

Boater Waste Education Campaign

GLO Contract # 12-138-000-4827

FINAL REPORT

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Table of Contents

Executive Summary	2
Project Description	2
Task 1 Maintain Active Working Group	3
Task 2 Develop Marketing and Outreach Materials	6
Task 3 Develop Outreach Schedule and Distribution Plan	14
Conclusions and Lessons Learned	29

Tables

1 – BWEC workgroup	5
2 – Workgroup meeting schedule	5
3 – Marinas contacted about the BWEC	15
4 – Yacht brokers contacted about the BWEC	16
5 – BWEC printed materials and distribution locations	17
6 – Distribution schedule of education events	18
7 – Media outlets contacted about BWEC	20
8 – Number of impressions from most utilized print and digital media outlets	22
9 – GBF Water Monitoring Team events	26

Figures

1 – Bags for Pump Don't Dump education packet	6
2 – Pump Don't Dump pump-out guide postcards	6
3 – Galveston Bay Action Network (GBAN) web application	7
4 – GBAN launch page on GBF website	8
5 – GBAN logo	8
6 – GBAN plastic wallet card	8
7 – Pump Don't Dump floating key chains	9
8 – Boat sewage discharge enforcement signs	9
9 – GBF Facebook post about boat sewage discharge report	10
10 – Purchased and donated ad space in The Boater's Directory 2012-2013	10
11 – Donated ad space in Dock Line Magazine	11
12 – Example of BWEC project update on GBF website's main page	11
13 – Toilet toss kid's activity for education booths	12
14 – Interactive visual display for education booths	12
15 – Student water quality monitoring kits	12
16 – GBF Water Monitoring Team sampling kits	13
17 – GBF Bacteria Monitoring Lab	13
18 – BWEC education booth at Clear Lake Racing Association event	14
19 – Pet waste station installed at Marina Del Sol	23
20 – Marina Del Sol's GBF Water Monitors completing their training in the marina	24
21 – Pet waste station installed a Pelican Rest Marina dog park	24
22 – Storm drain markers installed at Pelican Rest Marina	24
23 – Photos submitted to GBF with a boat sewage discharge report in Watergate Yachting Center	25
24 – Current monitoring sites of the GBF Water Monitoring Team	27
25 – Single grab Enterococci concentrations at select GBF monitoring sites	28
26 – Number of Clean Texas Marinas certified and/or pledged over time	30
27 – Number of registered marine sanitation devices (MSDs) with TCEQ's Clean Water Certification program	30
28 – Number of pump-out stations on Clear Lake and Galveston Bay	31

Appendices (see attachments)

I – BWEC Cycle 16 Performance Indicators	
II – BWEC Article and Press Release Examples	
III – GBF Water Monitoring Team Training Materials	

Executive Summary

The Boater Waste Education Campaign (BWEC) addresses the issue of illegal boater waste discharge through targeted outreach and education to boaters. The purpose of the campaign is to decrease the incidence of illegal discharges to the Galveston Bay estuarine system, particularly Clear Lake. Since Clear Lake has the third highest concentration of privately owned marinas in the U.S, educating the public about the proper disposal of boat sewage is critical for the overall health of the ecosystem. The Clear Lake and Galveston Bay communities have shown sincere interest in tackling this environmental issue and have played an instrumental role in the development of the campaign. The work group has successfully developed campaign messages, created marketing materials, and distributed materials in the boating community through a variety of methods (advertisements, education packets, promotional items, presentations, etc.). Members of the boating industry have been willing to help with all aspects of the campaign and the boaters reached during the events and exhibits have been very receptive to the campaign messages. The Galveston Bay Foundation (GBF) is extremely pleased with the progress that has been made with the campaign since its inception in 2008 through 2013.

During this funding cycle, enhancements were made to the program including the establishment of GBF's Water Monitoring Team (WMT) to sample at marinas and near-shore recreational areas, the Galveston Bay Action Network (GBAN) to provide citizens with an easy web application for reporting illegal discharges, and the formation of Clean Water Partnerships (CWPs) with marinas to build long-term relationships and provide hands-on opportunities to connect with the staff and tenants. Another highlight for this cycle is the fact that three new pump-out stations were installed in the project area!

Moving forward, GBF will continue to maintain the campaign and the distribution of the campaign message, as well as engage boaters in hands-on activities to motivate behavior change with the goal of reducing bacteria levels in Galveston Bay. GBF will continue communicating with marinas, fuel stations, and local governments about increasing the number of pump-outs in the Galveston Bay region, including Clear Lake. GBF will continue pushing for more participation from enforcement agencies in issuing citations for boats that do not have their discharge valve locked and/or have not registered their marine sanitation device through the Texas Commission on Environmental Quality's Clean Water Certification program. Finally, the campaign will work with partners to look at existing and volunteer monitoring data in order to try and quantify the level at which boater waste contributes to overall bacteria impairments in Galveston Bay. Continuing education and outreach regarding boater waste issues is needed as the boating population continues to grow and change, but GBF is hopeful that the BWEC's new approach will continue to drive measureable progress forward.

Project Description

Water and sediments are degraded in and around marinas from boat sewage and introduction of dockside wastes and other non-point sources. It has been demonstrated that the combination of poor circulation and discharge from boaters and boat maintenance operations create serious

localized water quality and potential public health problems. In spite of having several pump-outs throughout the Clear Lake area, the largest concentration of marinas in Texas, many boaters continue to discharge raw sewage from marine heads directly in the waters of Clear Lake and Galveston Bay, due in large part to a lack of knowledge of the resulting environmental and public health impacts and lack of enforcement of the “No Discharge” rule in Clear Lake.

GBF believes that outreach and education efforts are effective tools in decreasing discharges and improving water quality. In 2008, the BWEC was launched to address illegal discharges through targeted outreach and education to boaters. This project is comprised of an education campaign targeted at the Clear Lake, TX boating/marina community that is also applicable to Galveston Bay users as a whole. The purpose of the campaign is to decrease the incidences of illegal discharge of boater sewage waste in the Galveston Bay Estuary, particularly Clear Lake that has the third highest concentration of privately owned marinas in the U.S.

The project involves the development of marketing and outreach messages suitable for, but not limited to, personal communications via presentations and exhibits, as well as print and online outlets. GBF focuses on communicating the message directly to boaters and marinas. This has been achieved by contacting marinas to arrange special events, presentations, and/or exhibits where boaters will be exposed to the campaign message, in addition to distributing education packets to new tenants. The campaign emphasizes 1) negative environmental and public health impacts caused by sewage and 2) how boaters can properly dispose of their waste, and 3) the existing laws and fines associated with illegal boat discharges. As part of the initiative, boaters and marinas have been encouraged to join the Clean Texas Marina and Clean Boater Programs. Marinas have also been encouraged to seek funding through the Clean Vessel Act Program to construct, renovate, or replace pump-out stations. Outreach programs have proved to be effective in the past, but there is a need for a strong campaign in the Clear Lake area to reach new boaters and reawaken awareness of the issue. GBF has directed the development and distribution of the message with the input of a workgroup comprised of stakeholders representing 17 different boating and environmental groups, as well as members of the recreational boating community.

Funding from the Texas Coastal Management Program has played a key role in the distribution of the BWEC messages by covering costs associated with marketing, advertisement, outreach, illegal discharge reporting, marina partnerships, and volunteer water monitoring. The BWEC has been well received in the Clear Lake/Galveston Bay community and GBF plans to continue carrying out this project indefinitely.

Task 1: Maintain active working group

A workgroup continued to guide BWEC activities, and consisted of representatives from the Galveston Bay Estuary Program, Clean Marina Program, Clear Lake Marina Association, Texas Parks and Wildlife, and other relevant, bay-area groups. The working group was originally formed under a Galveston Bay Estuary Program grant beginning in 2007. The committee members were solicited in the fall of 2007; the original invitation sent to bay area entities

predated the beginning of this grant cycle. The active working group was formed to develop and execute the campaign. The current workgroup consists of several original members, but GBF continually recruits new members in order to keep the BWEC ideas fresh. Participation in the workgroup is open to any interested parties. **Table 1** includes a list of the participating individuals. The meeting schedule is included in **Table 2**.

The workgroup members contributed to the project in different ways. The Clear Lake Marina Association provides the business perspective to BWEC efforts and acts as an effective means to disseminate information and build networks in the local boating community. The Clean Texas Marina Program offers Clean Boating Tip cards, Clean Boater Pledge cards, Scoop on Poop brochures showing pump-out locations throughout Texas, as well as technical information on the Clean Marina Program. Both of these organizations are active in the Marina Association of Texas and aid in getting the BWEC efforts publicized state-wide. Redfish Island Marine and Maritime Sanitation are the two mobile pump-out companies currently in operation in Clear Lake and Galveston Bay. They provide in-kind donations for marina outreach events and donated pump-out services for the annual Redfish Raft Up event, as well as technical information on pump-out equipment and assistance to marinas interested in applying for Clean Vessel Act grants. Texas Parks and Wildlife Department, Texas Commission on Environmental Quality, and Galveston Bay Estuary Program assist the workgroup with questions relating to environmental regulations, access to data, and aid in the workgroup's efforts to get Galveston Bay designated as a No Discharge Zone. Several members of the workgroup are solely recreational boaters, or in addition to their involvement in the boating industry. Their knowledge and experience in the community is invaluable to the BWEC efforts.

The most valuable result of continuing this workgroup has been the fact that GBF has a group of committed stakeholders from the boating industry that are always available to bounce ideas off of and to give feedback on BWEC efforts. During Cycle 16 attendance to workgroup meetings was around 40% based on the list of members below, but several organizations have multiple representatives so this number is more accurately at 80% based on organizational representation. In addition, about 80% of the workgroup members are directly involved in assisting with campaign tasks, such as assembling and distributing education packets, connecting GBF to audiences for giving presentations, implementing the campaign at their marina, providing technical assistance for the Water Monitoring Team, etc. The workgroup has assisted with evolving the BWEC into what it is today, by moving the campaign from a marketing and advertising focus to an on-the-ground, hands-on focus. The performance indicators used during this funding cycle were approved by the workgroup, and can be found in **Appendix I**. The measured results corresponding to these indicators are addressed throughout this final report in the appropriate sections.

Table 1. Boater Waste Education Campaign Workgroup

Last	First	Organization
Bartsch	Trey	Galveston Bay Foundation
Bohanon	Charlene	Galveston Bay Foundation
Broach	Linda	Texas Commission on Environmental Quality
Calkins	Katie	Redfish Island Marine
Clevenger	Cynthia	Galveston Bay Estuary Program
Cunningham	Kevin	Texas Parks and Wildlife Department
Derrick	Cassandra	Texas Commission on Environmental Quality
Fitz Simmons-Evans	Lori	Galveston County Health District
Frakes	Dick	Recreational Boater
Guillen	George	University of Houston – Clear Lake
Hall	Lynda	Lakewood Yacht Club/Marina Association of Texas
Hollin	Dewayne	Clean Texas Marina Program, Texas Sea Grant
Johnston	Steven	Galveston Bay Estuary Program
Jones	Scott	Galveston Bay Foundation
Kropf	Philip	Clear Lake Marina Association
McCann	Katie	Galveston Bay Foundation
McDowell	Angela	Galveston County Health District
Morris	Chip	Texas Commission on Environmental Quality
Paige	Helen	Marina Bay Harbor/ Marina Association of Texas
Respass	Logan	Clean Texas Marina Program, Texas Sea Grant
Silva	Marianne	Maritime Sanitation, Inc.
Stokes	Bob	Galveston Bay Foundation
Tuma	Scott	City of League City/Clear Lake Racing Association
Williams	Paul	Maritime Sanitation, Inc.
Wright	Jean	Houston-Galveston Area Council

Table 2. Workgroup meeting schedule

CMP Cycle	Date	Location	Time	Attendance
15/16	10/12/11	Coffee Oasis	2:00pm	10
15/16	11/9/11	GBF Office	2:00pm	8
15/16	12/7/11	GBF Office	2:00pm	5

15/16	1/18/12	Armand Bayou Nature Center	5:30pm	8
15/16	5/2/12	GBF Office	2:00pm	8
15/16	6/6/12	GBF Office	2:00pm	11
16	8/3/2012	GBF Office	3:00pm	4 (break-out)
16	10/16/2012	GBF Office	2:00pm	10
16/17	2/20/2013	GBF Office	2:00pm	13
16/17	3/27/2013	GBF Office	2:00pm	3 (break-out)

Task 2. Develop marketing and outreach materials

Marketing and outreach materials were developed for all three branches of the BWEC – Pump Don’t Dump, Galveston Bay Action Network, and the GBF Water Monitoring Team. All items created were a result of feedback from the Boater Waste Workgroup.

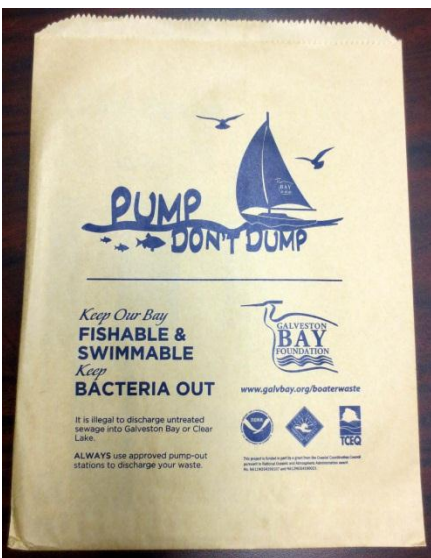


Figure 1. Bags for Pump Don't Dump education packet

Based on the success of the Pump Don’t Dump education packets created during Cycle 15, these were revised and reprinted for Cycle 16. The items were packaged in a small paper bag printed with the campaign message (**Figure 1**). Pump-out guide postcards (**Figure 2**) were designed and printed with the campaign message directing boaters to an interactive pump-out

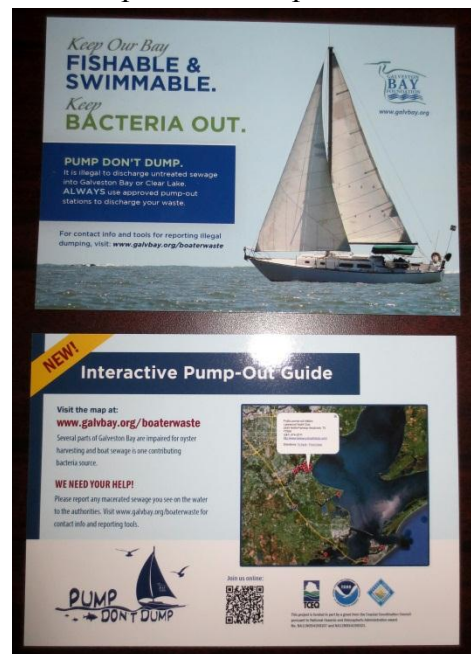


Figure 2. Pump Don't Dump pump-out guide postcards

guide that GBF created using Google Map technology and posted on www.galvbay.org/boaterwaste. The workgroup recommended the online version of the pump-out guide so that it is always up-to-date and can offer boaters more detailed information. GBF also setup the Galveston Bay Action Network (GBAN) web application through Ushahidi and Crowdmap (**Figure 3**), designed a GBAN webpage (www.galvbay.org/gban) (**Figure 4**), as well as designed a GBAN logo (**Figure 5**) and plastic wallet card (**Figure 6**). The cards were included in the bags in order to direct boaters to

www.galvbay.org/gban and to teach them how to collect information for reporting water pollution. In addition to these newly developed items, the packets also included TCEQ's brochure on the Clean Water Certification program, and Texas Sea Grant's Clean Boater Tip cards and Clean Boater Pledge brochures. During this cycle we are leaving the packets unsealed so that our partners that help distribute them at boat show booths (Maritime Sanitation, Redfish Island Marine, Houston Safe Boating Council, Marina Del Sol, and Marina Association of Texas) can include their flyer in it as well.

