Galveston Bay Estuary Program
Fiscal 2027 Section 320/State Proposals

Monitoring and Research (M&R) Subcommittee Fiscal 2027 Proposals

	PROPOSAL NAME	GRANTEE	TOTAL REQUEST
1.	Mercury accumulation in bottlenose dolphins (Tursiops truncatus), a sentinel species for estuarine and human health	GBF	$59,972.50
2.	Evaluating Economic and Ecosystems services of Galveston Bay Estuarine Wetlands	GTRI/HARC	$232,849.00
3.	Enumeration Methods Comparison and Evaluation of Nature-Based Stormwater Infrastructure to Reduce Microplastic Pollution in Galveston Bay	HGAC	$249,851.66
4.	Advancing monitoring estuarine ecosystems through development of automatic sampling framework	TAMUG	$255,962.00
5.	Sea Aggie Sea Turtle Patrol- Gulf Center for Sea Turtle Research	TAMUG	$111,347.00
6.	Developing a Tool to Assess Black Mangrove Distribution: A Pilot Study in Galveston Bay	EIH-UHCL	$74,107.75
7.	Coastal Ocean Acidification Monitoring Program in Galveston Bay	USGS	$130,000.00
		TOTAL:	**$1,114,089.91**

Galveston Bay Estuary Program
Fiscal 2027 Project Proposal

Please complete this proposal form and submit to the appropriate Subcommittee Coordinator (end of form) by July 25, 2025. No late submittals will be considered for funding.

This Call for Project Proposals complies with 30 Texas Administrative Code (TAC) § 14.7, which lays out requirements for a competitive solicitation by TCEQ for grant awards. For convenience, specific citations to 30 TAC § 14.7 are identified in the text.

SECTION ONE: INTRODUCTION

Purpose [required by 30 TAC § 14.7(1)]: The purpose of the proposed grant from the Galveston Bay Estuary Program (GBEP), a program of the Texas Commission on Environmental Quality (TCEQ), is to implement *The Galveston Bay Plan, 2nd Edition* (the Plan), a comprehensive conservation and management plan falling under Section 320, of the Federal Water Pollution Control Act (33 U.S.C. Section 1330), for a designated national estuary in the State of Texas.

Objective and Allowable Activities [see 30 TAC § 14.7(4)]: The objective of this grant is to implement the GBEP stakeholder developed priorities for fiscal 2027 (FY 2027) Priority Area Actions that were developed by GBEP subcommittees for FY 2027 at the June 2025 meetings. Any proposal implementing the Plan may be submitted, but proposals implementing the FY 2027 Priority Area Actions will be considered above others.

Authority [see 30 TAC § 14.7(2)]: Grants issued by GBEP under this solicitation are authorized by: the Federal Water Pollution Control Act (Clean Water Act) § 320 (33 UNITED STATES CODE § 1330), commonly referred to as the National Estuary Program; TEX. WATER CODE § 5.124; and 30 TAC ch. 14.

Match Requirement [see 30 TAC § 14.7(10) and 30 TAC § 14.7(11)]: No matching funds are required. Therefore, there is no need to adjust or waive any matching funds requirement.

Multiple Awards [see 30 TAC § 14.7(7)]: GBEP anticipates awarding funds for multiple proposals. GBEP intends to award grants to that combination of proposals which best implements the Plan, factoring in all criteria identified in this Call for Project Proposals, the availability of funds, and the most effective division of funds between awards.

Timeline of Proposals:

Task	Date Due
Release of Request for Proposals	June 23, 2025
Proposals Due	July 25, 2025
Send Proposals to Subcommittees Members for Review	August 13, 2025
Present Proposals to Subcommittees for Council Recommendation	September 3, 2025 (NRU and PPE) September 10, 2025 (M&R and WSQ)
Present Proposals to B&P Subcommittee for Final Recommendation	October 1, 2025
Present Proposals to Galveston Bay Council for Approval	October 15, 2025

SECTION TWO: SUBMITTAL – GENERAL INFORMATION

Primary Subcommittee: Monitoring and Research (M&R)
Secondary Subcommittee (if applicable): Choose an item.

Project Name:

Mercury accumulation in bottlenose dolphins (*Tursiops truncatus*), a sentinel species for estuarine and human health

Project Previously Funded by GBEP? Yes ☐ No ☒

Lead Implementer / Categories of Eligible Recipients [see 30 TAC § 14.7(3)]:

Galveston Bay Foundation

The lead implementer must be in one of the following categories of eligible recipients. Please indicate which category applies to your entity. If the proposing party is not already paired with a lead implementer in one of the categories listed below, the proposing party will need to partner with an eligible recipient in one of these categories to be selected for funding. Please reach out to GBEP staff with any questions.

☐ Federal, State, or Local Government ☐ Council of Government ☐ Public ISDs or Universities
☒ Nonprofit ☐ Other*

[If other, please identify pass-through partner.]

Unique Entity ID (UEI) Number:	WQMNK4LCT9N6
Vendor Identification Number (VIN) or Tax ID:	EIN:76-0279876

Contact Information:

Project Representative Name	Dr. Vanessa Mintzer
Project Representative Phone	352-359-5633
Project Representative Email	vmintzer@galvbay.org

Amount Requested from GBEP:

$59,972.50

Federal ☐ State ☐ No Preference ☐
Is the project scalable? ☒

Amount Requested per year (if applicable):

FY 2027 (09/01/2026-05/31/2027)	$33,810.00
FY 2028 (09/01/2027-05/31/2028)	$26,162.50
FY 2029 (09/01/2028-05/31/2029)	$0.00
Total	$0.00

Project Dates / Duration (beginning no earlier than September 1, 2026 – ending no later than May 31, 2029) [see 30 TAC § 14.7(5)]:

September 1, 2026 to May 31, 2028 (September 1, 2025 to May 31, 2027 would be greatly preferred)

Total Project Cost (including Leveraging Amounts, if any; provide leveraging information where indicated below):

$75,000

Is this an estimate? ☒

Leveraging (in-kind and/or cash):

[Please indicate source, amount, and status (secured, potential, etc.)]

The proposed project is leveraging work conducted by the Galveston Bay Foundation, the Environmental Institute of Houston at the University of Houston-Clear Lake, and the National Marine Mammal Foundation funded through the National Oceanic and Atmospheric Administration's (NOAA) RESTORE Science Program. Direct costs associated with the proposed project objectives such as travel and supplies equal approximately $15,000. These funds will cover the remote biopsy sampling field work that will be conducted in August-September 2025 to obtain tissue samples from bottlenose dolphins in Galveston Bay. These samples are being collected for the evaluation of PCBs and dioxins, but with additional funding (this proposal), these samples can be subsampled and analyzed for mercury accumulation as well.

Project Urgency:

[Please indicate the need for receiving funding during this cycle; such as loss of other funding secured, loss of opportunity to implement project, potential of breach, etc.]

We currently have 48 samples that are ready to be analyzed for mercury accumulation, and we will be collecting between 15 and 30 more samples in August-September 2025. It would be ideal to begin this straightforward and relatively inexpensive study on September 1, 2025, and complete it within 18 months. Hence, please consider this project for funding with the additional state funding that GBEP will receive for fiscal year 2026. We have no other potential funding to cover the mercury analyses proposed herein.

SECTION THREE: *GALVESTON BAY PLAN, 2ND EDITION* IMPLEMENTATION

Grant recipient activities to be funded must implement the Plan, but proposals implementing the Fiscal 2027 Subcommittee Priorities (Section Four) will be considered above others. This selection criteria provides for the selection of multiple recipients as needed.

The *Galveston Bay Plan, 2nd Edition* Action Plans are found at:
https://gbep.texas.gov/ensure-safe-human-and-aquatic-life-use/
https://gbep.texas.gov/protect-and-sustain-living-resources/
https://gbep.texas.gov/engage-communities/
https://gbep.texas.gov/inform-science-based-decision-making/

Galveston Bay Plan Priority Area Actions Addressed:

Plan Priority 1: Ensure Safe Human and Aquatic Life Use

NPS-1 ☐	NPS-2 ☒	NPS-3 ☐	NPS-4 ☐	
PS-1 ☐	PS-2 ☐	PS-3 ☐		
PHA-1 ☐	PHA-2 ☐	PHA-3 ☐	PHA-4 ☐	PHA-5 ☒

Plan Priority 2: Protect and Sustain Living Resources

HC-1 ☐	HC-2 ☐	HC-3 ☐
SC-1 ☒	SC-2 ☐	
FWI-1 ☐	FWI-2 ☐	FWI-3 ☐

Plan Priority 3: Engage Communities

SPO-1 ☒	SPO-2 ☒	SPO-3 ☒	SPO-4 ☒
PEA-1 ☒	PEA-2 ☒	PEA-3 ☒	

Plan Priority 4: Inform Science-based Decision Making

RES-1 ☐	RES-2 ☒	RES-3 ☐	RES-4 ☐
RES-5 ☒	RES-6 ☐	RES-7 ☐	RES-8 ☐
ACS-1 ☒	ACS-2 ☒	ACS-3 ☐	

Plan Priority Area Actions Detail:

[Please identify action items and state how the project implements actions of the Galveston Bay Plan, 2nd Edition Action Plans.]

Priority 1: Ensure Safe Human and Aquatic Life Use

NPS-2 Support Nonpoint Source Education and Outreach Campaigns: The results of the proposed project can be used to create conservation messaging connecting dolphin health to human and Bay health to foster public awareness, improve education, and encourage action to improve water quality.

PHA-5 Improve Finfish Consumption Safety Through Watershed-Based Plans: Because dolphins primarily use finfish as a food source and the contaminant evaluated (mercury) biomagnifies, they are a good indicator of consumption concerns for top predators, humans included, that also use finfish as a food source from Galveston Bay. The results of the proposed project can inform, raise awareness, and provide examples of consumption safety concerns.

Priority 2: Protect and Sustain Living Resources

SC-1 Native Species Management: Bottlenose dolphins are only mentioned once in the Species Conservation Action Plan, and it is stated that they are "increasingly reported." Due to a lack of research in upper Galveston Bay, the Galveston Bay Dolphin Research Program (GDRP) initiated a year-round, boat-based dolphin monitoring program in 2014 and has documented over 1,000 individual dolphins within Galveston Bay, including approximately 200 individuals exhibiting long-term residency in upper Galveston Bay (Mintzer et al., 2022). The results of the proposed project may be considered as baseline data to inform decisions on future Natural Resource Damage Assessment resource allocation to Galveston Bay to restore or sustain the native resident dolphin

population. These contaminant data along with long-term monitoring data on dolphins are important to the successful management of this native apex species within Galveston Bay.

Priority 3: Engage Communities

SPO-1 Stewardship Programs and Volunteer Opportunities: The GDRP continuously involves volunteer citizen scientists on their long-term, boat-based monitoring surveys through their Field Assistant Volunteer Program. These volunteers help collect data about Galveston Bay dolphins that have been and will continue to be used to decide which dolphins are targeted for biopsy sampling efforts. Moreover, these data inform potential biological factors, such as residency, that can be evaluated for potential relationship with mercury level. To date, the GDRP has trained 106 volunteer citizen scientists, including 26 new volunteers in 2025 alone.

SPO-2 Workshops and Events: The results from the proposed project will be presented at a future State of the Bay symposium. Additionally, the results can be integrated into workshops and events, providing opportunities for the public to receive education on the bottlenose dolphins that inhabit Galveston Bay.

SPO-3 Support Regional Initiatives: The proposed project would help to address the lack of data on Galveston Bay bottlenose dolphins in the Galveston Bay Plan. Including charismatic dolphins in existing and future regional initiatives would be a great way to connect people with the Bay.

SPO-4 Local Government Outreach: Bottlenose dolphins are federally managed under the Marine Mammal Protection Act, and a National Marine Fisheries Scientific Permit is necessary to conduct this work. The on-going long-term monitoring of dolphins in Galveston Bay is reported at a federal level, but nothing is reported to the state. The proposed project would begin to close the gap between government entities and inform local governments on threats to the health of this important species residing in local waters. The expected results of the proposed project can help inform contaminant levels and effects on state resources like finfish by expanding our understanding of contaminant transfer through the food web.

PEA-1 Key Issue Engagement: The proposed project will continue to develop, support, and promote public awareness along with education/outreach and continue a dialogue with the public about key issues affecting Galveston Bay and what can be done to mitigate those issues. The GDRP will integrate data analyzed from the proposed project into public outreach/booth events, the GDRP's quarterly newsletter - The Bow Rider, and social media to spread awareness about the issues affecting dolphins and Galveston Bay. Key outreach materials are being translated into Spanish for increased accessibility (e.g., both English and Spanish versions of "Dolphin Safe Boating Tips" are available on the GDRP website).

PEA-2 Adult Education: The proposed project will continue to support and promote public education activities that aim to change behaviors and attitudes of community members in and around Galveston Bay by using dolphins as a flagship species. The GDRP has trained 106 volunteer citizen scientists to date, including 26 new volunteers in 2025 alone. Volunteer workshops are held to train citizen scientists about our research and their responsibilities for assisting with boat-based dolphin surveys and land-based research conducted at Seawolf Park in Galveston. Volunteers also receive training in outreach engagement and conservation messaging to help host GDRP outreach/booth events. Training workshops will continue to be held in accordance with program needs.

PEA-3 K-12 Education Efforts: The GDRP continues to support grades K-12 with Texas Essential Knowledge and Skills aligned dolphin-based lessons by allowing teachers to check out "The Pod" for use in their classrooms. The curriculum focuses on dolphin biology and conservation, including lessons on the species' role in food webs and as indicators of ecosystem health. Moreover, Galveston Bay Foundation's Education team offers 45-minute classroom dolphin workshops that also highlight GDRP research and the importance of dolphins. The Pod and workshop curricula can be updated to include sections about the threats of contaminants on humans and marine life from the proposed project.

Priority 4: Inform Science-based Decision Making

RES-2 Conduct Geochemical Stressor Monitoring and Research: The proposed project will investigate biomagnification of the legacy toxin, mercury, in bottlenose dolphins in Galveston Bay.

Mercury is a legacy contaminant currently responsible for human consumption seafood advisories in all Texas coastal waters. The life history of dolphins makes them an ideal species to act as sentinels of human and ecosystem health. Many dolphins are residents in estuaries, live long lives, and feed at a high trophic level on the same local prey sources as humans. These similarities make dolphins ideal bioindicators for the effects of xenobiotic contamination on estuarine ecosystems and human health.

RES-5 Conduct Monitoring and Research to Address Limits to Seafood Consumption: The proposed project will investigate concentrations of mercury in bottlenose dolphins in Galveston Bay, primarily resident dolphins of upper Galveston Bay and those who frequent the Houston Ship Channel, where mercury levels are of highest concern (see Harmon et al., 2003). These data may be used indirectly to discuss and inform seafood consumption research and outreach as dolphins are ideal bioindicators for comparing contaminant concentrations in tissues and their resulting effects on health.

ACS-1 Tracking Ecosystem Health Indicators: There is currently a lack of data on bottlenose dolphins in the Galveston Bay Plan. Project partners will disseminate data, status, and trends of routine monitoring of Galveston Bay bottlenose dolphins and their stressors related to the health and sustainability of the Bay.

ACS-2 Access to Monitoring and Research Data: The results of the proposed project will be integrated into easy-to-access resources and dissemination efforts for a wide range of audiences.

Please see: Appendix 3 – Literature Cited

SECTION FOUR: SUBCOMMITTEE PRIORITIES / FACTORS TO BE USED TO SELECT AWARDS [see 30 TAC § 14.7(6)]

Grant recipient activities must implement the Plan. Additional recipient selection criteria includes whether a project addresses a subcommittee priority. This selection criteria provides for the selection of multiple recipients as needed.

Subcommittee Identified Priorities

Grant recipient activities must implement the Plan. Additional recipient selection criteria includes whether a project addresses a subcommittee priority.

☐ WSQ: Supporting management measures and watershed-based plans.
☐ WSQ: Implementation and/or evaluation of best management practices that address point and nonpoint source pollution.
☐ WSQ: Public health risk awareness outreach campaigns related to contact recreation and/or seafood consumption.
☐ NRU: Habitat acquisition.
☐ NRU: Enhancement of existing or ongoing restoration/conservation efforts with special emphasis on:
  ☐ Adaptive management for previously completed projects;
  ☐ Projects that have lost funding from other federal sources; and
  ☐ Nonnative species management.
☐ NRU: Benefit to native fish and wildlife, including federal and state listed species, Species of Greatest Conservation Need, or nongame wildlife.
☐ NRU: Brings funding, work leverage, or multiple Priority Area/Subcommittee benefits to the program.
☐ NRU: Project urgency: Project must be completed in next 24 months or opportunity is lost
☐ PPE: Empowers K-12 students and/or adults to positively impact their local environment through increased scientific literacy and community projects.
☐ PPE: Connects new audiences to existing/completed projects or the natural habitat.
☐ PPE: Opportunities for GBEP and partners to host workshops/networking for education and outreach practitioners on key topics.
☐ PPE: Conservation and environmental workforce development.
☒ M&R: Meaningful and effective monitoring of existing, past, and new projects (NRU: especially species of concern, WSQ, PPE).
☐ M&R: Baseline assessments for large-scale, man-made changes to Galveston Bay.

☒ M&R: Assessment, Exposure, and Response to stressors, including but not limited to:
- ☐ Species of Greatest Conservation Need;
- ☐ Contact recreation standards;
- ☒ Environmental parameters;
- ☐ Emerging contaminants; and
- ☒ Legacy contaminants.

☐ Investigate ecosystem services and economic valuation of bay resources.

Subcommittee Priority Detail:

[Please explain in detail how project addresses priorities selected. Attachments may be submitted via email in conjunction with this application.]

Meaningful and effective monitoring of existing, past, and new projects: The proposed project will provide meaningful and effective monitoring of existing and new projects resulting in legacy contaminant concentrations in bottlenose dolphins that reside in Galveston Bay. The Galveston Bay Dolphin Research Program (GDRP), a collaboration between the Galveston Bay Foundation and the Environmental Institute of Houston at the University of Houston-Clear Lake, has been conducting photo identification (photo-ID) monitoring of dolphins in upper Galveston Bay since 2014. These baseline monitoring data are critical to inform targeted tissue sampling of long-term resident dolphins for the project and provide details on the areas of the Bay where they have been observed over the previous 10 years (e.g., individual dolphins that spend a large portion of their lives in areas of the Bay with known or suspected high contaminant levels can be targeted). The proposed project will investigate mercury in tissues of these well-studied bottlenose dolphins. By combining information about dolphin distribution, residency, and movements (from past photo-ID efforts) with new information on tissue contamination levels, we can develop a more meaningful understanding of how dolphins use habitats across Galveston Bay, which dolphins may be most vulnerable to contaminants (i.e., explore differences in site fidelity and age class groups), and where restoration/conservation efforts may provide the most benefits to dolphins and other local natural resources.

Assessment, exposure, and response to stressors, including environmental parameters and legacy contaminants: The proposed project will evaluate exposure of a legacy contaminant to bottlenose dolphins in Galveston Bay. Bottlenose dolphins are a protected species under the Marine Mammal Protection Act, and dolphins in Galveston Bay are particularly at-risk due to a unique combination of petroleum/chemical industry, freshwater exposure, shipping traffic, entanglements from fishing gear, and proposed large-scale infrastructure projects. The mercury samples will be analyzed and a baseline evaluation of the concentration of mercury in dolphins in Galveston Bay will be summarized in the final report for this proposed project. Our proposed project is specifically designed to provide state and federal natural resource managers with the best-available science about how exposure to a legacy contaminant contributes to the multiple stressors impacting Galveston Bay dolphins, so that they can design and monitor effective conservation projects for the dolphins and their ecosystem.

Does the Project align with any EPA Areas of Special Interest?

☐ Reduce Nutrient Pollution to Protect Water Quality and Public Health
☐ Make Investments that Address Coastal Resiliency
☐ Reduce Trash

[If yes, please summarize how the proposal addresses EPA Areas of Special Interest.]

n/a

SECTION FIVE: PROPOSAL DETAILS

Grant recipient activities must implement the Plan. Additional recipient selection criteria includes whether a project addresses a subcommittee priority.

Project Summary:

The goal of this study is to assess mercury concentrations in Galveston Bay bottlenose dolphins, an estuarine sentinel species. The expected results of elevated concentrations of mercury compared to other dolphin populations, could result in a focus of resources to Galveston Bay to further investigate legacy contaminants, and will better inform restoration and conservation projects that benefit dolphin and human health in the Galveston Bay ecosystem.

Full Project Description (1,000 words or less):

The life history of bottlenose dolphins (*Tursiops truncatus;* hereafter, "dolphins") in estuarine waters makes them an ideal sentinel species of human and ecosystem health. Dolphins live long lives, feed at a high trophic level, and many spend most of their lives within bays and estuaries. Dolphins consume the same local finfish as humans (e.g., flounder, trout). These similarities make dolphins ideal bioindicators for the effects of xenobiotic contamination on estuarine ecosystems and human health (Fair and Becker, 2000; Ross, 2000; Irwin, 2005). Bioaccumulation of contaminants in dolphin tissue can provide key information on localized sources of aquatic pollution (Wells et al., 2004; Kucklick et al., 2011). In fact, dolphins can reflect some of the highest bioaccumulation levels recorded in wildlife (Wells et al., 2004).

A variety of factors influence dolphin abundance and distribution, including temperature, salinity, prey distribution, and anthropogenic disturbance (Shane, 1980; Hastie et al., 2004; Moreno, 2005; Mazzoil et al., 2008; Huther, 2010; Fazioli and Mintzer, 2020; Mintzer and Fazioli, 2021). In Galveston Bay, dolphins are regularly observed throughout open bay, nearshore, and channel habitats (GDRP, 2025), including the Houston Ship Channel, known for having high concentrations of pollutants (Harmon et al., 2003; Howell et al., 2008). Dolphins are protected under the Marine Mammal Protection Act, and Galveston Bay dolphins are designated as a Bay, Sound, and Estuary stock (NOAA Fisheries, 2021, 2022). Currently, there are insufficient data to determine population trends, but NOAA Fisheries has concern for the stock due to current and future stressors, including large-scale infrastructure projects, freshwater impacts, fishery interactions, and industrial toxins (Phillips and Rosel, 2014).

Mercury is a legacy contaminant currently responsible for human consumption seafood advisories throughout Texas coastal waters. In humans, mercury toxicity can affect the cardiovascular, reproductive, excretory, and central nervous systems (Zahir et al., 2005; Kershaw and Hall, 2019). Similarly, in dolphins, high mercury concentrations have been correlated with negative effects to the hepatic, renal, and endocrine systems (Schaefer et al., 2011). Previous studies have shown elevated mercury in both local dolphins and humans, compared to control sites, supporting the use of dolphins as sentinels for human health when evaluating mercury exposure (Schaefer et al., 2014).

<u>The primary objective of this study is to use dolphin skin tissue to quantify baseline mercury concentrations in live, free-ranging dolphins in Galveston Bay and compare levels to other estuarine dolphin populations. Moreover, we will investigate potential relationships between mercury concentrations in Galveston Bay dolphins and biological factors such as sex, age, and site fidelity (i.e. residency).</u>

The GDRP has 48 skin biopsy samples from live, free-ranging dolphins that were collected between 2015 and 2018 throughout Galveston Bay (Figure 1). Moreover, as part of a multi-collaborative project funded by the NOAA RESTORE Science Program, the GDRP will collect additional tissue samples in August-September 2025. Although these samples are being collected with the primary purpose of evaluating PCBs and dioxins for the RESTORE project, we have the unique opportunity to leverage this work and set aside subsamples of skin tissue for mercury analyses. We are requesting funds from GBEP to analyze the 48 archived samples, as well as new skin samples collected in summer 2025 (likely 15-30). Skin samples from individual dolphins

have a significant positive correlation with mercury recorded in internal organs, such as the liver, and are therefore considered a good proxy for overall mercury exposure in dolphins (Griffin et al., 2024).

Mercury analysis will take place at the Kaiser Lab at Texas A&M Galveston. The requested funds would support an undergraduate student to develop a senior thesis focused on reporting these baseline levels of mercury, as well as evaluating possible relationships between mercury and biological factors. The student, with support from Dr. Karl Kaiser and graduate student Bryan Gahn, will utilize a Milestone DMA-80 direct mercury analyzer to measure total Hg in these samples. The utilized method is compliant with US EPA Method 7473 and will yield total Hg concentration normalized to tissue weight. Accuracy and precision will be verified using certified reference materials and with replicate analyses. We will likely apply an ANOVA to explore the relationship between mercury level and biological factors, and a Tukey's honest significant test to explore significant differences between specific factors.

High mercury exposure in estuarine dolphins can result from methylation rates, anthropogenic activity, low freshwater input, low tidal flushing, and other biological or geochemical processes (Griffin et al., 2024). We expect that mercury levels will be higher in Galveston Bay dolphins compared to those recorded in dolphin populations residing in estuaries without legacy mercury contamination. Additionally, upper Galveston Bay is known to have higher mercury levels (Harmon et al., 2003), so we predict upper Bay resident dolphins will have higher mercury levels than dolphins who spend less time in upper Bay.

Our proposed study is unique in that we have skin samples from live, free-ranging dolphins, compared to other studies that use stranded/deceased dolphin tissue. Samples collected from live dolphins through remote biopsy are not as prone to tissue degradation and sample contamination as those collected from stranded animals (Das et al., 2003; O'Hara et al., 2003). The GDRP has 10-years of life history data for many of the sampled dolphins, providing a unique opportunity to evaluate mercury within the context of biological factors, including sex, age, and habitat preference within Galveston Bay. These data will enable us to more accurately use them as bioindicators for Galveston Bay.

Our samples enable us to compare mercury across time within the same areas of the Bay and, in a few cases, within the same individuals. Importantly, we have samples from before and after Hurricane Harvey, during which high concentrations of mercury in sediments of the Houston Ship Channel were redistributed and deposited into upper Bay (Dellapenna et al., 2020). Our 2025 sampling efforts will target residents in this upper Bay region. This grant award would allow us to move forward with these relatively inexpensive and straightforward analyses that could provide valuable information about mercury pollution in Galveston Bay.

Please see: Appendix 3 – Literature Cited

Word Count: 999/1000

Other Plans Implemented:

Marine Mammal Commission Strategic Plan: The proposed project addresses the priority topics "Improve Population Assessment and Health Surveillance", "Assess and Address Anthropogenic Threats Facing Marine Mammals", and "Engage with Marine Mammal Protection Act Stakeholders"

Programmatic Environmental Impact Statement for the Marine Mammal Health and Stranding Response Program: The proposed project addresses the Biomonitoring and Research – Sample Analysis.

Does the Project work with new, smaller communities/partnerships?

☒ Yes

☐ No

Yes, this project includes a new collaboration between the Galveston Bay Foundation/Galveston Bay Dolphin Research Program and the Kaiser Lab at Texas A&M University at Galveston.

Is the project subject to Title VI requirements?
To meet federal nondiscrimination guidance and laws (Title VI), TCEQ requires information and services to be provided in languages other than English when significant numbers of beneficiaries are of limited English-speaking ability (LEP). If 5% or more of the population within your project area is LEP and share a common language, then you are required to provide outreach in the alternative language. For statewide projects, Spanish language outreach is required. As Title VI compliance could impact the project budget, please reach out to the primary subcommittee coordinator for this application with questions on determining applicability and EJScreen instructions.

☐ Yes
☒ No

[TBD.]

Latitude/Longitude (Optional):

N/A

Location:

Biopsy samples have been and will continue to be collected from dolphins within Galveston Bay, particularly the upper Bay region (Figure 1)

Partners[1] **and Their Roles**:

Galveston Bay Foundation will be the lead organization responsible for project management/coordination and the dissemination/publication of results.

Texas A&M University at Galveston will conduct the laboratory mercury analyses and participate in dissemination/publication of study results.*

Environmental Institute of Houston at the University of Houston-Clear Lake was involved in collection and curation of existing samples (collected 2015-2018), collecting and cataloging sighting and demographic data for Galveston Bay dolphins (since 2014), and will assist in collecting new samples (Summer 2025) through our existing NOAA RESTORE funding. Staff will participate in dissemination/publication of results.

National Marine Mammal Foundation will assist in collecting new samples (Summer 2025) through our existing NOAA RESTORE funding.

*Please see: Appendix 2 – Letter of Commitment TAMUG

[1] If partners are subgrantees completing work reimbursable under GBEP funding, a letter of commitment from the partner must be submitted as an appendix with the application.

