

# PETRONILA AND SAN FERNANDO CREEK WPP OVERVIEW MEETING

AMERICAN LEGION HALL

BISHOP, TX

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# MEETING OBJECTIVES

- Present Draft WPP Overview
- Discuss Draft WPP Content
  - Additional Concerns
  - Additional Items to Include
- Discuss WPP Review Process and Timeline
- Next Steps



# CH I. 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

Use	Segment Number	Use Category	Criteria
Contact Recreation	2203	Primary contact recreation I	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

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

# 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
<b>Ammonia Nitrogen (NH<sub>3</sub>-N)</b>	0.33 mg/L	> 20 % of samples exceed Screening Level
<b>Nitrate Nitrogen (NO<sub>3</sub>-N)</b>	1.95 mg/L	
<b>Chlorophyll-a</b>	14.1 µg/L    21 µg/L (tidal)	
<b>Total Phosphorous (TP)</b>	0.69 mg/L	

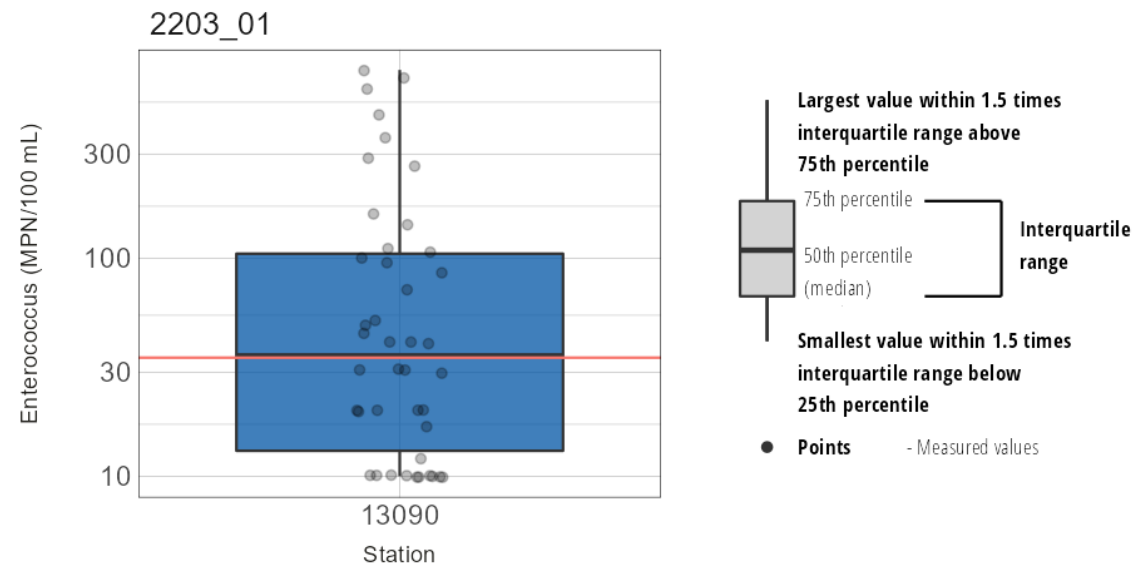
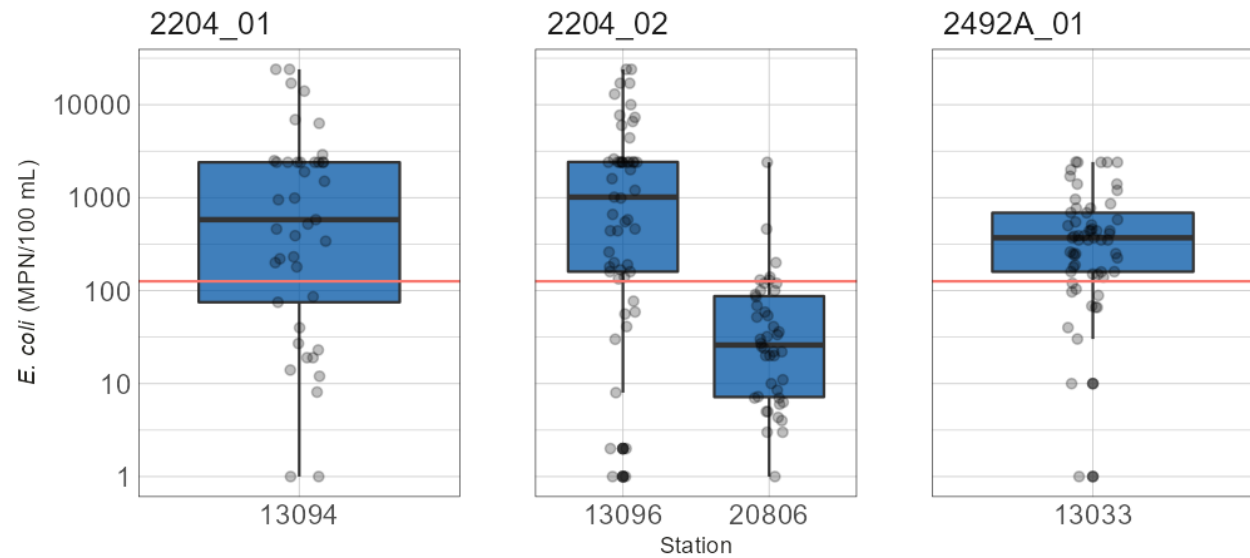
# CH 4. POTENTIAL POLLUTION SOURCES

