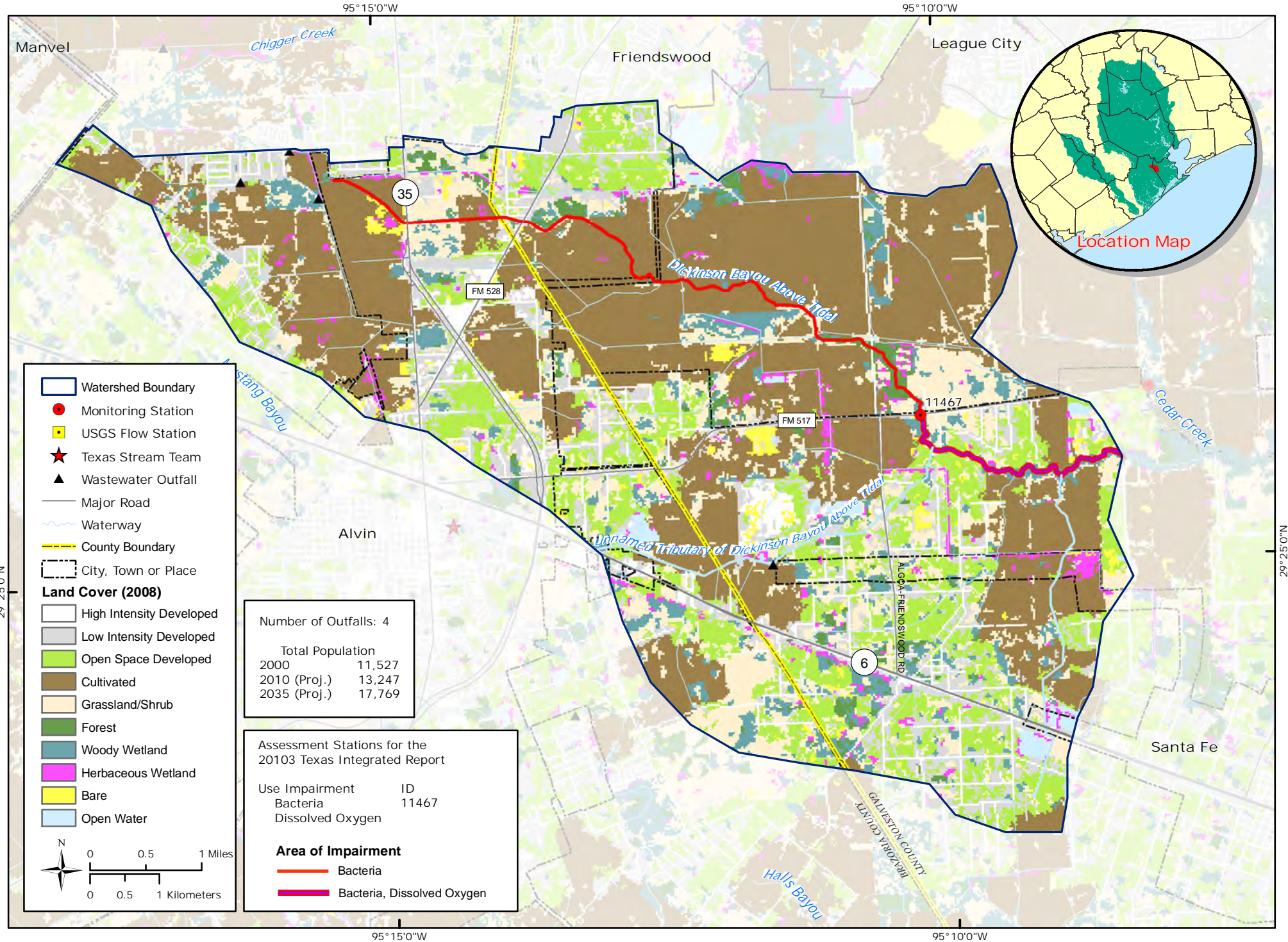


DICKINSON BAYOU ABOVE TIDAL - SEGMENT 1104



- Watershed Boundary
- Monitoring Station
- USGS Flow Station
- Texas Stream Team
- Wastewater Outfall
- Major Road
- Waterway
- County Boundary
- City, Town or Place

