EDUCATING COASTAL STAKEHOLDERS ON THE ROLE OF GREEN INFRASTRUCTURE

Contract Number 19-042-000-B076



FINAL REPORT
October 2018 – March 2020

Texas A&M AgriLife Extension Service

THIS PROJECT IS FUNDED BY A TEXAS COASTAL MANAGEMENT PROGRAM GRANT APPROVED BY THE TEXAS LAND COMMISSIONER PURSUANT TO NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION AWARD NO. NA18NOS4190153

Project Overview

Many waterways along the Texas Coast, especially in the Houston-Galveston region, are considered impaired by the State of Texas for low levels of dissolved, high levels of fecal bacteria, and excess nutrients. A primary cause of these impairments is stormwater runoff, which can lead to algae blooms, fish kills, oyster harvest bans, and beach closures. In response to this, the Texas Community Watershed Partners (TCWP) office of the Texas A&M AgriLife Extension Service (AgriLife) initiated Green Infrastructure for Texas (GIFT), a holistic approach to addressing current and emerging green infrastructure (GI) and surface water protection needs.

The GIFT program address stormwater at every scale – site to large ecosystem – and everything in between. At each scale we address three components 1) implementing on-the-ground demonstrations, 2) conducting research and 3) educating stakeholders through course, workshops, and publications. This contract allowed GIFT staff to focus on the third component, stakeholder education through a variety of activities.

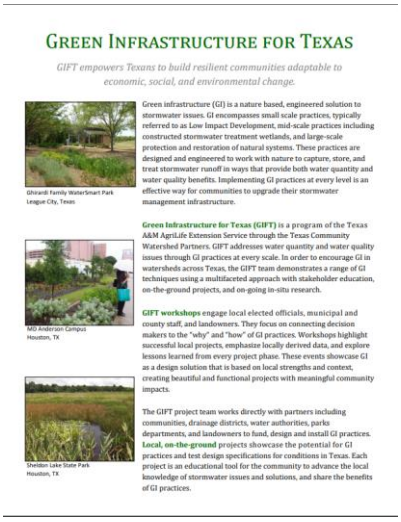
Green Infrastructure Outreach – Task 1

Through this contract, AgriLife staff created a number of long-lasting outreach materials including three factsheets, a short video for internet distribution, and a website with GI resources from Texas and across the United States.

Factsheets

Factsheets are short, informational pieces that were created for both digital and print usage. Each one addresses different aspects of GI and how it can be implemented. The first factsheet focuses on the GIFT program . The second factsheet focuses on GI case studies. The third factsheet focuses on how GI can be integrated with hazard mitigation planning, a hot topic that emerged after wide spread flooding occurred during Hurricane Harvey.

All three fact sheets are in Appendix 1.


GREEN INFRASTRUCTURE FOR TEXAS

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

Green infrastructure (GI) is a nature based, engineered solution to stormwater issues. GI encompasses small scale practices, typically referred to as Low Impact Development, mid-scale practices including constructed stormwater treatment wetlands, and large-scale protection and restoration of natural systems. These practices are designed and engineered to work with nature to capture, store, and treat stormwater runoff in ways that provide both water quantity and water quality benefits. Implementing GI practices at every level is an effective way for communities to upgrade their stormwater management infrastructure.

Ghirardi Family WaterSmart Park
League City, Texas

Green Infrastructure for Texas (GIFT) is a program of the Texas A&M AgriLife Extension Service through the Texas Community Watershed Partners. GIFT addresses water quantity and water quality issues through GI practices at every scale. In order to encourage GI in watersheds across Texas, the GIFT team demonstrates a range of GI techniques using a multifaceted approach with stakeholder education, on-the-ground projects, and on-going in-situ research.

MD Anderson Campus
Houston, TX

GIFT workshops engage local elected officials, municipal and county staff, and landowners. They focus on connecting decision makers to the "why" and "how" of GI practices. Workshops highlight successful local projects, emphasize locally derived data, and explore lessons learned from every project phase. These events showcase GI as a design solution that is based on local strengths and context, creating beautiful and functional projects with meaningful community impacts.

Sheldon Lake State Park
Houston, TX

The GIFT project team works directly with partners including communities, drainage districts, water authorities, parks departments, and landowners to fund, design and install GI practices. **Local, on-the-ground** projects showcase the potential for GI practices and test design specifications for conditions in Texas. Each project is an educational tool for the community to advance the local knowledge of stormwater issues and solutions, and share the benefits of GI practices.


