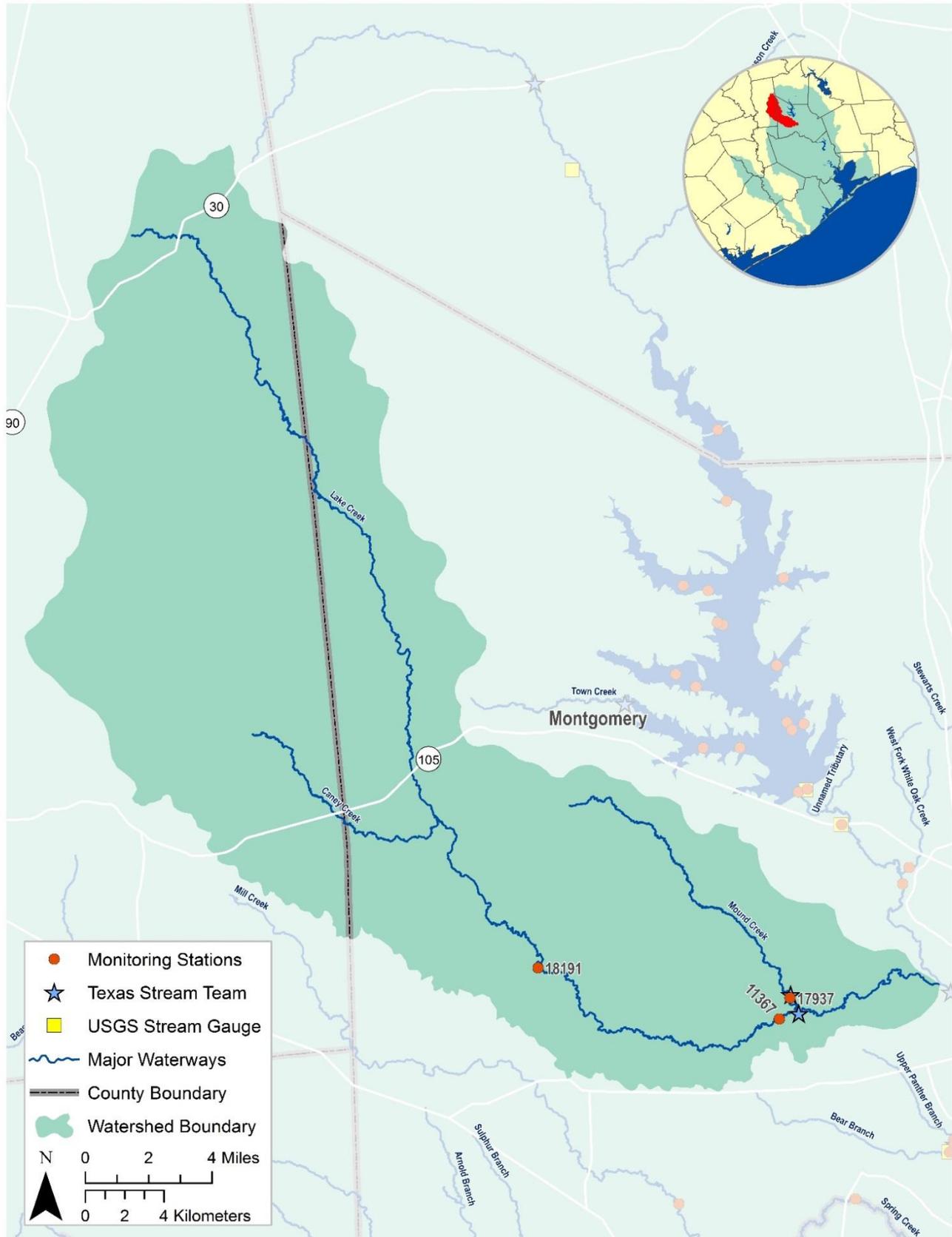
