

Water Quality Planning for the Houston-Galveston Region



Final Report, FY 2012

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Acronyms

ARRA	American Reinvestment and Recovery Act
BMP	Best Management Practice
CWQMN	Continuous Water Quality Monitoring Network
CWSRF	Clean Water State Revolving Fund
DMR	Discharge Monitoring Report
EPA	United States Environmental Protection Agency
FOG	Fats, Oils, and Grease
GIS	Geographic Information System(s)
H-GAC	Houston-Galveston Area Council
HHW	Household Hazardous Waste
MS4	Municipal Separate Storm Sewer System
MUD	Municipal Utility District
NPS	Nonpoint Source
OLD	Outfall Location Dataset
OSSF	On-Site Sewage Facility
PID	Permit Information Database
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
SABD	Service Area Boundary Dataset
SAS	Statistical Analysis Software
SEP	Supplemental Environmental Project(s)
SRF	State Revolving Fund
SSO	Sanitary Sewer Overflow
TCEQ	Texas Commission on Environmental Quality
TEHA	Texas Environmental Health Association

TMDL	Total Maximum Daily Load
TSSWCB	Texas State Soil and Water Conservation Board
TWDB	Texas Water Development Board
TxDOT	Texas Department of Transportation
USGS	United States Geologic Survey
WCID	Water Conservation and Improvement District
WQMP	Water Quality Management Plan
WPP	Watershed Protection Plan
WWTF	Wastewater Treatment Facility

Executive Summary

This report summarizes Contract 582-12-10088 (Project), a 604b project administered by the Texas Commission on Environmental Quality (TCEQ). The Project entailed a series of five (5) water quality data collection, special study, and coordination activity objectives¹ completed by the Houston-Galveston Area Council (H-GAC) in conjunction with the TCEQ. The purpose of these activities is to provide data and analysis regarding wastewater infrastructure and other sources of nonpoint source (NPS) pollution that impact water quality in the 13-county Houston Galveston area Region (Region) of the Upper Gulf Coast of Texas. This document² is a summary of the results of these efforts, and a discussion of future needs.

Objective 2 – Quality Assurance – The first objective was to develop a Quality Assurance Project Plan (QAPP) for the collection and assessment of the various data sources described under Objective 3. Additionally, an existing QAPP for Geospatial Data was amended to cover tasks in Objective 5. The following tasks were completed:

- A **QAPP meeting** was held between H-GAC and TCEQ staff, along with continuing conversations throughout the Project term, to discuss the development and terms of the QAPP (Task 2.1)
- A **QAPP** document was developed and submitted by H-GAC, and approved by TCEQ and EPA (Task 2.2).
- The **Regional Geospatial Data QAPP** was amended and approved by TCEQ and EPA (Task 2.3)
- H-GAC continued to support TCEQ review of a regional non-ambient water quality monitoring QAPP. No specific support was utilized by TCEQ during this Project term other than informal staff briefings for Project staff (Task 2.4).

Objective 3 - Water Quality Management Plan Review, Update and Coordination - The second of the five primary objectives of this Project involved the continued development and maintenance of a series of integrated wastewater treatment facility (WWTF) datasets, the review of State Revolving Fund (SRF) applications for compliance with regional data and aims, and coordination of regional watershed management issues. The following tasks were completed:

- Datasets containing spatial information related to **WWTF service area boundaries** and **permitted outfalls** were updated and amended to reflect changes and better reconcile with other related datasets (Task 3.1).

¹ These five water quality objectives are Objectives 2-6 of the Project. Objective 1 – Administration, and Objective 7 – Final Report are not discussed separately, but are referenced in relation to other Objectives.

² Due to size and length considerations, some documents or deliverables are provided on the enclosed DVD, as noted in the Report.

- The **WWTF permit information database** was updated with new permit information, reviewed for outdated or erroneous data, and then compared against the service area boundaries and outfall location datasets. Effluent data from Discharge Monitoring Reports and Sanitary Sewer Overflow data was acquired and incorporated for use in a wide array of watershed, wastewater infrastructure, and other related projects³ (Task 3.2).
- H-GAC reviewed **one** application to the **State Revolving Fund** (SRF), and provided formal comment to the TCEQ. (Task 3.3).
- H-GAC provided general **watershed/water quality management coordination** through the staffing and facilitation of the Natural Resources Advisory Committee, coordination of data and efforts with ongoing Total Maximum Daily Load (TMDL) and Watershed Protection Plan (WPP) projects, sending liaisons to a variety of local water quality and watershed organizations, and coordinating efforts between other H-GAC environmental efforts and this Project (Task 3.4).

Objective 4 - Support Watershed Planning in the Lake Houston Watershed – The third objective involved oversight of continuous monitoring on tributaries to Lake Houston, and coordination of watershed management efforts among local stakeholders to promote water quality in this important drinking water source. The following tasks were completed:

- **Continuous monitoring** was conducted at two sites on the West Fork of the San Jacinto by the USGS (subcontractor) and overseen by H-GAC staff, and results were compiled and submitted to TCEQ quarterly (Task 4.1-4.4).
- **Local stakeholder support** was facilitated by H-GAC staff through coordination with the Bacteria Implementation Group's TMDL Implementation Plan and with other regional education and outreach efforts.

Objective 5 - OSSF Inventory –Under this fourth objective, H-GAC updated and expanded an existing GIS database of regional on-site sewage facility (OSSF) locations, violation data, and a detailed a methodology for identifying unpermitted systems⁴. The following tasks were completed:

- **The OSSF location database** was updated with new data received during the contract period. (Tasks 5.1).
- **The Non-permitted OSSF methodology** was completed and an initial test was conducted by H-GAC staff. (Task 5.2)
- **Violation data** was solicited and received⁵ from the Authorized Agents. (Task 5.3)

³ These data collection and analysis activities took place under the auspices of the H-GAC Regional Water Quality Data Acquisition and Compilation QAPP. This QAPP was completed and approved during this contract period prior to initiation of data work.

⁴ These data collection and analysis activities took place under the auspices of the H-GAC Regional Geospatial Data QAPP. This QAPP was amended during this contract period.

⁵ The majority of the Authorized Agents did not have violation data available.

Objective 6 – Coastal Nonpoint Source Program Development – For the fifth objective, H-GAC evaluated the infrastructure and maintenance challenges faced by a number of small, non-MS4 permitted entities in the Region’s coastal counties. The analysis was the first phase in an ongoing program to prioritize support for local needs that impact NPS issues in these communities⁶. The following tasks were completed:

- H-GAC conducted a **program evaluation** process in which staff selected and interviewed eight coastal communities. The evaluations addressed the state of the community’s infrastructure, their outreach and education efforts concerning NPS issues, and their financial, logistical, and structural challenges in maintaining their utility infrastructure (Task 6.1).
- A **needs assessment** was conducted by H-GAC to review common challenges facing the communities and the nexus of these challenges and NPS impacts. The outcome of the process was a prioritized set of recommendations for local community support services (Task 6.2).

⁶ The summary report for both deliverables is contained within this report as Appendix D.

Introduction

This document is the culminating report for the fiscal year 2012 efforts conducted under 604b-funded Contract 582-12-10088 (Project) between the H-GAC and the TCEQ. The Project involved collecting and evaluating water and wastewater data, and a series of special studies and coordination activities. The purpose of the Project is to support current and future planning decisions concerning water quality efforts, wastewater infrastructure development, and related issues on both a regional and state level.

The 13-county Houston-Galveston Area Region (Region) has a variety of water quality concerns and developmental challenges. The majority of our local water bodies are impaired under state water quality standards, and our developmental patterns have resulted in a patchwork and diffuse network of wastewater infrastructure. With population expected to expand dramatically in the coming decades, the ability to make informed decisions regarding water quality and wastewater infrastructure development will be a key tool in planning for the Region's future. The background of this Project is discussed in the **Project Significance and Background** section. The efforts summarized in this document serve to advance these purposes through a series of specific studies and the maintenance of regional datasets for local use and in support of the state's Water Quality Management Plan.

This report will focus on the progress achieved in the five primary objectives set forth in the Project:

- Quality Assurance
- Water Quality Management Plan Review Update and Coordination
- Support Watershed Planning in the Lake Houston Watershed
- OSSF Inventory
- Coastal Nonpoint Source Program Development

Each of these primary tasks serves to maintain, expand or implement the H-GAC's store of water quality and wastewater infrastructure data, or provide related services to the Region. Each objective is explained in greater depth later in the **Project Studies and Coordination Activities** section.

The Project required a series of interim deliverables related to these tasks. A description of the methodologies employed to generate outcomes is provided in the **Methods** section. Some of the deliverables are generated as large electronic datasets, unsuitable for full inclusion in this final report⁷. However, representative pieces of each deliverable are included, and all Project outcomes are discussed in the **Results and Observations** section. The synthesis of the information gathered and tasks implemented under this Project is discussed in the **Discussion**

⁷ Copies of these electronic data are contained within the media that accompanies this report.

and **Summary** sections. Standalone reports completed for some deliverables are provided in the **Appendices**.

The following table is a guide to the location of data pertaining to Project objectives and tasks in this document. Additional information about the **results and observations** (p. 24), and **discussions of future needs** (p. 25) related to these deliverables and objectives can be found in the corresponding sections of this document, and are not reflected in this table.

Project Significance and Background

Background

The Region has experienced robust economic expansion over the last several decades. That expansion resulted in a proportional increase in population growth and resulting land development. While this has been a boon to local prosperity, increased population and development also carry with them the challenges for our utility infrastructure and the potential for increased impact on our local waterways. With 3.5 to 4 million more residents expected by 2035, these challenges will only be exacerbated by future population growth.

The majority of the stream segments in the Houston area are listed on the State of Texas's list of impaired water bodies (303d list). The most common source of impairments is elevated bacteria levels that do not meet the contact recreation standard. Other development related issues like low dissolved oxygen, PCBs, and dioxins are also present in some water bodies. The bacteria in our lakes, creeks, streams and bayous comes 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 in precipitation flowing over the land. While some bacteria are naturally occurring, development brings with it additional bacterial sources and a greater potential impact to water bodies unless careful planning is employed.

The wastewater infrastructure that serves the Region's increasing population has expanded and developed much like the Region itself. The availability to fund infrastructure through political subdivisions like Municipal Utility Districts (MUDs) and other special districts allowed for a wastewater treatment network that relatively widespread and diffuse rather than limited by the bounds of traditional, centralized utility service. The resulting patchwork of regional wastewater infrastructure development offers both future challenges and opportunities for local decision-makers. These challenges are best served by the accumulation, maintenance and application of regional wastewater and water quality data to inform regional decisions. As management measures designed to deal with the current and potential water and wastewater infrastructure issues are put into place, the need for coordinated, regional sources of information becomes plain.

Over the years, H-GAC has used previous 604b projects to address information and data needs related to the water quality issues the Region faces. These projects have typically been a mix of long term efforts and short term special studies. Some of the project efforts have been continuous (wastewater data collection and maintenance, etc.) while others have been standalone research efforts relating to specific data needs or questions (GIS analyses for infrastructure consolidation, etc.). This balance allows the long term accumulation of data while retaining flexibility to address specific issues. The ongoing efforts in the FY12 Project focus on updating and improving existing regional wastewater infrastructure databases and continuing water quality analysis for Lake Houston. A new programmatic element for the Project is the

initiation of a Coastal Nonpoint Source Program, whose impetus was the desire to evaluate and understand the unique NPS challenges of small, coastal communities and how they may be addressed outside of the traditional MS4 permit process for which these communities do not qualify.

Significance

From a regional perspective, the water and wastewater decisions facing our local areas are more effectively considered on a watershed basis, as contaminants do not adhere to political boundaries along waterways. This is especially important for watersheds that serve as significant drinking water sources, like Lake Houston. In order to provide useful information and viable recommendations, a large store of relevant and accessible data is necessary.

This purpose of this ongoing Project is to collect the data and perform the analyses necessary to address these issues and plan for the Region's future. Each year several specific studies are conducted in conjunction with updates and maintenance of ongoing wastewater information datasets. This year, the Project was designed to maintain an expanded set of existing wastewater data sets, evaluating NPS challenges and solutions for small coastal communities, and promoting watershed efforts in the Lake Houston watershed.

The significance of the efforts undertaken in this Project is demonstrated by the variety of capacities in which the outcomes are used:

- **Internal data collection** – The wastewater permit data, service area boundaries, Lake Houston monitoring data, and OSSF location data collected/created under this Project serve to augment existing datasets, 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.
- **Regional coordination** – The sum of the data and analyses allow 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 (WPP and TMDL efforts, etc.)
- **Source Water Protection** – A large portion of the Region's population is served by treated surface water that originates in our local rivers and lakes, of which Lake Houston is a prime example. The monitoring and coordination activities of this Project fostered greater understanding of the issues facing this prominent drinking water source.
- **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 that potential projects concur with regional priorities and regional data projections.
- **Education and Outreach** – Data gathered under this project has been used as a focal point or basis for several educational efforts, including the OSSF location database, and various facilitated meetings like the ongoing Natural Resources Advisory Committee.

- **Coastal NPS Program Development**– The outcome of the first phase of the Coastal Communities Program is a set of recommended priorities for addressing NPS issues in small communities in the Region’s coastal counties. This intent for this information is to help shape local, regional and state projects seeking to address NPS pollution in these areas.

Project Objectives

This section details the background, process and outcomes for the five Objectives that represent the component efforts of this year's Project (*Objectives 1 and 7 of the Project are administrative tasks and Final Report requirements, and therefore are not reported on this document*).

Objective 2: Quality Assurance

This objective includes tasks related to development of a QAPP for water quality data acquisition and compilation, and to update an existing QAPP for geospatial data analysis. The purpose of this objective is to ensure all data are collected and analyzed in a manner appropriate for the data objectives of the Project.

Task 2.1 – QAPP Meeting

H-GAC and TCEQ met to formally discuss the QAPP needs for the project on 12/2/2011 after the initiation of the contract in late November, 2011. The outcome of the meeting was a designation of the elements of Objective 3 that required QAPP coverage, and a confirmation that the Objective 6 OSSF Inventory tasks would continue to be covered under an existing QAPP. Informal discussions regarding the QAPPs occurred continuously throughout the project term.

