Water Quality Planning for the Houston-Galveston Region

Water Quality Management Plan Update, FY 2016

Funding for this project was provided by the Environmental Protection Agency through a Clean Water Act 604(b) grant to the Houston-Galveston Area Council, administered by the Texas Commission on Environmental Quality.

Houston-Galveston Area Council

TCEQ

EPA United States Environmental Protection Agency

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Prepared by the Houston-Galveston Area Council, in coordination with the Texas Commission on Environmental Quality. This project was funded under a Clean Water Act Section 604(b) grant; TCEQ contract number 582-16-60224.

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Acronyms

BMP	Best Management Practice
CCP	Coastal Communities Program
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
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
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 582-16-60224 (Project), a 604b project administered by the Texas Commission on Environmental Quality (TCEQ). The Project entailed a series of five (5) data collection, special study, and coordination activity objectives[1] 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, watershed planning, and 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 document[2] is a summary of the results of these efforts, and a discussion of future needs.

Objective 2 – Quality Assurance – This objective involved the maintenance of the project Quality Assurance Project Plans (QAPPs): the Regional Water Quality Data Acquisition and Compilation QAPP (Data QAPP) for the collection and assessment of the various data sources described under Objective 3; and the Regional Geospatial Data QAPP (Geospatial QAPP) for the collection and analysis of geospatial data as described in Objective 6 (Subtasks 6.1 and 6.2 related to OSSF database maintenance). The following tasks were completed:

- A **QAPP discussion** was held (as part of a general post-award meeting) on 9/17/2015 between H-GAC and TCEQ staff, along with continuing conversations throughout the Project term, including at the 8/26/15 planning meeting (Task 2.1)
- Annual Reviews of the **Geospatial QAPP** was completed and submitted by H-GAC, and approved by TCEQ and EPA.
- A new version of the **Data QAPP** was developed, approved, and disseminated.

Objective 3 - Wastewater Data Update and Coordination – Objective 3 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, coordination of regional watershed management efforts, and an evaluation of bacteria data reported in WWTFs' discharge monitoring reports (DMRs). 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).
- The **WWTF permit information database** was updated with new permit information through 7/1/16, reviewed for outdated or erroneous data, and then compared against

[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 in digital format, as noted in the Report.

the service area boundaries and outfall location datasets. Staff reviewed updated TCEQ online databases to identify points of redundancy to address in future projects.

- H-GAC reviewed **four** applications to the **State Revolving Fund** (SRF), and provided formal comment to the TCEQ (Task 3.3).

Objective 4 - Support Watershed Planning– Objective 4 involved support of watershed planning in the San Bernard River watershed and general coordination and support for regional watershed and water quality efforts. The following tasks were completed:

- Continued **stakeholder coordination** for the San Bernard WPP project was facilitated by H-GAC. H-GAC presented project information to prominent local partners (at the annual Friends of the River San Bernard meeting) and drafted a newsletter for dissemination in Q4 [3] . H-GAC staff also provided outreach at Migration Celebration (a community environmental event in the watershed). A primary effort of this year was coordination of revisions to the San Bernard WPP with TCEQ staff (Task 4.1).
- 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 including the Galveston Bay Estuary Program's Water and Sediment Quality and Monitoring and Research subcommittees, and coordinating efforts between other H-GAC environmental efforts and this Project (Task 4.2). In conjunction with Task 3, H-GAC fulfilled several project data requests for regional stakeholders, including the Gulf Coast Waste Disposal Authority, the Gulf Coast Water Authority, the Galveston Bay Foundation, and local governments.

Objective 5 – Coastal Nonpoint Source Program Coordination – For the fifth objective, H-GAC's primary areas of focus were representing small coastal communities in RESTORE Act planning processes, and providing direct support to participants. A program website was maintained to host model materials, funding resources, and other pertinent information. The following tasks were completed:

- H-GAC facilitated continued **program maintenance** for the Coastal Communities project through materials disseminated by email and/or its website. (Tasks 5.1).
- H-GAC **provided coordination and resource support services** to the program participants and other small coastal communities including coordinating with a Houston Wilderness-led project to generate a regional conservation plan and attract funding from RESTORE and other sources; continuing to assist the City of Morgan's Point on a coastal prairie/open space restoration project; providing education and outreach to coastal residents at local events (Migration Celebration, World Oceans Day, Trash Bash – Demi John) and through H-GAC led programs (in conjunction with Task 6 and TCEQ project 582-14-40156, implementation of the Bastrop Bayou WPP) (Task 5.2).

[3] As of the time of this writing, the newsletter is currently under review by TCEQ.

- In addition, H-GAC maintained **a program website**[4] to host program resources, funding opportunities, and related information relevant to our program participants (Task 5.1).

Objective 6 - OSSF Database Update – In fulfillment of Objective 6, H-GAC updated and expanded an existing GIS database of regional on-site sewage facility (OSSF) locations and a spatial projection of likely locations for unpermitted systems[5]. The following tasks were completed:

- The **OSSF location database** was updated with new data received through 7/1/16 (Tasks 6.1).
- The **unpermitted OSSF methodology** was reviewed and updated by H-GAC staff. (Task 6.2)
- H-GAC staff held a series of **OSSF Visual Inspection** trainings for residents and real estate inspectors (in conjunction with other projects.)