Pollutant Source	Pollutant Type	Potential Cause	Potential Impact
<b>WWTFs/ SSOs</b>	Bacteria, nutrients	Inflows & Infiltrations: <ul style="list-style-type: none"> <li>- Overload from large storm events</li> <li>- Conveyance system failures due to age, illicit connections, blockages, etc.</li> </ul>	Untreated wastewater may enter watershed or water bodies.
<b>OSSFs</b>	Bacteria, nutrients	<ul style="list-style-type: none"> <li>- System not properly designed for site specific conditions</li> <li>- Improper function due to age or lack of maintenance / sludge removal</li> <li>- Illegal discharge of untreated wastewater</li> </ul>	Improperly treated wastewater reaches soil surface; may runoff into water bodies.
<b>Urban Runoff</b>	Bacteria, nutrients	Stormwater runoff from lawns, parking lots, dog parks, etc. <ul style="list-style-type: none"> <li>- Improper application of fertilizers</li> <li>- Improper disposal of pet waste</li> </ul>	Stormwater drains quickly route water directly to creek or river
<b>Livestock</b>	Bacteria, nutrients	<ul style="list-style-type: none"> <li>- Manure transport in runoff</li> <li>- Direct fecal deposition to streams</li> <li>- Excessive runoff from pastures due to over grazing</li> <li>- Riparian area disturbance and degradation</li> </ul>	Deposited directly into water body or may enter during runoff events
<b>Wildlife</b>	Bacteria, nutrients	<ul style="list-style-type: none"> <li>- Manure transport in runoff</li> <li>- Direct fecal deposition to streams</li> <li>- Riparian area disturbance and degradation</li> </ul>	Deposited directly into water body or enters during runoff events
<b>Pets</b>	Bacteria Nutrients	<ul style="list-style-type: none"> <li>- Fecal matter not properly disposed of</li> <li>- Lack of dog owner education regarding effects of improper disposal</li> </ul>	Bacteria and nutrients enter water body through runoff
<b>Illegal Dumping</b>	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





