TEXAS CITY SHIP CHANNEL - SEGMENT 2437

Assessment Stations for the
20103 Texas Integrated Report

Use Impairment   ID
  PCBs & Dioxin   13361

Area of Impairment

▨ PCBs & Dioxin

Number of Outfalls: 45

Total Population
2000   1,896
2010 (Proj.)   3,187
2035 (Proj.)   4,726

Watershed Boundary
◉ Monitoring Station
▣ USGS Flow Station
★ Texas Stream Team
▲ Wastewater Outfall
— Major Road
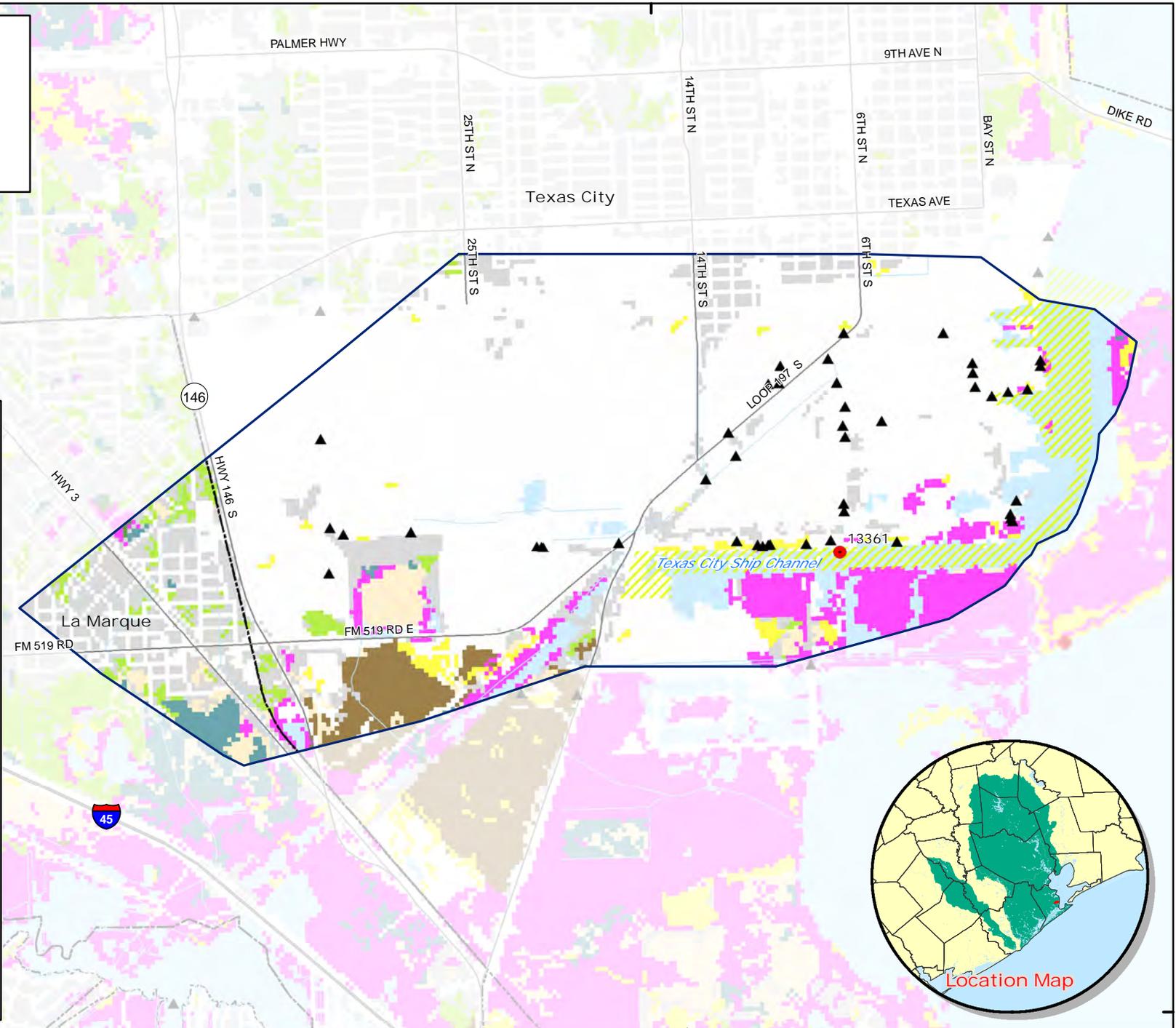— Waterway
—·— County Boundary
—·— City, Town or Place

Land Cover (2008)

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

N

0   0.25   0.5 Miles

0   0.25   0.5 Kilometers

94°55'0"W

PALMER HWY

9TH AVE N

DIKE RD

25TH ST N

14TH ST N

6TH ST N

BAY ST N

Texas City

TEXAS AVE

25TH ST S

14TH ST S

6TH ST S

LOOP 197 S

146

M 1765

HWY 3

HWY 146 S

13361

Texas City Ship Channel

La Marque

FM 519 RD E

FM 519 RD

45

Location Map

94°55'0"W

29°20'0"N

Segment Number:	2437	Name:	Texas City Ship Channel			

Area:	0.6 square miles	Miles of Shoreline:	8.79 miles	Designated Uses:	Noncontact Recreation; High Aquatic Life

Number of Active Monitoring Stations:	1	Texas Stream Team Monitors:	0	Permitted Outfalls:	51