[4] www.coastalcommunitiestx.com
[5] These data collection and analysis activities took place under the auspices of the H-GAC Regional Geospatial Data QAPP.

Introduction

This document is the culminating report for the fiscal year 2016 efforts conducted under 604b-funded Contract 582-16-60224 (Project) between the H-GAC and the TCEQ. The Project involved acquiring, compiling 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, watershed management, coastal nonpoint source management, 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 relatively 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[6] set forth in the Project:

- Quality Assurance
- Wastewater Data Update and Coordination
- Support Watershed Planning
- Coastal NPS Program Coordination
- OSSF Database Update

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 used to fulfill the deliverables is provided in the **Methods** section. Some of the deliverables are generated as large electronic datasets, unsuitable for full inclusion in a printed version of this final report[7]. However, representative pieces of each deliverable are included,

[6] Objective 1 (Project Administration) and Objective 7 (Final Report) are not specifically reported on in this document, as they relate only to the maintenance of the contract and the development of this document.
[7] Copies of these electronic data are contained within the media that accompanies this report, and have been provided under separate cover.

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** and **Summary** sections. Additional information and standalone reports completed for some deliverables are provided in the **Appendices.**

Project Significance and Background

Background

Even with a downturn in the oil market, the Houston region continues to grow at a rapid pace. Development, and its accompanying infrastructure and pollution challenges, has continued to expand into counties beyond the urban core. At the same time, existing infrastructure has continued to age and has faced challenges related to drought and flooding events. With several million more residents expected by 2040, 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[8]. An overwhelming majority of the region's segments are unable to meet one or more state water quality standards. The most common source of impairment is elevated bacteria levels in excess of 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 is relatively widespread and diffuse rather than limited by the bounds of a traditional, centralized model. The resulting patchwork of regional wastewater infrastructure development offers both future challenges and opportunities for local decision-makers. The accumulation, maintenance and application of wastewater and effluent quality data can help inform regional solutions to these challenges.

Under previous 604b projects, H-GAC has sought to address aspects of the information and data needs related to the water quality issues the Region faces. These projects have typically been a mix of ongoing 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, Phase II stormwater permit implementation, etc.). This balance allows the long term accumulation of data while retaining flexibility to address specific issues. The ongoing efforts in the FY16 Project focused on updating and improving existing regional

[8] The list of impaired water bodies is part of the State's Integrated Report of Surface Water Quality (for the Clean Water Act Sections 305[b] and 303[d]). The current (2014) report can be accessed online at https://www.tceq.texas.gov/waterquality/assessment/14twqi/14txir

wastewater infrastructure databases and spatial datasets of OSSF locations, providing nonpoint source management support to small coastal communities, and supporting local watershed protection planning. Short term/special study efforts include facilitating watershed planning efforts for the San Bernard River, a regional priority watershed.

Significance

From a regional perspective, the water quality and wastewater infrastructure 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.

The data collection and analysis tasks completed under this Project have significant value for a variety of efforts in the Region, benefitting local watershed protection planning, wastewater infrastructure planning, and program development.

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 and regional data sharing** – The wastewater permit data, service area boundaries, 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. For example, this year's data was used by the Houston-area Bacteria Implementation Group (BIG) TMDL effort; the West Fork Watersheds, San Bernard River, Cedar Bayou, and Bastrop Bayou WPPs; the Clean Rivers Program; the Trust for Public Land's Lake Houston Greenprint project; and in the planning activities of a variety of local governments and organizations.
- **Regional project coordination** – Maintaining and expanding regional data resources 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.) Participation in regional groups and efforts helps ensure decisions benefit from project resources and expand the reach of the project's aims through partner efforts.
- **Source water protection** – A large portion of the Region's population is served by treated surface water that originates in our local rivers and lakes. The infrastructure planning and watershed coordination activities of this Project fostered greater understanding of the issues facing surface water drinking sources.
- **Project review** – Data and analyses allow H-GAC Project staff to assist state and federal granting agencies in review of regional grant applications. These reviews ensure 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 continuation of the Coastal Communities Program focuses on supporting efforts by the participating communities and other small coastal communities to access funding and support to reduce point source and NPS issues.

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 WQMP Update requirements, and therefore are not reported on this document).*

Objective 2: Quality Assurance

This objective includes tasks related to maintenance and update of two existing Quality Assurance Project Plans (QAPPs): the Regional Water Quality Data Acquisition and Compilation QAPP (Data QAPP) for acquisition, compilation and assessment of TPDES permit data and related information as part of Objective 3; the Regional Geospatial Data QAPP (Geospatial QAPP) for the collection and analysis of geospatial data as described in Objectives 4 and 6.