Task 2.2 – QAPP

H-GAC worked with TCEQ and EPA to develop and submit:

- A QAPP for Objective 3 tasks (The H-GAC Regional Water Quality Data Acquisition and Compilation QAPP).
- An Amended QAPP for Objective 6 tasks (The H-GAC Geospatial Data QAPP)

Both QAPPs were approved by EPA prior to initiation of related work (in the case of the former) or completion of tasks related to the amended sections (in the case of the latter).

Task 2.3 – QAPP Updates/Amendments

As discussed in Task 2.2 above, H-GAC amended the existing Geospatial Data QAPP to cover additional elements of Tasks in Objective 6.

Task 2.4 – Regional QAPP facilitation

H-GAC developed a Regional Non-Ambient Water Quality Monitoring QAPP in the FY 2011 604b Project. TCEQ discussed the QAPP with H-GAC at various meetings, including on 6/28/2011 and 9/14/2011 of the previous Project term. Based on discussions with TCEQ, H-GAC provided for continuing support for review under this Project term on an as needed basis. Informal

discussions and short staff briefings for a new TCEQ PM were conducted, but TCEQ did not request additional meetings or provide additional comments on the QAPP.

Objective 3: Water Quality Management Plan Review, Update and Coordination

This objective includes tasks related to wastewater infrastructure data collection, dataset update and management, coordination of planning efforts, and project proposal reviews.

H-GAC maintains a series of datasets related to permitted wastewater infrastructure facilities in the region. They are the **Service Area Boundaries Dataset (SABD)**, the **Outfall Locations Database (OLD)**, and the **Permit Information Database (PID)**. A primary task under this Project is to update and continue to integrate these data sources.

Task 3.1 - Service Area Boundaries

The SABD is the spatial representation of the wastewater dischargers' service area boundaries. Typically, these boundaries include municipalities, public districts (MUDs, WCIDs, etc) and private utilities.

During previous annual Projects, the SABD was modified to integrate it with the Permit Information Database (PID) and the Outfall Location Dataset (OLD) directly in a shared GIS, to allow data updates to be shared across platforms directly, rather than through duplicated effort. The datasets were previously stored separately and contained discrepancies in shared data.

For this year's update, existing TCEQ and H-GAC GIS layers were compared with new TCEQ MUD/special district data, appraisal district data, and internal H-GAC GIS information to update the boundaries with the latest/most accurate information. Wherever possible, those boundaries that matched a record from the PID, were linked to that data. As part of Objective 6, additional improvement of the SABD was made when the unpermitted OSSF analysis indicated that there were missing district boundaries. Additional boundary data was appended or reclassified to alleviate this problem. H-GAC identified private utilities as a focus for this year's Project, and worked with TCEQ to identify all private utilities in the Region.

During the process of updating this data and the other datasets, the following needs were identified for further work in subsequent projects:

- Missing or incorrect boundaries – H-GAC continued to work toward full integration of the three datasets.
- Private Utilities – While some private utilities were already included in the existing SABD, several were missing. Staff was able to correct some missing boundaries, but it is expected there are others that are not present. Continuing with work from this year's project, an analysis needs to be made of whether we have SABs for the list of private utilities identified during this Project term.

The results of the SABD update are included in digital format on the media accompanying this report.

Task 3.2 – Wastewater Database Maintenance

In addition to the SABD, H-GAC maintains two other sets of data, the Outfall Location Database, a GIS layer coordinated with the other databases, and the Permit Information Database.

Outfall Location Database (OLD) – The OLD is a companion dataset to the SABD, and maintains the outfall location of each permitted wastewater outfall. It was combined with the other datasets in the previous fiscal year, and that integration process continued this Project term. TCEQ updates are the initial source of this dataset, as precise outfall location coordinates are not provided in permit documents (only general descriptions of the outfall path). However, when H-GAC receives data from individual permit holders or other sources that contradicts TCEQ data, staff review the conflicting data against the existing records.

Staff updated our GIS with the most current TCEQ outfall layers two times during the project term. Based on staff efforts to further integrate the databases, there are now existing permit records for all outfalls. The initial TCEQ outfall data received dropped 112 outfalls from the previous TCEQ dataset. H-GAC staff reviewed the outfalls using TCEQ’s central registry data and H-GAC’s PID. Outfalls from the list deleted by TCEQ were retained by H-GAC if they were the sole outfall from an active permit for which no replacement outfall existed, and for which discharge was approved in the permit.

The following information needs be addressed in subsequent projects:

- Missing outfalls– in conjunction with the other datasets, the remaining records in the SABD and PID that do not have a corresponding outfall location need to be identified and resolved. It is likely many of these discrepancies relate to additional permits that need to be removed from the PID/SABD. If active permits are missing outfalls, this needs to be addressed with the TCEQ.

The current outfalls database is provided in digital format in the media that accompanies this Report.

Permit Information Database (PID) – The PID is the collecting point for wastewater discharge permit data from regulated wastewater dischargers across the region. The H-GAC receives copies of permit information from the TCEQ, and incorporates it into periodic updates and reviews of a centralized database. The data H-GAC receives includes new permits, permit renewals, permit modifications, notices of permit applications, preliminary decisions on permit applications, and permit information updates⁸. From these documents, all relevant information is extracted into pre-

⁸ It should be noted that H-GAC does not receive notices of permit expiration, abandonment, or administrative enforcement orders.

determined fields. These fields include name of discharger, name of facility, addresses, EPA and TCEQ permit numbers, capacity and permitted flow requirements, contaminant limits, and other identifying data and regulatory restrictions.

Two updates, one major and one minor, occurred during this Project term, bring the PID current with data received through at least 9/1/2012. The H-GAC Project Manager conducted a quality control audit for the data entry on 10% of the data. No appreciable errors were found. The current database includes records for 1559 permits, representing well over 2000 individual outfalls. A screenshot of the database format is attached as Figure 1.

Figure 1 - WWTP Permits Database

The data was checked for consistency across all outfalls of a single permit, and for consistency across all permits. Staff continued to work on decreasing discrepancies between the PID and the SABD and OLD this year, and added additional fields to the database to allow for more precise collection of data. Examples of added fields include:

contact name, email and phone; expansion of limits section to include 7-day, grab, max, frequency, interim timing and other values; and a general revamping of the user interface to improve accessibility and reduce errors.

H-GAC acquired two (2) years of Discharge Monitoring Report (DMR) data from the TCEQ. Staff compiled and evaluated the DMR data based on EPA NPDES permit number as a correlating field to the existing PID. During evaluation of trends in the DMR data for another project, staff found 214 additional discrepancies in permit numbers, which were alleviated during a final quality assurance assessment of the PID.

The following information needs be addressed in subsequent projects:

- Inactive/Expired Permits– During this Project, H-GAC staff made several passes at deleting inactive permits. 112 permits were removed, having been positively identified as expired or inactive/replaced using TCEQ’s Central Registry and the OLD/SABD datasets. However, as discrepancies still exist between the OLD/SABD and the PID, additional outdated permit information may⁹ still exist.

Task 3.3 - State Revolving Fund

In conjunction with H-GAC’s role as a regional planning group and the council of governments for the Houston-Galveston area of the Upper Gulf Coast, staff regularly provides comment on grant proposals of varying types. These reviews help to assure that regional goals were represented in project funding decisions at variety of governmental levels.

H-GAC reviews the grant applications and associated engineering documentation (PER, Environmental Review, population projections) for concurrence with regional planning goals. Specifically, staff looked for:

- Population projections that matched TWDB, H-GAC or other relevant forecasts
- Consideration of engineering alternatives and general due diligence
- 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 provide comment on **one (1)** State Revolving Fund (SRF) projects for the TCEQ. The outcomes of the reviews are shown in Table 1 below.

⁹ Some discrepancy between the SABD and PID will exist due to the lack of service area boundaries for industrial facilities. Approximately 400 permits in the database are industrial.

Table 1 – Projects Reviewed in FY 2011

Granting Agency	Project ID#	Requesting Entity	Project Summary	Findings	Notes
TWDB CWSRF	73635	City of Houston	Rehabilitation of multiple wastewater systems/infrastructure.	Support	Sent letter of support. Annual multi-area project.

Task 3.4 - Coordination

As an extension of H-GAC’s role as a coordinator of regional planning efforts in a variety of fields, staff 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. These efforts address task 2.4 of the Project. Staff members facilitate the H-GAC’s Natural Resources Advisory Committee, which provides policy recommendations for the 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, and four (4) meetings were held during the original Project term, and one in the extended timeframe (November meeting). Project staff members also routinely attend meetings of, or otherwise support, a variety of other organizations involved in water quality efforts. This project term, staff helped coordinate activities with a wide variety of organizations. An example of these groups that staff worked with this year includes:

- Coordination with the Clean Rivers Program in Lake Houston water quality efforts.
- Coordination with the Harris County Flood Control District on the Halls Ahead assessment project for the Halls Bayou watershed.
- Promotion of OSSF data collection efforts relating to Objective 6, and other water quality efforts through presence and speaking engagements with a variety of conferences including the Texas Environmental Health Association (TEHA).
- The Galveston Bay Estuary Program – Water and Sediment Committee membership
- A variety of interactions with state and local policy and regulatory efforts (including coordination with ongoing TMDL, Watershed Protection Plan, and other efforts). Some projects of specific note are:
 - Bacteria Implementation Group (BIG) and Upper Oyster Creek TMDL Implementation Plans
 - Cedar Bayou, San Bernard River, Westfield Estates, and Bastrop Bayou Watershed Protection Plans

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

Objective 4 - Support Watershed Planning in the Lake Houston Watershed

Objective 4 is an evaluation of aspects of water quality in the Lake Houston Watershed, involving the operation and analysis of data from two continuous monitoring sites on the West Fork of the San Jacinto River upstream of Lake Houston. The sites are operated by the United States Geologic Survey (USGS), and the process, data coordination, and analysis are conducted or overseen by H-GAC project staff. Additionally, H-GAC has worked with local and regional entities to promote watershed efforts in the Lake Houston Watershed.

While local water utilities use a mixture of surface water and groundwater, surface water is a large and growing portion of the Region's supply. The core counties of the Region have experienced significant ground level subsidence related to groundwater withdrawals. This phenomenon led to the institution of Subsidence Districts and a mandated move toward surface water as a potable water source. Given surface water's inherently greater vulnerability to contamination, the Region's future water supply is greatly dependant on careful management of its water bodies and reservoirs. Lake Houston is a primary reservoir for the City of Houston, and the satellite districts, water authorities and municipalities it supplies.

Lake Houston serves as source water for a large population, and therefore elicits special attention for water quality protection efforts. To facilitate these goals, this Project includes the following tasks devoted to evaluating water quality in Lake Houston, and facilitating watershed protection efforts in the watershed.

Tasks 4.1 – Continuous Monitoring Sites

H-GAC maintains two continuous water quality monitoring sites in the Lake Houston Watershed, both located on the West Fork of the San Jacinto River. These stations are operated by the USGS under contract with H-GAC, and operated under the auspices of the TCEQ's Continuous Water Quality Monitoring Network (CWQMN) QAPP.

The two sites are:

- Monitoring Station 08067650 on the West Fork San Jacinto River, below Lake Conroe, near Conroe, TX.
- Monitoring Station 08068000 on the West Fork San Jacinto River near Conroe TX.

Monitoring efforts at the two stations are focused specifically on total dissolved solids, as an indicator of water quality concerns in Lake Houston. The actual parameters monitored include pH, dissolved oxygen, temperature and specific conductance. The specific conductance values are used to generate total dissolved solids values. The USGS provides the data directly to H-GAC and the TCEQ. Data collected at these sites is used as part of the City of Houston's overall continuous monitoring network, also maintained by the USGS.

Data from the sites is useful in determining impacts of upstream activities on Lake Houston, and thus a large portion of the Region's water supply. These monitoring activities are conducted as part of a long term effort to look at changes to conditions in the watershed. These particular sites have been monitored since FY 2008, but other sites in the same watershed have supplied similar data since as early as the mid-90's. Data from these monitoring efforts is submitted to the TCEQ along with the regular quarterly progress reports.

Tasks 4.2 – Compatibility

H-GAC took the proper steps to ensure that the sites, instrumentation, data loggers, and communications are fully compatible with the TCEQ standards, as specified in the Project.

Task 4.3 - Water Quality Statistical Summary Reports

The USGS prepares monthly Water Quality Summary Statistics Reports for each site. These reports, along with quality assurance data completeness reports, are submitted to the H-GAC, who then submits them to the TCEQ with each quarterly report.

Task 4.4 - Additional Data Responsibilities

H-GAC Clean Rivers Program staff attended regular Continuous Water Quality Monitoring meetings and provided H-GAC with all quality assurance and other data as requested, and as specified in the Project. No additional training was completed during this Project term.

Objective 5 – OSSF Inventory

On-Site Sewage Facilities (OSSFs), or septic systems, are a widespread wastewater treatment technology in the Region, especially in the developing counties on the Region's borders. Throughout the Region, onsite sewage facilities (OSSFs), or septic systems, are relied upon for the treatment and disposal of wastewater. The Houston-Galveston Area Council estimates that there are over 300,000 OSSFs within the region. This constitutes, roughly, 13% of all OSSFs within the state of Texas. Annually thousands of additional OSSFs are designed, sited, and installed within the Region, especially in the rapidly developing unincorporated areas of northern Harris and Montgomery Counties, as well as the rural counties that reside along the Region's periphery.

H-GAC has completed a series of OSSF initiatives in the FY 10/FY 11 Project years. During the FY12 Project, H-GAC continued work on an OSSF Spatial Inventory (inventory) begun under a previous American Reinvestment and Recovery Act (ARRA) grant¹⁰.

During the 2012 Project, new data from the Authorized Agents and old data not previously converted were added to the OSSF permit database. Additionally, H-GAC staff acquired and

¹⁰ Federal ID #96690301

formatted OSSF violation data from several Agents, and devised and tested a methodology for identifying areas where unpermitted systems may be located.

Task 5.1 – Update Regional OSSF Permit Database

The intent of the inventory is to provide a comprehensive, spatial database for all OSSF locations throughout the Region. No such inventory existed prior to the initiation of the work under the ARRA contract. The initial work had collected existing location data for permitted OSSFs and developed a program under which participating Authorized Agents would submit new system data on a regular basis. The data had been recorded in many different formats, such that the first draft of the inventory only contained ~70,000 of the systems from the data received. Issues existed with proprietary data formats, and data which could not readily be brought into a spatial format.

