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SECTION 320
GALVESTON BAY ESTUARY PROGRAM

Revision 0.0

EPA # CE-00655007

TCEQ Grant # 332020

A PROGRAM OF THE TCEQ

Texas Commission on Environmental Quality

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

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LIST OF ABBREVIATIONS

Table 1. Abbreviations List

Name	Abbreviation
Bacteria Implementation Group	BIG
Bacteria Source Tracking	BST
Best Management Practice	BMP
Clean Water Act	CWA
Comprehensive Conservation and Management Plan	CCMP
Conservation Assistance Program	CAP
Environmental Institute of Houston	EIH
Fats, Oils, and Grease	FOG
Freshwater Inflow and Bay Circulation Action Plan	FW
Fiscal Year	FY
Galveston Bay Bacteria Reduction Plan	GBBRP
Galveston Bay Council	GBC
Galveston Bay Estuary Program	GBEP
Galveston Bay Foundation	GBF
Galveston Bay Plan	*GBP*
Galveston Bay Plan, 2nd Edition	*GBP, 2nd Edition*
Galveston Bay Public Awareness and Education Campaign	Back the Bay
Geographic Information System	GIS
Green Infrastructure for Texas	GIFT
Habitat Protection Action Plan	HP
Houston Advanced Research Center/GeoTechnology Research Institute	HARC/GTRI
Houston-Galveston Area Council	H-GAC
Implementation Plan	I-Plan
Lead	Pb
Low Impact Development	LID
Monitoring and Research	M&R
National Estuary Program	NEP
Natural Resource Uses	NRU
Nonpoint Source	NPS
Nonpoint Sources of Pollution Action Plan	NPS
Point Source	PS
Point Sources of Pollution Action Plan	PS
Polychlorinated Biphenyls	PCBs
Public Health Protection Action Plan	PH

Name	Abbreviation
Public Participation and Education	PPE
Public Participation and Education Action Plan	PPE
Quality Assurance Project Plan	QAPP
Research Action Plan	RSC
River, Lakes, Bays N' Bayous Trash Bash	Trash Bash
Shoreline Management Action Plan	SM
Species Population Protection Action Plan	SP
Spills and Dumping Action Plan	SD
Submerged Aquatic Vegetation	SAV
Texas A&M AgriLife Extension Service	Texas AgriLife
Texas A&M University	TAMU
Texas A&M University Galveston	TAMUG
Texas Commission on Environmental Quality	TCEQ
Texas Department of State Health Services	DSHS
Texas General Land Office	GLO
Texas Parks and Wildlife Department	TPWD
Texas Water Resources Institute	TWRI
Total Maximum Daily Load	TMDL
U.S. Army Corps of Engineers	USACE
U.S. Environmental Protection Agency	EPA
U.S. Fish and Wildlife Service	USFWS
United States Geological Survey	USGS
University of Houston	UH
University of Houston – Clear Lake	UHCL
Water Quality Improvement Project	WQIP
Water and Sediment Quality	WSQ
Water and Sediment Quality Action Plan	WSQ
Watershed Protection Plan	WPP

SECTION 1: PROGRAM OVERVIEW

Revision 0.0 of Fiscal Year (FY) 2020 Section 320 Galveston Bay Estuary Program (pre-USAS #332020) is to request three years of time and one year of funding with the intent to request another year of funding for years two and three and extend the grant term to five years total through 8/31/24. 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.

The GBEP was established in 1989 to provide comprehensive management of this vital resource. In 1990, the 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 U.S. Environmental Protection Agency (EPA) administrator. The initial effort was jointly funded by the EPA, the Texas General Land Office (GLO), and the TCEQ. The *Galveston Bay Plan*, 2nd *edition* was approved by the TCEQ in March 2019.

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 the Galveston Bay. The GBEP received a grant from the EPA to begin implementing the *GBP* in 1995. This grant ran from FY years (FY) 1995–1999 and is now closed. Subsequent grants have run from FY 2000–2003, FY 2004–2007, FY 2008–2010, FY 2011–2015, and FY 2014–2018. The most recent grant #CE00655006 (FY 2017–2021) is open but is no longer receiving funding allocations. Over 200 implementation projects have been initiated under these grants.

The 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 U.S. Fish and Wildlife Service (USFWS) in 2006.
- The 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 the GBEP partners, including an award in the non-profit category to SCENIC GALVESTON for the Virginia Point Coastal Preserve; in which the GBEP played an instrumental role, and an award in the individual category to Dick Benoit, a highly active local citizen.

2008-PRESENT AWARDS

- The 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.
- The EPA's Gulf of Mexico Program Gulf Guardian Partnership Award for the North Deer Island Protection project.
- The Coastal America Partnership Award for the North Deer Island Protection project.
- The Coastal America Partnership Award for the Savannah Oaks Conservation project.
- The TCEQ Texas Environmental Excellence Awards 2014 Finalist: Civic/Community for the Sheldon Lake Restoration project in 2014.

- The Keep Houston Beautiful Mayors Proud Partner Award for the Sheldon Lake Restoration project in 2015.
- The 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.
- The H-GAC Our Great Region Award for the Double Bayou WPP in 2017.
- The EPA's Gulf of Mexico Program Gulf Guardian Partnership Award for the Plastic Pollution Prevention Partnership in 2017.
- The EPA's Gulf of Mexico Program Gulf Guardian Partnership Award for River, Lakes, Bays N' Bayous Trash Bash (Trash Bash) in 2017.
- The TCEQ Texas Environmental Excellence Awards 2018 Winner: Civic/Community for Trash Bash.
- The EPA 2018 Award for Green Infrastructure & Excellence in Communications / Important Message (Green Infrastructure for Texas (GIFT) – Exploration Green).

SECTION 2: INTRODUCTION

The GBEP, a special non-regulatory program of the TCEQ, is a partnership of local governments, business and industry, conservation organizations, bay user groups, and resources agencies. The GBEP is charged with implementing the *GBP*, the CCMP for Galveston Bay. The GBEP is part of the TCEQ's Office of Water, Water Quality Planning Division. A program manager and staff of seven located in the Houston-Galveston area directly oversee 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 the many cross jurisdictional issues;
- Coordinate, monitor, and track implementation activities of the 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 (see
- Figure 1); and
- Maintain stakeholder involvement in the decision-making process through the GBC and its subcommittees.

Figure 1. Great egret on a breakwater installed to decrease shoreline erosion near Galveston Island State Park (photo credit: Cassidy Kempf).

SECTION 2.1: ORGANIZATIONAL STRUCTURE

The 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 overall implementation of the *GBP*, including: securing and managing funds to support operations, staff, and projects; fostering stakeholder involvement to facilitate *GBP* implementation; managing program staff and operations to ensure efficient use of resources; and representing the GBEP on national, state, and local boards and committees and at national and state conferences/events to garner federal and state support. Ms. Marshall also coordinates the GBC and the Budget and Priorities subcommittee.

Cynthia Clevenger, Public Participation and Education (PPE) Coordinator and Community Relations Specialist: Responsible for coordinating implementation of PPE actions in the *GBP;* building relationships and developing communication channels and dialogue with local government officials, private sector, and other outside organizations key to implementing the *GBP;* facilitating the PPE subcommittee of the GBC; 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 the GBEP. Ms. Clevenger 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.

Lindsey Lippert, NRU Coordinator: Responsible for coordinating implementation of habitat protection (HP), species population protection (SP), freshwater inflows (FW), shoreline management (SM), and spills and dumping (SD) actions in the *GBP*; coordinating invasive species workgroup and the NRU subcommittee of the GBC; implementing specific projects to protect, 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; and serving as back-up budget liaison and bill analyst for the GBEP office.

Kristen McGovern, Ph.D., Monitoring and Research (M&R) Coordinator: Responsible for coordinating research (RSC) actions in the *GBP*; coordinating the regional monitoring program, including data management/reporting, and development and application of environmental indicators; facilitating the M&R subcommittee of the GBC; coordinating CCMP implementation tracking, and researching, evaluating, and reporting findings concerning scientific and technical issues impacting *GBP* implementation.

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

Patricia Thompson, Quality and Technical Programs Coordinator: Responsible for serving as the quality assurance officer, contracts specialist, budget liaison, and grants coordinator for the GBEP. Ms. Thompson also coordinates development and submission of federal reports, identifies and tracks the evolution of issues affecting bay management, and researches policy, technical, and management results that pertain to Galveston Bay in collaboration with the NRU and WSQ coordinators.

Mary Stiles, PPE Assistant: Responsible for handling the GBEP outreach events, maintains the GBEP contacts database, handles timekeeping, conducts K–12 presentations, and supports general activities of the PPE team and PPE subcommittee. Ms. Stiles manages the annual Trash Bash contract and Spanish language community outreach.

Doretta Thomas, Administrative Assistant: Responsible for travel coordination, vehicle and equipment maintenance and repairs, mail, correspondence, office safety, and general administrative support for the GBEP.

PROGRAM COMPETENCY DEMONSTRATION

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

- Competency is demonstrated by the TCEQ Quality Systems Audit conducted biennially by the TCEQ quality assurance manager.
- Competency is demonstrated through the EPA Quality Project and Program Management training taken by TCEQ GBEP staff. GBEP staff that review 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 24 approved January 2019) that the GBEP operates under, which provides descriptions of the quality assurance policies, including all the requirements described in the EPA document QA/R-2.
- The program manager and staff take many professional development training classes annually which are also available upon request.

FY YEAR 2019 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 2018–August 2019 (FY 2019). The number is subject to change as additional funding may be reported for the period.

Table 2. FY 2019 Leveraging

EPA Funds to Program (Section 320)	Other Federal Funds	State Funds	Local Government Funds and In-Kind	Private funds & In-kind
$600,000	$363,196	$871,640	$0	$ 4,025,000

Figures reported in Table 3 depict the travel expenses and tech transfer descriptions from FY 2019.

Table 3. FY 2019 Travel and Tech Transfer

EVENT, LOCATION, & PURPOSE	STAFF PERSON	EPA SECTION 320 FUNDS	TCEQ 100% STATE FUNDS
Galveston Bay Foundation (GBF) Conservation Committee Meetings Houston, Texas – Bimonthly (every two months) The GBF and partners meet to discuss conservation projects, management needs, and funding strategies for lands held by the GBF. The committee also reviews bylaws and requirements needed to maintain the GBF's Land Trust Alliance (LTA) Accreditation.	Lindsey Lippert	$0	$0
Interagency Public Meeting for the U.S. Army Corps of Engineers (USACE) Coastal Texas Protection and Restoration Feasibility Study Galveston, Texas (and via teleconference) - Monthly - The USACE Galveston District meets with state and federal agency partners to consult on the progress of the study which will identify critical data needs and recommend a comprehensive strategy for reducing coastal storm flood risk through structural and nonstructural measures that take advantage of natural features like barrier islands.	Lindsey Lippert	$0	$0

EVENT, LOCATION, & PURPOSE	STAFF PERSON	EPA SECTION 320 FUNDS	TCEQ 100% STATE FUNDS
GLO – Region 1 Technical Advisory Committee Meeting Galveston, Texas – Semiannual - The GLO and partners meet to discuss a synergistic approach to implement both green and gray projects that complement one another and create a more resilient coastal community for the counties of Brazoria, Chambers, Galveston, and Harris. The results are used to develop the annual updates of the Texas Coastal Resiliency Master Plan; a long-term framework to mitigate damage from future coastal natural disasters and to preserve and enhance the state's coastal natural resources and built assets.	Lindsey Lippert	$0	$0
The H-GAC Natural Resources Advisory Committee Houston, Texas – Quarterly - These meetings provided information on issues related to the natural resource management of the region. Presenters during FY 2017 covered topics including trees, wastewater, superfund sites, the *GBP, 2nd Edition*, among others. Lisa is a non-voting member.	Lisa Marshall	$0	$0
Texas State Soil and Water Conservation Board Watershed Coordinator Steering Committee – Semi-annual – These meetings provided information on WPPs, implementation and funding.	Lisa Marshall	$0	$0
University of Houston Clear Lake (UHCL)/ Environmental Institute of Houston (EIH), Science Advisory Board Houston, Texas – Triannual - The meetings provided research updates from the EIH staff and faculty on their research and educational initiatives. The GBEP Program Manager is a non-voting member.	Lisa Marshall	$0	$0
The H-GAC Bacteria Implementation Group (BIG) Fall meeting Houston, Texas – Semi annual - These meetings provided an update to implementation activities of the BIG Implementation Plan (I-Plan) and present topics that are related to water quality.	Lisa Marshall	$0	$0
Trash Summit Meetings Houston, Texas (and teleconference) – Monthly - Watershed-wide coordinating initiative to research, track, and quantify litter. This stakeholder-led effort also 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.	Cynthia Clevenger Lisa Marshall	$0	$0

EVENT, LOCATION, & PURPOSE	STAFF PERSON	EPA SECTION 320 FUNDS	TCEQ 100% STATE FUNDS
Plastic Pollution Prevention Partnership (P3P) Meetings Houston, Texas – Quarterly - Region-wide collaborative of several organizations and agencies to address plastic debris affecting wildlife and water quality. The group organizes cleanups, wildlife entanglement rescues, and outreach and education efforts. This group is an outcome of regional efforts to address the EPA's Trash Free Waters initiative.	Cynthia Clevenger Lisa Marshall	$0	$0
Texas City Dike (TCD) Trash Initiative Meeting Houston, Texas – Monthly - An outcome of the P3P addressing concerns about the large amount of monofilament fishing line causing wildlife entanglements and water quality issues on the TCD. The project is a partnership with organizations and agencies working with the Texas City Waste Management Department to develop a campaign helping anglers and visitors to the TCD keep fishing line off the ground.	Cynthia Clevenger Lisa Marshall	$0	$0
Trash Bash Event Coordination Meetings Houston, Texas – Quarterly - These meetings provided regional coordination, site selection, training, outreach materials development and training, and organizational support for the regional Trash Bash events.	Mary Stiles	$0	$0
Invasive Species Conference Austin, TX – October 2018 - This conference provided networking opportunities and information on current issues in invasive species management.	Cassidy Kempf	$0	$73
Texas Conference for Women Austin, TX – September 2018 - This conference provided networking opportunities and information for women and their careers.	Cassidy Kempf	$0	$39
Texas Plastic Pollution Symposium Corpus Christi, TX – October 2018 - This symposium provided networking opportunities and information on current plans, issues, and successes regarding plastic pollution in Texas.	Cynthia Clevenger	$0	$0
EPA Quality Assurance Training Oklahoma City, OK – October 2018 - This training provided individuals working with projects funded with EPA funds with the information and tools necessary to maintain an effective quality assurance program and develop Quality Assurance Project Plans (QAPPs).	Kristen McGovern	$1201	$0

EVENT, LOCATION, & PURPOSE	STAFF PERSON	EPA SECTION 320 FUNDS	TCEQ 100% STATE FUNDS
TCEQ Federal Funds training and meeting with Water Quality Planning Division's Division Support Services Austin, TX – November 2018 - This training provided the GBEP staff with training to support development and tracking of the GBEP's budget.	Lisa Marshall Kristen McGovern	$0	$771
TCEQ Office of Water Manager's Retreat Austin, TX – December 2018 - This retreat provided the GBEP program manager with the opportunity to network and communicate in person with other Office of Water managers.	Lisa Marshall	$0	$163
Texas Watershed Coordinators Meeting Waco, TX – January 2019 - These meetings provided regional organization, resources, and support for entities working on watershed-based plans and WPPs.	Lisa Marshall Christian Rines	$0	$0
Quality Assurance Audit College Station, TX – February 2019 - QA audits of the GBEP's projects help to ensure that projects are following their QAPPs and help the GBEP to maintain a high level of quality assurance over data collected by the GBEP's projects.	Lisa Marshall Kristen McGovern	$0	$0
Texas Watershed Short Course Bandera, TX – February 2019 - This training provided background information on the development and execution of WPPs, which will be useful to the GBEP staff that will work with entities to develop WPPs and develop mechanisms for the GBEP to track and assess implementation of the *GBP*.	Kristen McGovern Christian Rines	$0	$854
Spring EPA National Estuary Program (NEP) Tech Transfer Meeting Washington, D.C. – March 2019 - This meeting provides the NEP program managers a chance to exchange information and network.	Lisa Marshall	$2551	$0
2019 Gulf of Mexico Alliance All Hands Meeting Mobile, AL – June 2019 - This meeting provides networking opportunities with other organizations and governmental agencies that are working for the environmental and economic health of the Gulf of Mexico.	Lisa Marshall Cynthia Clevenger	$3507	$0
Total		$ 7259	$ 1900

SECTION 2.2: GOALS AND ACCOMPLISHMENTS SINCE FY 2019 WORKPLAN SUBMISSION

The GBEP partners made notable achievements in improving water quality, restoring wetlands, protecting unique habitats, and educating the public in FY 2019. These achievements are highlighted in the following sections.

