

**THE GALVESTON BAY PLAN REVISION
Workshop #2 Meeting Summary FINAL**

April 21, 2017

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WORKSHOP OVERVIEW

The Galveston Bay Plan is the comprehensive conservation and management plan for the Galveston Bay estuary. The Plan has led the Galveston Bay Estuary Program (GBEP) and its partners through 22 years of significant conservation, restoration, and education work in the Galveston Bay watershed.

Workshop #2 was held on March 1, 2017 from 2 – 4pm in La Marque, Texas. Fifty-four people, including GBEP and Houston-Galveston Area Council (H-GAC) staff, attended.

Attendees were provided with an informational packet upon arriving, which included an agenda, project reference information and acronym list, as well as Exercise #2 materials and Framework reference sheets for Monitoring & Research, Public Participation & Education, Natural Resource Uses and Water & Sediment Quality.

Workshop #2 Purpose

The purpose of Workshop #2 was to vet the frameworks and action plans with a focus on implementation feasibility.

Approach & Agenda

Galveston Bay Council and Subcommittee members (164 in total) were invited to the workshop via Constant Contact invitation(s). Respondents were asked to register in advance of the event to allow for thorough pre-planning. Registrants were sent Workshop #2 primer materials on Friday, February 24, which included a project status update, PDFs of the four subcommittee-specific Frameworks, and prompts for workshop Exercises.

The day of the workshop, attendees were given an informational packet, which contained an agenda, acronym list, Exercise #2 materials, and the four subcommittee-specific Frameworks.

The agenda for Workshop #2 can be found below.

- | | |
|----------------|---|
| 2:00 PM | Workshop Welcome
Jeff Taebel, Houston-Galveston Area Council |
| 2:05 PM | The Plan: Where We've Been & Where We're Going
Sarah Bernhardt, Galveston Bay Estuary Program |
| 2:20 PM | Update on Subcommittee Meetings
Monitoring & Research - George Guillen
Natural Resource Uses - Cherie O'Brien
Public Participation & Education - Cynthia Clevenger
Water & Sediment Quality - Brian Koch |
| 2:40 PM | Workshop Goals & Activities Overview
Meredith Dang, Houston-Galveston Area Council |
| 2:45 PM | Exercises At-Your-Own-Pace
Exercise #1 – Past, Current and Future Accomplishments
Exercise #2 – Costs and Feasibility of Targeted Outputs
Exercise #3 – Implementation Feasibility |

There was not a separate, public-facing meeting following Workshop #2; however, Secondary Audience members previously identified or that attended Open House #1 will receive information on the status of the project and any discussion outcomes, scheduled for mid-May 2017.

WORKSHOP ACTIVITIES

Prior to Workshop #2, the four subcommittees met to discuss the Frameworks for each programmatic Focus Area, providing input and updates to Specific Objectives, Actions, Measures, and Targeted Outputs.

Exercise #1 Instructions

For Exercise #1, revised Frameworks for each Focus Area were mounted on 60" x 40" foam core boards. Participants were asked to review the revised Frameworks and provide additional Projects & Accomplishments, as well as Lead Implementers.

The feedback in this report has been presented with limited editing, except in circumstances requiring additional clarity.

Exercise #2 Instructions

It is important that the activities identified in The Galveston Bay Plan are achievable, measurable, and ultimately support stakeholder identified Specific Objectives (goals).

Exercise #2 focused on Targeted Outputs, ensuring that they be achievable, measurable, and ultimately support identified Specific Objectives (goals). Respondents checked "yes" or "no" for each Targeted Output. Those respondents that selected "no" for a Targeted Output(s) were asked to provide further feedback, though none from Workshop #2 or the Digital Questionnaire did.

Respondents were also asked to provide cost estimates for each Targeted Output, but only if they felt comfortable doing so.

Note on Exercise #2: Participation in Exercise #2 saw the fewest respondents across the board. It is likely that the in-depth, technical nature of the exercise contributed to fewer respondents.

Additionally, respondent numbers, both at Workshop #2 and through the Digital Questionnaire, varied for each Specific Objective and for Targeted Outputs.

Exercise #3 Instructions

Exercise #3 focused on implementation feasibility. Participants were asked to use a pin to place Specific Objectives to a grid, per their answers to two questions:

1. To what extent would accomplishing this Specific Objective advance the mission of The Galveston Bay Plan? (y axis)
2. How easy or difficult would accomplishing this Specific Objective be? (x axis)

One grid was provided for each of the Subcommittees. For each exercise grid, there were four primary quadrants (A, B, C and D). Each quadrant was sub-divided into four units, or sub quadrants (A-1, A-2, A-3, A-4, and so on). Each sub quadrant represented an intersection between the how well the mission would be advanced by a specific objective (y axis) and how easy it would be to accomplish that specific objective (x-axis).

Note on Exercise #3 Calculations: H-GAC counted the total of each Specific Objective in each sub quadrant, and calculated the percentage represented in each. Those percentages were assigned a value based on ease of implementation and support of the mission, then plotted on a scatter graph to display aggregated information.

Inclusion of Digital Workshop Questionnaire

Those Galveston Bay Council and Subcommittee members unable to attend Workshop #2 were provided with Digital Workshop #2 Questionnaires (12 questionnaires in total), in which the activities and exercises from the workshop were made available digitally from March 23, 2017 – April 5, 2017.

The results from Digital Workshop #2 Questionnaires have been included in this report.

Additional Information Requests

Requests for Workshop #2 photos, calculation spreadsheets, and other materials can be requested by e-mail Kathy.Janhsen@h-gac.com.

WATER & SEDIMENT QUALITY RESULTS

Water & Sediment Quality (WSQ) Focus Area covers Specific Objectives pertaining to water and sediment quality issues and activities.

Report Key

There are 12 Specific Objectives for the WSQ Focus Area. Specific Objectives are grouped by Issue Area, and numbered correspondingly.

For WSQ, there are three Issue Areas:

- NPS – Nonpoint Source
- PS – Point Source
- PHA – Public Health Awareness

SPECIFIC OBJECTIVE	DESCRIPTION OF SPECIFIC OBJECTIVE
NPS-1	Support Watershed Based Plan Development and Implementation.
NPS-2	Support a Back the Bay NPS Education Campaign.
NPS-3	Implement NPS best management practice demonstration projects.
NPS-4	Host NPS Workshops to Enhance Technical Understanding and Expand Use of Best Practices.
PS-1	Implement a Back the Bay PS Campaign with Phase I and Phase II Stormwater Programs.
PS-2	Maintain Capacity and Integrity of Sanitary Sewer Systems (SSS).
PS-3	Improve WWTF Compliance.
PHA-1	Improve Seafood Advisory Awareness.
PHA-2	Improve Regional Contact Recreation Risk Awareness.
PHA-3	Improve Regional Contact Recreation Safety by Implementing WBPs (i.e. TMDL I-Plans and WPPs).
PHA-4	Improve Safety of Human Shellfish Consumption from Bay Waters by Implementing WBPs.
PHA-5	Improve Safety of Human Consumption of Recreational Finfish by Implementing WBPs.

Exercise #1 - Past, Current and Future Accomplishments

1. Issue Area

Improve Water Quality Through Nonpoint Source Pollution Abatement

Specific Objective

Support Watershed Based Plan Development and Implementation.

Description

Develop and implement local watershed based plans, i.e. watershed protection plans (WPPs) and total maximum daily load (TMDL) implementation plans (I-Plans) with local partners and stakeholders. Identify target area(s) to schedule implementation by developing prioritization measures such as: relationship of water body to water quality standard; local source of funding or match available; ongoing watershed planning effort; size of waterbody; access to monitoring data.

Projects & Accomplishments

- (1) There are 6 WPPs being developed or completed.
- (2) There are 3 TMDL I-Plans developed or completed.
- (3) Cease the Grease, low impact development (LID) projects, boater waste education, stormwater wetlands, and Construction Permit Education are being implemented.

Lead Implementers

WSQ Subcommittee
Texas Commission on Environmental Quality (TCEQ)
Texas State Soil & Water Conservation Board (TSSWCB)
Texas A&M AgriLife Extension Service (AgriLife)
Galveston Bay Foundation (GBF)
Houston-Galveston Area Council (H-GAC)
Future Watershed Partners

Workshop #2 Responses

Lead Implementers	Projects & Accomplishments
TPWD	Armand Bayou

Workshop #2 Digital Questionnaire Responses

Lead Implementers	Projects & Accomplishments
Lead Implementer: HARC	No response.

2. Issue Area

Improve Water Quality Through Nonpoint Source Pollution Abatement

Specific Objective

Support a Back the Bay Nonpoint Source (NPS) Education Campaign.

Description

Apply a NPS outreach campaign to the target area(s) using completed Galveston Bay Estuary Program Back the Bay message and brand to foster public awareness, education and encourage action to improve water quality.

Projects & Accomplishments

- (1) Back the Bay messages and materials have been completed.
- (2) Environmental Protection Agency (EPA) has developed a NPS Outreach Tool Box.
- (3) Cease the Grease, storm drain stenciling, Trash Bash, and pet waste public outreach messaging.
- (4) Galveston Bay Foundation's (GBF) Pump Don't Dump campaign aimed at educating boaters about hazards of sewage discharge and pump out alternatives.
- (5) Clear Lake has been declared a no discharge zone.
- (6) GBF looking at no discharge zone for Galveston Bay.

Lead Implementers

WSQ & Public Participation & Education (PPE) Subcommittees
TCEQ
Texas Parks & Wildlife Department (TPWD)
TSSWCB
AgriLife
GBF
H-GAC

Workshop #2 Responses

Lead Implementers	Projects & Accomplishments
Texans for Clean Water TPWD	No response.

Workshop #2 Digital Questionnaire Responses

Lead Implementers	Projects & Accomplishments
No response.	No response.

3. Issue Area

Improve Water Quality Through Nonpoint Source Pollution Abatement

Specific Objective

Implement NPS best management practice demonstration projects.

Description

Identify specific structural and non-structural measures to implement. Apply structural and nonstructural NPS best management practices to target area(s).

Projects & Accomplishments

Demonstration Projects include:

- (a) Brays Bayou Wetland
- (b) Ghirardi Family Watersmart Park
- (c) Harris County Flood Control District Detention with Water Quality Improvement Features
- (d) Birnamwood Dr.
- (e) Alameda Rd.

Lead Implementers

WSQ Subcommittee
TCEQ
TSSWCB
AgriLife
GBF
H-GAC
Local Governments
Development Community

Workshop #2 Responses

Lead Implementers	Projects & Accomplishments
Houston Wilderness (Gulf-Houston RCP) TPWD	Gulf-Houston Regional Conservation Plan (RCP): Headwaters to Baywaters Initiative; Galveston Bay Acq. And Easement Initiative; Migratory Bird & Oyster Reefs Initiative

Workshop #2 Digital Questionnaire Responses

Lead Implementers	Projects & Accomplishments
No response.	No response.

4. Issue Area

Improve Water Quality Through Nonpoint Source Pollution Abatement

Specific Objective

Host NPS Workshops to Enhance Technical Understanding and Expand Use of Best Practices.

Description

Provide NPS technical workshops in target area(s) to enhance the reach of structural and non-structural BMPs that address failing OSSFs, feral hogs, illicit discharges, illegal dumping, boater wastes and agricultural sources. Tie-in with Back the Bay messaging.

Projects & Accomplishments

Ongoing efforts by H-GAC, Harris County, Texas Coastal Watershed Program, Texas A&M University:

- (a) H-GAC on-site sewage facility (OSSF) website management
- (b) Harris County Annual OSSF Seminar
- (c) Harris County and East Aldine Management District OSSF abandonment
- (d) H-GAC Real Estate Course
- (e) AgriLife Extension OSSF Management Workshop
- (f) Texas Water Resources Institute Lone Star Healthy Streams program targets agriculture producers with information on best practices.

Lead Implementers

WSQ Subcommittee
 TCEQ
 TSSWCB
 AgriLife
 H-GAC

Workshop #2 Responses

Lead Implementers	Projects & Accomplishments
GLO TPWD	Coastal NPS Management Program - Management Measure Implementation Kills & Spills Database

Workshop #2 Digital Questionnaire Responses

Lead Implementers	Projects & Accomplishments
Lead implementer: TWRI	No response.

5. Issue Area

Improve Water Quality Through Point Source Pollution Abatement

Specific Objective

Implement a Back the Bay Point Source (PS) Campaign with Phase I and Phase II Stormwater Programs.

Description

Collaborate Back the Bay PS campaign with owners and operators of Phase I and II municipal separate storm sewer systems (MS4s) on development and implementation of stormwater management programs to address sediment, litter, pet wastes, and illicit discharges from the MS4s.

Projects & Accomplishments

- (1) MS4s address impaired waters through measures described in their Stormwater Management Plans.
- (2) H-GAC's Clean Water Initiative workshops that cover topics related to the MS4 permit requirements.
- (3) A number of programs/projects target MS4 management measures.
- (4) Top 5/Least 5 project and Bayou Preservation Association/City of Houston investigations are example IDDE programs

Lead Implementers

WSQ & PPE Subcommittees
TCEQ
H-GAC
Local MS4s

Workshop #2 Responses

Lead Implementers	Projects & Accomplishments
Houston Wilderness (Gulf-Houston RCP) Texans for Clean Water	No response.

