WEST FORK WATERSHEDS
PARTNERSHIP

PROTECTING OUR WATER

A Watershed Protection Plan for the West Fork San Jacinto River and Lake Creek

Houston-Galveston Area Council

TCEQ

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Environmental Protection
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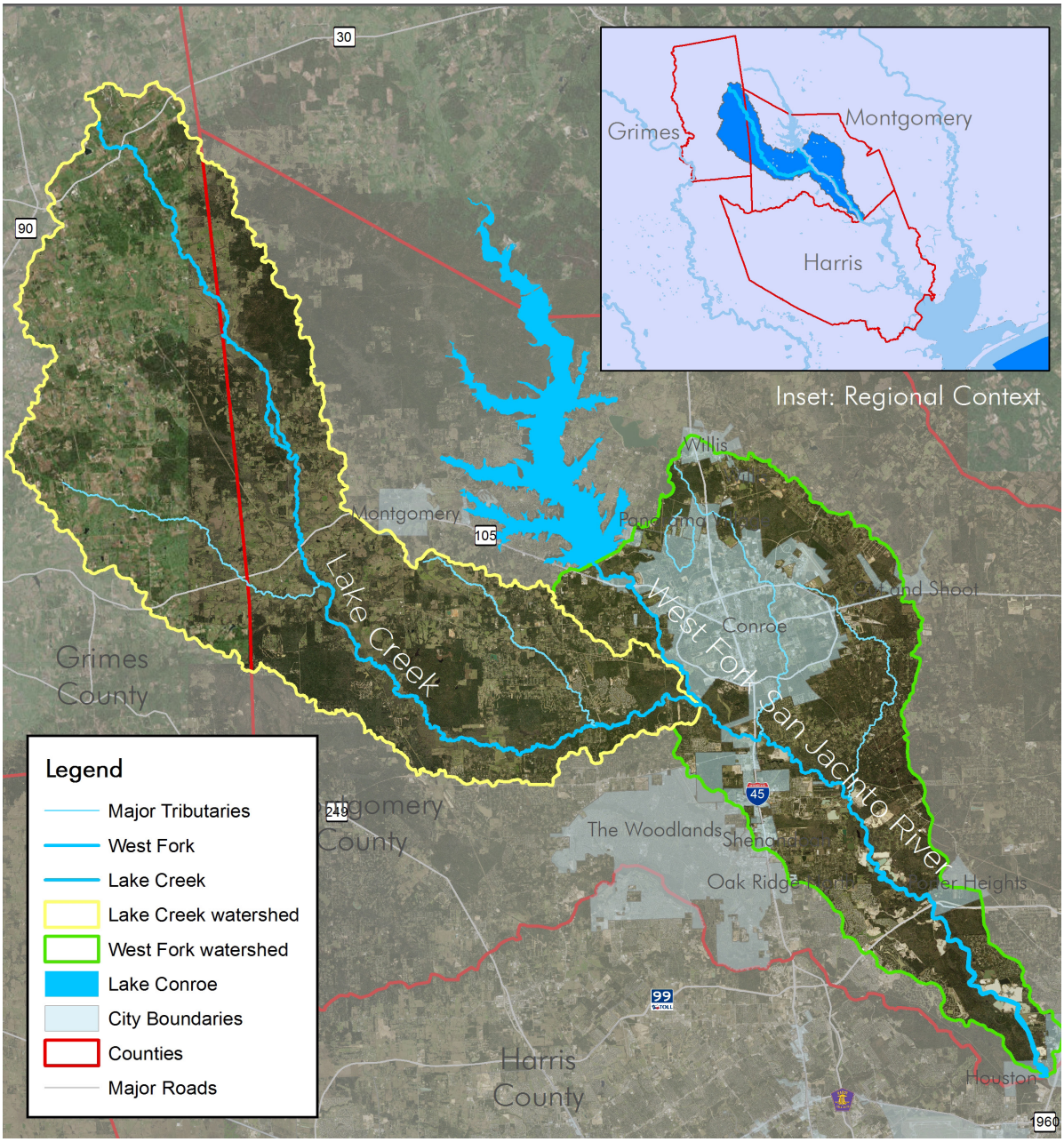
The West Fork San Jacinto River (West Fork) and its tributaries are a vital part of the Houston region's economy and environment. More than 500 square miles of land in Montgomery and Grimes counties, and releases from the Lake Conroe dam, drain into the West Fork north of its confluence with Spring Creek and Lake Houston.