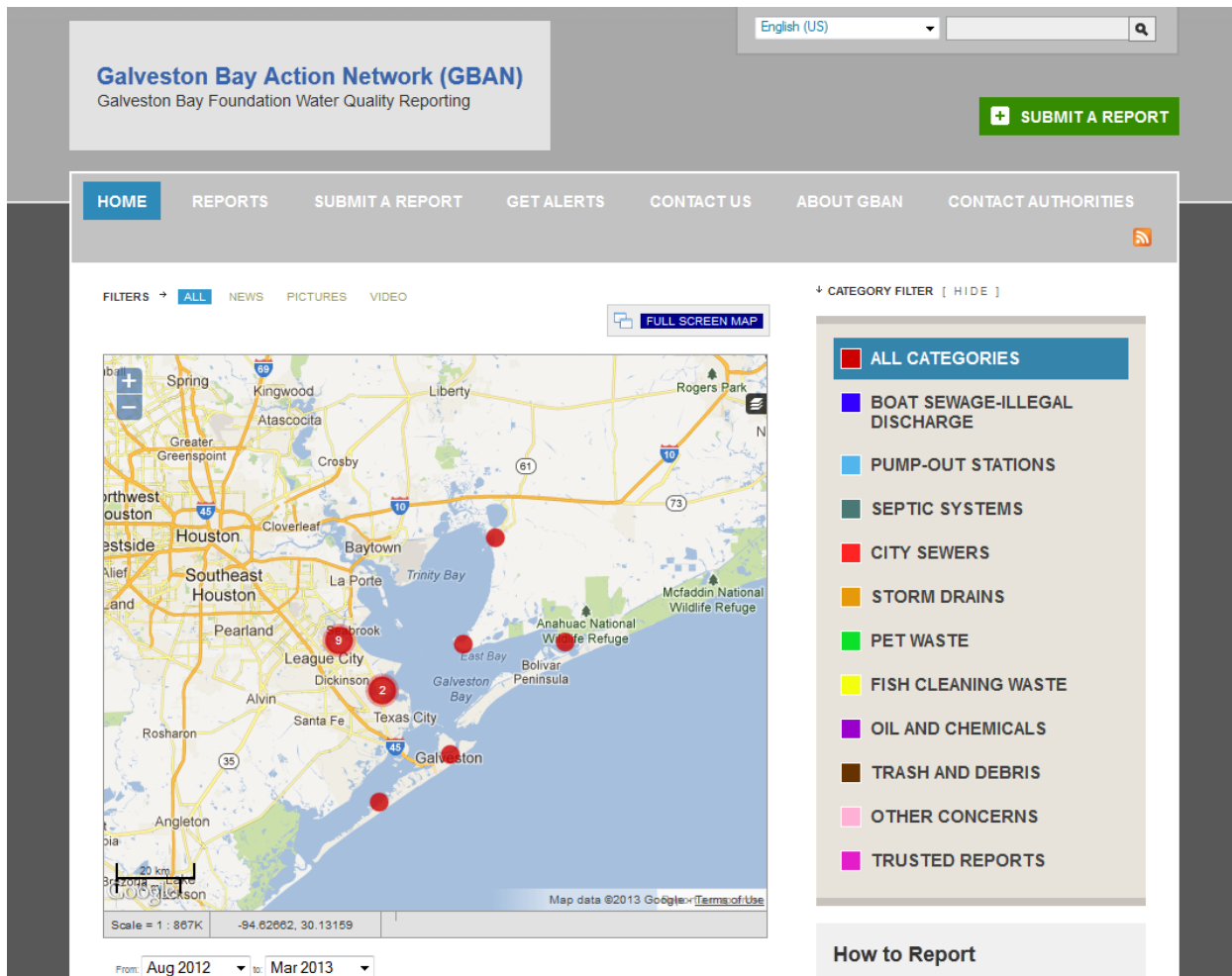


Figure 3. Galveston Bay Action Network (GBAN) web application



Figure 4. GBAN launch page on GBF website



Figure 5. GBAN logo

Pump Don't Dump floating key chains were designed and ordered by GBF's Marketing Coordinator to be used as partnership incentives and a campaign advertisement at presentations and education booths (Figure 7). GBF also designed a new sign in partnership with Texas Sea Grant (printed with their funding through the Clean Vessel Act) that educates boaters on key laws regarding the Clean



Figure 6. GBAN plastic wallet card

Water Certification program and having their discharge valve locked, cites the legislative codes, and gives contact information to report violations to the authorities (**Figure 8**). These signs were printed on corrugate plastic in order to make them weather resistant for posting on pilings in the marinas.

GBF wrote Facebook posts, newsletter articles, and press releases to advertise BWEC campaign messages, as well as to share our campaign work with GBF followers and supporters. Several examples can be viewed in **Figures 9 – 12** and **Appendix II**.

PowerPoint presentations and hands-on activities were developed for various audiences such as the Houston Safe Boating Council's W.A.D.E. summer program, GBF's Bay Day event, and marina partnership events. The hands-on activities include a toilet seat bean bag toss (**Figure 13**)

where we get kids to think about where their waste goes on a boat after it goes down the toilet, a visual display that represents the percentage of bacteria entering Galveston Bay from the five surrounding counties from humans, dogs, and livestock (**Figure 14**), and a set of monitoring kits that are suitable for teaching a younger audience or an audience with limited time about water quality (**Figure 15**).



Figure 7. Pump Don't Dump floating key chains



Figure 8. Boat sewage discharge enforcement signs

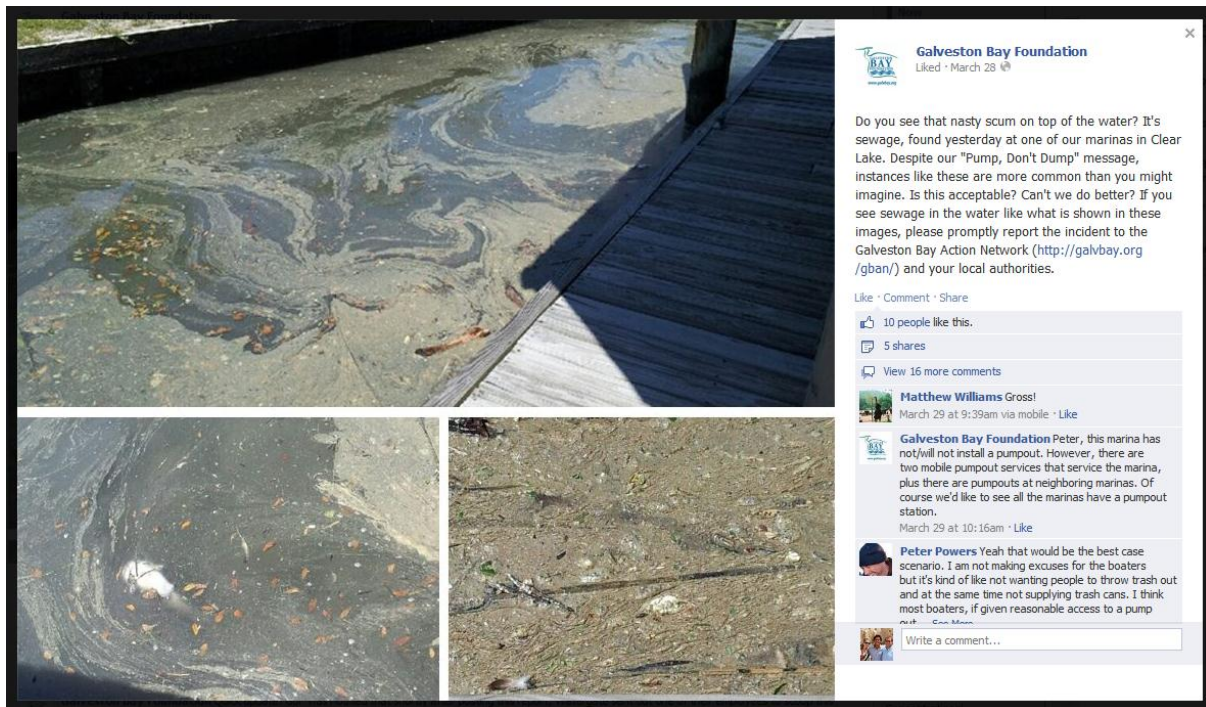


Figure 9. GBF Facebook post about boat sewage discharge report



Figure 10. Purchased and donated ad space in The Boater's Directory 2012-2013

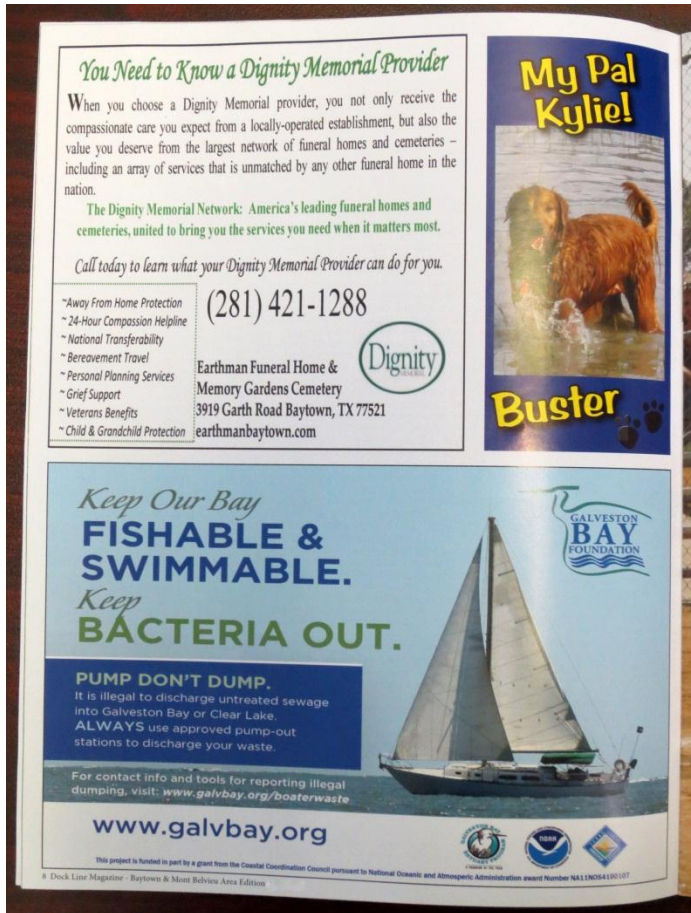


Figure 11. Donated ad space in Dock Line Magazine



Notice to Bidders

The City of Seabrook is currently seeking bids for construction of a breakwater/jetty structure at the mouth of Pine Gully. Please visit this [link](#) for more information.

The Galveston Bay Foundation is expecting to publish a Notice to Bidders for the dredging and grading of Pine Gully at a later date.



GBF informational video watch now!

Clean Texas Marina of the Year Awarded to Marina Del Sol for Project with the Galveston Bay Foundation

Marina Del Sol was given the 2012 Clean Marina of the Year Award for the State of Texas for its efforts to improve water quality through a partnership with the Galveston Bay Foundation (GBF). This award is part of the Clean Texas Marina Program through Texas Sea Grant. Each year, marinas apply for the award based on a specific project they are implementing to benefit the environment. Marina Del Sol's ongoing Clean Water Partnership with GBF focuses on reducing pathogenic bacteria entering the water, which can come from boat sewage in addition to other land based sources like pet waste and sewer overflows. GBF regularly receives reports across Clear Lake and Galveston Bay regarding illegal boat sewage discharges into the water and the staff at Marina Del Sol is taking proactive steps to ensure that its tenants are educated on the issue and are helping to keep our bay fishable and swimmable. [Click here for more information.](#)



Order Galveston on Board today
Proceeds benefit GBF



Amber Mckenna with Marina Del Sol (L) accepts the 2012 Clean Marina of the Year Award from Dewayne Hollin with Clean Texas Marina Program, and Lynda Hall with the Marina Association of Texas.

Figure 12. Example of BWEC project update on GBF website's main page



Figure 13. Toilet toss kid's activity for education booths



Figure 14. Interactive visual display for education booths



Figure 15. Student water quality monitoring kits



Figure 16. GBF Water Monitoring Team sampling kits

Overall, the marketing and outreach materials developed during this cycle were quite extensive and have added significant depth to the BWEC by being able to connect with boaters on multiple levels. In addition to the original Pump Don't Dump message, GBF is now able to communicate how citizens can engage in enforcement by providing them with the tools for submitting water quality monitoring reports, and has begun collecting water quality monitoring data in marinas and near-shore recreational areas. These additional branches of the campaign have and will continue to allow GBF to reach a broader audience by giving boaters the opportunity to take action and empower them to spread the campaign message to their fellow boaters.

Additionally, GBF setup our entire infrastructure for running the GBF Water Monitoring Team and Bacteria Monitoring Lab including developing an EPA-approved Quality Assurance Project Plan, modifying training materials and data sheets from the Texas Stream Team, ordering equipment, and becoming Certified Texas Stream Team Trainers. Photos of the monitoring kits and GBF Bacteria Monitoring Lab are in **Figures 16** and **17**, and copies of some of the training materials are in **Appendix III**. GBF also created a Google map of all of our current and potential monitoring sites (<http://goo.gl/maps/P80zd>) in order to make it easier to communicate with volunteers when they are trying to choose a site, as well as with the public to let them know where we monitor.



Figure 17. GBF Bacteria Monitoring Lab

Task 3. Develop outreach schedule and distribution plan

The workgroup routinely discussed ways to promote the message of the BWEC. Enhancements to the campaign resulted in outreach being carried out through the original avenues of print media and education booths/presentations, as well as through Clean Water Partnerships, the Galveston Bay Action Network, and the GBF Water Monitoring Team. Each of these are addressed in the subsections below.

Print Media, Education Booths, and Presentations

GBF contacted marinas and popular boating events to schedule outreach presentations and booth displays, and to offer printed materials for inclusion in tenant packets and event goodie bags.

Table 3 shows the list of marinas that were contacted during this grant cycle (current marina partnerships have an asterisk), **Table 4** shows the yacht brokers that were contacted, and **Table 5** shows the quantity of printed materials ordered and the distribution locations thus far.

Workgroup members and campaign partners frequently help with directly promoting the BWEC. For example, a workgroup member that organizes Wednesday night sailboat races through the Clear Lake Racing Association has donated banner space each week to the BWEC and invited GBF to setup a booth and speak to the racers at their season kick-off event (**Figure 18**). GBF staff and volunteers have hosted many education exhibits throughout the project area to ensure one-on-one interaction with boaters.

Based on experience in the beginning of this cycle, we have determined that the most successful events for us to booth at are the smaller, more intimate events because we are often the only booth and boaters take the time to speak with us. Our revised strategy for the larger boat shows and industry events during the last part of this campaign was to utilize our workgroup members, marina partnerships, and other campaign supporters to distribute education packets and discuss



Figure 18. BWEC education booth at Clear Lake Racing Association event

the campaign with visitors. In the past, when GBF carried out booths at the large events there were thousands of people in attendance, but we would not distribute as many outreach materials as one would expect. We attribute this to the fact that we are not selling a product or service, which is the reason a majority of the boat show audience is in attendance. Comparably, our partners that sell pump-out services, marina slips, and boater education summer camps distributed hundreds of education packets at the most recent Southwest International Boat Show in March 2013. The other benefit to this model is that it results in two or more booths distributing campaign materials, increasing the number of people that can be reached at each event. This new model for large boating events has been adopted in Cycle 17.

In addition to these outreach booths, several group presentations were made throughout the

BWEC project period. GBF continues to have quality interactions with the boating community through giving live presentations due to the fact that it facilitates better discussions and the opportunity to disseminate more detailed information than can be done with a passive booth audience. Please see **Table 6** for a schedule of both types of education events carried out during this grant cycle. Through these activities, GBF reached over 284,000 people at 42 live events.

In terms of advertising, GBF has promoted the campaign in boat show event programs, Dock Line Magazine, Change Magazine, The Boater’s Directory, GBF Gazette, E-newsletter, website main page, BWEC webpage, and Facebook page, as well as online articles at Wiredin.cc, Your Houston News, Your Bay Area News, and Ultimate Pasadena. Some of the space was paid for, but much of it was donated because of the publication’s support for the BWEC. Examples of printed posts and ads are in **Figures 9 – 12**, a complete list of our media outlets can be found in **Table 7**, and examples of articles and press releases published are in **Appendix II**. Numbers of impressions for the various BWEC advertisements, posts, and articles GBF was able to track are found in **Table 8**. Through print and digital media, GBF was able to reach over 560,000 people with the Pump Don’t Dump campaign message.

