Lavaca River Watershed Meeting Overview

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Topics for Today

- Review of previous meeting
- Example WPP
- Pollutant Loads and Sources
- Proposed Timeline and Next Steps

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Introductions

- Name
- Entity/group representing/ landowner/interested citizen, etc.

Review of Previous Meeting

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Water Quality Management Overview

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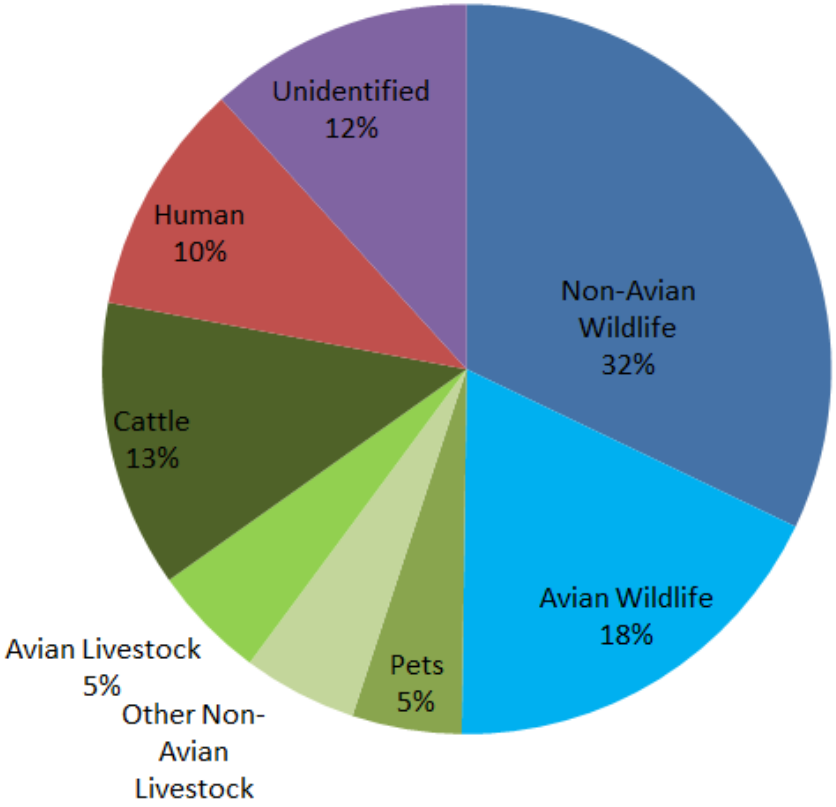
Major Sources Of Bacteria (based on previous projects)



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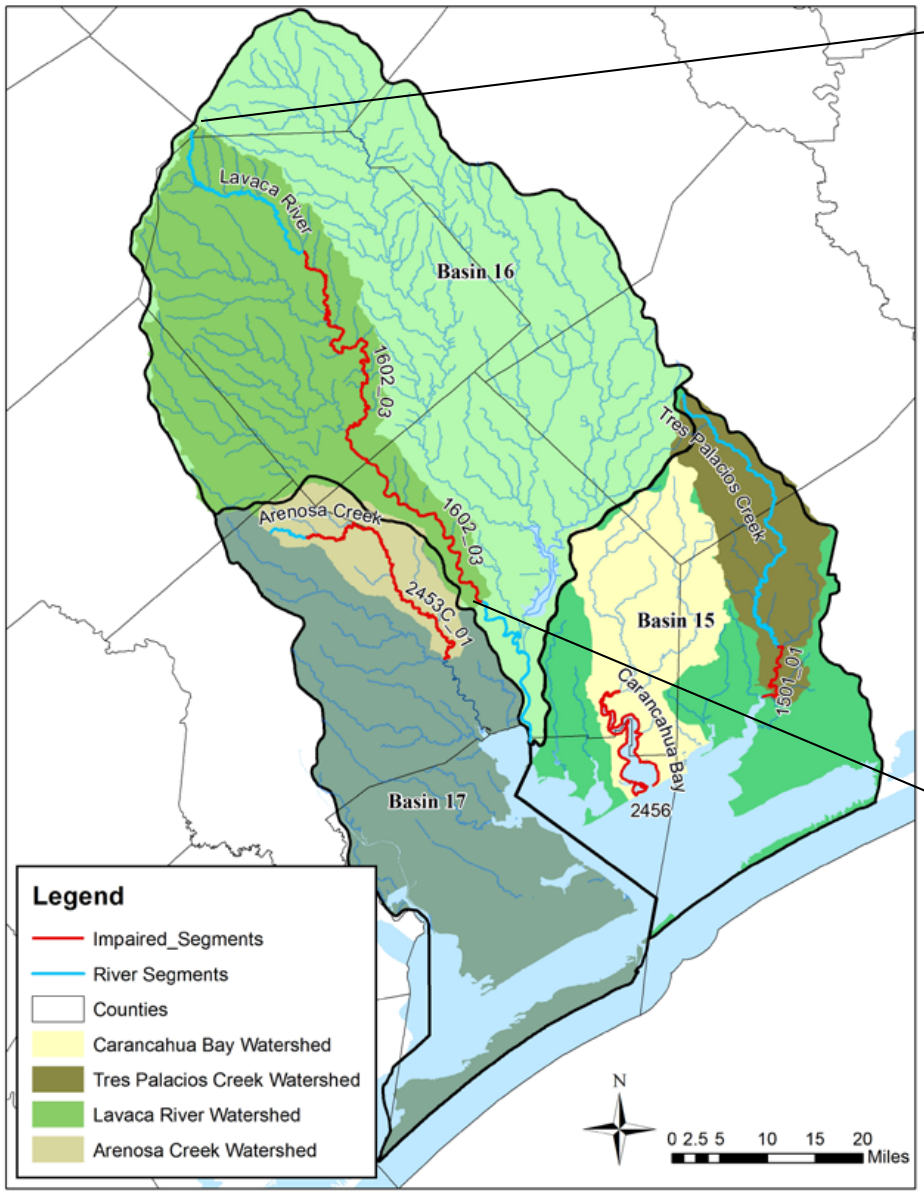

