PETRONILA AND SAN FERNANDO CREEK WPP UPDATE

CAESAR KLEBERG WILDLIFE CENTER

LUCAS GREGORY

LFGREGORY@AG.TAMU.EDU

CH 1. INTRO TO WATERSHED MANAGEMENT

The Watershed Approach

- A holistic stakeholder driven plan that addresses water quality in a watershed rather than political subdivisions

- Addresses all watershed impairments

- A mechanism for voluntarily addressing complex water quality problems across multiple jurisdictions

- A framework for coordinated implementation of prioritized and integrated protection and restoration strategies

- Integrates ongoing activities; prioritizes implementation projects based on technical merit and benefits to the community

Watershed Protection Plan Elements

- Identify Causes and Sources

- Estimate Loading Reductions Needed

- Describe Management Measures

- Education and Outreach Component

- Schedule for Implementation

- Define Measurable Milestones

- Source of Financial Assistance and Estimate Costs

- Progress Indicators to Measure Reductions and Adaptive Management

- Monitoring to Evaluate Effectiveness

CH 2. WATERSHED CHARACTERIZATION

Watershed Description
- Size and extent of the watershed – watershed map

Physical Characteristics
- Watershed Soils and Topography

Land Use and Land Cover
- Defines land covers and acreages across watershed

Population
- Distribution, density, persons per household

Ecoregions

Climate

Aquifers

CH 3. WATER QUALITY

- Water Body Assessments
  - How the State assess water quality – 2 year cycles by individual assessment units

- Texas Surface Water Quality Standards
  - Water quality benchmarks – vary by assessment unit
  - Protective of Designated Uses

- Bacteria
  - Freshwater – *E . coli* 126 cfu/100 mL
  - Tidal water – Enterococcus 35 cfu/100 mL

Use	Segment Number	Use Category	Criteria
Contact Recreation	2203	Primary contact recreation 1	35 cfu / 100 ml (enterococci)
	2204		126 cfu/100 mL (E. coli)
	2492		
Aquatic Life Use	2203	High	4.0/3.0 mg/L DO
	2204	Intermediate	4.0/3.0 mg/L DO
	2492	High	5.0/3.0 mg/L DO

CH 3. WATER QUALITY

- Dissolved Oxygen
  - Standards for Fresh and Tidal Waters by Use
- Nutrients
  - No standards – Screening Levels compared to other waterbodies
  - Ammonia, Nitrate, Nitrite, Total Phosphorus, Chlorophyll-a
- Flow

Parameter	Screening Level	Level of Concern
Ammonia Nitrogen (NH3-N)	0.33 mg/L	
Nitrate Nitrogen (NO3-N)	1.95 mg/L	> 20 % of samples exceed
Chlorophyll-a	14.1 µg/L 21 µg/L (tidal)	Screening Level
Total Phosphorous (TP)	0.69 mg/L	

CH 4. POTENTIAL POLLUTION SOURCES

| Pollutant Source	Pollutant Type	Potential Cause	Potential Impact
WWTFs/ SSOs	Bacteria, nutrients	Inflows & Infiltrations: - Overload from large storm events - Conveyance system failures due to age, illicit connections, blockages, etc.	Untreated wastewater may enter watershed or water bodies.
OSSFs	Bacteria, nutrients	- System not properly designed for site specific conditions - Improper function due to age or lack of maintenance / sludge removal - Illegal discharge of untreated wastewater	Improperly treated wastewater reaches soil surface; may runoff into water bodies.
Urban Runoff	Bacteria, nutrients	Stormwater runoff from lawns, parking lots, dog parks, etc. - Improper application of fertilizers - Improper disposal of pet waste	Stormwater drains quickly route water directly to creek or river
Livestock	Bacteria, nutrients	- Manure transport in runoff - Direct fecal deposition to streams - Excessive runoff from pastures due to over grazing - Riparian area disturbance and degradation	Deposited directly into water body or may enter during runoff events
Wildlife	Bacteria, nutrients	- Manure transport in runoff - Direct fecal deposition to streams - Riparian area disturbance and degradation	Deposited directly into water body or enters during runoff events
Pets	Bacteria Nutrients	- Fecal matter not properly disposed of - Lack of dog owner education regarding effects of improper disposal	Bacteria and nutrients enter water body through runoff
Illegal Dumping	Bacteria, nutrients, litter	Disposal of trash and animal carcasses in or near water body	Direct or indirect contamination of water body