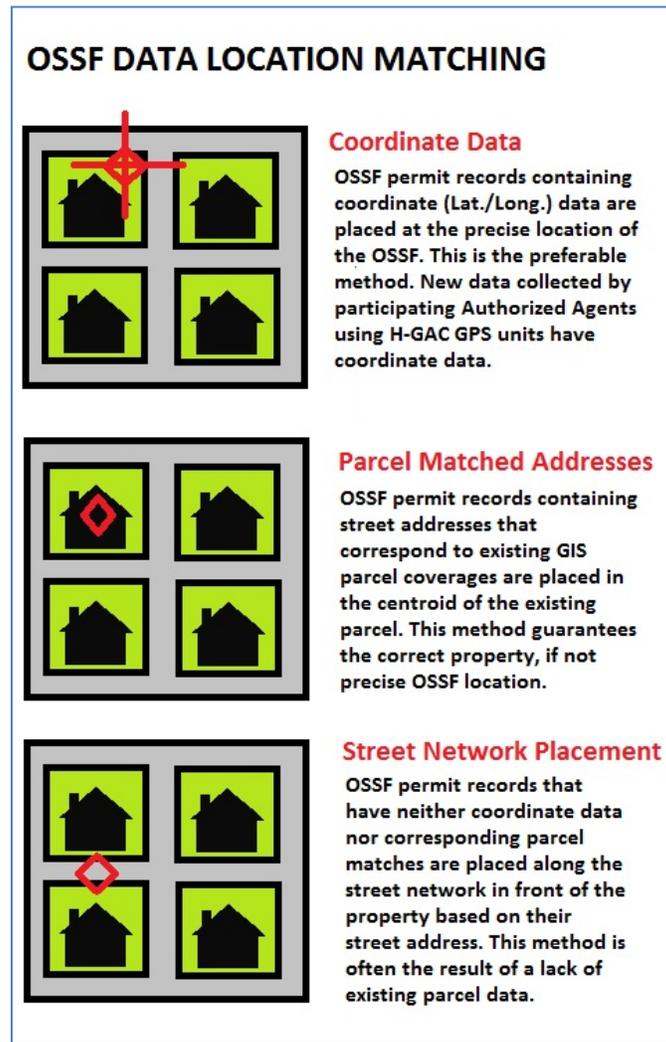
H-GAC has established partnerships with the 23 Regional Authorized Agents (Agents). H-GAC staff contacted the Designated Representatives of each Authorized Agent and requested that they submit electronically (via excel) addresses and other supplemental information regarding each permitted OSSF. Staff requested that the Agents submit data on a regular basis. Monthly reminders were sent starting during this Project term. Response from the Agents has varied.

In updating the existing inventory, data were geocoded by three different methods, depending on the format of the original data¹¹ and existing spatial data for that County/jurisdiction. Latitude/longitude data was the preferred method; parcel address or street network geocoding was used when necessary. For those data including coordinate data, the coordinates were formatted, verified (QA/QC) and then appended directly to the OSSF inventory. For those data utilizing address data, H-GAC utilized our existing GIS and Statistical Analysis Software (SAS) resources to match addresses in existing parcels. In the case that a parcel to parcel match was possible, the spatial location for the OSSF was placed within the center of the parcel (parcel centroid). For those data that lacked coordinates, and for which there was not a parcel match (i.e. parcel coverage did not exist for that area), address data was matched to existing street networks. In this case the OSSF location was placed on the street network. Figure 2 demonstrates the differences in precision of OSSF location based on method.

During the FY12 Project, the inventory was expanded to approximately 80,000 records. Additional data was acquired from Agents in non-digital formats. H-GAC is currently investigating options to convert and append this data, and will seek to do so in a future effort. Data acquisitions and additions are summarized in Appendix B.

¹¹ And in accordance with the then-current H-GAC Geospatial Data QAPP.

Figure 2 – OSSF Location Matching Methods



Task 5.2 – Identify Non-permitted OSSFs

The OSSF inventory data developed by H-GAC under Task 5.1 dealt with permitted OSSFs. For most Agents, systems began to be permitted subsequent to 1989. OSSFs installed prior to this date were not required to have a permit and in most cases are not actively tracked unless violation data exists for that site. While many of these systems are well maintained, aging systems in general pose a greater threat of failure and contamination of surface water sources. These systems also potentially represent an appreciable portion of the systems in service. H-GAC devised and tested a methodology to use existing data to identify by process of deduction, likely locations for unpermitted systems.

The general methodology is based on eliminating areas of known wastewater service (areas within WWTF service area boundaries or those parcels served by permitted OSSFs). The general assumption is

that dwellings outside of service areas which do not have a permitted OSSF located upon them must have an unpermitted system. Prior to developing a methodology to implement this process in GIS, H-GAC recognized that the effort was inherently limited by the accuracy of the existing SABD and the accuracy of the existing OSSF inventory. Given these inherent limitations, H-GAC staff's primary purpose in pursuing this task was to identify large groupings of potential unpermitted systems, rather than focus on each individual parcel. This decision was based on the known level of uncertainty in the existing data. A description of the full methodology and related GIS workflow is contained in Appendix C in Figure 3.

Task 5.3 – Incorporate OSSF Violation Data

H-GAC requested OSSF violation data to aid in the general purpose of identifying areas in which OSSFs may be contributing to NPS impairment, as well as to support identification efforts in Tasks 5.1 and 5.2. Three Authorized Agents had data they were willing to make available, and that were in a format conducive to the inventory's needs. The data was formatted to be compatible with the existing spatial format and key fields. A table summarizing the dates and content of violation data received from the Agents is found in Appendix B.

Objective 6 – Coastal Nonpoint Source Program Development

While many communities in the Region are covered by MS4 storm water permits, there are a large number of small communities with known NPS issues who have received less attention and have less access, or less knowledge of, existing resources that could mitigate challenges they face and lessen the impact of NPS sources in their communities. Of specific interest to the Region are those small communities in our coastal counties that may impact our coastal bays and estuaries. The purpose of this Objective was to initiate a program by which H-GAC will evaluate and support the nonpoint source planning needs for these small, coastal communities without MS4 permit requirements in the Houston-Galveston region. In addition to evaluating the current status of nonpoint source efforts among small coastal communities for the TCEQ, H-GAC will provide planning support and education/outreach opportunities and resources for these municipalities. H-GAC will also facilitate and track the progress of program development in these communities, and help with the preparation and planning for 319(h) and other grant opportunity submissions. The efforts detailed in the tasks for the FY12 Project represent the initial phase of this program. A stand-alone report on this Program is contained in Appendix D of this Report.

Task 6.1 – Program Evaluation

The first step in establishing the Coastal Communities Program was to devise a list of potential participants, target, gain their participation, and conduct preliminary interviews with their elected officials and/or staff. H-GAC conducted 8 interviews for communities in all four of the coastal counties of the H-GAC region. The interviews covered a broad array of questions regarding utility infrastructure, NPS issues, community challenges, and other background information. The summary of common elements in these program evaluations were used to

generate a prioritized list of policy recommendations in Task 6.2. Greater detail on this process is included in Appendix D of this Report.

Task 6.2 – Needs Assessment

Based on the summarized information from Task 6.1, H-GAC compared potential sources of NPS pollution in these communities with those challenges or opportunities the communities identified in the interviews. Those issues that were closely related to NPS sources (e.g., Issue - lack of funding to adequately maintain a sanitary sewer collection system; related NPS impact – increased fecal bacteria levels from sanitary sewer overflows.) were prioritized as program needs to be addresses. Finally, H-GAC produced a set of policy recommendations for addressing these priority issues in future phases of this program. Greater detail on this process is included in Appendix D of this Report.

Methods

The following is a brief summary of the methods employed by Project staff, and their strategy and approach to each of the primary Objectives. The methods used, objective goals, and results for each are described in more detail in their respective sections in the Project Objectives section. The objective numbers used reference the Project.

Objective 2: Quality Assurance

The FY12 Project year is the first in which a QAPP was required for data collection and assessment. The general strategy employed by H-GAC was to identify the data quality objectives identified informally in previous years, and to generate a formalized structure that represented the established workflows and objectives. H-GAC used existing staff knowledge of QAPP development, along with continual feedback from TCEQ project staff, to create the QAPP document.

Because a QAPP covering most of Objective 5 already existed, H-GAC and TCEQ elected to amend the existing QAPP rather than append it to the new Data Collection QAPP.

H-GAC utilized its existing QA/QC methods developed with TCEQ and other agencies over the course of many years of related projects, in application to the FY12 Project.

Objective 3: Water Quality Management Plan (WQMP) Review, Update and Coordination

In FY10 and FY11, H-GAC spent a great deal of effort in integrating the various datasets. The data gaps and needs identified in these projects drove the approach to Objective 3 during this year's Project. In FY12, the focus was on moving past the integration process to troubleshooting known data gaps.

The permit database updates were routine. However, H-GAC evaluated and modified the methods used to identify and update the SABD and OLD. This was partly due to greater discrepancy between subsequent TCEQ outfall coverage layers. H-GAC altered its methods to use SAS to the greatest degree possible to generate lists of potential problem data for further staff review. Additionally, the Objective 5 issues with SABD coverage allowed us to add another layer of QA review for our SABD and utilize GIS resources to improve the dataset rather than just permit-by-permit review by staff. Comparison of known districts and other regional data with the SABD helped to fill some of the data gaps revealed.

For the coordination aspects of the Objective, Project staff maintained a manifest in which to log SRF and other project reviews, and in which transition time was monitored internally. Staff first reviewed population projections, then engineering alternatives, then relevance for regional goals. In discussion with TCEQ, it was confirmed that H-GAC would not be responsible to the TCEQ for providing comment to Categorical Exclusion notices for the TWDB's SRF projects. These notices made up the vast majority of all potential SRF comment projects received by H-GAC.

Objective 4: Support Watershed Planning in the Lake Houston Watershed

During the FY 11 Project year, the full USGS subcontract was moved under this project, allowing for a more streamlined approach to the continuous monitoring project. During FY12 staff worked to further streamline internal communications between staff and USGS by setting additional expectations for data delivery timing to ensure timely delivery by H-GAC to TCEQ, and to ensure that H-GAC project management and quality assurance were on the same page.

Based on discussions with the TSSWCB, and potential partners, H-GAC decided to pursue another application for a watershed protection plan project in the Lake Creek Watershed. Our previous submittal had not been accepted because the watershed was not currently impaired. Despite shifts in state and federal stances on that aspect, however, our current application was also not accepted by TCEQ. However, H-GAC has also applied to the TSSWCB for funding for this effort, so it is not yet certain whether we will be engaged in this process in FY14. H-GAC continues to work with local partners in the Lake Creek and greater Lake Houston watersheds to coordinate similar activities through a variety of means.

Objective 5: OSSF Inventory

The primary strategy for this Objective was to move the inventory from its initial phase of past data collection to a focus on continuing data submittal from the Authorized Agents and a gradual inclusion of data that was previously ruled out due to format issues. Project staff worked to further develop relationships with the Agents, and implemented various methods of ensuring more timely submittals including monthly reminders, offering to make site visits, and planning for public recognition of those who submitted on a timely basis.

The development of the Non-permitted OSSF Methodology required the development of new methods for our WWTF data collection workflows. The previous focus has been on an additive approach, reviewing and appending data supplied to us by outside sources. The new strategy was to use deductive reasoning to generate new data from comparison of existing data sources. The overarching strategy was not to implement a solution that would give a precise status for every parcel. The general limitations of the base data that H-GAC identified ruled out this approach. Therefore, the methods employed in the development and testing of our approach put the focus back on NPS impacts by looking for large areas of potential unpermitted systems. This method opened the door for future work in further improving the methodology and output, and in serving as a base to assess the impacts of those unpermitted OSSF clusters on nearby surface waters.

Objective 6: Coastal Nonpoint Source Program Development

The Coastal Communities program arose from several previous regional efforts identifying small coastal communities as a neglected aspect of the NPS issues surrounding our coastal bays and estuaries. Additionally, much of the focus of state and regional attention to storm water/NPS

has been on larger MS4-permitted communities. By evaluating the unique challenges of these smaller communities and the nexus they have with NPS issues, H-GAC hoped to provide a more tailored roadmap for regional and state involvement with these communities.

The selection of methods by which to approach developing the programs hinged on two decisions. The first was the choice to start with a ground-up focus. Interviews with individual communities were the primary focus of the first phase of the project. Secondly, H-GAC created a multi-phased program proposal. Segregating the phases (program evaluation and policy recommendations, support for planning implementation, and finally implementing NPS solutions) allowed for a clear focus on understanding the unique challenges of the communities prior to implementing standard BMP approaches. It also helped center the efforts on establishing relationships with communities and providing resources prior to broadening the scope to their active involvement in NPS issue abatement outside of day to day operations. This methodology decision will allow the program to grow in time with the participants' knowledge base and involvement.

Methods Summary

In general, the methodical approach of the Project team for all tasks was to assess available data/resources, make a preliminary plan toward the task objective, periodically review the progress and plan, and make adjustments as necessary. For those objectives dealing with public interaction, staff utilized existing communication networks and meetings to maximize the number of people reached, and incorporated feedback into revised versions of deliverables. For all objectives, future needs not covered under the current fiscal year's project were identified and recorded for potential inclusion in the FY 13 Project proposal. To the greatest degree possible, project staff attempted to streamline and make uniform the methods and processes involved in the various Tasks to increase efficiency in future project years.

Results and Observations

This year's project was successful in building on progress made in last fiscal year's project. Specifically, the move from integration of existing wastewater permit database information to going forward with adding additional elements has enabled a greater efficiency and effectiveness in providing this data to internal and external clients.

Additionally, several deliverables produced this year, including the OSSF Inventory and the Coastal Communities Program, set up a solid base for continued work in FY 2013. The general progress this fiscal year has been toward developing applied uses for existing data resources. The long term goal for these efforts is to move from data collection and assessment to utilization of this data to produce a greater number of deliverables for H-GAC's regional communities.

In general, Project staff members are confident in the results of this Project. H-GAC feels that the deliverable meet the needs of the current Project, and will provide a solid foundation for future work.

Results and observations specific to each task and objective of this Project are described in detail in their corresponding subsection of the **Project Objectives** section of this document.

Future needs identified during this year's Project are established in the **Discussion** section of this document.

Discussion

This section will detail the areas of need identified for inclusion in future projects, including any recommended solutions.

