

FY 2019 WATER QUALITY MANAGEMENT PLAN UPDATE

Water Quality Planning for the Houston-Galveston Region



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Water Quality Management Plan Update

Fiscal Year 2019

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

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Acronyms and Abbreviations

ARRA	American Recovery and Reinvestment Act
AU	Assessment Unit
BIG	Bacteria Implementation Group
CCN	Certificate of Convenience and Necessity
CRP	Clean Rivers Program
CWA	Clean Water Act
CWSRF	Clean Water State Revolving Fund
DMR	Discharge Monitoring Report
<i>E. coli</i>	<i>Escherichia coli</i>
EPA	United States Environmental Protection Agency
FWSD	Fresh Water Supply District
FY	Fiscal Year
GBEP	Galveston Bay Estuary Program
GIS	Geographic Information System
GPS	Global Positioning System
H-GAC	Houston-Galveston Area Council
MGD	Millions of Gallons per Day
mL	Milliliters
MPN	Most Probable Number
MUD	Municipal Utility District
NRAC	Natural Resources Advisory Committee
OLD	Outfall Location Data Set
OSSF	On-Site Sewage Facility
PUC	Public Utility Commission of Texas
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
QPR	Quarterly Progress Report
SAB	Service Area Boundary
SABD	Service Area Boundaries Data Set
SEP	Supplemental Environmental Project
SJRA	San Jacinto River Authority
SSO	Sanitary Sewer Overflow
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
TMDL	Total Maximum Daily Load

TREC	Texas Real Estate Commission
TPDES	Texas Pollutant Discharge Elimination System
TSWQS	Texas Surface Water Quality Standards
TWDB	Texas Water Development Board
WCID	Water Control and Improvement District
WPP	Watershed Protection Plan
WQMP	Water Quality Management Plan
WWTF	Wastewater Treatment Facility

Introduction

The *Water Quality Management Plan (WQMP) Update* is a report from the Houston-Galveston Area Council (H-GAC) on the fiscal year (FY) 2019 activities conducted under Contract 582-19-90146 (Project), with funding through a Clean Water Act (CWA) § 604(b) grant by the Texas Commission on Environmental Quality (TCEQ). The WQMP Update is tied to the State's water quality assessments that identify priority water quality problems. The Project involved acquiring, compiling, and evaluating water and wastewater data, as well as a series of special studies and coordination activities, as requested by the State.

The WQMP Updates are used to guide planning for implementation measures that control and/or prevent water quality problems. The purpose of this Project is to support current and future planning decisions related to water quality efforts, development of wastewater infrastructure, watershed management, and related issues on both a regional and state level. The data and information compiled by H-GAC will be combined with TCEQ data into a series of integrated datasets to allow for meaningful evaluation of infrastructure and water quality decisions.

H-GAC's *WQMP Update Report* will become part of the State WQMP after completion of its public participation process, acceptance by the H-GAC Board of Directors, and certification by the TCEQ.

This report will focus on the progress achieved in the primary objectives set forth in the Project Scope of Work. These objectives are:

- Project Administration
- Quality Assurance
- Watershed Data Update and Coordination – Geographic Information System (GIS)
- Support Watershed Planning
- OSSF Planning, Support, and Outreach Activities
- *WQMP Update* (Final Report)

Table 1 describes each objective as defined in the Contract Scope of Work. Each of the primary project objectives serves to maintain, expand, or implement H-GAC's store of water quality and wastewater infrastructure data, or provide related services to the region. Each objective is described in a separate section of the *WQMP Update Report*, and includes methodologies, results and observations, and discussion, as appropriate.

A series of interim deliverables were required for each project objective. This report provides a description of the methodologies used to complete these contractual deliverables. Some of the deliverables generated for this project are large electronic data sets unsuitable for full inclusion in a printed version of the final report. However, copies of the full electronic data are available, with representative portions of the data included in the actual report.

Table 1 - Water Quality Management Plan Project Objectives and Descriptions

Task #	Task Objective	Task Description
1	Project Administration	To effectively coordinate and monitor all technical and financial activities performed under this contract, prepare regular progress reports, and manage project files and data.
2	Quality Assurance	To update or develop Quality Assurance Project Plans (QAPPs) for acquired and geospatial data to ensure environmental data acquired is of known and acceptable quality.
3	Wastewater Data Update and Coordination – Geographic Information System (GIS)	To collect and integrate wastewater infrastructure and permit data to support planning for wastewater treatment plants and water quality projects in H-GAC’s region, and to support TCEQ in the <i>WQMP Update</i> process.
4	Support Watershed Planning	To support watershed planning in H-GAC’s region, including the San Bernard River Watershed, and to support regional information sharing on water quality and related topics.
5	OSSF Planning, Coordination, and Outreach Activities	To administer and coordinate H-GAC’s On-Site Sewage Facility (OSSF) program activities. These activities include maintaining and continuing to develop H-GAC’s existing spatial database of permitted OSSFs and projected unpermitted OSSF locations to support regional water quality and wastewater infrastructure projects, and coordination of H-GAC’s Supplemental Environmental Project (SEP) to repair or replace failing OSSFs within the watershed, and H-GAC’s outreach and education programs.
6	<i>WQMP Update</i> / Final Report	To summarize all contract activities and findings that are relevant to the water quality goals of the region in a <i>Draft WQMP Update</i> . In accordance with Texas Water Code Section 26.037, H-GAC will provide a notice of participation to review the <i>Draft WQMP Update</i> . H-GAC will incorporate all comments received, including those by the Natural Resources Advisory Committee (NRAC), to prepare and provide to TCEQ a comprehensive final report on the water quality management planning activities. H-GAC will provide documentation that H-GAC’s Board of Directors has accepted the completed FY 19 project <i>WQMP Update</i> .

In previous iterations of this Project, this *WQMP Update Report* followed an outline and structure provided by TCEQ and specified in the Scope of Work and Contract. The report format for the FY 19 *WQMP Update* has been modified, with TCEQ approval, to reorganize the report as a series of Task Reports with each Objective/Task discussed separately. This change has been made with the intention of reducing duplication and streamlining the reporting process. The format change also makes the report more useful as a reference document, as each Task is self-contained and can be examined individually.

Project Background and Significance

Background

The Houston-Galveston Area Region (Region), shown in Figure 1, covers an area of approximately 12,500 square miles and encompasses 13 counties: Austin, Brazoria, Chambers, Colorado, Fort Bend, Galveston, Harris, Liberty, Matagorda, Montgomery, Walker, Waller, and Wharton. For some analyses, such as the wastewater treatment facility outfalls, a 15-County area (to include Grimes and San Jacinto counties) is considered due to the location of watersheds of interest.



Figure 1 – The 13-County Houston-Galveston Region

Already one of the largest metropolitan statistical areas in the United States, the Houston region continues to grow at a rapid pace. This growth is resulting in a proportional increase in population growth and land development. Development, and its accompanying utility infrastructure, continues into counties beyond the urban core. Existing water and wastewater infrastructure systems continue to age and face challenges related to drought and flooding events (Figure 2). With the Houston region expected to gain several million additional residents by 2040, these challenges will only be exacerbated.

Within the Region, there are a variety of water quality impairments and concerns. The majority of stream segments in the Region fail to meet the water quality standards as defined in the *Texas Surface Water Quality Standards* (TSWQS). Many of those water bodies are listed with impairments or concerns in the most recent *Texas Integrated Report of Surface Water Quality*. Approximately 80 percent of the Region’s streams are unable to meet one or more state water quality standards, with the most pervasive issue being elevated bacteria levels in exceedance of the primary contact recreation standard (Figure 3).

The bacteria in the Region’s lakes, creeks, streams, and bayous come from a variety of sources, including human waste, domestic animal waste, pet waste, and wildlife. These wastes may enter the water through point sources, i.e., discrete “end-of-pipe” discharges, or diffusely through nonpoint sources, carried by precipitation flowing over the land. While some bacteria are naturally occurring, development brings additional bacterial sources and a greater potential impact to water bodies. Careful planning is necessary to address these additional sources.



Figure 2 - Sanitary Sewer Overflow following heavy rain event

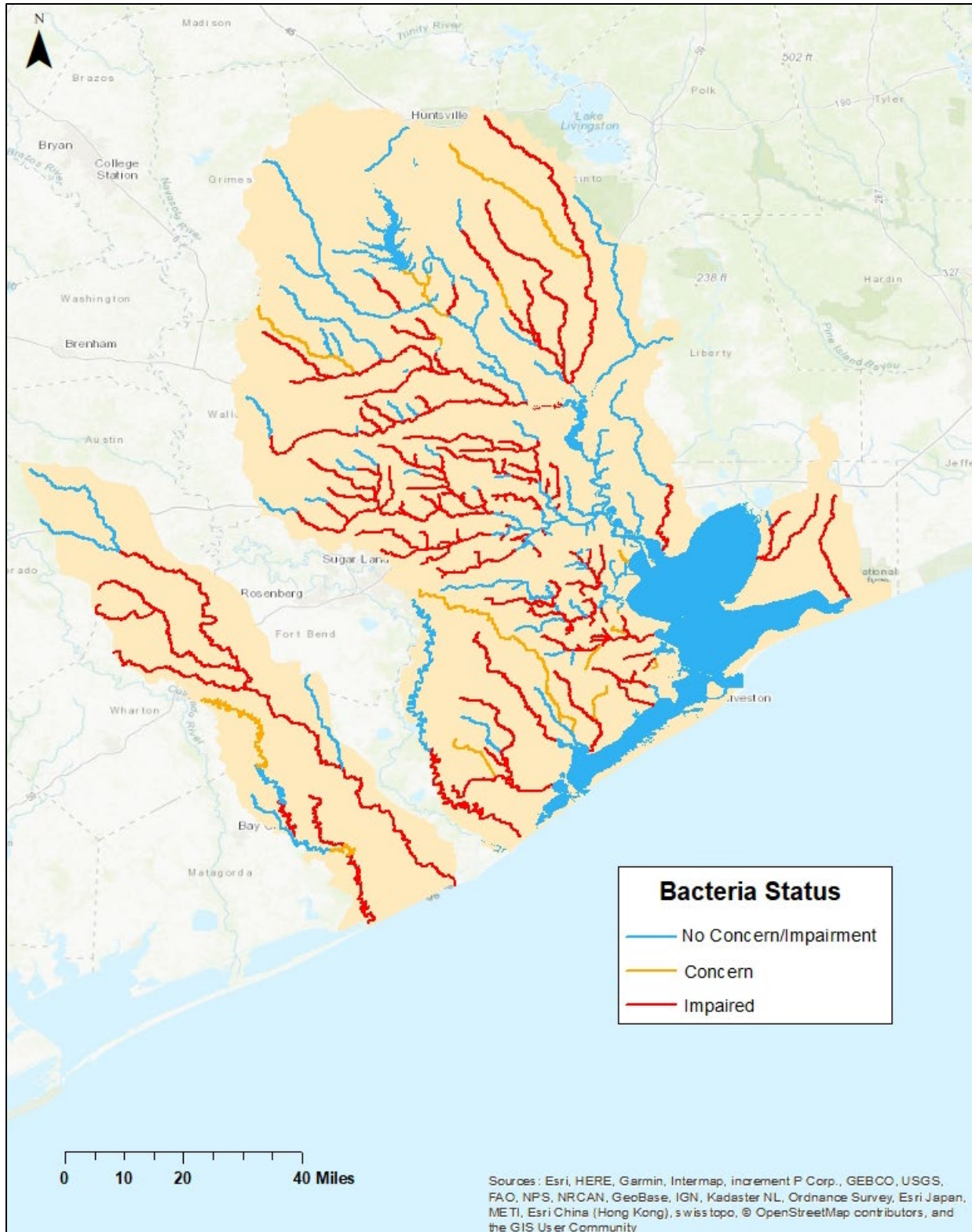


Figure 3 - Bacteria Impairments and Concerns in the Houston-Galveston Region

In addition to the identified water quality issues, numerous developmental challenges exist in the Region as well. The wastewater infrastructure that serves the Region's increasing

population has expanded and developed much like the Region itself. As the population has expanded and spread into less urban areas, there has been a proliferation of smaller-sized wastewater treatment facilities (WWTFs) and the creation of a diffuse network of infrastructure to provide utility service to this population. This is partially due to the area's flat topography, as larger centralized WWTFs would require a significant number of costly lift stations to consolidate flow. Due to the availability to fund infrastructure through political subdivisions like Municipal Utility Districts (MUDs) and other special districts, many areas of the Region have a wastewater treatment network that is relatively widespread and diffuse rather than limited by the bounds of a traditional, centralized model. Development through this model has created a patchwork of wastewater infrastructure, which offers both future challenges and opportunities for local decision-makers. The population is expected to continue to rapidly grow in the coming decades, and the ability to make informed decisions regarding water quality and wastewater infrastructure development will be crucial in planning for the Region's future. The accumulation, maintenance, and analysis of regional wastewater and effluent quality data can help inform regional solutions to these challenges.

In areas that are not served by a sanitary sewer collection system, which includes a sizable portion of the Region, wastewater is treated through use of decentralized on-site sewage facilities (OSSFs) instead of being collected and transmitted to a centralized WWTF. These OSSFs (Figure 4) collect, treat, and disperse wastewater generated by a home or business.



Figure 4 - Installation of an aerobic On-Site Sewage Facility

When properly designed, sited, and maintained, these systems are an effective form of wastewater treatment. However, if an OSSF fails, which can occur for numerous reasons

(improper design, system overload, improper operation, mechanical failure, lack of proper maintenance, etc.), it can contribute to groundwater or surface water contamination. One of the goals of this Project is to maintain a geospatial database of permitted OSSFs, and an estimation of locations of unpermitted OSSFs, which are typically those “grandfathered” systems that were installed prior to the State requirement that OSSFs be permitted.

Under previous 604(b) projects, H-GAC sought to address aspects of the information and data needs related to water quality issues facing the Region. These projects typically have been a mix of both ongoing efforts and short-term special studies. Some of the project efforts have been continuous, such as wastewater data collection and maintenance. Other efforts have been standalone research relating to specific data needs or questions, such as GIS analyses for infrastructure consolidation, Phase II stormwater permit implementation, etc. This balance of continuous and standalone efforts allows for the long-term accumulation of data while retaining flexibility to address specific issues. The ongoing efforts in the FY19 Project focused on updating and improving existing regional wastewater infrastructure databases (WWTF outfalls and service area boundaries) and spatial datasets of OSSF locations, support of local watershed protection planning, and coordination and public outreach in support of a Supplemental Environmental Project (SEP) to repair or replace failing OSSFs within the Region.

Significance

From a regional perspective, the water quality and wastewater infrastructure decisions facing the Region are more effectively considered on a watershed basis, as contaminants do not adhere to political boundaries along waterways. This is particularly important for watersheds that serve as significant sources of drinking water, such as Lake Houston. H-GAC maintains a large store of relevant and accessible data to provide useful information, analysis, and viable recommendations. The data collection and analysis tasks completed under this Project have significant value for a variety of efforts in the Region, such as the development of Watershed Protection Plans (WPPs) or Total Maximum Daily Loads (TMDLs). This work greatly benefits local watershed planning, wastewater infrastructure planning, and program development efforts. The significance of efforts undertaken in this Project is demonstrated by the variety of capacities in which the outcomes are used. Ways in which H-GAC utilizes these data include:

- **Internal Data Collection and Regional Data Sharing** – The wastewater permit data, service area boundaries, and OSSF location data acquired and/or collected under this Project serve to augment existing data sets, inform project decisions on related efforts, and expand internal abilities of both the H-GAC and TCEQ to incorporate and produce future data and analyses. For example, data were used by the Houston-area Bacteria Implementation Group (BIG) and Basins 11 and 13 TMDL efforts, the Galveston Bay Estuary Program (GBEP), the Clean Rivers Program, and others.
- **Regional Project Coordination** – Maintaining and expanding data resources allows the H-GAC and TCEQ to better understand and facilitate regional efforts between parties involved in wastewater infrastructure decisions and general water quality/watershed

protection efforts. Participation in regional groups and efforts helps ensure decisions benefit from Project resources and expand the reach of the Project's aims through partner efforts.

- **Source Water Protection** – A large portion of the Region's population is served by treated surface water originating in local rivers and lakes. The infrastructure planning and watershed coordination activities of this Project help foster a greater understanding of the relationship between these issues and protections for surface water drinking sources.
- **Project Review** – Data and analyses allow H-GAC Project staff to assist state and federal granting agencies in review of regional grant applications. These reviews ensure potential projects concur with regional priorities and regional data projections.
- **Education and Outreach** – Data gathered under this Project have been used as a focal point or basis for several education efforts, including the OSSF location database and various facilitated meetings, such as the ongoing Natural Resources Advisory Committee (NRAC).

Data gathered through the WQMP Update are used to inform numerous projects within the Region, including the Clean Rivers Program and numerous WPPs and TDMLs. One of the ways the Region is addressing bacteria issues is through projects such as the Bacteria Implementation Group (BIG). The BIG is a partnership between H-GAC, local governments, businesses, and community leaders who developed and implement a shared plan to reduce bacteria. The BIG Project area (Figure 5) is a combination of more than 100 TMDLs in adjacent watersheds.

One of the water quality protections implemented through the BIG was an initiative to lower the standard bacteria permit limit to 63 MPN/100 mL (most probable number per 100 milliliters) for some wastewater permittees in the BIG project area. This regulatory initiative, along with other non-regulatory activities, contribute to continued water quality improvement in the BIG area. Although overall bacteria levels for both the BIG area and the entire region (Region 12) have shown a gradual improvement over time since 2006, current bacteria geometric mean values for the Region continue to be significantly greater than the state standard for primary contact recreation (Figure 6).

