

TMDL Projects with an OSSF Component



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What is a bacteria TMDL?

- A total maximum daily load (TMDL):
 - Determines the maximum amount (or load) of bacteria that a water body can receive and attain and maintain its standards
 - Broadly allocates this allowable load to point and nonpoint sources of bacteria in the watershed

Why do TMDLs?

- First step to restore water quality in rivers, lakes, and bays affected by bacteria
- Effective tool for determining sources of bacteria
- Required under Section 303(d) of the federal Clean Water Act (CWA) for all water bodies that do not meet water quality standards
- Identify the percent reduction in loading of bacteria needed from sources to restore water quality

What do OSSFs and TMDL have to do with each other?

- Orange County
- Gilleland Creek
- Mission/Aransas Rivers and Copano Bay



Orange County TMDL Project

- Bacteria, DO, and pH
 - Adams and Cow Bayous and their tributaries
 - Slow flowing tidally influenced water bodies
 - Sometimes have reverse flow
 - Orange, Jasper and Newton counties



Data Collection

- Conducted 3 dry weather and 2 wet weather intensive surveys
- Sampled end of pipe from permitted dischargers



Modeling Approach

- Utilized HSPF and WASP to simulate instream water quality
- Models made use of land use data, soil types, runoff, rainfall, etc.



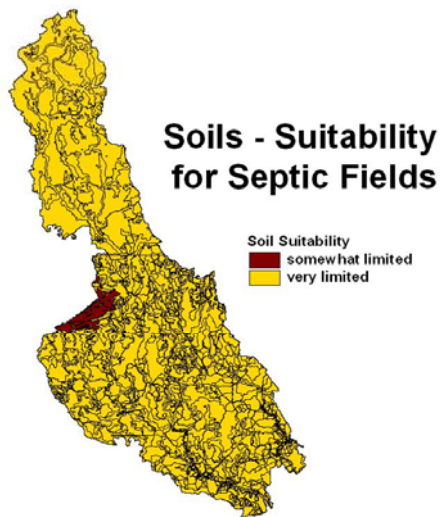
The OSSF Situation in the Orange County project area

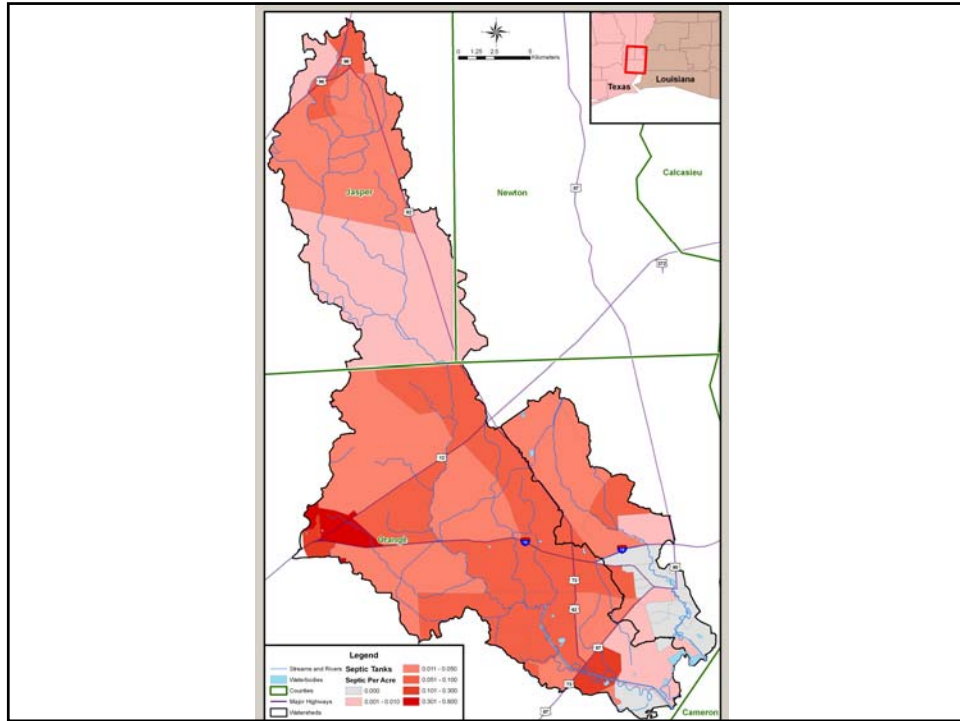
- Many homes were built out in rural areas away from collection systems, so only alternative was an OSSF
- Problem has been compounded in recent years by more people moving out of town to rural areas, resulting in more OSSFs
- Have seen entire neighborhoods built using OSSFs

