

FISCAL 2025 WORK PLAN SECTION 320 GALVESTON BAY ESTUARY PROGRAM

Revision 3.0

United States Environmental Protection Agency#CE-00655008

Texas Commission of Environmental Quality Grant #332023



A PROGRAM OF TCEQ

Texas Commission on Environmental Quality

P.O. Box 13087, Austin, Texas 78711-3087

May 2024

TABLE OF CONTENTS

FISCAL 2025 WORK PLAN	i
TABLE OF CONTENTS	ii
LIST OF ABBREVIATIONS	iii
SECTION 1: PROGRAM OVERVIEW	3
SECTION 2: INTRODUCTION	5
SECTION 2.1: ORGANIZATIONAL STRUCTURE	6
SECTION 2.2: GOALS AND ACCOMPLISHMENTS SINCE FISCAL 2024 WORK PLAN SUBMISSION	12
SECTION 2.3: STRATEGIC ACTION PLAN GOALS TO FOCUS ON IN FISCAL 2025	19
SECTION 3: FISCAL 2025 PROJECTS	24
SECTION 3.1: FISCAL 2025 PROJECTS – SUMMARY	24
SECTION 3.2: FISCAL 2025 PROJECTS – DETAIL	25
SECTION 3.3: FISCAL 2025 GRANT BUDGET SPREADSHEETS	33
SECTION 4: ONGOING PROJECTS	35
SECTION 4.1: ONGOING FEDERAL PROJECTS – SUMMARY	35
SECTION 4.2: ONGOING FEDERAL PROJECTS – DETAIL	38
SECTION 5: COMPLETED PROJECTS	60
SECTION 5.1: PROJECTS COMPLETED SINCE FISCAL 2024 WORK PLAN SUBMISSION – SUMMARY	60
SECTION 5.2: PROJECTS COMPLETED SINCE FISCAL 2024 WORK PLAN SUBMISSION – DETAIL	61

LIST OF FIGURES AND TABLES

Figure 1. Trash Bash® 2023 at Brays Bayou	34
Figure 2. Coastal Prairie at the Coastal Heritage Preserve	13
Table 1. Abbreviations List	iii
Table 2. Fiscal 2024 Leveraging	8
Table 3. Fiscal 2024 Travel and Tech Transfer	8
Table 4. Fiscal 2025 Funding and FTE Summary	23
Table 5. Fiscal 2025 Budget Detail	23
Table 6. Fiscal 2025 Federal Projects	24
Table 7. Fiscal 2025 Grant Budget Totals	33
Table 8. Fiscal 2025 Grant Budget by Category - Detail	34
Table 9. Ongoing Federal Projects - Summary	35
Table 10. Projects Completed Since Fiscal 2024 Work Plan Submission - Summary	60

LIST OF ABBREVIATIONS

Table 1. Abbreviations List

Name	Abbreviation
6 P-Phenylenediamine	6PPD
6 P-Phenylenediamine-Quinone	6PPD-Q
Access to Galveston Bay Ecosystem Information (Action Plan)	ACS
Assessment Unit	AU
Autonomous Recording Units	ARUs
Bacteria Implementation Group	BIG
Bayou Preservation Association	BPA
Best Management Practices	BMPs
Biological and Agricultural Engineering	BAEN
Black, Indigenous, and Other People of Color	BIPOC
Comprehensive Conservation and Management Plan	CCMP
Conservation Assistance Program	CAP
Deer Park Prairie	DPP
Dissolved Oxygen	DO
Erosion Control Structures	ECS
Environmental Institute of Houston	EIH
Forward Looking Infrared	FLIR
Fiscal Year	FY
Freshwater Inflows (Action Plan)	FWI
Full-time Equivalent	FTE
Galveston Bay Coalition of Watersheds	Coalition
Galveston Bay Council	GBC
Galveston Bay Estuary Program	GBEP
Galveston Bay Estuary System	GBES
Galveston Bay Foundation	GBF
Galveston Bay Plan	GBP
<i>Galveston Bay Plan, 2nd Edition</i>	<i>GBP, 2nd Edition</i>
Galveston Bay Public Awareness and Education Campaign	Back the Bay
Galveston Bay Report Card	GBRC
Geographic Information System	GIS
Green Infrastructure	GI
Green Stormwater Infrastructure	GSI
Gulf of Mexico Alliance	GOMA
Habitat Conservation (Action Plan)	HC

Name	Abbreviation
Houston Advanced Research Center-GeoTechnology Research Institute	HARC/GTRI
Houston Community College	HCC
Houston-Galveston Area Council	H-GAC
City of Houston Parks and Recreation Department	HPARD
Harris County Department of Education	HCDE
Implementation Tracking Viewer	ITV
Monitoring and Research (Subcommittee)	M&R
Monitoring and Research (Action Plan)	RES
National Estuary Program	NEP
Natural Resource Uses (Subcommittee)	NRU
Native Prairies Association of Texas	NPAT
Nonpoint Source	NPS
Number (Amendment)	No.
On-Site Sewage Facilities	OSSFs
Pharmaceutical and Personal Care Products	PPCPs
Point Source (Action Plan)	PS
Per- and Polyfluoroalkyl Substances	PFAS
Perfluorooctanesulfonic Acid	PFOS
Public Education and Awareness (Action Plan)	PEA
Public Health and Awareness (Action Plan)	PHA
Public Participation and Education (Subcommittee)	PPE
Quality Assurance	QA
Quality Assurance Project Plan	QAPP
Regional Monitoring Database	RMD
River, Lakes, Bays N' Bayous Trash Bash®	Trash Bash®
Science, Technology, Engineering, and Mathematics	STEM
Species Conservation (Action Plan)	SC
Soil Crop Sciences	SCSC
Spatial Resource Hub	SRH
Square Miles	SM
Stakeholder and Partner Outreach (Action Plan)	SPO
Student Conservation Association	SCA
Texas A&M AgriLife Extension Service	Texas AgriLife
Texas A&M University	TAMU
Texas A&M University at Galveston	TAMUG
Texas Commission on Environmental Quality	TCEQ
Texas Estuarine Resource Network	TERN

Name	Abbreviation
Texas Parks and Wildlife Department	TPWD
Texas Water Resources Institute	TWRI
To be determined	TBD
Total Maximum Daily Load	TMDL
Turtle Island Restoration Network	TIRN
Toxic Release Inventory	TRI
United States Environmental Protection Agency	EPA
United States Fish and Wildlife Service	USFWS
United States Geological Survey	USGS
University of Houston	UH
University of Houston-Clear Lake	UHCL
Water and Sediment Quality (Subcommittee)	WSQ
Watershed-based Plan	WBP
Watershed Protection Plan	WPP

SECTION 1: PROGRAM OVERVIEW

The initial application of grant #CE-00655008 was for three years of time and one year of funding with the intent to request another year of time and funding each year for the next two years and extend the grant term to five years total through 8/31/2027. The fiscal 2025 Work Plan (Revision 3.0) is the third request for funding for this grant. The Texas Commission on Environmental Quality (TCEQ) has found this method is most effective for successful operation and coordination of the Galveston Bay Estuary Program (GBEP).

Galveston Bay is the largest and one of the most productive estuaries in Texas. It sits adjacent to one of the most heavily industrialized areas in the nation. The GBEP service area encompasses 5,000 square miles and 232 miles of estuarine shoreline along the upper Texas Coast and incorporates the five-county area bordering Galveston Bay: Liberty, Chambers, Harris, Galveston, and Brazoria counties.

GBEP was established in 1989 to provide comprehensive management of this vital resource. In 1990, GBEP began working with a diverse group of stakeholders to develop a comprehensive plan that would receive broad-based support from, and involvement by, federal and state agencies with jurisdiction in Galveston Bay, industries and businesses, local government officials, commercial and recreational fisherman, conservation organizations, and citizens. In 1994, the Galveston Bay Plan (GBP), the comprehensive conservation and management plan (CCMP), was completed, and in 1995, it was approved by the governor of Texas and the United States Environmental Protection Agency (EPA) administrator. The initial effort was jointly funded by EPA, the Texas General Land Office, and TCEQ. *The Galveston Bay Plan, 2nd Edition (GBP, 2nd Edition)* was approved by TCEQ in March 2019 and by EPA in September 2021.

The GBP identified 82 action items to protect and restore the health and productivity of the estuary while supporting continued economic growth and public use of Galveston Bay. GBEP received a grant from EPA to begin implementing the GBP in 1995. This grant ran from fiscal 1995–1999 and is now closed.

Subsequent grants have run from fiscal 2000–2003, 2004–2007, 2008–2010, 2011–2013, 2014–2016, and 2017–2019. Grant #CE-00655007 (fiscal 2020–2022) is open but is no longer receiving funding allocations. Over 200 implementation projects have been initiated under these grants.

GBEP and its partners have received 17 national awards for their partnerships and progress in implementing the GBP and preserving Galveston Bay.

Pre-2008 AWARDS

- Four awards from Coastal America: one in 1999, Clear Creek Habitat Restoration project, for the beneficial use of dredge material, one in 2002 for Galveston Island State Park habitat restoration, one in 2003 for habitat restoration at Jumbile Cove, and one in 2005 for San Jacinto State Park for beneficial use of dredge material.
- Recognition award from the National Aeronautics and Space Administration for Galveston Bay estuary restoration and five years of implementation of the GBP.
- National Wetland Conservation Award for the Delehide Cove Protection and Restoration project from the United States Fish and Wildlife Service (USFWS) in 2006.
- EPA Gulf of Mexico Program Gulf Guardian Partnership Award for the Brays Bayou Urban Wetlands project.
- The Fisheries and Habitat Conservation Partnership award for the cumulative habitat conservation work on the part of the Natural Resource Uses (NRU) subcommittee.
- Two EPA Gulf of Mexico Program Gulf Guardian Awards to GBEP partners, including an award in the non-profit category to SCENIC GALVESTON for the Virginia Point Coastal Preserve in which GBEP played an instrumental role, and an award in the individual category to Dick Benoit, a highly active local citizen.

2008-PRESENT AWARDS

- EPA Gulf of Mexico Program awarded the First Place Gulf Guardian Award in the Partnership category for the East Bay Shoreline Protection project.
- Department of Interior's Collaborative Conservation award for the East Bay Shoreline Protection project.
- EPA's Gulf of Mexico Program Gulf Guardian Partnership Award for the North Deer Island Protection project.
- Coastal America Partnership Award for the North Deer Island Protection project.
- Coastal America Partnership Award for the Savannah Oaks Conservation project.
- TCEQ Texas Environmental Excellence Awards 2014 Finalist: Civic/Community for the Sheldon Lake Restoration project in 2014.
- Keep Houston Beautiful Mayors Proud Partner Award for the Sheldon Lake Restoration project in 2015.
- Houston-Galveston Area Council's (H-GAC) Our Great Region Diligence Award for Double Bayou Watershed Protection Plan (WPP) in 2016.
- USFWS Southwest Region Annual "Partnership of the Year" Award for 2016 for Oyster Lake Shoreline Protection and Marsh Restoration Project.
- H-GAC Our Great Region Award for the Double Bayou WPP in 2017.
- EPA's Gulf of Mexico Program Gulf Guardian Partnership Award for the Plastic Pollution Prevention Partnership in 2017.
- EPA's Gulf of Mexico Program Gulf Guardian Partnership Award for River, Lakes, Bays N' Bayous Trash Bash® (Trash Bash®) in 2017.
- TCEQ Texas Environmental Excellence Awards 2018 Winner: Civic/Community for Trash Bash®.
- EPA 2018 Award for Green Infrastructure (GI) & Excellence in Communications/Important Message (GI for Texas – Exploration Green).
- TCEQ Texas Environmental Excellence Award for Trash Bash® in 2019.
- EPA Gulf Guardian Award in for Trash Bash® 2019.
- City of Houston/Keep Houston Beautiful Mayor's Proud Partner Award in Honor of project excellence and longevity for Trash Bash® in 2019.

SECTION 2: INTRODUCTION

GBEP, a non-regulatory program of TCEQ, is a partnership of local governments, business and industry, conservation organizations, bay user groups, and resource agencies. GBEP is charged with implementing the GBP, the CCMP for Galveston Bay. GBEP is part of TCEQ's Office of Water, Water Quality Planning Division. A program manager and staff of seven located in the Houston-Galveston area directly oversee the implementation of the GBP. Program staff responsibilities are as follows:

- Acquire, manage, and disperse funds to implement specific actions in the GBP;
- Provide for coordination and communication among state and federal resource agencies for many cross-jurisdictional issues;
- Coordinate, monitor, and track implementation activities of Galveston Bay Council (GBC) partners;
- Identify and communicate bay improvements to agencies, stakeholders, and the public;
- Conduct public outreach and education to increase awareness of Galveston Bay;
- Advocate conservation of the estuary; and
- Maintain stakeholder involvement in the decision-making process through the GBC and its subcommittees.



Figure 1. Trash Bash® 2024 at Brays Bayou

SECTION 2.1: ORGANIZATIONAL STRUCTURE

GBEP has the primary responsibility for coordinating and administering the work plan. Program staff and job descriptions are provided below.

Lisa Marshall, M.S., GBEP Program Manager: Responsible for the overall implementation of the *GBP, 2nd Edition*, including securing and managing funds to support operations, staff, and projects; coordinating the GBC and the Budget and Priorities subcommittee; serving as grant project coordinator for GBEP; fostering stakeholder involvement to facilitate *GBP, 2nd Edition* implementation; managing program staff and operations to ensure efficient use of resources; and representing GBEP on national, state, and local boards and committees and at national and state conferences/events to garner federal and state support.

Christian Rines, M.S., Water and Sediment Quality (WSQ) Coordinator: responsible for coordinating the implementation of the nonpoint source (NPS), point source (PS), and public health and awareness (PHA) actions in the *GBP, 2nd Edition*; facilitating the WSQ subcommittee of the GBC; implementing specific stormwater, wastewater, septic systems, and seafood safety projects; and researching, evaluating, and reporting findings concerning scientific and technical issues impacting *GBP, 2nd Edition* implementation.

Lindsey Lippert, NRU Coordinator: responsible for coordinating the implementation of habitat conservation (HC), species conservation (SC), and freshwater inflows (FWI) actions in the *GBP, 2nd Edition*; facilitating the NRU subcommittee of the GBC and the invasive species and oyster restoration work groups of the NRU subcommittee; implementing specific projects to conserve, restore, and enhance coastal habitat and native species populations, and manage and control invasive species; maintaining Legislative Budget Board and EPA Government Performance and Results Act performance measures; serving as a back-up budget liaison and bill analyst for the GBEP office; and researching, evaluating, and reporting findings concerning scientific and technical issues impacting *GBP, 2nd Edition* implementation.

Vacant, Public Participation and Education (PPE) Coordinator and Community Relations Specialist: responsible for coordinating the implementation of the stakeholder and partner outreach (SPO) and public education and awareness (PEA) actions in the *GBP, 2nd Edition*; facilitating the PPE subcommittee of the GBC; building relationships and developing communication channels and dialogue with local government officials, private sector, and other outside organizations key to implementing the *GBP, 2nd Edition*; providing information to stakeholders, the public and media; overseeing the Galveston Bay Public Awareness and Education Campaign (Back the Bay); promoting special events and projects; and overseeing the websites of GBEP. The PPE Coordinator also facilitates cross-sectoral learning of public relations and marketing activities for the Galveston Bay watershed; organizes and manages community relations events and the State of the Bay symposium; and tracks emerging stakeholder community concerns/issues.

Jenelle Estrada M.S., Monitoring and Research (M&R) Coordinator: responsible for coordinating the monitoring and research (RES) and access to Galveston Bay ecosystem information (ACS) actions in the *GBP 2nd Edition*; facilitating the M&R subcommittee of the GBC; coordinating the regional monitoring program, including data management/reporting, and development and application of environmental indicators; coordinating *GBP, 2nd Edition* implementation tracking, and researching, evaluating, and reporting findings concerning scientific and technical issues impacting *GBP, 2nd Edition* implementation.

Vacant, Technical and Quality Program Coordinator: responsible for serving as the quality assurance (QA) officer; assisting with oversight of contract management, tracking, and execution; serving as budget liaison and backup grant project coordinator for GBEP; coordinating the development and submission of federal reports; identifying and tracking the evolution of issues affecting bay management; and researching policy, technical, and management results that pertain to Galveston Bay in collaboration with the NRU and WSQ coordinators.

Matthew Abernathy, M.A.R.M., Education and Outreach Coordinator: responsible for handling GBEP outreach events; conducting educational presentations in schools and at events; assisting with the informational needs of the program; managing contracts; and assisting subcommittee coordinators in implementing *GBP, 2nd Edition* projects.

Alejandra Trevino, B.S., Administrative Assistant: responsible for travel coordination, vehicle and equipment maintenance and repairs, mail, correspondence, office safety, and general administrative support for GBEP.

PROGRAM COMPETENCY DEMONSTRATION

The following statements demonstrate GBEP's competency as a Continuing Environmental Program:

- Competency is demonstrated by TCEQ Quality Systems Audits conducted biennially by the TCEQ QA Manager.
- Competency is demonstrated through EPA Quality Project and Program Management training taken by TCEQ GBEP staff. GBEP staff that review Quality Assurance Project Plans (QAPPs) or manage projects with QAPPs have taken this training and any new staff with QAPP-related responsibilities will be required to take this training. Certificates are available upon request.
- Competency is demonstrated through the EPA approved TCEQ Quality Management Plan (Revision 29 approved December 2023) that GBEP operates under, which provides descriptions of the QA policies, including all the requirements described in the EPA Quality Assurance Project Plan Standard (CIO 2105-S-02.0).
- The GBEP Program Manager and staff take many professional development training classes annually, which are also available upon request.

FISCAL 2024 LEVERAGING, TRAVEL, AND TECH TRANSFER AMOUNTS

Figures reported in Table 2 provide a mid-year estimate of leveraged funding reported by partners and grantees from September 2023–August 2024 (fiscal 2024). The numbers are subject to change as additional funding may be reported for the period.

Table 2. Fiscal 2024 Leveraging

EPA Funds to Program (Section 320)	TCEQ State Allocation	Other Federal Funds*	Other State Funds and In-kind*	Local Government Funds and In-Kind*	Private funds and In-kind*
\$850,000	\$1,674,484	\$4,499,465	\$30,000	\$153,000	\$3,670,884

*As Reported in fiscal 2023 National Estuary Program (NEP) Online Reporting Tool

Figures reported in Table 3 depict the travel expenses and tech transfer descriptions from fiscal 2024.

Table 3. Fiscal 2024 Travel and Tech Transfer

EVENT, LOCATION, AND PURPOSE	STAFF PERSON	EPA SECTION 320 FUNDS	TCEQ 100% STATE FUNDS
Partners for Litter Prevention Houston, Texas (Virtual) – Quarterly Watershed-wide coordinating initiative to research, track, and quantify litter. This stakeholder-led effort aims to identify prevention and removal strategies. Other efforts include identifying funding strategies, partnership opportunities, and communication approaches. Initial steps were taken to develop a regional action plan—like other water-based plans—focused on litter and marine debris prevention.	Lisa Marshall Kari Howard**	\$0.00	\$0.00
Galveston Bay Foundation (GBF) Conservation Committee Meetings Kemah, Texas – Quarterly GBF and partners meet to discuss conservation projects, management needs, and funding strategies for lands held by GBF. The committee also reviews bylaws and requirements needed to maintain GBF's Land Trust Alliance accreditation.	Lindsey Lippert	\$0.00	\$0.00
The H-GAC Natural Resources Advisory Committee Meetings Houston, Texas (Hybrid) – Quarterly These meetings provide information on issues related to natural resource management of the region. The GBEP Program Manager is a non- voting member.	Lisa Marshall	\$0.00	\$0.00
Trash Bash® Event Coordination Meetings Houston, Texas (Virtual) – Quarterly These meetings provide regional coordination, site selection, training,	Matthew Abernathy Kari Howard**	\$0.00	\$0.00

EVENT, LOCATION, AND PURPOSE	STAFF PERSON	EPA SECTION 320 FUNDS	TCEQ 100% STATE FUNDS
outreach materials development and training, and organizational support for the regional Trash Bash® events.			
University of Houston-Clear Lake (UHCL)/ Environmental Institute of Houston (EIH) Science Advisory Board Houston, Texas (Hybrid) – Biannually The meetings provide updates from EIH staff and faculty on their research and educational initiatives. The GBEP Program Manager is a non-voting member.	Lisa Marshall	\$0.00	\$0.00
H-GAC Bacteria Implementation Group (BIG) Houston, Texas (Virtual) – Biannually These meetings provide an update of implementation activities of the BIG Implementation Plan and present topics that are related to water quality.	Lisa Marshall Christian Rines	\$0.00	\$0.00
Texas Watershed Coordinator Roundtable Meetings Variable (Hybrid) – Biannually These meetings provide a forum for water professionals to establish and maintain dialogue between watershed coordinators, facilitate interactive solutions to common watershed issues faced throughout the state, and add to the fundamental knowledge conveyed at the short courses.	Lisa Marshall Christian Rines	\$0.00	\$0.00
Water Quality Planning Division (WQPD) Meetings Austin, Texas – Quarterly The WQPD meetings allow for sections and teams under the WQPD to share their updates and upcoming news. The WQPD Deputy Director and Assistant Deputy Director discuss their meetings and report on the past quarter's updates. These meetings allow GBEP staff to meet with other WQPD employees and network.	Lisa Marshall Lindsey Lippert Ellen Creecy** Christian Rines Kari Howard** Matthew Abernathy Alejandra Trevino Jenelle Estrada	\$0.00	\$1,224.19
Fall EPA NEP Workshop Portland, Oregon – November 2023 The conference provided the opportunity to learn, coordinate, and exchange information with other NEPs and federal program staff and allows GBEP to implement the succession plan.	Lisa Marshall Christian Rines	\$3,202.19	\$0.00
Gulf of Mexico Alliance Conference Tampa, Florida – February 2024 This meeting provides networking opportunities with other organizations and governmental agencies working for the environment and economic health of the	Lisa Marshall Kari Howard**	\$3,196.22	\$0.00

EVENT, LOCATION, AND PURPOSE	STAFF PERSON	EPA SECTION 320 FUNDS	TCEQ 100% STATE FUNDS
Gulf of Mexico.			
Spring EPA NEP Workshop Washington D.C. – March 2024 This meeting provides NEP program managers a chance to exchange information and network.	Lisa Marshall	\$2,400.00	\$0.00
Texas Association for Environmental Education Conference Trinity, Texas – September 2023 This meeting provides the Education and Outreach Coordinator with professional development opportunities related to the best management practices (BMPs) for environmental education in the state of Texas. This also provides networking opportunities with environmental education organizations from throughout the state.	Matthew Abernathy	\$0.00	\$318.98
International SSPEED Conference Houston, Texas – October 2023 This meeting provides the latest research and policy initiatives relating to the prevention of flooding in the region.	Lisa Marshall	\$0.00	\$300.00
Winter Gulf Coast Joint Venture Mid-Coast Meeting Richmond, Texas – January 2024 The meeting provides the NRU Subcommittee Coordinator the opportunity to discuss conservation priorities for bird habitat along the coast in 16 counties from Galveston to Corpus Christi, Texas.	Lindsey Lippert	\$0.00	\$0.00
EIH Surface Water Quality Monitoring Workshop Houston, Texas – March 2024 This workshop includes classroom and field-based instructions designed to explain the theory and methodology of SWQM procedures with hands-on components in local streams and bayous.	Ellen Creecy**	\$0.00	\$250
Texas Plastic Pollution Symposium Corpus Christi, Texas – April 2024 The symposium focused on research, solutions, and public policy regarding plastic pollution around the state of Texas.	Matthew Abernathy Christian Rines	\$0.00	\$727.14
TCEQ Environmental Trade Fair and Conference Austin, Texas – May 2024 This trade fair and conference provides an opportunity to showcase GBEP's operations and accomplishments to municipalities, other organizations, and other staff within TCEQ.	Matthew Abernathy	\$0.00	\$36.00

EVENT, LOCATION, AND PURPOSE	STAFF PERSON	EPA SECTION 320 FUNDS	TCEQ 100% STATE FUNDS
Spring Gulf Coast Joint Venture Mid Coast Team Meeting Bay City, Texas – May 2023 The meeting provides the NRU Subcommittee Coordinator the opportunity to discuss conservation priorities for bird habitat along the coast in 16 counties from Galveston to Corpus Christi, Texas	Lindsey Lippert	\$0.00	\$36.00
TCEQ Surface Water Quality Monitoring Workshop Location and Date TBD This workshop provides training on surface water quality monitoring issues and is an opportunity to network with other water quality specialists in the state.	Jenelle Estrada	\$0.00	\$848.00
Fiscal Year (FY) 24 TRAVEL AND TECH TRANSFER TOTAL		\$8,798.41	\$3,740.31

*Travel is dependent on TCEQ management review and approval. Rates for fiscal 2024 are subject to change.

