Lake Conroe Watershed Protection Plan Progress Report

Prepared by:

San Jacinto River Authority
1577 Dam Site Road
Conroe, TX 77304
www.sjra.net

December 2017

Progress Report

Lake Conroe Watershed Protection Plan

Prepared by:

San Jacinto River Authority
1577 Dam Site Road
Conroe, Texas 77304
www.sjra.net

December 2017

This page is intentionally left blank

Table of Contents

Acronyms and Abbreviations iv
Executive Summary v
1.0 Introduction 1
2.0 Water Quality Monitoring Programs 4
2.1. Clean Rivers Program 4
2.2. USGS Sampling Program 11
3.0 On-Site Sewage Facility Program 14
3.1. Permitting and Inspection 14
3.2. Enforcement Activities 15
4.0 Invasive Species Control and Native Aquatic Vegetation Program 18
4.1. SJRA Zebra Mussel Artificial Substrate Monitoring 18
4.2. Native Aquatic Vegetation Program 21
5.0 Public Outreach Activities 27
5.1. Stormwater Inlet Marking Program 27
5.2. Supporting Other Water Quality Programs 35
5.3. Additional Ongoing Public Education Activities 36
References 37
Appendix A (Watershed Protection Plan) 38
Appendix B (OSSF Program) 40
Appendix C (SwIM Program) 42

List of Figures

Figure 1 - Lake Conroe Watershed 3
Figure 2 - Water Quality Sampling Locations 5
Figure 3 - Chlorophyll-a Concentrations in Lake Conroe 8
Figure 4 - Nitrate Concentrations in Lake Conroe 9
Figure 5 - Total Phosphorus Concentrations in Lake Conroe 9
Figure 6 - E -Coli Concentrations in Lake Conroe 10
Figure 7 - Chloride Concentrations in Lake Conroe 10
Figure 8 - OSSF Locations 17
Figure 9 - Zebra Mussel Monitoring Stations 20
Figure 10 - SJRA's Current Nursery Stock 22
Figure 11 - Native Aquatic Vegetation Cages 26
Figure 12 - Stormwater Outfall Locations 31
Figure 13 - SwIM Locations (October 2017) 32
Figure 14 - SwIM Locations (Bentwater) 33
Figure 15 - SwIM Locations (April Sound) 34

List of Tables

Table 1: CRP Water Quality Data (Average over last seven years) 7
Table 2: CRP Water Quality Data (Average over last seven years) 7
Table 3: CRP Water Quality Data Screening Level Exceedances (Over last seven years) 8
Table 4: USGS Water Quality Data (Average over last seven years) 11
Table 5: USGS Water Quality Data (Average over last seven years) 12
Table 6: USGS Water Quality Data (Average over last seven years) 12
Table 7: USGS Quarterly Sampling Data Screening Level Exceedances (Over last seven years) 13
Table 8: Required Water Quality Parameters for Zebra Mussel Reproduction 19
Table 9: Lake Conroe Zebra Mussel Monitoring Stations 19

Acronyms and Abbreviations

ATU	Aerobic Treatment Unit
CRP	Clean Rivers Program
EPA	[United States] Environmental Protection Agency
GIS	Geographic Information System
GRP	Groundwater Reduction Program
H-GAC	Houston-Galveston Area Council
HOA	Home Owners' Association
mg/L	Milligrams per Liter
MSL	Mean Sea Level
MUD	Municipal Utility District
OSSF	On-Site Sewage Facility
POA	Property Owners Association
QA/QC	Quality Assurance / Quality Control
SJRA	San Jacinto River Authority
SwIM	Stormwater Inlet Marking
TCEQ	Texas Commission on Environmental Quality
The Plan	Lake Conroe Watershed Protection Plan
TPWD	Texas Parks and Wildlife Department
USGS	United States Geological Survey
WWTP	Wastewater Treatment Plant

Executive Summary

The Lake Conroe Watershed Protection Plan (the "Plan") was developed in 2015 by San Jacinto River Authority (SJRA) staff with input from a diverse group of stakeholders who volunteered their time in the Plan development effort. The goal of the Plan is to maintain and, when appropriate, improve the excellent water quality condition currently present in Lake Conroe. The development of the Plan required SJRA to characterize the current conditions within the watershed in greater detail and to assess the specific sources of potential pollution which may threaten the watershed in the future. Based on this assessment, various ongoing management activities were planned for implementation, including increased outreach and education programs for the community.

The primary sources of potential pollution in the Lake Conroe watershed were identified in the Plan as:

- Stormwater runoff from the surrounding urbanized development around Lake Conroe.
- Nutrient and bacteria levels from wastewater treatment plants.
- Bacteria from sanitary sewer overflows, pet and wildlife waste, and malfunctioning On-Site Sanitary Sewage Facilities (OSSFs).
- Silt and debris from construction sites within the high-growth areas of the watershed.
- Litter and waste from commercial areas and recreational activities.

The Plan proposed the following management activities in order to address these sources of pollution:

- Regulating OSSFs more stringently.
- Improving stormwater controls in new developments.
- Improving compliance and enforcement of existing stormwater quality permitting, including construction sites.
- Continuing public education and outreach with respect to nutrients and the impact of littering.

This progress report describes the management activities related to OSSFs, stormwater, water quality data collection and analysis, invasive species control, native aquatic vegetation, and public outreach activities that have been implemented or are in the process of being implemented to address the identified sources of pollution. Communities surrounding the lake have been engaged in implementing these management activities. A full revision to SJRA's current 2015 Plan is tentatively scheduled to be completed in 2020.

This page is intentionally left blank

1.0 Introduction

The SJRA is tasked with an overall mission to develop, conserve, and protect the water resources of the San Jacinto River watershed. The Lake Conroe Watershed Protection Plan (the "Plan") provides an important element of this mission. The fundamental goal of the Plan is to maintain the reservoir's current excellent water quality conditions and, when possible, improve the reservoir water quality. This goal is accomplished by identifying opportunities to better manage resources, by educating and informing the public and interest groups regarding water quality conditions, and by supporting and encouraging activities within the watershed that reduce future pollution from all sources. The Plan has created a management strategy that defines and addresses both existing and future water quality problems emanating from both point and non-point sources of pollution within the watershed and serves as a means of resolving and preventing water quality problems using a holistic watershed approach.

The Plan provides an assessment of the current reservoir's water quality and the potential for degradation in the future from various sources within the watershed. Based on this assessment and the potential for future pollution, the Plan proposes a range of management activities that the SJRA can adopt to mitigate the potential for increased pollution from the identified sources.

The Plan was developed with active assistance of local stakeholders, all of whom have an interest in protecting the water quality and the designated uses of the reservoir. The Plan proposed voluntary, non-regulatory water resource management activities and enhanced local regulations and ordinances where needed. Public participation will continue to be critical throughout the Plan development and implementation, since the ultimate success of any strategy depends on stewardship of the land and water resources by local landowners, businesses and residents of the watershed and of the public. It is expected that the Plan will lead to the implementation of various strategies for improvement and to the identification of opportunities for widespread participation of stakeholders across the watershed, working together and as individuals, to implement voluntary practices and programs that maintain and improve the quality of water in Lake Conroe.

The Lake Conroe watershed (the land area that drains into Lake Conroe) is primarily located in northern Montgomery County and southern Walker County; Grimes County occupies a small section of the watershed in the northwest area. Lake Conroe itself covers most of the lower one-third of the watershed and has significant residential and commercial development around the reservoir shores, including areas recently annexed by the City of Conroe. The middle part of the watershed consists of the Sam Houston National Forest, with small ranches and small farms scattered throughout the forest. The upper watershed comprises of a mixture of cultivated lands, pastures, pristine forests, and cleared land from timber harvesting. The City of Huntsville represents a major urban development located in the northeastern section of the watershed. The watershed of Lake Conroe comprises of approximately 450 square miles out of the total upper basin of the West Fork of the San Jacinto River. Figure 1 shows a map of the Lake Conroe watershed.

The primary sources of potential pollution in the Lake Conroe watershed were identified in the Plan as:

- Stormwater runoff from the surrounding urbanized development around Lake Conroe.
- Nutrient and bacteria levels from wastewater treatment plans (WWTPs).
- Bacteria from sanitary sewer overflows, pet and wildlife waste, and malfunctioning on-site sewage facilities (OSSFs).
- Silt and debris from construction sites within the high-growth areas of the watershed.
- Litter and waste from commercial areas and recreational activities.

Based on this assessment and the potential for increased future pollution, a range of management and public outreach activities were provided in the Plan which the Authority will continue to implement and enhance in order to meet its goals. SJRA's public relations department and the Lake Conroe Division developed an information pamphlet to distribute to the public that summarizes the Lake Conroe watershed protection plan management activities. A copy of the pamphlet can be seen in Appendix A of this report.

The management activities proposed to address these sources of pollution included:

- Regulating OSSFs more stringently.
- Improving stormwater controls in new developments.
- Improving compliance and enforcement of existing stormwater quality permitting, including construction sites.
- Continuing public education and outreach with respect to nutrients and the impact of littering.

This report describes the management activities that have been implemented or are in the process of being implemented to further address the identified sources of pollution, including more stringent regulation of OSSFs, stormwater inlet marking, and continued water quality data collection and analysis. The urban communities surrounding the lake have been engaged by SJRA in implementing these management activities.

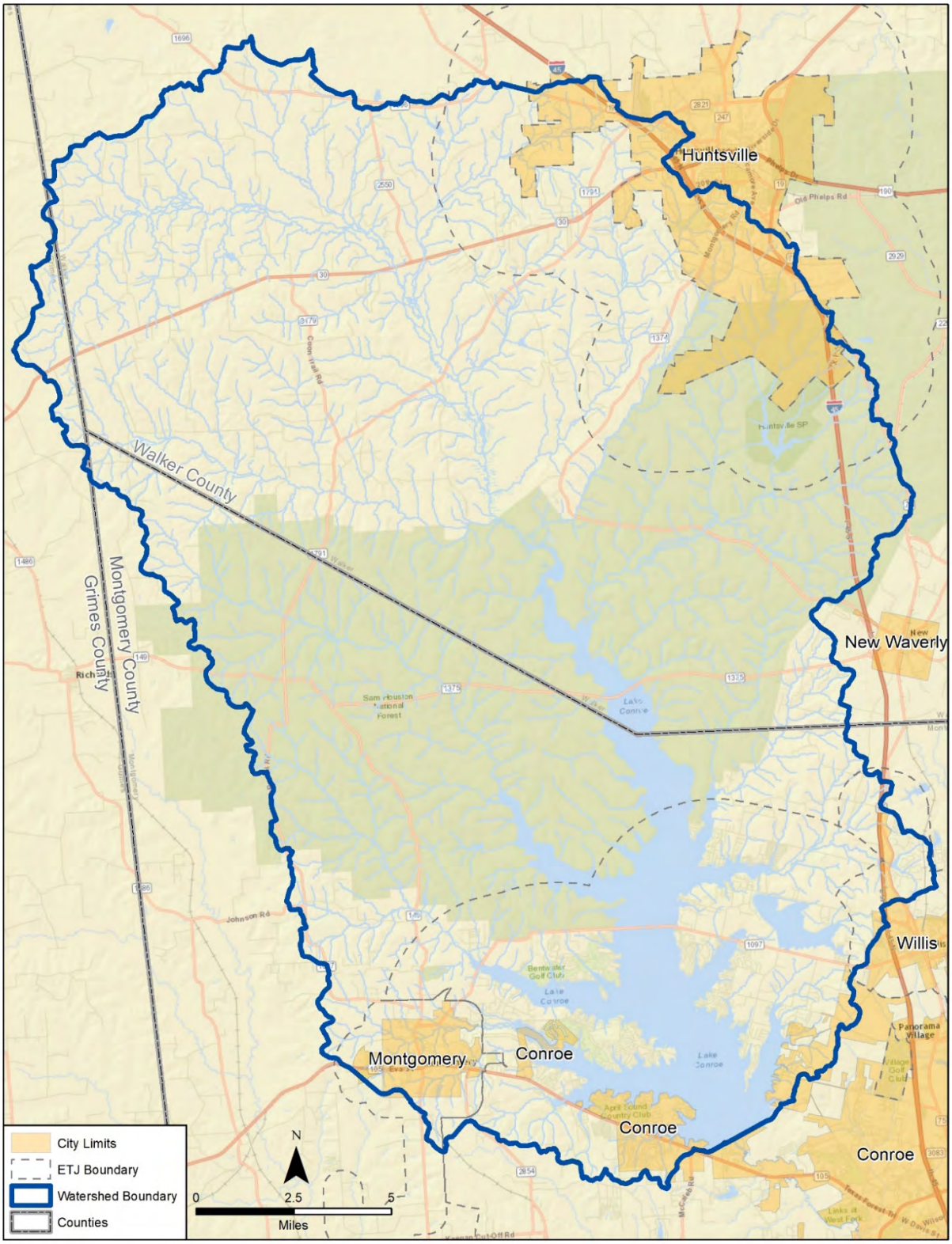


Figure 1 - Lake Conroe Watershed

2.0 Water Quality Monitoring Programs

Two independent but coordinated efforts for monitoring water quality are ongoing in the Lake Conroe watershed. 1) The Clean Rivers Program (CRP) sponsored by Texas Commission on Environmental Quality (TCEQ), and 2) the federally sponsored and locally financially supported program by the United States Geological Survey (USGS).