Workshop #2 Digital Questionnaire Responses

Lead Implementers	Projects & Accomplishments
No response.	No response.

6. Issue Area

Improve Water Quality Through Point Source Pollution Abatement

Specific Objective

Maintain Capacity and Integrity of Sanitary Sewer Systems (SSS).

Description

Promote TCEQ programs and efforts to encourage repairs, improvements and replacement of chronically failing SSS. Promote TCEQ's Sanitary Sewer Overflow Initiative (SSOI) that develops compliance agreements with municipalities with sanitary sewer overflows (SSO). Use Back the Bay Outreach to support initiatives that address fats, oils, grease and sanitary wipes, common causes of SSOs.

Projects & Accomplishments

- (1) The BIG identified SSOs as a leading contributor of untreated effluent to area waters.
- (2) The City of Houston placed resources to address failing systems.
- (3) TCEQ Region 12's list of local governments participating in TCEQ's SSOI.
- (4) GBF's Oyster I-Plan is addressing SSOs.

Lead Implementers

WSQ Subcommittee
TCEQ
TMDL I-Plan(s)
H-GAC
GBF

Workshop #2 Responses

Lead Implementers	Projects & Accomplishments
Owners of the San. Sewer System	No response.

Workshop #2 Digital Questionnaire Responses

Lead Implementers	Projects & Accomplishments
lead implementer: local governments	No response.

7. Issue Area

Improve Water Quality Through Point Source Pollution Abatement

Specific Objective

Improve Wastewater Treatment Facility (WWTF) Compliance.

Description

Coordinate with TCEQ's Region 12 and Small Business Administration on opportunities to improve WWTF compliance. Develop and promote through Back the Bay a compliance tool box that could include measures like technical workshops, increased regulatory compliance inspections and no-notice inspections, development of a non-regulatory inspection program, identify funding sources and potential for regionalization of chronically noncompliant WWTFs.

Projects & Accomplishments

- (1) Harris County conducts compliance inspections and shares data with the BIG and H-GAC.
- (2) Compliance data is available via EPA's ECHO website.
- (3) WWTF operators are required to report to the TCEQ via Discharge Monitoring Reports.
- (4) TCEQ and EPA maintain list of chronically noncompliant WWTFs, Harris County identifies chronically failing WWTFs, works with the facilities to find solutions that sometimes includes regionalization.

Lead Implementers

WSQ Subcommittee
TCEQ
Local Governments

Workshop #2 Responses

Lead Implementers	Projects & Accomplishments
TPWD-Kills & Spills Database Industry Galveston County Health District	No response.

Workshop #2 Digital Questionnaire Responses

Lead Implementers	Projects & Accomplishments
No response.	No response.

Additional feedback included the addition of "OSSF" in the Issue Area Description, and OSSF compliance under Specific Objective "Improve WWTF Compliance."

8. Issue Area

Promote Public Health Awareness

Specific Objective

Improve Seafood Advisory Awareness.

Description

Support effective seafood advisory outreach. Work with PPE and stakeholders on outreach, education, and awareness efforts to assist the public in better evaluating their risk from consuming Galveston Bay fish and/or shellfish.

Projects & Accomplishments

- (1) GBF with funding from the EPA, has placed warning signs in places with seafood advisories as part of their Galveston Bay Seafood Advisory Education Campaign.
- (2) H-GAC has created a seafood advisory pamphlet.
- (3) Major legacy source identified as a Superfund Site on the San Jacinto River, currently identifying and approving remedial step. EPA is lead agency.

Lead Implementers

WSQ & PPE Subcommittees
Texas Department of State Health Services (TDSHS)
TCEQ
TPWD
General Land Office (GLO)

Workshop #2 Responses

Lead Implementers	Projects & Accomplishments
GBF	No response.

Workshop #2 Digital Questionnaire Responses

Lead Implementers	Projects & Accomplishments
HARC & GBF	Galveston Bay Report Card

9. Issue Area

Promote Public Health Awareness

Specific Objective

Improve Regional Contact Recreation Risk Awareness.

Description

Work with the Public Participation and Education subcommittee to develop a public risk advisory program based on risks from contact recreation due to waterborne pathogens.

Projects & Accomplishments

- (1) GLO Texas Beach Watch - Harris, Galveston and Brazoria Counties implement the program at selected recreational beaches along the Texas Coast.
- (2) When Enterococcus levels exceed standards established by the EPA, GLO and local governments issue advisories warning public not to swim in affected waters.

Lead Implementers

WSQ & PPE Subcommittees
TCEQ
GLO
Local Governments

Workshop #2 Responses

Lead Implementers	Projects & Accomplishments
GBF	GBF Citizen Science Bacteria (enterococci) monitoring program (www.galvbay.org/citizenscience) includes map of current data, ~20 sites in Bay, GBF public outreach & presentations about recreation safety Human recreation risk grade on Galv. Bay Report Card

Workshop #2 Digital Questionnaire Responses

Lead Implementers	Projects & Accomplishments
HARC & GBF	Galveston Bay Report Card

10. Issue Area

Promote Public Health Awareness

Specific Objective

Improve Regional Contact Recreation Safety by Implementing WBPs (i.e. TMDL I-Plans and WPPs).

Description

Support and facilitate development and implementation of WBPs, including TMDL Programs or WPPs, to address bacteria impaired contact recreation waters.

Support could be in the form of continuing the stakeholder process or funding specific measures of the I-Plan or WPP.

Projects & Accomplishments

- (1) WSQ coordinates with the region WBPs.
- (2) Bacteria Implementation Group Implementation Plan and Dickinson Bayou Implementation Plan are two TMDL I-Plans developed to address bacteria impairments.
- (3) Several completed WPPs also address bacteria. Jarbo Bayou TMDL is in development.

Lead Implementers

- WSQ Subcommittee
- TCEQ
- TSSWCB
- AgriLife
- GBF
- H-GAC
- Future Watershed Partners

Workshop #2 Responses

Lead Implementers	Projects & Accomplishments
No response.	No response.

Workshop #2 Digital Questionnaire Responses

Lead Implementers	Projects & Accomplishments
Lead Implementer: HARC	No response.

11. Issue Area

Promote Public Health Awareness

Specific Objective

Improve Safety of Human Shellfish Consumption from Bay Waters by Implementing WBPs.

Description

Support implementation of the Upper Texas Coast Oyster Waters TMDL I-Plan to address bacteria impaired oyster waters. Support could be in the form of continuing the stakeholder process or funding specific measures of the I-Plan.

Projects & Accomplishments

The Upper Texas Oyster Waters TMDL and I-Plan was completed in 2015. TCEQ, Galveston Bay Foundation and stakeholders are implementing the plan to reduce sources of bacteria.

Lead Implementers

WSQ Subcommittee

TCEQ

GBF

TDSHS

Workshop #2 Responses

Lead Implementers	Projects & Accomplishments
AgriLife	No response.

Workshop #2 Digital Questionnaire Responses

Lead Implementers	Projects & Accomplishments
lead implementer: TPWD	No response.

12. Issue Area

Promote Public Health Awareness

Specific Objective

Improve Safety of Human Consumption of Recreational Finfish by Implementing WBPs.

Description

Support and facilitate development and implementation of legacy and toxin TMDL Programs as they arise. Provide support as needed, for the PCB/Dioxin TMDL study.

Projects & Accomplishments

Many TMDLs have been developed for local waterways impacted by high concentrations of toxins, including:

- (a) PCB/Dioxin TMDL
- (b) Patrick Bayou TMDL
- (c) Clear Creek TMDL (TDS-Complete)
- (d) Clear Creek Fish Advisory - Chlorinated Pesticides, rescinded.

Lead Implementers

WSQ Subcommittee
TCEQ
TSSWCB
AgriLife
GBF
H-GAC
Future Watershed Partners

Workshop #2 Responses

Lead Implementers	Projects & Accomplishments
No response.	No response.

Workshop #2 Digital Questionnaire Responses

Lead Implementers	Projects & Accomplishments
Lead implementer: TDSHS	No response.

WSQ Exercise #2 - Costs and Feasibility of Targeted Outputs

NPS-1

Support Watershed Based Plan (WBP) Development and Implementation.

Develop and implement local watershed based plans, i.e. watershed protection plans (WPPs) and total maximum daily load (TMDL) implementation plans (I-Plans) with local partners and stakeholders.

Identify target area(s) to schedule implementation by developing prioritization measures such as: relationship of water body to water quality standard; local source of funding or match available; ongoing watershed planning effort; size of waterbody; access to monitoring data; etc.

TARGETED OUTPUTS		IMPLEMENTATION COST	SUPPORTS SPECIFIC OBJECTIVE?	EDITS TO SUPPORT SPECIFIC OBJECTIVE?
Short	Support the development of two Watershed Based Plans (20% completion of goal).	\$0 - \$200,000	4/4 Respondents Agreed	None
Medium	Support the development of three additional (five total) Watershed Based Plans (50% completion of goal).	\$200,000 - \$1 Million	4/4 Respondents Agreed	None
Long-Term	Support the development of five additional (ten total) Watershed Based Plans (100% completion of goal).	\$1 Million - \$500 Million	4/4 Respondents Agreed	None

NPS-2

Support a Back the Bay NPS Education Campaign.

Apply a NPS outreach campaign to the target area(s) using completed Galveston Bay Estuary Program (GBEP) Back the Bay message and brand to foster public awareness, education and encourage action to improve water quality.

TARGETED OUTPUTS		IMPLEMENTATION COST	SUPPORTS SPECIFIC OBJECTIVE?	EDITS TO SUPPORT SPECIFIC OBJECTIVE?
Short	Conduct initial survey of target population.	\$0 - \$200,000	3/4 Respondents Agreed	None
Short	Initiate target area campaign.	\$200,000 - \$1 Million	3/4 Respondents Agreed	None
Medium	Track number of individuals involved, target populations or groups engaged	\$0 - \$200,000	4/4 Respondents Agreed	None
Long-Term	Track changes in public perception through follow-up evaluation/questionnaire.	\$0 - \$200,000	3/4 Respondents Agreed	None

NPS-3**Implement NPS best management practice demonstration projects.**

Identify specific structural and non-structural measures to implement. Apply structural and nonstructural NPS best management practices (BMPs) to target area(s).

TARGETED OUTPUTS		IMPLEMENTATION COST	SUPPORTS SPECIFIC OBJECTIVE?	EDITS TO SUPPORT SPECIFIC OBJECTIVE?
Short	Initiate two Best Management Practice demonstration projects.	\$0 - \$200,000	3/3 Respondents Agreed	None
Medium	Initiate first three additional Best Management Practice demonstration projects (five in total).	\$0 - \$200,000	3/3 Respondents Agreed	None
Long-Term	Complete five Best Management Practice demonstration projects.	\$200,000 - \$1 Million	3/3 Respondents Agreed	None
Long-Term	Evaluate demonstration project results and develop white paper on findings.	\$0 - \$200,000	3/3 Respondents Agreed	None

NPS-4**Host NPS Workshops to Enhance Technical Understanding and Expand Use of Best Practices.**

Provide NPS technical workshops in target area(s) to enhance the reach of structural and non-structural best management practices (BMPs) that address failing on-site sewage facilities (OSSFs), feral hogs, illicit discharges, illegal dumping, boater wastes and agricultural sources.

TARGETED OUTPUTS		IMPLEMENTATION COST	SUPPORTS SPECIFIC OBJECTIVE?	EDITS TO SUPPORT SPECIFIC OBJECTIVE?
Short	Conduct Best Management Practice awareness level surveys, prior to hosting workshops	\$0 - \$200,000	3/4 Respondents Agreed	None
Short	Conduct one Best Management Practice education workshop per year.	\$0 - \$200,000	4/4 Respondents Agreed	None
Medium	Conduct one Best Management Practice education workshop per year.	\$0 - \$200,000	4/4 Respondents Agreed	None
Long-Term	Conduct one Best Management Practice education workshop per year.	\$0 - \$200,000	4/4 Respondents Agreed	None
Long-Term	Conduct Best Management Practice awareness level surveys, after hosting workshops	\$0 - \$200,000	3/4 Respondents Agreed	None

PS-1

Implement a Back the Bay PS Campaign with Phase I and Phase II Stormwater Programs.

Collaborate Back the Bay PS campaign with owners and operators of Phase I and II municipal separate storm sewer systems (MS4s) on development and implementation of stormwater management programs to address sediment, litter, pet wastes, and illicit discharges from the MS4s.

Best management practices (e.g. low impact development/green infrastructure, Construction BMPs, Illicit Discharge Detection Programs) and other water quality improvement techniques can be promoted.