This drainage area is the watershed of the West Fork, and includes the land surrounding its tributary Lake Creek and parts of the City of Conroe and The Woodlands. Everything that happens on the land in the watershed affects the water quality and uses of the waterway, including regional water supply.

MAP OF PROJECT AREA



PARTNERSHIP TO PROTECT WATER

The West Fork and Lake Creek watersheds face several water quality challenges. Elevated levels of fecal bacteria and other concerns can impact public health, the health of the river's ecology, and the area's economy.

To address water quality challenges, the Houston-Galveston Area Council (H-GAC) worked with local stakeholders to form the West Fork Watersheds Partnership (Partnership), which worked closely with the Texas Commission on Environmental Quality (TCEQ) and the US Environmental Protection Agency (EPA).

The Partnership includes representatives from local government, area residents, industry and commerce, agricultural producers, community groups, and other interested parties. The mission of the Partnership is to identify and implement voluntary solutions to improve and maintain the water quality in the waterways of the West Fork.

The Partnership's primary goal is to protect public health by reducing fecal bacteria levels in the West Fork and Lake Creek to meet state water quality standards, now and in the future.

The Partnership developed a Watershed Protection Plan for the West Fork and Lake Creek to coordinate efforts in improving water quality. Watershed Protection Plans are collaborative guidance documents that use scientific analysis and local knowledge to identify sources of water quality problems and recommend feasible, voluntary solutions to address them.

This summary highlights the potential causes of water pollution in the West Fork watersheds, the solutions recommended by local stakeholders, and strategies and timing for putting each solution into action.

The full West Fork San Jacinto River and Lake Creek Watershed Protection Plan and supporting project information can be found at www.westforkwpp.com.

WATER QUALITY CHALLENGES

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 back into compliance with the applicable standard. Some pollutants or conditions do not have specific criteria but may be serious enough to warrant a "concern." These impairments and concerns are the challenges the Watershed Protection Plan seeks to address.

Fecal Bacteria

Sections of both the West Fork and Lake Creek have levels of *E.coli* bacteria in excess of the water quality standard for contact recreation, resulting in an impairment. This indicator bacterium reflects the presence of fecal waste in the water, which may cause people to become sick during contact recreation. The charts on page 5 are based on modeling approved by the Partnership which show the current and projected future contribution from fecal bacteria sources. Overall amounts of bacteria increase between these time periods.

Because of this impairment, which can endanger public health, fecal bacteria are the primary focus of the Watershed Protection Plan. The Partnership used the results of technical analyses informed by local knowledge to identify a variety of human and natural sources of fecal waste in the watersheds.

Other Challenges

In addition to fecal waste, the Partnership identified several other water quality issues.