# 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)

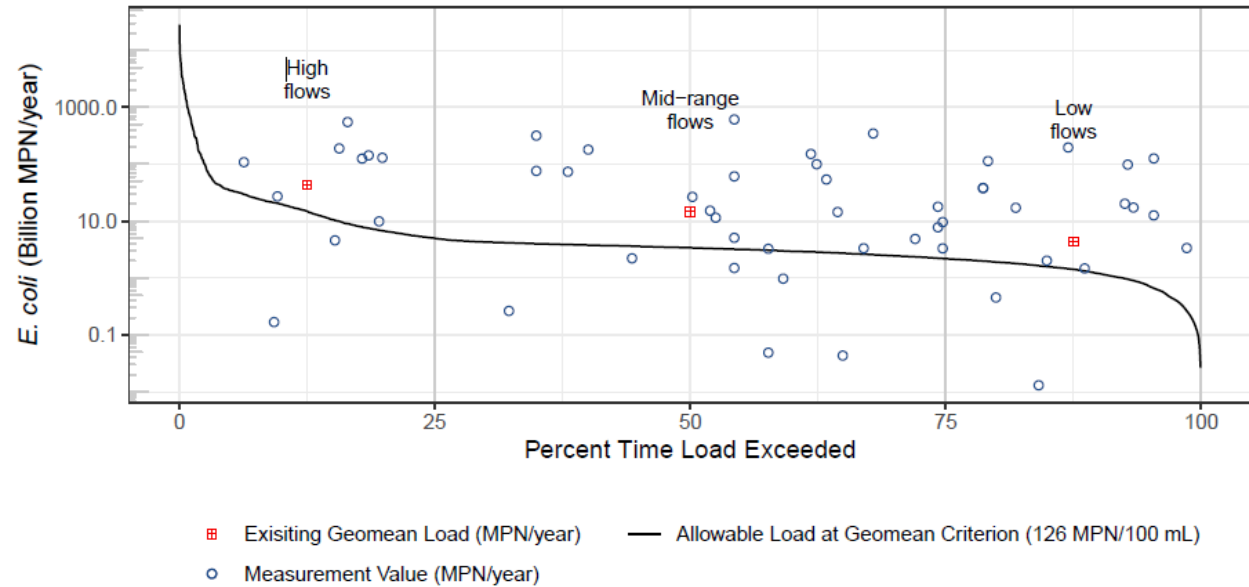
Station ID	AU	Water Body	Mean Nitrate (mg/L)	Mean Ammonia (mg/L)	Mean Chlorophyll-a (µg/L)	Mean Total Phosphorus (mg/L)
13033	2492A_01	San Fernando Creek	2.08	0.11	23.48	2.56
13090	2203_01	Petronila Creek Tidal	0.5	0.11	61.9	0.23
13094	2204_01	Petronila Creek Above Tidal	0.67	0.07	82.19	0.19
21598		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



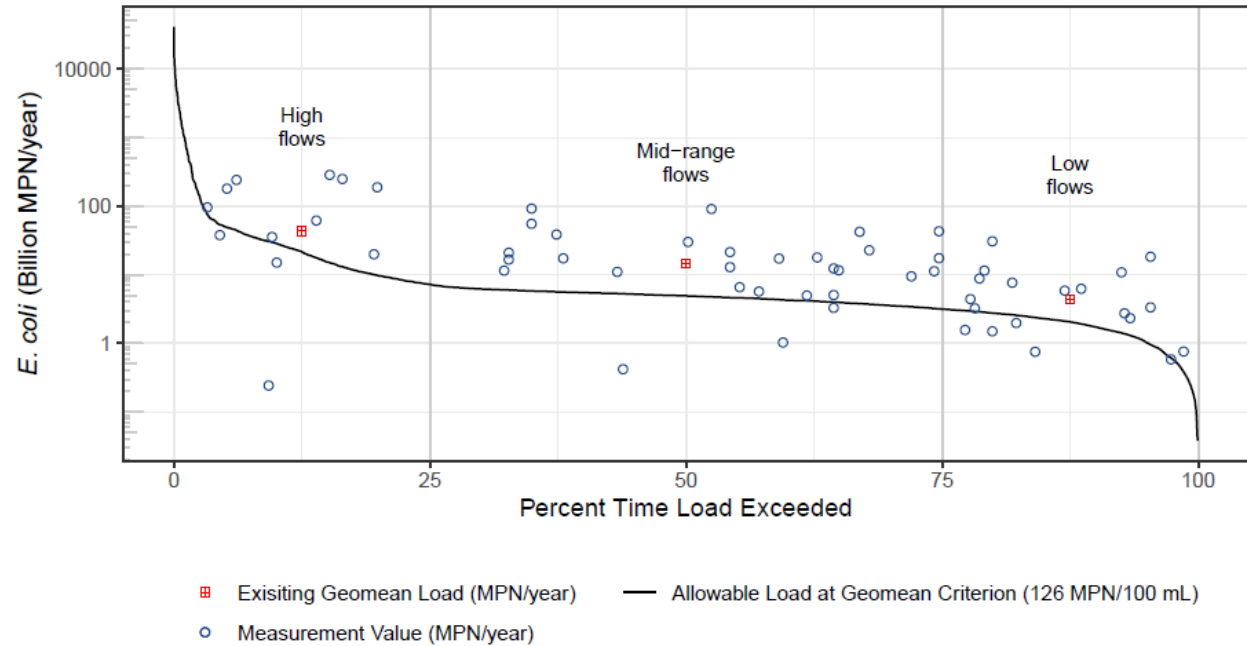
Petronila Creek	Flow Condition			
	Station: 13096	Lowest Flows	Mid-Range Flows	Highest Flows
Existing Annual Load (Billion MPN)	1,140.61	2,353.61	4,526.12	
Annual Load Reduction Needed (Billion MPN)	1,010.37	1,736.45	3,165.22	
Percent Reduction Needed	88.58%	73.78%	69.93%	
Total Annual Load (Billion MPN)	8,020.34			
Total Annual Load Reduction (Billion MPN)	5,912.04			
Total Percent Reduction	73.71%			