TARGETED OUTPUTS		IMPLEMENTATION COST	SUPPORTS SPECIFIC OBJECTIVE?	EDITS TO SUPPORT SPECIFIC OBJECTIVE?
Short	Develop database to track existing MS4 programs and identify opportunities for collaboration.	\$0 - \$200,000	4/4 Respondents Agreed	None
Short	Develop Outreach Plan to promote or host workshops and regional messaging campaigns to support Point Source education efforts (number TBD).	\$0 - \$200,000	3/4 Respondents Agreed	None
Medium	Significant progress on executing Outreach Plan goals (50% complete).	\$200,000 - \$1 Million	3/4 Respondents Agreed	None
Long-term	Significant progress on executing Outreach Plan goals (100% complete).	\$200,000 - \$1 Million	3/4 Respondents Agreed	None
Long-term	Track success of workshops by identifying the number of MS4s implementing Best Management Practice measures.	\$0 - \$200,000	4/4 Respondents Agreed	None

PS-2

Maintain Capacity and Integrity of Sanitary Sewer Systems (SSS).

Promote Texas Commission on Environmental Quality (TCEQ) programs and efforts to encourage repairs, improvements and replacement of chronically failing SSS. Promote TCEQ's Sanitary Sewer Overflow Initiative (SSOI) that develops compliance agreements with municipalities with sanitary sewer overflows.

Use Back the Bay Outreach to support initiatives that address Fats, Oils, Grease and Sanitary Wipes, common causes of SSOs.

TARGETED OUTPUTS		IMPLEMENTATION COST	SUPPORTS SPECIFIC OBJECTIVE?	EDITS TO SUPPORT SPECIFIC OBJECTIVE?
Short	Identify and prioritize list of geographies with chronically failing Sanitary Sewer Systems in need of repair, improvement, or replacement.	\$0 - \$200,000	4/4 Respondents Agreed	None
Medium	Support or host technical workshops (number to be determined) geared toward targeted communities.	\$0 - \$200,000	4/4 Respondents Agreed	None
Medium	Track number of workshops supported or hosted and number of attendees.	\$0 - \$200,000	3/4 Respondents Agreed	None
Long-term	Track number of Total Maximum Daily Load (TMDL) Implementation Plans initiated or completed in targeted geography.	\$0 - \$200,000	4/4 Respondents Agreed	None
Long-Term	Pull Sanitary Sewer Overflow data for targeted geographies to determine whether a reduction has occurred.	\$0 - \$200,000	4/4 Respondents Agreed	None

PS-3

Improve Wastewater Treatment Facility (WWTF) Compliance.

Coordinate with the Texas Commission on Environmental Quality’s (TCEQ) Region Twelve and Small Business Administration on opportunities to improve WWTF compliance.

Develop and promote through Back the Bay a compliance tool box that could include measures like technical workshops, increased regulatory compliance inspections and no-notice inspections, development of a non-regulatory inspection program, identify funding sources and potential for regionalization of chronically noncompliant WWTFs.

TARGETED OUTPUTS		IMPLEMENTATION COST	SUPPORTS SPECIFIC OBJECTIVE?	EDITS TO SUPPORT SPECIFIC OBJECTIVE?
Short	Identify chronically failing wastewater treatment facilities and create Compliance Toolbox.	\$0 - \$200,000	3/4 Respondents Agreed	None
Medium	Use Compliance Toolbox to work with chronically failing facilities, communicating through technical workshops and non-regulatory visits (number TBD).	\$200,000 - \$1 Million	3/4 Respondents Agreed	None
Long-Term	Pull failure data for identified wastewater treatment facilities to determine Compliance Toolbox success.	\$0 - \$200,000	3/4 Respondents Agreed	None

PHA-1

Improve Seafood Advisory Awareness.

Support effective seafood advisory outreach. Work with the Public Participation & Education subcommittee (PPE) and stakeholders on outreach, education, and awareness efforts to assist the public in better evaluating their risk from consuming Galveston Bay fish and/or shellfish.

TARGETED OUTPUTS		IMPLEMENTATION COST	SUPPORTS SPECIFIC OBJECTIVE?	EDITS TO SUPPORT SPECIFIC OBJECTIVE?
Short	Develop Seafood Advisory Awareness Outreach Plan. Identify specific goals for increasing awareness (goals TBD).	\$0 - \$200,000	2/3 Respondents Agreed	None
Medium	Significant progress on Outreach Plan goals (50% of goals completed).	\$0 - \$200,000	2/3 Respondents Agreed	None
Long-term	Significant progress on Outreach Plan goals (100% of goals completed).	\$200,000 - \$1 Million	2/3 Respondents Agreed	None
Long-Term	Assess effectiveness of Outreach Plan by tracking number of groups and individuals reached.	\$0 - \$200,000	2/3 Respondents Agreed	None

PHA-2

Improve Regional Contact Recreation Risk Awareness.

Work with the Public Participation & Education subcommittee (PPE) to develop a public risk advisory program based on risks from contact recreation due to waterborne pathogens.

TARGETED OUTPUTS		IMPLEMENTATION COST	SUPPORTS SPECIFIC OBJECTIVE?	EDITS TO SUPPORT SPECIFIC OBJECTIVE?
Short	Develop Contact Recreation Outreach Plan. Identify specific goals for increasing awareness (goals TBD).	\$0 - \$200,000	3/3 Respondents Agreed	None
Medium	Significant progress on Outreach Plan goals (50% of goals completed).	\$0 - \$200,000	3/3 Respondents Agreed	None
Long-term	Significant progress on Outreach Plan goals (100% of goals completed).	\$200,000 - \$1 Million	3/3 Respondents Agreed	None
Long-Term	Assess effectiveness of Outreach Plan by tracking number of groups and individuals reached.	\$0 - \$200,000	3/3 Respondents Agreed	None

PHA-3

Improve Regional Contact Recreation Safety by Implementing WBPs.

Support and facilitate development and implementation of watershed based plans (WBPs), including total maximum daily load (TMDL) Programs or watershed protection plans (WPPs), to address bacteria impaired contact recreation waters.

Support could be in the form of continuing the stakeholder process or funding specific measures of the TMDL Program or WPP.

TARGETED OUTPUTS		IMPLEMENTATION COST	SUPPORTS SPECIFIC OBJECTIVE?	EDITS TO SUPPORT SPECIFIC OBJECTIVE?
Short	Support and facilitate the development of one – two Watershed Based Plans.	\$0 - \$200,000	3/3 Respondents Agreed	None
Medium	Support and facilitate the development an additional two Watershed Based Plans (three – four total).	\$200,000 - \$1 Million	3/3 Respondents Agreed	None
Long-Term	Assess impact of supported Watershed Based Plans by tracking the number of Best Management Practices implemented and number of improved condition Assessment Units.	\$0 - \$200,000	3/3 Respondents Agreed	None

PHA-4**Improve Safety of Human Shellfish Consumption from Bay Waters by Implementing Watershed Based Plans (WBPs).**

Support implementation of the Upper Texas Coast Oyster Waters total maximum daily load implementation plan (TMDL I-Plan) to address bacteria impaired oyster waters.

Support could be in the form of continuing the stakeholder process or funding specific measures of the I-Plan.

TARGETED OUTPUTS		IMPLEMENTATION COST	SUPPORTS SPECIFIC OBJECTIVE?	EDITS TO SUPPORT SPECIFIC OBJECTIVE?
Short	Support implementation of the Upper Texas Coast Oyster Waters TMDL I-Plan and report on status.	\$0 - \$200,000	3/3 Respondents Agreed	None
Medium	Continue to support implementation of the Upper Texas Coast Oyster Waters TMDL I-Plan and report on status.	\$0 - \$200,000	3/3 Respondents Agreed	None
Long-term	Review water quality data to determine whether a decrease in bacteria concentrations has occurred.	\$0 - \$200,000	3/3 Respondents Agreed	None

PHA-5**Improve Safety of Human Consumption of Recreational Finfish by Implementing Watershed Based Plans (WBPs).**

Support and facilitate development and implementation of legacy and toxin total maximum daily load (TMDL) Programs as they arise. Provide support as needed, for the PCB/Dioxin TMDL study.

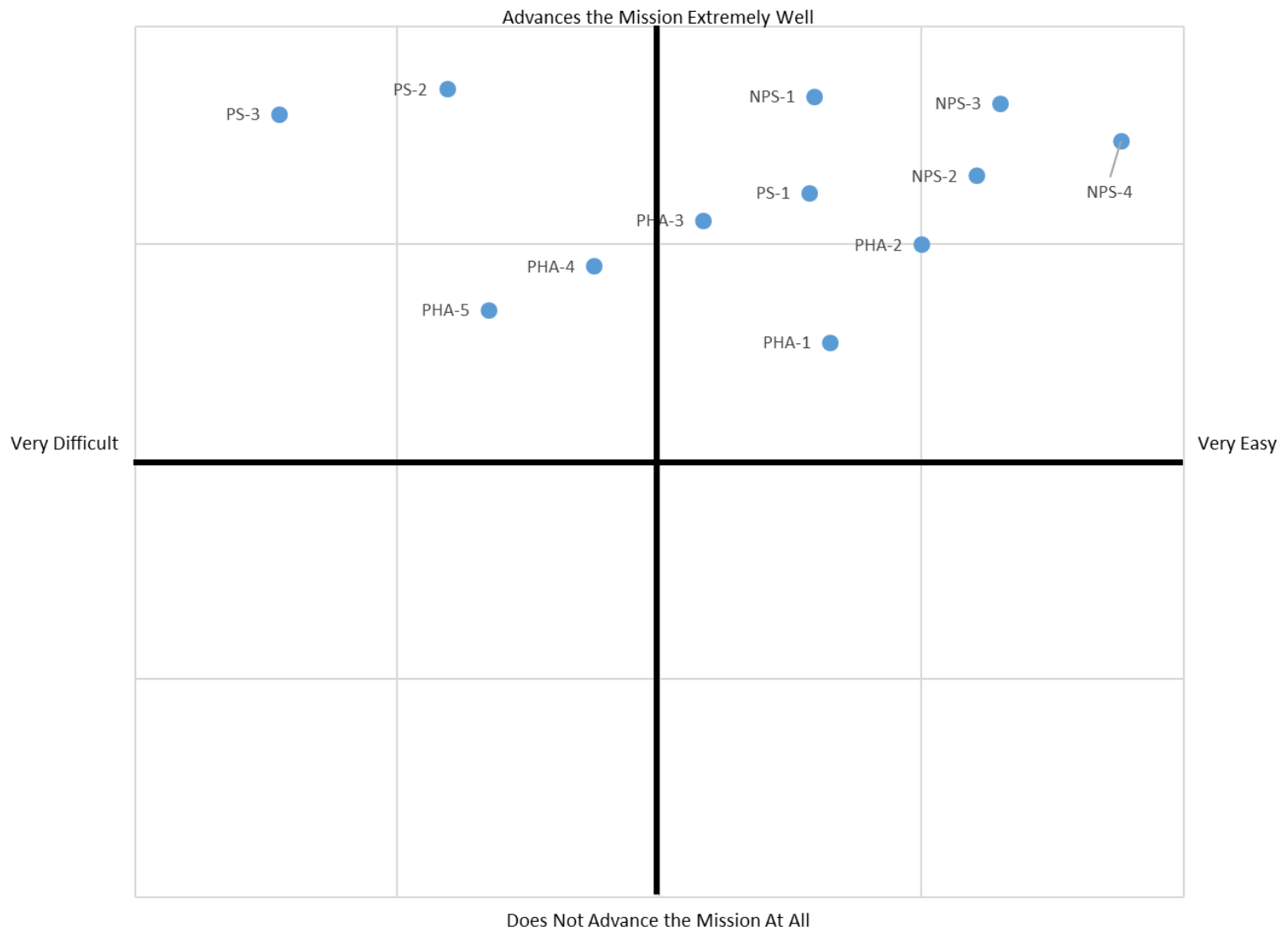
TARGETED OUTPUTS		IMPLEMENTATION COST	SUPPORTS SPECIFIC OBJECTIVE?	EDITS TO SUPPORT SPECIFIC OBJECTIVE?
Short	Support and facilitate the development of one – two Watershed Based Plans.	\$0 - \$200,000	3/3 Respondents Agreed	None
Medium	Support and facilitate the development an additional two Watershed Based Plans.	\$200,000 - \$1 Million	3/3 Respondents Agreed	None
Long-Term	Assess impact of supported Watershed Based Plans by tracking the number of Best Management Plans implemented and number of improved condition Assessment Units.	\$0 - \$200,000	3/3 Respondents Agreed	None

WSQ Exercise #3 - Implementation Feasibility

For WSQ, Specific Objectives contained the most variability between “Ease” and “Mission”.

- 67% (8/12) were considered **easy to very easy** to implement.
- 75% (9/12) **strongly support** mission implementation.

