# CZARA OSSF Reconnaissance; Training; and Replacement

Justin Mechell
Extension Program Specialist
Department of Biological and Agricultural Engineering
Texas AgriLife Extension Service

# Introduction

- Coastal Zone Act Reauthorization Amendments (CZARA)
- Nonpoint source pollution
  - Bacteria
- Project Period
  - May 12, 2010 to August 31, 2012

AgriLIFE EXTENSION
Texas A&M System

# Introduction

- On-Site Sewage Facility (OSSF)
  - Reconnaissance
  - Training
  - Inspection
  - Replacement

AgriLIFE EXTENSION
Texas A&M System

# Water Bodies

- Upper Galveston Bay (2421)
- West Bay (2424)
- Clear Lake (2425)
- Moses Lake (2431)
- Texas City Ship Channel (2437)
- Lower Galveston Bay (2439)
- Clear Creek Tidal (1101)
- Dickinson Bayou Tidal (1103)
- Dickinson Bayou Above Tidal (1104)

AgriLIFE EXTENSION
Texas A&M System

# Onsite wastewater treatment systems?

- Rural and Exurban wastewater infrastructure

-Water Quality Protection

- 25 - 40%, Wastewater Infrastructure

What is the system called?

- •OWTS – Onsite Wastewater Treatment System; Nationally
- •OSSF – On-Site Sewage Facility; Texas
- •Septic System

AgriLIFE EXTENSION
Texas A&M System

# Malfunctioning onsite system

# Evolution of wastewater treatment goals

- From outdoor plumbing to water reuse
- We need to review the history to understand the present

AgriLIFE EXTENSION
Texas A&M System

# Outdoor plumbing: the pit privy

- Goal: designated place
- No carrier needed to convey waste
- Waste applied directly to the soil
- Public health concerns addressed
- Management: relocate

AgriLIFE EXTENSION
Texas A&M System

# Indoor plumbing

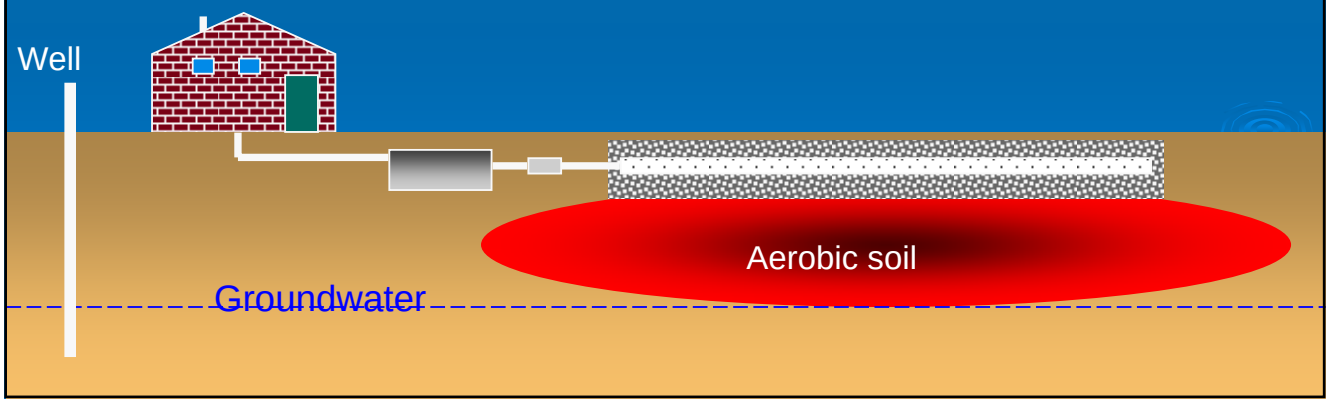
- Convenience
- Water carrier to convey waste out of facility
- ‘Collection system’
- Public health and pathogens
- Management: keep pipe flowing

# Disposal

- Goal: limit human contact
- Keep wastewater below ground
- Disposal options
- Public health
  - “Disposing” of pathogens
  - Treatment?
- Environment: groundwater contamination
- Management: install, flush and forget

