

# Upper Oyster Creek TMDL Implementation

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Annual Report, FY 2019



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## Annual Report, FY 2019

Prepared by the Houston-Galveston Area Council, in coordination with the Texas Commission on Environmental Quality.

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## Acronyms

BMP	Best Management Practice
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)
GCWA	Gulf Coast Water Authority
H-GAC	Houston-Galveston Area Council
HHW	Household Hazardous Waste
I-Plan	Implementation Plan
MUD	Municipal Utility District
NPS	Nonpoint Source
OSSF	On-Site Sewage Facility
SEP	Supplemental Environmental Project(s)
SSO	Sanitary Sewer Overflow
TCEQ	Texas Commission on Environmental Quality
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 the progress made in 2019 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 (Figure 1) 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<sup>1</sup> 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.

Subsequent studies and monitoring data have indicated there are ongoing water quality issues in the creek and its tributaries. While appreciable efforts have been put toward addressing various sources of contamination by local stakeholders, additional progress is needed to bring the creek and its tributaries into compliance with state water quality standards.

## 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 period since, the stakeholders have continued to implement activities to address Upper Oyster Creek's water quality impairments and to further study changing water quality conditions. The 2019 year marks the fifth year of implementation, a project milestone.

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

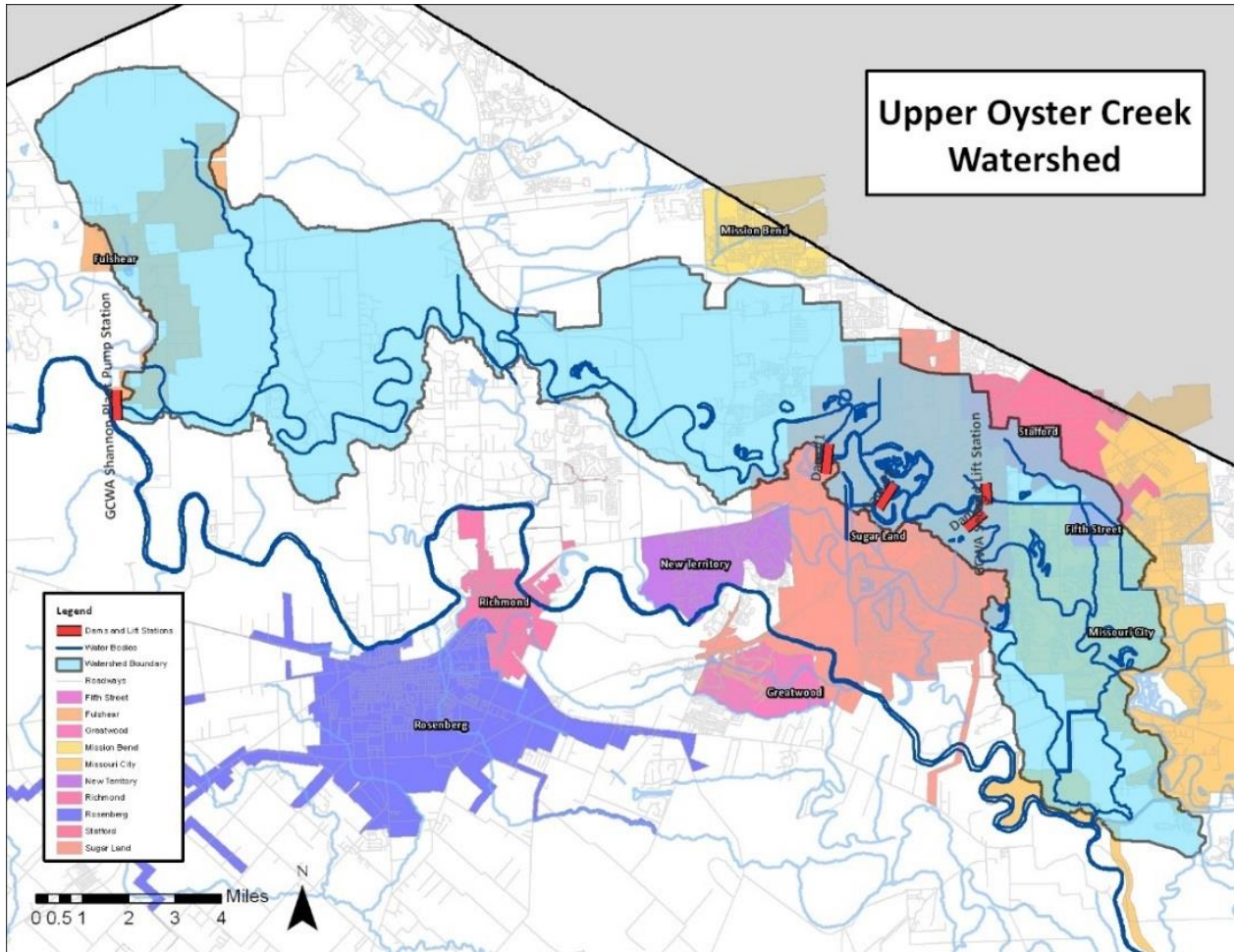


Figure 1 - The Upper Oyster Creek System

## Water Quality Status, 2019

A bi-annual comprehensive water quality analysis effort was conducted in 2019 as part of implementation activities 1.2 and 1.3 of the I-Plan. Project staff reviewed the regulatory status of the creek in approved and draft versions of the Texas Integrated Report of Surface Water Quality (Integrated Report), ambient water quality monitoring results, and wastewater permit-related data<sup>2</sup> as part efforts to inform stakeholder decisions. TCEQ provided stakeholders an update on enhanced monitoring project as part of the Annual Meeting in April 2019. The various water quality data sources indicated improvements in bacteria in some areas, but water quality challenges persisted throughout the system, and degradation was seen in some areas. 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 consistent, though could be acute in localized areas. Not reflected in the data, but pertinent from stakeholder discussions, are the impacts of transitions from rural sources in

<sup>2</sup> Sanitary sewer overflows (SSOs) and wastewater treatment facility (WWTF) discharge monitoring reports (DMRs).

some parts of the watershed to sources related to development as the watershed continues its developmental transition.

## Implementing Solutions

A variety of local partners are actively implementing solutions that have a positive benefit on the water quality and watershed health of the Upper Oyster Creek system. The progress made on the implementation activities in the I-Plan suggests the waterway is benefitting from the continuation of the TPDES stormwater permits, good housekeeping for local utility systems, a robust set of public education efforts, and shared benefits from other local efforts. Future needs include greater implementation of structural measures to match educational efforts, additional resources (financial and technical) to support implementation, and a focus on mitigating impacts of new development in the western and middle portions of the watershed.