Description:	A 1.6 square kilometer (0.6 square mile) navigation channel immediately south of the Texas City Dike on the western shore of Lower Galveston Bay in Galveston

Degree of Impairment and Overall Trends

Segment ID	Dissolved Oxygen	Bacteria	Nutrients	PCBs/Dioxin	Chlorophyll a	Other
2437			100	100	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
13361	TSCS Texas City Canal Midpoint	Quarterly	TCEQ	Field, Conventional, Bacteria, Chlorophyll-a, Metals
13361	TSCS Texas City Canal Midpoint	Twice / Year	TCEQ	Metals in Sediment

Segment 2437

Standards

Temperature (°C):	35
Dissolved Oxygen *(24-Hr Average)* (mg/L):	4.0
Dissolved Oxygen *(Absolute Minima)* (mg/L):	3.0
pH (standard units):	6.5-9.0
Enterococci (MPN/100mL) (grab):	89
Enterococci (MPN/100mL) (geometric mean):	35

Screening Levels

Ammonia-N (mg/L):	0.10
Nitrate-N (mg/L):	0.17
Orthophosphate Phosphorus (mg/L):	0.19
Total Phosphorus-P (mg/L):	0.21
Chlorophyll-*a* (µg/L):	11.6

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 Nutrients	C	C	Entire segment	- Nutrient loading from WWTP effluent, sanitary sewer overflows, and malfunctioning OSSFs - Fertilizer runoff from urbanized properties such as landscaped areas, residential lawns, and sport fields	- Monitor phosphorus levels at WWTFs to determine if controls are needed. - Implement *YardWise* and *Watersmart* landscape practices - Create and implement Water Quality Management Plans for individual agricultural properties
Dioxin/PCBs	-	I	Entire segment	- Concentrated deposits outside boundaries of the waste pits - Unknown industrial or urban sources	- Remove or contain contamination from locations already identified - Encourage additional testing to locate all unknown sources/deposits
Elevated Heavy Metals in sediment "Iron"	-	C	Entire segment	- Dissolution from natural deposits - Discharges from domestic, agricultural or industrial sources. - Build up in pipelines, pressure tanks, water heaters and water softeners from industrial point sources - Particles deposition and resuspension processes due to dredging processes or tidal movements	- Increase monitoring and enforcement efforts to identify and control industrial point sources - Encourage additional testing to locate all unknown sources/deposits

Segment Discussion:

Watershed Characteristics: More than 75% of the Texas City Ship Channel watershed is occupied by the Texas City petrochemical complex. The Texas City Ship Channel supports heavy barge and ship traffic on a regular basis. Docks used to load and unload raw materials and finished products occupy the entire north shoreline and area around the turning basin. An off-plant disposal area (OPDA) is situated on the south shore leaving only portions of Shoal Point/Snake Island, a dredge spoil disposal area, undeveloped. A small residential and commercial area of the City of La Marque located in the western portion of the watershed drains storm water into the channel via the Industrial Canal. The ship channel receives storm water and wastewater discharges from the industrial complex.

Water Quality Issues: The *Draft* 2010 Texas Integrated Report (IR) shows only one identified impairment for this segment - fish consumption - use- due to high levels of dioxin and PCBs in edible fish. For this reason, the Texas Department of State Health Services has issued a Limited Consumption Fish Advisory for this water body. In the 2010 IR there is also a water quality concern regarding to elevated nutrient levels because three of the five nutrients being monitored - ammonia nitrogen (ammonia), chlorophyll *a*, and total phosphorous (TP) - were above the screening level in more than 25% of the samples. Nutrients were also cause of concern in the 2008 IR. Additionally, high levels of iron in sediment were found in 100% of the samples assessed. However, neither dioxin/PCBs concentrations nor iron were listed in the 2008 Texas IR.

Special Studies/Projects: This segment is included in one TMDL project, the Galveston Bay System Survey for Dioxin and PCBs, which is 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 seven water quality parameters, all from the classified segment. The three most noteworthy trends are chlorophyll *a*, TP, and ammonia. Chlorophyll *a* shows an increasing trend of the annual median from 1995 to 2010. Although the medians jump up and down over the span of the 16 years, it wasn't until 2005 that the annual median was greater than the screening level. Since that first instance, the annual median has been above the screening level 50% of the time. Both ammonia and TP show downward trends of the annual medians from 1995 to 2010. The annual median of ammonia has made a steady decline over the 16-year time span. The annual medians for TP were above the screening level approximately 50% of the time from 1995 to 2001. Since 2002, the annual median has remained below the screening level.

Regression analysis on data from one monitoring station (13361) revealed eight significant trends. The two most noteworthy trends are chlorophyll *a* and ammonia. Nitrate and ammonia as well as orthophosphate phosphorus (OP) results suggest a decreasing trend for samples collected between 1995 and 2010. Prior to mid-1998 none of the ammonia samples collected were below the screening level. Since mid-1998 the number of samples above the screening level has generally decreased over time. No statistically-significant trend for TP emerged, but a graph of TP and chlorophyll *a* results follows for reference. Chlorophyll *a* shows an increasing trend for samples collected between 1995 and 2010. Before early 2001, only one chlorophyll *a* sample result was above the screening level. Since then, 38% of the samples were over the screening level.

The Texas City ship channel is surrounded by an industrial complex which includes numerous WWTP with discharges in the millions of gallons per day. The channel also receives runoff from some urban areas. Between the various sources, it is hard to determine the exact cause of the trends.

