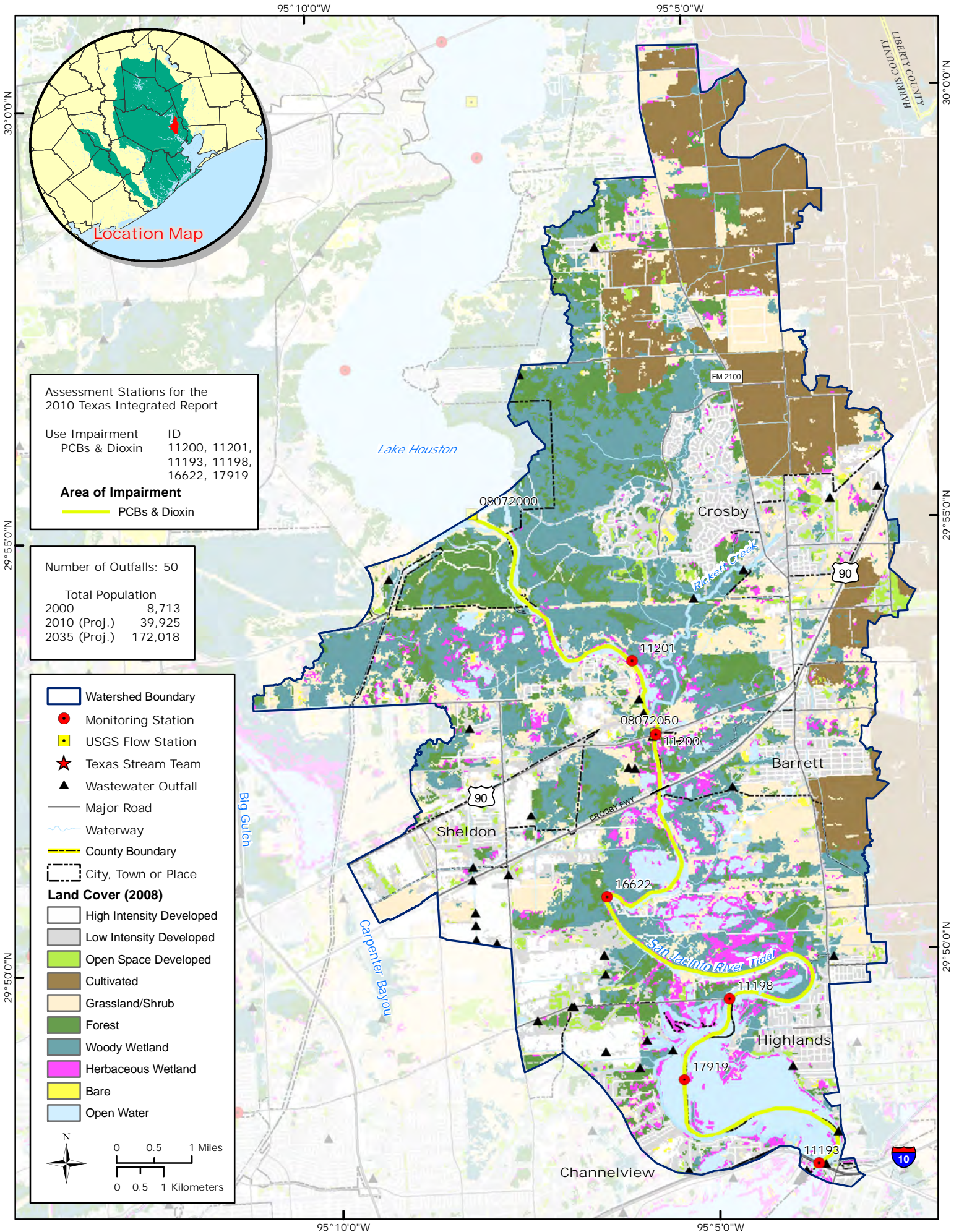


SAN JACINTO RIVER TIDAL - SEGMENT 1001



Segment Number:	1001	Name:	San Jacinto River Tidal				
Length:	17 miles	Watershed Area:	63 square miles	Designated Uses:	Contact Recreation; High Aquatic Life		
Number of Active Monitoring Stations:		6	Texas Stream Team Monitors:		0	Permitted Outfalls:	63
Description:	From a point 100 meters (110 yards) downstream of IH 10 in Harris County to Lake Houston Dam in Harris County						

Degree of Impairment and Overall Trends						
Segment ID	Dissolved Oxygen	Bacteria	Nutrients	PCBs/Dioxin	Chlorophyll <i>a</i>	Other
1001				100		

