

# **Galveston Bay Coalition of Watersheds**

**Final Report**

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Compiled by the

Texas Community Watershed Partners

A program of the Texas A&M AgriLife Extension Service

AND

Galveston Bay Foundation

PREPARED IN COOPERATION WITH THE  
TEXAS COMMISSION ON ENVIRONMENTAL QUALITY AND  
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## Executive Summary

Numerous bays, creeks, and streams in the Lower Galveston Bay watershed are considered impaired by the State of Texas for high levels of bacteria and low levels of dissolved oxygen. Funding from the Galveston Bay Estuary Program (GBEP) facilitated implementation efforts to address these issues through the Galveston Bay Coalition of Watersheds (Coalition) and the Galveston Bay Bacteria Reduction Plan (GBBRP). Both pieces of this project worked to bring stakeholders together to prioritize and implement management measures from existing locally derived watershed based plans. This report outlines efforts of the Texas Community Watershed Partners (TCWP), a program of the Texas A&M AgriLife Extension Service to form the Coalition made up of stakeholders from the Bastrop, Dickinson, Highland, and Jarbo Bayou watersheds. It also outlines efforts of the Galveston Bay Foundation (GBF) to implement the GBBRP through the Cease the Grease and Pump don't Dump campaigns as well as additional meetings and programs.

## Introduction

Numerous bayous, creeks and streams flowing through Coastal Texas, are considered impaired by the State of Texas for high levels of bacteria and low levels of dissolved oxygen. In the Lower Galveston Bay watershed, major pollution sources include pets and livestock, feral hogs, sanitary sewer overflows and leaks, and malfunctioning on-site sewage facilities, as well as stormwater runoff.

The first watershed protection plan (WPP) in the lower Galveston Bay Watershed was for Armand Bayou in 1997. Since then, many state resources have been put toward creating watershed based plans (WBPs) through local stakeholder processes to improve water quality in our coastal waterways. Once these WBPs are approved by state and federal agencies, the burden of implementation falls on local partners. The increase in WPPs and Implementation Plans (I-Plans) over time has created a number of autonomous groups, all with similar goals. After the reformation of the Armand Bayou Watershed Partnership as a 501(c)(3) non-profit, options for the future of the Dickinson Bayou Watershed Partnership were explored. Based on this research, a group with a larger focus, (similar to the Bacteria Implementation Group (BIG)) with support from local governments (like the Plum Creek Watershed Partnership), was identified as a sustainable model for coordinating local watershed efforts. Through this project, the Texas Community Watershed Partners a program of the Texas A&M AgriLife Extension Service established the Galveston Bay Coalition of Watersheds as a next step in the effort of regional implementation of WBPs. This approach (1) Extends limited resources for coordinating implementation efforts, (2) Reduces the number of meetings stakeholders are asked to attend, and (3) Facilitates the information coordination occurring between watershed groups.

For this project, the TCWP also partnered with the Galveston Bay Foundation for efforts to implement the Galveston Bay Bacteria Reduction Plan which works to reduce bacteria levels to standards that are safe for oyster consumption.

## Project Significance and Background

Through this project, the TCWP created the Galveston Bay Coalition of Watersheds, a group focused on water quality with representatives from lower Galveston Bay watersheds including Bastrop Bayou,

Dickinson Bayou, Highland Bayou, and Jarbo Bayou. This regional approach to implementing Watershed Based Plans:

1. Extends limited resources for coordinating implementation efforts,
2. Reduces the number of meetings stakeholders are asked to attend, and
3. Facilitates the information coordination occurring between watershed groups.

Galveston Bay Estuary Program funding was seed money to support a Coalition Coordinator who established and maintained the Coalition. The coordinator determined the local stakeholders participating in the group, worked with Coalition members to establish a unified vision and goals, and defined a plan for longer term funding which includes local leveraged funds.

The Coalition of watersheds and partnership with GBF were important next steps in implementing existing WBPs. Watershed coordinators and stakeholders worked hard to create these plans that address many of the same issues with the same methodologies. The unified approach created by the Coalition is both sustainable and necessary to improve local water quality and the health of Galveston Bay. The efforts of the Coalition pair well with those of GBBRP workgroups, as both are focused on multi-jurisdictional areas and implementation efforts for more than just one small watershed.

## Methods

### Task 1: Project Administration

**Objective:** To effectively administer, coordinate and monitor all work performed under this project including technical and financial supervision and preparation of status reports.

TCWP, GBF, and GBEP staff coordinated throughout the course of the project to ensure technical and financial project needs were met and status reports were completed.

### Task 2: Coalition Building

**Objective:** To create a cohesive stakeholder group made up of individuals from watersheds in the Galveston Bay and surrounding areas.

The Galveston Bay Coalition of Watersheds was convened in the spring of 2017. TCWP staff identified four watersheds that are contained wholly in Galveston and Brazoria Counties that had a WBP, there are: Bastrop, Dickinson, Highland, and Jarbo Bayous. These four watersheds have many of the same or similar implementation activities; therefore, working together for the same objective was an efficient use of all resources. Active stakeholders were identified from each watershed based on previous participation in WBP development and these individuals were invited to join the group which met on a regular basis. Coalition members prioritized the management measures previously identified in the WBPs for each watershed, defined the vision and priorities for the Coalition, set goals and determined action items. The Coalition worked by consensus decision making, and almost exclusively through in person meetings.

Long term funding for the Coalition was also a topic of discussion at the meetings, several options were presented and discussed, especially the Plum Creek Watershed Interlocal Agreement<sup>1</sup>. In this document all stakeholders within a single watershed (Plum Creek) agreed upon a proportionate representation

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<sup>1</sup> [http://www.gbra.org/documents/plumcreek/pcwp\\_interlocal\\_agreement\\_july\\_2011.pdf](http://www.gbra.org/documents/plumcreek/pcwp_interlocal_agreement_july_2011.pdf)

method and agreed on a dollar value that each entity would pay toward supporting the watershed group on an annual basis. These local dollars were leveraged as cost share to apply for grant funding. Information from Coalition discussions was used to draft a long term funding plan for the group.

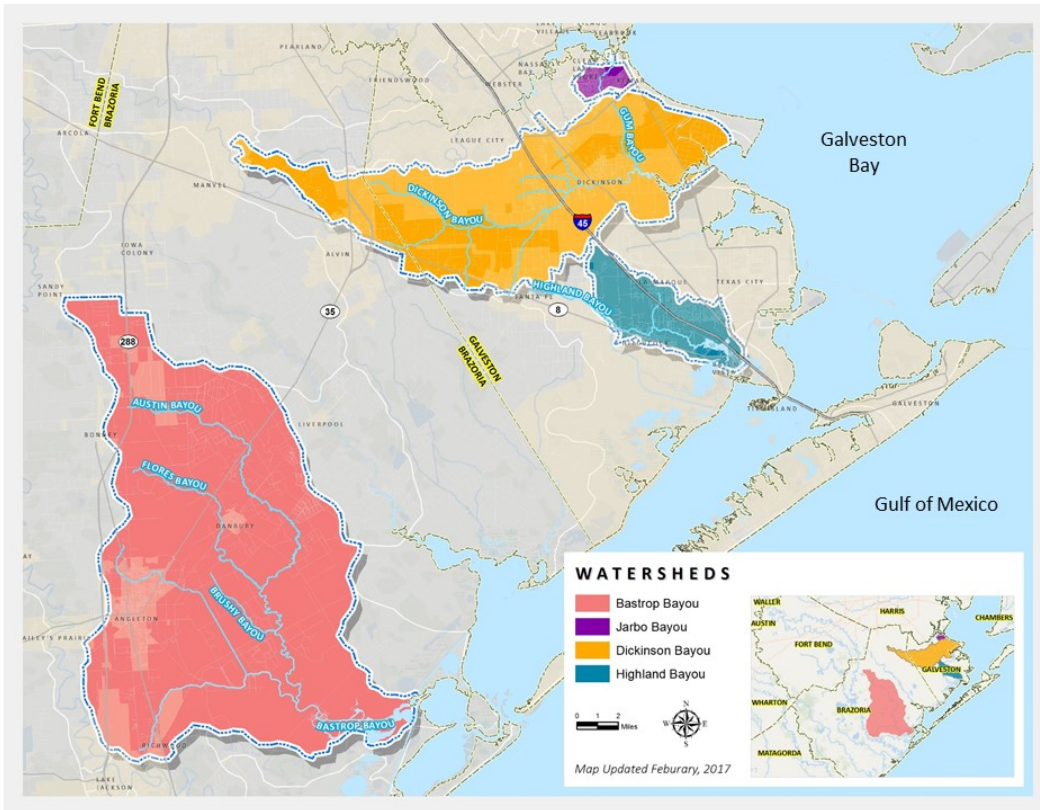


Figure 1. Galveston Bay Coalition of Watersheds Partner Watersheds

### Task 3: Implementation of Existing Plans

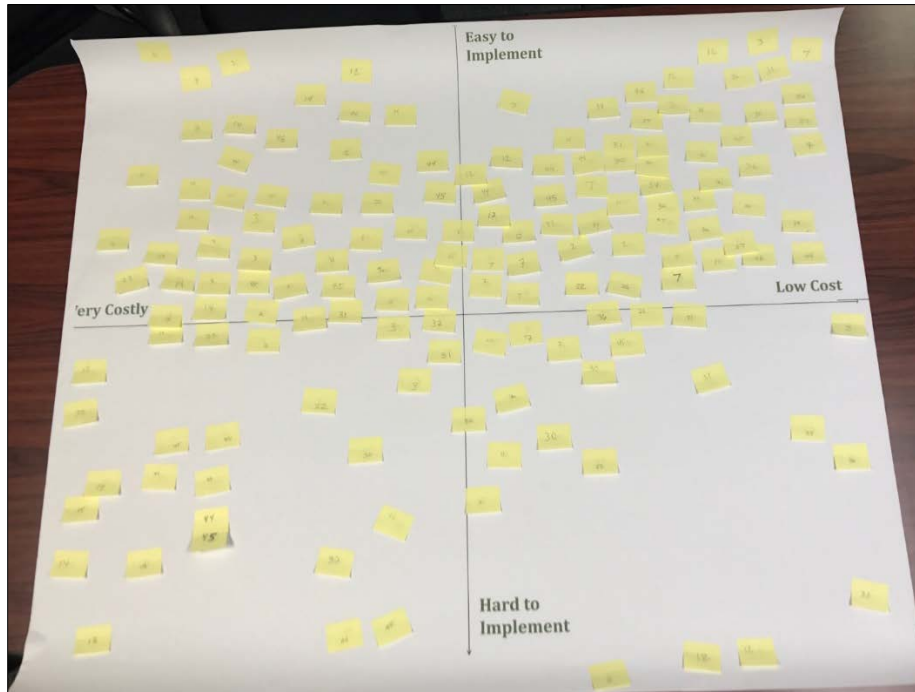
**Objective:** To prioritize outreach management measures from existing plans and carry out the activities deemed most important by the Coalition.

TCWP staff complied management measures from four WBPs:

- Bastrop Bayou Watershed Protection Plan
- Dickinson Bayou Bacteria Implementation Plan
- Draft Highland Bayou Watershed Protection Plan
- BIG Bacteria Implementation Plan (Jarbo Bayou was in the process of joining the BIG at this time, and has since officially joined)

Management measures were grouped by subject area and similar measures were consolidated into one representative measure. In total 45 distinct management measures were identified and grouped into six categories: on-site sewage facilities, wastewater treatment facilities, sanitary sewers, stormwater/urban runoff, pet waste, illegal dumping, agriculture/animals/feral hogs, and conservation & land preservation. Meeting attendees participated in three prioritization activities: first they ranked what they felt were the most important management measures in each category separately. Second, they ranked the most important management measures across all categories. Thirdly, the top 12 management measures were determined based on steps 1 and 2. Participants then ranked each of these 12 management measures on a

quadrant map where the x-axis varied from “very costly” to “low cost” and the y-axis varied from “easy to implement” to “hard to implement”. Management measures that ranked in the “easy to implement” and “low cost” would be the first measures to tackle, while management measures that ranked “very costly” and “hard to implement” would take time and strategy to implement. The results of all three exercises were used to determine the priority management measures for implementation by the Coalition.



*Figure 2. Prioritization exercise where the top 12 management measures were ranked on a quadrant system by Coalition members.*

#### Task 4: Website

**Objective:** To setup a website for the Coalition and maintain the website.

The website [agrilife.org/coalitionofwatersheds](http://agrilife.org/coalitionofwatersheds) was established for the Coalition. Information about Coalition watersheds, meeting notes, goals, and action items were all added to the site throughout the project. The site is intended primarily for Coalition members or stakeholders of member watershed groups and not the public. However, all information contained on the pages can easily be understood and utilized by anyone.

#### Task 5: Galveston Bay Bacteria Reduction Plan Coordination

**Objective:** To facilitate active stakeholder participation in the GBBRP and collaborate with adjacent watershed groups in order to guide successful implementation and tracking of plan progress, which addresses oyster waters bacteria impairments in Galveston Bay.

**5.1: Public Participation Plan (PPP):** GBF developed and submitted a PPP in May 2017. A copy of this PPP is provided in Appendix C.

### *5.2 Facilitate and Coordinate Stakeholder Meetings:*

Throughout this project period, GBF continued to meet regularly with workgroups.

An annual meeting of all four active workgroups (Wastewater Treatment Facilities (WWTF), On-Site Sewage Facilities (OSSF), Boater Waste and Cease the Grease (formerly Policy and Outreach)) took place on February 23, 2017. At this meeting, the 14 workgroup members and GBF staff in attendance reviewed implementation progress updated and the larger stakeholder base on progress made by each workgroup.

Quarterly Boater Waste (BW) workgroups and Cease the Grease (CtG) workgroups were held throughout the project period. During this time the Boater Waste workgroup helped to inform and advise GBF on best approaches to reaching the boater waste management measures laid out in the Bacteria Reduction Implementation Plan. Similarly, the Cease the Grease workgroup advised and assisted GBF on implementation of management measure 1.4B: Address Fats, Roots, Oils and Grease.

Members of the OSSF and WWTF workgroups agreed that meetings need not be held regularly, but rather as needed. During this project period, members of these workgroups served more as an advisory role than through regular meetings. Especially after Hurricane Harvey, finding the time to gather everyone in one room proved quite challenging, as many of these members were dealing with infrastructure problems of their own. However, GBF continued to communicate with members of the workgroup and other regional experts in the field to advise efforts on these management measures.

GBF also regularly participated in adjacent watershed meetings, including at H-GAC's Bacteria Implementation Group meetings, Coalition of Watershed meetings, Galveston Bay Estuary program subcommittee meetings, and other regional Watershed Protection Plan meetings. A list of all the adjacent watershed meetings attended can be found in Appendix II.

### *5.3 Disseminate Project Information:*

#### *Disseminate project through public meetings*

During this project period, GBF hosted three public meetings to share the work of the GBBRP with local residents and stakeholders. In addition to outlining the goals of the GBBRP, these meetings focused on sharing information on water quality threats to the Bay from fecal contamination, the work being done to address them, and what each individual stakeholder can do to help. The first of these meetings was held on June 12, 2017 at the League City Civic Center and had ten people in attendance. The second public meeting, held in conjunction with a Post Harvey Community Open House, was held on February 28, 2018 and had 35 people in attendance. The third public meeting was held on May 21, 2018 at Tommy's Restaurant and framed as a "summer kickoff event." It also had 35 people in attendance.

Copies of sign-ins for these public meetings as well as advertising materials for these meetings can be found in Appendix III.

Progress towards the following GBBRP management measures, all which focus on disseminating project information to targeted stakeholders, are outlined below.

#### **GBBRP Management Measure 1.4 Address Fats Oils and Grease (FOG) through outreach campaigns**

During this project period GBF maintained and promoted the regional Cease the Grease initiative with funding from the Coastal Management Program and the Galveston Bay Estuary Program. This initiative is



focused on increasing awareness among Houston-Galveston area residents on the harms of pouring cooking oils, fats, and greases down the drain. GBF maintains the campaigns website at [www.ceasethegrease.net](http://www.ceasethegrease.net).

During this project period, GBF and members of the I-Plan workgroups continually coordinated with the City of Nassau Bay, the City of Friendswood, the City of League City, the City of Houston, the City of Galveston, and the City of La Porte, among others, to track sanitary sewer overflows due to FOG blockages each year. GBF also provided outreach material to local municipalities aimed at reducing FOG-related sanitary sewer overflows via the Cease the Grease campaign.

