Onsite Wastewater Treatment Solutions

Ryan Gerlich
Program Specialist

Texas A&M AgriLife Extension

Overview

- What is an On Site Sewage Facility (OSSF)?
- Why are we concerned about wastewater?
- Evolution of onsite wastewater treatment
- Identifying OSSF issues
- Addressing OSSF issues
- Education and outreach

Onsite wastewater treatment system

Onsite wastewater treatment systems?

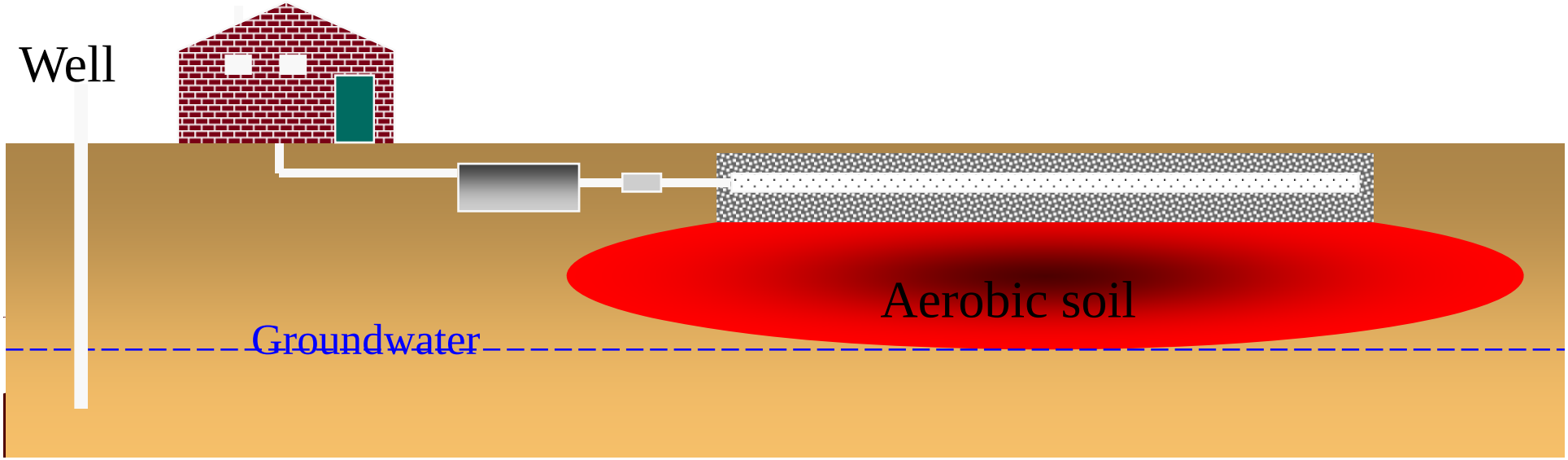
- Rural and Exurban wastewater infrastructure
- Water Quality Protection
- 25 - 40%, Wastewater Infrastructure
- What is the system called?
  - OWTS – Onsite Wastewater Treatment System; Nationally
  - OSSF – On-Site Sewage Facility; Texas
  - Septic System