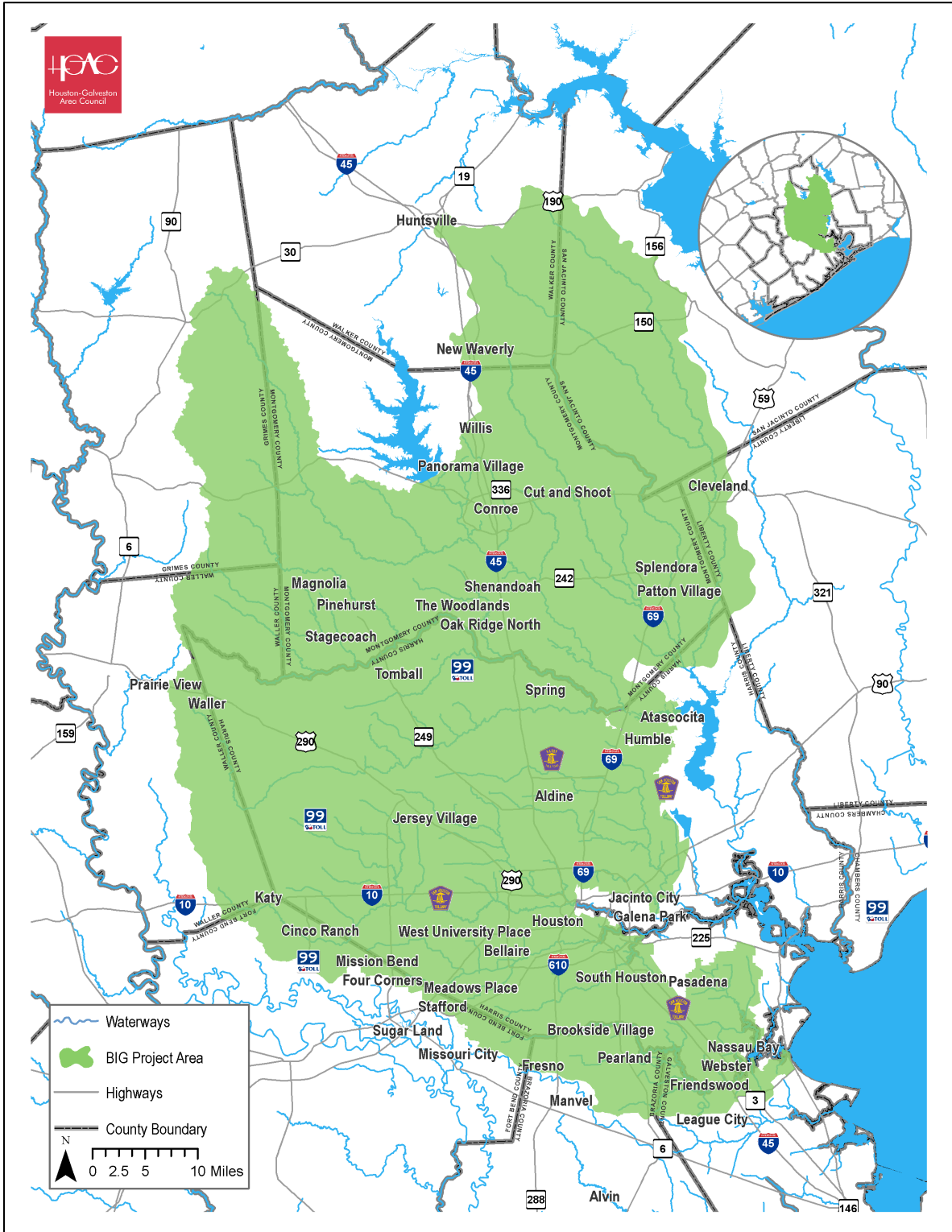


Figure 5 - BIG Project Area

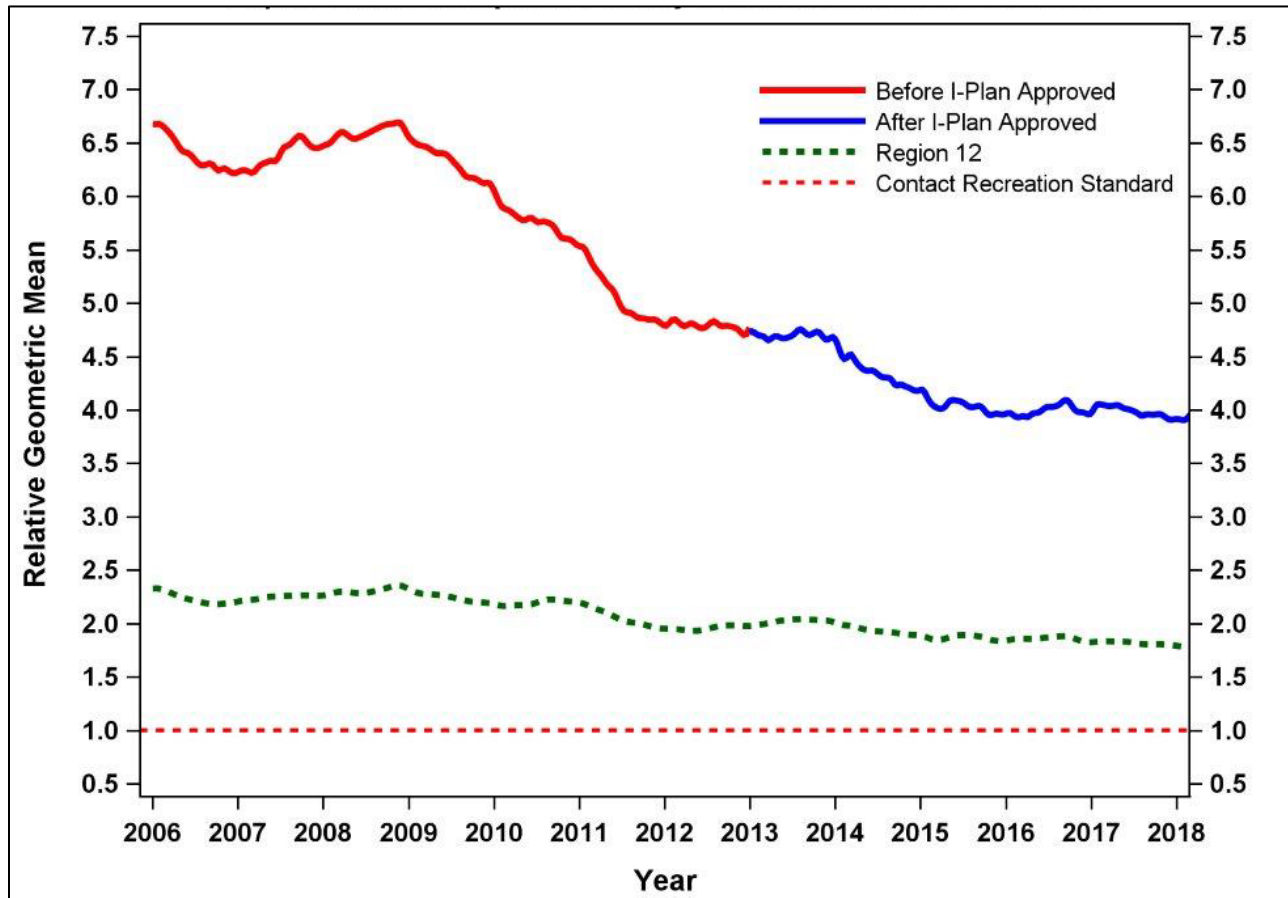


Figure 6 - Moving Seven-Year Bacteria Geometric Mean Plot for Region 12 and BIG Area (Before and After I-Plan Approval) Expressed as a Multiple of the Primary Contact Recreation Standard

One objective of this WQMP Project is to collect and analyze data related to wastewater infrastructure in the Region. Wastewater infrastructure is a potential contributor of bacteria into area waterways through improperly treated effluent discharges, or through the occurrence of sanitary sewer overflows (SSOs) from the plants or throughout the collection systems. Self-reported data from WWTF Discharge Monitoring Reports (DMRs) and SSO violation reports can be analyzed to better evaluate the potential impacts these sources have on bacteria impairments throughout the region. As the population continues to increase at a rapid pace and the infrastructure continues to age, the integrity of these treatment and collection systems may be harmed. It is important to continuously monitor these systems over time to ensure decision makers and water resource managers implement best management practices, repairs, or system replacements in areas with the most need.

Task 1: Project Administration

Task Description

The goal of this Task is to effectively coordinate and monitor all technical and financial activities performed under the Water Quality Management Planning contract, Contract Number 582-19-90146 (Contract), prepare regular progress reports, conduct quarterly conference calls, and manage project files and data.

Scope of Work

The following Subtasks are included in the Scope of Work under this project task:

- Project Oversight
- Quarterly Progress Reports
- Reimbursement Forms
- Contract Communication
- Final Project Summary

As part of the **Project Oversight** for the *Water Quality Management Plan (WQMP) Update Project* (Project), H-GAC staff provides technical and fiscal oversight to ensure Tasks and Deliverables are acceptable and are completed as scheduled and within budget.

Following the end of each state fiscal quarter, H-GAC staff submit **Quarterly Progress Reports (QPRs)** to TCEQ. These reports document the activities that were completed under each Task during the quarter.

Reimbursement Forms are submitted at the end of each quarter for work performed to complete the Tasks of the contract Scope of Work.

H-GAC staff maintain **Contract Communication** with TCEQ project management staff regarding the status and progress of the project.

The **Final Project Summary** summarizes activities completed under this Project.

Project Objectives

Project Oversight

The Contract has an effective period of 9/1/18 to 8/31/19 (Fiscal Year 2019). The original contract amount was for \$91,441.00. The Contract was amended (Amendment #1) to increase funding to \$138,754.21. The Scope of Work for the Contract was revised to reflect additional tasks to be performed with the increased funding. Modifications were made primarily to Task

4.3 (Urban Forestry Support and Coordination) and Objective 5 (On-Site Sewage Facility [OSSF] Planning, Coordination, and Outreach Activities). Changes to Objective 5 included Task 5.4 (Supplemental Environmental Project Coordination and Outreach). Efforts under this task supported the coordination and outreach activities performed for the Houston-Galveston Area Council's (H-GAC) Supplemental Environmental Project.

Quarterly Progress Reports

H-GAC staff submitted Quarterly Progress Reports documenting work performed under this Contract to the Texas Commission on Environmental Quality (TCEQ) Project Manager quarterly as required by the Contract Scope of Work. These reports contain a level of detail sufficient to document the activities that occurred under each Task during the quarter. The QPRs also contain a comprehensive tracking of deliverable status for the Project.

Reimbursement Forms

H-GAC staff submitted reimbursement forms/invoices for work performed under this Contract to the TCEQ Project Manager quarterly as required by the Contract Scope of Work.

Contract Communication

H-GAC Project staff maintained contact with the TCEQ Project Manager on activities performed under this Contract. This included quarterly conference calls to discuss task status, financial status, specific deliverables, quality assurance project plan development and updates, and contract amendments.

Final Project Summary

H-GAC will prepare a project summary report summarizing planning activities under this Contract. This report is due to TCEQ by the 15th day of the month following the last quarter of the Contract.

Task 2: Quality Assurance

Task Description

The goal of this task is to update and develop Quality Assurance Project Plans (QAPPs) that are consistent with the United States Environmental Protection Agency (EPA) requirements for QAPPs for acquired or geospatial data. QAPPs ensure environmental data that is acquired is of known and acceptable quality.

Scope of Work

The following Subtasks are included in the Scope of Work under this project task:

- QAPP Planning Meeting
- QAPP Annual Review Certification
- QAPP Amendments

The **QAPP Planning Meeting** allows the Houston-Galveston Area Council (H-GAC) and Texas Commission on Environmental Quality (TCEQ) project staff to determine the format and content of QAPPs for the project tasks.

Through the **QAPP Annual Reviews Certification** process, H-GAC submits documentation certifying its annual review of QAPPs. QAPPs are reviewed annually to ensure policies and procedures are up-to-date.

Any necessary changes to QAPPs are made through a **QAPP Amendment**.

Project Objectives

This Objective includes tasks related to the maintenance and updating of two existing QAPPs. A QAPP is a formal document outlining the procedures a project will use to ensure the data collected and analyzed as part of that project are of known and adequate quality and meet specific project requirements. The two QAPPs for this project are:

1. *H-GAC Regional Water Quality Data Acquisition and Compilation QAPP*

The purpose of this QAPP is to document how H-GAC acquires, reviews, and compiles data related to wastewater infrastructure and water quality in the Region. This QAPP clearly delineates H-GAC's Quality Assurance/Quality Control (QA/QC) policy, management structure, and procedures to implement the QA/QC requirements necessary to verify the data associated with this Project. This QAPP is reviewed by the TCEQ to help ensure the outputs and data generated for the Project purposes are scientifically valid and legally defensible.

2. H-GAC Regional Geospatial Data QAPP

The purpose of this ongoing QAPP is to document how H-GAC meets QA/QC objectives related to the update and maintenance of a regional On-Site Sewage Facility (OSSF) database and a related analysis of potential unpermitted OSSF locations. This QAPP clearly delineates the process, procedure, and methodology used to acquire and map OSSF data as part of maintaining and expanding the existing OSSF database. This QAPP ensures data collected under the QAPP and submitted to TCEQ have been collected and managed in a way that guarantees their reliability and can be used as deemed appropriate by the TCEQ.

Adherence to these QAPPs ensures that all data are collected and analyzed in a manner appropriate for the data objectives of this project.

QAPP Planning Meeting

H-GAC and TCEQ staff formally discussed the QAPP needs for the Water Quality Management Plan Update Project (Project) as part of a Project kickoff conversation on 10/2/18 after the initiation of the contract. The outcome of the meeting was a confirmation of the elements covered by each QAPP and a briefing for TCEQ staff on the Project background. Informal discussion regarding the maintenance and update of the QAPPs occurred continuously throughout the Project term, including revisions of both QAPPs.

QAPP Annual Review Certification

QAPPs for this Project are reviewed annually in their entirety, amended as necessary, and certified by the H-GAC Project Manager and the TCEQ Nonpoint Source Project Manager. QAPPs are effective for three years (spanning multiple project years) and must be reviewed and recertified each year as part of the Annual Review Certification.

During the Fiscal Year 19 (FY 19) Project year, it was necessary completely revise both QAPPs, as both QAPPs had reached their respective end dates of approval. A new Regional Water Quality Data Acquisition and Compilation QAPP was approved by TCEQ on 7/3/19. A new Regional Geospatial Data QAPP was submitted to TCEQ in July. Pending comments from the TCEQ, H-GAC will finalize this QAPP revision.

QAPP Amendments

Amendments to the QAPP(s) may be necessary to reflect changes in project management, tasks, schedules, or objectives and methods. QAPP amendments may be initiated to address deficiencies and non-conformances, improve operational efficiency, or accommodate unique or unanticipated circumstances. During FY 19, it was not necessary to make an amendment to either QAPP as a new revision of each QAPP was created instead.

Task 3: Wastewater Data Update and Coordination

Task Description

The goal of this task is to collect and integrate wastewater infrastructure and permit data to support planning for wastewater treatment plants and water quality projects in the Houston-Galveston Area Council's (H-GAC) Region (Region), and to support Texas Commission on Environmental Quality (TCEQ) in their *Water Quality Management Plan (WQMP) Update* process.

Scope of Work

The following Subtasks are included in the Scope of Work under this project task:

- Wastewater Infrastructure Geographic Information System (GIS) Data
- Wastewater Discharge Monitoring Report (DMR) and Sanitary Sewer Overflow (SSO) Data Analysis
- Clean Water State Revolving Fund (CWSRF) Application Review

For the **Wastewater Infrastructure GIS Data** task, H-GAC updates the service area boundaries and related domestic wastewater outfalls for the Region's wastewater collection and treatment facilities and incorporates the information into GIS. The update, prepared annually, includes a map of the boundaries of the wastewater collection systems within the Region and the geographic location of wastewater treatment plant outfalls.

The **Wastewater DMR Data Analysis** for this project involves the acquisition and analysis DMR data for regional permitted facilities. The WQMP update specifically evaluates bacteria discharges, but other constituents may be evaluated if a waterbody-specific or facility-specific need is identified, or if requested by stakeholders. H-GAC also acquires and analyzes Sanitary Sewer Overflow (SSO) data for the Region, if available.

Upon TCEQ request, H-GAC staff conducts **Clean Water State Revolving Fund (CWSRF) Application Review**, reviewing the applications for population projections and conformance with the WQMP.

Project Objectives

Wastewater Infrastructure GIS Data

To update the WQMP, H-GAC utilizes a series of data sets related to the Texas Pollutant Discharge Elimination System (TPDES) permitted wastewater facilities in the region. These are

the **Service Area Boundaries Data Set (SABD)** and the **Outfall Location Data Set (OLD)**. A primary task under this Project is to update and continue to integrate these data sources. To approach this task, H-GAC set out to address the following questions:

- Is there a corresponding service area boundary (SAB) for every domestic outfall?
- What is the difference between the current and previous outfall locations for current domestic permits?
- Are there any data errors that need to be reported to TCEQ?

The SABD is a GIS layer maintained by H-GAC. This file contains a spatial representation of the service area boundaries of the permitted domestic wastewater dischargers in the region. Typically, these boundaries include municipalities, Municipal Utility Districts (MUDs), Water Control and Improvement Districts (WCIDs), Fresh Water Supply Districts (FWSDs), other public districts, and private utilities that serve an area greater than a single facility. Industrial permittees are not included in the SABD as these dischargers typically only serve a single facility.

The wastewater outfall layer is maintained by TCEQ. This GIS layer identifies the location of TPDES-permitted wastewater treatment facility outfalls for the region. Each year, as part of the *WQMP Update* process, H-GAC requests an updated wastewater outfalls GIS data set from TCEQ. The data for this year's report were provided by TCEQ on 3/7/19.

H-GAC utilizes data from multiple sources (MUD records, United States Environmental Protection Agency and TCEQ permit databases, etc.) to update the service area boundary and outfall layer data sets. In addition, H-GAC also utilized the Public Utility Commission of Texas' (PUC) Certificates of Convenience and Necessity (CCN) data set to match outfalls to service area boundaries. A CCN grants the holder the exclusive right to provide retail water and/or sewer utility service to a defined geographic area. If a CCN is issued, it may serve as a proxy for the service area boundary, as the CCN holder is required to provide continuous and adequate service within its CCN boundary.

Data were checked for consistency across all outfalls of a single permit and for consistency across all permits. While the service area boundaries are integrated for those wastewater treatment facilities (WWTF) that have boundaries, a 1:1 ratio is not possible as boundaries do not exist for most industrial permits (which may serve a single parcel and do not have traditional boundaries). In the *FY 18 WQMP Update*, there were numerous permitted dischargers, particularly smaller, privately-owned facilities (such as mobile home parks), which did not have service area boundary data available. During the FY 19 Project, H-GAC staff began to identify the service area boundaries for those systems and will continue into the next Project cycle.

Methods

The acquisition and analysis of wastewater infrastructure data, including wastewater outfall locations, adhered to updated Quality Assurance Project Plans (QAPP) and quality

assurance/quality control (QA/QC) methods. For this Project, an updated WWTF outfall GIS layer was acquired from TCEQ on 3/7/19 and filtered to examine just the domestic outfalls.

In the metadata for the GIS layer provided by TCEQ, the outfalls are classified with descriptors. The outfalls examined for this project include those categorized as “D” or “W” in the data dictionary. The “D” category represents domestic outfalls at <1 MGD (millions of gallons per day) domestic sewage. The “W” category includes wastewater outfalls ≥1 MGD domestic sewage or process water, including water treatment plant discharge. As the focus of this analysis is on domestic discharges, the “D” category was included in H-GAC’s evaluation. To determine which facilities in the “W” category were domestic and which were industrial, the permit numbers were queried using TCEQ’s water quality permit registry¹. Permits in the “W” category identified as Public Domestic Wastewater or Private Domestic Wastewater were included in the domestic wastewater outfall layer.

The service area boundary GIS layer was compared to the previous year’s data to determine if data have changed from year-to-year, and if so, to what extent. A manual review of the GIS outfall layer and service area boundaries was performed to identify outfalls without an associated SAB and address those discrepancies. In the *FY 18 WQMP Update*, approximately 100 small private systems were identified that did not have an associated service area boundary. One of the goals of the *FY 19 WQMP Update* was to address these systems and develop boundaries for these permittees. This process compared the SAB to other sources such as city boundaries or the CCNs available through the PUC. These city boundaries and CCNs can serve as proxies for the service area boundary until H-GAC staff can reach out to the individual entities for verification of their service areas. These proxy boundaries were added to the service area boundary GIS layer.

Results and Observations

The data comparison of year-to-year data showed the removal of 12 permits and the addition of 60 permits. Additionally, two wastewater outfalls with incorrect TPDES permit numbers were identified. These discrepancies were reported to TCEQ and corrected in their data set.

Based on the analysis performed, 978 domestic outfalls were identified in the 13-County Region. Expanding to the 15-County Region (to include the entirety of the San Jacinto River Basin), 1,000 outfalls were identified.

Figure 7 shows the addition of new service area boundaries based upon the CCN and city boundaries analysis. Figure 8 shows the service area boundaries alongside the domestic outfalls.

Updated data sets are included in digital format on the media accompanying this report.

