FINAL REPORT

Project Name: Multifaceted Approach to Addressing Nonpoint Source Pollution in Galveston

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Project Description

Nonpoint source (NPS) pollution remains a major source of fecal bacteria contamination in Galveston Bay, impacting oyster harvesting zones, ecological health, and recreation safety. Reducing NPS pollution is challenging because locating the source and implementing best management practices require coordination across large spatial areas and multiple organizations. This project piloted a program to conduct targeted, community-scale NPS pollution control with a specific area of Galveston County. The information gained and lessons learned from these small community projects can be used to implement NPS pollution reduction in other areas.

Galveston Bay Foundation (GBF) used CMP Cycle 25 funds to address NPS pollution through a multifaceted campaign to address several different sources of NPS pollution within a specific area of Galveston County. GBF partnered with two mobile home parks, two marinas, two apartment complexes, and two community-based groups within this area to establish NPS reduction programs based on the specific issues within their business. GBF worked with property managers and county officials to (1) determine the largest contributions of NPS pollution, (2) identify key best management practices to reduce pollutant loading, (3) determine barriers and benefits to these practices, and (4) develop and implement initiatives to address these issues and reduce pollutant loading. GBF continued its volunteer water quality monitoring program with a new focus on studying NPS impacts to the water of Galveston Bay.

This project helped to minimize NPS pollution into the Galveston Bay by implementing strategies that result in measurable human behavior changes and infrastructure development. GBF's water quality monitoring program fills a need to engage volunteers in water quality issues while collecting valuable water quality data that will continue to supplement professional data sampling along Galveston Bay's nearshore. This project addressed the need for community-based initiatives that utilize best management practices to reduce NPS pollution.

Task 1: Target Community Identification, Engagement, and Partnerships

GBF identified two program partners within a specific area of Galveston County (the Community) in each of the following categories: trailer or mobile home parks, marinas, apartment complexes, and community groups. GBF established memorandums of understanding (MOUs) with the partners and worked with county officials and property managers to develop a community-specific engagement plan (Plan), including individual strategies for the eight program partners. GBF also conducted surveys with the program partner residents to foster engagement, determine priorities, and understand current perceived barriers and benefits to minimizing the identified sources of NPS loading. Additionally, GBF reviewed publicly available watershed assessments, such as those by the Texas Commission on Environmental Quality (TCEQ). The Plan was based on the surveys and assessment and contain (1) the primary NPS pollution sources, (2) the appropriate NPS reduction management strategies (e.g. infrastructure enhancements and behavior change), (3) a schedule of strategy implementation, and (4) success metrics.

1.1 Program Partner Locations

Galveston Bay Foundation identified all trailer or mobile home parks, marinas, apartment complexes, and community groups within the project area, and constructed a rubric to narrow down and prioritize the list of potential project partners. This list and the rubric were shared with the Non-Point Source (NPS) Workgroup at its inaugural meeting on November 19, 2020 in order to gain insight on these locations, identify potential contacts, and ensure that both documents were comprehensive. Galveston Bay Foundation conducted informal site visits to the list of potential project partners and included visual observations in the site prioritization rubric. Using the completed rubric, Galveston Bay Foundation identified the highest priority project partners and made first contact by telephone. Galveston Bay Foundation then continued contact with the proposed partners to identify those most interested in committing to the partnership and to plan the next step forward. Galveston Bay Foundation continued to maintain and build contact with the eight project partners selected based on interest, varied location across the project area, and potential need for resources. The resident surveys were created and distributed to partners. Galveston Bay Foundation Community Engagement Coordinator and Community Programs Manager met with project partners on April 8, 2021 to discuss partnership and provide survey information and flyers for residents and members at each location. Links and background information on the survey and project were provided digitally in follow-up correspondences to all partners to share in upcoming newsletters and/or social media. Galveston Bay Foundation continued to maintain contact and engage the eight project partners as part of the planning and implementation of the Community Engagement Plan through the following events.

- Galveston Bay Foundation staff hosted a presentation and attended a gathering for one of the community group partners, Texas Mariners Cruising Association, to share the survey and gather interest from members on March 26, 2021.
- Representatives from all eight project partners were invited to join Galveston Bay Foundation staff for a “Meet the Bay Boat Ride” on June 6, 2021 to provide an opportunity for partners to get to know staff and the Bay and increase interest and participation in the project and survey. This boat ride had to be cancelled due to inclement weather but will be rescheduled at a later date this summer.
- Partner locations were visited on June 24, 2021 to continue to foster connection with project partners and identify opportunities to meet residents and increase survey participation. Follow

up tasks included emailing the link to partners again, attending an event at a project partner location, and dropping off flyers as requested.

- Galveston Bay Foundation gathered insight on effective survey implementation and related community engagement from attending discussions in April and May of 2021 hosted by Houston Advanced Research Center (HARC) and Gulf of Mexico Alliance (GOMA) to utilize in development of the Community-Specific Engagement Plans.
- On July 2, Galveston Bay Foundation staff attended a large, popular social event at one of the Community Group partners - American Legion - as a guest speaker to share the survey with legion members and discuss their concerns regarding pollution. This was well-received by the community and a significant amount of informal feedback was collected. After monitoring and evaluating survey responses, staff followed up with all partners on July 12, via email or phone to mention the first Community Workshop being planned for October in San Leon.
- On August 19, Galveston Bay Foundation staff met with Lisa Halili, owner of one of the mobile home facilities - Latitude's North – and other businesses in San Leon, to discuss the project, survey responses, and first Community Workshop.

1.2 Memorandum of Understanding

A draft memorandum of understanding was created and reviewed by senior management to ensure it met Galveston Bay Foundation requirements. The draft memorandum of understanding (MOU) was expanded and personalized for each of the project partners. The MOUs were discussed and distributed through emails, calls, and brief meetings. Follow-up emails were sent one week following the distribution and follow-up calls were made after two weeks. A less intimidating document with the same listed expectations as the MOU was prepared in order to make project participation more approachable to those intimidated by signing an MOU. The MOU is attached in Appendix 1.

1.3 Community Engagement Plan

Galveston Bay Foundation reviewed publicly available watershed assessments made available by the Texas Commission on Environmental Quality (TCEQ) and project partners. These assessments and the workplan were used as a guideline for the formation of a draft outline of the Community-Specific Engagement Plan. Galveston Bay Foundation evaluated survey results to identify barriers and benefit to pollution reduction strategies and determine strategy for engaging the community in behavior changes. These results were incorporated into the Community Engagement Plan. Galveston Bay Foundation wrote a Community Engagement Plan which drew from conversations and meetings with staff and owners at project partner locations, surveys results (described within the Plan), and reviews of publicly available watershed assessments. This Plan is attached in Appendix 1 and includes strategies to engage the project partners which were implemented over the course of the project

Deliverables for this task are attached in Appendix 1, and include the following:

- Map of project area and project partners submitted March 31, 2021 and reattached for reference.
- MOU for community partners submitted March 31, 2021 and reattached for reference.
- Community Engagement Plan with Survey Results submitted September 30, 2021 and reattached for reference.

Task 2: NPS Workgroup Creation and Program Planning

GBF created a NPS workgroup including members from inside and outside the Community to help guide strategic directions and promote program activities. The workgroup drew from the GBF Boater Waste Workgroup, Water Quality Steering Committee, and additional relevant representatives and experts. The workgroup provided feedback on the Plan (Task 1), made recommendations, and established community connections with local leaders. GBF staff coordinated and facilitated biannual workgroup meetings and follow up with individual members to accomplish recommendations. GBF participated in additional stakeholder workgroups to coordinate efforts with other regional pollution control programs. Additionally, GBF utilized these workgroups to guide ongoing program analysis, including water quality data (Task 4) and program partner resident surveys (Task 1). GBF utilized the information gained from the surveys to update and create outreach and marketing materials to further promote program initiative.

2.1 Workgroup Members

A list of possible NPS Workgroup members was created based on the Boater Waste Workgroup, community members contributing to the Galveston Bay Action Network pollution reporting program, and local municipal representatives.

2.2 Working Group and Stakeholder Meetings

An inaugural NPS Workgroup meeting was held virtually on November 19, 2020. The meeting introduced the project team and project scope, including a description of the project area, timeline of workplan, and types of input that will be needed from the workgroup. There was a discussion of potential project partners, and input was gathered to gain insight on these locations, identify potential contacts, and ensure that the list prepared by Galveston Bay Foundation was comprehensive. The workgroup also discussed potential issues of concern in the Community relevant to project and how to ensure effective community engagement based on community-specific demographics. Workgroup members provided contact information for potential project partners, provided watershed assessments, and provided insight into local NPS issues as they took place.

A second NPS Workgroup meeting was held virtually on March 17, 2021. The meeting provided a reminder of the general project scope, including the team and goals, and recapped the activities taken during the first meeting. Updates since the first meeting were shared including the final project area, a list of the chosen project partners, and the drafts of the resident survey and Community Engagement Plan. Each of these drafts were reviewed by the workgroup and input was provided to improve and expand them. Galveston Bay Foundation reviewed upcoming project needs and discussion topics and announced the timeline for these future actions. Workgroup members were reached outside of the biannual NPS Workgroup meetings to provide feedback on the Community Engagement Plan.

A NPS Workgroup meeting was held virtually on December 12th with workgroup members from marinas, local municipalities, and residents. This meeting gave an overview of the project and progress made up to the date of the meeting, including an overview of the Community Engagement Plan and anticipated or completed activities. Input was gathered from attendees on specific project activities, such as the distribution of boater waste bags and posting of anti-pollution signage, and upcoming workshops.

Workgroup members were reached outside of the biannual NPS Workgroup meetings to invite them to the ongoing NPS community events in the project area, to offer anti-litter signage for their businesses and communities, to share boater waste materials, and to make connections with other potential

opportunities to share NPS initiatives such as upcoming regattas, resource meetings, and similar project initiatives.

A fourth and final meeting of the NPS workgroup was held on May 12, 2022. Attendees included project partner representatives, community leaders, and representatives from partner organizations including the Galveston County Health District (GCHD) and the Harris-Galveston Area Council (H-GAC). In this meeting, Galveston Bay Foundation gave an overview of the project's history, context, and mission, provided a recap of the last workgroup meeting, and described the progress made since the last gathering of the workgroup. Next steps were shared with the members and input was gathered on potential ideas on continued NPS efforts in the project area and how to share data with the community. Among the ideas, were boater waste bags at upcoming regattas, summer ice cream social to talk about dairy as a Cease the Grease issue, partnership ideas with the H-GAC fats oils and grease initiative, and potential connections to be made to ensure the long-term success of these efforts past the end date of the project.

Outside of project specific workgroup meetings, Galveston Bay Foundation has continued to participate in additional stakeholder workgroups to coordinate efforts with other regional pollution control programs, including the H-GAC Bacteria Implementation Group (BIG), the Galveston Bay Coalition of Watersheds, the Galveston Bay Estuary Program (GBEP), the EPA Trash Free Waters Program, the Galveston County Community Resource Coordination Group, and the H-GAC Fats Oils and Grease Workgroup.

GBF created a NPS workgroup including members from inside and outside the Community to help guide strategic directions and promote program activities. The workgroup drew from the GBF Boater Waste Workgroup, Water Quality Steering Committee, and additional relevant representatives and experts. The workgroup provided feedback on the Plan (Task 1), made recommendations, and established community connections with local leaders. GBF staff coordinated and facilitated biannual workgroup meetings and followed up with individual members to accomplish recommendations. GBF participated in additional stakeholder workgroups to coordinate efforts with other regional pollution control programs. Additionally, GBF utilized these workgroups to guide ongoing program analysis, including water quality data (Task 4) and program partner resident surveys (Task 1). GBF utilized the information gained from the surveys to update and create outreach and marketing materials to further promote program initiatives.

2.3 Campaigns and Strategies Created

The NPS workgroup meeting came up with a variety of programs that could be implemented in the area to help reduce NPS pollution. The three programs focused on were distributing boater waste bags, anti-pollution signage, and working on Cease the Grease campaign. Further details of what each of these campaigns entail can be found in Appendix two along with other ideas for future NPS campaigns in the area.

2.4 Outreach and Marketing Material

During this project period, outreach and marketing material was implemented as identified and described in Community Engagement Plan, including the creation of print and digital media. Workgroup members and campaign partners assisted with this promotion through inviting GBF to outreach events, presentations, and through distributing campaign materials at their own booths and events. During this

period marketing materials were maintained, distributed, and updated as needed for all various programs, including Cease the Grease, GBAN, the GBF Water Monitoring Team (WMT), and the Pump Don't Dump campaign. The digital and printed materials redesigned or designed specifically for this project are available in Appendix 2. GBF created multiple pieces of digital content throughout the project period, regarding GBAN, boater waste, water quality in Galveston Bay, bacteria, Pump Don't Dump, and non-point source pollution, including social media posts, educational videos, and infographics. Images of the social media posts and links to the articles and YouTube videos are linked in Appendix 2.

Deliverables for this task are attached in Appendix 2, and include the following:

- List of NPS working group members, submitted March, 31, 2021 and reattached for reference.
- Notes from biannual working group and stakeholder meetings submitted May, 1, 2021 and September 30, 2021 and reattached for reference
- Description of new campaign and strategies created submitted January 31, 2022 and reattached for reference.
- Copies of new outreach and marketing materials, presentations and associated messaging submitted January 31, 2022 and reattached for reference.

Task 3: Host Community Workshops

GBF hosted two community workshops in partnership with local community organizations. The workshops were open to the public but targeted program partner residents. The workshops focused on implementing the plan developed under Task 2 and provide solutions to the identified concerns. The workshop programs included tools to better understand specific contamination levels and issues within the region as well as resources to develop community-based programs to reduce NPS pollution. Tools shared with the community included the Galveston Bay Action Network (GBAN) website, resources regarding onsite sewage facilities (OSSFs), pet waste, green infrastructure, native landscaping, and more, and information to access other GBF programming such as rain barrel workshops.

3.1 Schedule and Agenda from Workshops

Three Community Workshops were conducted during this project. These events were shared not only with project partners in the area, but also the community at large based on the results of the survey and conversations with project partners. Information about these events can also be found in Appendix 3:

- The first Community Workshop took place in San Leon on Saturday October 30th. This event took place in a covered area outside of a popular restaurant in the project area, Topwater Grill, during the lunch rush. Several organizational partners attended and hosted booths to discuss their expertise and programs with attendees, including the Galveston County Health District, American Bird Conservancy, the Houston-Galveston Area Council, Galveston Bay Foundation, and Texas Mariners Cruising Association, among others. Topics shared with attendees were based on requested topics from the survey in the San Leon area, including septic and sewage systems, pet waste, litter and trash, clean boating, and wildlife and habitat. The event was well received with most participants visiting while waiting for a table at the restaurant or visiting after their meal.
- The second Community Workshop took place in Kemah on Friday November 19th. This event took place on the patio of a new local bar in Kemah to reach out to the young, apartment communities in the area. Most attendees came specifically for the event and were interested in forming partnerships related to the project. Topics shared with attendees were based on requested topics from the survey in the Kemah area, including neighborhood trash and litter, plastic pollution, pet waste, wildlife friendly fishing and boating, and household and cooking grease recycling. The event was well received and connections were made to community members interested in implementing behavior changes. For example, a local restaurant owner attended to talk about pollution reduction and recycling in the area, a few members of a local boating group collected outreach materials to share at their next meeting, and several community members expressed an interest in participating in a shoreline cleanup event.
- The third Community Workshop took place at the Galveston Bay Foundation Kemah headquarters on Monday December 20th. This event was a pollution reduction shoreline cleanup themed to the holiday season. Attendees not only cleaned up a shoreline within the project area, but were also given information about nonpoint source pollution reduction in their homes as indicated in the survey in the Kemah area and participated in a plastic pollution craft activity. This included information about neighborhood trash and litter, plastic pollution, clean boating, and household and cooking grease recycling.

3.2 Community Feedback

Galveston Bay Foundation created several versions of an example "anti-pollution" signage based on a request made in the project partner survey. This sign can be printed with a city or business logo on an aluminum sign and posted at areas where litter or dumping is commonly seen. An example sign was printed to take to the community workshops and events to encourage people to customize their own. A total of 22 signs were printed for project partners and posted at their locations. Additionally, the City of La Porte Public Works Department was interested in these signs and printed 11 of their own signs with the same design throughout the City. A photo of a Galveston Bay Foundation staff member sharing a sign with a project partner is shown below.

Galveston Bay Foundation visited a school and church within the project area on Thursday January 27th, 2022, at the request of a student interested in pollution reduction resources for his class. The student and Galveston Bay Foundation staff member co-hosted a discussion about pollution seen in the neighborhood and how residents could help reduce litter. The students, parents, and teachers were provided information about the upcoming community workshop at the Kemah property, the Galveston Bay Action Network (GBAN) tool, and the availability of anti-pollution signage.

Galveston Bay Foundation hosted an evening presentation and discussion session on Friday, February 18th, 2022 with project partner, Texas Mariners Cruising Association (TMCA). The organization members, consisting of project area residents, boaters, and fishing enthusiasts, were presented information on NPS reduction, particularly related to clean boating and methods to reduce plastic pollution. The discussion led to creative solutions that may be implemented by TMCA, such as boating equipment swaps, yard sales, and repair meet-ups to encourage the group to share supplies and reduce waste.

Galveston Bay Foundation hosted a Community Workshop in Kemah on Sunday, February 20th 2022 based on the results of the survey and conversations with project partners. This event served as another opportunity for stakeholders to participate in a pollution reduction shoreline cleanup and learn about local nonpoint source pollution reduction, since the December 20th event attracted more interest than space could allow. This workshop took place at the Galveston Bay Foundation Kemah headquarters and

sought to engage people in NPS conversations in multiple formats. Attendees not only cleaned up a shoreline within the project area but were also given information about nonpoint source pollution reduction in their homes as indicated in the survey in the Kemah area and participated in a plastic pollution craft activity. This included information about neighborhood trash and litter, plastic pollution, clean boating, and household and cooking grease recycling.

Galveston Bay Foundation hosted a presentation at Bayside Community Center in Bacliff on April 6th to discuss nonpoint source pollution issues and reduction, the Galveston Bay Action Network (GBAN) tool, and the availability of anti-pollution signage. Participants were so interested and driven to reduce run-off pollution in particular, that they requested to buy rain barrels that day. GBF staff coordinated a drop-off of 10 rain barrels and kits that same afternoon to interested participants and provided installation guidance, which will result in over 10,000 gallons of water being collected and strategically released into green spaces per year in the area. This has the potential to reduce street run-off pollution in Bacliff.

3.3 Resources Discussed During Workshops

Based on the previously conducted inventory of supplies, outreach materials, and giveaways, Galveston Bay Foundation ordered restocks of items that may be used in future workshops based on survey results. This included, among other items, boater waste items for the marina kits, interpretive flyers related to septic system issues and litter reporting, flyers on fans to distribute in warm weather months, GBAN pollution reporting stickers, and more. During most community outreach events a large amount of information was available and discussed. The information presented was guided by interest from community members and issues that they mention. Some of the main topics and resources are listed in Appendix 3.

Galveston Bay Foundation partnered with one of the Water Monitoring Team bacteria sampling members to host a booth at a community festival focused on water quality in the area and ways that community members can reduce their NPS contributions that impact water quality. This additionally included creating a water quality parameter game in which people can match water quality parameters with the description and learn about the purpose of collected water data. This also included printing water quality maps and graphs to communicate the latest results.

Galveston Bay Foundation began distribution of boater waste bags to marinas in the area based on lessons learned from the project partner marinas in the project area. These packets provide information on reducing improper disposal of boater waste, reporting pollution, and learning about the general health of the Bay. A list of all marinas in the project area was compiled, and calls were made to each one to determine a need for bags. Approximately 1248 bags were distributed to the marinas during this project period. Additionally, pollution prevention materials were provided for all participants in a large boating event and sailing events in the project area.

Cease the Grease handouts were provided to resident and community members at community workshops. These supplies included funnels, scrappers as well as information handouts and magnets. The handouts were in both Spanish and English to reach a larger audience. There was also a request from a local municipality that wanted Cease the Grease Kits. GBF was able to provide 138 kits that included a funnel, scrapper, magnet, promotional information and a fat trapper bag.

3.4 Descriptions and Outcomes/Outputs associated with Community Workshops

Galveston Bay Foundation hosted an evening workshop at a community center in the Clear Lake/Kemah project area on April 19th to share information on NPS reduction. Participants learned about pollution,

water quality, and pet waste hazards through educational games, a short presentation, and a community discussion on what individuals could do to help.

Galveston Bay Foundation contributed NPS resources information for residents in the project area during a Clear Creek Watershed Partnership meeting and a Clean Waters Initiative Workshop on April 27th and 28th.

Galveston Bay Foundation hosted a Community Workshop in Kemah on April 30th to connect boaters with other residents out on the Bay for an educational tour of the waterways and discuss NPS issues and solutions.

Galveston Bay Foundation hosted a presentation for the North Group, a community group of residents from Bacliff, Kemah, Clear Lake, and Seabrook on May 3rd to discuss nonpoint source pollution issues and reduction, the Galveston Bay Action Network (GBAN) tool, online resources, the availability of anti-pollution signage, and this project's efforts.

Galveston Bay Foundation responded to a complaint submitted through GBAN of trash and litter at a business within the project area. After visiting with the store manager, resources were provided for trash reduction and contact information was left to share with the owner to discuss potential opportunities for collaboration in the future.

Deliverables for this task are attached in Appendix 3, and include the following:

- Schedule and Agenda from Community Workshops, submitted January, 31, 2022 and reattached for reference.
- Community Feedback provided from community workshops, submitted January, 1, 2022 and reattached for reference
- List of resources discussed during workshops submitted January 31, 2022 and reattached for reference.
- Description, photos, and outputs/outcomes associated with community workshops, submitted January 31, 2022 and reattached for reference.

Task 4: Support Ongoing Water Quality Monitoring Program

GBF maintained its existing volunteer water quality monitoring program. GBF recruited and trained volunteer water quality monitors and hosted quality assurance trainings to maintain a successful and sustainable volunteer program. GBF analyzed water quality data to better determine local NPS impacts on water quality and will use this information to educate individuals on safe and unsafe recreation conditions. Through this project, GBF continued to collect Enterococci at locations in Galveston Bay, posting the results on Swim Guide and promoting this resource to the project's target communities.

4.1 Water Monitoring Team

The GBF Water Monitoring Team (a group within the Texas Stream Team) was launched in February 2012, with the Bacteria Sampling Program launching shortly thereafter in January 2013. There are four main goals for collecting water quality data through these programs for this project:

1. To engage citizens in a hands-on program that empowers them to be stewards of Galveston Bay;
2. To create a line of communication between GBF, boaters, marinas and residents on a regular basis;
3. To establish baseline data trends at marinas and other near-shore recreational sites in Clear Lake and Galveston Bay; and
4. To detect potential bacteria impairments in marinas and other near-shore recreational sites in Clear Lake and Galveston Bay.