Data Availability and Currency

While wastewater database integration has greatly improved over the last two years, discrepancies between the databases still exist. An increase in permit activity over the last two years has led to a reassessment of how staff resources are allocated on the project. H-GAC has not yet been able to fully identify all erroneous/outdated data in the PID or to accumulate full and complete data for the SABDs. This is in part due to factors outside of the control of H-GAC and TCEQ (inaccurate boundary data supplied by WWTFs owners, etc). While project staff were able to identify an appreciable number of outdated records this year, additional work remains to fully integrate the data sources. Deeper integration and use of DMR data was also identified as a need by this and other regional efforts in FY12.

OSSF Inventory

Efforts under this Project and related efforts have produced a good regional dataset regarding OSSF locations, and a coordinated outreach approach for addressing OSSFs. The efforts to obtain and append new permit data should be continued, and additional work needs to be done to refine data and outcomes for the non-permitted system identification process.

Coastal Communities

With the successful completion of the first phase of data gathering and analysis, the next step is to apply resources to program priorities. H-GAC intends to move to an active role in providing planning support for these communities in FY 13. Detailed recommendations on future efforts are contained in the Needs Assessment, Policy Recommendations section of the report in Appendix D.

Summary

This year's Project was successful in updating valuable infrastructure capacity data for the Region, for the benefit of both local and state purposes. This Project year's efforts continued integration and inclusion of additional data (better coverage for private utility systems, updated DMRs, etc) to expand the applicability of the Project's deliverables.

H-GAC continues to provide its unique regional perspective to the review of SRF projects, and continued refinement of databases and GIS resources allowed us to be more efficient this year.

H-GAC continues to develop and foster relationships with interested parties in the Region's watersheds, and coordinate regional water quality activities. We have been leaders in previous TMDL and WPP efforts, and the coordination activities of this Project mesh well with our overall approach of outreach, targeted studies and implementation activities. By having multiple water quality projects within the same organization, we are able to achieve a good vertical integration between base data sources, internal analysis, and coordination with other efforts (WPPs, TMDLs, etc). This year we have again sought to increase the efficiency of this integration.

While our efforts to gain approval and funding from TCEQ for a WPP in the Lake Creek watershed were not successful this year, we have continued to work with local partners and maintain lines of communication in the area. Additionally, we are awaiting a decision from the Texas State Soil and Water Conservation Board regarding funding for this effort. During the course of our activities, and other related outreach efforts, we identified many opportunities for future collaboration in the Lake Houston area.

The OSSF inventory development continued during this fiscal year, and made the move from passive data collection to active data sharing with local entities. The focus shift from permitted system to unpermitted systems created the start of a better perspective on the status and potential impact of OSSFs across the region. This deliverable remains one of our most popular efforts among internal and external clients. .

This report, the accumulated datasets, the GIS analyses, and other deliverables of this Project are attached in electronic format on accompanying media. Where allowable and appropriate, data from this Project will be used to support other related efforts and/or made available (upon TCEQ approval) on H-GAC's website at <http://www.h-gac.com/community/water/quality>. This Final Report document, when approved, will be made available at this location.

Appendices

Appendix A – Summary of Materials included on Media

The following materials are included on the media attached with this Report:

- 1) Final Report, digital version
- 2) Service Area Boundaries Dataset (GIS format)
- 3) Outfall Location Dataset (GIS Format)
- 4) Permit Information Database (Microsoft Access database format)
- 5) Non-Permitted Systems Methodology Test Output (image file)

Appendix B – OSSF Inventory Data Summaries

Table B1: Summary of OSSF Location Data Received from Authorized Agents

Entity	File Name	Date Received	Date Formatted
Austin County	OSSF_Austin_County_July_2010_Oct_2012	11/5/2012	11/8/2012
Brazoria County	OSSF_Permits_070810_013112	2/2/2012	4/9/2012
Brazoria County	OSSF_Feb_2012	3/5/2012	4/9/2012
Brazoria County	OSSF_March_2012	4/2/2012	4/9/2012
Brazoria County	OSSF_April_2012	5/3/2012	5/15/2012
Brazoria County	OSSF_May_2012	6/7/2012	7/18/2012
Brazoria County	OSSF_June_2012	7/10/2012	7/18/2012
Brazoria County	OSSF_July_2012	8/10/2012	10/16/2012
Brazoria County	OSSF_August_2012	9/11/2012	10/16/2012
Brazoria County	OSSF_Sept_2012	10/4/2012	10/16/2012
Chambers County	Chambers_County_New_Septic_GPS_Installation (8/1/2011 – 9/30/2011)	9/30/2011	4/19/2012
Chambers County	October_Septic_Installation_for_Chambers_County	11/1/2011	4/19/2012
Chambers County	Rex_Monthly_Report_(4) (2) (11/1/2011 – 11/30/2011)	12/1/2011	4/19/2012
Chambers County	Copy_of_Rex_Monthly_Report_(5) (12/1/2011 – 12/31/2011)	1/18/2012	4/19/2012
Chambers County	Copy_of_Rex_MONTHLY_REPORT_(5) (1/1/2012 – 1/31/2012)	2/1/2012	4/19/2012
Chambers County	Rex_Monthly_Report_(4)_ (2) (2/1/2012 – 2/29/2012)	3/5/2012	4/19/2012
Chambers County	Copy_of_Rex_Monthly_Report_(4)_ (2) (3/1/2012 – 3/30/2012)	3/30/2012	4/19/2012
Chambers County	Copy_of_Rex_MONTHLY_REPORT_(5) (3/31/2012 – 4/30/2012)	5/4/2012	5/15/2012
Chambers County	Copy_of_Rex_MONTHLY_REPORT_(5) (5/1/2012 – 5/31/2012)	6/1/2012	6/26/2012
Chambers County	Copy_of_Rex_MONTHLY_REPORT_(5) (6/1/2012 – 6/30/2012)	7/17/2012	7/24/2012
Chambers County	CHAMBERS_COUNTY_NEW_SEPTIC_GPSINSTALLATION (7/1/2012 – 7/31/2012)	8/1/2012	10/30/2012
Chambers County	CHAMBERS_COUNTY_NEW_SEPTIC_GPSINSTALLATION	9/4/2012	10/30/2012

County	N (8/1/2012 – 8/31/2012)		
Chambers County	CHAMBERS_COUNTY_NEW_SEPTIC_GPSINSTALLATIO N _September_2012	10/1/2012	10/30/2012
Chambers County	State_Activity_Detail_Report(2)_1_1_2010_8_28_201 1	10/26/201 2	10/30/2012
Fort Bend County	HGAC_OSSF_Permits_by_Date_1_1_2011_5_31_2012	6/4/2012	7/9/2012
Fort Bend County	HGAC_OSSF_Permits_by_Date_4_1_2012_6_30_2012	7/2/2012	7/9/2012
Fort Bend County	HGAC_OSSF_Permits_by_Date_7_1_2012_8_31_2012	9/6/2012	10/30/2012
Fort Bend County	HGAC_OSSF_Permits_by_Date_September_2012	10/5/2012	10/30/2012
Galveston County	GPS_STATSsept2011	10/3/2011	3/15/2012
Galveston County	OCT2011_GPS_STATS	11/8/2011	3/15/2012
Galveston County	Nov2011_GPS_stats	12/2/2011	3/15/2012
Galveston County	DEC2011_GPS_STATS	1/6/2012	3/15/2012
Galveston County	JAN2012_GPS_STATS	2/1/2012	3/15/2012
Galveston County	FEB2012_GPS_STATS	3/7/2012	3/15/2012
Galveston County	March2012_GPS_STATS	4/9/2012	3/15/2012
Galveston County	April2012_GPS_STATS	5/7/2012	5/15/2012
Galveston County	May2012_GPS_Stats	6/1/2012	6/11/2012
Galveston County	June2012_GPS_Stats	7/5/2012	7/24/2012
Galveston County	July2012_GPS_Stats	8/2/2012	10/30/2012
Galveston County	August2012_GPS_Stats	9/4/2012	10/30/2012
Galveston County	Sept2012_GPS_Stats	10/8/2012	10/30/2012
Harris County	Harris_county_Recent_OSSF_Data (March 2010 – March 2012)	3/29/2012	4/2/2012
Harris County	HC_ossf_update (April 2012 – July 2012)	8/8/2012	8/14/2012
Harris County	Hcjulaug2012 (August 2012)	9/5/2012	10/19/2012
Liberty County	Monthly_OSSF_Permit_Data_for_HGAC (January 2012)	2/6/2012	4/9/2012
Liberty	Hppscan299 (February 2012)	3/2/2012	4/9/2012

County			
Liberty County	Hppscan316 (March 2012)	4/10/2012	4/9/2012
Liberty County	Monthly_OSSF_Permit_Data_for_HGAC (April 2012)	5/2/2012	5/15/2012
Liberty County	Monthly_OSSF_Permit_Data_for_HGAC (May 2012)	6/4/2012	6/26/2012
Liberty County	Monthly_OSSF_Permit_Data_for_HGAC (June 2012)	7/2/2012	8/6/2012
Liberty County	Monthly_OSSF_Permit_Data_for_HGAC (July 2012)	7/31/2012	8/6/2012
Liberty County	Monthly_OSSF_Permit_Data_for_HGAC (August 2012)	8/31/2012	10/31/2012
Liberty County	Monthly_OSSF_Permit_Data_for_HGAC (September 2012)	10/3/2012	10/31/2012
City of Manvel	Permits_Issued_2010_07_01_to_2012_10_23_2	10/23/2012	10/30/2012
Montgomery County	Email_For_HGAC (August 2011 – March 2012)	4/16/2012	4/30/2012
Montgomery County	Copy_of_HGAC_Tracking (April 2012 – September 2012)	10/2/2012	10/31/2012
Waller County	GHA_Reporting_of_Septics_Form (January 2012 – April 2012)	5/1/2012	5/3/2012
Waller County	HGA_Reporting_of_Septics_Form (May 2012 – June 2012)	7/5/2012	7/24/2012
Waller County	HGA_Reporting_of_Septics_Form (July 2012)	8/1/2012	8/7/2012
Waller County	HGA_Reporting_of_Septics_Form (August 2012)	9/6/2012	10/30/2012
Waller County	HGA_Reporting_of_Septics_Form (September 2012)	10/4/2012	10/30/2012
Waller County	Book1 (August 2010 – November 2011)	10/22/2012	10/30/2012
Waller County	January_2011_thru_November_2011_worksheet_to_HGAC	10/26/2012	10/30/2012
Wharton County	July_2012_OSSF	8/9/2012	10/31/2012
Wharton County	August_2012_OSSF	9/5/2012	10/31/2012
Wharton County	September_2012_OSSF	10/2/2012	10/31/2012

Table B2 – Summary of OSSF Violation Data Acquired from Authorized Agents

Entity	File Name	Date Received	Date Formatted
Colorado County	Colorado_OSSF_Complaints	11/6/2012	11/6/2012
Fort Bend County	HGAC_OSSF_Complaint_by_Date (1/3/2011 – 5/31/2012)	6/4/2012	11/5/2012
Fort Bend County	HGAC_OSSF_Complaint_by_Date_4_1_2012_6_30_2012	7/2/2012	11/5/2012
Fort Bend County	HGAC_OSSF_Complaint_by_Date_7_1_2012_8_31_2012	9/6/2012	11/5/2012
Fort Bend County	HGAC_OSSF_Complaint_by_Date_September_2012	10/5/2012	11/5/2012
Galveston County	GPS_STATSsept2011	10/3/2011	11/5/2012
Galveston County	OCT2011_GPS_STATS	11/8/2011	11/5/2012
Galveston County	Nov2011_GPS_stats	12/2/2011	11/5/2012
Galveston County	DEC2011_GPS_STATS	1/6/2012	11/5/2012
Galveston County	JAN2012_GPS_STATS	2/1/2012	11/5/2012
Galveston County	FEB2012_GPS_STATS	3/7/2012	11/5/2012
Galveston County	March2012_GPS_STATS	4/9/2012	11/5/2012
Galveston County	April2012_GPS_STATS	5/7/2012	11/5/2012
Galveston County	May2012_GPS_Stats	6/1/2012	11/5/2012
Galveston County	June2012_GPS_Stats	7/5/2012	11/5/2012
Galveston County	July2012_GPS_Stats	8/2/2012	11/5/2012
Galveston County	August2012_GPS_Stats	9/4/2012	11/5/2012
Galveston County	Sept2012_GPS_Stats	10/8/2012	11/5/2012

- b. The remaining four counties within the Region (Colorado, Chambers, Matagorda, and Wharton) currently do not have parcel datasets. Substituted for parcels were census blocks. In order to do this, all census blocks and Census PL Data were exported. The census blocks and PL Data within the 4 counties was calculated and saved. Next, the census blocks within the four counties were merged together. The Census PL Data for the four counties were also merged into one dataset. Then, a join was made of the Census Blocks and PL data to create a shapefile of Census Blocks with Census PL data for the 4 counties. Only census blocks that showed human occupancy (HU>0) were retained for the final analysis.
- 2) Addition of Service Area Boundaries –**
 - a. The H-GAC SABD was dissolved into a singular polygon to create a regional SAB coverage.
 - 3) Addition of Permitted OSSF Locations –**
 - a. The Permitted OSSF point shapefile was then included in the model.
 - 4) Primary Exclusion (SABD Coverage) –**
 - a. The residential parcels and census blocks that were covered within the SAB coverage in Step 2 were selected and exported. It is assumed that these residential blocks are receiving sewer treatment from centralized systems.
 - 5) Secondary Exclusion (Permitted OSSFs) –**
 - a. Next, parcels and census blocks that had OSSF points were selected and exported. Because these parcels and census blocks contain known permitted OSSFs, it was assumed that these parcels/blocks were receiving wastewater treatment from these permitted OSSFs.
 - 6) Remnant Analysis –**
 - a. The remaining parcels which did not fall under the SAB polygon or have a known permitted OSSF assigned to them were selected and exported. It was assumed that these parcels/blocks must have wastewater treatment, which would then mean that treatment must be coming from an un-permitted OSSF¹².
 - 7) Draft Map Review**
 - a. A test map was drafted using the data from the remnant analysis. Residential parcels or blocks were color coded for staff review. Based on knowledge of regional neighborhoods, staff made an informal review of potentially incorrect areas (i.e. areas identified as being potentially served by unpermitted OSSFs that were known or suspected to be within SABs.)
 - b. H-GAC GIS staff sought out and updated missing SABs.