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 addition data that would help better isolate problem areas.
- Work with local partner and contract labs to lower detection limits for nutrients.

Texas City Ship Channel

Segment: 2437   Parameter: Chlorophyll a Annual Median

Water Body Type: Classified Estuary

2010 Nutrient Screening Level : 11.6 Micrograms / L
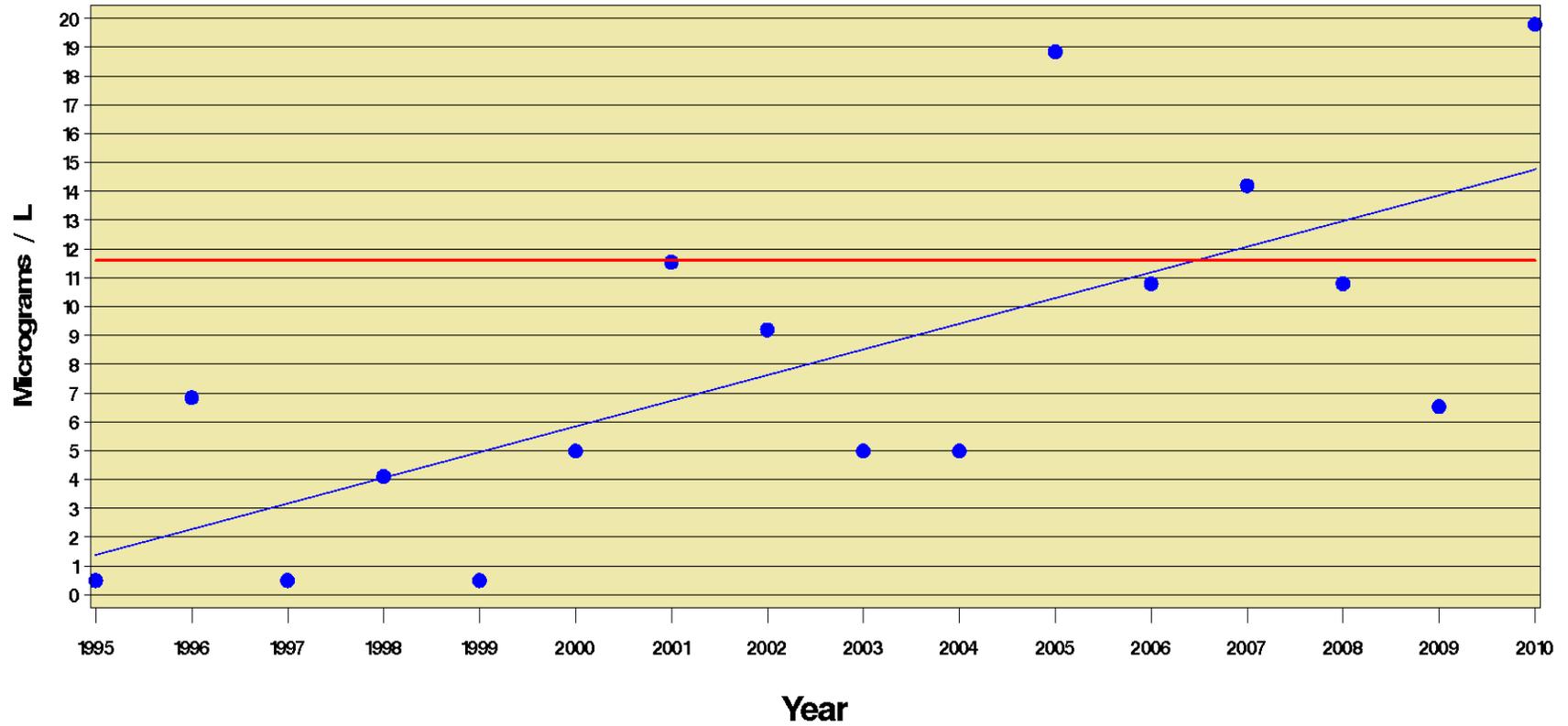
Trends are considered significant if the p—value is < 0.10