GBF Water Monitoring Team volunteers are certified to sample at sites around the Bay for core water quality parameters (temperature, pH, dissolved oxygen, salinity, transparency, and field observations), and have the option of being trained to collect samples for enterococci bacteria. Core certification consists of a full day, two-phase group training session and a one-on-one Phase III training at the volunteer's site with a GBF staff member. This training process is based on the Texas Stream Team training protocol. Volunteers commit to sampling their site(s) on at least a monthly basis. The entire monitoring program is conducted under an EPA-approved Quality Assurance Project Plan and Quality Management Plan. GBF's team is part of the Texas Stream Team because of its partnership with the Houston Galveston Area Council's region.

At the start of the project period, GBF had 57 active, fully certified monitors at 55 monitoring sites, with 7 sites sampling for Enterococcus bacteria. At the end of this project period, the monitoring team has 38 volunteers sampling from 36 locations. During this cycle, volunteers contributed over 1,752 volunteer hours, analyzed 482 water samples, and 78 collected bacteria samples. COVID-19 led to the closure of the GBF bacteria lab and asking volunteers to not collect bacteria samples beginning on March 17, 2020. A phased re-opening of the bacteria lab began in July 2020 and the lab continues to reopen in phases. Steps are currently being taken to getting a second volunteer to be certified to process laboratory samples and the new Water Quality Programs Coordinator is reaching out to old lab volunteers. There is currently a waitlist of over 30 people interested in becoming water quality volunteers. Once the new Water Quality Programs Coordinator is certified as an official Texas Stream Teams Trainer, GBF hosted trainings, quality control (QC) events and bacteria certifications will resume in full force. There are also plans to offer the opportunity for volunteers to become certified Texas Stream Team Trainers. This will expand the opportunity for hosting more trainings. A full map of monitoring locations, data summaries, and trends can be accessed at www.galvbay.org/watermonitors.

Implementation of the WMT has allowed GBF to better connect with many marina and waterfront restaurant owners around Galveston Bay to provide sampling sites and promote clean water. GBF continues to make improvements to the management and processes within the WMT. Consistent, long-term monitoring is valuable because the identifies trends and hotspots, fosters community-based environmental stewardship, and aids in watershed planning activities. Due to budget constraints, professional monitoring is conducted at a limited number of sites and generally on a quarterly basis, so GBF's WMT is a cost-effective way to augment this professional data. Additionally, most professional monitoring occurs in the middle of the Bay, while GBF monitoring focuses on the nearshore, where most humans are interacting with the water. Appendix 4 listed the volunteers and sites in the project area at the start of the project.

Within this cycle GBF focused a lot of our efforts on maintaining regular data sampling at existing sites and improving data management and analysis.

1. Maintaining regular data sampling: By sampling continually at the same existing sites, GBF can better track and interpret long-term trends at each location and across the Bay. Prior CMP cycles facilitated the expansion of the WMT to a representative sampling of Galveston Bay and in this cycle, GBF staff focused on the following items:

    - **Volunteer Management and Site Continuity**: GBF worked to maintain regular volunteer correspondence on an individual basis and through volunteer bulletins throughout the life of the project. As sites opened, GBF attempted to fill them with other volunteers to ensure continued sampling. In June of 2022 a new Water Quality Program Coordinator was hired. After her hiring she started to visit all sites to understand where they are located, how to best access each site, and if there are any safety or access changes. A new database is being created for each site to detail its location, access points, land owners and sampling permissioned needed for that site. A list is also being compiled for who to contact for each site if there is a noted immediate issue, such as very high bacteria levels. A site directions file is also being created for each site to include site pictures, ariel photos, directions, and including landowner contact information to be given to volunteers so that sampling continuity is easily maintained. Additional information will be added to these files as the need arises. Discussions have occurred about having backup volunteers to step in and collect samples at locations where the assigned volunteer will be out of town and unable to sample for a month. Logistics are still being worked out for this plan and will be contingent on enough notice from assigned volunteers absence and flexibility of backup volunteers' schedule.

2. Improving Data Management and Analysis: In order to truly have long-term success monitoring water quality throughout Galveston Bay, GBF is continually improving its capacity for data management and analysis. These actions are described below:

    - The data visualization portal data and sites were brought up to date in August of 2022. The data portal can be viewed at: waterdata.galvbay.org.
    - GBF hired a new Water Quality Programs Coordinator in June of 2022 who is reviewing current procedures and working on further steps to improve data management and datasheet retention protocols.
    - An R data analysis script was refined with a PhD student at Texas A&M University

Galveston to lay the groundwork for future data visualization using the tool.

4.2 Volunteer Training and events

Maintaining training and recruitment efforts:

Six Texas Stream Team Quality Control (QC) Training sessions were held for the water monitoring team volunteers on November 5th, November 7th (two sessions), November 12th, November 19th, and December 10th 2020.

Galveston Bay Foundation staff implemented an activity review of all water monitoring team members, which reached out to those who had not consistently sampled in the last year and offered them an opportunity to resign or to recommit to the program. This included meeting with volunteers to collect kits, discussing site changes with continuing volunteers, and other meetings and correspondence. This refresh of the list will help ensure consistent monitoring and growth of the program when the next recruitment and training event is planned to take place following the training Certification of the new Water Quality Programs Coordinator.

The long-time lab volunteer is still active and started to train a new volunteer on lab procedures during this project. Steps are currently being taken to establish and certify this second volunteer to process laboratory samples on his own. Once this occurs, we can begin having bacteria sampling days on two different days a month. The new Water Quality Programs Coordinator is reaching out to old lab volunteers to see if they are interested in coming back to assist with lab work. A survey is currently being created to poll current water quality volunteers on their interest in becoming Bacteria Sampling Certified and what days of the month would work for them to drop off samples at GBF for processing.

There is currently a waitlist of over 30 people interested in becoming water quality volunteers. A few of these volunteers may also be interested in assisting with lab work given their backgrounds. Once the new Water Quality Programs Coordinator is certified as an official Texas Stream Team's Trainer, GBF hosted trainings, QC events and bacteria certifications will resume in full force. There are also plans to offer the opportunity for volunteers of 2 years or more to become certified Texas Stream Team Trainers. This will expand the opportunity for hosting more trainings and help to fill the gap in case of any future staff turnover. It will also create more engagement and ownership of the water quality program by volunteers.

Galveston Bay Foundation gave a presentation about the Water Quality Monitoring Program at the GBEP Monitoring and Reporting (M&R) meeting on December 9, 2020.

Galveston Bay Foundation gave a presentation on the Water Monitoring Team to staff at the Johnson Space Center on March 17, 2021.

4.3 Data Analysis

There were 3 sites that were sampled regularly with a paired bacteria sample in Clear Lake during the project period. The site that had the most consistent sampling in Clear Lake and had paired bacteria samples were Clear Lake at Jarboe Park, Clear Lake at Endeavor Marine, Clear Lake at Clear Lake Park. Clear Lake at Jarboe is on a creek section that is marked as impaired for bacteria based historic TCEQ data. The most recent data for Jarboe Bayou posted on HGAC's Water Resource Information Map (WRIM) is from April 2019. The geometric mean calculated on the WRIM for Enterococcus at Jarboe Bayou site 16475 from 2012-2019 was calculated at 68 MPN/100ml. GBF's calculated mean for Jarboe Bayou for the length of this project is 29 mpn/100ml. This could indicate an overall improvement in the bacterial

concentrations for this location. When TCEQ updates their database to have data for Jarboe over this project period GBF will be able to compare the TCEQ official values at their two sampling locations on Jarboe Bayou to our sampling location at Jarboe Bayou Park to get a firmer grasp on the overall bacterial improvements at this site.

Clear Lake at Clear Lake Park Pier had 4 instances of samples exceeding the screeding limit for a single grab sample of 104 mpn/100ml and Clear Lake at Endeavor Marina had no instances of samples exceeding the screening limit. Overall, the bacteria samples at Clear Lake at Endeavor Marine maintained a consistently low level. Clear Lake at Clear Lake Park had two large spikes in bacteria concentrations over 500 mpn/100ml and Jarboe Bayou had 3 large spikes.

All three of these sites on Clear Lake showed seasonal trends in dissolved oxygen (DO) levels with lower dissolved oxygen levels in the summer months and higher levels in the winter. All sites in Clear Lake had a few instances where DO dropped below 3 mg/L which can be stressful to fish life. There were no fish kills noted along with these drops in DO during the project period at our sites in Clear Lake.

Graphs of bacteria and dissolved oxygen for these three sites are located in Appendix 4. To see more data and results you can visit our data viewer at http://waterdata.galvbay.org/ .

4.4 Information Products Created with Water Quality Data

Water quality data collected through this project is shared on multiple platforms and used in various analyses and reports. Galveston Bay Foundation has a data visualization portal located on its website. This data viewer allows visitors to see data and why it is important at all WMT sites located throughout Galveston Bay. Galveston Bay staff recently went through each site to make sure all data is up to date and accurately uploaded. As staff have been reviewing sampling activity and reaching out to volunteers, sites have been marked to accurately reflect if a volunteer is assigned and sampling that site. Given the amount of open sites vs volunteers waiting to be trained, all sites will likely have a volunteer assigned in early 2023. As staff are updating the visualization tool, notes are being made for ways to improve usage by both the public and potential researchers. Local school districts and STEM programs use the data from this site in student-driven research classes. GBF staff continue to work to ensure accessing data and downloading data from the site is easy and intuitive.

Galveston Bay Foundation also submits bacteria data to Swim Guide. This site was maintained though the project period. As the new Water Quality volunteer is visiting all sites, photos are being taken of the site and being added to each of GBF's locations on Swim Guide. This is so the public has a better understanding of where the samples are being collected and what the location looks like prior to visiting the area.

One of the reports that Galveston Bay water quality data is used for is the annual Galveston Bay Report Card. This report takes GBF's data along with data from TCEQ, HGAC and various other agencies to get an understanding of the state of Galveston Bay. The Report Card for 2022 has not yet been released (will be released in September 2022). The 2021 report card can be viewed in Appendix 4 along with a link to the report card's website.

Galveston Bay Foundation is also a partner with HGAC and the Texas Stream Teams. Our data and sites are also listed on both of their websites. In the past GBF provided all our data to HGAC and they were responsible for inputting the data onto their website and providing it to Texas Stream Team at the Meadow Institute. The Texas Stream Team has been going through a data transition and moving to a new data viewer platform. Going forward GBF staff will be entering the data directly onto the Texas Stream

Team's website data viewer. The new Water Quality Programs Coordinator is working with Texas Stream Team to transition to the new data viewer and set up Galveston Bay Foundations sites into their database. They are also working on getting all of Galveston Bay Foundation's historic data moved onto Texas Stream Team's data viewer.

Galveston Bay also posted content on our website and social media about the water monitoring program to engage the public and potential volunteers. After one such media push, GBF had 4 potential new volunteers reach out. Future such media post are in the works. The plan is to have at least one water quality focused post each month. These posts will focus on current research, equipment used, and scheduled training days. The posts will be engaging and question-focused to start discussions instead of just simply pushing information out.

Deliverables for this task are attached in Appendix 4, and include the following:

- List of volunteer water quality monitors and water quality monitoring locations in Galveston County, submitted March, 31, 2021 and reattached for reference.
- Schedule of volunteer trainings and events, submitted September 30, 2022 and reattached for reference
- Water Quality data and analysis-hotspots, trends over time, water quality tracking submitted September 30, 2022 and reattached for reference.
- Copies of information products created from WMT data, submitted September 30, 2022 and reattached for reference.

Task 5: Project Monitoring and Reporting

GBF conducted regular grant administration, financial reporting, and correspondence as outlined in the project description and executed contract throughout the life of the grant, this included monthly billings and progress reports, and this final report with the Grant Closeout Report.

One grant extension was approved in early 2022 which extended the termination date of the contract to end on September 20, 2022 and updated reporting dates throughout. Five budget amendments were made throughout the project period, as described below:

- GBF submitted a requested budget amendment in October 2020 with the most recent monthly billing to better reflect matching fund availability.
- GBF submitted a requested budget amendment in November 2021 to reallocate funds from "Supplies" to "other". Changes were made to more accurately reflect matching funding availability from volunteer hours due to COVID restrictions
- GBF submitted a requested budget amendment in December 2021 to reallocate funds from travel to other, to cover increased need in printing costs.
- GBF submitted a requested budget amendment in February 2022 to reallocate funds from "Travel" to "Supplies". This was due to the need to cover additional outreach materials and lab materials due to the extended projected date.
- GBF submitted a requested budget amendment in December 2021 to reallocate funds from "Personnel" and "Travel" to "Supplies". This was due to the need to cover additional outreach materials and lab materials due to the extended projected date.

Appendix 1

Galveston Bay Foundation
Multifaceted Approach to Addressing Nonpoint Source Pollution in Galveston County GLO Contract No. 21-060-004-C664
Cycle 25 Deliverable, Task 1.1
Galveston Bay Foundation

Map of Program Partner Locations

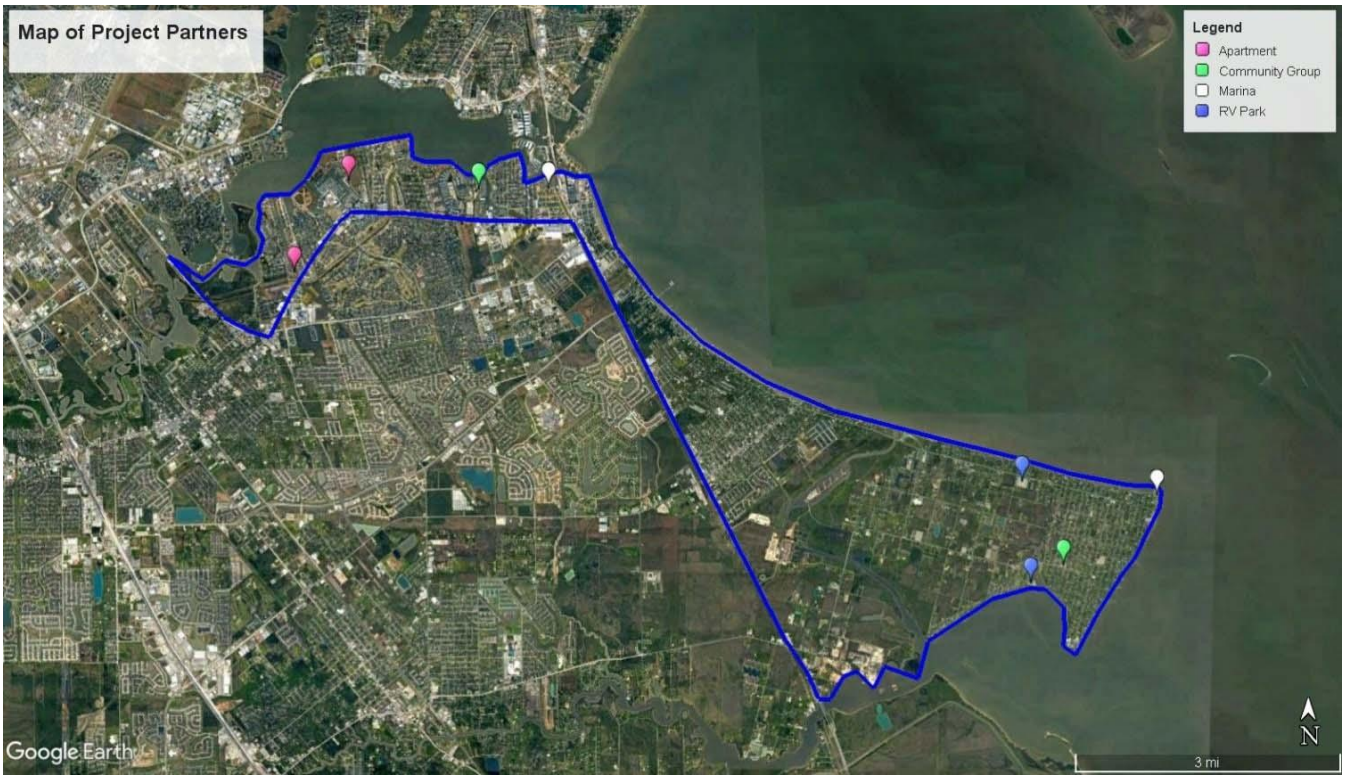

Photo 1: Map of Project Partners without labels

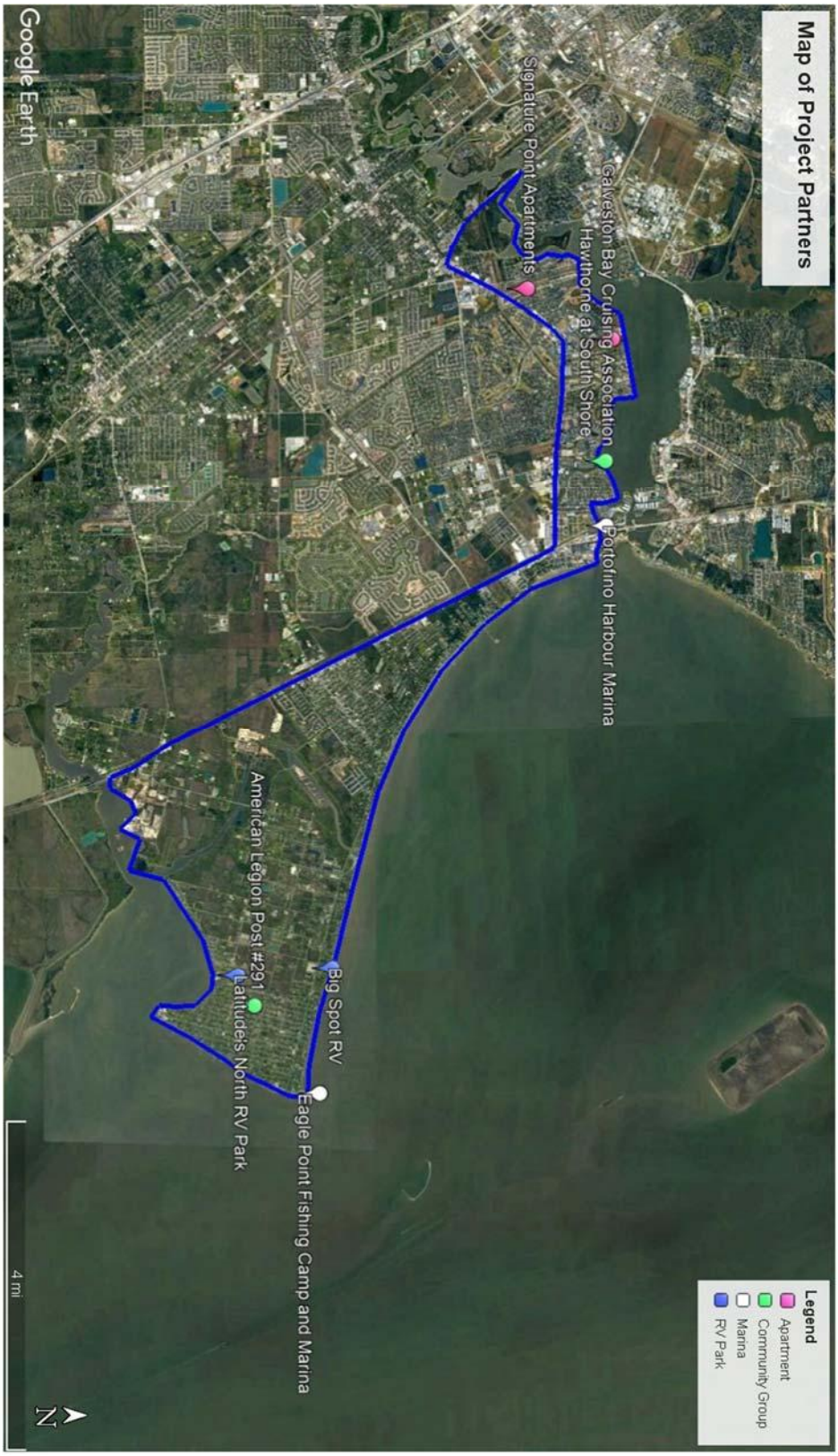

Photo 2: Map of Project Partners with labels

Galveston Bay Foundation
Multifaceted Approach to Addressing Nonpoint Source Pollution in Galveston County GLO Contract No. 21-060-004-C664
Cycle 25 Deliverable, Task 1.2
Galveston Bay Foundation

Attached is an informal project partner agreement in lieu of a Memorandum of Understanding (MOU). It was determined that the MOUs were overwhelming and felt too formal for some of the small businesses that this project is trying to engage. Shifting the project to a more informal agreement was approved by the Texas General Land Office on March 11, 2021.

THANK YOU!

Galveston Bay Foundation (GBF) is grateful for your involvement in our pollution prevention project! With your help, we can keep Galveston Bay fishable and swimmable for generations to come.

In an effort to be clear about our intentions in engaging with your community, we'd like to give some background and set expectations on what involvement on this project looks like. If you have any additional questions, please feel free to contact Sasha Francis, GBF's Community Engagement Coordinator, at sfrancis@galvbay.org.

General Project Description

Nonpoint source (NPS) pollution remains a major cause of bacterial contamination in Galveston Bay, impacting ecological health and recreation safety. This very broad category of pollution can include everything from pet waste, to leaks from septic systems, to runoff from herbicide application, and much more. In this project, GBF will work with eight project partners in San Leon, Bacliff, and Kemah to understand NPS challenges in the community and implement small-scale pollution control measures. In addition to creating a cleaner environment and reducing bacteria in the Bay, the lessons learned from this project will be used to build programs to reduce NPS pollution throughout the greater Houston-Galveston area.

Partnership

We look forward to working together towards reducing potential sources of NPS pollution in your area! Below is a summary of how we propose moving forward in our partnership:

- Surveys: GBF will conduct a survey with you, your staff, and your residents. These surveys are meant to encourage engagement in the project, determine local pollution control priorities, and understand perceived barriers and benefits to minimizing the identified sources of NPS pollution. This survey can be distributed as an emailed link, a QR code on a paper flyer, in-person, or through whatever channel you are comfortable with.

- Planning: Once we have reviewed the survey results, we would like to meet with you to develop personalized initiatives to address local NPS pollution. These ideas will be incorporated into a Community Engagement Plan describing next steps and how GBF will work to make your initiative successful.

- Implementation: Together, we will host two community workshops to share pollution reduction initiatives and resources with your residents. These workshops will provide tools to help residents better understand contamination issues within the region and resources to implement best practices to reduce local sources of NPS pollution.

Please let us know if you have any questions or concerns regarding these future plans, or if you think that your community may not be able to meet these expectations. We

Logistics

You are not expected to provide any funding or materials for the implementation of the pollution control measures. This project will end on March 31, 2022, but we hope to continue working with you on any issues related to Galveston Bay in the future!

Name	Signature	Organization	Contact phone # and email address	Date

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Cycle 25 Deliverable, Task 1.3
Galveston Bay Foundation

Attached is the Community Specific Engagement Plan that has strategies for partners. It incorporates the survey results and barriers and benefits related to pollution reduction identified.