Water and Sediment Quality Plan Area			
Action	Specific Objective	Ease of Implementation	Support of GBEP Mission
NPS-1	Support Watershed Based Plan Development and Implementation.	0.59	1.68
NPS-2	Support a Back the Bay NPS Education Campaign.	1.21	1.32
NPS-3	Implement NPS best management practice demonstration projects.	1.30	1.65
NPS-4	Host NPS Workshops to Enhance Technical Understanding and Expand Use of Best Practices.	1.76	1.48
PS-1	Implement a Back the Bay PS Campaign with Phase I and Phase II Stormwater Programs.	0.57	1.24
PS-2	Maintain Capacity and Integrity of Sanitary Sewer Systems (SSS).	-0.81	1.71
PS-3	Improve WWTF Compliance.	-1.45	1.60
PHA-1	Improve Seafood Advisory Awareness.	0.65	0.55
PHA-2	Improve Regional Contact Recreation Risk Awareness.	1.00	1.00
PHA-3	Improve Regional Contact Recreation Safety by Implementing WBPs (i.e. TMDL I-Plans and WPPs).	0.17	1.11
PHA-4	Improve Safety of Human Shellfish Consumption from Bay Waters by Implementing WBPs.	-0.25	0.90
PHA-5	Improve Safety of Human Consumption of Recreational Finfish by Implementing WBPs.	-0.65	0.70



NATURAL RESOURCE USES RESULTS

The Natural Resource Uses (NRU) Focus Area covers Specific Objectives pertaining to habitat/living resource conservation and balanced human uses issues and activities.

Report Key

There are eight Specific Objectives for the NRU Focus Area. Specific Objectives are grouped by Issue Area, and numbered correspondingly.

For NRU, there are three Issue Areas:

- HC – Habitat Conservation
- SC – Species Conservation
- FWI – Freshwater Inflows

SPECIFIC OBJECTIVE	DESCRIPTION OF SPECIFIC OBJECTIVE
HC-1	Land Acquisition
HC-2	Habitat Restoration
HC-3	Habitat Enhancement
SC-1	Native Species Management
SC-2	Invasive Species Control
FWI-1	Encourage public and GBEP stakeholder participation in regional water planning groups and the development of priorities policies that ensure adequate quantities of freshwater reach Galveston Bay.
FWI-2	Support further research to understand the annual and seasonal freshwater inflow needs for Galveston Bay, as well as information needed to develop management strategies.
FWI-3	Develop or support outreach initiatives that promote water conservation and educate the public on the value and importance of freshwater inflows.

Exercise #1 - Past, Current and Future Accomplishments

1. Issue Area

Habitat Conservation

Specific Objective

Land Acquisition

Description

Fund and develop Conservation Assistance Programs. Fund acquisition projects that leverages GBEP money for additional funds.

Projects & Accomplishments

Since 2000, GBEP and partners have conserved 8,812 acres of important coastal habitats through fee-simple acquisition and conservation easements, leveraging approximately \$30 million.

Lead Implementers

The Artist Boat
The Conservation Fund
Ducks Unlimited
Galveston Bay Foundation
Houston Audubon
Texas General Land Office
Texas Parks and Wildlife Department
US Fish and Wildlife Service
USDA Natural Resource Conservation Service

Workshop #2 Responses

Lead Implementers	Projects & Accomplishments
Trust for Public Land Houston Wilderness	No response.

Workshop #2 Digital Questionnaire Responses

Lead Implementers	Projects & Accomplishments
No response.	No response.

2. Issue Area

Habitat Conservation

Specific Objective

Habitat Restoration

Description

Fund projects that restore habitat(s) that leverages GBEP money for additional funds.

Projects & Accomplishments

Since 2000, GBEP and partners have conserved 14,548 acres of important coastal habitats and 39,663 linear feet of shoreline through restoration and erosion control projects, leveraging approximately \$29 million.

Lead Implementers

- Ducks Unlimited
- Galveston Bay Foundation
- The Nature Conservancy
- NOAA Restoration
- NRG Energy
- Texas Coastal Watershed Program
- Texas General Land Office
- Texas Parks and Wildlife Department
- US Fish and Wildlife Service
- USDA Natural Resource Conservation Service

Workshop #2 Responses

Lead Implementers	Projects & Accomplishments
Port of Houston Authority HW	No response.

Workshop #2 Digital Questionnaire Responses

Lead Implementers	Projects & Accomplishments
No response.	No response.

3. Issue Area

Habitat Conservation

Specific Objective

Habitat Enhancement

Description

Fund projects that enhance habitat(s) that leverages GBEP money for additional funds.

Projects & Accomplishments

Since 2000, GBEP and partners have conserved 5,472 acres of important coastal habitats through enhancement and invasive species control projects, leveraging approximately \$330,000.

Lead Implementers

- Armand Bayou Nature Center
- Galveston Bay Foundation
- Houston Audubon
- The Nature Conservancy
- NOAA Restoration
- NRG Energy
- Scenic Galveston
- Texas Parks and Wildlife Department
- US Fish and Wildlife Service
- USDA Natural Resource Conservation Service

Workshop #2 Responses

Lead Implementers	Projects & Accomplishments
Port of Houston Authority HW	No response.

Workshop #2 Digital Questionnaire Responses

Lead Implementers	Projects & Accomplishments
No response.	No response.

4. Issue Area

Species Conservation

Specific Objective

Native Species Management

Description

Fund Projects that Sustain and Restore Native Species Populations.

Projects & Accomplishments

Several habitat restoration projects focusing on target species underway (colonial waterbirds, migratory gamebirds, oysters, etc.).

Lead Implementers

Ducks Unlimited
Galveston Bay Foundation
The Nature Conservancy
NOAA Restoration
NRG Energy
Texas Coastal Watershed Program
Texas General Land Office
Texas Parks and Wildlife Department
US Fish and Wildlife Service
USDA Natural Resource Conservation Service

Workshop #2 Responses

Lead Implementers	Projects & Accomplishments
Houston Audubon American Birds Cons. GCBO Audubon-TX Houston Wilderness Bayou Preservation Association	

Workshop #2 Digital Questionnaire Responses

Lead Implementers	Projects & Accomplishments
No response.	No response.

5. Issue Area

Species Conservation

Specific Objective

Invasive Species Control

Description

Fund Projects that Reduce Invasive Species.

Projects & Accomplishments

Texas Department of Agriculture and Texas Parks and Wildlife Department regulate terrestrial and aquatic invasive species respectively. Many educational resources to inform public, example: texasinvasives.org. Programs to reduce abundance of invasive species occur in many locations.

Lead Implementers

- Ducks Unlimited
- Galveston Bay Foundation
- Houston Advanced Research Center
- The Nature Conservancy
- NOAA Restoration
- NRG Energy
- Texas Coastal Watershed Program
- Texas General Land Office
- Texas Parks and Wildlife Department
- US Fish and Wildlife Service
- USDA Natural Resource Conservation Service

Workshop #2 Responses

Lead Implementers	Projects & Accomplishments
AgriLife, Houston Wilderness (Gulf-Houston RCP Projects)	Bayou Preservation Association - association w/invasive vegetation removal along bayous

Workshop #2 Digital Questionnaire Responses

Lead Implementers	Projects & Accomplishments
No response.	No response.

6. Issue Area

Freshwater Inflows

Specific Objective

Encourage public and GBEP stakeholder participation in regional water planning groups and the development of priorities policies that ensure adequate quantities of freshwater reach Galveston Bay.

Description

Inform the public about opportunities to comment on Regional Water Plans.

Projects & Accomplishments

The Galveston Bay Freshwater Inflows Group (GBFIG) has been disbanded due to the passage of SB3. The SB3 process established the Basin and Bay Expert Science Team (BBEST) and Basin and Bay Stakeholder (BBAS) groups to discuss inflow needs. The BBEST and BBAS groups incorporated many members of the GBFIG.

Lead Implementers

Galveston Bay Foundation
 San Jacinto River Authority
 Gulf Coast Waste Disposal Authority
 USDA Natural Resource Conservation Service

Workshop #2 Responses

Lead Implementers	Projects & Accomplishments
Texas Living Waters Project (GBF, Lone Star Chapter of Sierra Club, and National Wildlife Federation) Trinity River Water Authority City of Houston Dallas City City of Fort Worth Gulf Coast Water Authority NFBWA WHWA Other water authorities TWBD National Wildlife Federation	TCEQ formally adopted the standards for e-flows protection for SJ/T in 2011. These standards will be revised in 2021 - time which there will be a public opportunity for revision. Continue research in this area to inform further revision of these standards.

Workshop #2 Digital Questionnaire Responses

Lead Implementers	Projects & Accomplishments
No response.	No response.

7. Issue Area

Freshwater Inflows

Specific Objective

Support further research to understand the annual and seasonal freshwater inflow needs for Galveston Bay, as well as information needed to develop management strategies.

Description

Inform the public about opportunities to comment on Regional Water Plans.

Projects & Accomplishments

Multiple Galveston Bay Council members sit on the Trinity/San Jacinto Basin and Bay Area Stakeholder Committee and Basin and Bay Area Expert Science Team.

Lead Implementers

Texas A&M Galveston
University of Houston Clear Lake
US Geological Survey
US Fish and Wildlife Service

Workshop #2 Responses

Lead Implementers	Projects & Accomplishments
Texas Living Waters Project (see above) Texas Water Development Board Houston Wilderness	Texas Environmental Flows Project (TxState, NWF, Harte, etc.) TWDB environmental flows studies Gulf-Houston Regional Conservation Plan (RVP) - Headwaters to Baywaters Initiative

Workshop #2 Digital Questionnaire Responses

Lead Implementers	Projects & Accomplishments
No response.	No response.

8. Issue Area

Freshwater Inflows

Specific Objective

Develop or support outreach initiatives that promote water conservation and educate the public on the value and importance of freshwater inflows.

Description

Inform the public about opportunities to comment on Regional Water Plans.

Projects & Accomplishments

Freshwater Inflow Education Program

Lead Implementers

Galveston Bay Foundation

Workshop #2 Responses

Lead Implementers	Projects & Accomplishments
Texas Living Waters Project GBEP?	Water Conservation Program

Workshop #2 Digital Questionnaire Responses

Lead Implementers	Projects & Accomplishments
No response.	No response.

NRU Exercise #2 - Costs and Feasibility of Targeted Outputs

HC-1

Land Acquisition

Fund and develop Conservation Assistance Programs. Fund acquisition projects that leverage Galveston Bay Estuary Program (GBEP) money for additional funds.

TARGETED OUTPUTS		IMPLEMENTATION COST	SUPPORTS SPECIFIC OBJECTIVE?	EDITS TO SUPPORT SPECIFIC OBJECTIVE?
Short	Maintain list of acquisition projects to submit for funding.	\$0 - \$200,000	6/6 Respondents Agreed	None
Medium	Develop Conservation Initiative white papers for targeted sub-bay watersheds.	\$200,000 - \$1 Million	6/6 Respondents Agreed	None
Medium	Continue GBEP programmatic support for conservation assistance programs in the watershed.	\$200,000 - \$1 Million	6/6 Respondents Agreed	None
Medium	Develop grant proposals and funding strategies for acquisition projects.	\$200,000 - \$1 Million	6/6 Respondents Agreed	None
Long-Term	Place 5,000 acres of important coastal habitat under long-term conservation through fee-simple acquisition, conservation easements, and other mechanisms.	\$1 Million - \$500 Million	6/6 Respondents Agreed	None

HC-2

Habitat Restoration

Fund projects that restore habitat(s) that leverages Galveston Bay Estuary Program (GBEP) money for additional funds.

TARGETED OUTPUTS		IMPLEMENTATION COST	SUPPORTS SPECIFIC OBJECTIVE?	EDITS TO SUPPORT SPECIFIC OBJECTIVE?
Short	Identify important coastal areas to target for restoration of lost or degraded coastal habitats, using 1950's aerial imagery as a benchmark.	\$200,000 - \$1 Million	6/6 Respondents Agreed	None
Medium	Develop funding strategies for restoration projects that can be adapted to multiple funding sources.	\$200,000 - \$1 Million	6/6 Respondents Agreed	None
Long-Term	Restore 2,500 acres of lost or degraded coastal habitats.	\$200,000 - \$1 Million	6/6 Respondents Agreed	None

HC-3

Habitat Enhancement

Fund projects that enhance habitat(s) that leverages Galveston Bay Estuary Program (GBEP) money for additional funds.

TARGETED OUTPUTS		IMPLEMENTATION COST	SUPPORTS SPECIFIC OBJECTIVE?	EDITS TO SUPPORT SPECIFIC OBJECTIVE?
Short	Identify important coastal areas to target for enhancement of degraded coastal habitats.	\$200,000 - \$1 Million	6/6 Respondents Agreed	None
Medium	Develop funding strategies for enhancement projects that can be adapted to multiple funding sources.	\$0 - \$200,000	6/6 Respondents Agreed	None
Long-Term	Enhance 5,000 acres of lost or degraded coastal habitats.	\$1 Million - \$500 Million	6/6 Respondents Agreed	None

SC-1

Native Species Management

Fund projects that sustain and restore native species populations.

TARGETED OUTPUTS		IMPLEMENTATION COST	SUPPORTS SPECIFIC OBJECTIVE?	EDITS TO SUPPORT SPECIFIC OBJECTIVE?
Short	Develop habitat conservation projects based on species needs.	\$200,000 - \$1 Million	6/6 Respondents Agreed	None
Medium	Continue to develop habitat conservation projects based on species needs.	\$200,000 - \$1 Million	6/6 Respondents Agreed	None
Long-Term	Continue to develop habitat conservation projects based on species needs.	\$200,000 - \$1 Million	6/6 Respondents Agreed	None

SC-2

Invasive Species Control

Fund projects that reduce invasive species.

