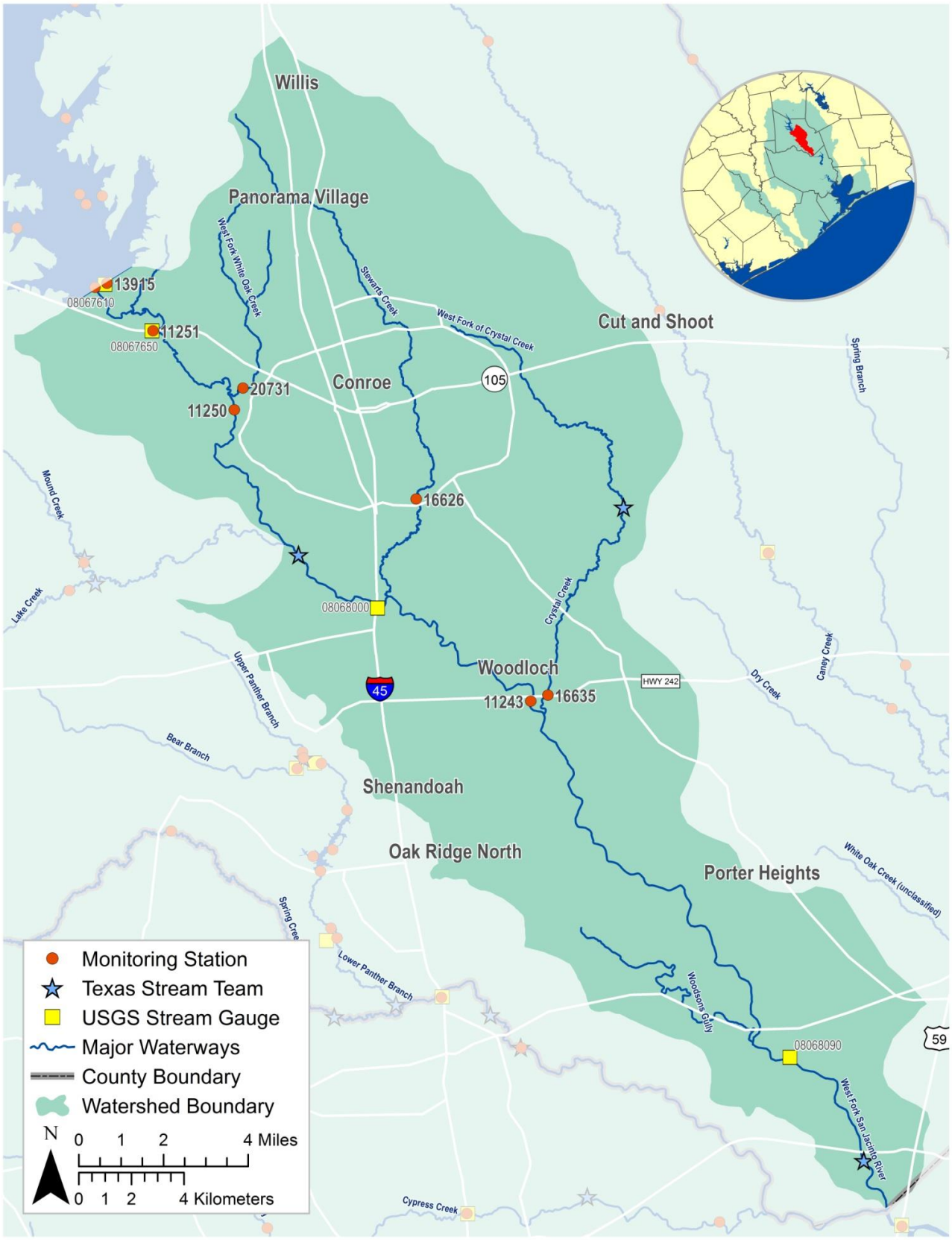