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 as part of a project kickoff conversation on 9/17/2015 after the initiation of the contract (planning conversations were also held on 8/25/15). The outcome of the meeting was a confirmation of the elements covered by each QAPP and a briefing for TCEQ staff on the project background. Informal discussions regarding the maintenance and update of the QAPPs occurred continuously throughout the project term, including the annual certification for the Geospatial QAPP and the development of a new Data QAPP.

Task 2.2 – QAPP

The existing QAPPs were maintained during this time period, with updates and revisions made as part of Task 2.3.

Task 2.3 – QAPP Updates/Amendments

H-GAC amended the Geospatial QAPP for content and for annual certification. The revised version was submitted and approved by TCEQ and EPA. A new version of the Data QAPP was developed, approved, and implemented.

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

This objective includes tasks related to wastewater infrastructure data collection, dataset update and management, and SRF project proposal reviews.

H-GAC maintains a series of datasets related to TPDES-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, this boundary data 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.

H-GAC GIS staff accumulated and integrated service area boundaries during this project term on an ongoing basis. The current version of the SABD is included in digital format on the media accompanying this report, and reflects data through 6/15/16.

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, and the Permit Information Database, a Microsoft Access database.

Outfall Location Database (OLD) – The OLD is a companion dataset to the SABD, and maintains the outfall location of each permitted wastewater outfall. 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 members review the conflicting data against the existing records.

During this project period, staff conducted an integration review after incorporating the most recent version of TCEQ data. As part of the review process, project staff compared the existing dataset with the most current TCEQ dataset and the TCEQ Central Registry permit entries to identify and resolve any discrepancies. Subsequent to this review, the outfall dataset was compared to the PID to ensure that each outfall record in the PID had a corresponding outfall location. Based on the review, H-GAC generated a list of discrepancies for TCEQ's review. The primary source of discrepancies was a mismatch between an outfall status and a permit status in the Central registry, duplicate records in TCEQ's data, or typos in permit numbers.

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 hard copies of WWTF permit information from the TCEQ, and incorporates it into a centralized, queryable Access database. The data H-GAC receives includes new permits, permit renewals, permit modifications, notices of permit applications/renewal

applications, preliminary decisions on permit applications/renewal applications, and permit information updates[9]. From these documents, all relevant information is extracted into pre-determined fields. These fields include name of discharger, name of facility, addresses, EPA and TCEQ permit numbers, capacity and permitted flow requirements, contaminant limits, outfall path, and other identifying data and regulatory restrictions.

Two major updates occurred during this Project term, bringing the PID current with data received through at least 7/1/2016. H-GAC used in-house staff with permit experience to enter data instead of relying on temporary workers as has been the practice under the project in the past. This change resulted in increased efficiency and a lower incidence of error. The H-GAC Project Manager conducted a quality control audit for the data entry on at least 10% of the data. No appreciable errors were found. The current database includes records for 1582 permits. A screenshot of the database format is attached as Figure 1.

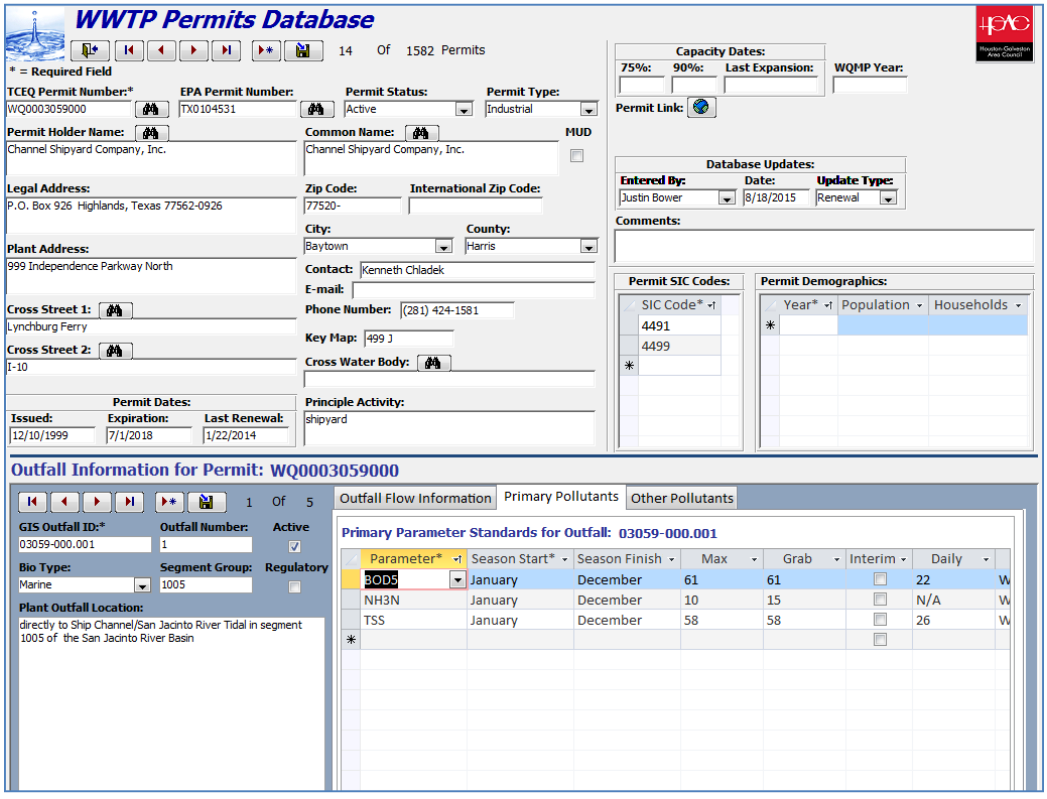


Figure 1 - The Permit Information Database (PID)