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
11193	San Jacinto River Tidal at IH-10	Quarterly	TCEQ	Field, Conventional, Bacteria, Chlorophyll-a
11193	San Jacinto River Tidal at IH-10	Monthly	HCPHES	Field, Conventional, Bacteria, Chlorophyll-a (Qtrly)
11198	San Jacinto River Tidal at Wallisville Road	Monthly	HCPHES	Field, Conventional, Bacteria
11200	San Jacinto River Tidal at US 90	Monthly	HCPHES	Field, Conventional, Bacteria
11201	San Jacinto River Tidal near Magnolia Gardens below Granite Creek	Monthly	HCPHES	Field, Conventional, Bacteria
16622	San Jacinto River Tidal at Banana Bend Road	Monthly	HCPHES	Field, Conventional, Bacteria
17919	San Jacinto River Tidal near Shady Lane	Bimonthly	HCPHES	Field, Conventional, Bacteria

Segment 1001			
Standards		Screening Levels	
Temperature (°C):	35	Ammonia-N (mg/L):	0.46
Dissolved Oxygen (24-Hr Average) (mg/L):	4.0	Nitrate-N (mg/L):	1.10
Dissolved Oxygen (Absolute Minima) (mg/L):	3.0	Orthophosphate Phosphorus (mg/L):	0.46
pH (standard units):	6.5-9.0	Total Phosphorus-P (mg/L):	0.66
Enterococci (MPN/100mL) (grab):	89	Chlorophyll-a (µg/L):	21
Enterococci (MPN/100mL) (geometric mean):	35		

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
Dioxin/PCBs	I	I	Entire segment	<ul style="list-style-type: none"> - Waste pit located along the San Jacinto River immediately upstream of I-10 bridge is now a National Priority List Superfund site managed by EPA - Concentrated deposits outside boundaries of the waste pits - Unknown industrial or urban sources 	<ul style="list-style-type: none"> - Encourage EPA and responsible parties to work together to remediate Superfund site - Remove or contain contamination from locations already identified - Encourage additional testing to locate all unknown sources/deposits

Segment Discussion:

Watershed Characteristics: This segment lies between the Lake Houston dam in the north to the I-10 bridge over the San Jacinto River at the southern end. The lower portion of the watershed is heavily developed with industrial activity as the major land use on the western side of the river. The community of Sheldon is situated in the industrial area. The communities of Crosby, Barrett, and Highlands are located on the eastern side of the river in the upper, middle, and lower portions of the watershed, respectively. Extensive woody wetlands are located on either side of the river while cultivated land dominates the northeast quadrant of the segment watershed.

Water Quality Issues: While the aquatic life use and the recreation use are fully supported, fish consumption use is not supported in this segment. High levels of dioxin and PCBs have been found in the edible fish tissue of fish and crab which led the Texas Department of State Health Services to issue a Limited Consumption Fish Advisory for this water body. Dissolved oxygen (DO) in the segment is in excellent condition with only 1 out of 328 results measuring below the grab minimum of 3.0 mg/L. Bacteria concentrations are still acceptable, with 17% of the single grab samples exceeding the standard of 89 MPN/100 mL. In the 2008 assessment, the percent exceedance was 15%. Still, bacteria concentrations are not severe enough in this large body of water to even be a concern at this time. Additionally, there are no water quality concerns regarding nutrients or chlorophyll-*a* in either the *Draft* 2010 Texas Integrated Report (IR) or 2008 IR.

Special Studies/Projects: This segment is included in two TMDL projects, the Houston Ship Channel and Upper Galveston Bay TMDL for PCBs in Fish Tissue and the Houston Ship Channel TMDL for Dioxin, which are currently under way. For more information, please refer to the detailed discussions located at the beginning of the water quality section of the 2011 Basin Summary Report regarding dioxin and PCB contamination.

Trends: Regression analysis of watershed-level data revealed statistically significant trends for nine water quality parameters. The annual median concentrations of two parameters – chlorophyll *a* and DO – are increasing over time while the other seven trends are decreasing. Between 1995 and 2010, the annual medians for salinity, specific conductance, Total Dissolved Solids (TDS), Total Suspended Solids (TSS), and Volatile Suspended Solids (VSS) were decreasing. These trends may be related to the weather patterns during the last several years when there were long periods of time between rain events. The Houston region also had a few major storm events that probably freshened this and other tidal streams plus Galveston Bay as a whole. With fewer rain events, there may also be a longer detention time in the upstream Lake Houston reservoir allowing more solids to drop out. The other possibility would be less sediment-laden runoff from various

sources such as home construction and commercial development, road construction, and/ or agricultural activities. Regardless, lower concentrations of sediment are being detected in the water column in the recent past. The segment trends are also supported by the station trends indicating TSS, TDS, and/or Total Organic Carbon (TOC) concentrations are declining along this tidal river. Regression analysis of data specific to each monitoring location (six stations) revealed 33 significant trends.