Table 3. Marinas contacted about the BWEC

Marina Name and Location			
Clear Lake			
Bal Harbor Marina	123 Lakeside Lane	Houston	(281) 333-5168
Blue Dolphin Yachting Center, Inc.	P.O. Box 123	Seabrook	(281) 474-4450
Clear Lake Marine Center, Inc.	P.O. Box 716	Seabrook	(281) 326-4426
Constellation Point and Marina	451 Constellation	League City	(281) 334-2527
Endeavour Marina	3101 NASA Parkway	Seabrook	(832) 864-4000
Kemah Boardwalk Marina	555 Bradford St.	Kemah	(281) 334-2284
Lakeside Yachting Center, Inc.	2511- B Nasa Rd. 1, Ste. 101	Seabrook	(281) 326-5547
Lakewood Yacht Club	2425 Nasa Parkway	Seabrook	(281) 474-2511
Legend Point	1300 Marina Bay Drive	Clear Lake Shores	(281) 334-3811
Marina Bay Harbor Yacht Club	P.O. Box 478	Kemah	(281) 535-2222
Marina Del Sol*	1203 Twin Oaks Blvd.	Kemah	(281) 334-3909
Nassau Bay Homes and Marina Assoc., Inc.	1120 Nasa Pkwy, Ste. 109	Nassau Bay	(281) 333-2570
Nassau Bay Yacht Club	1120 Nasa Pkwy, Ste. 109	Nassau Bay	(281) 333-2570
Portofino Harbour	One Portofino Plaza	Clear Lake Shores	(281) 334-6007
Seabrook Shipyard & Marina Inc.	1900 Shipyard Dr.	Seabrook	(281) 474-2586

South Shore Harbour	2551 South Shore Blvd., Ste B	League City	(281) 334-0515
Waterford Harbor Marina	800 Mariners Drive	Kemah	(281) 334-4400
Watergate Yachting Center	1500 Marina Bay Drive	Clear Lake Shores	(281) 334-1511
Wharf at Clear Lake	P.O. Box 1208	League City	(281) 334-5976

Galveston Bay

Bayland Marina	2651 S. Highway 146	Baytown	(281) 422-8900
Eagle Point Fishing Camp, Inc.	Route 1 Box 1718	San Leon	(281) 339-1131
Galveston Yacht Basin	715 North Holiday Dr.	Galveston	(409) 762-9689
Harborwalk Marina	P.O. Box 2328	Hitchcock	(409) 935-3737
Houston Yacht Club	3260 Miramar Drive	Shoreacres	(281) 471-1255
Payco, Inc.	501 Blume Dr.	Galveston	(409) 744-7428
Pelican Rest Marina*	7819 Broadway	Galveston	(409) 744-2618
Pirates Beach Bait & Tackle	14302 Steward Rd.	Galveston	(409) 737-3635
Ray's Marina	6310 Herds Lane	Galveston	(409) 744-2111
San Leon Marina	100 6 th St.	Dickinson	(281) 339-1515
Waterman's Harbor, Inc	16426 Clearcrest	Houston	(281) 339-1416

* Current Clean Water Partnership marinas

Table 4. Yacht brokers contacted about the BWEC

Yacht Broker	Location	Address	Phone Number
A&M Yacht Sales	Seabrook	1800 Seabrook Shipyards	281-291-7950
Set Americas	Webster	711 West Bay Area Boulevard	281-316-5100
The Yacht Service Co.	Clear Lake	3000 Nasa Parkway	281-333-9712
Lauderdale Yacht Sales	League City	2551 South Shore Harbour Blvd Suite B	281-535-0900
Galati Yacht Sales	Seabrook	1902 Seabrook Shipyards	281-474-1470
United Yacht Sales	Kemah	1115 Marina Bay Drive	281-538-6231
Sea Lake Yacht Sales	Kemah	1500 FM 2094 rd	281-334-1993
Jay Bettis & Co Yacht Sales	Seabrook	2509 Nasa Parkway	281-326-3333
American Yacht Sales	Dickinson	3304 N Wyoming Ave	281-334-6531
Flagship Yachts	Seabrook	2511 Nasa Parkwat #107	281-532-3200
Boatshedtexas.Com	Kemah	1500 Marina Bay Dr #1441	281-538-1632
Watergate Yachting Center	Kemah	1500 Marina Bay Drive	281-334-1511
Nautic Yacht Sales	Kemah	585 Bradford St	281-334-2628
Grand Banks Yachts	League City	3027 FM road 2094	281-335-3993
J M Yachts	Clear Lake	1500 Marina Bay Dr #1570	281-538-0761
Texas Marine & Brokerage Inc	Seabrook	2700 Nasa Parkway	281-326-9595
HSH Yacht Sales	Kemah	1500 Marina Bay Drive #132b	832-864-2030
Lone Star Yachts Sales	Kemah	1500 Marina Bay Drive #3380	281-334-3500
Josh at Sea Lake Yachts	Kemah	1500 Marina Bay Drive Pier 23	281-334-0485

Texas Sport Fishing Yachts Sales	Seabrook	802 Hardesty Ave	281-474-9600
Discovery Yachts Inc	Seabrook	2101 Todville Road	281-291-9109
Texas Coast Yachts	Kemah	1500 Marina Bay Drive Suite 122-A	281-957-9046
Gibson Weaver Yacht Sales	Seabrook	2511B Nasa Parkway	281-326-1574
Kent Little @ Little Yacht Sales	Kemah	Waterford Harbor, 800 Mariners Drive	713-817-7216
Third Coast Marine	Clear Lake	1500 Marina Bay Drive	323-835-3877
Southern Cross Yacht Sales	Kemah	585 Bradford Ave	281-334-7411
Seawinds International Inc	Kemah	703 Bay Ave	281-334-5296
Ron's Yacht Brokerage	Seabrook	Texas 146 & Shipyard Drive	281-474-5444
Marine Max Inc.	Seabrook	3001 Nasa Parkway	281-326-4224
Third Coast Marine & Pro-shop	Seabrook	1900 Shipyard Drive	281-832-9415

Table 5. BWEC print materials and distribution locations

Item	Number of Items	Distribution Location
Postcard pump-out guides	5,000	Pump Don't Dump education packets; education booths/presentations; marina billing statements
GBAN wallet cards	3,000	Pump Don't Dump education packets; education booths/presentations; South Coast Sailing rental boat manuals; Houston Safe Boating Council – Boater Safety Education Course; Galveston Bay Sail and Power Squadron; Gulf Coast Yacht Brokers Association; GBF Water Monitoring Team; Clear Lake Marina Association (marina managers)
Pump Don't Dump campaign bags	3,000	Pump Don't Dump education packets; education booths/presentations; new marina tenant packets
Pump Don't Dump floating key chains	3,000	Pump Don't Dump education packets; education booths/presentations
Boat Discharge Laws/Enforcement signs	100	Blue Dolphin Yachting Center; Endeavour Marina; Kemah Boardwalk Marina; Lakewood Yacht Club; Marina Bay Harbor Yacht Club; Marina Del Sol; Seabrook Marina, Inc.; Pelican Rest Marina; Galveston Yacht Basin; Gulf Coast Yacht Brokers Association
TCEQ Clean Water Certification brochures	5,000	Pump Don't Dump education packets; education booths/presentations; TPWD Boater Education; Coast Guard Auxillary
Bag It For Your Bay pet	6	Marina Del Sol (2); Lakewood Yacht Club (2);

waste signs/stations (purchased in Cycle 15)		Marina Bay Harbor (1); Pelican Rest Marina (1)
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Table 6. Distribution schedule of education booths and presentations

Date	Event	Location	Representative	Impressions
11/2/11	National Geographic Marine Recreation Workshop	Hotel Galvez	Bob Stokes and Charlene Bohanon	150
11/3/11	Gulf Coast Yacht Brokers Association	Lakewood Yacht Club	Charlene Bohanon	28
11/15/11	TMDL Public Meeting	Armand Bayou Nature Center	Charlene Bohanon	28
1/7/12 – 1/15/12	Houston Boat Show	Reliant Center	GBF staff and volunteers	75,000
1/18/12	TMDL Public Meeting	Armand Bayou Nature Center	Charlene Bohanon	31
1/31/12	AP Aquatic Science Class	Clear Springs High School	Charlene Bohanon	25
2/29/12	Galveston County Board of Health	Galveston County Health District Building	Charlene Bohanon	28
2/29/12 – 3/4/12	Fishing Shows Limited	George R. Brown Convention Center	GBF staff and volunteers	20,000
3/22/12 – 3/25/12	Southwest International Boat Show	South Shore Harbor Marina	GBF staff and volunteers	15,000
3/22/12	World Water Day event	Coffee Oasis	Charlene Bohanon, Julie Mintzer, volunteers	50
3/31/12	Trash Bash	Bay Area Park	Charlene Bohanon and Emily Demmeck	700
4/14/12	Clean Water Partnership launch event	Marina Del Sol	Charlene Bohanon and volunteers	35
5/3/12	West Marine Charity Night	West Marine	Emily Demmeck	100
6/9/12	Bay Day	Kemah Boardwalk	Charlene Bohanon, Teresa Long and volunteers	7,000
6/13/12	W.A.D.E. camp	Clear Lake Park	Charlene Bohanon	50
6/18/12	GBF Executive Committee Board Meeting	Kirby Marine headquarters	Charlene Bohanon and Bob Stokes	15

GLO Contract Number 12-138-000-4827
Boater Waste Education Campaign Final Report
Page 18

6/20/12 – 6/24/12	Houston Boat Show	Reliant Center	GBF staff and volunteers	75,000
4/5/2012	Texas Master Naturalist Meeting - Booth	Walter Hall Park Community Building	Charlene Bohanon	50
7/11/2012	W.A.D.E. camp	Clear Lake Park	Charlene Bohanon	50
8/4/2012	Marina partnership launch event	Marina Del Sol	Charlene Bohanon and volunteers	35
9/27/2012	Gulf of Mexico Coastal Ocean Observing System - presentation to the board	Texas A&M - Corpus Christi	Charlene Bohanon	50
10/1/2012	Marina Association of Texas Conference - education booth	South Shore Harbor Marina	Charlene Bohanon and volunteers	150
10/14/2012	Bike Around the Bay - education booth	Bayshore Park	Charlene Bohanon and volunteers	1,000
10/22/2012	Restore America's Estuaries Conference - presentation	Tampa Convention Center	Charlene Bohanon	50
11/7/2012	UHCL Environmental Safety and Hygiene students - presentation	UHCL campus	Charlene Bohanon	20
11/17/2012	Marina partnership outreach event	Marina Del Sol	Charlene Bohanon, Teresa Long, and volunteer	30
11/27/2012	GBF Quarterly Meeting - presentation and booth	United Way of Houston	GBF staff	75
12/6/2012	UHCL Environmental Safety and Hygiene students - presentation	UHCL campus	Charlene Bohanon and Teresa Long	20
1/4/2013 – 1/13/2013	Houston Boat Show	Reliant Center	Maritime Sanitation, Redfish Island Marine, Marina Del Sol	75,000
1/10/2013	Gulf Coast Yacht Brokers	Lakewood Yacht Club	Charlene Bohanon and Katie McCann	30

	Association Meeting			
2/1/2013	Watershed 101 Class	Ball High School	Charlene Bohanon	80
2/8/2013	Clear Lake Marina Association	Hoagie Ranch	Charlene Bohanon	15
2/23/2013	Nature Day	Sea Center Texas	Katie McCann and Jessica Curran	800
3/9/2013	Houston Yacht Club event booth	Houston Yacht Club	Sharon Roarke and Matt Singer	50
3/21/2013-3/24/2013	Southwest International Boat Show	South Shore Harbor Marina	Redfish Island Marine, Houston Safe Boating Council, Maritime Sanitation, Marina Del Sol	13,000
3/23/2013	GBF Trash Bash education booth	Bay Area Park	Charlene Bohanon and Jessica Curran	600
3/27/2013	Clear Lake Racing Association event booth	Villa Capri	Charlene Bohanon and volunteer	100
Total Impressions:				284,445

Table 7. Media outlets contacted about BWEC

Media Outlet	Contact Email Address
39 News	justin@39online.com
713news.com	cyndi@713news.com
ABC News	douglas.p.schurtz@abc.com
	Ktrk.newsalerts@abc.com
	Blanca.e.beltran@abc.com
	Gina.l.larson@abc.com
	Casey.curry@abc.com
	Randy.klein@abc.com
	Ktrk.news.releases@abc.com
	Denise.davis@abc.com
Associated Press	houstaff@ap.org
	rmasti@ap.org
Bay Area Observer	editor@bayareaobserver.com
Bay Area Print (local neighborhood newspapers)	baprint@sbcglobal.net
Baytown Sun	carla.torres@baytownsun.com
	sunnews@baytownsun.com

Change Magazine	triciag@changemediaonline.com
Citizens' Environmental Coalition	news@cechouston.org
Clear Channel Communication	bryanerickson@clearchannel.com
	rickjanacek@clearchannel.com
Click 2 Houston (KPRC)	hounews@click2houston.com
	lstewart@click2houston.com
Coastal Angler Magazine	susanne@coastalanglermagazine.com
EarthShare of Texas	estx@earthshare-texas.org
FishWestEnd.com	coe@fishwestend.com
Fox TV	John.Dawson@FOXTV.COM;
	dawson@fox26.com
	newsdesk@fox26.com
Galveston County Daily News	angela.taylor@galvnews.com
	stevy.curbow@galvnews.com
	chris@galvnews.com
Houston Chronicle	matthew.tresague@chron.com
	Jenny.Montgomery@chron.com
	citydesk@chron.com
	lindsay.wise@chron.com
	dale.lezon@chron.com
	anita.hassan@chron.com
	jason.spencer@chron.com
	mike.glenn@chron.com
Houston Community Newspapers	dbell@hcnonline.com
	jbranch@hcnonline.com
	stthomas@hcnonline.com
	dguthrie@hcnonline.com
	mhellinghausen@hcnonline.com
mreed@hcnonline.com	
Houston Newcomer Guide	info@houstonnewcomerguides.com
Houston Press	rich.connelly@houstonpress.com
Indo American News	indoamericannews@yahoo.com
Katy Times	timesnews@katytimes.com
KHOU Channel 11	assignments@khou.com
	tsnnews@cbs.com
KIAH Channel 39	news@39online.com
KPRC Local 2	storyideas@kprc.com
	desk@kprc.com
	jrizzuti@kprc.com

	ptopham@KPRC.com
	dlevy@kprc.com
KUHF 88.7	news@kuhf.org
Lone Star Outdoor News	mhughs@lonestaroutdoornews.com
MSNBC	sheara.braun@msnbc.com
Pasadena Citizen	pasadenacitizen@hcnonline.com
PBS Houston	sergio@pbshou.com
Restore America's Estuaries	hpotts@estuaries.org
	hwhite@estuaries.org
Southeast Neighbors	Southeastneighbors@yahoo.com
Telemundo	cdepavia@telemundo.com
	dxmorale@telemundo.com
	nxgarcia@telemundo.com
	axsanche@telemundo.com
	ktmd_newsdesk@telemundo.com
Texas Commission on Environmental Quality	Ericka.Mccauley@tceq.texas.gov
Texas Fish and Game Magazine	aneves@fishgame.com
Univision	cmardones@univision.net
	smoncivais@univision.net
	univision45@univision.net
Village News Southwest	kballanfant@Village-Southwest-News.com
	MyNews@Village-Southwest-News.com
Your Town TV	jennifer_vogel@yourtowntv.com

Table 8. Number of impressions from most utilized print and digital media outlets

Media Outlet	Distribution Period	Impressions
Change Magazine (article)	July 2012	70,000 (70,000/month)
Dock Line Magazine (ad)	2012: Mar, Apr, Nov, Dec 2013: Jan, Feb, Mar	52,500 (7,500/month)
GBF Boater Waste Web Page	Oct 2011 – Mar 2013	665
GBF E-Newsletter (post)	2011: Oct 2012: Jan, Feb, May, Oct, Dec 2013: Feb, Mar	49,600 (6,200/month)
GBF Facebook Page (post)	2011: Nov 2012: Feb, Mar (3 posts), Apr, Jun (2 posts), Aug (3 posts), Sept (2 posts), Oct, Dec 2013: Feb, Mar (4 posts)	40,000 (2,000/day)
GBF Gazette (article)	2011: Quarter 3	16,800

	2012: Quarter 1/2/3	(4,200/quarter)
GBF GBAN Launch Page	Oct 2011 – Mar 2013	128
GBF GBAN Web Application	Aug 2012 – Mar 2013	212
GBF Online Pump-Out Guide	Sep 2012 – Mar 2013	5,000
GBF Online Water Monitoring Map	Aug 2012 – Mar 2013	2,000
GBF Main Page (post)	Oct 2011 – Mar 2013	45,000 (2,500/month)
GBF YouTube Videos (Pump Don't Dump: Maritime Sanitation, Marina Del Sol, South Shore Harbour, How To Pump Out Your Boat)	Oct 2011 – Mar 2013	9,672
Houston Boat Show Program (ad)	2012: Jan 2013: Jan	150,000 (75,000/show)
Southwest International Boat Show Program (ad)	March 2012	13,000 (13,000/show)
The Boater's Directory (ad)	2011-2012 issue 2012-2013 issue	100,000 (50,000/issue)
YourHoustonNews.com (article)	2013: Mar	40
Wired.cc (article)	2012: Apr, May 2013: Mar	7,500 (2,500/month)
* Total Impressions:		562,117

* Total impressions is likely higher due to press releases picked up by online and print media that were not able to be tracked

Clean Water Partnerships

GBF continued to develop a model for Clean Water Partnerships with marinas through our partnership with Marina Del Sol during Cycle 16. In addition, a new partnership with Pelican Rest Marina was launched in February 2013. GBF worked with the marina owners/managers to determine their goals for the program and to plan workshops and projects to meet these goals. Marina Del Sol's focus is to engage their live-aboard boaters in the partnership and Pelican Rest Marina is focused on engaging kids at the marina and restaurant.