Figure 2 - Upper Oyster Creek at State Highway 6

## 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 augments the system's volume to varying degrees. 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<sup>3</sup>) 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 assesses 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 exceeds screening levels for some constituents without numeric standard limits (e.g., nutrients). The most current approved version of the assessment during this project year was the 2014 Integrated Report of Surface Water Quality<sup>4</sup>.

Upper Oyster Creek developed water quality 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) studies<sup>5</sup> were completed for the system to determine the load 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<sup>6</sup>. When TMDLs were approved for the system, an Implementation Plan (I-Plan) process was initiated.

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<sup>3</sup> Based on the 2014 Texas Integrated Report, assessment units 1 and 2 do not support the recreation use, while assessment unit 3 does. Recent data indicates that these assessments, based on trailing seven years of data, may differ from current conditions, with assessment unit 3 showing elevated levels of fecal bacteria.

<sup>4</sup> Draft 2016 and 2018 Integrated Reports are available for review and considered for this report. However, the 2014 report is the most current approved Report and is the basis for the current description of impairment and concerns in the system.

<sup>5</sup> More information on the TMDLs and the Implementation Plan can be found at <https://www.tceq.texas.gov/waterquality/tmdl/25-oystercreek.html> and [www.upperoystercreek.com](http://www.upperoystercreek.com).

<sup>6</sup> These efforts do not reflect current efforts by TCEQ to evaluate the DO TMDL(s) in the system.

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, 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.



**Figure 3 - Red Gully in Cullinan Park**

## 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, 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*<sup>7</sup> (Integrated Report) summarizes the assessments conducted by the state every two years. Seven years of data (2005-2012, for the 2014 report) 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 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.

Changes reflected in the Draft 2016 and Draft 2018 Integrated Reports (not reflected in Table 1) include the following changes:

- AU1
  - Starting in the 2016 IR, the depressed oxygen grab (screening level) concern was no longer present.
  - in the 2018 IR, the contact recreation standard was fully supported.
  - In the 2018 IR, a concern was added for Total Phosphorus.
- AU2
  - Starting in the 2016 IR, the concerns for dissolved oxygen grab (minimum and screening level) were no longer present
- AU3
  - Starting in 2018, the contact recreation standard was not supported.
- Tributaries
  - 1245I – in 2016 depressed DO (grab, screening level) was listed as a concern; in 2018 it was no longer listed as a concern.

