watershed Protection Plan

Chapter 5 – Management Measures

- **MM1 – Promote and implement WQMPs or Conservation Plans**
  - Develop, implement, and provide assistance for 100 livestock WQMPs and CPs (30 in Rocky) over 10 years
  - Deliver Lone Star Healthy Streams workshops every other year
- **MM2 – Promote technical and operational assistance for feral hog control**
  - Construct fencing around deer feeders
  - Trap/hunt/remove feral hogs
  - Implement wildlife management practices and habitat management plans
  - Deliver feral hog management workshops

Watershed Protection Plan

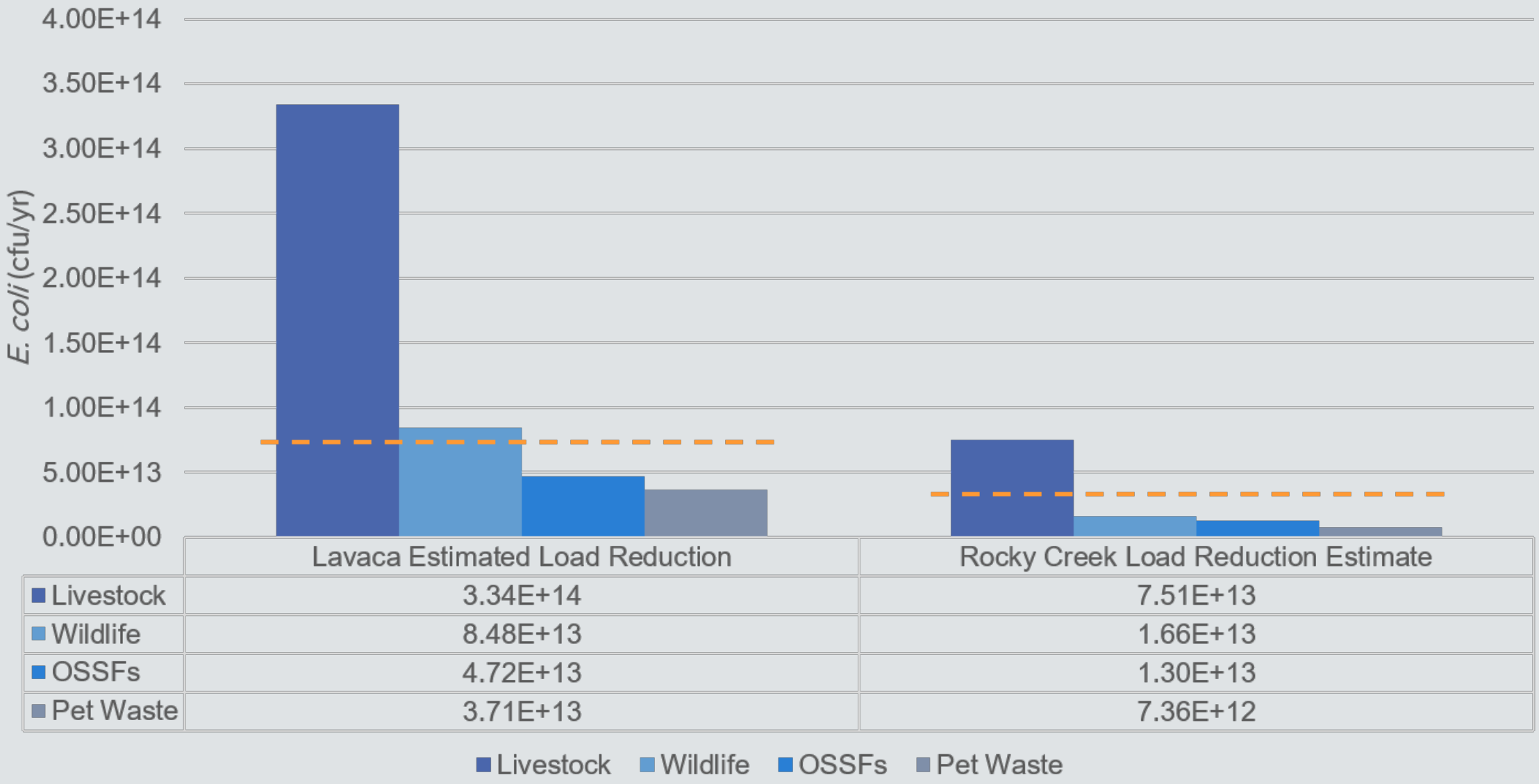
Chapter 5 – Management Measures

- **MM3 – Identify, repair or replace failing OSSFs**
  - Develop OSSF repair/replacement program
  - Identify, repair/replace 40 OSSFs (11 in Rocky) over 10 years
  - Deliver OSSF workshops every other year
- **MM4 – Increase proper pet waste management**
  - Install at least 5 pet waste stations
  - Develop and provide education materials
- **MM5 – Install urban and impervious surface stormwater BMPs**
  - Identify and install stormwater BMP projects as funding allows
  - Deliver education and outreach workshops

Watershed Protection Plan

Chapter 5 – Management Measures

- **MM6 – Address inflow & infiltration**
  - Develop program to repair private connections with I&I problems
  - Smoke testing to identify connections with problems and repair or replacement of pipes and connections as needed/funded
  - Develop and deliver education material for homeowners
- **MM7 – Reduce illicit dumping**
  - Develop and deliver educational and outreach materials to watershed residents



	Lavaca Estimated Load Reduction	Rocky Creek Load Reduction Estimate
Livestock	3.34E+14	7.51E+13
Wildlife	8.48E+13	1.66E+13
OSSFs	4.72E+13	1.30E+13
Pet Waste	3.71E+13	7.36E+12

CHAPTER 6 – EDUCATION & OUTREACH

Watershed Protection Plan

- Includes information/education components used to enhance the public understanding of the project and of implementing management measures
- Includes the role of the watershed coordinator, public meetings, newsletters, and various education programs
- Schedule for education programs is detailed in Chapter 8

Local stakeholders at the Watershed Stewards Workshop in Edna, TX Photo courtesy of Michael Kuitu, Texas A&M AgriLife Extension

CHAPTER 7 – FINANCIAL AND TECHNICAL RESOURCES

Watershed Protection Plan

Chapter 7 – Resources

- Identifies the financial and technical resources available to implement the plan.
- Estimated assistance needed included in Chapters 5 and 8

CHAPTER 8 – MEASURING SUCCESS

Watershed Protection Plan

Chapter 8 – Measuring Success

- The primary goal of the WPP is to ***restore water quality in the Lavaca River and Rocky Creek to the water quality standards set by the state of Texas*** through the long-term conservation and stewardship of the watershed's resources.
- Primary contact recreation standard: 126 cfu/100mL

Station(s)	Segment	Current Concentration†	5 yrs after implementation†	10 yrs after implementation†
12424	1602_03 Lavaca River Above Tidal	295	211	126
18190	1602B_01 Rocky Creek	222	174	126

† in units of MPN *E. coli*/100mL

Watershed Protection Plan

Chapter 8 – Measuring Success

- Milestones are used to evaluate implementation progress
- Interim milestones provide targets every few years to ensure implementation stays on track
- Identified in handout and Table 23 of the WPP

Finally!
The next steps

- Stakeholder meeting on June 29th
- Submit final draft to TCEQ this July for review and approval
- Submit draft TMDL document/I-Plan this summer
- Develop proposal to 319 grant program to fund watershed coordinator, implementation, and expanded monitoring
- Implement, monitor, review, revise

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