Land Cover (2008)

- High Intensity Developed
- Low Intensity Developed
- Open Space Developed
- Cultivated
- Grassland/Shrub
- Forest
- Woody Wetland
- Herbaceous Wetland
- Bare
- Open Water

Number of Outfalls: 4

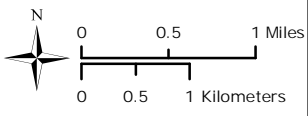
Total Population

2000	11,527
2010 (Proj.)	13,247
2035 (Proj.)	17,769

Assessment Stations for the 20103 Texas Integrated Report

Use Impairment	ID
Bacteria	11467
Dissolved Oxygen	

- Area of Impairment**
- Bacteria
 - Bacteria, Dissolved Oxygen



29° 25'0" N

29° 25'0" N

95° 15'0" W

95° 10'0" W

95° 15'0" W

95° 10'0" W

Segment Number:	1104	Name:	Dickinson Bayou Above Tidal			
Length:	7 miles	Watershed Area:	45 square miles	Designated Uses:	Contact Recreation; Intermediate Aquatic Life	
Number of Active Monitoring Stations:	1	Texas Stream Team Monitors:	0	Permitted Outfalls:	7	
Description:	From a point 4.0 km (2.5 miles) downstream of FM517 in Galveston County to FM 528 in Galveston County					

Degree of Impairment and Overall Trends						
Segment ID	Dissolved Oxygen	Bacteria	Nutrients	PCBs/Dioxin	Chlorophyll <i>a</i>	Other
1104	100	72				

Indicates general improvement
 Indicates general degradation
 Numbers indicate percent of segment impaired

FY 2011 Active Monitoring Stations				
Site ID	Site Description	Frequency	Monitoring Entity	Parameter Groups
11467	Dickinson Bayou at FM 517	Quarterly	TCEQ	Field, Conventional, Bacteria, Chlorophyll- <i>a</i> , Flow

Segment 1104			
Standards		Screening Levels	
Temperature (°C):	35	Ammonia (mg/L):	0.33
Dissolved Oxygen (24-Hr Average) (mg/L):	4.0	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/100 mL) (grab):	394	Chlorophyll- <i>a</i> (µg/L):	14.1
<i>E. coli</i> (MPN/100 mL) (geometric mean):	126		
Chloride (mg/L as Cl):	200		
Sulfate (mg/L as SO ₄):	100		
Total Dissolved Solids (mg/L):	600		

Water Quality Issues Summary					
Issue	2008 Assessment	Draft 2010 Assessment	Affected Area	Possible Causes / Influences / Concerns Voiced by Stakeholders	Possible Solutions / Actions To Be Taken
Elevated Levels of Bacteria	I	I	1104	<ul style="list-style-type: none"> - WWTP non-compliance, overflows, collection system by-passes - Small, privately-run WWTP - Developments with septic tanks - Rapid urbanization and increased impervious cover - Constructed storm water controls failing - Direct and dry weather discharges - Waste haulers illegal discharges/improper disposal - Improper or no pet waste disposal - Animal waste from agricultural production, wildlife ranch, and domestic animal facilities 	<ul style="list-style-type: none"> - Increase monitoring requirements for self-reporting - Impose new or stricter bacteria limits than those designated by TCEQ - Require all systems to develop and implement a utility asset management program and protect against power outages at lift stations or provide alternative power supplies during outages - Regionalize wastewater treatment to minimize number of small package plants and reduce OSSF dependency - Require larger portions of land in developments platted to use OSSFs - More public education regarding OSSF operations and maintenance - More public education regarding pet waste disposal - Improve storm water controls in new developments by adding bacteria reduction measures - Improve compliance and enforcement of existing storm water quality permits to minimize contaminated runoff - Improve construction oversight to minimize TSS discharges to waterways - Implement stream fencing and alternative water supplies to keep livestock out of or away from waterways - Promote and implement Water Quality Management Plans for individual agricultural