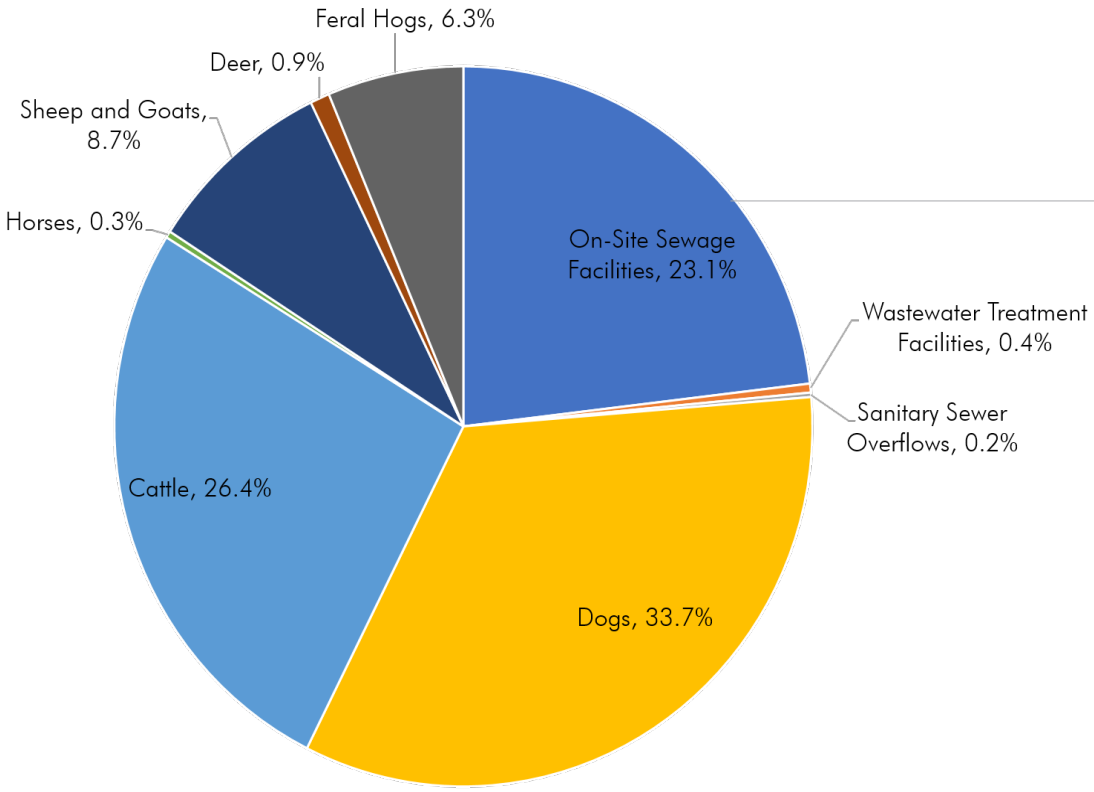
Nutrients and Dissolved Oxygen - Nutrients (nitrogen and phosphorus) from fertilizers, fecal waste, and other sources can lead to algal blooms that reduce oxygen levels, limiting aquatic life and causing fish kills. Many of the solutions and practices identified in the Watershed Protection Plan to address fecal waste will provide dual benefit by also reducing the amount of nutrients reaching the water.

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. Efforts by local governments, communities, and the Partnership will seek to reduce trash through coordinated direct intervention and outreach efforts.

Growth - H-GAC forecasts growth of more than 94,000 households and 256,000 people in the watershed by 2040. This will bring additional bacteria sources (on-site sewage facilities, pets, etc.) and increased paved surfaces. With careful planning, the impacts of growth on future water quality can be mitigated.