Projects Map

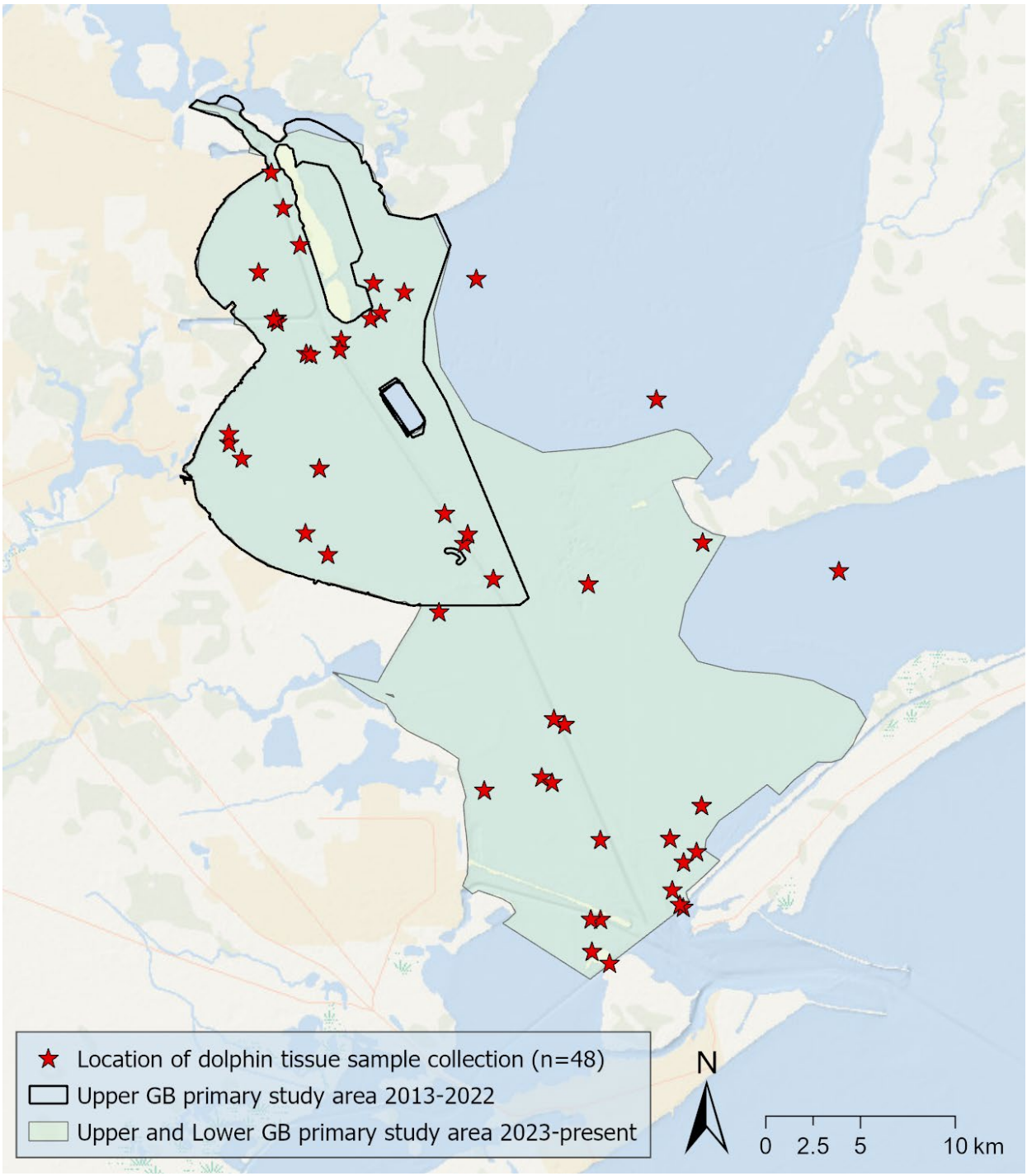


Figure 1. Map showing the locations where the 48 samples of tissue were collected from live, free-ranging bottlenose dolphins in Galveston Bay between 2015-2018. New samples will be collected in August-September 2025 as part of an ongoing/partner project, primarily in the Upper GB primary study area.

Supplemental Photos/Graphics (Optional):

Figure 2: Tissue samples were collected remotely using a crossbow and modified dart with a biopsy sampling head. The samples are divided for various analyses including mercury (this proposal).

SECTION SIX: BUDGET DETAILS

Grant Payments [see 30 TAC § 14.7(12)]: All grant payments will be made on the basis of reimbursement for allowable costs (as defined in 2 CFR Part 200, Subpart E). All payments for awarded proposals will be reimbursements of allowable costs incurred after both parties have entered (signed) a grant agreement for the project.

Budget. Authorized budgeted expenditures for work performed are as follows:

a. Direct Costs

Budget Category	Cost for Work to be Performed
Salary / Wages	$21,050.00
Fringe Benefits (7-19%; see Appendix 1 - Fringe Benefits Explanation)[2]	$2,200.00
Travel	$2,400.00
Supplies	$0.00
Equipment	$0.00
Contractual	$25,500.00
Construction	$0.00
Other	$1,000.00
Total Direct Cost	$52,150.00

b. Indirect Costs[3]

Distribution Base Amount *(identify Base type below)*	$ 52,150.00
Indirect Cost Rate for Reimbursement	15%
Total Indirect Costs	$ 7,822.50

c. Maximum Authorized Reimbursement

Maximum Authorized Reimbursement (Direct and Indirect Costs)	$ 59,972.50

Indirect Cost Distribution Base. The Distribution Base above is (check one):

☐ direct salary/wages and fringe benefits

☒ modified total direct costs

☐ Other direct costs base

If other direct cost base, identify:

The indirect cost rate is (check one):

[2] If fringe is not a single rate, please attach calculation or explanation as an appendix.
[3] Please attach Indirect Cost Agreement as an appendix if applicable

☐ **Predetermined Rate**— an indirect rate that is negotiated between the Performing Party and its federal cognizant agency and supported by a current Negotiated Indirect Cost Rate Agreement (NICRA) letter. A Predetermined Rate is not subject to adjustment except as provided by 2 Code of Federal Regulations (CFR) § 200.411.

☒ **De Minimis Rate**— if Performing Party does not have a current negotiated indirect rate, Performing Party may use a standard rate of fifteen percent of Modified Total Direct Costs (MTDC)[4] in lieu of determining the actual indirect costs of the service. Costs must be consistently charged as either indirect or direct costs.

☐ **Partial Reimbursement Rate**— a reimbursement rate agreed to between TCEQ and Performing Party that is less than the rate authorized under TxGMS or, where applicable, 2 CFR Part 200. Performing Party contributes all of its unreimbursed indirect costs to the successful performance of the project or projects funded under this Contract, in accordance with Article 9 of this section. [If this is a Partial Provisional Rate, include the following language: "This is a Partial Provisional Rate. Any adjustment is subject to the requirements of Article 9 of this section; however, no adjustment will be made unless the finally determined actual indirect costs are lower than the Partial Indirect Cost reimbursement made under the Contract."]

☐ **Other:** [Examples: De Minimis Rate with a base of direct salary and wages (less than or equal to actual indirect costs) or Provisional Rate. If this is a Provisional Rate, include the following language: Provisional Rate: The subsequent adjustment of the indirect cost rate is subject to the requirements of Article 9 of this section.]

Other. If Budget Category "Other" is greater than $25,000 or more than 10% of total Contract budget, identify the main constituents:

NA

SECTION SEVEN: CONTRACT REQUIREMENT [see 30 TAC § 14.7(15)]:

- By submitting this Project Proposal, you acknowledge that, if you become a successful grant recipient selected for a grant award, you must enter into a signed grant agreement or contract with TCEQ following the announcement of that award.

SECTION EIGHT: ACKNOWLEDGMENTS

Please read and understand the following:

- By submitting this Project Proposal, you acknowledge that information on how grant payments will be made is contained in the Budget Details section describing direct and possibly indirect costs. You further acknowledge that grant payments will be reimbursements on the basis of allowable costs incurred and that selected recipients will receive contract documents addressing allowable costs, unallowable costs, and reimbursement.
- By submitting this Project Proposal, you acknowledge your understanding that Project Proposals do not require matching funds and that a TCEQ director does not need to adjust or waive any matching funds requirement.
- By submitting this Project Proposal, you acknowledge that, if GBEP elects to hold a pre-submittal meeting relating to this Project Proposal, GBEP will notify you of the meeting's time and location indicating whether attendance is mandatory.

SECTION NINE: QUESTIONS AND PRE-SUBMITTAL MEETINGS [see 30 TAC § 14.7(13) and 30 TAC § 14.7(14)]:

- There are no pre-submittal meetings scheduled.
- For requests for additional, pre-submittal information **[see 30 TAC § 14.7(13)]**, please contact the corresponding Subcommittee Coordinator listed on this page.

[4] https://www.ecfr.gov/current/title-2/part-200/section-200.1#p-200.1(Modified%20Total%20Direct%20Cost%20(MTDC))

SECTION TEN: ADDITIONAL INSTRUCTIONS

In submitting your Project Proposal, please refer and adhere to the following instructions and guidelines concerning materials and information required to be submitted by potential grant recipients:

- GBEP intends to accept only complete Projected Proposals in a layout and format constituting a filled version of this proposal document with all applicable sections therein addressed; however, GBEP may, in its sole discretion, consider and accept nonconforming Project Proposals in the best interest of the state.
- Unless otherwise specified by GBEP, formal signatures are not required on Project Proposals.
- Unless otherwise communicated or implied, GBEP requires 1 (one) completed copy of your Project Proposal per corresponding Subcommittee Coordinator.
- Project Proposals must be received electronically, through the email address of the relevant Subcommittee Coordinator listed on this page, by the deadline listed on both this page and the first page of this Project Proposal document.

Submittal Process and Deadline [see 30 TAC § 14.7(8) and 30 TAC § 14.7(9)]:
Please Submit Project Proposals (Microsoft Word Only – No PDFs) by July 25, 2025 to the relevant Subcommittee Coordinators below:

WSQ Subcommittee
Christian.Rines@tceq.texas.gov

NRU Subcommittee
Lindsey.Lippert@tceq.texas.gov

PPE Subcommittee
Zoe.Gapayao@tceq.texas.gov

M&R Subcommittee
Jenelle.Estrada@tceq.texas.gov

Programmatic Projects
Lisa.Marshall@tceq.texas.gov

Galveston Bay Estuary Program
Fiscal 2027 Project Proposal

Please complete this proposal form and submit to the appropriate Subcommittee Coordinator (end of form) by July 25, 2025. No late submittals will be considered for funding.

This Call for Project Proposals complies with 30 Texas Administrative Code (TAC) § 14.7, which lays out requirements for a competitive solicitation by TCEQ for grant awards. For convenience, specific citations to 30 TAC § 14.7 are identified in the text.

SECTION ONE: INTRODUCTION

Purpose [required by 30 TAC § 14.7(1)]: The purpose of the proposed grant from the Galveston Bay Estuary Program (GBEP), a program of the Texas Commission on Environmental Quality (TCEQ), is to implement *The Galveston Bay Plan, 2nd Edition* (the Plan), a comprehensive conservation and management plan falling under Section 320, of the Federal Water Pollution Control Act (33 U.S.C. Section 1330), for a designated national estuary in the State of Texas.

Objective and Allowable Activities [see 30 TAC § 14.7(4)]: The objective of this grant is to implement the GBEP stakeholder developed priorities for fiscal 2027 (FY 2027) Priority Area Actions that were developed by GBEP subcommittees for FY 2027 at the June 2025 meetings. Any proposal implementing the Plan may be submitted, but proposals implementing the FY 2027 Priority Area Actions will be considered above others.

Authority [see 30 TAC § 14.7(2)]: Grants issued by GBEP under this solicitation are authorized by: the Federal Water Pollution Control Act (Clean Water Act) § 320 (33 UNITED STATES CODE § 1330), commonly referred to as the National Estuary Program; TEX. WATER CODE § 5.124; and 30 TAC ch. 14.

Match Requirement [see 30 TAC § 14.7(10) and 30 TAC § 14.7(11)]: No matching funds are required. Therefore, there is no need to adjust or waive any matching funds requirement.

Multiple Awards [see 30 TAC § 14.7(7)]: GBEP anticipates awarding funds for multiple proposals. GBEP intends to award grants to that combination of proposals which best implements the Plan, factoring in all criteria identified in this Call for Project Proposals, the availability of funds, and the most effective division of funds between awards.

Timeline of Proposals:

Task	Date Due
Release of Request for Proposals	June 23, 2025
Proposals Due	July 25, 2025
Send Proposals to Subcommittees Members for Review	August 13, 2025
Present Proposals to Subcommittees for Council Recommendation	September 3, 2025 (NRU and PPE) September 10, 2025 (M&R and WSQ)
Present Proposals to B&P Subcommittee for Final Recommendation	October 1, 2025
Present Proposals to Galveston Bay Council for Approval	October 15, 2025

SECTION TWO: SUBMITTAL – GENERAL INFORMATION

Primary Subcommittee: Monitoring and Research (M&R)
Secondary Subcommittee (if applicable): Natural Resource Uses (NRU)

Project Name:

Evaluating Economic and Ecosystems services of Galveston Bay Estuarine Wetlands

Project Previously Funded by GBEP? Yes ☐ No ☒

Lead Implementer / Categories of Eligible Recipients [see 30 TAC § 14.7(3)]:

Geotechnology Research Institute (GTRI)/Houston Advanced Research Center (HARC)

The lead implementer must be in one of the following categories of eligible recipients. Please indicate which category applies to your entity. If the proposing party is not already paired with a lead implementer in one of the categories listed below, the proposing party will need to partner with an eligible recipient in one of these categories to be selected for funding. Please reach out to GBEP staff with any questions.

☐ Federal, State, or Local Government ☐ Council of Government ☐ Public ISDs or Universities
☒ Nonprofit ☐ Other*

Unique Entity ID (UEI) Number:	MLKKJ9MNDN6
Vendor Identification Number (VIN) or Tax ID:	17600383156

Contact Information:

Project Representative Name	Dr. Erin Kinney
Project Representative Phone	281-364-6040
Project Representative Email	ekinney@harcresearch.org

Amount Requested from GBEP:

$222,849

Federal ☐ State ☐ No Preference ☒
Is the project scalable? ☒

Amount Requested per year (if applicable):

FY 2027 (09/01/2026-05/31/2027)	$118,162
FY 2028 (09/01/2027-05/31/2028)	$102,948
FY 2029 (09/01/2028-05/31/2029)	$0.00
Total	$0.00

Project Dates / Duration (beginning no earlier than September 1, 2026 – ending no later than May 31, 2029) [see 30 TAC § 14.7(5)]:

September 1, 2026 – August 31, 2028

Total Project Cost (including Leveraging Amounts, if any; provide leveraging information where indicated below):

$232,849

Is this an estimate? ☐

Leveraging (in-kind and/or cash):

Data for Harris and Galveston counties needed for the model is being provided as in-kind by TAMU ($10,000) as TAMUG, which already has the data.

Project Urgency:

Wetlands available for conservation are more valuable than ever, given their scarcity and the demand for coastal development, relative sea level rise, and the need for protection from storms. Providing information on the economic value of estuarine wetlands will give partners stronger arguments and references in future grant proposals for restoration.

This project could begin as early as 9/1/2025.

SECTION THREE: *GALVESTON BAY PLAN, 2ND EDITION* IMPLEMENTATION

Grant recipient activities to be funded must implement the Plan, but proposals implementing the Fiscal 2027 Subcommittee Priorities (Section Four) will be considered above others. This selection criteria provides for the selection of multiple recipients as needed.

The *Galveston Bay Plan, 2nd Edition* Action Plans are found at:
https://gbep.texas.gov/ensure-safe-human-and-aquatic-life-use/
https://gbep.texas.gov/protect-and-sustain-living-resources/
https://gbep.texas.gov/engage-communities/
https://gbep.texas.gov/inform-science-based-decision-making/

Galveston Bay Plan Priority Area Actions Addressed:

Plan Priority 1: Ensure Safe Human and Aquatic Life Use

NPS-1 ☐ NPS-2 ☐ NPS-3 ☐ NPS-4 ☐
PS-1 ☐ PS-2 ☐ PS-3 ☐
PHA-1 ☐ PHA-2 ☐ PHA-3 ☐ PHA-4 ☐ PHA-5 ☐

Plan Priority 2: Protect and Sustain Living Resources

HC-1 ☐ HC-2 ☒ HC-3 ☒
SC-1 ☒ SC-2 ☐
FWI-1 ☐ FWI-2 ☐ FWI-3 ☐

Plan Priority 3: Engage Communities

SPO-1 ☐ SPO-2 ☒ SPO-3 ☒ SPO-4 ☒
PEA-1 ☐ PEA-2 ☐ PEA-3 ☐

Plan Priority 4: Inform Science-based Decision Making

RES-1 ☐ RES-2 ☐ RES-3 ☐ RES-4 ☒
RES-5 ☐ RES-6 ☐ RES-7 ☒ RES-8 ☒
ACS-1 ☐ ACS-2 ☒ ACS-3 ☐

Plan Priority Area Actions Detail:

Priority 2: HC-2, HC-3, SC-1

This project will support HC-2 Habitat Restoration and HC-3 Habitat Enhancement by providing quantifiable ecosystems services associated with wetland habitat restoration and enhancement.

: By identifying economic value and ecosystem services of estuarine wetlands, this project promotes the conservation of critical habitat for a multitude of aquatic and terrestrial species (SC-1 Native Species Management).

Priority 3: SPO-2, SPO-3, SPO-4

The project will include a workshop (SPO-2) aimed at reaching new communities (SPO-3) and local governments (SPO-4) to deliver key findings of the economic and ecosystem services models and to teach them how to use the dashboard and the wetland valuation data.

Priority 4: RES-7, RES-8, ACS-2

This project will conduct Research on Ecosystem Service and Economic Valuation of Bay Resources (RES-7) and Complete Coastal Resiliency and Acclimation Studies (RES-8): We will deliver a model that provides estimates on ecosystem service and economic value of estuarine wetlands in the Galveston Bay system, including resilience to flooding.

This project will also support ACS-2: Provide Access to Monitoring and Research Data : We will provide a permanent online data source via ArcGIS online dashboards to act as a reference for stakeholders.

SECTION FOUR: SUBCOMMITTEE PRIORITIES / FACTORS TO BE USED TO SELECT AWARDS [see 30 TAC § 14.7(6)]

Grant recipient activities must implement the Plan. Additional recipient selection criteria includes whether a project addresses a subcommittee priority. This selection criteria provides for the selection of multiple recipients as needed.

Subcommittee Identified Priorities

Grant recipient activities must implement the Plan. Additional recipient selection criteria includes whether a project addresses a subcommittee priority.

☐ WSQ: Supporting management measures and watershed-based plans.
☐ WSQ: Implementation and/or evaluation of best management practices that address point and nonpoint source pollution.
☐ WSQ: Public health risk awareness outreach campaigns related to contact recreation and/or seafood consumption.
☐ NRU: Habitat acquisition.
☒ NRU: Enhancement of existing or ongoing restoration/conservation efforts with special emphasis on:
  ☐ Adaptive management for previously completed projects;
  ☐ Projects that have lost funding from other federal sources; and
  ☐ Nonnative species management.
☒ NRU: Benefit to native fish and wildlife, including federal and state listed species, Species of Greatest Conservation Need, or nongame wildlife.
☒ NRU: Brings funding, work leverage, or multiple Priority Area/Subcommittee benefits to the program.
☐ NRU: Project urgency: Project must be completed in next 24 months or opportunity is lost
☐ PPE: Empowers K-12 students and/or adults to positively impact their local environment through increased scientific literacy and community projects.
☐ PPE: Connects new audiences to existing/completed projects or the natural habitat.
☒ PPE: Opportunities for GBEP and partners to host workshops/networking for education and outreach practitioners on key topics.
☐ PPE: Conservation and environmental workforce development.
☐ M&R: Meaningful and effective monitoring of existing, past, and new projects (NRU: especially species of concern, WSQ, PPE).
☐ M&R: Baseline assessments for large-scale, man-made changes to Galveston Bay.
☐ M&R: Assessment, Exposure, and Response to stressors, including but not limited to:
  ☐ Species of Greatest Conservation Need;
  ☐ Contact recreation standards;
  ☐ Environmental parameters;
  ☐ Emerging contaminants; and
  ☐ Legacy contaminants.
☒ Investigate ecosystem services and economic valuation of bay resources.

Subcommittee Priority Detail:

This project supports NRU, PPE, M&R priorities
NRU:
Enhancement of current or ongoing conservation/restoration efforts: This project can directly support the conservation assistance program, any and all wetland conservation and restoration projects, the NRU Habitat Viewer, and the regional monitoring database.
Wetlands are critical habitat for numerous fish, shellfish and bird species and we are encouraging future conservation of these areas by providing more information about the value of wetlands to neighboring communities.
The project leverages NRU, PPE and M&R priorities and previous projects.
PPE:

This project will include stakeholder outreach and workshops specifically targeted to community based organizations and local governments.

M&R:

The project will directly quantify ecosystems services of wetlands to surrounding communities and make the data and maps available to stakeholders through outreach and workshops. There is a distinct lack of information currently available on ecosystems services and economic value of wetlands directly and indirectly supported by GBEP projects.

Does the Project align with any EPA Areas of Special Interest?

☐ Reduce Nutrient Pollution to Protect Water Quality and Public Health

☒ Make Investments that Address Coastal Resiliency

☐ Reduce Trash

This project will support improved identification of priority areas for conservation and restoration projects that address coastal resiliency by providing support for communities that are seeking information and tools on the value of coastal habitats like wetlands in preventing damage from flooding and storm surge.

SECTION FIVE: PROPOSAL DETAILS

Grant recipient activities must implement the Plan. Additional recipient selection criteria includes whether a project addresses a subcommittee priority.

Project Summary:

To use data from the GBEP Habitat tool and additional identified wetland habitat to model economic and ecosystems services values of Galveston Bay estuarine wetlands. The results of this analysis would be available in a dashboard for conservation and restoration planning and prioritization.

Full Project Description (1,000 words or less):

Estuarine wetlands are a limited and valuable resource in Galveston Bay. Benefits provided by wetlands to the Galveston Bay ecosystem are numerous and essential to both natural and human systems. Land value is increasing, even as the Galveston Bay watershed is facing increasing threats from flooding, storms, and erosion. Research on wetland valuation has primarily focused on understanding the ecological and economic importance of these systems through their flood mitigation (Highfield et al. 2018; Highfield 2022)*, habitat productivity (Zu Ermgassen, 2021), and public willingness to pay for wetland preservation (Hindsley & Yoskowitz 2020). Despite substantial research on wetland valuation in Galveston Bay, a notable gap exists in quantifying their non-market values through the application of hedonic pricing models. This work would assist in assigning economic value to those wetlands. By providing access to these values to GBEP stakeholders, we hope to provide the means to increase restoration and conservation, giving communities a tool to help benefit-cost analysis (BCA) for conservation projects that support vital habitat restoration and also improve water quality and other ecosystem services.

The Galveston Bay Habitat Restoration Tracker is currently in development to make the restoration and conservation efforts of the GBEP available in a GIS dashboard to all GBEP stakeholders. Using a hedonic pricing model, this project will provide access to estimated economic value of many of those coastal habitats, specifically wetlands. We will evaluate all estuarine wetlands in Harris, Galveston, and Chambers Counties and provide users with an interactive dashboard to explore wetland ecosystem values and distribution. This dashboard will showcase the results of the study, providing estimates of value per acre of wetland polygons which can be used for BCA analysis. With a few clicks of a mouse, a user will be able to identify the ecosystems value of a wetland parcel with respect to ecosystem service provision including their value for flood mitigation and broader ecosystem services. We could also incorporate other useful environmental metrics (i.e. adjacent conservation land, environmental indicators, previous flood history), providing data that can be used in grant proposals and resilience planning and depending on stakeholder feedback received from the planned outreach/workshops.

The project team consists of HARC, Black Cat GIS, and Dr. Meri Davlasheridze from TAMUG. Black Cat GIS and HARC will acquire GIS datasets on wetlands and other habitats around Galveston Bay, including GBEP projects included in the Habitat Restoration Tracker project. They will also calculate additional spatial variable values for the model. TAMUG will use data on Harris, Galveston and Chambers Counties (Chambers data to be purchased) home sales to use in the hedonic pricing model. Among non-market valuation approaches, hedonic pricing models (Rosen, 1974) are particularly effective and robust for capturing amenity and non-use values. These models infer the value of environmental attributes, such as proximity to wetlands and other wetland characteristics (size, type, etc.), by examining their effects on housing prices.

In the hedonic model, the price of an individual property i at time t (P_{it}) is a function of the property's structural attributes (X_{it}), distance from the nearest wetlands (d_i), and the area of the wetlands (W_i), along with neighborhood level effects. The following equation relates these variables.

$$(1) ln\,(P_{it}) = \alpha X_{it} + \beta_1 W_i + \beta_2 d_i + \mu_{BG} + \mu_{cyr} + \lambda_t + e_{it}$$

X_{it} vector of property-level structural (e.g., age, lot size, living square footage, property characteristics), location, and amenity characteristics (proxied by distances to the nearest airport, highway, waterway, and the national priority list (NPL) site).
μ_{BG} control for time-invariant spatial heterogeneity across neighborhoods that affect property values.
μ_{cyr} captures unobserved city- or town-wide changes in property tax and/or other land-use regulation, conservation policies that affect all properties within a jurisdiction in the same year.
λ_t denotes year-by-month fixed effects.

The effects of wetland amenity will be measured by the two coefficients β_1, (coefficient associated with the wetland area/type) and β_2, (coefficient associated with the distant to the nearest wetland variable). The maintained hypothesis is that the closer the property is to the nearest wetland, if the wetland is perceived as an amenity, properties should sell at a higher price relative to properties located further away. Similarly, size of wetland should have a positive capitalization effect on local sales prices. We will also explore the interaction between the two variables to capture the dependency of wetland size on the proximity.

Sales prices and transaction records for all properties in Harris and Galveston Counties are available to TAMUG and funding is requested to purchase additional data for Chambers County and to update the existing dataset. The current dataset includes all residential housing transactions within the county from 2010-2022, including sale prices and transaction dates. Various spatial amenities including shorelines, wetlands (area and proximity), major highways and roads, ponds, airports, open parks, and recreational areas are available from the Harris-Galveston Area Council (HGAC)[5] and superfund sites will be sourced from the Environmental Protection Agency's Facility Registry Service. Employing ArcGIS software, we intend to calculate distances from each parcel to the closest amenities and disamenities. We will also use the 2020 Census block-group map to spatially link properties to their respective census block-groups.

Such analyses will enhance our understanding of how local markets perceive and value wetlands, and how these values shift in response to ecological change or adaptation policies. This phase will focus on those counties as they comprise the largest area of coastal communities vulnerable to storm surge and flooding. To optimize the dashboard's utility and implementation, HARC will conduct outreach to local governments, community based organizations, and other GBEP stakeholders, and lead a workshop on how to use the tool to support decision-making.

Wetland valuation and the accompanying dashboard viewer will enable GBEP and stakeholders to identify and prioritize wetlands that have the most potential for reduction of resilience risk. The data will be accessible through the Regional Monitoring Database Website and will support projects such as the GBEP Habitat Restoration Viewer, the Conservation Assistance Program, the State of the Bay, and any wetland restoration, conservation, or mitigation related projects.

**Citations provided upon request.*

[6] If partners are subgrantees completing work reimbursable under GBEP funding, a letter of commitment from the partner must be submitted as an appendix with the application.

Other Plans Implemented:

This work will support any and all wetland conservation and restoration work by providing quantifiable ecosystems services that can be used for BCA analysis and to provide empirical justification for funding. This includes the Texas coastal Management Program, which focuses on protecting, preserving and restoring wetlands, and the Texas Coastal Resiliency Master plan, which prioritizes wetland protection and enhancement as a key strategy for building coastal resilience. This work will also support watershed-based plans that seek to support restoration and/or conservation of estuarine wetlands.

Does the Project work with new, smaller communities/partnerships?

☐ Yes
☒ No

[TBD.]

Is the project subject to Title VI requirements?

To meet federal nondiscrimination guidance and laws (Title VI), TCEQ requires information and services to be provided in languages other than English when significant numbers of beneficiaries are of limited English-speaking ability (LEP). If 5% or more of the population within your project area is LEP and share a common language, then you are required to provide outreach in the alternative language. For statewide projects, Spanish language outreach is required. As Title VI compliance could impact the project budget, please reach out to the primary subcommittee coordinator for this application with questions on determining applicability and EJScreen instructions.

☐ Yes
☒ No

[TBD.]

Latitude/Longitude (Optional):

[degrees, minutes, and seconds format]

Location:

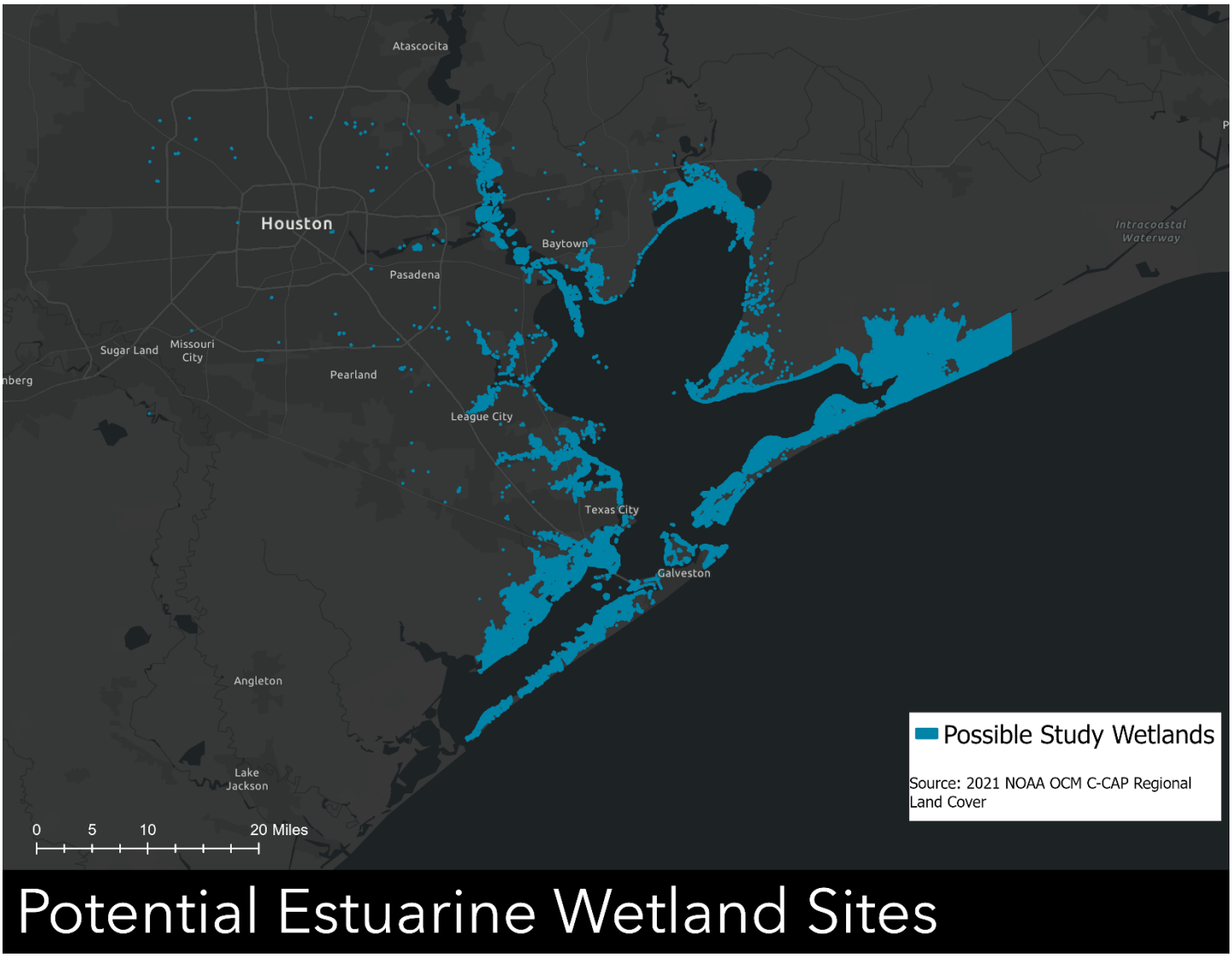
Galveston Bay estuarine wetlands in Harris, Galveston and Chambers County.