GREEN INFRASTRUCTURE

…. harnessing nature's processes for flood resilient communities

TEXAS A&M AGRILIFE EXTENSION

Green infrastructure (GI) is an approach to managing stormwater and mitigating flooding to build a community's resilience. The solutions include protecting natural areas or integrating green with concrete gray infrastructure that provide services like storing stormwater runoff.

Stormwater is often viewed as a nuisance. Traditionally, managing flood volume has been separate from treating water quality[1]. GI practices can address both. For example, undeveloped areas with native vegetation can trap and slow runoff, allowing it to seep into the soil where heavy metals and excess nutrients are removed. Having more impervious surfaces like this protects our communities from flooding while improving water quality.

GI can be used as an innovative tool to offset the runoff from developed areas, while offering benefits for all—beyond just water management. Solutions may center on managing flood water but projects offer many other benefits including opportunity for recreation and healthier lifestyles, higher property values, improved aesthetics, habitat for wildlife. Integrating GI within our communities can enhance our way of life.

TYPES OF GREEN INFRASTRUCTURE

GI can be protected where it currently exists, constructed where it is lacking, or retrofitted into the gray infrastructure system. No matter the budget or size of a site, there are GI solutions for every type of project.

Preservation, Restoration, Conservation……

In its simplest form, GI is preserving existing natural areas and open spaces. These methods identify the most ecologically valuable areas and help to maintain and restore their productivity.

◊ Restoring two acres of native prairie where a 500 acre expanse once existed. These small pockets of prairies support important pollinators, offset urban heat island effects, and provide flood water detention.

◊ Removing a dam to restore historic stream flows and habitat for native fishes. The banks are re-vegetated with native plants to reduce erosion and are maintained by removing invasive species.

◊ Defending against coastal storm surge by conserving natural sand dunes. Public access is limited to narrow foot paths to protect the fragile habitat. Native vegetation helps trap sand and regenerate the dunes while still providing opportunity for recreation and ecotourism.

Constructed, Reconstructed, Retrofitting……

Alternately, GI can be engineered to mimic natural processes to manage stormwater. These practices integrate natural features within developed areas using new GI construction or by reconstructing current infrastructure to include GI.

◊ Installing a native plant rain garden in a street median to capture runoff, improve water quality and beautify the neighborhood.

◊ Designing a network of parks and green corridors to collect and clean stormwater runoff, facilitate movement of the community along porous pavement walking trails, and offer education about stormwater management.

◊ Developing conservation subdivisions with smaller property lots that are grouped together, leaving 50% of the neighborhood undeveloped as public green space.

South Padre Island, TX

[1] National Parks and Recreation Association. Green Infrastructure and Health Policy Scan Summary.

Ver 11/2019


GREEN INFRASTRUCTURE

A Strategy for Flood Risk Mitigation in Coastal Communities

TEXAS A&M AGRILIFE EXTENSION

What is Green Infrastructure?

Green infrastructure (GI) is a nature-based approach to water management that uses engineered natural solutions in conjunction with gray infrastructure (culverts, pipes, detention basins). Practices such as rain gardens, stormwater wetlands, and bioswales hold rainwater for a set period of time, allowing for infiltration and pollutant removal. This holding period also decreases the volume of water moving downstream during the storm. Water then slowly drains over time, so the system is emptied before the next rainfall.

Green infrastructure practices offer the same benefits as gray infrastructure, plus more. These include:

- Flood reduction
- Water quality improvement
- Improved aesthetics
- Improved air quality
- Public safety
- Habitat for wildlife
- Property loss prevention
- Recreational opportunities
- Carbon sequestration

How is GI Flood Hazard Mitigation?

Flood hazard mitigation aims to reduce or eliminate the long-term risk associated with flooding. Green infrastructure projects are a localized, pre-disaster management practice that hold floodwater, lessening the severity of flooding for the contributing watershed.[1] GI practices, like any infrastructure, are designed to hold a specific amount of rainfall. Each community determines what design storm they plan for and build their infrastructure to mitigate. Once the design storm for infrastructure (gray or green) is surpassed, then flooding is likely.

Types of Green Infrastructure

Site scale – rain gardens, bioswales, rain water harvesting, pervious pavement, tree filter boxes, green roofs

Community scale – constructed stormwater wetlands, conservation neighborhoods, green streets

Landscape scale – open space preservation, habitat restoration, conservation easements

Why include GI in a Hazard Mitigation Plan?