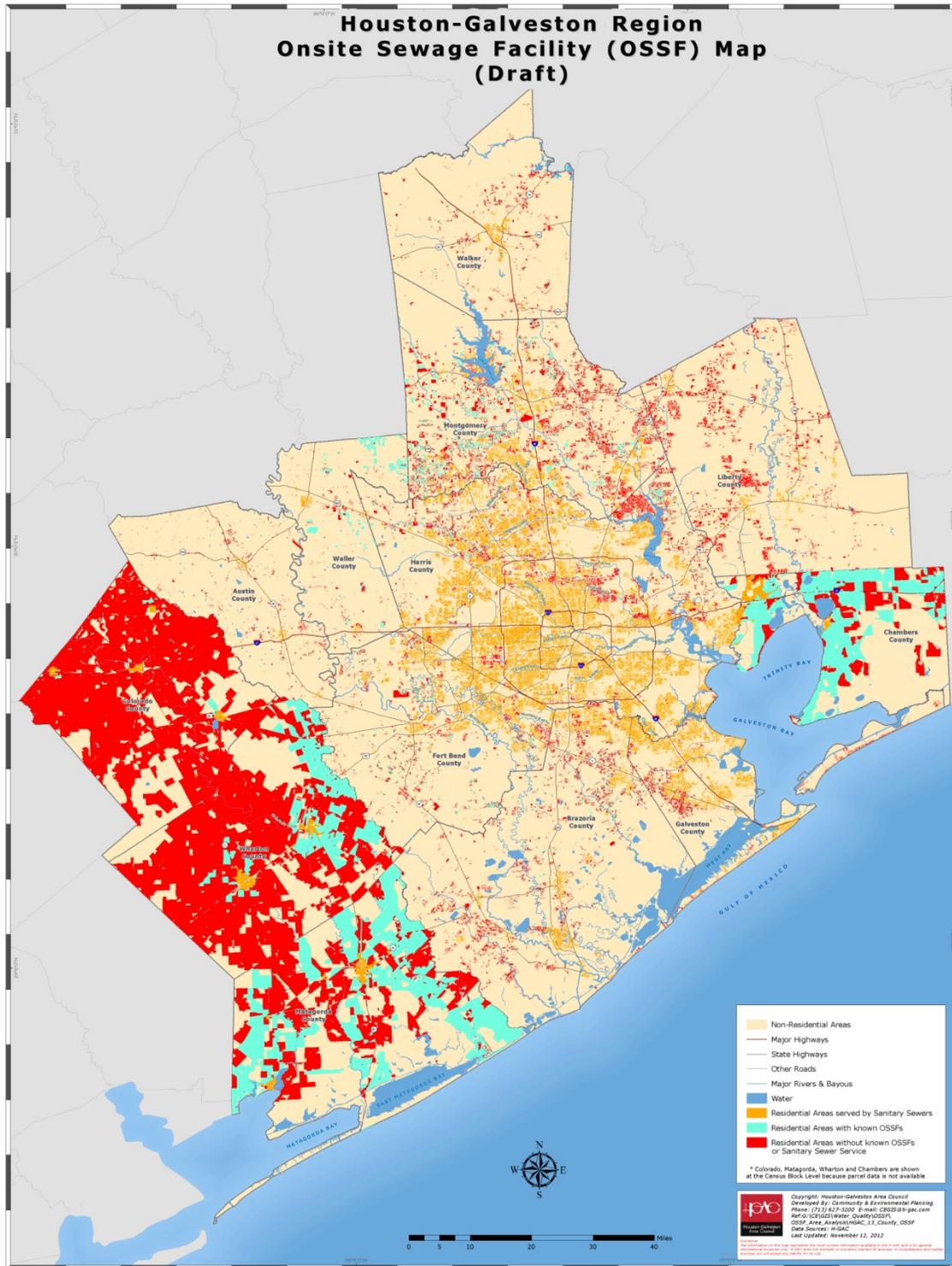
¹² For the purpose of this analysis, it was assumed that the wastewater from these areas was treated by OSSF. However, as has been reported in other efforts, varying degrees of unpermitted wastewater treatment do exist in the Region, including direct discharges, lagoons, etc. Based on discussions with Authorized Agents, these instances are expected to be the exception rather than the rule, and to not appreciably skew the results of the analysis.

- c. H-GAC project staff drafted a revised map for future review by Authorized Agents. The draft maps were handed out for review at a recent OSSF Workgroup meeting.

The first test of the methodology indicated that while the approach was sound, uncertainty in the base data hampered the initial usefulness of the product. However, areas identified as potentially false by staff provided focus for efforts to revise the SABD to guarantee better coverage. The end test product of the methodology will be a useful tool for focusing future Authorized Agent and H-GAC efforts. This methodology will continue to be refined as additional data allows. Figure C2 is a graphical representation of the methodology output¹³.

¹³ To note, the large block areas in the exterior counties of the region are due to the lack of parcel data discussed in step 1. In these counties, this lack of data was confounded by small populations and large census tracts. A full size image file of this map is provided in the media that accompanies this Report. This small sized version is included to give an impression of the scope of the outcome, with parcels/census blocks having potential non-permitted systems shown in red.

Figure C2 – Non-Permitted System Methodology Test Output



Appendix D – Coastal Communities Program Development Report

Coastal Communities Nonpoint Source Program Development

Phase I – Program Evaluation and Needs Assessment



City of Jamaica Beach, photo by Michael Salazar

Introduction

Outside of population centers like Galveston and Baytown, the coastal areas of the Upper Gulf Coast are predominantly characterized by small, rural communities. While many of these communities have not seen significant demographic change in the last few decades, changing conditions in the region have led to an opportunity to reassess their planning choices. Aging utility and drainage infrastructure, the impact of economic conditions on available resources, and recent increases in expected growth due to industrial expansion and the “halo effect” of growth from the urban core of the region are all factors that may exacerbate the scale and management of nonpoint source issues in these communities.

In the past, less attention has been paid to small, coastal communities in terms of their unique nonpoint source pollution challenges, needs, and potential surface water quality impact. Much of the regulatory focus and funding resources, especially for storm water, have been relegated to large, urban areas with Municipal Separate Storm Sewer System (MS4) permits. With limited staff and fiscal resources, and logistical issues arising from areas with little elevation change due to proximity to the coast, these small communities are often hamstrung in their abilities to adequately address storm water issues that may negatively impact surface water quality as it enters nearby streams, bays, and estuaries.

The Coastal Communities project described in this report is a multi-phase effort initiated in 2012¹⁴. The intent of the overall project was to identify the unique challenges and needs of the small, non-MS4 communities in the Houston-Galveston Area Council (H-GAC) 13-County Region. The primary desired outcome of this effort is to support these communities in planning efforts to address issues that impacted nonpoint source pollution. Additionally, this project aimed to assist state and federal agencies

¹⁴ The Coastal Communities program is funded under a 604(b) grant from the Texas Commission on Environmental Quality, as facilitated by the Houston-Galveston Area Council.

in better understanding the issues facing these communities so that could more precisely focus outreach efforts, funding resources, and regulatory decision. During the 2012 fiscal year, H-GAC initiated the first phase, which involved identification and assessment of the existing programs, statutes, and needs of the study area.

Program Evaluations

The project area for the Coastal Communities Program comprises the four coastal counties in the H-GAC region (Chambers, Galveston, Brazoria, and Matagorda Counties). During this phase of the project, H-GAC first focused on identifying all the communities in the region that met the specific criteria for this project. The primary criteria for inclusion were that the community:

- must be a city or census-based place within one of the aforementioned counties; and
- must not have its own MS4 permit or participate in another entity's MS4 permit¹⁵.

The slate of possible candidates for this project was further narrowed based on the utility/planning services that they provide¹⁶, as a secondary criterion. Although this project primarily focuses on storm water and non-point source pollution, sanitary collection systems were deemed an appreciable potential source, such that staff felt it was important that candidate communities also provide (or be substantially involved in planning for) sewer and/or water services to their residents. The challenge of maintaining utility infrastructure can be intertwined with issues of nonpoint pollution and drainage concerns. This connection was made because of the linkage between point and non-point source pollution and their combined effect on surface water quality.

The first step in the candidate review process was to make initial contact with the candidates. H-GAC staff was able to speak with 15 cities that met the initial criteria (coastal, non-MS4 cities)¹⁷. Several communities do not maintain their storm water systems, so subsequent contact was not made. The City of Oyster Creek provides water and wastewater services but Brazoria County maintains its drainage ditches. Despite not fully meeting the criteria, city staff expressed interest in the project, so Oyster Creek was not disqualified. Only one community that was contacted wished to not participate in the project (Danbury), so it, too, was not pursued further. During each initial conversation, communities

¹⁵ There are several communities in the region that are small enough to not be required to have its own MS4 permit; however, they have chosen to participate in another entity's permit. For example, several cities within Brazoria County are members of the Brazoria County Stormwater Coalition, which has one storm water management program for all the member organizations.

¹⁶ Some communities did not have actual jurisdictional controls or planning authority; i.e. they were census-based places by name rather than actual governing bodies.

¹⁷ H-GAC attempted to contact several more cities, but for various reasons, it was not possible to speak with the proper (or any) city staff member. Among these cities, any that meet the project criteria may be contacted in the future for inclusion in the project.

that met the criteria and wished to participate in the project scheduled a meeting with H-GAC staff for a more detailed assessment. Table 1 shows the list of all communities contacted for this project.

Table 1. Coastal Community Participation Evaluation Summary

City	Evaluated?	If not, why?
Anahuac	Yes	
Bailey's Prairie	No	No Services Provided ¹⁸
Bay City	Yes	
Bayou Vista	No	No Services Provided
Bonney	No	No Services Provided
Brazoria	Yes	
Brookside Village	No	No Services Provided
Cove	No	No Services Provided
Danbury	No	Not Interested
Hillcrest	No	No Services Provided
Holiday Lakes	No	Only Water Provided
Iowa Colony	No	No Services Provided
Jamaica Beach	Yes	
Jones Creek	No	No Services Provided
Liverpool	No	Only Water Provided
Manvel	Yes	
Old-River Winfree	No	No Services Provided
Oyster Creek	Yes	
Palacios	No	Did not respond
Surfside Beach	No	Did not respond
Sweeny	Yes	
West Columbia	Yes	

¹⁸ This is intended as short hand for a situation in which a community does not have a formal governmental structure, and/or does not have an appreciable role in their utility systems.

City Evaluations

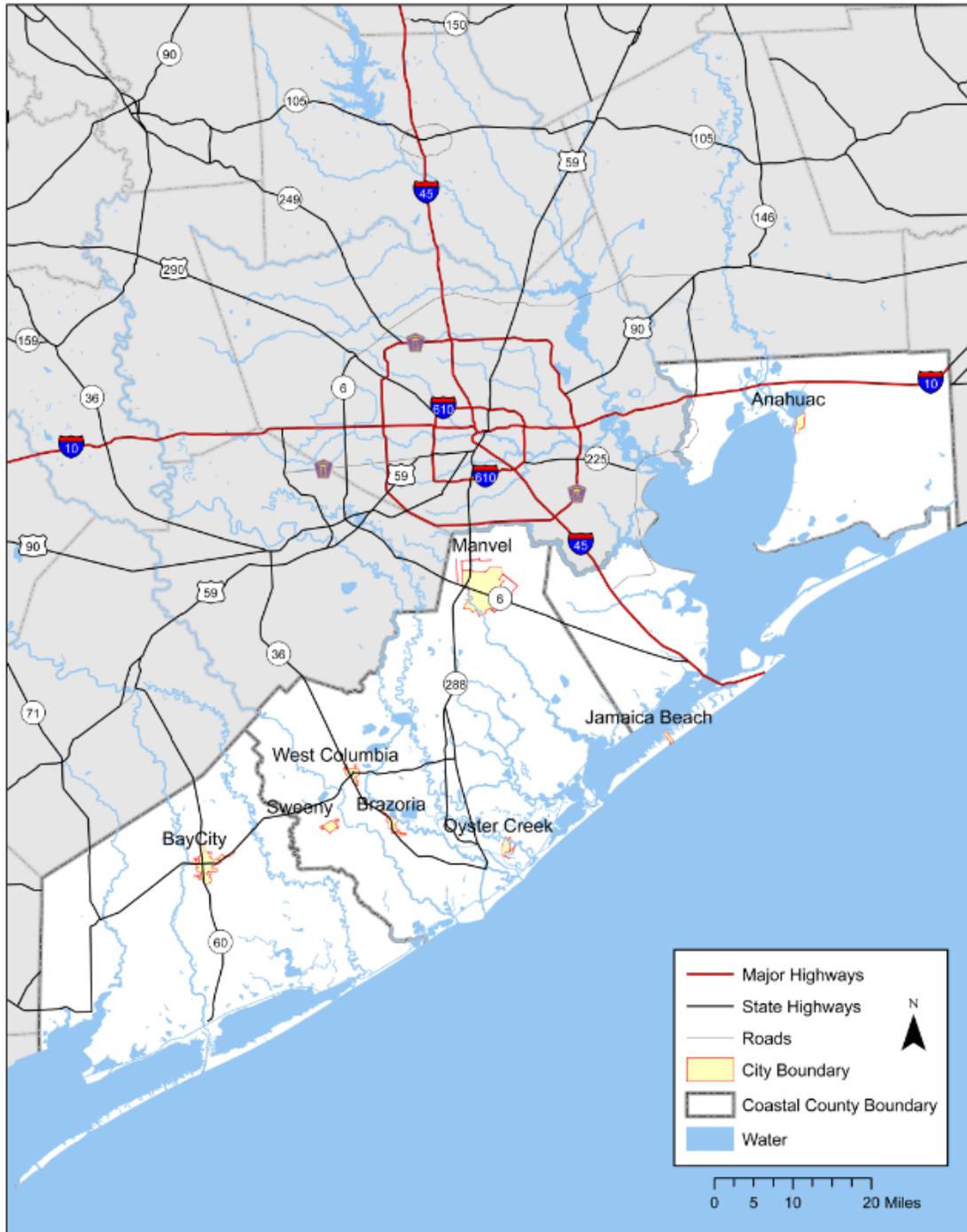
Between June and October 2012, staff met with eight communities either by conference call or in person. Using a general guideline of discussion topics and questions¹⁹ (found in Appendix A), H-GAC informally discussed the city's utilities programs, general demographics and growth projections information, education and outreach programs, any recurring problems or challenges they face, interest they may have in utilizing model materials or programmatic elements, and a 'wish list' of related items or programs the community would like to pursue if funding or staff resources were sufficient. H-GAC also discussed any related funding opportunities the community is currently seeking and/or whether they may need any assistance acquiring project funding.