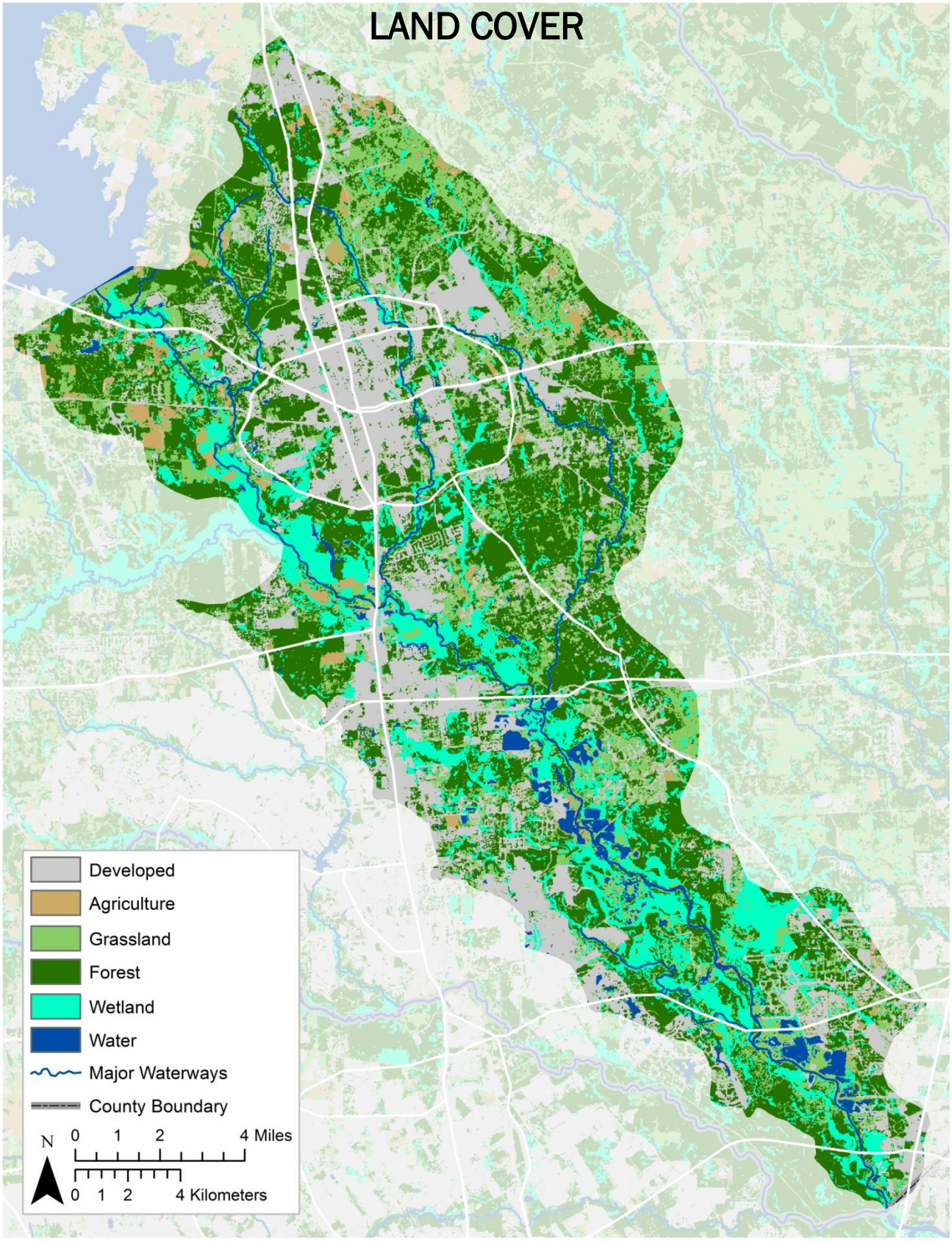
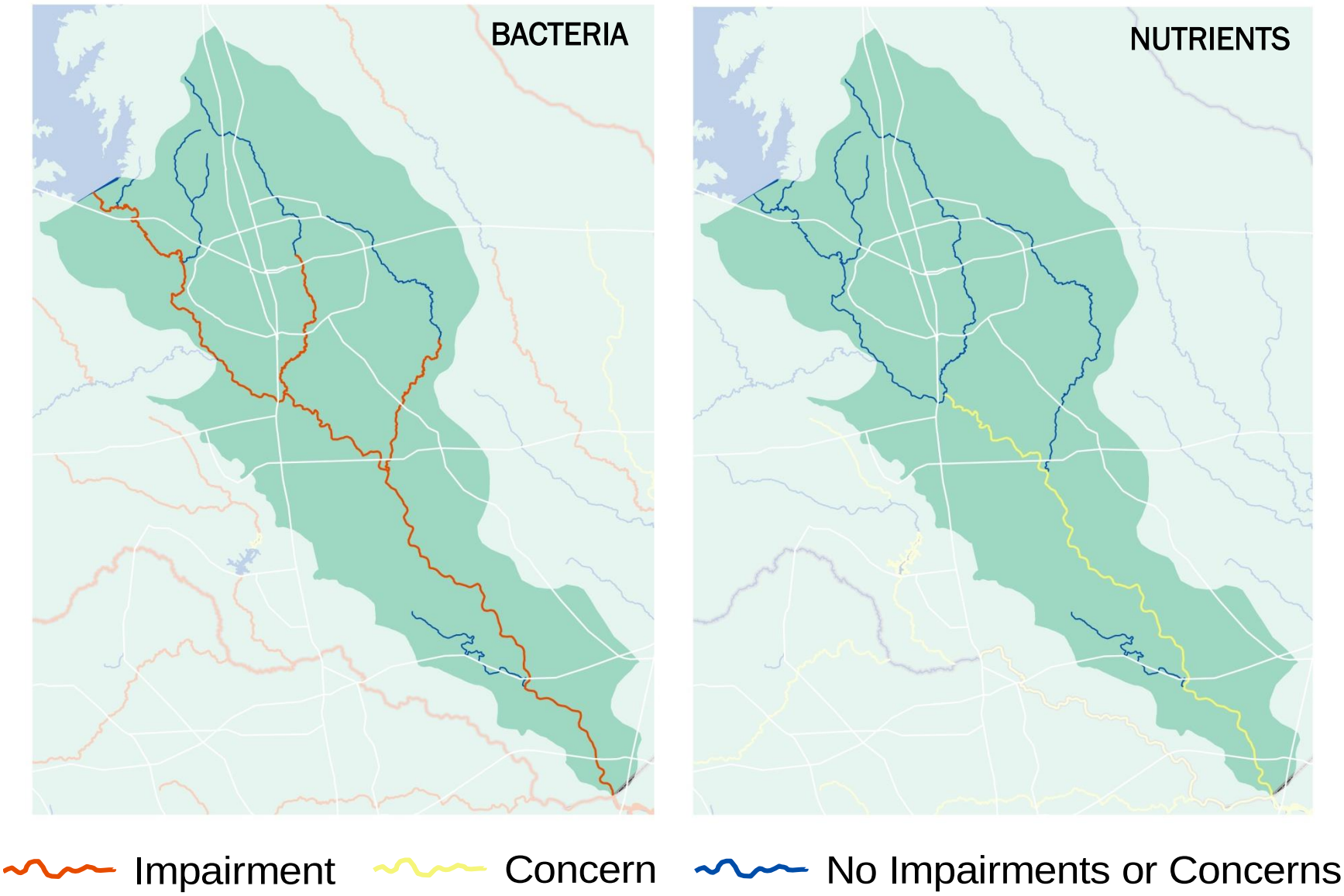
WEST FORK SAN JACINTO RIVER - SEGMENT 1004