**Staff no longer employed by TCEQ.

SECTION 2.2: GOALS AND ACCOMPLISHMENTS SINCE FISCAL 2024 WORK PLAN SUBMISSION

GBEP partners made notable achievements in improving water quality, restoring wetlands, protecting unique habitats, and educating the public in fiscal 2024. These achievements are highlighted in the following sections.

IMPROVING AND PROTECTING WATER QUALITY: SUPPORTING CORE CLEAN WATER ACT PROGRAMS

In support of EPA’s core Clean Water Act goals, GBEP has worked to build capacity of local stakeholders through watershed protection planning and implementation of water quality improvement projects. Through this effort in coordination with other water programs of TCEQ and local stakeholders, most of the impaired waters in the five-county region surrounding Galveston Bay have some level of watershed protection or improvement underway.

WPPs

Highland Bayou WPP

Highland and Marchand bayous have experienced periods of low dissolved oxygen (DO) and elevated bacteria levels, which can impact aquatic life and can be harmful to human health, respectively. All state assessments, now called the *Texas Integrated Report of Surface Water Quality for Clean Water Act Sections 305(b) and 303(d)* (Texas Integrated Report and 303(d) List), since 2002 have listed multiple assessment units (AUs) within Highland Bayou (2424A) and Marchand Bayou (2424C) as impaired for these constituents of concern. Texas A&M AgriLife Extension Service (Texas AgriLife) coordinated the creation of a characterization report and a stakeholder driven draft WPP for Highland Bayou. However, the WPP only addressed the bacteria impairment. Guidance from EPA in 2018 indicated that the DO impairment and flow needed to be included for a WPP to meet all requirements for acceptance as a watershed-based plan (WBP). DO impairments and flow have now been addressed as well as three new AUs added to the WPP – Highland Bayou Diversion Canal (AU 2424G_01), Moses Bayou (AU 2431A_01), and Unnamed Tributary of Moses Lake (AU 2431C_01). This project resulted in the completion of the final WPP revisions which include finalizing load reductions, obtaining stakeholder approval, and submitting the WPP to EPA for consistency review. The final version of the Highland Bayou WPP was accepted by EPA on May 12, 2021.

Although the GBEP funded portion of the project ended March 31, 2021, implementation efforts continue through the Galveston Bay Coalition of Watersheds (Coalition), a partnership of local water quality professionals that seek to promote widespread community awareness and engagement in the protection and improvement of Highland Bayou and other Coalition watersheds. In fiscal 2025, the GBEP state funded Texas AgriLife project, “Supporting Permeable Alternatives to Conventional Pavement in the Lower Galveston Bay Watershed”, will utilize current Coalition synergy, bringing together stakeholders and technical advisors from four watersheds with existing WPPs. The goal will be to share ideas and resources and to implement local solutions identified in these plans, and to also inform future implementation and WPP development in the region.

Double Bayou WPP

The Double Bayou watershed, on the eastern shoreline of the lower Galveston Bay watershed, is hydrologically connected to Trinity Bay, a sub bay of the Galveston Bay estuary. The Double Bayou WPP was accepted in July 2016 in response to the West Fork of Double Bayou being listed on the 2012 Texas Integrated Report and 303(d) List for elevated bacteria levels and low DO and the East Fork of Double Bayou being identified as a concern for near-nonattainment of water quality standards for elevated bacteria levels and as a water quality concern for low DO. From 2017-2021 GBEP funds supported water quality data analysis and implementation of the Double Bayou WPP through the state funded, fiscal 2018 project, “Coordinating Implementation of a WPP for Double Bayou.” This project monitored current water quality of DO and bacteria in the bayous and communicated water quality conditions to stakeholders to support adaptive management and expand public knowledge and participation in the Double Bayou watershed.

Through separate state funds, GBEP is supporting additional implementation efforts through the

“Strategic Implementation of Green Infrastructure Best Management Practices in the Double Bayou Watershed” project. The goal of this project is to support continued implementation of the Double Bayou WPP, which is critical to the long-term success of the watershed-based NPS pollution management efforts. This project’s objectives are to develop a bacteria source tracking assessment, establish a project specific watershed-based model, and conduct stakeholder outreach. The Double Bayou WPP implementation efforts are supported by increasing opportunities for adaptive management and decision making for GI BMPs in collaboration with stakeholders.

Clear Creek WPP

H-GAC is currently working with TCEQ on a Clean Water Act Section 319 WPP development project for Clear Creek. The project was initiated in 2021 and will continue through 2024. The effort will produce a nine-element WBP consistent with EPA requirements and conduct NPS education and outreach activities. Preliminary work was completed as part of a total maximum daily load (TMDL) project, during which strong local support for full development specific to the watershed was expressed. Water quality issues impacting recreation, local economies, public health, and the environment persist in this subsidiary watershed of the greater Galveston Bay watershed.

Project goals include:

- Stakeholder facilitation and WPP development (other than modeling and data assessment tasks requiring a QAPP).
- Outreach and education in the watershed, including NPS-oriented H-GAC workshops, outreach presence at local events, and support and coordination with partner agencies on joint outreach events.
- Supplemental outreach efforts in coordination with GBEP or its partners to forward *GBP, 2nd Edition* goals in the watershed.

In fiscal 2025, the Bayou Preservation Association (BPA) will help to implement and elevate the Clear Creek WPP through the GBEP funded project, [Enhancing Clear Creek Watershed Protection and Galveston Bay Plan through Community Engagement and Monitoring](#). By focusing on pet waste education and Texas Stream Team (TST) monitoring, the project seeks to improve water quality, reduce pollution, and enhance the ecological health of the Clear Creek watershed and Galveston Bay.

Greens Bayou WPP

H-GAC is also currently working with the TCEQ on a Clean Water Act Section 319 WPP development project for Greens Bayou which was initiated in December 2023 and continues through August 2027. The effort will produce an EPA 9-Element WBP and conduct NPS education and outreach elements during the project.

GBEP state funding under the “Watershed Protection Plan Development for Greens Bayou” project will be used to support the existing federal funding and local match for the project, as supplemental local match. The intended use of the funds will be to cover stakeholder coordination, outreach and education, and support of GBEP programming and messaging.

Water Quality Improvement Projects

In addition, various WSQ projects are providing new insights into water quality improvements through reducing bacteria concentrations in the lower Galveston Bay watershed and surrounding BIG project area, making rapid methods used for the detection of human waste contamination in waterways a more routine methodology used by Galveston Bay water quality professionals, quantifying the distribution and concentration of microplastics in Galveston Bay and its tributaries in new targeted locations, evaluating the effectiveness of existing water quality BMPs, installing green stormwater infrastructure (GSI) demonstration sites, and establishing new strategies to address water quality.

Targeted Bacteria Monitoring

Since 2019, the [Targeted Bacteria Monitoring](#) project with H-GAC has worked to reduce bacteria concentrations in impaired streams in the BIG project area by: (1) investigating bacteria sources in

the most bacteria-impaired waterways in the BIG project area, and (2) working with local jurisdictions to reduce or eliminate those sources. In the initial phase of the project, the team worked to identify significant bacteria sources in four of the six originally identified bacteria impaired AUs in the BIG project area. The team has since reported those findings to local jurisdictions through Targeted Monitoring Reports, which has resulted in corrective actions, such as the identification of collection system leaks and overflows, infrastructure repairs, increased wastewater treatment facility sampling, and resident education. Outreach for this project will better convey the results to local jurisdictions and the public to help promote the successes and importance of bacteria reduction efforts.

The third phase of this project, which started in fiscal 2023, is building on the work of the two previous phases, with the continued goal to significantly reduce bacteria levels within the most impaired stream segments in the BIG project area. This has been accomplished by: (1) continuing to work with local jurisdictions to reduce or eliminate identified bacteria sources, (2) conducting follow up monitoring on any corrective actions stemming from previous monitoring, and (3) working with local communities for focused outreach in areas with high occurrences of sanitary sewer overflows or where jurisdictions determined high bacteria levels originated from sources other than failing infrastructure.

Microbial Source Tracking

In fiscal 2025, the UHCL will begin the GBEP state funded project, “Application of Rapid Methods of Microbial Source Tracking to Assess the Source of Fecal Contamination to Western Galveston Bay”. This project aims to make the application of rapid molecular methods used to detect the contamination of waterways with human waste, a more routine methodology used by water quality professionals in the Galveston Bay watershed. Methods and results will be shared to support implementation of more rapid microbial source tracking protocols by local and regional stakeholders and water quality managers.

Microplastics

Litter and trash, such as plastics, is an issue of concern in Galveston Bay and its tributaries and has been identified by the WSQ and the PPE subcommittees of the GBC as a priority topic for research in recent years. It is the primary focus of the [Occurrence of Microplastics in Tributaries to Galveston Bay](#) and [Baseline Assessment of Microplastics in Galveston Bay](#) projects, particularly microplastics, which are plastic particles less than five millimeters in diameter, that are of increasing concern. The long-term effects of microplastics in the environment are currently not well known but concerns over potential effects have resulted in an increasing interest in understanding the extent and magnitude of their presence and their potential for bioaccumulation and disruption to ecosystem function and services. To date, no studies that assess the occurrence and abundance of microplastics in Galveston Bay and its tributaries have been published. Collecting microplastic samples in this region can provide information about the spatial distribution and concentrations of microplastics in the Galveston Bay watershed. Results from these projects provide preliminary information on the occurrence of microplastics in the Galveston Bay watershed and include quantification and categorization of microplastic particles.

In fiscal 2024, GBEP provided the United States Geological Survey (USGS) with additional funding to expand upon the previous two phases of the project and work to fill the gaps in our understanding of the spatial and temporal distribution of microplastics in Galveston Bay and its tributaries. The [Targeted Microplastics Monitoring in the Waters of Galveston Bay and its Tributaries](#) project will result in a preliminary assessment that will also serve as the foundation for future study and abatement.

GSI

According to the Trust for Public Land, Houston ranked number one in the nation for total greenspace among cities of comparable density. While these spaces can be found all throughout the city, the implementation of GSI within greenspaces has not been prioritized by developers. GSI in greenspaces can help prevent the negative impacts of stormwater runoff on our nearby waterways.

Impacts primarily include elevated bacteria levels, high nutrient loading from fertilizers, excess sediment from soil erosion, and accumulation of litter and trash. Therefore, it is imperative that residents, homeowner associations, green industry professionals, developers, and watershed coordinators have access to a space that demonstrates different types of GSI for greenspace stormwater mitigation. This will not only promote their implementation in existing master planned communities and public spaces but also inform developers for future projects.

In the fiscal 2024 funded project, [Green Stormwater Infrastructure \(GSI\) Demonstration Site Development for Greenspace Education in the Galveston Bay Watershed](#), Texas AgriLife will coordinate with Houston Community College (HCC) to develop a minimum of two different types of GSI demonstration sites on the HCC Katy Campus that can be used to educate Galveston Bay watershed developers, green industry professionals, residents, and homeowner associations on greenspace BMPs. The goal of the project is to provide the knowledge necessary for these groups to implement practices in their neighborhoods, public spaces, and occupations that will lead to a reduction of bacteria, nutrient loads, and sediment in stormwater runoff.

1. WSQ Goals

The WSQ subcommittee also identified several focus priorities for fiscal 2025 project selection. These priorities include supporting management measures and WBPs, which are addressed through [Enhancing Clear Creek Watershed Protection and Galveston Bay Plan through Community Engagement and Monitoring](#) and separately funded state projects; monitoring and research that evaluates GI effectiveness in water quality & soil health, which is addressed through the separately funded state project “Supporting Permeable Alternatives to Conventional Pavement in the Lower Galveston Bay Watershed”; and targeted/direct monitoring, which is addressed through the separately funded state project “Application of Rapid Methods of Microbial Source Tracking to Assess the Source of Fecal Contamination to Western Galveston Bay”.

HABITAT AND LANDSCAPE-LEVEL CONSERVATION: CONSERVE, RESTORE, AND ENHANCE IMPORTANT COASTAL HABITATS

The Texas coast features a wealth of coastal habitats that support a tremendous abundance and diversity of fish and wildlife. Although the habitat conservation efforts of GBEP and its partners are bay wide, distinctive consideration has been given to the West Bay watershed. Preserving wetlands and natural areas is critical to maintaining water quality and protecting valuable fish and wildlife habitat in this region.

Since 2000, GBEP and its partners created, protected, and enhanced 41,095 acres of important coastal habitats, leveraging \$182,025,969 in local, industry, state, and federal contributions, a leveraging rate of \$13.93 to every dollar received from EPA. During fiscal 2023, GBEP protected and enhanced 919.197 acres of wetlands and coastal habitats, and leveraged \$9,385,602 in local, industry, state, and federal contributions.

As of April 2024, an additional 230 acres of coastal habitat have been conserved via land acquisition. Through acquisition and restoration initiatives currently in progress, GBEP and partners are positioned to conserve and/or enhance an additional 1,000 acres of coastal habitat by August 2024.

Sylvan Rodriguez Park Habitat Restoration (Harris County, Texas)



Figure 2. Sylvan Rodriguez Park (Harris County, TX)

Sylvan Rodriguez Park is a 113.5-acre park acquired by Houston in 1991. The park is bordered by Horsepen Bayou, which flows downstream into Armand Bayou. Numerous prairie potholes and drainage features can be seen throughout the site in the historical photos dating back to 1944. In the absence of natural processes such as fire and intermittent grazing by bison, the park became inundated by Chinese tallow trees and other woody vegetation. By the mid-2000s, Houston had developed the southwestern portion of the park, which included lacrosse fields, parking areas, restrooms, a retention pond, and trails.

The “Sylvan Rodriguez Habitat Restoration” project focused on the restoration of a 23-acre section of forested and riparian buffer habitat within Sylvan Rodriguez Park. The restoration project included the removal of invasive woody species and the establishment of 1,407 native trees and shrubs. The community was actively engaged in the restoration process to educate on the importance of native habitats and to increase community acceptance of natural areas. Monthly volunteer workdays were hosted by Houston Parks and Recreation Department (HPARD) at the site and one community volunteer event also took place during the grant period. To increase visitor access to the natural area and create environmental education opportunities, six interpretive signs and a 450-foot boardwalk were installed.

Additional phases of the [project](#) to complete additional areas of the park using mechanical and chemical methods and prescribed fire are currently in progress.

Follets Island Conservation Initiative (Brazoria County, Texas)

The Follets Island Conservation Initiative project (externally funded) focused acquisition of barrier island habitat in Brazoria County, Texas. Follets Island is a barrier island on the upper coast of Texas that borders Christmas Bay. Described as a bay of uniquely high quality with minimal alteration by human activity, it is located at the southern end of the West Galveston Bay. The land north of and adjacent to the bay is the Brazoria National Wildlife Reserve. The project's coastal strand prairie and associated palustrine wetlands provides habitat to a wide range of migratory species.

Texas Parks and Wildlife Department (TPWD) and GBF permanently conserved 443 acres of pristine

coastal dune and wetland landscape on Follets Island, a barrier island southeast of Galveston Island. The [Conservation Assistance Program 2018 - 2024](#) supported the project by providing \$1,465.63 (Section 320) and administrative support toward due diligence documentation for the transaction. The project provides habitat to a range of migratory species such as shorebirds, waterfowl, neotropical songbirds, grassland birds, and raptors. The island's beaches have also seen an increased number of nesting sea turtles. Protective measures will be taken to limit human vehicular activity from negatively impacting the habitat.

2. NRU Goals

The NRU subcommittee also identified several focus priorities for fiscal 2025 project selection. These priorities include habitat acquisition, which is addressed through the [Conservation Assistance Program 2025](#); enhancement of existing or ongoing restoration/conservation efforts, which is addressed through the “Bay Harbor Island Stabilization” and “Wetland Planting Assistance in Galveston Bay” projects (state funded). The priority to benefit to native fish and wildlife, including federal and state listed species, species of greatest conservation need, or nongame wildlife is addressed through [Monitoring and Managing the Threatened Eastern Black Rails in the Galveston Bay Area](#).

CONTINUE BUILDING REGIONAL SUPPORT FOR PPE

GBEP continued engaging communities with outreach and education through GBEP funded projects and partnering with stakeholders on various initiatives. As COVID-19 restrictions have relaxed in recent years, GBEP staff have been able to participate in more in-person education and outreach activities.

Examples of these activities include:

- Continued support for the [Microplastics in the Galveston Bay Watershed: The Big Impacts of Tiny Pollution](#) which has so far held 19 events engaging 431 participants with citizen science and environmental educational stewardship opportunities to collect over 43 pounds of trash which included six balloons, 1,845 cigarette butts, 40 pieces of microplastics, and 425 nurdles. Additionally, three of the five educational watershed and microplastics kits were implemented during classroom instructions and teacher workshops.
- Continued coordination with partner organizations on the marine debris for the Texas Plastic Pollution Symposium held at the UHCL campus on May 11, 2023. The Symposium focused on projects, research, and communication on local trash, marine debris, and plastic pollution issues. This is in coordination with EPA's [Trash Free Waters](#)¹ initiative. The goal of the meeting was to update partners on regional efforts on litter and marine debris mitigation and to establish working groups for removal, research, and communication.
- Continued support for subcommittee members through an evaluation workshop hosted at GBF on May 22, 2023, where ten organizations participated to learn about strategies to improve and adapt current and ongoing education and outreach programs.
- GBEP staff engaged 290 individuals through presentations and 925 booth attendees at schools, colleges, and community events throughout the Houston-Galveston area to date in fiscal 2024.

Public Perception Assessment and Community-Based Social Marketing Campaigns

“The Public Perception Assessment and Community-Based Social Marketing Campaigns to Enhance Conservation and Educational Outreach Programs” produced an evaluation of community members with target demographics that represented the population distribution across the counties making up the lower Galveston Bay watershed in coordination with the University of Houston (UH) Hobby School of Public Affairs. This evaluation and resulting community outreach plan were used to identify barriers and benefits to environmental engagement within the communities, lessons learned, and suggestions to inform future community collaborations as well as strengthen the

¹ www.donttrashagoodthing.org

methods and effect of environmental concerns within the Galveston Bay Report Card (GBRC). The community partner pilot test showed the complexity and difficulty that can occur when executing communication and campaign plans to communities, especially during COVID-19. Though the sample size was small, it gave a realistic representation of various communities in the lower Galveston Bay watershed.

