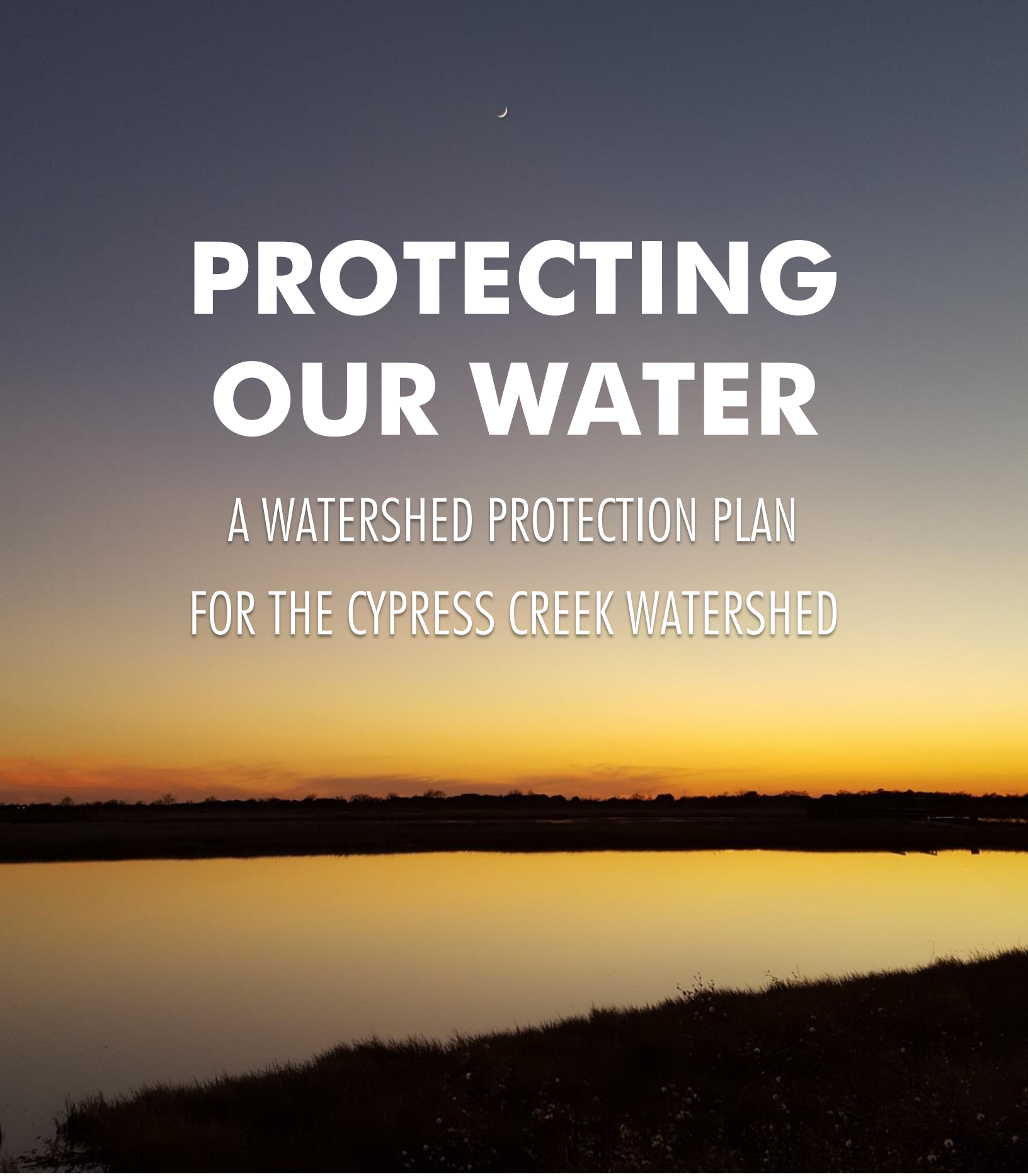


PROTECTING OUR WATER

A WATERSHED PROTECTION PLAN FOR THE CYPRESS CREEK WATERSHED

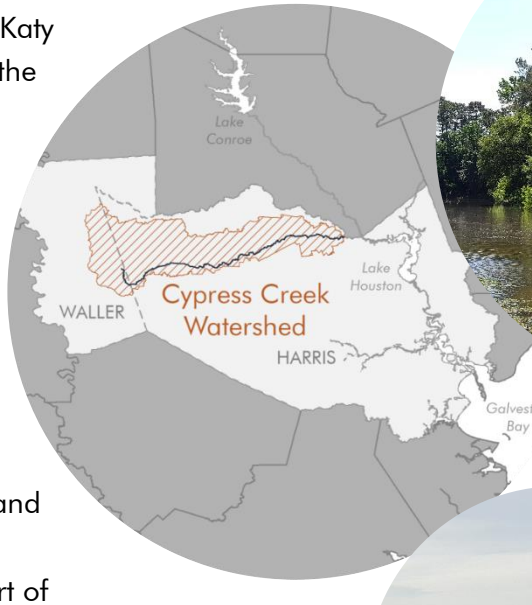
CYPRESS CREEK
WATERSHED PARTNERSHIP

EPA
United States
Environmental Protection
Agency

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

H-GAC
Houston-Galveston
Area Council

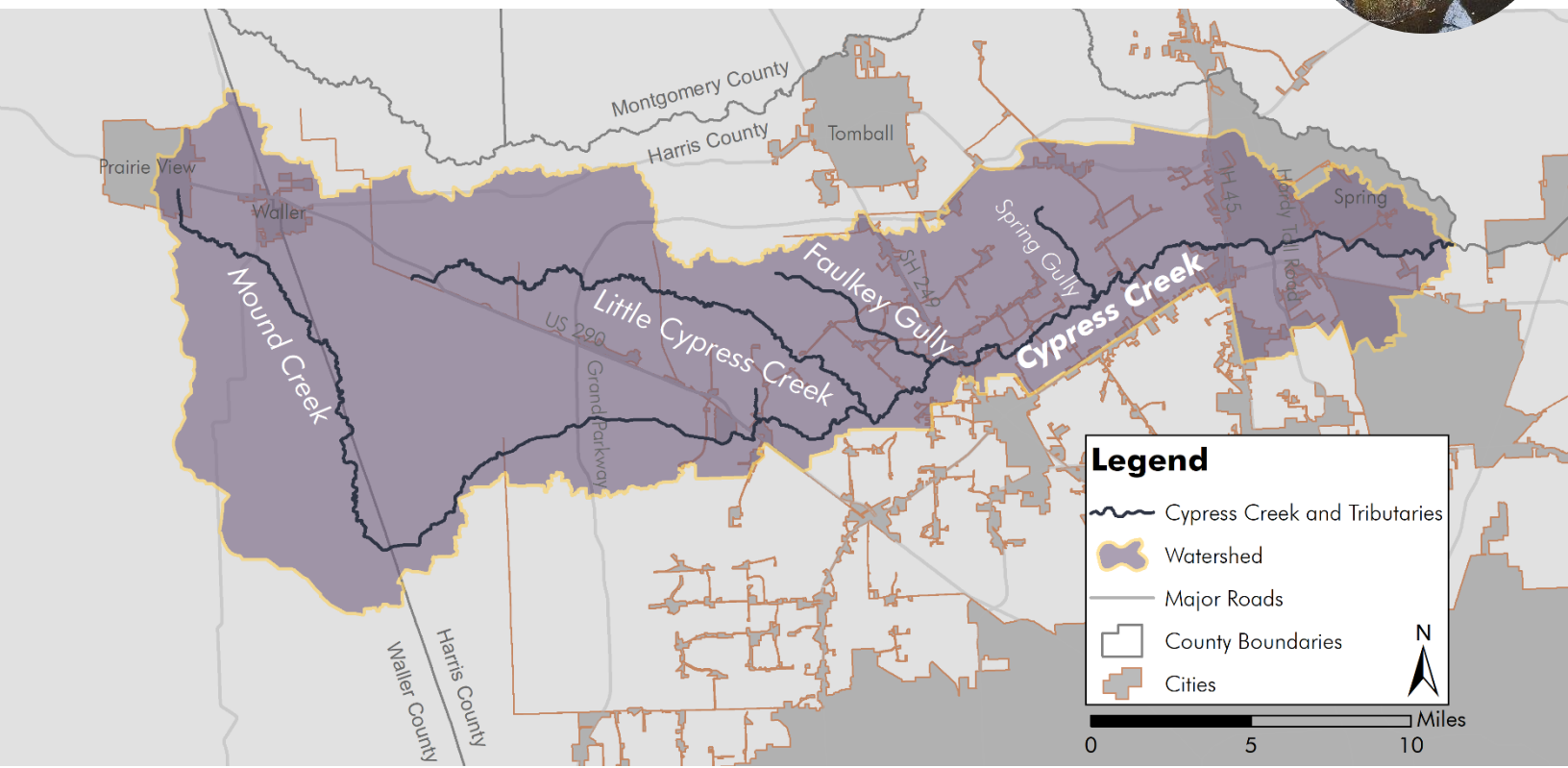
ABOUT THE PROJECT



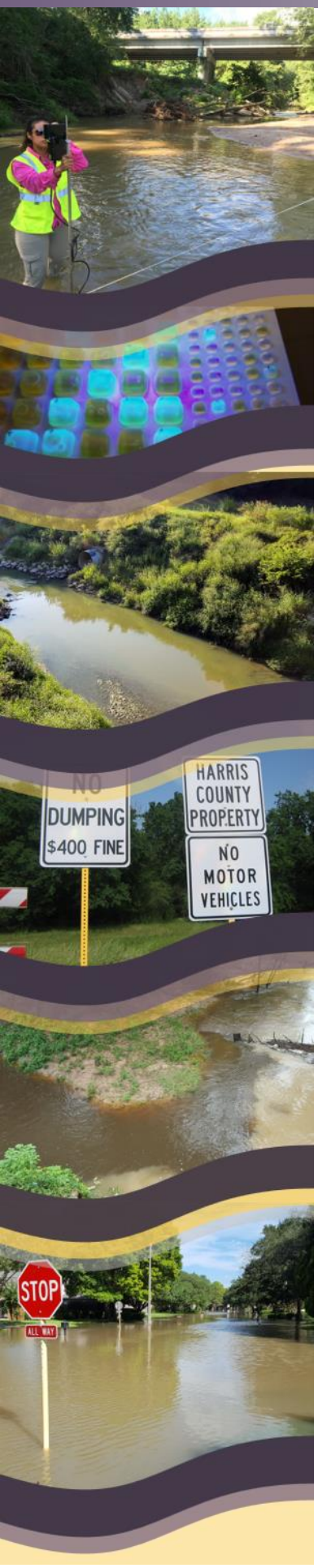
Cypress Creek flows from its headwaters in the Katy Prairie across a swath of the greater Houston area of the Texas Gulf Coast. It joins Spring Creek, and these waterways combined represent an substantial part of the flow entering Lake Houston, a regional drinking water source.

Cypress Creek connects a diverse set of communities and land uses. This waterway is in transition between its agricultural past and the rapid pace of its current development. Together, the 530 miles of waterways in the Cypress Creek system drain over 319 square miles of varying land uses in Harris and Waller counties. This complex drainage area is the **Cypress Creek