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<sup>7</sup> [https://www.tceq.texas.gov/waterquality/assessment/305\\_303.html](https://www.tceq.texas.gov/waterquality/assessment/305_303.html)

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

Water Quality Issue	Assessment Unit 1 (Downstream of Dam 3)	Assessment Unit 2 (Sugar Land)	Assessment Unit 3 (Upstream of Dam 1)	Tributaries also Impacted
<b>Bacteria</b>	Impaired	Impaired	Supporting	Red Gully, Bullhead Bayou, Unnamed trib. to Bullhead, Flewellen Creek, Alcorn Bayou, Steep Bank Creek, Stafford Run
<b>Dissolved Oxygen (24 hour)</b>	Supporting	Impaired	Supporting	Steep Bank Creek
<b>General</b>	Nitrate (CS), Chlorophyll a (CS)	Chlorophyll a (CS)	Chlorophyll a (CS)	Red Gully, Alcorn Bayou, Steep Bank Creek (nitrate)

Two of the three assessment units still have assessments indicating elevated levels of **fecal bacteria** in the 2014 IR, and most of the system’s tributaries are likewise impaired or have concerns. 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 based on the assessment (and AU1 is indicated as supporting the standard in the Draft 2018 IR). **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. Figures 4 and 5 represent network diagram of the main channel and tributaries (respectively) including the water quality impairments and concerns of its component waterways.