The evolution of wastewater management

TEXAS A&M AGRILIFE EXTENSION

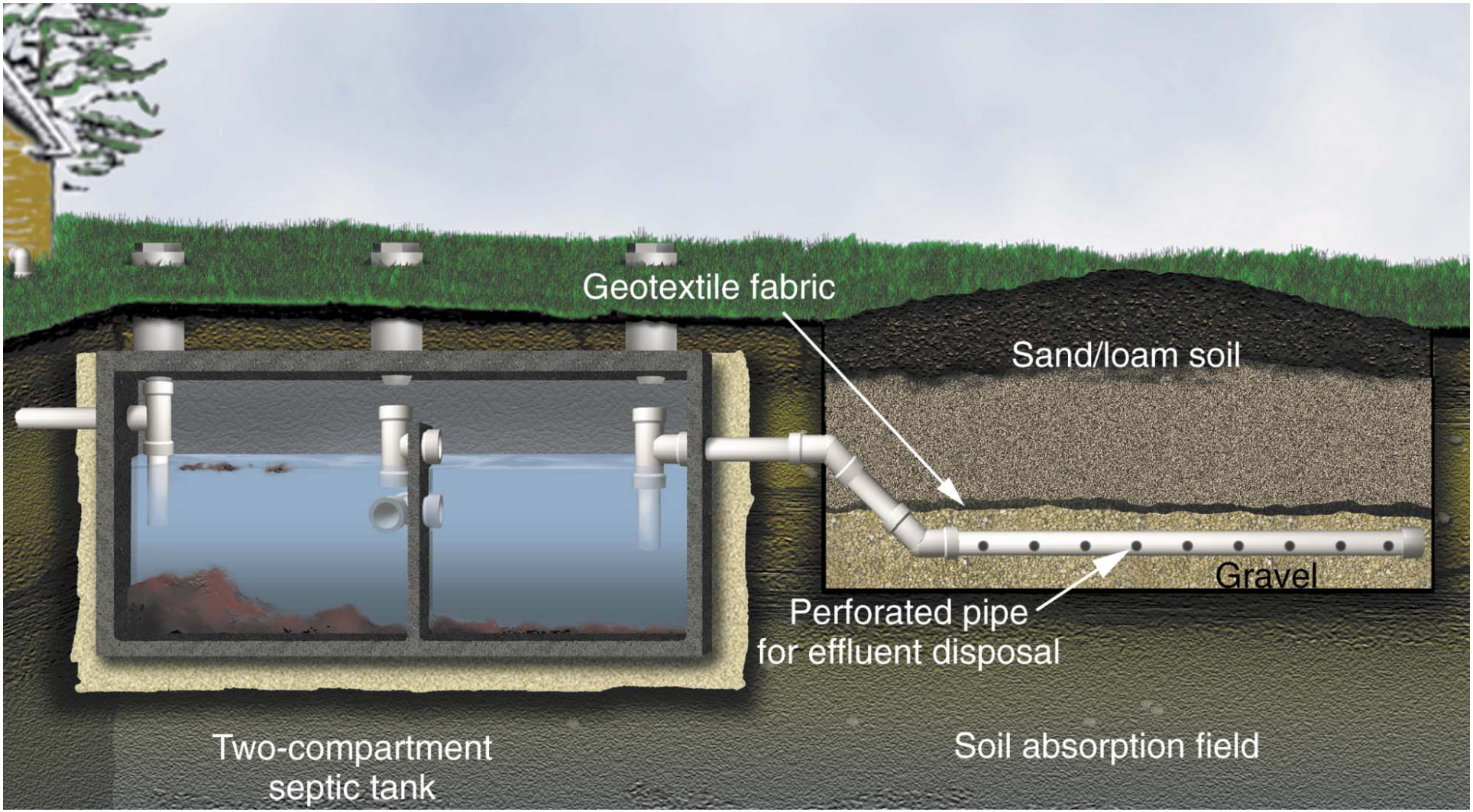
Septic tank & soil treatment area

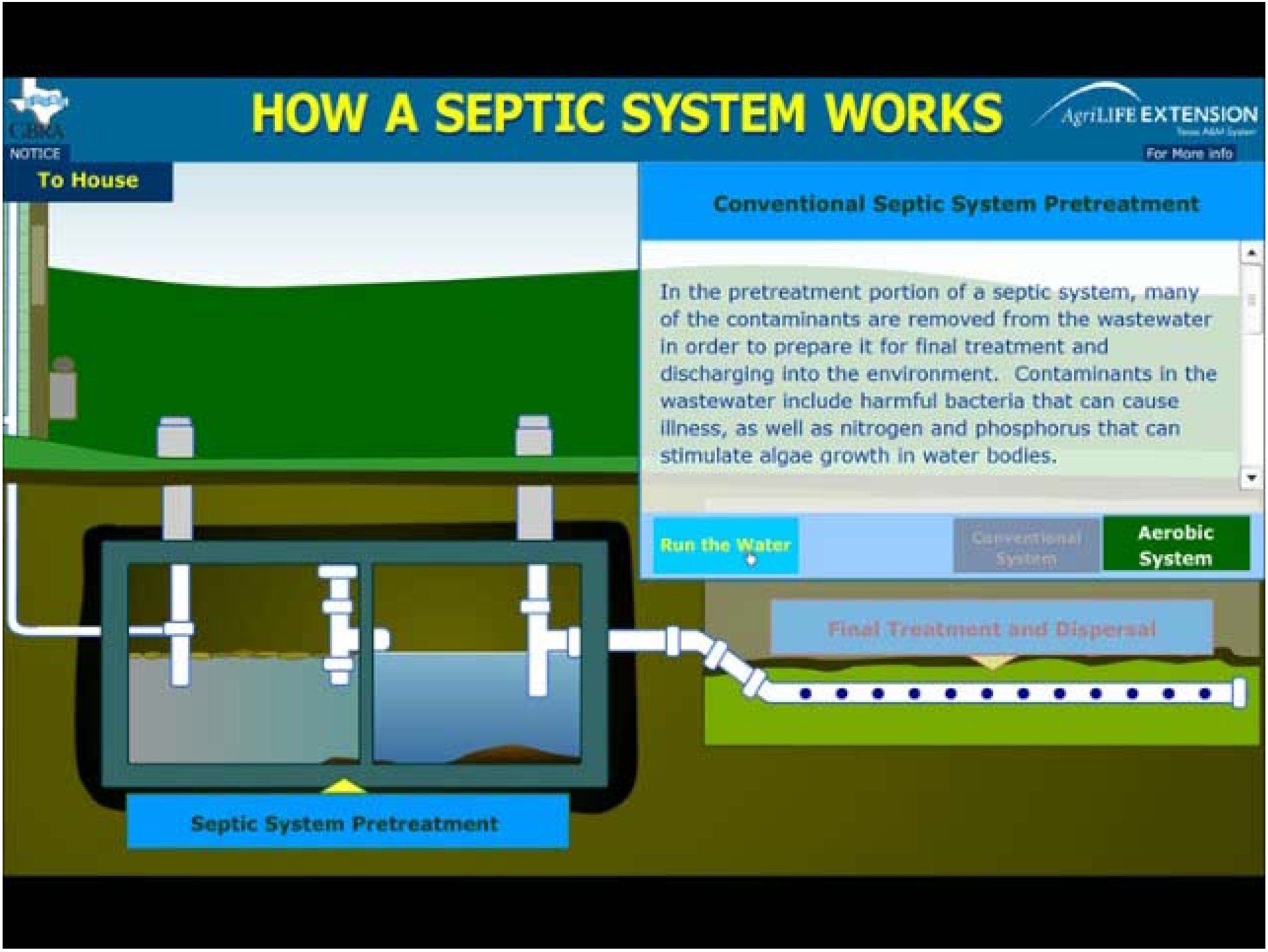
- Evolving goal:
  - Disposal: effluent goes away versus treatment
  - Dispersal: TREATMENT
- Public health AND environmental issues addressed
- Management:
  - Disposal: often no management at all
  - Dispersal: system management is critical