HABITAT AND LANDSCAPE-LEVEL CONSERVATION: CREATE, RESTORE, AND PROTECT 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 the 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 the water quality and protecting valuable fish and wildlife habitat in this region.

Since 2000, the GBEP and its partners created, protected, and enhanced 29,768 acres of important coastal habitats, leveraging $112,154,630 in local, industry, state, and federal contributions. During FY 2018, the GBEP protected and enhanced 717 acres of wetlands and coastal habitats, and leveraged $13,833,741 in local, industry, state, and federal contributions. In addition, 77,332 linear feet of habitat were enhanced through the installation of fencing, fire breaks, and access road improvements.

As of February 2019, an additional 19 acres and 1,200 linear feet of coastal habitat have been conserved via living shoreline projects. Through acquisition and restoration initiatives currently in progress, the GBEP and partners will conserve and/or enhance an additional 892 acres of coastal habitat by August 2019.

REGIONAL CONSERVATION MAINTENANCE AND MANAGEMENT PROJECT

The Regional Conservation Maintenance and Management Project was a collaborative effort to improve habitat on protected properties and maintain various conservation and restoration projects. This project benefited many of the non-governmental organizations conducting land protection and habitat enhancement activities throughout the region.

The GBEP, Texas Parks and Wildlife Department (TPWD), and the GBF, along with five other conservation partners, identified habitat enhancement opportunities and maintenance activities on existing preserves and conservation projects throughout the Galveston Bay watershed.

The following projects were identified by project partners as high priority:

- Invasive species control (Chinese tallow, Brazilian peppertree, privet, etc.);
- Coastal prairie restoration and enhancement (brush control);
- Freshwater wetland habitat management;
- Fire line establishment;
- Access road maintenance;
- Prescribed mowing;
- Boundary fencing; and
- Artificial nest site construction.

Individually, these tasks can present annual financial challenges to non-governmental organizations and are not typically competitive for grant funding through traditional sources which favor projects with larger footprints. However, the cumulative effect of these conservation projects improves the health and ecological function of natural habitats on protected property within the watershed, and the completion of these projects allowed additional management actions to be delivered.

Conservation partners identified their organization's highest priority enhancement and maintenance needs and utilized the project funds to accomplish the planned objectives. Collaboration between partners allowed funds to be delivered in a cost-effective manner to accomplish maintenance and management activities across the watershed and provided a significant benefit to wildlife and water quality.

Table 4. Conservation Maintenance and Management Project List

Partner Name	Project Site	Activity	Description	Area Affected
Armand Bayou Nature Center	Prairie Dawn Tract (Space Center)	Invasive Species Control	Foliar and cut stump herbicide application, spot treat along hog-panel fence	24 acres / 4,400 linear feet
Armand Bayou Nature Center	Taylor Bayou	Fencing	Boundary fencing to prevent illegal access and off-road vehicles	4,230 feet

Armand Bayou Nature Center	Armand Bayou Park	Rookery	Construction of an artificial nesting structure to support an active rookery	1 nesting structure (575 square feet)
Artist Boat	Coastal Heritage Preserve	Invasive Species Control	Foliar treatment of McCartney rose	60 acres
Artist Boat	Bob Moore Island	Invasive Species Control	Cut stump treatment for Chinese tallow and Brazilian peppertree, foliar treatment for McCartney rose	7 acres
GBF	Chocolate Bayou	Aquatic Vegetation Control / Mechanical Mulching / Mowing	Freshwater wetland habitat management for waterfowl, prairie restoration and enhancement	11 acres / 14 acres / 38 acres /
GBF	Gordy Marsh	Invasive Species Control / Access Road Maintenance	Prairie enhancement by removing Chinese tallow, restore site access	44 acres / 10,600 linear feet
GBF	Rich Sanctuary	Invasive Species Control	Coastal prairie restoration by removal of Chinese tallow	65 acres
GBF	Sweetwater Preserve	Invasive Species Control	Habitat enhancement by removal of Brazilian peppertree and other invasive species	14 acres
GBF	Texas City Preserve	Mowing / Invasive Species Control	Prairie enhancement by mowing rank vegetation, removal and treatment of Chinese tallow	44 acres / 6 acres
GBF	Turtle Bayou	Invasive Species Control / Access Road Maintenance	Control of Chinese tallow and other invasive species in forest openings, restore access throughout property	11 acres / 17,050 linear feet
Houston Audubon Society	Bolivar Preserves (3)	Fire Lines / Mowing	Mowing boundaries and sensitive areas to prepare for prescribed fire	9.5 miles / 0.5 acres
Houston Audubon Society	Dos Vacas Muertas (Galveston)	Mowing	Wetland habitat mowing to suppress unwanted vegetation, including large perennial grasses	1 acre
Houston Audubon Society	High Island (2)	Invasive Species Control / Mowing	Habitat enhancement by removal of shrubs	2.44 acres / 2 acres
Native Prairies Association of Texas	Deer Park Prairie	Mowing / Invasive Species Control	Prairie management by chemical and mechanical suppression of woody vegetation	36 acres 19 acres
Nature Conservancy	Texas City Prairie Preserve	Mechanical Mulching	Mechanical removal of Chinese tallow for habitat enhancement	25 acres

The combined efforts of the project resulted in the enhancement, stewardship, restoration, or maintenance of over 423 acres coastal habitats at 19 conservation properties, across four counties, owned and managed by six different conservation organizations. Other project achievements include installation of 4,230 feet of boundary fencing, construction of one bird nesting structure (575 square feet), maintenance and repair of 27,650 linear feet of access road, and 9.5 miles of firebreaks.

IMPROVING & PROTECTING WATER QUALITY: SUPPORTING CORE CLEAN WATER ACT (CWA) PROGRAMS

In support of the EPA's core CWA goals the GBEP has worked to build capacity of local stakeholders through watershed protection planning and implementation of water quality improvement projects (WQIPs). Through this effort in coordination with other water programs of the 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

Galveston Bay Coalition of Watersheds

The increase in WPPs and I-Plans over time has created several autonomous groups, all with similar goals. After the re-formation of the Armand Bayou Watershed Partnership as a 501(c)(3) non-profit, options for the future of the Dickinson Bayou Watershed Partnership were explored. Based on this research, creation of a group with a larger focus (like the BIG) with support from local governments (like the Plum Creek Watershed Partnership in South Central Texas) was identified as a sustainable model for coordinating local watershed efforts.

Through this project, a coalition of watershed groups was created for the Galveston Bay area and includes a partnership with the GBF to maintain the existing Galveston Bay Bacteria Reduction Plan (GBBRP). The new coalition includes stakeholders from existing watershed groups including Dickinson, Highland, and Jarbo Bayous, as well as adjacent watersheds that will likely be developing WPPs or I-Plans in the future such as Moses Bayou. This regional approach:

- Extends limited resources for coordinating implementation efforts;
- Reduces the number of meetings stakeholders are asked to attend; and
- Facilitates the coordination of information already happening between watershed groups.

The Galveston Bay Coalition of Watersheds had five stakeholder meetings where goals, a vision, and implementation priorities have been developed. The group of stakeholders continue to work on finding sustainable funding for the Coalition.

Highland Bayou WPP

Highland and Marchand Bayous sometimes experience periods of low dissolved oxygen (DO) and elevated bacteria levels, which can negatively impact aquatic life and can be harmful to human health respectively. All the state's assessments (Texas 303(d) List) since 2002 have listed multiple assessment units (AUs) within Highland Bayou (segment 2424A) and Marchand Bayou (segment 2424C) as impaired for these constituents of concern.

Texas AgriLife has coordinated the creation of a characterization report and a stakeholder driven draft WPP for Highland Bayou. The current draft WPP only addresses bacteria and work to address the DO impairment is ongoing. Recent guidance from the EPA indicates that the DO impairment and flow both need to be included for a WPP to satisfy EPA's *Nine Key Elements for Watershed-based Plans (WBP)* as described in EPA's *2013 Guidance*.

During FY 2019, the Texas Institute for Applied Environmental Research (TIAER) at Tarleton State University, with funding from the TCEQ TMDL program, was exploring options for modeling flow with existing data from surrogate watersheds using various methods. TIAER's goal was to find an acceptable protocol for addressing flow without collecting new data. Once an acceptable protocol was determined, the TCEQ TMDL program began funding a second year (FY 2019) of work to complete the modeling and associated load reduction calculations for both bacteria and DO.

WQIPs

Ghirardi Family Water Smart Park

The City of League City with encouragement from the GBEP, sought and received a 2011 TCEQ CWA Section 319 Program grant to control nonpoint source (NPS) pollution within the city limits. The million-dollar grant and match from the GBEP funded the construction of the Ghirardi Family WaterSmart Park, a 3.75-acre park that features green infrastructure BMPs including rain gardens, pervious pavement, bio-swales, rain water harvesting, and a green roof. This award-winning facility serves as a demonstration for residents, city staff, and local developers as to how these practices can be implemented into landscapes and developments around League City and Galveston County. Additional tasks in FY 2015 included reviewing and re-writing existing city ordinances, completing a report on BMP retrofit recommendations for the Creekside District to control NPS runoff, and completing modeling of runoff quantity and quality for areas of new developments, including how BMPs can best be utilized to reduce both. Monitoring of the BMPs occurred during most of FY 2015 but was suspended until a QAPP was developed for the FY 2016 contract. The QAPP was approved in June 2016.

Because no rain events took place during the work week that met the criteria of greater than .29 inches of rain, the contract was extended until May 2018. Several events were sampled, and soil testing was added to the project. Because soil plays a key role in filtering pollutants for these BMPs, measuring the soil offered insight into the filtration effectiveness.

Galveston Bay Fats, Oils, and Grease (FOG) Campaign

Starting in FY 2014, the FOG campaign was a joint project with the WSQ and the PPE subcommittees. To coordinate outreach and education efforts to the upper Galveston Bay watershed in the Dallas area, the GBEP funded this project with the City of Nassau Bay to implement the City of Dallas Water Utilities FOG outreach campaign called Cease the Grease. This project supported the CWA core program of addressing diffuse, NPS sources of pollution. The Dallas campaign not only showed measurable success in reducing FOG-related sanitary sewer overflows, but the City of Dallas was also willing to allow the City of Nassau Bay to use their materials free of charge. The campaign was implemented in the Galveston Bay region through the City of Nassau Bay and outreach materials and efforts have been tailored for the Galveston Bay region (see Figure 2). City of Nassau Bay in partnership with the GBF tracked the progress of the campaign based on the number of impressions achieved through marketing and outreach activities, knowledge change throughout the campaign based on pre- and post-test data in outreach programs and other indicators developed by the campaign work group. Additionally, the GBF requested sanitary sewer overflow reports from the TCEQ and municipalities to track if a bacteria reduction resulted from campaign implementation. Tracking results were shared with campaign partners, the City of Dallas as well as potential future partners and other regions looking for examples of a successful FOG reduction campaign. Funding for FY 2017 incorporated launching a grease recycling station in the City of Nassau Bay. During FY 2018, a recycling station was established in the City of Seabrook, City of Dickinson, and with the Clear Lake City Water Authority. The campaign also created a new, more family-oriented Grease Monster. The Cease the Grease Campaign also continued its social media posts and marketing with local National Broadcasting Company affiliate KPRC and added a Pandora audio advertisement campaign that continued through FY 2018.

Figure 2. New Grease Monster Mascot.*Bacteria Source Tracking (BST) on Tributaries of Trinity and Galveston Bays*

In FY 2018, Texas Water Resources Institute (TWRI) began a water quality monitoring regime that will help decision makers make appropriate recommendations for addressing the bacteria impairments in Buffalo, Double, Cedar, and Dickinson Bayous and Clear Creek. Monthly sampling is being conducted by TWRI at one site on each waterbody for 12 months (five total sites). Field parameters collected will include pH, temperature, conductivity, and dissolved oxygen. Samples will be delivered to the Texas A&M University (TAMU) Soil and Aquatic Microbiology Laboratory (SAML) where *E. coli* will be prepared for BST analysis. SAML will also conduct library-dependent BST and analyze *E. coli* isolates (four isolates per sample) using the ERIC-PCR and RiboPrinting combination method. TWRI will collect approximately 75 known source samples from the local watersheds to improve the accuracy of the BST results. Known source sample isolates will be archived in the Texas *E. coli* BST Library. A QA audit was performed in February of 2019 and sampling will be completed in April 2019.

Green Infrastructure for Texas

Texas AgriLife operates a program called GIFT. This project supports continued monitoring of GIFT's freshwater wetland restoration at Sheldon Lake State Park. In 2013, the Texas AgriLife and TPWD partnered together to establish a monitoring protocol for the newly created Phase II and Phase III prairie wetlands in Sheldon Lake State Park. The goal of the vegetation monitoring focused on understanding how the plant community changes by season and with time (post initial planting). Sampling has been conducted on a quarterly basis since 2003. This project supports continuation of the data collection for Phases II and III, and adds sites within Phase IV (one-year post construction) and future Phase V. The different wetland restoration techniques can then be compared to advance the knowledge base of wetland restoration.

Additionally, the GIFT program initiated two wetland demonstration projects. The wetland demonstration project(s) include the following sites: 1) a basin on the MD Anderson Cancer Center campus in the Texas Medical Center in Houston; and 2) a minimum two-acre wetland at Exploration Green Recreation Area in Clear Lake City.

CONTINUE BUILDING REGIONAL SUPPORT FOR PPE

Figure 3. Mary Stiles teaching children about the Galveston Bay watershed at Trash Bash 2019 (photo credit: Kristen McGovern).

The PPE subcommittee continued supporting Back the Bay in FY 2019 through the GBEP-funded projects and by partnering at outreach events. The GBEP staff also supported PPE by participating in speaking/presentation opportunities. Through these efforts, over 3,000 adults and children were reached with the message of protecting and preserving Galveston Bay.