#### **GBBRP Management Measure 2.4 Address OSSFs through outreach and workshops**

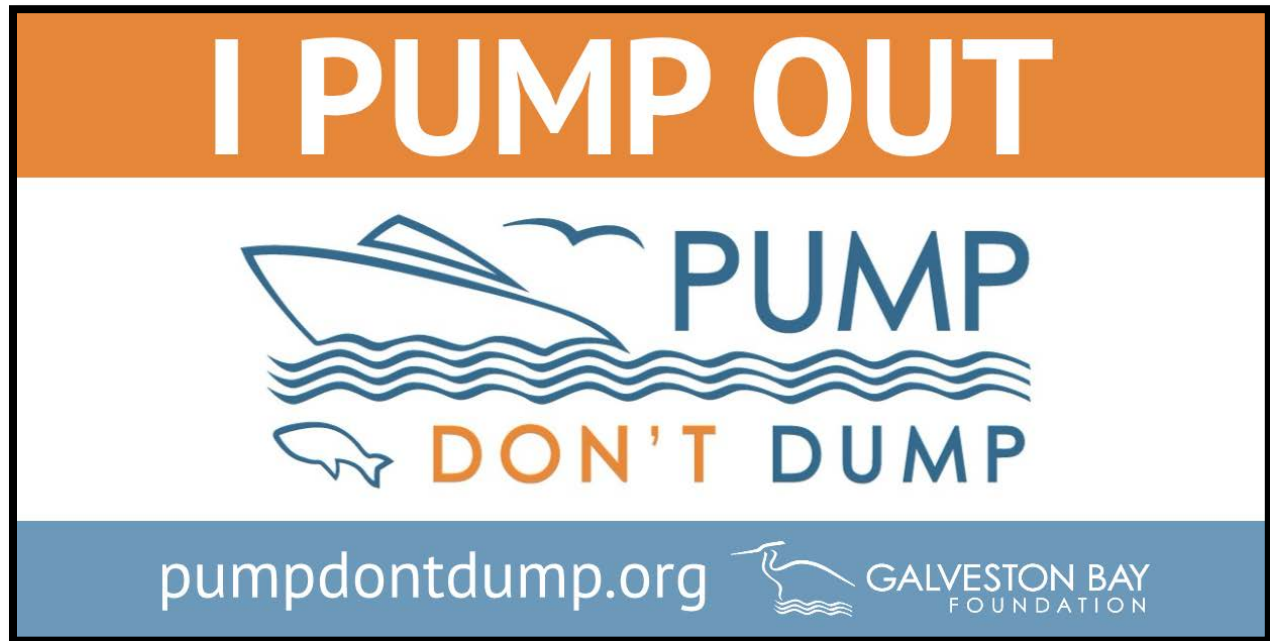
GBF met with OSSF workgroup members and other regional professionals to identify locations that needed increased outreach, education and funding for improved OSSF maintenance and replacement. GBF identified areas around Cedar and Double Bayous in Chambers County, as well as areas in Galveston and Brazoria Counties as locations with many older, permitted OSSFs and that needed increased outreach. GBF partnered with Houston-Galveston Area Council (H-GAC) to host two OSSF maintenance workshops that targeted these regions. H-GAC hosted a workshop on May 5<sup>th</sup> in Mont Belvieu to provide this information to homeowners in Chambers County. GBF and H-GAC cohosted a workshop on May 19<sup>th</sup> in Bayou Vista to target homeowners in Brazoria and Galveston Counties.

The workshops were designed to inform homeowners on proper septic system maintenance and of supplemental environmental program (SEP) funds currently available through H-GAC to update failing systems. Copies of sign-ins for these OSSF workshops as well as advertising materials for these meetings can be found in Appendix III. Additional outreach was carried out through Agrilife Extension's OSSF maintenance and outreach program as well.

#### **GBBRP Management Measure 3.3 Address Boater Waste: Enhance outreach and marketing through the Pump Don't Dump (PPD) campaign & partnerships with boaters, marinas, cities, etc.**

The boater waste workgroup identified a need for more effective outreach and messaging around the Pump Don't Dump campaign, with more pressure placed on boaters who are currently dumping their waste. As a result, GBF created flags that state "I Pump Out" for boaters to hang from their boat (Fig. 1). The idea is that a boater will pledge to properly dispose of their waste, and then hang this flag from their boat, serving as a public and durable commitment to this behavior while also promoting this behavior in others through social diffusion. This flag will make the pledge to pump out visible to other marina residents and boat owners, holding them accountable to their pledge and encouraging others to also pump out instead of dump their waste. GBF is partnering with Maritime Sanitation's dockside pump-out service to disseminate these flags to boaters who use their services. Through this partnership, GBF has been able to leverage the relationships Maritime Sanitation has with boaters to ensure they actually hang these flags and can better track program success as they are at these marinas and tracking pump out behaviors already.





*Figure 3. Pumpout Flag for boaters to hang from boat after pledging to pump out waste.*

During the first year of implementation, GBF also maintained the Pump Don't Dump webpage ([pumpdontdump.org](http://pumpdontdump.org)), including the interactive pump out map for Galveston Bay. GBF followed up with each marina to provide the most up-to-date information on this map, and updated the language and visuals to be more digestible and user friendly. GBF shared Pump Don't Dump messaging and outreach materials at various outreach events and presentations, and online through social media campaigns.

#### **GBBRP Management Measure 3.4 Boater Waste: No Discharge Zone (NDZ)**

During this project period, GBF continued to lay the groundwork for potentially submitting a NDZ application in the future. GBF accomplished this by meeting with stakeholders and garnering support for a No Discharge Zone designation in Galveston Bay. Through these meetings GBF fostered conversation on how this regulation change would impact each stakeholder and what would need to be done to reduce the barriers to this policy formation on their industry. GBF also surveyed recreational boaters to better gauge support for this policy change, and found that 91% of surveyed boaters would support this policy change.

#### *Update flyers & webpages*

GBF updated the Bacteria Reduction I-Plan webpage in the third quarter and sixth quarter of this project period to include updates on the project's implementation efforts. GBF also updated the brochure handout that outlines the I-Plan and its various management measures. The updated brochure is now more visually appealing, reflects updated progress, and has been condensed to make it more digestible and easier to understand. This brochure has been printed out and made available at all project public events and workshops. A copy of the updated brochure can be found in Appendix IV.

During this time, GBF maintained and updated the Pump Don't Dump webpage ([pumpdontdump.org](http://pumpdontdump.org)) to better promote the proper disposal of boater waste within Galveston Bay. GBF updated the interactive

pump out map, improved the language and layout of the webpage, and ensured all information was up to date, including following up with each marina in the Clear Lake region to ensure the information provided on the map was up to date and correct.

#### *5.4 Track and Report Implementation Progress:*

Quarterly progress reports were submitted throughout the project period, the PPP was submitted in May 2017, the annual report in August 2017, and this final report within 30 days of the end of the project contract. Project implementation and progress was tracked in reports, as well as on the I-Plan webpage and on the flyer handout.

## Results & Observations

### Coalition Building

The Coalition held 10 meetings during the course of the project. Meetings were held monthly during 2017, with the exception of September when the meeting was canceled as all four watersheds struggled to recover from the flooding associated with Hurricane Harvey. Most Coalition representatives were taking on extra duties at that time. During 2018, only two meetings were held, and moving forward the group will meet either bi-monthly or quarterly, as funding allows.

Table 1 provides a summary of the vision determined by Coalition members, after considering many longer and more complicated versions, the group decided to adopt this simple and straight forward statement. When discussing goals, Coalition members noticed that two different types were emerging, longer term, big picture goals, and shorter term project focused goals. The group decided to separate these two ideas, the big picture items were listed as Goals, and the project focus areas were listed as Action Items. Goals are expected to carry forward for many years, and action items will be more dynamic to meet the changing needs of the partner watersheds.

Table 1. Galveston Bay Coalition of Watersheds Vision, Goals, and Action Items

<b>Vision:</b> Partnering for healthy watersheds.		
<b>Goal</b>	Promote widespread community awareness and engagement in the protection and improvement of Coalition watersheds.	
<b>Action Items</b>		Work to establish a household hazardous waste facility for Galveston County.
		Identify new methods to reach citizens and make real change
		Find appropriate advocates to engage local governments/officials
		Coordinate with Coalition partners for education implementation measures
<b>Goal</b>	Work as a team to implement management measures from plans in Coalition watersheds.	
<b>Action Items</b>		Work with partners to remove debris from Coalition bayous
		Determine and pursue dredging needs for Coalition bayous
		Support bacteria source tracking projects that benefit Coalition watersheds
		Support wastewater infrastructure improvements for public and private entities in Coalition watersheds
		Work with partners to reduce FOG & wipes in sanitary sewer systems
		Support communities in Coalition watersheds in their efforts to manage development
		Promote the use of natural riparian buffers
<b>Goal</b>	Ensure the long-term funding of the Coalition.	
<b>Action Items</b>		Obtain funding for a Coalition Coordinator
		Apply for 3 grants per year to support Coalition efforts
		Establish a secure local funding mechanism to support Coalition efforts

Input from Coalition stakeholders was used to develop a long term Funding Plan (Appendix B) for the group. After discussing the Plum Creek model, Coalition members did not feel the group was ready to undertake the level of commitment for an Interlocal agreement. Multiple Coalition entities are willing to provide in kind match for grant applications as well as letters of support. Over time, this will likely develop into a similar funding mechanism to the one used in the Plum Creek watershed.

## Implementation of Existing Plans

The list below represents the top 12 management measures from WBPs in all four Coalition partner watersheds based on the prioritization activities described in the Methods section above. Coalition members feel it is the responsibility of the group to provide learning opportunities on the topics below to interested residents, and elected and municipal officials. They also feel strongly that the Coalition should explore new methods of reaching citizens, that a number of watershed groups across Texas are using similar methods (workshops, public meetings, social media posts) but not seeing results. With future funding, Coalition members want to identify and try new outreach strategies in an effort to see substantial improvements in water quality.

### **Top 12 Management Measures as Prioritized by the Galveston Bay Coalition of Watersheds**

1. Retain and treat stormwater on-site or in regional detention features using green infrastructure (rain gardens, bio-swales, rain water harvesting) and stormwater wetlands. (pilot projects, demonstrations, education, etc.)
2. Detect and eliminate illicit discharges and dumping sites
3. Improve enforcement to mitigate failing OSSFs
4. Identify and hookup, upgrade, and/or fix failing OSSFs
5. Promote best management practices for managing water quality for livestock and other large groups of animals
6. Protect, restore, and repair riparian zones
7. Upgrade/rehabilitate collection systems including lift stations
8. Increase compliance and enforcement by the TCEQ
9. Improve regulations and enforcement of illicit discharges and dumping
10. Target areas for intensive water quality sampling based on OSSF pollution
11. Promote increased participation in existing programs for erosion control, nutrient reduction, and livestock management
12. Support establishment of conservation easements to protect water quality

### *Post-Harvey Community Open House*

At the first meeting after Hurricane Harvey impacted all four Coalition watersheds, stakeholders discussed challenges in their communities and unmet needs. Coalition members discussed a number of topics related to both flooding and water quality, and the connection between the two. They especially wanted to take steps as a group to address misconceptions that arose during and after the storm related to water quality, how water moves across the land, and the impact of impervious surfaces. One member suggested hosting a meeting or open house, and the group agreed. Based on feedback at this meeting and additional meetings, the Post-Harvey Community Open House has held on February 28, 2018 in partnership with the Galveston Bay Foundation. Over fifty people attended and heard two talks, one on water quality by Sarah Gosset (GBF), and one on flooding and land development by Dr. John Jacob (Texas A&M University). Twelve groups also had informational tables set up including the Texas Well Owners Network, Galveston County Health District, Texas Department of Insurance, and the Federal Emergency Management Agency.

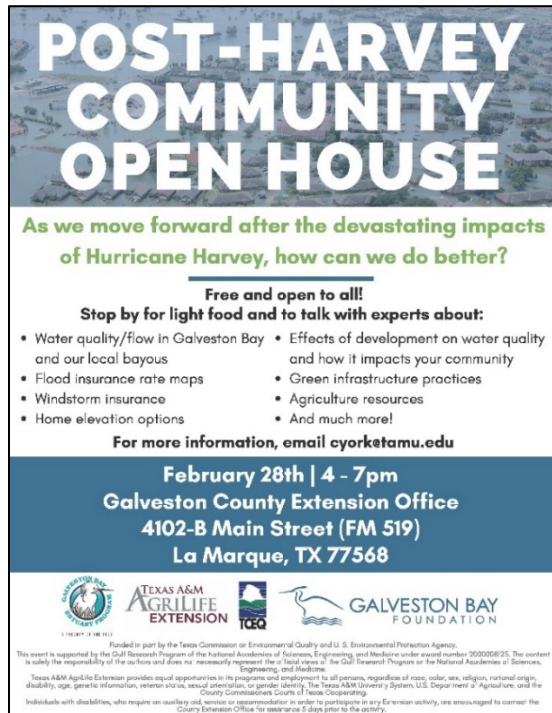


Figure 4. Flyer for the Post-Harvey Community Open House



Figure 5. Dr. John Jacob, Texas AgriLife, talks about flooding, water quality, and land development

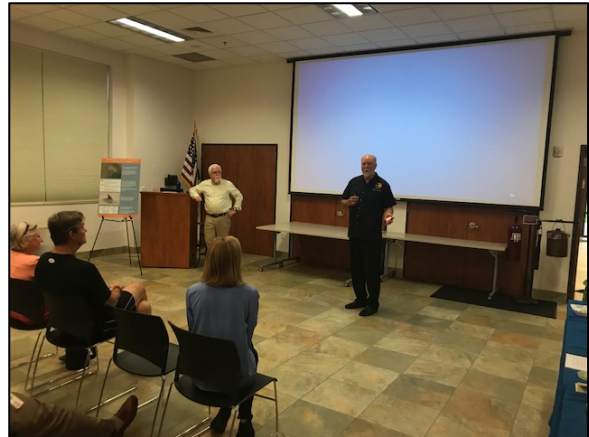


Figure 6. Council Member Robert Mitchich, City of La Marque, tells attendees about steps the City is talking to make improvements Post-Harvey



*Figure 7. Sarah Gossett, Galveston Bay Foundation, informs attendees about water quality, especially bacteria, in Galveston Bay.*

### Coalition Website

The Coalition website was established at [agrilife.org/coalitionofwatersheds](http://agrilife.org/coalitionofwatersheds). Based on previous experience, the site is hosted on a Texas A&M AgriLife Extension Service server. The connection to a university means there are no webhosting fees or domain name costs; it also adds a level of legitimacy to the site. The site contains links to each watershed in the coalition, lists the vision, goals, and action items, and meeting notes. Coalition members felt that enough information about water quality topics was already available on the website for each specific watershed group and the information did not need to be repeated on the Coalition website. The role of the website will be re-addressed as the Coalition continues, and the site can be changed to meet the needs of the Coalition moving forward.



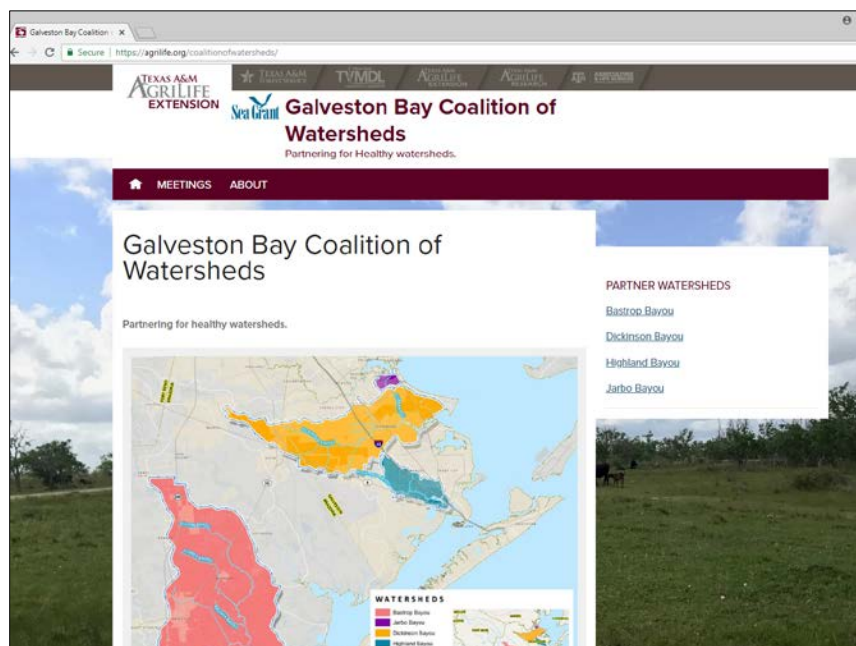


Figure 8. The home page for [agrilife.org/coalitionofwatersheds](https://agrilife.org/coalitionofwatersheds/)

## GBBRP

### *Attendance of public meetings & workshops*

The first public meeting was held on June 12, 2017 at the League City Civic Center. This meeting consisted of members from the Boater Waste, Wastewater Treatment Facility, and On-Site-Sewage Facility workgroups, as well as members of the local media and the general public. GBF released a press release about this event and advertised it on our webpage and newsletters. Ten people attended this workshop, though most were already a part of GBF's workgroups and therefore already involved in the implementation of the GBBRP.

