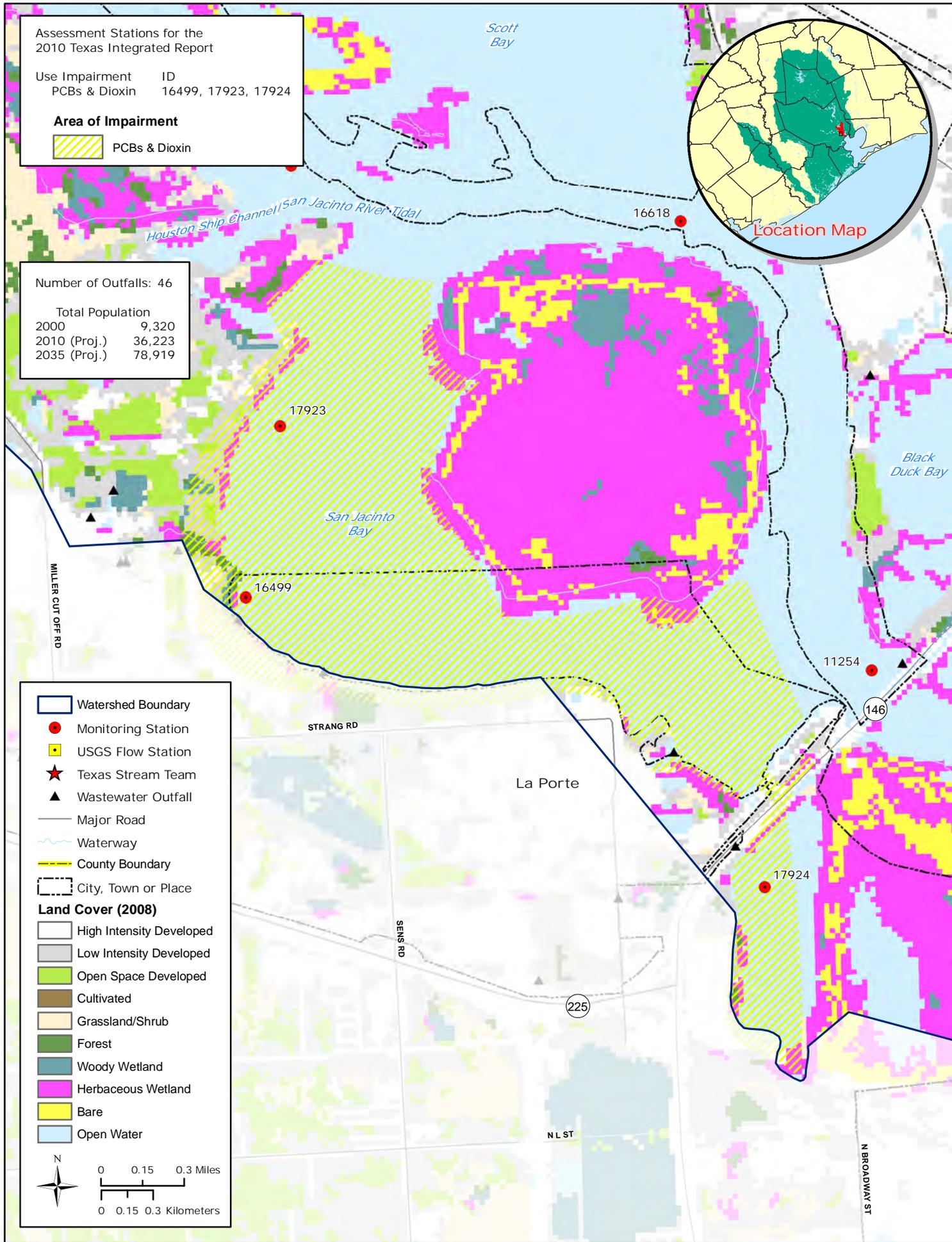


SAN JACINTO BAY - SEGMENT 2427



| | | | | | | |
|---------------------------------------|--|-----------------------------|------------------------|---------------------|---|--|
| Segment Number: | 2427 | Name: | San Jacinto Bay | | | |
| Area: | 2.1 square miles | Miles of Shoreline: | 7.6 miles | Designated Uses: | Contact Recreation; High Aquatic Life Use | |
| Number of Active Monitoring Stations: | 1 | Texas Stream Team Monitors: | 0 | Permitted Outfalls: | 56 | |
| Description: | A side bay located on the west side of the Houston Ship Channel/tidal San Jacinto River near Highway 146 bridge to the City of Baytown. There is the Upper San Jacinto Bay and the Lower San Jacinto Bay | | | | | |

