Upper Oyster Creek TMDL Implementation

Annual Report, FY 2016

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[Logos of Houston-Galveston Area Council, TCEQ, and EPA]
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Prepared by the Houston-Galveston Area Council, in coordination with the Texas Commission on Environmental Quality.

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### Acronyms

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<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>BMP</td>
<td>Best Management Practice</td>
</tr>
<tr>
<td>CWSRF</td>
<td>Clean Water State Revolving Fund</td>
</tr>
<tr>
<td>DMR</td>
<td>Discharge Monitoring Report</td>
</tr>
<tr>
<td>EPA</td>
<td>United States Environmental Protection Agency</td>
</tr>
<tr>
<td>FOG</td>
<td>Fats, Oils, and Grease</td>
</tr>
<tr>
<td>GIS</td>
<td>Geographic Information System(s)</td>
</tr>
<tr>
<td>GCWA</td>
<td>Gulf Coast Water Authority</td>
</tr>
<tr>
<td>H-GAC</td>
<td>Houston-Galveston Area Council</td>
</tr>
<tr>
<td>HHW</td>
<td>Household Hazardous Waste</td>
</tr>
<tr>
<td>I-Plan</td>
<td>Implementation Plan</td>
</tr>
<tr>
<td>MUD</td>
<td>Municipal Utility District</td>
</tr>
<tr>
<td>NPS</td>
<td>Nonpoint Source</td>
</tr>
<tr>
<td>OSSF</td>
<td>On-Site Sewage Facility</td>
</tr>
<tr>
<td>SEP</td>
<td>Supplemental Environmental Project(s)</td>
</tr>
<tr>
<td>SSO</td>
<td>Sanitary Sewer Overflow</td>
</tr>
<tr>
<td>TCEQ</td>
<td>Texas Commission on Environmental Quality</td>
</tr>
<tr>
<td>TMDL</td>
<td>Total Maximum Daily Load</td>
</tr>
<tr>
<td>TSSWCB</td>
<td>Texas State Soil and Water Conservation Board</td>
</tr>
<tr>
<td>TWDB</td>
<td>Texas Water Development Board</td>
</tr>
<tr>
<td>TxDOT</td>
<td>Texas Department of Transportation</td>
</tr>
<tr>
<td>WCID</td>
<td>Water Conservation and Improvement District</td>
</tr>
<tr>
<td>WQMP</td>
<td>Water Quality Management Plan</td>
</tr>
<tr>
<td>WPP</td>
<td>Watershed Protection Plan</td>
</tr>
<tr>
<td>WWTF</td>
<td>Wastewater Treatment Facility</td>
</tr>
</tbody>
</table>
Executive Summary

This report summarizes the progress made in 2016 by project stakeholders and local partners in implementing the TMDL Implementation Plan for Upper Oyster Creek. Additionally, it details the status of water quality and permitted discharges to Upper Oyster Creek as an indicator of progress toward meeting water quality standards.

Challenges for the Upper Oyster Creek System

The Upper Oyster Creek system begins near Fulshear, Texas, is greatly augmented by Brazos River water, and meanders down through impoundments in the City of Sugar Land to rejoin the Brazos. Along the way, natural and human influences in the watershed can contribute pollutants to the waterway. Total Maximum Daily Load (TMDL) studies\(^1\) were completed for the system when it became unable to support the state water quality standards for contact recreation (due to elevated levels of fecal bacteria) and aquatic life (based on low levels of dissolved oxygen). These studies indicated that reductions in fecal matter were needed, and would likely be needed in the future for oxygen-demanding substances.

![Figure 1 - The Upper Oyster Creek System](https://www.tceq.texas.gov/waterquality/tmdl/25-oystercreek.html)

\(^1\) More information on the TMDLs and the Implementation Plan can be found at [https://www.tceq.texas.gov/waterquality/tmdl/25-oystercreek.html](https://www.tceq.texas.gov/waterquality/tmdl/25-oystercreek.html) and [www.upperoystercreek.com](http://www.upperoystercreek.com).
A Plan for Implementation

As part of the TMDL process, local stakeholders and regional partners worked with the Texas Commission on Environmental Quality (TCEQ) and the Houston-Galveston Area Council (H-GAC) to develop an Implementation Plan (I-Plan). The I-Plan describes categories of voluntary activities that will be undertaken by local stakeholders to address fecal contamination and improve dissolved oxygen levels. The solutions identified in the I-Plan are the result of local decision-making using sound science as a guide. The Implementation Plan for both TMDLs was approved on January 15, 2014. In the two and a half years since, the stakeholders have continued to implement activities to address Upper Oyster Creek's water quality impairments.