					<ul style="list-style-type: none"> properties - Protect or install vegetative buffers along waterways
Low Dissolved Oxygen Concentrations	I	I	1104	<ul style="list-style-type: none"> - Excessive nutrients and organic matter from WWTP effluent, sanitary sewer overflows, malfunctioning OSSFs, illegal disposal of grease trap waste, biodegradable solid waste such as grass clippings and pet waste - Excessive nutrients and organic matter from agricultural production, and related activities - Vegetative canopy removed - High temperatures discharges from industrial WWTPs 	<ul style="list-style-type: none"> - Improve compliance and enforcement of existing storm water quality permits - Improve operation and maintenance of existing WWTP and collection systems - Regionalize wastewater treatment to minimize number of small package plants and reduce OSSFs dependency - More public education regarding pet waste disposal - More public education regarding disposal of household fats, oils, and grease - More stringent OSSF maintenance and education - Create and implement Water Quality Management Plans for individual agricultural properties - Install and/or maintain riparian buffer areas along all waterways

Segment Discussion:

Watershed Characteristics: The Dickinson Bayou Above Tidal watershed is not as developed as many of the surrounding watersheds. It includes portions of the cities of Santa Fe, League City, Friendswood, and Alvin. Residential and commercial development has been occurring throughout the watershed along major thoroughfares such as FM517 and Texas Highway 6. The predominant land use in the watershed is agriculture and grasslands especially in the north and western parts. The majority of the watershed is on on-site sewage facilities. There is a large wildlife ranch located immediately downstream of FM517 on the western and southern shoreline of the bayou.

Water Quality Issues: The aquatic life and recreation uses of Dickinson Bayou Above Tidal (1104) are not supported. High levels of *E. coli* bacteria were found in both assessment units of the main channel in samples collected between 2001 and 2008 resulting in their being listed as impaired in the *Draft* 2010 Texas Integrated Report (IR). Dissolved oxygen (DO) is also depressed throughout the segment with assessment unit 1104_02 listed as a concern and 1104_01 listed as impaired in both the 2008 and *Draft* 2010 IRs. Animals from the wildlife ranch do not have direct access to Dickinson Bayou for water but the fence line is located immediately at the top of the cut bank. Additionally, there is an unnamed tributary that flows through the ranch from the south and into the bayou and animals have had, and may still have, direct access to that source of water. Runoff from the fields, pens, and corals flow into the bayou carrying high loads of bacteria, nutrients, and sediment.

Special Studies/Projects: This segment has been subject to a watershed protection plan and will be included in a future implementation plan. It is also part of the bacteria TMDL for Dickinson Bayou. Both projects are being facilitated by Texas Agrilife.

Trends: Regression analysis of watershed-level data revealed statistically significant trends for nutrients, total suspended solids (TSS), alkalinity, and total organic carbon (TOC). Because data from only one station was included in the analysis, the trends at the station level are identical to those seen at the level of the watershed as a whole. The section of Dickinson Bayou above tidal is listed as impaired for bacteria and DO but no significant trend are suggested by the analysis.