SJRA currently administers the CRP for water quality monitoring within the Lake Conroe watershed. Other special water quality monitoring programs listed in SJRA's 2015 Plan were primarily developed to aid in the design of the Groundwater Reduction Program (GRP) water treatment facility, and have since been discontinued. These discontinued programs include a tributary stream storm-event program, branch cove program, and SJRA water treatment plant intake area program. Sampling locations within the Lake Conroe watershed for both currently implemented programs can be seen in Figure 2.

2.1. Clean Rivers Program

SJRA participates in and contributes to the CRP by sampling Lake Conroe and its tributaries' water at various designated sites on a monthly basis. The collected water quality samples are transported and delivered to the City of Houston's Water Quality Laboratory for analysis. The CRP is managed regionally by the Houston Galveston Area Council (H-GAC). The H-GAC obtains the laboratory results from the City of Houston Laboratory and disseminates the information through its website (www.h-gac.com).

There are ten CRP water quality monitoring stations located in the Lake Conroe watershed. The CRP sites are all located in the main body of the lake and were chosen based on capturing water quality from all tributaries, including sites in the center of the lake to capture the mixing of inflows. The data that is gathered from each sampling event is compared to the TCEQ water quality standards and screening levels. The standards and screening levels are designed to determine whether the stream segment or water body is impaired, or is in compliance with the established criteria.

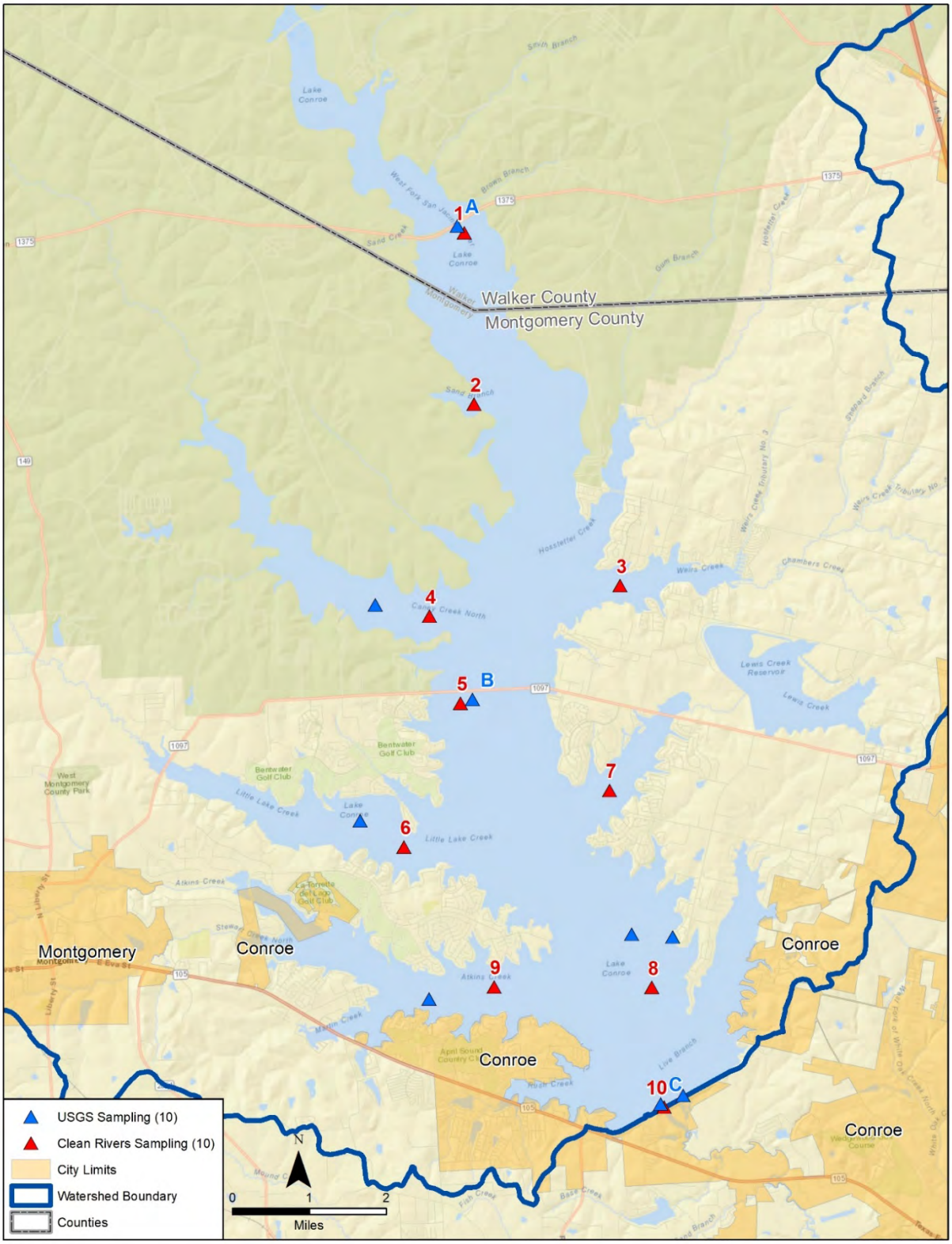


Figure 2 - Water Quality Sampling Locations

The water quality samples that are collected in the SJRA CRP monitoring program are analyzed for various constituents as presented in Tables 1 and 2. The data presented in the tables displays averages of sampling values over the past seven years. Table 3 summarizes the number of sampling events for each constituent that have exceeded the reference standard over the past seven years. The majority of these exceedances are likely due to a sampling period that occurs after recent heavy rainfall events. Heavy rainfall events in the watershed cause significant runoff which may introduce higher levels of the sampled constituents into the lake. The constituents sampled generally characterize the raw water quality in Lake Conroe and potentially provide indications of water quality issues that may need to be addressed. The parameters within the State standards are established by the TCEQ based on water quality problems that affect human and ecological health. The State's water quality standards were developed in compliance with the United States Environmental Protection Agency's (EPA) Clean Water Act of 1973 based on the "designated uses" of each water body. The three designated uses for Lake Conroe are water supply, primary contact recreation, and aquatic life. TCEQ also provides a set of screening criteria that are not official standards or laws, but are additional recommendations to prevent health or ecological problems. The TCEQ standards and screening levels for each tested constituent are shown in the following tables.

Figures 3 through 7 graphically depict a selected set of water quality data from the CRP, showing the reference standard or screening level. Each graph represents a different constituent at three (3) of the ten (10) sampling locations. The three (3) sampling locations were selected to best represent the major regions of the lake, including one sampling location in a northern part of the reservoir at the FM 1375 bridge, the second near the center of the reservoir at the FM 1097 bridge, and another at a downstream location near the Lake Conroe Dam. The red line on each figure represents the standard or screening level for the constituent. Trend lines were not added to the figures, but one identified trend depicted in the figures was for chloride, and the levels have significantly decrease over the past two years. This is most likely due to the above-average rainfalls the watershed has experienced since 2015.

The EPA and TCEQ provide detailed Quality Assurance and Quality Control (QA/QC) procedures for field sampling and data entry adopted from the Surface Water Quality Manual (refer to TCEQ (2012)). The SJRA follows all of these required procedures during field sampling, equipment calibrations, and data entry. The laboratory QA/QC process follows the guidelines found in the widely accepted Standard Methods for the Examination of Water and Wastewater, (Eaton, A.D. et al, 2005). The standard methods provide the detailed process for processing each sample through the laboratory. Quality control in the laboratory is also conducted by properly calibrating the laboratory equipment on a routine basis.

Table 1: CRP Water Quality Data (Average over last seven years)

Constituent	Units	Site 1	Site 2	Site 3	Site 4	Site 5	Std
pH	SU	8.33	8.47	8.51	8.38	8.40	NA
Conductivity	µs/cm	256.93	271.88	272.05	283.49	280.46	NA
Temperature	C*	22.21	22.74	22.14	22.10	22.15	<32
Nitrate	mg/L	0.07	0.05	0.17	0.07	0.07	<0.37
Ammonia	mg/L	0.11	0.10	0.21	0.10	0.10	<0.11
Chlorophyll	µg/L	11	14.17	13.30	12.38	12.73	<26.7
E-Coli	MPN/100mL	65.8	9.84	14.92	6.14	6.30	<126
T-Phosphorus	mg/L	0.11	0.08	0.18	0.08	0.08	<0.2

Table 2: CRP Water Quality Data (Average over last seven years)

Constituent	Units	Site 6	Site 7	Site 8	Site 9	Site 10	Std
pH	SU	8.49	8.50	8.36	8.34	8.05	NA
Conductivity	µs/cm	283.89	281.31	283.67	286.13	284.68	NA
Temperature	C*	22.56	21.97	21.54	22.22	21.95	<32
Nitrate	mg/L	0.07	0.08	0.09	0.08	0.12	<0.37
Ammonia	mg/L	0.10	0.10	0.10	0.10	0.10	<0.11
Chlorophyll	µg/L	13.06	13.26	11.82	11.46	10.21	<26.7
E-Coli	MPN/100mL	8.74	10.39	5.80	9.30	10.62	<126
T-Phosphorus	mg/L	0.09	0.07	0.08	0.06	0.07	<0.2

Table 3: CRP Water Quality Data Screening Level Exceedances (Over last seven years)

Constituent	Units	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Std
pH	SU	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Conductivity	µs/cm	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Temperature	C*	2	6	4	1	0	0	1	0	0	0	<32
Nitrate	mg/L	2	0	0	0	0	0	1	2	1	3	<0.37
Ammonia	mg/L	3	1	1	5	1	3	1	2	1	1	<0.11
Chlorophyll	µg/L	1	2	3	2	2	3	4	3	6	0	<26.7
E-Coli	MPN/100mL	3	1	1	1	0	0	1	0	2	1	<126
T-Phosphorus	mg/L	8	1	4	0	2	2	3	3	2	2	<0.2