Partners[6] **and Their Roles**:

Black Cat GIS: building dashboard, calculating spatial variable values, gathering data based on stakeholder feedback
TAMUG: running ecosystem valuation model
HARC: project management, gathering data based on stakeholder feedback, community-based organization and local government outreach and workshop, hosting final product

[6] If partners are subgrantees completing work reimbursable under GBEP funding, a letter of commitment from the partner must be submitted as an appendix with the application.

Projects Map



Supplemental Photos/Graphics (Optional):

[Insert Here or Attach as an Appendix]

SECTION SIX: BUDGET DETAILS

Grant Payments [see 30 TAC § 14.7(12)]: All grant payments will be made on the basis of reimbursement for allowable costs (as defined in 2 CFR Part 200, Subpart E). All payments for awarded proposals will be reimbursements of allowable costs incurred after both parties have entered (signed) a grant agreement for the project.

Budget. Authorized budgeted expenditures for work performed are as follows:

b. Direct Costs

Budget Category	Cost for Work to be Performed
Salary / Wages	$27,902.00
Fringe Benefits **(48%)**[7]	$13,393.00
Travel	$164.00
Supplies	$0.00
Equipment	$0.00
Contractual	$103,651.00
Construction	$0.00
Other	$4,163.00
Total Direct Cost	$149,273.00

c. Indirect Costs[8]

Distribution Base Amount *(identify Base type below)*	$ 138,822
Indirect Cost Rate for Reimbursement	% 53
Total Indirect Costs	$ 73,576

d. Maximum Authorized Reimbursement

Maximum Authorized Reimbursement (Direct and Indirect Costs)	$ 222,849

Indirect Cost Distribution Base. The Distribution Base above is (check one):

☐ direct salary/wages and fringe benefits

☒ modified total direct costs

☐ Other direct costs base

If other direct cost base, identify:

The indirect cost rate is (check one):

☒ **Predetermined Rate**— an indirect rate that is negotiated between the Performing Party and its federal cognizant agency and supported by a current Negotiated Indirect Cost Rate Agreement (NICRA) letter. A

[7] If fringe is not a single rate, please attach calculation or explanation as an appendix.
[8] Please attach Indirect Cost Agreement as an appendix if applicable

Predetermined Rate is not subject to adjustment except as provided by 2 Code of Federal Regulations (CFR) § 200.411.

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☐ **Other:** [Examples: De Minimis Rate with a base of direct salary and wages (less than or equal to actual indirect costs) or Provisional Rate. If this is a Provisional Rate, include the following language: Provisional Rate: The subsequent adjustment of the indirect cost rate is subject to the requirements of Article 9 of this section.]

Other. If Budget Category "Other" is greater than $25,000 or more than 10% of total Contract budget, identify the main constituents:

[Description of costs associated with "Other" budget category.]

SECTION SEVEN: CONTRACT REQUIREMENT [see 30 TAC § 14.7(15)]:

- By submitting this Project Proposal, you acknowledge that, if you become a successful grant recipient selected for a grant award, you must enter into a signed grant agreement or contract with TCEQ following the announcement of that award.

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Please read and understand the following:

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- There are no pre-submittal meetings scheduled.
- For requests for additional, pre-submittal information **[see 30 TAC § 14.7(13)]**, please contact the corresponding Subcommittee Coordinator listed on this page.

SECTION TEN: ADDITIONAL INSTRUCTIONS

[9] https://www.ecfr.gov/current/title-2/part-200/section-200.1#p-200.1(Modified%20Total%20Direct%20Cost%20(MTDC))

In submitting your Project Proposal, please refer and adhere to the following instructions and guidelines concerning materials and information required to be submitted by potential grant recipients:

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WSQ Subcommittee
Christian.Rines@tceq.texas.gov

NRU Subcommittee
Lindsey.Lippert@tceq.texas.gov

PPE Subcommittee
Zoe.Gapayao@tceq.texas.gov

M&R Subcommittee
Jenelle.Estrada@tceq.texas.gov

Programmatic Projects
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MARINE and COASTAL ENVIRONMENTAL SCIENCE DEPARTMENT

Dr. Meri Davlasheridze
Associate Professor of Environmental and Resource Economics

TEXAS A&M UNIVERSITY
GALVESTON

Date: July 24, 2025
Erin Kinney, Ph.D.
Coastal Resilience and Communities
Houston Advanced Research Center (HARC)
8801 Gosling Road
The Woodlands, TX 77381

Dear Dr. Kinney,

If the proposal submitted by Dr. Kinney entitled "Evaluating Economic and Ecosystems services of Galveston Bay Estuarine Wetlands" is selected for funding by the Galveston Bay Estuarine Program, it is my intent to collaborate and/or commit resources including my time and existing dataset of property sales transactions for Harris and Galveston counties (estimated at approximately $10,000), and contribute the project towards evaluating the value of ecosystem services associated with coastal habitats including wetlands.

Estimating the value of coastal wetlands will be a valuable project for the Galveston Bay Estuarine Program because it provides critical data to support sustainable management, restoration, and policy decisions that protect vital ecosystem services and enhance resilience for Galveston Bay communities.

Sincerely,

Meri Davlasheridze, Ph.D.
Associate Professor
Texas A&M University at Galveston
Department of Marine and Coastal Environmental Science
200 Seawolf Pkwy
Galveston, TX 7755

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Black Cat GIS and Biological LLC

Amanda Hackney
Owner/ Consultant
3907 Spring Circle Dr E
Pearland, TX 77584
(936)554-9033
a.hackney@blackcatgis.com

7/22/2025

Dear Proposal Review Committee,

I am writing to express my support of the Houston Advanced Research Center (HARC) proposal entitled "Evaluating Economic and Ecosystems services of Galveston Bay Estuarine Wetlands" for the Galveston Bay Estuary Program Fiscal 2027 application. Black Cat has collaborated with HARC for several years on multiple GIS projects and we would be honored to work on this project should it be awarded funding. We agree to committing our resources and staff as outlined in HARC's proposal.

Sincerely,

Amanda Hackney

Owner, Black Cat GIS and Biological LLC
a.hackney@blackcatgis.com

Galveston Bay Estuary Program
Fiscal 2027 Project Proposal

Please complete this proposal form and submit to the appropriate Subcommittee Coordinator (end of form) by July 25, 2025. No late submittals will be considered for funding.

This Call for Project Proposals complies with 30 Texas Administrative Code (TAC) § 14.7, which lays out requirements for a competitive solicitation by TCEQ for grant awards. For convenience, specific citations to 30 TAC § 14.7 are identified in the text.

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SECTION ONE: INTRODUCTION

Purpose [required by 30 TAC § 14.7(1)]: The purpose of the proposed grant from the Galveston Bay Estuary Program (GBEP), a program of the Texas Commission on Environmental Quality (TCEQ), is to implement *The Galveston Bay Plan, 2nd Edition* (the Plan), a comprehensive conservation and management plan falling under Section 320, of the Federal Water Pollution Control Act (33 U.S.C. Section 1330), for a designated national estuary in the State of Texas.

Objective and Allowable Activities [see 30 TAC § 14.7(4)]: The objective of this grant is to implement the GBEP stakeholder developed priorities for fiscal 2027 (FY 2027) Priority Area Actions that were developed by GBEP subcommittees for FY 2027 at the June 2025 meetings. Any proposal implementing the Plan may be submitted, but proposals implementing the FY 2027 Priority Area Actions will be considered above others.

Authority [see 30 TAC § 14.7(2)]: Grants issued by GBEP under this solicitation are authorized by: the Federal Water Pollution Control Act (Clean Water Act) § 320 (33 UNITED STATES CODE § 1330), commonly referred to as the National Estuary Program; TEX. WATER CODE § 5.124; and 30 TAC ch. 14.

Match Requirement [see 30 TAC § 14.7(10) and 30 TAC § 14.7(11)]: No matching funds are required. Therefore, there is no need to adjust or waive any matching funds requirement.

Multiple Awards [see 30 TAC § 14.7(7)]: GBEP anticipates awarding funds for multiple proposals. GBEP intends to award grants to that combination of proposals which best implements the Plan, factoring in all criteria identified in this Call for Project Proposals, the availability of funds, and the most effective division of funds between awards.

Timeline of Proposals:

Task	Date Due
Release of Request for Proposals	June 23, 2025
Proposals Due	July 25, 2025
Send Proposals to Subcommittees Members for Review	August 13, 2025
Present Proposals to Subcommittees for Council Recommendation	September 3, 2025 (NRU and PPE) September 10, 2025 (M&R and WSQ)
Present Proposals to B&P Subcommittee for Final Recommendation	October 1, 2025
Present Proposals to Galveston Bay Council for Approval	October 15, 2025

SECTION TWO: SUBMITTAL – GENERAL INFORMATION

Primary Subcommittee: Water and Sediment Quality (WSQ)
Secondary Subcommittee (if applicable): Monitoring and Research (M&R)

Project Name:

Enumeration Methods Comparison and Evaluation of Nature-Based Stormwater Infrastructure to Reduce Microplastic Pollution in Galveston Bay

Project Previously Funded by GBEP? Yes ☒ No ☐

Lead Implementer / Categories of Eligible Recipients [see 30 TAC § 14.7(3)]:

Houston-Galveston Area Council

The lead implementer must be in one of the following categories of eligible recipients. Please indicate which category applies to your entity. If the proposing party is not already paired with a lead implementer in one of the categories listed below, the proposing party will need to partner with an eligible recipient in one of these categories to be selected for funding. Please reach out to GBEP staff with any questions.

☐ Federal, State, or Local Government ☒ Council of Government ☐ Public ISDs or Universities
☐ Nonprofit ☐ Other*

[If other, please identify pass-through partner.] N/A

Unique Entity ID (UEI) Number:	VZFJDZCKG8C7
Vendor Identification Number (VIN) or Tax ID:	17415575756

Contact Information:

Project Representative Name	Jenny W. Oakley
Project Representative Phone	713-499-6660
Project Representative Email	Jenny.Oakley@h-gac.com

Amount Requested from GBEP:

$ 249,851.66 (note: current funded project = federal funds)

Federal ☐ State ☐ No Preference ☒
Is the project scalable? ☒

Amount Requested per year (if applicable):

FY 2027 (09/01/2026-05/31/2027)	$155,484.34 (FY26)
FY 2028 (09/01/2027-05/31/2028)	$94,367.32 (FY27)
FY 2029 (09/01/2028-05/31/2029)	$0.00
Total	$249,851.66

Project Dates / Duration (beginning no earlier than September 1, 2026 – ending no later than May 31, 2029) [see 30 TAC § 14.7(5)]:

September 1, 2025 – August 31, 2027
Ideally this project will utilize the funds available as of FY26, but it can be delayed by 1 year if needed.

Total Project Cost (including Leveraging Amounts, if any; provide leveraging information where indicated below):

$471,779.66

Is this an estimate? ☒

Leveraging (in-kind and/or cash):

This project will be an expansion of a FY26-27 GBEP funded project "Evaluation of Nature-Based Stormwater Infrastructure to Reduce Microplastic Pollution in Galveston Bay" which has an approved budget of $221,928.00

Project Urgency:

The proposed study is a timely expansion of an ongoing project collecting baseline data on microplastic pollution in Galveston Bay watersheds and assessing the effectiveness of nature-based stormwater infrastructure in reducing microplastic runoff into surface waters. This expansion will add a methods comparison component, recognizing the urgent need for standardized and quantitatively comparable microplastic enumeration techniques. Without this standardization, it is impossible to reliably compare data between studies with differing processing and enumeration techniques, which limits our ability to fully understand microplastic concentration and distribution in the Galveston Bay Estuary and to benchmark our findings against other coastal systems globally.

SECTION THREE: *GALVESTON BAY PLAN, 2ND EDITION* IMPLEMENTATION

Grant recipient activities to be funded must implement the Plan, but proposals implementing the Fiscal 2027 Subcommittee Priorities (Section Four) will be considered above others. This selection criteria provides for the selection of multiple recipients as needed.

The *Galveston Bay Plan, 2nd Edition* Action Plans are found at:
https://gbep.texas.gov/ensure-safe-human-and-aquatic-life-use/
https://gbep.texas.gov/protect-and-sustain-living-resources/
https://gbep.texas.gov/engage-communities/
https://gbep.texas.gov/inform-science-based-decision-making/

Galveston Bay Plan Priority Area Actions Addressed:

Plan Priority 1: Ensure Safe Human and Aquatic Life Use

NPS-1 ☒	NPS-2 ☒	NPS-3 ☒	NPS-4 ☐	
PS-1 ☒	PS-2 ☐	PS-3 ☐		
PHA-1 ☐	PHA-2 ☐	PHA-3 ☐	PHA-4 ☒	PHA-5 ☒

Plan Priority 2: Protect and Sustain Living Resources

HC-1 ☐	HC-2 ☐	HC-3 ☐
SC-1 ☐	SC-2 ☐	
FWI-1 ☐	FWI-2 ☐	FWI-3 ☐

Plan Priority 3: Engage Communities

SPO-1 ☐	SPO-2 ☐	SPO-3 ☐	SPO-4 ☐
PEA-1 ☐	PEA-2 ☐	PEA-3 ☐	

Plan Priority 4: Inform Science-based Decision Making

RES-1 ☐	RES-2 ☐	RES-3 ☐	RES-4 ☐
RES-5 ☐	RES-6 ☐	RES-7 ☐	RES-8 ☐
ACS-1 ☐	ACS-2 ☐	ACS-3 ☐	

Plan Priority Area Actions Detail:

The proposed project will implement the following Plan Priority 1: Ensure Safe Human and Aquatic Life Use Galveston Bay Plan Priority Area Actions.

Improve Water Quality Through Nonpoint Source Pollution (NPS)

NPS-1 Support watershed-based plan development and implementation: Understanding baseline microplastic concentrations is the first step to evaluating potential impacts to human and aquatic life. Results from this methods study could allow for a more complete understanding of microplastic pollution to be presented in existing and upcoming total maximum daily load I-plans and watershed protection plans in the Galveston Bay area. The output of the number of watershed-based plans would not be impacted by the proposed project, but the resulting knowledge could be used in future watershed-based plans to include baseline microplastic concentration data providing a more holistic review of pollutants discussed within the watershed.

NPS-2 Support nonpoint source education and outreach campaigns: The results of the proposed study will be used to inform public education and outreach materials for inclusion in social media campaigns and integration in existing nonpoint source education and outreach campaigns such as Bay to Schools, SPLASH, and Trash Bash.

NPS-3 Implement nonpoint source best management practices: The results of the proposed methods study will allow for a more complete review of watersheds with the highest microplastic loading which will inform where future nature-based stormwater infrastructure projects may provide the most impact in terms of microplastic treatment of stormwater entering Galveston Bay and provide another metric for stormwater retention and treatment best management practices to consider. The output of the number of best management practice projects will not be impacted by the proposed project, but the design and potential for treatment for another pollutant, microplastics, can be considered for future nature-based stormwater infrastructure projects.

Improve Water Quality Through Point Source Pollution Abatement (PS)

PS-1 Support stormwater education programs: The anticipated results from the proposed study will provide more complete and comparable data to illustrate that stormwater events result in increased loading of microplastics to Galveston Bay. The results can be integrated into stormwater education programs as one more pollutant of concern in stormwater and provide the community with recommendations of how they can help to reduce microplastic pollution into our waterways.

Promote Public Health and Awareness (PHA)

PHA-4 & 5 Improve the safety of human shellfish and finfish consumption from bay waters: The proposed methods study will bring awareness to the concentration of microplastic pollution in the waters that flow into Galveston Bay by providing more readily comparable results between existing data sources. Plastics have been found in all trophic levels of marine organisms, ranging from filter-feeding invertebrates like oysters to finfish and the humans that consume them. Quantifying the ability of nature-based stormwater infrastructure projects to reduce microplastic loading in Galveston Bay will inform future best management practices that can improve water quality and therefore improve the safety to human shellfish and finfish consumption from bay waters. While microplastics are not currently a water quality standard that is regulated by resource management agencies, the results from this methods study may provide baseline data that are useful in future oyster waters TMDL and I-plans related to consumption safety of aquatic organisms and inform future microplastic monitoring design.

The proposed project will implement the following **other** Galveston Bay Plan Priority Area Actions.

Protect and Sustain Living Resources – Demonstrate the treatment potential of nature-based stormwater infrastructure projects to reduce microplastic pollution and recommend future long-term monitoring methods and best management strategies to monitor and reduce microplastic pollution.

HC-3: The results of the proposed methods research will evaluate different enumeration processes allowing for comparison of results of different studies and make recommendations of future monitoring

methods. It will result in identifying watersheds with the highest contribution of microplastic pollution to Galveston Bay and recommend deployment of green infrastructure projects which include habitat enhancement in stormwater conveyance and detention with treatment potential for removing microplastics from stormwater.

Engage Communities – Support existing and new stewardship programs, volunteer opportunities, and public outreach to engage the public in a dialogue about the methods to enumerate and monitor the concentration of microplastics in surface waters flowing into Galveston Bay and ways that they can help reduce microplastic pollution.

SPO-1: The results of the proposed project can be used to support stewardship programs and volunteer opportunities by informing participants of the microplastic pollution in Galveston Bay and providing ways that they can reduce plastic pollution empowering them to become ambassadors of Galveston Bay.

SPO-2: The results of the proposed project will be presented at the State of the Bay Symposia and can be used to support workshops and events providing opportunities for the public to receive education on the microplastic pollution in Galveston Bay and ways that they can help reduce plastic pollution.

SPO-3: The results of the proposed project can be used to support existing or develop new regional initiatives and campaigns aimed at reducing plastic pollution in Galveston Bay.

Inform Science-Based Decision Making – The proposed project will support monitoring design including enumeration methods focused on microplastic pollution and evaluate applied research to inform the watersheds for future investment of nature-based stormwater infrastructure projects designed to reduce microplastic pollution.

RES-1: Conduct Biological Stressor Monitoring and Research – The proposed applied research will provide baseline data and methods comparison needed for future understanding of the emerging contaminant: microplastics and associated hydrophobic toxins on the aquatic life of Galveston Bay.

RES-6: Evaluate Best Management Practice (BMP) Projects – The proposed project will evaluate the treatment potential of nature-based stormwater infrastructure projects for stormwater treatment to remove microplastics from surface waters of the Galveston Bay area. It will identify watersheds with the highest microplastic pollution and recommended them for future best management practices to reduce microplastic pollution and inform future monitoring design including enumeration methods to ensure consistent and comparable results.

ACS-2: Access to Monitoring and Research Data – The project team will disseminate the methods comparison, monitoring, and research results realized for the proposed project through a variety of outreach activities for different audiences, including GBEP partners, decision makers, bay user groups, and the public as opportunities present.

ACS-3: Track Galveston Bay Plan Implementation – The project team will work with the GBEP and its partners to integrate the proposed project results into the Comprehensive Conservation and Management Plan for the Galveston Bay estuary and share it with the council and stakeholders.

SECTION FOUR: SUBCOMMITTEE PRIORITIES / FACTORS TO BE USED TO SELECT AWARDS [see 30 TAC § 14.7(6)]

Grant recipient activities must implement the Plan. Additional recipient selection criteria includes whether a project addresses a subcommittee priority. This selection criteria provides for the selection of multiple recipients as needed.

Subcommittee Identified Priorities

Grant recipient activities must implement the Plan. Additional recipient selection criteria includes whether a project addresses a subcommittee priority.

☒ WSQ: Supporting management measures and watershed-based plans.
☒ WSQ: Implementation and/or evaluation of best management practices that address point and nonpoint source pollution.
☐ WSQ: Public health risk awareness outreach campaigns related to contact recreation and/or seafood consumption.
☐ NRU: Habitat acquisition.
☐ NRU: Enhancement of existing or ongoing restoration/conservation efforts with special emphasis on:
    ☐ Adaptive management for previously completed projects;
    ☐ Projects that have lost funding from other federal sources; and
    ☐ Nonnative species management.
☐ NRU: Benefit to native fish and wildlife, including federal and state listed species, Species of Greatest Conservation Need, or nongame wildlife.
☐ NRU: Brings funding, work leverage, or multiple Priority Area/Subcommittee benefits to the program.
☐ NRU: Project urgency: Project must be completed in next 24 months or opportunity is lost
☐ PPE: Empowers K-12 students and/or adults to positively impact their local environment through increased scientific literacy and community projects.
☐ PPE: Connects new audiences to existing/completed projects or the natural habitat.
☐ PPE: Opportunities for GBEP and partners to host workshops/networking for education and outreach practitioners on key topics.
☐ PPE: Conservation and environmental workforce development.
☒ M&R: Meaningful and effective monitoring of existing, past, and new projects (NRU: especially species of concern, WSQ, PPE).
☐ M&R: Baseline assessments for large-scale, man-made changes to Galveston Bay.
☒ M&R: Assessment, Exposure, and Response to stressors, including but not limited to:
    ☐ Species of Greatest Conservation Need;
    ☐ Contact recreation standards;
    ☐ Environmental parameters;
    ☒ Emerging contaminants; and
    ☐ Legacy contaminants.
☐ Investigate ecosystem services and economic valuation of bay resources.

Subcommittee Priority Detail:

WSQ: Supporting management measures and watershed-based plans.
The proposed project will provide a methods comparison allowing for comparison among different microplastic enumeration techniques within the Galveston Bay Estuary and among other coastal systems worldwide. These data will be used to evaluate the effectiveness of nature-based stormwater infrastructure stormwater management systems to remove microplastics from surface waters entering Galveston Bay watersheds.

WSQ: Implementation and/or evaluation of best management practices that address point and nonpoint source pollution.
The proposed project will evaluate microplastic enumeration methods to make recommendations for better monitoring of microplastic concentrations and loading in major watersheds that flow into Galveston Bay. There are currently no agency-mandated water quality standards or standardized methods for enumerating microplastics in surface waters. This critical research will add to the knowledge base needed to understand baseline microplastic concentrations and standardize microplastic enumeration methodology to one day inform the development of water quality standards for microplastics in surface waters.

M&R: Meaningful and effective monitoring of existing, past, and new projects (NRU: especially species of concern, WSQ, PPE).
This proposed project will compliment a study that is already funded for FY26/27 to evaluate Microplastic loading and the treatment efficiency of nature-based stormwater infrastructure for removing microplastics from surface waters. The addition of the methods comparison component will leverage funds for the field collection of microplastic water samples allowing for collection of field duplicate samples greatly reducing the overall cost of a methods comparison while expanding the impact of the existing project.

M&R: Assessment, Exposure, and Response to stressors, including but not limited to emerging contaminants.
The proposed applied research will provide methods comparison needed to inform future monitoring programs and allow for better comparison between our study and others in the region and world-wide expanding our understanding of the emerging contaminant: microplastics and associated hydrophobic toxins on the aquatic life of Galveston Bay.

Does the Project align with any EPA Areas of Special Interest?
☐ Reduce Nutrient Pollution to Protect Water Quality and Public Health
☐ Make Investments that Address Coastal Resiliency
☒ Reduce Trash

Understanding the quantity and characteristics of microplastic pollution in an area is the first step in developing methods to combat the problem. With some nature-based stormwater infrastructure projects already in place, there is opportunity to measure the treatment efficiency of created wetlands in stormwater detention basins to remove microplastics from surface waters flowing into Galveston Bay.

SECTION FIVE: PROPOSAL DETAILS

Grant recipient activities must implement the Plan. Additional recipient selection criteria includes whether a project addresses a subcommittee priority.

Project Summary:

The proposed study will expand on a current-funded project to collect baseline microplastic loading data in Galveston Bay watersheds and quantify the treatment potential of green infrastructure projects to reduce microplastic loading in surface waters from stormwater runoff. The proposed expansion will integrate a methods comparison objective onto the existing study providing critically needed standardization of and comparisons among microplastic enumeration methods to gain a more wholistic understanding of the concentration and distribution of microplastics in the Galveston Bay Estuary.

Full Project Description (1,000 words or less):

Although numerous studies have monitored microplastic pollution in the Galveston Bay Estuary and other coastal systems worldwide, there is currently no widely recognized standardized method for microplastic identification and enumeration. Existing research has employed a variety of approaches, including visual enumeration with high-powered stereoscopic microscopes (Oakley et al. 2024) and advanced techniques such as fluorescent dye and infrared microscopy, which show promising results (Maes et al. 2024; McEachern et al. 2019). Each method offers unique advantages and limitations, but the lack of standardization hinders direct comparison across studies and reduces the utility of monitoring data (Lv et al. 2019).

Regular monitoring of water and sediment microplastics should be continued to begin to understand temporal and spatial patterns of this pollutant type in Galveston Bay. The state and federal agencies charged with routine monitoring of water quality should adopt standardized methods to monitor microplastic concentration in water. Ensuring that preferred methods are technologically accessible for a wide-range of monitoring groups, including citizen scientists, but reduce observer bias and can be successfully compared are critical considerations.

The proposed project will leverage the already-funded project to conduct baseline monitoring to quantify microplastics loading in Galveston Bay watersheds and quantify the treatment potential of nature-based stormwater infrastructure projects to reduce microplastic loading in surface waters from stormwater runoff. Field duplicate water samples will be collected as part of this ongoing work, and these samples will be used to directly compare visual enumeration via brightfield microscopy to fluorescent microscopy methods (Labbe et al. 2020; Kukkola et al. 2023; Kalaronis et al. 2022). Samples will be collected across all sites and under varying conditions to ensure robust comparisons.

By providing this critically needed, side-by-side methods comparison, the proposed project will directly inform the future standardization of microplastic enumeration techniques. This foundation is essential for building a holistic understanding of microplastic concentrations and distributions in the Galveston Bay Estuary and will allow for meaningful comparisons with other coastal watersheds around the world.

Literature Cited:

Kalaronis, D., N.M Ainali, E. Evgenidou, G.Z. Kyzas, X. Yang, D.N. Bikiaris, and D.A. Lambropoulou. 2022. Microscopic techniques as means for the determination of microplastics and nanoplastics in the aquatic environment: A concise review. Green Analytical Chemistry, *3*, 100036.

Kukkola, A., S. Krause, Y. Yonan, L. Kelleher, U. Schneidewind, G.H.S. Smith, ... and I. Lynch. 2023. Easy and accessible way to calibrate a fluorescence microscope and to create a microplastic identification key. MethodsX, *10*, 102053.

Labbe, A. B., C.R. Bagshaw, and L. Uttal. 2020. Inexpensive adaptations of basic microscopes for the identification of microplastic contamination using polarization and Nile Red fluorescence detection. Journal of Chemical Education, 97(11), 4026-4032.

Lv, L., X. Yan, L. Feng, S. Jiang, Z. Lu, H. Xie, S. Sun, J. Chen, and C. Li. 2019. Challenges for the detection of microplastics in the environment. Water Environment Research. 93(1): 5- 15. https://doi.org/10.1002/wer.1281

Maes, T., R. Jessop, N. Wellner, K. Haupt, and A.G. Mayes. 2017. A rapid-screening approach to detect and quantify microplastics based on fluorescent tagging with Nile red. Science. Rep. 7, 44501.

McEachern, K., H. Alegria, A.L. Kalagher, C. Hansen, S. Morrison, and D. Hastings. 2019. Microplastics in Tampa Bay, Florida: Abundance and variability in estuarine waters and sediments. Marine Pollution Bulletin. 148:97-106.

Oakley, J.W., G. Guillen, J. Steinhaus, E. Cox, M. Sager, and M. Huette. 2024. Microplastics in the Galveston Bay Watershed: The Big Impacts of Tiny Pollution, Final Report. (Report No. EIH24-002). Prepared for the Galveston Bay Estuary Program (Contract Number 582-21- 10096). 57 pages.

Other Plans Implemented:

The proposed project aligns with the following plans and strategies.

The Gulf of Mexico Alliance's Governor's Action Plan: Aligns with the priority issue item: Threats to Human Health and Aquatic Life. *"Gulf-wide efforts to collect data, monitor water resource conditions and trends, and identify linkages between water quality and threats to human health or aquatic life (such as harmful algal blooms, bacteria, microplastics, etc.) provide critical information to support improvements within Gulf of Mexico waters."*

The Save Our Seas Act of 2018: Also known as the *"Marine Debris Act"*, aligns with the priority goal of: "*Conduct and support research to address the most critical research needs related to microfiber pollution"*, as defined in the Marine Debris Report to Congress by NOAA's Marine Debris Program and the EPA's Trash Free Waters Program.

The Galveston Bay Report Card: Litter and trash are scored as "I" for insufficient data because *"there is no systematic bay-wide monitoring"* to evaluate this kind of pollution.

Does the Project work with new, smaller communities/partnerships?

☐ Yes

☒ No

[TBD.] *N/A*

Is the project subject to Title VI requirements?
To meet federal nondiscrimination guidance and laws (Title VI), TCEQ requires information and services to be provided in languages other than English when significant numbers of beneficiaries are of limited English-speaking ability (LEP). If 5% or more of the population within your project area is LEP and share a common language, then you are required to provide outreach in the alternative language. For statewide projects, Spanish language outreach is required. As Title VI compliance could impact the project budget, please reach out to the primary subcommittee coordinator for this application with questions on determining applicability and EJScreen instructions.

☐ Yes
☒ No

[TBD.] *N/A*

Latitude/Longitude (Optional):

Multiple, see Location for details.

