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Appendix A

Overview of Trend Analysis

The following summary is provided for those interested in a more comprehensive overview of the methods and statistical procedures that were used to test for long-term trends presented in Chapter III. The following is based on the methodologies presented in the EPA (1993) document “Methods for the Analysis of Lake Water Quality Trends.”

Objectives in Testing for Trends in Water Quality

Physical and chemical measurements of water quality vary both spatially and temporally. These changes are functions of complex interactions among numerous large and small scale processes at work within an estuarine system. On a large scale, changes in land use and associated point and non-point nutrient/pollutant loadings can often result in progressive changes (or trends) in water quality. Such changes may initially be evident in specific areas and eventually be detected through much of the system. However, unless dramatic, such patterns of change can often be obscured by the interactions of many other events. On a yearly basis, seasonal changes in physical influences, including solar radiation, temperature, and precipitation commonly result in distinct yearly cyclical patterns in many water quality measurements. Variations in water quality are also randomly influenced by a great many small-scale factors. Winds, tides and shoreline irregularities all interact with freshwater inflows to collectively cause turbulence and diffusion that can result in apparent random behavior with water quality parameters in both space and time.

In brief, the term "trends" is typically used to refer to progressive changes in the level (mean value) of a water quality variable caused by an external factor, while "seasonal" and shorter-term oscillating patterns are primarily caused by repeating natural processes. Additional "natural variability" can be used to summarize all other factors not explicitly identified. In addition, all environmental data includes some level of "measurement error" specifically inherent to the combined application of both field and laboratory methods.

The ability of being able to detect actual long-term changes (trends) in water quality from amid these sources of variation is dependent on: 1) the acquisition of uniform, standardized, time sequenced water quality data from a properly designed monitoring program; 2) the application of appropriate statistical methods; and 3) a conceptual understanding of relevant water quality relationships (cause and effect). Researchers have proposed a number of parametric and nonparametric (distribution-free) statistical methods for statistically determining the presence of trends in water quality data. The goal of all such procedures is to be able to separate a pattern (trend) from the “noise” caused by repeating seasonal and/or associated other random “unexplained” components within the water quality data.

The analysis and determination of the presence and/or absence of long-term trends within the data associated with the Hydrobiological Monitoring Program (HBMP) is a key component to assessing the effectiveness of the overall goals prescribed by the Water Use Permit (WUP). As permitted freshwater withdrawals increase, it is important both to determine the potential influences of other long-term changes (rainfall/inflows), as well as assess potential biotic and abiotic responses within the Lower Peace River/Upper Charlotte Harbor Estuary. The ability to detect and quantify, or determine the lack of, progressive changes over time is key to providing the framework and basis for future management decisions.

Basic Statistical Concepts

Summary Statistics - In order to characterize the various measurements contained within large data sets, the most effective method is usually to provide a few series of well-chosen statistics. In the selection of these descriptive statistics, it is important to understand their overall purpose. In general, summary statistics should provide as much information as possible to avoid potential misrepresentations or interpretations of the original data. The two most often used descriptive statistics to characterize data are measurements of central tendency and dispersion. Commonly used statistics of central tendency include the mean, median, mode, or geometric mean. Estimators of the spread, dispersion and scale of observations within the data include determination of the range, standard deviation, and interquartiles.

Robustness, Resistance, and Influence – “Robustness” is used to refer to a particular statistical procedure’s overall insensitivity to violations of its basic assumptions. The term “resistance” by comparison is used to refer to the method’s insensitivity to outliers; while the word “influence” is used to describe the effect of extreme observations on summary measures (statistics).

Parametric versus Nonparametric Methods – A basic assumption of most parametric statistical analyses is the assumption that the underlying distribution of the data in question is approximately normally distributed (or that it can be transformed to be so). The general overall robustness of parametric probability models is dependent on this underlying assumption and provides resistance to influential outliers. However, a great

many types of measurements gathered in environmental data in general, and water quality characteristics in particular, often violate this underlying assumption which is key to the robustness and resistance of many of the most commonly applied parametric procedures. Therefore, unless the underlying normality of the data can be proven, nonparametric procedures are usually more appropriately used in assessing potential trends in water quality data. Such distribution-free nonparametric methods, as the name suggests, do not require an assumption concerning the underlying probability of the data. However, as with parametric procedures, an assumption of sequential independence is usually implicit. Thus, autocorrelation can be a serious problem for both nonparametric and parametric methods.

Kendall's Tau and the seasonal Kendall's Tau test is one of the widely used distribution-free methods to test for trends in data where normality cannot be assumed. These methods can be used to determine whether time series data are moving upward, downward, or remaining relatively level over time. This is accomplished by computing a statistic (Tau), based on the differences among all possible data pairs, thus representing the net direction of movement of the time series data. The number of positive differences minus the number of negative differences is then determined and this is used to determine the test statistic (the Mann-Kendall Tau). If the time series data is increasing (decreasing) over time, then the test statistic will be a large positive (negative) number. If the trend in the water quality data series over time is negligible, then the number of positive pairs and the number of negative pairs will be approximately equal, and the test statistic will be small in absolute value. The Tau estimator can thus be viewed as an estimate of the median slope from the set of slopes estimated for the lines connecting all possible pairs of data.

The Seasonal Kendall's Tau test incorporates a seasonal basis to the same form of analysis. When analyzing monthly data, each month is viewed as a "season." This method is directly applicable to data characterized by strong seasonal patterns.

Hypothesis Testing - In conventional statistical analysis, hypothesis testing for a trend is usually based on the point null hypothesis "that there is no trend," which can only be rejected on the basis of sufficient evidence. To test this hypothesis, the actual data are used to provide an estimate of a test statistic, and a table for the test statistic is consulted to estimate how unusual the observed value of the test statistic is if the null hypothesis is true. If the observed value of the test statistic is "very unusual," then there is a basis for rejecting the null hypothesis.

Supporting Methods of Graphical Analyses

In conjunction with the Seasonal Kendall's Tau procedures used in the trend analyses presented in Chapter IV, three separate types of graphical statistical plotting procedures were incorporated into each trend test.

Time Series Graphs (Figure C-40) - Such an initial plot should be the first step in attempting to evaluate where the data for a particular measurement shows either seasonal cycles or any indication of a progressive change with time. In general, further statistical procedures are usually only applicable to assigning statistical probability to what is intuitively obvious from the information (patterns) contained within such a plot. The time series graphics presented in Chapter IV also include a predicted trend line based on a simple (ordinary least squares) regression. Such a line is provided to give a possible indication of the presence of a possible change over time (trend). However, it should be remembered that such a line is based on parametrical statistical procedures that neither account for the presence of seasonality or autocorrelation within the data.

Box and Whiskers Plots (Figure C-41) - One of the most informative methods of looking for seasonal patterns with water quality data is through the production of a box and whiskers plot of monthly observations. Such plots display information on the sample median, dispersion, skew, relative size of the underlying data set, and statistical significance of the median. The procedures used in the box and whiskers plots presented in Chapter IV used the following methods:

- 1) All observations within the data set were ordered, by month, from the lowest to the highest.
- 2) The lowest and highest values for each month are represented as extreme values for each box as vertical “whiskers” plotted as vertical lines extending above and below each box.
- 3) The 25th and the 75th percentiles of observed values for each month were then calculated and these quartiles were used to define the upper and lower edges of the box.
- 4) The median value for each month is shown as a horizontal line at the center of the “notch,” while the mean is depicted as a single round point.
- 5) The height of the notch in each box is determined based on the statistical significance of each month’s median value. Thus, when boxes are compared among months, if the notches do not overlap then the medians of those months are statistically different at an alpha 0.05 level.
- 6) The height of the box is directly proportional to the amount of variability observed in the data collected within a month.
- 7) The width of the box is representative of the number of observations for each month (note: since the HBMP data is based on uniform monthly data collections the width of the boxes do not vary among months).

Correlogram (Figure C-42) – Determining the presence of autocorrelation in data can be thought of as a measure of the persistence or continuance of similar measurements with time, or how similar a data point may be to other measurements collected from sequentially nearby time periods. Generally autocorrelation is expressed in terms of time lags by statistically developing a correlogram plot. A strong positive correlation between adjacent points (observations with lags of 1, 2 and 3) along the resulting time line

indicates persistence resulting in autocorrelated observations. By comparison, strong negative correlations after six months and/or strong positive correlations after 12 months are typically associated with marked seasonality within the data. If either of these patterns is observed, then it is appropriate to rerun the analysis using adjusted (or deseasonalized) values. If these patterns persist in the new resulting correlogram then the autocorrelation-corrected value for the Seasonal Kendal test should be used in determining the significance of the Tau statistic.



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Beginning

Appendix B

Additional Figures Chapter IV

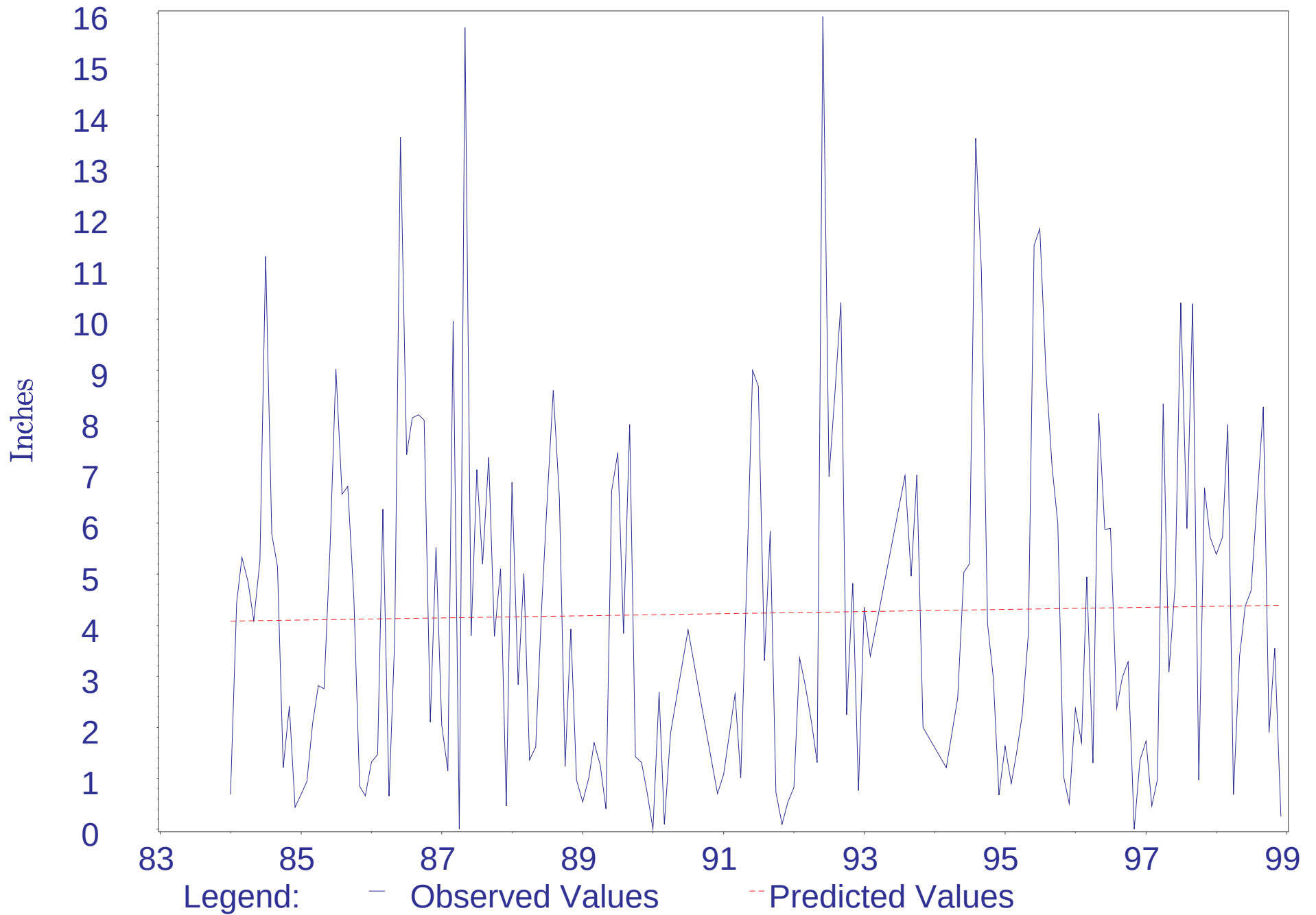
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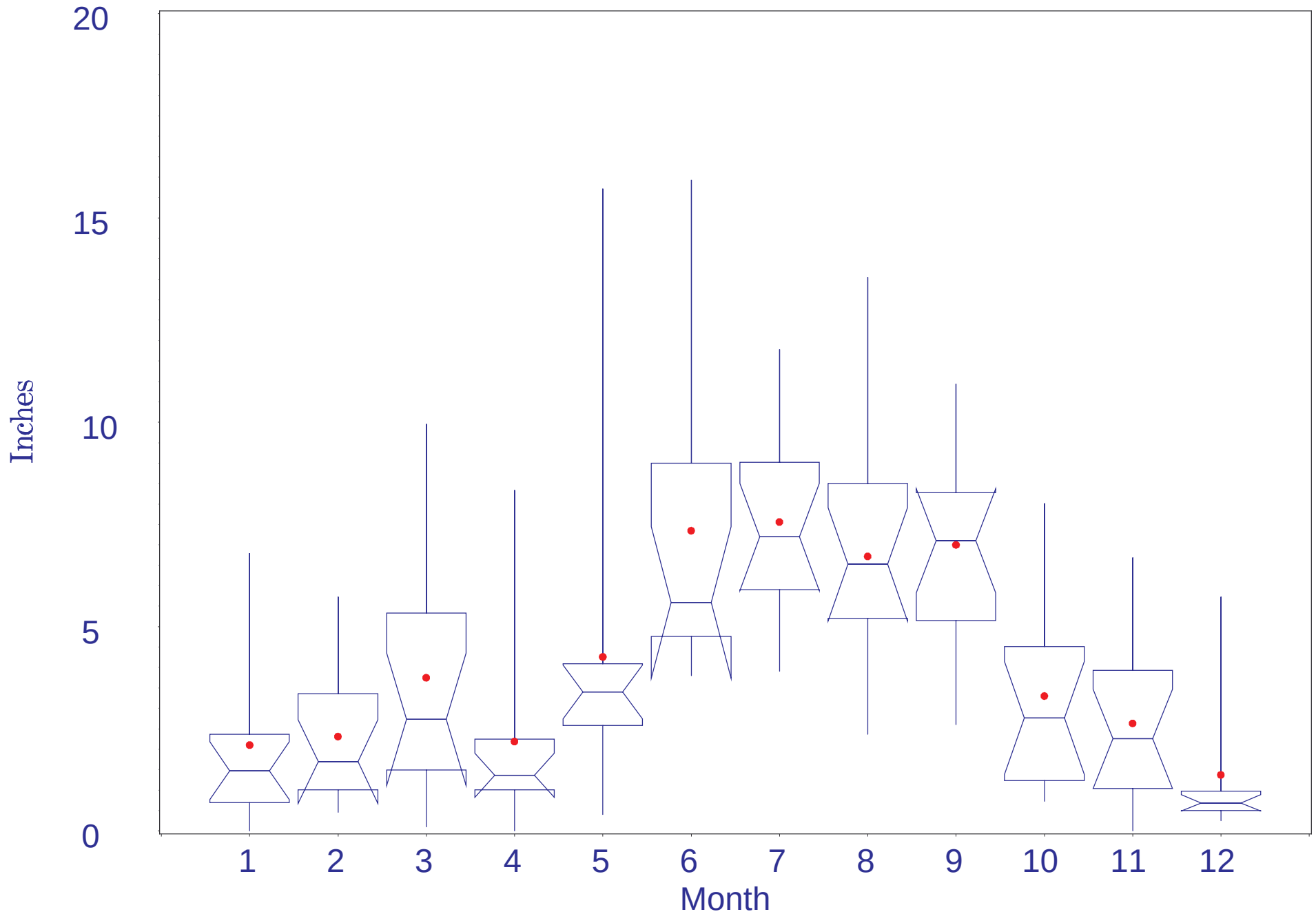
Monthly Rainfall at the Arcadia Gauge 1984-1998

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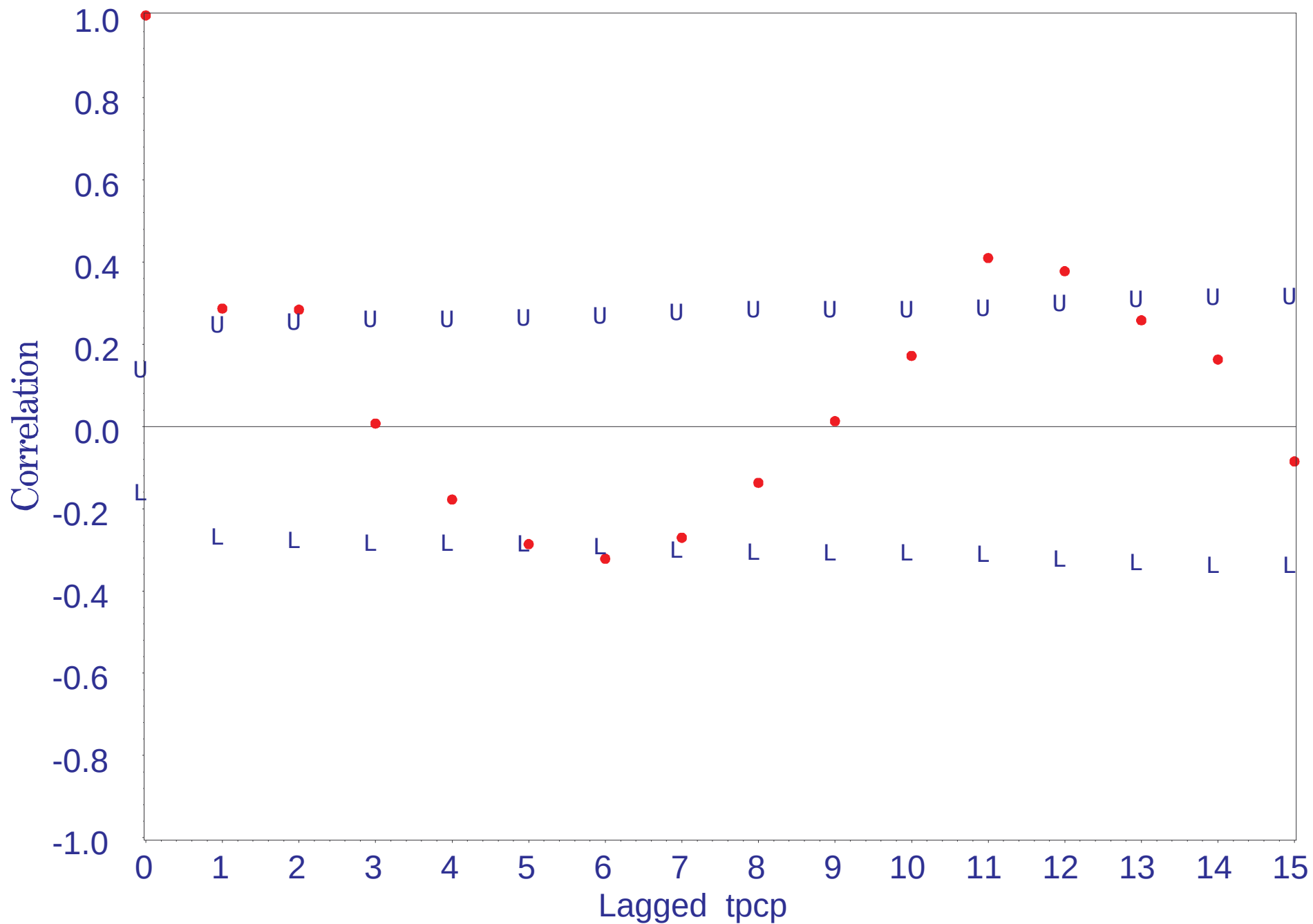
Monthly Rainfall at Arcadia Gauge 1984-1998
Monthly Boxplots of Total Inches

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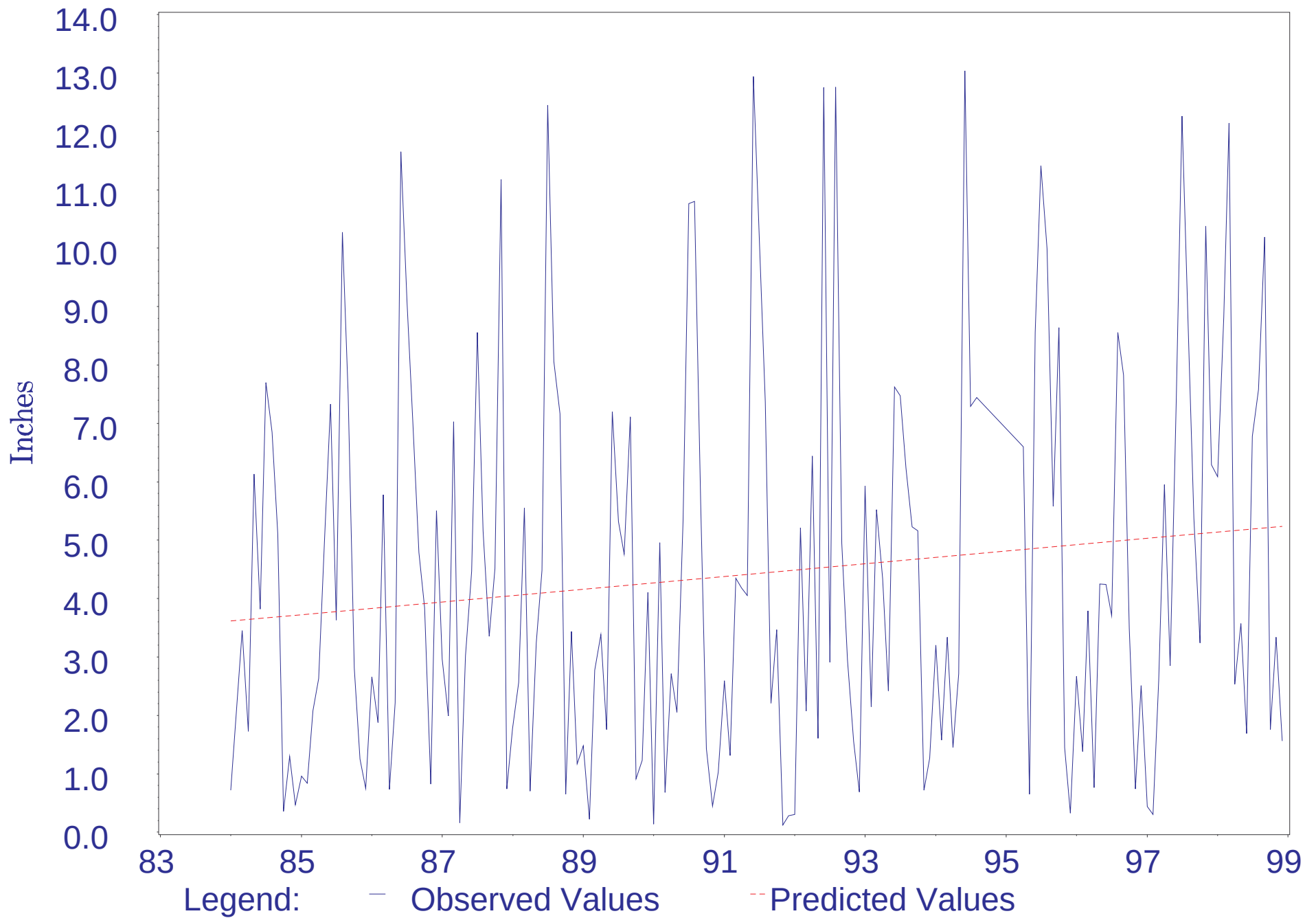
Monthly Rainfall at the Arcadia Gauge 1984-1998
Correlogram with Upper and Lower 95% Confidence Limits

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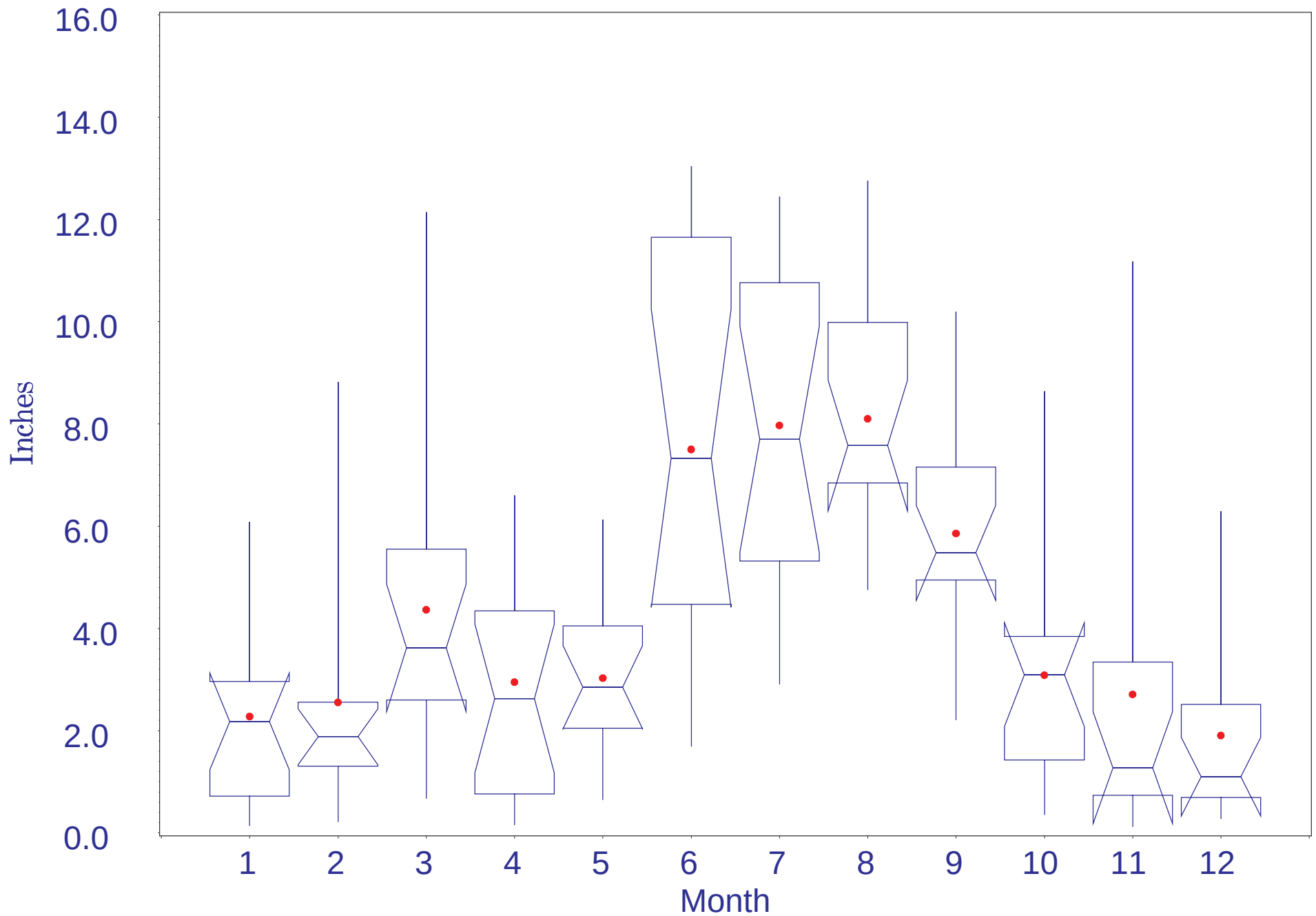
Monthly Rainfall at the Wauchula Gauge 1984-1998

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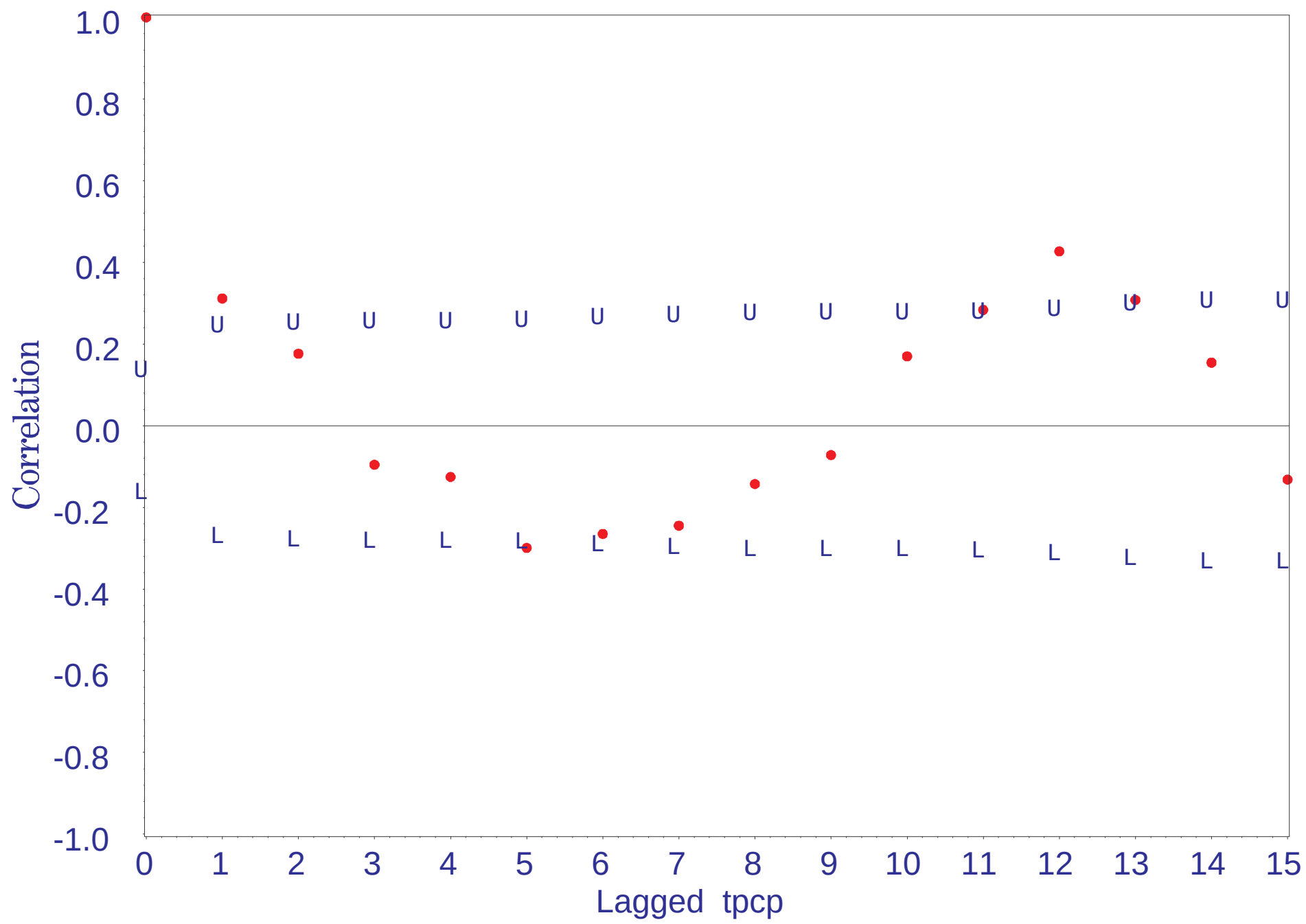
Monthly Rainfall at Wauchula Gauge 1984-1998
Monthly Boxplots of Total Inches

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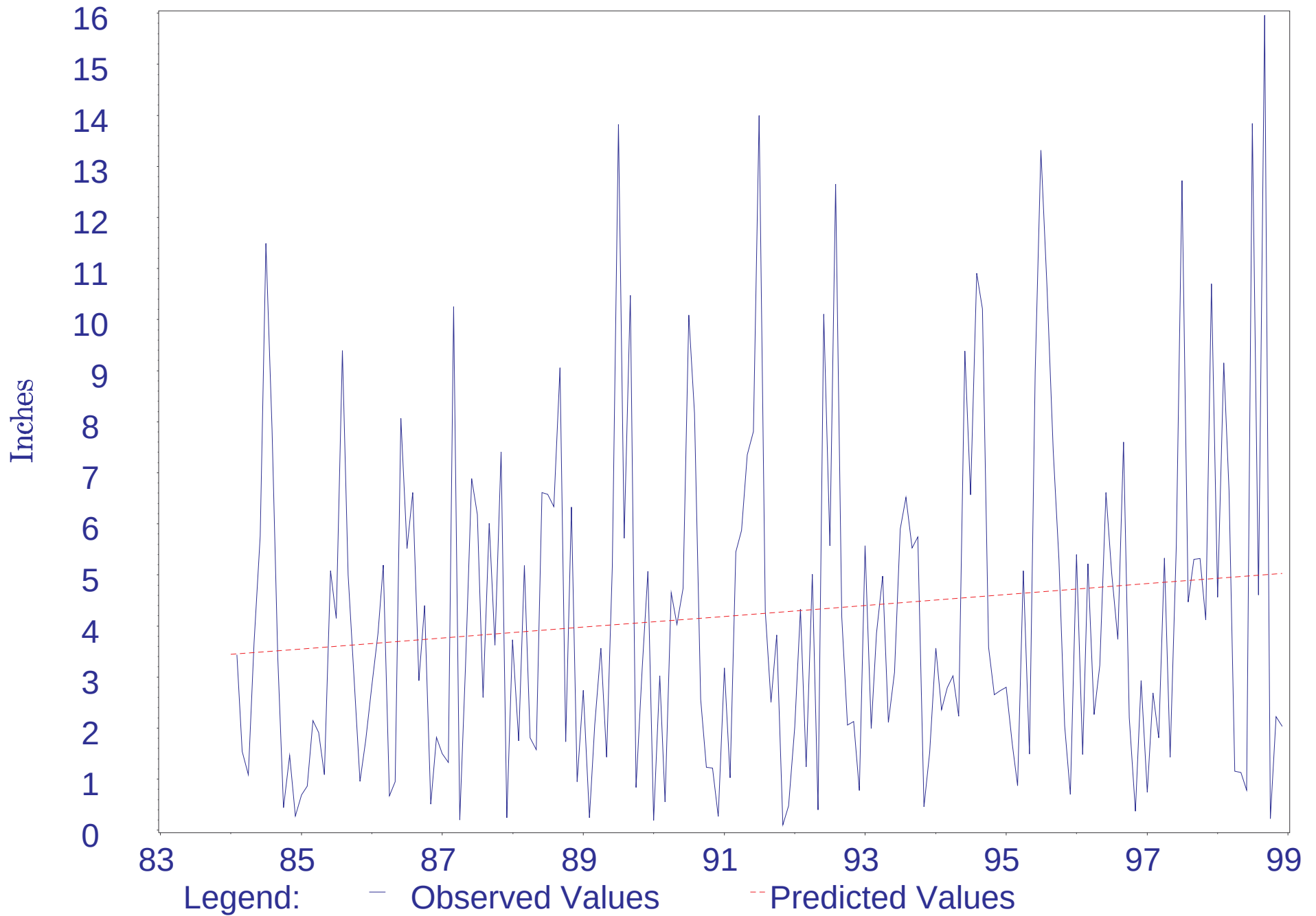
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Correlogram with Upper and Lower 95% Confidence Limits

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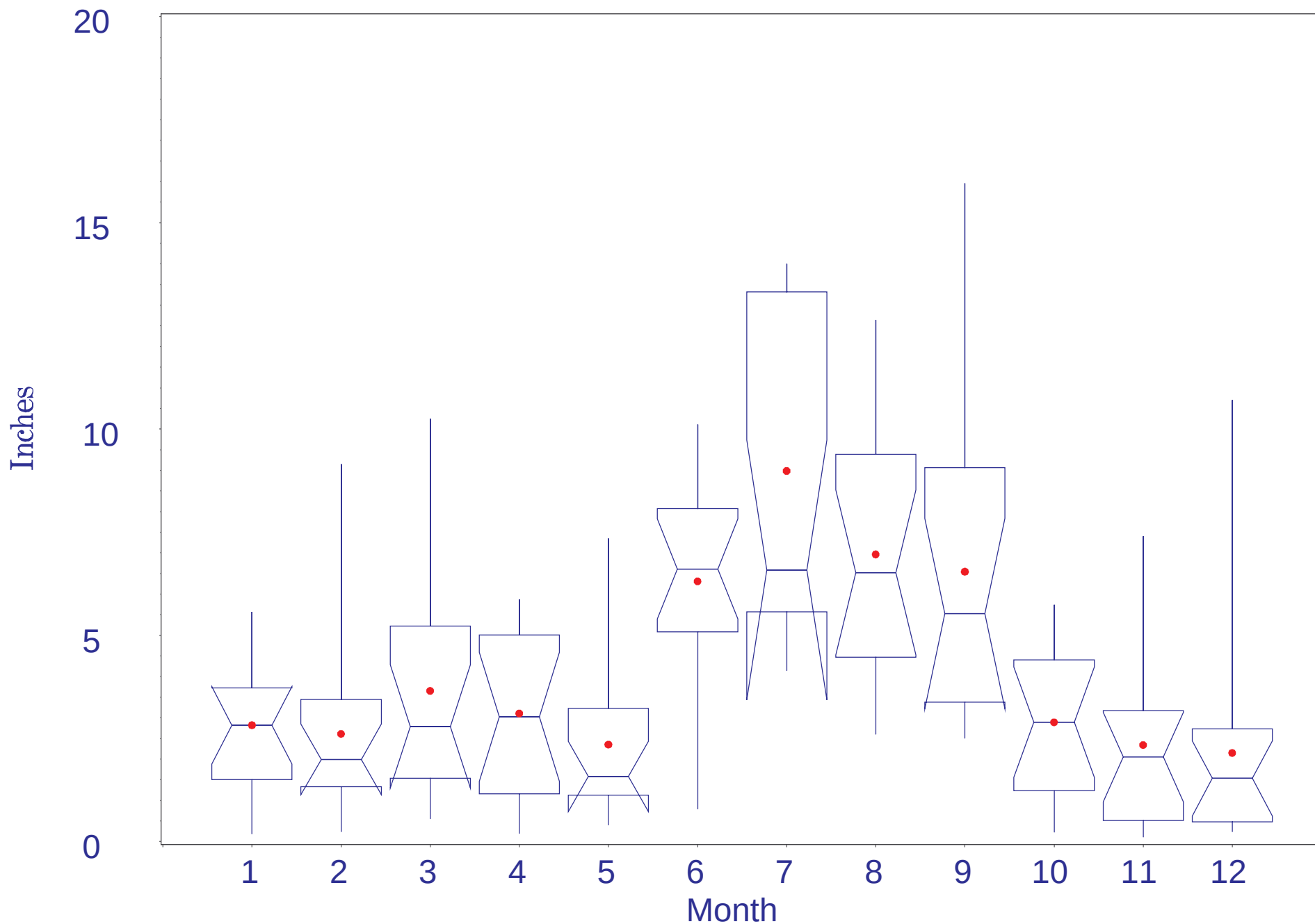
Monthly Rainfall at the Bartow Gauge 1984-1998

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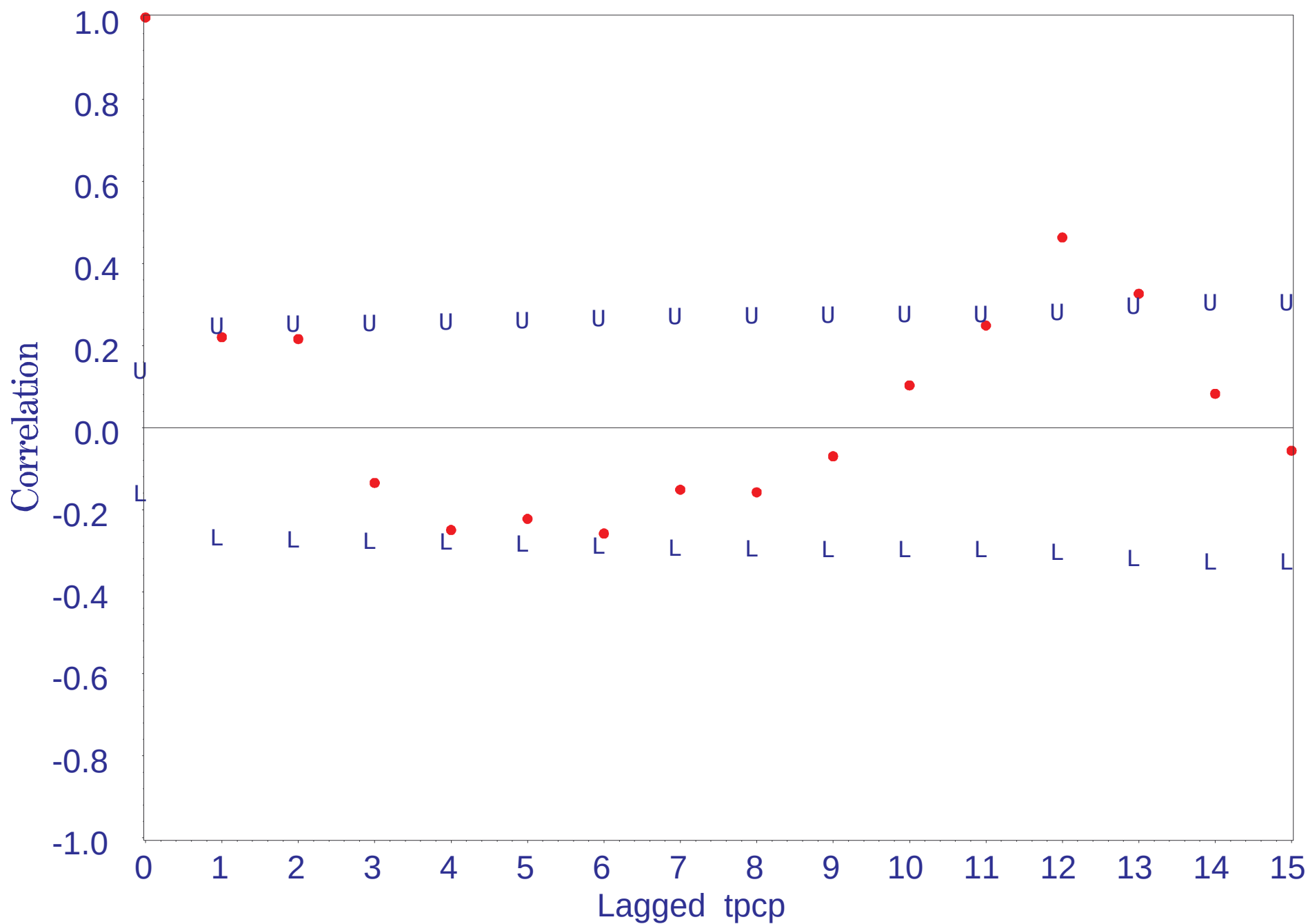
Monthly Rainfall at Bartow Gauge 1984-1998
Monthly Boxplots of Total Inches

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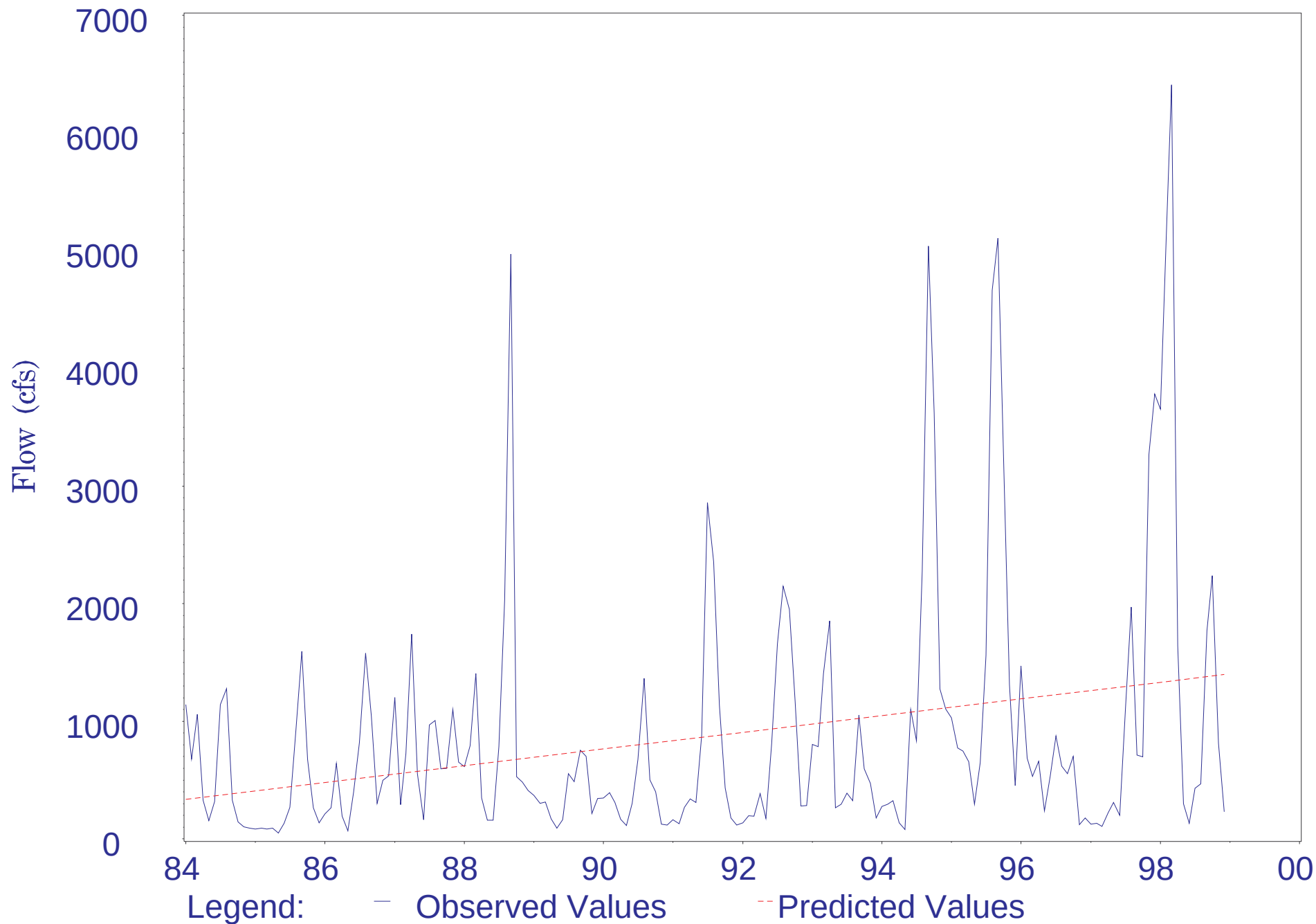
Monthly Rainfall at the Bartow Gauge 1984-1998
Correlogram with Upper and Lower 95% Confidence Limits

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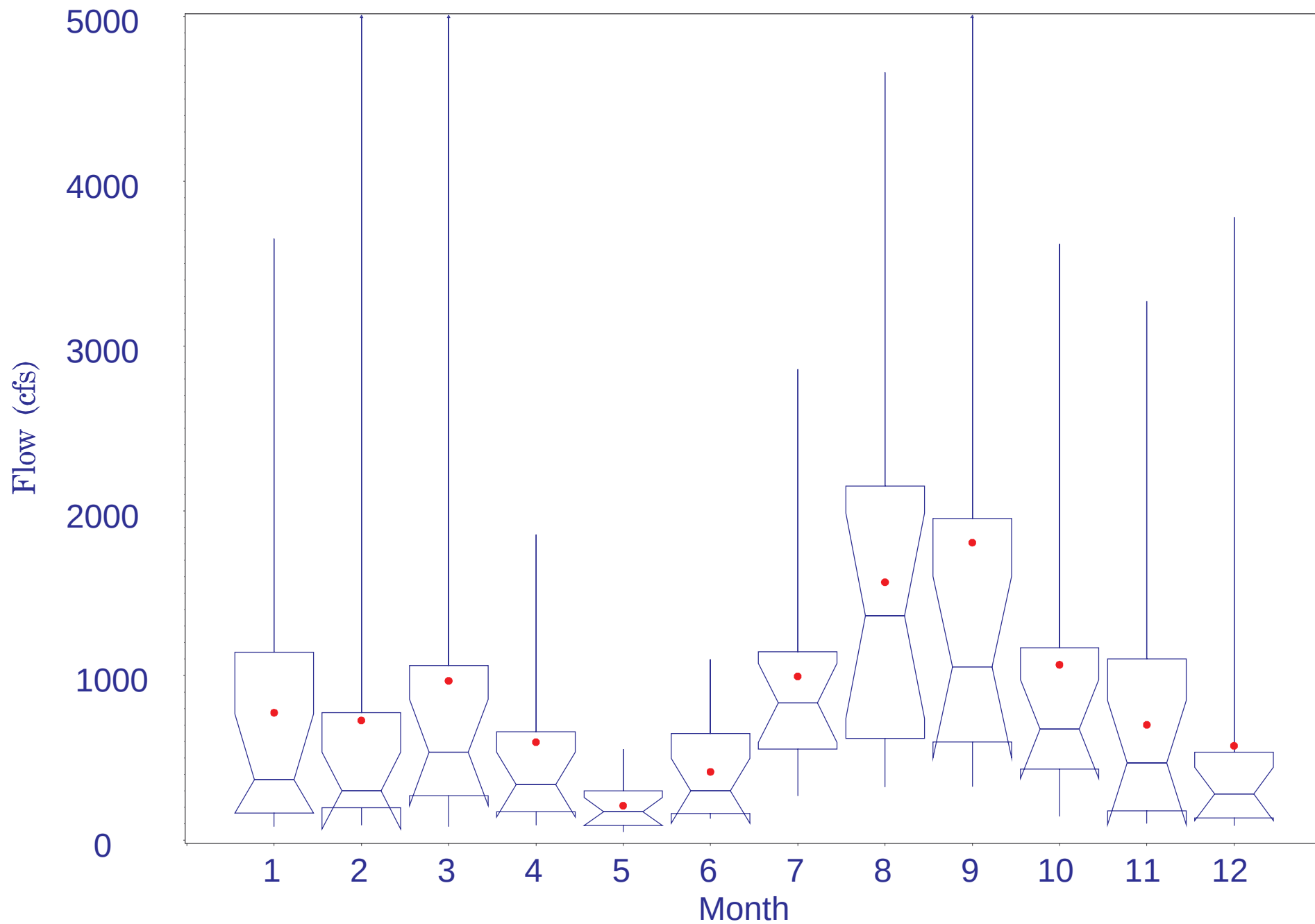
Peace River at Arcadia - 1984-1998
Flow (cfs)

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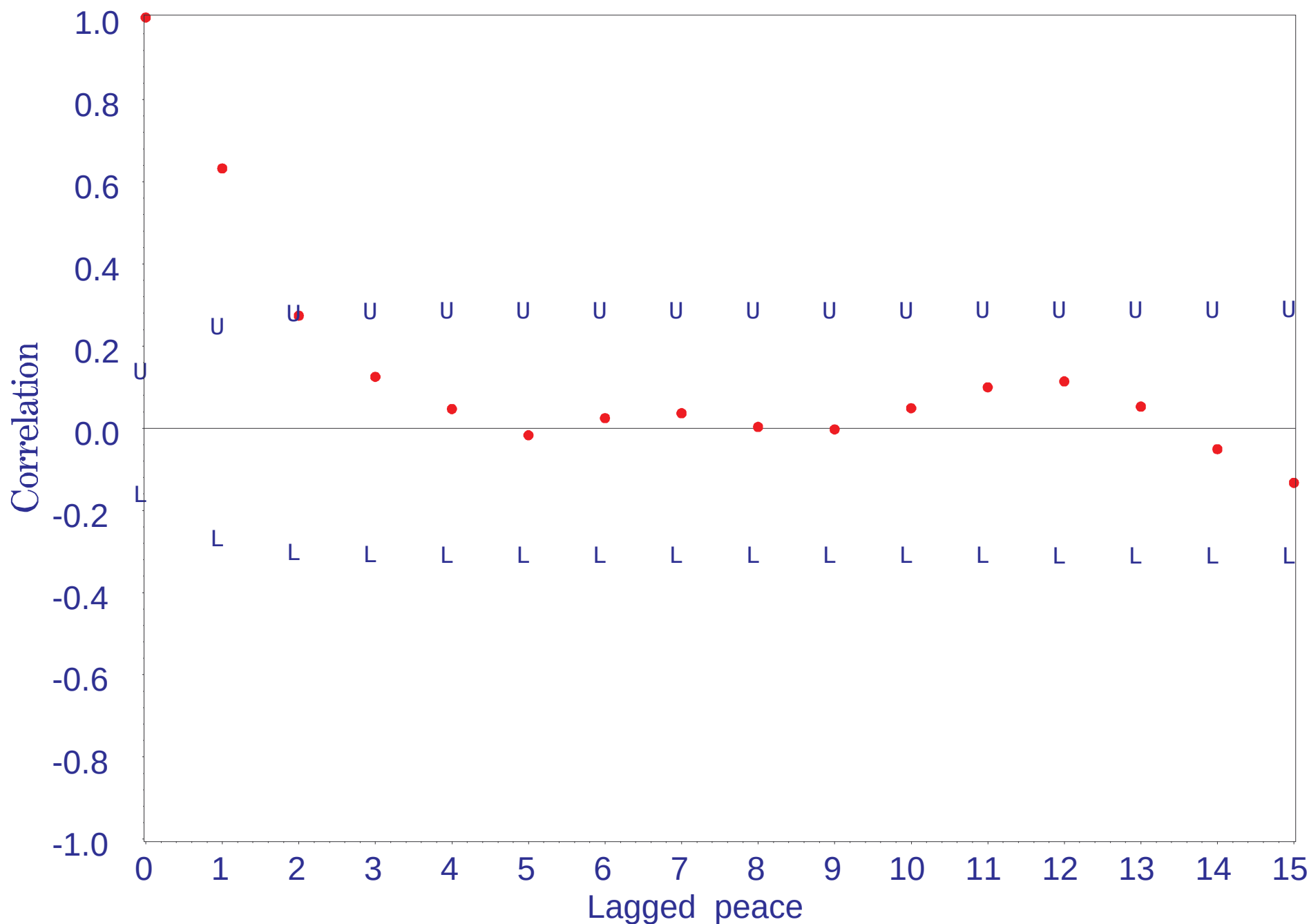
Peace River at Arcadia 1984-1998
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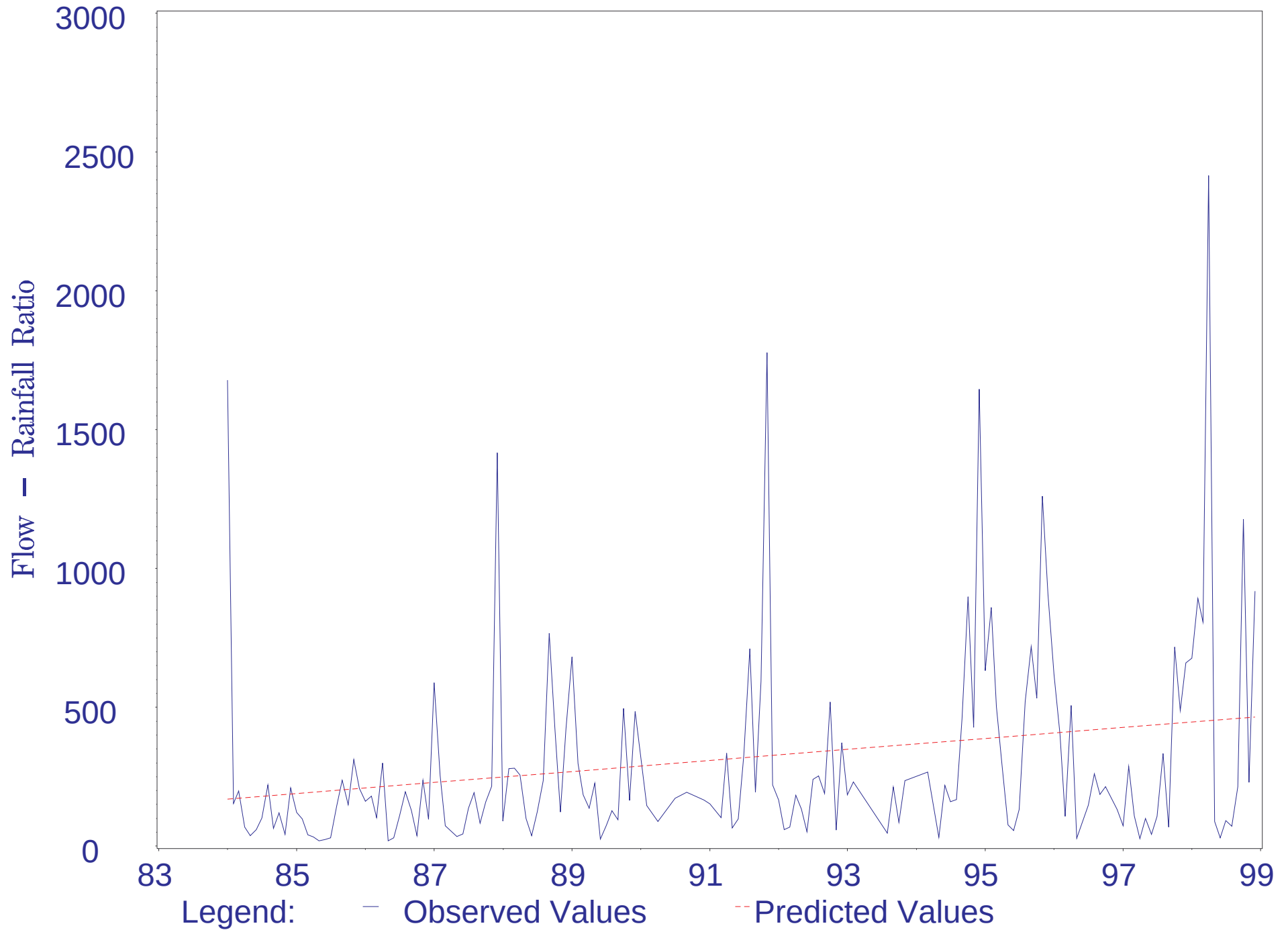
Peace River Flow (cfs) **1984-1998**
Correlogram with Upper and Lower 95% Confidence Limits

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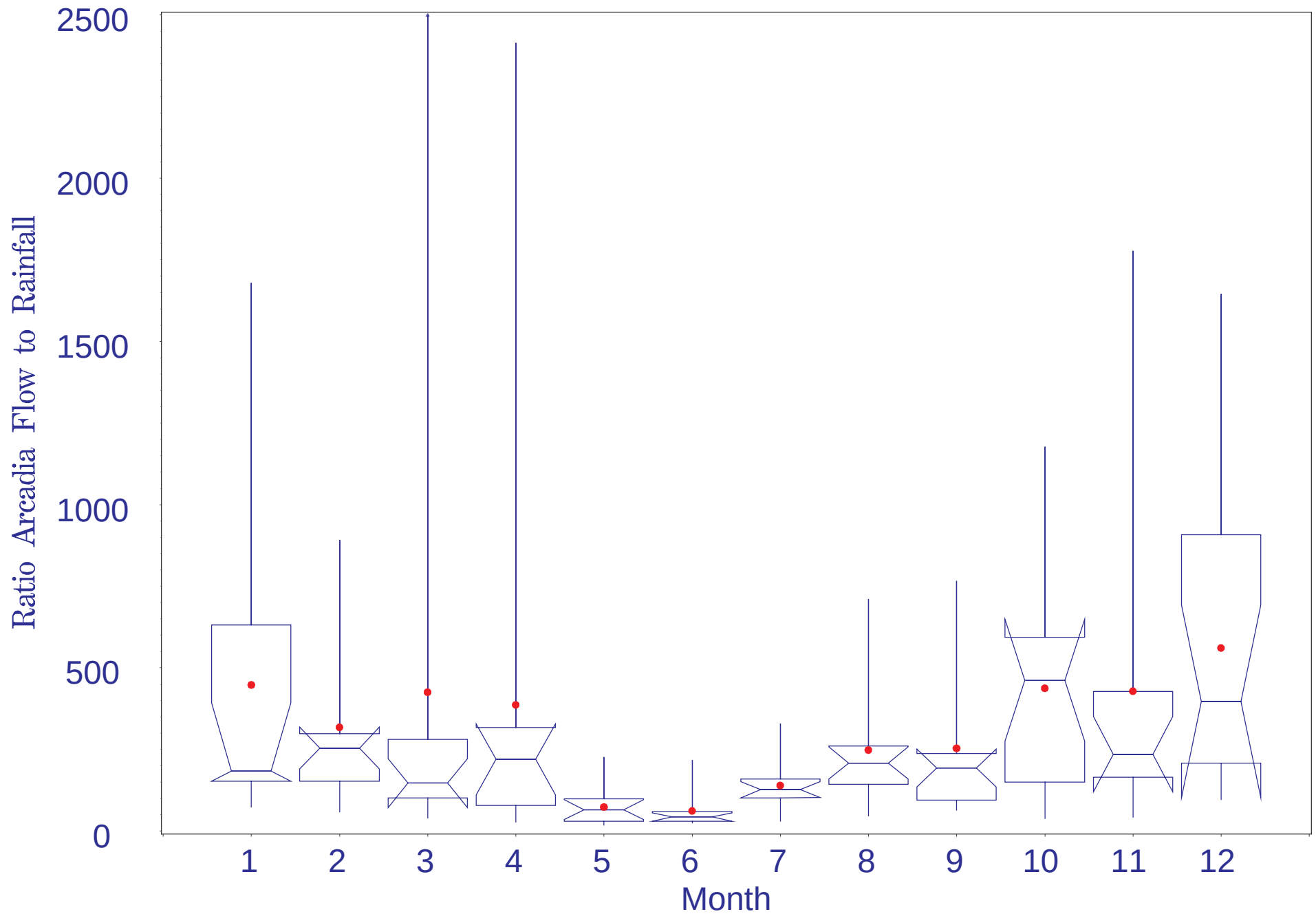
Ratio Flow at Arcadia to Rainfall at Arcadia (1984-1998)

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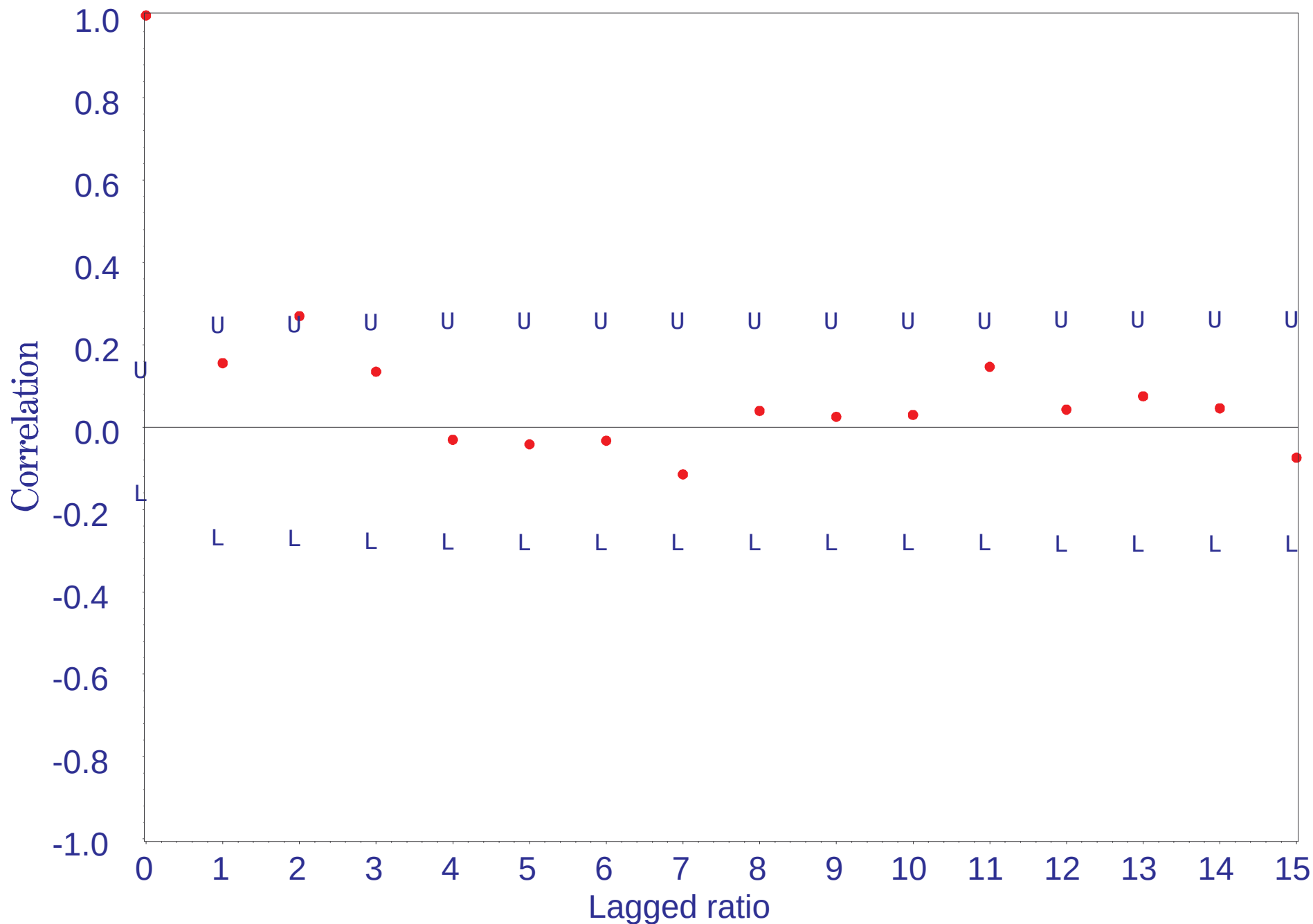
Ratio Arcadia Flow to Arcadia Rainfall 1984-1998 Monthly Boxplots

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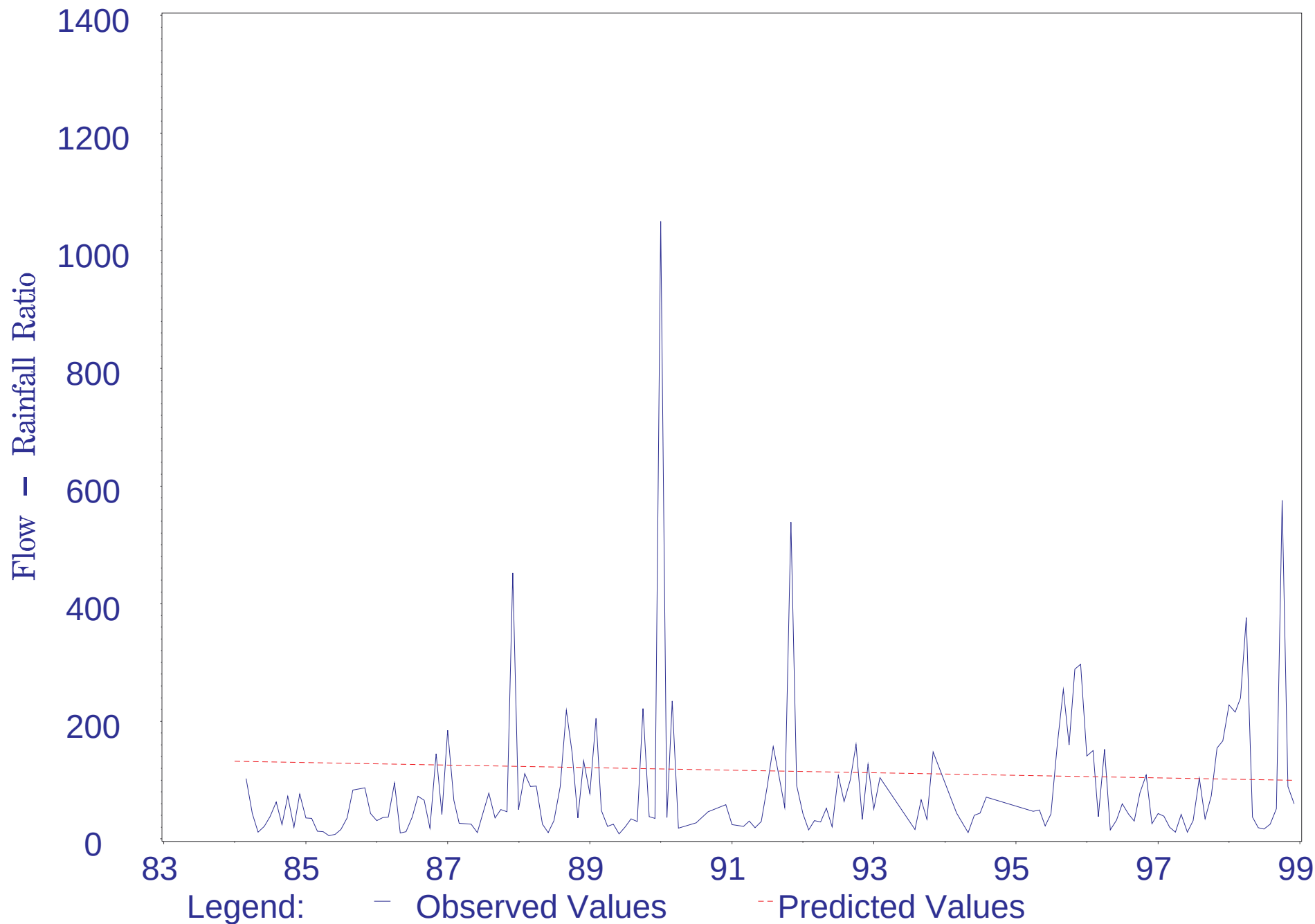
Ratio Arcadia Flow to Arcadia Rainfall (1984-1998)
Correlogram with Upper and Lower 95% Confidence Limits

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Ratio Arcadia Flow to Rainfall
(Arcadia + Wachula + Bartow) 1984-1998

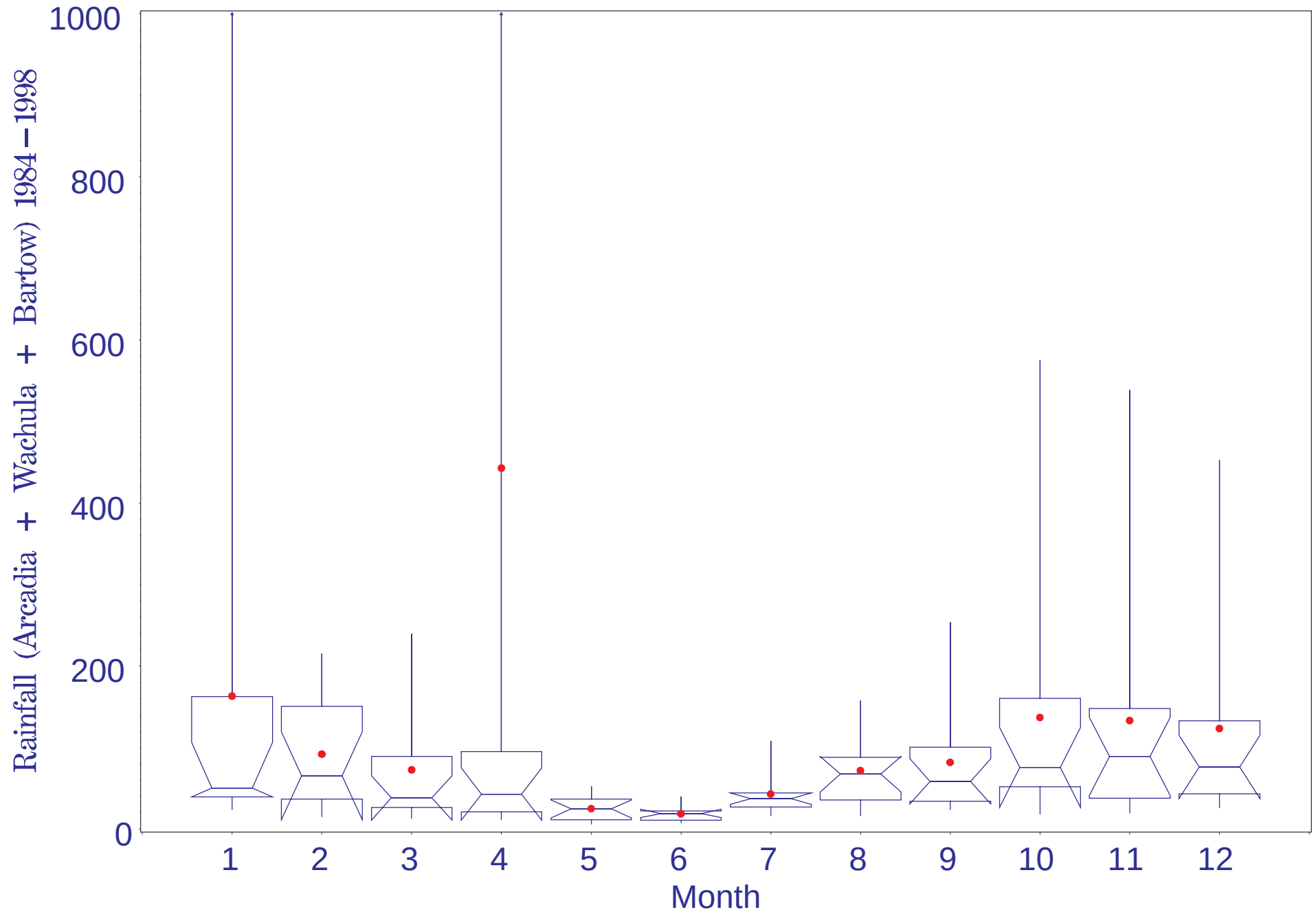
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Ratio Arcadia Flow to Rainfall (Arcadia + Wauchula + Bartow) 1984-1998

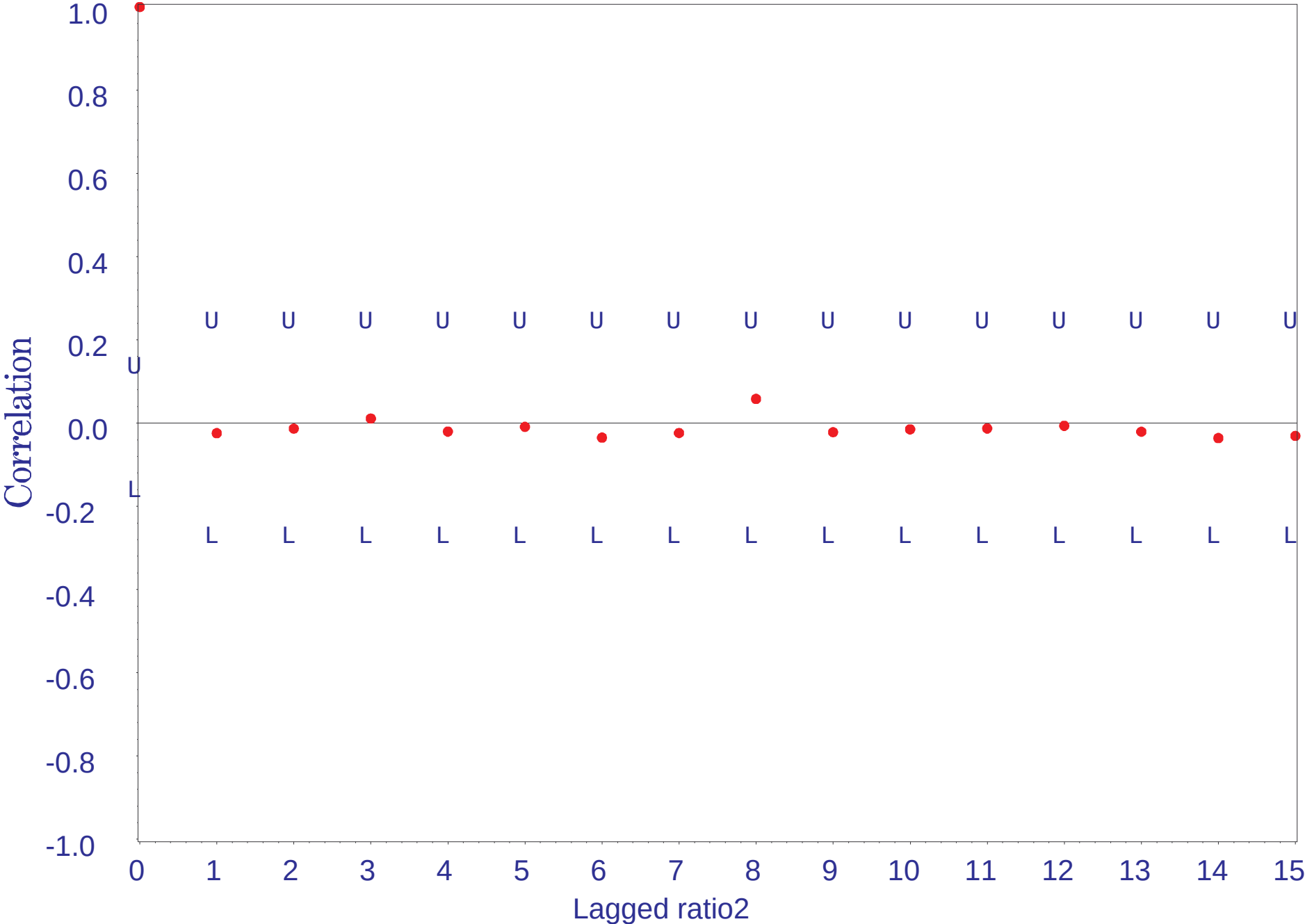
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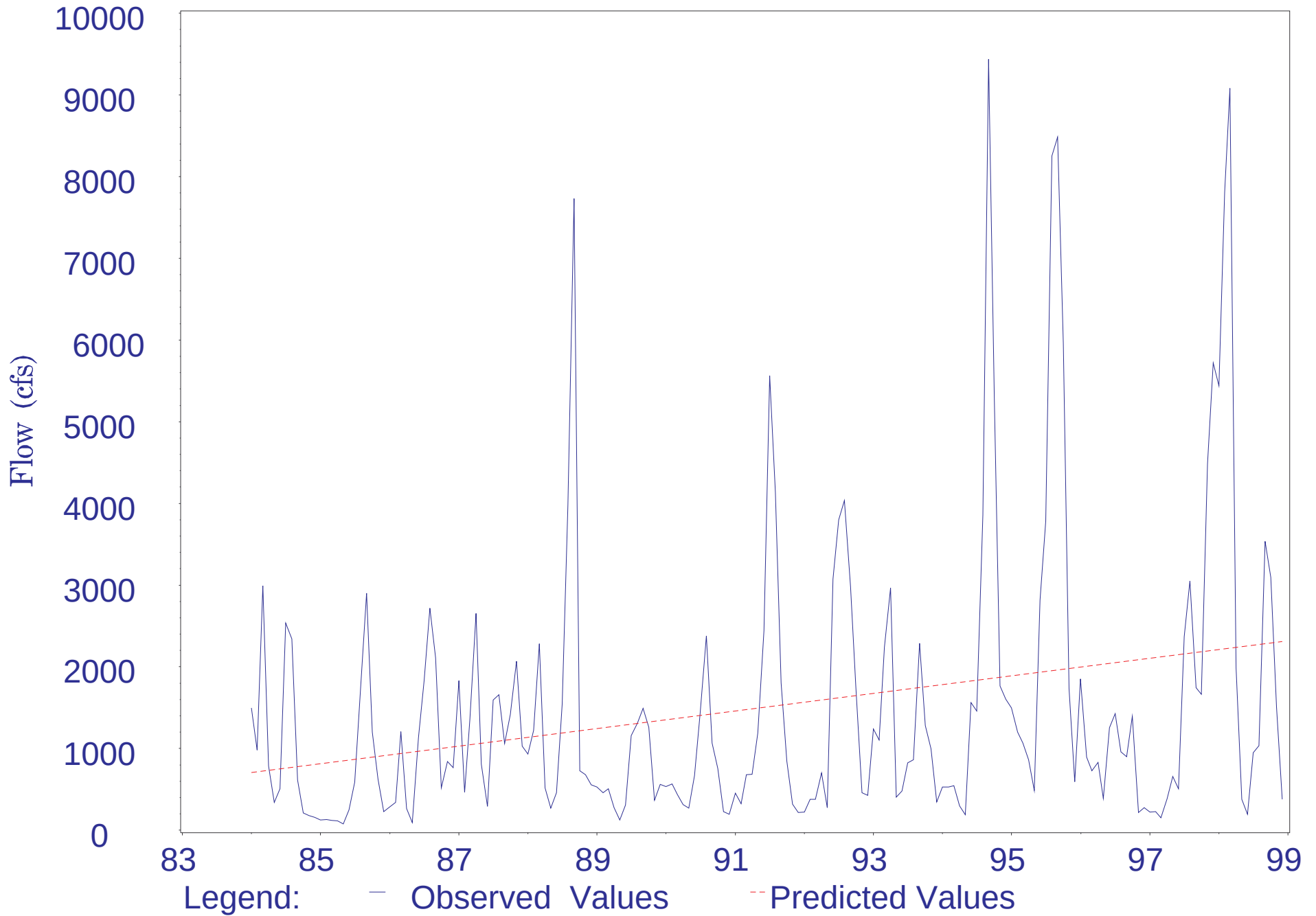
Ratio Arcadia Flow to Rainfall (Arcadia + Wachula + Bartow) 1984-1998
Correlogram with Upper and Lower 95% Confidence Limits

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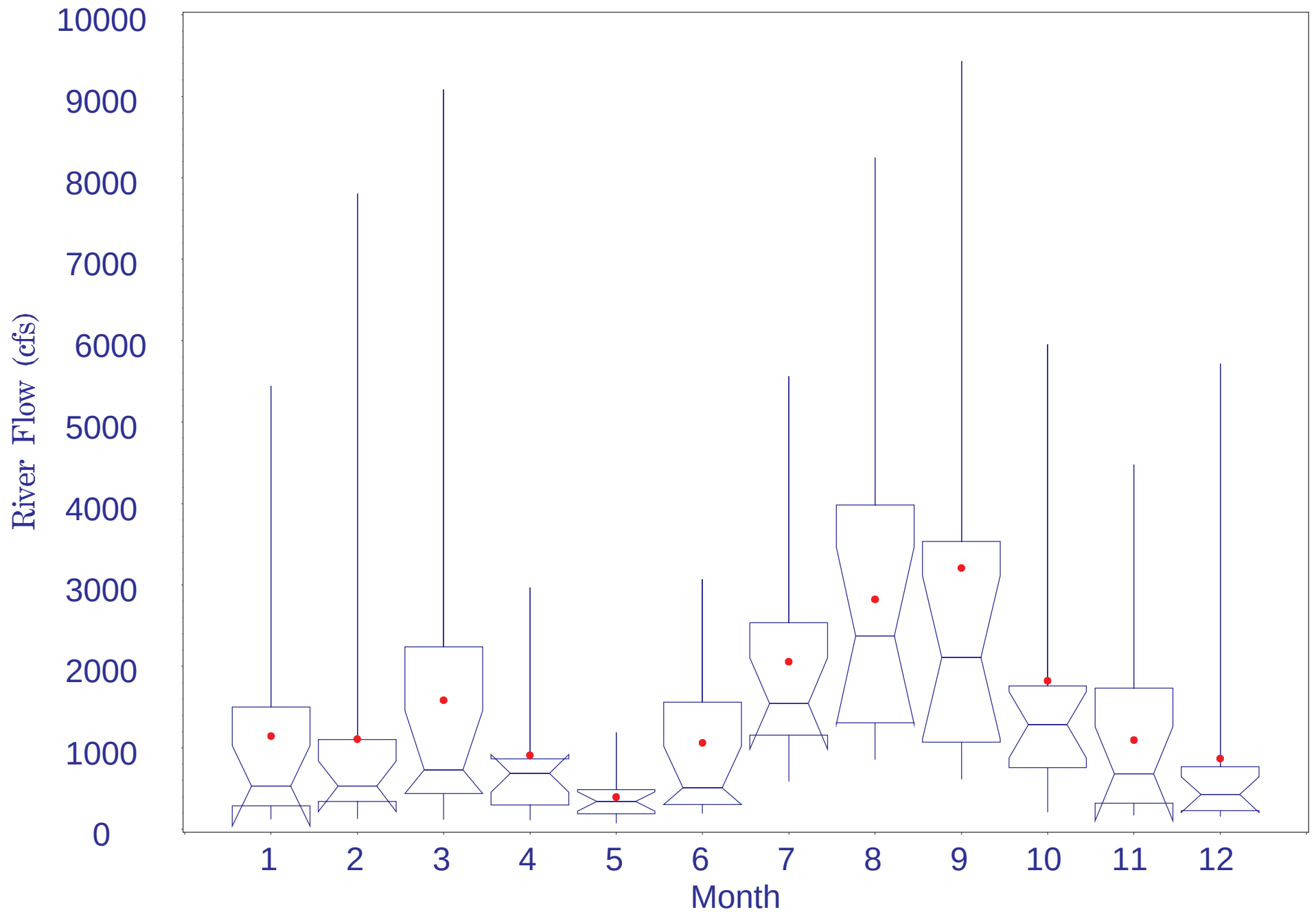
River Flow at US 41 Bridge 1984-1998

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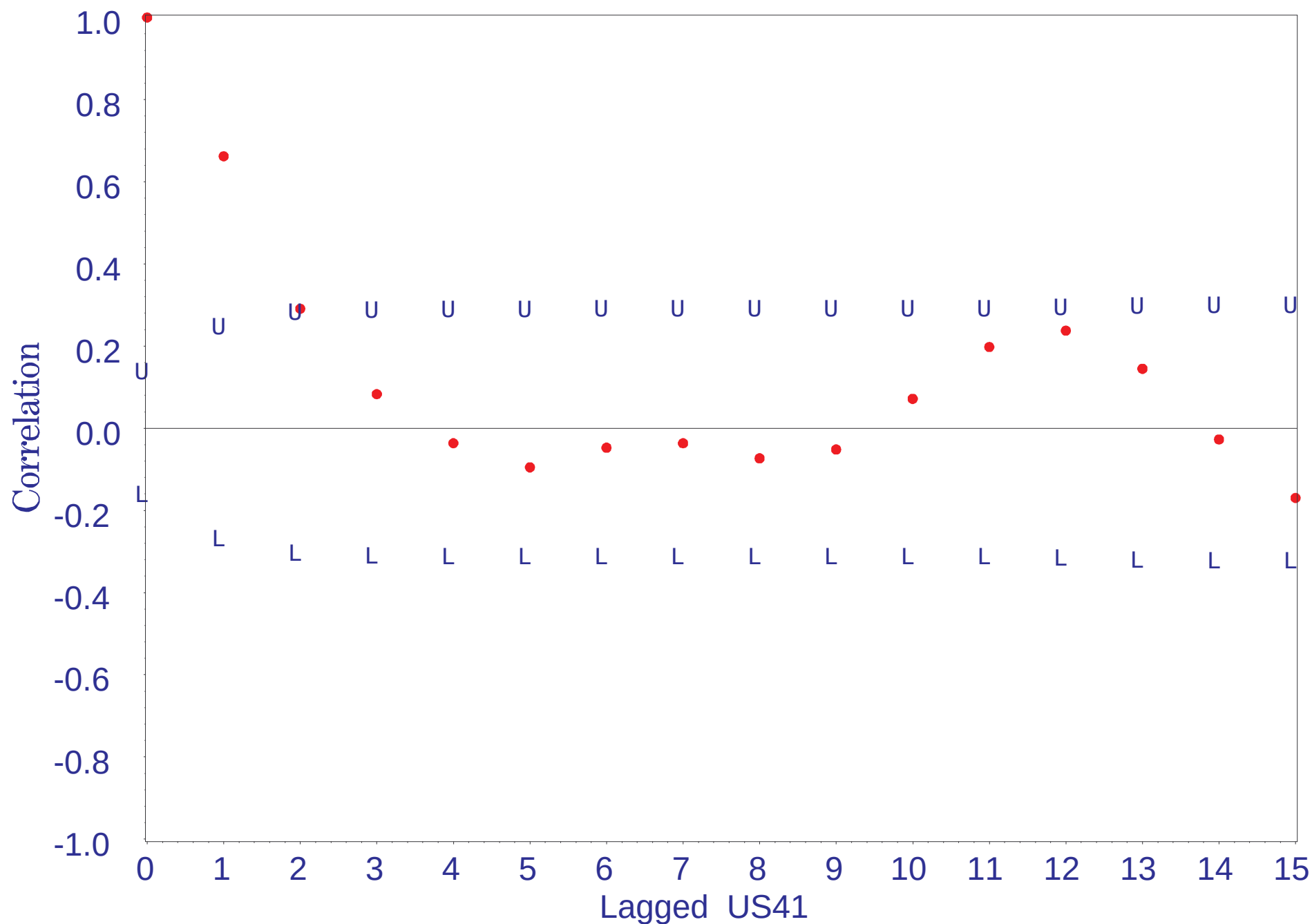
Monthly Boxplots for River Flow at US 41 Bridge 1984-1998

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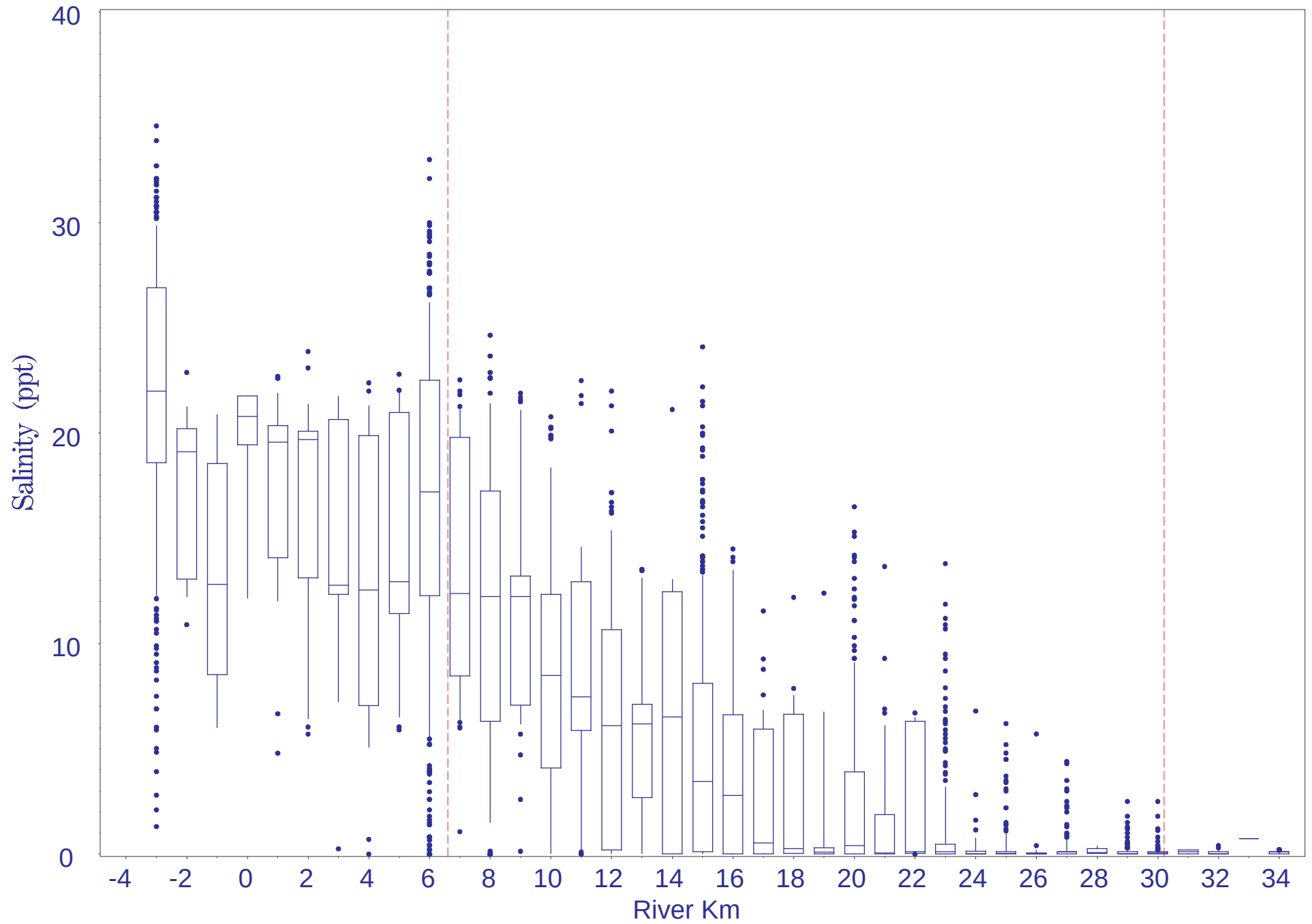
River Flow at US 41 Bridge 1984-1998
Correlogram with Upper and Lower 95% Confidence Limits

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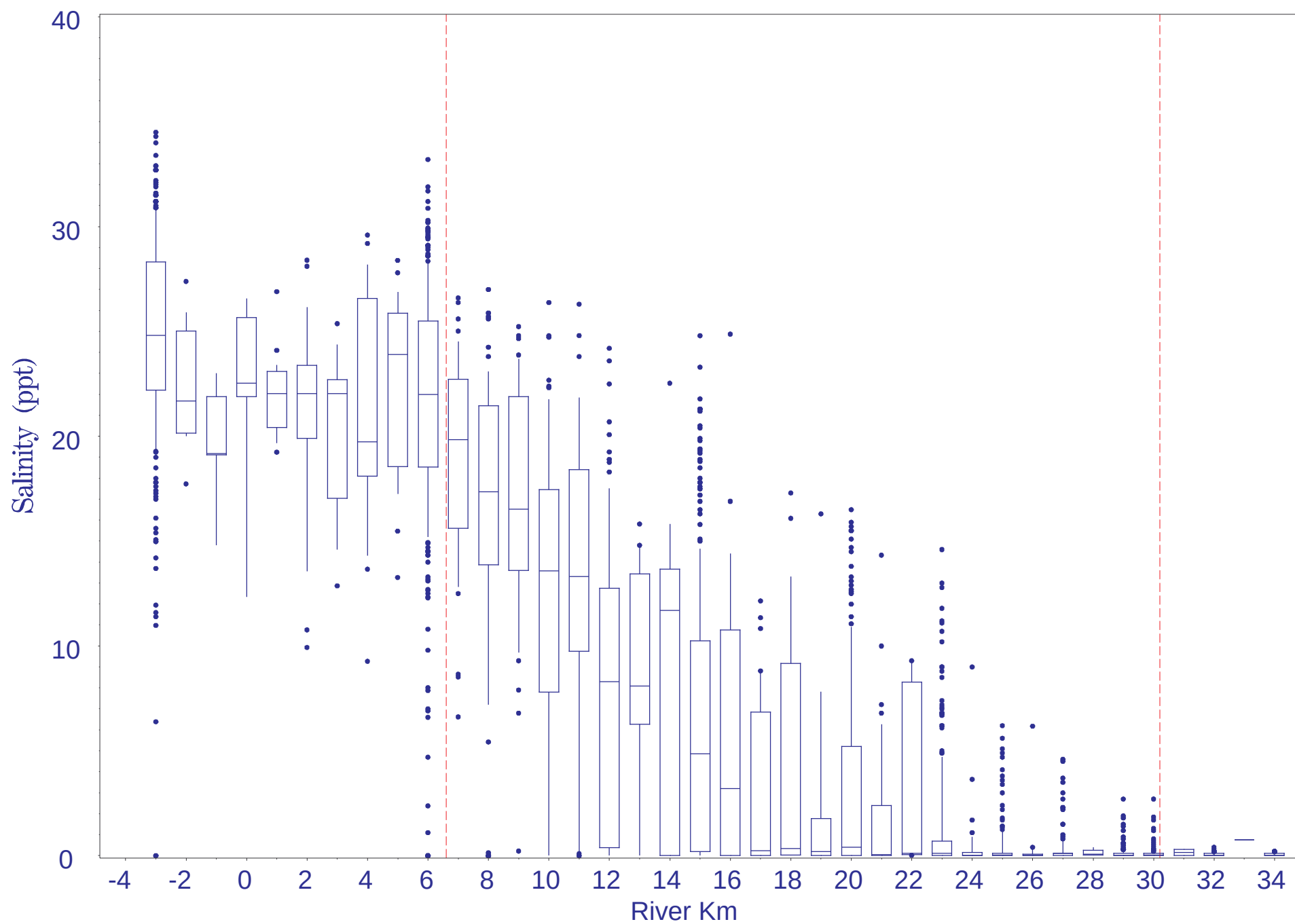
Salinity vs. River Kilometer 1976-1998
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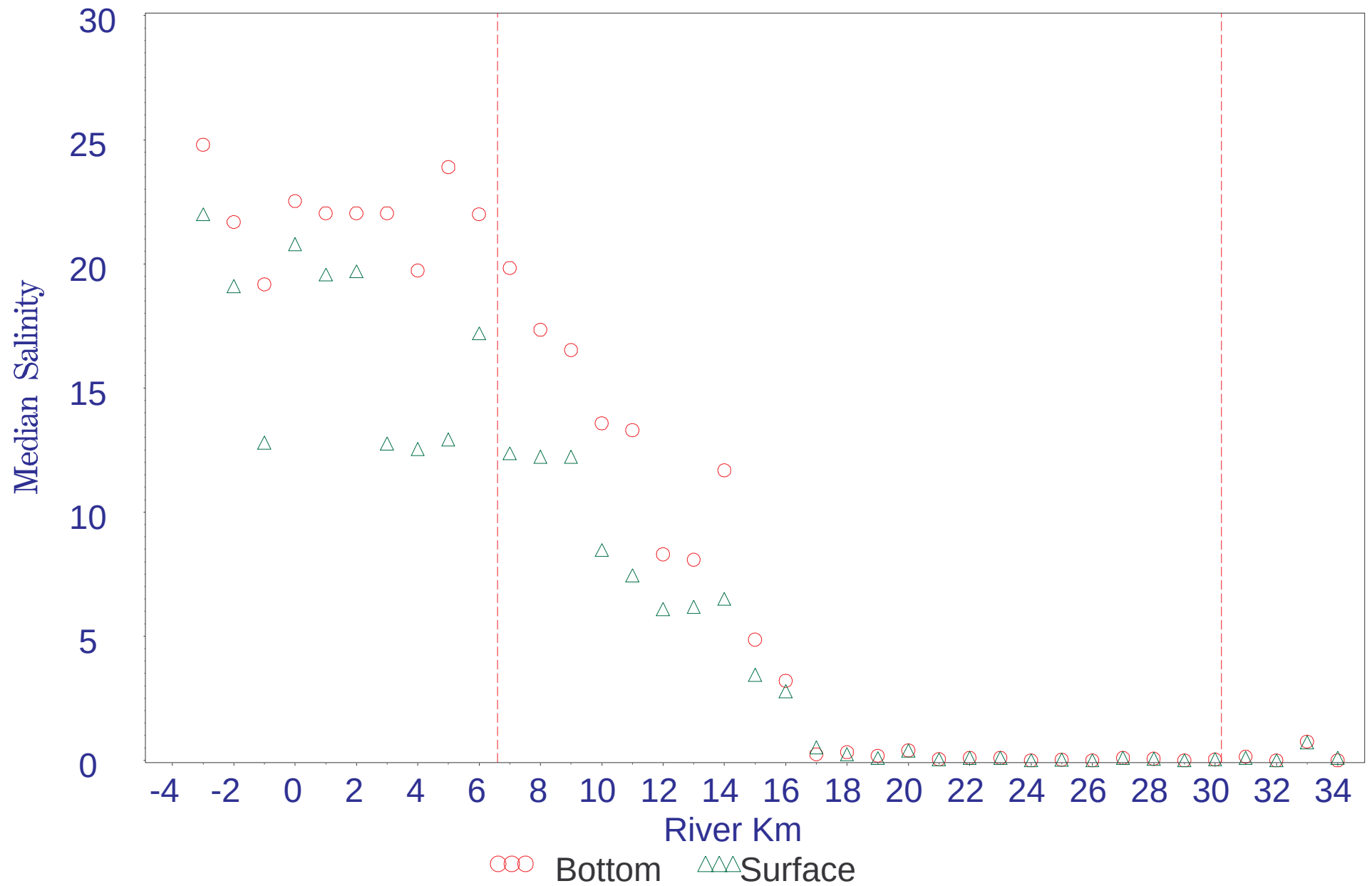
Salinity vs. River Kilometer 1976-1998
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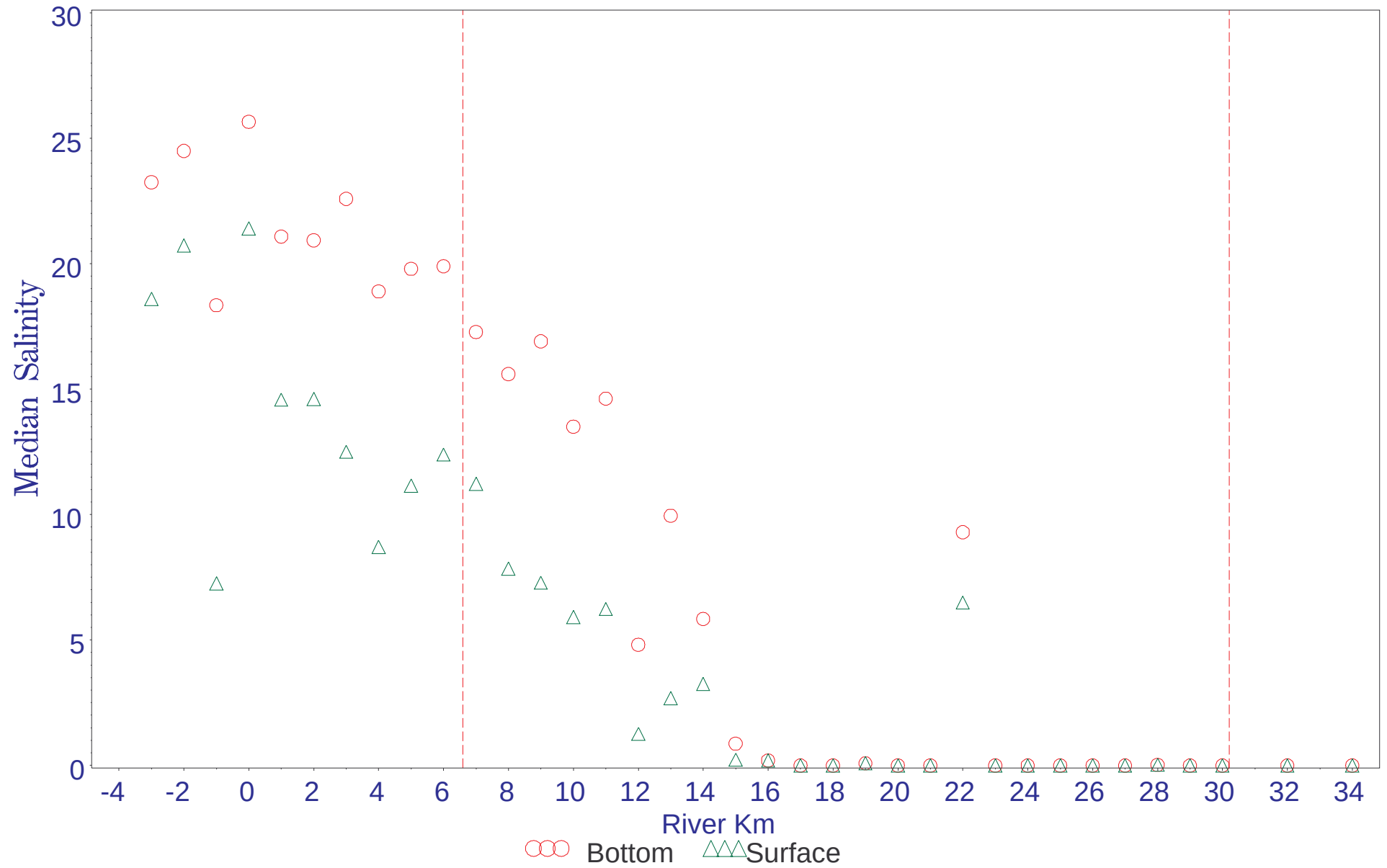
Median Salinity vs. River Km 1976-1998

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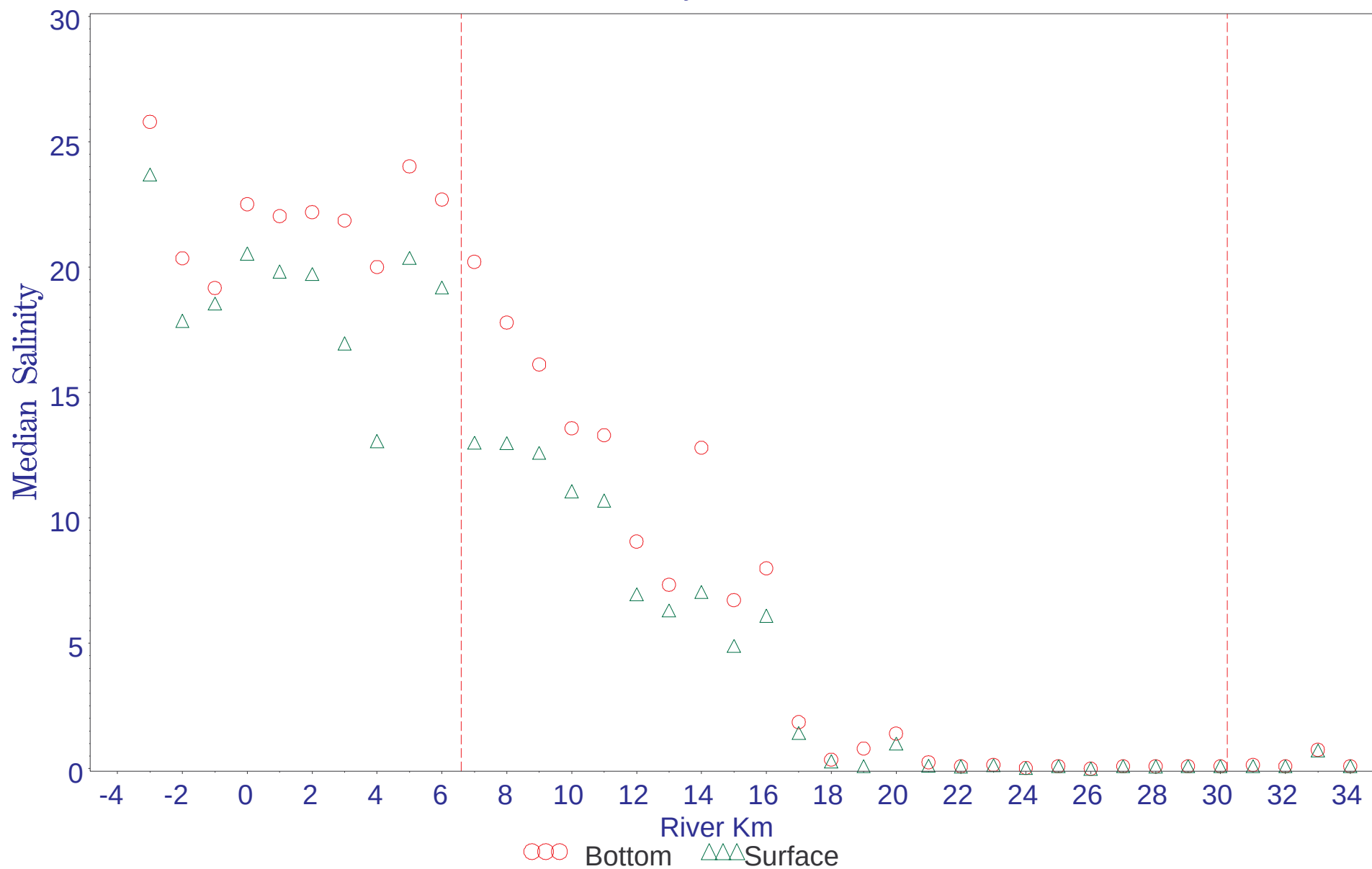
Median Salinity vs. River Km 1976-1998
Wet Season

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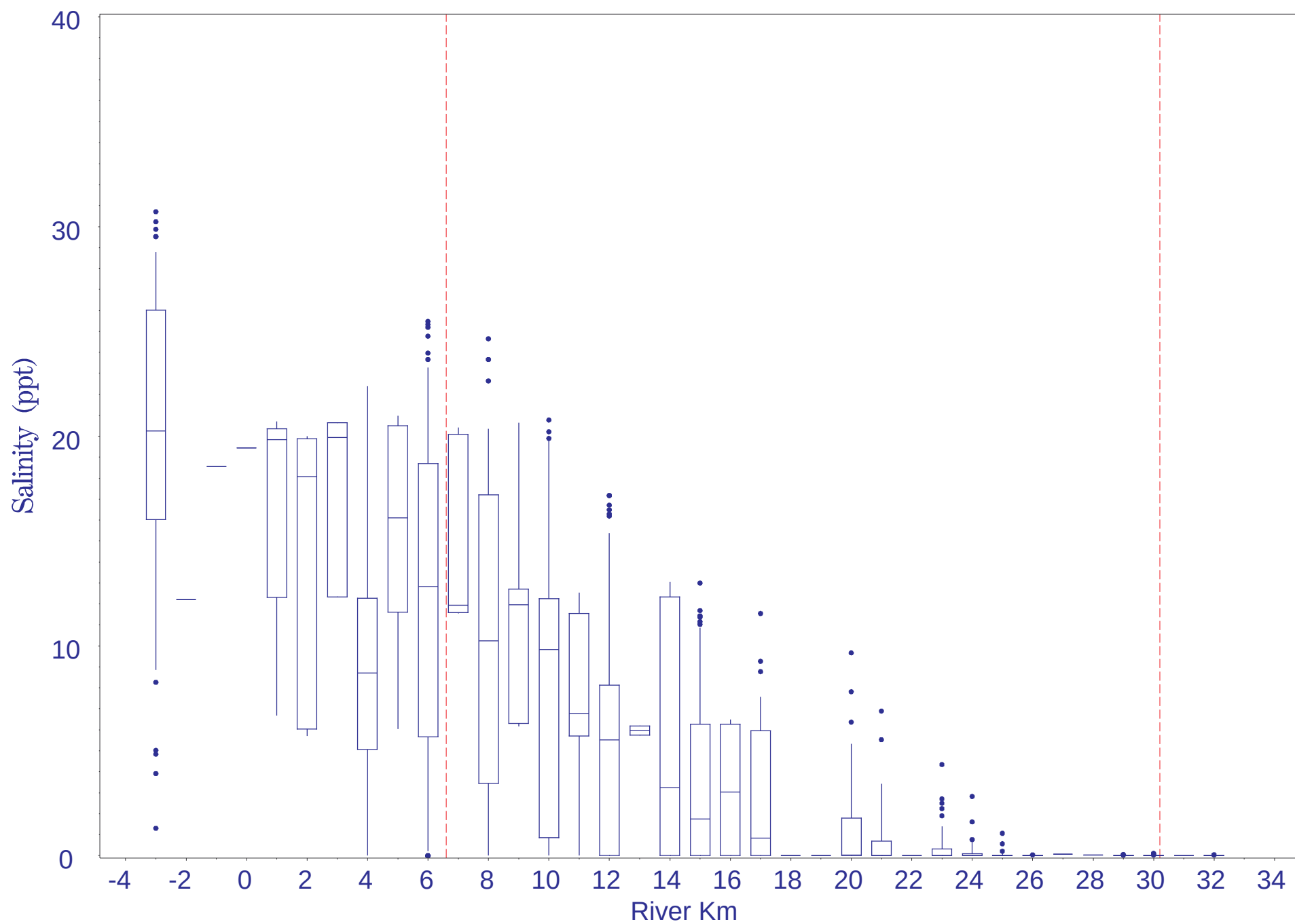
Median Salinity vs. River Km 1976-1998
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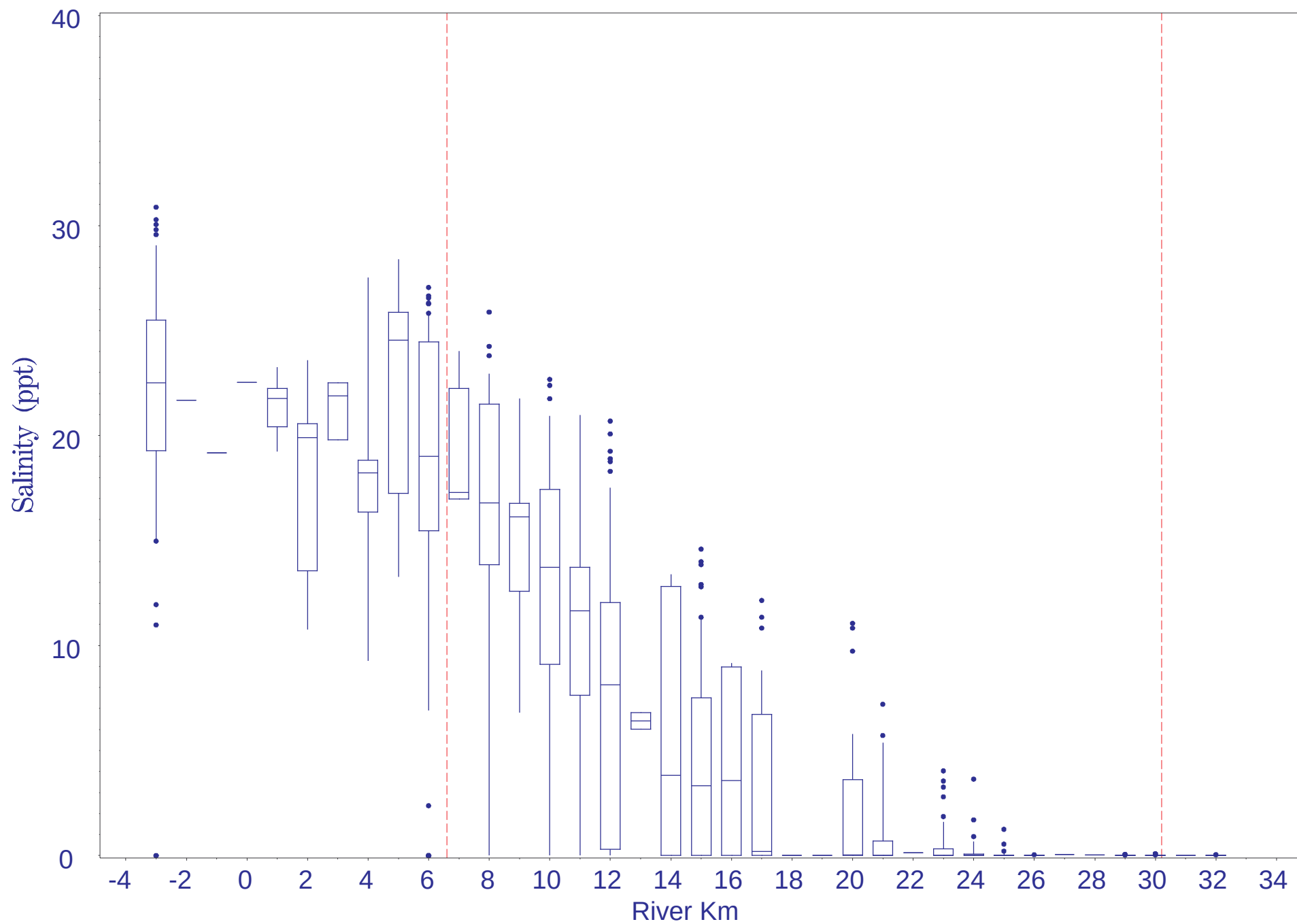
Salinity vs. River Kilometer 1996-1998
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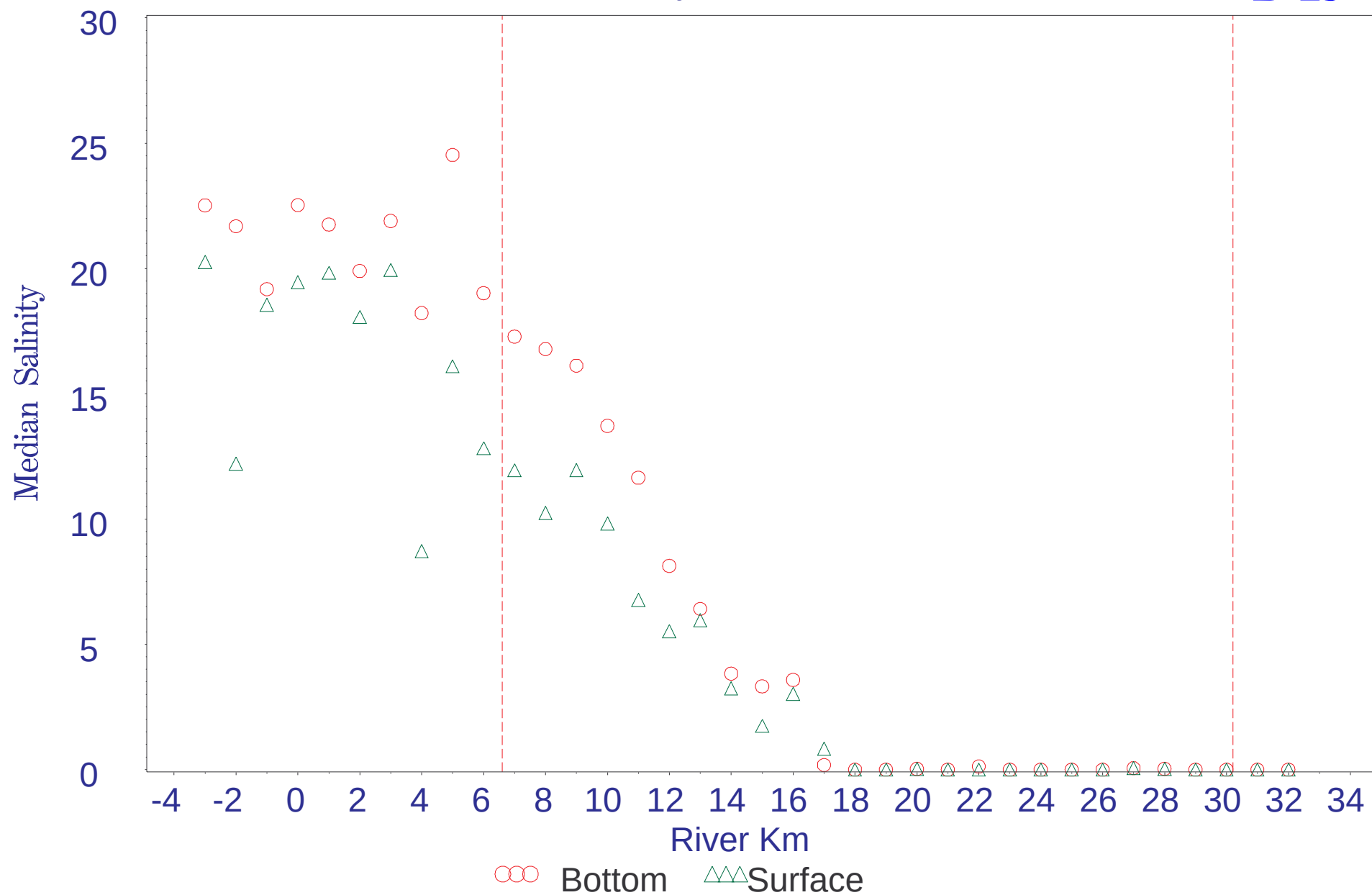
Salinity vs. River Kilometer 1996-1998
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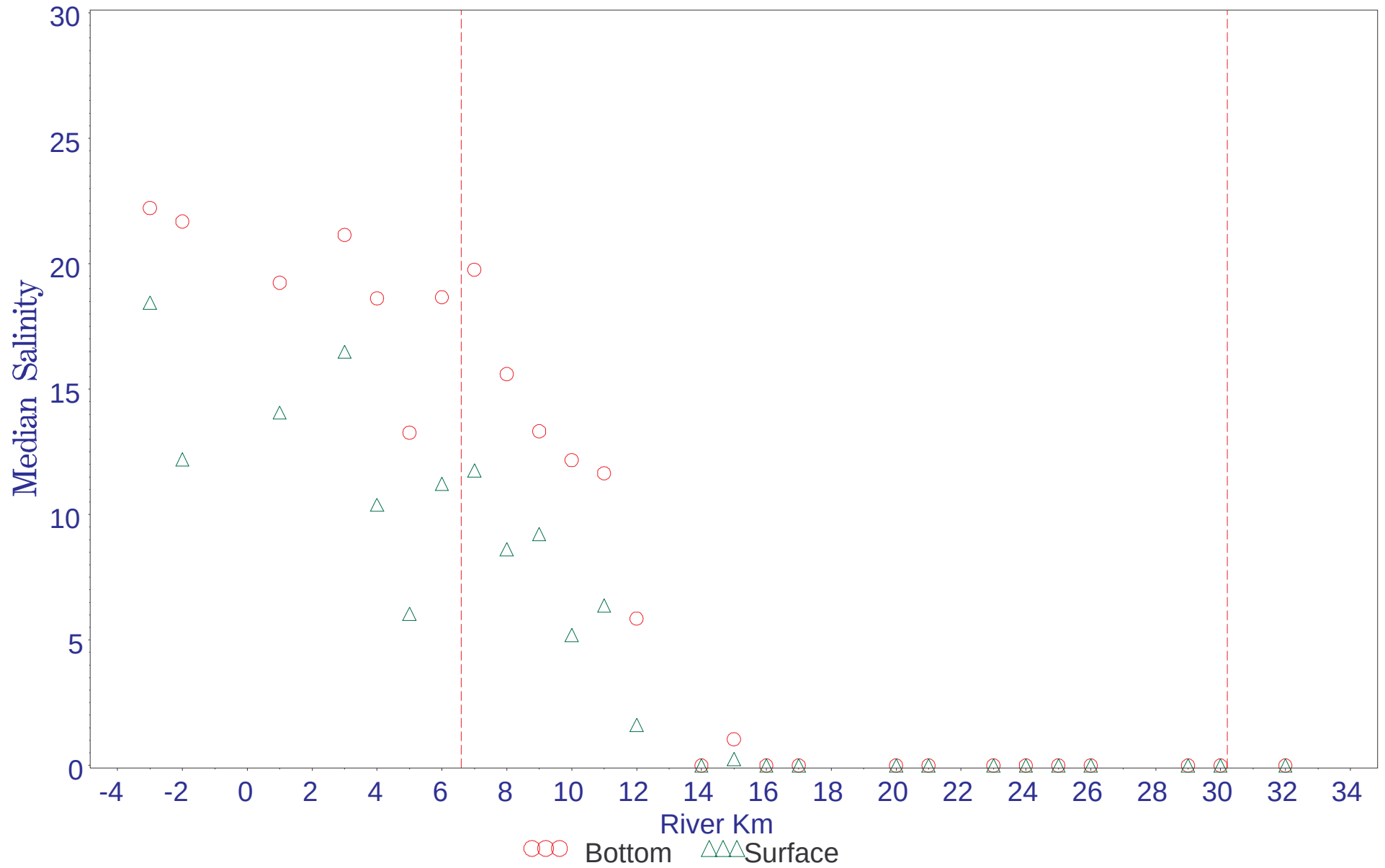
Median Salinity vs. River Km 1996-1998

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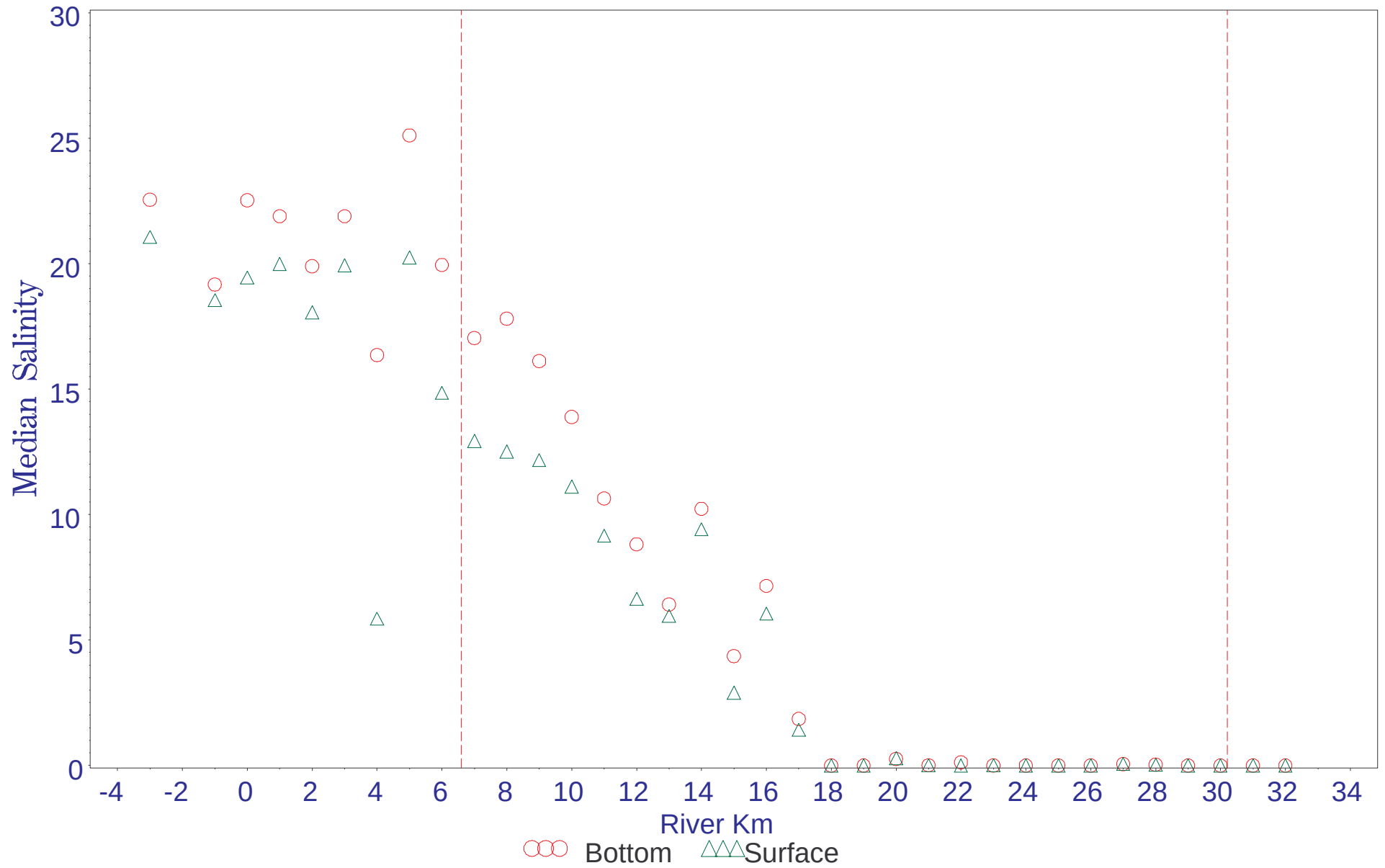
Median Salinity vs. River Km 1996-1998
Wet Season

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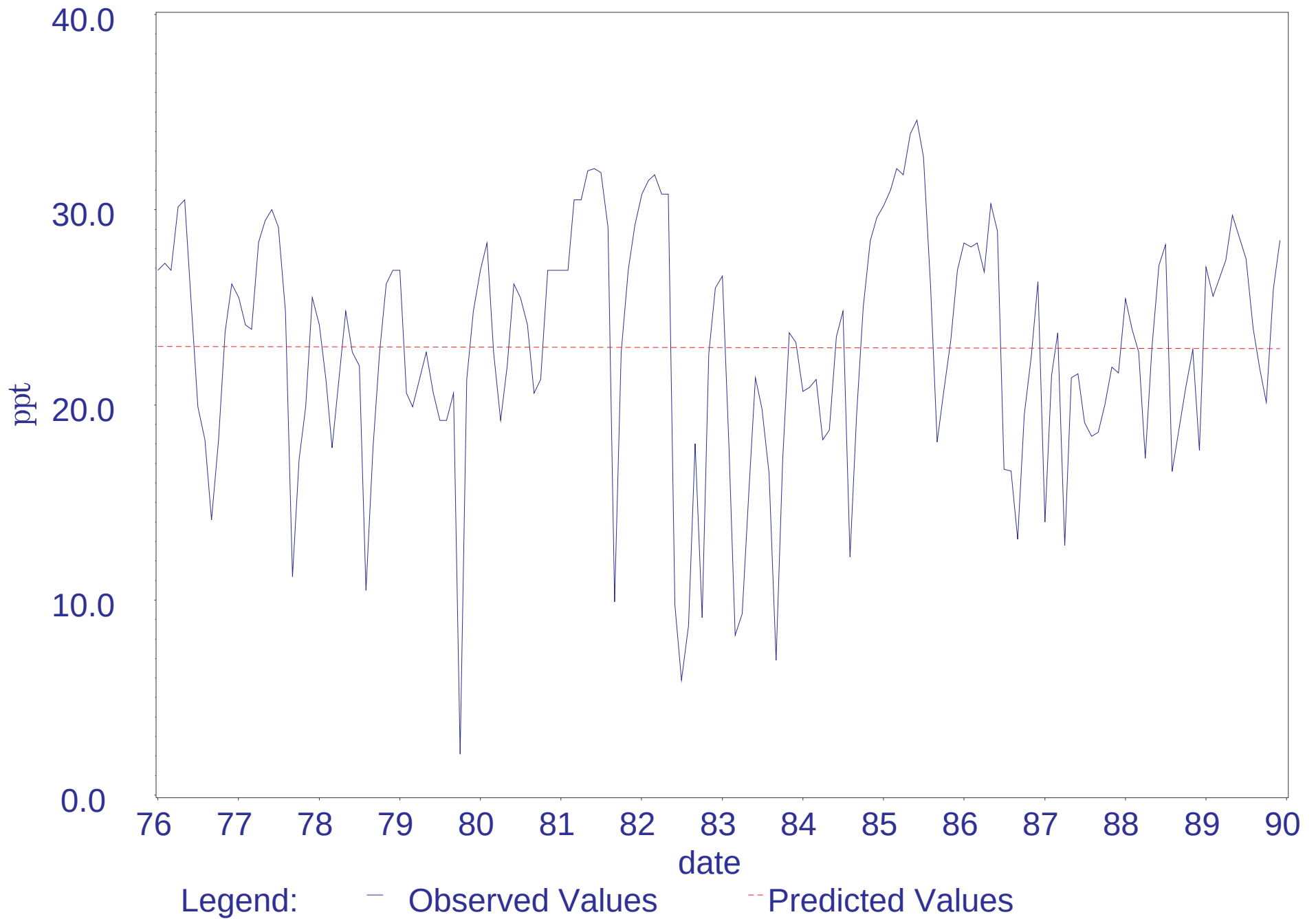
Median Salinity vs. River Km 1996-1998
Dry Season

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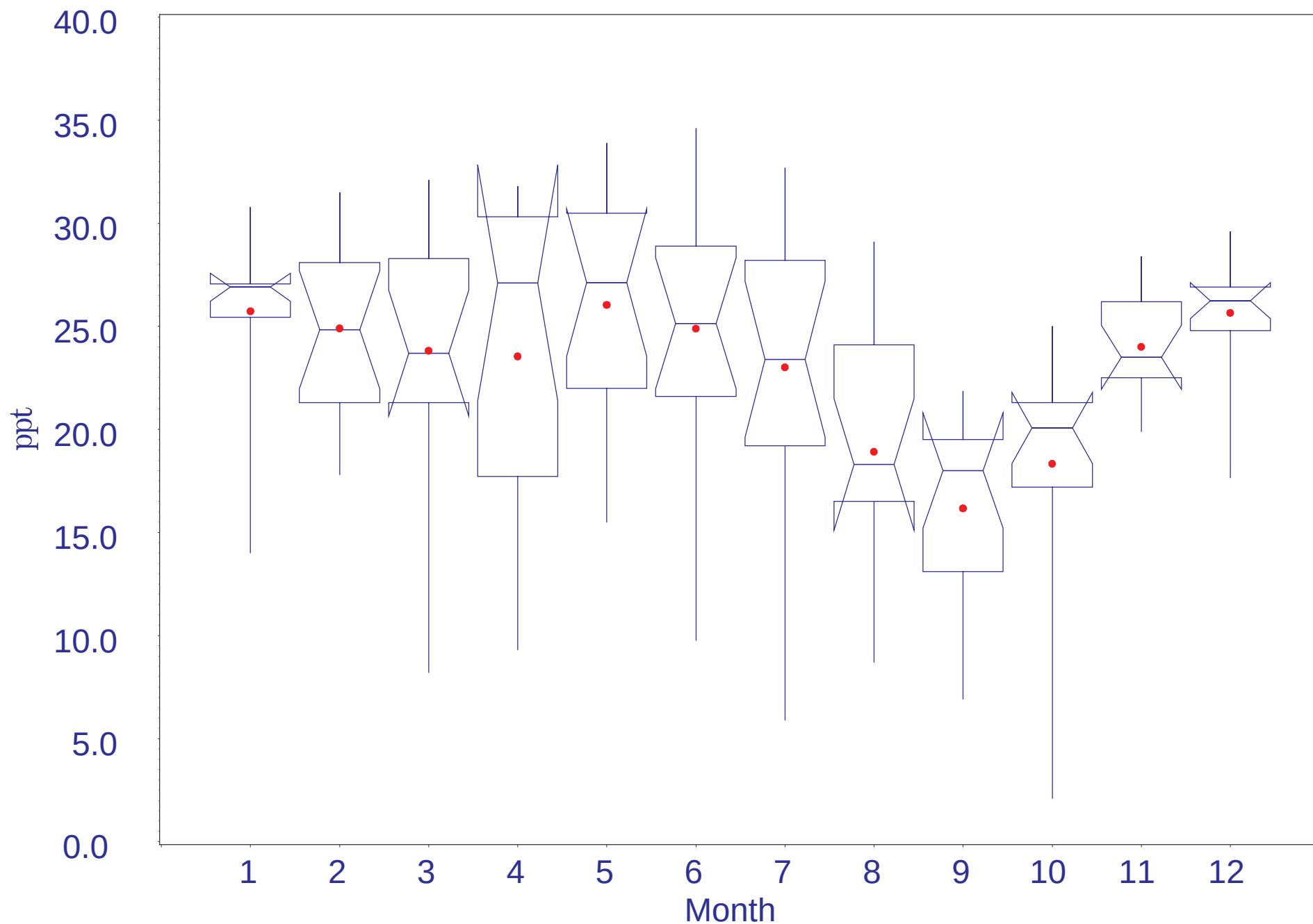
Surface Salinity at River Kilometer -2.4
1976-1989

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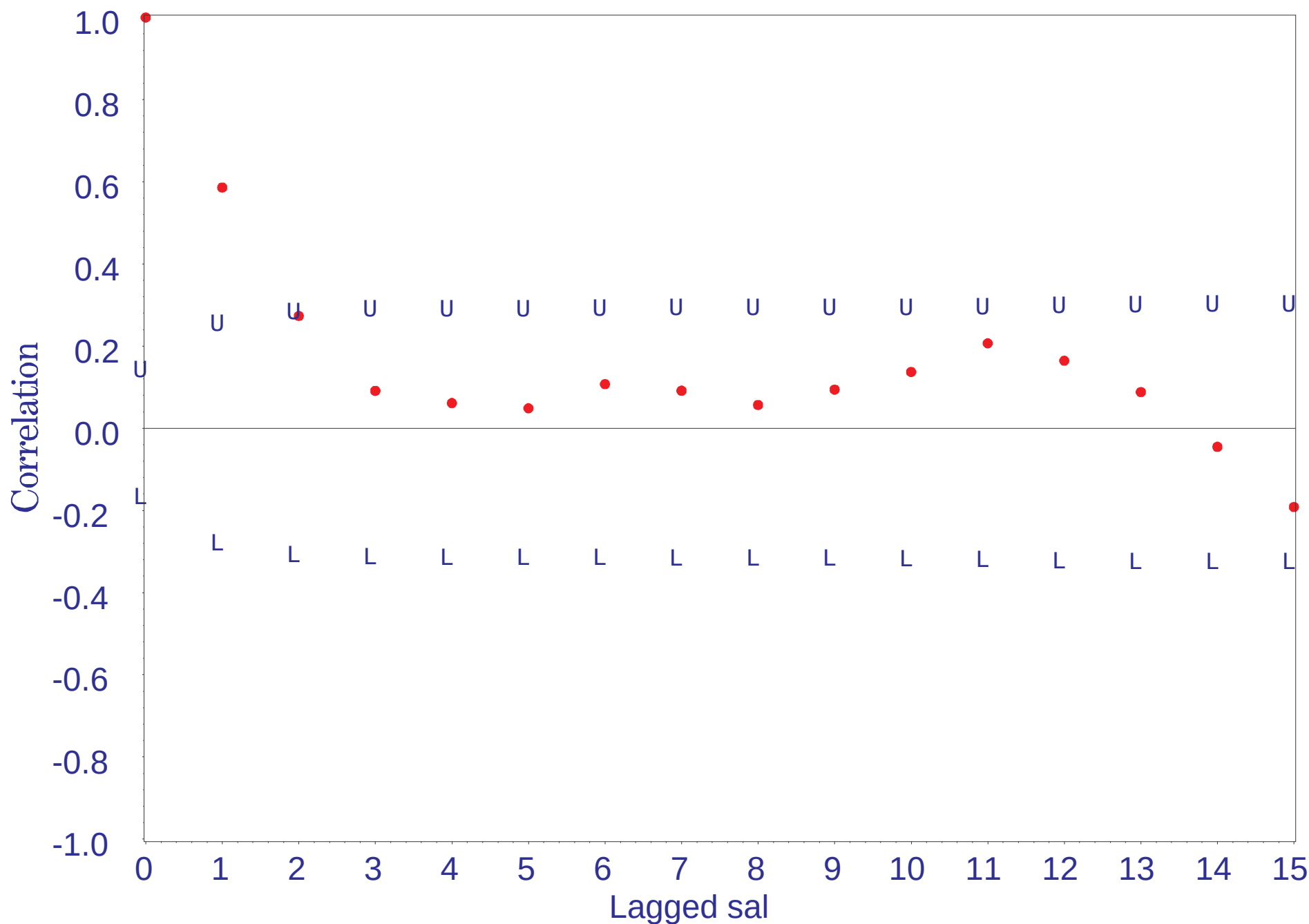
Surface Salinity at River Kilometer -2.4 (1976-1989)
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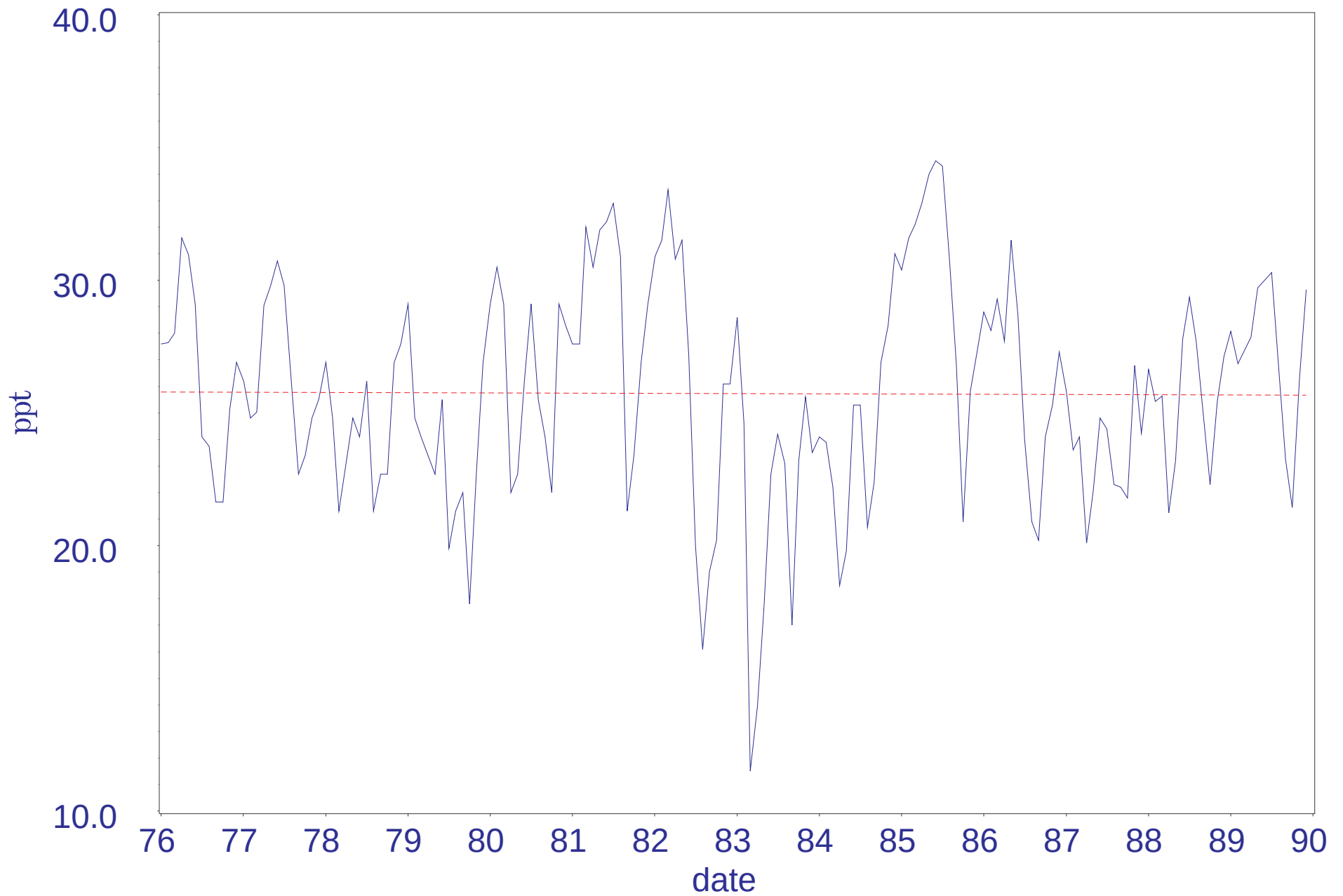
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Correlogram with Upper and Lower 95% Confidence Limits

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Bottom Salinity at River Kilometer -2.4
1976-1989

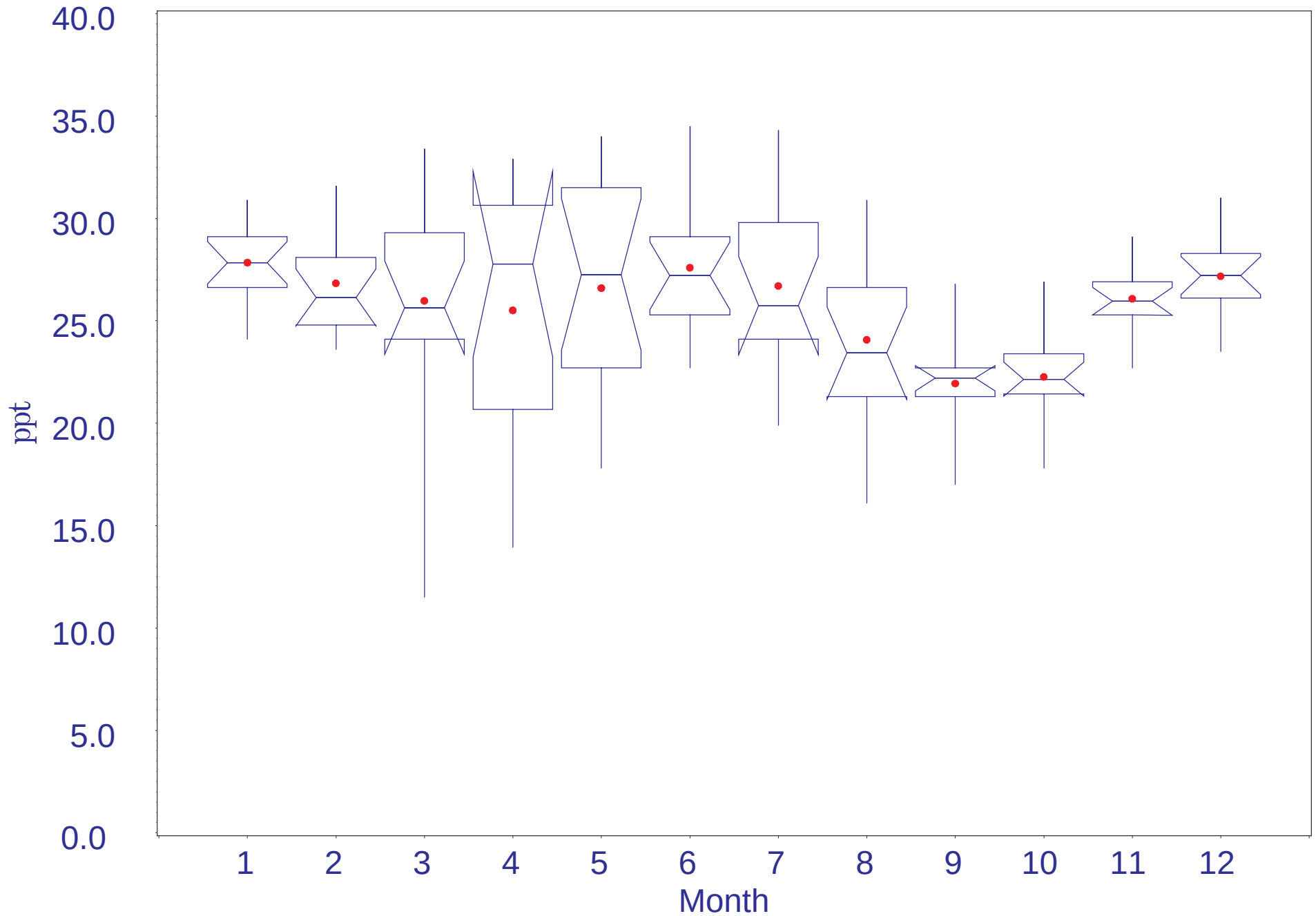
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Legend: — Observed Values - - - Predicted Values

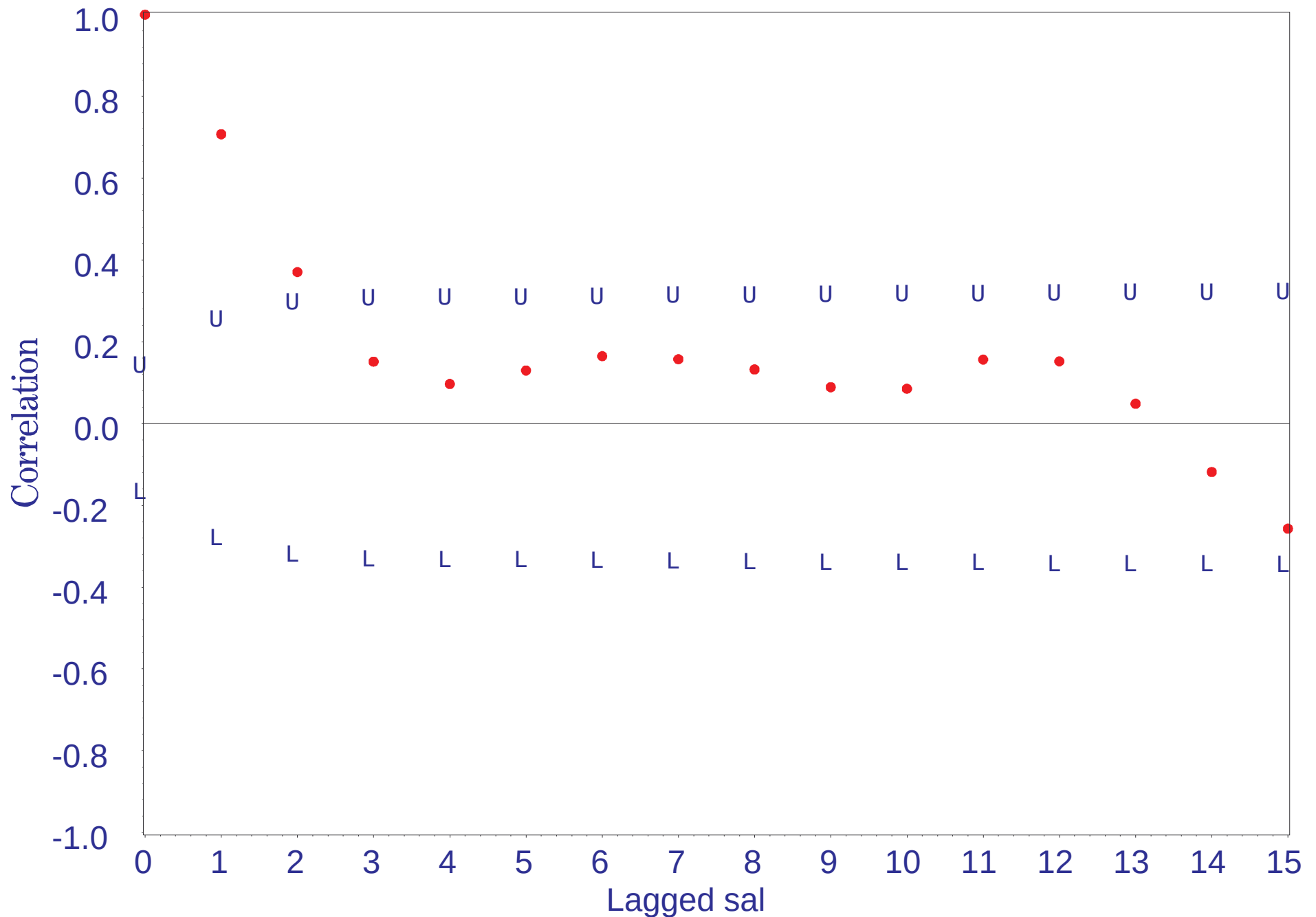
Bottom Salinity at River Kilometer -2.4 (1976-1989)
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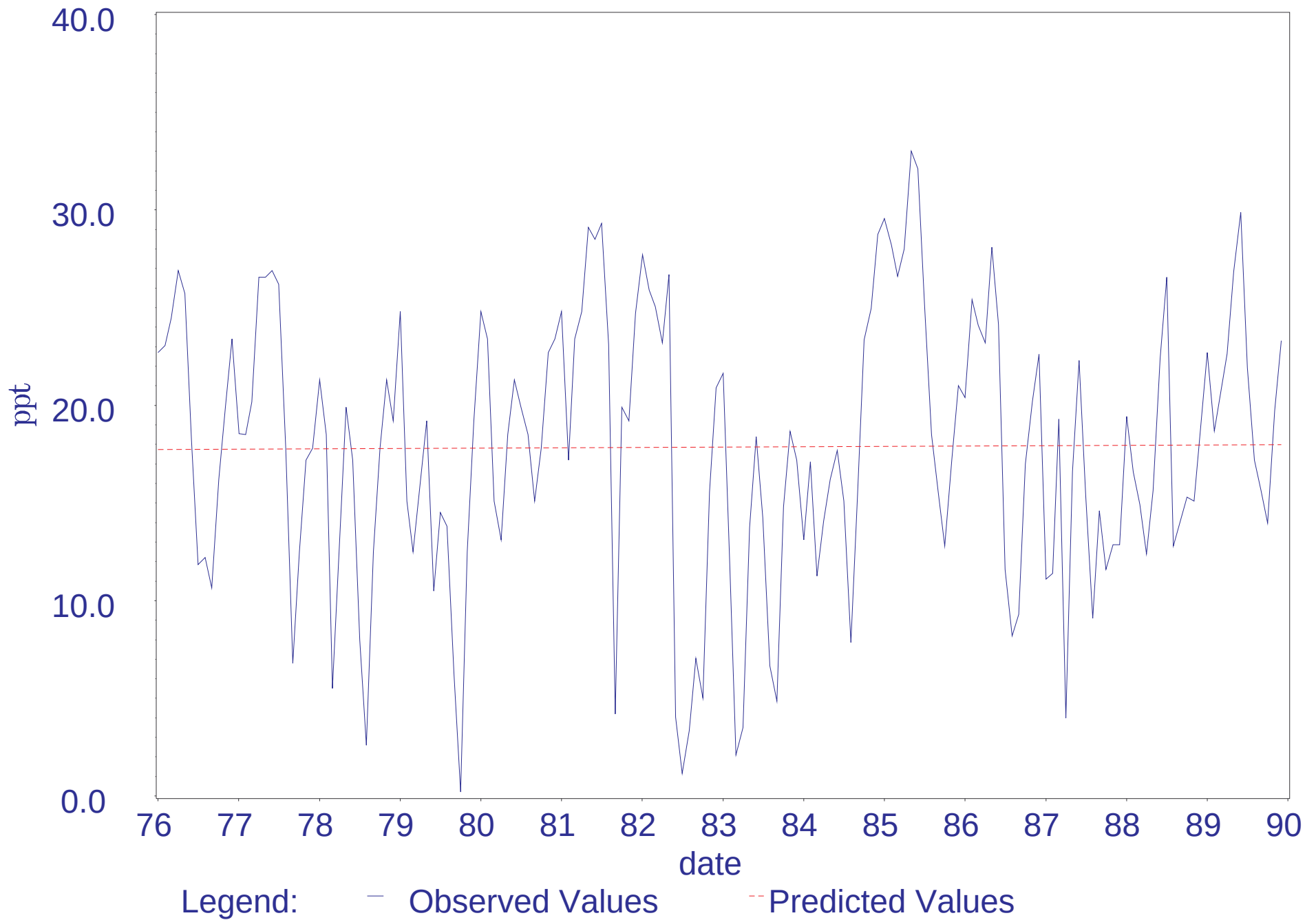
Bottom Salinity at River Kilometer -2.4 (1984-1998)
Correlogram with Upper and Lower 95% Confidence Limits