Water Quality Status, 2016

For the 2015 project year a comprehensive water quality analysis was completed as part of implementation activities 1.2 and 1.3 of the I-Plan. The comprehensive evaluation is scheduled to be completed every other year. In 2016, and in other interim years, staff review new data at a more limited scale. The review included ambient water quality data as well as sanitary sewer overflows (SSOs) and wastewater treatment facility (WWTF) discharge monitoring reports (DMRs). At that time, review of the limited water quality monitoring data available indicated improvements in bacteria in one area, but water quality challenges still persisted throughout the system. Wastewater treatment facilities were generally having few if any issues meeting their permit limits for bacteria and oxygen-demanding substances. The overall contribution from sanitary sewers was fairly small, though could be acute in localized areas.

Implementing Solutions

The local partners engaged in addressing water quality issues in the watershed represent a variety of interests. The progress made on the implementation activities in the I-Plan suggests the waterway is benefitting from the start of the TPDES Phase II stormwater permits, good housekeeping for local utility systems, a robust set of public education efforts, and shared benefits from other unrelated local efforts. Future needs include greater implementation of structural measures to match educational efforts, and a focus on mitigating impacts of new development in the western and central parts of the watershed.
Introduction

The Upper Oyster Creek system originates in the headwaters of Jones and Flewellen Creeks, near Fulshear, Texas. The Gulf Coast Water Authority (GCWA) uses the system as a conveyance for surface water supplies from the Brazos River, which greatly augment the system’s volume. Flow in Jones Creek enters Oyster Creek proper west of the City of Sugar Land. Within the City’s boundaries, the waterway is impounded by a series of three dams, forming several lakes held at static elevation. An appreciable portion of the volume is diverted into a GCWA water supply canal just above the third dam. Downstream of this dam, the waterway is reduced in size and depth. The last stage of the system includes a portion that flows through a diversion channel, then through a stretch of Steep and Flat Bank Creeks, eventually rejoining the Brazos south of the Riverstone development. Along the way, precipitation brings with it pollutants related to various land uses, and wastewater treatment facilities and other discharges enter directly into the waterway.

Due to pollutants in the waterway, Upper Oyster Creek is unable to support the state water quality standards for contact recreation (due to elevated levels of fecal bacteria) and aquatic life (based on low levels of dissolved oxygen). These standards seek to ensure Texas waterways are fishable and swimmable without risk of illness or impact on aquatic ecosystems. Every two years, the State conducts an assessment of water quality in its waterways using seven previous years’ data. If a waterway cannot support one or more of the state water quality standards, it is considered impaired. Additionally, a waterway can be identified as having a concern if it is in excess of screening levels for some constituents without numeric standard limits (e.g., nutrients). The most current version of the assessment is the 2014 Integrated Report of Surface Water Quality.

Upper Oyster Creek was previously identified as having both impairments for elevated fecal bacteria (based on a contact recreation standard) and depressed dissolved oxygen (based on an aquatic life standard.) Total Maximum Daily Load (TMDL) studies² were completed for the system to determine the amount of bacteria and oxygen-demanding substances (represented by ammonia and carbonaceous biochemical oxygen demand) the system could assimilate and still meet the applicable standards. These studies indicated that reductions in fecal matter were needed, and would likely be needed in the future for oxygen-demanding substances. When TMDLs were approved for the system, an Implementation Plan (I-Plan) process was initiated.

The I-Plan for Upper Oyster Creek is the product of local decision-making, and represents a targeted set of voluntary measures that will address the impairments in the waterways. The I-Plan lays out a series of broad implementation strategies to address water quality challenges. Each strategy includes a series of implementation activities in which local partners will engage, which target the various sources of bacteria in the watershed. The I-Plan was approved by a diverse local stakeholder group representing local governments, districts, landowners,

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agricultural producers, community groups, and businesses and submitted to the TCEQ. The I-Plan for Upper Oyster Creek was approved on January 15, 2014, and initiated implementation of its activities in the watershed.