Reasons for High Failure Rate of OSSFs in the project area

- Soils – tightly packed clay soils do not allow proper leaching
- High water table – soils are seasonally too saturated to absorb effluent
- Age of the system and type of system - pre-regulatory systems and conventional gravity flow drainfield
- Climate – frequent rainfall causes ground saturation; low evaporation in winter
- Small lot size and high population density
- Lack of education for owners

USGS Soil Survey





Common area violation



Common area violation

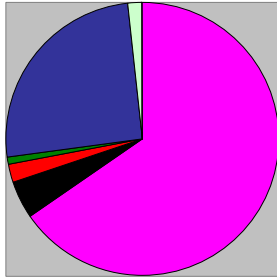


Sources of Bacteria

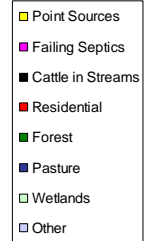
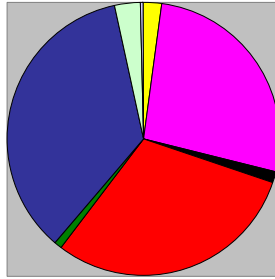
- Modeling Results
 - Main controllable source categories are cattle, WWTFs, and OSSFs
 - Failing OSSFs are main contributors in certain areas of watershed
 - Other nonpoint sources are urban runoff, pastureland, and forest

Sources of E. coli to Adams Bayou

Above I-10

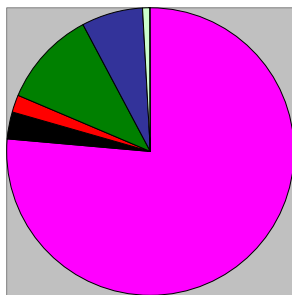


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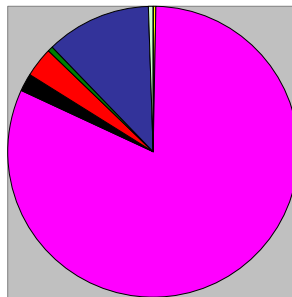


Sources of E. coli to Cow Bayou

Above I-10



Below I-10



TMDL Results

- Adams Bayou and tributaries
 - 56% reduction in constituents for DO
 - 62% reduction in bacteria loading
- Cow Bayou and tributaries
 - 48% reduction in constituents for DO
 - 52% reduction in bacteria loading

What is being done to fix the problem?

- Grants
 - Orange County Health Department
 - Obtained a grant to fund the repair, replacement, upgrade of existing OSSFs
- Supplemental Environmental Project (SEP) money
 - Available for every county in Texas for repair, replacement or upgrade existing OSSFs
- Feasibility study
- Building new WWTFs
 - Convert homes from OSSF to collection system
 - Results in net reduction in loading