Location:

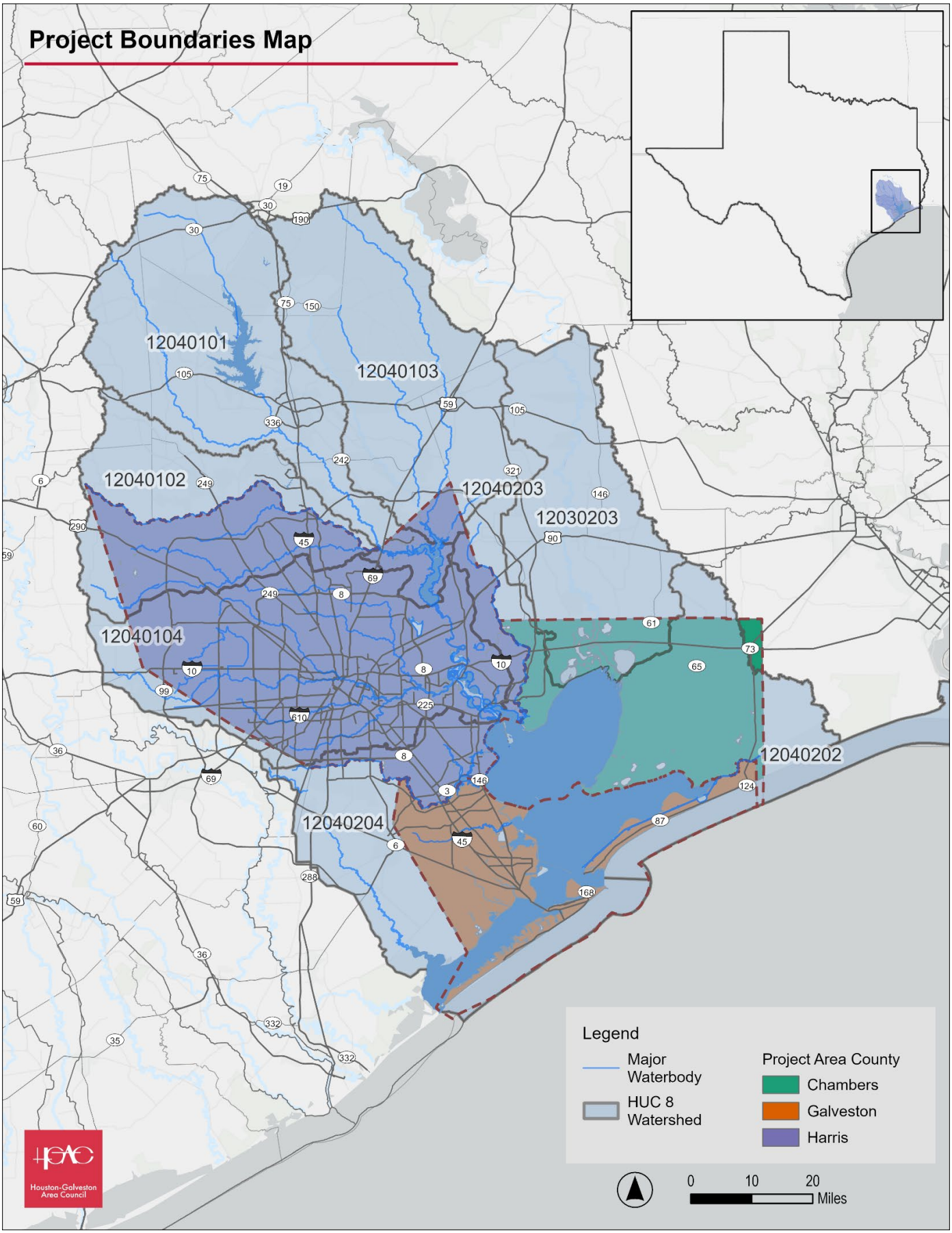
Project activities will take place in the greater Houston Region. All work will be completed within in the following HUC 8 watersheds which flow into Galveston Bay: 12030203, 12040101, 12040102, 12040103, 12040104, 12040202, 12040203, and 12040204. The study area includes the following counties: Harris, Galveston, and Chambers (see Projects Map).

Partners[10] and Their Roles:

The contract laboratory to conduct the additional microplastic enumeration has not been determined yet. If funded, we will work with the other researchers in the region to ensure that the methodology used best represents the microplastics data collected to date within the Galveston Bay Estuary.

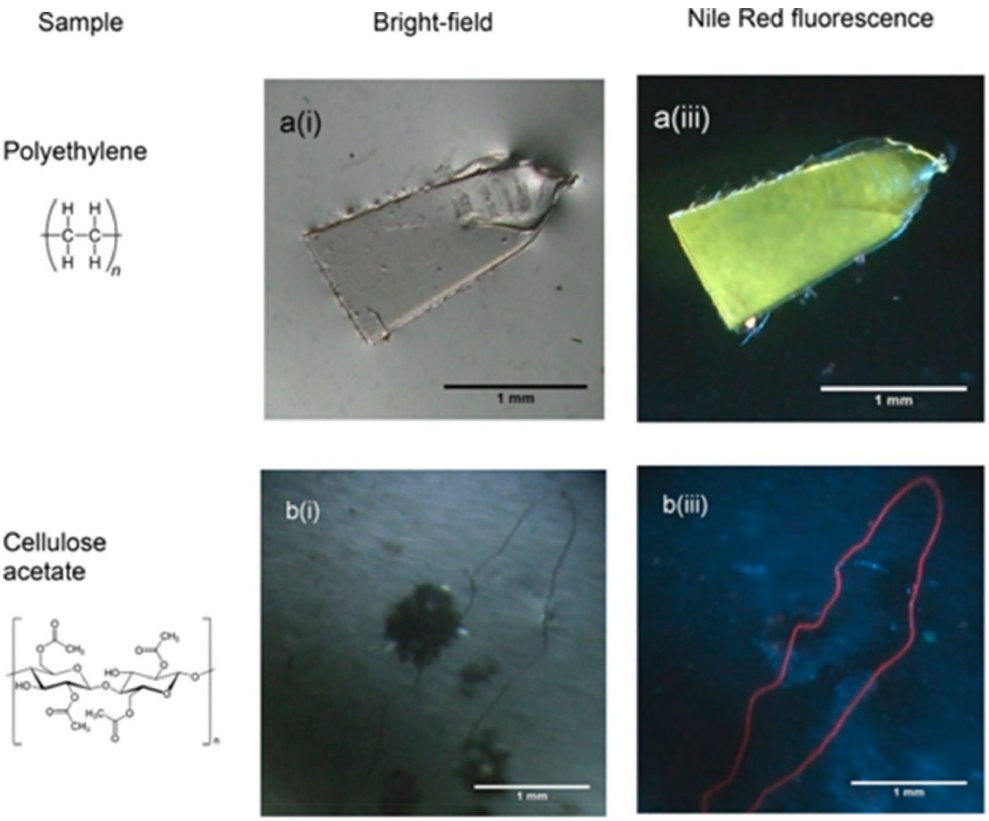
[10] If partners are subgrantees completing work reimbursable under GBEP funding, a letter of commitment from the partner must be submitted as an appendix with the application.

Projects Map



Supplemental Photos/Graphics (Optional):

Example of microplastics under brightfield and fluorescence stereoscopic microscopy. Modified from Labbe et al. 2020



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SECTION SIX: BUDGET DETAILS

Grant Payments [see 30 TAC § 14.7(12)]: All grant payments will be made on the basis of reimbursement for allowable costs (as defined in 2 CFR Part 200, Subpart E). All payments for awarded proposals will be reimbursements of allowable costs incurred after both parties have entered (signed) a grant agreement for the project.

Budget. Authorized budgeted expenditures for work performed are as follows:

c. Direct Costs

Budget Category	Cost for Work to be Performed
Salary / Wages	$49,087.68
Fringe Benefits (47.02%)[11]	$23,081.03
Travel	$1,776.04
Supplies	$19,375.84
Equipment	$62,000.00
Contractual	$72,000.00
Construction	$0.00
Other	$14,433.74
Total Direct Cost	$241,754.33

d. Indirect Costs[12]

Distribution Base Amount *(salary and fringe)*	$72,168.71
Indirect Cost Rate for Reimbursement	11.22%
Total Indirect Costs	$8,097.33

e. Maximum Authorized Reimbursement

Maximum Authorized Reimbursement (Direct and Indirect Costs)	**$249,851.66**

Indirect Cost Distribution Base. The Distribution Base above is (check one):

N/A

☒ direct salary/wages and fringe benefits

☐ modified total direct costs

☐ Other direct costs base

If other direct cost base, identify:

The indirect cost rate is (check one):

[11] If fringe is not a single rate, please attach calculation or explanation as an appendix.
[12] Please attach Indirect Cost Agreement as an appendix if applicable

☒ **Predetermined Rate**— an indirect rate that is negotiated between the Performing Party and its federal cognizant agency and supported by a current Negotiated Indirect Cost Rate Agreement (NICRA) letter. A Predetermined Rate is not subject to adjustment except as provided by 2 Code of Federal Regulations (CFR) § 200.411.

☐ **De Minimis Rate**— if Performing Party does not have a current negotiated indirect rate, Performing Party may use a standard rate of fifteen percent of Modified Total Direct Costs (MTDC)[13] in lieu of determining the actual indirect costs of the service. Costs must be consistently charged as either indirect or direct costs.

☐ **Partial Reimbursement Rate**— a reimbursement rate agreed to between TCEQ and Performing Party that is less than the rate authorized under TxGMS or, where applicable, 2 CFR Part 200. Performing Party contributes all of its unreimbursed indirect costs to the successful performance of the project or projects funded under this Contract, in accordance with Article 9 of this section. [If this is a Partial Provisional Rate, include the following language: "This is a Partial Provisional Rate. Any adjustment is subject to the requirements of Article 9 of this section; however, no adjustment will be made unless the finally determined actual indirect costs are lower than the Partial Indirect Cost reimbursement made under the Contract."]

☐ **Other:** [Examples: De Minimis Rate with a base of direct salary and wages (less than or equal to actual indirect costs) or Provisional Rate. If this is a Provisional Rate, include the following language: Provisional Rate: The subsequent adjustment of the indirect cost rate is subject to the requirements of Article 9 of this section.]

Other. If Budget Category "Other" is greater than $25,000 or more than 10% of total Contract budget, identify the main constituents:

N/A

SECTION SEVEN: CONTRACT REQUIREMENT [see 30 TAC § 14.7(15)]:

- By submitting this Project Proposal, you acknowledge that, if you become a successful grant recipient selected for a grant award, you must enter into a signed grant agreement or contract with TCEQ following the announcement of that award.

SECTION EIGHT: ACKNOWLEDGMENTS

Please read and understand the following:

- By submitting this Project Proposal, you acknowledge that information on how grant payments will be made is contained in the Budget Details section describing direct and possibly indirect costs. You further acknowledge that grant payments will be reimbursements on the basis of allowable costs incurred and that selected recipients will receive contract documents addressing allowable costs, unallowable costs, and reimbursement.
- By submitting this Project Proposal, you acknowledge your understanding that Project Proposals do not require matching funds and that a TCEQ director does not need to adjust or waive any matching funds requirement.
- By submitting this Project Proposal, you acknowledge that, if GBEP elects to hold a pre-submittal meeting relating to this Project Proposal, GBEP will notify you of the meeting's time and location indicating whether attendance is mandatory.

SECTION NINE: QUESTIONS AND PRE-SUBMITTAL MEETINGS [see 30 TAC § 14.7(13) and 30 TAC § 14.7(14)]:

- There are no pre-submittal meetings scheduled.
- For requests for additional, pre-submittal information **[see 30 TAC § 14.7(13)]**, please contact the corresponding Subcommittee Coordinator listed on this page.

[13] https://www.ecfr.gov/current/title-2/part-200/section-200.1#p-200.1(Modified%20Total%20Direct%20Cost%20(MTDC))

SECTION TEN: ADDITIONAL INSTRUCTIONS

In submitting your Project Proposal, please refer and adhere to the following instructions and guidelines concerning materials and information required to be submitted by potential grant recipients:

- GBEP intends to accept only complete Projected Proposals in a layout and format constituting a filled version of this proposal document with all applicable sections therein addressed; however, GBEP may, in its sole discretion, consider and accept nonconforming Project Proposals in the best interest of the state.
- Unless otherwise specified by GBEP, formal signatures are not required on Project Proposals.
- Unless otherwise communicated or implied, GBEP requires 1 (one) completed copy of your Project Proposal per corresponding Subcommittee Coordinator.
- Project Proposals must be received electronically, through the email address of the relevant Subcommittee Coordinator listed on this page, by the deadline listed on both this page and the first page of this Project Proposal document.

Submittal Process and Deadline [see 30 TAC § 14.7(8) and 30 TAC § 14.7(9)]: Please Submit Project Proposals (Microsoft Word Only – No PDFs) by July 25, 2025 to the relevant Subcommittee Coordinators below:

WSQ Subcommittee
Christian.Rines@tceq.texas.gov

NRU Subcommittee
Lindsey.Lippert@tceq.texas.gov

PPE Subcommittee
Zoe.Gapayao@tceq.texas.gov

M&R Subcommittee
Jenelle.Estrada@tceq.texas.gov

Programmatic Projects
Lisa.Marshall@tceq.texas.gov

Galveston Bay Estuary Program
Fiscal 2027 Project Proposal

Please complete this proposal form and submit to the appropriate Subcommittee Coordinator (end of form) by July 25, 2025. No late submittals will be considered for funding.

This Call for Project Proposals complies with 30 Texas Administrative Code (TAC) § 14.7, which lays out requirements for a competitive solicitation by TCEQ for grant awards. For convenience, specific citations to 30 TAC § 14.7 are identified in the text.

SECTION ONE: INTRODUCTION

Purpose [required by 30 TAC § 14.7(1)]: The purpose of the proposed grant from the Galveston Bay Estuary Program (GBEP), a program of the Texas Commission on Environmental Quality (TCEQ), is to implement *The Galveston Bay Plan, 2nd Edition* (the Plan), a comprehensive conservation and management plan falling under Section 320, of the Federal Water Pollution Control Act (33 U.S.C. Section 1330), for a designated national estuary in the State of Texas.

Objective and Allowable Activities [see 30 TAC § 14.7(4)]: The objective of this grant is to implement the GBEP stakeholder developed priorities for fiscal 2027 (FY 2027) Priority Area Actions that were developed by GBEP subcommittees for FY 2027 at the June 2025 meetings. Any proposal implementing the Plan may be submitted, but proposals implementing the FY 2027 Priority Area Actions will be considered above others.

Authority [see 30 TAC § 14.7(2)]: Grants issued by GBEP under this solicitation are authorized by: the Federal Water Pollution Control Act (Clean Water Act) § 320 (33 UNITED STATES CODE § 1330), commonly referred to as the National Estuary Program; TEX. WATER CODE § 5.124; and 30 TAC ch. 14.

Match Requirement [see 30 TAC § 14.7(10) and 30 TAC § 14.7(11)]: No matching funds are required. Therefore, there is no need to adjust or waive any matching funds requirement.

Multiple Awards [see 30 TAC § 14.7(7)]: GBEP anticipates awarding funds for multiple proposals. GBEP intends to award grants to that combination of proposals which best implements the Plan, factoring in all criteria identified in this Call for Project Proposals, the availability of funds, and the most effective division of funds between awards.

Timeline of Proposals:

Task	Date Due
Release of Request for Proposals	June 23, 2025
Proposals Due	July 25, 2025
Send Proposals to Subcommittees Members for Review	August 13, 2025
Present Proposals to Subcommittees for Council Recommendation	September 3, 2025 (NRU and PPE) September 10, 2025 (M&R and WSQ)
Present Proposals to B&P Subcommittee for Final Recommendation	October 1, 2025
Present Proposals to Galveston Bay Council for Approval	October 15, 2025

SECTION TWO: SUBMITTAL – GENERAL INFORMATION

Primary Subcommittee: Monitoring and Research (M&R)
Secondary Subcommittee (if applicable): Natural Resource Uses (NRU)

Project Name:

Advancing monitoring estuarine ecosystems through development of automatic sampling framework

Project Previously Funded by GBEP? Yes ☐ No ☒

Lead Implementer / Categories of Eligible Recipients [see 30 TAC § 14.7(3)]:

Texas A&M University at Galveston

The lead implementer must be in one of the following categories of eligible recipients. Please indicate which category applies to your entity. If the proposing party is not already paired with a lead implementer in one of the categories listed below, the proposing party will need to partner with an eligible recipient in one of these categories to be selected for funding. Please reach out to GBEP staff with any questions.

☐ Federal, State, or Local Government ☐ Council of Government ☒ Public ISDs or Universities
☐ Nonprofit ☐ Other*

[If other, please identify pass-through partner.]

Unique Entity ID (UEI) Number:	G8Y3L8JV2588
Vendor Identification Number (VIN) or Tax ID:	74-6000541

Contact Information:

Project Representative Name	Hui Liu
Project Representative Phone	(409)740-4716
Project Representative Email	liuh@tamug.edu

Amount Requested from GBEP:

$255,962

Federal ☐ State ☐ No Preference ☒
Is the project scalable? ☒

Amount Requested per year (if applicable):

FY 2027 (09/01/2026-08/31/2027)	$124,053
FY 2028 (09/01/2027-08/31/2028)	$131,909
FY 2029 (09/01/2028-08/31/2029)	$0.00
Total	$255,962

Project Dates / Duration (beginning no earlier than September 1, 2026 – ending no later than May 31, 2029) [see 30 TAC § 14.7(5)]:

24 months, 09/01/2026 to 08/31/2028

Total Project Cost (including Leveraging Amounts, if any; provide leveraging information where indicated below):

$255,962

Is this an estimate? ☒

Leveraging (in-kind and/or cash):

Project Urgency:

Science-based management actions and decision-making of estuarine ecosystems should be built upon high quality research data of key ecosystem components. In an existing monitoring project (September 2022-March 2026), valuable time series data on estuarine indicators collected in the project have been proven scientifically meaningful for addressing management relevant questions in Galveston Bay (Li and Liu, 2025, Liu et al. in review, and Lin et al., to be submitted).

As the project is close to complete, securing continued funding to keep the existing program ongoing is urgent. This new project is to focus on advancing the monitoring program through development of imaging sampling framework of PlanktoScope (photo attached). This is a modular, open-source hardware and software platform that allows for high-throughput quantitative imaging of plankton samples in aquatic biology and ecology.

Generating accessible research time series is highly needed to aid the implementation of Galveston Bay Plan and GBEP stakeholder developed priorities. Applying for funding through GBEP provides an opportunity for us to extend the valuable time series to fill this much needed research gap.

SECTION THREE: *GALVESTON BAY PLAN, 2ND EDITION* IMPLEMENTATION

Grant recipient activities to be funded must implement the Plan, but proposals implementing the Fiscal 2027 Subcommittee Priorities (Section Four) will be considered above others. This selection criteria provides for the selection of multiple recipients as needed.

The *Galveston Bay Plan, 2nd Edition* Action Plans are found at:
https://gbep.texas.gov/ensure-safe-human-and-aquatic-life-use/
https://gbep.texas.gov/protect-and-sustain-living-resources/
https://gbep.texas.gov/engage-communities/
https://gbep.texas.gov/inform-science-based-decision-making/

Galveston Bay Plan Priority Area Actions Addressed:

Plan Priority 1: Ensure Safe Human and Aquatic Life Use

NPS-1 ☐	NPS-2 ☐	NPS-3 ☐	NPS-4 ☐	
PS-1 ☐	PS-2 ☐	PS-3 ☐		
PHA-1 ☐	PHA-2 ☐	PHA-3 ☐	PHA-4 ☐	PHA-5 ☐

Plan Priority 2: Protect and Sustain Living Resources

HC-1 ☐	HC-2 ☒	HC-3 ☐
SC-1 ☒	SC-2 ☐	
FWI-1 ☐	FWI-2 ☐	FWI-3 ☐

Plan Priority 3: Engage Communities

SPO-1 ☐	SPO-2 ☐	SPO-3 ☐	SPO-4 ☒
PEA-1 ☐	PEA-2 ☐	PEA-3 ☒	

Plan Priority 4: Inform Science-based Decision Making

RES-1 ☒	RES-2 ☐	RES-3 ☒	RES-4 ☐
RES-5 ☐	RES-6 ☒	RES-7 ☒	RES-8 ☒
ACS-1 ☒	ACS-2 ☐	ACS-3 ☒	

Plan Priority Area Actions Detail:

Science-based implementation of Galveston Bay Plan and GBEP stakeholder developed priorities requires high quality data of key ecosystem components. Consistent data collection through meaningful and effective monitoring programs is highly needed for natural resource managers, stakeholders, and decision makers, but currently incomplete and insufficient in Galveston Bay. This project is designed to contribute to implementation of Galveston Bay Plan 2nd Edition Priority Area Actions through performing quality-assured monitoring activities. The proposed work will generate accessible research data on key ecosystem indicators in Galveston Bay to inform decision-making action plans of GBEP and TCEQ.

*Ecosystem assessment has been commonly accepted as a framework for management and restoration of estuarine ecosystems frequent subjected to natural and man-made disturbances (**Plan Priority 4**), which should be based on synthesis and analysis of sensitive indicators as proxies for tracking ecosystem responses to stressors and is highly needed to protection of natural living resources and assessment of the estuary health status. The research action in this project is to advance monitoring estuarine ecosystems through development and application of an imaging system of PlanktoScope to enhance the efficiency of data collection in Galveston Bay. The sample scheme consists of environmental factors and key indicators (i.e., oyster larvae, crab larvae, and fragile zooplankton) to generate time series of ecosystem indicators, as proxies of resilience of the Galveston Bay ecosystem. The suite of ecosystem indicators simultaneously collected with broad coverage in time and space in the bay will provide a timely complete picture of the Galveston Bay ecosystem along with the status of native, commercially important species (i.e., oysters and blue crabs) for decision-making by resource managers and stakeholders (**Plan Priority 2**). This project will engage with K-12 students (high school volunteers already engaged in the existing project), undergraduate/graduate students, adult volunteers from the local community (**Plan Priority 3**) on field sampling and laboratory work, promoting awareness and importance to protect the health of Galveston Bay considering natural and man-made disturbances.*

SECTION FOUR: SUBCOMMITTEE PRIORITIES / FACTORS TO BE USED TO SELECT AWARDS [see 30 TAC § 14.7(6)]

Grant recipient activities must implement the Plan. Additional recipient selection criteria includes whether a project addresses a subcommittee priority. This selection criteria provides for the selection of multiple recipients as needed.

Subcommittee Identified Priorities

Grant recipient activities must implement the Plan. Additional recipient selection criteria includes whether a project addresses a subcommittee priority.

☐ WSQ: Supporting management measures and watershed-based plans.
☐ WSQ: Implementation and/or evaluation of best management practices that address point and nonpoint source pollution.
☐ WSQ: Public health risk awareness outreach campaigns related to contact recreation and/or seafood consumption.
☐ NRU: Habitat acquisition.
☐ NRU: Enhancement of existing or ongoing restoration/conservation efforts with special emphasis on:
    ☐ Adaptive management for previously completed projects;
    ☐ Projects that have lost funding from other federal sources; and
    ☐ Nonnative species management.
☒ NRU: Benefit to native fish and wildlife, including federal and state listed species, Species of Greatest Conservation Need, or nongame wildlife.
☒ NRU: Brings funding, work leverage, or multiple Priority Area/Subcommittee benefits to the program.
☐ NRU: Project urgency: Project must be completed in next 24 months or opportunity is lost
☐ PPE: Empowers K-12 students and/or adults to positively impact their local environment through increased scientific literacy and community projects.
☐ PPE: Connects new audiences to existing/completed projects or the natural habitat.
☐ PPE: Opportunities for GBEP and partners to host workshops/networking for education and outreach practitioners on key topics.
☐ PPE: Conservation and environmental workforce development.
☒ M&R: Meaningful and effective monitoring of existing, past, and new projects (NRU: especially species of concern, WSQ, PPE).
☒ M&R: Baseline assessments for large-scale, man-made changes to Galveston Bay.
☒ M&R: Assessment, Exposure, and Response to stressors, including but not limited to:
    ☒ Species of Greatest Conservation Need;
    ☐ Contact recreation standards;
    ☒ Environmental parameters;
    ☐ Emerging contaminants; and
    ☐ Legacy contaminants.
☒ Investigate ecosystem services and economic valuation of bay resources.

Subcommittee Priority Detail:

The outcome of this project is accessible research data to inform the implementation of Galveston Bay Plan and GBEP stakeholder developed priorities. Targeting key estuarine abiotic and biotic indicators (i.e., environmental factors, zooplankton, oyster larvae, crab larvae and other fragile organisms), the proposed work benefits to both M&R and NRU subcommittees for better management of these valuable natural resources and prudent preparedness in response to external disturbances to Galveston Bay.

*Environmental and biological indicators (i.e., zooplankton, hydrological factors, and larvae of valuable species) are tightly connected. Systematic monitoring of abiotic and biotic indicators simultaneously in time and space is meaningful and effective to generate informative data for baseline assessment of sudden disturbances and chronic changes to the Galveston Bay ecosystem (**M&R priorities**), meanwhile the larval data of targeted species is currently lacking but highly needed for conservation and management of native fish and wildlife (**NRU priorities**). Therefore, this project will provide cross-subcommittee benefits to the GBEP program.*

Does the Project align with any EPA Areas of Special Interest?

☐ Reduce Nutrient Pollution to Protect Water Quality and Public Health
☒ Make Investments that Address Coastal Resiliency
☐ Reduce Trash

Coastal resiliency is defined as a coastal ecosystem's capacity to absorb external disturbances and still maintain its fundamental structure, function, and identity. In history, few major natural and man-made disturbances occurred in the Galveston Bay ecosystem. Knowing the resiliency of the bay is prerequisites to perform post-disaster assessments and subsequent restoration actions. All these are based on the availability of long-term baselines of key ecosystem components and understanding of the resiliency and driving mechanisms. The proposed work of advancing monitoring estuarine ecosystems through development of automatic sampling framework on data collection and data synthesis is well aligned with the EPA special interest on Coastal Resiliency in Galveston Bay.

SECTION FIVE: PROPOSAL DETAILS

Grant recipient activities must implement the Plan. Additional recipient selection criteria includes whether a project addresses a subcommittee priority.

Project Summary:

The project goal is to generate high-quality time series of indicators including environmental factors, zooplankton, oyster larvae, crab larvae and other fragile organisms for better management of these valuable living resources and prudent preparedness in response to external disturbances to the estuarine and coastal waters of Texas.

Project objectives are: (1) development of a novel imaging technique to advance monitoring estuarine ecosystems especially on key biotic indicators, (1) collection of time series data and examination of impacts of biophysical processes on seasonal and spatial patterns of larvae of key species and pelagic indicators, (3) dissemination of project findings through outreach and extension to stakeholders, resource managers and policy makers as well as national conferences plus peer-reviewed publications.

Full Project Description (1,000 words or less):

*Systematic monitoring of abiotic and biotic indicators simultaneously in time and space is meaningful and effective to generate informative baseline data for assessment of sudden disturbances and chronic changes to Galveston Bay (**M&R priorities**), meanwhile the data of larvae of key species is currently lacking but highly needed for conservation and management of native fish and wildlife (**NRU priorities**).*

*Consistent data collection through well designed monitoring programs is highly needed for natural resource managers, stakeholders, and decision makers, but currently insufficient in Galveston Bay. This project contributes to implementation of Galveston Bay Plan 2nd Edition Priority Area Actions. The proposed work will generate accessible research data on key indicators in Galveston Bay to inform decision-making action plans of TCEQ/GBEP (**Plan Priority 2**) with engagement with K-12 students, undergraduate/graduate students, adult volunteers from the local community (**Plan Priority 3**) promoting awareness and importance to protect the health of Galveston Bay. Ecosystem assessment has been commonly accepted as a framework for management and restoration of estuarine ecosystems frequent subjected to natural and man-made disturbances (**Plan Priority 4**), and prudent assessment should be based on synthesis of sensitive indicators for tracking ecosystem response to stressors and protection of natural living resources and the estuary health.*

Currently knowledge gaps on zooplankton and larvae of key species exists in Galveston Bay and Texas coastal waters. Traditional sampling is expensive and destructive for fragile organisms (e.g. various larvae etc.), which often cause underestimates of the quantity, role, and importance of these species in estuaries. Imaging technologies have enabled high-quality observations of ecosystem indicators in coastal waters (Bi et al., 2022). High quality data of key indicators have been proven valuable to understanding of physical and biological processes in estuaries and coastal waters (Liu et al., 2017, 2021, Liu et al, in review, Lin et al., to be submitted). This project will develop an imaging system of PlanktoScope for advancing the established monitoring activities through enhancing the efficiency of sample processing and accuracy of estimates of key indicators.

*In this project we will conduct monthly sampling cruises at 11 sites in the bay (Fig.1) over two years (September 2026 to August 2028). In 2017 we initiated monthly sampling of zooplankton, larvae of key species and water properties in the bay, and then we have been monitoring estuarine indicators in the bay since September 2022 to the summer of 2025 (starts labeled in Fig. 1). If funded, the new project will extend the monitoring project for another two years and will lengthen the monthly time series data of key indicators without gaps over **72 months of 6 years**. In this project we plan to conduct the sampling cruise every month onboard RV/Milan of Texas A&M University to deploy horizontal net tows with 100μm and 200μm mesh sizes and two replicates. Specimens collected on the sieve will be back rinsed into sample jars (500ml) and preserved in 5% formaldehyde/seawater solution later for sorting. Concurrently, temperature, salinity, dissolved oxygen, and pH will be obtained using a calibrated Hydrolab DataSonde. Surface water will be collected for analysis of chlorophyll a concentration. Oyster larvae, crab larvae and zooplankton will be identified (Boltovskoy et al. 1999, Johnson and Allen 2012) to quantify abundance, biomass and size of larvae and zooplankton. Samples will be enumerated and sorted to species or genera where possible under a dissecting microscope (Leica 205C) to the lowest taxa levels.*

Combined with net tows, we will develop an imaging system of PlanktoScope to enhance the efficiency of traditional sample processing. TAMUG purchased the PlanktoScope and a dedicated desktop to be used for the project. PlanktoScope (Fig. 2) is a modular, open-source hardware and software platform that allows for high-throughput quantitative imaging of plankton samples in aquatic biology and ecology. Its small size, ease of use, and low cost make it suitable for deployment in a range of applications, including the monitoring of laboratory cultures, natural micro-plankton communities, and real-time onboard application at sea. It can be controlled from WiFi-enabled device, and its versatility allows for rapid reconfiguration to match the evolving needs of the user. Validated with net towed samples, imaging files generated by PlanktoScope will be processed using high-speed computers with sophisticated algorithms of machine learning to automatically identify and count items. Further we will analyze the indicator data to examine the impacts of physical and biological processes on ecosystem dynamics, the impacts of environmental factors on the occurrence of different pelagic groups and assess the ecosystem resiliency of the bay.

Project objectives are: (1) development of a novel imaging technique to advance monitoring estuarine ecosystems especially on key biotic indicators, (2) collection of time series data and examination of impacts of biophysical processes on seasonal and spatial patterns of larvae of key species and pelagic indicators, (3) dissemination of project findings through outreach and extension to stakeholders, resource managers and policy makers as well as national conferences plus peer-reviewed publications.