What is an Onsite Wastewater Treatment System

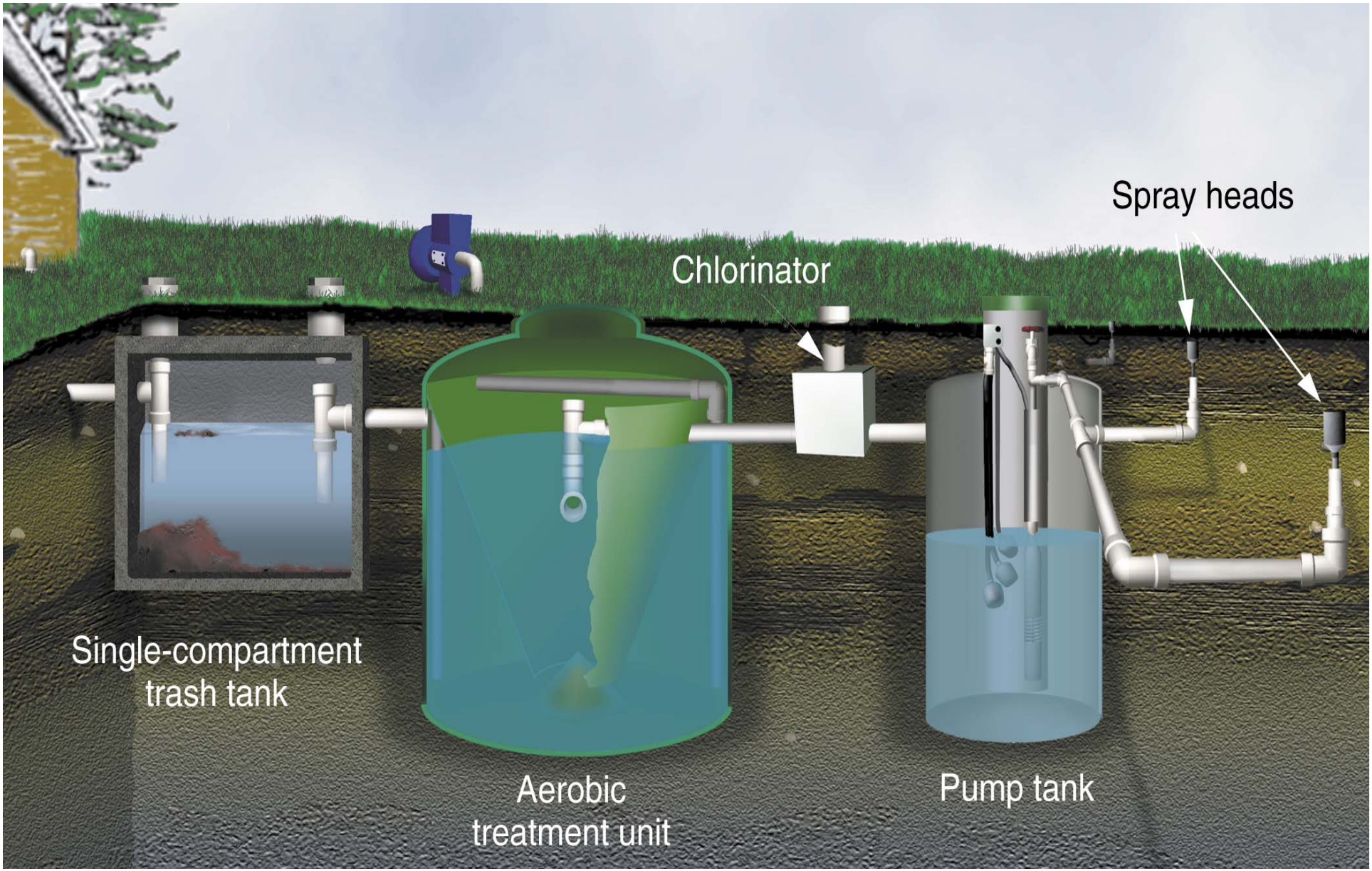
Conventional Septic Tank System

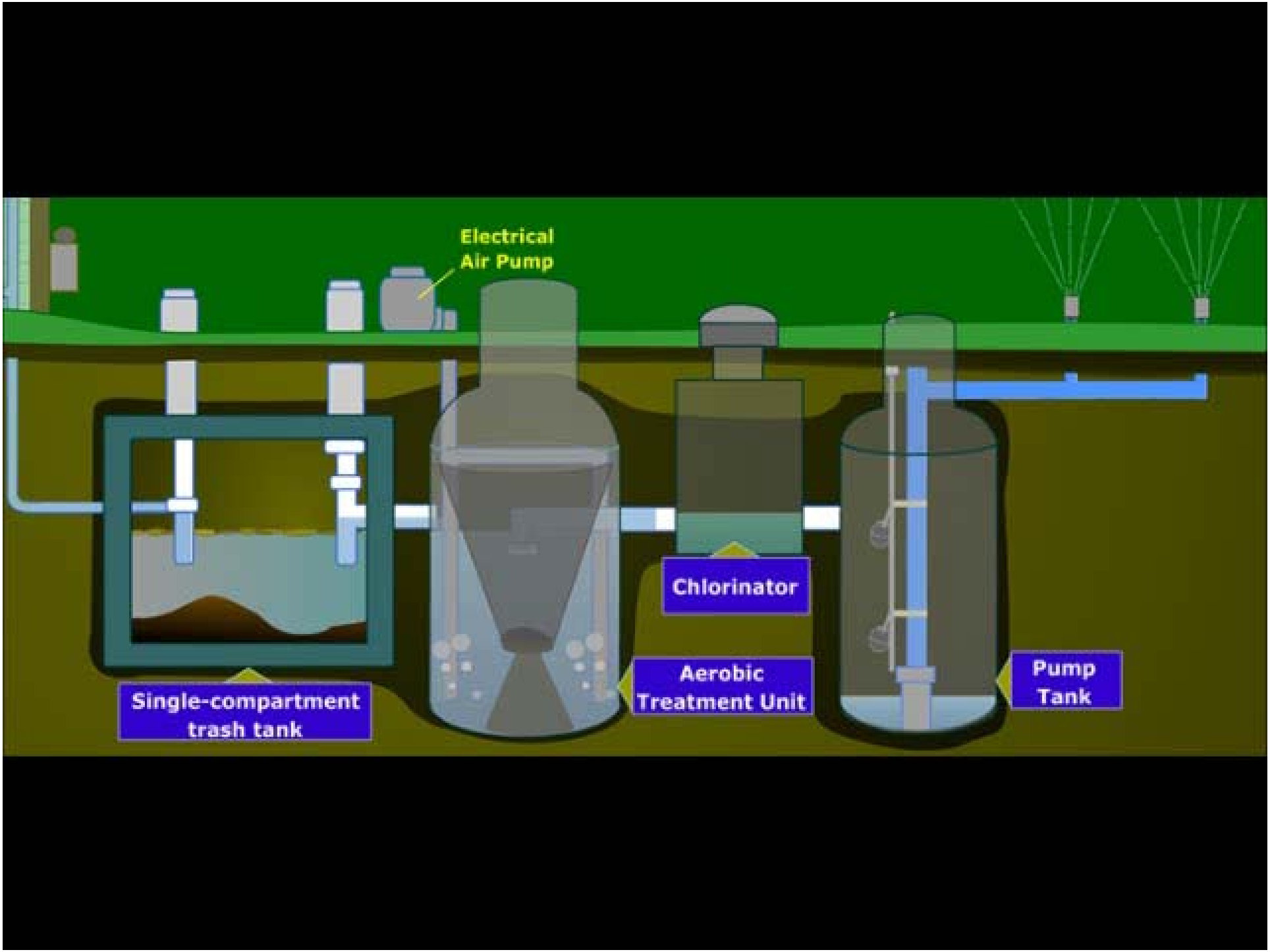



HOW A SEPTIC SYSTEM WORKS
AgriLIFE EXTENSION
NOTICE
For More Info
To House
Conventional Septic System Pretreatment
In the pretreatment portion of a septic system, many of the contaminants are removed from the wastewater in order to prepare it for final treatment and discharging into the environment. Contaminants in the wastewater include harmful bacteria that can cause illness, as well as nitrogen and phosphorus that can stimulate algae growth in water bodies.
Run the Water
Conventional System
Aerobic System
Final Treatment and Dispersal
Septic System Pretreatment

What is an Aerobic Treatment Unit?

TEXAS A&M AGRILIFE EXTENSION




Electrical
Air Pump
Chlorinator
Single-compartment
trash tank
Aerobic