Green infrastructure is a proven solution with multiple benefits. GI is based on natural practices, however, over the last century, advances in technology have moved communities to embrace gray infrastructure. But gray infrastructure is not working. Especially in rapidly developing areas, we are seeing more and more localized flooding due to the increase in impervious surface cover.[2] Integrating GI practices like stormwater wetlands with existing gray infrastructure is an economically viable solution.

When assessing the cost-benefit of a project, GI offers many more benefits than gray infrastructure, despite a similar cost of installation. The long-term benefits of GI exceed those of gray infrastructure projects. Hazard mitigation grants are available both pre- and post-disaster which can fund actions identified through the planning process, including GI. Addition local funds can be dedicated if GI is part of a community's Capital Improvement Plan. Also, if required for new development, then the cost of installing for on the ground practices falls on the developer, not the tax payer.

September 2019 | August 2017

Exploration Green constructed stormwater wetland (Clear Lake, TX) on a typical day (left) and during Hurricane Harvey flooding in 2017 (right).

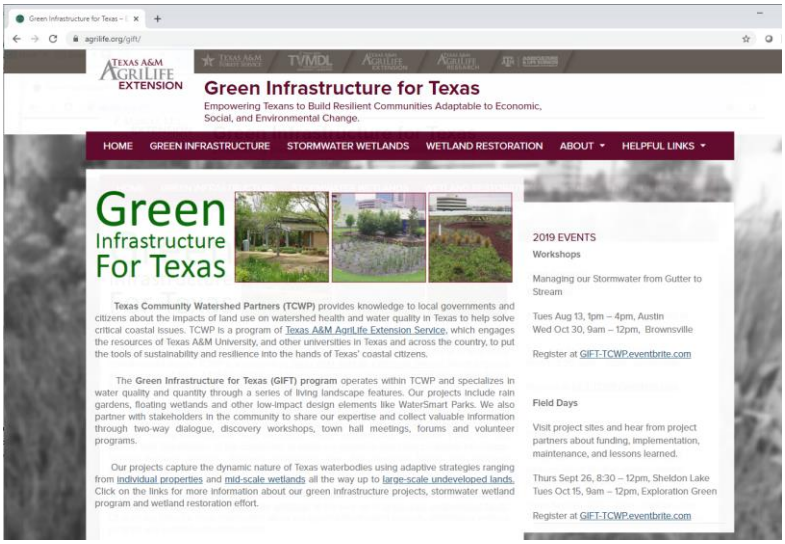
Video

A six-minute web video was created featuring three GI projects in the Houston area as case studies for coastal GI: Ghirardi Family WaterSmart Park, Sheldon Lake State Park freshwater restoration project, and Exploration Green. Each case study discusses the practices used and the benefits of using GI in each situation. For example, the Exploration Green stormwater wetland converted a condemned golf course into much needed detention that includes wetland features, thus protecting homes from flooding and improving water quality. The site also serves are recreational space with hike and bike trails. This video is intended to be shared with elected officials, decision makers, and landowners who can benefit from implanting GI practices.

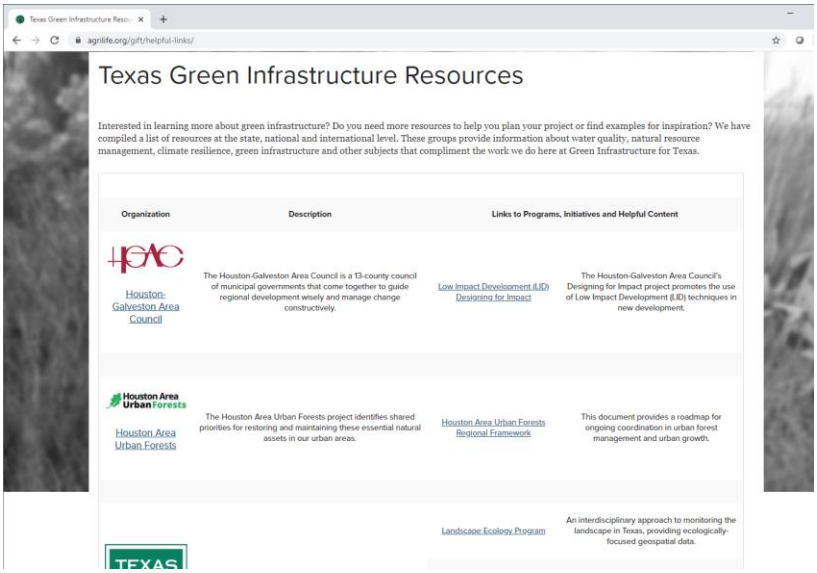
The video is available at Agrilife.org/GIFT.