TARGETED OUTPUTS		IMPLEMENTATION COST	SUPPORTS SPECIFIC OBJECTIVE?	EDITS TO SUPPORT SPECIFIC OBJECTIVE?
Short	Identify important coastal areas to target for enhancement of degraded coastal habitats.	\$0 - \$200,000	6/6 Respondents Agreed	None
Medium	Develop funding strategies for enhancement projects that can be adapted to multiple funding sources.	\$0 - \$200,000	6/6 Respondents Agreed	None
Long-Term	Enhance 5,000 acres of lost or degraded coastal habitats.	\$1 Million - \$500 Million	6/6 Respondents Agreed	None

FWI-1*

Encourage public and Galveston Bay Estuary Program (GBEP) stakeholder participation in regional water planning groups and the development of priorities policies that ensure adequate quantities of freshwater reach Galveston Bay.

FWI-2*

Support further research to understand the annual and seasonal freshwater inflow needs for Galveston Bay, as well as information needed to develop management strategies.

FWI-3*

Develop or support outreach initiatives that promote water conservation and educate the public on the value and importance of freshwater inflows.

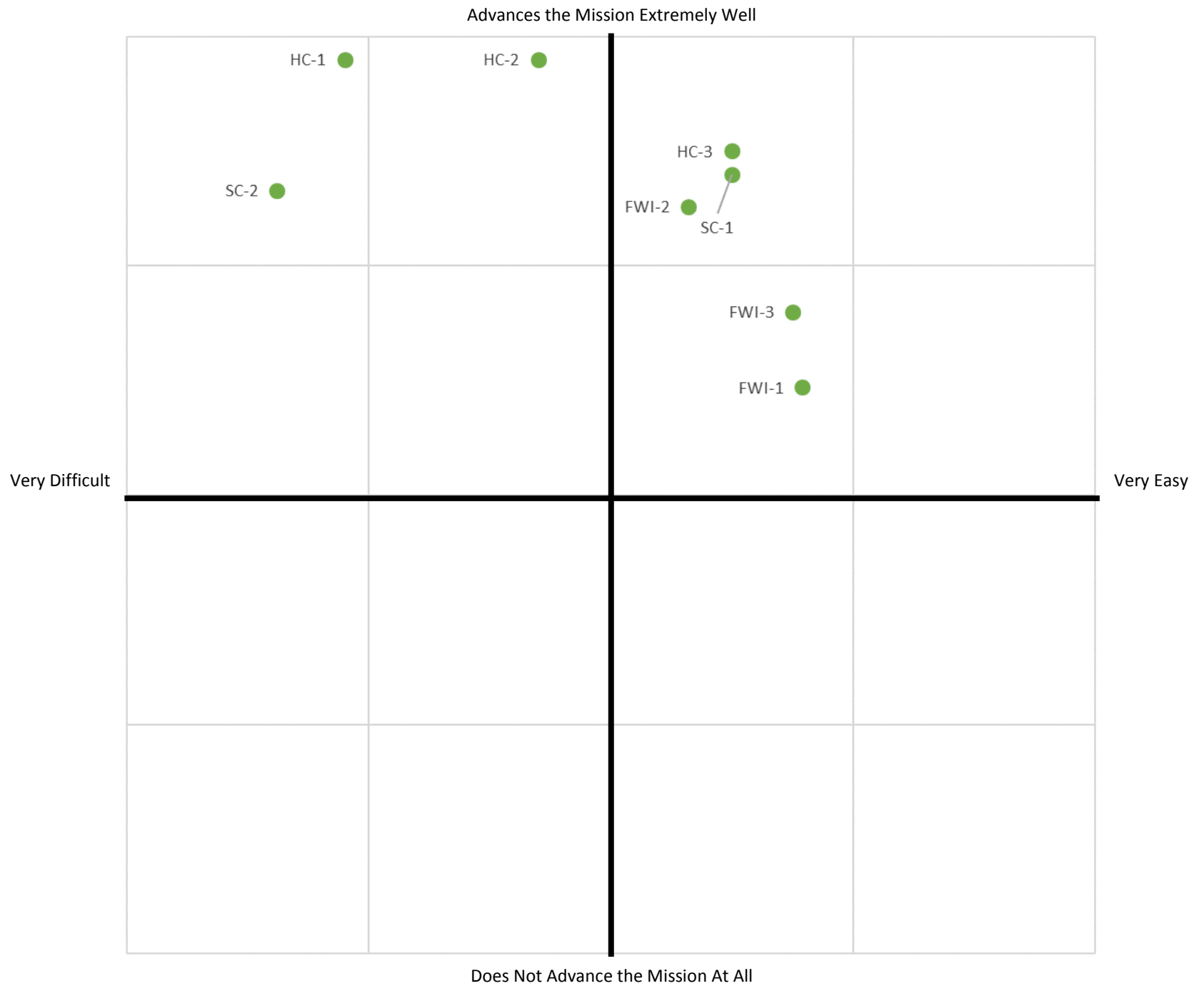
TARGETED OUTPUTS		IMPLEMENTATION COST	SUPPORTS SPECIFIC OBJECTIVE?	EDITS TO SUPPORT SPECIFIC OBJECTIVE?
Short	Identify opportunities to participate in the regional water planning processes to ensure that the rules that govern the regional Water Plans better protect water for wildlife.	\$0 - \$200,000	6/6 Respondents Agreed	None
Medium	Continue to identify opportunities to participate in the regional water planning processes to ensure that the rules that govern the regional Water Plans better protect water for wildlife.	\$0 - \$200,000	6/6 Respondents Agreed	None
Long-Term	Continue to identify opportunities to participate in the regional water planning processes to ensure that the rules that govern the regional Water Plans better protect water for wildlife.	\$200,000 - \$1 Million	6/6 Respondents Agreed	None

*The Targeted Outputs for all three Freshwater Inflows Specific Objectives are the same and were grouped during Exercise #2.

NRU Exercise #3 - Implementation Feasibility

- 75% (6/8) of NRU Specific Objectives were considered to advance the mission extremely well.
- 63% (5/8) of NRU Specific Objectives were considered easy to implement, with 25% (2/8) considered very difficult to implement.

Natural Resource Uses			
Action	Specific Objective	Ease of Implementation	Support of GBEP Mission
HC-1	Land Acquisition	-1.1	1.9
HC-2	Habitat Restoration	-0.3	1.9
HC-3	Habitat Enhancement	0.5	1.5
SC-1	Native Species Management	0.5	1.4
SC-2	Invasive Species Control	-1.38	1.33
FWI-1	Encourage public and GBEP stakeholder participation in regional water planning groups and the development of priorities policies that ensure adequate quantities of freshwater reach Galveston Bay.	0.79	0.47
FWI-2	Support further research to understand the annual and seasonal freshwater inflow needs for Galveston Bay, as well as information needed to develop management strategies.	0.32	1.26
FWI-3	Develop or support outreach initiatives that promote water conservation and educate the public on the value and importance of freshwater inflows.	0.75	0.8



PUBLIC PARTICIPATION & EDUCATION RESULTS

Public Participation & Education (PPE) Focus Area covers Specific Objectives pertaining to education and outreach issues and activities.

Report Key

There are six Specific Objectives for the PPE Focus Area. Specific Objectives are grouped by Issue Area, and numbered correspondingly.

For PPE, there are two Issue Areas:

- SPO – Stakeholder & Partner Outreach
- PEA – Public Education & Awareness

SPECIFIC OBJECTIVE	DESCRIPTION OF SPECIFIC OBJECTIVE
SPO-1	Develop New and Support Existing Stewardship Programs & Volunteer Opportunities for Stakeholders.
SPO-2	Support and Promote Workshops and Events that Facilitate Stakeholder & Partner Involvement.
SPO-3	Ensure that local governments are knowledgeable about key estuary issues, common interests, and new information as it becomes available.
SPO-4	Continue to Expand and Support the Back the Bay Campaign and Other Regional Initiatives.
PEA-1	Develop New and Support Existing Programs in Galveston Bay to Engage the Public in a Dialogue About Key Issues.
PEA-2	Develop New and Support Existing K-12 Galveston Bay Estuary-Related Curricular Materials for Regional Use. Find Opportunities to "Train the Trainers."

Exercise #1 - Past, Current and Future Accomplishments

1. Issue Area

Stakeholder & Partner Outreach

Specific Objective

Develop New and Support Existing Stewardship Programs & Volunteer Opportunities for Stakeholders.

Description

Continue to develop, support and promote stewardship programs and volunteer opportunities for Stakeholders, industry and government. Opportunities could include GBEP Subcommittee participation or any other projects that allow participants to become ambassadors of and for the health of Galveston Bay, as well as events, special projects, and other volunteer programs.

Projects & Accomplishments

Galveston Bay Brigade
 Girl Scouts of San Jacinto Council - Various Projects
 Houston Advanced Research Center (HARC) Invasive Species Program - Current
 River, Lakes, Bays 'N Bayous Trash Bash - Annual
 Sam Houston Council - Boy Scouts of America - Various Projects
 Texas Estuarine Resource Network Program (various) - Current
 Texas Parks & Wildlife Department Learn to Fish - Current
 Texas Stream Team - Current
 White Oak Bayou Project (RE: invasive species) - Current

Lead Implementers

Galveston Bay Estuary Program (GBEP)
 Various Partners
 HARC
 Houston-Galveston Area Council (H-GAC)
 Texas Audubon
 Texas Conservation Fund

Workshop #2 Responses

Lead Implementers	Projects & Accomplishments
Houston Sierra Club Student Conservation Association Texans for Clean Water GBF Bayou Preservation Association Industry Texas City - La Marque Community Advisory Council	Adopt-a-beach Setty / Bolivar Texas master naturalists - Galveston Bay Area Chapter SCA Houston Community Program (Env. / Cons. Service projects & Enc. Ed and workforce readiness) GBF Land Stewardship workdays, habitat restoration workdays (marsh, oysters) - current Bayou Preservation Association - Bayou Clean Ups

Workshop #2 Digital Questionnaire Responses

Lead Implementers	Projects & Accomplishments
No response.	No response.

2. Issue Area

Stakeholder & Partner Outreach

Specific Objective

Support and Promote Workshops and Events that Facilitate Stakeholder & Partner Involvement.

Description

Continue to host and expand the State of the Bay Symposia on a three-year schedule. Support existing workshops and events hosted by Stakeholders & Partners in off years. Explore opportunities for new workshops or events.

Projects & Accomplishments

- Environmental Educators Workshop - Future
- GBEP Speaker's Bureau - Future
- H-GAC Workshop Series (Various) - Current
- State of the Bay Symposium - 2016
- Texas AgriLife Programs (Various) - Current
- Trash Free Waters- Current
- Trash Summit- Current

Lead Implementers

- GBEP
- Galveston Bay Council
- Subcommittee Members

Workshop #2 Responses

Lead Implementers	Projects & Accomplishments
No response.	No response.

Workshop #2 Digital Questionnaire Responses

Lead Implementers	Projects & Accomplishments
HARC	No response.

3. Issue Area

Stakeholder & Partner Outreach

Specific Objective

Ensure that local governments are knowledgeable about key estuary issues, common interests, and new information as it becomes available.

Description

Develop resource materials for local government use and reference, and proactively distribute and promote those materials. Use resource materials as a vehicle to build new and support existing relationships with local governments.

Provide specific support to MS4 permit holders to assist in meeting permit requirements.
Provide materials to small communities without MS4 permits to supplement public engagement activities.

Projects & Accomplishments

- Galveston Bay Action Network - Current
- H-GAC's Clean Water Is Essential - Future
- H-GAC's Designing For Impact - Current
- H-GAC's Water Resources Information Map - Current
- Texas A&M - Galveston's Texas Coastal Atlas - Current
- Texas AgriLife CHARM Mapping Application - Current
- Total Maximum Daily Load (TMDL) / I-Plan Projects - Various
- Watershed Protection Plans - Various

Lead Implementers

- GBEP
- Galveston Bay Council
- Subcommittee Members

Workshop #2 Responses

Lead Implementers	Projects & Accomplishments
Houston Sierra Club Texans for Clean Water Texas Living Waters Project GBF GLO NWF Houston Wilderness (Gulf-Houston RCP)	Bays in Peril Report (upcoming from NFW) HW Workshops & Government meeting(s) opportunities Sierra Club - Review & comment on section 10/404 permits Texans for Clean Water - Comment and communicate with elected officials and agencies Coastal NPS Management Program (management measure implementation) GBF's work w/water utilities and municipalities on water consideration for the Bay - informed by the recently released Texas Water Conservation Scorecard (texaswaterconservationboard.org) and the Water By the Yard Report.

Workshop #2 Digital Questionnaire Responses

Lead Implementers	Projects & Accomplishments
HARC	Maybe have programs that provide CEUs to licensed city staff to encourage more participation.

4. Issue Area

Stakeholder & Partner Outreach

Specific Objective

Continue to Expand and Support the Back the Bay Campaign and Other Regional Initiatives.