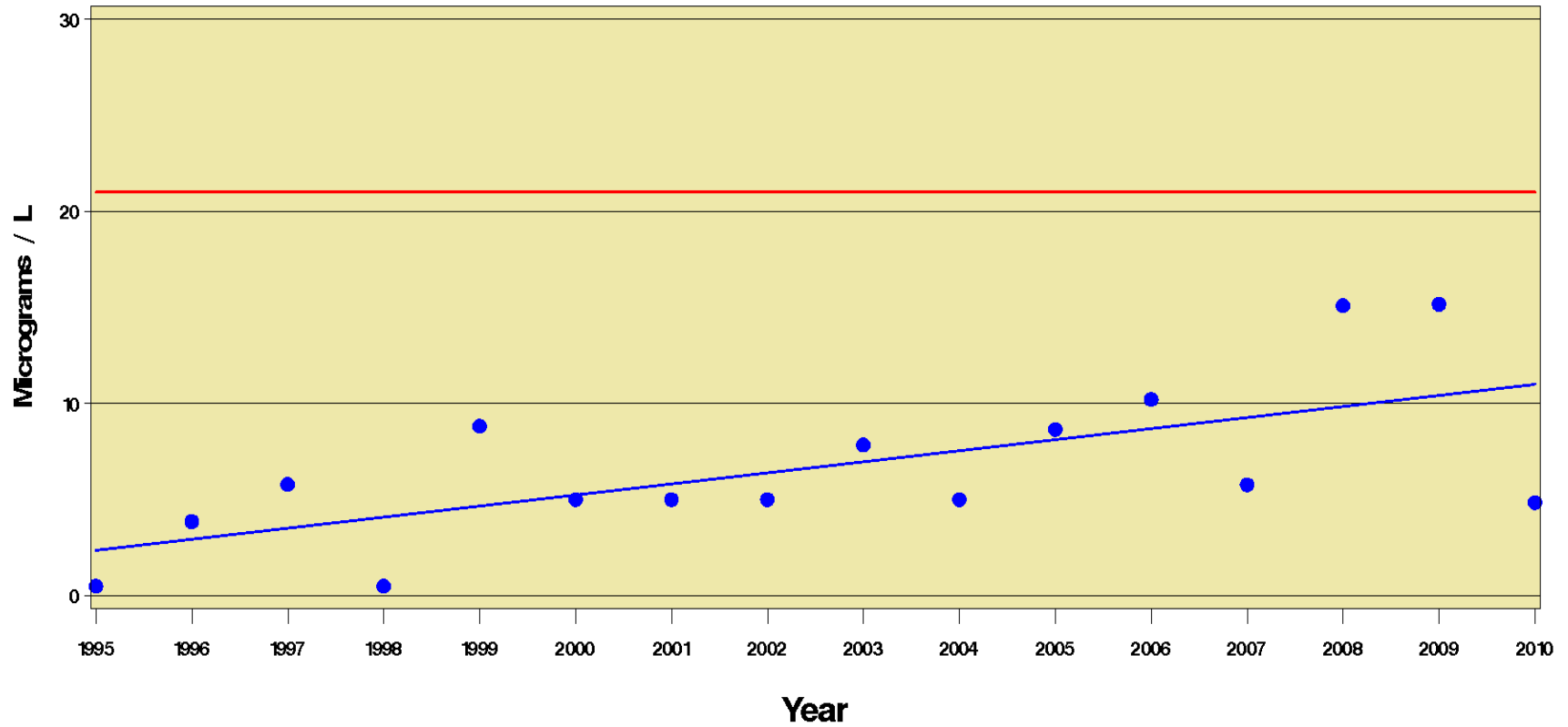
During the same 15-year period, the annual medians for chlorophyll *a* have been steadily increasing in the segment. The 2010 value in the attached graph represents an incomplete year of data so it should be disregarded at this time. The trend for concentrations of chlorophyll *a*, however, coincides with other trends found at individual monitoring stations where concentrations of nutrients such as nitrate nitrogen (nitrate) or total phosphorus (TP) are increasing. At five of the six monitoring stations, nitrate concentrations are increasing. Only the most downstream site (11193), which gets more mixing with the Houston Ship Channel, does not have a nitrate trend. Instead, orthophosphate phosphorus (OP) and TP concentrations are creeping up over time. Chlorophyll *a* concentrations at station 11193 are increasing to the point where a couple of samples collected on a quarterly basis finally exceeded the screening level of 21 µg/L during the past few years. These nutrient patterns are probably a major factor in the segment chlorophyll *a* trend. The increased chlorophyll *a* may explain the increasing trend in DO found in the segment analysis and at the four upstream monitoring stations.

Recommendations:

- 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.
- Pursue new local partners to Clean Rivers Program to collect additional data that would help better isolate problem areas.
- Work with local partner and contract labs to lower detection limits for nutrients since chlorophyll *a* concentrations are increasing and nutrient concentrations have an effect.