Examples of these activities include:

- Supported community-based events such as Boy Scouts, Trash Bash, Bay Day, and the Harvard Elementary School Science Night, and World Ocean's Day in Galveston.
- Increased awareness of Galveston Bay and its value and actions that help protect the bay through a coordinated, regionally implemented campaign.
- Participated in additional coordination with Trash Free Texas efforts. Trash Free Trinity was changed to Trash Free Texas to capture hotspots in the entire state and bring in additional partners. Worked with the Trash Free Texas group to reach out to additional partners in the lower Galveston Bay watershed and link this effort to the regional Trash Summit efforts. www.trashfreetexas.org
- Continued to partner with the P3P to highlight messages about awareness on water pollution and marine debris risks to native wildlife such as fishing line at various education and outreach events.
- Participated in developing the Fishing Line Recycling campaign with a work group of the P3P on a monofilament fishing line abatement project for the Texas City Dike. Seawolf Park in Galveston was

added, and partners are working with the City of Galveston to install additional fishing line recycle bins at the park.

- Continued to share coordination with partner organizations on marine debris for a third Trash Summit workshop held at the Houston Zoo in May 2018. This was a continuation of efforts to coordinate regional planning and implementation as well as fill in missing gaps for projects, research, and communications on local trash, marine debris, and plastic pollution issues. This is in coordination with the EPA's Trash Free Waters initiative. The goal of this effort is to create the Greater Houston-Galveston Trash-Based Aquatic Action Plan. More information on this effort can be found on the website www.donttrashagoodthing.org
- Continued to partner with the City of Pasadena Municipal Library for a Back the Bay presentation for their children's program that engaged 50 children and 10 adults with the message of litter and plastic pollution prevention.
- Participated in an Educators Day at the Houston Zoo. Helped develop a lesson plan aligned with the Texas Essential Knowledge and Skills requirements that focuses on a school campus litter assessment and cleanup project. Provided 30 educators with the lesson plan and a copy of the Galveston Bay watershed map.
- Coordinated and hosted 24 quarterly meetings of the GBC and its subcommittees.

Trash Bash

Trash Bash 2019 was conducted in March 2019; estimates of volunteers and trash collected are pending. For example, in March 2018, the GBEP coordinated the 25th annual Trash Bash event at Galveston-Virginia Point, one of 15 clean-up sites across the Houston-Galveston area. The event promotes environmental stewardship and encourages volunteers to do their part at home by properly disposing of trash, household chemicals, and pet waste. Trash Bash supports two of the EPA's FY 2014–2018 Strategic Plan goals which include: 1) cleaning up our communities and advancing sustainable development, and 2) protecting America's waters.

At the event, 3,591 volunteers collected an estimated 2,200 pounds of trash at Virginia Point. Their efforts enabled 40 pounds of materials to be recycled. Each year, Trash Bash meets or surpasses volunteer goals. In 2017, 3,242 volunteers from all over the Houston-Galveston area cleaned 158.5 miles of shoreline, collected approximately 85.5 tons of trash—including 356 tires—and recycled .94 tons of trash.

Figure 4. Dickinson High School students incorporating the Back the Bay campaign messages onto cisterns for their school's watersmart project (photo credit: Cassidy Kempf).

Back the Bay

The GBEP worked with Artist Boat on their "We Back the Bay" project. This project provided classroom teachers with information/resources about watersmart landscapes, and then those teachers worked with their students and their school administrators to create a watersmart project for their campuses. The goal of this project is to reduce non-point source pollution in Galveston bay and improve water quality. The GBEP participated in the professional development training for the teachers by providing a presentation on the Back the Bay campaign. Five schools were granted $5,000 to create a watersmart landscape on their campuses, and 10 percent of their budget had to be spent on outreach and education using the Back the Bay campaign. Dickinson High School students recreated the 10 Tips from the campaign website by creating art on water cisterns and a mural that will be displayed inside the school. This is another way the PPE subcommittee and partners are incorporating the campaign into their projects.

IMPROVING RESOURCE MANAGEMENT THROUGH TARGETED RESEARCH THAT INCREASES ECOSYSTEM UNDERSTANDING

The GBEP continues to focus on providing ecosystem-based M&R and encouraging the sharing of new information to inform resource managers. In FY 2016, the M&R subcommittee supported a project that investigates the impacts of reservoirs on freshwater inflows, specifically the Lake Livingston reservoir. The GBC approved funding to continue the Lake Livingston project in FY 2017 and a funding request was included in the FY 2017 work plan. In FY 2018, M&R funded projects to collect and analyze fish tissue samples to evaluate the risk associated with consumption of fish and crabs from a portion of Galveston Bay and to

quantify the influence of freshwater inflow on the Trinity River delta salinity regime and biota. In FY 2019, M&R approved continued funding of the seafood evaluation project and funded a project to create a complete Geographic Information System (GIS) database of oyster reef habitat in Galveston Bay while simultaneously assessing intertidal oyster population dynamics and community structure on selected reefs. The following projects were all ongoing during FY 2019.

The Impacts of Assimilative Capacity of Reservoirs on Coastal Inflows

The goal of this project is to assess the assimilative capacity of the Lake Livingston reservoir and how it impacts coastal inflows. Lake Livingston's dam forms the upper boundary of the lower Galveston Bay watershed on the Trinity River. This project will monitor the inflows into Lake Livingston and the outflows to obtain before and after data for nutrients and sediments. Assimilative capacity changes depending on flows, so the study will obtain samples during low, medium, and high flows (ambient and event monitoring). The Lake Livingston reservoir may play an important role in controlling sediment and nutrient load variability to the coastal ecosystem. The effect Lake Livingston has in sequestering sediments and nutrients is not well understood; therefore, quantifying the assimilative capacity of Lake Livingston is critical to understanding the impacts of reservoirs on the health of the Galveston Bay ecosystem. The United States Geological Survey (USGS), the subcontractor, began exploratory sampling in March 2016 to estimate residence time in Lake Livingston and get baseline data. In May 2016, the Houston Advanced Research Center/GeoTechnology Research Institute (HARC/GTRI) began routine and event sampling. The QAPP renewal was approved in March 2018. Sampling continued through FY 2019 and is completed. The contractor is currently finalizing sample analyses and writing the final report.

Seafood Evaluation in a Portion of Upper Galveston Bay

A fish advisory for the area below Highway 146 down to a line from Red Bluff Point to Five Mile Pass to Houston Point has not been sampled recently by Texas Department of State Health Services (DSHS). This area has a consumption advisory for catfish, blue crabs, and spotted seatrout due to polychlorinated biphenyls (PCBs) and dioxins. The area is a popular recreational fishing area for spotted seatrout. Fishing occurs regularly in Tabb's and Barnett Bays, which are contained in this advisory area. It is important to select a geographical area that is of a size that will allow an evaluation of tissue concentrations and risk that allows a high degree of confidence so that appropriate regulatory decisions can be made by the Commissioner of Health related to altering an existing fish consumption advisory. The Texas Department of State Health Services (DSHS) will collect about 63 samples from this area. Four or five locations will be established in the area to collect fish and crab samples based upon habitat and areas where fishing occurs. Targeted species will include commonly eaten species such as blue crab, spotted seatrout, red drum, black drum, sheepshead, catfish, flounder, and croaker. Once the samples are collected and analyzed, a risk characterization will be conducted to determine the adequacy of the current fish consumption advisory in the area. All samples will be tested for PCBs and dioxins, as there is a history of issues with these compounds. A limited number of samples will be tested for additional contaminants of concern. The project will produce data to determine whether any changes need to be made to the current advisory. Sampling began in April 2018, the QAPP renewal was approved in December 2018, and the contractor plans to be finished sampling in March 2019. The contractor is currently analyzing samples and drafting the final report.

Characterization of the Influence of Freshwater Inflow on Trinity River Delta Indicators

Little is known about the influence of freshwater inflow on the salinity regime and multiple freshwater indicator fauna including Rangia clams and wild celery. Recent studies have documented current and past abundances of Rangia clams in open bay portions of the Galveston Bay system. However, spatial and temporal trends in populations of Rangia clams and wild celery remain poorly documented within the shallow portions of the Trinity River delta. UHCL is conducting a comprehensive study that includes two components: 1) establishment of a network of shallow automated salinity monitoring sites; and 2) on the ground inventory of submerged aquatic vegetation (SAV) and Rangia clams. Sampling for this project began in February 2018 and the QAPP renewal was approved in January 2019.

Freshwater Inflows in Galveston Bay: Relationships to Harmful Algal Blooms

This project seeks to monitor the relationship between freshwater inflows and the presence of harmful algal blooms in Galveston Bay by using an Imaging FlowCytobot to detect harmful algal blooms earlier than previously possible. The Imaging FlowCytobot will help to (i) identify phytoplankton blooms – their timing, magnitude and duration, (ii) follow blooms and observe changes, and (iii) develop predictive abilities to forecast subsequent blooms. Observations will be related to concurrently sampled water quality data and freshwater inflow data collected by USGS. By working with the TPWD Coastal Fisheries Division and the DSHS, the goal is to provide an early announcement to oyster and fisheries groups to protect consumers from disease or other health hazards associated with harvesting and/or consuming products exposed to (harmful) algal blooms. Samples continue to be collected daily to monitor phytoplankton in the bay. The final report is currently being drafted.

Galveston Bay Intertidal Oyster Reef Mapping and Analysis

Intertidal oyster shell reef locations in Galveston Bay have not been extensively mapped on a large scale in the last 20 years. Small scale exploratory projects have been conducted in Bastrop Bay and the Carancahua reef area in West Bay by the UHCL utilizing drone and side scanning sonar. Obtaining information on past intertidal reef locations will provide baseline data that can be used as a benchmark for analyzing restoration techniques in the bay and monitoring future growth/ loss of habitat. The project proposes to use 2015 Texas Orthoimagery Program (TOP) aerial photography to build a GIS database of historic intertidal oyster reef habitat in Galveston Bay. TOP data was recorded in a 0.5 m resolution, providing a higher quality image for habitat reclassification than other publicly available images. After obtaining GIS-created shapefiles of possible intertidal reef locations, ground-truthing will be conducted on a subsample of locations to validate the analysis and collect current elevation data with a sub-meter accuracy GPS unit. On a subsample of the mapped intertidal reefs, oyster population characteristics will be assessed. These metrics will include oyster abundance, size demography, reef structure (overall percent cover of shell, percentage of live oysters, and rugosity), and oyster condition (provides a relative index of oyster health). Additionally, the benthic associated macrofauna will be excavated and community composition determined. This community analysis will not only indicate the value of Galveston Bay intertidal reefs as oyster habitat, but also provide a relative indication of the value of this habitat type for mobile nekton and birds. QAPPs are currently being drafted.

SECTION 2.3: STRATEGIC ACTION PLAN GOALS TO FOCUS ON IN FY 2020

- Conserve, restore, and enhance important coastal habitats.
- Reduce NPS pollutant loads.
- Implementation of watershed-based plans to address bacteria impaired contact recreation waters.
- Ensure adequate levels of freshwater inflows necessary to maintain the balance of salinity, nutrients, and sediments required to support a productive estuary.
- Create a sense of personal ownership and shared responsibility among all cultural components of the community, including the public, industry, and government.
- Ensure that stakeholders receive the knowledge necessary to act on the GBEP's priorities in ways that benefit Galveston Bay and the entire community.
- Increase the number of partners actively involved in the GBEP initiatives.
- Reduce human health risk from consumption of seafood contaminated with toxic substances.
- Increase understanding of the Galveston Bay ecosystem.

FY 2020 EXPECTED OUTCOMES

- Conserve, restore, and enhance important coastal habitats.
- Improve knowledge of sources of bacteria pollution in the lower Galveston Bay watershed.
- Increase coordination of marine debris and plastic pollution reduction efforts throughout the region.
- Increase the public's awareness of their connection to and effect on the Galveston Bay ecosystem.
- Increase coordination of environmental education efforts in the region.
- Continue to monitor the influence of freshwater inflows on Galveston Bay.
- Increase understanding of intertidal oyster population dynamics and community structure of oyster reefs.
- Improve knowledge of PCB and dioxin levels in Galveston Bay post Hurricane Harvey.
- Improve knowledge of lead isotope composition and heavy metal concentrations in Galveston Bay waters, sediments, and oysters.
- Improve knowledge of the types and quantities of microplastics in watersheds draining to Galveston Bay.

FY 2020 EXPECTED OUTPUTS

- Conserve and protect 800 acres of habitat.
- Restore and enhance 200 acres of habitat.
- Initiate at least two stormwater treatment wetlands projects.
- Complete/continue one bacterial source tracking project.
- Coordinate/facilitate an environmental education workshop for educators who are working on environmental curriculum in the region.
- Complete two bird and wildlife habitat restoration projects that incorporate educational workshops, interpretive signage, and volunteer opportunities.
- Continue to participate in the coordination of Trash Bash.
- Continue implementing Back the Bay.
- Complete data collection to determine if a seafood advisory is still necessary for a portion of Galveston Bay.
- Support two freshwater inflow research projects.
- Continue one project that monitors freshwater wetland restoration.
- Continue mapping oyster reef habitat and analysis of intertidal oyster population dynamics and community structure.
- Complete the State of the Bay Report, 4th Edition.
- Maintain the GBEP and Back the Bay websites.
- Continue an estuary resilience assessment of the goals, objectives, and actions in the *GBP, 2nd Edition*.
- Initiate an assessment of the public's attitudes and perceptions of the Galveston Bay watershed and use the information gathered to create community-specific targeted education and outreach campaigns.
- Create a complete GIS database of oyster reef habitat in Galveston Bay.

FY 2018-2022 EPA STRATEGIC PLAN MEASURES IMPLEMENTED

The projects proposed for FY 2020 implement objectives of all three goals identified in the FY 2018–2022 EPA Strategic Plan, including:

Goal 1: Core Mission - Deliver real results to provide Americans with clean air, land, and water, and ensure chemical safety.

- Objective 1.2: Provide for Clean and Safe Water: Ensure waters are clean through improved water infrastructure and, in partnership with states and tribes, sustainably manage programs to support drinking water, aquatic ecosystems, and recreational, economic, and subsistence activities.

As Objective 1.2 is the main goal of all NEPs, the GBEP's projects focus on safeguarding human health and maintaining, restoring, and/or improving water quality through a variety of methods including seafood safety programs, land conservation, and developing and implementing watershed-based plans.

Goal 2: Cooperative Federalism - Rebalance the power between Washington and the states to create tangible environmental results for the American people.

- Objective 2.1: Enhance Shared Accountability: Improve environmental protection through shared governance and enhanced collaboration with state, tribal, and federal partners using the full range of compliance assurance tools.

The GBEP itself is an exercise in cooperative federalism between the TCEQ, EPA and GBC. Projects are developed and implemented by a diverse partnership of federal and state agencies, local government, industry, and nonprofits.

- Objective 2.2: Increase Transparency and Public Participation: Listen to and collaborate with impacted stakeholders and provide effective platforms for public participation and meaningful engagement.

The GBEP is a non-regulatory program that maintains stakeholder involvement associated with the Galveston Bay Council and its subcommittees. In addition, many of our projects have significant education and public outreach components that emphasize public participation to better partner with stakeholder and local communities to create tangible environmental results.

Goal 3: Rule of Law and Process - Administer the law, as Congress intended, to refocus the Agency on its statutory obligations under the law.

- Objective 3.3: Prioritize Robust Science: Refocus the EPA's robust research and scientific analysis to inform policy making.

The GBEP's proposed M&R projects were developed and selected by the Galveston Bay Council and its subcommittees, composed of federal and state agencies, research and academia, and local industry, to address current and future environmental concerns and/or emerging environmental issues, develop new approaches, and improve the scientific foundation for environmental protection.