Marina Del Sol has hosted several presentations and Water Monitoring Team training events for both their tenants and outside audiences (**Tables 6 and 9**), as well as installed two pet waste stations (**Figure 19**) and a rain barrel to decrease pollution from stormwater runoff (Note: Rain barrel funded by a different grant). They also have three certified GBF Water Monitors and a fourth person that assists them with monthly sampling at one site in the marina (one marina manager and



Figure 19. Pet waste station installed at Marina Del Sol

three live-aboard boaters) (**Figure 20**). They recently completed GBF's Bacteria Sampling certification class and have collected two bacteria samples to date. GBF will continue to hold presentations at the marina and carry out education booths at some of the marina's annual events. We will also be helping the marina manager develop a more extensive bacteria sampling plan to help them get a better overall picture of water quality in the marina, and encouraging them to utilize GBAN for submitting sewage discharge reports in addition to reporting it to the authorities.

Pelican Rest Marina has established "No Pet Zones" on their property and installed one pet waste station in a fenced off dog park that they set aside for their tenants (**Figure 21**). They have also installed storm drain markers (in-kind donation) to meet the Clean Texas Marina program requirements (**Figure 22**). GBF is currently working with them to plan their partnership outreach events.



Figure 20. Marina Del Sol's GBF Water Monitors completing their training in the marina



Figure 21. Pet waste station installed at Pelican Rest Marina dog park



Figure 22. Storm drain markers installed at Pelican Rest Marina

Galveston Bay Action Network (GBAN)

This new web tool is creating a lot of buzz around the Clear Lake/Galveston Bay waterfront community. GBF has found the most successful distribution tool to be the GBAN plastic wallet cards (**Figure 6**) because it is something that people are likely to keep with them. The main goal of GBAN is to educate citizens on how and where to report boat sewage discharges and other common water pollution incidents. The workgroup's theory is that more citizens reporting discharge incidents will open the eyes of marina owners, boaters, and enforcement agencies to the reality of the boater waste issue. Having a central location for these reports to be mapped allows GBF to determine if there are repetitive problem areas that we can then present to enforcement agencies to monitor. The reports in and of themselves will likely not result in direct



Figure 23. Photos submitted to GBF with a boat sewage discharge report in Watergate Yachting Center

enforcement action since it is difficult to document discharges in real-time, but this evidence will help GBF approach enforcement agencies with a concrete plan and recommendations for checking boats for secured discharge valves and registered marine sanitation devices.

GBF began distributing GBAN cards in March and three of our partners have stepped up and started reporting sewage discharges in two local marinas. See **Figure 23** for photos submitted with one of these reports that took place in Watergate Yachting Center. GBF posted these photos on our Facebook page and the word spread because one of our yacht broker partners notified us that shortly after the post went up, the

marina sent out one of their staff members to scoop the sewage out of the water and discard it in the trash. GBF did not initially name the marina where the report came from, but inevitably one of our followers asked for the location. We shared the marina name, but were sure to point out that this is a problem in many marinas, not just in Watergate. The toughest issue to overcome with GBAN is that people are still not comfortable with openly reporting these incidents for fear of business or personal repercussions. GBF hopes that as GBAN usage continues to grow, this fear will lessen as they realize that our ultimate goal with GBAN is to keep our water fishable and swimmable through the transparent exchange of information, not to see people suffer from being fined or from hurting businesses. This transparency should be similar to a neighborhood crime watch program and result in safer and more desirable marinas, thus improving businesses.

GBF Water Monitoring Team

There are four main goals for collecting water quality data through GBF’s Water Monitoring Team for the BWEC:

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

During Cycle 16, GBF launched our Water Monitoring Team (WMT) which included everything from becoming Texas Stream Team Certified Trainers, hiring a part-time Water Quality Intern, and then a full-time Water Quality Program Assistant, to developing training materials, ordering equipment, setting up the GBF Bacteria Monitoring Lab, and training volunteers. **Table 9** shows the group training events that GBF held during this cycle. In addition, each volunteer that decided to complete their certification received a one-on-one Phase III certification session at their site with a GBF staff member to ensure that they are able to carry out the procedures accurately. The WMT currently has 21 certified monitors at 24 sites around Clear Lake and Galveston Bay and these sites are displayed in **Figure 24**. This number fluctuates up and down as volunteers decide not to monitor or as new ones complete Phase III certification. Around 66% of these monitors are consistently turning in monthly or bi-monthly data. This percentage has gone up by 26% since launching the Bacteria Sampling Certification because volunteers are required to turn in at least 3 consecutive months of data in order to qualify to become bacteria samplers. This requirement, coupled with the fact that bacteria sampling requires regular communication with GBF staff for dropping off samples, has been very beneficial to the overall volunteer program. As of March 2013, GBF had 14 certified bacteria samplers, several of which also assist with data entry.

Table 9. GBF Water Monitoring Team events

Date	Event	Location	Representative	Impressions
2/2/2012	Phase I and II training class	Watergate Yachting Center	Charlene Bohanon	8
4/21/2012	Phase I and II training class	Marina Del Sol	Charlene Bohanon	8
9/14/2012	Phase I and II training class	Star Fleet Yachts	Charlene Bohanon, Teresa Long, and Matthew Abernathy	24
1/31/2013	Volunteer appreciation event and bacteria sampling training	GBF Conference Room	Charlene Bohanon and Katie McCann	6
2/11/2013	Volunteer appreciation event and bacteria	GBF Conference Room	Katie McCann	2

	sampling training			
3/9/2013	QC and bacteria sampling training	Marina Del Sol	Charlene Bohanon and Katie McCann	10
3/22/2013	Phase I and II training class	Star Fleet Yachts	Charlene Bohanon, Katie McCann and volunteer monitor assistant	14



Figure 24. Current monitoring sites of the GBF Water Monitoring Team

GBF Water Monitors supposed to sample their site(s) on at least a monthly basis for the following core parameters: temperature, salinity, pH, dissolved oxygen, water transparency, and

field observations. GBF currently has all of the volunteer data for these core parameters and bacteria samples entered into our internal database and have begun to analyze it in preparation for a presentation we will give to the WMT at their quarterly appreciation event in May 2013. Preliminary bacteria data is shown in **Figure 25** for ten sites on Clear Lake and Galveston Bay. The number of data points is limited and further analysis is needed to determine the reason for the bacteria exceedance for primary contact recreation (swimming, boating, etc.) at the San Leon site, but this figure is included to show that the GBF Bacteria Monitoring Lab is up and running at multiple sites and that the data has been entered into our internal database. Data collection will continue in Cycle 17 of the BWEC, which will allow GBF to collect more continuous data and analyze it further. In addition, GBF will carry out focused bacteria sampling at select marinas that would like a more detailed look at bacteria concentrations than can be offered by monthly sampling.

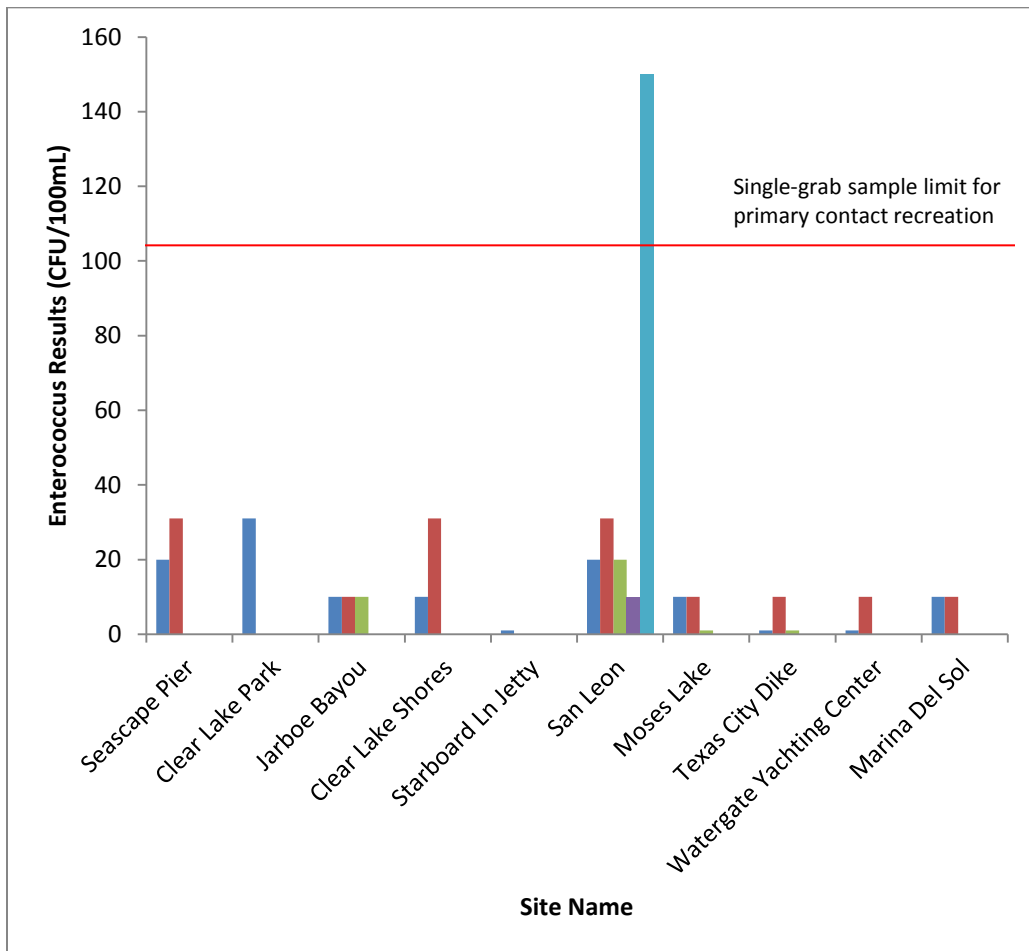


Figure 25. Single grab Enterococci concentrations at select GBF monitoring sites

Conclusions and Lessons Learned

Cycle 16 was a huge leap forward for the BWEC through the development and tracking of more detailed performance indicators, increased involvement from partners in the boating industry, improved campaign graphics due to the hiring of GBF's new Marketing Coordinator, creation of the Galveston Bay Action Network web application, launch of Clean Water Partnerships with marinas, and the setup and launch of GBF's Water Monitoring Team and Bacteria Monitoring Lab.

The performance indicators presented in this report will serve as a way for GBF to plot our results over time and compare the campaign results from year to year. To summarize our major findings, 80% of the organizations on the BWEC workgroup attended meetings regularly and directly contributed to campaign activities, such as certifying Clean Texas Marinas, distributing BWEC education packets, and submitting sewage discharge reports to GBAN. Through education booths, presentations, and workshops, the BWEC reached over 284,000 people at live events. Through print and digital media outlets, GBF was able to reach over 560,000 people with the Pump Don't Dump campaign message. GBAN reporting is still in its beginning stages, but GBF has established a relationship with three of our partners who report sewage discharges when they see them. In the past 16 months since launching the GBF Water Monitoring Team, GBF has 21 certified volunteer monitors at 24 sites around Clear Lake and Galveston Bay. The retention rate of volunteer monitors who submit regular data has increased by 26% since launching our Volunteer Bacteria Sampling Program, with the program currently standing at 14 certified bacteria samplers.

In addition to this data, the BWEC project area saw an increase in the number of Clean Texas Marinas either certified or pledged into the program (**Figure 26**), an increase in the number of marine sanitation devices registered with the TCEQ Clean Water Certification program (**Figure 27**), and an increase in the number of pump-out stations on Galveston Bay (**Figure 28**)! The biggest win by far is the increase in pump-outs, which the workgroup has been striving for years to see happen.

Overall, GBF and the workgroup are pleased with the advances that have been made to the campaign. The information collected during this cycle will assist us as we continue to strive for Texas Parks and Wildlife and local marine safety officers to enforce existing boater waste laws. GBF recognizes that the BWEC is a complex balance of education and advocacy efforts and we look forward to continuing work on this project. Thank you to the Coastal Management Program and NOAA for your ongoing support of this important environmental, economic, and public health issue.