CH 5. POLLUTANT SOURCE ASSESSMENT

- Bacteria
  - *E. coli*
    - 126 cfu/100 mL
  - Enterococcus
    - 35 cfu/100 mL

Geomean criterion (126 MPN/100mL)

Geomean criterion (35 MPN/100mL)
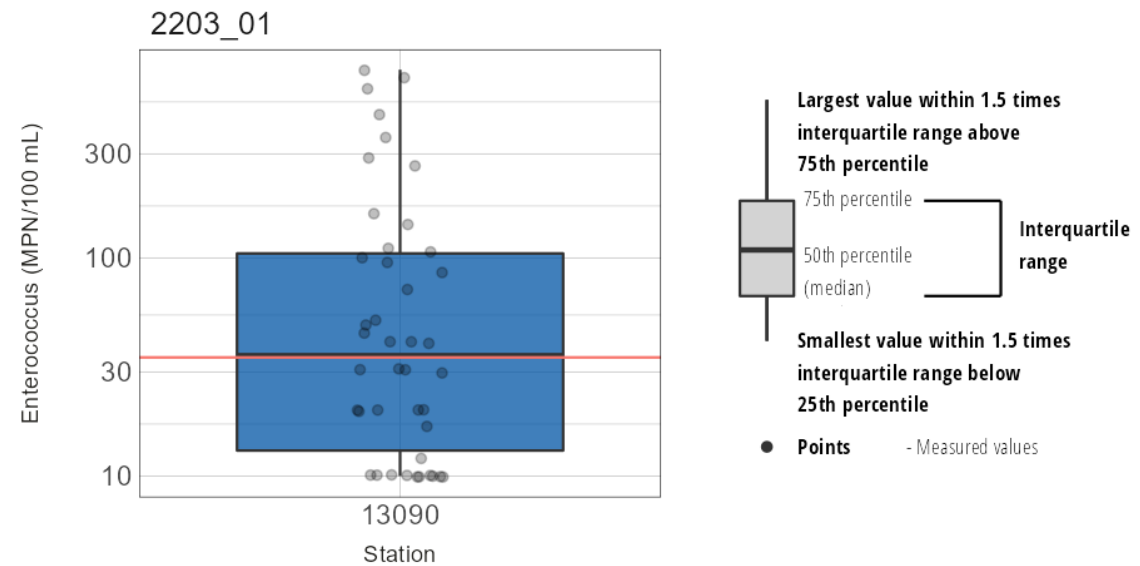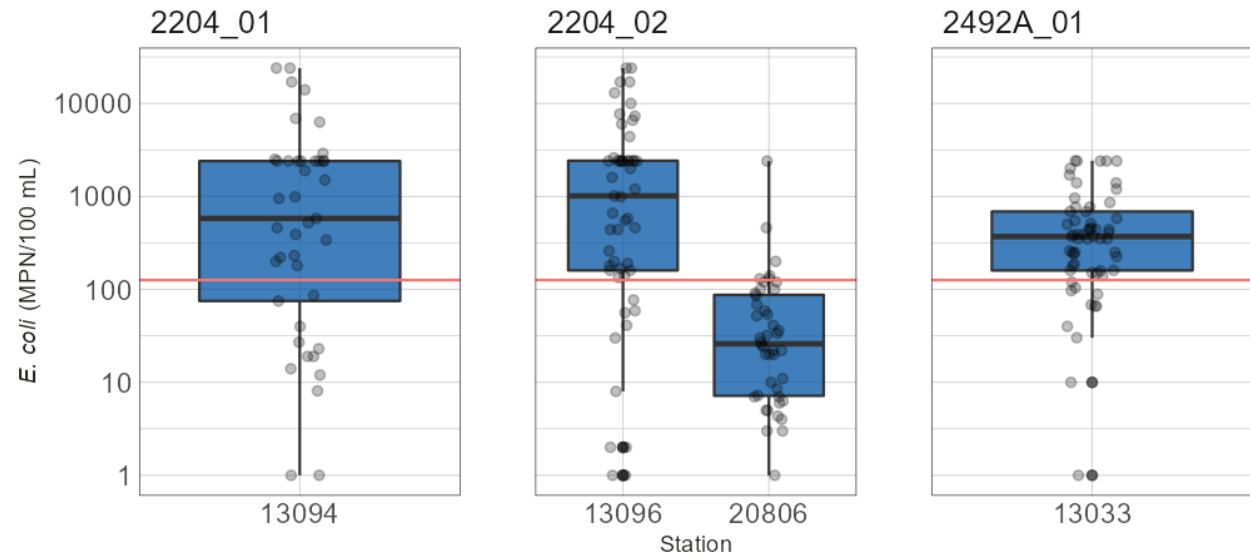
CH 5. POLLUTANT SOURCE ASSESSMENT