¹ <https://www6.tceq.texas.gov/wqpaq/index.cfm>

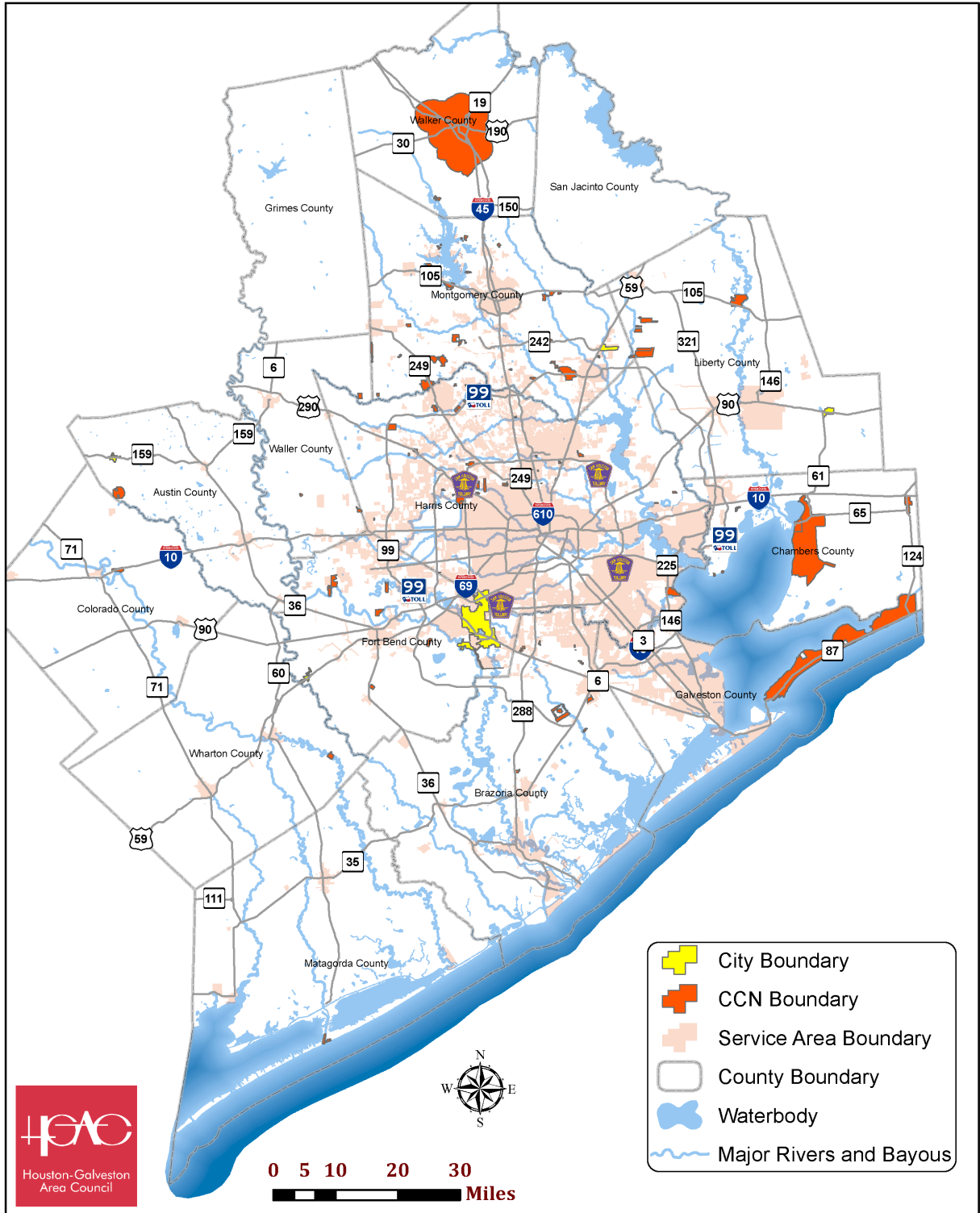


Figure 7 – 2019 Service Area Boundary Proxies by CCN or City Boundaries, H-GAC 15-County Region

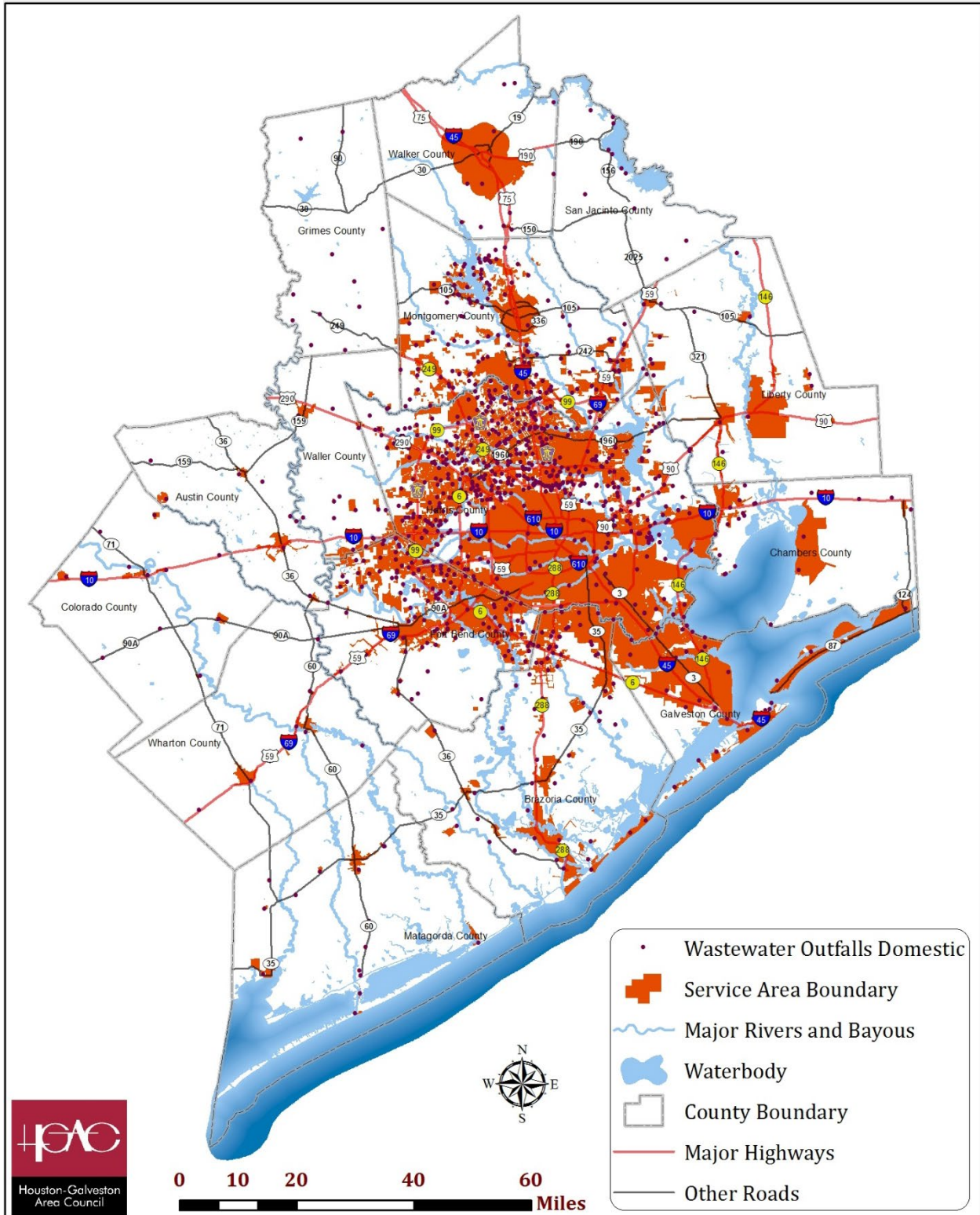


Figure 8 - 2019 Service Area Boundaries and Domestic WWTf Outfalls, H-GAC 15-County Region

Wastewater DMR Data Analysis

As part of the analysis for the *WQMP Update*, H-GAC acquired self-reported DMR data for permitted facilities through TCEQ and EPA to evaluate bacteria permit limit exceedances for the period of 2012–2018.

As defined in the *Texas Surface Water Quality Standards*, the *E. coli* geometric mean criterion for primary contact recreation for ambient surface water is 126 most probable number (MPN) per 100 milliliters (mL), and 399 MPN/100mL for single grab samples. For enterococci, which is the designated indicator organism for tidal segments, the criterion for the geometric mean is 35 MPN/100mL, with a single sample criterion of 89 MPN/100mL. TCEQ does not apply the single sample criterion for their assessment.

In most cases, these standards are generally applied as a water quality permit limit for WWTFs. In the Region, the majority of TPDES permits have effluent limitations set for *E. coli*. However, some permits have enterococci as the indicator organism. Select WWTFs may have more stringent bacteria permit limits depending on site-specific conditions or participation in total maximum daily load (TMDL) projects like the Bacteria Implementation Group (BIG).

Effluent discharges from WWTFs are regulated by TCEQ, with water quality limits specified in each discharger's permit. These effluent discharge limits are monitored by WWTF personnel on a frequency dependent on plant size, location, wastewater type (domestic or industrial), and other factors. Results from field measurements (pH, dissolved oxygen, instantaneous flow, etc.) and laboratory analyses (biochemical oxygen demand, total suspended solids, ammonia, etc.) from these required monitoring events are submitted to the TCEQ monthly as a DMR. As with any self-reported data, there is an expectation that some degree of uncertainty or variation from conditions may occur. Additionally, samples are collected at the weir and not at the end of the outfall pipe, so results generated do not take into account potential bacterial regrowth in the outfall pipe. Even with these inherent uncertainties, DMRs are the most comprehensive data available for the broad regional evaluations conducted under the *WQMP Update*. Evaluating trends in permit exceedances for indicator bacteria is important in understanding the impact WWTFs may have on overall surface water quality. The data created under this task continues to be widely used by local projects and entities. Water quality protection efforts, including the various watershed protection plans (WPP), TMDLs, and the Clean Rivers Program, use the data to guide and inform planning decisions.

Methods

For this project, H-GAC staff evaluated the occurrence of self-reported bacteria violations through domestic WWTF DMRs in the region for the period of 2012–2018. Evaluations were based on the regulatory permit limits specific to each plant and consider the number of exceedances and bacteria loadings by year and by WWTF size. The data analyzed for this project are self-reported by WWTFs and samples are collected before the end of the outfall pipe, so results do not consider the effect of bacteria regrowth.

The number of permittees can change from year-to-year, and multi-year comparisons are based on the current wastewater outfall GIS layer. Therefore, slight variations may be present from the data presented in this report and previous or subsequent reports. The data presented in this report are accurate when the data being analyzed were acquired (March 2019), but previous or subsequent data could be slightly different based upon the number of outfalls present at the time of that data acquisition.

DMR data for this Project are from the period of 1/1/18 to 12/31/18 and were acquired from TCEQ and EPA. The wastewater outfall GIS layer was acquired from TCEQ. The acquisition and analysis of wastewater infrastructure data adhered to updated QAPPs and QA/QC methods.

Results and Observations

Based on the GIS data acquired from TCEQ (version dated 3/7/19), there are 1,221 permitted outfalls in the TCEQ Outfall Layer, with the EPA Registry showing 1,210 outfalls. This discrepancy is most likely due to new permits approved by TCEQ but not yet entered into the EPA Registry. Of the permitted systems in the Registry, self-reported DMR data (of any type) were submitted for 1,023 outfalls, with bacteria data being submitted for 874 of the outfalls. Of the permittees submitting bacteria DMR data (either *E. coli* or enterococci), 793 are domestic WWTFs, and 81 are industrial facilities. Table 2 provides a summary of the WWTFs submitting DMR data in 2018. Most are domestic facilities.

Table 2 - DMR Data Submission Summary, 2018

WWTF Type	Plants Submitting DMR Data	Plants Submitting DMR Bacteria Data
Domestic	819	793
Industrial	204	81
TOTAL	1023	874

For many of the analyses in this report, WWTFs are evaluated on relative plant size, as categorized by daily flow in millions of gallons per day (MGD). Those plant size categories and the number of plants per category are shown in Table 3. The total number of dischargers submitting DMR data shown in Table 2 (874 WWTFs) differs from that in Table 3 (906 WWTFs) due to a difference in the timeframe the data represent. The values shown in Table 2 are based on 2018 data only. The number of WWTFs by size shown in Table 3 are calculated using data from 2012–2018 so permit exceedance rates by year and plant size can be determined.

Table 3 - Number of Plants by WWTF Plant Size (by Flow, in MGD), 2012 - 2018

WWTF Plant Size by MGD	Number of Plants	Percentage
Variable Intermittent Discharge	28	3.09%
< 0.1 MGD	286	31.57%
0.1 – 0.5 MGD	224	24.72%
0.5 – 1 MGD	153	16.89%
1 – 5 MGD	156	17.22%
5 – 10 MGD	38	4.19%
> 10 MGD	21	2.32%
TOTAL	906	100%

Within the Region, the <0.1 MGD category comprises the largest number of plants at 31.57% of the facilities, followed by plants in the 0.1 – 0.5 MGD category at 24.72%. Combined, these two categories represent 56.29% of the permitted facilities in the Region. Considering the growth patterns within the Region and the proliferation of MUDs and other special districts, this is as expected.

With only 21 WWTFs discharging >10 MGD, this is the smallest category within the Region, comprising only 2.32% of the permitted facilities.

In 2018, WWTFs within the Region self-reported a combined 8,286 bacteria single grab sample results and 7,970 bacteria geometric mean results. Of these reported results, 279 of the single grab samples (3.37%) were permit exceedances, with 69 of the geometric mean results (0.86%) exceeding permit limits (Table 4). These records include only those outfalls with permit limits. Plants that test and report data but do not have a permit limit are not included in these numbers.

Table 4 - Bacteria Data Reported and Permit Exceedance Rates, 2018

Variable	Geometric Mean	Single Grab Sample (Daily Maximum)
Total Results Reported	7970	8286
Total Exceeding Permit Limit	69	279
Percent Exceedance	0.86%	3.37%

Single grab sample and geometric mean bacteria sampling and compliance data were evaluated by relative plant size.

Table 5 shows the number of single grab and geometric mean results reported, the number exceeding permit limits, and the percent exceedance for each of the WWTF plant sizes.

Table 5 - Bacteria Sampling and Compliance DMR Results by Plant Size Category, 2018

WWTF Plant Size by Millions of Gallons per Day (MGD)	Geometric Mean Results Reported	Geometric Mean Results Exceeding Permit Limit	Geometric Mean Percent Exceedance	Single Grab Results Reported	Single Grab Results Exceeding Permit Limit	Single Grab Results Percent Exceedance
Variable/Intermittent Discharge	286	10	3.50%	285	12	4.21%
< 0.1 MGD	1374	10	0.73%	1420	24	1.69%
0.1 – 0.5 MGD	2424	26	1.07%	2488	48	1.93%
0.5 – 1 MGD	1583	4	0.25%	1775	30	1.69%
1 – 5 MGD	1823	11	0.60%	1843	109	5.91%
5 – 10 MGD	437	6	1.37%	449	30	6.68%
> 10 MGD	224	2	0.89%	246	26	10.57%

As shown in Table 5, plants in the 0.1–0.5 MGD category have the largest number of samples reported (both single sample and geometric mean), with the smallest number being for plants with flow >10 MGD.

Bacteria permit limit exceedance rates were examined for the period of 2012–2018. These data were examined both in aggregate (Table 6) and by Relative Plant Size (Tables 7 and 8).

Table 6 - Bacteria Permit Exceedance Rates by Year, 2012 - 2018

Year	Total Geomean Results Reported from Permittees with Limits in Permits	Samples Exceeding Geomean Limit	Percent Samples Exceeding Geomean Limit	Geomean Percent Compliance	Total Grab/Max Results Reported from Permittees with Limits in Permits	Samples Exceeding Grab/ Max Limit	Percent Samples Exceeding Grab/Max Limit	Grab/Max Percent Compliance
2012	4021	94	2.3%	97.7%	4125	318	7.7%	92.3%
2013	5786	113	2.0%	98.0%	6120	354	5.8%	94.2%
2014	6848	119	1.7%	98.3%	7289	288	4.0%	96.0%
2015	7456	100	1.3%	98.7%	8013	351	4.4%	95.6%
2016	7708	104	1.3%	98.7%	8188	295	3.6%	96.4%
2017	7907	80	1.0%	99.0%	8389	306	3.6%	96.4%
2018	7970	69	0.9%	99.1%	8506	279	3.3%	96.7%

In general, results indicate a small number of bacteria permit exceedances are reported annually. For 2018, 69 out of 7,970 geometric mean samples, or 0.9%, were reported as exceedances. Of the 8,506 single grab samples reported, only 279, or 3.3%, were reported as permit exceedances in the DMR data. Overall, permit compliance is high, with 99.1% of geometric mean results and 96.7% of single grab sample results being within compliance. These compliance rates hold fairly steady over the years, indicating most self-reported data is within compliance based upon discharger permit limits.

Bacteria permit exceedance data were analyzed on relative plant size. Table 7 shows the bacteria permit limit exceedance rates for geometric mean samples for the period of 2012–2018. Table 8 shows the bacteria permit limit exceedance rates for single grab samples for the same time period.

Table 7 - Bacteria Permit Geometric Mean Exceedance Rates by Year and Plant Size, 2012 - 2018

Relative Plant size	2012	2013	2014	2015	2016	2017	2018
Variable/Intermittent Discharge	33.3%	0.0%	33.3%	16.3%	20.6%	10.2%	4.7%
< 0.1 MGD	5.6%	4.8%	4.5%	2.4%	1.5%	1.5%	0.7%
0.1-0.5 MGD	2.1%	1.5%	0.9%	1.6%	1.9%	1.2%	1.1%
0.5-1 MGD	1.1%	0.6%	0.4%	0.1%	0.3%	0.2%	0.3%
1-5 MGD	2.0%	1.6%	1.0%	0.4%	0.4%	0.4%	0.6%
5-10 MGD	1.9%	3.1%	2.1%	2.9%	1.0%	0.5%	1.5%
> 10 MGD	0.7%	1.2%	0.5%	0.5%	0.0%	0.0%	1.1%

Table 8 - Bacteria Permit Single Grab Sample Exceedance Rates by Year and Plant Size, 2012 - 2018

Relative Plant size	2012	2013	2014	2015	2016	2017	2018
Variable/Intermittent Discharge	14.6%	1.4%	15.0%	9.5%	14.4%	10.2%	4.2%
< 0.1 MGD	9.6%	6.9%	5.9%	3.3%	2.2%	2.7%	1.7%
0.1-0.5 MGD	5.5%	3.4%	2.2%	2.8%	2.4%	2.3%	1.9%
0.5-1 MGD	5.5%	4.2%	1.7%	1.9%	1.1%	2.0%	1.7%
1-5 MGD	9.1%	6.7%	4.3%	5.6%	5.2%	4.8%	5.9%
5-10 MGD	10.2%	13.9%	7.5%	12.2%	8.4%	6.5%	6.7%
> 10 MGD	14.1%	13.6%	12.1%	17.4%	12.3%	15.0%	10.6%

The highest rate of permit exceedances (4.7%) for geometric mean data are observed with plants in the Variable/Intermittent Discharge category. These plants are typically small and discharge infrequently and at a smaller volume than most facilities.

Generally, permit exceedances for geometric mean limits are low (at or below 1.5%, with the exception of the Variable/Intermittent dischargers). The geometric mean calculation normalizes the range of values being averaged and shows the typical value or central tendency of the data set, so that outliers (such as an atypical elevated single grab value) do not overly influence the results, as would be the case if an arithmetic mean were utilized.

Higher permit exceedance rates are seen with the single grab samples as compared to the geometric mean results, but this is to be expected. For smaller plants, discharges may only have to sample once per quarter or once per month. At higher flow volumes, sampling frequency may increase to weekly or daily. There can be multiple single grab results for each facility each month, but there will only be one geometric mean result reported for the month.

WWTFs in the >10 MGD flow category have the highest rate of single grab bacteria sample permit limit exceedances at 10.6%. Because of the higher flow, these facilities are required to collect, analyze, and report at a much greater frequency than smaller plants. The >10 MGD category's geometric mean exceedance rate is low at only 1.1%.

Overall, bacteria permit limit compliance rates, based upon self-reported DMR data, are very high. These data are self-reported and have some inherent uncertainty. In many cases, these samples are collected at the same time each day, which may bias the results if sample collection is postponed until conditions are ideal. WWTF Compliance Inspection data from Harris County Pollution Control are acquired under the BIG Project and show higher rates of permit exceedances than is observed in the self-reported data. This is likely due to the random nature of the compliance inspection monitoring (i.e., it is not biased to certain flow conditions, chlorine residual levels, etc.). The Harris County Pollution Control compliance data are not acquired under this Project's QAPP, therefore, those results are not reported as part of the WQMP Update. However, this data, combined with the data generated under this WQMP Project, are an important cornerstone for the analyses that inform the activities of the BIG that address bacterial impairments within a sizable portion of the region.

In addition to the exceedance rates for the geometric mean, the actual geometric means of the single grab *E. coli* sample results were calculated. These data are shown in Table 9.

Table 9 - Geometric Mean of Single Grab *E. coli* Results (in MPN/100mL) by Plant Size, 2012 - 2018

Relative Plant Size	2012	2013	2014	2015	2016	2017	2018
Variable/Intermittent Discharge	41	206	279	298	101	43	52
< 0.1 MGD	5.3	3.9	3.7	3.0	2.9	2.7	2.6
0.1-0.5 MGD	3.4	2.6	2.4	2.5	2.4	2.4	2.4
0.5-1 MGD	4.8	3.2	2.8	2.9	3.0	3.2	3.0
1-5 MGD	13	8.0	6.7	7.2	7.8	7.9	9.3
5-10 MGD	11	15	12	14	15	13	11
> 10 MGD	13	23	28	47	22	20	19

While this data does not allow us to draw conclusions about any single facility, it is useful to look at the data in aggregate. As these data show, the highest geometric means are observed with plants in the Variable/Intermittent Discharge category. For 2018, the geometric mean of all samples reported for this size category was 52 MPN/100mL. Over the period of 2012–2018, *E. coli* geometric means for this plant size category ranged from 41 to 298 MPN/100mL. Historically, the plants with the lowest geometric mean are those in the 0.1–0.5 MGD category. Smaller plants such as these will have less frequent monitoring than larger facilities.