watershed**, an essential part of supporting local communities and economies, recreation, fisheries, and a diverse ecology, including remnants of the Katy Prairie.

The Cypress Creek watershed faces several water quality challenges. Elevated levels of fecal waste and other concerns can impact our communities' public health and environmental resilience. To address these challenges, the Houston-Galveston Area Council (H-GAC) worked with local stakeholders to form the Cypress Creek Watershed Partnership, which worked closely with the Texas Commission on Environmental Quality (TCEQ) and the United States Environmental Protection Agency (EPA) to create and implement a Watershed Protection Plan (WPP).



WATER QUALITY



Waterways in Texas have a variety of uses. They provide drinking water, offer recreational opportunities, and support aquatic life. The State of Texas establishes water quality standards for waterways based on the uses they serve. If water quality samples show that a waterway is unable to support one of these uses, it is considered to have an **impairment**. When waterways have impairments, the State is required to take action to bring the waterway into compliance with the water quality standard. Some pollutants or conditions do not have specific standards criteria but may be serious enough to warrant a **concern**.

FECAL WASTE POLLUTION

The most common water quality impairment in the Cypress Creek watershed is elevated levels of fecal waste. Testing for Escherichia coli (*E. coli*) bacteria, common in the digestive systems of warm blooded animals, is used to indicate the presence of human and animal fecal waste in our waterways. Fecal waste in the Cypress Creek Watershed is contributed by human waste sources, such as overflow from sanitary sewers and onsite sewage facilities; waste from domestic animals such as pets and livestock; and waste from wildlife and invasive species. Harmful pathogens associated with fecal waste can endanger public health during contact recreation such as swimming or wading. The primary focus of the Partnership is to address sources of fecal waste pollution, but the WPP considers a number of other water quality issues.