Description

Build on previous Back the Bay campaign success and explore new opportunities to refine and expand it through Stakeholder & Partner feedback / participation.

Support other regional initiatives, such as Cease the Grease and the Galveston Bay Action Network.

Projects & Accomplishments

- Back the Bay - Current
- Cease the Grease - Current
- Galveston Bay Action Network - Current

Lead Implementers

- GBEP
- Galveston Bay Council
- Subcommittee Members

Workshop #2 Responses

Lead Implementers	Projects & Accomplishments
GBF Texas Living Waters Project Bayou Preservation Association	Galveston Bay Water Brigade - water wise Bay cities challenge (gbwb.org - campaign)

Workshop #2 Digital Questionnaire Responses

Lead Implementers	Projects & Accomplishments
No response.	No response.

5. Issue Area

Public Education & Awareness

Specific Objective

Develop New and Support Existing Programs in Galveston Bay to Engage the Public in a Dialogue About Key Issues.

Description

Continue to develop, support and promote public awareness and start a dialogue about key issues impacting Galveston Bay and what can be done to mitigate those issues.

Continue to develop, support and promote public education initiatives, with a focus on Adult Education, that change behaviors and attitudes in Galveston Bay. Conduct and/or support public awareness and public perception surveys to measure awareness levels and message impact.

Projects & Accomplishments

Back the Bay - Current
Galveston Bay Report Card - Annual
Kinder Institute Houston Area Survey - Annual

Lead Implementers

GBEP
Various Partners

Workshop #2 Responses

Lead Implementers	Projects & Accomplishments
Student Conservation Association Texans for Clean Water Sierra Club GBF Texas Living Waters Project (GBF, NWF, Lonestar Chapter of Sierra Club) Houston Sierra Club AgriLife USPOS (sp?) Urban Initiative	SCA / WPARD Milby Park / Sims Bayou NPS Project (2 Yrs) Texas master Naturalist (Training & Outreach Program) Ongoing Outreach & social Media (TFCW) Monthly Programs (Sierra Club) Galveston Bay Water Brigade (GBWB) Water-wise bay Cities Challenge (competition for 20 cities in the Bay area to conserve water for the Bay) GBF rain barrel workshops Outings Program (Houston Sierra Club) Galveston Bay Report Card - Annual (->and in Spanish) GBF rain barrel workshops

Workshop #2 Digital Questionnaire Responses

Lead Implementers	Projects & Accomplishments
HARC GBF	Galveston Bay Report Card

6. Issue Area

Public Education & Awareness

Specific Objective

Develop New and Support Existing K-12 Galveston Bay Estuary-Related Curricular Materials for Regional Use. Find Opportunities to "Train the Trainers."

Description

Continue to develop, support and promote programs that seek to educate K-12 audiences on how changes in behavior and attitude can positively influence the protection and preservation of Galveston Bay.

Continue to develop, support and promote programs that seek to work collaboratively with educators on how educational materials and programs are introduced to students.

Projects & Accomplishments

- Artist Boat Youth Eco-Art Series - Current
- Audubon Texas Youth Program - Current
- Environmental Educators Exchange - Current
- Galveston Bay Foundation Youth Programs - Current
- HERE Project - Future
- Project Water Education for Teachers (WET) - Current
- Texas AgriLife Education Workshops (Various) - Current

Lead Implementers

- GBEP
- Various Partners

Workshop #2 Responses

Lead Implementers	Projects & Accomplishments
Galveston Bay Foundation Artist Boat Bayou Preservation Association Bayou Land Conservancy	University of Houston - Clear Lake Environmental Institute: Junior Master Naturalist Bayou Preservation Association - Watershed Explorers BLC No Child Left Inside

Workshop #2 Digital Questionnaire Responses

Lead Implementers	Projects & Accomplishments
No response.	No response.

PPE Exercise #2 - Costs and Feasibility of Targeted Outputs

SPO-1

Develop New and Support Existing Stewardship Programs & Volunteer Opportunities for Stakeholders.

Continue to develop, support and promote stewardship programs and volunteer opportunities for stakeholders, industry and government.

Opportunities could include Galveston Bay Estuary Program (GBEP) Subcommittee participation or any other projects that allow participants to become ambassadors of and for the health of Galveston Bay, as well as events, special projects, and other volunteer programs.

TARGETED OUTPUTS		IMPLEMENTATION COST	SUPPORTS SPECIFIC OBJECTIVE?	EDITS TO SUPPORT SPECIFIC OBJECTIVE?
Short	Develop database of existing programs.	\$0 - \$200,000	10/10 Respondents Agreed	None
Short	Identify new geographies and communities.	\$0 - \$200,000	10/10 Respondents Agreed	None
Short	Create action plan to support existing (or create) ten programs.	\$200,000 - \$1 Million	10/10 Respondents Agreed	None
Medium	Measurable increase in existing program participation (specific to programs already supported, such as Texas Stream Team, Trash Bash, etc.).	\$0 - \$200,000	10/10 Respondents Agreed	None
Medium	Support five additional programs (or 50% goal met).	\$200,000 - \$1 Million	9/10 Respondents Agreed	None
Long-term	Support five additional programs (or 100% goal met).	\$200,000 - \$1 Million	9/10 Respondents Agreed	None

SPO-2

Support and Promote Workshops and Events that Facilitate Stakeholder & Partner Involvement.

Continue to host and expand the State of the Bay Symposia on a three-year schedule. Support existing workshops and events hosted by Stakeholders & Partners in off years. Explore opportunities for new workshops or events.

TARGETED OUTPUTS		IMPLEMENTATION COST	SUPPORTS SPECIFIC OBJECTIVE?	EDITS TO SUPPORT SPECIFIC OBJECTIVE?
Short	Host 2019 and 2022 Symposia. Complete events database.	\$200,000 - \$1 Million	11/11 Respondents Agreed	None
Medium	Host 2025 Symposium. Measurable increase (5%) in attendance from 2022.	\$0 - \$200,000	11/11 Respondents Agreed	None
Long-Term	Host 2028 Symposium. Measurable increase (10%) in attendance from 2025.	\$200,000 - \$1 Million	10/11 Respondents Agreed	None
Short	Identify underserved geographies and culturally diverse communities.	\$0 - \$200,000	11/11 Respondents Agreed	None
Short	Create action plan (specific number of events to be determined).	\$0 - \$200,000	11/11 Respondents Agreed	None
Short	Development and promotion of a Speaker's Bureau, spanning all subject areas.	\$0 - \$200,000	11/11 Respondents Agreed	None
Medium	Significant progress on action plan items (50% of goals met).	\$200,000 - \$1 Million	11/11 Respondents Agreed	None
Long-Term	Completion of all action plan items (100% of goals met).	\$200,000 - \$1 Million	11/11 Respondents Agreed	None
Short	Sponsor or assist in planning of three Stakeholder activities or events (2018, 2020, 2021).	\$200,000 - \$1 Million	11/11 Respondents Agreed	None
Medium	Sponsor or assist in planning of two Stakeholder activities or events (2023, 2024).	\$0 - \$200,000	11/11 Respondents Agreed	None
Long-Term	Sponsor or assist in planning of two Stakeholder activities or events (2026, 2027).	\$0 - \$200,000	10/11 Respondents Agreed	None

SPO-3

Ensure that local governments are knowledgeable about key estuary issues, common interests, and new information as it becomes available.

Develop resource materials for local government use and reference, and proactively distribute and promote those materials. Use resource materials as a vehicle to build new and support existing relationships with local governments. Provide specific support to municipal separate storm sewer system (MS4) permit holders to assist in meeting permit requirements. Provide materials to small communities without MS4 permits to supplement public engagement activities.

TARGETED OUTPUTS		IMPLEMENTATION COST	SUPPORTS SPECIFIC OBJECTIVE?	EDITS TO SUPPORT SPECIFIC OBJECTIVE?
Short	Develop database of existing resources.	\$0 - \$200,000	11/11 Respondents Agreed	None
Medium	Update database with new or updated resources.	\$0 - \$200,000	11/11 Respondents Agreed	None
Long-Term	Update database with new or updated resources.	\$0 - \$200,000	11/11 Respondents Agreed	None
Short	Create action plan (specific resources to be determined based on gap analysis).	\$0 - \$200,000	11/11 Respondents Agreed	None
Short	Work with Partners to create new materials identified in action plan.	\$0 - \$200,000	11/11 Respondents Agreed	None
Medium	Significant progress on action plan items (50% of goals met).	\$200,000 - \$1 Million	11/11 Respondents Agreed	None
Long-Term	Completion of all action plan items (100% of goals met).	\$200,000 - \$1 Million	11/11 Respondents Agreed	None

SPO-4

Continue to Expand and Support the Back the Bay Campaign and Other Regional Initiatives.

Build on previous Back the Bay campaign success and explore new opportunities to refine and expand it through Stakeholder & Partner feedback / participation. Support other regional initiatives, such as Cease the Grease and the Galveston Bay Action Network.

TARGETED OUTPUTS		IMPLEMENTATION COST	SUPPORTS SPECIFIC OBJECTIVE?	EDITS TO SUPPORT SPECIFIC OBJECTIVE?
Short	Create action plan for goals (specific goals to be determined, could include increasing the number of partners each year).	\$0 - \$200,000	7/8 Respondents Agreed	None
Medium	Significant progress on action plan items (50% of goals met).	\$200,000 - \$1 Million	7/8 Respondents Agreed	None
Long-Term	Completion of all action plan items (100% of goals met).	\$200,000 - \$1 Million	7/8 Respondents Agreed	None

PEA-1

Develop New and Support Existing Programs in Galveston Bay to Engage the Public in a Dialogue About Key Issues.

Continue to develop, support and promote public awareness and start a dialogue about key issues impacting Galveston Bay and what can be done to mitigate those issues.

Continue to develop, support and promote public education initiatives, with a focus on Adult Education, that change behaviors and attitudes in Galveston Bay. Conduct and/or support public awareness and public perception surveys to measure awareness levels and message impact.

TARGETED OUTPUTS		IMPLEMENTATION COST	SUPPORTS SPECIFIC OBJECTIVE?	EDITS TO SUPPORT SPECIFIC OBJECTIVE?
Short	Develop database of existing programs.	\$0 - \$200,000	11/11 Respondents Agreed	None
Short	Conduct awareness level surveys, prior to program expansion.	\$0 - \$200,000	11/11 Respondents Agreed	None
Short	Identify new geographies and communities from survey.	\$0 - \$200,000	11/11 Respondents Agreed	None
Short	Create action plan (specific goals to be determined based on gap analysis). Coordinate with other groups conducting similar research / surveys.	\$0 - \$200,000	11/11 Respondents Agreed	None
Medium	Significant progress on action plan items (50% of goals met).	\$200,000 - \$1 Million	11/11 Respondents Agreed	None
Long-Term	Completion of all action plan items (100% of goals met).	\$200,000 - \$1 Million	11/11 Respondents Agreed	None
Long-Term	Conduct awareness level surveys, after program expansion.	\$0 - \$200,000	11/11 Respondents Agreed	None
Medium	Create new materials identified in action plan.	\$0 - \$200,000	11/11 Respondents Agreed	None
Long-Term	Create any new materials, as needed.	\$200,000 - \$1 Million	11/11 Respondents Agreed	None

PEA-2

Develop New and Support Existing K-12 Galveston Bay Estuary-Related Curricular Materials for Regional Use. Find Opportunities to "Train the Trainers."

Continue to develop, support and promote programs that seek to educate K-12 audiences on how changes in behavior and attitude can positively influence the protection and preservation of Galveston Bay.

Continue to develop, support and promote programs that seek to work collaboratively with educators on how educational materials and programs are introduced to students.