The estimated *E. coli* daily load (in Millions MPN per day) from domestic WWTFs is shown in Table 10 and Figures 9 and 10. Results are shown by year and relative plant size.

Table 10 - Estimated *E. coli* Load (in Million MPN/Day) from Domestic WWTFs by Year and Relative Plant Size

Plant Size	2012	2013	2014	2015	2016	2017	2018
<0.1 MGD	6730.4	1249.3	857.0	535.6	487.7	413.0	384.3
0.1 – 0.5 MGD	1689.3	1702.5	1741.1	2306.5	3813.1	3093.2	3452.4
0.5 – 1 MGD	3342.6	3944.3	3513.2	2940.4	4222.2	3667.0	4362.8
1 – 5 MGD	44727.7	31327.3	15189.7	16299.6	17195.1	16290.4	18275.8
5 – 10 MGD	8143.8	7940.8	6598.2	10282.6	11468.3	9684.1	8414.7
>10 MGD	6288.1	6398.3	7821.8	7305.3	6773.8	7469.1	11323.7

Figure 9 shows the estimated *E. coli* loading (in Million MPN/Day) for domestic WWTFs by year and relative plant size. Figure 10 shows the trend of this data over time for each plant size

category. There are no domestic WWTFs with variable/intermittent flows, and therefore, this category is not included for the following figures.

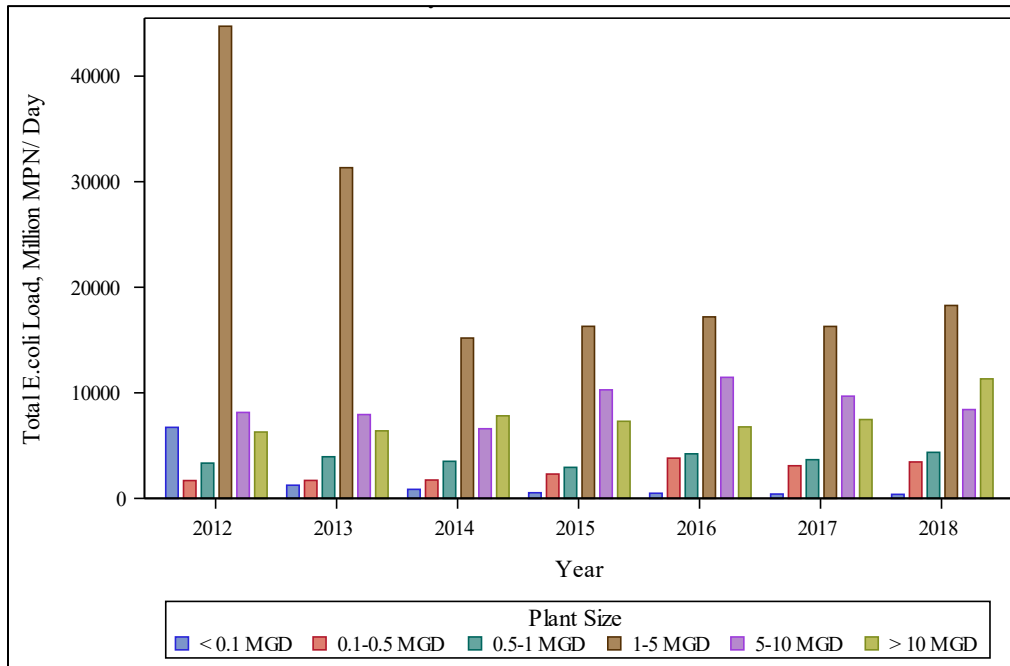


Figure 9 - Estimated *E. coli* Load (in Million MPN/Day) from Domestic WWTFs by Year and Plant Size

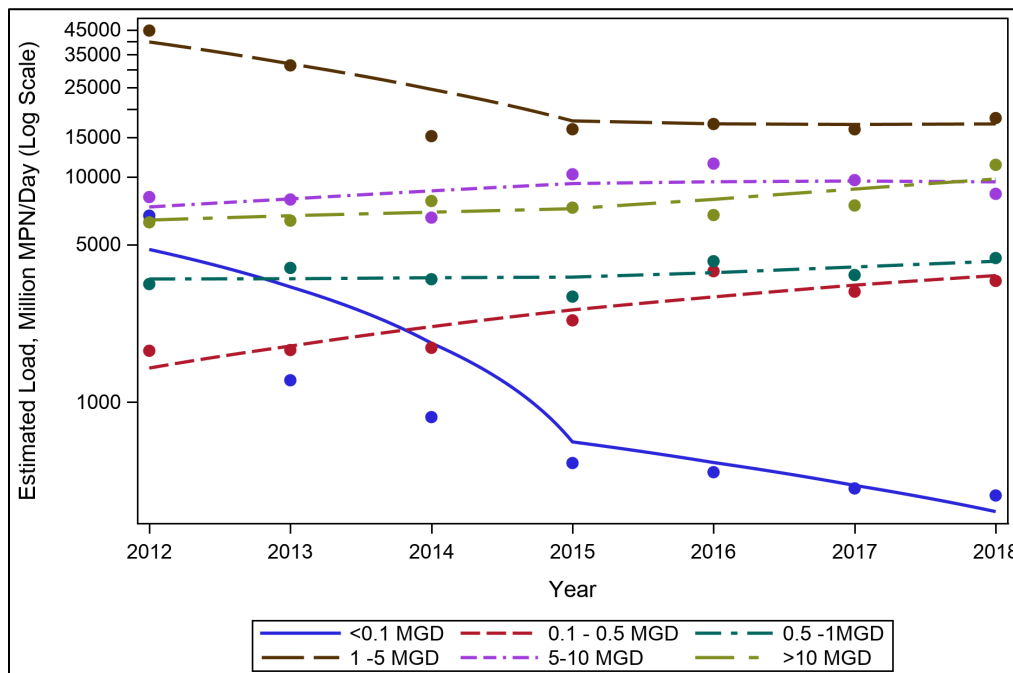


Figure 10 - Estimated *E. coli* Load Trends from Domestic WWTFs by Year and Plant Size

For the period of 2012 to 2018, plants in the 1–5 MGD size category contributed the most bacteria loading. In 2018, the estimated bacteria loading for this plant size category was 18275.8 Million MPN/day. Even though they represented the single largest category of plants by number in 2018, WWTFs in the <0.1 MGD size category contributed the least bacteria loading due to their relatively low flows.

The frequency of bacteria permit limit exceedances is shown in Figure 11. Figure 12 shows the density of bacteria permit limit exceedances by watershed.

Water quality trends are analyzed under the Clean Rivers Program (CRP) and reported in the *Basin Highlights Report*. Based upon the CRP monitoring station results from 2001 – 2018, water quality trends for each stream segment and assessment unit (AU) were analyzed. For *E. coli*, the monitoring data shows a deteriorating trend in 10 AUs, with improvement in 58 AUs and no change in 141 AUs. For enterococci, there are deteriorating trends in 10 AUs, improving trends in 30 AUs, and no change in 78 AUs.

While overall bacteria levels within the region are still above the geometric mean criteria, the level has decreased, indicating an improvement in water quality. This is more pronounced when you compare it to the data from the BIG Project area (Figure 6). Even with the improvements observed, it will still take additional effort to improve water quality, with WPPs and TMDLs being the primary tools to achieve these reductions.

The analyses generated for this task are included in digital format on the media accompanying this report.

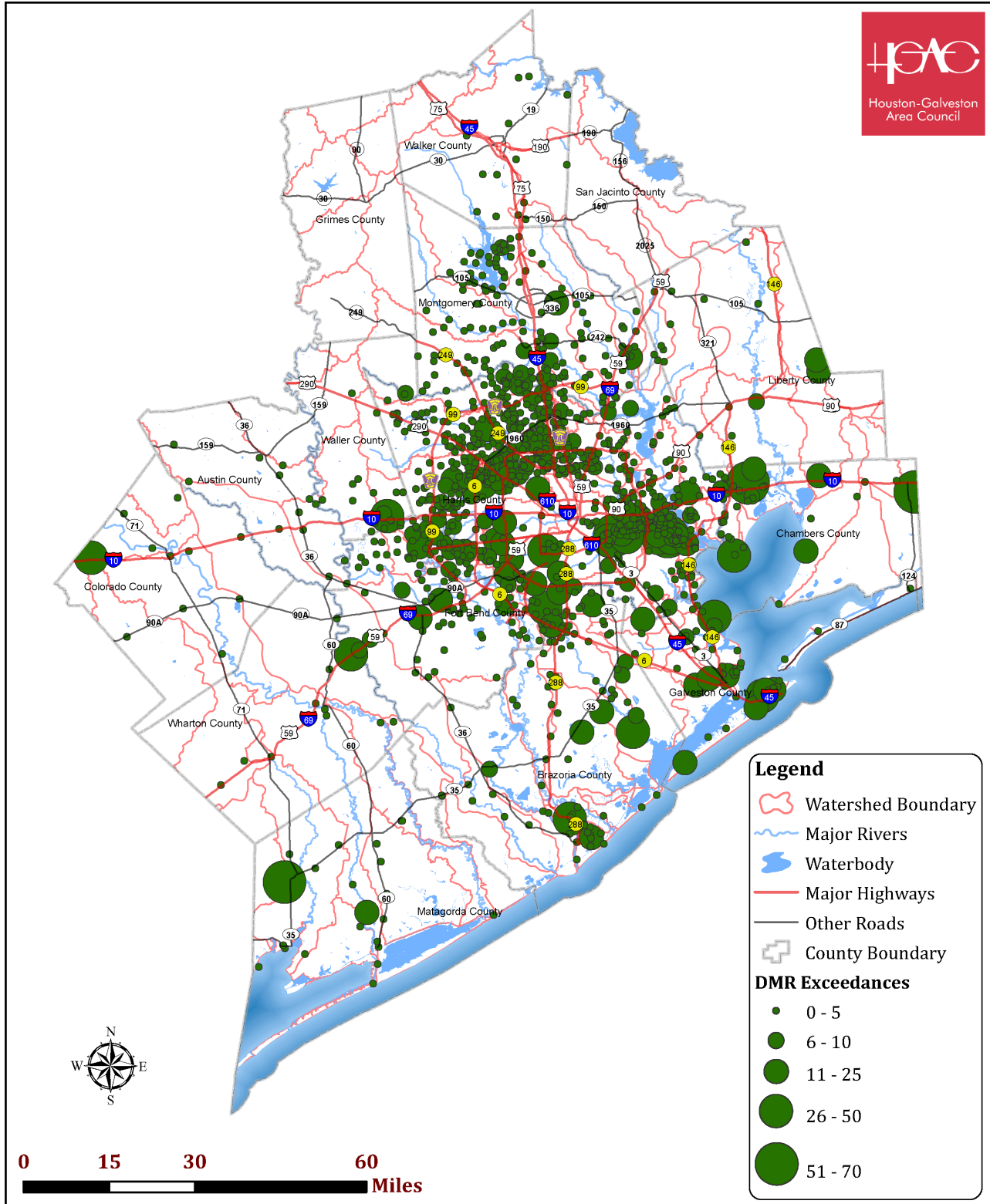


Figure 11 - DMR Bacteria Exceedance Occurrences, 2012-2018

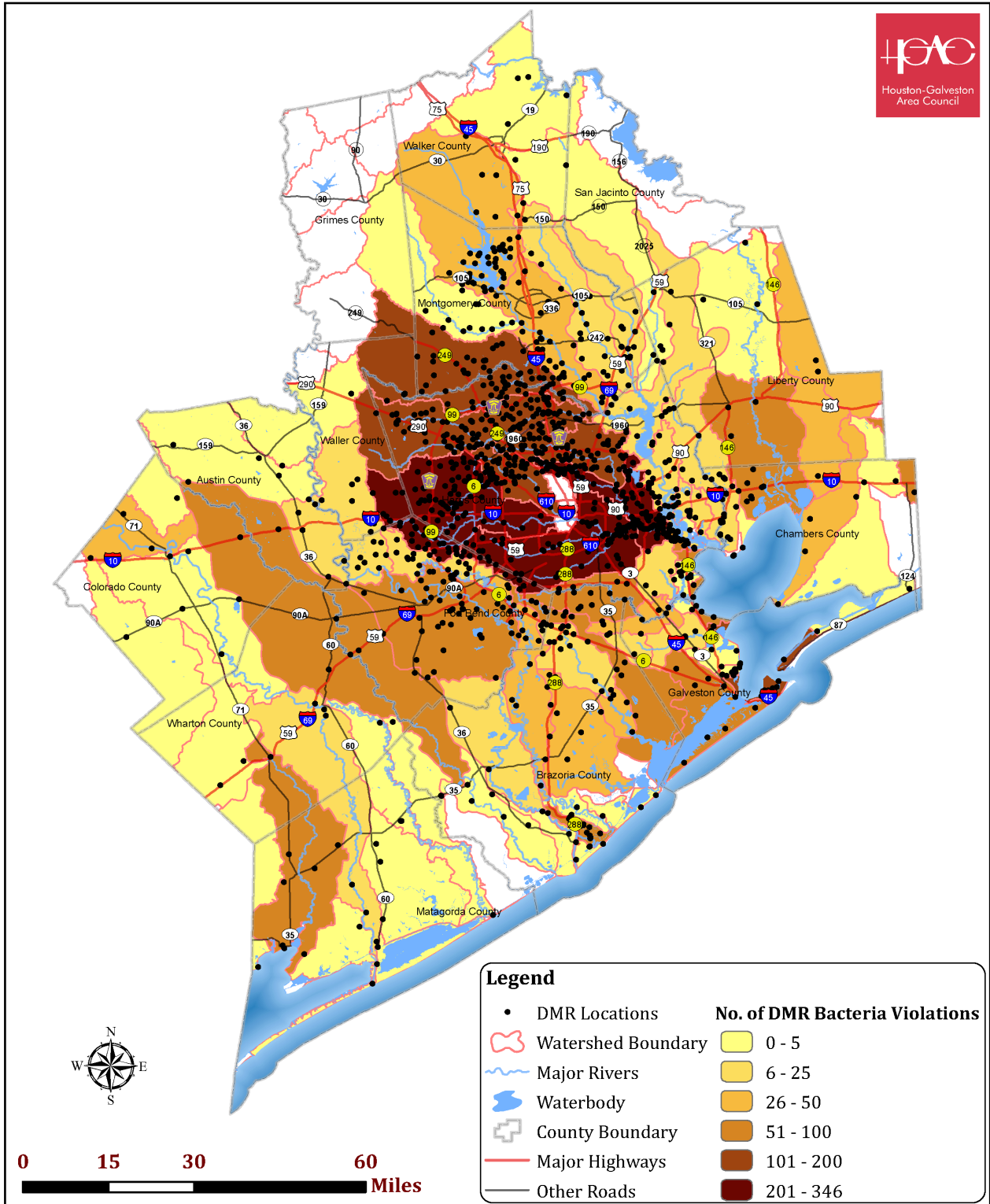


Figure 12 - DMR Bacteria Exceedance Density by Watershed, 2012-2018

Wastewater SSO Data Analysis

One of the goals of this year's *WQMP Update* was to provide an analysis of SSO data for the region. The self-reported SSO data are usually acquired from the TCEQ Region 12 office and analyzed to locate areas with high or frequent SSO activity.

Unfortunately, H-GAC has been unable to acquire a complete data set for the SSO activity from the regional TCEQ office. Project Managers from the Central Office of TCEQ in Austin are actively working with H-GAC staff to acquire that data, but it is not available at this time and therefore, an analysis of the SSO data cannot be included in the FY 19 WQMP Update.

If additional data becomes available in a timely manner, it will be analyzed as normal and an Addendum to the *FY 19 WQMP Update* will be issued. Otherwise, the SSO data will be analyzed as part of the *FY 20 WQMP Update*, if the data are updated and available.

Clean Water State Revolving Fund Application Review

In conjunction with H-GAC's role as a regional planning group and the local council of governments for the Houston-Galveston area of the Upper Gulf Coast, staff regularly provides comments on grant proposals of varying types. For the *WQMP Update*, H-GAC reviews proposals for projects under the Texas Water Development Board's (TWDB) CWSRF program. These reviews help ensure regional goals are represented in project funding decisions at a variety of governmental levels.

Methods

Facilities with wastewater treatment plant and transport infrastructure make loan applications to TWDB to assist in the cost of improvements. These applications are reviewed by TCEQ. H-GAC also completes a review as requested by TCEQ to determine if the applicant has conformed to the regional water quality management plan. H-GAC reviews the grant application and associated engineering documentation (such as the Preliminary Engineering Report, Environmental Review, population projections, etc.) for concurrence with broad regional planning priorities and goals (such as improving water quality, protecting waterways, reducing bacteria or nutrient loading, etc.).

During this review process, H-GAC staff looked for:

- Population projections that matched TWDB, H-GAC, or other relevant forecasts;
- Alternatives that may impact water quality considerations; and
- Concurrence with regional priorities and goals (water quality impacts, etc.).

As part of this Project, H-GAC staff used data gathered under this and previous projects to review and provide comments on four CWSRF project applications during the *FY 19 WQMP Update* period.

Results and Observations

The outcomes of the reviews are shown in Table 11. CWSRF projects reviewed during this year were consistent with regional goals of the WQMP. For two of the submitted projects, permit effluent discharge limits for fecal indicator bacteria were not included with the application. During the review process, H-GAC staff requested these limits be added to the applications.

Table 11 - Clean Water State Revolving Fund Application Review

Project ID	Requesting Entity	Project Summary	Findings
73756	City of Houston	Design and construction of stormwater management and flood reduction measures. Replacement and extension of bridges in the Brays Bayou watershed to increase stormwater conveyance capacity.	The WQMP does not specifically address stormwater or flooding. The project may indirectly reduce the number, duration, and severity of SSOs.
73814	City of Houston	Citywide collection system rehabilitation utilizing pipe-busting and cured-in-place rehabilitation methods to repair/renew approximately 650,000 linear feet of sanitary sewer pipe throughout the City.	The proposed project addresses SSOs in the City’s sewer collection system. The goals of the project are consistent with regional goals as defined in the WQMP.
73838	Town of Woodloch	Planning, design, and construction of a new 0.15 MGD wastewater treatment plant to replace the existing plant. The purpose of this project is to address a current compliance issue, avoid potential compliance issues, extend service, and expand capacity.	H-GAC requested that proposed permit limits include fecal indicator bacteria. The goals of the project are consistent with regional goals as defined in the WQMP.
73839	Roman Forest Consolidated MUD	The proposed project is for the planning, design, and construction of a new 0.35 MGD (ultimately 0.70 MGD) WWTF. The proposed project will replace the existing WWTF that was flooded during Hurricane Harvey and is operating at diminished capacity. Plans call for elevation of the plant structures above the high-water elevation to mitigate flooding issues that occurred during Harvey. Replacement of the system will address current and future compliance issues, extend service, and expand capacity.	H-GAC requested that proposed permit limits include fecal indicator bacteria. The goals of the project are consistent with regional goals as defined in the WQMP.

Discussion

During the *FY 19 WQMP Update Project*, H-GAC acquired and analyzed geospatial data for wastewater treatment plant outfall locations. These data are used in numerous water quality projects within the region, particularly the development of WPPs and TMDLs. In addition to the outfalls layer, service area boundary data were also examined. H-GAC added several additional service area boundaries for small privately-owned facilities by utilizing the CCN boundaries as proxies. Future projects will attempt to reach out to individual permittees to acquire new service area boundary data or verify the current data.

Analysis of self-reported DMR data provides a means by which decision makers and water resource managers can evaluate the role wastewater infrastructure plays in regional water quality issues. For the *FY 19 WQMP Update Project*, H-GAC examined the bacteria DMR data for wastewater treatment facilities within the region to determine the bacteria exceedance rates. The analysis of self-reported DMR data shows that most WWTFs have few reported bacteria exceedances. Permit compliance is high, with rates of bacteria permit exceedances low (typically <2%).