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

The data was checked for consistency across all outfalls of a single permit, and for consistency across all permits. It should be noted that while the PID and the SABD are integrated for those WWTFs that have boundaries, a 1:1 is not possible as boundaries do not exist for the majority of the industrial permits (which may serve a single parcel, and do not have traditional boundaries, but do have outfall locations). Over 1500 documents were processed during this year's updates.

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 a 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 alternatives that may impact water quality considerations
- 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 **five (5)** State Revolving Fund (SRF) projects for the TCEQ. The outcomes of the reviews are shown in Table 1 below.

Table 1 – Projects Reviewed in FY 2016

Granting Agency	Project ID#	Requesting Entity	Project Summary	Findings	Notes
TWDB CWSRF	73716	City of Pearland	Expansion of existing WWTF.	Support, with comments	Sent letter of support.
TWDB CWSRF	73717	Sequoia ID	Rehabilitation of existing sewer infrastructure	Support	Sent letter of support.
TWDB CWSRF	73719	City of Houston	Rehabilitation of existing sewer infrastructure.	Support	Sent letter of support.
TWDB CWSRF	73721	North Fort Bend Water Authority	Design and construction of an effluent reuse system.	Support, with comments	Sent letter of support.
TWDB CWSRF	73733	City of La Porte	Rehabilitation and replacement of existing collection system/lift stations.	Support, with comments	Sent letter of support

Objective 4 - Support Watershed Planning

Objective 4 provides targeted support for ongoing source water and watershed planning in priority watersheds of the region. The efforts under this objective include continued stakeholder group maintenance for the San Bernard River Watershed and its WPP (Tasks 4.1) and general coordination with other regional water quality efforts (Task 4.2).

4.1 – San Bernard River WPP Coordination

H-GAC has established a Watershed Protection Plan effort in the San Bernard River Watershed through previous ARRA/319h grants from the TCEQ. During this project, staff worked with TCEQ to revise the Watershed Protection Plan and to maintain an active and engaged stakeholder base. Due to ongoing WPP revisions and review, H-GAC staff gave their project update through presentations at a key partner meetings and through outreach at local events rather than a single stakeholder meeting. Additionally, H-GAC prepared a newsletter on water quality and project progress for the stakeholders. In discussion with TCEQ staff, this approach determined to meet the deliverable for this task, as it achieved the same goal with equal or greater effort. Speaking engagements, events, and efforts related to this subtask are summarized in Table 2.

Table 2 – San Bernard River Stakeholder Events

Date	Event	Participation
Various	NRAC	H-GAC gave intermittent brief updates to the NRAC on the WPP progress at quarterly meetings.
Various	WPP revisions	H-GAC revised the WPP in response to TSSWCB and TCEQ rounds of comments.
Various	GBEP	H-GAC provided San Bernard updates as part of project updates at the GBEP Water and Sediment Quality subcommittee meetings.
4/16/15	Migration Celebration	H-GAC maintained a booth at the nature-oriented festival in the San Bernard watershed. Project staff discussed the San Bernard WPP, the watershed in general, and related topics with several hundred visitors.
6/2/16	Friends of the River San Bernard	H-GAC met with this prominent stakeholder group at one of their public meetings

		to discuss the San Bernard project status and other local projects. Stakeholders expressed a desire for more water quality data.
6/8/16	World Oceans Day	H-GAC maintained a booth at the nature-oriented festival that represented H-GAC water quality projects, including the SBWPP.
(Various)	Stakeholder Newsletter	H-GAC disseminated a newsletter on the project and implementation progress to project stakeholders.

Additionally, H-GAC coordinated with several stakeholders through the year on various projects including participation in regional efforts to encourage RESTORE act investment in the Upper Texas Gulf Coast, and specific stakeholders engaged in reopening the mouth of the San Bernard River (a priority concern for the project stakeholders).

Task 4.2 - Coordination

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

Staff members facilitate the 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 Project term. The topics discussed at these meetings included the Waters of the United States designation changes and stream mitigation banking (November 2015); the RESTORE Act update and local programs and tools (February 2016); an update on the San Jacinto Waste Pits and PCB/Dioxin contamination (May 2016); and aquaponics (August 2016). 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 on the development of the Basin Summary Report sections on the San Bernard and other CRP efforts.
- Coordination with TCEQ on implementing a project to address watershed planning in the Lake Houston watershed.