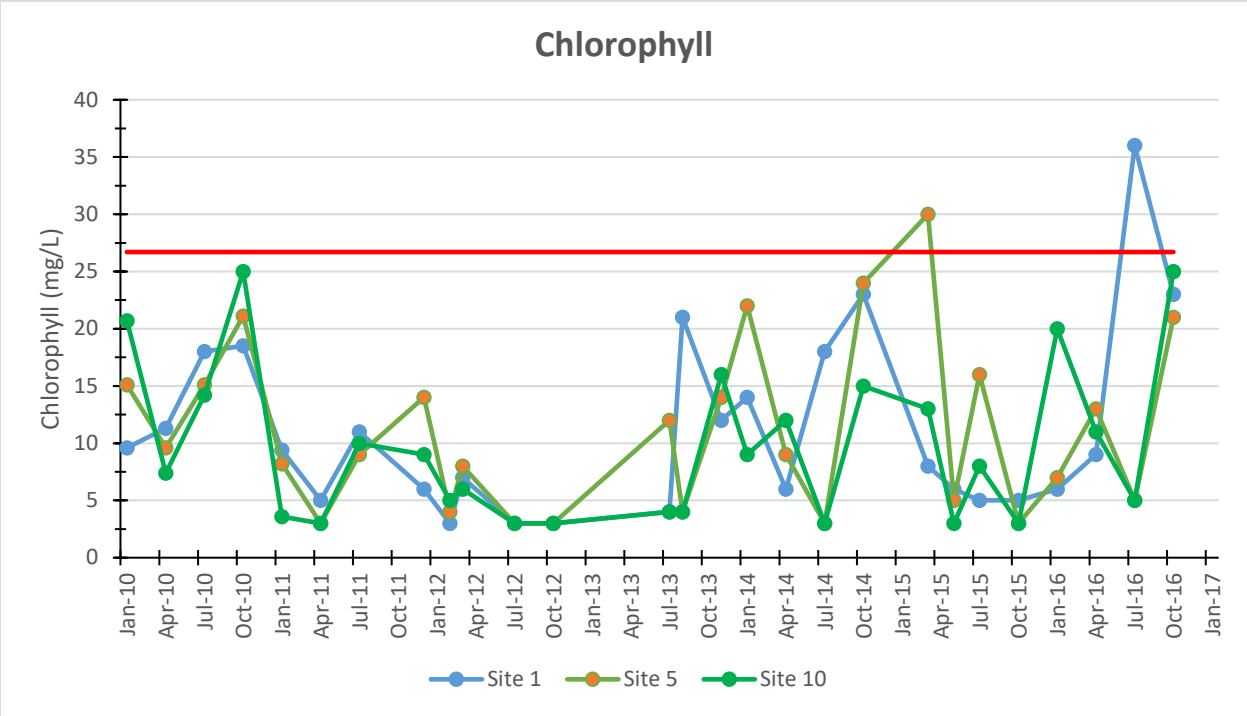


Figure 3 - Chlorophyll-a Concentrations in Lake Conroe

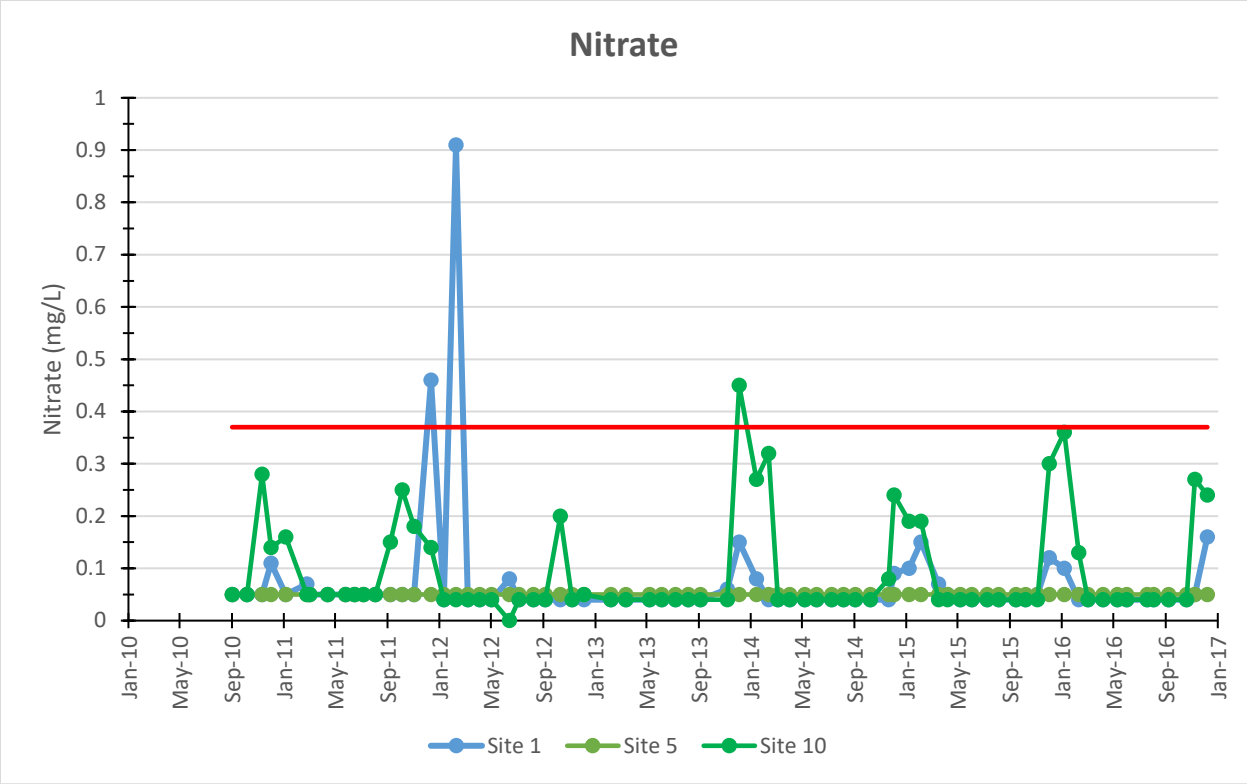


Figure 4 - Nitrate Concentrations in Lake Conroe

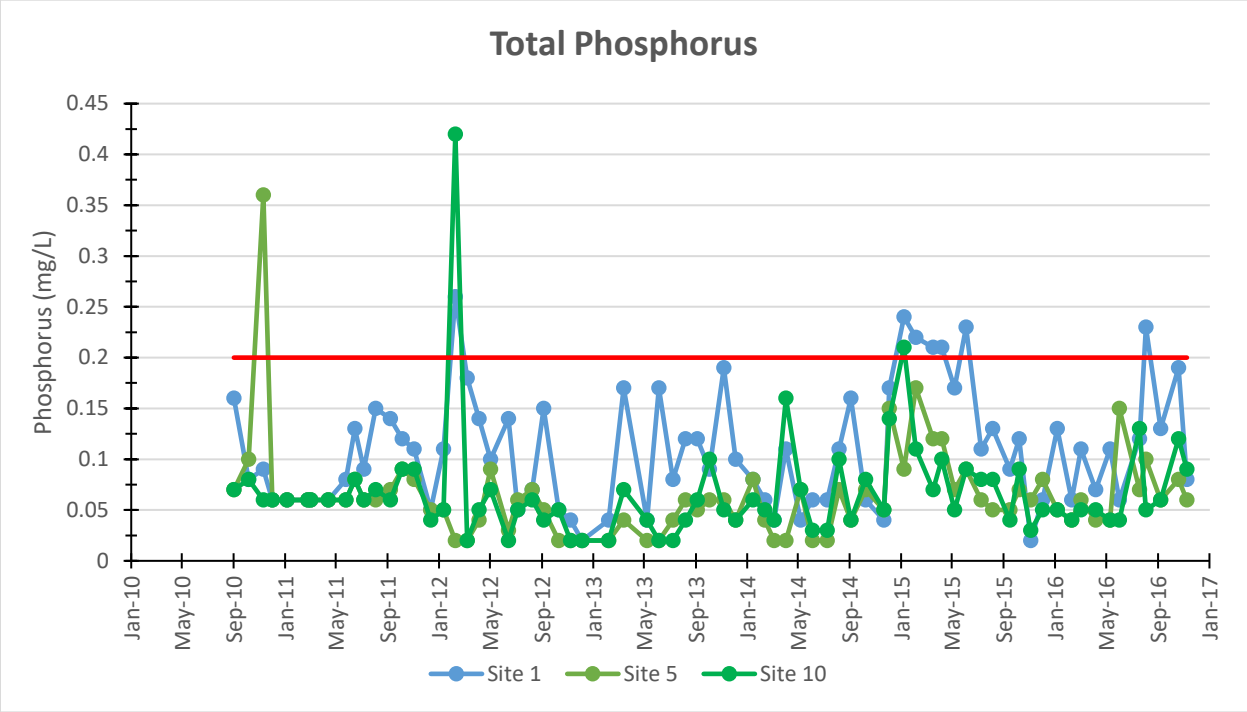


Figure 5 - Total Phosphorus Concentrations in Lake Conroe

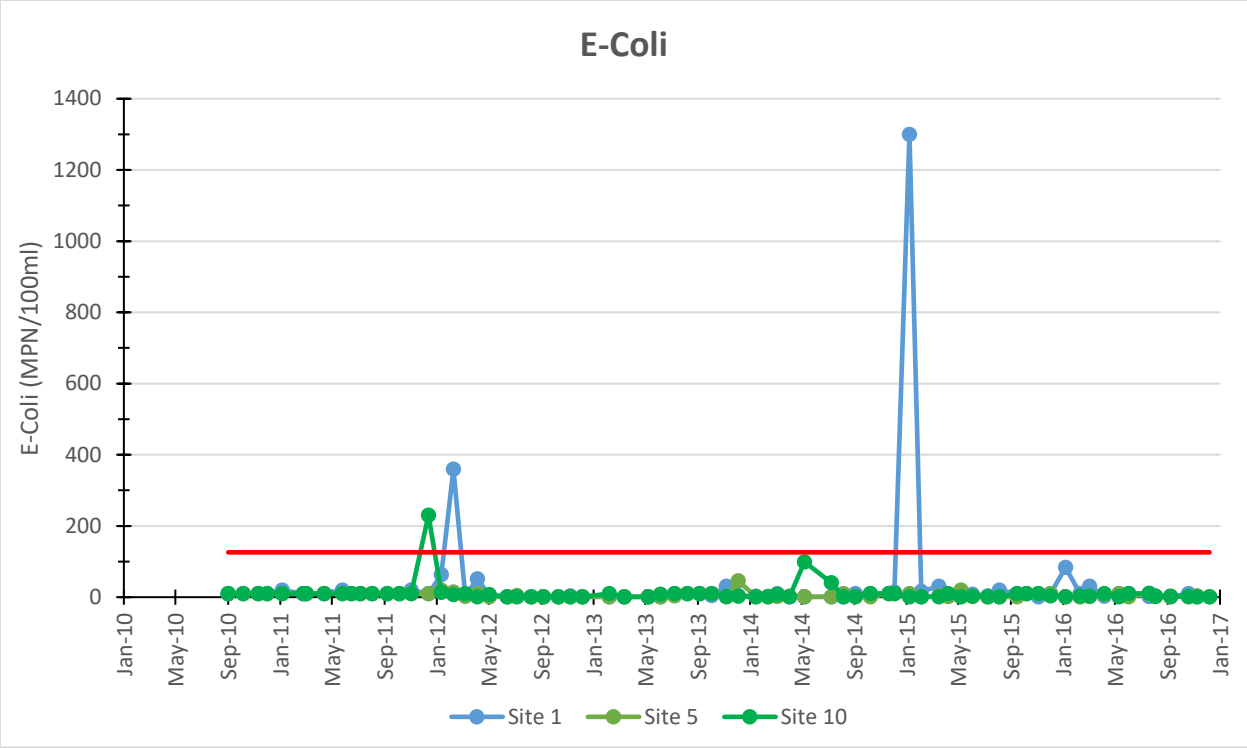


Figure 6 - E -Coli Concentrations in Lake Conroe

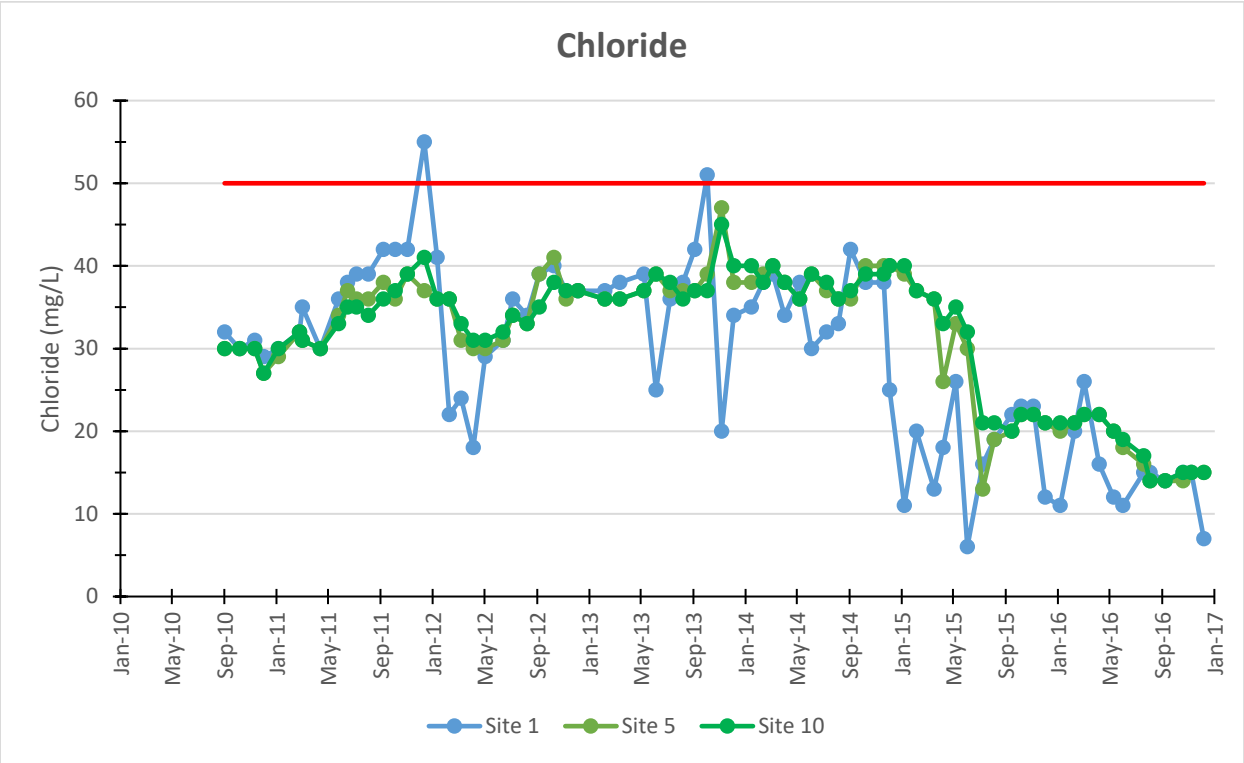


Figure 7 - Chloride Concentrations in Lake Conroe

2.2. USGS Sampling Program

As compared to the CRP sampling program, the United States Geological Survey (USGS) samples for similar parameters but also includes some different constituents. The USGS samples are collected on a quarterly basis at multiple locations and depths located on Lake Conroe. The sites are shown in Figure 7. The USGS use similar QA/QC procedures for sampling and data processing.

The USGS sampling sites are partially funded by the SJRA and provide additional constituents and data from multiple depths in the reservoir. Three (3) USGS locations were analyzed (Sites A, B, C). The USGS sampling program data was reviewed at the three selected sites (Sites A, B, and C) and is shown in Tables 4, 5, and 6. Table 7 shows the number of times each constituent exceeded the screening levels over the past seven years. The exceedances for the screening levels and standards set by TCEQ are greater at the bottom samples due to sediments and stratification of the water column. The sediments will bond to nutrients until disturbed during lake "turnover". During the summer months the bottom of the lake will be relatively stable with, limited oxygen and limited turbulence or mixing. During the winter months the lake will start to "turnover" and create some mixing of the water column from top to bottom. This mixing effect will then disrupt the bottom sediments and release certain nutrients contained in those sediments.