# Septic tank and soil treatment area

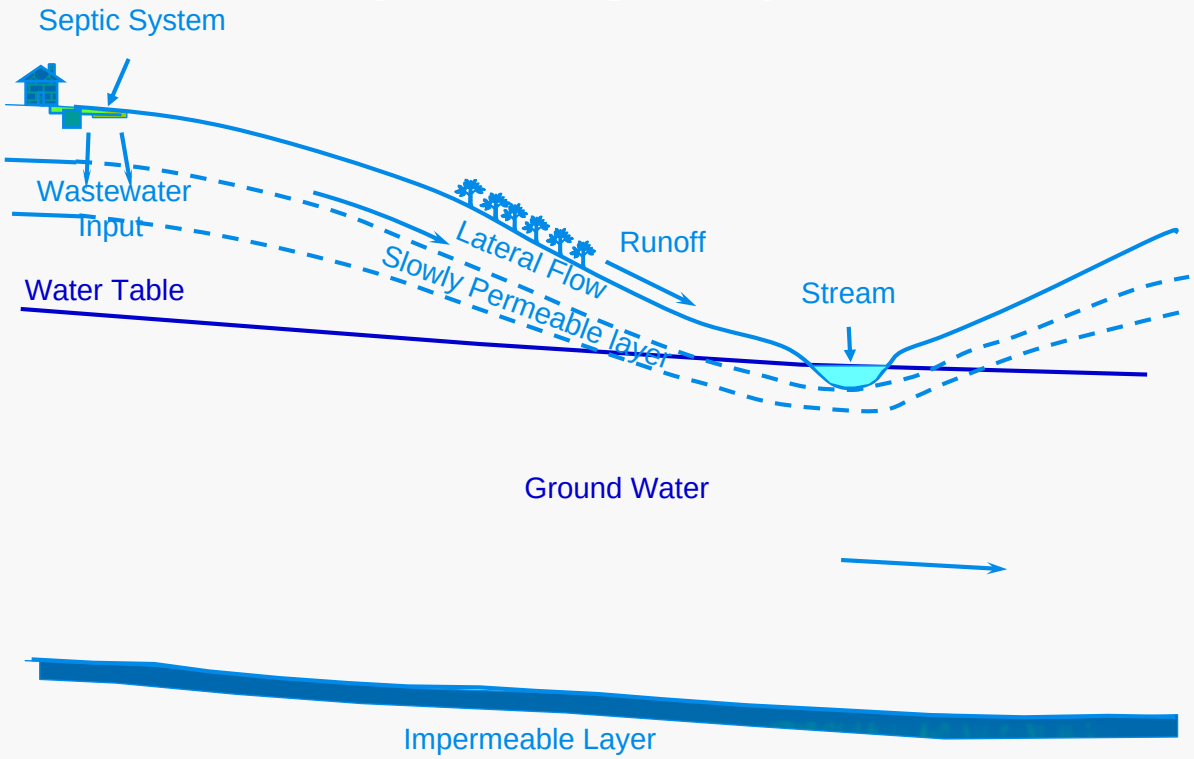
- Evolving goal:
  - Disposal: effluent goes away versus treatment
  - Dispersal: TREATMENT is essential to good systems
- Public health AND environmental issues addressed
- Management:
  - Disposal: often none at all;
  - Dispersal: System management is critical