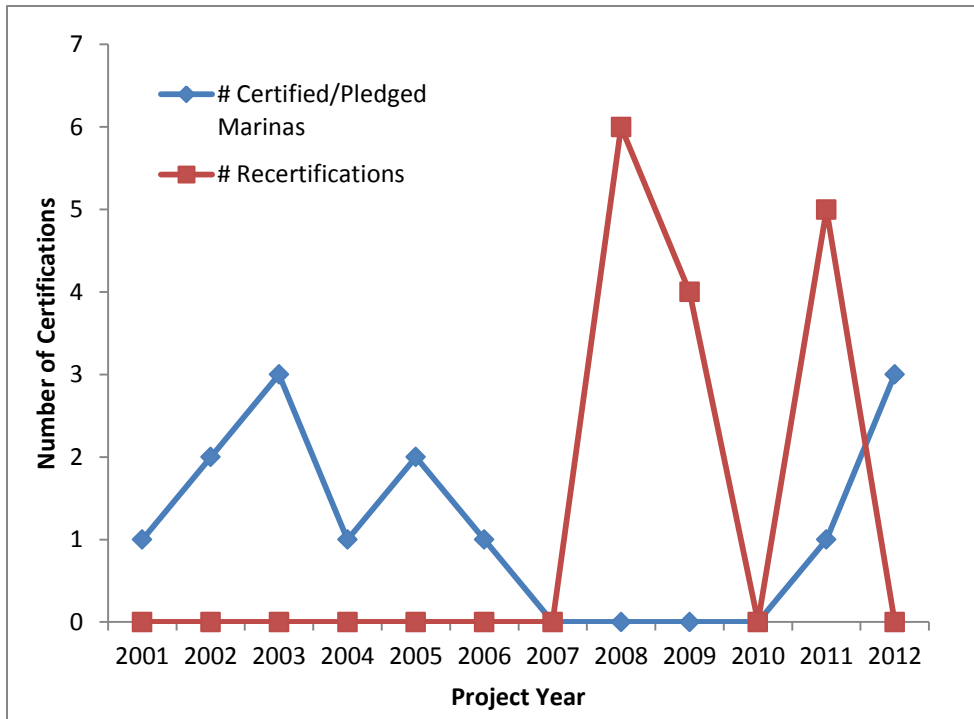


Figure 26. Number of Clean Texas Marinas certified and/or pledged over time

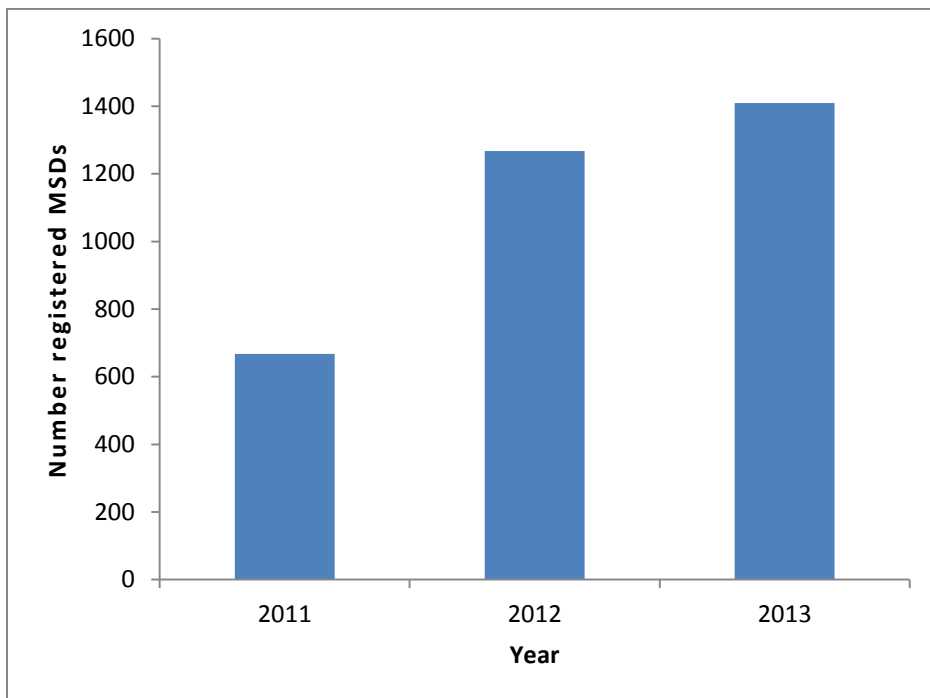


Figure 27. Number of registered marine sanitation devices (MSDs) with TCEQ's Clean Water Certification program

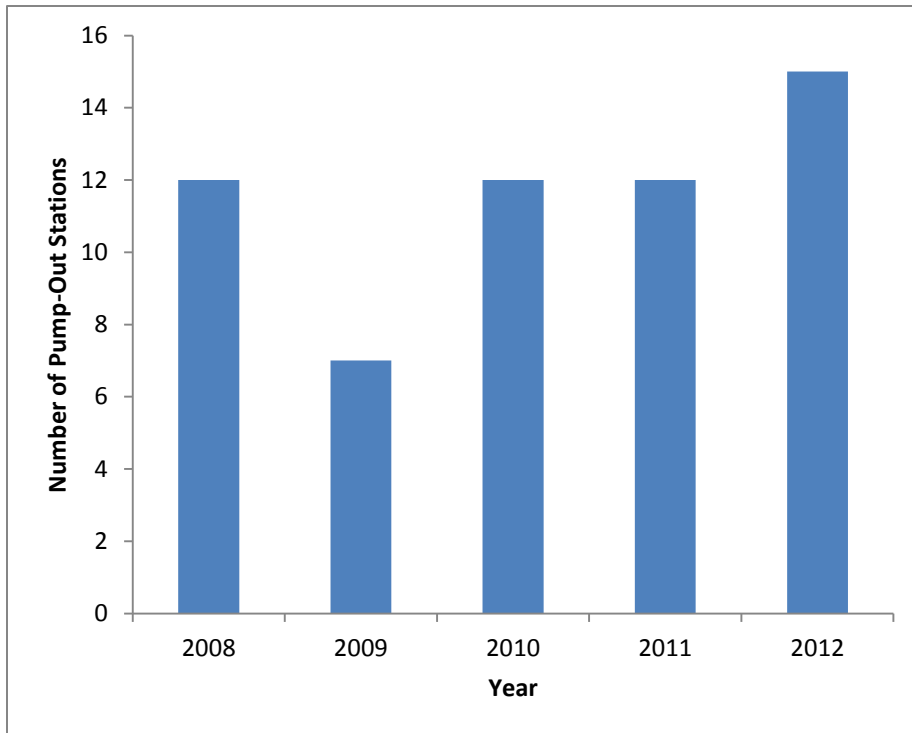


Figure 28. Number of pump-out stations on Clear Lake and Galveston Bay

Appendix I, II, and III (see attachments)

BWEC Cycle 16 Tasks, Goals, and Performance Measures

Tasks	Goals	Performance Measures
1.) Maintain active workgroup	Maintain stakeholder interest and effectiveness of the workgroup	Percentage of stakeholders consistently attending workgroup meetings Percentage of workgroup members assisting with campaign tasks
2.) Develop marketing and outreach materials	Increase effectiveness of BWEC presentations and educational booth events	Presentations revised to connect with specific audiences and call them to action Number of presentations given during project period Number of people reached through presentations, outreach programs and workshops Number of educational booth events that incorporate interactive components
3a.) Develop outreach schedule and distribution plan	Maintain campaign presence in print, radio and TV media outlets	Number of ads, articles, interviews, press releases, TV/radio spots released during project period Number of outlets/campaign materials distributed Number of impressions from campaign materials
	Sustain a core group of active volunteers for the BWEC	Number of active volunteers involved in BWEC Number of marina partnerships formed during project period Number of active volunteers reporting illegal sewage discharges
3b.) Track behavior/knowledge change and resulting environmental improvements	Increase awareness of boater waste issues and engagement in proper waste disposal	Marina partnership pre/post survey, GBAN site visits/reports Number of participants in project area signed up for Clean Texas Marina Program Number of public pump-out stations that received funding for installation Number of citations issued for illegal discharges Volunteer water quality data trends Overall bacteria concentrations in Galveston Bay reported by professional monitors

GBF GAZETTE



Volume 21, Issue 3

Fall 2011

Inside this issue:

- From the President	2
- Guardian of the Bay Luncheon	3
- Progress Made on Seafood Consumption Advisory Education	4
- San Jacinto River Waste Pits Superfund Site Update	5
- Sundance Cinema Houston Pre-Opening Event	5
- Bike Around the Bay	6
- Bike Around the Bay Photos	7
- Bike Around the Bay Top Fundraisers	8
- Shoreline Protection at Anahuac NWR	8
- Welcome New Staff	9
- 2011 Redfish Raft Up	9
- Wildlife Workdays	10
- Spotlight on Shell Oil Company	11

Save these dates!

January 6-15, 2012
Houston Boat Show

January 18, 2012
Galveston Bay Water Quality Public Meeting

February 18, 2012
Abandoned Crab Trap Removal

March TBD
Trash Bash

Partnering with the Community for Improved Water Quality

If there is one positive result from the current drought in Texas, it is that water has been put in the forefront of people's minds. With nearly 4.5 million people living in the five counties surrounding Galveston Bay, the amount of influence each person has on water quality is only going to increase in significance as our population continues to increase. Now is the perfect time to engage the community in improving water quality, and that is just what the Galveston Bay Foundation is doing.

Forming Clean Water Partnerships with local organizations has allowed GBF to take an on-the-ground approach to water quality outreach that we believe will provide the best possible outcomes. For many in the general public, these issues are intangible or "out of sight, out of mind," which makes it more difficult to inspire behavior change. The main goals of GBF's Clean Water Partnerships are to get people's hands wet and for them to realize the importance of this somewhat abstract topic, as well as how they can help. Some of the activities that partners can choose to participate in to improve water quality are partnership launch events, specialized workshops, volunteer water quality monitoring, and the implementation of best management practices.

The foundation of these partnerships will be centered on meeting the participating organization's "triple bottom line," which is a balance of the environmental, economic and social factors that contribute to an organization's sustainability. With that being said, GBF Clean Water Partnerships will

be tailored to meet the specific needs of the partner organization. For example, water quality concerns at a marina are going to look very different than those of a neighborhood homeowner's association in terms of their triple bottom line. GBF will sit down with each partner and develop a plan that takes this into consideration.

The primary issue that GBF will address in our Clean Water Partnerships is bacteria inputs into our water bodies. Over 50% of Texas' surface waters are impaired by bacteria to some degree. In our region, specific areas of Upper and Lower Galveston Bay, East and West Bay, Chocolate, Christmas and Bastrop Bays, and Oyster Lake are impaired with bacteria levels that restrict oyster harvesting. Galveston Bay provides invaluable resources to our community such as tens of thousands of jobs, more harvested oysters than any single water body in the U.S., natural shoreline protection, and nursery habitat for a diverse variety of plants and animals. The aim of GBF's Clean Water Partnerships is to preserve, protect, and enhance these resources so that the bacteria levels decrease, instead of increase. At this time, it is still safe to use Galveston Bay waters for recreational activities such as swimming, fishing, surfing and boating. GBF and its stakeholders would like to see it remain that way for years to come.

For more information or for your organization to become a GBF Clean Water Partner, contact Charlene Bohanon at cbohanon@galvbay.org or 281.332.3381, ext. 215.

Recreational Boaters Monitor Water Quality

On February 2, GBF partnered with the Houston-Galveston Area Council to train GBF's first group of Texas Stream Team volunteer water quality monitors.

The group was comprised of GBF staff, volunteers, and representatives from Sea Lake Yachts, Marina Del Sol and Redfish Island Marine. Those present learned about their watershed and non-point source pollution, and were trained to measure temperature, salinity, pH and dissolved oxygen in order to become certified Texas Stream Team monitors.

In the future, these monitors will also be trained to sample for bacteria, which is a main pollutant of concern in Galveston Bay. These volunteers will collect and test water samples at least one time per month in order to augment professional data and aid GBF in tracking water quality changes as we implement our Clean Water Partnership program with organizations throughout

the Galveston Bay area. GBF is excited about the enthusiasm that these recreational boating organizations showed and look forward to expanding their team to include additional boaters, homeowners, businesses, students and teachers.

GBF would like to thank Watergate Yachting Center for their generous donation of the workshop venue. Please contact Charlene Bohanon, cbohanon@galvbay.org, if you would like information on how to join GBF's water quality monitoring team and/or for your organization to become a Clean Water Partner.



Doug Hughes & Mike Shebester (Sea Lake Yachts) & Kristian Rogers, Joshua Gunn & Erika Watson (GBF volunteers & staff) carry out tests to measure dissolved oxygen levels in water samples from Clear Lake.

IN THIS ISSUE:

SPRING / SUMMER 2012



*Oyster Shell Recycling
and Reef Restoration
Project Updates*

PAGE 3



*Bike Around the Bay
Improves for 2012*

PAGE 8



*Backing the Bay at
Bay Day 2012*

PAGE 9



*Four Acres Planted at
Marsh Mania*

PAGE 12

GBF GAZETTE

GALVESTON BAY FOUNDATION



GBF LAUNCHES FIRST CLEAN WATER PARTNERSHIP

The Clean Water Partnership launched in April 2012 with Marina Del Sol as the first partnering organization.

The Galveston Bay Foundation recently launched its new Clean Water Partnership program, a community-led effort to create change towards improved water quality. The first partner organization, Marina Del Sol, is leading the way with the help of its proactive marina management team and supportive local businesses like Maritime Sanitation and Redfish Island Marine. Marina Del Sol recently sponsored the official launch party for GBF's Clean Water Partnership program, giving GBF the opportunity to introduce marina tenants to the program with a festive crawfish boil, blues band, and raffle prizes.

The program attempts to address the impaired water quality in Galveston Bay, specifically, high bacteria levels in several portions of the Bay which has led them to be deemed restricted shellfish harvesting areas. Through collaboration with Marina Del Sol and various other organizations, GBF aims to decrease the amount of bacteria reaching Galveston Bay and to keep our waters clean for present and future enjoyment. "Partnering with GBF has allowed us to reach out to many of our marina members, because like GBF, Marina Del Sol is committed to keeping Galveston Bay clean. We will continue to work with GBF in hopes of reaching more organizations to support our clean marina efforts," stated Marissa Ochoa, Marina Del

Sol marina manager.

Marina Del Sol's partnership will be driven by the marina staff and boaters through regular Bay Ambassador meetings with

"This program will ...provide an avenue for carrying out effective outreach that will benefit Galveston Bay, and ultimately the community."

-Charlene Bohanon

GBF Water Quality Outreach Specialist

GBF staff, where they will guide the types of workshops and activities that will take place. In addition, volunteers will collect water quality data through the Texas Stream Team program and survey data through a volunteer Dockwalker program in order to measure behavior, attitude,

and knowledge change throughout the partnership. Charlene Bohanon, GBF's Water Quality Outreach Specialist, feels that "this program will allow GBF to build valuable relationships around the Bay and provide an avenue for carrying out effective outreach that will benefit Galveston Bay, and ultimately the community." Please visit www.galvbay.org if your organization would like to learn more about how it can help preserve, protect, and enhance Galveston Bay through the Clean Water Partnership program.

Marina Del Sol managers, Marissa Ochoa (left) and Amber Treybig (right), accept a certificate from GBF's Water Quality Outreach Specialist, Charlene Bohanon, signifying their official participation in GBF's Clean Water Partnership program.



In This Issue:

Winter 2013



GBF Young Professionals Group Growing
PAGE 2



2012 Bike Around the Bay a Great Success
PAGE 3



GBF Creates Water Quality Reporting Site
PAGE 6

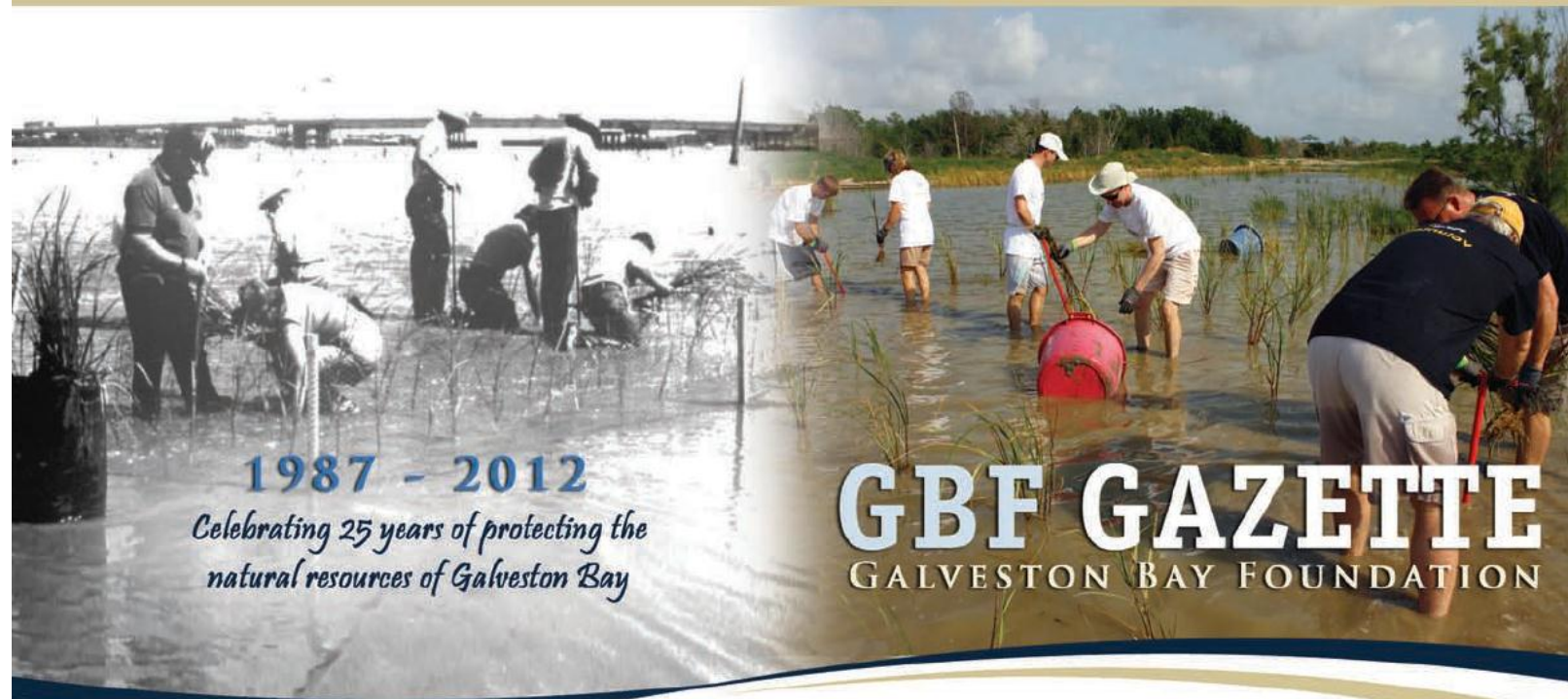


Spotlight on GBF Volunteers
PAGE 10

1987 - 2012

Celebrating 25 years of protecting the natural resources of Galveston Bay

GBF GAZETTE
GALVESTON BAY FOUNDATION

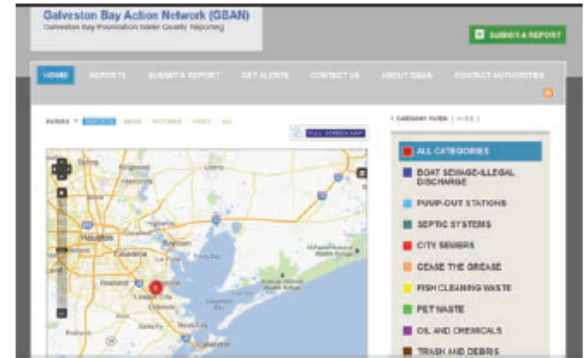


GBAN CREATED FOR WATER QUALITY REPORTING

Galveston Bay Action Network (GBAN) tracks water pollution reports and positive actions to improve water quality