River, Lakes, Bays, N' Bayous Trash Bash®

The 30th annual [Trash Bash®](#) was held in-person on March 23, 2024, to promote environmental stewardship to properly dispose of trash, chemicals, and pet waste. The preliminary numbers for 2024 indicate that 2,122 volunteers collected 50.13 tons of trash, 197 illegally dumped tires, and 0.5 tons of recyclable materials were removed from 72 miles of the Galveston Bay Watershed. Since its inception, Trash Bash® has received 30 local, regional, state, and national awards and recognitions.

3. PPE Goals

The PPE subcommittee also identified several focus priorities for fiscal 2025 project selection. These priorities include creating place based and immersive programming for students in K-12th grades which is addressed through “Wetlands Connections” (state funded); conservation and environmental workforce training which is addressed through “Engaging Diverse Communities in Conservation” (state funded); adult engagement in science literacy focused on the Galveston Bay estuary and watershed which is addressed through [Trash Bash](#); and the continuation or expansion of established education, outreach, or engagement programs which are addressed by all three selected projects.

IMPROVING RESOURCE MANAGEMENT THROUGH TARGETED RESEARCH THAT INCREASES ECOSYSTEM UNDERSTANDING

Since the submission of the fiscal 2024 Work Plan, three M&R projects have reached completion and provided new insights into components of the Galveston Bay ecosystem:

The Fate of Emerging Per- and Polyfluoroalkylated Substances (PFAS) Pollutants in Shellfish and Fish of Galveston Bay

[The Fate of Emerging Per- and Polyfluoroalkylated Substances \(PFAS\) Pollutants in Shellfish and Fish of Galveston Bay](#) assessed the levels of the per- and polyfluoroalkyl substances (PFAS) homolog, Perfluorooctanesulfonic Acid (PFOS) in shellfish and fish from Galveston Bay. In addition, PFOS levels were also quantified in pelagic fish and marine mammals (stranded dolphins) opportunistically sampled from the northern Gulf of Mexico. To assess whether PFOS body-burdens were likely to cause toxicity effects, this project also implemented an integrated computational (or *in silico*) systems toxicological approach to identify physiologically relevant biomarkers of PFOS exposure and toxicity in fish. For PFOS body-burden analyses, results showed eastern oysters (*Crassostrea virginica*) to exhibit the lowest PFOS levels in gill/mantle tissue, whereas bottlenose dolphins (*Tursiops truncatus*) had the highest hepatic PFOS levels. In Galveston Bay fish gafftopsail catfish (*Bagre marinus*), red drum (*Sciaenops ocellatus*), and spotted seatrout (*Cynoscion nebulosus*), had hepatic PFOS levels ~8-13x higher than the pelagic species sampled from the Gulf of Mexico, which included red snapper (*Lutjanus campechanus*) and yellowfin tuna (*Thunnus albacares*).

Finally, a sea food consumption risk assessment of the PFOS body-burdens in the shellfish and fish sampled from Galveston Bay and Northern Gulf of Mexico showed levels to be below that of concern for human exposure (i.e., through the consumption of PFOS contaminated fish). The results of this project highlight the efficacy of using an integrated systems toxicological and environmental monitoring framework to quantify the extent of pollutant exposure in aquatic wildlife and to also assess likely adverse effects in the exposed organisms.

Effects of Erosion Control Structures on Shoreline Marsh Species Population

[Effects of Erosion Control Structures on Shoreline Marsh Species Population](#) investigated how erosion control structures (ECS) affect restored marsh community composition and productivity. The project surveyed emergent marsh vegetation, epifauna, soil characteristics, and benthic microalgae in restored marshes with and without ECS in May and November 2022.

In both the fall and spring, aboveground plant biomass was higher at sites without ECS and belowground plant biomass was similar between sites with and without ECS. Total plant cover did not differ between sites with and without ECS in the spring but was higher at sites without ECS in the fall. The concentrations of the two abundant benthic microalgal groups, cyanobacteria and diatoms, were higher at sites without ECS. There was no significant difference in soil percent moisture between sites with and without ECS in either the spring or fall. Percent soil organic content was higher at sites without ECS in the fall but did not differ between site types in the spring. In both time periods, snail density was higher at sites with ECS, and crab burrow densities were similar between site types. There were few effects of ECS on the zooplankton or nekton communities in either spring or fall, though a few species varied among site types.

These findings indicate that ECS have stronger effects on benthic fauna and microalgae than on emergent vegetation. In addition, this provides further evidence that assessments of restored salt marshes that focus just on emergent plant cover may yield an incomplete picture of restoration success.

The Distribution, Fate, and Transport of Emerging Contaminants in Galveston Bay

While extensive observations and monitoring of legacy contaminants such as polychlorinated biphenyls and dioxins have been conducted in Galveston Bay, the same information is lacking for emerging contaminants, such as PFAS, artificial sweeteners, and pharmaceutical and personal care products (PPCPs). [The Distribution, Fate, and Transport of Emerging Contaminants in Galveston Bay](#) project monitored 30 PFAS with carbon chain lengths from four to 20, two artificial sweeteners, and 12 pharmaceutical and personal care product compounds in quarterly monitoring cruises from 2021 to 2023. The cruises typically occurred in March, June, September, and November. The data showed that PFAS observed in water samples were typically short chain (i.e., less than eight carbon atoms). On the other hand, longer-chain compounds were found in the sediment. The spatial distributions of PFAS also varied with carbon chain length. For example, PFAS with four carbon atoms generally follow the riverine input, while eight carbon compounds appear to be spatially heterogeneous.

PPCPs and artificial sweeteners are broad groups of compounds with different applications and, thus, different initial sources and vastly different chemical structures. Some of the more hydrophobic compounds are expected to be associated with particles and, therefore, are more likely to be found in sediments, while others dominate in the aqueous phase. High concentrations of caffeine and sucralose (an artificial sweetener) were found in both sediment and water due to their moderate water solubility. The distribution of PPCPs and artificial sweeteners in Galveston Bay water generally follows riverine input.

4. M&R Goals

The M&R subcommittee identified several focus priorities for fiscal 2025 project selection. These priorities included meaningful and effective monitoring of existing and new projects, which is addressed through [Monitoring to Assess Long-Term Restoration Success in Galveston Bay Wetlands](#) and [Tracking Perkinsus marinus \(Dermo\) Infection in Sun-Cured Oysters: Informing Oyster Shell Recycling Programs in Galveston Bay](#); reestablishing dermo monitoring programs which is addressed through [Tracking Perkinsus marinus \(Dermo\) Infection in Sun-Cured Oysters: Informing Oyster Shell Recycling Programs in Galveston Bay](#) and [Establishment of an Oyster Sentinel Program for Tracking Perkinsus marinus \(Dermo\) in Oysters of Galveston Bay](#); and translation to plain language/practical knowledge which is addressed by both oyster projects.

SECTION 2.3: STRATEGIC ACTION PLAN GOALS TO FOCUS ON IN FISCAL 2025

GBEP will focus on implementing EPA Strategic Action Plan Objective 5.2: Protect and Restore Waterbodies and Watersheds through implementing the following goals of the *GBP, 2nd Edition*:

- Reducing NPS pollution ([NPS-1](#), [NPS-2](#), [NPS-4](#)).
- Reducing public health risk through implementation of WBPs ([PHA-3](#)).
- Conserving, restoring and enhancing vital habitats in the lower portion of the Galveston Bay watershed ([HC-1](#), [HC-2](#), [HC-3](#)).
- Sustaining and restoring native species populations ([SC-1](#), [SC-2](#)).

- Increasing a sense of responsibility in the health of Galveston Bay ([SPO-1](#), [SPO-2](#), [SPO-3](#)).
- Supporting stakeholder and partner involvement in GBEP program policy, management, and implementation ([SPO-4](#)).
- Ensuring the public receives the knowledge necessary to preserve Galveston Bay ([PEA-1](#), [PEA-2](#), [PEA-3](#)).
- Increasing understanding of biological stressors in the Galveston Bay ecosystem ([RES-1](#)).
- Evaluating BMPs for restoration ([RES-6](#)).
- Conducting research on ecosystem service and coastal resiliency ([RES-7](#), [RES-8](#)).
- Increasing opportunities to access monitoring and research information ([ACS-1](#), [ACS-2](#)).

FISCAL 2025 EXPECTED OUTCOMES

- Increase the public's awareness of their connection to and effect on the Galveston Bay ecosystem.
- Increase the exchange of scientific information among research scientists, natural resource managers, stakeholders, and the public.
- Increase implementation of ongoing WBP efforts in the watershed.
- Increase coordination of marine debris and plastic pollution reduction efforts throughout the region.
- Increase education opportunities on land management practices to urban and suburban landowners and practitioners to improve soil health and reduce stormwater runoff and NPS pollution in the watershed.
- Increase understanding of the types, quantities, and spatial distribution of microplastics in Galveston Bay and its tributaries.
- Improve the knowledge of regional developers, green industry professionals, residents, and homeowner associations by providing GSI demonstration sites necessary for these groups to implement practices that will lead to a reduction of bacteria, nutrient loads, and sediment in stormwater runoff.
- Acquire land or development rights to preserve habitats vital to the health of the Galveston Bay watershed.
- Provide benefits for native vegetation and wildlife by restoring and enhancing habitat degraded by invasive vegetation to increase overall function.
- Improve implementation tracking of coastal habitat projects in the watershed.
- Increase public knowledge and education about the importance of Galveston Bay watershed and estuary by providing science, technology, engineering, and mathematics (STEM) training to teachers and young professionals as well as help facilitate future Galveston Bay estuary-related careers on environmental education.
- Increase awareness of water conservation throughout the City of Houston, methods of implementing water conservation strategies, and how it benefits the region.
- Reduce the amount of trash in our waterways by promoting environmental stewardship using hands-on-education and public outreach.
- Engage underserved communities to expand the GBRC audience and make future GBRC grades more inclusive of the community's needs.
- Engage underserved communities to expand conservation education opportunities.
- Improve wastewater infrastructure in vulnerable populations and throughout the community.
- Improve knowledge of spatial and temporal variations in the abundance and distribution of zooplankton in Galveston Bay.
- Improve knowledge of spatial and temporal variations of 6 p-phenylenediamine (6PPD) and 6PPD-quinone (6PPD-Q) in Galveston Bay.
- Improve knowledge of coastal management strategies and differences in long-term ecosystem service provision.
- Improve understanding of regional oyster shell recycling and handling practices.
- Improve understanding of the prevalence of Dermo in commercial and retail oysters.

FISCAL 2025 EXPECTED OUTPUTS

- Initiate the update of the GBP.
- Continue construction of the Regional Monitoring Database (RMD), containing datasets related to Galveston Bay conservation and management.
- Continue maintaining GBEP and Back the Bay websites.
- Host a two-day symposium for bay user groups and partners to share results of projects, research, and collaborations.
- Complete an action plan to determine adaptation and mitigation options for each of the risks developed as part of the Estuary Resilience Assessment Report.
- Initiate a project to implement and elevate the Clear Creek WPP through outreach and monitoring efforts.
- Continue the design and construction of two GSI demonstration sites on the HCC Katy Campus.
- Continue a soil health project to host two workshops and one field day in the Galveston Bay watershed.
- Continue a tertiary assessment of the types, quantities, and spatial distribution of microplastics in Galveston Bay and its tributaries.
- Continue to provide workshops and grant applications for improved wastewater infrastructure in vulnerable populations and throughout the community.
- Continue outreach on reducing NPS pollution by providing implementation resources for existing WBPs.
- Complete a targeted bacteria monitoring project to investigate sources of bacteria in impaired waterbodies and work with local jurisdictions to reduce or eliminate those sources.
- Complete a project to develop a Water Management Plan to address impacts to water quality and quantity in City of Houston parks.
- Conserve and protect 850 acres of habitat.
- Restore and enhance 150 acres of habitat.
- Initiate a project to evaluate habitat BMPs for the benefit of Black rails.
- Continue a project to track coastal habitat project implementation in the Galveston Bay watershed.
- Continue an assessment of population dynamics and physical stressors on sea turtle populations and productivity in Galveston Bay.
- Initiate a project to provide STEM training to teachers and young professionals.
- Initiate a water conservation outreach campaign for the City of Houston.
- Continue implementing Back the Bay.
- Continue to participate in the coordination of Trash Bash®.
- Continue developing resources to address engagement barriers with underserved populations in coastal communities.
- Continue partnerships between diverse communities for conservation.
- Continue to engage underserved and underrepresented communities to ensure a healthy bay by translating the GBRC into Vietnamese and engaging with the local Southeast Asian community.
- Complete an assessment of the spatial relationship and accumulation of microplastics along shorelines and the open waters of Galveston Bay that incorporates citizen science methodologies for monitoring and research of microplastics into classrooms.
- Complete stakeholder and community workshops to support wastewater application assistance grants to improve On-Site Sewage Facilities (OSSFs) infrastructure in vulnerable populations.
- Complete an assessment mapping project to identify schools in need of environmental education.
- Complete a project to host partner workshops and provide environmental education opportunities focused on native prairies.
- Initiate an assessment of spatial and temporal variations of 6PPD and 6PPD-Q in Galveston Bay.

- Continue an assessment of the effect of living shorelines restoration techniques on resiliency, biological communities, and contaminant loads.
- Continue an assessment of spatial and temporal variations in the abundance and distribution of zooplankton, including eastern oyster larvae, in Galveston Bay.
- Complete an assessment of spatial and temporal variation of PFAS and PPCPs in water and sediment in Galveston Bay and the Houston Ship Channel.
- Complete an assessment of the biomarkers of stress and body-burdens of PFAS in fish and shellfish collected from Galveston Bay.
- Complete an assessment of the effects of ECS on shoreline marsh species populations and how resiliency and functional aspects of living shorelines restoration projects differ in comparison to unrestored marsh and traditionally armored sites.
- Initiate an assessment on the effectiveness of long-term restoration sites in Galveston Bay.
- Initiate an assessment on the prevalence of Dermo in commercial and retail oysters.
- Development of oyster shell recycling BMPs for restoration in Galveston Bay.

FISCAL 2022–2026 EPA STRATEGIC PLAN MEASURES IMPLEMENTED

The projects proposed for fiscal 2025 implement the objective of one goal identified in the fiscal 2022–2026 EPA Strategic Plan:

Goal 5: Ensure Clean and Safe Water for All Communities.

- Objective 5.2: Protect and Restore Waterbodies and Watersheds.

As Objective 5.2 is the main goal of all NEPs, all GBEP's projects outlined in this work plan focus on maintaining, restoring, and/or improving water quality through a variety of methods including, but not limited to, habitat restoration and enhancement, water quality implementation through GI projects, and microplastics and emerging contaminants research.

TCEQ GOAL, OBJECTIVE, AND STRATEGY

TCEQ Goal 1: Assessment, Planning, and Permitting

To protect public health and the environment by accurately assessing environmental conditions, by preventing or minimizing the level of contaminants released to the environment through regulation and permitting of facilities, individuals, or activities with potential to contribute to pollution levels.

Objective 1.1: Reduce Toxic Releases

Decrease the amount of toxic chemicals released into the environment via air, water, and waste pollutants in Texas by at least two percent as comparing the current Toxic Release Inventory (TRI) values to the previous reported TRI reporting year values and reduce air, water, and waste pollutants through assessing the environment.

- Outcome Measure 1.1 oc 10: Number of acres of habitat created, restored, and protected (through implementation of Estuary Action Plans).

Strategy 1.1.2: Water Resource Assessment and Planning

Develop plans to ensure an adequate, affordable supply of clean water by monitoring and assessing water quality and availability.

- Output Measures 1.1.2 op 1: Number of surface water assessments.

FISCAL 2025 FEDERAL AND STATE FUNDING

This request is for funding in the amount of \$850,000 (federal) and \$850,000 (state) for a total equaling \$1,700,000. The match ratio for this grant is 50/50. Full-time equivalent (FTE) for the grant is seven. Tables 4 and 5 provide funding and budget details.

Table 4. Fiscal 2025 Funding and FTE Summary

Program Element	Division	Federal	State Match	Total	FTEs
GBEP Program Implementation	Water Quality Planning	\$850,000	\$850,000	\$1,700,000	7
Total		\$850,000	\$850,000	\$1,700,000	7

Table 5. Fiscal 2025 Budget Detail

Budget Detail- see also FY 25 Federal Projects	Amount (\$)
01-Salaries (excludes Fringe and Indirect)	\$437,744.00
02-Contracts	\$5,868.00
03-Travel	\$7,450.00
04-Other	\$927,800.75
05-Supplies	\$446.00
06-Equipment	\$0.00
07-Construction	\$0.00
Fringe (38.93%) and Indirect (34.33%)	\$320,691.25
Total	\$1,700,000.00

PROJECT SCHEDULE

The execution of the tasks associated with this work plan will occur over a 36-month period, which is anticipated to begin September 1, 2024, and end August 31, 2027. The exact start date of the work plan and all due dates for deliverables are contingent upon the actual date the grant funds are awarded and contracts are executed.

The projects outlined in this work plan were developed by the NRU, WSQ, PPE, and M&R subcommittees, balanced by the Budget and Priorities subcommittee, and submitted to the GBC for approval. The GBC approved the projects listed in this work plan at the October 18, 2023 quarterly meeting.

The project scopes of work will be submitted to the TCEQ QA Officer to determine which projects in the work plan will require a QAPP. Under the authority granted by EPA to TCEQ to approve QAPPs for GBEP, GBEP staff and their project partners will develop QAPPs for projects determined by TCEQ and EPA to require QAPPs. QAPPs will be developed in accordance with EPA QAPP requirements, EPA document IT/IM Directive Standard.

SECTION 3: FISCAL 2025 PROJECTS**SECTION 3.1: FISCAL 2025 PROJECTS – SUMMARY****Table 6. Fiscal 2025 Federal Projects**

PROJECT NAME	FY	FEDERAL	MATCH	TOTAL	STATUS
Program Administration (Includes supplies, travel, salary, fringe and indirect)	2025	\$383,240.62	\$383,240.63	\$766,481.25	Annual
Administrative					
1. Annual Website Hosting & Maintenance (2 websites)	2025	\$2,934.00	\$2,934.00	\$5,868.00	Annual
WSQ					
2. Enhancing Clear Creek Watershed Protection and Galveston Bay Plan through Community Engagement and Monitoring	2025	\$15,000.00	\$15,000.00	\$30,000.00	New
NRU					
3. Conservation Assistance Program 2025	2025	\$50,000.00	\$50,000.00	100,000.00	New
4. Monitoring and Managing the Threatened Eastern Black Rails in the Galveston Bay Area	2025	\$69,194.00	\$69,194.00	\$138,388.00	New
PPE					
5. Regional Coordination of the Rivers, Lakes, Bays, 'N Bayous Trash Bash	2025	\$5,000.00	\$5,000.00	\$10,000.00	Ongoing
6. Mobilizing the Environmental Education Community through Prairie Education	2025	\$40,526.16	\$40,526.15	\$81,052.31	New
M&R					
7. Monitoring to Assess Long-Term Restoration Success in Galveston Bay Wetlands	2025	\$51,954.00	\$51,954.00	\$103,908.00	New
8. Establishment of an Oyster Sentinel Program for Tracking Perkinsus marinus (Dermo) in Oysters of Galveston Bay	2025	\$148,702.17	\$148,702.16	\$297,404.33	New
9. Tracking Perkinsus marinus (Dermo) Infection in Sun-Cured Oysters: Informing Oyster Shell Recycling Programs in Galveston Bay	2025	\$83,449.05	\$83,449.06	\$166,898.11	New
FY 25 TOTAL		\$850,000.00	\$850,000.00	\$1,700,000.00	

SECTION 3.2: FISCAL 2025 PROJECTS – DETAIL

3.2A - ADMINISTRATIVE PROJECTS FOR FISCAL 2025

1. GBEP Website Hosting and Maintenance

CCMP Actions Implemented: SPO-1, SPO-2, SPO-3

Grantee/Contractor: Wilkins Group

Zip Codes: N/A

Census Tracts: N/A

Subwatersheds: N/A

Fiscal 2025 Budget: \$5,868 (\$2,934 Federal, \$2,934 State)

Total Project Budget: \$17,604 (\$17,604 from CE-00655008: fiscal 2023 \$5,868, fiscal 2024 \$5,868, fiscal 2025 \$5,868)

Milestones: N/A

Project period: September 2023 – August 2025

Status: Annual project.

Objective(s): Support or maintain two websites for public participation, education, and outreach.

Project Description: This project provides support for two websites maintained by GBEP:

- Tasks for the [GBEP](http://www.gbep.texas.gov)² website include hosting, maintenance, and updates as needed throughout the year.
- Tasks for the [Back the Bay](http://www.backthebay.org)³ website include hosting, maintenance, updates as needed throughout the year, and domain name registration.

Partners and Their Role(s): N/A

Outputs/Deliverables:

- N/A

Long-term Outcomes: N/A

3.2B - WSQ PROJECTS FOR FISCAL 2025

2. Enhancing Clear Creek Watershed Protection and Galveston Bay Plan through Community Engagement and Monitoring

CCMP Actions Implemented: NPS-1, NPS-2, NPS-4, PHA-3, SPO-2, SPO-3

Grantee/Contractor: BPA

Zip Codes: Multiple; Population 432,559

Census Tracts: Multiple; Square Miles (SM): 181.77

Subwatersheds: Clear Creek

Fiscal 2025 Budget: \$30,000 (\$15,000 Federal, \$15,000 State)

Total Project Budget: \$30,000 (\$30,000 from CE-00655008: fiscal 2025 \$30,000)

Milestones: Final Report anticipated August 2026.

² www.gbep.texas.gov

³ www.backthebay.org

Project period: September 2024 – August 2026

Status: New project.

Objective(s): To implement and elevate the ongoing Clear Creek WPP development project through community engagement and monitoring.