San Jacinto River Tidal

Segment: 1001 Parameter: Chlorophyll a Annual Median
Water Body Type: Classified Tidal Stream
2010 Nutrient Screening Level : 21.0 Micrograms / L



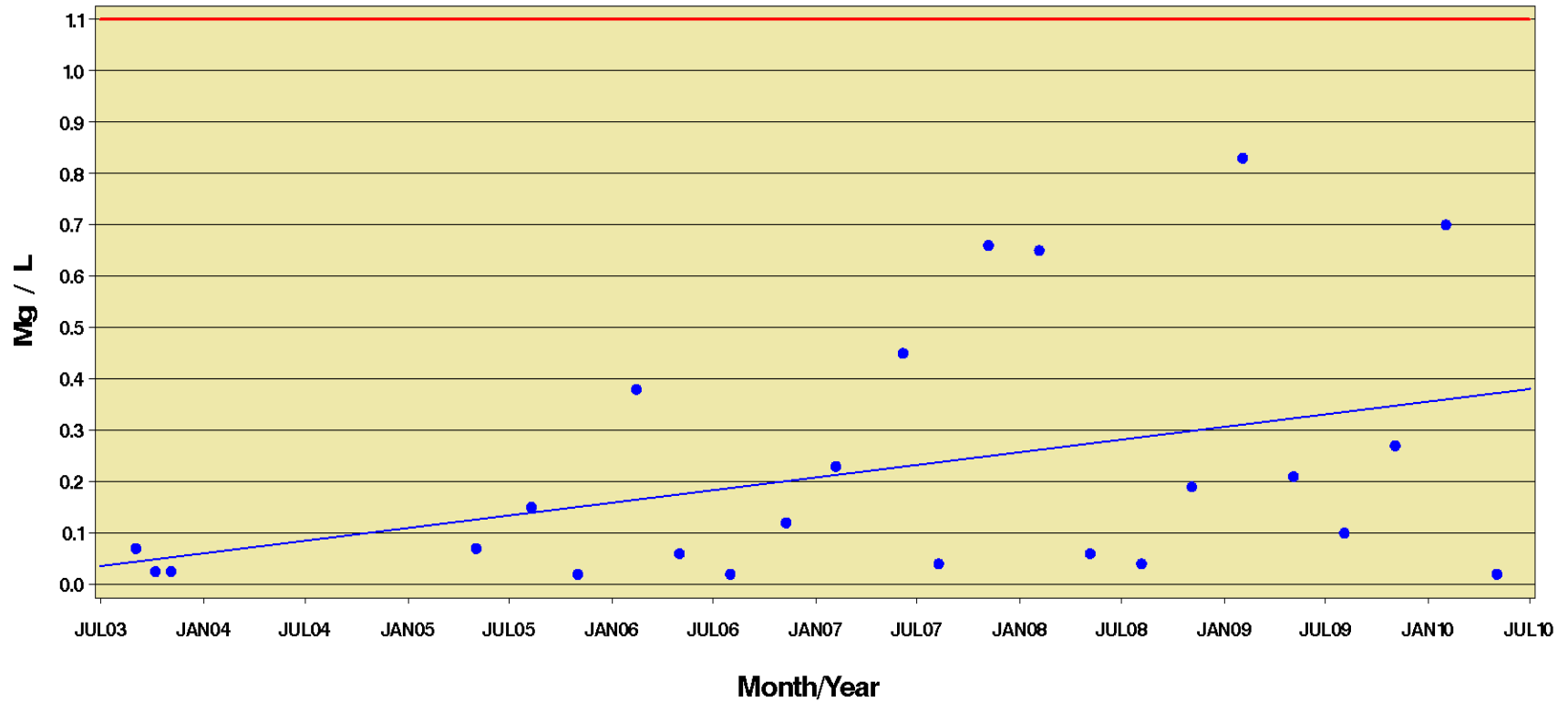
Trends are considered significant if the p-value is < 0.10

Trend is significant at p= 0.0061 R-Square = 0.4264 T-Value = 3.226 Number of samples: 55

If present, the dashed red line indicates the 2010 2010 Nutrient Screening Level

San Jacinto River Tidal

Station: 16622 Segment: 1001 Parameter: Nitrate—N
2010 Nutrient Screening Level: 1.10 Mg / L
Assessment Unit: 1001_02