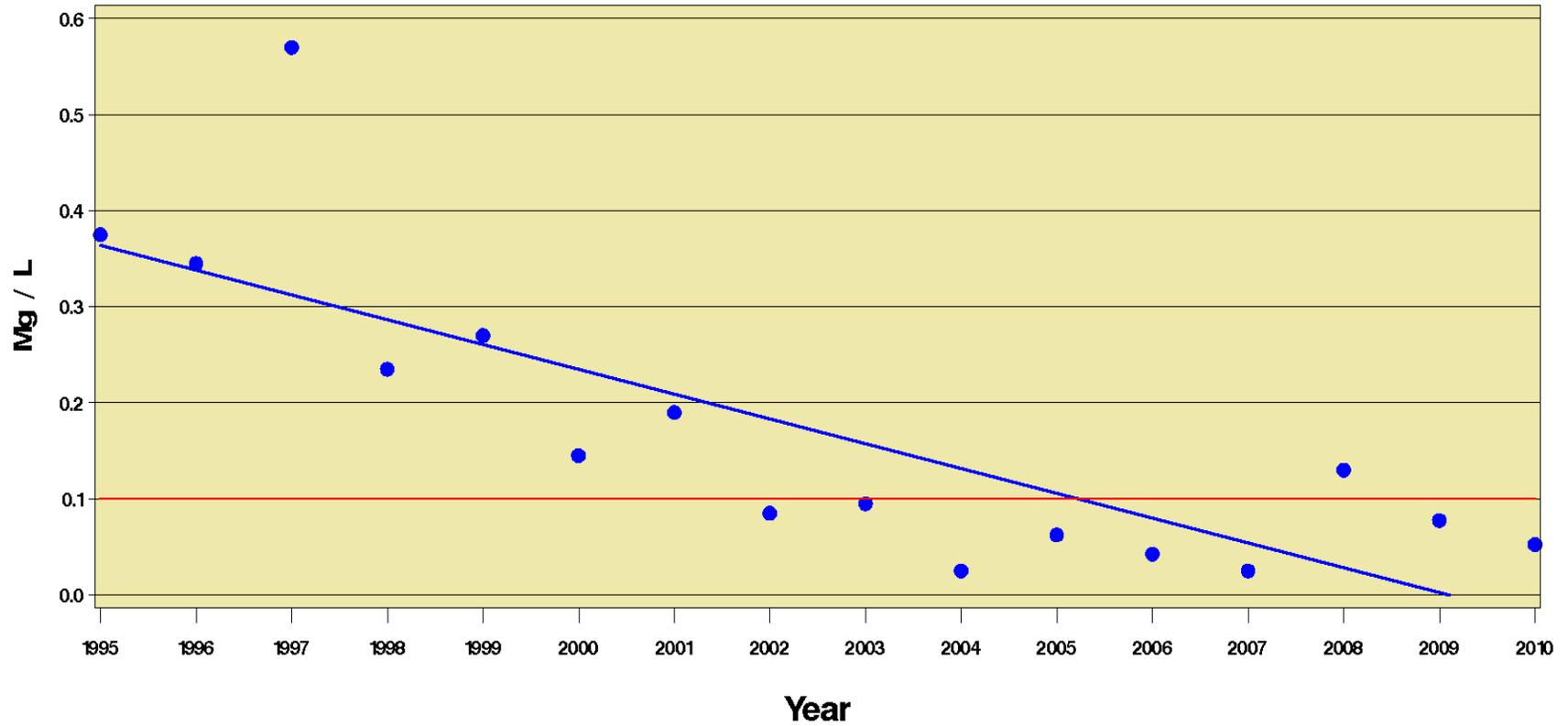Trend is significant at p= 0.0021   R—Square = 0.5023 T—Value = 3.759   Number of samples: 50

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

Texas City Ship Channel

Segment: 2437   Parameter: Ammonia–N Annual Median
Water Body Type: Classified Estuary
2010 Nutrient Screening Level : 0.10 Mg / L

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

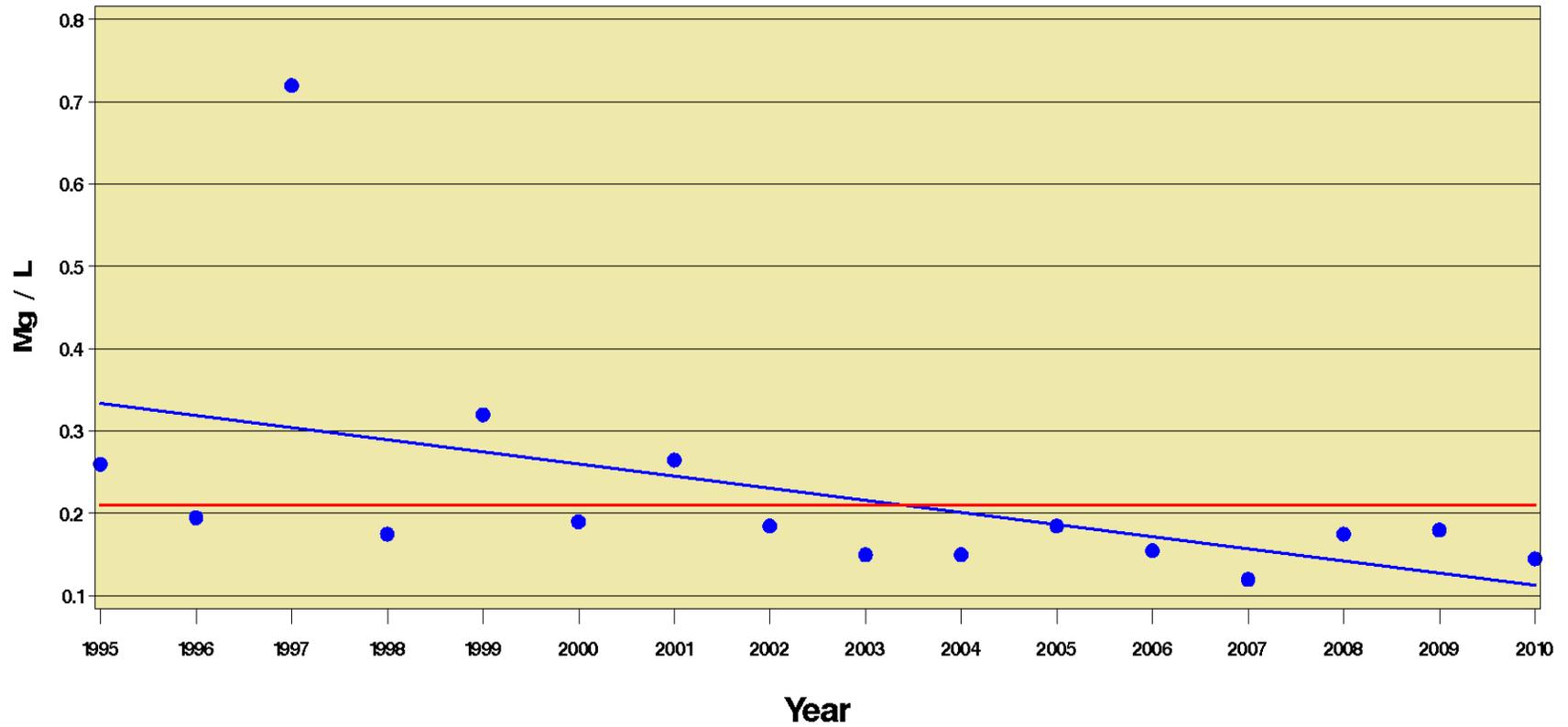Trend is significant at p= 0.0002   R–Square = 0.6376   T–Value = –4.963   Number of samples: 53