Table 4: USGS Water Quality Data (Average over last seven years)

(Site A) FM 1375 Bridge USGS Data (Average Over Last 7 Years)					
	Units	**Standard**	**Top**	**Middle**	**Bottom**
Total Nitrogen	mg/L	N/A	1.09	0.94	1.01
Organic Nitrogen	mg/L	N/A	0.66	0.62	0.57
Nitrite	mg/L	N/A	0.00	0.00	0.00
Nitrate	mg/L	<0.37	0.27	0.07	0.20
Ammonia	mg/L	<0.11	0.60	0.62	0.64
Orthophosphate	mg/L	<0.05	0.03	0.04	0.05
Magnesium	mg/L	N/A	2.49	1.79	2.55
Chloride	mg/L	N/A	25.42	N/A	26.50
Sulfate	mg/L	<50.00	7.33	N/A	7.50
Fluoride	mg/L	N/A	0.15	N/A	0.15
Silica	mg/L	N/A	11.72	N/A	12.35
Iron	mg/L	N/A	93.15	84.01	115.64
Manganese	mg/L	N/A	10.39	58.29	141.43

Table 5: USGS Water Quality Data (Average over last seven years)

(Site B) FM 1097 Bridge USGS Data (Average Over Last 7 Years)					
	Units	**Standard**	**Top**	**Middle**	**Bottom**
Total Nitrogen	mg/L	N/A	0.55	N/A	0.67
Organic Nitrogen	mg/L	N/A	0.48	N/A	0.47
Nitrite	mg/L	N/A	0.00	0.01	0.00
Nitrate	mg/L	<0.37	0.10	N/A	0.11
Ammonia	mg/L	<0.11	0.48	0.48	0.62
Orthophosphate	mg/L	<0.05	0.03	2.34	0.15
Magnesium	mg/L	N/A	2.63	2.95	2.64
Chloride	mg/L	N/A	27.69	N/A	27.94
Sulfate	mg/L	<50.00	7.48	N/A	7.24
Fluoride	mg/L	N/A	0.16	N/A	0.16
Silica	mg/L	N/A	9.98	N/A	10.24
Iron	mg/L	N/A	21.64	5.10	147.44
Manganese	mg/L	N/A	3.57	3.16	284.54

Table 6: USGS Water Quality Data (Average over last seven years)

(Site C) Lake Conroe Dam USGS Data (Average Over Last 7 Years)					
	Units	**Standard**	**Top**	**Middle**	**Bottom**
Total Nitrogen	mg/L	N/A	0.60	0.60	0.63
Organic Nitrogen	mg/L	N/A	0.44	0.45	0.50
Nitrite	mg/L	N/A	0.02	0.03	0.01
Nitrate	mg/L	<0.37	0.12	0.09	0.10
Ammonia	mg/L	<0.11	0.03	0.09	1.32
Orthophosphate	mg/L	<0.05	0.02	0.05	0.88
Magnesium	mg/L	N/A	2.64	3.12	2.77
Chloride	mg/L	N/A	28.20	37.30	28.38
Sulfate	mg/L	<50.00	7.66	10.50	5.92
Fluoride	mg/L	N/A	0.16	0.19	0.16
Silica	mg/L	N/A	9.80	5.58	12.64
Iron	mg/L	N/A	12.76	28.74	852.31
Manganese	mg/L	N/A	29.94	114.67	2,541.59

Table 7: USGS Quarterly Sampling Data Screening Level Exceedances (Over last seven years)

Sample Location in Water Column	Nitrate (NO_3) (mg/L)	Ammonia (NH_3) (mg/L)	Chloride (Cl) (mg/L)	Sulfate (SO_4) (mg/L)
FM 1375 Bridge (Site A)				
Top	1	0	0	0
Middle	0	1	0	0
Bottom	0	7	0	0
FM 1097 Bridge (Site B)				
Top	0	1	0	0
Middle	0	1	0	0
Bottom	0	14	0	0
Lake Conroe Dam (Site C)				
Top	0	1	0	0
Middle	0	6	0	0
Bottom	0	26	0	0

3.0 On-Site Sewage Facility Program

On-Site Sewage Facilities (OSSFs), also commonly known as septic-tank systems, are wastewater systems designed to treat and dispose of effluent on the same property that produces the wastewater. The TCEQ sets the minimum regulatory code for managing OSSFs, issues licenses to OSSF operators, and delegates permitting and enforcement authority to local governmental entities, such as SJRA. The TCEQ has designated SJRA as the Authorized Agent to implement and enforce TCEQ's On-Site Sewage Facility Order for the area immediately surrounding Lake Conroe. SJRA's area of jurisdiction, also known as the Lake Conroe Water Quality Zone, is currently defined as 2,075 feet in all directions horizontally from the lake shoreline defined at elevation 201 feet mean sea level (MSL).

3.1. Permitting and Inspection

There are many different types of OSSFs; however, the most common types used within the Lake Conroe Water Quality Zone are conventional systems and Aerobic Treatment Units (ATUs). ATUs provide secondary treatment of the wastewater and use spray or drip irrigation to dispose of the treated effluent. These systems have treatment components that must be maintained to function properly and a lack of maintenance may result in a failure of the system. Prior to the 1980's, most of the OSSFs within SJRA's jurisdiction were conventional systems. These types of systems, however, are no longer permitted by the TCEQ in areas with poor soil conditions or high seasonal water table. Due to the Lake Conroe Water Quality Zone having these kinds of conditions, the conventional systems have been gradually replaced by the technologically superior ATUs. Figure 8 shows the distribution of the current OSSFs in the Lake Conroe watershed. Within SJRA's Water Quality Zone there are approximately 1,639 ATUs and 561 conventional systems that have been located and mapped. OSSF systems, when maintained properly, provide effective protection in the Lake Conroe Water Quality Zone. A failure of an OSSF is generally associated with a lack of maintenance to the system. In order to help mitigate this potential problem, SJRA amended its regulatory OSSF Order in December 2015 to adopted standards more stringent than TCEQ standards. The amendments to the OSSF Order are similar to the requirements previously adopted by Montgomery and Walker counties. The OSSF Order can be viewed on SJRA's Lake Conroe Division website http://www.sjra.net/lakeconroe/. An OSSF information pamphlet developed by SJRA's public education department and Lake Conroe Division is located in Appendix B.

In order to implement the more stringent requirements adopted by SJRA, a comprehensive program was initiated which includes initial construction permitting, new construction inspections, licensing of the systems, routine inspections of systems, tracking of contract and maintenance reports, and prompt enforcement measures when necessary. SJRA's Lake Conroe Division administers this program with in-house staff, while partnering with other local regulatory and law enforcement agencies for any required enforcement.

One of the most significant amendments to the SJRA's OSSF Order is the requirement for all ATU's are required to have, at a minimum, a one-year maintenance contracts with a licensed

maintenance provider and for the provider to perform at least three (3) system inspections within the contracted year. For homeowners who do not wish to enter into a contract with a licensed maintenance provider, SJRA has provided a second option, as explained below.

3.2. Enforcement Activities

The inspection and maintenance of ATUs serving single family dwellings can be performed by a homeowner if any one of the following criteria is met:

- The property owner has satisfactorily completed the 8-hour course entitled "Troubleshooting Aerobic Treatment Units", offered by Environmental Training Systems (http://www.environmentaltrainingsystems.com).
- The property owner is a maintenance provider licensed by the TCEQ.
- The property owner holds a valid Class-D or higher wastewater treatment license.
- The property owner has satisfactorily completed a TCEQ-approved Basic Maintenance Provider Course.
- The property owner has satisfactorily completed the OSSF – Aerobic/Surface Application System Operation and Maintenance Course entitled "General Guidance for Monitoring Aerobic Treatment Units, Disinfection Units, and Spray Fields in Texas (B6235)", offered by the AgriLife Extension, Texas A&M University System.

SJRA conducts routine inspections of all ATUs within Lake Conroe's Water Quality Zone in order to ensure the systems are functioning properly and that proper maintenance is being performed by the maintenance provider or the homeowner.

SJRA makes every effort to encourage voluntary compliance with the State's rules and regulations and its OSSF Order. However, failure to repair a malfunctioning system or to meet SJRA's maintenance requirements for an ATU can lead to legal enforcement action. Citations for violations of these rules are now being issued by law enforcement officers from the Montgomery County Precinct-1 Constable's office. A property owner who operates and maintains an OSSF within the Lake Conroe Water Quality Zone must comply with the OSSF Order and the Lake Conroe Rules and Regulations related to these facilities.

Since enforcement actions began in June 2016, the following OSSF program implementation activities have taken place:

- Routine Inspections of OSSFs
    - Eight to ten inspections of newly constructed ATU's are performed monthly.
    - 25 random inspections are performed per week on existing ATUs. The goal is to have all ATU's inspected at least once every two years.
- Maintenance of OSSFs
    - Approximately 17 homeowners have obtained certified training to conduct maintenance of their ATUs.
    - Approximately 1,600 homeowners have executed contracts with licensed maintenance providers to provide the maintenance services needed.

- Enforcement Activities
    - Complaints from neighbors are investigated promptly as needed.
    - Those homeowners who fail to get a maintenance contract receive multiple notices and ample time to obtain the contract from a Licensed Maintenance Provider or to provide documentation of completion for one of the SJRA approved homeowner courses. Failure to obtain the contract will result in the customer being issued a citation by the Montgomery County Precinct-1 Constable.
    - Should the homeowner not respond to the citation, the homeowner may be summons to appear before the Precinct 1 Justice of the Peace.

SJRA has developed this OSSF management strategy to protect the water quality and address future potential water quality problems that may result from urban growth around the reservoir. The SJRA program of permitting, inspecting, complaint investigation, and enforcement action when necessary for those OSSFs in the Water Quality Zone is expected to contribute to maintaining the water quality in the watershed.

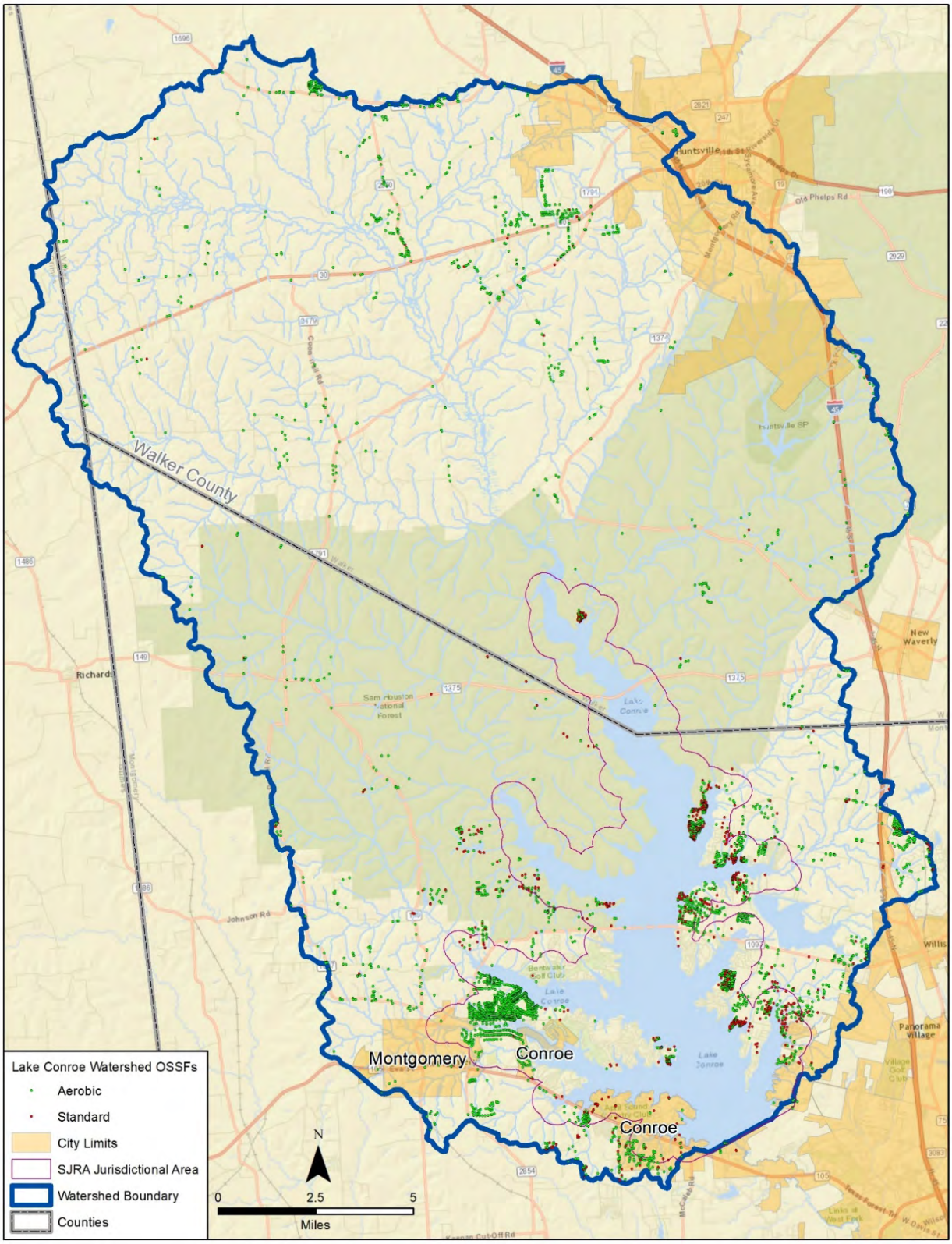


Figure 8 - OSSF Locations

4.0 Invasive Species Control and Native Aquatic Vegetation Program

4.1. SJRA Zebra Mussel Artificial Substrate Monitoring

The Zebra Mussel (Dreissena polymorpha) was first detected in North America in 1988 in Canada. It is believed to have been inadvertently introduced by ballast water of ships traveling from overseas. Since then, Zebra Mussels have spread extensively to multiple waterbodies throughout Canada and the United States. The mussels attach to and can potentially clog various structures throughout invested waterbodies, including water intakes. Since Zebra Mussels are filter feeders, infested waters can experience improved water clarity, but can also lead to increased algae growth resulting from the increased sunlight penetration in the water. Characteristics of Zebra Mussels include their relatively small shell, ¼ inch to 2 inches in length, with alternating light and dark brown stripes. An example photograph of a Zebra Mussel is shown below.

Like other lakes in Texas, Lake Conroe is monitored on a quarterly basis by Texas Parks and Wildlife (TPWD). To date, Lake Conroe has not exhibited any signs of Zebra Mussel activity; however, it is unlikely that this reservoir will remain free from this invasive species due to the high level of boating activity on the lake.