| Degree of Impairment and Overall Trends | | | | | | |
|---|------------------|----------|-----------|-------------|----------------------|-------|
| Segment ID | Dissolved Oxygen | Bacteria | Nutrients | PCBs/Dioxin | Chlorophyll <i>a</i> | Other |
| 2427 | | | 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 | |
| 17923 | Upper San Jacinto Bay under electrical transmission lines | Bi-Monthly | HCPHES | Field, Conventional, Bacteria, Chlorophyll-a (Qrtrly) | |
| 17924 | Lower San Jacinto Bay S of SH 146 | Bi-Monthly | HCPHES | Field, Conventional, Bacteria, Chlorophyll-a (Qrtrly) | |

| Segment 2427 | | | |
|--|---------|-----------------------------------|------|
| Standards | | Screening Levels | |
| Temperature (°C): | 35 | Ammonia-N (mg/L): | 0.10 |
| Dissolved Oxygen (24-Hr Average) (mg/L): | 4.0 | Nitrate-N (mg/L): | 0.17 |
| Dissolved Oxygen (Absolute Minima) (mg/L): | 3.0 | Orthophosphate Phosphorus (mg/L): | 0.19 |
| pH (standard units): | 6.5-9.0 | Total Phosphorus-P (mg/L): | 0.21 |
| Enterococci (MPN/100mL) (grab): | 89 | Chlorophyll-a (µg/L): | 11.6 |
| 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 |
| Elevated Nutrients | C | C | Entire segment | <ul style="list-style-type: none"> - Nutrient loading from WWTPs effluent, sanitary sewer overflows, and malfunctioning OSSFs - Agricultural runoff from row crops, fallow fields pastures, and animal operations - Fertilizer runoff from urbanized properties such as landscaped areas, residential lawns, and sport fields - | <ul style="list-style-type: none"> - Monitor phosphorus levels at WWTFs to determine if controls are needed. - Implement <i>YardWise</i> and <i>Watersmart</i> landscape practices - Create and implement Water Quality Management Plans for individual agricultural properties - Install and/or maintain riparian buffer areas between agricultural fields and waterways |
| Dioxin/PCBs | I | I | Entire segment | <ul style="list-style-type: none"> - Concentrated deposits outside boundaries of the waste pits - Unknown industrial or urban sources | <ul style="list-style-type: none"> - Remove or contain contamination from locations already identified - Encourage additional testing to locate all unknown sources/deposits |

Segment Discussion:

Watershed Characteristics: This watershed includes the Cities of LaPorte and Morgan Point. This area is highly developed and also contains Alexander Island, a large wetland area. The Houston Ship Channel (HSC) supports heavy boat and barge traffic on a consistent basis.

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. For this reason, the Texas Department of State Health Services has issued a Limited Consumption Fish Advisory for this water body. Additionally, there is a water quality concern regarding to elevated nutrient levels in the 2010 assessment because all nutrients measured --ammonia nitrogen (ammonia), nitrate nitrogen (nitrate), orthophosphate phosphorous (OP), and total phosphorous (TP), and chlorophyll *a*-- were above the screening level in more than 30% of the samples. Dioxin/PCBs as well as nutrients were the cause of impairment and concern in the 2008 assessment.

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 in the 2011 Basin Summary Report regarding dioxin and PCB contamination.

Trends: The *Draft* 2010 IR identifies one impairment (PCB/dioxin) and several nutrient concerns in San Jacinto Bay. Analysis of pooled data for the entire watershed shows that the median levels of TP and volatile suspended solids (VSS) are trending downwards while total organic carbon appears to be increasing. Unsurprisingly, the situation is more complicated when the focus is narrowed to trends at the station-level.

There are three monitoring stations in the San Jacinto Bay watershed, none of which provide more than 10-year of data for the parameters found to exhibit statistically-significant trends over time. There are no significant trends for enterococci density even though roughly 25% of samples collected have exceeded 35 MPN/100 mL over the period of record.

Samples are collected at each of the three monitoring stations for Chlorophyll *a* analysis. A trend was revealed only at station 16499 but the dataset is too small (12) to place much confidence in that observation. Nevertheless, the trend suggests increasing concentrations of chlorophyll *a* over time. It is worth noting that OP also is trending higher at that station. Neither of these trends is supported by analysis of the annual median concentration. Analysis of log-transformed single sample data from Station 17924, which is the most distant station from the mouth of the Houston Ship Channel, revealed a statistically-significant increase in total phosphorus (highlighting the inadequacy of reliance on the analysis of pooled data) and ammonia. Analysis of data from 17923 (closest to the mouth of the Ship Channel) suggests that concentrations of nitrate and ammonia are on the upswing. None of these trends are supported by analysis of annual median concentrations and may have been biased by the existence of a few outliers. Inferences should be made with caution. Graphs of these trends follow.