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

Texas City Ship Channel

Segment: 2437   Parameter: Total Phosphorus Annual Median
Water Body Type: Classified Estuary
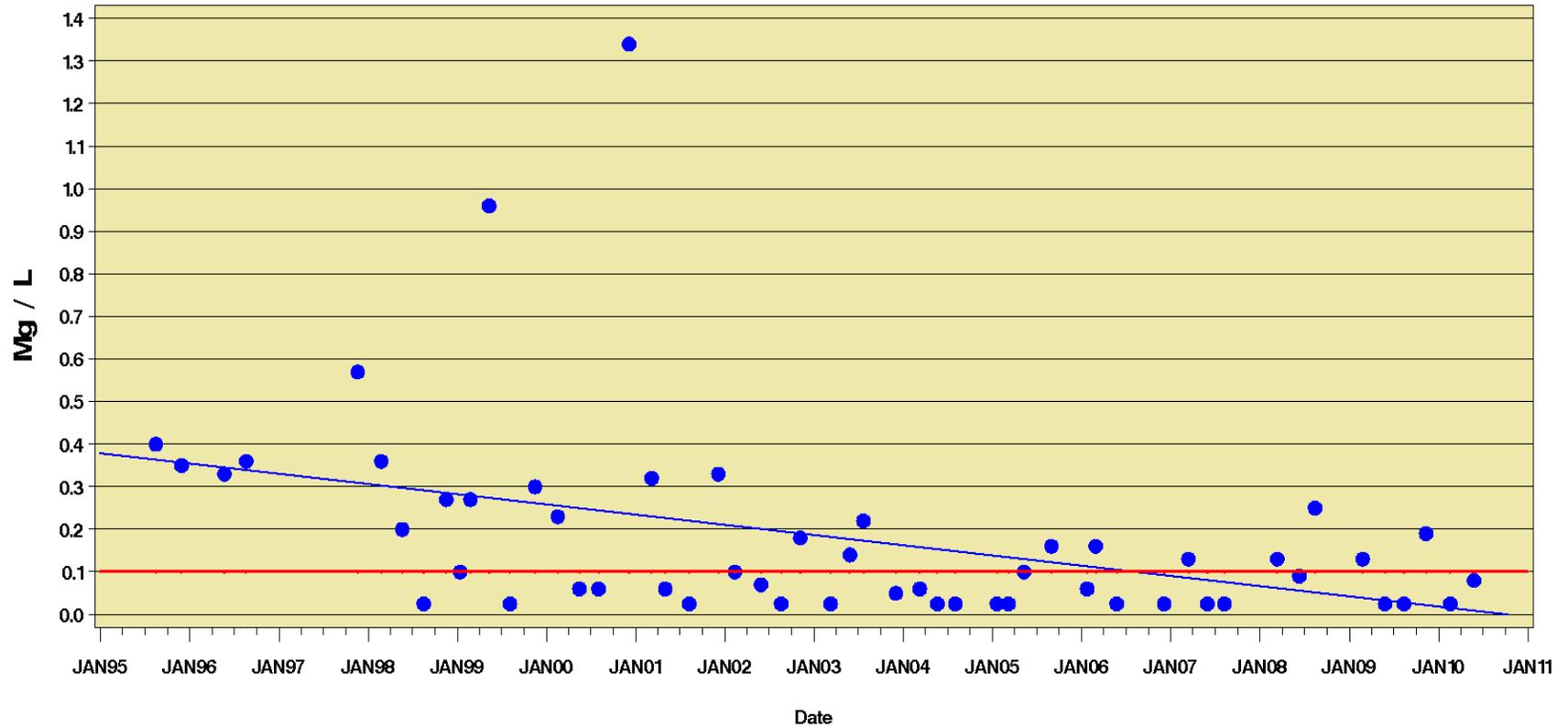### 2010 Nutrient Screening Level : 0.21 Mg / L

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

Trend is significant at p= 0.0533   R—Square = 0.2414 T—Value = —2.111   Number of samples: 57