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

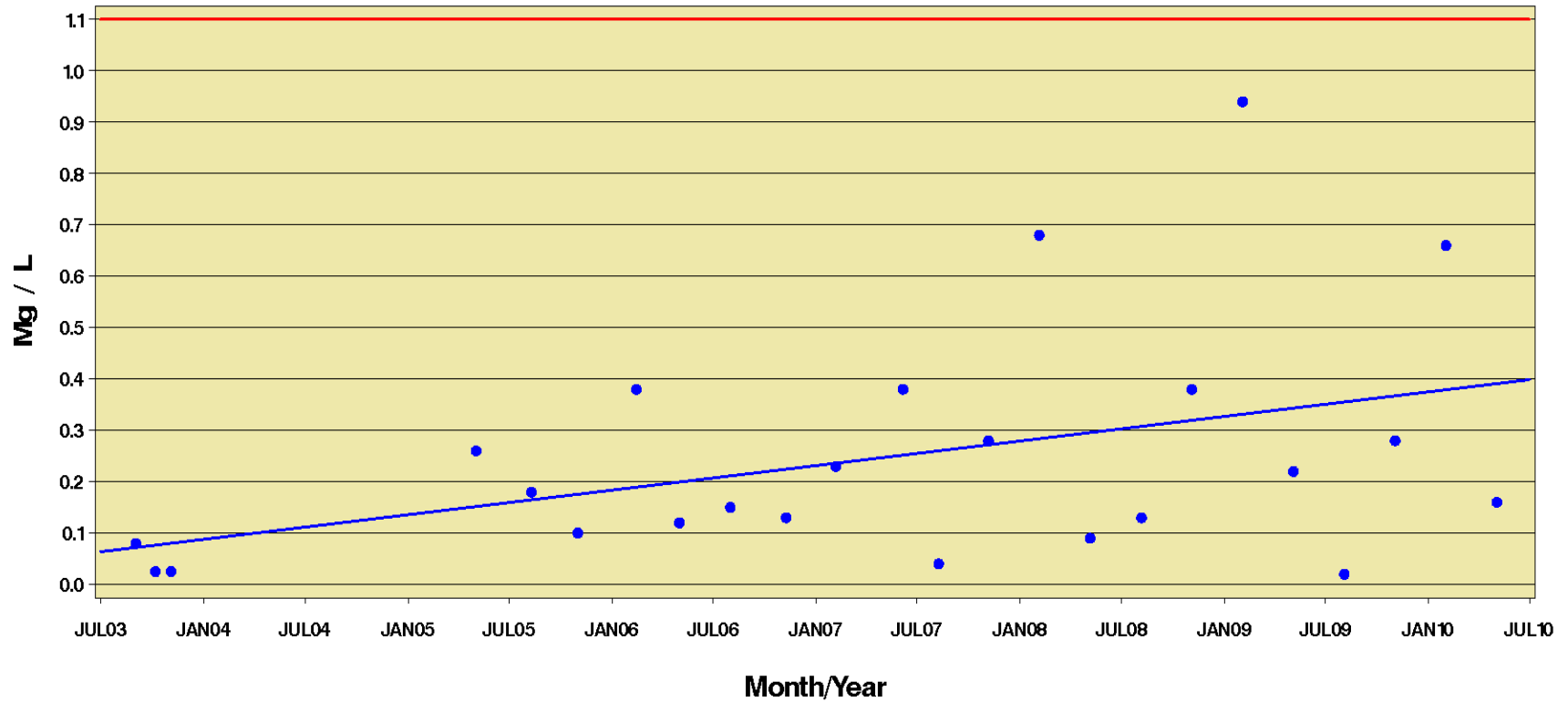
Trend is significant at p=0.0506 R-Square= 0.1627 T-Value= 2.0680 Number of Samples= 24

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

San Jacinto River Tidal

Station: 11198 Segment: 1001 Parameter: Nitrate-N
2010 Nutrient Screening Level: 1.10 Mg / L
Assessment Unit: 1001_02



