BIG

BACTERIA IMPLEMENTATION GROUP

2019 ANNUAL REPORT

OCTOBER 2019

Implementing the BIG I-Plan

The 33-member Bacteria Implementation Group (BIG) consists of government, business, and community leaders working with other stakeholders to implement the BIG Implementation Plan (I-Plan), a plan to help reduce bacteria in area waterways.

BIG MEMBERS

Rep. Ernest Bailes IV, San Jacinto County (Agriculture)

Sarah Bernhardt, Bayou Preservation Association (Conservation)

David Brown, US Geological Survey (Resource Agency/Academia)

Ralph Calvino, Terracon (Business/Industry)

Jerry Caraviotis, Harris County (Urban County)

Richard Chapin, City of Houston (Large City)

Danielle Cioce, Harris County (Urban County)

Christine Cooper, City of Conroe (Small City)

Tom Douglas, Houston Sierra Club (Conservation)

Denise Ehrlich, Gulf Coast Authority (Business/Industry)

Catherine Elliott, Harris County Flood Control District (Urban County)

Sarah Gossett, Galveston Bay Foundation (Conservation)

Teague Harris, IDS Engineering Group (Utility District)

Andrew Isbell, Walker County (Rural County)

Carol La Breche, City of Houston (Large City)

Helen Lane, Houston Audubon Society (Conservation)

Mike Lindsey, Montgomery County (Rural County)

Mac Martin, Texas A&M Forest Service (Agriculture)

Cathy McCoy, Harris County Soil and Water Conservation District #442 (Agriculture)

Jack Murphy, City of League City (Small City)

Becky Olive, AECOM (Business/Industry)

Mitchell Page, Schwartz, Page & Harding, LLP (Utility District)

Linda Pechacek, LDP Consultants, Inc. (Public)

Rod Pinheiro, City of Houston (Large City)

Rachel Powers, Citizen's Environmental Coalition (Conservation)

Jim Robertson, Cypress Creek Flood Control Coalition (Conservation)

Scott Saenger, Jones and Carter (Business/Industry)

Aaron Schindewolf, San Jacinto River Authority (Business/Industry)

Linda Shead, Texas Coastal Partners (Conservation)

Brian Shmaefsky, Lone Star College, Kingwood (Resource Agency/Academia)

Hon. Leah Tarrant, (Rural Small City)

Michael Thornhill, SI Environmental (Utility District)

Scott Tuma, (Business/Industry)

Parenthetical indicates type of organization represented.

BIG ALTERNATES

Zafar Ahmed, City of Houston

Shaun Austin, Gulf Coast Authority

Camila Biaggi, Harris County

Susie Blake, City of League City

Kathlie Bulloch, City of Houston

Jerry Caraviotis, Harris County

Matthew Carpenter, IDS Engineering Group

Jon Connolly, Lone Star College, Kingwood

Dale Everitt, San Jacinto County

Bethany Foshee, Houston Audubon Society

Jessalyn Giacona, Buffalo Bayou Partnership

Frank Green, Montgomery County

Greg Hall, City of Conroe

Jody Hooks, City of League City

Scott Jones, Galveston Bay Foundation

James "Ty" Kelly, Bayou Preservation Association

Karen Kottke, AECOM

Carol LaBreche, City of Houston

Michael Lee, US Geological Survey

Jason M. Maldonado, Lockwood, Andrews and Newnam

Reuben Martinez, Montgomery County

Clint Miller, Terracon

Scott Nichols, Montgomery County

Anne Olson, Buffalo Bayou Partnership

Michael Page, Schwartz, Page & Harding, LLP

Patrick Rightmyer, City of Houston

Nick J. Russo, Harris County

Scott Saenger, Jones & Carter, Inc.

Linda Shead, Buffalo Bayou Partnership

Hughes Simpson, Texas A&M Forest Service

Richard "Dick" Smith, Cypress Creek Flood Control Coalition

Robert Snoza, Harris County Flood Control District

Roberto Vega, Harris County Flood Control District

Mary Ellen Whitworth, Texas Coastal Partners

Jim Williams, Sierra Club

Many stakeholders participated in actions in support of the I-Plan, many of which are documented in this Annual Report

The Houston-Galveston Area Council (H-GAC) facilitates the BIG and supports and supplements implementation of the I-Plan through a grant from the Texas Commission on Environmental Quality (TCEQ).

Be Part of the Solution

The BIG project is and will continue to be successful in no small part to the individual actions of each stakeholder. We are eager to build on each success and seek the continued commitment of our partners and renewed interest and participation of our stakeholders.

Most of the implementation activities in the I-Plan are voluntary. Municipal Separate Storm Sewer Systems (MS4) Phase I and Phase II operators, local governments, farmers and ranchers, septic system owners, pet owners, and residents can help reduce the number of bacteria entering waterways by selecting one or more of these activities to implement.

Learn more by visiting www.h-gac.com/BIG.

EXECUTIVE SUMMARY

Half of the Houston-Galveston region's stream and shoreline miles have bacteria levels higher than state standards for contact recreation. High bacterial concentrations may cause gastrointestinal illnesses or skin infections in swimmers or others who come into direct contact with the water. Fecal wastes come from a variety of sources, including human, pets, domesticated animals and wildlife (Figure 1).

Since 2008, a group of government, business, and community leaders as members of the Bacteria Implementation Group (BIG) have joined together to develop and implement a plan, the BIG Implementation Plan (I-Plan), to reduce bacteria and improve water quality. The Texas Commission on Environmental Quality (TCEQ) approved the I-Plan (formally known as the Implementation Plan for Seventy-Two Total Maximum Daily Loads (TMDL) for Bacteria in the Houston-Galveston Region) on January 31, 2013. The 2019 Annual Report is designed to track progress made in the BIG Project Area (Figure 2) from January 1, 2018 to December 31, 2018.

MAKING PROGRESS

The good news is we're making a difference. Overall, bacteria levels for waterways in the BIG project area are going down. Bacteria levels in waterways have decreased from above six times the state's contact recreation standard to four times the standard (Figure 2). Bacteria conditions have improved in 57 of the 227 assessment units that make up the BIG project area. In fact, two assessment units, 1004_01 and 1004D_01 on the West Fork of the San Jacinto River and Crystal Creek, respectively, now meet the contact recreation standard and were delisted for the TCEQ's 2016 Texas Integrated Report[1]. While some areas have substantially improved, other areas remain stable. Eight assessment units deteriorated in 2018.

As a region, we have seen progress, however as Figure 3 shows, the bacteria trend has leveled out with a perceptive increase in recent years. Clearly, there's more to do to reach the goal of the I-Plan - reduce bacteria concentrations in the region's waters and eventually fully support contact recreation.

Figure 1. Pet waste control at a multi-family property

[1] https://www.tceq.texas.gov/assets/public/waterquality/swqm/assess/16txir/2016_delist.pdf