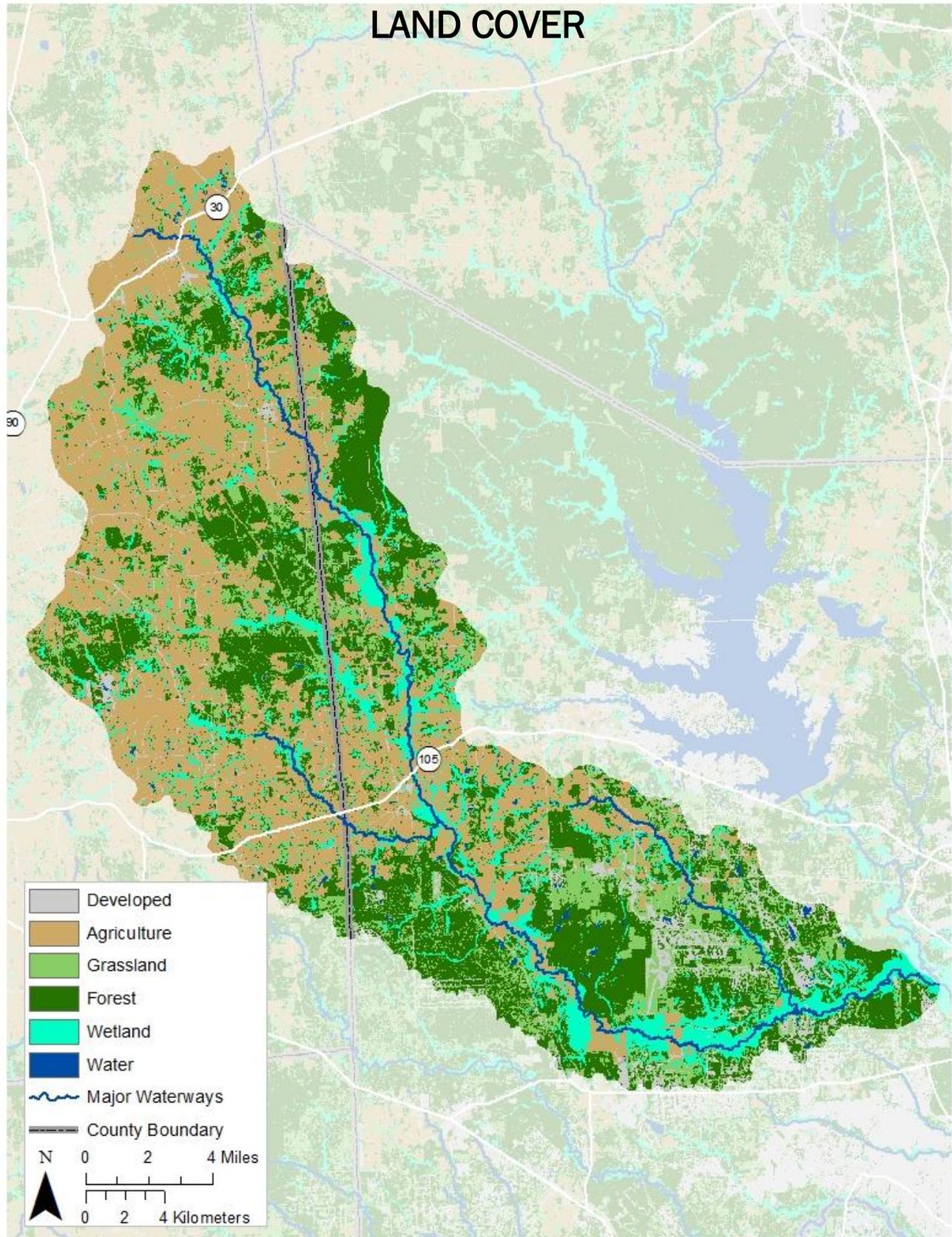