Have you ever wondered who to call when you see water pollution, or what happens after you report a potential violation to an enforcement agency? GBF has developed the Galveston Bay Action Network (GBAN), a web app that allows you to map your water pollution reports and send them to GBF and provides links to contact information for submitting reports to local authorities. Submitting a GBAN report is quick and simple, can be done from a computer or smartphone, and allows you to upload a video or photo of the incident. GBAN also contains categories for reporting positive actions that you take to keep our water clean, such as picking up trash and properly disposing of cooking grease. You can even choose for your report to be posted anonymously, which is an attractive option for those who want to do the right thing but may not be comfortable with their name being broadcast.

The goal of GBAN is to use the power of internet technology and citizen involvement to make reporting water quality concerns easier. GBF believes that community members can be extremely powerful advocates for clean water when they know their efforts are leading to positive results for our bay. GBAN has the ability to bridge the communication gap between citizens submitting a report and enforcement action being taken by allowing GBF to track and follow up on these reports. As a GBAN user, you will have the option to setup a profile page for managing your reports and can earn badges in recognition for your reporting activity. You can also choose to receive email alerts when new reports are posted by selecting your area of concern on the map and specifying the types of reports that interest you.



Those wishing to report water pollution or view our interactive map, can visit www.galvbay.org/gban.html

Check out the Galveston Bay Action Network at www.galvbay.org/GBAN and start submitting reports and positive actions today! For questions or to request for your group to receive a live demo, contact Charlene Bohanon at cbohanon@galvbay.org. Please help us spread the word about GBAN and recruit your friends to “Be the Eyes on Your Bay!”



FOR IMMEDIATE RELEASE

CONTACT: Trey Bartsch
281-332-3381, x208
tbartsch@galvbay.org

Clean Texas Marina of the Year Awarded to Marina Del Sol for Project with the Galveston Bay Foundation

Webster, TX – March 25, 2013 – Marina Del Sol was given the 2012 Clean Marina of the Year Award for the State of Texas for its efforts to improve water quality through a partnership with the Galveston



Amber Mckenna with Marina Del Sol (L) accepts the 2012 Clean Marina of the Year Award from Dewayne Hollin with Clean Texas Marina Program, and Lynda Hall with the Marina Association of Texas.

Bay Foundation (GBF). This award is part of the Clean Texas Marina Program through Texas Sea Grant. Each year, marinas apply for the award based on a specific project they are implementing to benefit the environment. Marina Del Sol's ongoing Clean Water Partnership with GBF focuses on reducing pathogenic bacteria entering the water, which can come from boat sewage in addition to other land based sources like pet waste and sewer overflows. GBF regularly receives reports across Clear Lake and Galveston Bay regarding illegal boat sewage discharges into the water and the staff at Marina Del Sol is taking proactive steps to ensure that its tenants are educated on the issue and are helping to keep our bay fishable and swimmable.

Marina Del Sol manager, Amber Mckenna said, "As a result of the partnership between

Marina Del Sol and GBF, our members have become more aware of keeping the water clean. The hands-on training and guidance from GBF has made water quality fun for everyone. We have decided to continue with the partnership because as long as new boaters come to the area, there will be a need for continuing education on clean water practices." Marina Del Sol staff and tenants are trained as volunteer water monitors to sample in the marina each month. They also conduct monthly bacteria sampling and record visual observations when they notice scum on the water surface. GBF has provided the marina with signs listing the boat sewage laws and numbers for



Marina Del Sol hosted a quality control training session for GBF's Volunteer Water Monitoring Team in March.

reporting illegal discharges to authorities. Tenants also receive training on how to record their reports on the Galveston Bay Action Network (www.galvbay.org/gban), which is a web app that enables GBF to track pollution reports. GBF carries out regular outreach events for the tenants and works with the staff to implement action projects, such as installing pet waste stations and storm drain markers in the marina.

Boating is a way of life for many along the Upper Texas Coast, particularly in Clear Lake and Galveston Bay. Boasting 30 marinas and over 8,000 boat slips, a coastline dabbled with waterfront homes and private docks, and numerous public boat ramps, Clear Lake and Galveston Bay are a source of enjoyment for the many people who reside and recreate here. Special thanks go to Marina Del Sol for being committed to protecting our valuable resources. For more information on Marina Del Sol's Clean Water Partnership, you can contact Charlene Bohanon, GBF's Water Quality Outreach Specialist, at cbohanon@galvbay.org.

This project is funded in part by a grant approved by the Texas Land Commissioner pursuant to National Oceanic and Atmospheric Administration Award No. NA12NOS4190021, the U.S. EPA's Urban Water Small Grant Program, and through the TCEQ's Total Maximum Daily Load Program.

About Galveston Bay Foundation

The mission of the Galveston Bay Foundation is to preserve, protect, and enhance the natural resources of the Galveston Bay estuarine system and its tributaries for present users and for posterity. The Foundation was incorporated in 1987, and is a non-profit organization under Section 501 (c)(3) of the Internal Revenue Code. GBF is located at 17330 Highway 3 in Webster, Texas. For further information contact GBF at 281-332-3381 or visit the website at www.galvbay.org.



Marina Del Sol provides their tenants with outreach materials from GBF's Boater Waste Education Campaign.

###

8th Continent • Health of Galveston Bay • The Winter Family Farm • Fresh Water Shortages
Hijacking Democracy • Limit Household Toxins • Do-It-Yourself Rain Barrels • AND MORE!!

your source for inspiration

change

July 2012

Clear Creek Winery

Award-winning wine
produced in Kemah

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CHOICE**

Best Magazine Articles
in the Bay Area!

Our Annual Water Issue!



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change **ONLINE!**

ChangeMediaOnline.com

harmful to humans.”

Oyster reefs are vital in maintaining the Galveston Bay ecosystem because they help prevent erosion and provide habitat for invertebrates and bottom-dwelling fish, which attract larger game fish upon which the Bay’s thriving recreational fishery is founded.

With the drought behind us, “looking at least from the southern, lower part of Galveston Bay to about mid-Bay, the salinities are ranging between 12 to 18 parts per thousand, which should be adequate salt to promote reproduction. Oysters in mid-bay that I’ve gotten off commercial oyster reefs are developing reproductive organs real well. If we get a lot of rain, and drops in salinity, it will inhibit spawning, and they may not spawn until mid-summer or late-summer.”

Federal, state and local organizations—including the Texas Parks and Wildlife Department and the Galveston Bay Foundation—are working on reef restoration projects, but such projects alone are not a panacea for repairing the fragile ecosystem.

Ultimately, the health of Galveston Bay has a direct impact on the health of the local economy, Bohanon says.

Not only does its natural beauty draw millions of visitors with dollars to spend at local businesses, she says, “The recreational and commercial fishing industries combined are valued at over \$3 billion annually and support over 40,000 jobs in the area.”

Bohanon says the sunny side is that some of the water quality problems can be solved if everyone acts responsibly—and shows respect to the Bay for all it provides.

A key component in improving the Bay’s health is for the public to have an appreciation of the vital and a nationally significant estuary in their own backyard.

“The most important thing is for more people to just get out and swim, float, paddle, and fish on our Bay,” she says. “The more that people view Galveston Bay as a valuable place they can call their own, the more successful any attempt to improve its health will be.”

Best Boating Practices

Charlene Bohanon, the Galveston Bay Foundation’s water quality specialist, also leads the organization’s Boater Waste Education Campaign.

“One of the main concerns of recreational boating on Clear Lake and Galveston Bay is the issue of properly disposing of boat sewage,” Bohanon says.

Discharging boater sewage into the water can introduce disease-causing microorganisms that are vectors for diseases such as hepatitis A, typhoid and cholera. Additionally, sewage can lead to depressed oxygen levels resulting in fish kills.

Clear Lake is a federally-designated No Discharge Zone, which means it is illegal to discharge both treated and untreated sewage into Clear Lake. Additionally, it is illegal to discharge untreated waste into Galveston Bay.

“There are 28 marinas in the Galveston Bay/Clear Lake area, most of which are located on Clear Lake, which has the third highest concentration of privately-owned marinas in the U.S.” However, there are only nine public and four private pump-outs in the area, which mean 50 percent of the marinas have no pump-out facility.

“Boaters in those marinas must either hire a mobile pump-out service or travel to the nearest marina with a public facility,” she says. “Aside from obeying the law and pumping out their boats, GBF asks boaters to join us in encouraging local government officials to pass ordinances requiring all marinas to have functioning pump-out facilities—and that enforcement agencies actually issue citations to those boaters who are discharging sewage into our bay.”

According to the Texas Commission on Environmental Quality (TCEQ) website (<http://m.tceq.texas.gov>), violations of the Clean Water Certification Program can be enforced under the Texas Water Code, with administrative penalties of up to \$25,000 per day, as well as under



the Texas Parks and Wildlife Code, in which the violator faces a Class C misdemeanor charge and fines of up to \$500. To report a violation, call 1-888-777-3186.

In addition to encouraging boaters to obey laws governing speeding, littering and discharges, the Galveston Bay Foundation offers the following tips on how to be an environmentally friendly boater:

- Recycle cans, glass, plastic, newspapers, antifreeze, oil, and lead batteries.
- Do not let trash blow overboard. Trash must be retrieved.
- Keep your engine well tuned to prevent fuel and oil leaks.
- Prevent fuel spills by filling fuel tanks slowly and use absorbent pads or rags to catch drips and spills. Leave the tank 10 percent empty to allow fuel to expand as it warms.
- Wash your boat frequently with a sponge and plain water. Use phosphate-free, biodegradable and non-toxic cleaners.
- Establish a regular maintenance schedule for marine sanitation devices based on the manufacturer’s recommendations.
- Do not throw fish waste into marina waters. Discard waste over deep water or in the trash, or save fish waste and use as chum or bait.
- Proceed slowly in shallow areas (wake can lead to shoreline erosion), do not disturb wildlife, and avoid contact with submerged aquatic vegetation.

For more information about clean boating, visit www.cleanmarinas.org.

THE *Beauty* OF OUR *Bay*

Clean Water Partnership promotes environmental stewardship

By Donna Gable Hatch

There is no denying the intrinsic beauty of Galveston Bay, but nature often needs a helping hand to maintain a long-term, sustainable relationship with the nearly 4.5 million people who live in the five counties that surround the Bay.

A variety of human and natural causes, such as severe drought or flooding, can wreak havoc on the Bay, and that's why the Galveston Bay Foundation created a program that encourages organizations to become stewards of the Bay.

The Clean Water Partnership program, which launched in May 2012, is designed to let people "get their hands wet" in the effort to address important environmental issues in and around the Bay, says Charlene Bohanon, the foundation's water quality outreach specialist and team leader on the program.

"The goal is to engage community organizations in their environment...provide educational opportunities that will lead to behavior change, and to help partners take action in practical ways that can benefit Galveston Bay," Bohanon says. "Through collaboration with various organizations—from schools and Scout groups to homeowner associations and local businesses—GBF works with partners to offer hands-on workshops, classes and events, and to implement projects that can reduce bacteria levels entering the Bay."

Bohanon adds, "Some of our biggest water quality problems are caused by actions that do not seem to be a big deal on an individual level and really add up over time. It is going to take

everyone getting onboard to make a difference."

Galveston Bay Foundation launched its first partnership in April with Marina Del Sol in Kemah, "and we have a couple other partnerships in the works."

To get involved or become a partner, contact Charlene Bohanon at cbohanon@galvbay.org or visit www.galvbay.org.



Pelican Rest Marina accepts their Clean Texas Marina flag. (Left to right) Marita Schultz (marina owner), Lynda Hall and Helen Paige (representing Clear Lake Marina Association and Marina Association of Texas), Dewayne Hollin (Texas Sea Grant Clean Texas Marina program).



Volunteer Water Monitoring Team

GBF's Volunteer Water Monitoring Team conducts regular sampling around Galveston Bay that includes chemical analyses, physical testing, and field observations. This creates a unique portrait of water quality parameters for each particular site and moment in time. Over time, trend analysis provides many clues and can facilitate early identification of potential water quality issues. Our volunteers commit to the following:

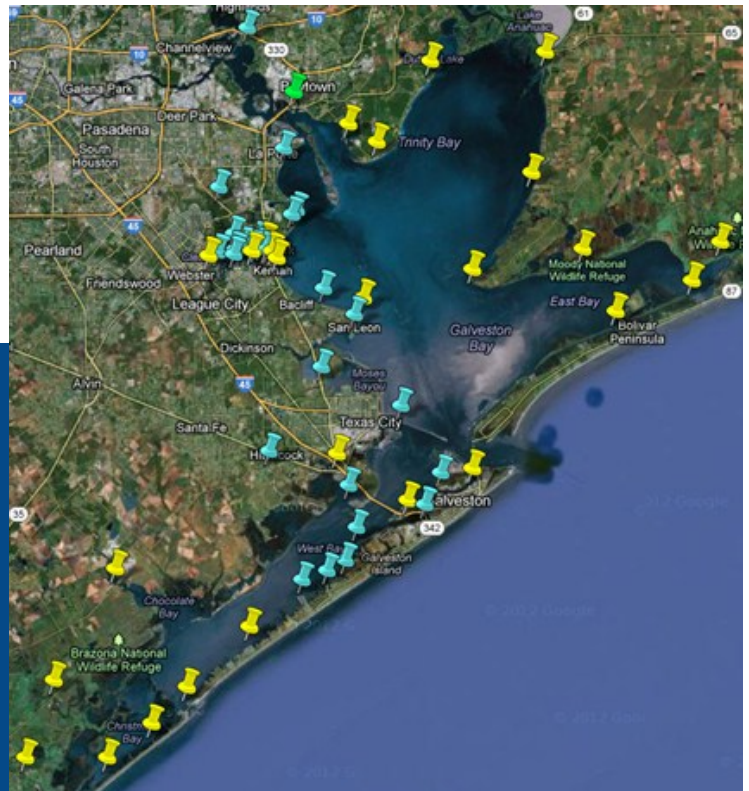
- ◆ Complete three phases of training (10 to 12 hours total)
- ◆ Monitor their site(s) at the same time each month for at least 2 years (1 to 2 hours per site)
- ◆ Submit their completed data sheet(s) promptly each month
- ◆ Complete quality assurance training one time per year (1 to 2 hours)
- ◆ Have fun!!