BIG Project Area

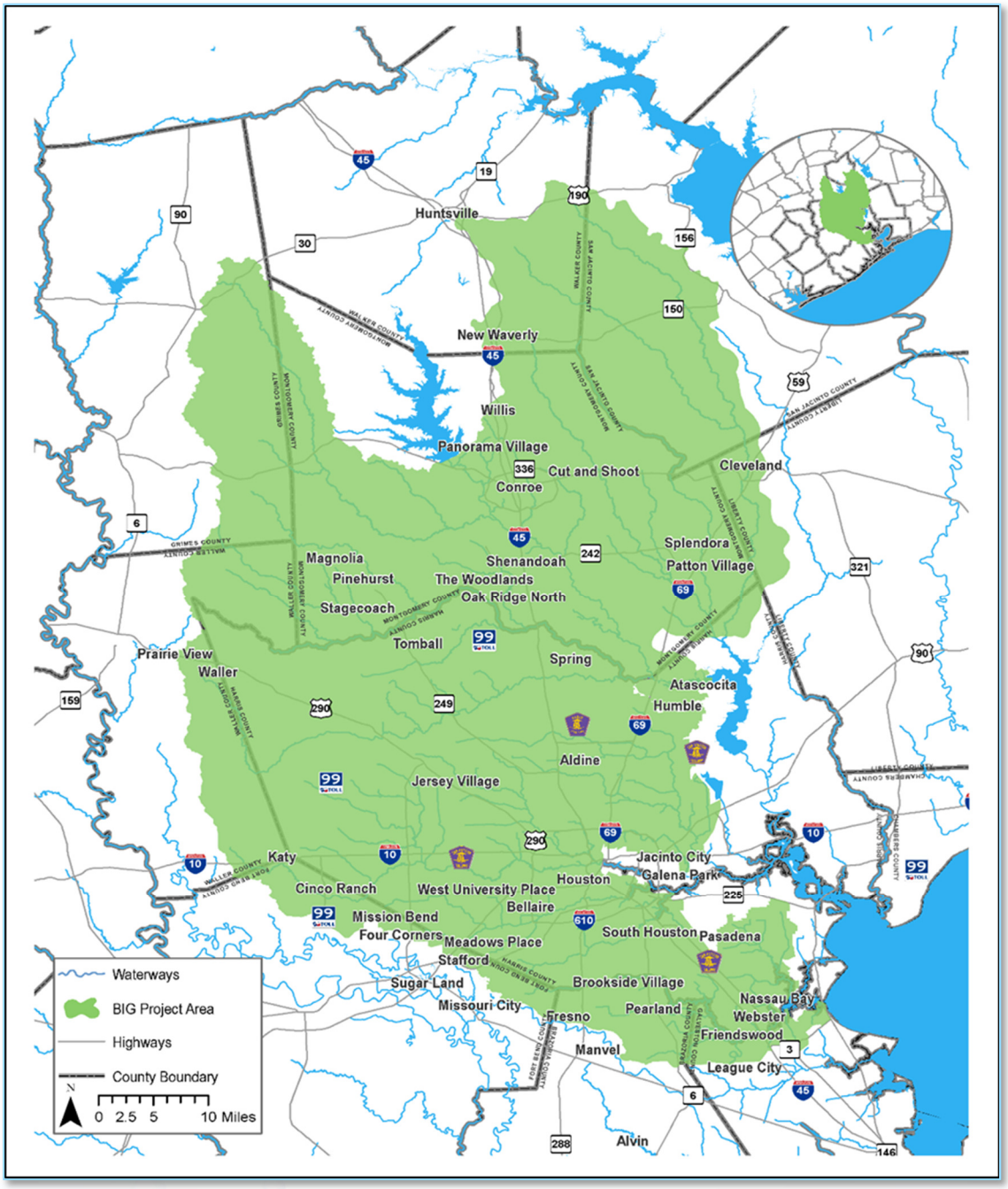


Figure 2. The BIG project area is approximately 3,260 square miles and has a population of nearly five million people. The area encompasses part of 10 counties much of the City of Houston and all or part of another 63 cities.

Many stakeholders are actively implementing and tracking progress. Partners within the BIG are examining the effectiveness of implementation activities in reducing bacteria, including installing and monitoring structural best management practices; addressing bacteria impairments as part of their MS4 program; committing resources to address aging and failing infrastructure; educating and training local wastewater treatment operators, developers, and water quality service providers; and conducting public education and involvement campaigns. By working together, we can continue to identify what's working and what remains to be implemented.

Since the first annual report was published in 2013, the BIG project area (Figure 1) has expanded. The first expansion included the Armand Bayou TMDL project area in 2015. The second expansion in 2016 included the East and West Fork of the San Jacinto TMDL project Area. The latest expansion incorporated the Jarbo Bayou watershed in 2018. The original project area was 2,202.7 square miles. The expanded area is now 3,259.89 square miles, roughly the size of Delaware and Rhode Island, combined. The I-Plan was initially written for 72 TMDLs. With additional TMDLs completed within the BIG project area and with the expanded area, the I-Plan now covers 103 TMDLs.

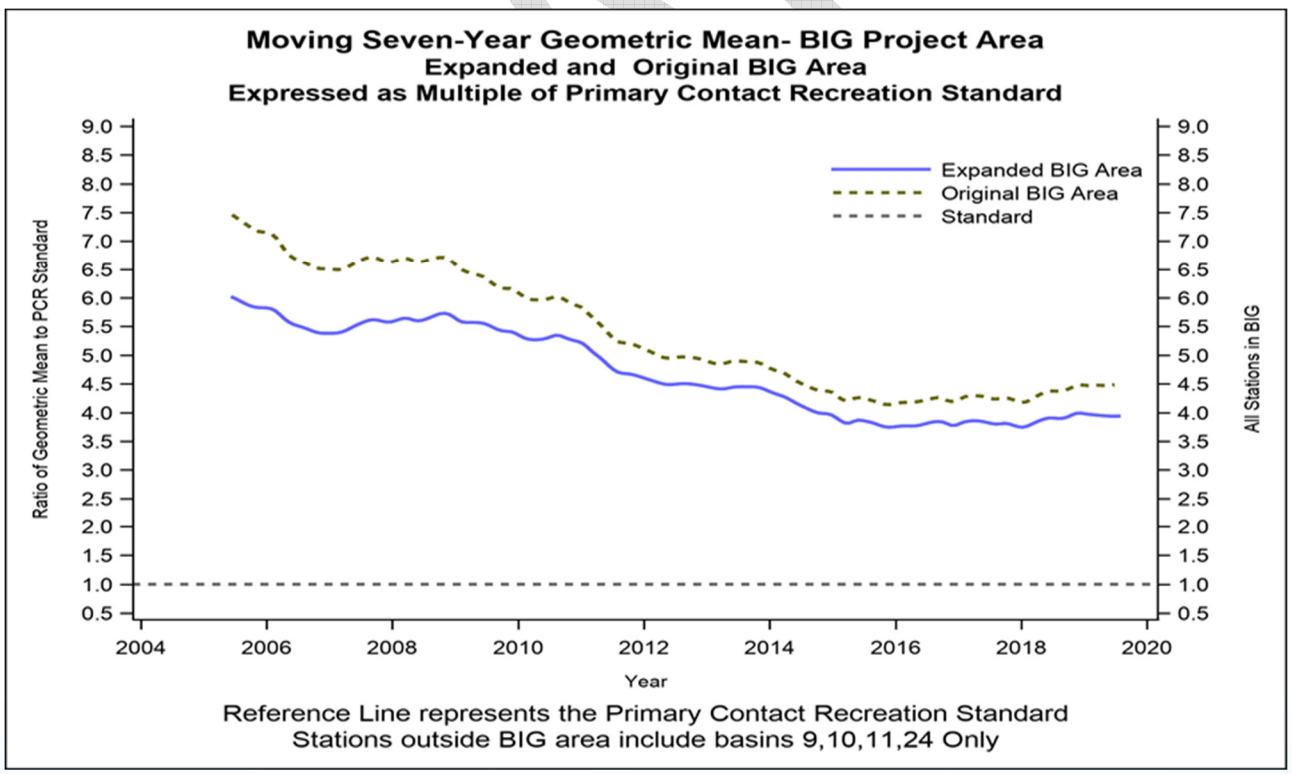


Figure 3. Bacteria trend lines for the BIG Area, Original Project Area and Expanded Project Area 2005-2018.

SPOTLIGHT ON SUCCESS

Highlighting successful projects is an important part of the BIG Annual Report. The BIG hopes by focusing on model bacteria reduction projects that are having an impact, presenting cost saving opportunities for organizations on tight budgets, increasing knowledge and understanding, improving operation and maintenance, and/or contributing unique and novel approaches will foster a sharing of information and lessons learned, and ultimately result in the expanded use of bacteria reduction projects across the BIG project area. While several projects follow, please note this list is not exhaustive and does not reflect the entirety of successful projects in 2018.

ON-SITE SEWAGE FACILITY REPAIR AND REPLACEMENT

On-site sewage facilities, often referred to as septic systems, when maintained and sited correctly, are an appropriate method to safely treat human wastes. One BIG priority is to address those systems that are not functioning properly within the project area (Figure 3). There are approximately 46,000 permitted on-site sewage facilities and an estimated 172,000 unpermitted, those installed either illegally or prior to the establishment of permit requirements, within the project area. One study[2] conservatively estimates the rate of failing systems at 12 percent or 26,000 of the 218,000 systems are likely failing to properly treat human wastes.

Figure 4. Septic tank replacement

At least two programs are seeking to address those failing systems: The East Aldine Area and the H-GAC Waste Water Assistance Program.