Some final trends worth noting are that dissolved oxygen appears to be decreasing at station 17924, which could be due to its proximity to the Ship Channel, while pH is decreasing at 17923 and 17924. The pH trends are supported by analysis of annual median data. Graphs of these for station 17924 follow.

Recommendations:

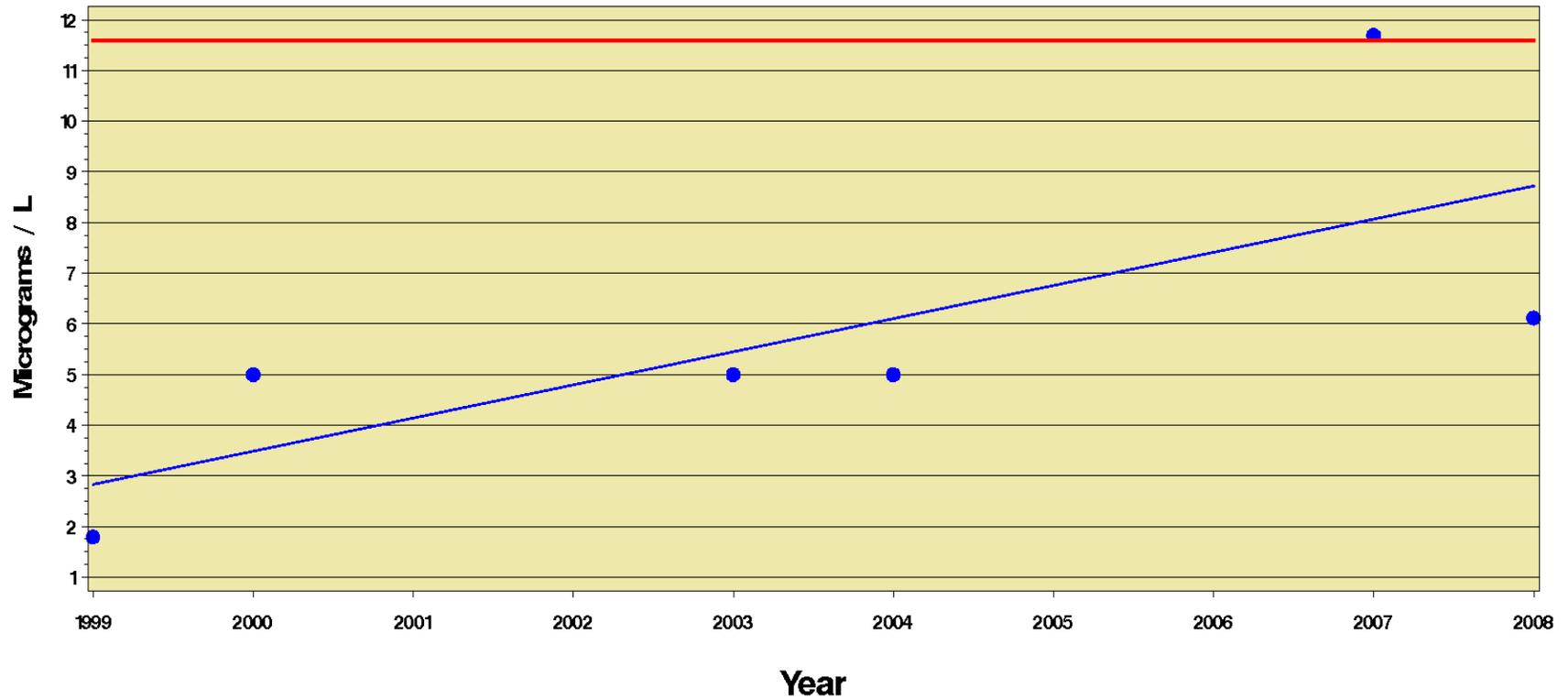
- Continue collecting water quality data to support actions associated with watershed protection plan development and future modeling.
- Pursue new local partners to CRP to collect additional data that would help better isolate problem areas.
- Work with residents and local businesses to address excessive nutrients through education.
- Support additional sampling to investigate sources of elevated dioxin and PCB levels.
- Coordinate with other local TMDL and WPP efforts.