# Regulatory Status - Main Channel

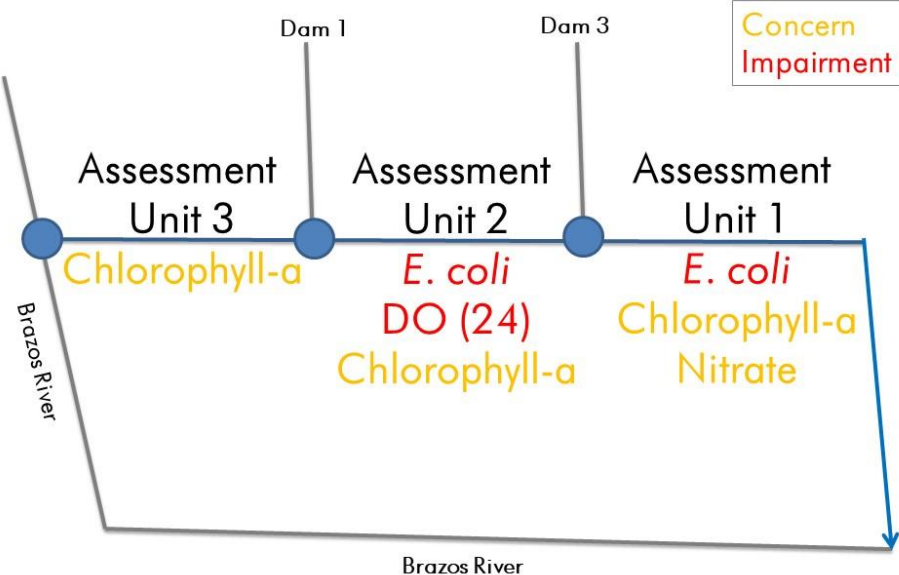


Figure 4 - Network diagram with regulatory status - main channel

# Regulatory Status - Tributaries

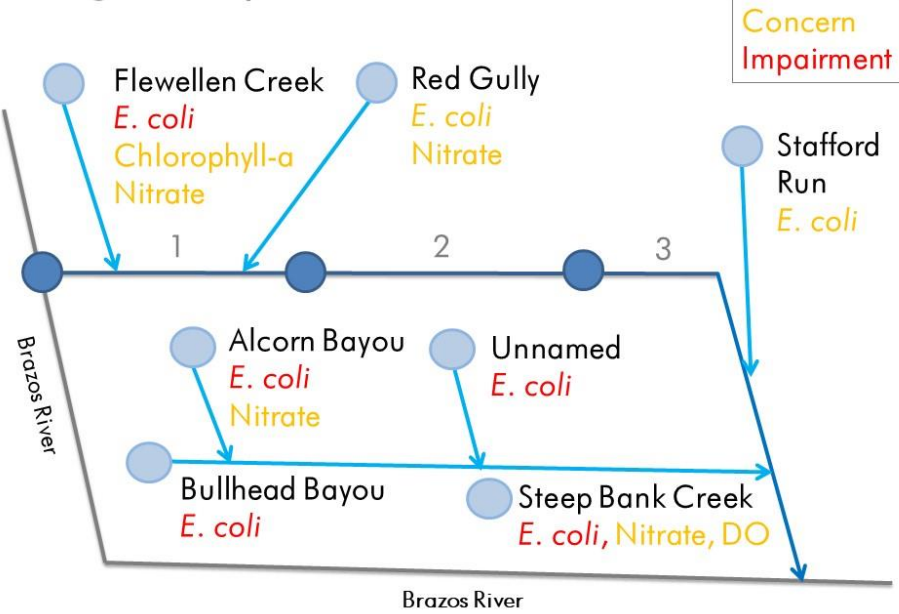


Figure 5 - Network diagram with regulatory status - tributaries

## 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. In recent years, additional sites were sampled in the system as part of an effort by TCEQ and the Texas Institute for Advanced Environmental Research (TIAER)<sup>8</sup>. These monitoring sites are shown in Figure 6.

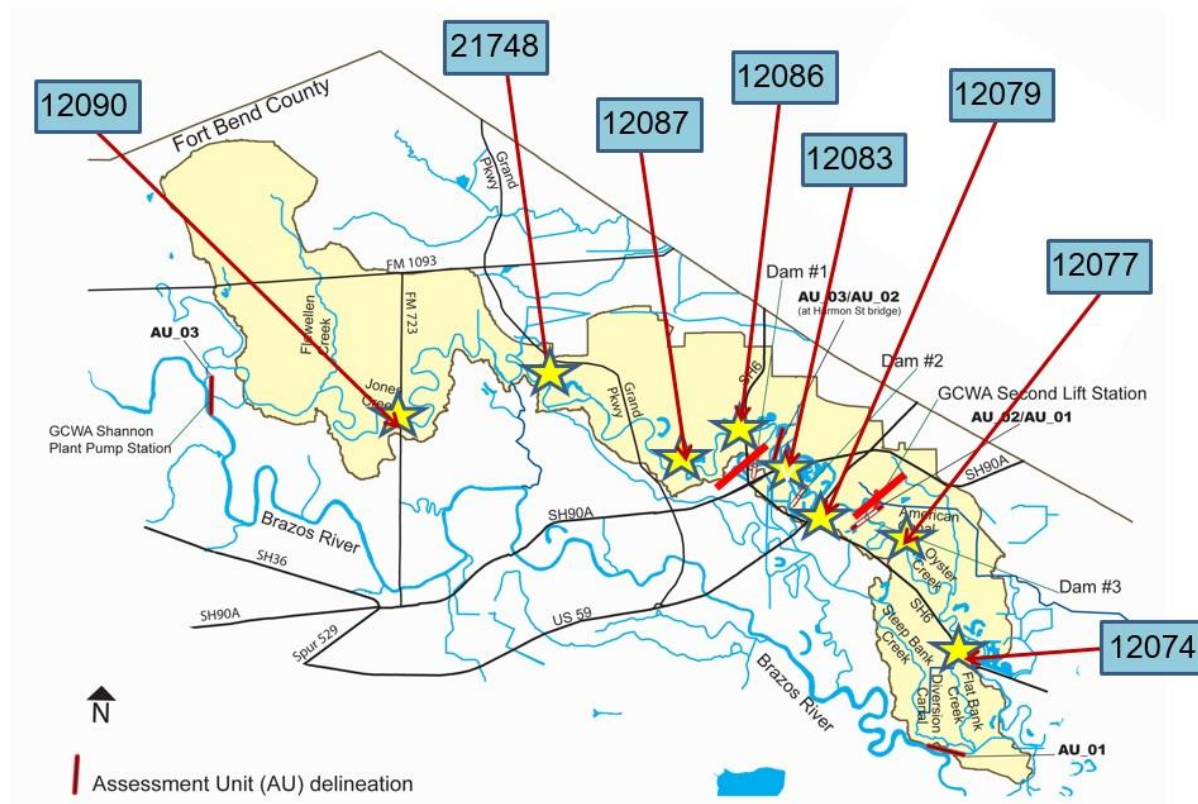


Figure 6 - Recent monitoring stations in Upper Oyster Creek

Water quality data from this sampling effort was discussed by TCEQ at the Annual Meeting in April 2018 and was included in the 2019 project year data review for stations 12087, 12083, and 12074 (representing the three assessment units).