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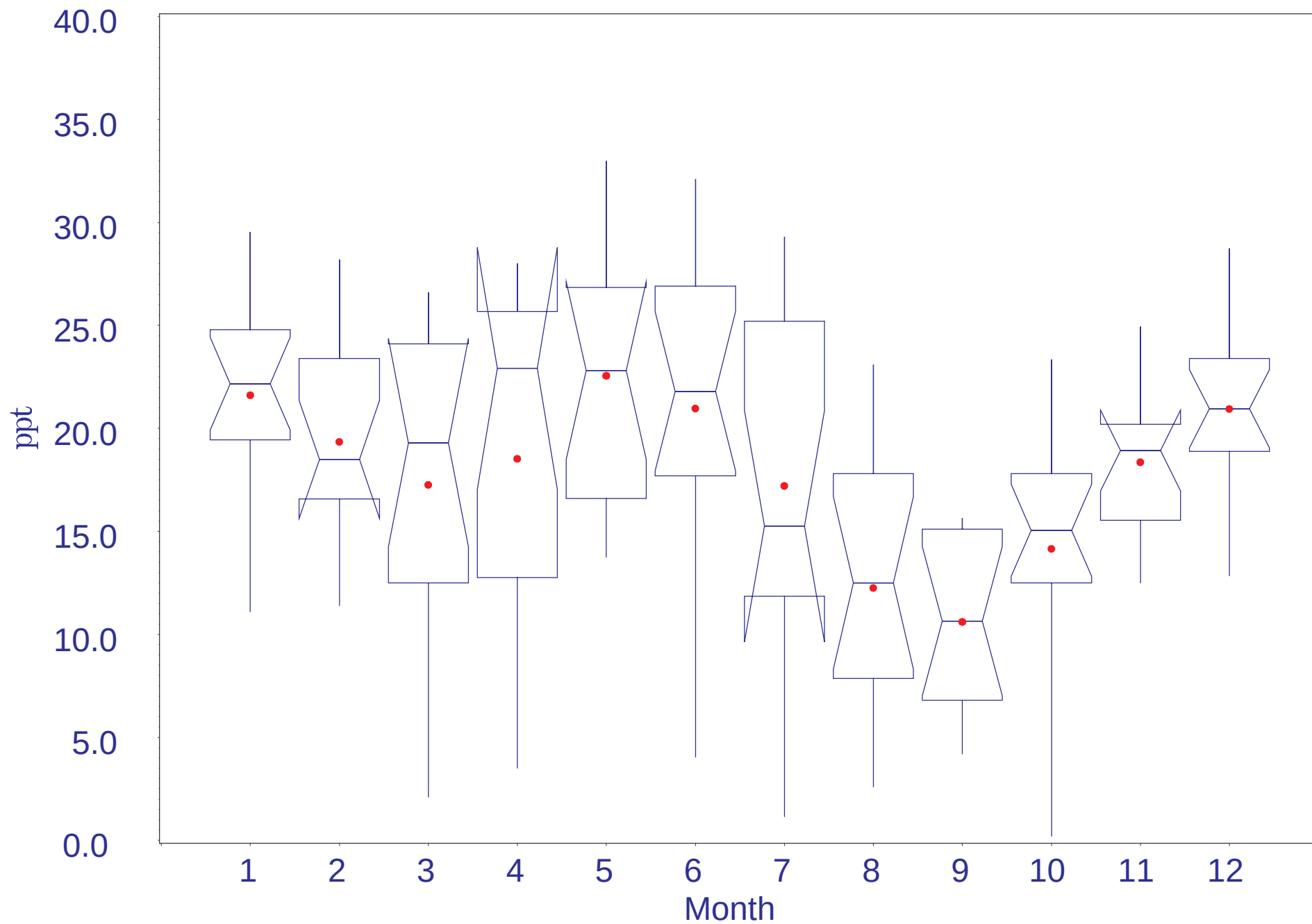
Surface Salinity at River Kilometer 6.6
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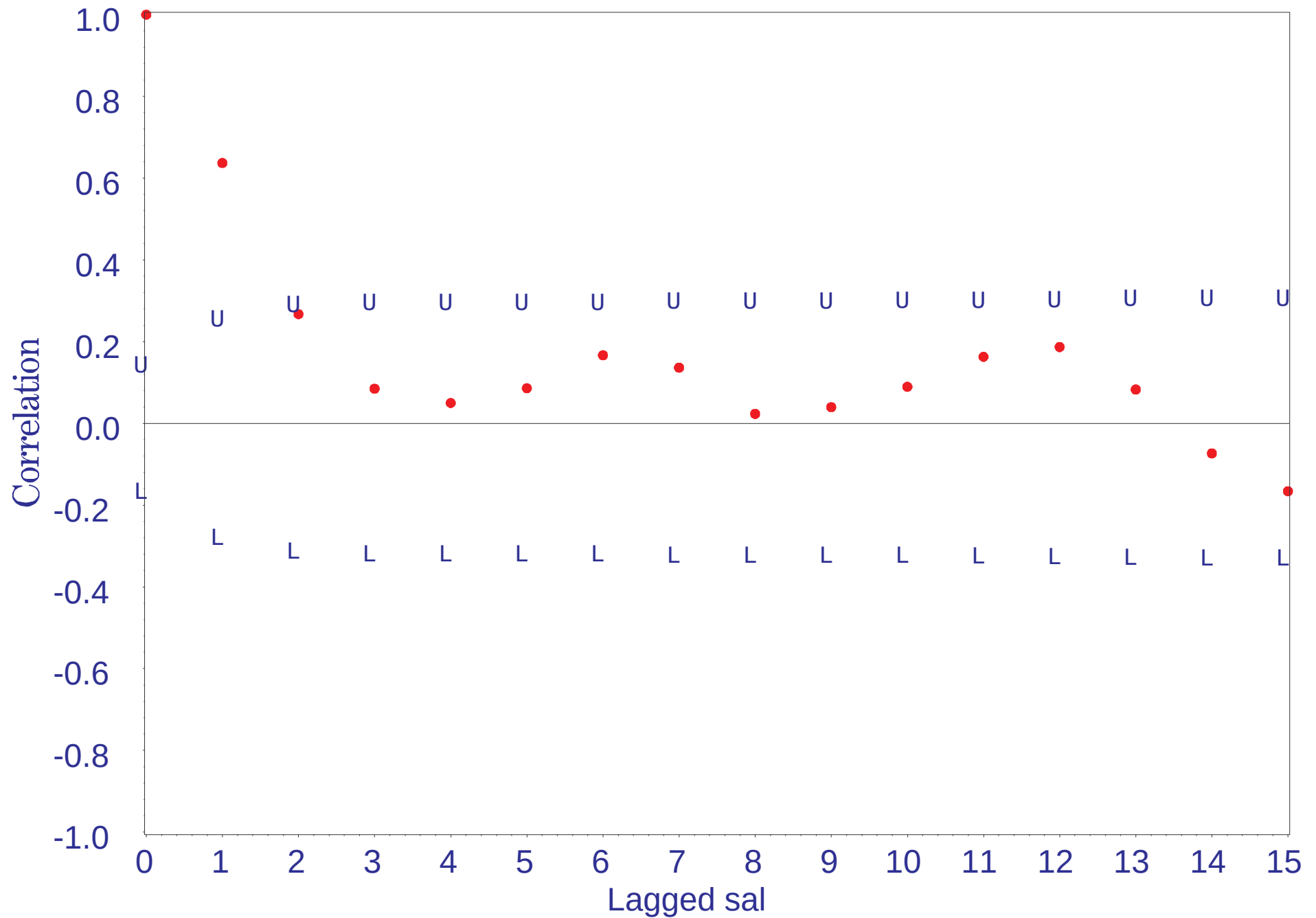
Surface Salinity at River Kilometer 6.6 (1976-1989)
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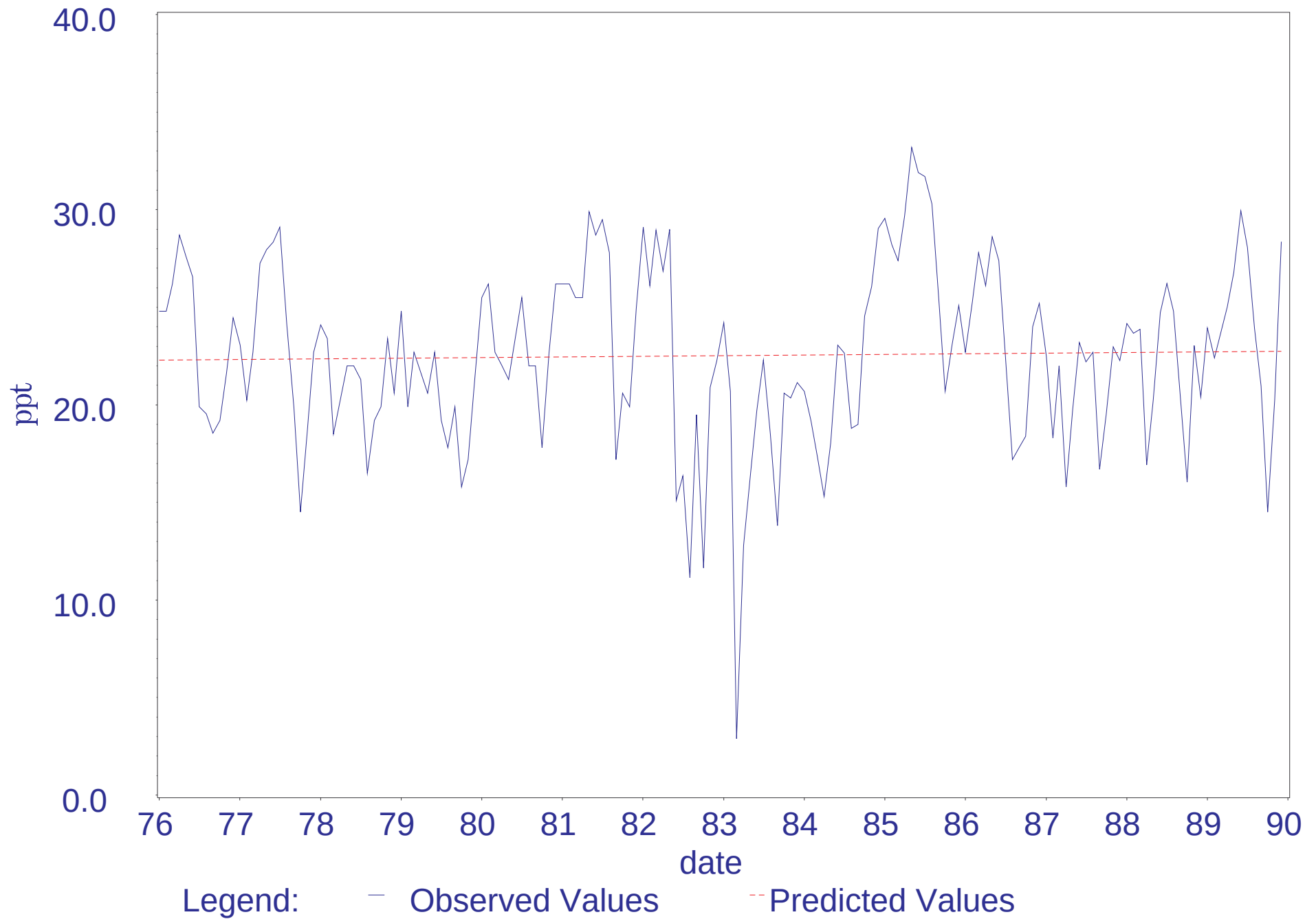
Surface Salinity at River Kilometer 6.6 (1976-1989)
Correlogram with Upper and Lower 95% Confidence Limits

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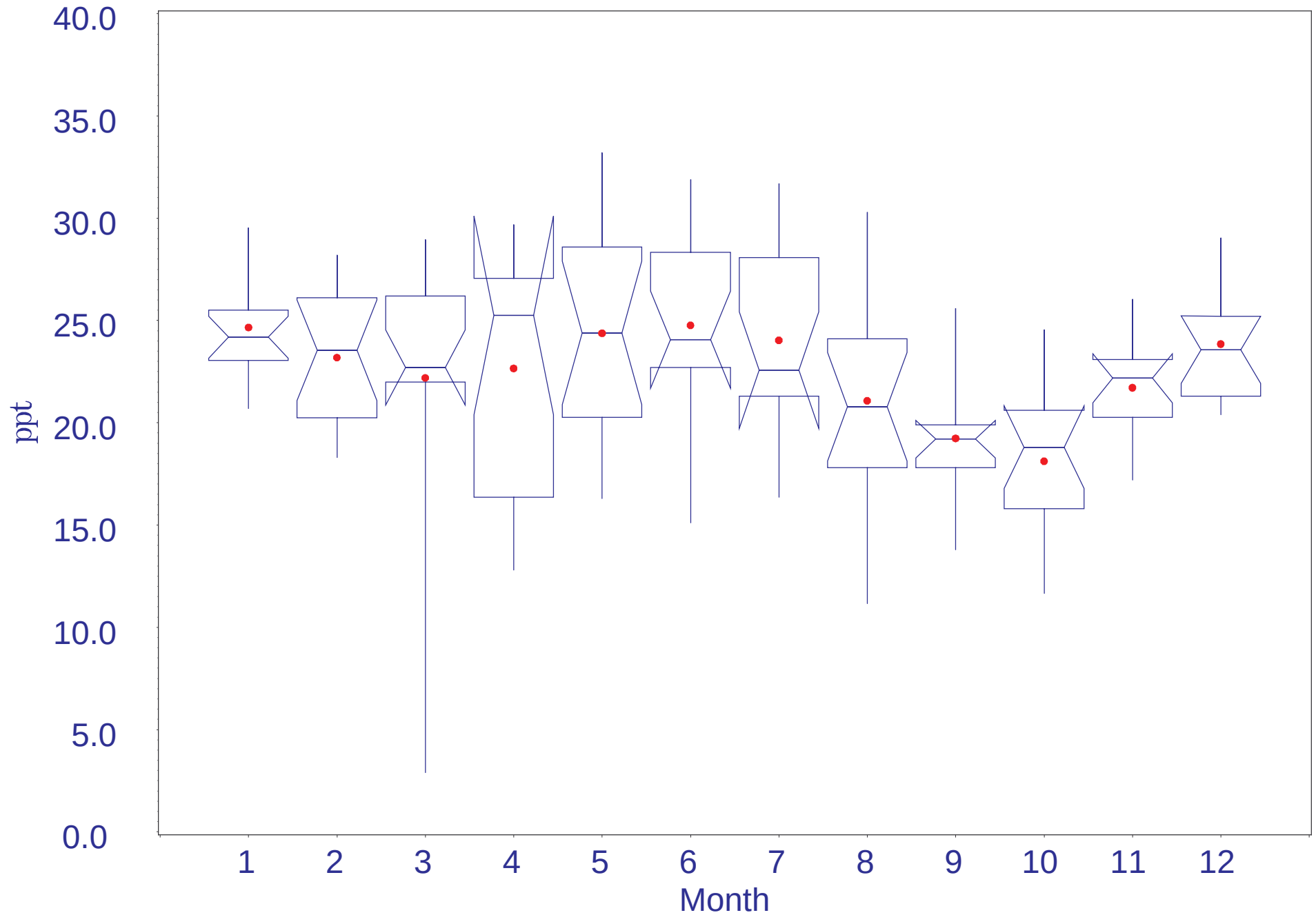
Bottom Salinity at River Kilometer 6.6
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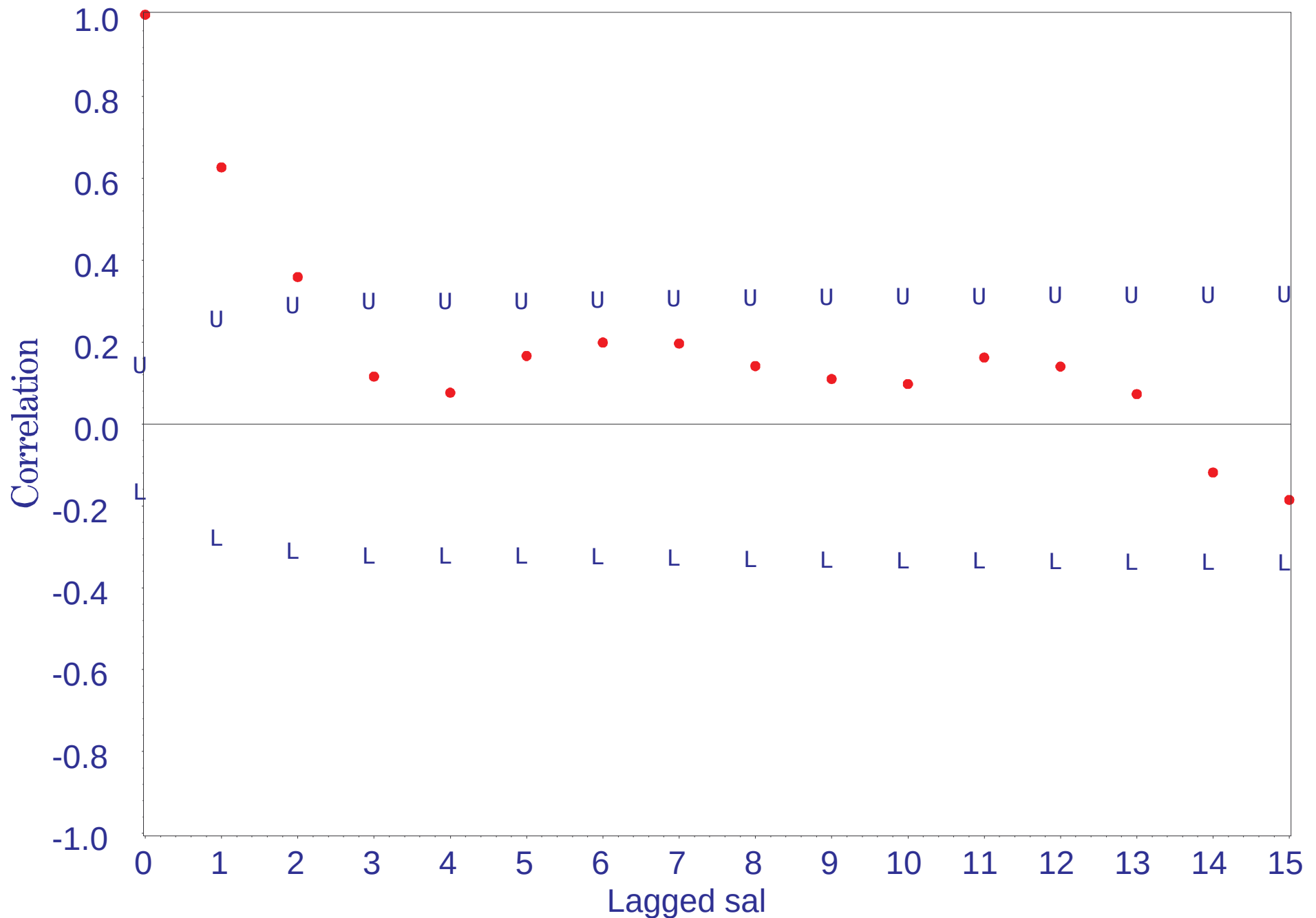
Bottom Salinity at River Kilometer 6.6 (1976-1989)
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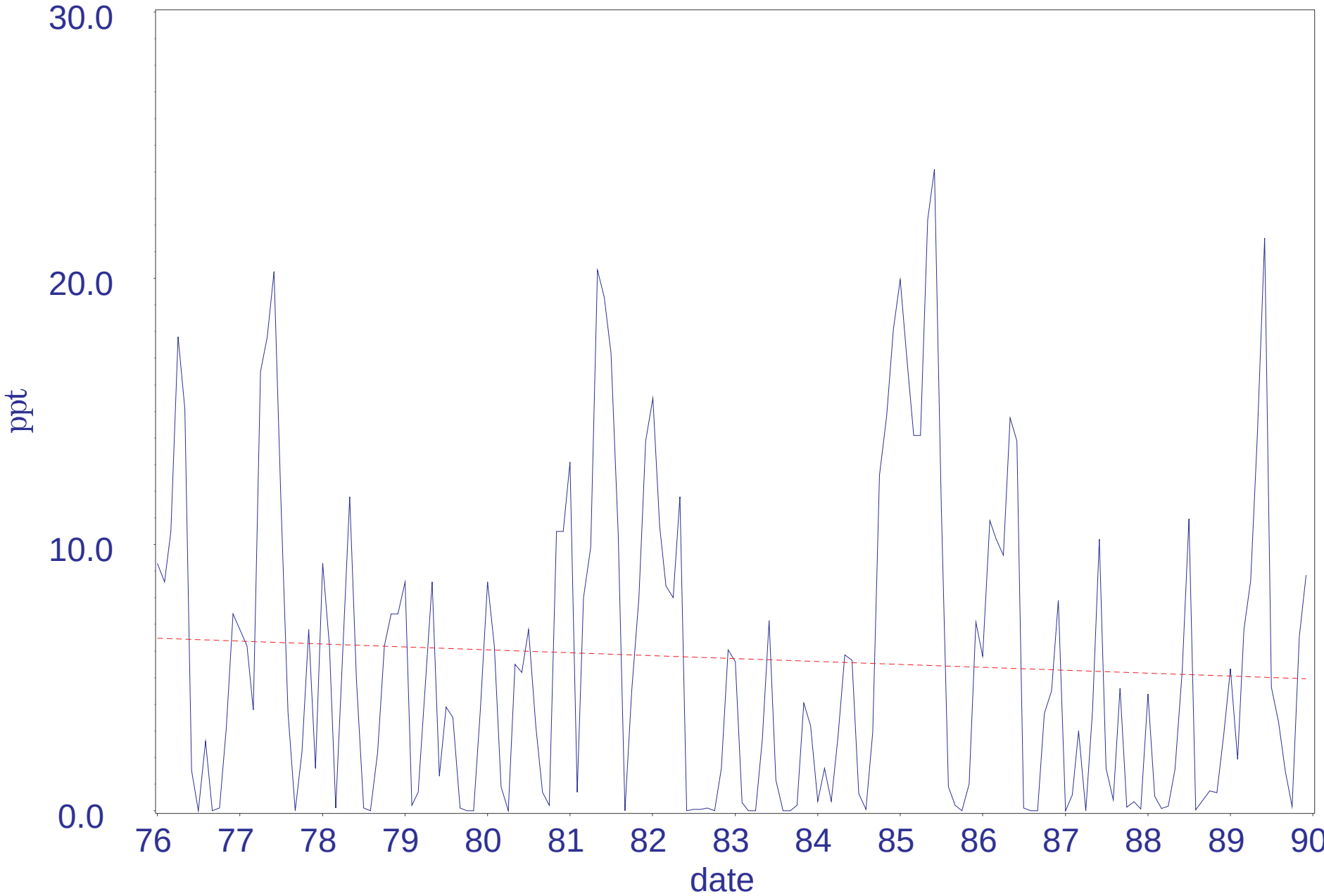
Bottom Salinity at River Kilometer 6.6 (1976-1989)
Correlogram with Upper and Lower 95% Confidence Limits

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Surface Salinity at River Kilometer 15.5
1976-1989

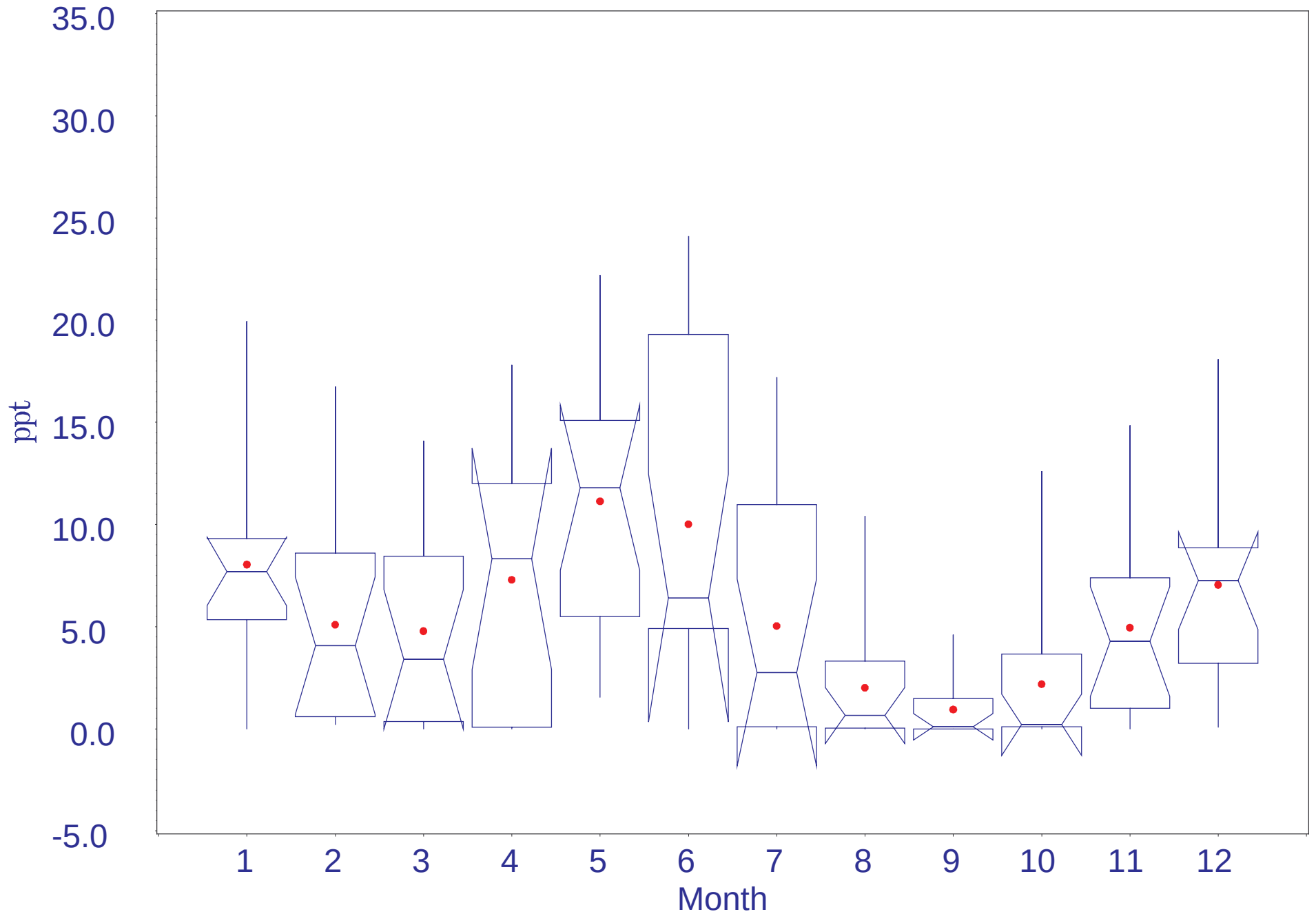
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Legend: — Observed Values - - - Predicted Values

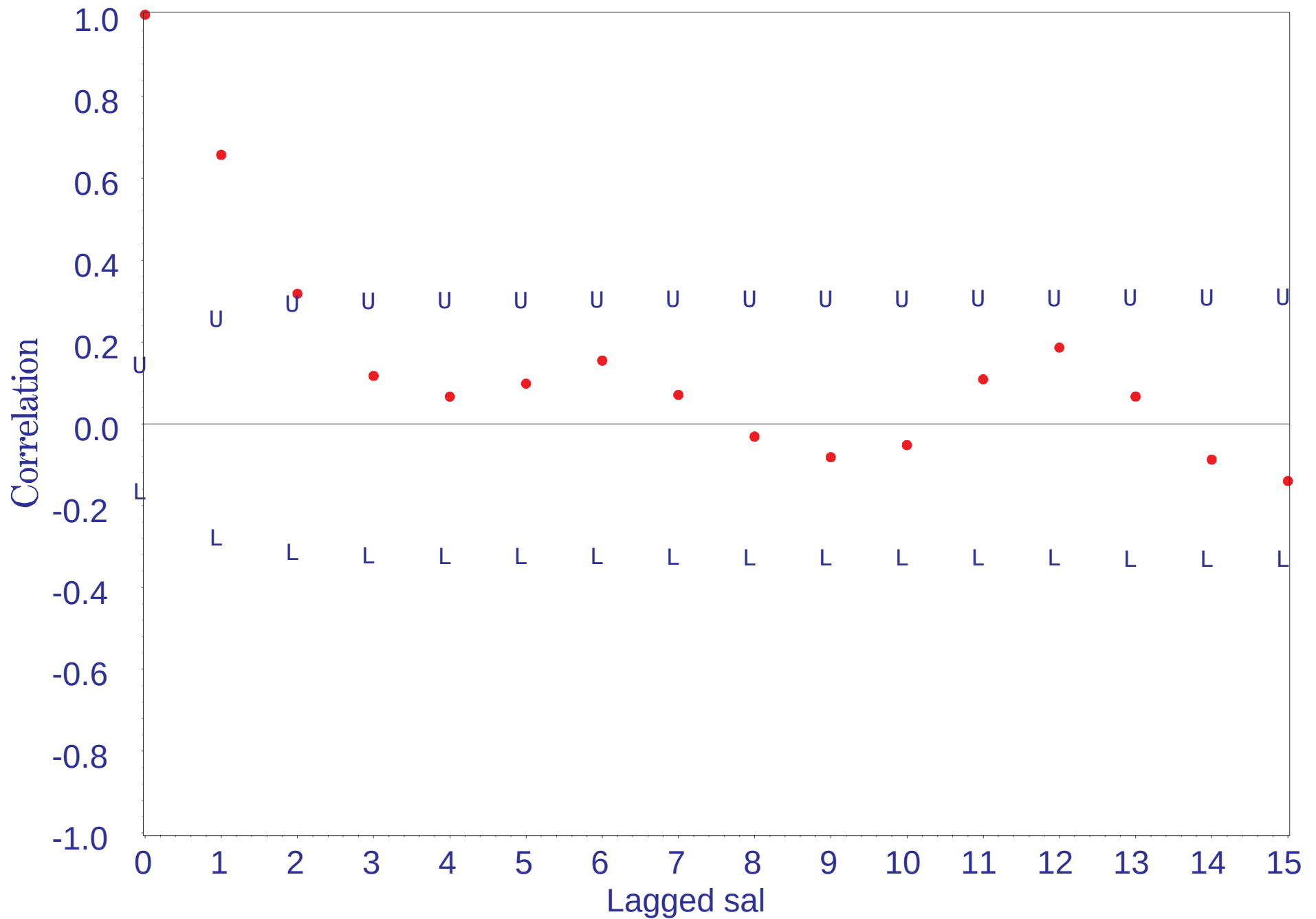
Surface Salinity at River Kilometer 15.5 (1976-1989)
Monthly Boxplots

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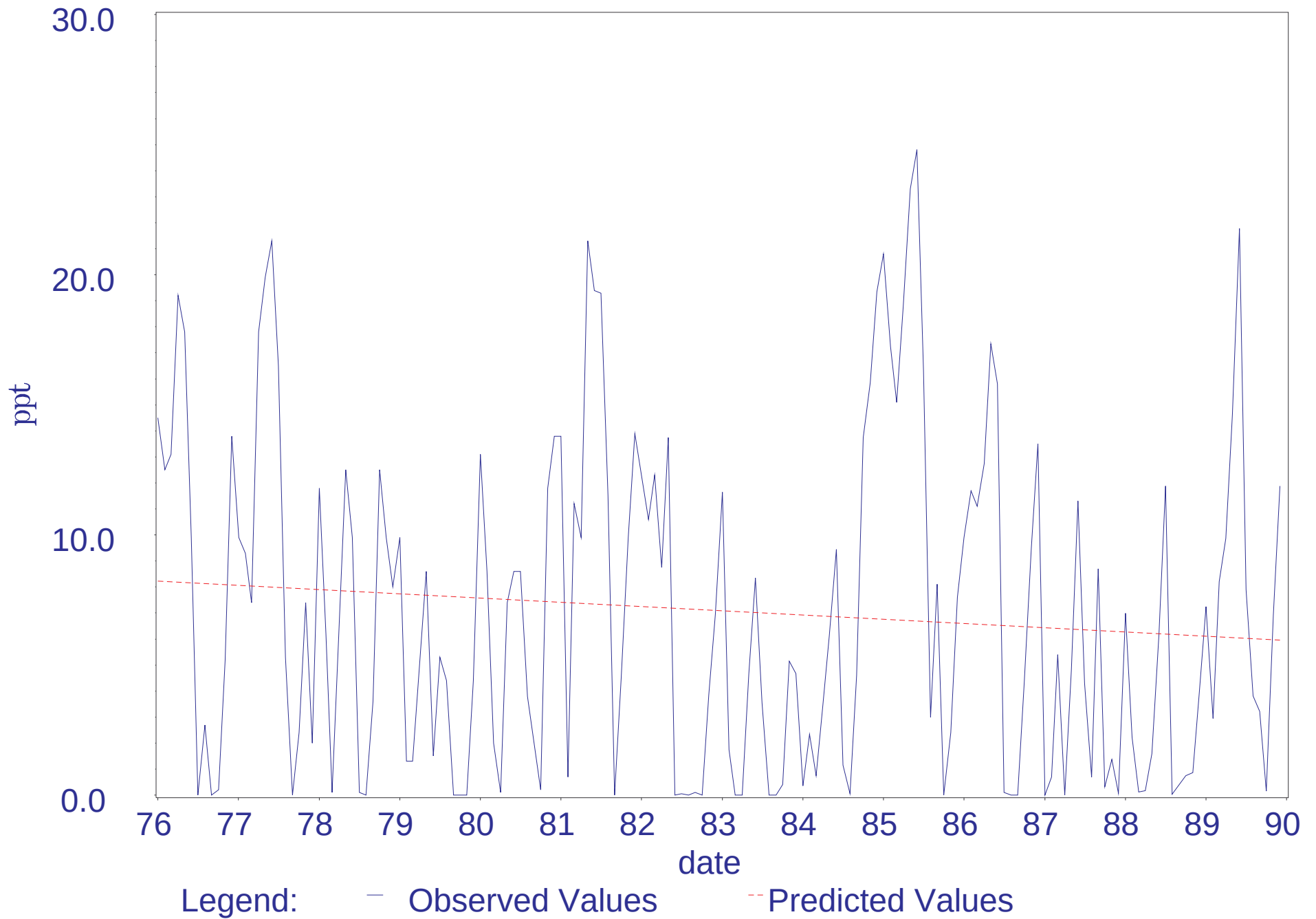
Surface Salinity at River Kilometer 15.5 (1976-1989)
Correlogram with Upper and Lower 95% Confidence Limits

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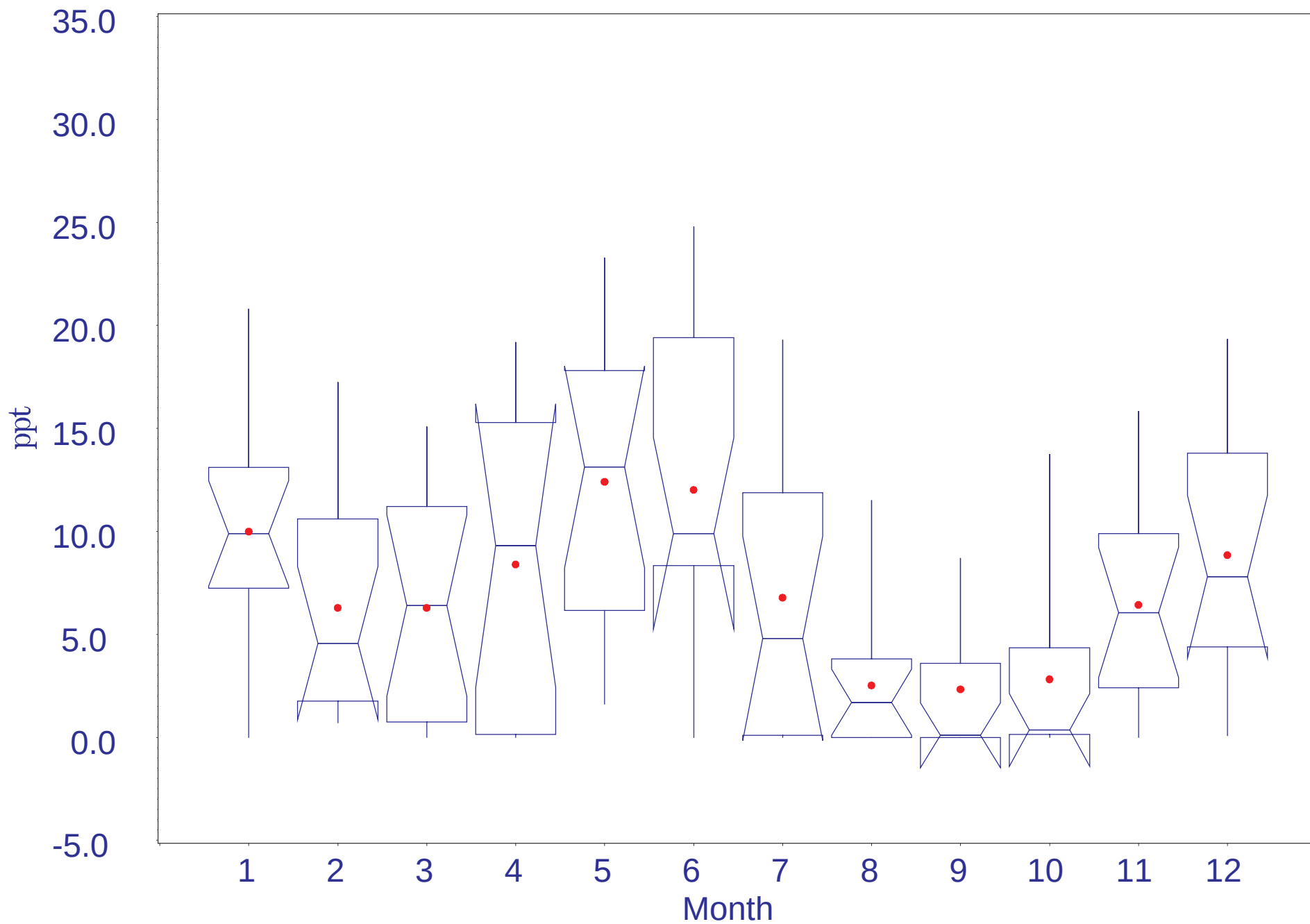
Bottom Salinity at River Kilometer 15.5
1976-1989

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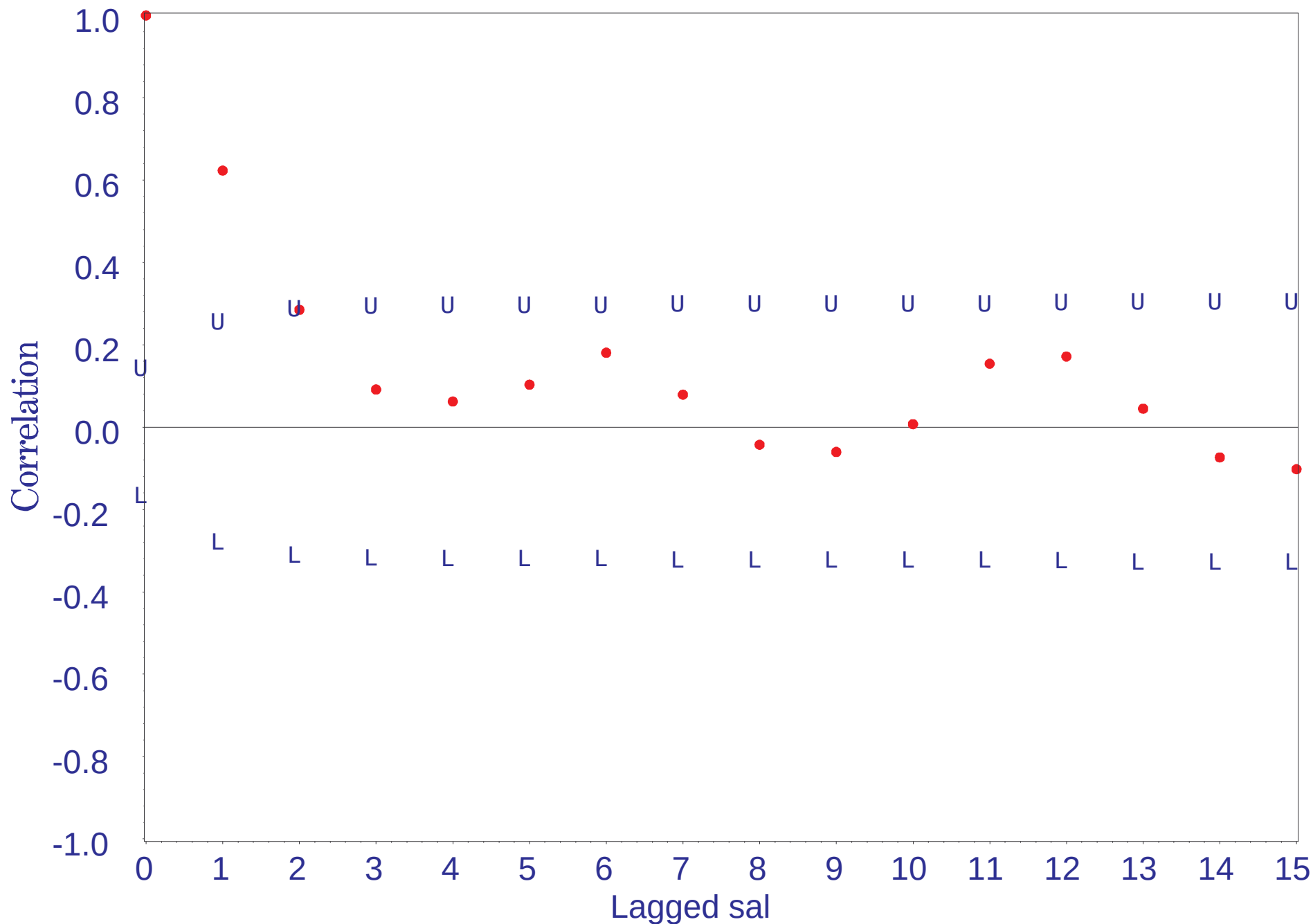
Bottom Salinity at River Kilometer 15.5 (1976-1989)
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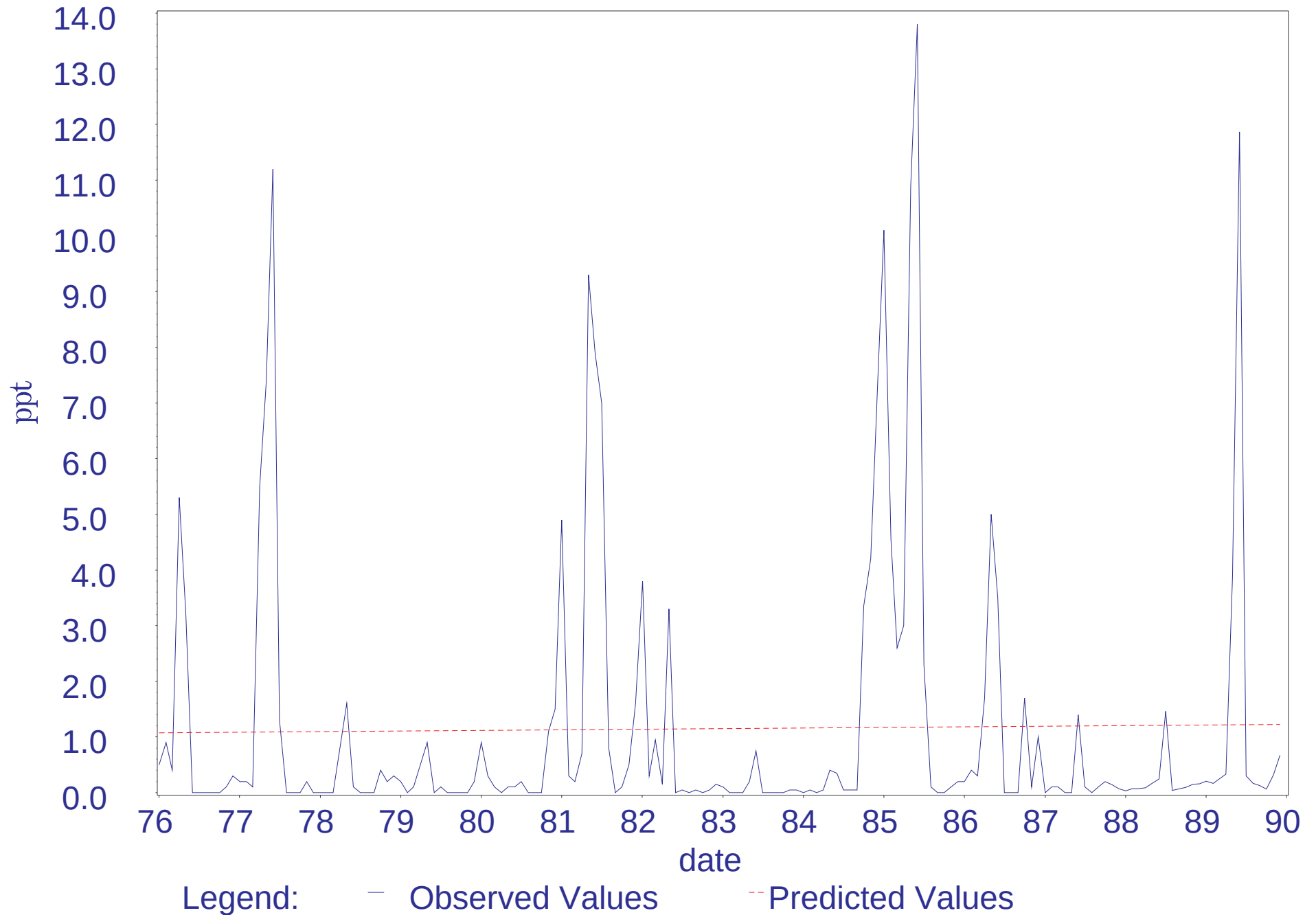
Bottom Salinity at River Kilometer 15.5 (1976-1989)
Correlogram with Upper and Lower 95% Confidence Limits

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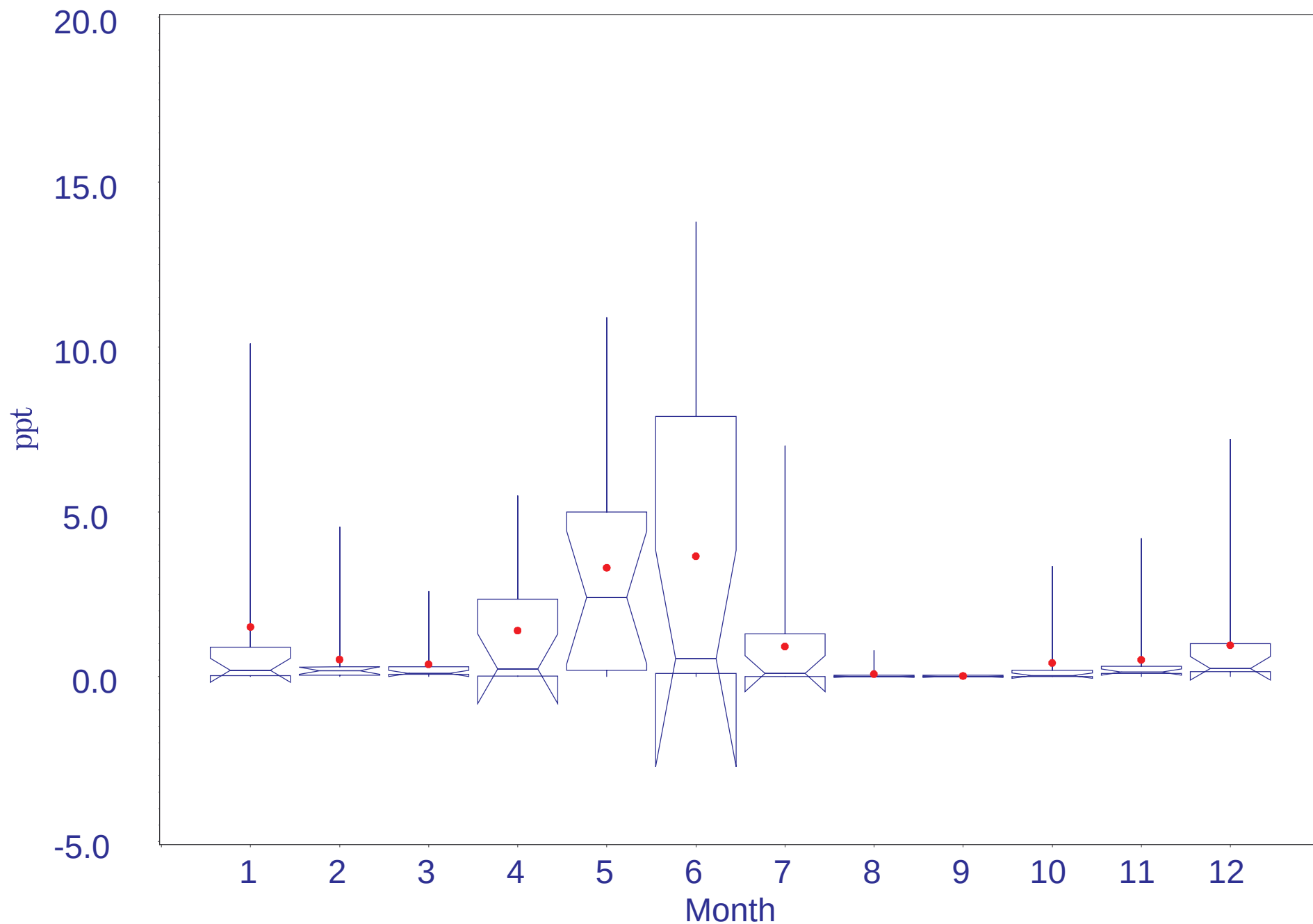
Surface Salinity at River Kilometer 23.6
1976-1989

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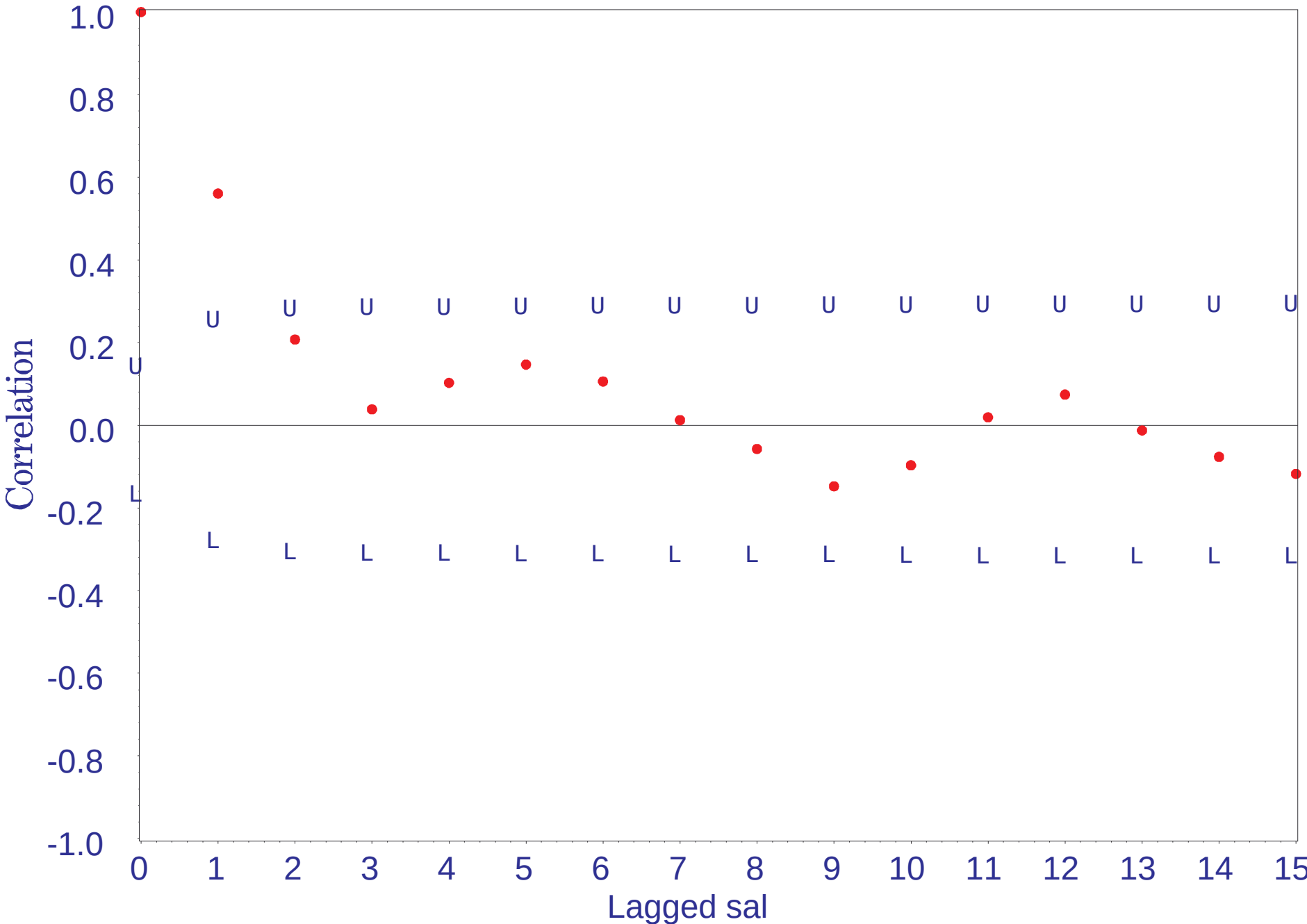
Surface Salinity at River Kilometer 23.6 (1976-1989)
Monthly Boxplots

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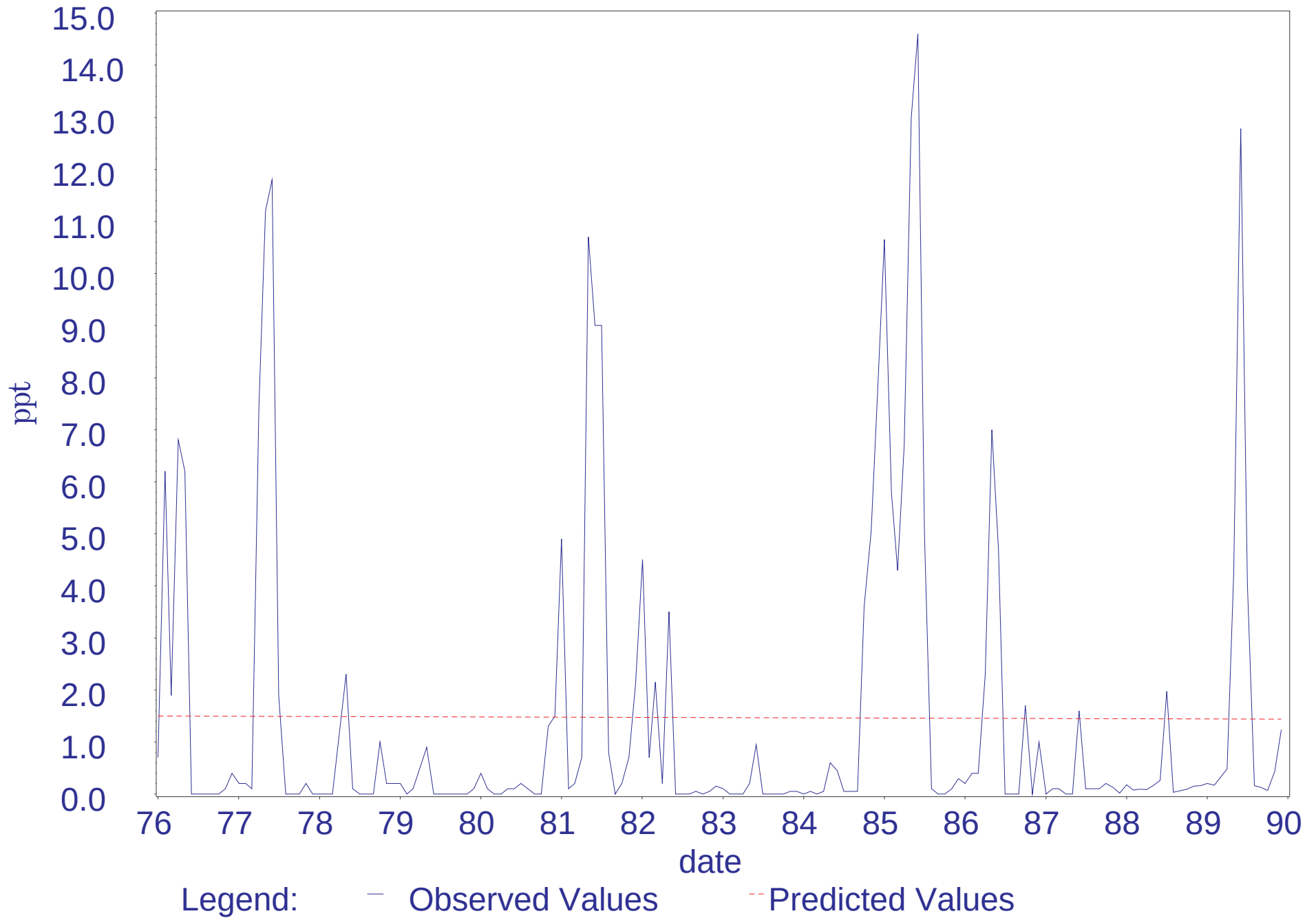
Surface Salinity at River Kilometer 23.6 (1976-1989)
Correlogram with Upper and Lower 95% Confidence Limits

B-52



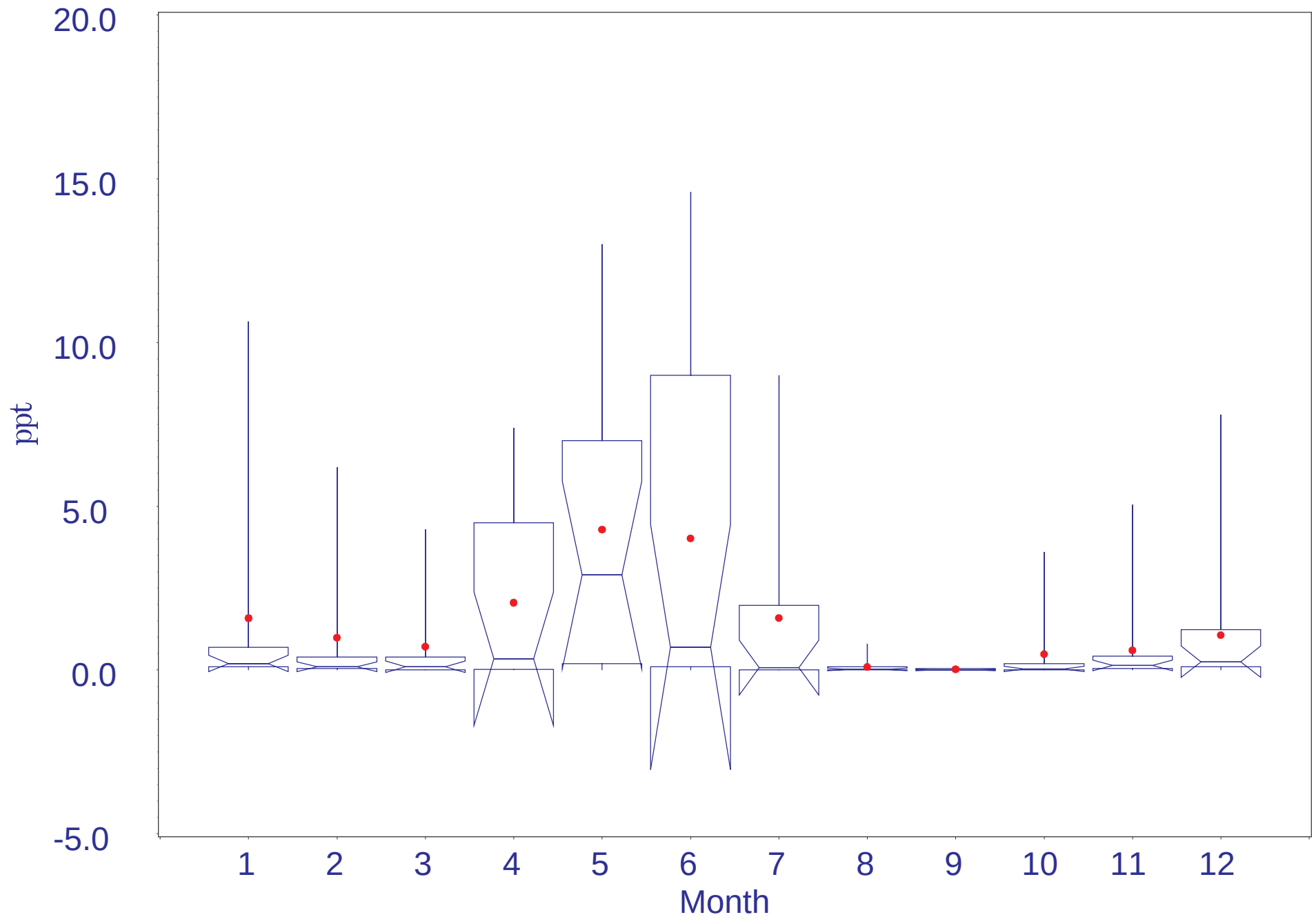
Bottom Salinity at River Kilometer 23.6
1976-1989

B-53



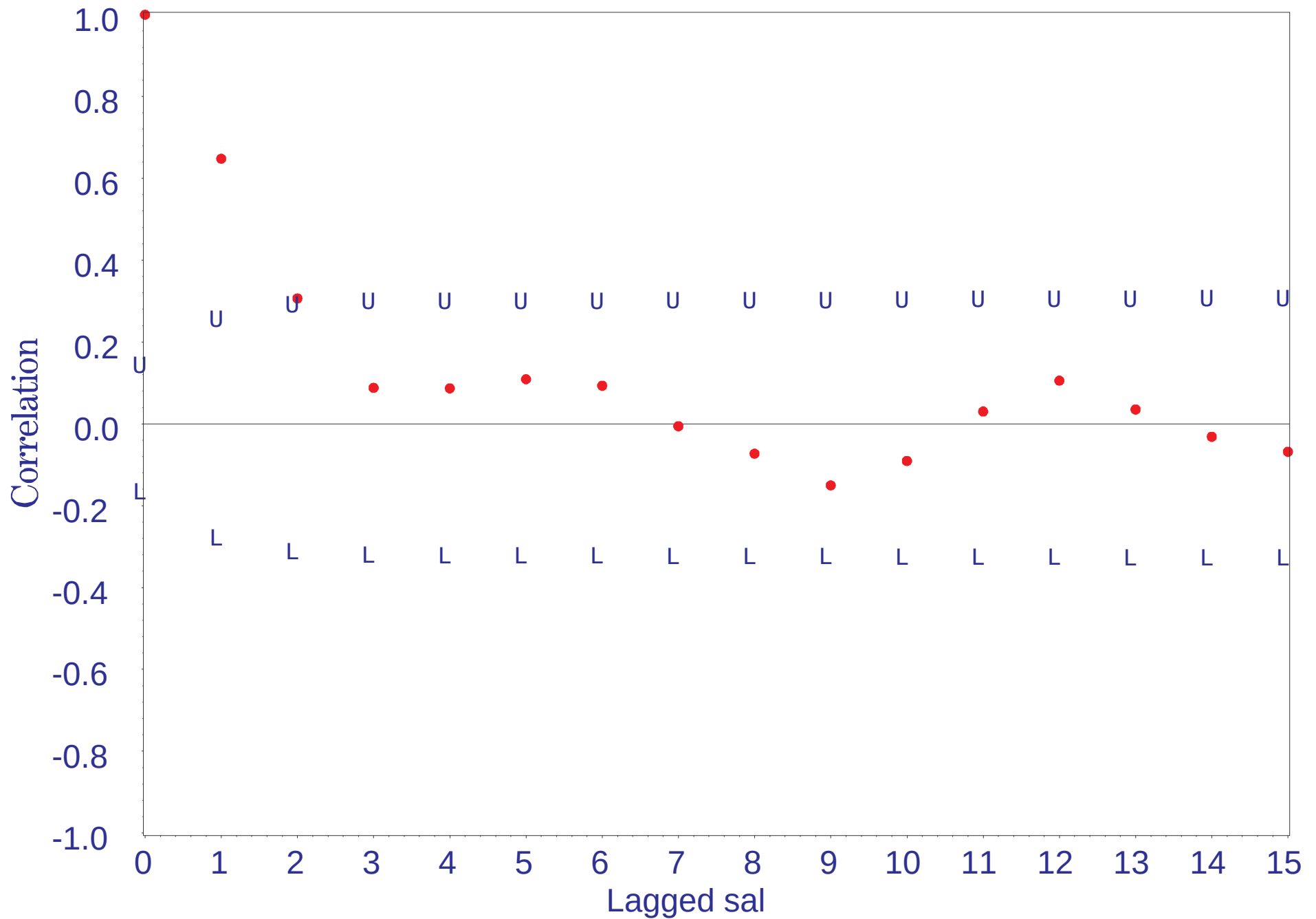
Bottom Salinity at River Kilometer 23.6 (1976-1989)
Monthly Boxplots

B-54



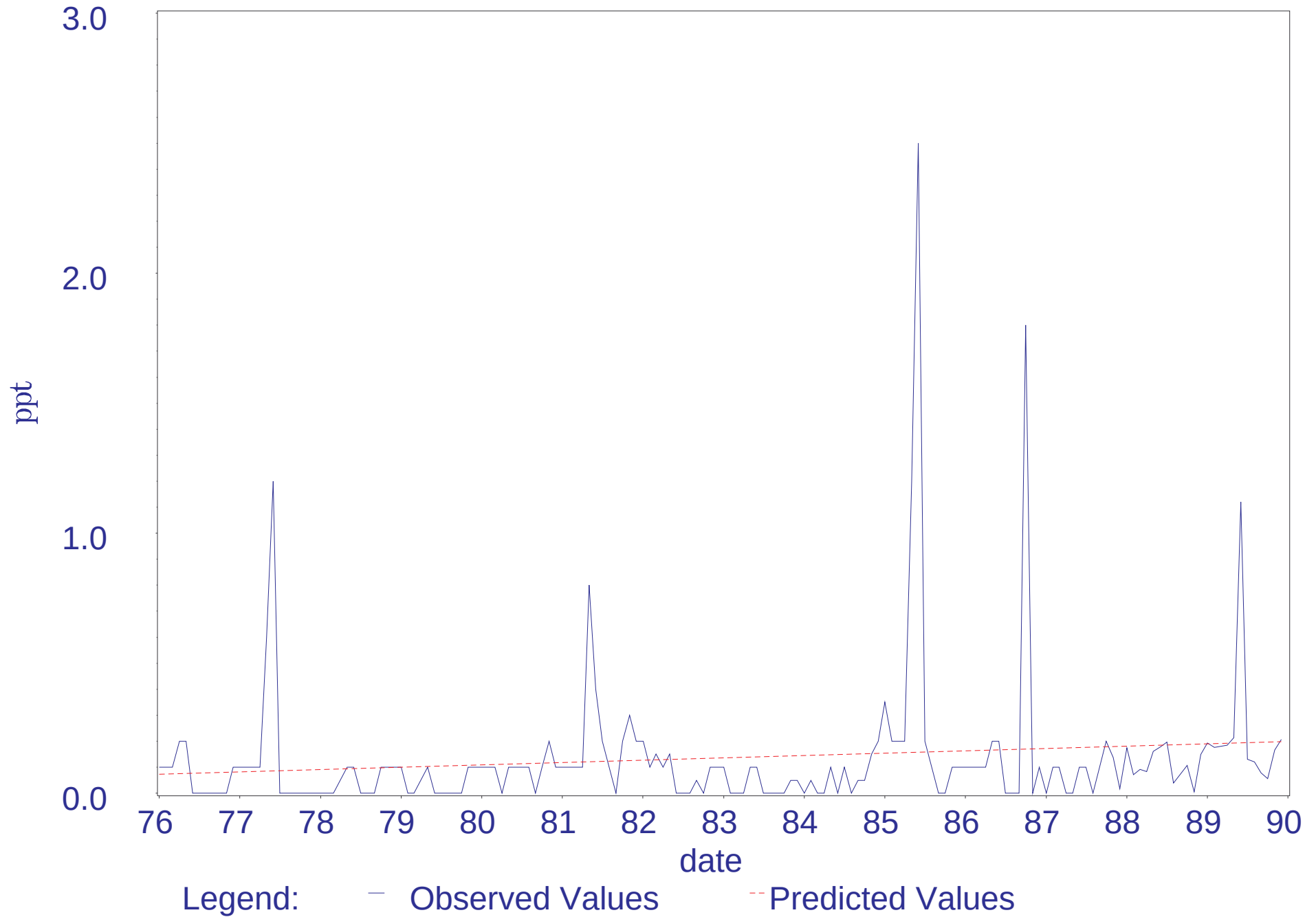
Bottom Salinity at River Kilometer 23.6 (1976-1989)
Correlogram with Upper and Lower 95% Confidence Limits

B-55



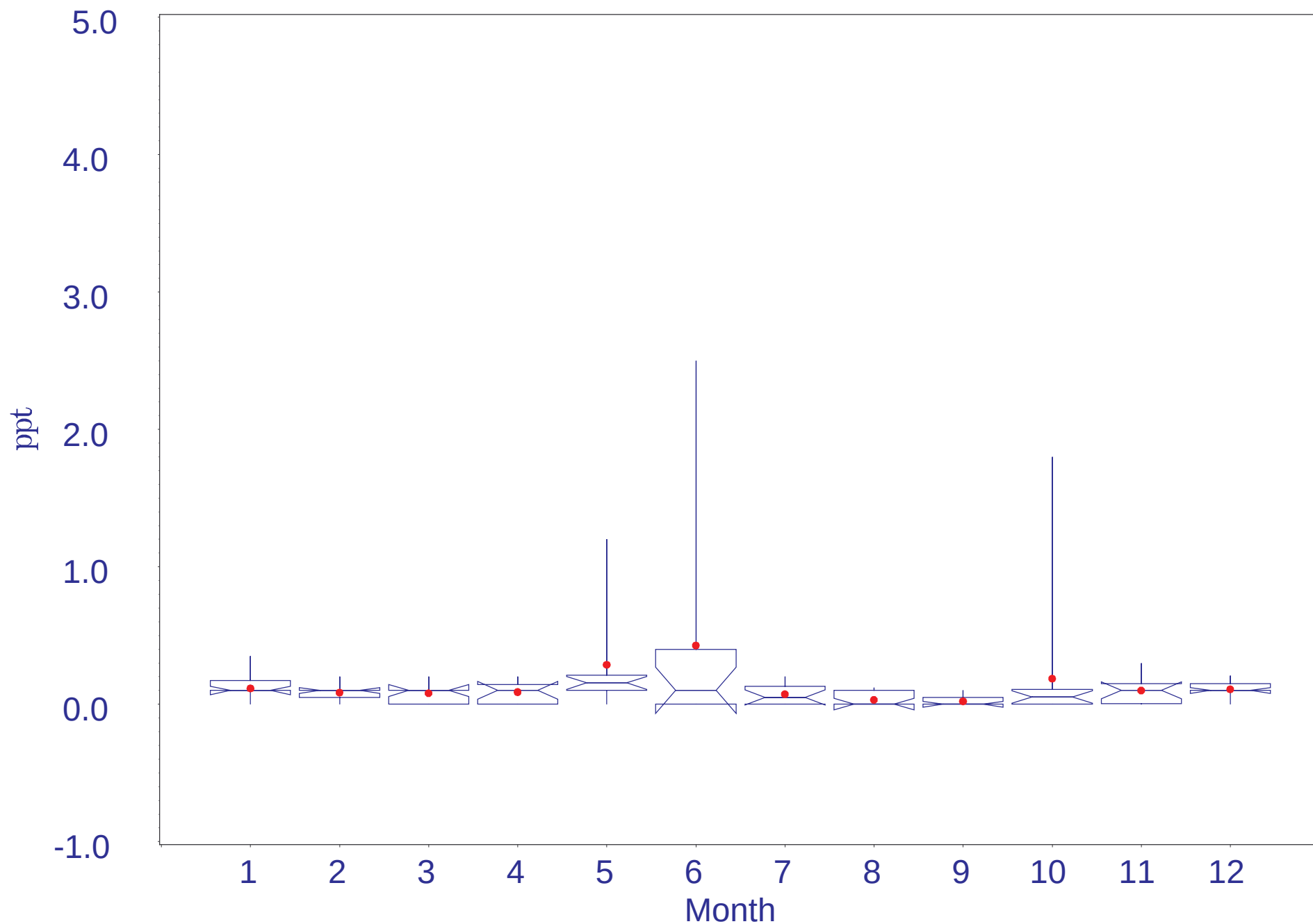
Surface Salinity at River Kilometer 30.4
1976-1989

B-56



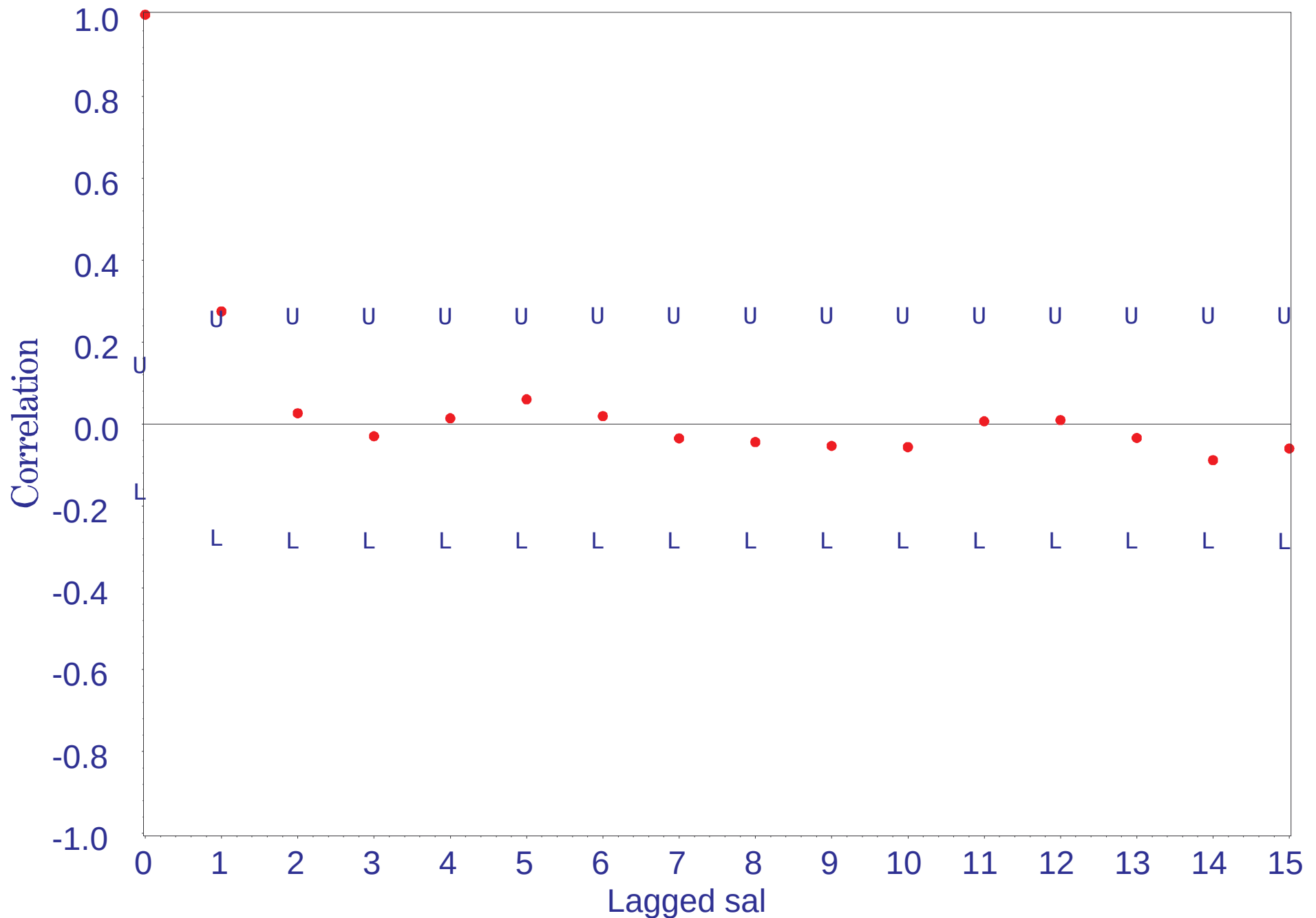
Surface Salinity at River Kilometer 30.4 (1976-1989)
Monthly Boxplots

B-57



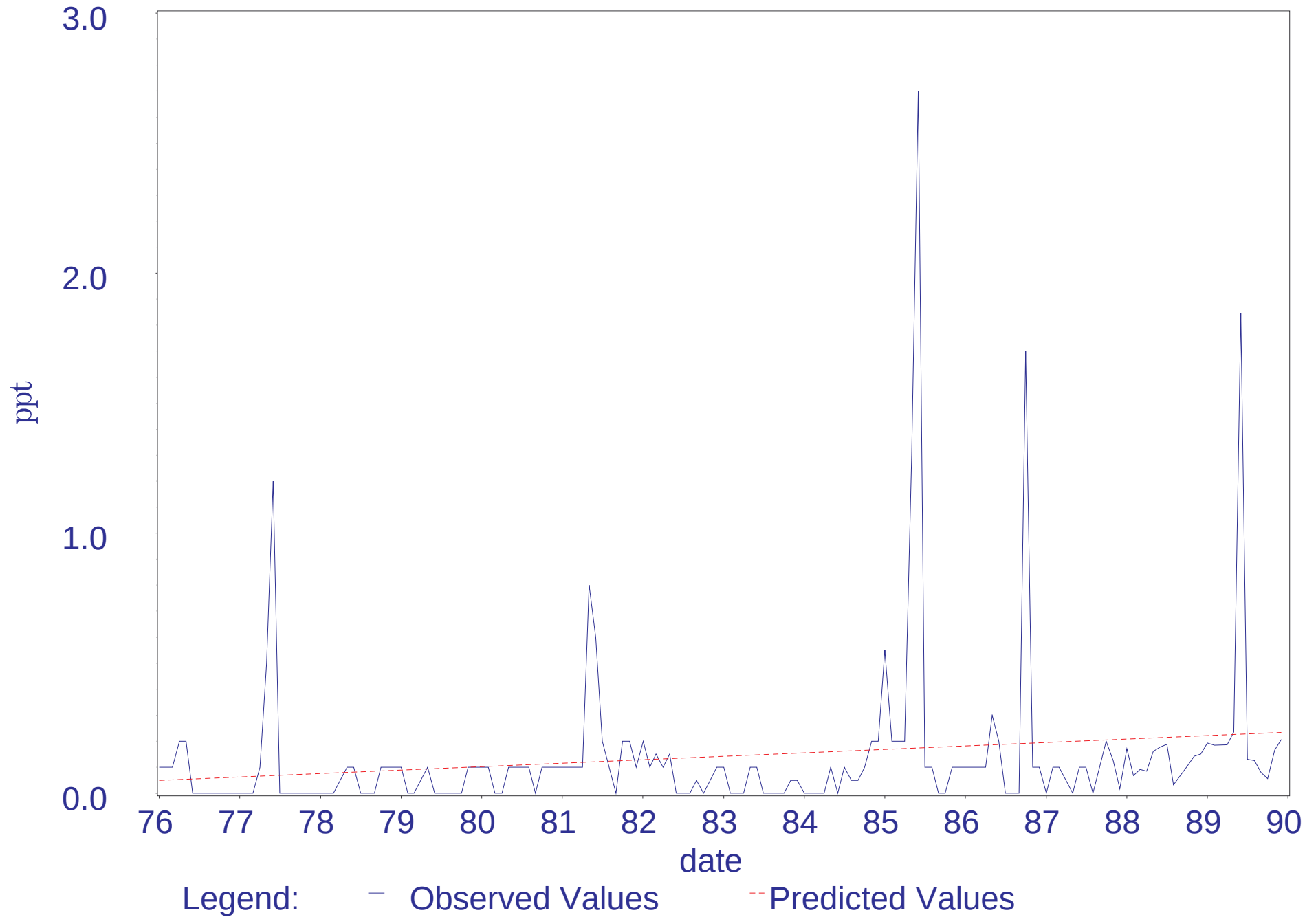
Surface Salinity at River Kilometer 30.4 (1976-1989)
Correlogram with Upper and Lower 95% Confidence Limits

B-58



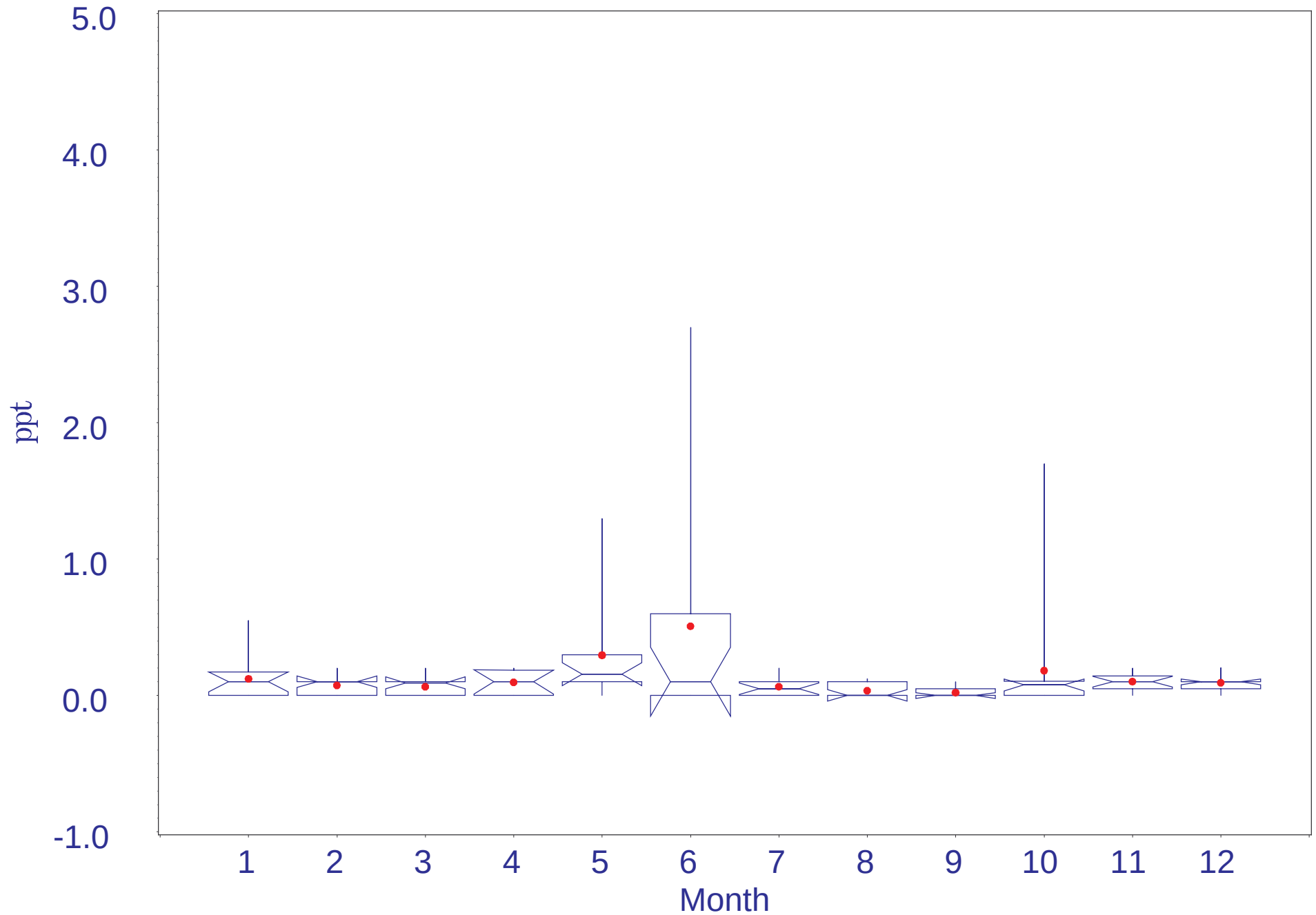
Bottom Salinity at River Kilometer 30.4
1976-1989

B-59



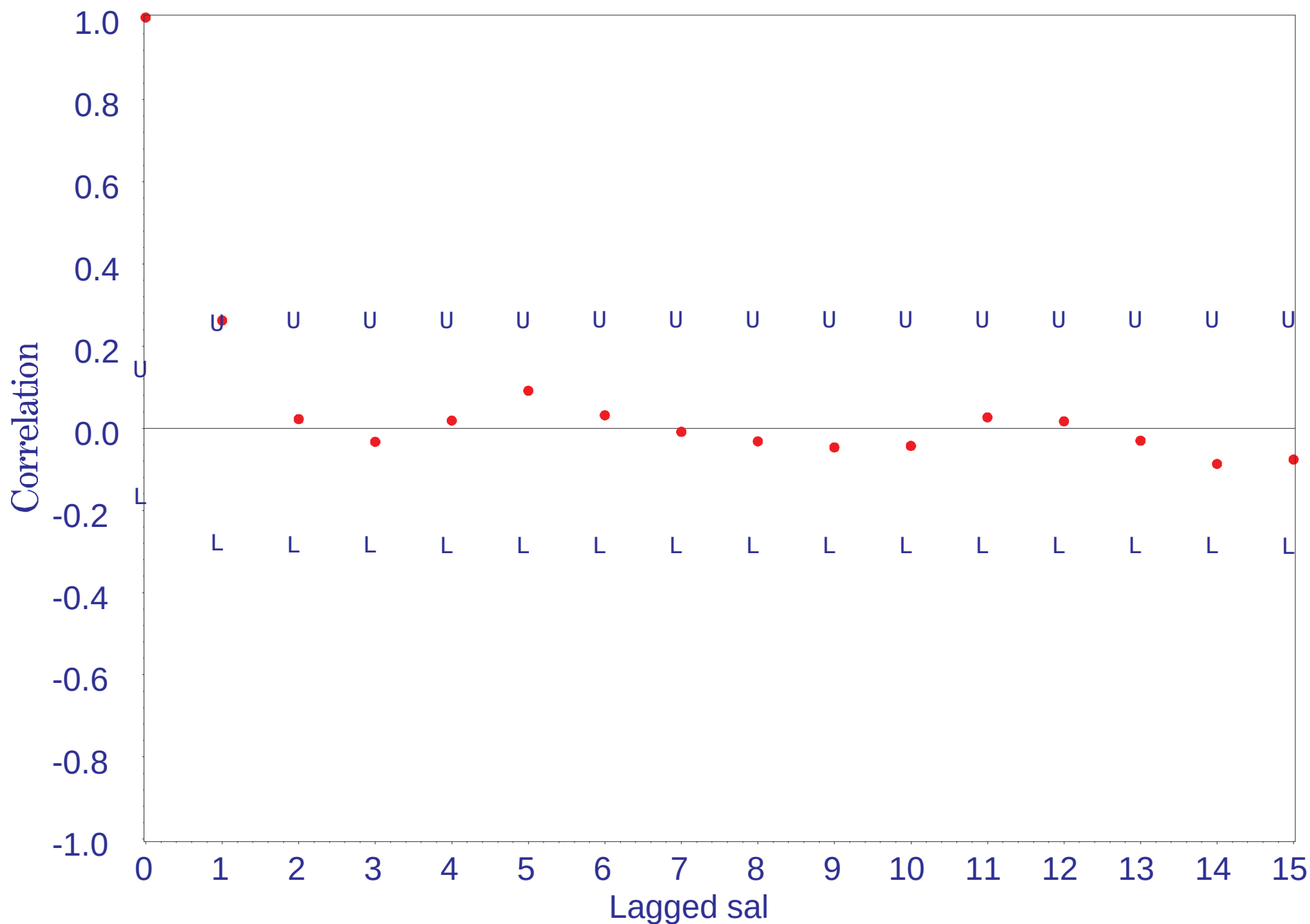
Bottom Salinity at River Kilometer 30.4 (1976-1989)
Monthly Boxplots

B-60



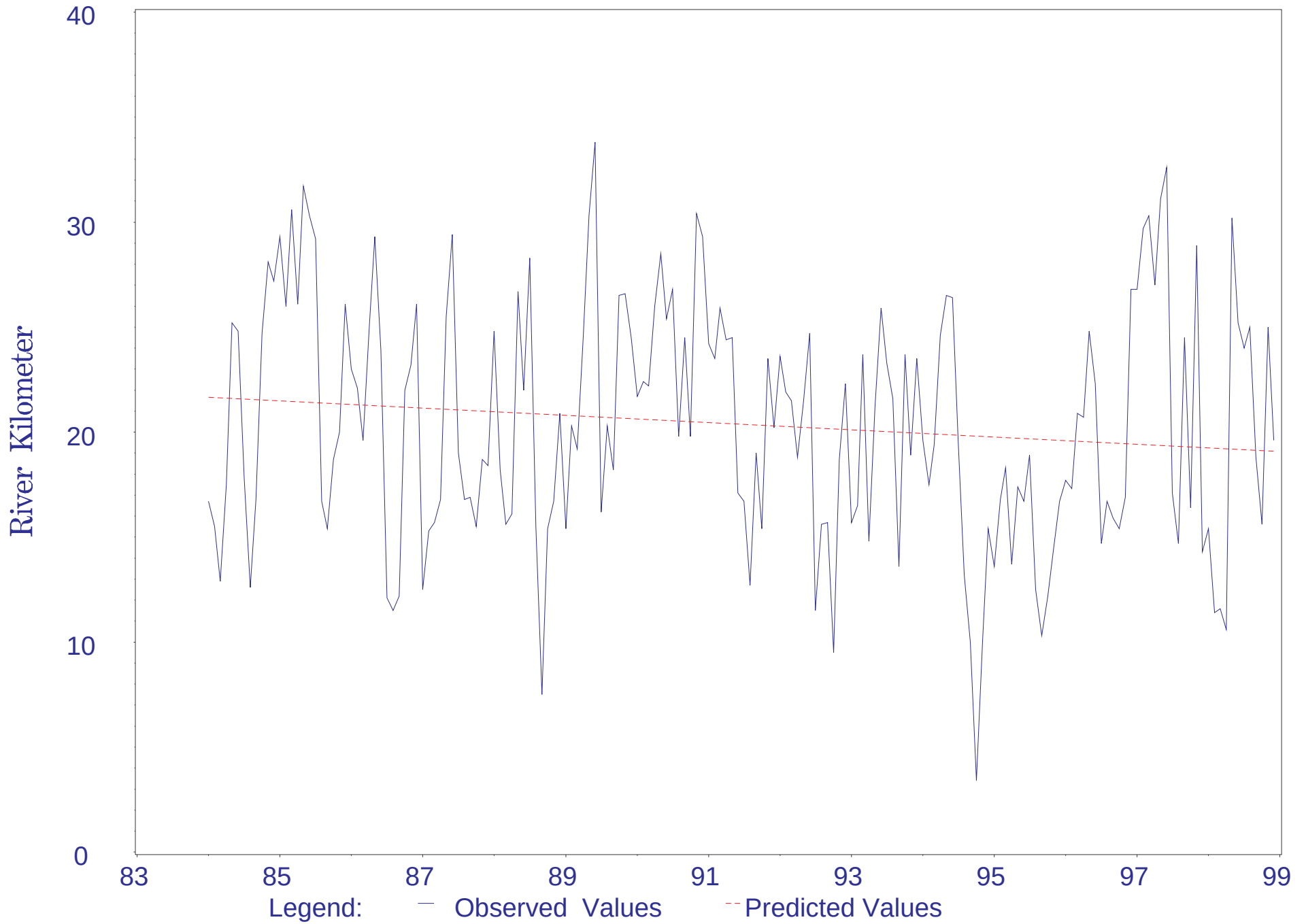
Bottom Salinity at River Kilometer 30.4 (1976-1989)
Correlogram with Upper and Lower 95% Confidence Limits

B-61



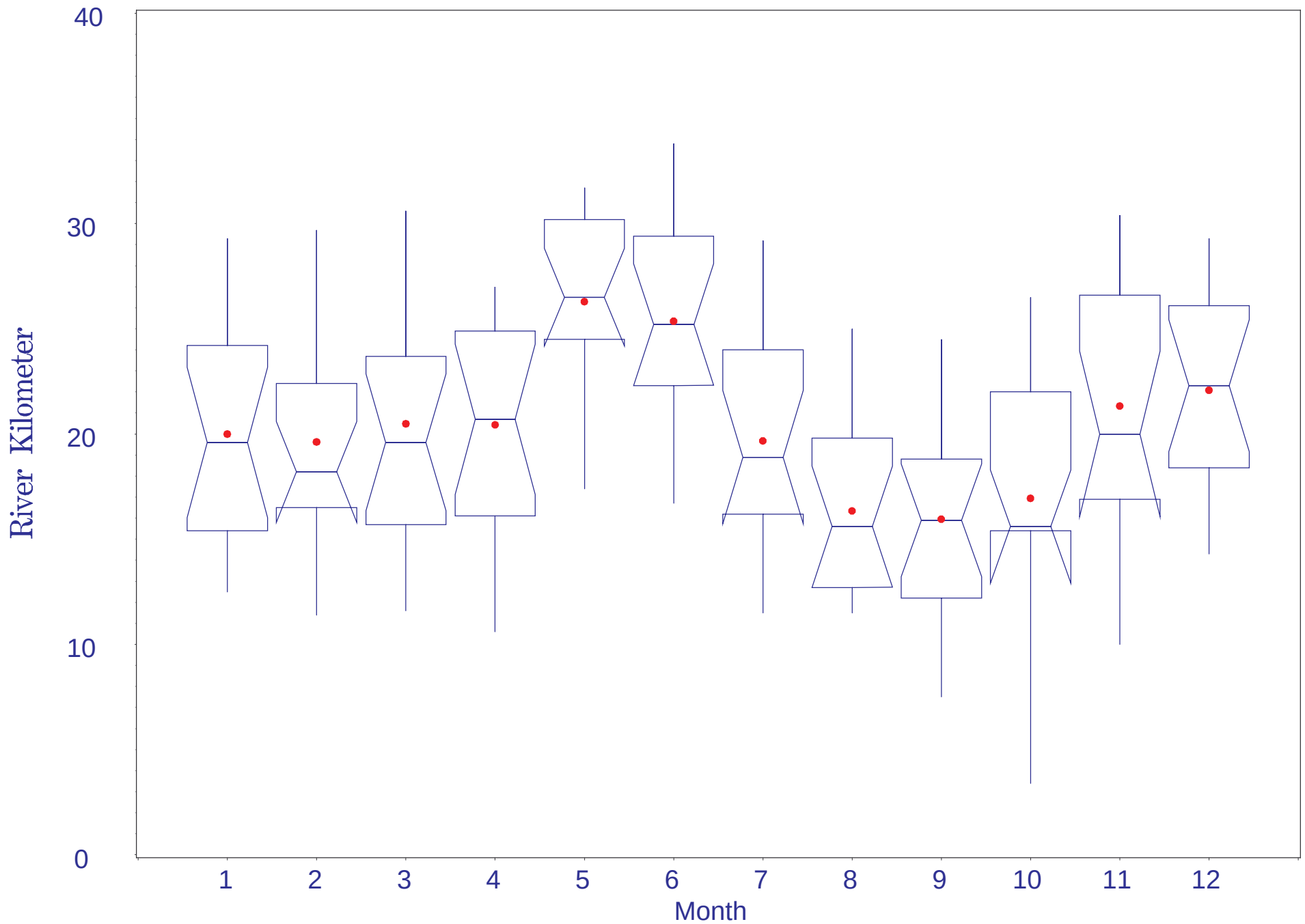
Location of 0 ppt Isohaline
1984-1998

B-62



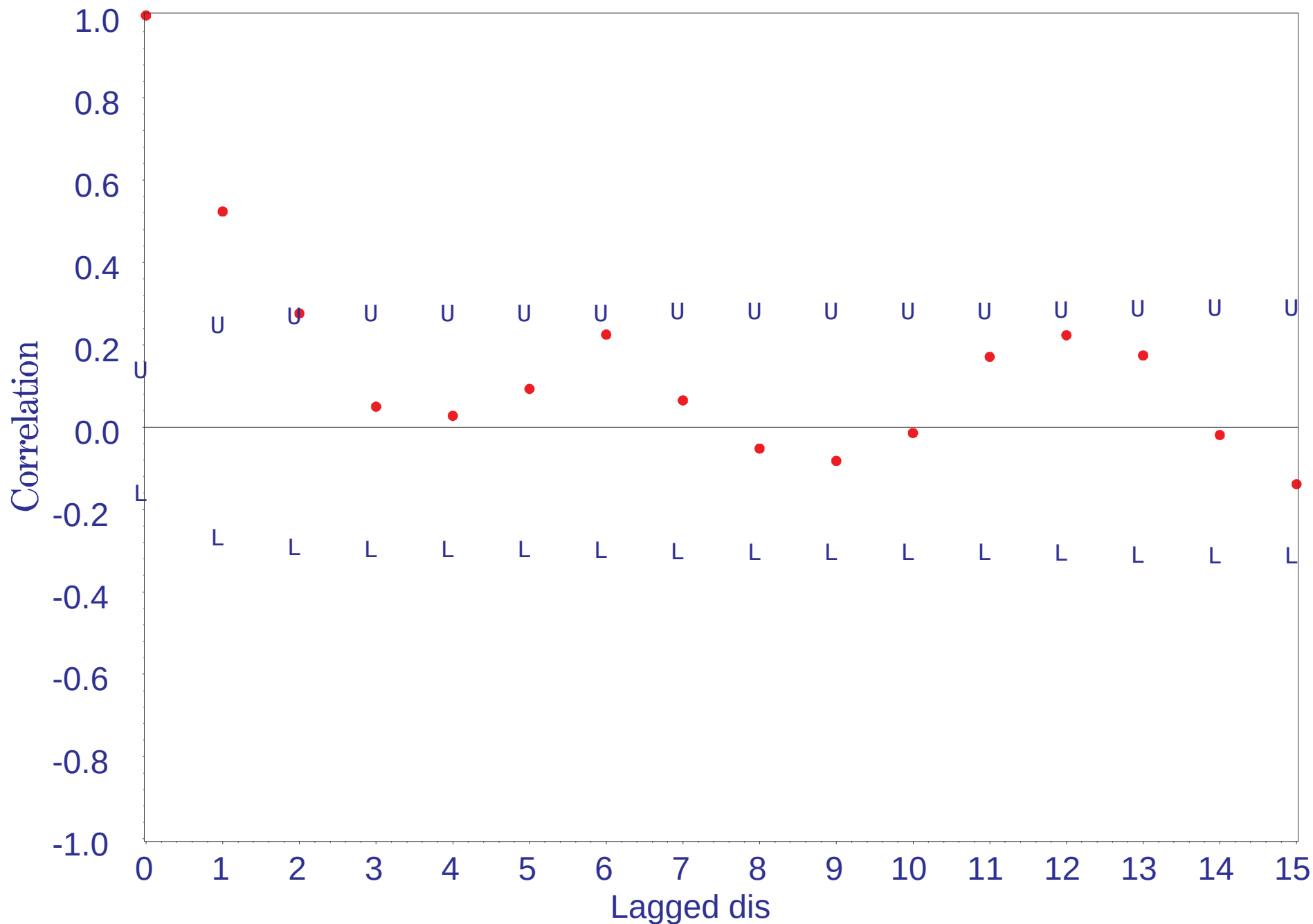
Location of 0 ppt Isohaline 1984-1998
Monthly Boxplots of River Kilometer

B-63



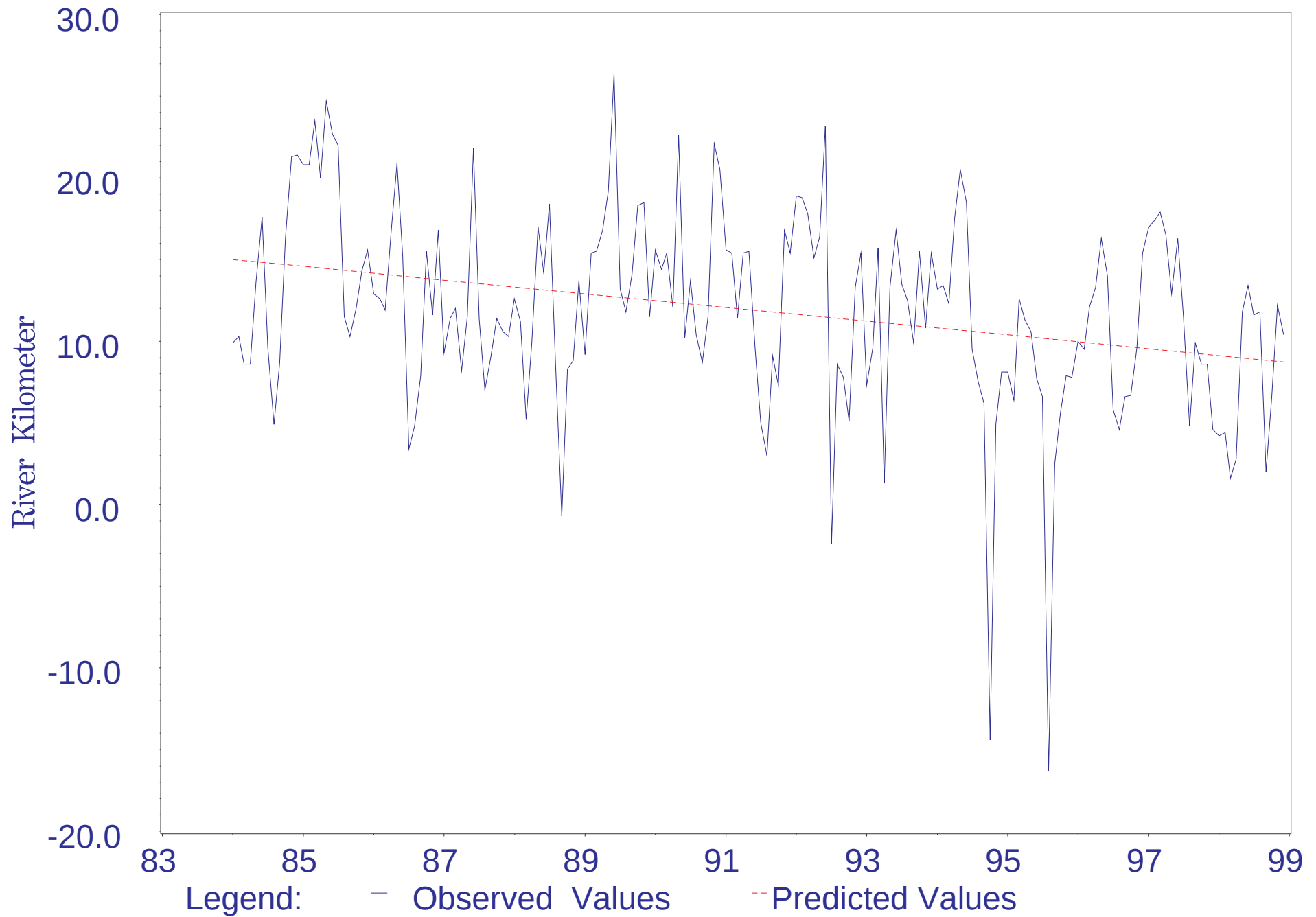
Location of 0 ppt Isohaline - 1984-1998
Correlogram with Upper and Lower 95% Confidence Limits

B-64



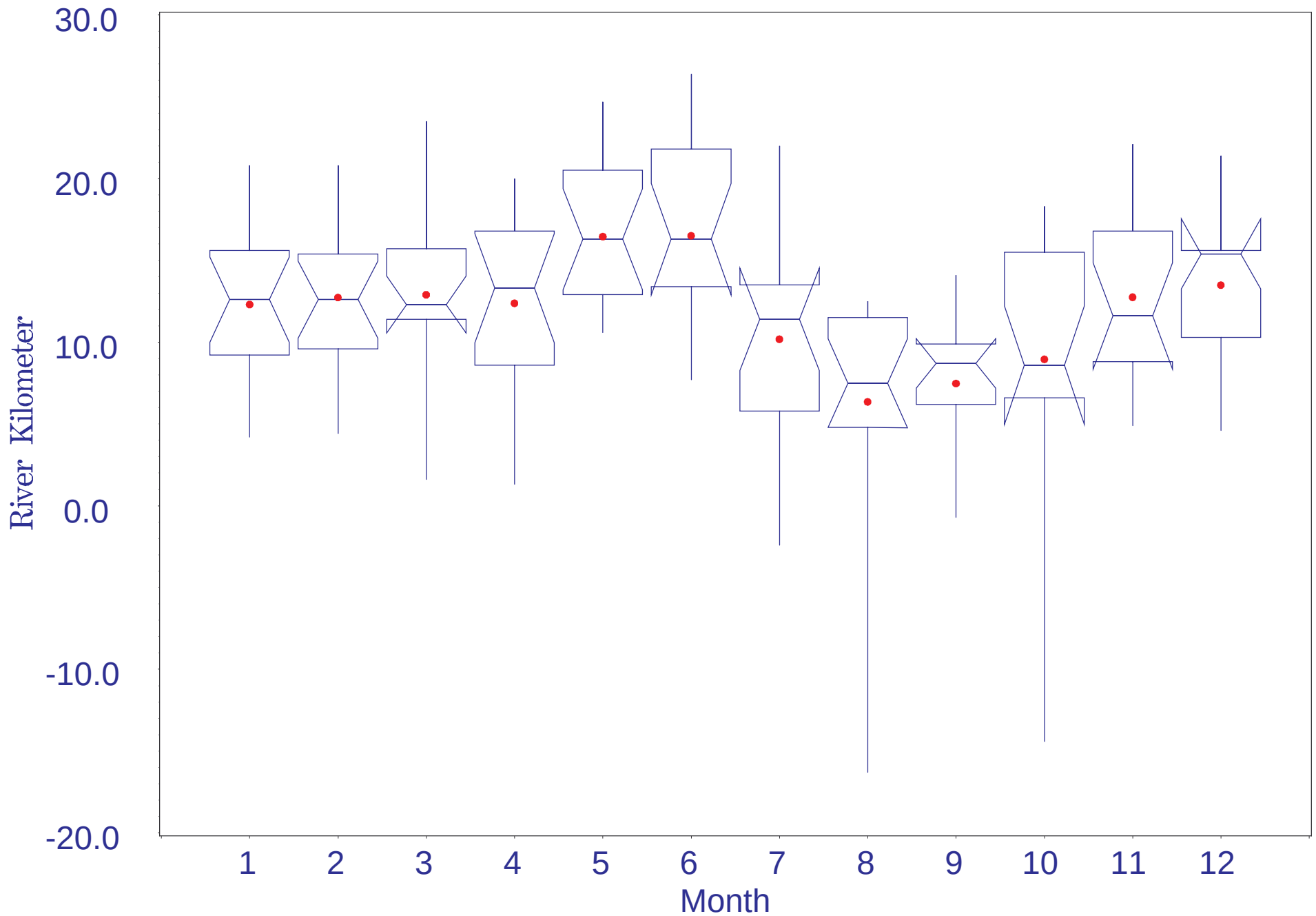
Location of 6 ppt Isohaline
1984-1998

B-65



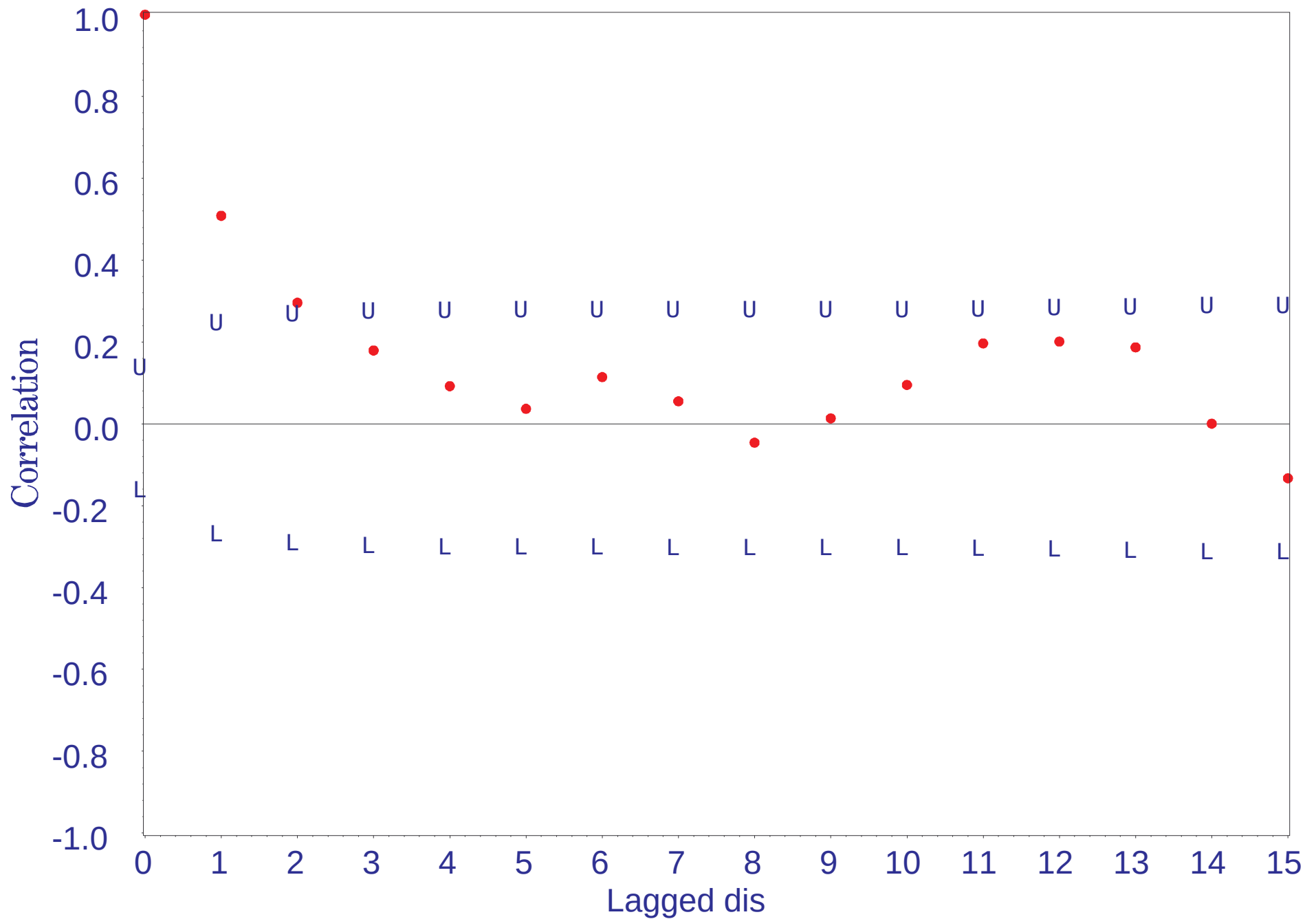
Location of 6 ppt Isohaline 1984-1998
Monthly Boxplots of River Kilometer

B-66



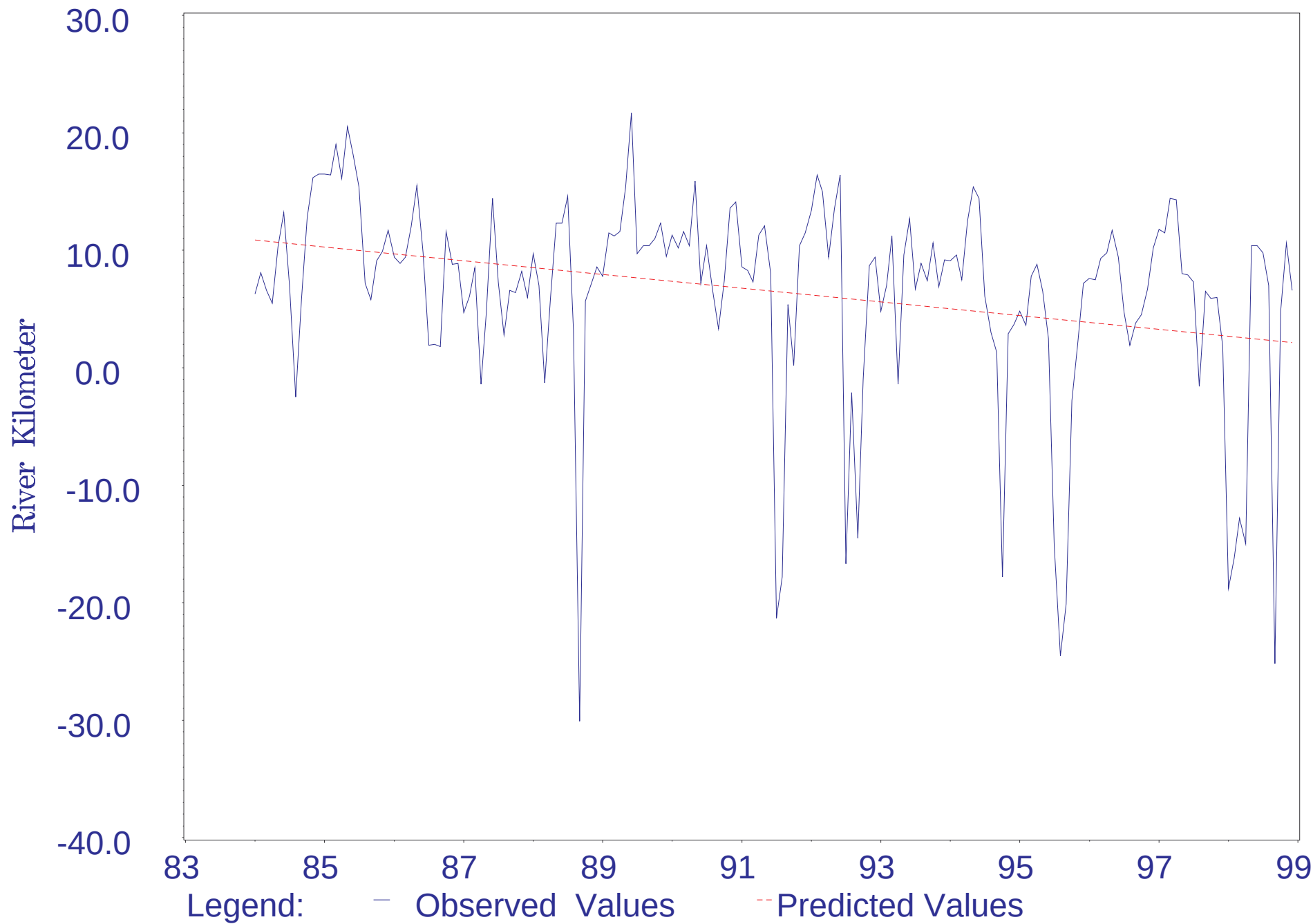
Location of 6 ppt Isohaline - 1984-1998
Correlogram with Upper and Lower 95% Confidence Limits

B-67



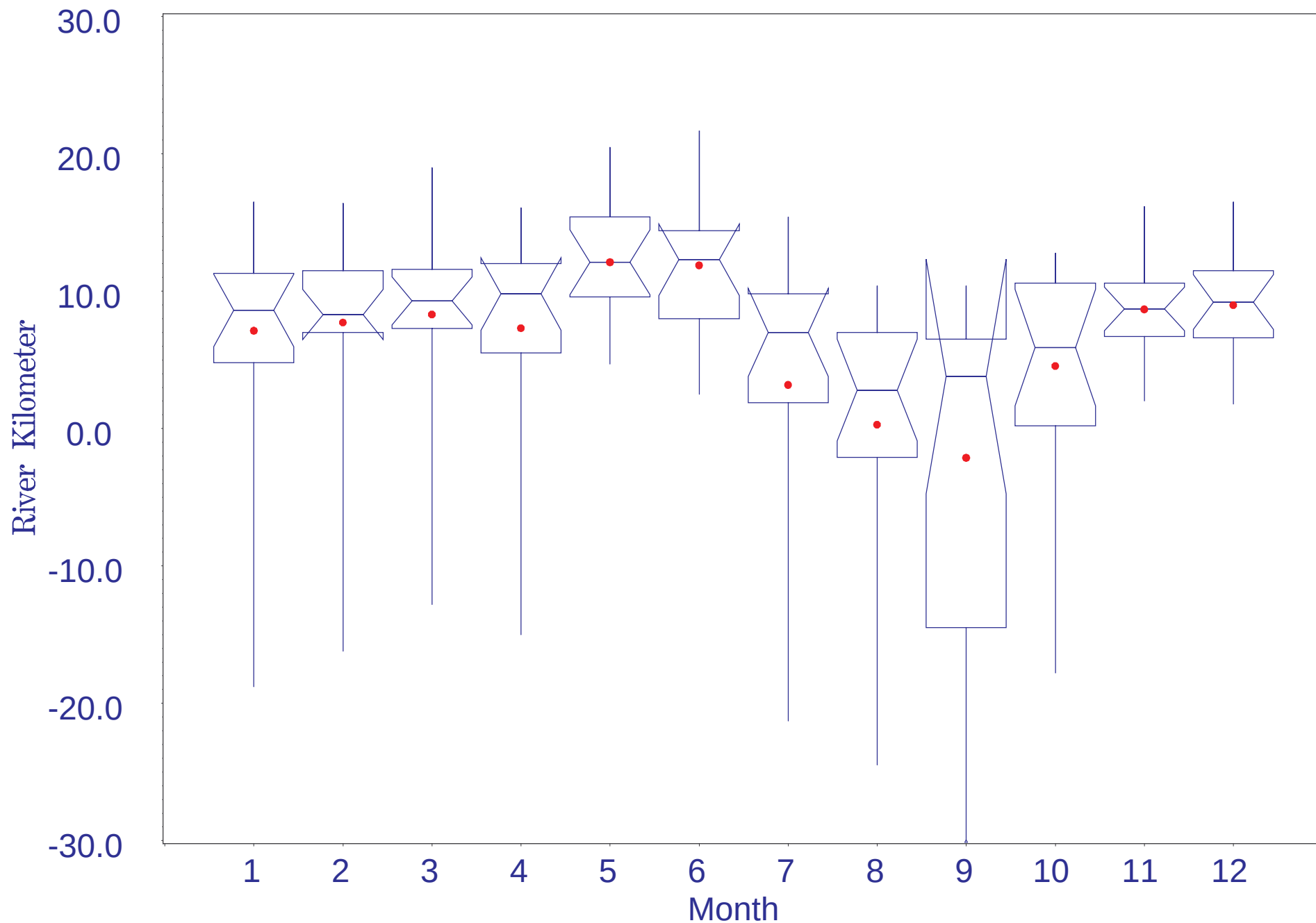
Location of 12 ppt Isohaline
1984-1998

B-68



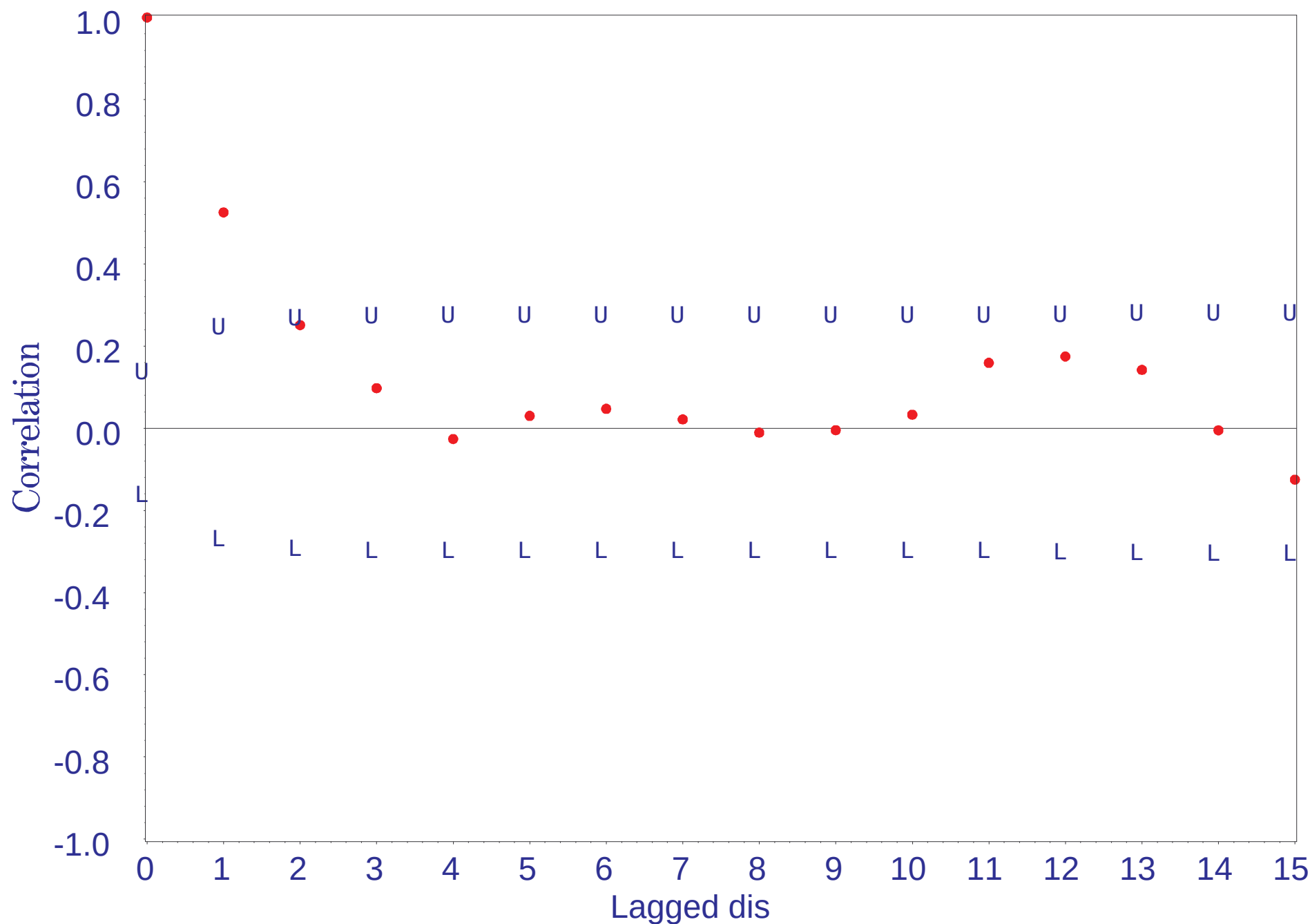
Location of 12 ppt Isohaline 1984-1998
Monthly Boxplots of River Kilometer

B-69



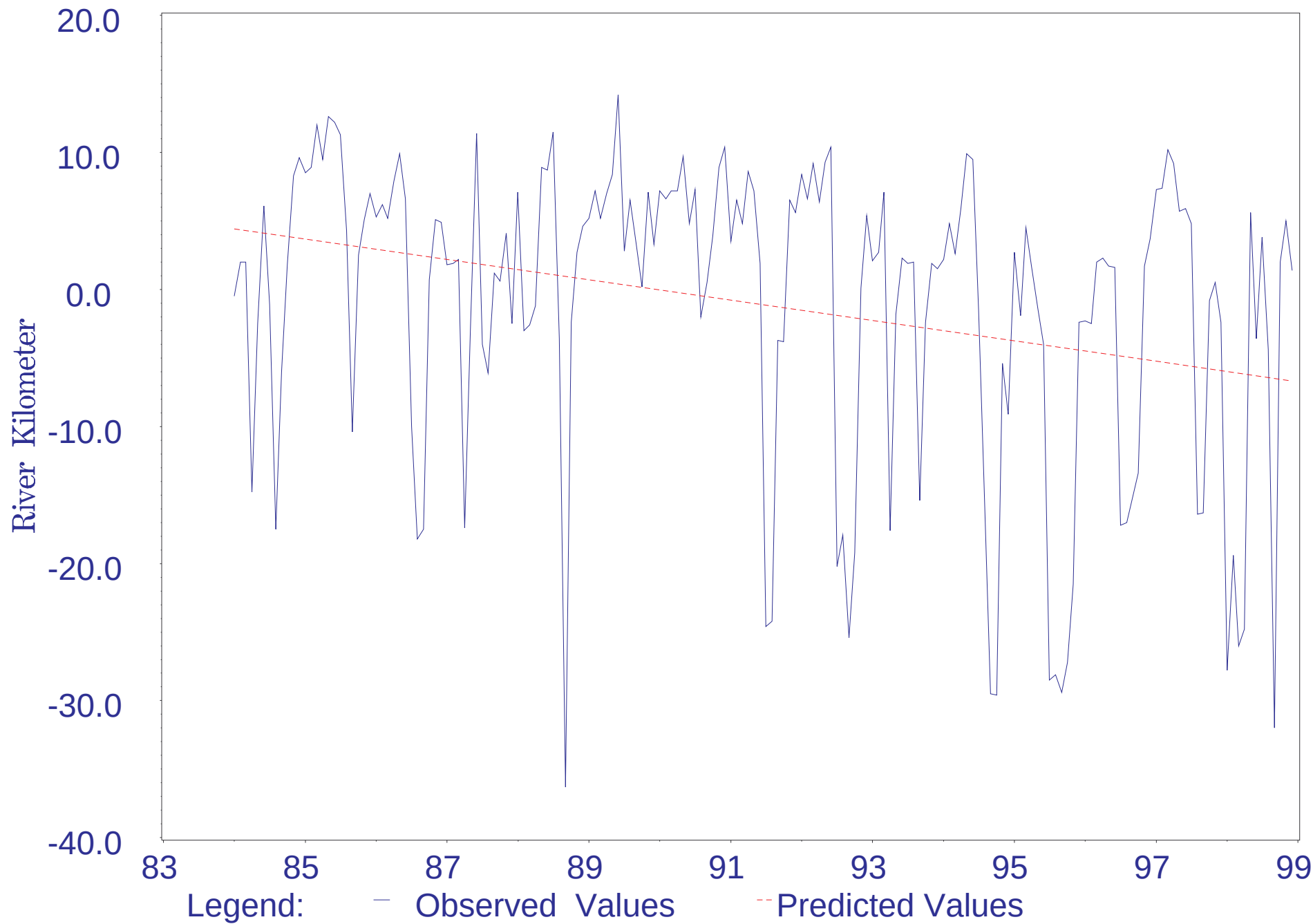
Location of 12 ppt Isohaline - 1984-1998
Correlogram with Upper and Lower 95% Confidence Limits

B-70



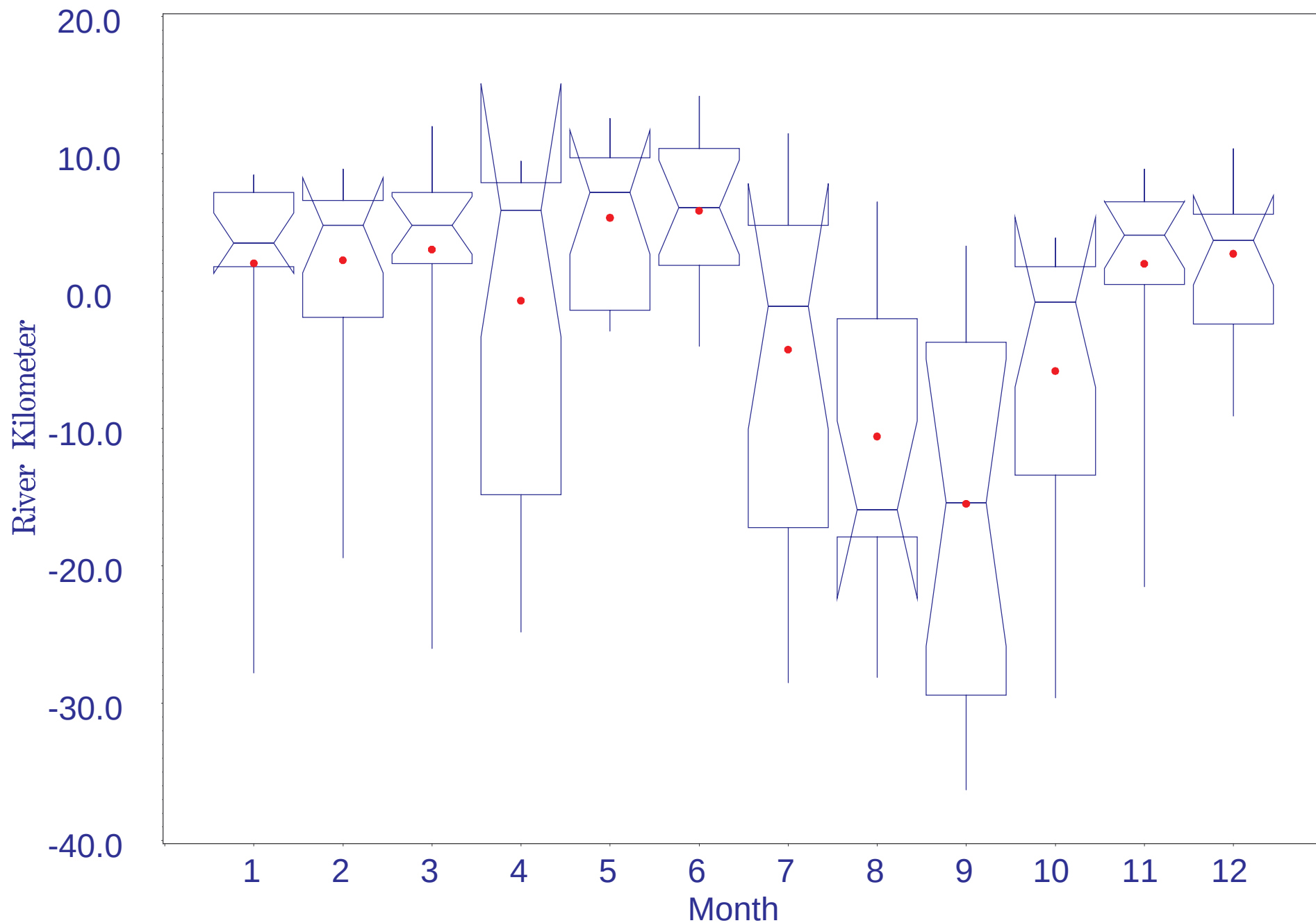
Location of 20 ppt Isohaline
1984-1998

B-71



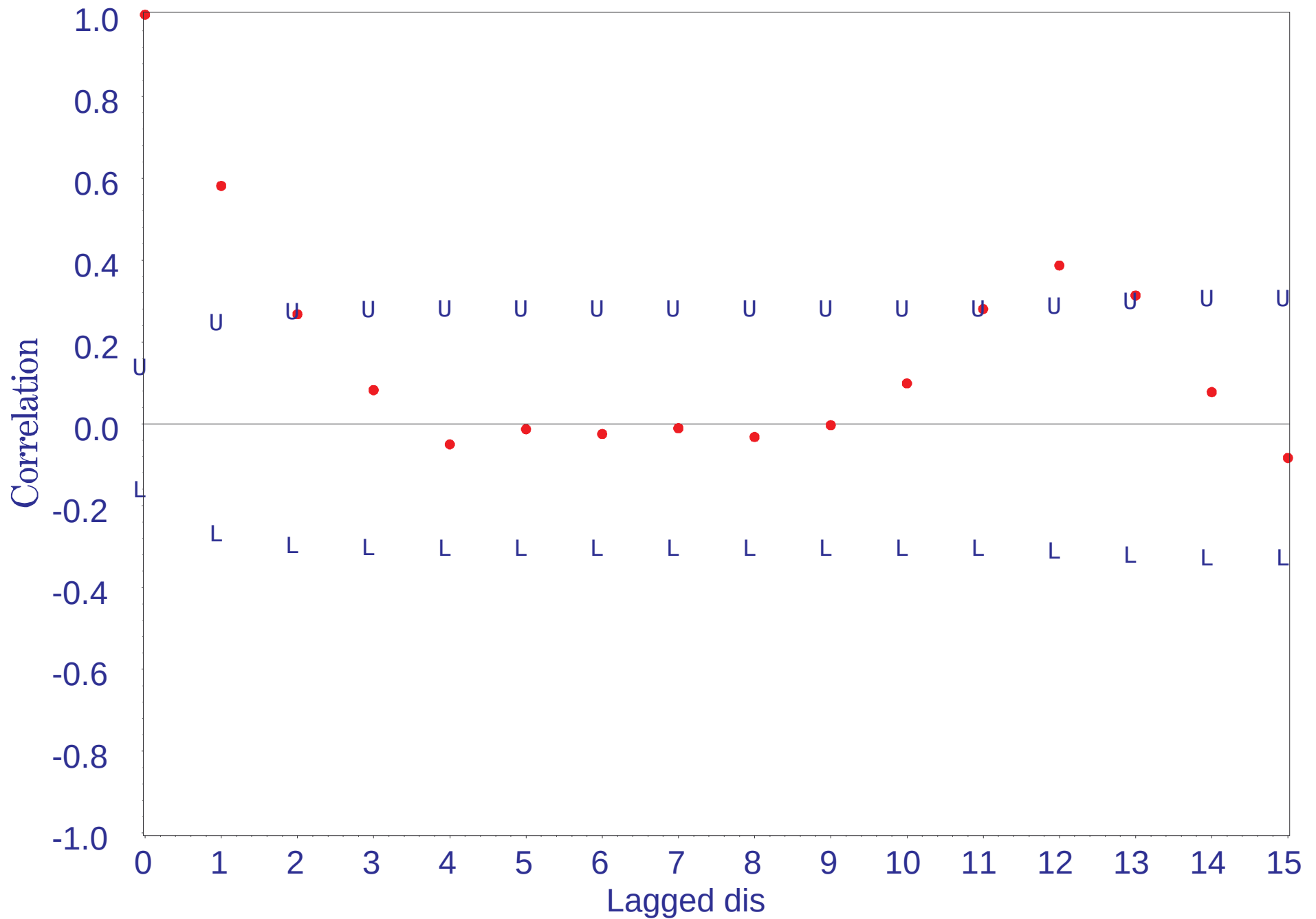
Location of 20 ppt Isohaline 1984-1998
Monthly Boxplots of River Kilometer

B-72



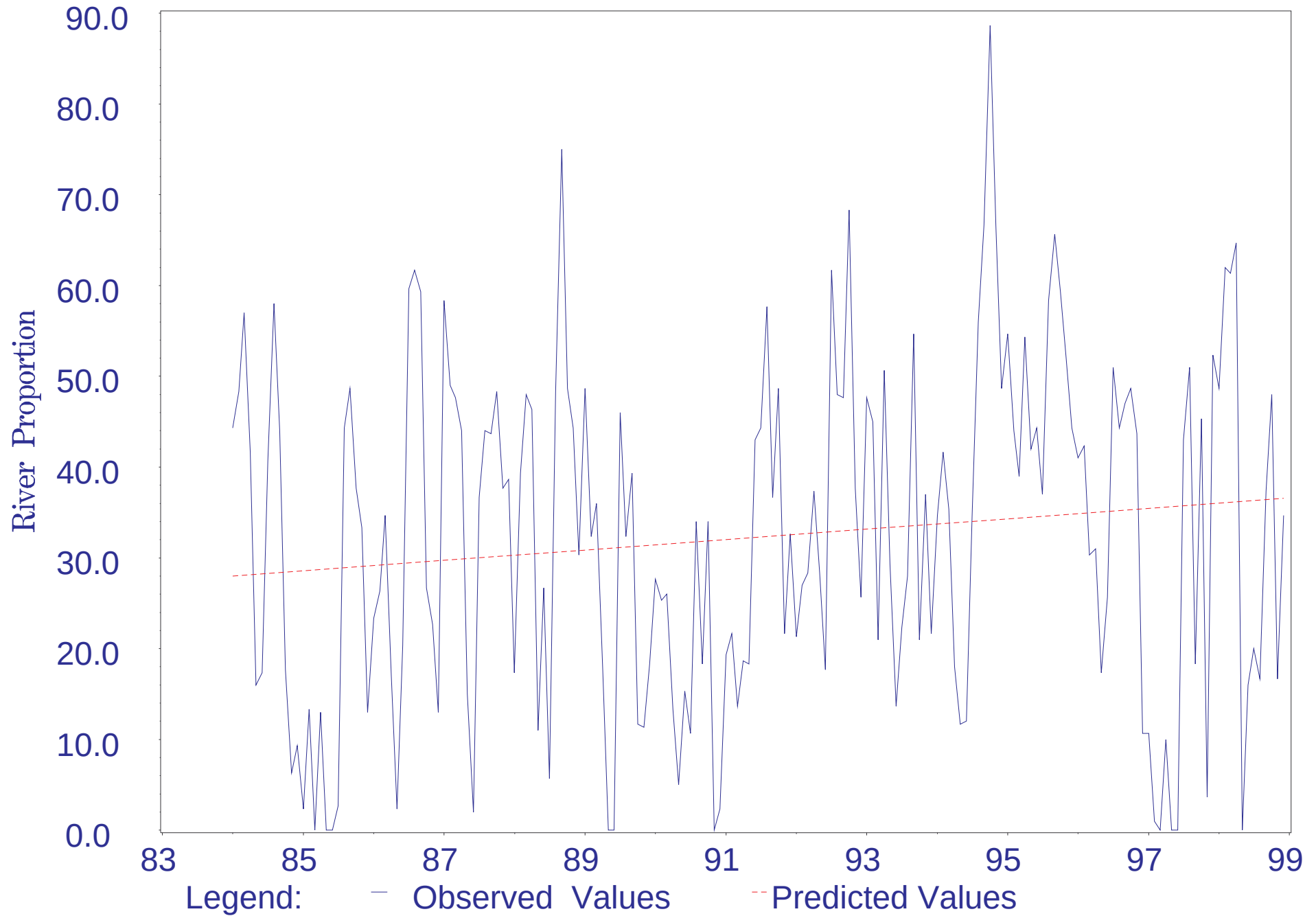
Location of 20 ppt Isohaline - 1984-1998
Correlogram with Upper and Lower 95% Confidence Limits

B-73



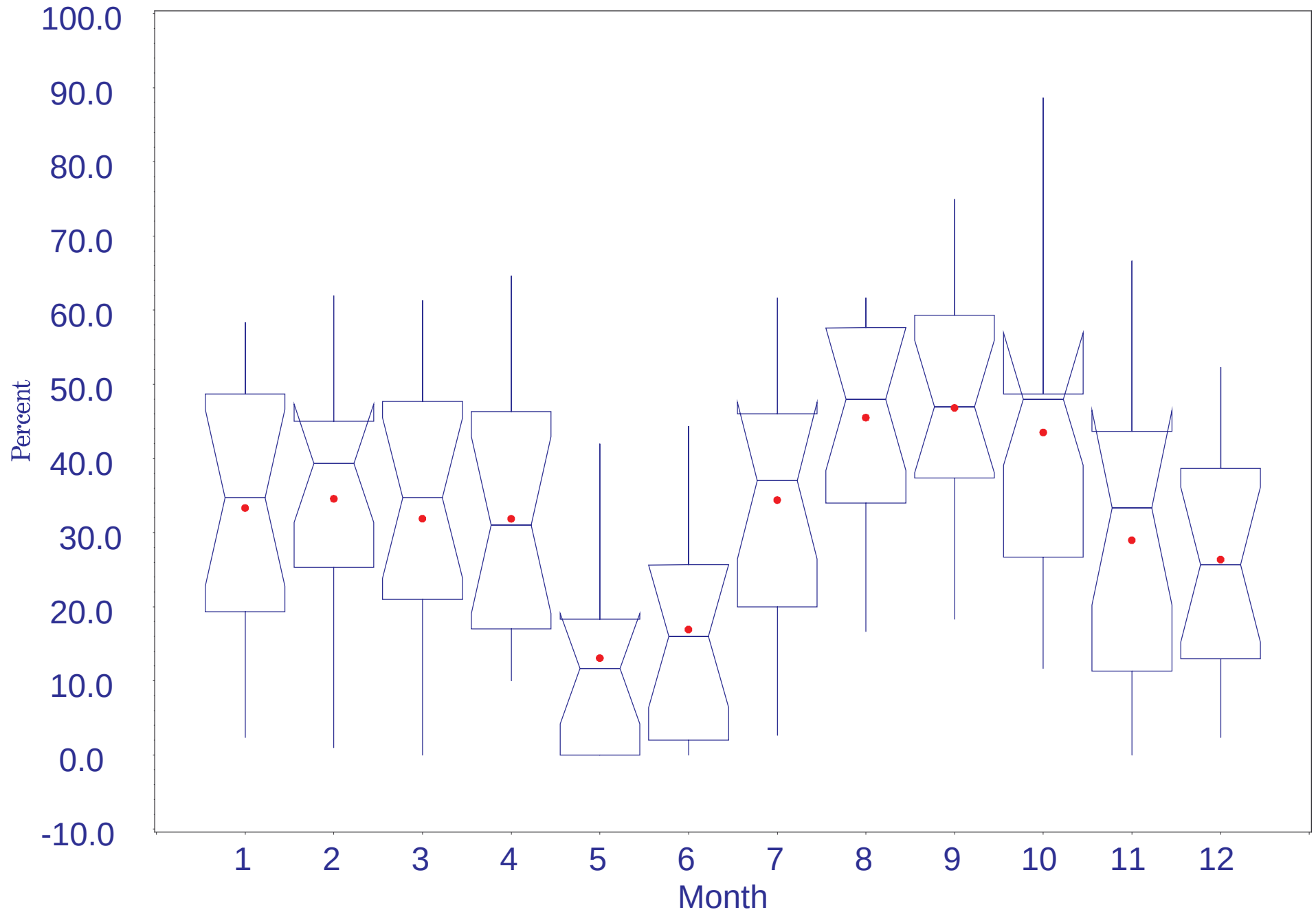
Proportion of River = 0 ppt
1984-1998

B-74



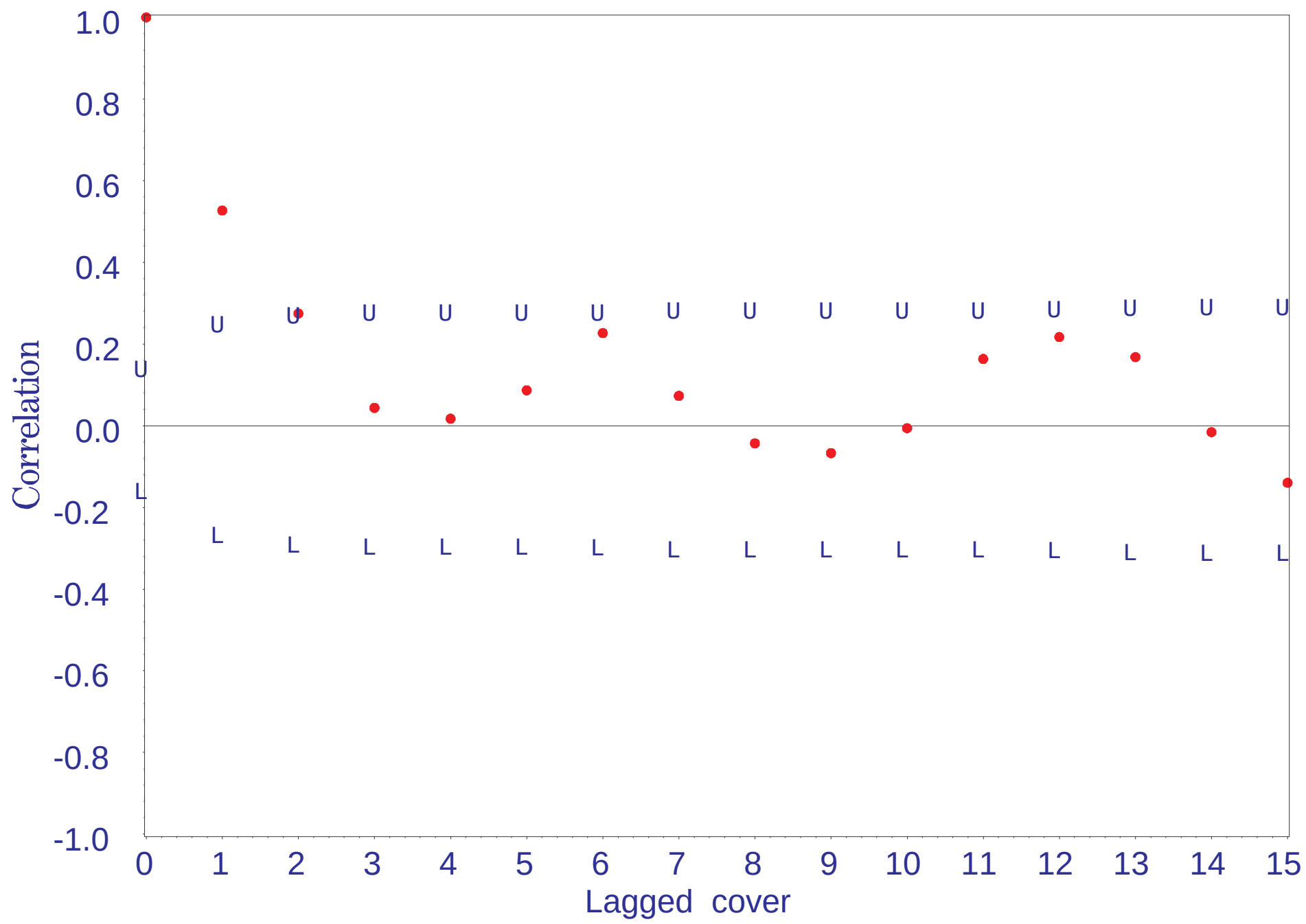
Proportion of River = 0 ppt 1984-1998
Monthly Boxplots of Percent

B-75



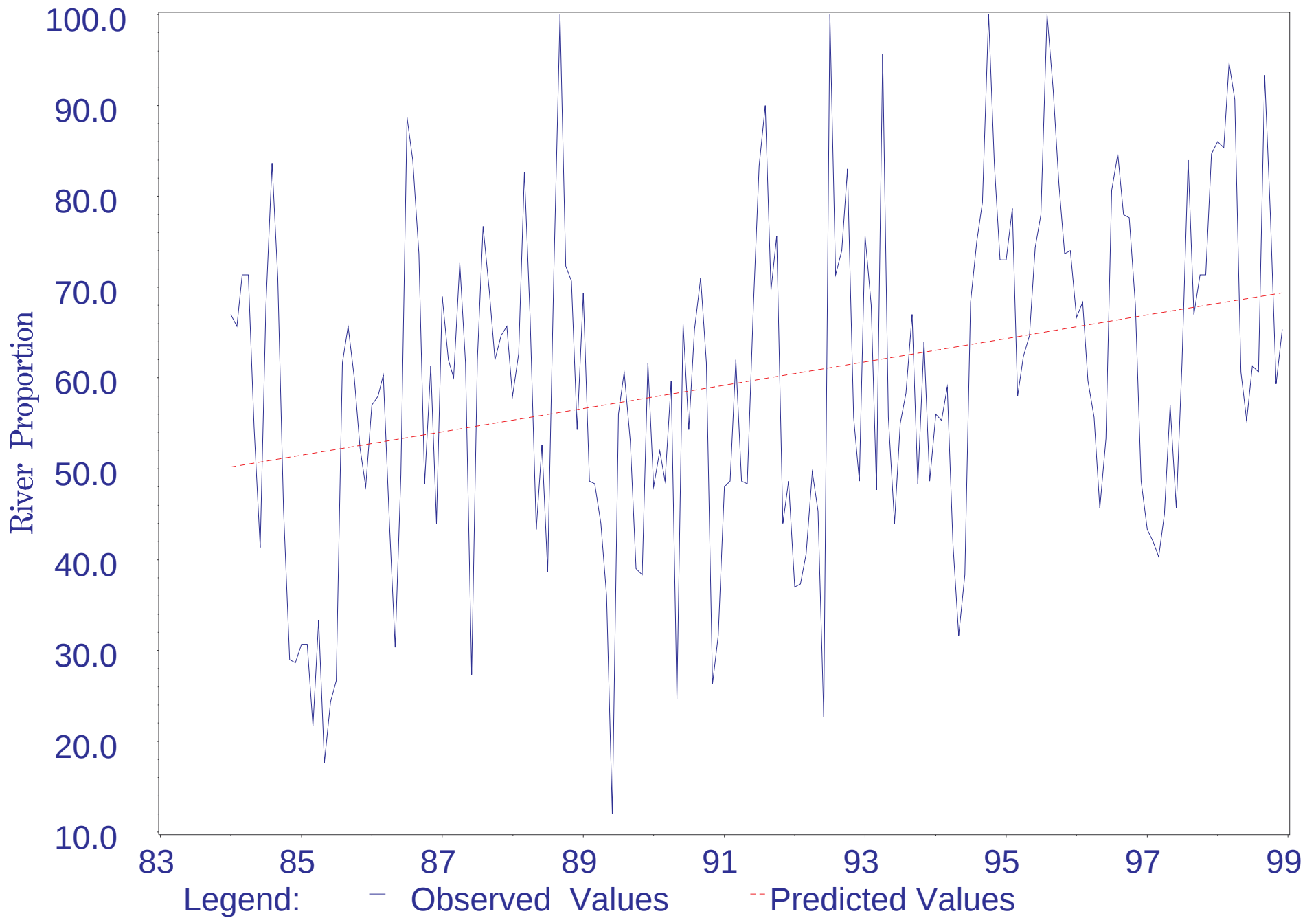
Proportion of River < 0 ppt (1984-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-76