Project Description: By focusing on pet waste education and TST monitoring, this project seeks to improve water quality, reduce pollution, and enhance the ecological health of the Clear Creek watershed and Galveston Bay. Key activities include distributing educational materials, installing pet waste stations, and training volunteers for water quality monitoring and riparian evaluation. Through these efforts, the project will foster environmental stewardship and strengthen collaborations among stakeholders to better protect the Clear Creek watershed.

Partners and Their Role(s): BPA will coordinate the distribution of all educational materials, installation of all pet waste stations, and volunteer monitor training. H-GAC will provide advice in implementation of the project, and local homeowner associations will serve as partners in the installation of pet waste stations.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- Pet Waste Reduction Task Report due 90 days prior to end of Contract;
- TST Monitoring and Riparian Evaluation Training Task Report due 90 days prior to end of Contract; and
- Final report due August 2026.

Long-term Outcomes: Provide resources and education that directly and indirectly improve water quality across the lower Galveston Bay watershed by reducing NPS pollution.

3.2C - NRU PROJECTS FOR FISCAL 2025

3. Conservation Assistance Program 2025

CCMP Actions Implemented: HC-1, SC-1

Grantee/Contractor: GBF

Zip Codes: All; Population: 4,969,243

Census Tracts: All; SM: 5,113.35

Subwatersheds: All

Fiscal 2025 Budget: \$100,000 (\$50,000 Federal, \$50,000 State)

Total Project Budget: \$100,000 (\$100,000 from CE-00655008: fiscal 2025 \$100,000)

Milestones: Not applicable. Milestone dates for individual tasks are not applicable as project identification is a continuous task, and specific project support is applied for as needed.

Project period: September 2024 – August 2026

Status: New project.

Objective(s): To support stakeholder efforts to preserve wetlands, prairies, and other important coastal habitats to protect the long-term health and productivity of Galveston Bay.

Project Description: The Conservation Assistance Program (CAP) was initiated in 2011 and has been reauthorized in several phases through 2024. This contract includes funding to continue the program and build upon successful land conservation efforts in the Galveston Bay watershed and complete the ongoing projects underway.

Growth and development in the lower Galveston Bay watershed are accelerating land use changes from traditional open space, agricultural, and recreational uses toward residential and commercial

uses. This trend threatens the health of our ecosystems surrounding Galveston Bay and associated waterways by reducing parcel sizes and permanently altering the landscape of the region. Additionally, land prices are continuing to rise as the availability of land is reduced and demand increases. Purchasing ecologically significant parcels of land at today's prices will help us maximize the availability of federal and state conservation funding sources.

Partners and Their Role(s): The CAP workgroup is comprised of a diverse group of federal, state, local, and non-governmental organization resource managers.

Outputs/Deliverables: The overall goal of the CAP is to support GBEP and its partners' efforts to preserve wetlands and other important coastal habitats to protect the long-term health and productivity of Galveston Bay. The CAP will continue to accomplish these goals by:

- Identifying priority conservation properties with the help and consensus of conservation partners;
- Building funding strategies through grant identification, grant writing, and fundraising;
- Working with willing sellers to negotiate fee simple or conservation easement transactions;
- Carrying out legal, title, and other due diligence transaction support; and
- Finalizing the sale and transfer of title to a third-party organization or government entity.

Long-term Outcomes: Permanent conservation of coastal habitat and preservation of important hydrologic and water quality functions in lower Galveston Bay.

4. Monitoring and Managing the Threatened Eastern Black Rails in the Galveston Bay Area

CCMP Actions Implemented: HC-2, HC-3, SC-2, RES-6

Grantee/Contractor: Texas A&M University (TAMU)

Zip Codes: 77541, 77554 Galveston/Brazoria; Population: 715,659

Census Tracts: Multiple; SM: 2,482.54

Subwatersheds: Austin/Bastrop, West Bay, East Bay

Fiscal 2025 Budget: \$138,388 (\$69,194 Federal, \$69,194 State)

Total Project Budget: \$138,388 (\$138,388 from CE-00655008: fiscal 2025 \$138,388, future fiscal 2026 \$15,847)

Milestones: Final report anticipated May 2027.

Project period: September 2024 – May 2027

Status: New project.

Objective(s): To evaluate habitat management techniques and response effects on Black rail populations, as well as conducting mark-recapture studies and fecal metagenomics to understand their diet.

Project Description: The project aims to study and conserve the Black rail (*Laterallus jamaicensis*), a threatened species heavily reliant on high salt marsh habitats. The research involves using Autonomous Recording Units (ARUs) and a Forward Looking InfraRed (FLIR)-equipped drone to evaluate habitat management techniques and response effects on Black rail populations, as well as conducting mark-recapture studies and fecal metagenomics to understand their diet. The research will be carried out at multiple sites within the Galveston Bay watershed.

After consultation with appropriate refuge personnel, ARUs will be deployed to determine when Black rails recolonize an area after treatments at sites within broader management goals. A FLIR-equipped drone will also be used to survey for Black rails in control and treatment areas. Additionally, habitat (such as above-ground biomass) and landscape-level metrics (such as patch size) will be examined to further refine the understanding of how habitat quality influences Black Rail occupancy. During the non-breeding season, rope-drags will be conducted at selected locations

to determine if Black rails are present. Individuals that flush will be banded, measured, and any fecal material present will be collected and analyzed to quantify the diet.

Partners and Their Role(s): USFWS will assist with selection of study sites on USFWS-managed properties, will provide housing for field techs during field season, and will also assist with field work and will oversee some habitat enhancement activities. TPWD will provide access to Galveston Island State Park. Houston Audubon will provide access to properties on Bolivar Peninsula. Ducks Unlimited will be responsible for habitat enhancement and restoration (funded through other external grants).

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- QAPP due 60 days prior to the scheduled initiation of environmental data operations;
- Survey, Mark-Recapture, and Statistical Analysis Task Reports due February 2027; and
- Final report due May 2027.

Long-term Outcomes: Inform fire BMPs, agricultural BMPs, and facilitating marsh migration for supporting Black Rail populations.

3.2D - PPE PROJECTS FOR FISCAL 2025

5. Rivers, Lakes, Bays, 'N Bayous Trash Bash

CCMP Actions Implemented: PEA-2, PEA-3, SPO-1, SPO-3

Grantee/Contractor: H-GAC

Zip Codes: All; Population: 4,969,243

Census Tracts: All; SM: 5,113.35

Subwatersheds: All

Fiscal 2025 Budget: \$10,000 (\$5,000 Federal, \$5,000 State)

Total Project Budget: \$25,000 (\$25,000 from CE-00655008: fiscal 2024 \$15,000; fiscal 2025 \$10,000)

Milestones: Trash Bash® events will occur between March and April of each year of the project.

Project period: September 2023-August 2025

Status: Ongoing project. Planning committee meetings were held in September and November 2023, and in January, February, and March 2024. The 30th annual event was held on Saturday, March 23, 2024.

Objective(s): The goal of Trash Bash® is to promote environmental stewardship of the watershed through public education and to provide a means to clean up waterways in the Houston-Galveston area.

Project Description: Trash Bash® is a successful volunteer-based litter cleanup event that has been held at multiple sites in the Houston-Galveston area on an annual basis since 1994. In fiscal 2024, funding will go towards salary and fringe benefits for a portion of the H-GAC Trash Bash® coordinator position and other planning and volunteer training expenses.

Partners and Their Role(s): Partners for this project include H-GAC, which organizes and coordinates the event, Gulf Coast Authority, which provides equipment and t-shirts for the event, the Texas Conservation Fund, which manages the funding, and private and corporate sponsorships.

Outputs/Deliverables:

- Trash Bash® Steering Committee meeting agendas and meeting minutes due July 31 annually; and
- Final Report due August 2025.

Long-term Outcomes: Reduce the amount of trash in our waterways by promoting environmental stewardship using hands-on education and public outreach.

6. Mobilizing the Environmental Education Community through Prairie Education

CCMP Actions Implemented: SPO-1, SPO-2, SPO-3, SPO-4, PEA-1, PEA-2, PEA-3

Grantee/Contractor: Native Prairies Association of Texas (NPAT)

Zip Codes: Deer Park Prairie (DPP): 77536; UHCL: 77058

Census Tracts: DPP: 48201342900 -- SM 1.68; UHCL: 48201341304, 48201340203 -- SM 1.8

Subwatersheds: Armand-Taylor

Fiscal 2025 Budget: \$81,052.31 (\$40,526.16 Federal, \$40,526.15 State)

Total Project Budget: \$81,052.31 (\$81,052.31 from CE-00655008: fiscal 2025 \$81,052.31)

Milestones: Final report anticipated August 2026.

Project period: September 2024 – August 2026

Status: New project.

Objective(s): This project will allow NPAT to facilitate prairie education programs to increase knowledge and awareness of the ecological services provided by native coastal prairies and wetlands for K-12 students, educators, and the community at large.

Project Description: This program will increase the knowledge and awareness of native coastal prairies and wetlands and provide field experiences for both students and educators. Schools will be identified using a needs assessment conducted as part of a previous project that utilized social, environmental, and education factors to identify schools that lack access to environmental education programs.

NPAT in partnership with a subgrantee will offer three different types of field experiences in this program. Teacher and administrator workshops will provide educators and administrators with information on the ecological, historical, and cultural importance of coastal prairie ecosystems. Field trips will be offered in the fall and spring and highlight the importance of these ecosystems throughout Texas history and their current importance to people, plants, and wildlife. The Girls on the Prairie summer camp will serve minority girls and include lessons on prairies, technology, and environmental career opportunities.

Partners and Their Role(s): NPAT will develop and facilitate prairie education programs for this project. UHCL EIH will assist in the facilitation of the education programs.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- Teacher Workshops, Student Field Trips, and Girls Summer Camps Task Report due June 2026; and
- Final report due August 2026.

Long-term Outcomes: Provide education and workshops to educators, administrators, and students to increase knowledge and awareness of coastal prairies and wetlands and their importance to the Galveston Bay ecosystem.

3.2E – M&R PROJECTS FOR FISCAL 2025

7. Monitoring to Assess Long-term Restoration Success in Galveston Bay Wetlands

CCMP Actions Implemented: RES-7, RES-8, ACS-2

Grantee/Contractor: Texas A&M University at Galveston (TAMUG)

Zip Codes: 77554, 77563, 77650

Census Tracts: 48167726100, 48167726000, 48167723600, 48167723900; SM: 873.88

Subwatersheds: West Bay, South Bay

Fiscal 2025 Budget: \$103,908 (\$51,954 Federal, \$51,954 State)

Total Project Budget: \$103,908 (\$103,908 from CE-00655008: fiscal 2025 \$103,908, future fiscal 2026 \$47,253)

Milestones: Final report anticipated February 2027.

Project period: September 2024 – February 2027

Status: New project.

Objective(s): The overarching goal of this project is to assess the relationships between standard success metrics (plant cover), key restoration project design features, and ecosystem service provision in older (10+ year) restoration sites.

Project Description: As wetland restoration becomes an increasingly important part of effective and forward-looking coastal management strategies, it is vital that the best available science is used to boost near-term and long-term restoration success. Restoration projects vary widely in terms of size, soil configuration (e.g., mounds vs. continuous fill), and the inclusion of ECS such as sills or geotubes. These designs often boost emergent plant cover over near-term (5-year) scales, but links to improved ecosystem service provision over a longer time-period are largely unquantified. Furthermore, some ECS in Galveston Bay have subsided over time, thus exposing restored areas to more fetch and wave action, potentially leading to degradation of restored sites. As wetland restoration becomes an increasingly important part of effective and forward-looking coastal management strategies, it is vital that the best available science is used to boost near-term and long-term restoration success.

One of the key outcomes of this project is a robust assessment of site design features that yield successful restoration of key ecosystem services, including carbon sequestration and food web support. This outcome will generate rigorous scientific support for the design of future restoration projects and will ensure appropriate and efficient use of regional resources in ecosystem management.

Partners and Their Role(s): TAMUG will perform the tasks necessary to collect and analyze data for this project. TPWD will assist with permitting and site access.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- QAPP due 60 days prior to the scheduled initiation of environmental data operations;
- Biological Sampling and Field Surveys Task Report due January 2027; and
- Final report due February 2027.

Long-term Outcomes: Provide insight into characteristics of successful wetland restoration sites to inform future coastal management strategies.

8. Establishment of an Oyster Sentinel Program for Tracking Perkinsus Marinus (Dermo) in Oysters of Galveston Bay

CCMP Actions Implemented: RES-1, ACS-1, ACS-2

Grantee/Contractor: UHCL

Zip Codes: All; Population: 4,969,243

Census Tracts: All; SM: 5,113.35

Subwatersheds: All

Fiscal 2025 Budget: \$297,404.33 (\$148,702.17 Federal, \$148,702.16 State)

Total Project Budget: \$297,404.33 (\$297,404.33 from CE-00655008: fiscal 2025 \$297,404.33)

Milestones: Final report anticipated December 2026.

Project period: September 2024 – December 2026

Status: New project.

Objective(s): This project will monitor Dermo presence, prevalence and intensity along with estimates of freshwater inflow, salinity, water temperature, and auxiliary variables to evaluate how dermo responds to freshwater inflow in comparison to projected environmental flow standards for adaptive management use.

Project Description: The Eastern Oyster, *Crassostrea virginica* is considered to be an ecosystem engineer and keystone species providing limited hard-bottom habitat and numerous ecosystem services (e.g. wave protection, water filtration, fisheries, complex habitat, and hard bottom substrate). They are also considered a reliable bioindicator of estuarine ecosystem health which integrates the effects of freshwater inflow, pollutants, climate variability, and habitat destruction (e.g. dredging, overharvest, and shell mining) and extreme weather (e.g. droughts, floods, and storms) impacts. Oysters suffer from numerous biological and anthropogenic sources of stress and mortality. In the Gulf, the pathogenic protozoan, dermo is widely distributed throughout the oyster-producing waters of the Gulf, and the prevalence of the parasite is high among oyster populations. Consequently, it is important to understand the influence of various stressors on this critical resource.

Partners and Their Role(s): UHCL will coordinate the research for this project and lead oyster collection. TPWD Coastal Fisheries will assist with sample collection and storage. The Perry R. Bass Marine Facility will provide laboratory support for genetic analysis of dermo. Prestige Seafood will provide oysters harvested from a lease and public reefs during operations. GBF will assist with obtaining access to their restoration sites and oyster gardens.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- QAPP due 60 days prior to the scheduled initiation of environmental data operations; and
- Final report due December 2026.

Long-term Outcomes: Conduct monitoring and research on biological stressors for oysters which relates to the health of Galveston Bay's estuarine ecosystem and distribute these results to the public.

9. Tracking Perkinsus Marinus (Dermo) Infection in Sun-Cured Oysters: Informing Oyster Shell Recycling Programs in Galveston Bay

CCMP Actions Implemented: RES-1, RES-6, ACS-2

Grantee/Contractor: UHCL

Zip Codes: All; Population: 4,969,243

Census Tracts: All; SM: 5,113.35

Subwatersheds: All

Fiscal 2025 Budget: \$166,898.11 (\$83,449.05 Federal, \$83,449.06 State)

Total Project Budget: \$166,898.11 (\$166,898.11 from CE-00655008: fiscal 2025 \$166,898.11)

Milestones: Final report anticipated in August 2026.

Project period: September 2024 – August 2026

Status: New project.

Objective(s): This project will provide a characterization of current oyster shell recycling practices

in Texas and provide outreach and education related to oyster restoration. It will also expand ongoing research to track the prevalence and severity of Dermo in commercially sourced sun-cured oysters, resulting in a best practices publication for oyster restoration efforts in Galveston Bay.

Project Description: This project will research the prevalence of Dermo in commercial and retail oysters as well as evaluate a local oyster shell recycling program to determine the best method for curing shell before deploying back into Galveston Bay.

The performing party will contact organizations throughout the region to determine the current methods used to recycle and cure oyster shells currently implemented. Oyster handling processes will also be evaluated and oysters that would typically be placed back into the bay through recycling will be tested for Dermo prevalence and severity. Additionally, the performing party will work with GBF, who has conducted oyster shell recycling in the region for over 10 years, to test common curing times and methods to determine what method works best to minimize Dermo and if methods should be varied depending on the time of the year.

Partners and Their Role(s): UHCL will coordinate the research for this project. GBF will provide access to their oyster shell recycling facility and program information for the project.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- QAPP due 60 days prior to the scheduled initiation of environmental data operations;
- Oyster Shell Recycling Best Management Practices document due in July 2026;
- Dermo Experimental Work Task Report due in May 2026; and
- Final report due August 2026.

Long-term Outcomes: Provide a better understanding of the prevalence of Dermo in commercial and retail operations in the Galveston Bay region. Additionally, it will produce BMPs for oyster shell recycling that can be used in the Galveston Bay region and to guide shell recycling in other regions.

SECTION 3.3: FISCAL 2025 GRANT BUDGET SPREADSHEETS*3.3A – Fiscal 2025 Grant Budget by Category – Summary***Table 7. Fiscal 2025 Grant Budget Totals**

FY 25 Grant Budget Totals	Administration	NRU	WSQ	PPE	M&R	Total Costs
Project #	95994-05920	95994-05920	95994-05920	95994-05920	95994-05920	95994-05920
01-Salaries	\$437,744.00	\$0.00	\$0.00	\$0.00	\$0.00	\$437,744.00
02-Contracts	\$5,868.00	\$0.00	\$0.00	\$0.00	\$0.00	\$5,868.00
03-Travel	\$7,450.00	\$0.00	\$0.00	\$0.00	\$0.00	\$7,450.00
04-Other	\$150.00	\$238,388.00	\$30,000.00	\$91,052.31	\$568,210.44	\$927,800.75
05-Supplies	\$446.00	\$0.00	\$0.00	\$0.00	\$0.00	\$446.00
06-Equipment	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
07-Construction	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Subtotal	\$451,658.00	\$238,388.00	\$30,000.00	\$91,052.31	\$568,210.44	\$1,379,308.75
Fringe (38.93%)	\$170,413.74	\$0.00	\$0.00	\$0.00	\$0.00	\$170,413.74
Indirect (34.33%)	\$150,277.52	\$0.00	\$0.00	\$0.00	\$0.00	\$150,277.52
GRANT TOTAL	\$772,349.26	\$238,388.00	\$30,000.00	\$91,052.31	\$568,210.44	\$1,700,000.00

3.3B – Fiscal 2025 Grant Budget by Category – Detail

Table 8. Fiscal 2025 Grant Budget by Category - Detail

FY 25 GBEP Budget Summary by Grant Budget Category	Amount
01-Salaries	\$437,744.00
Salaries for GBEP Staff Members	\$437,744.00
02-Contracts	\$5,868.00
Website Hosting Costs	\$5,868.00
03-Travel	\$7,450.00
Travel for GBEP Program Manager to attend the Fall NEP Tech Transfer Meeting in New York/Long Island, New York	\$2,535.00
Travel for GBEP Program Manager to attend Spring EPA NEP Workshop in Washington, D.C.	\$3,115.00
Travel for GBEP Program Manager and one staff member to attend GOMA conference	\$1,800.00
04-Other	\$927,800.75
Website Domain Registration (BC 46)	\$150.00
Enhancing Clear Creek Watershed Protection and Galveston Bay Plan through Community Engagement and Monitoring	\$30,000.00
Conservation Assistance Program 2025	\$100,000.00
Monitoring and Managing the Threatened Eastern Black Rails in the Galveston Bay Area	\$138,388.00
Rivers, Lakes, Bays, 'N Bayous Trash Bash	\$10,000.00
Mobilizing the Environmental Education Community through Prairie Education	\$81,052.31
Monitoring to Assess Long-Term Restoration Success in Galveston Bay Wetlands	\$103,908.00
Establishment of an Oyster Sentinel Program for Tracking Perkinsus marinus (Dermo) in Oysters of Galveston Bay	\$297,404.33
Tracking Perkinsus marinus (Dermo) Infection in Sun-Cured Oysters: Informing Oyster Shell Recycling Programs in Galveston Bay	\$166,898.11
05-Supplies	\$446.00
PPE Supplies	\$446.00
06-Equipment	\$0.00
No Equipment Costs	\$0.00
07-Construction	\$0.00
No Construction Costs	\$0.00
Fringe and Indirect	\$320,691.25
Fringe (38.93%)	\$170,413.74
Indirect (34.33%)	\$150,277.52
FY 25 GRANT TOTAL	\$1,700,000.00

SECTION 4: ONGOING PROJECTS**SECTION 4.1: ONGOING FEDERAL PROJECTS – SUMMARY****Table 9. Ongoing Federal Projects - Summary**

PROJECT NAME	CONTRACT NUMBER	FUNDING YEARS	Award #CE-00655008 Budget		Award #CE-00655007 Budget	Award #CE-00655006 Budget	TOTAL
			FY 24	FY 23	FY 20-22	FY 17-19	
1. GBEP Website Hosting and Maintenance	N/A	2023-2025	\$5,868.00	\$5,868.00	\$17,604.00	\$0.00	\$29,340.00
10. Regional Monitoring Database	21-10088	2021-2024	\$65,523.44	\$46,733.37	\$237,971.19	\$0.00	\$350,228.00
11. Comprehensive Conservation Management Plan (CCMP) Update	24-50173	2024	\$120,000.00	\$0.00	\$0.00	\$0.00	\$120,000.00
Administration Total			\$191,391.44	\$52,601.37	\$255,575.19	\$0.00	\$499,568.00
12. Targeted Bacteria Monitoring	20-10367	2023	\$0.00	\$40,000.00	\$80,000.00	\$40,000.00	\$160,000.00
13. Digging Deeper: Addressing Soil Health to Improve Water Quality	24-50214	2024	\$57,894.00	\$0.00	\$0.00	\$0.00	\$57,894.00
14. Targeted Microplastics Monitoring in the Waters of Galveston Bay and its Tributaries	24-50171	2024	\$86,000.00	\$0.00	\$0.00	\$0.00	\$86,000.00
15. Green Stormwater Infrastructure (GSI) Demonstration Site Development for Greenspace Education in the Galveston Bay Watershed	24-50170	2024	\$82,661.00	\$0.00	\$0.00	\$0.00	\$82,661.00
16. Houston Parks and Recreation Department Water Management Plan	23-40245	2023	\$0.00	\$50,000.00	\$0.00	\$0.00	\$50,000.00
17. Townwood Park Green Stormwater Infrastructure	22-30198	2022	\$0.00	\$0.00	\$80,000.00	\$0.00	\$80,000.00