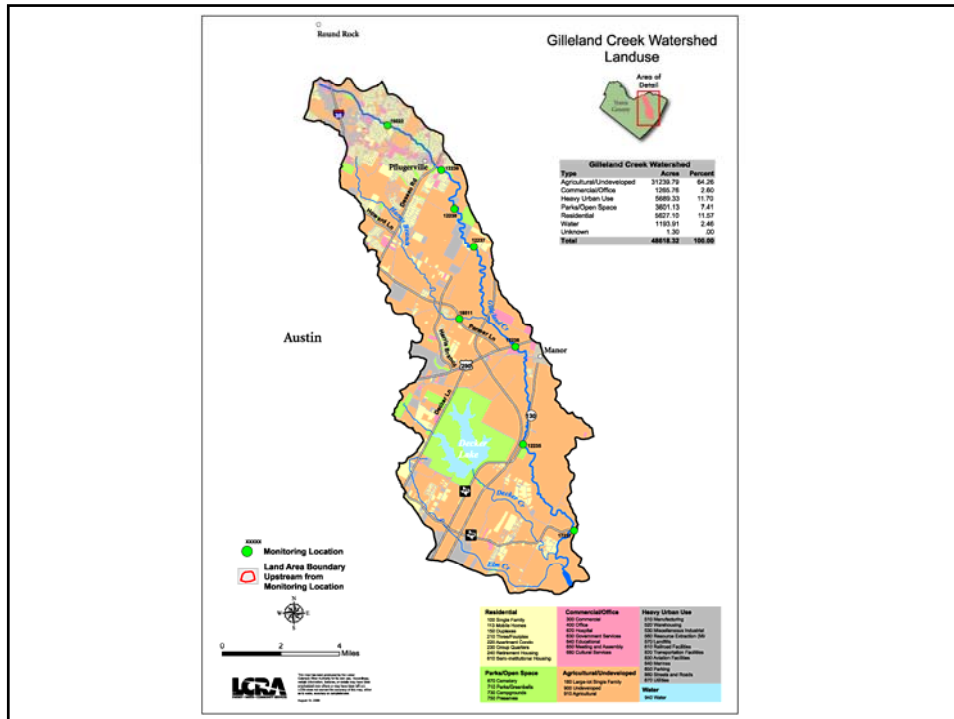
Gilleland Creek TMDL Project

- Bacteria impairment
 - Combination urban/rural watershed
 - Effluent dominated stream at low flow



Data Collection

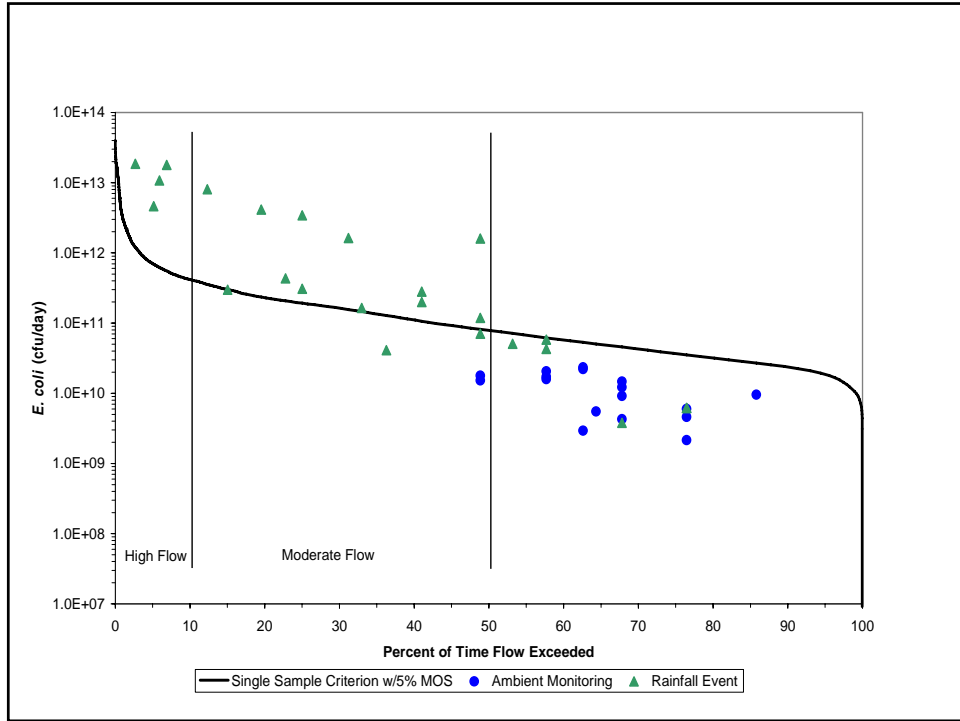
- Wet weather sampling
 - 6 sampling events
 - Categorized as wet weather based on flow
 - Sampled on initial rain day and for 3 days following
- Dry weather sampling
 - 17 sampling events
 - Categorized as dry weather based on flow
 - Single day sampling events