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

  To decrease the amount of toxic chemicals released into the environment via air, water, and waste pollutants in Texas by at least 2 percent, 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

FY 2020 FEDERAL AND STATE FUNDING

This request is for funding in the amount of $600,000 (federal) and $600,000 (state) for a total equaling $1,200,000. The match ratio for this grant is 50/50. Full-time (FTE) equivalent for the grant are 7.0. Tables 5 and 6 provide funding and budget details.

Table 5. FY 2020 Funding and FTE Summary

Program Element		Division	Federal	State Match	Total	FTEs
TCEQ Strategy 1.1.2						
1	GBEP Program Implementation	Water Quality Planning	$600,000	$600,000	$1,200,000	7.0
		Total	**$600,000**	**$600,000**	**$1,200,000**	**7.0**

Table 6. FY 2020 Budget Detail

Budget Detail- see also FY 2020 Federal Projects	Amount ($)
Salaries (includes Fringe and Indirect)	$602,602
Travel	$7,500
Capital	$0
Supplies	$447
Contracts	$31,000
Other	$558,451
Total	**$1,200,000**

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, 2019, and to end August 31, 2022. 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 subcommittee, WSQ subcommittee, PPE subcommittee, and the M&R subcommittee, balanced by the Budget and Priorities subcommittee, and submitted to the GBC for approval in October 2018. The GBC approved the projects listed in this work plan at the October 17, 2018 quarterly meeting.

The project scopes of work will be submitted to the TCEQ Quality Assurance Officer to determine which projects in the work plan will require a QAPP. Under the authority granted by the EPA to the TCEQ to approve QAPPs for the GBEP, the GBEP staff and their project partners will develop QAPPs for projects determined by the TCEQ and the EPA to require QAPPs. QAPPs will be developed in accordance with the EPA requirements for QAPPs, EPA document QA/R-5.

SECTION 3: FY 2020 PROJECTS

SECTION 3.1: FY 2020 FEDERAL PROJECTS - SUMMARY

PROJECT NAME	FISCAL YEAR	FEDERAL	STATE MATCH	TOTAL 2020 GBEP BUDGET	STATUS
Program Administration (Includes supplies, travel, salary, fringe and indirect)	2020	$305,274.50	$305,274.50	$610,549.00	Annual
1. GBEP Website Hosting and Maintenance	2020	$3,000.00	$3,000.00	$6,000.00	Annual
2. Mickey Leland Environmental Internship	2020	$3,750.00	$3,750.00	$7,500.00	Annual
3. State of the Bay Symposium	2020	$12,500.00	$12,500.00	$25,000.00	New
Administration Total		$324,524.50	$324,524.50	$649,049.00	
4. Conservation Assistance Program	2020	$87,306.50	$87,306.50	$174,613.00	Ongoing
NRU Total		$87,306.50	$87,306.50	$174,613.00	
5. Bacteria Source Tracking on Tributaries of Trinity and Galveston Bays	2020	$15,835.00	$15,835.00	$31,670.00	Ongoing
6. Occurrence of Microplastics in Tributaries to Galveston Bay	2020	$20,000.00	$20,000.00	$40,000.00	New
7. Targeted Bacteria Monitoring Project	2020	$20,000.00	$20,000.00	$40,000.00	New
WSQ Total		$55,835.00	$55,835.00	$111,670.00	
8. Trash Bash 2020	2020	$5,000.00	$5,000.00	$10,000.00	Ongoing
9. Public Assessment/Community-Based Social Marketing	2020	$30,500.00	$30,500.00	$61,000.00	New
PPE Total		$35,500.00	$35,500.00	$71,000.00	
10. Characterizing PCBs and Dioxin in the Houston Ship Channel and Galveston Bay Post Harvey	2020	$30,000.00	$30,000.00	$60,000.00	New
11. Heavy Metals and Lead Isotopes in Galveston Bay Waters, Sediments, and Oysters	2020	$66,834.00	$66,834.00	$133,668.00	New
M&R Total		$96,834.00	$96,834.00	$193,668.00	
FUNDING REQUEST GRANT TOTAL		$600,000.00	$600,000.00	$1,200,000.00	

SECTION 3.2: FY 2020 FEDERAL PROJECT - DETAIL

3.2A - ADMINISTRATIVE PROJECTS FOR FY 2020

1. GBEP Website Hosting and Maintenance

CCMP Actions Implemented: PPE-1, PPE-3, PPE-7, PPE-8

EPA's Strategic Plan Measures Implemented: Goal 2 – Cooperative Federalism, Objective 2.2 - Increase Transparency and Public Participation; Goal 3 – Rule of Law and Process, Objective 3.5 - Improve Efficiency and Effectiveness

Grantee/Contractor: Wilkins Group

FY 2020 Budget: $6,000 ($3,000 Federal, $3,000 State)

Total Project Budget: $6,000 ($6,000 from Pre-USAS #332020)

Milestones: N/A

Project period: September 2019–August 2020

Status: Annual project.

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

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

- www.gbep.texas.gov: Tasks for the GBEP website include maintenance and updates as needed throughout the year, hosting, and domain name registration;
- www.backthebay.org: Tasks for the Back the Bay website include maintenance and updates as needed throughout the year, hosting, and domain name registration;
- https://gbep.texas.gov/galveston-bay-plan/: Tasks for the *GBP, 2nd Edition* website include maintenance and updates as needed throughout the year, hosting, and domain name registration.

2. Mickey Leland Environmental Intern

CCMP Actions Implemented: General support of all Action Plans

EPA's Strategic Plan Measures Implemented: Goal 1 - Core Mission, Objective 1.2 - Provide for Clean and Safe Water; Goal 2 – Cooperative Federalism, Objective 2.2 - Increase Transparency and Public Participation

Grantee/Contractor: Goodwill Staffing Services/TCEQ

FY 2020 Budget: $7,500 ($3,750 Federal, $3,750 State)

Total Project Budget: $7,500 ($7,500 from Pre-USAS #332020)

Milestones: The selected intern will develop a white paper and final presentation that summarizes their efforts at the end of the summer internship period.

Project period: May–August 2020

Status: Annual project.

Objective(s): An undergraduate or graduate college student will learn about environmental issues specific to the GBEP and gain professional work experience through a paid, full-time summer internship.

Project Description: The Mickey Leland Environmental Intern will generate a white paper and final presentation that summarizes their efforts at the end of the summer internship period. The intern will work on a project that helps to implement or track implementation of the *GBP*.

3. State of the Bay Symposium

CCMP Actions Implemented: PPE-1, 2, 3, 4, 5, 6, 7, 8; Research Action Plan (RSC)-3

EPA's Strategic Plan Measures Implemented: Goal 1 - Core Mission, Objective 1.2 - Provide for Clean and Safe Water, Objective 1.3 - Revitalize Land and Prevent Contamination; Goal 2 – Cooperative Federalism, Objective 2.1 - Enhance Shared Accountability, Objective 2.2 - Increase Transparency and Public Participation

Grantee/Contractor: TBD

FY 2020 Budget: $25,000 ($12,500 Federal, $12,500 State)

Total Project Budget: $25,000 ($25,000 from Pre-USAS #332020)

Milestones: Provide printing of event materials such as the agenda, signage, and other communication materials as well as poster session display boards at the event in January 2020.

Project period: September 2019–February 2020

Status: This event has historically been held every three to five years, with the last symposium occurring in 2016.

Objective(s): To provide a forum for bay user groups and partners to share results of projects, research, and collaborations.

Project Description: The symposium will be a two-day event and will take place in late January 2020. Two general sessions are proposed, with six breakout sessions in the morning and in the afternoon. As many as 80-100 speakers could be accommodated with a minimum of four speakers per session and morning and lunch keynote speakers.

Partners and Their Role(s): TCEQ Environmental Assistance Division (EAD)

Outputs/Deliverables: TBD

Long-term Outcomes: The exchange of scientific information among research scientists, natural resource managers, stakeholders, and the public.

3.2B - NRU PROJECTS FOR FY 2020

4. Conservation Assistance Program

CCMP Actions Implemented: HP-1, HP-5, SP-1, SM-5, PPE-1

EPA's Strategic Plan Measures Implemented: Goal 1 - Core Mission, Objective 1.2 - Provide for Clean and Safe Water, Objective 1.3 - Revitalize Land and Prevent Contamination; Goal 2 – Cooperative Federalism, Objective 2.1 - Enhance Shared Accountability, Objective 2.2 - Increase Transparency and Public Participation

Grantee/Contractor: GBF

FY 2020 Budget: $174,613 ($87,306.50 Federal, $87,306.50 State)

Total Project Budget: $600,000 ($200,000 from Award #CE-00655006: FY 2018 $100,000, FY 2019 $100,000; $174,613 from Pre-USAS #332020)

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 2022

Status: Ongoing project. The GBF was selected as the project contractor and the contract was executed July 2018. The first Conservation Assistance Program (CAP) work group meeting was held November 2018. Several acquisition projects are being developed.

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

Project Description: The overall goal of the CAP is to support the 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;
- Annual report due August 31 until contract expiration; and
- Final report due August 2023.

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

3.2C - WSQ PROJECTS FOR FY 2020

5. Bacteria Source Tracking on Tributaries of Trinity and Galveston Bays

CCMP Actions Implemented: NPS-3, WSQ-1

EPA's Strategic Plan Measures Implemented: Goal 1 - Core Mission, Objective 1.2 - Provide for Clean and Safe Water; Goal 2 – Cooperative Federalism, Objective 2.1 - Enhance Shared Accountability, Objective 2.2 - Increase Transparency and Public Participation

Grantee/Contractor: Texas AgriLife/TWRI

FY 2020 Budget: $31,670 ($15,835 Federal, $15,835 State)

Project Total: $240,000 ($208,330 from Award #CE-00655006: FY 2018 $80,000, FY 2019 $128,330; $31,670 from Pre-USAS #332020).

Project received approval from the GBC to receive $80,000 a year for three consecutive years, dependent on funding. Additional funds were available during FY 2019, so $48,330 was moved from FY 2020 to FY 2019.

Milestones: Water quality sampling will be completed by April 2019.

Project Period: September 2017–May 2020

Status: Ongoing project. Desk audit and annual coordination meeting conducted February 2019. Sampling will be completed by April 2019.

Objective(s): To gather information needed to address bacteria concerns in five watersheds of the Trinity and Galveston bays.

Project Description: Through this project, a water quality monitoring regime will be employed that will help decision makers make appropriate recommendations for addressing the bacteria impairments in Buffalo, Double, Cedar, and Dickinson bayous and Clear Creek. Monthly sampling will be conducted by TWRI at one site on each waterbody for 12 months (five total sites). Field parameters collected will include pH, temperature, conductivity, and dissolved oxygen. Water samples will be collected and delivered to the TAMU SAML where *E. coli* will be prepared for BST analysis. SAML will also conduct library-dependent BST and analyze *E. coli* isolates (four isolates per sample) using the ERIC-PCR and RiboPrinting combination method. TWRI will collect approximately 75 known source samples from the local watersheds to improve the accuracy of the BST results. Known source sample isolates will be archived in the Texas *E. coli* BST library. Results of both the known source sampling and BST analysis will be reported in a project final report and presented as necessary.

Partners and Their Role(s): Contractor will be working with the SAML at TAMU to perform the sample analyses.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- Draft QAPP due within 60 days of contract execution;
- Final QAPP due within 45 days of draft;
- Data results and interpretation due with quarterly progress reports; and
- Final report due April 2020.

Long-term Outcomes: A better understanding of the sources contributing to bacteria pollution in the lower Galveston Bay watershed.

6. Occurrence of Microplastics in Tributaries to Galveston Bay

CCMP Actions Implemented: NPS-3, WSQ-1

EPA's Strategic Plan Measures Implemented: Goal 1 - Core Mission, Objective 1.2 - Provide for Clean and Safe Water; Goal 2 – Cooperative Federalism, Objective 2.2 - Increase Transparency and Public Participation

Grantee/Contractor: USGS

FY 2020 Budget: $75,000 ($20,000 Federal, $55,000 State)

Total Project Budget: $75,000 ($40,000 from Pre-USAS #332020; $35,000 State)

Milestones: Coordination/orientation and QAPP meetings anticipated in September 2019; draft QAPP to be submitted by December 2019.

Project period: September 1, 2019–August 31, 2021

Status: New project.

Objective(s): The goal of this project is to quantify and categorize microplastics in select watersheds draining to Galveston Bay.

Project Description:

Litter and trash, such as plastics, is an issue of concern in Galveston Bay and its tributaries and has been identified by the GBEP as a priority topic for research. Microplastics, which are plastic particles less than five mm 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 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.

Microplastics accumulation in Galveston Bay have the potential to impact the health of marine organisms, including oyster reefs and fish. In the Texas Gulf Coast microplastics have been found in in six species of fish, with higher frequencies associated with species that consume vegetation and shrimp. To date, no studies that assess the occurrence and abundance of microplastics in tributaries of Galveston Bay have been published.

Partners and Their Role(s): USGS will perform the tasks necessary for the collection and analysis of microplastics in the water column. Collected samples will be submitted to the USGS Microplastics Laboratory in the Washington Water Science Center for analysis.

Outputs/Deliverables:

- Annual project work plan due at beginning of each fiscal year of the project;
- Quarterly progress reports until contract expiration;
- Draft QAPP due within 60 days of contract execution;
- Final QAPP due within 45 days of draft;
- Data release by the end of the contract; and
- Project summary by the end of the contract.

Long-term Outcomes: Provide information about the spatial distribution and concentrations of microplastics in the Galveston Bay watershed and provide the foundation for future study and abatement.

7. Targeted Bacteria Monitoring Project

CCMP Actions Implemented: NPS–3, PS–1, PS–2, PS–5

EPA's Strategic Plan Measures Implemented: Goal 1 - Core Mission, Objective 1.2 - Provide for Clean and Safe Water; Goal 2 – Cooperative Federalism, Objective 2.1 - Enhance Shared Accountability, Objective 2.2 - Increase Transparency and Public Participation

Grantee/Contractor: H-GAC

FY 2020 Budget: $40,000 ($20,000 Federal, $20,000 State)

Total Project Budget: $40,000 ($40,000 from Pre-USAS #332020)

Milestones: Coordination/orientation and QAPP meeting anticipated in September 2019.

Project period: September 2019–May 2021

Status: New project.

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 Targeted Bacteria Monitoring 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 assessment units (AUs) with the highest geomeans of *E. coli* concentrations in the BIG Project Area. For the past eight years, the Bayou Preservation Association (Bayou Preservation) and/or the H-GAC have conducted intensive bacteria monitoring within the five or 10 most or least impaired AUs, to help move these streams off the TCEQ's Integrated Report – the Texas 303(d) List of impaired water bodies.

This project will target sites within the top 10 most impaired AUs, with a goal to significantly reduce the bacteria levels in these streams. In the BIG Annual Report '17 (from 2016 data), the 10 most impaired AUs are within the following water bodies: Brays Bayou, Buffalo Bayou, Greens Bayou, Sims Bayou, West Fork San Jacinto River, and White Oak Bayou. The seven-year *E. coli* geomeans of the 10 stream segments range from 1,886 MPN/100mL to 4,850 MPN/100ML (standard is 126 MPN/100mL).

This project will focus only on the most impaired AUs with the goal to identify relative differences in bacteria levels for the purpose of narrowing down the geographic location of the potential sources. When potential sources are identified, the information will be passed on to local authorities in a targeted monitoring report. The performing party 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): The H-GAC will partner with Bayou Preservation on implementation of the project, with the H-GAC in a primary technical advisor role and Student Conservation Association (SCA) interns will conduct sampling.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- Draft QAPP due within 60 days of contract execution;
- Final QAPP due within 45 days of draft;
- Data submittals;
- Findings and Preliminary Action Report;
- Targeted Monitoring Report;
- Outreach and education report due February 2021; and
- Final report due April 2021.