Treatment Unit
Pump
Tank

Water Quality – Spray Field

- Disinfection
  - ***NOT STERILIZATION!***
- High potential for human contact with water
- Secondary Quality Effluent
  - Remove 85-98% of solids and organic matter
  - Remove pathogens?
- Soil microbes are the final treatment!
- This is effluent – ***NOT DRINKING WATER!!!!***

TEXAS A&M AGRILIFE EXTENSION

Role of vegetative cover in treatment system

- A healthy cover crop is essential for the system to function properly.
- Plants will:
  - Take up water and nutrients
  - Stabilize the soil & prevent erosion
  - Support beneficial soil organisms
- Do NOT park vehicles on drainfield
- Do NOT construct decks, driveways or buildings over drainfield
- NO woody vegetation over drainfield

Septic system additives

- Not been proven to be beneficial to system performance
- Not recommended
- Break up particles that are settled at the bottom and make them suspended
- Potential solids loading to downstream components

Kitchen

- Dishwasher
  - Hydraulic surges of wastewater
    - Space out loads
  - Organic load
    - Clean/scrape plates
- Garbage Disposal
  - Increases scum by 20%
  - Pumping required 1-2 years sooner
  - Organic matter had not been digested, so it will take longer to break down
  - Small particles take longer to settle

Fats, oils and grease

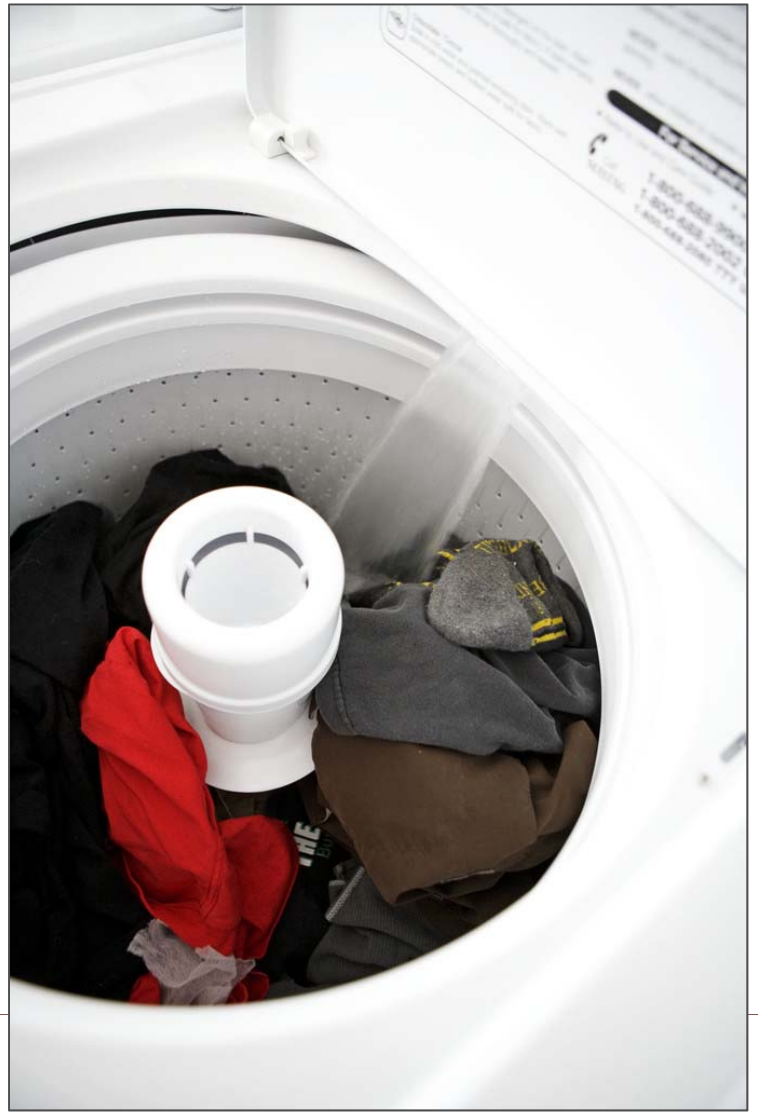
Constituent	State at room temperature	Comments
Fats	Solid	Non-toxic to the system, origin – animals, will separate in water
Oils	Liquid	Non-toxic to the system, origin – plants, trouble separating in water
Grease	Solid	Residual material on appliances; solid material on pans/equipment; petroleum products; moisturizers; bath oils; tanning oils; toxic to the wastewater system