City staff participation ranged from one to three people, and generally included a combination of city manager, city administrator, public works director, and/or mayor.

Figure 1 is a map of the communities that participated in the evaluations for the first year of this project. The eight participants included representation from all four coastal counties in the H-GAC region. A summary of the program evaluation for each community follows Figure 1.

¹⁹ This document was for internal staff reference, and was not intended as a formal survey or data gathering instrument. Staff did not follow it rigidly or provide it to the meeting attendees. Its sole purpose was as a conversation guide for staff, and conversations were not limited to its contents.

Figure 1. Coastal Communities evaluated in 2012



City of Anahuac

H-GAC staff held a conference call with Lance Nauman, City Administrator, and Scott Wible, Water/Wastewater Operations Manager, on June 11, 2012. Table 2 provides a summary of the discussion with the city. The City of Anahuac is a historic community, located adjacent to Lake Anahuac and Trinity Bay. It is primarily residential, with a mix of commercial and industrial land uses.

The City of Anahuac's drinking water is from surface water²⁰, their population is entirely on sanitary sewer²¹, and the storm water system consists of open drainage ditches throughout the city. Utilities are paid by a fee-based fund, while the storm water system is funded by the general road and bridge funds²².

Anahuac does not have a pet waste ordinance but they have done conservation outreach in the past. The city does not have an outreach program for household hazardous waste (HHW) pickups, but the county does have a program available. City staff indicated that there is little interest in HHW by the residents. City staff is, however, very interested in being provided with education and outreach materials for distribution to residents.

Infiltration/Inflow (I & I) in the sanitary sewer system and drainage are Anahuac's two main problems, which are exacerbated by the city's proximity to Trinity Bay and Lake Anahuac. After rain events, flows can greatly increase, causing sanitary sewer overflows (SSOs) resulting from I & I, and flooding within neighborhoods. Lack of financial and staff resources to adequately maintain the storm water system was emphasized by city staff. Even if infrastructure is improved, the city would not have the means to maintain drainage ditches. Sedimentation and vegetation are two main contributors to the lack of efficient drainage capacity in the storm water system.

The greatest need identified by the City of Anahuac is improving their ability to provide the necessary maintenance for the infrastructure already in place. Although infrastructure improvements would help alleviate some of their problems, they face challenges in maintaining the system they currently have in place. Because of this, the city is interested in H-GAC providing assistance in locating funding opportunities that can provide support of its chronic storm water problems within the city.

²⁰ Questions regarding drinking water source were posed to the communities to assess whether there was any relationship between their water source and nonpoint source contamination concerns.

²¹ Throughout these evaluations, H-GAC specifically requested information on the extent of wastewater service provided by OSSFs as opposed to sanitary collection system. OSSFs have been noted as an appreciable potential source of fecal bacteria nonpoint source pollution in this region. The relatively older age of infrastructure and development in these communities potentially increases the chance for contributions from unpermitted and/or failing OSSFs.

²² The use of separate enterprise funds for utilities, as opposed to funding infrastructure through general ad valorem tax revenue or similar sources, was another focus of discussions throughout the program assessments. This distinction was made to evaluate whether the method of funding infrastructure was related to funding issues faced by the communities.

Table 2. City Summary - Anahuac

Anahuac
Problems
I & I
Drainage**-due to flatness and proximity to Trinity Bay/Anahuac Lake
Lack of resources for maintenance
Sediment
Education/Outreach
No pet waste ordinances
No HHW outreach
Some educational outreach
Needs
Maintenance equipment
Funding - mainly for maintenance
Utilities
Open ditch
Fee based funds
All sanitary sewer, no OSSF
Surface water
10-15% population increase in next 10 yrs

City of Bay City

H-GAC staff held a conference call with Roberto Montelongo, Assistant Director of Public Works, and David Luce, Utility and Street and Bridge Superintendent, on June 25, 2012. Table 3 provides a summary of the discussion with the city. Bay City is a mix of residential, commercial, and industrial land uses, and is located directly on the Colorado River, upstream of Matagorda Bay.

The City of Bay City uses groundwater for drinking water and has very few on-site sewage facilities (OSSFs) within the city limits. Most of the city has open ditches, but there is currently a small amount of curb and gutter conveyance within the denser parts of the city. Utilities are paid through an enterprise fund.

The city does not have any formal education and outreach programs, but they are interested in model programs that can be provided by H-GAC. Although it is not enforced, there is a fats, oils, and grease (FOG) ordinance in place. Some lift station failures have been attributed to FOG. Once or twice per year, the city holds a HHW pickup day.

Flooding within the city is a major reoccurring problem after any significant rainfall event. Ditches and culverts are not regularly cleaned or maintained, which has led to sedimentation problems. Ditches are only cleaned on a complaint basis.

City staff does not have the resources to dedicate staff time to develop education and outreach, including a FOG program. If H-GAC can provide assistance or provide a model program, the city would be able to better enforce the ordinance. Bay City's 'wish list' includes funding for new water and sewer lines to replace the outdated lines causing problems throughout parts of the city. H-GAC was asked to help locate grant opportunities and write proposals to assist with these problems.

Table 3. City Summary – Bay City

Bay City
Problems
Inadequate drainage, flooding with any significant rainfall
Lift station failures, related to FOG
Ditches have not been cleaned, leads to flooding
Occasional SSO and lift station failures
Education/Outreach
FOG ordinance, but not enforced
No education/outreach
HHW day 1x or 2x per year
Needs
Model program for inspections (grease traps/FOG)
Funding for street rehab
General funding needs
Grant writing assistance
Model ordinances, education/outreach programs
Utilities
Open ditch, very little curb and gutter
No construction ordinances
All sanitary sewer, very few OSSF
Groundwater
No pretreatment program for industrial users
Enterprise fund
Planning full rehab of streets to c/g and update storm water facilities

City of Brazoria

H-GAC staff held a conference call with David Jordan, Director of Public Works for the City of Brazoria, on June 26, 2012. Table 4 provides a summary of the discussion with the city. Brazoria is a small, primarily residential community located between the Brazos River and the San Bernard River, upstream of several crucial coastal estuarine areas.

The City of Brazoria's sanitary sewer system covers the entire city limits; there are no OSSFs within the city. Brazoria's drinking water is surface water from the Brazos River, and the storm water system is overwhelmingly composed of open linear ditches. All utilities are paid through an enterprise fund.

Despite the lack of a FOG program, the city has not experienced grease-related problems. Brazoria does, however, have an active outreach and education program through the elementary and junior high schools. Teachers promote conservation, waste, and recycling programs. Twice per year, the city holds the 'Clean up Brazoria Day,' which promotes and facilitates the cleanup of HHW and trash, along with used oil, paint, and tires.

Over the past 10 years, Brazoria has focused on improving the chronic SSO problem that occur throughout the city. Most of the SSO problems are thought to be associated with private yard lines at individual homes. The city has also had drainage issues throughout its storm water system. However, of all the outfalls that affect the city's drainage, the city only controls a few of them. Others are controlled by the Brazoria County Drainage District, which makes it difficult to maintain the storm water system. In the past, maintenance has generally been done on a complaint basis. By acquiring more of the outfalls over the past few years, the city has been able to be more proactive with its maintenance program, and they have improved drainage time after large rainfall events.

A program through a local bank for homeowners to replace private sewer lines has provided a funding mechanism to alleviate many of the city's SSO problems, so the main item on their 'wish list' is funding to assist in installing replacement pipe throughout the city. A main point of concern for the city is their inability for their sewer plant to be in compliance with the TCEQ. Despite constant attempts at identifying and improving their problems, they continue to receive fines. Brazoria expressed concerns about having to allocate resources to fines instead of toward improvements. They have identified a need to work with the TCEQ to help them solve their problems by re-allocating fines to improvements.

Table 4. City Summary - Brazoria

Brazoria
Problems
SSO, mainly from private yard lines
Flooding, have made recent improvements
Education/Outreach
No FOG inspections, but little problems with grease
Water conservation, waste, and recycling programs
HHW 2x per year
Needs
Replacement pipe
Help getting into compliance with TCEQ
Utilities
All sanitary sewer, no OSSF
99% open ditch
Brazos River (drinking)
SAB includes homes outside of city, too
Enterprise fund
Little residential growth, some in last two years

City of Jamaica Beach

H-GAC staff met in person with John Brick, City Administrator, on September 4, 2012. Table 5 provides a summary of the discussion with the city. Jamaica Beach is an almost exclusively residential community on Galveston Island, west of the main population center of Galveston.

Jamaica Beach provides sanitary sewer service to all homes within the city, and there are no legacy OSSFs. Water is purchased from the City of Galveston. Storm water is conveyed by open ditches. Water and wastewater utilities are paid by general revenue, and the storm water system is maintained by revenue from property taxes.

The only outreach and education the city offers deals with flooding. There has been little interest from residents concerning other aspects of outreach. Two HHW events are held each year.

The only significant problem the city faces is a chronic flooding issue caused by a lack of drainage. A beach-facing intersection floods because sand builds up and high tide sends water into the ditch. It is a problem the city has experienced for more than 10 years, and they have not been able to alleviate the issue. The location of the community on a thin strip of central western Galveston Island leads to greater than usual impact from flooding and/or storm surge.

Consequently, Jamaica Beach is looking for a solution, whether it is planning support or infrastructure funding, to solve their existing drainage issue. The City has made continued routine improvements to their drainage system in recent years.

Table 5. City Summary – Jamaica Beach

<p>Problems Major drainage problem to beach Grass ditches require frequent maintenance</p>
<p>Education/Outreach Education on flooding None for conservation, quality HHW events twice per year</p>
<p>Needs Improve drainage at intersection to beach Rip Rap in long ditches Beach nourishment</p>
<p>Utilities 100% Sanitary Sewer 100% open ditches Purchases drinking water from City of Galveston Paid by general revenue, storm water paid by property taxes</p>

City of Manvel

H-GAC staff held a conference call with Kyle Jung, on June 27, 2012. Table 6 provides a summary of the discussion with the city. The city of Manvel is the furthest inland of the coastal communities identified in this project, being far upstream of Chocolate Bay on Chocolate Bayou. It also is the closest to rapidly growing urban centers.

There is very little sanitary sewer service in the Manvel city limits. There has been an increasing number of municipal utility districts (MUDs) since the city has began to develop rapidly in the past few years, but their coverage is still not extensive. Consequently, there are still homes with OSSFs within the city. All drinking water is from groundwater, and most of the storm water conveyance is through open ditches. Similar to sanitary sewer, as neighborhoods develop, there is an increasing amount of curb and gutter storm water infrastructure. City utilities are paid through a combined enterprise fund.

Manvel has a FOG ordinance and inspection program that is well enforced. They do not have any other education and outreach programs, nor do they have any HHW events. The City indicated that it would greatly benefit from model ordinances and outreach materials made available by H-GAC.

The biggest problem Manvel faces is drainage issues throughout the city, caused by the flatness of the land. The city expects exponential growth in its near-term forecasts due to its close proximity to State Highway 288 and access to downtown Houston. Managing the resulting fast-paced development was identified as a potential challenge. Storm water and utility infrastructure must be prioritized in order to prevent the already looming drainage issues from becoming worse as population and impervious cover increase.

Additional water and sewer lines are at the top of Manvel’s ‘wish list’ as development increases in otherwise rural areas. A future commercial site is currently without both water and wastewater services, which has become a bottleneck to growth.

Table 6. City Summary - Manvel

Manvel
Problems
Few infrastructure problems, little problems with I & I
Drainage** - biggest problem b/c so flat
Education/Outreach
FOG inspection, regular inspections
No ISD outreach programs or water conservation
No HHW
Needs
Water tower
Extension of water and sewer lines
model outreach programs
Full GIS of utility infrastructure
Utilities
Very little Sanitary, mostly MUDs and OSSF
Plans to greatly increase number of water/wastewater plants
Combined enterprise fund
No industrial users, no pretreatment
WWTF discharge to tributary to Chocolate Bayou
Storm water drains to Mustang and Chocolate
Mostly open ditch, c/g only in new developments
All drinking water is groundwater

City of Oyster Creek

H-GAC staff held a conference call with Toby Guenter, City Administrator and Lewis Guidry, Mayor, on October 24, 2012. Table 7 provides a summary of the discussion with the city. Oyster Creek is located

almost directly adjacent to the coast, upstream of Drum Bay/Christmas Bay and adjacent to sensitive wildlife areas including Brazoria National Wildlife Refuge. The City is a mix of residential and commercial land uses, in the heavily industrialized Freeport/Brazosport area.

The City of Oyster Creek provides sanitary sewer service and drinking water to the entire city. Drinking water is both from local groundwater and surface water purchased from the Brazosport Water Authority (BWA). Brazoria County maintains the storm water system, which is entirely composed of open ditches. Utilities are paid through an enterprise fund.

The city has not considered providing any water conservation outreach and education because their drinking water system is actually oversized for their current use. They indicated they face a disadvantage in promoting conservation because it decreases needed revenues. Stagnation of water in the distribution system has been an issue, so they encourage their customers to use the water instead of conserving it to promote continual flow through the system. Brazoria County holds one HHW event per year in which Oyster Creek residents participate.

As stated previously, while the city does not maintain its own storm water system, H-GAC staff decided to include Oyster Creek in this project because of a concern that was expressed during the initial conversation. When surface water from BWA is used for drinking water²³, a foul odor and taste is noticed by customers. However, when only groundwater is used, there is no problem. Despite attempts to identify and alleviate the cause of the issue, city staff has been unsuccessful in solving the problem.

Oyster Creek staff has asked H-GAC for assistance in identifying a possible cause and solution for the odor and taste problem associated with the BWA water. If possible, H-GAC may be able to facilitate discussion with BWA or other entities. Oyster Creek is also seeking funding opportunities for specific utility maintenance projects. While not necessarily in the scope of this project, H-GAC may be able to locate possible funding opportunities available to the city.