WWTF flow rates were examined, and plants were categorized based upon their permitted flow rates. The two largest categories of WWTFs are those with flows <0.1 MGD and between 0.1 – 0.5 MGD. This is to be expected considering the proliferation of MUDs and other special districts that have allowed for the rapid population growth and spread of wastewater infrastructure into the counties outside the urban core.

While compliance rates are high (based upon self-reported data), continued monitoring and inspection of treatment systems remains an essential component of water quality management due to the potential impact of poor effluent quality. Bacteria sampling is a discrete event, with a sample grabbed at a specific point in time. The sample is also generally collected at a weir or flume and not at the end of the discharge pipe, so the data do not take into consideration bacteria regrowth.

For the *WQMP Update*, H-GAC planned to analyze the frequency and sources of SSOs in the Region. However, H-GAC was not able to receive this data set from the TCEQ Region 12 office. If the data becomes available soon, it will be analyzed and an Addendum to this report will be issued. Otherwise, the data, if available, will be analyzed as part of the *FY 20 WQMP Update Project*.

In support of responsible use of grant funding for infrastructure improvements, H-GAC reviewed CWSRF grant project applications as requested by TCEQ. For the FY 19 contract period, H-GAC reviewed four CWSRF project grant applications and associated documentation

for concurrence with broad regional planning goals and provided comments. These reviews help to ensure regional goals, such as improving water quality and protecting waterways, are represented in project funding decisions at a variety of governmental levels.

Task 4: Support Watershed Planning

Task Description

The goal of this task is to support planning in the Houston-Galveston Area Council (H-GAC) Region (Region) and to support regional information sharing on water quality and related topics

Scope of Work

The following Subtasks are included in the Scope of Work under this project task:

- San Bernard River Watershed Coordination
- General Water Quality Coordination
- Urban Forestry Support and Coordination

H-GAC facilitates ongoing **San Bernard River Watershed Coordination** for stakeholders in the watershed. This includes at least one stakeholder group meeting during each fiscal year, maintaining communication with stakeholders, and assisting stakeholders in coordinating their implementation activities as outlined in the United States Environmental Protection Agency (EPA)-accepted San Bernard River Watershed Protection Plan (WPP).

General Water Quality Coordination activities include water quality planning activities that are not currently funded under other contracts. This includes participation in stakeholder activities and information-sharing events related to both total maximum daily loads (TMDL) and WPPs that are not currently funded. Through this task, H-GAC provides staff for the quarterly Natural Resources Advisory Committee (NRAC) meeting to address regional watershed management and related natural resource issues. H-GAC coordinates with state and federal water programs, such as the Galveston Bay Estuary Program (GBEP), and local governments, targeting prevention of duplication of efforts and promoting watershed management.

Through the **Urban Forestry Support and Coordination** subtask, H-GAC supports regional efforts to coordinate water quality and forestry efforts, with a focus on riparian and urban areas. H-GAC supports the Texas Forest Service and other forestry agents in facilitating events and efforts in the H-GAC region, including participation in the Houston Area Urban Forestry Council, participation on the planning team for the Texas Forests and Drinking Water Partnership, facilitation of a Geographic Information Systems (GIS) workshop for forestry practitioners, and support in providing data resources and information on funding resources to local forestry partners.

Project Objectives

San Bernard River Watershed Coordination

H-GAC has established a WPP effort in the San Bernard River Watershed through previous American Recovery and Reinvestment Act (ARRA)/Clean Water Act (CWA) Section 319(h) grants from Texas Commission on Environmental Quality (TCEQ) and the Texas State Soil and Water Conservation Board. During this project, staff worked to maintain an active and engaged stakeholder base. H-GAC staff met with Friends of the River San Bernard three times during the year to discuss various outreach and support activities H-GAC is providing them, including mapping support. H-GAC staff provided updates through presentations at key partner meetings (such as the GBEP) and through outreach at local events. Quarterly updates are provided to the NRAC.

In addition to the outreach activities, H-GAC works closely with Texas Stream Team monitors conducting volunteer monitoring at seven active monitoring stations within the watershed.

General Water Quality Coordination

As an extension of H-GAC's role as a coordinator of regional planning efforts in a variety of fields, staff members develop and maintain relationships with other local and state governments, community groups, and other organizations involved in efforts related to the aims of this Project.

Staff members facilitate the NRAC, which provides policy recommendations for H-GAC's Board of Directors and serves as a regional roundtable for coordinating environmental efforts. The NRAC provides an efficient communication network and point of contact for H-GAC staff with other local and regional water quality decision makers.

The NRAC developed an annual awards program to recognize projects and programs in the region that help improve water quality conditions through innovative water infrastructure projects and improvements. This program, the Water Innovation Strategies of Excellence (WISE) Awards (Figure 13), honors projects in four categories.



Figure 13 - WISE Awards Logo

WISE Awards categories and 2019 winners are:

Winner of the Built Project (Less than \$500K) Category

Bioswale Demonstration Project
Harris County Flood Control District

Winner of the Built Project (More than \$500K) Category

Harris County Precinct 4 Service Center
Harris County Precinct 4

Winner of the Planning and Policy Category

Houston Parks Riparian Restoration Plan
City of Houston Parks and Recreation Department

Winner of the Education and Public Awareness Category

Galveston Bay Action Network
Galveston Bay Foundation

In addition to the four named WISE Awards categories, applications that were exemplary in specific, specialized areas supporting the mission of the WISE Awards were also recognized:

- **Robust Community Involvement** – Bayport Berm Planting, Port of Houston Authority (Port Houston)

- **Positive Integration of Amenities in Planning** – City of Mont Belvieu Supplemental Detention Criteria, City of Mont Belvieu
- **Innovative Approach for New Development** – Bridgeland Creek Parkway Sections Seven and Eight, The Howard Hughes Corporation
- **Proactive Planning & Leadership** – Sugarland Integrated Water Resource Plan, City of Sugarland
- **Effective Use of Natural Pollution Mitigation Measures** – The Port of Houston Tree & Riparian Enhancement of Ecosystem Services Program, Houston Wilderness

The intent is that these projects will serve as a success model for others. Winners and special recognition recipients were provided a digital badge for display on their websites and social media channels to help promote the awards following an awards ceremony on 5/17/19. The 2020 WISE Awards application period will open in early 2020.

In 2019, the NRAC focused primarily on issues pertaining to flooding, water quality, and water conservation. Four NRAC meetings were held during the Project term. Topics discussed at these meetings are detailed in Table 12.

Table 12 - Natural Resources Advisory Committee (NRAC) Meetings, FY 19

Date	Topics Discussed
11/1/18	<ul style="list-style-type: none"> • Appointment of new members • Report from the Parks & Natural Areas Subcommittee • Report from the Water Innovation Strategies of Excellence (WISE) Awards Subcommittee • Environmental Program Highlights <ul style="list-style-type: none"> ○ West Fork San Jacinto River Project Update ○ Cedar Bayou Project Update ○ Cypress Creek Project Preview ○ Supplemental Environmental Project – OSSF Program Update • Needs Assessment Survey results • NRAC Extranet presentation
2/7/19	<ul style="list-style-type: none"> • Re-nomination and appointment of members • Report from the Parks & Natural Areas Subcommittee • Report from the Water Innovation Strategies of Excellence (WISE) Awards Subcommittee • Report from the Policy & White Paper Subcommittee • Environmental Program Highlights <ul style="list-style-type: none"> ○ West Fork San Jacinto River Project Update ○ Urban Forests Update ○ Cypress Creek Update

	<ul style="list-style-type: none"> ○ Regional Trash Projects Update ○ Basin 11 and Basin 13 Project Updates ● Presentation (Water Planning) - Update on the 2021 Region H Water Plan
5/2/19	<ul style="list-style-type: none"> ● Re-nomination and appointment of members ● Report from the Parks & Natural Areas Subcommittee ● Report from the Water Innovation Strategies of Excellence (WISE) Awards Subcommittee ● Report from the Policy & White Paper Subcommittee ● Environmental Program Highlights <ul style="list-style-type: none"> ○ Residential Wastewater Assistance SEP ○ TMDL/I-Plans Update ○ Regional Trash Projects Update ○ Water Resources Events Update ● Presentation – Gulf Coast Regional Conservation Plan
8/1/19	<ul style="list-style-type: none"> ● Re-nomination and appointment of members ● Report from the Parks & Natural Areas Subcommittee ● Report from the Water Innovation Strategies of Excellence (WISE) Awards Subcommittee ● Environmental Program Highlights <ul style="list-style-type: none"> ○ TMDL Umbrella Contract ○ Big Creek Update ○ Cypress Creek Update ○ Urban Forestry Update ○ Clean Waters Initiative Update ○ Regional Trash Initiatives Update ○ Solid Waste Workshops and Grant Program ● Presentation on the City of Mont Belvieu Supplemental Detention Criteria ● Presentation of the <i>Draft WQMP Update Report</i> for discussion and comments

In addition to facilitating the NRAC meetings, H-GAC staff routinely attend meetings of, or otherwise support, numerous other organizations involved in water quality efforts throughout the region. Due to the density of work in the Houston-Galveston region, coordination and communication is required. During the WQMP Update Project (Project) term, staff helped coordinate activities with a variety of organizations on several projects. Examples of these groups and projects staff worked with this year include:

- Support of the Galveston Bay Plan revision
- Coordination with the Clean Rivers Program on the development of the Basin Highlights Report
- Promotion of On-Site Sewage Facility (OSSF) projects (presentation at the Harris County Onsite Wastewater Seminar, Texas Environmental Health Association meeting, and Montgomery County Environmental Health Services OSSF Conference)
- Subcommittee memberships (Water and Sediment, Monitoring and Research) and Subcommittee leadership (Water and Sediment – Vice Chair) for the GBEP
- Attendance and presentations at city council meetings throughout the region

- Attendance and presentation at the Harris County Commissioners Court
- A variety of interactions with state and local policy and regulatory efforts (including coordination with ongoing TMDL, WPP, and other efforts). Noteworthy watershed-based projects include:
 - Bacteria Implementation Group (BIG)
 - San Jacinto-Brazos Coastal Basin
 - Brazos-Colorado Coastal Basin
 - Upper Oyster Creek
 - East Fork San Jacinto River
 - West Fork San Jacinto River
 - Cedar Creek
 - Bastrop Bayou
 - San Bernard River
 - Cypress Creek

In addition to facilitating regional communication, coordination, and cooperation on water quality efforts through staff presence and participation, H-GAC uses the data generated under the Project to support various internal and external project needs.

Urban Forestry Support and Coordination

Support for Urban Forestry issues has become a major focus for H-GAC in recent years. As part of these activities, H-GAC staff works regularly with various entities, such as Houston Wilderness, The Nature Conservancy, and Trees for Houston, to provide data for urban forest research projects. Major urban forestry milestones for FY 19 include:

- Selection as a presenter for the Southern Region Water Conference, speaking on integrating watershed management and urban forestry.
- Selection as part of a competitive process for a team to represent the region at a national conference in New York City in October 2019, presenting approaches to urban forestry in Houston/Texas.
- Actively working in a leadership role with the Houston Area Urban Forestry Council.
- Promoting forestry programs through workshops, such as the Agricultural Resources workshop in Conroe (coordinated with Texas A&M AgriLife and Texas Forest Service as part of the West Fork San Jacinto River and Lake Creek WPP), the WG Jones State Forest Landowner forestry workshop offered by the Texas Forest Service, and a GIS workshop for forestry practitioners.
- Seeking additional grant opportunities for local partners through meetings with granting agencies (American Forests, US Endowment for Forestry and Communities, etc.) and local partners (City of Houston, Memorial Park Conservancy, Trees for Houston, Houston Wilderness, etc.).

Discussion

As part of H-GAC's continued support of watershed planning in the region as a tool for responsible decision-making, project staff continued to facilitate the ongoing planning and implementation efforts associated with the San Bernard River WPP. Additionally, H-GAC fostered regional coordination through facilitation of the NRAC. H-GAC also promoted and supported watershed planning efforts with local stakeholders and partners.

One of the main areas of focus for FY 19 has been the support of urban forestry activities. Through these activities, H-GAC receives local and regional recognition, and will represent the region at a national conference in New York in Fall 2019. H-GAC anticipates the urban forestry activities will become standalone, funded projects.

Task 5: OSSF Planning, Coordination, and Outreach Activities

Task Description

The goal of this task is to coordinate the Houston-Galveston Area Council's (H-GAC) various On-Site Sewage Facility (OSSF) program activities. These activities include:

- Maintaining and continuing to develop H-GAC's spatial database of permitted OSSFs and projected unpermitted OSSF locations to support regional water quality and wastewater infrastructure projects;
- Planning, coordination, and outreach related to H-GAC's Supplemental Environmental Project (SEP) to repair and replace failing OSSFs within the watershed; and
- Outreach and educational programs, such as homeowner maintenance courses and real estate inspector courses.

Scope of Work

The following Subtasks are included in the Scope of Work under this project task:

- Permitted OSSF Update
- Unpermitted OSSF Update
- Coordination with Authorized Agents
- SEP Coordination and Outreach Activities
- OSSF Outreach and Education Activities.

For the **Permitted OSSF Update**, H-GAC staff continued to update the OSSF location database with data from Authorized Agents, including permitted OSSF locations and related permit data as appropriate.

For the **Unpermitted OSSF Update**, H-GAC staff evaluates and estimates the probable locations of unpermitted systems, which were typically installed prior to the requirement that OSSFs be permitted. This analysis is performed using parcel, census block, and 911 address data.

H-GAC staff works in **Coordination with Authorized Agents** to receive OSSF permit data submissions for inclusion into H-GAC's Geographic Information Systems (GIS) database. For counties in the Coastal Zone (Brazoria, Chambers, Galveston, Harris, and Matagorda), H-GAC facilitates data gathering and sharing with Texas A&M AgriLife Extension, who are currently developing a Coastal Zone OSSF database for Texas Commission on Environmental Quality (TCEQ).

H-GAC staff performs **SEP Coordination and Outreach Activities** in support of a SEP program to address failing OSSFs within the region. These efforts target priority watersheds (such as those monitored by the Clean Rivers Program or subject to a watershed protection plan [WPP] or total maximum daily load [TMDL]) to identify areas with failing OSSFs and evaluate best management options such as repairing the system, replacing the system, or tying in to nearby sewer lines (if feasible). Efforts are coordinated with the appropriate H-GAC staff for each watershed project, as well as the local permitting and enforcement agencies, such as local Authorized Agents. Outreach to public officials and enforcement agencies is conducted through various meetings, such as presentations to the Bacteria Implementation Group, Natural Resources Advisory Committee, Clean Waters Initiative workshop, and the H-GAC Board of Directors. Outreach to OSSF professionals is conducted through county, regional, and statewide conferences and workshops.

Through H-GAC's **OSSF Outreach and Education** programs, staff conduct or facilitate educational training courses on basic OSSF maintenance and fundamentals of operation. These training courses are offered to homeowners, real estate inspectors and other interested parties as requested.

Project Objectives

Decentralized OSSFs are a widespread wastewater treatment technology in the Region. OSSFs are relied on for the treatment and disposal of wastewater in areas not conducive to centralized sanitary sewer service. Although they produce treated effluent of a high grade when functioning properly, OSSFs can be appreciable sources of bacterial contamination if they are not properly maintained and functioning. Annually, thousands of OSSFs are designed, sited, permitted, and installed within the Region, especially in the rapidly developing unincorporated areas of northern Harris and Montgomery counties, as well as the rural counties along the Region's outer boundary. While new systems are subject to permit requirements as specified in Title 30 Texas Administrative Code Chapter 285 (30 TAC §285), many systems installed before 1989 did not require a permit. These older systems may be grandfathered, and specific locations may be unknown. H-GAC estimates there are over 300,000 OSSFs within the Region, with only approximately one-third of them being permitted systems installed after 1989.

TCEQ has authority over regulating and permitting OSSFs in Texas. In many cases, that authority is delegated by TCEQ to Authorized Agents (counties, municipalities, river authorities, and other responsible entities). As there is no centralized repository for OSSF permitting data, the Authorized Agents have traditionally maintained these data in a variety of formats. To ensure a regional, uniform set of data for use by Authorized Agents and water quality planning efforts, H-GAC developed a comprehensive inventory of permitted system locations and likely unpermitted system locations under previous grant contracts. During the FY 19 Project, new data provided by the Authorized Agents were added to the OSSF permit database.

Permitted OSSF Update

The intent of the OSSF database is to provide a comprehensive, spatially-explicit inventory for all permitted OSSF locations throughout the region. No such inventory existed prior to the initiation of H-GAC's initial database development. The initial work had collected location data for permitted OSSFs and developed a program under which participating Authorized Agents would submit new system data on a regular basis, including spatial locations using Global Positioning System (GPS) units provided by H-GAC. This information is updated regularly and is available to the public through the OSSF Information System (Figure 14) found on H-GAC's website at <https://datalab.h-gac.com/OSSF/>. This interactive OSSF mapping tool allows the user to view the locations of permitted OSSFs by age, Authorized Agent or permitting authority, number of permits per square mile, and likely locations for old or unpermitted OSSFs.

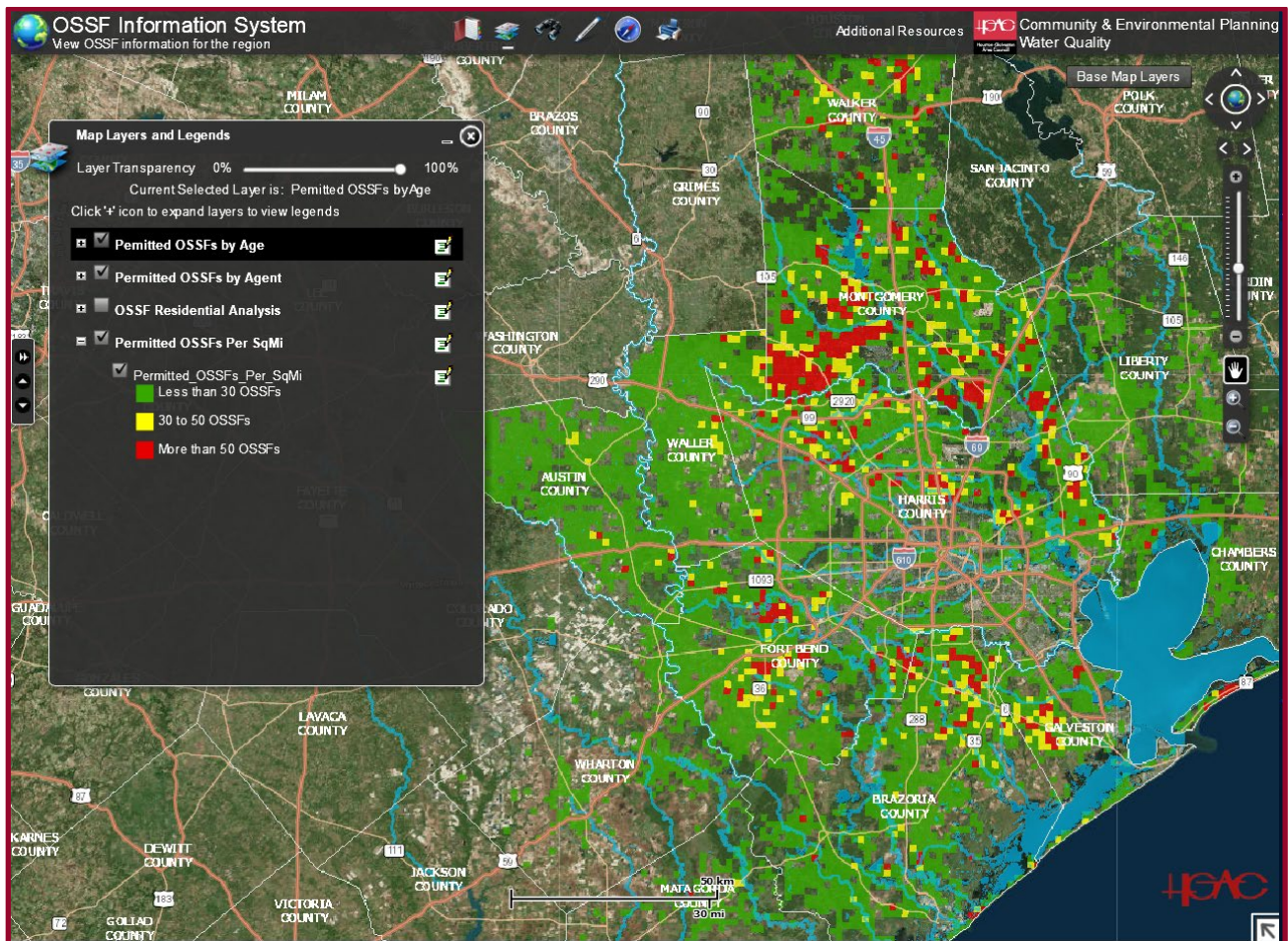


Figure 14 - H-GAC's OSSF Information System Interface

H-GAC's partners have been responsive with data submittals. Records submitted by Brazoria County, Chambers County, Fort Bend County, Galveston County, Liberty County, Montgomery

County, Waller County, and Wharton County contained latitude and longitude coordinates of the location of the system, allowing very precise siting. Permit records received by the remaining Authorized Agents were geo-referenced, or identified on a map, by the permit address. Project staff worked directly with several Authorized Agents to improve their data quality and submissions.