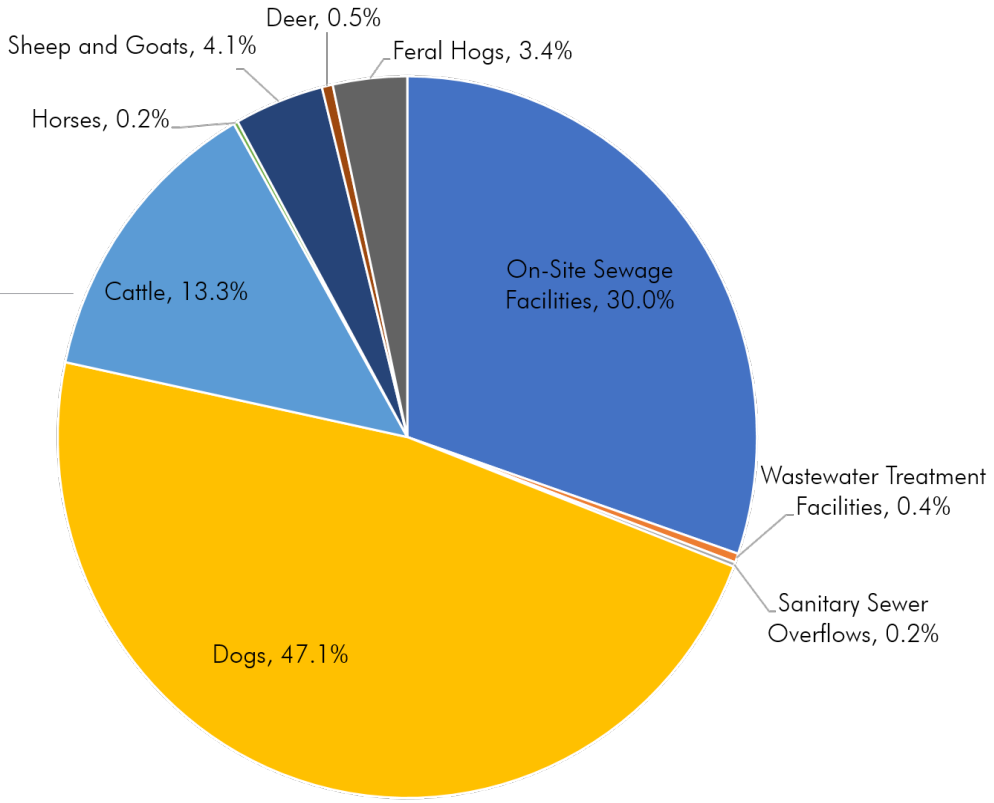
Sediment - Sediment in the waterways from erosion, development, and mining operations can have a significant impact on aquatic life, drinking water, and flooding. The Partnership seeks to coordinate its water quality goals with broader efforts to address the hydrologic issues of the West Fork.

BACTERIA SOURCES: CURRENT & FUTURE



2019 BACTERIA LEVELS

- On-Site Sewage Facilities, 23.1%
- Wastewater Treatment Facilities, 0.4%
- Sanitary Sewer Overflows, 0.2%
- Dogs, 33.7%
- Cattle, 26.4%
- Horses, 0.3%
- Sheep and Goats, 8.7%
- Deer, 0.9%
- Feral Hogs, 6.3%



2030 BACTERIA LEVELS (PROJECTED)

- On-Site Sewage Facilities, 30.0%
- Wastewater Treatment Facilities, 0.4%
- Sanitary Sewer Overflows, 0.2%
- Dogs, 47.1%
- Cattle, 13.3%
- Horses, 0.2%
- Sheep and Goats, 4.1%
- Deer, 0.5%
- Feral Hogs, 3.4%

TAKING ACTION

The West Fork and Lake Creek Watershed Protection Plan contains a toolbox of voluntary, feasible solutions to address fecal waste and other concerns in the watershed. TThe Partnership worked diligently to ensure that their recommendations are cost-effective, empower local decision-making, respect private property, seek to avoid unintended consequences, accent public education, and make good use of existing, proven programs and resources. The recommendations consider both current and future needs in their focus on five primary strategies for reducing sources of pollution and engaging the public.

Reduce Sources of Human Waste

Failing on-site sewage systems (septic and aerobic systems) and overflows or improperly treated waste from sewer systems are potential sources of fecal pathogens. The Watershed Protection Plan recommends converting some on-site sewage systems to sanitary sewer systems where feasible; remediating failing on-site sewage systems; improving operations of problem sewer plants; and addressing areas with chronic sewer overflows through direct rehabilitation and enhanced lift station backup systems. **Reduces: Bacteria & Nutrients**

Improve Stormwater Runoff

Water running off paved surfaces during rain events carries a piece of everything that happens on the land, especially in denser developed areas. The Watershed Protection Plan recommends conducting detailed investigation of urban drainage channels for illicit connections; installing storm sewer inlet markers; promoting the use of low impact development practices; emphasizing community forestry and buffer areas along waterways to slow and filter runoff; and increasing monitoring of illegal dump sites. **Reduces: Bacteria, Nutrients, Sediment & Trash**