²³ The city often uses a mixture of surface and groundwater for its drinking water supply. Oyster Creek is under contract with BWA, so they are required to purchase a certain amount of surface water. While it is likely that taste and odor issues are primarily aesthetic in nature, H-GAC staff will facilitate discussions between these entities, as appropriate, to ascertain whether a nonpoint source pollution issue may be involved (e.g., excessive nutrient contribution in the source watershed.)

Table 7. City Summary – Oyster Creek

<p>Oyster Creek</p> <p>Problems</p> <p>Taste and odor of drinking water caused by surface water Distribution system too big, causing stagnation</p> <p>Education/Outreach</p> <p>None for conservation None for FOG HHW pickup event once per year by county</p> <p>Needs</p> <p>Solve drinking water taste and odor issue Elevated storage tower maintenance Manhole repair</p> <p>Utilities</p> <p>100% Sanitary Sewer ~50% drinking water from surface water (BRA) and ~50% from groundwater SAB is same as municipal boundary Drainage 100% open ditch County maintains drainage ditches Minimal growth Paid by enterprise fund</p>

City of Sweeny

H-GAC staff held a conference call with Cindy King, City Manager, Homer Toscano, Director of Public Works, and Wendell Becker, Public Works Foreman, on June 26, 2012. Table 8 provides a summary of the discussion with the city. Sweeny is located near the San Bernard River and the San Bernard National Wildlife Refuge, and is adjacent to a large petrochemical complex. The city is a traditional mix of residential and small commercial land uses.

The City of Sweeny provides sanitary sewer to the entire city, and its drinking water is entirely from groundwater supplies. Open ditches make up about three-quarters of the storm water system. All the city’s utilities are paid through an enterprise fund.

Sweeny has a FOG ordinance and inspects businesses as needed. The city does not have any outreach and education programs. Brazoria County provides a HHW pickup event once per year.

Sedimentation and aging infrastructure present the most pressing problems for Sweeny’s storm water system. Ongoing maintenance in coordination with the county is required to control the sedimentation problem in the drainage ditches. Broken concrete and clay line pipes throughout the city have also created drainage issues caused by I&I.

City staff did not show an interest in receiving planning support or education and outreach material. Monetary support is needed, however, because they do not currently have the funds to do necessary upgrades to their system. They expressed interest in hearing more about grant or funding opportunities.

Table 8. City Summary – Sweeny

Sweeny
Problems
Chronic I & I
Problems with existing system due to rainfall and condition of system
Sedimentation issues
Education/Outreach
FOG ordinance, inspect as needed
No HHW, county has a day
Needs
Drainage issues
Funding for replacing lines
Utilities
100% sanitary sewer
WWTF discharge to San Bernard River
75% open ditch
No industrial users
Groundwater (drinking)
Enterprise fund
Little growth

City of West Columbia

H-GAC staff held a conference call with Debbie Sutherland, City Manager of the City of West Columbia, on June 27, 2012. Table 9 provides a summary of the discussion with the city. West Columbia is a historic community located adjacent near the Brazos River, at the juncture of two regional transportation corridors. The city has a larger commercial base than many of the participating communities, but does not have a substantial industrial presence within its limits.

The City of West Columbia provides sanitary sewer service to almost all of the homes within the city limits. There are only a few OSSFs. Groundwater is the source for the city’s drinking water, and most of the city has open ditch drainage. The only curb and gutter infrastructure within the city is along Highway 35 and Business Highway 35.

The city does not have a formal FOG ordinance, nor do they have their own HHW event. The only education and outreach materials are basic information that is listed on the city's website. There is a desire for both a formal FOG program and model ordinances and outreach material. The city does not currently have the staff time or resources available for development and implementation.

Because of the drought conditions over the past few years, West Columbia has not been experiencing many SSOs. I&I, however, is an ongoing problem in rain events. The city does have a grant to replace sewer lines in economically disadvantaged areas. Otherwise, they are only able to replace lines as resources allow. Problems are spread out in areas depending on the age and type of pipe that is in the ground. The drought has been causing many breaks in water and sewer lines, and ability to adequately maintain its drainage ditches are another ongoing challenge. The city coordinates with Brazoria County to mow and clean out the ditches as often as resources allow, but additional maintenance would benefit drainage.

Located along the Highway 35 corridor, and proximate to the local population centers of Lake Jackson and Angleton, West Columbia has the potential for increased growth over the next decade. Before they experience additional growth, the City is interested in augmenting their infrastructure and nonpoint source planning efforts and research support. City staff wants to identify projected growth in problem areas, and identify planning options to address concerns in these areas. Texas Department of Transportation (TxDOT) has a requirement that businesses have storm water detention adjacent to the highway for flood prevention. Because of this, businesses have been reluctant to build in West Columbia, which the City has identified as an impediment to growth. City staff has asked for assistance in looking for ways that this problem can be alleviated.

Table 9. City Summary – West Columbia

West Columbia
Problems
Chronic I & I
SSO, replacing sewer lines in low economic areas (~60%)
Drainage due to flatness
Ditch maintenance (lack of)
Development issues with TxDOT, detention/retention ponds along hwy
Education/Outreach
Informal FOG program, no ordinance
None, basic information on city website
HHW, participate with county
Needs
Desire to recycle water, but funding is an issue
FOG program (don't have one due to funding and time)
Studies done to locate problem areas and how to solve the problems
Study to identify areas to grow
Regional program to share resources
Locate and apply for grant/loan funds
Utilities
100% sanitary sewer coverage, few OSSF
Groundwater (drinking)
Mostly open ditch
Utilities funded through certificates of obligations, block grants
Population has decreased, hope to maintain

Summary of Program Evaluations

After completion of the interview process, H-GAC staff compiled the information to create a profile of the utility services provided by the communities and common themes among the challenges they described.

Coastal Communities Profile

The coastal communities evaluated ranged in size, age, and financial situation. There were some differences in the utility services they provided and their approach to managing storm water quality and quantity. To better portray the scope of situations involved, H-GAC staff compiled a brief cumulative profile of the communities.

In general, the communities are a mix of land uses, although residential is the dominant land use category. The eastern communities (Anahuac, Jamaica Beach) are predominantly residential, while the communities in Brazoria and Matagorda Counties have varying degrees of industry, primarily petrochemical in nature. Three of the communities are directly on or adjacent to the Gulf of Mexico or the Galveston Bay system, while five of the communities are located further inland. Of these five, however, all but Manvel are located proximate to the flood plains of major river systems. The communities in Brazoria County saw the greatest potential for growth, primarily due to projected increases in petrochemical industry presence in the area.

Table 10. Demographics Summary

	Demographics	
	Population	Growth
Anahuac	2,400	yes
Bay City	18,000	unsure
Brazoria	3,000	some
Jamaica Beach	1,000	minimal
Manvel	8,000	exponential
Oyster Creek	1,162	minimal
Sweeny	3,684	minimal
West Columbia	3,905	possible

Style of governance and staffing levels varied with size of the community, but none of the communities had dedicated staff for storm water or NPS issues specifically. In general, education and outreach on

NPS issues or related storm water or utility concerns was limited²⁴. None of the communities reported actively pursuing advanced storm water quality BMPs (low impact development principles, etc.)

All of the communities that were evaluated provide sanitary sewer service to their residents. There are only a few cities with legacy OSSFs remaining within the city limits. Of the eight cities, four provide drinking water from groundwater sources, while three use surface water for drinking water. One city (Oyster Creek) uses a mixture of ground and surface water. All cities except one (Jamaica Beach) have dedicated enterprise funds to pay for their utilities.

Table 11. Utility Services Summary

	Utilities							
	WWTF	OSSF	Water		Storm water		Revenue	
			Surface	Ground	Curb/gutter	Open ditch	Enterprise	General
Anahuac	x		x			x	x	
Bay City	x			x		x	x	
Brazoria	x		x			x	x	
Jamaica Beach	x		x			x		x
Manvel	x	x		x	x	x	x	
Oyster Creek	x		x	x		x	x	
Sweeny	x			x	x	x	x	
West Columbia	x	x		x		x	x	

Open linear ditches are the dominant storm water conveyance system used by all communities in this project. The denser, more urbanized communities have some sections of curb and gutter, but it is still a minority approach. One of the criteria H-GAC staff used for selecting cities to include in this project was that they maintain their own storm water system. Most do maintain their own ditches; however, several have an agreement with their respective county to assist with mowing and cleaning. Oyster Creek was still included in this project despite not maintaining their own storm water system because they showed interest in the project and they requested assistance from H-GAC.

²⁴ All of the communities had access to HHW events, but none had other HHW outreach efforts. Three of the communities had some program related to fats, oils, and grease (FOG). Two communities had water quality or water conservation oriented programs. None of the communities had pet waste outreach efforts or programs.

Common Challenges

While each community interviewed had its own unique challenges, there were several recurring themes that H-GAC staff identified. Many of the issues facing the communities in general were strongly rooted in the communities' small size, the impact of economic conditions, the logistical challenges of maintaining utilities in low-lying, relatively flat coastal areas, and the ability to maintain and allocate specialized staff resources. A summary of the evaluations is provided in Tables 12-15. The primary themes that emerged in the evaluations of the eight coastal communities, in order of the numbers of communities who identified them, were:

- **Aging/inefficient utility infrastructure** – All eight communities interviewed had some degree of their utility infrastructure in need of repair or replacement. Seven of the eight indicated this was in large part due to limited available resources. Issues related to this theme were SSOs due to I&I, flooding in wet weather conditions, and potential impacts of future demand.
 - Drainage /storm water infrastructure was the greatest issue, with seven of eight communities indicating they had drainage problems in wet weather events. While all seven indicated that part of their drainage issues stem from being low-lying coastal communities, they all also stated that funding to renovate and maintain infrastructure was a primary limiting factor.
 - Five of the eight communities indicated they had sanitary sewer collection system issues from I&I or other overflow causes, and one community indicating lift station problems.
 - One community indicated that they had issues with their drinking water utility. However, the issue was related to aesthetic problems in the source water and oversized infrastructure rather than an NPS-related issue.

Table 12. Utilities Issues Summary

	Problems				
	Drainage	I&I	Sanitary sewer		Water
			Lift stations	SSO	
Anahuac	x	x			
Bay City	x		x	x	
Brazoria	x			x	
Jamaica Beach	x				
Manvel	x				
Oyster Creek					x
Sweeny	x	x			
West Columbia	x	x		x	

- **Limited financial and staff resources** – All of the communities indicated that additional resources were needed to adequately address their infrastructure and maintenance challenges.

Common causes were the challenges of their size and limited tax base, the impact of current economic conditions, and inability to afford specialized personnel. Four of the eight indicated that funding routine maintenance was a particular problem. There was not an observable relationship between financial resources and revenue source (i.e. enterprise fund versus general revenue).

Table 13. Funding Needs Summary

	Funding Needs	
	Infrastructure	Maintenance
Anahuac		x
Bay City	x	x
Brazoria	x	
Jamaica Beach	x	
Manvel	x	
Oyster Creek	x	x
Sweeny	x	
West Columbia	x	x

- **Inadequate maintenance capacity** – Six of the eight communities surveyed indicated that they either lacked the financial, equipment, or staff resources to adequately maintain utility infrastructure. As indicated above, four of the eight indicated that funding levels were a primary driver for this challenge.

Table 14. Internal Capacity Needs Summary

	Needs (non-funding)			
	Maintenance		Ordinances	Grant writing
	Equipment	Services		
Anahuac	x		x	
Bay City			x	x
Brazoria				
Jamaica Beach		x		
Manvel			x	
Oyster Creek		x		
Sweeny		x		
West Columbia	x	x	x	

- Lack of outreach and professional services capacity** – While all eight of the communities held, or participated in, a household hazardous waste event, only two promoted water conservation or water quality programs other than fats, oils and grease (FOG) issues. Three of the eight communities had FOG programs. The most common reason cited for lack of additional programmatic elements was lack of staff time, financial resources, or model programs to draw from. Five of the eight communities indicated they would be interested in using model program materials if they were provided. Four of these communities indicated that model ordinance for FOG, pet waste, and other issues would be of greatest interest. Knowledge of NPS issues varied greatly among the communities. However, none of the communities were actively addressing NPS issues for their own sake, but rather, indirectly as part of infrastructure maintenance, etc.

Table 15. Education and Outreach Summary

	Education/Outreach			
	Conservation	Pet Waste	FOG	HHW
Anahuac	x			
Bay City			x	x
Brazoria	x			x
Jamaica Beach				x
Manvel			x	
Oyster Creek				x
Sweeny			x	x
West Columbia				x

- Regulatory burden** – One community indicated that ongoing issues with their sanitary sewer system have caused a challenge in resource allocation. They are spending money in fees that they would like to spend on addressing the issues.

The following section describes the relationship of these common challenges to potential NPS issues.

Nexus of Community Challenges with NPS Issues

Although the community interviews covered a wide array of questions concerning potential challenges, one of the primary purposes of this project was to evaluate the relationship of the common issues the communities face with the potential NPS sources that they impact or are impacted by. The focus of this evaluation, therefore, is to identify those common issues that have the greatest potential NPS impact.

The H-GAC region faces a diverse variety of NPS issues from an equally diverse number of sources. The greatest source of surface water quality impairment for the region as a whole is fecal bacteria/pathogens. Other regional concerns include precursors to low dissolved oxygen (including excessive nutrients and oxygen demanding chemical compounds), sediment, PCBs and dioxins, and impairment of macrobenthic communities through habitat change. Based on our interviews with the communities and the general character of their land use, the NPS sources this evaluation focuses on are fecal bacteria, nutrients, and sediment²⁵. The following is a brief discussion of potential sources of these constituents relevant to the communities interviewed.

Fecal Bacteria – There are a variety of sources of fecal bacteria²⁶ contamination in urban areas. NPS fecal contamination can be introduced through sanitary sewer collection systems (via leaks or overflows), failing or improperly maintained OSSFs, pet waste, and wildlife²⁷. Bacterial contamination is often a mix of sources rather than a single culprit. The primary concern for increased levels of fecal bacteria is the potential impact on human health from contact recreation in impaired segments and through ingestion of contaminated oysters.

Nutrients – Excessive Nitrogen and Phosphorus compounds can result in algal blooms and lower dissolved oxygen levels. Changes in water chemistry or changes in habitat by decreasing available light to lower trophic levels can impact the usability of a segment by aquatic communities. While the general impact on aquatic communities is the primary impetus for concern about excessive nutrients, small coastal communities may experience a specific impact in decreased tourism dollars, commercial fisheries productivity, and subsistence-level fishing productivity.

