

TEXAS A&M AGRILIFE

Digging Deeper: Addressing soil health to improve water quality

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Almeda Road Nature Reserve, April 2025

Green Infrastructure for Texas



Education

- Workshops
- Presentations
- Technical Assistance
- Student Internships



On-the-Ground Projects

- Exploration Green
- Ghirardi Family WaterSmart Park
- Sheldon Lake State Park restoration
- Hitchcock City Parks
- Houston City College - Katy



Research

- Water quality
- BMP Performance
- Plant propagation



Overview

Award Amount-

\$57,894

Project Highlights -

- 2 workshops & 1 field day in the Lower Galv Bay watershed
- Focus on applying soil health principals in suburban and urban landscapes

Project Partners & Advisors -

Ag and Natural Resource Extension agents in multiple counties; TSSWCB; local NRCS office; Soil and Water Conservation District



Outreach, workshops, and resources to...

- Expand the conversation about soil health and NPS reduction into suburban and urban watersheds, building on established resources from the agricultural community
- Strengthen understanding of connection between soil health, green infrastructure, and NPS
- Encourage the formation of local strategies and partnerships that recognize and champion soil health
- Encourage a vision of lawns and landscaped areas as productive ecosystems

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EXTENSION

DISASTER ASSESSMENT
AND RECOVERY



If you increase the organic matter in 1 acre of soil by 1%, how many more gallons of water can that soil hold in the top 6 inches?

- a) 500
- b) 25,000
- c) 300,000



For every 1% increase in organic matter, soils increase their water holding capacity by

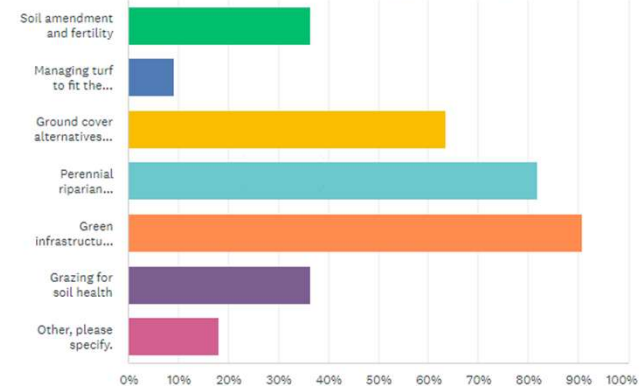
25,000-27,000 gallons

(per acre in the top 6 inches)

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What soil health focus areas do you consider most needed by municipalities and other watershed stakeholders?



ANSWER CHOICES	RESPONSES	
▼ Soil amendment and fertility	36.36%	4
▼ Managing turf to fit the context of the location	9.09%	1
▼ Ground cover alternatives to turf	63.64%	7
▼ Perennial riparian buffers and soil health - more than erosion control. Water holding capacity and increased infiltration.	81.82%	9
▼ Green infrastructure approaches with native plants outside of riparian areas	90.91%	10
▼ Grazing for soil health	36.36%	4
▼ Other, please specify.	Responses 18.18%	2
Total Respondents: 11		

Partnership-Driven Workshops & Field Day

DIG DEEPER INTO SOIL HEALTH

A WORKSHOP FOCUSED ON
URBAN AND SUBURBAN LANDSCAPES



Healthy, living soils improve water storage and water quality, reduce disease and pest problems, are resilient to drought, temperature extremes, fire and flood, and much more. Soil health applies to more than growing food and rural land use. It's time to recognize the role of healthy soil in our communities.

OCTOBER 29, 2024
9:00 AM - 2:00 PM

LUNCH PROVIDED BY HARRIS COUNTY SWCD
SIGN IN BEGINS AT 8:30 AM

HOUSTON COMMUNITY COLLEGE
HCC SOUTH
1990 AIRPORT BLVD
HOUSTON, TX, 77051

NO COST TO ATTEND
SEATING IS LIMITED
REGISTRATION IS REQUIRED

[Register Here](#) tx.ag/SoilHealthOct29

Local practitioners at parks departments, ISDs, counties, drainage districts, hospital campuses, MUDs and municipalities will benefit from attending with homeowners, urban gardeners and farmers, and small landowners welcome.

TOPICS

- Principles of soil health
- Improved soil conditions to promote water infiltration and retention
- Managing water on-site with green stormwater infrastructure
- Strategies to incorporate best practices in your operations
- Undeveloped lands as productive ecosystems

Multi-speaker agenda
Hands-on demonstrations
Interactive Q&A



Prepared in cooperation with the Texas Commission on Environmental Quality and U.S. Environmental Protection Agency

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TUESDAY, MARCH 4, 2025
9:00 AM - 3:00 PM

SIGN IN BEGINS AT 8:30 AM
MORNING REFRESHMENTS PROVIDED BY CITY OF MONT BELVIEU
LUNCH PROVIDED BY ONEOK

EAGLE POINTE RECREATION COMPLEX
MAGNOLIA ROOM
12450 EAGLE POINTE DRIVE
MONT BELVIEU TX, 77523

NO COST TO ATTEND
SEATING IS LIMITED
REGISTRATION IS REQUIRED

[Register Here](#) tx.ag/SoilHealthMar4

Local practitioners at parks departments, ISDs, counties, drainage districts, hospital campuses, MUDs and municipalities will benefit from attending with homeowners, urban gardeners and farmers, and small landowners welcome.