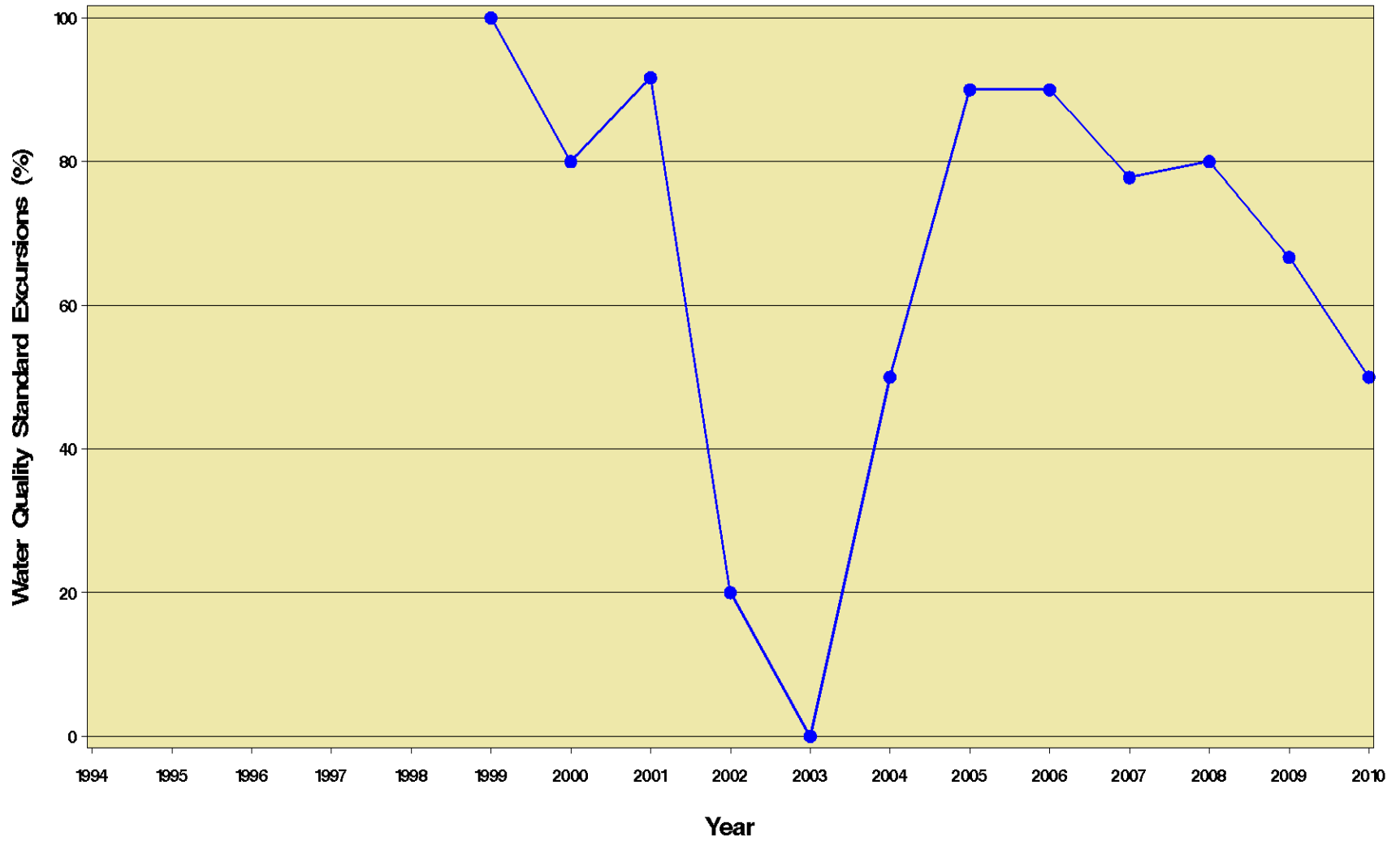
The concentrations of nitrate nitrogen (nitrate), phosphate phosphorus (TP), and orthophosphate phosphorus (OP) are trending downward, but the overall change is not dramatic. Nutrients are not a concern in this watershed because there are few exceedances of the screening levels in the dataset. Chlorophyll *a* concentrations have never exceeded the screening level, and 95% of measured concentrations are below 5.6 mg/L. There is no significant trend over the period of record, so it is unlikely the ambient levels of nutrients are sufficient to increase algal populations. The change in total suspended solids concentrations since 1995 has significantly improved. If it were not for the continuing bacteria problem, one could conclude that water quality in this area is improving. Nearly 8% of samples collected since *E. coli* sampling became the indicator preferred have exceeded the 2010 water quality standard.

Plots of percent excursions of the *E. coli* standard and ammonia, OP, and TSS data from station 11467 follow.

Recommendations:

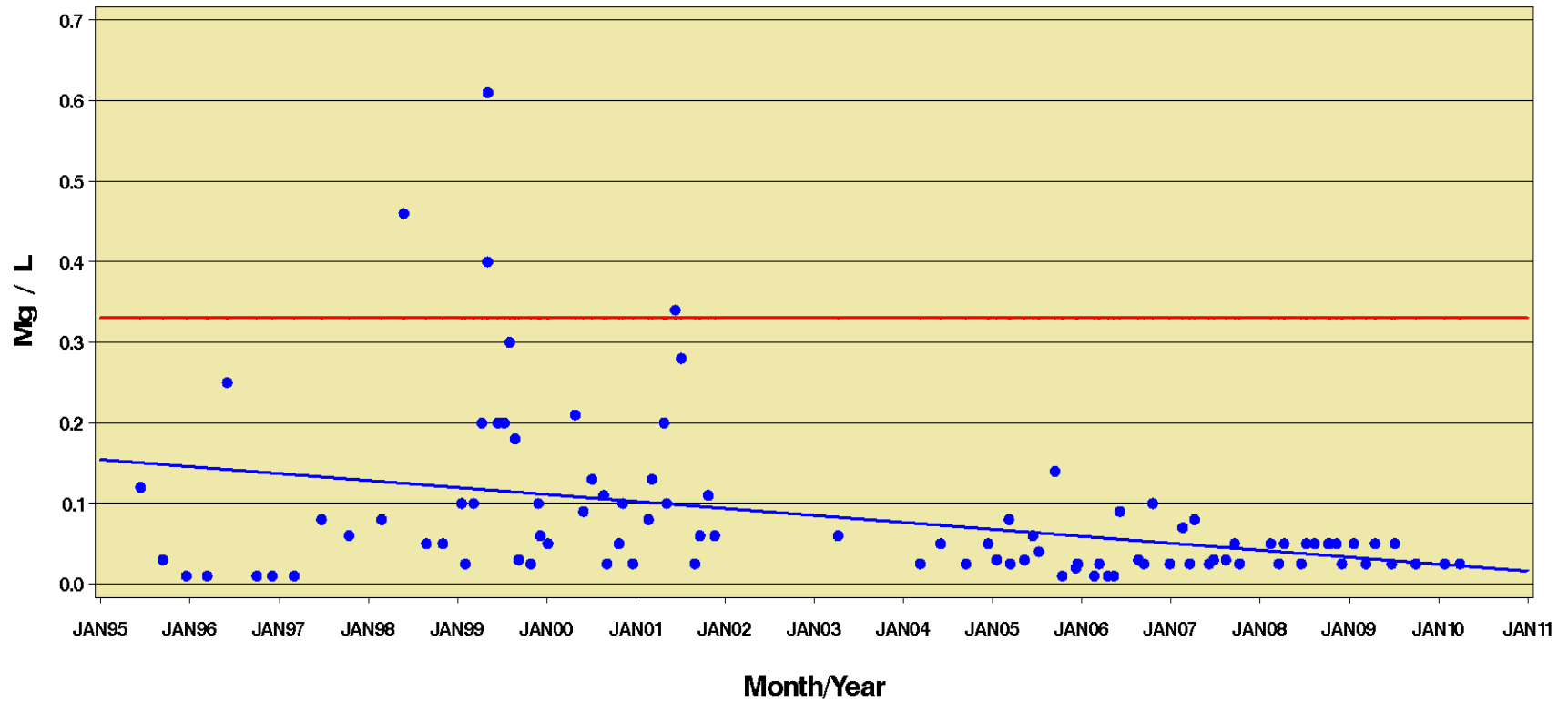
- Continue working with Texas Agrilife to help complete the bacteria TMDL and the WPP.
- Address the various concerns found in this segment summary through stakeholder participation.
- Continue collecting water quality data to support actions associated with watershed protection plan development and future modeling.
- Work with local partner and contract labs to lower detection limits for nutrients.

Percent Excursion of 2010 Water Quality Standard
Dickinson Bayou Above Tidal Segment: 1104 Parameter: E.coli
2010 Water Quality Standard: 126 MPN / 100 mL



Dickinson Bayou Above Tidal

Station: 11467 Segment: 1104 Parameter: Ammonia—N
2010 Nutrient Screening Level: 0.33 Mg / L
Assessment Unit: 1104_02