PROJECT NAME	CONTRACT NUMBER	FUNDING YEARS	Award #CE-00655008 Budget		Award #CE-00655007 Budget	Award #CE-00655006 Budget	TOTAL
			FY 24	FY 23	FY 20-22	FY 17-19	
WSQ Total			\$226,555.00	\$90,000.00	\$160,000.00	\$40,000.00	\$516,555.00
18. Conservation Assistance Program 2018-2024	18-80344	2018-2024	\$7,084.36	\$100,000.00	\$300,000.00	\$200,000.00	\$607,084.36
19. GBEP Interactive Conservation and Restoration Project Portal	24-50169	2024	\$100,000.00	\$0.00	\$0.00	\$0.00	\$100,000.00
20. White Oak Bayou Riparian Restoration Project	24-50201	2024	\$50,000.00	\$0.00	\$0.00	\$0.00	\$50,000.00
21. Blackhawk Park Habitat Restoration Project	23-40256	2023-2024	\$30,000.00	\$50,000.00	\$0.00	\$0.00	\$80,000.00
22. The Impact of Cold-Stunning Events as Physical Stressors on Sea Turtle Movement and Behavior in Galveston Bay	23-40242	2023	\$0.00	\$96,453.00	\$0.00	\$0.00	\$96,453.00
23. Sylvan Rodriguez Habitat Restoration Project Phase III	22-30257	2022-2024	\$30,000.00	\$0.00	\$75,300.00	\$0.00	\$105,300.00
NRU Total			\$217,084.36	\$246,453.00	\$375,300.00	\$200,000.00	\$1,038,837.36
5. Rivers, Lakes, Bays, 'N Bayous Trash Bash	23-40240	2024-2025	\$15,000.00	\$0.00	\$0.00	\$0.00	\$15,000.00
24. Bays to Schools	24-50165	2024	\$107,937.00	\$0.00	\$0.00	\$0.00	\$107,937.00
25. Drought and Water Conservation Outreach Campaign	24-50213	2024	\$50,000.00	\$0.00	\$0.00	\$0.00	\$50,000.00
26. Water Quality Outreach Implementation for Vulnerable Rural Populations	23-40239	2023	\$0.00	\$40,000.00	\$0.00	\$0.00	\$40,000.00

PROJECT NAME	CONTRACT NUMBER	FUNDING YEARS	Award #CE-00655008 Budget		Award #CE-00655007 Budget	Award #CE-00655006 Budget	TOTAL
			FY 24	FY 23	FY 20-22	FY 17-19	
27. Galveston Bay Report Card Vietnamese Outreach	23-40249	2023-2024	\$10,000.00	\$65,000.00	\$0.00	\$0.00	\$75,000.00
28. Engaging Diverse Communities in Conservation	23-40077	2023	\$0.00	\$58,140.00	\$0.00	\$0.00	\$58,140.00
29. Mobilizing the Environmental Education Community through Prairie Education in the Galveston Bay	22-30208	2022	\$0.00	\$0.00	\$80,000.00	\$0.00	\$80,000.00
30. Microplastics in the Galveston Bay Watershed: The Big Impacts of Tiny Pollution	21-10096	2021-2022	\$0.00	\$0.00	\$114,458.00	\$0.00	\$114,458.00
PPE Total			\$182,937.00	\$163,140.00	\$194,458.00	\$0.00	\$540,535.00
31. The Distribution and Fate of Tire Rubber-Derived Chemicals in Galveston Bay	24-50207	2024	\$98,312.00	\$0.00	\$0.00	\$0.00	\$98,312.00
32. Monitoring Ecosystem Indicators for Science-Based Restoration and Enhancement	23-40251	2023	\$42,066.00	\$88,596.12	\$0.00	\$0.00	\$130,662.12
33. Long-term Monitoring of Living Shorelines	23-40258	2023	\$0.00	\$127,791.00	\$0.00	\$0.00	\$127,791.00
M&R Total			\$140,378.00	\$216,387.12	\$0.00	\$0.00	\$356,765.12
ONGOING PROJECTS TOTAL			\$958,345.80	\$768,581.49	\$985,333.19	\$240,000.00	\$2,952,260.48

SECTION 4.2: ONGOING FEDERAL PROJECTS – DETAIL

**Red font indicates a change from Fiscal 2024 Work Plan*

4.2A – ONGOING ADMINISTRATIVE PROJECTS

10. Regional Monitoring Database

CCMP Actions Implemented: ACS-1, ACS-2

Grantee/Contractor: Houston Advanced Research Center-GeoTechnology Research Institute (HARC/GTRI)

Zip Codes: All; Population: 4,969,243

Census Tracts: All; SM: 5,113.35

Subwatersheds: All

Total Project Budget: \$350,228 (\$112,256.81 from CE-00655008: fiscal 2023 \$46,733.37, fiscal 2024 \$65,523.44; \$237,971.19 from CE-00655007: fiscal 2021 \$130,001.00, fiscal 2022 \$107,970.19)

Milestones: Final report anticipated August 2025.

Project period: January 2021 – August 2025

Status: Ongoing project. Revision 1 to the QAPP was approved on April 4, 2024. Dataset acquisition, updates, and website design have been completed for Phase One, Two, and Three of the RMD. Maintenance of the website continues with annual updates.

Objective(s): This project will establish the [Galveston Bay RMD](http://www.galvbaydata.org/)⁴, an interactive, web-based data portal through which users can view and download Galveston Bay watershed environmental data.

Project Description: This project will develop, launch, and maintain the RMD, an interactive web-based portal providing quality-assured data related to the conservation and management of Galveston Bay. The RMD will allow users to view, explore, and download data. HARC/GTRI will gather environmental datasets related to the lower Galveston Bay watershed in cooperation with federal, state, and local governments; universities; and research organizations in support of the Regional Monitoring Plan detailed in *GBP 2nd Edition*. Datasets included in the RMD will be informed by the ecosystem indicators identified in *GBP 2nd Edition*. The RMD will: assist in evaluating whether the goals and objectives of the *GBP 2nd Edition* are being met; inform future State of the Bay Reports by GBEP; and provide the public and stakeholders access to data related to management and research within the lower Galveston Bay watershed.

Partners and Their Role(s): HARC/GTRI will perform the tasks necessary to develop and launch the RMD. HARC/GTRI will consult with local stakeholders for input and feedback throughout the process.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- QAPP due March 2021;
- RMD to be released in three phases due July 2022, March 2023, and July 2023;
- Galveston Bay datasets and metadata due July 2023; and
- Final Report due August 2025.

Long-term Outcomes: Dissemination of data related to the conservation and management of Galveston Bay.

⁴ www.galvbaydata.org/

11. Comprehensive Conservation Management Plan (CCMP) Update

CCMP Actions Implemented: General support of all Action Plans

Grantee/Contractor: HARC/GTRI

Zip Codes: All; Population: 4,969,243

Census Tracts: All; SM: 5,113.35

Subwatersheds: All

Total Project Budget: \$120,000 (\$120,000.00 from CE-00655008: fiscal 2024 \$120,000.00)

Milestones: Final version of the *GBP, 2nd Edition* addendum anticipated August 2025.

Project period: September 2023-August 2025

Status: Ongoing project.

Objective(s): The objective is to update the Galveston Bay CCMP, also known as the *GBP, 2nd Edition* with updated priorities and emerging issues.

Project Description: The project will update the revised *GBP, 2nd Edition* with the information in the Finance Plan Addendum and the Galveston Bay Estuary Resilience Assessment. A stakeholder process will result in an addendum that will serve as a clear, concise update to the Action Plans within the *GBP, 2nd Edition* for GBEP and its stakeholders that reflects changing priorities and conditions within the watershed. The updated *GBP, 2nd Edition* will be built on the same framework, background, and stakeholder input critical to GBEP that includes issues like water quality, habitat preservation, the impacts of extreme storm events, microplastics, and others to reflect management strategies aimed at creating a resilient bay system. The strategies and tools identified in this plan, in concert with the collaboration, coordination, and monitoring that occur through the GBC and its subcommittees, will ensure that Galveston Bay is protected for generations to come.

Partners and Their Role(s): HARC/GTRI will perform the tasks necessary to develop the CCMP Update. HARC/GTRI will consult with local stakeholders for input and feedback throughout the process.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- List of stakeholder meetings and edits due April 2025; and
- Final Report due June 2025.

Long-term Outcomes: To update the CCMP with new and emerging priorities in the watershed utilizing results from the Estuary Resilience Action Plan.

4.2B - ONGOING WSQ PROJECTS

12. Targeted Bacteria Monitoring

CCMP Actions Implemented: NPS-1, NPS-2, NPS-3, PEA-1, PHA-3, PS-2, PS-3, RES-4, SPO-1, SPO-4

Grantee/Contractor: H-GAC

Zip Codes: Multiple; (BIG) Population

Census Tracts: Multiple; SM: 3,230.14

Subwatersheds: Multiple

Total Project Budget: \$160,000 (\$40,000 from CE-00655008: fiscal 2023 \$40,000; \$80,000 from CE-00655007: \$40,000 fiscal 2021, \$40,000 fiscal 2022; \$40,000 from CE-00655006: fiscal 2019 \$40,000)

Milestones: Final Report anticipated August 2024.

Project period: September 2019 – August 2024

Status: Ongoing project. Revision 1.0 to the QAPP was approved on March 1, 2022. Amendment Number (No.) 1 to add \$40,000 in fiscal 2021 funds and extend the contract end date to August 31, 2022, was approved on November 23, 2020. Amendment No. 2 to add \$40,000 in fiscal 2023 funds and extend the contract end date to August 31, 2024, was approved on August 30, 2022. All investigatory monitoring is complete, and preparation of the Final Report is underway.

Objective(s): The goal of the Targeted Bacteria Monitoring project is to reduce bacteria concentrations in impaired streams in the BIG project area, toward meeting contact recreation standards. The objectives of the project are to 1) investigate bacteria sources in the most bacteria-impaired waterways in the BIG project area, and 2) work with local jurisdictions to reduce or eliminate those sources.

Project Description: In its annual reports, the BIG identifies the Top 10 “Most Wanted” Streams – those designated AUs with the highest geomeans of E. coli concentrations in the BIG project area. For the past eight years, the BPA and/or H-GAC have conducted intensive bacteria monitoring within the most impaired AUs, to help move these streams back to attaining the applicable recreational water quality standards.

This project will focus on the most impaired AUs to identify relative differences in bacteria levels to narrow down the Geographic Information System (GIS) location of potential sources. When potential sources are identified, the information will be passed on to local authorities in a targeted monitoring report. H-GAC will encourage local jurisdictions to investigate any identified sources and will report back on any action taken to address the identified source(s).

Partners and Their Role(s): H-GAC will partner with the BPA on implementation of the project, with H-GAC in a primary technical advisory role and Student Conservation Association (SCA) interns will conduct sampling.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- Findings and preliminary action report due May 2020;
- Outreach and education summary due June 2022;
- Targeted monitoring report due August 2024; and
- Final Report due August 2024.

Long-term Outcomes: Significantly reduce bacteria levels in impaired streams of the BIG project area and help move these streams back to attaining the applicable recreational water quality standards. Promote the importance of bacteria reduction efforts to other jurisdictions and the public.

13. Digging Deeper: Addressing Soil Health to Improve Water Quality

CCMP Actions Implemented: NPS-1, NPS-4, PHA-3, HC-3, FWI-3, SPO-2

Grantee/Contractor: Texas AgriLife

Zip Codes: All; Population: 4,969,243

Census Tracts: All; SM: 5,113.35

Subwatersheds: All

Total Project Budget: \$57,894 (\$57,894 from CE-00655008: fiscal 2024 \$57,894)

Milestones: Final Report anticipated August 2025.

Project period: September 2023 – August 2025

Status: Ongoing project. Contract kickoff meeting anticipated May 2024.

Objective(s): This project aims to bring education on land management practices to

urban/suburban landowners and practitioners that will help to improve soil health and reduce both stormwater runoff and NPS pollution in the lower Galveston Bay watershed.

Project Description: Through the process of development, urban and suburban soils have become degraded, compacted, depleted of organic matter, and frequently removed of topsoil. Healthy soil is a key component of functioning ecosystems, especially as it relates to water quality. Unfortunately, it is often ignored as a contributing factor. Even proponents of GI struggle to make the connection between GI, NPS reduction, and soil health. Healthy soil reduces erosion, increases infiltration rates, improves soil water holding capacity, and contains a plethora of microorganisms that break down pollutants, fix nitrogen, and filter contaminants from stormwater runoff; all key factors in reducing microbial, sediment, and nutrient export to streams.

The use of nature-based GI solutions is increasing along the Texas Coast. As more entities begin to explore these methods, it is important that we use and expand upon available resources to fill existing knowledge gaps surrounding soil health. Soil health resources are plentiful for agricultural producers, but should be reimagined for urban and suburban areas, including the well-established five principles of soil health (i.e., soil armor, minimizing soil disturbance, plant diversity, continual live plant/root, and livestock integration).

The lower Galveston Bay watershed has a multitude of urban and suburban communities and numerous impaired waterbodies, most of which have a WBP and groups actively working to improve water quality. These factors make it an excellent location to pilot a new type of soil health workshop. Workshops will encourage a vision of lawns, landscaped areas, and tracts of undeveloped land as productive ecosystems. This project is a first step in bringing soil back into the conversation for urban and suburban landowners. Implementation of these practices would have a profound impact on local water quality by reducing both stormwater runoff and NPS pollution.

Partners and Their Role(s): Texas AgriLife will host a series of soil health workshops geared toward the suburban/urban landscape.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- Workshop and field day materials due 14 days prior to public dissemination;
- Workshop and field day attendance lists due 14 days after event; and
- Final Report due August 2025.

Long-term Outcomes: Provide education opportunities on land management practices to urban/suburban landowners and practitioners.

14. Targeted Microplastics Monitoring in the Waters of Galveston Bay and its Tributaries

CCMP Actions Implemented: NPS-1, PHA-4, PHA-5, RES-1, RES-2, RES-3

Grantee/Contractor: USGS

Zip Codes: All; Population: 4,969,243

Census Tracts: All; SM: 5,113.35

Subwatersheds: All

Total Project Budget: \$86,000 (\$86,000 from CE-00655008: fiscal 2024 \$86,000)

Milestones: Data release and Final Project Summary anticipated May 2026.

Project period: September 2023 – May 2026

Status: Ongoing project. Contract kickoff meeting anticipated May 2024. Development of the QAPP is underway.

Objective(s): This project seeks to expand upon past studies conducted by USGS in cooperation with GBEP and fill the gaps in our understanding of the spatial and temporal distribution of microplastics

in Galveston Bay and its tributaries.

Project Description: Litter and trash, such as plastics, are issues of concern in Galveston Bay and its tributaries. Microplastics, which are plastic particles less than five millimeters in diameter, are of increasing concern. These small particles, which are derived from degradation or mechanical breakdown of larger plastic objects or particles, are introduced to waterways through urban runoff, wastewater effluent, and in situ weathering. The long-term effects of microplastics in the environment are currently not well known; however, potential effects have resulted in an increasing interest in understanding the extent and magnitude of their presence and their potential for bioaccumulation and disruption to ecosystem services.

To better understand the spatial distribution and abundance of microplastics in Galveston Bay, USGS, in cooperation with GBEP, began a study in fiscal 2020 that assessed the occurrence of microplastics in the tributaries leading to Galveston Bay. A second study was conducted in fiscal 2021 that targeted locations in the open waters of Galveston Bay. The purpose of this project is to expand upon these studies and fill the gaps in our understanding of the spatial and temporal distribution of microplastics in Galveston Bay and its tributaries by:

- Targeting tributaries and locations in the bay that could not be included in the previous two studies.
- Potentially revisiting sites of interest based on analytical results and/or identified patterns in the previous two studies.
- Targeting new locations based on findings of other GBEP funded projects.

Targeting tributaries and bay locations not monitored in previous studies will not only fill gaps in our understanding of the spatial distribution of microplastics in the region, but also provide information to evaluate the extent to which each watershed contributes to the delivery of microplastics to Galveston Bay. By revisiting sites of interest, temporal variations, and the influence of hydrologic conditions on microplastic concentrations may be assessed. This assessment may serve as the foundation for future studies and evaluation of potential mitigation strategies.

Partners and Their Role(s): USGS will perform the tasks necessary for sample collection. Collected samples will be submitted to OphthoKhemia Analytical laboratory for analysis.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- QAPP due 60 days prior to the scheduled initiation of environmental data operations;
- Data release due May 2026; and
- Final Project Summary due May 2026.

Long-term Outcomes: Provide an assessment of the types, quantities, and spatial distribution of microplastics in Galveston Bay and its tributaries.

15. Green Stormwater Infrastructure (GSI) Demonstration Site Development for Greenspace Education in the Galveston Bay Watershed

CCMP Actions Implemented: NPS-2, NPS-3, PEA-2

Grantee/Contractor: Texas Water Resources Institute (TWRI)

Zip Codes: 77449

Census Tracts: 48201542500; SM: 1.36

Subwatersheds: Barker Reservoir

Total Project Budget: \$82,661 (\$82,661 from CE-00655008: fiscal 2024 \$82,661)

Milestones: Construction and design of a minimum of two GSI demonstration sites on the HCC Katy Campus anticipated May 2026. Final Report anticipated May 2026.

Project period: September 2023 – May 2026

Status: Ongoing project. Contract kick-off meeting scheduled for May 2024.

Objective(s): Texas AgriLife will coordinate with HCC to develop a minimum of two different types of GSI demonstration sites on the HCC Katy Campus that can be used to provide Galveston Bay developers, green industry professionals, residents, and homeowner associations with the knowledge necessary for these groups to implement practices in their neighborhoods, public spaces, and occupations that will lead to a reduction of bacteria, nutrient loads, and sediment in stormwater runoff.

Project Description: According to the Trust for Public Land, Houston ranked number one in the nation for total greenspace among cities of comparable density. While these spaces can be found throughout the city, the implementation of GSI within greenspaces has not been prioritized by developers. GSI in greenspaces can help prevent the negative impacts of stormwater runoff on our nearby waterways. Impacts primarily include elevated bacteria levels, high nutrient loading from fertilizers, excess sediment from soil erosion, and accumulation of litter and trash. Therefore, it is imperative that residents, homeowner associations, green industry professionals, developers, and watershed coordinators have access to a space that demonstrates different types of GSI for greenspace stormwater mitigation. This will not only promote their implementation in existing master planned communities and public spaces but also inform developers for future projects.

Soil Crop Sciences (SCSC), TWRI, and Biological and Agricultural Engineering (BAEN) at Texas AgriLife plan to coordinate with HCC to develop a minimum of two different types of GSI demonstration sites for greenspaces at the HCC Katy Campus. Interactive signage will also be developed for each demonstration site to promote informal learning around the design and function of GSI elements. BAEN, SCSC, and TWRI will also work closely with the Harris County horticulture agents and the Texas Community Watershed Partners to consult on the demonstration sites' design and procuring supplies and plants for development. The students in the landscape design program at HCC will spearhead upkeep and maintenance of the project area after the project period.

Partners and Their Role(s): Texas AgriLife will work closely with the Harris County horticulture agents and the Texas Community Watershed Partners to consult on the demonstration sites design and procuring equipment and plants for development. Texas AgriLife will coordinate with HCC on construction logistics and maintenance.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- Project Work Plan due October 2023;
- GSI demonstration site design due 30 days prior to construction;
- Construction workshop materials due 14 days prior to distribution;
- Photos of GSI construction due with quarterly progress reports; and
- Final Report due May 2026.

Long-term Outcomes: Construct GSI demonstration sites that can be used to educate regional developers, green industry professionals, residents, and homeowner associations on greenspace management practices.

16. Houston Parks and Recreation Department Water Management Plan

CCMP Actions Implemented: NPS-1, NPS-3

Grantee/Contractor: HPARD

Zip Codes: Multiple; (City of Houston) - Population: 2,329,901

Census Tracts: Multiple; SM: 671.67

Subwatersheds: Multiple

Total Project Budget: \$50,000 (\$50,000 from CE-00655008: fiscal 2023 \$50,000)

Milestones: Final Report anticipated May 2025.

Project period: September 2022 – May 2025

Status: Ongoing project. The secured subcontractor is currently developing the Water Management Plan.

Objective(s): The goal of this project is to develop a Water Management Plan that will establish strategies for addressing impacts to water quality and quantity in City of Houston parks.

Project Description: HPARD owns and/or manages 380 parks throughout Houston with a footprint of over 25,000 acres. The parks fall within numerous watersheds and over 70 are immediately adjacent to a major bayou or tributary that flows into Galveston Bay. HPARD's Natural Resources Management Program is tasked with delivering solutions to water quality and quantity problems for the department in the form of nature-based and GI projects. To support increasing numbers of GSI features throughout Houston's park system, HPARD has identified the need for a Water Management Plan that will provide guidance and establish strategies for addressing impacts to water quality and quantity throughout the park system and rights-of-way in Houston.

Partners and Their Role(s): HPARD will secure and oversee a subcontractor that will develop a Water Management Plan for Houston parks and its rights-of-way.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- Stakeholder meeting materials submitted with progress reports;
- Water Management Plan due February 2024; and
- Final Report due May 2024.