OTHER CHALLENGES

Nutrients & Dissolved Oxygen - Nutrients (nitrogen and phosphorus) from fertilizers, fecal waste, and other sources can lead to algal blooms that reduce oxygen levels, limiting aquatic life and causing fish kills.

Trash - Trash from stormwater runoff and illegal dumping can affect aquatic life, degrade the beauty of our local communities, and expose people to hazardous substances.

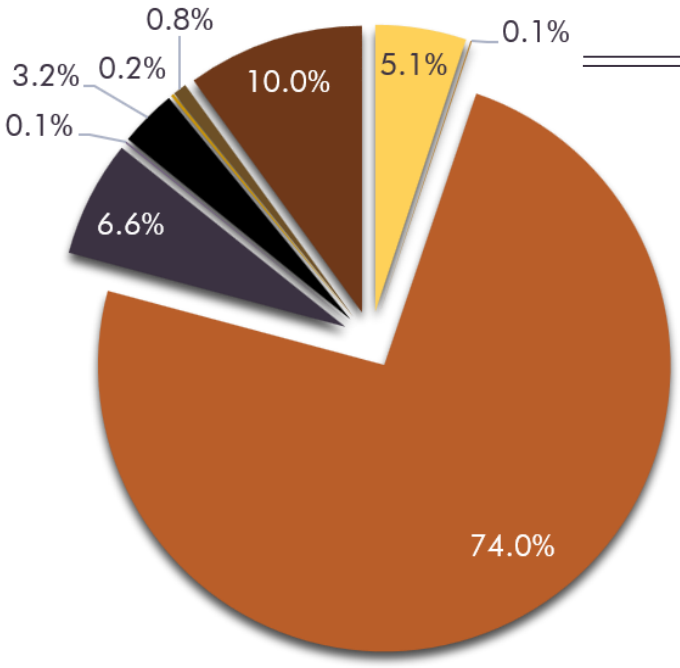
Sediment - Sediment in the waterways from erosion, development, and mining operations can have a significant impact on aquatic life, drinking water, and flooding.

Flooding - While flood management is outside the scope of this project, changes to flow conditions or increased flooding can alter the impact of pollutant sources. Water quality considerations should be included in future decisions that may affect hydrologic modification of the waterways.

Growth - H-GAC estimates that the region's population will grow by 4 million by the year 2045. This will bring additional bacteria sources (onsite sewage facilities, pets, *etc.*) and increased paved surfaces. With careful planning, the impacts of growth on future water quality can be mitigated.