Methods

Authorized Agents typically submit data to H-GAC in electronic format (.xls, .doc, or .pdf). Several of the Authorized Agents (including Brazoria, Chambers, Galveston, Montgomery, and Waller counties) submit data to H-GAC monthly. Other Authorized Agents submit data as requested. Staff changes at both H-GAC and some of the Authorized Agents led to the need to meet with those entities and reestablish some of the working relationships that have existed in the past. While staff have met with several of the Authorized Agents and their Designated Representatives, further meetings are necessary to resume receiving data from the other permitting authorities.

Data received by Authorized Agents are reviewed by H-GAC staff and reformatted as necessary for inclusion into the geospatial database. The methods employed in the update of the OSSF database are described in further detail in the separate H-GAC Geospatial Quality Assurance Project Plan (QAPP).

Results and Observations

In FY 19, H-GAC added 2,930 new records to the OSSF Permits Database. Existing records were examined. Any data errors (incorrect GPS points, typographical errors, etc.) were corrected, while duplicate data records were removed. This update, which covers the period through June 2019 (the most recent data submittal by Authorized Agents), brings the total number of OSSFs in the database to 92,617. Table 13 summarizes the available permitted OSSF data for the Region based on the FY 19 update.

Table 13 - Summary of Permitted OSSFs by County (through June 2019)

County	Total Number of OSSFs in Database	Number of OSSFs Added in 2019 Update	Included in 2019 Update?
Austin	3368	-	No
Brazoria	13308	926	Yes
Chambers	913	132	Yes
Colorado	609	-	No
Fort Bend	10432	-	No
Galveston	5599	257	Yes
Harris	18132	-	No
Liberty	965	-	No
Matagorda	1414	-	No
Montgomery	27620	1317	Yes
Walker	6018	-	No
Waller	3597	298	Yes
Wharton	642	-	No
TOTAL	92617	2930	-

For the FY 19 OSSF permit data update, records were received, quality assured, and incorporated into the database for the following counties: Brazoria, Chambers, Galveston, Montgomery, and Waller. Harris County also provided a substantial amount of data in July 2019; however, the review of that data has not yet been completed. Unlike the service area boundary data set, which is updated annually, the OSSF data is updated monthly, so the Harris County data will be ready to incorporate into the database once the quality assurance/quality control (QA/QC) review is complete.

In the past, H-GAC's analysis included the number of systems by type (conventional, aerobic, other, or unknown). Based on some data discrepancies and the fact that not all Authorized Agents submit this detail, that analysis has been excluded from the *FY 19 WQMP Update*. However, this is an area of particular interest to H-GAC staff and could be beneficial to the development of WPP and TMDL implementation plans. This is an area that will be explored further once H-GAC can acquire additional data and verify the data records for accuracy.

Maps illustrating the location of new permitted systems (Figure 15) and the density of OSSFs by county (Figure 16) are shown below and are included in the digital media attached to this report.

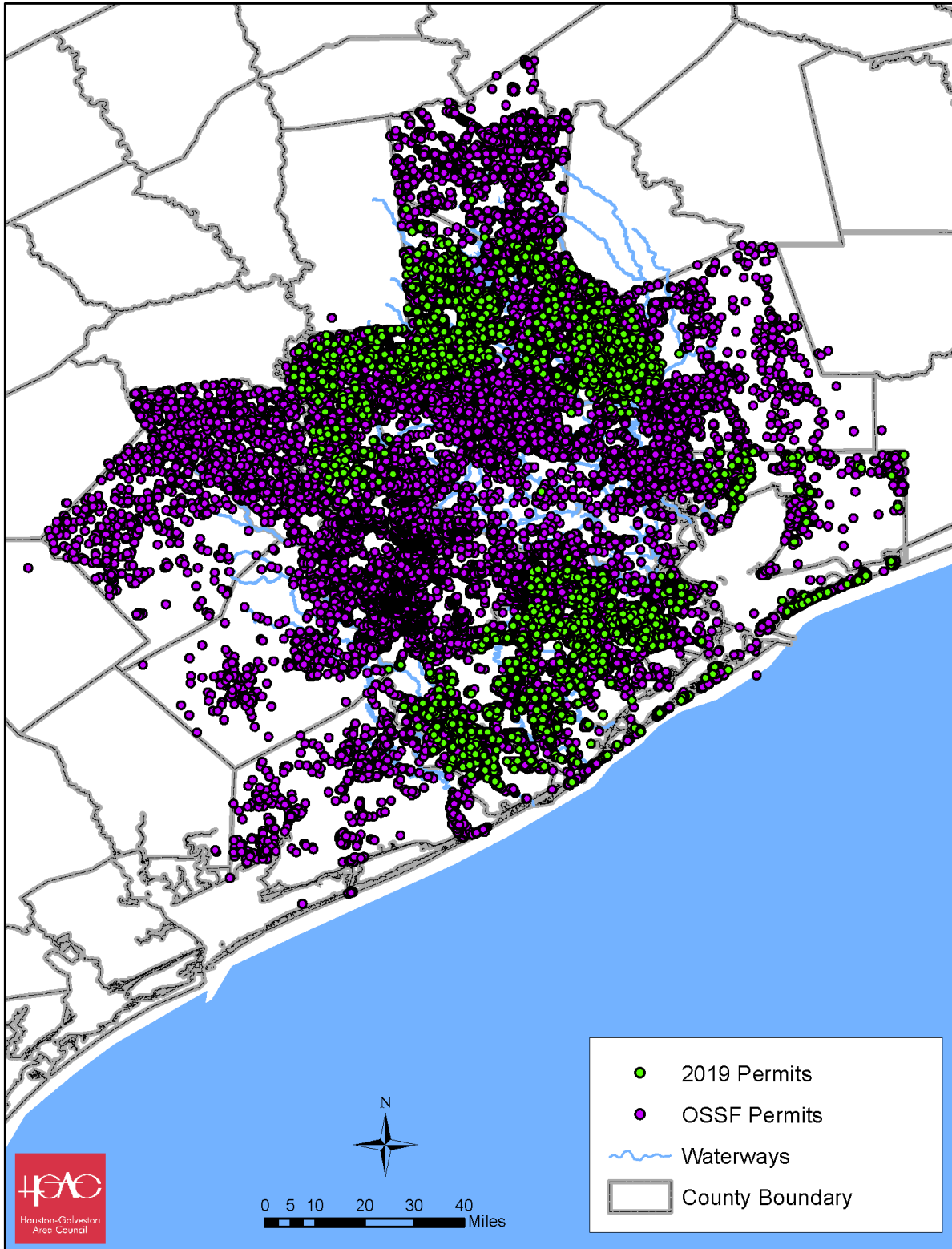


Figure 15 - Map of Permitted OSSFs, FY 2019 Update

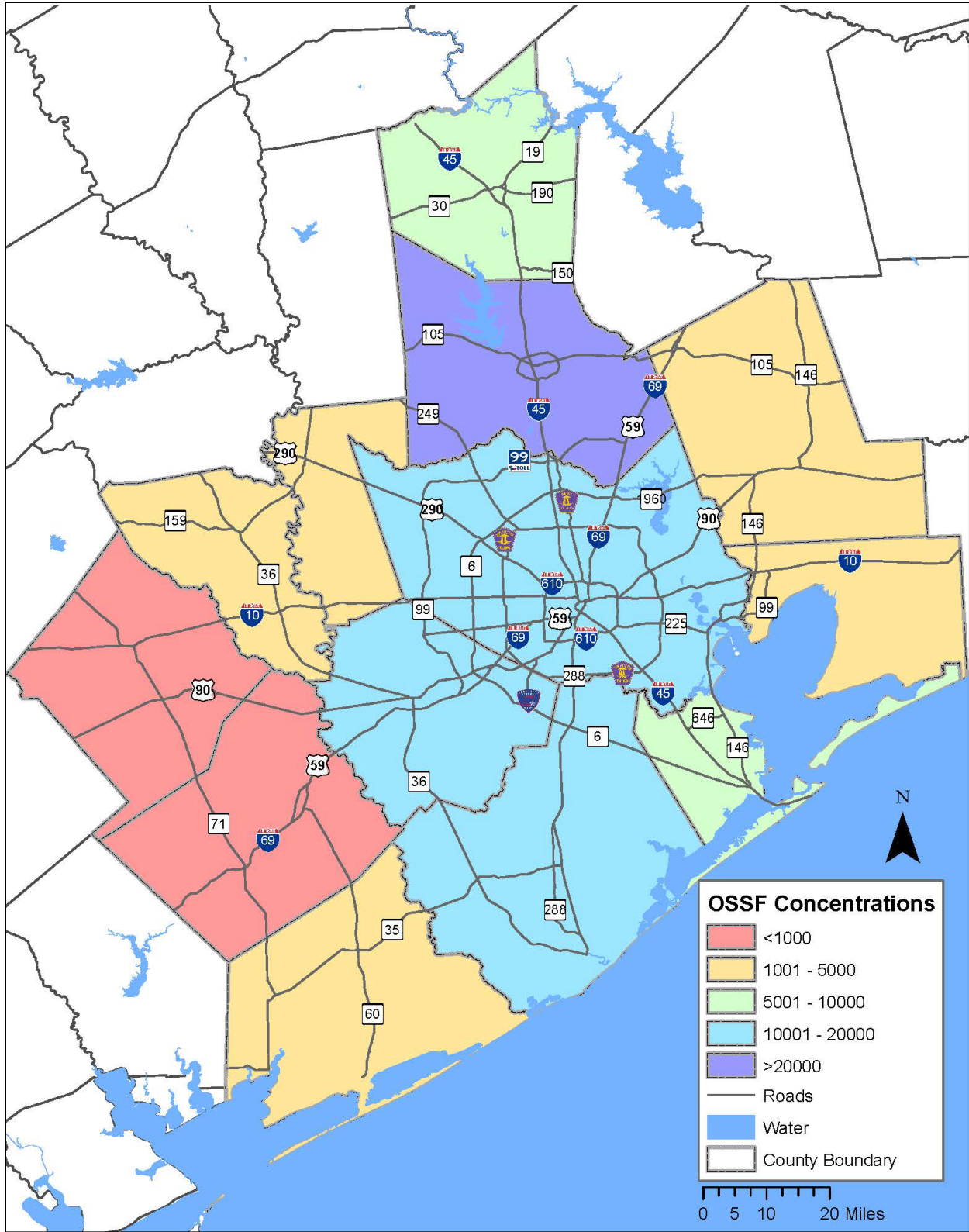


Figure 16 - OSSF Permits by County, FY 2019

Unpermitted OSSF Update

The OSSF inventory data developed by H-GAC deals specifically with permitted OSSFs. For most Authorized Agents, systems began to be permitted after 1989. OSSFs installed prior to this date were not necessarily required to have a permit (depending on county). These systems are considered to be grandfathered and, in most cases, are not actively tracked unless violation data exist for that site. While many of these systems are well-maintained, aging systems in general pose a greater threat of failure and contamination of groundwater and surface water sources. Many of these older systems may be of a type that is not most appropriately suited for the soil type. These unpermitted systems represent an appreciable portion of the systems in service, as it is estimated that there are approximately 200,000 unpermitted systems, while only slightly more than 92,000 records are in the database of permitted systems.

The OSSF data have already been used for a variety of watershed protection efforts and other local planning projects. With the projected population expansion and aging infrastructure, additional information about unpermitted system locations will be vital to utility planning. H-GAC has revised the Geospatial QAPP to allow for more accurate and detailed estimations of the numbers and location of unpermitted systems in the H-GAC region using 911 address points.

Methods

H-GAC's methods for the unpermitted analysis were the same as previous project years, in which unpermitted locations were deduced through a comparison of known parcels, known OSSFs, and known sanitary sewer systems. Parcels outside service areas, with occupied structures that did not have a permitted OSSF were assumed to have an unpermitted OSSF. The methods employed in the unpermitted OSSF analysis are described in further detail in the Geospatial QAPP.

The Unpermitted OSSF analysis was originally designed to identify the locations of unpermitted OSSFs by tax parcel polygon or census block data. H-GAC has a comprehensive parcel database for nine of the 13 counties in the H-GAC region. Tax appraisal parcels allow for numeric estimations of unpermitted OSSFs with some limitations. For example, the centroid of the parcel is usually identified as the location of the OSSF. As properties vary in size and shape, the centroid in many cases is not adjacent to the actual system. For the four counties for which H-GAC does not have digitized tax parcels available (Austin, Chambers, Matagorda, and Wharton), census blocks were used to complete the analysis. However, use of the census blocks is not ideal. Using this methodology, areas containing unpermitted OSSFs could be established, but it is difficult to ascertain a numeric estimation or the exact physical location of systems.

While parcel data have been extremely useful in identifying potential locations of unpermitted OSSFs, H-GAC will attempt to refine the process in future project years by utilizing the 911 address data set. The QAPP has been revised to allow use of the 911 address points, and H-GAC staff are currently developing the methodology to begin using these data to develop a more accurate and detailed estimation and location of unpermitted systems in future years.

Results and Observations

The estimated locations of unpermitted OSSFs are shown in Figure 17 and are included in the digital media attached to this report. The map differentiates between systems identified by parcel data and those identified by census block data.

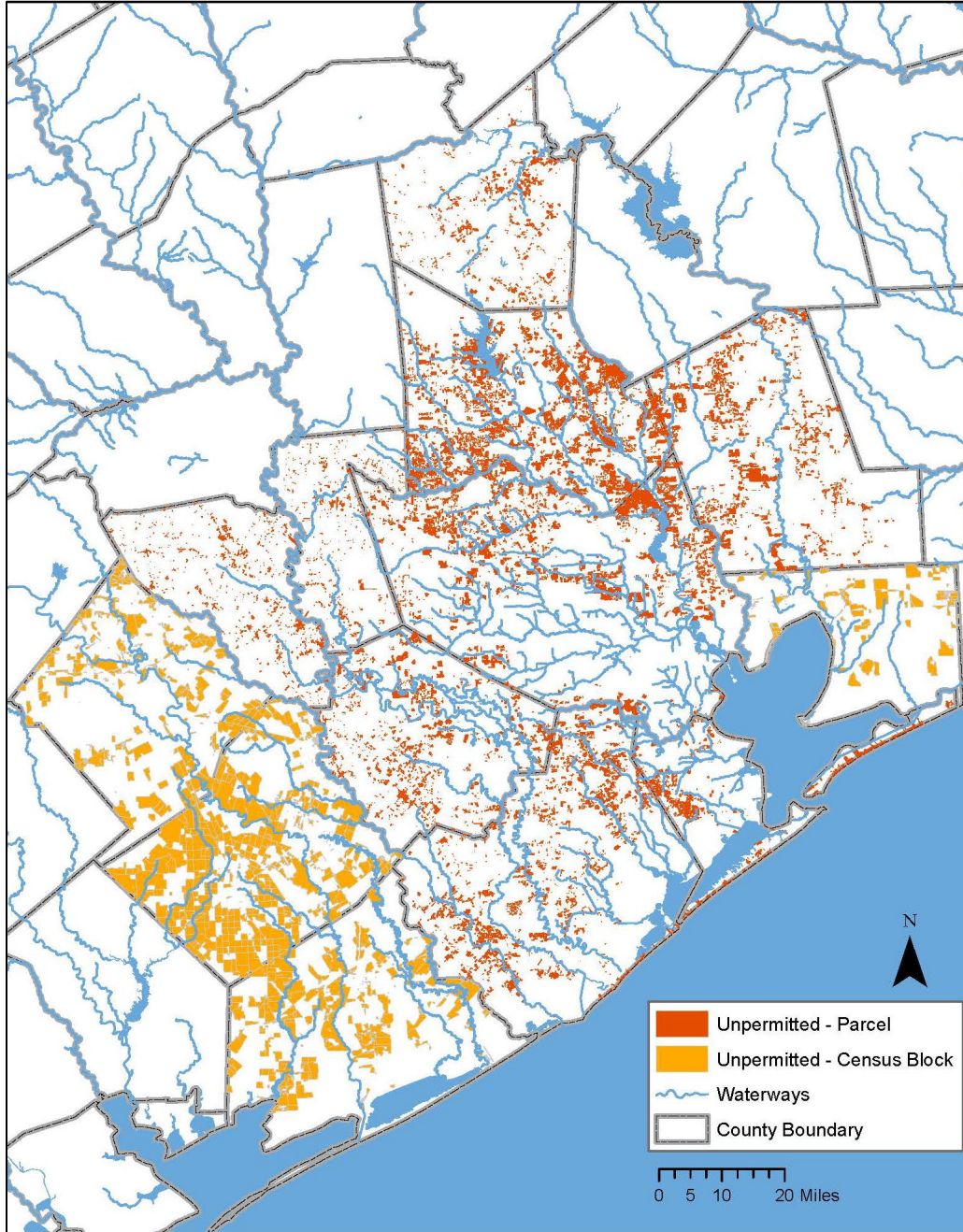


Figure 17 - Map of Unpermitted OSSFs, Estimated

Coordination with Authorized Agents

H-GAC staff works closely with local Authorized Agents to facilitate the transmission of data for inclusion into H-GAC's OSSF database. During FY 19, H-GAC staff met with the Designated Representatives from several of the Authorized Agents, including Galveston County Health District, Harris County Engineering, and Chambers County Environmental Health. The purpose of these meetings was to discuss the available OSSF permit data held by each Authorized Agent and ways to submit that data to H-GAC for inclusion in the regional OSSF database.

The Authorized Agents were a driving force in the success of H-GAC's SEP, as several of the Authorized Agents routinely referred applicants to H-GAC's program to repair and replace failing OSSFs. Many of the systems installed or repaired through the project were the direct result of those referrals.

SEP Coordination and Outreach Activities

H-GAC is the Third-Party Administrator for a SEP through the TCEQ (Agreement No. 2012-15). This project, titled "Wastewater Treatment Assistance," funds the repair or replacement of malfunctioning or failing OSSFs for low income homeowners. Funding from this project may also be used to provide extension of first-time sewer service, pump-out service, and water conservation equipment. Homeowners are not charged for any portion of the cost of the work performed. Eligible sites are limited to those where the household income qualifies as low income as defined by Tex. Gov't Code § 2306.004(15). A program flyer is presented in Figure 18.

Houston-Galveston Area Council Residential Wastewater Assistance Program



**Funding to Repair or Replace Failing
On-Site Sewage Systems**

- Applicants must own and reside in the home in any of the 13 counties in the H-GAC service area.
- Combined household income must not exceed 80% of the median household income for the county.
- There is no match component. Homeowners pay no portion of the cost to repair or replace the system.
- Vendors are paid directly. No payments are made to the homeowner.

**To find out if you qualify for the program,
contact Brian.Sims@h-gac.com or 713-993-2438.**

Customer Testimonial -
"I really appreciate your help and assistance in helping my mother out. Thank you so much! And glad to know that there are people and organizations that help their citizens and people in these situations. Just to let you know people do appreciate your consideration and help! You don't know how much.... I just want you to know you make a huge difference in people's lives."
 - System replaced in 2018

Learn more about proper care and maintenance of on-site sewage systems at
www.h-gac.com/community/water/ossf.aspx

H-GAC invites qualified installation professionals to learn more about the program.
 Contact Brian.Sims@h-gac.com or 713-993-2438.

www.H-GAC.com
CE0119

Figure 18 - H-GAC SEP Flyer

Funding for the SEP program is provided through voluntary contributions by respondents in a TCEQ enforcement action. These respondents negotiate an agreement to perform a TCEQ-approved SEP to offset a portion of the assessed administrative penalty. In addition to this funding through TCEQ, the Harris County District Attorney's Office provides funding through their enforcement actions. Homeowners under enforcement for violation of TCEQ rules set forth in 30 TAC § 285 are not eligible for assistance under the TCEQ SEP. However, the additional funding from the Harris County District Attorney's Office does not have that same requirement. Additionally, since Harris County is concerned about water quality on a regional level, their funding is not limited to Harris County and can be used to address OSSF issues throughout the region. Funding has also been supplied by DOW and Olin Corporation for projects in Brazoria County. Examples of program signage acknowledging SEP funding sources are shown in Figure 19.