Trends are considered significant if the p-value is < 0.10

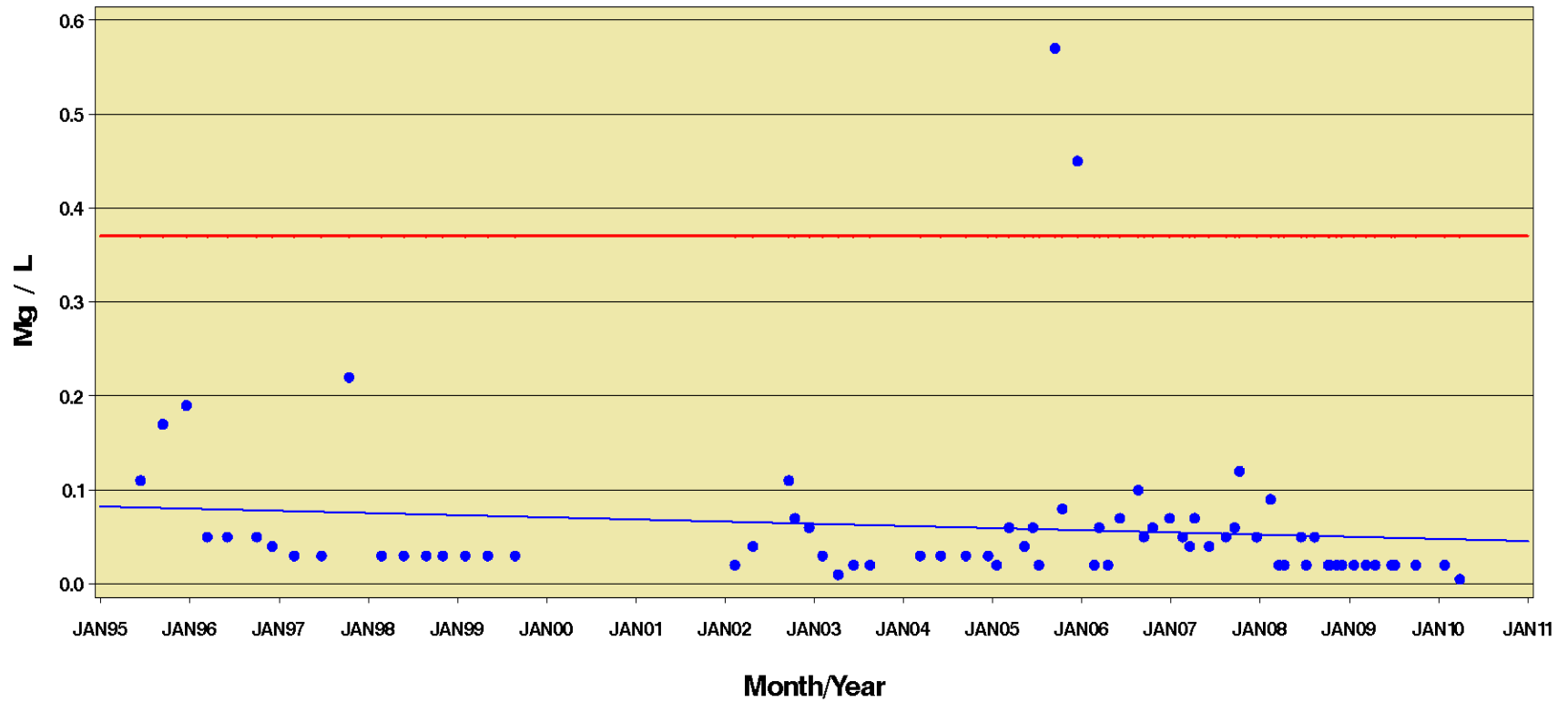
Trend is significant at $p=0.0021$ R-Square= 0.0955 T-Value= -3.167 Number of Samples= 97

The blue regression line applies to the plot of actual values ; regression statistics are derived from regression of log-transformed data

Red line indicates the applicable 2010 Nutrient Screening Level

Dickinson Bayou Above Tidal

Station: 11467 Segment: 1104 Parameter: Orthophosphate—P
2010 Nutrient Screening Level: 0.37 Mg / L
Assessment Unit: 1104_02



Trends are considered significant if the p-value is < 0.10

Trend is significant at $p=0.0241$ R-Square= 0.0705 T-Value= -2.305 Number of Samples= 72

The blue regression line applies to the plot of actual values ; regression statistics are derived from regression of log-transformed data