Initially, it was believed that the mussels would not survive in the warmer waters of the southern United States, but that has not been the case. The location and ecological factors of Lake Conroe make it a conducive habitat to the Zebra Mussels. Due to the geographic location of the reservoir, if Zebra Mussels become present it will most likely be a result of recreational boating traffic, fishing traffic, or a wildlife transfer. Table 8 compares the Zebra Mussel's water quality limitations to Lake Conroe's average water quality.

Table 8: Required Water Quality Parameters for Zebra Mussel Reproduction

Water Quality Parameters	Zebra Mussel Water Quality Requirements	Lake Conroe Average Water Quality
Calcium (mg/L)	>25	93
Water Temp (F)	32 to 86	50 to 87
pH	7.4 to 8.0	8.6
Conductivity	37 to > 110	265
Turbidity (schecci)	20 to 200	36.3
Total Hardness	45 to > 125	121

TPWD recently held a certified watercraft inspection training workshop at the SJRA Lake Conroe campus for State and local entities, and the public that were interested in providing inspections on Texas lakes for watercraft. Although the training was for all invasive species, the focus was on Zebra Mussels. The turnout was successful with multiple public and private entities participating. SJRA's current sampling stations will be used for trading data with TPWD's future Zebra Mussel monitoring program on Lake Conroe. SJRA will compile and transfer data regarding the in-house monitoring to TPWD on a quarterly basis for their reporting needs.

Figure 9 reflects all Zebra Mussel monitoring stations located on Lake Conroe, and Table 9 lists the monitoring data collected during the second quarter of 2017.

Table 9: Lake Conroe Zebra Mussel Monitoring Stations

Location	Latitude	Longitude	Mussels Present
SJRA Boat Ramp	30° 21' 12.16"	95° 34' 35.94"	No
Inland Marina	30° 21' 43.76"	95° 35' 48.24"	No
April Plaza Marina	30° 22' 23.14"	95° 38' 1.56"	No
Walden Marina	30° 24' 10.02"	95° 36' 25.74"	No
Stubblefield Bridge	30° 33' 48.78"	95° 38' 9.95"	No
Cagle Campground	30° 31' 6.93"	95° 35' 30.20"	No
Stow Away Marina	30° 28' 25.49"	95° 34' 8.21"	No
830 Boat Ramp	30° 24' 47.88"	95° 34' 17.62"	No
Ayres Island	30° 22' 58.46"	95° 33' 58.67"	No

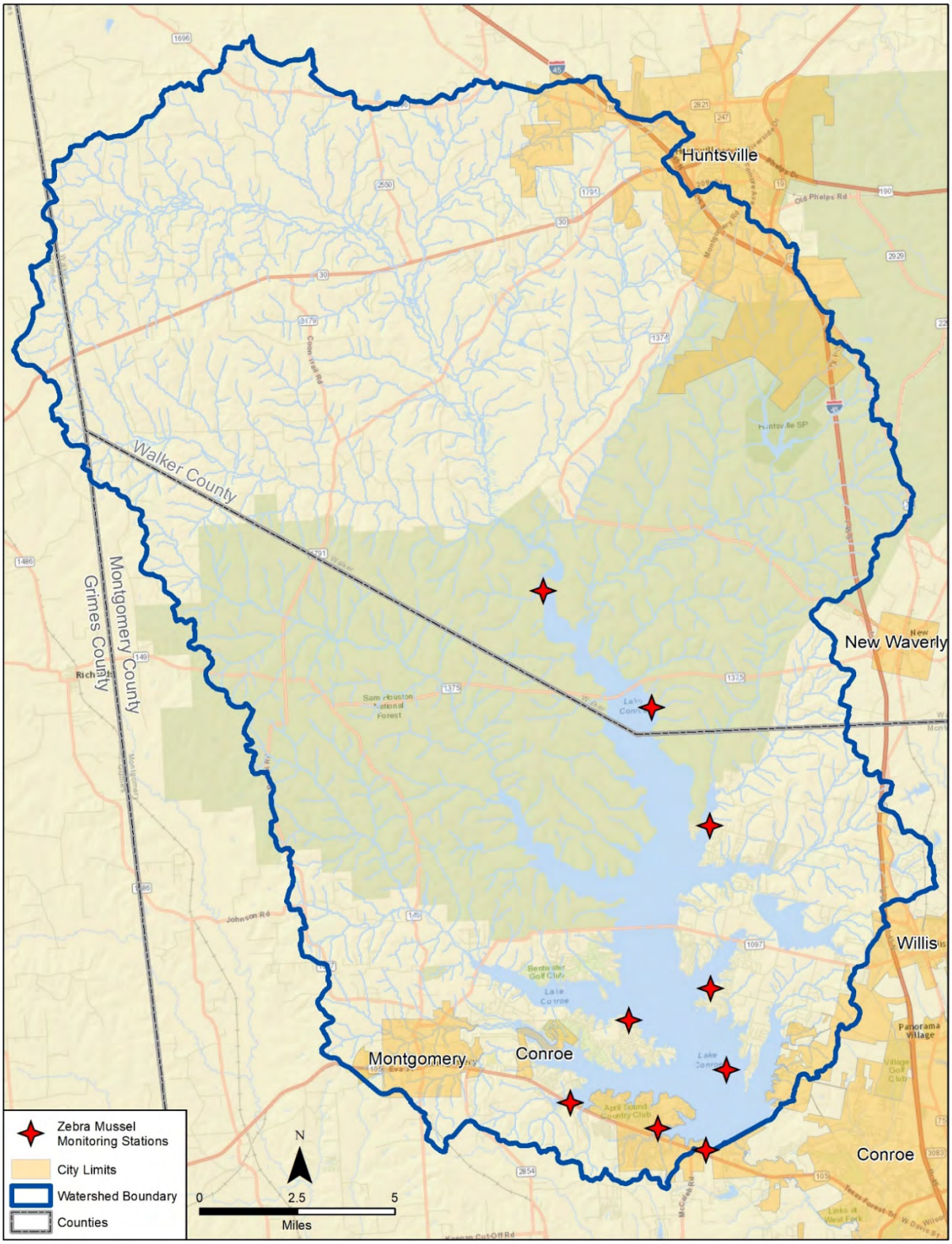


Figure 9 - Zebra Mussel Monitoring Stations

4.2. Native Aquatic Vegetation Program

Not long after Lake Conroe filled in 1973, the reservoir became infested with Hydrilla, and by the early 1980's approximately 9,000 of the lakes 21,000 surface acres was covered with Hydrilla. The excessive amount of invasive vegetation disrupted the recreational use of Lake Conroe, while also creating significant water quality concerns. EPA-approved herbicides were used to help control the invasive species from spreading, but eventually were unable to keep up. Chinese Grass Carp (White Amur) were introduced to better control the invasive species that had overtaken the native species in Lake Conroe and had grown to a high nuisance level. The Grass Carp are the main predator for both native and invasive plants on Lake Conroe. To date, the Grass Carp have been successful at keeping invasive vegetation controlled in the lake, but have reduced the native species as well.

SJRA manages a small aquatic plant nursery, originally built in 2008 by a local bass club using grant funds, located on the Lake Conroe Dam campus. The nursey is used propagate and replenish native vegetation within Lake Conroe. In 2017, SJRA took on a larger role in managing the native aquatic plant nursery, orchestrating the plantings, and monitoring the growth and spread of the native species restoration.

The nursery is now managed to develop the greatest propagation of aquatic plants possible from the existing planters. The nursery has been rehabilitated with new structural support and irrigation parts, such as lumber to hold the rubber liners in place and new floats for the irrigation. Currently SJRA has eight planters, approximately 3 feet by 10 feet. A layout of SJRA's nursey and the current species is shown in Figure 10.

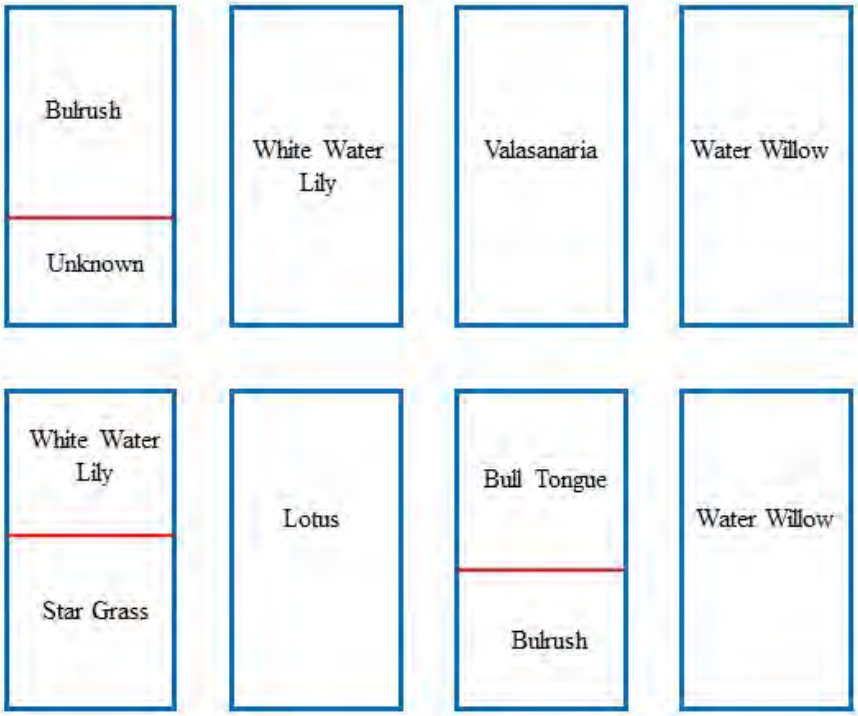


Figure 10 - SJRA's Current Nursery Stock

After propagating in the fall of 2016, the nursery was at approximately 80% capacity. No plants were purchased for the 2017 plantings, but instead propagated from the stock that was in the nursery. 75% of the plants were used for the summer 2017 planting season, with additional plantings in the fall of 2017. The most heavily propagated plants were the water willow, since this species has proven to yield the best survival rates to date.

Numerous native plants have been tested for growth and survival in Lake Conroe. These plants have been placed in many locations, and various depths throughout the northern portion of the lake. These plants have been placed into standard wire cages to provide protection and to improve the survival rate against predator species. The cages have kept the planted native species safe and living, but most of the species have not been able to survive outside the cages. Once native plants have been placed in the cages, SJRA staff monitors the plants growth, checks the integrity of the cages, and locate any new native plant colonies once in the fall season, and again in the spring. During the monitoring, SJRA staff checks and records the percentage of the plants which survived the previous plantings, or what percentage of new growth has occurred. The survival rate is determined by how much of the cage has been colonized. The cages are also checked to see if breaches or damages have occurred, and repairs are performed as necessary. New plant colonies that are identified will be mapped, and continues to be monitored for the success of native plant habitation. Figure 11 shows the locations of the current aquatic cages. After a cage becomes compromised due to its age it is removed and disposed of appropriately.

SJRA has experimented with other vegetative species in Lake Conroe with little success outside the aquatic cages. These species include vallisneria americana (eelgrass, tapegrass, or wild cherry)

and pontederia cordata (pickerelweed). SJRA will continue to experiment with new methods in attempt to increase success rates. New species will be reviewed and experimented with to increase the diversity of the native species on the reservoir, and to further expand SJRA's knowledge of the aquatic vegetation program. The 2017 planting season has consisted of fully stocking the nursery, organizing and conducting two (2) plantings and several monitoring trips. The following species are the few to survive outside of their protective cages, therefore these will be the species SJRA will continue to focus on in the future.

Bulrushes (Scirpus spp.)

There are several different species of bulrush plants. Bulrushes are perennial grass-like plants that have the ability to grow to approximately 10 feet in height, in shallow water or in moist soils. Soft-stem bulrushes grow from rhizomes and are round (in cross section), light gray-green, relatively soft stems that comes to a point with no obvious leaves (only sheaths at the base of the stems). When the plant flowers they usually occur just below the tip of the stem (Texas AgriLife Extension, 2017).

American Water-Willow (Justicia Americana)

Water-willow is a perennial that is can be found along streams and lake margins. Water-willow can grow to around 3 feet in height and often forms dense colonies that help stabilize shorelines. The stems do not usually branch and have prominent whitish lines. The leaves are opposite, long and narrowly tapered (up to inches 6 long and ½ inch wide) with smooth margins and a distinctive whitish midvein. The leaves look very much like those of the willow tree. Water-willow plants flower from May through October, and flowers are located on long stems originating from the base of the leaves. Flowers are 5-petaled orchid-like (3/4 inch diameter), white with purple/violet streaks on the lower petals. Water-willow can spread from seeds and forms extensive rhizomes by which it forms colonies and spreads rapidly (Texas AgriLife Extension, 2017).

White Water Lily (Nymphaea odorata)

The white water lily is a perennial plant that often forms dense colonies. The leaves arise on flexible stalks from large thick rhizomes. The leaves are more round than heart-shaped, bright green, 6 to 12 inches in diameter with the slit about 1/3 the length of the leaf. Leaves usually float on the water's surface. Flowers arise on separate stalks, have brilliant white petals (25 or more per flower) with yellow centers. The flowers may float or stick above the water and each opens in the morning and closes in the afternoon. The flowers are very fragrant. White water lily can spread from seeds or the rhizomes (Texas AgriLife Extension, 2017).

