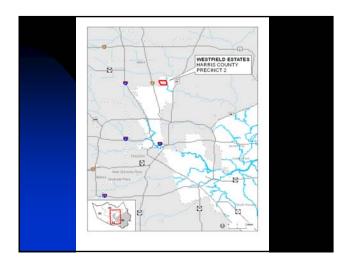
Westfield Estates Watershed Protection Plan

Todd Running Houston-Galveston Area Council

Purpose

- Raise watershed stakeholder awareness on water quality issues
- Develop a plan to address all issues
- Identify and prioritize options
- Obtain consensus and commitment on how to manage issues
- Implementation of BMPs





Westfield Estates Watershed

- Homes built in 1950s
- Homes all have on-site sewage systems
- Small lots, many have been subdivided with multiple residences
- Low Income
- Adjacent to Halls Bayou
- Black water standing in some ditches year round
- High population of dogs and chickens that roam freely









Bacteria Levels Above State Standard For Contact Recreation

Three Sampling Events

- Community 12 of 22 ditch locations
- Halls Bayou 3 of 5 locations
- No detectible E. coli at the wastewater treatment plant outfall on three occasions

Bacterial Sources - Westfield Estates

- Human	19 %
Dog	35 %
Chicken	11 %
Unknown	35 %

Current Plan Status

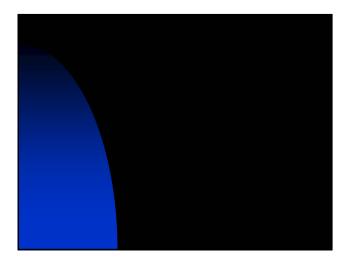
- Budget \$1.2 million
- EPA 319(h) grant \$750,000 (2009-2011)
- Contract is in signature process
- Draft WPP complete & comments received from TCEQ
- QAPP bacteria studies draft complete & comments received from TCEQ
- Stakeholders moving forward
 - Field study: 700 homes need inspection
 - Design phase & prioritization: 100 to150 homes
 - Monitoring bacteria levels and sources

Implementation

- Structural controls
- ◆ OSSF installation/repair
- Non-structural controls
- ♦ BMPs OSSFs
- OSSF maintenance agreement
- BMPs Dogs and Chickens
- Public Education Outreach

Westfield WPP Partners

- Harris County Precinct 2
 - Commissioner Sylvia Garcia & Staff
- Harris County PID
- East Aldine Management District
- Sunbelt FWSD
- Galveston Bay Estuary Program
- Texas A & M University at Galveston
- H-GAC Clean Rivers Program



Keys to Successful Plans

- Stakeholder input
- Concerns balanced
- Consensus
- Policy, politics, and capital
- Water quality issues addressed
- Evaluation
- Continuity

E. coli Levels Exceeding State Standard for Contact Recreation

Variation

- Weather conditions Wet not always highest
- Ambient Temperature Cooler temperature higher
- *E. coli* may not exceed State criteria every sampling event
- Quantity bacteria varies at each site with different sampling event
- Multiple sampling events needed to establish true picture of bacterial contamination at a single location

What is the Source of Bacteria?

- •Human
- •Dog
- •Chicken
- •Other Non-human

Conclusions - Part I

- *E. coli* above State criteria at 12 of 22 locations septic system community
- E. coli in Halls Bayou at 3 of 5 sites
- Overall pattern of Enterococcus source
 - >Human (19%)
 - ≻Dog (3<mark>5%)</mark>
 - Chicken (11%)
 - Unknown bacterial contamination (35%)

Conclusions - Part II Biolog Microarray

- Flexible BST: identify bacteria from numerous sources local watershed
- Comparison of community and affected waterway under a variety of conditions
- Automated, inexpensive, quick
 - >\$3,000 per species library
 - >\$22,000 (30 sites x 3 events + 3 species library)
 - Four Five months

Conclusions – Part III

- No WWTP contamination on 3 sampling events
- Upstream bacterial contamination on Halls Bayou (sources human & others) higher than downstream
- BST-based regulation should include multiple sampling events at in stream locations to minimize high individual sampling variability
- Bacterial contamination Halls Bayou is not primarily human

What is a Malfunctioning On-Site Sewer System?

- On-Site System that does not completely treat human wastewater
- Releases raw sewage and bacteria to yard, ditch, street, community, bayou, and Galveston Bay
- Potential effect on human health and water quality of streams and bayous

Plan Structure

- Introduction
- Watershed Characterization
- Watershed Water Quality Monitoring
- Pollutant Cause and source Assessment
- Linkage of Pollution Loads to Water Quality
- Goals and Objectives
- Management Strategies for Implementation
- Implementation Strategy Design