Long-term Outcomes: Provide a framework for nature-based infrastructure goals that will reduce sources of NPS pollution into Houston's waterways, reduce pollution and sediment loads via runoff, and create a drought contingency plan, including prescribed burns.

17. Townwood Park Green Stormwater Infrastructure

CCMP Actions Implemented: NPS-3

Grantee/Contractor: HPARD

Zip Codes: 77045; Population: 2,201

Census Tracts: 48201330500; SM: 0.54

Subwatersheds: Sims

Total Project Budget: \$80,000 (\$80,000 from CE-00655007: fiscal 2022 \$80,000)

Milestones: Final Report submitted March 7, 2024.

Project period: September 2021 – May 2024

Status: Ongoing project. Amendment No. 1 to add \$25,000 in fiscal 2022 funds and modify the scope of work was approved on November 4, 2022. Construction of the bioswale is complete.

Objective(s): The project will create a GSI demonstration feature to support future implementation of similar projects in parks and private development in Houston.

Project Description: HPARD will create a bioretention demonstration project in Townwood Park to slow stormwater runoff and support infiltration and water retention. Native grasses and forbs, collected locally and propagated by HPARD, will be installed to provide beautification, infiltration, and water quality improvements in the systems. HPARD will work with staff and volunteers to amend the soil and install a mix of native shrubs, grasses, and wildflowers. Interpretive signage will be installed adjacent to each feature to identify them as City approved GSI examples for the

incentive program. The signs will provide information on the functions of GSI, the connections of Houston's watersheds to Galveston Bay, and the role that community members play in protecting our waterways. The project will tackle water quality, habitat creation, and community education.

Partners and Their Role(s): HPARD will secure and oversee a subcontractor that will develop a Water Management Plan for Houston parks and its rights-of-way.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- Project work plan within 30 days of contract execution; and
- Final Report due May 2024.

Long-term Outcomes: HPARD will provide project management and maintenance of the GSI features. They will also provide native herbaceous plants for the project.

4.2C - ONGOING NRU PROJECTS

18. Conservation Assistance Program 2018 - 2024

CCMP Actions Implemented: HC-1, HC-2, HC-3, SC-1, SC-2

Grantee/Contractor: GBF

Zip Codes: All; Population: 4,969,243

Census Tracts: All; SM: 5,113.35

Subwatersheds: All

Total Project Budget: \$607,084.36 (\$107,084.36 from CE-00655008: fiscal 2023 \$100,000, fiscal 2024 \$7,084.36; \$300,000 from CE-00655007: fiscal 2020 \$100,000, fiscal 2021 \$115,000, fiscal 2022 \$85,000; \$200,000 from CE-00655006: fiscal 2018 \$100,000, fiscal 2019 \$100,000)

Milestones: Not applicable. Milestone dates for individual tasks are not applicable as project identification is a continuous task, and specific project support is applied for as needed.

Project period: September 2017 – August 2024

Status: Ongoing project. A no-cost extension to August 31, 2024, was executed on January 20, 2023. A CAP workgroup meeting was held on December 15, 2023. Another meeting is being planned for May 2024. GBF coordinated with project partners to plan the workgroup meetings and discuss ongoing projects and future conservation priorities. GBF is working to advance land protection projects within the Galveston Bay watershed and to support regional conservation partners.

Objective(s): The goal of this project is to place 2,500 acres of coastal habitat in the Galveston Bay area in permanent conservation.

Description: The overall goal of the CAP is to support GBEP and its partners' efforts to preserve wetlands and other important coastal habitats to protect the long-term health and productivity of Galveston Bay. The CAP will continue to accomplish these goals by:

- Identifying priority conservation properties with the help and consensus of conservation partners;
- Building funding strategies through grant identification, grant writing, and fundraising;
- Working with willing sellers to negotiate fee simple or conservation easement transactions;
- Carrying out legal, title, and other due diligence transaction support; and
- Finalizing the sale and transfer of title to a third-party organization or government entity.

Partners and Their Role(s): The CAP workgroup is comprised of a diverse group of federal, state, local, and non-governmental organization resource managers.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration; and

- Annual Report(s) due August 31 until contract expiration.

Long-term Outcomes: The permanent conservation of coastal habitat and preservation of important hydrologic and water quality functions in lower Galveston Bay.

19. GBEP Interactive Conservation and Restoration Project Portal

CCMP Actions Implemented: HC-2, HC-3

Grantee/Contractor: HARC/GTRI

Zip Codes: All; Population: 4,969,243

Census Tracts: All; SM: 5,113.35

Subwatersheds: All

Total Project Budget: \$100,000 (\$100,000 from CE-00655008: fiscal 2024 \$100,000)

Milestones: Final Spatial Resource Hub (SRH) Portal anticipated February 2026. Final Executive Summary anticipated March 2026.

Project period: September 2023 – May 2026

Status: Ongoing project. The QAPP kickoff meeting was held on January 23, 2024, and the QAPP is under development.

Objective(s): This GIS-based project will aid in habitat conservation, restoration, and enhancement by documenting where existing GBEP projects have been implemented and make that information, along with details about GBEP projects, easily accessible to GBEP and its stakeholders through an updated geodatabase.

Project Description: Currently, associated project details have been captured in the GBEP Projects Database and the Implementation Tracking Viewer (ITV). This project will leverage the newly released Esri Hub Portal platform in combination with an ArcGIS Dashboard to provide interactive and dynamic data visuals, maps, and other summarized information/conservation variables (e.g., total number of acres by project type, number of projects by watershed). The expansion of the ITV to include an SRH will be developed in coordination with Black Cat GIS as the subgrantee of HARC/GTRI. In the SRH, spatial information will be combined with a dashboard of summary statistics, explanatory text, project photos, and data related to each project (as available). Filters for each of the subcommittees will make data easier to find and the SRH easier to use. Custom tools will allow the viewer to quickly sort projects, tally statistics, find final reports, and view special subsets of data. In addition to making another valuable dataset available to GBEP stakeholders, the SRH will add value and utility to the GBEP projects dataset by enhancing spatial content.

Partners and Their Role(s): HARC/GTRI will perform the tasks necessary to develop and launch the SRH. HARC/GTRI will consult with local stakeholders for input and feedback throughout the process.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- QAPP due 60 days prior to the scheduled initiation of environmental data operations;
- Datasets and associated metadata due September 2024;
- SRH Portal due February 2026; and
- Final Executive Summary due March 2026.

Long-term Outcomes: Enhanced tracking and public transparency of habitat conservation, restoration, and enhancement activities in the Galveston Bay watershed.

20. White Oak Bayou Riparian Restoration Project

CCMP Actions Implemented: HC-2, HC-3, SC-1, SC-2

Grantee/Contractor: City of Houston/HPARD

Zip Codes: TC Jester Park: 77092, 77018; Little Thicket Park: 77008

Census Tracts: TC Jester Park: 48201531200; Little Thicket Park: 48201511100; SM: 0.6

Subwatersheds: White Oak

Total Project Budget: \$50,000 (\$50,000 from CE-00655008: fiscal 2024 \$50,000)

Milestones: Final Report anticipated May 2026.

Project period: September 2023 – May 2026

Status: Ongoing project. The work plan was submitted on March 5, 2024, and work will begin Spring 2024.

Objective(s): This project will restore approximately 13 acres of riparian habitat within TC Jester Park and Little Thicket Park along White Oak Bayou in Harris County, Texas.

Project Description: The White Oak Bayou Riparian Restoration project will restore 4.6 acres of riparian forest at TC Jester Park and enhance nine acres of riparian forest at Little Thicket Park by performing invasive species removal and native species planting to support resident and migratory wildlife. The historic riparian habitat along White Oak Bayou seen on aerial imagery from the 1940's was removed with bayou channelization and adjacent urban development by the 1970's. The land that is now TC Jester Park once consisted of thick, native riparian forest. The park now contains regularly mowed, non-native lawn grass with sparse trees. Little Thicket Park, once the location of the original channel of White Oak Bayou, now acts as a tributary to the concrete channel that is now the main course of the bayou. This park has recently undergone a project to stabilize the banks of the tributary. The existing forest contains a large percentage of invasive species.

Partners and Their Role(s): HPARD will provide project management and oversight of management activities at TC Jester and Little Thicket Parks.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- Project Work Plan within 30 days of contract execution; and
- Final Report due May 2026.

Long-term Outcomes: Provide benefits for native vegetation and wildlife by restoring and enhancing 13 acres of riparian habitat that is degraded by invasive vegetation to increase the overall function.

21. Blackhawk Park Habitat Restoration

CCMP Actions Implemented: HC-2, HC-3, SC-1, SC-2

Grantee/Contractor: HPARD

Zip Codes: 77075

Census Tracts: 48201333904; SM: 0.37

Subwatersheds: Clear Creek

Total Project Budget: \$80,000 (\$80,000 from CE-00655008: fiscal 2023 \$50,000, fiscal 2024 \$30,000)

Milestones: Final Report anticipated May 2025.

Project period: September 2022 – May 2025

Status: Ongoing project. An amendment to add \$30,000 and extend the project to August 31, 2025, is under development. Herbicide contractors are being bid out. HPARD hosted a community event on February 24, 2024, and 32 volunteers planted 1,250 plants in the prairie. HPARD also hosted a planting workday with school groups provided by the National Wildlife Federation on December 5,

2023, where 15 volunteers planted 500 plants.

Objective(s): The goal of this project is to restore 30 acres of coastal prairie and riparian habitat within Blackhawk Park (Harris County, Texas).

Project Description: HPARD will restore and enhance habitat in the lower Galveston Bay watershed by performing invasive species removal to support resident and migratory wildlife. The project will utilize subcontractors, interns, and/or community volunteers to complete the work.

Historic aerial imagery dating back to 1944 shows Blackhawk Park and the surrounding areas contained coastal prairie pothole habitat, a critically endangered ecosystem. Residential development now surrounds the park, and the historic prairie ecosystem has been converted to non-native forest dominated by Chinese Tallow (*Triadica sebifera*) and Privet species (*Ligustrum sp.*). The eastern edge of the park borders a drainage feature that flows downstream into Clear Creek.

The project will expand the footprint of an existing GBEP-funded habitat restoration at Blackhawk Park (10 acres). This will not only result in a larger piece of habitat that provides more significant wildlife habitat and ecosystem services, but also will reduce the amount of invasive species intrusion into the section of the park that is already restored.

Partners and Their Role(s): HPARD will provide project management and oversight of management activities at Blackhawk Park.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- Project Work Plan within 30 days of contract execution; and
- Final Report due May 2025.

Long-term Outcomes: Provide benefits for native vegetation and wildlife by restoring and enhancing 30 acres of coastal prairie and riparian habitat that is degraded by invasive woody vegetation to increase the overall function as habitat for grassland-dependent species.

22. The Impact of Cold-Stunning Events as Physical Stressors on Sea Turtle Movement and Behavior in Galveston Bay

CCMP Actions Implemented: SC-2, RES-5

Grantee/Contractor: TAMUG

Zip Codes: All; Population: 4,969,243

Census Tracts: All; SM: 5,113.35

Subwatersheds: All

Total Project Budget: \$96,453 (\$96,453 from CE-00655008: fiscal 2023 \$96,453)

Milestones: Final Report anticipated in May 2025.

Project period: May 2023 – May 2025

Status: Ongoing project. The QAPP was approved on October 19, 2023. Data collection is underway.

Objective(s): The goal of the project is to characterize the physical stressors related to cold-stunning events that drive sea turtle movement and continue a newly established long-term mark and recapture program that provides data on population demographics and sea turtle health.

Project Description: The Houston-Galveston region experienced an historic winter storm that resulted in an exceptional “cold-stunning” event with a widespread kill of numerous marine species. In total, approximately 13,500 sea turtles in Texas were impacted by the sudden and extended drop in air and water temperatures from winter storm Uri. Generally, cold events are common physical and biological stressors in the Galveston Bay Estuary System (GBES) that occur almost every year. However, these events appear to be increasing in intensity, duration, and frequency, as

demonstrated in February 2021 with winter storm Uri. To further explore how sea turtles respond to these annual stressors, TAMUG will deploy satellite tags that collect geolocation, and temperature and they will also deploy depth sensors onto sea turtles of varying life history stages in the GBES. The goal is to characterize the physical and biological stressors related to cold-stun events that drive sea turtle movement.

Partners and Their Role(s): TAMUG will perform the tasks necessary to collect and analyze data for this project.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- QAPP due July 2023;
- Preparation and Deployment of Satellite Tags due February 2025;
- Statistical Analysis due February 2025; and
- Final Report due April 2025.

Long-term Outcomes: Insight into population dynamics and physical stressors on species populations and productivity.

23. Sylvan Rodriguez Habitat Restoration Project Phase III

CCMP Actions Implemented: HC-2, HC-3, SC-1, SC-2

Grantee/Contractor: HPARD

Zip Codes: 77062

Census Tracts: 48201340202; SM: 3.29

Subwatersheds: Armand-Taylor

Total Project Budget: \$105,300 (\$75,300 from CE-00655007: fiscal 2022 \$75,300; \$30,000 from CE-0065500: fiscal 2024 \$30,000)

Milestones: Final Report anticipated **May 2025**.

Project period: September 2021 – **May 2025**

Status: Ongoing project. An amendment to add \$30,000 and extend the project to May 31, 2025, is under development. The project work plan was submitted on March 2, 2022. The vegetation assessment was completed on April 13, 2022, and the hydro-ax contractor work was completed on September 20, 2022. Monthly volunteer workdays at the park take place on the second Wednesday of each month. A prescribed fire was performed on December 13, 2023. HPARD hosted a community event on December 20, 2023, where two volunteers planted 200 plants, and on February 14, 2024, where five volunteers planted 350 plants.

Objective(s): To complete the restoration of the final 19 acres of the Sylvan Rodriguez Habitat Restoration Project. This project supports HPARD's overall goal of restoring natural ecosystem function to mitigate flooding, improve water quality, and enhance wildlife habitat.

Project Description: Sylvan Rodriguez Park is a 113.5-acre park acquired by the City of Houston on December 30, 1991. According to historical aerial imagery, the park consisted of coastal prairie habitat at the time of acquisition. Numerous prairie potholes and drainage features can be seen throughout the site in the historical photos dating back to 1944. In the absence of natural processes such as fire and intermittent grazing, the park became inundated by Chinese tallow and other woody vegetation. By the mid-2000s, HPARD had developed the southwestern portion of the park, which included two lacrosse fields, parking areas, restrooms, a retention pond, and trails.

HPARD is currently working on a multi-phased project that will result in 72 acres of coastal prairie and riparian habitat. This phase (Phase III) of the project will complete the restoration of the final 19 acres of prairie. A hydro-ax contractor will chip invasive tree species, leaving a mulch layer that will improve soil quality and provide the basis for a new prairie habitat. An herbicide contractor will

treat the cut stumps and remove any invasive species that appear at the site after chipping occurs. The site will be seeded with native prairie plant species and will be planted with grasses and forbs. HPARD will host two community planting events to educate the community on the importance of prairie habitat and promote stewardship and appreciation of nature parks in local communities.

Partners and Their Role(s): HPARD will provide project management and oversight of management activities at Sylvan Park. They will also provide native herbaceous plants for the project.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- Project Work Plan within 30 days of contract execution; and
- Final Report due **May 2025**.

Long-term Outcomes: Provide benefits for native vegetation and wildlife by restoring 12.5 acres of open grassland habitat that was degraded by invasive woody vegetation and enhancing 6.5 acres of existing grassland to increase the overall function as habitat for grassland-dependent species. The project will also provide opportunities to educate residents on the importance of prairie habitat and promote stewardship and appreciation of nature parks in local communities.

4.2D - ONGOING PPE PROJECTS

24. Bays to Schools

CCMP Actions Implemented: PEA-3

Grantee/Contractor: GBF

Zip Codes: All; Population: 4,969,243

Census Tracts: All; SM: 5,113.35

Subwatersheds: All

Total Project Budget: \$107,937 (\$107,937 from CE-00655008: fiscal 2024 \$107,937)

Milestones: Final Report anticipated August 2025.

Project period: September 2023 – August 2025

Status: Ongoing project. The contract was executed on January 31, 2024. In January 2024 an SCA intern was hired to implement programing and has since completed educational student workshops at 13 different schools. GBF, SCA, and UHCL have developed recruitment and workshop materials for planning future events as well as presented at local conferences to promote the program.

Objective(s): The objectives of GBF's Environmental STEM Education programs are to instill knowledge and appreciation of the Galveston Bay ecosystem, inspire participants to break down barriers and open themselves to new experiences, and empower students to become life-long advocates for a resilient Galveston Bay.

Project Description: This project will increase the capacity of GBF's STEM Workshop program by employing SCA interns to implement programs in underrepresented school districts, provide on-the-job training and mentorships for SCA interns, strengthen relationships with participating school districts, provide educator professional development, and amplify opportunities for project promotion and publicity via literature and conference presentations by UHCL and project partners. GBF's Environmental STEM Education programs provide classroom and place-based STEM environmental education focused on Galveston Bay to over 10,000 students and teachers each year. The goal of this project is to directly reach at least 4,800 students and teachers via classroom STEM workshops and teacher professional development, indirectly reach up to 4,000 students via teachers implementing lessons learned through teacher professional development, and train two SCA interns in environmental education best practices during this project.

Partners and Their Role(s): SCA will hire two interns to assist GBF's education team; UHCL will

document program implementation and develop materials about the project for publication.

Outputs/Deliverables:

- Intern final task report due June 2025;
- Classroom STEM Workshop final task report due June 2025;
- Teacher Professional Development Workshop final task report due June 2025;
- Project Literature and Presentation final task report due June 2025; and
- Final Report due August 2025.

Long-term Outcomes: To increase public knowledge and education about the importance of Galveston Bay watershed and estuary by providing STEM training to teachers and young professionals as well as help facilitate future Galveston Bay estuary-related careers on environmental education.

25. Drought and Water Conservation Outreach Campaign

CCMP Actions Implemented: SPO-2, SPO-4, PEA-1, PEA-2, PEA-3, FWI-3

Grantee/Contractor: City of Houston Public Works

Zip Codes: Multiple; (City of Houston) - Population: 2,329,901

Census Tracts: Multiple; SM: 671.67

Subwatersheds: Multiple

Total Project Budget: \$50,000 (\$50,000 from CE-00655008: fiscal 2024 \$50,000)

Milestones: Final Report anticipated May 2025.

Project period: September 2023 – May 2025

Status: Ongoing project. The contract was executed on January 2, 2024.

Objective(s): This project will fund a digital marketing and advertising agency to create a Drought and Water Conservation Outreach Campaign tailored to the greater Houston area. This funding will expand on the \$50,000 budget which has been secured for fiscal 2023 to begin the strategy and development of the campaign.

Project Description: This contract will allow the City of Houston to expand the reach of the Drought Contingency Plan and Water Conservation Campaign for the Houston area. Contract funding will be used for the creation of more collateral materials as well as more paid advertising to increase the reach and effectiveness of the campaign. Due to the constrained budget the initial campaign will need to focus on the main methods of water conservation outlined in the Drought Contingency Plan (limiting outdoor irrigation, only watering between the hours of 7:00 p.m. and 5:00 a.m., reducing irrigation runoff, and repairing water leaks). The increased funding for creative design will expand the campaign to touch on secondary water conservation methods such as rain barrels, native plants, smart irrigation, and others.

Partners and Their Role(s): Versa Creative will develop the outreach campaign materials and advertising plan to support the City of Houston's existing [Give Water A Break](https://www.houstonpublicworks.org/give-water-break)⁵ campaign.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- Outreach campaign designs and materials provided for project manager review 14 days prior to production;
- Advertising plan provided for project manager review 30 days prior to commencement of advertising; and;

⁵ www.houstonpublicworks.org/give-water-break

- Final Report due May 2025.

Long-term Outcomes: To raise awareness of water conservation throughout the City of Houston, the means and methods of implementing water conservation strategies, and how it benefits the region.

26. Water Quality Outreach Implementation for Vulnerable Rural Populations

CCMP Actions Implemented: SPO-2, SPO-3, SPO-4, PEA-1, PEA-2

Grantee/Contractor: H-GAC

Zip Codes: All; Population: 4,969,243

Census Tracts: All; SM: 5,113.35

Subwatersheds: All

Total Project Budget: \$40,000 (\$40,000 from CE-00655008: fiscal 2023 \$40,000)

Milestones: Final Report anticipated May 2025.

Project period: September 2022 – May 2025

Status: Ongoing project. Vulnerable communities Liverpool and Brazoria County were identified. Stakeholder planning meetings with the Mayor of Liverpool and Actions, Inc. to develop workshop materials, advertisement, and resources were completed. A workshop was held on March 8, 2024.

Objective(s): The goal of this project is to identify and work with some of the most vulnerable populations in the coastal communities struggling with failing or insufficient wastewater treatment. It is also to identify local partners and new engagement strategies to provide education and resources to those communities and individuals not reached by current project materials, and to work with local governments to assist them in finding community-wide solutions to these problems.

Project Description: The Coastal Communities Water Quality Outreach project was designed to support implementation of management measures and outreach requirements in WBPs. This proposed project aims to identify more underserved populations and test different engagement strategies to determine what barriers prevented engagement. Resources would then be adapted or developed to specifically address those barriers, whether they are language limitations, lack of reliable internet or transportation, etc. Engagement with these populations will provide information on all focus topics of the Coastal Communities project. However, residents will be targeted primarily based on low-income levels and high risk of OSSFs in need of repair or replacement, which can have detrimental effects on resident and public health, and local waterways. Partnerships with local organizations and institutions will assist with identifying audiences and developing or testing engagement strategies. In this proposed project, H-GAC will expand the coastal communities support of WBP implementation.