Sediment – Sediment transport between upland areas in the watershed and the bays and estuaries is a natural part of the hydrologic process. However, human activities can add additional volumes of sediment or impact the processes by which sediment is transported by sheet flow. Increased levels of sediment in navigable waterways can impact local economies and

²⁵ Appreciable industrial activity is located in and adjacent to some of the coastal communities, especially those in Brazoria County. While industrial contaminants reaching waterways through means other than permitted discharges include other potential NPS issues, or are aggravating factors for those identified by this report, these sources were not considered within the scope of this report. The focus for this evaluation was on those sources/issues that were mostly directly applicable to, and impacted by, the communities' jurisdictions.

²⁶ For the purpose of this discussion, fecal bacteria (specifically indicator species *E. coli* and Enterococcus) are discussed by name. However, in accordance with State of Texas Water Quality Standards, these contaminants are evaluated for the potential impact on human health via contact recreation and/or oyster consumption. Therefore, references to fecal bacteria in this summary are intended to be cumulative of the variety of fecal-borne pathogenic organisms for which they are an indicator.

²⁷ While some agricultural activity exists in the communities (especially in Brazoria County), it was not considered related to the infrastructure focus of this evaluation and was not identified by the communities as a primary concern.

aquatic habitat. Open drainage systems in these communities are vulnerable to excess sediment, and development practices can influence sediment loading to waterways.

To move toward a linkage between NPS issues and the community challenges, H-GAC compared the potential for the inability to surmount a challenge to result in additional NPS contamination. For example, if a community could not find resources to reduce SSOs from aging sanitary sewer infrastructure, it would be likely that that community would contribute additional NPS contamination to local water bodies. Those challenges that had a demonstrable relationship to NPS sources were ranked as more important to the purpose of this project. The relationship between the challenge and its potential NPS impact(s) form the basis of deriving prioritized needs for the communities. Table 16 indicates the relationship of the ranked challenges and the NPS pollution issues to which they relate²⁸. While this linkage is based on the impact of challenges on NPS contamination, it aligned well with the initial community priorities. Those challenges that were most commonly held to be a priority by the communities were also priorities for abatement of NPS contamination. With this linkage established, the next step was to assess what policy and programmatic recommendations would meet the combined needs of the community and also address NPS concerns.

²⁸ H-GAC recognizes that there are a variety of impacts of the Community challenges which are not represented in this chart (e.g., financial impact of flood damage). For the purpose of this evaluation, the focus is on those effects related to NPS pollution. However, it is expected that efforts to address these issues will have ancillary benefits beyond NPS abatement.

Table 16 – Nexus of Coastal Community Challenges and NPS Impacts

Community Challenge(s)	Potential Effects	Related NPS Impacts
Maintaining sanitary sewer infrastructure with limited financial and staff resources	<ul style="list-style-type: none"> • Increased SSOs • Increased sewage backups into homes 	<ul style="list-style-type: none"> • Increased fecal bacteria in waterways • Increased nutrients in waterways²⁹ • Additional health risk from sewage backups in homes •
Maintaining drainage infrastructure with limited financial and staff resources	<ul style="list-style-type: none"> • Contributes to SSOs • Flooding risk 	<ul style="list-style-type: none"> • Increased fecal bacteria from SSOs • Increased nutrients • Public exposure to fecal contamination in flood waters
Accommodating future growth	<ul style="list-style-type: none"> • Increased burden on sanitary sewer systems • Increased impervious cover • Increased burden on drainage systems 	<ul style="list-style-type: none"> • Increased fecal bacteria in waterways • Increased nutrients from overburden • Increased sediment carried directly to waterways • Increased sediment in drainage conveyances, decreased efficiency
Lack of outreach and education Capacity	<ul style="list-style-type: none"> • Less resident knowledge of FOG issues • Less resident knowledge of proper pet waste disposal • Less resident knowledge of nutrient management in lawn care 	<ul style="list-style-type: none"> • Increased fecal bacteria from FOG related SSOs • Increased fecal bacteria from pet waste • Increased nutrients in waterways from pet waste • Increased nutrients in waterways from over-fertilization, organic

²⁹ This evaluation is considering nutrients from an NPS issue perspective. It is recognized that a balance of nutrients is necessary to maintain bay and estuary productivity.

		debris
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Needs Assessment

The Needs Assessment (Assessment) process was intended to use the preliminary review of shared needs and their relationship to NPS contamination as a focal point for allocating resources and devising support strategies. The linkage between these two elements established where these needs/sources overlap, providing for a framework by which to prioritize future efforts; those issues that are both urgent for the communities and which directly impact nonpoint source concerns represent priority areas for support and foundations on which to build community buy-in for nonpoint source management efforts.

The final step in developing policy recommendations to support the communities in addressing these challenges was to identify the specific impediments the community faced. Table 17 identifies the prioritized challenges, the proposed solutions, the impediments to addressing those solutions, and the policy recommendations made for overcoming those impediments.

Impediments

As Table 16 indicates, some of the most pressing concerns for these small coastal communities revolve around the ability effectively obtain and utilize resources. These resource issues are not completely unique to the coastal communities; NPS efforts in general are limited by finite resources. However, the coastal communities H-GAC evaluated have unique challenges and opportunities that larger entities may more easily surmount. Smaller communities cannot often support specialized staff able to focus on NPS issues. The primary focus of their staffing is on maintaining mission critical services. Staff members interviewed invariably reported “wearing many hats”, i.e., serving a more general, multi-faceted function than their contemporaries in larger communities. Even in providing key services, lack of specialized staff or adequate staff to support the service was reported as a significant impact on the community’s ability to plan or act proactively in maintenance. These limitations impact both actual service provision as well as voluntary efforts like education and outreach on utility issues related to NPS.

In terms of financial resources, smaller communities may not as easily take advantage of the economies of scale available to larger systems. Smaller budgets often led to reduced ability to address unforeseen costs and situations.

The location of many of these communities aggravates the challenges they face. Not only do they have fewer resources to put toward maintaining their systems, but they faced increased system vulnerabilities and challenges of flat coastal topography. Drainage infrastructure is more vulnerable to storm surge and less consolidated sediments; utility infrastructure requires more lift station capacity and is more vulnerable to surge and other coastal threats. Even the logistics of outreach and education are unique to these smaller communities, with fewer venues for outreach.

Lastly, NPS issues in these communities are not always as “visible” to many state and regional efforts as larger systems are. They fall beneath the requirement for MS4 permits and are not traditionally as active in regional organization due to staff capacity challenges. This potential isolating effect can reduce knowledge of available resources and of the impacts of their decisions on NPS issues.

Policy Recommendations

Given that these communities have unique needs, a unique set of targeted solutions is necessary to tailor an approach to NPS abatement that compliments an approach to addressing the community’s basic service needs. The final purpose of the Needs Assessment was to match policy recommendations, including proposed services, to overcome the identified impediments. Each of the solutions for the four primary NPS-related challenges had its own set of policy recommendations, and the recommendations of this report are that the Coastal Communities Program fosters all policy recommendations in Table 17. However, the individual recommendations fit within four general categories:

- **Supporting pursuit of additional resources** – H-GAC proposes to assist communities in pursuing a variety of additional resources to enable them to manage their systems on a more proactive basis. Services related to this category include general land use planning support, coordination and facilitation between communities and with granting agencies, promoting additional funding sources like Supplemental Environmental Projects (SEP), and grant proposal and review support.
- **Coordination and facilitation** – H-GAC proposes to assist communities in seeking opportunities to coordinate with potential local, regional and state partners on implementation efforts, planning, and resource mobilization. Services related to this category include promoting and providing regional resources like population forecasting data and wastewater treatment infrastructure data, and facilitating meetings or other communication between communities and potential partners.
- **Developing and providing model materials** – H-GAC proposes to develop or promote an array of model materials for use by the communities. Potential materials include model ordinances, model programs, model grant language, model utility management plans, model storm water management plans, etc.
- **Outreach and education program development** – H-GAC proposes to assist communities in developing education and outreach efforts to address utility/storm water issues related to NPS pollution. Services include providing model materials/programs, plan development and review, and providing outreach support for meetings and events.

H-GAC recommends that the Coastal Communities Program be continued in subsequent Project years to help support the implementation of these policy recommendations. Additionally, TCEQ and other state and regional regulators are encouraged to consider the evaluations in the report in their interactions with these and other small coastal communities.

Paths to NPS Attainment

None of the participant communities are the sole, or even primary, source of NPS contamination for their adjacent water bodies. Implementation of activities under this Project cannot be construed as the sole solution to regional impairments. However, the policy recommendations made under this phase of the Program are intended to provide a path toward addressing one piece of the overall NPS issue. The attainment sought under this Program is the reduction of NPS contamination from sources in these communities, to the greatest degree practicable given the limitations they face. Given their proximity to coastal bays and estuaries, and the lack of regulatory framework on their storm water contributions similar to the Phase I and II communities, the efforts of this Program are framed as a necessary complement to other regional efforts. The path to attainment for these communities, therefore, mirrors the Program itself; identifying challenges, utilizing regional resources to plan for solutions, and receiving support to implement solutions. The roadmap for this collaborative effort is discussed in the subsequent section on next steps. While each community has a unique situation and will require a tailored approach, the fundamental focus on addressing NPS issues by relating them to infrastructure, maintenance and outreach needs of the community remains universal.

Table 17 – Needs Assessment Summary

Challenge	Recommended Solution(s)	Impediments to Solutions	Policy Recommendation(s)
Inadequate financial resources to repair current utility infrastructure.	Find additional financial resources for capital programs.	<ul style="list-style-type: none"> • Lack of awareness of funding opportunities. • Lack of staff capacity to pursue funding. • Lack of available funding. • Regulatory penalties decrease available funding 	<ul style="list-style-type: none"> • Provide outreach and guidance materials regarding funding opportunities • Provide grant and proposal development support • Recommend granting agencies, et al. specifically target funds for these communities; • Utilize SEP funds for appropriate projects. • Encourage regulatory entities to make special consideration of financial challenges for small communities in enforcement, as long as progress demonstrated.
Inadequate maintenance capacity for current utility infrastructure; inability to maintain proactively.	<ul style="list-style-type: none"> • Utilize external planning services. • Institute proactive utility management programs³⁰. 	<ul style="list-style-type: none"> • Availability of free or low cost planning services. • Knowledge of available services. • Lack of model program • Lack of staff capacity to develop/ implement. 	<ul style="list-style-type: none"> • Provide planning support services. • Promote Coastal Communities Program services through outreach and materials. • Make model programs, ordinances available. • Provide staff support for program development

³⁰ Including but not limited to regular inspection of transmission lines and conveyance, upgraded asset management policies, etc.

Challenge	Recommended Solution(s)	Impediments to Solutions	Policy Recommendation(s)
Accommodating future growth.	<ul style="list-style-type: none"> • Plan for increased burden on sanitary sewer and drainage system from additional population. • Plan for impacts of increased impervious cover. 	<ul style="list-style-type: none"> • Staff capacity for long range planning studies. • Financial resources for system improvements. • Uncertainty of growth. • Resources to fund, plan for mitigating impervious cover. • Knowledge of potential options for mitigating impervious cover. 	<ul style="list-style-type: none"> • Facilitate communication between communities, regional data sources, and regulators. • Support pursuit of additional financial and staff resources³¹. • Provide support to utilize regional forecasting data and projections to more accurately predict growth. • Support pursuit of additional financial and staff resources³². • Provide model materials and outreach on methods for mitigating impervious cover through structural or planning efforts.

³¹ As per rows 1 and 2 of this table regarding current utility infrastructure.

³² *Ibid.*

Challenge	Recommended Solution(s)	Impediments to Solutions	Policy Recommendation(s)
Lack of public knowledge about NPS-related utility issues.	<ul style="list-style-type: none"> • Develop outreach and education program/materials³³. • Increase community outreach and education efforts • Enact select ordinances 	<ul style="list-style-type: none"> • Lack of funding or staff capacity • Lack of model materials. • Lack of finding and staff capacity. • Lack of venues or appropriate media outlets. • Lack of model materials. 	<ul style="list-style-type: none"> • Provide model materials and programs. • Provide program development assistance. • Support pursuit of additional financial and staff resources³⁴. • Facilitate coordination with other communities and organizations with appropriate venues. • Utilize existing regional communication networks/assets to support outreach. • Provide model ordinances

³³ Key issues may vary from community to community, but include standard storm water/utility concerns like pet waste, FOG, nutrient management in lawn care, proper use of storm drains or drainage ditches, illegal dumping, etc.

³⁴ As per rows 1 and 2 of this table regarding current utility infrastructure.

Next Steps

The Coastal Communities Program was designed to be a multi-phased process. This initial phase was designed to prioritize areas of focus and identify community needs. In our discussions with the communities during phase I, a need for planning services and support was a common theme in meeting many of the identified challenges. Based on this identified need, H-GAC intends to pursue further phases of this Program.

Future phases will focus on providing planning support for implementation activities and expanding the participation base (Phase II) and providing planning and resource mobilization support for implementing NPS solutions (Phase III). Additionally, the information garnered from these evaluations will be disseminated to local, regional, and state regulatory entities, funding sources, and other relevant groups as appropriate to promote a better understanding of these small coastal communities. The desired result is to help shape interactions with these communities in such a way as to provide a greater resource base to the communities and also provide a more efficient means of achieving NPS abatement successes for state and local entities.

Phase II of the Coastal Communities Program, initiated under the FY 2013 Project will focus on disseminating information from Phase I to state and regional entities (TCEQ, TSSWCB, TWDB, et al.) and marketing planning support services to the participating communities. Potential services to be offered by H-GAC would be grant identification and proposal assistance, provision of model materials (ordinances, education programs, etc), and outreach opportunities. H-GAC will also seek to facilitate communication between these communities and relative resource agencies. The focus of this phase will be to generate community interest in expanding efforts that have a relationship to NPS abatement (e.g., proactive management of sanitary collection systems, establishing pet waste ordinances, etc.) and assisting interested communities in developing these elements for implementation.

Phase III of the Program will be the eventual implementation of planned activities/BMPs. H-GAC will support local communities as in Phase II, with an additional focus on measuring outcomes to indicate programmatic success.

Throughout the program timelines, H-GAC will seek to increase participation and foster community commitment.