# Goal: TREATMENT AND DISPERSAL

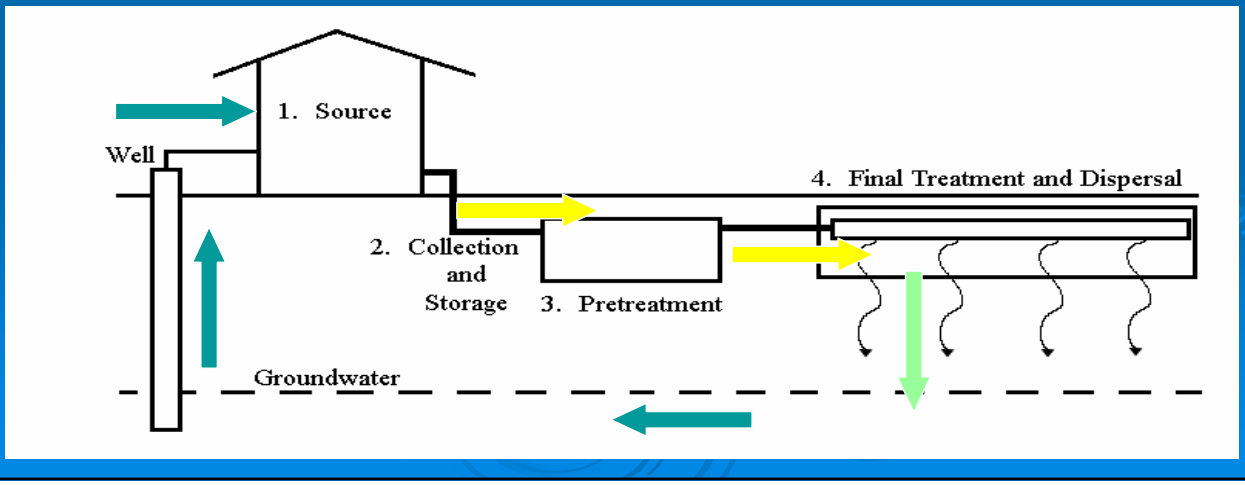
- Starting to address both environmental concerns in addition to public health concerns
- Technological advancements now allow removal of:
  - Bacteria - Pathogens
  - Solids – Organic matter
  - Nutrients
- System management is vital to treatment
- Goal is now DISPERSAL
  - Hydrologic cycle

# Hydrologic cycle

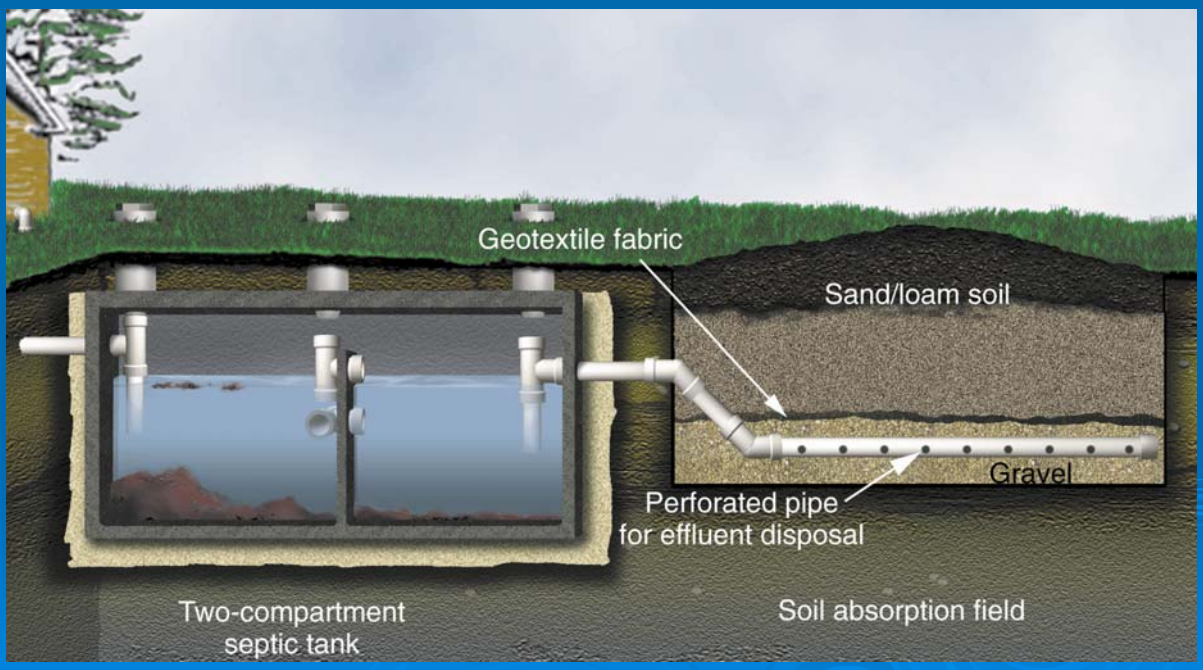


# What is an Onsite Wastewater Treatment System?

1. Wastewater source
2. Collection and storage
3. Pretreatment components
4. Final treatment and dispersal components



# Conventional septic tank system




AgriLIFE EXTENSION
Texas A&M System

# Project goals

- Identify areas of chronic OSSF failure
  - Counties identified by Section 6217, CZARA
- Train Designated Representatives in Brazoria, Galveston, and other coastal counties
- Conduct visual inspections of anaerobic OSSFs