The East Aldine Management District (District) and Harris County have made significant improvement in the East Aldine area's water and sanitary sewer infrastructure. A study in the 1990s found that there were over 4,500 single-family homes in East Aldine that relied on shallow water wells for drinking water and traditional septic tank systems for wastewater treatment. Utilizing $43 million in Community Development Block Grants received by Harris County, Texas Water Development Board grants and the District's general funds and District issued bonds, new water and wastewater service was and will be provided to 1,336 homes and an estimated 3,600 residents. The District and Harris County targeting Aldine communities with the highest septic tank failure rates, areas greater than 30

[2] Reed, Stowe & Yanke, LLC. 2001. Study to Determine the Magnitude of, and Reasons for, Chronically Malfunctioning On-site Sewage Facility Systems in Texas. Texas On-site Wastewater Treatment Council.

percent, and with a prevalence of private drinking wells[3].

Harris County and the District continued to install sewer service in 2018 using grant funding. Since 2014, Harris County and East Aldine Management District had made 811 connections to new sanitary sewer systems, abandoning a total of 1,413 OSSFs.

The H-GAC Wastewater Assistance Program is funded by directing environmental fines from water quality violations to two Supplemental Environmental Projects (SEP), one through TCEQ and the second through the Harris County District Attorney's Office (Figure 4). More information about the program is available on H-GAC's website[4].

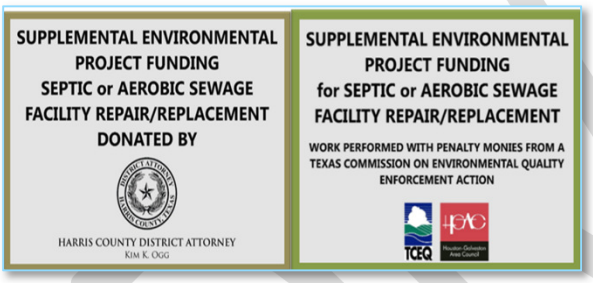


Figure 5. H-GAC SEP Signage

H-GAC uses these SEP funds to assist homeowners with failing systems by providing holding tank pump outs, complete system repairs, and if necessary, replacement of the entire system. Homeowners must qualify based on income, must own the home, and live in the 13 county H-GAC Service Area.

H-GAC began addressing failing systems in 2018. In the BIG project area, 14 systems were identified either through a referral from the county or by the homeowner. Of those systems, five have been fixed, one is being scheduled for repair, and eight are on a wait list. The program is looking for additional funding to address those systems on the wait list. The average cost per system is $5,000 for repairs that range from the simple and least costly, water conservation kits and pump-outs, to the more complex and greater cost, major repairs, system replacement and in limited cases, tie-ins to centralized wastewater.

2019 WATER INNOVATION STRATEGIES OF EXCELLENCE AWARDS

The Water Innovation Strategies of Excellence Awards (WISE) recognize innovative strategies and projects in the Houston-Galveston region that serve as models for improving water quality (Figure 6). More information about the program is available on H-GAC's website[5]. H-GAC and the H-GAC Board of Directors' Natural Resources Advisory Committee initiated the award in 2019 for projects carried out in 2018 and prior years. There are four award categories: Planning and Policy, Education and Public Awareness, Built Projects less than $500,000 and Built Projects greater than $500,000. Nine award applications were received for the inaugural award. The four winning projects were:

1. ***Houston Parks Riparian Restoration Plan*** – The Houston Parks and Recreation Department won the Planning and Policy category for their plan to restore forest riparian buffers in 70 parks with areas adjacent to a bayou or tributary. The goal is to use this green infrastructure (GI) practice to restore over 1,000 acres of habitat and plant

[3] Presentation by East Aldine Management District, "East Aldine District Water-Sewer Capital Improvement Plan." Clean Water Initiative Workshop, Houston-Galveston Area Council May 22, 2019. Web access: http://www.h-gac.com/clean-water-initiative-workshops/default.aspx.

[4] http://www.h-gac.com/on-site-sewage-facilities/residential-wastewater-assistance-program.aspx

[5] http://www.h-gac.com/board-of-directors/advisory-committees/natural-resources-advisory-committee/wise-awards.aspx

200,000 native trees within a 100-foot buffer. Plans include future water quality monitoring to determine if there are any pollutant removal benefits.

Figure 6. WISE Awards Logo

2. ***Galveston Bay Action Network*** – The Galveston Bay Foundation won the Education and Public Awareness category for their online pollution reporting tool. The goal of the tool is to increase the reporting and removal of sources of pollution. Results of the online tool have included 16 reports of boater sewage, five reports on malfunctioning septic systems and 28 reports of sanitary sewer overflows leading to a minimum of two construction site best practice adoptions and the repair to six sanitary sewers.
3. ***Bioswale Demonstration Project*** – The Harris County Flood Control District (HCFCD) won the Built Project less than $500,000 category for their implementation of bioswales to enhance flood detention waters. The green infrastructure is expected to decrease runoff through infiltration and plant uptake. Harris County Flood Control District will monitor these features in 2019.
4. ***Harris County Precinct 4 Service Center*** – Harris County Precinct 4 won the Built Project greater than $500,000 category for their new service center. The center was designed to be Net Zero, Low Impact Development (LID) with LEED Certification. Elements of the Net Zero include the use of photovoltaic solar panels, geothermal heating and cooling and low power lighting. LID practices included minimal site disturbance, 1,500 linear feet of bioswales, 300 square feet of biofiltration and two constructed wetlands. The building received a Gold LEED certification.

DESIGNING FOR IMPACT: ADDRESSING MUNICIPAL BARRIERS TO LID

H-GAC wrapped up the second phase of the Designing for Impact program in 2018. The goal of the program is to implement and incentivize LID in the region (Figure 7). The first phase included: an online interactive map; LID tool box of resources; LID guide and local outreach.

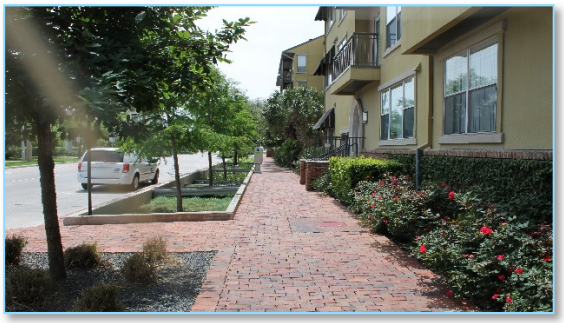


Figure 7. Planter boxes on Bagby St., Houston

The second phase completed with a grant from the Galveston Bay Estuary Program of TCEQ sought to assist local governments in identifying barriers to LID implementation and provide recommendations for removing or lowering those barriers.

H-GAC worked with the cities of Pearland and Mont Belvieu and determined maintenance and ordinance were potential barriers. The project resulted in development of sample LID maintenance agreements, maintenance installation checklists, and maintenance schedules. The project also included an ordinance review and recommended code and

process modifications. More information about the program is available on H-GAC's website[6].

PROGRESS REPORT

Ultimate success for the BIG will be achieved when the waters assessed by the state are no longer considered impaired, meaning they meet the state contact recreation standard (Figure 8 & 9). Achieving that goal requires annually assessing progress to determine what is working and what is not working, looking critically at what each of the BIG partners is doing to further the goals set forth in the I-Plan, sharing information, and coordinating future implementation activities. This Annual Report is meant to be a mechanism for annual assessment, encouraging efforts that appear to be working and redirecting implementation that seems to be falling short. It is also an opportunity to look at the I-Plan to see if expectations are being met or if some activities need further refinement.

This report is based on information given to H-GAC through the workgroup process by stakeholders already involved in the BIG's planning effort. The BIG workgroups met in separate meetings between March 2019 and May 2019 to discuss implementation. This report includes activities through December 2018.

I-PLAN

There are 11 implementation strategies and 38 implementation activities described in the I-Plan and laid out in this report. Activity goals, an assessment, and a summary of implementation efforts conducted throughout the 2018 calendar year are presented for each (Table 1).

The BIG is revising the I-Plan. The process started in 2018 and will wrap up in 2019. The goal of the revision is to:

- Update the I-Plan with new information and lessons learned after five years of implementation;
- Adjust strategies and activities due to the expansion of the project area and need to include management of forest lands and boater wastes; and
- Address activities that have not seen significant progress or have been completed.