Partners and Their Role(s): Project activities will supplement previous work conducted from the H-GAC WBP, TMDL, Clean Rivers Program, and Water Quality Management Plan funding and resources as appropriate. H-GAC has developed several public and private partnerships to provide resources and funding streams to support the goals of the Coastal Communities Water Quality Outreach project, of which this is an extension.

Outputs/Deliverables:

- Quarterly progress reports due until contract expiration;
- List of vulnerable populations submitted February 2023;
- Stakeholder meeting materials due 14 days prior to distribution;
- Community Partners workshop materials due 14 days prior to distribution;
- Outreach materials due 14 days prior to distribution;
- OSSF workshop materials due 14 days prior to distribution;
- Wastewater grant application assistance workshop materials due 14 days prior to distribution; and

- Final Report due May 2025.

Long-term Outcomes: Improve wastewater infrastructure in vulnerable populations and throughout the community.

27. Galveston Bay Report Card Vietnamese Outreach

CCMP Actions Implemented: SPO-2, SPO-3, PEA-1, PEA-2

Grantee/Contractor: HARC/GTRI

Zip Codes: All; Population: 4,969,243

Census Tracts: All; SM: 5,113.35

Subwatersheds: All

Total Project Budget: \$75,000 (\$75,000 from CE-00655008: fiscal 2023 \$65,000; fiscal 2024 \$10,000)

Milestones: Final Report anticipated March 2025.

Project Period: September 2022 – March 2025

Status: Ongoing project. The QAPP was approved on September 6, 2023. An amendment to add \$10,000 to expand outreach to Vietnamese communities was executed on March 28, 2024. The Vietnamese communities engaged ranged from crabbers and commercial fisheries to student groups associated with the Vietnamese community. Ongoing engagement with these communities continues through translations of the GBRC and resources as well as stewardship and volunteer opportunities for shoreline cleanups. A cleanup with Vietnamese student groups and their families occurred on March 16, 2024, at Seawolf Park, Galveston Texas.

Objective(s): This project will use the GBRC to engage underserved and underrepresented communities to ensure a healthy bay for generations to come by translating the GBRC into Vietnamese and engaging with the local Southeast Asian community. Community members will become aware of the proximity and importance of the bay and implement scientifically backed behavior changes, resulting in long-term improvements in the health of the bay and a larger number and greater diversity of environmental advocates.

Project Description: This project will strengthen and advance the GBRC - a community-driven, scientific analysis of the health of Galveston Bay. Twenty-two indicators across six categories (habitat, water quality, human health risk, pollution events and sources, wildlife, and coastal change) are graded to identify areas for improvement within the bay's ecosystem. The GBRC provides learning opportunities for the general public and scientific guidance on the direction of environmental work in the area. These outreach efforts connect approximately 5,700 people to the GBRC each year and the program serves as the model for watershed report cards. In this project, outreach and engagement activities will be targeted to the Vietnamese community surrounding Galveston Bay. According to the 2020 United States Census, 104,689 Vietnamese Americans lived in Harris County in 2019 and the Asian population is noted to be one of the fastest growing populations in the county. This project specifically aims to reach and engage this Vietnamese-speaking community surrounding Galveston Bay, known users of the Bay that are often overlooked in environmental engagement efforts, to create a more inclusive GBRC. Amendment No. 1 will provide an additional \$10,000 in fiscal 2024 state and federal funds to develop more Vietnamese outreach through the GBRC website, "What You Can Do" tool which will provide users with information and direct connection to conservation stewardship organizations, events, and more resources.

Partners and Their Role(s): HARC will conduct GBRC data analyses and GBF will lead public outreach and community engagement efforts.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- QAPP due May 2023;
- Data Acquisition, Analysis, and Grade Development Task Report due January 2025;
- Community Engagement Plan due March 2023; and
- Final Report due March 2025.

Long-term Outcomes: Engage underserved communities to expand the GBRC audience and make future grades more inclusive of the community's needs.

28. Engaging Diverse Communities in Conservation

CCMP Actions Implemented: SPO-1, SPO-2, SPO-3, PEA-2

Grantee/Contractor: Harris County Department of Education (HCDE)

Zip Codes: All; Population: 4,969,243

Census Tracts: All; SM: 5,113.35

Subwatersheds: All

Total Project Budget: \$58,140 (\$58,140 from CE-00655008: fiscal 2023 \$58,140.00)

Milestones: Final Report anticipated July 2024.

Project period: September 2022 – August 2024

Status: Ongoing project. The Certified Interpretive Guide training for all four candidates was completed on October 20, 2023. All candidates have been leading guided nature tours at the cooperative partnership nature centers and parks. Some candidates have hosted bilingual events to serve the limited English proficiency community members.

Objective(s): Increase participation in conservation stewardship and volunteering within the four collaborating partner organizations; and provide scholarships for Certified Interpretive Guide training to four diverse community members, to expand awareness opportunities.

Project Description: Bayou Land Conservancy, Armand Bayou Nature Center, HCDE, and Katy Prairie Conservancy, under the coordination of BPA, have formed a Cooperative Partnership to provide more effective stewardship and volunteer activities for underrepresented communities across the Houston region to Galveston Bay. The partnership will create opportunities for deeper and broader interorganizational collaboration with nonprofits and community groups led by diverse communities, as well as educational institutions and agencies that serve historically underrepresented communities. The partnership will provide for the extension of community members' roles from passive participant to active facilitator through an interpretive guide training program and recruitment strategy.

Partners and Their Role(s): HCDE will partner with BPA to coordinate the Cooperative Partnership.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- Recruitment materials due 14 days before distribution;
- Quarterly updates on partner activities submitted with progress reports; and
- Final Report due July 2024.

Long-term Outcomes: Engage underserved communities to expand conservation education opportunities to more diverse audiences.

29. Mobilizing the Environmental Education Community through Prairie Education in the Galveston Bay

CCMP Actions Implemented: SPO-1, SPO-2, SPO-3, SPO-4, PEA-1, PEA-2, PEA-3

Grantee/Contractor: UHCL EIH

Zip Codes: DPP: 77536; UHCL: 77058

Census Tracts: DPP: 48201342900 -- SM 1.68; UHCL: 48201341304, 48201340203 -- SM 1.8

Subwatersheds: Armand-Taylor

Total Project Budget: \$80,000 (\$80,000 from CE-00655007: fiscal 2022 \$80,000)

Milestones: Final Report anticipated **May 2025**.

Project period: September 2021 – **May 2025**

Status: Ongoing project. The QAPP was approved on July 1, 2022. Amendment No. 2 to add \$12,515.60 in state funds and extend the project end date to May, 31 2025 was executed July 31, 2023. Girls on the Prairie summer camp is scheduled for Summer 2024.

Objective(s): This project will facilitate prairie education programs for K-12 students and educators in underserved and underrepresented populations in the lower Galveston Bay watershed. Agencies will also collect data as part of a vigorous mapping project to identify underserved school districts (and students) that do not receive (and could greatly benefit from) quality environmental education programming.

Project Description: Citizens Environmental Coalition and EcoRise will conduct a needs assessment for underserved and underrepresented communities and host a partner workshop to create a plan of action to deliver environmental education programs to those identified communities. UHCL EIH and NPAT will facilitate prairie education programs to increase knowledge and awareness of ecological services provided by native coastal prairies and wetlands for K-12 students, educators, and the community at large. The prairie programs will serve as the demonstration project/case study for how a program can adapt to meet the identified needs of the community. This project seeks to address the low science and math test scores and workforce development of students in Texas Region Four communities by providing STEM activities on the Deer Park Prairie and at UHCL EIH through field trips, summer camps, and teacher/administrator workshops. Activities can be adapted to virtual formats if needed.

Partners and Their Role(s): Citizens Environmental Coalition and EcoRise will conduct a needs assessment mapping project and host a partner workshop and the NPAT will assist UHCL EIH with prairie education programs.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- QAPP due July 2022;
- Prairie education workshops and field trips due **April 2025**;
- Map of underserved communities in need of environmental education due **May 2025**;
- Environmental education program delivery plan of action due **May 2025**; and
- Final Report due **May 2025**.

Long-term Outcomes: Disseminate mapping project results to help partners engage communities in need of environmental education opportunities and provide field trips, tools, and resources to students and educators from underserved and underrepresented communities. STEM activities related to environmental education will connect those communities to environmental issues in the Galveston Bay watershed.

30. Microplastics in the Galveston Bay Watershed: The Big Impacts of Tiny Pollution

CCMP Actions Implemented: NPS-2, SPO-3, PEA-1, PEA-2, PEA-3, RES-2, RES-3

Grantee/Contractor: UHCL EIH

Zip Codes: 77554, 77563, 77650

Census Tracts: 48167726100, 48167726000, 48167723600, 48167723900; SM: 873.88

Subwatersheds: West Bay, South Bay

Total Project Budget: \$114,458 (\$114,458 from Award #CE-00655007: fiscal 2021 \$64,458, fiscal 2022 \$50,000)

Milestones: Final Report anticipated May 2024.

Project period: January 2021 – May 2024

Status: Ongoing project. The QAPP for Turtle Island Restoration Network (TIRN) was approved on August 11, 2021, and the QAPP for UHCL was approved on January, 28 2022. Sampling, classroom curriculum materials, and classroom kit materials completed. Preparation of final report is underway.

Objective(s): This project aims to build general scientific literacy and environmental stewardship among Galveston Bay residents regarding microplastics and increase public utilization and knowledge of the research capacity and conservation programs throughout the Galveston Bay area.

Project Description: This project targets fourth grade and high school grade levels in the Galveston Independent School District, a historically underserved district, by providing curriculum that focuses on watershed science, food web interactions, microplastics, marine debris, and conservation. Students will be guided in selecting sites within the Galveston Bay watershed to collect water and sediment samples for microplastics. The sites will be monitored monthly to compare data to water and sediment sample data collected by other area citizen science groups and utilized in the biostatistical analysis. In addition, UHCL EIH will collect water and sediment samples along shorelines in the Galveston Bay watershed for research and geospatial statistical data analysis.

Partners and Their Role(s): TIRN will provide teacher and student training and oversee student data collection. UHCL EIH will collect data, conduct research, and geospatial statistical analysis of that data for microplastics along designated shorelines in Galveston Bay. UHCL EIH seeks to characterize the spatial distribution of plastic debris along Galveston Bay shorelines.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- QAPP due August 2021 (TIRN) and January 2022 (UHCL EIH)
- Student classroom curriculum materials, participation sheets, and evaluations due December 2023;
- Classroom kit materials, participation sheets, and evaluations due December 2023;
- Microplastic load data for surface water and sediment samples due February 2024; and
- Final Report due May 2024.

Long-term Outcomes: Incorporate citizen science methodologies for monitoring and research of microplastics into classrooms to foster scientific literacy among students and create sustainable behavior change to reduce microplastics in addition to increasing knowledge of the spatial relationship and accumulation of microplastics along shorelines and the open waters of Galveston Bay.

4.2E – ONGOING M&R PROJECTS

31. The Distribution and Fate of Tire Rubber-Derived Chemicals in Galveston Bay

CCMP Actions Implemented: ACS-2, RES-2

Grantee/Contractor: TAMU

Zip Codes: All; Population: 4,969,243

Census Tracts: All; SM: 5,113.35

Subwatersheds: All

Total Project Budget: \$98,312 (\$98,312.00 from CE-00655008: fiscal 2024 \$98,312.00)

Milestones: Final Report anticipated December 2025.

Project period: September 2023 – December 2025

Status: Ongoing project. Draft QAPP was submitted to TCEQ on March 12, 2024.

Objective(s): This project will examine the spatial and temporal distribution of the tire rubber-derived contaminant, 6PPD-Q, as well as its precursor, 6PPD, in Galveston Bay water and sediments that were collected during quarterly cruises over a two-year timespan. 6PPD-Q was recently discovered to be responsible for the Coho salmon die-offs in the Pacific Northwest (United States). This compound is a transformation product of 6PPD, a compound widely used as an antiozonant in tires to prevent their degradation. With tire rubber as the source, it is likely ubiquitous in the environment and numerous studies are beginning to find it at high concentrations in urban stormwater runoff. Baseline data on the distribution and fate of these compounds in Galveston Bay is needed to understand its potential impact on aquatic life and the overall health of the bay.

Project Description: This project aims to: (1) determine the distributions of 6PPD and 6PPD-Q in Galveston Bay over two years in relation to changes in hydrographic conditions with variable stormwater inflows; (2) determine what possible transformation products are formed from photochemical reactions; and (3) determine how 6PPD and 6PPD-Q partition between water and sediments in Galveston Bay.

Partners and Their Role(s): TAMU will complete analyses for 6PPD and 6PPD-Q in Galveston Bay.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- QAPP due 60 days prior to the scheduled initiation of environmental data operations;
- Data release due October 2025; and
- Final Report due December 2025.

Long-term Outcomes: Insight into spatial and temporal variation in 6PPD and 6PPD-Q concentrations in Galveston Bay.

32. Monitoring Ecosystem Indicators for Science-Based Restoration and Enhancement

CCMP Actions Implemented: RES-3, ACS-1

Grantee/Contractor: TAMUG

Zip Codes: All; Population: 4,969,243

Census Tracts: All; SM: 5,113.35

Subwatersheds: All

Total Project Budget: \$130,662.12 (\$130,662.12 from CE-00655008: fiscal 2023 \$88,596.12, fiscal 2024 \$42,066)

Milestones: Final Report anticipated March 2026.

Project period: September 2022 – March 2026

Status: Ongoing project. The QAPP was approved on August 25, 2023. Data collection of zooplankton is underway.

Objective(s): Assess spatial and temporal variations in the abundance and distribution of zooplankton, including eastern oyster larvae, in Galveston Bay.

Project Description: Zooplankton are ecosystem health indicators of water quality and provide the principal conduits for energy transfer from phytoplankton to higher trophic levels. To date, only a few studies to examine the interactions between zooplankton and environmental factors and fisheries have been conducted. This project will conduct monthly sampling of zooplankton in Galveston Bay over two years to determine spatial and temporal variations in the abundance and

distribution of eastern oyster larvae. The data generated will be used to estimate larval dispersal and recruitment success and will be used to validate a population model for Galveston Bay. The project data will fill an information gap needed for science-based ecosystem assessments of Galveston Bay.

Partners and Their Role(s): TAMUG will perform the tasks necessary to collect and analyze data for this project. This project leverages an existing time series of zooplankton data collected by TAMUG from Galveston Bay.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- QAPP due May 2023;
- Zooplankton Sampling in Galveston Bay Task Report due December 2024;
- Zooplankton Sample Processing and Analysis in Galveston Bay Task Report due December 2024; and
- Final Report due March 2025.

Long-term Outcomes: Insight into the abundance, distribution, and transport of zooplankton in Galveston Bay.

33. Long-term Monitoring of Living Shorelines

CCMP Actions Implemented: PEA-2, RES-2, RES-3, RES-6

Grantee/Contractor: Lee College

Zip Codes: All; Population: 4,969,243

Census Tracts: All; SM: 5,113.35

Subwatersheds: All

Total Project Budget: \$127,791 (\$127,791 from CE-00655008: fiscal 2023 \$127,791)

Milestones: Coordination/orientation and QAPP meeting held in October 2022. Final Report anticipated September 2024.

Project period: September 2022 – November 2024

Status: Ongoing project. The final QAPP was approved on June 8, 2023. Expedited Amendment No. 1 to the QAPP to change genetic sequencing laboratories was approved on July 6, 2023.

Objective(s): Determine whether resiliency and functional aspects of living shorelines restoration projects differ in comparison to unrestored natural marsh reference sites and traditionally armored sites in Galveston Bay.

Project Description: This project will collect comprehensive data at living shorelines sites throughout the Galveston Bay system to assess the resiliency and functional aspects of small-scale restoration projects over time. Data will include biological community (e.g., plants, fish, benthic macroinvertebrates, sediment microorganisms), contaminants in sediment (e.g., heavy metals, organic pesticides, microplastics), and low altitude aerial imagery (to determine trends in shoreline erosion and elevation). Data will be compared to unrestored natural marsh reference sites and traditionally armored sites.

Partners and Their Role(s): Lee College will partner with UHCL and GBF to collect and analyze data from living shorelines and control sites.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- QAPP due May 2023;
- Sampling data due October 2024;
- Data Collection and Lab Analyses Task Report due July 2024;

- Data Analyses Task Report due July 2024; and
- Final Report due September 2024.

Long-term Outcomes: Insight into the effect of living shorelines restoration techniques on resiliency, biological communities, and contaminant loads.

SECTION 5: COMPLETED PROJECTS**SECTION 5.1: PROJECTS COMPLETED SINCE FISCAL 2024 WORK PLAN SUBMISSION – SUMMARY****Table 10. Projects Completed Since Fiscal 2024 Work Plan Submission - Summary**

PROJECT NAME	Contract Number	Funding Years	Award #CE-00655008 (FY 23) Budget	Award #CE-00655007 (FY 20-22) Budget	Award #CE-00655006 (FY 17-19) Budget	Final Report Submitted to EPA
34. Estuary Resilience Assessment	19-90216	2019-2021	\$33,688.97	\$72,419.03	\$30,000.00	Will submit September 2024
35. Supporting the Use of Green Infrastructure in the Lower Galveston Bay Watershed	22-30136	2022-2023	\$15,000.00	\$45,000.00	\$0.00	Will submit September 2024
36. Baseline Assessment of Microplastics in Galveston Bay	21-10078	2021-2022	\$0.00	\$90,000.00	\$0.00	TBD
37. Audubon TERN Citizens Science in Schools: Students as Field Researchers	21-10097	2021-2022	\$0.00	\$89,323.00	\$0.00	September 2023
38. Effects of Erosion Control Structures on Shoreline Marsh Species Population	22-30084	2022-2023	\$31,140.00	\$38,165.00	\$0.00	March 2024
39. The Fate of Emerging PFAS Pollutants in Shellfish and Fish of Galveston Bay	22-30197	2022-2023	\$37,093.00	\$68,456.00	\$0.00	March 2024
40. The Effect of Microplastics on the Base of Marine Food Webs	21-10079	2021-2022	\$0.00	\$36,939.00	\$0.00	March 2024
41. Galveston Bay Oyster Microplastics: Baselines and Impacts	21-10080	2021	\$0.00	\$90,427.00	\$0.00	September 2023
42. The Distribution, Fate, and Transport of Emerging Contaminants in Galveston Bay	21-10104	2021-2022	\$0.00	\$108,438.00	\$0.00	Will submit September 2024
GRANT TOTAL-PROJECT FUNDING			\$116,921.97	\$639,167.03	\$30,000.00	

SECTION 5.2: PROJECTS COMPLETED SINCE FISCAL 2024 WORK PLAN SUBMISSION – DETAIL

34. Estuary Resilience Assessment

CCMP Actions Implemented: Regional Monitoring Plan

Grantee/Contractor: HARC/GTRI

Zip Codes: All; Population: 4,969,243

Census Tracts: All; SM: 5,113.35

Subwatersheds: All

Total Project Budget: \$136,108.00 (\$33,688.97 from CE-00655008: fiscal 2023 \$33,688.97; \$72,419.03 from CE-00655007: fiscal 2020 \$20,000.00, fiscal 2021 \$432.54, fiscal 2022 \$51,986.49; \$30,000.00 from CE-00655006: fiscal 2019 \$30,000.00)

Milestones: The final Estuary Resilience Action Plan submitted on February 7, 2024.

Project period: September 2018 – June 2023

Status: Completed project. Both the Estuary Resilience Assessment and Estuary Resiliency Action Plan have been accepted by EPA. The adaptation/mitigation actions identified and discussed in the report and the risks that will necessitate their implementation will also be included in the updated CCMP. GBEP's partners have already implemented some of these actions and strategies and others are in development. Including estuary resilience stressors and adaptation/mitigation strategies when implementing the *GBP, 2nd Edition* will make it easier to prioritize and fund projects that will improve the resilience of Galveston Bay.

Objective(s): This project assessed the goals, objectives, and actions in the *GBP, 2nd Edition* against a series of coastal resilience criteria, meeting requirements identified in the EPA NEP Funding Guidance.

Project Description: The primary output of the project was a companion document to the *GBP, 2nd Edition* and provided resiliency adaptation considerations for implementers of the *GBP, 2nd Edition*. The document was developed in coordination with subject matter experts and/or members of the GBC and its subcommittees through workshops or via existing meeting structures. The project followed the requirements identified in the EPA NEP Funding Guidance. The secondary output was the Estuary Resiliency Action Plan.

Partners and Their Role(s): While the lead contractor is HARC/GTRI, the Estuary Resilience Assessment and Estuary Resilience Action Plan drew on the expertise of GBC members and subcommittee members including a diverse group of research institutions and federal, state, local, and non-governmental organizations that collected data in the watershed.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- Five-seven stakeholder meetings or workshops;
- Final Estuary Resilience Assessment Report due February 2022; and
- Final Estuary Resiliency Action Plan due June 2023.

Long-term Outcomes: Increased efforts to consider resiliency during project selection and ensure the Galveston Bay estuary is managed based on best-known data.

35. Supporting the Use of Green Infrastructure in the Lower Galveston Bay Watershed

CCMP Actions Implemented: PS-1, NPS-4

Grantee/Contractor: H-GAC

Zip Codes: All; Population: 4,969,243

Census Tracts: All; SM: 5,113.35

Subwatersheds: All

Total Project Budget: \$60,000 (\$15,000 from CE-00655008: fiscal 2023 \$15,000; \$45,000 from CE-00655007: fiscal 2022 \$45,000)

Milestones: Final report submitted on April 4, 2024.