- Coordination with the Trust for Public Land on a Greenprint project addressing water quality and land management in the Lake Houston 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 Harris County Annual OSSF meeting, Texas Watershed Stewards trainings, the Texas Watershed Coordinators Roundtable, and other watershed coordinator meetings at the local and regional level.
- The Galveston Bay Estuary Program – Water and Sediment subcommittee membership and leadership (Justin Bower is vice-chair of the Committee); Monitoring and Research subcommittee membership (Jean Wright), and attendance at other subcommittee and Council meetings.
- 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), East and West Forks of the San Jacinto River, Jarbo Bayou, and Upper Oyster Creek TMDL Implementation Plans
    - West Fork Watersheds, Cedar Bayou, San Bernard River, and Bastrop Bayou Watershed Protection Plans
    - The Gulf Coast Regional Conservation Plan group for Houston

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. External requests for project data were fulfilled for the Gulf Coast Waste Disposal Authority, the Gulf Coast Water Authority, the Galveston Bay Foundation, the Trust for Public Land Greenprint project, and other local government and development requests.

Objective 5 – Coastal NPS Development

Under the FY12 604b project, H-GAC initiated a Coastal Communities Program to evaluate the needs of these communities, the nexus of those needs with NPS contributions, and potential services that would serve elements of the communities' needs while alleviating NPS pollution. During this Project term, H-GAC maintained the program, but focused specifically on supporting development of a coastal restoration project for the City of Morgan's Point in coastal Harris County and (in conjunction with implementation of the Bastrop Bayou WPP) identifying funding and other resources for the Demi John community in coastal Brazoria County.

Task 5.1 – Coastal NPS Program Maintenance

The primary focus of this year's Program effort was to make program resources and services available to the participating communities. The following services or products were delivered to the participants:

- A **program website** (www.coastalcommunitiestx.com) was maintained for disseminating information to participants. The website hosts model programmatic resources, previous year's assessments, information on funding resources, information on events of interest (RESTORE Act, etc.), etc. Figure 3 is a screenshot of the website landing page.
- **Grant opportunities** were disseminated to (or discussed with) specific program participants as they were developed. Examples of grant announcements disseminated include the RESTORE Act information and TWDB SRF solicitations.

Task 5.2 – Coordination and Resource Support

While no individual communities took advantage of H-GAC services during this project year, H-GAC continued to maintain relationships and investigate potential opportunities. Additionally, project staff coordinated with large regional efforts which promised to have direct benefit for the participant communities and coastal zone. A highlight of the efforts was providing support for the City of Morgan's Point on a land management planning project.

- **The City of Morgan's Point** is a small coastal community along the Houston Ship Channel/upper Galveston Bay system area in Harris County. The City contacted H-GAC project staff during the FY15 project to discuss potential funding and planning resources related to conserving a 50-acre tract of undeveloped land for a variety of reasons, including reducing impervious cover and runoff. During 2016 H-GAC staff worked with the City to identify a series of funding options after the development of a site plan with Texas A&M Sea Grant and directly provide support for obtaining H-GAC internal resources.
- **RESTORE Act Representation –** As part of a large effort to ensure representation of the needs of coastal communities in the region, H-GAC took part in several meetings, seminars, and trainings surrounding the development of RESTORE Act funding priorities for the state of Texas. These meetings included trainings hosted by a local coalition of environmental organizations, and grant application workshops related to the RESTORE funding agencies. H-GAC served as part of a steering committee for the Houston-area Regional Conservation Plan project (facilitated by Houston Wilderness) which seeks to define conservation and remediation priorities for the coastal areas in the region, in advance of RESTORE and other coastal funding sources coming fully online. H-GAC's representation was partially to ensure that the needs and NPS sources identified under this coastal program are part of the priority for funding/project selection. The Plan continued to develop this year, and H-GAC continued to press for inclusion of projects related to small coastal communities' needs.