Long-term Outcomes: Significantly reduce the bacteria levels in impaired streams of the BIG project area and help move these streams off the TCEQ's Integrated Report – the Texas 303(d) list of impaired water bodies. Promote the importance of bacteria reduction efforts to other jurisdictions and the general public.

3.2D - PPE PROJECTS FOR FY 2020

8. Trash Bash 2020

CCMP Actions Implemented: PPE-1, PPE-3, PPE-5, SD-5

EPA's Strategic Plan Measures Implemented: Goal 1 - Core Mission, Objective 1.2 - Provide for Clean and Safe Water; Goal 2 – Cooperative Federalism, Objective 2.2 - Increase Transparency and Public Participation

Grantee/Contractor: The H-GAC

FY 2020 Budget: $10,000 ($5,000 Federal, $5,000 State)

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

Project Period: September 2019–August 2020

Status: Ongoing project. The Trash Bash Steering Committee is planning the 2020 Trash Bash events.

Objective(s): The goal of Trash Bash is to promote environmental stewardship of our watershed through public education and providing 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 FY 2020 funding will be used to support staff time and salaries to organize the event, and to develop a new interactive educational exhibit for all regional Trash Bash sites. The GBEP continues to support Trash Bash in 2020 by providing funds for partial staff support of the H-GAC Trash Bash Coordinator, and creation, design, and production of promotional and educational materials.

Partners and Their Role(s): Partners for this project include the H-GAC which organizes and coordinates the event, Gulf Coast Authority which provides equipment and t-shirts for the event, 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 July 2020.

Long-term Outcomes: Reduce the amount of trash in our waterways by promoting environmental stewardship in our waterways, education utilizing hands-on-education. and public outreach. Developing partnership and private organizations.

9. Public Perception Assessment and Community-Based Social Marketing (CBSM) Campaigns to Enhance Conservation and Educational Outreach Programs

CCMP Actions Implemented: PPE-1, PPE-3

EPA's Strategic Plan Measures Implemented: Goal 1 - Core Mission, Objective 1.2 - Provide for Clean and Safe Water, Objective 1.3 - Revitalize Land and Prevent Contamination; Goal 2 – Cooperative Federalism, Objective 2.1 - Enhance Shared Accountability, Objective 2.2 - Increase Transparency and Public Participation

Grantee/Contractor: HARC/GTRI

FY 2020 Budget: $61,000 ($30,500 Federal, $30,500 State)

Total Project Budget: $61,000 ($61,000 from Pre-USAS #332020)

Milestones: Coordination/orientation meeting anticipated in September 2019.

Project period: September 2019–August 31, 2021

Status: New project

Objective(s): This project seeks to conduct public assessment and awareness and implement three small education and outreach campaigns using a community-based engagement approach.

Project Description: The goal of the project is to conduct a community-centered approach to implementing public outreach and education campaigns. A public perception and awareness assessment will be conducted to identify communities and behaviors to target for the three small outreach and education campaigns. Once the targeted behaviors and communities have been identified, the campaigns will be created and implemented. Metrics will be developed to evaluate the success of each of the campaigns. The outcome of the campaigns and the public assessment and awareness information will be shared with stakeholders to demonstrate another approach to communicating with the public the importance of changing behaviors to conserve and protect Galveston Bay.

Partners and Their Role(s): HARC/GTRI will partner with the GBF to conduct the public awareness and perception assessment, and the GBF will implement the three outreach and education campaigns.

Outputs/Deliverables:

- Final Public Assessment Report;
- Three small outreach and education campaigns; and
- Final report due August 2021.

Long-term Outcomes: Disseminating the project results to help partners and stakeholders have additional tools and resources to engage the public at the community-level on outreach and education campaigns that lead to sustainable behavior changes to preserve Galveston Bay.

3.2E - M&R PROJECTS FOR FY 2020

10. Characterizing PCBs and Dioxins in the Houston Ship Channel and Galveston Bay Post Harvey

CCMP Actions Implemented: WSQ-4

EPA's Strategic Plan Measures Implemented: Goal 3 – Rule of Law and Processes, Objective 3.3 – Prioritize Robust Science

Grantee/Contractor: University of Houston (UH)

FY 2020 Budget: $60,000 ($30,000 Federal, $30,000 State)

Total Project Budget: $60,000 ($60,000 from Pre-USAS #332020)

Milestones: Coordination/orientation and QAPP meeting anticipated in September 2019.

Project period: September 2019–May 2021

Status: New project.

Objective(s): This project seeks to collect fish and crab tissue and sediment samples to measure PCB and dioxin levels in the Houston Ship Channel and Galveston Bay post Hurricane Harvey for comparison to historical datasets from TMDL studies conducted by UH with TCEQ funding.

Project Description: Two observations after Hurricane Harvey motivate this study: (i) some parts of the Houston Ship Channel and Galveston Bay exhibited higher sediment concentrations of dioxin and PCBs after the hurricane relative to historic levels, and (ii) it has been reported that the protective cap on the San Jacinto River Waste Pits site incurred failures during the hurricane, potentially exposing waste material in the pits to the San Jacinto River waters. An existing study funded by the GBF examining fish and crab dioxin and PCB levels in the San Jacinto River and the Houston Ship Channel is limited to a 5-mile radius around the San Jacinto River Waste Pits Superfund site. The main goal for this study is to expand the sampling scope beyond the five-mile limit of the GBF study to encompass the remainder of the Houston Ship Channel and Galveston Bay system as applicable and appropriate.

Partners and Their Role(s): UH will perform the tasks necessary for the collection and analysis of sediment and tissue samples and for comparing the measurements to historical data collected within the system to determine change, if any, post Hurricane Harvey.

Outputs/Deliverables:

- Annual project work plan due at beginning of each FY year of the project;
- Quarterly progress reports until contract expiration;
- QAPP due by November 2019;
- PCB and dioxin data; and
- Final report due May 2021.

Long-term Outcomes: Insight into potential changes in PCB and dioxin levels in the Houston Ship Channel and Galveston Bay following Hurricane Harvey.

11. Heavy Metals and Lead Isotopes in Galveston Bay Waters, Sediments and Oysters

CCMP Actions Implemented: WSQ-2

EPA's Strategic Plan Measures Implemented: Goal 3 – Rule of Law and Processes, Objective 3.3 – Prioritize Robust Science

Grantee/Contractor: UH

FY 2020 Budget: $133,668 ($66,834 Federal, $66,834 State)

Total Project Budget: $133,668 ($133,668 from Pre-USAS #332020)

Milestones: Coordination/orientation and QAPP meeting anticipated in September 2019.

Project period: September 2019–May 2021

Status: New project.

Objective(s): This study proposes lead (Pb) isotope compositions and heavy metal concentrations be determined for Galveston Bay waters, sediments and oysters to evaluate the toxicity of the bay and identify types of industrial pollution sources.

Project Description: Galveston Bay is an anthropogenic estuary, where industrial runoff, wastewater, and shipping oil enter the bay in incoming freshwaters. These polluted freshwaters can contain heavy metals, either dissolved in the waters or absorbed onto inflowing sediments, which can be toxic for humans and pelagic/benthic communities in the bay. This study proposes Pb isotope compositions and heavy metal concentrations be determined for Galveston Bay waters, sediments and oysters to evaluate the toxicity of the bay and identify types of industrial pollution sources. Oyster samples will be collected from eight sites in Galveston Bay and analyzed for Pb isotope and heavy metal concentrations along with water and sediment samples collected with external funding at eight sites in Galveston Bay as well as up to fifteen inflowing freshwater sites. Together Pb isotope and heavy metal concentration data will highlight areas with elevated pollutant levels, provide insight into pollutant mobility, and constrain pollutant sources and fluxes. Preliminary Pb isotope data from Galveston Bay sediments reveal a discernable pollutant Pb signal. The Texas Surface Water Quality Standards and Texas Risk Reduction Program will be used as references for analyzing surface water and sediment samples. The information obtained from additional water, sediment, and oyster analyses will enhance our understanding of industrial pollution, and inform reduction, remediation, and mitigation efforts in Galveston Bay and the region. This type of approach and project will serve as a test bed for future work in Galveston Bay as well as for other major U.S. water systems.

Partners and Their Role(s): UH will be performing the laboratory preparation of samples (leaching, extracting etc.) as well as the Pb isotope analysis. TAMU will be subcontracted to perform the heavy metal concentration analyses.

Outputs/Deliverables:

- Annual project work plan due at beginning of each fiscal year of the project;
- Quarterly progress reports until contract expiration;
- QAPP due by November 2019;
- Heavy metal and Pb isotope data; and
- Final report due May 2021.

Long-term Outcomes: Insights into Pb isotope composition, heavy metal concentrations, and potential types of industrial pollution sources in Galveston Bay and associated freshwater inflows.

SECTION 3.3: FY 2020 GRANT BUDGET SPREADSHEETS

3.3A - FY 2020 Grant Budget by Category - Summary

FY 2020 Grant Budget Totals	Administration	NRU	WSQ	PPE	M&R	Total Costs
Project #	915210	915210	915210	915210	915210	915210
Salaries	$350,554	$0	$0	$0	$0	$350,554
Contracts	$31,000	$0	$0	$0	$0	$31,000
Travel	$7,500	$0	$0	$0	$0	$7,500
Other	$7,500	$174,613	$111,670	$71,000	$193,668	$558,451
Supplies	$447	$0	$0	$0	$0	$447
Equipment	$0	$0	$0	$0	$0	$0
Construction	$0	$0	$0	$0	$0	$0
Sub-Total	**$397,001**	**$174,613**	**$111,670**	**$71,000**	**$193,668**	**$947,952**
Fringe 38.65%	$135,489	$0	$0	$0	$0	$135,489
Indirect 33.25%	$116,559	$0	$0	$0	$0	$116,559
GRANT TOTAL	**$649,049**	**$174,613**	**$111,670**	**$71,000**	**$193,668**	**$1,200,000**

3.3B - FY 2020 Grant Budget by Category - Detail

FY 2020 GBEP Budget Summary by Grant Budget Category	Amount
Salaries	**$350,554**
Salaries for staff members of the GBEP	$350,554
Contracts	**$31,000**
Website Hosting Costs	$6,000
State of the Bay Symposium	$25,000
Travel	**$7,500**
Travel for program manager to attend Fall NEP Tech Transfer meeting	$2,245
Travel for two staff members to attend EPA Quality Assurance training	$2,513
Travel for program manager to attend Spring EPA NEP Workshop	$2,742
Other	**$558,451**
Mickey Leland Intern	$7,500
Conservation Assistance Program	$174,613
Bacteria Source Tracking (Previously Approved FY 18-20 Project)	$31,670
Occurrence of Microplastics in Tributaries to Galveston Bay	$40,000
Targeted Bacteria Monitoring Project	$40,000
Trash Bash 2020	$10,000
Public Assessment/Community-Based Social Marketing	$61,000
Characterizing PCBs and Dioxin in the Houston Ship Channel and Galveston Bay Post Harvey	$60,000
Heavy Metals and Lead Isotopes in Galveston Bay Waters, Sediments, and Oysters	$133,668
Supplies	**$447**
Supplies for Outreach and Education	$447
Fringe and Indirect	**$252,048**
FY 2020 GRANT TOTAL	**$1,200,000**

3.3C - FY 2020 Travel Summary by Trip

FY 2020 Travel Summary by Trip	Amount
Fall NEP Tech Transfer Meeting in Delaware (1-person travel, 4 days)	$2,245
Airfare	$1,200
Airport Parking	$150
Lodging ($94/night)	$376
Hotel Tax (13.0%)	$49
Taxi/transport	$100
Per diem ($55/day)	$220
Conference registration	$150
EPA Quality Assurance Training in TBD (2-person travel, 3 days)	$2,513
Spring EPA-NEP Workshop in Washington, D.C. (1-person travel, 4 days)	$2,742
Airfare	$1,200
Airport Parking	$150
Lodging ($189/night)	$756
Hotel Tax (14.5%)	$110
Taxi/transport	$100
Per diem ($69/day)	$276
Conference registration	$150
FY 2020 Travel Estimate Total*	$7,500

*All out of state travel is dependent on TCEQ management review and approval. Rates for FY 2020 are subject to change and estimates are based on previous trips from FY 2019 as well as the current FY 2019 federal and state per diem rates.

SECTION 4: ONGOING PROJECTS

SECTION 4.1: ONGOING FEDERAL PROJECTS - SUMMARY

Ongoing Projects Under	Grant Pre-USAS #332020			Award # CE-00655006		
PROJECT NAME	Contract Number	Funding Years	2020 Budget	2019 Budget	2018 Budget	2017 Budget
1. GBEP Website Hosting and Maintenance	N/A	2017-2020	$6,000	$6,000	$32,024	$1,605
2. Mickey Leland Environmental Internship	N/A	2017-2020	$7,500	$7,979	$8,333	$8,404
12. State of the Bay Report, Fourth Edition	18-80343	2018	$0	$7,919	$85,000	$0
13. Estuary Resilience Assessment	19-90217	2019	$0	$30,000	$0	$0
Administration Total			$13,500	$51,898	$125,357	$10,009
4. Conservation Assistance Program	18-80344	2018-2022	$174,613	$100,000	$100,000	$0
NRU Total			$174,613	$100,000	$100,000	$0
5. Bacteria Source Tracking on Tributaries of Trinity and Galveston Bays	18-80240	2018-2020	$31,670	$128,887	$80,000	$0
14. Green Infrastructure for Texas	18-80237	2018-2019	$0	$37,500	$74,197	$0
15. Highland Bayou Watershed Protection Plan	19-90214	2019-2020	$0	$68,362	$0	$0
WSQ Total			$31,670	$234,749	$154,197	$0
9. Trash Bash 2019-2020	19-90216	2019-2020	$10,000	$15,000	$0	$0
16. White Oak Parkway Native Habitat Restoration and Outreach	18-80341	2018	$0	$0	$45,000	$0
17. Texas Estuarine Resource Network Citizen Science Program in Galveston Bay	17-73627	2017-2018	$0	$0	$27,392	$25,000
18. Know Your Watershed	19-90211	2019	$0	$38,341	$0	$0
19. Blackhawk Park Coastal Prairie Restoration and Education Project	19-90212	2019	$0	$53,600	$0	$0
20. Galveston Seawall Recycling	19-90210	2019	$0	$18,420	$0	$0
PPE Total			$10,000	$125,361	$72,392	$25,000
21. Seafood Evaluation in a Portion of Galveston Bay	18-80234	2018-2019	$0	$32,831	$66,544	$0
22. Characterization of the Influence of Freshwater Inflow on Trinity River Delta Indicators	18-80338	2018-2019	$0	$18,000	$42,000	$0
23. The Impacts of Assimilative Capacity of Reservoirs on Coastal Inflows Phase II	16-60126	2016-2018	$0	$0	$24,058	$41,300
24. Freshwater Inflows to Galveston Bay: Relationship to Harmful Algal Blooms	17-70187	2017	$0	$0	$0	$80,000
25. Galveston Bay Intertidal Oyster Reef Mapping and Analysis	19-90213	2019	$0	$64,883	$0	$0
M&R Total			$0	$115,714	$132,602	$121,300
GRANT TOTAL-ONGOING PROJECT FUNDING			$229,783	$627,722	$584,548	$156,309

SECTION 4.2: ONGOING FEDERAL PROJECTS - DETAIL

4.2A - ONGOING ADMINISTRATIVE PROJECTS

12. The State of the Bay, Fourth Edition

CCMP Actions Implemented: All

EPA's Strategic Plan Measures Implemented: Goal 2 – Cooperative Federalism, Objective 2.1 – Enhance Shared Accountability; Goal 3 – Rule of Law and Processes, Objective 3.3 – Prioritize Robust Science

Grantee/Contractor: HARC/GTRI

Total Project Budget: $92,919 ($92,919 from Award #CE-00655006: FY 2018 $85,000, FY 2019 $7,919)

Milestones: Four sections of the State of the Bay Report have been submitted for review – Human Role Past, The Bayou and Public Health, WSQ, and Freshwater Inflows. A QA desk audit was completed in January 2019.