Figure 8. Fishing, one of many recreational activities where ingestion of water is possible

[6] http://www.h-gac.com/low-impact-development/default.aspx

THREE BIG IDEAS TO CONSIDER

With 11 strategies that include 38 activities, the BIG focused and prioritized implementation. A review of available data and an assessment of current actions taken by BIG stakeholders suggest three key implementation strategies for local communities to consider addressing when committing resources to reduce bacteria. The first two BIG Ideas, Reduce or Eliminate Sanitary Sewer Overflows and Address Failing Onsite Sewage Facilities, directly target untreated or partially treated sewage. The third, Decrease and Disconnect Impervious Surface, is a broader strategy that expands the landscape's capacity to naturally reduce bacteria and can be an important component of a robust stormwater management plan.

1. ***Reduce or Eliminate Sanitary Sewer Overflows (SSOs)*** – Develop and implement a routine illicit discharge detection and elimination (IDDE) program and prioritize rehabilitation and replacement of aging and/or undersized infrastructure, including collection systems, lift stations, and wastewater treatment facilities. Coordinate with other partners to develop and implement effective education and outreach with residents concerning the handling of fats, oils, and grease (FOG). Example programs include the City of Houston's Corral the Grease and the Galveston Bay Foundation's Cease the Grease programs.

2. ***Address Failing On-Site Sewage Facilities (commonly referred to as septic systems)*** – On-site sewage facilities are wastewater infrastructure, albeit on a much smaller and localized scale than wastewater treatment facilities. Like all infrastructure, on-site sewage facilities require periodic inspections, routine maintenance, and eventual replacement to function properly. Residents, cities, and counties should participate in on-site sewage facility function and maintenance training, encourage real estate on-site sewage facility inspections at the time of property sale, and increase the number of resident or water professional inspections. Local governments, as needed, should seek and make funding available to help incentivize onsite sewage facility rehabilitation or replacement and promote connections to centralized waste treatment for areas with chronically failing on-site sewage facilities.

3. ***Reduce Peak Stormwater Runoff*** – Concrete and other impervious surfaces, particularly when linked together (i.e. gutter to driveway to roadway) increase the speed at which stormwater – and the bacteria it carries – reaches a water body. Pervious surfaces, such as native grasses and specialized, pervious concrete, interrupt the flow and decrease the volume of water to a water body and create a more disconnected drainage system. This allows natural processes time to mitigate bacteria. Consider expanding traditional development methods to include alternative practices that decrease use of and/or disconnect impervious surfaces in redevelopment and new built areas. LID and green infrastructure along with other best practices are designed to reduce pollutant loads while not adversely impacting flood management. Cities and counties can encourage the use of these practices by removing potential ordinance barriers and offering incentives for their use.

The brochure, "BIG Ideas for Cleaner Water 2017: Local Government Strategies for Improving Water Quality," covers these topics in greater detail. The brochure is available on H-GAC's website[7]. Appendix C provides

[7] http://www.h-gac.com/community/water/tmdl/BIG/reports.aspx

common resource links to available funding, outreach and education materials, more detailed reporting and data information to assist in the implementation of these three strategies and other activities of the I-Plan.

IMPLEMENTATION STRATEGIES

Since different sources contribute to the bacteria issue in the BIG project area, there is no one-size-fits-all solution for the problem. This I-Plan is a common-sense approach for reducing bacteria in the region's waterways. Municipalities, industries, landowners, and residents can consider a menu of water protection and implementation activities addressed by the following 11 strategies:

1. Wastewater Treatment Facilities
2. Sanitary Sewer Systems
3. On-Site Sewage Facilities
4. Stormwater and Land Development
5. Construction
6. Illicit Discharges and Dumping
7. Agriculture and Animals
8. Residential
9. Monitoring and I-Plan Revision
10. Research
11. Geographic Priority Framework

Figure 9. Canoeing, one of many recreational activities where ingestion of water is possible

2018 IMPLEMENTATION

The assessment of each activity includes determining progress made toward achieving the activity's interim goal: Not Started, Initiated, In Progress, or Completed (Table 1). Additionally, each activity is assessed based on the BIG partner's efforts to advance the activity over the year: Behind Schedule, On Schedule, Ahead of Schedule, or Completed and in Tracking (Table 1). Completed and in Tracking signifies that the activity has been completed and the BIG will continue to track. In a future I-Plan update, the activity will be reviewed to determine if a new activity is needed, a change to the assessment measure is required, or if the activity should continue and be tracked.

Overall, six activities have been completed and 32 are In Progress. The six completed activities and five of the In Progress activities have been placed into Tracking (11) to evaluate changes over time or are identified to be reviewed during the I-Plan update. Three activities were considered Ahead of Schedule and 24 On Schedule (Figure 5, Table 1). The BIG will conduct an extensive plan review in the 2019 reporting year and will review the activities that are Behind Schedule or those Completed and In Tracking to determine if the activities are appropriate and the measures valid.

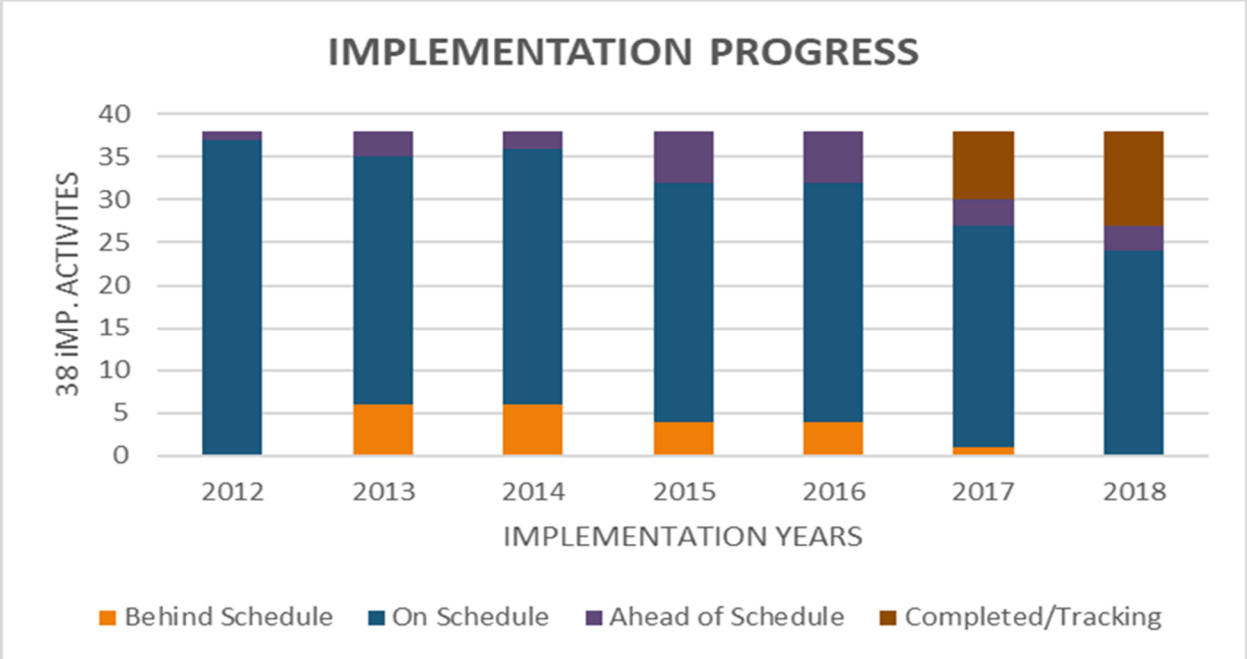


Figure 10. Implementation tracking for all 38 I-Plan Activities. Note: Completed and in Tracking is a new category added for the 2018 Annual Report. When reviewing this figure, it is possible that in a prior year assessment, one or more activity might have been considered for this category.