Website

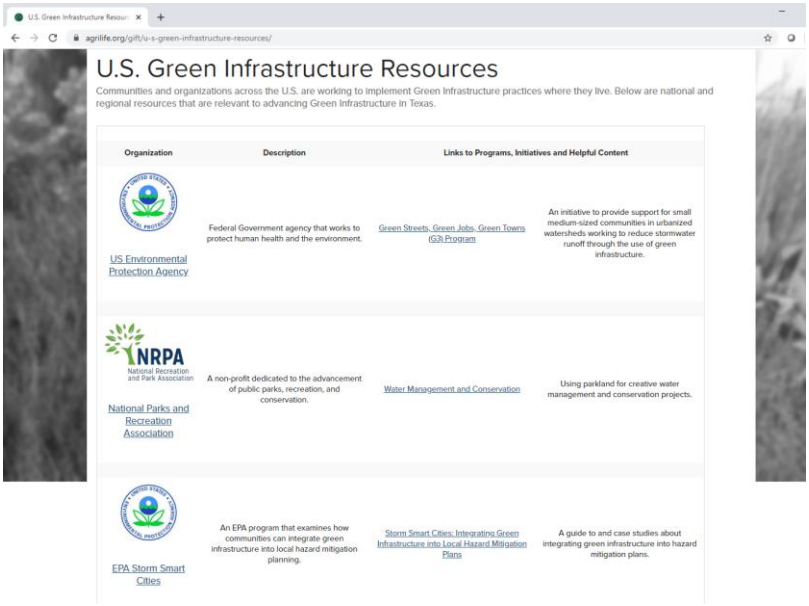
The GIFT program website (Agrilife.org/GIFT) was updated to contain the resources mentioned above and this AgriLife hosted site will continue after the end of this project, allowing these resources to be continuously available for reference and distribution. A new resource library was also compiled which contains links to GI resources from entities in Texas and across the United States. There is an extensive and growing wealth of information available on line about GI, however it can difficult to find. For example, both the National Parks and Recreation Association and the Georgetown Climate Center have broadly applicable information on stormwater management using GI, however a city employee or elected official would not intuitively know to search for in information from these organizations. Our intent is to make these resources more widely available so Texas Coastal communities can have the best information possible to inform their GI decisions.



Texas Green Infrastructure Resources



U.S. Green Infrastructure Resources



GIFT Workshops – Task 2

The GIFT program held two in person workshops as part of this contract, one in Pearland and one in Brownsville. These workshops were part of a larger programmatic effort to hold six workshops across Texas during 2019. Each workshops was held in partnership with a local entity and was three hours long, featuring four speakers, three from the GIFT team and one from a local partner. The GIFT team presentations were the same at both workshops, but the local speaker presented on a topic of their choosing related to GI.

Pearland

Held on June 12, 2019 in partnership with the City of Pearland and the Houston-Galveston Area Council (HGAC) at the Delores Fenwick Nature Center. Steven Johnston with HGAC was the local speaker who discussed a project with the City of Pearland to create draft GI maintenance agreements, checklists, and schedules (http://www.h-gac.com/low-impact-development/toolbox.aspx). Thirty-eight individuals attended the workshop and based on exit surveys, 95% of attendees were completely or mostly satisfied with the workshops; 86% of respondents intended to take action or make a change based on information they received at this workshop.

The workshop flyer and agenda are in Appendix 2.

Christie Taylor, AgriLife Extension, presents on constructed stormwater wetlands

Dr. John Jacob, AgriLife Extension, presents on landscape scale GI

Brownsville

Held on October 30, 2019 in partnership with the City of Brownsville at the Brownsville METRO building. David Licon with the City of Brownsville Engineering Department was the local speaker who discussed a GI projects planned for the City. Thirty-four individuals attended the workshop and based on exit surveys, 100% of attendees were completely or mostly satisfied with the workshops; 77% of respondents intended to take action or make a change based on information they received at this workshop.

The workshop flyer and agenda are in Appendix 2.

David Licon, City of Brownsville, presents at the workshop

Brownsville workshop attendees

GIFT Field Days – Task 3

The GIFT program held three Field Days in the Houston area as part of this contract, two at the Exploration Green constructed stormwater wetland in Clear Lake and one at the Ghirardi Family WaterSmart Park in League City. These half day events offered attendees the opportunity to see GI practices first hand to better understand how they function, and to envision how GI can work in their community.