Promote Agricultural Management Programs and Address Feral Hogs

While livestock and other agriculture can be sources of pollutants which can be mitigated by best management practices, well-run operations can greatly enhance the watershed. Feral hogs pose a growing threat to water quality and agricultural production in the watershed. The Watershed Protection Plan recommends promoting existing, voluntary landowner assistance programs from established agricultural agencies to enhance land management; encouraging voluntary conservation in riparian areas; and encouraging eradication programs and private hunting of feral hogs. **Reduces: Bacteria, Nutrients & Sediment**

Proper Disposal of Dog Waste

Waste from both pet and feral dogs is a substantial potential source of fecal bacteria in the watersheds. The Watershed Protection Plan recommends installing pet waste stations in local areas; expanding dog parks; and promoting spay and neuter events to reduce feral pet populations. **Reduces: Bacteria & Nutrients**

Coordinate and Educate

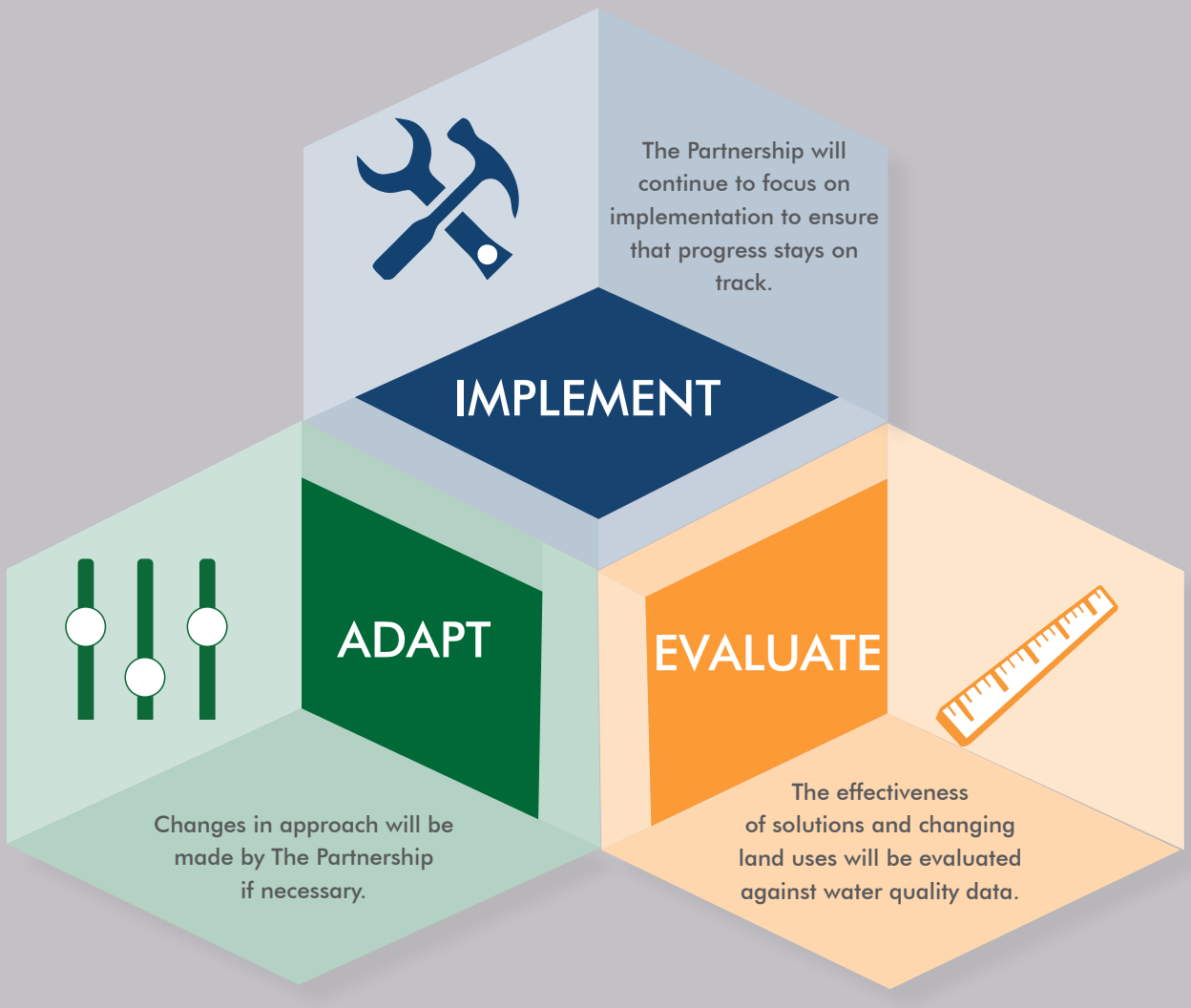
Underlying all of these efforts is the Watershed Protection Plan's focus on public education and outreach, and a continued need for coordination among local partners. The Watershed Protection Plan recommends ongoing facilitation by a watershed coordinator to support and enhance the efforts of local partners; implementing workshops and events; continuing to facilitate cooperation through the Partnership; and coordinating with other local efforts (flood mitigation, etc.) that affect the waterways.