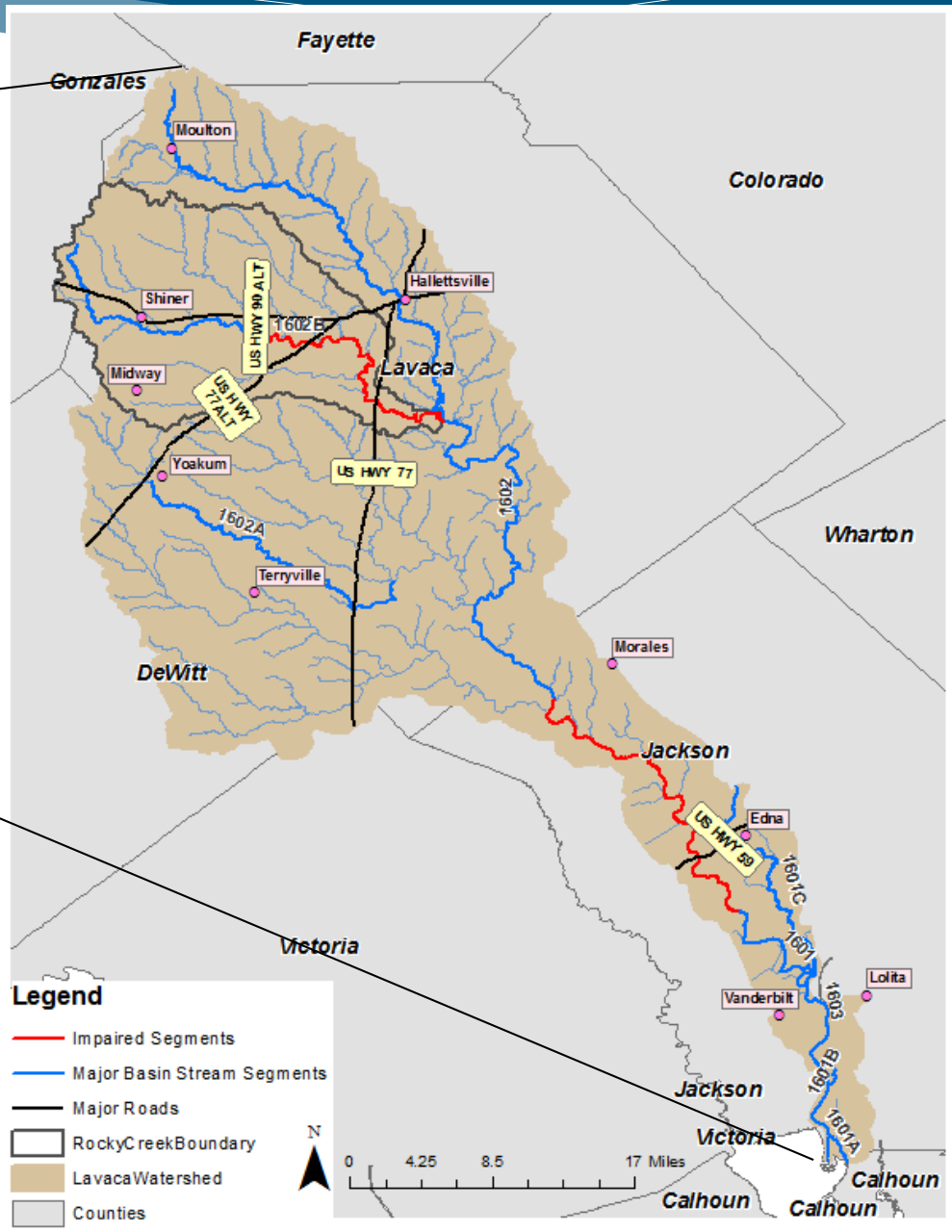

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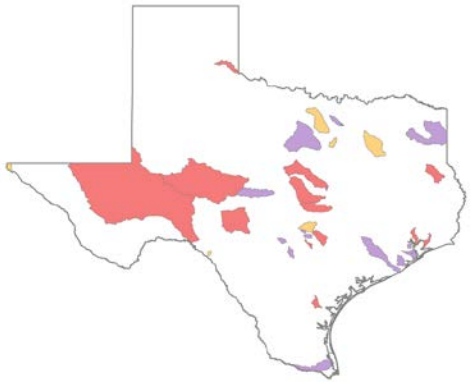
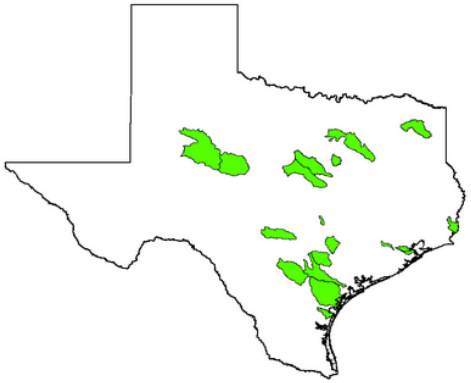
What is in a watershed plan?