Table 1. 2018 Implementation Progress

Strategy	#	Activity	Achievements	Progress	Status
Wastewater Treatment Facilities	1.1	Impose More Rigorous Bacteria Monitoring Requirements	More strict monitoring frequency requirements found in the I-Plan have not shown up in wastewater permits. The BIG submitted a letter which requested TCEQ consider this measure in 2017. It was determined that the monitoring frequency can be changed at the request of the wastewater treatment facility. A general adjustment of the frequency to the recommendation found in the I-Plan would not be carried out.	Not Started **Initiated** In Progress Completed	Behind Schedule On Schedule Ahead of Schedule **Tracking**
	1.2	Impose Stricter Bacteria Limits for WWTF Effluent	More stringent limits have been implemented for wastewater permits. Activity is programmatically complete. In 2018, there were 636 active permits in the project area, with 552 submitting discharge monitoring reports (DMRs) with 527 reporting bacteria in their DMRs. Wastewater treatment facilities with bacteria permits: 510 domestic and 17 Industrial. 449 (84%) reported 63 MPN/100mL as their limit in 2018.	Not Started Initiated In Progress **Completed**	Behind Schedule On Schedule Ahead of Schedule **Tracking**
	1.3	Increase Compliance and Enforcement by the TCEQ	The TCEQ reports performing compliance and enforcement capabilities within the BIG region. The BIG requested in 2017 TCEQ share data to track implementation. TCEQ provided inspection data for the period of 2013-2018 in July of 2019. H-GAC will review the information to determine if there are reportable trends in the inspection and compliance data. WWTF DMR report 97.7 percent compliance with their permit limit. Harris County Pollution Control Service reported for the same period, 93.3 percent compliance for those WWTFs inspected by the county.	Not Started Initiated **In Progress** Completed	Behind Schedule **On Schedule** Ahead of Schedule Tracking
	1.4	Improved Design and Operation Criteria for New Plants	Title 30 Chapter 217 of the Texas Administrative Code was updated to reflect current permitting practices of TCEQ and updated wastewater treatment facility standards and criteria. Harris County reviews new wastewater treatment facility plan sets and specifications. In 2018, Harris County screened 29 wastewater treatment facility plan sets for compliance with state disinfections standards. None needed to be referred to outside consultants for in-depth plan review.	Not Started Initiated In Progress	Behind Schedule On Schedule Ahead of Schedule

Strategy	#	Activity	Achievements	Progress	Status
				Completed	**Tracking**
	1.5	Upgrade Facilities	TCEQ's Permit Central Registry provides general information on the number of wastewater treatment facility upgrades by county. The information lacks specificity on the number of non-compliant wastewater treatment facilities that have been upgraded.	Not Started Initiated **In Progress** Completed	Behind Schedule **On Schedule** Ahead of Schedule Tracking
	1.6	Consider Regionalization of WWTFs	The U.S. Environmental Protection Agency (EPA) and TCEQ maintain non-compliant lists. TCEQ through the latest Chapter 217 requires new wastewater treatment facilities to consider regionalization if an existing plant is within a three-mile radius. The city of Houston reported that one wastewater treatment facility was taken offline due to flooding from Hurricane Harvey and potential for future inundation. The waste was redirected to another facility.	Not Started Initiated **In Progress** Completed	Behind Schedule **On Schedule** Ahead of Schedule Tracking
	1.7	Use Treated Effluent for Facility Irrigation	TCEQ's Permit Central Registry provides general information on the number of wastewater treatment facility applications for reuse by County.	Not Started Initiated **In Progress** Completed	Behind Schedule **On Schedule** Ahead of Schedule Tracking
Sanitary Sewer Systems	2.1	Develop Utility Asset Management Programs (UAMPs) for Sanitary Sewer Systems	TCEQ's voluntary sanitary sewer overflow initiative has 16 wastewater treatment facility operators participating in 2018. H-GAC, TCEQ and EPA offer technical training and workshops tailored to encourage the use of life-cycle maintenance and dedicated wastewater treatment facility and sanitary sewer funding. The City of Houston and the EPA have agreed to the city's plan to address the city's sanitary sewer overflows.	Not Started Initiated **In Progress**	Behind Schedule **On Schedule** Ahead of Schedule

Strategy	#	Activity	Achievements	Progress	Status
				Completed	Tracking
	2.2	Address Fats, Oils, and Grease	Several model fats, oils and grease (FOG) programs are available from the City of Houston[8], San Jacinto River Authority[9] and H-GAC.[10].	Not Started	Behind Schedule
				Initiated	On Schedule
				In Progress	**Ahead of Schedule**
				Completed	Tracking
	2.3	Encourage Appropriate Mechanisms to Maintain Function at Lift Stations	The TCEQ upgraded portions of Title 30, Chapter 217 of the TAC, which addressed emergency power requirements. TCEQ's Permit Central Registry provides general information on the number of Lift Station applications made by county.	Not Started	Behind Schedule
				Initiated	On Schedule
				In Progress	Ahead of Schedule
				Completed	**Tracking**
	2.4	Improve Reporting Requirements for SSOs	There is not a searchable database online. H-GAC receives annual updates on the number of sanitary sewer overflows in the project area through a request to TCEQ. TCEQ appears to be notified of sanitary sewer overflows as required. In 2017, there were 2,339 sanitary sewer overflows and an estimated 13,719,000 gallons of untreated effluent released in the project area. A problem was found with the 2018 sanitary sewer overflow data and H-GAC has sought corrected data from TCEQ.	Not Started	Behind Schedule
				Initiated	**On Schedule**
				In Progress	Ahead of Schedule
				Completed	Tracking

[8] https://www.publicworks.houstontx.gov/pud/corral_grease.html
[9] http://www.pattypotty.com/
[10] https://coastalcommunitiestx.weebly.com/materials.html

Strategy	#	Activity	Achievements	Progress	Status
	2.5	Strengthen Controls on Subscriber Systems	TCEQ was asked via letter from the BIG to consider adding a permit requirement to document subscriber systems or require subscriber system permits.	Not Started Initiated **In Progress** Completed	Behind Schedule **On Schedule** Ahead of Schedule Tracking
	2.6	Penalties for Violations	The TCEQ is revising its Enforcement Initiation Criteria, revision 15. TCEQ inspectors can conduct focused sanitary sewer overflow investigations during rain events even if the facility has never reported a sanitary sewer overflow.	Not Started Initiated In Progress **Completed**	Behind Schedule On Schedule Ahead of Schedule **Tracking**
OSSF	3.1	Identify and Address Failing Systems	H-GAC maintains the on-site sanitary sewage facility permit database that shows permits by age, authorized agent, and the number of on-site sewage facilities per square mile. In 2018, there were 46,167 permitted OSSFs and an estimated 172,537 without permits. Harris County and East Aldine Management District continue to install sewer service in the Aldine region using grant funding. Many of the abandoned OSSFs were failing as evidenced by violations. See the included success story for more information. H-GAC addresses failing systems through a supplemental environmental project. See the included success story for more information. Harris County and the Airline Improvement District continued to install sewer service in the Airline region using grant funding. Harris County and Airline Improvement District had made 45 connections to new sanitary sewer system in 2018 for a total of 175 connections since 2017. 67 OSFFs were abandoned in 2018 for a total 382 since 2017. Many of the abandoned OSSFs were failing as evidenced by violations.	Not Started Initiated **In Progress** Completed	Behind Schedule On Schedule **Ahead of Schedule** Tracking

Strategy	#	Activity	Achievements	Progress	Status
	3.2	Address Inadequate Maintenance of OSSF	Model on-site sewage facility regulations and policies are available online. H-GAC created a website for homeowners, homebuyers, local governments, and real estate professionals. Harris County hosted the 8th Annual Onsite Wastewater Seminar on May 15, 2018, with 152 water quality professionals in attendance.	Not Started Initiated **In Progress** Completed	Behind Schedule **On Schedule** Ahead of Schedule Tracking
	3.3	Legislation and Other Regulatory Actions	House Bill 2771 was enacted in September 2017 to create a dedicated fund using $10 from OSSF application fees. TCEQ will use the fund for competitive research grants. Harris County hosted the 8th Annual Wastewater Seminar on May 15, 2018 with 152 water quality professionals in attendance. The daylong event presented new innovations, best practices, and rules and enforcement updates.	Not Started Initiated **In Progress** Completed	Behind Schedule **On Schedule** Ahead of Schedule Tracking
Stormwater & Land Development	4.1	Continue Existing Programs	Two phase I municipal separate storm sewer systems (MS4s) permits (Joint Task Force [JTF] and Pasadena) and 129 MS4 phase II permits are partially or fully found in the BIG project area. A review of MS4 Phase II permit annual reports continues to see these programs identify best practices, begin linkages to impaired waters, and support educational opportunities.	Not Started Initiated **In Progress** Completed	Behind Schedule On Schedule Ahead of Schedule **Tracking**
	4.2	Model Best Practices	Harris County Flood Control District continues to host and update the Regional BMP Database[11]. H-GAC manages a LID/Green Infrastructure online resource[12]. H-GAC hosted the Clean Waters Initiative Workshop on MS4 Minimum Control Measures, May 16, 2018.	Not Started Initiated	Behind Schedule **On Schedule**