- Nutrients (Freshwater/Tidal)
  - Nitrate
    - 1.95 mg/L (1.10 mg/L)
  - Ammonia
    - 0.33 mg/L (0.46 mg/L)
  - Total Phosphorous
    - 0.69 mg/L (0.66 mg/L)
 - Chlorophyll-a
    - 14.1 µg/L   (21 µg/L)

Station ID	AU	Water Body	Mean Nitrate (mg/L)	Mean Ammonia (mg/L)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (mg/L)
13033	2492A_01	San Fernando Creek	2.08	0.11	23.48	2.56
13090	2203_01	Petronila Creek Tidal	0.5	0.11	61.9	0.23
13094	2204_01	Petronila Creek Above Tidal	0.67	0.07	82.19	0.19
21598			No data	No data	No data	No data
13096	2204_02		0.72	0.11	131.07	0.6
20806			0.19	0.06	38.3	2.65

CH 5. POLLUTANT SOURCE ASSESSMENT

Load Duration Curves

- Define needed load reduction targets to meet water quality goals across all flow regimes
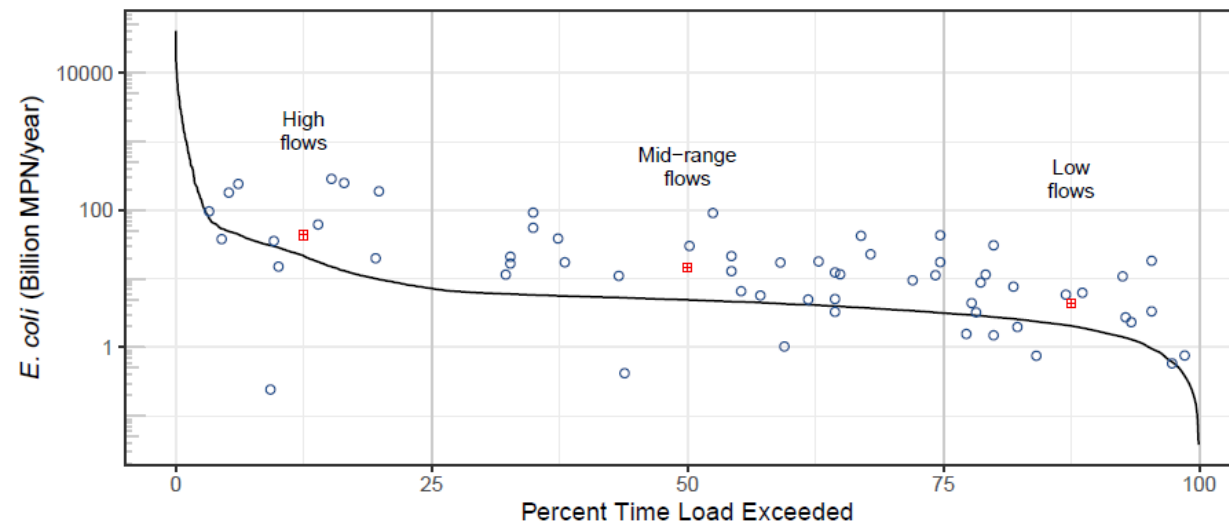