WEST FORK SAN JACINTO RIVER - SEGMENT 1004
LAND COVER




BACTERIA
NUTRIENTS
Impairment
Concern
No Impairments or Concerns

Segment Number:	1004	Name:	West Fork San Jacinto River				
Length:	40 miles	**Watershed Area:**	216 square miles	**Designated Uses:**	Primary Contact Recreation 1; High Aquatic Life Use; Public Water Supply		
Number of Active Monitoring Stations:	6	**Texas Stream Team Monitors:**	3	**Permitted Outfalls:**	44		

Description:

Segment 1008 (Perennial Stream): From the confluence of Spring Creek in Harris/Montgomery County to Conroe Dam in Montgomery County

Segment 1004A (Perennial Stream w/ intermediate ALU): East Fork White Oak Creek (unclassified water body) – Perennial stream from the confluence with White Oak Creek upstream to the confluence of an unnamed tributary approximately 0.4 km upstream of League Line Road in the City of Panorama Village

Segment 1004B (Perennial Stream w/ intermediate ALU): West Fork White Oak Creek (unclassified water body) – Perennial stream from the confluence with White Oak Creek and West Fork San Jacinto River upstream to an on-channel impoundment of West Fork White Oak Creek 1.2 km upstream of League Line Road

Segment 1004C (Perennial Stream w/ intermediate ALU): (unclassified water body) – Perennial stream from the confluence of the West Fork San Jacinto River upstream to the Missouri-Pacific Railroad bridge crossing located east of IH 45 north of Needham Road approximately 10 km south of the City of Conroe

Segment 1004D (Perennial Stream w/ high ALU): Crystal Creek (unclassified water body) — From the West Fork of the San Jacinto River confluence to the confluence of the east and west forks of Crystal Creek

Segment 1004E (Perennial Stream w/ high ALU): Stewarts Creek (unclassified water body) — From the West Fork of the San Jacinto River to the headwaters northwest of Old Montgomery Road

Segment 1004F (Perennial Stream w/ high ALU): Woodsons Gully (unclassified water body) — Perennial stream from the confluence with West Fork San Jacinto River upstream to the confluence with an unnamed tributary approximately 1.9 km upstream from Riley-Fussel Road

Segment 1004G (Perennial Stream w/ high ALU): West Fork of Crystal Creek (unclassified water body) – From the Crystal Creek confluence upstream of a point 0.30 km (0.19 mi) northeast of the FM 3083 and Loop 336 intersection

Percent of Stream Impaired or of Concern

Segment ID	PCBs/Dioxin	Bacteria	Dissolved Oxygen	Nutrients	Chlorophyll *a*	Other
1004	-	100	-	40	-	-
1004D	-	100	-	-	-	-
1004E	-	44	-	-	-	-

Segment 1004

Standards	Perennial Stream	Screening Levels	Perennial Stream
Temperature (°C/°F):	35 / 95	Ammonia (mg/L):	0.33
Dissolved Oxygen *(24-Hr Average)* (mg/L):	5.0 / 4.0	Nitrate-N (mg/L):	1.95
Dissolved Oxygen *(Absolute Minima)* (mg/L):	3.0 / 3.0	Orthophosphate Phosphorus (mg/L):	0.37
pH (standard units):	6.5-9.0	Total Phosphorus (mg/L):	0.69
E. coli (MPN/100 mL) (grab):	399	Chlorophyll *a* (µg/L):	14.1
E. coli (MPN/100 mL) (geometric mean):	126		
Chloride (mg/L as Cl):	100		
Sulfate (mg/L as SO_4):	50		
Total Dissolved Solids (mg/L):	400		

FY 2016 Active Monitoring Stations

Site ID	Site Description	Frequency	Monitoring Entity	Parameter Groups
11243	West Fork San Jacinto River at SH 242	Bimonthly	COH / WQC	Field, Conventional, Bacteria
11250	West Fork San Jacinto at FM 2854	Quarterly	TCEQ	Field, Conventional, Bacteria, Chlorophyll *a*, Flow
11251	West Fork San Jacinto River at SH 105	Bimonthly	COH / WQC	Field, Conventional, Bacteria
16626	Stewarts Creek at SH Loop 336	Bimonthly	COH / WQC	Field, Conventional, Bacteria
16635	Crystal Creek at SH 242	Bimonthly	COH / WQC	Field, Conventional, Bacteria
20731	White Oak Creek at Memorial Drive in Conroe	Quarterly	H-GAC	Field, Conventional, Bacteria, Flow