The dataset evaluated included data collected in the five-year period between 2014 and the end of 2018 (additional data from the first quarter of 2019 was not yet available but will be

<sup>8</sup> More information about current status of the TMDL projects for this waterway can be found at <https://www.tceq.texas.gov/waterquality/tmdl/25-oystercreek.html>.

included in the 2020 project year evaluation). The evaluation considered results for fecal indicator bacteria (*E. coli*), DO, Nitrate, Total Phosphorus, and chlorophyll-a. Table 2 indicates the results of the analyses showing the geomean (bacteria) or number of exceedances/percent of exceedances (all others) for each parameter.

**Table 2 - Ambient water quality data analyses summary**

Parameter	AU1 - Station 12074 (number of violations, % of total samples)	AU2 - Station 12083 (number of violations, % of total samples)	AU3 - Station 12087 (number of violations, % of total samples)
<i>E. coli</i> <sup>9</sup>	Geomean – 189	Geomean – 111	Geomean - 127
DO (grab)	5, 11.1%	22, 29.7%	3, 7.3%
DO (24 hr. average)	(No data)	12, 30.0%	9, 22.5%
DO (24 hr. minimum)	(No data)	6, 15.0%	1, 2.5%
Nitrate	14, 82.4%	2, 5.1%	1, 2.8%
Total Phosphorus	13, 81.3%	0,0%	0,0%
Chlorophyll-a	13, 81.3%	12, 30.1%	11, 30.1%

These data indicate that during the five-year period evaluated, bacteria geomeans AU1 and AU3 were above the standard, with many instances in which values (including maximum values of 5,800 in AU3, 4,100 in AU1, and 11,000 in AU2) were in excess of the standard in all three AUs. There were no exceedances of the minimum DO grab in any AU, but all three had some samples that were too low for the screening level, with AU2 having the most prominent issue. No 24-hour DO data was available for AU1, but the data for AUs 2 and 3 indicated both had appreciable issues meeting the 24-hour average, and that AU2 had the most issue meeting the 24-hour minimum. For Nitrate, results were highest in AU1, with fairly low levels of exceedance in AUs 2 and 3, likely related to the different stream character in the most downstream AU. These results were mirrored for Total Phosphorus, which had significant exceedances in AU1, but no exceedances in the upstream AUs. While Chlorophyll-a was most significant in AU1, there were appreciable exceedances in AUs 2 and 3. These data, in summary, indicate that positive water trends in the most recent IRs may not be reflected in subsequent reports based on the most recent data. In general, the system continues to be challenged with ongoing fecal bacteria impairments and appreciable nutrient/aquatic life standard issues.

<sup>9</sup> Data for bacteria is given as the geomean in MPN/100mL for the dataset, rather than the unit descriptions given in the column head.

## Sanitary Sewer Overflows

Between 2016-2018<sup>10</sup>, there were 24 reported sanitary sewer overflow (SSO) events, representing a volume of 232,245 gallons of untreated sewage. The number and volume of SSOs per year has been relatively consistent in this period. While this evaluation period had fewer SSOs and volume than the 2018 assessment period, the dataset from 2018 may be underrepresenting reported SSOs, so a direct comparison is not possible.

No single problem (broken pipe infrastructure, rainwater intrusion, human error, equipment failures, or blockages, as shown in Figure 3) completely dominated the causes of these SSOs by number, but rainwater inflow and infiltration and lift station failures accounted for more than half of the SSOs, and 85.7% of the reported SSO volume. 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. This is especially relevant in 2017/2018, given several flooding events including Hurricane Harvey in August 2017. While flooding of systems was not reported to be widespread in the area, there were locations that were not able to be actively monitored during portions of the event. However, unlike other areas in the Houston region, the utility systems in this watershed are generally newer and well-maintained, limiting chronic SSO issues. SSOs in the watershed seem to be episodic, so it is likely they represent a greater acute loading source than a chronic one. The number and volumes of SSOs are shown in Table 4, and the breakdown of SSO causes (by number and volume) is shown in Table 5.