AgriLIFE EXTENSION
Texas A&M System

# Project goals

- Pump solids from primary septic tanks, if needed
- Replace failing OSSFs, if needed
- Public outreach

AgriLIFE EXTENSION
Texas A&M System

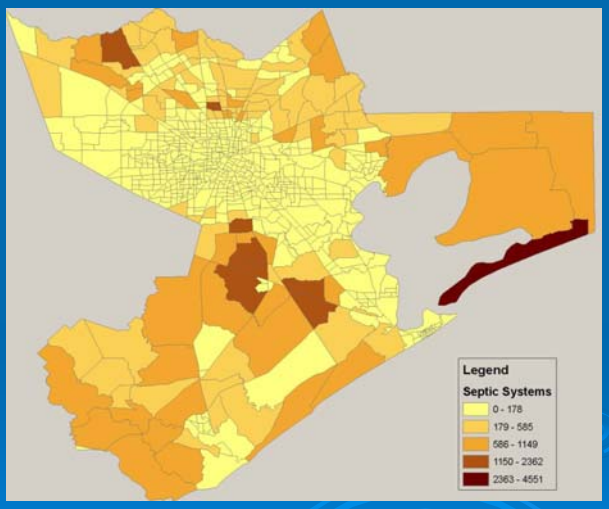
# Reconnaissance

- Identify areas of chronic OSSF failure
- Areas along bays and tributaries
  - Holding tanks
  - Seepage pits
  - Septic tanks
  - Leach fields
  - Direct discharges

AgriLIFE EXTENSION
Texas A&M System

# Reconnaissance

- Limited data on OSSFs distributed near the bay
  - 1990 Census map of OSSF density
- Permit records
- Complaints history
- Municipal sewer system boundaries
- HGAC GIS Maps
  - Pulled permits for each county




AgriLIFE EXTENSION
Texas A&M System

# Reconnaissance

- General signs of OSSF issues
  - Vegetation – color, type, distribution
- Site Conditions
  - Treatment potential
  - Lot size
  - Slope
- Development Density

AgriLIFE EXTENSION
Texas A&M System

# Reconnaissance

- Depth to groundwater
- Proximity to surface water
  - Water exchange potential - canals
- Demographics
  - Land value
  - Potential income