All training and equipment is provided by GBF, as well as opportunities to participate in other hands-on water quality projects as they become available. For more information and upcoming training dates, contact us at waterquality@galvbay.org or 281-332-3381 x215.



GBF's Volunteer Water Monitoring Team is part of the statewide Texas Stream Team program.

Volunteers currently monitor sites around Galveston Bay marked with blue pins. Yellow pins denote potential sites for new monitors, but feel free to suggest other sites as well!



www.galvbay.org

17330 Highway 3
Webster, TX 77598
Phone: 281.332.3381
Fax: 281.332.3153



Texas Stream Team

Caring for Our Waters

Record Before Monitoring

Tide Stage

Days Since Last Significant Precipitation

Total Rainfall in Last 3 Days (inches)

Bacteria sample (if applicable) must be collected before proceeding

Water Temperature, Clarity, Color, & Odor

1. Place thermometer in bucket sample and gently stir for 1.5 minutes
2. Read thermometer while it is still in the water and record temperature
3. Observe and record clarity, color, and odor

Record Field Observations and Comments

Flow Severity

Water Conditions

Algae Cover

Present Weather

Water Surface

General Observations

Dissolved Oxygen (D.O.)

1. Rinse sample bottles and caps TWICE with bucket sample water, disposing of rinse water in the waste container
2. Fill both bottles with sample water (at the same time). Keep bottles below surface of the water
3. Cap the bottles **while still under water** and check for air bubbles
4. Put on safety goggles and gloves, then uncap sample bottles

Measure Field Parameters

Air Temperature

1. Hang thermometer out of direct sunlight
2. Record temperature after 2-3 minutes

Water Transparency

1. Remove sunglasses
2. Lower Secchi Disk in water until it disappears and mark depth
3. Raise disk until barely visible and mark depth
4. Average readings and record to the nearest 0.01 meter (example: 143 cm = 1.43 m)

Total Depth

1. Lower Secchi Disk into the water until cord becomes slack, then raise until straight
2. Record depth, in meters

Fixing the Dissolved Oxygen Sample

1. Add 8 drops Manganese Sulfate solution (pink) to each bottle
2. Add 8 drops Alkaline Potassium Iodide solution (clear) and cap both bottles
3. Slowly invert 25 times
4. Allow precipitate to settle below bottle shoulders
5. Invert 10 times and allow to settle again
6. Add 8 drops Sulfuric acid solution (red cap)
7. Cap both bottles and invert for a minimum of 3 minutes and a maximum of 10 min (until no precipitates are observed)
8. Sample is now "fixed" and can be finished at home within 6 hours if conditions warrant

Bucket Grab Sample

1. Rinse sampling bucket with water to be tested TWICE
2. Discard rinse water downstream of sampling point
3. Collect sample (in bucket) from a depth of 1 foot under the surface
4. Place bucket out of direct sunlight and wind while measuring all field parameters

Dissolved Oxygen Titration

1. Rinse sample vial TWICE with a small portion of sample #1
2. Dispose of rinse solution in waste container

3. Add 20 ml of fixed sample solution to the vial (measure at meniscus) and cap
4. Fill titrator syringe with Sodium Thiosulfate until tip base of the green plunger is at the 0 mark, expelling any air bubbles
5. Place titrator syringe into hole in sample vial cap
6. Add 1 drop at a time, swirling gently to mix, repeating until the solution turns a pale straw color
7. Uncap vial with titrator still inserted, tilting open and keeping tip suspended above the vial
8. Add 8 drops of Starch Indicator solution, cap vial and swirl to mix
9. Continue titration, adding one drop at a time and swirling until the solution becomes clear
10. Read total # of units to nearest 0.1 mg/L (amount of Sodium Thiosulfate used) and record results

11. Repeat titration for sample #2
12. Record results. Second result must be within 0.5 mg/L of first titration or you must repeat both titrations
13. Calculate the average of both titrations to nearest 0.1 mg/L and record (round up)
14. Rinse sample bottles, vial, and caps

pH

1. Rinse test tube and cap TWICE in bucket sample water
2. Fill test tube to indicator line with sample water
3. Add 10 drops Wide Range pH Indicator
4. Cap tube and invert 10 times
5. **Uncap test tube**, insert in viewer and hold up to white background for comparison
6. Read and record to nearest 0.1 su (standard units). Dispose of solution in waste container

White Background for Color Comparison

To Report a Problem:

Spills (24 hours)	(800) 832-8224
TCEQ Region 12	(713) 767-3500
Galveston Bay Foundation	(281) 332-3381
HGAC Water Concerns	(866) 779-2837

Submit data sheets to:
waterquality@galvbay.org
stream.team@h-gac.com

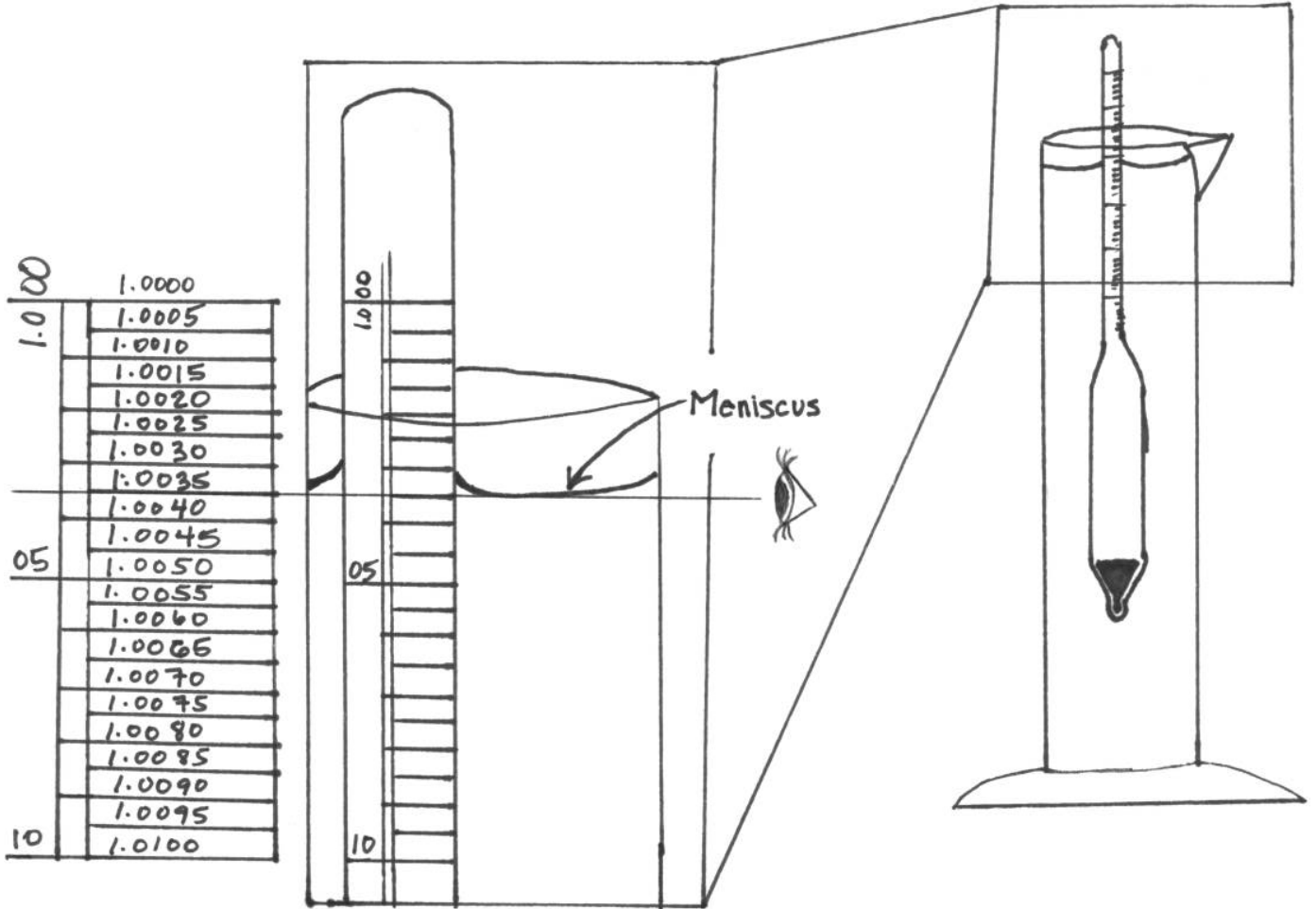
Water Quality Team
 Galveston Bay Foundation
 17330 Highway 3
 Webster, Texas 77598
 (281) 332-3381 x215





Measuring Salinity

1. Rinse the graduated cylinder, thermometer, and hydrometer TWICE with bucket sample water.
2. Dispose of rinse solution in waste container.
3. Fill the graduated cylinder with bucket sample water.
4. Hang the thermometer in the graduated cylinder so that it is totally submerged.
5. Lower the hydrometer into the graduated cylinder. Make sure it does not touch the thermometer or sides of the graduated cylinder.
6. Allow the hydrometer to stop moving.
7. Read and record temperature.
8. Be sure your eyes are at the same level as the water inside the graduated cylinder. Looking up or down from an angle can result in an incorrect reading.
9. Read and record specific gravity (to the fourth decimal place) on the data sheet.



10. Use Table 1 to convert the hydrometer reading and water temperature reading to salinity in parts per thousand (ppt). Locate the observed hydrometer reading in the left hand column. Move across the chart row to the observed temperature reading. The number found is the salinity.
11. Record data.

Table 1 – Salinity in parts per thousand (ppt)

Observed Reading (SpGr)	Temperature of Water (°C)									
	-1.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0
1.0000										
1.0010	0.6	0.6	0.5	0.5	0.2	0.2	0.2	0.2	0.2	0.2
1.0020	1.9	1.9	1.8	1.6	1.6	1.6	1.5	1.5	1.6	1.6
1.0030	3.2	3.1	2.9	2.9	2.8	2.8	2.8	2.8	2.8	2.9
1.0040	4.4	4.2	4.2	4.1	4.1	4.1	4.1	4.1	4.1	4.2
1.0050	5.7	5.5	5.4	5.4	5.4	5.3	5.3	5.4	5.4	5.4
1.0060	6.8	6.8	6.7	6.6	6.6	6.6	6.6	6.6	6.7	6.7
1.0070	8.1	8.0	7.9	7.9	7.9	7.9	7.9	7.9	7.9	8.0
1.0080	9.3	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.3
1.0090	10.5	10.5	10.4	10.4	10.4	10.4	10.4	10.5	10.5	10.6
1.0100	11.8	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.8	11.8
1.0110	13.0	13.0	12.8	12.8	12.8	12.8	13.0	13.0	13.0	13.1
1.0120	14.3	14.1	14.1	14.1	14.1	14.1	14.1	14.3	14.3	14.4
1.0130	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.6	15.7
1.0140	16.7	16.6	16.6	16.6	16.6	16.6	16.7	16.7	16.9	17.0
1.0150	17.9	17.9	17.9	17.9	17.9	17.9	17.9	18.0	18.0	18.2
1.0160	19.2	19.1	19.1	19.1	19.1	19.2	19.2	19.3	19.3	19.5
1.0170	20.4	20.4	20.4	20.4	20.4	20.4	20.5	20.5	20.6	20.8
1.0180	21.7	21.7	21.6	21.6	21.7	21.7	21.7	21.8	22.0	22.1
1.0190	22.9	22.9	22.9	22.9	22.9	23.0	23.0	23.1	23.3	23.4
1.0200	24.2	24.2	24.0	24.2	24.2	24.2	24.3	24.3	24.4	24.6
1.0210	25.3	25.3	25.3	25.3	25.5	25.5	25.6	25.6	25.7	25.9
1.0220	26.6	26.6	26.6	26.6	26.6	26.8	26.8	26.9	27.0	27.2
1.0230	27.8	27.8	27.8	27.8	27.9	27.9	28.1	28.2	28.3	28.5
1.0240	29.1	29.1	29.1	29.1	29.1	29.4	29.4	29.5	29.5	29.8
1.0250	30.3	30.3	30.3	30.4	30.4	30.6	30.6	30.7	30.8	30.9
1.0260	31.6	31.6	31.6	31.6	31.7	31.7	31.9	32.0	32.1	32.2
1.0270	32.8	32.8	32.9	32.9	32.9	33.0	33.2	33.3	33.4	33.5
1.0280	34.1	34.1	34.1	34.1	34.2	34.5	34.5	34.5	34.7	34.8
1.0290	35.2	35.2	35.4	35.4	35.5	35.6	35.6	35.8	35.9	36.2
1.0300	36.5	36.5	36.5	36.7	36.7	36.9	36.9	37.1	37.2	37.3
1.0310	37.7	37.7	37.8	37.8	38.0	38.1	38.2	38.4	38.5	38.6

Observed Reading (Sp Gr)	Temperature of Water (°C)										
	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	18.0	
1.0000									0.0	0.2	0.3
1.0010	0.5	0.5	0.6	0.6	0.7	0.8	1.0	1.2	1.5	1.6	
1.0020	1.6	1.8	1.9	2.0	2.1	2.3	2.4	2.5	2.8	2.9	
1.0030	2.9	3.1	3.2	3.3	3.4	3.6	3.7	3.8	4.1	4.2	
1.0040	4.2	4.4	4.5	4.6	4.8	4.9	5.0	5.1	5.4	5.5	
1.0050	5.5	5.5	5.7	5.8	5.9	6.2	6.3	6.6	6.7	7.0	
1.0060	6.8	6.8	7.0	7.1	7.2	7.5	7.6	7.9	8.0	8.3	
1.0070	8.1	8.1	8.3	8.4	8.5	8.8	8.9	9.2	9.3	9.6	
1.0080	9.3	9.4	9.6	9.7	9.8	10.0	10.2	10.5	10.6	10.9	
1.0090	10.6	10.7	10.9	11.0	11.1	11.3	11.5	11.8	11.9	12.2	
1.0100	11.9	12.0	12.2	12.3	12.4	12.6	12.8	13.1	13.2	13.5	
1.0110	13.2	13.4	13.5	13.6	13.7	13.9	14.1	14.4	14.5	14.8	
1.0120	14.5	14.7	14.8	14.9	15.0	15.2	15.4	15.7	15.8	16.1	
1.0130	15.8	15.8	16.0	16.2	16.3	16.5	16.7	17.0	17.1	17.4	
1.0140	17.0	17.1	17.3	17.5	17.7	17.8	18.0	18.3	18.6	18.7	
1.0150	18.3	18.4	18.6	18.8	19.0	19.1	19.3	19.6	19.9	20.0	
1.0160	19.6	19.7	19.9	20.1	20.3	20.4	20.6	20.9	21.2	21.3	
1.0170	20.9	21.0	21.2	21.3	21.6	21.7	22.0	22.2	22.5	22.7	
1.0180	22.2	22.3	22.5	22.6	22.9	23.0	23.3	23.5	23.8	24.0	
1.0190	23.5	23.6	23.8	23.9	24.2	24.3	24.6	24.8	25.1	25.3	
1.0200	24.7	24.8	25.1	25.2	25.5	25.6	25.9	26.1	26.4	26.6	
1.0210	26.0	26.1	26.4	26.5	26.8	26.9	27.2	27.4	27.7	27.9	
1.0220	27.3	27.4	27.7	27.8	28.1	28.2	28.5	28.7	29.0	29.2	
1.0230	28.6	28.7	28.9	29.1	29.4	29.5	29.8	30.0	30.3	30.6	
1.0240	29.9	30.0	30.2	30.4	30.6	30.8	31.1	31.3	31.6	31.9	
1.0250	31.1	31.3	31.5	31.7	31.9	32.1	32.4	32.6	32.9	33.2	
1.0260	32.4	32.6	32.8	33.0	33.2	33.4	33.7	33.9	34.2	34.5	
1.0270	33.7	33.9	34.1	34.3	34.5	34.7	35.0	35.2	35.5	35.8	
1.0280	35.0	35.1	35.4	35.6	35.8	36.0	36.3	36.5	36.8	37.1	
1.0290	36.3	36.4	36.7	36.8	37.1	37.3	37.6	37.8	38.1	38.4	
1.0300	37.6	37.7	38.0	38.1	38.4	38.6	38.9	39.1	39.4	39.7	
1.0310	38.9	39.0	39.3	39.4	39.7	39.9	40.2	40.5	40.7	41.0	