Exploration Green

Two Field Days were held at Exploration Green, one on June 13, 2019 and one on October 15, 2019. Each event featured brief presentations at the by AgriLife Extension staff and Exploration Green Conservancy Board members at the Clear Lake City Community Association building, then a tour of Exploration Green Phase 1 (completed in 2018) and Phase 4 (construction has not yet began). Visiting both Phases of the project allowing attendees to see a before and after to better understand the transformation that occurred.

Field Day flyer and agenda in Appendix 3.

Field Day attendees (June 2019)

Dr. Fouad Jaber, AgriLife Extension, points out wetland features in Phase 1 (June 2019)

Frank Weary, Exploration Green Conservancy, shows attendees Phase 4 of the project where construction has not yet begun. (October 2019)

Christie Taylor, AgriLife Extension, discusses wetland plantings in Phase 1. (October 2019)

Ghirardi Family WaterSmart Park

A Field Day was held at the Ghirardi Family WaterSmart Park on June 25, 2019. Attendance was lower than expected due to rain. The decision was made to hold the event rain or shine due to the fact that GI practices function to capture and treat rainwater, therefore seeing them in the rain is actually the best

way to see them in action. Attendees who braved the weather left with a better understanding of what GI looks like in action.

Field Day flyer and agenda in Appendix 3.

Learning about the Ghirardi Family WaterSmart Park GI practices in the rain

Water flowing from the parking lot through a curb cut into a rain garden, one of the GI practices in action during the field day

Appendix 1 – Green Infrastructure Fact Sheets

Green Infrastructure for Texas

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League City, Texas

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As part of the Texas A&M University System, **research** is an essential component of the GIFT package. Studies from around the world document the ability of GI practices to improve water quality in a variety of soil types and climates. However, home-grown Texas data speaks to local elected officials, and helps them convey the value of GI projects as they advocate for these solutions in their towns.

The next step for GIFT is the addition of participatory stakeholder engagement through interactive technology to provide greater understanding of the multi-level benefits of GI and improve ownership of stormwater solutions. Complex issues are examined though stakeholder discussions around a powerful visualization tool that allows users to explore siting of GI practices in their community, the impacts on water quality and quantity, and the associated costs. This tool is important because it not only computes local data, but also sparks real discussions and empowers communities to envision broad-scale implementation of green infrastructure practices.

The GIFT Team

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Learn more at agrilife.org/GIFT

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GREEN INFRASTRUCTURE

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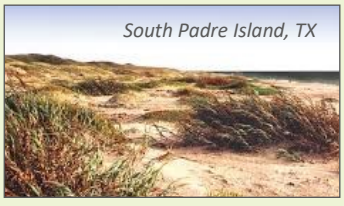

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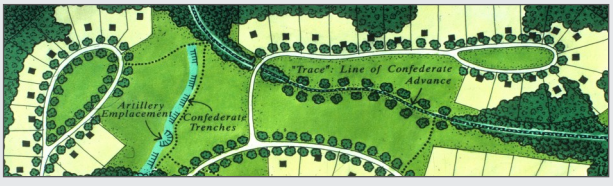


[1] National Parks and Recreation Association. Green Infrastructure and Health Policy Scan Summary.

GREEN INFRASTRUCTURE ACROSS TEXAS

… harnessing nature's processes for flood resilient communities

PRESERVATION, CONSERVATION, RESTORATION

A Network of Open Space in El Paso

With a comprehensive Open Space Plan, El Paso is working to become a "city in unique harmony with its natural setting." The City envisions a network of parks and natural areas connected by trails that follow the arroyos and drainage features. The plan emphasizes balancing development with preservation. The community's input reflected their pride in protecting El Paso's rugged, native habitats and how these areas improve the overall quality of life.

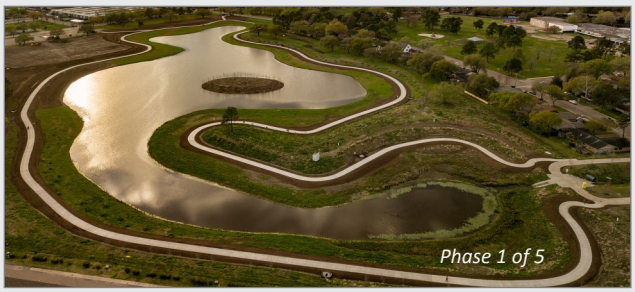
San Antonio Pays to Protect Distant Lands

Residents of San Antonio rely heavily on the Edwards Aquifer laying beneath their city for drinking water. The aquifer, however, relies on clean water runoff from areas located well outside the city. If contaminated, the feasibility and cost of clean up would be near impossible. To protect this irreplaceable resource, the people of San Antonio pay a higher sales tax to fund preservation of distant lands laying above the contributing and recharge zones.