Community Engagement Plan

Multifaceted Approach to Addressing Nonpoint Source Pollution in Galveston County

Kemah, Bacliff, and San Leon, Texas

Dated 09/16/2021

Prepared by:

GALVESTON BAY FOUNDATION

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A report funded by a Texas Coastal Management Program grant approved by the Texas Land Commissioner pursuant to National Oceanic and Atmospheric Administration award no. 21-060-004-C664.

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I. Project Summary

Nonpoint source (NPS) pollution remains a major source of fecal and chemical bacteria contamination in Galveston Bay. This type of pollution includes all water pollution that did not originate from a regulated point source, such as a wastewater treatment facility, municipal stormwater system, or concentrated animal feeding operation (CAFO). Common NPS pollutants can include oil, grease, and toxic chemicals from roadways, spills, and residential areas; bacteria or nutrients from pet waste, boater waste, or leaking septic systems; fertilizers, herbicides, pesticides, and other hazardous household waste; and can include many other site-specific sources. These types of pollution impact the Bay when rainfall carries it into a water body in the watershed, eventually impacting oyster harvesting zones, ecological health, and recreation safety. Reducing NPS pollution in a large area is a monumental task due to difficulty locating the most impactful sources in various areas. Additionally, the implementation of best management practices requires coordination across large spatial areas and multiple organizations.

This project aims to conduct targeted, community-scale NPS pollution control with a specific area of Galveston County, specifically the area around Kemah, Bacliff, and San Leon, in order to improve water quality in Galveston Bay. The information gained and lessons learned from these small community projects can be used to implement NPS pollution reduction in other areas.

With the help of a NPS Pollution Workgroup, Galveston Bay Foundation has partnered with two mobile home parks, two marinas, two apartment complexes, and two community-based groups within the Kemah, Bacliff, San Leon area within Galveston County to establish NPS reduction programs based on the specific issues noted on and around their property. Through these partnerships, GBF, county officials, and project partner property managers and residents are working to (1) determine the largest contributions of NPS pollution, (2) identify key best management practices to reduce pollutant loading, (3) determine barriers and benefits to these practices, and (4) develop and implement initiatives to address these issues and reduce pollutant loading.

Once project partners were identified and finalized, a survey of project partner staff and residents was conducted to foster engagement, determine priorities, and understand current perceived barriers and benefits to minimizing the identified sources of NPS loading. The results of the survey, as well as a review of publicly available watershed assessments made available by the Texas Commission on Environmental Quality (TCEQ), were used to create this Community Engagement Plan. This plan will be used to guide the implementation of initiatives to address project partner specific NPS issues and reduce pollutant loading to Galveston Bay.

A. Overview of Area

The community chosen to be the project area includes San Leon, Bacliff, and Kemah, Texas. A map of this area can be found in **Attachment A**. This area was chosen for the following reasons:

1. The community sits directly on Galveston Bay, so runoff pollution immediately moves from the community into the Bay.
2. GBF has several community partners in the area, but has not conducted a large amount of outreach programming in the areas determined to have the highest need.

3. A wide range of income levels are present in the area, as shown on the Regional Equity Tool made available by the Harris-Galveston Area Council (H-GAC), so findings may be applicable in a variety of other areas surrounding Galveston Bay.
4. Several water quality monitoring team members currently measure water quality parameters, including bacteria concentrations in the area, making it convenient for them to continue measuring the impact of NPS pollutants.
5. There is visible NPS pollution in the area.

B. Project Partner Selection

In order to identify project partners within the project area, Galveston Bay Foundation first identified all trailer or mobile home parks, marinas, apartment complexes, and community groups within the project area. A rubric was created to narrow down and prioritize the list of potential project partners that included metrics such as location in project area, observed presence of trash receptables, relative distance to Galveston Bay, amount of visible pollution, and history of known releases, among others. This list and the rubric were shared with the NPS Workgroup at its inaugural meeting on November 19, 2020 to gain insight on these locations, identify potential contacts, and ensure that both documents were comprehensive.

Once additional information was gathered from the Workgroup, Galveston Bay Foundation conducted informal site visits to all of the potential project partners and filled out the rubric with notes based on their visual observations. Based on the completed rubric, Galveston Bay Foundation identified the three highest priority project partners to contact. First contact was made by telephone to introduce the project, determine level of interest, and plan for a time to discuss further. Based on the connections made in this first conversation, the final project partners were chosen:

- Community Groups: Texas Mariners Cruising Association and American Legion Post #29
- Apartment Complexes: Hawthorne at South Shore and Signature Point
- Trailer or Mobile Home Parks: Big Spot RV and Latitude's North
- Marinas: Eagle Point Fishing Camp and Marina and Portofino Harbour Marina

A map of these project partners is included in **Attachment B**.

A memorandum of understanding (MOU) was created for each of the project partners to ensure buy-in on the project by the partners. The MOUs were discussed with the project partner contacts and distributed through emails, calls, and brief meetings. However, issues were encountered in getting signed memorandums of understanding back from project partners– even from those that had previously expressed an excited interest in participating in the project. The impression gained from the partners was that any sort of document requiring a signature is generally an overwhelming thing for small, underserved businesses. A less intimidating project welcome document with the same listed expectations was prepared in order to make project participation more approachable to those intimidated by signing an MOU.

C. Summary of Survey Implementation

A survey targeted to project partner staff and residents was created to foster engagement, determine priorities, and understand current perceived barriers and benefits to minimizing the identified sources of NPS loading. The survey was made available both online and as a paper survey.

Galveston Bay Foundation distributed the survey through in person meetings with the partners, informal visits to the project partner locations, distribution of flyers and other promotional materials at each location, hosting presentations for project partner residents, and emailing the survey link to be shared in newsletters or social media. Galveston Bay Foundation additionally planned a fun social event (a boat ride around the project area) for the project partners to increase participation and interest in the project. Unfortunately, this boat trip was cancelled due to weather, and the boat was not available at a later date. Galveston Bay Foundation additionally offered to host boothing events, provide mailers to residents, hang posters in public spaces, and more; however, none of the project partners indicated an interest in these activities.

Results of the survey are described in the follow section for each of the project partner types.

II. Community Groups

A. Overview

The two community groups participating in this project are the Texas Mariners Cruising Association (TMCA) located at 623 Hanson Road in Kemah and American Legion Post #29 San Leon (American Legion) located at 1402 FM517 in San Leon. These groups were more involved in this project than any other partner category. This is likely due to the groups having multiple routes of communication with their membership (newsletters, social media pages) and established gathering times (meetings, events, etc.). Survey participants for each of these two groups showed interest in multiple outdoor activities including boating and sailing, walking around the neighborhood, visiting local parks, visiting the beach, fishing, and wildlife viewing. Both community groups indicated an interest in taking action to reduce pollution in the future; however, interest in volunteering or making monetary donations accounted for less than 10% for each. Sixty percent of American Legion respondents and 40% of TMCA respondents indicated they would like to either take action at home or report pollution to be removed, and an additional 46% of TMCA respondents indicated that they would like to learn more about local pollution issues.

B. Primary Pollution Sources

According to TMCA survey respondents, the top three primary pollution concerns are: industrial impacts on water quality, abandoned fishing gear, and boater waste. American Legion responses indicated that the top three pollution concerns are: septic or sewage systems, industrial impacts on water quality, and large debris. Two respondents indicated specific areas requiring attention: along 9th Street in San Leon and Dickinson Bayou. TMCA survey respondents indicated each of the following options a variety of potential projects for the community, with gaining about 40% support: more/improved trash receptacles, large debris pick-up, recycling options, local drainage improvements, or more accessible or frequent community information on a variety of environmental issues. Two items for improvement were chosen by 75% of American Legion respondents: sewage/septic system maintenance information and signage to prevent littering. Two people at TMCA indicated that it would be helpful in their household to provide resources in Spanish.

C. Reduction Management Strategy

Based on the results of the survey and conversations with the project partners, two large community events will be held in the San Leon and Kemah areas, respectively. These events will address and provide resources related to a variety of issues as requested by the communities. For the Kemah area (as requested by TMCA) this will focus on ways to learn more about local water quality and other environmental issues, resources to reduce fishing and boater waste, access to pollution reporting tools, and providing connections to local municipal and industrial groups involved with environmental issues. For the San Leon area (as requested by American Legion), the event will provide information about ways to ensure properly maintain septic systems, resources related to pollution reporting in the area, and signage that people can post in their area. Each of the events will focus on providing resources that community members can implement at home rather than recruiting people to implement an activity or take on a project. The events will be open to all community members, not just members of the groups involved in the survey, and will be fun and accessible weekend events.

III. Apartment Complexes

A. Overview

The two apartment complexes identified for participation in this project are Hawthorne at South Shore located at 1201 Enterprise Avenue in League City and Signature Point located at 1 Signature Point Drive in League City. Participation by apartment complex residents in the survey was low due to the cancellation of community events and shared spaces at the apartments due to COVID social distancing requirements, and both complexes not having a central gathering area to disseminate information such as a bulletin board, entry table, etc. Additionally, Signature Point underwent a major management change during the survey period, and Hawthorne at South Shore experienced damage during the winter storm and management was tied up with construction tasks.

B. Primary Pollution Sources

Each of the apartment complexes already have a lot of resources for their residents, including pet waste stations, recycling options, and maintenance crews that pick-up litter and ensure trash cans are emptied regularly. Primary sources of NPS pollution that remains surrounding these apartment complexes include urban stormwater runoff and illegal dumping, including littering. Urban stormwater runoff often carries a variety of pollutants that can adversely affect water quality and is a larger problem in developed areas with impervious ground cover. Although trash cans and maintenance crews are available on each of the properties, the surrounding area has visible litter and debris in the roadways.

C. Reduction Management Strategy

The strategy for reaching these apartment residents is to have an approachable and affordable social event in evening hours or on the weekend. This would not be marketed as an educational event, but rather a fun way to people to experience the Bay through the expertise of Galveston Bay Foundation staff. Ideas could include a happy hour with Bay experts with booths and information at a popular destination, kayak tour of the area close to the apartments, an introductory class on how to enjoy the Bay, a nature walk in underutilized park in the area, etc. This event may also be combined with one of the workshops described above in Section III.C. This event would serve as an opportunity for the community to understand their connection to the Bay and to obtain resources for them to get more involved in issues affecting the Bay.

IV. Mobile Home or Trailer Parks

A. Overview

The two mobile home or trailer parks identified for participation in this project are Bay View RV and Mobile Home Park located at 1801 Avenue K in San Leon and Big Spot RV located at 2241 E Bay Shore Drive in San Leon. Participation by the mobile home residents in the survey was low due to a lack of shared spaces utilized on the property and low facility budget for hosting events with residents.

B. Primary Pollution Sources

The main source of NPS pollution in and around the mobile home facilities is illegal dumping, including litter. Most of the illegal dumping observed was associated with residential- or construction-related debris; however, vehicles were also observed. These vehicles also imply that maintenance activities might be taking place, which could lead to small chemical spills. Urban stormwater runoff is also a localized pollution source which often carries a variety of pollutants that can adversely affect water quality. Mobile home and trailer park facilities have large areas of impervious ground cover which facilitates the movement of runoff to the Bay.

C. Reduction Management Strategy

Based on the results of the survey and conversations with the project partners, the large community events described in the community group section of this plan will be promoted at the mobile home and trailer parks included in this project. These events will be open to all community members, not just members of the partners involved in the survey and will have free giveaways, access to food, and be a fun, weekend event. Both of these properties are located in San Leon where the community event will focus on maintaining septic systems, resources related to pollution reporting in the area, and signage that people can post in their communities. The event will be promoted through the contacts at each of the mobile home parks and in general social media and news outlets in the San Leon area.

V. Marinas

A. Overview

The two marinas identified for participation in this project are Eagle Point Fishing Camp and Marina located at 101 1st Street in San Leon and Portofino Harbour Marina located at 1 Portofino Plaza in Clear Lake Shores. Participation by the marina customers in the survey was low due to a lack of events at the marina locations, marina customers visiting at odd hours when the store or office is closed, and many marina customers infrequently visiting the marina.

B. Primary Pollution Sources

The main source of NPS pollution in and around the marinas is boater waste, chemical spills, and dumping, including littering. Boater waste includes onboard untreated human sewage that is dumped into the water instead of pumped at a station to be treated. Both of the marinas included in this project have pump-out stations; however, accidental or illicit spills of boater waste may still be an issue for local water quality. Chemical spills can happen in marinas during fueling or cleaning, but can be mitigated by using inert chemicals or making sure chemical absorbents are kept nearby. Common litter at marinas can include fishing supplies including monofilament fishing line and residential debris such as food wrappers, cigarette butts, and bottles.

C. Reduction Management Strategy

Due to the infrequent visits or irregular hours of visits to the marinas, and based on survey responses and conversations with the project partners, an event will not be held for the marinas. Instead, boater waste packets will be provided to each of the marinas with information on reducing boater waste, reporting pollution, and learning about the general health of the Bay. These packets can be provided to new customers renting marina space, current customers as they come into the office, or visitors who visit the marina stores, as applicable and so desired by the project partner contacts. The customers of each of the marinas will additionally be invited to attend the community workshop events in San Leon and Kemah, depending on the one closest to that particular marina.

VI. Strategy Implementation

A. Events

1. Community Resource Fairs

Based on the results of the survey and conversations with the project partners, two community events will be held: one large resource fair in San Leon and one social event with resources in the Kemah area. These fun, weekend events will focus on providing resources that community members can implement at home rather than recruiting people to implement an activity or take on a project. The provided resources will address the issues requested by the communities in the surveys and will include not only Galveston Bay Foundation resources but those available through local municipalities, other nonprofit organizations, and local businesses who will be invited to host booths at the events. All involved organizations will be encouraged to distribute giveaways, host interactive activities, and use the opportunity to launch community-scale projects in order to build attendance and attention in the area. This would be formatted like a boothing event and be held in popular, well-traveled areas where people may stumble across the events in addition to those intentionally visiting. Both events will be open to all community members, not just members of the project partners involved in the survey, although all of the project partners and their residents will be directly invited to attend. It will additionally be promoted through targeted social media advertisements and local news outlets. They would not be marketed as an educational event, but rather a fun way for people to experience the Bay through the expertise of Galveston Bay Foundation staff and other local organizations.

In the Kemah area, the event will have a broad focus based on the varied interests shown in the results of the community survey. Among these, the event will provide information on how to learn more about local water quality, resources to reduce fishing and boater waste, access to pollution reporting tools, and also provide connections to local municipal and industrial groups involved with environmental issues. Based on results from the Kemah-area surveys, particularly the apartment residents, the events will be marketed as social, approachable, and affordable, and will take place in evening hours or on the weekend. The current event venue being considered for this event is Bubble Jungle in Kemah. This venue is a new, welcoming bar and restaurant with a large outdoor area and a lot of excitement in the community. In conversations with the owner, they have indicated that they are very interested in the idea and a date is being planned for the event.

In the San Leon area, the community event will provide information about ways to ensure properly maintained septic and mobile home sewage systems, resources related to pollution reporting in the area, general information about water quality in the Bay, and connect people to ways to learn more about issues affecting their area. This event is currently scheduled for October 30, 2021 at Topwater Grill in San Leon. Invitations have been sent to various organizations and agencies for boothing, including the Harris-Galveston Area Council, the Bacteria Implementation Group, Texas Commission on

Environmental Quality, Keep Texas Beautiful, Galveston County Health District, the Coalition of Watersheds, and San Leon Municipal Utility District, among others.

2. Distribution of Boater Waste Bags

Due to the infrequent or irregular hours that residents visit the marinas and based on survey responses and interviews with the project partners, an event will not be held for the marinas. Instead, boater waste packets will be provided to each of the marinas with information on reducing boater waste, reporting pollution, and learning about the general health of the Bay. These packets can be provided to new customers renting marina space, current customers as they come into the office, or visitors who visit the marina stores, as applicable and so desired by the project partner contacts.

B. Schedule

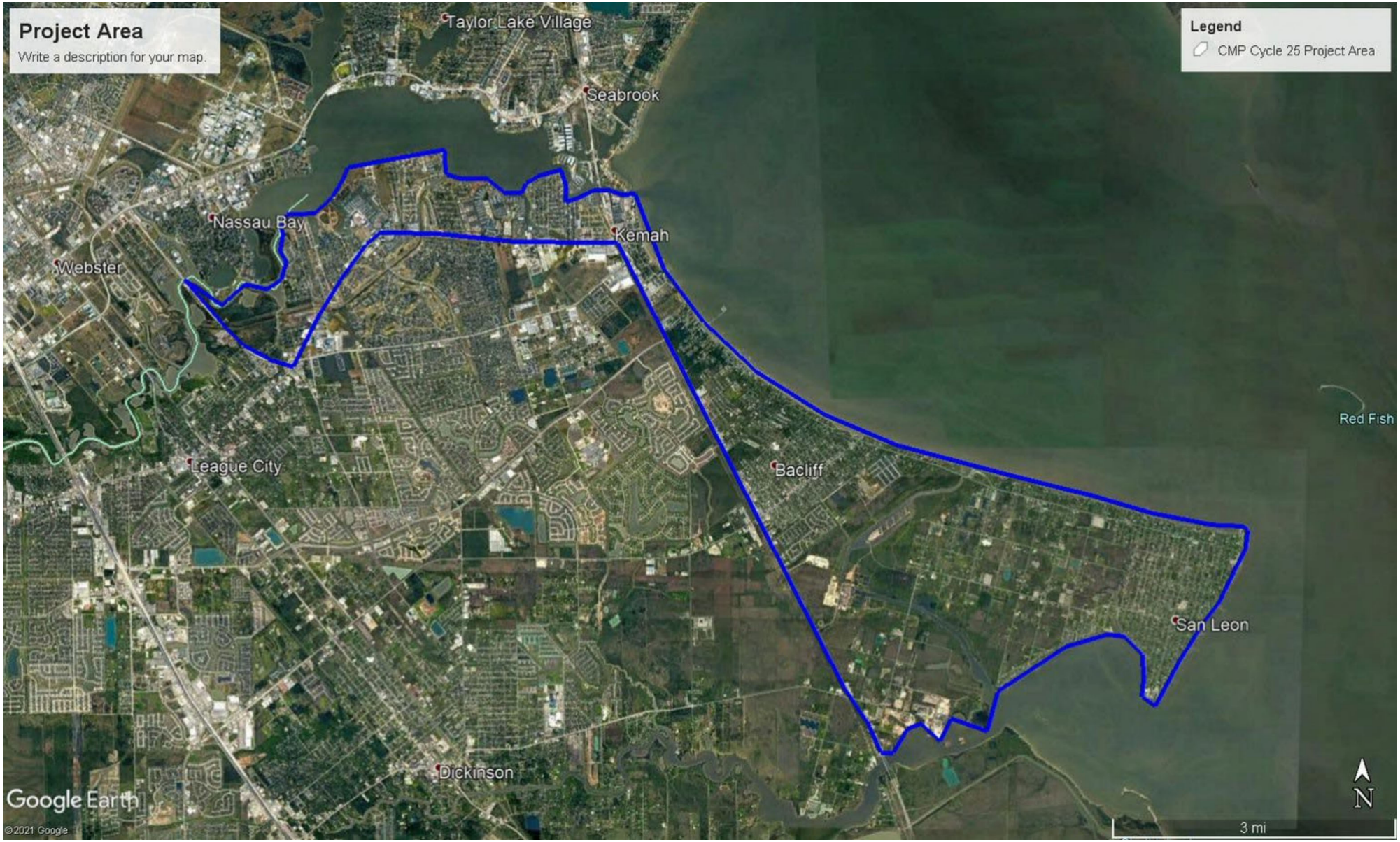
The community events will likely take place in October and November 2021. These dates were chosen based on the anticipated cooler weather to ensure maximum participation, to provide enough time to ensure all materials and resources are ready, to avoid the highest risk for hurricane events, and to provide enough time for impact assessment following implementation of the programs. The boater waste bag distribution will take place in early December 2021 so that marinas can include the distribution in their holiday gift-giving practices and as a follow up to the community events.