Bi H, Song J, Zhao J, Liu H, et al. (2022) Temporal characteristics of plankton indicators in coastal waters: High-frequency data from PlanktonScope. Journal of Sea Research 189: 102283.

Liu H, et al. (2021) Detection of time-varying pulsed event effects on estuarine pelagic communities with ecological indicators after catastrophic hurricanes. Ecological Indicators 123, 107327.

Liu H, et al. (2017) Mesozooplankton dynamics in relation to environmental factors and juvenile fish in a subtropical estuary of the Gulf of Mexico. Journal of Coastal Research 33:5, 1038–1050.

Li C, Liu H. (2025) Modeling larval recruitment dynamics of eastern oysters (Crassostrea virginica) with implications for restoration and management of oyster fisheries. Marine Ecology Progress Series. https://doi.org/10.3354/meps14805

Liu H, et al. Exploration of enigmatic pelagic larval oysters (Crassostrea virginica) fostering estuarine restoration of oyster fisheries. Journal of Sea Research (under review)

Lin B, et al. Environmental gradient shaped spatiotemporal dynamics of zooplankton in a typical estuary of the Gulf of Mexico. Journal of Plankton Research (to be submitted)

Other Plans Implemented:

[Please identify any third-party conservation plans this project implements, such as the Texas Coastal Management Plan, Texas Coastal Resiliency Master Plan, watershed-based plans, etc.]

Does the Project work with new, smaller communities/partnerships?

☒ Yes

☐ No

Bob Kosar, City of El Lago, Twin Crab Seafood Restaurant

Is the project subject to Title VI requirements?

To meet federal nondiscrimination guidance and laws (Title VI), TCEQ requires information and services to be provided in languages other than English when significant numbers of beneficiaries are of limited English-speaking ability (LEP). If 5% or more of the population within your project area is LEP and share a common

language, then you are required to provide outreach in the alternative language. For statewide projects, Spanish language outreach is required. As Title VI compliance could impact the project budget, please reach out to the primary subcommittee coordinator for this application with questions on determining applicability and EJScreen instructions.

☐ Yes
☒ No

[TBD.]

Latitude/Longitude (Optional):

[degrees, minutes, and seconds format]

Location:

[Description of area(s) of Galveston Bay watershed addressed by proposal]
Galveston Bay

Partners[14] **and Their Roles**:

CBL/University of Maryland, consulting on processing of imagining files.

Projects Map

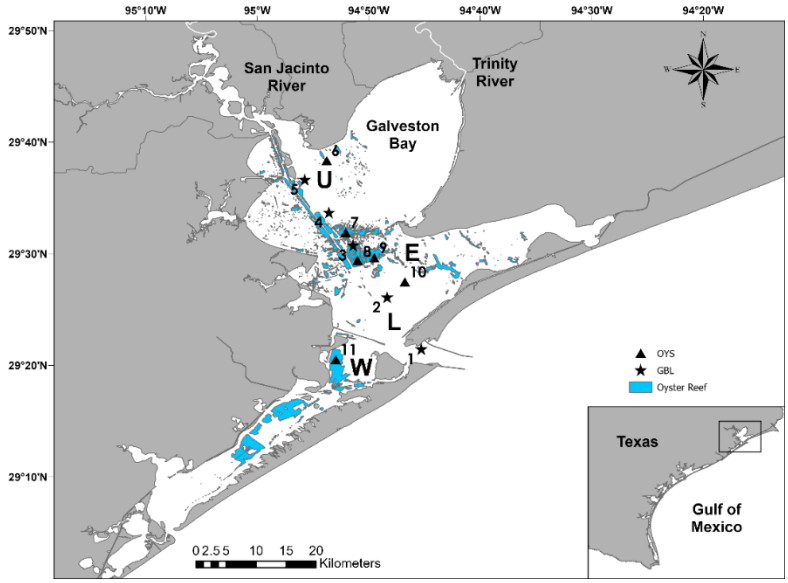


Figure 1. Study sites (stars: sites of existing monitoring project since 2022 to now, triangles: sites sampled during the oyster reproductive season in 2023&2024) in Galveston Bay. U: upper bay, E: east bay, L: lower bay, W: west bay.

[14] If partners are subgrantees completing work reimbursable under GBEP funding, a letter of commitment from the partner must be submitted as an appendix with the application.

Supplemental Photos/Graphics (Optional):

[Insert Here or Attach as an Appendix]

PlanktoScope-6-env.jpg https://drive.google.com/drive/folders/1MI6QnvkWGdbRJb6qP6YkA...

Figure 2. Field view of PlanktoScope (photo provided by FairScope).

Figure 3. Imaging files of plankton generated by PlanktoScope (photo provided by FairScope).

Figure 4. Illustration of AI-aided automatic processing of imaginary files

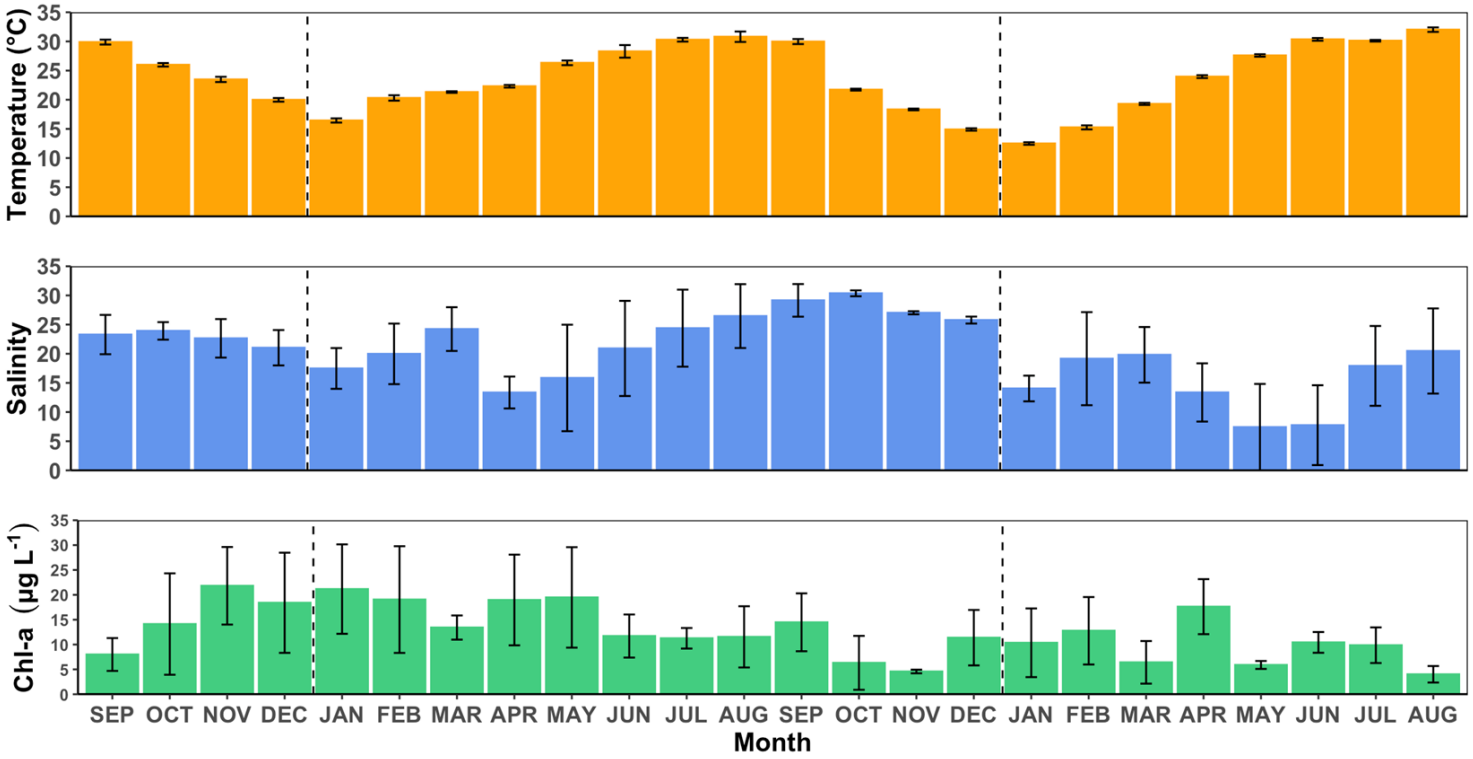


Figure 5 Exhibit of monitoring environmental factors in Galveston Bay during recent project from September 2022 to Sepetember 2024 (Lin et al. to be submitted)

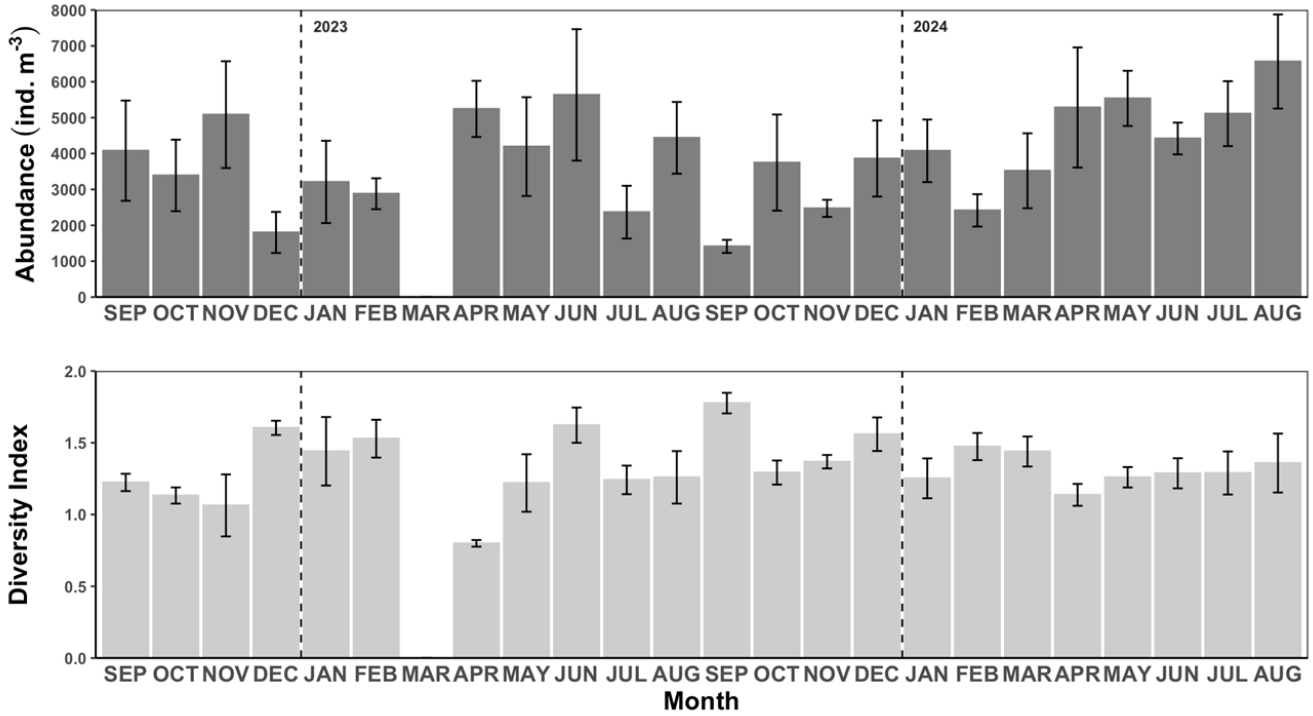


Figure 6 Exhibit of monitoring zooplankton in the recent project from Sepetember 2022 to September 2024 (Lin et al. to be submitted)

SECTION SIX: BUDGET DETAILS

Grant Payments [see 30 TAC § 14.7(12)]: All grant payments will be made on the basis of reimbursement for allowable costs (as defined in 2 CFR Part 200, Subpart E). All payments for awarded proposals will be reimbursements of allowable costs incurred after both parties have entered (signed) a grant agreement for the project.

Budget. Authorized budgeted expenditures for work performed are as follows:

d. Direct Costs

Budget Category	Cost for Work to be Performed
Salary / Wages	$79,433
Fringe Benefits **(##%)**[15]	$12,364
Travel	$5,008
Supplies	$6,000
Equipment	$0.00
Contractual	$0.00
Construction	$0.00
Other	$68,860
Total Direct Cost	**$171,665**

e. Indirect Costs[16]

[15] If fringe is not a single rate, please attach calculation or explanation as an appendix.
[16] Please attach Indirect Cost Agreement as an appendix if applicable

Distribution Base Amount *(identify Base type below)*	$
Indirect Cost Rate for Reimbursement	54.0%
Total Indirect Costs	$ 84,297

f. Maximum Authorized Reimbursement

Maximum Authorized Reimbursement (Direct and Indirect Costs)	$ 255,962

Indirect Cost Distribution Base. The Distribution Base above is (check one):

☐ direct salary/wages and fringe benefits

☒ modified total direct costs

☐ Other direct costs base

If other direct cost base, identify:

The indirect cost rate is (check one):

☒ **Predetermined Rate**— an indirect rate that is negotiated between the Performing Party and its federal cognizant agency and supported by a current Negotiated Indirect Cost Rate Agreement (NICRA) letter. A Predetermined Rate is not subject to adjustment except as provided by 2 Code of Federal Regulations (CFR) § 200.411.

☐ **De Minimis Rate**— if Performing Party does not have a current negotiated indirect rate, Performing Party may use a standard rate of fifteen percent of Modified Total Direct Costs (MTDC)[17] in lieu of determining the actual indirect costs of the service. Costs must be consistently charged as either indirect or direct costs.

☐ **Partial Reimbursement Rate**— a reimbursement rate agreed to between TCEQ and Performing Party that is less than the rate authorized under TxGMS or, where applicable, 2 CFR Part 200. Performing Party contributes all of its unreimbursed indirect costs to the successful performance of the project or projects funded under this Contract, in accordance with Article 9 of this section. [If this is a Partial Provisional Rate, include the following language: "This is a Partial Provisional Rate. Any adjustment is subject to the requirements of Article 9 of this section; however, no adjustment will be made unless the finally determined actual indirect costs are lower than the Partial Indirect Cost reimbursement made under the Contract."]

☐ **Other:** [Examples: De Minimis Rate with a base of direct salary and wages (less than or equal to actual indirect costs) or Provisional Rate. If this is a Provisional Rate, include the following language: Provisional Rate: The subsequent adjustment of the indirect cost rate is subject to the requirements of Article 9 of this section.]

Other. If Budget Category "Other" is greater than $25,000 or more than 10% of total Contract budget, identify the main constituents:

Ship time ($48,600 total): Ship time is budgeted for sampling Galveston Bay. We request support for 12 daily cruises (up to 9 hours per trip) per year in Years 1&2. The current rate for R/V Milan is $225/hour. $2,025 /per trip, $12,000 per year in Years 1&2. The total cost for ship time is $24,300/ per year and $48,600 in total during the project.

[17] https://www.ecfr.gov/current/title-2/part-200/section-200.1#p-200.1(Modified%20Total%20Direct%20Cost%20(MTDC))

SECTION SEVEN: CONTRACT REQUIREMENT [see 30 TAC § 14.7(15)]:

- By submitting this Project Proposal, you acknowledge that, if you become a successful grant recipient selected for a grant award, you must enter into a signed grant agreement or contract with TCEQ following the announcement of that award.

SECTION EIGHT: ACKNOWLEDGMENTS

Please read and understand the following:

- By submitting this Project Proposal, you acknowledge that information on how grant payments will be made is contained in the Budget Details section describing direct and possibly indirect costs. You further acknowledge that grant payments will be reimbursements on the basis of allowable costs incurred and that selected recipients will receive contract documents addressing allowable costs, unallowable costs, and reimbursement.
- By submitting this Project Proposal, you acknowledge your understanding that Project Proposals do not require matching funds and that a TCEQ director does not need to adjust or waive any matching funds requirement.
- By submitting this Project Proposal, you acknowledge that, if GBEP elects to hold a pre-submittal meeting relating to this Project Proposal, GBEP will notify you of the meeting's time and location indicating whether attendance is mandatory.

SECTION NINE: QUESTIONS AND PRE-SUBMITTAL MEETINGS [see 30 TAC § 14.7(13) and 30 TAC § 14.7(14)]:

- There are no pre-submittal meetings scheduled.
- For requests for additional, pre-submittal information **[see 30 TAC § 14.7(13)]**, please contact the corresponding Subcommittee Coordinator listed on this page.

SECTION TEN: ADDITIONAL INSTRUCTIONS

In submitting your Project Proposal, please refer and adhere to the following instructions and guidelines concerning materials and information required to be submitted by potential grant recipients:

- GBEP intends to accept only complete Projected Proposals in a layout and format constituting a filled version of this proposal document with all applicable sections therein addressed; however, GBEP may, in its sole discretion, consider and accept nonconforming Project Proposals in the best interest of the state.
- Unless otherwise specified by GBEP, formal signatures are not required on Project Proposals.
- Unless otherwise communicated or implied, GBEP requires 1 (one) completed copy of your Project Proposal per corresponding Subcommittee Coordinator.
- Project Proposals must be received electronically, through the email address of the relevant Subcommittee Coordinator listed on this page, by the deadline listed on both this page and the first page of this Project Proposal document.

Submittal Process and Deadline [see 30 TAC § 14.7(8) and 30 TAC § 14.7(9)]:
Please Submit Project Proposals (Microsoft Word Only – No PDFs) by July 25, 2025 to the relevant Subcommittee Coordinators below:

WSQ Subcommittee
Christian.Rines@tceq.texas.gov

NRU Subcommittee
Lindsey.Lippert@tceq.texas.gov

PPE Subcommittee
Zoe.Gapayao@tceq.texas.gov

M&R Subcommittee
Jenelle.Estrada@tceq.texas.gov

Programmatic Projects
Lisa.Marshall@tceq.texas.gov

Extended Budget Justification

Project Title: **Advancing monitoring estuarine ecosystems through development of automatic sampling framework**

Project Period: 9/1/2026-8/31/2028

Investigator: Hui Liu
Texas A&M University Galveston, Marine Biology Department, Galveston, TX 77553
Contact: liuh@tamug.edu, 409-740-4716(phone), 409-740-5001(fax)

TAMUG Budget Justification:

Personnel

One month of salary per year over two years is budgeted for Dr. Liu. He will be responsible for overseeing and carrying out this project. Base monthly rate of pay is $10,320.01 with 3% annual escalations applied at the beginning of each project year beginning in Year 1.

Dr. Liu requests 7.5 months (4.5 semester months and 3 summer months) at 50% effort (3.75 months FTE) of support per year in Years 1&2 for one graduate student (TBD), who will participate in sampling cruises, sample sorting, imaging process and statistical analysis and draft project reports during the project. Base monthly rate of pay is $5,200/month FTE, with 3% escalations applied in Year 2. Justification of tuition is listed under other costs.

Support for a hourly undergraduate research assistant is budgeted. The undergraduate students will assist Dr. Liu and his graduate student in completing the field work in Years 1&2. The undergraduate students will be the driving workforce behind field sampling and lab sample processing. The cost is budgeted starting at a rate of $15/hour for 20 hours per week over 30 weeks in Year 1&2, with a 3% escalation applied in Year 2.

Fringe Benefits

Fringe benefits for faculty: 18.9% of salary requested + $1,104/month for group medical insurance. Fringe benefits for graduate students: 3% of salary requested + $566/month FTE for group medical insurance. Fringe benefits for undergraduate students: 3% of wages requested.

Travel

Travel is budgeted at $2,504/trip in Year 1 and Year 2 for Dr. Liu to participate in the ASLO in 2027 and Ocean Science conference in 2028 (Locations TBD) to disseminate research results.

Materials & Supplies

We request support for supplies for sampling at sea budgeted at $3,000 per year for two years.

Other Cost

Conference Registration Fee: $600 per year for two years is requested for conferences (TBD) registration fees for Dr. Liu to disseminate research results.

Publication Costs: $3,500 for open access publication fees is requested in Year 2.

Graduate Student Tuition ($15,560 total): Tuition for one graduate student is budgeted at $489 per credit for 15 credits per year in Years 1&2 with a 5% escalation annually starting in Year 2.
Ship time ($48,600 total): Ship time is budgeted for sampling Galveston Bay. We request support for 12 daily cruises (up to 9 hours per trip) per year in Years 1&2. The current rate for *R/V* Milan is $225/hour. $2,025 /per trip for 12 trips, $24,300 per year in Years 1&2. The total cost for ship time is $24,300/ per year and $48,600 in total during the project.

Indirect Charges

Indirect costs are requested at the rate of 54% of Modified Total Direct Costs (MTDC) including the cost of ship time.

Galveston Bay Estuary Program
Fiscal 2027 Project Proposal

Please complete this proposal form and submit to the appropriate Subcommittee Coordinator (end of form) by July 25, 2025. No late submittals will be considered for funding.

This Call for Project Proposals complies with 30 Texas Administrative Code (TAC) § 14.7, which lays out requirements for a competitive solicitation by TCEQ for grant awards. For convenience, specific citations to 30 TAC § 14.7 are identified in the text.

SECTION ONE: INTRODUCTION

Purpose [required by 30 TAC § 14.7(1)]: The purpose of the proposed grant from the Galveston Bay Estuary Program (GBEP), a program of the Texas Commission on Environmental Quality (TCEQ), is to implement *The Galveston Bay Plan, 2nd Edition* (the Plan), a comprehensive conservation and management plan falling under Section 320, of the Federal Water Pollution Control Act (33 U.S.C. Section 1330), for a designated national estuary in the State of Texas.

Objective and Allowable Activities [see 30 TAC § 14.7(4)]: The objective of this grant is to implement the GBEP stakeholder developed priorities for fiscal 2027 (FY 2027) Priority Area Actions that were developed by GBEP subcommittees for FY 2027 at the June 2025 meetings. Any proposal implementing the Plan may be submitted, but proposals implementing the FY 2027 Priority Area Actions will be considered above others.

Authority [see 30 TAC § 14.7(2)]: Grants issued by GBEP under this solicitation are authorized by: the Federal Water Pollution Control Act (Clean Water Act) § 320 (33 UNITED STATES CODE § 1330), commonly referred to as the National Estuary Program; TEX. WATER CODE § 5.124; and 30 TAC ch. 14.

Match Requirement [see 30 TAC § 14.7(10) and 30 TAC § 14.7(11)]: No matching funds are required. Therefore, there is no need to adjust or waive any matching funds requirement.

Multiple Awards [see 30 TAC § 14.7(7)]: GBEP anticipates awarding funds for multiple proposals. GBEP intends to award grants to that combination of proposals which best implements the Plan, factoring in all criteria identified in this Call for Project Proposals, the availability of funds, and the most effective division of funds between awards.

Timeline of Proposals:

Task	Date Due
Release of Request for Proposals	June 23, 2025
Proposals Due	July 25, 2025
Send Proposals to Subcommittees Members for Review	August 13, 2025
Present Proposals to Subcommittees for Council Recommendation	September 3, 2025 (NRU and PPE) September 10, 2025 (M&R and WSQ)
Present Proposals to B&P Subcommittee for Final Recommendation	October 1, 2025
Present Proposals to Galveston Bay Council for Approval	October 15, 2025

SECTION TWO: SUBMITTAL – GENERAL INFORMATION

Primary Subcommittee: Public Participation and Education (PPE)
Secondary Subcommittee (if applicable): Monitoring and Research (M&R)

Project Name:

Sea Aggie Sea Turtle Patrol- Gulf Center for Sea Turtle Research

Project Previously Funded by GBEP? Yes ☐ No ☒

Lead Implementer / Categories of Eligible Recipients [see 30 TAC § 14.7(3)]:

Texas A&M University at Galveston

The lead implementer must be in one of the following categories of eligible recipients. Please indicate which category applies to your entity. If the proposing party is not already paired with a lead implementer in one of the categories listed below, the proposing party will need to partner with an eligible recipient in one of these categories to be selected for funding. Please reach out to GBEP staff with any questions.

☒ Federal, State, or Local Government ☐ Council of Government ☐ Public ISDs or Universities
☐ Nonprofit ☐ Other*

[If other, please identify pass-through partner.]

Unique Entity ID (UEI) Number:	G8Y3L8JV2588
Vendor Identification Number (VIN) or Tax ID:	74-6000541

Contact Information:

Project Representative Name	Christopher D. Marshall, Ph.D.
Project Representative Phone	409-740-4884
Project Representative Email	marshalc@tamug.edu

Amount Requested from GBEP:

$111,347

Federal ☐ State ☐ No Preference ☒
Is the project scalable? ☒

Amount Requested per year (if applicable):

FY 2027 (09/01/2026-05/31/2027)	$111,347
FY 2028 (09/01/2027-05/31/2028)	$0.00
FY 2029 (09/01/2028-05/31/2029)	$0.00
Total	$0.00

Project Dates / Duration (beginning no earlier than September 1, 2026 – ending no later than May 31, 2029) [see 30 TAC § 14.7(5)]:

12 months

Total Project Cost (including Leveraging Amounts, if any; provide leveraging information where indicated below):

$111,347 (GBEP)+$50,545 (NRDA TIG) = $161,892 Total Cost

Is this an estimate? ☐

Leveraging (in-kind and/or cash):

The Sea Aggie Sea Turtle Patrol has been funded by NRDA/Deepwater Horizon funds for the past 10 years. This is the official last year of this funding. However, the Texas Trustee Implementation Group (TIG) that oversees the expenditure of these funds will fund the Sea Aggie Sea Turtle Patrol at a minimal level for the next three years. This funding is in hand, but the GCSTR requires additional funding sources to fully operate the Sea Aggie Sea Turtle Patrol program. Once the Gulf Center for Sea Turtle Research's Educational Facility is constructed, revenue from ecotourism will fund the Sea Aggie Sea Turtle Patrol in the future. The GCSTR is requesting assistance during these gap years.

Project Urgency:

The need for funding this cycle is urgent since the NRDA funding for this work is greatly reduced. While plans are being executed to replace this funding, delays in the Gulf Center for Sea Turtle Research's Educational Facility construction that will supply such funds requires the GCSTR to seek funding in this gap year.

SECTION THREE: *GALVESTON BAY PLAN, 2ND EDITION* IMPLEMENTATION

Grant recipient activities to be funded must implement the Plan, but proposals implementing the Fiscal 2027 Subcommittee Priorities (Section Four) will be considered above others. This selection criteria provides for the selection of multiple recipients as needed.

The *Galveston Bay Plan, 2nd Edition* Action Plans are found at:
https://gbep.texas.gov/ensure-safe-human-and-aquatic-life-use/
https://gbep.texas.gov/protect-and-sustain-living-resources/
https://gbep.texas.gov/engage-communities/
https://gbep.texas.gov/inform-science-based-decision-making/

Galveston Bay Plan Priority Area Actions Addressed:

Plan Priority 1: Ensure Safe Human and Aquatic Life Use

NPS-1 ☐	NPS-2 ☐	NPS-3 ☐	NPS-4 ☐	
PS-1 ☐	PS-2 ☐	PS-3 ☐		
PHA-1 ☐	PHA-2 ☐	PHA-3 ☐	PHA-4 ☐	PHA-5 ☐

Plan Priority 2: Protect and Sustain Living Resources

HC-1 ☐	HC-2 ☐	HC-3 ☒
SC-1 ☒	SC-2 ☐	
FWI-1 ☐	FWI-2 ☐	FWI-3 ☐

Plan Priority 3: Engage Communities

SPO-1 ☒	SPO-2 ☒	SPO-3 ☒	SPO-4 ☒
PEA-1 ☒	PEA-2 ☒	PEA-3 ☒	

Plan Priority 4: Inform Science-based Decision Making

RES-1 ☒	RES-2 ☐	RES-3 ☒	RES-4 ☐
RES-5 ☐	RES-6 ☐	RES-7 ☒	RES-8 ☒
ACS-1 ☒	ACS-2 ☒	ACS-3 ☐	

Plan Priority Area Actions Detail:

This proposal implements the Galveston Bay Priority Plan, focusing on three key Priority Plans: Protect and Sustain Living Resources (Priority 2), Engage Communities (Priority 3), and Inform Science-based Decision Making (Priority 4). These implementations also coincide with current TCEQ funded projects to provide updated demographic baseline data for ***species of greatest conservation need***. This program currently enhances existing and ongoing conservation efforts for sea turtle species that utilize all areas of Galveston Bay, focusing on adaptive management strategies.

Priority Plan 2: Protect and Sustain Living Resources

SC-1 (support projects that sustain and restore native species populations).

The primary goals of the Sea Aggie Sea Turtle Patrol is to 1) restore sea turtle populations by increasing the recruitment of Kemp's ridley hatchling to the adult population, and by reducing sea turtle egg and hatchling mortality through continued support for nest detection and protection efforts and 2) Educate the public, students, and scholars on the conservation of sea turtles in Galveston Bay, the role sea turtles play in the Galveston Bay lower watershed ecosystem, the need to create a resilient coastal environment, and to create marine conservation stewards in the community. The work of the Sea Aggie Sea Turtle Patrol actively saves hatchlings that would likely be lost to high tide inundation on the upper Texas coast. Detected nests are excavated per State of Texas protocol and eggs are carefully packed and transported to Padre Island National Seashore (PAIS), where controlled incubation conditions improve hatching success for these species of greatest conservation need (**SC-1**). Furthermore, recent data regarding sea turtle strandings, and from sea turtles captured as part of the in-water research program, demonstrate that three species of sea turtles (Green [*Chelonia mydas*], Kemp's ridley [*Lepidochelys kempii*], and loggerheads [*Caretta caretta*]) use the

Galveston Bay Estuary as both adult foraging (loggerheads), and developmental habitat (greens and Kemp's ridleys). Sea turtles that hatch in the lower Galveston watershed are presumed to return to the area for continued development and nesting.

During nest monitoring patrols, volunteers searching for sea turtles and their tracks also interact with the public raising awareness of sea turtle conservation and marine conservation. Patrollers also help clean the beach of marine debris and identify marine debris hotspot areas, which informs future cleanup events as part of the GCSTR's Marine Debris program (**HC-3:** Enhance existing habitats to increase overall function and productivity). Last, the Sea Aggie Sea Turtle Patrol also is integrated with the GCSTR's Sea Turtle Rescue and Recovery efforts along the upper Texas coast. Due to the large area covered and the high level of survey effort, patrollers often come across stranded sea turtles and assist in the process of recovery and transport to the GCSTR's rehabilitation hospital. Patrollers also report and may assist in the recovery of injured or stranded marine mammals and birds, including banded individuals.