Water Quality Issues Summary			
Issue	**2014 Assessment** *I – Impaired* *C – Of Concern*	**Possible Causes / Influences / Concerns Voiced by Stakeholders**	**Possible Solutions / Actions To Be Taken**
Elevated Levels of Indicator Bacteria	1004 I 1004D I 1004E I	▪ Rapid urbanization and increased impervious cover ▪ Constructed stormwater controls failing ▪ Poorly operated or undersized WWTFs ▪ WWTF non-compliance, overflows, and collection system by-passes ▪ Waste haulers illegal discharges/improper disposal ▪ Direct and dry weather discharges ▪ Improper or no pet waste disposal ▪ Developments with malfunctioning OSSFs	▪ Improve compliance and enforcement of existing stormwater quality permits ▪ Improve construction oversight to minimize TSS discharges to waterways ▪ Improve stormwater controls in new developments by adding bacteria reduction measures ▪ Increase monitoring requirements for self-reporting ▪ Regionalize chronically non-compliant WWTFs ▪ Impose new or stricter discharge permit bacteria limits than currently designated by TCEQ ▪ Require all systems to develop and implement a utility asset management program and protect against power outages at lift stations ▪ More public education on pet waste disposal ▪ Ensure proper citing of new or replacement OSSFs ▪ More public education regarding OSSF operation and maintenance
Elevated Nutrients	1004 C	▪ Agricultural runoff from row crops, pastures, and fallow fields ▪ Fertilizer runoff from urbanized properties, such as landscaped areas, residential lawns, and sport fields ▪ WWTF effluent, sanitary sewer overflows, and malfunctioning OSSFs	▪ Install and/or maintain riparian buffer areas between agricultural fields and waterways ▪ Implement YardWise and Watersmart landscape practices ▪ If DO swings are significant and biology shows a related effect, some phosphorus controls may be needed for WWTF

Segment Discussion

Watershed Characteristics: This segment lies between U.S. Hwy 59 on the west fork of Lake Houston to the south and Lake Conroe to the north. Several concentrated urban areas lie within the watershed boundaries including The City of Conroe and Willis to the north, Shenandoah and surrounding Woodlands and Oak Ridge North developments in the center, and Porter, Kingwood, and the City of Houston to the south. The majority of river segments are lined with wooded riparian buffers from north to south. Primary urban development is residential and commercial with smaller subdivisions and hobby farms present throughout the watershed. There is little industrial activity in the area with pockets of agricultural land uses dispersed throughout the northern portion of the watershed. The Sam Houston National Forest is located in the northern portion of the watershed as well with commercial logging occurring intermittently throughout the area.

Water Quality Issues:

The 2014 Texas Integrated Reports (IR) lists both assessment units of the classified water body (segment 1004) and two of the five tributaries as impaired for recreational use due to high levels of *E. coli.* West Fork White Oak Creek (1004B_01) was not assessed in 2014, and the *E. coli* data collected since May 2013 (when sampling began) suggest the water body is highly impaired for recreational use. TCEQ assessment data and H-GAC analysis are summarized below

Assessment Unit	TCEQ Assessment (2005-2012) Geomean (MPN/100 mL) / % Grab Exceedance	HGAC Analysis 2001-2008 Geomean (MPN/100 mL) / % Grab Exceedance	HGAC Analysis 2008-2015 Geomean (MPN/100 mL) / % Grab Exceedance
1004_01	149.9 / NA	166 / 27.9%	116 / 14.8%
1004_02	185 / NA	103 / 18.3%	181 / 51.7%
1004D_01	136.8 / NA	193 / 26.1%	51 / 14.8%
1004E_02	315.5 / NA	259 / 43.8%	204 / 32.1%
1004B_01	Not assessed	Insufficient Data	3297 / 70.0%

There is a nutrient concern in assessment unit 1004_01, in the lower portion of the segment. The TCEQ assessment found that 61 percent of the nitrate nitrogen (nitrate) data exceeded the screening level of 1.95 mg/L. H-GAC analysis found that the percent exceedance went from 34.9 percent for 2001-2008 to 70.4 percent in the seven-year period ending 5/31/15. Refer to the plot of rolling seven-year geometric means above that shows bacteria density has increased over time.