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

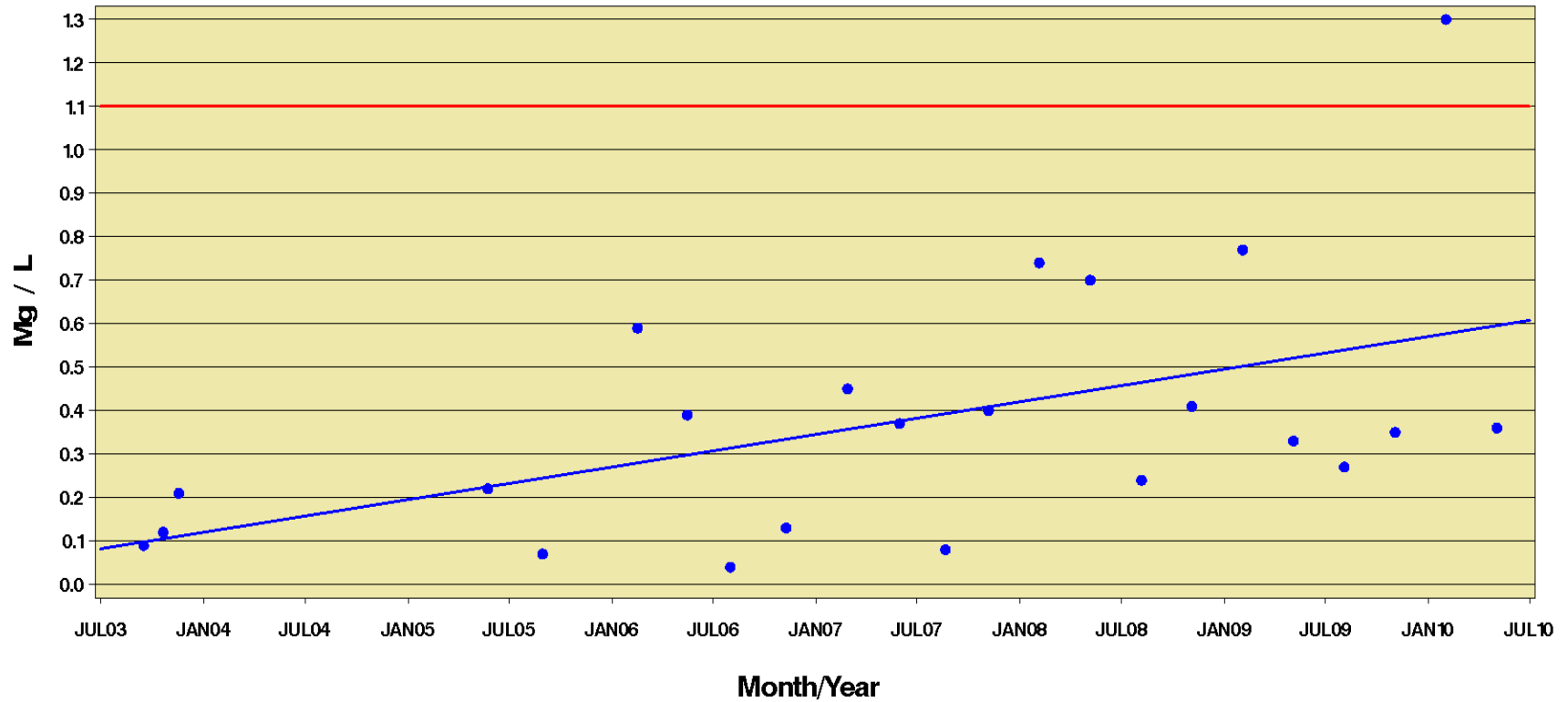
Trend is significant at $p=0.0377$ R-Square= 0.1819 T-Value= 2.2120 Number of Samples= 24

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

San Jacinto River Tidal

Station: 17919 Segment: 1001 Parameter: Nitrate—N
2010 Nutrient Screening Level: 1.10 Mg / L
Assessment Unit: 1001_02



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

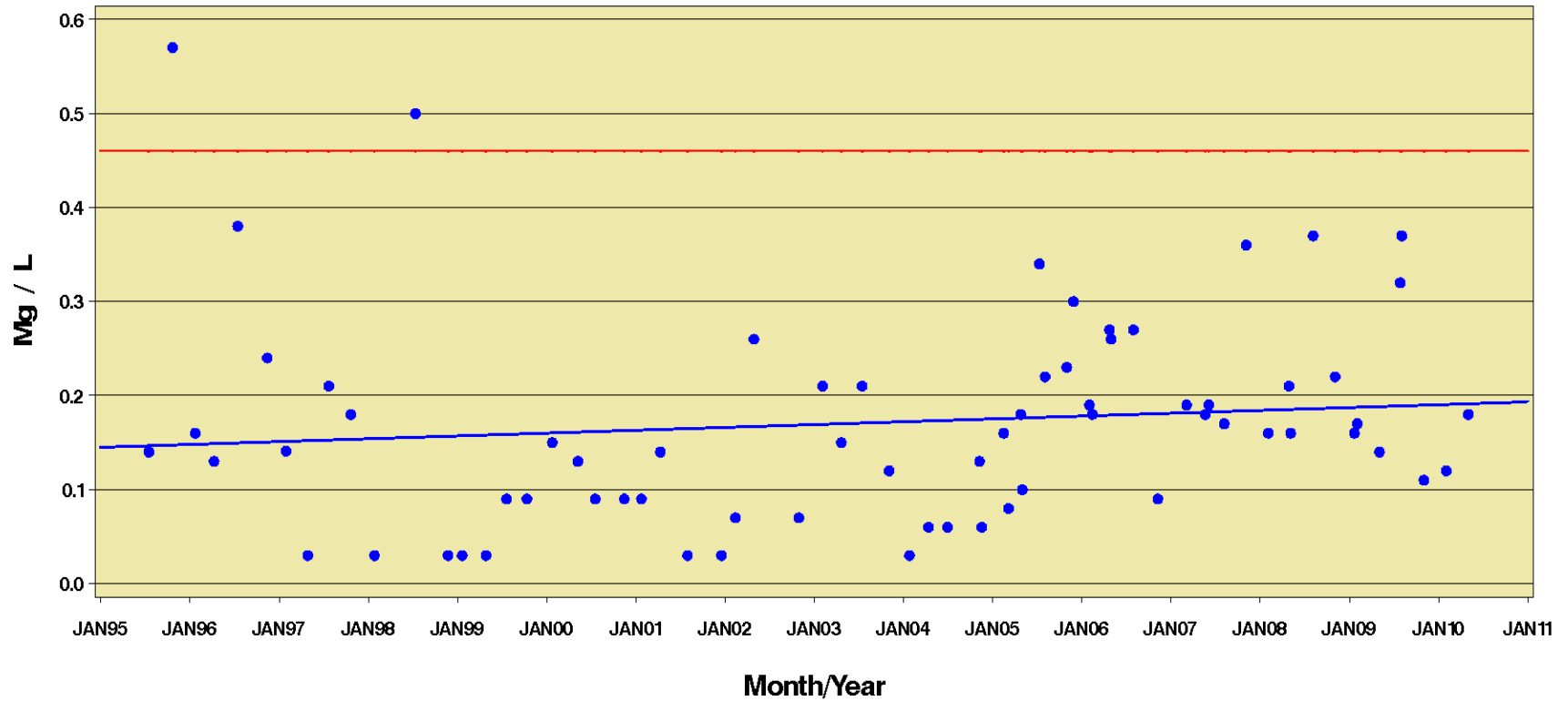
Trend is significant at $p=0.0069$ R-Square= 0.2989 T-Value= 2.9920 Number of Samples= 23