C. Success Metrics

Success of the outreach efforts will be measured in the following ways:

- Number of people attending the community events
- Number of boater waste bags distributed to marinas
- Number of Galveston Bay Report Card website visits
- Number of Galveston Bay Action Network (GBAN) downloads
- Review of trends in GBAN reporting in the three months following the events
- Review of water quality monitoring team data for changing trends in the project area in the three months following the events

Attachment A



Attachment B

Photo 1: Map of Project Partners without labels

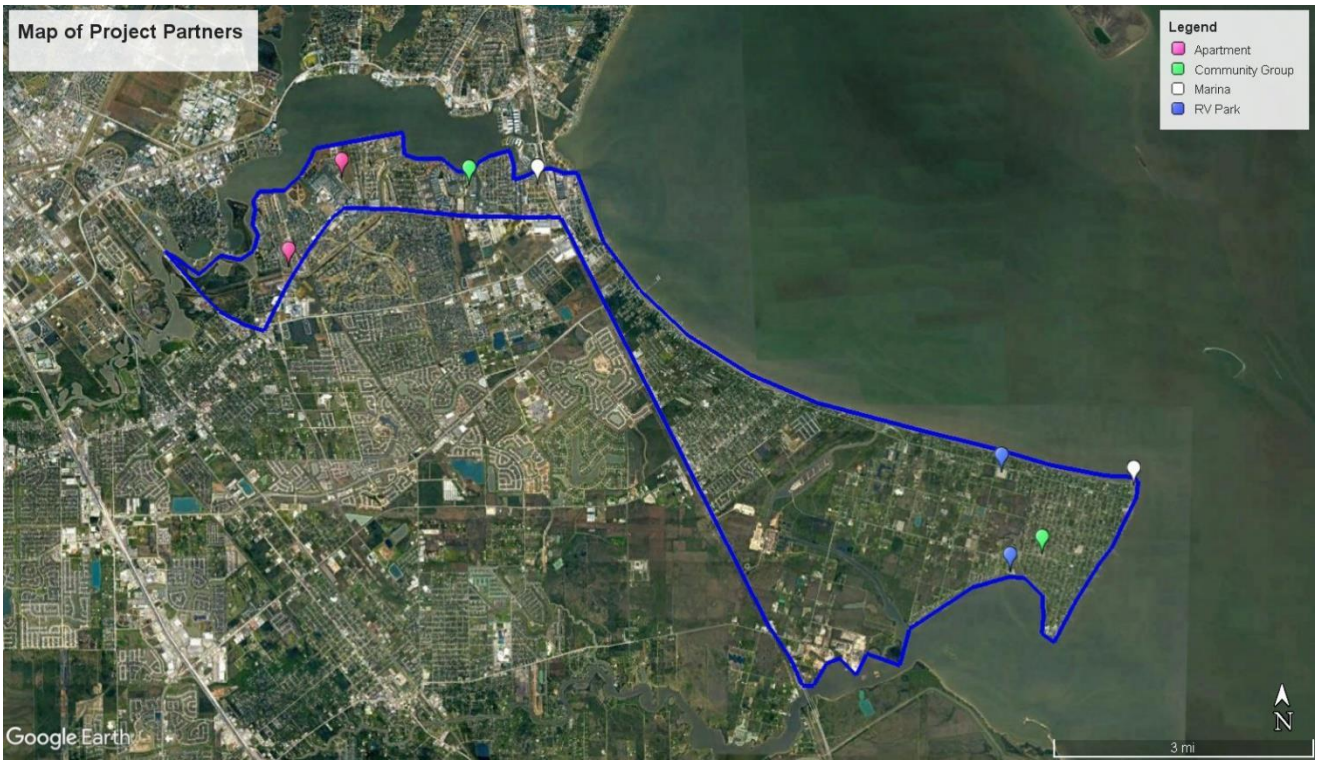
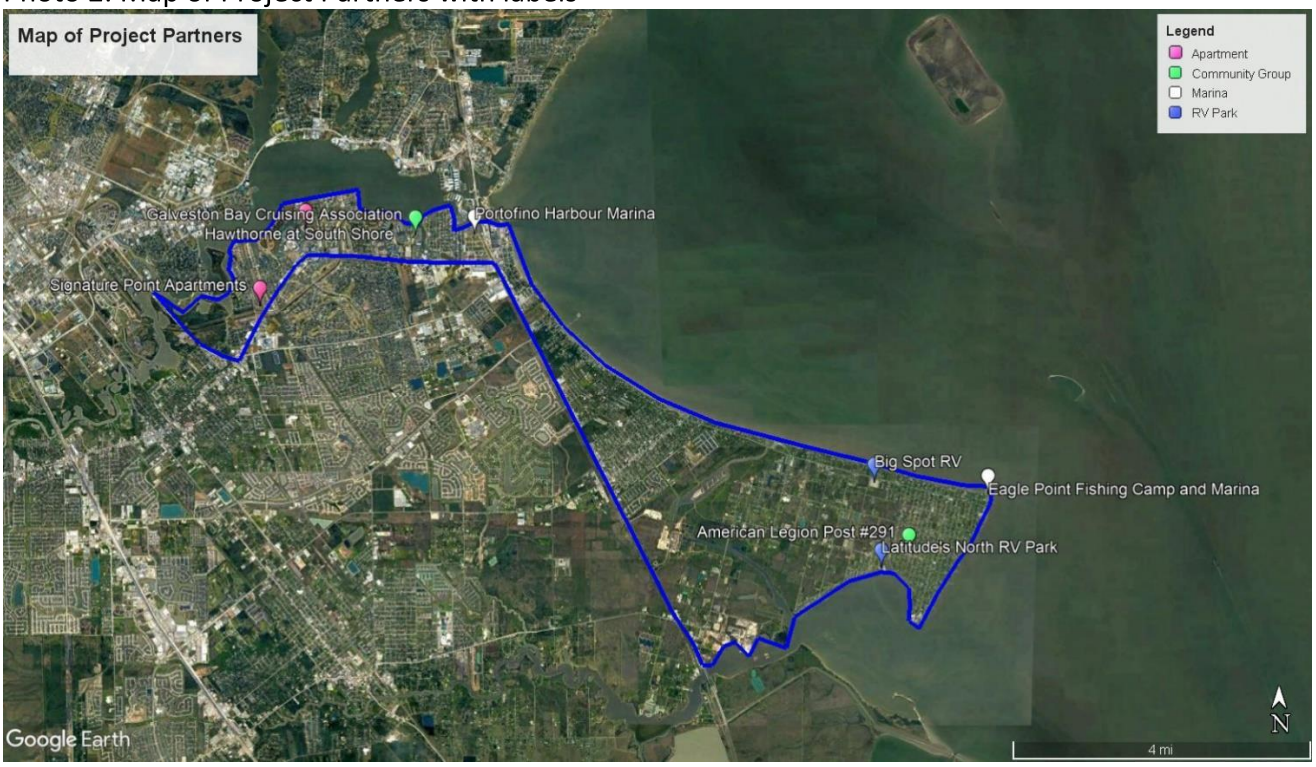


Photo 2: Map of Project Partners with labels



Appendix 2

Galveston Bay Foundation
Multifaceted Approach to Addressing Nonpoint Source Pollution in Galveston County GLO Contract No. 21-060-004-C664
Cycle 25 Deliverable, Task 2.1
Galveston Bay Foundation

Nonpoint Source Working Group Members

Names	Organization	Email
Christian Rines	Galveston Bay Estuary Program	Christian.Rines@tceq.texas.gov
Scott Tuma	City of League City	Scott.Tuma@leaguecity.com
Kendall Guidroz	H-GAC	Kendall.Guidroz@h-gac.com
Katherine Knight	Resident	kharzi@gmail.com
Lisa Liu	Johnson Space Center	lisa.liu@nasa.gov
Katie Wilson	Galveston County Health District	kwilson@gchd.org
Chris Clodfelter	Resident	clcoceansports@gmail.com
Rick Felan	Johnson Space Center	ricardo.felan@nasa.gov
Lori Freimel	Texas Mariners Cruising Assn.	laughingcrab209@gmail.com
Andrew Miller	San Leon Municipal Utility District	amiller@slmud.org

Multifaceted Approach to Addressing Nonpoint Source Pollution in Galveston County GLO Contract No. 21-060-004-C664
Cycle 25 Deliverable, Task 2.2

Workgroup Meeting Notes

Attached are notes from the Nonpoint Source Pollution Workgroup meetings which took place on November 19, 2020, March 17, 2021, December 2, 2021, and May 12, 2022.

Meeting Notes

Nonpoint Source Pollution Project Workgroup

November 19, 2020

Attendees:
Sasha Francis (Galveston Bay Foundation)
Charlotte Cisneros (Galveston Bay Foundation)
Katie Wilson (Galveston County Health District)
Scott Tuma (League City)

I. Introductions and Welcome
   Introduce people
   What is "nonpoint source pollution"
II. Brief Overview of Galveston Bay Foundation
III. Project Introduction
   - Background – BWEC and other programs in the past, combined for stronger project
   - Future Plan Overview – Structure of Project
   - Proposed Area – Kemah, Bacliff, San Leon
   - Needs – today and in the future!
IV. Brainstorming
   - Project Partners
     i. Look into mobile park by Topwater
     ii. Look into restaurants as well – who might have marinas or redo marinas.
     iii. Legend Point by watergate – live aboard community
     iv. Bayshore RV in 2018 for discharging sewage to ditches
     v. Tilman Fratitta
     vi. Walmart
     vii. Sample location by Latitudes Marina
     viii. True North Marine – New boat yard by Watergate – Patrick McAndrew (Patrick@truenorth-marine.com)
     ix. Not aware of Mandolin Pier, Captains Quarters
     x. Galveston Bay Cruising Association – Ron Eddleman: Ron_1056@yahoo.com. GBCA's contact with Cruzan Rum that wanted to do a community involvement
     xi. Seabreeze –discharge seeping out from temp sewer tank
   - Issues of Concern
     In addition to listed items:
     i. RV dumping
     ii. Restaurant waste
   - Community Engagement
     i. Sometimes take the sheriff with us
     ii. Top-down approach won't work – common/shared goals work better
     iii. Listen!

Meeting Notes

Nonpoint Source Pollution Project Workgroup

March 17, 2021

Attendees: Lori Friemel, Katherine Knight, Lisa Liu, Katie Wilson, Kendall Guidroz, Christian Rines, Chris Clodfelter, Rick Felan, Charlotte Cisneros, Sasha Francis

I. Brief Overview of Project
   1. Provide project background, mission, etc.
   2. Internal resources, but project is also open to all that are applicable to the identified sources of pollution
   3. Summary of what we accomplished during the last meeting
   4. Recent Updates
      - Project Boundary: Described why – residential areas, diverse demographics
      - Project Partners: Show list and discuss reasons for choosing

II. Brainstorming
   1. Project Partner Surveys
      - General: focus on pollution or cleaner communities rather than environmental
      - Mention how long the survey is at the beginning (whichever is less effort)
      - Don't worry about how many pages
   2. Specific
      - Outdoor Activity question
        1. Add in dog walking and bicycling
        2. Question - who is the survey targeted to? Residents or all?
      - Issues question
        1. Put some examples under each of the categories
        2. Boater waste – dumped waste, boat parts, abandoned boats
        3. Fishing waste - (line, traps, lures, tackle)
        4. Flooding caused by clogged drains – maybe combine with drainage issues/standing water?
        5. Grass and tree clippings, leaf blowing
      - Involvement
        1. Passive/active
        2. Add an option for "Other"
      - Solutions
        1. Lots of ideas, but do we need this question?
   3. Community Engagement Plan
      - Overview and share outline, potential measures of success

III. Future Help Needed

1. Texas Mariners Cruising Association offered to be a resource

IV. Closing

Meeting Notes

Nonpoint Source Pollution Project Workgroup

December 2, 2021

Attendees:
Patrick McAndrew – True North Marine
Lori Fremiel – TMCA
Scott Tuma – GBCA, Clear Lake Racing Association, League City
Katherine Knight – TMCA and Yacht Club member, teacher
Cindi Du - Resident
Sasha Francis – Galveston Bay Foundation
Charlotte Cisneros – Galveston Bay Foundation

I. Signage:
- Clearlake Shores (3 parks) Sundial Park, Jarboe might need tubes – Scott Tuma recommends reaching out to: Clear Lake Shores City Administrator, Brent Spier, BSpier@ClearLakeShores-tx.gov
- Suggestion – add a recycling can to sign! - Lori

II. Idea for boater waste bags:
- Yacht brokers – Scott Tuma
- Clear Lake Boat Parade – Cindi Du
- At LYC boat races – Katherine Knight is a volunteer race committee member for LYC
- Award brunch after the boat races at South Shore – December 11th - Patrick
- Patrick and Scott will both take bags!
- Lori good on bags for now – will wait for whistles

III. Resource Sharing:
- Boat Parades
- Post Event Brunch
- 3 to 5 minute elevator pitch of pollution reduction resources (all resources together or one at a time)
- Idea – sharing recycling info for the different areas within project
- Donate GBF reusable water bottles to Lakewood Yacht Club and Houston Yacht Club for their youth programs. Scott will send approx. number for this and other youth programs and competitions, including at Seabrook Sailing Center
- Create one pagers of pollution resources with QR codes
- Send QR code to Scott and others

IV. Areas for Implementation:
- Lake Jackson, Freeport Area
- Pasadena, Deer Park, Galena Park
- Texas City and surrounding area
- Folks will send more!

Meeting Notes

Nonpoint Source Pollution Project Workgroup
May 12, 2022

I. Introductions and Welcome

<u>Attendees</u>: Lori Friemel, Lisa Liu, Katie Wilson, Kendall Guidroz
<u>GBF Staff introductions:</u> Charlotte Cisneros, and Sasha Francis

II. Brief Overview of Project Background

Funder acknowledgements, initiative overview
Recap of project area and project partners
Recap of last Workgroup Meeting
Progress since last Workgroup meeting

III. Recent Updates

<u>Events and Presentations</u>

- *Bayside Community Center*
- *Kemah GBF Office*
- *GBAN Outreach*
- *February - Pollution Event*
- *March- Water Quality Event*
- *April – Explore the Bay Boat Ride*

<u>Anti-Pollution Signage</u>

- *22 signs distributed*

<u>Boater Outreach</u>

- *Over 200 bags distributed*
- *Outreach – Explore the Bay Boat Ride, Crab Trap Removal Event*

IV. Next Steps and Action Items

- *Review Water Quality Results*
- *Boater Waste Bags for cleanups and regattas*
- *Infographics and Signage*
    - i. *TMCA - well received!*
    - ii. *Portable Signage*
- *Summer Ice Cream Social – idea for Cease the Grease Outreach?*
- *Partner with H-GAC to talk about FOG outreach at apartment complexes*
- *Connect H-GAC to Nacero*

V. Closing

Multifaceted Approach to Addressing Nonpoint Source Pollution in Galveston County GLO Contract No. 21-060-004-C664
Cycle 25 Deliverable, Task 2.3

At the NPS Workgroup meetings, input was gathered from influential members within the project area and knowledgeable on NPS topics to guide strategic direction of the project and promote program activities. Ideas were also generated for campaigns in the area outside of the community workgroup to reduce NPS pollution in the project area.

Two of these campaigns have already begun.

- Galveston Bay Foundation began distribution of boater waste bags to marinas in the area based on lessons learned from the project partner marinas in the project area and input from the NPS workgroup. These packets provide information on reducing improper disposal of boater waste, reporting pollution, and learning about the general health of the Bay. A list of all marinas in the project area was compiled, and calls were made to each one to determine a need for bags. Approximately 1248 bags were distributed to the marinas through the project period. These bags will continue to be distributed throughout the remainder of the project period and will be expanded to include yacht brokers, boat parades, boat races and associated events, and more.
- Galveston Bay Foundation created several versions of an example “anti-pollution” signage based on a request made in the project partner survey that was emphasized and expanded on during NPS workgroup meetings. This sign can be printed with a city or business logo on an aluminum sign and posted at areas where litter or dumping is commonly seen. An example sign was printed to take to the community workshops and events to encourage people to customize their own or consider posting signage at their business.
- Galveston Bay Foundation was invited to be a member of the Houston-Galveston Area Council Fats Oils and Grease Workgroup to continue pursuing outreach opportunities beyond this project period and more specific to this type of bacterial contribution. We had some partner groups reach out and request Cease the Grease kits to hand out to residents. 138 kits were supplied to partner groups during this time and further kits will continue to be handed out after the completion of this project. Kit components were also handed out at various community event through the program area.

Additional campaigns in mind for future implementation include:

- Boothing at boater events in the area
- Creation of one-pager summaries of pollution resources to distribute at events
- Engaging youth programs in the area
- Engaging with local restaurants and businesses to reduce plastic usage and ensure outdoor trash receptacles are emptied frequently

Multifaceted Approach to Addressing Nonpoint Source Pollution in Galveston County GLO Contract No. 21-060-004-C664
Cycle 25 Deliverable, Task 2.4

Galveston Bay Foundation restocked items to promote resources used in workshops based on survey results. This included, among other items, boater waste items for the marina kits, interpretive flyers related to septic system issues and litter reporting, flyers on fans to distribute in warm weather months, GBAN pollution reporting stickers, and more. Some old program handouts were redesigned and updated. This was to make sure all the information was accurate, and the most recent logos were used on these handouts. Additionally, new outreach and marketing materials were created to promote the workshops and share with communities in the project area. These are included below as **Figures 1 through 13**.

Figure 1: Promotional Flyer for Community Workshop:

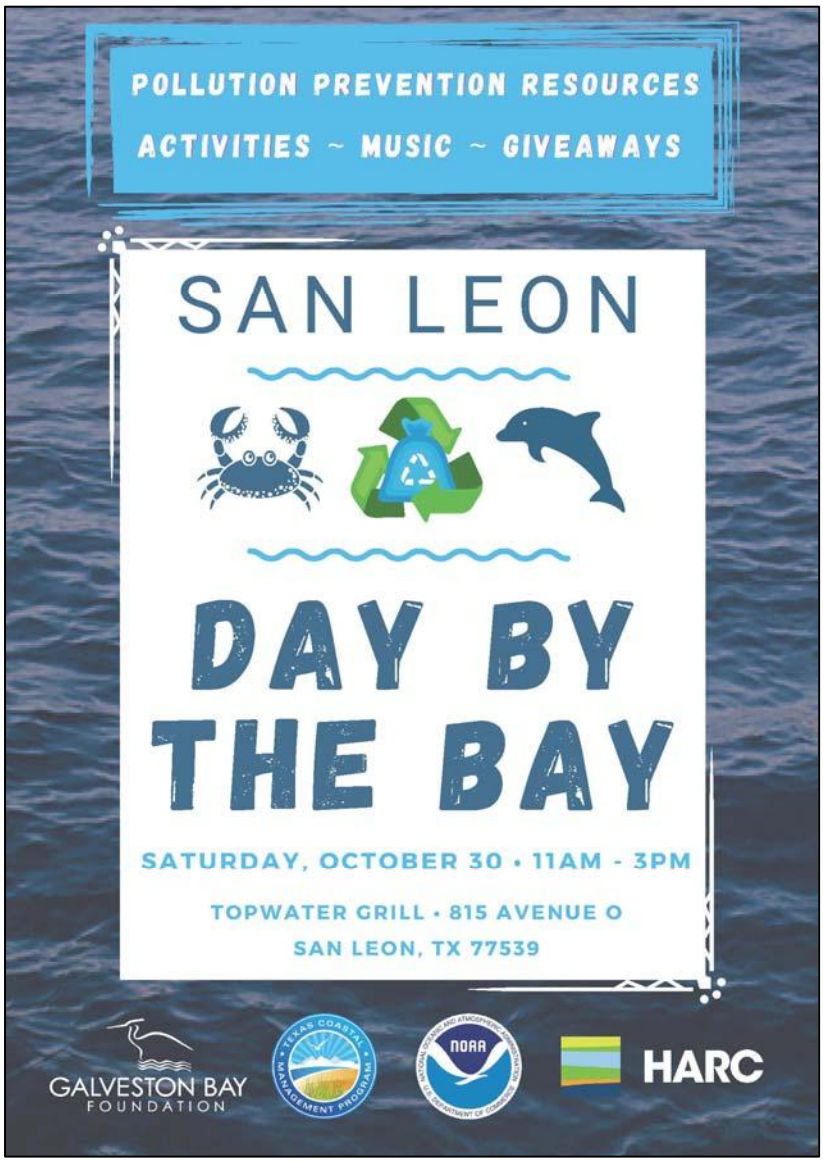


Figure 2: Example of Anti-Litter Signage Created for a Project Partner:

Figure 3: Example of Anti-Dumping Signage Created for a Project Partner:

Figure 4: Promotional Flyer for Kemah Community Event:

Figure 5: Community Survey Flyer

Figure 6: Solar Light and Emergency Whistle to hand out in conjunction with other NOAA and Texas Coastal Management branded boater waste information including Pump Don't Dump flyers and stickers:

Figure 7: Fan for Warm Weather Months:

Figure 8: Redesigned Cease the Grease Magnet:

Figure 9: Redesigned Double Sided Cease the Grease Bilingual Handout:

Figure 10: Social Media Post for Partners to Promote FOG Programs:

Figure 11: Redesigned Pump Don't Dump Handouts:

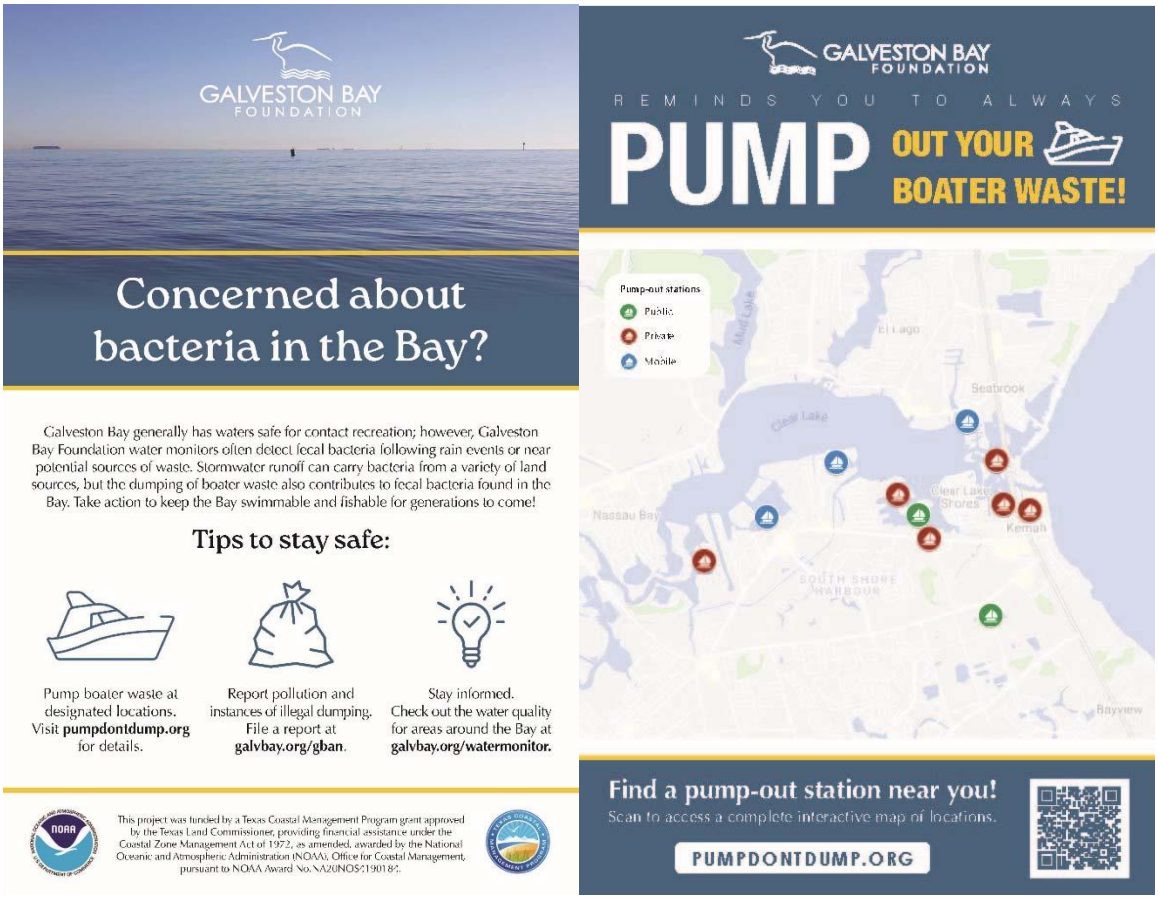


Figure 12: Redesigned Pump Don't Stickers:

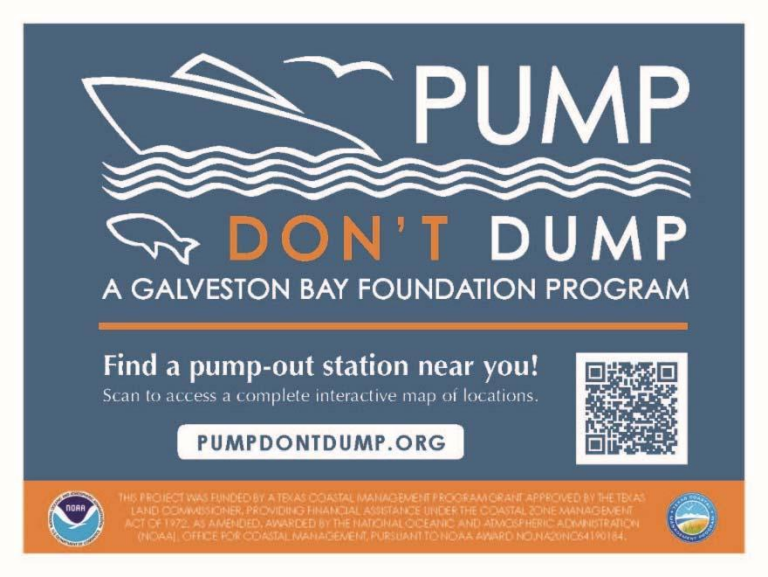


Figure 13: Bags for creating Boater Waste Education Bags. These were used to combine NOAA and Texas Coastal Management branded boater waste information including Pump Don't Dump flyers and stickers.