Table 3 - Sanitary sewer overflows by number and volume, 2016-2018

Period	Number Reported	Volume In gallons	Facilities Reporting
Total (2016-2018)	24	232,245	7
2016	12	117,520	7
2017	11	113,825	4
2018*	1*	900*	1*

<sup>10</sup> At the time of the development of this report, the full dataset for 2018 and 2019 were not available. Based on analyses created for other projects, the 2018 dataset for SSOs may be incomplete. This report will be updated as additional data for this dataset is available.

**Table 4 - Sanitary sewer overflows by volume, 2016-2018**

SSO Cause	Number Reported	% of total Volume
Blockage - Fats/Grease	1	0.4%
Blockage – Other Cause	1	<0.1%
Collection System Structural Failure	2	0.2%
Lift Station Failure	7	44.4%
Power Failure	1	4.3%
Rain / Inflow / Infiltration	4	37.4%
Unknown Cause	3	10.8%
WWTP Operation or Equipment Malfunction	5	2.4%

In Table 4, the total number of facilities reporting for the entire period (last 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 period. This reflects that some facilities reported SSOs each year, while some only in one year. It should be noted that a reported cause may be, in reality, a combination of multiple causes, as opposed to the single reported cause. For example, rainwater may exacerbate existing clogs, or fats oils and grease blockages may cause equipment failures. Rainfall and lift station failures were prominent causes by volume in this time period.

### **Wastewater Treatment Facility Discharges**

Wastewater treatment facilities are potential sources of all three TMDL constituents<sup>11</sup>: 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 the review of the DMRs for the WWTFs in the Upper Oyster Creek system that was performed for the 2019 project year, the facilities seemed to be performing well during the 2016-2018 timeframe. DMR data was available for 18 wastewater facilities in the watershed. In

<sup>11</sup> The TMDL project for depressed dissolved oxygen focused on ammonia and CBOD5 as the precursor constituents for which TMDLs would be developed.

general, the plants had few exceedances of their permit limits based on reported data. Specific information on the three TMDL constituents is as follows.

**Bacteria-** No samples out of 751 records exceeded their permit limit.

**Ammonia Nitrogen** - 9 samples out of 807 records exceeded their limits for ammonia (weight-based limit), and 14 samples out of 806 records exceeded their limits for the concentration-based limit. Less than 2% of all samples were in exceedance of permit limits.

**CBOD5** – No samples out of 1605 records exceeded their limits.

While the DMR data indicates that plants generally meet their permit limit in reported data, with few exceptions, the exceedances point to potential issues at a few plants rather than a widespread irregular pattern.

### Water Quality Summary

In general, the 2019 water quality data assessment indicated that there were mixed results since the 2018 project year assessment, but that conditions remained relatively consistent. Continued monitoring in those assessment units at a minimum of one station each will ensure the ability to measure progress in future years.



Figure 7 - Aquatic vegetation in lake impoundment, AU2

## 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<sup>12</sup> 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 maturation of efforts under the TPDES MS4 stormwater permits has added to the focus on alleviating sources of bacteria and oxygen-demanding substances in the watershed. Permit requirements now in place have augmented attention and actions that will positively benefit the TMDL goals. As part of a review of progress, H-GAC reviewed Annual Reports from stormwater permittees, spoke with local partners, and assessed activities ongoing in the watershed. Additionally, feedback and information about implementation activities was collected at the April 2019 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:

- DMR and SSO data were reviewed for 2016-2018, as summarized in this report (1.2);
- TCEQ continued to monitor ambient water quality in the watershed at an expanded number of stations, and TCEQ completed a special monitoring study with TIAER (1.3, 1.5). The results of the TIAER monitoring were reflected in the water quality assessment for the stations on the main channel. The City of Sugar Land has also monitored water quality in Oyster Creek in the vicinity of their surface water plant.

### Strategy 2 - Research

The purpose of the research strategy is to identify changing conditions. This year:

- Current wastewater quality data (SSOs and DMR) was evaluated and presented at the April 2019 meeting, and summarized in this report (2.3); and

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<sup>12</sup> 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 the Implementation Plan at <http://www.upperoystercreek.com/ProjectDocuments.html>.

- several entities have continued to consider research and feasibility of wastewater reuse, including reclaimed water use within the annexed areas (New Territory) of the City of Sugar Land.

### **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. Local partners indicated they perceived a continued need for education, rather than a saturation of efforts.