Project period: September 2019 – February 2024

Status: Completed project. The project highlighted the overall positive impacts of green infrastructure (GI) practices on water quality improvement. While further data collection and analyses are warranted to better validate these observations and provide more robust insights for effective decision-making, some reasonable conclusions can be drawn. All GI practice types reviewed for this project demonstrated the ability to reduce water quality parameters, with some practices outperforming others. GI practices that focus on storage capacity and holding time fare well across most parameters.

H-GAC plans to continue to encourage GI adoption through its many programs, including watershed-based planning and implementation. Outreach conducted as part of this review showed the need for more targeted technical assistance and education on GI, its uses, benefits, costs, and maintenance. Hesitancy on the part of certain groups still prevents wide scale GI implementation. In addition to focusing outreach targeting decision-makers and community organizations, additional GI demonstration projects and performance data are necessary to fully document GI water quality benefits.

Objective(s): Made a recommended GI practice list based on local and regional data available to local decision-makers. Convened and organized a project committee (e.g. EIH, HARC/GTRI, Texas AgriLife, Harris County Flood Control District, Harris County, City of Houston)

Project Description: Through this project, H-GAC:

- Compiled available local BMP data, catalogued by practice(s);
- Completed analysis of BMP data and/or utilize existing analysis;
- Compared analysis with state and national examples from areas of common soils and precipitation;
- Recommend BMPs based on performance;
- Hosted at minimum one NPS workshop targeted to municipal separate storm sewer system operators and local governments; and
- Wrote a Final Report that included a distribution and outreach plan.

Partners and Their Role(s): H-GAC worked with local water professionals to form a project committee that cataloged GI practices, identified and assisted in acquiring local GI data, and developed weighted performance guidance (e.g., water quality, cost, maintenance, etc.). H-GAC also worked with partners, including GBEP, Texas AgriLife, HARC/GTRI, GBF, and others to support BMP implementation through the partner's WBPs.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- QAPP due August 2022;
- Performance guidance due November 2023;
- GI datafiles, GIS files, summary analysis, photos and map set due December 2023; and
- Final Report due February 2024.

Long-term Outcomes: Significantly reduced bacteria levels in impaired streams of the BIG project area and helped move these streams back to attaining the applicable recreational water quality standards. Promoted the importance of bacteria reduction efforts to other jurisdictions and the public.

36. Baseline Assessment of Microplastics in Galveston Bay

CCMP Actions Implemented: NPS-1, PS-1, RES-2, RES-3, SPO-4

Grantee/Contractor: USGS

Zip Codes: All; Population: 4,969,243

Census Tracts: All; SM: 5,113.35

Subwatersheds: All

Total Project Budget: \$90,000.00 (\$90,000.00 from CE-00655007: fiscal 2021 \$79,343.00, fiscal 2022 \$10,657.00)

Milestones: Final report pending data submission by lab. Preliminary final report was submitted, but the contractor is still waiting for final analysis to finalize the report.

Project period: September 2020 – August 2023

Status: Completed project.

Objective(s): The objectives of this study were to 1) investigate the occurrence of microplastics in the open waters of Galveston Bay, and 2) categorize the type(s) of microplastics present.

Project Description: Litter and trash, such as plastics, are an issue of concern in Galveston Bay and its tributaries and have been identified by GBEP as a priority topic for research. Microplastics, which are plastic particles less than five millimeters in diameter, are of increasing concern. These small particles are derived from the degradation or mechanical breakdown of larger plastic objects or particles and are introduced to waterways through urban runoff and wastewater effluent. Microplastics ingested by living organisms, such as birds, oysters, fish, and turtles can have effects on their health, including obstructions in the digestive system, impaired reproduction, malnourishment, and death. Microplastics also have high sorption capacities, enabling the accumulation of organic pollutants, pathogens, and metals that could potentially affect living organisms.

This study contributed data to another GBEP funded project, “Occurrence of Microplastics in Tributaries to Galveston Bay”, and other partner projects. These baseline studies provided information about the spatial distribution and concentrations of microplastics in the Galveston Bay watershed.

Partners and Their Role(s): USGS performed the tasks necessary for sample collection. Collected samples were submitted to OphthoKhemia Analytical laboratory for analysis.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- QAPP due March 2021;
- Data release due August 2023; and
- Final Project Summary due August 2023.

Long-term Outcomes: Results will provide information on the occurrence of microplastics in the Galveston Bay watershed and will include quantification and categorization of microplastic particles. The results of this reconnaissance study will provide a preliminary assessment of where microplastics are found in the Galveston Bay watershed and provide the foundation for future study and abatement.

37. Audubon TERN Citizens Science in Schools: Students as Field Researchers

CCMP Actions Implemented: SPO-2, SPO-3, PEA-3

Grantee/Contractor: HCDE

Zip Codes: All; Population: 4,969,243

Census Tracts: All; SM: 5,113.35

Subwatersheds: All

Total Project Budget: \$89,323.00 (\$89,323.00 from CE-00655007: fiscal 2021 \$49,323.00, fiscal 2022 \$40,000.00)

Milestones: The final report submitted on June 8, 2023.

Project period: November 2020 – May 2023

Status: Completed project. The Audubon Texas Estuarine Resource Network (TERN) project has been completed and the final report has been accepted by TCEQ. While complications from COVID-19 impacted the initial plan to train teachers to use this program in their classes, the performing party and their partner, Audubon Texas, did an excellent job adapting the program to implement it in HCDE after school programs. At the completion of the project, Audubon Texas implemented the TERN program in nine schools over 17 weeks and engaged with 119 students. Additionally, resource trunks with binoculars, field guides, and other resources were provided to the after-school programs for future use.

Objective(s): This project engaged and trained students and teachers in citizen science conservation work alongside biologists and Audubon staff in the Galveston Bay watershed through the TERN program created by Audubon Texas.

Project Description: This program identified schools in the HCDE service area to participate in the Audubon TERN program. Issues related to COVID-19 delayed the project and created complications in engaging teachers to participate. In 2022, it was decided to transition to engage the HCDE afterschool program to participate in the TERN program. This was a huge success. The TERN program delivered trainings, classroom lessons and activities, and field trips to the afterschool programs for bird monitoring and data collection. Teachers and students were provided with lessons that focus on bird identification, how to use the equipment, and how to analyze data. A field activity was included for each school so students can apply what they learned in the classroom in a field setting. Each of these activities are Texas Essential Knowledge Skills aligned with the appropriate grade level.

Partners and Their Role(s): HCDE helped recruit schools and provided access to classrooms for Audubon Texas to deliver the TERN program.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- Teacher and student training materials due annually in December;
- Afterschool program curriculum and training materials provided in September 2022; and
- Final Report received June 8, 2023.

Long-term Outcomes: Engaged students and teachers in citizen science conservation work alongside biologists and wardens in the Galveston Bay watershed to demonstrate how citizen science and the data collected can help the community.

38. Effects of Erosion Control Structures on Shoreline Marsh Species Population

CCMP Actions Implemented: RES-3, RES-8, ACS-2

Grantee/Contractor: TAMUG

Zip Codes: 77554, 77563, 77650

Census Tracts: 48167726100, 48167726000, 48167723600, 48167723900; SM: 873.88

Subwatersheds: West Bay, South Bay

Total Project Budget: \$69,305.00 (\$31,140.00 from CE-00655008: fiscal 2023 \$31,140.00; \$38,165.00 from CE-00655007: fiscal 2022 \$38,165.00)

Milestones: The final report submitted on July 21, 2023.

Project period: January 2022 – April 2024

Status: Completed project. Efforts to restore coastal wetlands in Galveston Bay have used various restoration techniques, including the installation of erosion-control structures (ECS) such as geotubes or breakwaters to help reduce wave action and sediment erosion. These structures were investigated in how they affect restored marsh community composition and productivity. Emergent marsh vegetation, epifauna, soil characteristics, and benthic microalgae in restored marshes with and without ECS were surveyed in May and November 2022. In both the fall and spring, aboveground plant biomass was higher at sites without ECS and belowground plant biomass was similar between sites with and without ECS. Total plant cover did not differ between sites with and without ECS in the spring but was higher at sites without ECS in the fall. The concentrations of the two abundant benthic microalgal groups, cyanobacteria and diatoms, were higher at sites without ECS. There was no significant difference in soil percent moisture between sites with and without ECS in either the spring or fall. Percent soil organic content was higher at sites without ECS in the fall but did not differ between site types in the spring. In both time periods, snail density was higher at sites with ECS, and crab burrow densities were similar between site types. There were few effects of ECS on the zooplankton or nekton communities in either spring or fall, though a few species varied among site types. These findings indicate that ECS have stronger effects on benthic fauna and microalgae than on emergent vegetation. In addition, this provides further evidence that assessments of restored salt marshes that focus just on emergent plant cover may yield an incomplete picture of restoration success.

Objective(s): Determined if the presence or absence of ECS (breakwaters) influence species populations in shoreline marsh areas.

Project Description: This project examined whether the presence or absence of ECS (breakwaters) influence species populations in shoreline marsh areas of Galveston Bay. This was accomplished by surveying nekton and zooplankton in Galveston Bay shoreline marsh areas with and without breakwater or sill structures and examining productivity patterns.

Partners and Their Role(s): TAMUG performed the tasks necessary to collect and analyze data for this project. This project leveraged existing shoreline projects around Galveston Bay to study the effects of erosion control measures on species populations. The project also leveraged existing research equipment, laboratory space, vessels and vessel maintenance, and high-resolution microscopes for species identification and zooplankton counts at TAMUG.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- QAPP due February 2022;
- Biological sampling data due July 2023;
- Final Report due September 2023.

Long-term Outcomes: Provided insight into the influence of erosion control structure presence in shoreline marsh areas on species populations and productivity.

39. The Fate of Emerging PFAS Pollutants in Shellfish and Fish of Galveston Bay

CCMP Actions Implemented: RES-2, RES-5

Grantee/Contractor: TAMUG

Zip Codes: All; Population: 4,969,243

Census Tracts: All; SM: 5,113.35

Subwatersheds: All

Total Project Budget: \$105,549.00 (\$37,093.00 from CE-00655008: fiscal 2023 \$37,093.00;

\$68,456.00 from CE-00655007: fiscal 2022 \$68,456.00)

Milestones: Final Report submitted on October 1, 2023.

Project period: January 2022 – October 2023

Status: Completed project. The project assessed the levels of the PFAS homolog, PFOS in shellfish and fish from Galveston Bay. PFOS levels were quantified in pelagic fish and marine mammals (stranded dolphins) opportunistically sampled from the northern Gulf of Mexico. This project implemented an integrated computational (or *in silico*) systems toxicological approach to identify physiologically relevant biomarkers of PFOS exposure and toxicity in fish. For PFOS body-burden analyses, results showed eastern oysters (*Crassostrea virginica*) exhibited the lowest PFOS levels in gill/mantle tissue, whereas bottlenose dolphins (*Tursiops truncatus*) had the highest hepatic PFOS levels. In Galveston Bay fish, gafftopsail catfish (*Bagre marinus*), red drum (*Sciaenops ocellatus*), and spotted seatrout (*Cynoscion nebulosus*), had hepatic PFOS levels ~8-13x higher than the pelagic species sampled from the Gulf of Mexico, which included red snapper (*Lutjanus campechanus*) and yellowfin tuna (*Thunnus albacares*).

A sea food consumption risk assessment of the PFOS body-burdens in the shellfish and fish sampled from Galveston Bay and Northern Gulf of Mexico showed levels to be below that of concern for human exposure (i.e., through the consumption of PFOS contaminated fish). The results of this project highlighted the efficacy of using an integrated systems toxicological and environmental monitoring framework to quantify the extent of pollutant exposure in aquatic wildlife and to also assess likely adverse effects in the exposed organisms.

Objective(s): Measured emerging PFAS as pollutant body-burdens in shellfish and fish from Galveston Bay and assess biomarkers of health in the exposed shellfish and fish.

Project Description: This project aimed to increase the current understanding of the fate of emerging pollutants in Galveston Bay biota. This project generated data on the body-burdens of PFAS in fish and shellfish collected from Galveston Bay. Biomarkers of stress were measured in these organisms to determine the effect(s) of PFAS exposure on Galveston Bay fish and shellfish health.

Partners and Their Role(s): TAMUG performed the tasks necessary to collect and analyze data for this project. This project leveraged in-kind services from TPWD of collecting fish and shellfish samples, in-kind supplies from TAMUG including research equipment, laboratory space, and in-kind services from TAMUG co-principal investigators.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- QAPP due January 2022;
- PFAS body-burden data for Galveston Bay biota data due July 2023;
- Stress biomarker enzyme activity level data for Galveston Bay biota due July 2023; and
- Final Report due September 2023.

Long-term Outcomes: Provided insight into the fate of PFAS pollutants in Galveston Bay biota and associated health effects.

40. The Effect of Microplastics on the Base of Marine Food Webs

CCMP Actions Implemented: RES-2, RES-3

Grantee/Contractor: TAMUG

Zip Codes: All; Population: 4,969,243

Census Tracts: All; SM: 5,113.35

Subwatersheds: All

Total Project Budget: \$36,939.00 (\$36,939 from CE-00655007: fiscal 2021 \$36,939)

Milestones: Final Report submitted on October 3, 2023.

Project period: January 2021 – March 2023

Status: Completed project. Results indicated an increasing trend in all three orders of fish over time, detecting plastics in excised tissue as far back as 1970. Relative abundance of plastics seemed to be independent of trophic level and feeding mode across fishes, rather than being influenced by it, as was originally hypothesized. Overall, polyethylene was the most common polymer detected across all species, with body burden of all plastics expected to increase exponentially over time. This trend of exponential plastic accumulation follows the global production of plastics.

By examining historic fish samples, this project has provided insight into the long-term trends of plastic pollution in Galveston Bay that will serve as the baseline for an assessment of the potential impacts on local fish populations. Such data will help to inform future management and conservation efforts in Galveston Bay.

Objective(s): The purpose of this project was to quantify the body burden and investigate the trend of plastic accumulation in key Galveston Bay fish species over the last 60+ years.

Project Description: Plastic has become a ubiquitous aquatic pollutant. The accumulation of plastic in Galveston Bay has the potential to impact the health of marine organisms, including fish. The project targeted the striped mullet (*Mugil cephalus*), and menhaden (*Brevoortia sp.*), known as major sources of prey, and the Spotted Sea Trout (*Cynoscion nebulosus*), which feed on lower trophic level fish such as mullet and menhaden, and are commonly consumed by humans. Samples were chosen from the TAMU Biodiversity Research & Teaching Collections based on size, year and location and included specimens collected between 1958 and 2021. Excised respiratory and gastrointestinal tissue were chemically processed to separate plastic particles and then identified using Pyrolysis Gas Chromatography Mass Spectrometry. TAMUG then statistically modeled the accumulation of the eight identified plastic polymers.

Partners and Their Role(s): TAMUG obtained historical fish specimens from TAMU. TAMUG completed analyses of microplastic accumulation in Galveston Bay fishes and conducted swimming trials of fishes under exposure to varying concentrations of microplastics.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- QAPP due February 2021;
- Microplastic quantification data for fish tissue samples due May 2023; and
- Final Report due May 2023; the final report and microplastic data was extended due to delays with lab processing.

Long-term Outcomes: Provided insight into microplastics accumulation in Galveston Bay fishes since 1958 and information on effects of microplastics on fish physiology and swimming performance.

41. Galveston Bay Oyster Microplastics: Baselines and Impacts

CCMP Actions Implemented: NPS-2, PEA-1, PEA-3, RES-2, RES-3

Grantee/Contractor: TAMUG

Zip Codes: All; Population: 4,969,243

Census Tracts: All; SM: 5,113.35

Subwatersheds: All

Total Project Budget: \$90,427 (\$90,427 from #CE-00655007: fiscal 2021 \$90,427)

Milestones: Final report submitted on March 31, 2023.

Project period: January 2021 – April 2023

Status: Completed project. Microplastics were abundant in all oysters sampled in the study, suggesting they may be transferred to food web consumers, including humans. Results of up to 200 microplastics per oyster were found, which is within the ranges previously reported in studies from Chesapeake Bay, Georgia, and Florida. Water sampling data demonstrated surface waters tend to carry microplastics, predominantly in the form of fibers rather than fragments or films. These fibers are then being transferred to food webs, and concentrated in some oyster tissues, as evidenced in the findings. The quantity oysters retain varied widely by individual. Some specific locations had higher concentrations of particles in oyster tissue than others, but no pattern was found by bay region. Additionally, no significant differences in oyster condition index (CI) by microplastic load was found, suggesting CI may not be a valuable tool to understand how oyster health may be impacted by microplastic loading. While overall this initial study found microplastics present in oysters, future studies of broader scope could examine impacts on oyster health in more detail using laboratory feeding assays.

Objective(s): This project examined spatial variation in the presence, type, and relative amount of microplastics in Galveston Bay oysters.

Project Description: This project examined spatial variation in the presence, type, and relative amount (density per gram of tissue) of microplastic (pieces of plastic less than five millimeters in diameter) particles and fibers in Galveston Bay oysters; identified and compared the composition of microplastics retained by oysters relative to the microplastics present in surface waters to ascertain whether oysters selectively retain certain types of microplastics; and examined the potential for microplastic loads in oysters to influence oyster health. The researchers sampled surface water and oysters at three sites in each of five major bay regions: Trinity Bay, East Bay, West Bay, Dickinson/Central Bay, and the Kemah/Seabrook area (15 sampling locations with up to 28 oysters per location for a total of 420 oyster samples and nine one-liter water samples per location for a total of 135 water samples). Up to 12 oyster samples per region were used to determine the microplastic type(s) and abundance. Oyster tissue was extracted in a clean fume hood in the laboratory before undergoing acid digestion and vacuum filtration to extract microplastics. Microplastic type(s) for oyster and water samples were identified using Fourier Transform Infrared Spectroscopy, which identified the chemical composition of polymers. Up to 16 oysters per region were used to determine a representative oyster CI for each sampling location. The CI was calculated by determining the amount of tissue within an oyster in relation to the available volume inside the shell and provided a relative indication of oyster health. This project provided information on the links between spatial variations in surface water microplastic loads, oyster microplastic loads, and oyster health.

Partners and Their Role(s): TAMUG completed measurements of microplastic loads and analysis of plastic types in oysters and sediments and facilitated completion of the Final Report. UH completed measurements of the oyster CI. GBF facilitated the creation and dissemination of outreach and education materials.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- QAPP due March 2021;
- Oyster CI data due January 2023;
- Oyster and surface water microplastic load data due January 2023;
- Oyster and surface water microplastic composition data due January 2023;
- Public outreach materials due March 2023;
- Classroom curriculum materials due March 2023; and
- Final Report due April 2023.

Long-term Outcomes: Insight into types and amounts of microplastics in Galveston Bay oysters relative to that present in surface water, as well as spatial variation in oyster health relative to microplastic abundance.

42. The Distribution, Fate, and Transport of Emerging Contaminants in Galveston Bay

CCMP Actions Implemented: RES-2

Grantee/Contractor: TAMU

Zip Codes: All; Population: 4,969,243

Census Tracts: All; SM: 5,113.35

Subwatersheds: All

Total Project Budget: \$108,438 (\$108,438 from #CE-00655007: fiscal 2021 \$92,938, fiscal 2022 \$15,500)

Milestones: The final report submitted on March 11, 2024.

Project period: January 2021 – March 2024

Status: Completed project. This project successfully established the longest time series of PFAS in Galveston Bay, with water and sediment data available from 2017 to 2023. The times series captured concentration anomalies due to extreme events such as Hurricane Harvey and the ITC fire. Now, data exists for months before and after the ITC fire to establish what is considered “normal” for Galveston Bay. Therefore, should another event like ITC fire happen, what is considered exceptionally high concentrations of PFAS during the event would be known. With this data, how long it takes for the Galveston Bay ecosystem to return to normal after an event like the ITC fire can be assessed. Additionally, potentially new sources of PFAS could be detected. For example, PFDA was observed after March 2020, but rarely before that.

Data for PPCPs and AS in water are available from March 2021 to November 2023. Data for PPCPs and AS in sediment are available from September 2017 to November 2023. While the record for PPCPs and AS will not be as long as PFAS, this is still likely the longest time series record for PPCPs and AS in Galveston Bay.

Objective(s): This project measured concentrations of PFAS and PPCPs in water and sediment in Galveston Bay and the Houston Ship Channel over a two-year period.

Project Description: This project examined spatial and temporal variation in a group of emerging contaminants, including PFAS and PPCPs in Galveston Bay water and sediment. TAMU conducted quarterly field observations at 13 sites in Galveston Bay and the Houston Ship Channel over a two-year period, extending a current dataset dating from June 2017 to present. Unlike legacy contaminants such as polychlorinated biphenyls and dioxins, PFAS and PPCPs are soluble in water, which poses a threat to water quality. Baseline data on the distributions, fate, and transport of PFAS and PPCPs in Galveston Bay is scarce, making it difficult to understand whether and to what extent extreme events such as hurricanes and chemical releases contribute additional contamination to Galveston Bay. This project aimed to answer: (1) What are the distributions of PFAS and PPCPs in Galveston Bay concerning river discharge rates and extreme events? (2) Do hurricanes and chemical releases contribute to elevated levels of PFAS and/or PPCPs in the bay, and if so, how long does it take to recover to background levels? and (3) What are the water/sediment partitioning patterns of these emerging contaminants in Galveston Bay?

Partners and Their Role(s): TAMU conducted sampling and completed analyses for PFAS and PPCPs in Galveston Bay and the Houston Ship Channel.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- QAPP due February 2021;
- PFAS concentration data for water and sediment samples due December 2023;
- PPCPs concentration data for water and sediment samples due December 2023; and
- Final Report due December 2023.

Long-term Outcomes: Provided insight into spatial and temporal variation in PFAS and PPCPs concentrations in Galveston Bay and the Houston Ship Channel.