# Reconnaissance

Saturated Soil Treatment Area

# Reconnaissance

Nutrients in Surface water

# Reconnaissance

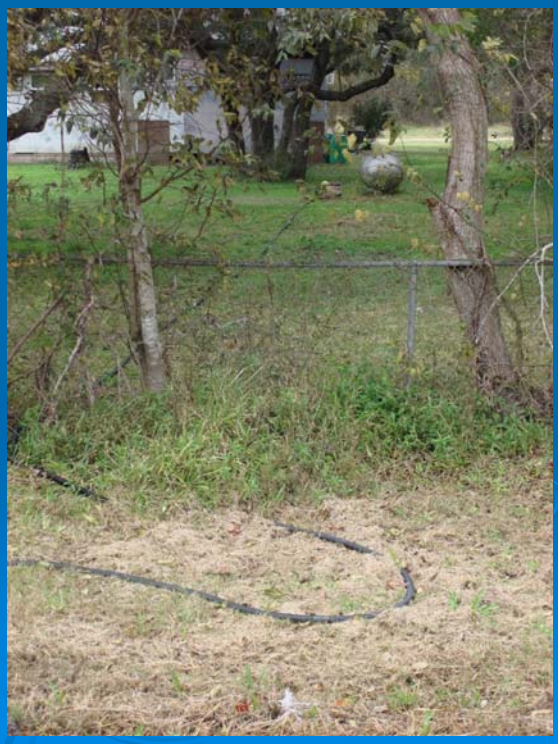
Grey water Discharge

Tank Overflow

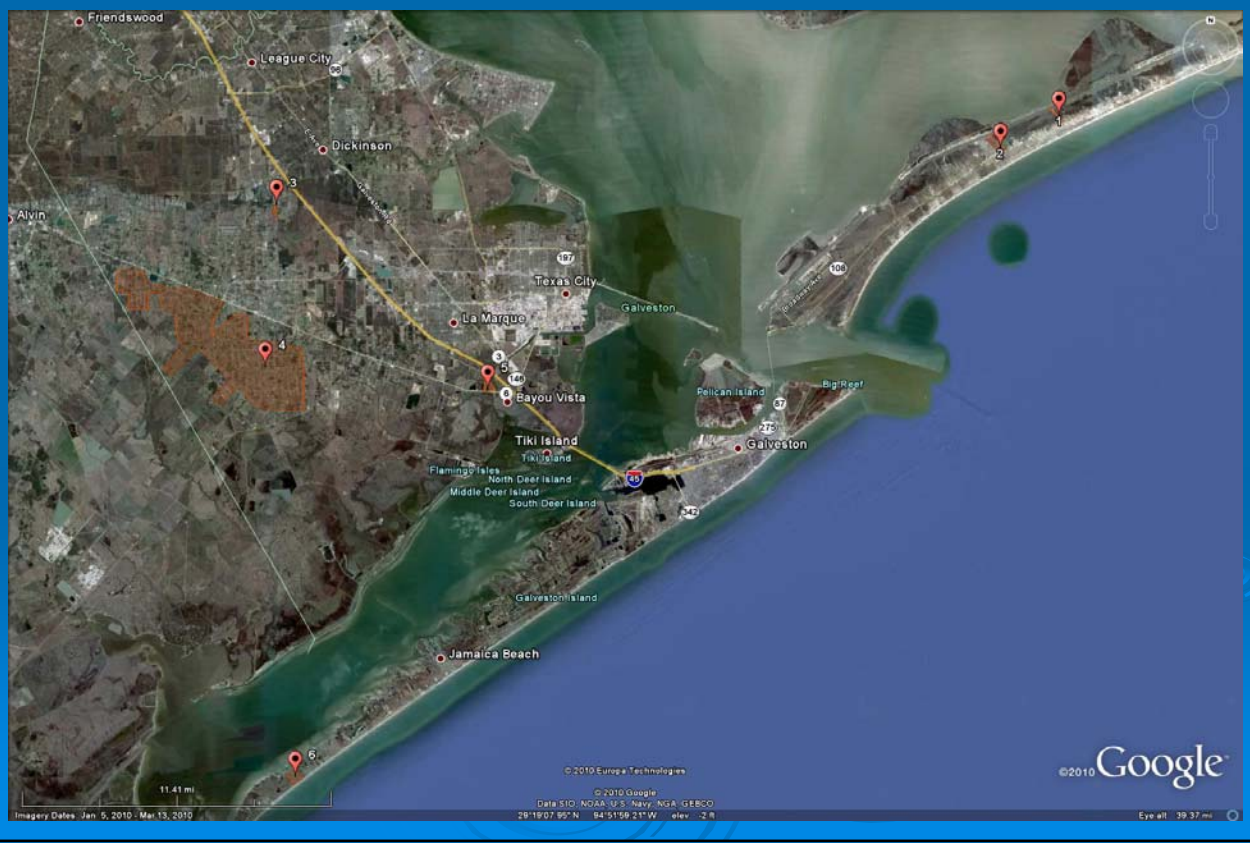
AgriLIFE EXTENSION
Texas A&M System

# Reconnaissance

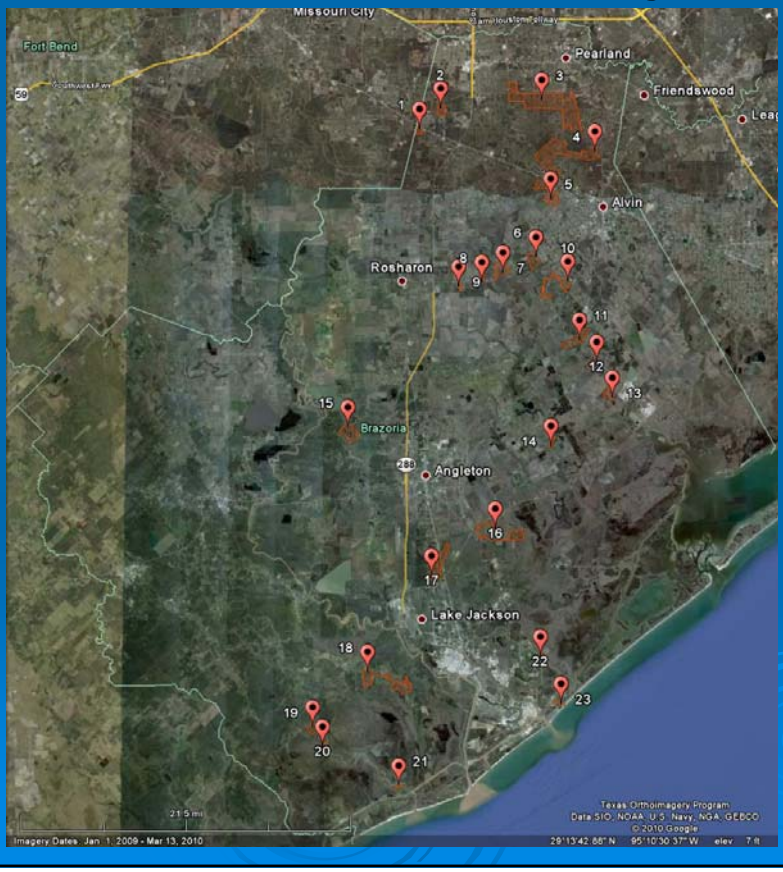
Pumping of septic
or holding tanks



# Galveston County



# Brazoria County



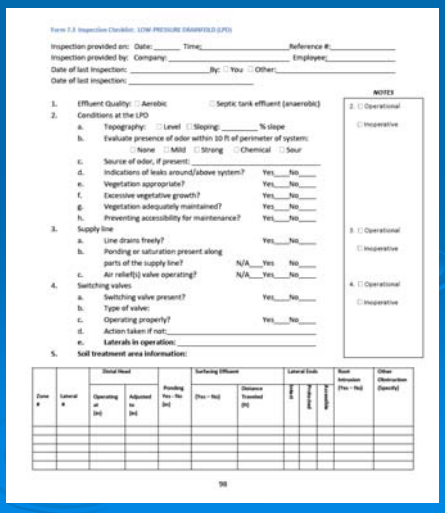
# Inspector Training

- Develop guidance for visual inspections of anaerobic OSSF
- Determine inspection frequency criteria
- Train local District Representatives

AgriLIFE EXTENSION
Texas A&M System

# Guidance Document

- "Guidance for the Inspection of Anaerobic OSSF"
  - Overview of system components
  - Inspection rational
  - Site assessment
  - Inspection procedures
    - checklist



# Inspector Training Course

- Critical concepts for visually evaluating septic systems

- 16 hour course
  - Classroom instruction
  - Field exercises
  - Evaluation of an actual system

# Inspection Frequency

- OSSF
  - Type / technology
  - Design flow vs. Daily flow
  - Age / condition
- Site Conditions
  - Surface water
  - Groundwater
  - Soil treatment potential

AgriLIFE EXTENSION
Texas A&M System

# Inspection Frequency

- Property usage
  - Single or multifamily residence
  - Vacation or rental property
  - Organic loading
  - Hydraulic loading