In the subsequent years, the stakeholder group has met to review the status of water quality in Upper Oyster Creek, and report on progress made in implementing recommended activities. This report summarizes the state of Upper Oyster Creek (see Water Quality Status) and the activities of the stakeholders (see Implementation Progress), and makes recommendations (see Recommendations) regarding further implementation of the I-Plan.
Water Quality Status

In preparation for the annual stakeholder meeting, H-GAC and TCEQ evaluated several data sources to provide a view of the water quality status of the waterway, and the performance of some permitted sources which discharge to it. The data evaluated included a descriptive summary of the creek’s assessment status, a summary of the ambient water quality data from 2015-2016, an evaluation of reported sanitary sewer overflows, and a review of discharge data from wastewater treatment facilities.

Assessment Status
The *Texas Integrated Report of Surface Water Quality*³ (Integrated Report) summarizes the assessments conducted by the state every two years. Seven years of data is used to evaluate a waterway’s compliance with state water quality standards. As part of the Integrated Report, the state identifies impairments and concerns associated with each water body. For the purpose of the assessment, Upper Oyster Creek is divided into three assessment units: Assessment Unit 3, the reach between the headwaters and the City of Sugar Land; Assessment Unit 2 which is generally the reach within the City of Sugar Land; and Assessment Unit 1, which is the reach between dam 3 and the final confluence with the Brazos River.

The 2014 Integrated Report indicates that Upper Oyster Creek is still unable to fully support the contact recreation and aquatic life standards in all or portions of its assessment units. A summary of the status of each assessment unit and related tributaries is shown in Table 1. The status of this assessment has not changed since the FY15 Annual Report, as the same Integrated Report is still in place.

Table 1 – Status of Upper Oyster Creek in the 2014 Integrated Report

<table>
<thead>
<tr>
<th>Water Quality Issue</th>
<th>Assessment Unit 1 (Downstream of Dam 3)</th>
<th>Assessment Unit 2 (Sugar Land)</th>
<th>Assessment Unit 3 (Upstream of Dam 1)</th>
<th>Tributaries also Impacted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacteria</td>
<td>Impaired</td>
<td>Impaired</td>
<td>Supporting</td>
<td>Red Gully, Bullhead Bayou, Unnamed trib. to Bullhead, Flewellen Creek, Alcorn Bayou, Steep Bank Creek, Stafford Run</td>
</tr>
<tr>
<td>Dissolved Oxygen (24 hour)</td>
<td>Supporting</td>
<td>Impaired</td>
<td>Supporting</td>
<td>Steep Bank Creek (no data for others)</td>
</tr>
<tr>
<td>General</td>
<td>Nitrate (CS), Chlorophyll a (CS)</td>
<td>Chlorophyll a (CS)</td>
<td>Chlorophyll a (CS)</td>
<td>Red Gully (Chlorophyll a); Alcorn Bayou, Steep Bank Creek (nitrate)</td>
</tr>
</tbody>
</table>

Two of the three assessment units still have elevated levels of fecal bacteria, and most of the system’s tributaries are likewise impaired. However, the stretch of the Creek from the Fulshear area east to the start of the Sugar Land area remains in compliance with the water quality standard. Dissolved oxygen levels are generally supportive of the standard, except for the impounded area within the City of Sugar Land and Steep Bank Creek. In addition, there are concerns for nutrients and other indicators of low dissolved oxygen situations (nitrate, chlorophyll-a) throughout the system and in several tributaries.
Recent Water Quality Data

During the development of the TMDLs, additional water quality monitoring was conducted throughout the watershed, providing ample data on the system’s status. However, in the intervening years prior to 2015, only the monitoring station within Assessment Unit 2 at Highway 90A in Sugar Land had been sampled, leaving two of the three assessment units for the waterway without current data. During 2015-2016, additional sites were sampled in the system. The current monitoring sites are shown in Figure 1.

The available water quality sampling data from 2015-2016 is limited, with samples initiating in mid-2015 (data was evaluated through 4/16, but some data had not yet been quality assured for inclusion in SWQMIS at that time) but indicates that bacteria levels remain an issue in AUs 1 and 2. The available bacteria data for this timeframe is summarized in Table 2.
Table 2 – Bacteria data, 2015-2016

<table>
<thead>
<tr>
<th>Category</th>
<th>Station 12087</th>
<th>Station 12083</th>
<th>Station 12074</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacteria Geomeans</td>
<td>103</td>
<td>278</td>
<td>1090</td>
</tr>
</tbody>
</table>

Dissolved oxygen data is similarly limited to a single year, with no 24-hour data collected under the Clean Rivers Program data effort. The DO data indicated a large variation in levels, with minimum levels dipping below 3 mg/L, even as median levels were above it. The results of this data are shown in Table 3 and Figures 2-4.