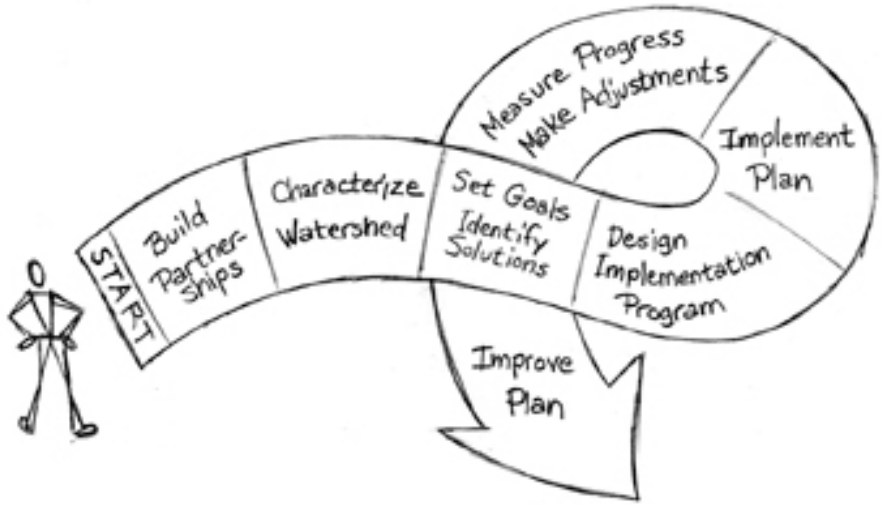




- USEPA 9 Elements
  - Identify Causes and Sources
  - Estimate Loading Reductions Needed
  - Describe Management Measures
  - Education and Outreach Component
  - Schedule for Implementation
  - Measureable Milestones
  - Source of Financial Assistance and Estimate Costs
  - Progress Indicators to Measure Reductions and Adaptive Management
  - Monitoring to Evaluate Effectiveness

Frameworks and Decision Making

- Examples of other stakeholder groups
- Types of decision making
  - Consensus Decisions as a Group
- Example organizational frameworks
  - Still need decision



Possible Frameworks for Organizing Stakeholders

Option 1

Coordination Committee ← Stakeholder group

Option 2

Coordination Committee ← Stakeholder group

↑

Workgroups

Option 3

No formal framework

Option 4

Stakeholder group

↑

Workgroups

Example WPP – Tres Palacios

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- Problem (pg ix):
  - Water quality monitoring has indicated the fecal indicator bacteria levels are often above the state's water quality standard in the tidal segment of Tres Palacios Creek. The creek is currently listed on the state's 303(d) impaired water bodies list.

- Document overview (pg ix-xii):
  - Identified pollutant sources
  - Developed 9 recommended management measures
  - Documented needed education and outreach
  - Established how we will track progress through water quality monitoring and interim milestones
  - Set a goal of reducing bacteria levels in the creek to 33 cfu/100mL

Chapter 1 – Watershed Management

- WPP objective: reduce bacteria loadings and attain primary contact water quality standards
- Definition of a Watershed - Land Use that drains into a common waterway
- Watershed and Water Quality
  - Point source pollution
  - Nonpoint source pollution
- Benefits of a watershed approach - involving stakeholders and geographic boundaries rather than political boundaries
- Watershed Protection Planning – 9 Element Plan
- Adaptive Management – allows for changes to be made

Chapter 2 – Watershed Characterization

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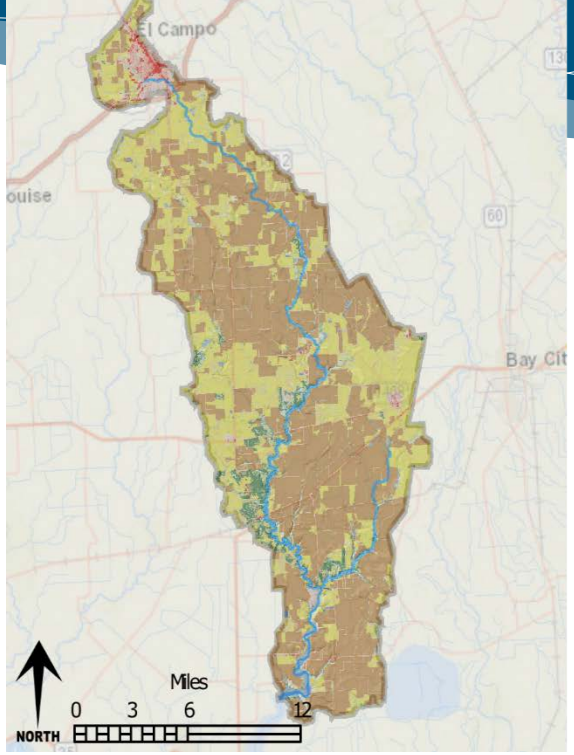
Overview

- Describes the current conditions of the watershed
- Developed through state and federal data resources and local stakeholder knowledge
- This information is used throughout the plan to identify pollution loadings, management measures, and prioritize critical areas.

Tres Palacios Watershed

- Topography
- Soils
- Climate
- Land Cover
- OSSF Estimates

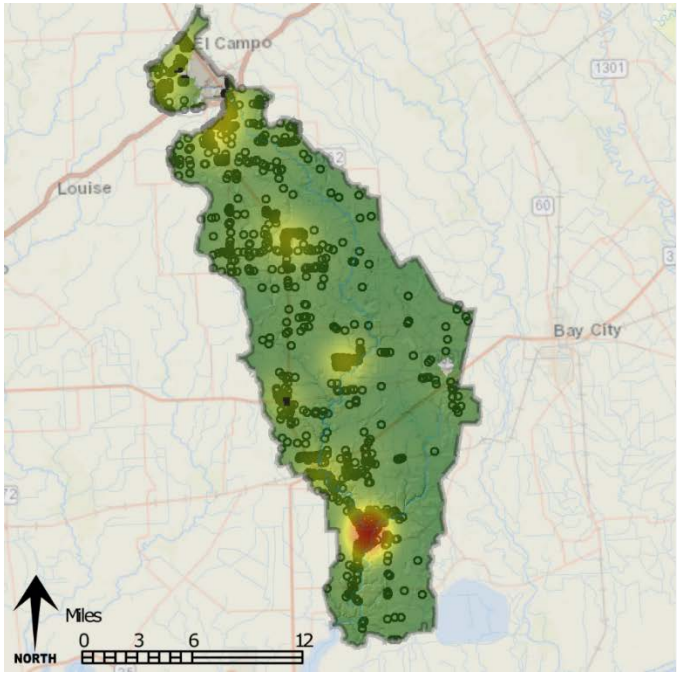


Tres Palacios and Tributaries
Tres Palacios Boundaries

Land Cover

- Open Water
- Developed, Open Space
- Developed, Low Intensity
- Developed, Medium Intensity
- Developed, High Intensity
- Barren Land
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Shrub/Scrub
- Herbaceuous
- Hay/Pasture
- Cultivated Crops
- Woody Wetlands
- Emergent Herbaceuous Wetlands