  - In-home business
    - Day care
    - Bakery
    - Taxidermy

AgriLIFE EXTENSION
Texas A&M System

# Public outreach

- Homeowner education
  - Homeowner Maintenance of Septic Systems
  - How to keep a system operating properly
  - Share project information
  - Provide handouts
  - Candidates for pumpouts and inspections
- Select areas of know septic failures

AgriLIFE EXTENSION
Texas A&M System

# Why perform inspections and maintenance?

- Keep systems functioning properly
- Maintain effluent quality
- Early detection of problems
- Public health
- Environmental Protection
- System reliability
- User satisfaction

AgriLIFE EXTENSION
Texas A&M System

# Environmental protection

Treat contaminants before they reach surface or ground water

- Nutrients
  - Phosphorus
  - Nitrogen
- Organic Loading
- Pathogens
  - Fecal coliforms
  - E-coli

AgriLIFE EXTENSION
Texas A&M System

# Summary

- Reduce the overall loading of contaminants to watersheds
- Proper OSSF operation is necessary for contaminant removal
  - Develop visual inspection procedure
  - Inspection frequency criteria

AgriLIFE EXTENSION
Texas A&M System

# Summary

- Public education and outreach
  - Reduce contaminant loading through public awareness and behavioral change
- The replacement of malfunctioning OSSFs will provide additional reduction of contaminant loading to the watershed

AgriLIFE EXTENSION
Texas A&M System