POLLUTION SOURCES

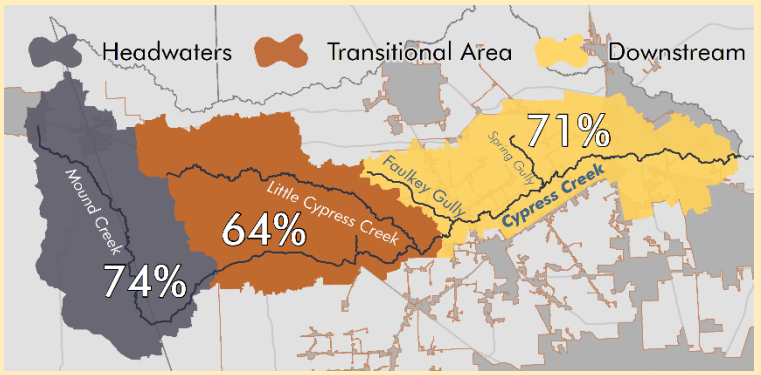
2018 FECAL WASTE POLLUTION



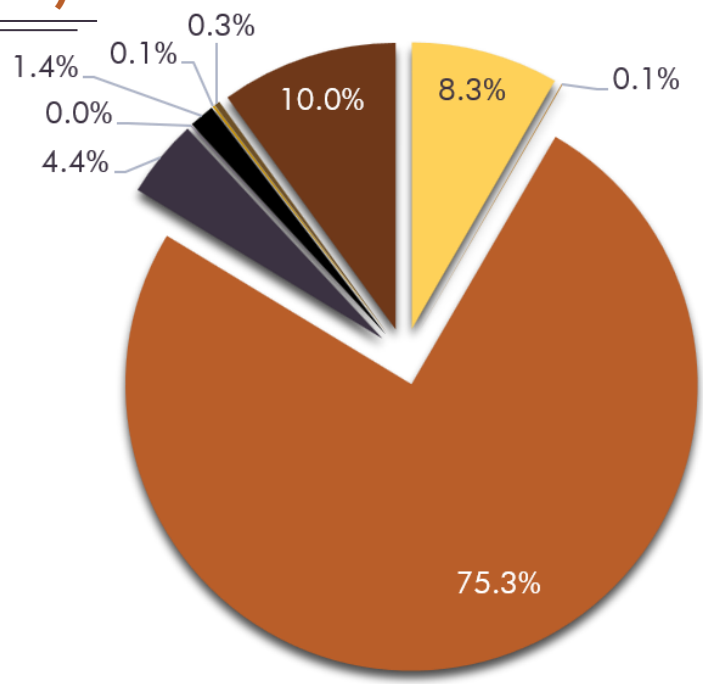
- Onsite Sewage Facilities, 5.1%
- Wastewater Treatment Facilities, 0.1%
- Pet Waste, 74.0%
- Cattle, 6.6%
- Horses, 0.1%
- Sheep and Goats, 3.2%
- Deer, 0.2%
- Feral Hogs, 0.8%
- Other Wildlife, 10.0%

H-GAC worked with local stakeholders and technical experts to identify and assess the impacts of observed (2018) and forecasted (2035) fecal waste sources in the watershed. The charts above and below show that the primary sources of concern in the watershed include pet waste, human sewage, livestock waste, and wildlife. The map shows the amount of reduction of fecal waste pollution needed in different areas of the watershed to restore Cypress Creek by 2035, the WPP's goal year. Pollutant sources and changes to the hydrology of the watershed related to human activity will continue to increase with future development, exacerbating the existing situation if left unchecked.

PERCENT REDUCTION NEEDED



2035 FECAL WASTE POLLUTION (FORECAST)

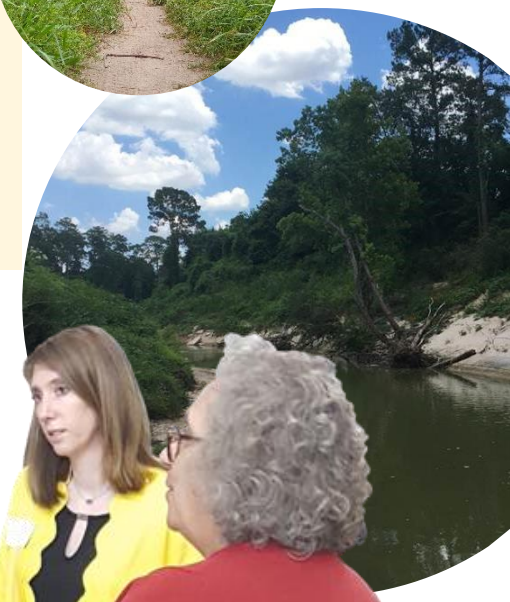


- Onsite Sewage Facilities, 8.3%
- Wastewater Treatment Facilities, 0.1%
- Pet Waste, 75.3%
- Cattle, 4.4%
- Horses, 0.0%
- Sheep and Goats, 1.4%
- Deer, 0.1%
- Feral Hogs, 0.3%
- Other Wildlife, 10.0%

LOCAL KNOWLEDGE, LOCAL SOLUTIONS

Local concern over water quality issues and the future of Cypress Creek led to the formation of the **Cypress Creek Watershed Partnership** (Partnership). The Partnership is composed of local residents, governments, industry, agricultural producers, community groups, and other local partners. Supported by H-GAC and TCEQ, the Partnership developed the WPP as a voluntary, locally led approach to improving water quality for the communities of the watershed.

The Partnership used a variety of methods to identify causes and recommend potential voluntary solutions for pollutants in the waterway. While the primary focus is on reducing fecal waste, many of the solutions are intended to have multiple benefits. The recommendations represent a flexible range of solutions designed to adapt to changing conditions and guide efforts to improve water quality through 2035. The various recommendations, responsible parties, and general timeframes are shown on the following page.



ENSURING SUCCESS

Implementation of the WPP will require the continued coordination, cooperation, and commitment of the local partners. With a focus on voluntary, cost-effective decisions, and a strong education and outreach component, the WPP will serve as a framework for coordinating future efforts. The solutions are designed to **coordinate** with flood mitigation, conservation, and other efforts in the watershed to broaden the WPP's reach. The Partnership will evaluate ongoing water quality testing and periodically review the success of actions taken and adjust the WPP accordingly to ensure it continues to serve our communities.