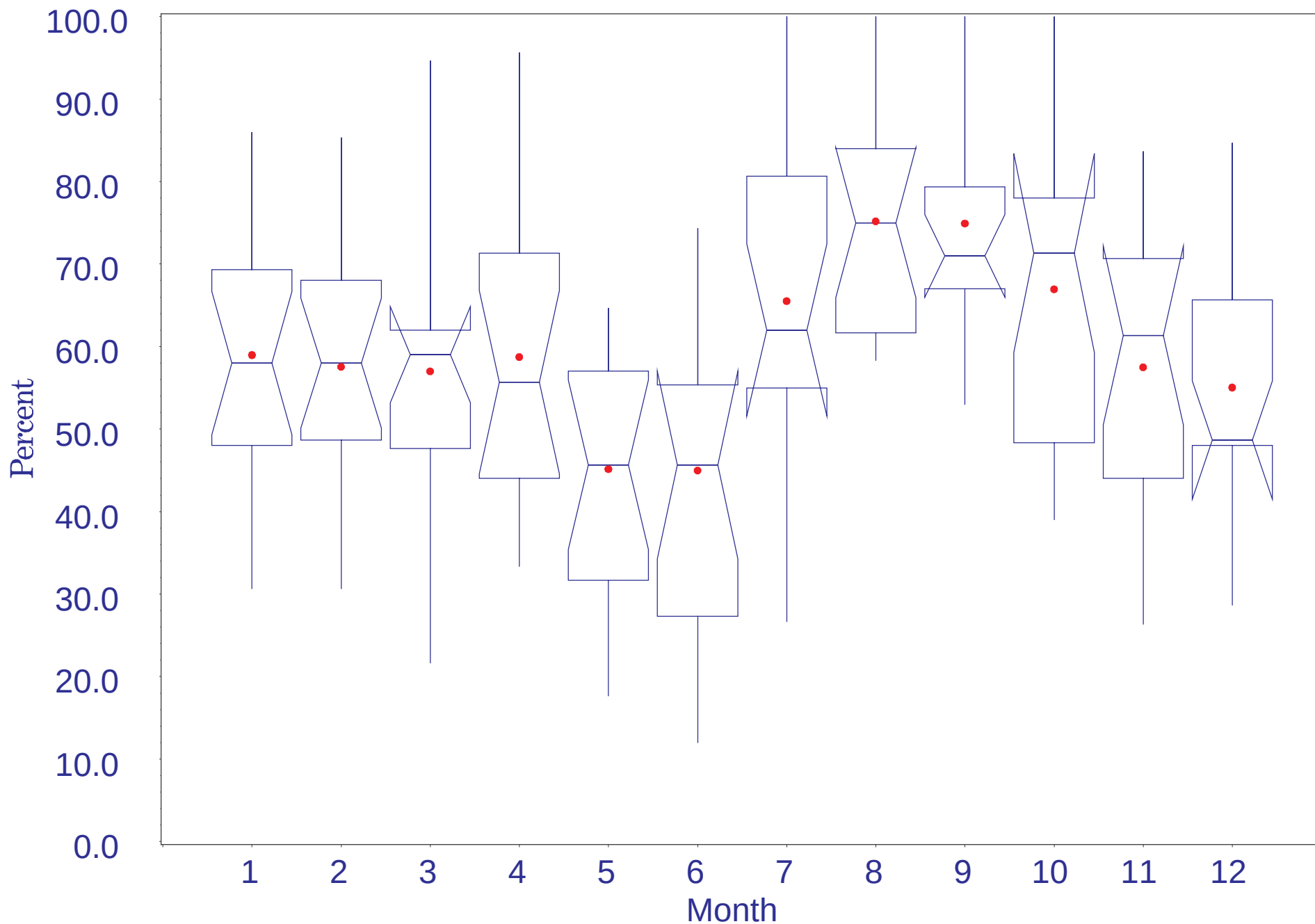
Proportion of River < 6 ppt
1984-1998

B-77



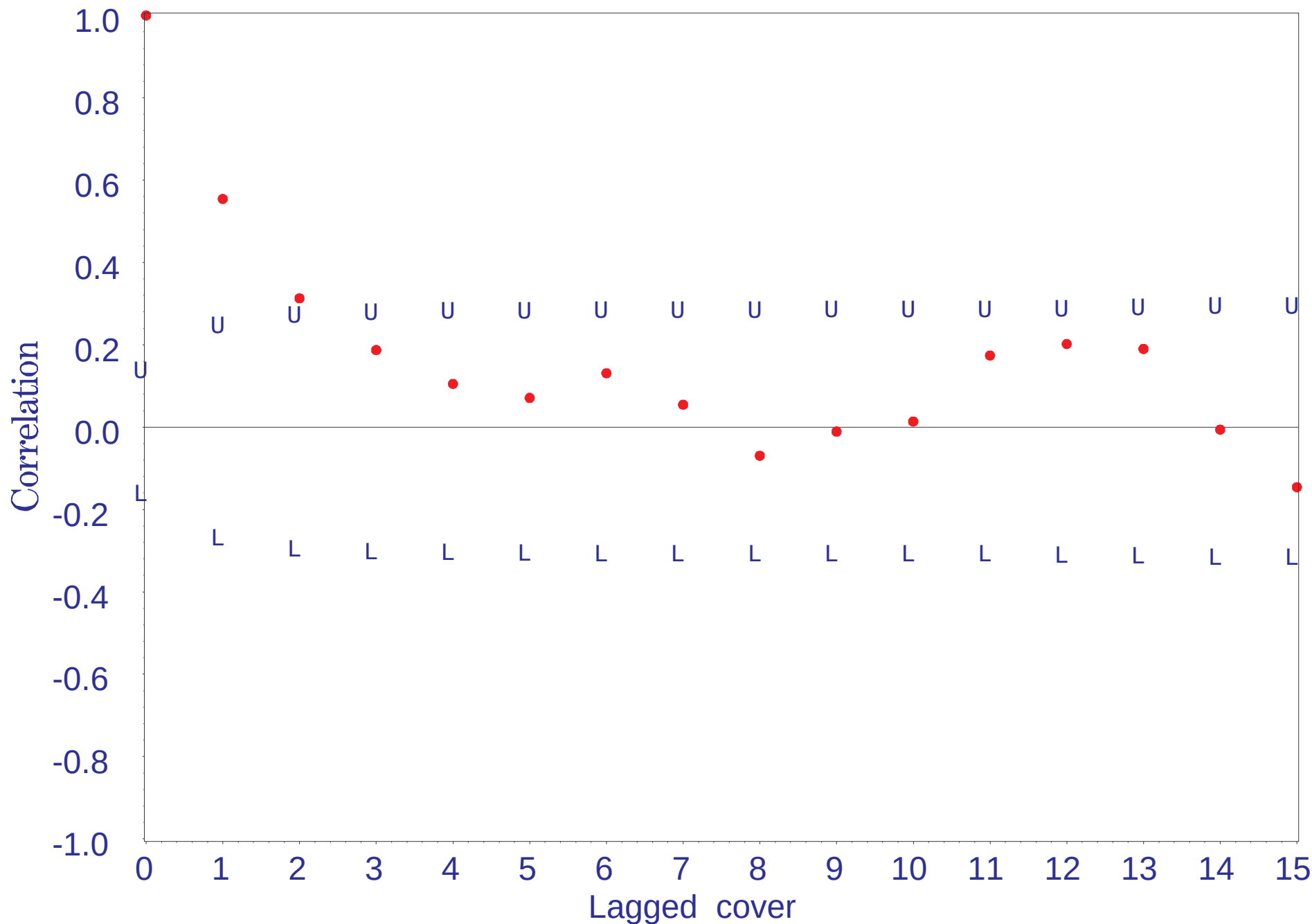
Proportion of River < 6 ppt 1984-1998
Monthly Boxplots of Percent

B-78



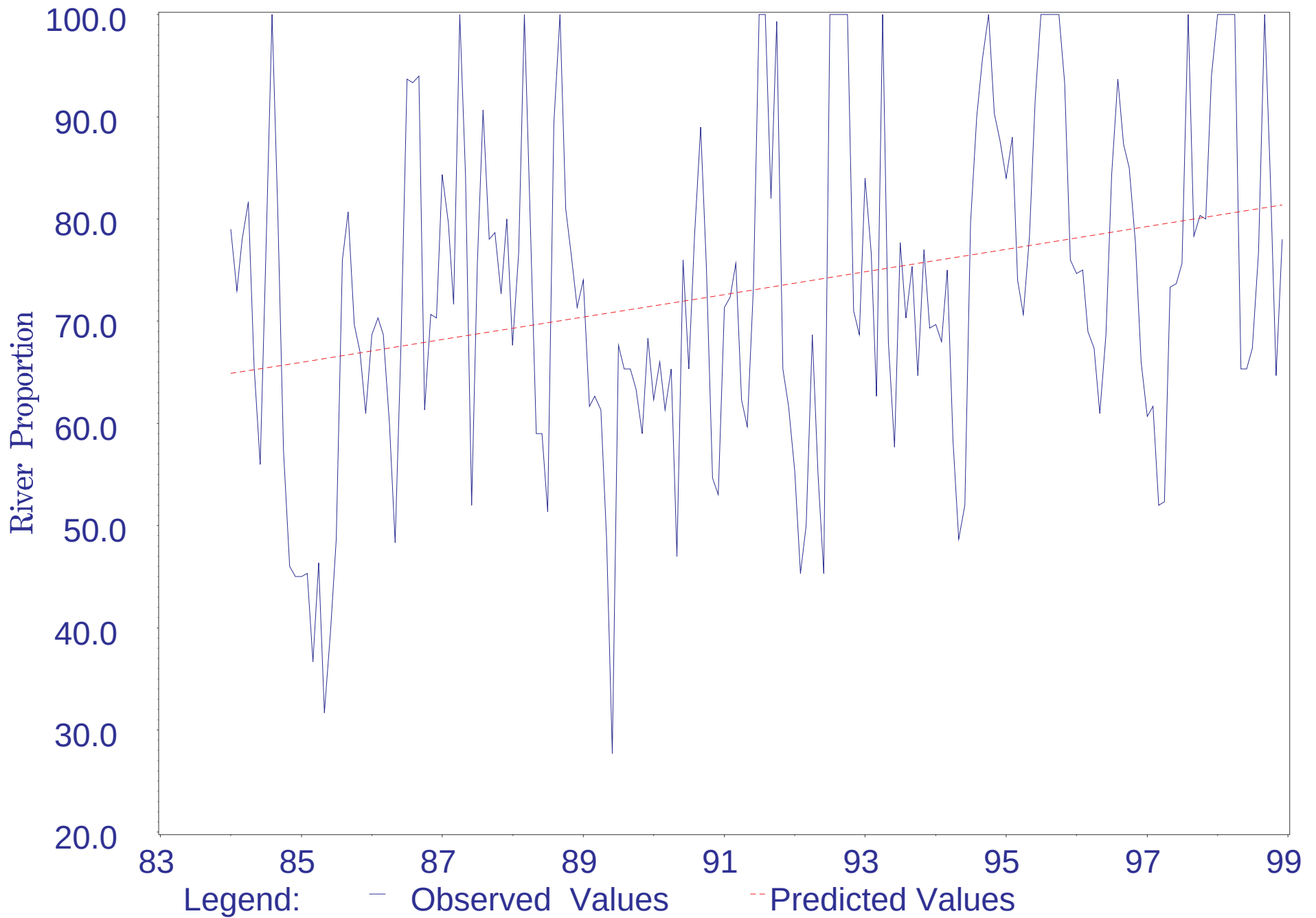
Proportion of River < 6 ppt (1984-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-79



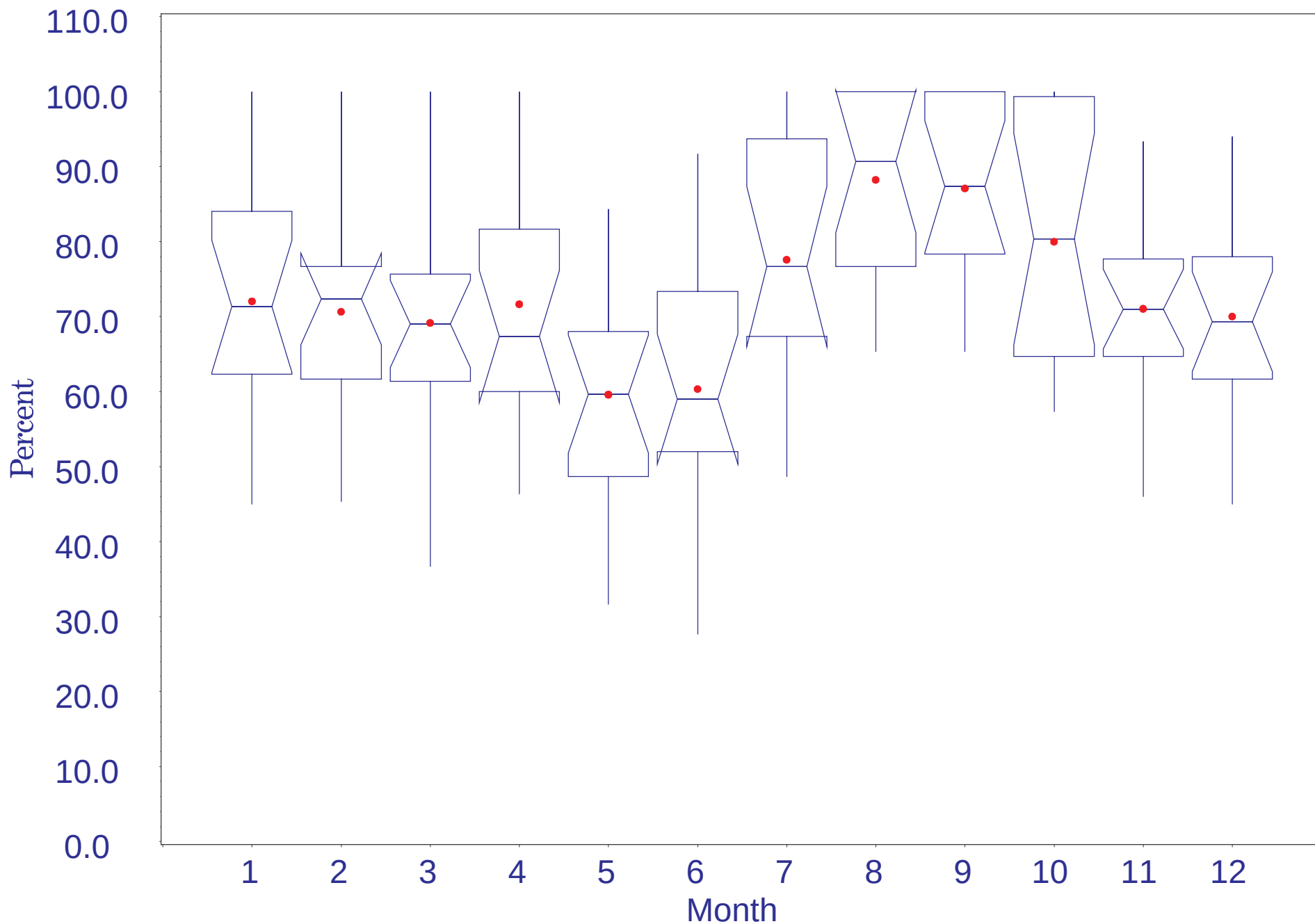
Proportion of River < 12 ppt
1984-1998

B-80



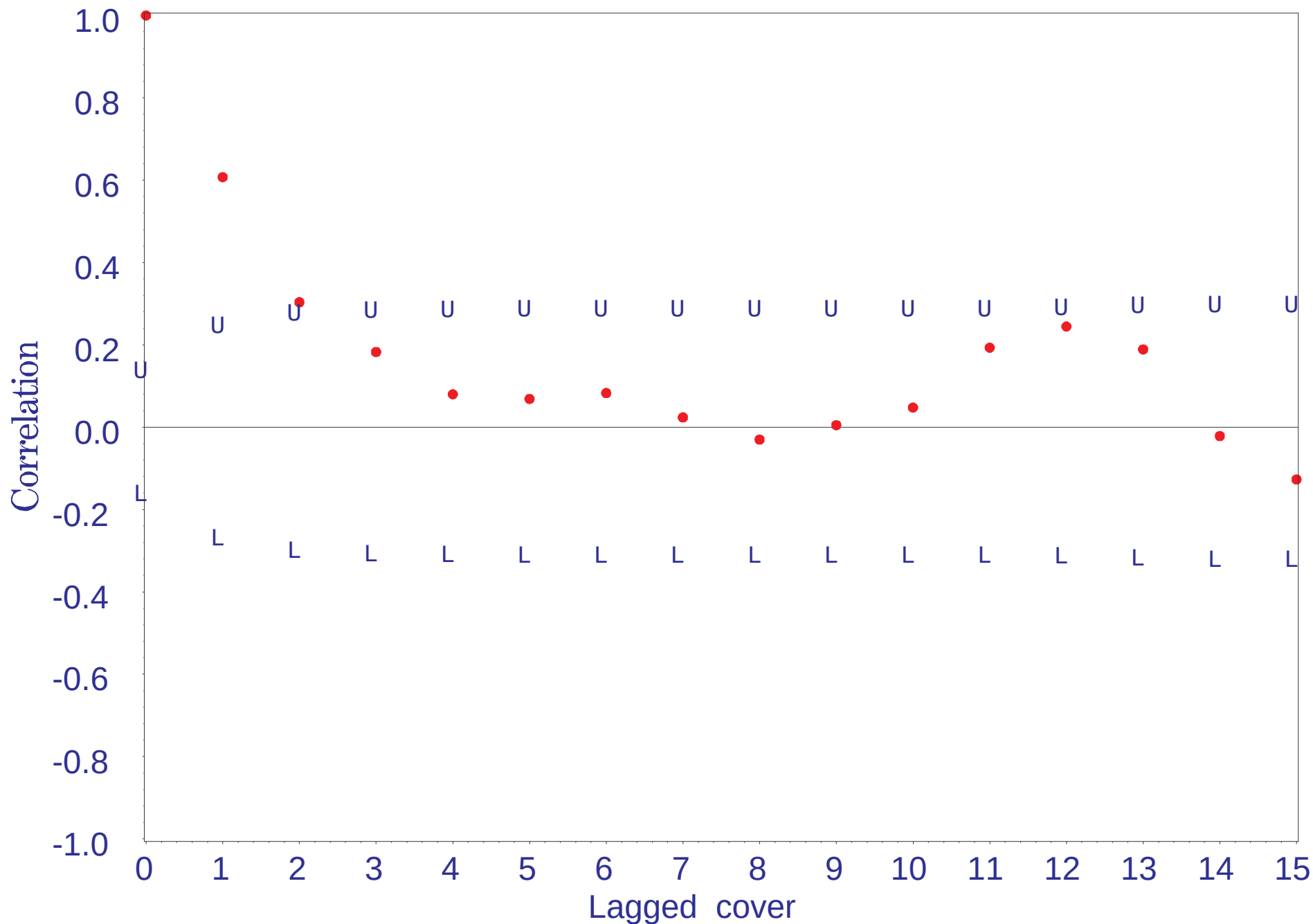
Proportion of River < 12 ppt 1984-1998
Monthly Boxplots of Percent

B-81



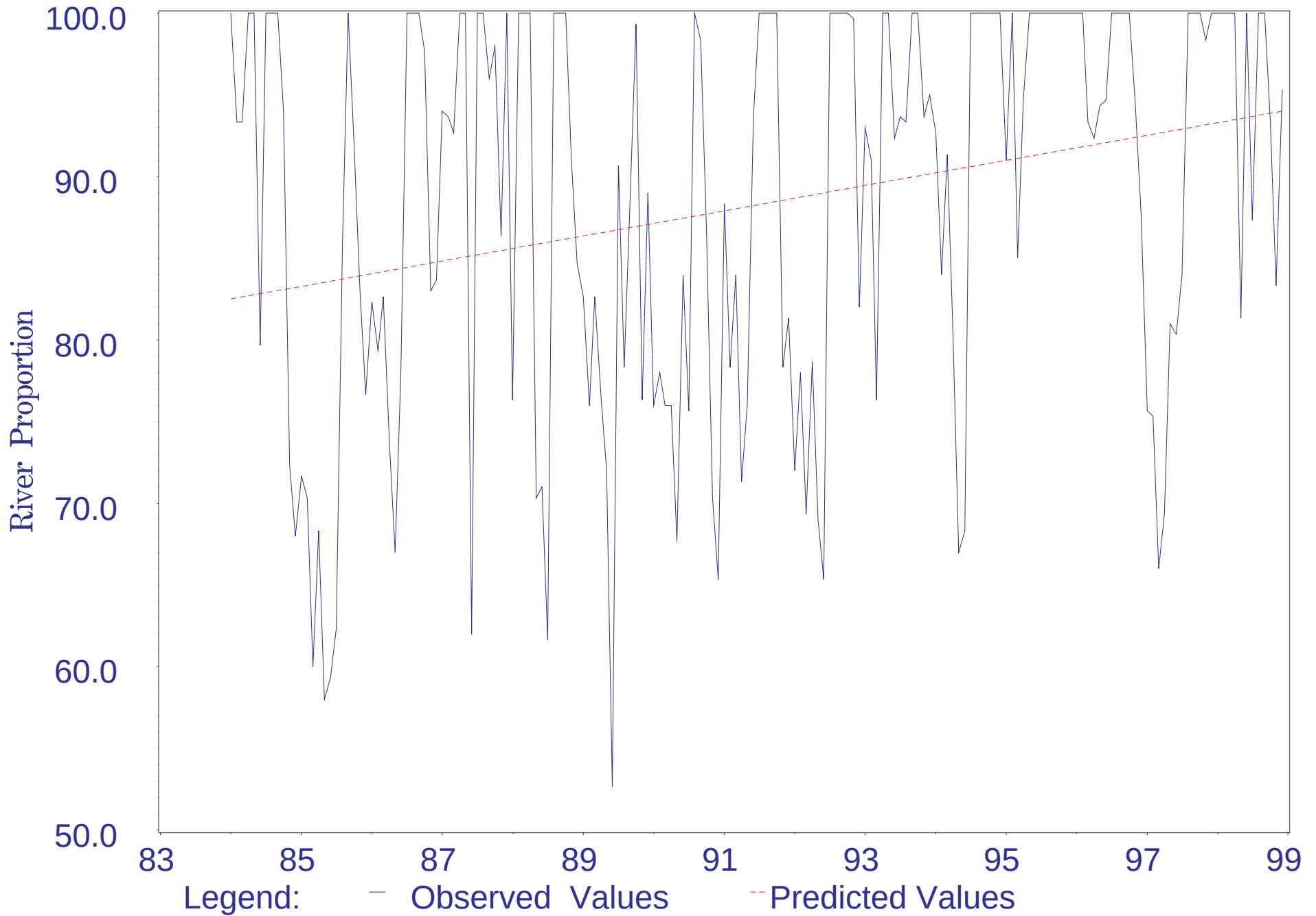
Proportion of River < 12 ppt (1984-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-82



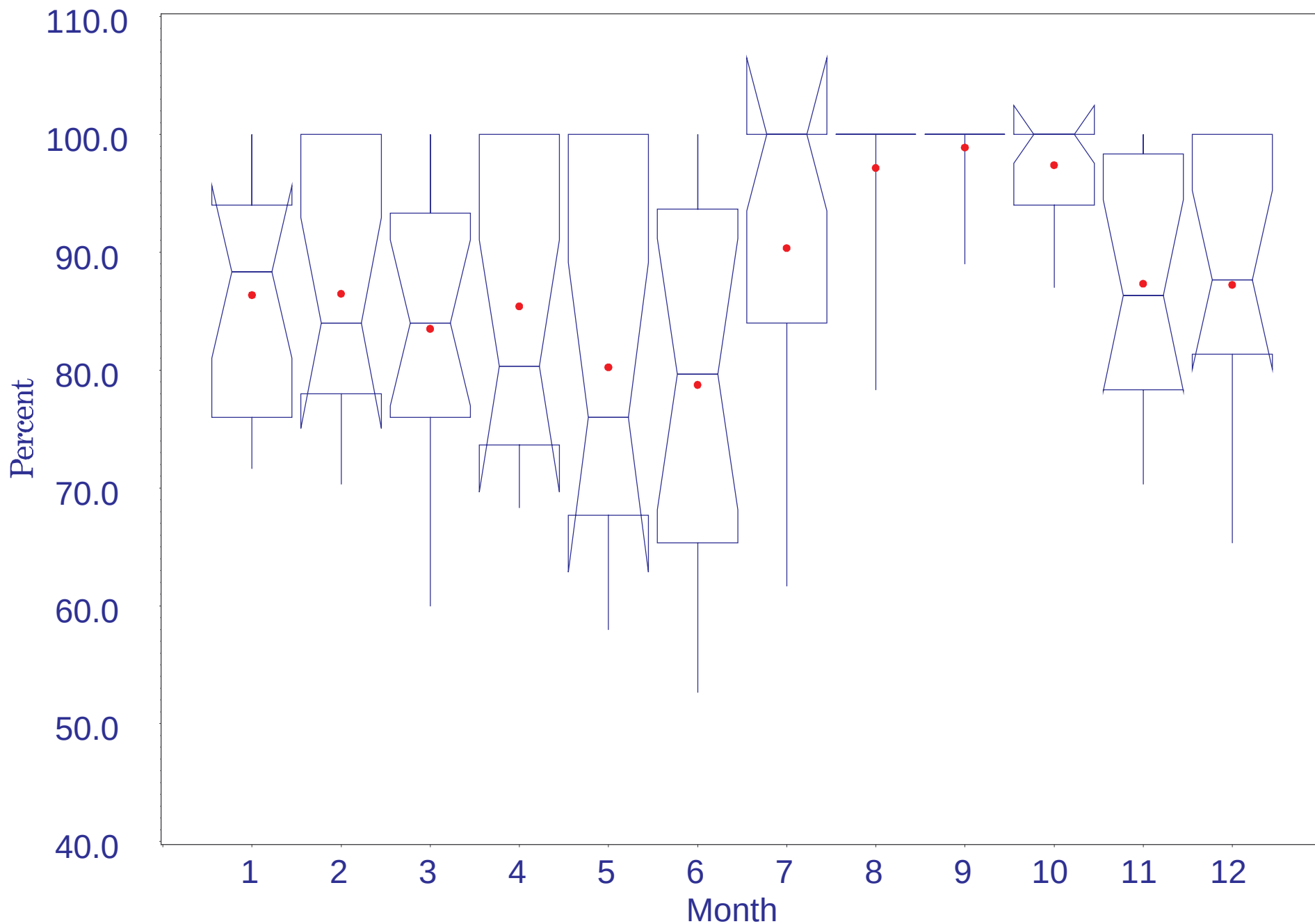
Proportion of River < 20 ppt
1984-1998

B-83



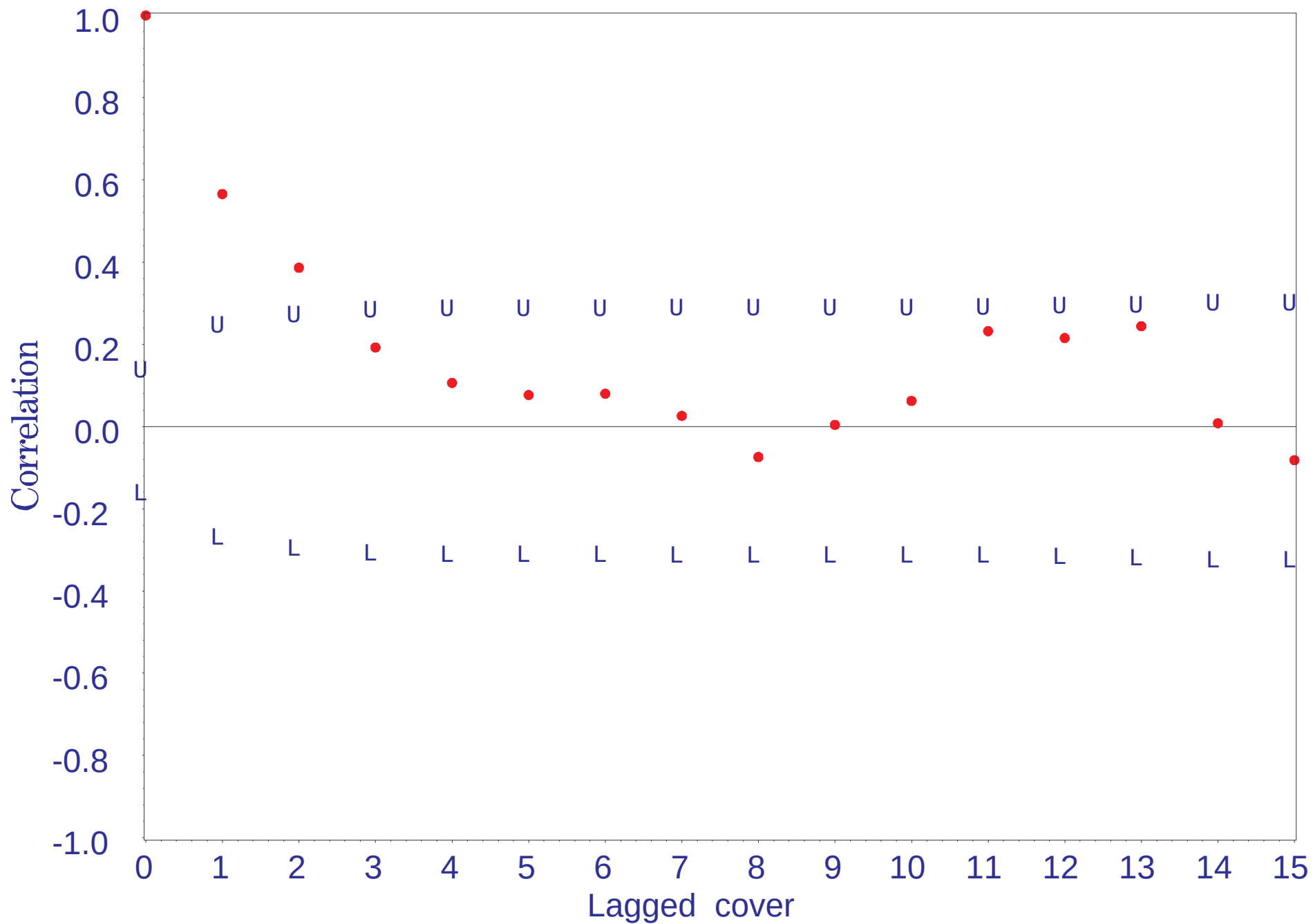
Proportion of River < 20 ppt 1984-1998
Monthly Boxplots of Percent

B-84



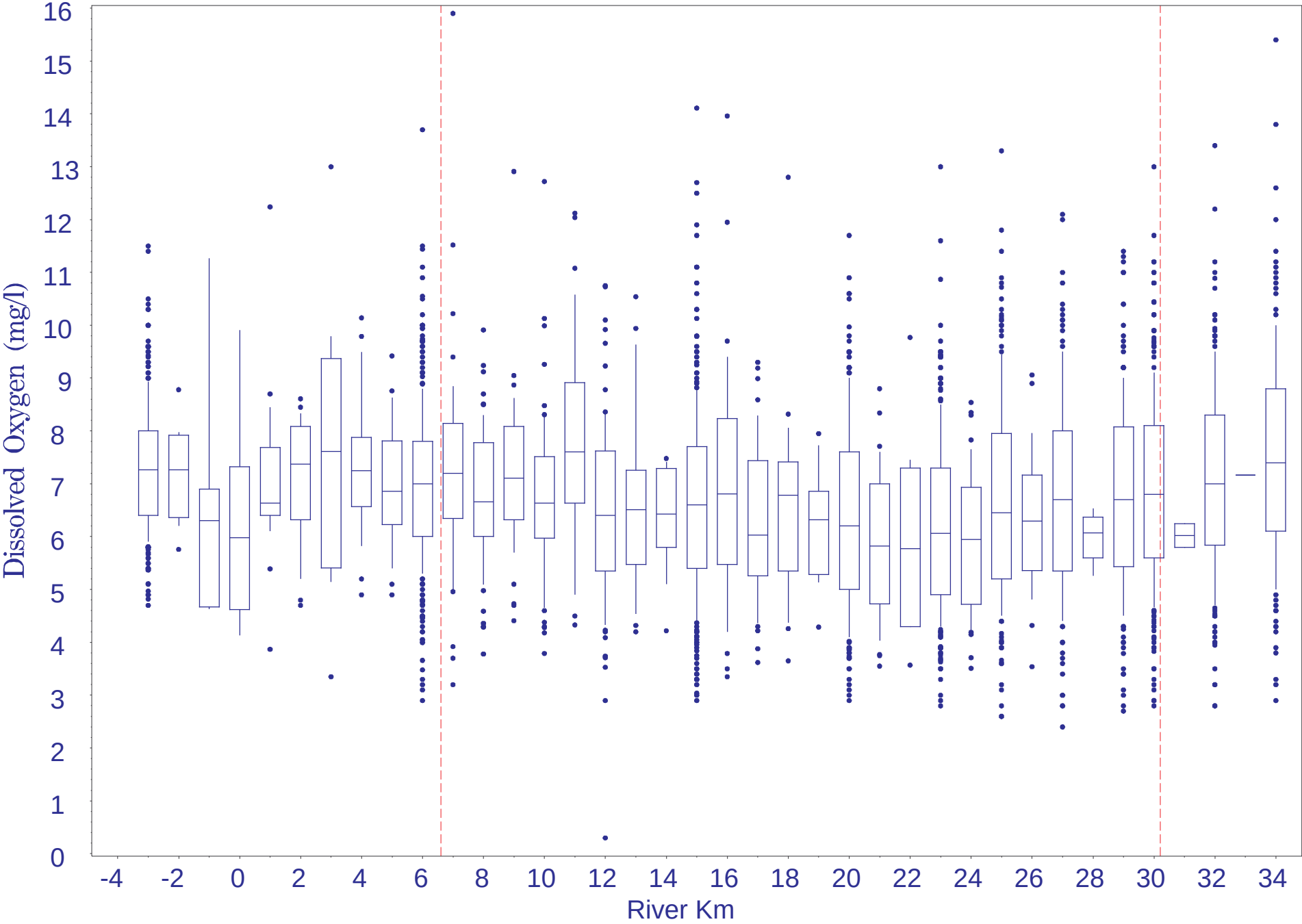
Proportion of River < 20 ppt (1984-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-85



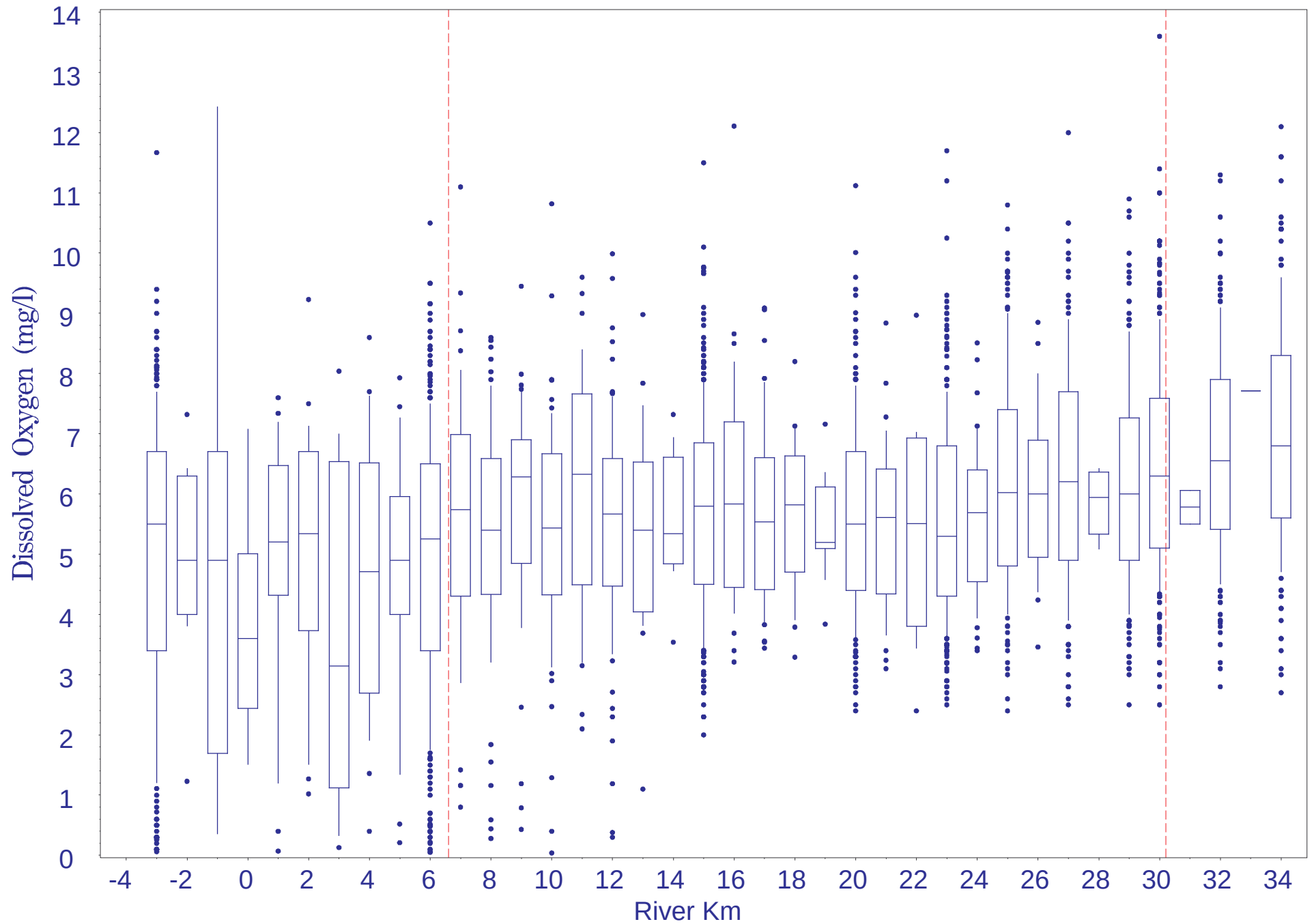
Dissolved Oxygen vs. River Kilometer 1976-1998
Surface

B-86



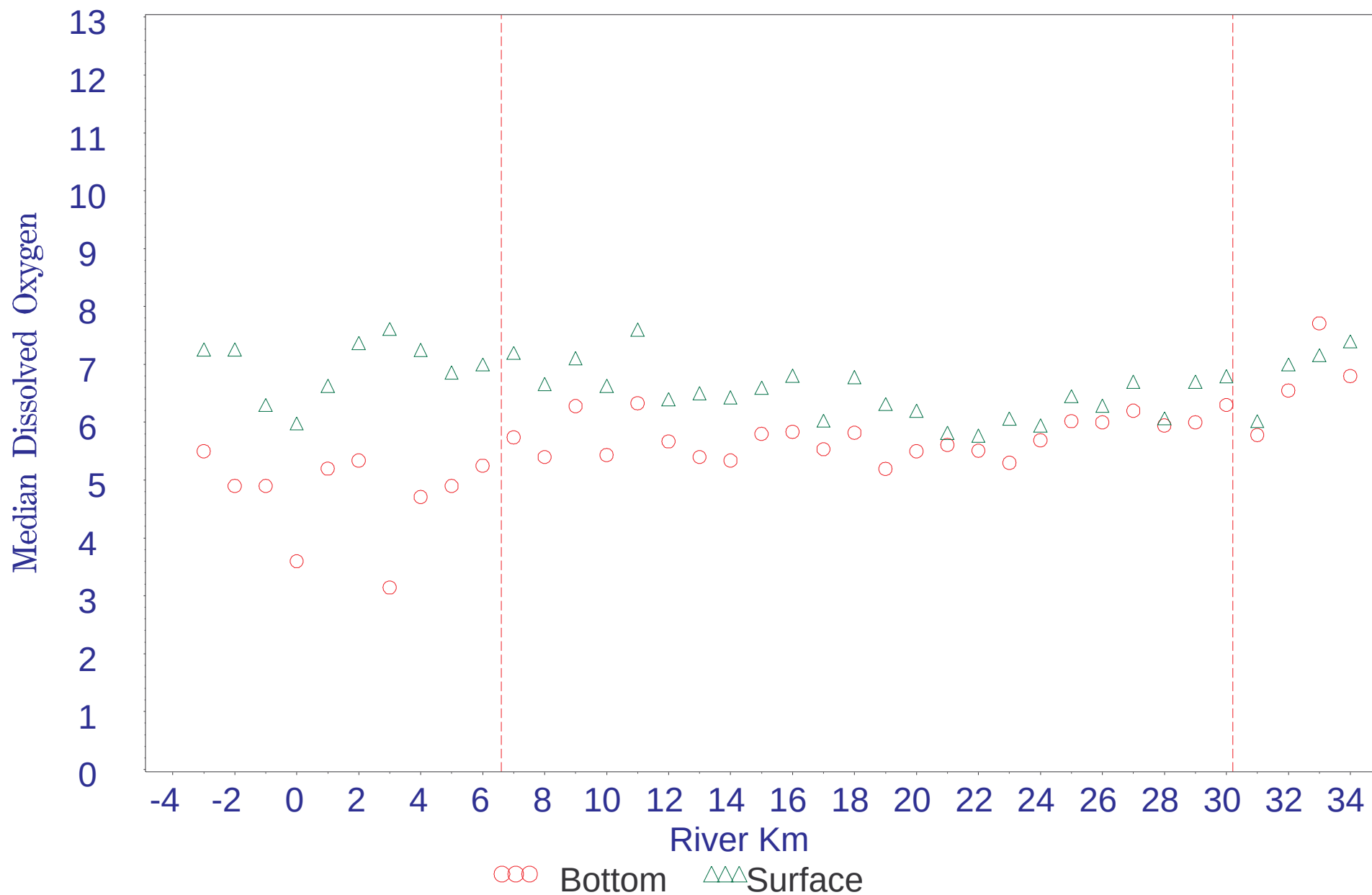
Dissolved Oxygen vs. River Kilometer 1976-1998
Bottom

B-87



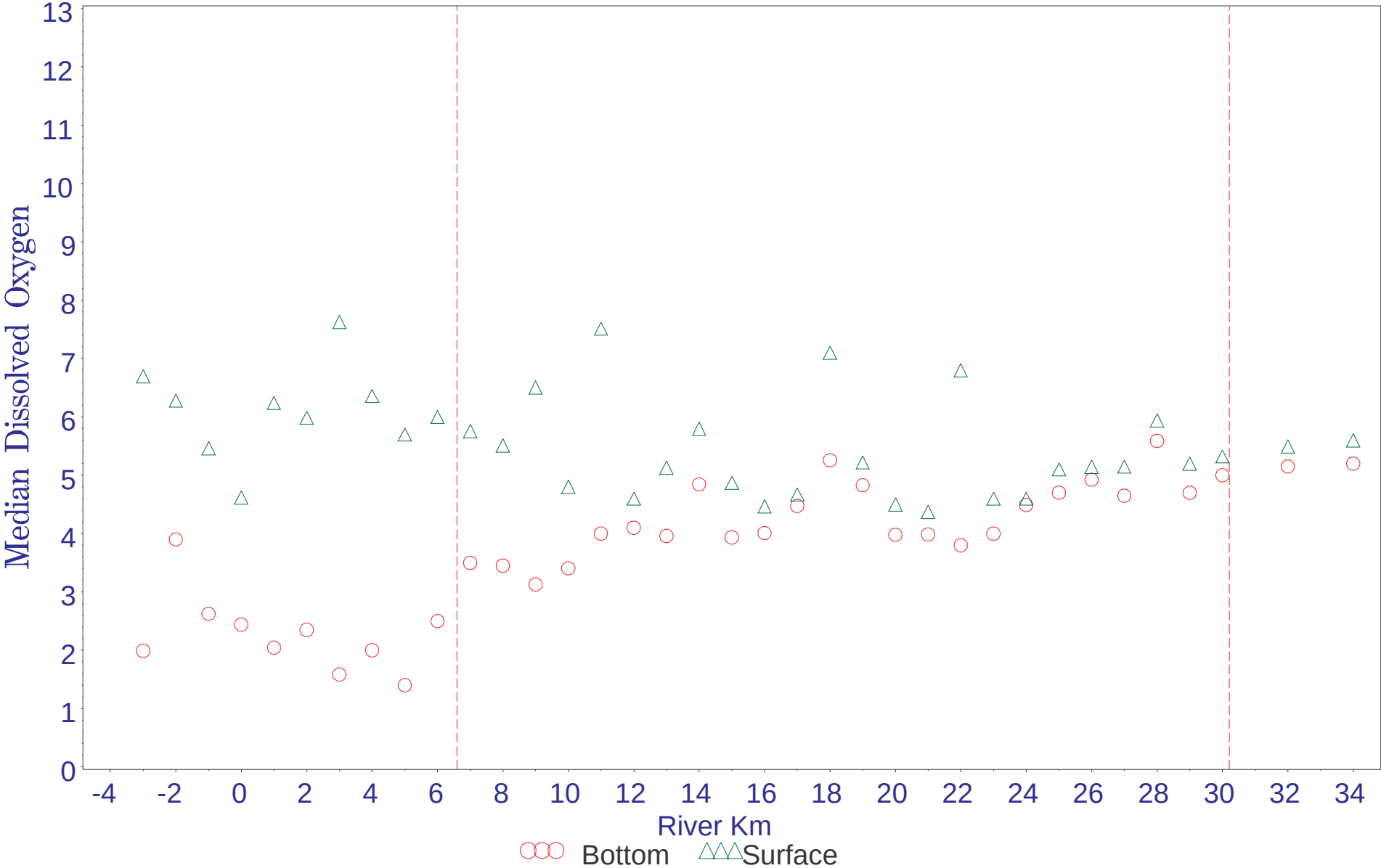
Median Dissolved Oxygen vs. River Km 1976-1998

B-88



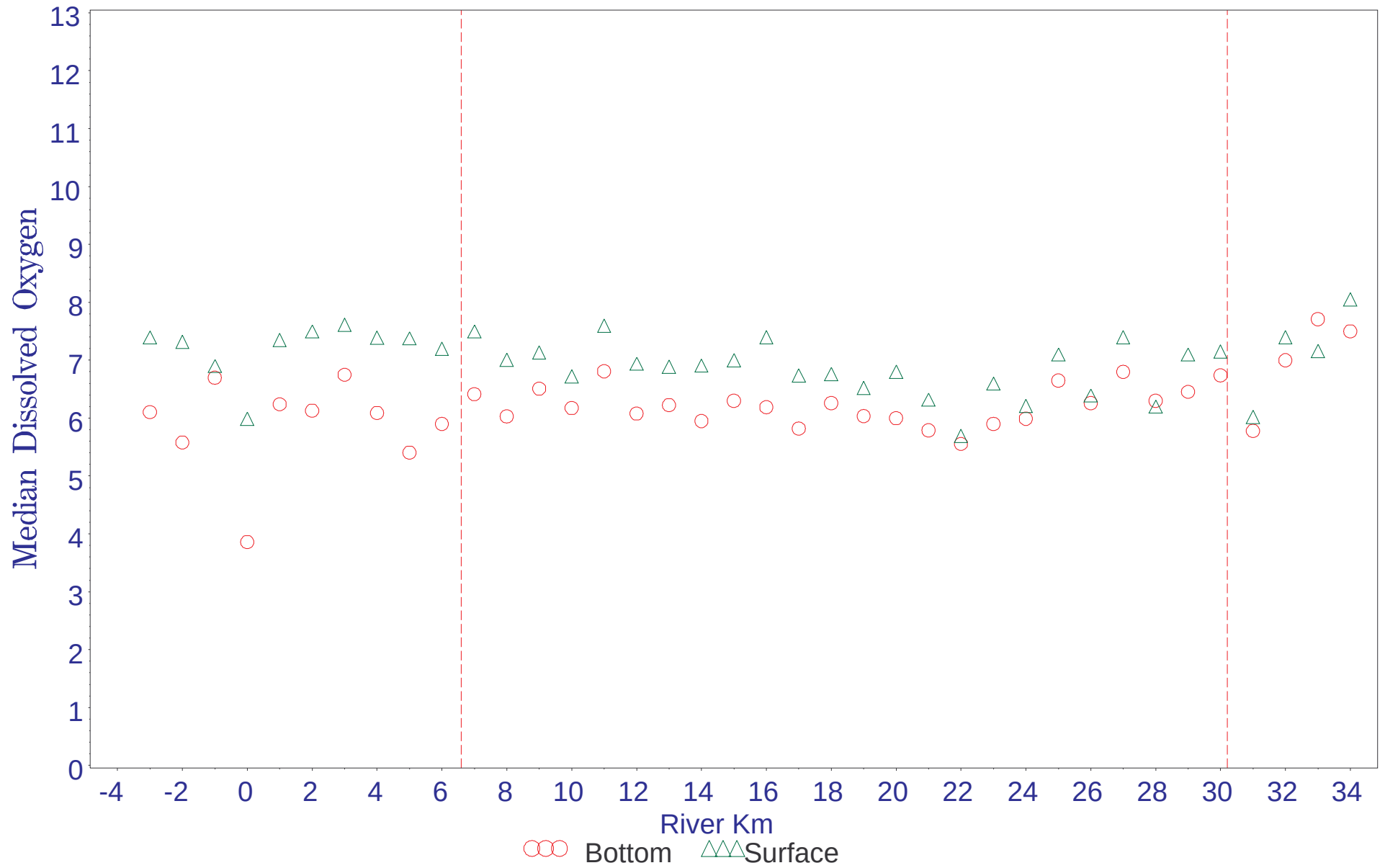
Median Dissolved Oxygen vs. River Km 1976-1998
Wet Season

B-89



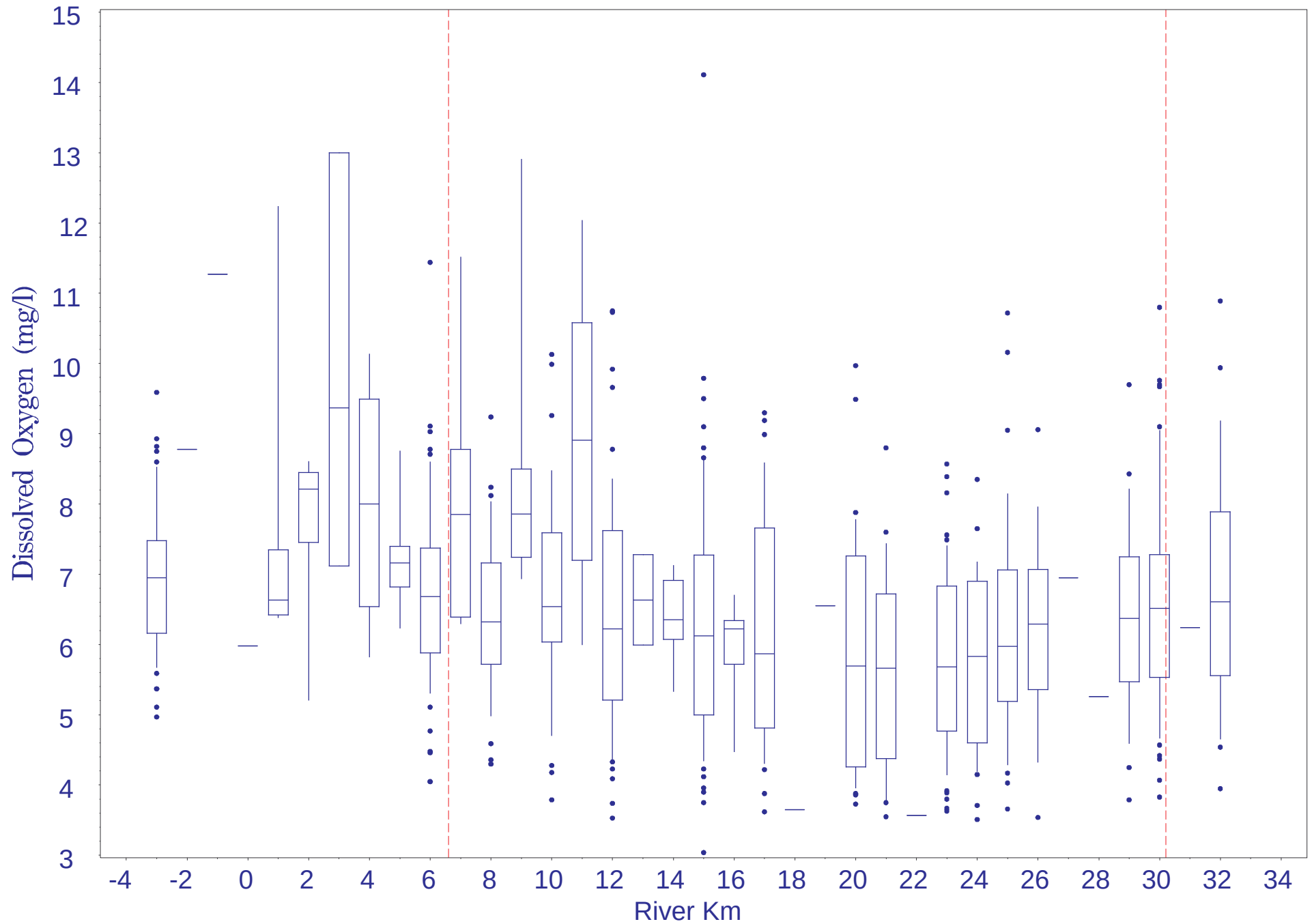
Median Dissolved Oxygen vs. River Km 1976-1998
Dry Season

B-90



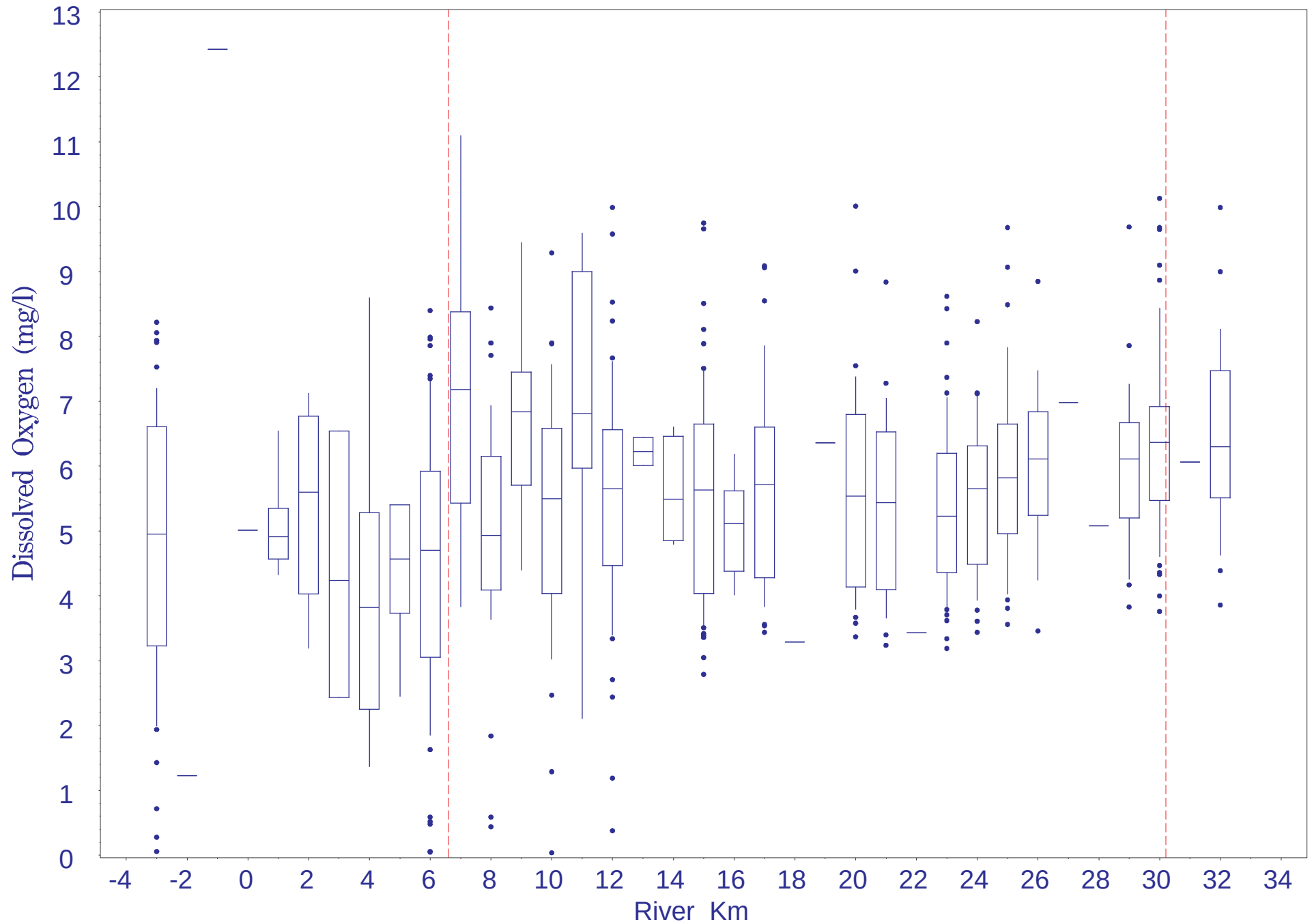
Dissolved Oxygen vs. River Kilometer 1996-1998
Surface

B-91



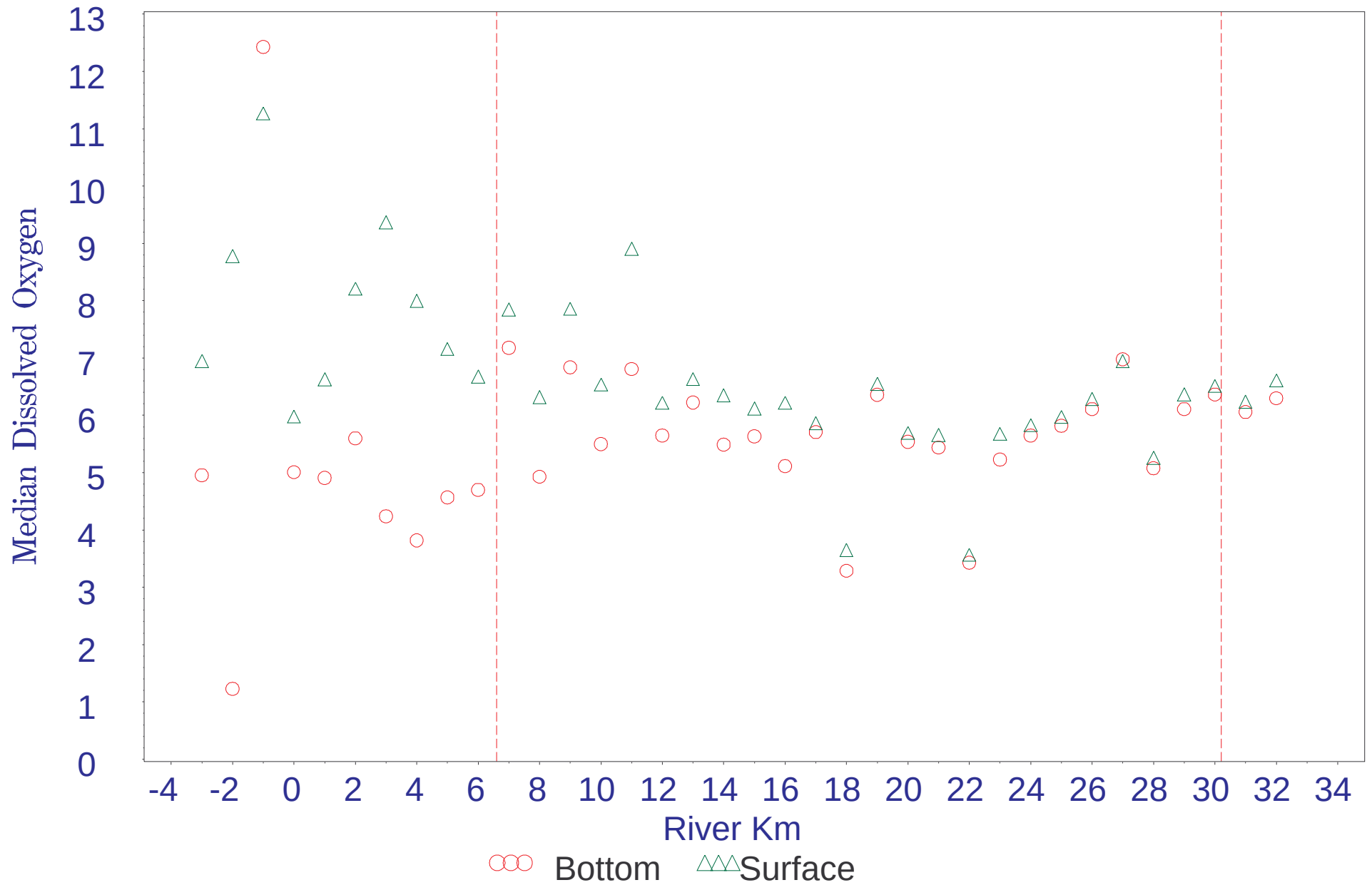
Dissolved Oxygen vs. River Kilometer 1996-1998
Bottom

B-92



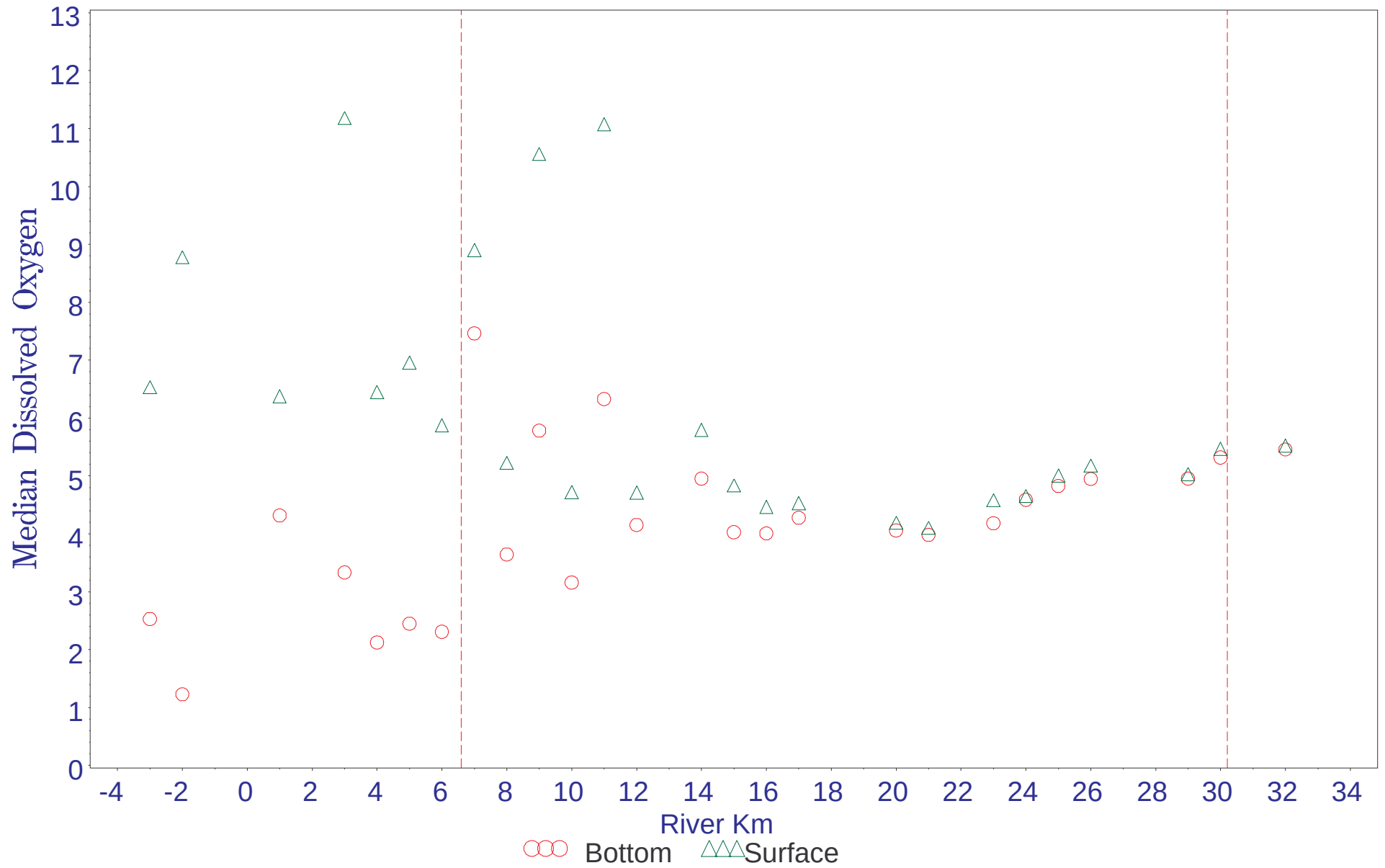
Median Dissolved Oxygen vs. River Km 1996-1998

B-93



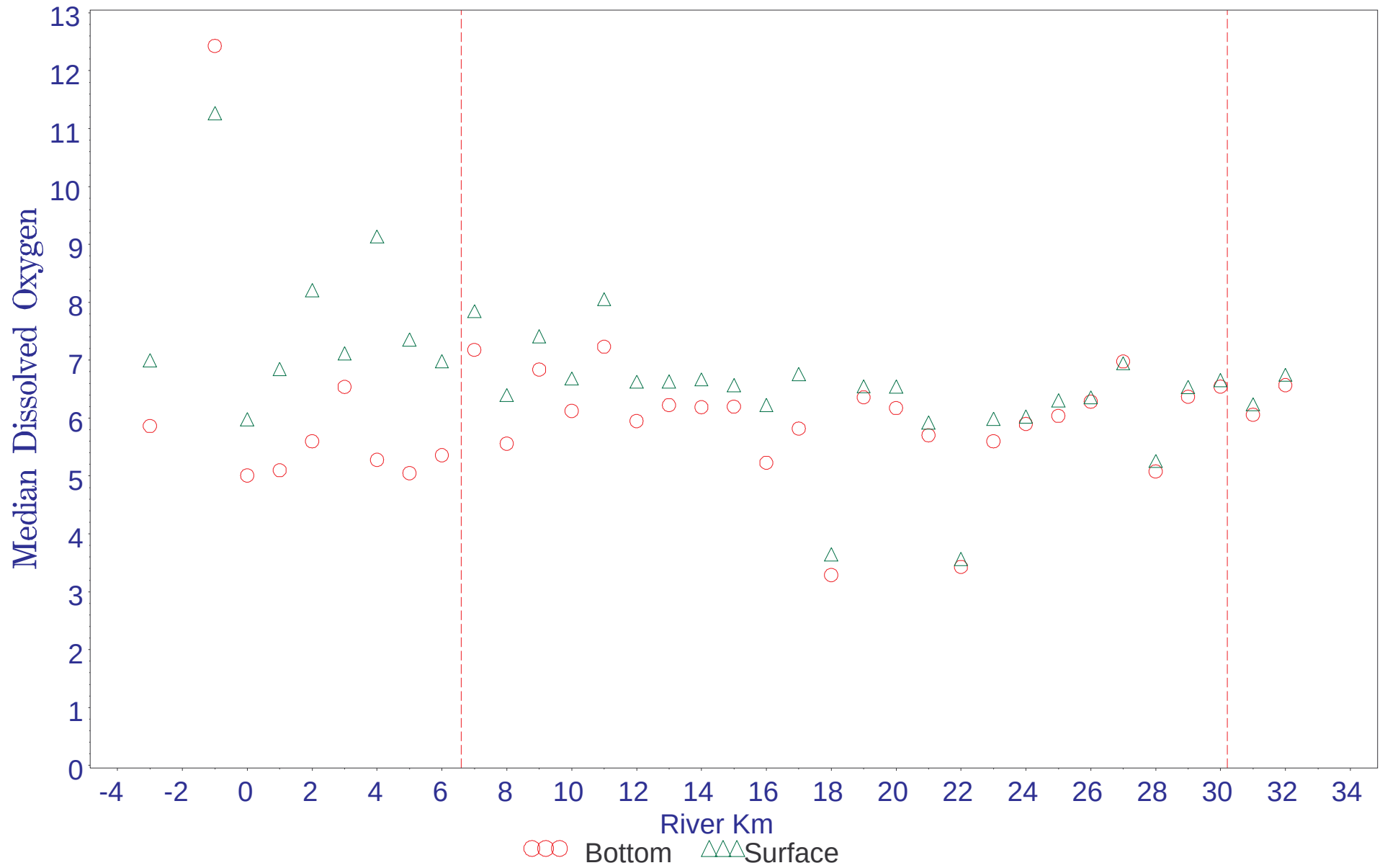
Median Dissolved Oxygen vs. River Km 1996-1998
Wet Season

B-94



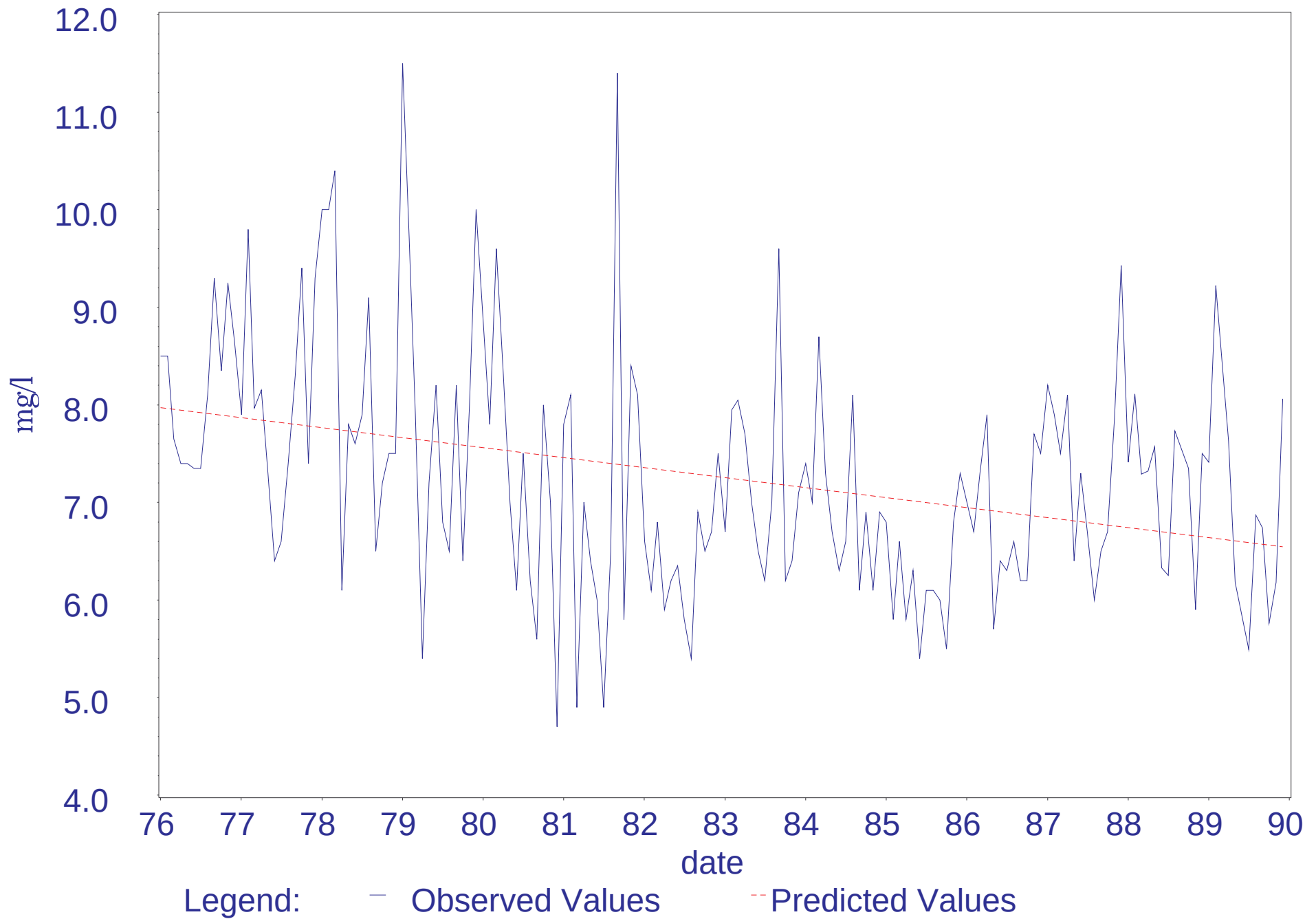
Median Dissolved Oxygen vs. River Km 1996-1998
Dry Season

B-95



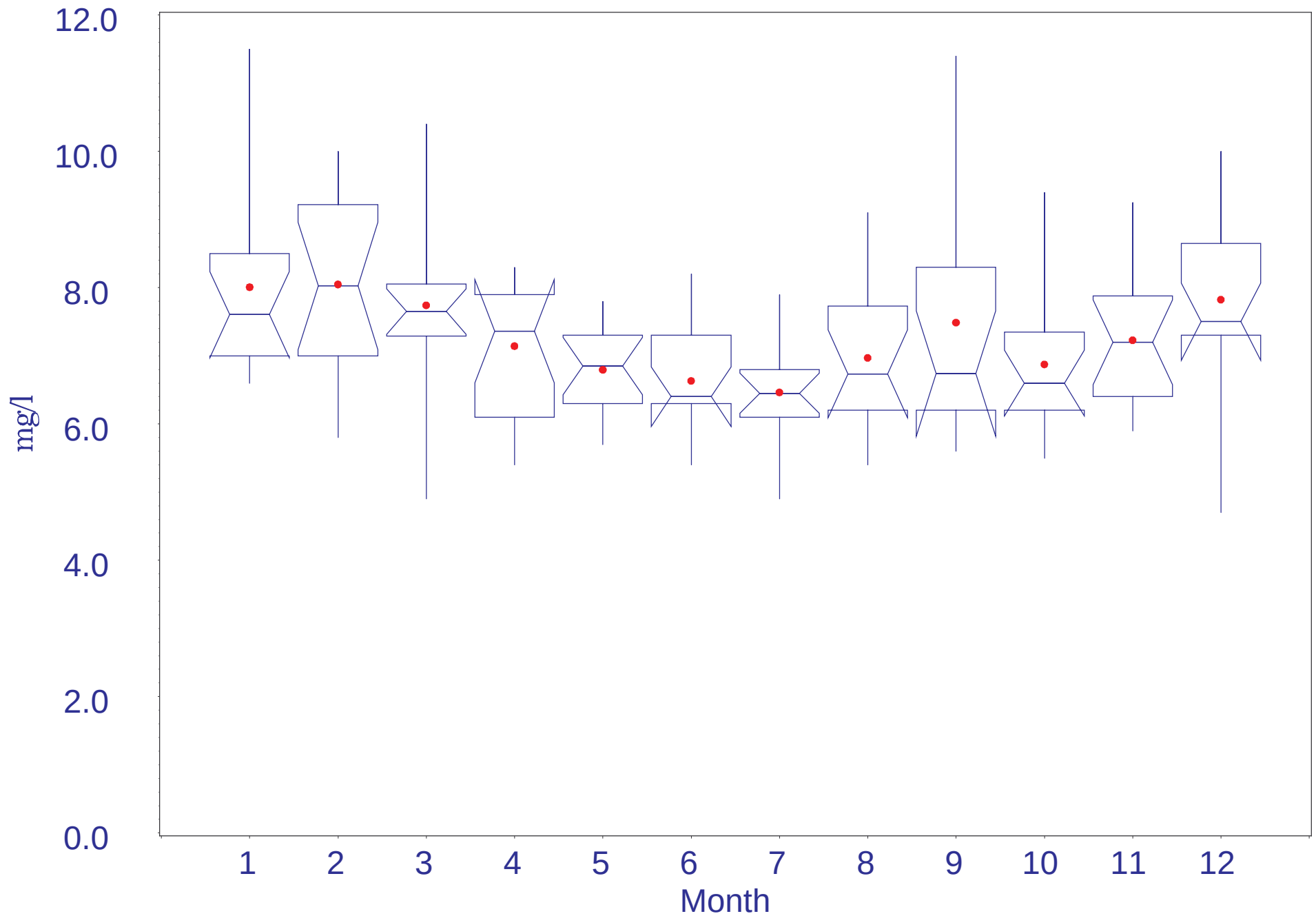
Surface Dissolved Oxygen at River Kilometer -2.4
1976-1989

B-96



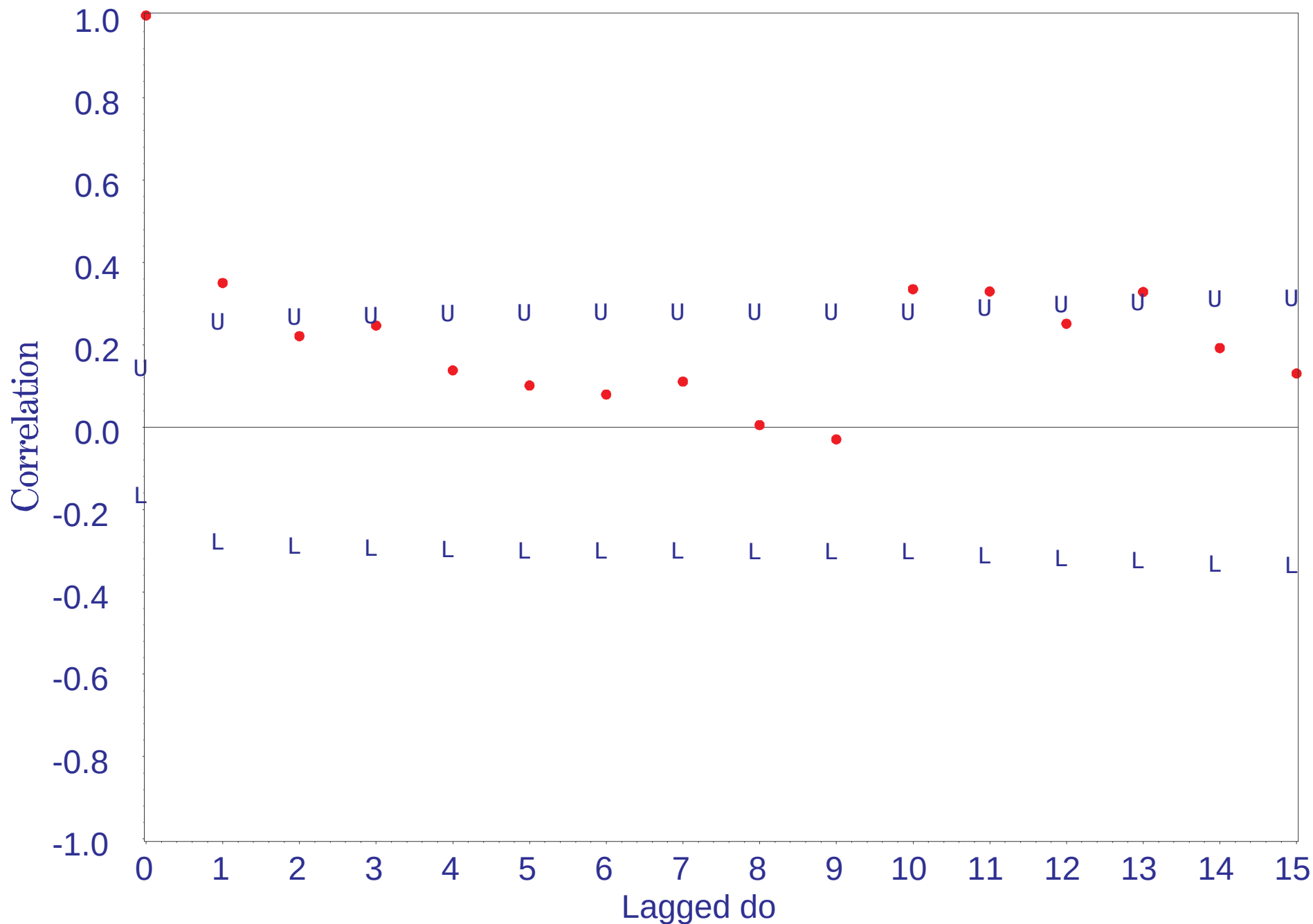
Surface Dissolved Oxygen at River Kilometer -2.4 (1976-1989)
Monthly Boxplots

B-97



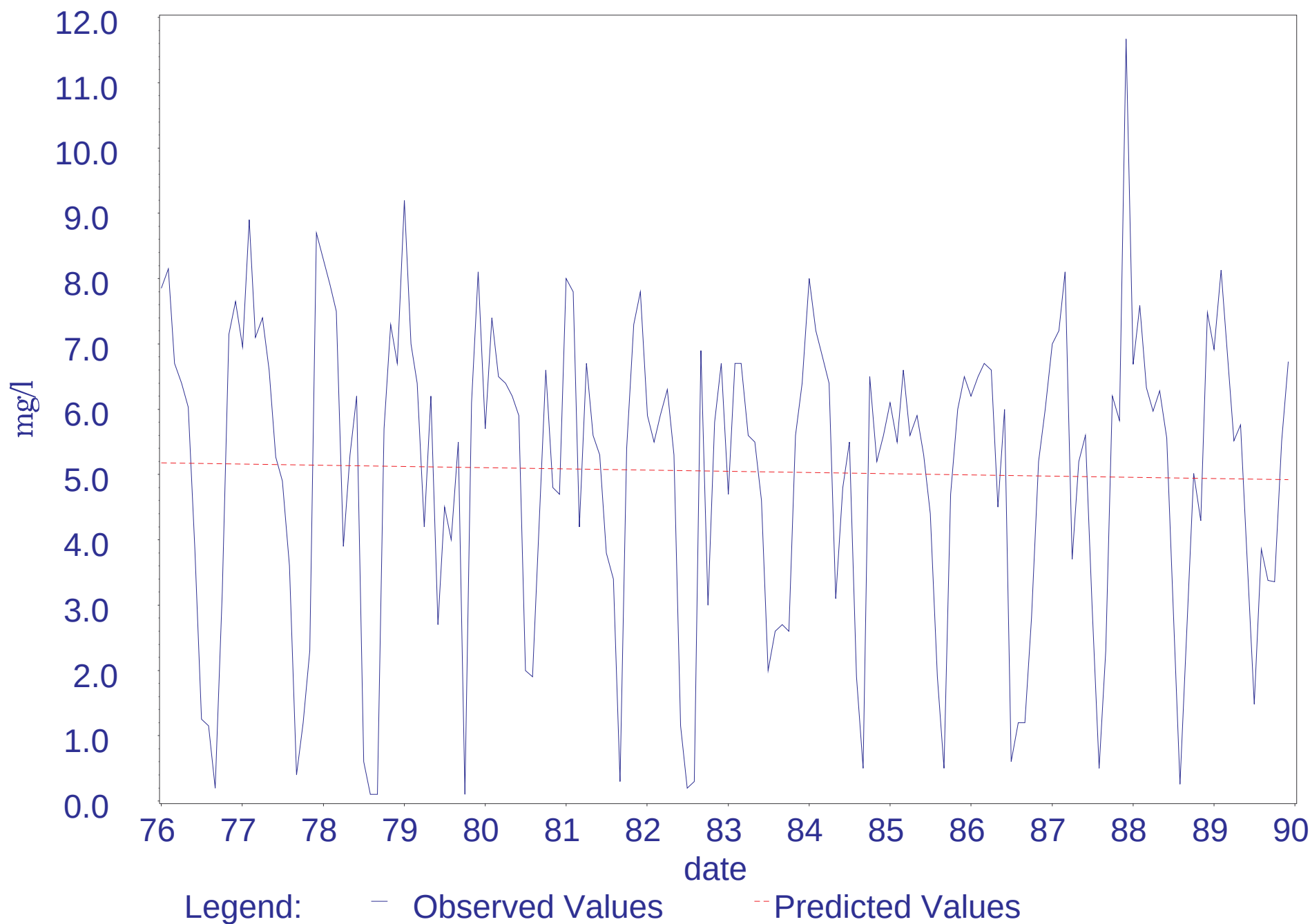
Surface Dissolved Oxygen at River Kilometer -2.4 (1976-1989)
Correlogram with Upper and Lower 95% Confidence Limits

B-98



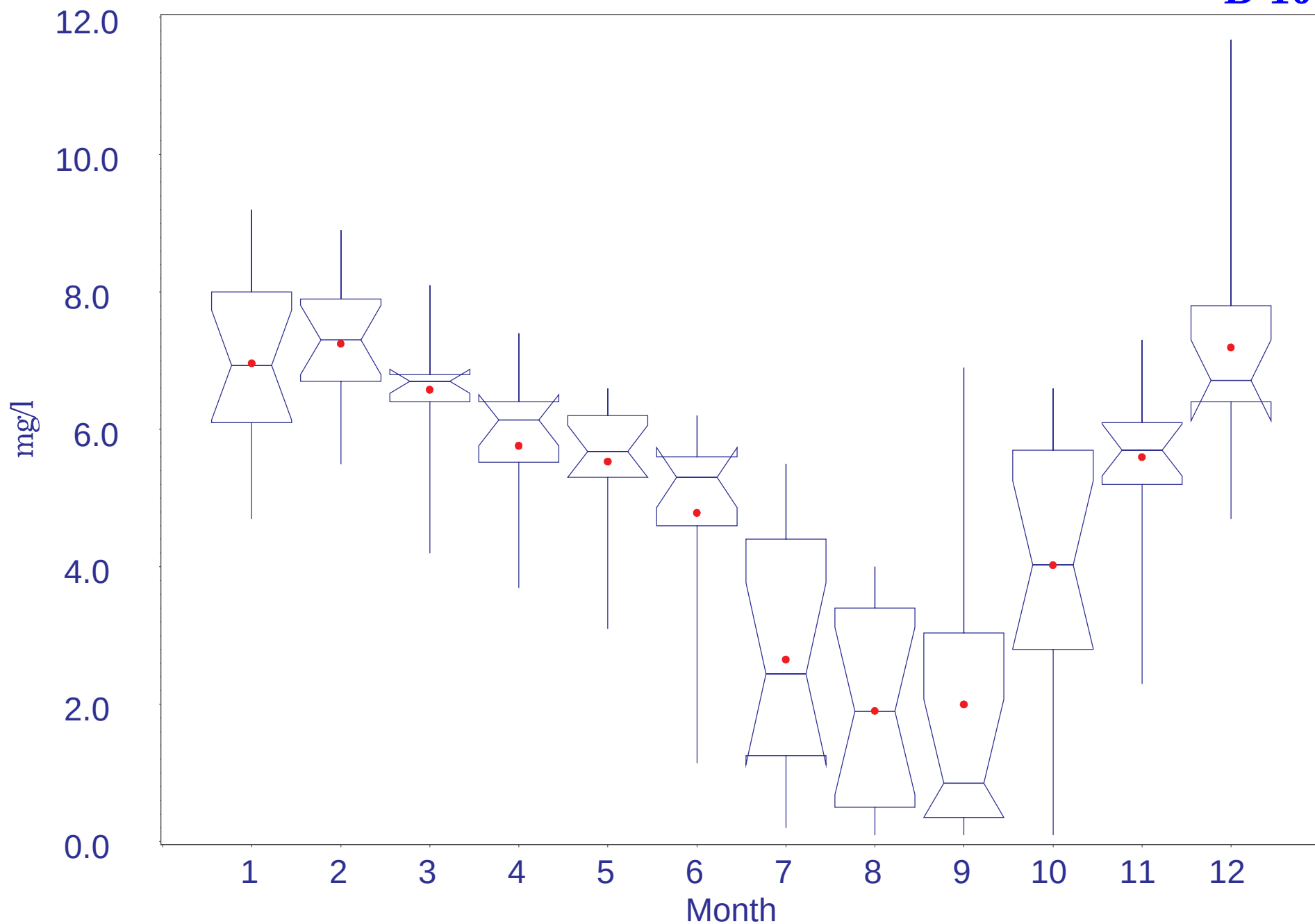
Bottom Dissolved Oxygen at River Kilometer -2.4
1976-1989

B-99



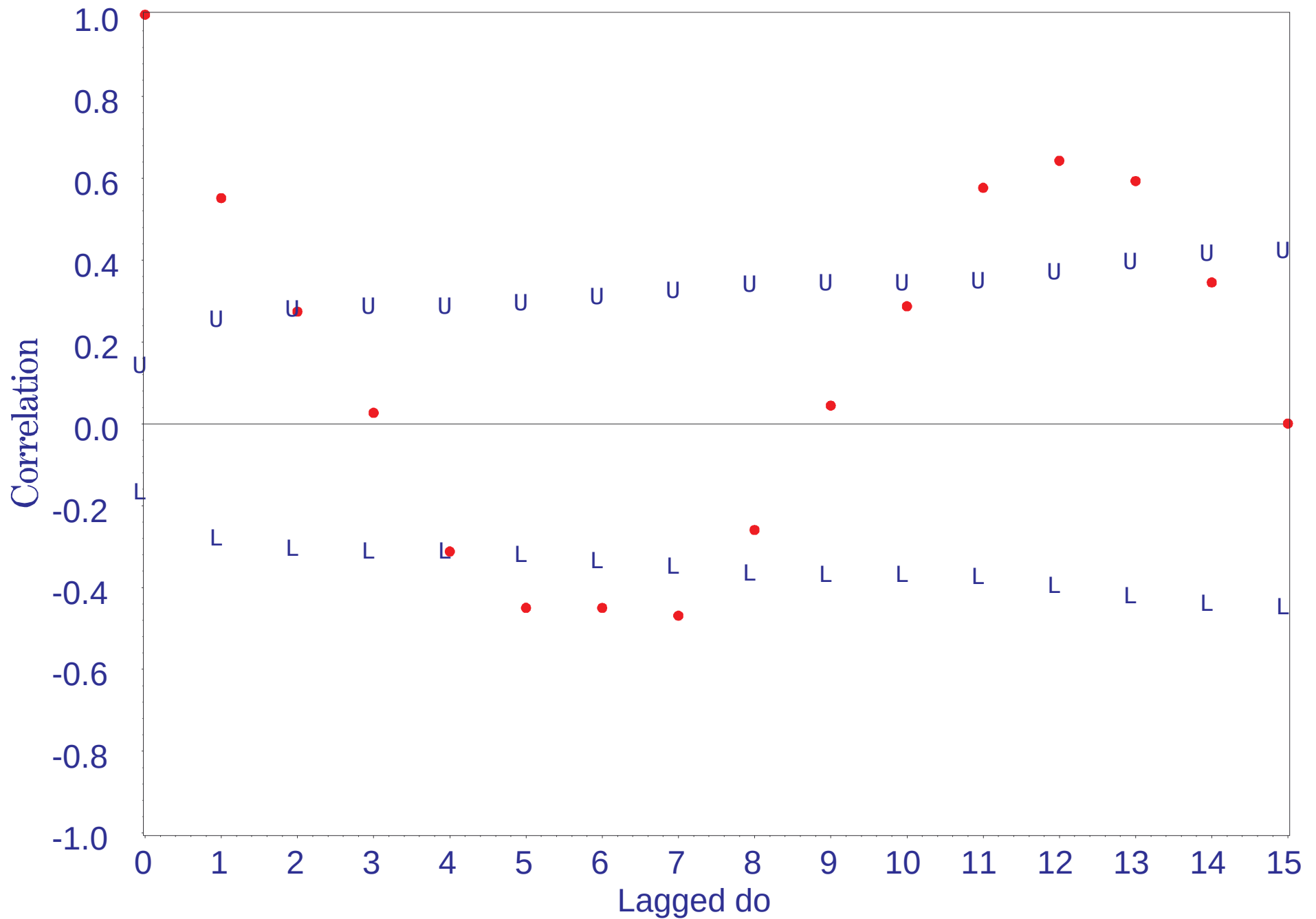
Bottom Dissolved Oxygen at River Kilometer -2.4 (1976-1989)
Monthly Boxplots

B-100



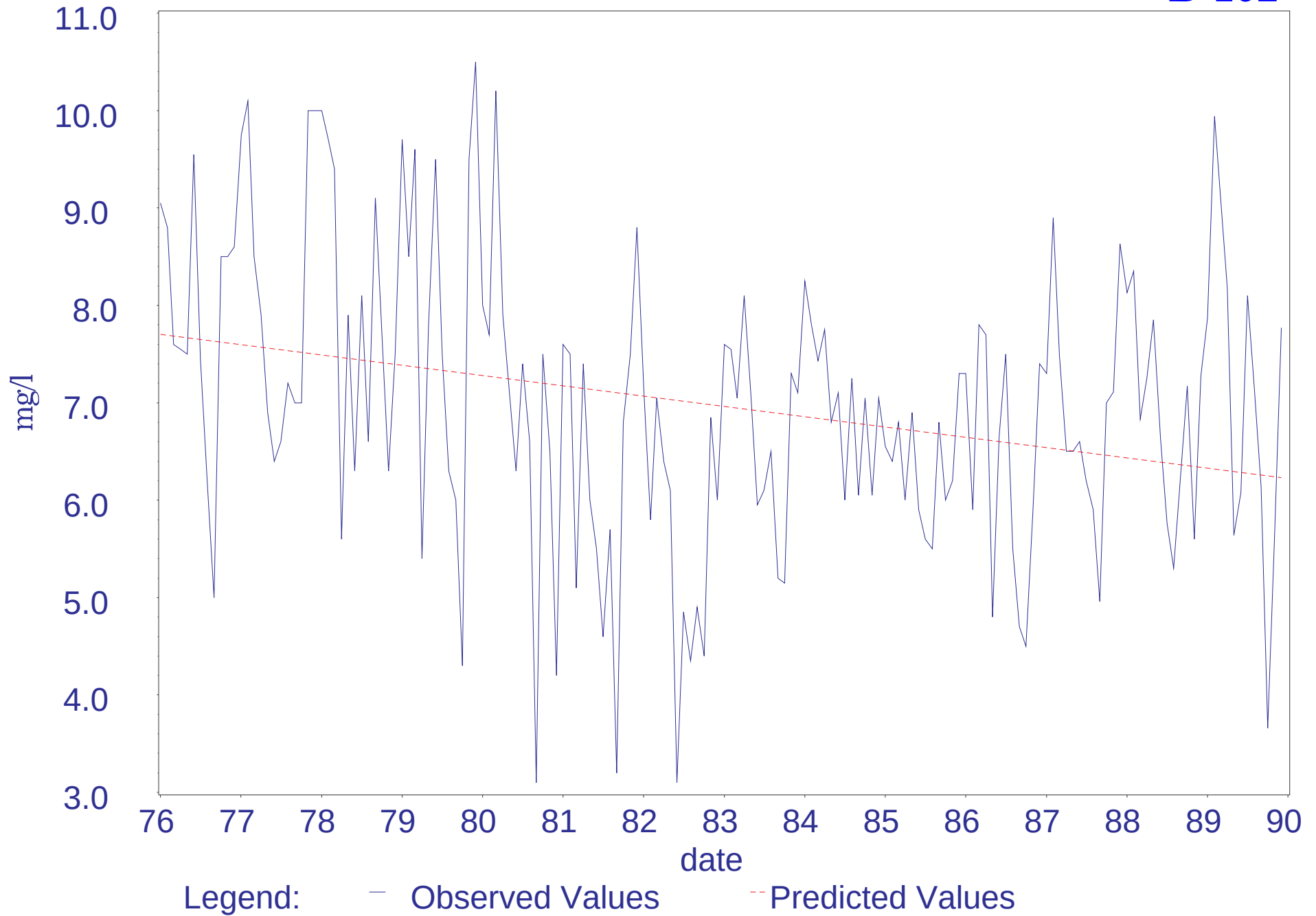
Bottom Dissolved Oxygen at River Kilometer -2.4 (1976-1989)
Correlogram with Upper and Lower 95% Confidence Limits

B-101



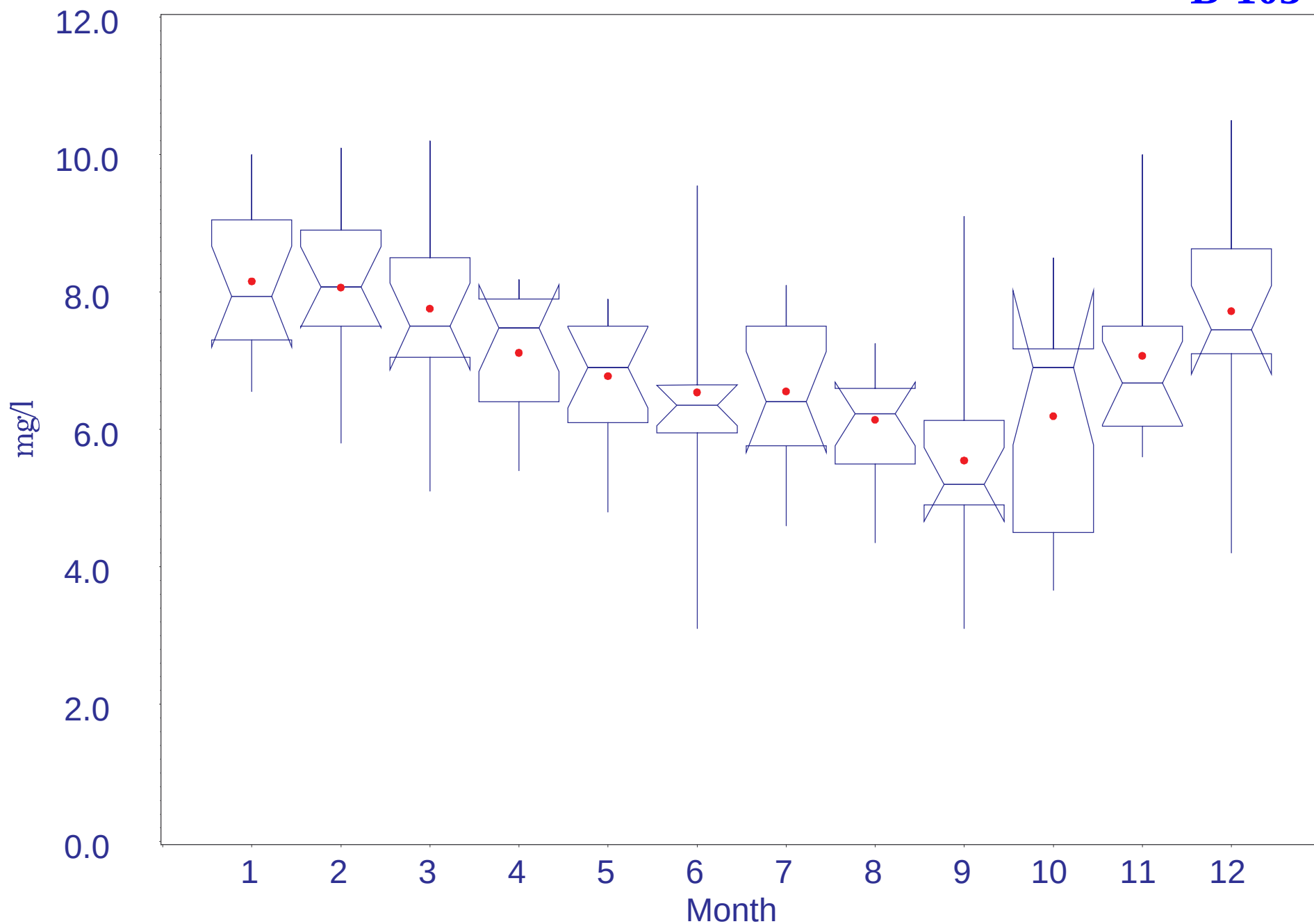
Surface Dissolved Oxygen at River Kilometer 6.6
1976-1989

B-102



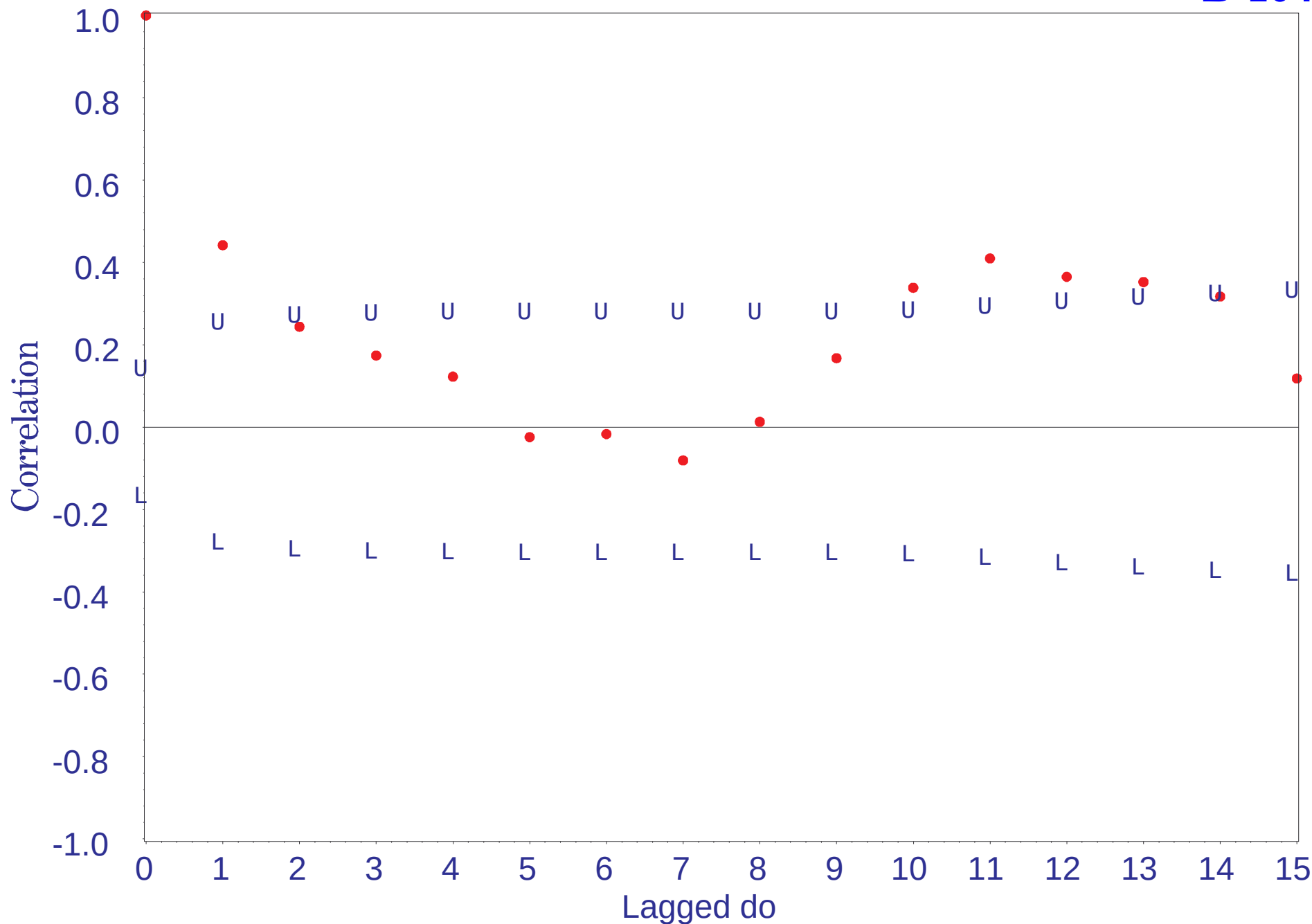
Surface Dissolved Oxygen at River Kilometer 6.6 (1976-1989)
Monthly Boxplots

B-103



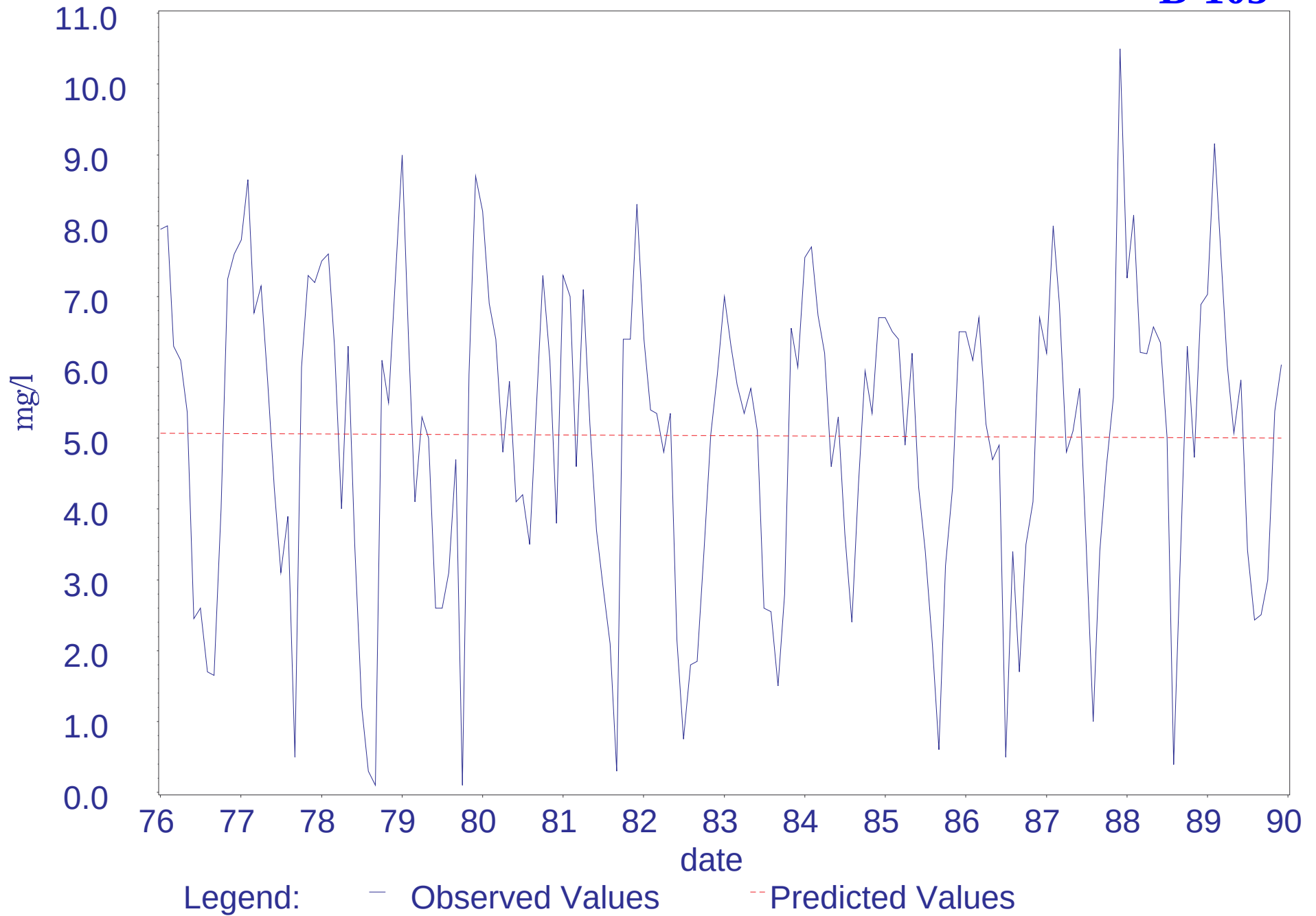
Surface Dissolved Oxygen at River Kilometer 6.6 (1976-1989)
Correlogram with Upper and Lower 95% Confidence Limits

B-104



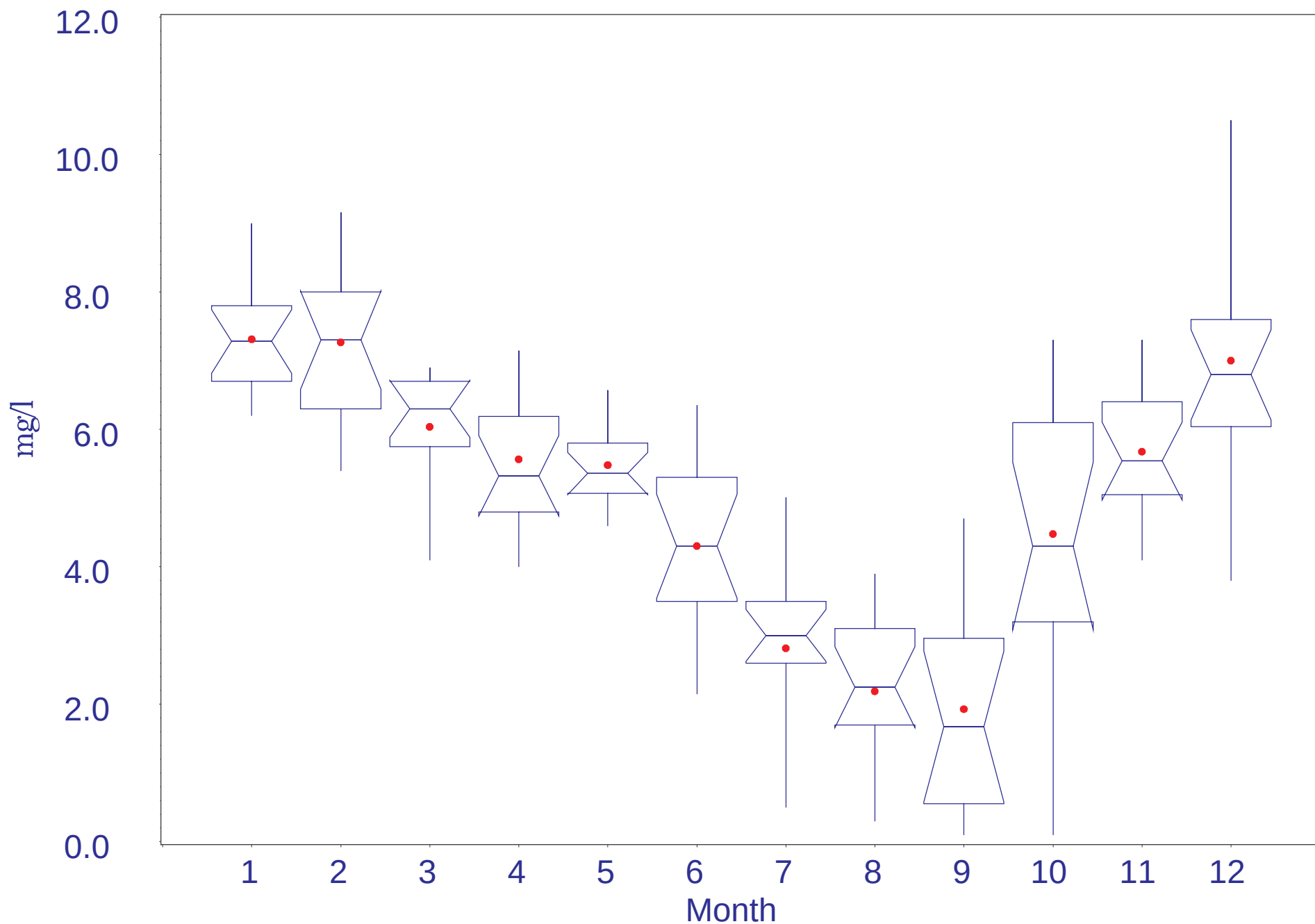
Bottom Dissolved Oxygen at River Kilometer 6.6
1976-1989

B-105



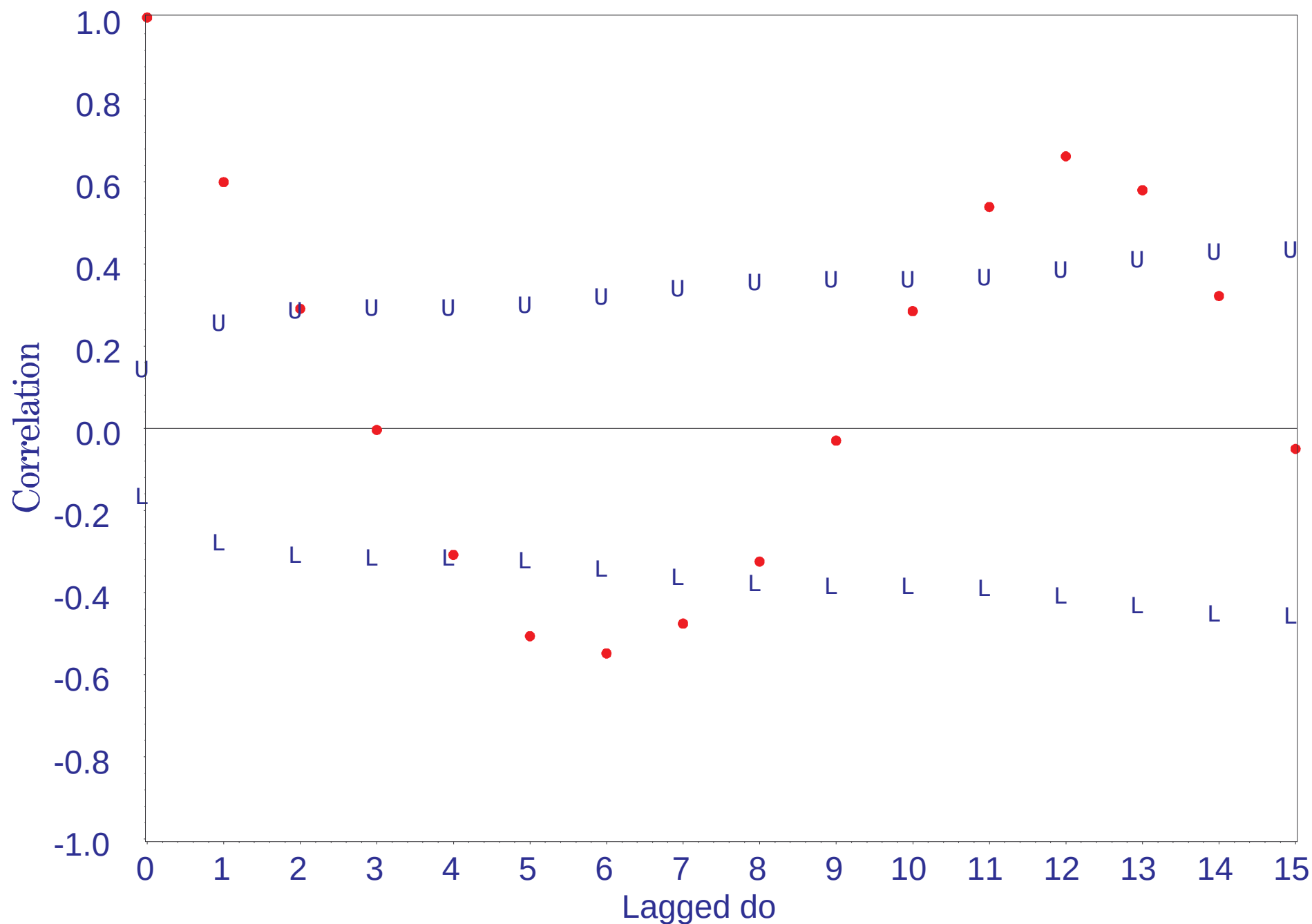
Bottom Dissolved Oxygen River Kilometer 6.6 (1976-1989)
Monthly Boxplots

B-106



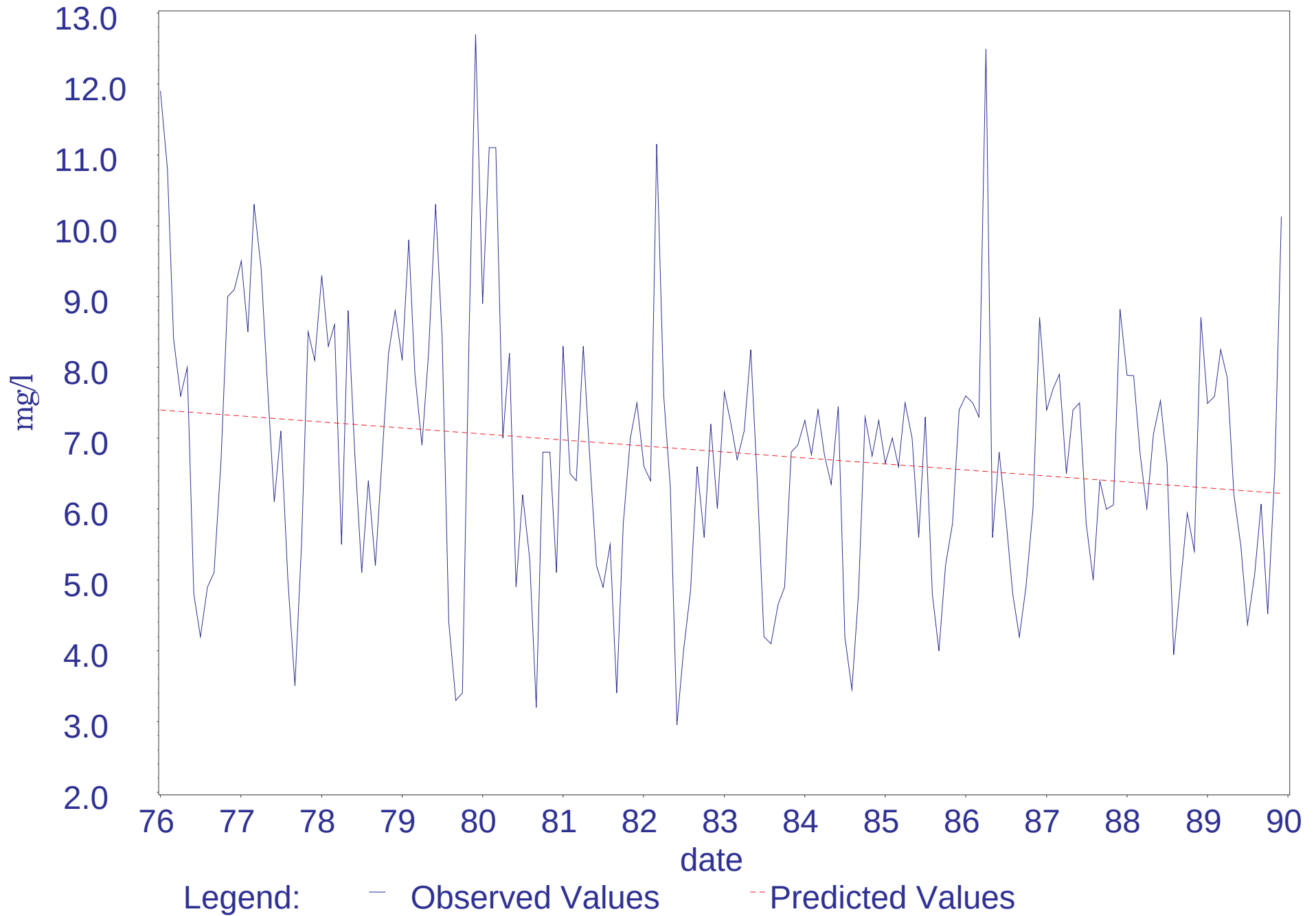
Bottom Dissolved Oxygen at River Kilometer 6.6 (1976-1989)
Correlogram with Upper and Lower 95% Confidence Limits

B-107



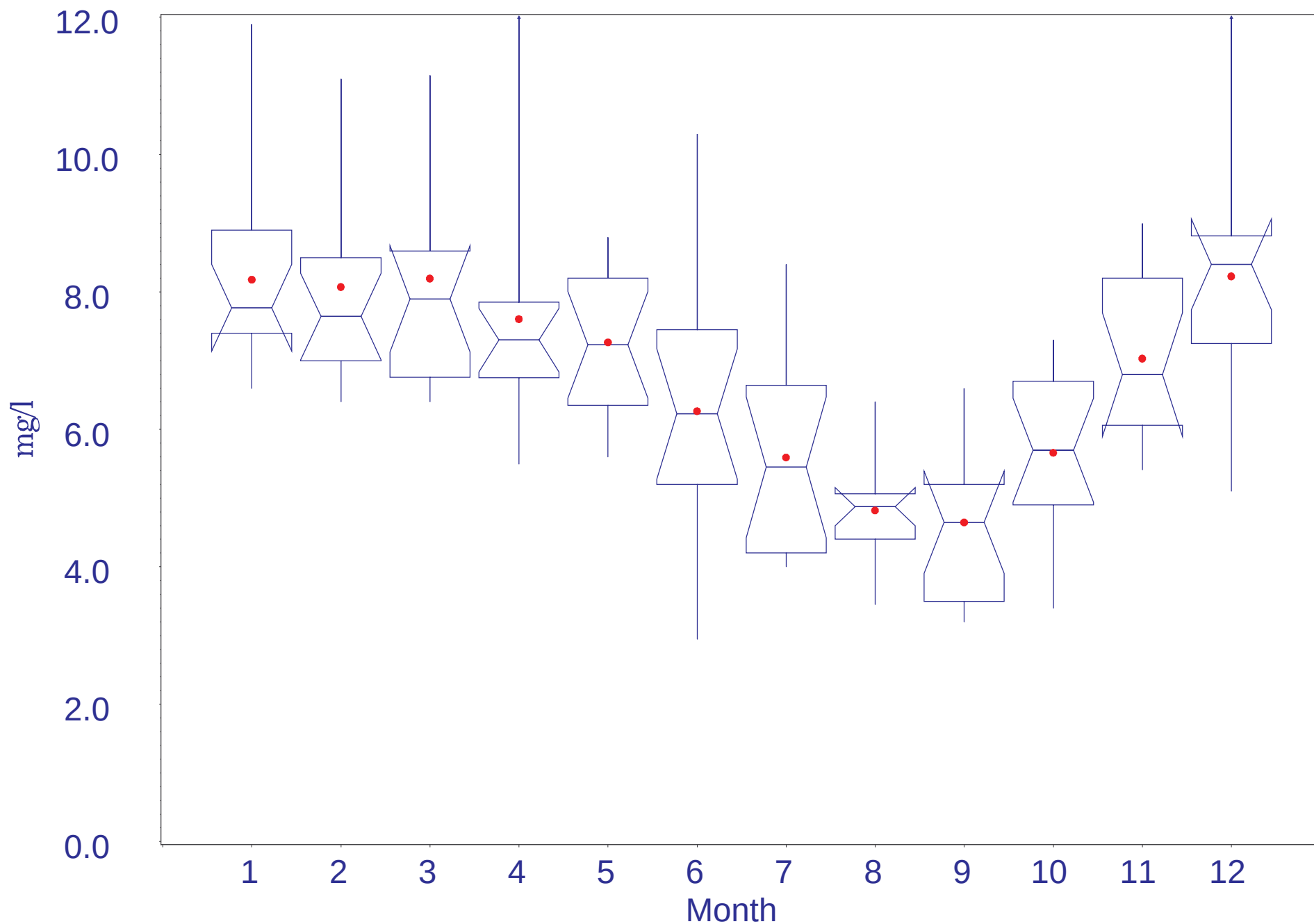
Surface Dissolved Oxygen at River Kilometer 15.5
1976-1989

B-108



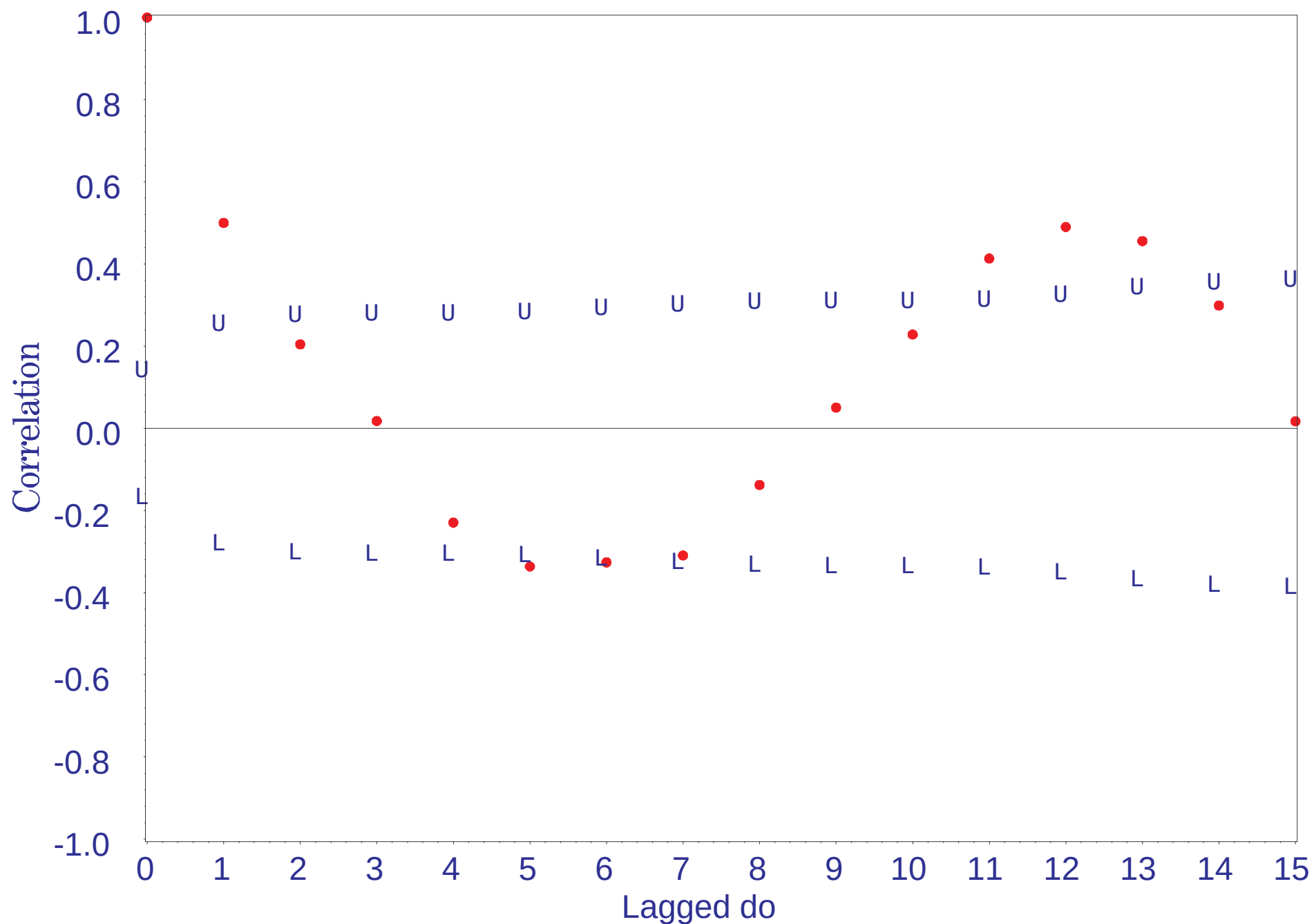
Surface Dissolved Oxygen at River Kilometer 15.5 (1976-1989)
Monthly Boxplots

B-109



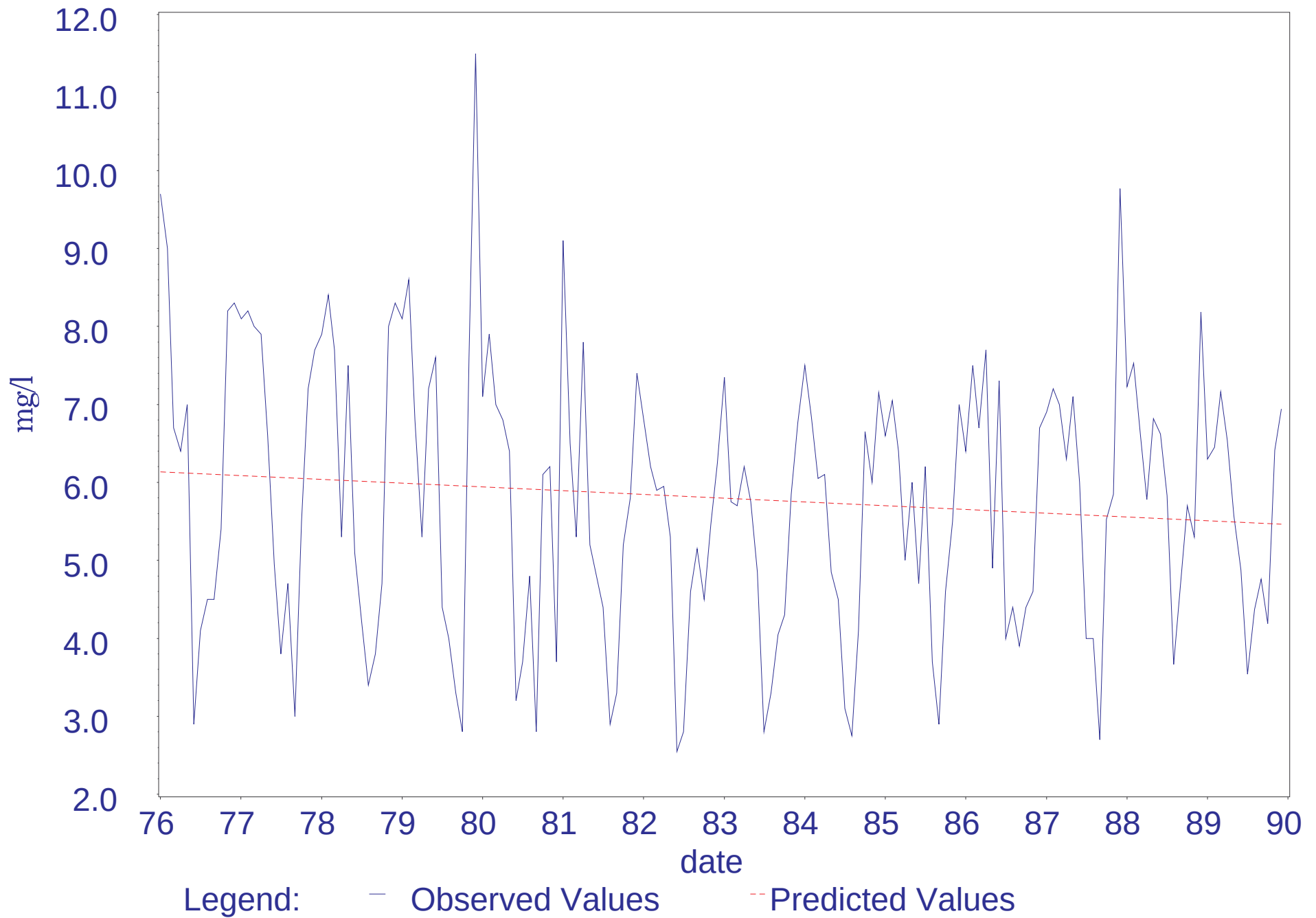
Surface Dissolved Oxygen at River Kilometer 15.5 (1976-1989)
Correlogram with Upper and Lower 95% Confidence Limits

B-110



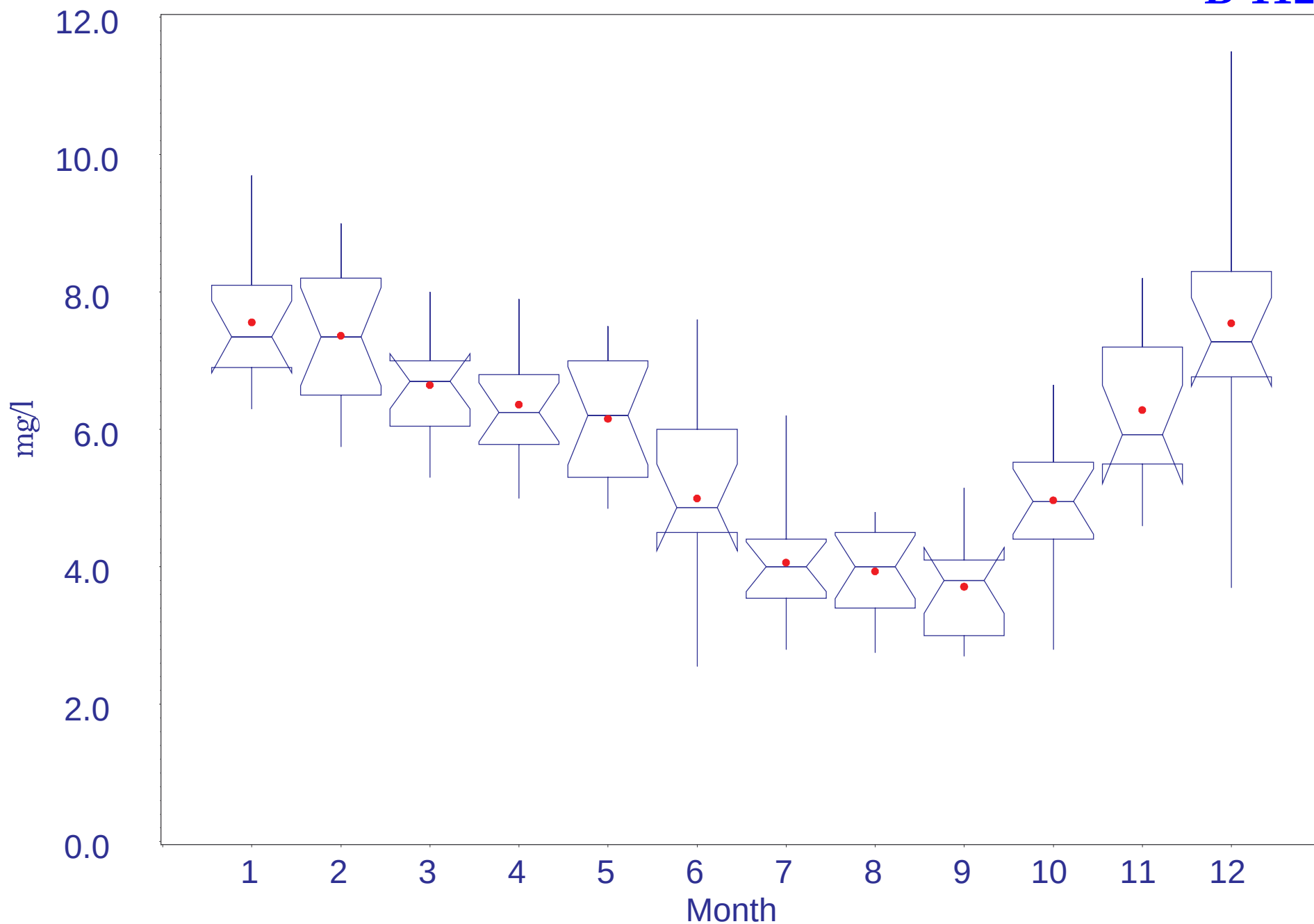
Bottom Dissolved Oxygen at River Kilometer 15.5
1976-1989

B-111



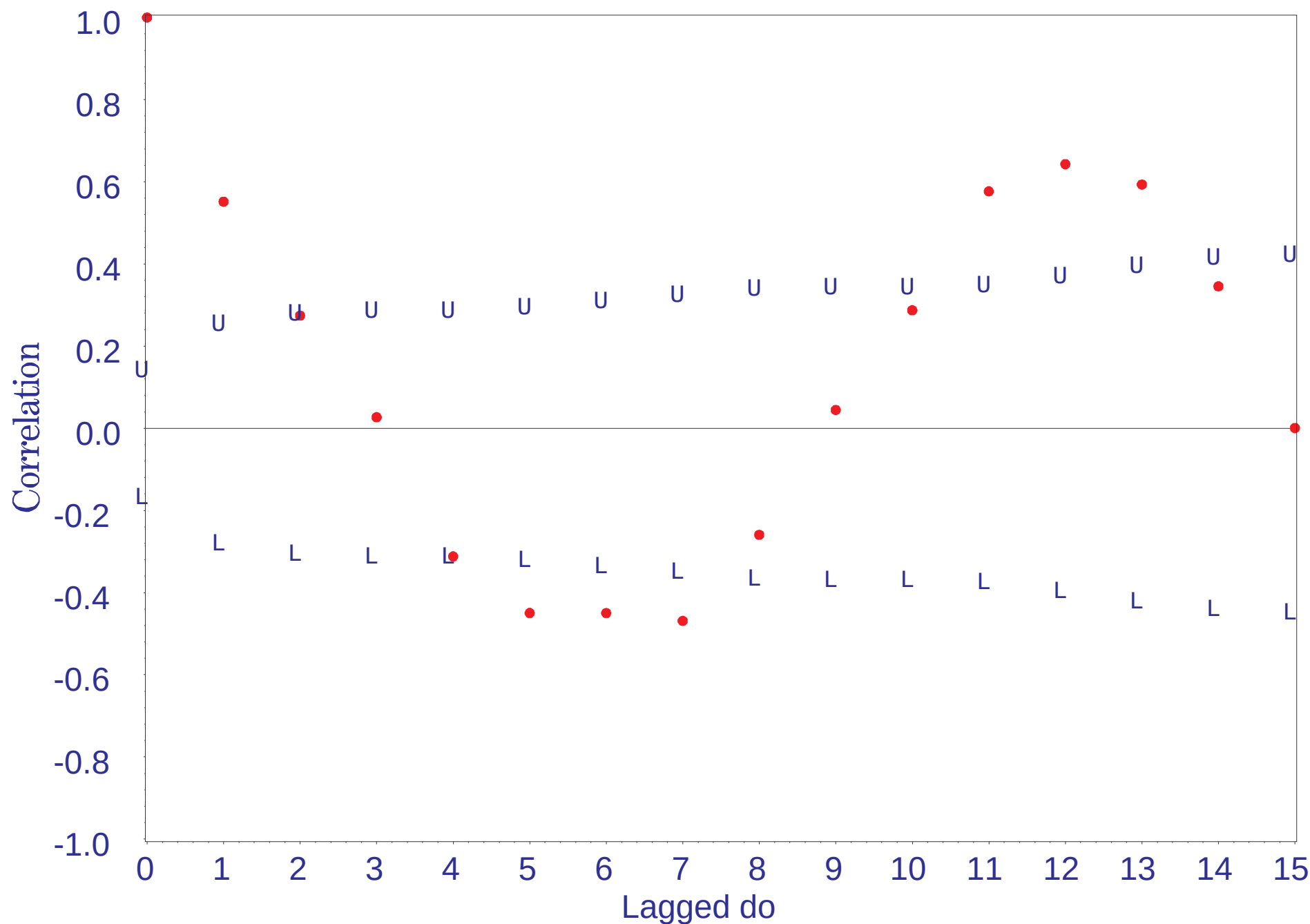
Bottom Dissolved Oxygen at River Kilometer 15.5 (1976-1989)
Monthly Boxplots

B-112



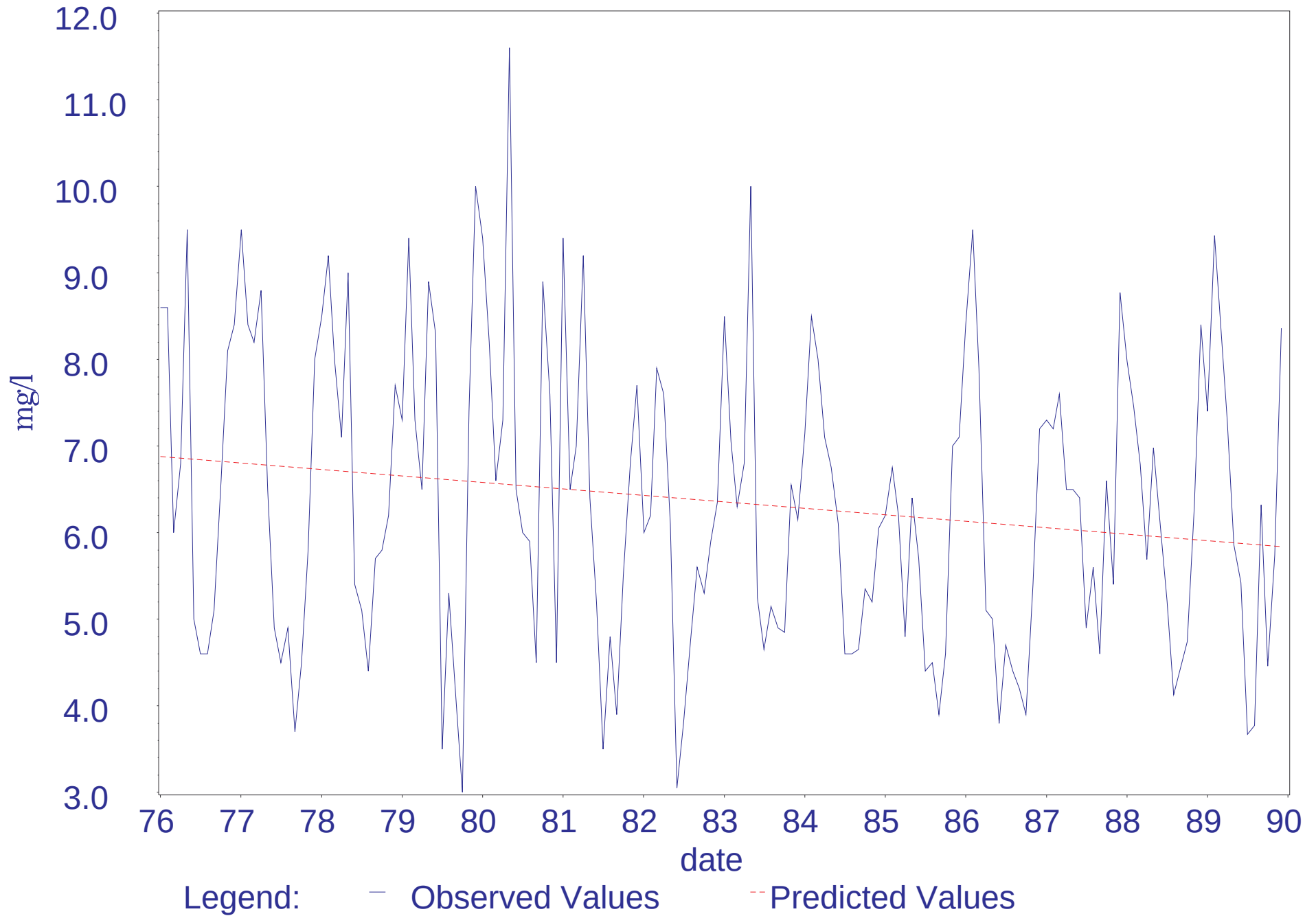
Bottom Dissolved Oxygen at River Kilometer 15.5 (1976-1989)
Correlogram with Upper and Lower 95% Confidence Limits

B-113



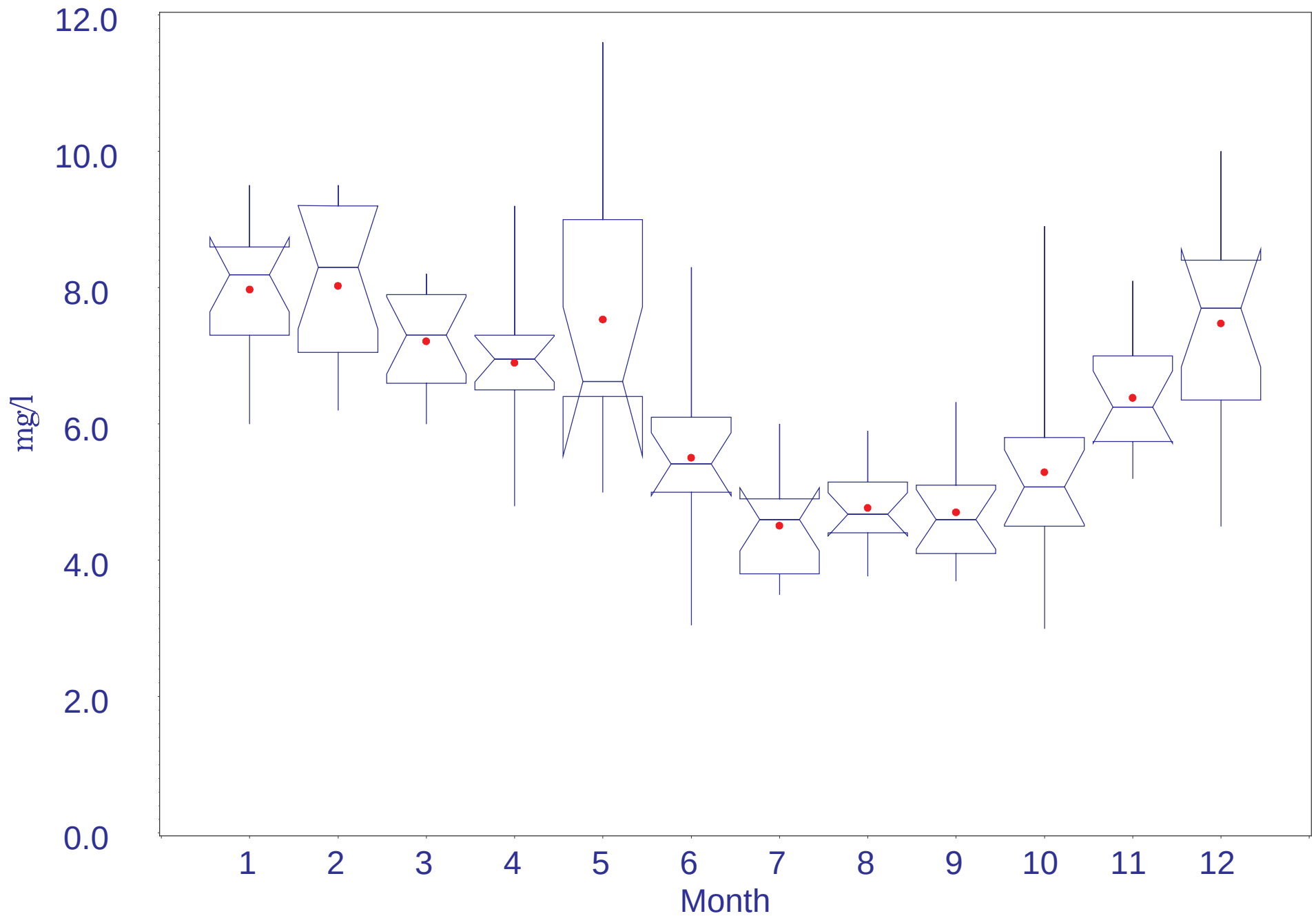
Surface Dissolved Oxygen at River Kilometer 23.6 1976-1989

B-114



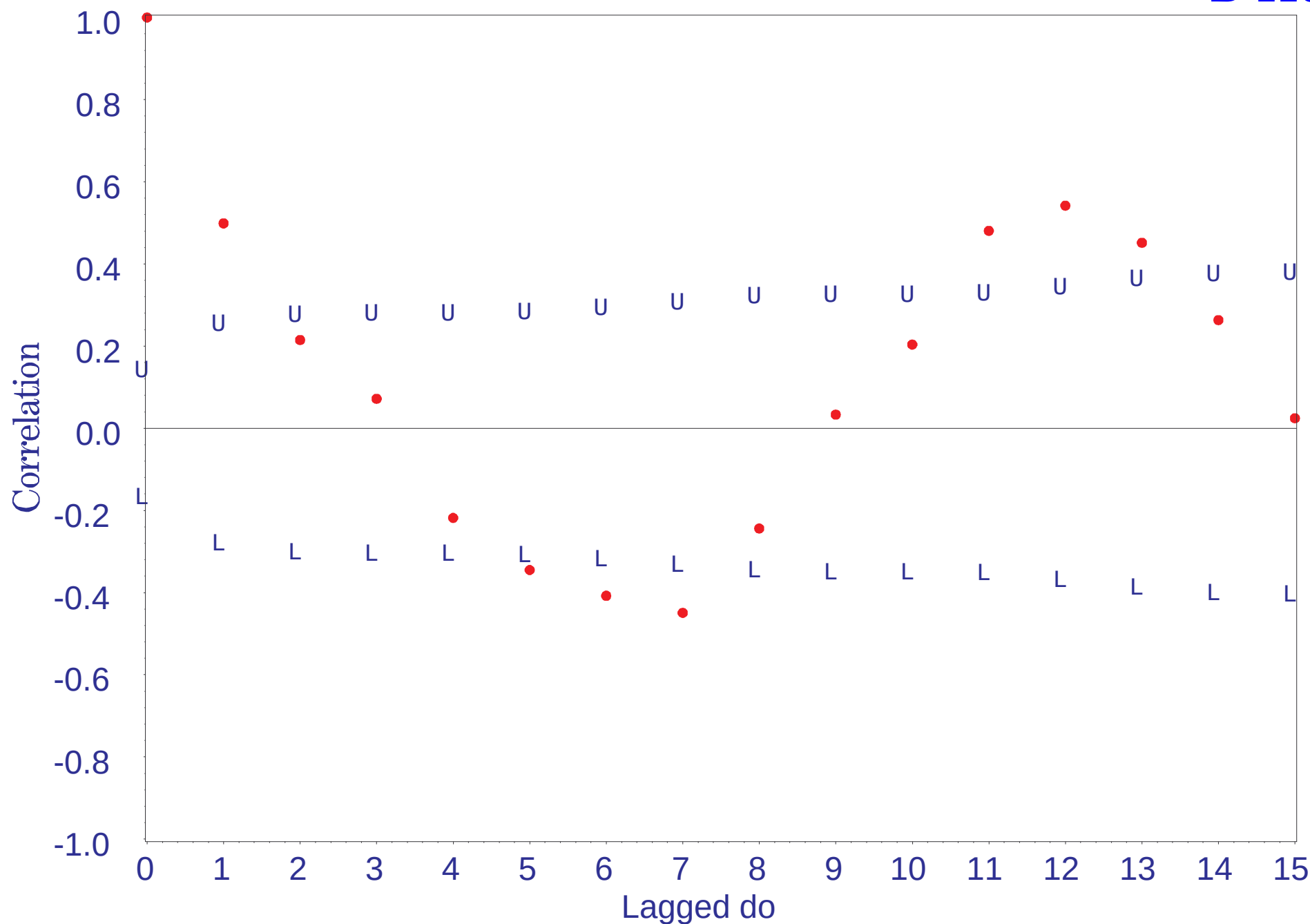
Surface Dissolved Oxygen at River Kilometer 23.6 (1976-1989)
Monthly Boxplots

B-115



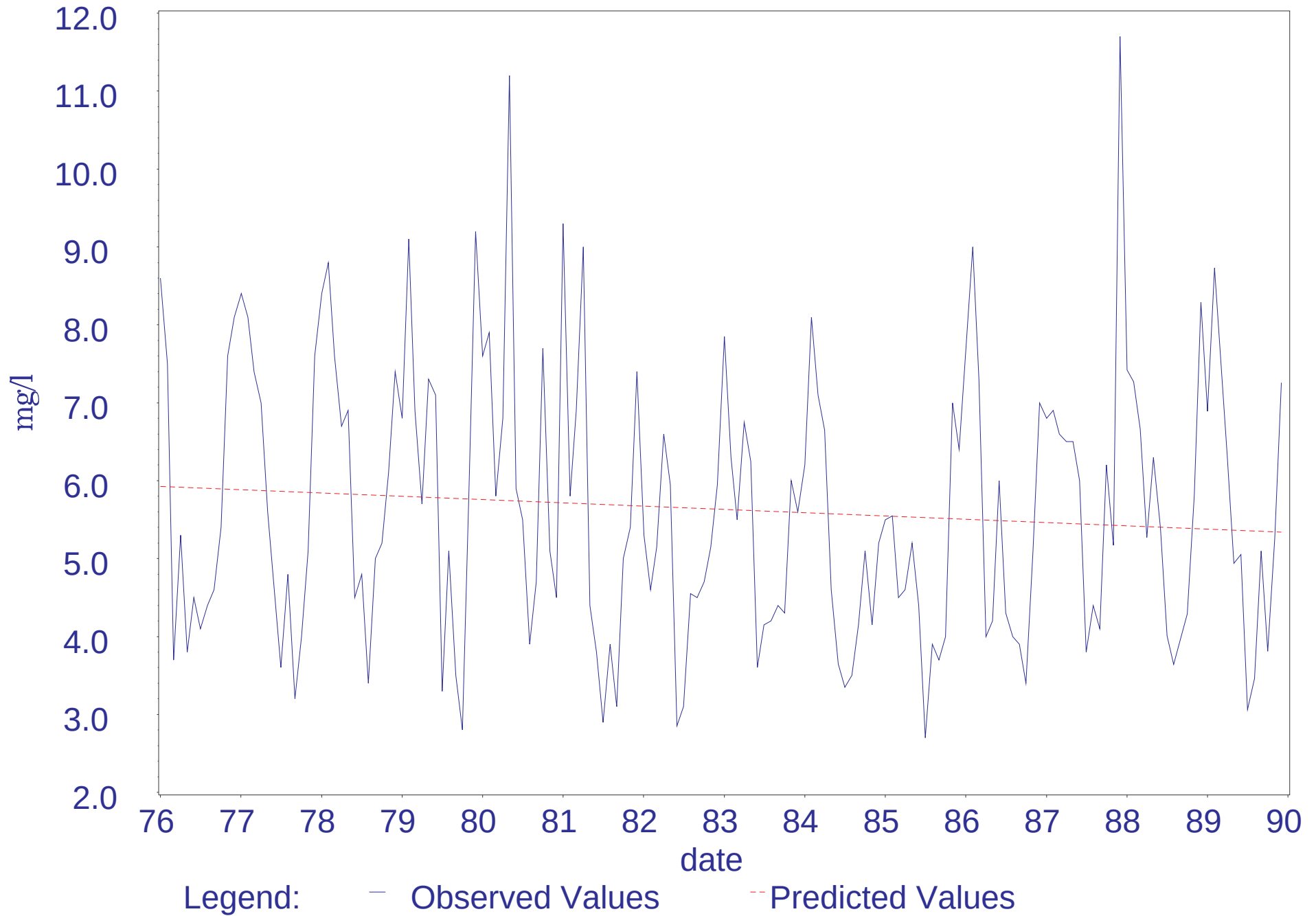
Surface Dissolved Oxygen at River Kilometer 23.6 (1976-1989)
Correlogram with Upper and Lower 95% Confidence Limits

B-116



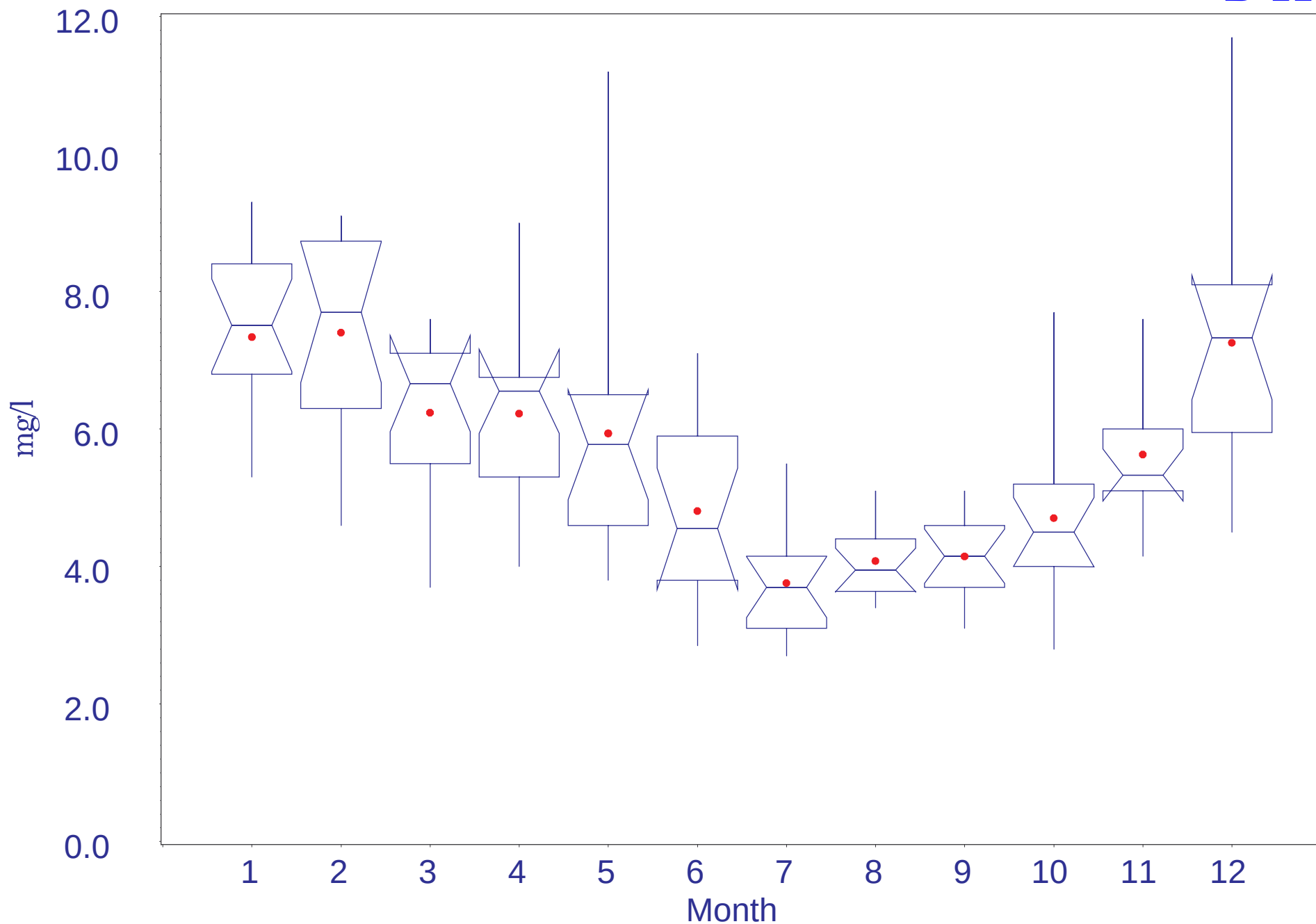
Bottom Dissolved Oxygen at River Kilometer 23.6
1976-1989