[11] www.bmpbase.org.
[12] www.h-gac.com/community/go/LID

Strategy	#	Activity	Achievements	Progress	Status
				In Progress	Ahead of Schedule
				Completed	Tracking
	4.3	Encourage Expansion of Stormwater Management Programs	There are over 129 municipalities and utility districts in the BIG project area subject to the MS4 Phase II General Permit. Workshops to encourage the use: 1. H-GAC Clean Waters Initiative Workshops • Water Quality and Transportation, March 28, 2018. • MS4 Minimum Control Measures, May 16, 2018. 2. TCEQ held conferences on water quality and permitting at two conferences: • Environmental Trade Fair, May 15-15, 2018 • Autumn Environmental Conference and Expo, October 11-12, 2018.	Not Started	Behind Schedule
				Initiated	On Schedule
				In Progress	Ahead of Schedule
				Completed	**Tracking**
	4.4	Promote Recognition Programs for Developments that Voluntarily Incorporate Bacteria Reduction Measures	H-GAC developed an award program, Water Innovation Strategies of Excellence Awards (WISE). The program was released in 2018 and the first awards were given on May 17, 2019 for projects completed in 2018 or prior. Nine applicants were received and four were awarded based on the four categories: Build Project less than $500,000, Built Project greater than $500,000, Planning and Policy, and Education and Public Awareness. Please see the included success story for more detail.	Not Started	Behind Schedule
				Initiated	**On Schedule**
				In Progress	Ahead of Schedule
				Completed	Tracking
	4.5	Provide a Circuit Rider Program	H-GAC completed a project with the cities of Pearland and Mont Belvieu to review development ordinances and evaluate opportunities to expand the use of LID and green infrastructure. Please see the included success story for more detail. H-GAC hosted the Clean Waters Initiative Workshop on Water Quality and Transportation, March 28, 2018. H-GAC hosted the Clean Waters Initiative Workshop on MS4 Minimum Control Measures, May 16, 2018.	Not Started	Behind Schedule
				Initiated	**On Schedule**
				In Progress	Ahead of Schedule
				Completed	Tracking

Strategy	#	Activity	Achievements	Progress	Status
	4.6	Petition TCEQ to Facilitate Reimbursement of Bacteria Reduction Measures	H-GAC submitted a letter on behalf of the BIG in 2017 to TCEQ requesting development of a guidance document to standardize the reimbursement process. TCEQ responded in 2018 that they would continue with the current system to reimburse for water quality features. A guidance document would not be developed at this time.	Not Started Initiated In Progress **Completed**	Behind Schedule On Schedule Ahead of Schedule **Tracking**
Construction	5.1	Increase Compliance With and Enforcement of Stormwater Management Permits	The City of Houston and Harris County manage mature programs to address construction site compliance. City of Houston reports onsite education is a big factor in ensuring compliance.	Not Started Initiated **In Progress** Completed	Behind Schedule **On Schedule** Ahead of Schedule Tracking
Illicit Discharge Detection and Elimination	6.1	Detect and Eliminate Illicit Discharges	Analysis of MS4 annual reports indicated that MS4 operators have regulatory mechanisms in place and procedures for detecting illicit discharges, including mapping to meet 10-year goal. Reporting of the number identified and addressed remains a work in progress. H-GAC and Bayou Preservation Association were successful in 2018, receiving a grant from TCEQ's the Galveston Bay Estuary Program to conduct illicit discharge monitoring in 2019. A model illicit discharge program for local governments is available online[13]. Citizen reporting tools are available to assist local government: 311[14] and Galveston Bay Action Network[15]. H-GAC hosted the Clean Waters Initiative Workshop on MS4 Minimum Control Measures, May 16, 2018.	Not Started Initiated **In Progress** Completed	Behind Schedule **On Schedule** Ahead of Schedule Tracking
	6.2	Improve Regulation and	MS4 Phase II operators review and implement regulations as a permit requirement. H-GAC continues to compile existing regulations. H-GAC maintains an online	Not Started	Behind Schedule

[13] http://www.h-gac.com/community/water/tmdl/BIG/documents/Top5-Least5-Final%20Report-06-5-17.pdf.
[14] www.CleanBayous.org
[15] www.galvbay.org/gban.

Strategy	#	Activity	Achievements	Progress	Status
		Enforcement of Illicit Discharges	resource of enforcement topical presentations given at environmental workshops held at H-GAC[16].	Initiated	**On Schedule**
				In Progress	Ahead of Schedule
				Completed	Tracking
	6.3	Monitor & Control Waste Hauler Activities	No waste hauler tracking fleet program has been identified for a pilot project. City of Houston maintains a mature waste hauler tracking program. Potential online tracking programs have been developed: • vendors like Track My FOG[17]. • Dallas maintains a program that uses Scantron device (XC2 and Pearson Scan Tool Software) to upload manifests.	Not Started	Behind Schedule
				Initiated	**On Schedule**
				In Progress	Ahead of Schedule
				Completed	Tracking
Animals, Agriculture	7.1	Promote Increased Participation in Existing Programs for Erosion Control Nutrient Reduction, and Livestock Management	Natural Resource Conservation Service and Texas State Soil and Water Conservation Board manage and promote land management programs in the project area. The Texas Forest Service works with landowners with forest product management. Stakeholders recommended expanding the use of water quality management plans and conservation management plans. One suggestion is to seek a modification to property tax assessments to allow stacking of water quality property tax exemption on to an agriculture or conservation land exemption.	Not Started	Behind Schedule
				Initiated	**On Schedule**
				In Progress	Ahead of Schedule
				Completed	Tracking
	7.2	Promote the Management of Feral Hog Populations	Bait evaluation continues for sodium citrate and warfarin.	Not Started	Behind Schedule
				Initiated	**On Schedule**

[16] http://www.h-gac.com/community/environmental-enforcement/workshops.aspx
[17] https://www.trackmyfog.com/

Strategy	#	Activity	Achievements	Progress	Status
				In Progress	Ahead of Schedule
				Completed	Tracking
Residential	8.1	Expand Homeowner Education Efforts Throughout the BIG Project Area	H-GAC continues a series of Clean Water Initiative workshops covering topics from water quality data, watershed-based plans, MS4 minimum control measures and wastewater technology. Information available online[18].	Not Started	Behind Schedule
				Initiated	**On Schedule**
				In Progress	Ahead of Schedule
				Completed	Tracking
Monitoring and I-Plan Revision	9.1	Continue to Utilize Ambient Water Quality Monitoring and Data Analysis	The region's Clean Rivers Program's ambient monitoring data forms the backbone of assessments used in this report. Eight monitoring partners collect ambient data at 208 monitoring sites in the BIG project area. Additional data is provided by the network 19 Texas Stream Team volunteers.	Not Started	Behind Schedule
				Initiated	On Schedule
				In Progress	Ahead of Schedule
				Completed	**Tracking**
	9.2	Conduct and Coordinate Non-		Not Started	Behind Schedule

[18] www.h-gac.com/cwi

Strategy	#	Activity	Achievements	Progress	Status
		Ambient Water Quality Monitoring	Harris County Flood Control District continues to monitor water quality at several detention basins. Data is uploaded to their BMP database. Harris County wrapped up monitoring at Birnamwood Drive LID project.	Initiated **In Progress** Completed	**On Schedule** Ahead of Schedule Tracking
	9.3	Create and Maintain a Regional Implementation Database	H-GAC maintains an online Regional Implementation database.[19]	Not Started Initiated **In Progress** Completed	Behind Schedule On Schedule Ahead of Schedule **Tracking**
	9.4	Assess Monitoring Results and Modify I-Plan.	The BIG produces an annual report. The I-Plan has been modified through four addendums that expanded the project area and added additional TMDLs. In 2018 there were 103 impaired AUs with TMDLs. In 2018, the BIG began the process to revise the I-Plan to codify changes and updates. The process will be completed in 2019.	Not Started Initiated **In Progress** Completed	Behind Schedule On Schedule Ahead of Schedule **Tracking**
Research	10.1	Evaluate the Effectiveness of Stormwater Implementation Activities	Harris County Flood Control District continues to monitor BMPs installed at detention basins. City of Houston is evaluating LID installation on Almeda Rd.	Not Started Initiated	Behind Schedule **On Schedule**