IMPLEMENTATION

The West Fork and Lake Creek Watershed Protection Plan is designed to guide efforts into 2030. However, recommended actions in the plan will provide water quality benefits beyond that time frame.

The adaptive management process will allow the Partnership to make decisions on how to continue activities into the future as needed. The Partnership will meet annually to review progress and submit a formal revision to the Watershed Protection Plan at least once every four years.

ADAPTIVE MANAGEMENT PROCESS



Adaptive management is an iterative approach used to redirect and refocus resources during implementation activities to address emerging challenges and new opportunities as they become apparent (illustrated above).

TIMELINE

STRATEGIES FOR HUMAN WASTE

G, R	Convert on-site sewage facilities to sanitary sewer	2018-2030
G, R	Remediate failing on-site sewage facilities	2018-2030
G, C	Hold workshops and enhance on-site sewage facilities data	2019-2030
G	Improve problem sewer plants	2019-2025
G	Reduce sanitary sewer overflows	2018-2030
G	Enhance lift station backup capacity	2018-2025
G, C	Promote fats, oil, and grease awareness	2018-2030

STRATEGIES FOR PET WASTE

G, C, B	Install pet waste stations	2018-2025
G, B	Expand dog parks	2020-2030
G, C	Promote spay and neuter events	2018-2025

STRATEGIES FOR URBAN STORMWATER

G	Investigate drainage channels	2018-2020
G, C, R, B	Promote riparian buffers	2018-2030
G, C	Install stormwater inlet markers	2018-2025
G, B	Promote low impact development	2018-2030
G, R	Address illegal dumping hot spots	2018-2030
G, C, R, B	Promote urban forestry practices	2018-2030

STRATEGIES FOR AGRICULTURE AND FERAL HOG MANAGEMENT

G, R, B	Implement voluntary agricultural plans and technical assistance	2018-2030
R, B, C	Maintain or restore rural riparian buffers and forestry practices	2018-2030
R, G, B	Support efforts to remove feral hogs	2018-2030

COORDINATION AND EDUCATION

G, C, R, B	Continue to foster the Partnership	2018-2030
G, C, R, B	Support existing outreach programs in the watershed	2018-2030
G, C	Hold educational workshops and train volunteers	2018-2025
G, C, R, B	Hold trash clean up events	2018-2030
G, C	Provide model materials online	2018-2030

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

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.

MAKE A DIFFERENCE

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 native vegetation.
- ✓ Support water quality initiatives in your local government decision-making.

LOCAL GOVERNMENT

- ✓ 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 the Texas State Soil and Water Conservation Board, U.S. Department of Agriculture Natural Resources Conservation Service, 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.

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