B-117



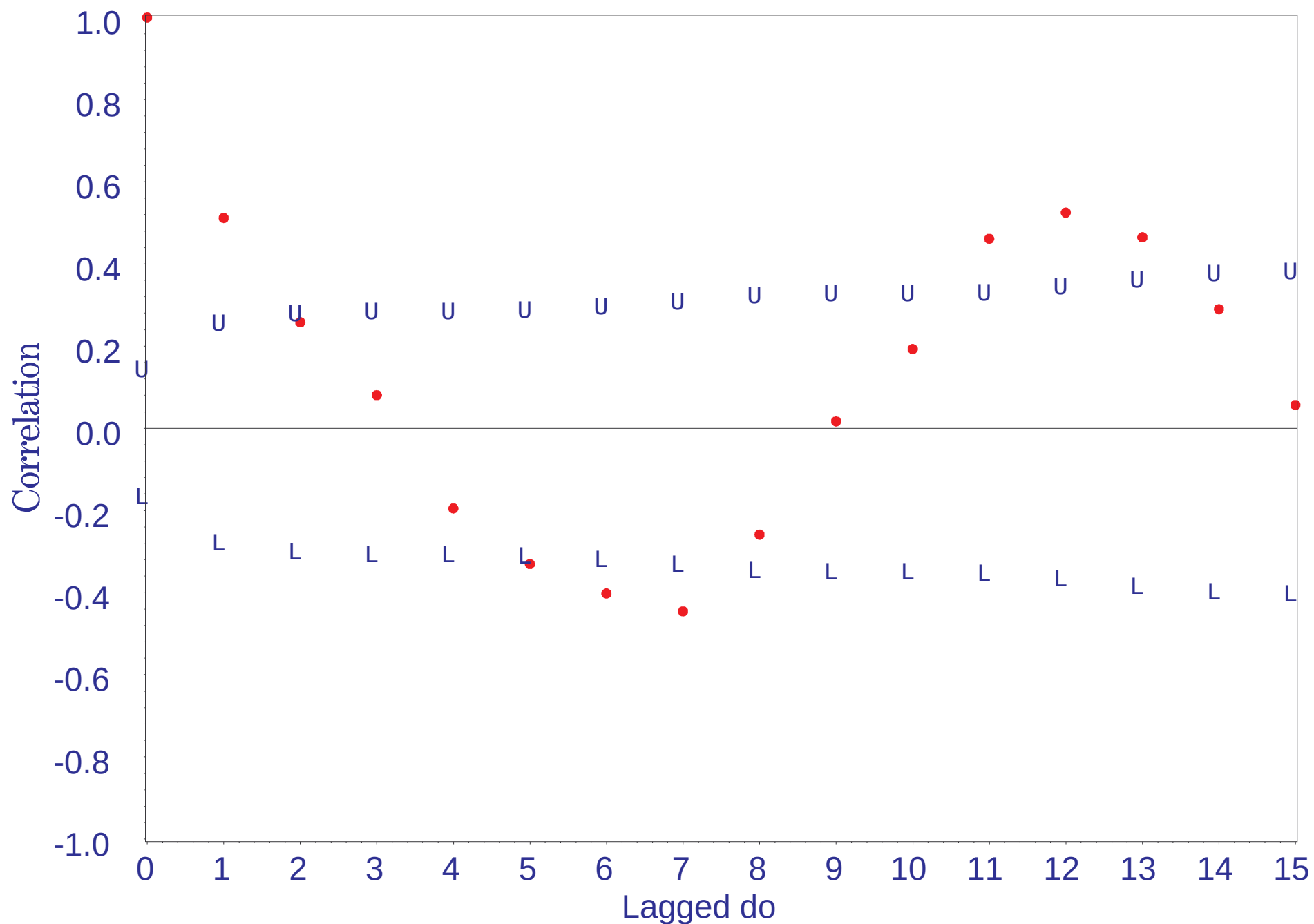
Bottom Dissolved Oxygen at River Kilometer 23.6 (1976-1989)
Monthly Boxplots

B-118



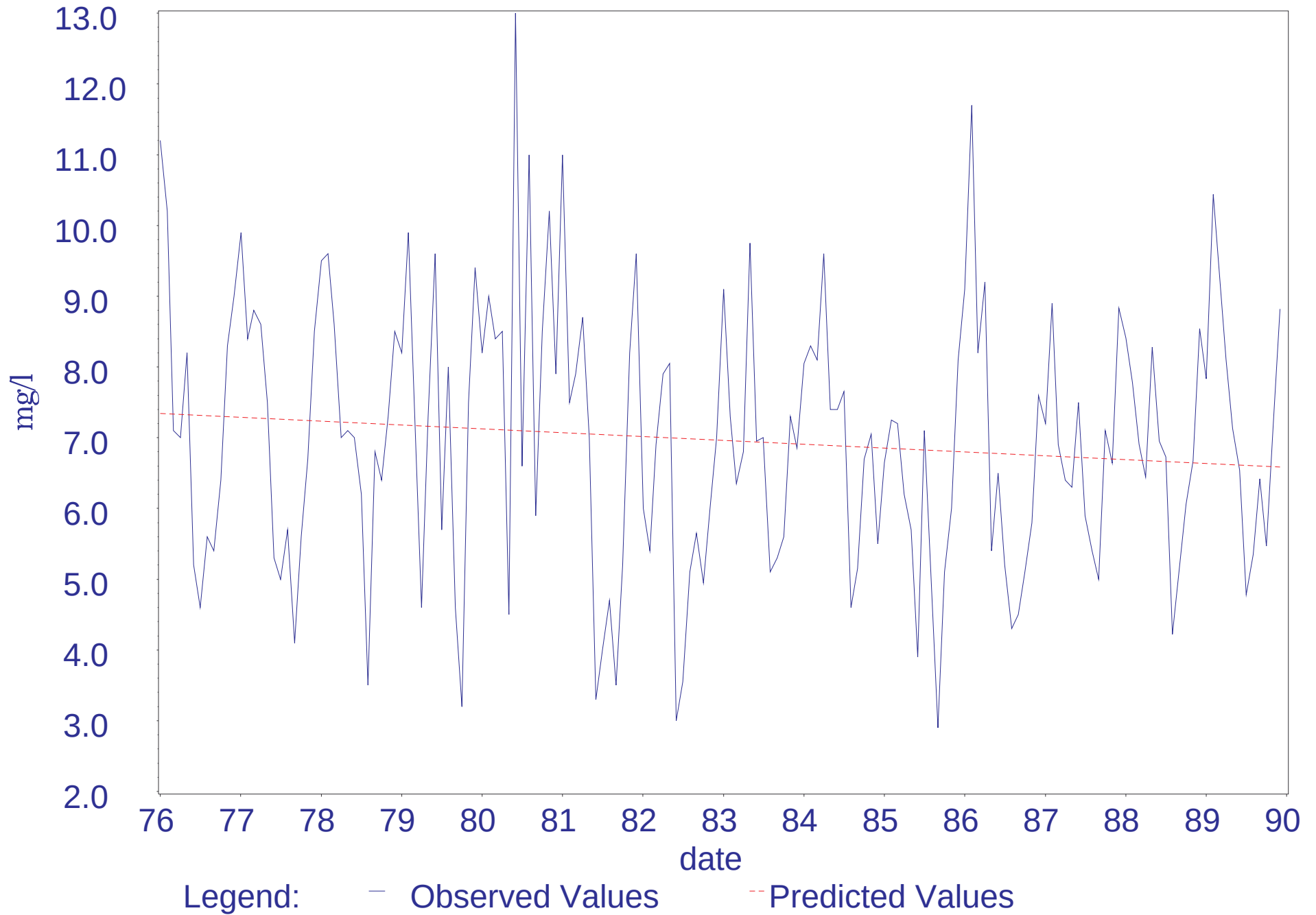
Bottom Dissolved Oxygen at River Kilometer 23.6 (1976-1989)
Correlogram with Upper and Lower 95% Confidence Limits

B-119



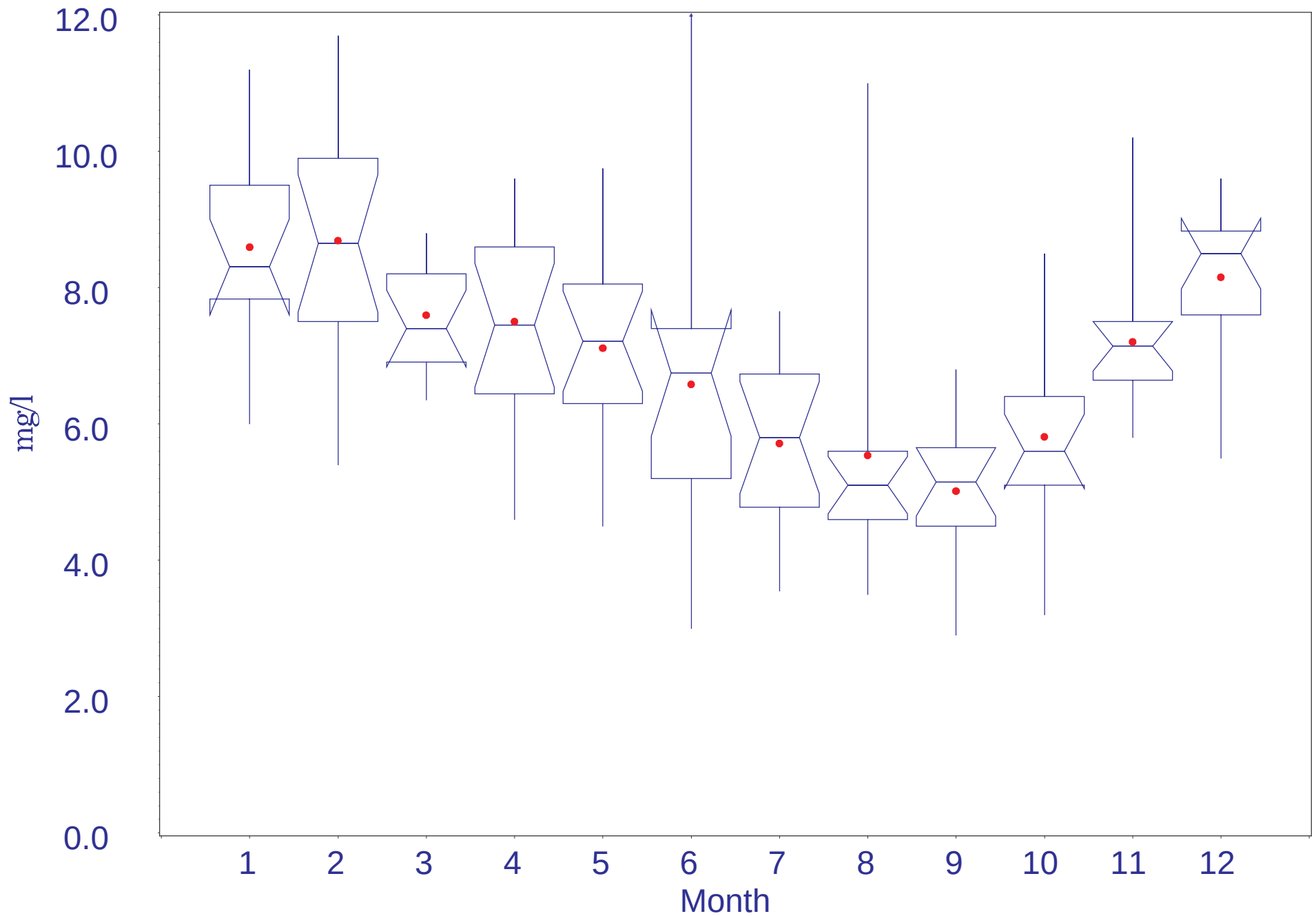
Surface Dissolved Oxygen at River Kilometer 30.4 1976-1989

B-120



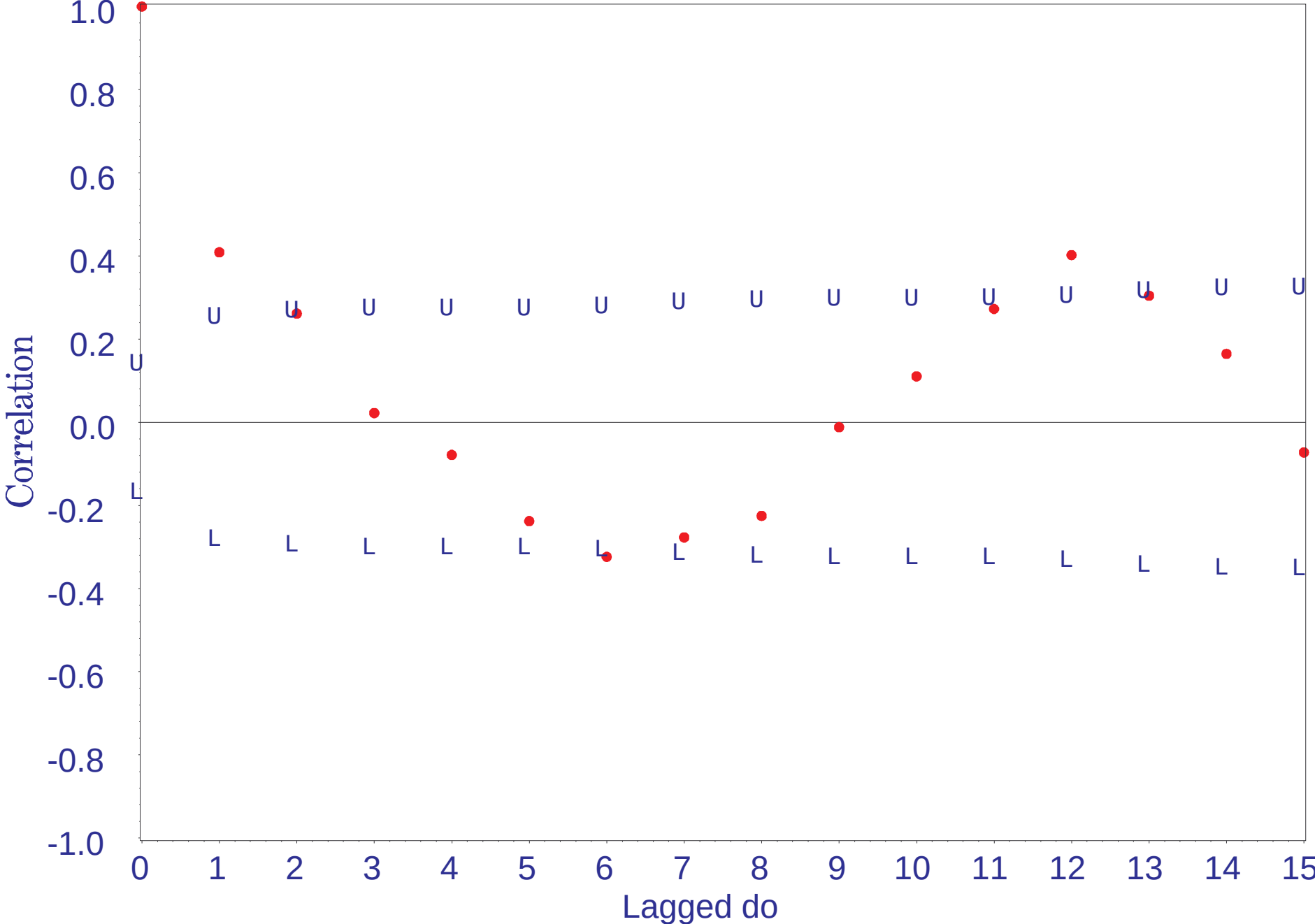
Surface Dissolved Oxygen at River Kilometer 30.4 (1976-1989)
Monthly Boxplots

B-121



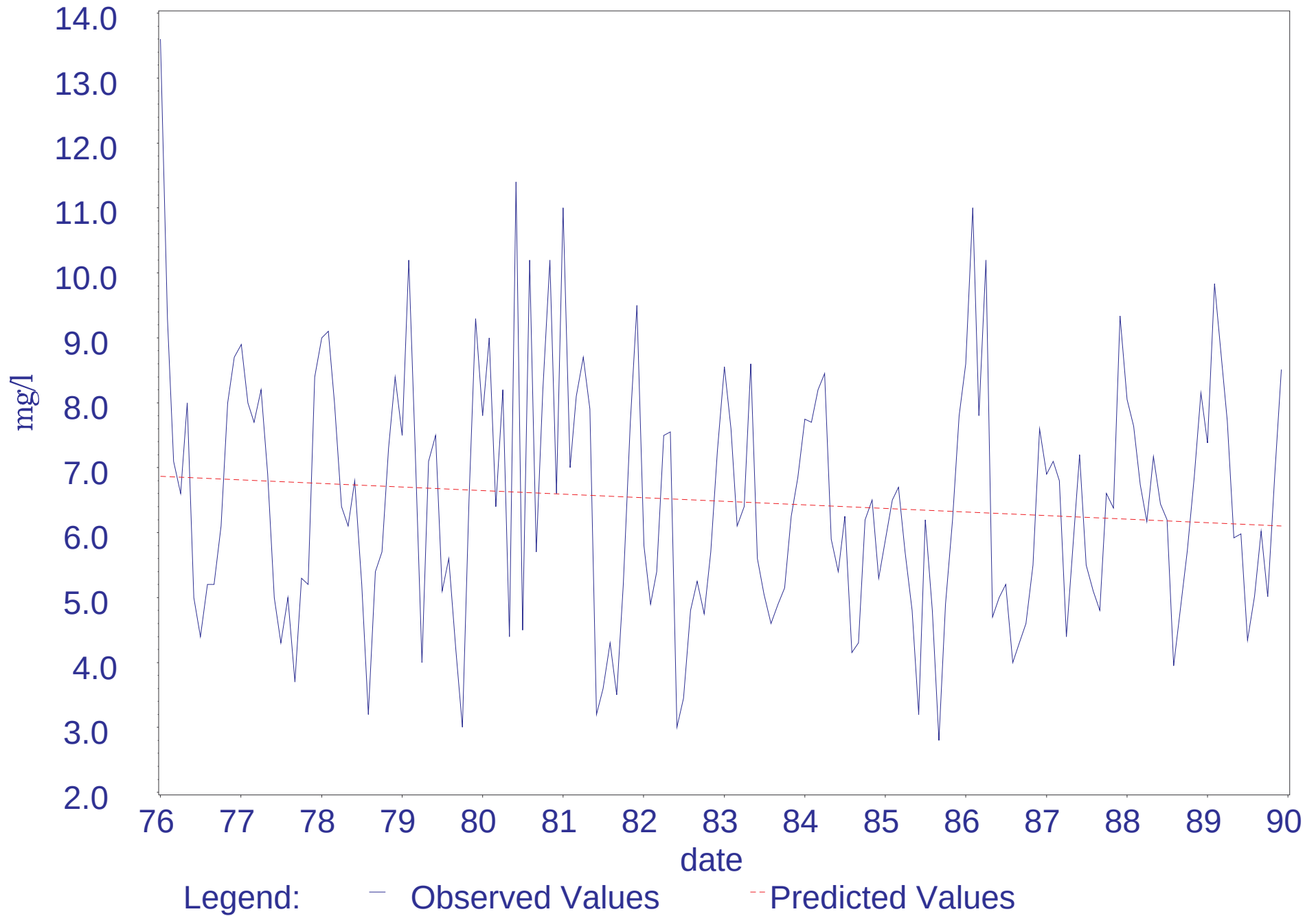
Surface Dissolved Oxygen at River Kilometer 30.4 (1976-1989)
Correlogram with Upper and Lower 95% Confidence Limits

B-122



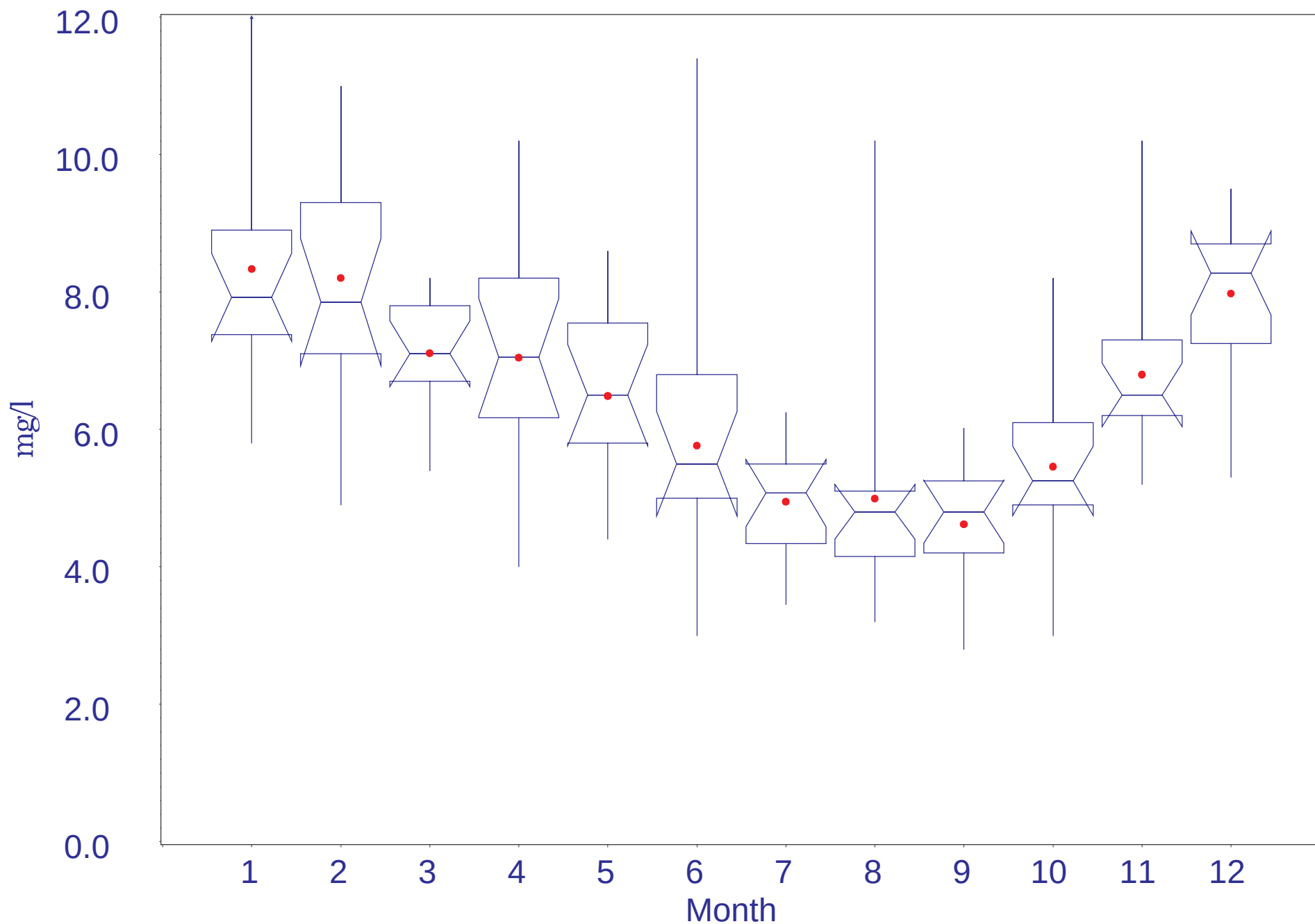
Bottom Dissolved Oxygen at River Kilometer 30.4
1976-1989

B-123



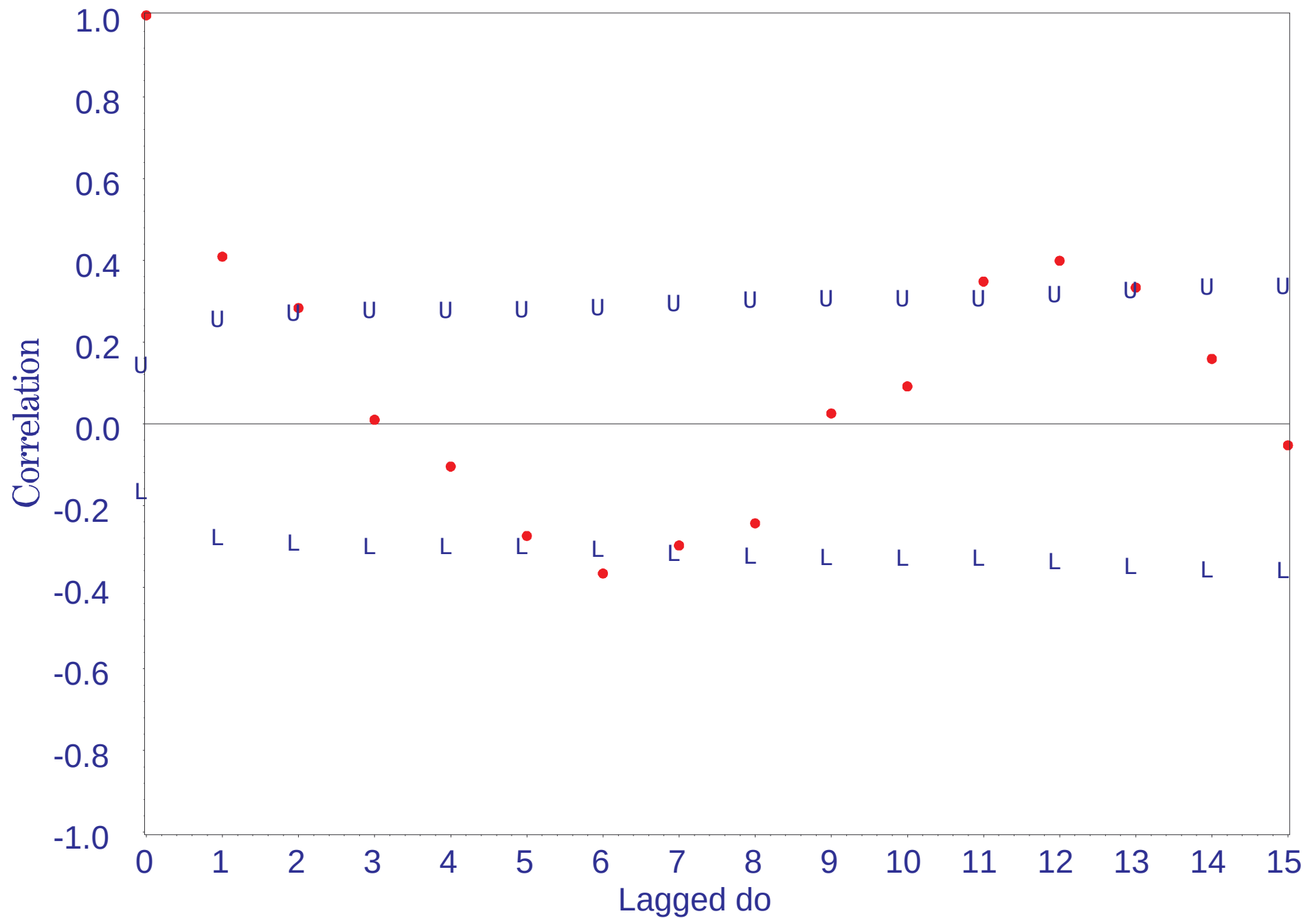
Bottom Dissolved Oxygen at River Kilometer 30.4 (1976-1989)
Monthly Boxplots

B-124



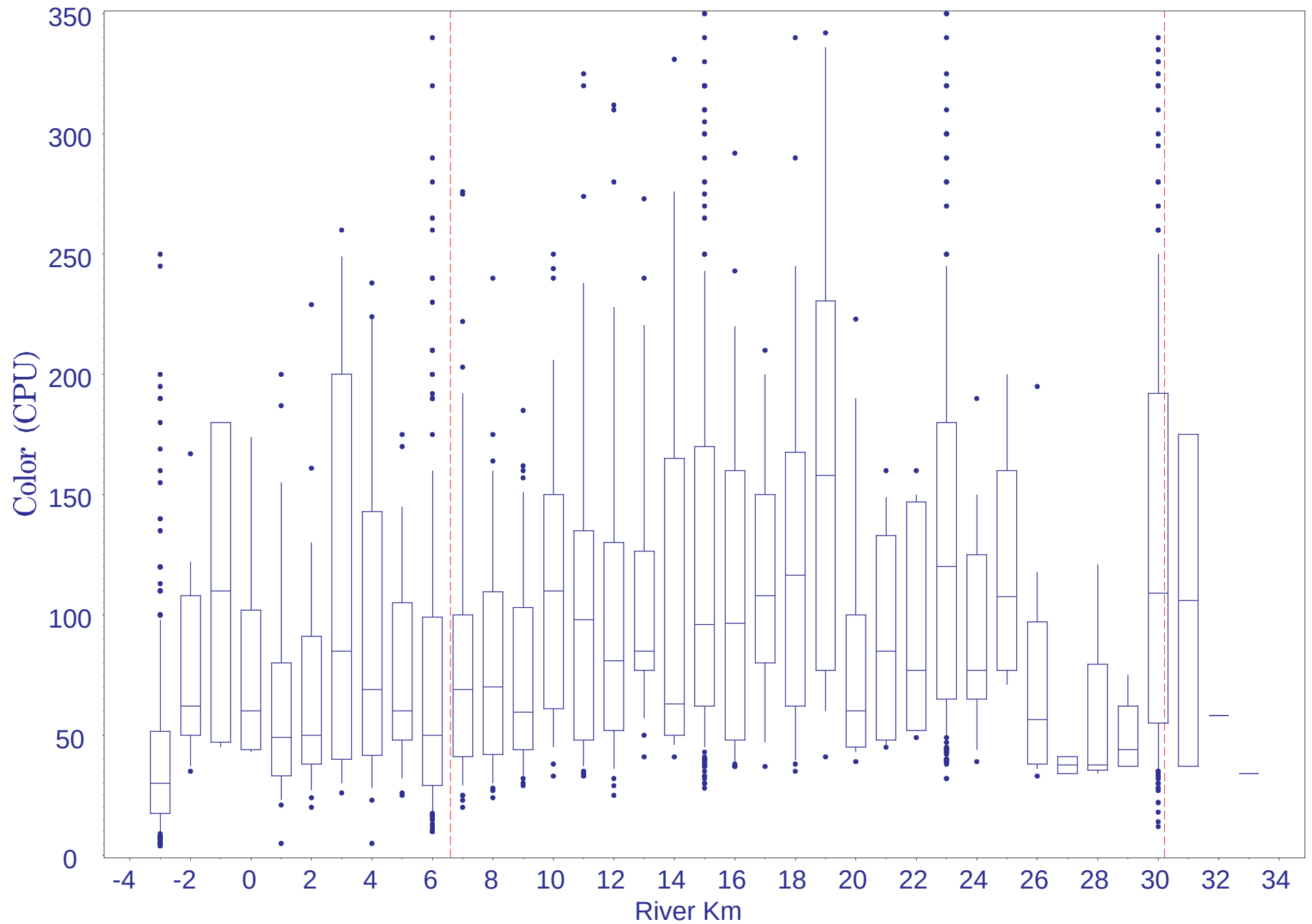
Bottom Dissolved Oxygen at River Kilometer 30.4 (1976-1989)
Correlogram with Upper and Lower 95% Confidence Limits

B-125



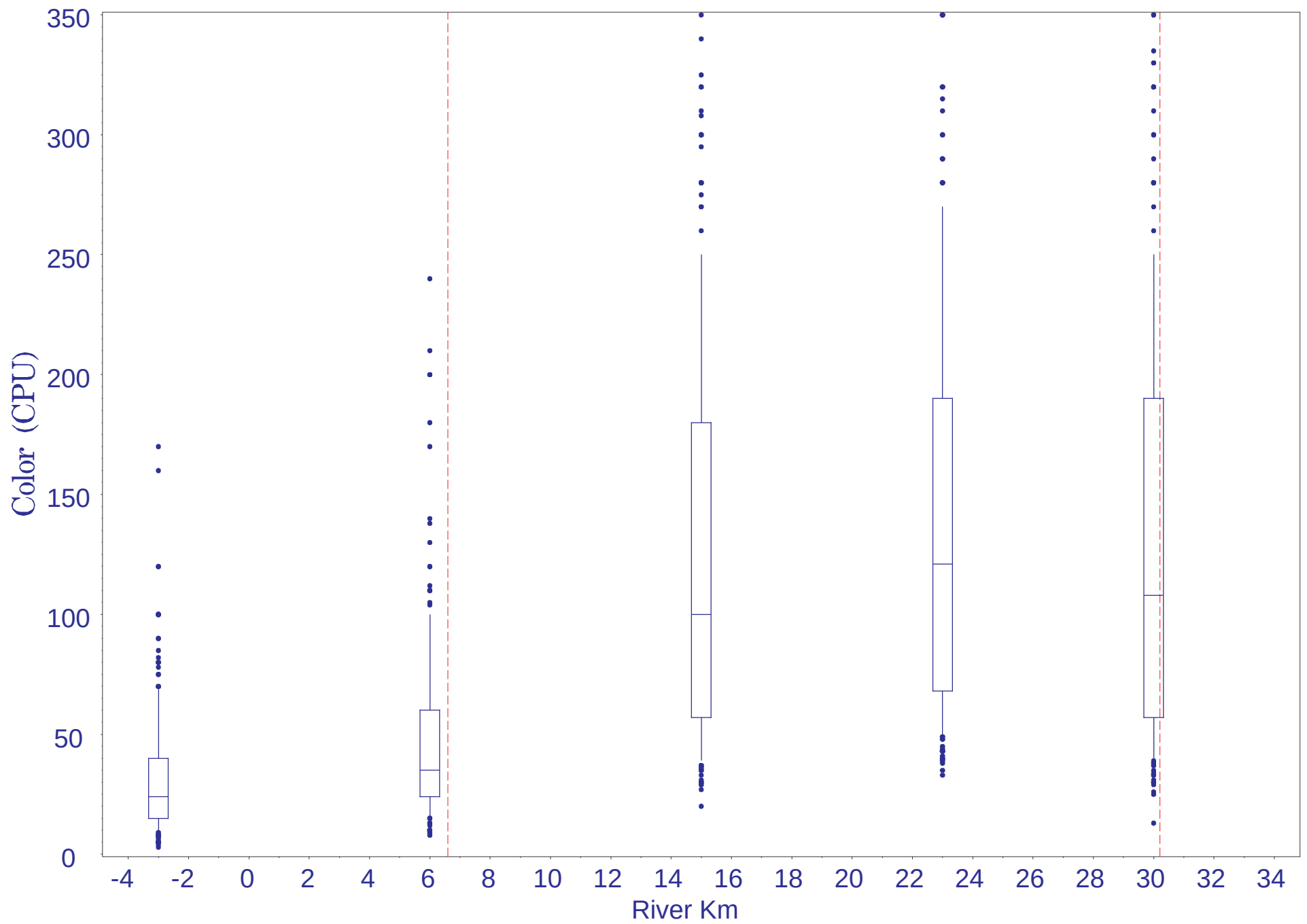
Color vs. River Kilometer 1976-1998
Surface

B-126



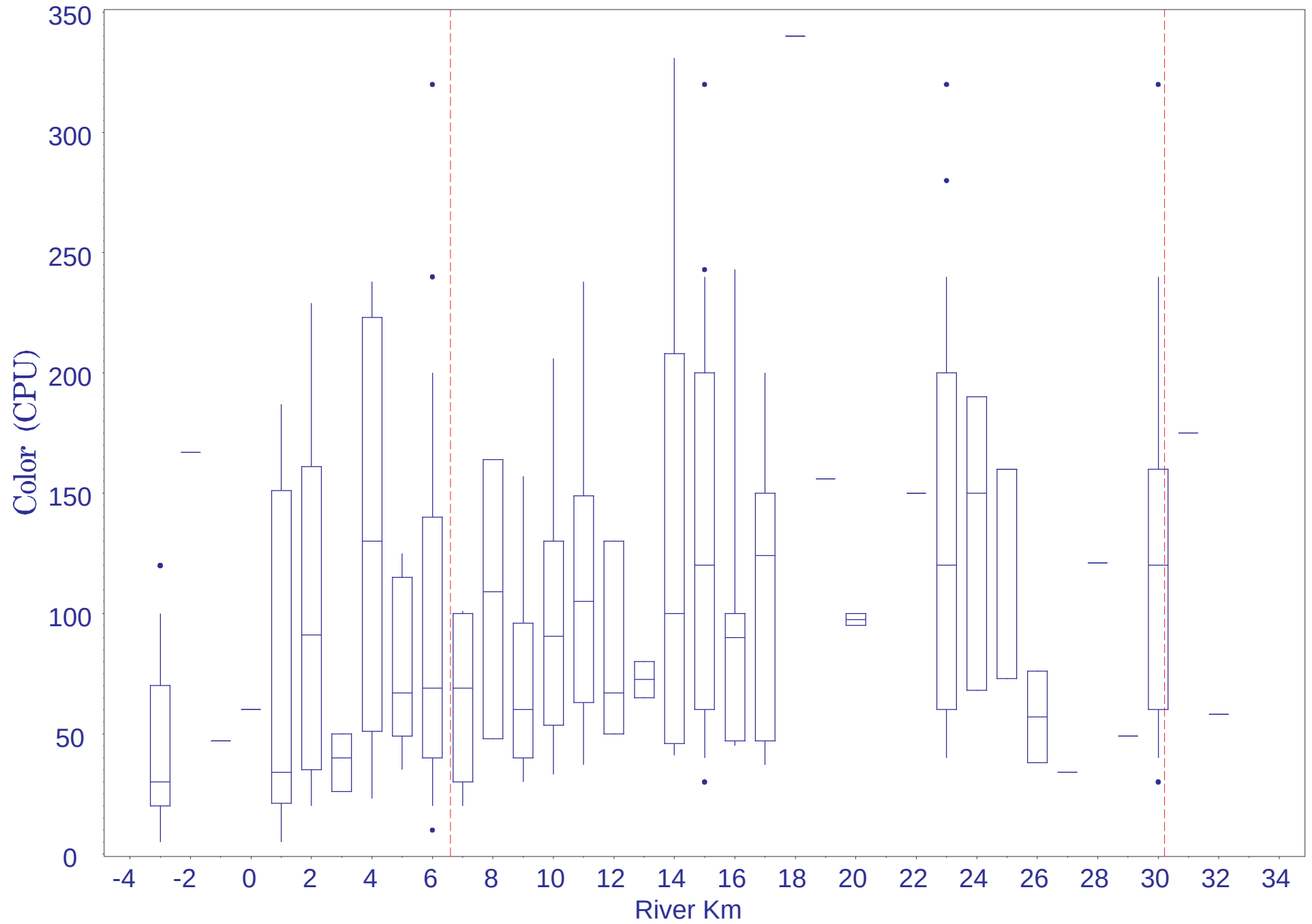
Color vs. River Kilometer 1976-1998
Bottom

B-127



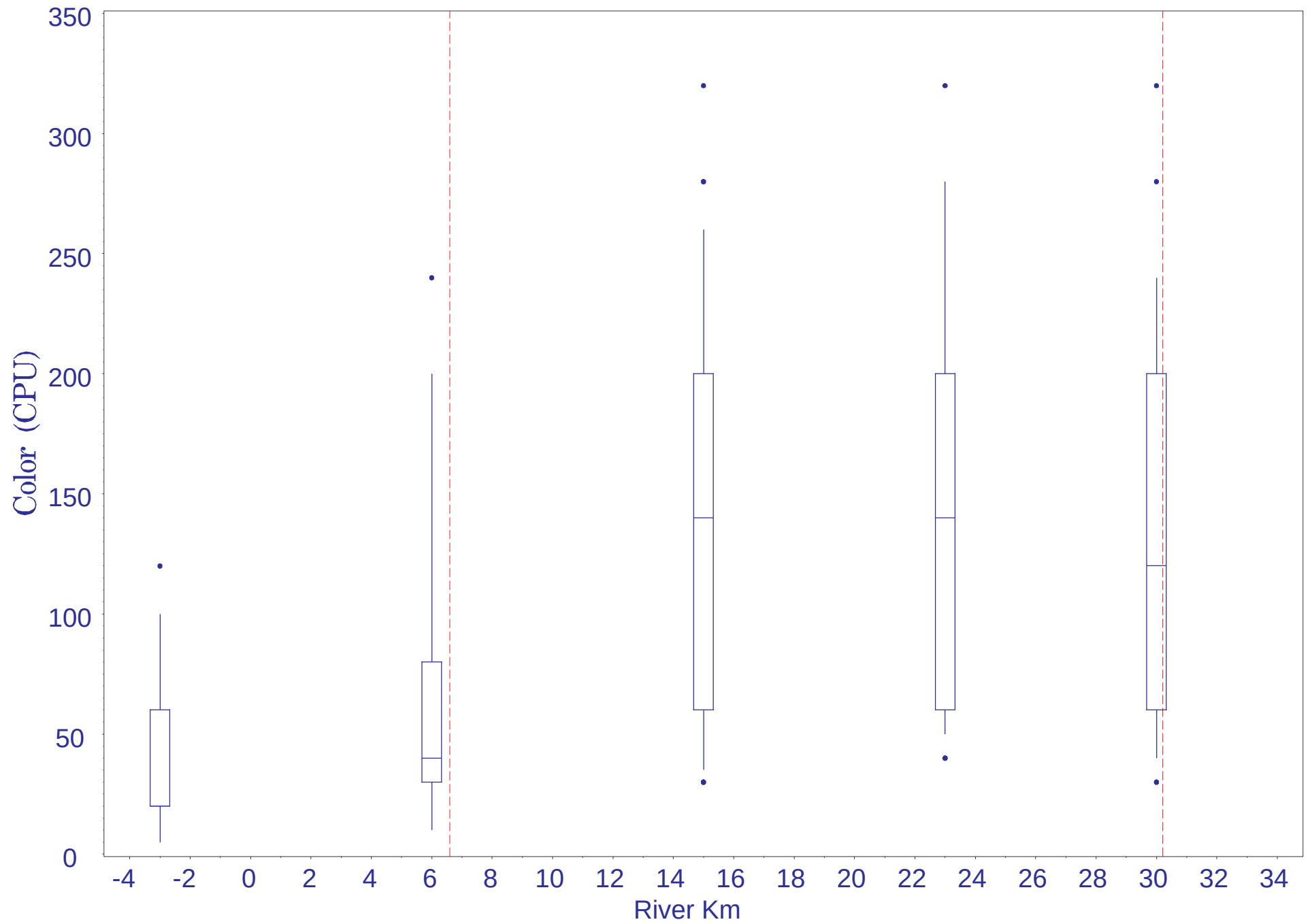
Color vs. River Kilometer 1996-1998
Surface

B-128

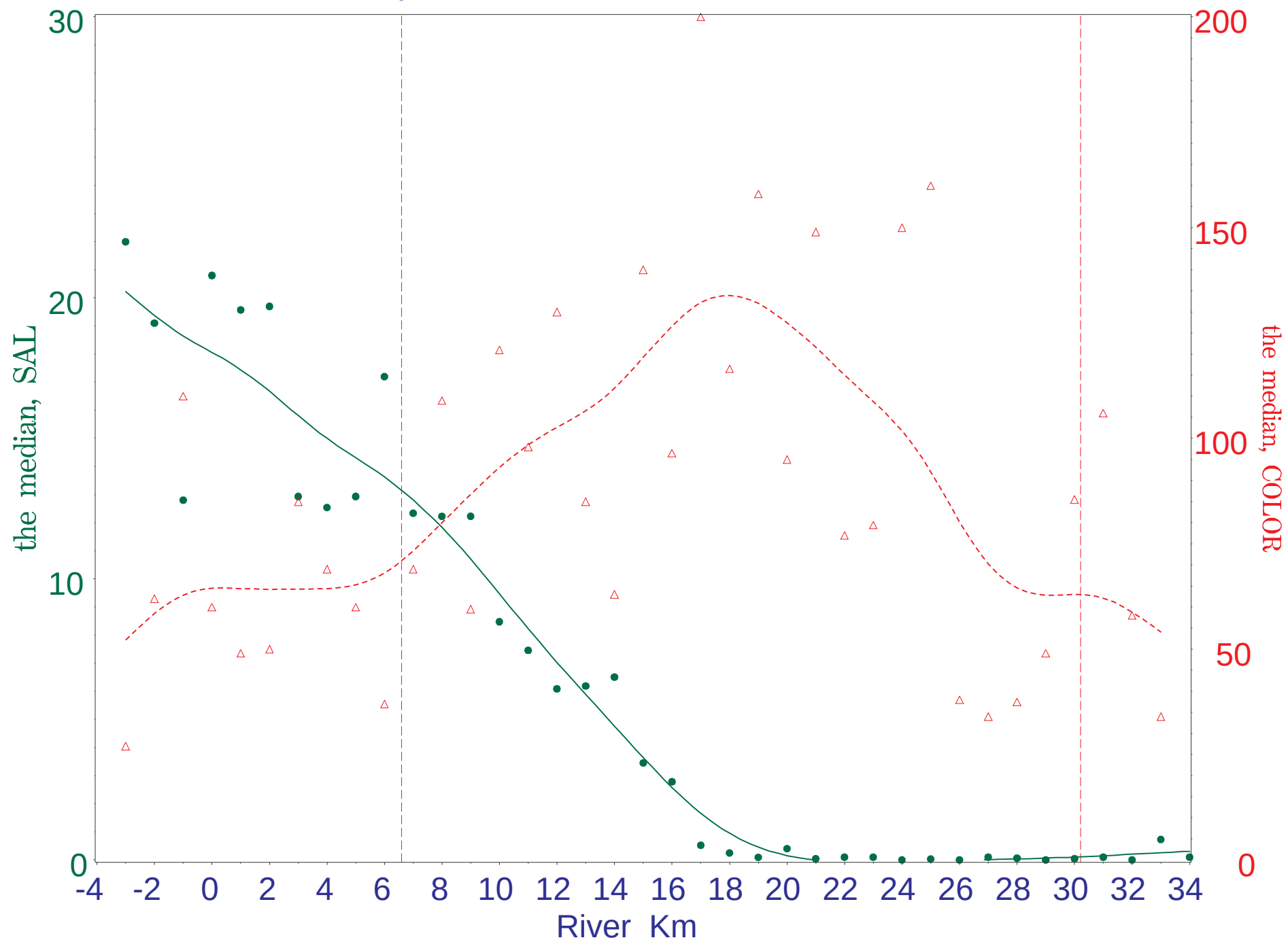


Color vs. River Kilometer 1996-1998
Bottom

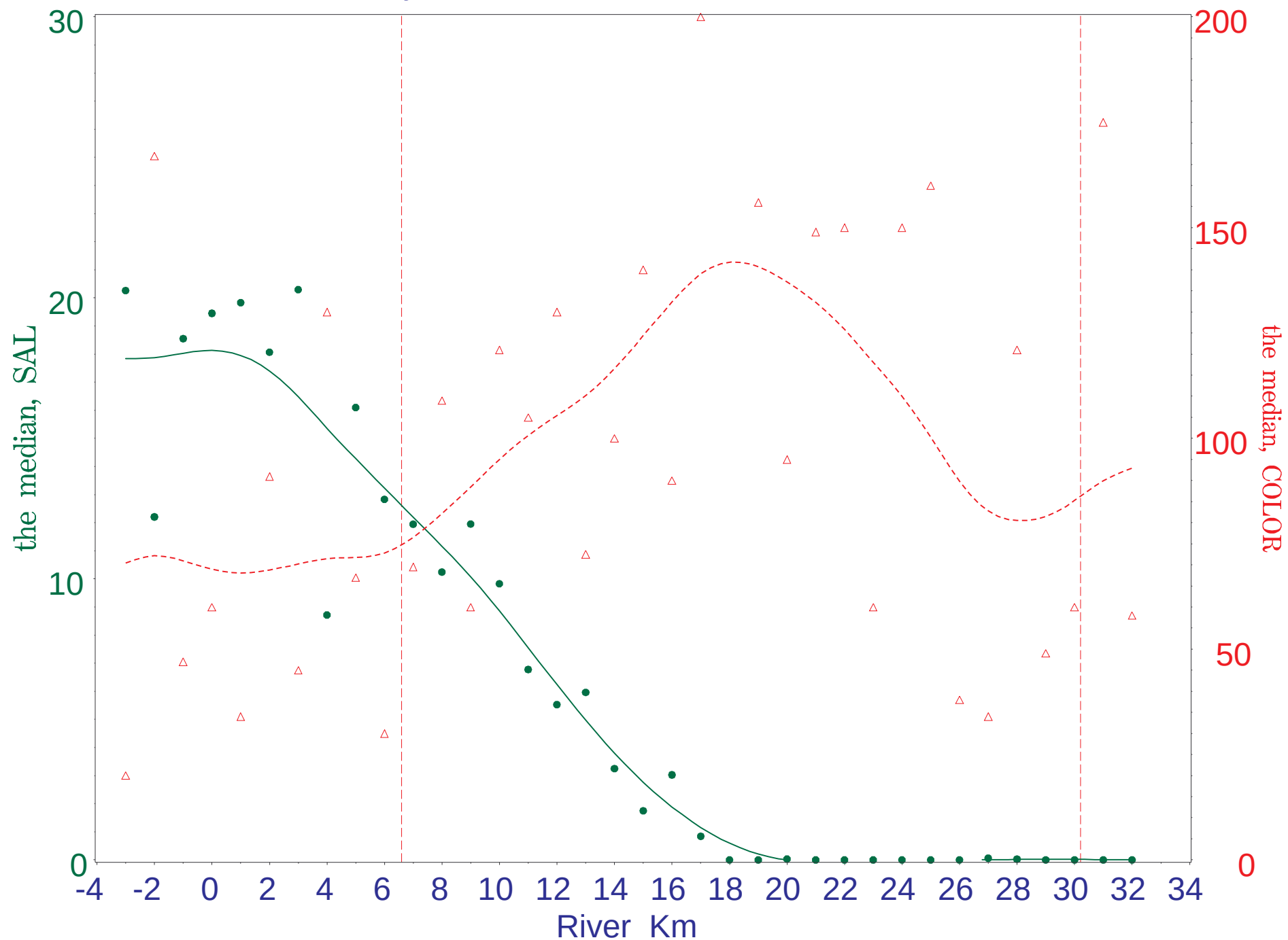
B-129



Salinity vs. River Kilometer vs. Color 1976-1998

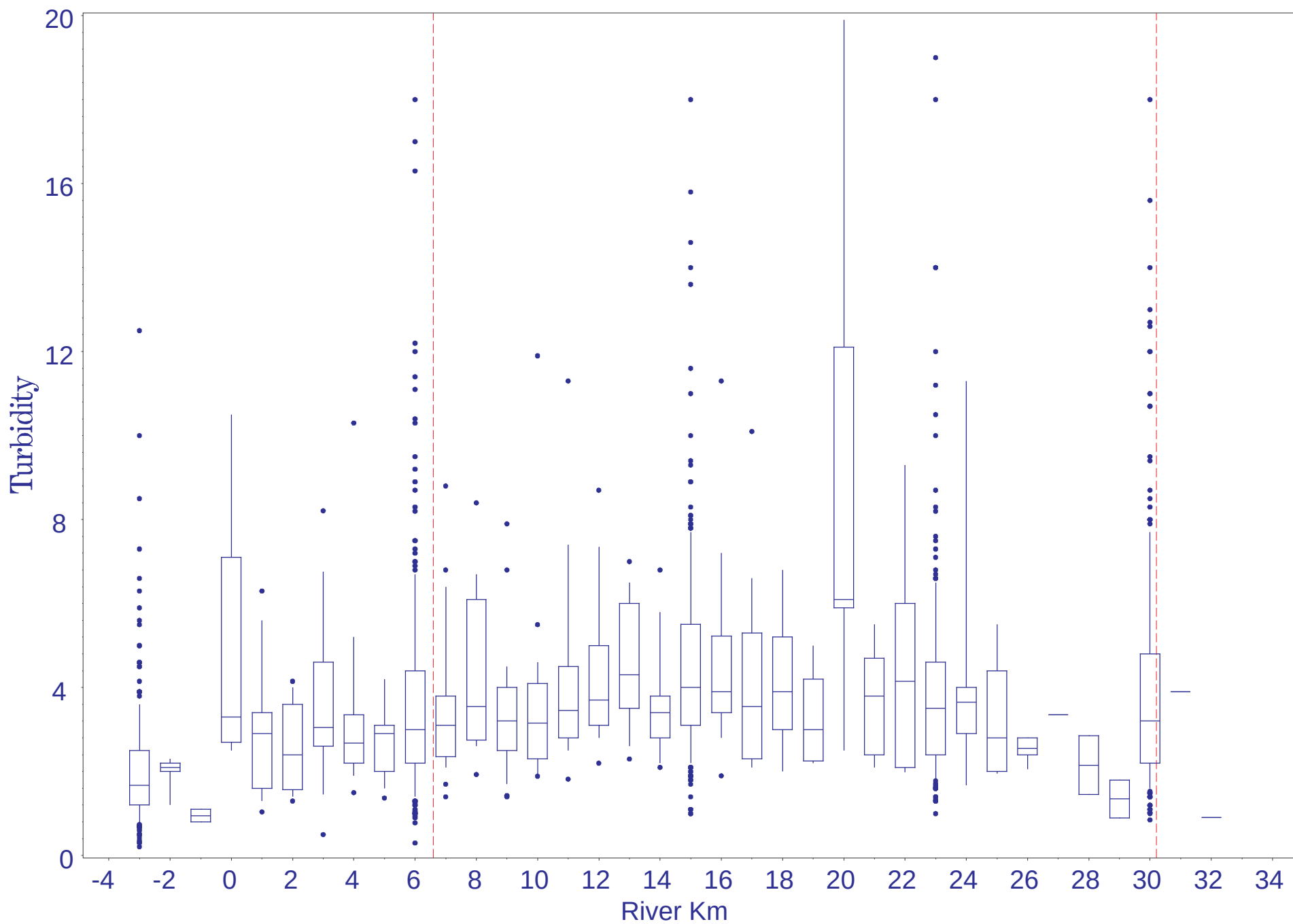


Salinity vs. River Kilometer vs. Color 1996-1998



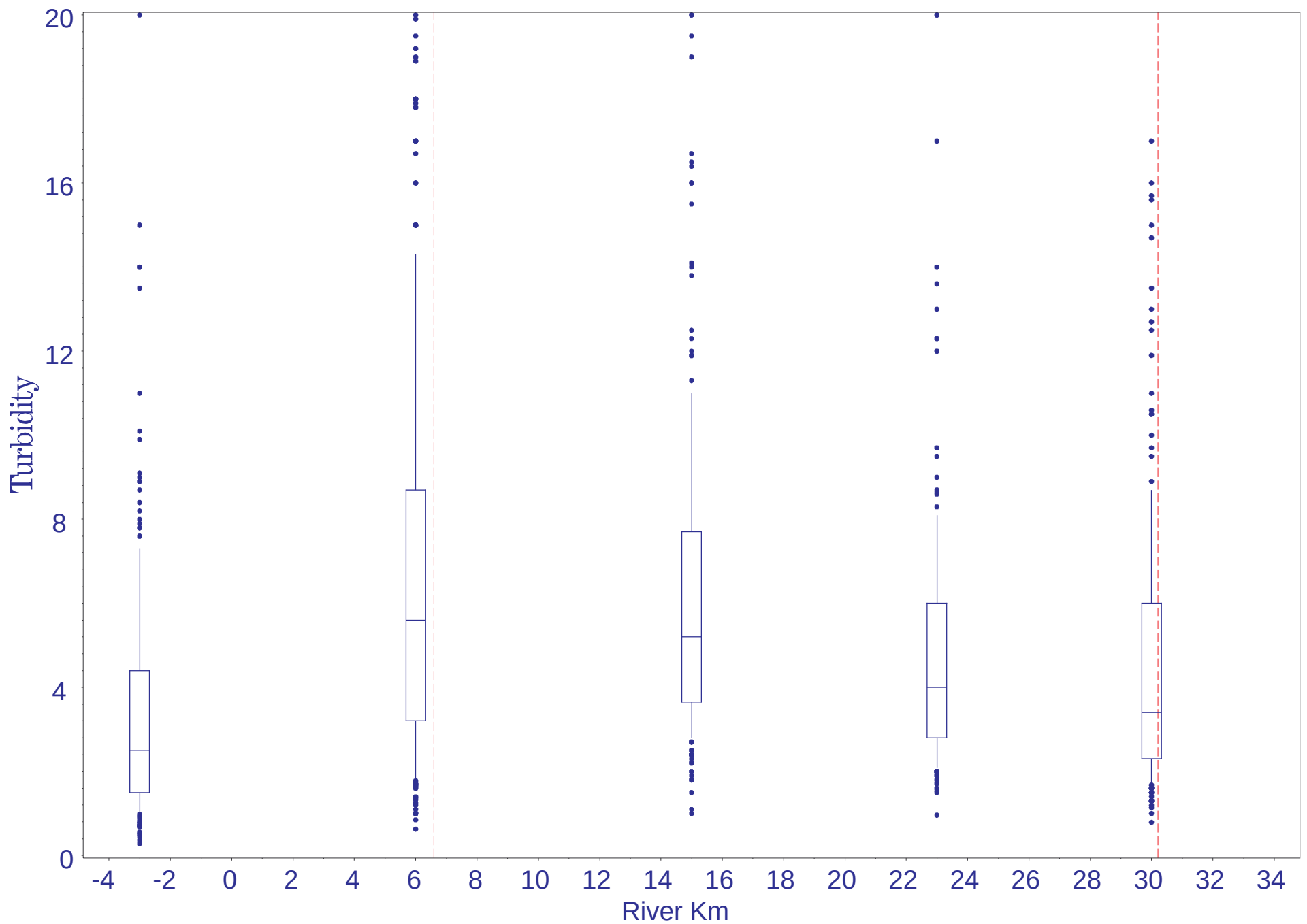
Turbidity vs. River Kilometer 1976-1998
Surface

B-132



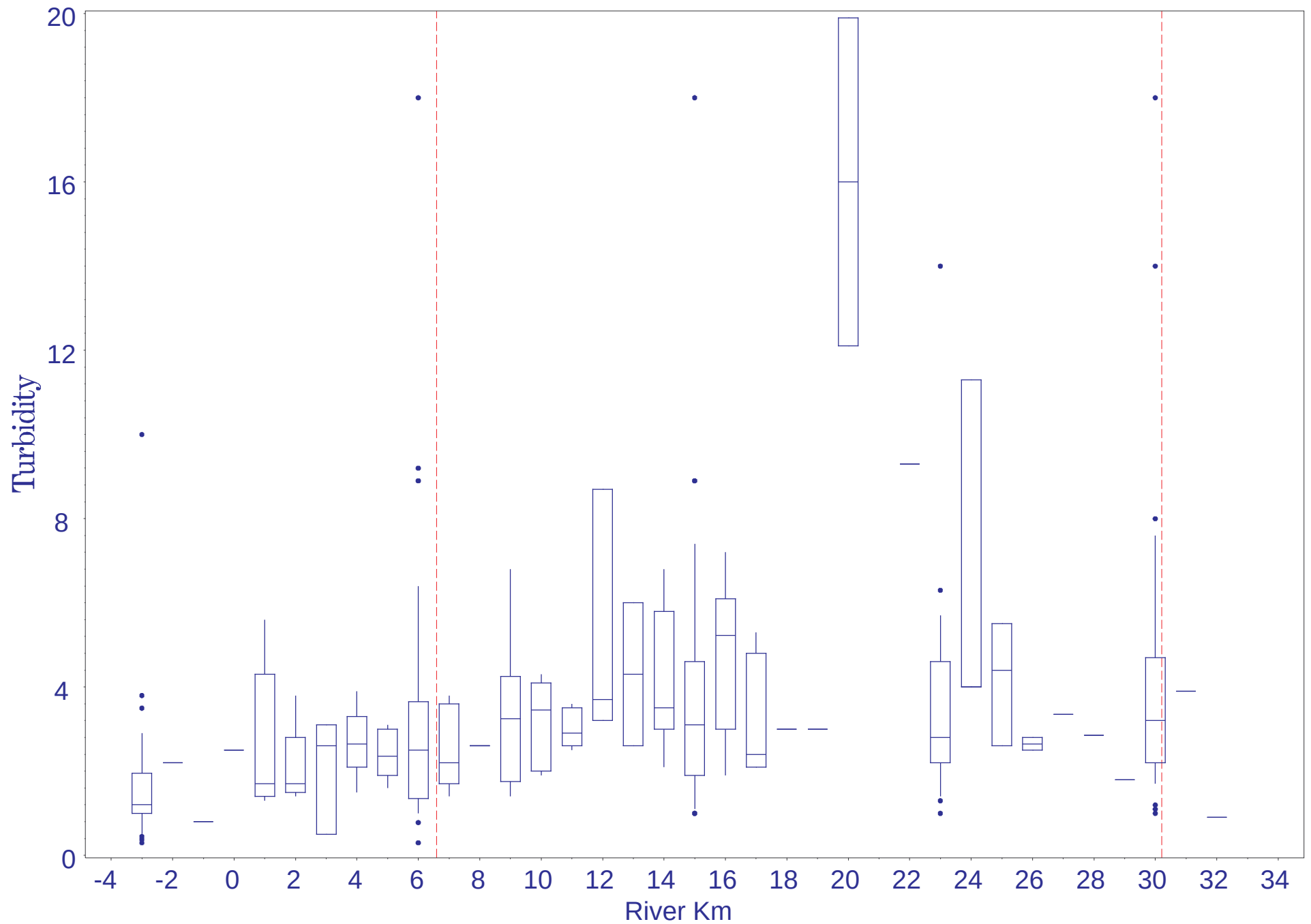
Turbidity vs. River Kilometer 1976-1998
Bottom

B-133



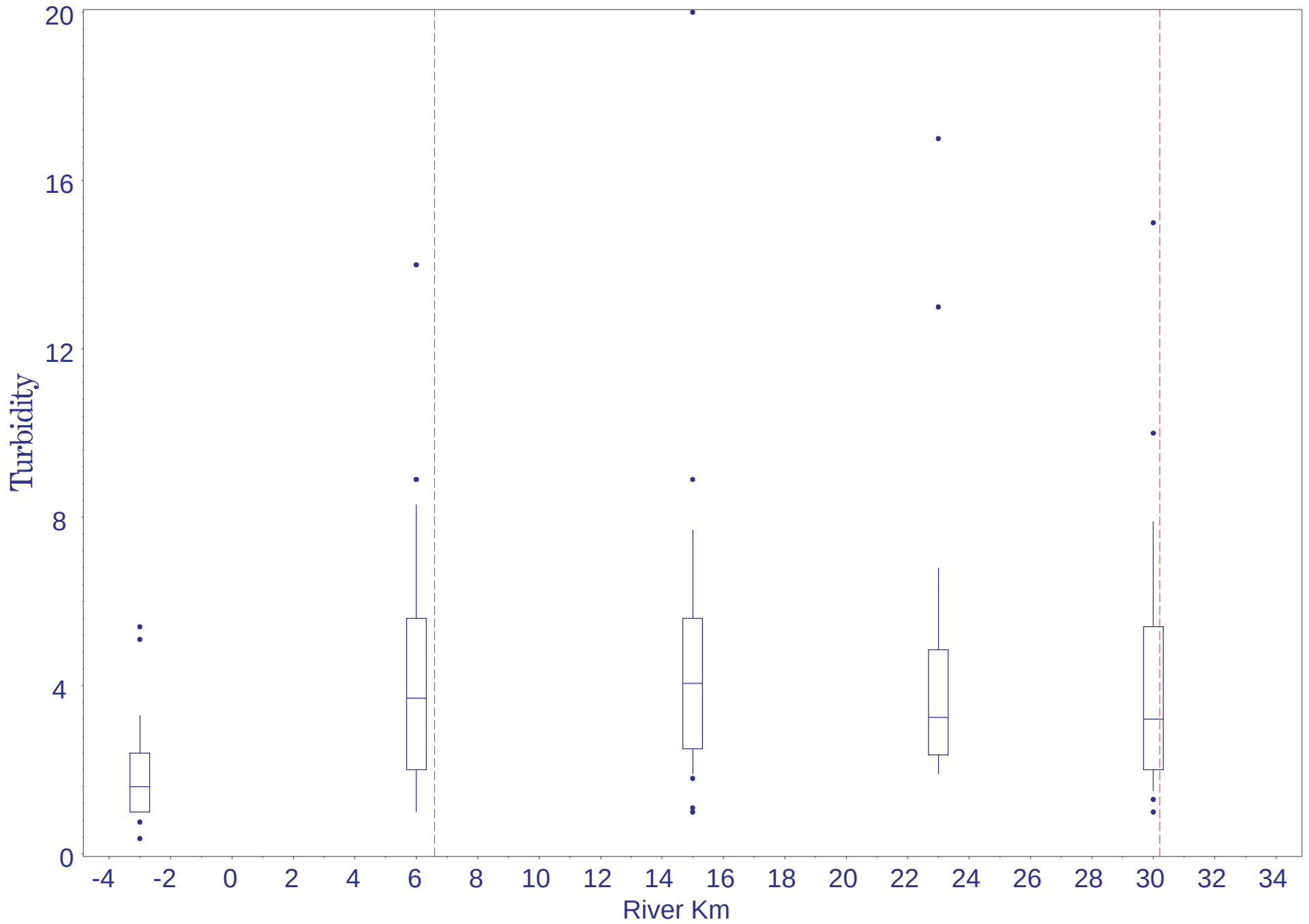
Turbidity vs. River Kilometer 1996-1998
Surface

B-134

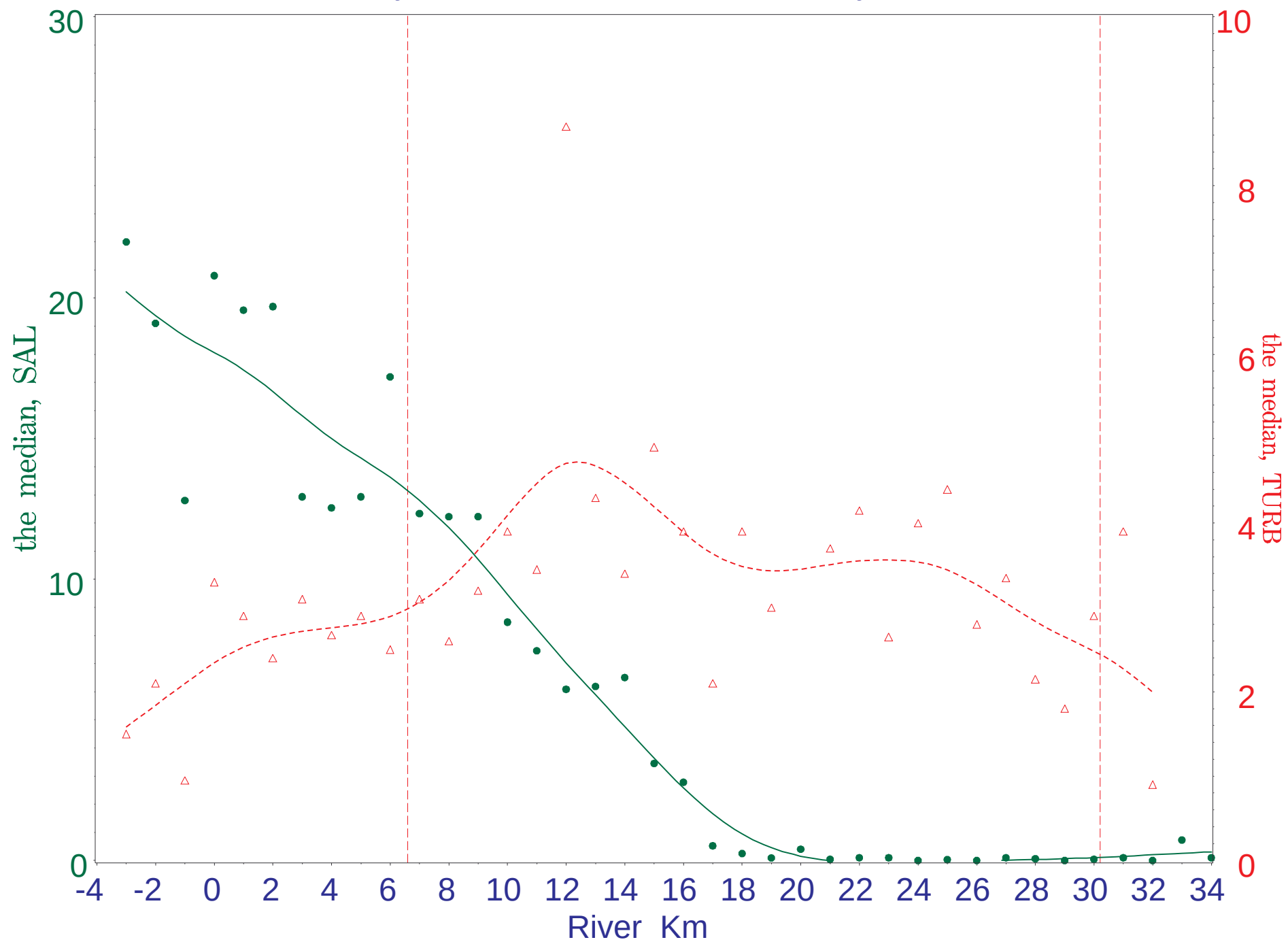


Turbidity vs. River Kilometer 1996-1998
Bottom

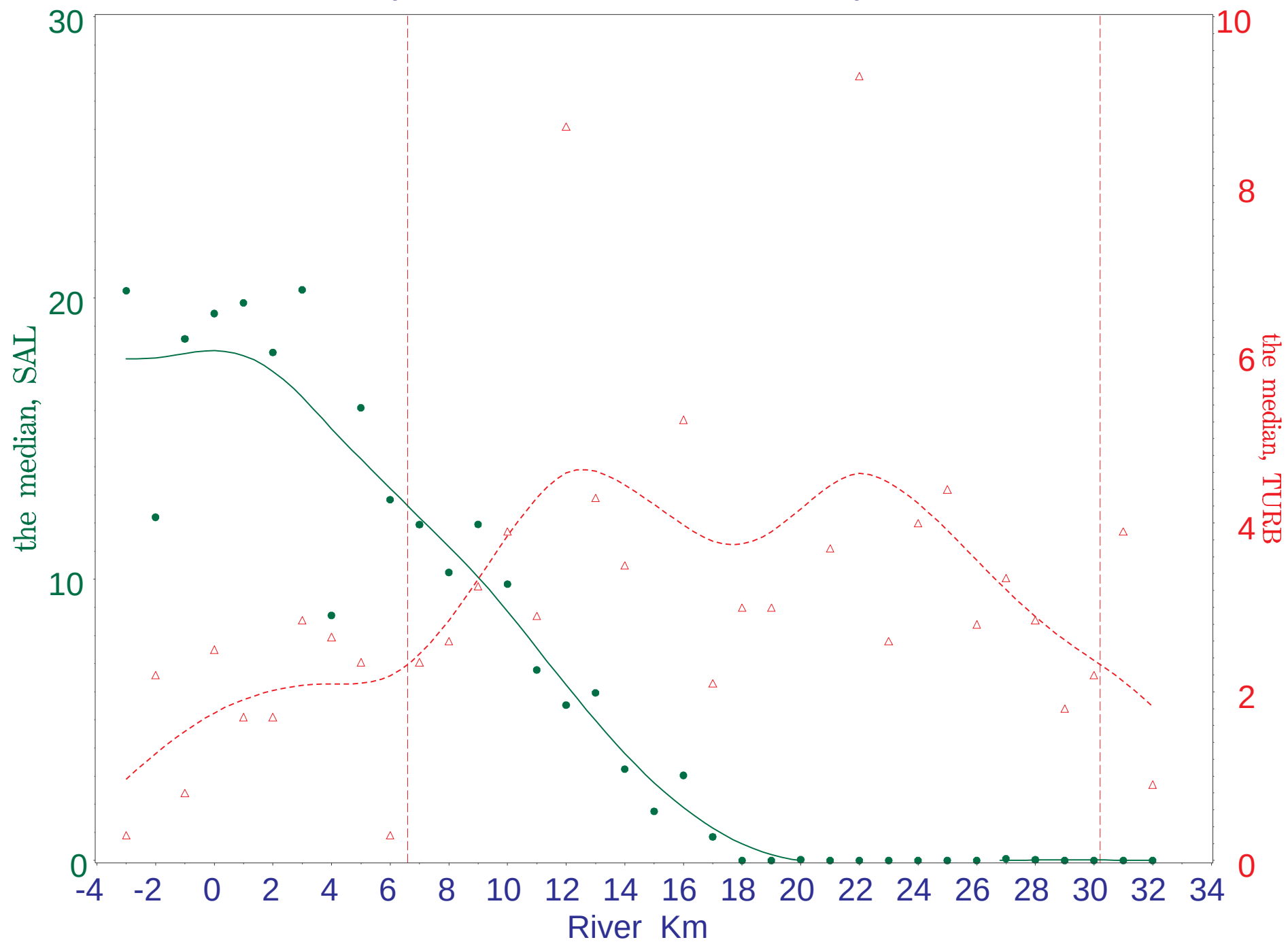
B-135



Salinity vs. River Kilometer vs. Turbidity 1976-1998

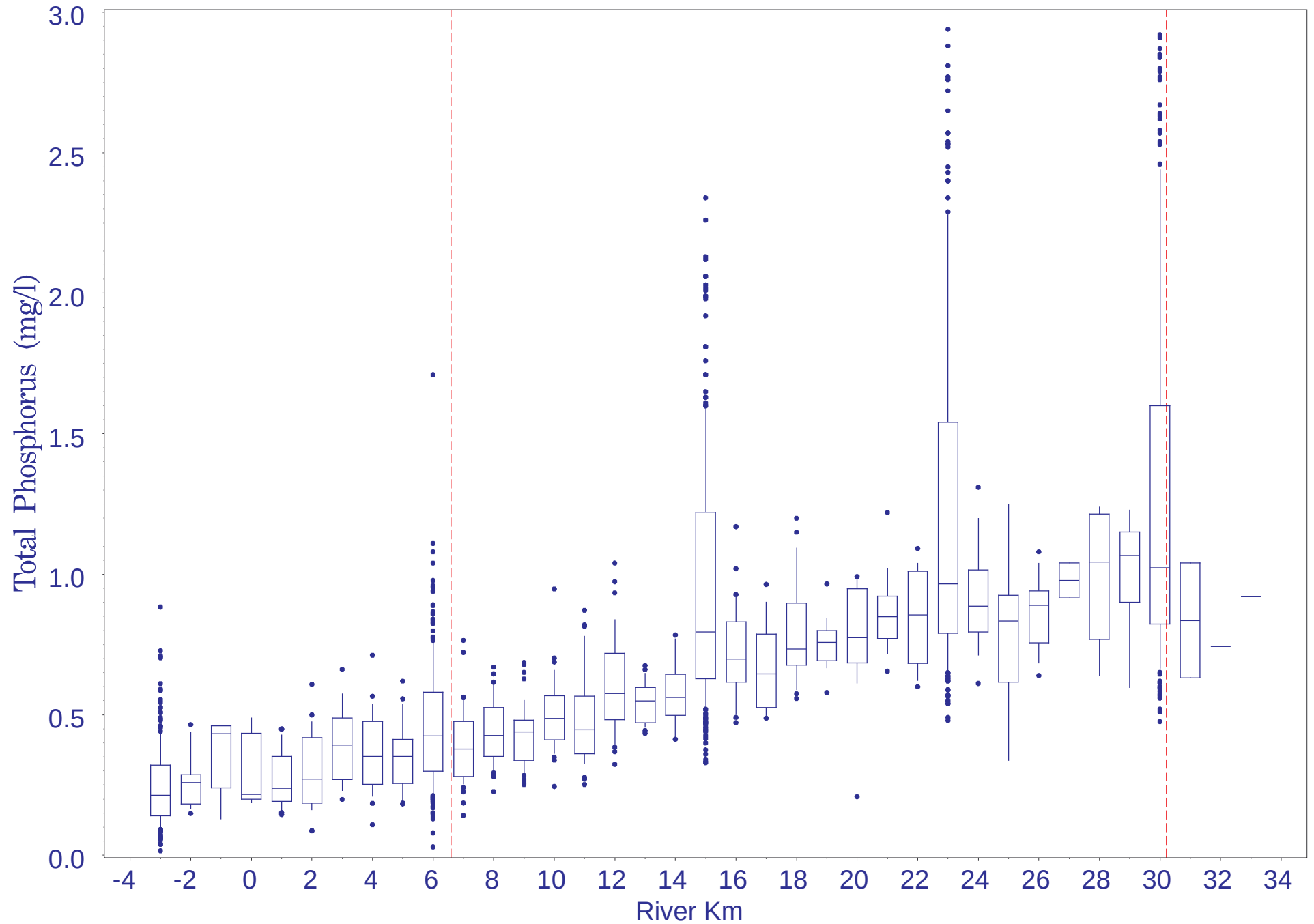


Salinity vs. River Kilometer vs. Turbidity 1996-1998



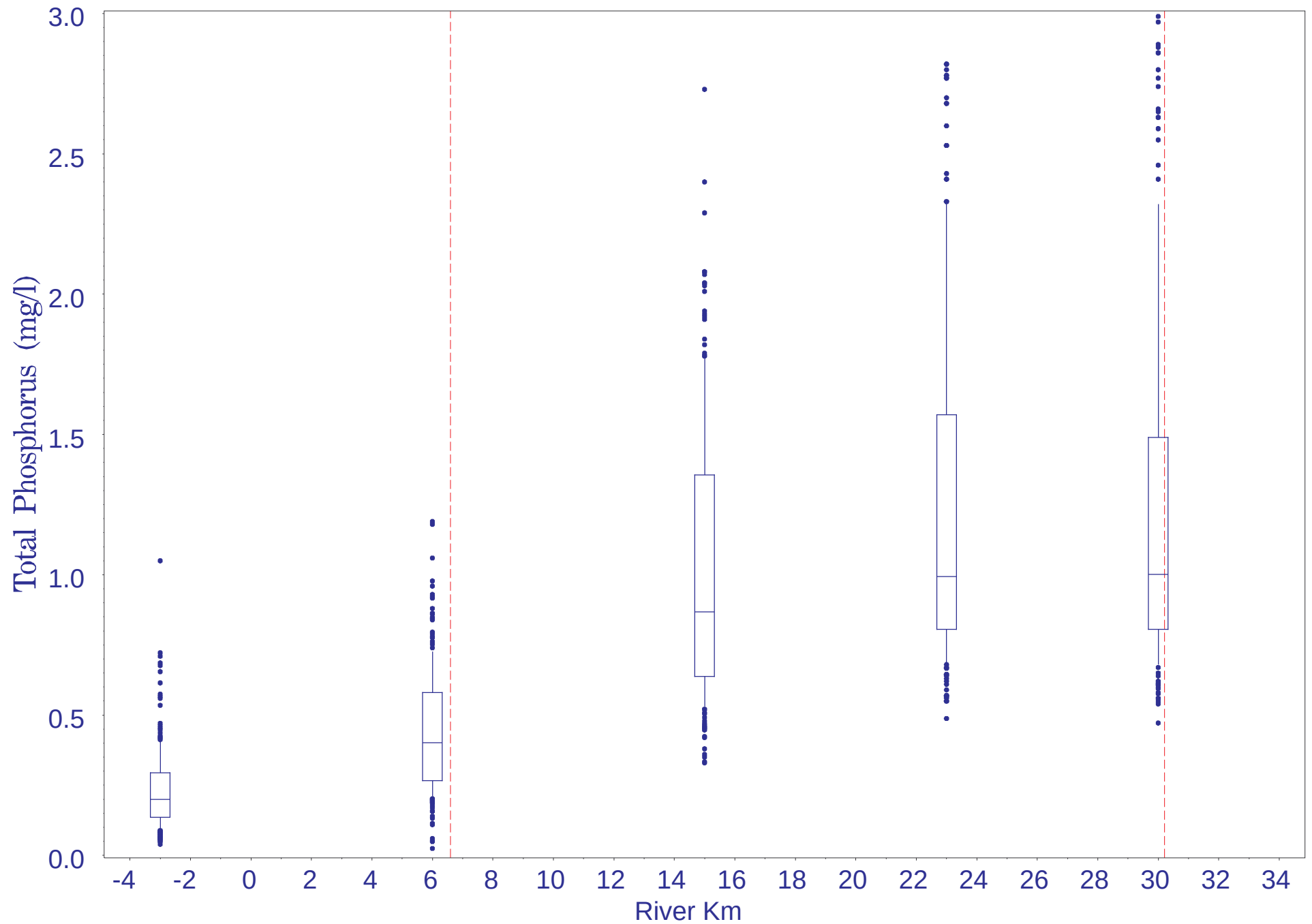
Total Phosphorus vs. River Kilometer 1976-1998
Surface

B-138



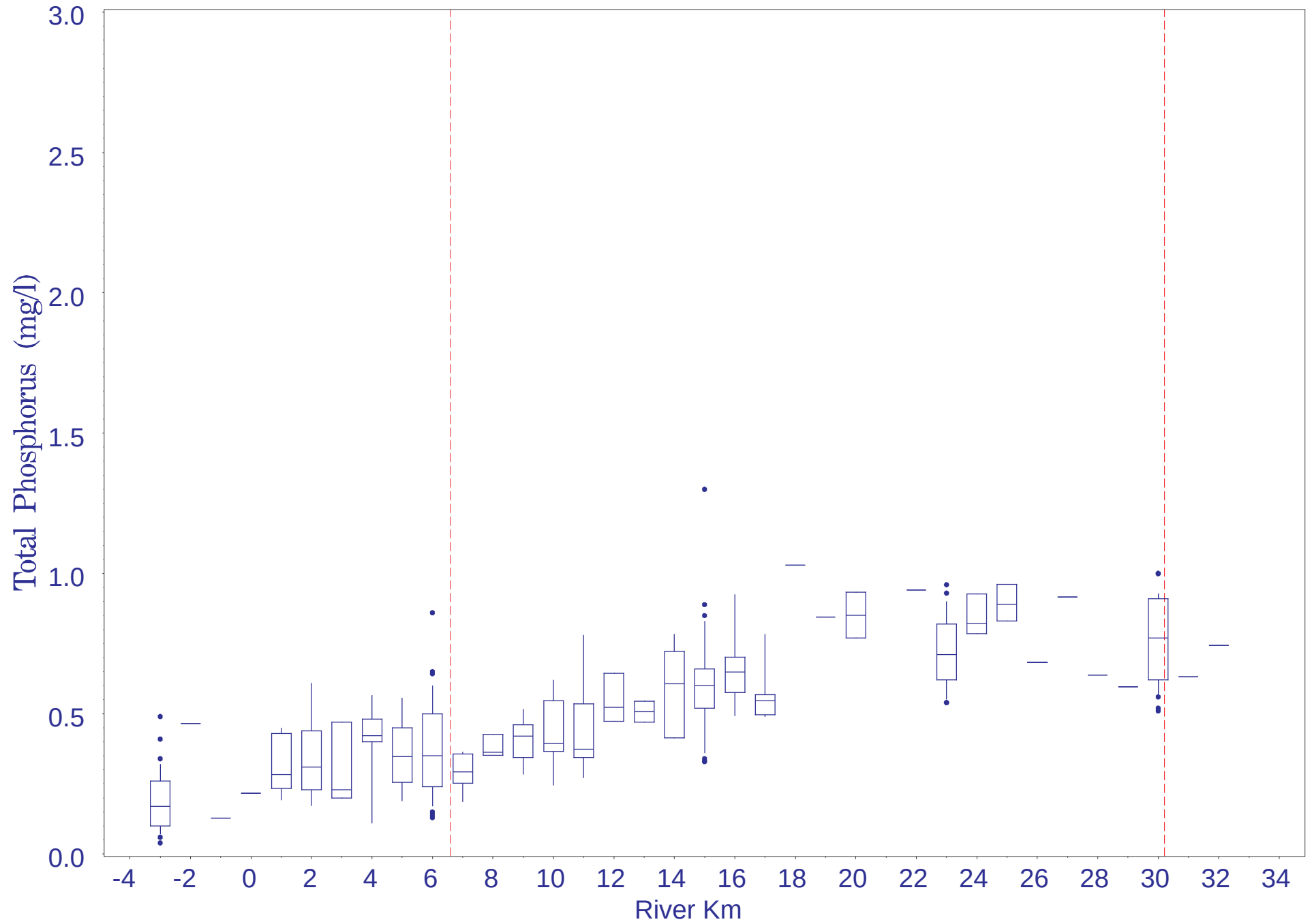
Total Phosphorus vs. River Kilometer 1976-1998
Bottom

B-139



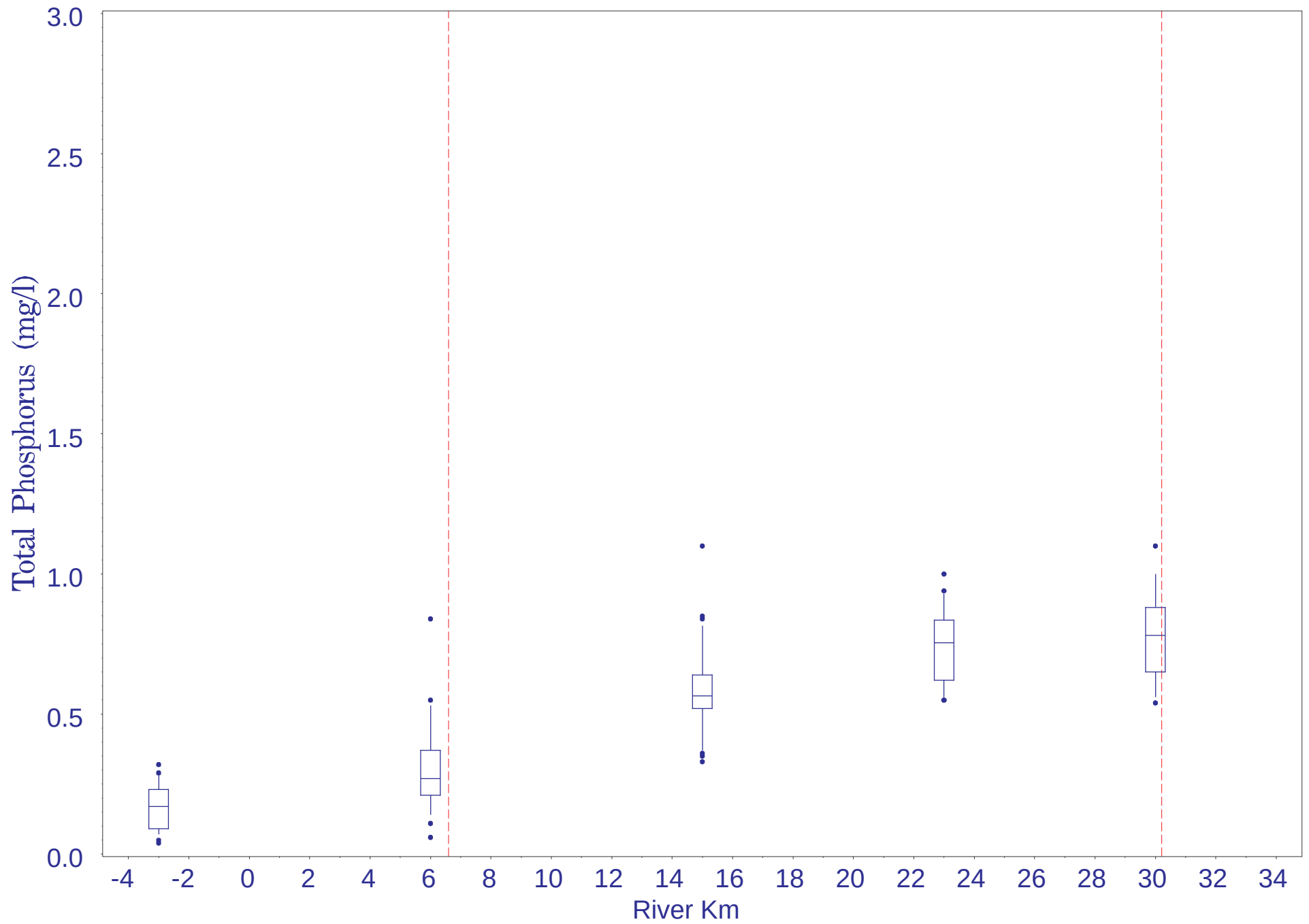
Total Phosphorus vs. River Kilometer 1996-1998
Surface

B-140

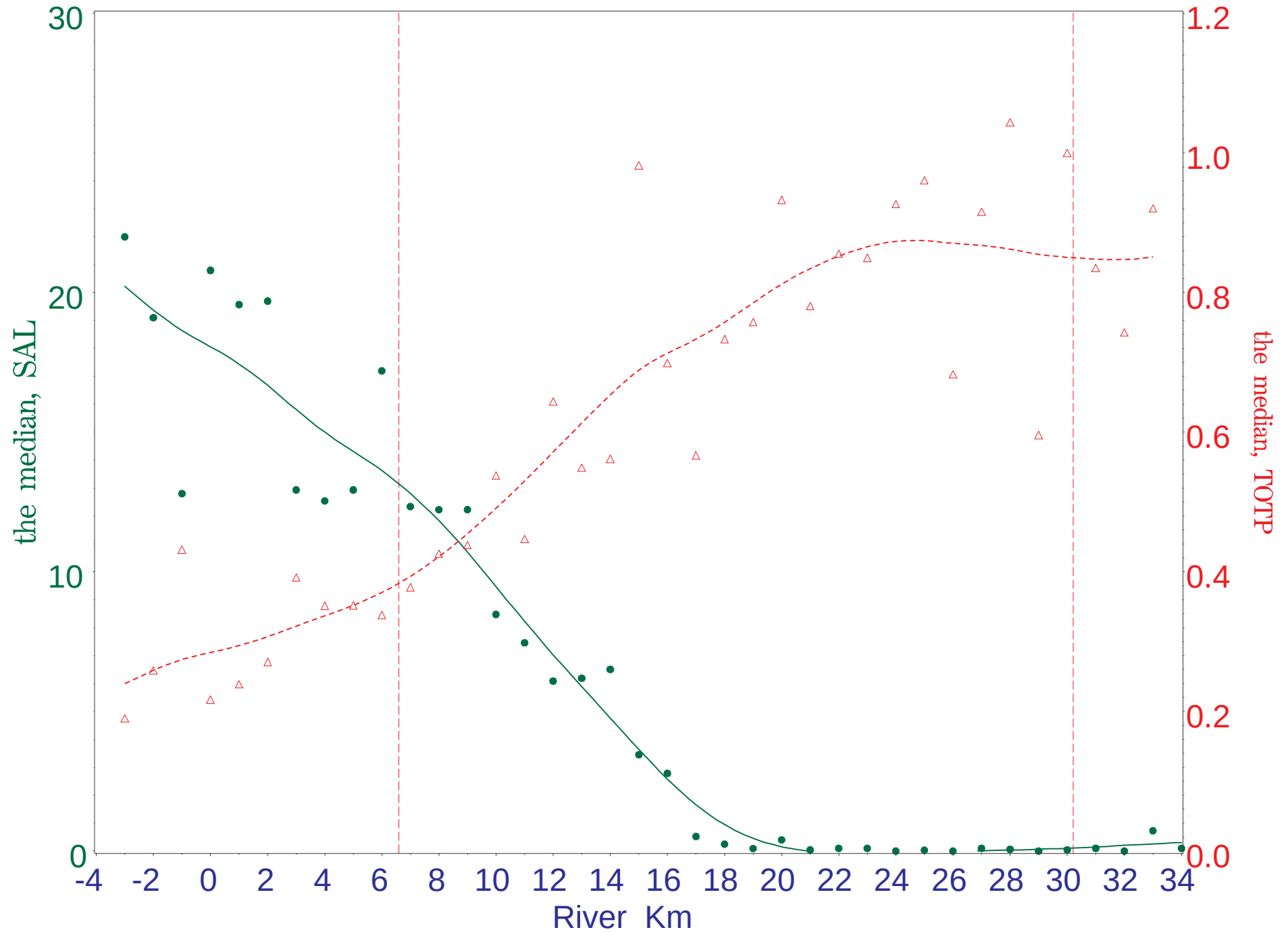


Total Phosphorus vs. River Kilometer 1996-1998
Bottom

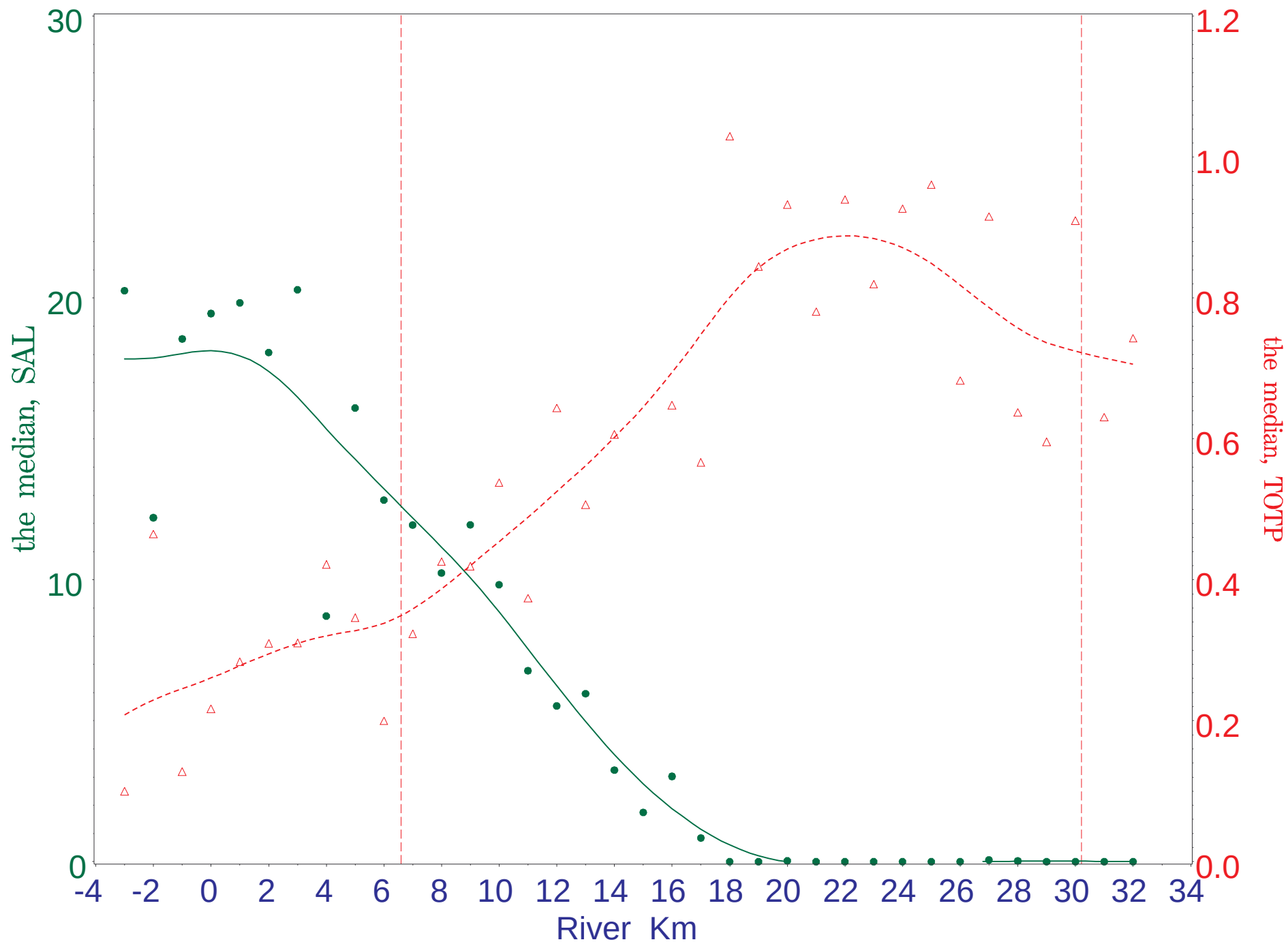
B-141



Salinity vs. River Kilometer vs. Total Phosphorus 1976-1998

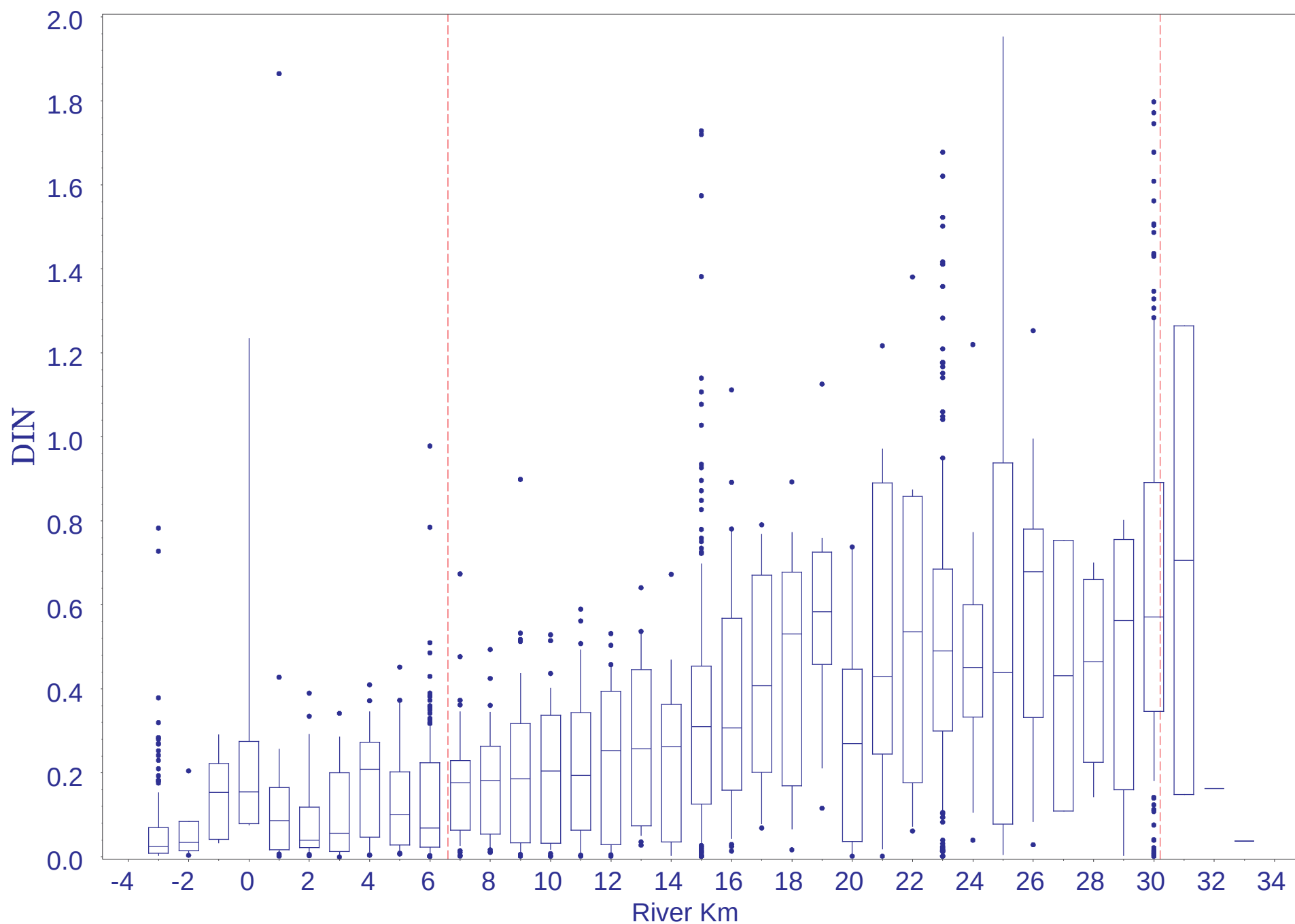


Salinity vs. River Kilometer vs. Total Phosphorus 1996-1998



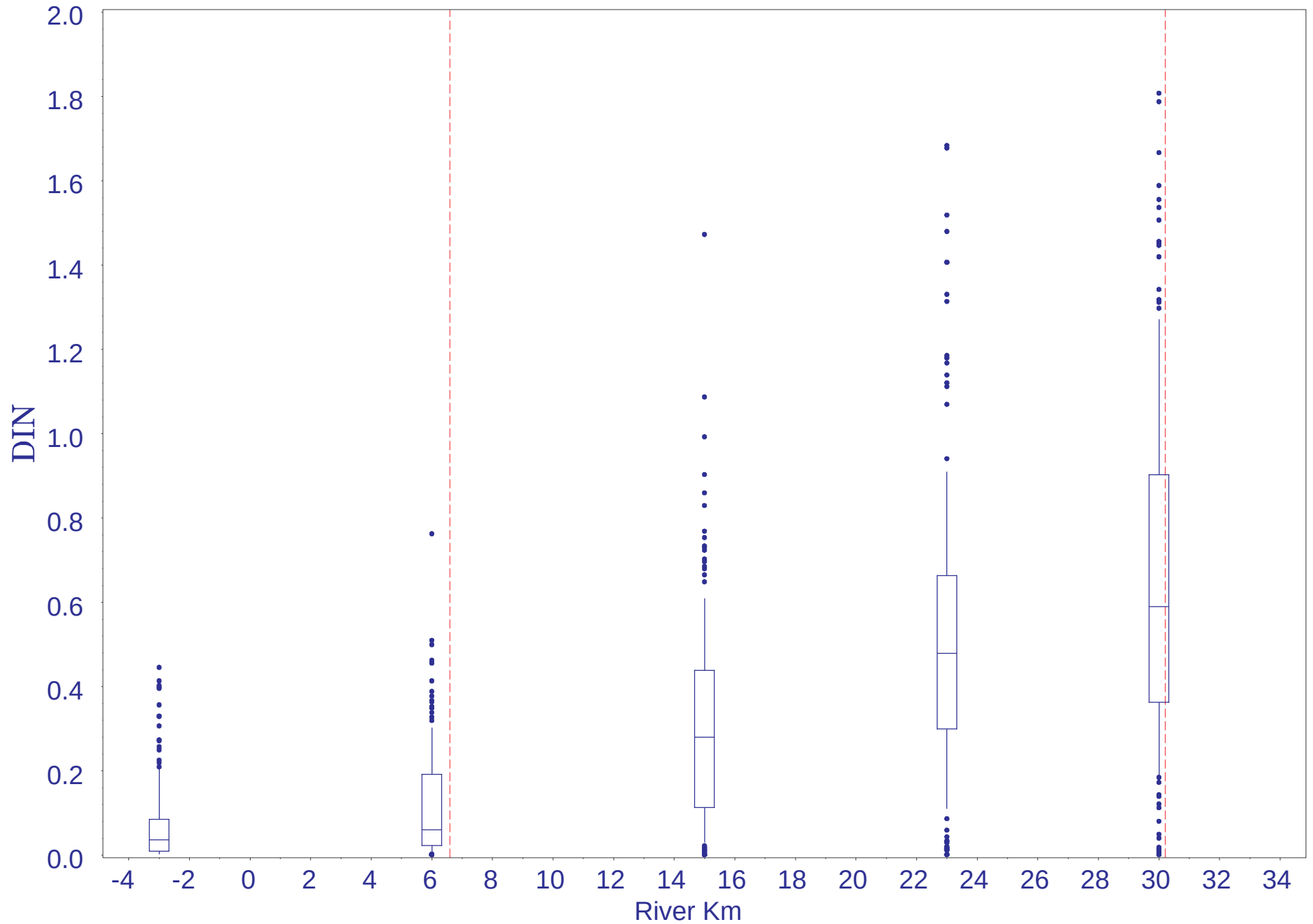
Dissolved Inorganic Nitrogen vs. River Kilometer 1976-1998
Surface

B-144



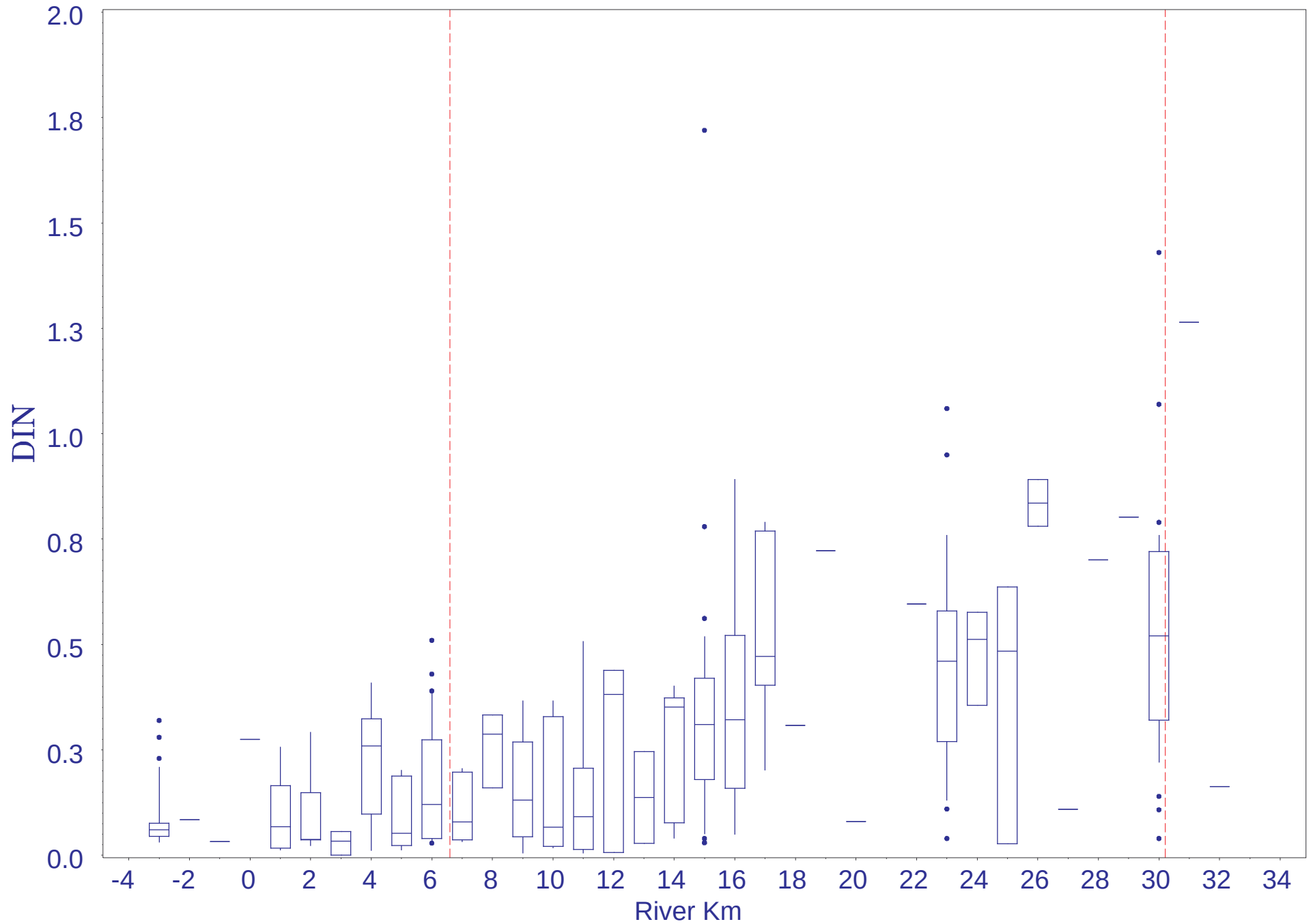
Dissolved Inorganic Nitrogen vs. River Kilometer 1976-1998
Bottom

B-145



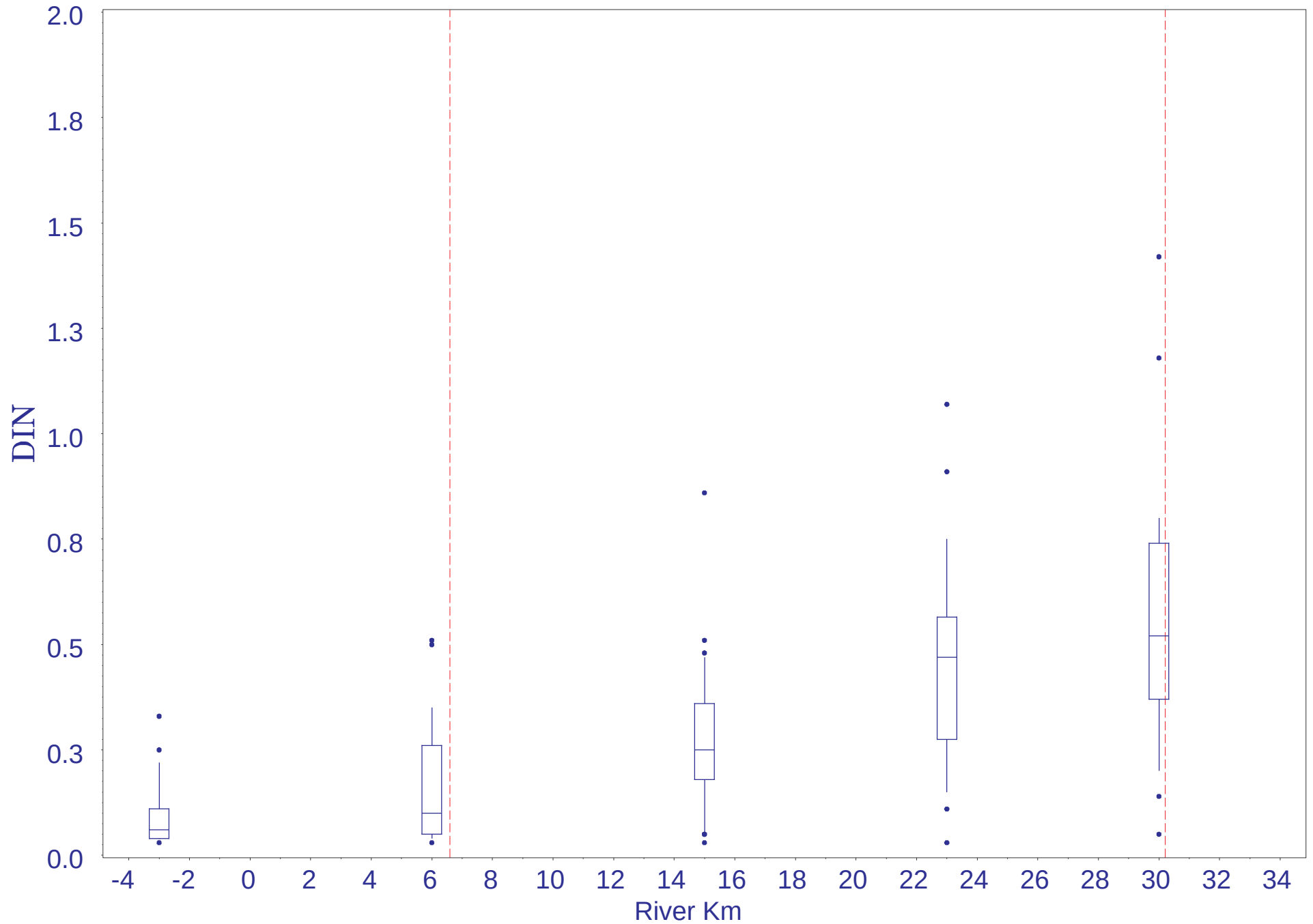
Dissolved Inorganic Nitrogen vs. River Kilometer 1996-1998
Surface

B-146

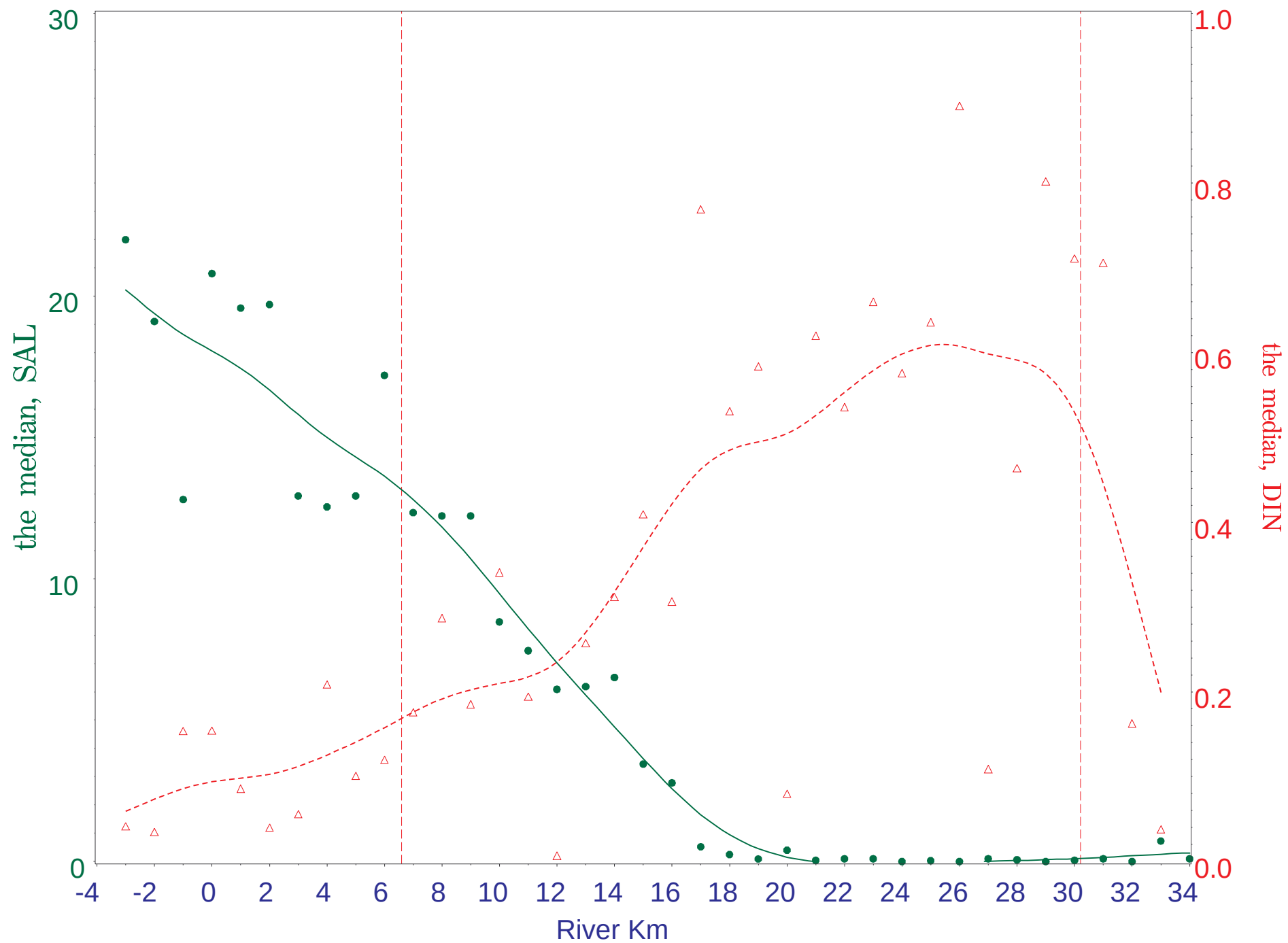


Dissolved Inorganic Nitrogen vs. River Kilometer 1996-1998
Bottom

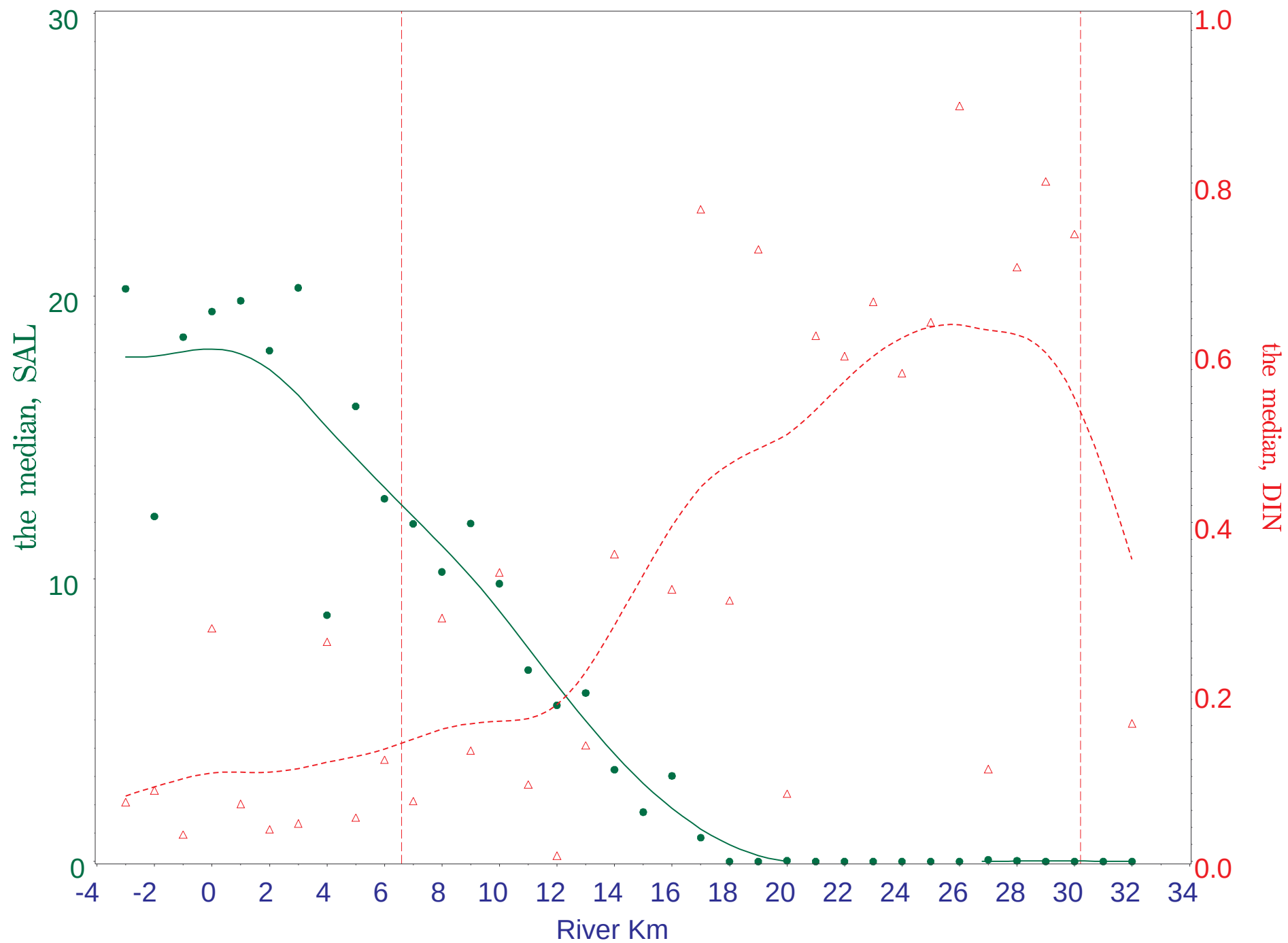
B-147



Salinity vs. River Kilometer vs. Dissolved Inorganic Nitrogen 1976-1998

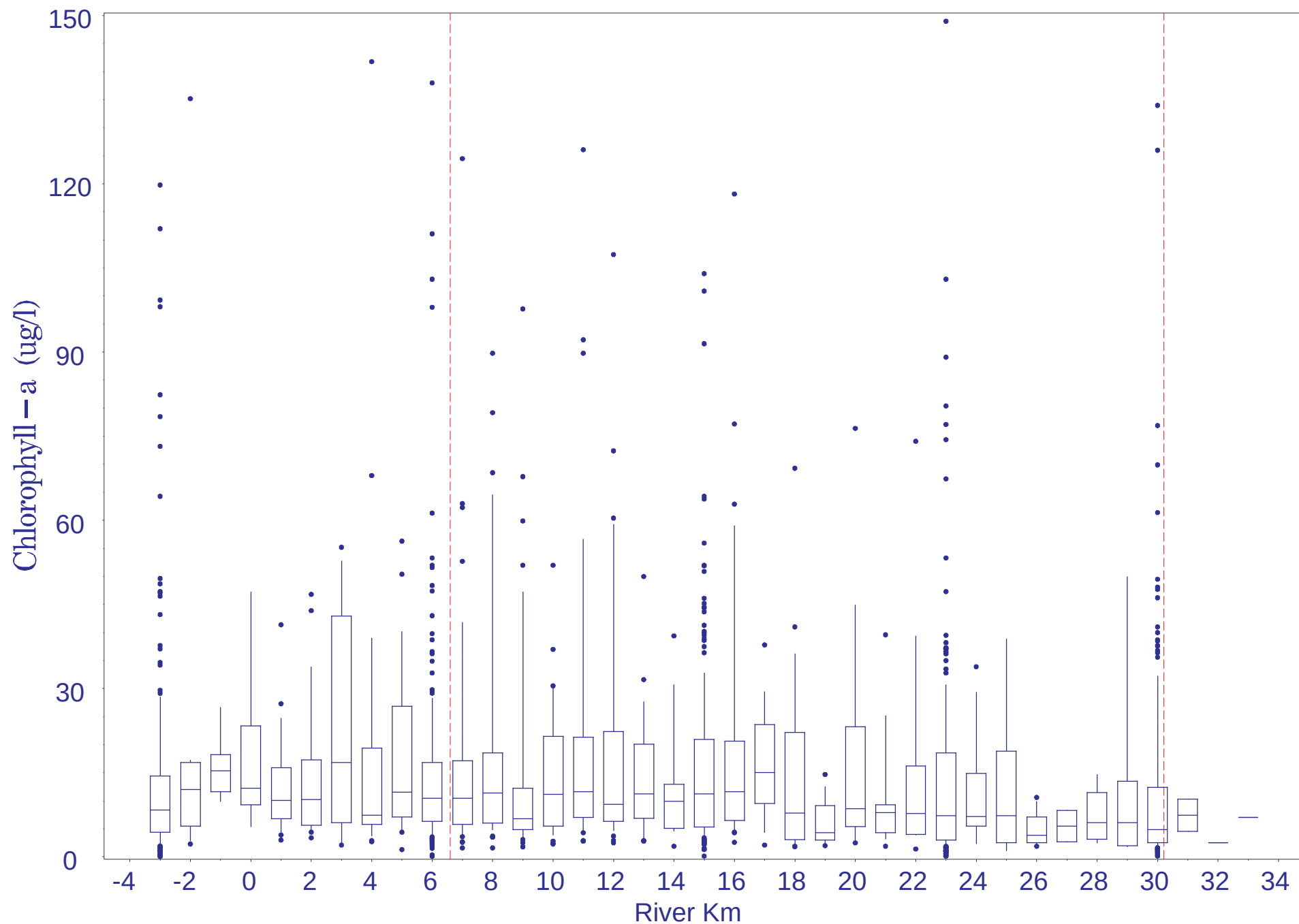


Salinity vs. River Kilometer vs. Dissolved Inorganic Nitrogen 1996-1998



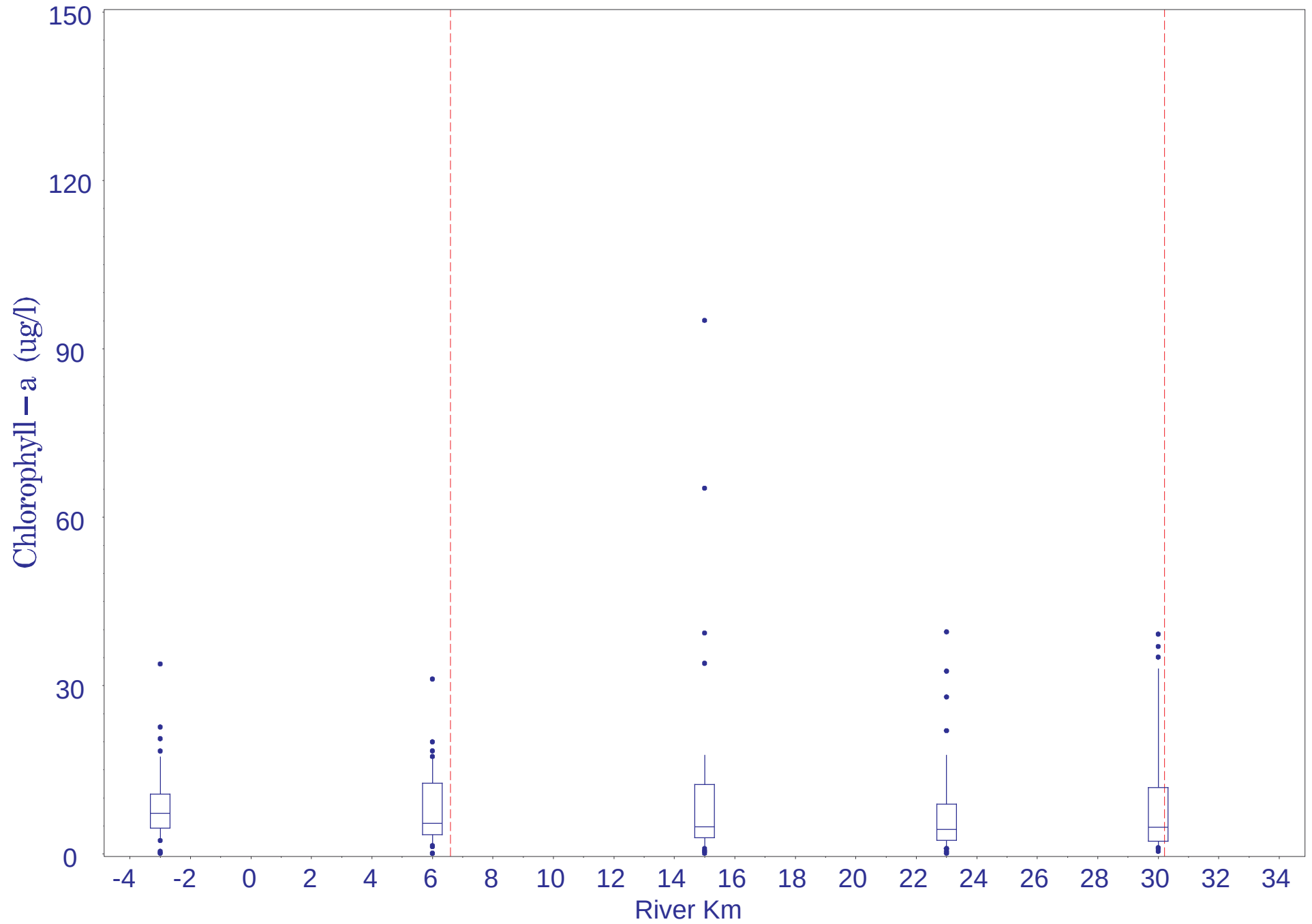
Chlorophyll vs. River Kilometer 1976-1998
Surface

B-150



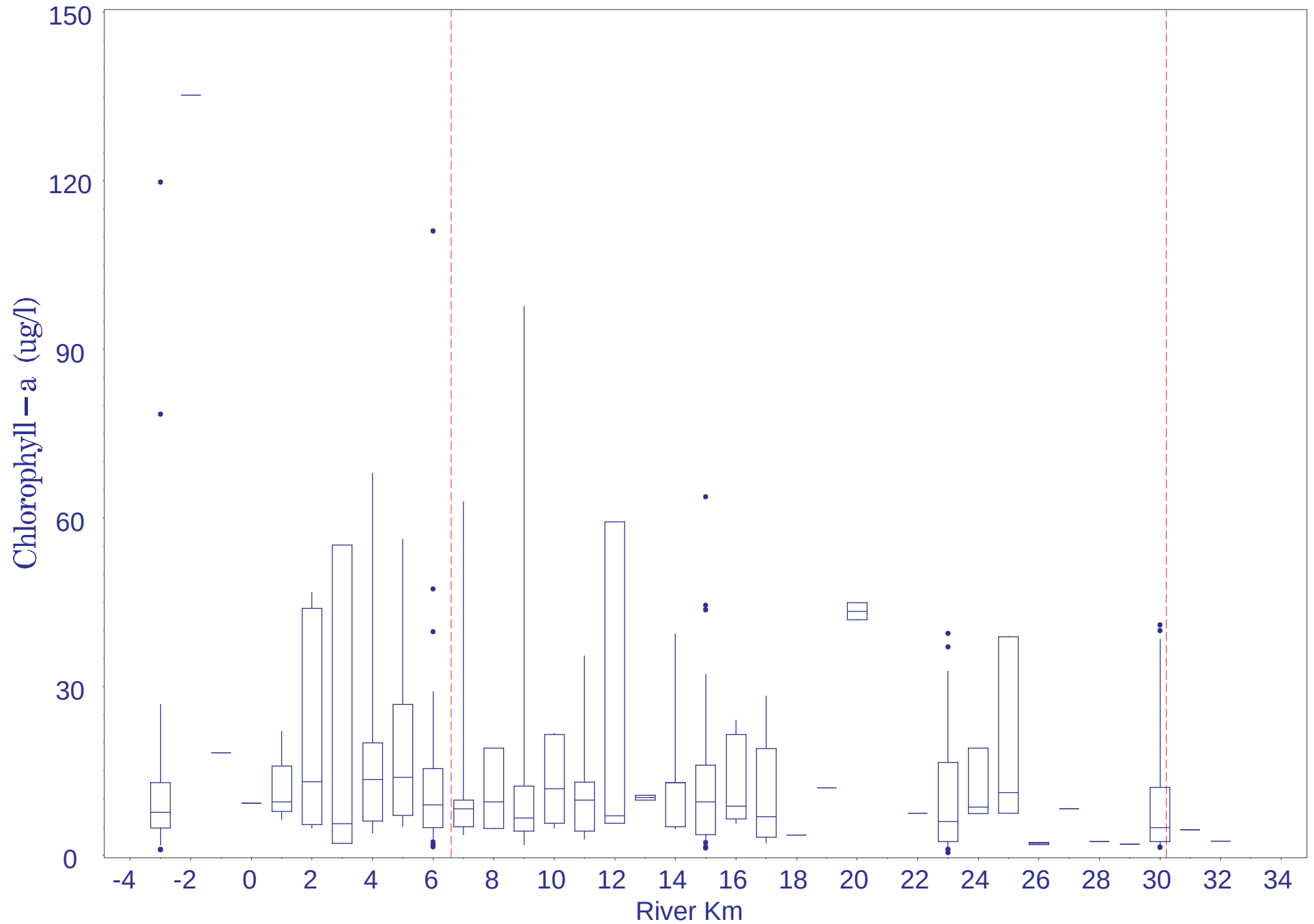
Chlorophyll vs. River Kilometer 1976-1998
Bottom

B-151



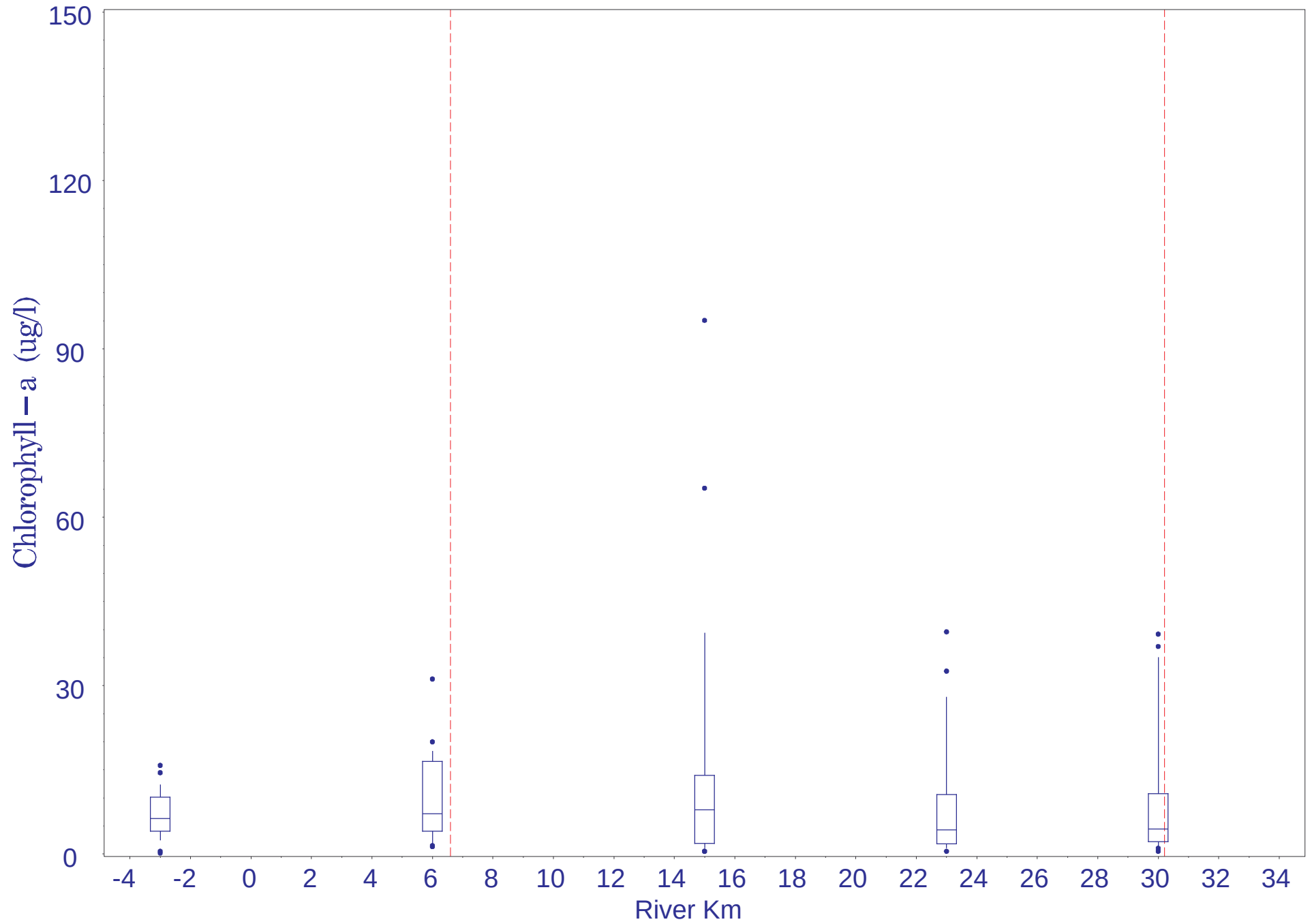
Chlorophyll vs. River Kilometer 1996-1998
Surface

B-152

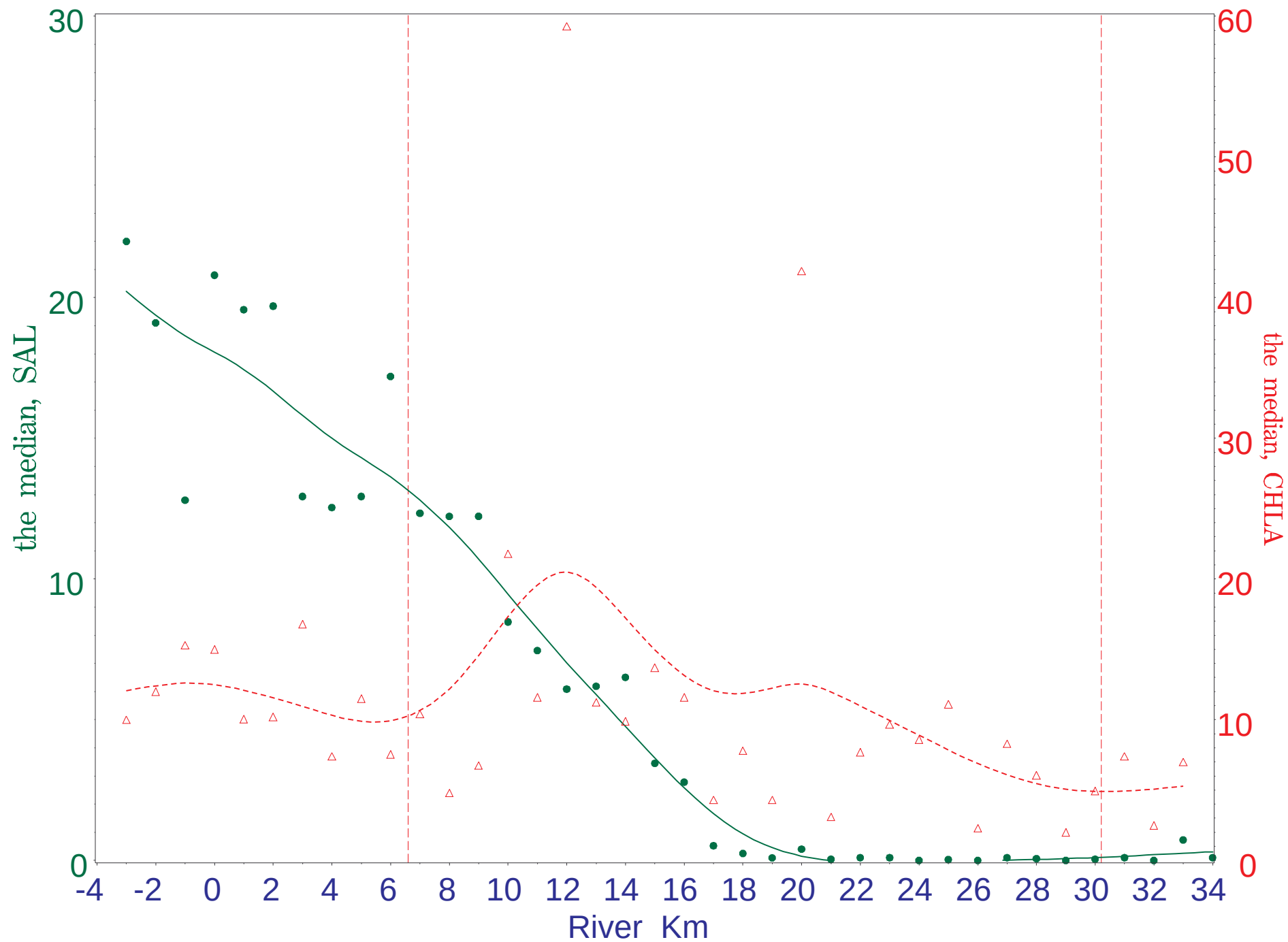


Chlorophyll vs. River Kilometer 1996-1998
Bottom

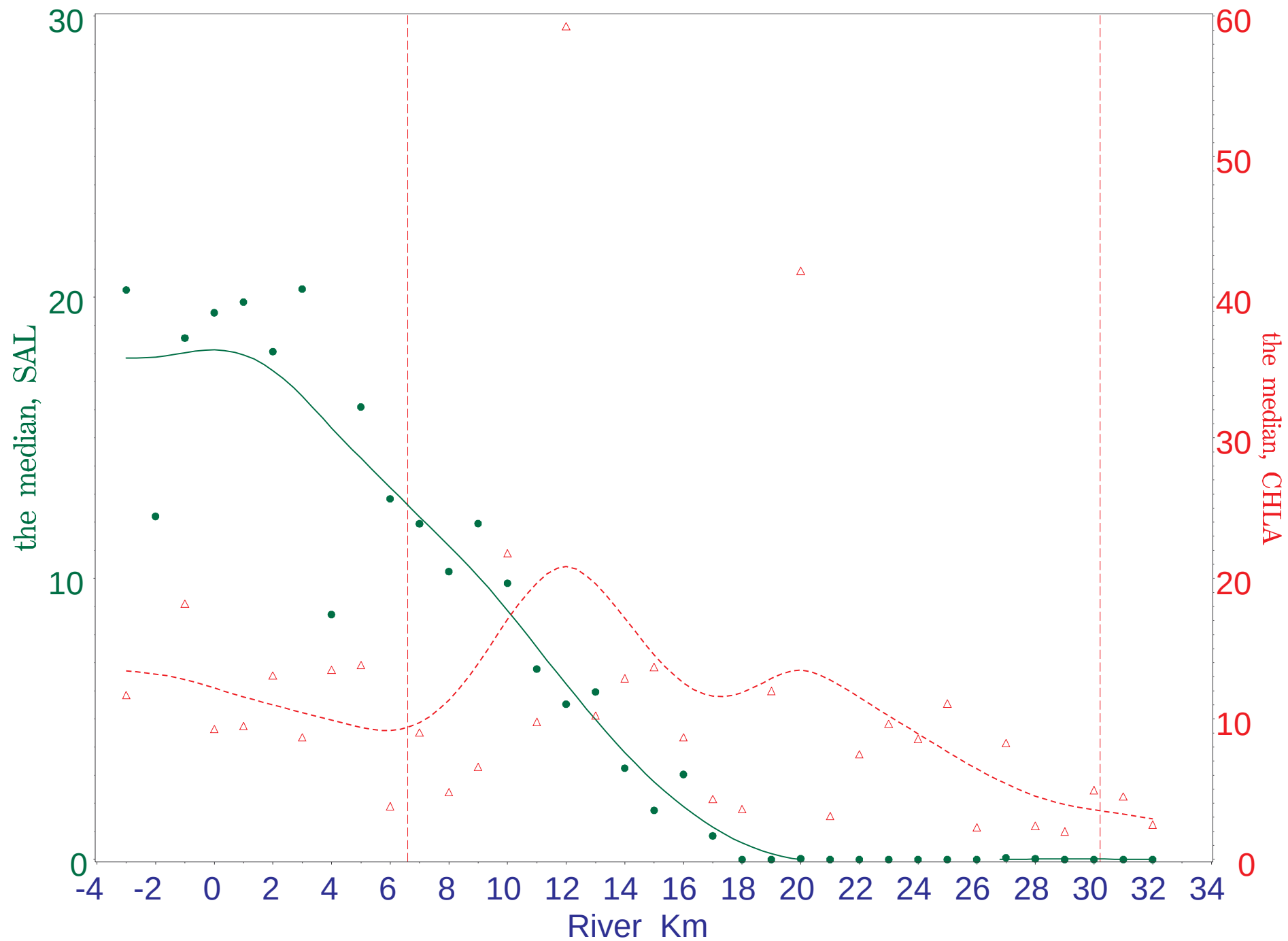
B-153



Salinity vs. River Kilometer vs. Chlorophyll 1976-1998

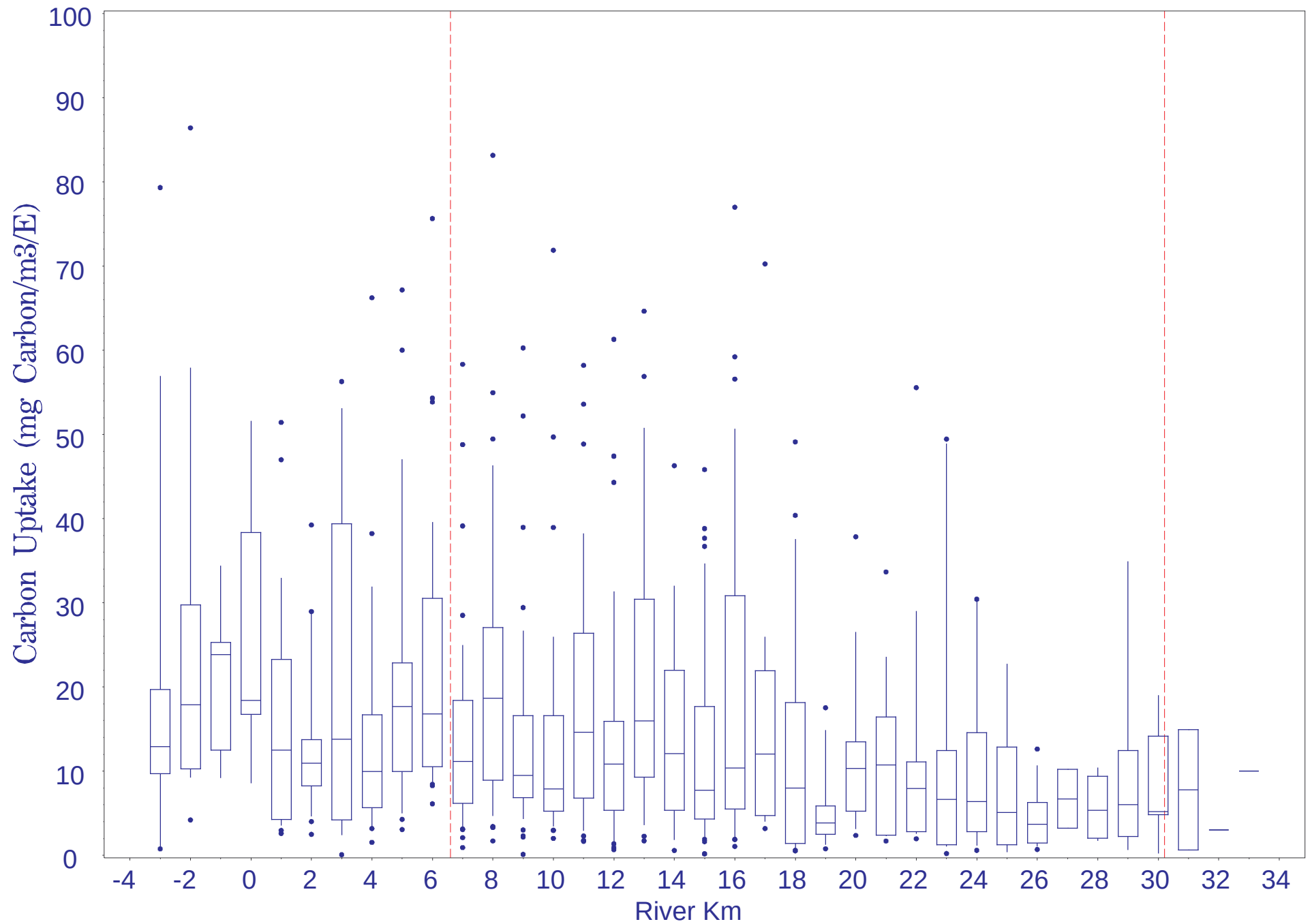


Salinity vs. River Kilometer vs. Chlorophyll 1996-1998



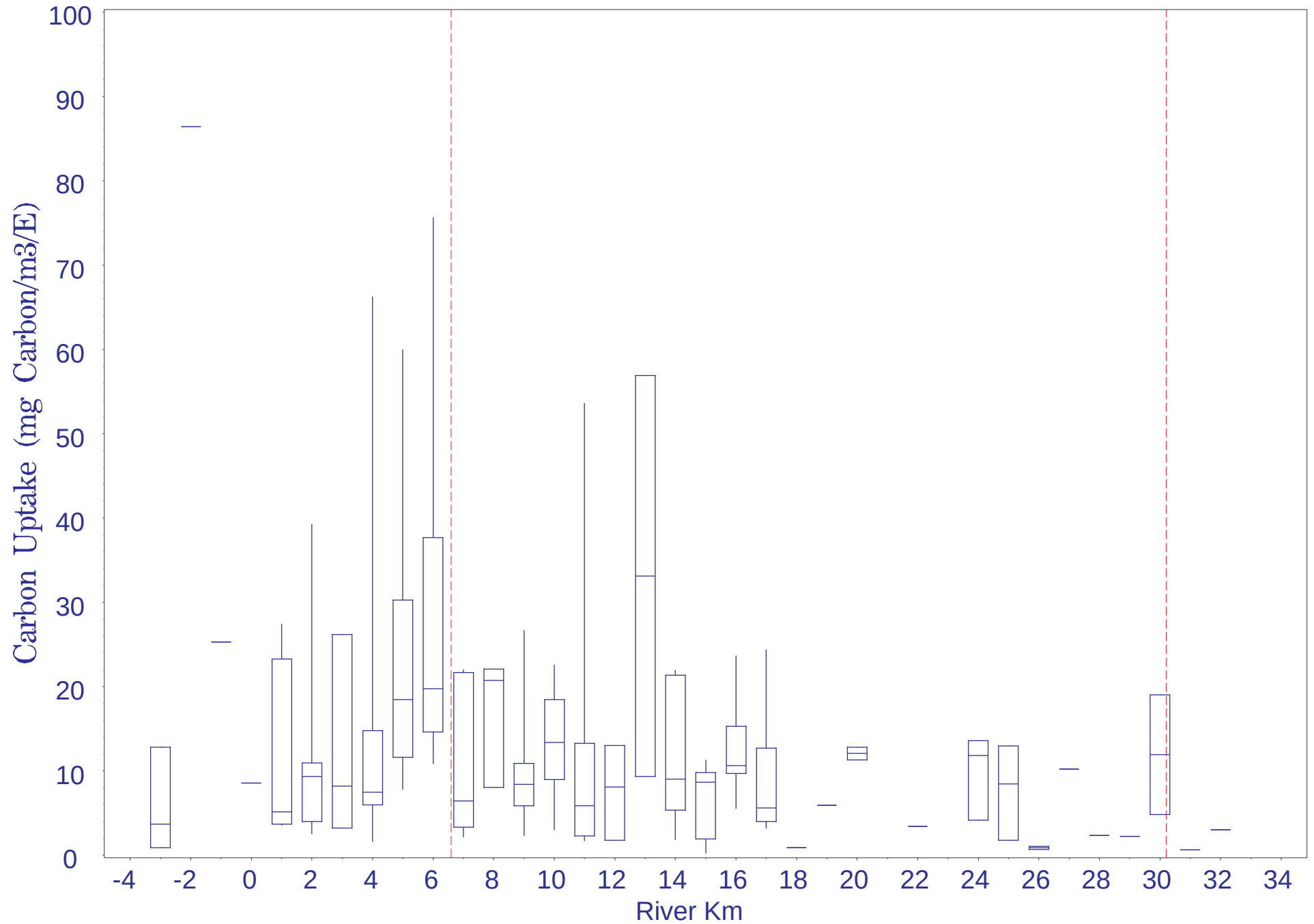
Carbon Uptake vs. River Kilometer 1976-1998
Surface

B-156



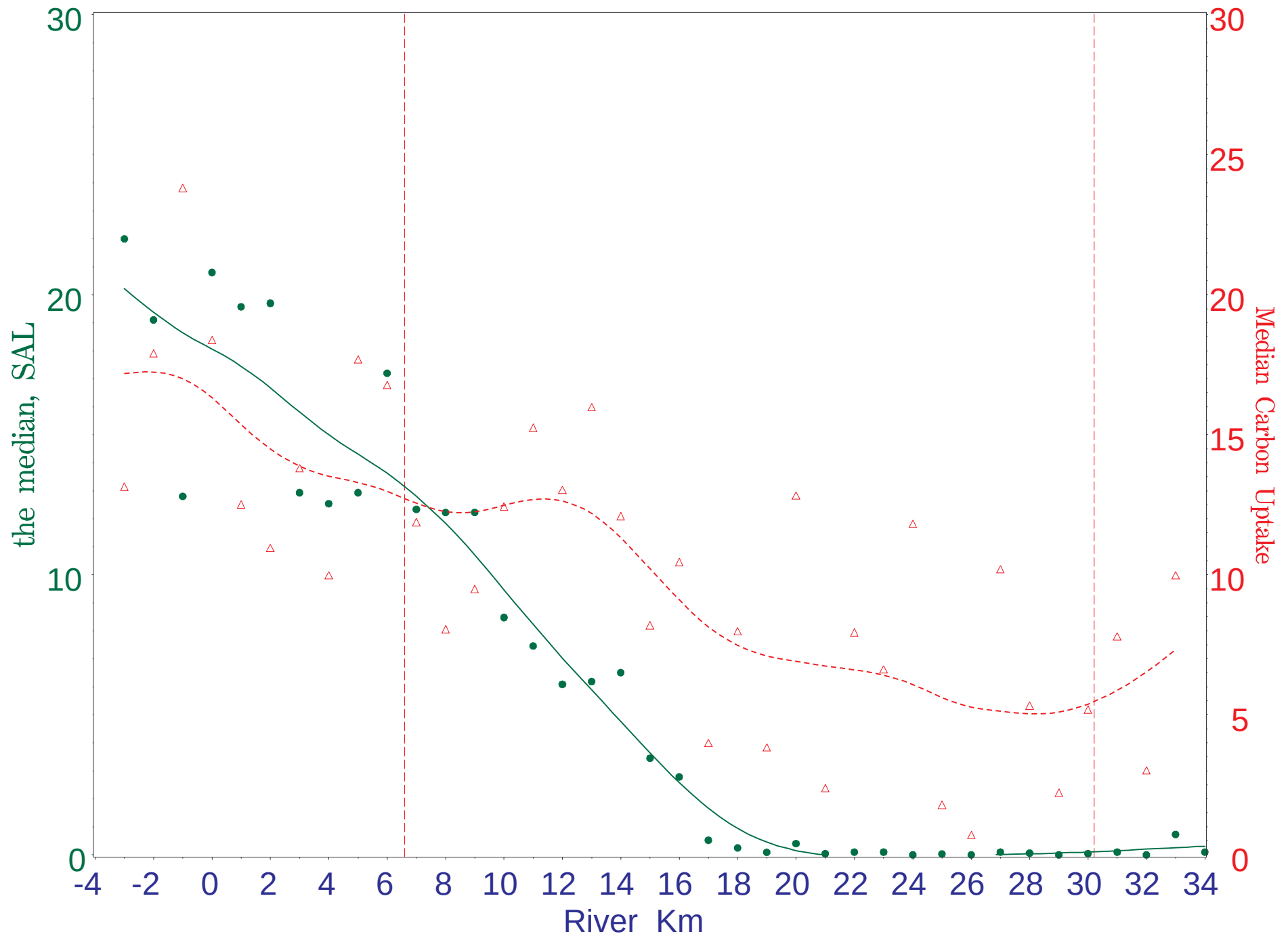
Carbon Uptake vs. River Kilometer 1996-1998
Surface