Data Analysis

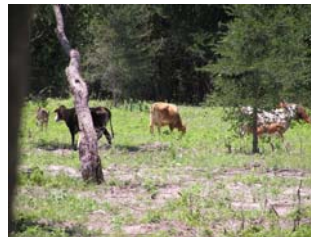
- Data Modeling
 - Utilized Load Duration Curve Analysis
 - Determined that exceedance of the standard happened as a result of runoff events-NPS





Non Point Sources

- OSSFs
- Wildlife/pet waste
- Ag production
- Rapid urbanization



TMDL Results

- At high flow
 - 92.8% reduction in bacteria loading
- At moderate flow
 - 83% reduction in bacteria loading

Implementation Planning

- Work Groups to address issues
 - Ordinances/Planning work group
 - Outreach/Education work group
 - Wastewater/OSSF work group
 - Structural BMPs work group
 - Natural Resource work group



What is being done to fix the OSSF problem?

- Wastewater/OSSF Group
 - Identify OSSF locations
 - Some in GIS database, older systems are not
 - Prioritize sites for inspection
 - Initiate inspection program
 - Identify and retrofit existing failing OSSFs

Copano Bay TMDL Project

- Bacteria
 - Mission and Aransas Rivers tidal
 - Contact recreation
 - Copano Bay
 - Shellfish harvesting

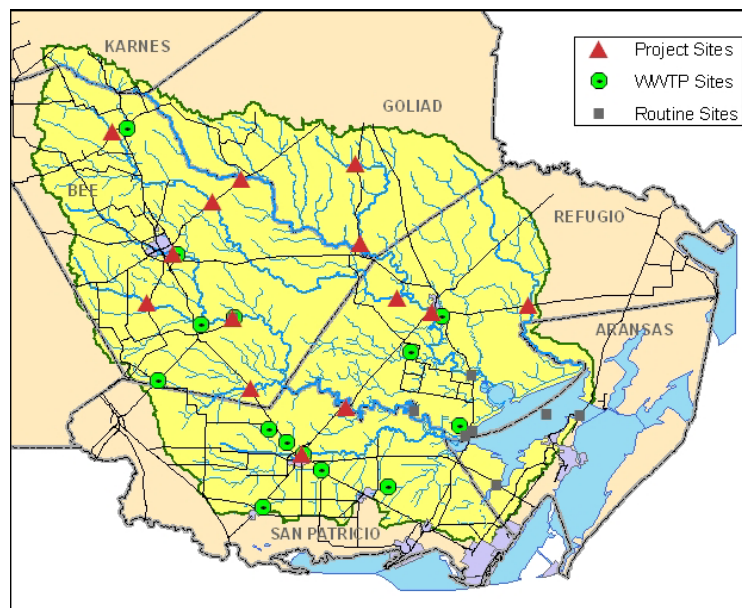


Data Collection

- Initiated an intensive 3 year data collection effort
 - Composed of dry/wet weather sampling
 - Sampling unannounced at WWTFs



MAP



Modeling Approach

- The proposed approach is a hybrid of the load duration curve, schematic processor, and tidal prism methods

Components of the Bacteria Impairment

- Possible sources are WWTF outfalls, OSSFs, wildlife, agriculture
- Possible reasons for failing OSSFs
 - High water table
 - Poor soils
 - Age of systems
- Locations of systems may allow them to have a high impact on water quality



What is being done to fix the problem?

- Project is just underway
- Taking an early look at all potential bacteria sources
- Beginning to look at funding sources

888-777-3186

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