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Registration Required
tx.ag/SoilHealthApr29

FIELD DAY

TUESDAY, APRIL 29
8:30am - 12:30pm

Start and End @ Sylvan Rodriguez Park
1201 Clear Lake City Blvd, Houston, TX 77062

- Hands-on Demonstrations
- Expert Guides
- Soil Health Principles in Action
- Transportation Provided
- Multiple locations: Including Almeda Road Nature Reserve



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EXTENSION

DISASTER ASSESSMENT
AND RECOVERY

Hands-on Demonstrations and Discussions



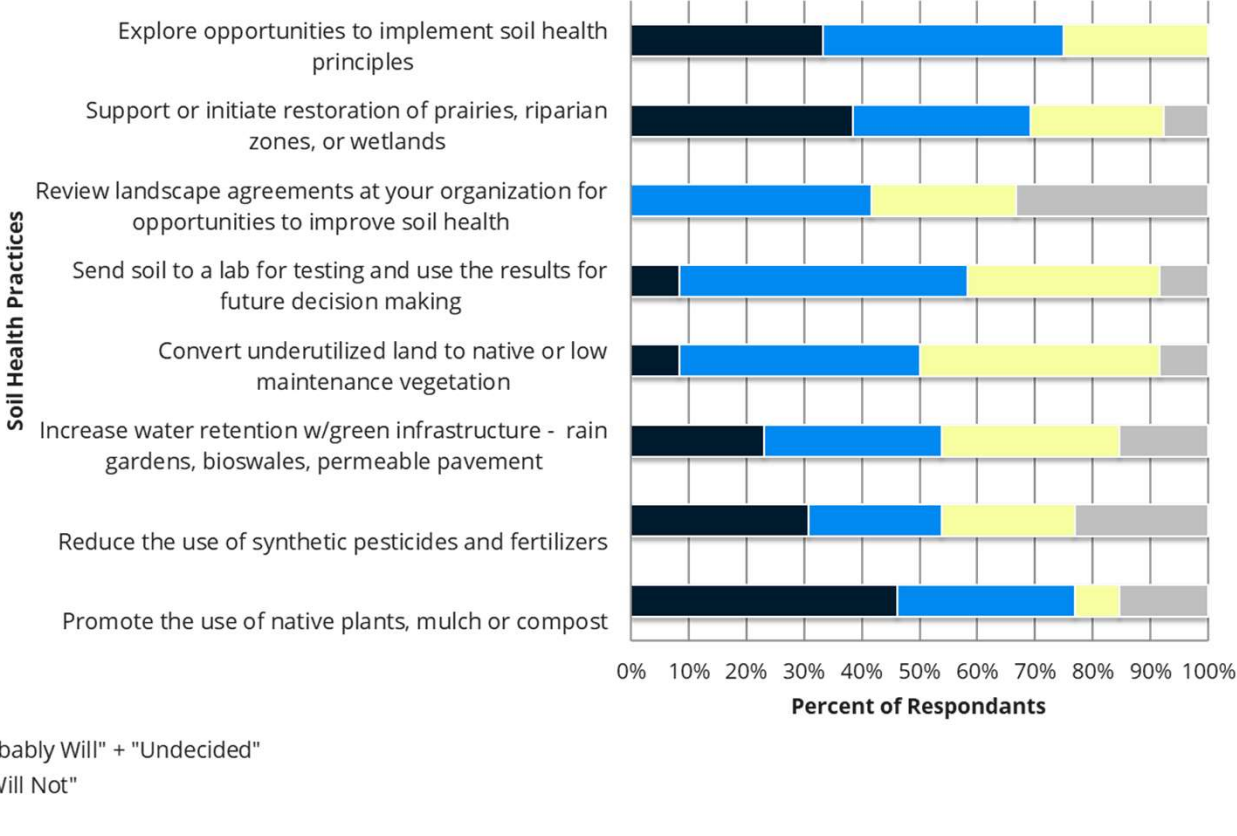
Program Attendance & Audience Reach

**Air Lawn Aeration
Archie's Garden Beds LLC
Brazoria County Master Gardeners
Chambers County Parks
City of Baytown Parks and Rec
City of Friendswood
City of Houston
City of La Porte
City of Mont Belvieu
City Of Pasadena
City of Round Rock
City of Santa Fe
Deer Park ISD
Environmental Institute of Houston, UHCL**

**Fish and Wildlife Service
G&V&M farm
Greenscapes Six
Grow and Company
HARC
Harris County Master Gardeners
Harris County Precinct 1
Harris County Precinct 4
Harris County Sustainability Division
Harris County SWCD
Hermann Park Conservancy
Houston Community College
Houston Parks Board
Liberty County Master Gardeners
Local Parks & Rec Board**

**Lower Trinity Basin Master Naturalists
PVAMU Cooperative Extension
Residents
Texas A&M Forest Service
TCEQ GBEP
Trinity Bay SWCD #434
TSSWCB
USDA-Natural Resources Conservation
Service
UTMB Health
Vision Galveston
Water Engineering Technologies (WET)
West Street Recovery
Wildlife Habitat Federation**

Action and Intention to adopt by Soil Health Practice



Infiltration Trench

Infiltration trenches are excavated trenches typically filled with stone or gravel to allow water to infiltrate the ground. They are designed to capture runoff from roofs, parking lots, and other impervious surfaces, and to filter out pollutants before the water enters the ground. Infiltration trenches are a key component of green infrastructure for stormwater management.