The second meeting was held on February 28, 2018 in partnership with Texas A&M Agrilife Extension (AgriLife). This meeting was framed as a "post Harvey Community Open House" and served to inform residents of Galveston County about resiliency, stormwater, and flooding. At this event, GBF hosted an informational table about the GBBRP and delivered a presentation about its implementation. After Hurricane Harvey hit the region around Galveston Bay, GBF and the Coalition of Watersheds as a whole recognized a need to communicate basic watershed concepts with the local community. This included information such as how water flows during a storm, factors that can mitigate or exacerbate flooding, how flooding and other storm events impact water quality, and what each individual can do to contribute to the larger, regional picture of resiliency. By framing the Open House as an event that focused on these community needs, the Coalition and GBF were able to increase attendance and spread their message while also better serving the community. Members from GBF's various workgroups, as well as other local stakeholders and members of the general public attended this meeting. This event was framed slightly differently than GBF's first public meeting, in an effort to better serve community needs and to bring in new audiences. In addition to framing this event to focus on the community, GBF allocated



resources to better promote this event to the targeted community members and stakeholders. GBF created an event on social media to garner online excitement, posted a press release, and placed a print ad in the Houston Chronicle to diversify outreach mediums and reach new community members. Additionally, by partnering with Agrilife, traditional marketing and outreach methods were disseminated to a wider audience base. As a result of this myriad of outreach strategies, attendance at this public meeting vastly outpaced that of the first public meeting, with about 35 members in attendance. While many of these public meetings have historically seen the same faces over and over, this event included many new community members who had previously not been a part of the conversation, or aware of the various efforts to improve water quality in the region.

GBF's third public meeting about the GBBRP was held at Tommy's Restaurant and Oyster Bar. As a local restaurant that specializes in serving local oysters and works to maintain a sustainable oyster fishery in Galveston Bay, this venue seemed appropriate to discuss GBF's efforts to reduce bacteria levels in Galveston Bay for improved oyster waters. Additionally, this restaurant is very popular among local residents, boaters and Bay recreators, a major stakeholder group targeted within the GBBRP. GBF promoted this public meeting as a "summer kickoff party" to showcase the work GBF is doing to keep Galveston Bay fishable and swimmable. In addition to the measures and progress laid out in the GBBRP, GBF also featured current water quality findings and correlations to better showcase the relationship between anthropogenic causes and bacteria concentrations. While GBF did little advertising outside of basic digital marketing, registration for this event hit 46 people, with about 35 in attendance at the actual event. Attendees comprised of a good mix of workgroup members and many local residents, boaters, bay users, and even a local city council member. Conversation throughout the event was very engaged, with the audience asking many pertinent and important questions, and offering suggestions for other ways they could get involved. The audience at this event was the sweet spot of the "general public" who were previously unaware of much of this work, but were interested and informed enough on the issues facing the bay to take action and foster productive dialogue.

A major takeaway from this meeting was that location and messaging are crucial in determining the success of a public meeting. By hosting a public meeting around an issue pertinent to the community or at a location many of the target audience already frequent, GBF was able to successfully engage with the targeted stakeholder groups and increase the quantity and diversity of stakeholders involved in local and regional water quality issues. Lessons learned from these meeting will be used moving forward when planning other public events.

#### *Wastewater Treatment Facilities*

GBF continued to work with TCEQ and other partners to ensure the continued implementation of the GBBRP management measures, particularly those in 1.1 and 1.2. Because many of these management measures require participation and action from entities other than GBF, the role of GBF in these measures has been more of facilitation, tracking, and information sharing when necessary.

To address management measure 1.4: Sanitary Systems Measure, GBF focused mainly on communication with local municipalities and on outreach to homeowners and residents on proper FOG disposal. The website received 8,089 pageviews from 5,143 users in 2017, and 15,877 pageviews from 9,496 users since Jan 1, 2015. Through many outreach events, GBF has directly reached over 16,000 people with campaign messaging, informational handouts, and giveaways such as plastic funnels and plastic scrapers. While it is difficult to measure the true success of these outreach campaigns, GBF was able to reach thousands of residents with campaign messaging, and has worked to better follow up with these residents

to better gauge continued behavior change and ultimate implementation success. Images from this webpage and of campaign giveaways can be found in Appendix IV.

#### *On Site Sewage Facilities*

The biggest hurdle with a lot of OSSF maintenance is resources for outreach, finding funding to provide financial assistance to help replace old systems, and to better identify unpermitted systems. While the resources provided helped support one septic system workshop in the region, to adequately reach each targeted community, smaller workshops held close to home in a well known and commonly frequented location would be ideal. Additionally, when talking with OSSF workgroup members and other stakeholders, many homeowners in these rural areas acknowledge the problem their septic systems are creating and want to fix their systems, but do not have the financial means to do so. While the SEP funding currently provided by H-GAC helps to address this issue, it has very strict income guidelines that exclude the vast majority of homeowners from benefiting. Finally, identifying areas of unpermitted OSSFs also requires resources, including time and funding, not currently available to most professionals in our region.

GBF invested resources in promoting the May 19 OSSF workshop, placing an ad in the local regional newspapers, and promoting heavily online through social media and partner organizations. While 16 individuals registered for the workshop, nine showed up for the workshop itself. The attendees provided positive feedback, stating that the workshop was informative and worthwhile. While this attendance was more successful than many past OSSF workshops, the hope was that by advertising in new mediums and to new community groups the attendance at this workshop would be greater than it was. This continues to show that the best success for an event such as this would be to find an exciting location already frequented by the target community, and using messaging that targets that community specifically.

#### *Boater waste: flags, surveys & targeting their population*

GBF has been working to engage boaters in proper waste disposal for the better part of a decade, with moderate success. However, many boaters and workgroup members have emphasized that traditional outreach and messaging would not work for most boaters currently dumping their waste into the Bay. GBF is now using the new boater flags as a way to “revamp” the Pump Don’t Dump outreach campaign. By targeting boaters currently engaging in the positive behavior of pumping out, GBF is creating “influencers” within the boating community. GBF hopes this will help to encourage behavior change from within. This is the first year of implementation, but already many boaters and workgroup members have expressed renewed excitement about the flags, and have already pledged to hang them from their boats. Additionally, GBF is continuing conversation with local marinas, many of whom support this initiative and are open to a continued partnership towards better program tracking and enforcement.

#### *Boater Waste: No Discharge Zone application*

While the majority of stakeholders GBF met with showed support for the establishment of Galveston Bay as a No Discharge Zone, most also expressed concern on receiving pushback from other stakeholder groups and recognized the challenge that passing a policy change such as this. To help with this, GBF researched other recent coastal NDZ designations to understand the pushback received there, how it impacted various stakeholder groups, and what was done to reduce these barriers that would lead to pushback. The more GBF understands about current dynamics and needs, the more GBF is realizing that a formal petition is still several years out, as infrastructure for and support from the commercial sector is not established enough currently.

## Discussion

### Galveston Bay Coalition of Watersheds

Forming the Coalition was a response to a need seen in the Lower Galveston Bay watershed to increase implementation of WBPs, minimize the administrative costs, and reduce the overall number of meetings that stakeholders are asked to attend, all of this while improving water quality. Coalition members have expressed a desire to continue the group, and to expand implementation efforts. A coordinator is essential to maintaining a regular meeting schedule and coordinating efforts between watersheds. Active participation from all watersheds is essential as well. Stakeholders from the Bastrop Bayou watershed do not have a history or active engagement in the Coalition or during the WBP process. Moving forward, additional efforts will be made to include representatives from this area. As additional water bodies are listed on the 303(d) list (i.e. Chocolate Bayou), the opportunity to include additional watersheds to the Coalition will arise. This might be a way to engage additional stakeholders from Brazoria County, and further strengthen the Coalition.

The greatest strength of the Coalition has been the ability to meet the changing needs of partner watersheds. The widespread flooding from Hurricane Harvey was not expected, however the Coalition was able to work together to address new and relevant needs in Galveston and Brazoria Counties. To this end, it is important moving forward that the Coalition continue to re-assess Goals and Action items on a regular basis, and to continue to align these goals with the management measures in WBPs.

There is no current funding in place to continue Coalition meetings. Grant applications were submitted to the GBEP Public Participation and Education sub-committee and the Dixon Water Foundation, but neither were selected for funding. A grant pre-proposal was submitted to the Texas General Land Office, Coastal Management Program, and an additional proposal will be submitted to the TCEQ 319(h) request for proposals, this funding will be used to continue the work of the Coalition. Additional grant proposals will be submitted as opportunities arise. Both TCWP and GBF have existing programs that implement the WBPs in Coalition watersheds, these programs and other implementation efforts will continue but without the coordinated focus provided by the Coalition.

### Galveston Bay Bacteria Reduction Plan

Year 1 of implementation yielded many successes, but also faced many unexpected challenges, such as staff changes and Hurricane Harvey. Despite this, this year has laid the foundation for Year 2 and Year 3 implementation, funding permitted. The majority of Year 2 and 3 management measures continue the efforts that have begun in Year 1, though some represent new actions aimed at reducing boater waste and bacteria from septic systems throughout the study site. In order to better reach these goals, continued workgroup and stakeholder engagement is required. With a project as vast in scope as the GBBRP, and with so many different partners involved, it can be difficult to retain workgroup engagement from year to year. While GBF utilized the resources and knowledge provided by workgroup members, engagement and interest in meetings – particularly for the Wastewater and OSSF workgroups – remained relatively low. Therefore, as resources become available GBF will work to strengthen communication between workgroup members through individual interactions outside of scheduled meetings to better understand each workgroup members' interests in the I-Plan and to foster open communication.

In terms of Implementation success, GBF found the most success in meeting community members and stakeholders where they were, as mentioned above. Going to each individual community to implement management measures requires more resources and time, but ultimately increased success. During this

year of implementation, GBF began to identify specific communities and groups to target, however more work needs to be allocated to this task. GBF has found success in partnering with other watershed-focused groups, and sees that as the most effective and efficient way to reach as many individual communities as possible.

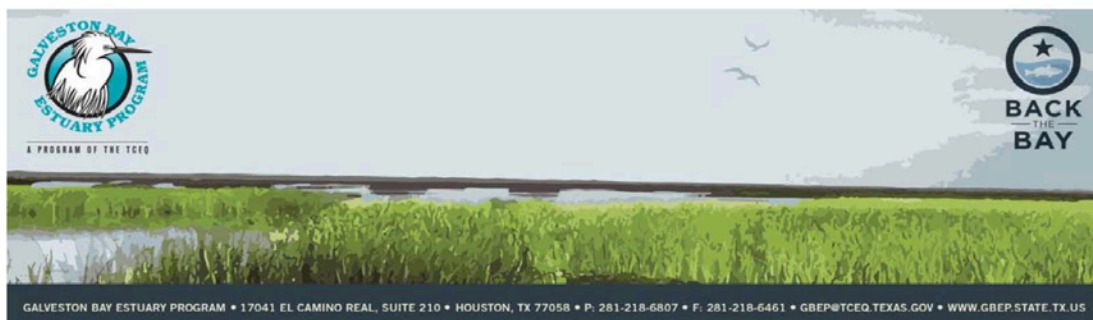
## Summary

The Galveston Bay Coalition of Watersheds and the Galveston Bay Bacteria Reduction Plan are two efforts actively working to improve water quality in Galveston Bay and its tributaries. Through this project, the Coalition was founded and stakeholders from four watersheds (Bastrop, Dickinson, Highland, and Jarbo Bayous) were engaged to actively begin implementing locally derived watershed based plans. The Galveston Bay Foundation focused on implementing the GBBRP and expand efforts that benefit multiple watersheds including the Cease the Grease and Pump Don't Dump campaigns. All of these efforts have successfully moved the bar forward on improving water quality in Galveston Bay.

## References

Plum Creek Watershed Partnership. 2011. Interlocal Agreement Among Hays County, Caldwell County, City of Luling, City of Kyle, City of Buda, City of Lockhart, City of Uhland, Guadalupe-Blanco River Authority, Plum Creek Conservation District, Polonia Water Supply Corporation, Caldwell-Travis Soil and Water Conservation District #304, And Hays County Soil and Water Conservation District #351, Regarding Implementation of the Plum Creek Watershed Protection Plan. Accessed June 2018.  
[http://www.gbra.org/documents/plumcreek/pcwp\\_interlocal\\_agreement\\_july\\_2011.pdf](http://www.gbra.org/documents/plumcreek/pcwp_interlocal_agreement_july_2011.pdf)

## Appendix A: Project Article (Task 1.7)



## Galveston Bay Coalition of Watersheds

### Summary

The Texas Coastal Watershed Program, a partnership between the Texas A&M AgriLife Extension Service and Texas Sea Grant, with funding from the Galveston Bay Estuary Program (GBEP) is working with stakeholders in Galveston and Brazoria counties to establish the Galveston Bay Coalition of Watersheds (GBCOW).

The GBCOW was created to implement existing watershed based plans for Bastrop, Dickinson, Highland, and Jarbo Bayous. This approach reduces the overall number of meetings that stakeholders and technical advisors are asked to attend and also provides opportunities to increase partnership. These four watersheds have many of the same or similar implementation activities, so working together for the same objective is a more efficient use of resources.

Active stakeholders from each watershed were invited to join the group and are meeting on a monthly basis. Coalition members are working to define the vision and priorities for the group, and to set short and long-term goals.

At future meetings, the GBCOW will determine projects to undertake and a funding plan to include both grant and local dollars.

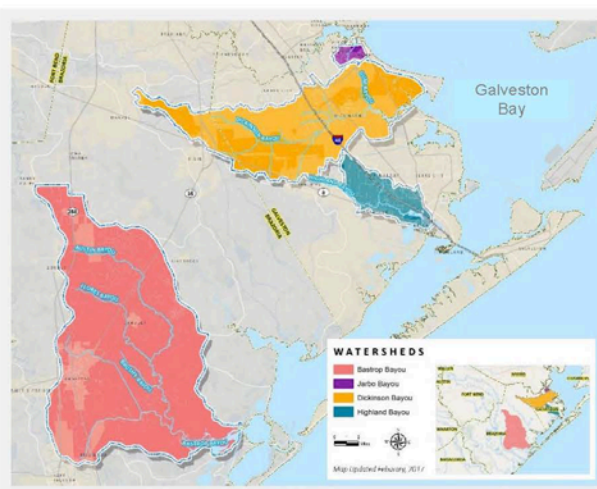
### Plan Relevance

This project implements nonpoint source pollution goals in the Galveston Bay Plan (WSQ-1, WSQ-6, NPS-3, NPS-4) by implementing existing

watershed based plans and engaging local county and municipal stakeholders to encourage and support existing and new activities.

### Partners:

Galveston County, Brazoria County, City of Dickinson, City of Santa Fe, City of League City, Texas Commission on Environmental Quality, Environmental Protection Agency, GBEP, Texas Parks and Wildlife, Texas State Soil and Water Conservation Board, Texas A&M AgriLife Extension Service



**Figure 1. The Galveston Bay Coalition of Watersheds is focused on implementing existing plans for the Bastrop, Dickinson, Highland, and Jarbo Bayou watersheds.**

### For more information:

Charriss York, Texas A&M AgriLife Extension Service, [cyork@tamu.edu](mailto:cyork@tamu.edu), 281.694.5508

## Appendix B: Coalition Participant List (Task 2.1)



*Table 2. List of Galveston Bay Coalition of Watershed Stakeholders and Technical Advisors*

Stakeholders			
Name	Organization	Email	Watershed
Lori FitzSimmons-Evans	Galveston County Health District	fitzsimmmons@gchd.org	Dickinson, Highland
Martin Entringer	Galveston County Health District	mentringer@gchd.org	Dickinson, Highland
Julie Diaz	Galveston County Parks	julie.diaz@co.galveston.tx.us	Highland
Michael Shannon	Galveston County Engineer	michael.shannon@co.galveston.tx.us	Highland
Julie Masters	Dickinson	mayor@ci.dickinson.tx.us	Dickinson
Doug Kneupper	Texas City Engineer	dkneupper@texas-city-tx.org	Dickinson, Highland
Joe Giusti	Galveston County Commissioner	Joseph.Giusti@co.galveston.tx.us	Highland
Ed Linck	Water Control Improvement District 12	felinck@linckrefy.com	Jarbo
Jack Murphy	League City	jack.murphy@leaguecity.com	Dickinson, Jarbo
Wanda Zimmer	Kemah City Council	zimmer_wanda@msn.com	Jarbo
Angie Galvan	City of Clear Lake Shores	Agalvan@clearlakeshores-tx.gov	Jarbo
Robert Michetich	La Marque City Council	r.michetich@cityoflamarque.org	Highland
Lee Crowder	Galveston County Road and Bridge	'lee.crowder@co.galveston.tx.us	Highland
Diana Steelquist	Santa Fe	diana@ci.santa-fe.tx.us	Dickinson, Highland
David Paulissen	Water Control Improvement District 1	dap@wcid1.com	Dickinson
Don West	Brazoria Co Fresh Water Supply District 2	dandpwest@gmail.com	Bastrop

Dude Payne	Brazoria County Commissioner	dudep@brazoria-county.com	Bastrop
Michael Stoldt	Angleton City Manager	mstoldt@angleton.tx.us	Bastrop
Alex Noel	League City	alex.noel@leaguecity.com	Dickinson, Jarbo
Bryan Frazier	Brazoria County Parks	bryanf@brazoria-county.com	Bastrop
Katie Wilson	Galveston County Health District	kwilson@gchd.org	Dickinson, Highland
Bryan Milward	Dickinson	bmilward@ci.dickinson.tx.us	Dickinson
Paul Booth	Dickinson	pbooth@ci.dickinson.tx.us	Dickinson
<b>Technical Advisors</b>			
<b>Organization</b>	<b>Organization</b>	<b>Organization</b>	<b>Organization</b>
Rebecca Hensley	Texas Parks and Wildlife Department	rebecca.hensley@tpwd.texas.gov	All
Linda Broach	Texas Commission on Environmental Quality	linda.broach@tceq.texas.gov	All
Kim Laird	Texas Commission on Environmental Quality	kim.laird@tceq.texas.gov	All
Bryan Eastham	Texas Commission on Environmental Quality	bryan.eastham@tceq.texas.gov	All
Brian Koch	Texas State Soil and Water Conservation Board	bkoch@tsswcb.texas.gov	All
Phoenix Rogers	Texas A&M AgriLife Extension Galveston County	plrogers@ag.tamu.edu	Dickinson, Highland, Jarbo
Jessica Chase	Texas A&M AgriLife Extension Brazoria County	jessica.chase@ag.tamu.edu	Bastrop
Lisa Marshall	Galveston Bay Estuary Program	lisa.marshall@tceq.texas.gov	All
Sarah Gossett	Galveston Bay Foundation	sgossett@galvbay.org	All
Jean Wright	Houston-Galveston Area Council	jean.wright@h-gac.com	Jarbo

Cody Dingee	US Fish and Wildlife Service	james_dingee@fws.gov	Bastrop
Chris Morgan	US Department of Agriculture Natural Resource Conservation Service	chris.morgan@tx.usda.gov	Dickinson, Bastrop, Highland
Steven Mitchell	Texas Parks and Wildlife Department	steven.mitchell@tpwd.texas.gov	All
Celina Lowry	Texas A&M AgriLife Extension	celina.lowry@tamu.edu	Highland
Steven Johnston	Houston-Galveston Area Council	steven.johnston@h-gac.com	Jarbo
Justin Bower	Houston-Galveston Area Council	justin.bower@h-gac.com	Bastrop
Charriss York	Texas A&M AgriLife Extension	cyork@tamu.edu	Dickinson

## Appendix C: Coalition List of Prioritized Management Measures (Task 3.1)

Coalition stakeholders participated in multiple exercises to prioritize Implementation Measures to set priorities for the group. The table below shows the results from these priority ranking exercises. The top 12 vote receiving Implementation Measures are highlighted in yellow, and the top 5 vote receiving categories are denoted by \*\*.