- Cities and other MS4 utilities conducted related outreach under their Phase II permits (3.2), as outlined in their SWMPs and Annual Reports. Examples of these activities include dissemination of educational materials conducting storm drain marking, holding environmental events, and providing direct curriculum to students;
- several entities expressed an increased effort and effectiveness in utilizing social media for direct community contact (3.2);
- several districts have expanded/integrated existing website resources (3.2);
- Sugar Land, Missouri City, and other entities have call/complaint tracking databases or apps (Missouri City's SeeClickFix app, etc.) to enhance reporting and identification of problem areas;
- 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, as promoted by H-GAC as appropriate, continued to provide educational opportunities for landowners and agricultural producers (3.3);
- HOA and MUD boards have continued to increase their interest in disseminating related materials and messages; and
- the City of Sugar Land and the City of Missouri City continued to manage their Stream Team volunteer water quality monitors (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<sup>13</sup> included:

- a continuation of the Galveston Bay Foundation's Cease the Grease campaign (4.1) with related efforts by H-GAC;
- the H-GAC Clean Water Initiative seminars' inclusion of stormwater management and other related topics (4.1);

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<sup>13</sup> The items included as new elements here refer to elements added since the inception of the I-Plan. This should not be taken to indicate these elements are new for this project year. They are included in this section based on the numbering schema of the I-Plan.

- and other new elements under the MS4 permit education programs, including City of Sugar Land efforts to expand messages to annexed areas in partnership with KSLB;
- H-GAC has continued to develop and implement OSSF education programs regionally, to which watershed stakeholders are invited (4.2); and
- Local partners, including Texas Master Naturalists/Texas Master Gardeners intend to explore lawn maintenance education through AgriLife Extension, with a native plant focus (4.3).

### **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. The continued implementation of the current permit requirements was reported as spurring both interest and activity in additional actions by permittees. This year:

- the Phase II permittees worked with new developments to enhance stormwater considerations, and the City of Sugar Land will have added industrial stormwater elements based on its increase in population size and permit category (IV), including floatables monitoring;
- 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 regular use (5.4). Sugar land has indicated an interest in expanding pet waste stations if additional funds were available;
- water conservation elements (Rain barrels, etc.) continued to be offered through Missouri City, First Colony, and the City of Sugar Land.
- Missouri City continues to recycle their internal fleet waste oil, and Sugar Land and Fort Bend County have accepted waste oil from the public (5.7);
- Sugar Land has continued to offer household hazardous waste (HHW) pickup and Missouri City has continued to subsidize their residents' use of the Fort Bend County HHW disposal site (5.8); and
- Sugar Land continues to operate its liquid waste hauler licensure program.

Local partners discussed additional elements to consider, including expanded focus on HOA/MUD Boards for new activities, consideration of the potential impact of trash and lawn waste on lake storage capacity, additional waste stations in the watershed, potential to use BST in the future to identify the potential impact of MS4 actions, and the benefit of using simplified "report card" or executive summary style reports for Boards.

## 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<sup>14</sup>. Many of the efforts in Strategy 5 had significant overlap with the elements of this strategy, and those of strategy 4. Stormwater management continues to be a primary focus for implementation in the watershed, and a coordinating point for many of the efforts stakeholders have completed or recommended. 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 elements included a continued focus on educating district/HOA boards on issues by Stormwater Solutions and other operators;
- Sugar Land is continuing its transition to a level 4 permitted system, including addition of industrial stormwater elements, and has continued to maintain pet waste stations and is maintaining similarly progressive stormwater programs with the now-annexed communities of Greatwood and New Territory; and
- Missouri Citi has pet waste stations in a new park area and has indicated component MUDs have interest in adding more.

## 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); and
- 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. This year:

- Texas A&M AgriLife Extension continued to offer and implement technical services in the watershed;
- Feral hog populations were identified as a large issue in the Riverstone area; and

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<sup>14</sup> Examples of existing stormwater programs can be viewed at <http://www.sugarlandtx.gov/index.aspx?NID=333> (City of Sugar Land), <http://www.missouricitytx.gov/?nid=88> (City of Missouri City), <http://www.ljams4.com/fortbend/> (Fort Bend County).

- Municipalities in the watershed continued trapping on primarily an as-needed basis. The City of Sugar Land is trapping and actively shooting in specific locations in and adjacent to the watershed (in the Brazos River corridor).