Table 3 – Dissolved oxygen data, 2015-2016

<table>
<thead>
<tr>
<th></th>
<th>Station 12087</th>
<th>Station 12083</th>
<th>Station 12074</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Value</td>
<td>4.6 mg/L</td>
<td>2.6 mg/L</td>
<td>2.7 mg/L</td>
</tr>
<tr>
<td>Maximum Value</td>
<td>9.7 mg/L</td>
<td>7.8 mg/L</td>
<td>11.2 mg/L</td>
</tr>
<tr>
<td>Median Value</td>
<td>7 mg/L</td>
<td>6 mg/L</td>
<td>6.3 mg/L</td>
</tr>
</tbody>
</table>

Figure 2 – Dissolved oxygen results, 2015-2016 – Station 12087
While this data can help indicate general trends in the waterway, the single year of samples and lack of 24-hour data hinders its representativeness. This situation is especially challenging because the waterway changes greatly in character and depth between its headwaters and its final reach, and over the diurnal cycle, based on previous 24-hour data.

TCEQ has engaged the Texas Institute for Advanced Environmental Research (TIAER) to complete a two-year study of bacteria, 24-hour dissolved oxygen, and related constituents. The
data described above does not include this data, which was still being collected and assessed at the time this data evaluation was completed. This monitoring effort serves stakeholder requests in previous years for additional data, and will be crucial in providing more in depth information about the system moving forward. More information about this data will be included in future reports.

**Sanitary Sewer Overflows**

Between 2013-2015, there were 42 reported sanitary sewer overflow (SSO) events, indicating this source of bacteria is still a potential acute, local issue, even if the volumes involved were small (averaging a reported 4,697 gallons per event for the whole period, and increasing to 7,034 gallons per event for 2015 alone). No single problem (broken pipes, rainwater intrusion, etc) dominated the causes of these SSOs. SSO data assessment is tempered by the understanding that this data is self-reported, or based on complaint data, so the full scope of SSO contributions may not be reflected. However, unlike other areas in the Houston region, the utility systems in this watershed are generally newer and well maintained, limiting chronic SSO issues. In 2015, there was a marked reduction in SSOs related to human error and infrastructure issues, but as a single year, it should not be taken to be representative of a definite trend. The number and volumes of SSOs are shown in Table 4, and the breakdown of SSO causes is shown in Figure 5.
### Table 4 – Sanitary Sewer Overflows in Upper Oyster Creek, 2013-2015

<table>
<thead>
<tr>
<th>Period</th>
<th>Number Reported</th>
<th>Volume</th>
<th>Facilities Reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total (2013-15)</td>
<td>42</td>
<td>146,013 gal.</td>
<td>10</td>
</tr>
<tr>
<td>2013</td>
<td>19</td>
<td>52,203 gal.</td>
<td>7</td>
</tr>
<tr>
<td>2014</td>
<td>10</td>
<td>53,650 gal.</td>
<td>6</td>
</tr>
<tr>
<td>2015</td>
<td>13</td>
<td>91,450 gal.</td>
<td>6</td>
</tr>
</tbody>
</table>

#### SSOs, 2013-2014

- Rain/I&I: 24%
- Human Error: 19%
- Equipment Failure: 19%
- Blockage: 14%
- Broken Infrastructure: 7%
- Other: 26%

#### SSOs, 2015

- Rain/I&I: 39%
- Human Error: 23%
- Equipment Failure: 38%
- Blockage: 36%
- Broken Infrastructure: 33%
- Other: 32%
In Table 4, the total number of facilities reporting for the entire period (first row) is not intended to be cumulative of the numbers for each year. The total represents the number of unique facilities that reported in that time period. This reflects that some facilities report each year, while some only in one year. In Figure 5, Broken infrastructure are physical breaks; Blockages refer to blockages (e.g. grease clogs); Human error refers to improper operation; Rain/Inflow and Infiltration (I&I) refers to overflows due to high volumes of stormwater in the collection system; and Equipment malfunction refers to issues with the pumps, control systems and other aspects of system operation.