Room temperature assumes 74 degrees F

A degreaser will move all components through a system

Laundry

- Use should be spread out
  - Returning from vacation
- Liquid soap is recommended
  - Use less
  - Remove risk of fillers in powders
- Install High Efficiency appliances



Toilet

- Only urine, feces, soap, toilet paper and limited amounts of cleaner should be going down drain
- No feminine products, prophylactics, cigarette butts, etc.
- No every-flush toilet bowl sanitizers

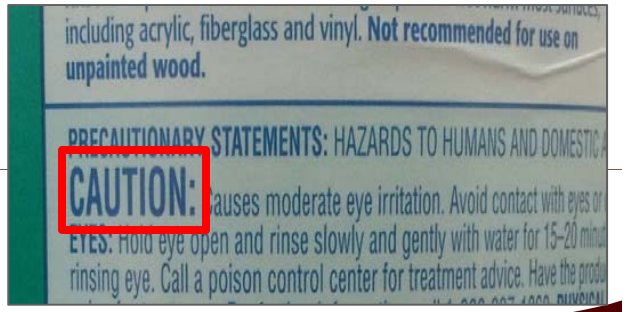
Septic Safe?

Toilet paper

- Excessive use results in faster sludge build up
- Treated toilet paper (with lotions) prevents paper from settling
- Wet wipe disposal is discouraged

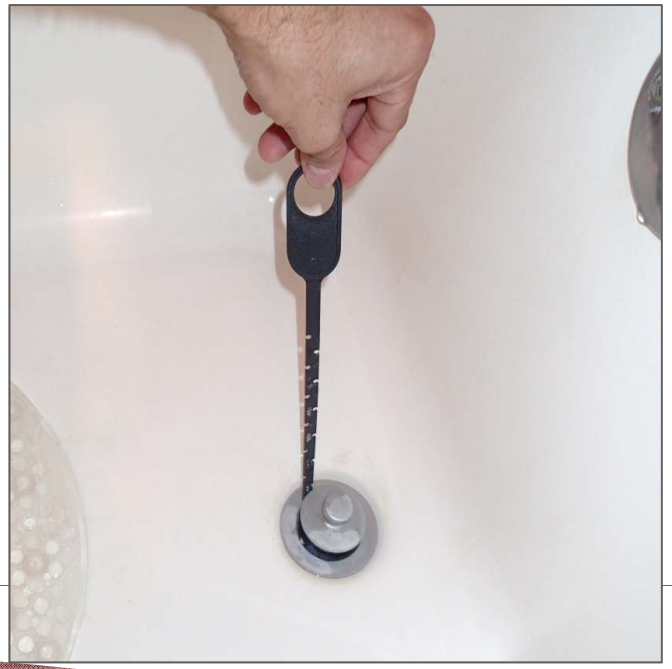
Cleaning products

- Cumulative effects on system performance
- Look at Labels!
  - ***DANGER*:** Means the chemical will kill the bacteria, and its use should be minimized or eliminated.
  - ***WARNING*:** Means limited use should have a minimal impact on the system.
  - ***CAUTION*:** Typically means the product will have little effect.