*Table 3. Coalition prioritized Management Measures by category*

		Priority Ranking within each category	Priority ranking across all categories	Total Votes	Category Priority Ranking
<b>On-Site Sewage Facilities **</b>					
1	Address inadequate maintenance of OSSFs	1	0	1	8
2	Improve enforcement to mitigate failing OSSFs	13	13	26	
3	Identify and hookup, upgrade, and/or fix failing OSSFs	11	12	23	
4	Identify and rank target areas by pollutant reduction priority (for both education and upgrades)	1	0	1	
5	Evaluate/enhance OSSF design criteria	0	0	0	
6	Incorporate OSSF criteria into standards of practice for home sale inspections	14	1	15	

		Priority Ranking within each category	Priority ranking across all categories	Total Votes	Category Priority Ranking
7	Target areas for intensive water quality sampling based on OSSF pollution	12	7	19	
Wastewater Treatment Facilities **					
8	Promote sanitary sewer where appropriate	9	5	14	6
9	Implement stricter bacteria limits and enforcement measures for effluent	9	3	12	
10	Improve design and operation criteria for new plants	3	1	4	
11	Upgrade plants/facilities	7	8	15	
12	Increase compliance and enforcement by the TCEQ	11	10	21	
13	Use effluent for facility irrigation	0	0	0	
Sanitary Sewers **					
14	Upgrade/rehabilitate collection systems including lift stations	14	8	22	7

		Priority Ranking within each category	Priority ranking across all categories	Total Votes	Category Priority Ranking
15	Address Fats, Oils and Grease (and roots & wipes) through education for homeowners & renters (Cease the Grease, workshops, outreach, etc.)	4	2	6	
16	Address Fats, Oils and Grease (and roots & wipes) through ordinances and policy for commercial businesses	7	9	16	
17	Improve reporting requirements & capabilities for sanitary sewer overflows	7	2	9	
18	Revise penalties for sanitary sewer overflow violations	8	3	11	
19	Develop utility asset management programs or infrastructure management programs to pay for upgrades	7	3	10	
20	Upgrade or repair private line connections to wastewater collection systems	4	3	7	
Stormwater/Urban Runoff **					
21	Continue existing and encourage expansion of stormwater management programs	8	4	12	8
22	Retain and treat stormwater on-site or in regional detention features using green infrastructure (rain gardens, bio-swales, rain water harvesting) and stormwater wetlands. (pilot projects, demonstrations, education, etc.)	15	17	32	



		Priority Ranking within each category	Priority ranking across all categories	Total Votes	Category Priority Ranking
23	Revise ordinances and codes to allow for green infrastructure practices, especially in new development	7	5	12	
24	Increase compliance with and enforcement of stormwater management permits	7	1	8	
25	Decrease and minimize the introduction of lawn debris and nutrients into stormwater through ordinances, education and enforcement	2	0	2	
26	Publicize contact information for reporting violations and poor disposal practices	0	0	0	
Pet Waste					
27	Expand pet owner education efforts (distributing educational materials, pet waste bags, etc.)	7	2	9	0
28	Install pet waste stations in public areas including informative signage	12	2	14	
29	Develop and promote model ordinances and HOA bylaws for adoption and enforcement	7	0	7	
Illegal Dumping					
30	Detect and eliminate illicit discharges and dumping sites	15	13	28	3

		Priority Ranking within each category	Priority ranking across all categories	Total Votes	Category Priority Ranking
31	Improve regulations and enforcement of illicit discharges and dumping	9	11	20	
32	Monitor and control waste hauler activities	3	0	3	
33	Host Trash Bash event within watershed	2	0	2	
34	Implement illegal dumping hotline and signage	6	3	9	
35	Removal of abandoned and potentially leaking boats	4	0	4	
Agriculture, Animals, and Feral Hogs					
36	Promote increased participation in existing programs for erosion control, nutrient reduction, and livestock management	12	6	18	0
37	Promote best management practices for managing water quality for livestock and other large groups of animals	15	8	23	
38	Lone Star Healthy Streams Program and materials (for both livestock and feral hogs)	1	0	1	

		Priority Ranking within each category	Priority ranking across all categories	Total Votes	Category Priority Ranking
39	Promote the reduction of feral hog populations (workshops, education, etc..)	0			
40	Feral hog hunting promotion event	3	0	3	
Conservation Programs & Land Preservation **					
41	Increase landowner participation in existing conservation and habitat management plans to decrease bacteria and nutrient loading (including TSSWCB Water Quality Improvement Plans)	11	3	14	7
42	Identify existing conservation and habitat management plans and facilitate communication between organizations with existing plans and potential participants when appropriate	4	0	4	
43	Support acquisition of undeveloped lands to protect water quality	6	9	15	
44	Support establishment of conservation easements to protect water quality	8	9	17	
45	Protect, restore, and repair riparian zones	9	14	23	

## Appendix D: Galveston Bay Coalition of Watersheds

### Funding Plan (Task 2.4)

**Galveston Bay Coalition of Watersheds**  
**Long-term Funding Plan**  
**May 2018**

**Compiled by the**  
**Texas Community Watershed Partners**  
**A program of the Texas A&M AgriLife Extension Service**

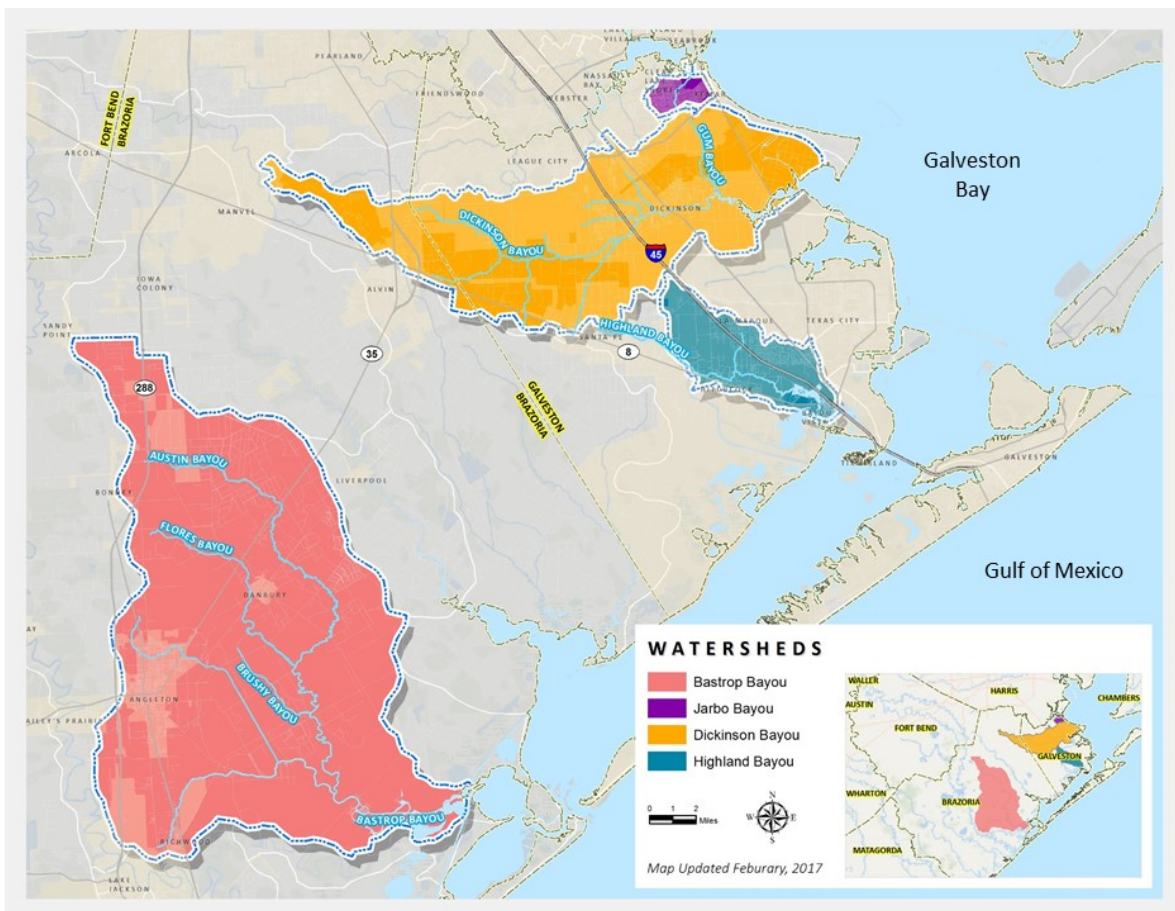
PREPARED IN COOPERATION WITH THE  
TEXAS COMMISSION ON ENVIRONMENTAL QUALITY AND  
U.S. ENVIRONMENTAL PROTECTION AGENCY



## About the Coalition of Watersheds

The Galveston Bay Coalition of Watersheds (GBCOW) was convened in the spring of 2017 by the Texas Community Watershed Partners, a program of the Texas A&M AgriLife Extension Service, with funding from the Galveston Bay Estuary Program. The GBCOW was created to implement existing watershed based plans for Bastrop, Dickinson, Highland, and Jarbo Bayous. This approach is meant to reduce burden on stakeholders in implementing watershed based plans by reducing the overall number of meetings they and technical advisors are asked to attend. The Coalition also provides opportunities to increase partnerships between watersheds. These four watersheds have many of the same or similar implementation activities; therefore working together for the same objective is a more efficient use of all resources.

Active stakeholders from each watershed were invited to join the group and met on a monthly basis to define the vision and priorities for the group, and to set short and long-term goals. Three focus areas are outlined through the Coalition goals (see below), this Funding Plan is a step in reaching Goal 3 – Ensure the long term funding of the Coalition.





## Figure 9. Galveston Bay Coalition of Watersheds Partner Watersheds

### Coalition Vision

Partnering for healthy watersheds.

### Coalition Goals and Action Items

**Goal:** Promote widespread community awareness and engagement in the protection and improvement of Coalition watersheds.

Action Items:

- Work to establish a household hazardous waste facility for Galveston County.
- Identify new methods to reach citizens and make real change
- Find appropriate advocates to engage local governments/officials
- Coordinate with Coalition partners for education implementation measures

**Goal:** Work as a team to implement management measures from plans in Coalition watersheds.

Action Items:

- Work with partners to remove debris from Coalition bayous
- Determine and pursue dredging needs for Coalition bayous
- Support bacteria source tracking projects that benefit Coalition watersheds
- Support wastewater infrastructure improvements for public and private entities in Coalition watersheds
- Work with partners to reduce FOG & wipes in sanitary sewer systems
- Support communities in Coalition watersheds in their efforts to manage development
- Promote the use of natural riparian buffers

**Goal:** Ensure the long term funding of the Coalition.

Action Items:

- Obtain funding for a Coalition Coordinator
- Apply for 3 grants per year to support Coalition efforts
- Establish a secure local funding mechanism to support Coalition efforts

### Potential Funding Sources

Watershed groups in Texas are most commonly funded by grants, a majority of which require local match. With a growing number of approved watershed based plans, and thus more stakeholder groups, grant funding is becoming more competitive and a less reliable source of support. Strong partnerships and a diversity of matching dollars create a robust grant application. With this said,

the unusual multi-watershed approach of the Coalition has many aspects that make it a desirable project to funders. Multiple partner watersheds:

1. reduces overhead costs for the grant
2. reduces redundancy of programs in a region
3. reduces the overall need for local match
4. creates a unified local message

Unconventional funding opportunities also exist and should be sought. These include community disaster recovery funds and programs like the Environmental Protection Agency (EPA) Urban Waters Program.

A number of local charitable foundations fund programs related to water and the environment. Currently, few of these have supported watershed based implementation efforts. These funds typically do not require local match, and can even serve a match for a state or federal grant. A thoughtful discussion with one or more of these foundations could result in a lucrative partnership for the Coalition.

## Grant Opportunities

Numerous grants are available from a variety of State and Federal Agencies.

### Potential Federal and State Funders

- Texas Commission on Environmental Quality 319(h) grants
- Texas State Soil and Water Conservation Board 319(h) grants
- Galveston Bay Estuary Program
- U.S. Environmental Protection Agency
- National Fish and Wildlife Foundation
- National Oceanic and Atmospheric Administration
- United States Department of Agriculture
- Texas General Land Office (GLO) Coastal Management Program (CMP)

### Potential Foundation Funders

- Dixon Water Foundation
- Herzstein Foundation
- Moody Foundation
- Powell Foundation
- Houston Endowment
- Meadows Foundation
- Hershey Foundation

### Private Sector Funding

A number of private companies offer grants and donations for environmental work. DOW, Lyondell Basell, Exxon, and Valero all have facilities within the Coalition watersheds and have supported environmental causes in the past. These are not typically grants but frequently require reaching out to the local staff at the companies and cultivating knowledge of local projects and needs. Another example of private sector funding are the many breweries across the US have begun supporting

clean water initiatives, because brewing has high water demand and they want to support causes related to their product. Coalition members will remain open and pursue private sector funding opportunities as they arise and are appropriate for projects and events.

### **Applications Submitted**

Galveston Bay Estuary Program – no matching requirement, proposal submitted through Public Participation and Education sub-committee fall 2017. No funding received.

Dixon Water Foundation – no matching requirement, application submitted November 2017. No funding received.

### **Potential Sources of Leveraged Funds**

Below are potential sources of leveraged funds, or match, for grant applications. The Coalition Coordinator will determine which of these are most appropriate for any given application and will coordinate with the appropriate Coalition Member to ensure leveraged funds are properly documented and accounted for. In addition, certain activities may be added to a grant scope to properly utilize these sources of match.

- Houston-Galveston Area Council – quarterly water sampling on local bayous as part of the Clean Rivers Program
- Galveston County Health District – water sampling on local bayous
- Municipalities – activities for Municipal Separate Storm Sewer System (MS4) Permit activities (not eligible for 319 grant match but may be eligible for other grants)
- Texas A&M AgriLife Extension Service – internal funding and unrecovered indirect costs
- Galveston Bay Foundation – volunteer water quality monitoring for sites inside Coalition watersheds

### **Potential Action Items to Focus Grant Applications**

Requests for proposals (RFP) vary by grantor and often have a specific area of focus. Therefore, each application must be tailored to meet the specific request of the funding source. Below are six Action Items that will likely be focus areas for grant applications given the current trends in requests for proposals. These Action Items as well as continued Coalition management will be the primary focus of upcoming grant applications.

#### **Coalition Action Items**

- Identify new methods to reach citizens and make real change
- Work with partners to remove debris from Coalition bayous
- Determine and pursue dredging needs for Coalition bayous
- Support wastewater infrastructure improvements for public and private entities in Coalition watersheds
- Support communities in Coalition watersheds in their efforts to manage development
- Promote the use of natural riparian buffers

## Next Steps for the Coalition

Coalition Members determined that for the time being, the Coalition will remain under the umbrella of the Texas A&M AgriLife Extension Service and the Texas Community Watershed Partners.

Therefore, all grants will be submitted and managed through AgriLife Sponsored Research Services department and will follow their guidelines.

The TCEQ 319(h) grant RFP opens on June 1, 2018 and the Coalition Coordinator will submit an application on behalf of the group. Letters of support and match (when appropriate) from Coalition members will be sought.