Land Cover: USGS NLCD
Stream Segements and Watershed Boundaries: TCEQ
Basemap: ESRI, DeLorme, USGS, and Open Street Map



Legend

OSSFs/acre

High : 0.07

Low : 0

OSSF Locations

Tres Palacios and Tributaries

Tres Palacios Boundaries

Residential 911 Addresses: Matagorda & Wharton County Governments
CCN Areas: Public Utility Commission of Texas
Water and Sewer Districts, Stream Segements and Watershed Boundaries: TCEQ
Basemap Sources: ESRI, DeLorme,USGS, and Open Street Map

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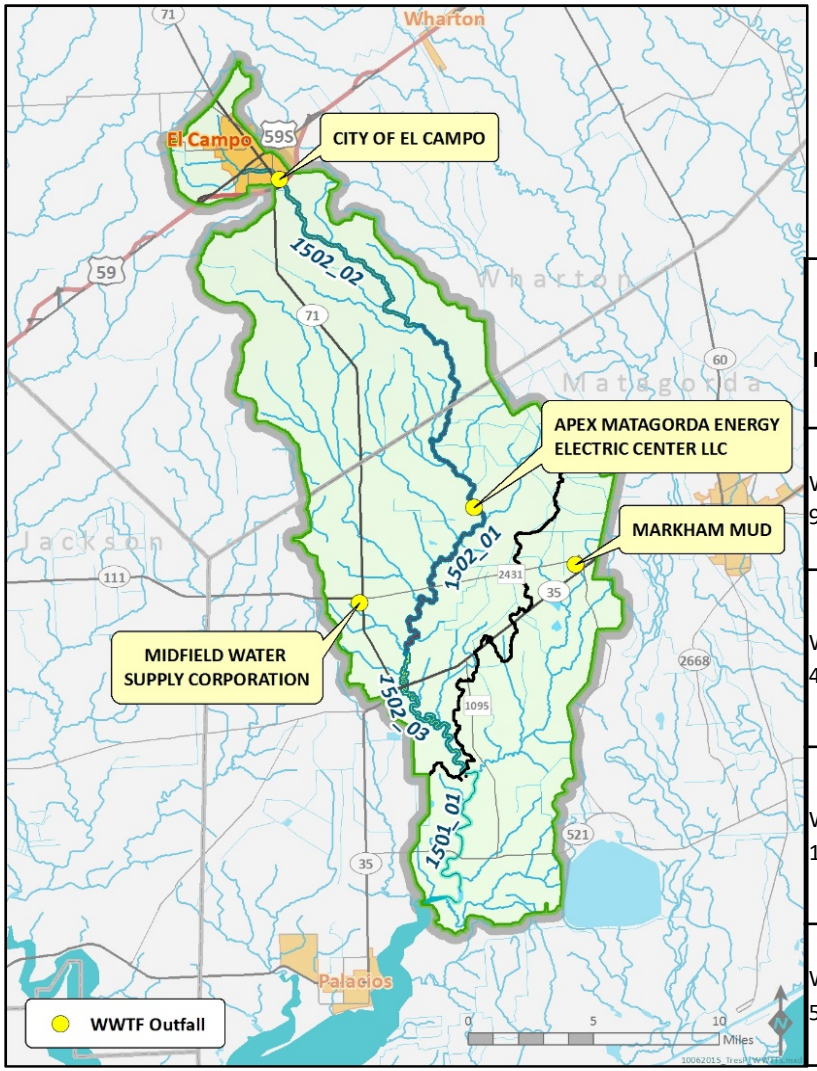
WWTFs pg 13-14



TPDES Permit No.	Facility	Held By	AU	Receiving Waters	Discharge Type	Permitted Discharge[a] (MGD)	Recent Discharge (MGD)
WQ0005009000	Apex Matagorda Energy Center	Apex Matagorda Energy Center, LLC	1502_01	Tres Palacios Creek Above Tidal	wastes from a compressed air energy storage facility	0.223 (daily avg)	0.079[b]
WQ0010844001	City of El Campo Wastewater Treatment Facility	City of El Campo	1502_02	Tres Palacios Creek Above Tidal	treated domestic wastewater	2.628 (annual avg)	1.015[b]
WQ0013091001	Midfield Wastewater Treatment Facility	Midfield Water Supply Corporation	1502_03	an unnamed tributary; thence to Wallace Creek; thence to Tres Palacios Creek Above Tidal	treated domestic wastewater	0.03 (daily avg)	0.016[b]
WQ0015075001	Markham MUD Wastewater Treatment Facility	Markham Municipal Utility District	1501_01	an unnamed ditch; thence to Wilson Creek; thence to Tres Palacios Creek Tidal	treated domestic wastewater	0.3 (daily avg)	0.045[c]