Table 1 – Salinity in parts per thousand (ppt)

Observed Reading (Sp Gr)	Temperature of Water (°C)									
	18.5	19.0	19.5	20.0	20.5	21.0	21.5	22.0	22.5	23.0
0.9990							0.0	0.1	0.2	0.3
1.0000	0.5	0.6	0.7	0.8	1.0	1.1	1.2	1.4	1.5	1.6
1.0010	1.8	1.9	2.0	2.1	2.3	2.4	2.5	2.5	2.7	2.8
1.0020	3.1	3.2	3.3	3.4	3.6	3.7	3.8	4.0	4.1	4.2
1.0030	4.4	4.5	4.6	4.8	4.9	5.0	5.1	5.3	5.4	5.5
1.0040	5.7	5.8	5.9	6.1	6.2	6.3	6.4	6.6	6.7	7.0
1.0050	7.1	7.1	7.2	7.4	7.5	7.6	7.7	7.9	8.1	8.3
1.0060	8.4	8.5	8.7	8.8	8.9	9.1	9.2	9.3	9.4	9.6
1.0070	9.7	9.8	10.0	10.1	10.2	10.4	10.5	10.6	10.7	10.9
1.0080	11.0	11.1	11.3	11.4	11.5	11.7	11.8	11.9	12.0	12.2
1.0090	12.3	12.4	12.6	12.7	12.8	13.0	13.1	13.2	13.4	13.6
1.0100	13.6	13.7	13.9	14.0	14.1	14.3	14.4	14.5	14.8	14.9
1.0110	14.9	15.0	15.2	15.3	15.4	15.6	15.7	16.0	16.1	16.2
1.0120	16.2	16.3	16.5	16.6	16.7	17.0	17.1	17.3	17.4	17.5
1.0130	17.5	17.7	17.8	17.9	18.0	18.3	18.4	18.6	18.7	18.8
1.0140	18.8	19.0	19.1	19.3	19.5	19.6	19.7	19.9	20.0	20.1
1.0150	20.1	20.4	20.5	20.6	20.8	20.9	21.0	21.2	21.3	21.6
1.0160	21.4	21.7	21.8	22.0	22.1	22.2	22.3	22.5	22.7	22.9
1.0170	22.9	23.0	23.1	23.3	23.4	23.5	23.6	23.8	24.0	24.2
1.0180	24.2	24.3	24.4	24.6	24.7	24.8	24.9	25.2	25.3	25.5
1.0190	25.5	25.6	25.7	25.9	26.0	26.1	26.4	26.5	26.6	26.8
1.0200	26.8	26.9	27.0	27.2	27.3	27.4	27.7	27.8	27.9	28.2
1.0210	28.1	28.2	28.3	28.5	28.6	28.9	29.0	29.1	29.2	29.5
1.0220	29.4	29.5	29.6	29.8	30.0	30.2	30.3	30.4	30.7	30.8
1.0230	30.7	30.8	30.9	31.2	31.3	31.5	31.6	31.7	32.0	32.1
1.0240	32.0	32.1	32.2	32.5	32.6	32.8	32.9	33.2	33.3	33.4
1.0250	33.3	33.4	33.7	33.8	33.9	34.1	34.2	34.5	34.6	34.7
1.0260	34.6	34.7	35.0	35.1	35.2	35.4	35.6	35.8	35.9	36.0
1.0270	35.9	36.2	36.3	36.4	36.5	36.7	36.9	37.1	37.2	37.5
1.0280	37.2	37.5	37.6	37.7	37.8	38.1	38.2	38.4	38.5	38.8
1.0290	38.6	38.8	38.9	39.0	39.1	39.4	39.5	39.7	39.9	40.1
1.0300	39.9	40.1	40.2	40.3	40.6	40.7	40.8	41.0	41.2	41.4
1.0310	41.2	41.4	41.5	41.8	41.9	42.0	42.1	42.3	42.5	

Observed Reading (Sp Gr)	Temperature of Water (°C)									
	23.5	24.0	24.5	25.0	25.5	26.0	26.5	27.0	27.5	28.0
0.9980							0.1	0.2	0.3	0.6
0.9990	0.5	0.6	0.7	0.8	1.0	1.2	1.4	1.5	1.8	1.9
1.0000	1.8	1.9	2.0	2.1	2.4	2.5	2.7	2.9	3.1	3.2
1.0010	2.9	3.1	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.5
1.0020	4.4	4.6	4.8	4.9	5.0	5.1	5.4	5.5	5.7	5.9
1.0030	5.8	5.9	6.1	6.2	6.3	6.6	6.7	6.8	7.1	7.2
1.0040	7.1	7.2	7.4	7.5	7.7	7.9	8.0	8.3	8.4	8.5
1.0050	8.4	8.5	8.7	8.9	9.1	9.2	9.3	9.6	9.7	10.0
1.0060	9.7	9.8	10.1	10.2	10.4	10.5	10.7	10.9	11.0	11.3
1.0070	11.0	11.3	11.4	11.5	11.7	11.9	12.0	12.2	12.4	12.6
1.0080	12.4	12.6	12.7	12.8	13.0	13.2	13.4	13.6	13.7	13.9
1.0090	13.7	13.9	14.0	14.1	14.4	14.5	14.7	14.9	15.0	15.3
1.0100	15.0	15.2	15.3	15.6	15.7	15.8	16.1	16.2	16.5	16.6
1.0110	16.3	16.5	16.7	16.9	17.0	17.3	17.4	17.5	17.8	17.9
1.0120	17.7	17.9	18.0	18.2	18.3	18.6	18.7	19.0	19.1	19.3
1.0130	19.1	19.2	19.3	19.5	19.7	19.9	20.0	20.3	20.4	20.6
1.0140	20.4	20.5	20.6	20.9	21.0	21.2	21.4	21.6	21.8	22.0
1.0150	21.7	21.8	22.0	22.2	22.3	22.5	22.7	22.9	23.1	23.3
1.0160	23.0	23.3	23.4	23.5	23.6	23.9	24.0	24.3	24.4	24.7
1.0170	24.3	24.6	24.7	24.8	25.1	25.2	25.3	25.6	25.7	26.0
1.0180	25.6	25.9	26.0	26.1	26.4	26.5	26.8	26.9	27.2	27.3
1.0190	27.0	27.2	27.3	27.6	27.7	27.8	28.1	28.2	28.5	28.6
1.0200	28.3	28.5	28.6	28.9	29.0	29.2	29.4	29.6	29.8	30.0
1.0210	29.6	29.8	30.0	30.2	30.3	30.6	30.7	30.9	31.1	31.3
1.0220	30.9	31.2	31.3	31.5	31.7	31.9	32.0	32.2	32.5	32.6
1.0230	32.2	32.5	32.6	32.8	33.0	33.2	33.4	33.5	33.8	33.9
1.0240	33.7	33.8	33.9	34.2	34.3	34.5	34.7	35.0	35.1	35.4
1.0250	35.0	35.1	35.2	35.5	35.6	35.9	36.0	36.3	36.4	36.7
1.0260	36.3	36.4	36.7	36.8	36.9	37.2	37.3	37.6	37.7	38.0
1.0270	37.6	37.8	38.0	38.1	38.4	38.5	38.8	38.9	39.1	39.3
1.0280	38.9	39.1	39.3	39.4	39.7	39.8	40.1	40.2	40.5	40.7
1.0290	40.2	40.5	40.6	40.8	41.0	41.2	41.4	41.6	41.8	
1.0300	41.6	41.8	41.9							
1.0310										

Table 1 – Salinity in parts per thousand (ppt)

Observed Reading (Sp Gr)	Temperature of Water in Graduated Cylinder (°C)									
	28.5	29.0	29.5	30.0	30.5	31.5	31.5	32.0	32.5	33.0
0.9980	0.7	0.8	1.1	1.2	1.5	1.6	1.9	2.0	2.3	2.4
0.9990	2.0	2.3	2.4	2.5	2.8	2.9	3.2	3.4	3.6	3.8
1.000	3.4	3.6	3.7	4.0	4.1	4.4	4.5	4.8	4.9	5.1
1.0010	4.8	4.9	5.1	5.1	5.4	5.5	5.8	5.9	6.2	6.4
1.0020	6.1	6.3	6.4	6.6	6.8	7.0	7.2	7.5	7.6	7.9
1.0030	7.4	7.6	7.7	8.0	8.1	8.4	8.5	8.8	9.1	9.2
1.0040	8.8	8.9	9.2	9.3	9.6	9.7	10.0	10.1	10.4	10.5
1.0050	10.1	10.2	10.5	10.6	10.9	11.0	11.3	11.5	11.7	11.9
1.0060	11.4	11.7	11.8	12.0	12.2	12.4	12.6	12.8	13.1	13.2
1.0070	12.8	13.0	13.1	13.4	13.6	13.7	14.0	14.1	14.4	14.7
1.0080	14.1	14.3	14.5	14.7	14.9	15.2	15.3	15.6	15.7	16.0
1.0090	15.4	15.7	15.8	16.1	16.2	16.5	16.6	16.9	17.1	17.3
1.0100	16.7	17.0	17.1	17.4	17.5	17.8	18.0	18.2	18.4	18.7
1.0110	18.2	18.3	18.6	18.7	19.0	19.1	19.3	19.6	19.7	20.0
1.0120	19.5	19.6	19.9	20.1	20.3	20.5	20.6	20.9	21.2	21.3
1.0130	20.8	21.0	21.2	21.4	21.6	21.8	22.1	22.2	22.5	22.7
1.0140	22.2	22.3	22.6	22.7	23.0	23.1	23.4	23.6	23.8	24.0
1.0150	23.5	23.6	23.9	24.0	24.3	24.6	24.7	24.9	25.2	25.3
1.0160	24.8	25.1	25.2	25.5	25.6	25.9	26.1	26.3	26.5	26.8
1.0170	26.1	26.4	26.5	26.8	27.0	27.2	27.4	27.7	27.8	28.1
1.0180	27.6	27.7	27.9	28.1	28.3	28.5	28.7	29.0	29.2	29.4
1.0190	28.9	29.0	29.2	29.5	29.6	29.9	30.0	30.3	30.6	30.8
1.0200	30.2	30.4	30.6	30.8	30.9	31.20	31.5	31.6	31.9	32.1
1.0210	31.5	31.7	32.0	32.1	32.4	32.5	32.8	33.0	33.3	33.4
1.0220	32.9	33.0	33.3	33.4	33.7	33.9	34.1	34.3	34.6	34.8
1.0230	34.2	34.5	34.6	34.8	35.0	35.2	35.5	35.6	35.9	36.2
1.0240	35.5	35.8	35.9	36.2	36.4	36.5	36.8	37.1	37.2	37.5
1.0250	36.8	37.1	37.2	37.5	37.7	37.8	38.1	38.4	38.6	38.8
1.0260	38.2	38.4	38.6	38.8	39.0	39.3	39.4	39.7	39.9	40.2
1.0270	39.5	39.8	39.9	40.2	40.3	40.6	40.8	41.0	41.2	41.5
1.0280	40.8	41.1	41.2	41.5						

Collecting Bacteria Samples

- 1. Plan field collection to ensure samples are delivered to the lab within the 6 hour holding time**
- 2. Avoid contamination**
 - a. Samples must be obtained from bucket grab sample **before** any other monitoring activities occur
 - b. Use a sterilized beaker to obtain sample from bucket
 - c. Never immerse sample bag in the bucket
 - d. Always pour water into the sample bag
 - e. Never pre-rinse the sample bag
 - f. Do not touch inside of sample bag
- 3. Label sample bag**
 - a. Site ID
 - b. Date / Time
 - c. Monitor's Name or Initials
- 4. Open sample bag**
 - a. Carefully tear off top at perforation
 - b. Pull tabs to open bag
 - c. Do not allow tablet to fall out
- 5. Pour sample into sample bag**
 - a. Fill to 100 ml line, leaving 1inch of air space
 - b. Fold top of bag down once, whirl three times to seal, and fold wire tabs inward to secure
 - c. Invert bag until tablet dissolves
- 6. Place sample bag on ice**
 - a. Maximum hold time is **6 hours**
- 7. Deliver sample to lab within the 6 hour hold time**



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Texas Stream Team

Caring for Our Waters

Submit to:
Galveston Bay Foundation
waterquality@galvbay.org
Houston-Galveston Area
Council Clean Rivers Program
Stream.Team@h-gac.com

WATER QUALITY MONITORING FORM

Group ID		Monitors ID #			
Site ID #		Site Description			
Sample Date MM-DD-YY		Sample Time (military: HHMM)		Sample Depth meters (not total depth)	
Core Test and Measurements				Reagents: Are any reagents expired?	
				YES	
				NO	
Air Temperature (°C)				List expired reagents:	
Water Temperature (°C)					
Dissolved Oxygen (mg/L) (average)					
1 st titration		2 nd titration		Additional Test Conducted (nutrients, bacteria, etc.)	
pH (Standard Units)				1. Type	Reading
Water Transparency (meters)				2. Type	Reading
Total Depth (meters)				3. <i>Enterococcus</i> MPN	
Field Observations				Sources of Readings:	Certified Lab Monitor
Flow Severity		1- no flow 2- low 3- normal 4- flood 5- high 6- dry		Coastal Area Salinity Test and Observations	
Algae Cover		1- absent 2- rare (<25%) 3- common (26-50%) 4- abundant (51-75%) 5- dominant (>75%)		1. 0 _ _ _ Specific gravity measured	
Water Color		1- no color 2- light green 3- dark green 4- tan 5- red 6- green/brown 7- black		Current Sample Temp °C	
Water Clarity		1- clear 2- cloudy 3- turbid		Salinity (ppt) From Table 1	
Water Surface		1- clear 2- scum 3- foam 4- debris 5- sheen		Tide Stage	1- low 2- falling 3- slack 4- rising 5- high
Water Conditions		1- calm 2- ripples 3- waves 4- white caps		Measurement Comments and Field Observations (IMPORTANT)	
Water Odor		1- none 2- oil 3- acrid (pungent) 4- sewage 5- rotten egg 6- fishy 7- musky			
Present Weather		1- clear 2- cloudy 3- overcast 4- rain			
Days Since Last Precipitation (runoff)					
inches Rainfall Accumulation (last 3 days)					
Hours Total Time Spent Sampling AND Traveling		Total Roundtrip Distance Traveled (miles)		Total Number of Participants	
CERTIFIED MONITOR'S SIGNATURE				DATE	
DATA MANAGER'S SIGNATURE				DATE	



Texas Stream Team

Caring for Our Waters

Chain of Custody Form

GBF Lab must have prior knowledge of your arrival with sample.

Confirmed Sample Drop-off with	Sampler Name	Sampler Signature
Date Sample Collected	Sample Source: Recreational Waters <input type="checkbox"/>	Other Waters <input type="checkbox"/> <i>(please specify)</i>
Time Sample Collected	Site ID and Description	
Number of Samples		

Place sample on ice immediately. Deliver to the Lab within 6 hours of sampling.

Field Data

Air Temperature (°C)	Algae Cover	Present Weather
Water Temperature (°C)	Water Color	Days Since Last Significant Precipitation <i>(runoff)</i>
Dissolved Oxygen (mg/L)	Water Clarity	Rainfall Accumulation <i>(last 3 days)</i>
pH	Water Surface	Sample Depth <i>(meters)</i>
Water Transparency <i>(meters)</i>	Water Conditions	Salinity <i>(ppt)</i>
Total Depth <i>(meters)</i>	Water Odor	Tide Stage

Laboratory Use Only

Sample Number:	Sample Condition:	Comments:
Volume Analyzed:	Analytical Method:	

Relinquished By: _____

Date / Time: _____

Received By (Lab): _____

Date / Time: _____