The Texas GLO CMP grant pre-proposal is due on June 14, 2018. If the pre-proposal is accepted, a final application will be submitted in October 2018.

Additional applications will be submitted based upon the RFP timelines.

## Appendix E: Galveston Bay Bacteria Reduction Plan Public Participation Plan (Task 5.1)



## **GALVESTON BAY FOUNDATION**

### **The Coalition of Watersheds**

#### **Task 5: Galveston Bay Bacteria Reduction Plan Coordination Subtask 5.1: Draft Public Participation Plan (PPP)**

##### **Initial Workgroup Meeting:**

Thursday, February 23<sup>rd</sup>, 2017

2:30pm-4:00pm

Freeman-Branch County Library Meeting Room

All Workgroups

Attendance: 14 members

##### **Projected Workgroup Meeting:**

Wednesday, May 17<sup>th</sup>, 2017

2:30pm-3:30pm

GBF Conference Room

Boater Waste Workgroup

Wednesday, May 24<sup>th</sup>, 2017

6:00-7:30pm

City of Seabrook

Public Meeting

Tuesday, August 8<sup>th</sup>, 2017

2:30pm-3:30pm

GBF Conference Room

Boater Waste Workgroup

Tuesday, August 15<sup>th</sup>, 2017

2:30-3:30pm

GBF Conference Room

Wastewater Treatment Facility Workgroup (if needed)

Tuesday, September 12<sup>th</sup>, 2017

2:30-3:30pm

GBF Conference Room  
On-Site Sewage Facility Workgroup (if needed)

Tuesday, November 7<sup>th</sup>, 2017

2:30pm-3:30pm

GBF Conference Room

Boater Waste Workgroup

**Workgroup Meeting Goals:**

**Thursday, February 23rd, 2017**

- Reviewed I-Plan Management Measures with all workgroups
- Evaluated solutions for select measures that have not been accomplished
- Reviewed bacteria data for Galveston Bay
- Set priorities for 2017 I-Plan activities

**Tuesday, May 17<sup>th</sup>, 2017**

- Review commercial vessel information as it relates to NDZ application
- Review status of pumpout stations around Galveston Bay and potential funding
- Plan and finalize boating season outreach campaign

**Wednesday, May 24th, 2017**

- Public meeting to discuss I-Plan management measures in the project site
- Provide information and resources to community on ways to reduce bacteria concentrations
- Receive feedback from public on implementation strategies

**Tuesday, August 8<sup>th</sup>, 2017**

- Review boating season outreach campaign
- Update on commercial vessel information
- Discuss offseason suggestions for increasing pumpout usage and development around the Bay
- Discuss potential of submitting GBEP or other grant for additional pumpout funds

**Tuesday, August 15<sup>th</sup>, 2017**

- Review WWTF management measures and update workgroup on status of select ones
- Discuss the potential need for additional funding for management measure implementation

**Tuesday, September 12<sup>th</sup>, 2017**

- Review OSSF management measures and update workgroup on status of select ones
- Review potential priority areas for inspection and discuss initiatives regarding septic repairs
- Discuss the potential need for additional funding for management measure implementation

**Tuesday, November 7<sup>th</sup>, 2017**

- Update workgroup on any potential grants submitted
- Determine holiday outreach campaign and marketing goals for 2018
- Review current commercial vessel data and data needs for 2018
- Discuss potential locations for increased pumpout service around the Bay

**Recruited Volunteers:**

Organization	Name
Marina Bay Harbor	Helen Paige
Recreational Boater Representative	Philip Kropf
Lakewood Yacht Club	Lynda Hall
Galveston Bay Estuary Program	Lisa Marshall
City of League City	Scott Tuma
	Susie Blake
Houston-Galveston Area Council	Steven Johnston
	Jean Wright
	Kathy Jahnsen
Texas Commission on Environmental Quality	Linda Broach
	Kim Laird
	Bryan Eastham
Maritime Sanitation	Jennifer Demers
Galveston County Health District	Lori FitzSimmons-Evans
	Ron Schultz
	Marty Entringer
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## Appendix F: Oyster Waters Annual Report (Task 5.4)

**Oyster Waters Annual Report**  
**TCEQ Contract # 581-17-70186**

**FINAL REPORT**  
Submitted: August 31, 2017

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## Background of I-Plan

Six Total Maximum Daily Loads (TMDL) for Bacteria in Waters of the Upper Gulf Coast (Segments 2421OW, 2422OW, 2423OW, 2424OW, 2432OW, 2433OW, 2434OW, 2435OW, 2439OW) were adopted by the Texas Commission on Environmental Quality (TCEQ) on August 20, 2008, and approved by the U.S. Environmental Protection Agency (U.S. EPA) on February 4, 2009. Subsequent amendments to the State of Texas Water Quality Management Plan (WQMP) added newly listed water bodies within the original TMDL watershed, bringing the total number of assessment units (AUs) involved to eleven. Therefore, the Implementation Plan (I-Plan) addresses bacteria impairments for oyster waters use in eleven AUs of nine segments in Galveston Bay:

1. Upper Galveston Bay, Segment 2421OW (AU 2421OW\_01 and 2421OW\_02)
2. Trinity Bay, Segment 2422OW (AU 2422OW\_01)
3. East Bay, Segment 2423OW (AU 2423OW\_01)
4. West Bay, Segment 2424OW (AU 2424OW\_02)
5. Chocolate Bay, Segment 2432OW (AU 2432OW\_01)
6. Bastrop Bay/Oyster Lake, Segment 2433OW (AU 2433OW\_02)
7. Christmas Bay, Segment 2434OW (AU 2434OW\_01)
8. Drum Bay, Segment 2435OW (AU 2435OW\_01 and 2435OW\_02)
9. Lower Galveston Bay Segment 2439OW (AU 2439OW\_01)

With the desired levels of water quality established by the TMDL, the second part of the process is an I-Plan which describes the strategy and activities the watershed partners will carry out to improve water quality in the affected watershed. The TMDL identified potential regulated and unregulated sources of fecal coliform. For instance, seventeen domestic wastewater treatment facilities (WWTFs) discharge directly into or near the project-area segments. Potential unregulated bacteria sources identified in the TMDL include urban stormwater runoff, malfunctioning on-site sewage facilities (OSSFs), and boater waste. The goal of the I-Plan is to reduce bacteria concentrations in Waters of the Upper Gulf Coast to levels that meet the oyster waters use as defined in the Texas Surface Water Quality Standards. The plan documents three categories of stakeholder-developed management measures that will be used to reduce bacteria contributions: Wastewater Treatment Facility (WWTF) management measures, On-Site Sewage Facility (OSSF) management measures, and Boater Waste (BW) management measures

Though the Implementation Plan was approved by the Texas Commission on Environmental Quality in 2015, GBF and partners were unable to secure funding to carry out many of the management measures outlined in the Plan until 2017. Workgroup members agreed, therefore, that 2017 represents Year 1 of this I-Plan. This report outlines work that has been done to accomplish each of the Year 1 management measures, any obstacles that may have been encountered causing delays in implementation of these management measures, and a potential schedule of activities in 2018 towards Year 2 management measures. The plan also identifies potential sources of funding for future I-Plan work to ensure that the implementation of future management measures remain on schedule.

From available TDSHS data, bacteria medians for Galveston Bay regions (East Bay, Trinity Bay, Upper Bay, Lower Bay) range between 2 – 120 colony forming units (CFU) based on fecal coliform measurements from May 2010 – June 2017 (4.34 geomean across all sites during this time-period). From May 2015 – June 2017 the medians for these sample sites range between 2 – 70 CFU (4.51 geomean across all sites during this time-period). It should be noted, however, that it is risky to measure bacteria levels throughout Galveston Bay as a whole because bacteria concentrations can vary significantly between sites within the Bay and this variation tends to get lost in Bay-wide measurements. Individual, site-by-site and year-by-year Galveston Bay bacteria data from TDSHS or GBF can be provided upon request. This represents the most current data we have for TDSHS bacteria measurements at the study sites originally identified in the I-Plan. Please see Table 1 (Appendix A) for a breakdown of recent median fecal coliform measurements for each of the sub-bays within Galveston Bay.

### Overview of Year 1 Activity

The I-Plan workgroups met regularly throughout 2017 to discuss current progress towards implementing each of the Year 1 management measures. An annual meeting of all four active workgroups (Wastewater Treatment Facilities, On-Site Sewage Facilities, Boater Waste and Cease the Grease (formerly Policy and Outreach)) took place on February 23, 2017 (see Appendix C for meeting minutes). This meeting, which was attended by 14 workgroup members and GBF staff, updated the larger stakeholder base and will be held on an annual basis as funding allows. Though the workgroups did not discuss the status of every single Year 1 management measure at this meeting, workgroup chairs and members did agree that, with just a couple of exceptions, the management measures for Year 1 were either already completed or currently in progress and scheduled to be completed by the end of 2017. One point of discussion at the meeting surrounded the Wastewater Treatment Facility (WWTF) management measures 1.3 (Increase Compliance and Enforcement - Implementation Schedule and Tasks). The primary task for Year 1 under this management measure is to “develop and gain U.S. EPA approval for focused investigations at major/mandatory minor facilities”; it was noted, however, that ultimately the members of the WWTF workgroup do not have the final say in whether or not this can ultimately be accomplished. While TCEQ continues to stress to the EPA how it would be beneficial to receive approval for focused investigations at treatment facilities, workgroup members were unsure if this approval would be granted by the EPA. Therefore, workgroup members agreed that the success of this management measure should not rely solely on gaining the EPA’s approval for focused investigations in Year 1. Rather, it should rely on the continued, and ideally progressive, discussions between TCEQ representatives and the EPA. The management measure will not, however, be reworded at this time.

Quarterly Boater Waste (BW) workgroups and Cease the Grease (CtG) workgroups were held throughout 2016 and 2017, though since many of the BW workgroup members attended the February meeting this took the place of the first quarterly meeting for the BW workgroup. Many of the BW workgroup members stressed the need for continued water quality and bacteria sampling at marinas throughout Galveston Bay and Clear Lake to better understand specific locations where pump-out facilities could be beneficial in reducing bacteria levels. Workgroup members also agreed that GBF and partners should continue to evaluate whether a No-Discharge

Zone designation for Galveston Bay would be the appropriate action to take in order to reduce instances of vessel sewage discharge. GBF will continue to discuss a potential NDZ designation with all stakeholder groups that would be impacted by such a designation (recreational boaters, fishers, commercial boaters, industry groups, elected officials) while simultaneously working with state agencies, municipalities, and local marinas to increase the number of pump-out facilities available for local boaters, largely through the distribution of Clean Vessel Act funds. The CtG workgroup members will continue to provide data to GBF on sanitary sewer overflow (SSO) metrics throughout the 2017 calendar year, which will be used in conjunction with other data to evaluate the effectiveness of the Cease the Grease campaign's education and awareness messaging. GBF is also working with CtG workgroup members and partners to install additional drop-off centers for collected fats, cooking oils, and grease (FOG). These centers provide an opportunity for individuals to recycle collected FOG, which is then turned into biodiesel fuel, without having to find a formal recycling center that accepts cooking oil. GBF works with partnering organizations to purchase and install a collection receptacle for FOG, and works with local oil haulers to regularly transport the collected FOG from the receptacles to biodiesel recycling centers throughout the Houston area. GBF is also working with media partners including Houston Public Media, Pandora, and Houston Press to distribute CtG campaign messaging to the six million residents living within the Houston-Galveston area.

Members of the OSSF and WWTF workgroups agreed that meetings need not be held quarterly, but rather semi-annually or as needed. The OSSF workgroup stressed that while members of H-GAC, GCHD, and TAMU Agrilife Extension Service continue to identify and map failing septic systems throughout the four-county region, these groups typically can only dedicate a small number of staff and funding to these projects. Therefore, without a dedicated funding source specifically focused on mapping and repairing failing septic systems, progress towards Year 1 management measures may be slow. GBF is currently working with GCHD and OSSF workgroup members to pursue funding in the hopes of resolving this issue. TAMU Agrilife Extension service continues to hold workshops on proper OSSF maintenance and repair for homeowners, and local researchers at Texas A&M University and Texas Water Resources Institute continue to study comparative treatment methods, ideal soil conditions, and bacteria discharge levels regarding septic systems in the Houston-Galveston area. The WWTF workgroup members identified that in addition to continuing discussions with the EPA on focused investigations, members and partners should continue to maintain, update, and disseminate training and guidance information for Wastewater Operators. GBF, TCEQ, and other I-Plan partners will continue to host this information on their respective websites, though at this time a more targeted outreach campaign for Wastewater Operators was deemed unnecessary by the workgroup.

GBF also hosted a public meeting on June 12, 2017 to discuss the background, current status, and future directions of the I-Plan with members of the local communities. The meeting was held at the League City Civic Center, and was free to attend for all interested individuals. In addition to the I-Plan workgroup meetings, partners and GBF staff regularly attended meetings of the Houston-Galveston Area Council's Bacteria Implementation Group, the Galveston Bay Estuary Program's Water and Sediment Quality subcommittee, and the Texas Coastal Watershed

Program's Galveston Bay Coalition of Watersheds initiative. A full list of these meetings, as well as the members of GBF's staff that attended, can be provided upon request.

### Overview of Progress Towards Year 1 Management Measures

#### 1.1. Wastewater Treatment Facilities Measure: Guidance and Training

- **Distribute and maintain guidance document:** TCEQ staff developed a regulatory guidance document entitled "Troubleshooting Bacteria Levels at Wastewater Treatment Plants (Revised March 2015)" to assist wastewater treatment operators with changes to organic loading levels at newer facilities due to the increased usage of water saving devices. The document was distributed to Wastewater Operators via the TCEQ website upon completion.
- **Develop WWTF resources webpage on the GBF website:** GBF has maintained the Bacteria Reduction Plan's page on the organizations website at the following address: <http://www.galvbay.org/how-we-protect-the-bay/taking-action/bacteria-implementation-plan/>. This page was updated in early 2017 to feature new "Additional Resources" and "Take Action" tabs that include, among other resources, links to information for wastewater operator licensing applicants and to TCEQ pages training courses and occupational licensing. The page has received 172 page views since Jan 17, and 1,624 page views since Jan 1, 2015.
- **Promote the EnviroMentors Program:** In 2016 and 2017, there were no participants in the Enviromentors Program. However, TCEQ maintains the Enviromentors Program page on its website and continues to promote it in various presentations and outreach opportunities throughout the Houston-Galveston area.
- **Offer two training sessions:** In the 2017 calendar year, as of June 8, Texas A&M Engineering Extension Service (TEEX) held 38 wastewater-related classes in and around the Houston area with a total attendance of 555 participants.

#### 1.2. Wastewater Treatment Facilities Measure: Pre-Permit Renewal Sampling

- **Draft and send letters to permittees before permit renewal and to association meetings:** TCEQ continues to work with permittees to ensure all staff and operators are aware of and fully trained in sampling procedures, especially in instances where procedures and limits may have changed prior to the renewal process.
- **Advise operators on new sampling requirements:** TCEQ staff and other I-Plan partners continue to work with WWTF operators to ensure that they have adequate training and knowledge regarding any changes to sampling requirements.

#### 1.3. Wastewater Treatment Facilities Measure: Increase Compliance and Enforcement

- **Develop and gain U.S. EPA approval for focused investigations at major/mandatory minor facilities:** As mentioned earlier in the report, TCEQ staff are in discussions with EPA personnel to hopefully receive approval to carry out focused inspections. However, the ultimate approval can only be granted by the EPA, and therefore the I-Plan members do not have the final say on whether or not this management measure is considered "implemented" as written.

#### 1.4A. Sanitary Sewer Systems Measure: Decrease Sanitary Sewer Overflows



- **Present information on participating in SSOIs at owner and operator association meetings:** Members of the I-Plan workgroups continue to promote the SSOI to wastewater operators and other pertinent stakeholders within the Houston-Galveston area as appropriate. In 2015, one organization in the Houston area participated in the SSOI.
- **Coordinate with adjacent watersheds to organize additional utility management workshops:** Between the workshops and programs offered by TEEX, TAMU Agrilife Extension, and TCEQ, the workgroup did not believe any additional utility management workshops were needed at this time. The workgroup will, however, continue to promote and assist these workshops as needed.
- **Develop an outreach campaign to promote SSOIs and post materials on GBF website:** While GBF maintains the Bacteria Reduction Plan page on its website, which includes various resources and information for wastewater operators and public works employees, it was determined that GBF's website is not the most effective platform for promoting the SSOI because GBF's primary audience does not typically include wastewater operators. However, information on the SSOI is currently available on the TCEQ website as well as on the H-GAC website.

1.4B. Sanitary Sewer Systems Measure: Address Fats, Roots, Oils, and Grease

- **Contact local governments, identify inspection and enforcement tools used, offer supporting information:** GBF and members of the I-Plan workgroups are currently coordinating with the City of Nassau Bay, the City of Friendswood, the City of League City, the City of Houston, the City of Galveston, and the City of La Porte, among others, to track sanitary sewer overflows due to FOG blockages each year. GBF also provides outreach material to local municipalities aimed at reducing FOG-related SSOs via the Cease the Grease campaign.
- **Develop FOG education campaign and post materials on the GBF website:** GBF created a regional Cease the Grease initiative with funding from the Coastal Management Program and the Galveston Bay Estuary Program. This initiative is focused on increasing awareness among Houston-Galveston area residents on the harms of pouring cooking oils, fats, and greases down the drain. GBF maintains the campaigns website at [www.ceasethegrease.net](http://www.ceasethegrease.net). The website received 1,147 views in 2017, and 4,307 website views since Jan 1, 2015. More than 15,000 informational handouts, plastic funnels, and plastic scrapers have been distributed since the start of the campaign in 2014 (Appendix B).