San Jacinto Bay

Monitoring Station: 16499 Segment: 2427 Assessment Unit: 2427_01

Parameter: Chlorophyll a Annual Median

2010 Nutrient Screening Level: 11.6 Micrograms / L



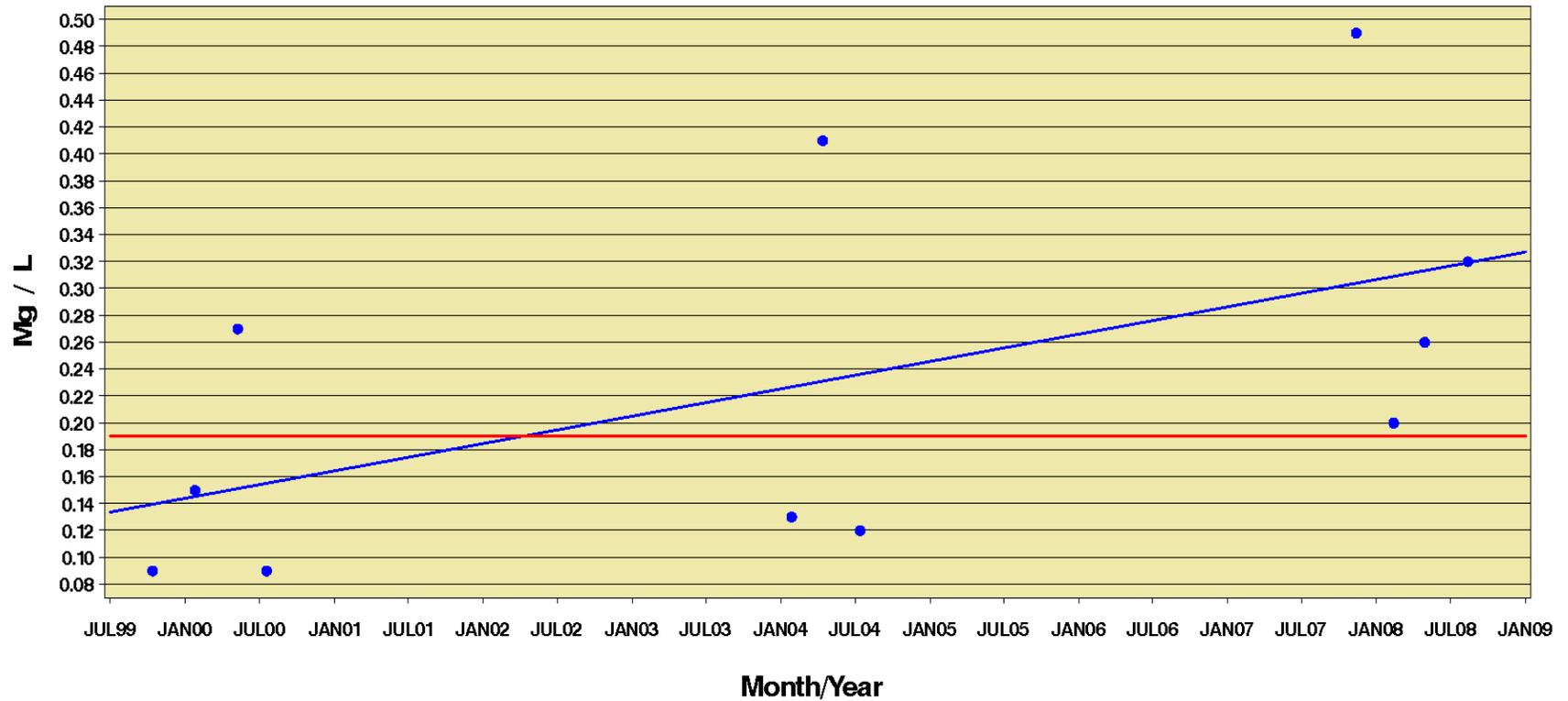
Trends are considered significant if the p-value is < 0.10

Trend is significant at p= 0.1001 R-Square = 0.5316 T-Value = 2.131 Number of Samples= 12

Red line indicates the applicable 2010 Nutrient Screening Level

San Jacinto Bay

Station: 16499 Segment: 2427 Parameter: Orthophosphate—P
2010 Nutrient Screening Level: 0.19 Mg / L
Assessment Unit: 2427_01