# CH 5. POLLUTANT SOURCE ASSESSMENT

## Load Duration Curves

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

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

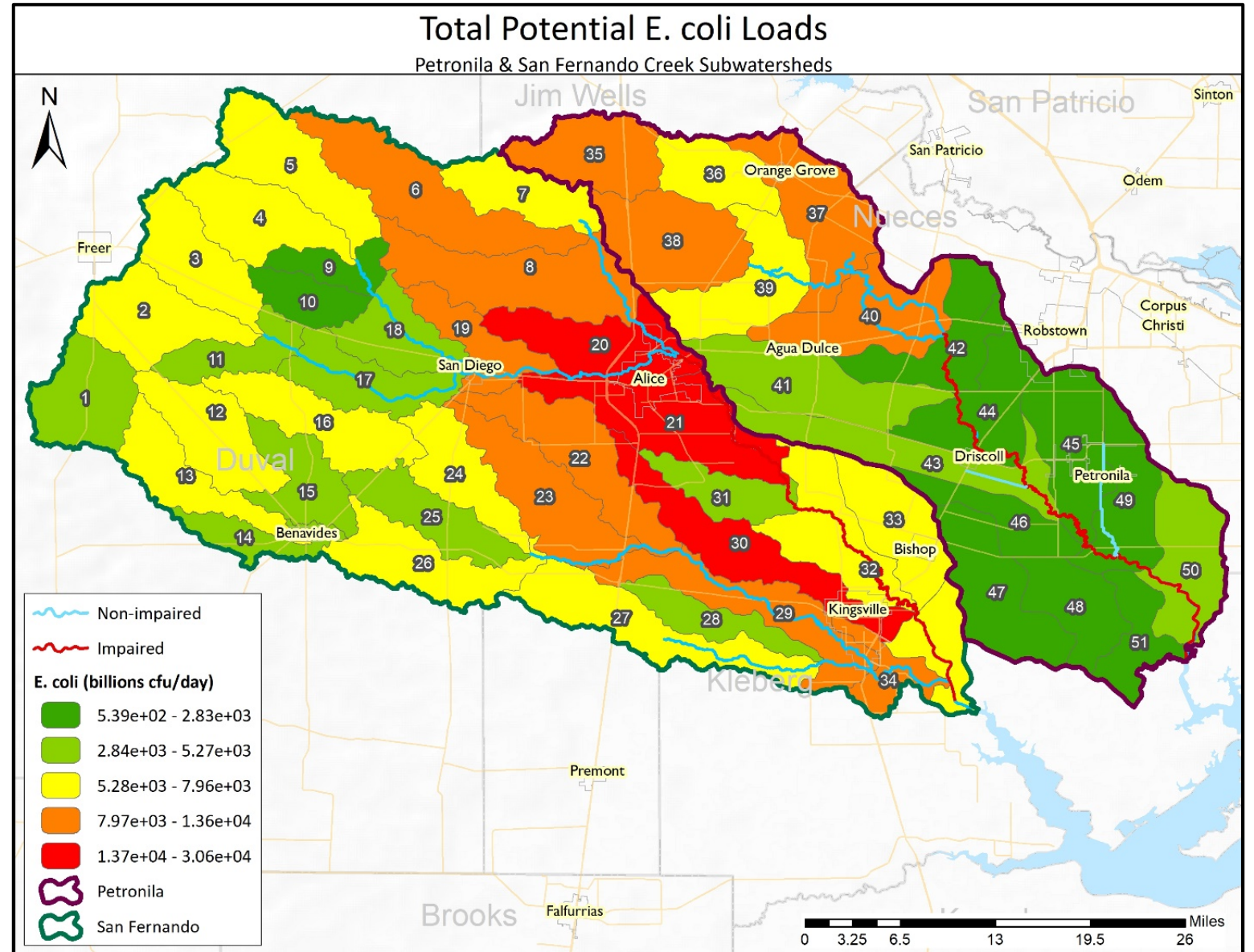


San Fernando Creek	Flow Condition		
	Station: 13033	Lowest Flows	Mid-Range Flows
Existing Annual Load (Billion MPN)	<b>399.13</b>	<b>2678.84</b>	<b>3970.33</b>
Annual Load Reduction Needed (Billion MPN)	209.82	1781.51	1992.08
Percent Reduction Needed	52.57%	66.50%	50.17%
Total Annual Load (Billion MPN)	7048.39		
Total Annual Load Reduction (Billion MPN)	<b>3983.41</b>		
Total Percent Reduction	56.52%		

# 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



# 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

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

## Feral Hogs

- Remove hogs from the watershed: 15% of population
- Reduce access to food sources
- Improve trapping success with information resources

	Hogs to be Removed	<i>E. coli</i> (cfu/year)	Nitrogen (lbs/year)	Phosphorus (lbs/year)
Petronila Creek	590	$2.05 \times 10^{13}$	3,768	1,345
San Fernando Creek	2,674	$9.28 \times 10^{13}$	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

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

## 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

	Managed Dog's Waste	<i>E. coli</i> (cfu/year)	Nitrogen (lbs/year)	Phosphorus (lbs/year)
<b>Petronila Creek</b>	<b>387</b>	$2.23 \times 10^{14}$	404	93
<b>San Fernando Creek</b>	<b>1,650</b>	$9.49 \times 10^{14}$	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