1.4C. Sanitary Sewer Systems Measure: Address Lateral Line Maintenance

- **Develop and/or compile existing education materials and post on the GBF website:** GBF continues to maintain the Bacteria Reduction Plan on its website, and includes on this page links to training opportunities for wastewater operators and informational resources on SSOs (Appendix B). Please see the description for management measure 1.4A regarding the SSOI program's absence from the GBF website. The page has received 172 views since Jan 17, and 1,624 page views since Jan 1, 2015.

2.1. On-Site Sewage Facilities Measure: Create Regional Plan to Identify, Prioritize, and Address Failing OSSFs

- **Prioritize areas to focus inspections:** Aside from responding to complaints regarding malfunctioning or broken OSSFs in the region, members of this workgroup have not developed a formal inspection plan to prioritize OSSF inspections. This is largely due to a lack of adequate resources in many of the agencies responsible for this work. The workgroup is, however, coordinating with H-GAC's efforts to map out regional OSSFs on a publicly-available database (Appendix A). Members also assist as necessary with local Watershed Protection Plan (WPP) efforts to address bacteria originating from OSSFs.
- **Hold workshops for OSSF homeowners, real estate agents, property inspectors and consumers:** Texas A&M Agrilife Extension continues to offer regular workshops and training opportunities for OSSF homeowners and property inspectors in the Houston-Galveston area. In 2016, 58 participants took part in these workshops through Agrilife Extension, and as of June 1, 17 participants took part in 2017 workshops.
- **Identify low income candidates and potential funding:** Funding sources for the management measure continue to be investigated, with TCEQ 319 Nonpoint Source grants being one of the primary potential sources. Currently, though, no funding for this management measure has been secured.
- **Identify research partners and potential funding:** Funding sources for this potential research continues to be evaluated, and projects evaluating OSSFs and bacteria concentrations are currently ongoing at Texas A&M University.

3.1. Boater Waste Measure: Designate Galveston Bay a federal NDZ, Increase Number of Pump-Out Stations, Raise Level of Enforcement, and Enhance Education and Outreach

- **Promote federal NDZ establishment and adding pump-out stations through education and outreach:** GBF and workgroup members continue to actively participate in the Pump Don't Dump campaign and the Dockwalker program. The Pump Don't Dump campaign is focused on educating boaters on the impacts of treated and untreated waste discharges into Galveston Bay and Clear Lake, and promotes the usage of the 25 stationary or mobile pump-out services available for boaters in the Galveston Bay area. The Dockwalker program seeks to inform boaters on the legal aspect of vessel discharge in the Bay and to collect information on waste management practices from marinas and boaters. Over 120,000 informational handouts, koozies, keychains, or other materials have been distributed since 2014 (Appendix B). Over 640,000 individuals received campaign messaging either through print, digital, or face-to-face communication.
- **Hold discussions with marina owners and various jurisdictions:** GBF and workgroup members continue to engage in discussions with marina managers, leaders in the boating community, and municipalities regarding the development of additional pump-out stations, best management practices for water quality, and pollution reporting strategies to help keep our waters free of boater waste. In 2016, GBF held conversations with 21 marina managers, government officials, regulatory agencies, and leaders in the seafood, boating, and commercial fishing communities. Of these individuals, 18 were supportive of an NDZ designation and three remained unsure, wanting to discuss with their stakeholder groups and collect additional information.

- **Hold workshops to train marine officers on enforcement:** GBF and workgroup members continue to discuss enforcement strategies with various state and federal agencies to encourage consistent enforcement of boater waste issues in Clear Lake and Galveston Bay. In prior years, formal meetings and workshops were held with representatives from Texas Parks and Wildlife, TCEQ, and the U.S. Coast Guard, though these workshops have since ended. GBF and workgroup members will continue to identify potential opportunities to increase the consistency of boater waste enforcement within Galveston Bay and Clear Lake.
- **Begin federal NDZ application process:** GBF and workgroup members continue to evaluate the possibility of submitting a petition to designate Galveston Bay a federal No Discharge Zone (NDZ). A draft application has been created, and GBF developed a white paper for internal use on NDZs to better understand what this designation would mean for Galveston Bay and how other cities and states have successfully implemented NDZs in their region. One large question that remains is if commercial groups and industry stakeholders would support an NDZ designation. Because of the large commercial presence in Galveston Bay, GBF and workgroup members agreed that it is best to collect more information on waste management practices for tugboats, barges, and other large commercial vessels that frequent the Bay prior to submitting any formal application. It is essential that we receive the support of the commercial shipping industry if we want an NDZ designation to be successful, and therefore a greater focus on building these relationships is necessary in the coming years.

#### Obstacles of Year 1 Management Measures

The two primary obstacles facing the successful implementation of the I-Plan management measures are the lack of resources and funding to investigate and address failing septic systems and the hurdles associated with implementing a state-level policy change like the NDZ designation in Texas. While there is certainly funding available through various community, state, and federal grants to repair failing septic systems in low-income communities, the cost of identifying and repairing or replacing a single system can be a few hundred thousand dollars. Therefore, the typical grants that organizations like GBF apply for would not go very far in addressing the many failing systems in the Houston-Galveston area. Additionally, with the limited resources that GCHD has to tackle this issue, applying for grants, managing the grants, handling the reporting requirements, and carrying out the repairs and replacements is a tall order. Therefore, it may be most beneficial to partner with other agencies like H-GAC and TAMU Agrilife Extension that are pursuing this work in other areas of the state in order to share resources and potentially funding.

Pursuing an NDZ designation is likely to be a multi-year process, even with the draft application that GBF currently has. While we are able to collect data on recreational boaters within Galveston Bay fairly easily, collecting similar data on commercial vessels is quite complicated. In addition to basic traffic data for ships entering and exiting the Bay, an application would need to address how these commercial vessels manage their waste (whether they use a holding tank or a treatment and discharge device) as well as what pump-out options are available for commercial vessels. GBF and partners are currently working on strengthening

and expanding our relationship with the commercial boating and shipping industries to better understand how a potential NDZ designation would impact this enormous sector of the Houston-Galveston area economy. While Galveston Bay currently has enough pump-out options to satisfy the EPA's minimum required number of pump-outs based on the most recent boating statistics, it would strengthen the application significantly if three or four more could be established at marinas on the east end of Galveston Bay. Finally, GBF and partners would most likely need to launch an informational campaign focused specifically on alleviating any concerns boaters may have about an NDZ designation. Currently, the workgroup is taking a slow and steady approach to this designation to ensure that, if and when a formal petition is submitted, it is a thorough, well-researched and well-supported petition that does not take anyone by surprise.

### Lessons Learned and Future Directions

In Years 2 and 3, GBF and I-Plan workgroup members will continue to implement management measures from Year 1 as needed and begin to implement management measures for the following years as well. The majority of these management measures continue the efforts that have begun in Year 1, though some represent new actions aimed at reducing boater waste and bacteria from septic systems throughout the study site. Specifically, GBF and its partners will work with local marinas and municipalities to install at least one new pump-out for recreational vessels each year beginning in 2018. It's unlikely that GBF will submit a formal petition for the designation of Galveston Bay as a federal No Discharge Zone in the next year or two, but GBF and its partners will certainly work towards laying the groundwork for potentially submitting a petition in the future. Specifically, GBF will continue to meet with members of the shipping and commercial fishing industry to discuss the potential impacts of an NDZ and ideally gather their support for such an effort.

GBF will also work with its partners to identify potential funding opportunities to continue work on this I-Plan for 2018 and beyond. Though the current funding climate for environmental work is uncertain, GBF has received consistent funding from agencies like the Texas General Land Office, the Galveston Bay Estuary Program, and the Environmental Protection Agency in years past and we believe that these may be viable options for future I-Plan funding. Finally, GBF will continue to work towards maintaining and growing partner engagement and workgroup involvement over the coming years. With a project as vast in scope as the I-Plan, and with so many different partners involved, it can be difficult to retain workgroup engagement from year to year. Therefore, GBF will work to strengthen communication between workgroup members through individual interactions outside of scheduled meetings to better understand each workgroup members' interests in the I-Plan and to foster open communication. Each workgroup will meet according to the ideal schedule set forth by workgroup members, so that individuals do not feel like meetings are becoming burdensome or redundant. GBF will also work to create opportunities for members of each workgroup to share their insights about I-Plan campaigns to better incorporate partner feedback into bacteria reduction efforts throughout the Galveston Bay area.

## Appendix A

Maps and tables of bacteria sampling, water quality data, and bacteria sources in Galveston Bay