Galveston Bay Foundation created multiple pieces of digital content throughout the project period, regarding GBAN, boater waste, water quality in Galveston Bay, bacteria, Pump Don't Dump, and non-point source pollution, including social media posts, educational videos, and infographics. Below is a selection of some of these pieces of digital content form **Figure 14 to Figure 25**.

Figure 14: Facebook post for an event discussing Water quality in Galveston Bay and promoting GBF's water quality data viewer. Link to the YouTube videos mentioned in the post: https://www.youtube.com/watch?v=k9Ox_HRTq5E

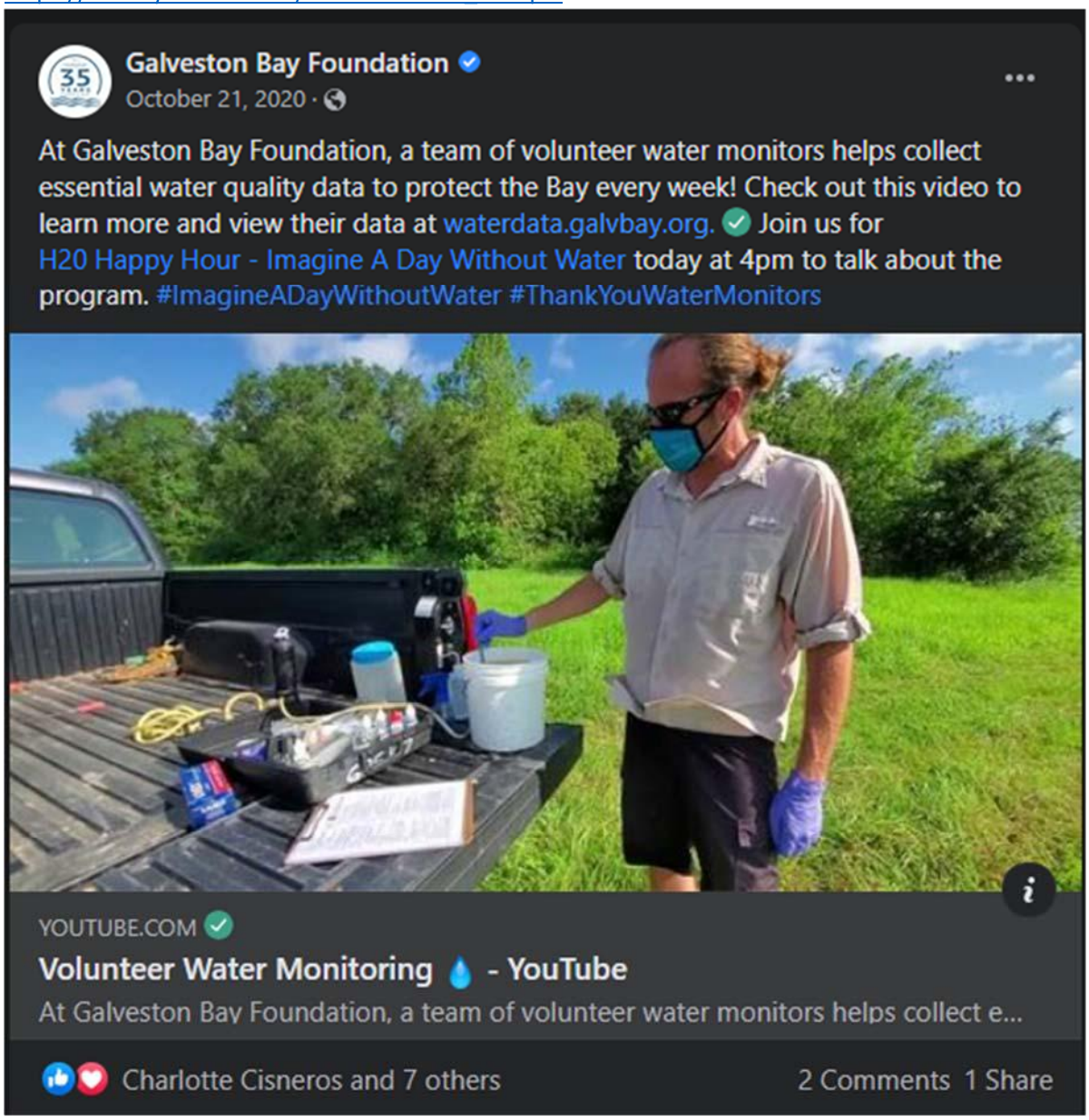


Figure 15: Post promoting our Cease the Grease website with tools about preventing Fats Oils and Grease (FOG) from going down pipes. Check out www.ceasethegrease.net for more information about our promotion of this program.

In further promotion of the Cease the Grease program, GBF created and published a YouTube video on March 12, 2021 about how to properly dispose of FOGs and the damage it can cause to pipes and Galveston Bay's water quality. To view this video visit: https://www.youtube.com/watch?v=oyikrlPIQU4

Figure 16: Post from May of 2021 with Pump Don't dump and other boating NPS pollution tips.

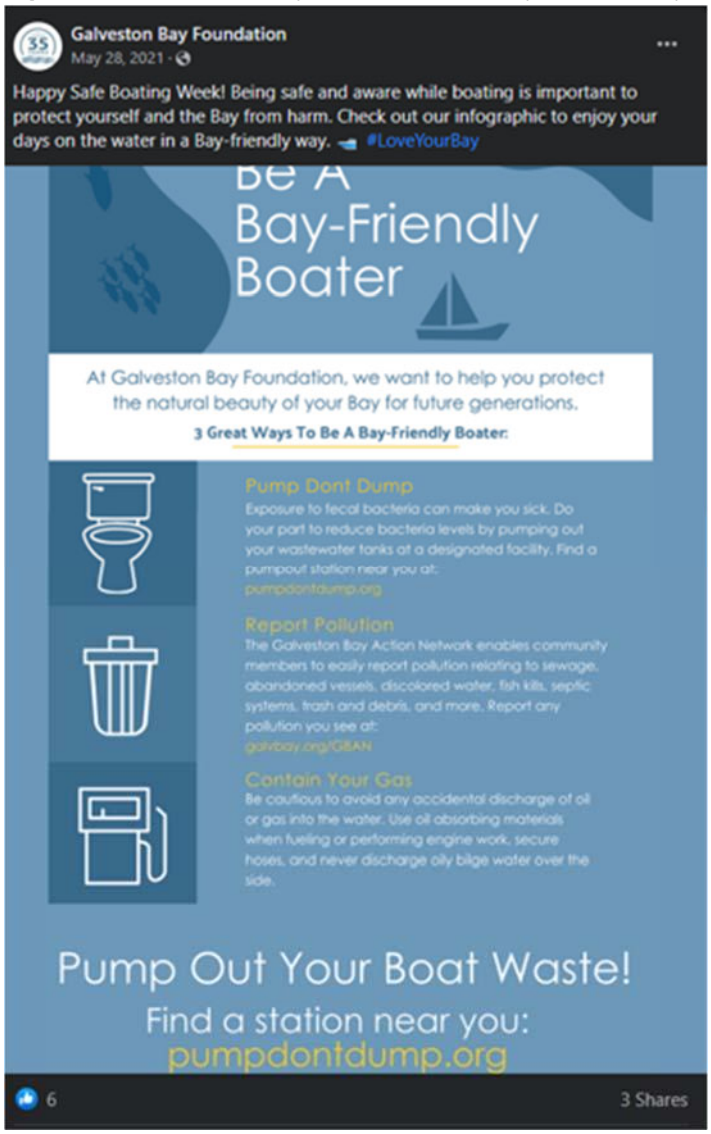
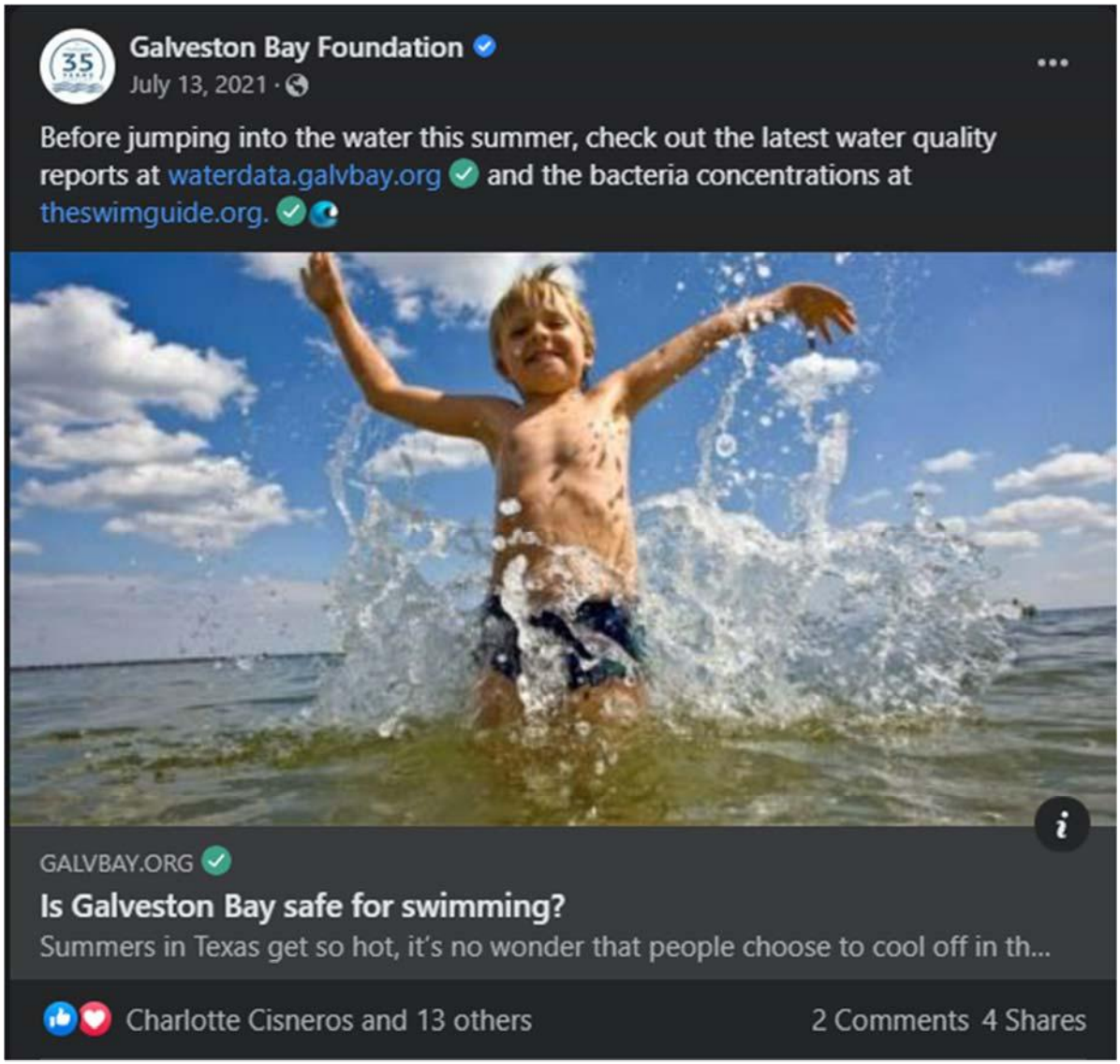


Figure 17: Post from June of 2021 with information about the Galveston Bay Action website and how to report NPS pollution.

Figure 18: Social media post, article screenshot and link to view article about bacteria concentrations in Galveston Bay and safe swimming conditions. https://galvbay.org/is-galveston-bay-safe-for-swimming/



Is Galveston Bay safe for swimming?

JULY 02, 2021 / NEWS

Summers in Texas get so hot, it's no wonder that people choose to cool off in the water! From swimming and kayaking to sailing and fishing, Houston-Galveston Area residents flock to Galveston Bay frequently to enjoy a variety of water recreation activities. Many of these people reach out to Galveston Bay Foundation (GBF) to ask if the water is safe to swim in, and fortunately, we have the answer!

The main concern for swimming in any surface water is the presence of bacteria. Enterococcus bacteria are a valuable indicator for determining the presence of fecal contamination in recreational surface waters like Galveston Bay and are more resilient in saltwater than other indicators. These naturally occurring bacteria are found in the guts of birds and mammals, including humans. Exposure to fecal bacteria can cause sickness such as rashes and skin irritation, as well as eye, ear, and respiratory infections.

High bacteria levels can lead governmental agencies to issue beach advisories and restrict public access to beaches, bayous, or bays. Additionally, high concentrations of these bacteria and associated pathogens can accumulate in oysters and other shellfish, making them unsafe to eat, especially if eaten raw. Large areas of Galveston Bay are closed for harvesting shellfish for direct consumption due to elevated concentrations of bacteria.

Figure 19: Social media post about non-point source pollution prevention and the Galveston Bay 2021 Report card.

Figure 20: Social media post about non-point source pollution prevention with the Cease the Grease program and where you can recycle used cooking oil in the Houston area.

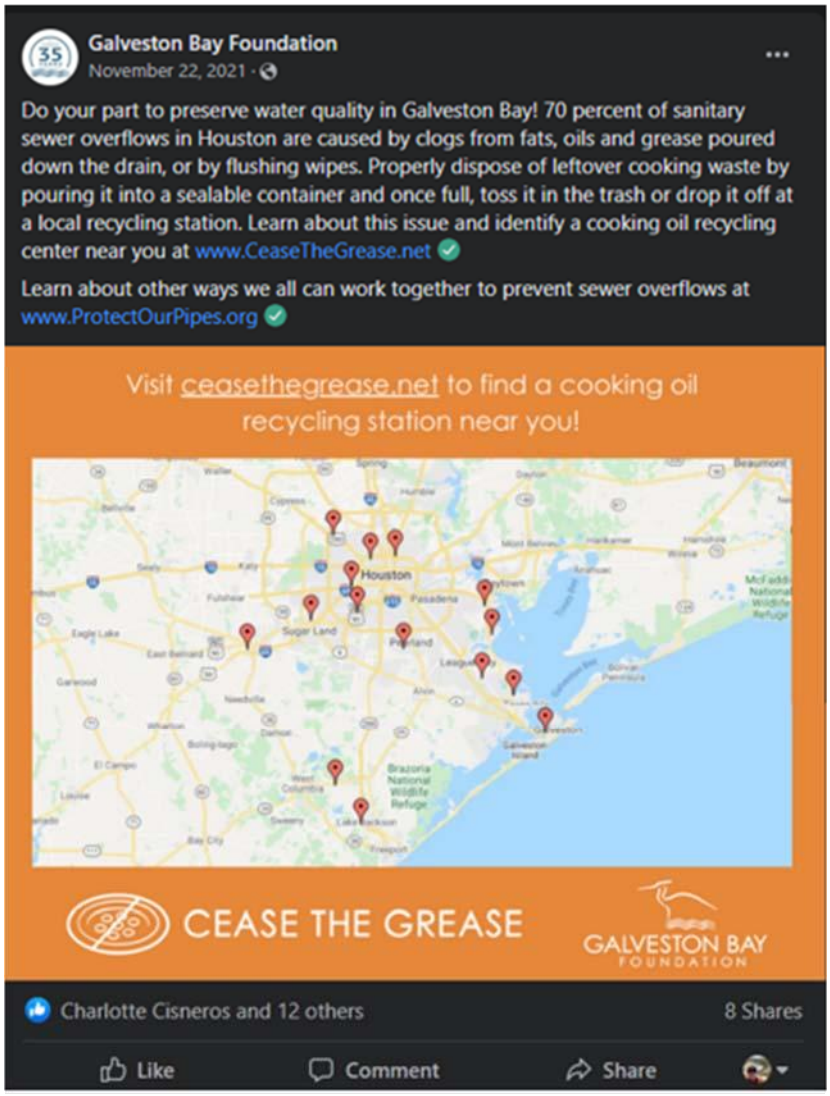


Figure 21: Social media post about community workshop and clean up hosted in Kemah.

Figure 22: Video and social media post about nurdle and marine debris non-point source pollution findings in Kemah. Link to view video is found on Facebook watch at https://www.facebook.com/watch/?v=492648572442601

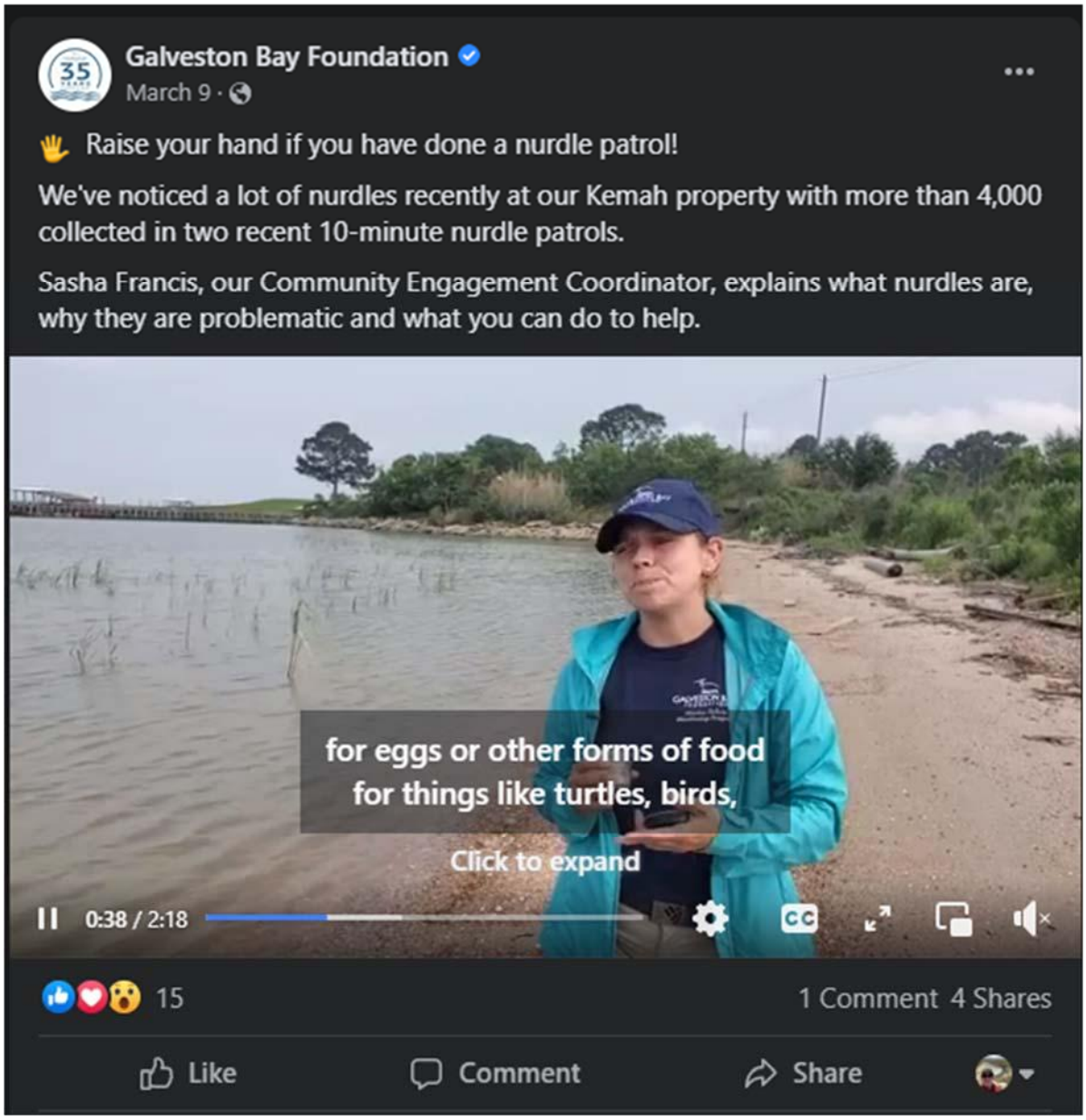


Figure 23: Social media post about the history of our water quality program. This post was created for National Water Quality Month and to help recruit new volunteers. After this post we had 3 potential new volunteers reach out about volunteering with the Water Quality Program.