Project period: September 2017–August 2019

Status: Ongoing project. Chapters from the previous State of the Bay Report are being updated and new chapters and success stories are being written.

Objective(s): To create a web-based State of the Bay Report, 4th Edition based on the *GBP, 2nd Edition*. The Report will summarize *GBP* implementation, research findings, monitoring data, indicators, and metrics for the Galveston Bay watershed. Information will be aggregated by sub-bay, watershed, or station as appropriate, based on stakeholder input and acquired and quality assured monitoring data collected through 2017.

Project Description: The State of the Bay Report is a summary of the current *GBP* implementation. This will include research and an analysis and presentation of the indicators and metrics available for Galveston Bay based on acquired and quality assured monitoring data from the Galveston Bay Status and Trends project. Information will be related to the goals of the *GBP, 2nd Edition* and issues of concern for managers and stakeholders. The State of the Bay Report will be developed in a web-based format that will enable content, graphics, narrative GIS story maps, analysis, and linked data to be presented in a format that is easily updated, sharable, and accessible to managers, scientists, and other stakeholders. In this format, the State of the Bay Report can become a continuing electronic record of the progress of the *GBP, 2nd Edition* and the accomplishments of the GBEP, the GBC, and partner organizations.

Partners and Their Role(s): HARC/GTRI

Outputs/Deliverables:

- Crosswalk document between old State of the Bay Report and new;
- 11 updated sections in a web format and three success Story Maps;
- Quarterly progress reports until contract expiration;
- Final State of the Bay Report website August 2019; and
- Final report due July 2019.

Long-term Outcomes: The State of the Bay Report updated with the most current data and in a more sharable and accessible format.

13. Estuary Resilience Assessment

CCMP Actions Implemented: Galveston Bay Regional Monitoring Program.

EPA's Strategic Plan Measures Implemented: Goal 1 - Core Mission, Objective 1.2 - Provide for Clean and Safe Water; Goal 2 – Cooperative Federalism, Objective 2.1 - Enhance Shared Accountability, Objective 2.2 - Increase Transparency and Public Participation

Grantee/Contractor: HARC/GTRI

Total Project Budget: $30,000 ($30,000 from Award #CE-00655006: FY 2019 $30,000)

Milestones: Stakeholder workshop and draft report by February 2019.

Project period: September 2018–August 2020

Status: Ongoing project. First stakeholder meeting was held and the work group is contributing to the assessment.

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

Project Description: The final output of the project will be a companion document to the *GBP, 2nd Edition* and will provide resiliency adaptation considerations for implementers of the *GBP, 2nd Edition*. The document will

be developed in coordination with subject matter experts and/or members of the GBC and its committees through workshops or via existing meeting structures. The project will follow the requirements identified in the EPA's NEP Funding Guidance Document.

Partners and Their Role(s): While the lead contractor is HARC/GTRI, the Estuary Resilience Assessment will draw 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 collect data in the watershed.

Outputs/Deliverables:

- Three stakeholder meetings or workshops;
- Quarterly progress reports until contract expiration;
- Final Estuary Resilience Assessment document and report April 2020; and
- Final report due August 2020.

Long-term Outcomes: Galveston Bay estuary is managed by all the GBEP partners based on best known data and implementation efforts to consider resiliency during project selection.

4.2B - ONGOING NRU PROJECTS

None

4.2C - ONGOING WSQ PROJECTS

14. Green Infrastructure for Texas

CCMP Actions Implemented: HP-1, NPS-1, 2, PPE-1, 5

EPA's Strategic Plan Measures Implemented: Goal 1 - Core Mission, Objective 1.2 - Provide for Clean and Safe Water, Objective 1.3 - Revitalize Land and Prevent Contamination; Goal 2 – Cooperative Federalism, Objective 2.1 - Enhance Shared Accountability, Objective 2.2 - Increase Transparency and Public Participation

Grantee/Contractor: Texas AgriLife

Project Total: $111,697 ($111,697 from Award #CE-00655006: FY 2018 $74,197, FY 2019 $37,500).

Milestones: Begin excavating the stormwater wetlands at Exploration Green, Phase II in spring 2019; began designing a third stormwater wetland on the West campus of MD Anderson in spring 2019; and finish freshwater wetland monitoring at Sheldon Lakes State Park in fall 2019.

Project Period: September 2017–February 2020

Status: Ongoing project. Data collection continues for Phases II and III of the Sheldon Lake State Park freshwater wetland monitoring project, with the recent addition of monitoring sites within Phase IV. A monitoring protocol for future Phase V have been developed, implementation pending construction. Phase I stormwater wetlands at Exploration Green has been planted and excavation has started for Phase II with planting scheduled for fall 2019. The MD Anderson stormwater wetlands have been completed and a third phase has been proposed.

Objective(s): The goal of this project is to monitor freshwater wetland restoration in Sheldon Lake State Park and to develop several stormwater treatment wetlands.

Project Description: To establish green infrastructure, or natural drainage, in the Galveston Bay watershed, the Texas AgriLife will demonstrate a range of green infrastructure techniques using a multi-level approach, from individual property owners to large-scale undeveloped lands, with built-in applied research projects focused on water quality and quantity. The GIFT project brings together three Texas AgriLife programs—Freshwater Wetland Restoration, Stormwater Treatment Wetlands, and Green Stormwater Infrastructure—for a unified, holistic approach addressing current and emerging needs to protect surface water resources. Each of the programmatic areas has three components: 1) implementing on-the-ground demonstration projects for stormwater BMPs; 2) conducting research to study green infrastructure in situ; and 3) educating stakeholders to manage their water resources through courses, workshops, and publications.

Under this project, stormwater treatment wetlands are proposed to be developed in two areas where partnerships have already been initiated; an 8,500-square foot basin on the MD Anderson Cancer Center campus in the Texas Medical Center in Houston and five acres of wetlands at Exploration Green Recreation Area in Clear Lake City (Phase one of five planned phases). In addition, this project will monitor freshwater wetland restoration at Sheldon Lake State Park. The goal of the vegetation monitoring focuses on understanding how the plant community changes by season and with time (post initial planting). Sampling has been conducted on a quarterly basis since 2003. This project will continue the data collection for Phase II and III, but add sites within Phase IV (one-year post construction) and future Phase V.

Partners and Their Role(s): MD Anderson Cancer Center, and Clear Lake City will provide MOUs and

contribute to the planning of the stormwater wetlands; Sheldon Lake State Park will assist with the monitoring and provide the land.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- Draft QAPP due within 60 days of contract execution;
- Final QAPP due within 45 days of draft;
- Signed MOUs by December 31, 2018; and
- Final report due December 2019.

Long-term Outcomes: Green infrastructure BMPs installed and monitored and used to demonstrate the effectiveness of green infrastructure.

15. Highland Bayou Watershed Protection Plan

CCMP Actions Implemented: NPS–3; WSQ-1

EPA's Strategic Plan Measures Implemented: Goal 1 - Core Mission, Objective 1.2 - Provide for Clean and Safe Water; Goal 2 – Cooperative Federalism, Objective 2.1 - Enhance Shared Accountability, Objective 2.2 - Increase Transparency and Public Participation

Grantee/Contractor: Texas AgriLife

Project Total: $68,362 ($68,362 from Award #CE-00655006: FY 2019 $68,362)

Milestones: Coordinate kick-off meeting with the GBEP by October 1, 2018 and develop an education and outreach plan by December 1, 2018.

Project Period: September 2018–May 2020

Status: Ongoing project. First stakeholder meeting will take place in March 2019.

Objective(s): The goal of this project is to update the Highland Bayou WPP to include load reduction estimates which incorporate flow data for both bacteria and dissolved oxygen, and to shepherd the WPP through the TCEQ and EPA Region 6 approval process.

Project Description:

Highland and Marchand bayous sometimes experience periods of low dissolved oxygen (DO) and elevated bacteria levels, which can negatively impact aquatic life and can be harmful to human health respectively. All the state's assessments (Texas 303(d) List) since 2002 have listed multiple AUs within Highland Bayou (segment 2424A) and Marchand Bayou (segment 2424C) as impaired for these constituents of concern.

Texas AgriLife has coordinated the creation of a characterization report and a stakeholder driven draft WPP for Highland Bayou. The current draft WPP only addresses bacteria and work to address the DO impairment is ongoing. Recent guidance from the EPA indicates that the DO impairment and flow both need to be included for a WPP to meet all requirements for approval as a watershed-based plan (WBP).

During FY 2018, TIAER at Tarleton State University, with funding from the TCEQ TMDL program was exploring options for modeling flow with existing data from surrogate watersheds using various methods. TIAER's goal was to find an acceptable protocol for addressing flow without collecting new data. Once an acceptable protocol was determined, the TCEQ TMDL program began funding a second year (FY 2019) of work to complete the modeling and associated load reduction calculations for both bacteria and DO.

Partners and Their Role(s): TIAER and TCEQ's TMDL program.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- Education and Outreach Plan by November 1, 2018;
- Updated Highland Bayou WPP website by November 1, 2018;
- Draft WPP by March 2020; and
- Final report due May 2020.

Long-term Outcomes: Water quality in the Highland and Marchand Bayous will improve.

4.2D - ONGOING PPE PROJECTS

16. White Oak Parkway Native Habitat Restoration and Outreach

CCMP Actions Implemented: PPE-1, PPE-3, PPE-7, HP-1, FW-6

EPA's Strategic Plan Measures Implemented: Goal 1 - Core Mission, Objective 1.2 - Provide for Clean and Safe Water, Objective 1.3 - Revitalize Land and Prevent Contamination; Goal 2 – Cooperative Federalism, Objective 2.2 - Increase Transparency and Public Participation

Grantee/Contractor: City of Houston Parks and Recreation Department

Total Project Budget: $45,000 ($45,000 from Award #CE-00655006: FY 2018 $45,000)

Milestones: Complete four acres of invasive species removal and native plant installation by February 2018.

Project period: September 2017–August 2019

Status: Ongoing project. Interpretative signs were installed highlighting: 1) the significance of our bayou systems to birds; 2) the importance of diverse habitats to support diverse species and; 3) actions people can take to support birds. Three community planting events have taken place, and two invasive plant removals and native plantings have been completed since September 16, 2017. Ten acres of invasive species have been removed, and 10 acres of native plants have been installed.

Objective(s): The goal of the project is to enhance urban bird and wildlife habitat along Houston's bayou corridors and serve as a demonstration for future birding interpretation and recreation sites within Houston.

Project Description: To perform habitat management activities focusing on the removal of invasive species and planting of native vegetation suited for the riparian corridor along White Oak Parkway. Additionally, this project provides outreach and education events as well as volunteer activities such as a community planting event to install native plants.

Partners and Their Role(s): The SCA provided species removal and native plant installation as well as support for the community outreach events. The Houston Audubon provided bird interpretation stations and information at the community outreach events as well as language for the interpretive signs.

Outputs/Deliverables:

- Install three interpretive signs;
- Three community outreach events;
- Remove invasive species in 10 acres; and
- Install native plants in 10 acres.

Long-term Outcomes: Link Houston's birds to a diverse audience–from the casual passerby to the advanced citizen scientist–as well as families participating in activities at adjacent community centers. Provide community members the skills to identify invasive species and the recognize the value of native habitats.

17. Texas Estuarine Resource Network Citizen Science Program in Galveston Bay

CCMP Actions Implemented: PPE-1, PPE-5, PPE-8, SP-8, HP-7

EPA's Strategic Plan Measures Implemented: Goal 1 - Core Mission, Objective 1.2 - Provide for Clean and Safe Water; Goal 2 – Cooperative Federalism, Objective 2.2 - Increase Transparency and Public Participation

Grantee/Contractor: TPWD

Total Project Budget: $75,000 ($52,392 from Award #CE-00655006: FY 2017 $25,000, FY 2018 $27,392; $20,000 State: FY 2018 $20,000)

Funding shortfall of $2,608 to be addressed through FY 2018-2019 state operating budget.

Milestones: A Seabird Scout Project working guidance plan established by January 2019.

Project period: August 2017–August 2019

Status: Ongoing project. The memo of agreement (MOA) between TPWD and Audubon Texas was signed on August 30, 2018. TPWD submitted the first quarterly report on November 28, 2018.

Objective(s): The goal of this project is to conduct outreach and education on plastic pollution and wildlife entanglement. The project partners will also develop a working guidance plan such as a Standard Operating Procedure for volunteers who will collect information to identify and report injured and sick birds and wildlife in need of aid.

Project Description: This project aims to develop a Seabird Scout Project and plastic pollution education program to provide educational opportunities for new and existing citizen scientists. These volunteers will assist with documenting and coordinating response to birds that have been injured by anthropogenic sources and educate the public on impacts from plastic pollution. Also, to help fill data gaps for area partners installing and maintaining fishing line recycling stations, the project partners will work with volunteers to coordinate collecting recycled monofilament fishing line materials and gathering data from, at a minimum of

three stations in Galveston County. Because there are limited resources and individuals who are permitted to handle and transport injured birds, an information guidance document pertaining to the Texas Parks and Wildlife Department and United States Fish and Wildlife Service permitting process involved for citizen scientists to capture and transport injured birds and wildlife in the Galveston Bay watershed will be developed. The document will also provide volunteers with information regarding the necessary steps, timeline, and fees required for the permitting process.

Partners and Their Role(s): TPWD provided an MOA with Audubon Texas and will be providing guidance for developing the permitting process document that will be produced by Audubon Texas. Additionally, Audubon Texas will conduct public outreach and education and coordinate the citizen scientist activities.

Outputs/Deliverables:

- Education and outreach materials;
- Permitting process information document; and
- Installing and maintaining monofilament fishing line recycling containers.

Long-term Outcomes: Supporting citizen science training and development and increasing the monitoring knowledge of injured birds and wildlife in the Galveston Bay watershed. Educating the public on impacts of plastic pollution.

18. Know Your Watershed Educators Summer Institute

CCMP Actions Implemented: PPE-1, PPE-3, PPE-7, HP-1, FW-6

EPA's Strategic Plan Measures Implemented: Goal 1 - Core Mission, Objective 1.2 - Provide for Clean and Safe Water; Goal 2 – Cooperative Federalism, Objective 2.2 - Increase Transparency and Public Participation

Grantee/Contractor: UHCL

Total Project Budget: $38,341 ($38,341 from Award #CE-00655006: FY 2019 $38,341)

Milestones: Hold an eight-day summer institute and an administrator symposium by the summer of 2019.

Project period: September 2017–August 2020

Status: Ongoing project. The summer institute has been scheduled and the agenda and materials are being developed.

Objective(s): To support formal K-12 education efforts to incorporate environmental education about the Galveston Bay watershed into classrooms in the region.