Wastewater Treatment Facility Discharges
Wastewater treatment facilities are potential sources of all three TMDL constituents\(^4\): bacteria, ammonia, and CBOD5. Improperly treated sewage, especially in areas of the waterway that are dominated by effluent flows, can have a pronounced impact on water quality. Each wastewater treatment facility (WWTF) is required to have a discharge permit, which includes both limits on constituents in the water, as well as requirements for periodic water quality sampling of their effluent. The results of this sampling are submitted in discharge monitoring reports (DMRs).

Based on a review of the DMRs for the WWTFs in the Upper Oyster Creek system that was performed in the 2015 project year, the facilities seemed to be performing well during the 2012-2014 timeframe. A full review was not completed for the 2016 project year, but will be again in the 2017 project year. A limited review of DMR data for the 2014-2015 timeframe did not indicate any plants were having appreciable problems with bacteria, Ammonia nitrogen, or CBOD5.

Water Quality Summary
In general, the water quality data assessment indicated that there was some general improvement from the 2015 project year, but issues persist. Additional data from assessment units 1 and 3 will help evaluations in subsequent years. Additional 24-hour DO data is required to fully evaluate compliance with the aquatic life standard in coming years.

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\(^4\) The TMDL project for depressed dissolved oxygen focused on ammonia and CBOD5 as the precursor constituents for which TMDLs would be developed.
Implementation Progress

The I-Plan for Upper Oyster Creek lays out twelve strategies for addressing water quality challenges. Each implementation strategy includes two to eight activities\(^5\) that are being implemented by the stakeholders. The general guidelines for implementation are to rely on existing, proven efforts; highlight cost-effectiveness; coordinate with other related efforts; and continue to evaluate effectiveness.

Over the last year, and since the start of implementation, local partners have made good progress in implementing aspects of the strategies. In addition, the initiation (and increased focus on bacteria) of the TPDES Phase II stormwater permits implementation has added to the overall focus on alleviating sources of bacteria and oxygen-demanding substances in the watershed. H-GAC reviewed Annual Reports from stormwater permittees, spoke with local partners, and conducted an assessment of activities ongoing in the watershed. Additionally, feedback and information about implementation activities was collected at the April 2016 Annual Meeting. The highlights of progress made on each strategy are summarized below. References to applicable implementation activities in the I-Plan are included in parentheses.

**Strategy 1 - Monitoring**
The purpose of the monitoring strategy is to support the evaluation of progress made in implementation. This year, project staff have continued to support and coordinate with the Bacteria Implementation Group (BIG)’s database project (1.1); DMR and SSO data were reviewed for 2015-2016, as summarized in this report (1.2); the Brazos River Authority’s (BRA) Clean Rivers Program (CRP) has continued to monitor ambient water quality in the watershed and TCEQ has worked with TIAER to conduct a special monitoring study (1.3, 1.5); and enhanced flow data from the Gulf Coast Water Authority (GCWA) pumping will be available for future consideration (1.6, FY2017 project year).

**Strategy 2 - Research**
The purpose of the research strategy is to identify changing conditions. This year, current water quality data was evaluated and presented at the April 2016 meeting, and summarized in this report (2.3). Additionally, in conjunction with Strategy 12, several entities have conducted research on the feasibility of wastewater reuse.

**Strategy 3 - Continue and Expand Existing Education and Outreach Efforts**
This year, existing education and outreach on various elements of water quality, waste management, and related topics continued in the watershed. Cities and other MS4 utilities conducted related outreach under their Phase II permits (3.2), as outlined in their SWMPs and

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\(^5\) This summary only addresses those implementation activities for which progress has been made this year. For the full list of all activities and strategies statuses, refer to Appendix A
Annual Reports. Examples of these activities include dissemination of educational materials conducting storm drain marking, holding environmental events, and providing direct curriculum to students. Existing education by Keep Sugar Land Beautiful (KSLB) and other partners was conducted (e.g., KSLB Trash Off, and Earth Day) (3.2). Texas A&M AgriLife Extension continued to provide educational opportunities for landowners and agricultural producers (3.3). In addition, new elements included promotional materials like a bilingual brochure for landscapers put out by the City of Sugar Land. Additionally, the City of Sugar Land has expanded their Stream Team volunteer water quality monitors, and the City of Missouri City is managing their own volunteer monitoring program initiated in the previous year (3.4).