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

Texas City Ship Channel

Station: 13361   Segment:2437   Parameter: Ammonia—N

2010 Nutrient Screening Level: 0.10 Mg / L

Assessment Unit: 2437_01

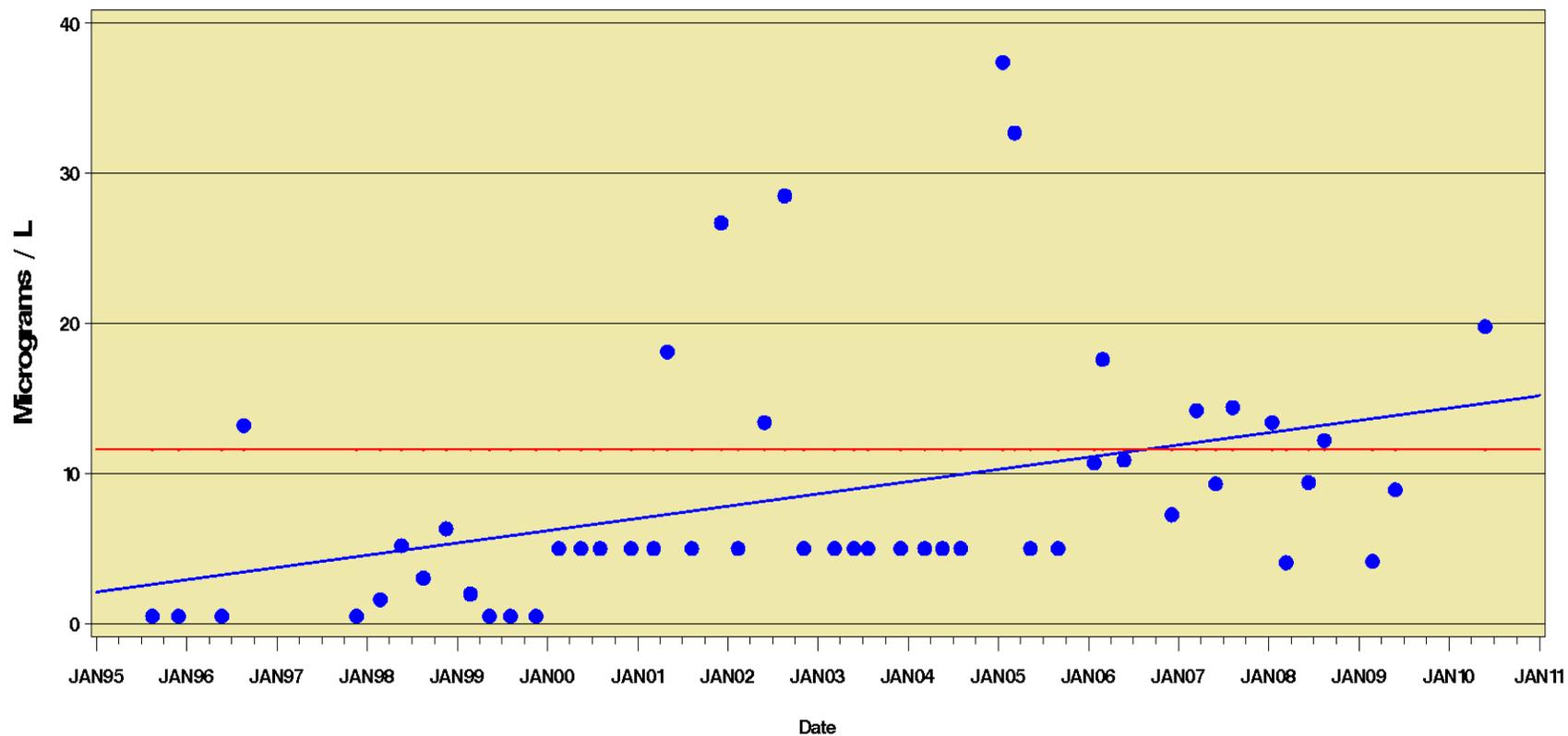Trends are considered significant if the p—value is < 0.10

Trend is significant at p= 0.0003   R—Square= 0.2295   T—Value= —3.898   Number of Samples= 53