American Lotus (Nelumbo lutea)

American lotus is a perennial plant that is often confused with water lilies. Leaves are simple, round, bluish-green in color, up to 2 feet in diameter, attached to the stem in center (no slit like water lilies). Leaves are flat if floating or conical if emergent and can stand above the water's surface as high as 3 1/2 feet on the rigid stem. Flowers are large (to 10 inches across) yellowish-white to yellow with more than 20 petals. The center of the flower, the seed structure, is cone-shaped (or like an inverted shower-head) and has openings in which the seeds develop. Lotus can form large colonies and spreads by seeds and large fleshy rhizomes (Texas AgriLife Extension, 2017).

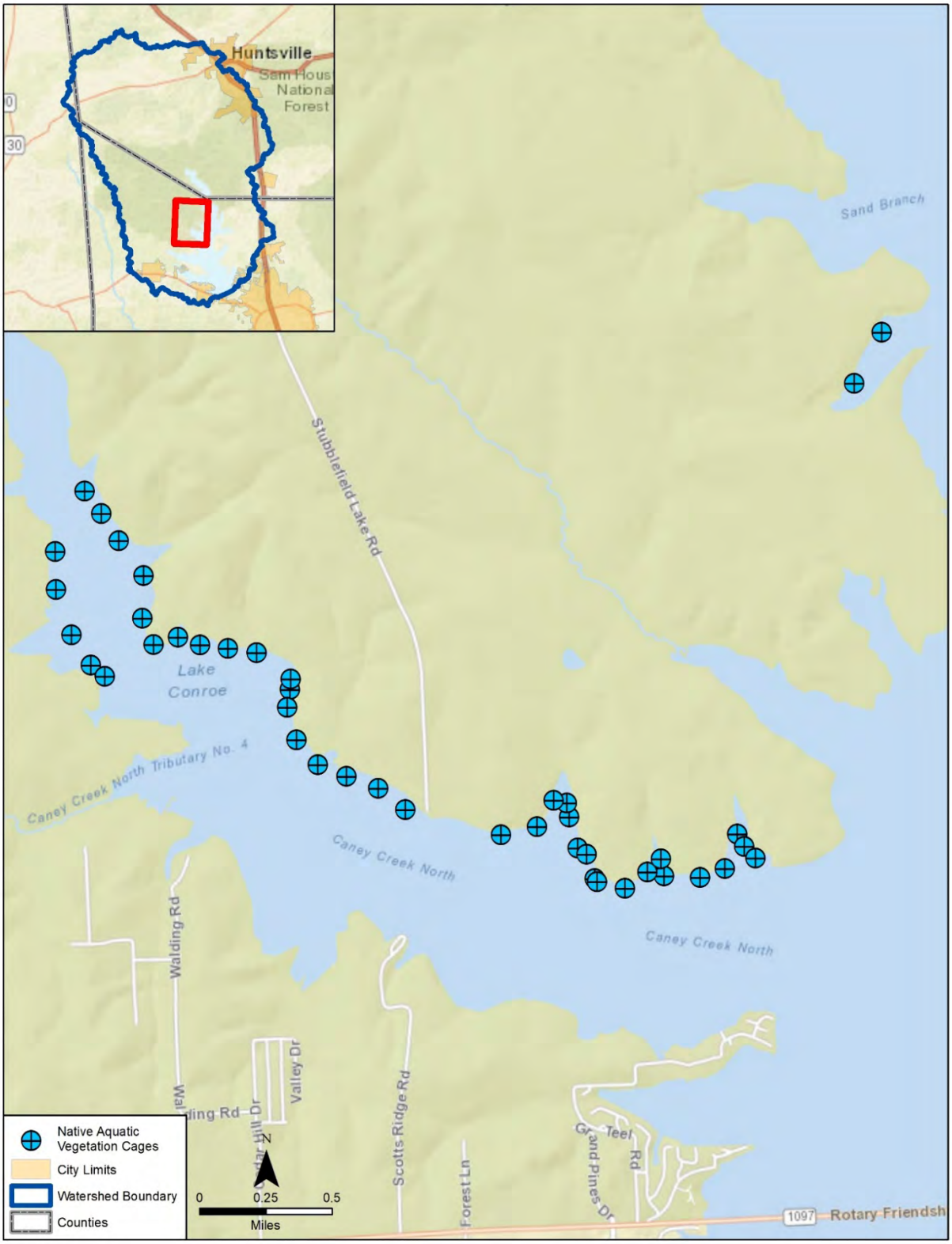


Figure 11 - Native Aquatic Vegetation Cages

5.0 Public Outreach Activities

SJRA has currently developed and will continue to implement ongoing public education and outreach efforts associated with all programs of the Lake Conroe watershed protection plan. In addition, SJRA's Plan has identified several additional activities that will be evaluated and considered for implementation. These education and outreach activities will be modified regularly, and the Plan will be revised in accordance with the needs and success of the various programs as further explained below.

5.1. Stormwater Inlet Marking Program

One of the primary sources of potential pollution in the Lake Conroe watershed has previously been identified as stormwater runoff from the surrounding urbanized development around Lake Conroe.

There are 222 mapped stormwater outfalls that discharge directly into Lake Conroe from the surrounding neighborhoods, roadways and parking lots, as shown in Figure 12. In addition, there are hundreds of drainage ditches, swales, and tributary streams that are influenced by heavy stormwater runoff which discharge directly into Lake Conroe. This extensive drainage system connects to thousands of stormwater inlets located among numerous neighborhoods that surround Lake Conroe. One of the educational activities proposed in the Plan that applies to both new and older developments is the installation of prominent "markers" for all stormwater inlets which drain into the Lake Conroe watershed. Since the development of the Plan, SJRA has implemented its Stormwater Inlet Marking (SwIM) program into select neighborhoods around Lake Conroe and will continue this activity with the intent to complete all stormwater inlets.

The SwIM program is an education and outreach approach to improve water quality. The program gives local communities a chance to become involved in protecting Lake Conroe by simply installing metal educational markers, such as the one depicted below, on stormwater inlets within neighborhoods that are located in the Lake Conroe watershed.

The educational component of the SwIM program consists of several different approaches, such as door hangers, social media, rack cards, and other educational events. Volunteers will distribute door hangers in advance of installing the markers for informational purposes. Rack cards are also distributed through mail or through Home Owners' Association (HOA) offices for the selected neighborhoods. SJRA's social media approach consists of placing educational material on Facebook, Twitter, and the SJRA website. Educational events consist of conducting school field trips, environmental fairs, and trash bash. Examples of the developed education materials for the SwIM program can be seen in Appendix C of this progress update.

Materials such as pesticides, petroleum products, paint products, pet waste, yard waste (including fertilizers), and other materials are all potential sources of water pollution which may find their way into our waterbodies through stormwater inlets that carry water away from streets and private property. Unfortunately, many people are under the false impression that stormwater inlets actually lead to the same waste treatment facility that handles the human waste from inside their homes. As a result, it is quite common for people to pour pollutants directly into stormwater inlets thinking that they will be properly "treated" at a wastewater treatment facility. Other common activities that occur, that are less obvious to the public, are improper application of pesticides, herbicides, and fertilizers on yards, and changing oils and other harmful fluids in driveways that may accidentally spill onto the ground, all which may be flushed into stormwater inlets during rain events.

One of the methods used to help combat this problem is to mark stormwater inlets with information that helps identify where materials placed into these stormwater inlets ultimately ends up. These markers are reminders to the public that their actions can have an adverse effect on the local waterbody. By creatively crafting images and slogans for the markers, SJRA can help discourage this type of pollution.

In addition to the education component, SJRA will be involving communities and the public in the SwIM program. Potential volunteer groups from the local community may consist of school groups, church groups, boy scouts, girl scouts, HOAs, and other volunteers. Community involvement in the program will help to develop accountability and knowledge within local communities.

Potential volunteer groups from the local community will be asked to fill out an application and a waiver form located on SJRA's website (www.sjra.net/lakeconroe). Once SJRA staff receives and reviews the application and waiver, SJRA will assign and approved neighborhood in which the markers will be installed on the stormwater inlets. The volunteer group will be provided with a SwIM kit that contains the following:

- Wire Brush
- Adhesive Markers
- Safety Vests
- Safety Cones

- Safety Glasses
- Gloves
- 5-Gallon Bucket
- Door Hangers

SwIM Pilot Project

On June 23, 2016, a SwIM pilot program was completed by the Operations Department of the Lake Conroe Division. The selected subdivisions for the pilot project were Waterford Estates and White Oak Ranch. These were selected due to their size and proximity to Lake Conroe. One week prior to the installation of the markers, informational SwIM door hangers were placed on the door of the residences in each neighborhood. Altogether, 34 markers were installed in a three hour timeframe, including driving to the site, mapping the inlets using GIS collector application, wire brushing area of installation, glue application, and placement of the marker on the stormwater inlets, as shown in the photo below.

SwIM Implementation Projects

To date, SJRA, local utilities, and volunteers have installed a total of 1,761 markers within the Lake Conroe watershed. SJRA has also mapped all the installed markers using a field collector application for GIS. Figure 13 shows the overall location of the installed markers.

Bentwater is one of the largest neighborhoods located adjacent to Lake Conroe. The Municipal Utility District (MUD) 18 owns and is responsible for the stormwater facilities for the neighborhood. The MUD currently uses Hays Utility to maintain all stormwater facilities on behalf of the MUD, including the stormwater inlets. At the Board Meeting for MUD 18 in

March 2017, the board approved the installation of the SJRA SwIM markers on all stormwater inlets within Bentwater. SJRA agreed to supply Hays Utility with the necessary markers for installation in the neighborhood. Electronic informational packages were subsequently distributed by Bentwater Property Owners Association (POA) to all residences that would be effected by the installation. In all, 1,257 markers were installed in the neighborhood and their locations were mapped using the collector application for the GIS software. Figure 14 shows a detailed view of the locations of the inlet markers installed in the Bentwater neighborhood.

In addition to the Bentwater neighborhood, 470 SwIM markers were installed, during the week of April 3, 2017, in April Sound, April Point North, April Village, and Lakeview Village neighborhoods located adjacent to Lake Conroe. Figure 15 shows a detailed view of the locations of the inlet markers located in the April Sound area. The photograph below shows members of SJRA staff installing one of the stormwater inlet markers.

Future SwIM Projects

In the upcoming years, depending on funding and volunteer support, SJRA's goal is to mark all stormwater inlets within the watershed, and to expand this program throughout the remainder of the San Jacinto River Basin.