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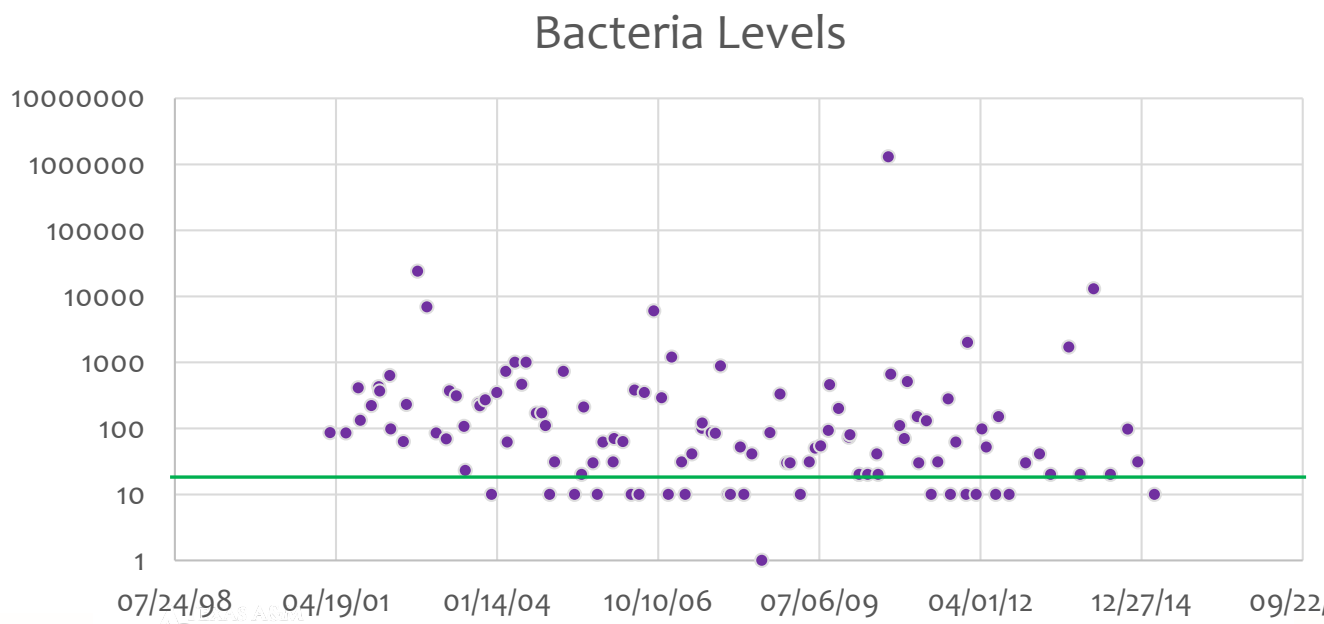
Bacteria

Data used for:	Parameter	ASMT Start Date	ASMT End Date	# of samples	Geometric Mean	Criteria	Designated Use
Assessment	Enterococcus	12/1/2005	11/30/2012	64	67.19	35.00	Recreation
All Data	Enterococcus	3/14/2001	3/17/2015	115	92.42	35.00	Recreation



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Chapter 3 -
Pollutant Loads and Sources

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Introduction – Chapter 3

- Needed Load Reductions
  - How much and when

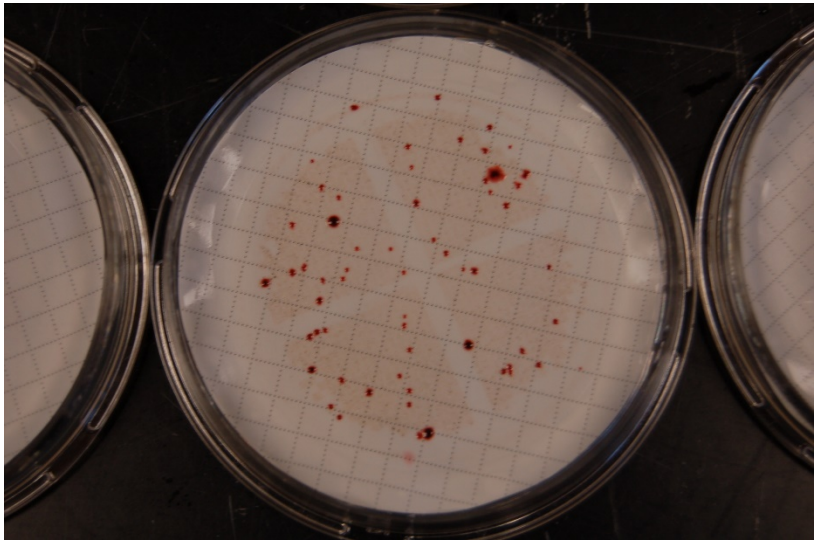
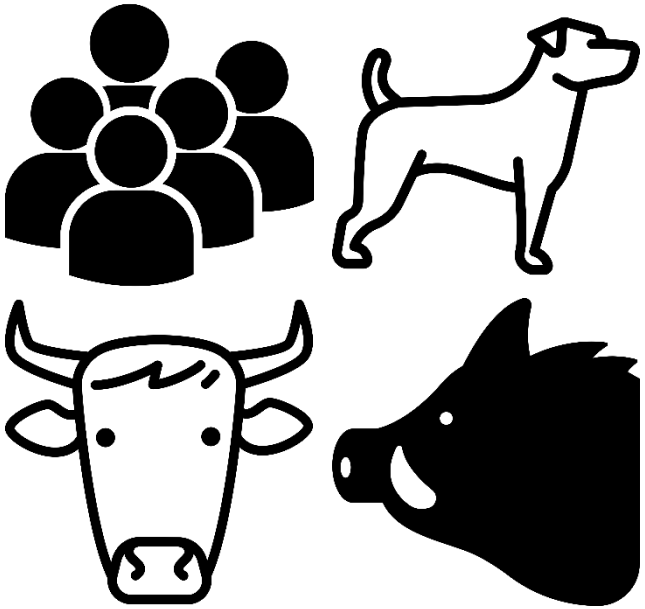


Image: Enterococci colonies growing on a selective agar membrane filtration.
Photo by C Hruby 2010