B-157

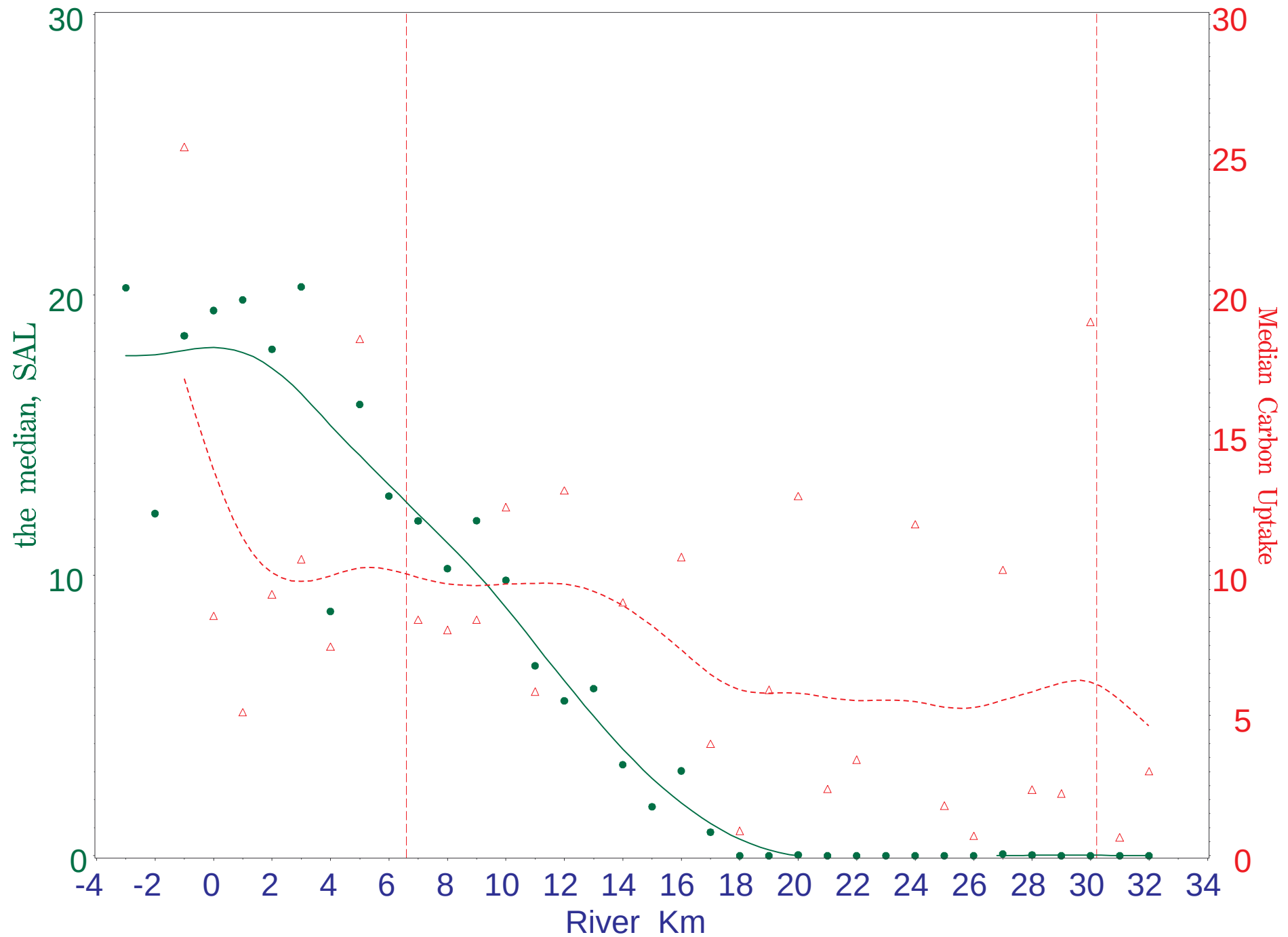


Salinity vs. River Kilometer vs. Carbon Uptake 1976-1998

B-158

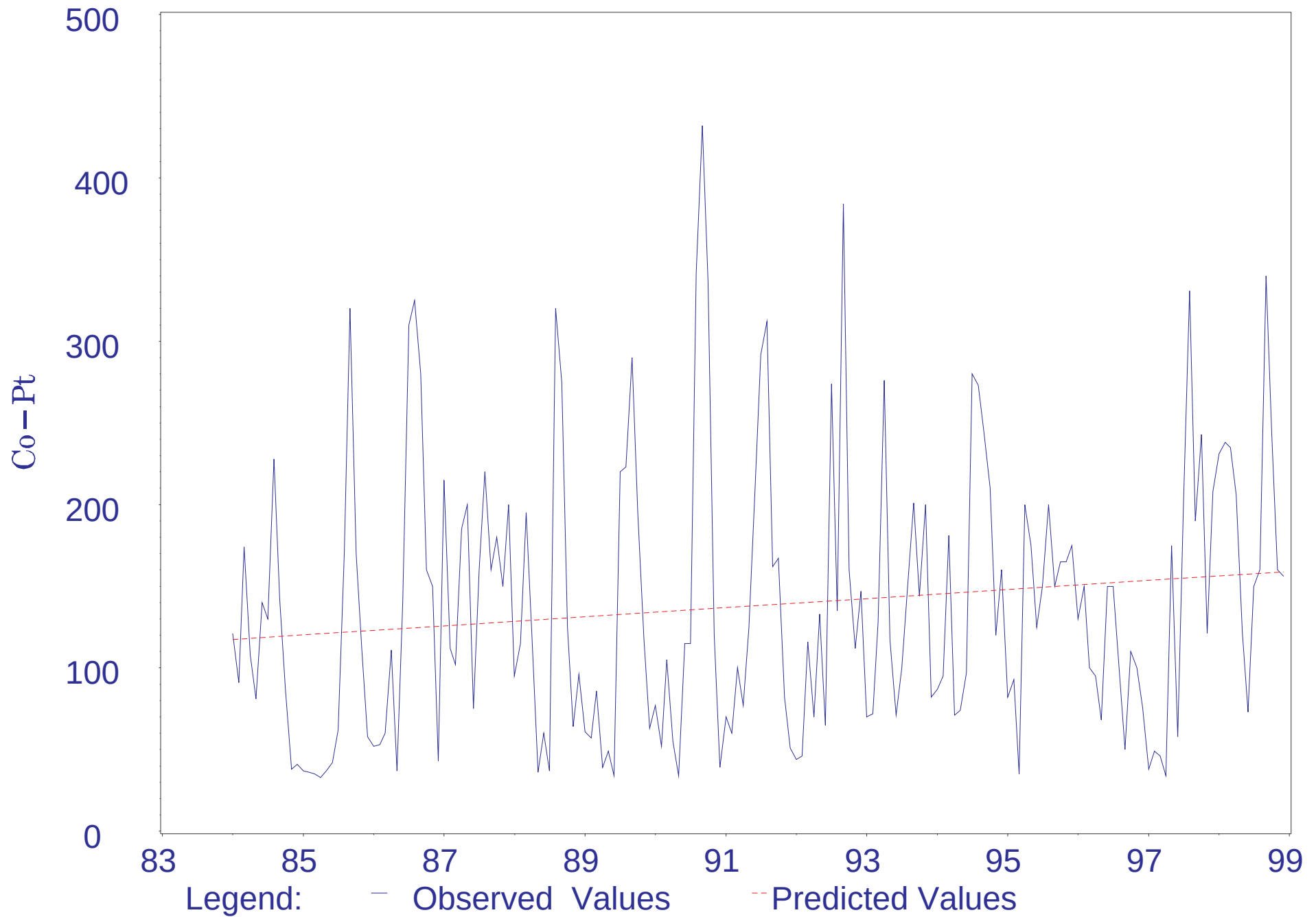


Salinity vs. River Kilometer vs. Carbon Uptake 1996-1998 **B-159**



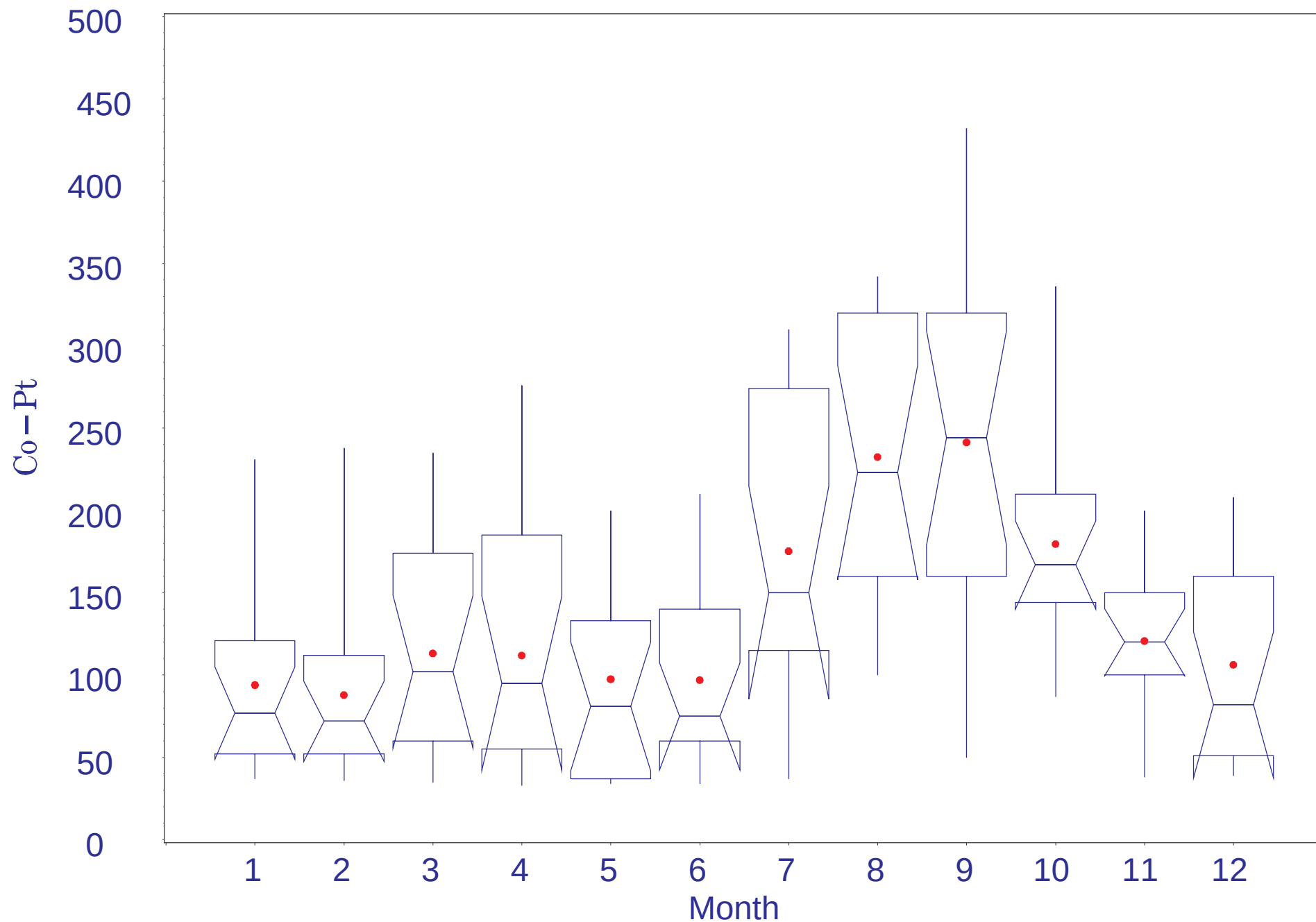
Water Color at 0 ppt Isohaline
1984-1998

B-160



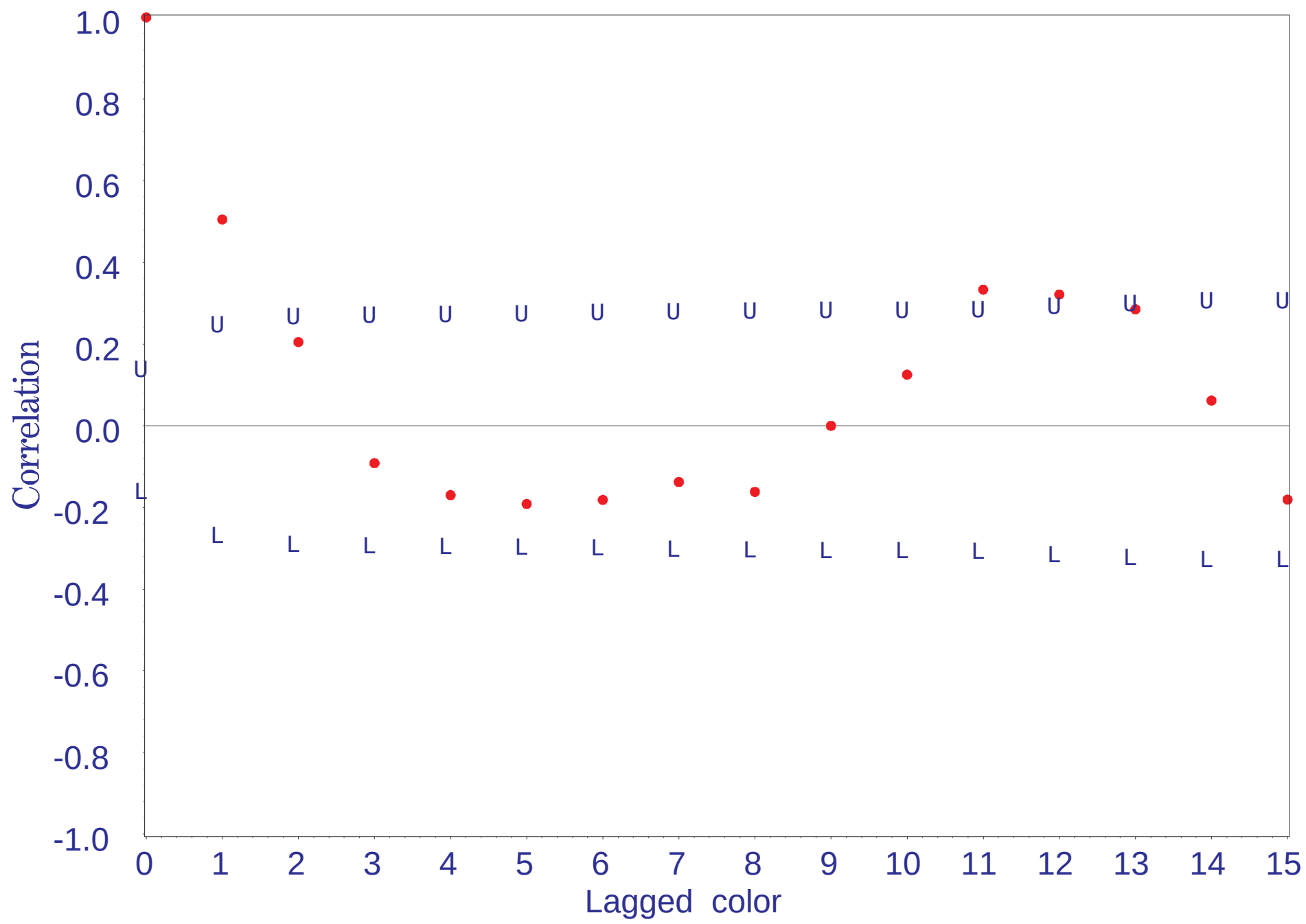
Water Color at 0 ppt Isohaline 1984-1998
Monthly Boxplots of Co-Pt

B-161



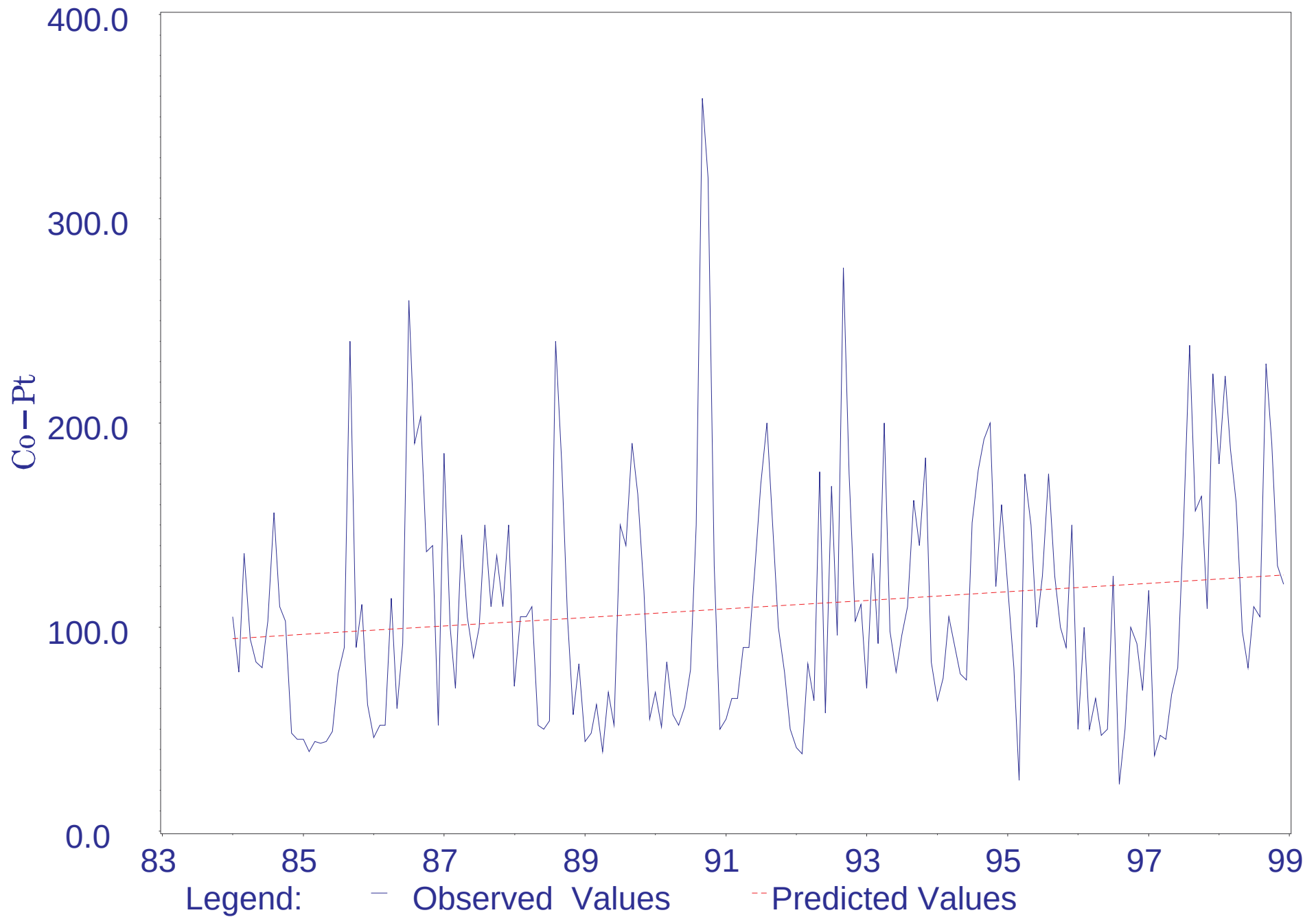
Water Color at 0 ppt Isohaline - 1984-1998
Correlogram with Upper and Lower 95% Confidence Limits

B-162



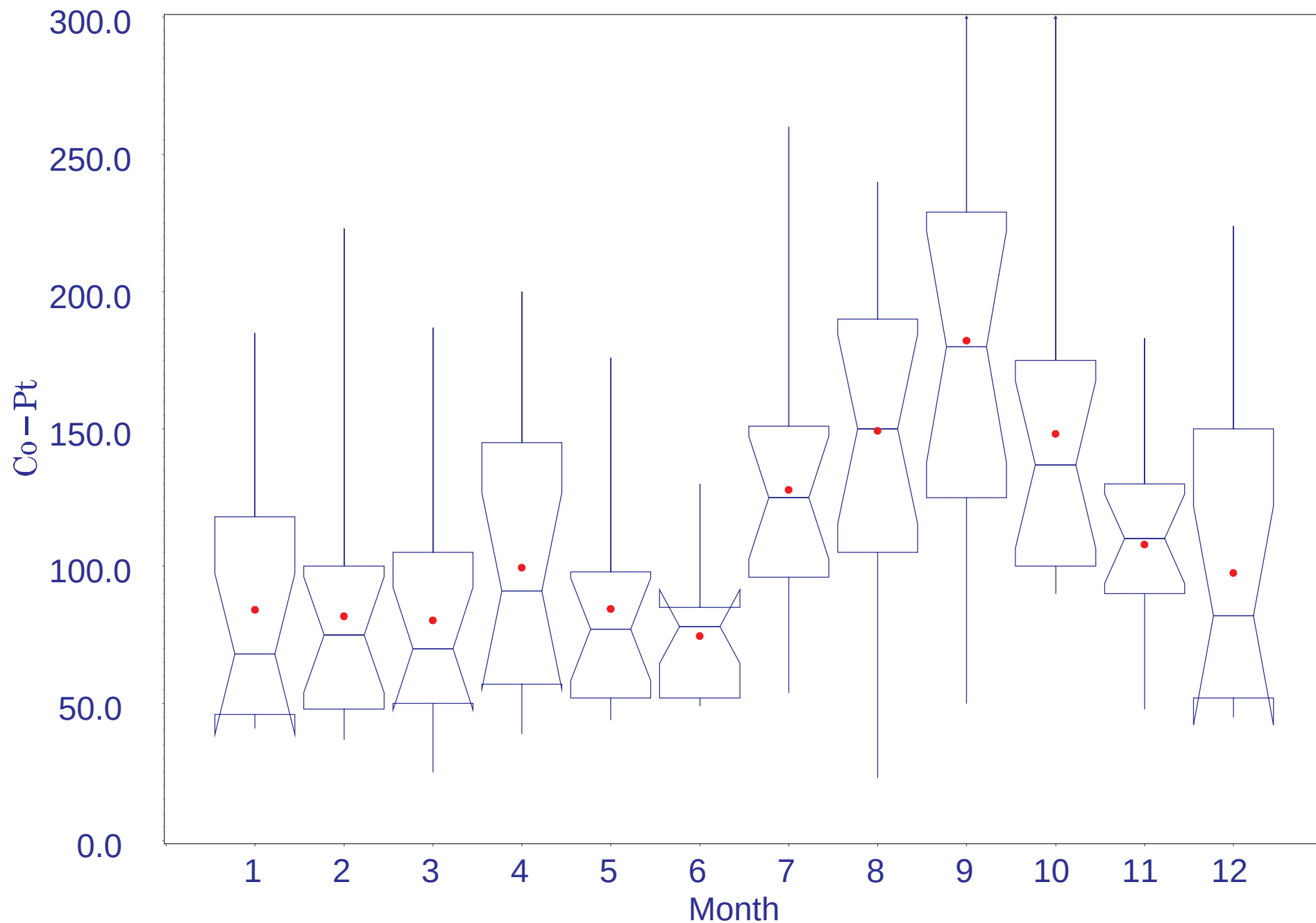
Water Color at 6 ppt Isohaline
1984-1998

B-163



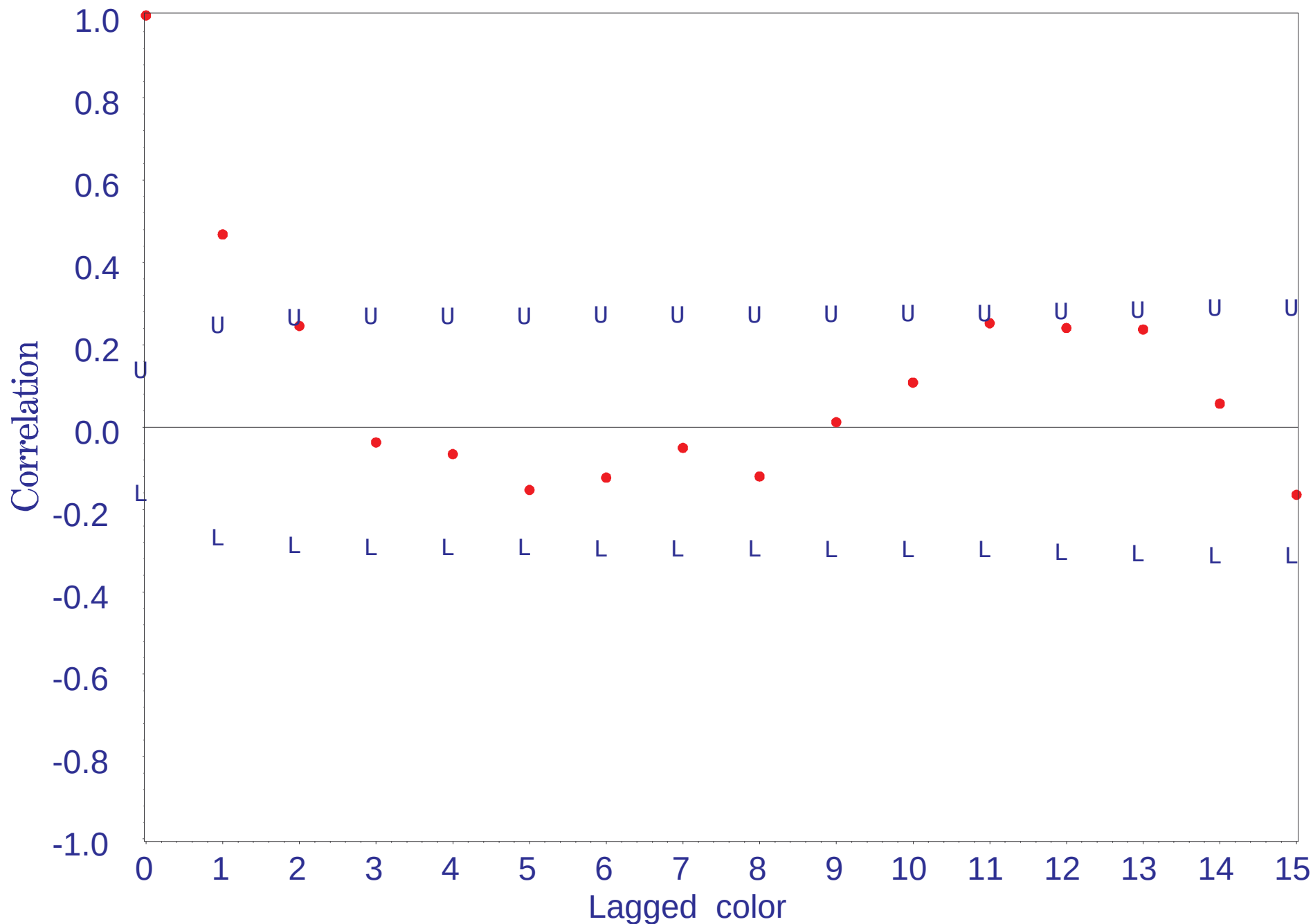
Water Color at 6 ppt Isohaline 1984-1998
Monthly Boxplots Co-Pt

B-164



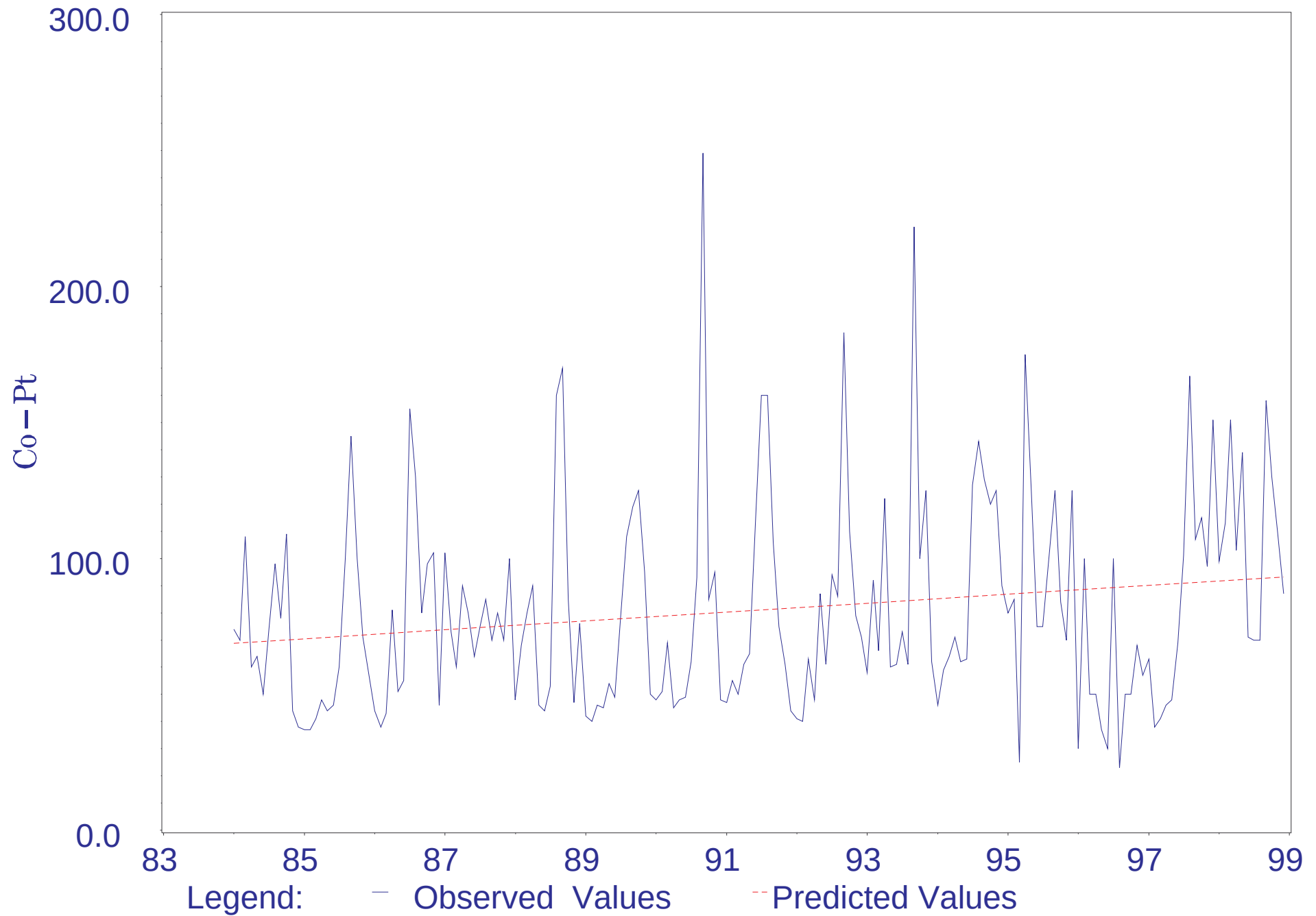
Water Color at 6 ppt Isohaline - 1984-1998
Correlogram with Upper and Lower 95% Confidence Limits

B-165



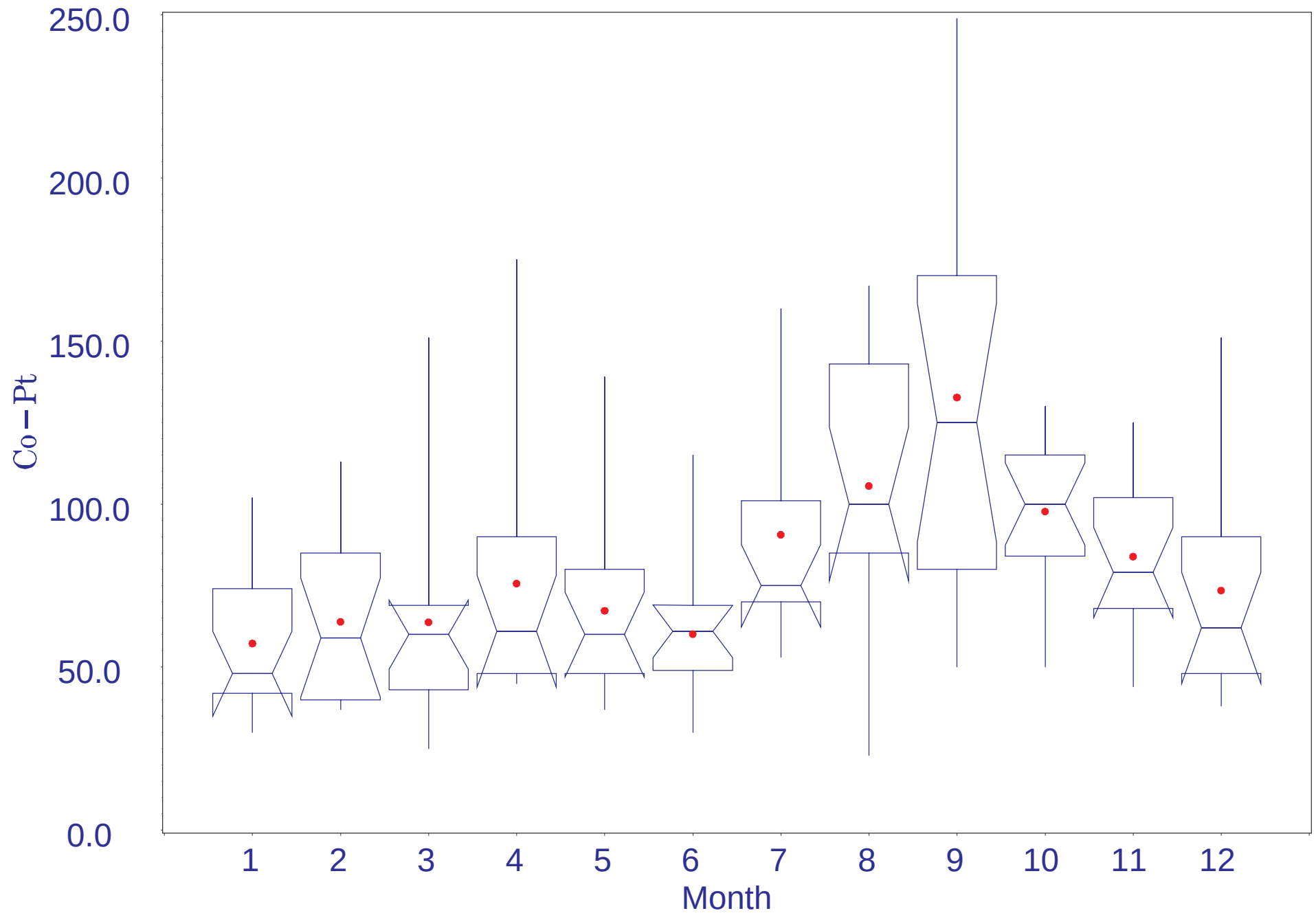
Water Color at 12 ppt Isohaline
1984-1998

B-166



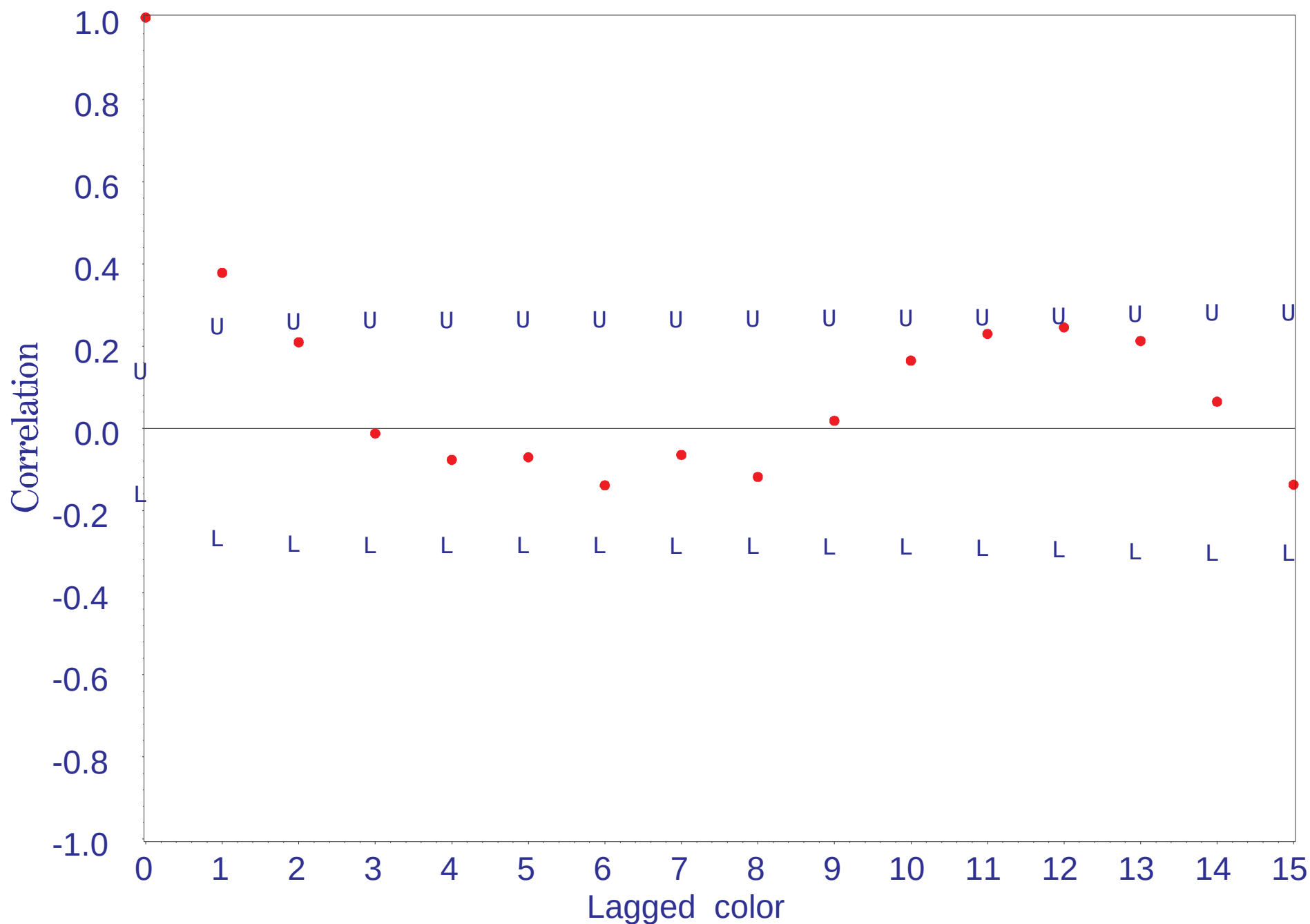
Water Color at 12 ppt Isohaline 1984-1998
Monthly Boxplots of Co-Pt

B-167



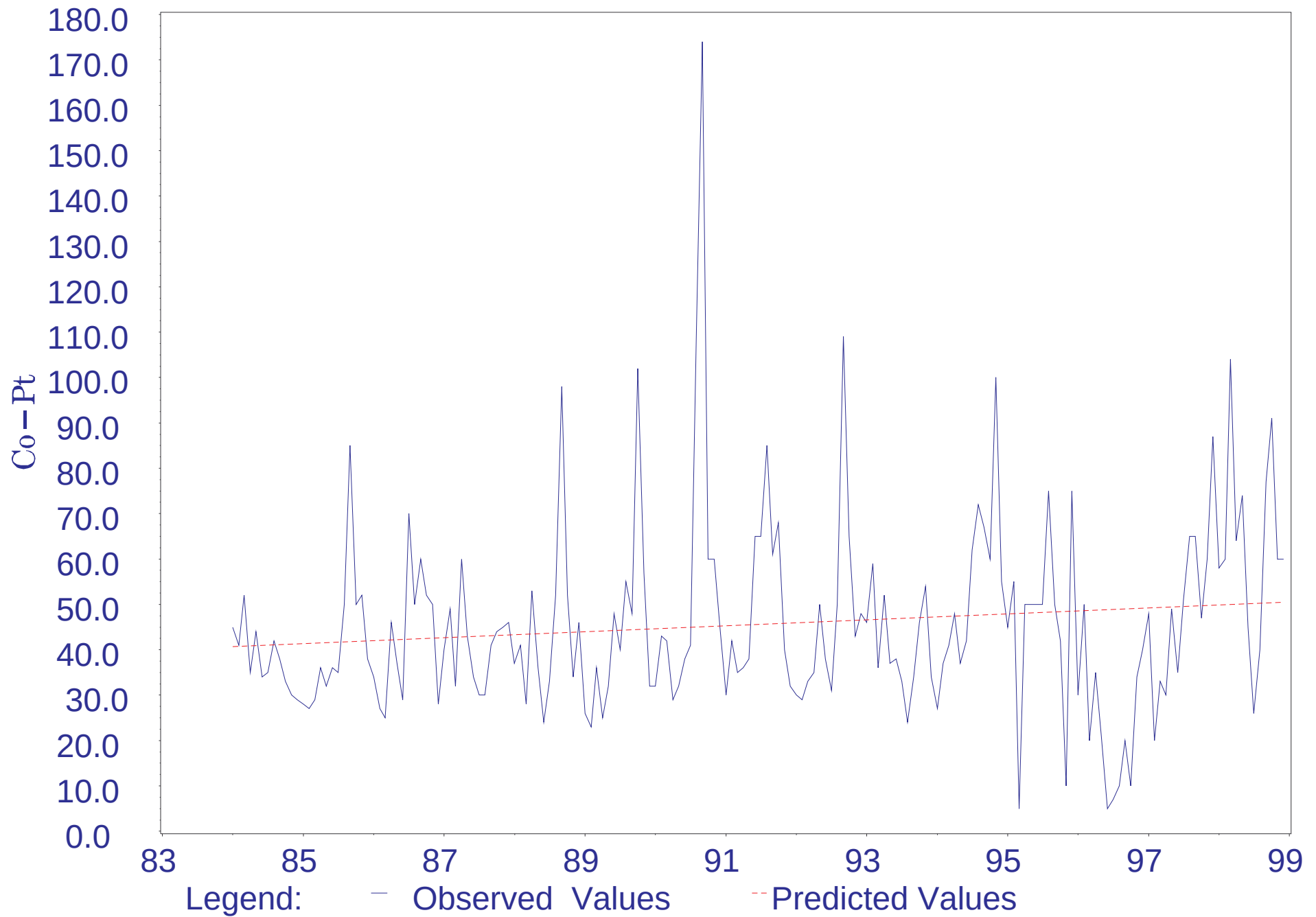
Water Color at 12 ppt Isohaline - 1984-1998
Correlogram with Upper and Lower 95% Confidence Limits

B-168



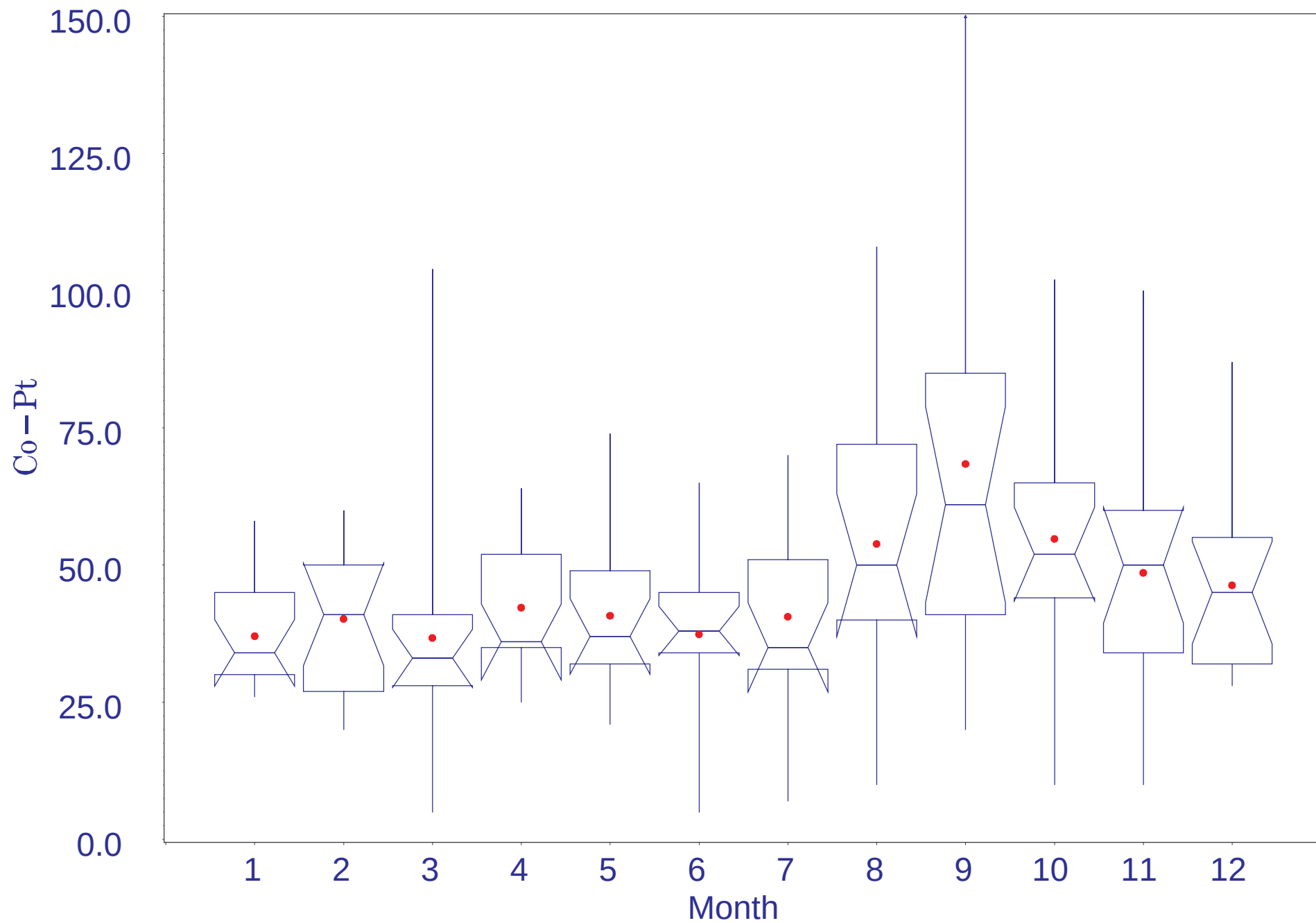
Water Color at 20 ppt Isohaline
1984-1998

B-169



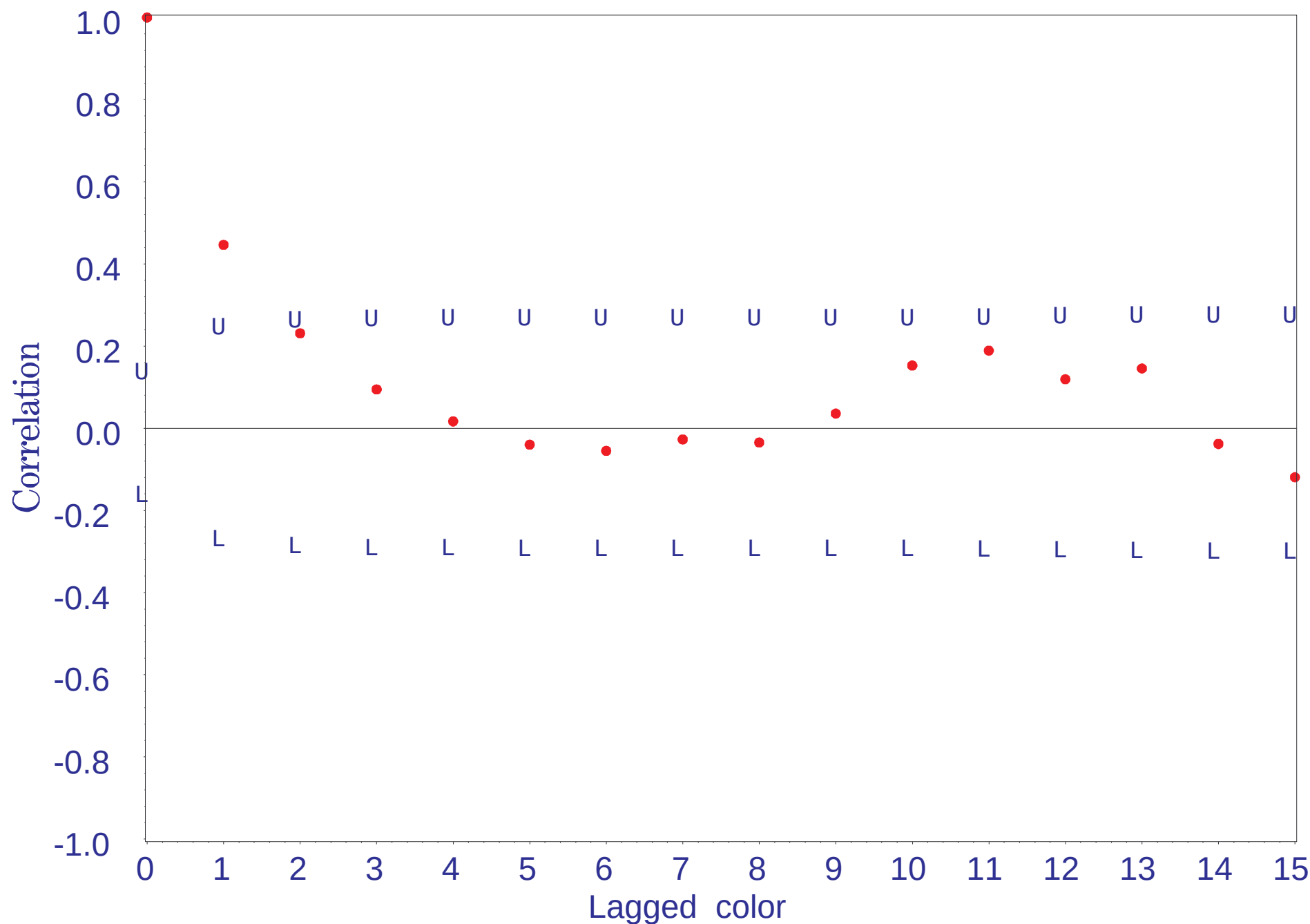
Water Color at 20 ppt Isohaline 1984-1998
Monthly Boxplots of Co- Pt

B-170



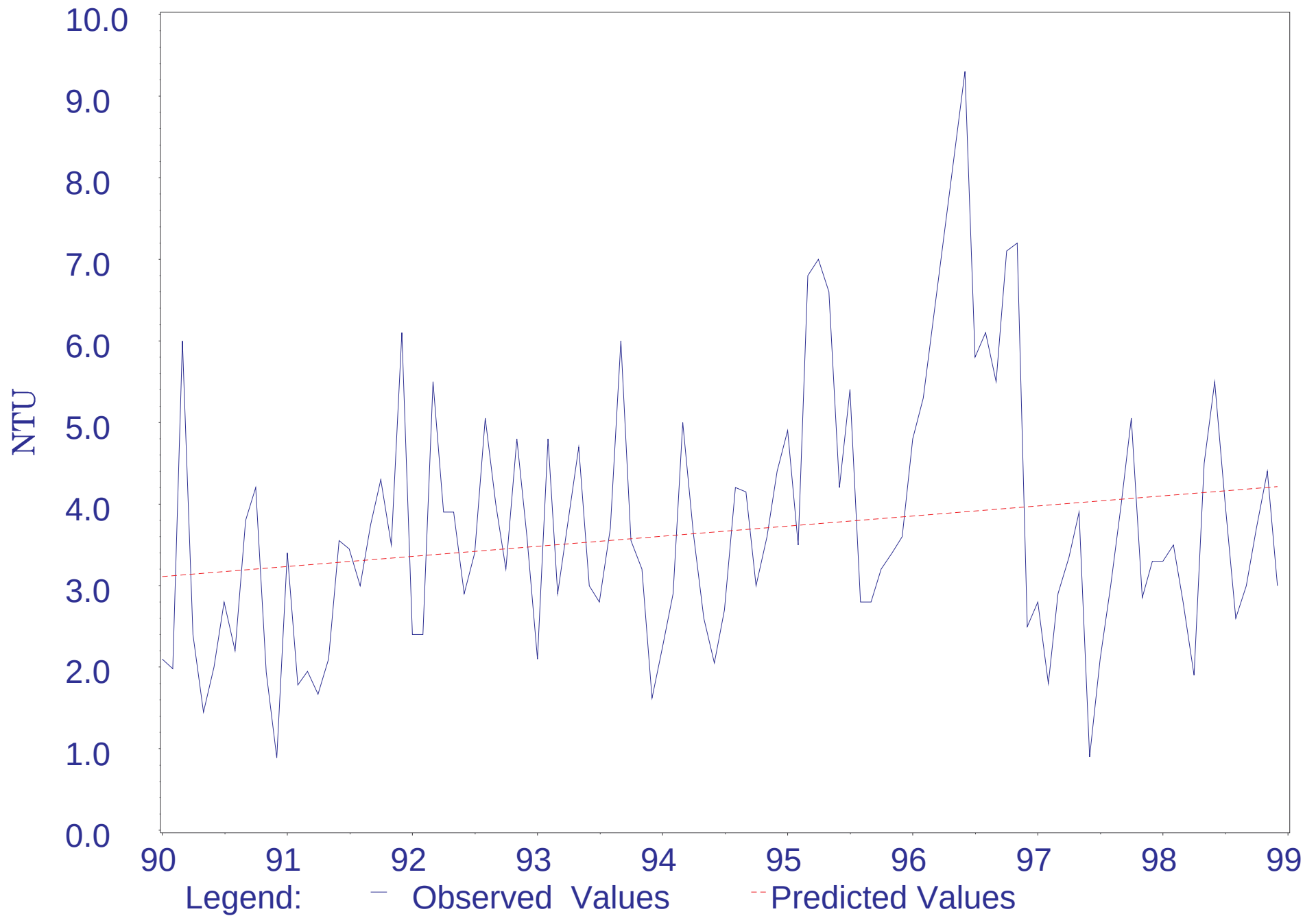
Water Color at 20 ppt Isohaline - 1984-1998
Correlogram with Upper and Lower 95% Confidence Limits

B-171



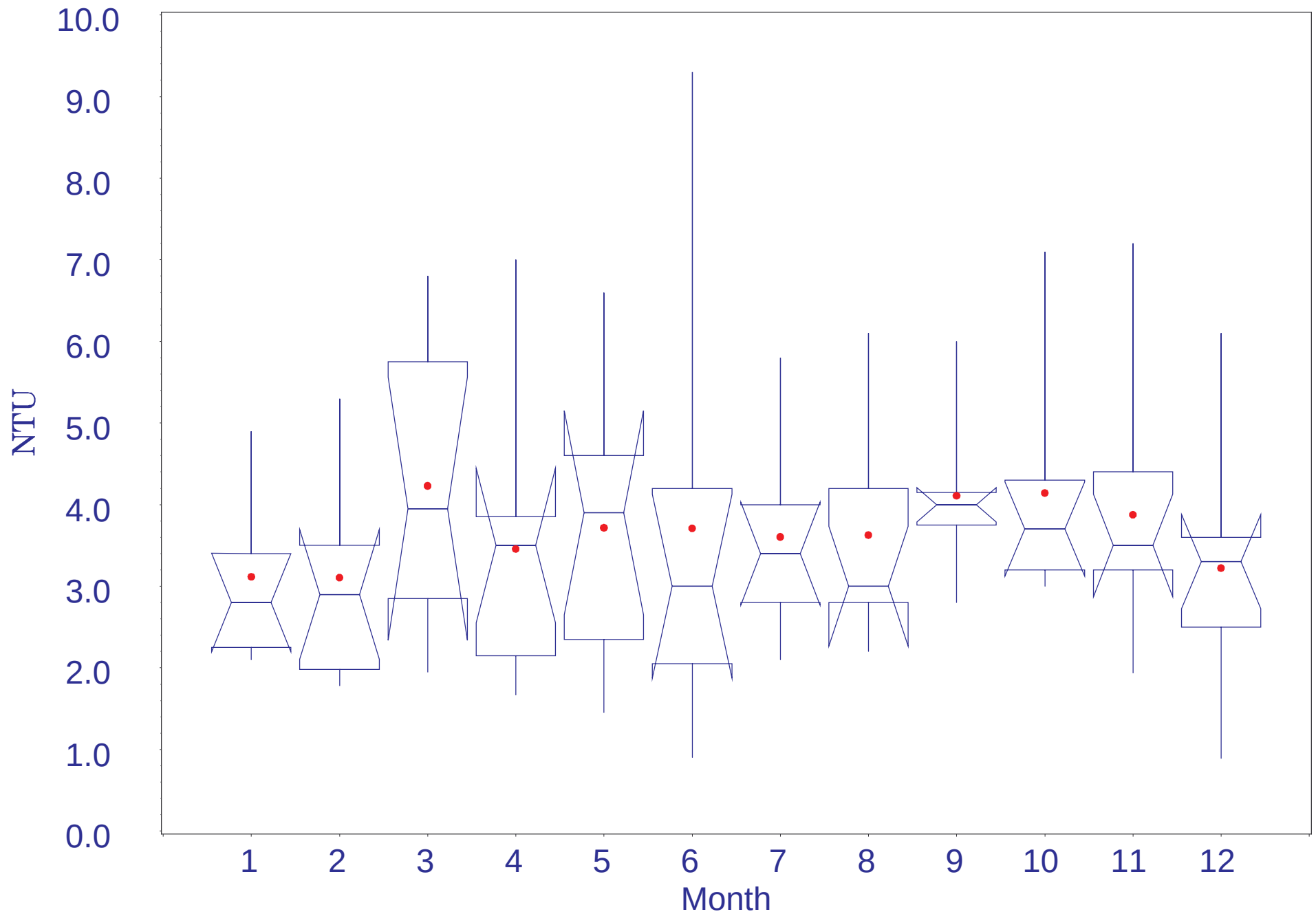
Turbidity at 0 ppt Isohaline
1990-1998

B-172



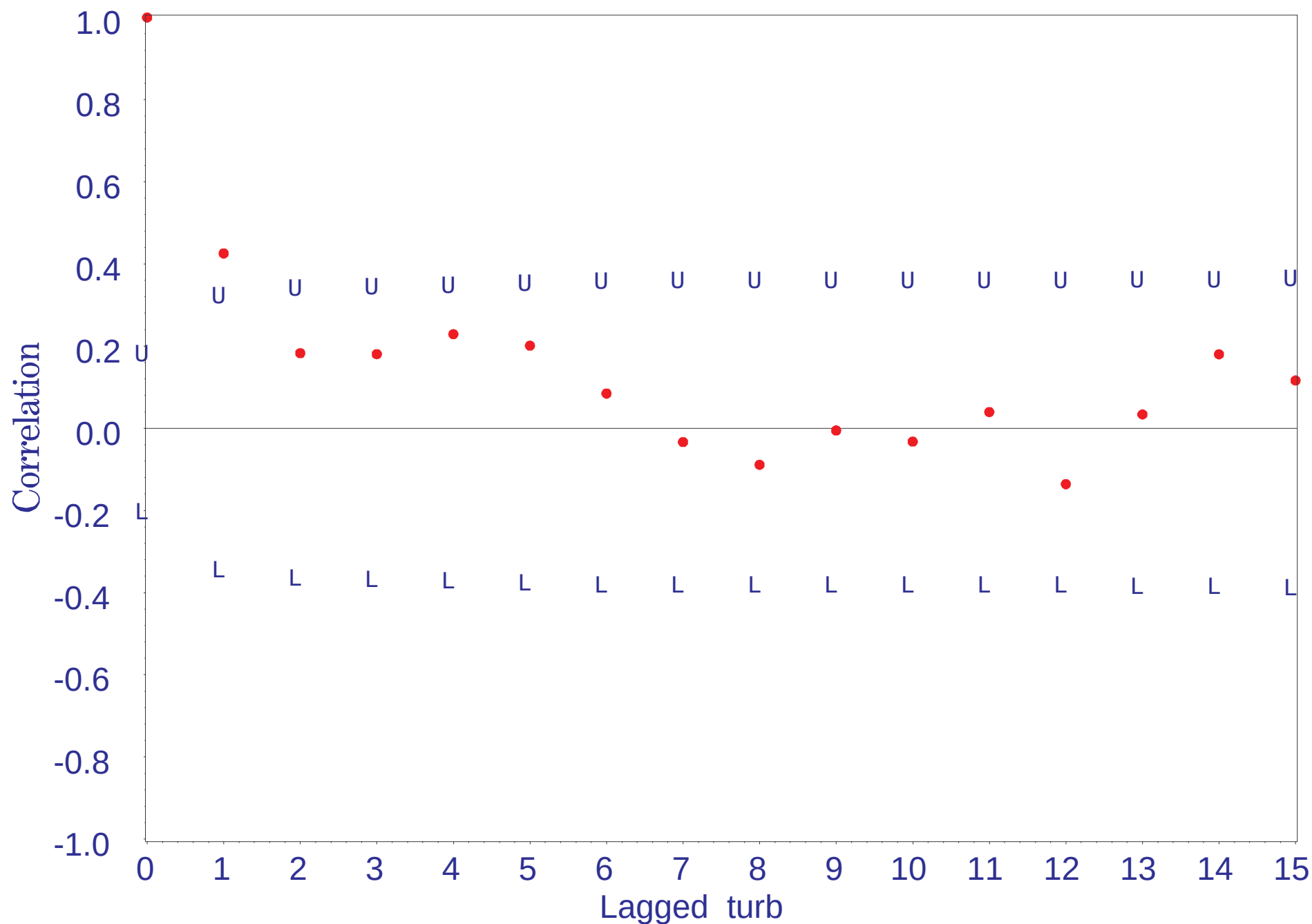
Turbidity at 0 ppt Isohaline 1990-1998
Monthly Boxplots of NTU

B-173



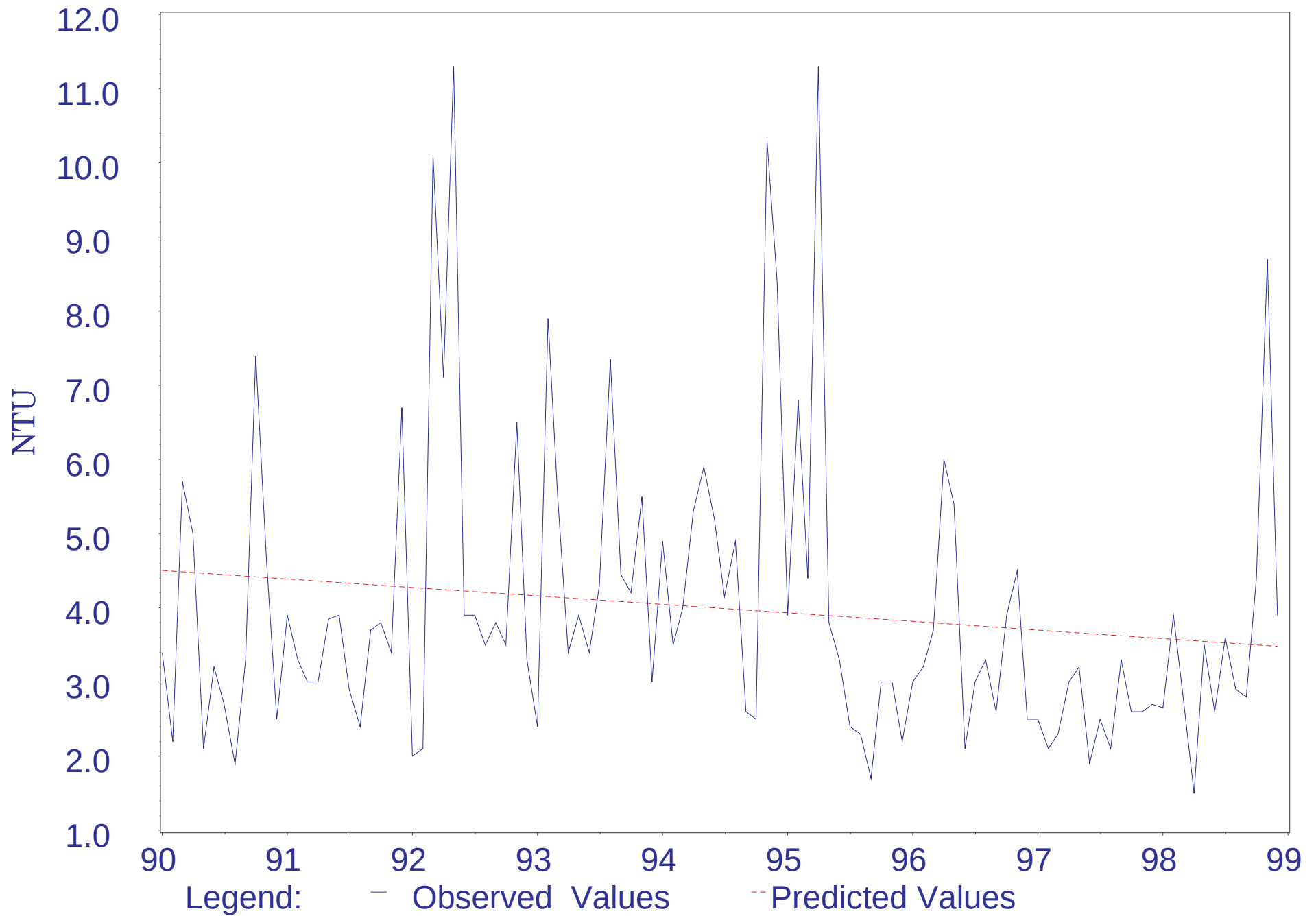
Turbidity at 0 ppt Isohaline - 1990-1998
Correlogram with Upper and Lower 95% Confidence Limits

B-174



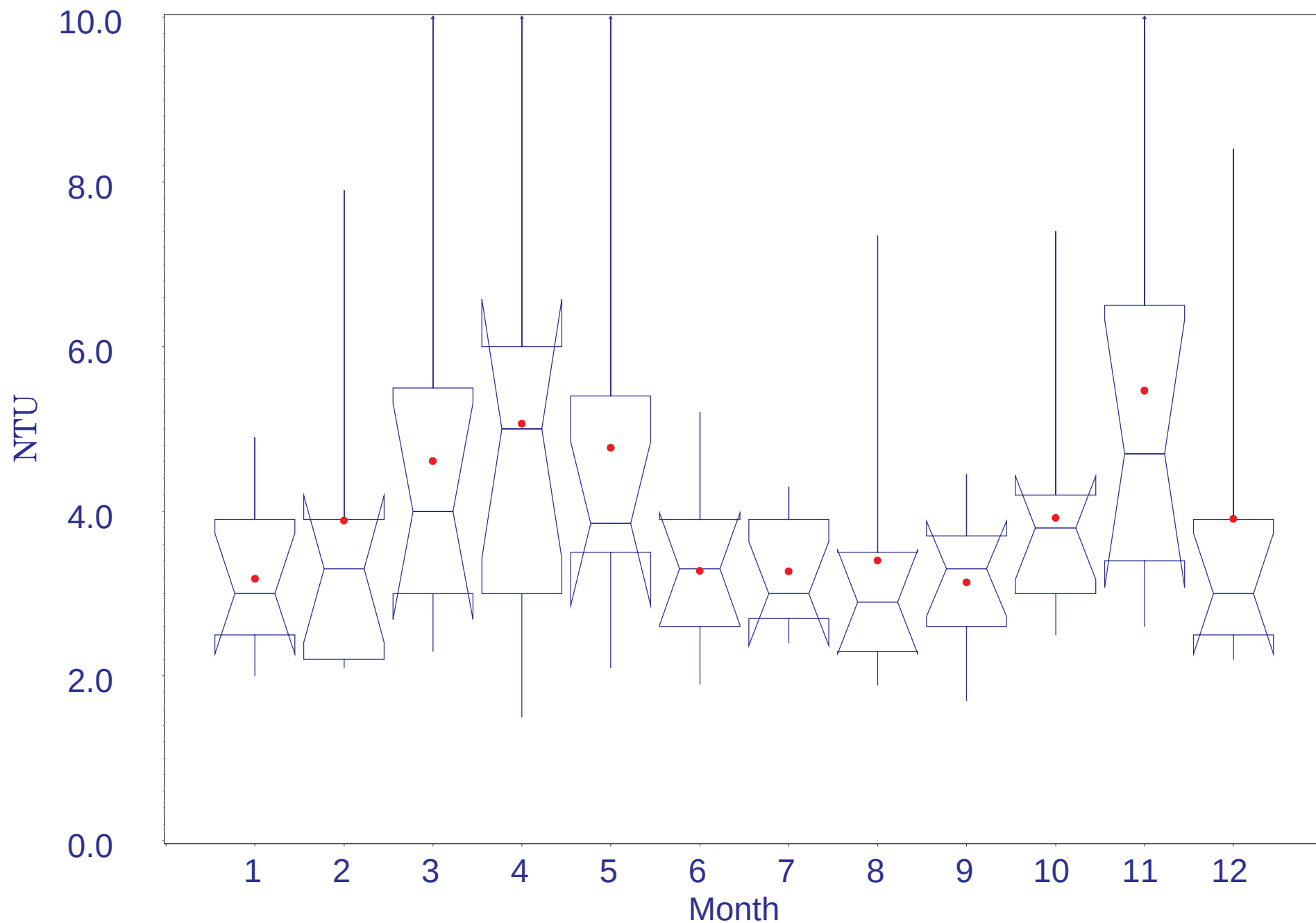
Turbidity at 6 ppt Isohaline
1990-1998

B-175



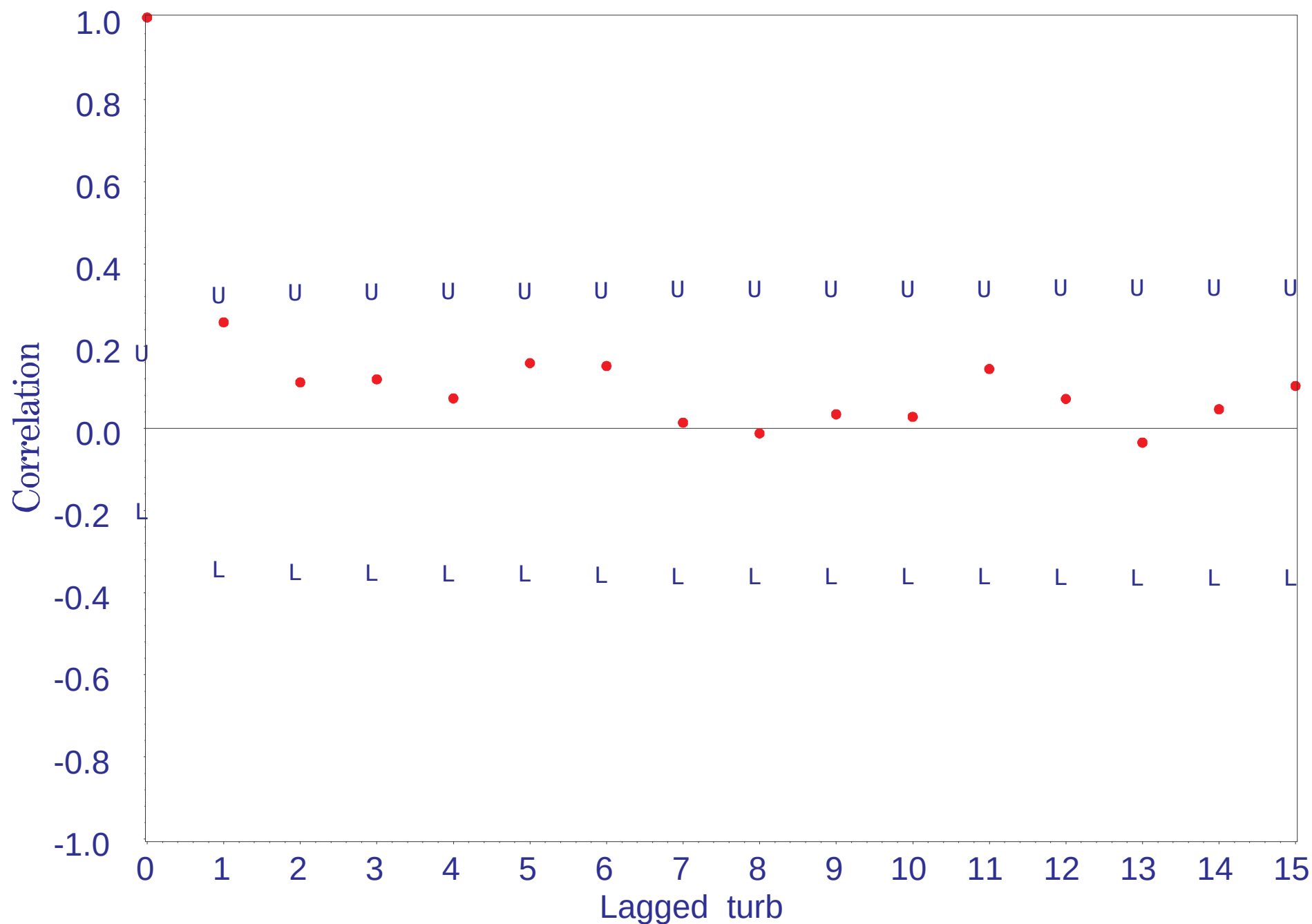
Turbidity at 6 ppt Isohaline 1990-1998
Monthly Boxplots of NTU

B-176



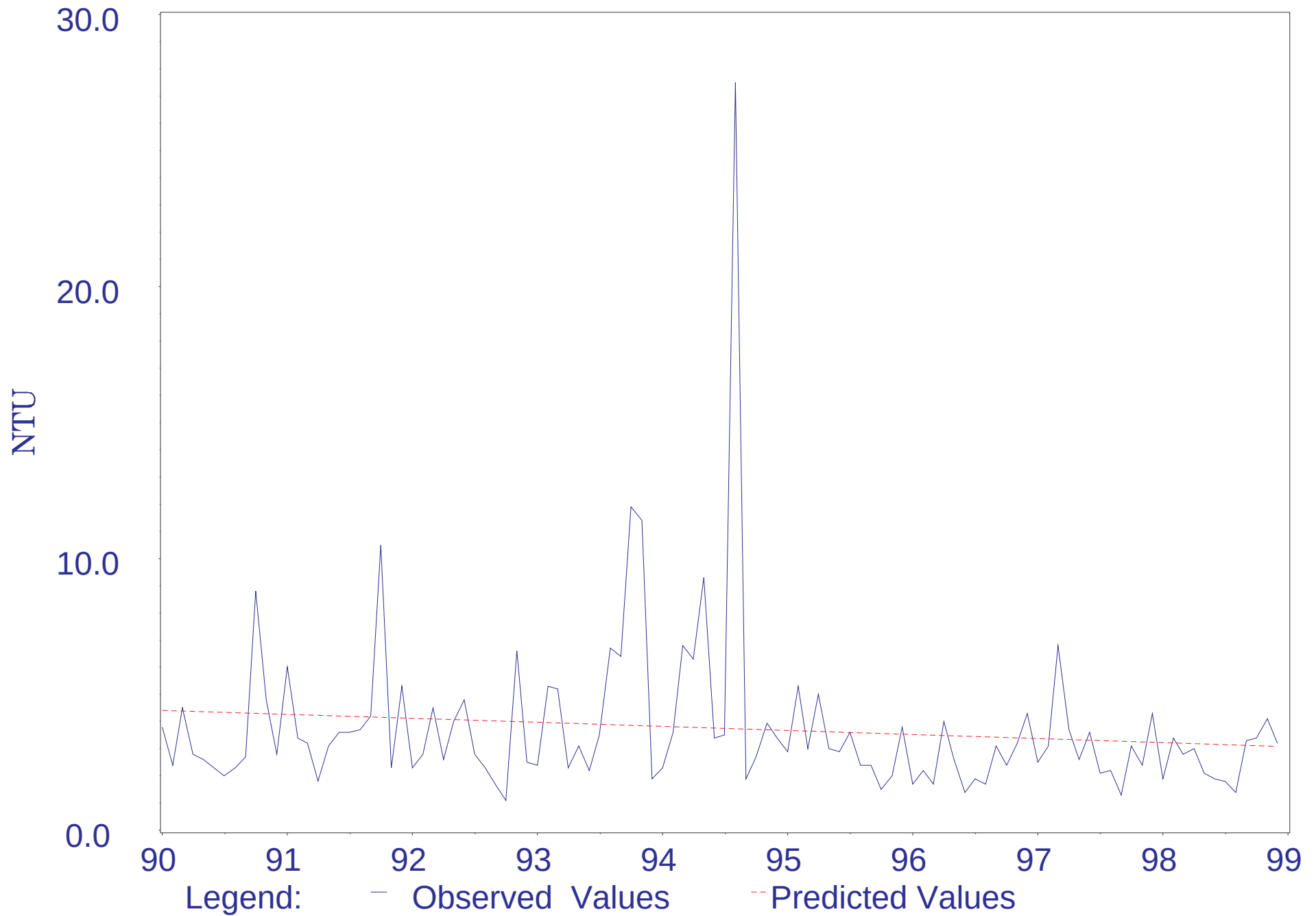
Turbidity at 6 ppt Isohaline - 1990-1998
Correlogram with Upper and Lower 95% Confidence Limits

B-177



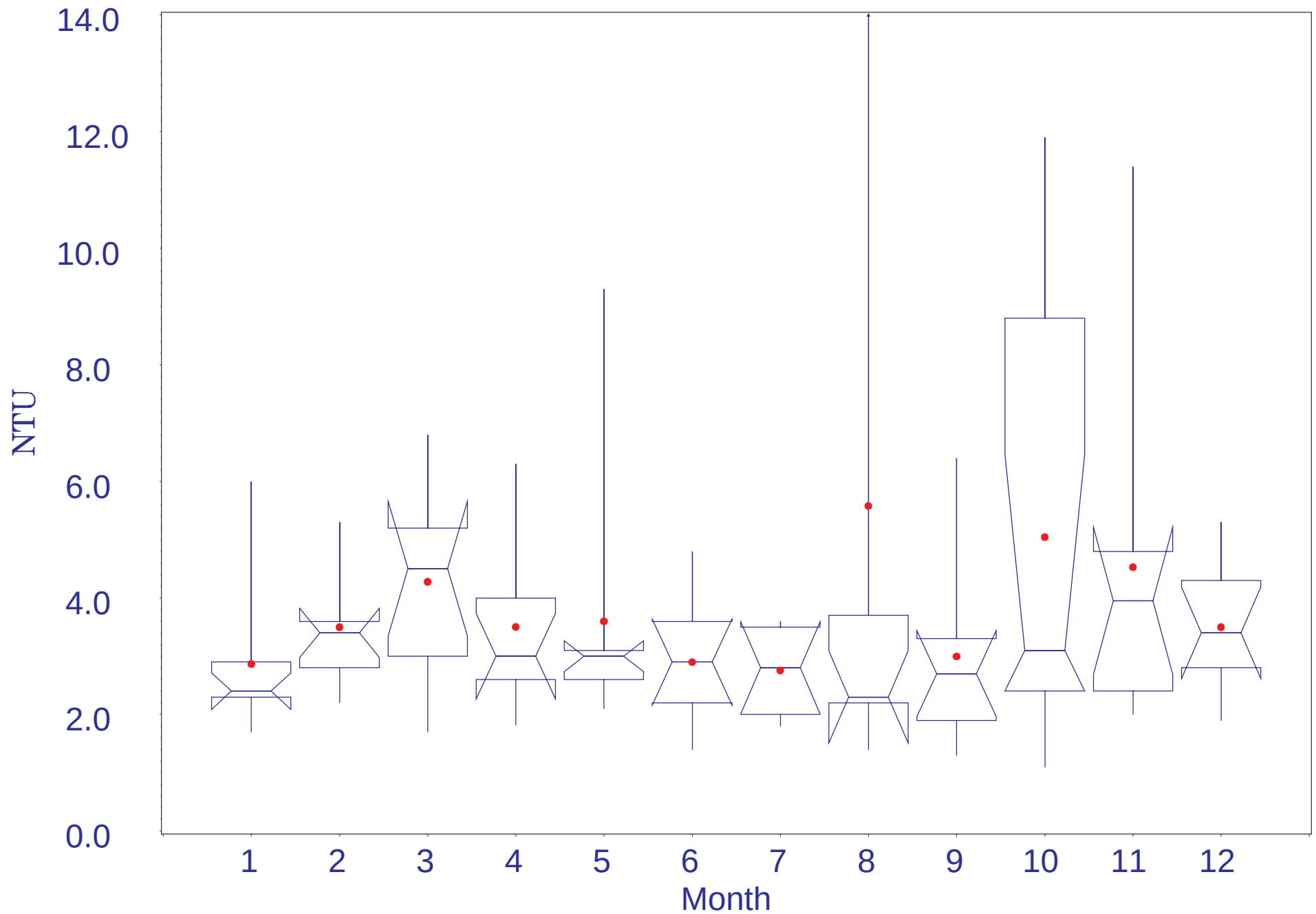
Turbidity at 12 ppt Isohaline
1990-1998

B-178



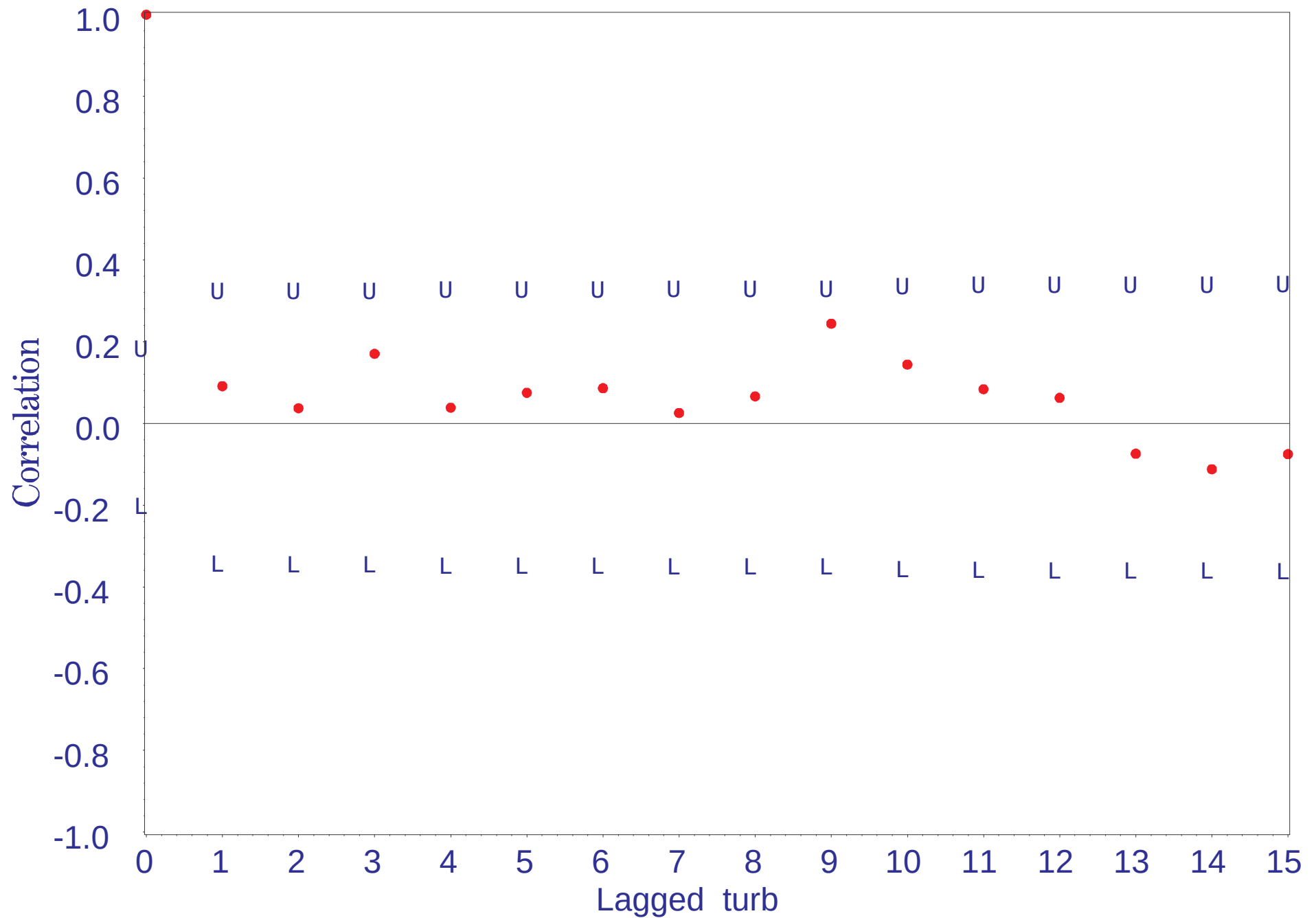
Turbidity at 12 ppt Isohaline 1990-1998
Monthly Boxplots of NTU

B-179



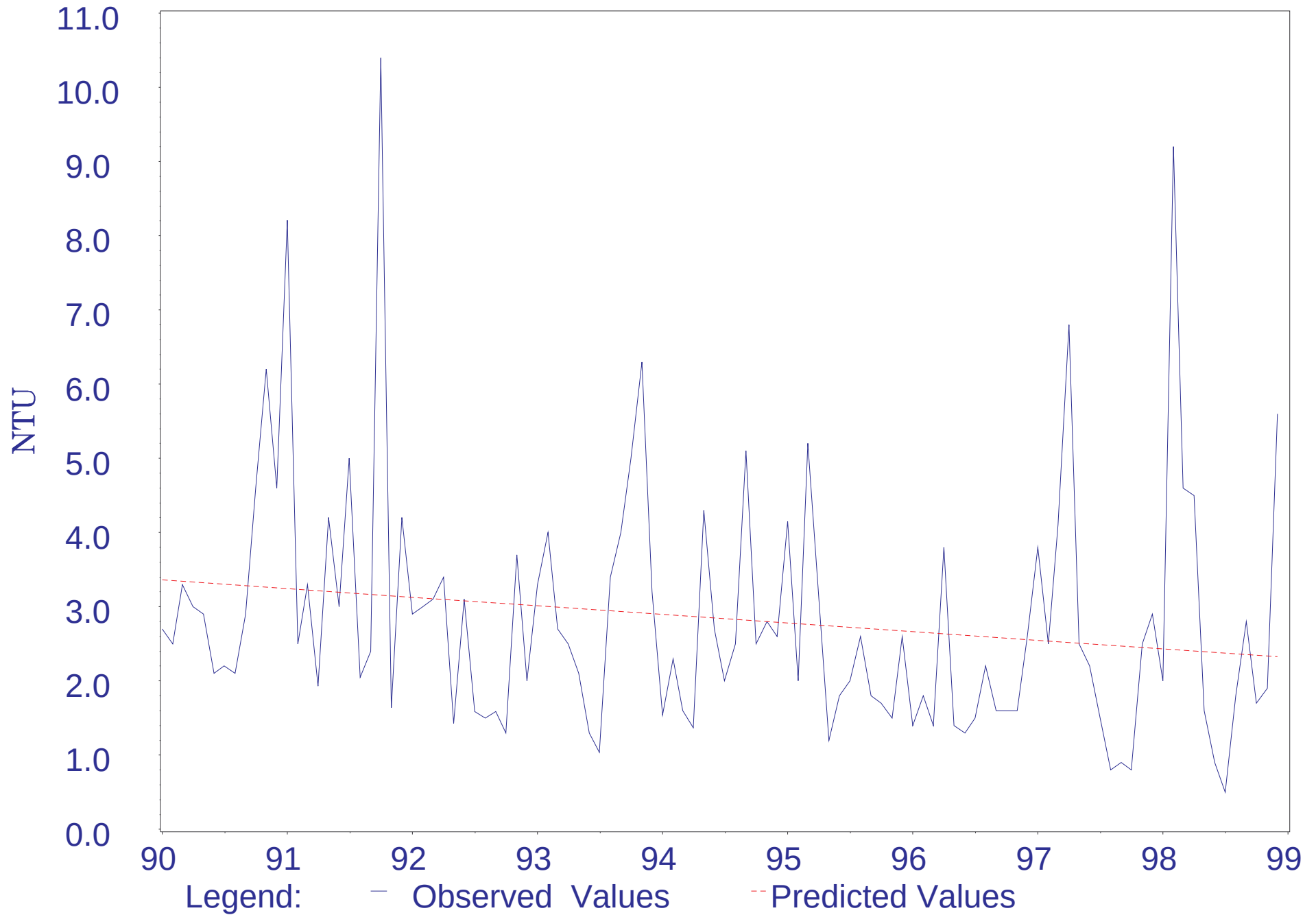
Turbidity at 12 ppt Isohaline - 1990-1998
Correlogram with Upper and Lower 95% Confidence Limits

B-180



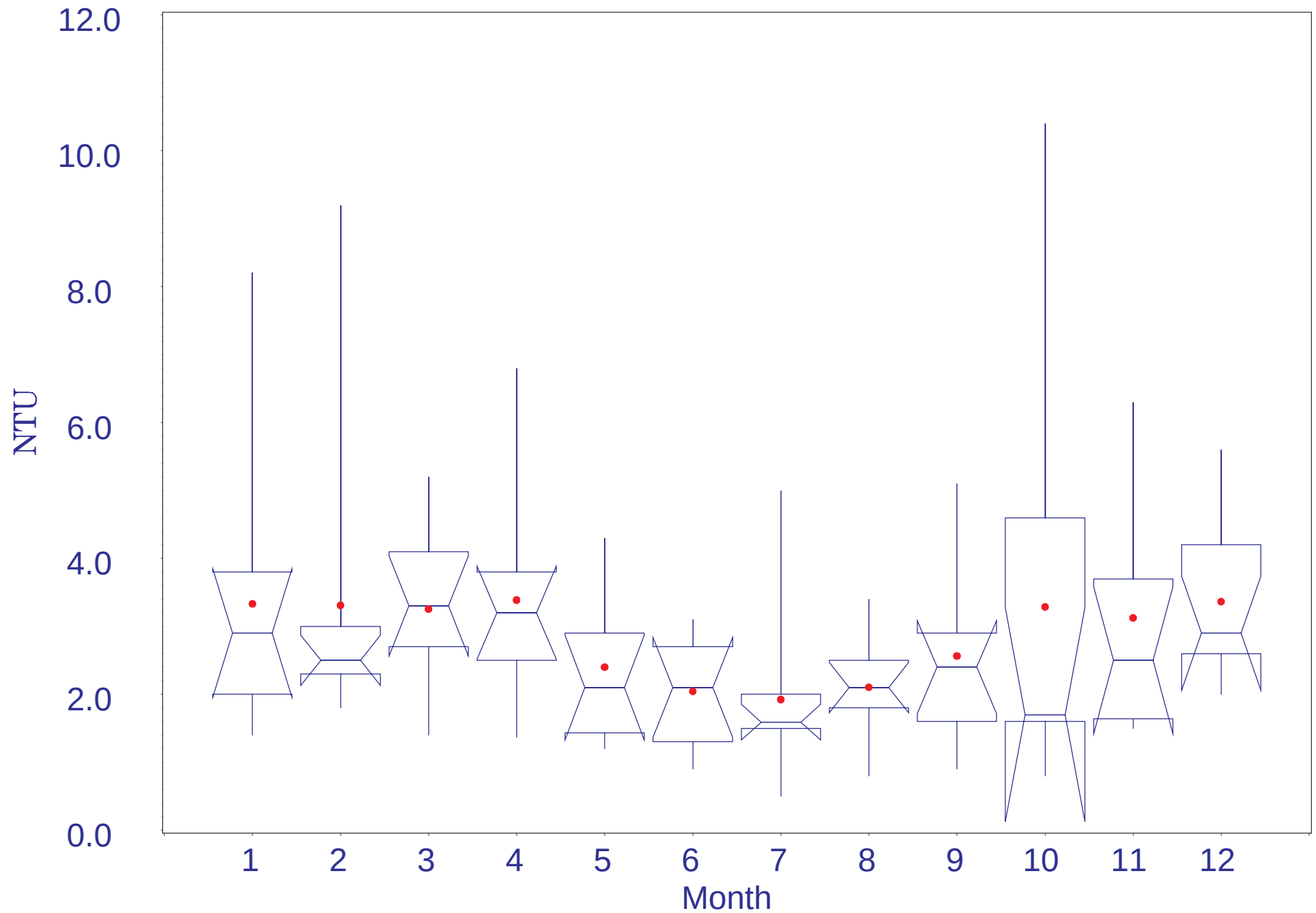
Turbidity at 20 ppt Isohaline 1990-1998

B-181



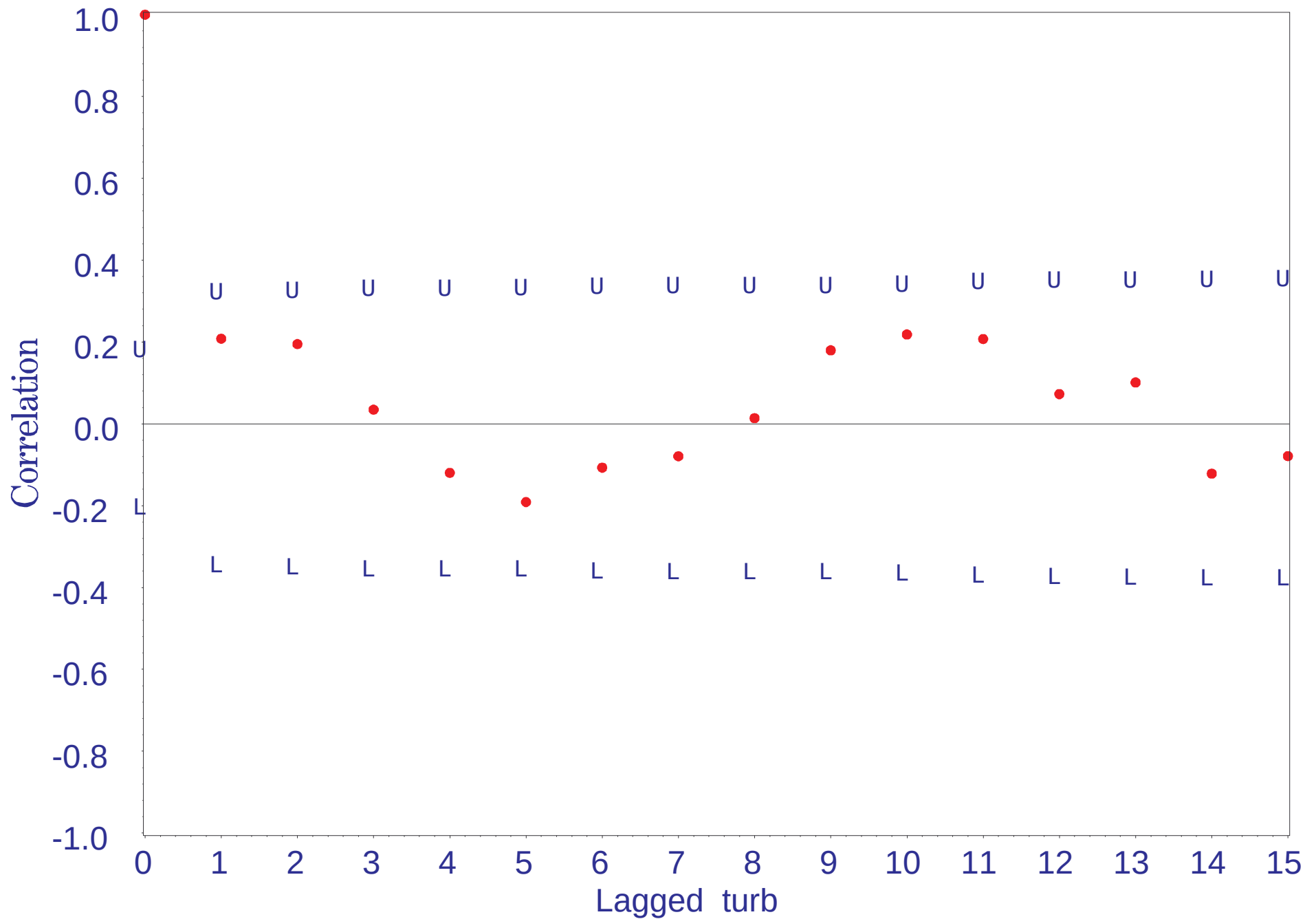
Turbidity at 20 ppt Isohaline 1990-1998
Monthly Boxplots of NTU

B-182



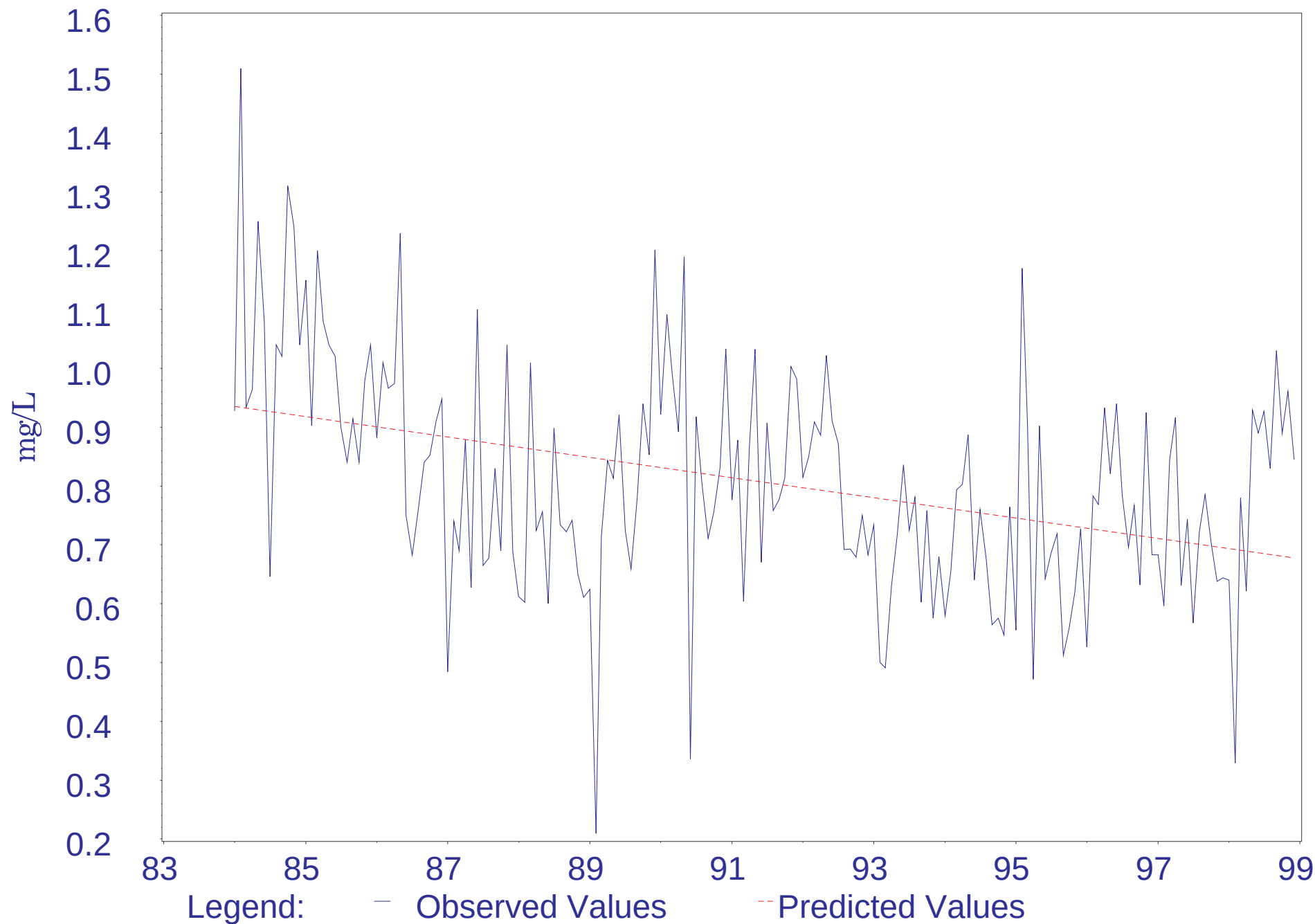
Turbidity at 20 ppt Isohaline - 1990-1998
Correlogram with Upper and Lower 95% Confidence Limits

B-183



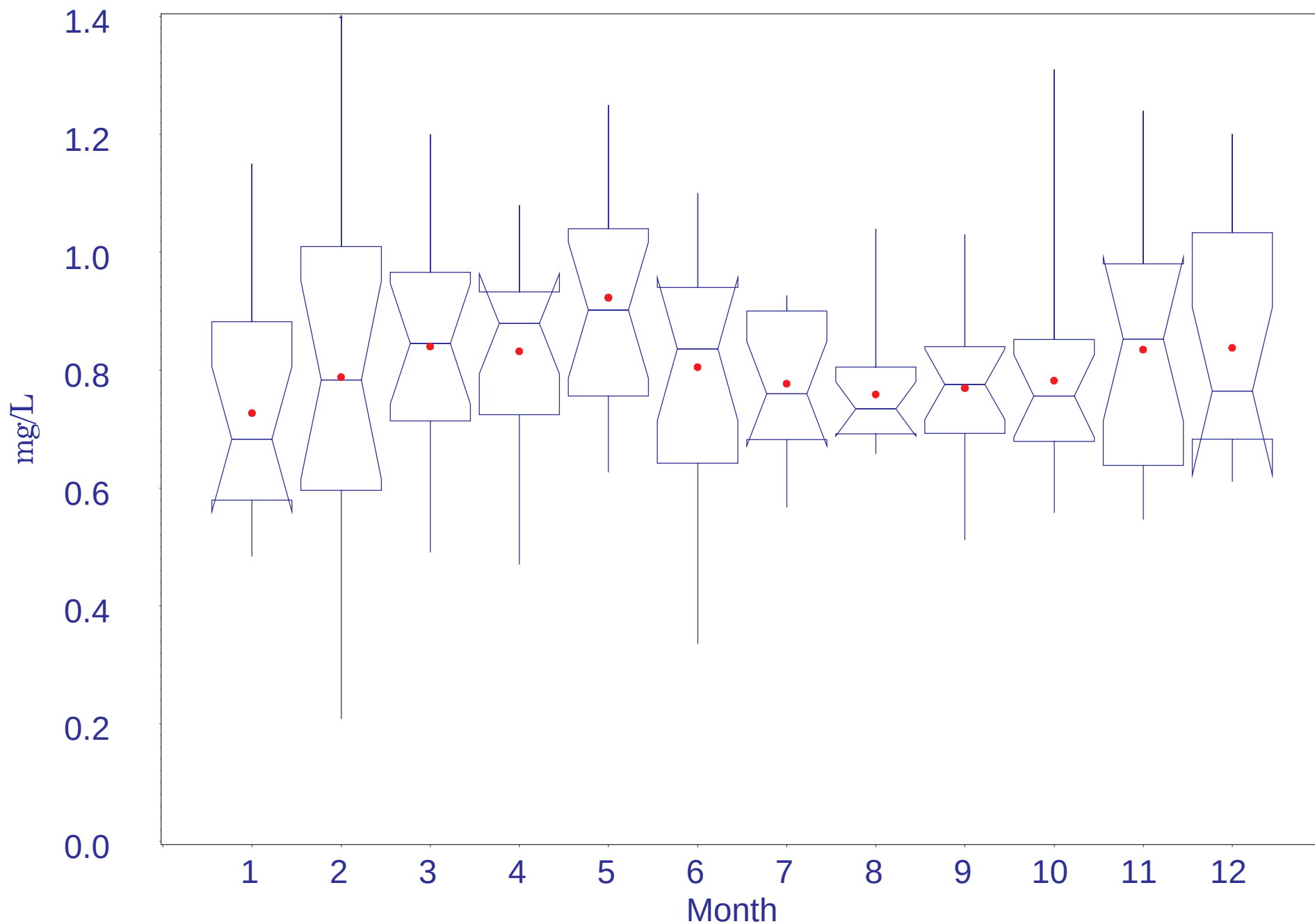
0 ppt Isohaline - Total Phosphorus
1984-1998

B-184



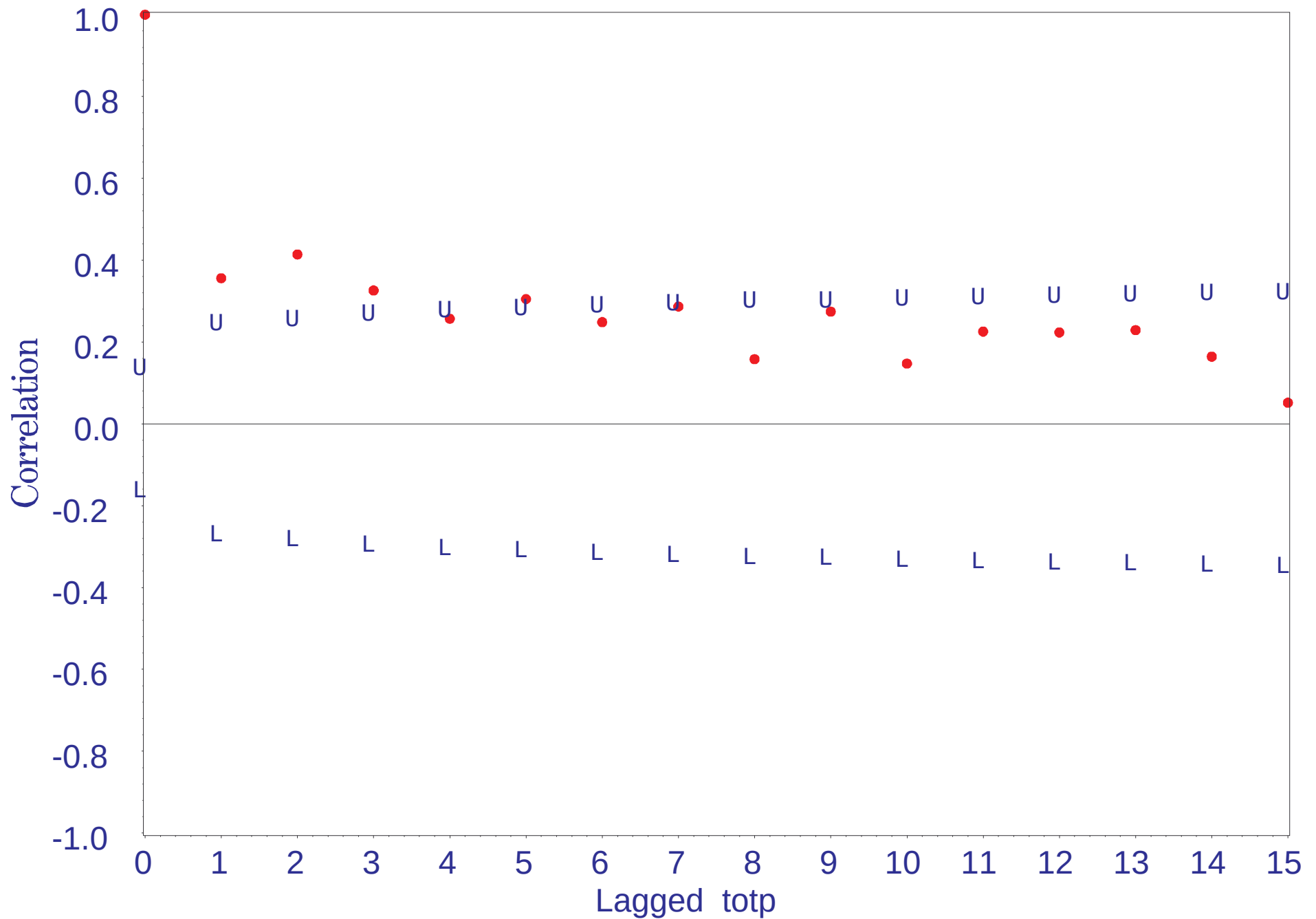
0 ppt Isohaline 1984-1998
Monthly Boxplots of Total Phosphorus (mg/L)

B-185



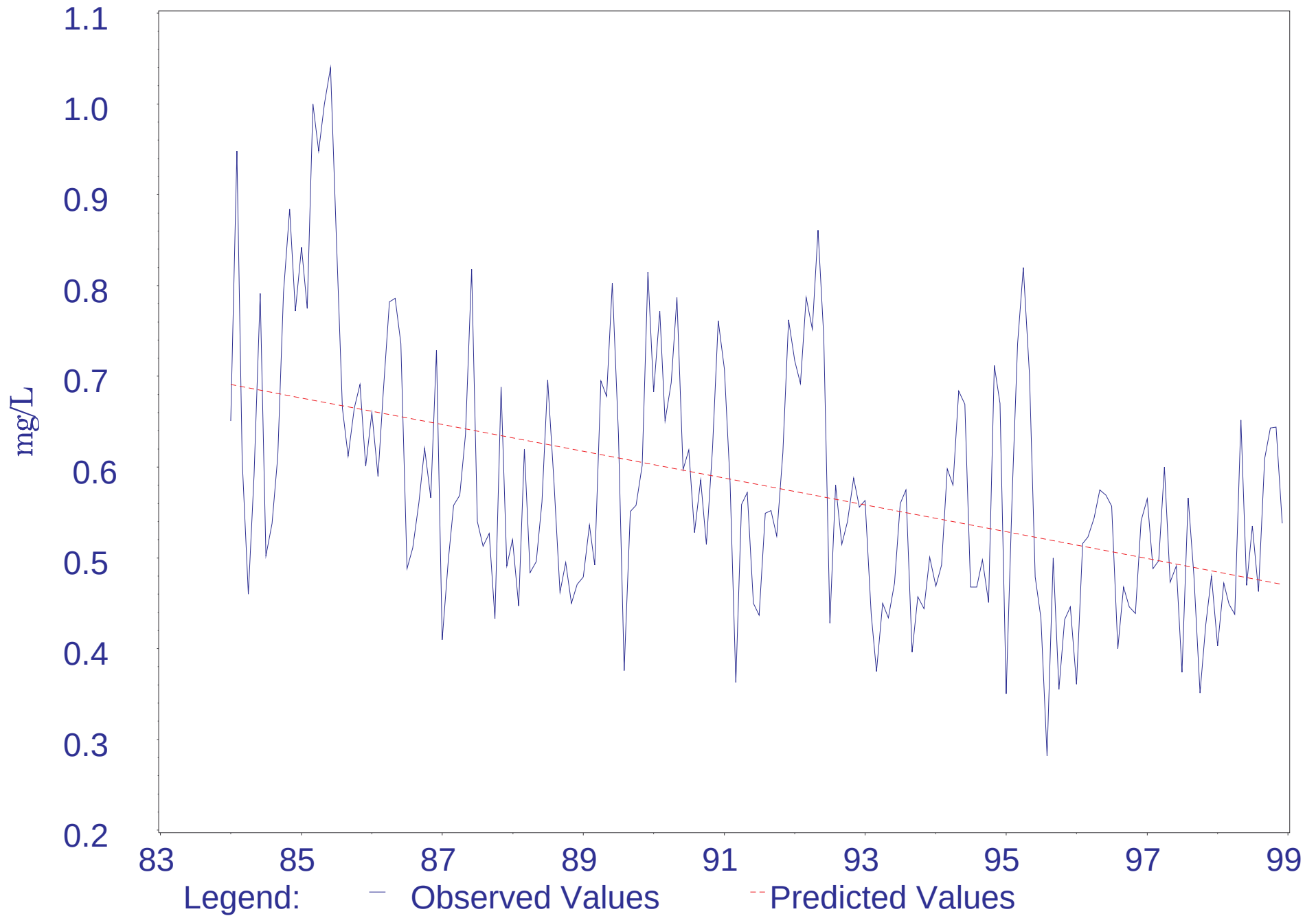
0 ppt Isohaline - Total Phosphorus (1984-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-186



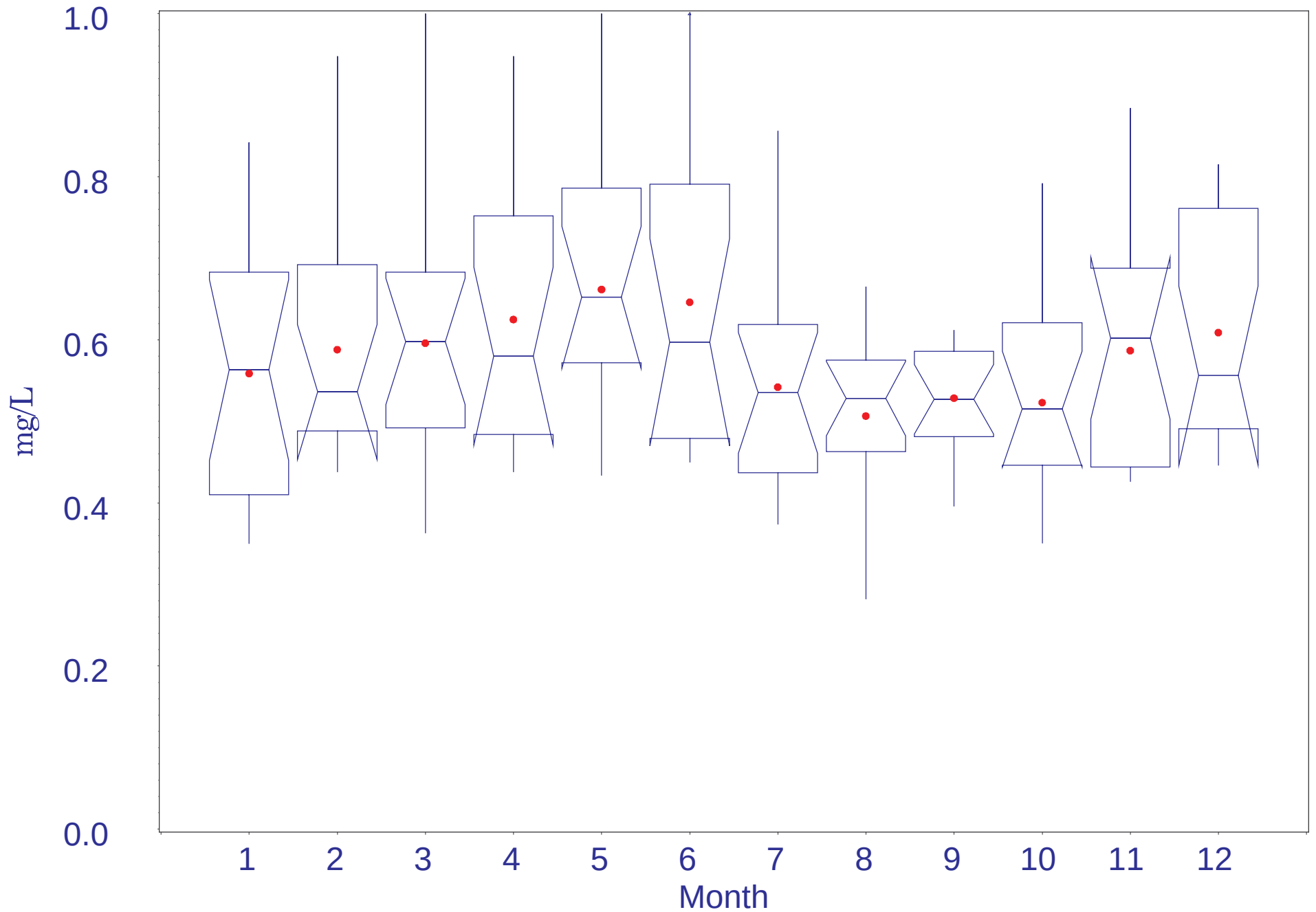
6 ppt Isohaline - Total Phosphorus
1984-1998

B-187



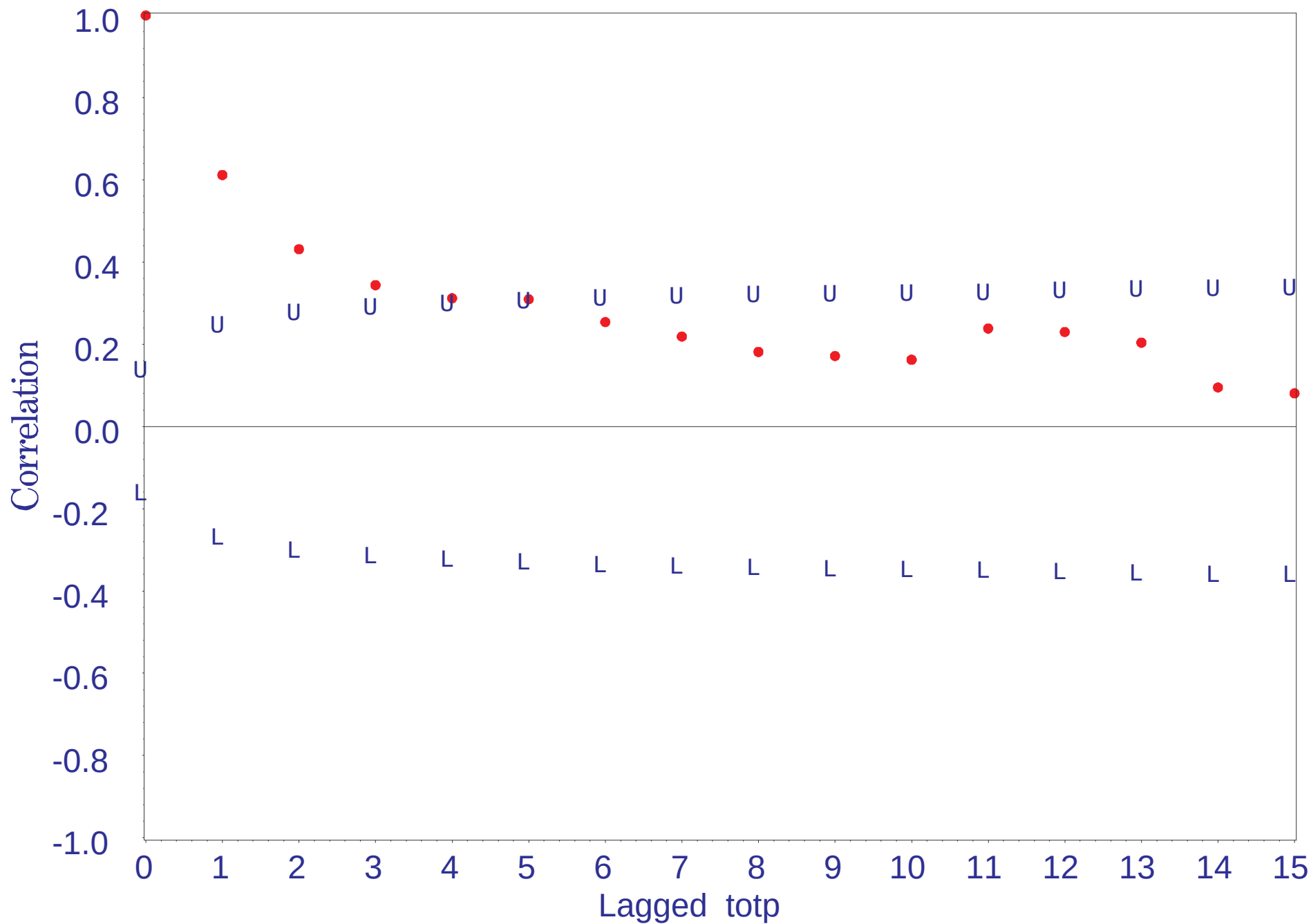
6 ppt Isohaline 1984-1998
Monthly Boxplots of Total Phosphorus (mg/L)

B-188



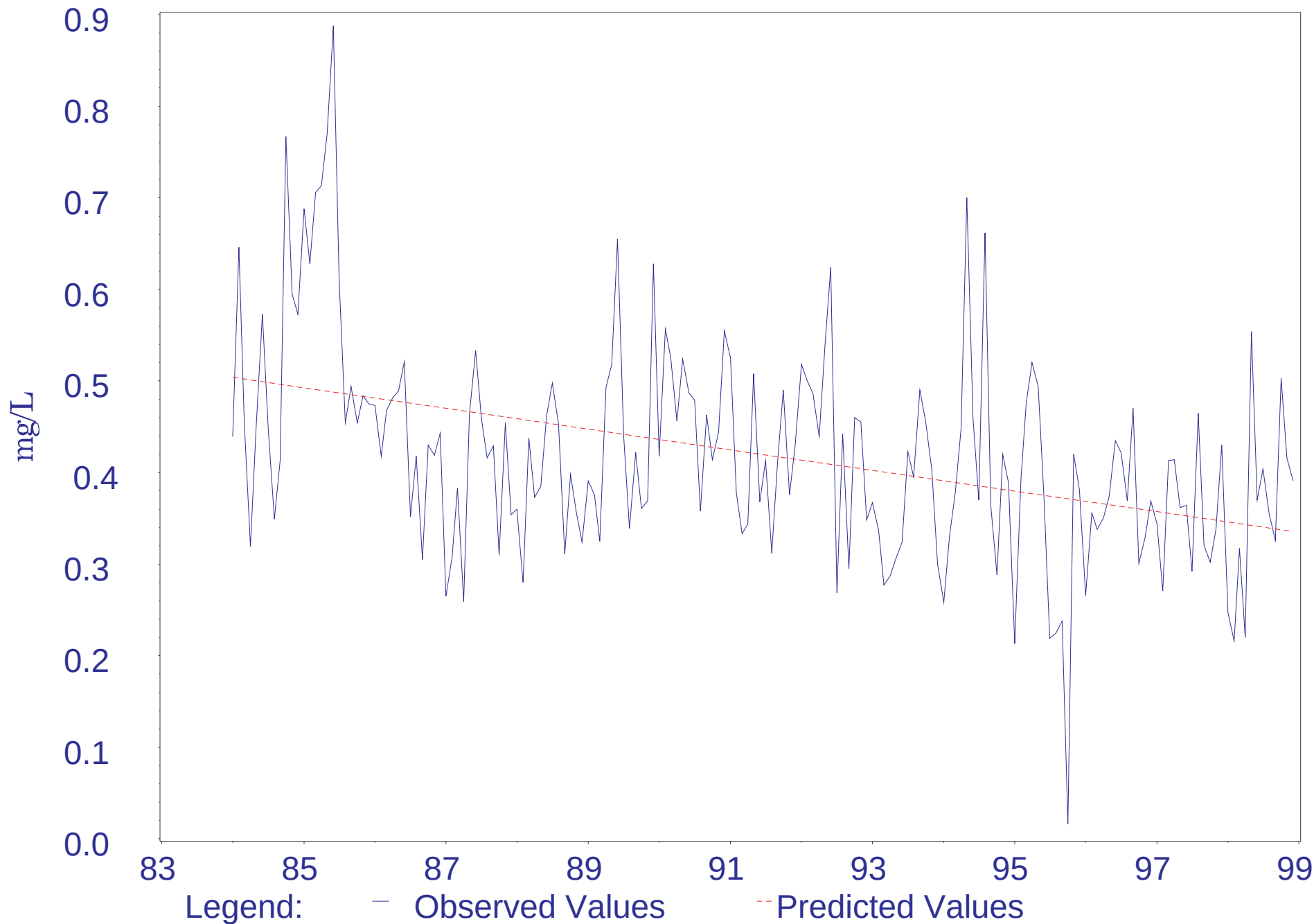
6 ppt Isohaline - Total Phosphorus (1984-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-189



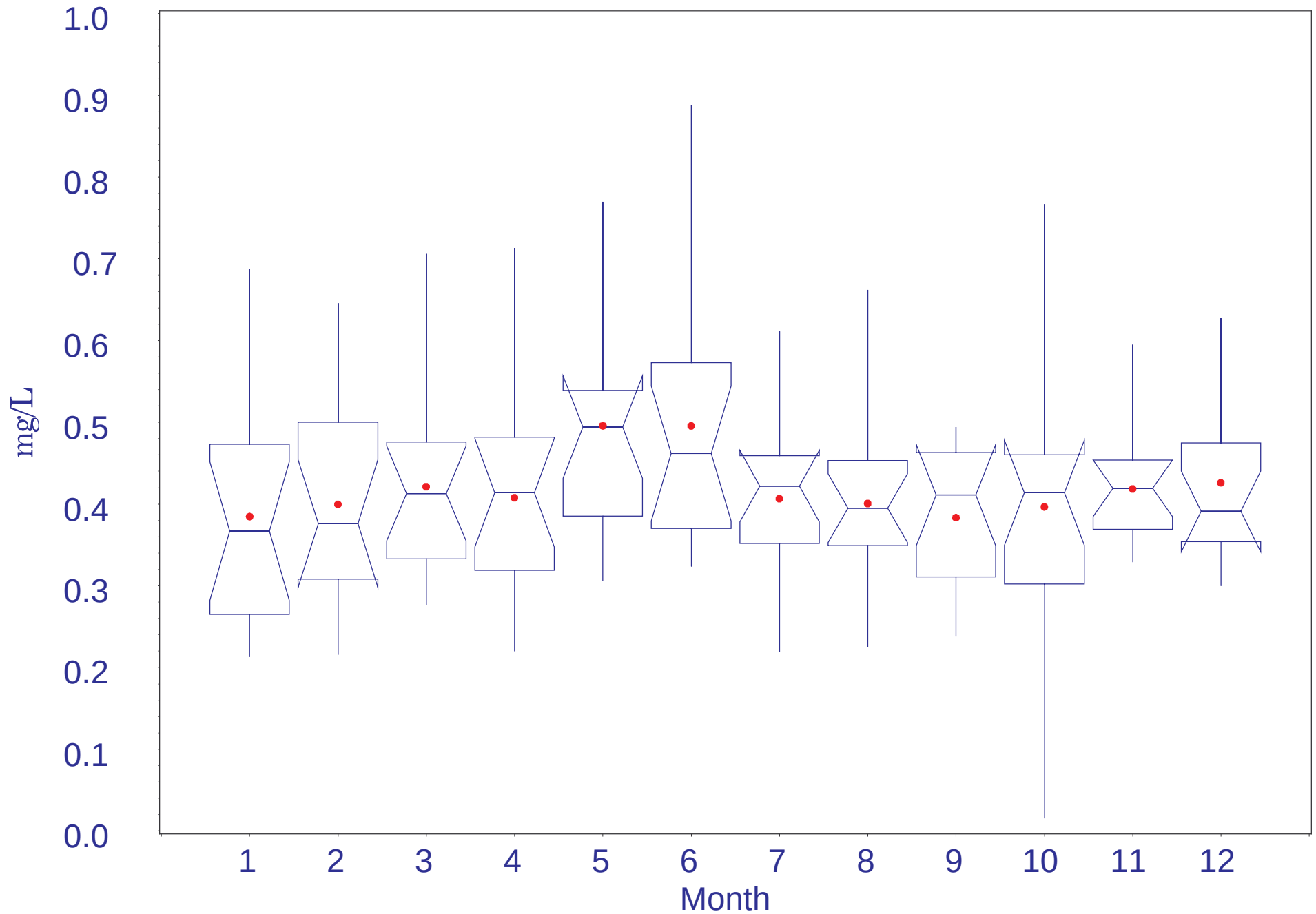
12 ppt Isohaline - Total Phosphorus
1984-1998

B-190



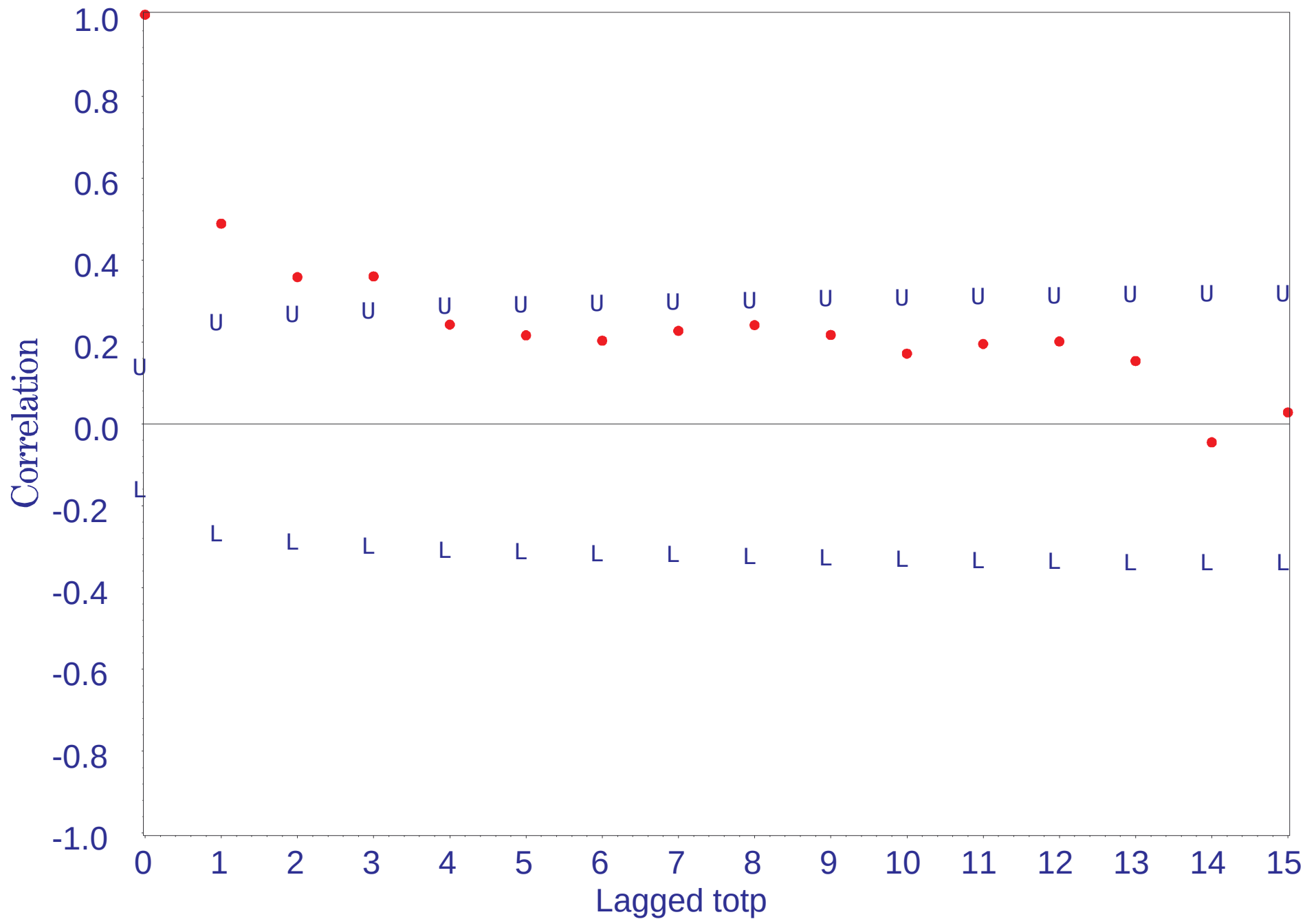
20 ppt Isohaline 1984-1998
Monthly Boxplots of Total Phosphorus (mg/L)

B-191



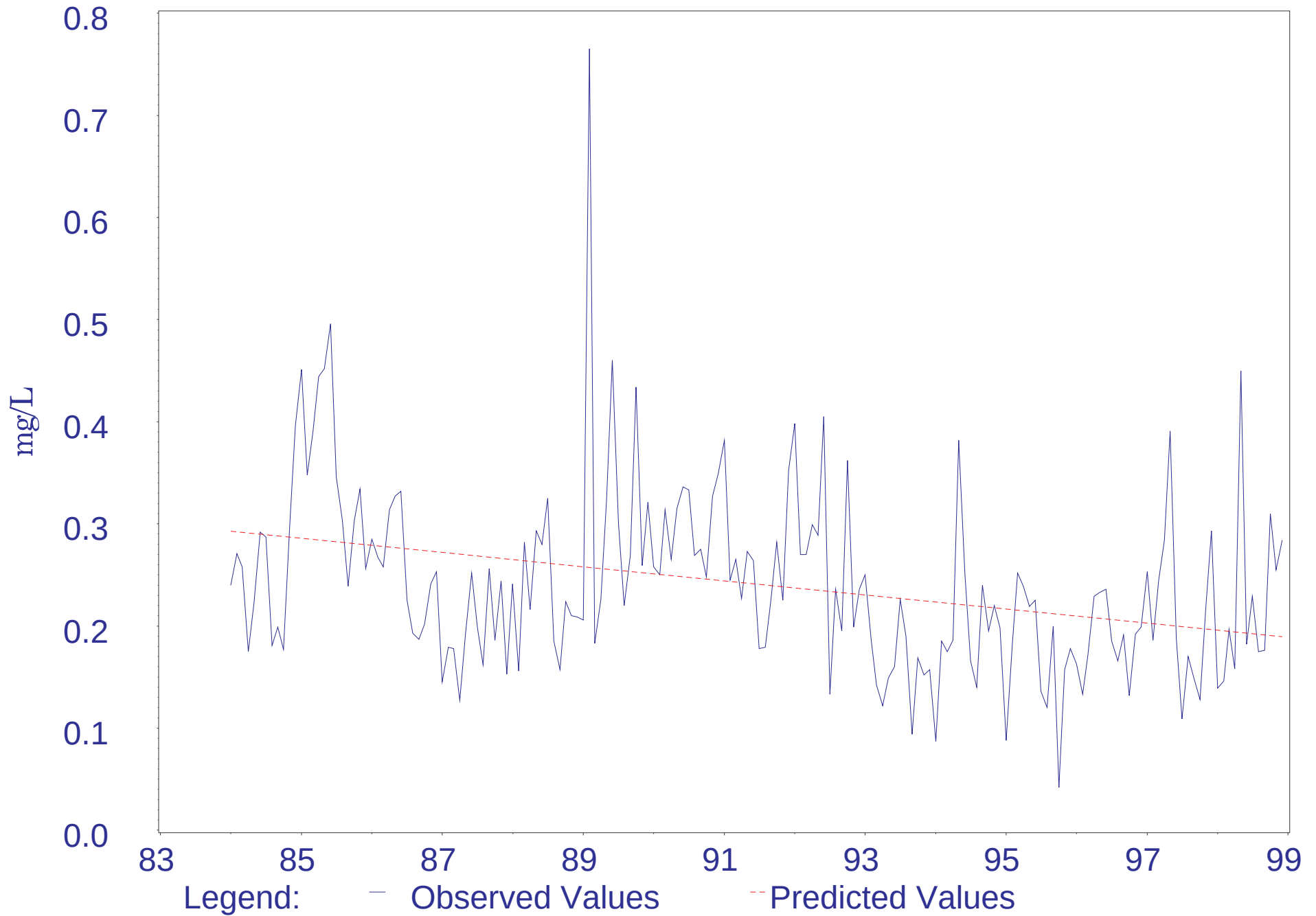
12 ppt Isohaline - Total Phosphorus (1984-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-192



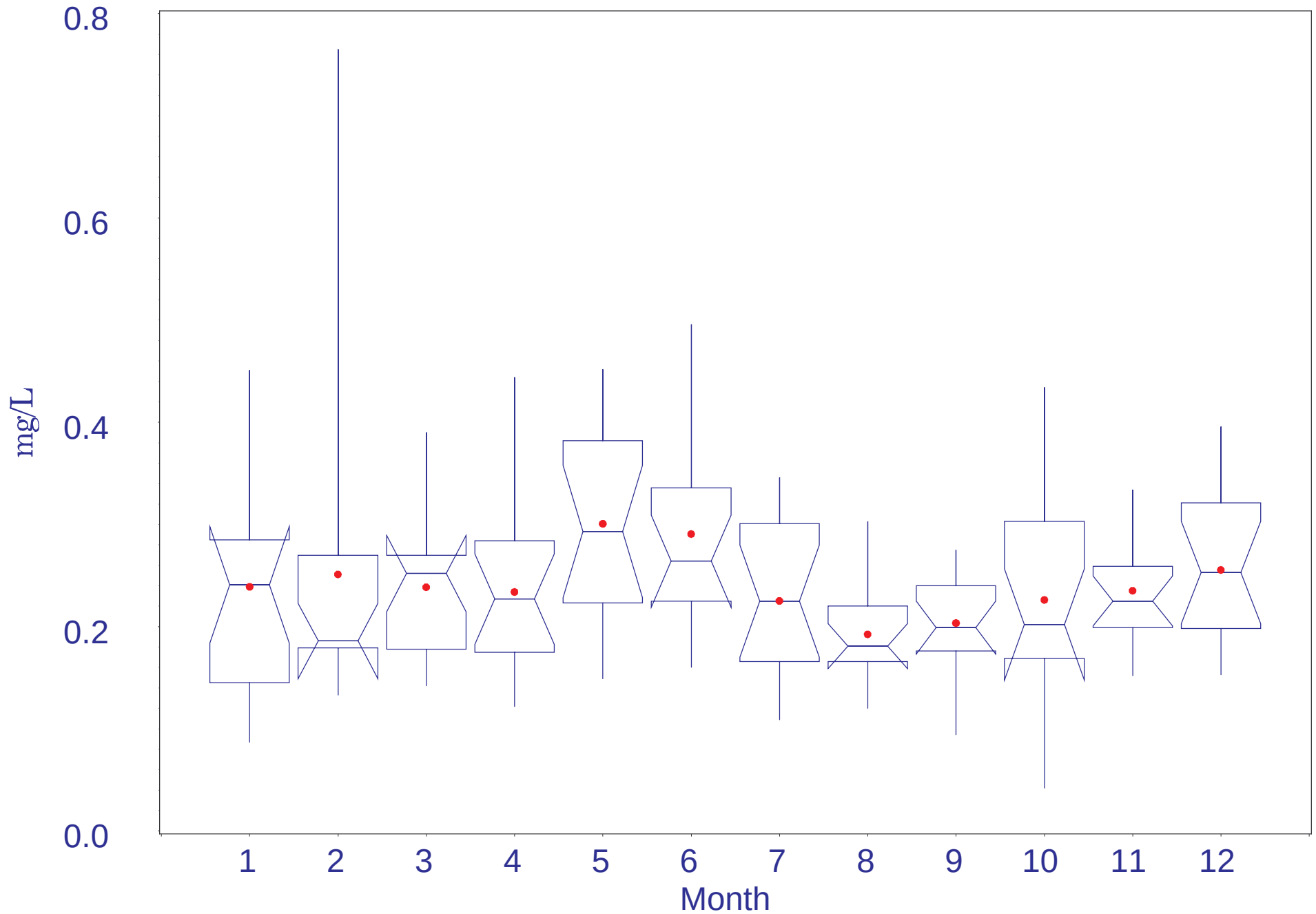
20 ppt Isohaline - Total Phosphorus
1984-1998

B-193



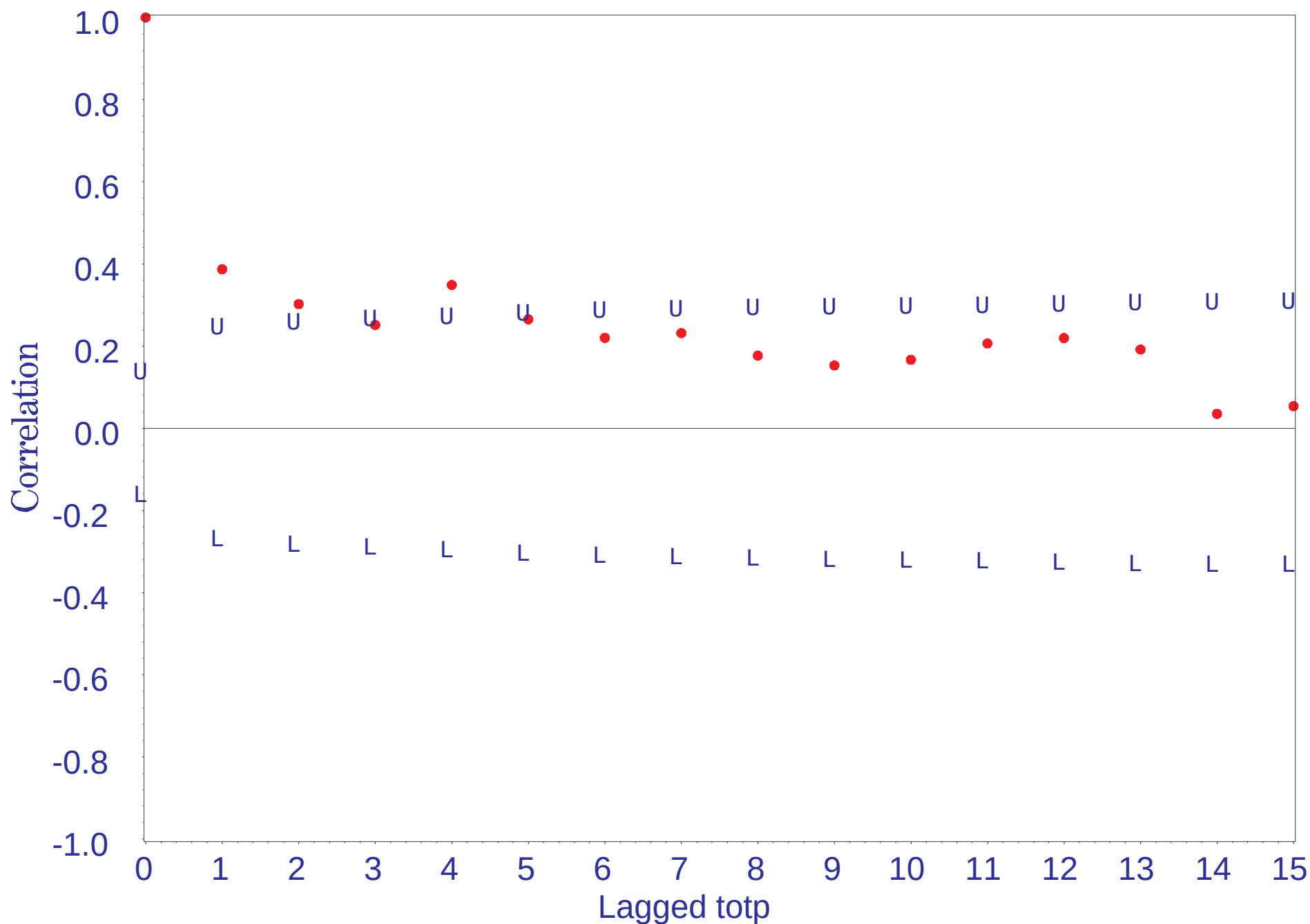
20 ppt Isohaline 1984-1998
Monthly Boxplots of Total Phosphorus (mg/L)

B-194



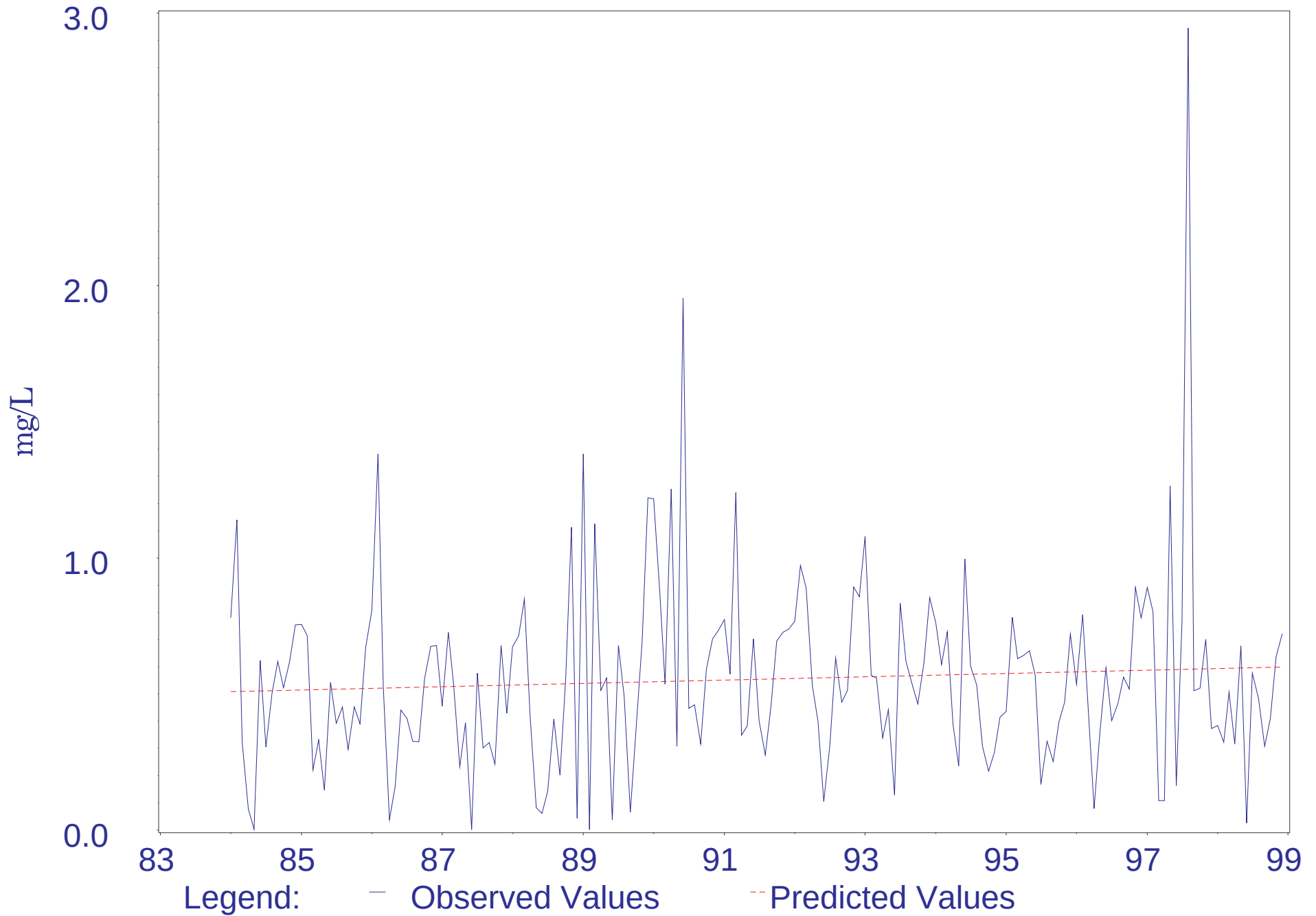
20 ppt Isohaline - Total Phosphorus (1984-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-195



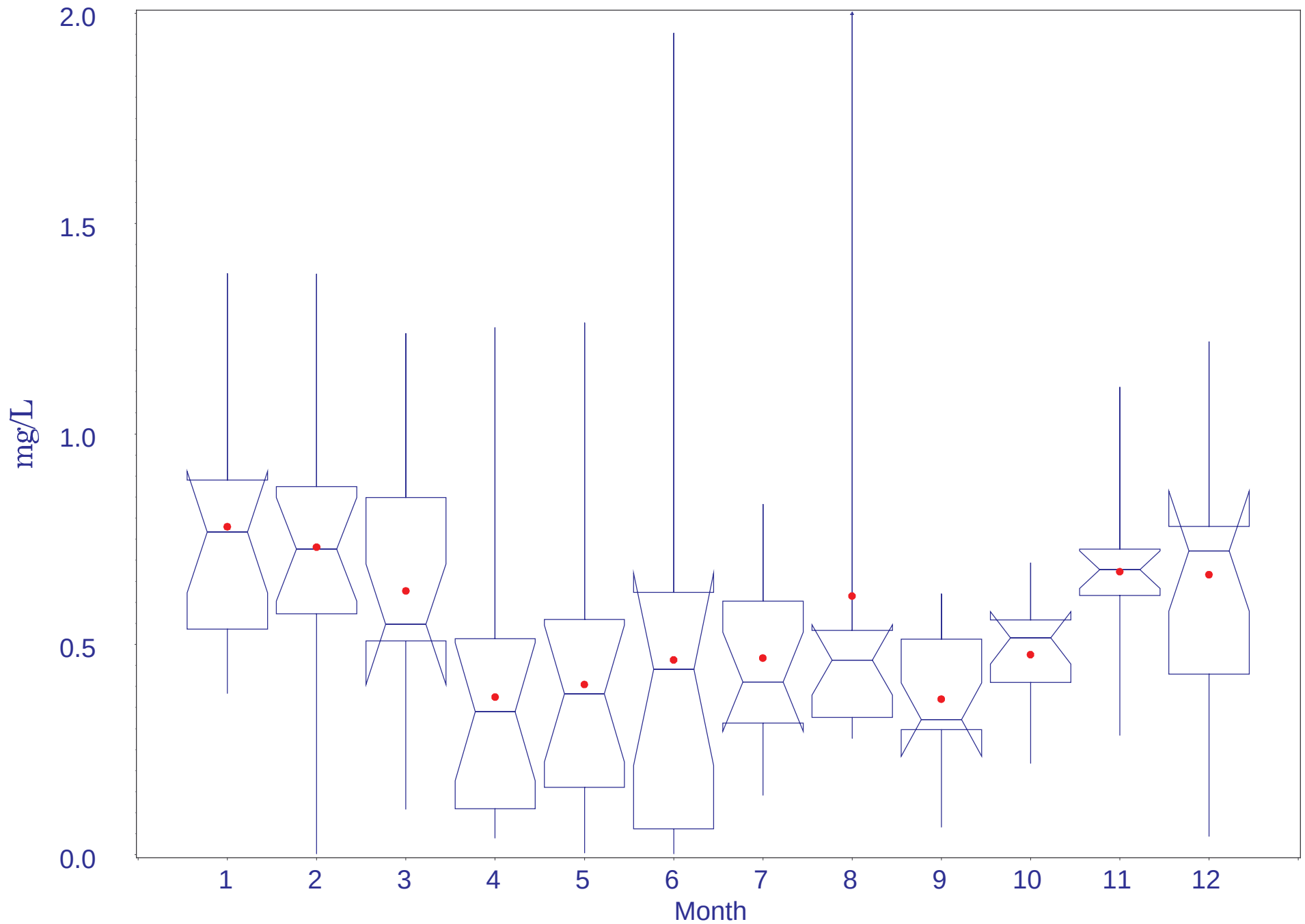
Dissolved Inorganic Nitrogen at 0 ppt Isohaline
1984-1998

B-196



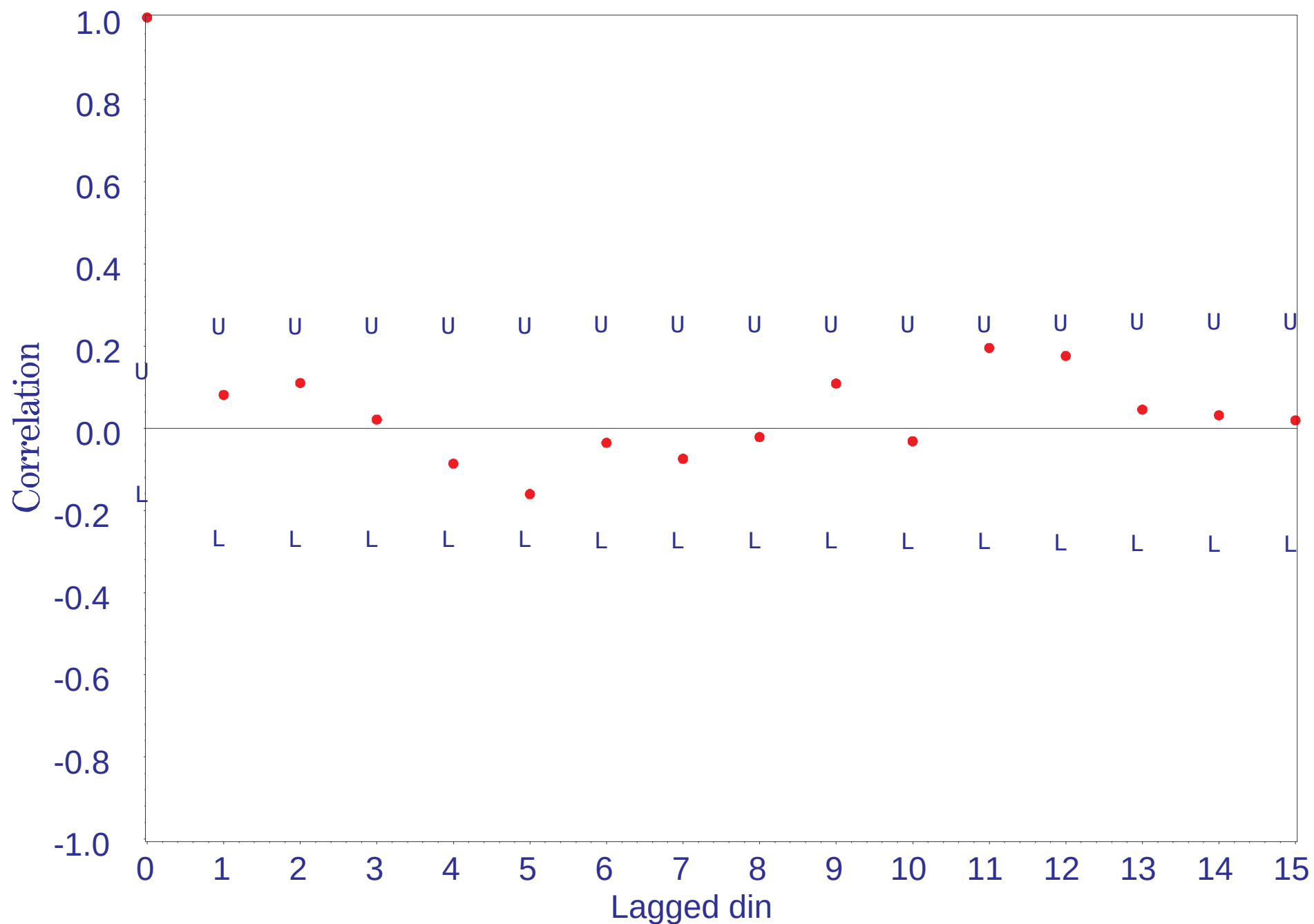
Dissolved Inorganic Nitrogen at 0 ppt Isohaline 1984-1998
Monthly Boxplots of mg/L