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

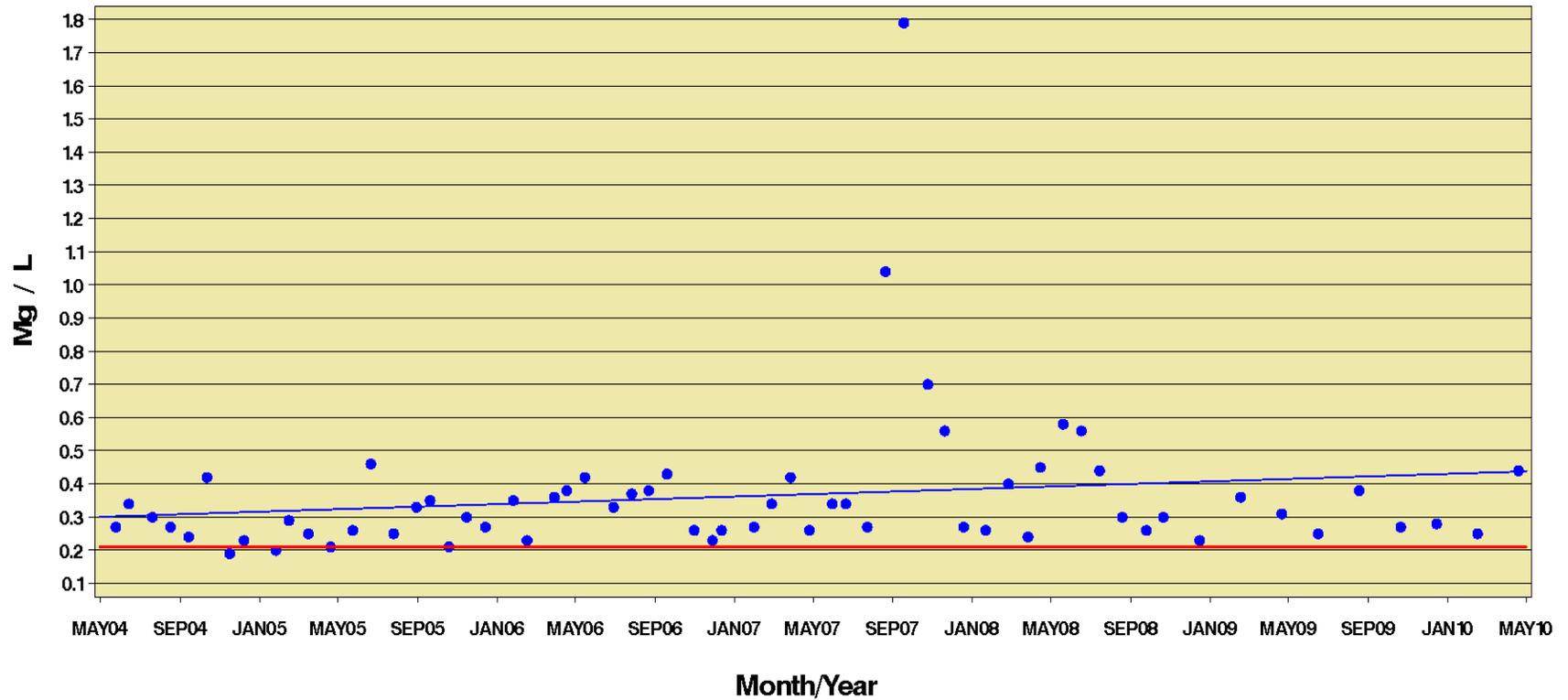
Trend is significant at p=0.0495 R-Square= 0.3636 T-Value= 2.2680 Number of Samples= 11

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 Bay

Station: 17924 Segment: 2427 Parameter: Total Phosphorus
2010 Nutrient Screening Level: 0.21 Mg / L
Assessment Unit: 2427_01



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

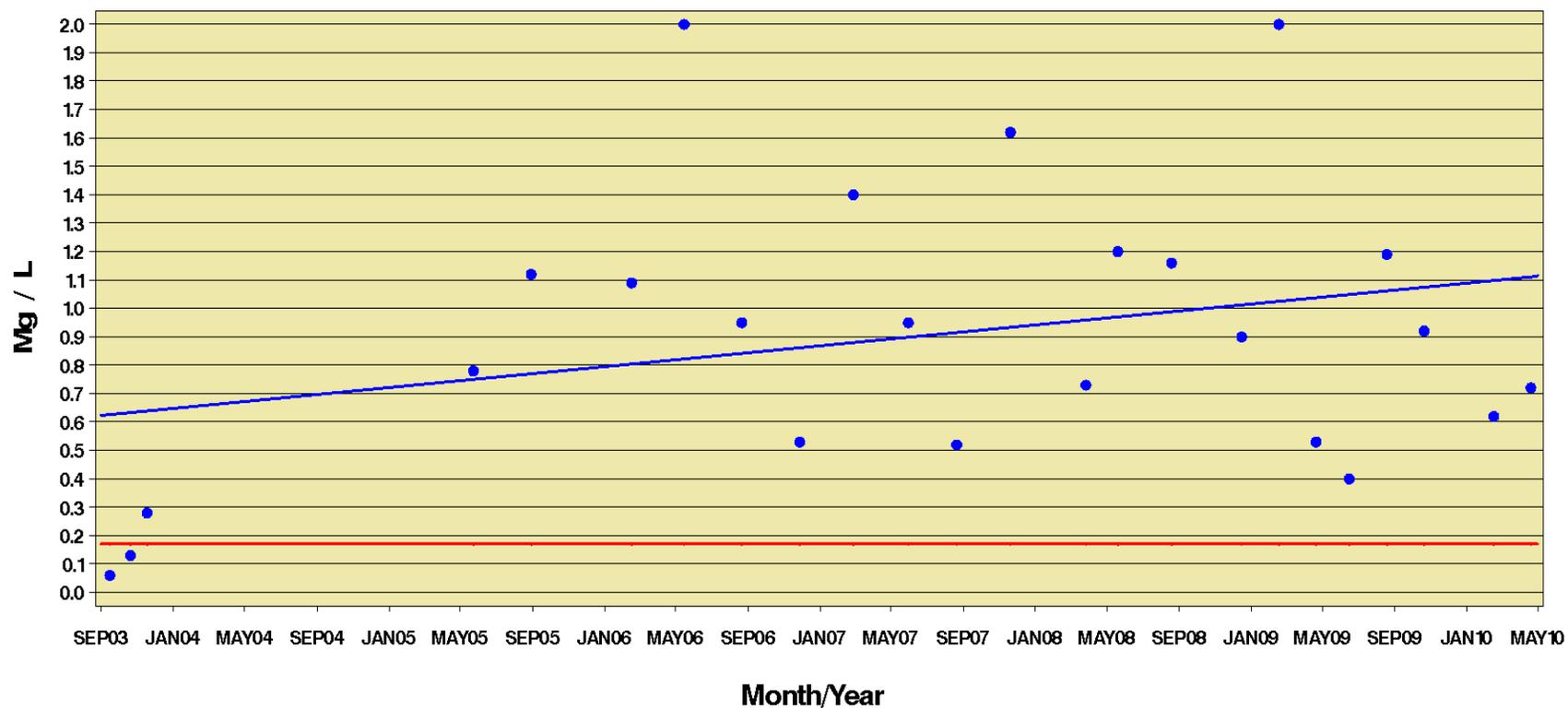
Trend is significant at p= 0.0774 R-Square= 0.0502 T-Value= 1.7960 Number of Samples= 63