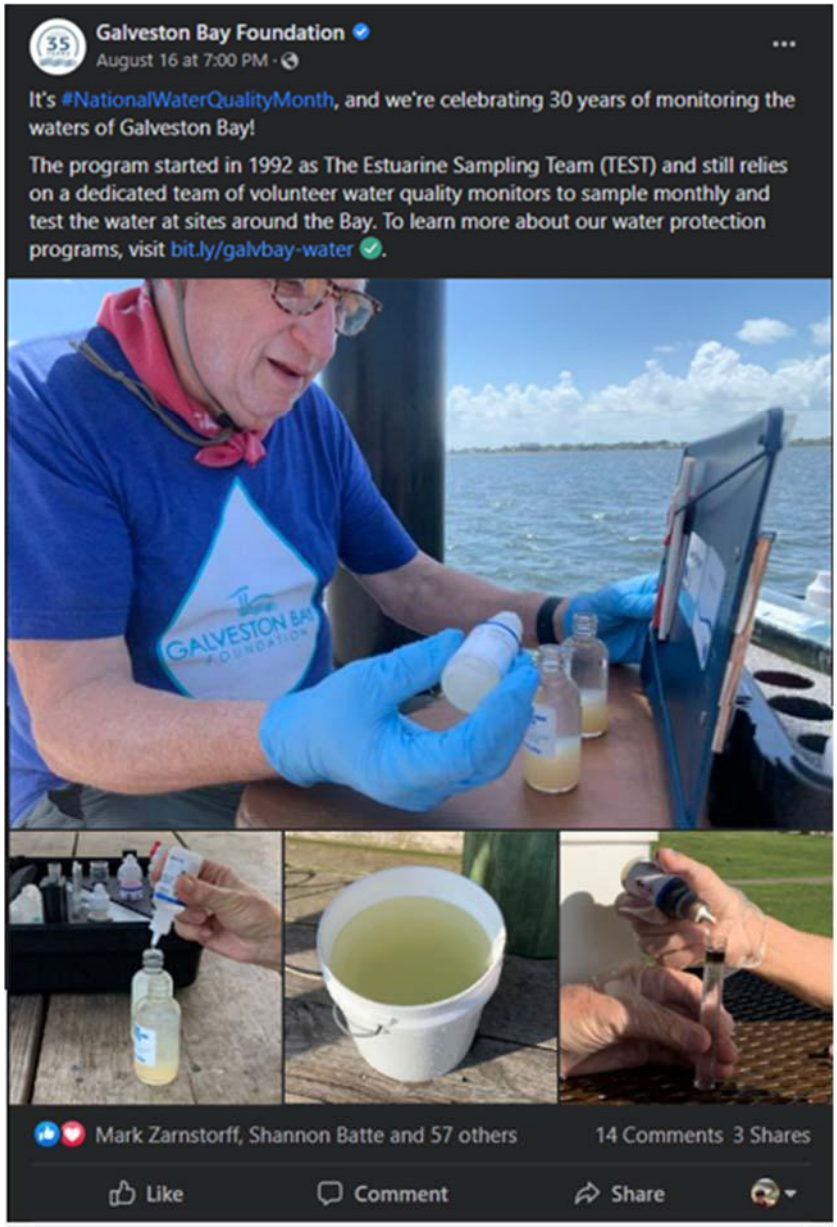
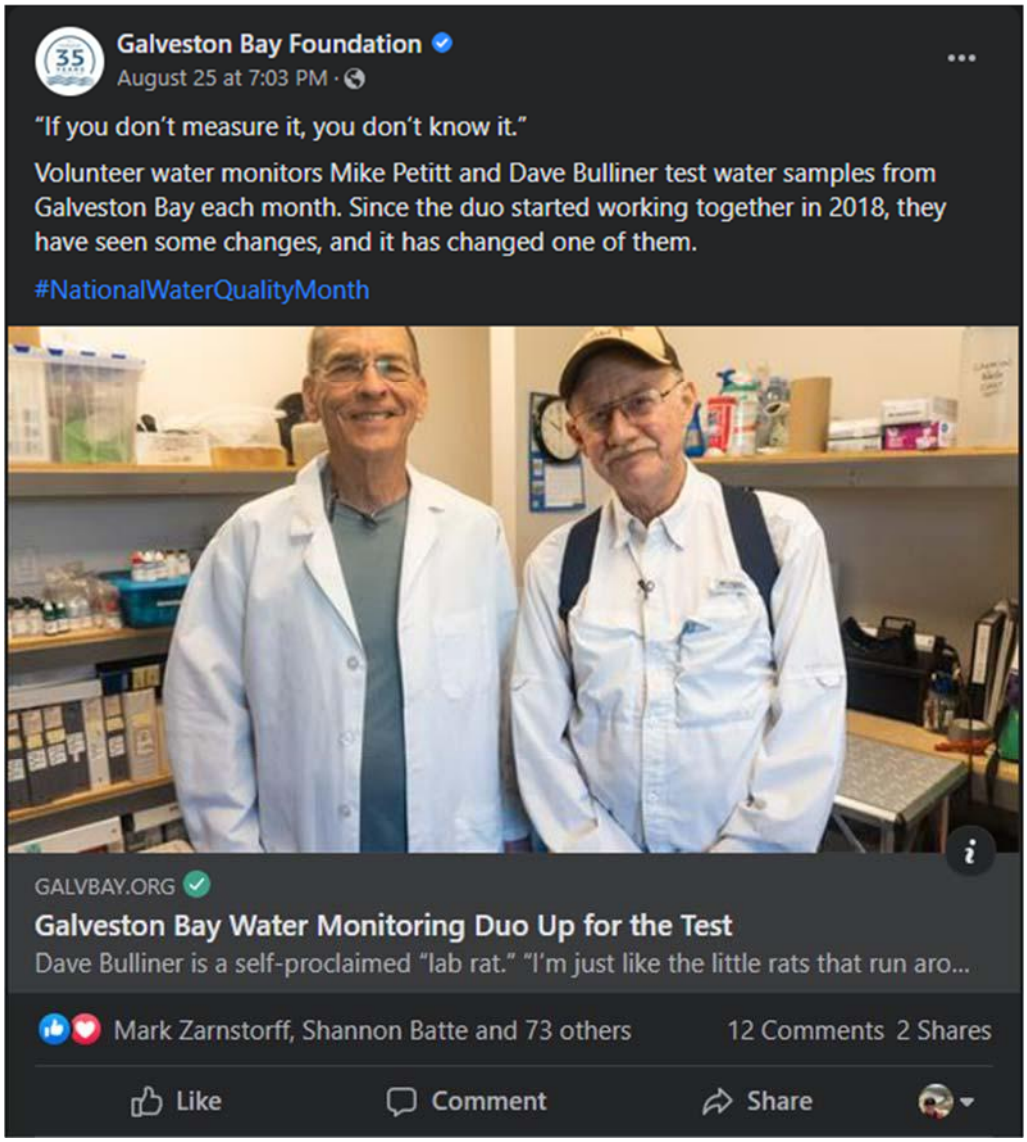


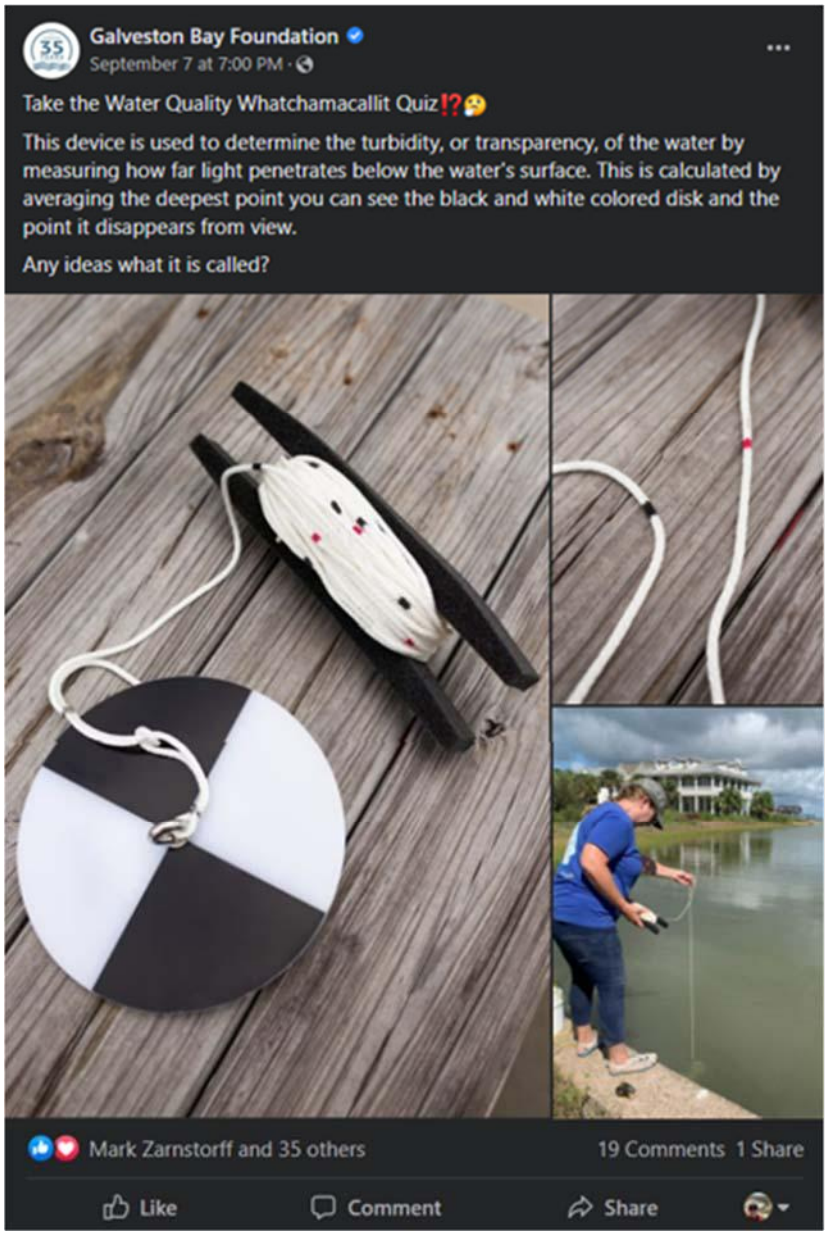
Figure 24: Social media post, article and video about our lab volunteers, how they process bacteria samples, and why we should care about water quality. Link to article can be found at https://galvbay.org/water-monitoring-duo-up-for-the-test/



Galveston Bay Water Monitoring Duo Up for the Test

Dave Bulliner is a self-proclaimed "lab rat."

Figure 25: Social media post about equipment used in water quality monitoring. Plans are in place to create multiple social media posts about the various equipment used in water quality monitoring



Appendix 3

Galveston Bay Foundation
Multifaceted Approach to Addressing Nonpoint Source Pollution in Galveston County GLO Contract No. 21-060-004-C664
Cycle 25 Deliverable, Task 3.1

Schedule and agenda from community workshops

Three community workshops have been completed to date on this project. These workshops are described in more detail below.

- **October 30, 2021: San Leon Community Workshop**

  This event took place in a covered area outside of a popular restaurant in the project area, Topwater Grill, during a weekend lunch rush. Several organizational partners attended and discussed their expertise and programs with attendees, including the Galveston County Health District, American Bird Conservancy, the Houston-Galveston Area Council, Galveston Bay Foundation, and Texas Mariners Cruising Association, among others. Topics shared with attendees were based on requested topics from the survey in the San Leon area, including septic and sewage systems, pet waste, litter and trash, clean boating, and wildlife and habitat. The event was well received with most participants visiting while waiting for a table at the restaurant or visiting after their meal.

- **November 19, 2021: Kemah Community Workshop**

  This event took place on the patio of a new local bar in Kemah to reach out to the young, apartment communities in the area. Most attendees came specifically for the event and were interested in forming partnerships related to the project. Topics shared with attendees were based on requested topics from the survey in the Kemah area, including neighborhood trash and litter, plastic pollution, pet waste, wildlife friendly fishing and boating, and household and cooking grease recycling. The event was well received, and connections were made to community members interested in implementing behavior changes. For example, a local restaurant owner attended to talk about pollution reduction and recycling in the area, a few members of a local boating group collected outreach materials to share at their next meeting, and several community members expressed an interest in participating in a shoreline cleanup event.

- **December 20, 2021: Kemah Community Workshop**

  This workshop took place at the Galveston Bay Foundation Kemah headquarters and paired engagement on non-point source pollution topics with an engagement activity- a pollution reduction shoreline cleanup themed to the holiday season. Attendees were presented information about nonpoint source pollution reduction in their homes as indicated in the survey in the Kemah area and participated in a plastic pollution craft activity. This included information about neighborhood trash and litter, plastic pollution, clean boating, and household and cooking grease recycling. Attendees of all ages were welcome to encourage attendance by families and to encourage long-term behavior changes.

Galveston Bay Foundation
Multifaceted Approach to Addressing Nonpoint Source Pollution in Galveston County GLO Contract No. 21-060-004-C664
Cycle 25 Deliverable, Task 3.2

Community feedback provided from community workshops

- **October 30, 2021: San Leon Community Workshop**

  Visitors indicated that they appreciated the opportunity to explore helpful tools and resources conveniently while out for lunch on a Saturday and find out about the different organizations involved in the area. One connection made with a community member at this event lead to connecting with a local organization regarding grease recycling. Another visitor to this community workshop became a volunteer with Galveston Bay Foundation, contributing to the December Workshop and bi-monthly marine debris cleanups on shorelines in Galveston County. Another attendee has since recruited her organization, Blue Theology, to plan a series of volunteer events to reduce pollution in the Texas City Area.

  Partner organizations that participated said they appreciated being included to share resources with the community in that format, particularly Texas Mariners Cruising Association, Galveston County Health District, and Turtle Island Restoration Network.

- **November 19, 2021: Kemah Community Workshop**

  Young residents of the Kemah area were interested in the GBAN pollution reporting app, recycling information, and talking about ways to improve recycling at the businesses where they work or frequent, particularly in the service industry such as restaurants or bars. The idea for the second, trash-specific Kemah workshop came up at this event based on interest expressed by attendees.

- **December 20, 2021: Kemah Community Workshop**

  Participants commented that the pollution reduction workshop paired with being encouraged to bring their own reusable mug for the complimentary hot beverages both caused them to think about easy pollution reduction initiatives they could take on going forward. Once participating in the cleanup activity, attendees were surprised by the wide variety of pollution types found on the Kemah shoreline and participated in group discussions about where these types of nonpoint source pollution originate. There was positive feedback from families and young couples on the craft activity which encouraged people to create works of art using pieces of debris they found on the shoreline. Before leaving the workshop, several attendees asked for additional specific recommendations for ways to reduce their single-use waste at home.

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List of resources discussed during workshops

Multiple resources were shared or discussed at the community workshops covering a variety of topics picked for that event. Topics and partner organizations to attend the event were chosen based on the results of the community surveys and conversations or interviews with project partners.

Name of Resource	Description	Community Event
Cease the Grease	A website discussing how pipes damaged by fats, oils, and grease can lead to bacteria intrusion in the Bay. Includes interactive game to demonstrate the issue.	San Leon Kemah 1 Kemah 2
Pump Don't Dump	A website showing the locations of pump out stations in the area for recreational boaters to reduce fecal bacteria in Galveston Bay.	San Leon Kemah 2
Galveston Bay Action Network	A pollution reporting website and mobile application that routes reports to the agency responsible for cleanup.	San Leon Kemah 1 Kemah 2
Pitch the Poop	Interactive game and display describing the impact of pet waste on bacteria concentrations in surface water	San Leon
NOAA Marine Debris Tracking App	A mobile app where collected litter is categorized to determine issues in the area and contribute to national research efforts.	Kemah 2
Clean Coast Texas Water Protection Handbook	A document produced by The Center for Research in Water Resources which provides ways that residents can help protect water quality	San Leon
Homeowner's Guide to Septic Systems Fact Sheet	A one-page flyer available in English and Spanish describing septic system maintenance to avoid bacterial contamination	San Leon
Enviroscape Watershed and Nonpoint Source Models	Portable models used to demonstrate water pollution concepts and prevention measures.	San Leon
Litter and Recycling Fishing Game	Interactive game and display illustrating the impact of litter on the watershed and encouraging participants to practice proper trash disposal	San Leon Kemah 1
Coastal Communities	A website produced by the Houston-Galveston Area Council which provides multiple non-point source pollution reduction resources available in the Houston Area.	San Leon
Rain Barrel Program	A program by the Galveston Bay Foundation where community members install rain barrels at their homes to reduce stormwater runoff in the area.	Kemah 2

Galveston Bay Report Card	A program which shares the results of a scientific analysis of the health of Galveston Bay to encourage community action. Includes interactive and accessible tools implement to scientifically backed suggested behavior changes.	San Leon Kemah 1 Kemah 2

Galveston Bay Foundation
Multifaceted Approach to Addressing Nonpoint Source Pollution in Galveston County GLO Contract No. 21-060-004-C664
Cycle 25
Deliverable, Task 3.4

Description, photos, and outputs/outcomes associated with community workshops

October 30, 2021: San Leon Community Workshop

This event took place in a covered area outside of a popular restaurant in the project area, Topwater Grill, during a weekend lunch rush. Several organizational partners attended and discussed their expertise and programs with attendees, including the Galveston County Health District, American Bird Conservancy, the Houston-Galveston Area Council, Galveston Bay Foundation, and Texas Mariners Cruising Association, among others. Topics shared with attendees were based on requested topics from the survey in the San Leon area, including septic and sewage systems, pet waste, litter and trash, clean boating, and wildlife and habitat. The event was well received, with most participants visiting while waiting for a table at the restaurant or visiting after their meal. Photos are included below.

Photo 1: Galveston Bay Foundation staff member at entry way booth at event:

Photo 2: General view of event location with partner tables pictured:

Photo 3: Galveston Bay Foundation staff engaging attendees in pollution reduction topics:

Photo 4: Partner Organization staff presenting pollution topics to attendees:

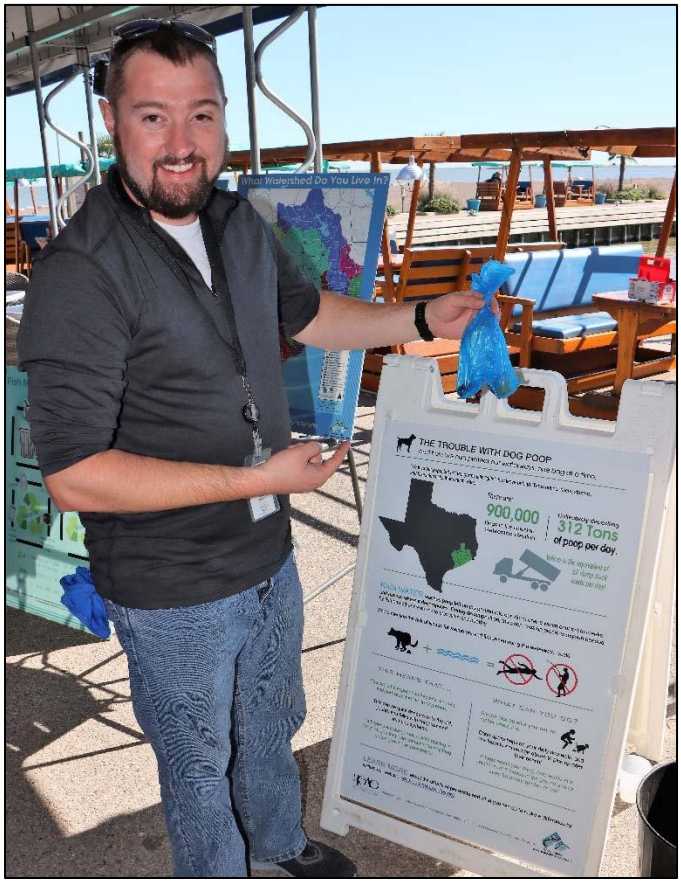


Photo 5: Galveston Bay Foundation and partner organization staff engaging attendees in pollution reduction topics:

November 19, 2021: Kemah Community Workshop

This event took place on the patio of a new local bar in Kemah to reach out to the young, apartment communities in the area. Topics shared with attendees included neighborhood trash and litter, plastic pollution, pet waste, wildlife friendly fishing and boating, and household and cooking grease recycling. The event was well received, and connections were made to community members interested in implementing behavior changes. For example, a local restaurant owner attended to talk about pollution reduction and recycling in the area, a few members of a local boating group collected outreach materials to share at their next meeting, and several community members expressed an interest in participating in a shoreline cleanup event. Photos are included below.

Photo 1: Galveston Bay Foundation staff member engaging attendees in pollution topics:

Photo 2: Galveston Bay Foundation staff member engaging an attendee in pollution topics:

December 20, 2021: Kemah Community Workshop

This workshop took place at the Galveston Bay Foundation headquarters and paired engagement on non-point source pollution topics with an engagement activity- a pollution reduction shoreline cleanup themed to the holiday season. Attendees were presented information about nonpoint source pollution reduction in their homes as indicated in the survey in the Kemah area and participated in a plastic pollution craft activity. This included information about neighborhood trash and litter, plastic pollution, clean boating, and household and cooking grease recycling. Attendees of all ages were welcome to encourage attendance by families and to encourage long-term behavior changes. Photos are included below.

Photo 1: Galveston Bay Foundation staff presenting pollution topics to attendees:

Photo 2: Galveston Bay Foundation staff engaging with a family of attendees:

Photo 3: Event attendee with a Bay-themed nurdle (plastic pollution) art project:

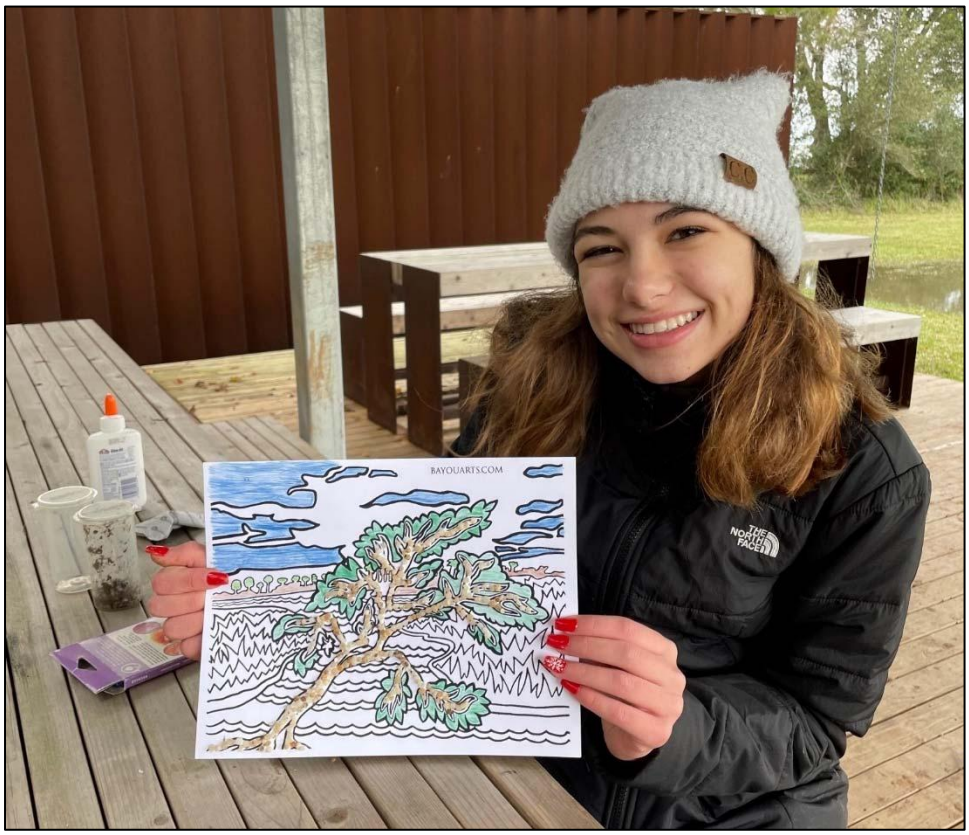


Photo 4: Event attendees conducting pollution removal activities:

Galveston Bay Action Network (GBAN) Use During Project Duration

Municipality	Date of Report	Pollution Type
Kemah	11/2/2020	Trash and Debris
Kemah	11/3/2020	Trash and Debris
Kemah	11/4/2020	Trash and Debris
Kemah	11/4/2020	Trash and Debris
San Leon	01/15/2021	Trash and Debris
Taylor Lake Village	01/23/2021	Trash and Debris
Webster	09/30/2021	Trash and Debris
Kemah	10/07/2021	Trash and Debris
Bacliff	02/02/2022	Trash and Debris
Dickinson	04/27/2022	Unknown
League City	04/27/2022	Pet Waste
Webster	05/25/2022	Trash and Debris
Seabrook	08/5/2022	Chemicals

Efforts are being made to further work through the functionality of the app and plans are being made to expand the language accessibility of the site to include Spanish. Workflow of the site is also being considered in order to improve the resolution of each report and a way to show reports as resolved on the website. Further work with parner organizations is occurring to make sure reports are being funneled to the appropriate entity and email address. The list of email addresses reports are sent to is being reviewed and updated to make sure emails are still active and are the accurate location for the emails to be sent to. While this work is ongoing in the month of September it will likely conclude outside of the project period.