Red line (if present) indicates the applicable 2010 Nutrient Screening Level

Texas City Ship Channel

Station: 13361   Segment:2437   Parameter: Chlorophyll a

2010 Nutrient Screening Level: 11.6 Micrograms / L

Assessment Unit: 2437_01

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

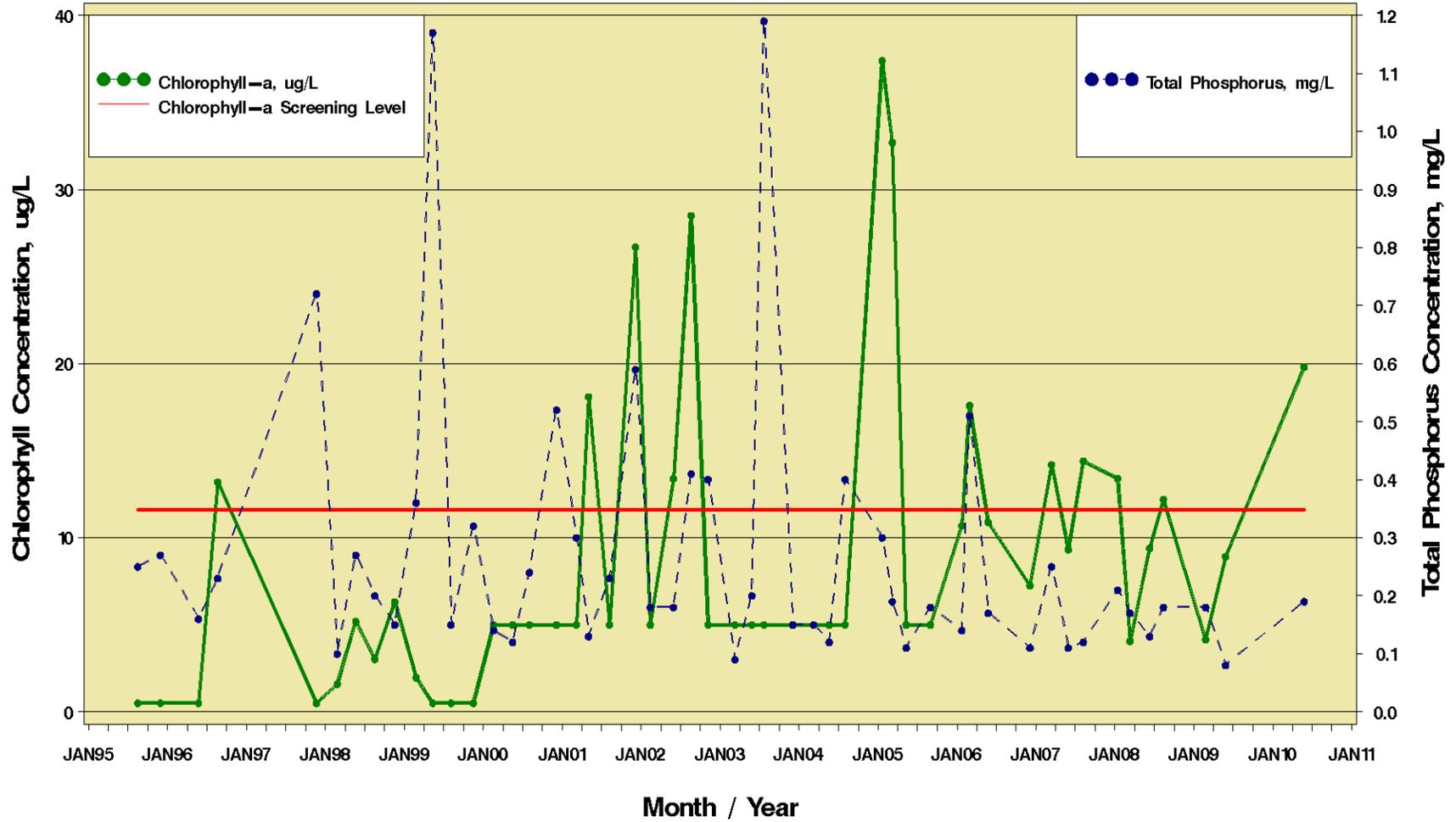Trend is significant at p= 0   R—Square= 0.3775   T—Value= 5.395   Number of Samples= 50

Red line (if present) indicates the applicable 2010 Nutrient Screening Level

Chlorophyll—a and Total Phosphorus Concentrations
Segment: 2437   Watershed: Texas City Ship Channel
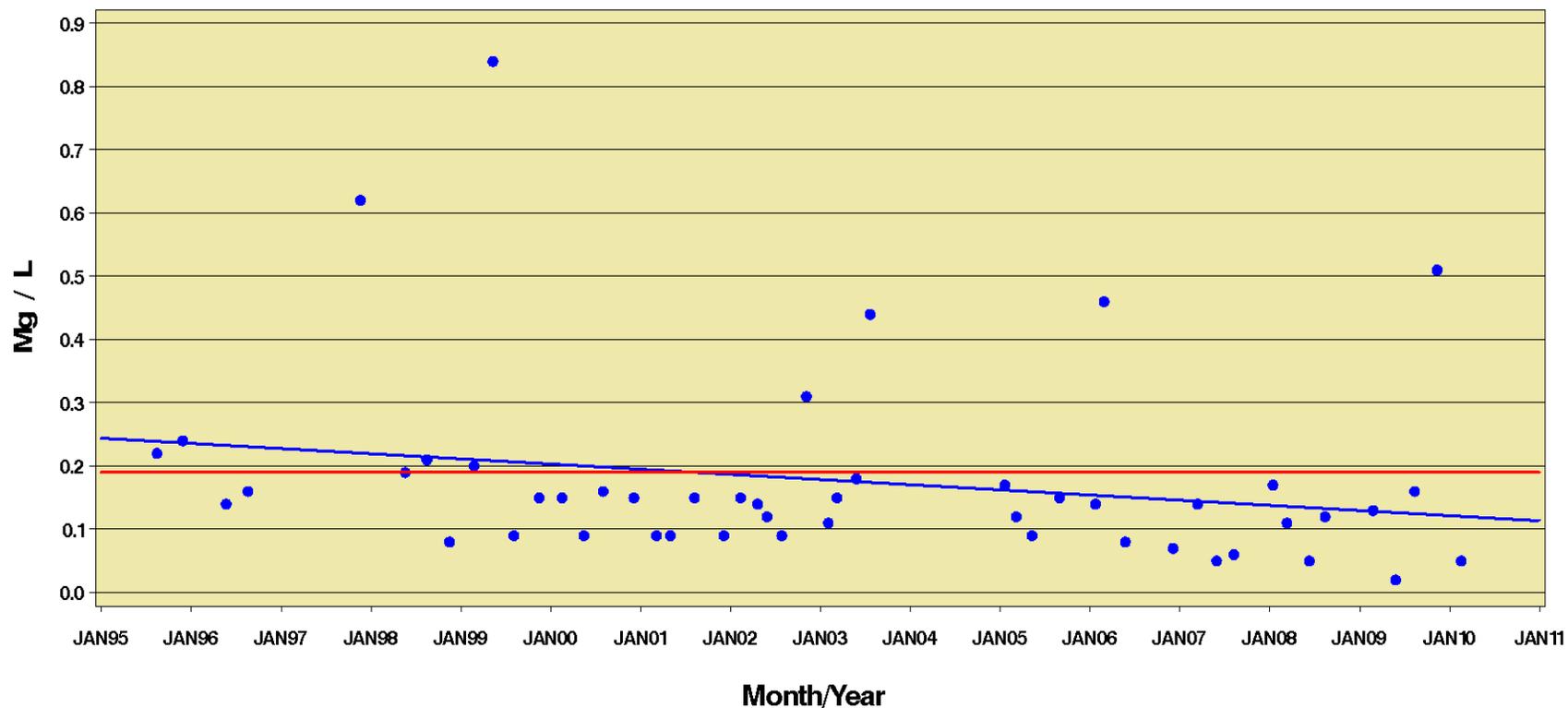Station: 13361   Assessment Unit: 2437_01