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

San Jacinto River Tidal

Station: 11193 Segment: 1001 Parameter: Orthophosphate—P
2010 Nutrient Screening Level: 0.46 Mg / L
Assessment Unit: 1001_02



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

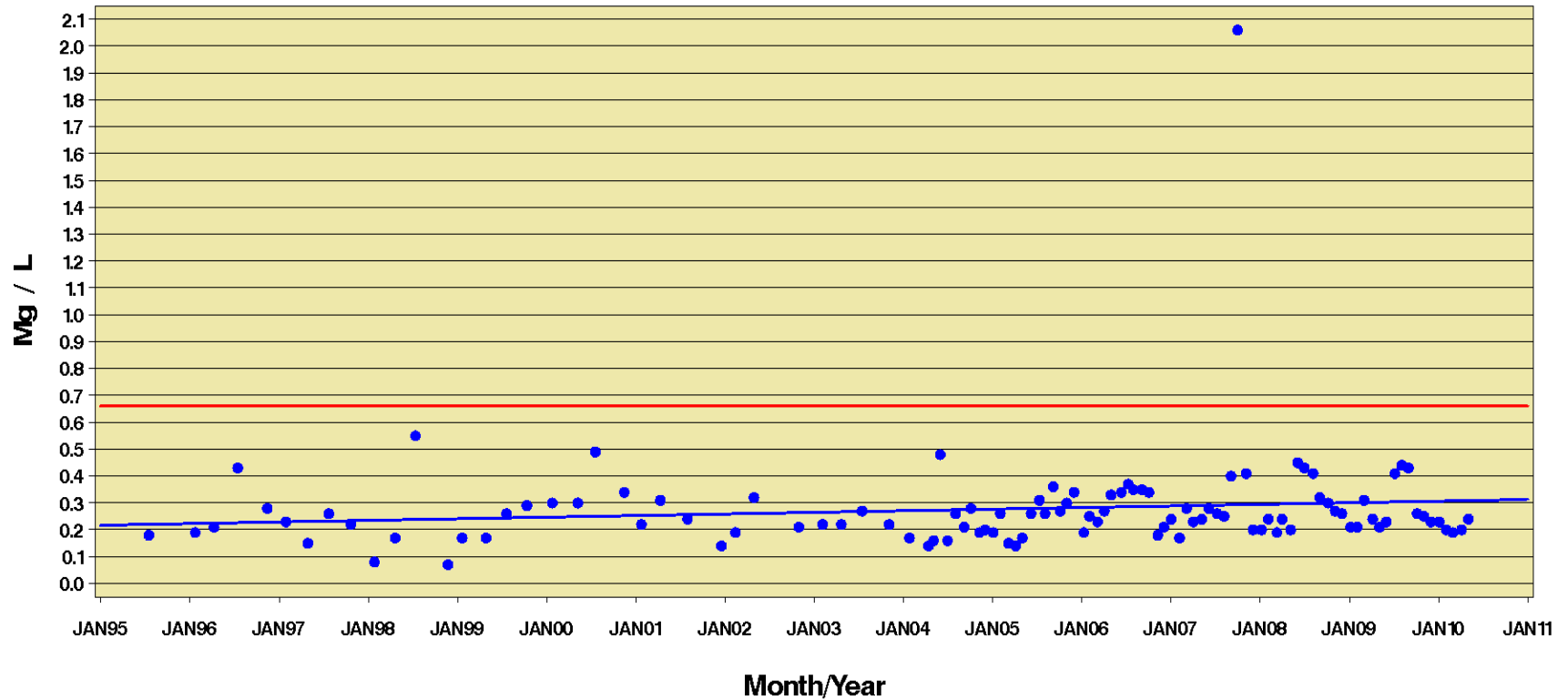
Trend is significant at $p=0.0295$ R-Square= 0.0688 T-Value= 2.2250 Number of Samples= 69