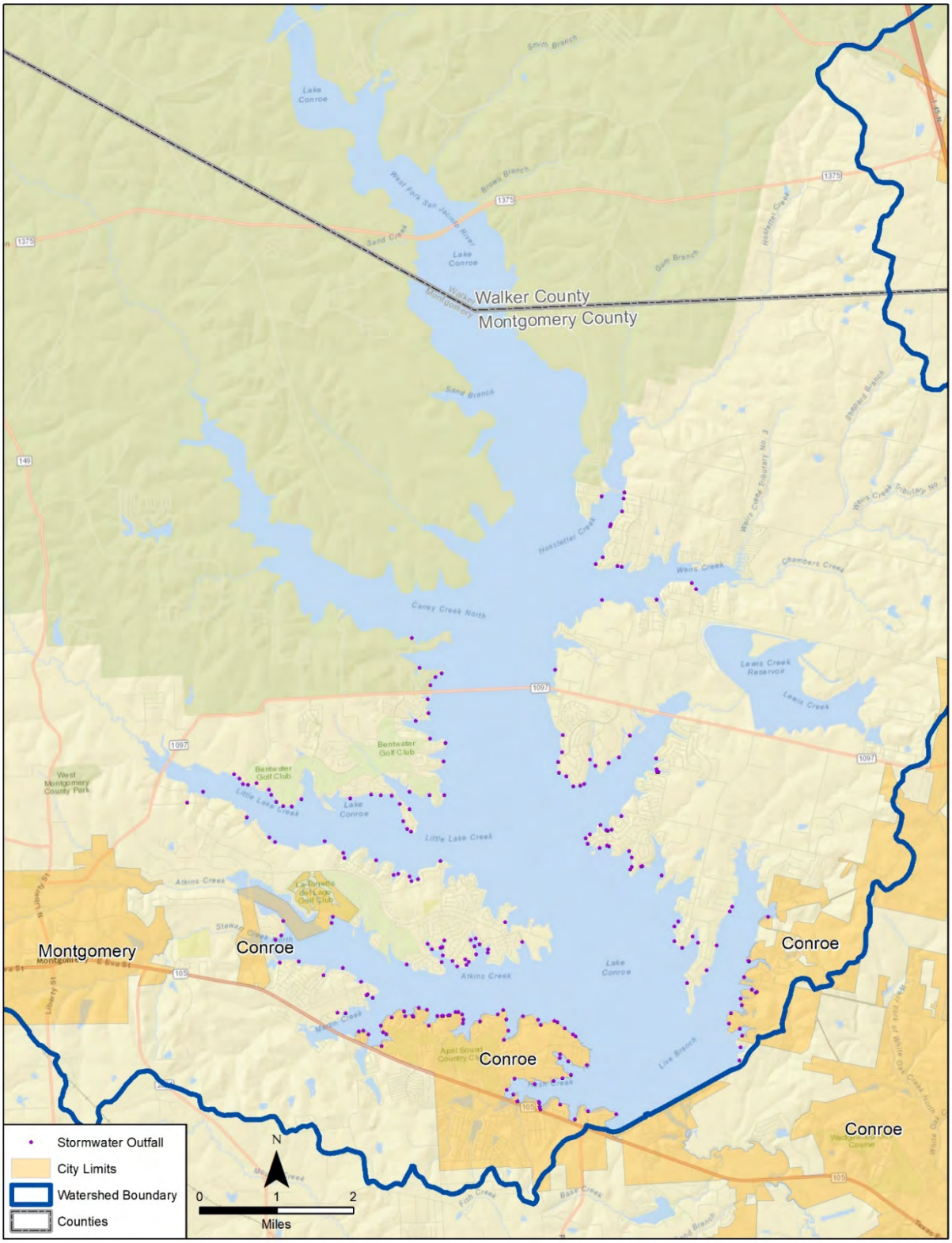


Figure 12 - Stormwater Outfall Locations

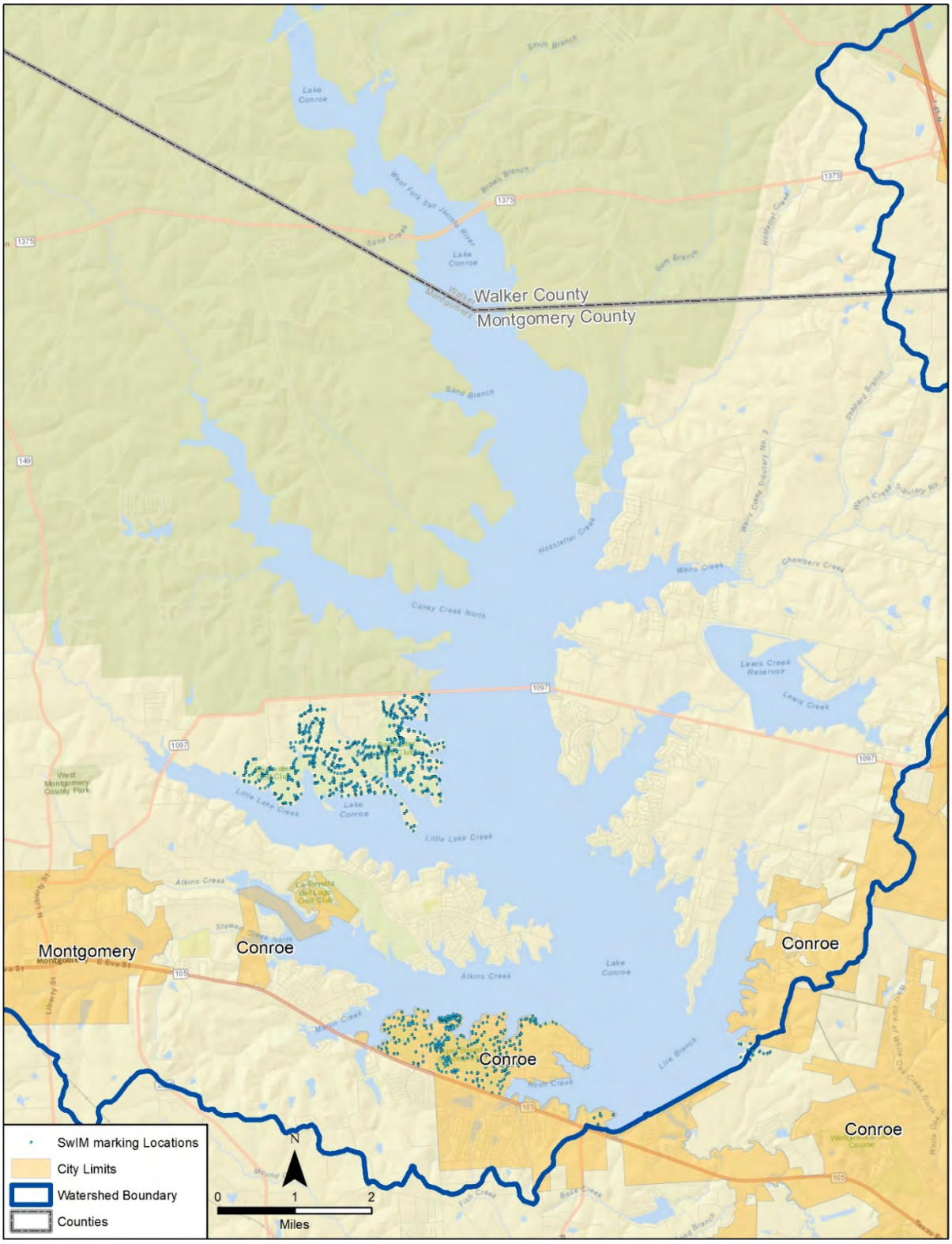


Figure 13 - SwIM Locations (October 2017)

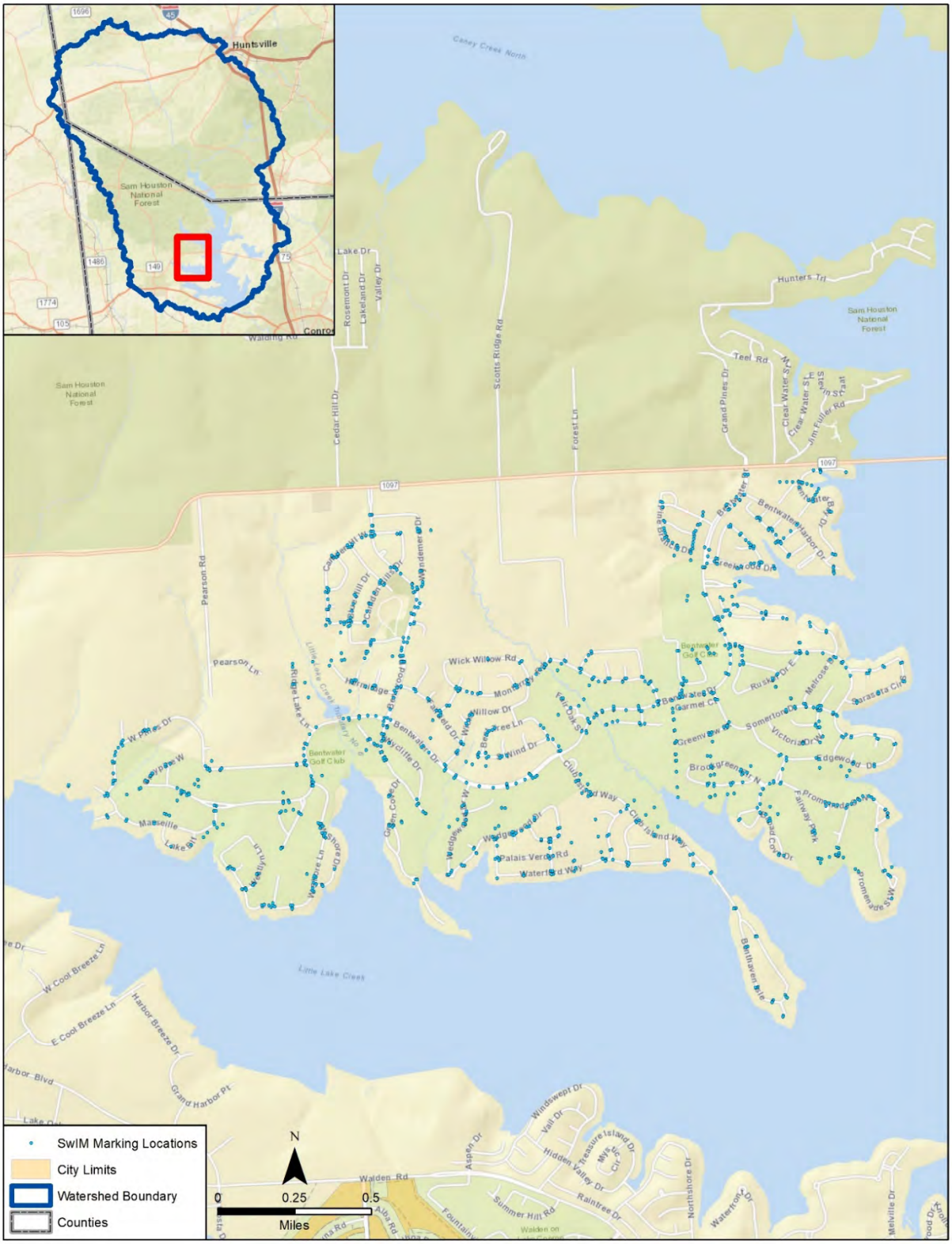


Figure 14 - SwIM Locations (Bentwater)

Figure 15 - SwIM Locations (April Sound)

5.2. Supporting Other Water Quality Programs

The SJRA actively participates in and supports multiple programs in this region which were developed and implemented by other entities.

West Fork Watershed Partnership

The West Fork Watersheds Partnership, a voluntary stakeholder group, is currently engaged in developing a watershed protection plan for the West Fork San Jacinto River and Lake Creek watersheds. The project was developed and is facilitated by H-GAC and TCEQ, and funded by Clean Water Act Section 319(h) grant and additional funding from the Galveston Bay Estuary Program. As one of the principal stakeholders, SJRA has participated in numerous public meetings and work group sessions to help identify the sources and potential activities to help protect and improve the water quality. Additional information and most recent updates regarding the project can be found at www.westforkwpp.com.

West Fork San Jacinto Watershed Greenprint

The Trust for Public Land, a national 501(3c) conservation organization, and H-GAC recently partnered to develop a West Fork San Jacinto River "Greenprint". The Greenprint combines community engagement along with computer modeling to identify lands with the highest value for voluntary conservation. The goals of the project were to protect water quality and to provide access to water-based recreation. The Greenprint was finalized during the summer of 2016. A copy of the final report, dated July 2016, can be viewed at https://www.tpl.org/sites/default/files/West%20Fork%20Greenprint.pdf. SJRA contributed as a stakeholder during the project.

Texas Forest Lands

On November 17 and 18, 2015, multiple stakeholders from the Texas forest, conservation, and drinking water sectors convened at La Torretta Lake Resort in Montgomery, Texas for the first-ever Texas Forests and Drinking Water Forum to explore the connections between forests and drinking water, and to brainstorm ways to work together to continue to sustain these two very important and interdependent resources. On May 11, 2016, the Partnership met again in Conroe, Texas at the SJRA offices to continue discussion and brainstorming ideas for collaborative watershed protection in Texas. The Forum was convened with the knowledge that forests and drinking water are strongly connected and dependent on each other.

Southeastern forests that are actively managed can help protect and enhance drinking water supplies while also providing economic benefits. The Texas Forests and Drinking Water Forum is supported by the Texas A&M Forest Service, the Texas Rural Water Association, and multiple other federal, state, and local organizations working throughout Texas and is intended to begin a collaborative relationship between the forest, conservation, and drinking water communities and

to think creatively about how to help ensure the viability of these resources. The Forum's key goals and objectives are to discuss:

- Issues and challenges facing the forest and drinking water sectors.
- How to enhance communication and develop relationships between the sectors.
- Options for managing forested watersheds for both sustainable drinking water and forest products.

Various members of this community are continuing to meet regularly and explore how to help the Partnership to achieve these objectives.

5.3. Additional Ongoing Public Education Activities

The SJRA is also actively engaged in these additional educational efforts.

- Maintain the Lake Conroe website for watershed protection plan activities and continue to enhance the water quality educational material. Specific ongoing activities that require website updates include the OSSF and SwIM programs.
- Develop and distribute informational brochures and pamphlets to support SJRA watershed protection activities such as, SwIM, and OSSF programs.
- Continue to develop educational material for local publications such as Dockline magazine. When applicable develop public press releases regarding activities associated with the Lake Conroe watershed.
- Sponsor and support various special events to raise awareness of the importance of water quality to the Lake Conroe watershed.
- Continue to sponsor Texas Stream Team training for volunteers who will conduct water quality sampling at sites throughout the watershed.

References

Eaton, A.D., L.S. Clesceri, E.W. Rice, A.E. Greenberg, M.A.H. Franson, (editors). 2005, ***Standard Methods for the Examination of Water and Wastewater***: Centennial Edition. 21st Edition. ISBN: 0875530478. American Public Health Association. Washington, D.C.

Texas Commissioning on Environmental Quality (2012), ***Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods***, TCEQ Publication RG-415, Revised August 2012.

Texas A&M AgriLife Extension Service, Department of Wildlife & Fisheries Sciences (2017), https://aquaplant.tamu.edu/plant-identification/alphabetical-index/.

Appendix A (Watershed Protection Plan)

MONITORING ON LAKE CONROE

- Monitored ten sites on Lake Conroe monthly for the Clean Rivers Program since 1973.
- Conducted special study at eight sites over a three year period for small cove areas within the reservoir.
- Conducted storm sampling over a three-year period for eight sites within the major tributaries that feed into Lake Conroe.

MANAGEMENT ACTIVITIES

The management activities proposed to address these sources of pollution include:

- Regulating On-site Sewage Facilities (OSSFs) more stringently.
- Continuing public education and outreach with respect to nutrients and the impact of littering.
- Improving stormwater controls in new developments.
- Improving compliance and enforcement of existing stormwater quality permitting, including construction sites.

MAPPING SOURCES OF POLLUTION

Potential sources of Lake Conroe water pollution were identified and catalogued in a geographic database by the SJRA team. The primary sources of future potential pollution in the Lake Conroe watershed were identified as:

- Stormwater runoff from the urbanized development around Lake Conroe.
- Nutrient and bacteria levels from wastewater treatment plants.
- Nutrients and bacteria from sanitary sewer overflows, pet and wildlife waste, and malfunctioning OSSFs.
- Silt and debris from construction sites within the high-growth areas of the watershed.
- Litter and waste from commercial areas and recreational activities.