B-197



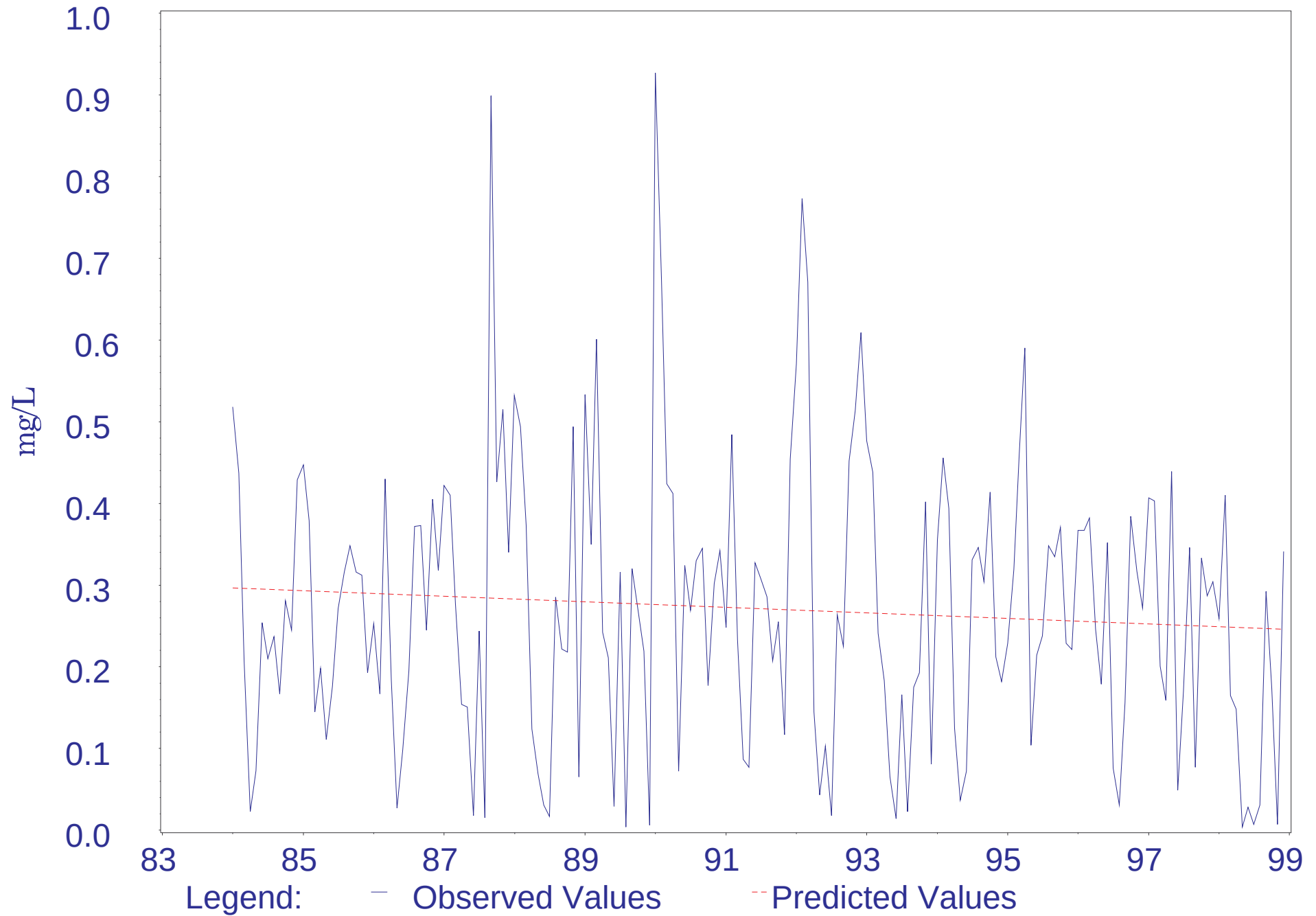
Dissolved Inorganic Nitrogen at 0 ppt Isohaline - 1984-1998
Correlogram with Upper and Lower 95% Confidence Limits

B-198



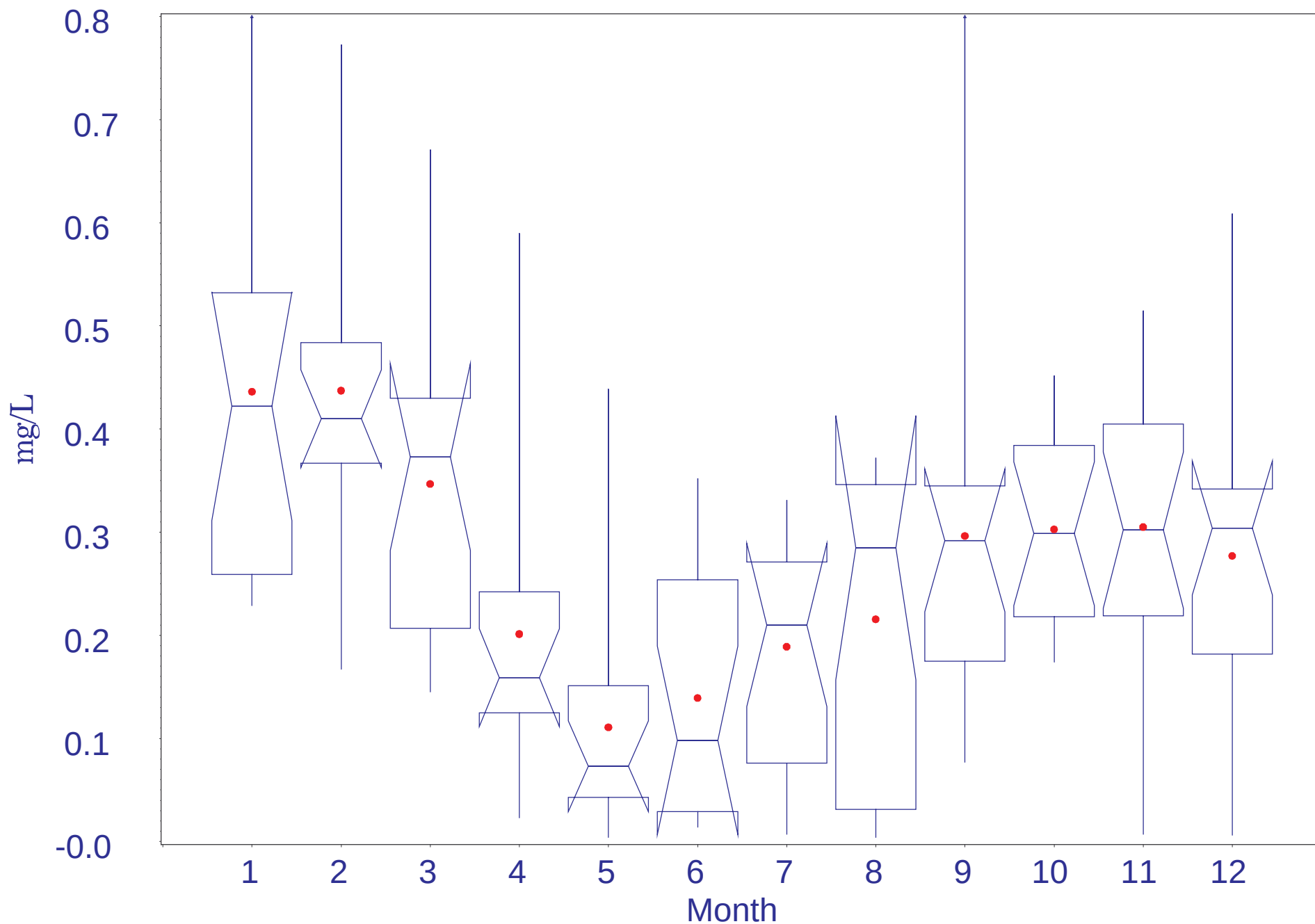
Dissolved Inorganic Nitrogen at 6 ppt Isohaline
1984-1998

B-199



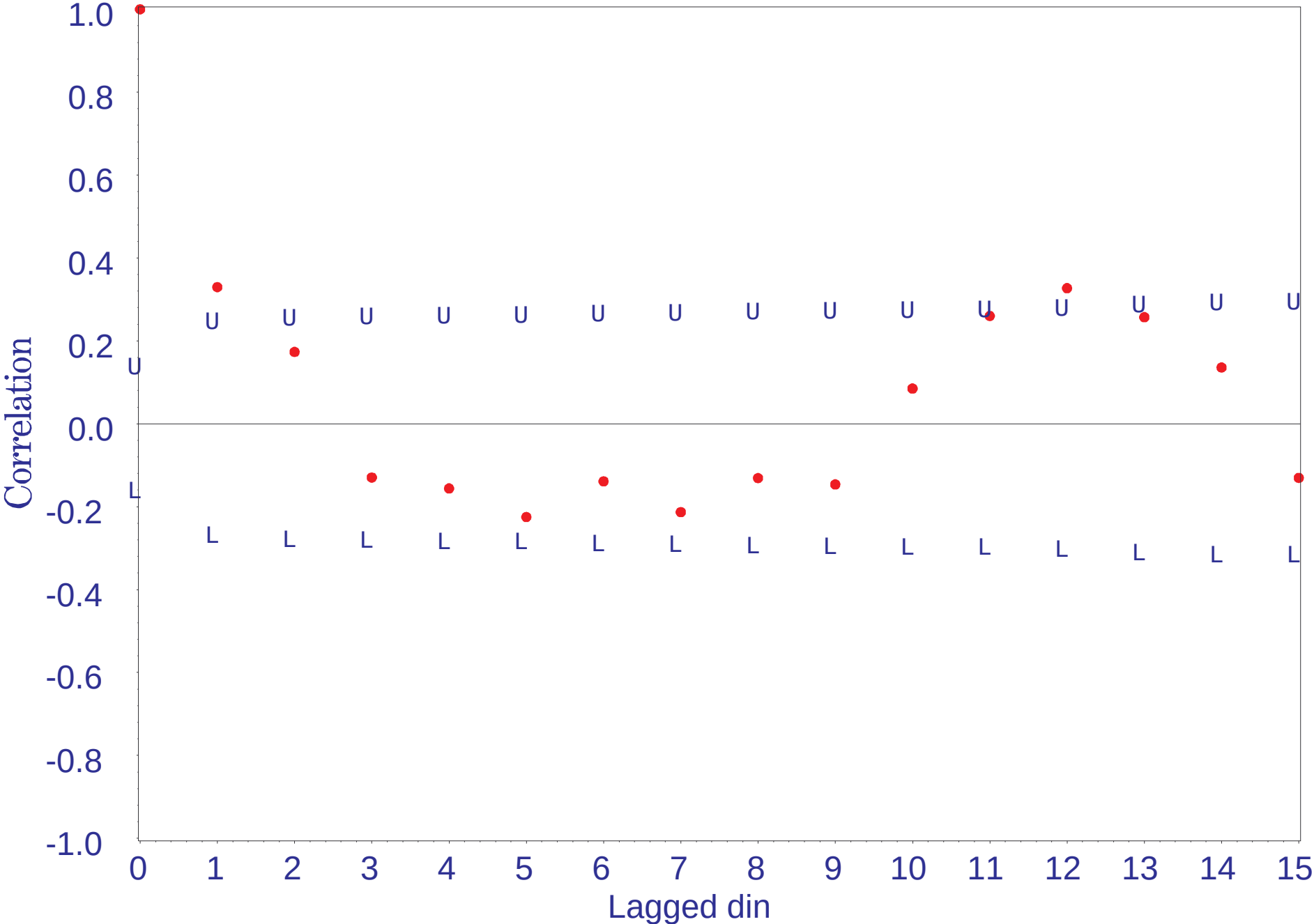
Dissolved Inorganic Nitrogen at 6 ppt Isohaline 1984-1998
Monthly Boxplots of mg/L

B-200



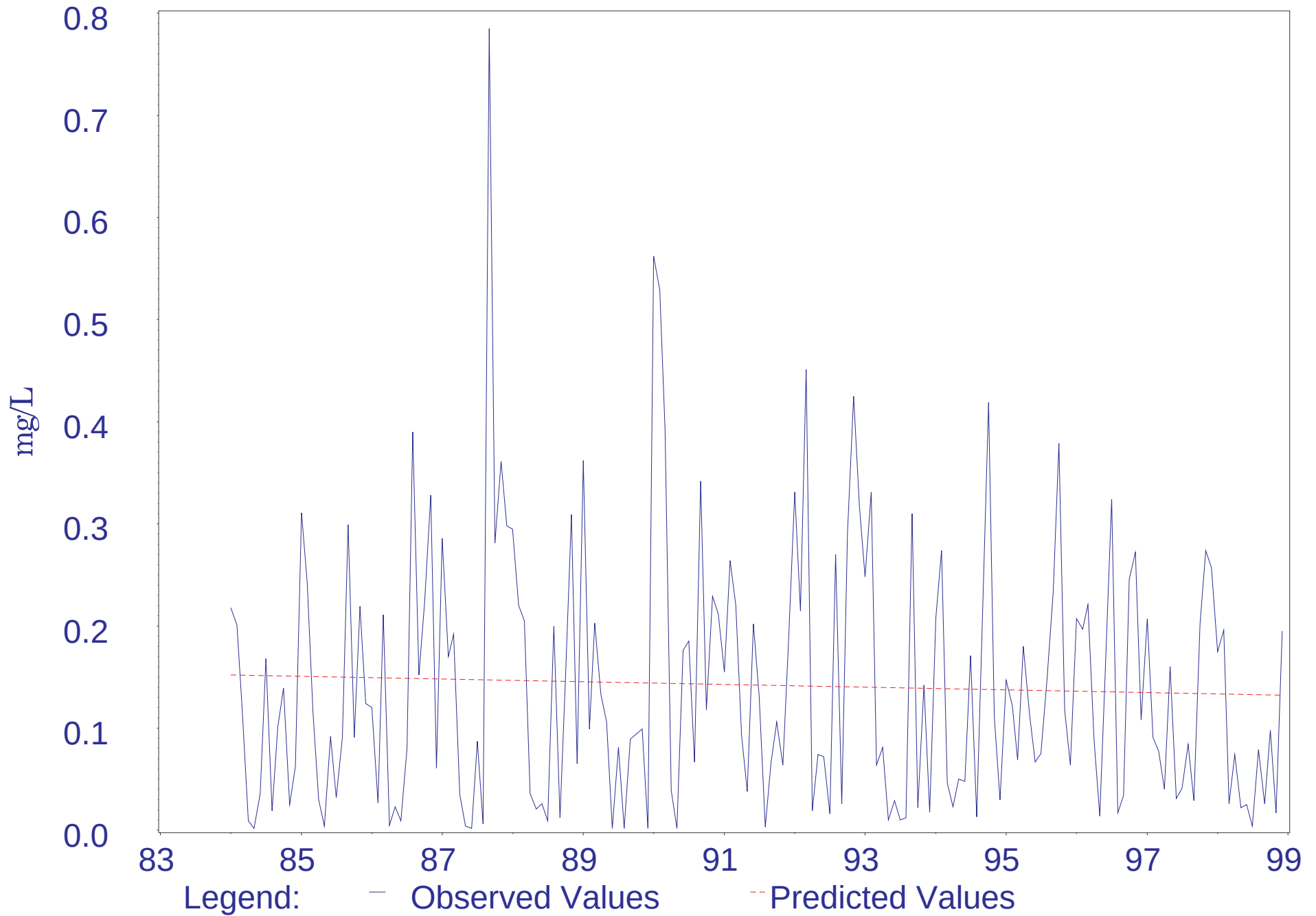
Dissolved Inorganic Nitrogen at 6 ppt Isohaline - 1984-1998
Correlogram with Upper and Lower 95% Confidence Limits

B-201



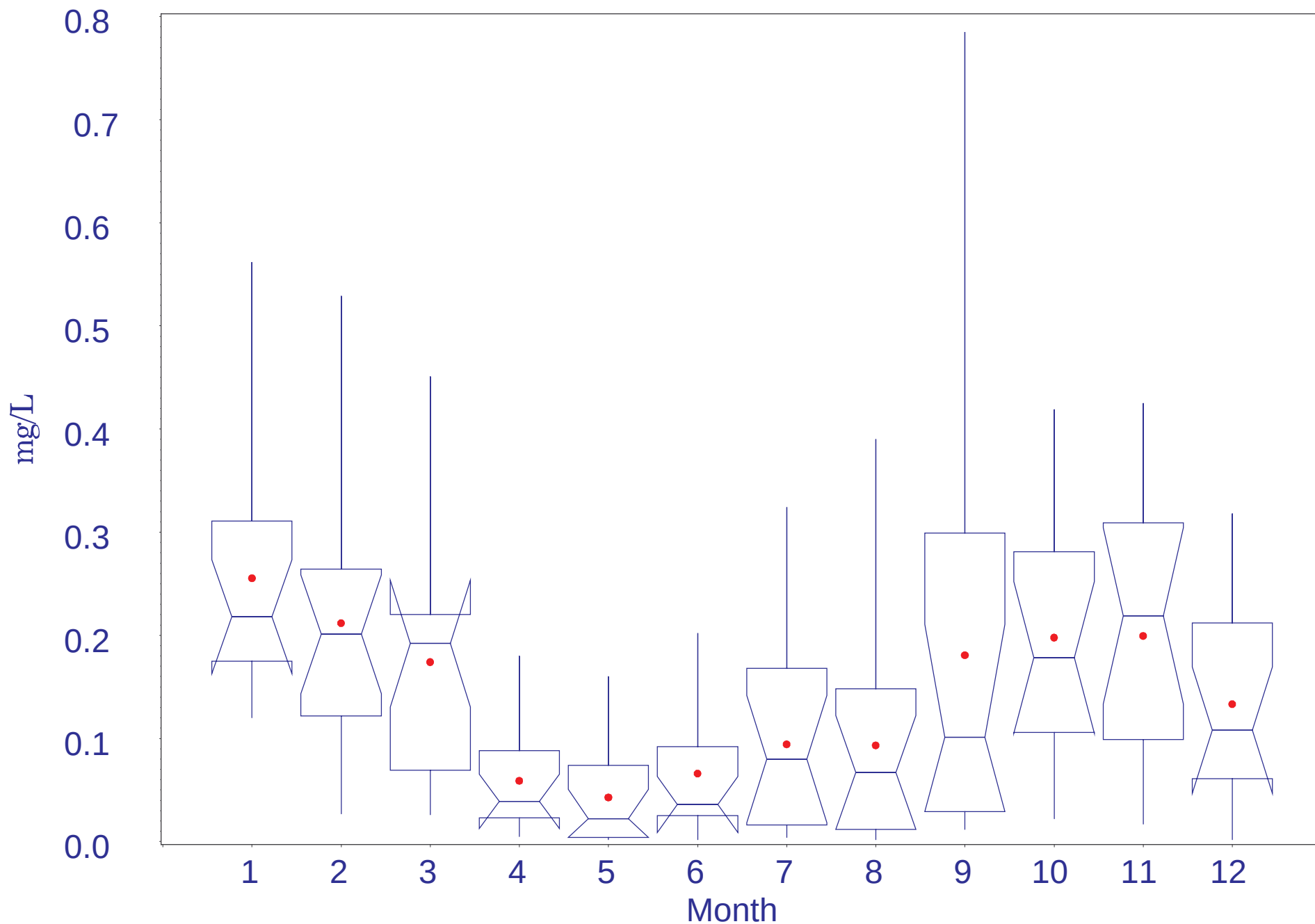
Dissolved Inorganic Nitrogen at 12 ppt Isohaline
1984-1998

B-202



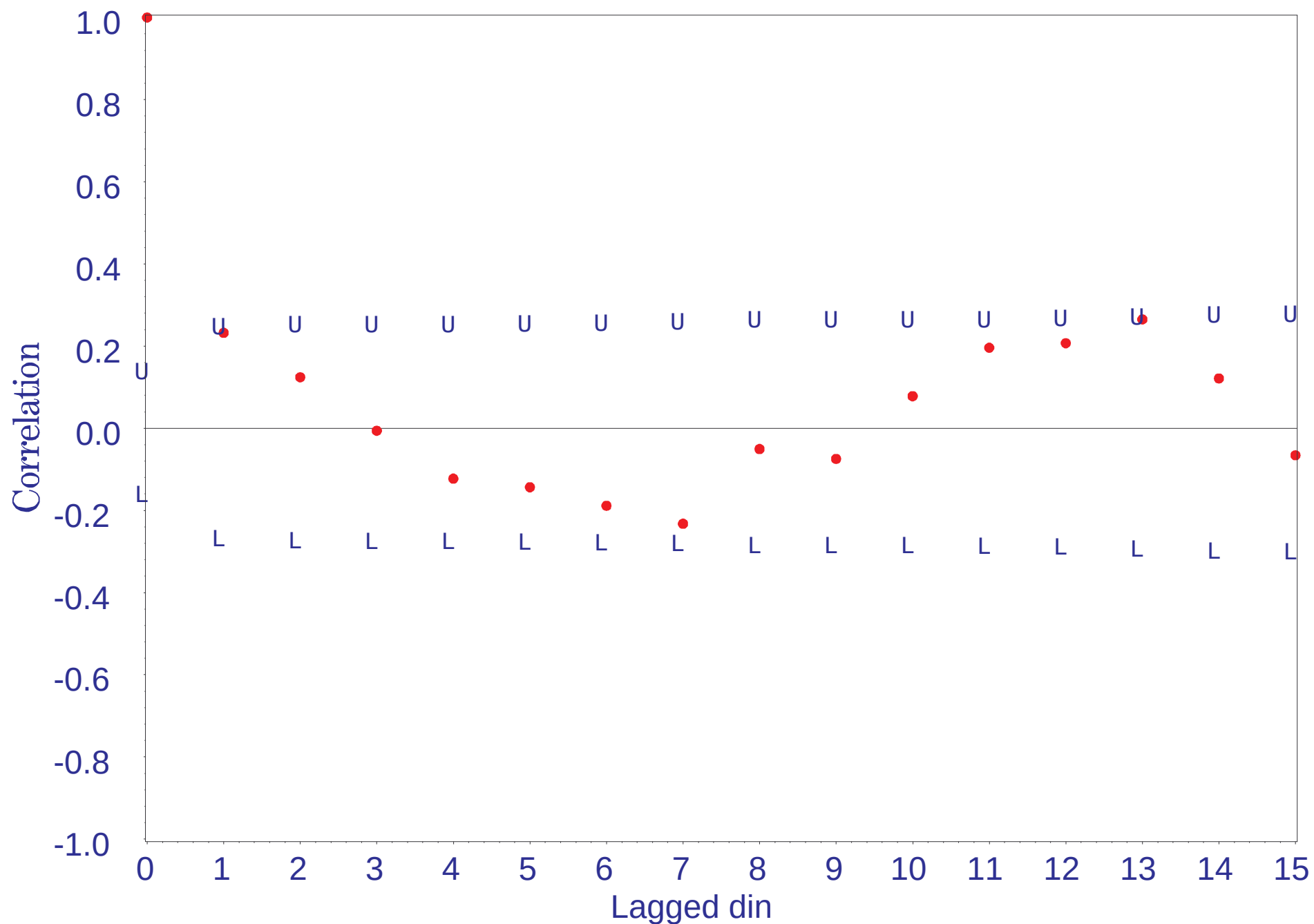
Dissolved Inorganic Nitrogen at 12 ppt Isohaline 1984-1998
Monthly Boxplots of mg/L

B-203



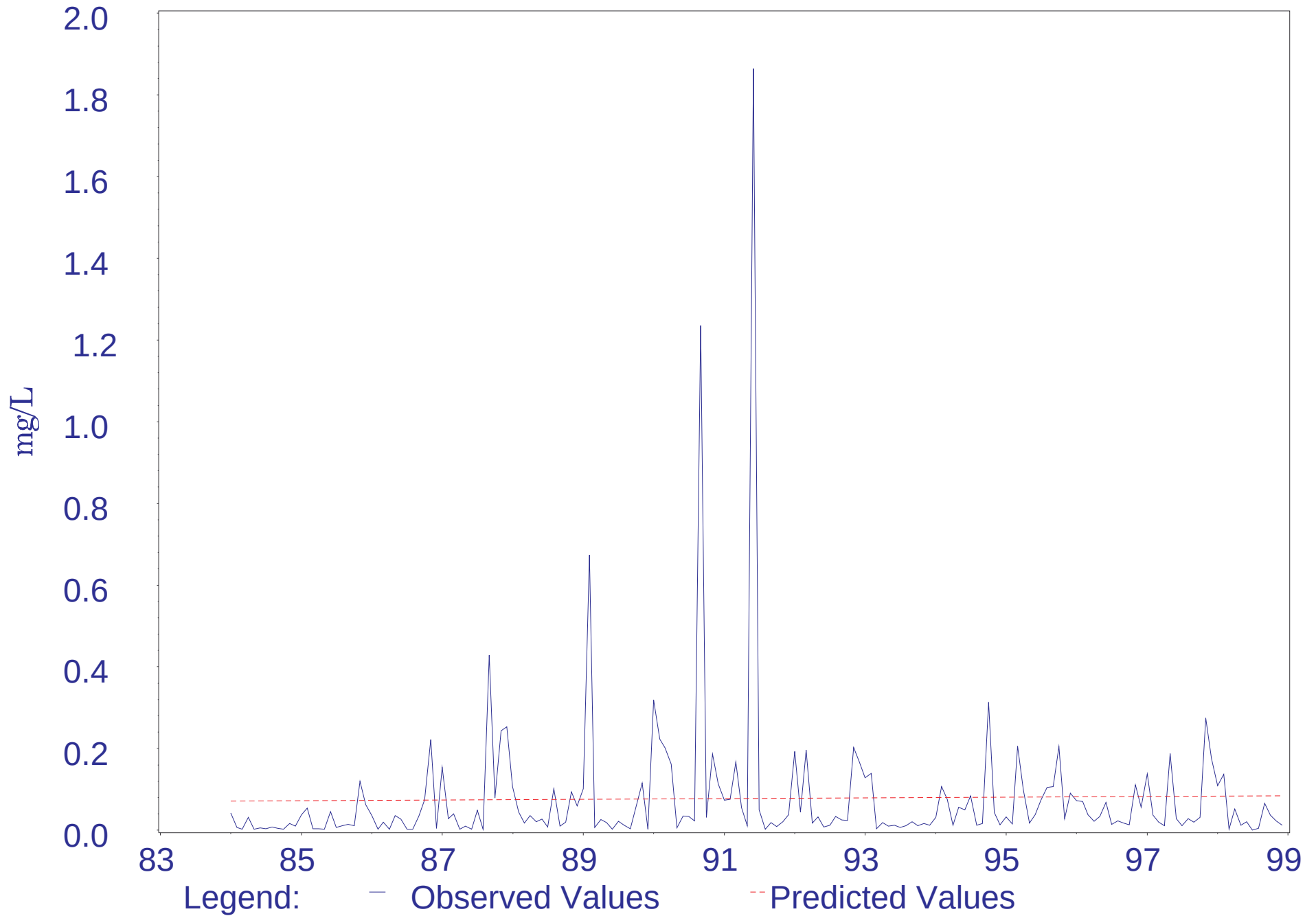
Dissolved Inorganic Nitrogen at 12 ppt Isohaline - 1984-1998
Correlogram with Upper and Lower 95% Confidence Limits

B-204



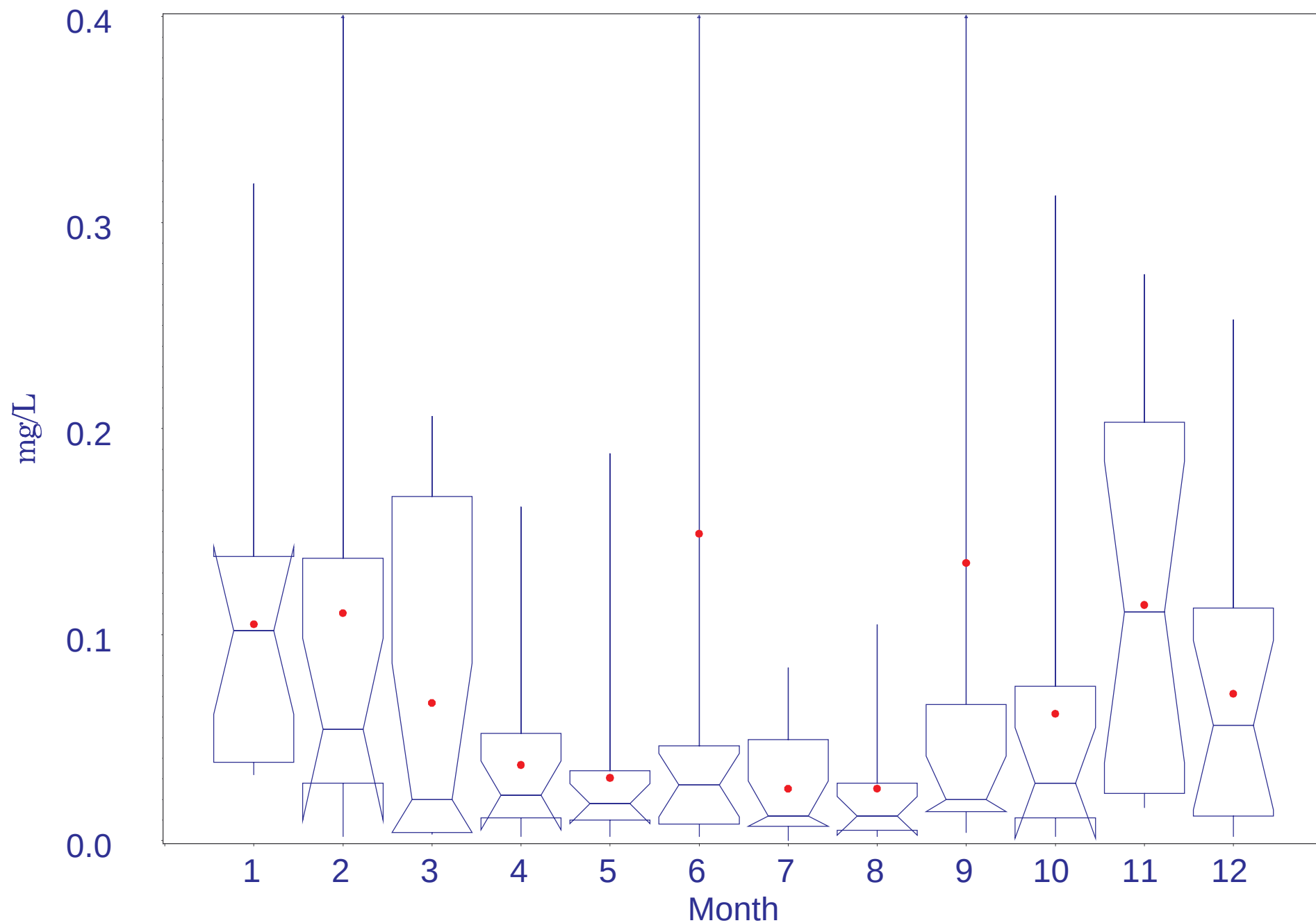
Dissolved Inorganic Nitrogen at 20 ppt Isohaline
1984-1998

B-205



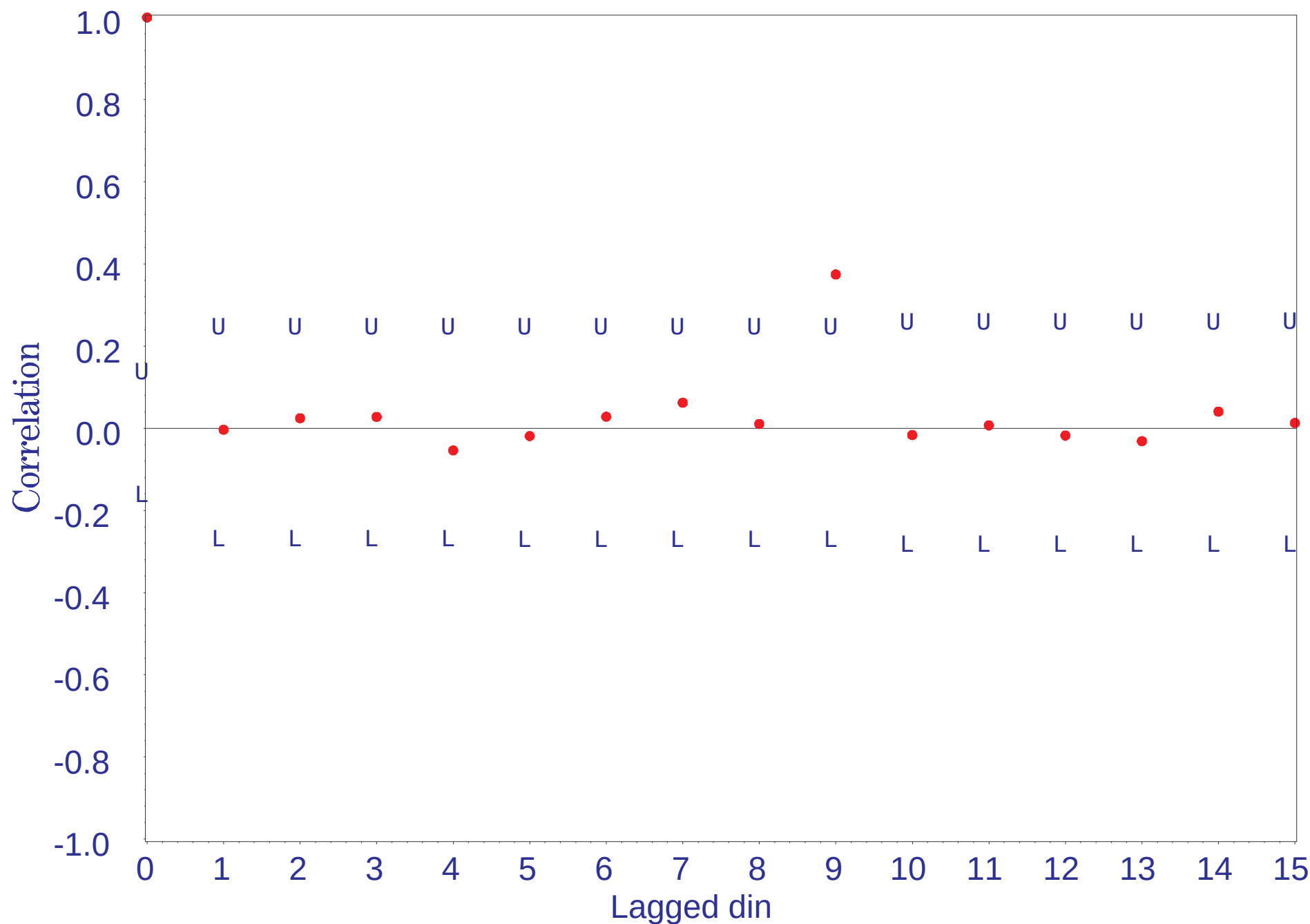
Dissolved Inorganic Nitrogen at 20 ppt Isohaline 1984-1998
Monthly Boxplots of mg/L

B-206



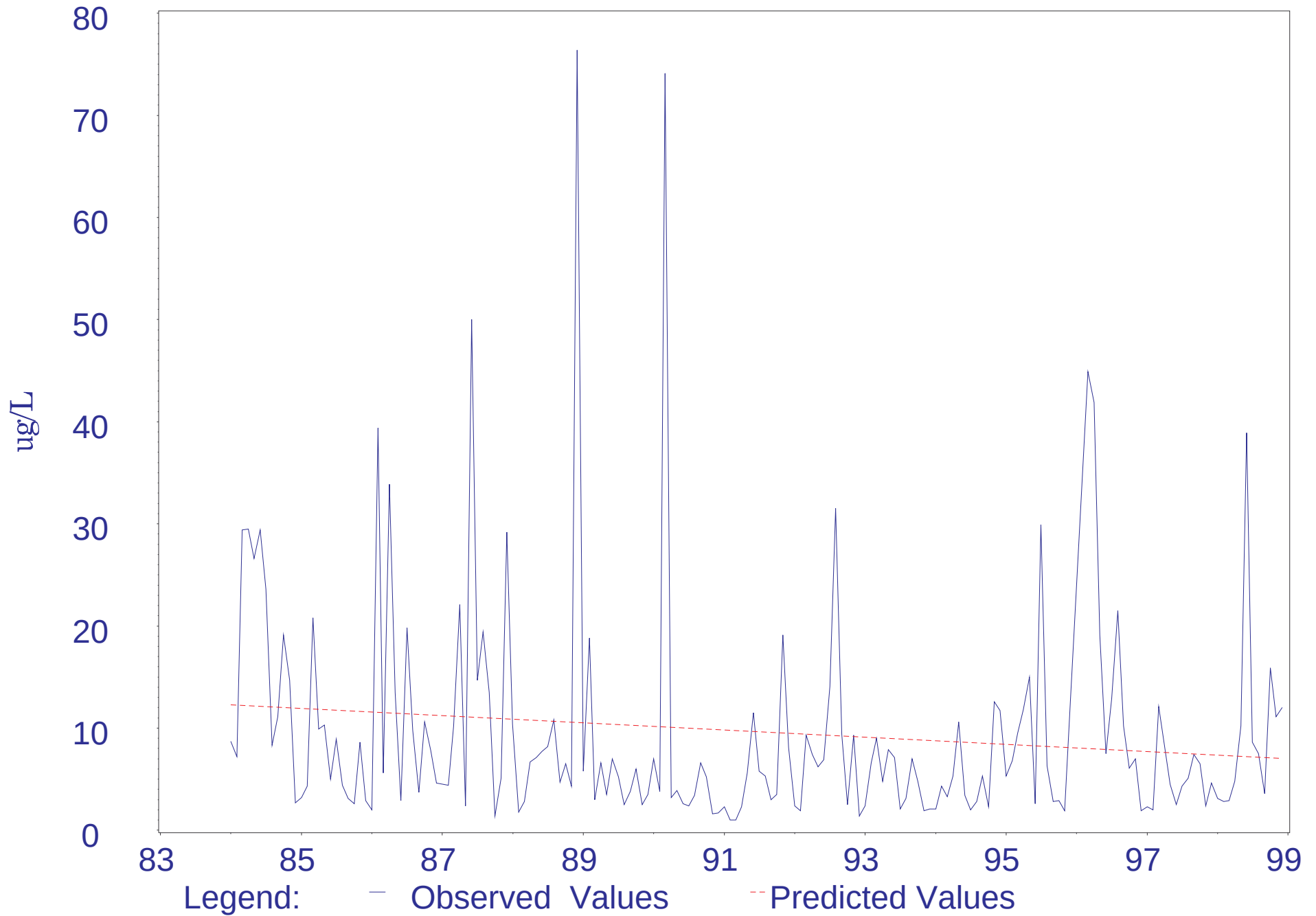
Dissolved Inorganic Nitrogen at 20 ppt Isohaline - 1984-1998
Correlogram with Upper and Lower 95% Confidence Limits

B-207



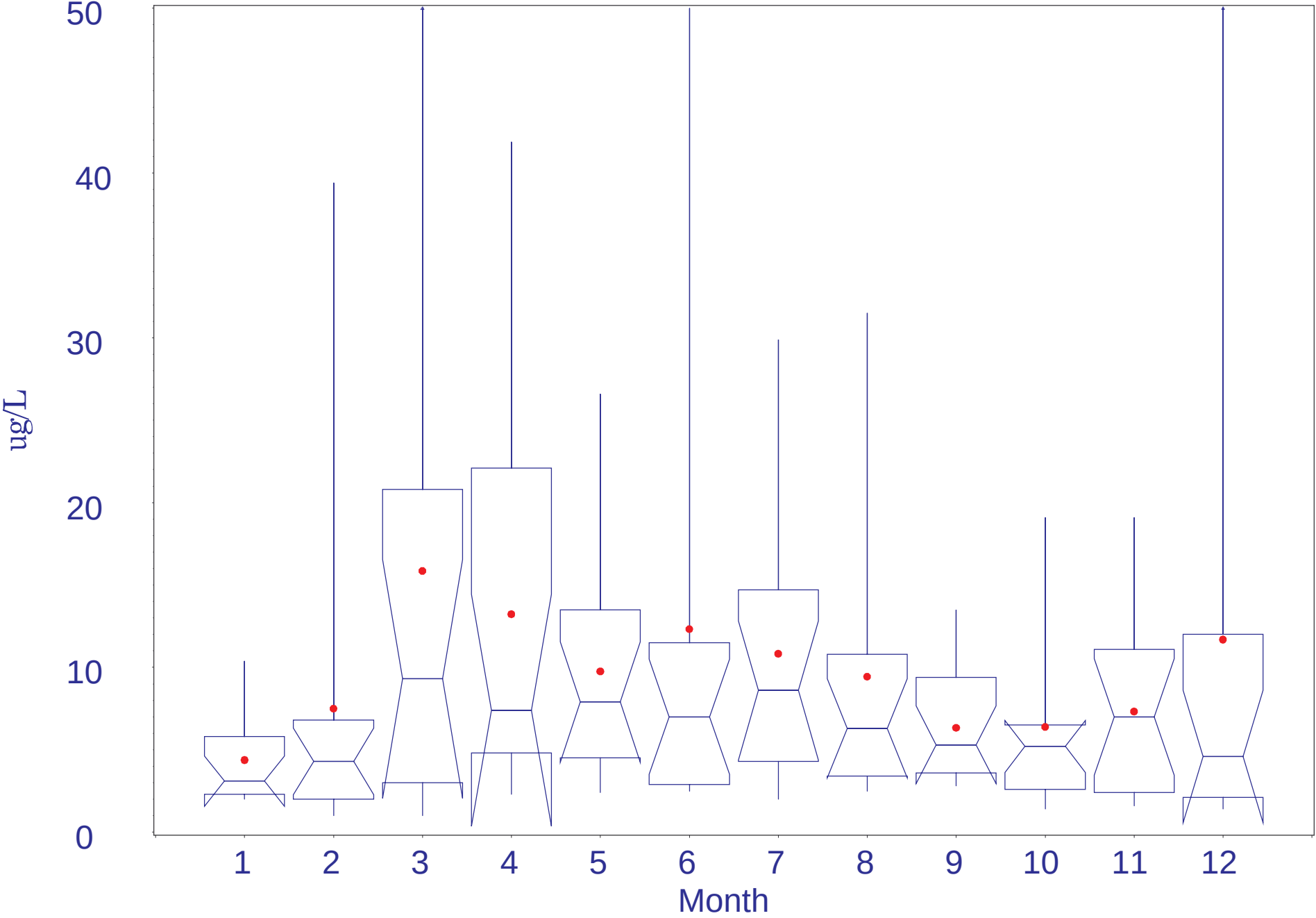
Chlorophyll at 0 ppt Isohaline
1984-1998

B-208



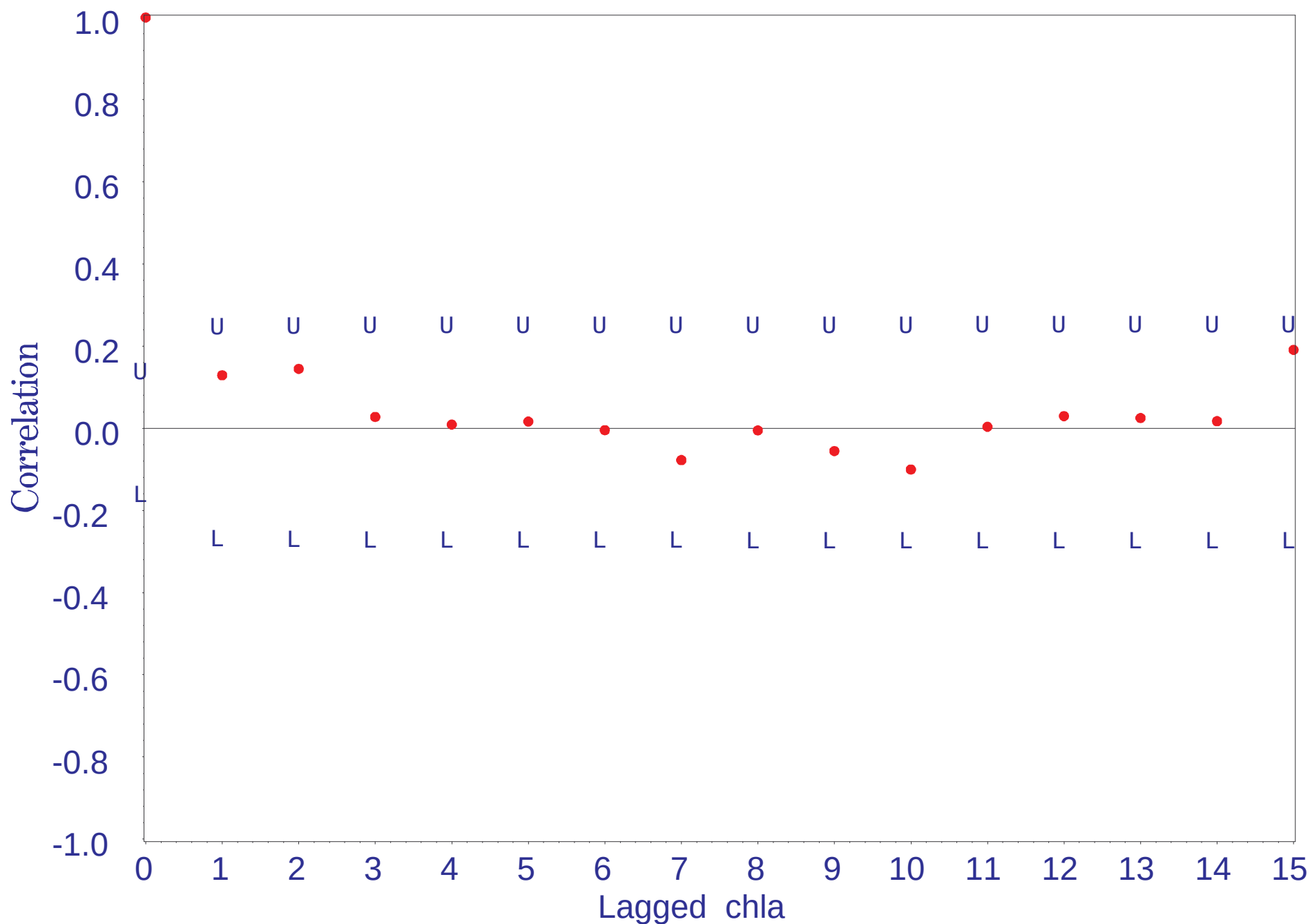
Chlorophyll at 0 ppt Isohaline 1984-1998
Monthly Boxplots of ug/L

B-209



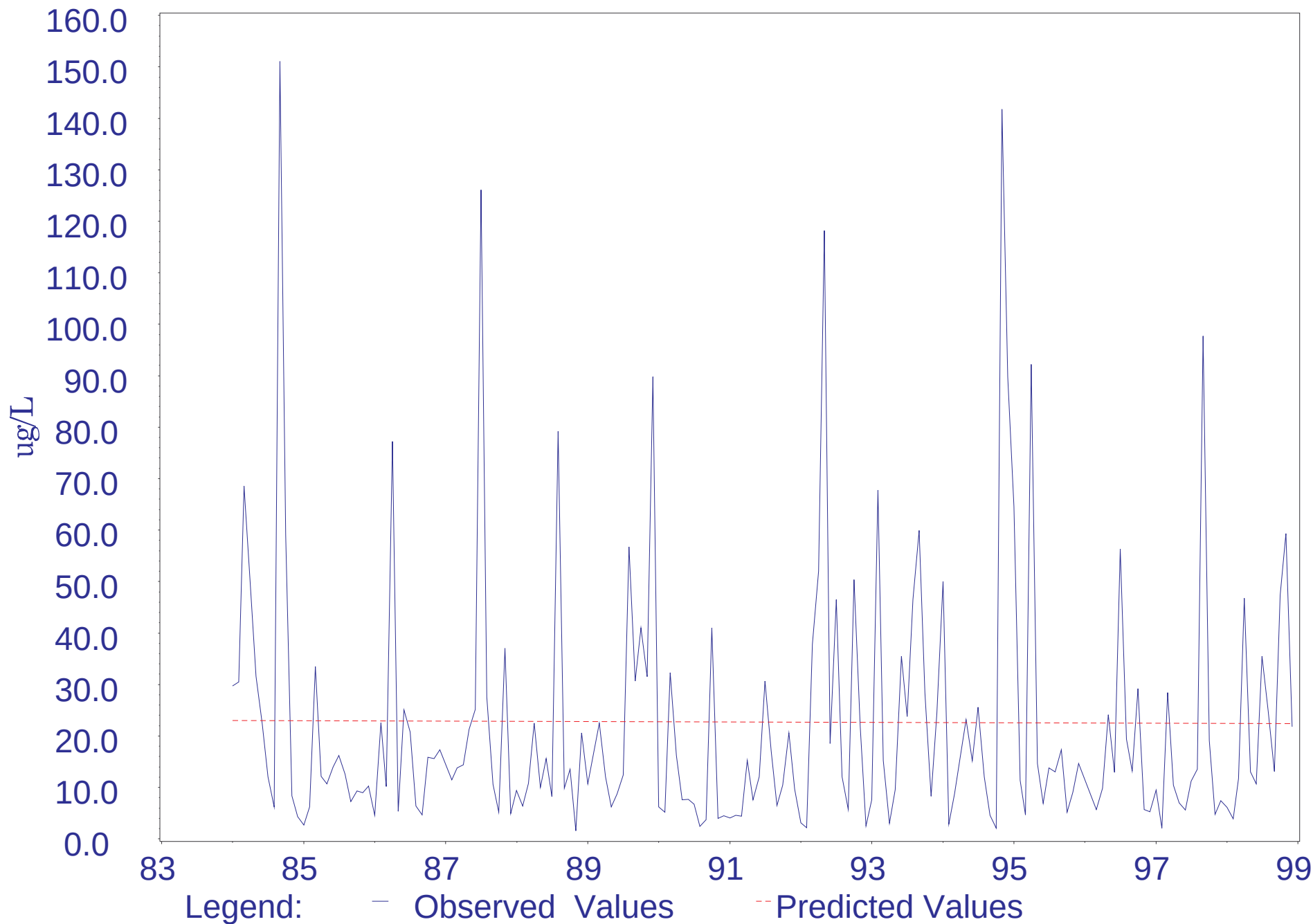
Chlorophyll at 0 ppt Isohaline - 1984-1998
Correlogram with Upper and Lower 95% Confidence Limits

B-210



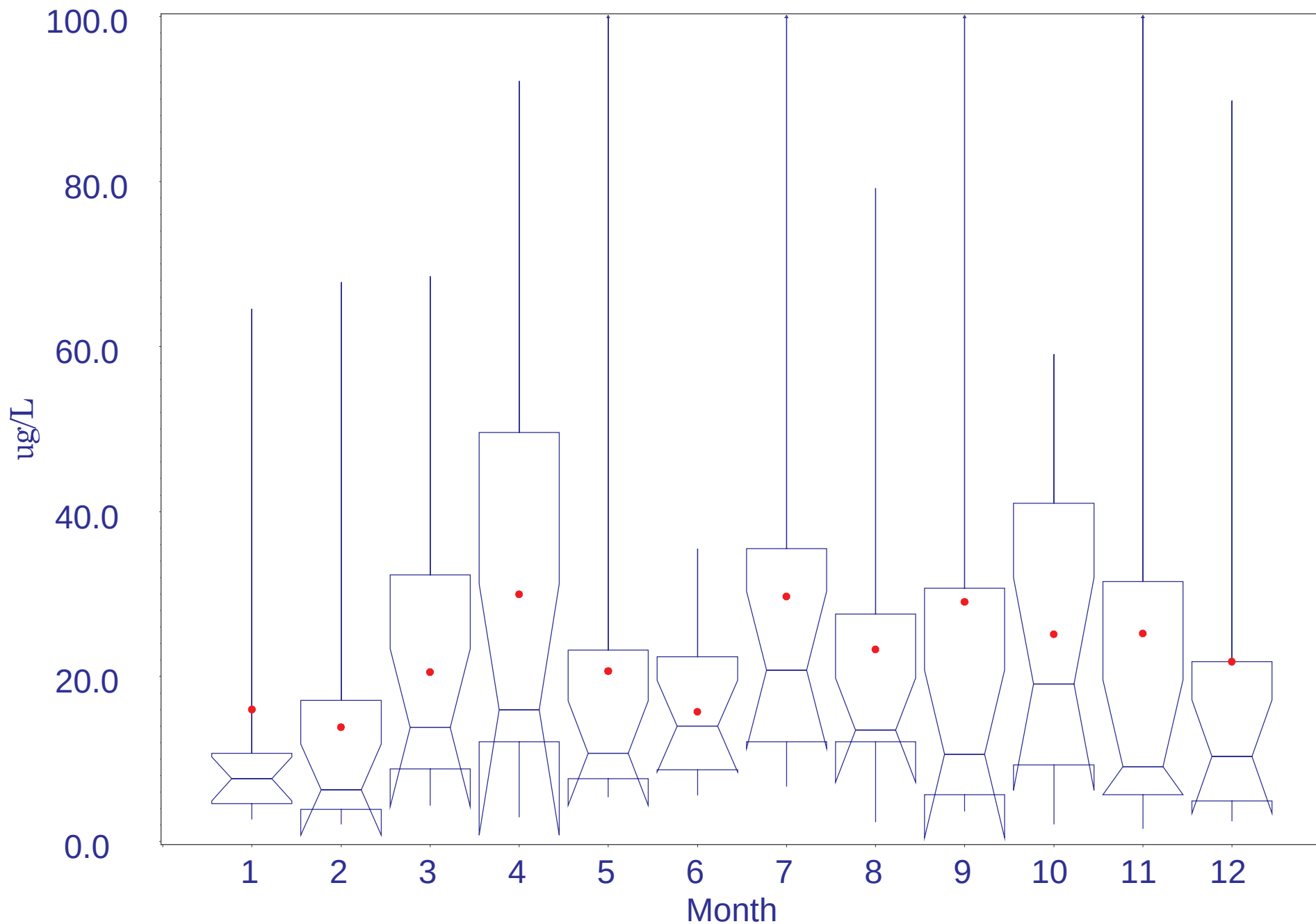
Chlorophyll at 6 ppt Isohaline 1984-1998

B-211



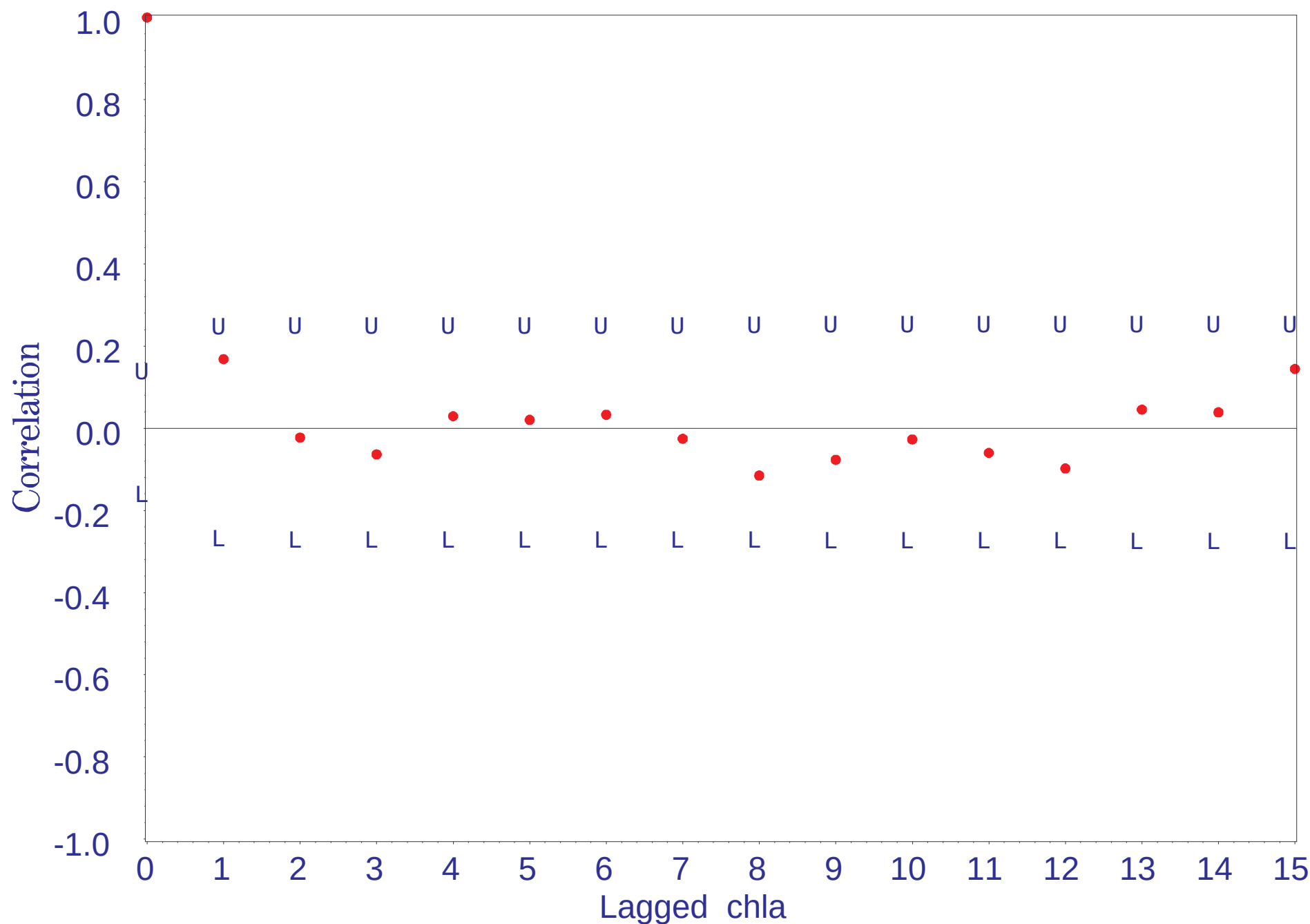
Chlorophyll at 6 ppt Isohaline 1984-1998
Monthly Boxplots of ug/L

B-212



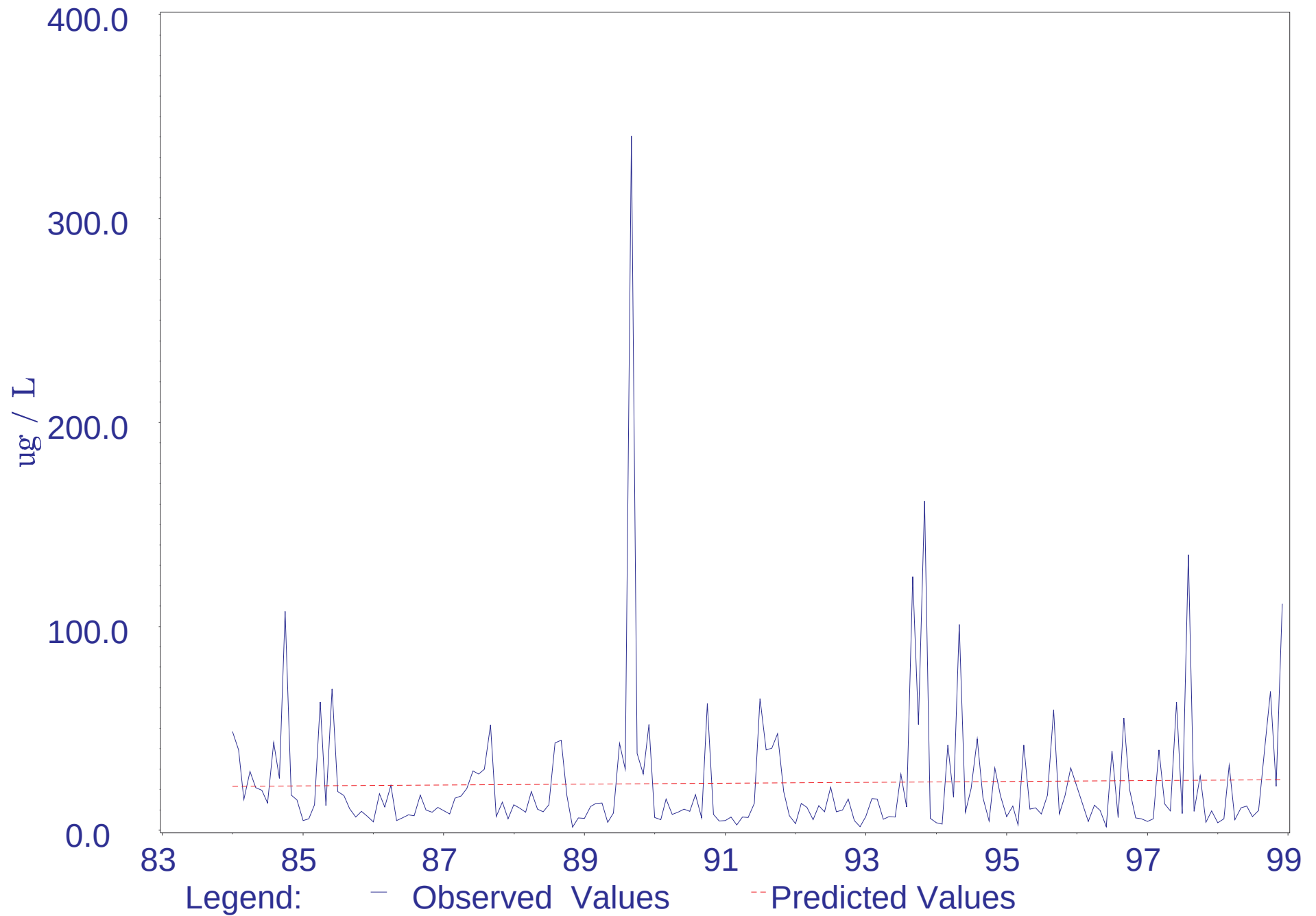
Chlorophyll at 6 ppt Isohaline - 1984-1998
Correlogram with Upper and Lower 95% Confidence Limits

B-213



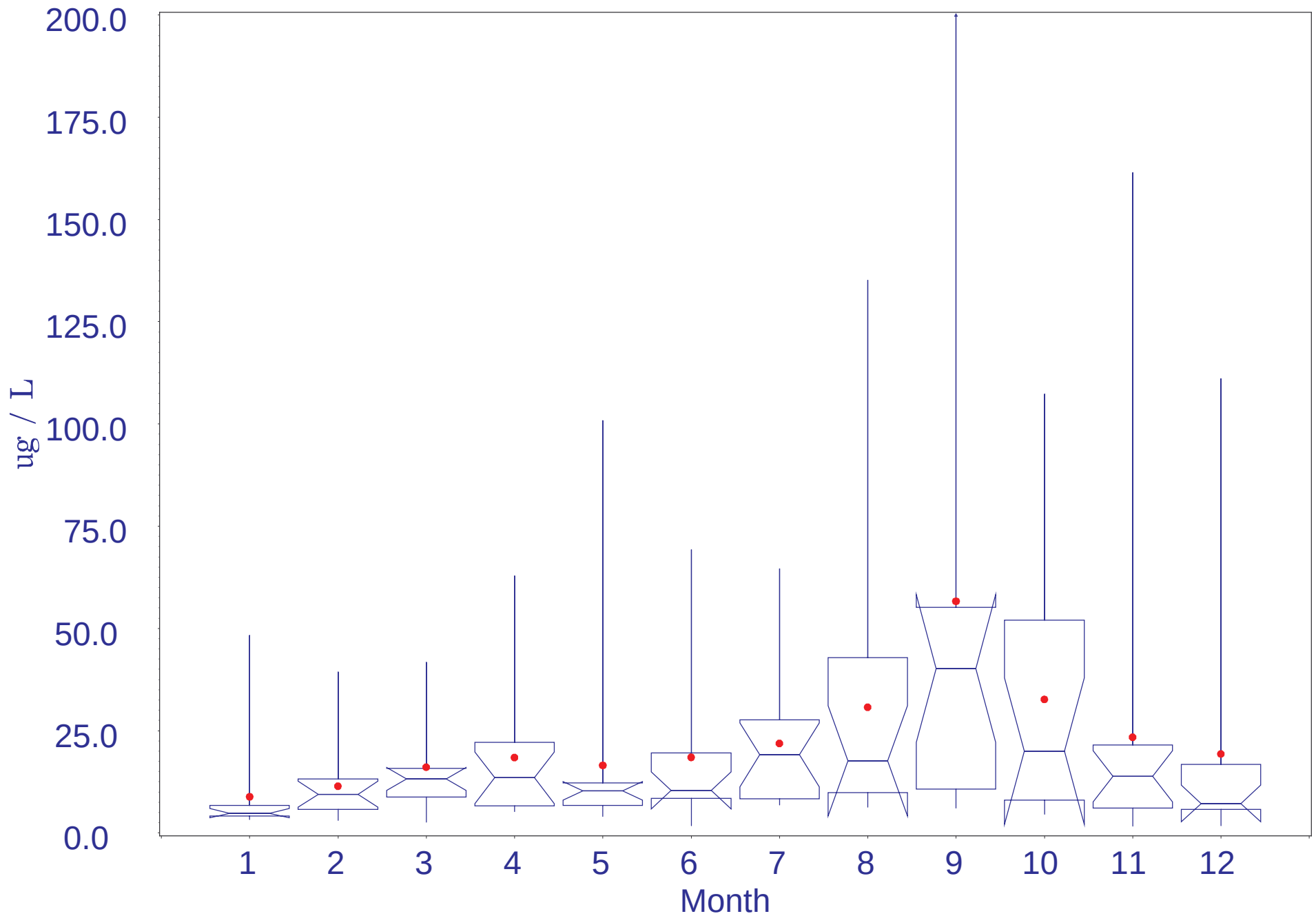
Chlorophyll at 12 ppt Isohaline
1984-1998

B-214



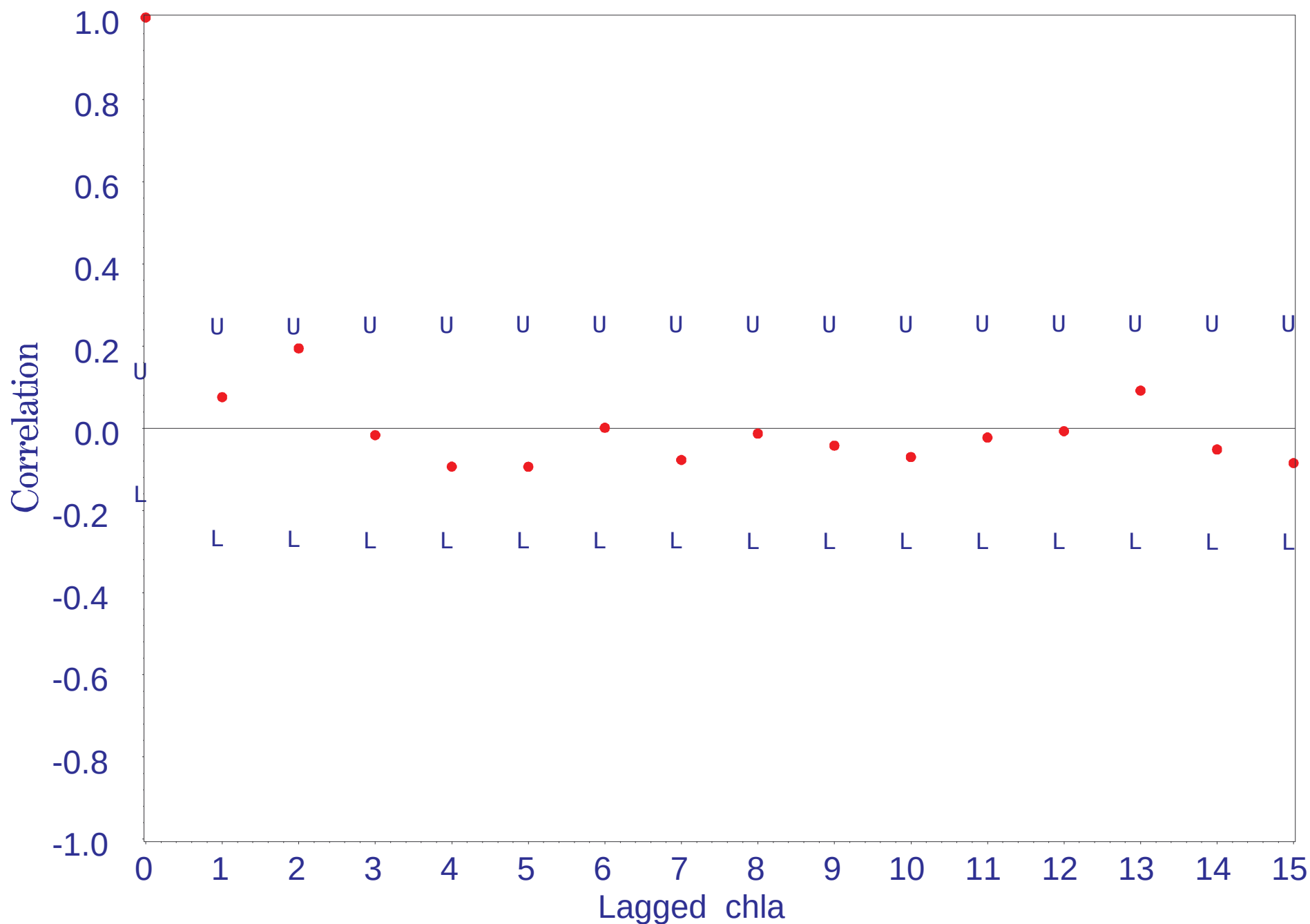
Chlorophyll at 12 ppt Isohaline 1984-1998
Monthly Boxplots of ug/L

B-215



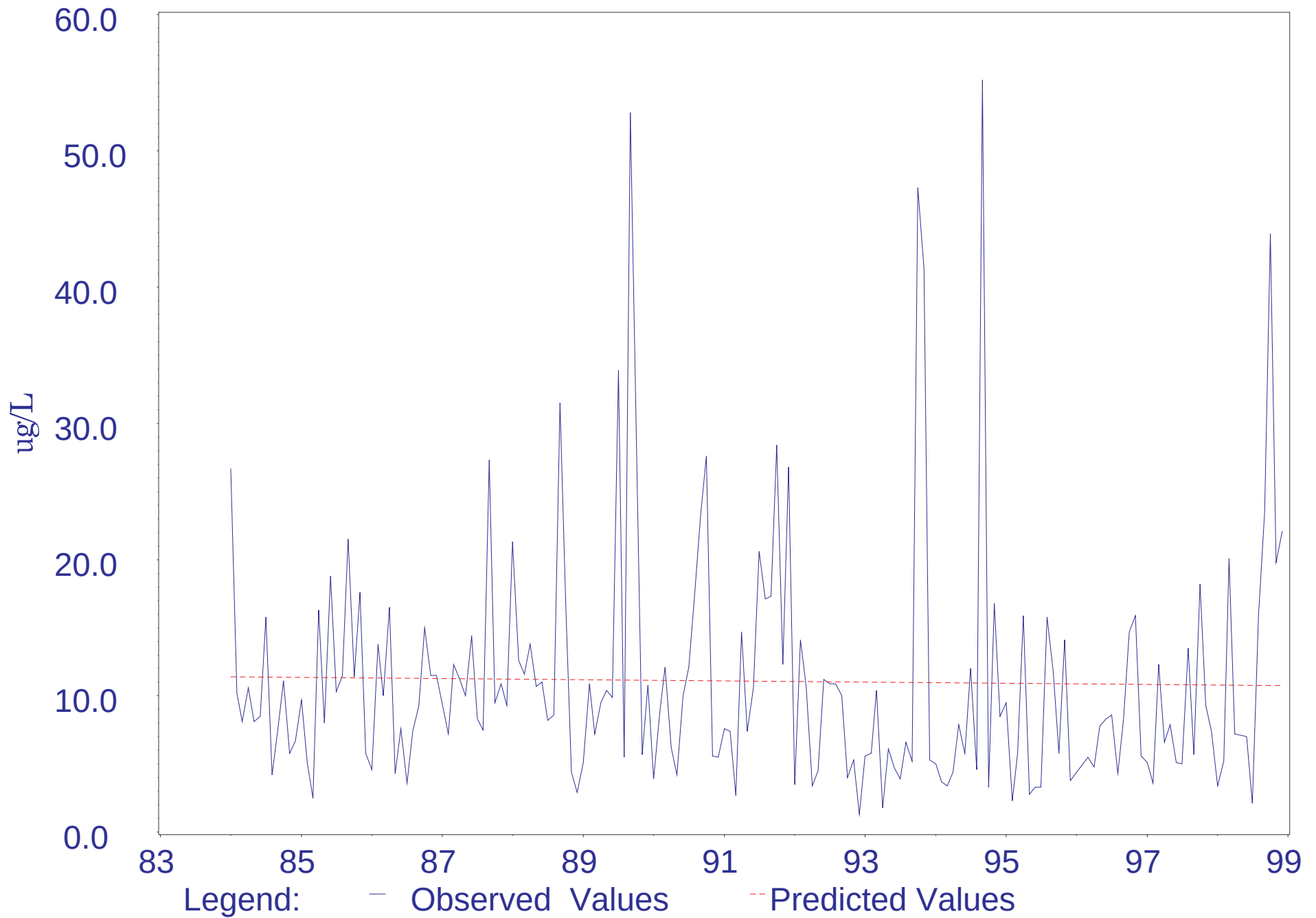
Chlorophyll at 12 ppt Isohaline - 1984-1998
Correlogram with Upper and Lower 95% Confidence Limits

B-216



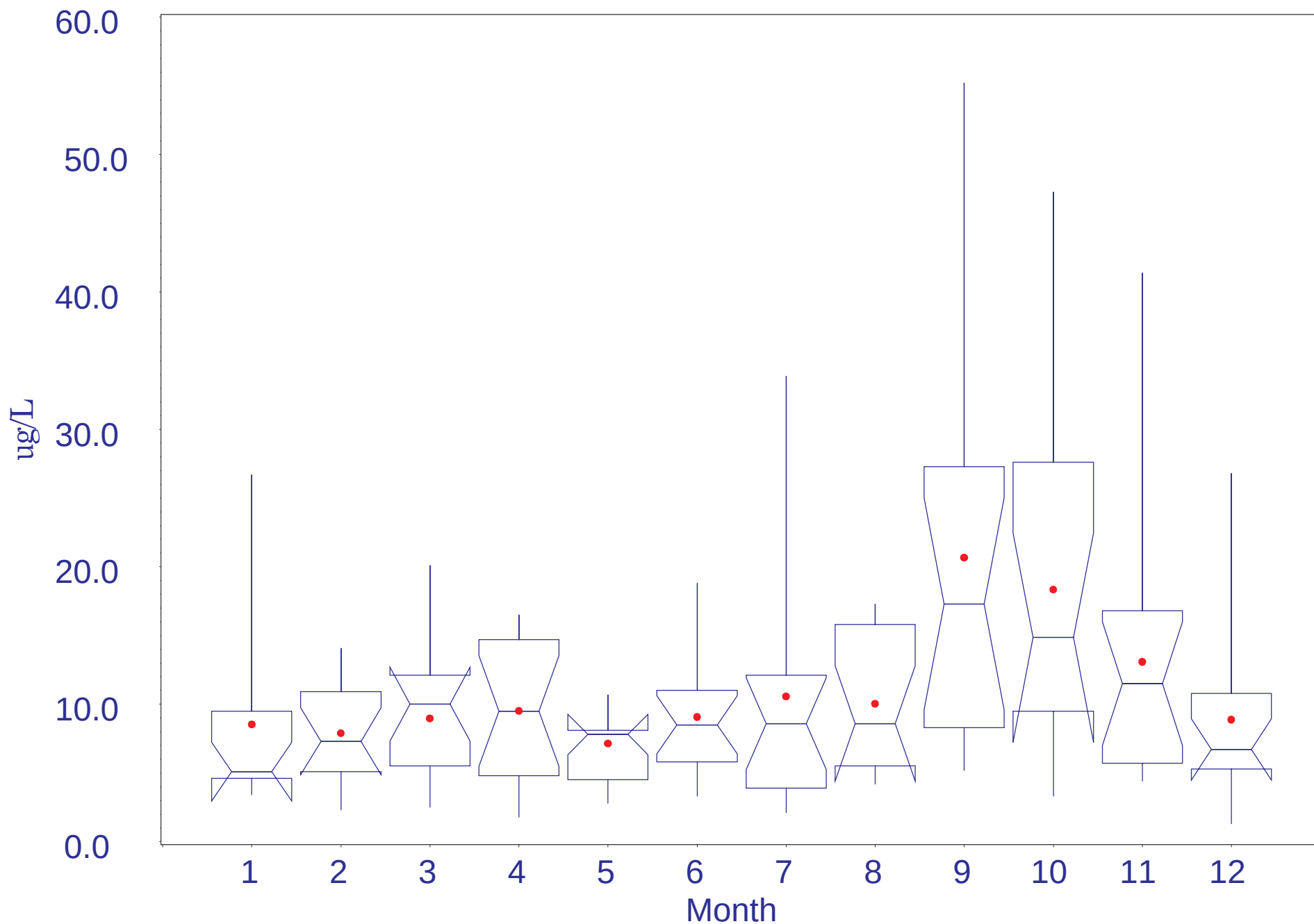
Chlorophyll at 20 ppt Isohaline
1984-1998

B-217



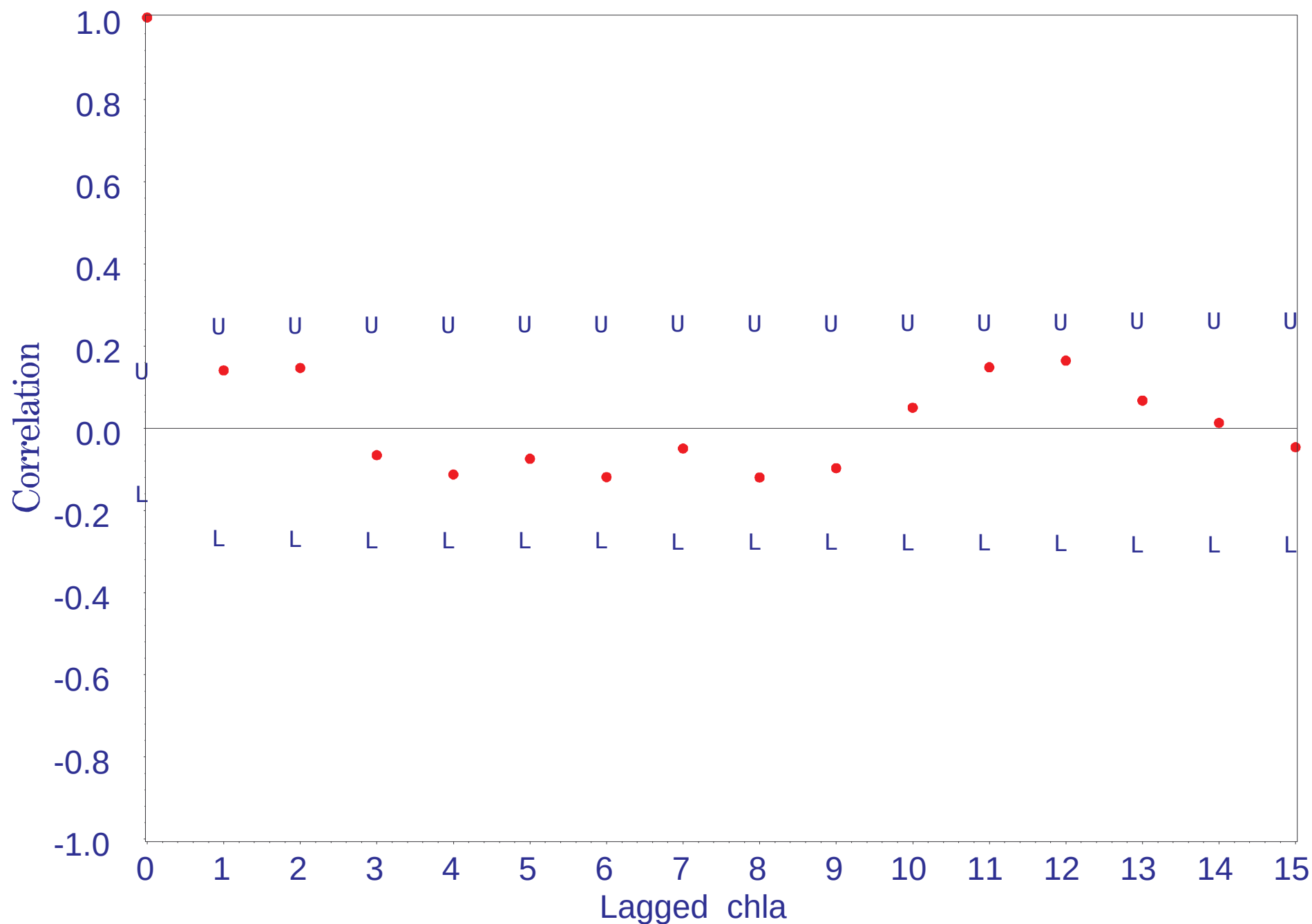
Chlorophyll at 20 ppt Isohaline 1984-1998
Monthly Boxplots of ug/L

B-218



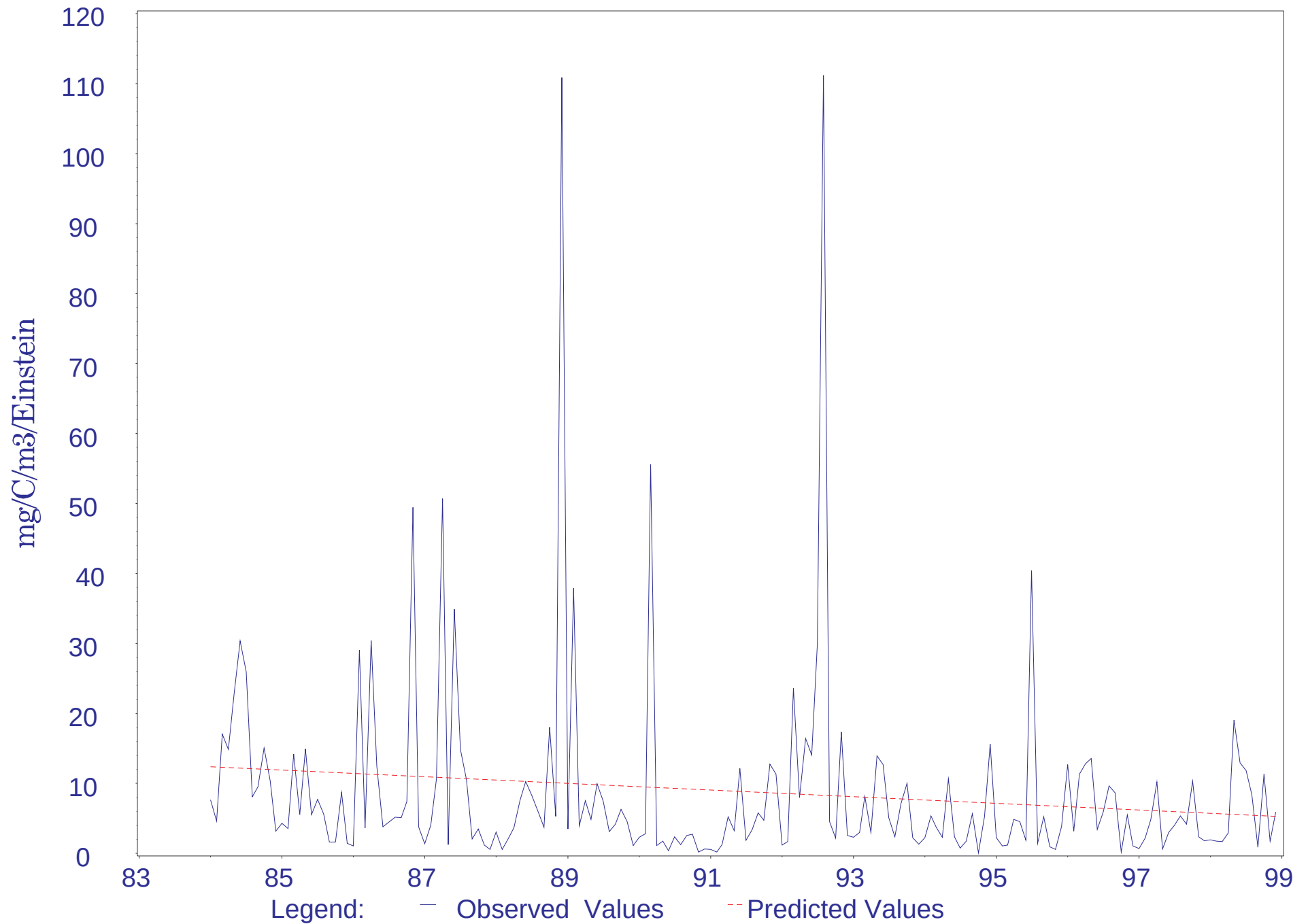
Chlorophyll at 20 ppt Isohaline - 1984-1998
Correlogram with Upper and Lower 95% Confidence Limits

B-219



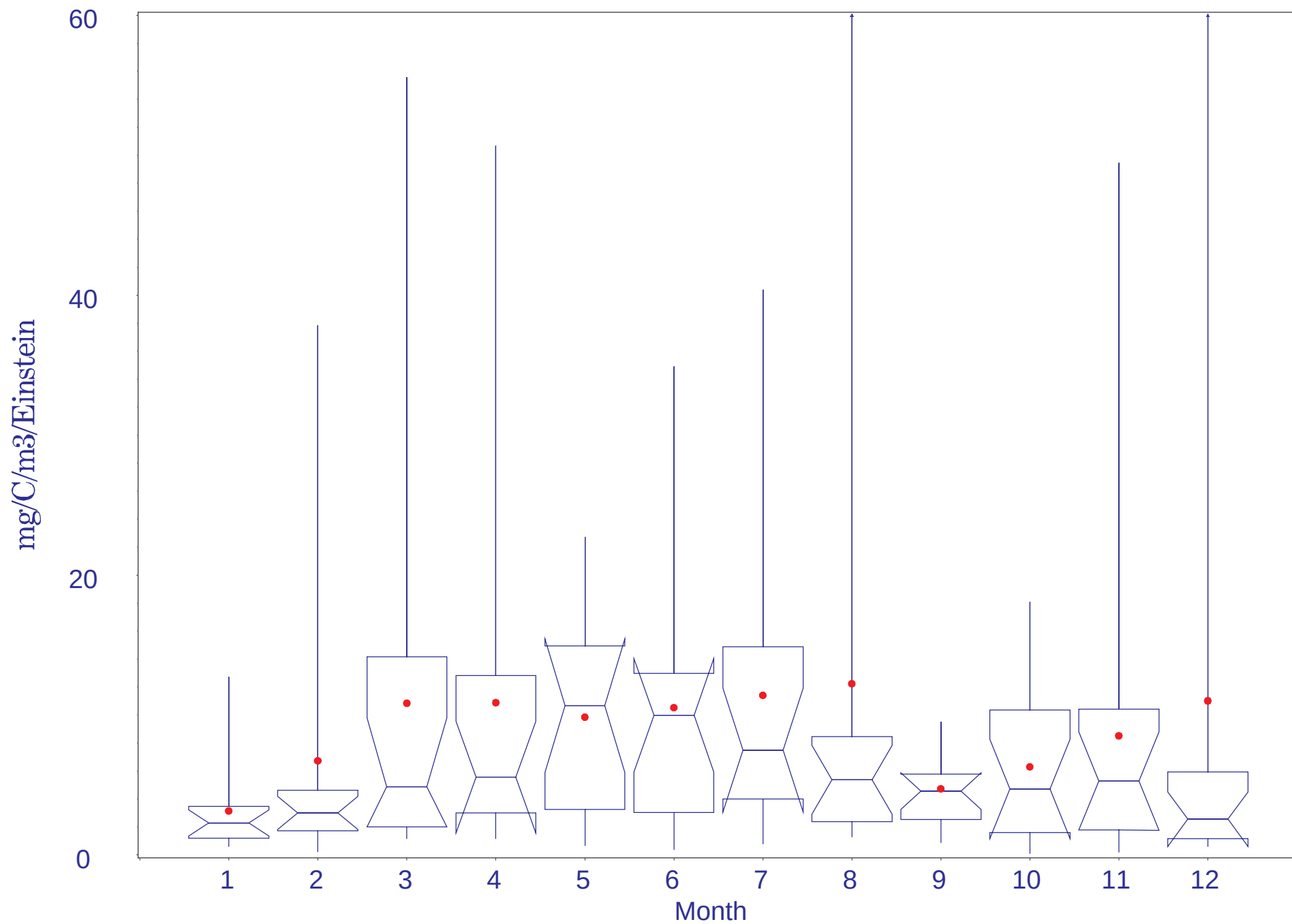
Carbon Uptake at 0 ppt Isohaline
1984-1998

B-220



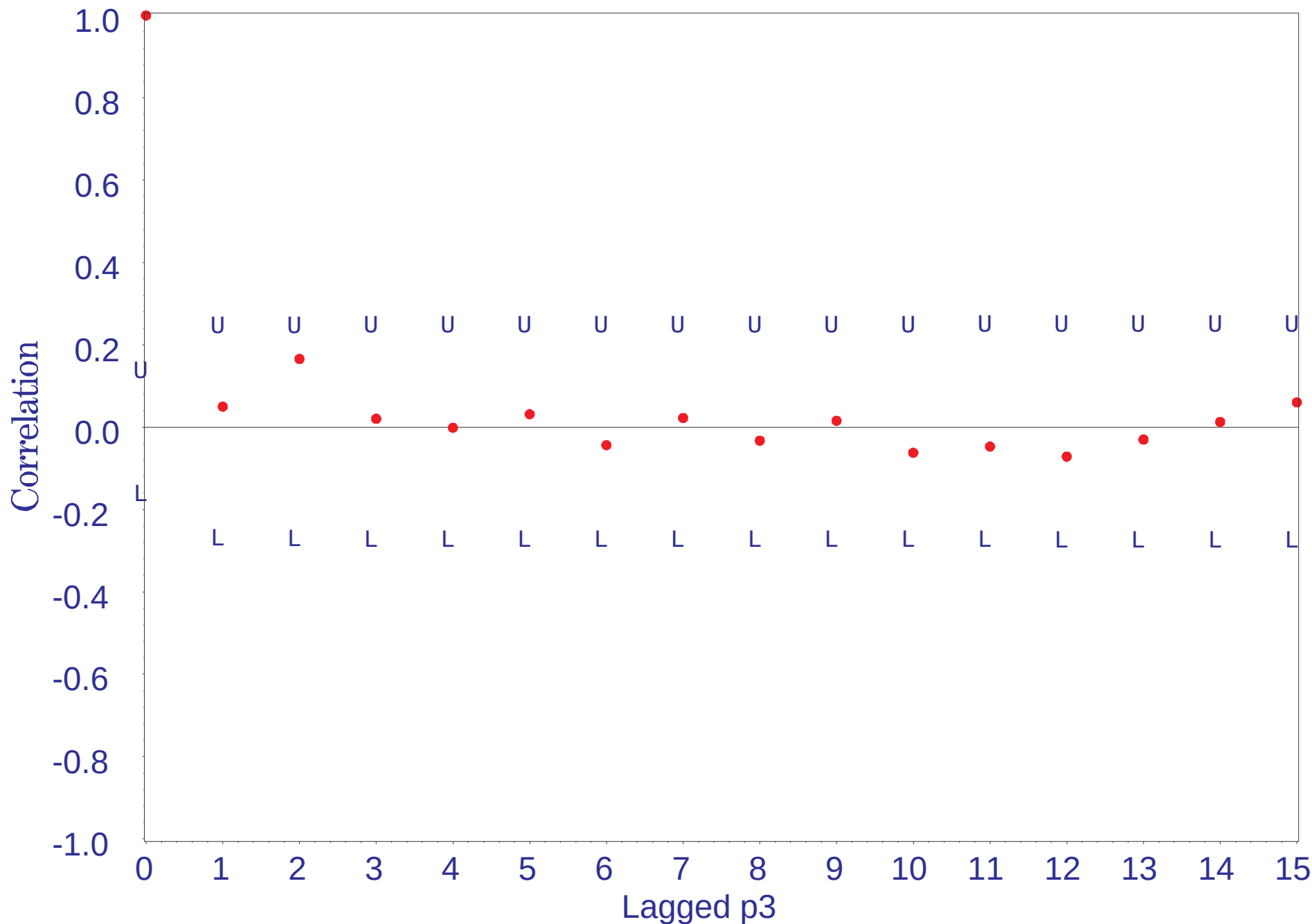
Carbon Uptake at 0 ppt Isohaline 1984-1998
Monthly Boxplots

B-221



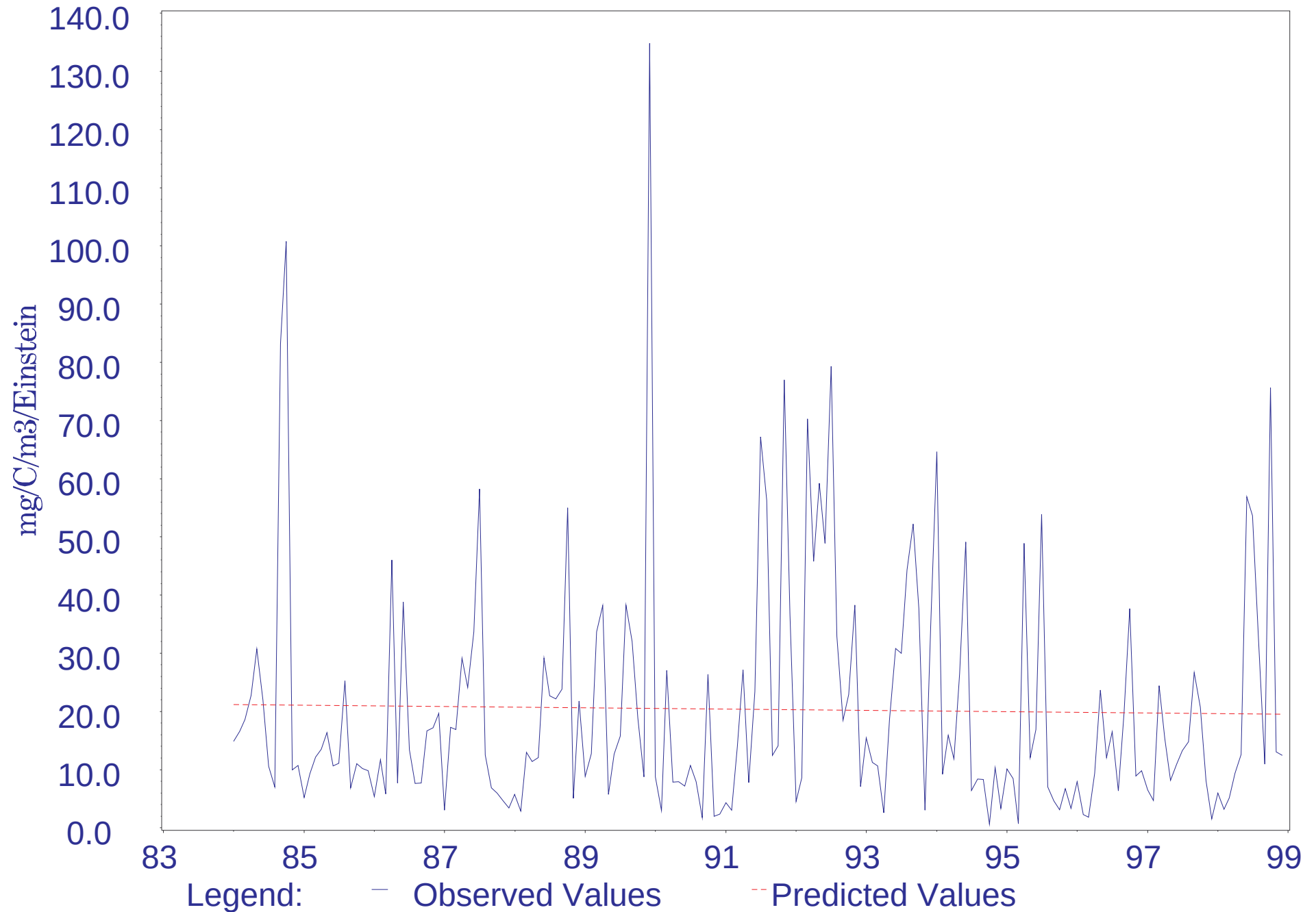
Carbon Uptake at 0 ppt Isohaline - 1984-1998
Correlogram with Upper and Lower 95% Confidence Limits

B-222



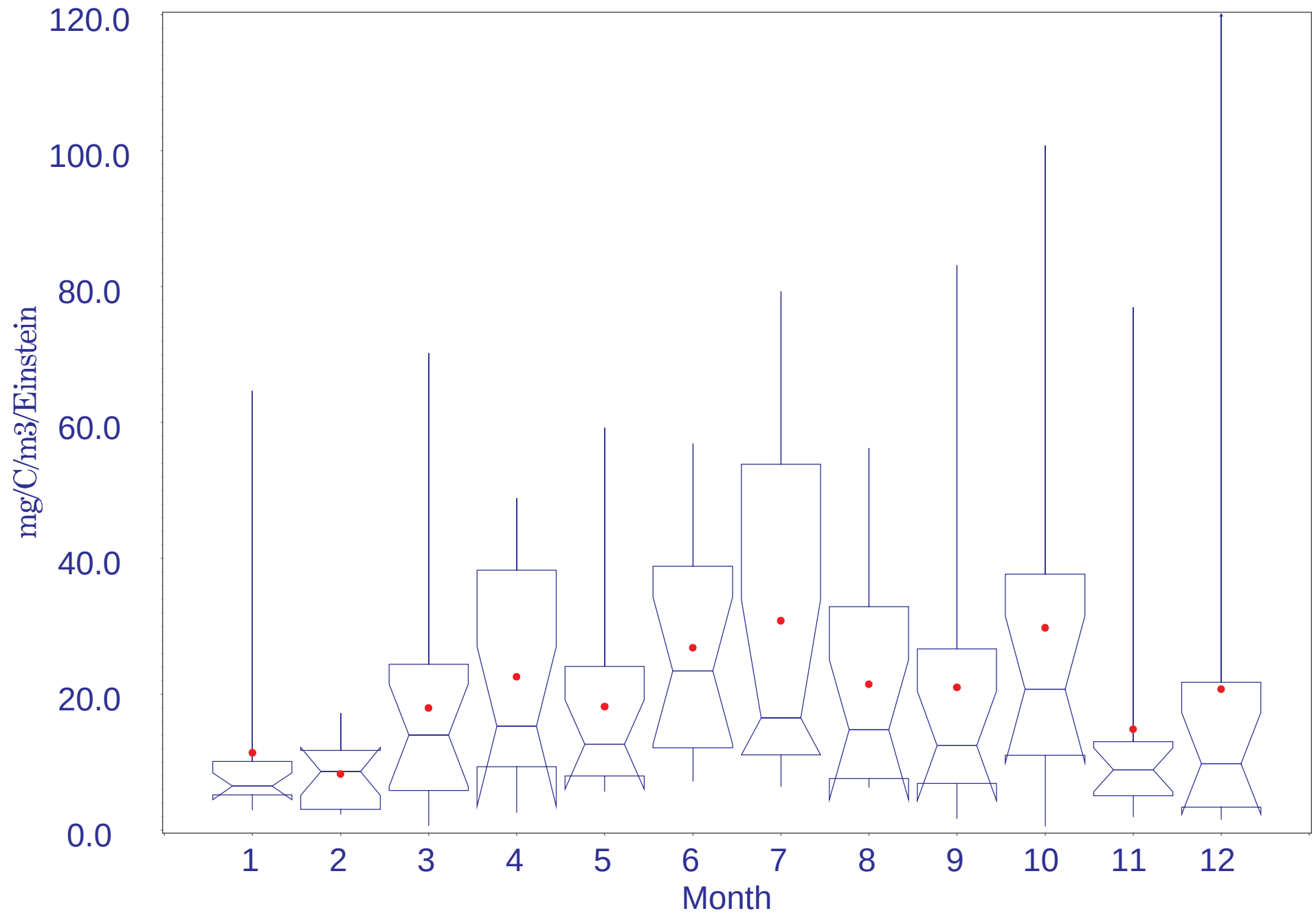
Carbon Uptake at 6 ppt Isohaline 1984-1998

B-223



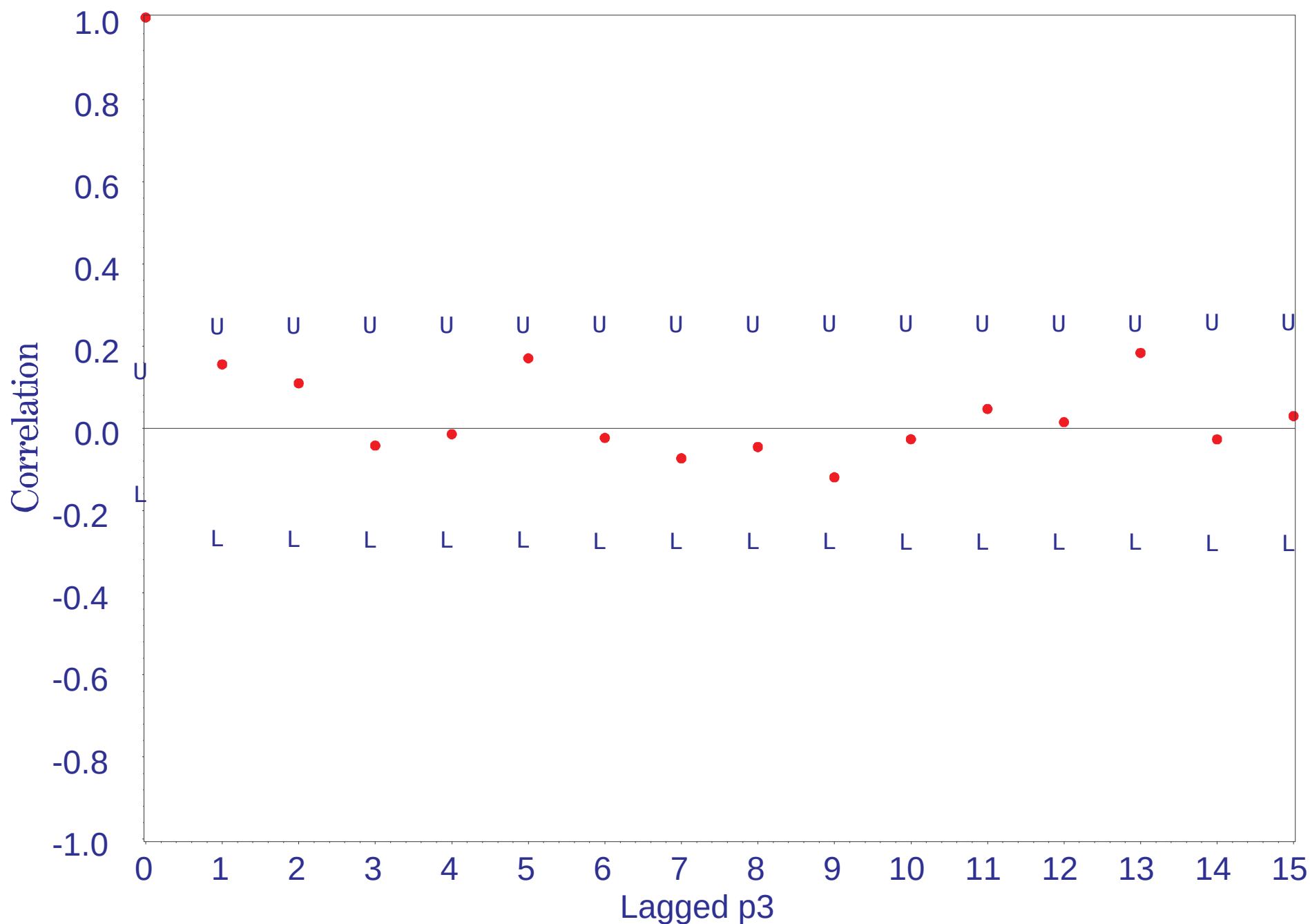
Carbon Uptake at 6 ppt Isohaline 1984-1998
Monthly Boxplots

B-224



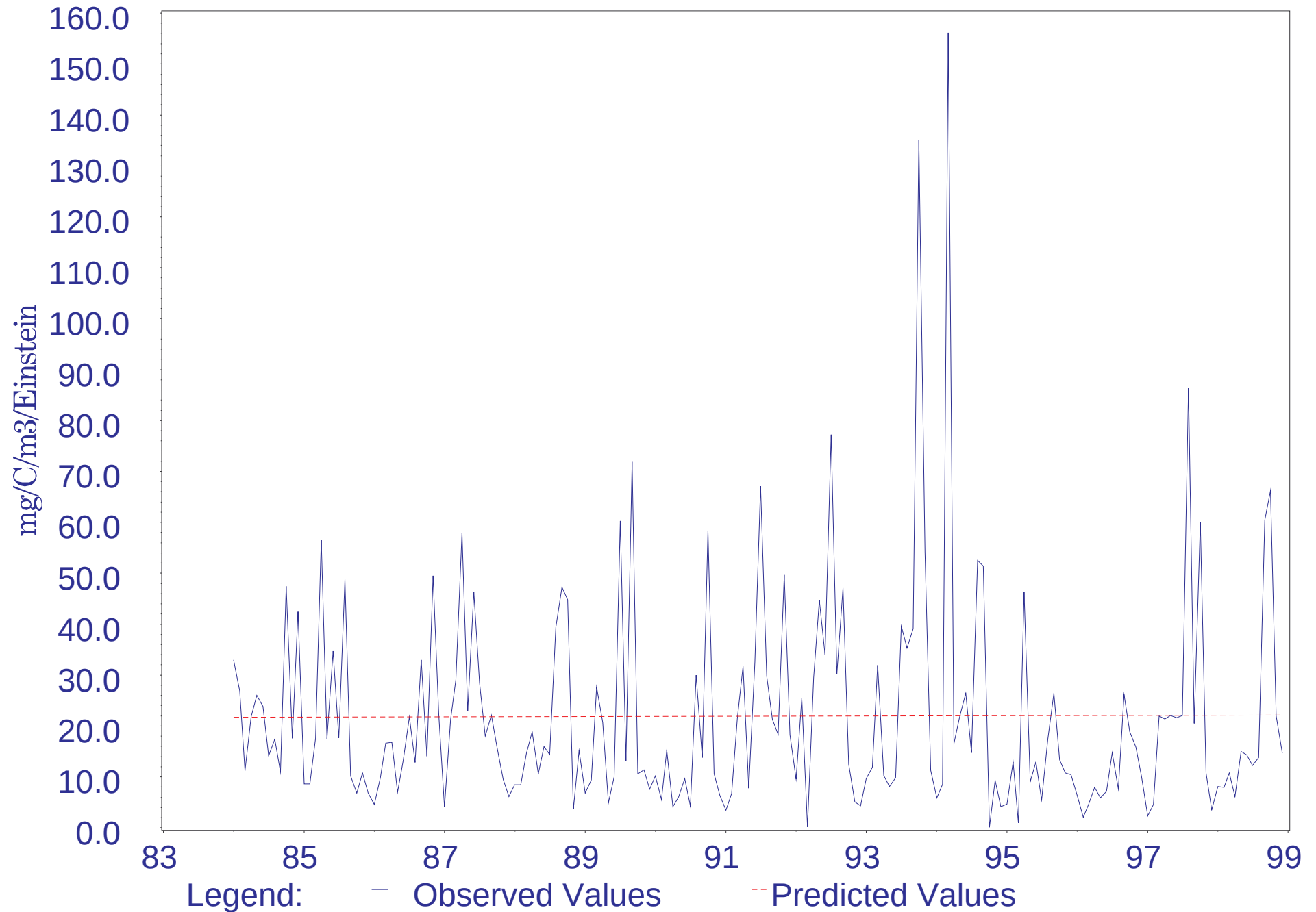
Carbon Uptake at 6 ppt Isohaline - 1984-1998
Correlogram with Upper and Lower 95% Confidence Limits

B-225



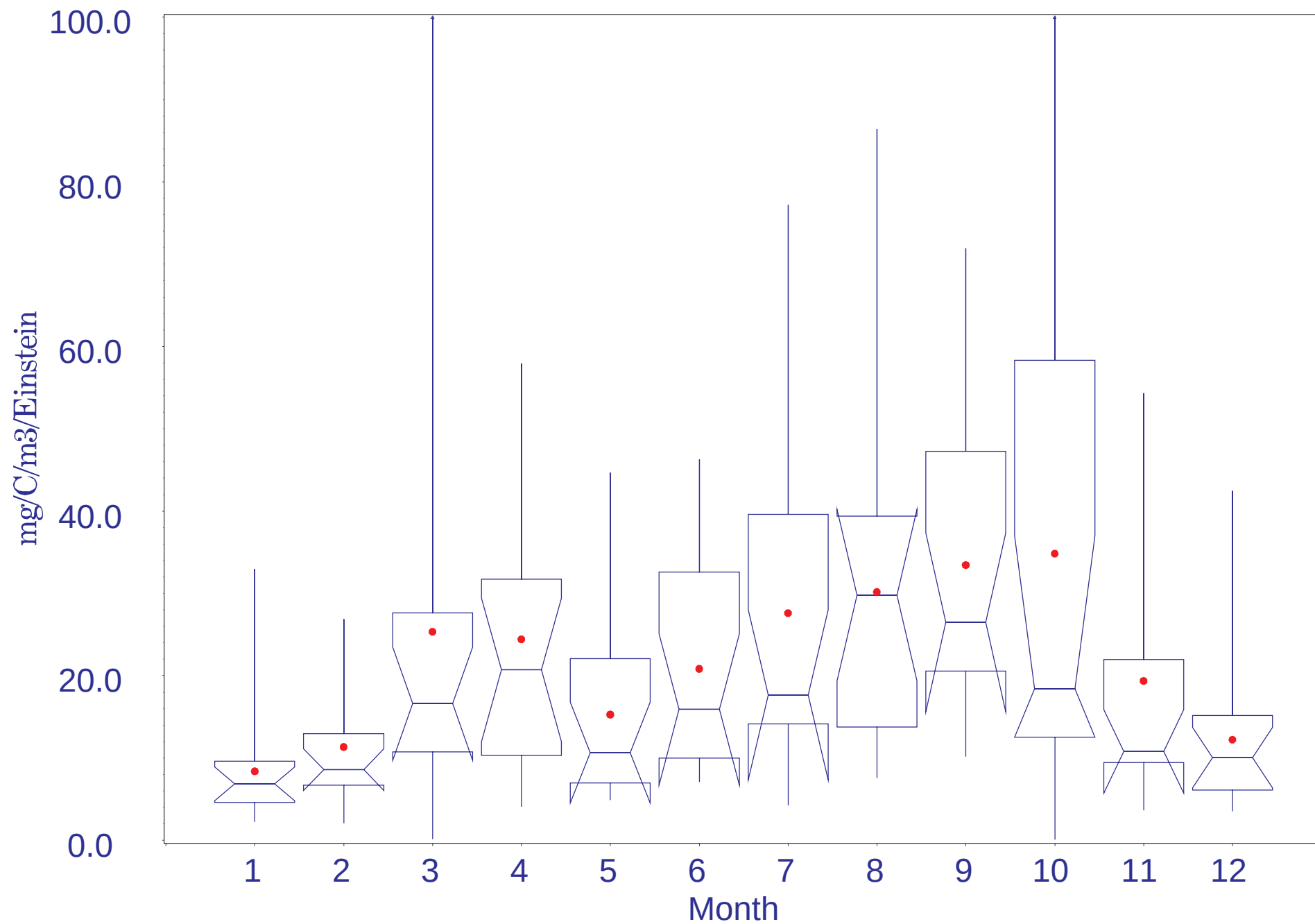
Carbon Uptake at 12 ppt Isohaline 1984-1998

B-226



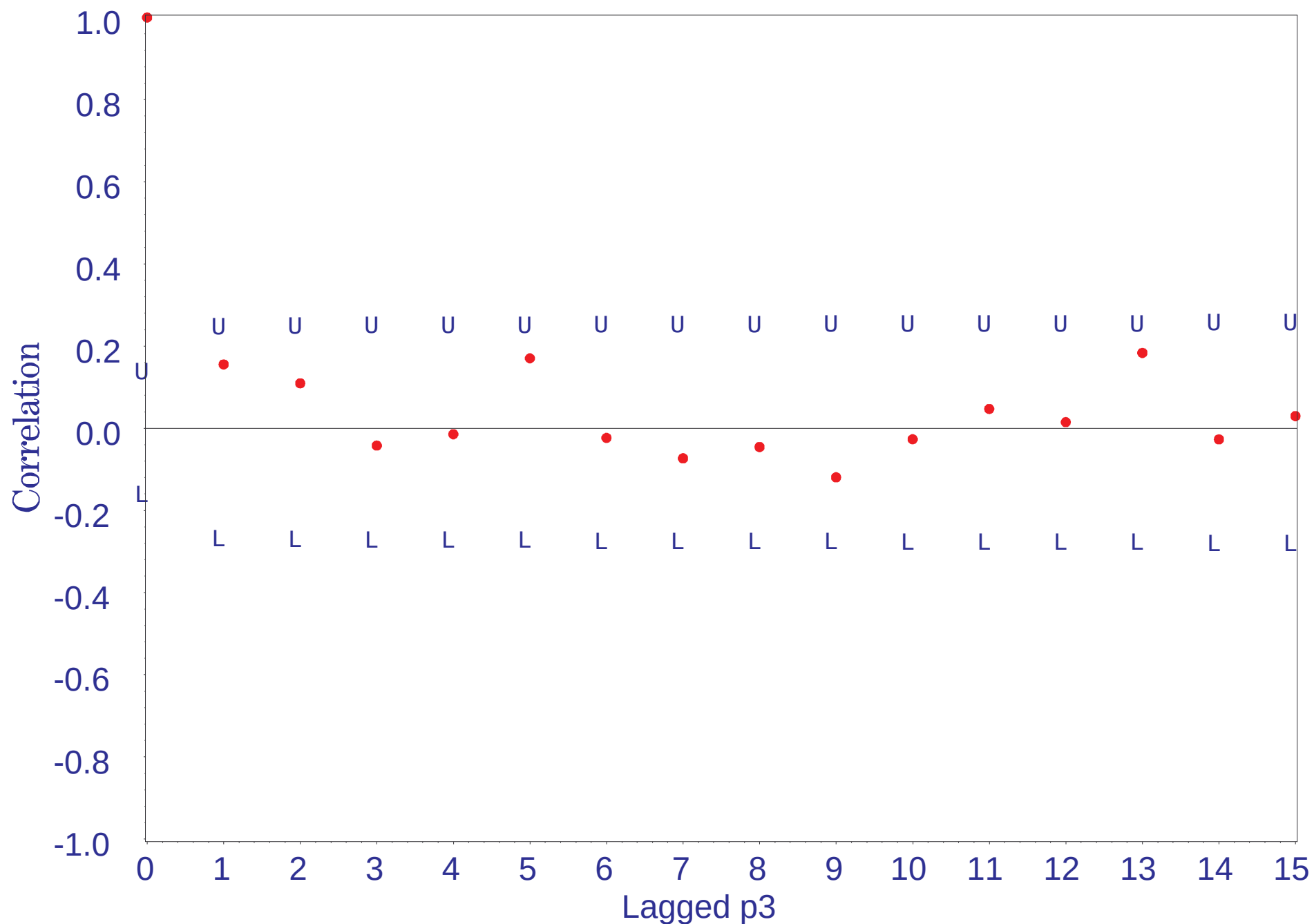
Carbon Uptake at 12 ppt Isohaline 1984-1998
Monthly Boxplots

B-227



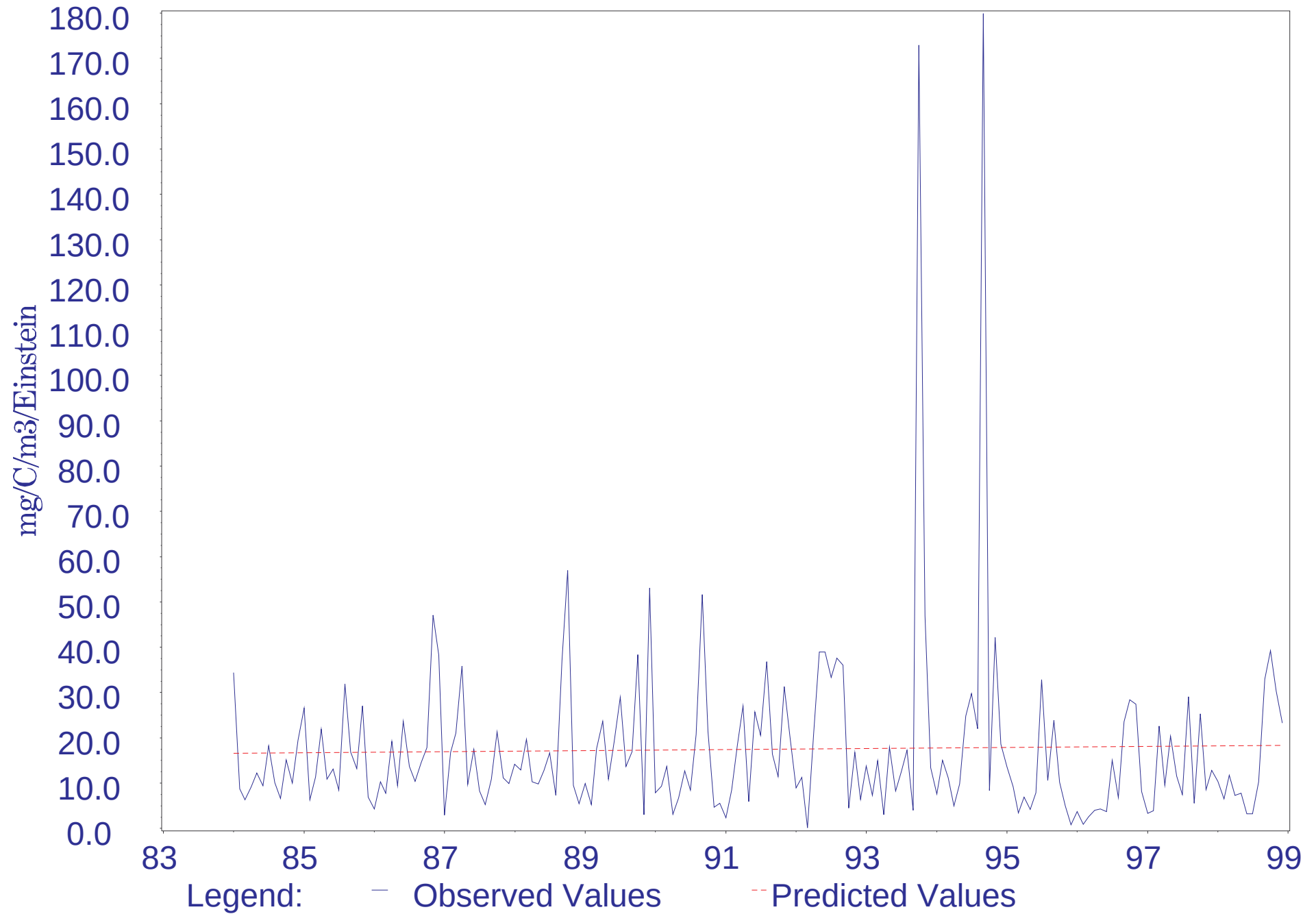
Carbon Uptake at 12 ppt Isohaline - 1984-1998
Correlogram with Upper and Lower 95% Confidence Limits

B-228



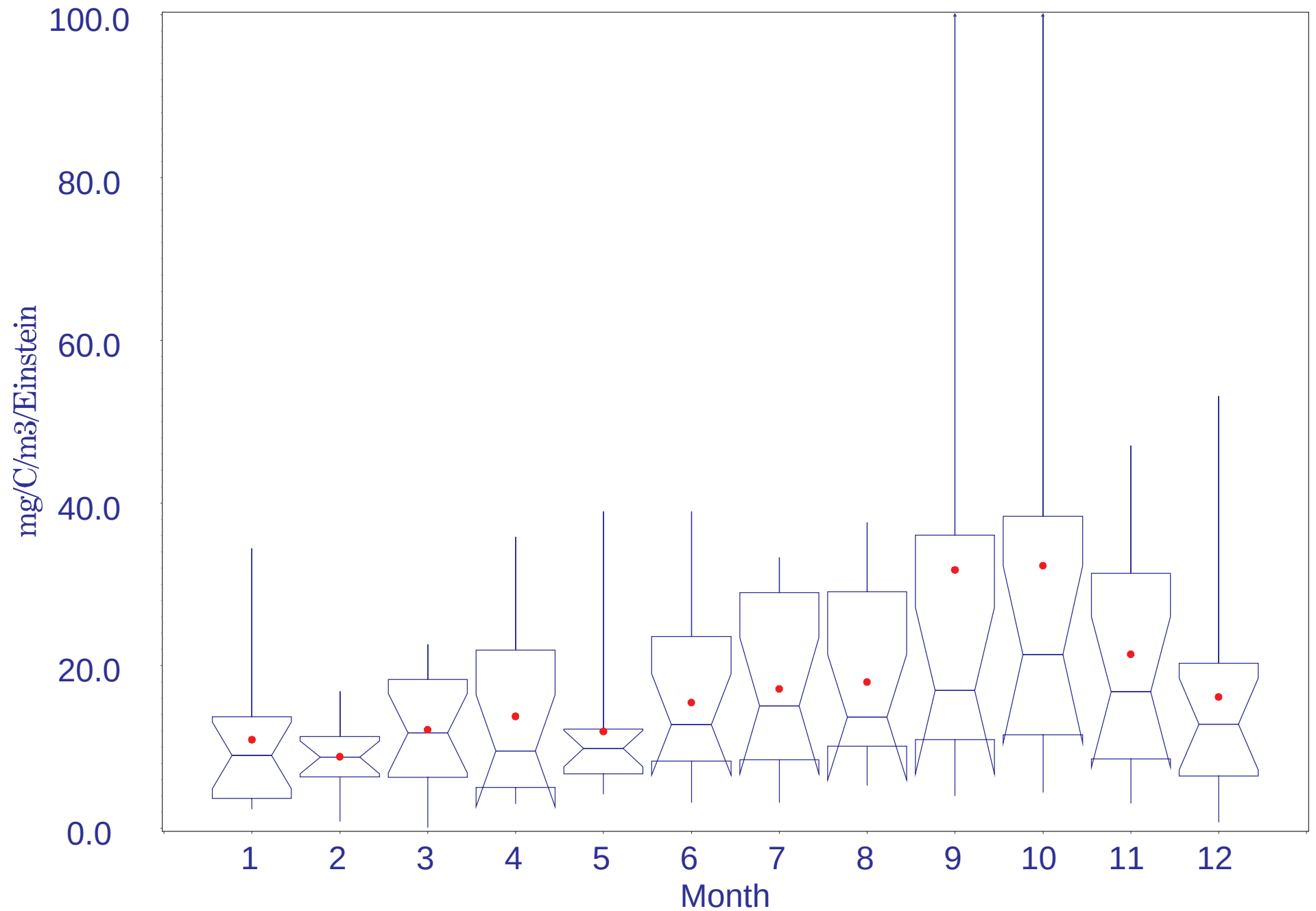
Carbon Uptake at 20 ppt Isohaline
1984-1998

B-229



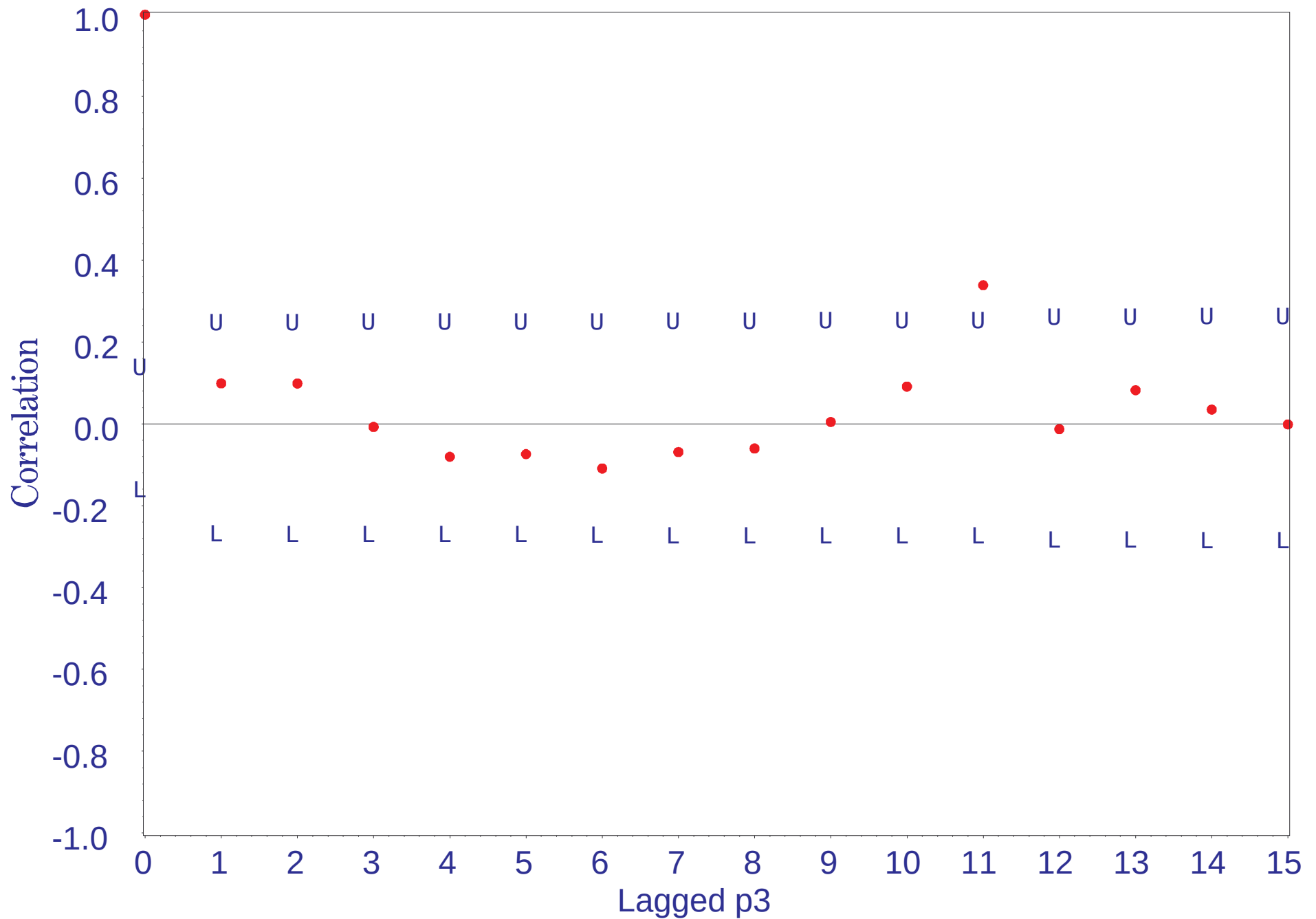
Carbon Uptake at 20 ppt Isohaline 1984-1998
Monthly Boxplots

B-230



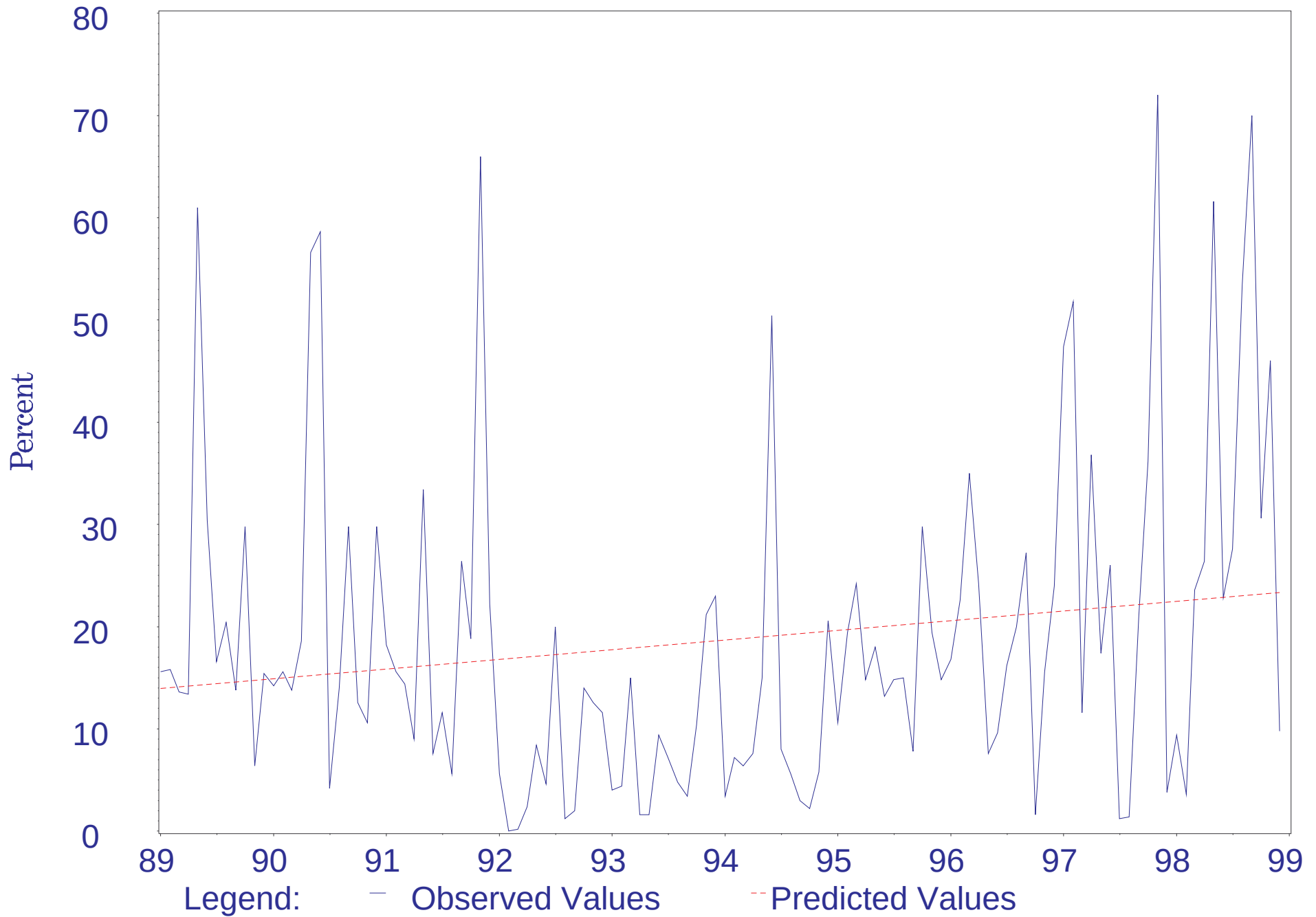
Carbon Uptake at 20 ppt Isohaline - 1984-1998
Correlogram with Upper and Lower 95% Confidence Limits

B-231



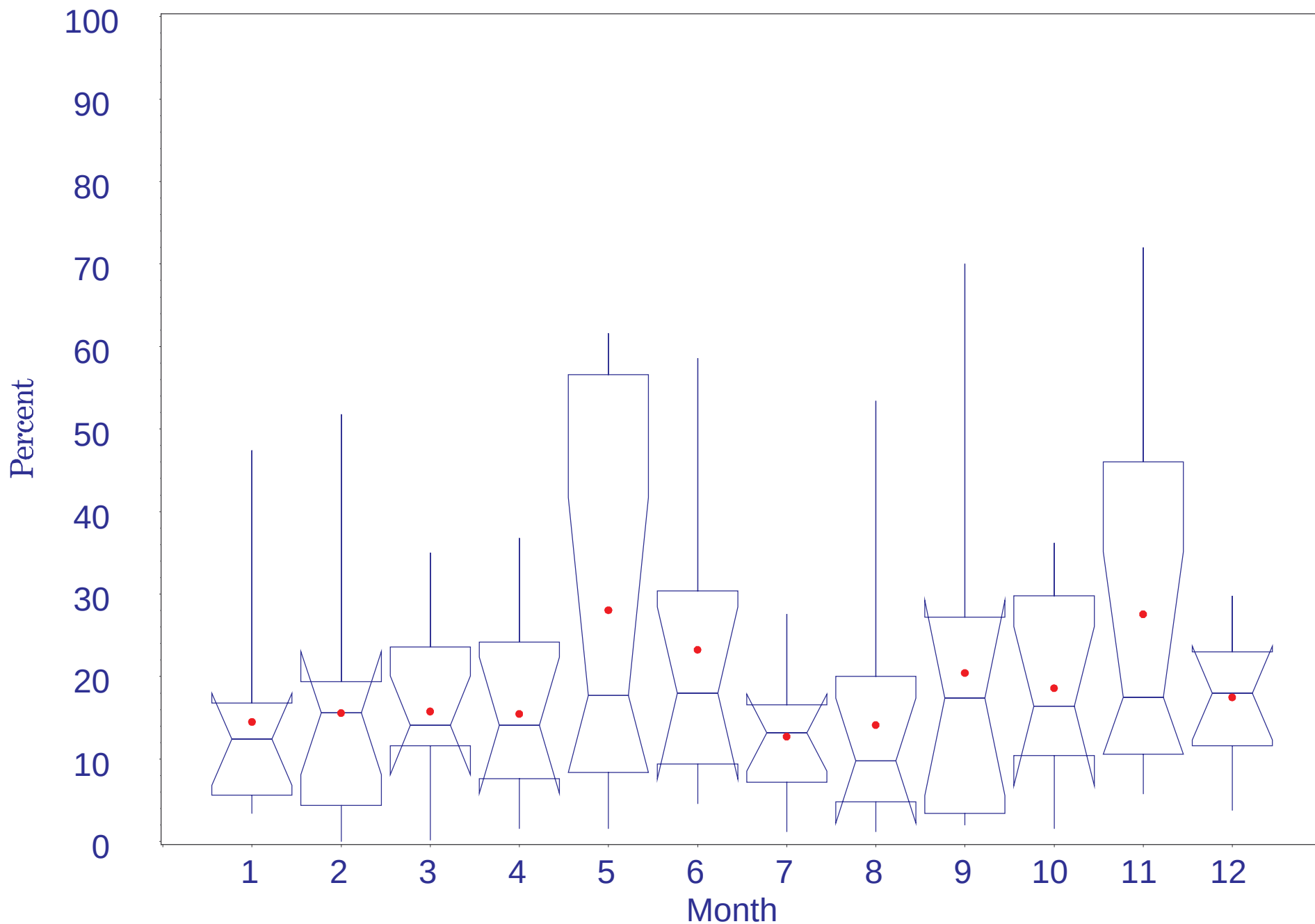
Percent Green Algae at 0 ppt Isohaline
1989-1998

B-232



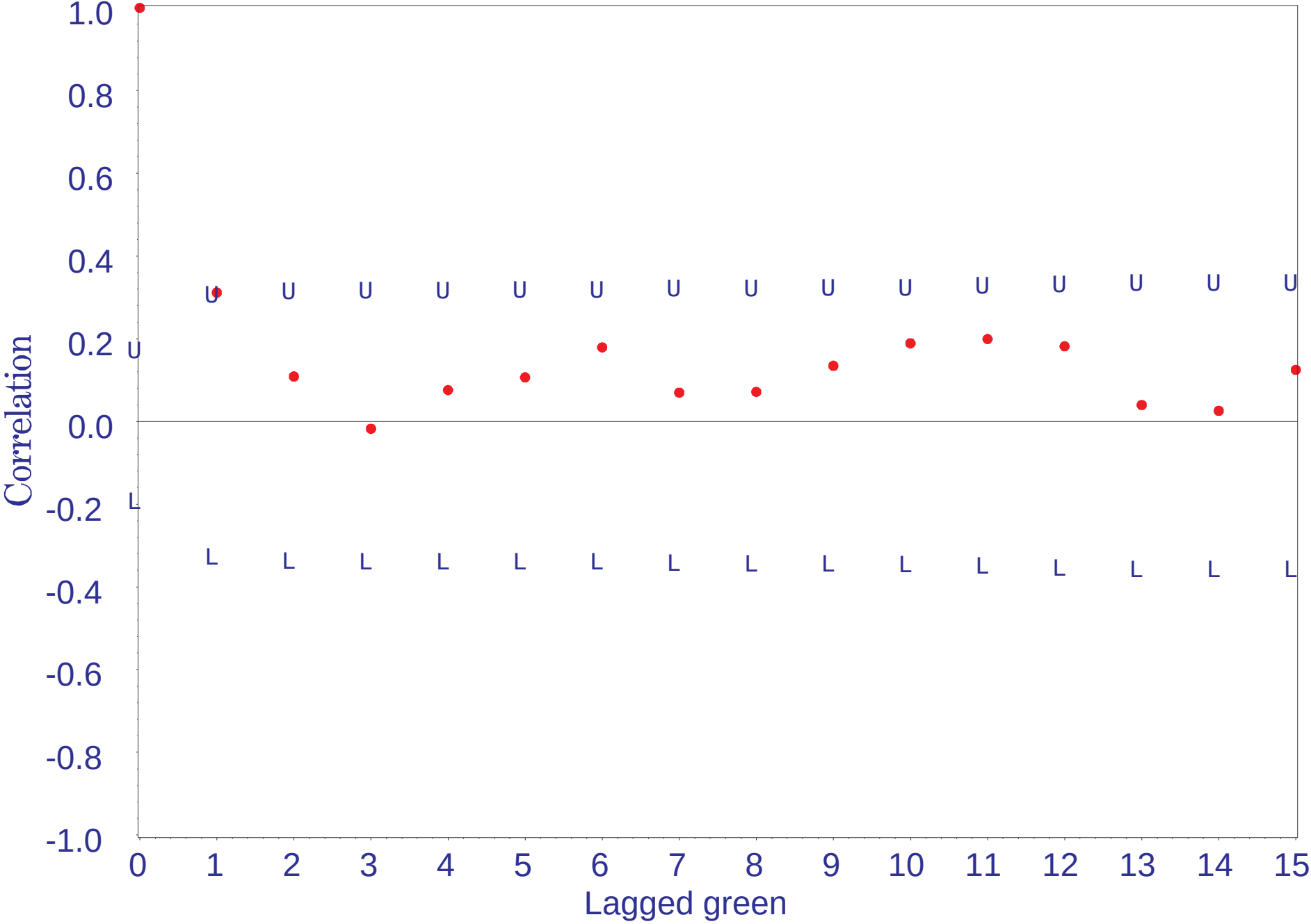
Percent Green Algae at 0 ppt Isohaline (1989-1998)
Monthly Boxplots

B-233



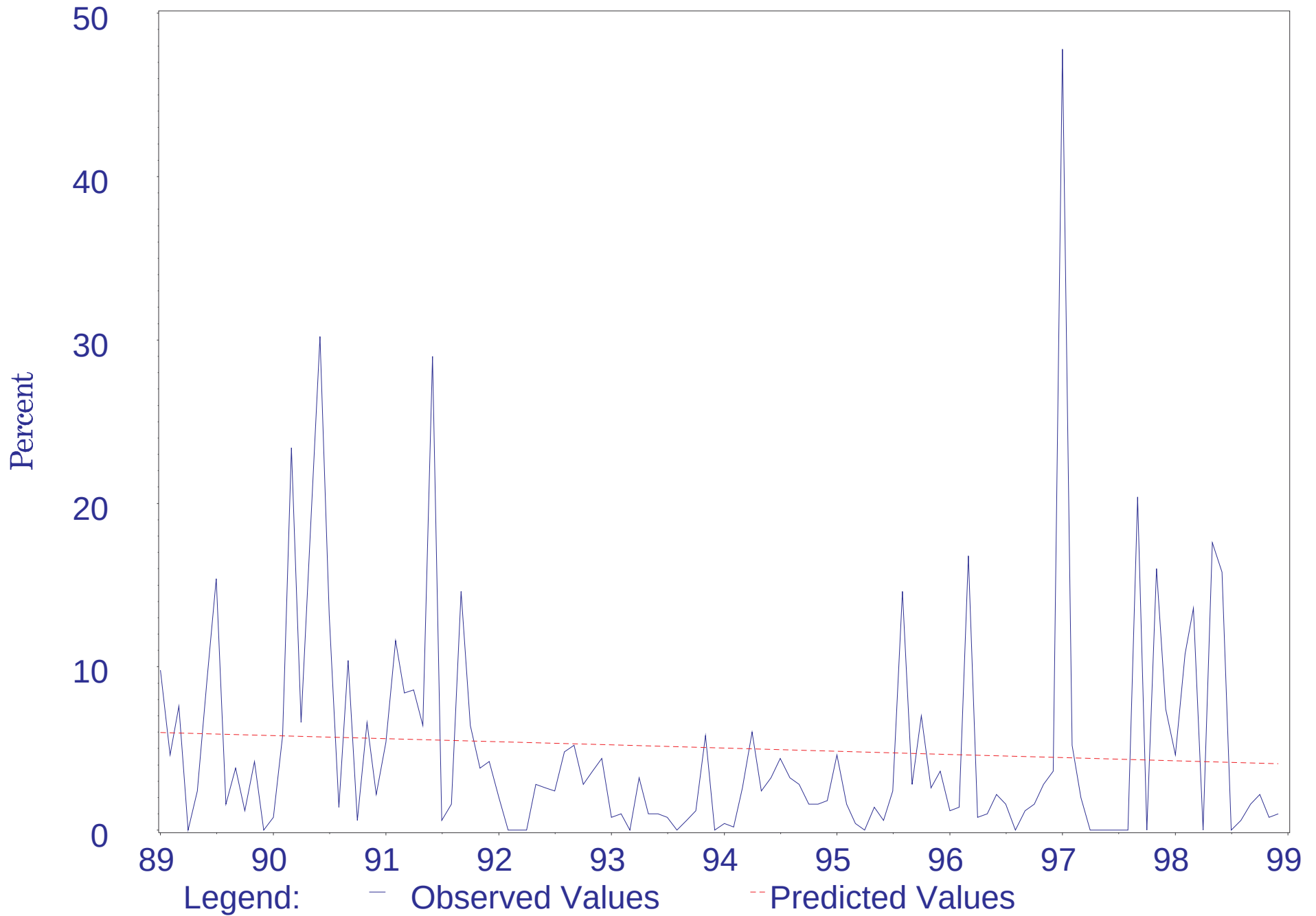
Percent of Green Algae at 0 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-234



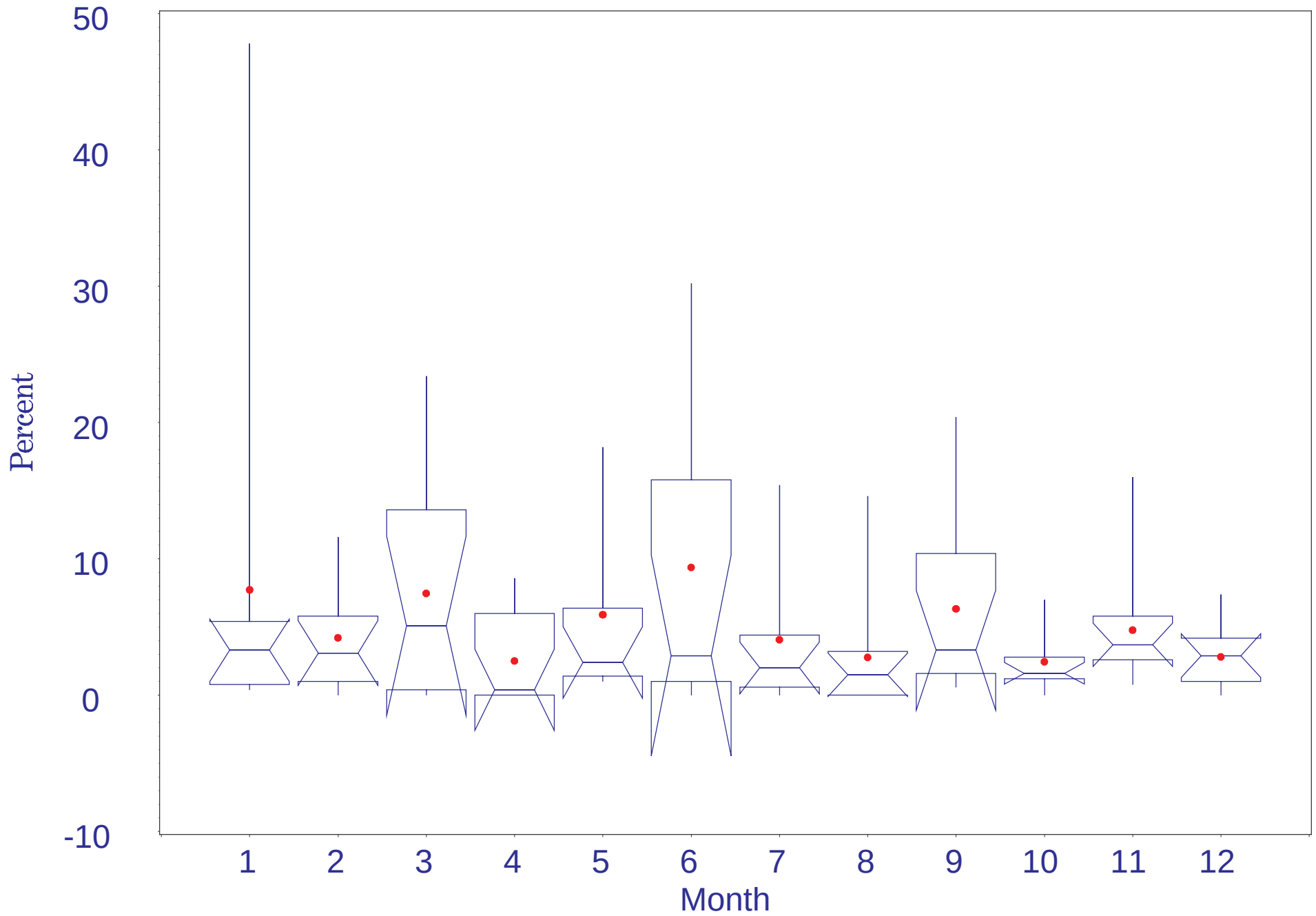
Percent Green Algae at 6 ppt Isohaline
1989-1998

B-235



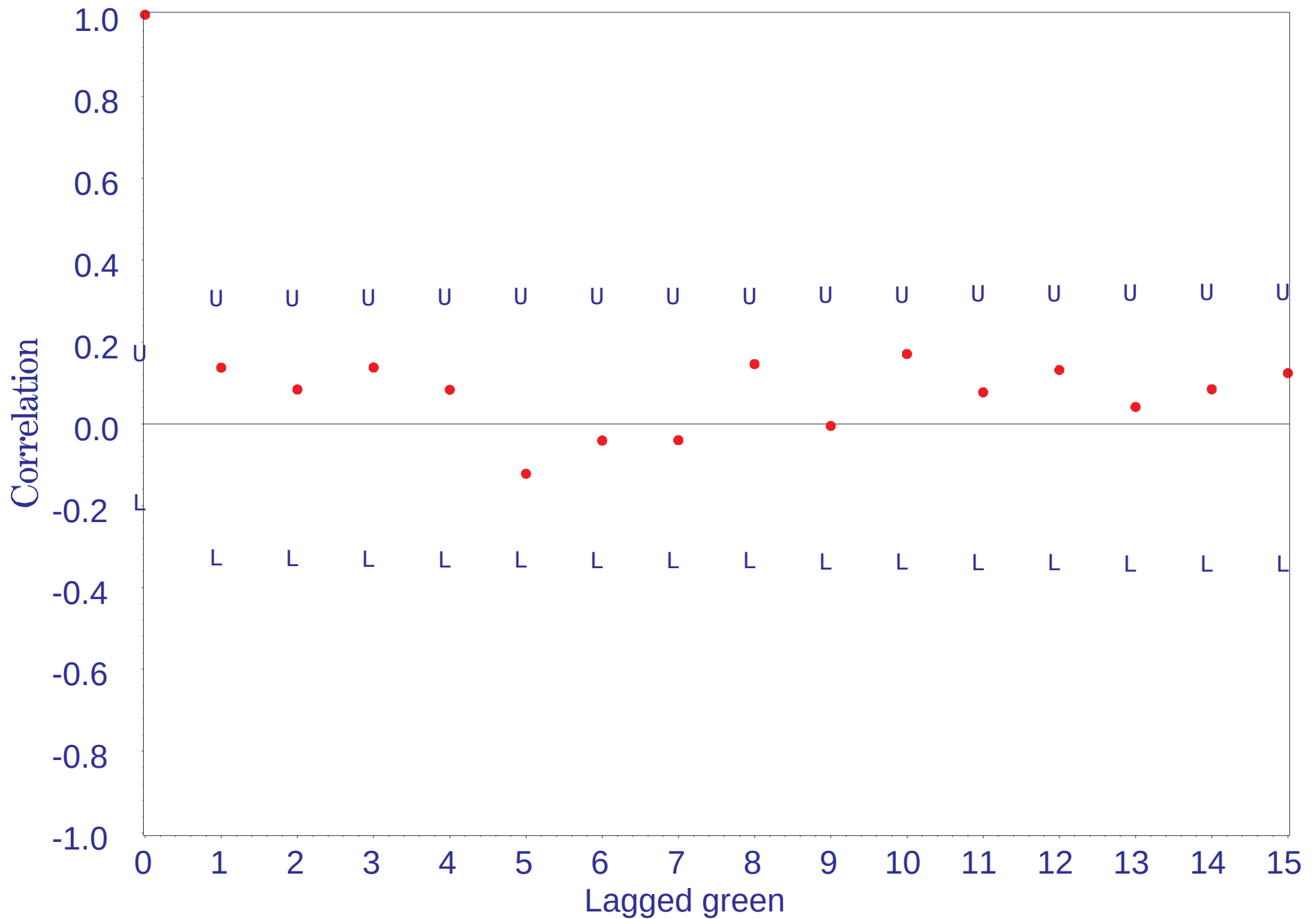
Percent Green Algae at 6 ppt Isohaline (1989-1998)
Monthly Boxplots

B-236



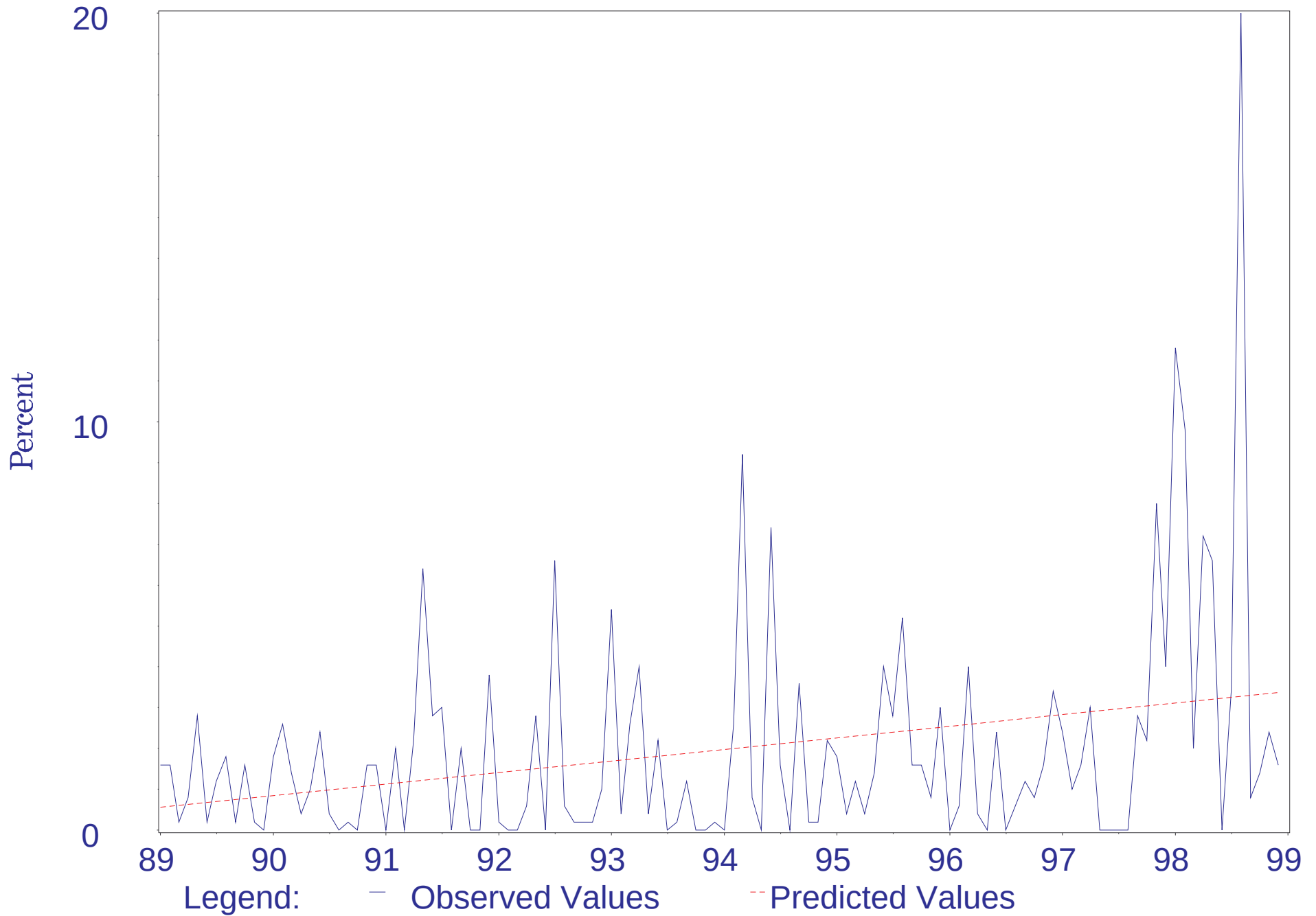
Percent of Green Algae at 6 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-237