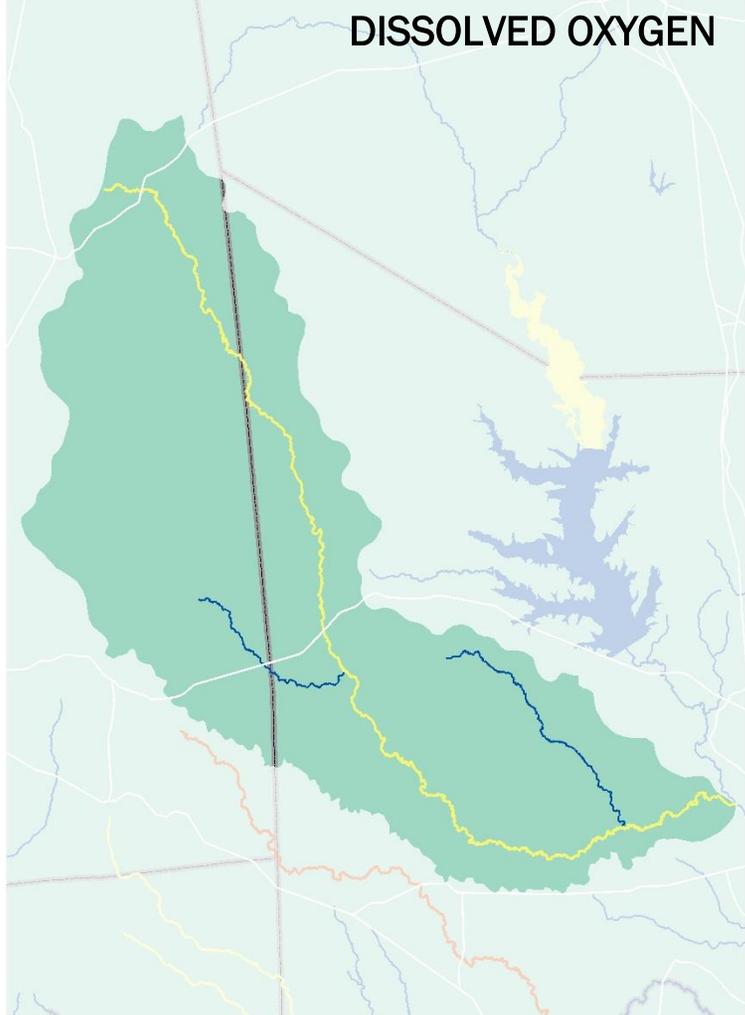
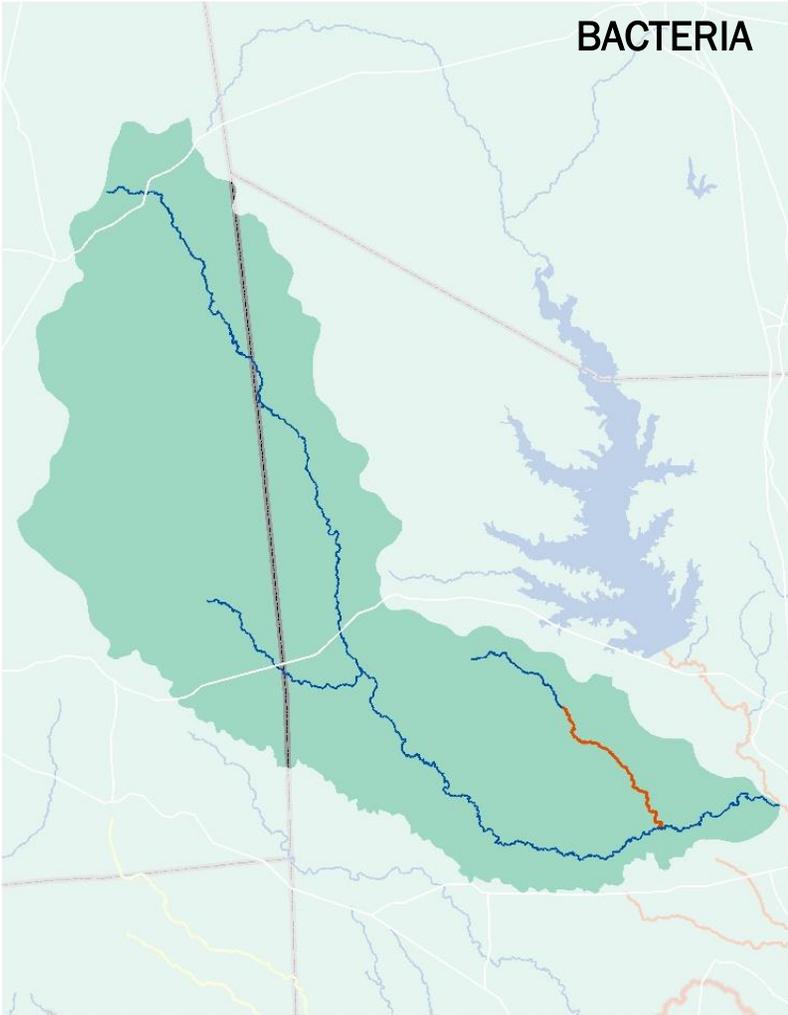
# LAKE CREEK - SEGMENT 1015