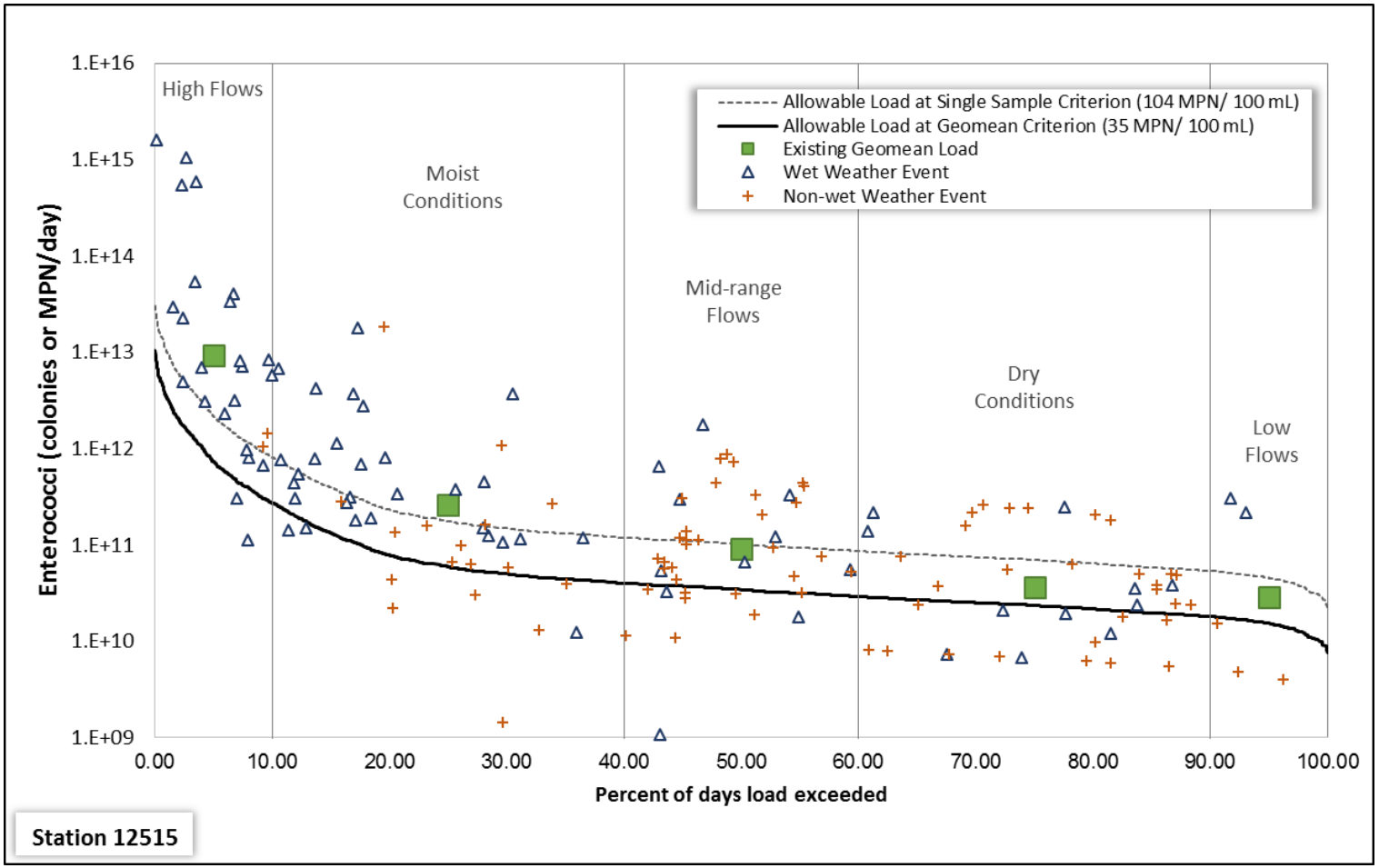
- Estimating Pollutant Source Loads
  - What and where



Images: Freepik from flaticon.com

Needed Load Reduction

Load duration curve for Tres Palacios at tidal station 12515



Needed Load Reduction (pg 25)

Flow Condition	Existing Load (cfu/day)	Allowable Load (cfu/day)	Needed Daily Reduction (cfu/day)	Needed Annual Reduction (cfu/yr)
High Flows	9.29×10^{12}	6.91×10^{11}	8.60×10^{12}	3.14×10^{14}
Moist	2.61×10^{11}	5.62×10^{10}	2.05×10^{11}	2.25×10^{13}
Mid-Range	9.10×10^{10}	3.25×10^{10}	5.85×10^{10}	4.27×10^{12}
Dry	3.65×10^{10}	2.20×10^{10}	1.44×10^{10}	1.58×10^{12}
Low Flows	2.86×10^{10}	1.45×10^{10}	1.41×10^{10}	5.15×10^{11}

Annual loading reduction needed to meet existing water quality standard:

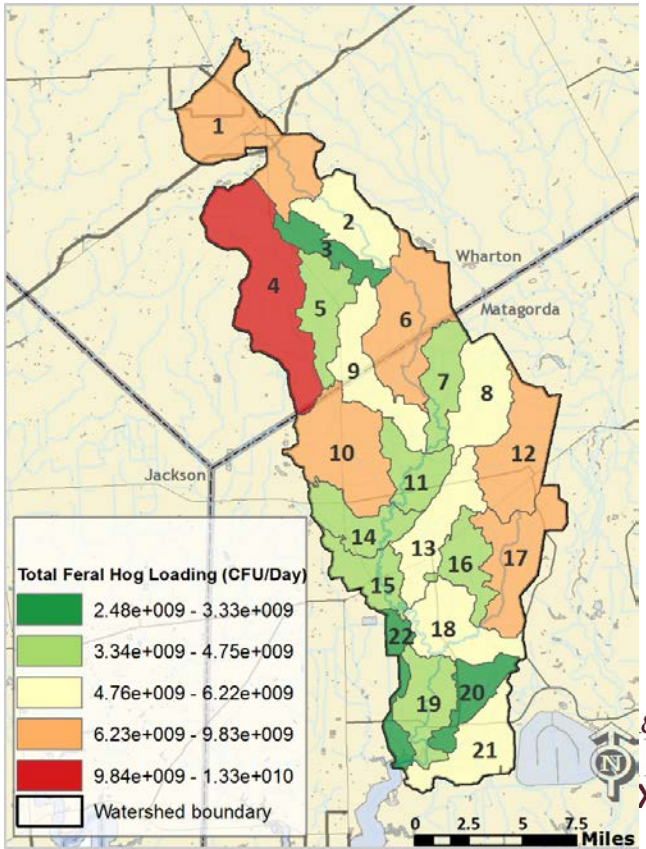
3.43×10^{14} CFU

Estimating Pollutant Source Loads

- Estimates maximum *potential* loading
- Does not account for deposition, fate, or transport processes
- Informs the types of management measures that would be effective and where in a watershed to focus those efforts