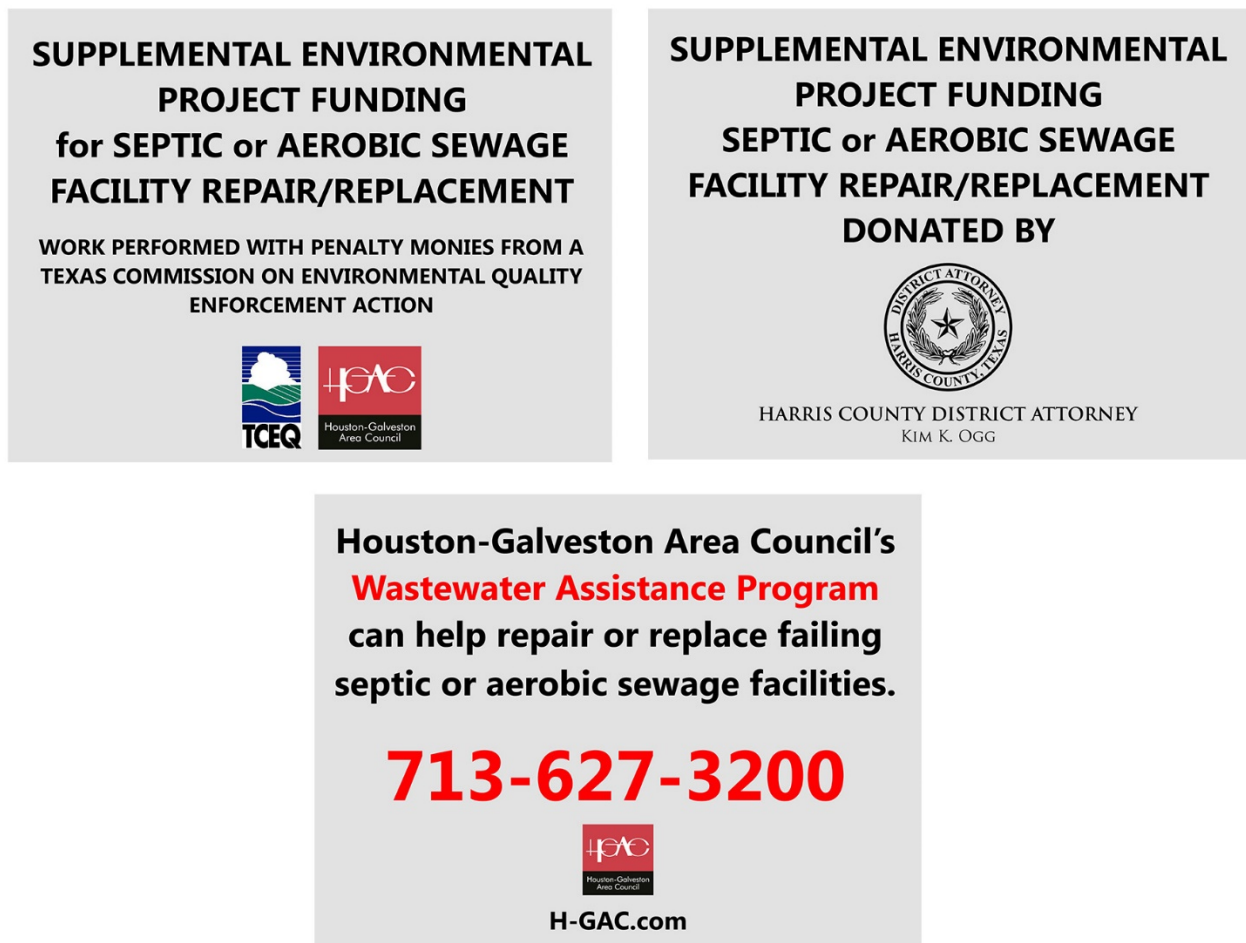


Figure 19 - SEP Program Signage

The WQMP contract does not fund any of the OSSF repair and replacement. That funding is strictly from one or more of the SEP funding sources. However, the WQMP supports the SEP program as a component of the water quality planning process, especially the outreach and

education component of the SEP. Through the SEP, H-GAC can identify failing OSSFs, either through homeowner self-disclosure or reported through referrals from Authorized Agents or OSSF professionals. This is an important planning tool used by H-GAC in addressing OSSFs as a major contributor to bacterial impairments in the region. By identifying these systems and then targeting them for repair, replacement, or decommissioning through the SEP, H-GAC can actively contribute to the remediation of these failing systems.

As of 7/15/19, the SEP program has funded the replacement of 23 failed OSSFs and the repair of 13 malfunctioning OSSFs (Table 14). Of those, 17 of the replacements and 10 of the repairs have been completed, with the remaining approved and scheduled for completion soon. In addition to those systems that have been repaired or replaced, H-GAC has over 30 homeowners on a waiting list. Through 7/15/19, H-GAC has received \$310,975.00 in contributions through the SEP program and has spent \$307,757.25 on OSSF remediation by repairing and replacing failing systems.

Table 14 - OSSF Replacement and Repairs by County

County	OSSF Replacement	OSSF Repair	Waiting List
Brazoria	3	3	8
Chambers	4	-	2
Fort Bend	-	-	1
Galveston	1	1	1
Harris	7	2	11
Liberty	-	4	1
Matagorda	2	-	4
Montgomery	2	2	1
Walker	-	1	-
Waller	4	-	-
TOTAL	23	13	29

SEP activities supported by the WQMP include coordinating with elected government officials and enforcement agencies to promote the program and presenting at numerous meetings to inform homeowners and OSSF professionals about the program and the qualifications that applicants must meet to qualify. Homeowner outreach conducted through the SEP is an important component of numerous watershed-based projects (such as WPPs and TMDLs). H-GAC uses this program as a vehicle by which homeowners can be educated about the proper operation and maintenance of their systems.

Approved applicants for the SEP are mapped as part of the WQMP process to analyze the impact that these repairs/replacements may have on a regional basis (Figure 20). In areas where there are large concentrations of system repairs/replacements, future water quality monitoring studies (through other programs or special projects) may be implemented to evaluate improvements in water quality.

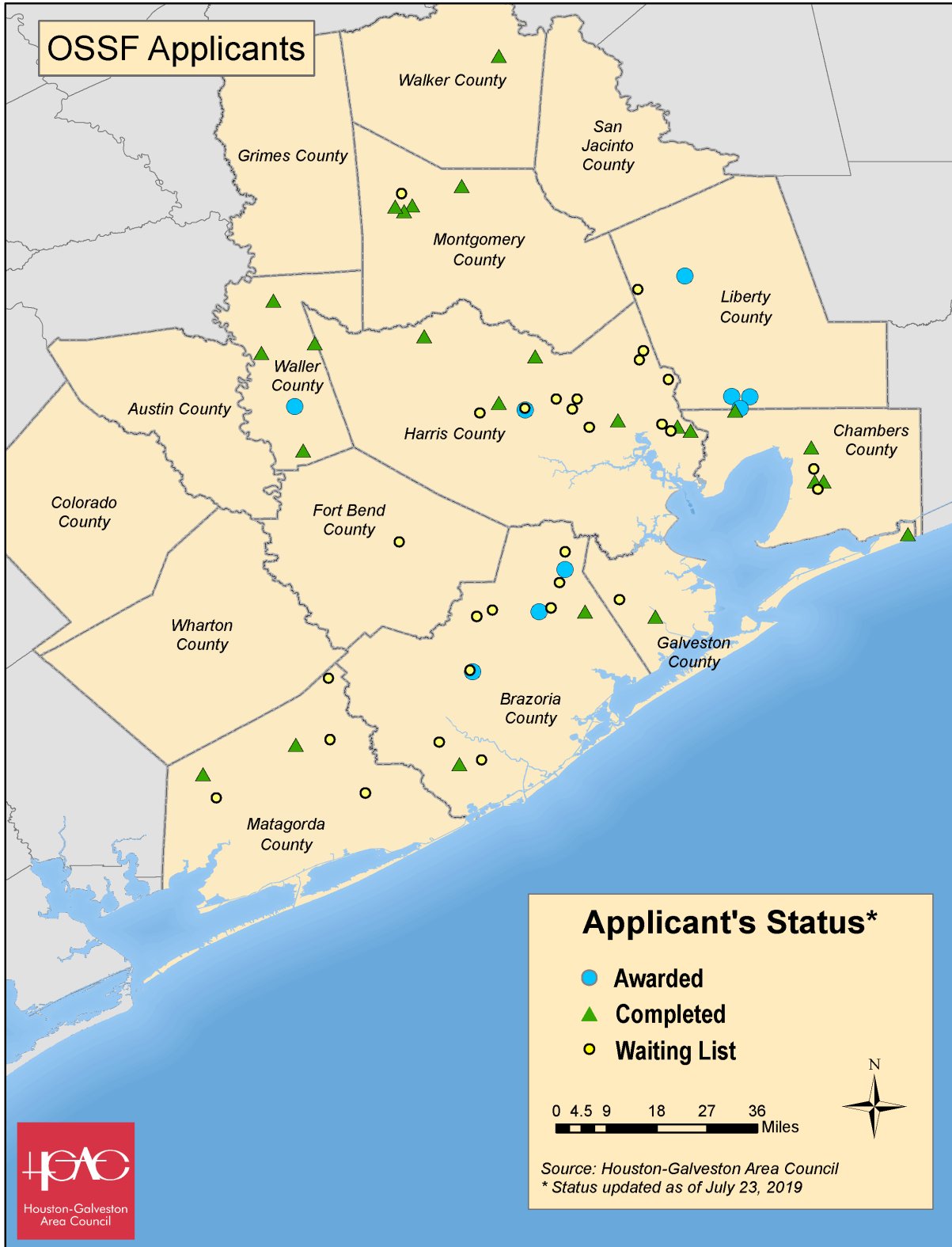


Figure 20 - OSSF SEP Applicants

Figure 21 shows several before and after photographs of OSSFs replaced through the SEP program.



Figure 21 - OSSF Replacement Photographs, Before (Left) and After (Right)

During FY 19, H-GAC presented on the SEP program at numerous meetings to diverse audiences (Table 15). These meetings have been crucial in promoting the program and making contact with new applicants and licensed OSSF professionals.

Table 15 - Presentations on the OSSF SEP Program

Date	Meeting	Location	Presentation Description
10/23/18	BIG	H-GAC	Provided an overview presentation on SEP.
11/1/18	NRAC	H-GAC	Provided an overview presentation on SEP.
12/3/18	H-GAC Community & Environmental Staff Meeting	H-GAC	Provided an overview presentation on SEP.
12/6/18	Texas AgriLife Homeowner OSSF Training Course	Palacios	Provided presentation on SEP to homeowners attending OSSF training course, including how to qualify for the program.
12/7/18	Texas AgriLife Homeowner OSSF Training Course	Bay City	Provided presentation on SEP to homeowners attending OSSF training course, including how to qualify for the program.
1/24/19	Texas Environmental Health Association Meeting	Rosenberg	Presented on water quality, watershed protection plans, and TMDL program, and provided an overview of the SEP.
1/28/19	Galveston County Health District	Texas City	H-GAC staff met with Galveston County Health District to discuss data submission for the OSSF Database, sharing of data with Texas A&M for their Coastal Zone OSSF database, and the SEP.
2/26/19	Clean Waters Initiative	H-GAC	H-GAC's SEP was discussed under the topic of "Funding Sources for Water and Wastewater-related Infrastructure."
3/6/19	Harris County District Attorney's Office	Houston	Provided Harris County District Attorney's Office with an update of SEP activity.
4/12/19	Brazosport College	Lake Jackson	Meeting with Brazosport College staff to discuss H-GAC teaching Homeowner OSSF Education classes at the college.
4/30/19	Harris County Engineering Department	Houston	Meeting with Designated Representatives to discuss the SEP, availability of data, data formats, and data sharing for inclusion of Harris County data in the H-GAC OSSF Database.
4/30/19	Harris County Commissioners' Court	Houston	Spoke about the SEP in support of the Harris County District Attorney's Office efforts to hire additional investigators.
5/2/19	NRAC	H-GAC	Provided an update to NRAC on SEP status.
5/6/19	Bacteria Implementation Group OSSF Meeting	H-GAC	Provided an update to the BIG on SEP status.
5/6/19	Chambers County Environmental Health and Permitting	H-GAC	Met with Chambers County to discuss the SEP, OSSF permit data formats and sharing for inclusion in the H-GAC OSSF Database.
5/21/19	9 th Annual Harris County Onsite Wastewater Seminar	Houston	Provided an update on the status of the SEP to OSSF professionals and regulatory agencies.
5/22/19	Clean Waters Initiative	H-GAC	Numerous presentations on OSSF remediation projects, including the SEP, were provided by speakers from Texas A&M AgriLife Extension, H-GAC, and Halls Hill and Associates, LLP.
5/22/19	CRP Steering Committee	H-GAC	Provided an update on the status of the SEP, and its role in identifying and addressing water quality issues.
6/6/19	Montgomery County Environmental Health Services OSSF Conference	SJRA Conroe	Presented on OSSFs and water quality, H-GAC's OSSF mapping capabilities and online programs, and an update on the SEP. The audience was OSSF professionals and regulatory agencies.


OSSF Outreach and Education


H-GAC provides homeowner maintenance training courses throughout the year as part of various watershed-based projects within the Region, such as WPP and TMDL projects. Although these courses do not allow or authorize the homeowner to inspect and maintain their own system in lieu of a maintenance contract with a licensed provider, the courses provide homeowners with valuable information on the proper operation and on-going maintenance of OSSFs. These homeowner courses provide details on available resources to maintain, repair, or replace aging systems. The goal of this two-hour course is to improve the overall water quality in the region's rivers, lakes, bays, and bayous by reducing the number of malfunctioning or failing systems and eliminating sources of bacterial contamination. H-GAC recently partnered with Brazosport College in Lake Jackson to offer two OSSF Homeowner Education courses in the Fall of 2019 as part of their Community Education program (Figure 22).

On-site Sewage System Homeowner Education


Thursday, Sept. 26 6 to 8 pm
Saturday, Oct. 12 9 to 11 am

Participants will receive an overview of the two types of systems, information on system maintenance and inspection, and details on available resources to maintain, repair and replace aging systems. This course is designed to instruct and educate homeowners on the basics of septic system and onsite sewage facility (OSSF) maintenance and visual inspection. It does not provide for or allow homeowners to inspect their own aerobic system in place of a maintenance contract.



 **Brazosport College**
The College of Choice®

Get more information or enroll:
Brazosport.edu/programs/community-education/
H-GAC.com



H-GAC
Houston-Galveston
Area Council

Figure 22 - Brazosport College Community Education OSSF Homeowner Education Course Flyer

In addition to the homeowner education course, H-GAC has developed a course for Texas real estate inspectors (Figure 23) to inform and instruct on how to properly inspect an OSSF as part of a real estate transaction in accordance with guidelines set forth in the rules of the Texas Real Estate Commission (TREC). This six-hour course is designed to educate inspectors on the components, functions, and general maintenance of OSSFs, so inspectors can identify malfunctioning or failed OSSFs and inform and educate home buyers and sellers of potential

OSSF issues. H-GAC has been designated as a TREC-Approved Continuing Education Provider (License #10353), allowing staff to provide Continuing Education Units for course attendance.



Figure 23 - H-GAC's Real Estate Home Inspector Course

Discussion

Through the *WQMP Update Project*, H-GAC continues to maintain and update its current database of OSSF locations and related data. The intent of the existing OSSF database is to provide a comprehensive, spatially explicit inventory for all permitted OSSF locations throughout the Region. H-GAC's database of permitted OSSFs is a valuable resource that provides useful data to numerous watershed-based projects.

For the *FY 19 WQMP Update*, H-GAC added 2,930 new records to the OSSF Permits database. This update, which incorporated available data through June 2019, brings the total of permitted OSSFs in the database to 92,617.

Under this task, H-GAC works to estimate the number and location of unpermitted OSSFs within the region. The H-GAC Regional Geospatial Data QAPP has been revised to allow the incorporation of the 911 address points into the analysis. This process has been initiated, but additional work is necessary to complete the analysis. The use of 911 data will provide for a more accurate and detailed numeric estimation and location of the unpermitted systems. A more accurate model will assist H-GAC with identifying unpermitted OSSFs, especially systems

in proximity to local waterways. The data will be very useful in the development of WPPs and TMDLs to address bacteria impairments within the region.

H-GAC actively works with several of the Authorized Agents to acquire OSSF permit data to update H-GAC's OSSF spatial database. H-GAC is updating the list of Designated Representatives to reestablish some relationships, as staff changes have occurred at both H-GAC and some of Authorized Agents. These relationships are important not only for the sharing of OSSF permit data and the update of the OSSF geospatial database, but also because the Authorized Agents have been the leading source of referrals of homeowners to H-GAC's SEP.

Through the Homeowner Wastewater Assistance SEP, H-GAC funded the replacement of 23 failed OSSFs and the repair of 13 malfunctioning OSSFs, with work being conducted in multiple counties within the region. As of 7/15/19, the SEP has spent a total of \$307,757.25 for OSSF remediation activities for low income homeowners. A need has been demonstrated by this program, as there are numerous applicants on a waiting list until additional funding is available.

Outreach and Education is an important component of H-GAC's OSSF program. H-GAC staff regularly present on OSSFs and the SEP program at various public meetings, workshops, and seminars. Recently, H-GAC received approval to begin offering a Real Estate Inspectors OSSF training course to train inspectors on how to properly inspect and evaluate OSSFs as part of a real estate transaction. Historically, H-GAC has offered homeowner OSSF training courses through various watershed-based projects. These offerings will be expanding, including being offered through Brazosport College's Community Education program. The primary goal of these programs is to educate homeowners on the proper operation and maintenance of their OSSFs to reduce failure rates and improve water quality.

H-GAC's OSSF program activities remain an important part of the WQMP Update. Not only does the data generated through this program inform planning and decision-making for watershed-based plans such as WPPs and TMDLs, but through the SEP, H-GAC can directly address sources of bacteria and positively affect water quality through the repair and replacement of failing OSSFs.

Task 6: Water Quality Management Plan Update / Final Report

Task Description

The goal of this task is to provide the Texas Commission on Environmental Quality (TCEQ) with a comprehensive report on the water quality management planning activities conducted under this contract and to provide documentation that the Houston-Galveston Area Council's Board of Directors has accepted the completed *FY 19 Water Quality Management Plan (WQMP) Update*.

Scope of Work

The following Subtasks are included in the Scope of Work under this project task:

- Draft WQMP Update
- Final WQMP Update

Project Objectives

Draft WQMP Update

For the Draft WQMP Update, H-GAC summarizes all contract activities and findings relevant to the water quality goals of the region. Additionally, H-GAC will provide a public notice of participation to review the *Draft WQMP Update* in accordance with Texas Water Code (TWC) Section 26.037. Submittal of the *Draft WQMP Update* to the Natural Resources Advisory Committee (NRAC) begins the public comment period. The report will also be posted on H-GAC's website² to allow other interested parties the opportunity to comment and provide input into the *WQMP Update*.

In previous project years, the Contract Scope of Work specified the individual sections to be included in the *WQMP Update Report*, and the order in which those sections should appear. This resulted in a somewhat disjointed report that made it hard to follow any specific project task from start to finish. Based on a recommendation from the NRAC last year, the report format has been restructured. Following discussions with the TCEQ Project Manager, language was included in the FY 19 Contract Scope of Work that allows for greater flexibility in report design. H-GAC staff reorganized the content into a series of individual task reports. This new report structure not only reduces duplication of information but also allows for any specific project task to be self-contained in a single section. Additionally, the *WQMP Update Report*

² <http://www.h-gac.com/community/water/quality/default.aspx>

format was updated to include specific contract language to remove some ambiguity related to content that is to be included in the report.