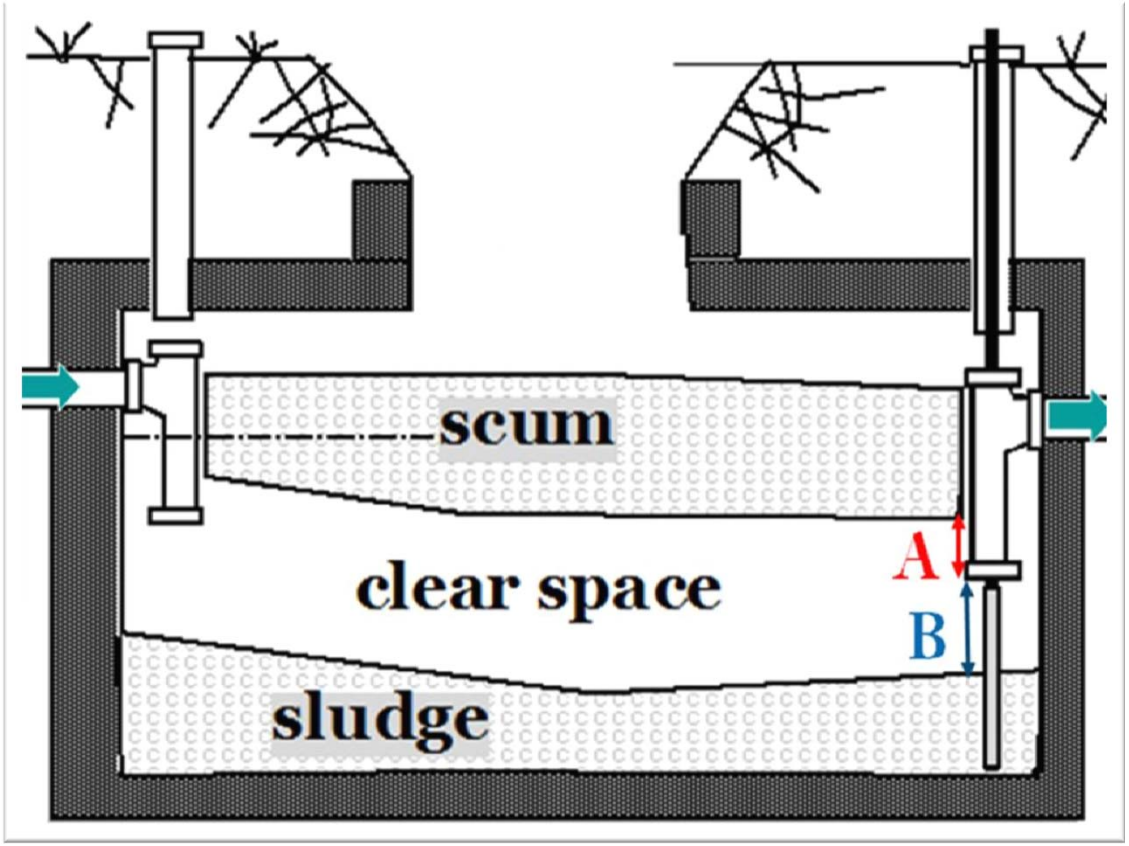
Drain cleaner

- Toxic drain cleaners can impact ability to properly treat wastewater
- Affect bacteria activity



Septic tank pumping recommended?

- Should be pumped when total solids reach 25-33% of tank capacity.
  - If ‘A’ is less than 3”
  - If ‘B’ is less than 12”
- Typically required every 3 to 5 years
- Pump during dry seasons to reduce the risk of tank floatation