Description: The goal of the project is to hold an eight-day summer institute to provide educators with resources and field experiences on environmental education. The focus will be on the importance of watersheds, wetland creation and restoration, marshes, storm drain water quality, and benefits of BMPs for citizens that improve water quality. Educators will have the opportunity to tour wastewater treatment plants and constructed outfall wetlands for stormwater treatments. Teachers will learn how they can use this information in their classrooms, schools, and/or community. Additionally, the project will hold a one-day symposium for school administrators that will address questions on what environmental education entails and how they can support classroom teachers to incorporate environmental education into their curriculum and lesson plans.

Partners and Their Role(s): The UHCL will partner with the GBF to provide support for creating and implementing the summer institute and the symposium. Additionally, in-field support will be provided by area municipalities and the Armand Bayou Nature Center.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- Summer institute and symposium; and
- Final report due July 2020.

Long-term Outcomes: Increase awareness level of the connection between the natural environment and the impacts that environmental education can have on the public's understanding of water quality and habitat preservation.

19. Blackhawk Park Coastal Prairie Restoration and Education Project

CCMP Actions Implemented: PPE-1, PPE-3, PPE-7, HP-1, FW-6

EPA's Strategic Plan Measures Implemented: Goal 1 – Core Mission, Objective 1.2 - Provide for Clean and Safe Water, Objective 1.3 – Revitalize Land and Prevent Contamination; Goal 2 – Cooperative Federalism, Objective 2.2 - Increase Transparency and Public Participation

Grantee/Contractor: City of Houston Parks and Recreation Department

Total Project Budget: $53,600 ($53,600 from Award #CE-00655006: FY 2019 $53,600)

Milestones: Complete four-acres of invasive species removal and native plant installation by February 2019.

Project period: September 2017–August 2020

Status: Ongoing project. One clean-up event has taken place and one-acre of land has been reseeded.

Objective(s): To engage the community in restoring a city park to its historic coastal prairie pothole habitat. The project aims to involve the community in habitat restoration to learn the historic significance of coastal prairie, its benefit to wildlife, and the positive impacts that a prairie site can have to the community.

Description: The City of Houston Natural Resources Management Program targeted 47-acres of undeveloped land within Blackhawk Park for prairie restoration. This area was identified as historic coastal prairie through satellite imagery, and still contains valuable prairie plants. These plants are currently being crowded out by non-native woody vegetation. Once restored, this park has the potential to provide significant ecosystem functions, habitat value for wildlife, and educational importance for surrounding urban and coastal communities. The GBEP is funding a 10-acre portion of the park through this project.

Partners and Their Role(s): The City of Houston will partner with the SCA to perform habitat management activities focusing on the removal of invasive species. The SCA will also lead community volunteers in planting native grasses and forbs that have been grown in the City of Houston's greenhouse by Master Naturalist volunteers.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- Quarterly public education and volunteer events; and
- Final report due July 2020.

Long-term Outcomes: Increase awareness level of the connection between the natural environment and the impacts the public can have on water quality and habitat preservation.

20. Galveston Seawall Recycling

CCMP Actions Implemented: PPE-1, PPE-3, PPE-7, NPS-1

EPA's Strategic Plan Measures Implemented: Goal 1 - Core Mission, Objective 1.2 - Provide for Clean and Safe Water; Goal 2 – Cooperative Federalism, Objective 2.2 - Increase Transparency and Public Participation

Grantee/Contractor: The Park Board of Trustees of the City of Galveston (PBTG)

Total Project Budget: $18,420 ($18,420 from Award #CE-00655006: FY 2019 $18,420)

Milestones: Purchase and placement of recycling receptacles by April 2019.

Project period: September 2017–August 2020

Status: Ongoing project. Bids are being accepted and reviewed; the messaging for the bins is being designed.

Objective(s): The goal of the project is to provide recycling opportunities along approximately six miles of Galveston's seawall to reduce litter that could become marine debris effecting the stormwater system and Galveston Bay.

Description: This project is an outcome of the Marine Debris Task Force, a collective of various groups including Artist Boat, the GLO, Turtle Island Restoration Network, the GBF, and NOAA-Flower Garden Banks National Marine Sanctuary. The Task Force was formed after a workshop meeting in Galveston in 2015 for the EPA's Trash Free Waters Initiative. The group identified the need to purchase 20 recycling cans and place at the seawall bus stops as well as a six-compartment recycle station that can be moved based on areas of highest need, particularly during special events. The project leverages $58,500 of in-kind contributions from the PBTG. The Back the Bay message and logo will be incorporated on the recycling cans as well as any outreach efforts.

Partners and Their Role(s): The PBTG will partner with Artist Boat to coordinate efforts to deploy the recycling receptacles and analyze the materials collected in the containers to evaluate the success of the project.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration:
- Recycling receptacles;

- Map of where recycling containers are located;
- Analysis of materials collected; and
- Final report due August 2020.

Long-term Outcomes: Increase awareness level of the connection between the natural environment and the impacts that the public can have on water quality.

4.2E - ONGOING M&R PROJECTS

21. Seafood Evaluation in a Portion of Galveston Bay

CCMP Actions Implemented: PH-1

EPA's Strategic Plan Measures Implemented: Goal 1 - Core Mission, Objective 1.2 - Provide for Clean and Safe Water; Goal 2 – Cooperative Federalism, Objective 2.1 - Enhance Shared Accountability; Goal 3 – Rule of Law and Process, Objective 3.3 – Prioritize Robust Science

Grantee/Contractor: DSHS

Total Project Budget: $99,375 ($99,375 from Award #CE-00655006: FY 2018 $66,544, FY 2019 $32,831)

Milestones: A QAPP revision was approved effective December 1, 2018. A QAPP audit is scheduled for early winter 2019.

Project period: September 2017–August 2019

Status: Ongoing project. Sampling took place in April 2018. The contractor continues to analyze samples and is drafting the final report.

Objective(s): To evaluate the risk associated with consumption of fish and crabs from a portion of Galveston Bay.

Project Description: Recently, fish tissue samples have been collected from the upper portion of the Houston Ship Channel to assess current fish advisories. However, the advisory area below Highway 146 down to a line from Red Bluff Point to Five Mile Pass to Houston Point has not been sampled lately. This area has a consumption advisory for catfish, blue crabs, and spotted seatrout due to PCBs and Dioxins. The area is a popular recreational fishing area for spotted seatrout. Fishing occurs regularly in Tabb's and Barnett Bays that are contained in this advisory area. It is important that the targeted area that is selected is a geographical area that is of a size that will allow an evaluation of tissue concentrations and risk that allows a high degree of confidence so that appropriate regulatory decisions can be made by the Commissioner of Health related to altering an existing fish consumption advisory.

Approximately 63 samples will be collected and analyzed from this area. Four or five locations in the area will be selected to collect fish and crab samples based upon habitat and areas where fishing occurs. Targeted species will include those species that are commonly eaten such as blue crab, spotted seatrout, red drum, black drum, sheepshead, catfish, flounder, and croaker. Once the samples are collected and analyzed, a risk characterization will be conducted to determine the adequacy of the current fish consumption advisory in this location.

Partners and Their Role(s): The Geochemical Environmental Research Group lab at Texas A&M University at Galveston (TAMUG) will analyze the samples while the DSHS will do the sampling.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration; and
- Final report due July 2019.

Long-term Outcomes: To determine if a fish advisory continues to be necessary for a portion of Galveston Bay.

22. Characterization of the Influence of Freshwater Inflow on Trinity River Delta Indicators

CCMP Actions Implemented: FW-1; FW-3; FW-7

EPA's Strategic Plan Measures Implemented: Goal 1 - Core Mission, Objective 1.2 - Provide for Clean and Safe Water; Goal 2 – Cooperative Federalism, Objective 2.1 - Enhance Shared Accountability; Goal 3 – Rule of Law and Process, Objective 3.3 – Prioritize Robust Science

Grantee/Contractor: UHCL

Total Project Budget: $60,000 ($60,000 from Award #CE-00655006: FY 2018 $42,000 FY 2019 $18,000)

Milestones: Continue Geographic Positioning System (GPS) surveys, water quality sampling, biological community collection during FY 2019 and begin statistical analysis by summer of 2019.

Project period: September 2017–December 2019

Status: Ongoing project. The QAPP renewal was approved January 2019. Sampling began in February 2018.

Objective(s): The objective of this project is to quantify the influence of freshwater inflow on the Trinity River delta salinity regime and indicator biota.

Project Description: Little is known about the influence of freshwater inflow on the salinity regime and response of multiple freshwater indicator fauna including *Rangia cuneate* (Rangia clams) and *Vallisneria americana* (wild celery). Recent studies have documented the recent and past abundances of Rangia clams in open bay portions of the Galveston Bay system. However, spatial and temporal trends in populations of Rangia clams and wild celery remain poorly documented within the shallow portions of the Trinity River delta. UHCL therefore proposes to conduct a comprehensive study that includes three components: 1) remote sensing of SAV (wild celery and other species) using unmanned aerial vehicles (UAV's) and on the ground surveys, 2) establishment of a network of shallow automated salinity monitoring sites and 3) an on the ground inventory of SAV and Rangia clams.

Sites containing SAV will be delineated and input into GIS databases during the first phase of this project. This data and historical information will be used to establish a network of monitoring sites within the delta. During the second phase 10-25 automated temperature and salinity/conductivity meters, one to two water/tide level recorders, and one to two recording precipitation gages will be deployed at strategic locations within the delta region to characterize changes in salinity regime associated with freshwater input. The salinity/conductivity automated probes will automatically log salinity and temperature at varying intervals for over one and a half years. Data collected from these units will be compared to nearby National Oceanic Atmospheric Association tide and precipitation gages, and the USGS gage at Romayor to assess temporal and spatial patterns and correlations between precipitation, tide stage, freshwater inflow and the response of ambient salinity, SAV, and Rangia clams. Although the field portion of this project will end in one and a half years, it is anticipated that the meters will be deployed for an additional one to two years to collect additional data. The third concurrent phase of the project will be an inventory of SAV and Rangia clam beds.

Partners and Their Role(s): UHCL will conduct all fieldwork and data analyses.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration; and
- Final report due December 2019.

Long-term Outcomes: A better understanding of the influence of freshwater inflow on salinity and indicator biota.

23. The Impacts of Assimilative Capacity of Reservoirs on Coastal Inflows

CCMP Actions Implemented: FW-1-5, RSC-2

EPA's Strategic Plan Measures Implemented: Goal 1 - Core Mission, Objective 1.2 - Provide for Clean and Safe Water; Goal 2 – Cooperative Federalism, Objective 2.1 - Enhance Shared Accountability; Goal 3 – Rule of Law and Process, Objective 3.3 – Prioritize Robust Science

Grantee/Contractor: HARC/GTRI

Total Project Budget: $160,000 ($94,642 from Award #CE-00655005: FY 2016 $80,000, FY 2017 (carried forward) $14,642); $65,358 from Award #CE-00655006: FY 2017 $41,300, FY 2018 $24,058)

Milestones: All samples have been collected.

Project period: September 2017–May 2019

Status: Ongoing project. The contractor is in the process of finalizing sample analyses and writing the final report.

Objective(s): This project will help support research to quantify the assimilative capacity of Lake Livingston to better understand the impacts reservoirs have on coastal ecosystems.

Project Description: This study proposes to analyze the assimilative capacity of Lake Livingston. The project will sample the inflows into Lake Livingston and the outflows to obtain before and after numbers for nutrients and sediments. Because assimilative capacity changes depend on flows, the study will obtain samples during low, medium and high flows (ambient and event monitoring). Determining residence time of Lake Livingston will be an important factor and part of the study. Timing of sample collections will be based on the determined residence times. A baseline data set of measurements from available surface water quality samples for the study area will be developed along with assessment methodologies capable of identifying spatial and temporal changes in water quality. The surface water data sampled during the proposed project will be analyzed to begin characterization of the assimilative capacity of the reservoir for the supply of

nutrients and sediments to the Galveston Bay ecosystem.

Partners and Their Role(s): HARC/GTRI will lead the project and will analyze the data with the subcontractor (USGS), the party responsible for data collection.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration; and
- Final report due May 2019.

Long-term Outcomes: Provide insight into assimilative capacity of reservoirs and impacts to inflows for Galveston Bay.

24. Freshwater Inflows in Galveston Bay: Relationships to Harmful Algal Blooms

CCMP Actions Implemented: FW-1, FW-7, SP-1

EPA's Strategic Plan Measures Implemented: Goal 1 - Core Mission, Objective 1.2 - Provide for Clean and Safe Water; Goal 3 – Rule of Law and Process, Objective 3.3 – Prioritize Robust Science

Grantee/Contractor: TAMUG

Total Project Budget: $80,000 ($80,000 from Award #CE-00655005: FY 2017 $80,000)

Milestones: QAPP Revision 1 was approved in July 2018. QAPP desk audit was performed in February 2019.

Project period: January 2017–May 2019

Status: Ongoing project. The contractor continues to collect samples daily using the Imaging FlowCytobot to monitor phytoplankton in the bay. The final report is currently being drafted.

Objective(s): This project will monitor the relationship between freshwater inflows and the presence of harmful algal blooms in Galveston Bay by using an Imaging FlowCytobot to detect harmful algal blooms earlier than previously documented.

Project Description: Current understanding of the factors which led to harmful algal blooms in Galveston Bay is limited. Using a new type of technology, the Imaging FlowCytobot, will allow a more proactive approach to providing needed early detection of harmful algal blooms when they occur in Galveston Bay. The Imaging FlowCytobot will help to (i) identify phytoplankton blooms – their timing, magnitude and duration, (ii) follow blooms and observe changes, and (iii) develop predictive abilities to forecast subsequent blooms. Observations will be related to water quality data collected concurrently and freshwater inflows data collected by USGS. By working with the TPWD Coastal Fisheries Division and the DSHS, the goal is to provide an early announcement to oyster and fisheries groups to protect consumers from disease or other health hazards associated with harvesting and/or consuming products exposed to (harmful) algal blooms.

Partners and Their Role(s): TAMUG collects daily samples and analyzes the samples with the Imaging FlowCytobot. Salinity, temperature, dissolved oxygen, and pH are measured concurrently. Freshwater inflows data are obtained from USGS.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- Phytoplankton and water quality data; and
- Final report by May 2019.

Long-term Outcomes: Insights into the influence of freshwater inflows on harmful algal blooms in Galveston Bay.

25. Galveston Bay Intertidal Oyster Reef Mapping and Analysis

CCMP Actions Implemented: SP-1, SP-5, RSC-2

EPA's Strategic Plan Measures Implemented: Goal 1 - Core Mission, Objective 1.2 - Provide for Clean and Safe Water; Goal 2 – Cooperative Federalism, Objective 2.1 - Enhance Shared Accountability; Goal 3 – Rule of Law and Process, Objective 3.3 – Prioritize Robust Science

Grantee/Contractor: UH

Total Project Budget: $64,883 ($64,883 from Award #CE-00655006: FY 2019 $64,883)

Milestones: It has been determined that two QAPPS are necessary for this project; drafts were submitted January 2019.

Project period: September 2018–May 2020

Status: Ongoing project. No work has started under this project; waiting for QAPP approval.

Objective(s): This project seeks to create a complete GIS database of oyster reef habitat in Galveston Bay while simultaneously assessing intertidal oyster population dynamics and community structure on selected reefs.