The *WQMP Update Report* is designed for accessibility based on recommendations on the Texas Governor’s Committee on People with Disabilities website³.

Based upon the Scope of Work, the contents of the report should include the information shown in Table 16. References to the location of the information in the report are included.

Table 16 - WQMP Update Report Required Content and Location

Required Content	Content Location
Title	Title Page
Table of Contents	Table of Contents List of Tables List of Figures
Contract Background	Introduction Project Background and Significance
Study Area	Project Background and Significance
Summary of all Task Reports	Individual project task sections Summary
Amount of funding and amount spent	Project Administration task section
Discussion, including deliverables not completed, lessons learned, and recommendations	Individual project task sections Summary
Water Quality results achieved	Project Background and Significance Wastewater Data Update and Coordination task section Summary
Appendices (if necessary)	Appendices A, B, and C

Final WQMP Update

After comments on the *Draft WQMP Update* are received from NRAC and other interested parties, H-GAC will incorporate the comments received to prepare a *Final WQMP Update*. Comments received will be addressed and incorporated into the document as appropriate. The table of comments received and H-GAC’s written response to those comments, will be incorporated into the *Final WQMP* as an Appendix. The *Final WQMP Update* will be submitted to H-GAC’s Board of Directors for acceptance. Once accepted by the Board, the Update will be certified by TCEQ for inclusion in the State’s Water Quality Management Plan.

³ <https://gov.texas.gov/organization/disabilities/accessibledocs>

The timeframe presented in Table 17 was established to meet the requirements of TWC Section 26.037 related to the public comment period for the report.

Table 17 - WQMP Update Report Review, Acceptance, and Submittal Timeframe

Task	Due Date
Public Comment Period Opens	7/25/19
Send Draft WQMP Update Report electronically to NRAC members for review	7/25/19
Upload Draft WQMP Update Report to H-GAC's website	7/25/19
NRAC Meeting (to include presentation of the Draft WQMP Update Report)	8/1/19
Submit Agenda Item related to WQMP Update for H-GAC Board of Directors	8/22/19
Public Comment Period closes	8/23/19
Revise Draft WQMP Update Report to address public comments	8/1/19 – 8/23/19
Management Review (if needed/requested)	8/26/19 – 9/5/19
Final edits completed	9/9/19
Submit Final WQMP Update Report for inclusion in H-GAC Board packet	9/9/19
Upload Final WQMP Report to H-GAC's website	9/9/19
H-GAC Board of Directors Meeting	9/17/19
Submit Final WQMP Update Report and documentation of public comment period to TCEQ	9/17/19

Summary

The *Fiscal Year 2019 Water Quality Management Plan (WQMP) Update Report* summarizes the activities conducted under Contract 582-19-90146.

This year's project was successful in acquiring and analyzing the wastewater treatment facility infrastructure data for the region. Several additional service area boundaries were added to the geospatial data set through the analysis conducted under Task 3 of this project. This work expands the data repository that the Houston-Galveston Area Council (H-GAC) maintains and provides a starting point for next year's project by continuing to identify, delineate, and refine the service area boundaries for those systems that typically have not been included due to a lack of data, such as the small, privately-owned wastewater systems.

A primary component of the WQMP Update involves the acquisition and analysis of self-reported Discharge Monitoring Report (DMR) data. These data are important for evaluating potential sources of bacteria in area waterways. Analysis of self-reported wastewater treatment facilities (WWTF) data provides a means by which decision makers and water resource managers can evaluate the role wastewater infrastructure plays in regional water quality issues. The analysis provided in this report shows wastewater treatment facilities are typically operating within compliance of their effluent discharge permit limits for bacteria. However, considering the volume of discharge and the potential for high bacteria loading in the case of a system malfunction, it is prudent to continue to monitor the DMR data closely. The data acquired through this project are important for other watershed-based projects within the H-GAC Region (Region), most notably the Bacteria Implementation Group (BIG). Through addressing issues such as wastewater treatment facility discharge permit limits, the BIG has been very successful in reducing bacteria loading in the region's water bodies.

The analysis of Sanitary Sewer Overflow (SSO) data was intended to occur as part of the *FY 19 WQMP Update*. SSO data are of great interest due to the potential for acute loading of extremely elevated levels of fecal bacteria. Unfortunately, H-GAC was not able to receive a complete data set for these records. Therefore, the SSO analysis is not included in this year's update. If this data becomes available, an Addendum to this report may be issued. Alternatively, the data will be examined for the *FY 20 WQMP Update*, assuming the data are available.

H-GAC continues to develop and foster relationships with interested parties in the Region's watersheds and coordinate regional water quality activities. H-GAC has been a leader in previous total maximum daily load (TMDL) and watershed protection plan (WPP) efforts, and the coordination activities of the *WQMP Update Project* mesh well with the overall approach of outreach, targeted studies, and implementation activities. By having multiple water quality projects concurrently within the same organization, H-GAC is able to achieve vertical integration between base data sources, internal analysis, planning efforts (WPPs, TMDLs, etc.), and external coordination.

The On-Site Sewage Facility (OSSF) Database development continued during this project year and will be an ongoing effort that will be continuously updated. This project deliverable remains useful in H-GAC's various watershed planning efforts. Additional work needs to be performed to update the analysis of unpermitted OSSFs within the region. Historically, this data has been analyzed using parcel and census block data. While this can provide a reasonable estimate of the number of systems, an analysis of the systems using 911 address point data would provide for a more precise estimation of location. This could prove useful in targeting certain areas for additional monitoring, OSSF homeowner education and outreach, or OSSF repair and replacement. Data from this project is also shared for use with the coastal management database being developed by Texas A&M.

H-GAC is the Third Party Administrator for a Supplemental Environmental Project (SEP) to repair or replace malfunctioning or failed OSSFs for low income homeowners within the region. Through this SEP, H-GAC addressed numerous failing systems, having funded the replacement of 23 OSSFs and the repair of 13 OSSFs, with numerous candidates on a waiting list until more funding is made available. Although the WQMP Contract does not fund any OSSF repair or replacement, many of the coordination, outreach, and education activities fall under the WQMP. This program has allowed H-GAC to expand its reach within the Region and bring water quality messages and educational opportunities to new audiences.

This report, the accumulated data sets, the Geographic Information Systems (GIS) analyses, and other deliverables of this Project (see Appendices) are attached in electronic format on accompanying media. Where allowable and appropriate, data from this Project will be used to support other related efforts.

This report, once accepted by the H-GAC Board of Directors and certified by Texas Commission on Environmental Quality (TCEQ), will be incorporated into the State's Water Quality Management Plan.

Additional Resources

The following resources are provided for additional information on topics discussed in this report.

H-GAC

Water Quality Management Planning

<http://www.h-gac.com/community/water/quality/default.aspx>

On-Site Sewage Facilities (OSSF)

<http://www.h-gac.com/community/water/ossf.aspx>

OSSF Information System

<https://datalab.h-gac.com/OSSF/>

Clean Rivers Program

<http://www.h-gac.com/community/water/rivers/default.aspx>

Clean Rivers Program 2019 Basin Highlights Report

<https://datalab.h-gac.com/BHR2019/index.html>

Water Resources Information Map (WRIM)

<http://h-gac.com/go/wrim>

Natural Resources Advisory Committee (NRAC)

<http://www.h-gac.com/board-of-directors/advisory-committees/natural-resources-advisory-committee/default.aspx>

Clean Waters Initiative Workshops

<http://www.h-gac.com/community/water/cwi/default.aspx>

Bacteria Implementation Group (BIG)

<http://www.h-gac.com/community/water/tmdl/big/default.aspx>

BIG Reports

<http://www.h-gac.com/community/water/tmdl/BIG/reports.aspx>

Watershed Protection Plans

http://www.h-gac.com/community/water/watershed_protection/default.aspx

Total Maximum Daily Loads (TMDL) and Implementation Plans

<http://www.h-gac.com/community/water/tmdl/default.aspx>

Coastal Communities

<http://www.coastalcommunitiestx.com/>

TCEQ

Texas Surface Water Quality Standards

<https://www.tceq.texas.gov/waterquality/standards>

Texas Integrated Report of Surface Water Quality

<https://www.tceq.texas.gov/waterquality/assessment>

Texas Clean Rivers Program

<https://www.tceq.texas.gov/waterquality/clean-rivers/index.html>

Surface Water Quality Segments Viewer

<https://www.tceq.texas.gov/gis/segments-viewer>

Surface Water Quality Web Reporting Tool

<https://www80.tceq.texas.gov/SwqmisPublic/index.htm>

State Water Quality Management Plan

<https://www.tceq.texas.gov/permitting/wqmp>

Total Maximum Daily Load Program

<https://www.tceq.texas.gov/waterquality/tmdl/index.html>

Nonpoint Source Program

<https://www.tceq.texas.gov/waterquality/nonpoint-source/index>

Wastewater and Stormwater Permitting

<https://www.tceq.texas.gov/permitting/wastewater>

TCEQ GIS Data

<https://www.tceq.texas.gov/gis/download-tceq-gis-data>

Supplemental Environmental Projects

<https://www.tceq.texas.gov/compliance/enforcement/sep>

On-Site Sewage Facilities Rules and Regulations

<https://www.tceq.texas.gov/permitting/ossf/ossfregulators.html>

Galveston Bay Estuary Program

<https://gbep.texas.gov/>

TWDB

Clean Water State Revolving Fund (CWSRF) Loan Program

<http://www.twdb.texas.gov/financial/programs/CWSRF/index.asp>

Appendices

List of Appendices

Appendix A – Task 3 Wastewater Data Update and Coordination

Appendix B – Task 5 OSSF Database Update

Appendix C – Task 6 WQMP Update / Final Report Documentation and Comments

Appendix A – Task 3 Wastewater Data Update and Coordination

The following materials are included on the media submitted with this report:

- 2019 Map of Wastewater Outfalls
- 2019 Map of Service Area Boundaries
- 2019 R12 DMR Analysis

Appendix B – Task 5 OSSF Database Update

The following materials are included on the electronic media submitted with this report:

- 2019 Permitted OSSF Database
- 2019 H-GAC OSSF Permits Update Map
- 2019 H-GAC OSSF Unpermitted Analysis Map

Appendix C – Task 6 WQMP Update / Final Report Documentation and Updates

The following materials are included with this report:

- Documentation of Public Participation in WQMP Update
- Comments Received on Draft 2019 Water Quality Management Plan Update Report
- Response to Comments Received on Draft 2019 Water Quality Management Plan Update Report

Documentation on Public Participation in WQMP Update

- To ensure the public has an opportunity to participate in the WQMP Update and provide comments on the report, a 30-day public comment period was available. This comment period opened on 7/25/19. On that date the Draft WQMP Update Report was sent electronically to members of the Natural Resources Advisory Committee (NRAC) for review and comment. The document was also posted on H-GAC's website for public review and comment.
- The Draft WQMP Update Report was presented to the NRAC on 8/1/19 as part of a public meeting. Committee members and the general public were presented with an opportunity to provide comments at the meeting, either verbally or in writing.
- On 8/22/19, an agenda item was submitted for inclusion of the WQMP Update Report on an upcoming H-GAC Board of Directors meeting.
- The public comment period closed on 8/23/19.
- The Draft WQMP Update Report was revised to address comments received. A listing of comments received, as well as staff response to comments, are included in this appendix.
- The Final WQMP Update Report was submitted for inclusion in the H-GAC Board Packet on 9/9/19.
- The Final WQMP Update Report was presented to the H-GAC Board of Directors for acceptance on 9/17/19.

Public Comments on WQMP Update

Please note that references to specific page numbers below refer to the page number of the Draft report. Due to edits made to the text, some of these page numbers may have changed slightly in the Final Report.

From	Page	Comment	Response
Andrea Tantillo Senior Communication Coordinator H-GAC	Various	While it's ok to re-introduce the acronyms in each section, that needs to be done consistently across all acronyms. I tried to fix that, but it might be worth another pass.	Document reviewed to reintroduce acronyms in each section. This reintroduction was done so that each section could be a standalone document if necessary.
	Various	I wasn't sure what the name of this document/project is. There were several names of documents throughout this document that seemed like they may be the name of this one. If they are differed documents, don't worry about it, but if we are referring to the same document in multiple different ways, we'll want to clean that up. They are: <ul style="list-style-type: none"> • Project • Contract • FY 19 WQMP Update Project • FY 19 WQMP Update • FY 19 Contract Period • Draft WQMP Update Report • WQMP Update Project • WQMP Update Report • Final WQMP Update • FY 19 WQMP Update Report 	Different language was used because sometimes the name is referring to the project as a whole and sometimes just the end product (the Update Report). Other times, a specific document, such as the contract, is being referred to. Some references in the Final report were changed to provide for more consistency.
	Various	Document reviewed and edited for consistency and readability, compliance with H-GAC Communication Department guidance, and compliance with accessibility recommendations.	Edits accepted
	Various	Update H-GAC logo to reflect new logo provided by Communications department.	Logo updated

From	Page	Comment	Response
Kathy Jahnsen Principal Program Coordinator H-GAC	Cover	EPA logo on cover is pixelated	Updated image file.
	Various	Consider adding Task numbers to section headers	Task numbers added to section headers
	Various	Some section headers do not have correct font color	Font color corrected
	Various	Some maps and images appear pixelated in printed version of document	Maps and images updated. This may be due to the capabilities of the printer instead of the resolution of the images.

From	Page	Comment	Response
Bill Hoffman Data Manager H-GAC	28	The criteria for enterococci are listed incorrectly. The criterion for the geometric mean is shown as 33 MPN/100mL, and the criterion for single grab is shown as 78 MPN/100mL.	The limits of 33/78 are for high saline inland waters with PCR1. The correct limits for saltwater with PCR1 are 35/89. A sentence was also added to state that TCEQ no longer uses the single sample criterion for assessment.

From	Page	Comment	Response
Tom Douglas Natural Resources Advisory Committee (NRAC)	7	Define the acronym "MPN" as "Most Probable Number".	Corrected typographical error
	7	Add CRP to the list of acronyms. (It is used without definition on pages 36 and 63.)	Added CRP to list of acronyms
	7	Add SJRA to the list of acronyms. (It is used without definition on page 63.)	Added SJRA to list of acronyms
	7, 23	The definition of the acronym "OLD" includes the word "Location" on page 7, but "Locations" on page 23. For clarity, use the same definition in both places.	Correction made
	11	If the intent is to list counties in alphabetical order, then Walker should come before Waller.	Correction made

	13	In Figure 3, there are two discontinuities in the West Fork of the San Jacinto River: one between its confluence with Spring Creek and Lake Houston, and the other between its confluence with Robinson Creek and the north end of Lake Conroe. There is also a discontinuity in Luce Bayou just east of Lake Houston.	This data is provided by TCEQ. We are not able to edit this data.
	16	In paragraph 5, substitute “WPPs” for “WWPs”.	Corrected typographical error
	18	In the key to Figure 6, consider changing the first two items to “BIG Project Area Before I-Plan Approved” and “BIG Project Area After I-Plan Approved.” Besides helping the reader at this point, it will also be of benefit when a reader refers back to this figure from reading page 36.	Added this information to the Figure title instead of the legend to keep the graph from being cluttered.
	18	It would be helpful to show a map to indicate the geographical extent of the TCEQ Region 12, so that the reader could readily see how it compares with the area covered by the BIG Project.	TCEQ Region 12 covers the same 13-County region shown in Figure 1. This area is shown in the inset on the map in Figure 5.
	26, 27	In Figure 7 and Figure 8, there is a discontinuity in Luce Bayou just east of Lake Houston.	This data is provided by TCEQ. We are not able to edit this data.
	26, 27	In Figure 7, the Service Area Boundaries do not extend all of the way to the west side of Lake Houston, but in Figure 8, they do.	SABs will be reviewed and the data set updated as appropriate.
	32	For all WWTFs that are in the category of <0.1 MGD or larger, the Single Grab Sample Exceedance Rate (Table 8) is higher than the Geometric Mean Exceedance Rate (Table 7). But, for 5 of the 7 years, this is not the case for WWTFs in the “Variable/Intermittent Discharge” category. Is there an explanation for this pattern?	BH: Almost all of the plants in that category (<0.1 MGD permitted flow) sample, and report, once per quarter. In such a case, the sample result = the monthly geometric mean = the highest “grab” result of the day, as there is only one result for the period; the daily grab result will never exceed the monthly

			geometric mean. Because the permit limit for the monthly geomean is considerably lower than the permit limit for the grab sample result, any result between, e.g., 63 and 194 will exceed the monthly geomean, but not the daily grab.
33	On line 4 of paragraph 2, the word “value” is duplicated.		Corrected typographical error.
34	State the units (MPN/100 mL) for the numbers presented in Table 9.		Added units to title
34, 35	Is there a reason that estimated <i>E. coli</i> loads for “Variable/Intermittent Discharge” WWTFs are not shown in Table 10 and in Figures 9 and 10?		BH: Figures 9 and 10 include data from domestic WWTF only; there are no “variable/intermittent” flow limits in that category Clarifying language added to report.
35	Is there a known reason why the estimated <i>E. coli</i> load, particularly for WWTFs in the <0.1 MGD and 1-5 MGD categories, decreased by such a large amount following 2012?		BH: None Known by Me
35	Indicate that the Y-axis in Figure 10 is a logarithmic scale. This could avoid confusion, because Figure 10 appears directly below Figure 9, in which the Y-axis is linear.		BH: Done This figure has been updated in the report.
35	In Figure 10, the regression line for WWTFs in the <0.1 MGD category does not appear to fit the individual data points very well, especially for the years 2012 through 2014.		BH: it is not a conventional regression line; it is a LOESS plot (locally weighted least squares, and will not “fit” all points – it fits subsets of points. Given the small number of data points it could probably work with a

			traditional regression line, though...the fact that it is a log scale will distort the trends a bit (particularly for < 0.1).
35	The legend for Figure 10 would be easier to read if the <0.1 MGD category were listed first (before the 0.1-0.5 MGD category rather than between the categories for 5-10 MGD and >10 MGD).		The legend for this graph has been changed, and the image updated in the report.
36	Clarify that the statement in the last sentence of paragraph 1 is meant to apply to the year 2018. (Specifically, it isn't true for 2012.) "Even though they represented the single largest category of plants by number in 2018 , WWTFs in the <0.1 MGD size category contributed the least amount of bacteria loading, most likely due to their relatively low flows. The qualifying phrase "most likely" can be deleted, based on a calculation using available data. <u>*See the separate note, which includes a sample calculation using data from Table 3 and Table 9.</u>		This language has been changed in the report.
37	In the Legend to Figure 11, consider using " DMR Exceedances " instead of "DMR Occurrences". Use of the word "Occurrences" sounds more like it would represent the number of reports submitted rather than the number of reports that showed exceedances of the permit.		Agreed. This is addressed in the caption for the figure, as I do not have access to the source file to make the edit to the map.
40	For consistency with usage elsewhere in the document, consider replacing "wastewater treatment plant (WWTP)" with 'wastewater treatment facility (WWTF) ' in the bottom row of Table 11. In the sentence that follows, replace WWTP with WWTF .		This change has been made.

41	In the first paragraph, replace “privately-owner” with “privately-owned”.	Typographical error corrected.
48	Under the fifth bulleted point, “Trees” instead of “Tress.”	Typographical error corrected.
51	For consistency, use “OSSFs” rather than “OSSF” at the end of paragraph one.	Corrected.
52	The statement that “The methods employed in the update of the OSSF database are described in further detail in the Geospatial QAPP” could be read to imply that this is a reference to material to be found elsewhere in this document. Save the reader a search by clarifying that the Geospatial QAPP is a separate document, not included herein.	Added clarifying language to denote that the QAPP is a separate document.
56	In line 9 of paragraph 4, “is not ideal” rather than “are not ideal”.	Correction made.
60	In Table 14, if the intent is to list counties in alphabetical order, then Walker should come before Waller.	Table has been corrected.
60	The first sentence in paragraph 4 is puzzling. Perhaps the word “were” was left out, between “area” and “also”?	This sentence was rewritten to improve clarity.
68	In paragraph 2, “References.....are also included”.	Corrected.
70	In paragraph 3, use the term “wastewater treatment facility” to match usage elsewhere in the document.	This change was made for consistency with language in the rest of the document.
71	It appears that two words have been deleted from the last sentence in paragraph 2. Is the intended wording “...to expand our reach within the region...”?	Sentence has been rewritten.