Potential Loading from Feral Hogs

- Estimated 4,856 feral hogs
- Annual Load 4.7×10^{13} cfu/yr
- Subwatersheds 4, 6, and 10
- pg 28



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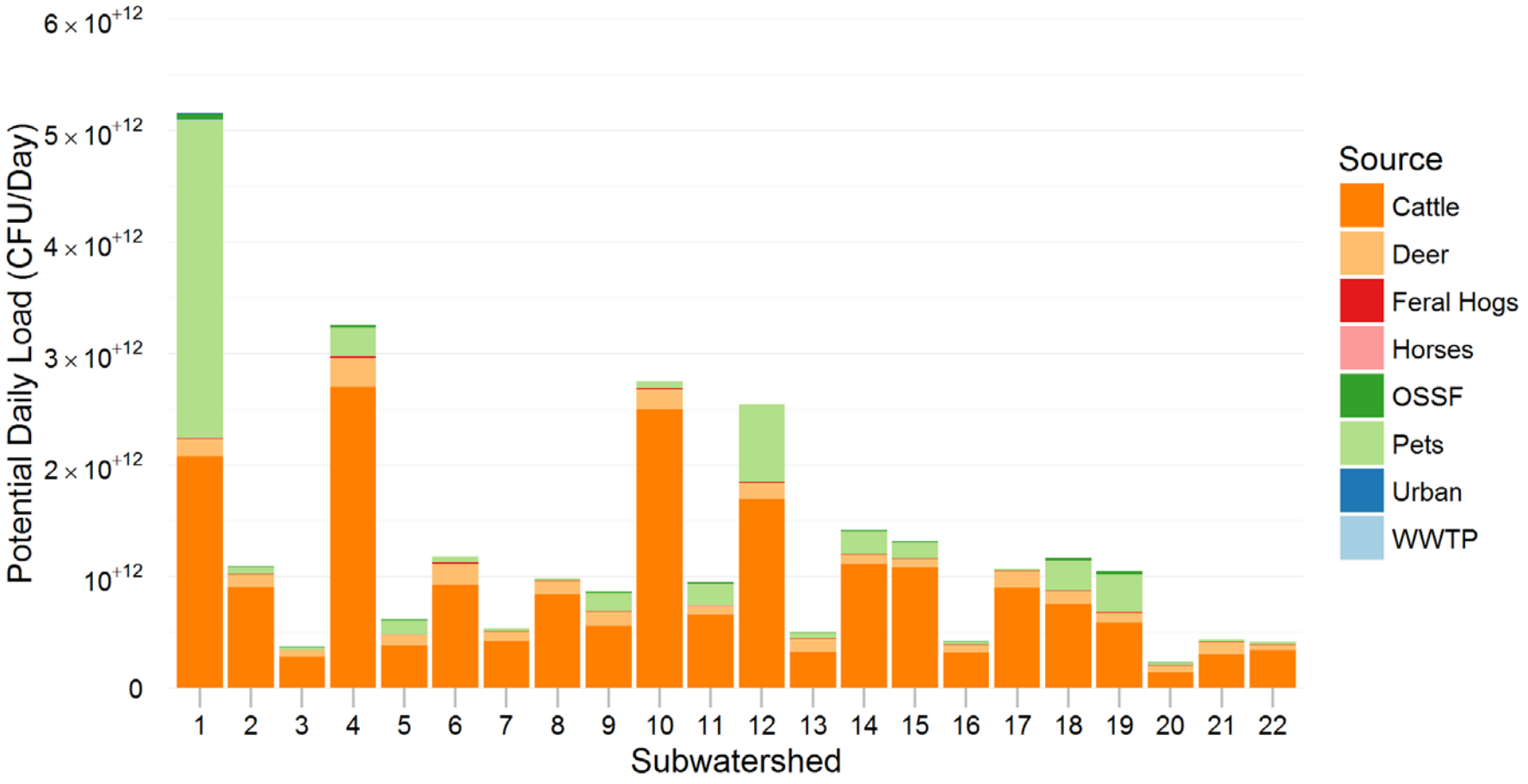
Estimating Pollutant Source Loads



Conclusion

- LDC methodology indicates **3.45×10^{14} CFU** annual reduction needed to meet water quality standard
- GIS analysis indicates Cattle, Deer, Pets, Hogs, and OSSFs have the highest potential loads in the watershed and indicated critical areas to target management measures

Chapter 4 – WPP Management Measures

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Purpose of Management Measures

- Proposed primarily to address causes and sources of bacteria concentrations in the watershed identified in earlier chapters
- All measures are voluntary
- Heavy focus on public outreach and education
- Also consist of:
  - Problem statement
  - Objective
  - Priority areas
  - Description
  - Load reduction
  - Potential funding sources

Management Measures

- Agricultural
  - Develop conservation plans
- Wildlife and Non-Domestic Animals
  - Remove feral hogs
- On-site Sewage Facility
  - Replace failing systems
- Illegal Dumping
  - Reduce illegal dumping
- Urban
  - Stormwater planning and management
  - Structural measures
  - Pet waste programs
- Wastewater Treatment Facility
  - Wastewater reuse
- Sanitary Sewer Overflow
  - Infrastructure maintenance and replacement