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 Bay

Station: 17923 Segment: 2427 Parameter: Nitrate—N
2010 Nutrient Screening Level: 0.17 Mg / L
Assessment Unit: 2427_01



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

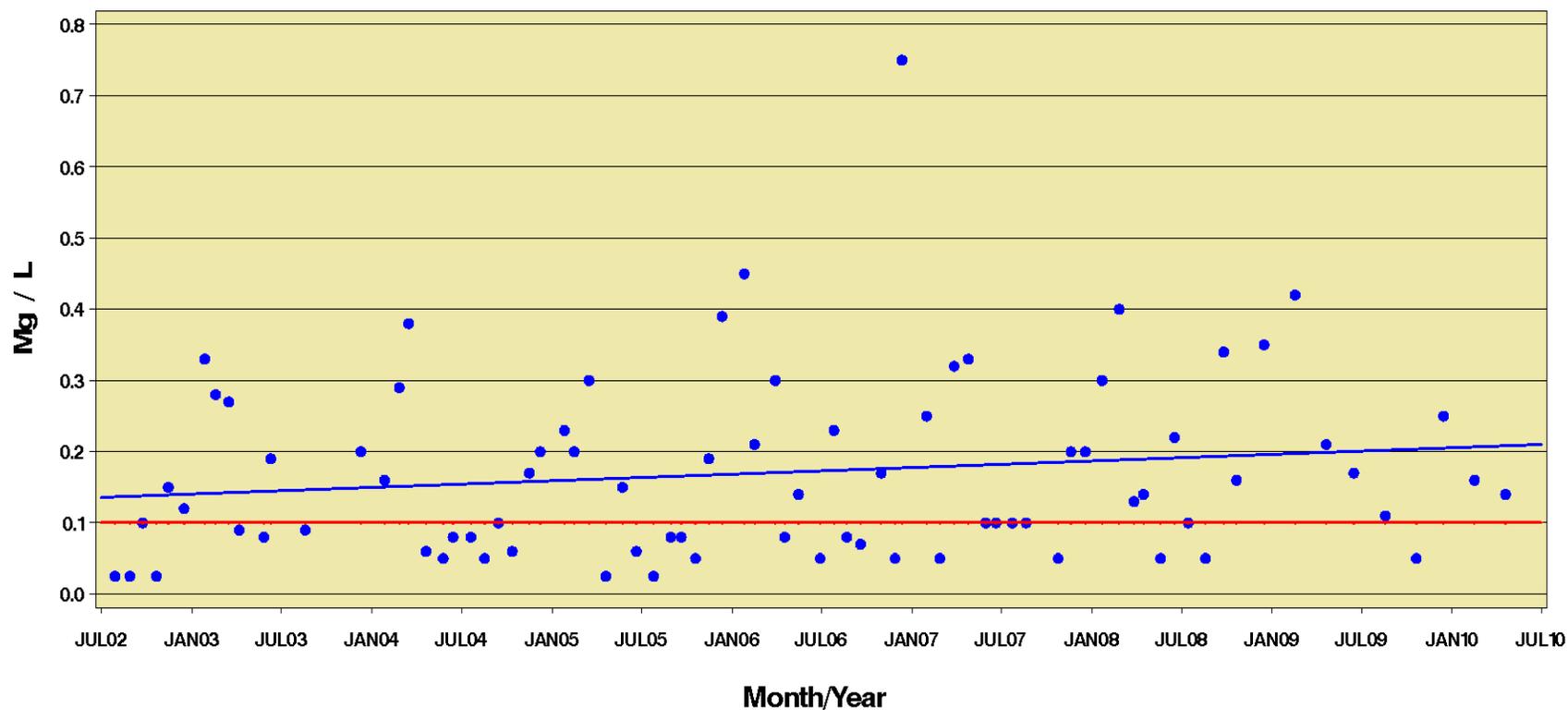
Trend is significant at p=0.0118 R-Square= 0.2550 T-Value= 2.7440 Number of Samples= 24