Applications

Infiltration trenches can be used in a variety of applications, including:

- Along roadways and parking lots
- At the edges of parking lots
- Near to buildings and structures
- In areas with high groundwater levels
- In areas with high soil permeability
- In areas with high water table

Why an Infiltration Trench?

Infiltration trenches offer several benefits, including:

- Reduces runoff volume and peak
- Improves water quality
- Promotes groundwater recharge
- Easy to install
- Straightforward maintenance

Challenges

There are several challenges associated with infiltration trenches, including:

- Limited space for installation
- High cost of construction
- Potential for clogging
- Limited capacity for high flow events
- Potential for odors
- Potential for groundwater contamination

Considerations

When designing an infiltration trench, several factors should be considered, including:

- Soil type and permeability
- Groundwater level
- Flow rate and volume
- Trench depth and width
- Trench material and construction
- Trench location and orientation
- Trench maintenance and monitoring

Design Elements

The design of an infiltration trench should consider the following elements:

- **Inlets:** Inlets should be designed to capture runoff from roofs, parking lots, and other impervious surfaces. They should be located at the edge of the impervious surface and should have a slope of at least 1%.
- **Perforated Pipe:** A perforated pipe should be installed at the bottom of the trench to collect and convey the infiltrated water. The pipe should have a diameter of at least 12 inches and should be made of a material that is resistant to corrosion.
- **Filter Layer:** A filter layer should be installed above the perforated pipe to prevent soil and debris from entering the pipe. The filter layer should be made of a material that is resistant to clogging and should have a thickness of at least 6 inches.
- **Gravel Layer:** A layer of gravel should be installed above the filter layer to provide additional filtration and to prevent the filter layer from clogging. The gravel layer should be made of a material that is resistant to clogging and should have a thickness of at least 12 inches.
- **Outlet:** The outlet of the trench should be designed to convey the infiltrated water to a stormwater management system or to a body of water. The outlet should be located at the end of the trench and should have a slope of at least 1%.

- # Green Infrastructure Design Tool Kit
- Multiple design sets
 - Common challenges & considerations to address them
 - Design elements
 - Relevant values and calculations
 - Permitting, construction, and maintenance considerations
 - Standard details



Free Online Training
 January 15, 2026, 12:30-2pm
 Registration information available soon.



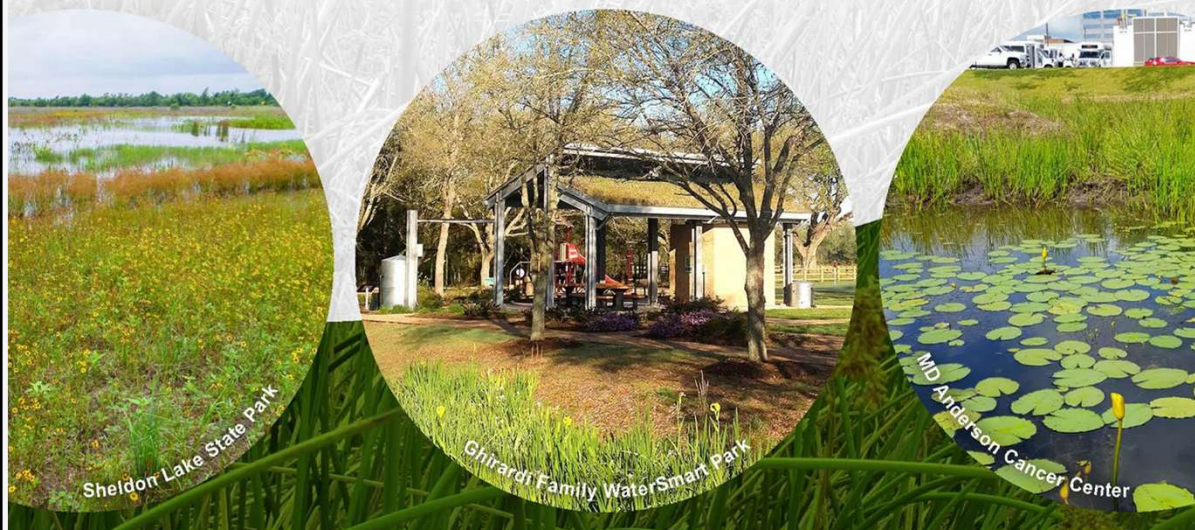
agrilife.org/gift/resources/



GIFT

GREEN INFRASTRUCTURE FOR TEXAS

agrilife.org/gift



Empowering Texans to build resilient communities adaptable to social, economic, and environmental change.

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