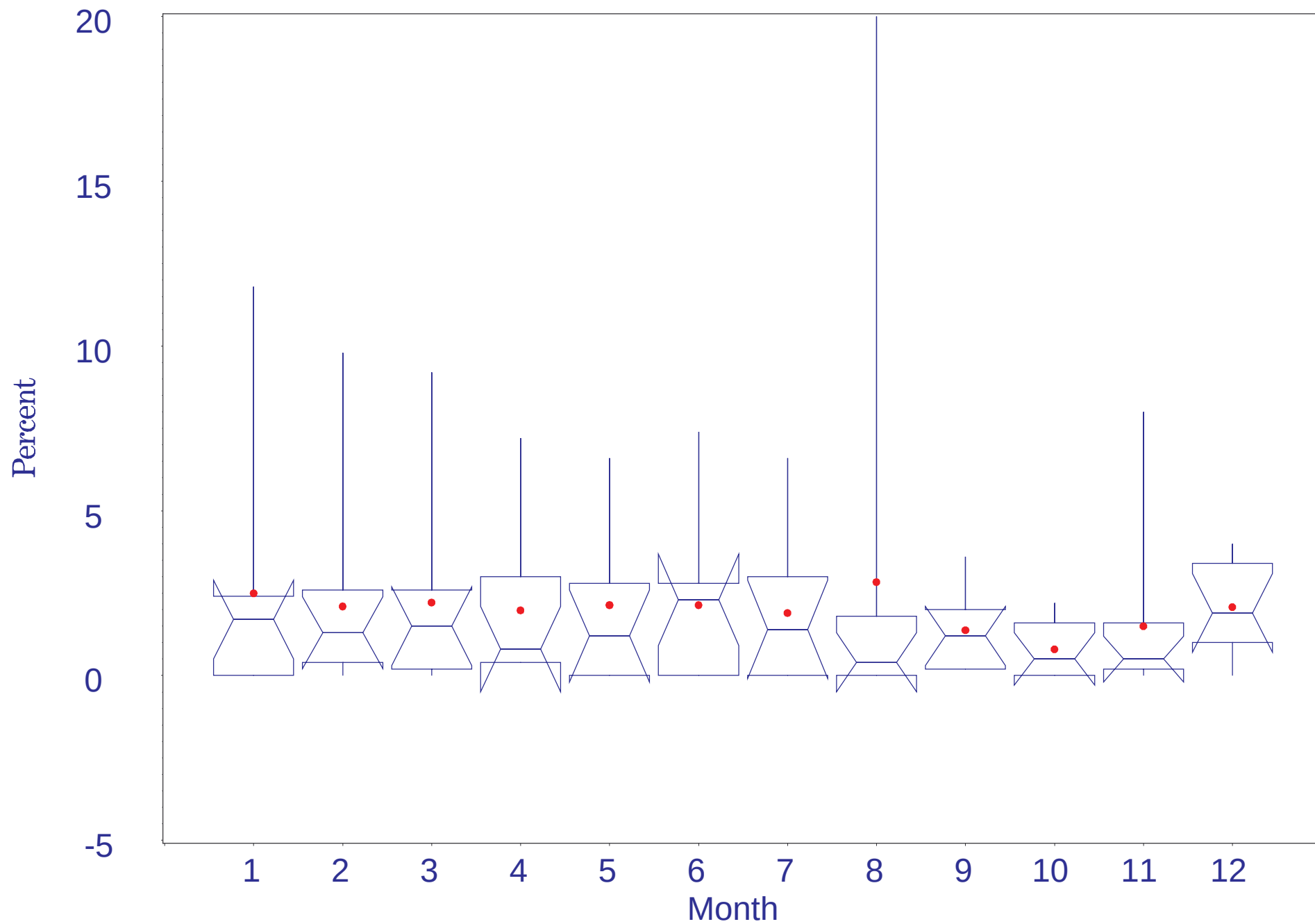
Percent Green Algae at 12 ppt Isohaline
1989-1998

B-238



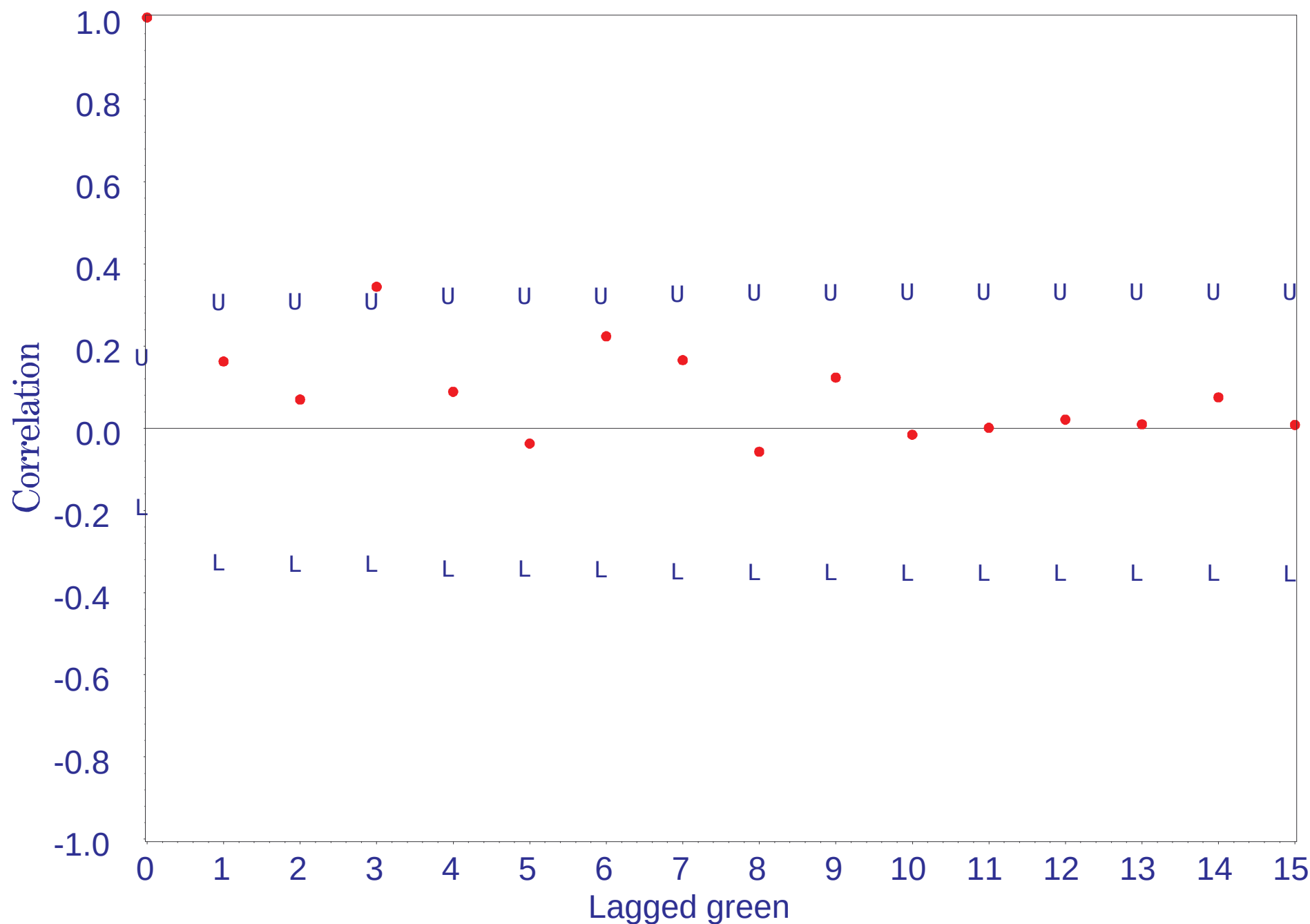
Percent Green Algae at 12 ppt Isohaline (1989-1998)
Monthly Boxplots

B-239



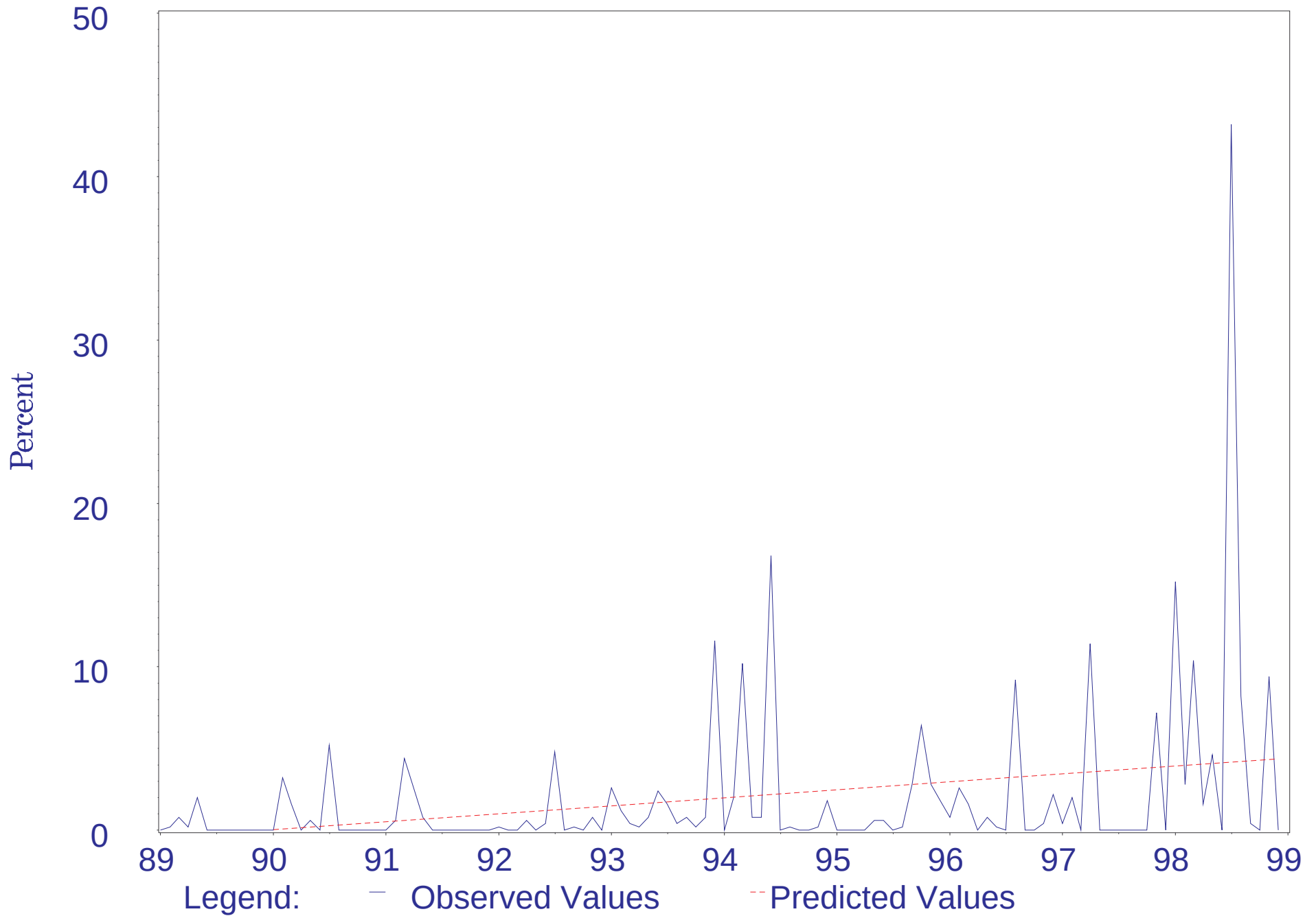
Percent of Green Algae at 12 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-240



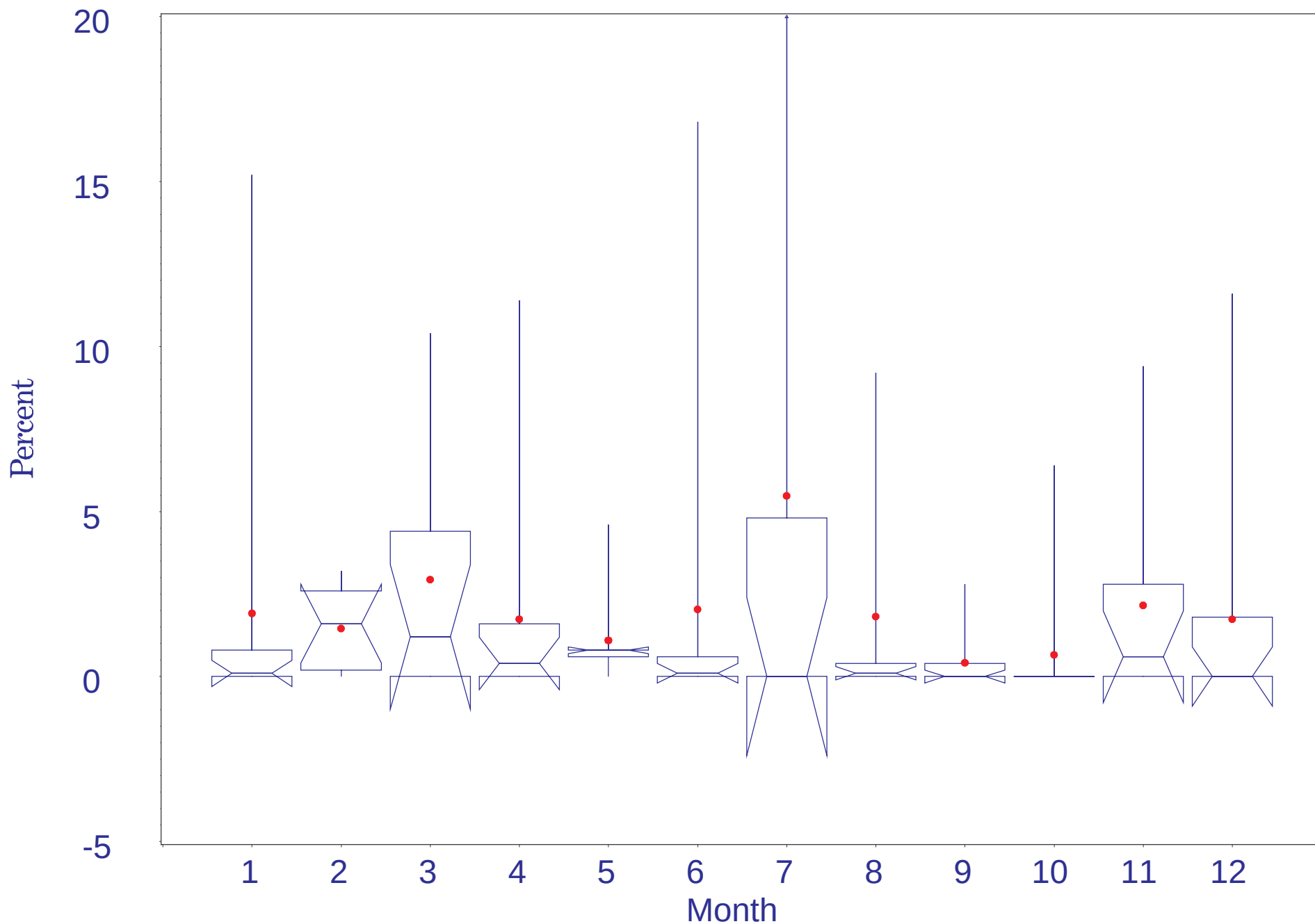
Percent Green Algae at 20 ppt Isohaline
1989-1998

B-241



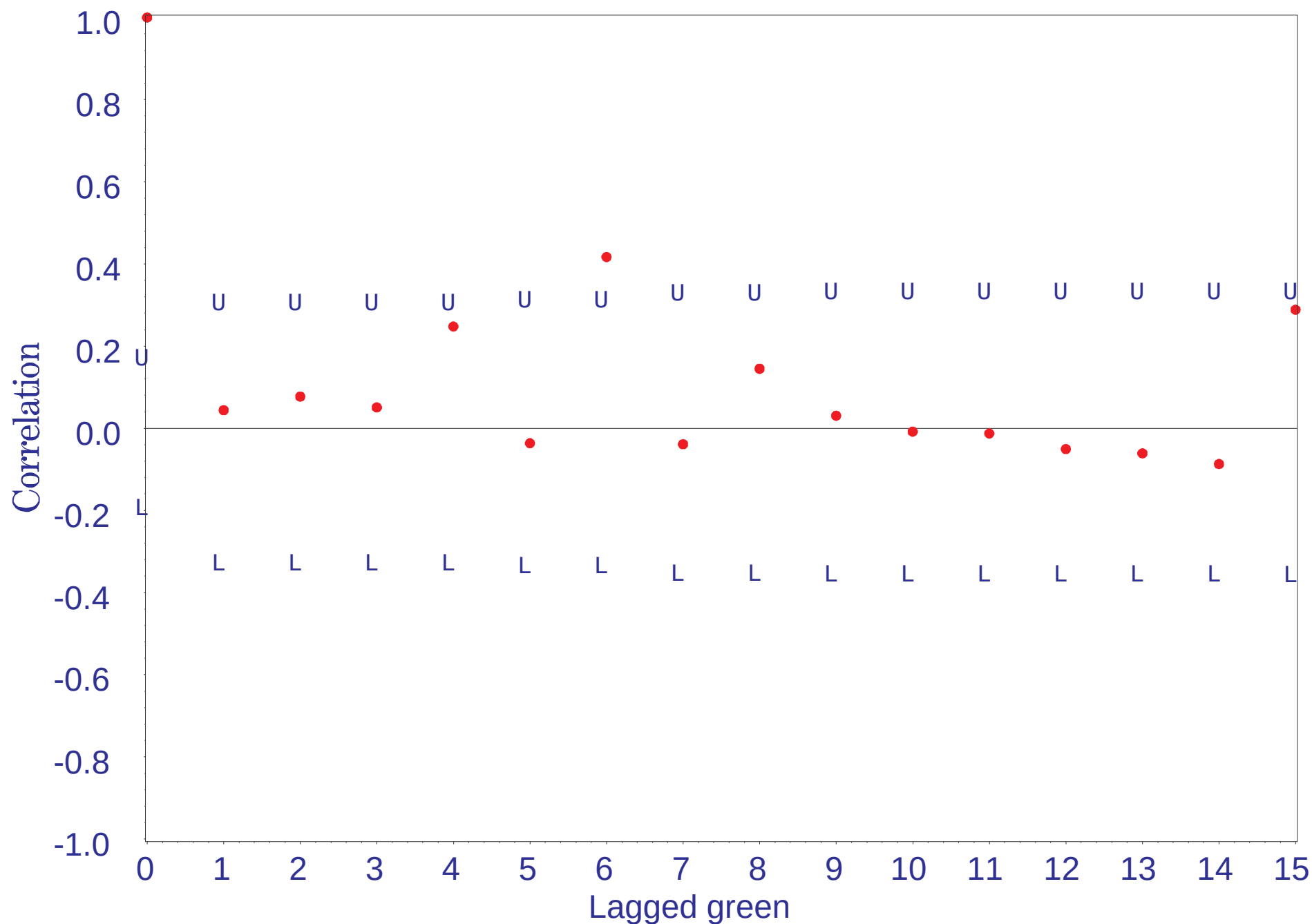
Percent Green Algae at 20 ppt Isohaline (1989-1998)
Monthly Boxplots

B-242



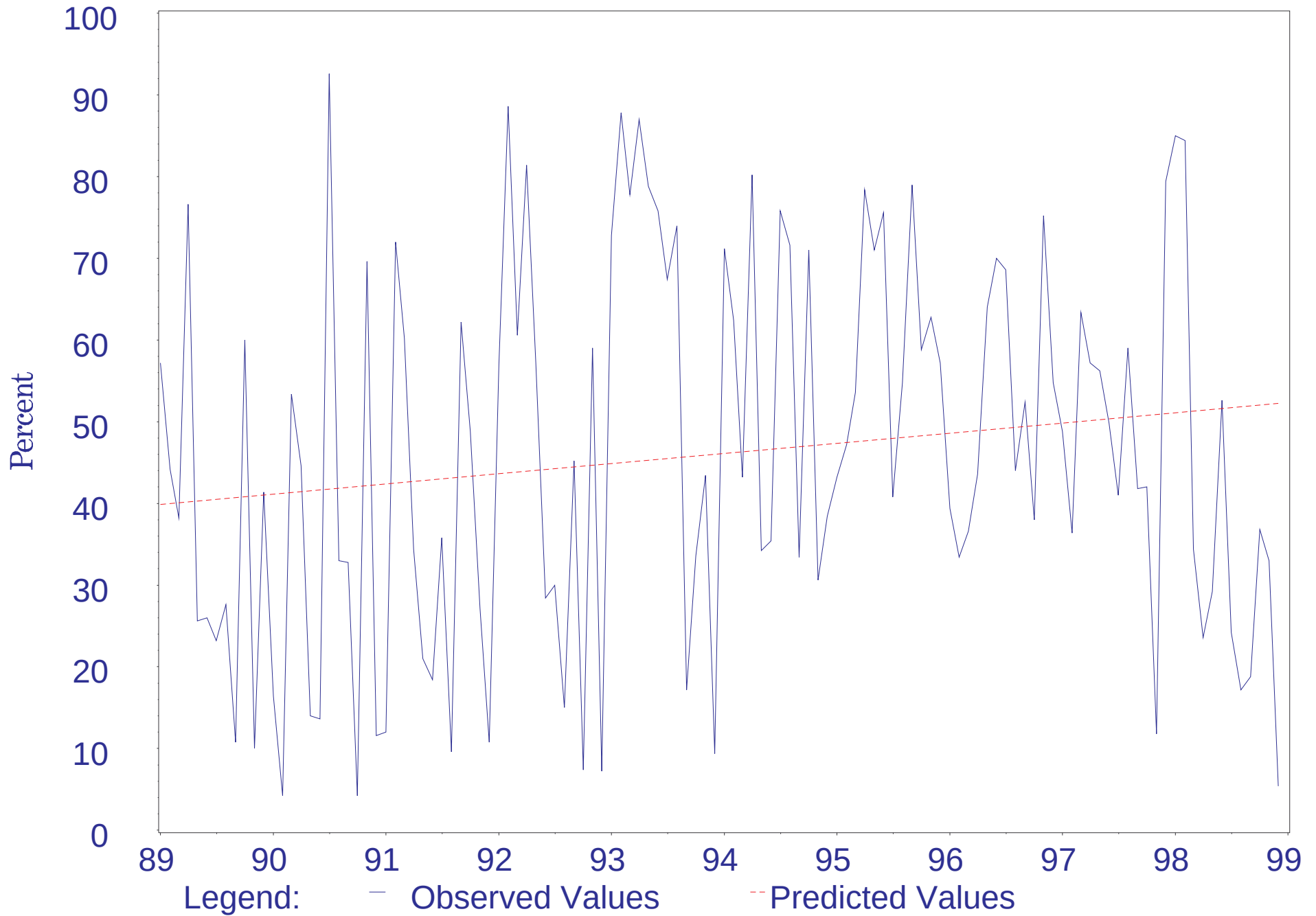
Percent of Green Algae at 20 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-243



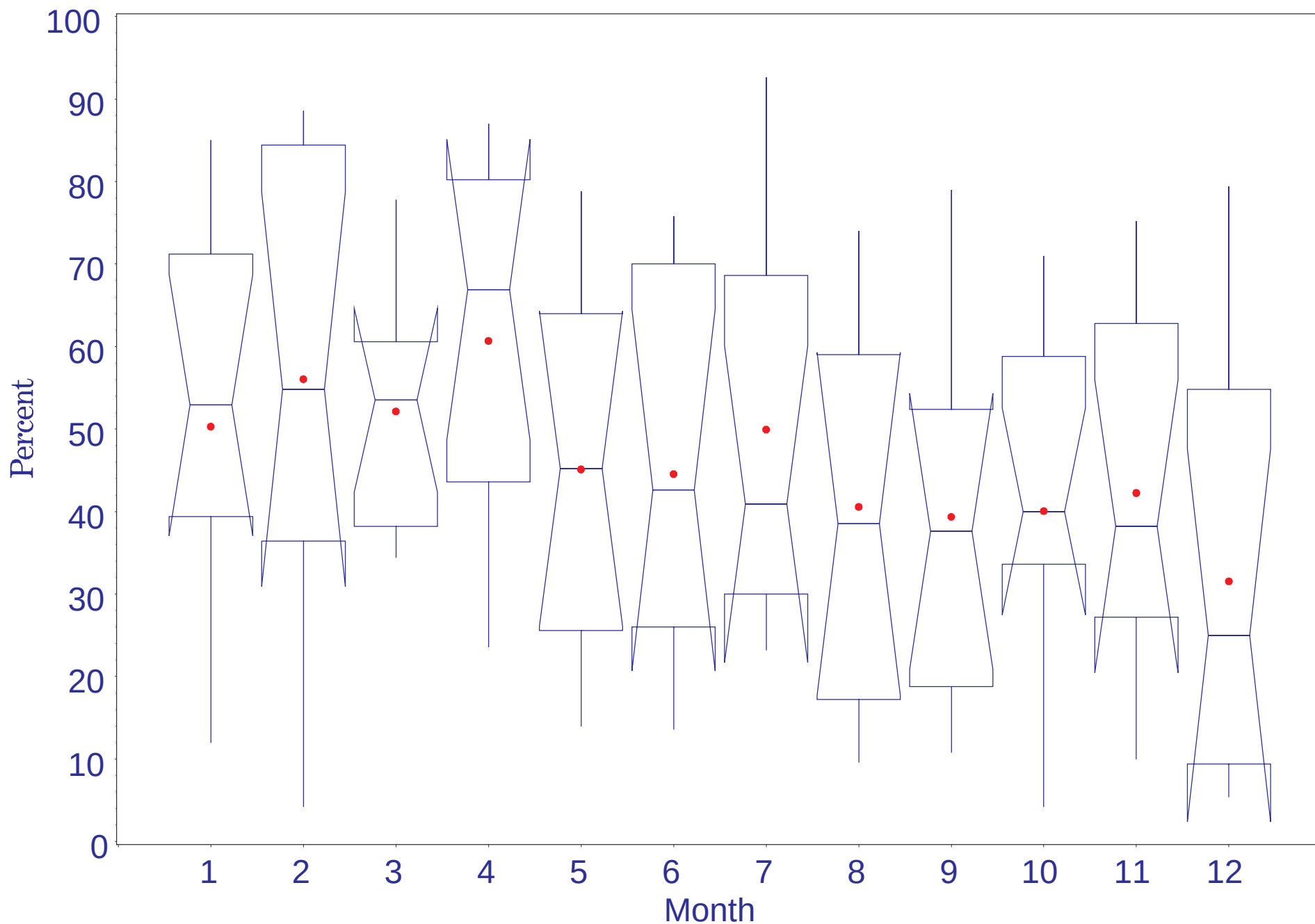
Percent Blue-Green Algae at 0 ppt Isohaline
1989-1998

B-244



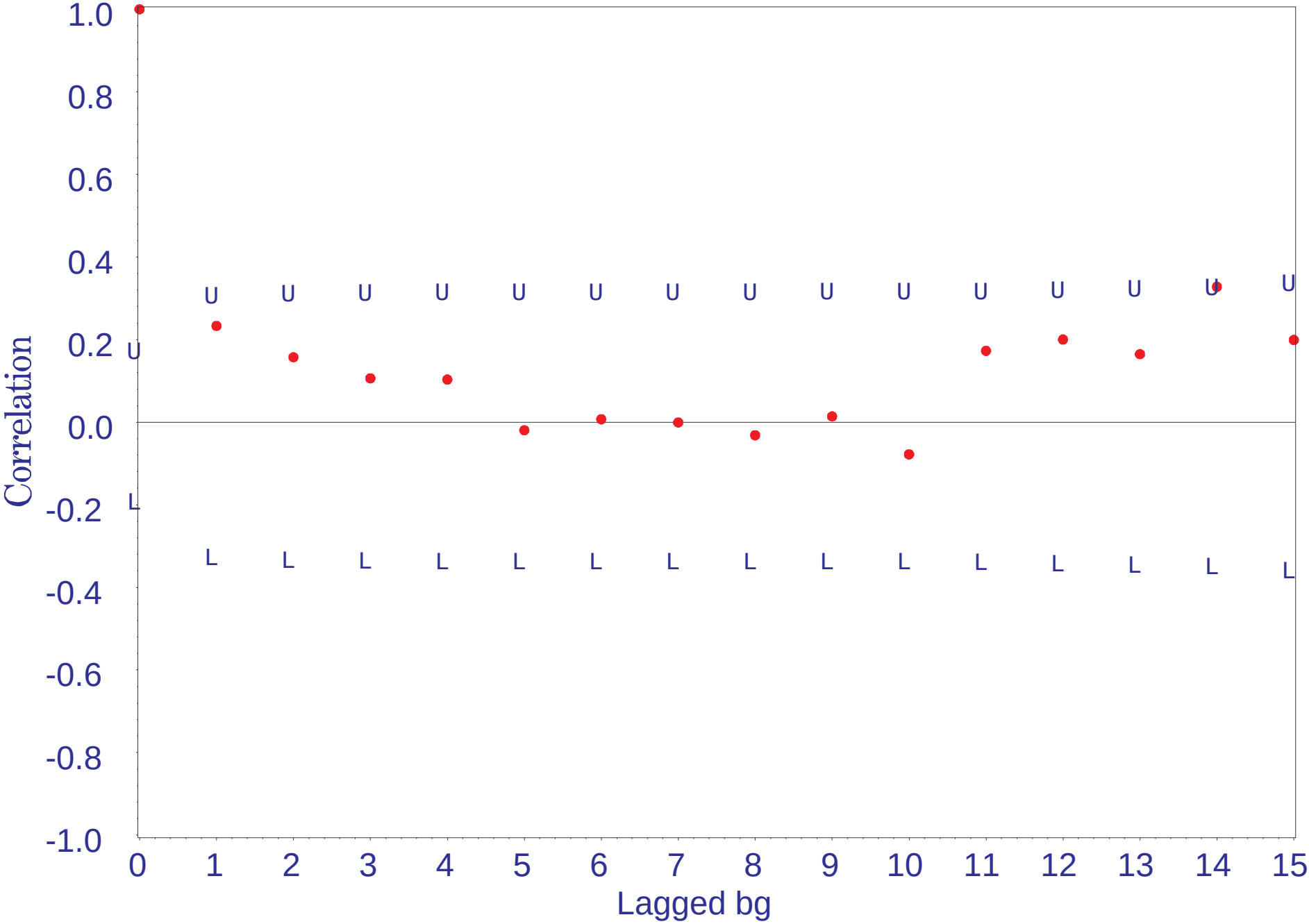
Percent Blue-Green Algae at 0 ppt Isohaline (1989-1998)
Monthly Boxplots

B-245



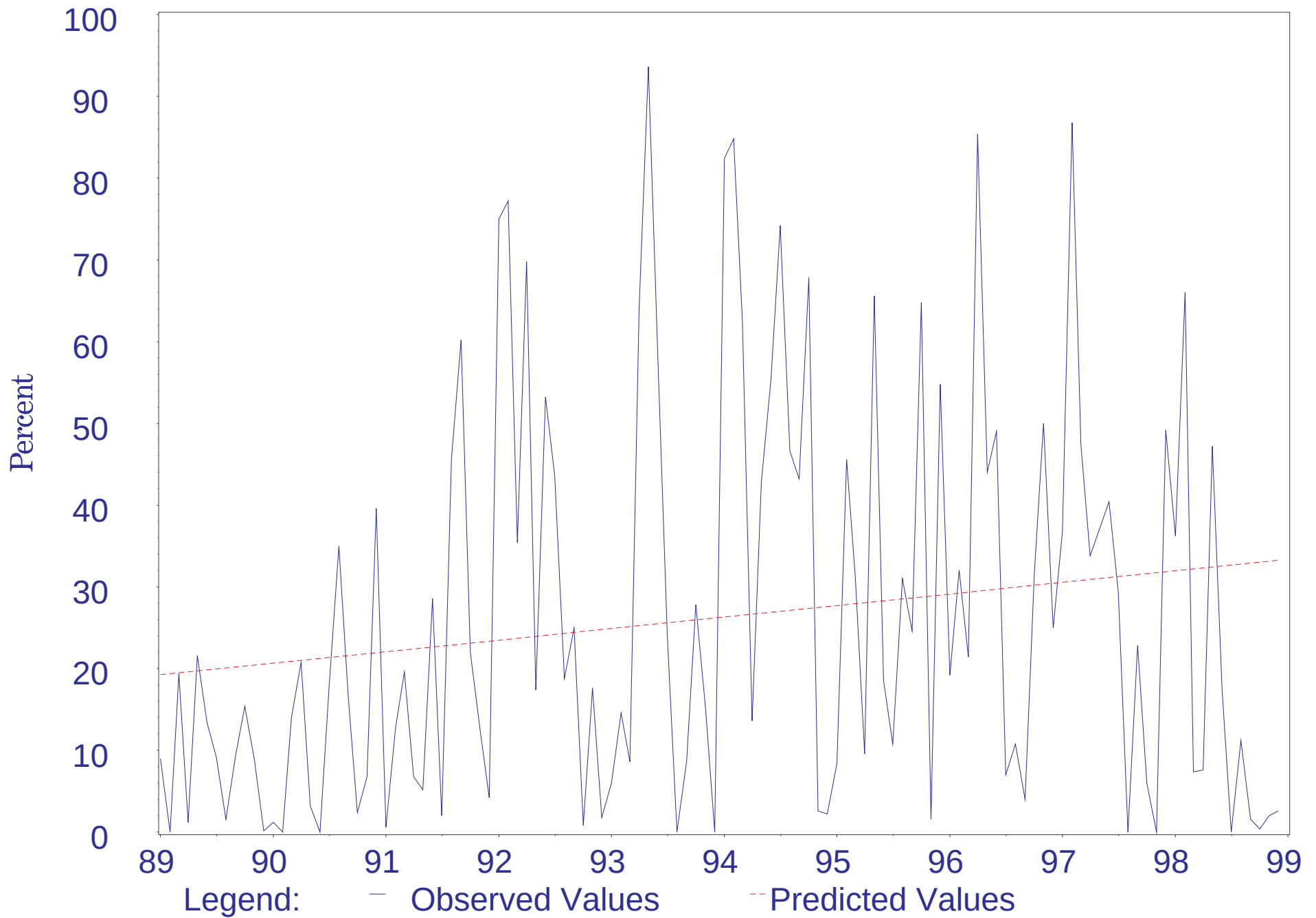
Percent of Blue-Green Algae at 0 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-246



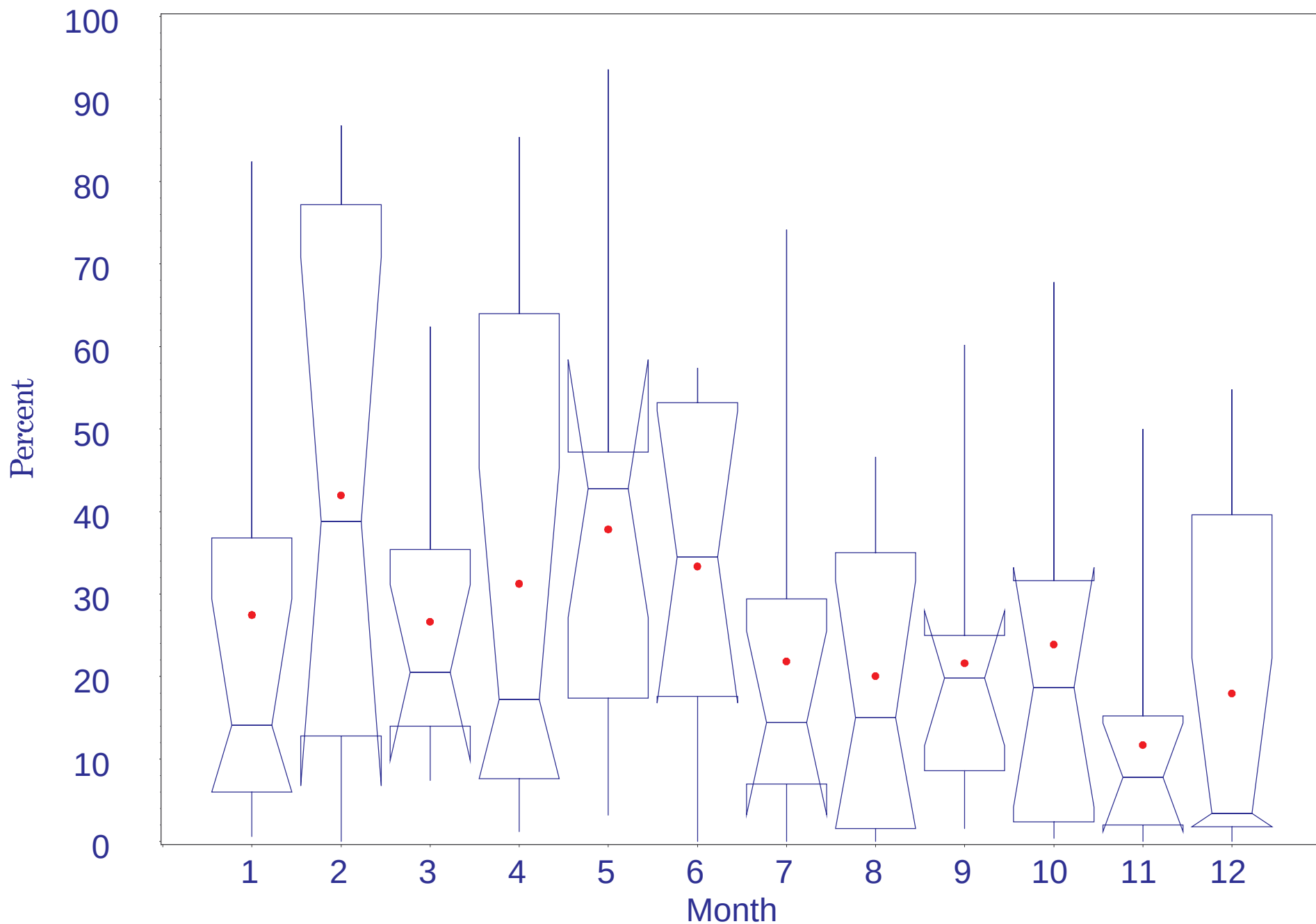
Percent Blue-Green Algae at 6 ppt Isohaline
1989-1998

B-247



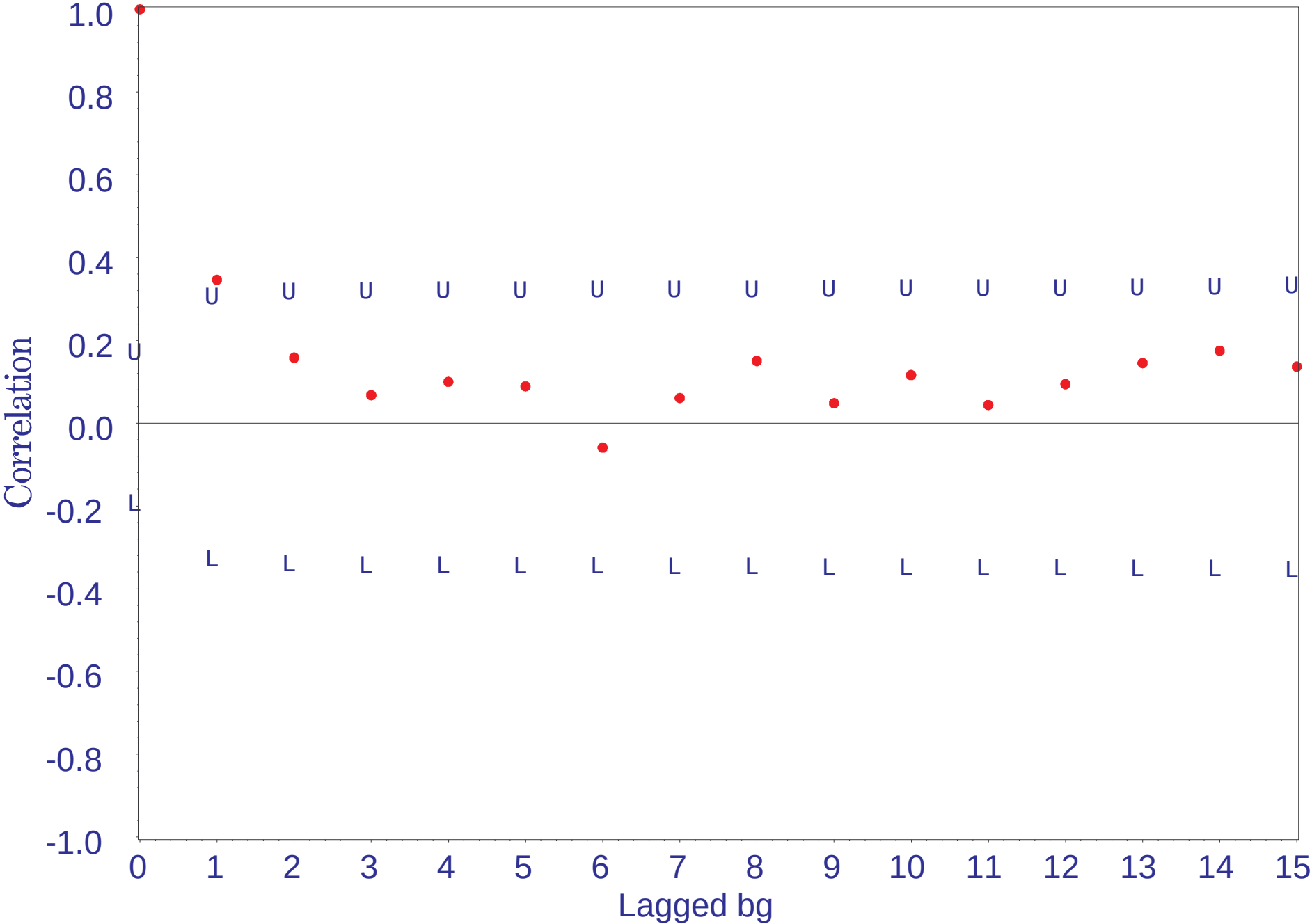
Percent Blue-Green Algae at 6 ppt Isohaline (1989-1998)
Monthly Boxplots

B-248



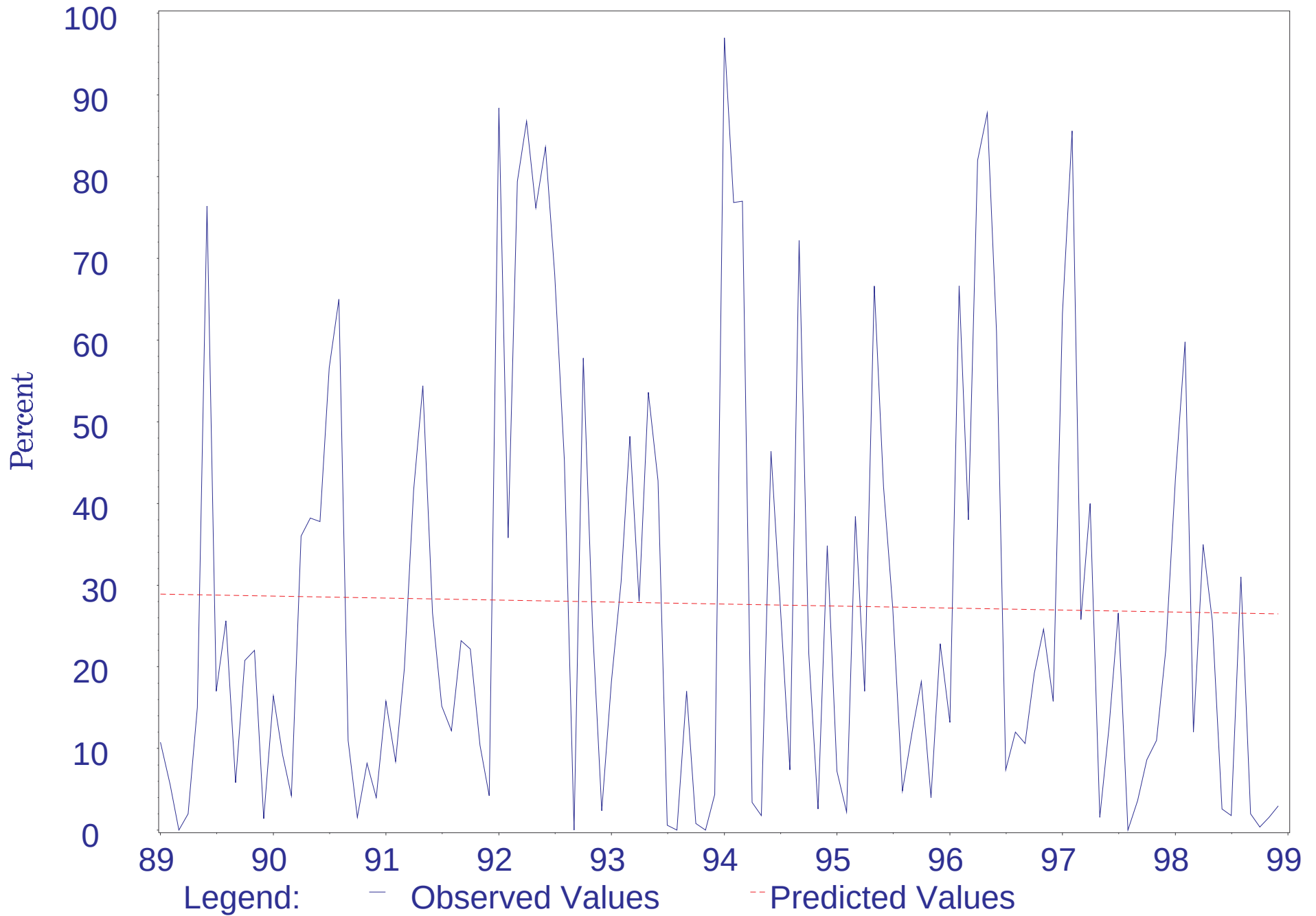
Percent of Blue-Green Algae at 6 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-249



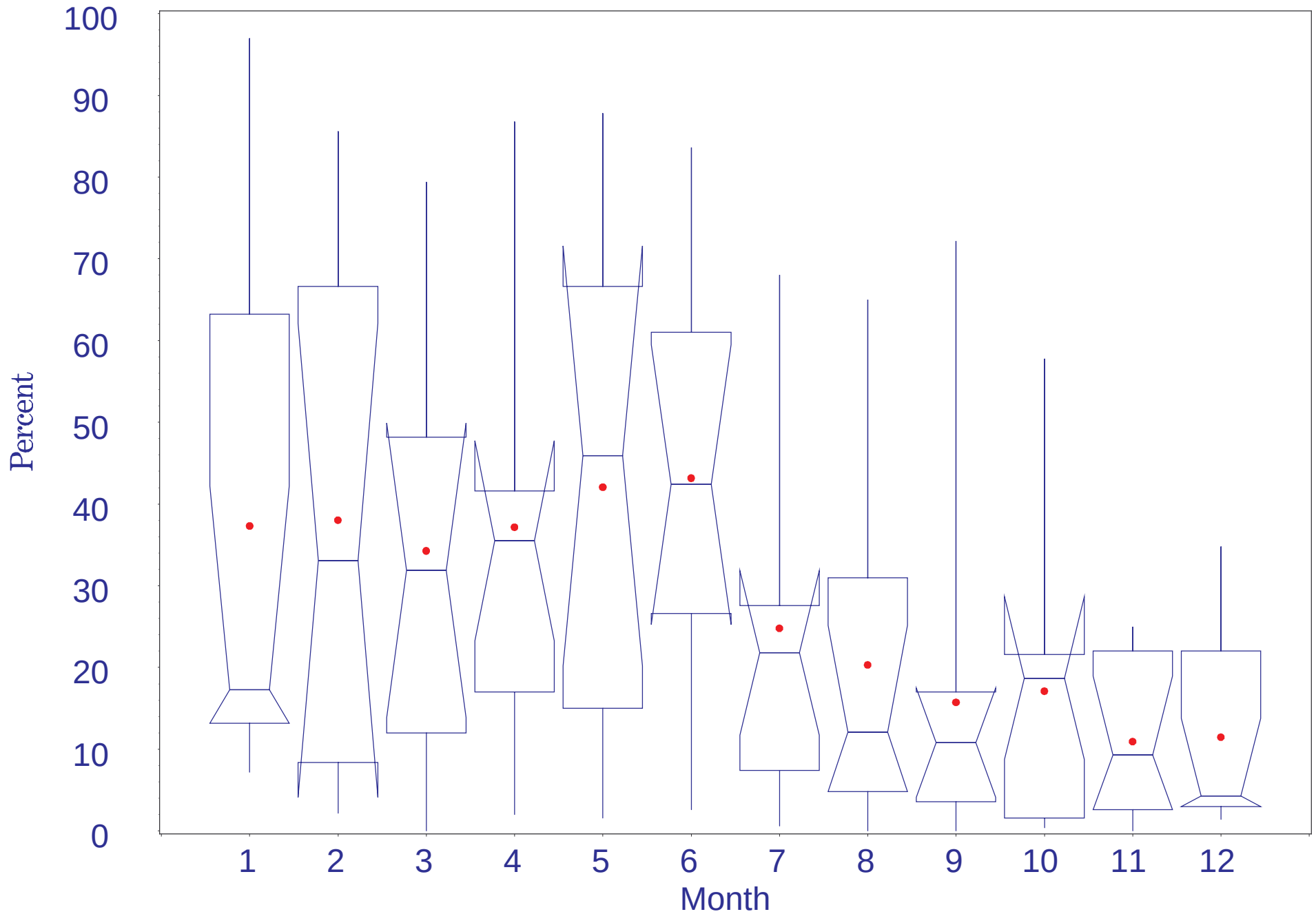
Percent Blue-Green Algae at 12 ppt Isohaline
1989-1998

B-250



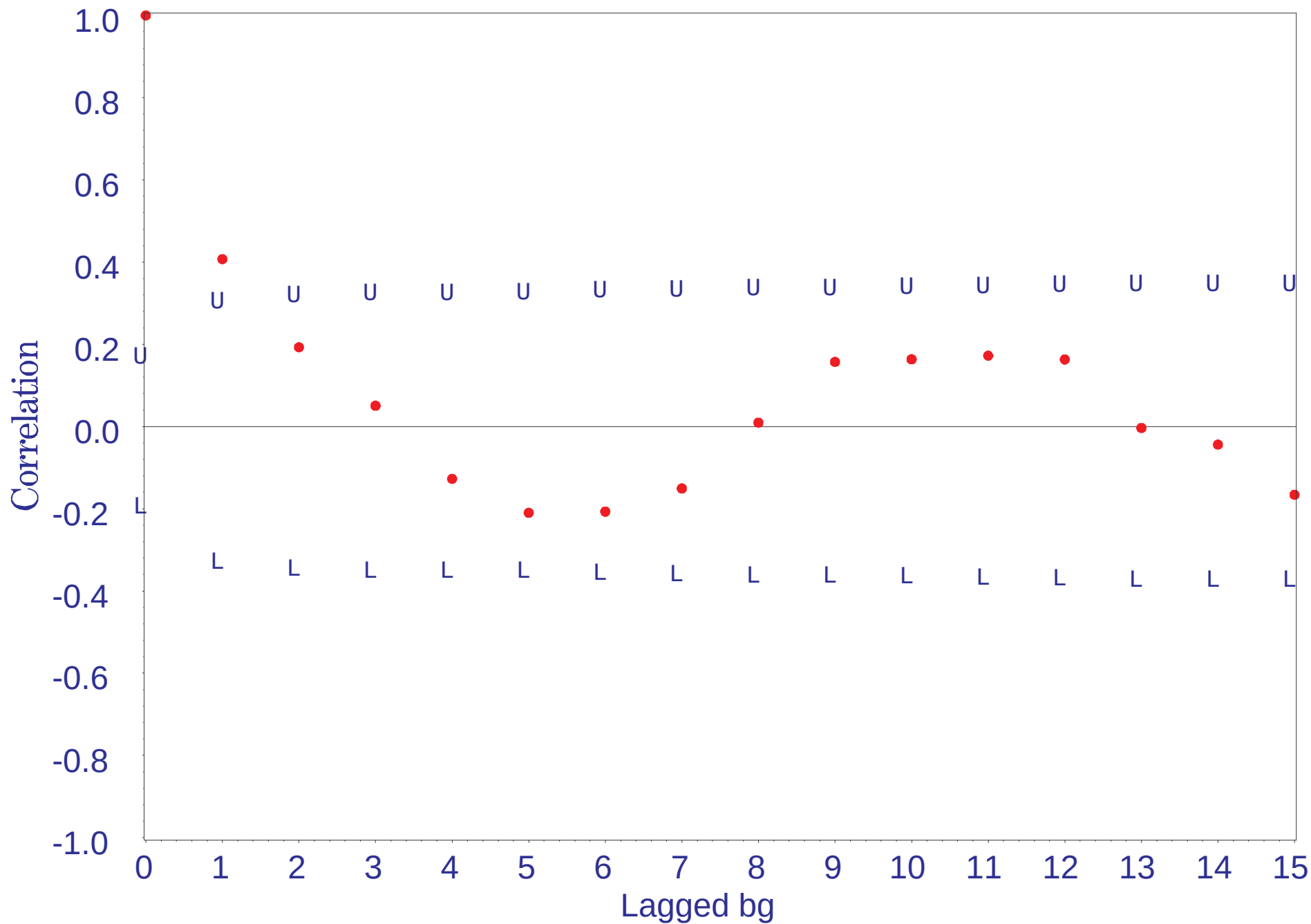
Percent Blue-Green Algae at 12 ppt Isohaline (1989-1998)
Monthly Boxplots

B-251



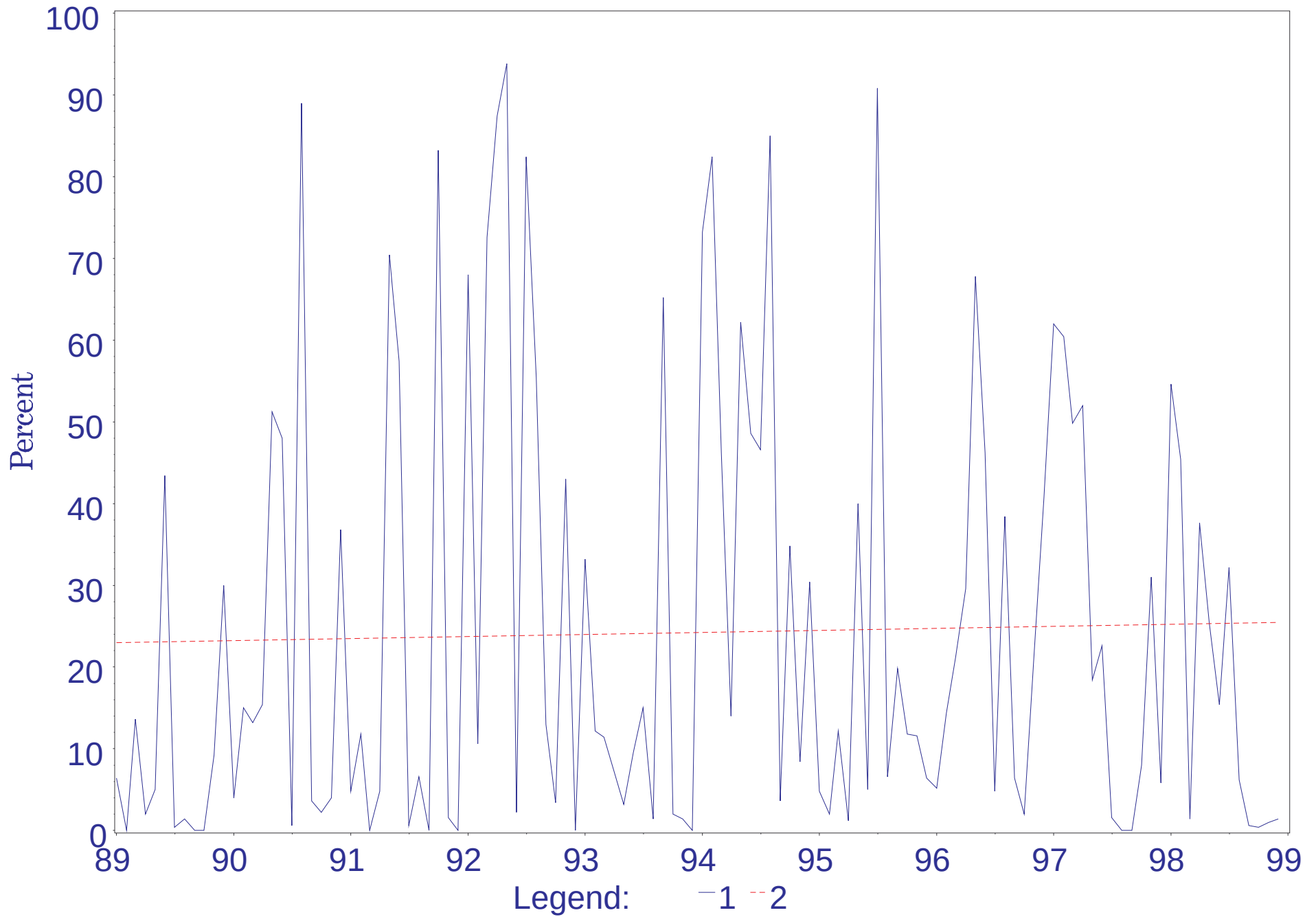
Percent of Blue-Green Algae at 12 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-252



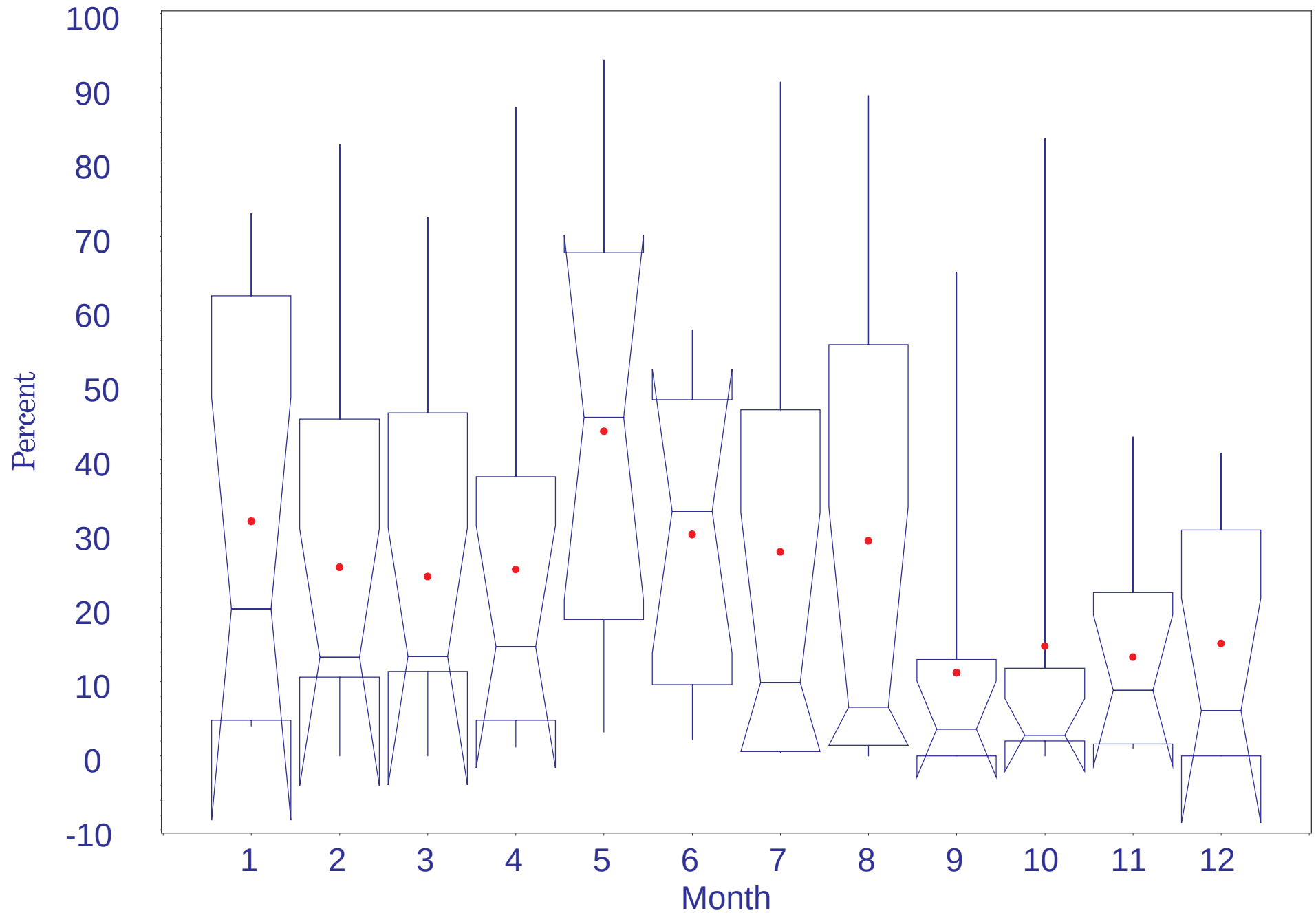
Percent Blue-Green Algae at 20 ppt Isohaline
1989-1998

B-253



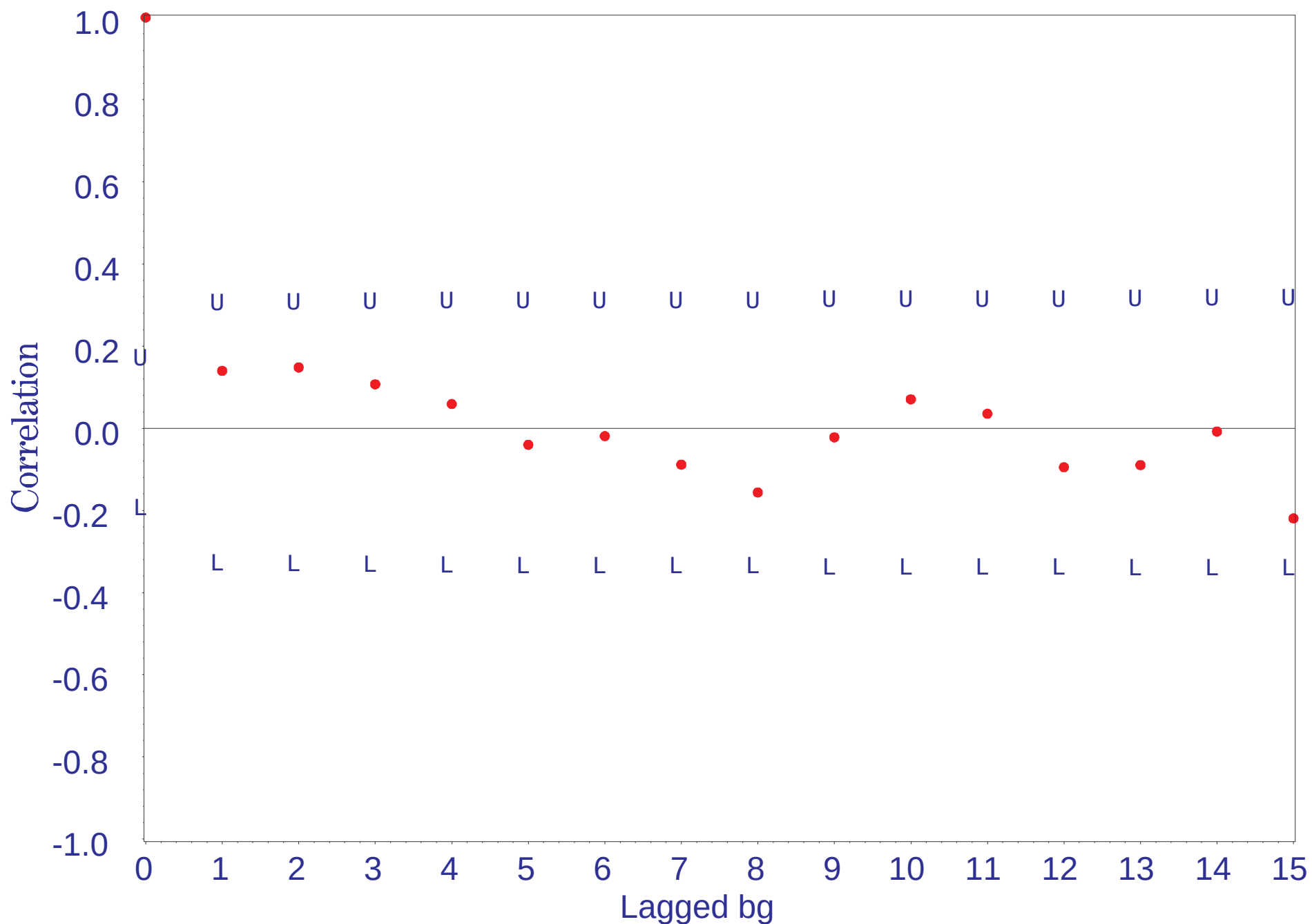
Percent Blue-Green Algae at 20 ppt Isohaline (1989-1998)
Monthly Boxplots

B-254



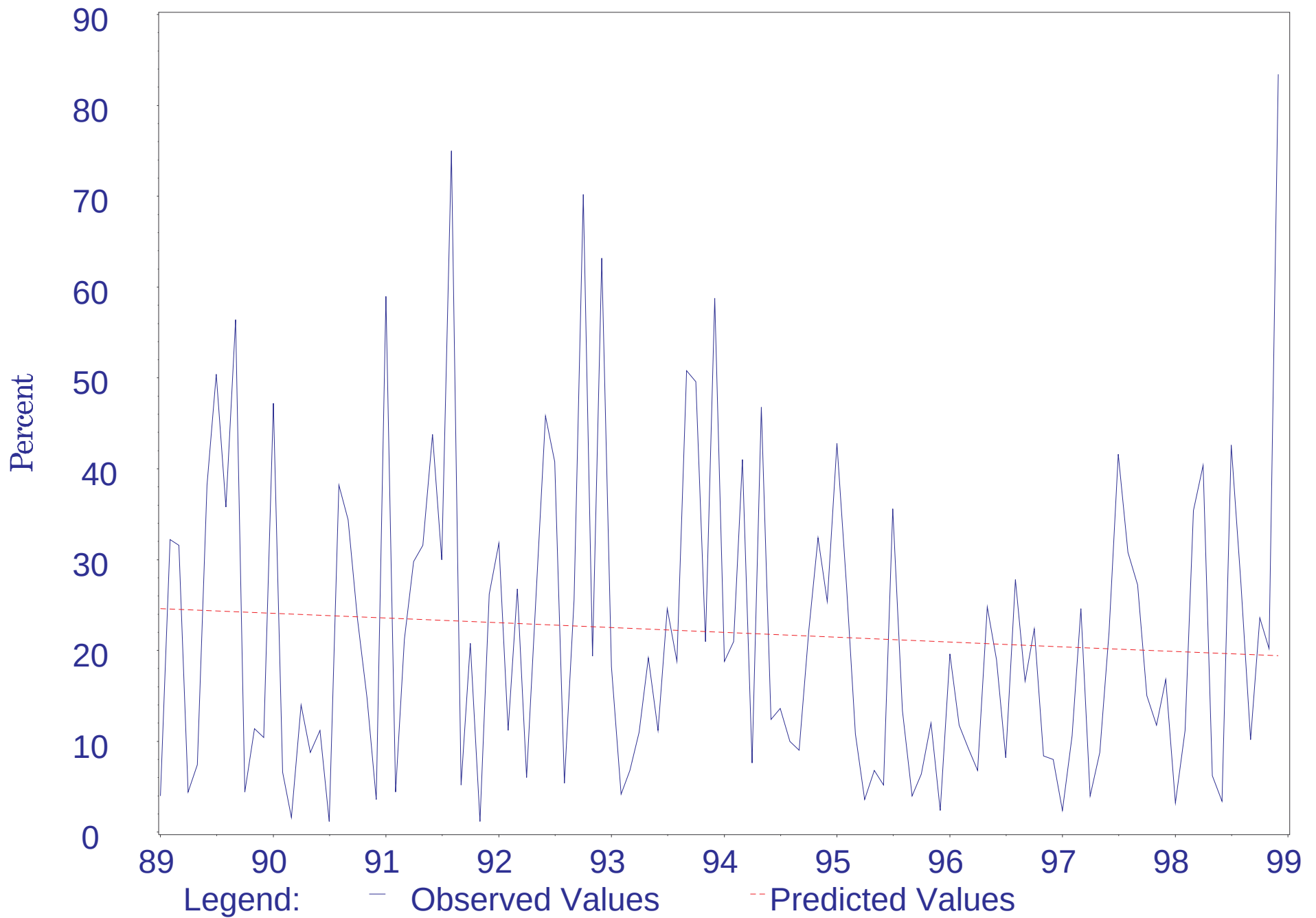
Percent of Blue-Green Algae at 20 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-255



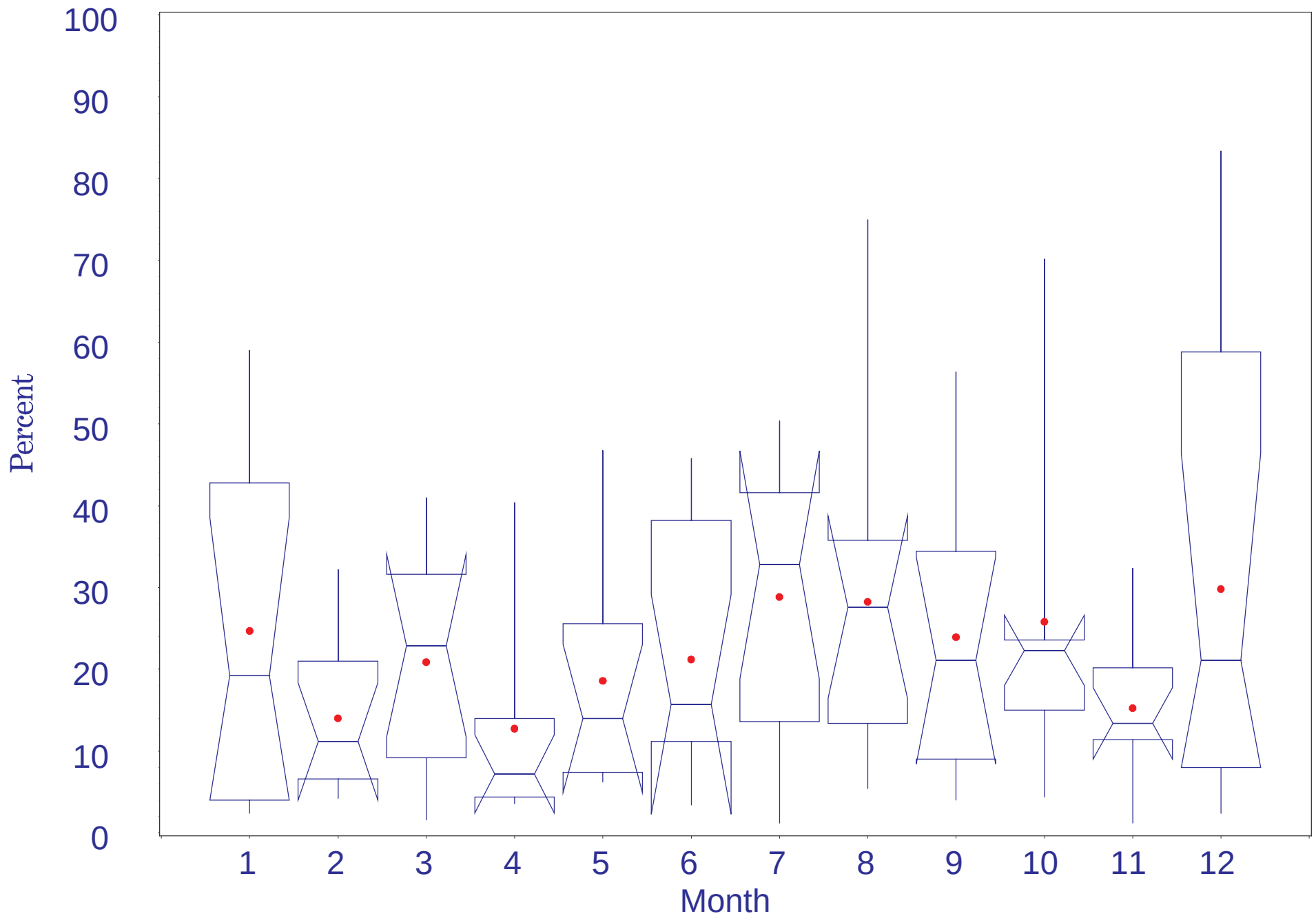
Percent Flagellates at 0 ppt Isohaline
1989-1998

B-256



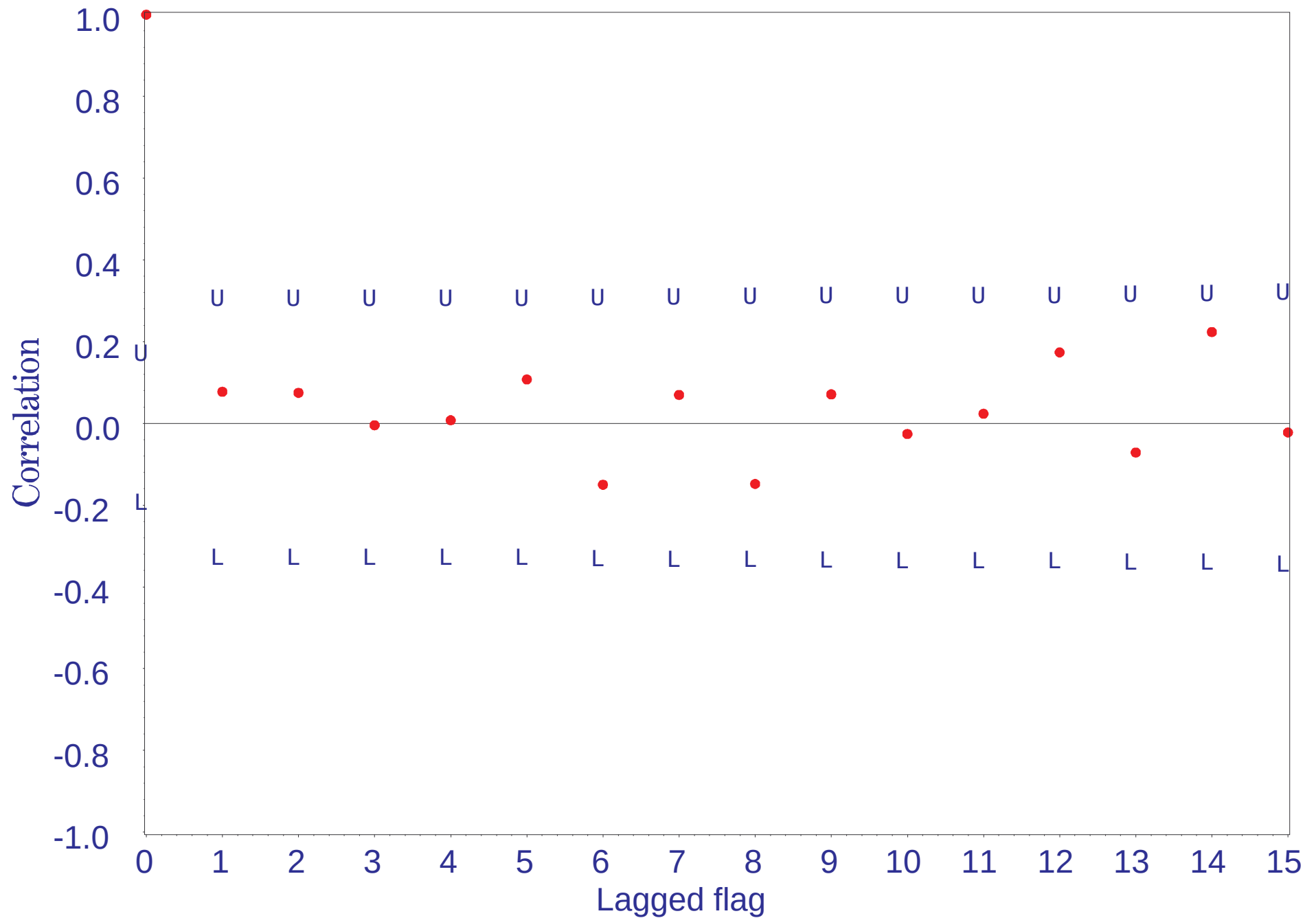
Percent Flagellates at 0 ppt Isohaline (1989-1998)
Monthly Boxplots

B-257



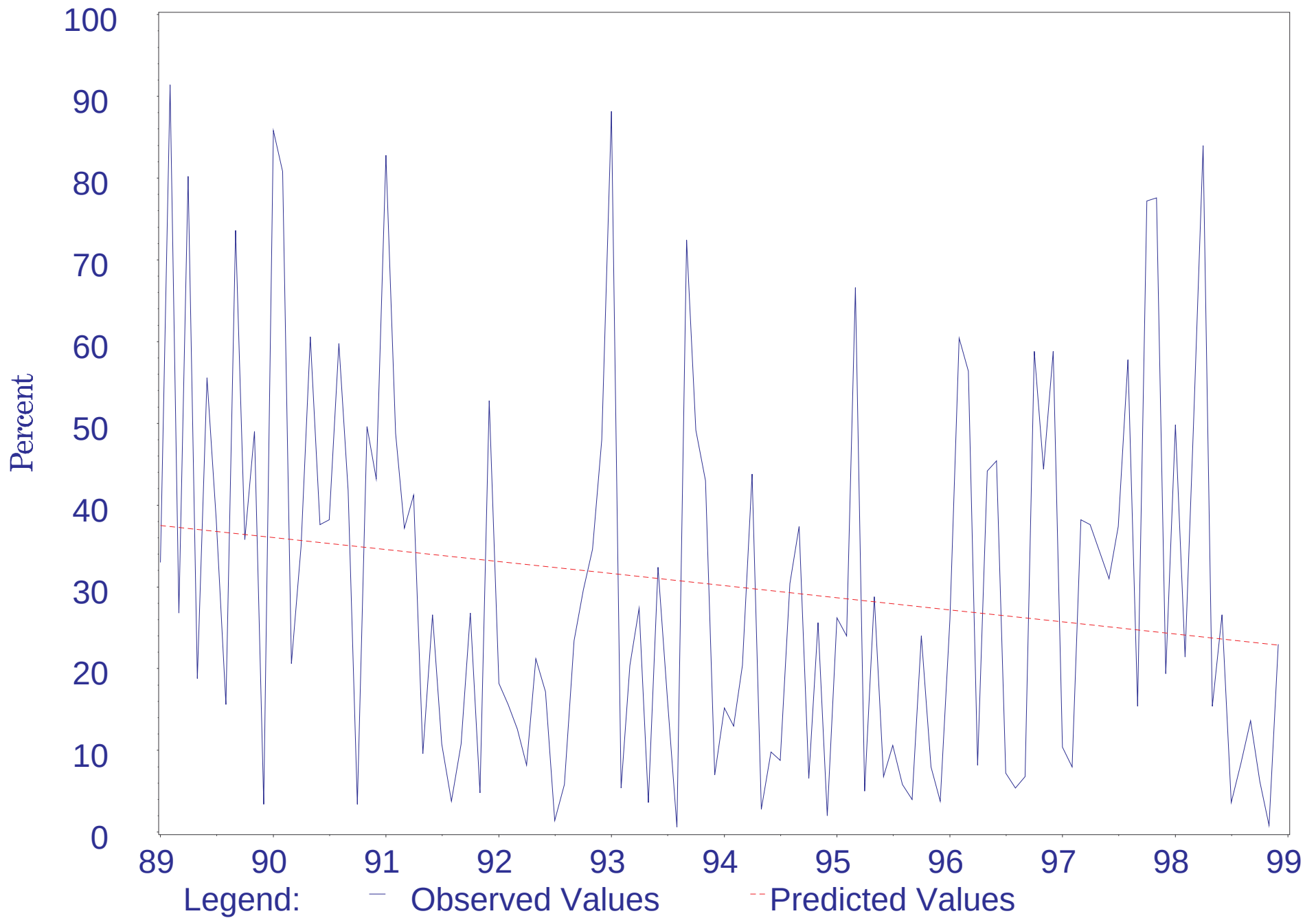
Percent of Flagellates at 0 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-258



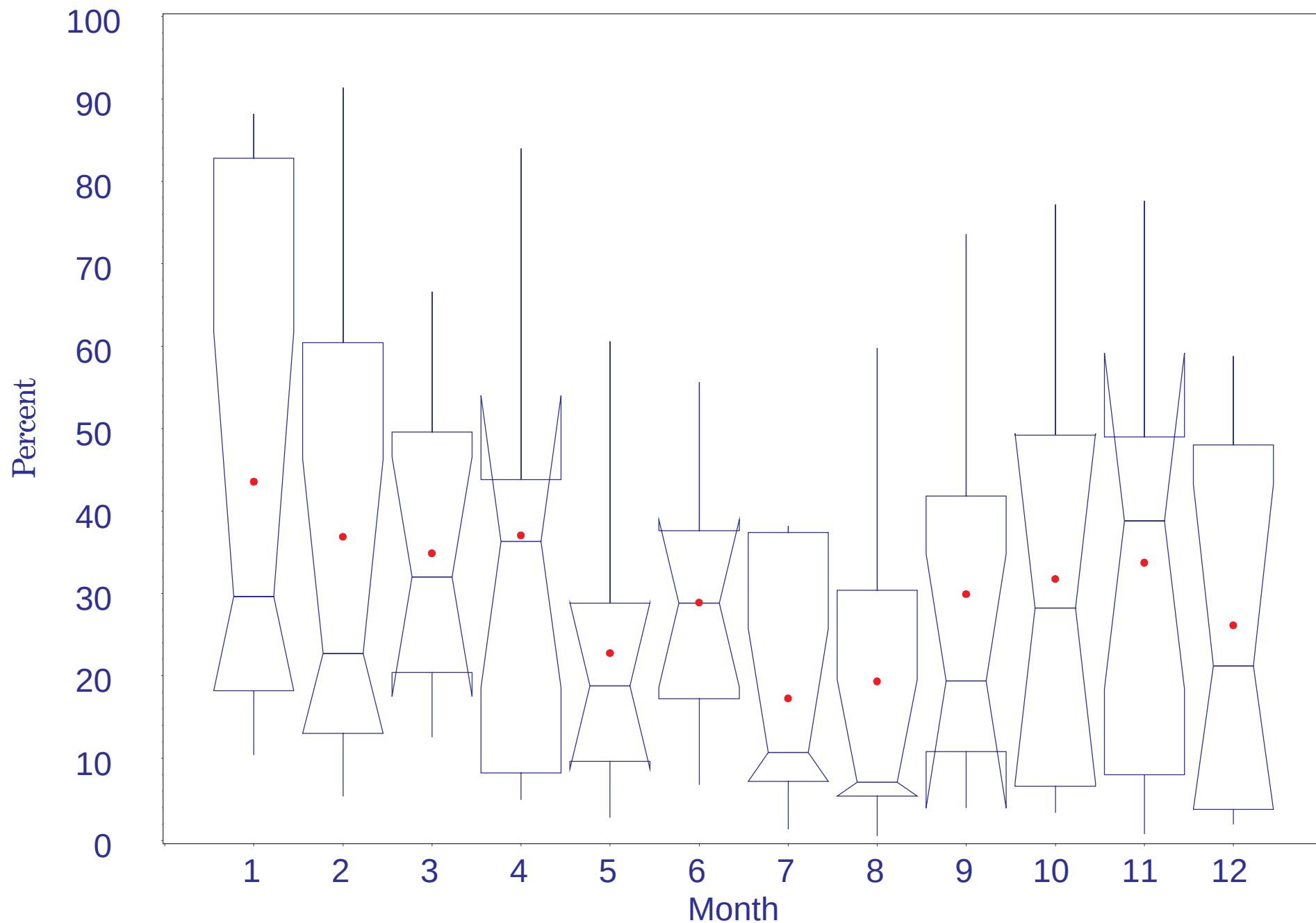
Percent Flagellates at 6 ppt Isohaline
1989-1998

B-259



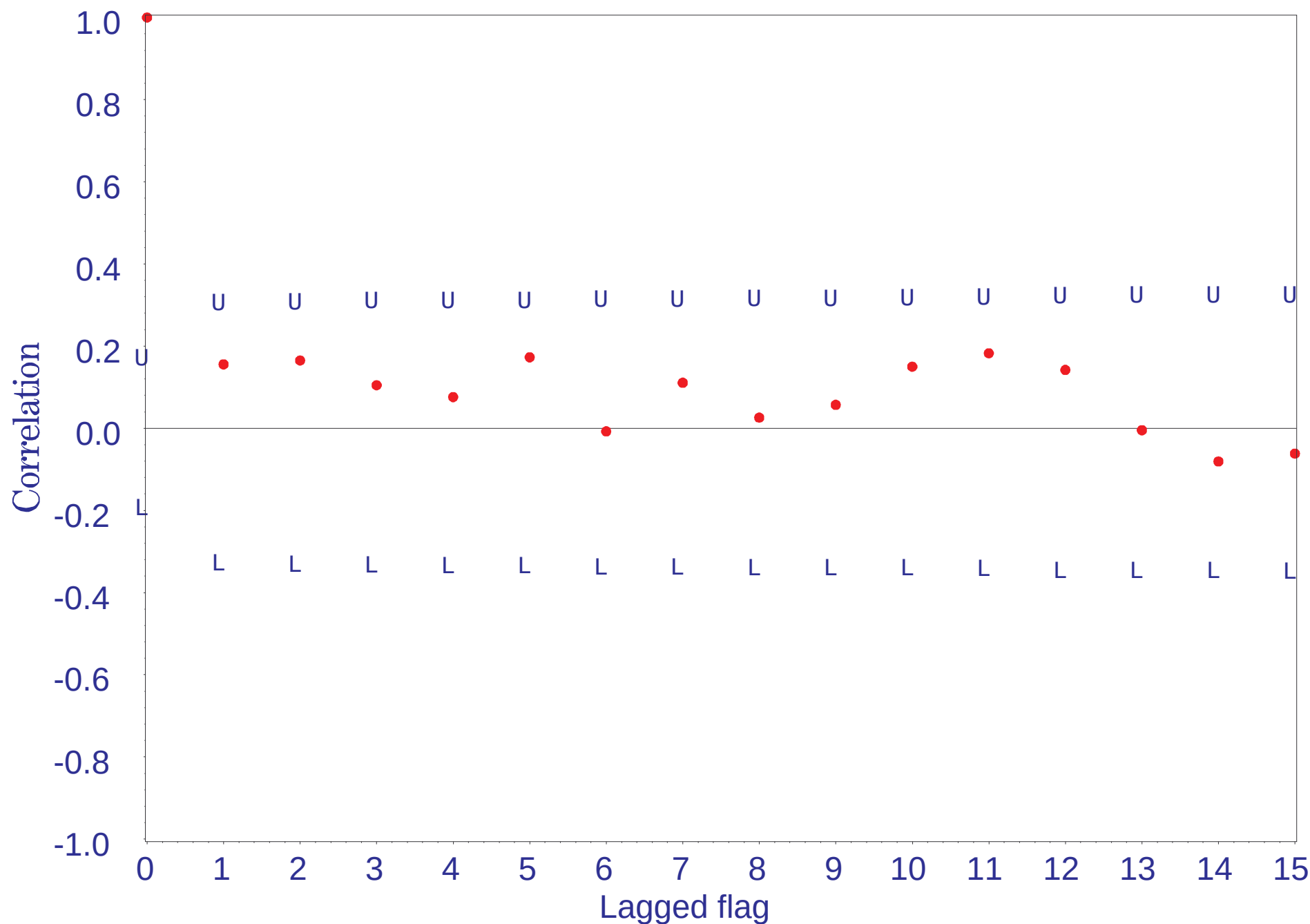
Percent Flagellates at 6 ppt Isohaline (1989-1998)
Monthly Boxplots

B-260



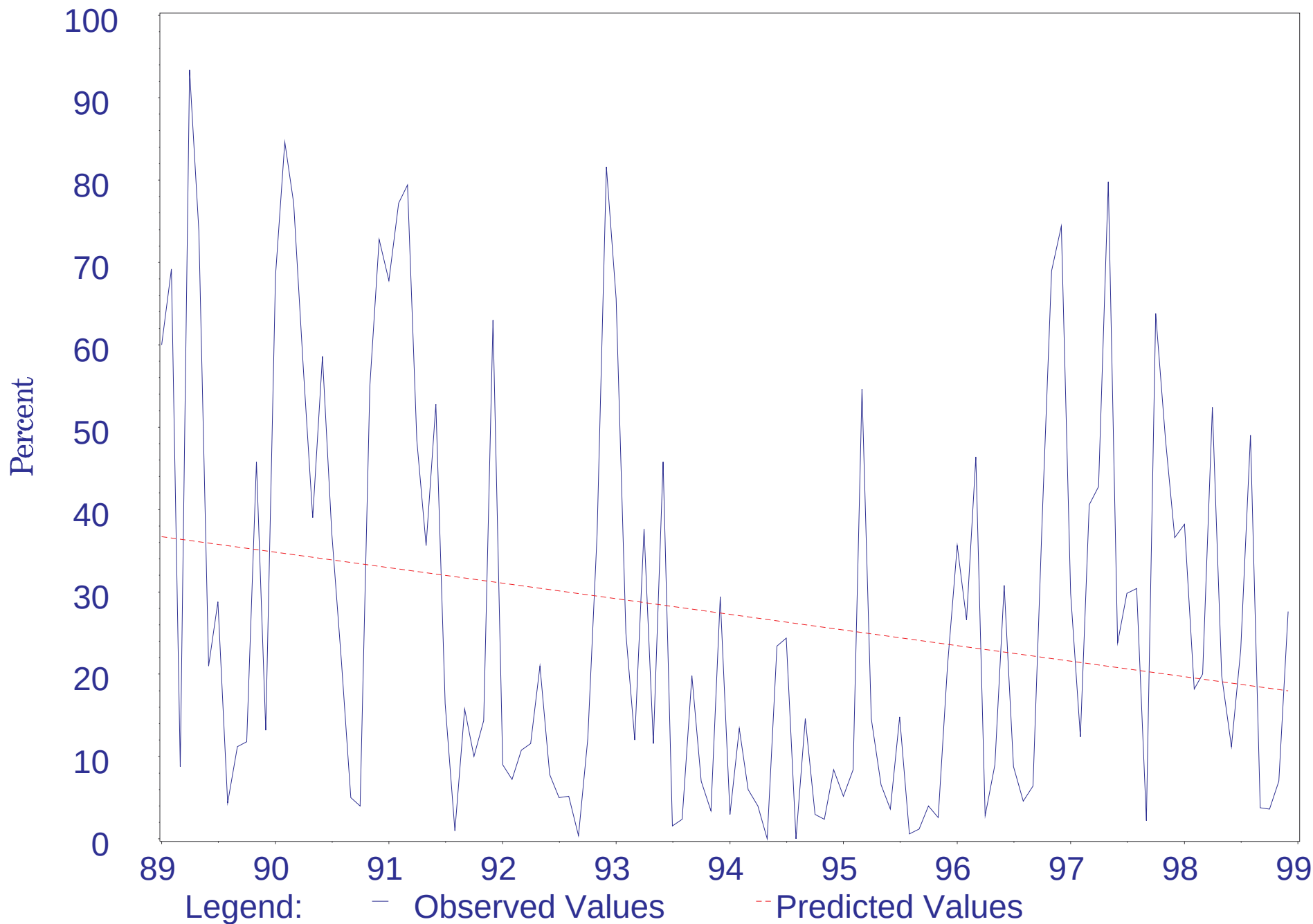
Percent of Flagellates at 6 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-261



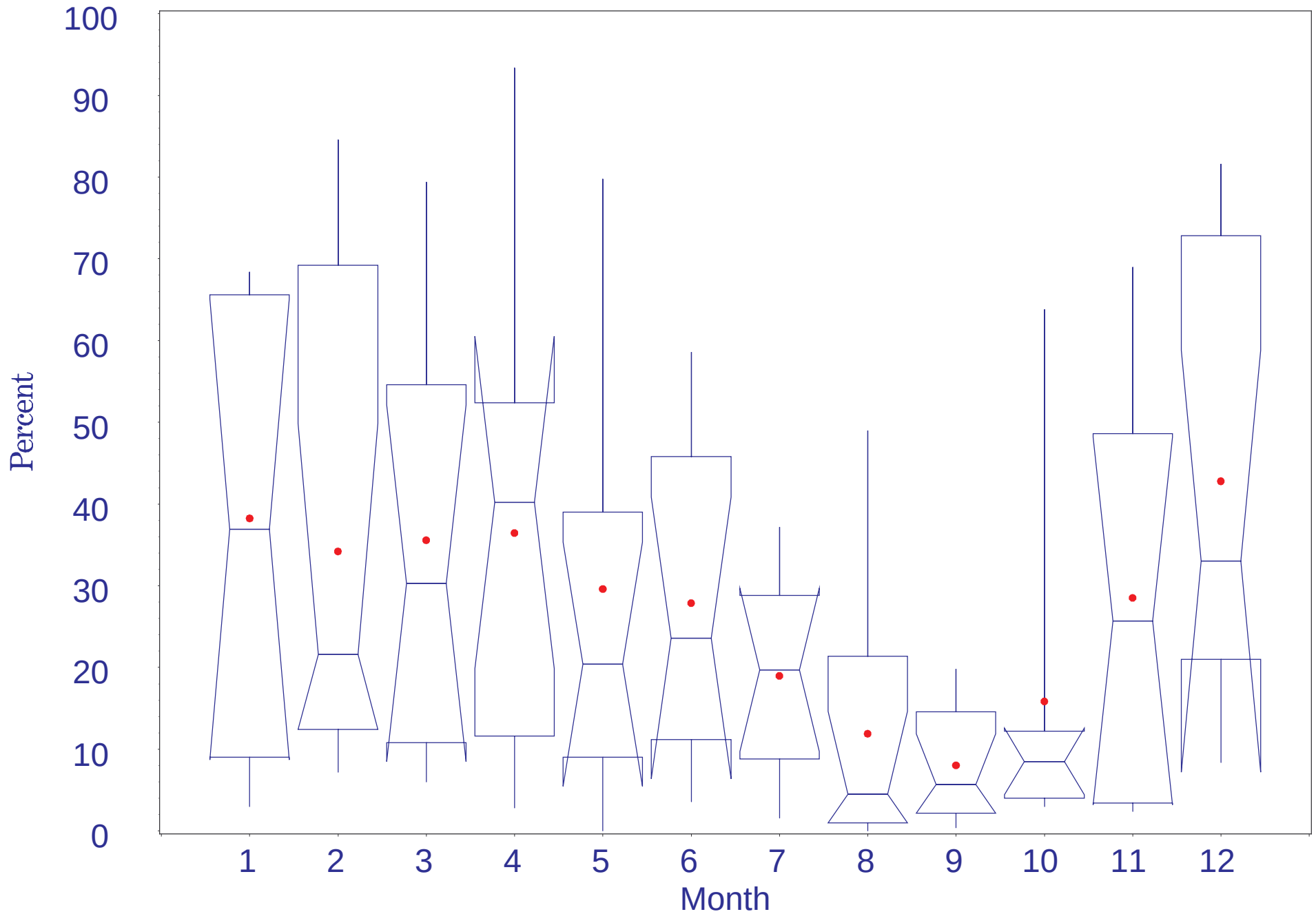
Percent Flagellates at 12 ppt Isohaline
1989-1998

B-262



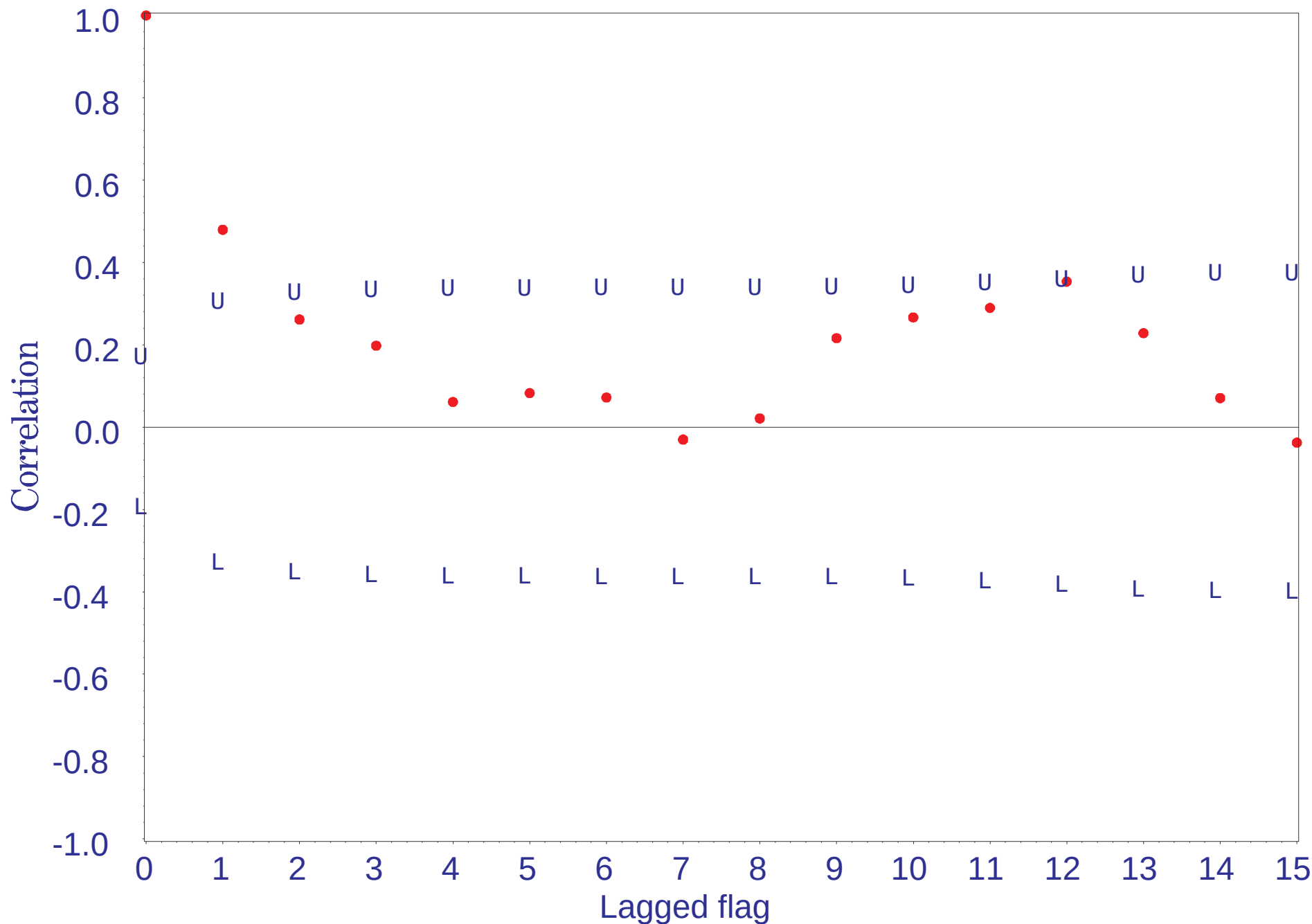
Percent Flagellates at 12 ppt Isohaline (1989-1998)
Monthly Boxplots

B-263



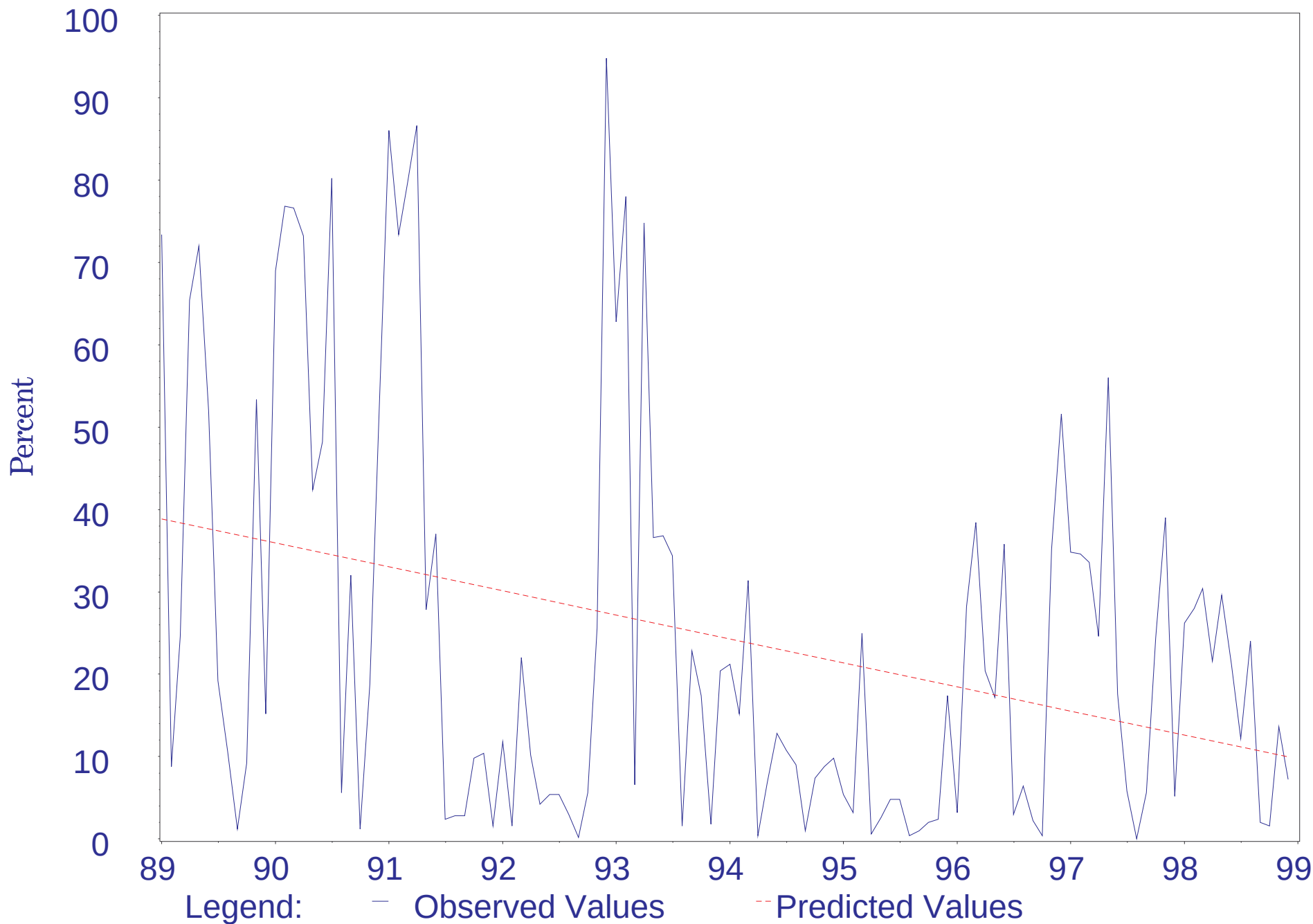
Percent of Flagellates at 12 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-264



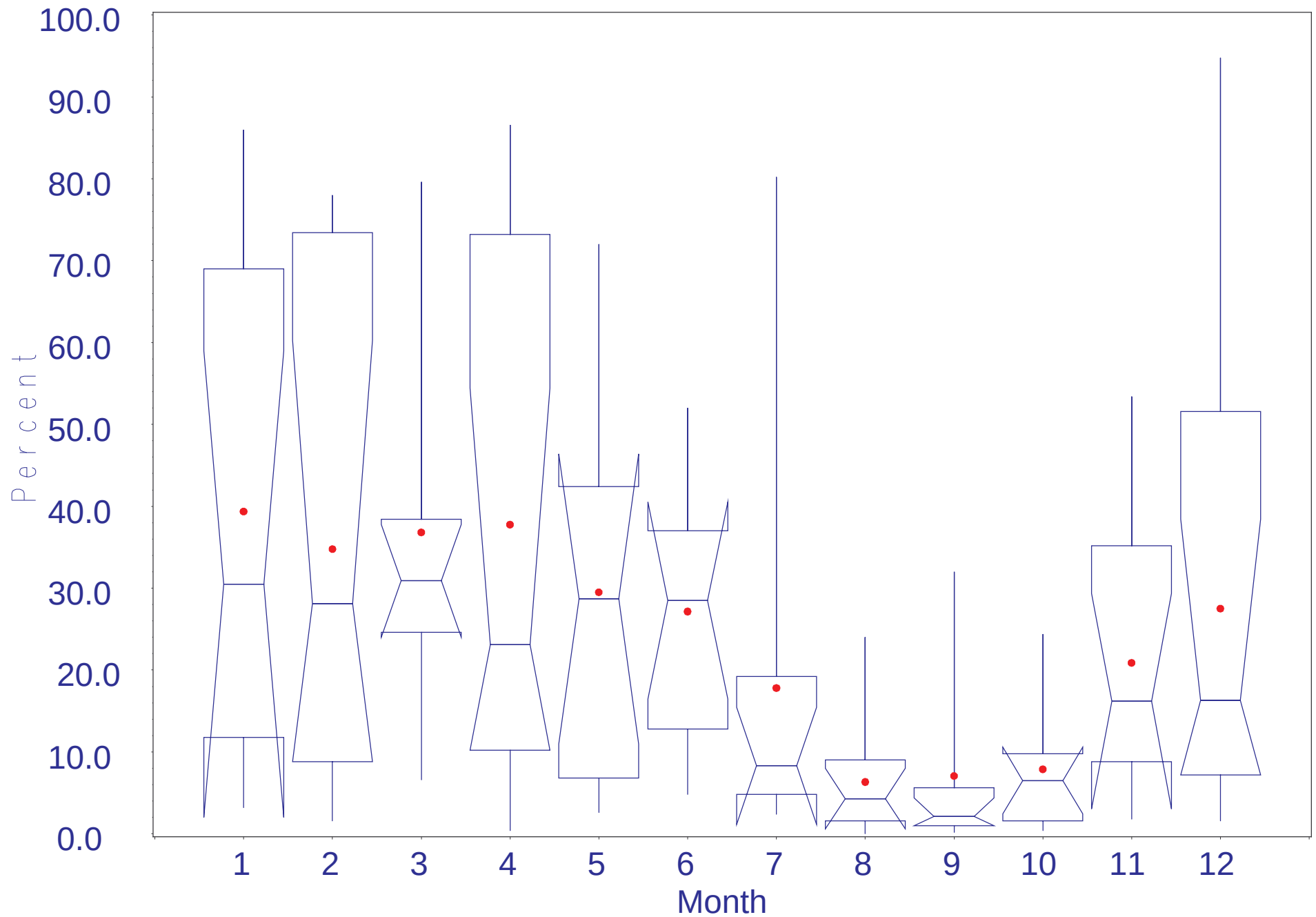
Percent Flagellates at 20 ppt Isohaline
1989-1998

B-265



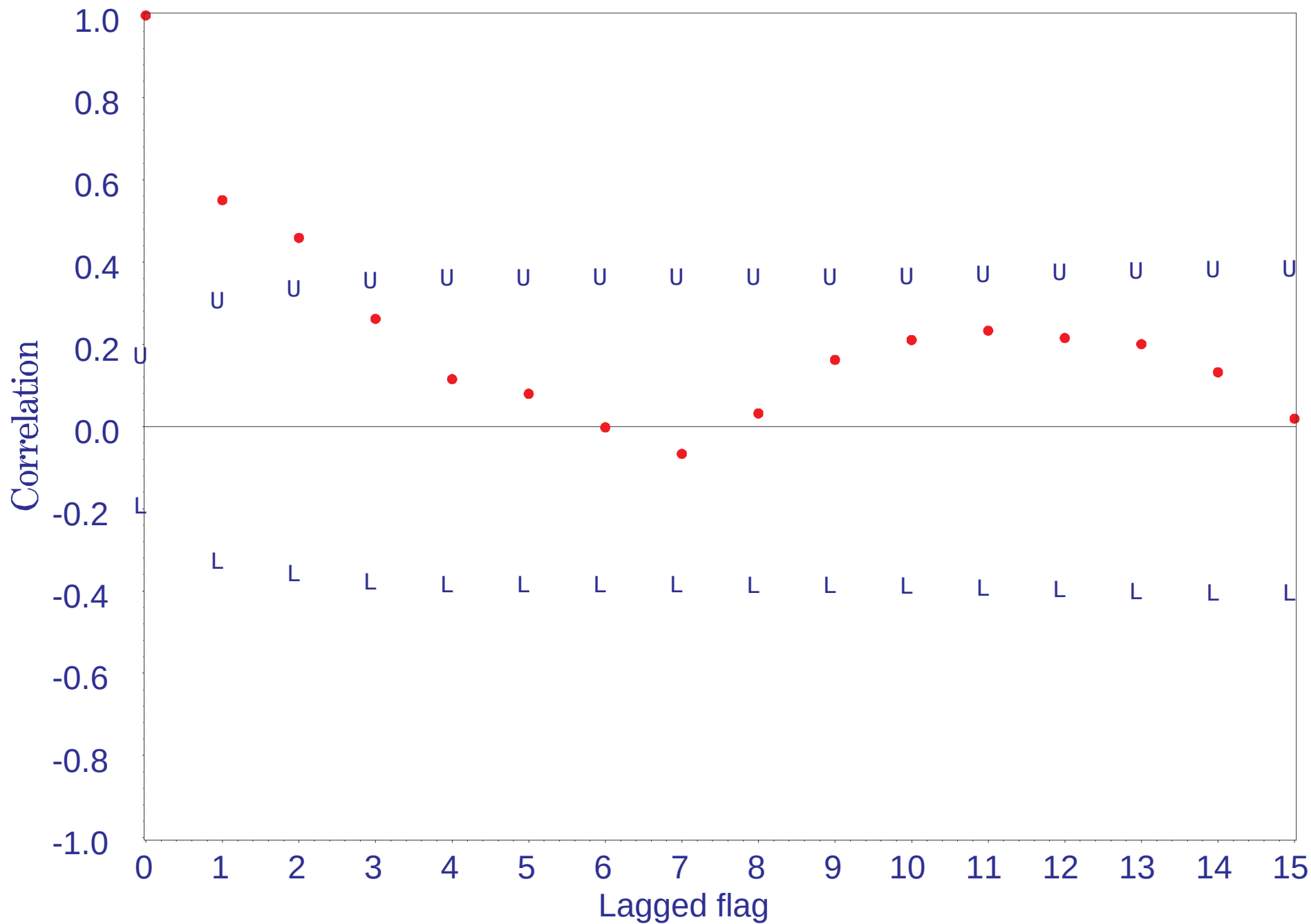
Percent Flagellates at 20 ppt Isohaline (1989-1998)
Monthly Boxplots

B-266



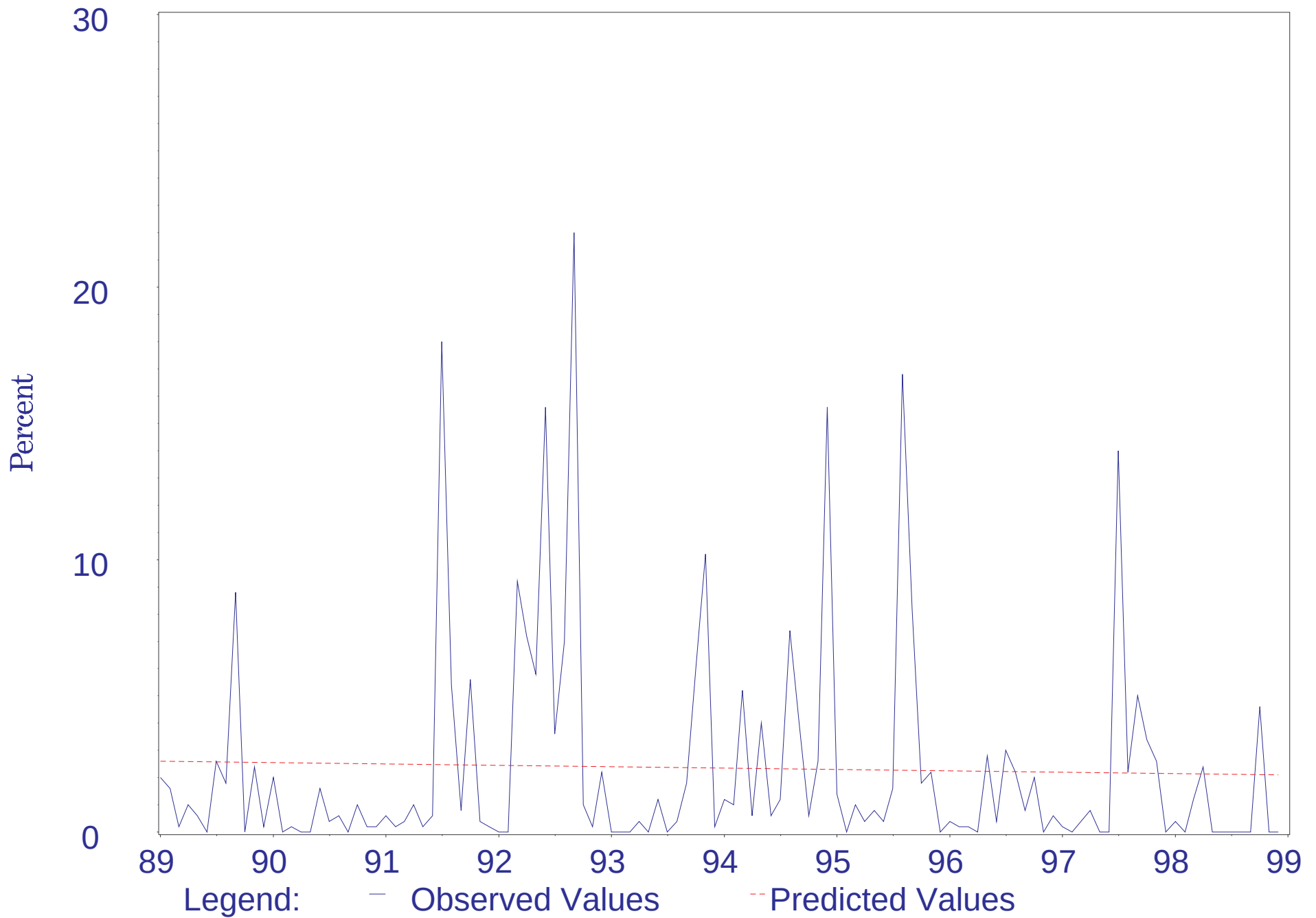
Percent of Flagellates at 20 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-267



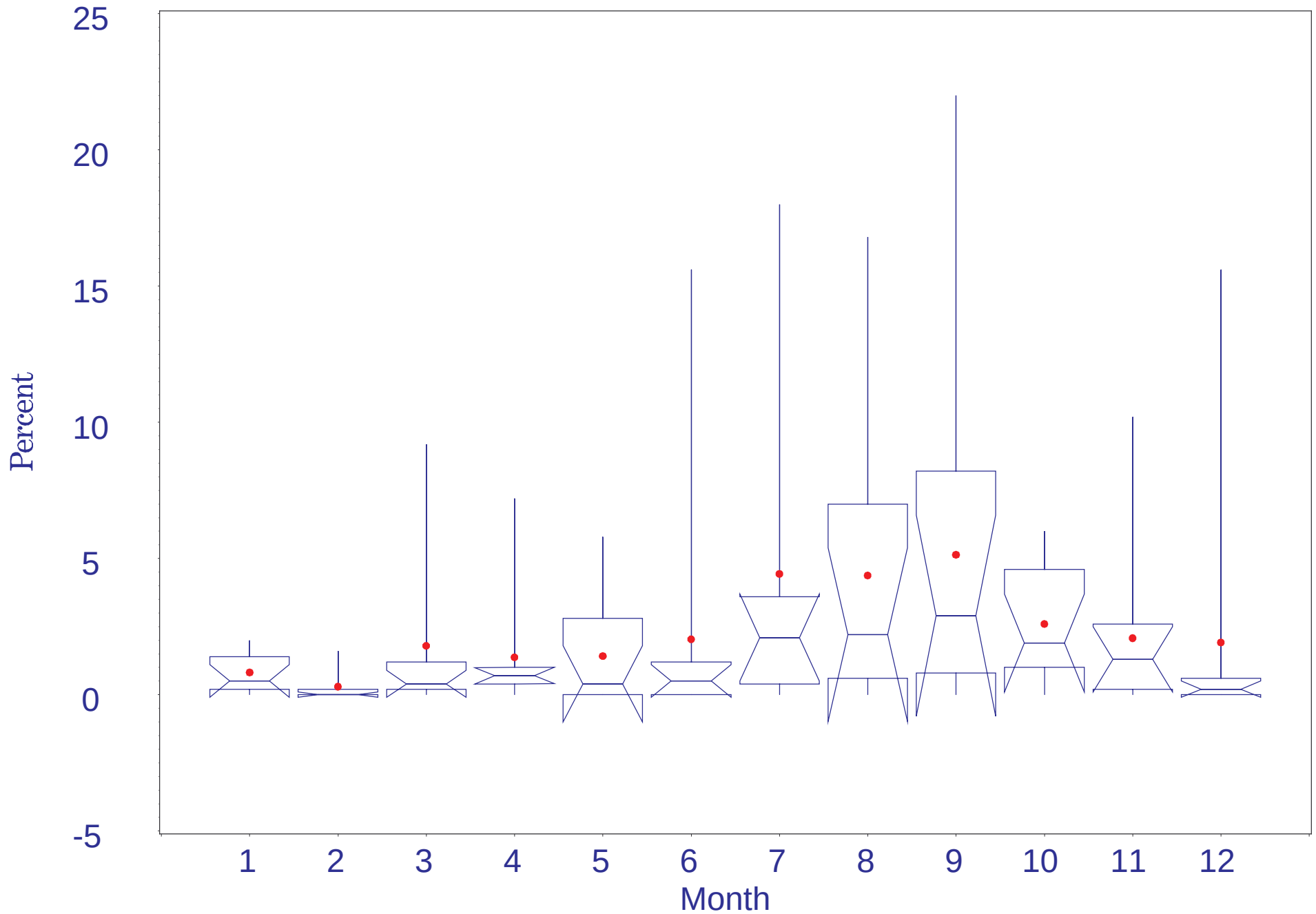
Percent Dinoflagellates at 0 ppt Isohaline
1989-1998

B-268



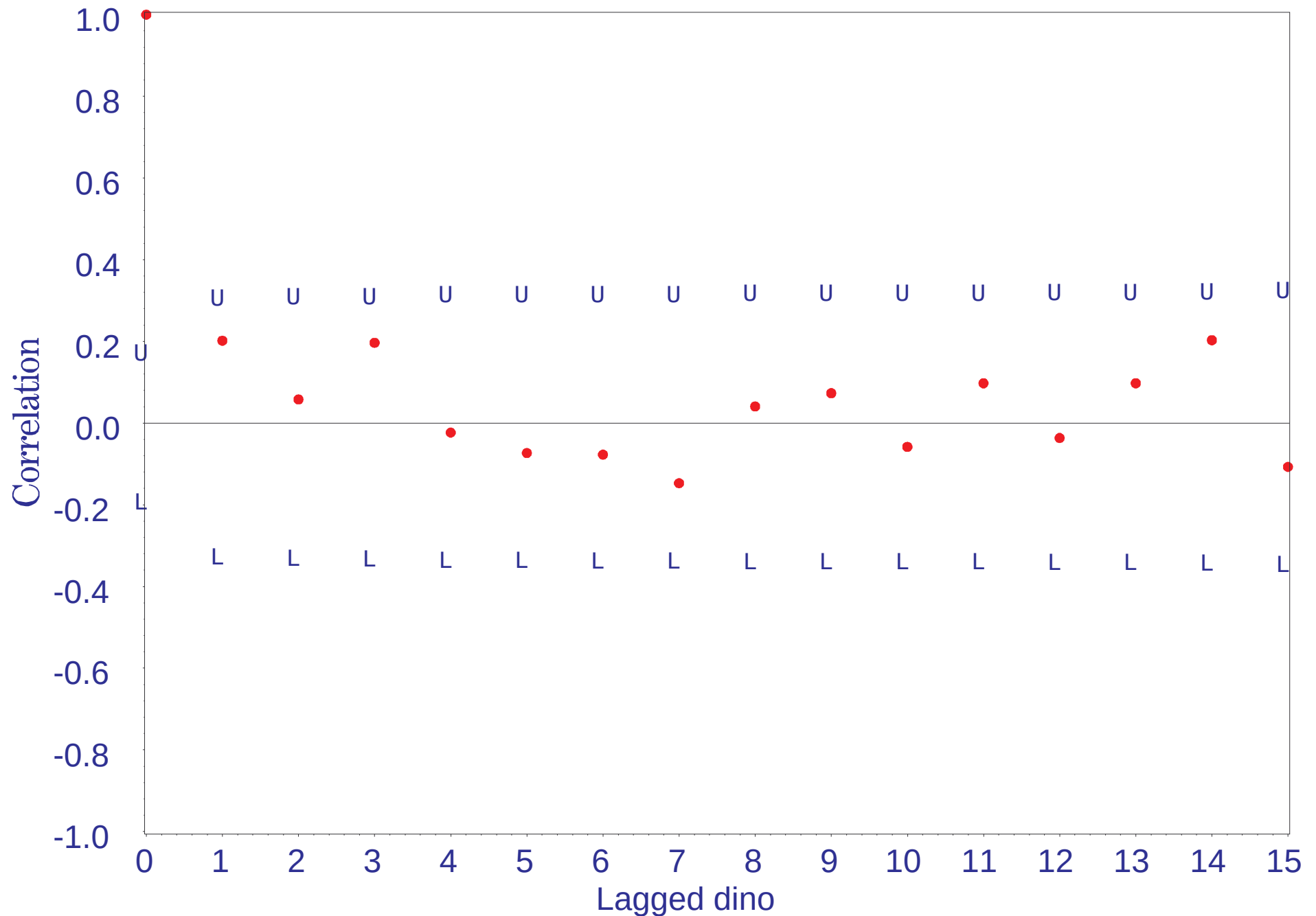
Percent Dinoflagellates at 0 ppt Isohaline (1989-1998)
Monthly Boxplots

B-269



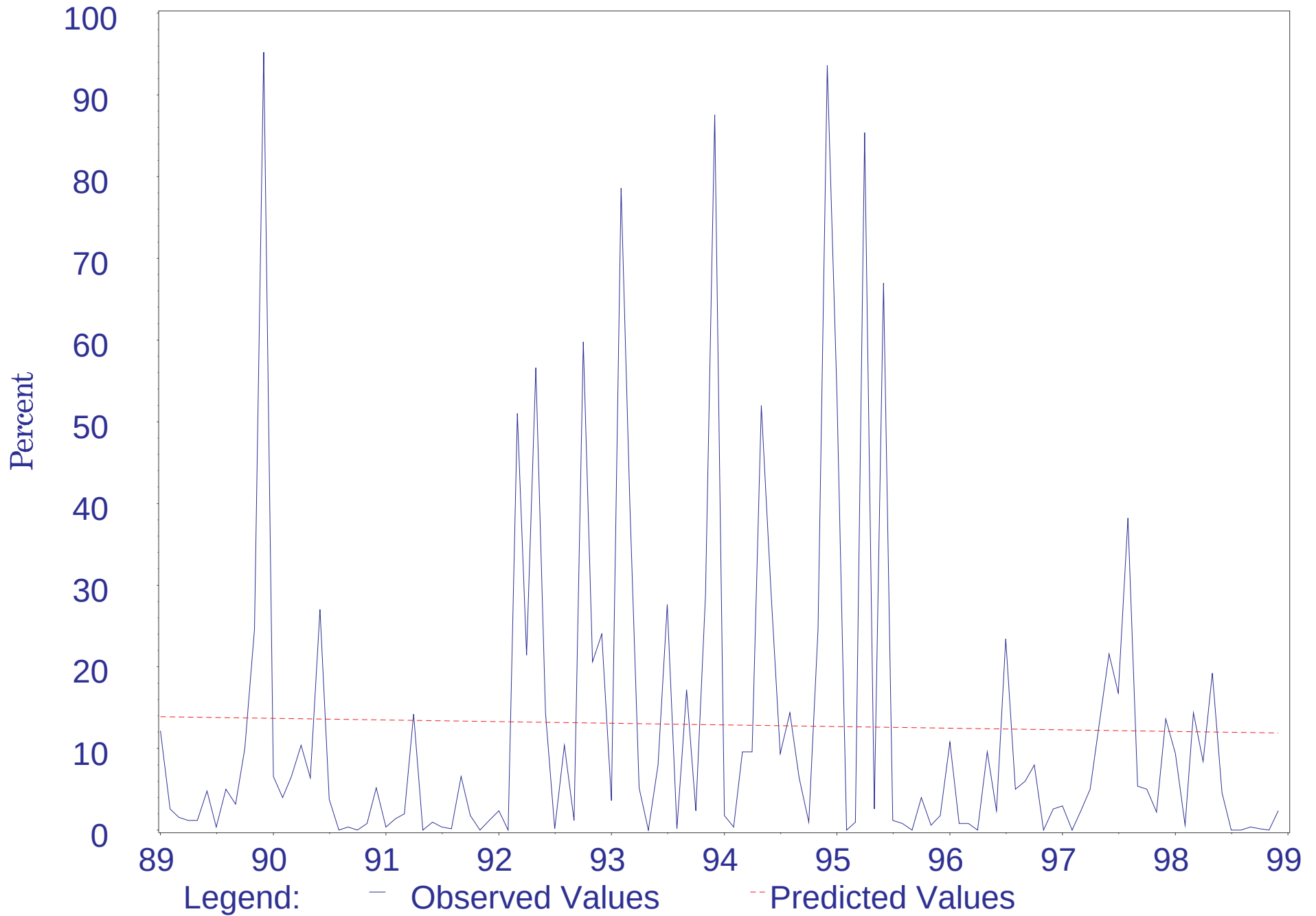
Percent of Dinoflagellates at 0 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-270



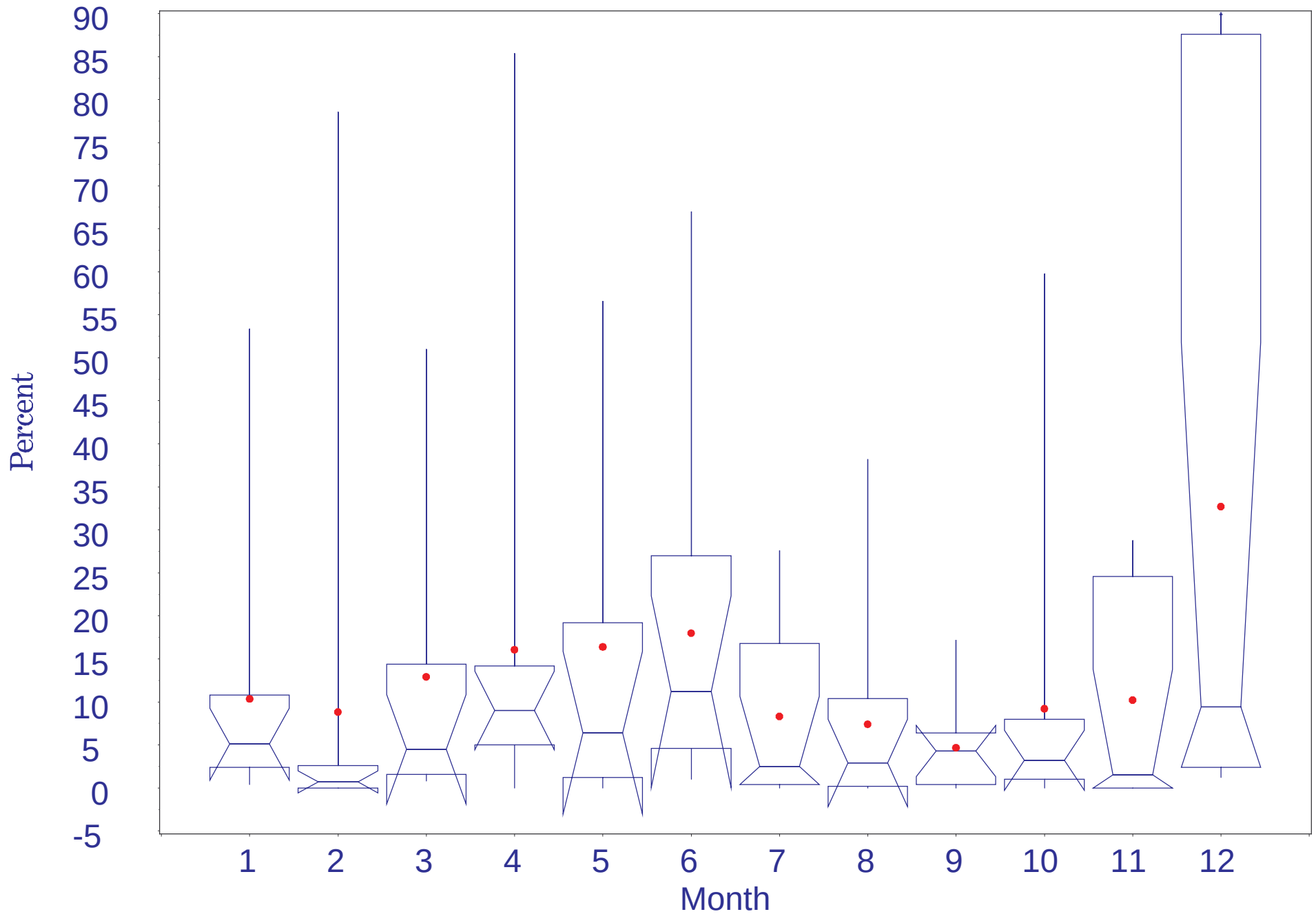
Percent Dinoflagellates at 6 ppt Isohaline
1989-1998

B-271



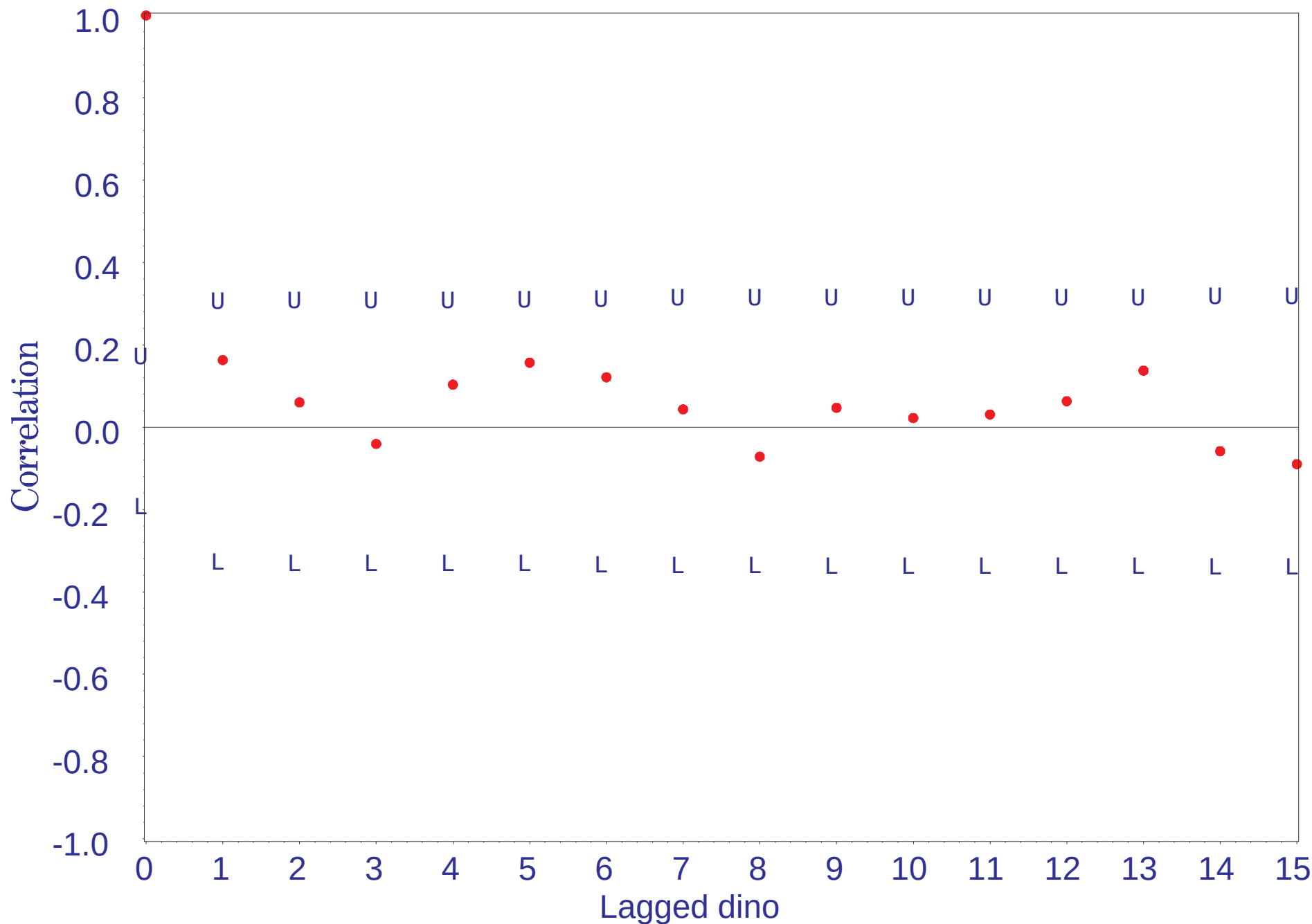
Percent Dinoflagellates at 6 ppt Isohaline (1989-1998)
Monthly Boxplots

B-272



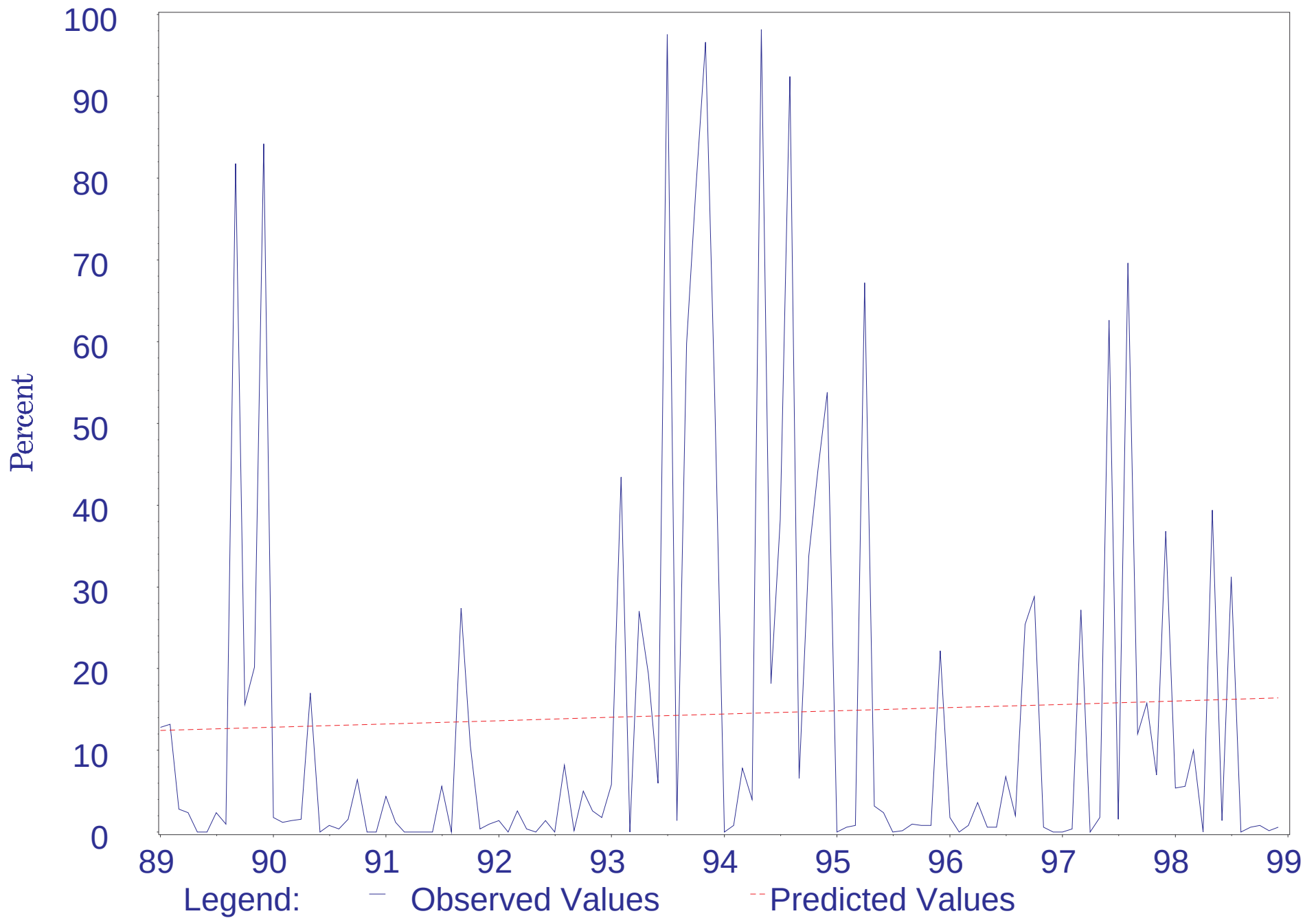
Percent of Dinoflagellates at 6 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-273



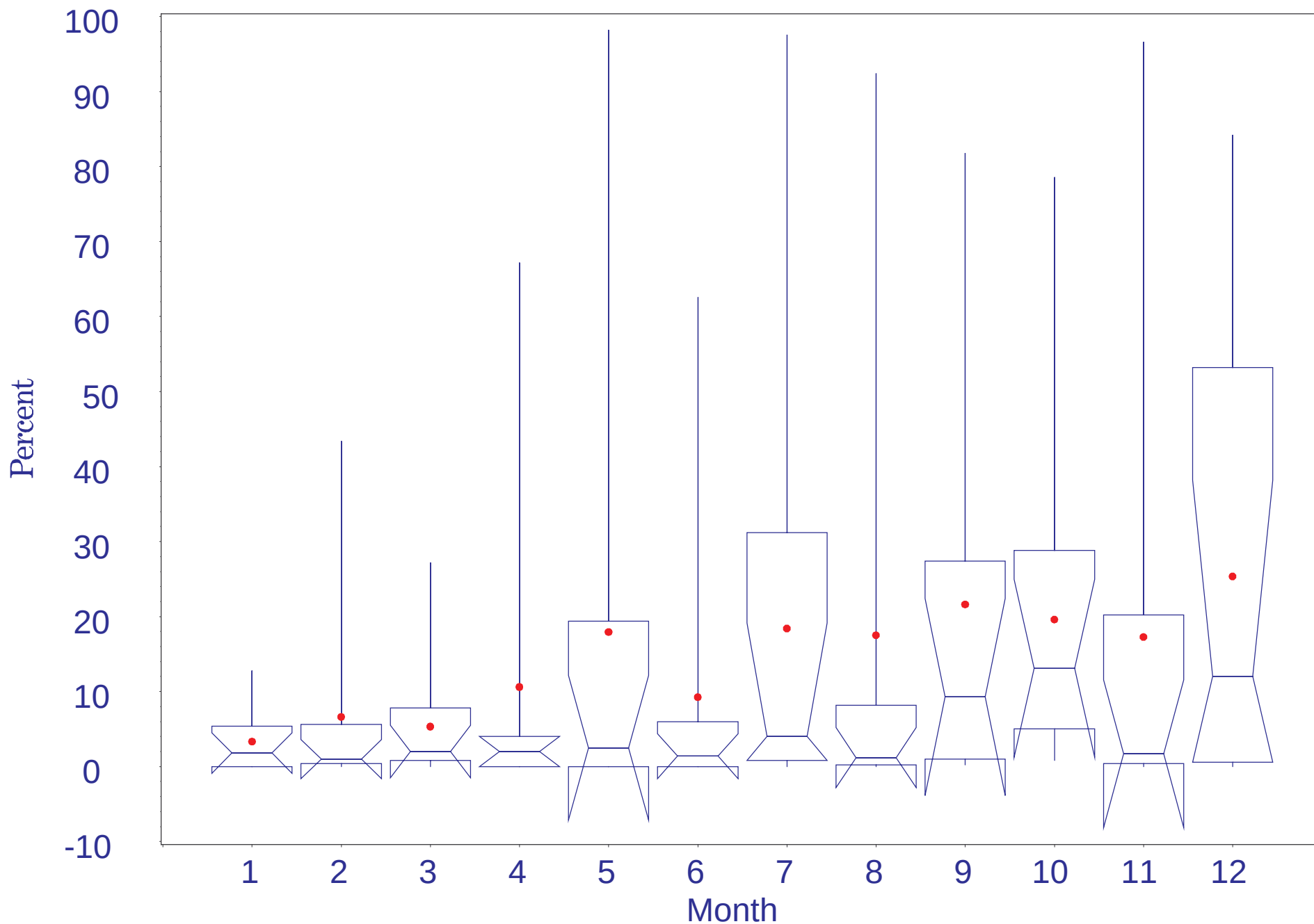
Percent Dinoflagellates at 12 ppt Isohaline
1989-1998

B-274



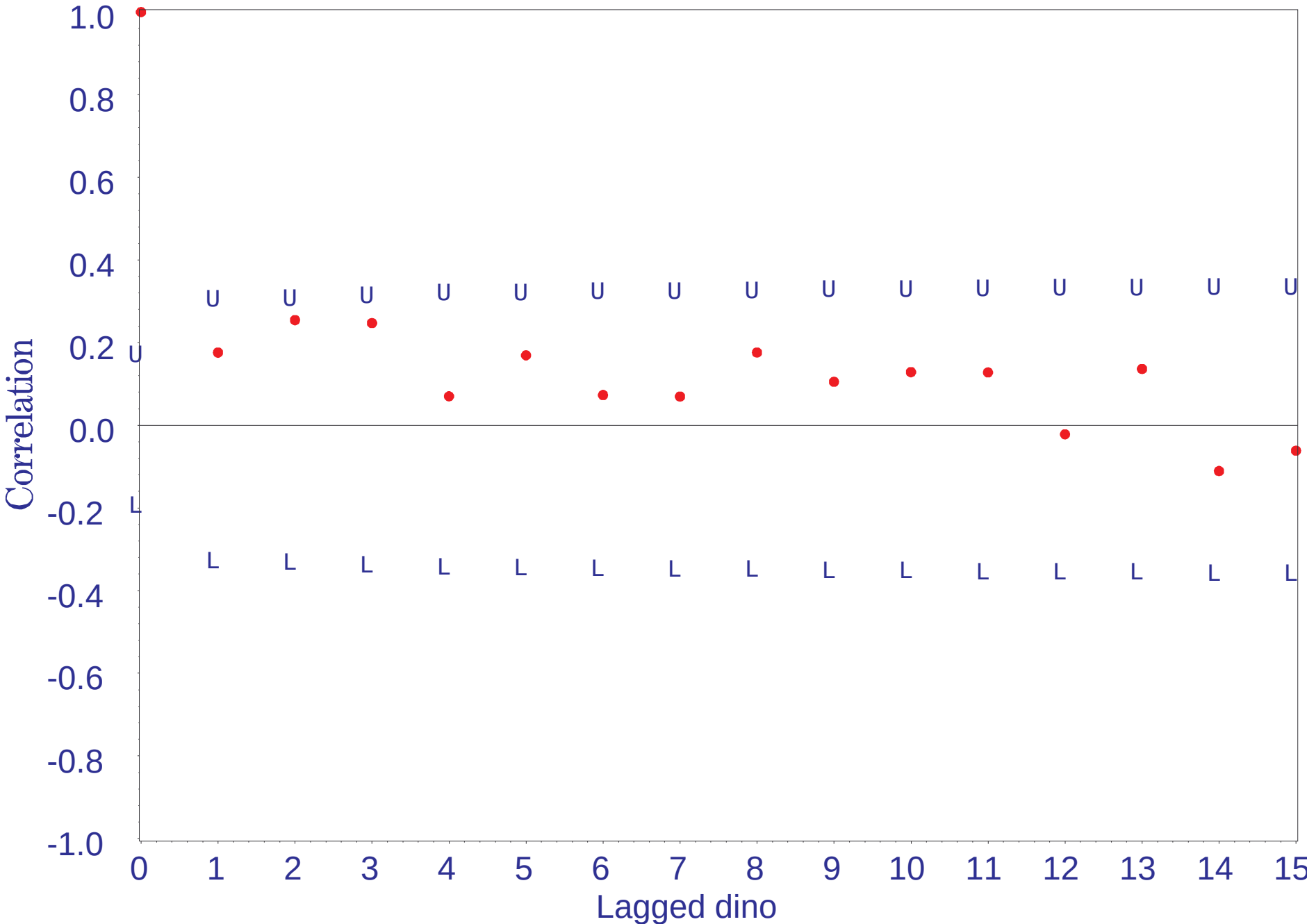
Percent Dinoflagellates at 12 ppt Isohaline (1989-1998)
Monthly Boxplots

B-275



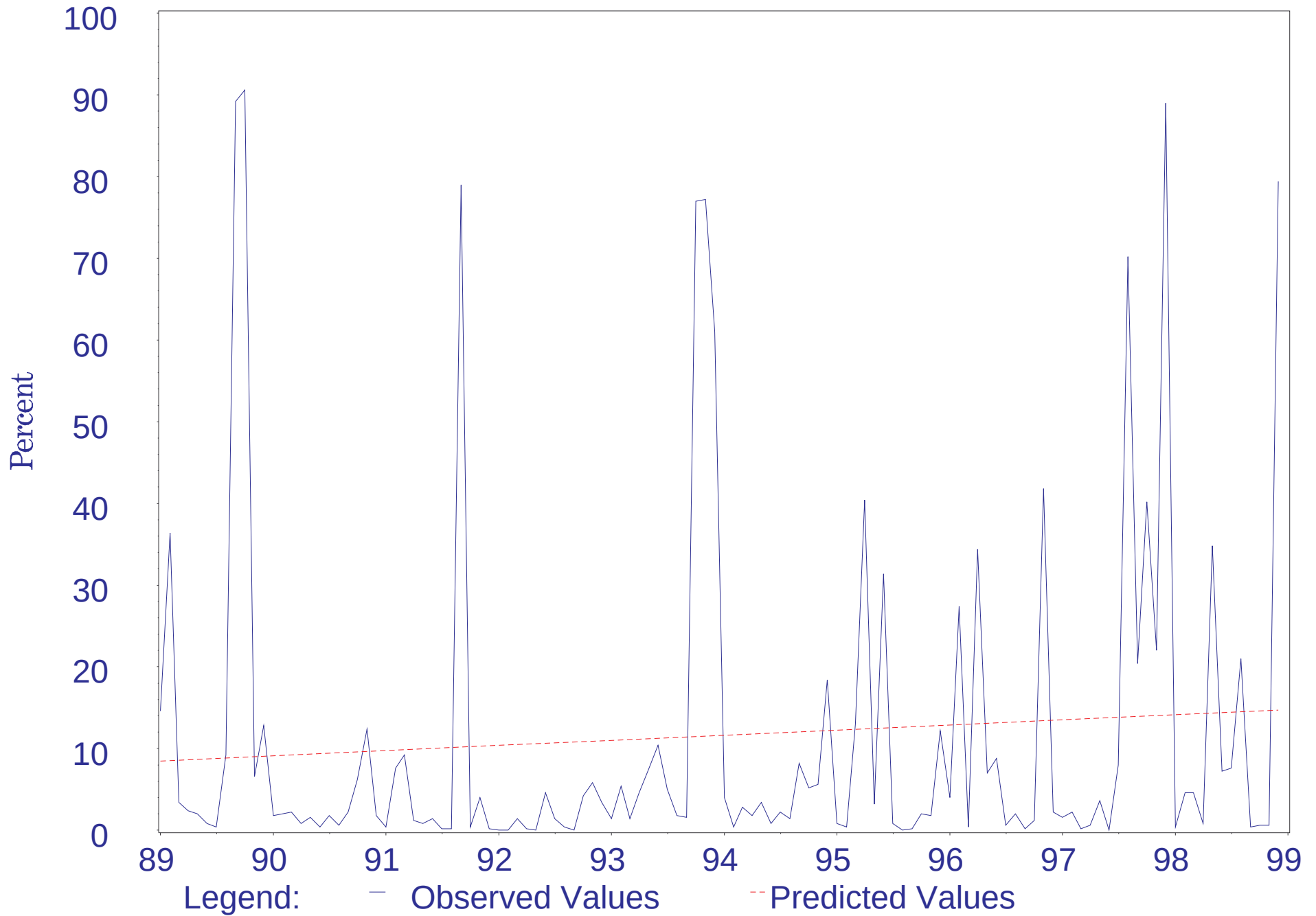
Percent of Dinoflagellates at 12 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-276



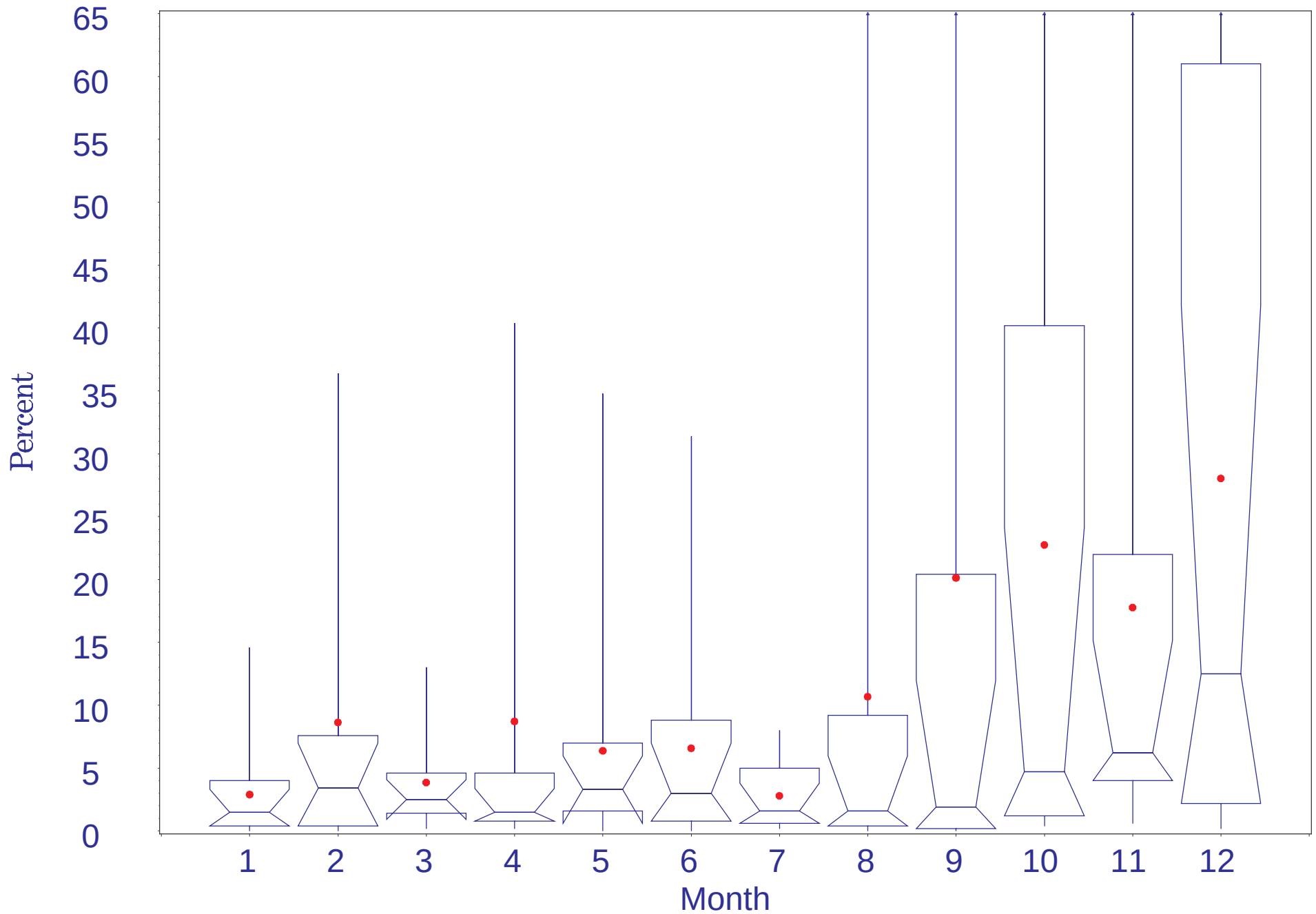
Percent Dinoflagellates at 20 ppt Isohaline
1989-1998