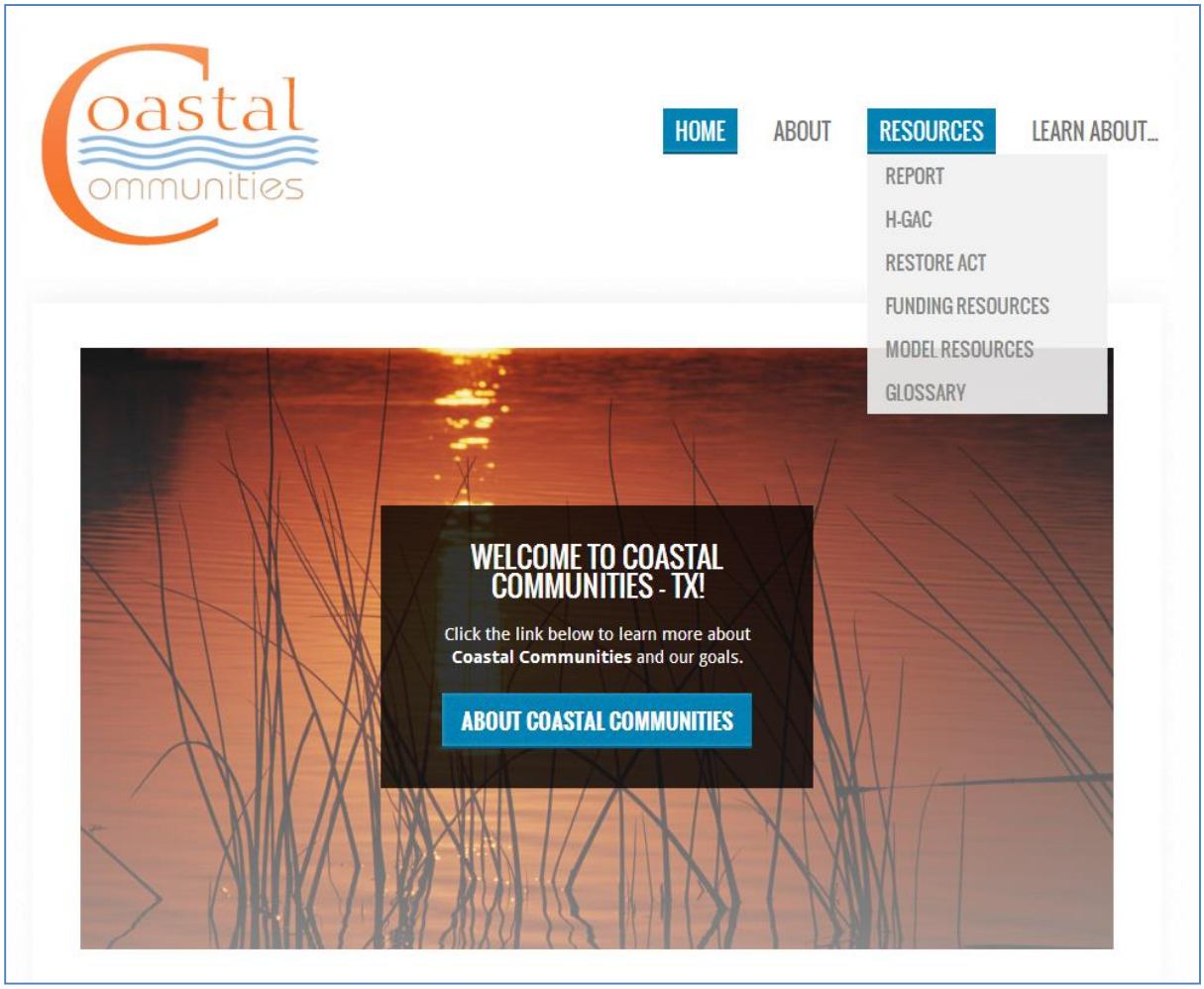


Figure 3 – Coastal Communities Program Website

Objective 6 – OSSF Database Update

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. OSSFs are relied upon for the treatment and disposal of wastewater in areas not conducive to sanitary service, but can be appreciable sources of contamination. The Houston-Galveston Area Council estimates that there are over 300,000 OSSFs within the region. 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 outer boundary. While new systems are subject to permit requirements, systems installed before 1989 may be grandfathered and specific locations may be unknown.

Authority over managing OSSF permitting is designated to Authorized Agents (counties, municipalities and other responsible entities), who have traditionally kept this data in a variety of formats. To ensure a regional, uniform set of data for use by Authorized Agents and water quality planning efforts, H-GAC developed a comprehensive inventory of permitted system locations and likely unpermitted system locations under previous grant contracts[10].

During the 2016 Project, new data from the Authorized Agents and old data not previously converted were added to the OSSF permit database. Additionally, H-GAC staff updated the unpermitted OSSF location methodology.

Task 6.1 – Maintain OSSF Database

The intent of the existing OSSF database is to provide a comprehensive, spatially-explicit inventory for all permitted OSSF locations throughout the region. No such inventory existed prior to the initiation of H-GAC's initial database development. The initial work had collected existing location data for permitted OSSFs and developed a program under which participating Authorized Agents would submit new system data on a regular basis, including spatial locations using GPS units provided by H-GAC[11].

H-GAC added new records to the OSSF Permits Database in FY16, and removed outdated or bad data. Prior to the recent update, the database consisted of 88,599 records of permitted OSSFs. With the update, the database now contains 88,499 records. This update is a net decrease to the database total, but represents a large number of permit records removed based on more precise data. New permit data has continued to be updated throughout the year, but was less than the total number removed. The updated OSSF database is included in the digital media attached to this report.

Our partners have been very responsive with data submittals, partly in thanks to periodic efforts (monthly emails and/or calls as necessary) to remind them to submit data. Records submitted by Brazoria County, Chambers County, Fort Bend County, Galveston County, Liberty County, Montgomery County, Waller County, and Wharton County contained latitude and longitude coordinates of the location of the system's septic or trash tank, allowing very precise siting. Permit Records received by the remaining Authorized Agents were geo-referenced, or identified on a map, by the permit address.

Project staff worked directly with several Authorized Agents to improve their data quality and submissions. However, for the most part data transmittal was efficient.

[10] The effort was initiated in an ARRA grant (Federal ID #96690301), and continued in previous years' 604b projects.