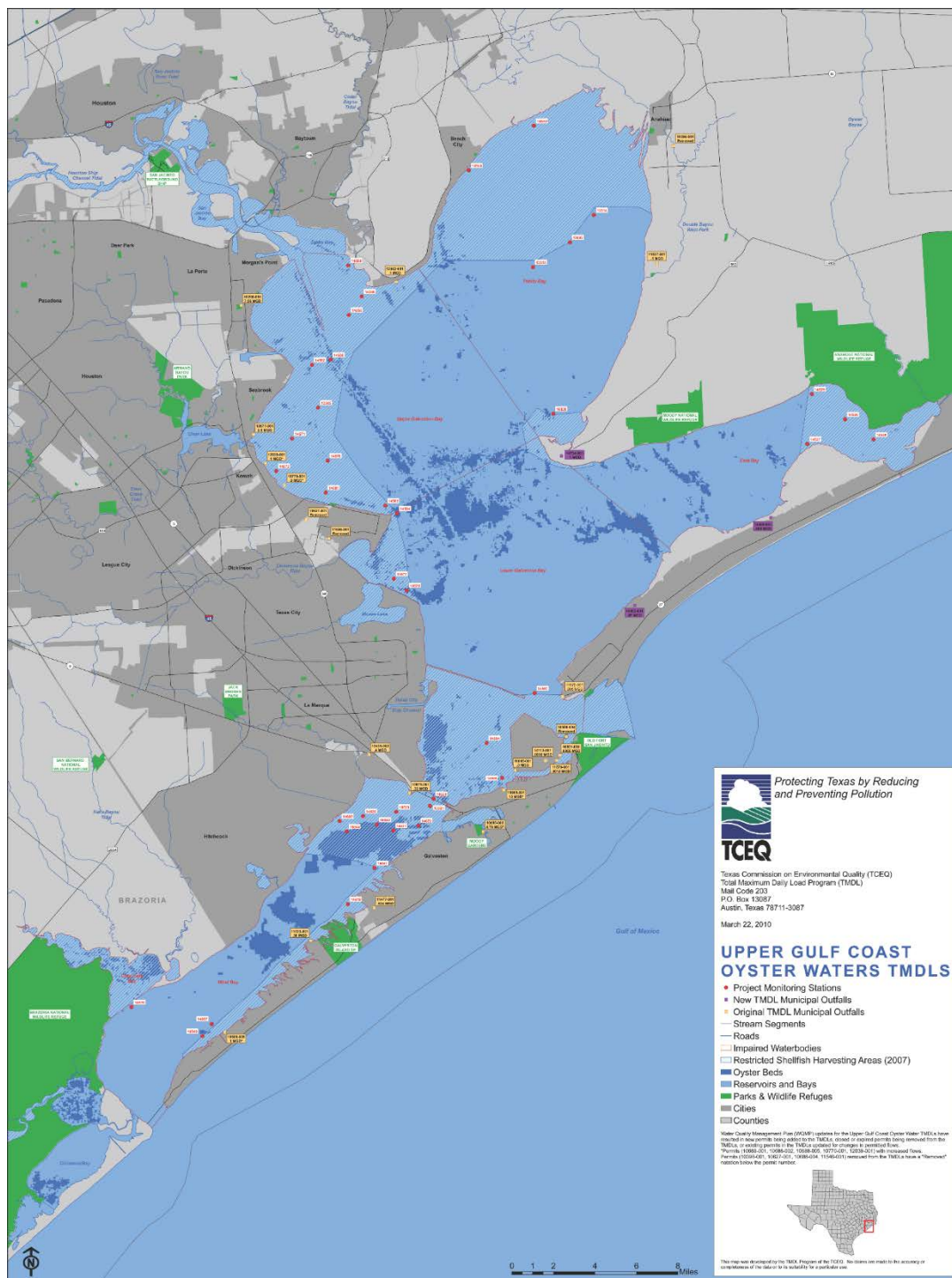


Figure 10. Map of I-Plan coverage and TMDL original municipal outflows



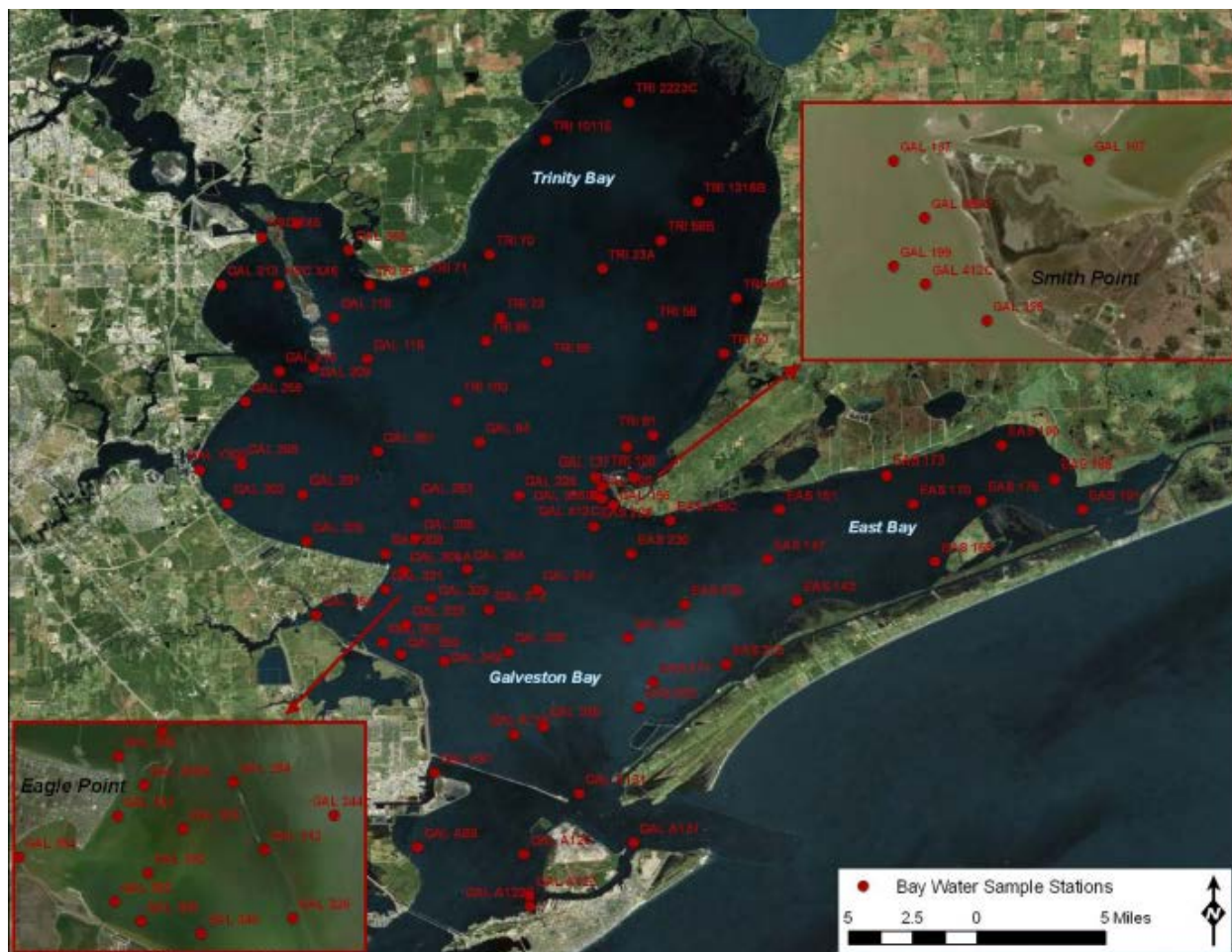


Figure 11. Map of TDSHS monitoring sites in Galveston Bay



Figure 12. Map of TDSHS monitoring sites in Christmas Bay





Figure 13. Map of TDSHS monitoring sites in West Bay

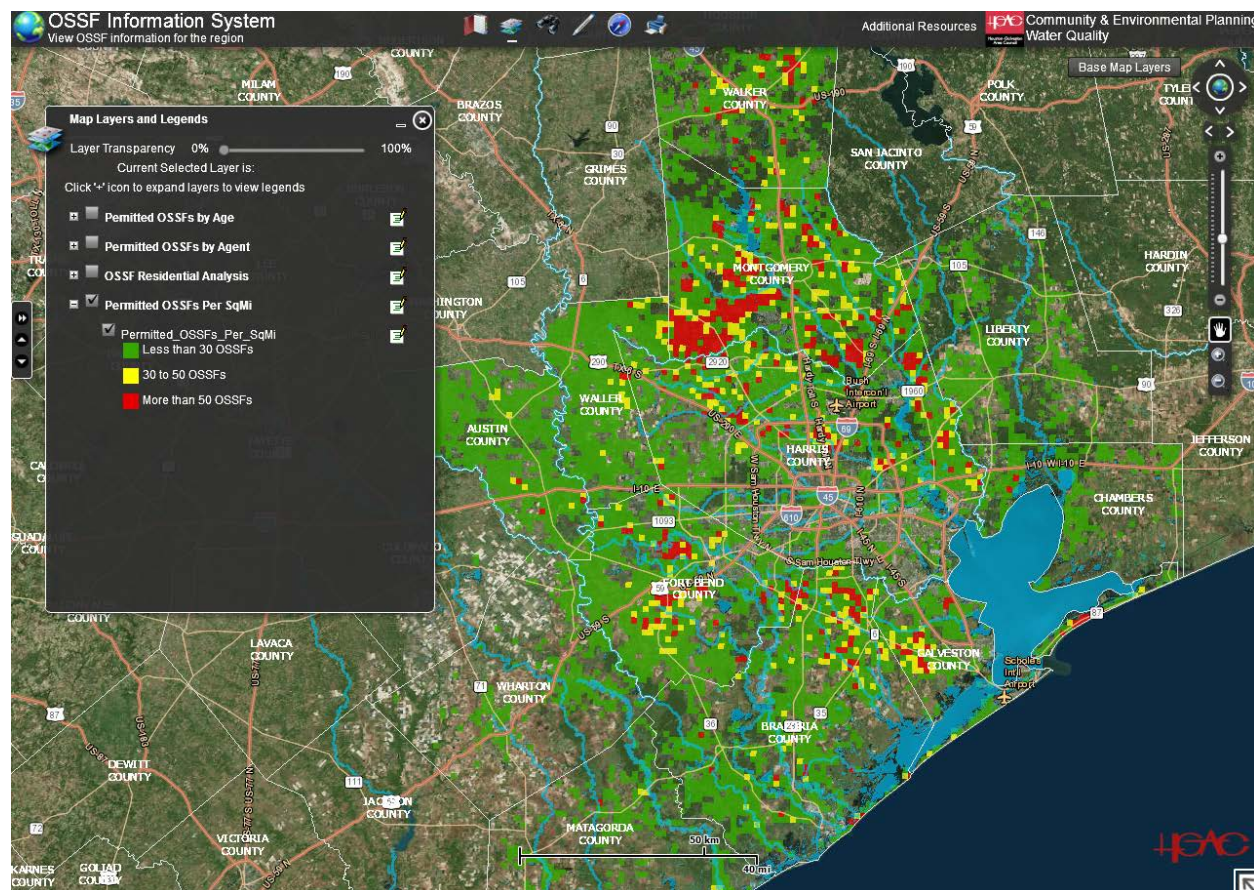


Figure 14. H-GAC septic system mapping tool





Figure 15. Map of GBF Monitoring sites in West Bay and Lower Bay. Green dots indicate bacteria levels below the primary contact recreation threshold, labels indicate annual average geometric means for 2016, numbers in parentheses indicate sample size

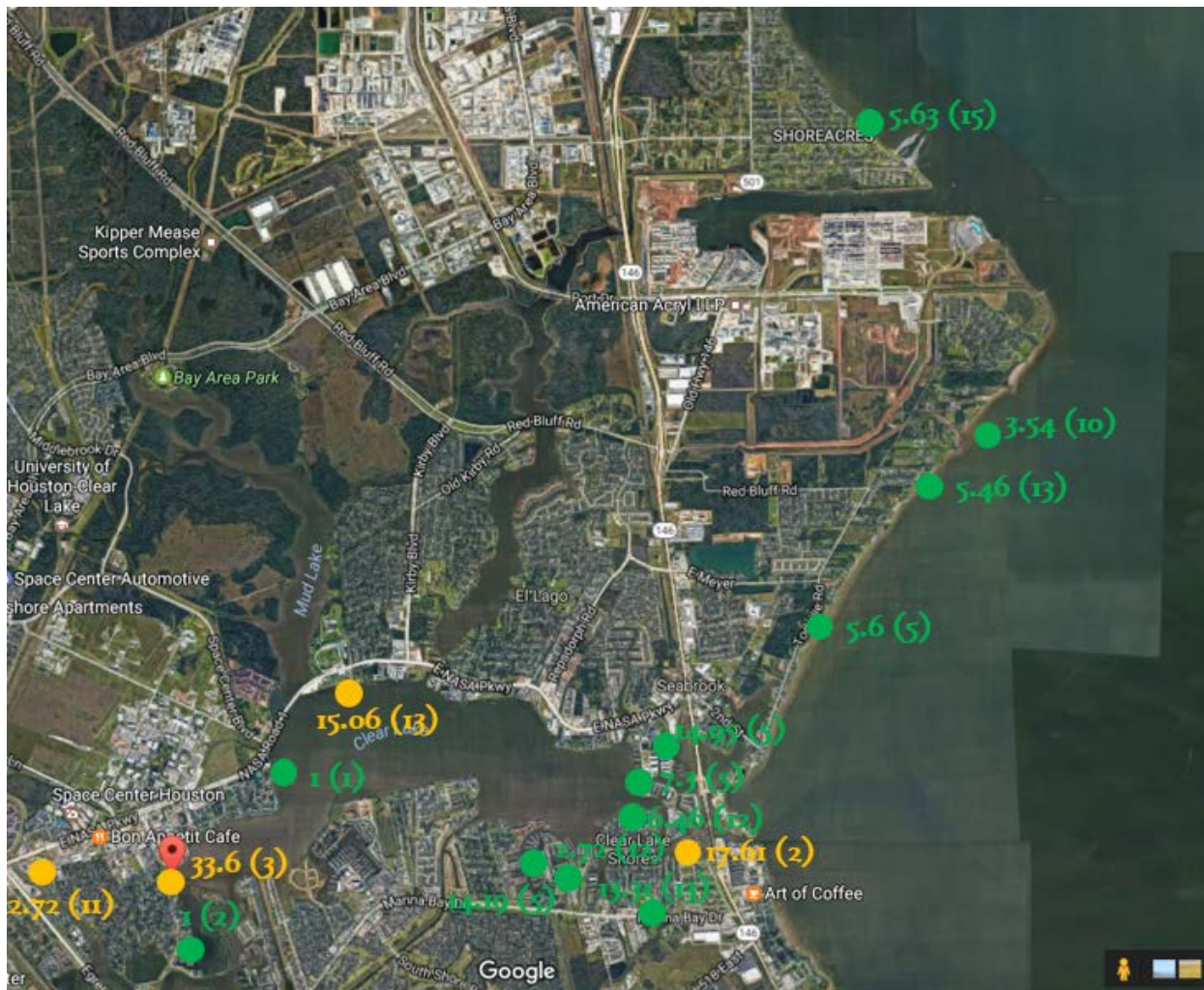


Figure 16. Map of GBF Monitoring sites in Galveston Bay and Clear Lake. Green dots indicate bacteria levels below the primary contact recreation threshold, yellow dots indicate bacteria levels close (but still below) threshold, labels indicate annual average geometric means for 2016, numbers in parentheses indicate sample size

*Table 4. TDSHS fecal coliform data within study site (see Figures 2-4 for map of sample points), collected from 2015 - 2017. Geomean, median, and 90<sup>th</sup> percentiles are calculated from multiple data points at each site from the beginning of 2015 to June 2017. Individual readings at each site throughout this time period can be provided upon request*

BAY_DESC	STATION	HOUR	TIDE	DEPTH	CLASS	GEOMEAN	MEDIAN	90th PERCENTILE
East Galveston Bay	00143	1124	O	2	AP	2	2	2
East Galveston Bay	00147	1127	O	2	AP	2	2	2
East Galveston Bay	00239	1115	O	2	AP	2.256128213	2	5.2
East Galveston Bay	00275	1119	O	2	AP	2.272927333	2	5.3
East Galveston Bay	00151	1148	O	2	AP	2.333058079	2	8
East Galveston Bay	00173	1143	O	2	AP	2.540961947	2	8
East Galveston Bay	00277	1104	I	2	AP	2.710871576	2	10
East Galveston Bay	0138C	1153	O	2	AP	2.789173438	2	13.1
East Galveston Bay	00320	1102	I	2	AP	3.016809888	2	9.5
East Galveston Bay	00168	1135	O	2	AP	3.04009752	2	15
East Galveston Bay	00230	1220	I	2	AP	3.109705124	2	12
East Galveston Bay	00175	1306	O	2	RS	4.120120739	2	184
East Galveston Bay	00170	1138	O	2	AP	4.202669447	2	64.7
East Galveston Bay	00228	1223	I	2	AP	4.439829461	2	56
East Galveston Bay	00188	1153	I	2	RS	5.357693691	2	325
East Galveston Bay	00190	1156	I	2	RS	5.79679218	2	525
East Galveston Bay	00191	1151	I	2	RS	7.281049073	2	515
Freeport Area Bays	0010A	1142	I	2	AP	4.802819875	2	82.1
Freeport Area Bays	00011	1200	I	2	RS	11.87993875	10.5	182
Freeport Area Bays	00012	1212	I	2	AP	7.363945033	5	158.6
Freeport Area Bays	00014	1132	I	2	RS	4.872445736	2	72.7
Freeport Area Bays	00015	1128	I	2	RS	8.026468737	6	330
Freeport Area Bays	00016	1107	I	2	RS	58.28265574	25	1600
Freeport Area Bays	00024	1208	I	2	RS	9.856985237	14	46.9
Freeport Area Bays	00025	1210	I	2	RS	11.69805737	12	67.3
Freeport Area Bays	00026	1204	I	2	RS	9.661469265	12.5	106.3
Freeport Area Bays	00013	1137	I	2	AP	2.82886836	2	15.4
Freeport Area Bays	00018	1117	I	2	RS	15.68428309	15	239

Galveston Bay	00198	1310	I	2	AP	2	2	n/a
Galveston Bay	00199	1313	I	2	AP	2	2	n/a
Galveston Bay	00226	1322	I	2	AP	2	2	n/a
Galveston Bay	00244	1048	I	2	AP	2	2	n/a
Galveston Bay	00280	1152	I	2	AP	2	2	n/a
Galveston Bay	00312	1151	I	2	CA	2	2	n/a
Galveston Bay	00326	1146	I	2	CA	2	2	n/a
Galveston Bay	00329	1120	I	2	CA	2	2	n/a
Galveston Bay	00345	1057	I	2	AP	2	2	2
Galveston Bay	00349	1142	I	2	CA	2	2	2
Galveston Bay	00A89	1140	I	2	RS	2.173733808	2	4.4
Galveston Bay	0308A	1113	I	2	CA	2.158696876	2	4.1
Galveston Bay	0A114	1100	I	2	AP	2.146054592	2	3.8
Galveston Bay	0A120	1144	I	2	RS	2.135277294	2	3.5
Galveston Bay	0A131	1105	I	2	AP	2.125980759	2	3.2
Galveston Bay	0A137	1200	I	2	RS	2.117879498	2	2.9
Galveston Bay	412C	1312	I	2	AP	2.110756967	2	2.6
Galveston Bay	00284	1156	I	2	CA	2.10444594	2	2.3
Galveston Bay	00263	1206	I	2	CA	2.098815228	2	2
Galveston Bay	00286	1201	I	2	CA	2.09376047	2	2
Galveston Bay	00332	1124	I	2	CA	2.089197608	2	2
Galveston Bay	00A91	1030	O	2	RS	2.09376047	2	2
Galveston Bay	00084	945	I	2	AP	2.081285867	2	2
Galveston Bay	00305	1103	I	2	RS	2.077833909	2	2
Galveston Bay	00331	1116	I	2	RS	2.074663164	2	2
Galveston Bay	00350	1137	I	2	RS	2.071740617	2	2
Galveston Bay	00352	1134	I	2	RS	2.069038226	2	2
Galveston Bay	0386D	1314	I	2	AP	2.06653202	2	2
Galveston Bay	00137	1317	I	2	RS	2.064201384	2	2
Galveston Bay	00251	1211	I	2	CA	2.062028496	2	2
Galveston Bay	00291	1058	I	2	RS	2.144950885	2	2
Galveston Bay	00209	1216	I	2	RS	2.155326318	2	2
Galveston Bay	00308	1110	I	2	RS	2.13587432	2	2
Galveston Bay	0A122	1149	I	2	RS	2.333493933	2	5.5

Galveston Bay	A122C	1151	I	2	RS	2.333493933	2	5.5
Galveston Bay	00213	1225	I	2	RS	2.421318243	2	7.4
Galveston Bay	00216	1230	I	2	RS	2.434011634	2	7
Galveston Bay	00302	1053	I	2	RS	2.403365917	2	6.6
Galveston Bay	00116	1112	I	2	CA	2.750424913	2	11.6
Galveston Bay	00256	1236	I	2	RS	2.358308306	2	7
Galveston Bay	00361	1123	I	2	RS	2	2	n/a
Galveston Bay	00354	1130	I	2	RS	2.448557209	2	6.4
Galveston Bay	00296	1049	I	2	RS	2.795956915	2	15.2
Galveston Bay	0Y300	1046	I	2	RS	7.273796245	9.5	n/a
Galveston Bay	00362	1120	I	2	RS	7.198327137	2	659.8
Houston Ship Channel	00X46	1116	I	2	RS	23.58577494	33	306
Houston Ship Channel	00X45	1218	I	2	RS	63.52748231	33	350
Trinity Bay	00081	1137	O	2	CA	4.274432968	2	20.2
Trinity Bay	00108	1135	O	2	CA	4.580164533	2	106.2
Trinity Bay	00088	1120	O	2	CA	6.209446765	5	97.4
Trinity Bay	00065	1129	O	2	CA	6.592003398	8	57.4
Trinity Bay	00073	1124	O	2	CA	7.480828879	5	118
Trinity Bay	00100	1115	O	2	CA	8.684027831	5	242
Trinity Bay	00058	1155	O	2	CA	8.703457	5	159.4
Trinity Bay	00061	1013	I	2	CA	8.803316823	10	n/a
Trinity Bay	0023A	1108	I	2	CA	10.09383174	10.5	120
Trinity Bay	00060	1012	I	2	CA	14.2888345	13	682
Trinity Bay	00071	1240	O	2	RS	14.71263989	14	170
Trinity Bay	0058B	1205	O	2	CA	15.63257852	17	294
Trinity Bay	0058F	1150	O	2	CA	16.53623233	13	682
Trinity Bay	00070	1236	O	2	CA	17.03078516	13	256
Trinity Bay	1011E	1228	O	2	RS	18.00983933	17	162
Trinity Bay	1316B	1209	O	2	CA	23.45502658	23	360
Trinity Bay	00095	1244	O	2	RS	40.61366891	23	692
Trinity Bay	2223C	1220	O	2	RS	45.87723041	70	512
West Galveston Bay	00025	1119	I	2	AP	4.947722084	2	87.8
West Galveston Bay	00038	1112	I	2	AP	3.362096761	2	61

West Galveston Bay	00070	1039	I	2	RS	7.950713798	5	94.3
West Galveston Bay	000A8	1124	I	2	RS	10.46335674	8	540
West Galveston Bay	0083A	1200	I	2	RS	16.2884667	33	118
West Galveston Bay	00A19	1127	I	2	RS	13.47847946	9.5	350
West Galveston Bay	00A23	1130	I	2	RS	13.16303459	13	94.3
West Galveston Bay	00A61	1151	I	2	RS	7.804792962	8	109.2
West Galveston Bay	00A73	1156	I	2	RS	18.83066744	27	146
West Galveston Bay	00A79	1033	I	2	RS	9.272630551	5	196
West Galveston Bay	00A86	1021	I	2	RS	10.41220915	12.5	49
West Galveston Bay	071IC	1154	I	2	RS	13.76069278	11	159.4
West Galveston Bay	0A105	1028	I	2	RS	7.93294654	7.5	49
West Galveston Bay	00036	1114	I	2	AP	2.967907193	2	29.3
West Galveston Bay	00077	1044	I	2	AP	3.551503881	2	18.8
West Galveston Bay	00A46	1110	I	2	AP	3.26525768	2	23.8
West Galveston Bay	00A47	1106	I	2	AP	2.523445867	2	13.4
West Galveston Bay	00A49	1101	I	2	AP	2.211646034	2	4.4
West Galveston Bay	00A58	1058	I	2	AP	2.981385007	2	33
West Galveston Bay	00A59	1056	I	2	AP	2.457677203	2	9.2
West Galveston Bay	00A67	1051	I	2	AP	2.711136945	2	9.5
West Galveston Bay	00A69	1048	I	2	AP	3.370110689	2	13
West Galveston Bay	0079W	1035	I	2	RS	9.742528618	8	160.3



## Appendix B

Images of outreach materials, websites, and engagement tools

TAKING ACTION

Bacteria Reduction Plan »

Seafood Consumption Advisories »

Wetland Permit Review »


Water Conservation for the Bay »

Advertencia sobre el Consumo de Mariscos »

San Jacinto River Waste Pits – Technical Assistance Webpage »

Galveston Bay Report Card »

ABOUT GBF



The Galveston Bay Foundation (GBF) is a 501(c)(3) non-profit organization established in 1987 under the laws of the State of Texas. The Foundation's strength is that it involves a true cross-section of Bay interests to address issues and concerns ... [Read More >>](#)

RECENT POSTS

Houston Public Media: Environmental Group Outlines Cleanup Plan For Galveston Bay »

Houston Chronicle: Galveston Bay Foundation plans new headquarters in Kemah »

Coastal Angler Magazine: Ladies Casting For Conservation »

Houston Chronicle: Galveston Bay Foundation asks the public to name dolphins; help fund research »

## Bacteria Reduction Plan

Bacteria concentrations are elevated in several parts of Galveston Bay due to contamination from human and animal waste. These areas are closed for shellfish harvesting for direct marketing because it is unsafe to eat them. The bay historically accounted for 90% of oysters commercially harvested in the state of Texas, but drought, hurricanes, and bacteria impairments have reduced that to about 30%. In addition, human and animal waste introduces nutrients into the bay that can lead to algal blooms and subsequent fish kills, and localized bacteria hot spots can make conditions temporarily unsafe for swimming.