[19] http://h-gac.maps.arcgis.com/apps/MapSeries/index.html?appid=a75ba4bb46ca40658066c5755a8dba6e

Strategy	#	Activity	Achievements	Progress	Status
				In Progress	Ahead of Schedule
				Completed	Tracking
	10.2	Further Evaluate Bacteria Persistence and Regrowth	Texas Water Resource Institute continued a bacteria source-tracking project in the region in 2018. H-GAC hosted the Clean Waters Initiative Workshop on Water Quality and Public Health, June 20, 2018.	Not Started	Behind Schedule
				Initiated	**On Schedule**
				In Progress	Ahead of Schedule
				Completed	Tracking
	10.3	Determine Appropriate Indicators	EPA presented new coliphage measurement methods at national conference in 2017. EPA has completed validations for two coliphage measurements methods for ambient water with an aim to publish draft criteria in 2018[20].	Not Started	Behind Schedule
				Initiated	**On Schedule**
				In Progress	Ahead of Schedule
				Completed	Tracking
	10.4	Additional Research Topics	House Bill 2771 went into effect on September 1, 2017. The bill requires TCEQ to award competitive grants using funds collected from the $10 on-site sewage facility permit fee. Eligible projects include research and demonstration projects for on-site sewage facility treatment technology that improves water quality, reduces costs, and/or wastewater reuse	Not Started	Behind Schedule
				Initiated	**On Schedule**
				In Progress	Ahead of Schedule

[20] John F. Griffith, SCCWRP Commission, Sept. 8, 2017

Strategy	#	Activity	Achievements	Progress	Status
				Completed	Tracking
Geographic Priority	11.1	Consider Recommended Criteria When Selecting Geographic Locations for Projects	H-GAC developed the Top 10 "Most Likely to Succeed" and "Most Wanted" Streams lists to help local stakeholders prioritize water quality improvements. Geographic prioritization continues to be used to target areas. One model project The Top Five / Least Five project was completed in 2017,[21] which can for the basis for local government investigations.	Not Started	Behind Schedule
				Initiated	On Schedule
				In Progress	**Ahead of Schedule**
			Based on the model project and previous investigations by BPA and BIG stakeholders, H-GAC and Bayou Preservation Association were successful in 2018, receiving a grant from the Galveston Bay Estuary Program/TCEQ to conduct source identification monitoring in 2019.	Completed	Tracking

[21] http://www.h-gac.com/community/water/tmdl/BIG/reports.aspx

Appendix A
Acknowledgments

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Chris Loft

Earlene Lambeth

Jason Leifester

Nicole Reed

TEXAS STATE SOIL AND WATER CONSERVATION BOARD

Brian Koch

HOUSTON-GALVESTON AREA COUNCIL

Jeff Taebel

Todd Running

Steven Johnston

Justin Bower

Brian Simms

Bill Hoffman

Andrea Tantillo

Kathy Janhsen

Jessie Casillas

ANIMALS AND AGRICULTURE WORKGROUP

Ernest Bailes, IV, Agricultural Interest

Camila Biaggi, Harris County

Richard Chapin, City of Houston

Danielle Cioce, Harris County

Tom Ivy, Public

Brian Koch, Texas State Soil and Water Conservation Board

Brandt Mannchen, Houston Sierra Club

Mac Martin, Texas A&M Forest Service

Steven Mitchell, Texas Parks and Wildlife Department

Kyle Wright, National Resource Conservation Service

STORMWATER AND LAND DEVELOPMENT AND CONSTRUCTION WORKGROUPS

Camila Biaggi, Harris County

Richard Chapin, City of Houston

Danielle Cioce, Harris County

Teague Harris, IDS Engineering Group

Tom Ivy, Public

John Moss, Eco Services

Jim Robertson, Cypress Creek Flood Control Coalition

Robert Snoza, Harris County Flood Control District

COORDINATION AND POLICY AND PLAN REVISION WORKGROUPS

Camila Biaggi, Harris County

Sarah Bernhardt, Bayou Preservation Association

Ralph Calvino, AECOM

Richard Chapin, City of Houston

Danielle Cioce, Harris County

Catherine Elliott, Harris County Flood Control District

Denise Ehrlich, Gulf Coast Authority

Sarah Gossett, Galveston Bay Foundation

Teague Harris, IDS Engineering Group

Tom Ivy, Public

Jason Maldonado, Lockwood, Andrews and Newnam

Mac Martin, Texas A&M Forest Service

Linda Pechacek, LDP Consultants

Jim Robertson, Cypress Creek Flood Control Coalition

Aaron Schindewolf, San Jacinto River Authority

Linda Shead, Texas Coastal Partners

Robert Snoza, Harris County Flood Control District

Michael Thornhill, SI Environmental

Scott Tuma, Boater

RESEARCH, MONITORING, AND WATERSHED OUTREACH WORKGROUPS

Camila Biaggi, Harris County

Richard Chapin, City of Houston

Danielle Cioce, Harris County

Tom Ivy, Public

Karen Kottke, AECOM

Carol LaBreche, City of Houston

Robert Snoza, Harris County Flood Control District

ON-SITE SEWAGE FACILITY AND ILLICIT DISCHARGES WORKGROUP

Alfonso Acosta, Austin County

Zafar Ahmed, City of Houston

Louis Bergman, Liberty County

Camila Biaggi, Harris County

Richard Chapin, City of Houston

Danielle Cioce, Harris County

Roy Elzondo, Montgomery County

Ryan Gerlich, Texas Agrilife Extension

Frank Green, Montgomery County

Wesley Adam Grier, Harris County

Anita Hunt, Hunt & Hunt Engineering Corp.