Project Description: Intertidal oyster shell reef locations in Galveston Bay have not been extensively mapped on a large scale in the last 20 years. Small scale exploratory projects have been conducted in Bastrop Bay and the Carancahua reef area in West Bay by the UHCL utilizing drone and side scanning sonar. Ultimately, drone and side scan sonar mapping will provide high quality data for future use. However, obtaining information on past intertidal reef locations will provide baseline data that can be used as a benchmark for analyzing restoration techniques in the bay and monitoring future growth/ loss of habitat.

The project proposes to use 2015 Texas Orthoimagery Program (TOP) aerial photography to build historic intertidal reef datasets. TOP data was recorded in a 0.5 m resolution, providing a higher quality image for habitat reclassification than other publicly available images.

After obtaining GIS created shapefiles of possible intertidal reef locations, ground-truthing will be conducted on a sub sample of locations to validate the analysis and collect current elevation data with a sub-meter accuracy GPS unit. On a sub sample of the mapped intertidal reefs, oyster population characteristics will be assessed. These metrics will include oyster abundance, size demography, reef structure (overall percent cover of shell, percentage of live oysters, and rugosity), and oyster condition (provides a relative index of oyster health). Additionally, the benthic associated macrofauna will be excavated and community composition determined. This community analysis will not only indicate the value of Galveston Bay intertidal reefs as habitat, but also provide a relative indication of the value of this habitat type for mobile nekton and birds.

Partners and Their Role(s): Black Cat GIS and Biological Services will create the GIS shape files and develop the online Story Map and Gulf Coast Bird Observatory will help assess the community structure on selected oyster reefs.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- Final QAPPs by March 2019;
- Final shapefiles showing intertidal oyster reef habitat due five months after QAPP approval;
- Final white paper due by April 2020; and
- Final report due April 2020.

Long-term Outcomes: A complete GIS database of oyster reef habitat in Galveston Bay while simultaneously assessing intertidal oyster population dynamics and community structure on selected reefs.

SECTION 5: COMPLETED PROJECTS

SECTION 5.1: PROJECTS COMPLETED SINCE FY 2019 WORKPLAN SUBMISSION - SUMMARY

Completed Projects Under			Award # CE-00655006			Award #CE-00655005	
PROJECT NAME	TCEQ Contract Number	Funding Years	2019 Budget	2018 Budget	2017 Budget	2014-2016	Final Report Submitted
26. The Galveston Bay Plan, 2nd Edition	17-70188	2017-2018	$0	$3,874	$75,000	$0	December 2018
27. Designing for Impact: Promoting Low Impact Development Implementation	18-80339	2018	$0	$30,000	$0	$0	December 2018
28. Galveston Bay Coalition of Watersheds	17-70186	2017	$0	$0	$85,000	$0	December 2018
29. Galveston Bay Fats, Oils, and Grease Campaign	14-43075	2014-2017	$0	$0	$60,000	$156,000	December 2018
30. Stormwater Best Management Practices Testing at the Ghirardi Family Water Smart Park	16-60055	2016	$0	$0	$0	$57,300	December 2018
31. Trash Bash (2015-2018)	15-50886	2015-2018	$0	$5,000	$5,000	$6,500	December 2018
GRANT TOTAL-PROJECT FUNDING			$0	$38,874	$225,000	$219,800	

SECTION 5.2: PROJECTS COMPLETED SINCE FY 2019 WORKPLAN SUBMISSION - DETAIL

26. *The Galveston Bay Plan, 2nd Edition*

CCMP Actions Implemented: All

EPA's Strategic Plan Measures Implemented: Goal 1 - Core Mission, Objective 1.2 - Provide for Clean and Safe Water, Objective 1.3 - Revitalize Land and Prevent Contamination; Goal 2 – Cooperative Federalism, Objective 2.1 - Enhance Shared Accountability, Objective 2.2 - Increase Transparency and Public Participation; Goal 3 - Rule of Law and Process, Objective 3.3 - Prioritize Robust Science

Grantee/Contractor: H-GAC

Total Project Budget: $95,000 ($78,784 from Award #CE-00655006: FY 2017 $75,000, FY 2018 $3,784; $16,216 State: FY 2018 $16,216)

Milestones: Final draft of the *GBP, 2nd Edition* and Executive Summary.

Project period: September 2016–December 2018

Status: Completed project.

Objective(s): To design and implement a public engagement process to complete a draft and final version of the *GBP, 2nd Edition* that meets both stakeholders needs and EPA requirements.

Project Description: The H-GAC worked with the GBEP and its partner organizations to revise the *GBP, 2nd Edition*, fulfilling the EPA requirements for NEPs to revise their CCMPs. The *GBP, 2nd Edition* included measurable actions that the GBEP and implementing partners can take to achieve the vision and goals for the restoration and preservation of the Galveston Bay estuary.

Partners and Their Role(s): The H-GAC, in coordination with the GBEP, used common planning techniques to reach stakeholders and publicize opportunities for local government and public involvement through questionnaires, one-on-one meetings and facilitated meetings to gather, organize and assess implementation goals and priorities.

Outputs/Deliverables:

- Final draft of the *GBP, 2nd Edition*; and
- Final draft of the Executive Summary to the *GBP, 2nd Edition*.

Long-term Outcomes: To continue protection and conservation of the estuary, using the *GBP, 2nd Edition* as a guiding document for the GBEP, regional stakeholders, and the public.

27. Designing for Impact: Promoting Low Impact Development Implementation

CCMP Actions Implemented: NPS-2, NPS–7, NPS-10, NPS–11

EPA's Strategic Plan Measures Implemented: Goal 1 - Core Mission, Objective 1.2 - Provide for Clean and Safe Water; Goal 2 – Cooperative Federalism, Objective 2.1 - Enhance Shared Accountability, Objective 2.2 - Increase Transparency and Public Participation

Grantee/Contractor: H-GAC

Total Project Budget: $30,000 ($30,000 from Award #CE-00655006: FY 2018 $30,000)

Milestones: A generic ordinance has been drafted to be used by City of Pearland to adopt LID maintenance agreements; implementation workshop occurred in November 2018.

Project period: August 2017–December 2018

Status: Completed project.

Objective(s): The goal of this project was to work directly with local governments to encourage greater usage of LID throughout the Houston-Galveston region.

Project Description: The H-GAC partnered with the City of Mont Belvieu and the City of Pearland in this pilot project to make their municipal codes more "LID-friendly." The H-GAC focused on the City of Pearland but conducted initial kick-off meetings with the City of Mont Belvieu. The H-GAC presented the City of Pearland with a tailored report outlining impediments to LID implementation in their code, proposing code and ordinance revisions, and prioritizing LID techniques appropriate for their jurisdiction. The H-GAC concluded the project by hosting a community LID workshop.

Partners and Their Role(s): The City of Mont Belvieu and the City of Pearland allowed the H-GAC to review their municipal codes and offer recommendations.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- Revised findings report per consultant review;
- Revised findings report per City of Pearland review;
- Community LID workshop; and
- Final report due December 2018.

Long-term Outcomes: Municipalities will use LID-friendly practices in the future.

28. Galveston Bay Coalition of Watersheds

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

EPA's Strategic Plan Measures Implemented: Goal 1 - Core Mission, Objective 1.2 - Provide for Clean and Safe Water; Goal 2 – Cooperative Federalism, Objective 2.1 - Enhance Shared Accountability, Objective 2.2 - Increase Transparency and Public Participation

Grantee/Contractor: Texas AgriLife

Total Project Budget: $85,000 ($85,000 from Award #CE-00655006: FY 2017 $85,000)

Milestones: Five Coalition stakeholder meetings and one public meeting took place. Goals, vision, and implementation priorities were developed.

Project period: September 2016–May 2018

Status: Completed project.

Objective(s): The objective of this project was to establish and maintain a sustainable coalition of watershed groups for the Galveston Bay area to implement existing WPPs and I-Plans. The funding for this project also included managing implementation of the GBBRP with the GBF.

Project Description: The Galveston Bay Coalition of Watersheds (GBCW) was established to implement measures from existing WPPs and I-Plans. The GBCW included stakeholders from existing groups including Dickinson, Highland, and Jarbo bayous, as well as watersheds that will likely be developing WPPs or I-Plans in the future such as Moses Bayou. This regional approach will:

- Extend limited resources for coordinating implementation efforts;
- Reduce the number of meetings stakeholders are asked to attend; and
- Facilitate the information coordination already happening between watershed groups.

The GBEP funding was used as seed funding for a full-time coordinator who established and maintained the GBCW. This coordinator helped determine the makeup of the group, worked with stakeholders to establish a unified vision and goals, and defined a plan for continued funding which should include a matching component from local governments, be it financial or in-kind. Local contributions would be leveraged for grant applications to fund implementation measures and continued coordination. The coordinator also worked with GBCW members to carry out implementation measures in existing plans across all the partner watersheds. The coordinator also worked with the GBF staff to ensure facilitation of active stakeholder participation in the GBBRP and collaborated with adjacent watershed groups to guide successful implementation and tracking of plan progress, which addresses oyster waters bacteria impairments in Galveston Bay.

Partners and Their Role(s): Texas AgriLife, the GBF, and watershed groups in the lower Galveston Bay area.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- Galveston Bay Oyster Waters annual report; and
- Final report due May 2018.

Long-term Outcomes: Establish a sustainable model for coordinating local watershed efforts.

29. Galveston Bay Fats, Oils, and Grease Campaign

CCMP Actions Implemented: WSQ-1, WSQ-5, WSQ--6, PS-2, PPE-3

EPA's Strategic Plan Measures Implemented: Goal 1 - Core Mission, Objective 1.2 - Provide for Clean and Safe Water; Goal 2 – Cooperative Federalism, Objective 2.1 - Enhance Shared Accountability, Objective 2.2 - Increase Transparency and Public Participation

Grantee/Contractor: The City of Nassau Bay

Total Project Budget: $216,000 ($156,000 from Award #CE-00655005: FY 2014 $50,000, FY 2015 $46,000, FY

2016 $60,000; $60,000 from Award #CE-00655006: FY 2017 $60,000)

Milestones: Four recycling stations have been installed; one at the City of Nassau Bay, one with the City of Seabrook, one with the City of Dickinson, and one with the Clear Lake Water Authority. Two more are being planned for League City and Friendswood.

Project period: September 2014–August 2018

Status: Completed project.

Objective(s): The goal of this project was to reduce, via public education, bacteria loading into Galveston Bay caused by the release of FOG into sewer systems. This project aligns with one of the EPA's areas of special interest regarding nutrient management and control activities.

Project Description: The success of the cooking oil recycling program was to be evaluated based on tracking data and the program modified based on lessons learned, as well as develop refreshed and new marketing and outreach materials, expand the reach of the campaign, and increase the number of cooking oil recycling stations. In addition, the workgroup developed a partnership model that allows for the campaign to be sustainable over time. The Cease the Grease Campaign continues to target reducing sanitary sewer overflows from FOG by: 1) working in cooperation with a stakeholder workgroup, 2) developing marketing and outreach materials, 3) creating a distribution plan, and 4) tracking campaign progress. These campaign efforts have been maintained based on lessons learned, in addition to partnering with cities to pilot local grease recycling stations.

Partners and Their Role(s): The GBF coordinated and facilitated the effort between partners, City of Nassau Bay is serving as the pass-thru entity, City of Dallas is providing the Cease the Grease program materials free of charge, League City, City of La Porte, and City of Pasadena are contributing to brand development, and KPRC Channel 2 is providing in-kind media and created the website.

Outputs/Deliverables:

- Quarterly progress reports until contract expiration;
- Installation of recycling receptacles;
- Mass media communications;
- Public education and outreach events;
- Project webpage; and
- Final report due July 2018.

Long-term Outcomes: Fewer overflow reports, increase in number of grease recycling stations.

30. Stormwater Best Management Practices Testing at the Ghirardi Family Water Smart Park

CCMP Actions Implemented: WSQ-1, NPS-1, NPS-2

EPA's Strategic Plan Measures Implemented: Goal 1 - Core Mission, Objective 1.2 - Provide for Clean and Safe Water; Goal 2 – Cooperative Federalism, Objective 2.1 - Enhance Shared Accountability, Objective 2.2 - Increase Transparency and Public Participation

Grantee/Contractor: Texas AgriLife

Total Project Budget: $57,300 ($57,300 from Award #CE-00655005: FY 2015 $57,300)

Milestones: Five events were sampled and soil analysis completed.

Project period: September 2015–June 2018

Status: Completed project.

Objective(s): To create a long-term data set for stormwater BMP effectiveness and the use of green infrastructure. This project aligns with one of the EPA's areas of special interest regarding nutrient management and control activities.

Project Description: This project was a continuation of data collection of green infrastructure elements at five existing sites within the park: pervious pavers, impervious pavers, green roof, cistern, and rain garden. The two types of pavers created a paired data set and the green roof and cistern both treat runoff from the pavilion roof, creating a second paired set. Finally, a rain garden (bio-retention cell) that collects water off the parking lot through a curb cut was sampled. Each site was sampled during qualifying rain fall events (storms producing at least 0.29 inches of rain). Measured parameters for each practice were: nitrate/ nitrite, total phosphorus, total suspended solids and E. coli. Because several of the most commonly used BMPs encourage soil infiltration as a means of removing pollutants, preliminary soil data was also collected for both the rain garden and bioswale as well as three control sites.

The initial design and construction of the Ghirardi Family WaterSmart Park was funded through a 319 (h) grant from TCEQ. It also included a BMP monitoring plan, QAPP, and monitoring equipment purchases. This contract with the GBEP was the continuation of data collection for an additional 18 months to provide much needed long-term data of stormwater BMPs and their continued ability to improve water quality.

Partners and Their Role(s): League City coordinated with Texas AgriLife to allow the use of their parkland.

Outputs/Deliverables: Long term dataset for stormwater BMPs and white paper outlining the water quality data collected from the stormwater BMPs and the conclusions that can be drawn from this data.

- Quarterly progress reports until contract expiration;
- QAPP;
- Stormwater BMPs data;
- White paper; and
- Final report due May 2018.

Long-term Outcomes: Long term data set that provides results demonstrating the effectiveness of the stormwater BMPs and design criteria.

31. Trash Bash (2015–2018)

CCMP Actions Implemented: PPE-1, PPE-3, PPE-5, SD-5

EPA's Strategic Plan Measures Implemented: Goal 1 - Core Mission, Objective 1.2 - Provide for Clean and Safe Water; Goal2 – Cooperative Federalism, Objective 2.1 - Enhance Shared Accountability, Objective 2.2 - Increase Transparency and Public Participation

Grantee/Contractor: H-GAC

Total Project Budget: $16,500 ($6,500 from Award #CE-00655005: FY 2015 $1,500, FY 2016 $5,000; $10,000 in Grant #CE-00655006: FY 2017 $5,000, FY 2018 $5,000)

Milestones: Annual event held in March every year since 1994.

Project period: September 2015–July 2018

Status: Completed project.

Objective(s): Trash Bash is a successful award-winning volunteer-based litter cleanup event that has been held at multiple sites in the Houston-Galveston area on an annual basis since 1994.

Project Description: Trash Bash is the largest single day waterway cleanup event in the State of Texas. Trash Bash continues to provide environmental stewardship of the Galveston Bay watershed by removing litter and debris in the Houston Galveston areas. This project will support implementation of multiple *GBP* actions, particularly those addressing PPE.

Partners and Their Role(s): Trash Bash is managed by the Texas Conservation Fund, a 501(c)(3) organization, with additional guidance and management leadership from its 40-person steering committee and the H-GAC.

Outputs/Deliverables:

- Printed education and outreach materials; and
- Final report due April 2018.

Long-term Outcomes: To decrease trash in waterways in the Houston-Galveston area.