In order to address bacteria impairments, GBF worked with local, regional, and state-level stakeholders and the Texas Commission on Environmental Quality (TCEQ) to help them develop the Upper Gulf Coast Oyster Waters TMDL Implementation Plan. This community-based plan, which is more simply called the Galveston Bay Bacteria Reduction Plan, lays out the major sources of concern and recommended management measures for reducing bacteria levels to standards that are safe for oyster consumption. The primary sources addressed in the plan include:

- Wastewater treatment facilities
- Sanitary sewer overflows
- Malfunctioning septic systems
- Boat sewage
- Stormwater runoff

### View the Plan

[Full Plan \(PDF\)- APPROVED](#)  
[Plan Summary \(PDF\)](#)

Figure 17. Screenshot of GBF Bacteria Reduction Plan webpage

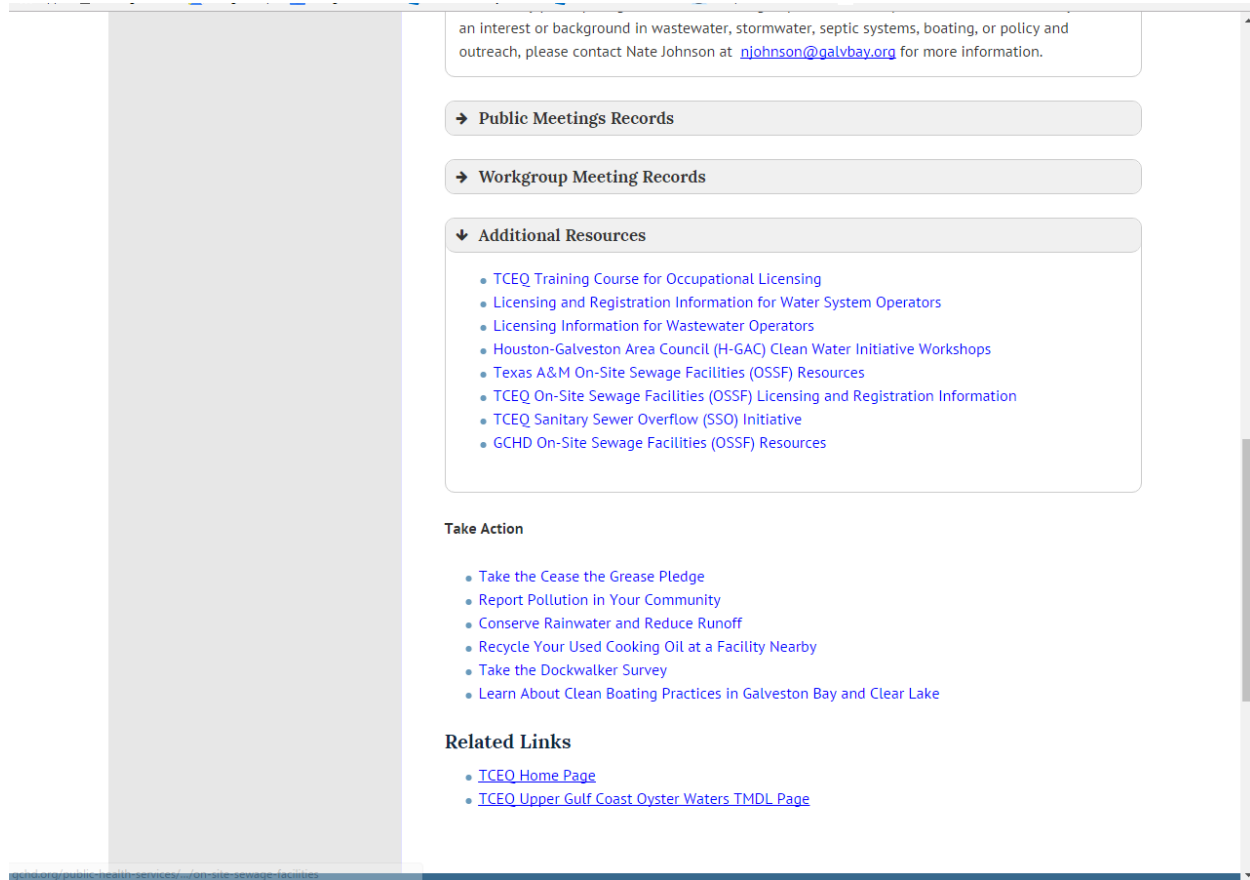


Figure 18. Screenshot of GBF Bacteria Reduction Plan webpage, featuring additional resources and links to partner sites

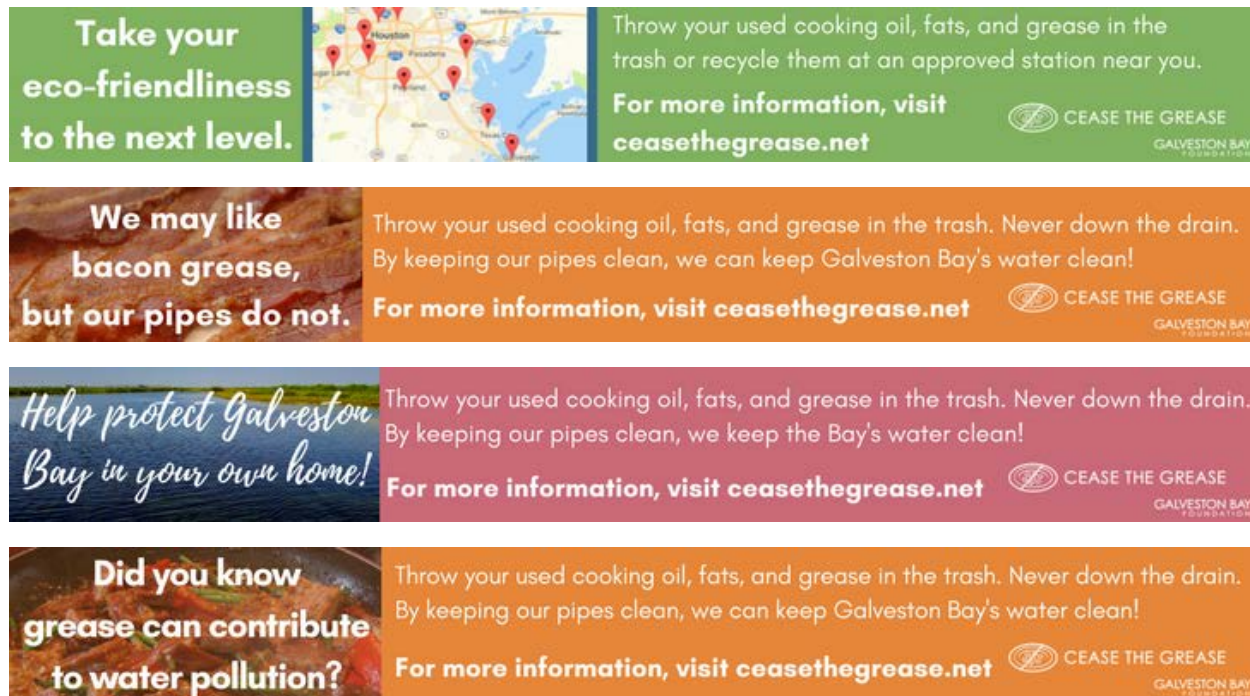


Figure 19. GBF's Cease the Grease mass media advertisements with the Houston Press



Figure 20. Images of GBF's Cease the Grease funnels and scrapers, provided free of charge at many GBF outreach efforts

## You can help protect Galveston Bay in your own home!



Properly dispose of your used cooking oils, fats, and grease.

1. Remove oil and grease from dishes and pans
2. Pour into a collection container
3. Seal the container and store it in the freezer
4. Once full, recycle oil at an approved station or throw it in the garbage



For more information,  
visit [ceasethegrease.net](http://ceasethegrease.net)

 CEASE THE GREASE  
GALVESTON BAY  
FOUNDATION

Figure 21. One of GBF's Cease the Grease social media graphics





Figure 22. Map of cooking oil recycling stations within the Houston-Galveston area, as seen on GBF's Cease the Grease website



Figure 23. Images of GBF's Pump Don't Dump outreach items and giveaways



Figure 24. Two of GBF's Pump Don't Dump social media graphics

## Appendix C

Meeting minutes from 2017 I-Plan Annual Stakeholder Meeting

Implementation Plan Annual Stakeholders Meeting

Thursday, February 23<sup>rd</sup>, 2017 2:30 PM – 3:45 PM

Freeman-Branch Public Library in Clear Lake

**Meeting Minutes**

**In Attendance:** Ray Mayo (City of La Porte), Susie Blake (City of League City), Linda Broach (TCEQ), Lori FitzSimmons-Evans (GCHD), Martin Entringer (GCHD), Jean Wright (H-GAC), Lisa Marshall (GBEP), Steven Johnston (H-GAC), Kaitlin Grable (GBF), Sarah Gossett (GBF), Bryan Eastham (TCEQ), Leonard Levine (GCWDA), Helen Paige (Marina Bay Harbor), Nate Johnson (GBF)

**I. Welcome, introductions – 2:30 – 2:35 PM**

- a. GBF displayed updated maps of the TDSHS oyster consumption bacteria data from 2010 – 2016, just 2015 – 2016, and GBF’s citizen science bacteria data for 2016 to provide a reference for how bacteria concentrations have changed over the last couple of years. While the TDSHS data show that bacteria concentrations have largely increased in 2015 – 2016 compared to the 2010 – 2016 data, the sample sizes for the 2015 – 2016 data are relatively small and rainfall during these years was relatively high. Additionally, GBF’s monitoring data from 2016 showed that all sites were below the enterococci limit for primary contact recreation.

**II. Update on Management Measures – 2:35 – 3:30 PM**

**a. Waste Water Treatment Facility Workgroup**

- i. **Measure 1.1: Guidance and Training** - Distribute and maintain guidance document
  1. Workgroup expressed uncertainty as to what this specific document (Troubleshooting Bacteria Effluent from Wastewater Treatment Plants RG-515) refers to. GBF will follow up with TCEQ to determine if this document is part of a Texas A&M Engineering and Extension (TEEX) guidance document for WWTFs. This guidance document was intended to be separate from the guidance and training provided to WWTF operators regarding sampling requirements prior to permit renewal, and was mostly focused on providing preventative assistance. However, currently this training document is most likely not applicable to many WWTF operators and so the workgroup agreed that there is no need to develop this document if it has not already been developed. GBF will follow up with WWTF workgroup regarding the status of the document once more information is collected.
- ii. **Measure 1.3: Increase Compliance and Enforcement** - Develop and gain U.S. EPA approval for focused investigations at major/mandatory minor facilities
  1. The ultimate success of this measure is out of the hands of the workgroup, and rests at the federal level as the EPA would need to approve TCEQ’s plan to provide focused inspections and receive “credit” for these inspections. TCEQ is currently negotiating this with the EPA, and hopes to receive approval for this plan. However, the workgroup agreed that the wording of this measure may need to be revised, so as to ensure that the success of the measure does not rely on a



facet of this process that is out of the hands of the workgroup. Preferred wording would be something like “Develop a plan to gain U.S. EPA approval for focused investigations at major/mandatory minor facilities, and negotiate with the EPA to seek approval for focused investigations.” GBF will coordinate with the WWTF workgroup to determine appropriate wording for the measure.

- iii. **Measure 1.4a: Decrease Sanitary Sewer Overflows** - Develop an outreach campaign to promote SSOIs and post materials on GBF website
  - 1. The workgroup mentioned that while these outreach materials to promote the SSOI exist, they are not frequently used in mass marketing campaigns primarily because the audience for SSOIs is relatively small. The initiative is an education and training tool for facilities that may face issues with SSOs, and much of the outreach is focused on ensuring that individuals who may benefit from the SSOI know about it. These materials can be added to the GBF I-Plan webpage if the workgroup believes that would help spread the message to groups that would benefit from the SSOI. GBF and the WWTF workgroup agreed that additional revisions need to be made to GBF’s I-Plan website to increase its visibility and update the information provided. Additional links to other relevant GBF programs (such as Cease the Grease and GBAN) as well as announcements of outside training opportunities and resources will be added to the site.

**b. On-Site Sewage Facility Workgroup**

- i. **Measure 2.1: Create Regional Plan to Identify, Prioritize, and Address Failing OSSFs** - Prioritize areas to focus inspections
  - 1. The OSSF workgroup mentioned that this is the first step to address failing septic systems throughout Galveston County, though limited resources continue to be the primary issue facing these measures. Bolivar Peninsula may be an area to focus inspections, as Galveston Island does not have as many septic systems as the Peninsula does. Regardless, the workgroup is on schedule to complete this task.
- ii. **Measure 2.1: Create Regional Plan to Identify, Prioritize, and Address Failing OSSFs** - Identify research partners, low income candidates, and potential funding
  - 1. Again, a lack of resources continue to be an obstacle for addressing failing systems in low-income areas. In order to gain more political support and funding for addressing failing systems, research would need to be done that directly shows the environmental impacts caused by malfunctioning systems (research that has not yet been done). TCEQ’s 319 NPS grants may be a potential source of research funding, as are SEPs for both research and repair. However, the number of systems that can be repaired with SEP funds can be quite small relative to the number of malfunctioning systems currently known. GBF will follow up with

Texas A&M Agrilife Extension Services (TAES) to discuss potential funding and research opportunities for OSSFs.

**c. Boater Waste Workgroup**

**i. Measure 3.1: Increase Access to Pump-Out Facilities, Enforce Existing Regulations, Enhance Outreach and Marketing, Designate Galveston Bay as Federal NDZ, Conduct Water Quality Monitoring in Marinas** - Survey and collect data on boater waste impact on bacteria

1. GBF provided updates on the Dockwalker program (carried out each summer by volunteer interns) and the GBAN pollution reporting tool (scheduled for beta testing in March, full launch as downloadable app in April). GBF also raised a concern that a major question by boaters, specifically what proportion of total harmful bacteria in the Bay is caused by boaters, may be difficult to answer. TCEQ recommended that focused marina studies, such as those carried out by GBF summer interns and water monitors in the past, may provide a small case study of boater contributions to bacteria that could be useful going forward. GBF will continue to host a summer intern, assuming resources are available, to perform this type of study.

**ii. Measure 3.1: Increase Access to Pump-Out Facilities, Enforce Existing Regulations, Enhance Outreach and Marketing, Designate Galveston Bay as Federal NDZ, Conduct Water Quality Monitoring in Marinas** - Begin federal NDZ application process

1. GBF expressed concerns that the wording of this measure implies that, within Year 1, GBF will have a completed NDZ application. Though there are currently 23 pumpout facilities throughout the Bay that GBF is aware of, none exist in the Anahuac-East Bay region. Additionally, GBF and the BW workgroup are still unaware of how the majority of commercial vessels discharge their sewage, and although the EPA's "adequate number of pumpouts" formula does not specifically address commercial vessels, GBF and the workgroup do not feel that they have sufficient knowledge on this industry to request an NDZ designation in the next year. Other members of the I-Plan stakeholder group interpreted the wording of the measure to mean that GBF could acquire data or draft an application, with the end goal potentially being a formal request, without being held to complete an application by the end of Year 1. Therefore, the management measure's wording will remain as is.

**III. Final wrap up.....3:30 – 3:45 PM**

- a. GBF summarized the following action items based on input from the workgroups:
  - i. GBF will track down information from TCEQ on the guidance document in WWTF MM 1.1 to determine the status of this document
  - ii. GBF will work with the WWTF workgroup to revise the wording in MM 1.3
  - iii. GBF will update the I-Plan website with additional links and resources relevant to the I-Plan audience

- iv. GBF will inquire into the possibility of using TCEQ 319 NPS grant funding for OSSF research and will coordinate with TAES on research and maintenance being completed in the region
  - v. GBF will try and host a summer intern to complete bacteria research in local marinas
  - vi. GBF will continue to collect data from commercial groups on vessel sewage practices in Galveston Bay and share this information with the workgroup as applicable
- b. The workgroups will meet according to their own respective schedules (BW quarterly – May 2017, OSSF and WWTF as needed) going forward
- c. The meeting was adjourned at 3:45 PM