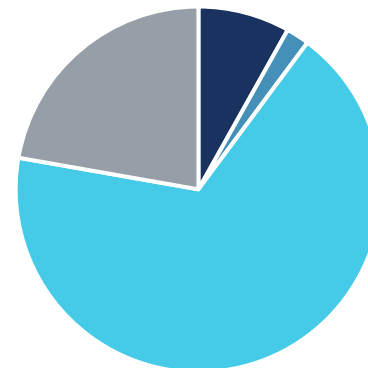
## Illicit Dumping

- 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

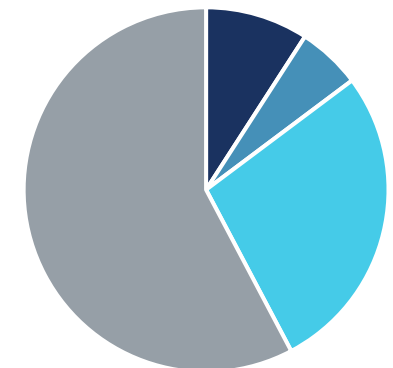
## Reduction Needed vs. Planned

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

Portion of Source Reduction in Petronila Creek



Portion of Source Reduction in San Fernando Creek



■ Livestock ■ Feral Hogs ■ OSSFs ■ Pets

■ Livestock ■ Feral Hogs ■ OSSFs ■ Pets

## 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 <sup>†</sup>	5 Years After Implementation <sup>†</sup>	10 Years After Implementation <sup>†</sup>
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

# REMAINING WPP CONTENT TO ADD



## Up Front

Cover Page  
Table of Contents  
List of Figures  
List of Tables  
List of Acronyms  
Executive Summary



## In the Back

References  
Appendices

- WPP elements reference list
- Loading calculations
- Load reduction calculations

## NEXT STEPS

### **Send out Draft WPP Chapters for Stakeholder Review**

- ETA for delivery is Jan 28th
- Request comments by Feb 20th

### **TWRI adds Front Matter, References and Appendices**

**TWRI begins review for formatting consistency, grammar, etc.**

**TWRI addresses comments received and sends Final Draft for Stakeholder Review by March 7<sup>th</sup>**

**Final Stakeholder Meeting to Approve the WPP: Last week of March**  
(do we need this to approve the plan?)

**April 1 - WPP sent to TSSWCB for final Agency Review then on to EPA from there**

**QUESTIONS?**

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