Plan Priority 3:
The Sea Aggie Sea Turtle Patrol has offered walking and UTV (Utility Task Vehicles) nesting survey volunteer opportunities in the Houston-Galveston area over the past 10 years, enacting **SPO-1** (Develop new and support existing stewardship programs and volunteer opportunities for stakeholders). The GCSTR has consistently recruited and trained ~350 volunteers each year and this program has grown significantly, following **SPO-1** and **SPO-2** (support and promote workshops and events that facilitate stakeholder and partner involvement). Additionally, there are volunteer opportunities for data collection and management of patrol logs for those unable to go into the field. Turtle Trails, a new component of Sea Aggie Sea Turtle Patrol, launched in 2024, is a stewardship program for the public to join a turtle patrol without the long-term commitment. Turtle Trails attracts 300 participants each season and the program is led by our most dedicated patrollers who are educated in nesting sea turtle biology in our area (**SPO-1**). Additionally, the integration of the GCSTR's new Marine Debris Program with the Sea Aggie Sea Turtle Patrol improves the environmental quality of Galveston Bay by increasing awareness and connection to our natural resources (***SPO-3).*** Last, the GCSTR frequently informs local state and federal government entities (Galveston Park Board, Texas Parks and Wildlife, Texas Grant Land Office, U.S. Army Corps of Engineers, U.S. Coast Guard, and U.S. Fish & Wildlife) of lower Galveston Bay watershed concerns, especially as it pertains to endangered species, coastal concerns and new information (***SPO-4).*** Throughout the last decade, this survey program has reported countless kills and spills concerns such as mass die off events or hazardous waste to TPWD. Additionally, major pollution incidents and larger debris items including illegal drugs, oil drums, refrigerators and boats to the respective entity to remove them from the lower watershed.

Engage Communities: **PEA-1** (Key Issue Engagement), **PEA-2** (Adult Education), **PEA-3** (Kindergarten to 12th Grade (K-12) Education Efforts). The mission of the GCSTR is to educate the public on key coastal issues related to marine conservation, coastal sustainability, climate and sustainability (PEA-1). We will do so by reaching out to underrepresented ISDs (PEA-3) and communities (PEA-2) through our volunteers during patrols, regional patroller recruitment events, and through the Turtle Trails program. We currently have volunteers and public members from the Houston-Galveston metroplex and beyond.

Inform Science-based Decision Making: Continued funding for the Sea Aggie Sea Turtle Patrols will enact FY2027 Priority Area Actions for ***RES-1*** (Develop new and support existing efforts to conduct biological stressor monitoring and research), and ***RES-3*** (Develop new and support existing efforts to conduct physical stressor monitoring and research) through direct observations of Optimal Sea Turtle Nesting Habitat metrics that are documented in the Sea Aggie Sea Turtle Patrol survey logs. These observations note and assess environmental shifts including sargassum inundation, erosion, weather, wind speed, tides, cloud cover, beach nourishment, and beach raking, but also high tide and potential nest inundation events. Recent research on Optimal Nesting Habitat relied upon Sea Aggie Sea Turtle Patrol observations to support the study results

that stated sea turtle nests left *in situ* would be lost due to multiple high tide inundations. Such data from the Sea Aggie Sea Turtle Patrol has gained the attention of the U.S. Army Corps of Engineers as they plan to implement the Texas Coast Spine. Efforts from the Sea Aggie Sea Turtle patrol may help shape how beach renourishment activities of the Corps are executed. Overall analysis of these data will result in the characterized risks to coastal habitats and how endangered species respond to the changes and frequencies of tropical storms (***RES-8).*** The results of this monitoring and research are conveyed to numerous audiences through outreach, scientific publications, workshops, and seminars, as well as state and federal agencies (***ACS-2)***. The GCSTR maintains a social media presence with over 21,000 followers, and a reach of 400,000-975,000 views in the region.

SECTION FOUR: SUBCOMMITTEE PRIORITIES / FACTORS TO BE USED TO SELECT AWARDS [see 30 TAC § 14.7(6)]

Grant recipient activities must implement the Plan. Additional recipient selection criteria includes whether a project addresses a subcommittee priority. This selection criteria provides for the selection of multiple recipients as needed.

Subcommittee Identified Priorities

Grant recipient activities must implement the Plan. Additional recipient selection criteria includes whether a project addresses a subcommittee priority.

☐ WSQ: Supporting management measures and watershed-based plans.
☐ WSQ: Implementation and/or evaluation of best management practices that address point and nonpoint source pollution.
☐ WSQ: Public health risk awareness outreach campaigns related to contact recreation and/or seafood consumption.
☐ NRU: Habitat acquisition.
☐ NRU: Enhancement of existing or ongoing restoration/conservation efforts with special emphasis on:
    ☐ Adaptive management for previously completed projects;
    ☐ Projects that have lost funding from other federal sources; and
    ☐ Nonnative species management.
☒ NRU: Benefit to native fish and wildlife, including federal and state listed species, Species of Greatest Conservation Need, or nongame wildlife.
☐ NRU: Brings funding, work leverage, or multiple Priority Area/Subcommittee benefits to the program.
☐ NRU: Project urgency: Project must be completed in next 24 months or opportunity is lost
☒ PPE: Empowers K-12 students and/or adults to positively impact their local environment through increased scientific literacy and community projects.
☒ PPE: Connects new audiences to existing/completed projects or the natural habitat.
☒ PPE: Opportunities for GBEP and partners to host workshops/networking for education and outreach practitioners on key topics.
☒ PPE: Conservation and environmental workforce development.
☒ M&R: Meaningful and effective monitoring of existing, past, and new projects (NRU: especially species of concern, WSQ, PPE).
☐ M&R: Baseline assessments for large-scale, man-made changes to Galveston Bay.
☒ M&R: Assessment, Exposure, and Response to stressors, including but not limited to:

☒ Species of Greatest Conservation Need;
☐ Contact recreation standards;
☐ Environmental parameters;
☐ Emerging contaminants; and
☐ Legacy contaminants.

☐ Investigate ecosystem services and economic valuation of bay resources.

Subcommittee Priority Detail:

The Sea Aggie Sea Turtle Patrol Program supports key goals of the Galveston Bay Estuary Program, especially in the areas of PPE, NRU, and M&R. The program plays a direct role in protecting native wildlife, most notably the critically endangered Kemp's ridley sea turtle, through regular patrols, nest monitoring, and egg recovery efforts along the upper Texas coast. It offers students, university interns, and community volunteers the chance to participate in hands-on conservation work, helping to build a stronger sense of environmental responsibility and stewardship. The data collected supports long-term sea turtle recovery efforts throughout the Gulf and helps track how these species are impacted by ongoing threats like habitat loss and human activity. The program also includes a team of permitted nest responders who recover eggs from nests for our area, which is not optimal nesting habitat for sea turtles due to tides, storms, erosion and inundation of our dune systems. The eggs are transported to Padre Island National Seashore (PAIS), where controlled incubation conditions improve hatching success for these species of greatest conservation need.

Does the Project align with any EPA Areas of Special Interest?

☐ Reduce Nutrient Pollution to Protect Water Quality and Public Health
☐ Make Investments that Address Coastal Resiliency
☒ Reduce Trash

The Sea Aggie Sea Turtle Patrol interfaces with the Gulf Center for Sea Turtle Research's Marine Debris Program with is funded by the EPA Texas Trustee Implementation Group. In addition to removing trash as they survey, Sea Aggie Sea Turtle Patrol volunteers report on marine debris hotspots and are integral to the GCSTR's Marine Debris Program's decisions to focus resources for beach cleanups and removal of marine debris. During Turtle Trails, public participants also support these efforts by joining a patrol and assisting with beach trash removal.

SECTION FIVE: PROPOSAL DETAILS

Grant recipient activities must implement the Plan. Additional recipient selection criteria includes whether a project addresses a subcommittee priority.

Project Summary:

The primary goals of the Sea Aggie Sea Turtle Patrol is to 1) restore sea turtle populations by increasing the recruitment of Kemp's ridley hatchling to the adult population, and by reducing sea turtle egg and hatchling mortality through continued support for nest detection and protection efforts and 2) Educate the public, students, and scholars on the conservation of sea turtles in Galveston Bay, the role sea turtles play in the Galveston Bay lower watershed ecosystem, the need to create a resilient coastal environment, and to create marine conservation stewards in the community.

The objective of this proposal is to support the operation of the Sea Aggie Sea Turtle Patrol Program, which plays a vital role in protecting the critically endangered Kemp's ridley sea turtle and other threatened and endangered species along the upper Texas coast. The program focuses on early detection of nesting activity, nest protection, and monitoring beaches for undetected nests and emerging hatchlings, while also engaging students, volunteers, and the community in meaningful conservation work and raises awareness, creates public stewardship, and contributes data to regional and Gulf-wide efforts. The Sea Aggie Sea Turtle Patrol also provides data to the GCSTR's Marine Debris Program and the Sea Turtle Rescue and Rehabilitation Program.

Full Project Description (1,000 words or less):

The primary goals of the Sea Aggie Sea Turtle Patrol is to 1) restore sea turtle populations by increasing the recruitment of Kemp's ridley hatchling to the adult population, and by reducing sea turtle egg and hatchling mortality through continued support for nest detection and protection efforts and 2) Educate the public, students, and scholars on the conservation of sea turtles in Galveston Bay, the role sea turtles play in the Galveston Bay lower watershed ecosystem, the need to create a resilient coastal environment, and to create marine conservation stewards in the community. The Gulf Center for Sea Turtle Research (GCSTR) at Texas A&M University at Galveston (TAMUG) is the lead for all sea turtle activities along the upper Texas coast between the TX-LA boarder and Surfside Beach, TX. The GCSTR coordinates training for beach patrols, leads nest recovery efforts, and organizes and conducts nesting surveys. These surveys occur six days a week, from April 1 through July 15 and routes range from Rollover Pass in Bolivar to Surfside Beach. Patrols are conducted by GCSTR staff, TAMUG students, staff, and a cadre of community volunteers. This patrollers use either Utility Task Vehicles (UTVs) or conduct walking patrols, depending on the route. When sea turtle tracks are found, responders assess whether nesting occurred, locate and excavate the nest cavity, and carefully remove the eggs. The eggs are packed in sand either from the original nest and are transported to Padre Island National Seashore's incubation facility per State of Texas protocols. All GCSTR staff, contractors, and volunteers follow all required permits, authorizations, methodologies, and agency protocols outlined by the State of Texas nesting and stranding coordinator, Dr. Donna Shaver, Padre Island National Seashore, Sea Turtle Science and Recovery Division. The GCSTR reports nesting data to Dr. Shaver and TPWD NRDA Trustees that have funded the program.

The Sea Aggie Sea Turtle Patrol Program plays a critical role in conserving sea turtles in the lower Galveston Bay watershed along the upper Texas coast. Over the past 10 years this program was funded through a Deep-Water Horizon Early Restoration grant which ends in 2025. Although some minimal funding is being provided, the GCSTR is seeking alternate funding mechanisms to fully operate the Sea Aggie Sea Turtle Patrol at its current effort level. As the GCSTR continues to lead these efforts, the need to enhance patrol coverage, volunteer coordination, and data collection remains vital. The program protects the critically endangered Kemp's ridley and other threatened and endangered sea turtles through early detection of nesting activity, nest protection, and monitoring for undetected nests and emerging hatchlings. Additionally, this program works in tandem with the GCSTR's Sea Turtle Rescue and Rehabilitation Program that enables the rescue of many stranded sea turtles found washed ashore during the surveys. This program also acts in tandem with the GCSTR's Marine Debris program to report marine hot spots for subsequent beach cleanups. The work of the Sea Aggie Sea Turtle Patrol actively involves students, volunteers, and the broader community in conservation and contributes essential data to regional and Gulf-wide efforts; the program regularly trains ~350 volunteers per season.

The Sea Aggie Sea Turtle Patrol Program supports the goals of the Galveston Bay Estuary Program by helping protect endangered and threatened sea turtles through active nest detection and monitoring along the lower Galveston Bay watershed. (i.e., Protect and Sustain Living Resources). The lower Galveston Bay watershed is an important developmental and nesting habitat for sea turtles. Research funded by GBEP has shown important connections among the habitats sea turtles use in Galveston Bay and nearby beachfront areas (Galveston Bay Estuary System – GBES). These links among bays and beachfront play a vital role in supporting a healthy and functioning coastal ecosystem overall. In the past 10 years, this program has collected detailed patrol logs containing data such as wind speed, tides, cloud cover, beach nourishment, beach raking, high tide inundation events and the impact of numerous tropical storms and hurricanes on our coast. This information supports our conservation work but can also show how environmental factors affect sea turtle behavior and all marine life.

The GCSTR actively recruits volunteers through outreach events and directly with the public on the beach during nesting season and throughout the year. The public is fascinated with sea turtles and the 8.1 million tourists that visit Galveston per year, learn about marine conservation and the issues of Galveston Bay, its marine life as well as sea turtles. These activities allow the GCSTR to grow its volunteer base and educate the public on sea turtle conservation, coastal stewardship, and marine ecosystem health. Strengthening this

program fosters a more informed and conservation-minded coastal community, and communities far from the coast, while supporting the long-term recovery of sea turtle populations.

In addition to monitoring endangered sea turtles, patrol personnel are extensively trained to identify and report sightings of federally protected shorebirds, including piping plovers (*Charadrius melodus)* and red knots (*Calidris canutus),* as well as to document and mitigate potential negative interactions between wildlife and the public. Each year, over a dozen injured birds and other marine or coastal wildlife are rescued, while incidents such as mass fish die-offs and stranded cetaceans are promptly reported to the appropriate regulatory agencies. This program is currently the longest running survey operating within the lower Galveston watershed and has played a pivotal role in raising awareness and informing response efforts related to regional environmental issues. As the primary gateway to the Gulf, the survey area occupies a strategically vital position in tracking the movement of endangered species, marine debris and hazardous material spills into and out of the Galveston Bay Estuary System.

Other Plans Implemented:

Texas Coastal Management Plan, Texas Coastal Resiliency Master Plan

Does the Project work with new, smaller communities/partnerships?

☒ Yes
☐ No

Girl and Boy Scout Groups, Visitors to Galveston

Is the project subject to Title VI requirements?

To meet federal nondiscrimination guidance and laws (Title VI), TCEQ requires information and services to be provided in languages other than English when significant numbers of beneficiaries are of limited English-speaking ability (LEP). If 5% or more of the population within your project area is LEP and share a common language, then you are required to provide outreach in the alternative language. For statewide projects, Spanish language outreach is required. As Title VI compliance could impact the project budget, please reach out to the primary subcommittee coordinator for this application with questions on determining applicability and EJScreen instructions.

☐ Yes
☒ No

N/A

Latitude/Longitude (Optional):

From (28.9376454, -95.2955976) to (29.5068112, -94.5002928)

Location:

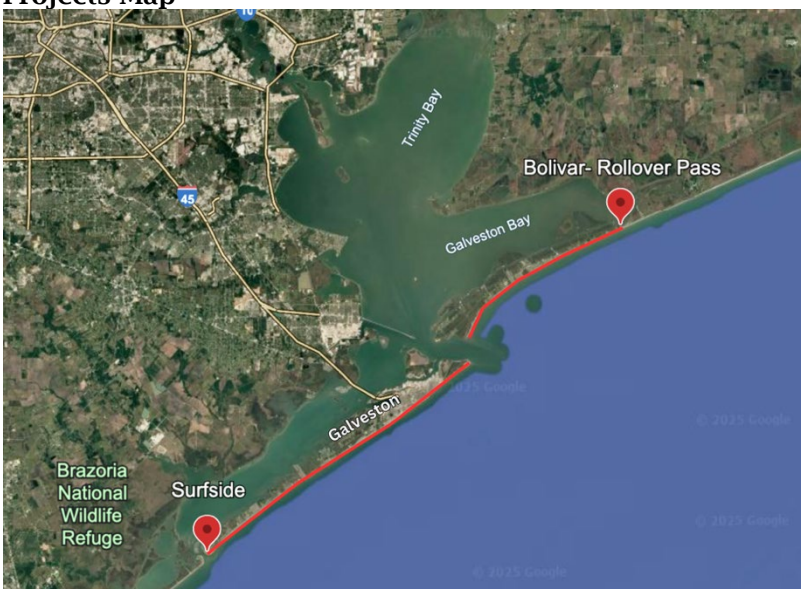
Lower Galveston Bay watershed ranging from the Rollover Pass on the Bolivar Peninsula to Surfside, TX

Partners[18] **and Their Roles**:

The Bay Area Chapter of the Texas Master Naturalists groups provide many volunteers to our program, TAMUG provides students, scholars, and staff volunteers for our program. The GCSTR works closely with Padre Island National Seashore (PAIS), U.S. Fish & Wildlife, and Texas Parks Wildlife. State level oversight is conducted by the nesting and stranding coordinator at PAIS. U.S. Fish & Wildlife and Texas Parks and Wildlife oversee the state and federal permits for the GCSTR to work with these endangered animals.

[18] If partners are subgrantees completing work reimbursable under GBEP funding, a letter of commitment from the partner must be submitted as an appendix with the application.

Projects Map



Sea Aggie Sea Turtle Patrol Coverage area in red.

Supplemental Photos/Graphics (Optional):

GCSTR Excavating a Kemp's Ridley Nest.

TXMN Volunteer patrolling with a UTV.

SECTION SIX: BUDGET DETAILS

Grant Payments [see 30 TAC § 14.7(12)]: All grant payments will be made on the basis of reimbursement for allowable costs (as defined in 2 CFR Part 200, Subpart E). All payments for awarded proposals will be reimbursements of allowable costs incurred after both parties have entered (signed) a grant agreement for the project.

Budget. Authorized budgeted expenditures for work performed are as follows:

e. Direct Costs

Budget Category	Cost for Work to be Performed
Salary / Wages	$34,811
Fringe Benefits **(##%)**[19]	$16,092
Travel	$0.00
Supplies	$5,600
Equipment	$0.00
Contractual	$0.00
Construction	$0.00
Other	$15,800
Total Direct Cost	72,303

f. Indirect Costs[20]

Distribution Base Amount *(identify Base type below)*	$
Indirect Cost Rate for Reimbursement	54.0%
Total Indirect Costs	$ 39,044

g. Maximum Authorized Reimbursement

Maximum Authorized Reimbursement (Direct and Indirect Costs)	$ 111,347

Indirect Cost Distribution Base. The Distribution Base above is (check one):

☐ direct salary/wages and fringe benefits

X modified total direct costs

☐ Other direct costs base

If other direct cost base, identify:

The indirect cost rate is (check one):

X **Predetermined Rate**— an indirect rate that is negotiated between the Performing Party and its federal cognizant agency and supported by a current Negotiated Indirect Cost Rate Agreement (NICRA) letter. A Predetermined Rate is not subject to adjustment except as provided by 2 Code of Federal Regulations (CFR) § 200.411.

☐ **De Minimis Rate**— if Performing Party does not have a current negotiated indirect rate, Performing Party may use a standard rate of fifteen percent of Modified Total Direct Costs (MTDC)[21] in lieu of

[19] If fringe is not a single rate, please attach calculation or explanation as an appendix.
[20] Please attach Indirect Cost Agreement as an appendix if applicable
[21] https://www.ecfr.gov/current/title-2/part-200/section-200.1#p-200.1(Modified%20Total%20Direct%20Cost%20(MTDC))

determining the actual indirect costs of the service. Costs must be consistently charged as either indirect or direct costs.

☐ **Partial Reimbursement Rate**— a reimbursement rate agreed to between TCEQ and Performing Party that is less than the rate authorized under TxGMS or, where applicable, 2 CFR Part 200. Performing Party contributes all of its unreimbursed indirect costs to the successful performance of the project or projects funded under this Contract, in accordance with Article 9 of this section. [If this is a Partial Provisional Rate, include the following language: "This is a Partial Provisional Rate. Any adjustment is subject to the requirements of Article 9 of this section; however, no adjustment will be made unless the finally determined actual indirect costs are lower than the Partial Indirect Cost reimbursement made under the Contract."]

☐ **Other:** [Examples: De Minimis Rate with a base of direct salary and wages (less than or equal to actual indirect costs) or Provisional Rate. If this is a Provisional Rate, include the following language: Provisional Rate: The subsequent adjustment of the indirect cost rate is subject to the requirements of Article 9 of this section.]

Other. If Budget Category "Other" is greater than $25,000 or more than 10% of total Contract budget, identify the main constituents:

[Description of costs associated with "Other" budget category.]

SECTION SEVEN: CONTRACT REQUIREMENT [see 30 TAC § 14.7(15)]:

- By submitting this Project Proposal, you acknowledge that, if you become a successful grant recipient selected for a grant award, you must enter into a signed grant agreement or contract with TCEQ following the announcement of that award.

SECTION EIGHT: ACKNOWLEDGMENTS

Please read and understand the following:

- By submitting this Project Proposal, you acknowledge that information on how grant payments will be made is contained in the Budget Details section describing direct and possibly indirect costs. You further acknowledge that grant payments will be reimbursements on the basis of allowable costs incurred and that selected recipients will receive contract documents addressing allowable costs, unallowable costs, and reimbursement.
- By submitting this Project Proposal, you acknowledge your understanding that Project Proposals do not require matching funds and that a TCEQ director does not need to adjust or waive any matching funds requirement.
- By submitting this Project Proposal, you acknowledge that, if GBEP elects to hold a pre-submittal meeting relating to this Project Proposal, GBEP will notify you of the meeting's time and location indicating whether attendance is mandatory.

SECTION NINE: QUESTIONS AND PRE-SUBMITTAL MEETINGS [see 30 TAC § 14.7(13) and 30 TAC § 14.7(14)]:

- There are no pre-submittal meetings scheduled.
- For requests for additional, pre-submittal information **[see 30 TAC § 14.7(13)]**, please contact the corresponding Subcommittee Coordinator listed on this page.

SECTION TEN: ADDITIONAL INSTRUCTIONS

In submitting your Project Proposal, please refer and adhere to the following instructions and guidelines concerning materials and information required to be submitted by potential grant recipients:

- GBEP intends to accept only complete Projected Proposals in a layout and format constituting a filled version of this proposal document with all applicable sections therein addressed; however, GBEP may,

in its sole discretion, consider and accept nonconforming Project Proposals in the best interest of the state.

- Unless otherwise specified by GBEP, formal signatures are not required on Project Proposals.
- Unless otherwise communicated or implied, GBEP requires 1 (one) completed copy of your Project Proposal per corresponding Subcommittee Coordinator.
- Project Proposals must be received electronically, through the email address of the relevant Subcommittee Coordinator listed on this page, by the deadline listed on both this page and the first page of this Project Proposal document.

Submittal Process and Deadline [see 30 TAC § 14.7(8) and 30 TAC § 14.7(9)]:
Please Submit Project Proposals (Microsoft Word Only – No PDFs) by July 25, 2025 to the relevant Subcommittee Coordinators below:

WSQ Subcommittee
Christian.Rines@tceq.texas.gov

NRU Subcommittee
Lindsey.Lippert@tceq.texas.gov

PPE Subcommittee
Zoe.Gapayao@tceq.texas.gov

M&R Subcommittee
Jenelle.Estrada@tceq.texas.gov

Programmatic Projects
Lisa.Marshall@tceq.texas.gov

Galveston Bay Estuary Program
Fiscal 2027 Project Proposal

Please complete this proposal form and submit to the appropriate Subcommittee Coordinator (end of form) by July 25, 2025. No late submittals will be considered for funding.

This Call for Project Proposals complies with 30 Texas Administrative Code (TAC) § 14.7, which lays out requirements for a competitive solicitation by TCEQ for grant awards. For convenience, specific citations to 30 TAC § 14.7 are identified in the text.

SECTION ONE: INTRODUCTION

Purpose [required by 30 TAC § 14.7(1)]: The purpose of the proposed grant from the Galveston Bay Estuary Program (GBEP), a program of the Texas Commission on Environmental Quality (TCEQ), is to implement *The Galveston Bay Plan, 2nd Edition* (the Plan), a comprehensive conservation and management plan falling under Section 320, of the Federal Water Pollution Control Act (33 U.S.C. Section 1330), for a designated national estuary in the State of Texas.

Objective and Allowable Activities [see 30 TAC § 14.7(4)]: The objective of this grant is to implement the GBEP stakeholder developed priorities for fiscal 2027 (FY 2027) Priority Area Actions that were developed by GBEP subcommittees for FY 2027 at the June 2025 meetings. Any proposal implementing the Plan may be submitted, but proposals implementing the FY 2027 Priority Area Actions will be considered above others.

Authority [see 30 TAC § 14.7(2)]: Grants issued by GBEP under this solicitation are authorized by: the Federal Water Pollution Control Act (Clean Water Act) § 320 (33 UNITED STATES CODE § 1330), commonly referred to as the National Estuary Program; TEX. WATER CODE § 5.124; and 30 TAC ch. 14.

Match Requirement [see 30 TAC § 14.7(10) and 30 TAC § 14.7(11)]: No matching funds are required. Therefore, there is no need to adjust or waive any matching funds requirement.

Multiple Awards [see 30 TAC § 14.7(7)]: GBEP anticipates awarding funds for multiple proposals. GBEP intends to award grants to that combination of proposals which best implements the Plan, factoring in all criteria identified in this Call for Project Proposals, the availability of funds, and the most effective division of funds between awards.

Timeline of Proposals:

Task	Date Due
Release of Request for Proposals	June 23, 2025
Proposals Due	July 25, 2025
Send Proposals to Subcommittees Members for Review	August 13, 2025
Present Proposals to Subcommittees for Council Recommendation	September 3, 2025 (NRU and PPE) September 10, 2025 (M&R and WSQ)
Present Proposals to B&P Subcommittee for Final Recommendation	October 1, 2025
Present Proposals to Galveston Bay Council for Approval	October 15, 2025

SECTION TWO: SUBMITTAL – GENERAL INFORMATION

Primary Subcommittee: Monitoring and Research (M&R)
Secondary Subcommittee (if applicable): Natural Resource Uses (NRU)

Project Name:

Developing a Tool to Assess Black Mangrove Distribution: A Pilot Study in Galveston Bay

Project Previously Funded by GBEP? Yes ☐ No ☒

Lead Implementer / Categories of Eligible Recipients [see 30 TAC § 14.7(3)]:

Environmental Institute of Houston, University of Houston-Clear Lake

The lead implementer must be in one of the following categories of eligible recipients. Please indicate which category applies to your entity. If the proposing party is not already paired with a lead implementer in one of the categories listed below, the proposing party will need to partner with an eligible recipient in one of these categories to be selected for funding. Please reach out to GBEP staff with any questions.

☐ Federal, State, or Local Government ☐ Council of Government ☒ Public ISDs or Universities
☐ Nonprofit ☐ Other*

N/A

Unique Entity ID (UEI) Number:	RD74AUNCTZJ1
Vendor Identification Number (VIN) or Tax ID:	State: 3-75975-9759-2; Federal: 74-6001399

Contact Information:

Project Representative Name	Mandi Gordon
Project Representative Phone	281-283-3794
Project Representative Email	gordon@uhcl.edu

Amount Requested from GBEP:

$ 74,107.75; *Note: this project can be started as early as September 1, 2025 (FY26) and is not scalable*

Federal ☐ State ☐ No Preference ☒
Is the project scalable? ☐

Amount Requested per year (if applicable):

FY 2027 (09/01/2026-08/31/2027)	$ 34,635.45 (starting as early as FY26)
FY 2028 (09/01/2027-08/31/2028)	$ 39,472.30 (starting as early as FY27)
Total	$ 74,107.75

Project Dates / Duration (beginning no earlier than September 1, 2026 – ending no later than May 31, 2029) [see 30 TAC § 14.7(5)]:

09/01/2025-08/31/2027 if funded for FY26
09/01/2026-08/31/2028 if funded for FY27

Total Project Cost (including Leveraging Amounts, if any; provide leveraging information where indicated below):

$74,107.75; *Note: A project summary has also been submitted to the Gulf of America Alliance (GOAA) for consideration with their FY26 Gulf Star program. Funds from GBEP would be start up for the overall project. If awarded, the funds from GOAA would be supplemental and allow for expansion along the full Texas Coast.*

Is this an estimate? ☐

Leveraging (in-kind and/or cash):

This is an entirely new study design and therefore no leverage, in-kind, or cash funds are planned. The University maintains licenses for all software that will be used on the project (e.g., ESRI geospatial software) and use of iNaturalist and R programming software are free to use.

Project Urgency:

This project can be started as early as September 1, 2025. There is not field data collection or surveys planned, so coordination around climatic events and/or accessibility are not required.

SECTION THREE: *GALVESTON BAY PLAN, 2ND EDITION* IMPLEMENTATION

Grant recipient activities to be funded must implement the Plan, but proposals implementing the Fiscal 2027 Subcommittee Priorities (Section Four) will be considered above others. This selection criteria provides for the selection of multiple recipients as needed.

The *Galveston Bay Plan, 2nd Edition* Action Plans are found at:
https://gbep.texas.gov/ensure-safe-human-and-aquatic-life-use/
https://gbep.texas.gov/protect-and-sustain-living-resources/
https://gbep.texas.gov/engage-communities/
https://gbep.texas.gov/inform-science-based-decision-making/

Galveston Bay Plan Priority Area Actions Addressed:

Plan Priority 1: Ensure Safe Human and Aquatic Life Use

NPS-1 ☐ NPS-2 ☐ NPS-3 ☐ NPS-4 ☐
PS-1 ☐ PS-2 ☐ PS-3 ☐
PHA-1 ☐ PHA-2 ☐ PHA-3 ☐ PHA-4 ☐ PHA-5 ☐

Plan Priority 2: Protect and Sustain Living Resources

HC-1 ☐ HC-2 ☐ HC-3 ☐
SC-1 ☒ SC-2 ☒
FWI-1 ☐ FWI-2 ☐ FWI-3 ☐

Plan Priority 3: Engage Communities

SPO-1 ☐ SPO-2 ☐ SPO-3 ☐ SPO-4 ☐
PEA-1 ☐ PEA-2 ☐ PEA-3 ☐

Plan Priority 4: Inform Science-based Decision Making

RES-1 ☒ RES-2 ☐ RES-3 ☐ RES-4 ☐
RES-5 ☐ RES-6 ☐ RES-7 ☐ RES-8 ☒
ACS-1 ☒ ACS-2 ☒ ACS-3 ☐

Plan Priority Area Actions Detail:

SC-1: Native Species Management
Black mangroves (*Avicennia germinans*) are native to the tropical and subtropical regions of the Texas coast, represent a key species for monitoring ecological shifts within this sensitive estuarine ecosystem. Galveston Bay lies at the interface of tropical/subtropical and temperate saltmarsh habitats, making it an ideal location to study the natural dynamics of native species within their historic range. In support of SC-1's objective to sustain and restore native species populations, this project proposes the development of a black mangrove monitoring program that integrates public engagement through citizen science with advanced deep-learning tools. By leveraging these technologies, resource managers will gain the ability to detect range changes more efficiently and apply scalable monitoring strategies throughout the lower Galveston Bay watershed. This approach aligns with the GBEP's mission of enhancing native species tracking and coastal habitat understanding while providing a cost-effective model for broader implementation.