# LAKE CREEK - SEGMENT 1015

## LAND COVER

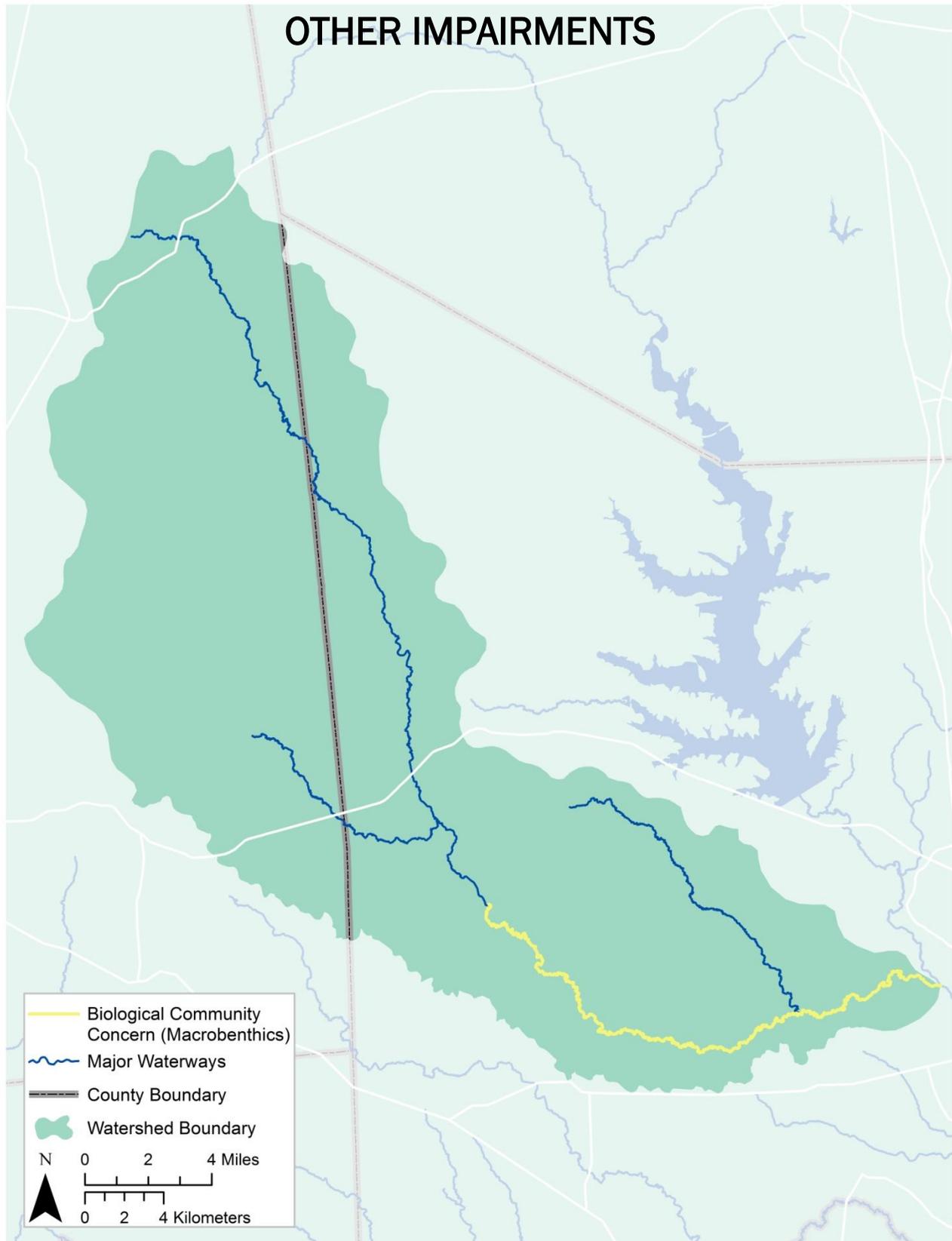




 Impairment     Concern     No Impairments or Concerns

# LAKE CREEK - SEGMENT 1015

## OTHER IMPAIRMENTS



<b>Segment Number:</b>	<b>1015</b>	<b>Name:</b>	<b>Lake Creek</b>		
<b>Length:</b>	62.5 miles	<b>Watershed Area:</b>	328 square miles	<b>Designated Uses:</b>	Primary Contact Recreation 1; High Aquatic Life; Public Water Supply
<b>Number of Active Monitoring Stations:</b>	3	<b>Texas Stream Team Monitors:</b>	2	<b>Permitted Outfalls:</b>	16
<b>Description:</b>	<p>Segment 1015 (Perennial Stream w/ high ALU): From the confluence with the West Fork San Jacinto River in Montgomery County to a point 4.0 km (2.5 mi) upstream of SH 30 in Grimes County</p> <p>Segment 1015A (Perennial Stream w/ high ALU): Mound Creek (unclassified water body) – From the Lake Creek confluence upstream to a point 1.1 km (0.69 mi) east of FM 149</p> <p>Segment 1015B (Perennial Stream w/ high ALU): Caney Creek (unclassified water body) – From the Lake Creek confluence upstream to a point 2.4 km (1.5 mi) south of FM 1774</p>				

Percent of Stream Impaired or of Concern						
Segment ID	Dissolved Oxygen	Bacteria	Nutrients	PCBs/Dioxin	Chlorophyll a	Other
1015	100	-	-	-	-	55.6
1015A	-	71.3	-	-	-	-

Segment 1015			
Standards	Perennial Stream	Screening Levels	Perennial Stream
Temperature (°C/°F):	32 / 90	Ammonia (mg/L):	0.33
Dissolved Oxygen (24-Hr Average) (mg/L):	5.0	Nitrate-N (mg/L):	1.95
Dissolved Oxygen (Absolute Minima) (mg/L):	3.0	Orthophosphate Phosphorus (mg/L):	0.37
pH (standard units):	6.5-9.0	Total Phosphorus (mg/L):	0.69
<i>E. coli</i> (MPN/100mL) (grab):	399	Chlorophyll a (µg/L):	14.1
<i>E. coli</i> (MPN/100 mL) (geometric mean):	126		
Chloride (mg/L as Cl):	80		
Sulfate (mg/L as SO <sub>4</sub> ):	50		
Total Dissolved Solids (mg/L):	300		

## FY 2016 Active Monitoring Stations

Site ID	Site Description	Frequency	Monitoring Entity	Parameter Groups
11367	Lake Creek at Honea-Egypt Road	Quarterly	H-GAC	Field, Conventional, Bacteria, Flow
11367	Lake Creek at Honea-Egypt Road	Quarterly	H-GAC	Flow, 24-hr DO
17937	Mound Creek at Run Of The Oaks Drive	Quarterly	H-GAC	Field, Conventional, Bacteria, Flow