**Strategy 4 - New Education and Outreach Efforts**

The purpose of this strategy is to supplement existing education and outreach with new targeted efforts that relate to the pollutants of concern. New elements included a new phase of the Galveston Bay Foundation’s Cease the Grease campaign (4.1), the H-GAC Clean Water Initiative seminars’ focus on stormwater management and other related topics (4.1), and other new elements under the MS4 permit education programs. Specific examples include a focus by Keep Sugar Land Beautiful on face to face outreach, especially with youth, using a coordinated message among activities and partners. The City of Sugar Land is conducting water education (including water quality issues) with elementary school students. Both the City of Missouri City and the City of Sugar Land held Water Conservation Workshops with Texas A&M AgriLife that included a rain barrel for participants, and highlighted reducing runoff from landscaping.

**Strategy 5 - General Nonpoint Source Management**

The purpose of this strategy is to implement practices that deal with various aspects of stormwater pollution sources. In addition to efforts noted in previous project years, notable additions, expansions, or changes in efforts were undertaken by stakeholders. This year, the Phase II permittees worked with new developments to enhance stormwater considerations, The City of Sugar Land and Fort Bend County have continued to operate and enhance existing dog park areas (Pawm Springs, Kitty Hollow Park, etc.) which have seen good use, and pet waste stations have also been implemented in Riverstone and Sienna Plantation (5.4). Water conservation elements are offered through (Rain barrels, etc.) through Missouri City, First Colony, and the City if Sugar Land. Missouri City recycles their internal fleet waste oil, and Sugar Land and Fort Bend County have additionally accepted waste oil from the public as well (5.7). Sugar Land has continued to offer household hazardous waste (HHW) pickup. Missouri City has continued to subsidize their residents’ use of the Fort Bend County HHW disposal site and has two events a year. Sugar Land has a liquid waste hauler licensure program. Additionally, spay/neuter programs for pets were discussed as a valuable addition for future iterations of the I-Plan, as Missouri City and other partners are invested in promoting this. Fort Bend County, in
conjunction with the municipalities and GCWA, has continued to spray for invasive aquatic vegetation that can impact DO levels (hyacinth, etc.) (5.2).

**Strategy 6 - Urban MS4 Stormwater Management**
The purpose of this strategy is to continue to coordinate with and enhance specific Phase II stormwater permit efforts\(^6\). This year, the permittees in the watershed continued to implement their Stormwater Management Plans (SWMPs) (6.1), and continued the second permit cycle with increased effort aimed at identifying and reducing impairment sources. Specific new elements include a second round of water quality testing and evaluation of flows from city facilities by the City of Sugar Land, a focus on educating district boards on issues by Stormwater Solutions and other operators, and ahead-of-schedule efforts by Fort Bend County to map and screen stormwater outfalls. Sugar Land is in the midst of transition to a level 4 permitted system in the next two years, and has implemented pet waste stations and is maintaining similarly progressive stormwater programs with the ETJ communities of Greatwood and New Territory. Missouri City has focused on print media education and internal review and coordination of City functions, in addition to waste reduction events.

**Strategy 7 - Agriculture/Livestock Management**
The purpose of this strategy is to address agricultural sources of contaminants through voluntary efforts and outreach. This year, the existing concentrated animal feeding operation (CAFO) continued their good management practices with no CAFO permit violations (7.1). Agricultural partner agencies such as local Soil and Water Conservation Districts, USDA Natural Resources Conservation Service, and the Texas State Soil and Water Conservation Board continued to work with agricultural producers in the county and provided educational resources through their existing online and in-person venues (7.2).

**Strategy 8 - Feral Hog Management**
The purpose of this strategy is to manage the burgeoning feral hog populations in the area to reduce bacteria and habitat damage. Texas A&M AgriLife gave several feral hog workshops in the region which were publicized to stakeholders from the watershed area (8.1). This year, the City of Sugar Land trapped 43 hogs in the River Park area, and Greatwood, LID 15 and LID 19 also have ongoing trapping programs. Missouri City uses an on-call system, but did not have any reported for last year. Texas A&M AgriLife Extension held a Feral Hog Workshop in Missouri City during 2015, and project staff have requested consideration of the area for an additional workshop in coming years, given the level of interest and ongoing trapping.