Petronila Creek, E. Coli Load Duration Curve: Station 13096, 1990–2021
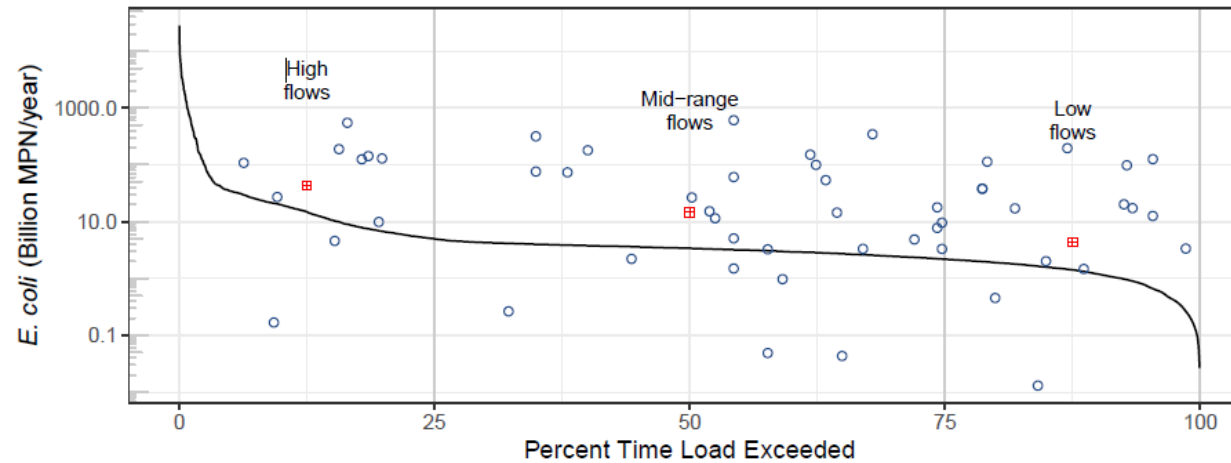
San Fernando Creek, E. Coli Load Duration Curve: Station 13033, 1990–2021

⊞ Exisiting Geomean Load (MPN/year) —— Allowable Load at Geomean Criterion (126 MPN/100 mL)

○ Measurement Value (MPN/year)

Reduction Needed

73.7%

56.5%

CH 5. POLLUTANT SOURCE ASSESSMENT

Spatial Analysis of Potential *E. coli* Loading

- Considers distribution of various bacteria sources across watershed

- Highlights parts of watershed with higher potential for bacteria loading

- Worst-case scenario: bacteria die-off is not considered

- Useful for planning prioritization

Total Potential E. coli Loads
Petronila & San Fernando Creek Subwatersheds
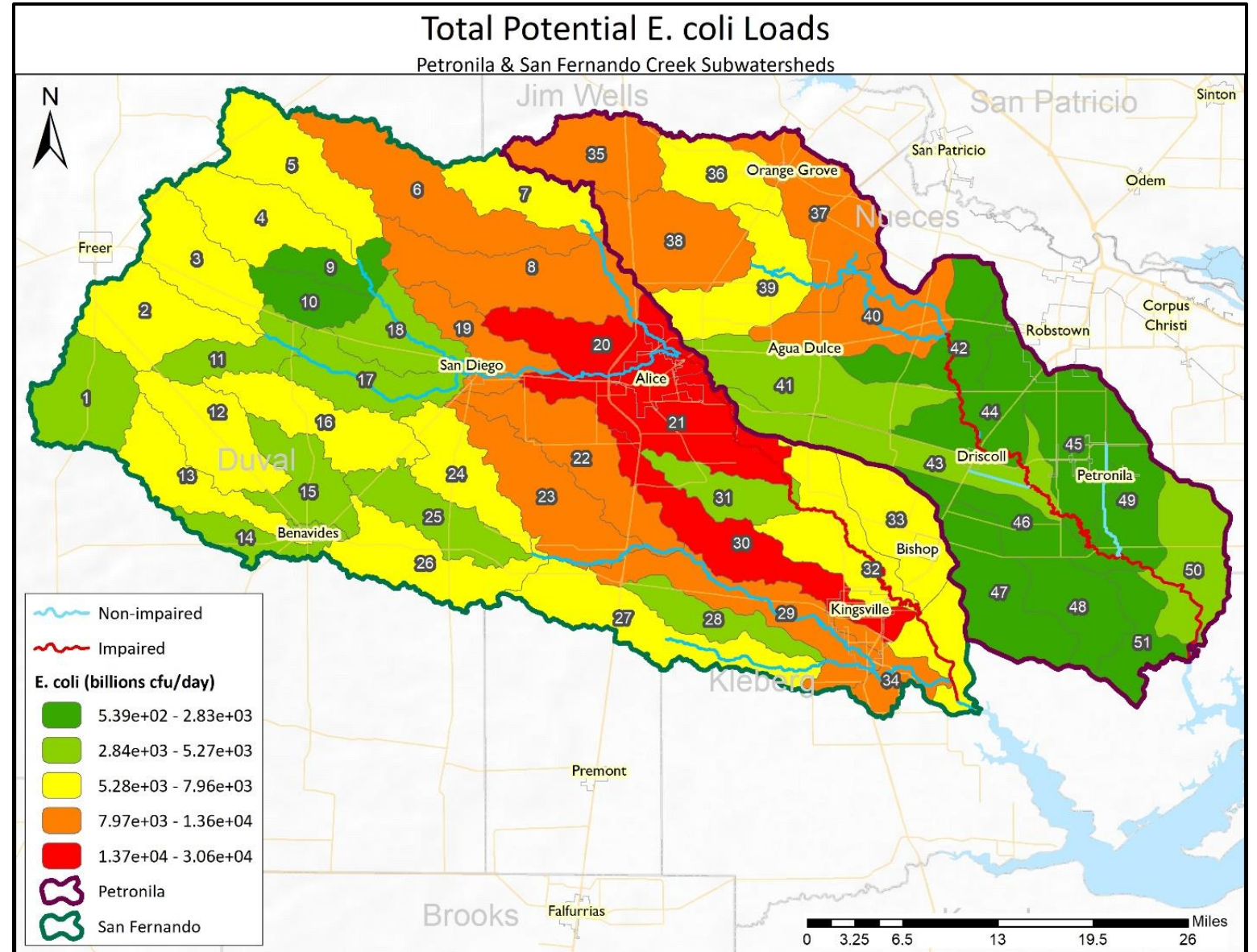
CH 6. RECOMMENDED IMPLEMENTATION STRATEGIES