Throughout the project period GBAN received 88 total reports. Of those reports, 13 were located in the specific study area or close surrounding areas.

List of GBAN Reports Received in the Study Area and close surrounding area

Appendix 4

Galveston Bay Foundation

Multifaceted Approach to Addressing Nonpoint Source Pollution in Galveston County GLO Contract No. 21-060-004-C664

Cycle 25 Deliverable, Task 4.1

Water Monitoring Team Members and Locations in Galveston County

Galveston County Monitors:

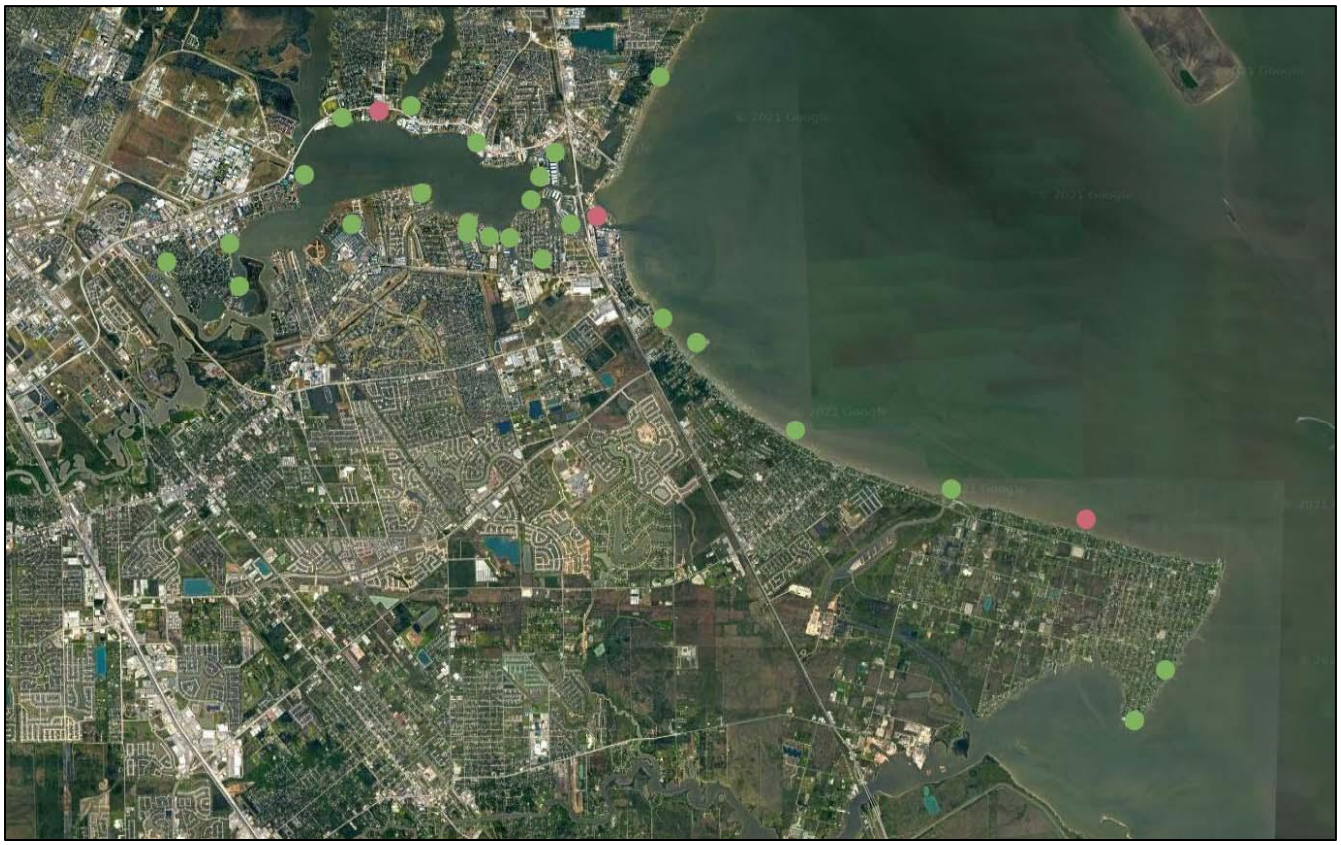
1. Becky Kowalski
2. Mike Pettit
3. James Dismukes
4. Mary Christian
5. Tyler Dudley
6. Arline Laughter
7. Helle Brown
8. Kendra Havlik
9. Kris Johnson
10. Dianne Forthman
11. Joe Cavallaro
12. Steve Ellerbe
13. Mark Niles
14. Scott Buckel
15. Cindy Liening
16. Becky Gantert
17. Chris Roper
18. Suzanne Dehart
19. Sandra Metoyer
20. Skyler Carey
21. Wayne O'Quin
22. David Labbe
23. Denise Bell

Galveston County Sites:

- Christmas Bay at 257S County Boat Ramp
- Clear Lake at Marine del Sol
- Clear Lake at Waterford Oaks Lane
- Clear Lake at Waterford Harbor Marina
- Clear Lake at Watergate Yachting Center Pier 4
- Clear Lake at Clear Lake Shores
- Clear Lake at Jarboe Bayou
- Clear Lake at Kemah Boardwalk

- Galveston Bay at GBF
- Galveston Bay at Texas Corinthian Yacht Club
- Galveston Bay at Bayshore Drive Bacliff
- Galveston Bay at Bayshore Park
- Galveston Bay at San Leon
- Galveston Bay at Topwater Grill
- Moses Lake at Texas City Prairie Preserve
- Galveston Bay at Texas City Dike
- East Bay at Frenchtown Road
- Galveston Bay at Pier 19
- Jones Bay at Bayou Vista
- West Bay at Eckert Bayou
- West Bay at Sweetwater Preserve
- West Bay at Sportsman Road
- West Bay at Pirates' Cove
- West Bay at Oak Bayou
- West Bay at Jamaica Beach
- West Bay at Bay Harbor
- East Bay at Bluewater Bait Camp

Map of Water Monitoring Team locations in Project Area:



Galveston Bay Foundation

Multifaceted Approach to Addressing Nonpoint Source Pollution in Galveston County GLO Contract No. 21-060-004-C664

Cycle 25 Deliverable, Task 4.2

Six Texas Stream Team Quality Control (QC) Training sessions were held for the water monitoring team volunteers on November 5th, November 7th (two sessions), November 12th, November 19th, and December 10th in 2020.

Due to COVID restrictions and a gap in having a staff member certified as a Texas Stream Team's Trainer, there were limited amounts of trainings and QC events during this project period. A new Water Quality Programs Coordinator was hired in June of 2022. Since her hiring she has been working on becoming a certified Texas Stream Team's Trainer. The next step will be to host a training overseen by a certified trainer. The new Water Quality Programs Coordinator is working with a Texas Stream Team Trainer at Houston Galveston Area Council (HGAC) to schedule a training, ideally before the end of 2022. If no date works with current events scheduled the training will be in early 2023.

Schedule of Trainer Certification for New Water Quality Programs Coordinator

Date	Event	Location of Event	Hosted by
6/13/22	New Water Quality Programs Coordinator Start Date	GBF	N/A
6/18/22	**Trainer Requirements Phase 1**: Attend a Texas Stream Teams Training	**Delores Fenwick Nature Center** 5750 Magnolia Pkwy, Pearland, TX 77584	HGAC
9/9/22	**Trainer Requirements Phase 2**: Attend and Assist with a Texas stream teams training	Bear Branch Park 5200 Research Forest Dr, The Woodlands, TX 77381	HGAC
TBD	**Trainer Requirements Phase 3**: Lead a Training assisted by a Texas Stream Team's Trainer	TBD	HGAC
TBD	**Trainer Requirements Phase 4**: Submit form to Texas Stream Team	N/A	Texas Stream Team
TBD	First Solo Training Event	TBD	GBF

The new Water Quality Programs Coordinator is also reaching out to current volunteers who meet Texas Stream Team Trainer requirements to see if any volunteers would like to become a certified Texas Stream Team trainer. This will help to ensure that there is always someone associated with GBF that will be able to help host trainings.

GBF currently has a waitlist of over 30 individuals who are interested in becoming certified water monitors and 24 sampling sites available. If all interested volunteers get trained and certified GBF will be able to fill all the sampling sites. With any extra volunteers, GBF will recommend sampling with HGAC's Stream Team group or GBF will look into adding new sites to better cover the full shoreline of Galveston Bay. Two potential volunteers attended the training event hosted by HGAC on September 9th. These two people plan on volunteering for GBF's citizen science water monitoring team. One volunteer already has a site they prefer which would be at the Houston Yacht Club. The other volunteer is located in Texas City and will likely chose a site near that area.

Attached below are the current in-progress trainer forms for the new Water Quality Programs Coordinator.

THE MEADOWS CENTER FOR WATER AND THE ENVIRONMENT
TEXAS STATE UNIVERSITY

TEXAS STREAM TEAM
TRAINER ENROLLMENT FORM

Trainer Prerequisites

All trainers should read the Quality Assurance Project Plan, respective training manual (if available), respective Trainer Training Packet (if available), and watch the respective YouTube Quality Control and Parameter Videos (if available).

Trainer Certification

Each phase below must be completed to receive official trainer certification through the Texas Stream Team program. Please note, a trainer may ask the trainer trainee to repeat any of the below phases if the trainer feels the trainer trainee is not yet ready to be signed off as a certified trainer.

☐ **Phase I** – Trainer trainee must be a certified Texas Stream Team citizen scientist who has been actively monitoring for at least two years in the training they would like to be a trainer for.

☐ **Phase II** – Trainer trainee assists a certified trainer in planning, coordination, and presenting at one citizen scientist training session.

Trainer Name: Kendall Guidroz
Trainer Signature: Kendall Guidroz
Date: 9/9/22

☐ **Phase III** – Trainer trainee plans, coordinates, and presents all phases of one citizen scientist training assisted by a certified Texas Stream Trainer.

Trainer Name: _____
Trainer Signature: _____
Date: _____

☐ **Phase IV** – Submit completed Trainer Enrollment Form to Texas Stream Team. If approved, the newly certified trainer will receive a certificate as a certified Texas Stream Team trainer.

Trainer Name: _____
Trainer Signature: _____
Date: _____

Maintaining Certification

The following are requirements to maintain active trainer status:

- Trainer must participate in and/or lead at least one citizen scientist training sessions per year.
- Trainer must attend the Annual Texas Stream Team Trainer meeting or have an alternate attend in their place.
- Trainer should submit scheduled trainings to the Texas Stream Team online calendar.
- A Training Sign-In Sheet should be submitted to TxStreamTeam@txstate.edu after each training.
- Trainer must complete a quality control field audit every two years. The field audit is designed to help detect and correct discrepancies in monitoring techniques. This requirement is necessary to ensure the highest quality and comparability in the citizen scientist data statewide.

Note that if the above is not met, the trainer will be encouraged to repeat Phase II-III above.

Trainer Trainee Information

The trainer trainee should fill out the below information once Phase I-III above are complete.

Trainee Name: Natasha Zarnstorff Phone: 832-536-2274

Organization/Group: Galveston Bay foundation

Training Type:

- [x] Standard Core
- [ ] Probe Core
- [ ] *E. coli* Bacteria
- [ ] Advanced
- [ ] Riparian Evaluation
- [ ] Macroinvertebrate Bioassessment

Will your trainings be public or private? [x] Public [ ] Private

Address: 1725 Highway 146

City: Kemah State: TX Zip Code: 77565

Email (to be displayed on website): waterquality@galvbay.org

Trainee Signature: _____ Date: _____

Prepared in cooperation with the Texas Commission on Environmental Quality and the United States Environmental Protection Agency.
Revised January 20, 2022

All the sites that were monitored for bacteria during the project period had variability in bacteria values over time (Figures 1-3). Using HGAC's Water Resource Information Map (WRIM) GBF looked at impaired waterways located within the project area. Jareboe Bayou has known bacterial impairments on both sampling locations on its stream segment. We compared GBF's bacteria values from this project period and TCEQ values at a local paired site, Jarboe Bayou at Jarboe Bayou Park, from 2012-2019. This showed a 42 percent drop when comparing TCEQ's geometric mean of 68 mpn/100ml during 2012-2019 and GBF's geometric mean of 29.84 mpn/100ml from October 202- September 2022. This indicates that there is a downward trend of bacteria concentrations over time. Once the WRIM is updated with data from this project period GBF will be able to compare our data to that of TCEQ and further determine if there is a downward trend in bacteria concentration in Jarboe Bayou (Figure 3).

All the sites show large variability and spikes at each of their sites due to rain or local issues (Table 1). Clear Lake at Endeavor never had an exceedance of the 35 mpn/100ml standard and its highest spike was 31 mpn/100ml. Moses Lake did exceed the 35 mpn standard but did not have any exceedances over the 104 mpn/100ml screening level. Moses Lake's highest value was 51. All the other sites had exceedances over the 104 mpn/100ml level. These spikes were likely caused by rain flushes and other local issues.

Jones Bay at Bayou Vista had the greatest number of exceedances with 7 exceedance events of Texas Stream Team sites during this project period. There are 3 other sites also monitored for bacteria in the Bayou Vista and Omega Bay communities that are not part of the normal Texas Stream Team sampling locations. All the sampling locations in these communities have a large number of exceedances and high geometric means over 70 mpn/100ml over the course of this project. The Omega Bay site had the highest exceedance rate, with 50% of the samples taken exceeding the 104 mpn/100ml single grab sample limit. Further work and outreach should occur within the Bayou Vista and Omega Bay communities to try to reduce the number and frequency of exceedances these communities are facing.

All three sites on Clear Lake showed expected seasonal trends in dissolved oxygen (Figures 4-6). Dissolved oxygen levels dropped in the summer months and then rebounded in the windier months. All sites had a few instances where dissolved oxygen levels dropped to levels that are considered stressful to aquatic life (3 mg/L). While there were instances of dissolved oxygen levels dropping below 3 mg/L, these drops were not sustained and there were no reported fish kills associated with these events.

Table 1: Bacteria concentrations at all sites measured during the project period

Site	Geometric Mean (mpn/100ml)	Number of Exceedances over 104 mpn /100ml screening level	Highest Value	Total Number of Samples
Moses Lake	10.39	0	53	21
Clear Lake @ Endeavor Marine	6.16	0	31	12
Clear Lake @ Clear Lake Park	16.27	4	1091	24
Clear Lake @ Jarboe Bayou Park	29.84	6	2006	25
Clear Lake @ Waterford Marina	43.23	2	453	6
Jones Bay @ Bayou Vista	44.82	7	2005	22
BV01 @ Bayou Vista	71.18	3	271	12
BV12 @ Bayou Vista	95.59	4	2005	12
OMB3 @ Omega Bay	90.87	7	2000	14

Figure 1: Bacteria concentrations in mpn/100ml at Clear Lake at Endeavor Marina for the project period. The thick red line indicated the 104 mpn/100ml exceedance limit and the thin red line indicates the 35 mpn/100ml geometric mean exceedance limit.

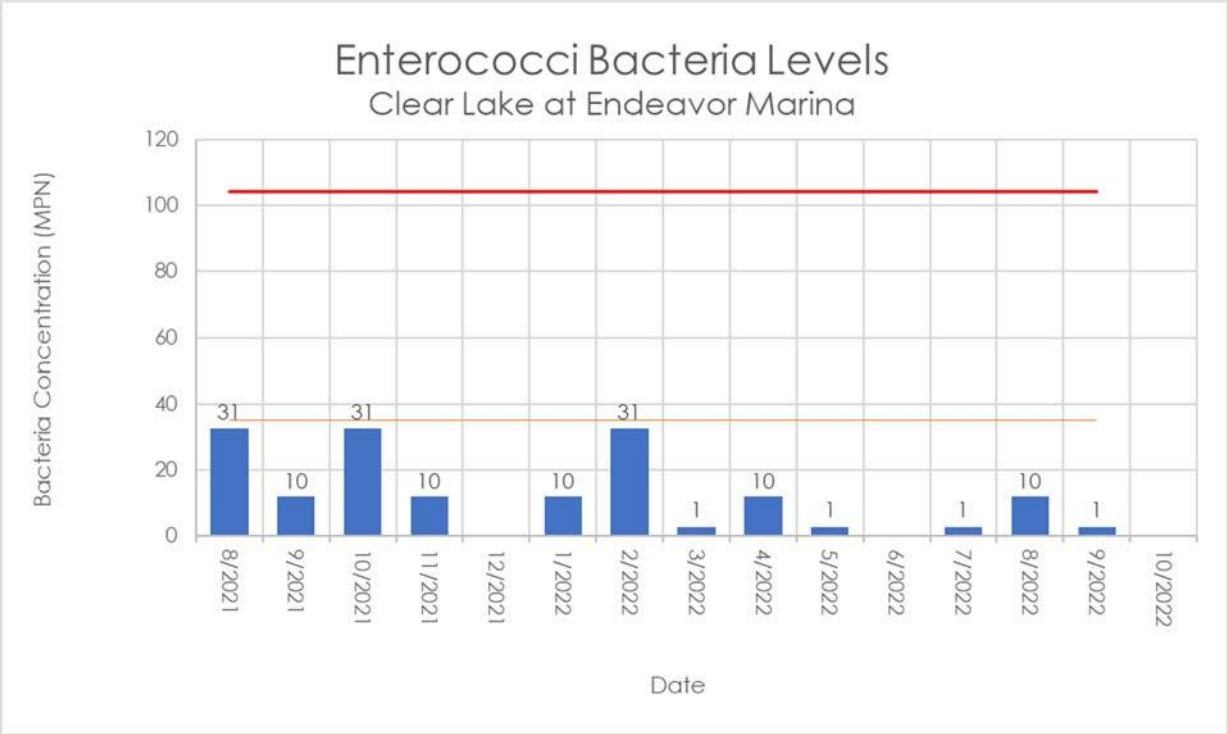


Figure 2: Bacteria concentrations in mpn/100ml at Clear Lake at Clear Lake Park for the project period. The thick red line indicated the 104 mpn/100ml exceedance limit and the thin red line indicates the 35 mpn/100ml geometric mean exceedance limit

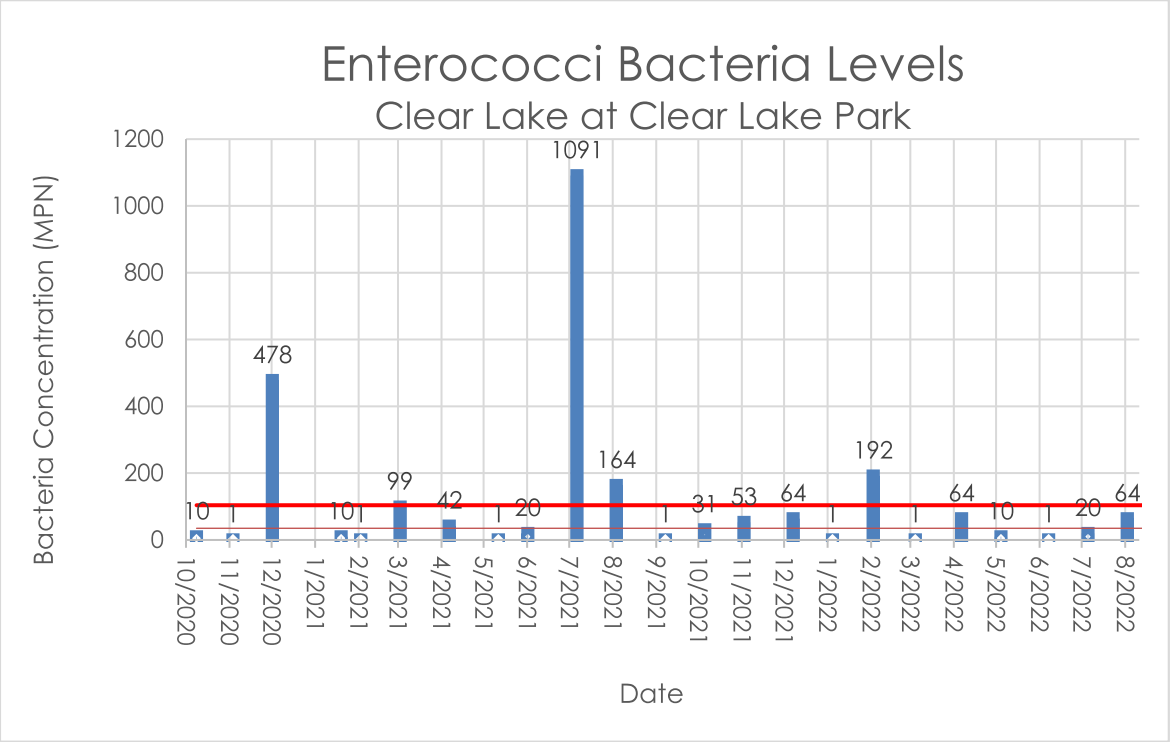


Figure 3: Bacteria concentrations in mpn/100ml at Clear Lake at Jarboe Park for the project period. The thick red line indicated the 104 mpn/100ml exceedance limit and the thin red line indicates the 35 mpn/100ml geometric mean exceedance limit

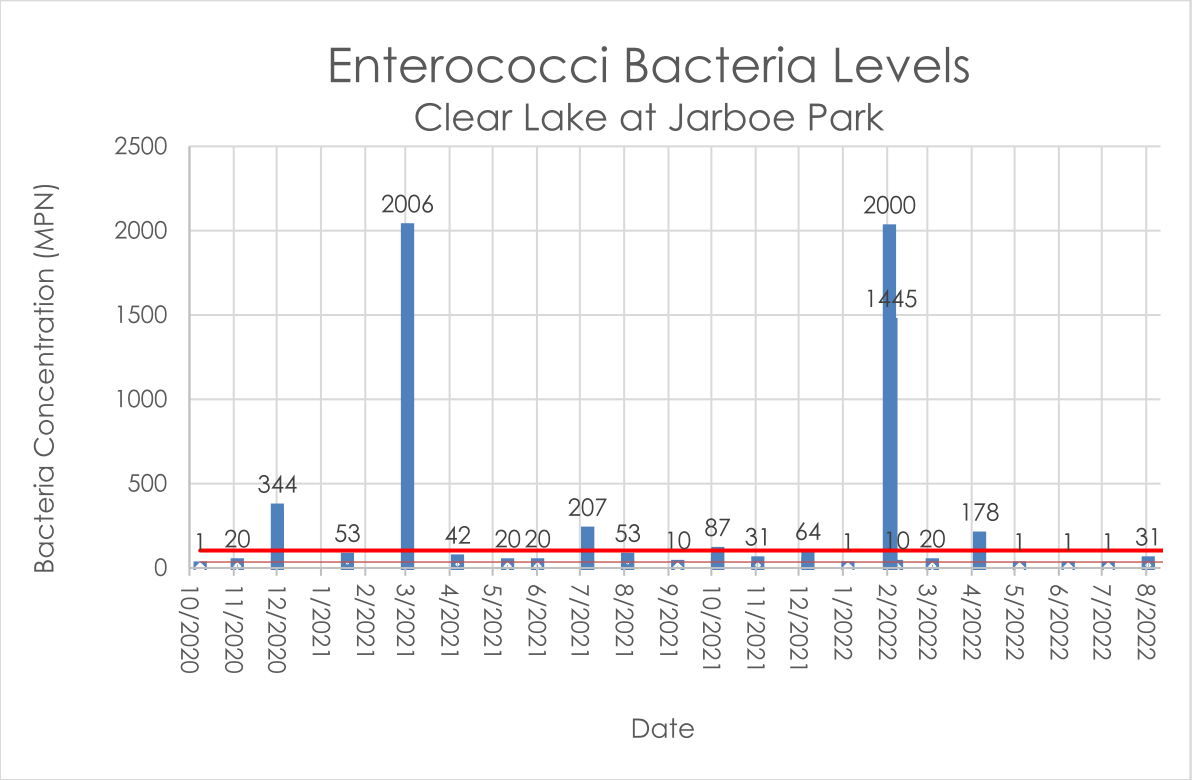


Figure 4: Dissolved oxygen(DO) concentrations in mg/L at Clear Lake at Endeavour Marina for the project period.