SC-2: Invasive Species Management
Although black mangroves are native to the Texas coast and historically present in Galveston Bay, recent trends have facilitated their expansion into more temperate zones in the northern reaches of the Gulf, where they may begin to exhibit invasive characteristics. This expansion has the potential to displace native saltmarsh vegetation, disrupt established ecological relationships, and alter habitat structure, raising concerns about the species' long-term impact on the ecosystem. In line with SC-2's objective to support projects that reduce invasive species, this initiative will evaluate black mangrove encroachment patterns and assess whether their spread poses a threat to native habitats within and beyond the lower Galveston Bay watershed. Validating remote monitoring and predictive modeling tools through this project may also inform future management strategies to mitigate black mangrove impacts in areas where their expansion could be ecologically detrimental. This proactive approach supports the Galveston Bay Plan's priority to address emerging threats from species whose behavior may shift under changing climate conditions.

FWI-2: Freshwater Inflows Research and Management
The proposed study does not directly investigate freshwater inflows. However, the resulting dataset and validated methodology will offer valuable insights for future research on the influence of freshwater availability on black mangrove distribution and abundance in Galveston Bay. As black mangroves expand within the transitional zone of the lower watershed, understanding their spatial patterns may serve as an indicator of changing salinity regimes influenced by freshwater inflow variability. This baseline data will enhance the capacity of future studies to evaluate the ecological responses of native vegetation to seasonal and annual shifts in freshwater availability. In this way, the project supports the broader objectives of FWI-2 by contributing tools and data that can inform long-term freshwater inflow management strategies critical to maintaining ecosystem productivity in Galveston Bay.

RES-1 Conduct Biological Stressor Monitoring and Research
While black mangroves are not invasive, their encroachment can lead to structural and functional shifts in coastal habitats, potentially impacting aquatic and semi-aquatic species. Aligned with RES-1's objective to expand biological stressor research, this study aims to develop innovative monitoring tools to evaluate black mangrove distribution in a region where they are native but historically sparse. By integrating citizen science with deep-learning technology, the project addresses the need for applied research to anticipate and model habitat change, enhancing our understanding of biological stressors in the lower Galveston Bay watershed and supporting long-term ecosystem resilience.

RES-6: Evaluate Best Management Practice Projects
While this project does not directly address evaluation of best management practices, the data provided by this study may be used to develop monitoring or management practices in the future.

RES-8 Complete Coastal Resiliency and Acclimation Studies
This project does not directly evaluate existing Best Management Practices (BMPs), but it supports the RES-6 objective by generating applied research and monitoring data critical for future BMP planning and assessment. By using citizen science platforms, georeferenced photo data, and AI-based recognition tools to map black mangrove distribution, the project will contribute valuable baseline information about vegetative shifts in the lower Galveston Bay watershed. These ecological data may inform future management strategies, including habitat-based BMPs that respond to vegetation changes linked to climate-driven coastal transformation. The monitoring framework developed through this initiative has the potential to be adapted as a management tool, helping to evaluate and guide restoration or conservation practices. In doing so, the project contributes to filling key knowledge gaps identified in RES-6 and provides a foundation for future integration into the State of the Bay Report and related outreach materials.

ACS-1 Track Ecosystem Health Indicators
In support of ACS-1, this project directly contributes to tracking ecosystem health indicators by consolidating historic and contemporary distribution data of black mangroves in Galveston Bay. Through a coordinated partnership with the Texas Parks and Wildlife Department (TPWD), the project compiles both agency data and new citizen-science observations to address existing data gaps related to species distribution and habitat transitions. All validated datasets will be made available to TPWD and integrated into the Galveston Bay Regional Monitoring Database, aligning with GBEP's goal to improve accessibility and synthesis of environmental indicators. By enhancing long-term monitoring capabilities and contributing actionable data on native vegetation shifts, this project will help inform the Galveston Bay Report Card and future updates to the State of the Bay Report and GBP'18.

ACS-2 Provide Access to Monitoring and Research Data
Data collected through this project will be shared with project partners, agency representatives, and interested parties in digital format. The final distribution of this data will be determined after discussion with stakeholders based on need and/or preferred format. Data resulting from this study will also be provided in a Final Report format to the GBEP and prepared for publication in a peer-reviewed journal. The resulting distribution maps and geospatial data will be shared with TPWD and GBEP representatives.

SECTION FOUR: SUBCOMMITTEE PRIORITIES / FACTORS TO BE USED TO SELECT AWARDS [see 30 TAC § 14.7(6)]

Grant recipient activities must implement the Plan. Additional recipient selection criteria includes whether a project addresses a subcommittee priority. This selection criteria provides for the selection of multiple recipients as needed.

Subcommittee Identified Priorities

Grant recipient activities must implement the Plan. Additional recipient selection criteria includes whether a project addresses a subcommittee priority.

☐ WSQ: Supporting management measures and watershed-based plans.
☐ WSQ: Implementation and/or evaluation of best management practices that address point and nonpoint source pollution.
☐ WSQ: Public health risk awareness outreach campaigns related to contact recreation and/or seafood consumption.
☐ NRU: Habitat acquisition.
☐ NRU: Enhancement of existing or ongoing restoration/conservation efforts with special emphasis on:
    ☐ Adaptive management for previously completed projects;
    ☐ Projects that have lost funding from other federal sources; and
    ☐ Nonnative species management.
☒ NRU: Benefit to native fish and wildlife, including federal and state listed species, Species of Greatest Conservation Need, or nongame wildlife.
☐ NRU: Brings funding, work leverage, or multiple Priority Area/Subcommittee benefits to the program.
☐ NRU: Project urgency: Project must be completed in next 24 months or opportunity is lost
☐ PPE: Empowers K-12 students and/or adults to positively impact their local environment through increased scientific literacy and community projects.
☐ PPE: Connects new audiences to existing/completed projects or the natural habitat.
☐ PPE: Opportunities for GBEP and partners to host workshops/networking for education and outreach practitioners on key topics.
☐ PPE: Conservation and environmental workforce development.
☒ M&R: Meaningful and effective monitoring of existing, past, and new projects (NRU: especially species of concern, WSQ, PPE).
☐ M&R: Baseline assessments for large-scale, man-made changes to Galveston Bay.
☒ M&R: Assessment, Exposure, and Response to stressors, including but not limited to:
    ☐ Species of Greatest Conservation Need;
    ☐ Contact recreation standards;
    ☒ Environmental parameters;
    ☐ Emerging contaminants; and
    ☐ Legacy contaminants.
☐ Investigate ecosystem services and economic valuation of bay resources.

Subcommittee Priority Detail:

M&R: Assessment, Exposure, and Response to stressors, including Environmental parameters
This project directly contributes to assessing environmental stressors by tracking the expansion of black mangroves, which is an ecological response to milder winter temperatures and tropicalization. By integrating historic and current species distribution data, the project provides insights into how climate-driven parameters influence vegetation dynamics and coastal ecosystem structure, enabling early detection and response planning.

M&R: Meaningful and effective monitoring of past projects
Through collaboration with TPWD and the integration of long-term mangrove data, this project supports the ongoing evaluation of past habitat and species monitoring efforts. By incorporating modern tools like iNaturalist and deep-learning models, the project enhances the resolution and effectiveness of long-standing monitoring strategies, offering a bridge between legacy datasets and innovative assessment tools.

NRU: Benefit to native fish and wildlife
The black mangrove plays a significant role in shaping habitat for estuarine and coastal species. This project improves understanding of its current and expanding distribution, informing habitat conservation strategies that ultimately benefit native fish, birds, and wildlife that rely on healthy coastal vegetative communities for foraging, nesting, and shelter.

Does the Project align with any EPA Areas of Special Interest?
☐ Reduce Nutrient Pollution to Protect Water Quality and Public Health
☒ Make Investments that Address Coastal Resiliency
☐ Reduce Trash

This project aligns with EPA's priority to support coastal resiliency by investing in scalable monitoring tools and emerging technologies—specifically deep-learning models and citizen science platforms—to detect ecological shifts such as tropicalization. By tracking the expansion of black mangroves, a native species influencing shoreline structure, the project informs proactive habitat management strategies that help address long-term impacts of coastal erosion and climate change along the Texas coast.

COASTAL EROSION
State programs to prevent and reduce coastal erosion including preserving natural protective features such as dunes and bluffs; restricting or prohibiting activities, development or actions in natural protective feature areas to prevent or reduce erosion; placing new construction or structures a safe distance from areas of active erosion and impacts of coastal storms; regulating the placement and construction of erosion protection structures; and establishing standards for the issuance of coastal erosion management permits.

SECTION FIVE: PROPOSAL DETAILS

Grant recipient activities must implement the Plan. Additional recipient selection criteria includes whether a project addresses a subcommittee priority.

Project Summary:

This year, a special interest group comprising representatives from the five Gulf states identified the need to compile comprehensive mangrove distribution data across the region. We will use mangrove distribution in Galveston Bay to pilot creation of an assessment tool that combines citizen-science observations, deep-learning model development, a customizable online reporting tool, and agency data integration to assess the current distribution of black mangroves.

Full Project Description (1,000 words or less):

Tropicalization is the process by which tropical organisms expand their range into more temperate ecosystems. Given the socioeconomic importance and ecological sensitivity of coastal habitats, tropicalization can affect ecosystem structure and coastal resiliency on a global scale. One effective way to monitor these shifts is by examining changes in vegetative structure, using indicator species to detect ecological transitions. As reliable ecological sentinels, indicator species like Black Mangroves (*Avicennia germinans*) provide a powerful means of identifying range shifts at large spatial scales. Black mangroves are native to the southern, subtropical regions of the United States and have recently expanded into the transitional zone between temperate and subtropical environments along the Texas coast. In areas like Galveston Bay, milder winter temperatures have facilitated their northward encroachment into saltmarsh habitats, leading to overlapping vegetation zones. This range expansion has been documented since around 2018, largely due to observations recorded by citizen scientists on iNaturalist. These records have proven essential in recognizing ecological change that might otherwise go unnoticed.

In May 2025, a special interest group comprising representatives from the five Gulf states, which spans across management agencies, researchers, policymakers, and community partners, and identified the need to compile comprehensive mangrove distribution data across the region. The scale of this task makes traditional visual surveys impractical due to their cost and labor demands. Given these limitations, integrating citizen science platforms with advanced digital tools presents a promising alternative. iNaturalist is one such tool that allows users to report and identify species with georeferenced, photo-verified observations. Its "Projects" feature enables groups to pool data and apply quality control filters, including “Research Grade” status and unobscured coordinates, to produce high-confidence datasets. Additionally, deep-learning image recognition models, particularly those integrated through platforms like ArcGIS Pro, have demonstrated high efficiency in species detection using photographic and spatial data (Buetti-Dinh et al., 2019). These tools can detect and analyze ecological patterns more rapidly than manual methods. Finally, mobile-based platforms like Survey123 can be used to gather supplemental data from a wide audience, improving coverage and engaging diverse stakeholder groups.

Partners at the Texas Parks and Wildlife Department (TPWD) have been compiling historic black mangrove distribution data along the Texas coast for decades. However, there remains an urgent need to integrate these records with current, scalable, and community-supported data sources to support predictive modeling and conservation planning. Here, we propose using Galveston Bay to pilot creation of an assessment tool that combines citizen-science observations, deep-learning model development, a customizable online reporting tool, and agency data integration to assess the current distribution of black mangroves. We aim to achieve this through the following objectives:

Objective 1: Develop a Texas Mangrove Monitoring Network Project on iNaturalist.

Objective 2: Conduct deep-learning API model training in ArcGIS Pro to evaluate the use of georeferenced photographic data for black mangrove recognition.

Objective 3: Develop an online reporting tool using Survey123 to increase community engagement in reporting mangrove observations.

Objective 4: Compile historic data from TPWD and geospatial data from Objectives 1–3 to determine the current state of black mangrove distribution.

To meet **Objective 1**, we will establish a Texas Mangrove Monitoring Network project on iNaturalist by creating a dedicated special interest group for researchers, stakeholders, and community observers. This group will curate "Research Grade" observations for black mangroves, which include verified photographic evidence and unobscured geospatial coordinates (see Gordon et al. 2023 for a detailed description of how research grade reports can be utilized in a research framework). To address **Objective 2**, verified georeferenced photographs will be used to train and test a deep-learning image recognition model within ArcGIS Pro. The model will be developed using the platform's Deep Learning toolset and evaluated for accuracy in identifying black mangroves across varied coastal landscapes. Under **Objective 3**, we will design a user-friendly Survey123 reporting tool to expand participation beyond the iNaturalist platform. This tool will allow Galveston Bay stakeholders to contribute additional observations, environmental context, and location data, supporting both community engagement and data quality. Finally, to fulfill **Objective 4** we will coordinate with the TPWD Coastal Resources team to compile and integrate historic distribution records with new spatial data generated from Objectives 1–3. All validated datasets will be shared with TPWD and incorporated into the Galveston Bay Regional Monitoring Database.

The proposed work will result in a preliminary validation assessment of a scalable, high-resolution dataset that integrates citizen science observations, artificial intelligence, and agency-collected geospatial records. This pilot effort in the Galveston Bay area will serve as a proof of concept for tracking black mangrove distribution across complex and dynamic coastal environments. By demonstrating the effectiveness of combining iNaturalist data with deep-learning tools and stakeholder-driven reporting platforms like Survey123, the project establishes a replicable monitoring framework. If validated, this approach can be expanded to other regions along the Texas coast and throughout the Gulf, where similar habitat transitions are occurring. Moreover, the ability to automate species detection and map distribution patterns in near real time offers significant potential for regional or even coast-wide application. Ultimately, the data and methods generated by this study will strengthen the capacity of natural resource managers, conservation planners, and policy makers to make timely, informed decisions in response to shifting species distributions and habitat changes driven by climate and land-use pressures.

Literature Cited

Buetti-Dinh et al., 2019. *Biotechnology Reports* 22:e00321. **Gordon et al., 2023**. *Southeastern Naturalist* 22(Special Issue 12):171–196.

Other Plans Implemented:

In addition to Actions addressed in the Galveston Bay Plan, the proposed study also addresses aspects of other state and gulf-wide plans and strategies.

Governor's Action Plan (GOAA) - Integrated Planning Cross-Team Initiative focus area for Natural and Human System Planning Models. The proposed project gives stakeholders improved access to predictive models that are available to assist and facilitate in the support of coastal resource decision-making.

Does the Project work with new, smaller communities/partnerships?

☐ Yes
☒ No

N/A

Is the project subject to Title VI requirements?

To meet federal nondiscrimination guidance and laws (Title VI), TCEQ requires information and services to be provided in languages other than English when significant numbers of beneficiaries are of limited English-speaking ability (LEP). If 5% or more of the population within your project area is LEP and share a common language, then you are required to provide outreach in the alternative language. For statewide projects, Spanish language outreach is required. As Title VI compliance could impact the project budget, please reach out to the primary subcommittee coordinator for this application with questions on determining applicability and EJScreen instructions.

☐ Yes
☒ No

N/A

Latitude/Longitude (Optional):

Covers entire spatial area of Galveston and adjacent bays.

Location:

Gulf Coast Prairie and Marshes Ecoregion → San Jacinto-Brazos Coastal Basin → Lower Galveston Bay Watershed

Partners[22] and Their Roles:

Internal Project Personnel

Mandi Gordon (gordon@uhcl.edu); EIH, UHCL; Senior Biologist and Interim Associate Director, Research Programs – Mandi will serve as Lead-PI for the proposed project. Mandi's primary roles will be to provide administrative oversight, assist with study design and implementation, manage contractual obligations, conduct data analyses, and reporting.

Brandon Smith (smithbran@uhcl.edu); EIH, UHCL; Research Technician – Brandon will serve as Co-PI for the proposed project. Brandon's primary roles will be to assist with day-to-day project management, coordination with project partners, assisting with data analysis, and report development.

Debbie Bush (bush@uhcl.edu); EIH, UHCL; Outreach Coordinator – Debbie will serve as key personnel on the project. Debbie's primary role will be to assist with the development of the Survey123 reporting tool, data compilation, and outreach activities related to the project (through EIH social media channels and the UHCL website).

TBD; EIH, UHCL; Undergraduate Research Assistant – An Undergraduate Research Assistant will be hired onto the project as Key Personnel. The Undergraduate Research Assistant's primary roles will be to assist project staff with data compilation, dissemination, community outreach and other activities as needed. The undergraduate student may also use data collected through the proposed project in completion of an undergraduate practicum course requirement or as an undergraduate research project.

External Project Partners:

Evan Pettis (evan.pettis@tpwd.texas.gov); TPWD; Natural Resources Specialist V, Habitat Assessment Team Lead – Evan will serve as a state partner on the project. Evan's primary role will be to coordinate with the UHCL project team to provide current and historic distribution data for black mangroves in Texas. As a representative of the GOAA Coastal Resiliency Team, he will also facilitate communications with GOAA on an as needed basis.

Story Lesher (story.lesher@tpwd.texas.gov); TPWD; Natural Resources Specialist, Habitat Assessment Team – Story will serve as a state partner on the project. As a local expert in the Galveston Bay region, Story will assist the UHCL project team and the TPWD Habitat Assessment Team with data sharing and communications, as needed.

[22] If partners are subgrantees completing work reimbursable under GBEP funding, a letter of commitment from the partner must be submitted as an appendix with the application.

Projects Map

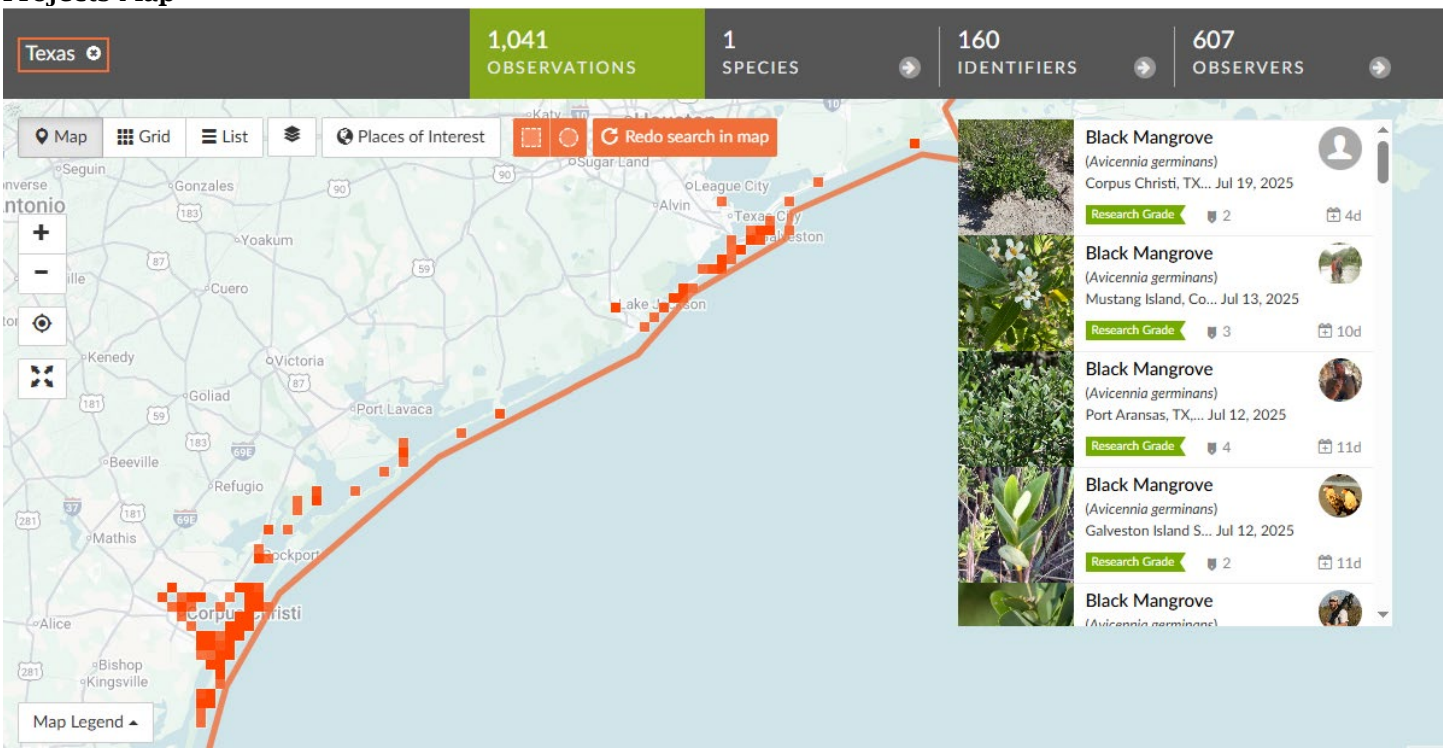


Figure 1 Map of Research Grade reports for Black Mangrove (*Avicennia germinans*) along the Texas coast. There are 1,041 observations as of 25 July 2025 with 68 reports from the lower Galveston Bay watershed.

Supplemental Photos/Graphics (Optional):

Figure 2 Example of a Research grade photo from iNaturalist that would be used to train the deep learning model.

TEXAS PARKS & WILDLIFE

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25 July 2025

Dear Members of the Galveston Bay Council Subcommittee,

We are writing today to advocate for the Section 320 funding proposal entitled "Developing a Tool to Assess Black Mangrove Distribution: A Pilot Study in Galveston Bay," submitted by the University of Houston—Clear Lake. We have been in discussion with the Lead PI, Mandi Gordon, and believe that the results and map products this project would generate fill a critical data gap regarding mangrove extent and expansion in Texas. This information will greatly facilitate the resolution of natural resource management issues that the Texas Parks and Wildlife Department (TPWD) is currently dealing with. Our agency also routinely participates in regional workgroups, such as the Gulf of America Alliance, through which we've received considerable feedback on the necessity of improving mangrove expansion mapping and monitoring across the Gulf states.

We are happy to support this project as resource manager representatives for the Galveston Bay system and the rest of the Texas coast. We are currently employed with the TPWD Ecosystem Resource Program (ERP) as the Program Director (Dr. Zachary Olsen) and the Lead Coastal Ecologist for our Habitat Assessment Team (Evan Pettis). ERP is broadly responsible for the ecosystem-based adaptive management of our coastal natural resources. ERP staff provide technical reviews and guidance for coastal projects and permits, coordinate and implement habitat restorations, and submit recommendations for resource management based on the best available scientific data. The Habitat Assessment Team, specifically, is tasked with coordinating our ongoing habitat mapping and monitoring programs and compiling habitat and fisheries data to inform management decisions.

Our roles in this proposal will be to (1) provide a compilation of all available, historical mangrove spatial data, (2) provide technical guidance and feedback on project methodology, (3) incorporate the resulting data products into our internal and public-facing spatial planning tools, and (4) facilitate the dissemination of this information and data to our regional partners.

As previously stated, the additional monitoring efforts and analyses proposed here address significant data and information gaps that are not sufficiently covered by TPWD's current routine monitoring and mapping programs. Broad-scale remote sensing mapping initiatives (i.e. utilizing satellite or aerial imagery) are often not conducive to capturing fine-scale features such as individual mangroves or small mangrove stands. Moreover, remote sensing imagery sets are often prohibitively expensive, can take years to be published, and require extensive time to classify. Verifying the accuracy of remote-sensing products requires in-situ ground-truthing, especially for mangrove delineations which are often indiscernible from other marsh shrubs and trees. The proposed project resolves these issues by promoting real-time data collection from local stakeholders and automated verification via deep-learning models.

The results of this proposed study can be directly incorporated into our management decision framework and ensure that our recommendations are backed by scientific data. Improved knowledge of the location and condition of mangrove habitats can bolster our ability to adequately provide feedback on various proposed coastal projects and permit applications. This information can also facilitate the identification of priority areas for conservation, enhance site selection for restoration and mitigation efforts, and inform the direction of funding for future research. The project deliverables are supplemental to our existing monitoring programs and provide insight into the rate and severity of coastwide tropicalization that can have significant impacts on local fish and invertebrate communities.

4200 SMITH SCHOOL ROAD
AUSTIN, TEXAS 78744-3291
512.389.4800
www.tpwd.texas.gov

Figure 3 Page 1 of 2 from a letter of support for the project provided by TPWD management.

If funded, the data products generated from this project will be incorporated into our Marine Spatial Planning Tool, a geodatabase utilized by TPWD resource managers for a variety of applications. The data will also be incorporated into our public-facing web apps and web maps, providing access to other researchers and stakeholders. Lastly, the results of this project will be relayed to regional groups that have expressed interest in expanding mapping efforts across the Gulf.

Thank you for your consideration.

Dr. Zachary Olsen
Program Director
Ecosystem Resources Program
Texas Parks and Wildlife Department
Coastal Fisheries Division
1409 Waldron Road
Corpus Christi, TX 78418
Email: Zachary.Olsen@tpwd.texas.gov
Phone: (361) 431-6003 x811

Mr. Evan L. Pettis
Lead Coastal Ecologist
Habitat Assessment Team
Texas Parks and Wildlife Department
Coastal Fisheries Division
1409 Waldron Road
Corpus Christi, TX 78418
Email: Evan.Pettis@tpwd.texas.gov
Phone: (361) 431-6003 x821

Figure 4 Page 2 of 2 from a letter of support for the project provided by TPWD management.

SECTION SIX: BUDGET DETAILS

Grant Payments [see 30 TAC § 14.7(12)]: All grant payments will be made on the basis of reimbursement for allowable costs (as defined in 2 CFR Part 200, Subpart E). All payments for awarded proposals will be reimbursements of allowable costs incurred after both parties have entered (signed) a grant agreement for the project.

Budget. Authorized budgeted expenditures for work performed are as follows:

f. Direct Costs

Budget Category	Cost for Work to be Performed
Salary / Wages	$ 35,847.16
Fringe Benefits **(30%)**[23]	$ 10,858.01
Travel	$ 2,000.00
Supplies	$ 0.00
Equipment	$ 0.00
Contractual	$ 0.00
Construction	$ 0.00
Other	$ 700.00
Total Direct Cost	$ 49,405.17

*Fringe rates = 36% for staff, 15% for students; average rate applied to budget = 30%

g. Indirect Costs[24]

Distribution Base Amount *(identify Base type below)*	$ 49,405.17
Indirect Cost Rate for Reimbursement	50 %
Total Indirect Costs	$ 24,702.58

h. Maximum Authorized Reimbursement

Maximum Authorized Reimbursement (Direct and Indirect Costs)	$ 74,107.75

Indirect Cost Distribution Base. The Distribution Base above is (check one):

☐ direct salary/wages and fringe benefits

☒ modified total direct costs

☐ Other direct costs base

If other direct cost base, identify:

The indirect cost rate is (check one):

[23] If fringe is not a single rate, please attach calculation or explanation as an appendix.

[24] Please attach Indirect Cost Agreement as an appendix if applicable

☒ **Predetermined Rate**— an indirect rate that is negotiated between the Performing Party and its federal cognizant agency and supported by a current Negotiated Indirect Cost Rate Agreement (NICRA) letter. A Predetermined Rate is not subject to adjustment except as provided by 2 Code of Federal Regulations (CFR) § 200.411.

☐ **De Minimis Rate**— if Performing Party does not have a current negotiated indirect rate, Performing Party may use a standard rate of fifteen percent of Modified Total Direct Costs (MTDC)[25] in lieu of determining the actual indirect costs of the service. Costs must be consistently charged as either indirect or direct costs.

☐ **Partial Reimbursement Rate**— a reimbursement rate agreed to between TCEQ and Performing Party that is less than the rate authorized under TxGMS or, where applicable, 2 CFR Part 200. Performing Party contributes all of its unreimbursed indirect costs to the successful performance of the project or projects funded under this Contract, in accordance with Article 9 of this section. [If this is a Partial Provisional Rate, include the following language: "This is a Partial Provisional Rate. Any adjustment is subject to the requirements of Article 9 of this section; however, no adjustment will be made unless the finally determined actual indirect costs are lower than the Partial Indirect Cost reimbursement made under the Contract."]

☐ **Other:** [Examples: De Minimis Rate with a base of direct salary and wages (less than or equal to actual indirect costs) or Provisional Rate. If this is a Provisional Rate, include the following language: Provisional Rate: The subsequent adjustment of the indirect cost rate is subject to the requirements of Article 9 of this section.]

Other. If Budget Category "Other" is greater than $25,000 or more than 10% of total Contract budget, identify the main constituents:

N/A

SECTION SEVEN: CONTRACT REQUIREMENT [see 30 TAC § 14.7(15)]:

- By submitting this Project Proposal, you acknowledge that, if you become a successful grant recipient selected for a grant award, you must enter into a signed grant agreement or contract with TCEQ following the announcement of that award.

SECTION EIGHT: ACKNOWLEDGMENTS

Please read and understand the following:

- By submitting this Project Proposal, you acknowledge that information on how grant payments will be made is contained in the Budget Details section describing direct and possibly indirect costs. You further acknowledge that grant payments will be reimbursements on the basis of allowable costs incurred and that selected recipients will receive contract documents addressing allowable costs, unallowable costs, and reimbursement.
- By submitting this Project Proposal, you acknowledge your understanding that Project Proposals do not require matching funds and that a TCEQ director does not need to adjust or waive any matching funds requirement.
- By submitting this Project Proposal, you acknowledge that, if GBEP elects to hold a pre-submittal meeting relating to this Project Proposal, GBEP will notify you of the meeting's time and location indicating whether attendance is mandatory.