Management Recommendation

- Focus is on addressing bacteria loading in the watershed
- Ancillary nutrient removal benefits from most practices
- Address manageable sources
- Outlines planned number of practices
- Lists priority subwatersheds
- Provides cost estimates
- Estimates load reductions from implementation
- Discusses likelihood of implementation

Sources Addressed

- Livestock
- Feral hogs
- OSSFs
- Urban Landscapes: Pets and Fertilizer
- Stormwater
- WWTFs and SSOs
- Illicit Dumping

CH 6. RECOMMENDED IMPLEMENTATION STRATEGIES

Livestock

- Develop Conservation Plans and Water Quality Management Plans

- Plans prescribe conservation practices that reduce bacteria loading by either changing livestock land use patterns or by keeping water on the landscape

Feral Hogs

- Remove hogs from the watershed: 15% of population

- Reduce access to food sources

- Improve trapping success with information resources

	CP/WQMP # Planned for Grazing Operations	E. coli (cfu/year)	Nitrogen (lbs/year)	Phosphorus (lbs/year)
Petronila Creek	56	8.15×10^{13}	16,633	10,194
San Fernando Creek	178	1.50×10^{14}	30,610	18,761

	Hogs to be Removed	E. coli (cfu/year)	Nitrogen (lbs/year)	Phosphorus (lbs/year)
Petronila Creek	590	2.05×10^{13}	3,768	1,345
San Fernando Creek	2,674	9.28×10^{13}	17,080	6,100

CH 6. RECOMMENDED IMPLEMENTATION STRATEGIES

OSSFs

- Inspect OSSFs

- Repair/replace 100 failing OSSFs

- Provide operation and maintenance education and outreach resources and programming

Lawn/Landscapes: Pets and Fertilizer

- Install 25 dog waste stations in public areas

- Increase proper dog waste disposal education and outreach; change behavior for 10% of dog owners

- Include proper fertilization information in education and outreach

	OSSFs Planned for Repair or Replacement	E. coli (cfu/year)	Nitrogen (lbs/year)	Phosphorus (lbs/year)
Petronila Creek	**60**	6.78×10^{14}	1,477	369
San Fernando Creek	**40**	4.52×10^{14}	985	246

	Managed Dog's Waste	E. coli (cfu/year)	Nitrogen (lbs/year)	Phosphorus (lbs/year)
Petronila Creek	**387**	2.23×10^{14}	404	93
San Fernando Creek	**1,650**	9.49×10^{14}	1,723	397

CH 6. RECOMMENDED IMPLEMENTATION STRATEGIES

Stormwater Runoff

- Increase education and outreach regarding stormwater management options

- Install stormwater BMP demonstration and education sites
  - No load reductions estimated
  - Options are numerous
  - Size and type of practice has considerable influence on efficiency

WWTFs and SSOs

- Repair and upgrade aging WWTF infrastructure at small facilities

- Address SSOs in WWTF conveyance systems

- Increase education and outreach regarding fats, oils, grease, non-flushables
  - No load reductions estimated
  - Reduction efficiency depends on type and size of repair
  - Funding drives ability to address each issue

# CH 6. RECOMMENDED IMPLEMENTATION STRATEGIES

Illicit Dumping

- Increase education and outreach regarding illicit dumping issues and management options