CONSTRUCTED, RECONSTRUCTED, RETROFITTED

From Golf Course to Flood Control

Once a former golf course, Exploration Green is becoming a complex of five stormwater wetlands serving the community with flood mitigation and outstanding recreational amenities. The constructed wetlands not only slow stormwater but also remove pollutants and beautify the public green space. The timeline for completion was expedited after the park's value was demonstrated during the record-breaking Hurricane Harvey of 2017.



GI on the Streets in Deep Ellum, Dallas

The Elm Street Streetscape project widened sidewalks and narrowed streets to increase pedestrian safety. Integrated GI has beautified the area and improved the public realm experience.

GI practices included permeable pavements, bioretention and infiltration and rain gardens using native and adapted species. The significant increase of vegetation in a previously hardscaped area also improves air quality in this heavily congested area.

Green Infrastructure for Texas | AgriLife.org/GIFT

Texas Community Watershed Partners | Houston, Texas
Texas A&M AgriLife Extension | Authored by Colleen Ulibarri, Kareem Heshmat & Charriss York

Publication funded by a Texas Coastal Management Grant approved by the Texas Land Commissioner pursuant to National Oceanic and Atmospheric Administration Award No. NA18NOS4190153

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GREEN INFRASTRUCTURE

Texas A&M AgriLife Extension

A Strategy for Flood Risk Mitigation in Coastal Communities

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How is GI Flood Hazard Mitigation?

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Types of Green Infrastructure

Site scale – rain gardens, bioswales, rain water harvesting, pervious pavement, tree filter boxes, green roofs

Community scale – constructed stormwater wetlands, conservation neighborhoods, green streets

Landscape scale – open space preservation, habitat restoration, conservation easements

Why include GI in a Hazard Mitigation Plan?

Green infrastructure is a proven solution with multiple benefits. GI is based on natural practices, however, over the last century, advances in technology have moved communities to embrace gray infrastructure. But gray infrastructure is not working. Especially in rapidly developing areas, we are seeing more and more localized flooding due to the increase in impervious surface cover.[2] Integrating GI practices, like stormwater wetlands, with existing gray infrastructure is an economically viable solution.

Exploration Green constructed stormwater wetland (Clear Lake, TX) on a typical day (left) and during Hurricane Harvey flooding in 2017 (right).

When assessing the cost-benefit of a project, GI offers many more benefits than gray infrastructure, despite a similar cost of installation. The long-term benefits of GI exceed those of gray infrastructure projects. Hazard mitigation grants are available both pre- and post-disaster which can fund actions identified through the planning process, including GI. Additional local funds can be dedicated if GI is part of a community's Capital Improvement Plan. Also, if required for new development, then the cost of installation for on the ground practices falls on the developer, not the tax payer.

How can GI fit into a Hazard Mitigation Action Plan?

The Hazard Mitigation Action Planning (HMAP) process is directed by guidance from the Federal Emergency Management Agency (FEMA), and the Texas Division of Emergency Management (TDEM). The planning process is intended to be stakeholder inclusive and to integrate recommendations from existing local and regional plans such as Comprehensive Plans, Capital Improvement Plans, Drainage Plans, and Economic Development Plans into the HMAP.

Potential hazards must be locally identified and ranked, then appropriate mitigation strategies determined. After the HMAP has been approved, competitive grants are available through FEMA's Hazard Mitigation Grant Program (HMGP). FEMA has identified four types of mitigation strategies:

1. Local plans and regulations
2. Structure and infrastructure projects
3. Natural systems protection
4. Education and awareness programs

An identified problem statement such as *localized roadway flooding impacts multiple neighborhoods in the community, stopping traffic and preventing access by emergency vehicles several times a year, flooding continues to worsen with increasing development pressure,* could lead to the mitigation actions in the table below.