Reports from local partners indicate the impacts of new development have been exacerbating hog issues in areas like southern Sugar Land, as other habitat is disturbed.

### **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. The stakeholders did not have specific interest in pursuing these efforts in the near future. Specific interest was voiced by representatives from some districts who have related issues with wastes from pigeons/domestic ducks. Anecdotal reports from a resident in the impounded lakes in Sugar Land suggest wild and domestic bird species have declined in their area. NO apparent cause was found in subsequent H-GAC site visits and consultation with TPWD staff (other than potential impact of expanded development in the area.)

### **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 standard good housekeeping practices and utility management. DMR data results are discussed earlier in this report, but generally indicated compliance for all constituents of concern, with infrequent violations. No problem facilities were reported by the stakeholders.
- Several reuse projects (primarily irrigation and lake-filling (e.g. lake filling in Riverstone, use in Quail Valley, select Missouri City districts, etc.) are ongoing, with golf courses were identified as a continuing priority for non-potable supplies. The Fort Bend Subsidence District is now collecting reuse data, which may be a potential data source for the project moving forward. The LID 17/New Territory 2 MGD reuse project is now online serving public spaces and lakes (10.3).
- The City of Sugar Land completed an Integrated Water Resource Plan that takes a comprehensive approach to system and supply management, including integration of WWTP considerations and a heavy emphasis on non-potable reuse (10.3, 10.5).

Local partners indicated reuse has become a more interesting prospect for many districts due to the rising cost of potable water supply. With the lack of additional firm water supplies from GCWA, reuse is highly recommended in the watershed.

### **Strategy 11 - Sanitary Sewer Collection Systems**

The purpose of this strategy is to reduce sanitary sewer overflows. This year:

- Local partners continued to implement local and regional 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);
- the City of Sugar Land indicated they were beginning a process of evaluating potential for consolidating lift stations (11.5); and
- H-GAC’s CWI series touched on several wastewater utility related topics.

## 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 continued its OSSF training program for real estate inspectors and homeowners held several regional trainings to which stakeholders were invited;
- 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). Oyster Creek is one of the priority watersheds for expending those funds in the coming year, depending on needs in other areas.

## Summary and Recommendations

In 2019, watershed stakeholders continued to pursue efforts that were beneficial to the aims of the I-Plan. While significant water quality improvement was not noted, the data indicated some improvement in some areas, although two AUs are now impaired based on the 2014 IR<sup>15</sup>, and dissolved oxygen levels continue to be an issue. The lack of appreciable degradation in a rapidly developing watershed is also a sign of the impact of stakeholder efforts. The TPDES stormwater permits, including the current permit requirements, continued to be a driver for pollutant reduction efforts. SSOs have not decreased appreciably<sup>16</sup>, and are a continued need for future focus. WWTFs continue to generally meet permit limits, with no exceedances reported for bacteria and CBOD5 and only a limited number of facilities reporting ammonia exceedances. Education and outreach goals are well represented by existing efforts and partners, and

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<sup>15</sup> Though AU1 is currently assessed as fully supporting in the Draft 2018 IR.

<sup>16</sup> While 2018 data indicates fewer than normal SSOs, the dataset is incomplete and is potentially underrepresenting actual SSOs, so should not be taken in comparison with previous years.

supplemented as needed, with increased interest and activity and the HOA/MUD Board level, who continue to be a primary intended audience for this outreach additional outreach.

Avian wildlife management continues to be a lesser focus, with no activity again 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 surface water use continues to expand, changing the flow conditions in the conveyance waterways of the system. Feral hog issues have been exacerbated with continued growth and are especially prominent in the Brazos River corridor south of the City of Sugar Land/Riverstone area. While limited efforts are being employed to address them, a coordinated approach could enhance results.

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. Specific activities noted by stakeholders include the potential for expanded pet waste stations, the use of SEP or other funds for OSSF remediation, and additional funding for general outreach by participants like KSLB.

### **Message Building**

Additional outreach topics of great concern are “flushable” wipes, impacts of legislation arising from the 2019 Legislature, and support for hazardous waste efforts in smaller districts. Stakeholders recommended expanded web and social media platforms as good avenues for expanded outreach, especially to districts and other smaller entities without staff dedicated to these issues.

### **Ongoing Monitoring Data**

Maintenance of the existing TCEQ ambient stations in each of the assessment units is crucial to long term evaluation of program effectiveness.