[11] Further information about the development of the database, the methodologies employed, and previous efforts can be found in the FY12-FY15 604b Final Reports and the Geospatial QAPP.

Task 6.2 – Update Unpermitted OSSFs

The OSSF inventory data developed by H-GAC under Task 6.1 dealt with permitted OSSFs. For most Agents, systems began to be permitted after 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 (see the corresponding section under "Methods"). During this Project year, the identification methodology was re-run to update the analysis. The updated Unpermitted OSSF map is included in the digital media attached to this report.

In addition to these contract deliverables, H-GAC promoted our OSSF data resources at a variety of meetings and through speaking engagements (See Task 4.2). Project staff held OSSF visual inspection/ management trainings in Montgomery County and Brazoria County, and maintained an online OSSF data website and data tool[12]. H-GAC discussed OSSF resources at a variety of public meetings and events as part of general project representation.

H-GAC has created, in conjunction with several other projects, a Supplemental Environmental Project (SEP) through TCEQ to remediate septic systems in the priority watersheds of the 13-county region. Throughout FY16, H-GAC staff promoted the SEP to permit holders through one on one contacts and events. One contribution of $9,900 was made during this time frame.

[12] Accessible at http://www.h-gac.com/community/water/ossf.aspx

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.

Objective 2: Quality Assurance

The general strategy employed by H-GAC was to first confirm that the new Project year tasks were covered under the existing QAPPs, and to implement the existing QAPPS. Annual Certification for the Geospatial QAPP was completed as required, and a new Data QAPP was developed and implemented.

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 FY16 Project.

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

The permit database updates were routine, and adhered to existing QAPPs and QC methods. However, H-GAC worked to finalize work on this project in anticipation of moving to a use of TCEQ database data in the FY2017 project year.

For the SRF 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.

Objective 4: Support Watershed Planning

To foster the San Bernard WPP group, H-GAC maintained an active presence in the watershed and contact with key stakeholders through general outreach, participation in meetings and events, and a project status newsletter. The WPP was revised over several rounds based on TCEQ/TSSWCB comments.

Objective 5: Coastal NPS Program Development

The methods employed in the maintenance of the Coastal Communities Program focused on providing information and services to support the needs of the participant (and other) small coastal communities and representing them in broader regional efforts.

To meet the goal of providing services to the participants, H-GAC focused on identifying potential projects for which our services could be applied. H-GAC's methods in developing grant opportunities were to screen all grant possibilities, and disseminate those with relevant applicability. The approach with the participants was designed to be as community specific as possible, although the communities did not engage H-GAC in any specific projects beyond conceptualization. The website continued to be the approach that would allow a central depository for information and a quick reference for all resources. The Morgan's Point project was the primary focus of this effort, as no other participant took advantage of our services.

Lastly, due to the lack of active requests from the participants, H-GAC worked to represent their interests in regional projects that would benefit them directly or indirectly (RESTORE Act planning, etc.)

Objective 6: OSSF Database Update

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

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.

As much of the data and analysis developed under this Project will likely serve other water quality and watershed efforts, H-GAC coordinated with internal and external project managers to assure that the format and approach to these efforts would provide meaningful products.

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, and providing a solid base for a number of regional efforts. The following observations will inform the approach to future iterations of this Project.

Objective 2, QAPP - The extent of QAPP coverage and the proactive approach to planning for annual certification and other QAPP changes were generally successful. The development of a new Data QAPP will provide a basis for next year's data work.

Objective 3, WWTF Data – A significant number of permit documents were incorporated this year. To increase accuracy and improve QA, internal staff members were used rather than temp workers for data entry. Changes to TCEQ online hosting of permit documents was evaluated against the needs for data identified in other projects. The data created in this task continues to be widely used by local projects and entities. Water quality protection efforts including the various WPPs, TMDLs, and the Clean Rivers Program use the data to characterize the location and potential impact of sanitary sewers systems, and local decision-makers use the data to guide planning decisions. Subsequent to the FY16 project year, the PID updates will be discontinued, and TCEQ's existing permit database will be used. This task will be replaced by discharge monitoring report and sanitary sewer overflow data analysis.

Objective 4, Watershed Planning Support – The NRAC and H-GAC participation in other projects continues to be a valued part of this contract. The density of project work in the Houston area requires a good deal of coordination, communication, and cooperation. NRAC has continued to be well attended, and the legislative review was favorably received by the participants. While the San Bernard watershed planning process was delayed by WPP review, H-GAC staff members were able to complete significant WPP revisions and make contacts with key partners throughout the process in lieu of a single project meeting.

Objective 5, Coastal NPS Program Development – Active participation by the majority of project participants continued to be minimal, as primary needs were for large infrastructure financing or engineering work beyond the scope of this project. Additionally, many participants lack the necessary staff or capacity to take on items beyond their core infrastructure needs (which were overwhelmingly point-source related). However, The Morgan's Point project has moved rapidly since the inception of H-GAC's involvement in FY2015. H-GAC was able to continue to assist the City in identifying partners and funding resources to move toward the implementation of their project plan. Cooperation between the H-GAC and Houston area Regional Conservation Plan and this Project will continue to be beneficial to all parties.