Public water supply, aquatic life, and fish consumption uses are fully supported in this segment.

Special Studies/Projects: Assessment Unit (AU) 1004E, Stewarts Creek, is part of a larger geographic area covered under several TMDLs, collectively known as the Bacteria Implementation Group (BIG) I-Plan. Refer to the Public Involvement and Outreach section of the 2016 Basin Summary Report for more information about the BIG. This segment, along with one of its primary tributaries, Lake Creek (1015), is also the subject of a watershed protection plan development project initiated in 2015. The project will address bacteria and other contaminants, with an expected completion date of August 2018. Additional tributaries (Spring and Cypress creeks) are part of a characterization study with the intent of eventual watershed-based plan development.

Trends: Regression analysis of watershed-level data revealed statistically significant trends for thirteen water quality parameters. There were six statistically significant trends on the classified segment and a total of seven trends on two unclassified tributaries (1004D and 1004E). On the classified stream, ammonia, chloride, *E. coli*, nitrate, and total Kjeldahl nitrogen (TKN) are increasing while pH is decreasing. The unclassified tributaries show increasing

trends in specific conductance (SPCond), alkalinity, and total phosphorous (TP) while nitrate and chloride have shown decreasing trends.

E. coli concentrations have been increasing in the main segment with spikes reaching levels as high as almost 25,000 MPN/100 mL in 2014 and 2015. Analysis shows that approximately half of the 125 *E. coli* samples collected over the past 15 years have been greater than the 126 MPN/100 mL standard. These spikes in bacteria are likely related to rain events when collection systems overflow, WWTFs and OSSFs malfunction, and pet waste, livestock fields and enclosures lead to higher bacteria levels in stormwater. Significant increasing trends in TKN and nitrate are also present in the main segment with nitrate levels gradually approaching the 1.95 mg/L screening criteria. AU 1004D, Crystal Creek, has shown a decreasing chloride trend since 2012, likely related to higher precipitation rates after the 2011 drought diluting chloride levels in the waterway. Nutrient trends in AU 1004D illustrate interesting changes over time with nitrate levels showing a significant decrease while TP levels have been increasing since 2011. However, it should be noted that only 31 TP samples have been collected since 2007 due to a two year gap in sample collection from 2008 to 2010. Only two significant trends were found for AU 1004E, Stewarts Creek, including a significant decrease in nitrate and a slight increase in SPCond.

Station 11251, located on the main segment just downstream of Lake Conroe, has shown significant decreases in nitrate since 2000 with the majority of samples collected since 2014 measuring lower than the CRP LOQ of 0.02 mg/L. However, the other two monitoring stations located on the main stem of the West Fork San Jacinto River have shown significant increases in nitrate. Nitrate levels at station 11250, located directly downstream of the main segment's confluence with White Oak Creek, have been increasing over the past five years but are still below the 1.95 mg/L screening criteria. Station 11243 however, has shown a significant increase in nitrate levels since 2000 with concentrations frequently reaching as high as 10 mg/L. In addition, sulfate concentrations are also increasing at this station with exceedances reaching near 120 mg/L. Station 11243 is the furthest downstream monitoring station on the main segment making it the most susceptible to contamination from runoff pollutants and discharges originating upstream.

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.
Look for an opportunity to add a monitoring site to the most downstream portion of the segment.
Pursue a new local partner to Clean Rivers Program to collect additional data that would help better isolate problem areas.