18191	Lake Creek at FM149 near Karen	Quarterly	H-GAC	Field, Conventional, Bacteria, Flow

## Water Quality Issues Summary

Issue	2014 Assessment <i>I - Impaired</i> <i>C - Of Concern</i>	Possible Causes / Influences / Concerns Voiced by Stakeholders	Possible Solutions / Actions To Be Taken
Dissolved Oxygen Concentrations	1015 I	<ul style="list-style-type: none"> <li>▪ Eutrophication of streams due to agricultural activities, especially in the upper portion of the watershed</li> <li>▪ Excessive nutrients and organic matter from WWTF effluent, sanitary sewer overflows, malfunctioning OSSFs, illegal disposal of grease trap waste, and biodegradable solid waste, such as grass clippings and pet waste</li> <li>▪ Vegetative canopy removed</li> </ul>	<ul style="list-style-type: none"> <li>▪ Conserve or plant canopy trees and habitat along waterways to maintain/create shade to cool water</li> <li>▪ Improve compliance and enforcement of existing stormwater quality permits</li> <li>▪ Improve operation and maintenance of existing WWTF and collection systems</li> <li>▪ More public education on pet waste; household fats, oils, and grease disposal; and OSSF maintenance</li> <li>▪ Regionalize wastewater treatment to minimize number of small package plants and reduce OSSF dependency</li> <li>▪ Work with drainage districts and agencies to change practices of clear cutting and channelizing waterways to protect from solar heating</li> <li>▪ Work with farmers to optimize fertilization practices and avoid nutrients runoff</li> </ul>
Elevated Levels of Indicator Bacteria	1015A I	<ul style="list-style-type: none"> <li>▪ Improper or no pet waste disposal</li> <li>▪ WWTF non-compliance, overflows, and collection system by-passes</li> <li>▪ Runoff from agricultural areas in the upper portion of the watershed</li> <li>▪ Malfunctioning OSSFs</li> </ul>	<ul style="list-style-type: none"> <li>▪ Improve operation and maintenance of existing WWTF and collection systems</li> <li>▪ More public education on pet waste; household fats, oils, and grease disposal; and OSSF maintenance</li> <li>▪ Regionalize wastewater treatment to minimize number of small package plants and reduce</li> </ul>