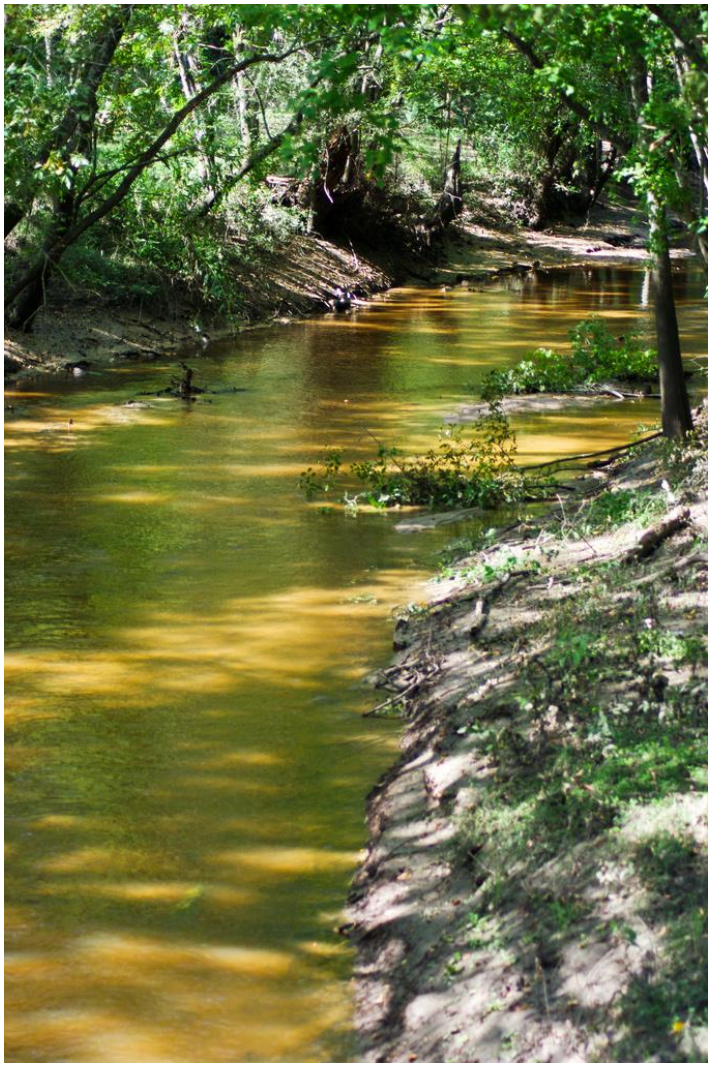
Objective 6, OSSF Database Update – The OSSF data has already been used for a variety of watershed protection efforts and other local planning projects. With the population expansion of the coming decades, and aging infrastructure, additional information about unpermitted system locations will be vital to utility planning. Future work should consider ways in which to

account for OSSF abandonment in expanding sanitary sewer areas, which cannot be easily captured currently.

In general, H-GAC project staff members are confident in the results of this year's Project. H-GAC feels that the deliverables 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.

WWTF PID Discontinuation

The expansion/availability of TCEQ's online permit resources (scanned permits, queryable database, etc.), the need for continued entry into H-GAC's database is no longer needed. H-GAC has proposed to discontinue this task in the FY2017 project, to be replaced by a greater focus on reviewing DMR and SSO data sources. H-GAC will continue to compare the OLD and SAB datasets against the TCEQ permits database.

OSSF Trainings

H-GAC has developed a visual OSSF inspection course designed to provide real estate inspectors (and homeowners) basic knowledge of OSSFs and visual cues to their function. The success of previous trainings coordinated between this and other projects has indicated that this is a valued educational program, and should be continued.

Coastal Communities

While H-GAC is not able to provide some core service to the participants (infrastructure funding and engineering), there has been interest in expanded, comprehensive education and outreach to these communities. With this project effort as a base, additional funding opportunities through 319(h) or other sources may be able to implement some of the recommendations of previous years for the whole coastal area.

Summary

This year's Project was successful in updating WWTF infrastructure data for the Region, for the benefit of both local and state purposes. H-GAC continues to provide its unique regional perspective to the review of SRF projects.

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, planning efforts (WPPs, TMDLs, etc), and external coordination.

The Coastal Communities Program has continued to be a source of information for participant communities, but has not attracted as many specific community projects as anticipated. The Morgan's Point project, however, has been a highlight of the intended purpose of the effort. H-GAC will continue to support this effort under this and other internal programs in the coming year.

The OSSF inventory development continued during this fiscal year. This deliverable remains one of our most well-received 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) Service Area Boundaries Dataset and map (GIS format) – Task 3.1
2) Outfall locations and recommended changes to TCEQ outfall later – Task 3.1
3) Permit Information Database (Microsoft Access database format) – Task 3.2
4) Permitted OSSFs (GIS format) – Task 6.1
5) Potential Non-Permitted Systems Location Map(image file) – Task 6.2
6) Final Report, digital version (Objective 7)