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 Bay

Station: 17923 Segment: 2427 Parameter: Ammonia—N
2010 Nutrient Screening Level: 0.10 Mg / L
Assessment Unit: 2427_01



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

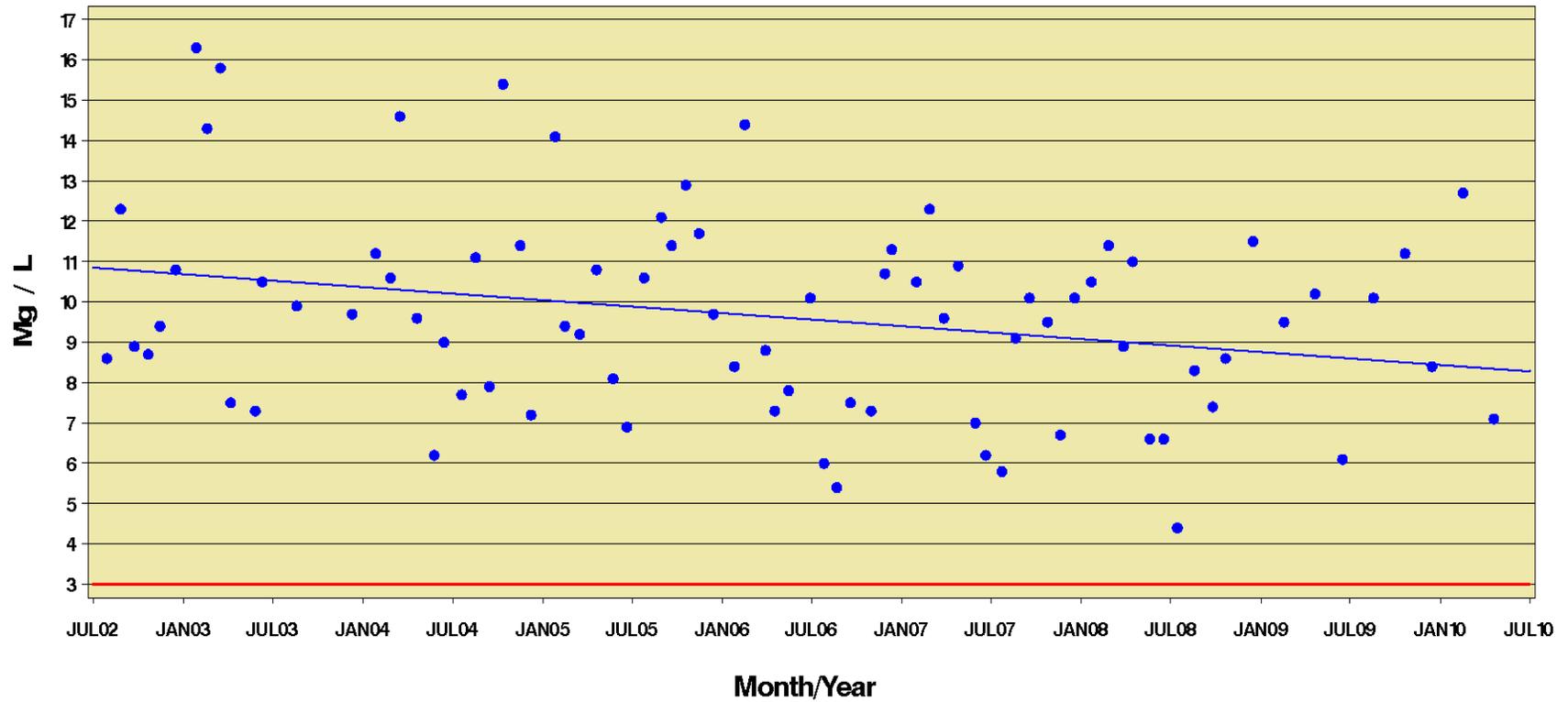
Trend is significant at p=0.0635 R-Square= 0.0434 T-Value= 1.8820 Number of Samples= 80