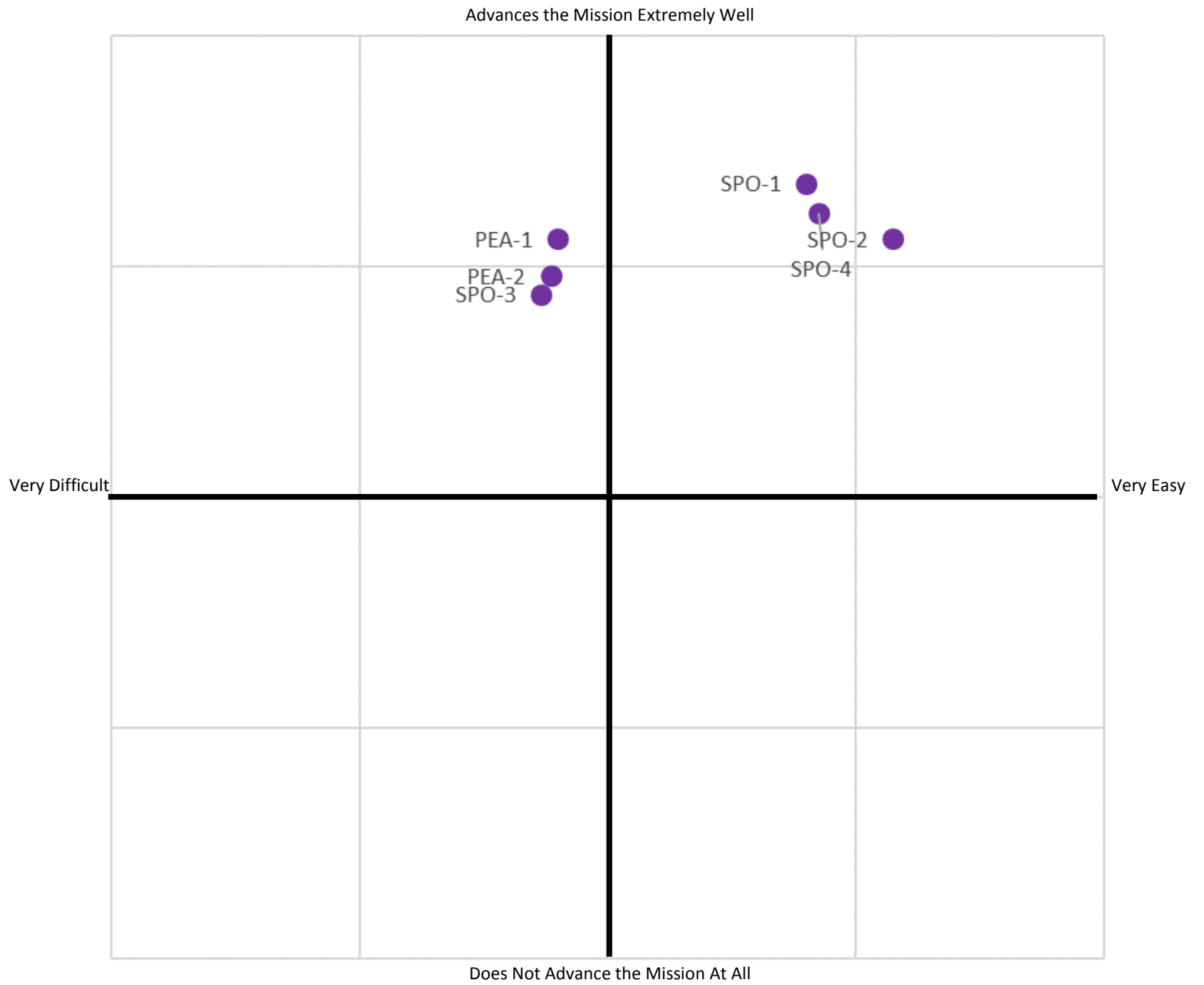
TARGETED OUTPUTS		IMPLEMENTATION COST	SUPPORTS SPECIFIC OBJECTIVE?	EDITS TO SUPPORT SPECIFIC OBJECTIVE?
Short	Develop database of existing programs.	\$0 - \$200,000	11/11 Respondents Agreed	None
Short	Conduct Educators Summit to identify education gaps and needs.	\$200,000 - \$1 Million	10/11 Respondents Agreed	None
Short	Create action plan (specific goals to be determined in Educators Summit).	\$0 - \$200,000	10/11 Respondents Agreed	None
Medium	Significant progress on action plan items (50% of goals met).	\$200,000 - \$1 Million	10/11 Respondents Agreed	None
Long-Term	Completion of all action plan items (100% of goals met).	\$200,000 - \$1 Million	10/11 Respondents Agreed	None

PPE Exercise #3 - Implementation Feasibility

PPE clustered the most of the four Focus Areas.

- 50% (3/6) of Specific Objectives were considered easy to implement and three considered difficult, though only slightly.
- 67% (4/6) were considered as strongly implementing the mission.

Public Participation and Education Plan			
Action	Specific Objective	Ease of Implementation	Support of GBEP Mission
SPO-1	Develop New and Support Existing Stewardship Programs & Volunteer Opportunities for Stakeholders.	0.8	1.36
SPO-2	Support and Promote Workshops and Events that Facilitate Stakeholder & Partner Involvement.	1.15	1.12
SPO-3	Ensure that local governments are knowledgeable about key estuary issues, common interests, and new information as it becomes available.	-0.27	0.88
SPO-4	Continue to Expand and Support the Back the Bay Campaign and Other Regional Initiatives.	0.85	1.23
PEA-1	Develop New and Support Existing Programs in Galveston Bay to Engage the Public in a Dialogue About Key Issues.	-0.2	1.12
PEA-2	Develop New and Support Existing K-12 Galveston Bay Estuary-Related Curricular Materials for Regional Use. Find Opportunities to "Train the Trainers."	-0.23	0.96



MONITORING & RESEARCH RESULTS

Monitoring & Research (M&R) Focus Area covers Specific Objectives pertaining to monitoring, research, and access.

Report Key

There are ten Specific Objectives for the M&R Focus Area. Specific Objectives are grouped by Issue Area, and numbered correspondingly.

For M&R, there are two Issue Areas:

- RES – Research
- ACS – Access

SPECIFIC OBJECTIVE	DESCRIPTION OF SPECIFIC OBJECTIVE
RES-1	Conduct Biological Stressor Monitoring and Research
RES-2	Conduct Geochemical Stressor Monitoring and Research
RES-3	Conduct Physical Stressor Monitoring and Research
RES-4	Conduct Monitoring and Research to Address Limits to Contact Recreation
RES-5	Conduct Monitoring and Research to Address Limits to Seafood Consumption
RES-6	Evaluate Best Management Practice (BMP) Demonstration Projects
RES-7	Conduct Research on Ecosystem Service and Economic Valuation of Bay Resources
RES-8	Complete Coastal Resiliency and Acclimation Studies
ACS-1	Support Tracking the Status and Trends of Environmental and Stressor Indicators of Galveston Bay Ecosystem Health
ACS-2	Expand the Dissemination of Easy to Access Galveston Bay Monitoring and Research

Exercise #1 - Past, Current and Future Accomplishments

1. Issue Area

Collaborate with Research Institutions to Support Focus Area Applied Research and Monitoring

Specific Objective

Conduct Biological Stressor Monitoring and Research

Description

Evaluate the influence of biological stressors (e.g. harmful algal blooms, *Toxoplasma gondii*, *Perkinsus marinus* (Dermo), invasive species and commercial and recreational harvest) on aquatic, semi-aquatic, and terrestrial species populations found in the Galveston Bay watershed.

Projects & Accomplishments

- (1) Texas A&M University (TAMU) has taken the lead in studying harmful algal blooms and Dermo in the past.
- (2) Texas Parks & Wildlife Department (TPWD) investigates fish kills.
- (3) TPWD, United States Fish and Wildlife Service (USFWS), Natural Resource Uses (NRU) subcommittee, and others have led efforts to study effective ways to limit or locally eradicate invasive species populations.
- (4) Other institutions have studied individual populations (e.g. University of Houston - Clear Lake and Houston Zoo's Diamondback Terrapin work).

Lead Implementers

Galveston Bay Estuary Program (GBEP)
 Various Research Institutions, Agencies, and non-governmental organizations (NGOs)

Workshop #2 Responses

Lead Implementers	Projects & Accomplishments
No response.	TPWD /TAMUG completed collaborative study of Dermo and comparison w/PER methodologies - in connection with TLWS work on freshwater inflows - salinity affecting species survival and incidence of invasive species and position such as dermo? Not sure if to add here.

Workshop #2 Digital Questionnaire Responses

Lead Implementers	Projects & Accomplishments
No response.	No response.

2. Issue Area

Collaborate with Research Institutions to Support Focus Area Applied Research and Monitoring

Specific Objective

Conduct Geochemical Stressor Monitoring and Research

Description

Investigate the affect of geochemical stressors (e.g. eutrophication, biomagnification of legacy toxins and endocrine disrupters) on aquatic, semi-aquatic and terrestrial species populations found in the Galveston Bay watershed. Evaluate fate and transport through the environment and develop baselines for future comparison.

Projects & Accomplishments

(1) Watershed based plans identify current water quality baselines to determine load reductions needed to meet water quality standards.

(2) The Texas Commission on Environmental Quality (TCEQ) has begun to develop nutrient numerical standards beginning with Lakes and Rivers. Sediment and Litter might be emerging areas where baselines could be developed.

(3) Baylor University, Texas A&M University-Galveston (TAMUG), United States Geological Survey (USGS) and others have identified endocrine disrupters and personal care products in this region.

(4) TAMUG and UHCL-Environmental Institute of Houston have studied Dolphin populations and conducted tissue bioassays. There has been some interest in biomagnification studies in avian populations.

Lead Implementers

GBEP

Various Research Institutions, Agencies, and NGOs

Workshop #2 Responses

Lead Implementers	Projects & Accomplishments
No response.	No response.

Workshop #2 Digital Questionnaire Responses

Lead Implementers	Projects & Accomplishments
No response.	No response.

3. Issue Area

Collaborate with Research Institutions to Support Focus Area Applied Research and Monitoring

Specific Objective

Conduct Physical Stressor Monitoring and Research

Description

Study the influence of physical changes to the estuary (e.g. litter and illegal dumping, modified freshwater inflows, bay circulation, coastal erosion, shoreline hardening, land use changes and loss or fragmentation of habitats) on aquatic, semi-aquatic, and terrestrial species populations found in the Galveston Bay watershed.

Projects & Accomplishments

(1) Bay circulation and infrastructure studies were completed in 1999 by the Texas Water Development Board (TWDB) for GBEP.

(2) Research covering sea level rise, wetland habitat loss and freshwater inflows have been completed during the first twenty years.

(3) Estuarine wetland habitat restoration projects have resulted in seagrass bed returns to West Bay.

(4) UHCL and Houston Zoo have conducted studies on Diamond backed Terrapin.

Lead Implementers

GBEP

Various Research Institutions, Agencies, and NGOs

Workshop #2 Responses

Lead Implementers	Projects & Accomplishments
Texas Living Waters Project (National Wildlife Federation) Houston Wilderness	TAMUG studies on Rangia (sp?) and Vallisneria as biological indicators of freshwater inflows. Texas Living Waters Project (NWF) on rangia and vallisneria as other biological indicators of freshwater inflows. USGS coastal inflow (Trinity @Wallisville) TWDB hydrodynamic model development for the Trinity River Delta TWDB TxBlend model for T-SJ Estuary. Gulf - Houston RCP - Headwaters to Baywaters Initiative

Workshop #2 Digital Questionnaire Responses

Lead Implementers	Projects & Accomplishments
No response.	No response.

4. Issue Area

Collaborate with Research Institutions to Support Focus Area Applied Research and Monitoring

Specific Objective

Conduct Monitoring and Research to Address Limits to Contact Recreation

Description

Initiate and complete studies that characterize the public's contact recreation risks from waterborne pathogens in bay and bay tributaries; conduct bacteria source tracking to characterize sources of pathogens and evaluate the emergence of new pathogen indicators.

Projects & Accomplishments

(1) City of Houston, Harris County, TAMUG and others have been looking at alternative bacteria indicators, analysis methods, resuspension and other research.

(2) Fiscal Year (FY) 2018 planned funding by GBEP for watersheds within the GBEP region.

Lead Implementers

GBEP

Local Governments

Various Research Institutions, Agencies, and NGOs

Workshop #2 Responses

Lead Implementers	Projects & Accomplishments
No response.	No response.

Workshop #2 Digital Questionnaire Responses

Lead Implementers	Projects & Accomplishments
No response.	No response.

5. Issue Area

Collaborate with Research Institutions to Support Focus Area Applied Research and Monitoring

Specific Objective

Conduct Monitoring and Research to Address Limits to Seafood Consumption

Description

Identify sources and evaluate remedial actions to address legacy pollutants, surface run-off, illegal dumping and air deposition that can affect the size of recreational shellfish harvest areas or number of seafood advisories. Known pollutants of concern include PCB, Dioxin, and mercury.

Projects & Accomplishments

(1) Advisory (ADV) 55 was issued in December 2015 and rescinded ADV 49 and the pesticide advisory (HSC) due to lower concentrations but maintains consumption advisory for Dioxin and PCBs in fish and shellfish (all fish and blue crabs) for HSC above Fred Hartman Bridge and an advisory for catfish, spotted seatrout and blue crab between Fred Hartman Bridge south to a line from Red Bluff Point to Five-Mile Cut Marker to Houston Point.

(2) ADV 50 issued in June 2013 advisory for all species of catfish for Galveston Bay and all contiguous waters, including Chocolate, East, Trinity, and West Bays. Galveston Bay Symposium highlighted air deposition studies and GBEP funded a project with the University of Houston.

Lead Implementers

GBEP
Texas Department of State Health Services (TDSHS)
TCEQ
TPWD
General Land Office (GLO)
Various Research Institutions, Agencies, and NGOs

Workshop #2 Responses

Lead Implementers	Projects & Accomplishments
Houston Wilderness Rice University City of Houston	Test & analysis of Asian Carp Fish

Workshop #2 Digital Questionnaire Responses

Lead Implementers	Projects & Accomplishments
No response.	No response.

6. Issue Area

Collaborate with Research Institutions to Support Focus Area Applied Research and Monitoring

Specific Objective

Evaluate Best Management Practice (BMP) Demonstration Projects

Description

Evaluate the effectiveness of BMPs to address non-point source (NPS) and point source (PS) pollutants and improve water quality. Evaluation of data from either built BMPs with available data or from future planned demonstration BMPs would be studied. New projects would be instrumented or monitored to collect stormwater run-off in watersheds containing impaired waters.