TIMELINE

STRATEGIES FOR HUMAN WASTE

G, R, C	Convert onsite sewage facilities to sanitary sewer where appropriate	Ongoing
G, R	Remediate failing onsite sewage facilities	Ongoing
G	Address problem wastewater plants and consider regionalization	Early, Ongoing
G	Recommend increased testing to better characterize effluent	Early, Middle
G	Remediate collection system infrastructure; consider preventative measures	Ongoing
G, C	Minimize fats, oils, and grease in sewage through education and outreach	Ongoing

STRATEGIES FOR PET WASTE

G, B, C	Install pet waste stations	Early, Ongoing
G, B	Expand dog parks	Early, Middle-Late
G, C	Promote spay and neuter events	Ongoing (Periodic)
G	Consider increased enforcement	Early, Middle
C	Distribute handheld pet waste bag dispensers at local events	Ongoing

STRATEGIES FOR URBAN STORMWATER

C, G	Investigate drainage channels in urban areas for potential pollutant sources	Early, Middle
G, R, C	Install stormwater inlet markers	Early, Middle
G, R, B, C	Promote maintenance and restoration of riparian buffers	Ongoing
G, B, C	Promote and implement low impact development practices	Ongoing
G, R, B, C	Promote urban forestry as a stormwater solution	Ongoing

STRATEGIES FOR AGRICULTURE, WILDLIFE, AND FERAL HOG MANAGEMENT

G, R, B	Implement voluntary agricultural plans and technical assistance	Ongoing
G, R, B, C	Maintain or restore rural riparian buffers and upland habitat	Ongoing
B, C	Implement horse manure composting program	Early, Ongoing
G, R, B	Support efforts to remove feral hogs	Ongoing

COORDINATION AND EDUCATION

G, R, B, C	Continue to foster the Cypress Creek Watershed Partnership	Ongoing
G, R, B, C	Support existing outreach programs and partnerships in the watershed	Ongoing
G, C	Hold educational workshops for major strategies and train volunteers	Ongoing
G, R, B, C	Hold trash clean-up events	Ongoing
G, C	Provide educational materials for major strategies online	Ongoing

G: Government • R: Residents / Landowners • B: Business / Industry • C: Community Organizations

Early: 2021 - 2025 • Middle: 2025 - 2030 • Late: 2030 - 2035 • Ongoing: 2021 - 2035

Note: The responsible parties for each strategy represent categories of local partners that may be involved with these voluntary measures, not specific entities. The actual participants in any specific project may vary based on resources and location. Some strategies are ongoing through the project term and some are specific to certain time periods. All will be subject to opportunities as they arise.

JOIN THE EFFORT

RESIDENTS

- ✓ Pick up after your pet to keep waste out of the storm sewer.
- ✓ Maintain your septic or aerobic system.
- ✓ Become a volunteer Texas Stream Team Monitor or report pollution in your community.
- ✓ Reduce your fertilizer use on lawns and consider planting native vegetation.
- ✓ Support water quality initiatives in your local government decision-making.

LOCAL GOVERNMENTS AND DISTRICTS

- ✓ Consider ordinances or incentives to reduce sources of waste in your jurisdiction.
- ✓ Address wastewater treatment challenges, especially sanitary sewer overflows; consider participation in the Texas Commission on Environment Quality's Sanitary Sewer Overflow Initiative.
- ✓ Consider green infrastructure, urban forestry, riparian buffers, and other development practices for government facilities and design codes.

AGRICULTURAL COMMUNITIES

- ✓ Work with U.S. Department of Agriculture Natural Resources Conservation Service, Texas State Soil and Water Conservation Board, and Texas A&M AgriLife Extension to implement voluntary land management practices and plans.
- ✓ Get support in managing feral hog activity on your property.
- ✓ Consider voluntary conservation, especially in riparian areas, to preserve rural character and water quality.

BUSINESSES AND INDUSTRY

- ✓ Where applicable, ensure all permit requirements for wastewater discharge are being met.
- ✓ Consider green infrastructure, riparian buffers, and low impact development in site design.
- ✓ Support community water quality initiatives through involvement and sponsorship.

COMMUNITY ORGANIZATIONS

- ✓ Promote and implement voluntary land conservation projects.
- ✓ Provide or participate in public education and outreach campaigns.

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CE0921

EPA United States Environmental Protection Agency

Texas Commission on Environmental Quality

H-GAC Houston-Galveston Area Council

Justin Bower 713.499.6653 justin.bower@h-gac.com www.cypresspartnership.com