SECTION NINE: QUESTIONS AND PRE-SUBMITTAL MEETINGS [see 30 TAC § 14.7(13) and 30 TAC § 14.7(14)]:

- There are no pre-submittal meetings scheduled.
- For requests for additional, pre-submittal information **[see 30 TAC § 14.7(13)]**, please contact the corresponding Subcommittee Coordinator listed on this page.

[25] https://www.ecfr.gov/current/title-2/part-200/section-200.1#p-200.1(Modified%20Total%20Direct%20Cost%20(MTDC))

SECTION TEN: ADDITIONAL INSTRUCTIONS

In submitting your Project Proposal, please refer and adhere to the following instructions and guidelines concerning materials and information required to be submitted by potential grant recipients:

- GBEP intends to accept only complete Projected Proposals in a layout and format constituting a filled version of this proposal document with all applicable sections therein addressed; however, GBEP may, in its sole discretion, consider and accept nonconforming Project Proposals in the best interest of the state.
- Unless otherwise specified by GBEP, formal signatures are not required on Project Proposals.
- Unless otherwise communicated or implied, GBEP requires 1 (one) completed copy of your Project Proposal per corresponding Subcommittee Coordinator.
- Project Proposals must be received electronically, through the email address of the relevant Subcommittee Coordinator listed on this page, by the deadline listed on both this page and the first page of this Project Proposal document.

Submittal Process and Deadline [see 30 TAC § 14.7(8) and 30 TAC § 14.7(9)]:
Please Submit Project Proposals (Microsoft Word Only – No PDFs) by July 25, 2025 to the relevant Subcommittee Coordinators below:

WSQ Subcommittee
Christian.Rines@tceq.texas.gov

NRU Subcommittee
Lindsey.Lippert@tceq.texas.gov

PPE Subcommittee
Zoe.Gapayao@tceq.texas.gov

M&R Subcommittee
Jenelle.Estrada@tceq.texas.gov

Programmatic Projects
Lisa.Marshall@tceq.texas.gov

Galveston Bay Estuary Program
Fiscal 2027 Project Proposal

Please complete this proposal form and submit to the appropriate Subcommittee Coordinator (end of form) by July 25, 2025. No late submittals will be considered for funding.

This Call for Project Proposals complies with 30 Texas Administrative Code (TAC) § 14.7, which lays out requirements for a competitive solicitation by TCEQ for grant awards. For convenience, specific citations to 30 TAC § 14.7 are identified in the text.

SECTION ONE: INTRODUCTION

Purpose [required by 30 TAC § 14.7(1)]: The purpose of the proposed grant from the Galveston Bay Estuary Program (GBEP), a program of the Texas Commission on Environmental Quality (TCEQ), is to implement *The Galveston Bay Plan, 2nd Edition* (the Plan), a comprehensive conservation and management plan falling under Section 320, of the Federal Water Pollution Control Act (33 U.S.C. Section 1330), for a designated national estuary in the State of Texas.

Objective and Allowable Activities [see 30 TAC § 14.7(4)]: The objective of this grant is to implement the GBEP stakeholder developed priorities for fiscal 2027 (FY 2027) Priority Area Actions that were developed by GBEP subcommittees for FY 2027 at the June 2025 meetings. Any proposal implementing the Plan may be submitted, but proposals implementing the FY 2027 Priority Area Actions will be considered above others.

Authority [see 30 TAC § 14.7(2)]: Grants issued by GBEP under this solicitation are authorized by: the Federal Water Pollution Control Act (Clean Water Act) § 320 (33 UNITED STATES CODE § 1330), commonly referred to as the National Estuary Program; TEX. WATER CODE § 5.124; and 30 TAC ch. 14.

Match Requirement [see 30 TAC § 14.7(10) and 30 TAC § 14.7(11)]: No matching funds are required. Therefore, there is no need to adjust or waive any matching funds requirement.

Multiple Awards [see 30 TAC § 14.7(7)]: GBEP anticipates awarding funds for multiple proposals. GBEP intends to award grants to that combination of proposals which best implements the Plan, factoring in all criteria identified in this Call for Project Proposals, the availability of funds, and the most effective division of funds between awards.

Timeline of Proposals:

Task	Date Due
Release of Request for Proposals	June 23, 2025
Proposals Due	July 25, 2025
Send Proposals to Subcommittees Members for Review	August 13, 2025
Present Proposals to Subcommittees for Council Recommendation	September 3, 2025 (NRU and PPE) September 10, 2025 (M&R and WSQ)
Present Proposals to B&P Subcommittee for Final Recommendation	October 1, 2025
Present Proposals to Galveston Bay Council for Approval	October 15, 2025

SECTION TWO: SUBMITTAL – GENERAL INFORMATION

Primary Subcommittee: Monitoring and Research (M&R)
Secondary Subcommittee (if applicable): Choose an item.

Project Name:

Coastal Ocean Acidification Monitoring Program in Galveston Bay

Project Previously Funded by GBEP? Yes ☐ No ☒

Lead Implementer / Categories of Eligible Recipients [see 30 TAC § 14.7(3)]:

Luke Travis

The lead implementer must be in one of the following categories of eligible recipients. Please indicate which category applies to your entity. If the proposing party is not already paired with a lead implementer in one of the categories listed below, the proposing party will need to partner with an eligible recipient in one of these categories to be selected for funding. Please reach out to GBEP staff with any questions.

☒ Federal, State, or Local Government ☐ Council of Government ☐ Public ISDs or Universities
☐ Nonprofit ☐ Other*

[If other, please identify pass-through partner.]

Unique Entity ID (UEI) Number:	
Vendor Identification Number (VIN) or Tax ID:	

Contact Information:

Project Representative Name	Luke Travis
Project Representative Phone	936-217-5211
Project Representative Email	ltravis@usgs.gov

Amount Requested from GBEP:

$130,000

Federal ☐ State ☐ No Preference ☐
Is the project scalable? ☒

Amount Requested per year (if applicable):

FY 2027 (09/01/2026-05/31/2027)	$65,000
FY 2028 (09/01/2027-05/31/2028)	$65,000
FY 2029 (09/01/2028-05/31/2029)	$0.00
Total	$130,000

Project Dates / Duration (beginning no earlier than September 1, 2026 – ending no later than May 31, 2029) [see 30 TAC § 14.7(5)]:

September 1st, 2026 – August 31st, 2028

Total Project Cost (including Leveraging Amounts, if any; provide leveraging information where indicated below):

$130,000

Is this an estimate? ☐

Leveraging (in-kind and/or cash):

The United States Geological Survey (USGS) will continue operation of a long-term, continuous monitoring program that had previously been established with the leverage of National Oceanic and Atmospheric Administration (NOAA) Gulf of America Coastal Ocean Observing System (GCOOS) funds as well as a previously funded project by GEBP in partnership with Houston Advanced Research Center (HARC) and Galveston Bay Foundation (GBF). These projects supported the acquisition of all sensors and instrumentation used to collect carbonate chemistry parameters at the continuous monitoring station located at Eagle Point, Texas. The USGS will continue to leverage this same equipment for the next two years of this project.

Project Urgency:

This project was initially proposed for four years but only received funding for two. The objective of this project is to continue the support of a previously established continuous monitoring station. Previous NOAA GCOOS and GBEP projects supported the initial installation and data collection effort, but additional funding is required to continue operation and maintenance of the station to build a data set large enough to effectively inform stakeholders on baseline ocean coastal acidification (OCA). It is critical to continue funding of this site to properly leverage the initial funds used to establish the data collection platform and extend monitoring to produce actionable information for GBEP and stakeholders.

SECTION THREE: *GALVESTON BAY PLAN, 2ND EDITION* IMPLEMENTATION

Grant recipient activities to be funded must implement the Plan, but proposals implementing the Fiscal 2027 Subcommittee Priorities (Section Four) will be considered above others. This selection criteria provides for the selection of multiple recipients as needed.

The *Galveston Bay Plan, 2nd Edition* Action Plans are found at:
https://gbep.texas.gov/ensure-safe-human-and-aquatic-life-use/
https://gbep.texas.gov/protect-and-sustain-living-resources/
https://gbep.texas.gov/engage-communities/
https://gbep.texas.gov/inform-science-based-decision-making/

Galveston Bay Plan Priority Area Actions Addressed:

Plan Priority 1: Ensure Safe Human and Aquatic Life Use

NPS-1 ☐	NPS-2 ☐	NPS-3 ☐	NPS-4 ☐	
PS-1 ☐	PS-2 ☐	PS-3 ☐		
PHA-1 ☐	PHA-2 ☐	PHA-3 ☐	PHA-4 ☐	PHA-5 ☐

Plan Priority 2: Protect and Sustain Living Resources

HC-1 ☐	HC-2 ☐	HC-3 ☐
SC-1 ☐	SC-2 ☐	
FWI-1 ☐	FWI-2 ☐	FWI-3 ☐

Plan Priority 3: Engage Communities

SPO-1 ☐	SPO-2 ☐	SPO-3 ☐	SPO-4 ☐
PEA-1 ☐	PEA-2 ☐	PEA-3 ☐	

Plan Priority 4: Inform Science-based Decision Making

RES-1 ☐	RES-2 ☒	RES-3 ☒	RES-4 ☐
RES-5 ☐	RES-6 ☐	RES-7 ☐	RES-8 ☐
ACS-1 ☒	ACS-2 ☒	ACS-3 ☐	

Plan Priority Area Actions Detail:

RES-2 Conduct Geochemical Stressor Monitoring and Research
RES-3 Conduct Physical Stressor Monitoring and Research
ACS-1 Tracking Ecosystem Health Indicators
ACS-2 Access to Monitoring and Research Data
A lack of available applied research and monitoring data can prevent the understanding of Galveston Bay ecosystem components, addressing limits to human uses, and implementing estuary preservation initiatives. The foundation of this project is to continue the support of an already established long-term, continuous acidification monitoring and research program to further our understanding of carbonate system variability in the Galveston Bay estuary and provide a robust dataset of both continuously monitored physical properties and discrete measurements for geochemical and biological stressors at multiple locations throughout the Galveston Bay complex. This monitoring can help determine the environmental conditions in bays, estuaries and near shore regions, forming the basis for many management decisions. All data from this project will be made available on a publicly accessible website. Multiple local, state, federal, and academic entities can use the data collected from this project, including trends and characterization of spatial variability, to support management, planning, and research programs beyond this project alone.

SECTION FOUR: SUBCOMMITTEE PRIORITIES / FACTORS TO BE USED TO SELECT AWARDS [see 30 TAC § 14.7(6)]

Grant recipient activities must implement the Plan. Additional recipient selection criteria includes whether a project addresses a subcommittee priority. This selection criteria provides for the selection of multiple recipients as needed.

Subcommittee Identified Priorities

Grant recipient activities must implement the Plan. Additional recipient selection criteria includes whether a project addresses a subcommittee priority.

☐ WSQ: Supporting management measures and watershed-based plans.
☐ WSQ: Implementation and/or evaluation of best management practices that address point and nonpoint source pollution.
☐ WSQ: Public health risk awareness outreach campaigns related to contact recreation and/or seafood consumption.
☐ NRU: Habitat acquisition.
☐ NRU: Enhancement of existing or ongoing restoration/conservation efforts with special emphasis on:
    ☐ Adaptive management for previously completed projects;
    ☐ Projects that have lost funding from other federal sources; and
    ☐ Nonnative species management.
☐ NRU: Benefit to native fish and wildlife, including federal and state listed species, Species of Greatest Conservation Need, or nongame wildlife.
☐ NRU: Brings funding, work leverage, or multiple Priority Area/Subcommittee benefits to the program.
☐ NRU: Project urgency: Project must be completed in next 24 months or opportunity is lost
☐ PPE: Empowers K-12 students and/or adults to positively impact their local environment through increased scientific literacy and community projects.
☐ PPE: Connects new audiences to existing/completed projects or the natural habitat.
☐ PPE: Opportunities for GBEP and partners to host workshops/networking for education and outreach practitioners on key topics.
☐ PPE: Conservation and environmental workforce development.
☐ M&R: Meaningful and effective monitoring of existing, past, and new projects (NRU: especially species of concern, WSQ, PPE).
☒ M&R: Baseline assessments for large-scale, man-made changes to Galveston Bay.
☒ M&R: Assessment, Exposure, and Response to stressors, including but not limited to:
    ☐ Species of Greatest Conservation Need;
    ☐ Contact recreation standards;
    ☒ Environmental parameters;
    ☐ Emerging contaminants; and
    ☐ Legacy contaminants.
☐ Investigate ecosystem services and economic valuation of bay resources.

Subcommittee Priority Detail:

M&R: Baseline assessments for large-scale, man-made changes to Galveston Bay.

The information from this project will provide a baseline assessment of OCA in Galveston Bay through both continuous and discrete monitoring of the water's carbonate chemistry. The OCA monitoring station helps establish a critical baseline of pH, temperature, salinity, dissolved oxygen, dissolved inorganic carbon, total alkalinity, and partial pressure carbon dioxide. These baseline measurements are essential to distinguish natural variability from human-induced changes and to assess how large-scale events influence acidification dynamics. Consistent monitoring can help decision-makers better evaluate the environmental impacts of man-made changes and implement adaptive management strategies to protect the bay's vital habitats and marine life.

M&R: Assessment, Exposure, and Response to stressors, including but not limited to: Environmental Parameters.

This project will continue enabling real-time data collection of key stressors such as pH, dissolved inorganics carbon, total alkalinity, and partial pressure carbon dioxide in Galveston Bay. These environmental parameters are directly influenced by both natural processes and human activities, and fluctuations can significantly affect marine species and habitats. Continuous monitoring allows for understanding of long-term carbonate chemistry variability, which can stress or disrupt critical ecosystems like oyster reefs and other local fisheries. By providing consistent, quality assured data, the station enhances our ability to assess the bay's exposure to environmental stressors.

Does the Project align with any EPA Areas of Special Interest?

☐ Reduce Nutrient Pollution to Protect Water Quality and Public Health
☒ Make Investments that Address Coastal Resiliency
☐ Reduce Trash

This project helps provide the critical data needed to understand and respond to long-term environmental stressors impacting Galveston Bay. By continuously measuring changes in water chemistry and related parameters, the station can be a source of information that can be used by local stakeholders to address or adapt to acidification impacts. This data set strengthens the bay's resilience by informing restoration efforts, guiding sustainable resource management, and supporting infrastructure planning that protects coastal communities and ecosystems from future stressors.

SECTION FIVE: PROPOSAL DETAILS

Grant recipient activities must implement the Plan. Additional recipient selection criteria includes whether a project addresses a subcommittee priority.

Project Summary:

The United States Geological Survey (USGS) will continue the operation of a long-term, continuous monitoring program to extend understanding of baseline conditions and analyze estuary stressor scenarios for carbonate system stressors to develop a framework for coastal acidification in Galveston Bay. The framework will guide implementation of ocean and coastal acidification planning to build Galveston Bay's resilience.

Full Project Description (1,000 words or less):

Ocean acidification is a process driven by elevated carbon dioxide (CO_2) in our atmosphere, leading to increased CO_2 concentration in seawater. Ocean coastal acidification (OCA) in Galveston Bay, in contrast, is primarily driven by regional factors such as freshwater inflows, coastal upwelling (high CO_2, low-pH water), and eutrophication in addition to increased atmospheric CO_2. Ocean and coastal acidification are considered a threat to our oceans, estuaries, and life forms that rely on carbonate-based shells and skeletons, such as oysters, shrimp, crab, and other important fisheries species. Galveston Bay supports a variety of economically and ecologically important marine calcifiers, such as the Eastern oyster, which has been shown to be particularly vulnerable to the effects of ocean acidification[1]. Oysters provide many ecosystem benefits such as filtering the water, creating reef habitats, and supporting commercial fisheries. Other commercially harvested species such as white and brown shrimp, accounting for 27% of annual harvest in Galveston Bay[2], are also a valuable fishery for the Galveston Bay region. With acidification showing a rising trend in the Northwest Gulf of America, there is a growing need for OCA monitoring in Galveston Bay[3].

Although there is continuous monitoring of some variables that may influence shellfish health in Galveston Bay such as water temperature, salinity, freshwater inflows, and water levels, this project was the first to establish continuous monitoring of carbonate system parameters such as pH, dissolved oxygen (DO), and the partial pressure of carbon dioxide (pCO_2). Our OCA time-series monitoring program is one of four OCA monitoring programs in the Gulf of America. Currently there are monitoring programs in Tampa Bay, Florida, Coastal Louisiana, Aransas Pass, Texas, and our recently established program in Galveston Bay, Texas. The monitoring station, 08077652 Galveston Bay site EAGLEP nr Bacliff Texas, was inherently designed to establish a long-term data collection platform that could provide an understanding of the baseline carbonate chemistry parameters and address long-term anthropogenically-driven changes in hydrographic conditions and carbon chemistry. It is critical to continue the operation and maintenance of this continuous monitoring station in Galveston Bay to achieve these objectives and to provide actionable information to GBEP and other stakeholders. The OCA data will continue being transmitted to the USGS National Water Information System (NWIS), as established during the initial two years of project funding, ensuring ongoing public access to real-time monitoring data.

This project also involves the sampling of carbonate chemistry parameters. To validate sensor data from the continuous monitoring station at Eagle Point, discrete samples are collected and processed for pH, dissolved inorganic carbon, and total alkalinity, along with discrete measurements of salinity, temperature, and dissolved oxygen will be collected using a multiparameter sonde. Two samples will be taken at the Eagle Point monitoring station once a month and shipped to St. Petersburg Coastal and Marine Science Center for analysis. This sampling is a continuation of previously established sampling at this site to extend the time series of carbonate chemistry parameters.

The original vision for this project was a four-year effort designed to generate a robust, long-term dataset to better characterize the baseline carbonate chemistry of Galveston Bay. However, initial funding supported only the first two years, which allowed for the successful installation of monitoring equipment and the initiation of continuous data collection. To fully realize the value of this investment and leverage the

existing infrastructure, it is essential to continue data collection at the station. Expanding the dataset is critical to understanding long-term trends, informing adaptive management strategies, and ultimately support the ecological resilience of Galveston Bay in the face of growing environmental challenges.

Other Plans Implemented:

None

Does the Project work with new, smaller communities/partnerships?

☐ Yes

☒ No

NA

Is the project subject to Title VI requirements?

To meet federal nondiscrimination guidance and laws (Title VI), TCEQ requires information and services to be provided in languages other than English when significant numbers of beneficiaries are of limited English-speaking ability (LEP). If 5% or more of the population within your project area is LEP and share a common

language, then you are required to provide outreach in the alternative language. For statewide projects, Spanish language outreach is required. As Title VI compliance could impact the project budget, please reach out to the primary subcommittee coordinator for this application with questions on determining applicability and EJScreen instructions.

☐ Yes
☒ No

NA

Latitude/Longitude (Optional):

29°28'52.58"N, 94°55'1.95"W

Location:

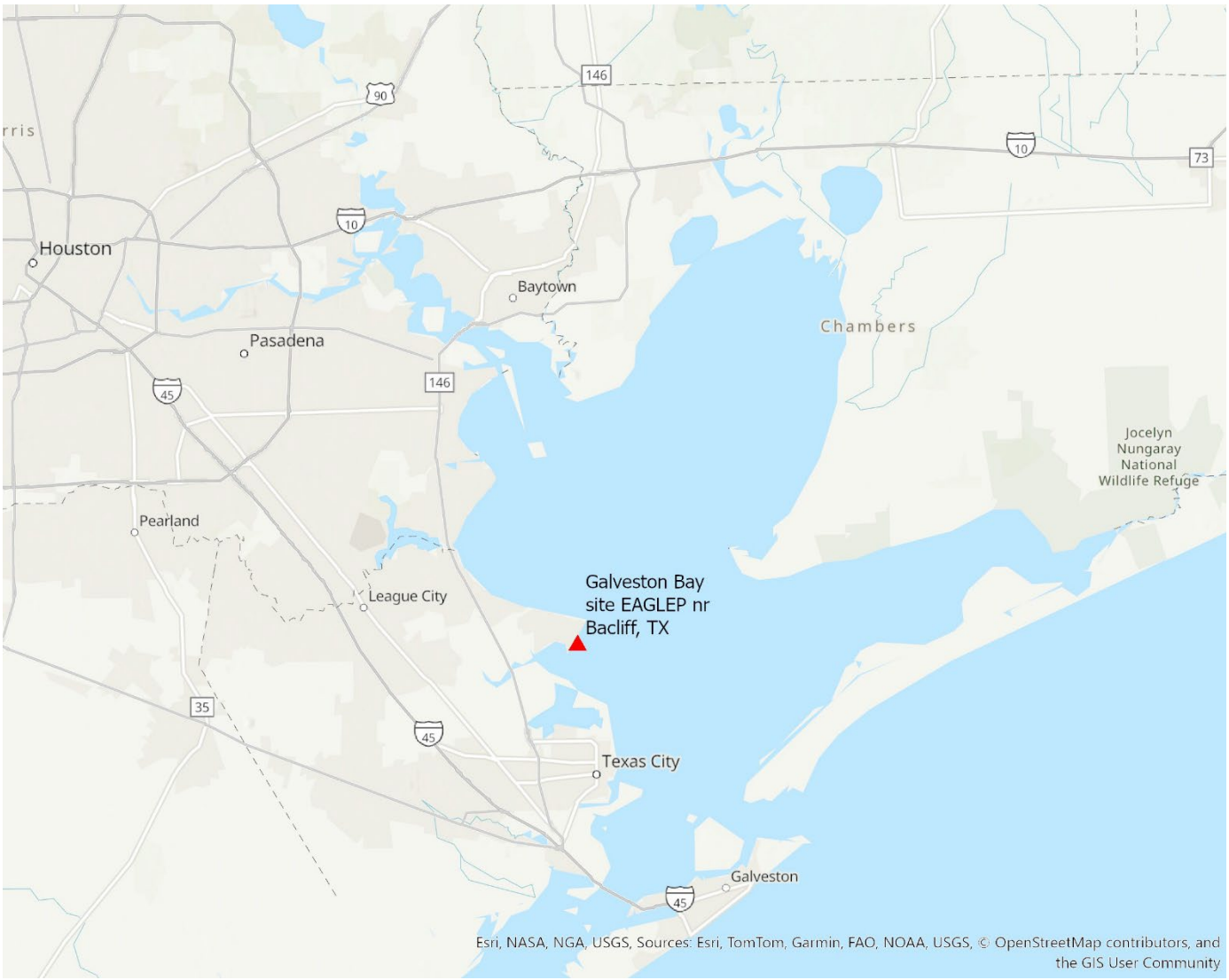
Galveston Bay, Texas

Partners[26] **and Their Roles**:

The first phase of this project leveraged the funding from NOAA GCOOS, GBF, and HARC to acquire all the instrumentation needed for the continuous monitoring station.

[26] If partners are subgrantees completing work reimbursable under GBEP funding, a letter of commitment from the partner must be submitted as an appendix with the application.

Project Map



Supplemental Photos/Graphics (Optional):

[Insert Here or Attach as an Appendix]

SECTION SIX: BUDGET DETAILS

Grant Payments [see 30 TAC § 14.7(12)]: All grant payments will be made on the basis of reimbursement for allowable costs (as defined in 2 CFR Part 200, Subpart E). All payments for awarded proposals will be reimbursements of allowable costs incurred after both parties have entered (signed) a grant agreement for the project.

Budget. Authorized budgeted expenditures for work performed are as follows:

g. Direct Costs

Budget Category	Cost for Work to be Performed
Salary / Wages	$45,160.00
Fringe Benefits **(##%)**[27]	$0.00
Travel	$0.00
Supplies	$12,975.00
Equipment	$0.00
Contractual	$0.00
Construction	$0.00
Other	$8,635.00
Total Direct Cost	$130,000.00

h. Indirect Costs[28]

Distribution Base Amount *(identify Base type below)*	$
Indirect Cost Rate for Reimbursement	*See note below %
Total Indirect Costs	$ 63,230 (Estimated)

i. Maximum Authorized Reimbursement

Maximum Authorized Reimbursement (Direct and Indirect Costs)	$

Indirect Cost Distribution Base. The Distribution Base above is (check one):

☐ direct salary/wages and fringe benefits

☐ modified total direct costs

☒ Other direct costs base

If other direct cost base, identify: The Indirect Reimbursable Rate for the Oklahoma-Texas Water Science Center is established annually in accordance with the U.S. Geological Survey (USGS) Financial Operating Procedure (FOP) Chapter 6-1 and Survey Manual (SM) 501.1 guidance. In accordance with generally accepted accounting principles, the USGS recognizes direct and indirect costs. Distributed direct costs are included in the category of direct costs. Indirect costs include facilities-related indirect costs, common services indirect costs, and bureau costs.

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[27] If fringe is not a single rate, please attach calculation or explanation as an appendix.
[28] Please attach Indirect Cost Agreement as an appendix if applicable

The indirect cost rate is (check one):

☐ **Predetermined Rate**— an indirect rate that is negotiated between the Performing Party and its federal cognizant agency and supported by a current Negotiated Indirect Cost Rate Agreement (NICRA) letter. A Predetermined Rate is not subject to adjustment except as provided by 2 Code of Federal Regulations (CFR) § 200.411.

☐ **De Minimis Rate**— if Performing Party does not have a current negotiated indirect rate, Performing Party may use a standard rate of fifteen percent of Modified Total Direct Costs (MTDC)[29] in lieu of determining the actual indirect costs of the service. Costs must be consistently charged as either indirect or direct costs.

☐ **Partial Reimbursement Rate**— a reimbursement rate agreed to between TCEQ and Performing Party that is less than the rate authorized under TxGMS or, where applicable, 2 CFR Part 200. Performing Party contributes all of its unreimbursed indirect costs to the successful performance of the project or projects funded under this Contract, in accordance with Article 9 of this section. [If this is a Partial Provisional Rate, include the following language: "This is a Partial Provisional Rate. Any adjustment is subject to the requirements of Article 9 of this section; however, no adjustment will be made unless the finally determined actual indirect costs are lower than the Partial Indirect Cost reimbursement made under the Contract."]

☒ **Other:** The Indirect Reimbursable Rate for the Oklahoma-Texas Water Science Center is established annually in accordance with the U.S. Geological Survey (USGS) Financial Operating Procedure (FOP) Chapter 6-1 and Survey Manual (SM) 501.1 guidance. In accordance with generally accepted accounting principles, the USGS recognizes direct and indirect costs. Distributed direct costs are included in the category of direct costs. Indirect costs include facilities-related indirect costs, common services indirect costs, and bureau costs.

Other. If Budget Category "Other" is greater than $25,000 or more than 10% of total Contract budget, identify the main constituents:

[Description of costs associated with "Other" budget category.]

SECTION SEVEN: CONTRACT REQUIREMENT [see 30 TAC § 14.7(15)]:

- By submitting this Project Proposal, you acknowledge that, if you become a successful grant recipient selected for a grant award, you must enter into a signed grant agreement or contract with TCEQ following the announcement of that award.

SECTION EIGHT: ACKNOWLEDGMENTS

Please read and understand the following:

- By submitting this Project Proposal, you acknowledge that information on how grant payments will be made is contained in the Budget Details section describing direct and possibly indirect costs. You further acknowledge that grant payments will be reimbursements on the basis of allowable costs incurred and that selected recipients will receive contract documents addressing allowable costs, unallowable costs, and reimbursement.
- By submitting this Project Proposal, you acknowledge your understanding that Project Proposals do not require matching funds and that a TCEQ director does not need to adjust or waive any matching funds requirement.
- By submitting this Project Proposal, you acknowledge that, if GBEP elects to hold a pre-submittal meeting relating to this Project Proposal, GBEP will notify you of the meeting's time and location indicating whether attendance is mandatory.

[29] https://www.ecfr.gov/current/title-2/part-200/section-200.1#p-200.1(Modified%20Total%20Direct%20Cost%20(MTDC))

SECTION NINE: QUESTIONS AND PRE-SUBMITTAL MEETINGS [see 30 TAC § 14.7(13) and 30 TAC § 14.7(14)]:

- There are no pre-submittal meetings scheduled.
- For requests for additional, pre-submittal information **[see 30 TAC § 14.7(13)]**, please contact the corresponding Subcommittee Coordinator listed on this page.

SECTION TEN: ADDITIONAL INSTRUCTIONS

In submitting your Project Proposal, please refer and adhere to the following instructions and guidelines concerning materials and information required to be submitted by potential grant recipients:

- GBEP intends to accept only complete Projected Proposals in a layout and format constituting a filled version of this proposal document with all applicable sections therein addressed; however, GBEP may, in its sole discretion, consider and accept nonconforming Project Proposals in the best interest of the state.
- Unless otherwise specified by GBEP, formal signatures are not required on Project Proposals.
- Unless otherwise communicated or implied, GBEP requires 1 (one) completed copy of your Project Proposal per corresponding Subcommittee Coordinator.
- Project Proposals must be received electronically, through the email address of the relevant Subcommittee Coordinator listed on this page, by the deadline listed on both this page and the first page of this Project Proposal document.

Submittal Process and Deadline [see 30 TAC § 14.7(8) and 30 TAC § 14.7(9)]:
Please Submit Project Proposals (Microsoft Word Only – No PDFs) by July 25, 2025 to the relevant Subcommittee Coordinators below:

WSQ Subcommittee
Christian.Rines@tceq.texas.gov

NRU Subcommittee
Lindsey.Lippert@tceq.texas.gov

PPE Subcommittee
Zoe.Gapayao@tceq.texas.gov

M&R Subcommittee
Jenelle.Estrada@tceq.texas.gov

Programmatic Projects
Lisa.Marshall@tceq.texas.gov

(1) Waldbusser, G.G., Voigt, E.P., Bergschneider, H. *et al.* Biocalcification in the Eastern Oyster (*Crassostrea virginica)* in Relation to Long-term Trends in Chesapeake Bay pH. *Estuaries and Coasts* **34**, 221–231 (2011). https://doi.org/10.1007/s12237-010-9307-0

(2) Houston Advanced Research Center. 2020. State of the Bay: A characterization of the Galveston Bay ecosystem. 4th Edition. Texas Commission on Environmental Quality. stateofgalvbay.org.

(3) Hu X, Pollack JB, McCutcheon MR, Montagna PA, Ouyang Z. 2015. Long-term alkalinity decrease and acidification of estuaries in northwestern Gulf of Mexico. Environmental Science & Technology 49:3401-3409.