Strategy 9 - Avian Wildlife Management
The purpose of this strategy is to deal with avian sources of bacteria. No specific activity was conducted this year. No specific interest was indicated by stakeholders in pursuing these efforts in the near future. The impacts of multiple flooding events during this implementation year on habitat and populations is unknown at this time.

Strategy 10 - Wastewater Treatment Facilities
The purpose of this strategy is to ensure WWTFs do not discharge pollutants of concern in excess of their permitted effluent limits. This year, the facilities continued to implement good housekeeping practices and utility management. There have been no significant issues in the previous adoption of bacteria permits, as indicated in the assessed DMR data. All domestic permits have bacteria limits (10.1). TCEQ has revised some plant design criteria that may reduce the need for enforcement and revised some enforcement criteria. The City of Sugar Land conducted a study concerning non-potable effluent reuse potential, and is planning with River Park, New Territory, and/or Greatwood to implement reuse projects in the future (10.3). The New Territory plant (2 MGD) to provide greenspace irrigation using treated effluent, and Riverstone is using reclaimed water for lake filling. Fort Bend MUD 25 continued to operate a reuse irrigation project (10.3). Golf courses were identified as a continuing priority for non-potable supplies.

Strategy 11 - Sanitary Sewer Collection Systems
The purpose of this strategy is to reduce sanitary sewer overflows. Several regional partners have developed programs and resources for fats, oils, and grease reduction (including the Galveston Bayou Foundation’s Cease the Grease program) (11.3). Lift station function requirements continue to be an aspect of improving utility asset management to ensure proper continuance of operation (11.5, 11.4). Utility asset management was the subject of educational efforts as part of CWI and other outlets (11.4). The City of Sugar Land continued its participation in the TCEQ’s Sanitary Sewer Overflow Initiative. The watershed utilities have reduced the number of SSOs from human and infrastructure malfunction since 2014, as indicated in the data summary.

Strategy 12 - OSSFs
The purpose of this strategy is to identify and manage on-site sewage facilities (OSSFs e.g., septic tanks) to prevent bacterial contamination of surface water. This year, H-GAC and local authorized agents continued to assist in collecting OSSF site locations for a regional database and unpermitted system location analysis (12.1, 12.3). H-GAC developed an accredited OSSF training program for real estate inspectors in previous years and held several regional trainings that stakeholders were invited to. Authorized agents continued to enforce existing requirements for OSSFs. H-GAC continued to operate a regional Supplemental Environmental
Program to fund OSSF repairs, with Oyster Creek being one of several priority watersheds (12.4).

Summary and Recommendations

During the 2016 project year, the watershed stakeholders continued to implement and expand efforts identified in the I-Plan. The Phase II stormwater permits continued to be a driver for bacteria reduction efforts. Continued good housekeeping by utilities has decreased SSOs from human and mechanical error, and ensured that WWTFs have not become an increasing source. Education and outreach is well represented by existing efforts and partners, and supplemented as needed. Avian wildlife management continues to be a lesser focus, with no activity this year due to lack of resources and viable opportunities, and little interest in future expansion without additional resources. The watershed continues to experience growth, and there is still not a clear picture of the impacts of changing surface water use patterns.

In discussions with the local stakeholders, the following recommendations are offered for future implementation:

Additional Funding
While much of the effort is funded through existing programs or due to mutual benefit with other needs, additional funding is needed to address some of the projected implementation activities that do not fall under the purview of established programs. Continued project facilitation, in the short term, would aid in identifying and pursuing opportunities, or identifying potential local partnerships. A primary focus of need is structural activities; the greater balance of activity has been in addressing educational and outreach needs so far.

Additional Activities
Stakeholders have suggested several additional elements or items of consideration, including a follow up to existing bacteria source tracking study data, increasing educational efforts to deal with fats oils and greases (FOG), evaluating plant outflows in high flow conditions, and identifying additional funding (as above).

Enhanced Monitoring Data
The lack of ongoing 24-hour DO data hampers the ability of the stakeholders and TCEQ to accurately gauge progress on the aquatic life standard. Special studies conducted at regular intervals to provide similar information or regular 24-hour data should be collected via CRP. As
mentioned in the water quality summary section of this document, TCEQ is midway through a significant two-year sampling effort in which they have engaged the TIAER to collect bacteria, 24-hour DO, and associated parameters. One of the primary justifications for this work is interest in additional data expressed previously by project stakeholders.