Projects & Accomplishments

Demonstration Projects Include:

- (a) Brays Bayou Wetland
- (b) Ghirardi Family Watersmart Park
- (c) Harris County Flood Control (HCFCD) Detention with Water Quality Improvement Features
- (d) Birnamwood Dr.
- (e) Alameda Rd.

Lead Implementers

GBEP
Various Research Institutions, Agencies, and NGOs
Local Governments

Workshop #2 Responses

Lead Implementers	Projects & Accomplishments
Houston Wilderness	CCISD Education Village Stormwater Wetland (Texas Coastal Watershed Program) Gulf-Houston RCP (Headwaters to Baywaters Initiative)

Workshop #2 Digital Questionnaire Responses

Lead Implementers	Projects & Accomplishments
No response.	No response.

7. Issue Area

Collaborate with Research Institutions to Support Focus Area Applied Research and Monitoring

Specific Objective

Conduct Research on Ecosystem Service and Economic Valuation of Bay Resources

Description

Detail the Ecosystem Services provided by Galveston Bay and Upland Habitats and Determine an Economic Value for Each.

Projects & Accomplishments

- (1) Initial White Paper completed by Houston Advanced Research Center (HARC) (2005?).
- (2) Research being carried out by Harte Research Institute and Gulf of Mexico Alliance - study completed for Galveston Bay in 2012.
- (3) Paper by the SSPEED Center on Mid Coast completed in 2014.
- (4) Ecosystem services viewer by Dr. David Yoskowitz TAMU Corpus Christi.
- (5) Houston Wilderness and The Nature Conservancy have each addressed Galveston Bay ecosystem services.

Lead Implementers

GBEP
Various Research Institutions, Agencies, and NGOs

Workshop #2 Responses	
Lead Implementers	Projects & Accomplishments
Houston Wilderness	Houston Wilderness and The Nature Conservancy have each addressed Galveston Bay ecosystem services (->ES Primer (2016)

Workshop #2 Digital Questionnaire Responses	
Lead Implementers	Projects & Accomplishments
No response.	No response.

8. Issue Area

Collaborate with Research Institutions to Support Focus Area Applied Research and Monitoring

Specific Objective

Complete Coastal Resiliency and Acclimation Studies

Description

Characterize the risks to coastal habitats from rising sea-levels, altered precipitation patterns, and changes to the frequency and size of tropical systems. Determine the impacts and ecosystem adaptations to changing patterns.

Projects & Accomplishments

- (1) The Bureau of Economic Geology completed a sea level change analysis in (2005?).
- (2) SSPEED Center has worked in recent years to evaluate coastal resiliency and change due to storms and sea level rise.

Lead Implementers

GBEP

Various Research Institutions, Agencies, and NGOs

Workshop #2 Responses

Lead Implementers	Projects & Accomplishments
No response.	No response.

Workshop #2 Digital Questionnaire Responses

Lead Implementers	Projects & Accomplishments
No response.	No response.

9. Issue Area

Increase Access to Galveston Bay Ecosystem Information

Specific Objective

Support Tracking the Status and Trends of Environmental and Stressor Indicators of Galveston Bay Ecosystem Health

Description

Obtain, analyze, and synthesize routine monitoring data sources needed to determine the status and trends of bay indicators, parameters and stressors directly related to the health and sustainability of the bay in formats that increase access and understanding.

Projects & Accomplishments

(1) GBEP has produced the Status and Trends on an annual basis to meet Legislative Budget Board measure. Status and Trends has been used to gather and maintain data related to the Bay to prevent loss of data and prevent the need for costly restarts and maintain continuity and knowledge.

(2) The Galveston Bay Foundation and Houston Advance Research Center have begun to produce an annual report card based on Status and Trends work and previous GBEP indicator development.

(3) The State of the Bay report builds on the Status and Trends information, reports on changes to environmental and social indicators, summarizes resource management efforts to preserve and protect Galveston Bay, and summarizes the latest Galveston Bay research.

Lead Implementers

M&R Subcommittee
Galveston Bay Council Budget & Priorities Subcommittee

Workshop #2 Responses

Lead Implementers	Projects & Accomplishments
Industry	Partner w/industry

Workshop #2 Digital Questionnaire Responses

Lead Implementers	Projects & Accomplishments
No response.	No response.

10. **Issue Area**

Increase Access to Galveston Bay Ecosystem Information

Specific Objective

Expand the Dissemination of Easy to Access Galveston Bay Monitoring and Research

Description

Disseminate monitoring and research results through a variety of active and passive outreach vehicles for consumption by different audiences, including GBEP partners, decision makers, bay user groups and the public.

Projects & Accomplishments

(1) In addition to passive outreach in the form of reports GBEP, project contractors, and technical stakeholders (e.g. Master Naturalist) present at the Biennial State of the Bay Symposiums, technical presentations at the behest of local organizations, and at workshops.

(2) The GBEP website and Galveston Bay Information Center have also been used to house monitoring and research reports, National Green Book series, and project location/information.

Lead Implementers

M&R Subcommittee
GBEP
TAMU
Galveston Bay Foundation (GBF)
HARC
Various Research Institutions, Agencies, and NGOs

Workshop #2 Responses

Lead Implementers	Projects & Accomplishments
Galveston Bay Foundation? TPWD - Data for Status & Trends Industry	No response.

Workshop #2 Digital Questionnaire Responses

Lead Implementers	Projects & Accomplishments
No response.	No response.

M&R Exercise #2 - Costs and Feasibility of Targeted Outputs

RES-1*

Conduct Biological Stressor Monitoring and Research

Evaluate the influence of biological stressors (e.g. harmful algal blooms, *Toxoplasma gondii*, *Perkinsus marinus* (Dermo), invasive species and commercial and recreational harvest) on aquatic, semi-aquatic, and terrestrial species populations found in the Galveston Bay watershed.

RES-2*

Conduct Geochemical Stressor Monitoring and Research

Investigate the effect of geochemical stressors (e.g. eutrophication, biomagnification of legacy toxins and endocrine disrupters) on aquatic, semi-aquatic and terrestrial species populations found in the Galveston Bay watershed. Evaluate fate and transport through the environment and develop baselines for future comparison.

RES-3*

Conduct Physical Stressor Monitoring and Research

Study the influence of physical changes to the estuary (e.g. litter and illegal dumping, modified freshwater inflows, bay circulation, coastal erosion, shoreline hardening, land use changes and loss or fragmentation of habitats) on aquatic, semi-aquatic, and terrestrial species populations found in the Galveston Bay watershed.

RES-4*

Conduct Monitoring and Research to Address Limits to Contact Recreation

Initiate and complete studies that characterize the public's contact recreation risks from waterborne pathogens in bay and bay tributaries; conduct bacteria source tracking to characterize sources of pathogens and evaluate the emergence of new pathogen indicators.

RES-5*

Conduct Monitoring and Research to Address Limits to Seafood Consumption

Identify sources and evaluate remedial actions to address legacy pollutants, surface run-off, illegal dumping and air deposition that can affect the size of recreational shellfish harvest areas or number of seafood advisories. Known pollutants of concern include PCB, Dioxin, and mercury.

RES-6*

Evaluate Best Management Practice (BMP) Demonstration Projects

Evaluate the effectiveness of best management practices (BMPs) to address non-point source (NPS) and point source (PS) pollutants and improve water quality. Evaluation of data from either built BMPs with available data or from future planned demonstration BMPs would be studied. New projects would be instrumented or monitored to collect stormwater run-off in watersheds containing impaired waters.

RES-7*

Conduct Research on Ecosystem Service and Economic Valuation of Bay Resources

Detail the ecosystem services provided by Galveston Bay and upland habitats and determine an economic value for each.

RES-8*

Complete Coastal Resiliency and Acclimation Studies

Characterize the risks to coastal habitats from rising sea-levels, altered precipitation patterns, and changes to the frequency and size of tropical systems. Determine the impacts and ecosystem adaptations to changing patterns.

TARGETED OUTPUTS		IMPLEMENTATION COST	SUPPORTS SPECIFIC OBJECTIVE?	EDITS TO SUPPORT SPECIFIC OBJECTIVE?
Short	Support the State of the Bay Symposium and Proceedings.	\$0 - \$200,000	3/3 Respondents Agreed	None
Short	Collect Data and Create Data and Mapping Research Hub (Database).	\$200,000 - \$1 Million	3/3 Respondents Agreed	None
Short	Support the Development of White Papers, Journal Publications, Technical Presentations, and Workshops.	\$0 - \$200,000	3/3 Respondents Agreed	None
Medium	Create the State of the Bay Characterization Report.	\$0 - \$200,000	3/3 Respondents Agreed	None
Medium	Conduct The Galveston Bay Plan Update.	\$200,000 - \$1 Million	3/3 Respondents Agreed	None
Long-Term	Create the Research Synthesis Report.	\$0 - \$200,000	3/3 Respondents Agreed	None
Long-Term	Conduct The Galveston Bay Plan Revision.	\$200,000 - \$1 Million	3/3 Respondents Agreed	None

*The Targeted Outputs for all eight Research Specific Objectives are the same and were grouped during Exercise #2.

ACS-1

Support Tracking the Status and Trends of Environmental and Stressor Indicators of Galveston Bay Ecosystem Health.

Obtain, analyze, and synthesize routine monitoring data sources needed to determine the status and trends of bay indicators, parameters and stressors directly related to the health and sustainability of the bay in formats that increase access and understanding.

TARGETED OUTPUTS		IMPLEMENTATION COST	SUPPORTS SPECIFIC OBJECTIVE?	EDITS TO SUPPORT SPECIFIC OBJECTIVE?
Short	Create Status and Trends Report, Post Status and Trends to the Website.	\$200,000 - \$1 Million	3/3 Respondents Agreed	None
Short	Support Development of the Galveston Bay Report Card.	\$0 - \$200,000	3/3 Respondents Agreed	None
Medium	Create the State of the Bay Characterization Report.	\$200,000 - \$1 Million	3/3 Respondents Agreed	None
Medium	Conduct The Galveston Bay Plan Update.	\$200,000 - \$1 Million	3/3 Respondents Agreed	None
Long-Term	Conduct The Galveston Bay Plan Revision.	\$200,000 - \$1 Million	3/3 Respondents Agreed	None

ACS-2

Expand the Dissemination of Easy to Access Galveston Bay Monitoring and Research.

Disseminate monitoring and research results through a variety of active and passive outreach vehicles for consumption by different audiences, including Galveston Bay Estuary Program (GBEP) partners, decision makers, bay user groups and the public.

TARGETED OUTPUTS		IMPLEMENTATION COST	SUPPORTS SPECIFIC OBJECTIVE?	EDITS TO SUPPORT SPECIFIC OBJECTIVE?
Short	Support the Regular State of the Bay Symposium and Proceedings.	\$0 - \$200,000	3/3 Respondents Agreed	None
Short	Collect Data and Create Data and Mapping Research Hub (Database).	\$0 - \$200,000	3/3 Respondents Agreed	None
Short	Support the Development of White Papers, Journal Publications, Technical Presentations, and Workshops.	\$0 - \$200,000	3/3 Respondents Agreed	None
Medium	Create the State of the Bay Characterization Report.	\$200,000 - \$1 Million	3/3 Respondents Agreed	None
Medium	Conduct The Galveston Bay Plan Update.	\$200,000 - \$1 Million	3/3 Respondents Agreed	None
Long-Term	Create the Research Synthesis Report.	\$200,000 - \$1 Million	3/3 Respondents Agreed	None
Long-Term	Conduct The Galveston Bay Plan Revision.	\$200,000 - \$1 Million	3/3 Respondents Agreed	None

M&R Exercise #3 - Implementation Feasibility

- 100% (10/10) M&R objectives were considered strongly supporting.
- 40% (4/10) were considered easy to implement.

Monitoring and Research Plan Area			
Action	Specific Objective	Ease of Implementation	Support of GBEP Mission
RES-1	Conduct Biological Stressor Monitoring and Research	-0.69	1.85
RES-2	Conduct Geochemical Stressor Monitoring and Research	-0.15	1.69
RES-3	Conduct Physical Stressor Monitoring and Research	-0.23	1.31
RES-4	Conduct Monitoring and Research to Address Limits to Contact Recreation	0.43	1.50
RES-5	Conduct Monitoring and Research to Address Limits to Seafood Consumption	-0.57	1.36
RES-6	Evaluate Best Management Practice (BMP) Demonstration Projects	1.14	1.57
RES-7	Conduct Research on Ecosystem Service and Economic Valuation of Bay Resources	0.14	1.71
RES-8	Complete Coastal Resiliency and Acclimation Studies	-0.21	1.07
ACS-1	Support Tracking the Status and Trends of Environmental and Stressor Indicators of Galveston Bay Ecosystem Health	-0.21	1.79
ACS-2	Expand the Dissemination of Easy to Access Galveston Bay Monitoring and Research	1.36	1.64