- Provide additional resources to minimize illicit dumping: additional dump sites; collection events
  - No load reductions estimated
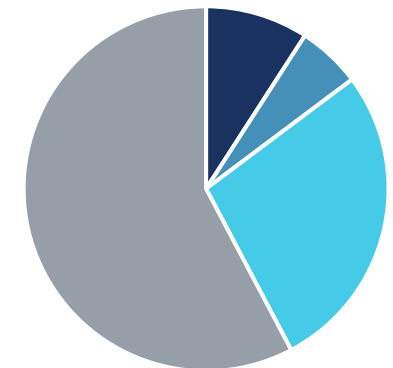 - Dumping does not contribute significant bacteria

Reduction Needed vs. Planned

	Petronila Creek	San Fernando Creek
Needed	5.91×10^{12}	3.93×10^{12}
Planned	1.00×10^{15}	1.64×10^{15}

Portion of Souce Reduction in Petronila Creek
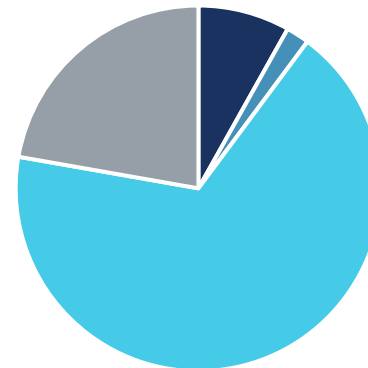
Portion of Source Reduction in San Fernando Creek

■ Livestock ■ Feral Hogs ■ OSSFs ■ Pets

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CH 7. EDUCATION AND OUTREACH

🌳	**Role of the Watershed Coordinator**	Facilitates and tracks implementation
👥	**Public Meetings**	Summary of meetings held and participants
👥	**Future Stakeholder Engagement**	Discussion of future stakeholder activities
📚	**Education Programs**	Summarizes various programs supporting implementation
🤝	**Events and Opportunities**	Existing activities supporting implementation

CH 8. PLAN IMPLEMENTATION   CH 9. IMPLEMENTATION RESOURCES

- Outlines management recommendation details
  - Briefly describes management measure
  - List responsible party for implementing practice or items supporting practices
  - Estimates unit cost each item where possible
  - Lists implementation targets over implementation period
  - Estimates total cost for implementation where possible

- Technical Assistance Needs
  - Describes topical expertise available to assist with practice planning, design, implementation and maintenance
  - Entities providing assistance listed
- Technical Resource Descriptions
  - Highlights existing technical programs and resources available to aid implementation efforts
- Financial Resource Descriptions
  - Describes sources of funding available for plan implementation
  - Highlights types of applicable implementation activities

CH 10. MEASURING SUCCESS

Water Quality Targets

Station(s)	Segment	Current Concentration†	5 Years After Implementation†	10 Years After Implementation†
13090	2203_01	44.9	40.0	≤35
13094	2204_01	419.4	272.5	≤126
13096	2204_02	592.5	359.3	≤126
20806	2204_02	28.8	≤126	≤126
13033	2492A_01	303.6	214.8	≤126

Additional Data Collection Needs

- Continued CRP monitoring

- Expand monitoring sites and frequency where possible

- Conduct focused monitoring to evaluate practice effectiveness

CH 10. MEASURING SUCCESS

Data Reviews

- Texas' biennial water quality assessments
  - *Texas Integrated Report*
  - 7 year rolling average
- Other Assessments
  - Geometric mean of most recent 3 years of data
  - Long term trend analysis
  - Focused assessments for special monitoring projects

Interim Measurable Milestones

- Non-water quality means to evaluate implementation success
- #s of practices implemented
- #s of programs delivered
- Area of watershed impacted

Adaptive Management

- Discussion on ability and mechanisms to revisit the WPP if implementation strays from plan, stalls, or results are less than expected

CURRENT STATUS

- WPP was accepted by EPA in June 2022

  - Opens the door for grant funds from EPA

  - May increase chances for funding from other sources

- Proposals submitted to implement the WPP (all still pending)

  - Provide septic system inspections and education and outreach regarding proper operation and maintenance

  - Provide information and educational resources to stakeholders

  - Provide technical and financial assistance to producers to implement agricultural conservation

  - Work to identify and secure additional funding sources

  - Facilitate ongoing stakeholder group coordination and engagement

    - Continue discussion about specific project ideas and needs

    - Continue discussions about resource concerns

QUESTIONS?

LUCAS GREGORY

979-314-2361

LFGREGORY@AG.TAMU.EDU