Andrew Isbell, Walker County

Larry Johnson, Harris County

Jeremiah Kilgore, Harris County

Robert Knight, Walker County

Rayfield May Sr., Harris County

Winford Roberts, Waller County

Robert Snoza, Harris County Flood Control District

James Walls, Harris County

Tyrone West, Harris County

WASTEWATER TREATMENT FACILITY AND SANITARY SEWER SYSTEMS WORKGROUP

Susie Blake, City of League City

Camila Biaggi, Harris County

Richard Chapin, City of Houston

Danielle Cioce, Harris County

Denise Ehrlich, Gulf Coast Authority

Frank Green, Montgomery County

Teague Harris, IDS Engineering

Tom Ivy, Public

Carol LaBreche, City of Houston

Karen Kottke, AECOM

Jason Maldonado, Lockwood, Andrews and Newnam

Scott Nichols, Montgomery County

Ray Pavlovich, Nottingham Country MUD

Mary Purzer, AECOM

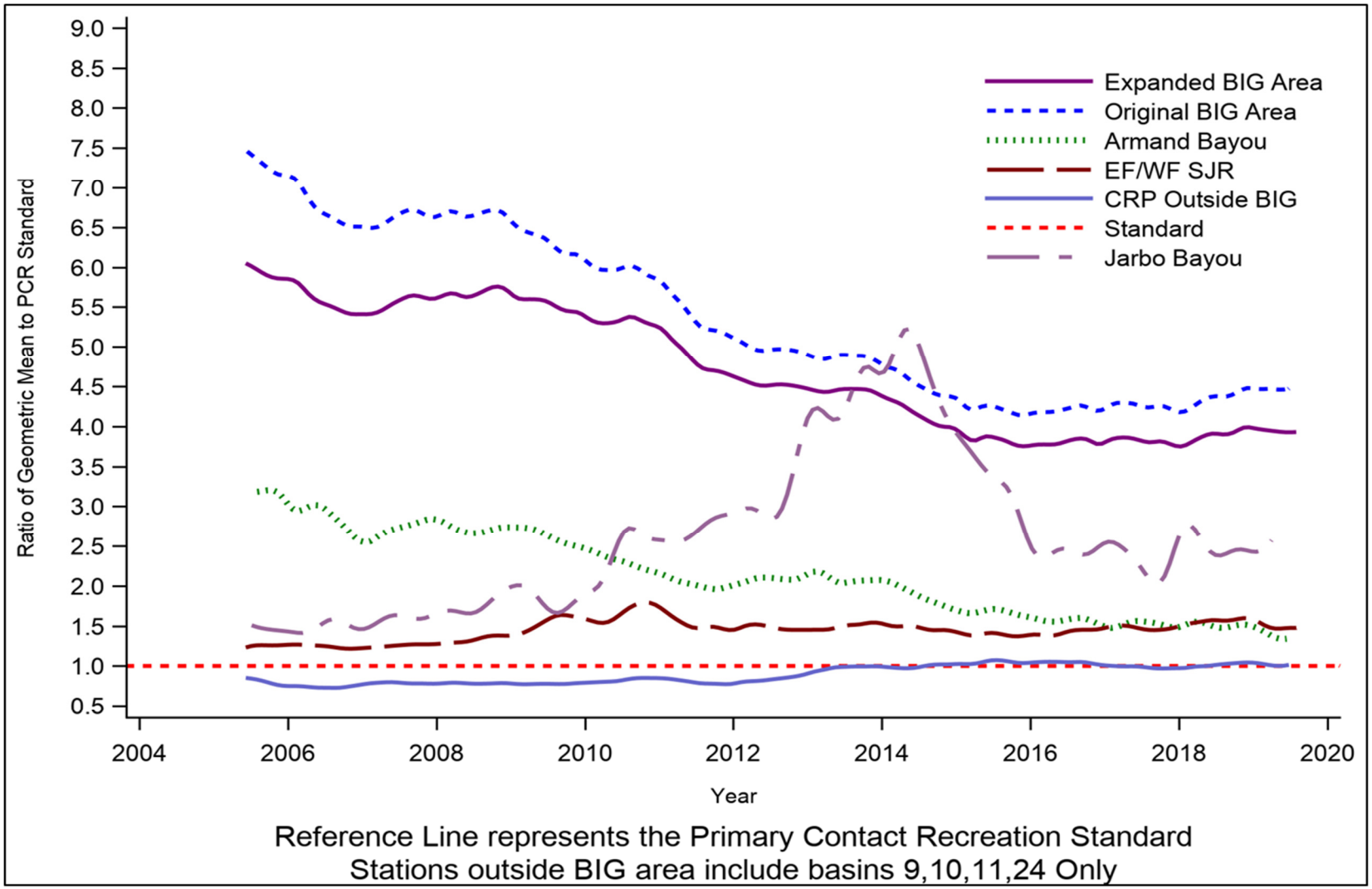
Robert Snoza, Harris County Flood Control District

Appendix B
Bacteria Trends

The area's relative geometric mean is just above four times the state's water quality standard for bacteria (, Appendix B - Figure 1). This is down overall from six times the standard in 2006. While the overall bacteria trend in the BIG project area continues to decline, it appears to have leveled out with a potential increase with recent geometric means. The background, those areas outside of the BIG project area has also seen a general rise over the same timeframe.

Appendix B - Figure 1 illustrates how the rolling seven-year geometric mean for bacteria levels has changed over time (2005-2018). It is based on ambient water quality data collecting indicator bacteria samples (*E. coli* and Enterococci) from all Clean Rivers Program monitoring stations within the BIG project area through the calendar year 2018. Included are bacteria trend lines for the BIG (short dashed royal blue line), the Expanded BIG (solid dark purple line) including Armand Bayou, Jarbo Bayou and East and West Fork of the San Jacinto River (EF/WF SJR), Armand Bayou (short dashed green line), EF/WF SJR (long dashed brown line), Jarbo Bayou (long-short dashed light purple line) and bacteria trend for CRP areas outside of the BIG project area (solid light blue line).

The lines were generated using a ratio of the geometric mean of the rolling seven years with that of the state's contact recreation standard, either *E. coli* or Enterococci, 126 Most Probable Number (MPN)/100mL or 35 MPN/100mL, respectively. The short dashed red line represents the standard normalized by dividing by the standard. This allows both standards to be used on the same graph. The geometric means were also divided by the appropriate standard.


Ratio of Geometric Mean to PCR Standard
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
2004
2006
2008
2010
2012
2014
2016
2018
2020
Year
Expanded BIG Area
Original BIG Area
Armand Bayou
EF/WF SJR
CRP Outside BIG
Standard
Jarbo Bayou
Reference Line represents the Primary Contact Recreation Standard
Stations outside BIG area include basins 9,10,11,24 Only

Appendix C
Implementation Resources

IMPLEMENTATION RESOURCES			
RESOURCE	**NAME**	**USE**	**WEBSITE**
FUNDING	319 Nonpoint Source Grant	Non permitted Nonpoint Source Reduction Measures	https://www.tceq.texas.gov/waterquality/nonpoint-source/grants
	319 Nonpoint Source Grant	Agriculture and Silviculture Nonpoint Source Measures	https://www.tsswcb.texas.gov/programs/texas-nonpoint-source-management-program
	320 Estuary Program	Water Quality Improvement, Conservation, Restoration, Public Outreach and Education, and Research	https://gbep.texas.gov/
	Clean Water State Revolving Fund	Low cost financial assistance for wastewater, reuse, and stormwater infrastructure	http://www.twdb.texas.gov/financial/programs/CWSRF/
	EPA Water Infrastructure and Resiliency	Resource to explore innovative finance solutions	http://water.epa.gov/ infrastructure/ waterfinancecenter.cfm
	NRCS EQUIP	Resource Conservation for Agriculture and Silviculture	https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/eqip/
	Texas Parks and Wildlife Landowner Incentive Program	Enact conservation practices on private lands	https://tpwd.texas.gov/landwater/land/private/lip/#contact
	Texas Water Infrastructure Coordination Committee	Identify and develop solutions to water and wastewater	www.twicc.org
	USDA Rural Development Grant	Rural Wastewater Infrastructure	https://www.rd.usda.gov/programs-services/water-waste-disposal-loan-grant-program
	USDA Waste and Environmental Program	Multiple assistance programs	https://www.rd.usda.gov/programs-services/all-programs/water-environmental-programs
	Water Quality Management Plan	Soil and Water Conservation for Agriculture and Silviculture	https://www.tsswcb.texas.gov/index.php/programs/water-quality-management-plan
Outreach and Education	Clean Water Clear Choice	Water quality outreach and education	www.cleanwaterways.org
	Clean Waters Initiative Workshops	Technical workshops covering a variety of water quality information	www.h-gac. com/CWI

IMPLEMENTATION RESOURCES			
RESOURCE	**NAME**	**USE**	**WEBSITE**
	Coastal Communities	Nonpoint source outreach and education information	http://www.h-gac.com/coastal-communities/default.aspx
	Fats, Oils, Grease, Wipes	Cease the Grease	http://galvbay.org/ceasethegrease/
		Corral the Grease	www.publicworks.houstontx.gov/pud/corral_grease.html
		Patty Potty	www.pattypotty.com
	Lone Star Healthy Streams	Agriculture BMPs	http://lshs.tamu.edu/bmps/
	OSSF	OSSF mapping system	http://arcgis02.h-gac.com/ossf/
		Public outreach and education	www.h-gac.com/go/septic
	Pet Waste	Basic information on pet wastes	www.h-gac.com/community/pet-waste/default.aspx
Reporting	City of Houston Bureau of Pollution Control and Prevention	Service helpline and pollution reporting	www.houstontx.gov/311 and 713.837.0311
	Galveston Bay Action Network	Pollution reporting in five counties surrounding Galveston Bay	www.galvbay.org/gban
	HCFCD Citizen's Service Hotline	Telephone reporting system	713.684.4197
	Illegal Dumping	Pollution reporting system for MS4s	www.cleanbayous.org
Data	Clear Rivers Program	Water Resource Information System	www.h-gac.com/go/wrim
	HCFCD BMP Database	Best Management Practices Monitoring	www.bmpbase.org
	LID Tracking	Low Impact Development Resource	www.h-gac.com/community/go/LID
	Wastewater and Stormwater	Permit look up	https://www.tceq.texas.gov/agency/data/lookup-data/status-stormwater-wastewater.html

Houston-Galveston Area Council
3555 Timmons Lane, Suite 120
Houston, Texas 77027
713.627.3200
h-gac.com