Red line indicates the applicable 2010 Nutrient Screening Level

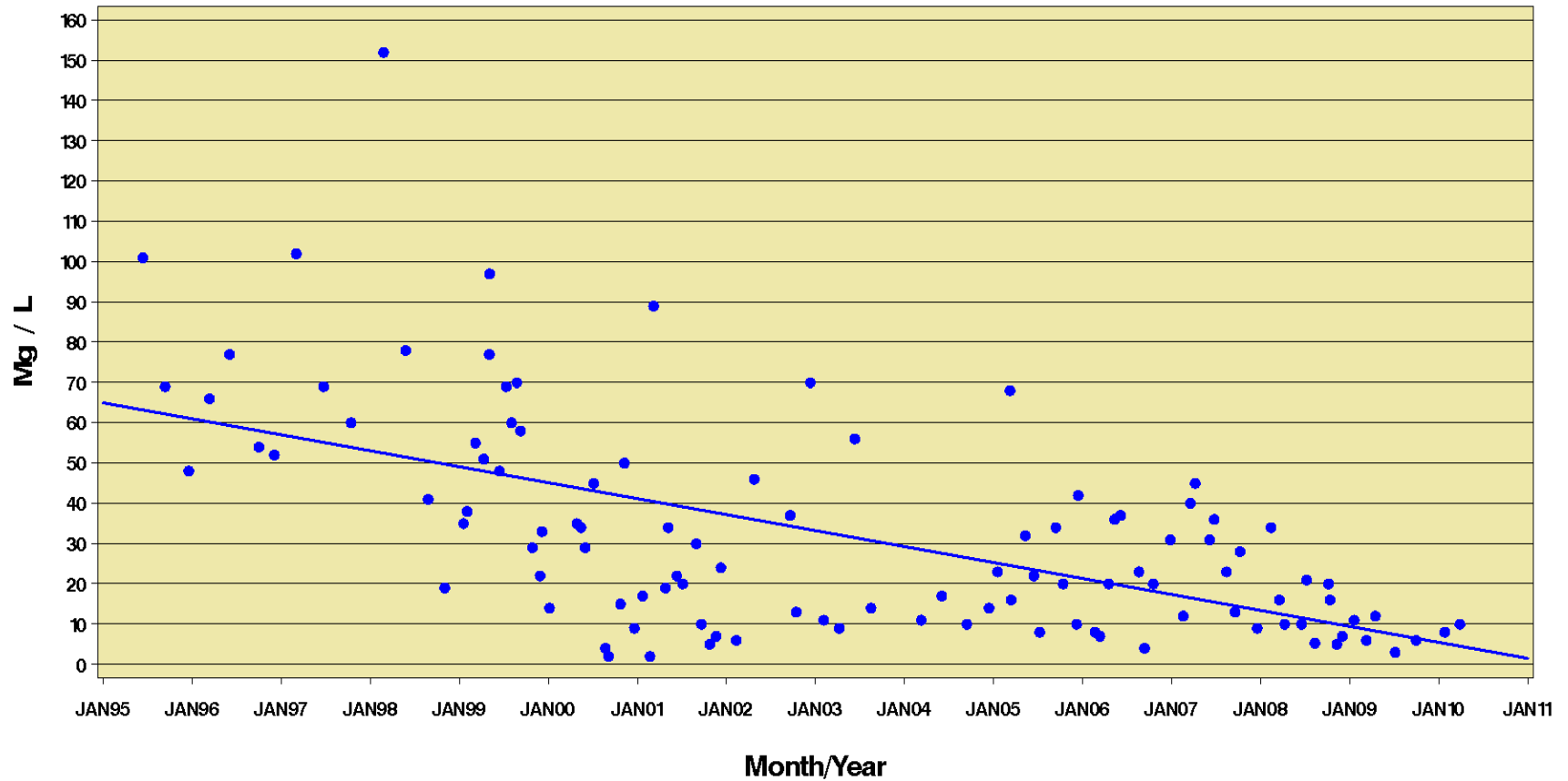
Dickinson Bayou Above Tidal

Station: 11467

Segment: 1104

Parameter: Total Suspended Solids

Assessment Unit: 1104_02



Trends are considered significant if the p-value is < 0.10

Trend is significant at p=0.0000

R-Square= 0.2836

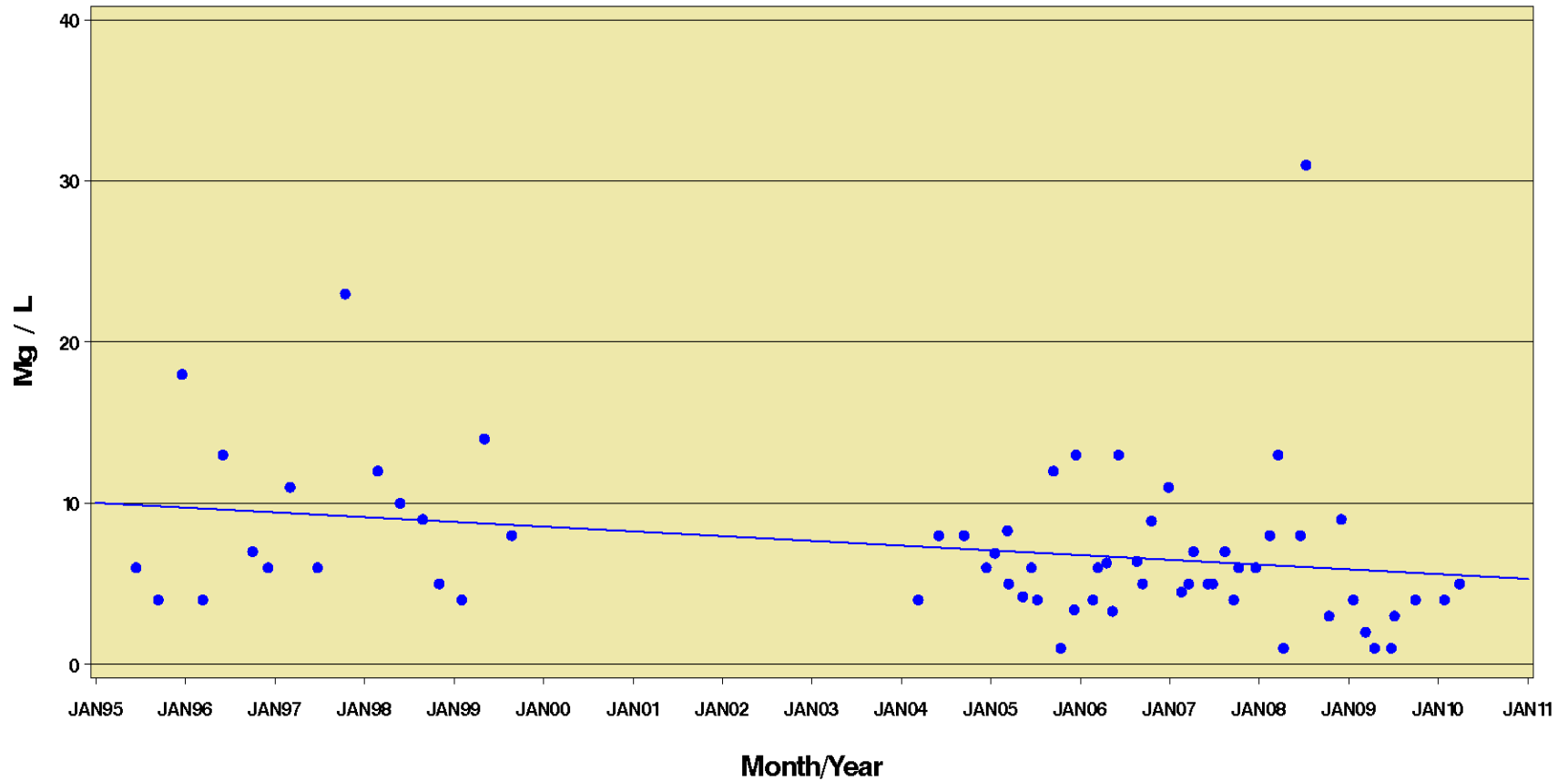
T-Value= -6.4780

Number of Samples= 108

The blue regression line applies to the plot of actual values ; regression statistics are derived from regression of log-transformed data

Dickinson Bayou Above Tidal

Station: 11467 Segment: 1104 Parameter: Total Organic Carbon
Assessment Unit: 1104_02



Trends are considered significant if the p-value is < 0.10
Trend is significant at p=0.0053 R-Square= 0.1185 T-Value= -2.8870 Number of Samples= 64
The blue regression line applies to the plot of actual values ; regression statistics are derived from regression of log-transformed data