Education and Outreach

- The Watershed Coordinator
- Public Meetings
- Future Stakeholder Engagement
- Education Program
  - Feral Hog Management Workshops
  - Lone Star Healthy Streams
  - OSSF Operation and Maintenance
  - Texas Well Owner Network
  - Riparian Education
  - Wildlife Management
- Public Meetings
- Newsletters and News Releases

Chapter 5 – Sources for Watershed Protection Plan Implementation

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Chapter 5

Management Measure	Technical Assistance
MM- 1: Develop and implement conservation plans in priority areas of the watershed	TSSWCB, Texas AgriLife, NRCS, and TPWD
MM- 2: Explore Feasibility of Altering Tax Exemption Requirements for Small Acreage Landowners	Texas Comptroller of Public Accounts office to ensure that all requirements of the tax code have been met
MM- 3: Promote the Management of and Control Feral Hog Populations	Texas A&M AgriLife Extension Service Texas Wildlife Services
MM- 4: Promote the Reduction of Illicit Dumping and Proper Disposal of Animal Carcasses	Texas A&M AgriLife County Extension Agents TCEQ Region 14 TCEQ Small Business and Local Government Assistance Program
MM- 5: Identify OSSFs, Prioritize Problem Areas, and Systematically Work to Bring Failing Systems into Compliance	TCEQ Region 14 TCEQ Small Business and Local Government Assistance Program
MM- 6: Promote the Improved Quality of and Management of Urban Stormwater	TCEQ Region 14
MM- 7: Coordinate Efforts to Reduce Unauthorized Discharges	TCEQ Region 14
MM- 8: *Reduce WWTF Contributions by Meeting Half of the Permitted Bacteria Limit*	TCEQ, TEEX
MM-9: *Monitoring of WWTF Effluent to Ensure Permit Compliance*	TCEQ permit compliance assistance TEEX – WWTF operation and maintenance TRWA – sample collection and handling Private Engineering firms – general civil engineering services
MM-10: *Improve and Upgrade WWTFs*	TCEQ permit compliance assistance TEEX – WWTF operation and maintenance TRWA Private Engineering firms – general civil engineering services

Management Measure	Financial Assistance Program
MM- 1: Develop and implement conservation plans in priority areas of the watershed	Agricultural Conservation Easement Program (ACEP) Agricultural Food Research Initiative Competitive Fellowship Grants Program Coastal Wetlands Conservation Grants Coastal Zone Management Administration (CZMA) Awards Conservation Innovation Grants Conservation Stewardship Program (CSP) Environmental Education Grants Environmental Quality Incentives Program (EQIP) Farm Business Management and Benchmarking (FBMB) Program Federal and State CWA §319(h) Grants (USEPA/TCEQ/TSSWCB) Integrated Programs National Integrated Water Quality Program (NIWQP) Regional Conservation Partnership Program (RCPP) Sustainable Agriculture Research & Education (SARE) Targeted Watershed Grants Program
MM- 2: Explore Feasibility of Altering Tax Exemption Requirements for Small Acreage Landowners	State CWA §319(h) Grants (TCEQ/TSSWCB)
MM- 3: Promote the Management of and Control Feral Hog Populations	State CWA §319(h) Grants (TSSWCB) or other available opportunities. Texas Department of Agriculture (TDA) Texas Wildlife Services
MM- 4: Promote the Reduction of Illicit Dumping and Proper Disposal of Animal Carcasses	State CWA §319(h) Grants (TCEQ/TSSWCB) USDA Rural Utilities Service Water and Waste Disposal Loans and Grants
MM- 5: Identify OSSFs, Prioritize Problem Areas, and Systematically Work to Bring Failing Systems into Compliance	Coastal Impact Assistance Program (CIAP) Coastal Management Program (CMP) and National Coastal Zone Management Program (CZM) State CWA §319(h) grants (TCEQ)
MM- 6: Promote the Improved Quality of and Management of Urban Stormwater	Clean Water State Revolving Fund (CWSRF) Environmental Education Grants State CWA §319(h) Grants (TCEQ) Urban Water Small Grants
MM- 7: Coordinate Efforts to Reduce Unauthorized Discharges	Clean Water State Revolving Fund (CWSRF) Economically Distressed Areas Program (EDAP) Water and Waste Disposal Loans and Grants
MM- 8: *Reduce WWTF Contributions by Meeting Half of the Permitted Bacteria Limit*	Clean Water State Revolving Fund (CWSRF) Economically Distressed Areas Program (EDAP) Water and Waste Disposal Loans and Grants
MM- 9: *Monitoring of WWTF Effluent to Ensure Permit Compliance*	Clean Water State Revolving Fund (CWSRF) Economically Distressed Areas Program (EDAP) Water and Waste Disposal Loans and Grants
MM-10: *Improve and Upgrade WWTFs*	Clean Water State Revolving Fund (CWSRF) Economically Distressed Areas Program (EDAP) Existing local funding for wastewater improvements Water and Waste Disposal Loans and Grants

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Chapter 6 – Measures of Success

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Water Quality Targets

	Enterococcus Concentration (cfu/100mL)		
Year	**Station 20636**	**Station 12515**	**Both Stations**
2012 303(d) List	149	49	67
Year 1	120.4	45.1	58.7
Year 2	95.4	41.7	51.4
Year 3	70.5	38.3	44.1
Year 4	45.6	34.9	36.9
Year 5	33.3	33.3	33.3

Measures of Success Continued

- Additional Data Collection Needs
  - Additional monitoring data at index site from quarterly to monthly

- Data Review
  - Evaluate collected data
  - Participate in annual Clean Rivers Program meeting
  - Discuss adaptive management

Interim Measurable Milestones

- On Handout

Adaptive Implementation

- Necessary due to dynamic nature of watersheds
- Relies on constant input of watershed information
- Is an ongoing cycle

Tres Palacios WPP: Appendix A-C

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- Overview
  - Appendix A – Load Duration Curve Methodology
  - Appendix B – Calculations for Potential Loading and Load Reductions
  - Appendix C- Elements of Successful WPPs

Questions?

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