Mitigation type [3]	Description[3]	GI example	Potential Actions
Local plans and regulations	Actions include government authority, policies, or codes.	• Green Infrastructure Plan • Stormwater Management Plan • Make GI practices part of the development code	Adopt a stormwater ordinance that requires or encourages green infrastructures to manage stormwater volumes to reduce flooding and to mitigate risk to life and property.
Structure and infrastructure projects	Projects to construct manmade structures to reduce the impact of hazards.	• Constructed stormwater wetlands • Bioswales • Rain gardens • Tree filter boxes	Reconstruct neighborhood storm drain systems and upgrade to include GI practices (rain gardens, constructed wetland, etc.) where feasible.
Natural systems protection	Actions that minimize damage and losses and also preserve or restore the function of natural systems.	• Conservation easements • Wetland restoration • Forest management	Identify large tracts of land in and upstream from the hazard areas for acquisition and protection to preserve ecosystem services including floodwater holding capability.
Education and awareness programs	Actions that inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them.	• Websites with maps and information • Presentations to school groups and neighborhood organizations • Mailings to residents in hazard-prone areas	Develop materials and implement a program to educate property owners about green infrastructure options and allowable uses in the community based on existing or proposed codes and ordinances.

[1] EPA Storm Smart Cities: Integrating Green Infrastructure into Local Hazard Mitigation Plans
[2] Tyler, J. 2016. Sustainable Hazard Mitigation: Exploring the Importance of Green Infrastructure in Building Disaster Resilient Communities. The Journal of Sustainable Development Vol 15, Iss. 1, pp.134-145
[3] FEMA Local Mitigation Planning Handbook

TEXAS A&M AGRILIFE EXTENSION

Green Infrastructure for Texas | AgriLife.org/GIFT
Texas Community Watershed Partners | Houston, Texas
Disaster Assessment and Recovery Program
Authored by Charriss York

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Appendix 2 – Workshop Flyers and Agendas

Managing Our Stormwater

From Gutter to Stream


Ghirardi Family WaterSmart Park
League City


Exploration Green Stormwater Wetland
Clear Lake City


Wetland Restoration
Sheldon Lake State Park

Attend a **free half-day workshop** to find out more about nature based techniques to clean and conserve stormwater for people and wildlife at any scale: backyard to urban/suburban/industrial to regional.

Local elected officials, municipal representatives, county staff, landowners, and facilities managers will benefit from attending. Speakers will focus on the ***why*** and ***how*** of green infrastructure practices.

Topics

Collecting and cleansing stormwater at home and in the local neighborhood

Using wetlands in flood control basins to enhance water quality and wildlife

Protecting and restoring large-scale wetlands and natural areas for flood control and water quality benefits

Workshops in 2019

- **March 22, 9am-noon, Corpus Christi**
- **April 9, 9am-noon, Arlington**
- **April 16, 9am-noon, Beaumont**
- **June 12, 1pm–4pm, Pearland**

Register at GIFT-TCWP.eventbrite.com

There is no cost to attend these workshops, but space is limited. *Registration is required.*
For more information: cyork@tamu.edu.

TEXAS A&M AGRILIFE EXTENSION

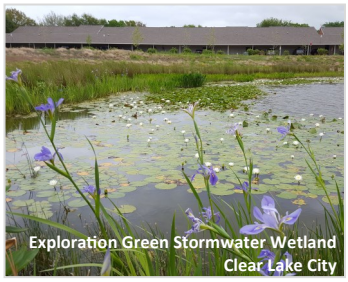
Empowering Texans to Build Resilient Communities Adaptable to Economic, Social, and Environmental Change. ~ Find us online at agrilife.org/GIFT.

These events are funded in part by a Texas Coastal Management Program Grant approved by the Texas Land Commissioner pursuant to National Oceanic and Atmospheric Administration Award No. NA18NOS4190153.

Managing Our Stormwater

From Gutter to Stream


Ghirardi Family WaterSmart Park
League City


Exploration Green Stormwater Wetland
Clear Lake City


Wetland Restoration
Sheldon Lake State Park

Attend a **free half-day workshop** to learn more about nature-based techniques to clean and conserve storm-water for people and wildlife at any scale: backyard to urban-suburban-industrial landscapes to regional.

Local elected officials, municipal representatives, county staff, facilities managers and landowners will benefit from attending. Speakers will focus on the **why and how** of green infrastructure practices.

Topics

Collecting and cleansing stormwater at home and in the local neighborhood

Using wetlands in flood control basins to enhance water quality and wildlife habitat

Protecting and restoring large-scale wetlands and natural areas for flood mitigation and water quality benefits

October 30, 2019
9:00 am - 12:00 pm

Brownsville METRO (La Plaza)
755 International Blvd
2nd Floor, Community Room
Brownsville, TX 78520

Register at GIFT-TCWP.eventbrite.com

Registration is required. There is no cost to attend, but space is limited.
For more information contact Colleen, culibarri@tamu.edu

Empowering Texans to Build Resilient Communities Adaptable to Economic, Social, and Environmental Change ~ Find out more at AgriLife.org/GIFT

These events are funded in part by a Texas Coastal Management Program Grant approved by the Texas Land Commissioner pursuant to National Oceanic and Atmospheric Administration Award No. NA18NOS4190153.