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 Bay

Station: 17924 Segment: 2427 Parameter: Dissolved Oxygen
2010 Water Quality Standard: 3.0 Mg / L
Assessment Unit: 2427_01



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

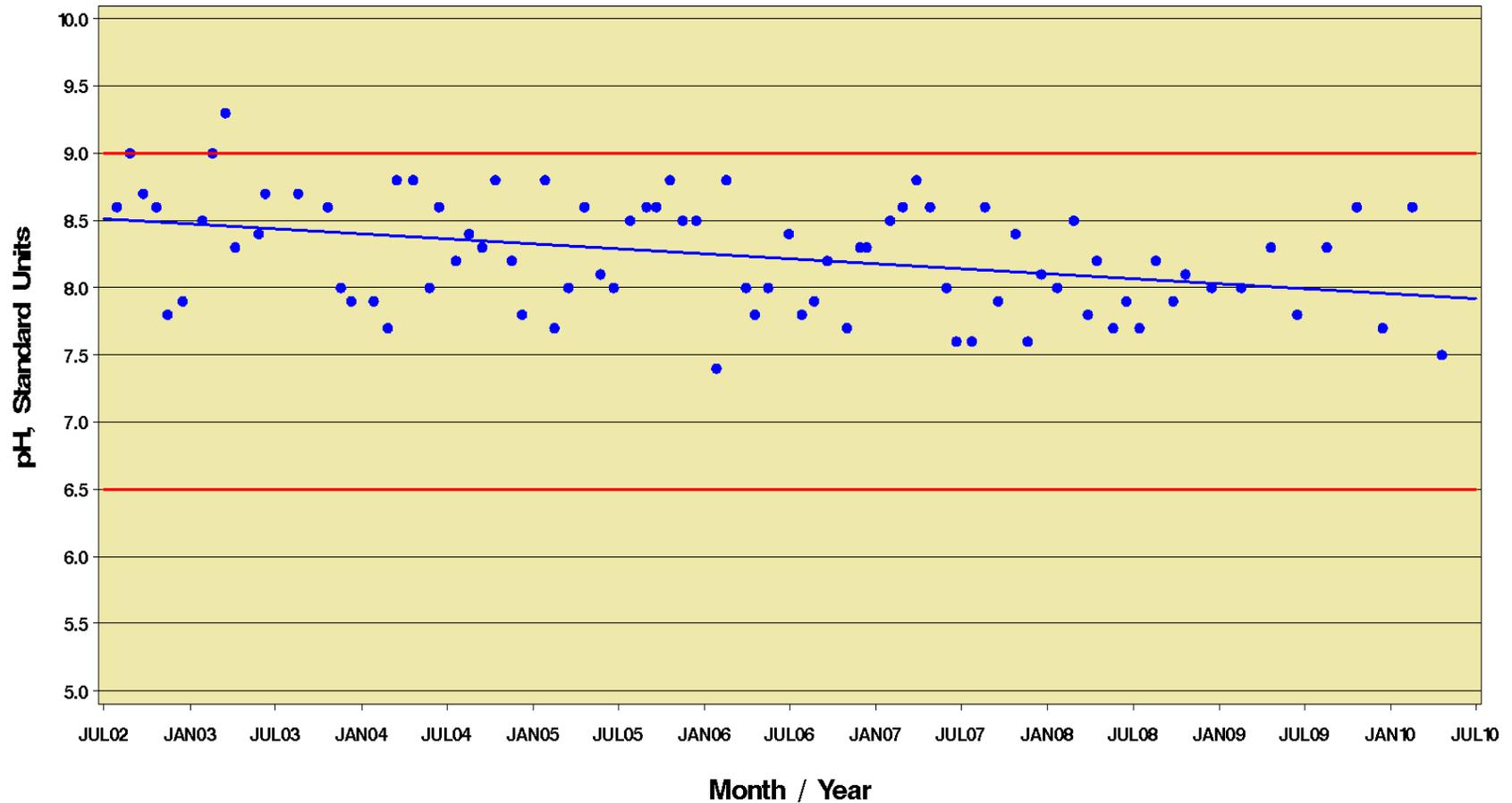
Trend is significant at $p=0.0181$ R-Square= 0.0686 T-Value= -2.4130 Number of Samples= 81

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 Water Quality Standard

San Jacinto Bay

Station: 17924 Segment: 2427 Parameter: pH
Assessment Unit: 2427_01
2010 Water Quality Standard: 6.5 – 9.0 Standard Units



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

Trend is significant at $p = 0.0004$ R-Square = 0.1426 T-Value = -3.6700 Number of samples: 83

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

Red lines indicate the 2010 Water Quality Standard