Measuring solids

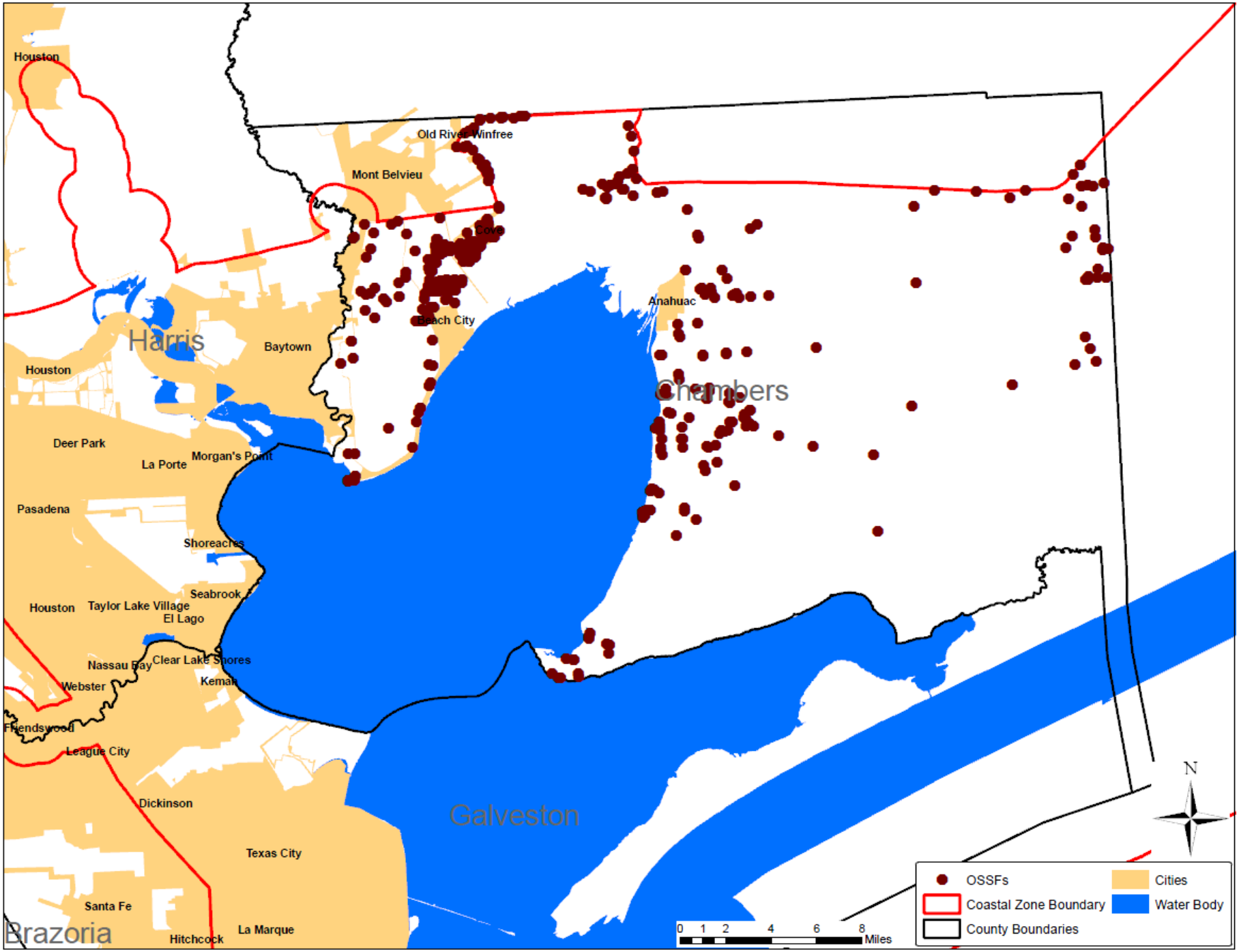
TEXAS A&M AGRILIFE EXTENSION

Addressing Coastal OSSFs

- Coastal Zone Act Reauthorization Amendments (CZARA)
- Nonpoint source pollution
  - Bacteria
- Project Period
  - June 1, 2010 to August 31, 2015

Project goals

- Identify areas of chronic OSSF failure
  - Coastal Counties
  - Counties identified by Section 6217, CZARA
- Develop OSSF inspector training course
- Public outreach
- Conduct visual inspections of anaerobic OSSFs
  - Pump solids from primary septic tanks, if needed
- Replace failing OSSFs, if needed


Houston
Old River-Winfree
Mont Belvieu
Cove
Anahuac
Beach City
Harris
Baytown
Houston
Chambers
Deer Park
La Porte
Morgan's Point
Pasadena
Shoreacres
Seabrook
Houston
Taylor Lake Village
El Lago
Nassau Bay
Clear Lake Shores
Kemah
Webster
Friendswood
League City
Dickinson
Galveston
Texas City
Santa Fe
Brazoria
Hitchcock
La Marque
N
0 1 2 4 6 8
Miles
OSSFs
Cities
Coastal Zone Boundary
Water Body
County Boundaries

Identifying issues

- Consult local Authorized Agent
  - Permit records - age and location of systems
  - Complaints history
- Soil types and water table
- Separation distances
  - Wells
  - Property lines
  - Surface water
- 1990 Census Data
- Reconnaissance
- Inspections

Training

- Develop guidance for visual inspections of anaerobic OSSF
- Determine inspection frequency criteria
- Submit course for CEUs

Public outreach

- Homeowner maintenance of Septic Systems
  - 2 hour workshop
  - How to live with a septic system
  - When to pump a septic system
  - Share project information
  - Candidates for pump-outs and inspections
- Select areas of known septic failures
- Incentives include:
  - Possible free pump out & evaluations
  - Possible free replacement OSSF

OSSF inspections

- Voluntary inspections
- Visual inspection of septic tank
- Operational status of the system
- Participants receive:
  - Free system pump out
  - Visual inspection of the septic tank
  - Report of operational status
  - A better understanding of OSSF operation and maintenance
  - Suggestions to improve system operation

OSSF replacements

- 2013 – Replaced 6 anaerobic OSSFs
- 2014 – 7 OSSF replacements scheduled for February – March 2014

Challenges

- Long term O&M
- Undersized lots
- High water tables
- Restrictive soils

Summary

- Expanding to additional coastal counties
- Seeking additional inspection candidates
- Public education and outreach
  - Reduce contaminant loading through public awareness and behavioral change
- Inspector trainings
- Replace failing anaerobic OSSFs
- Reduce the overall loading of contaminants to watersheds

Thank you

Ryan Gerlich

Office: 979-458-4185

ragerlich@ag.tamu.edu

http://ossf.tamu.edu/