Texas City Ship Channel

Station: 13361   Segment: 2437   Parameter: Orthophosphate—P
2010 Nutrient Screening Level: 0.19 Mg / L
Assessment Unit: 2437_01

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

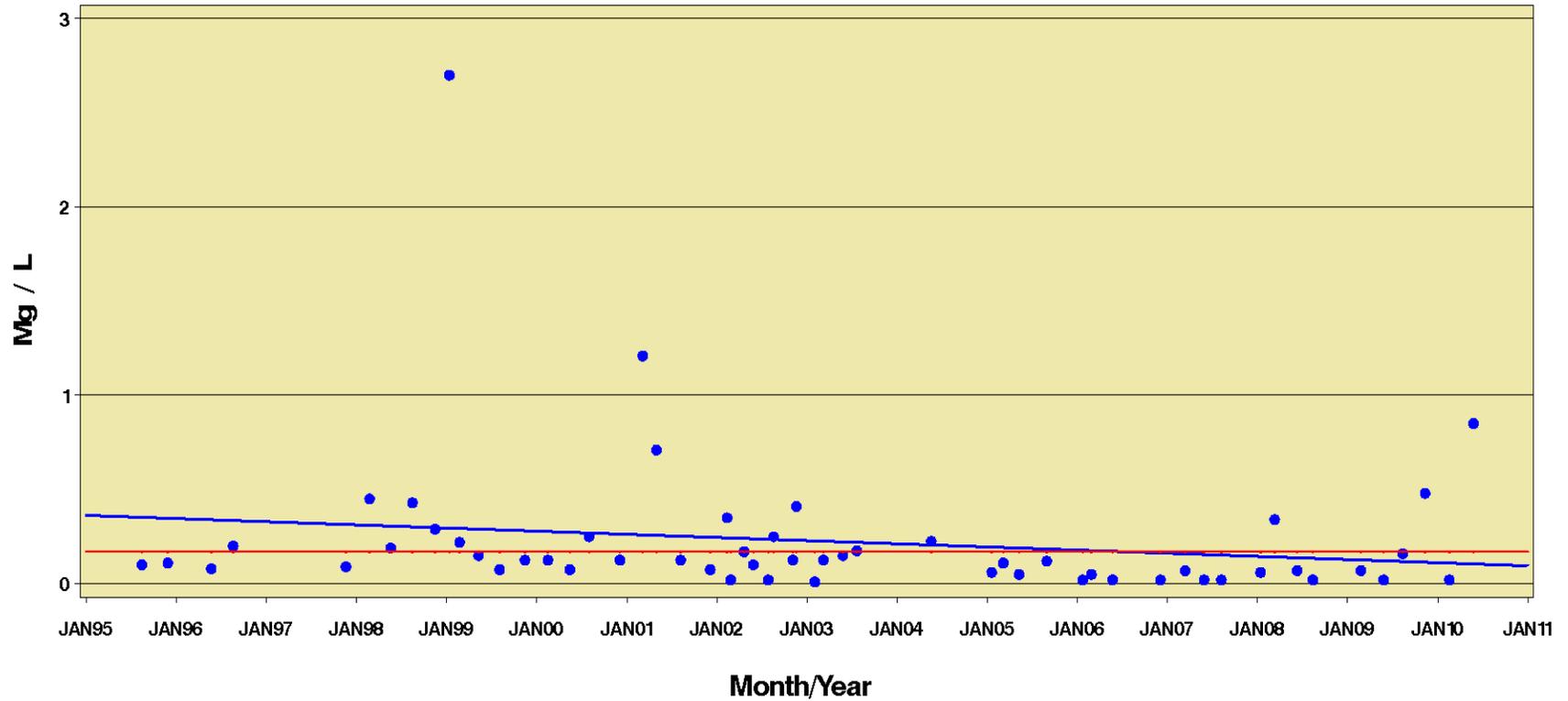Trend is significant at p= 0.0131   R—Square= 0.1240   T—Value= —2.5790   Number of Samples= 49

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

Texas City Ship Channel

Station: 13361   Segment: 2437   Parameter: Nitrate-N

2010 Nutrient Screening Level: 0.17 Mg / L

Assessment Unit: 2437_01

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

Trend is significant at p= 0.0106   R-Square= 0.1149   T-Value= -2.6480   Number of Samples= 56

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