Notes

Managing Our Stormwater

From Gutter to Stream

October 30, 2019
9am - Noon

A workshop on natural techniques to clean and conserve stormwater for humans and wildlife, at any scale.

Brownsville METRO
2nd Floor Community Room
755 International Blvd
Brownsville, TX 78520

Texas A&M AgriLife Extension

City of Brownsville, Texas — On the Border, By the Sea

Texas Community Watershed Partners

National Oceanic and Atmospheric Administration — U.S. Department of Commerce — NOAA

Texas Coastal Management Program

Texas General Land Office — Established 1836

Agenda

8:45am	Registration
9:00 - 9:10	Welcome
9:10 - 10:10	**Charriss York** on capturing and cleansing stormwater runoff at homes, businesses and in the neighborhood.
10:10 - 10:30	**David Licon** on City of Brownsville stormwater projects.
10:30 - 10:45	Break
10:45 - 11:25	**Christie Taylor** on changing the way we design flood control basins, using stormwater wetlands.
11:25 - 11:55	**Colleen Ulibarri** on large scale protection and restoration of natural areas to promote water quality benefits.
11:55am	Concluding Remarks

Wetland Restoration
Sheldon Lake State Park

Speaker Contacts

Green Infrastructure for Texas (GIFT)

GIFT.tamu.edu

Charriss York, cyork@tamu.edu
Green Stormwater Infrastructure
Texas A&M AgriLife Extension Program Specialist

Christie Taylor, cctaylor@tamu.edu
Stormwater Wetlands
Texas A&M AgriLife Extension Program Specialist

Colleen Ulibarri, culibarri@tamu.edu
Ecological Restoration
Texas A&M AgriLife, Program Coordinator

City of Brownsville

www.cob.us

David Licon, Jr., david.licon@cob.us
Engineer
City of Brownsville Engineering Department

Notes

Appendix 3 – Field Day Flyers and Agendas

Green Infrastructure Field Days

Register at GIFT-TCWP.eventbrite.com

Join us for a brief classroom session followed by time in the field to see green infrastructure practices first hand. Help your organization take the next step in installing green infrastructure practices to manage stormwater.

Hear from project partners about funding, implementation, maintenance, and lessons learned.

Local elected officials, municipal representatives, county staff, landowners, school districts, not for profit organizations, and facilities mangers will all benefit from attending.

Exploration Green!

Thursday, June 13, 9:00 am—noon

Clear Lake City, TX

This 200 acre suburban detention facility includes 40 acres of constructed wetlands; and merges flood control and water quality improvement into public green space along with walking trails and amenities.

Ghirardi Family WaterSmart Park

Tuesday, June 25, 8:30am—11:00am

League City, TX

This 3.75 acre municipal park features site scale practices including rain gardens, swales, rain water harvesting, and pervious pavement installations.

Sheldon Lake State Park

Thursday, September 26, 9:00 am—noon

Houston, TX

This wetland restoration project returned over 400 acres of fallow farmland to its pre-development state of freshwater prairie-wetland using historic aerial photos to locate and re-excavate wetland basins that were converted to agriculture.

There is **no cost** to attend these workshops, but space is limited. ***Registration is required.***

For more information: cyork@tamu.edu.

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Sheldon Lake State Park

Thursday, September 26, 8:30am—noon

Houston, TX

This wetland restoration project returned over 400 acres of fallow farmland to its pre-development state of freshwater prairie-wetland using historic aerial photos to locate and re-excavate wetland basins that were converted to agriculture.

Exploration Green

Tuesday, October 15, 9:00am—noon

Clear Lake City, TX

This 200 acre suburban detention facility includes 40 acres of constructed wetlands; and merges flood control and water quality improvements into public green space along with walking trails and amenities.

There is no cost to attend these Filed Days, but space is limited. *Registration is required.*

For more information: cyork@tamu.edu

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Exploration Green Field Day

October 15, 2019

- Welcome
- Christie Taylor, Texas A&M AgriLife Extension Service
- Frank Weary, Exploration Green Conservancy
- Visit to Exploration Green

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