SAN JACINTO RIVER AUTHORITY
SJRA
www.SJRA.net
Lake Conroe Division

Lake Conroe Watershed Protection Plan

www.sjra.net/lakeconroe

San Jacinto River Authority Lake Conroe Division
1561 Dam Site Road - Conroe, Texas 77304
936-588-1111 - lakeconroe@sjra.net

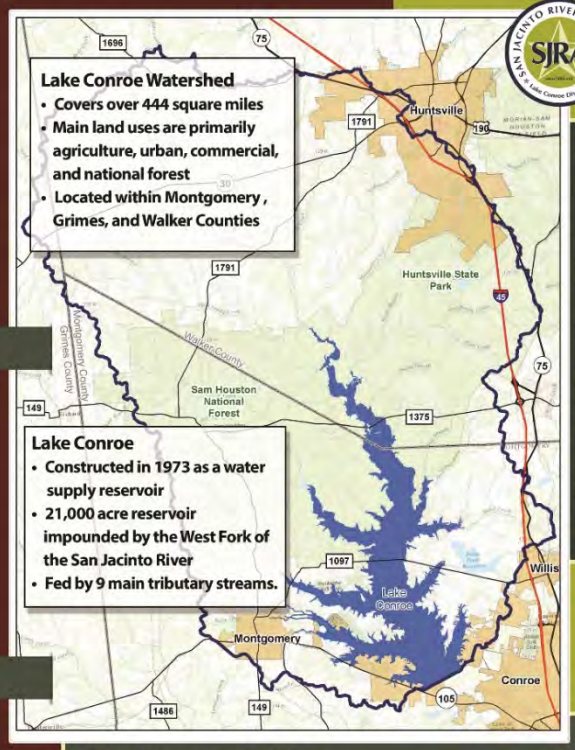
Lake Conroe is one of our region's most valuable natural resources and is heavily used for both water supply and recreation. Fortunately, the water quality in Lake Conroe is excellent and currently unimpaired by the steadily increasing urban development around its perimeter. However, future growth in the watershed and continued heavy recreational use threatens the high water quality in the reservoir. In response, SJRA has developed a Watershed Protection Plan to help protect the excellent water quality conditions that currently exist.

What is a Watershed Protection Plan?

A Watershed Protection Plan is a planning tool to establish guidance for future programs and management activities to support the goal of maintaining water quality of the reservoir and streams within the watershed. The Watershed Protection Plan establishes a management strategy that provides a coordinated framework for implementing an integrated program of water quality protection and restoration activities.

How did SJRA develop the Watershed Protection Plan ?

1. Obtained input through a stakeholder group.
2. Characterized the watershed through water quality monitoring and mapping of potential pollution sources.
3. Identified goals and potential solutions.
4. Designed a watershed management strategy.



Stakeholders

A diverse group of stakeholders were assembled to help design and implement the Lake Conroe Watershed Protection Plan. The stakeholders were selected from federal and state agencies, cities, counties, municipal utility districts (MUDs), local businesses, industries, landowners, agricultural producers, environmental interest groups, homeowners, and citizens.

What is a watershed?

A watershed is the term to describe the land that water flows across or through on its way to a common stream, river, or lake. A watershed can be very large (e.g. draining thousands of square miles to a major river or lake or the ocean), or very small, such as a 20-acre watershed that drains to a pond.

Appendix B (OSSF Program)

www.sjra.net/lakeconroe

San Jacinto River Authority Lake Conroe Division
1561 Dam Site Road - Conroe, Texas 77304
936-588-1111 - lakeconroe@sjra.net

All OSSF permits issued must comply with SJRA's approved Order Adopting Rules for OSSFs within 2,075 feet of Lake Conroe. Below is an excerpt from the Order:

The inspection and maintenance of all OSSFs identified as Aerobic Treatment Units must be performed by a maintenance provider, licensed by the TCEQ, under a written contract between the property owner served by the OSSF and such TCEQ-licensed maintenance provider, with one exception. If the OSSF serves a single family dwelling that is the primary residence of the property owner, the property owner may conduct the maintenance, provided they perform one of the following:

(A) the property owner is a maintenance provider licensed by the TCEQ;

(B) the property owner holds a valid Class D or higher wastewater treatment license;

(C) the property owner has satisfactorily completed a TCEQ-approved Basic Maintenance Provider Course; or

(D) the property owner has satisfactorily completed the OSSF – Aerobic/Surface Application System Operation and Maintenance Course entitled – General Guidance for Monitoring Aerobic Treatment Units, Disinfection Units, and Spray Fields in Texas (B-6235) offered by the AgriLife Extension, Texas A&M System.

Important Links and Contact Information:
For more information on the Lake Conroe Watershed Protection Plan, or the OSSF Program, visit: www.sjra.net/lakeconroe/ or call 936-588-1111.

SAN JACINTO RIVER AUTHORITY
SJRA
www.SJRA.net

Lake Conroe Division On-site Sewage Facilities (OSSF) Program

Lake Conroe is one of our region's most valuable natural resources and helps provide the county's drinking water supply to augment existing groundwater sources. It is vital that we preserve the quality of this precious natural resource.

The San Jacinto River Authority (SJRA) has been sampling and analyzing the quality of the water in Lake Conroe for decades. Fortunately, Lake Conroe has some of the highest quality of water in the entire region. SJRA's updated guidelines for the OSSF Program are yet another measure to ensure continued high water quality for years to come:

www.sjra.net/lakeconroe

San Jacinto River Authority Lake Conroe Division
1561 Dam Site Road - Conroe, Texas 77304
936-588-1111 - lakeconroe@sjra.net

Definition:

An OSSF is one or more systems of treatment devices and disposal facilities that: (1) produce not more than 5,000 gallons of waste each day and (2) are used only for disposal of sewage produced on a site for which any part of the system is located.

Overview:

There are two basic types of on-site wastewater treatment systems (see figures below): (1) Conventional OSSF Systems (Figure 2.6) which separate liquids from solids in a septic tank and then send that liquid to a drain field by means of underground pipes or other proprietary products; and in (2) Aerobic Treatment Units (Figure 2.7) which add oxygen to the process of treating wastewater by using any of several types aeration or "fine air bubble" systems to increase the level of treatment in the tank by encouraging aerobic bacteria growth and allows sedimentation and disinfection to occur before discharge of the liquid. Aerobic systems produce a better quality wastewater effluent for final treatment and disposal. The Texas Commission on Environmental Quality (TCEQ) sets the minimum standards, issues operator licenses, delegates permitting and enforcement to local governmental entities, and periodically reviews their programs. SJRA is the authorized agent for TCEQ within 2,075 feet horizontally of the Lake Conroe shore at elevation of 201 feet (MSL).

How do I Permit my OSSF?:

The following items must be submitted to SJRA for review before a permit to install can be issued:

1. **Professional Design of the System**
   A Professional Engineer or a Registered Sanitarian must design the system.
2. **Soil and Site Analysis**
   A Professional Engineer or a Registered Site Evaluator must perform this analysis.
3. **Two-Year Maintenance Contract**
   - Must be signed by both the installer and the homeowner.
   - Only applicable to Aerobic Treatment Units.
4. **Receipt of an Affidavit to the Public**
   Must be filed at the County Clerk's office in which the property is located.
5. **SJRA On-Site Sewage Facility Application**
   Must be completed by the homeowner. Please do not apply as a business.
6. **Permit Fee**
   Required prior to issuance of permit.

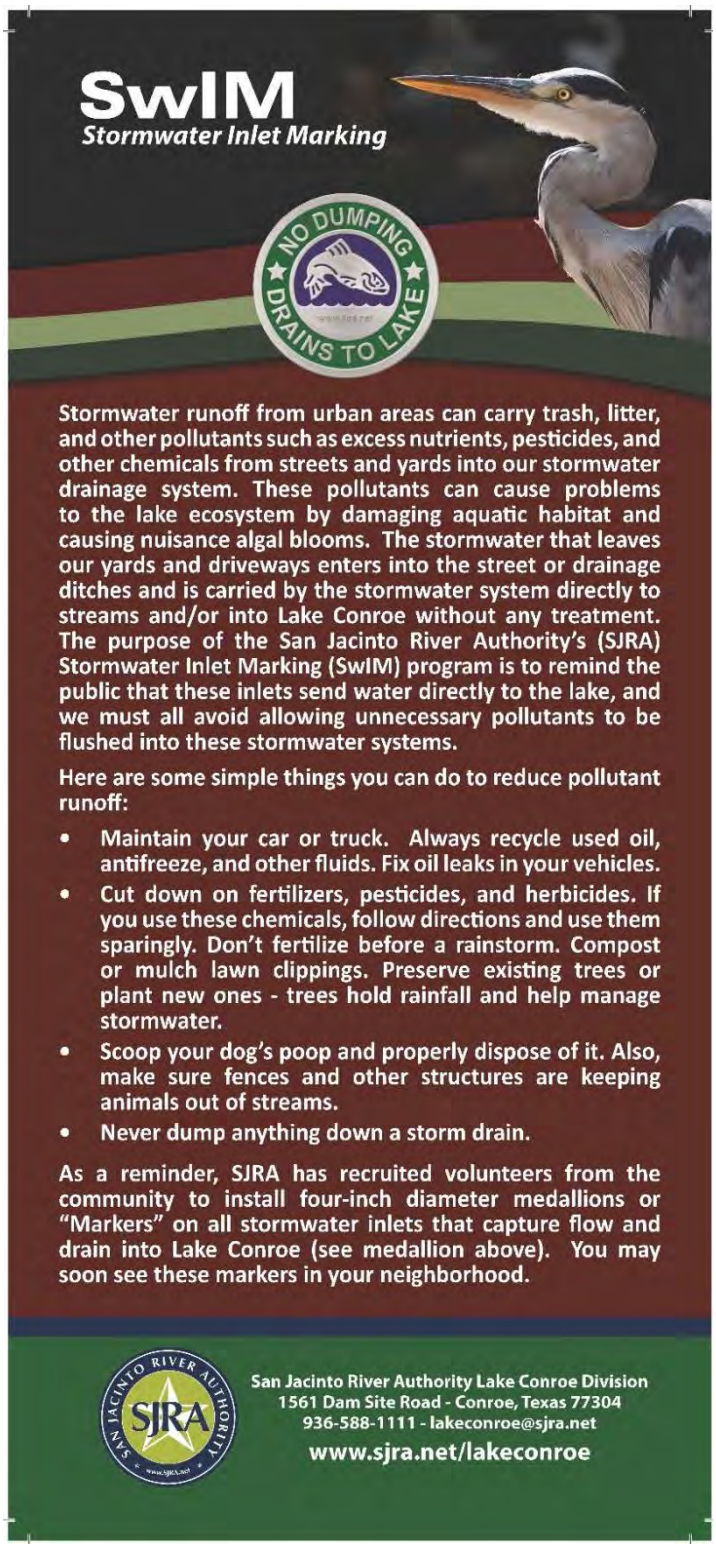
Figure 2.6. Conventional OSSF
(Source: structural-design-solutions.com)

Figure 2.7. Aerobic Treatment Unit
(Source: flower-mound.com)

SJRA Lake Conroe Division
1561 Dam Site Road
Conroe, Texas 77304
936-588-1111 - lakeconroe@sjra.net

www.sjra.net/lakeconroe

Appendix C (SwIM Program)



SwIM
Stormwater Inlet Marking

NO DUMPING
DRAINS TO LAKE

Stormwater runoff from urban areas can carry trash, litter, and other pollutants such as excess nutrients, pesticides, and other chemicals from streets and yards into our stormwater drainage system. These pollutants can cause problems to the lake ecosystem by damaging aquatic habitat and causing nuisance algal blooms. The stormwater that leaves our yards and driveways enters into the street or drainage ditches and is carried by the stormwater system directly to streams and/or into Lake Conroe without any treatment. The purpose of the San Jacinto River Authority's (SJRA) Stormwater Inlet Marking (SwIM) program is to remind the public that these inlets send water directly to the lake, and we must all avoid allowing unnecessary pollutants to be flushed into these stormwater systems.

Here are some simple things you can do to reduce pollutant runoff:

- Maintain your car or truck. Always recycle used oil, antifreeze, and other fluids. Fix oil leaks in your vehicles.
- Cut down on fertilizers, pesticides, and herbicides. If you use these chemicals, follow directions and use them sparingly. Don't fertilize before a rainstorm. Compost or mulch lawn clippings. Preserve existing trees or plant new ones - trees hold rainfall and help manage stormwater.
- Scoop your dog's poop and properly dispose of it. Also, make sure fences and other structures are keeping animals out of streams.
- Never dump anything down a storm drain.

As a reminder, SJRA has recruited volunteers from the community to install four-inch diameter medallions or "Markers" on all stormwater inlets that capture flow and drain into Lake Conroe (see medallion above). You may soon see these markers in your neighborhood.

SAN JACINTO RIVER AUTHORITY
SJRA
www.sjra.net

San Jacinto River Authority Lake Conroe Division
1561 Dam Site Road - Conroe, Texas 77304
936-588-1111 - lakeconroe@sjra.net
www.sjra.net/lakeconroe

NO DUMPING
DRAINS TO LAKE
Stormwater Inlet Markers (SwIM)
Stormwater runoff from urban areas may contain trash, litter, and other pollutants. The water that leaves our yards and driveways enters into the street or drainage ditches and is carried by the stormwater system directly into Lake Conroe. In an effort to educate the community we are installing stormwater inlet markers (SwIM) in the neighborhoods along Lake Conroe's shoreline in conjunction with launching a SwIM campaign.
An SJRA staff member and/or volunteers will be in your neighborhood within the next week to install such markers.
SAN JACINTO RIVER AUTHORITY
SJRA
If you have any questions about the program, please call us or visit our website at:
936-588-1111
www.sjra.net/lakeconroe/SwIM