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

San Jacinto River Tidal

Station: 11193 Segment: 1001 Parameter: Total Phosphorus
2010 Nutrient Screening Level: 0.66 Mg / L
Assessment Unit: 1001_02



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

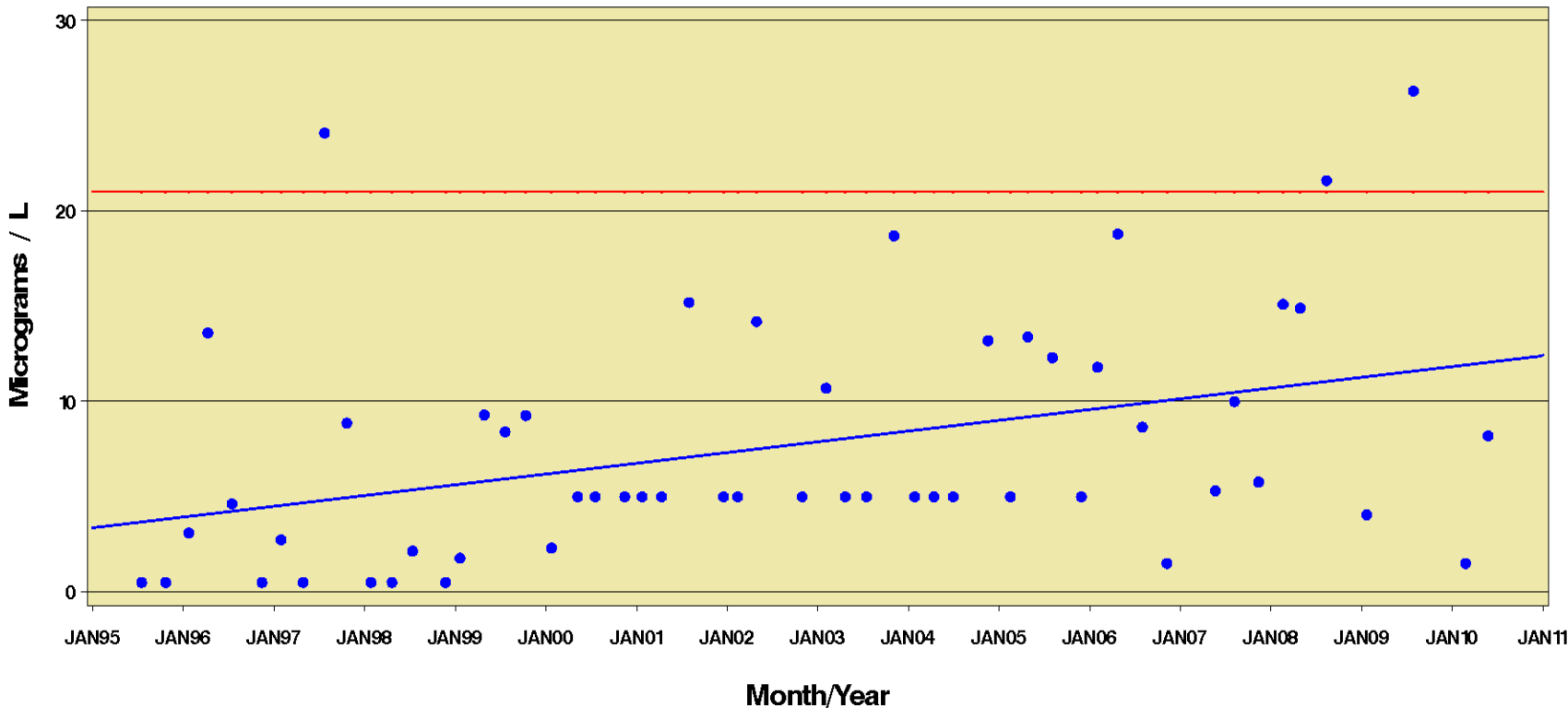
Trend is significant at $p=0.0256$ $R\text{-Square}=0.0466$ $T\text{-Value}=2.2650$ Number of Samples= 107

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

San Jacinto River Tidal

Station: 11193 Segment: 1001 Parameter: Chlorophyll a
 2010 Nutrient Screening Level: 21.0 Micrograms / L
 Assessment Unit: 1001_02



Trends are considered significant if the p-value is < 0.10
 Trend is significant at p=0.0002 R-Square= 0.2347 T-Value= 4.0320 Number of Samples= 55
 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

Chlorophyll-a and Nitrate-Nitrogen Trends

Segment: 1001 Watershed: San Jacinto River Tidal
Station: 11193 Assessment Unit: 1001_02