			<ul style="list-style-type: none"> <li>OSSF dependency <ul style="list-style-type: none"> <li>Work with farmers to optimize fertilization practices and reduce runoff</li> </ul> </li> </ul>
Macrobenthic Community	1015 C	<ul style="list-style-type: none"> <li>Bank erosion causing increased suspended sediment</li> <li>Erosion from agricultural properties</li> </ul>	<ul style="list-style-type: none"> <li>Strategically plant vegetation to enhance tree canopy and slow bank erosion to create more habitat</li> <li>Install and maintain silt fencing and other BMPs to minimize sediment laden runoff</li> </ul>

## Segment Discussion

**Watershed Characteristics:** The majority of the watershed is rural in nature, dominated by forested lands and grasslands. Agricultural land uses such as pastureland for hay are common throughout the watershed. Residential developments are scattered throughout, particularly in the southern portion of the watershed west of the City of Conroe and I-45 between Hwy 2854 and Hwy 1488. There are a few other pockets of development in the center of the watershed outside of the City of Montgomery, but no major population centers are present in the area.

**Water Quality Issues:** The 2014 TCEQ Integrated Report (IR) identified one impairment and three concerns in the Lake Creek (1015) watershed. The contact recreation use in Mound Creek (1015A) is impaired due to high levels of *E. coli*.

Assessment Unit	TCEQ Assessment (2005-2012)	HGAC Analysis 2001-2008	HGAC Analysis 2008-2015
	Geomean (MPN/100 mL) / % Grab Exceedance	Geomean (MPN/100 mL) / % Grab Exceedance	Geomean (MPN/100 mL) / % Grab Exceedance
1015_01	114	179 / 33.3	111 / 16.4
1015A_01	387	1759 / 66.7	241 / 26.9

A plot of variation of [E. coli and total phosphorous \(TP\) density with flow conditions](#) suggests that *E. coli* are introduced by nonpoint sources.

Assessment unit (AU) 1015\_01 was identified as of concern for aquatic life use support due to low levels of dissolved oxygen (DO) in grab samples (25.9 percent of samples were below the screening level of 5.0 mg/L. H-GAC found that during the seven-year period ending 5/31/16, 43.2 percent of samples were below the DO screening level of 5.0 mg/L, in AU 1015\_01. During the TCEQ assessment period, 54 percent of samples in 1015\_01 were below the screening level, and they reported no statistics for 1015\_02 which was not assessed. No data has been collected in that AU since June of 2004. In addition, a concern exists for macrobenthic community in 1015\_01.

**Special Studies/Projects:** H-GAC is currently partnering with TCEQ on a watershed protection plan development project for Lake Creek and the West Fork San Jacinto River, to address elevated fecal bacteria levels and other stakeholder concerns. The project was initiated in 2015 and will be completed in 2018.

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**Trends:** Data collection on this segment began in 2002 during a two year special study conducted by the USGS. Then H-GAC began conducting routine monitoring on three sites within the watershed beginning in 2007 resulting in a gap in data from 2005 to mid-2007. Regression analysis on existing data for the main segment revealed five significant parameter trends including increasing ammonia, instantaneous flow, nitrate, and [TP](#) while pH levels are decreasing over time. A decreasing trend in DO is also observed at monitoring stations [11367](#) and [18191](#) located on the main segment of Lake Creek. Levels have been decreasing since 2007 with occasional dips in DO reaching concentrations lower than 0.5 mg/L at station 18191. Runoff from agricultural land uses in the upper portion of the watershed as well as upstream WWTF discharges are likely factors contributing to variations in DO and nutrients in area waterways.

### Recommendations

Address concerns found in this segment summary through stakeholder participation.

Continue collecting water quality data to support actions associated with any future watershed protection plan development and possible modeling.

Pursue a new local partner to Clean Rivers Program to collect additional data that would help better isolate problem areas.