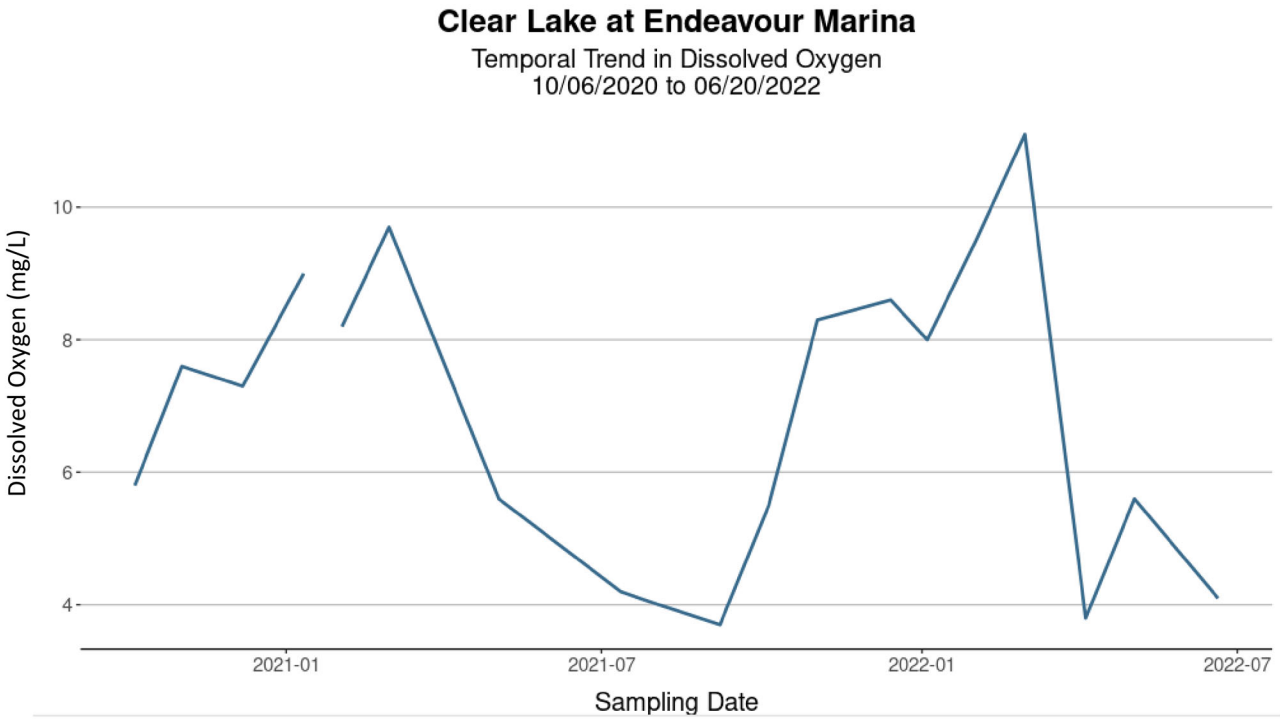


Figure 5: Dissolved oxygen(DO) concentrations in mg/L at Clear Lake at Clear Lake Park for the project period.

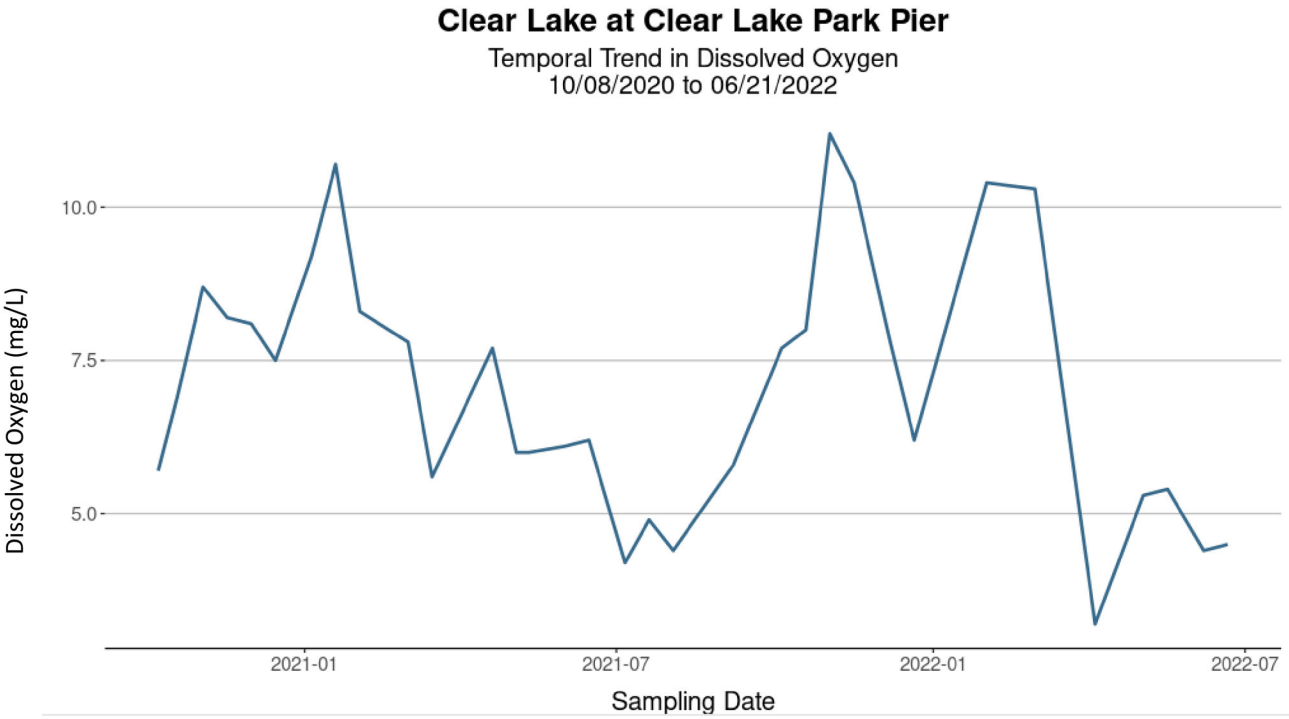


Figure 6: Dissolved oxygen (DO) concentrations in mg/L at Clear Lake at Jarboe Park for the project period.

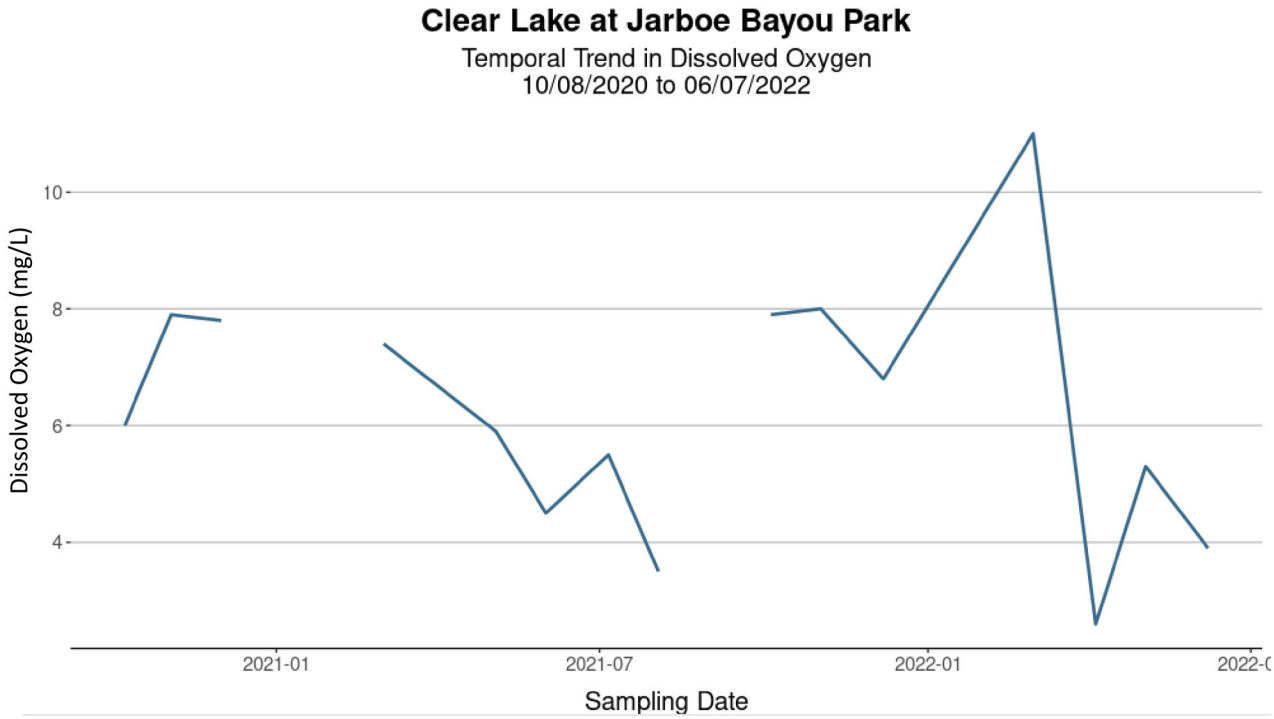


Figure 7: Screenshot of updated GBF data viewer with all sites updated to include up to date data and site status. Visit the data viewer at: http://waterdata.galvbay.org/ to view full data results

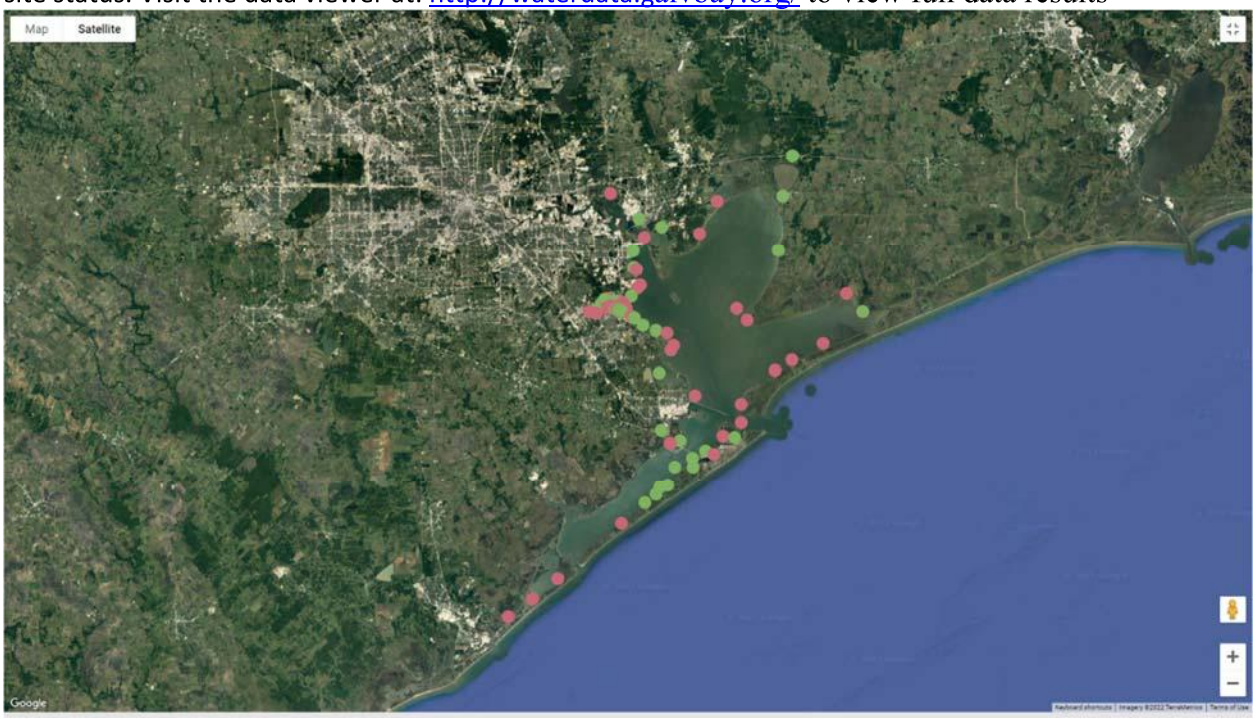


Figure 8: Screenshot of updated GBF data viewer focused on the project area with all sites updated to include up to date data and site status. Visit the data viewer at: http://waterdata.galvbay.org/ to view full data results

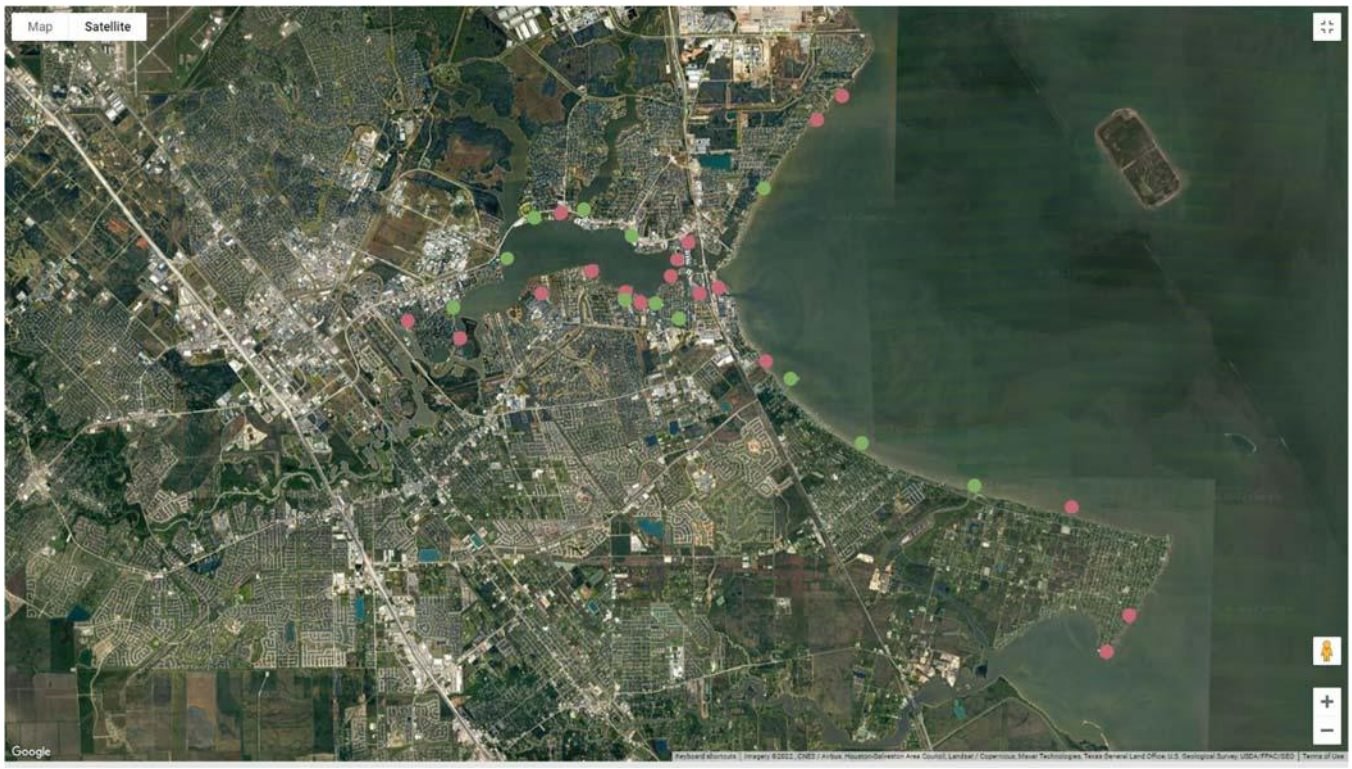


Figure 8: Screenshot of updated Swim Guide focused on the project area with all sites updated to include up to date data and site status. Visit the site at: https://www.theswimguide.org/find

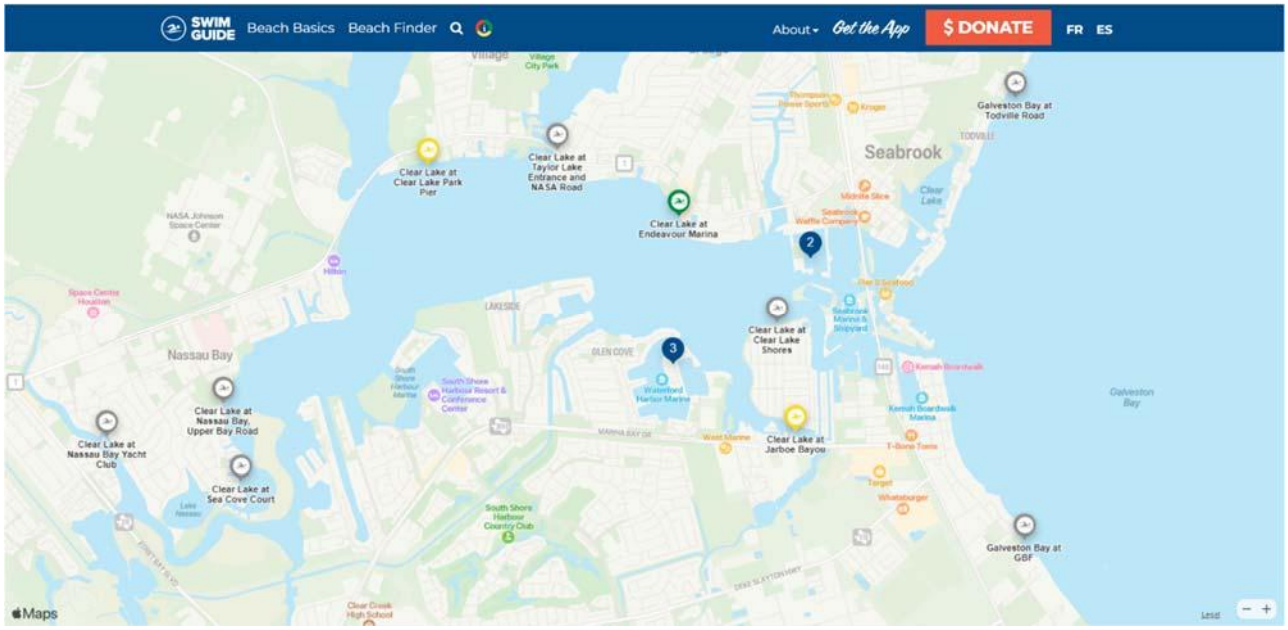
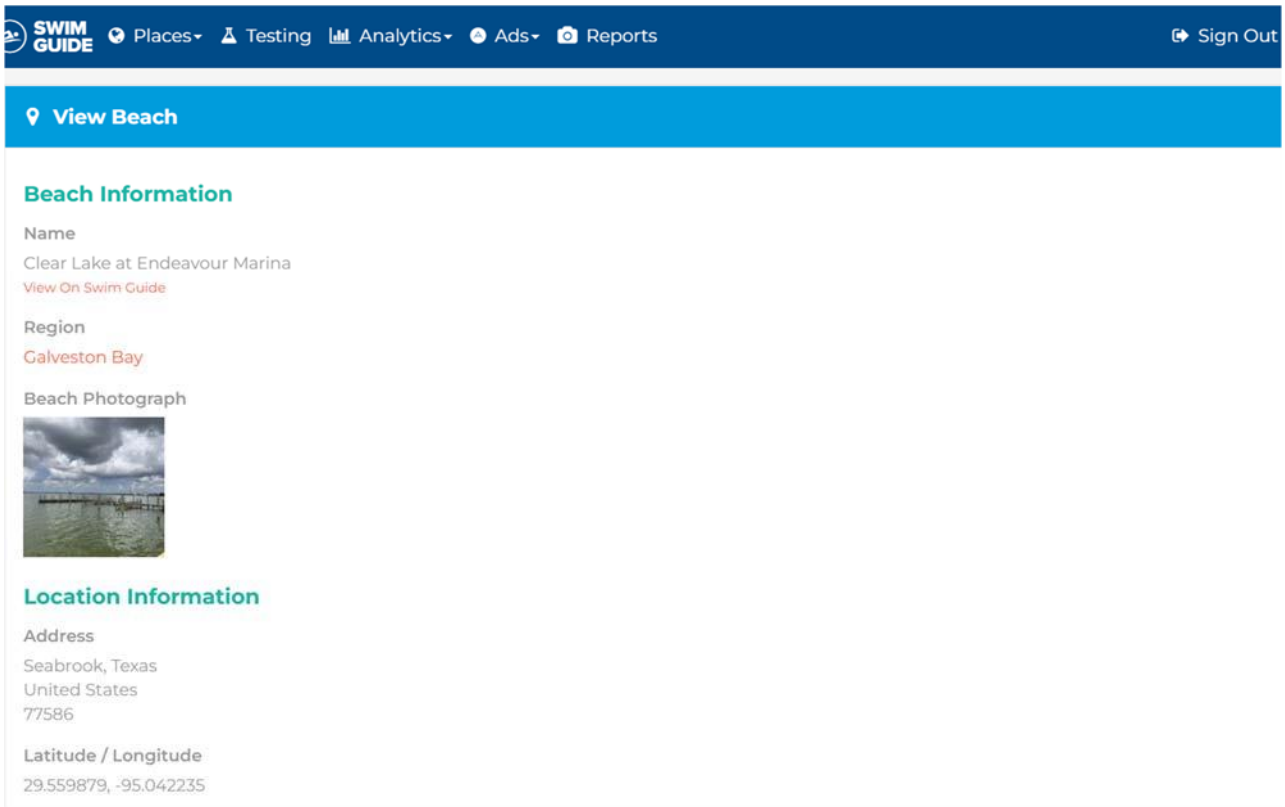



Figure 8: Screenshot of updated Swim Guide site information. As site visits are occurring pictures are being added to each site to better give the public an understanding of where the site is and what the site accessibility.