B-277



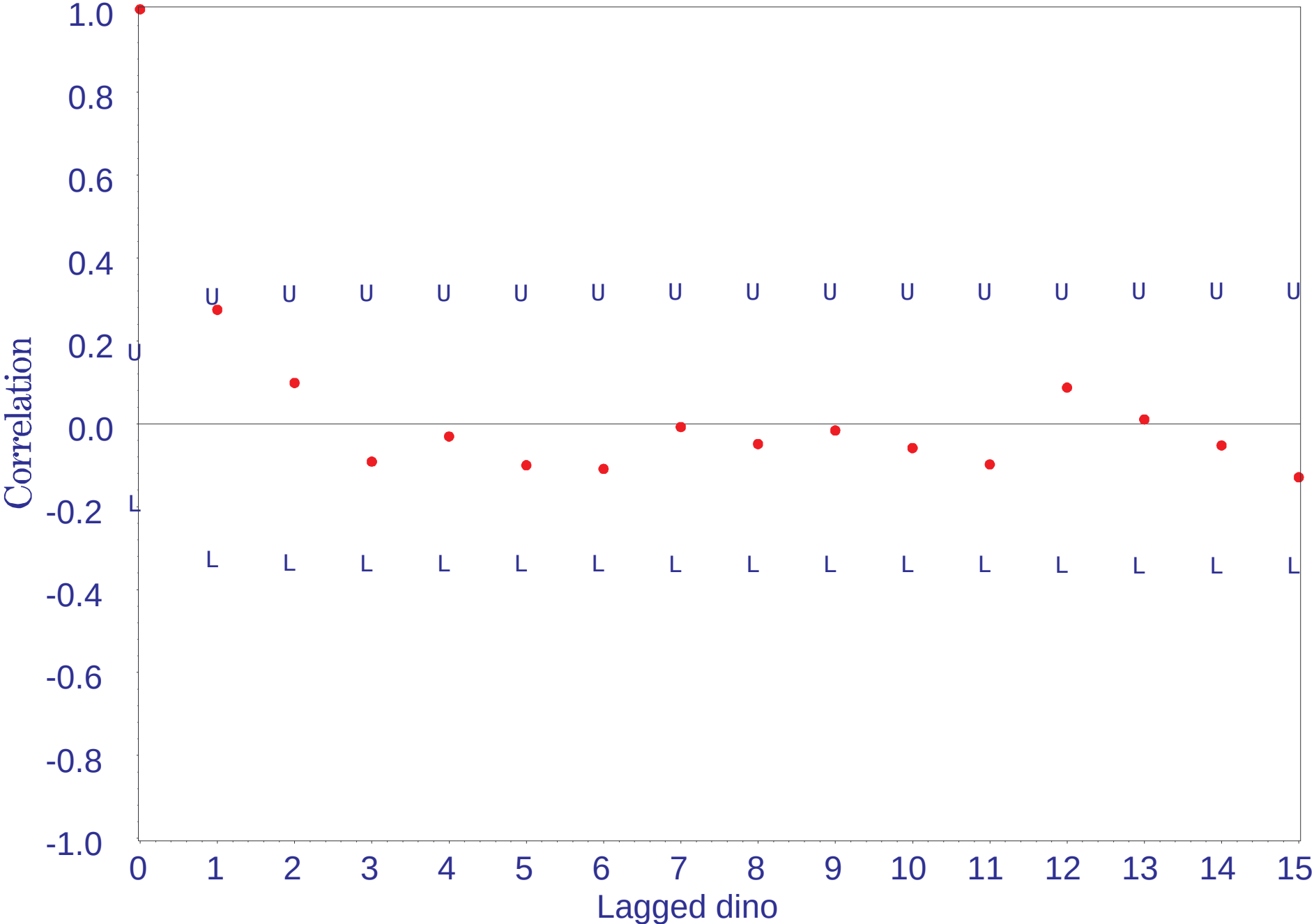
Percent Dinoflagellates at 20 ppt Isohaline (1989-1998)
Monthly Boxplots

B-278



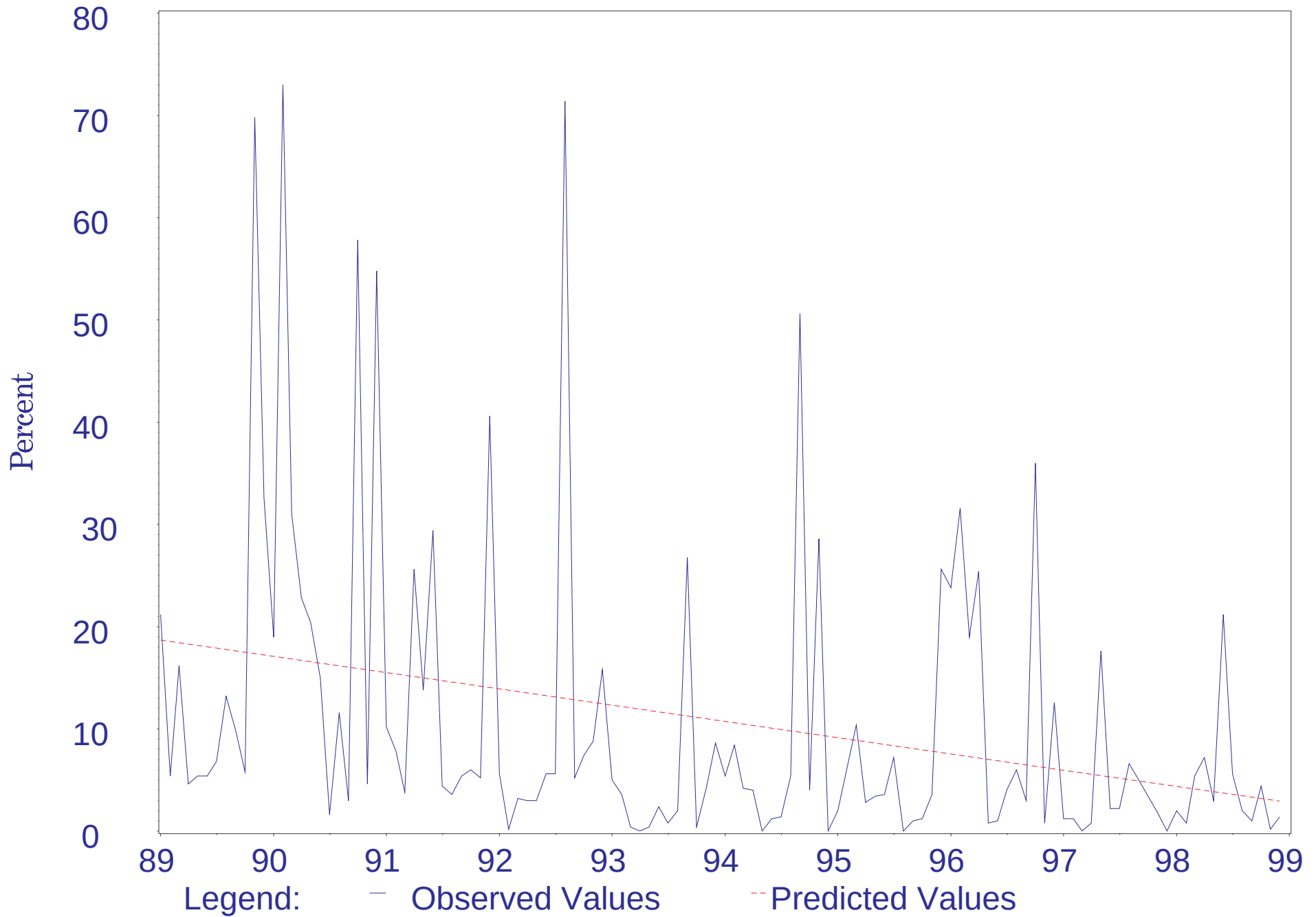
Percent of Dinoflagellates at 20 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-279



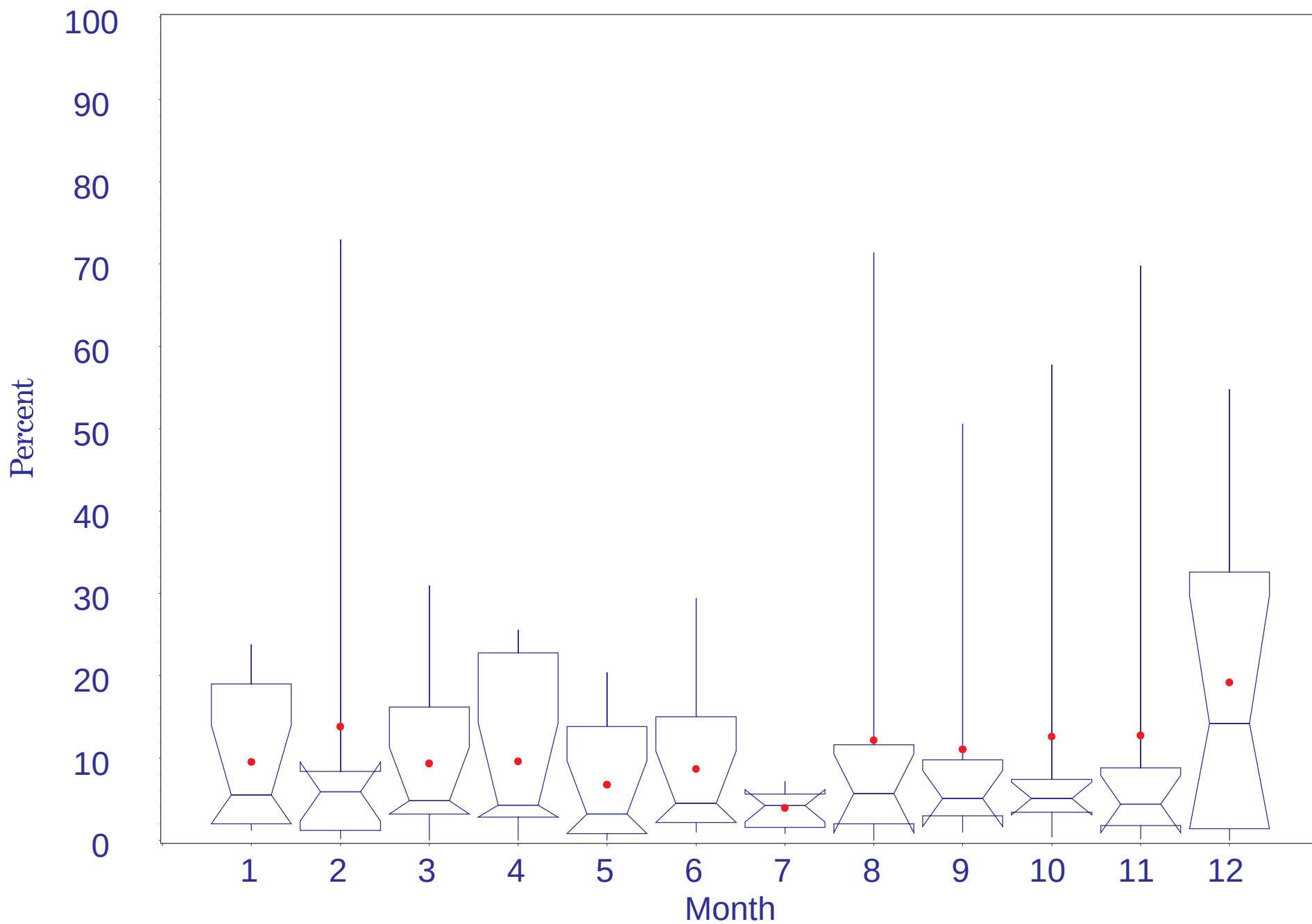
Percent Diatoms at 0 ppt Isohaline
1989-1998

B-280



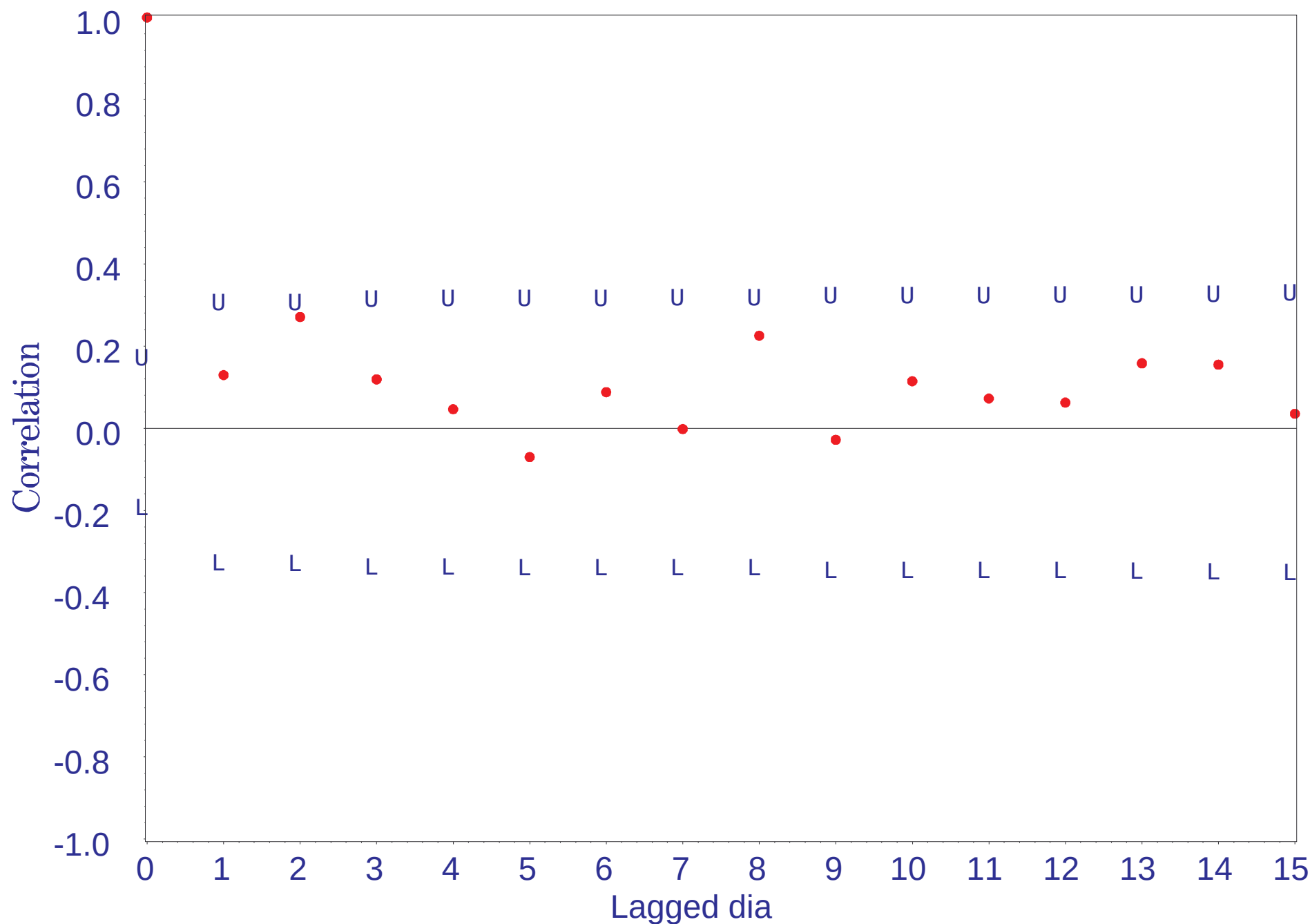
Percent Diatoms at 0 ppt Isohaline (1989-1998)
Monthly Boxplots

B-281



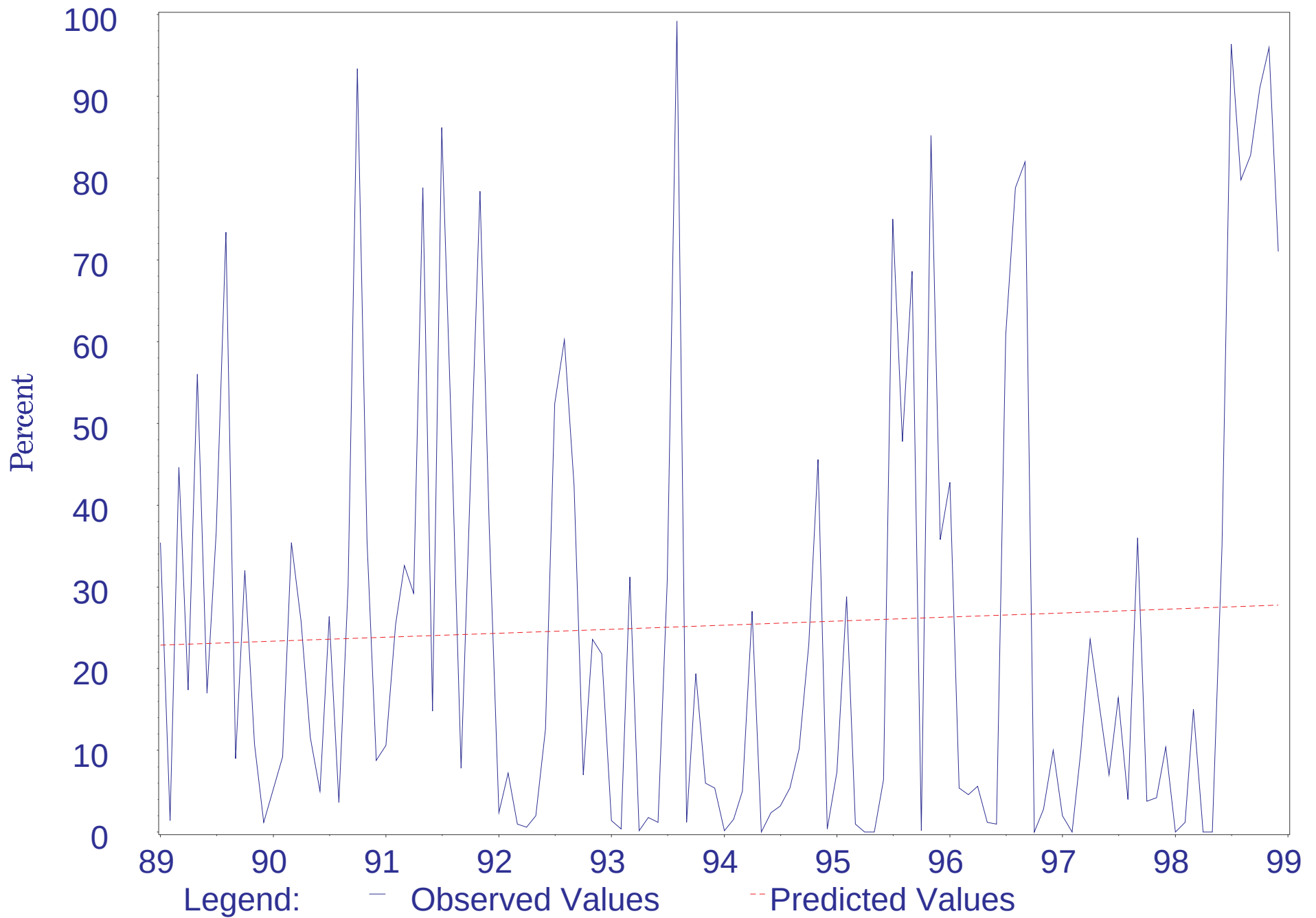
Percent of Diatoms at 0 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-282



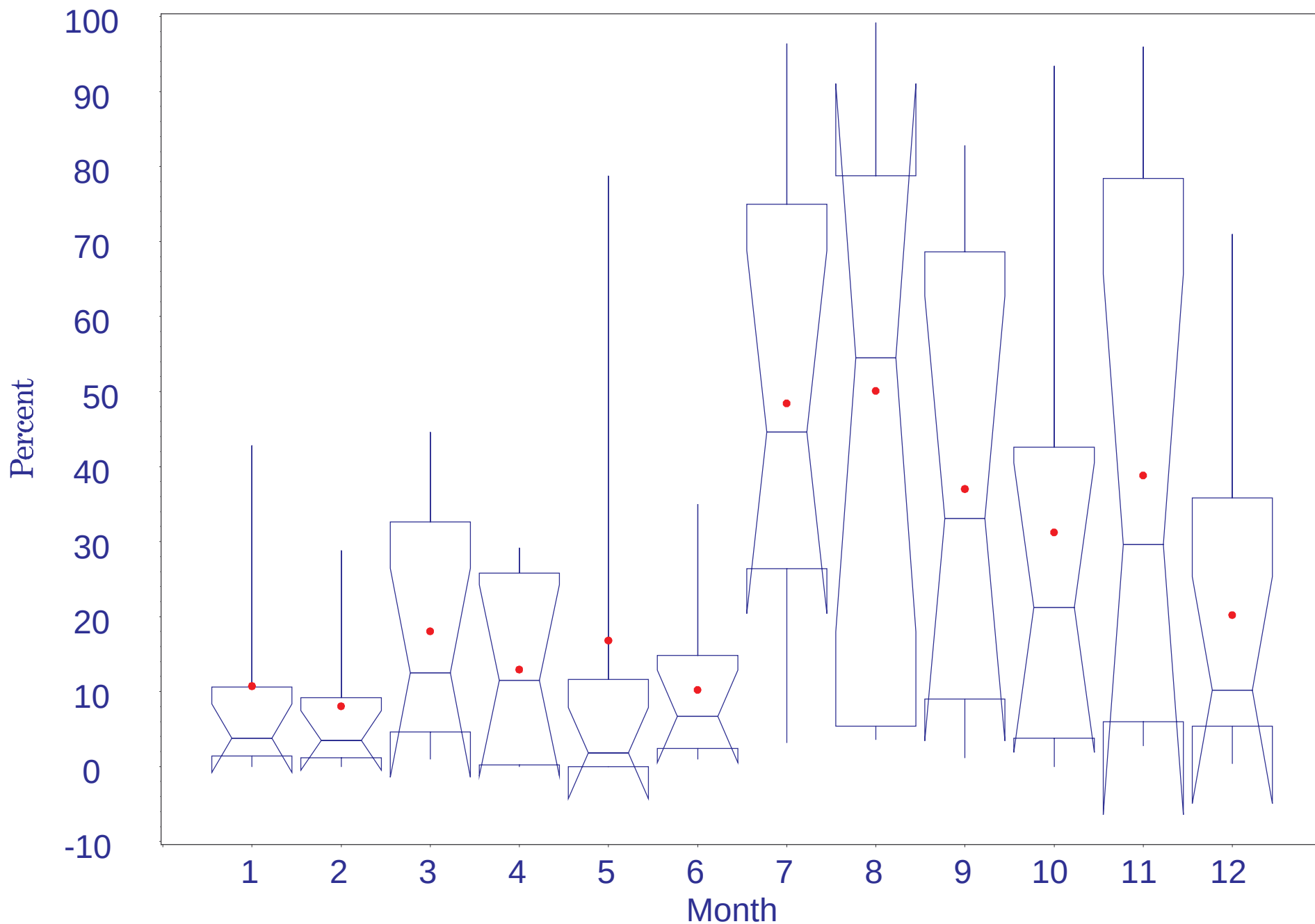
Percent Diatoms at 6 ppt Isohaline
1989-1998

B-283



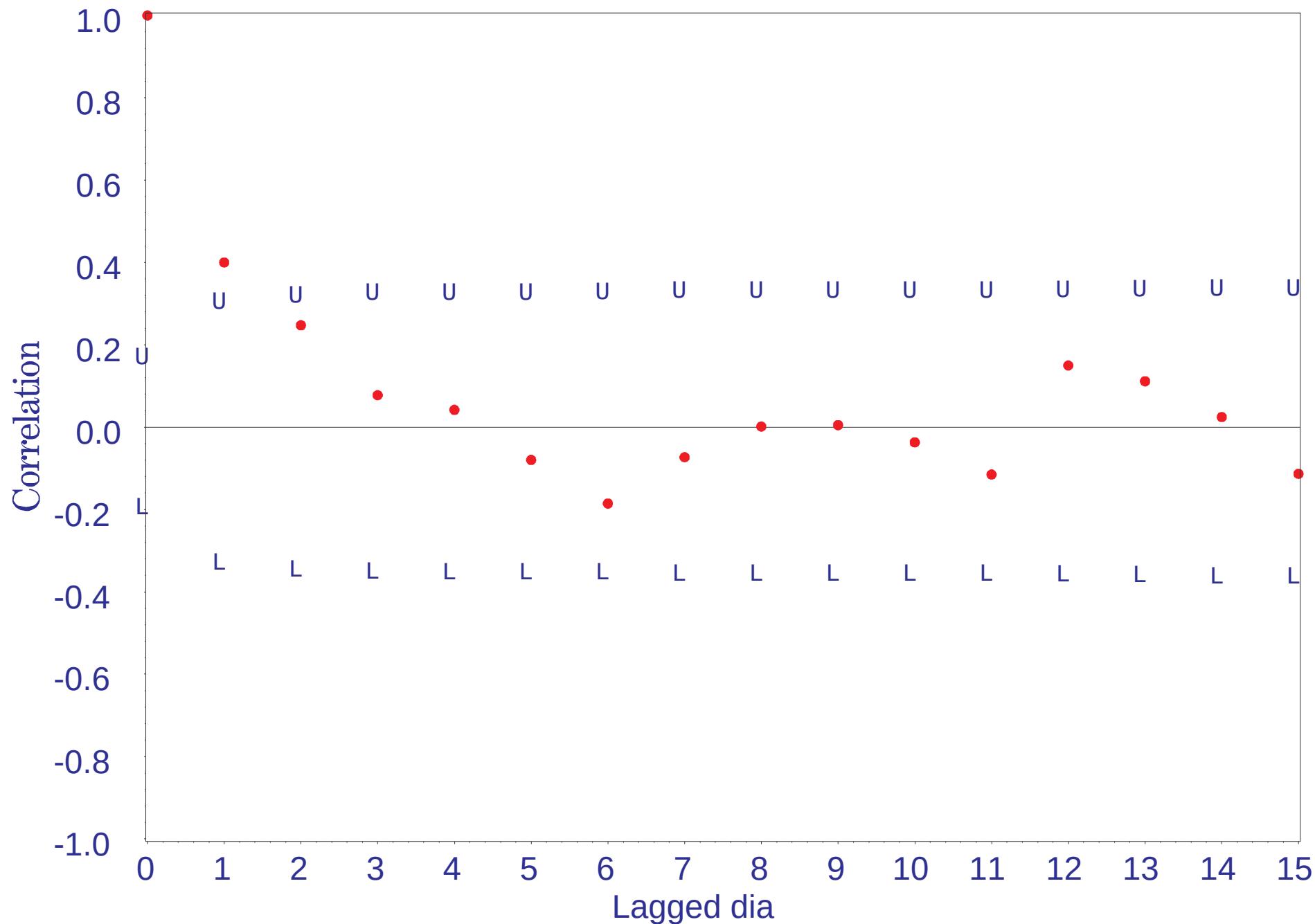
Percent Diatoms at 6 ppt Isohaline (1989-1998)
Monthly Boxplots

B-284



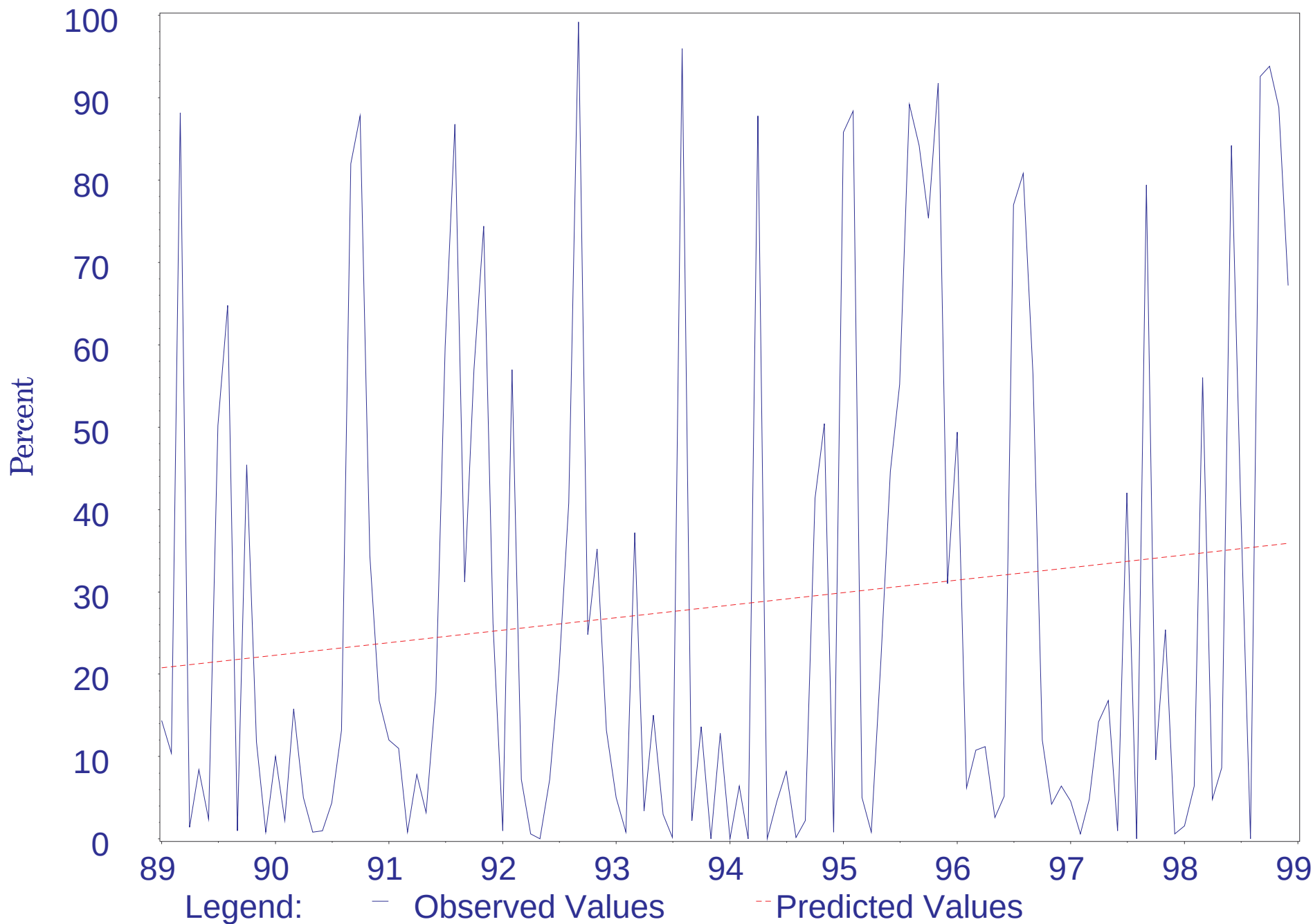
Percent of Diatoms at 6 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-285



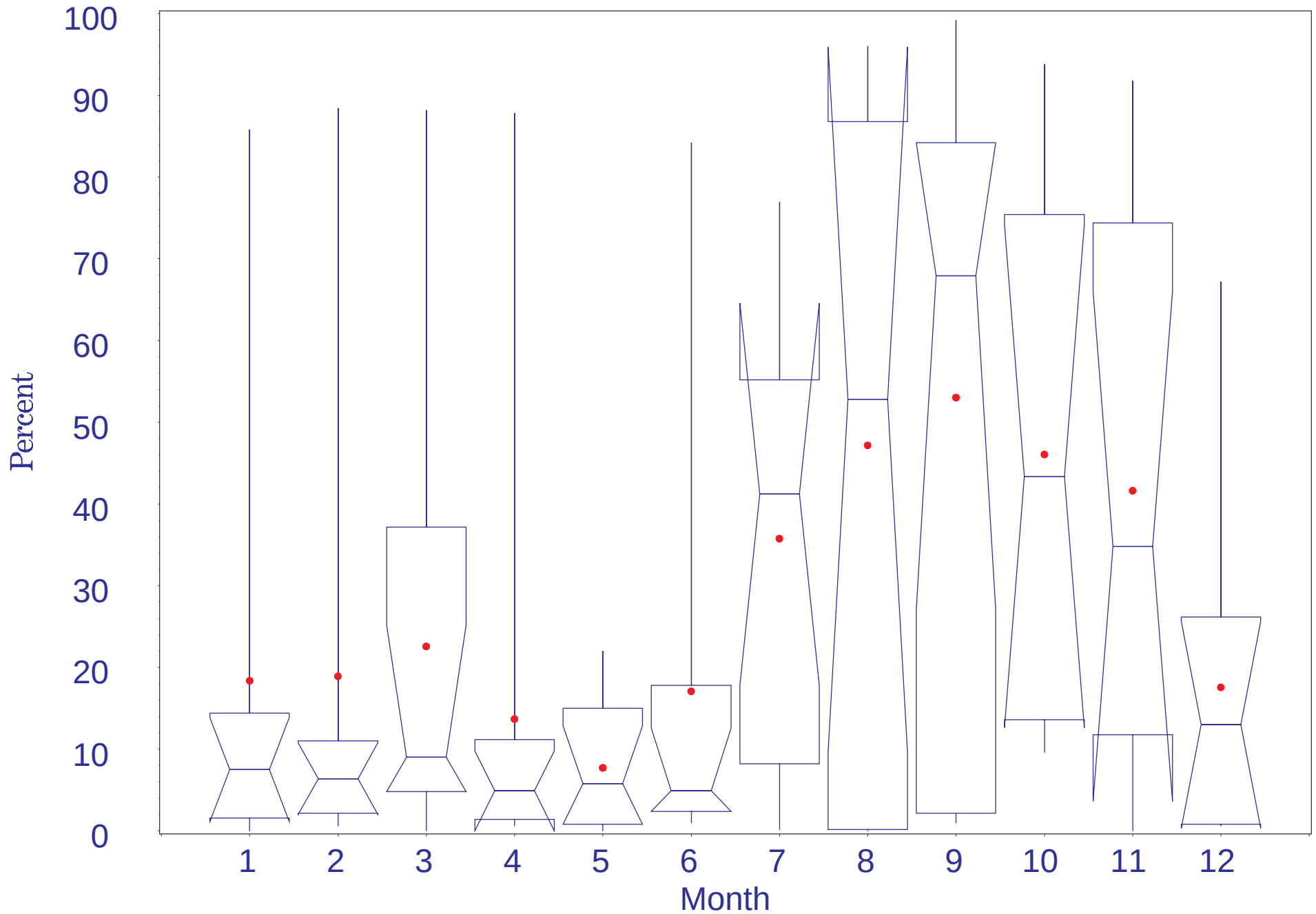
Percent Diatoms at 12 ppt Isohaline
1989-1998

B-286



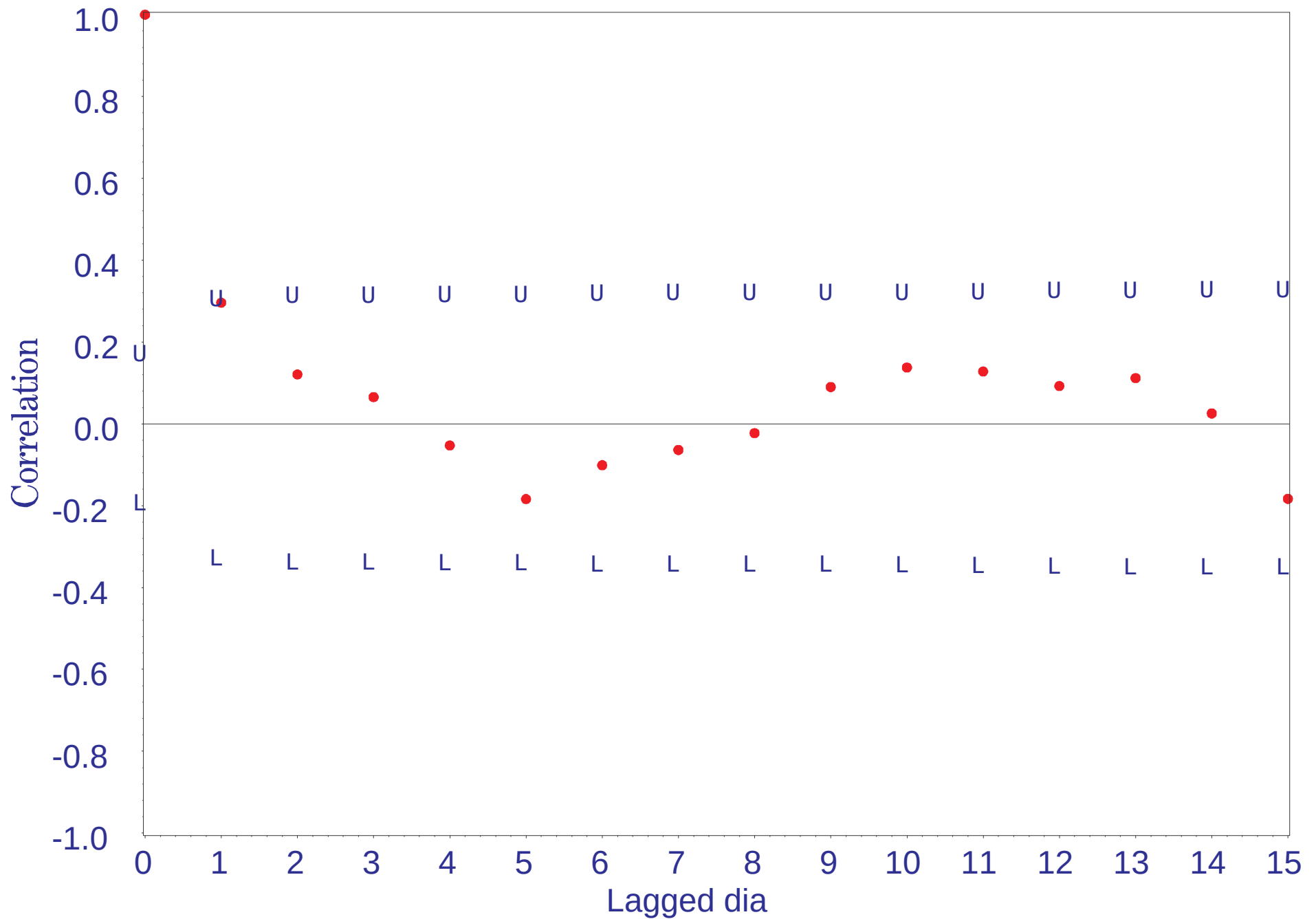
Percent Diatoms at 12 ppt Isohaline (1989-1998)
Monthly Boxplots

B-287



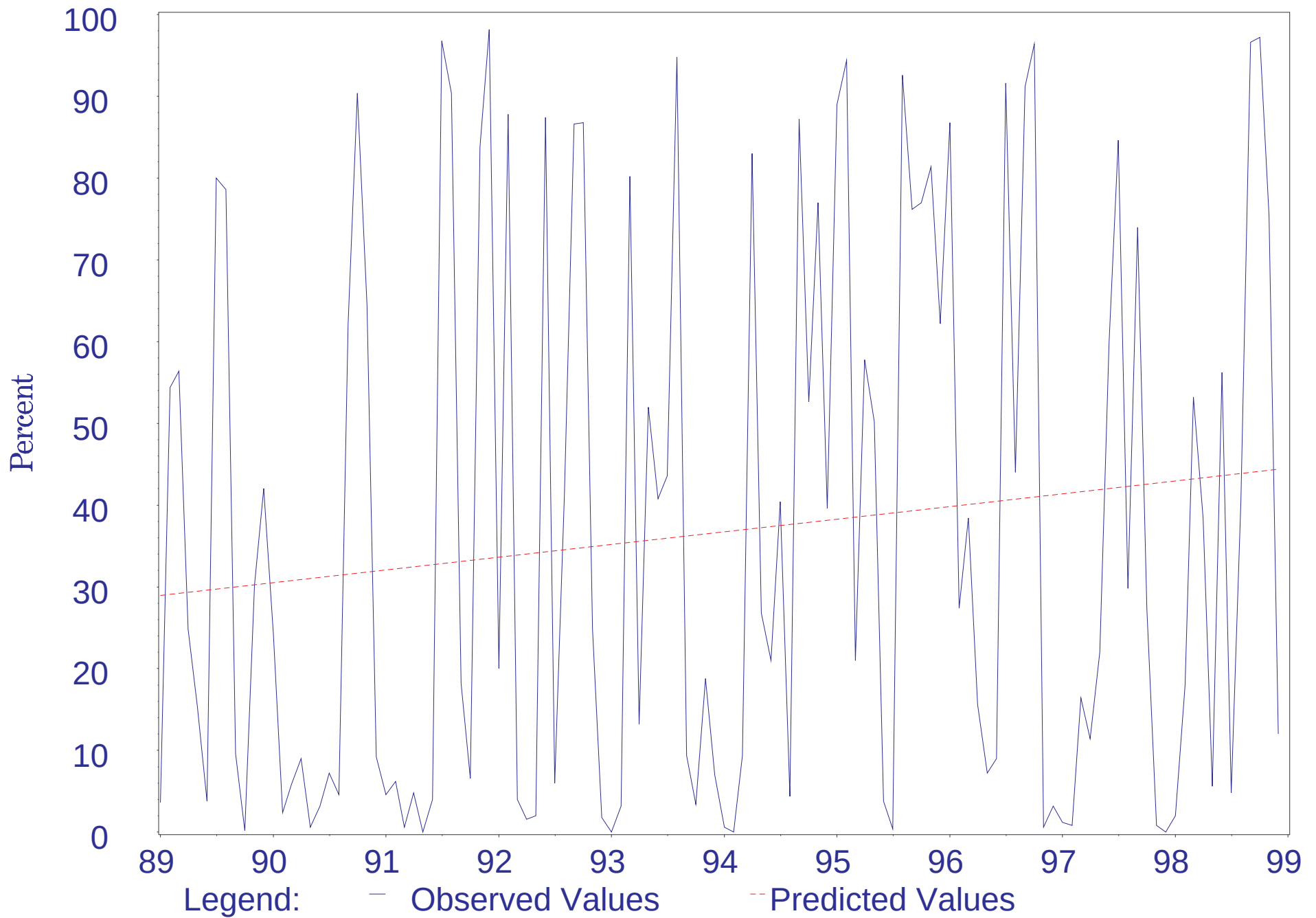
Percent Diatoms at 12 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-288



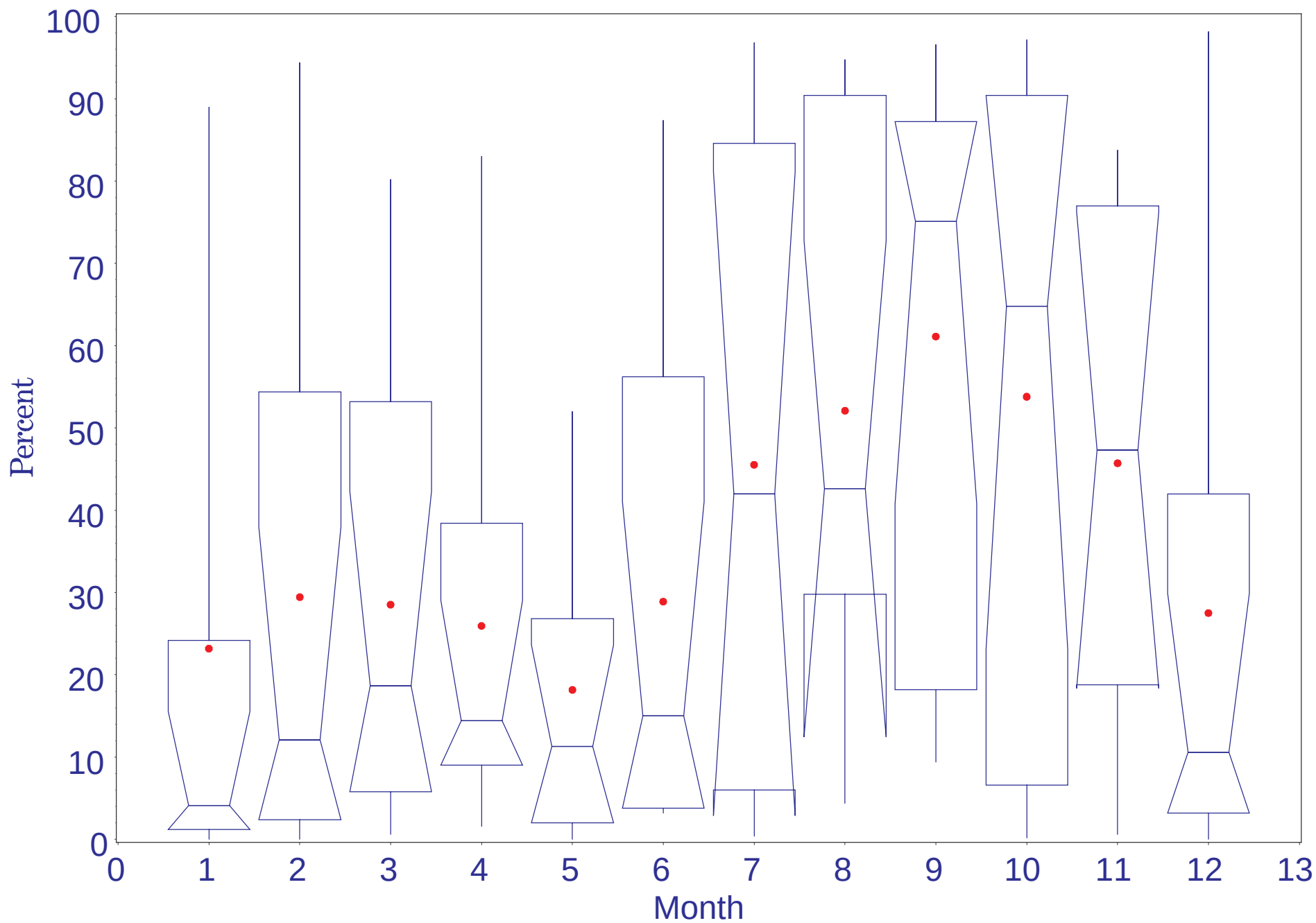
Percent Diatoms at 20 ppt Isohaline
1989-1998

B-289



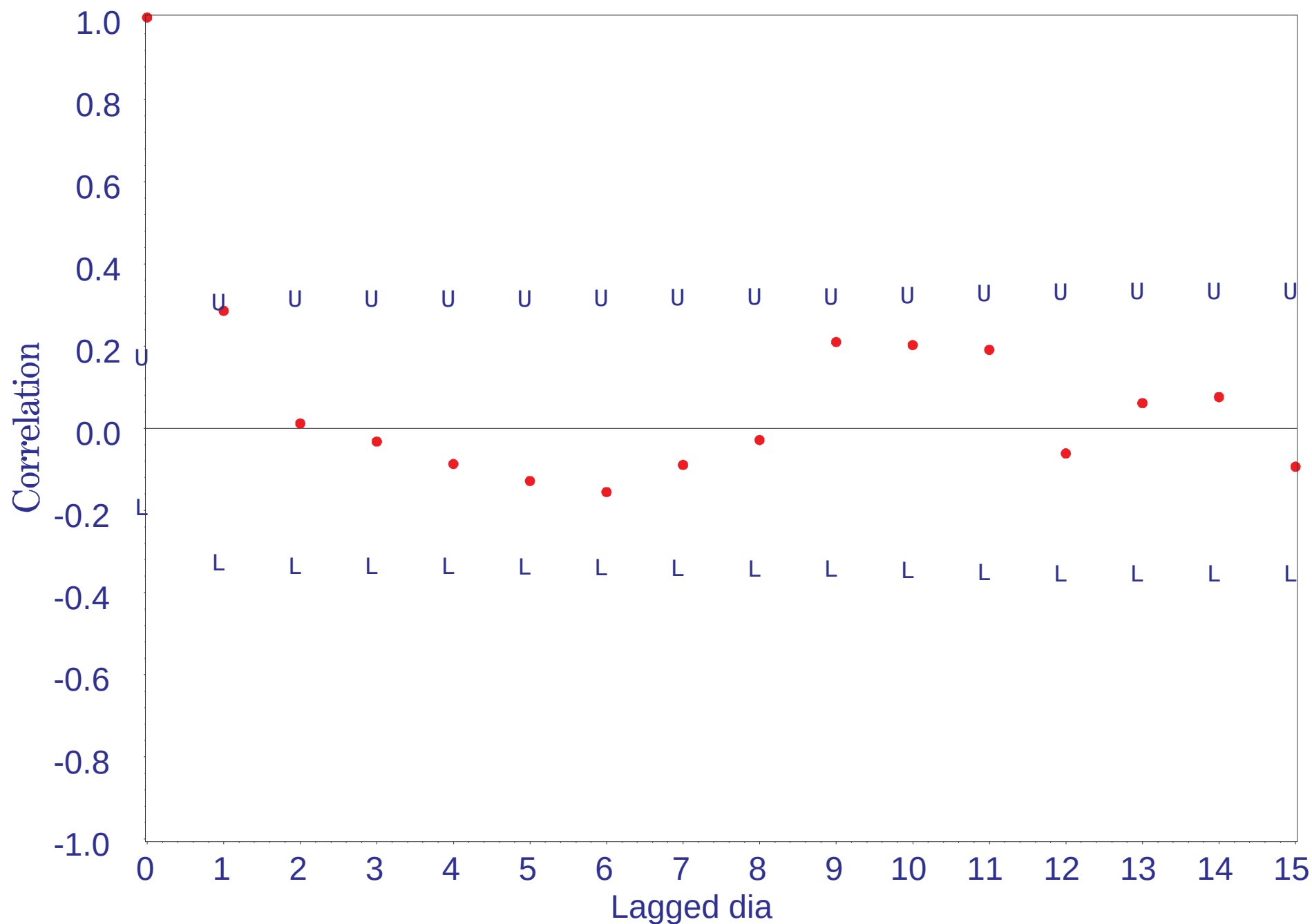
Percent Diatoms at 20 ppt Isohaline (1989-1998)
Monthly Boxplots

B-290



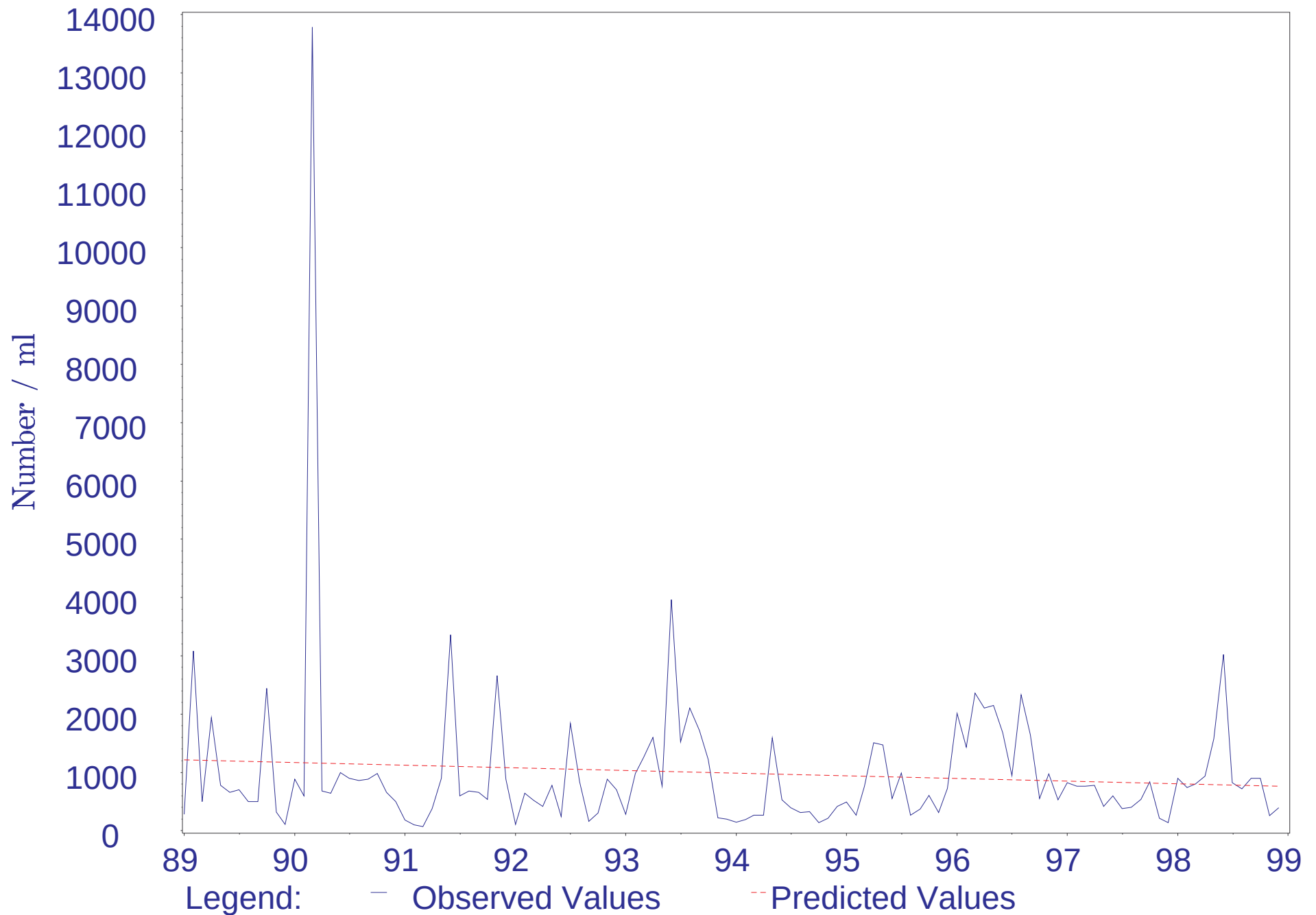
Percent Diatoms at 20 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-291



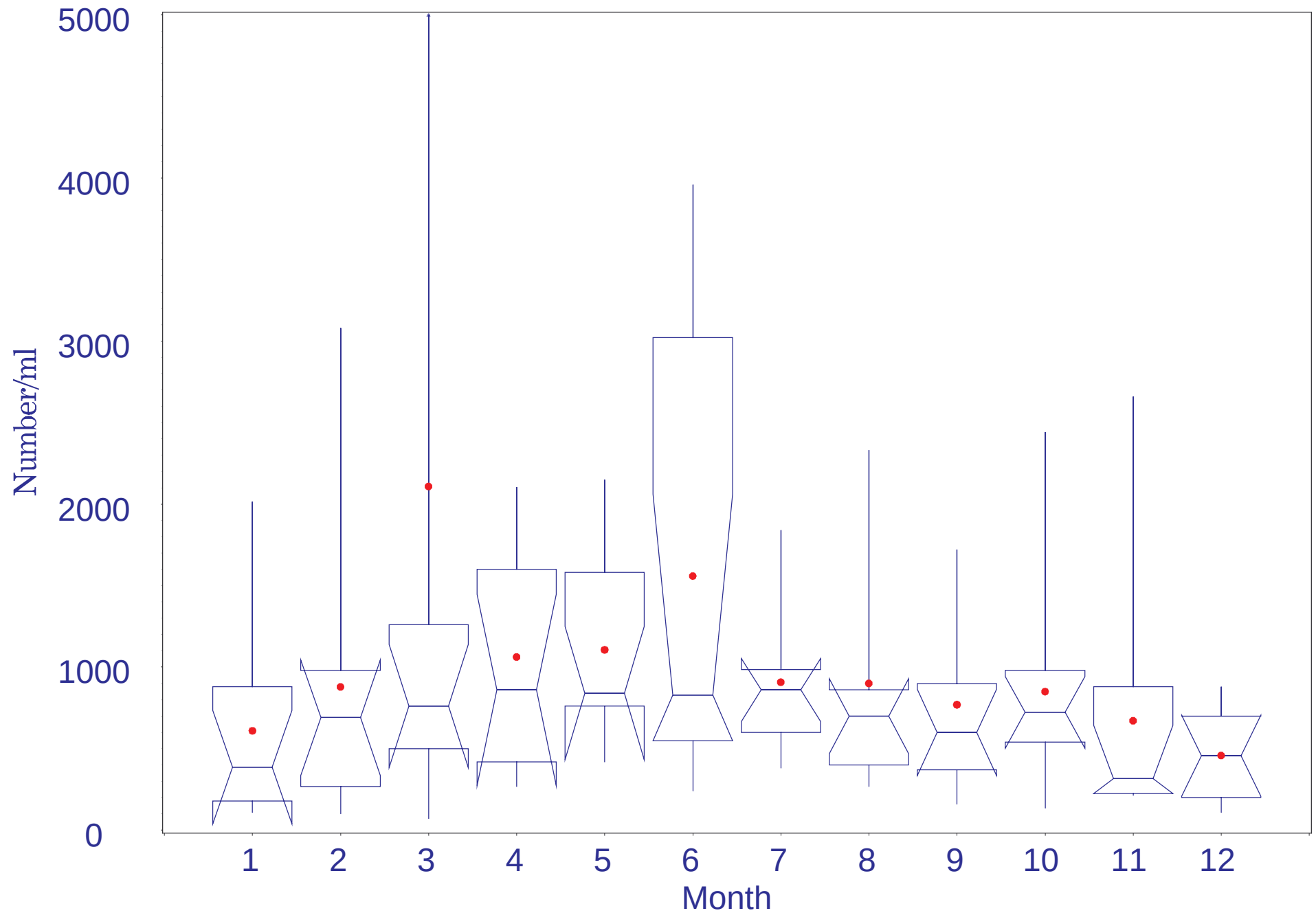
Phytoplankton Cell Density - 0 ppt Isohaline
1989-1998

B-292



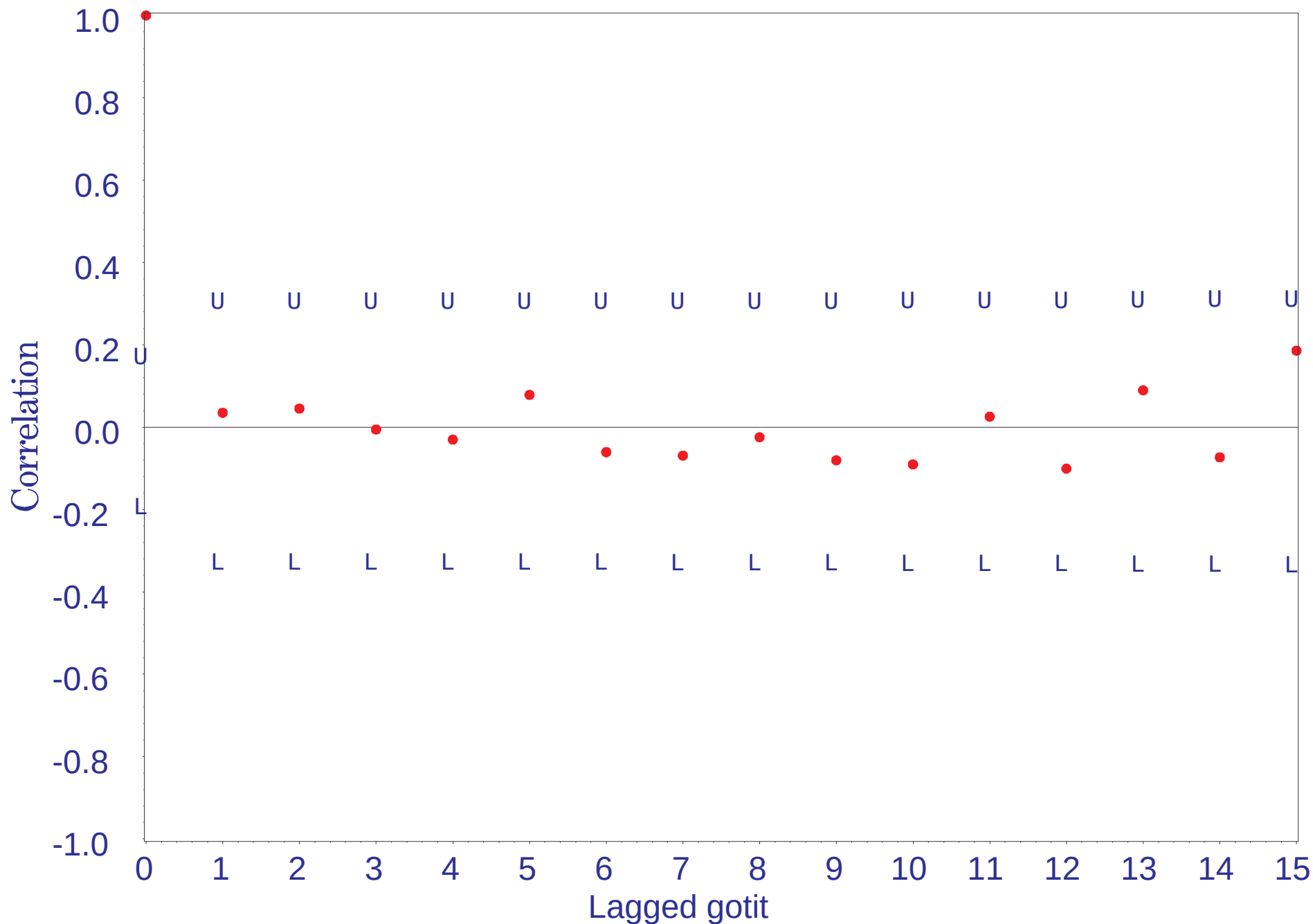
Phytoplankton Cell Density at 0 ppt Isohaline 1989-1998
Monthly Boxplots

B-293



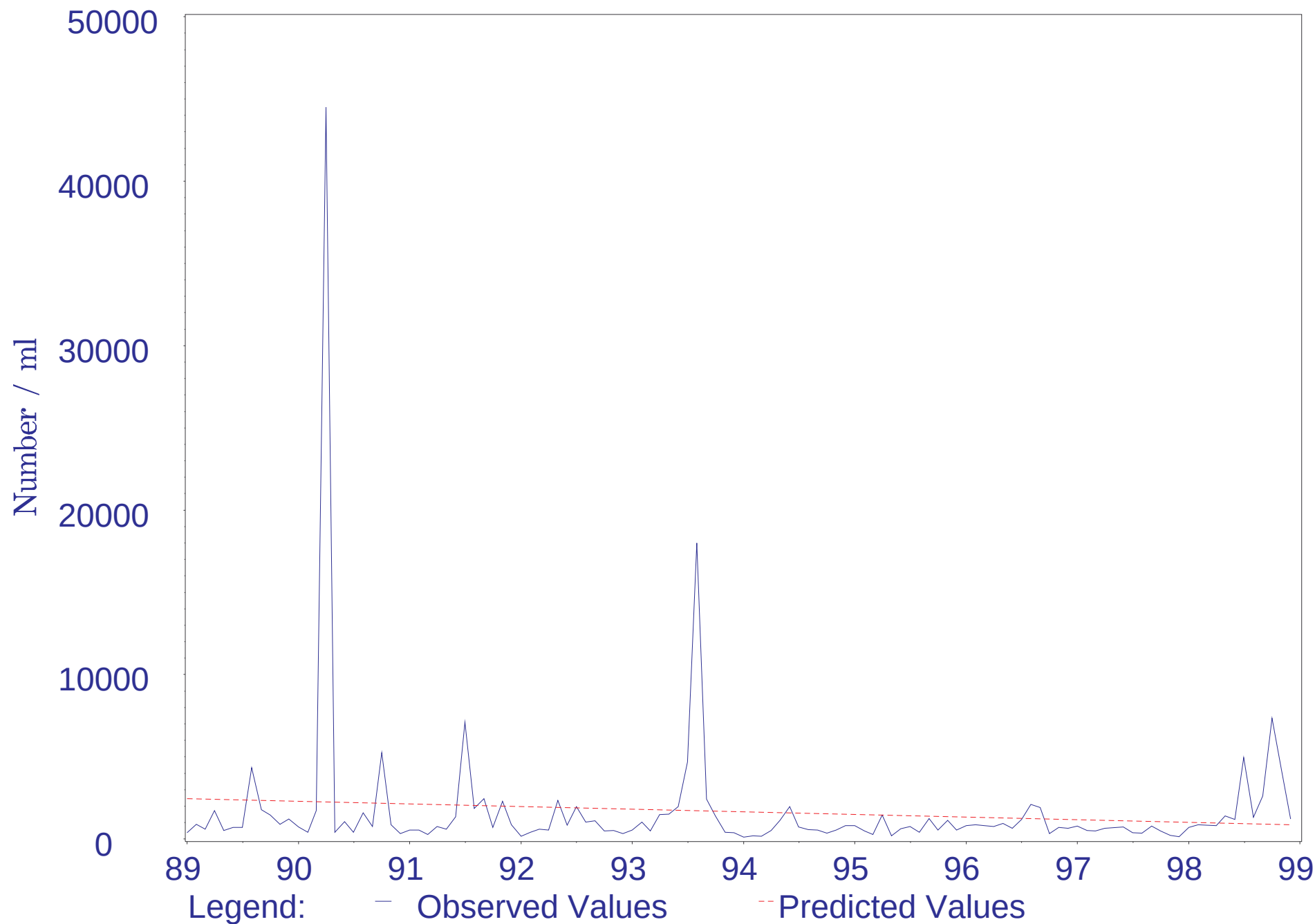
Phytoplankton Cell Density - 0 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-294



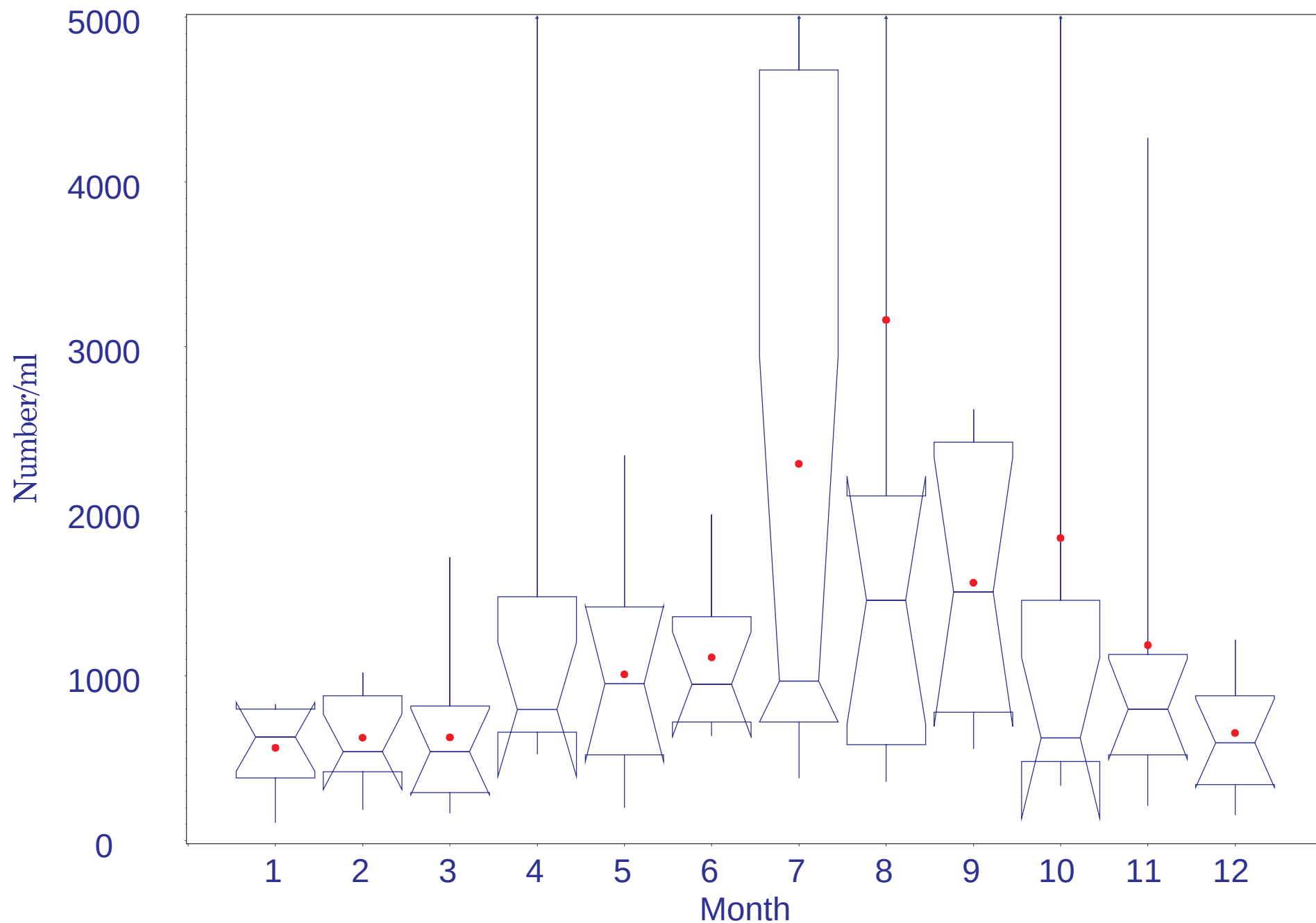
Phytoplankton Cell Density - 6 ppt Isohaline
1989-1998

B-295



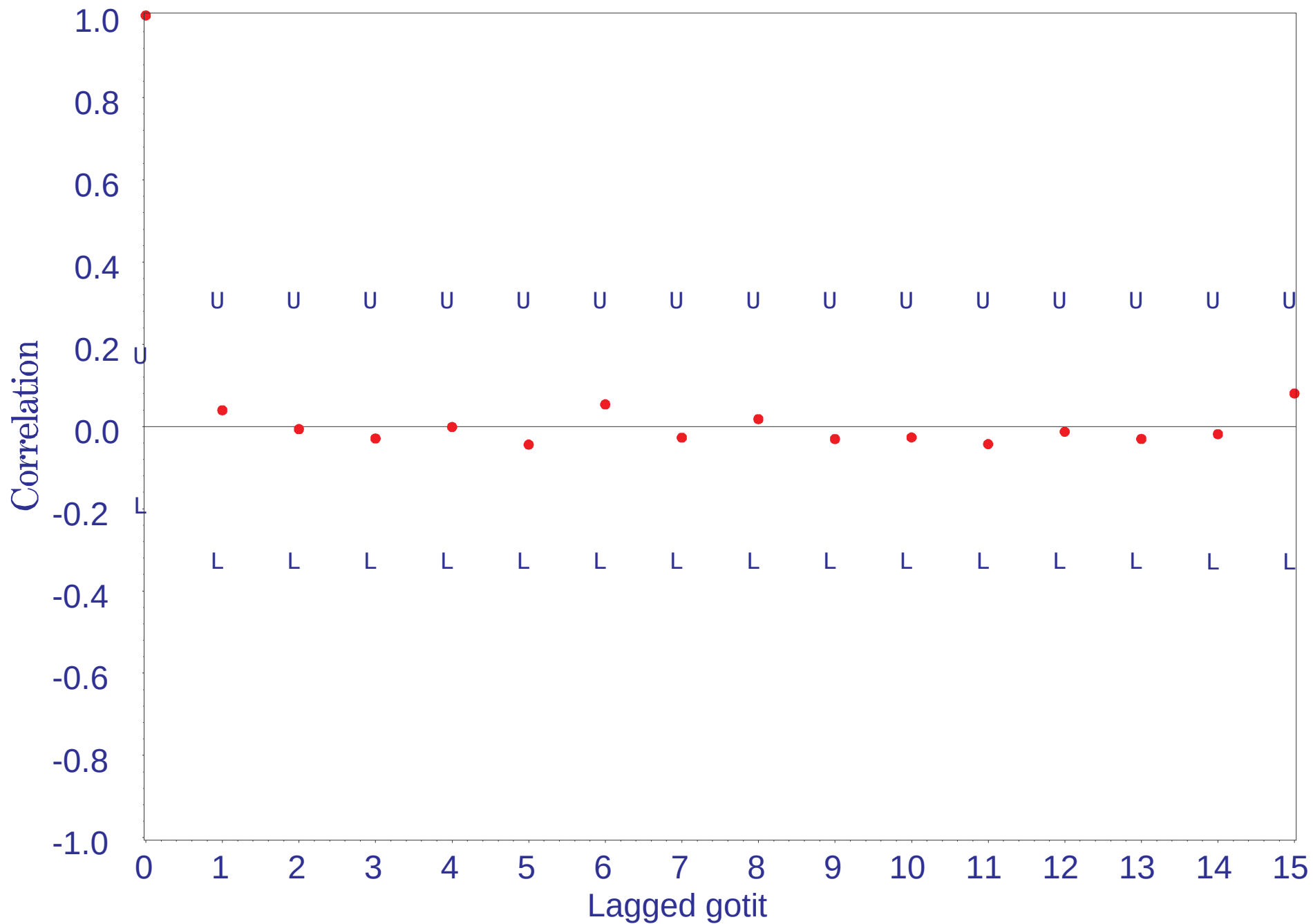
Phytoplankton Cell Density at 6 ppt Isohaline 1989-1998 Monthly Boxplots

B-296



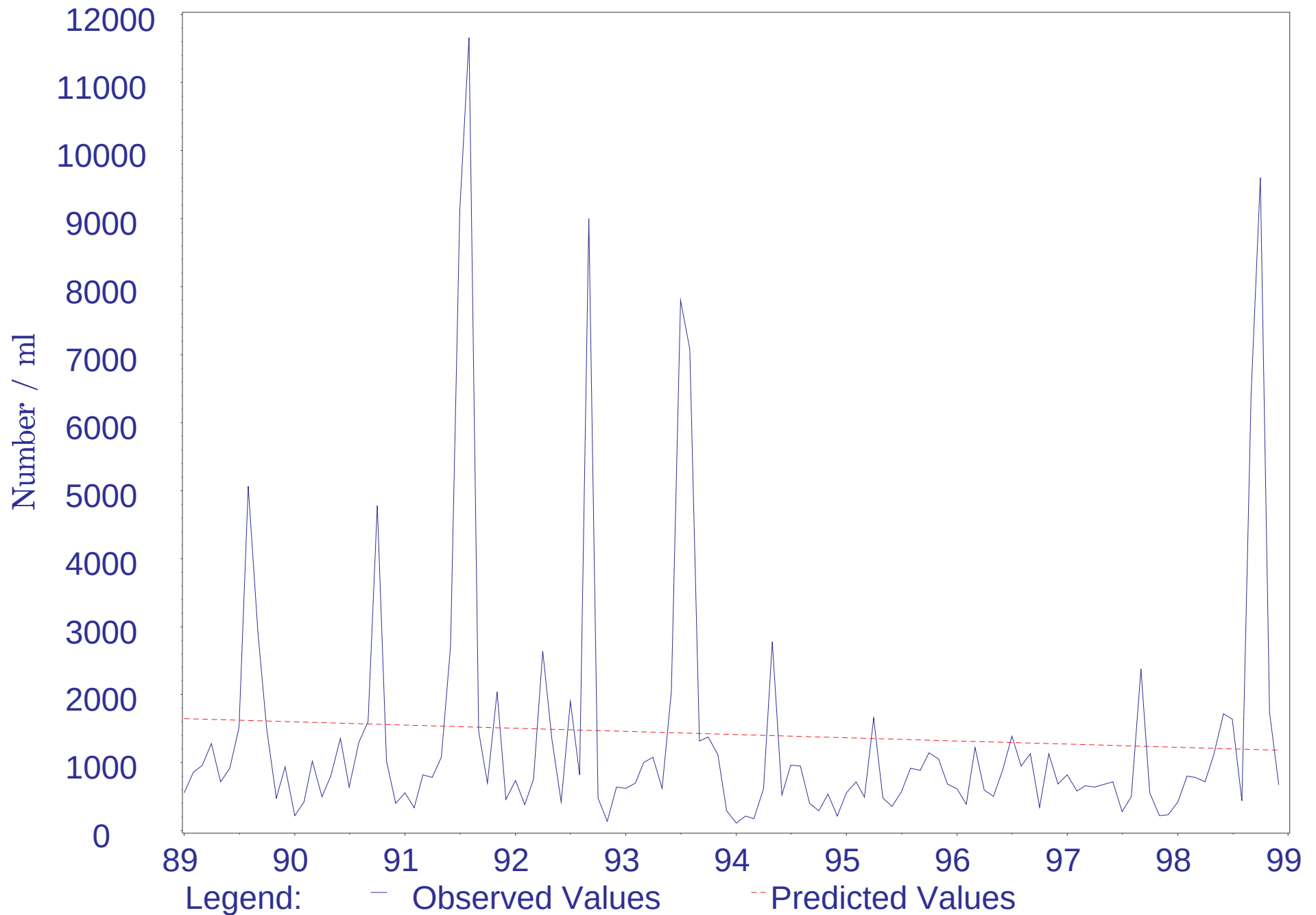
Phytoplankton Cell Density - 6 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-297



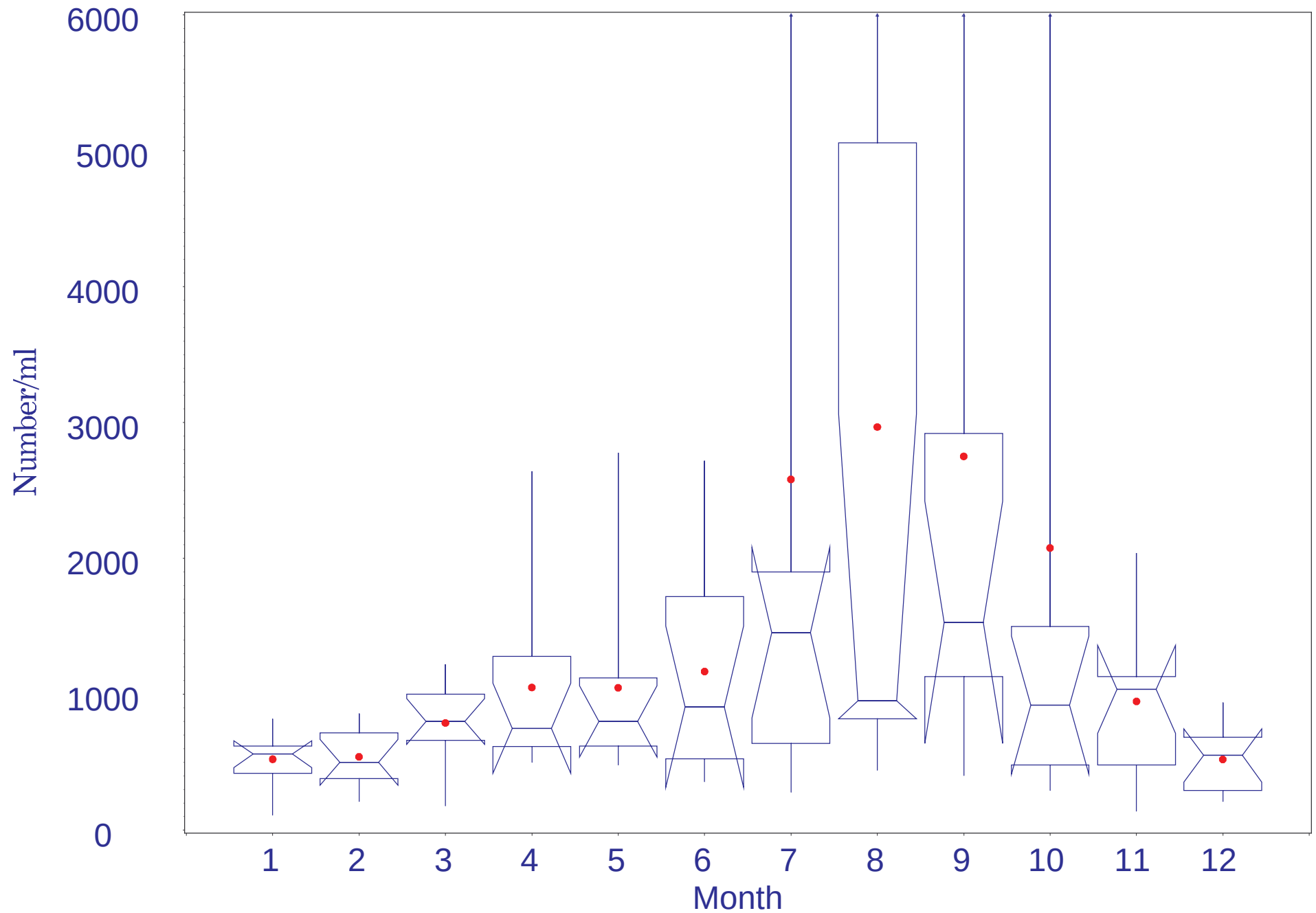
Phytoplankton Cell Density - 12 ppt Isohaline 1989-1998

B-298



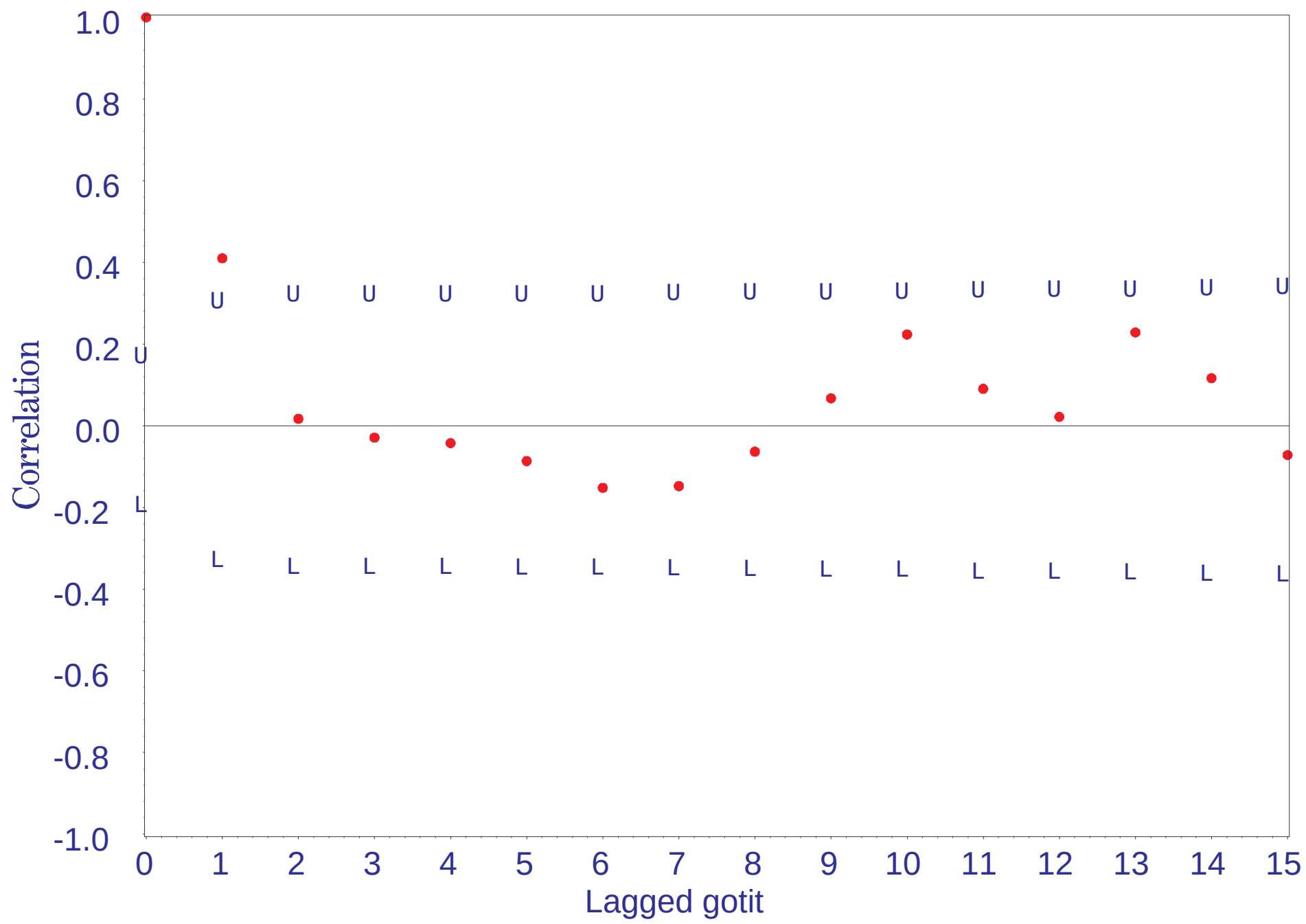
Phytoplankton Cell Density at 12 ppt Isohaline 1989-1998
Monthly Boxplots

B-299



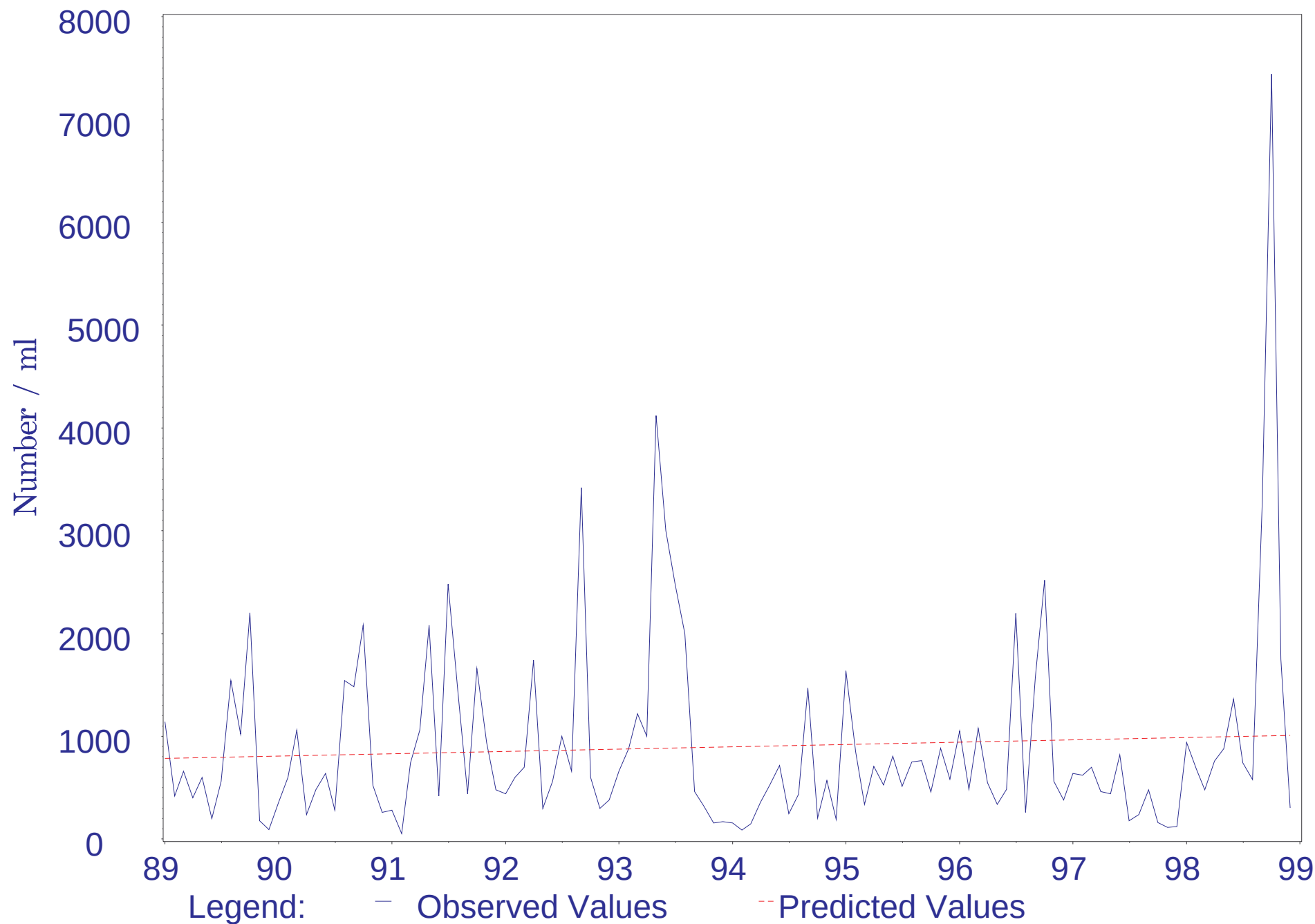
Phytoplankton Cell Density - 12 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-300



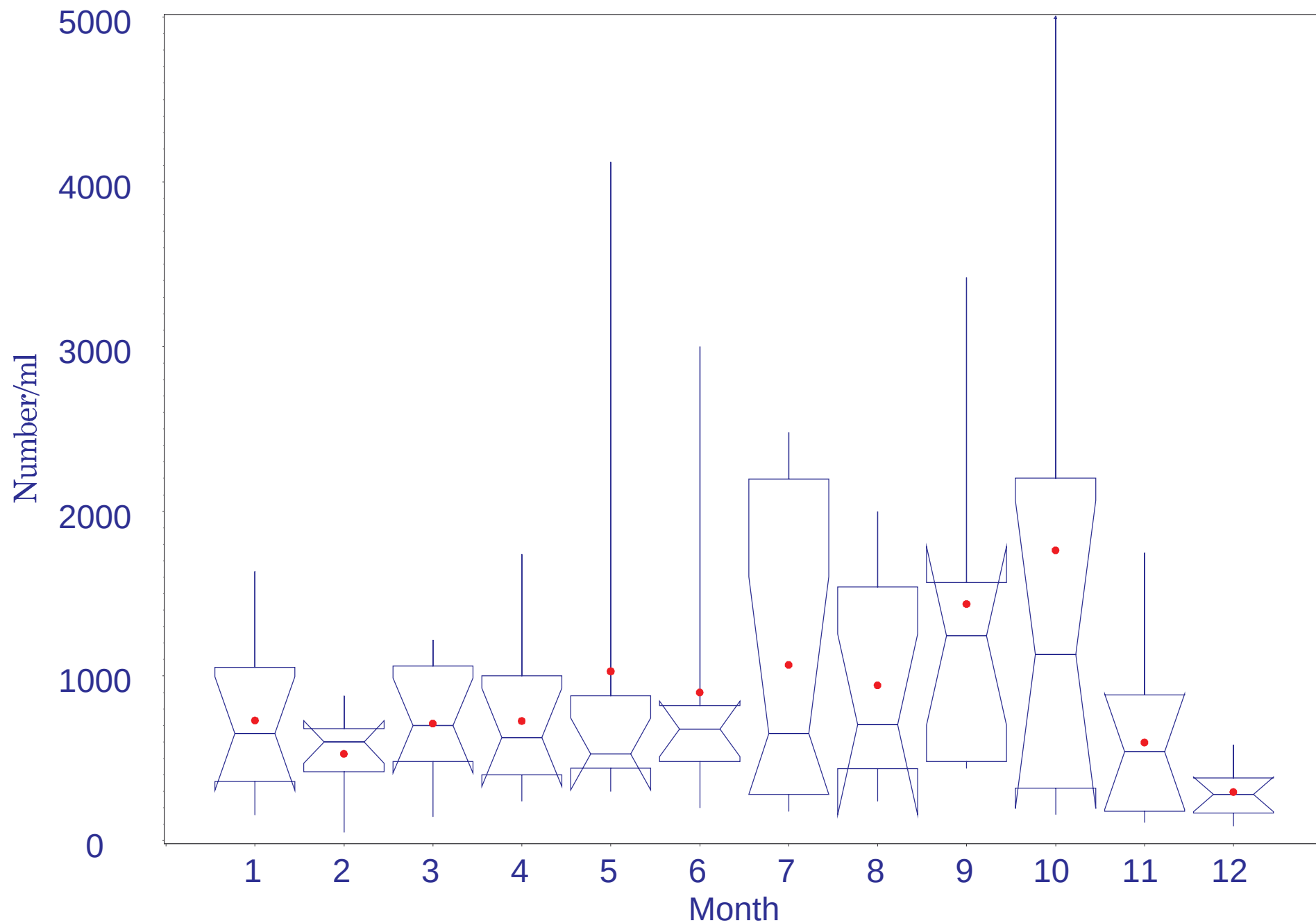
Phytoplankton Cell Density - 20 ppt Isohaline
1989-1998

B-301



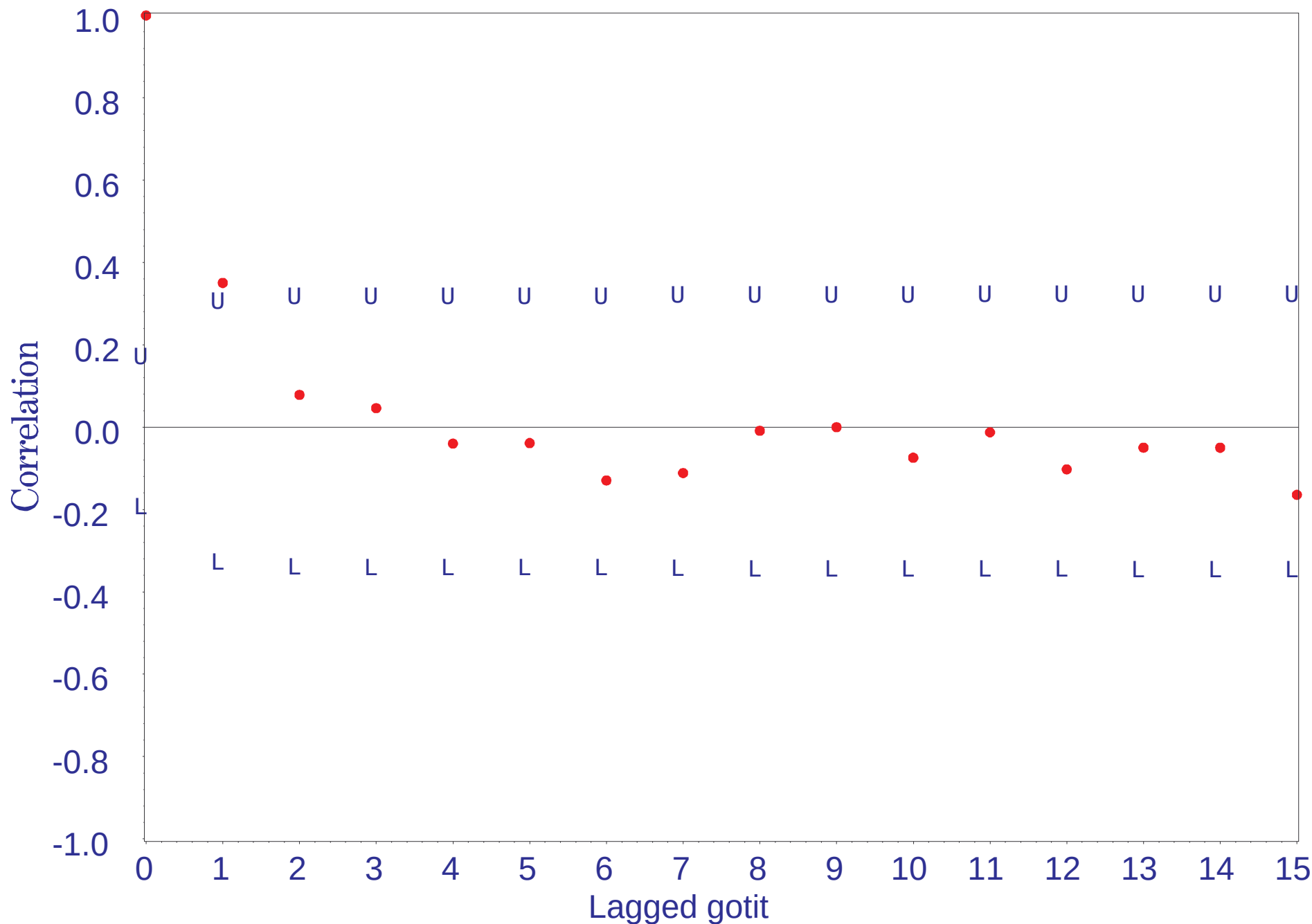
Phytoplankton Cell Density at 20 ppt Isohaline 1989-1998 Monthly Boxplots

B-302



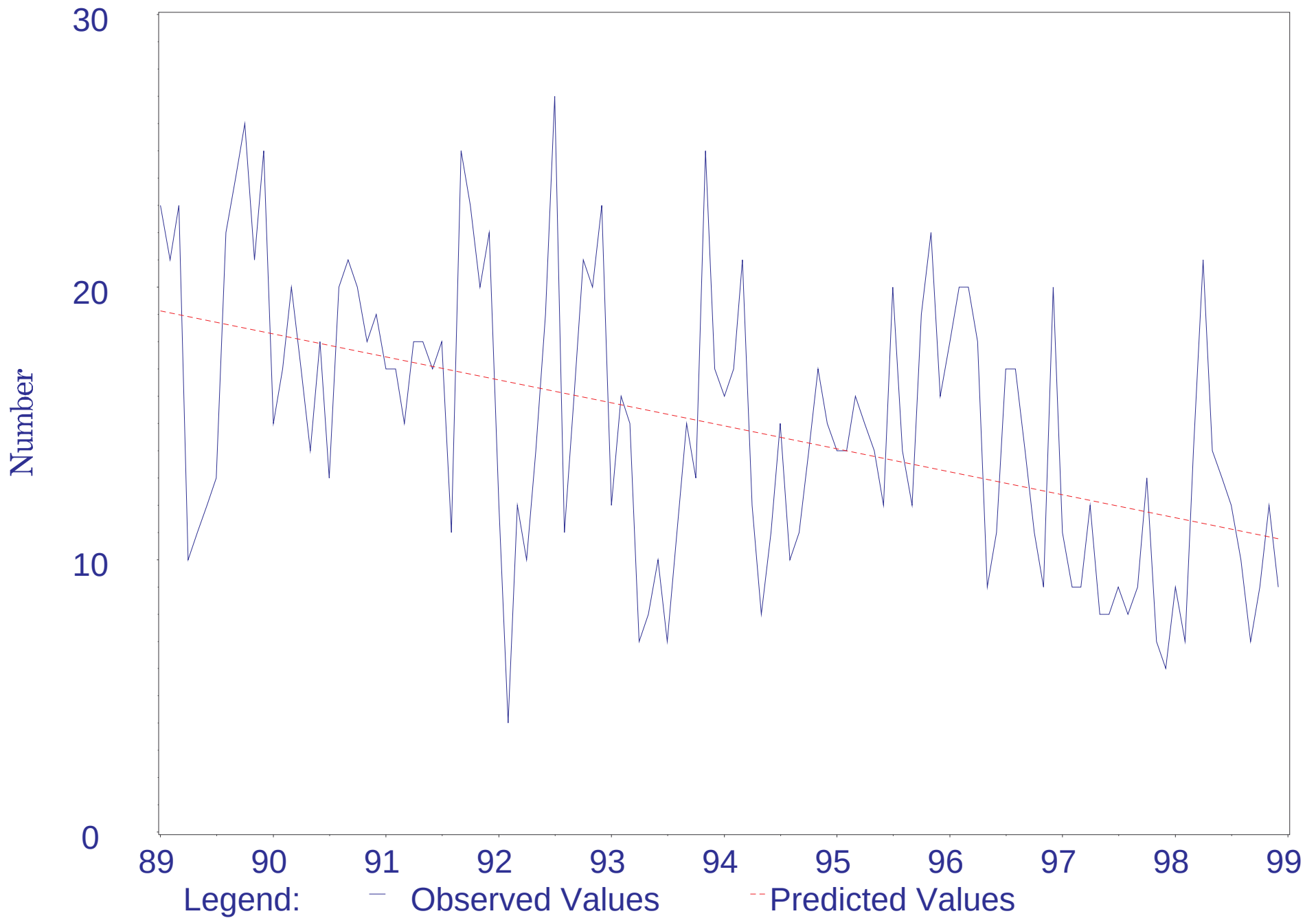
Phytoplankton Cell Density - 20 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-303



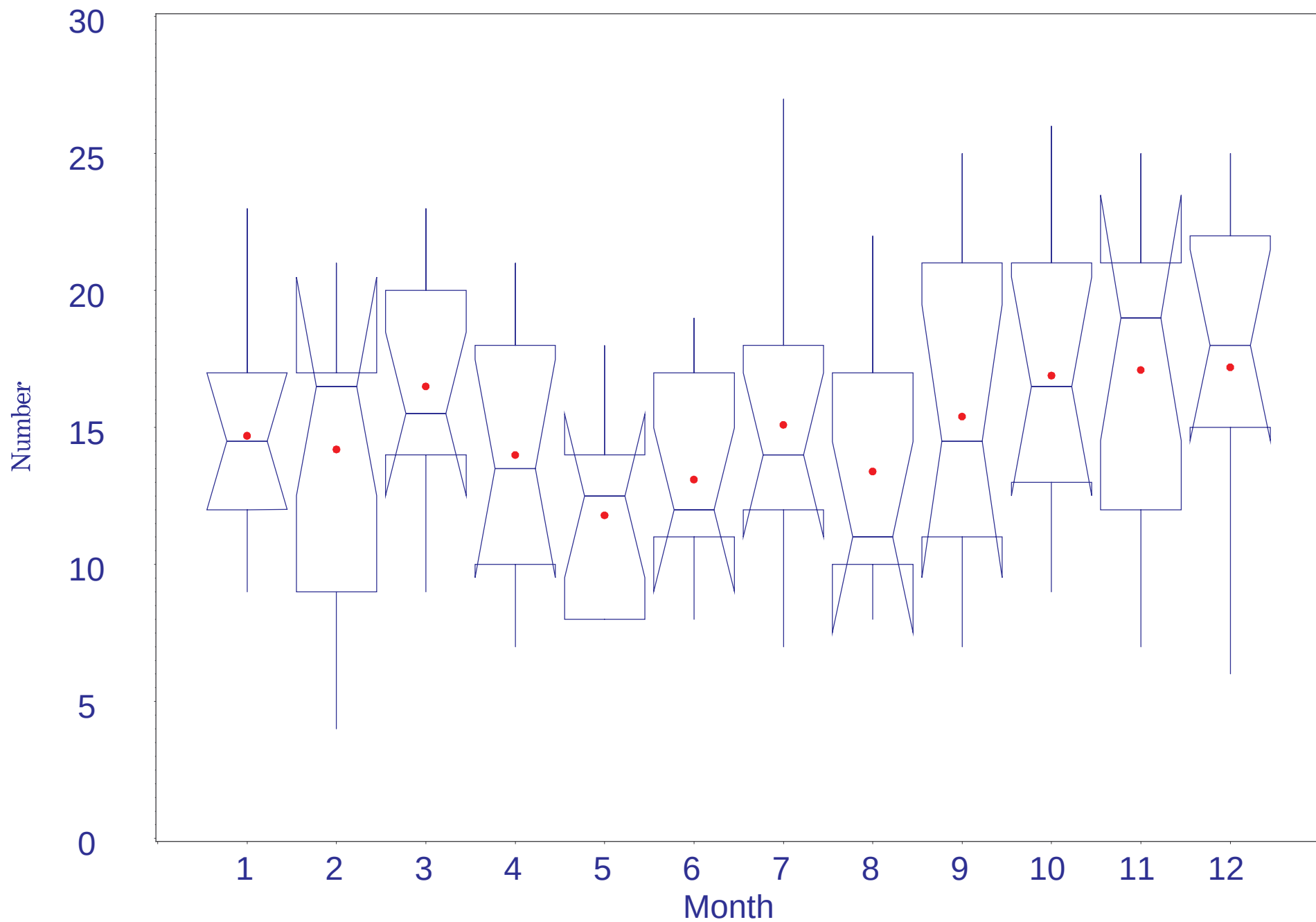
Number of Phytoplankton Species - 0 ppt Isohaline
1989-1998

B-304



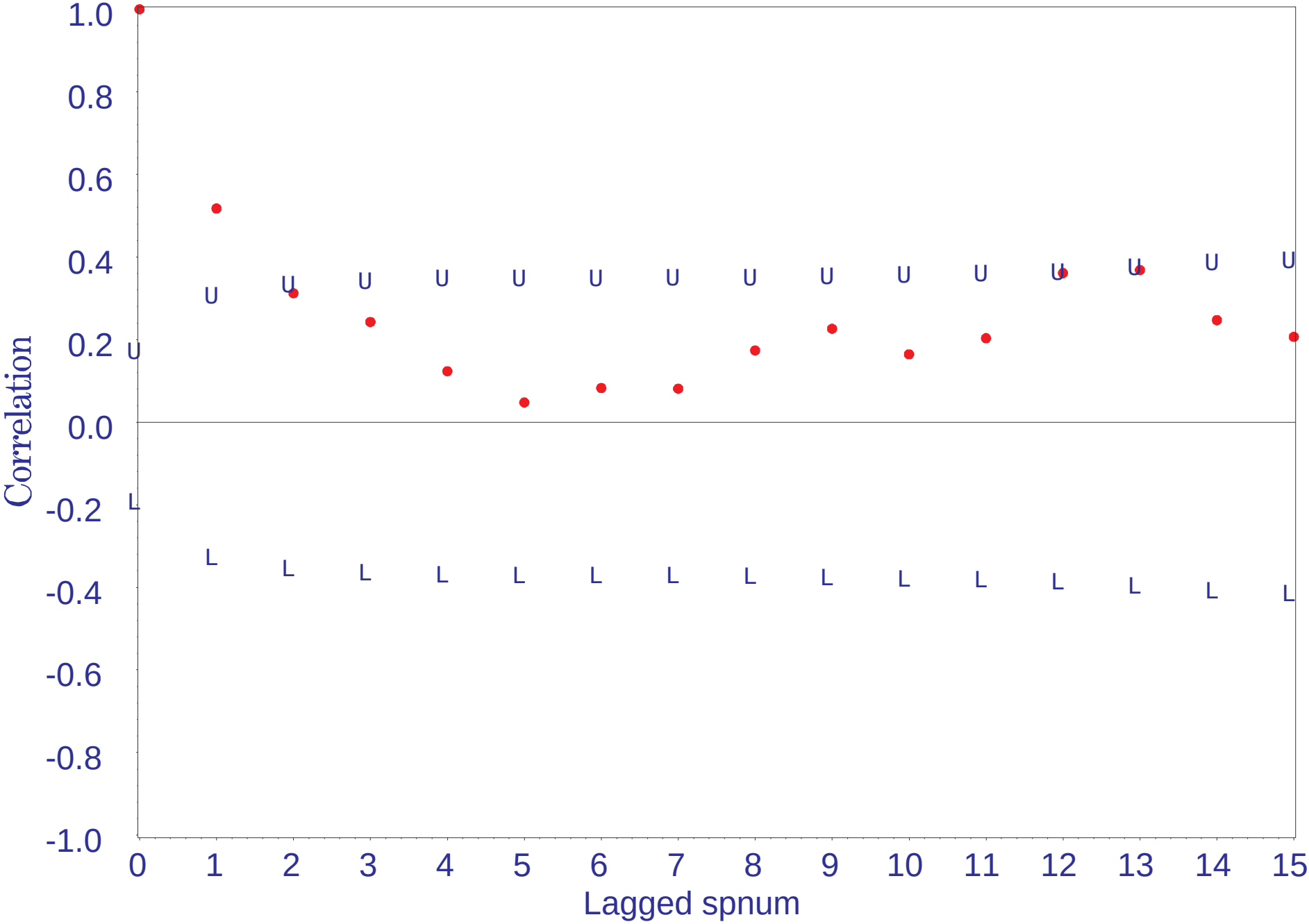
Phytoplankton Species 0 ppt Isohaline 1989-1998
Monthly Boxplots

B-305



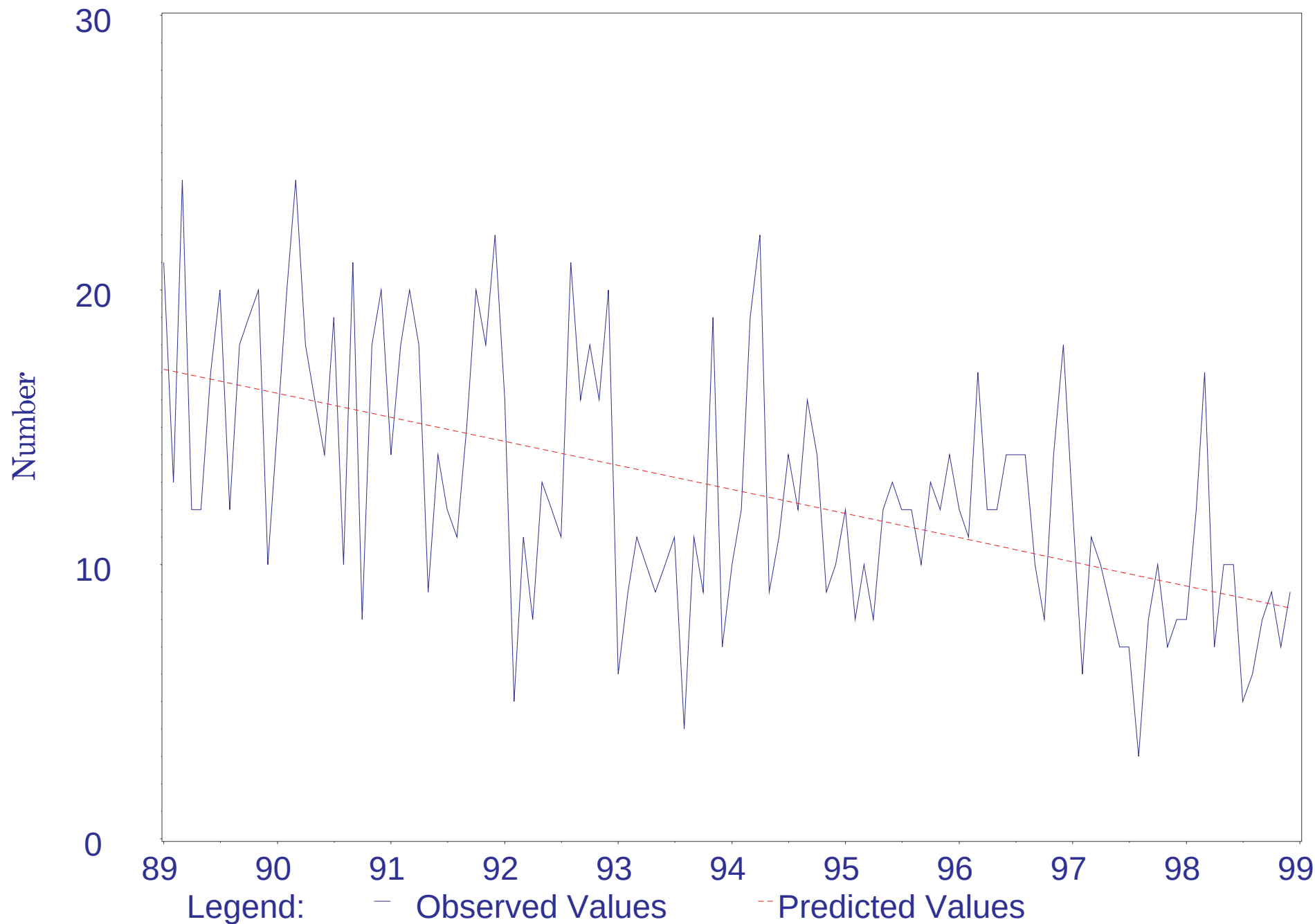
Phytoplankton Species - 0 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-306



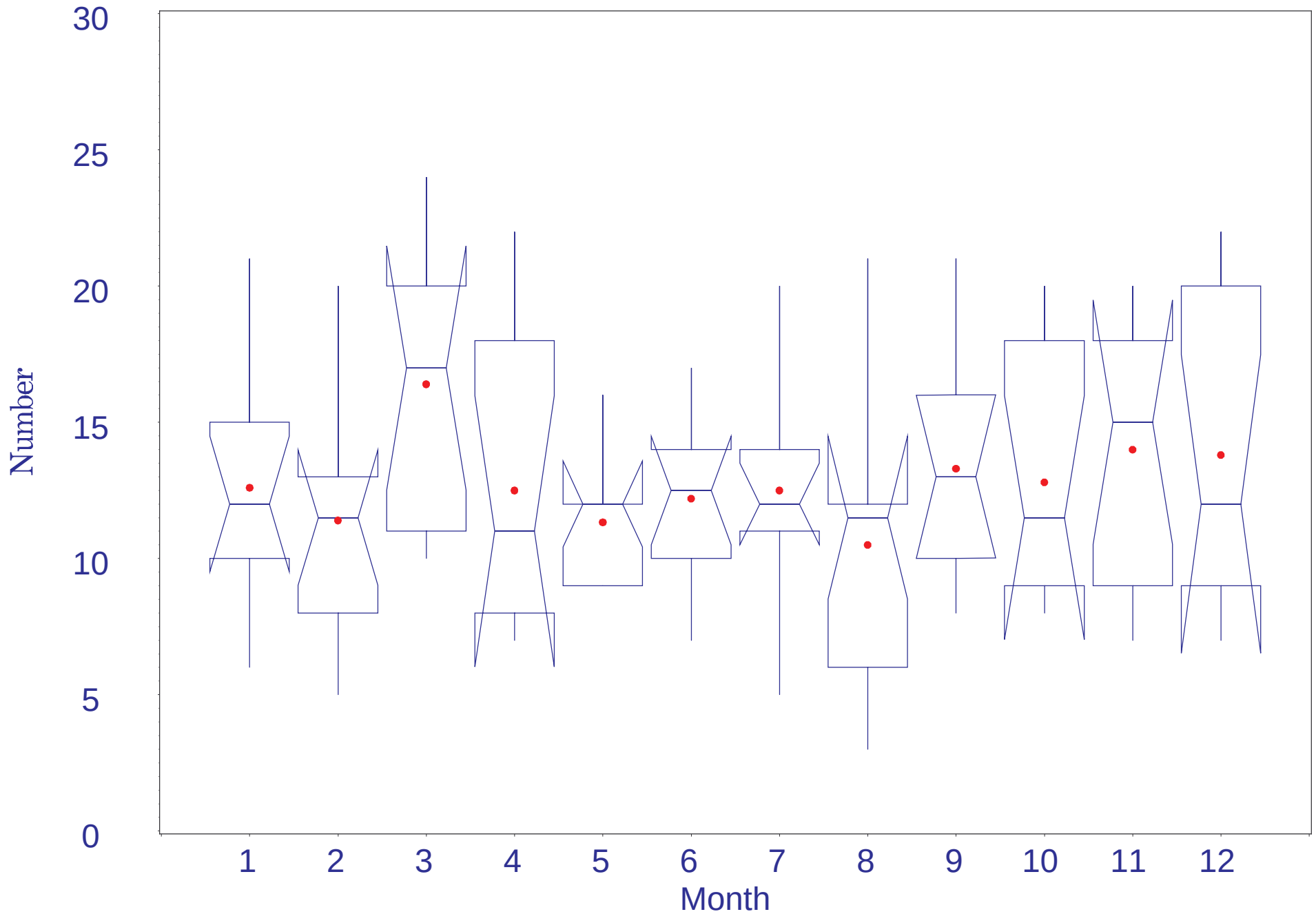
Number of Phytoplankton Species - 6 ppt Isohaline
1989-1998

B-307



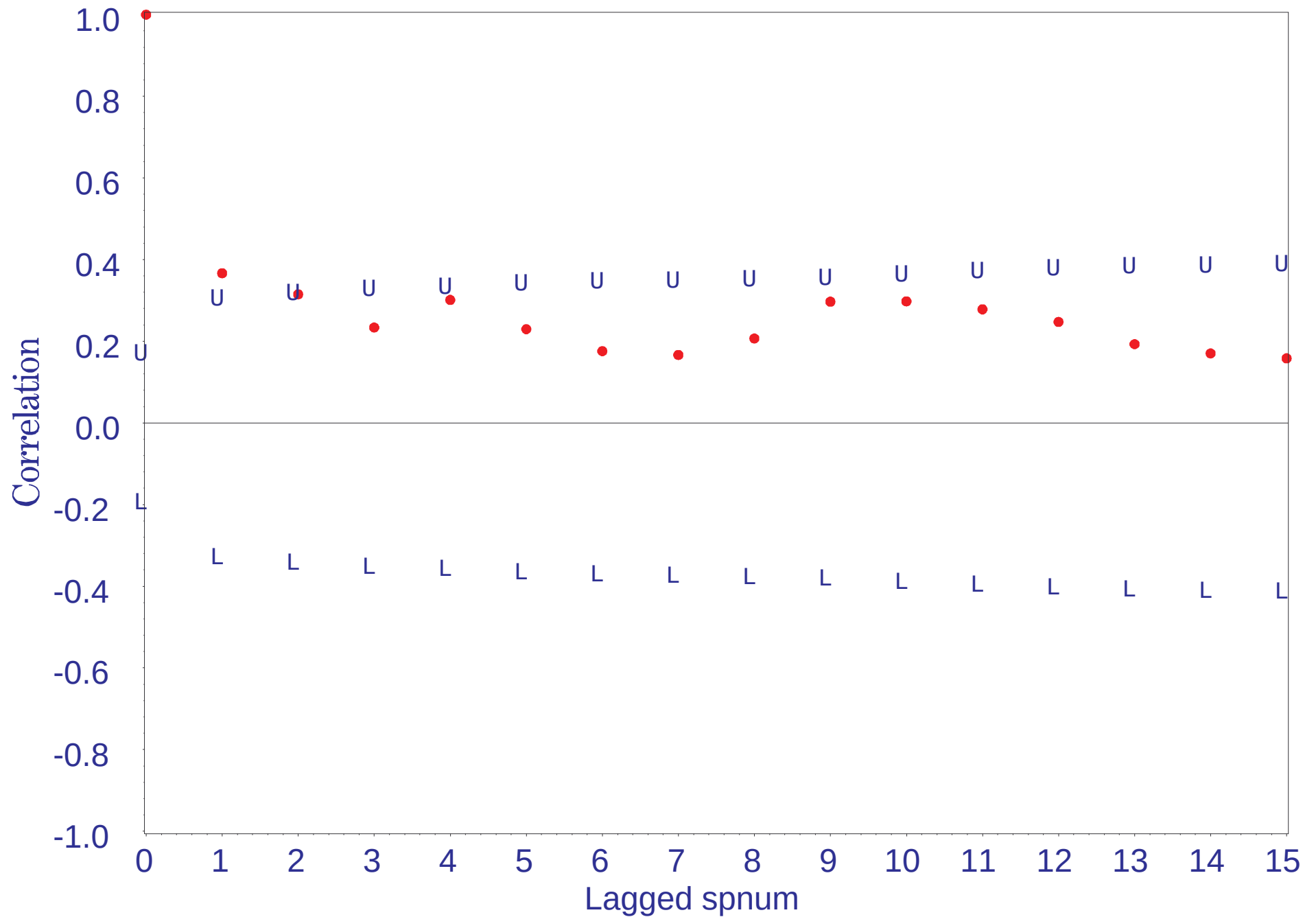
Phytoplankton Species 6 ppt Isohaline 1989-1998
Monthly Boxplots

B-308



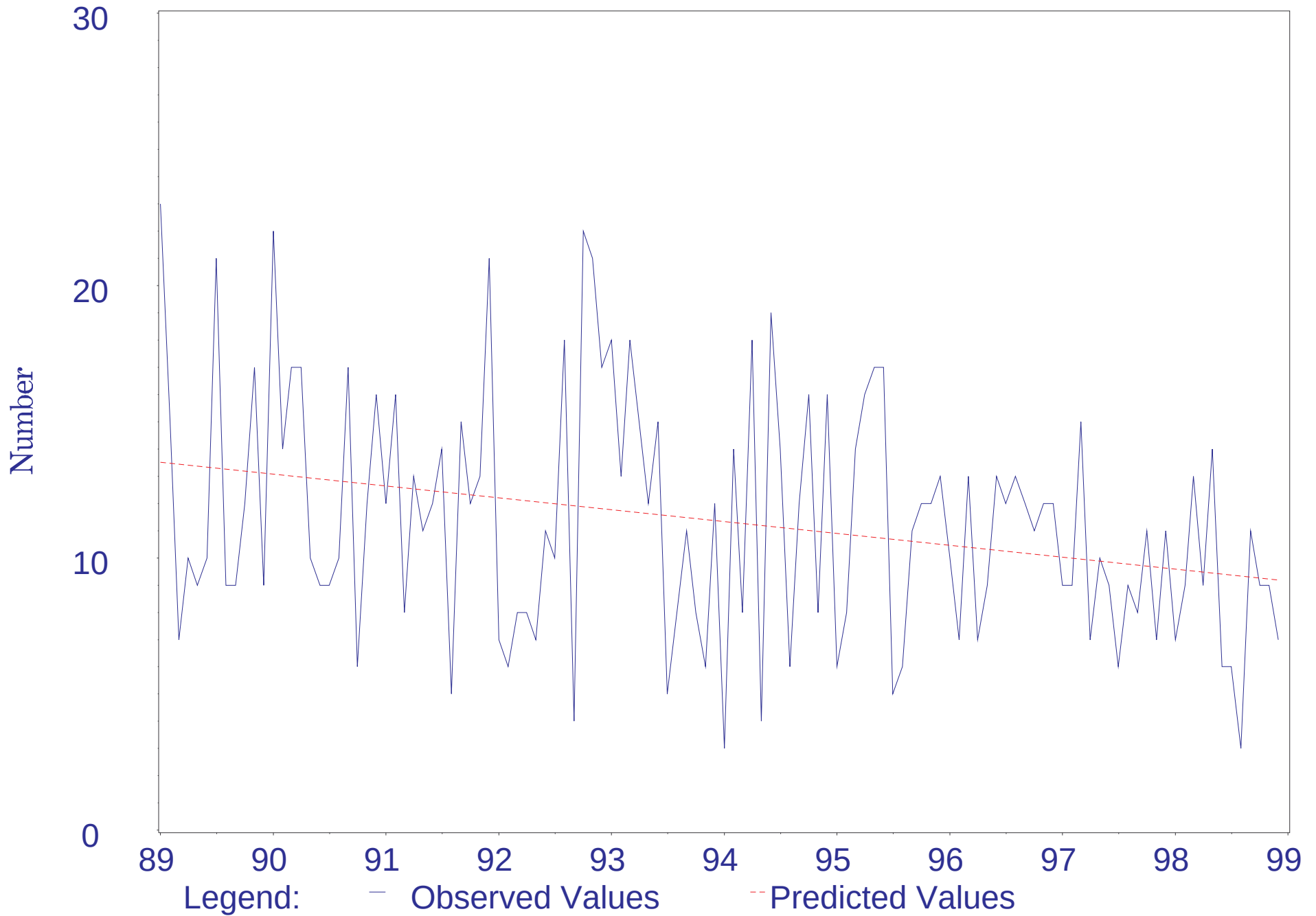
Phytoplankton Species - 6 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-309



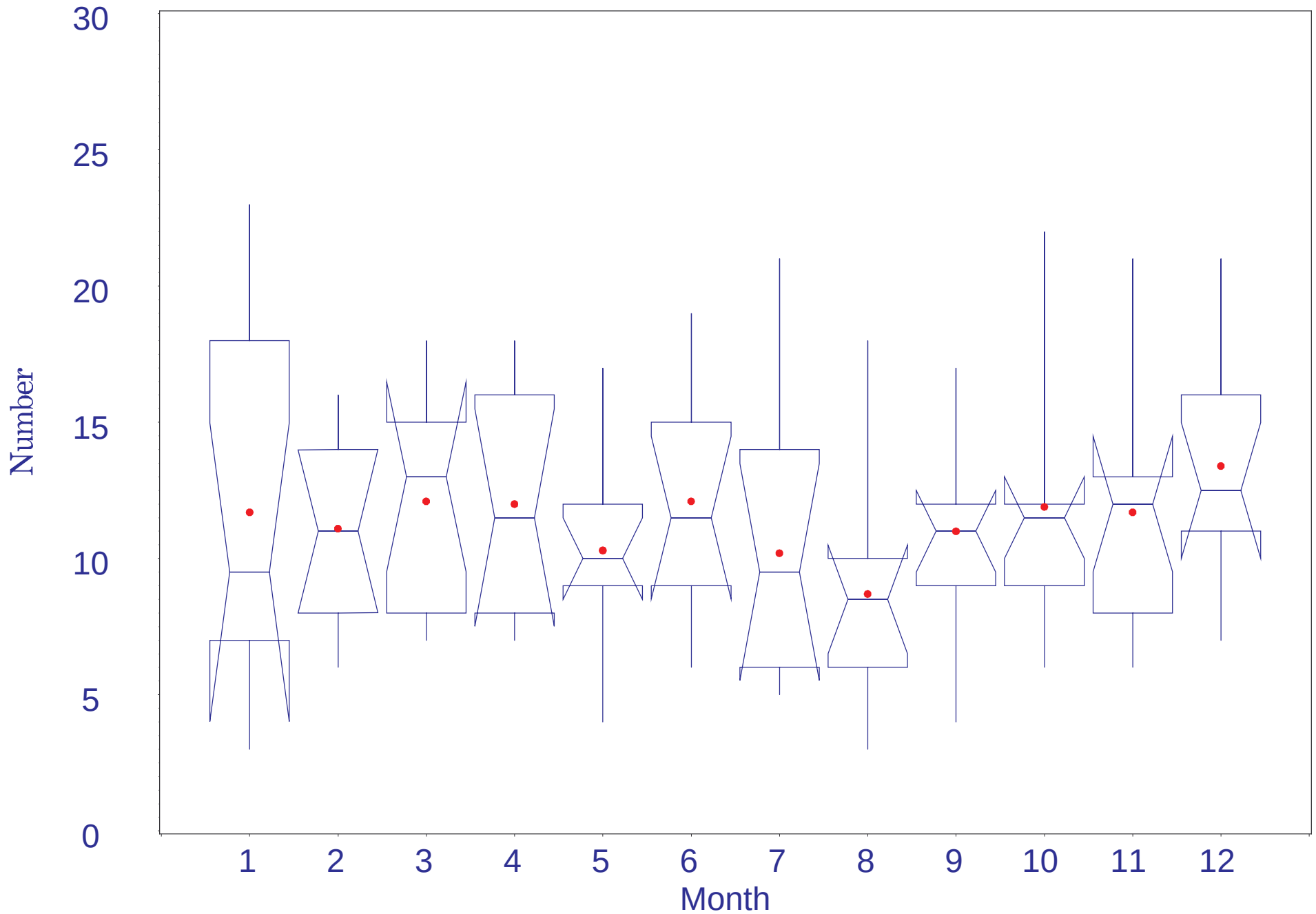
Number of Phytoplankton Species - 12 ppt Isohaline
1989-1998

B-310



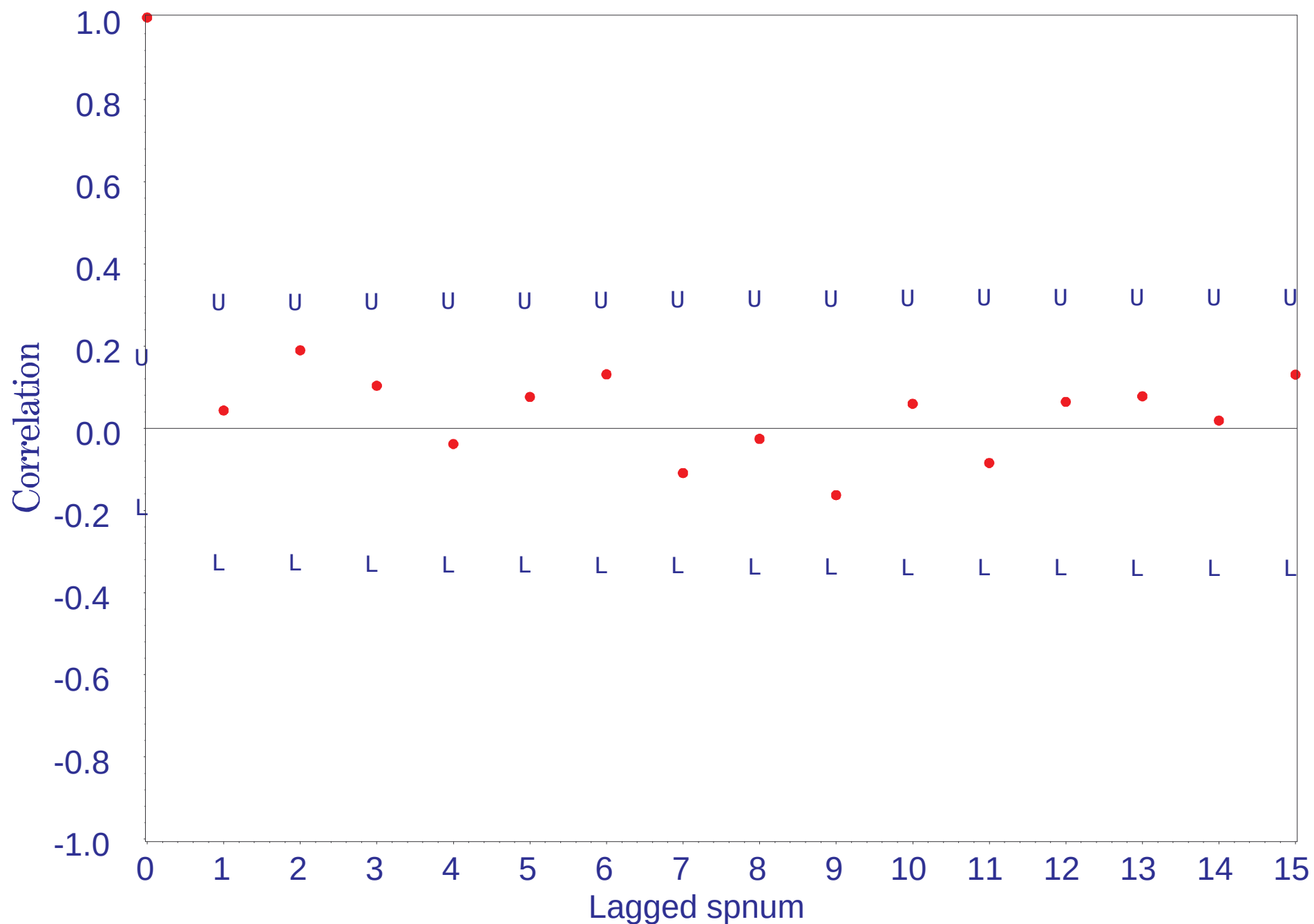
Phytoplankton Species 12 ppt Isohaline 1989-1998
Monthly Boxplots

B-311



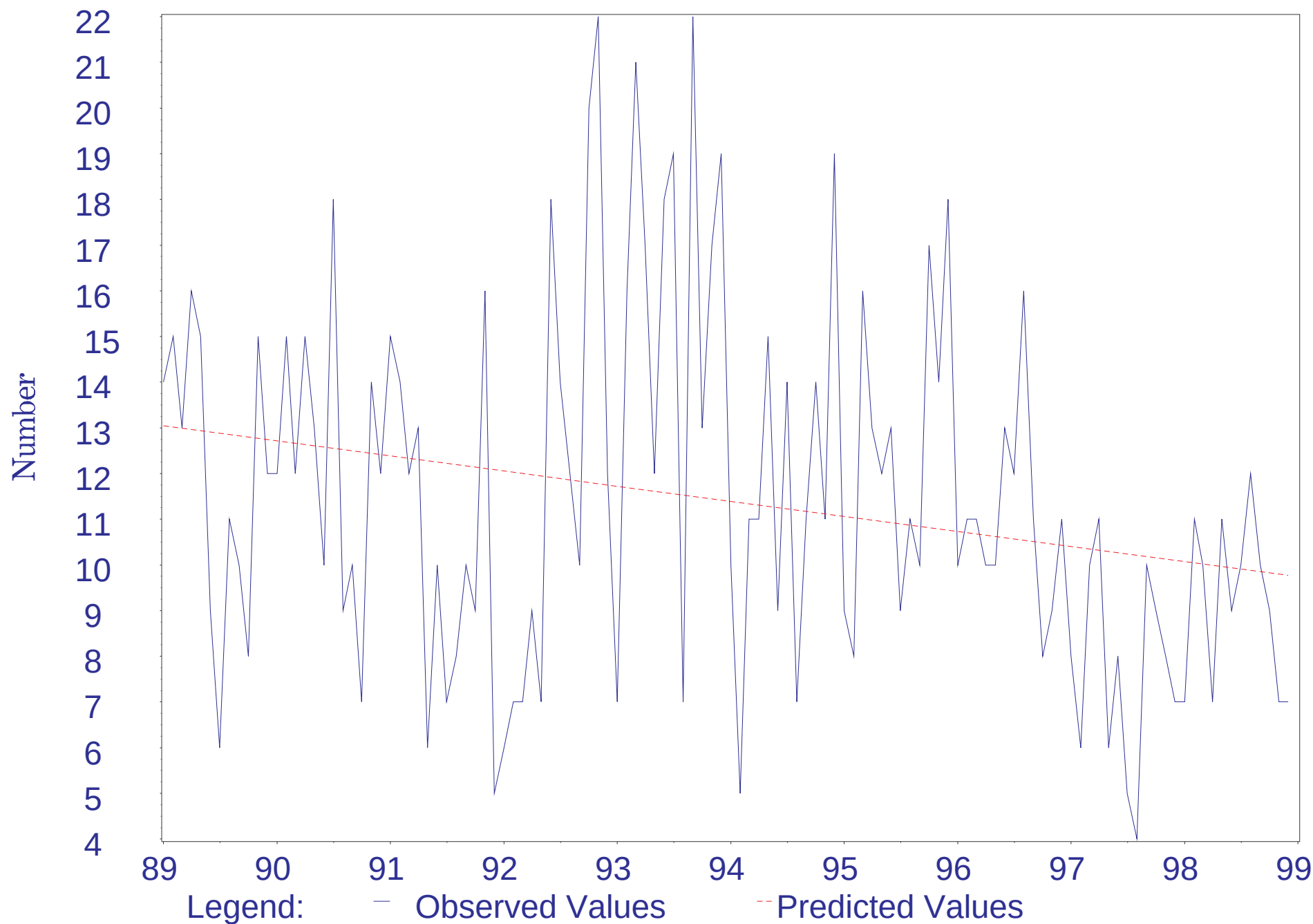
Phytoplankton Species - 12 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-312



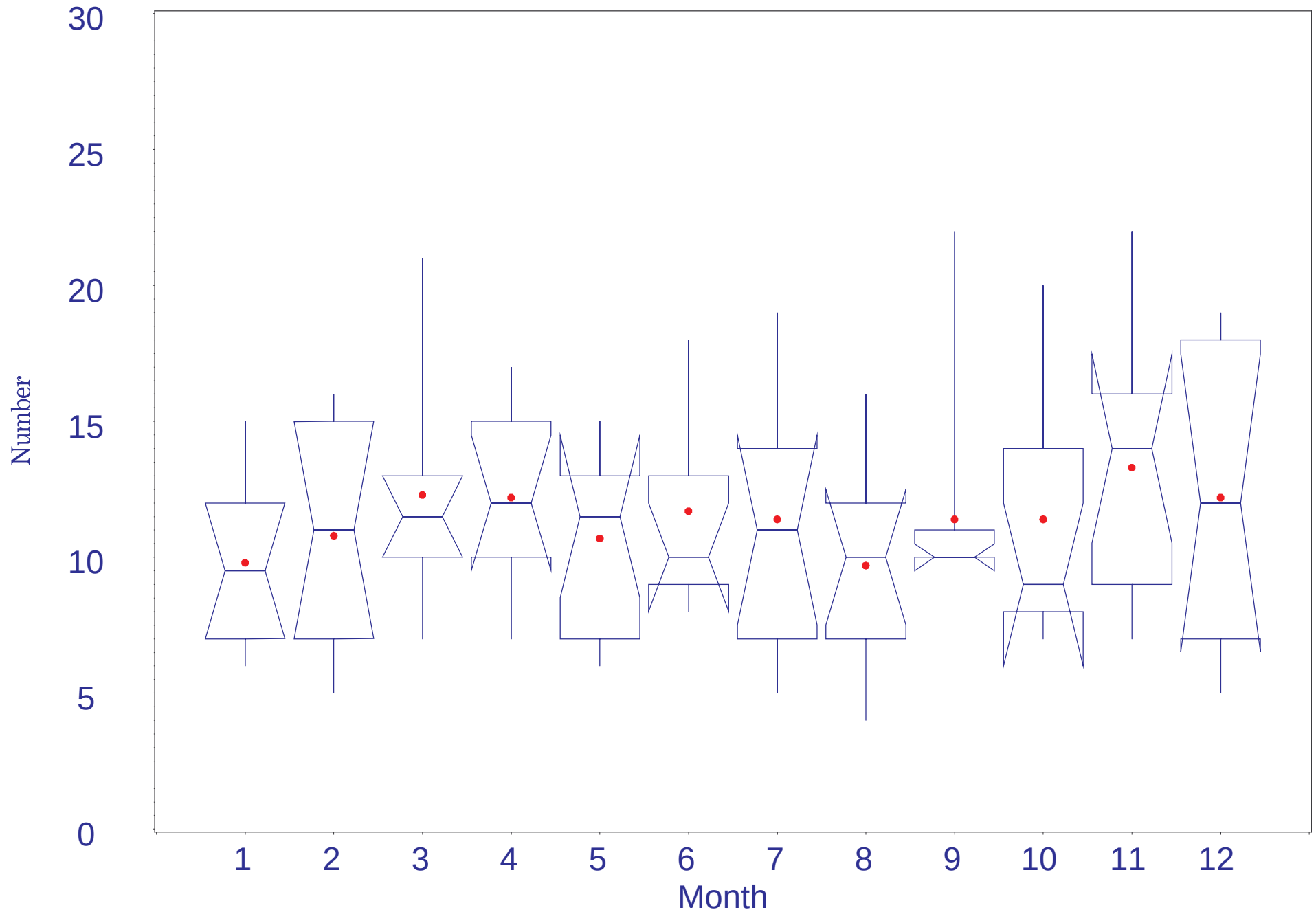
Number of Phytoplankton Species - 20 ppt Isohaline 1989-1998

B-313



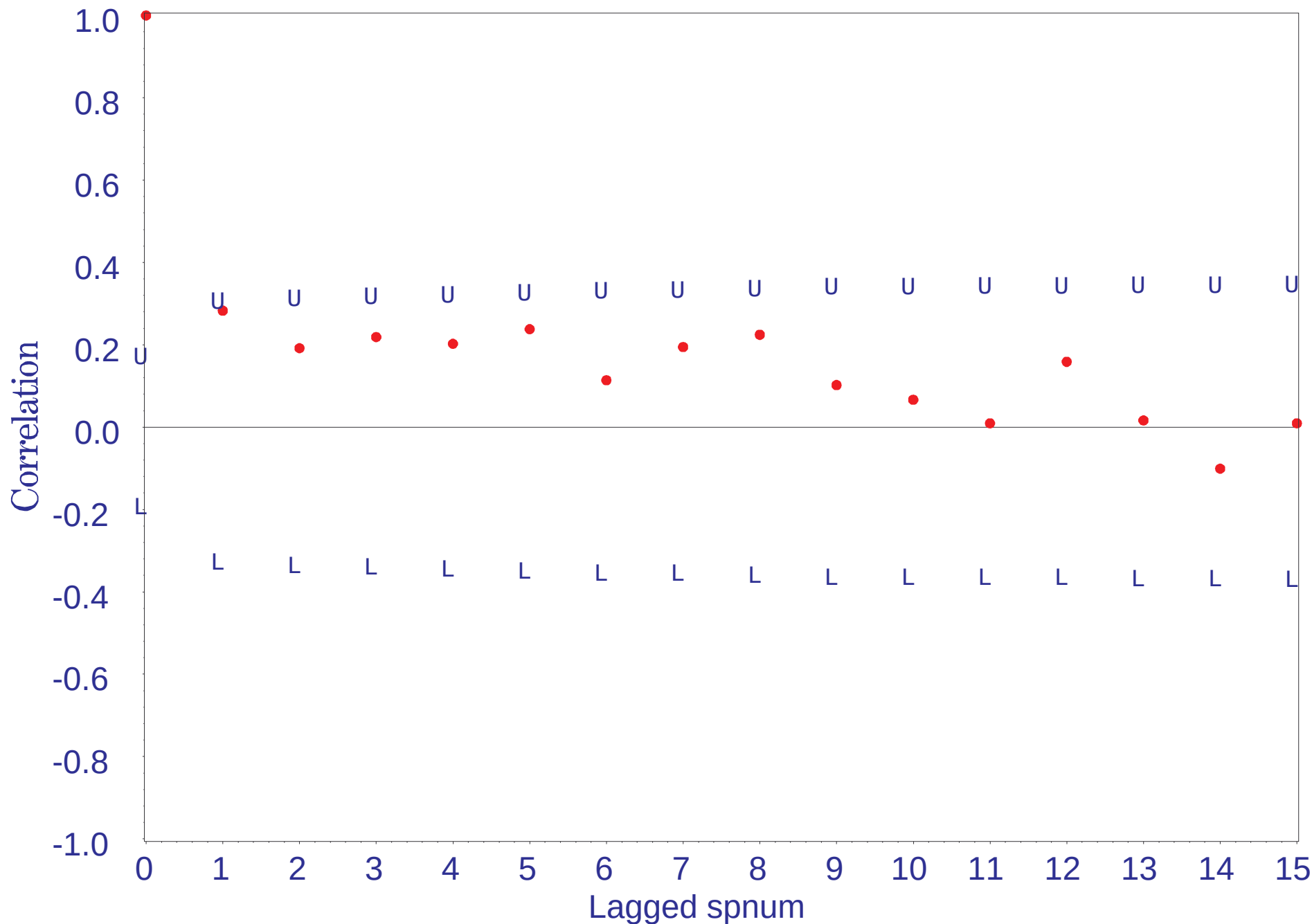
Phytoplankton Species 20 ppt Isohaline 1989-1998
Monthly Boxplots

B-314



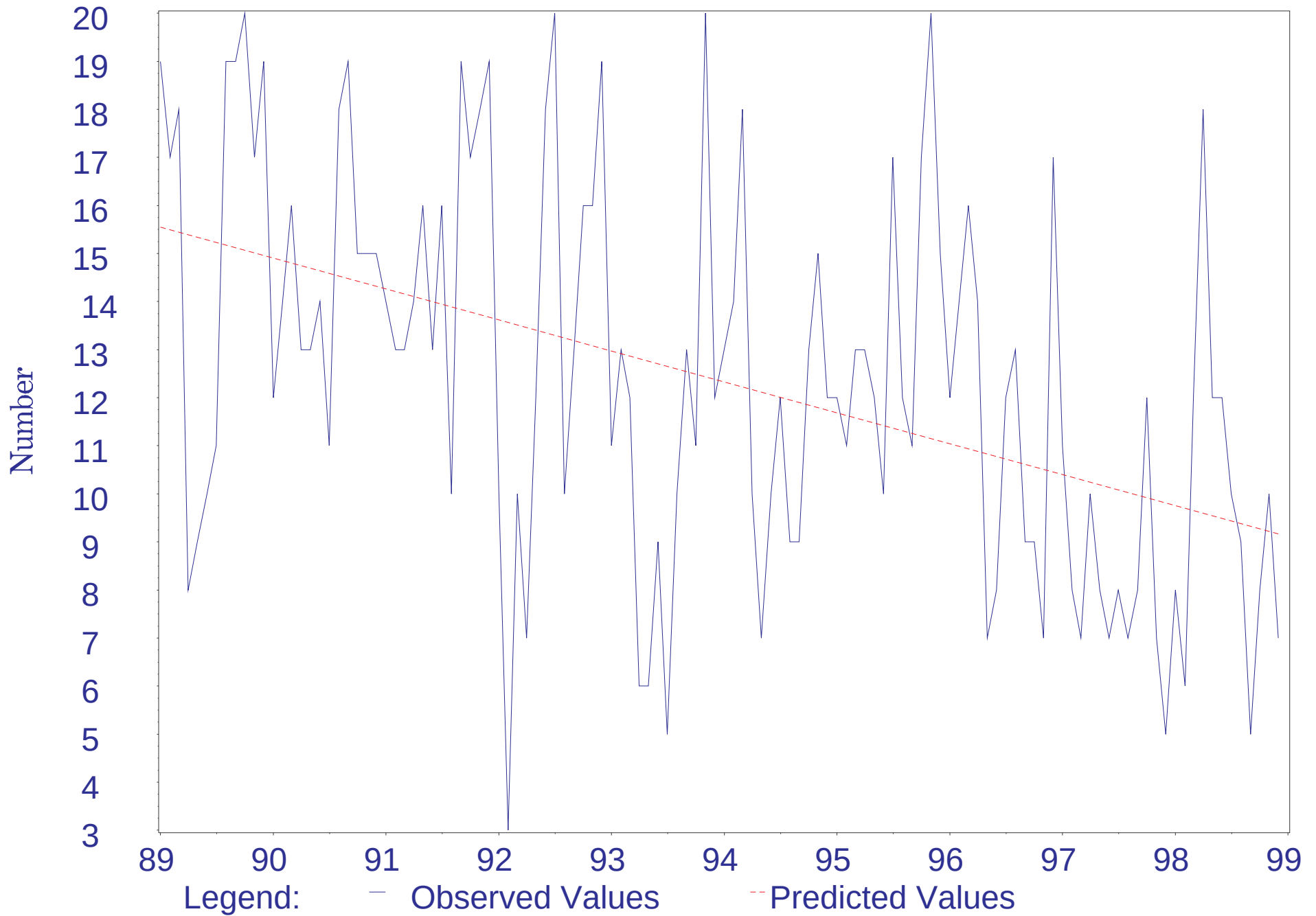
Phytoplankton Species - 20 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-315



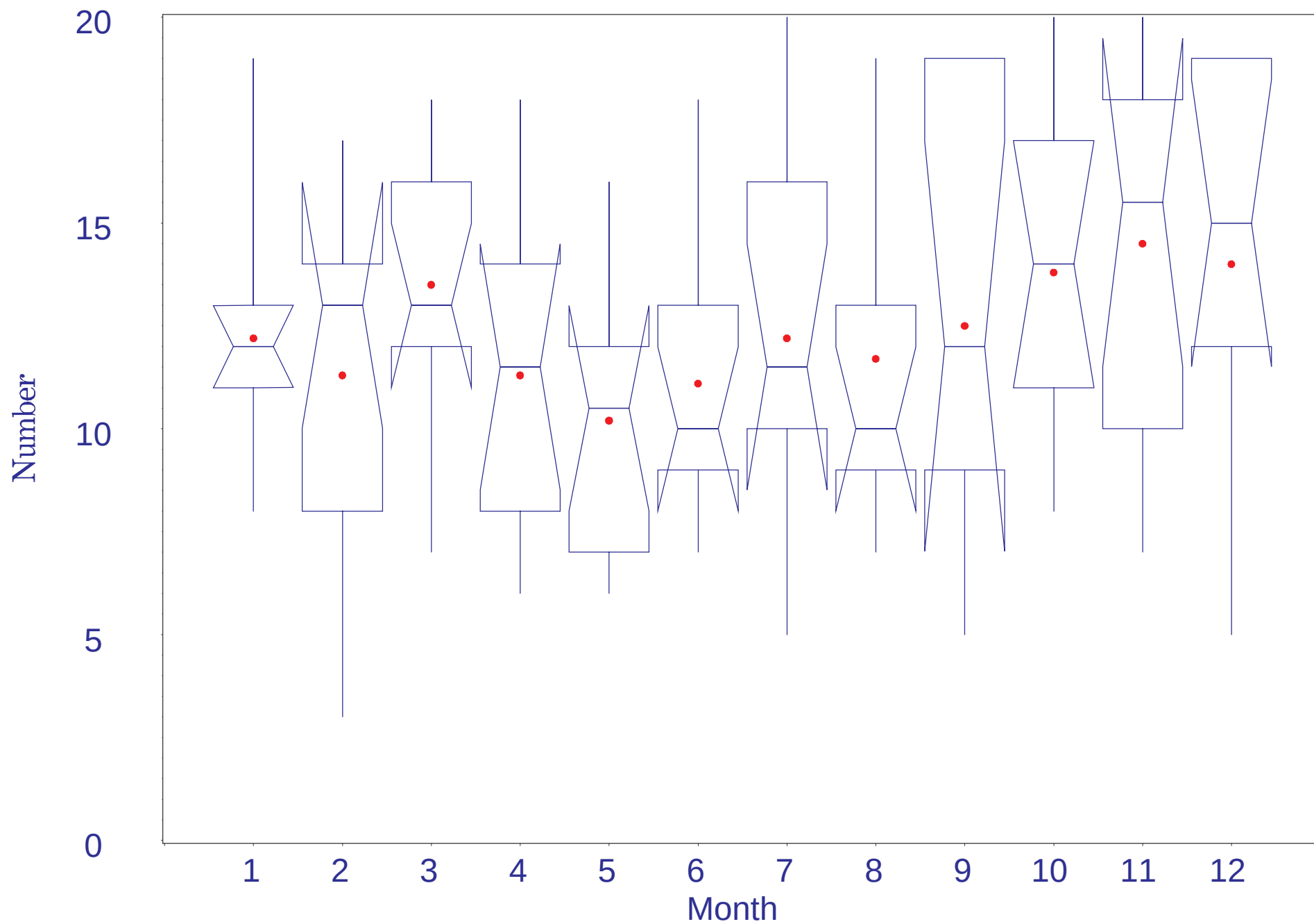
Number of Phytoplankton Genera - 0 ppt Isohaline 1989-1998

B-316



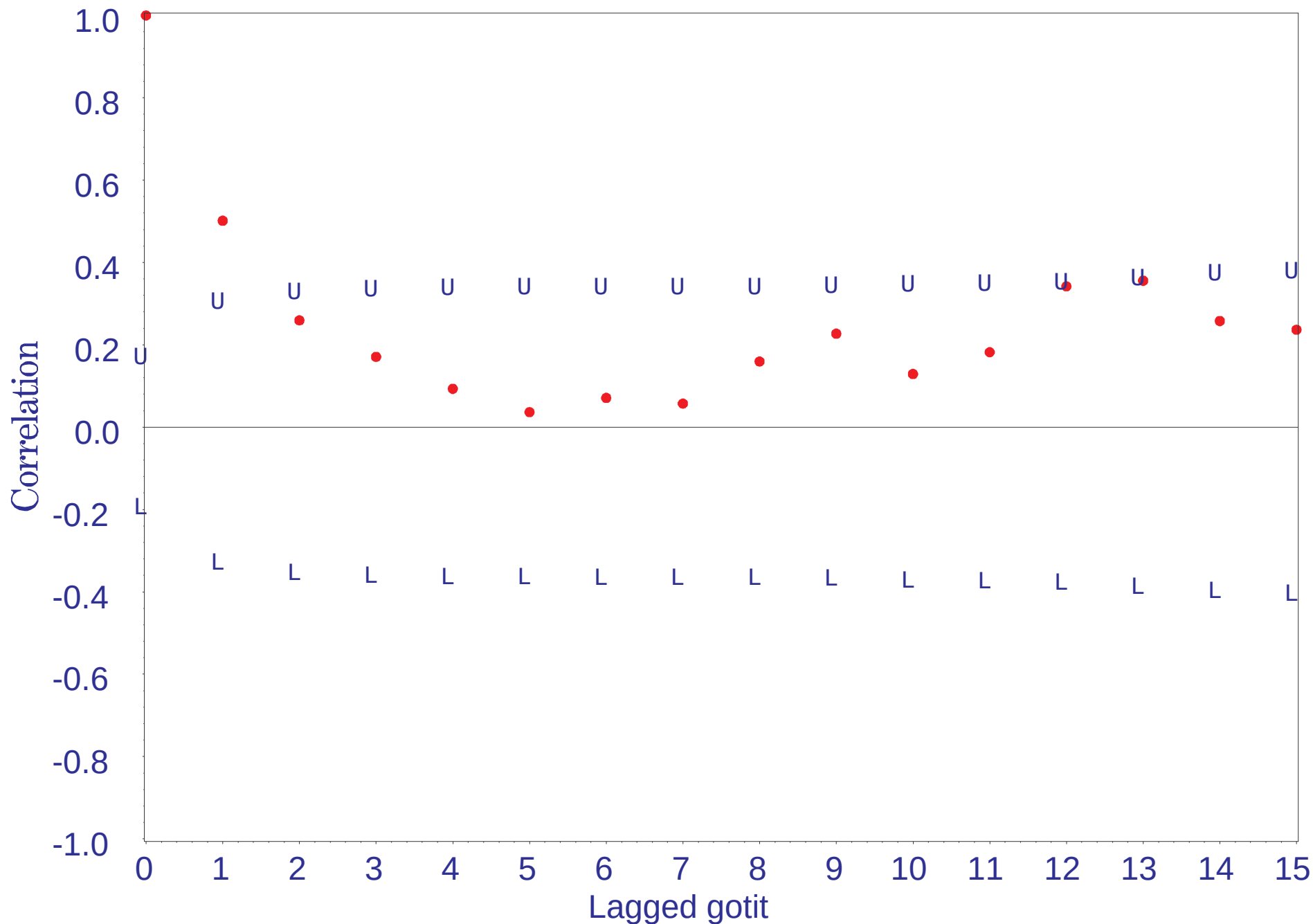
Number of Phytoplankton Genera at 0 ppt Isohaline 1989-1998
Monthly Boxplots

B-317



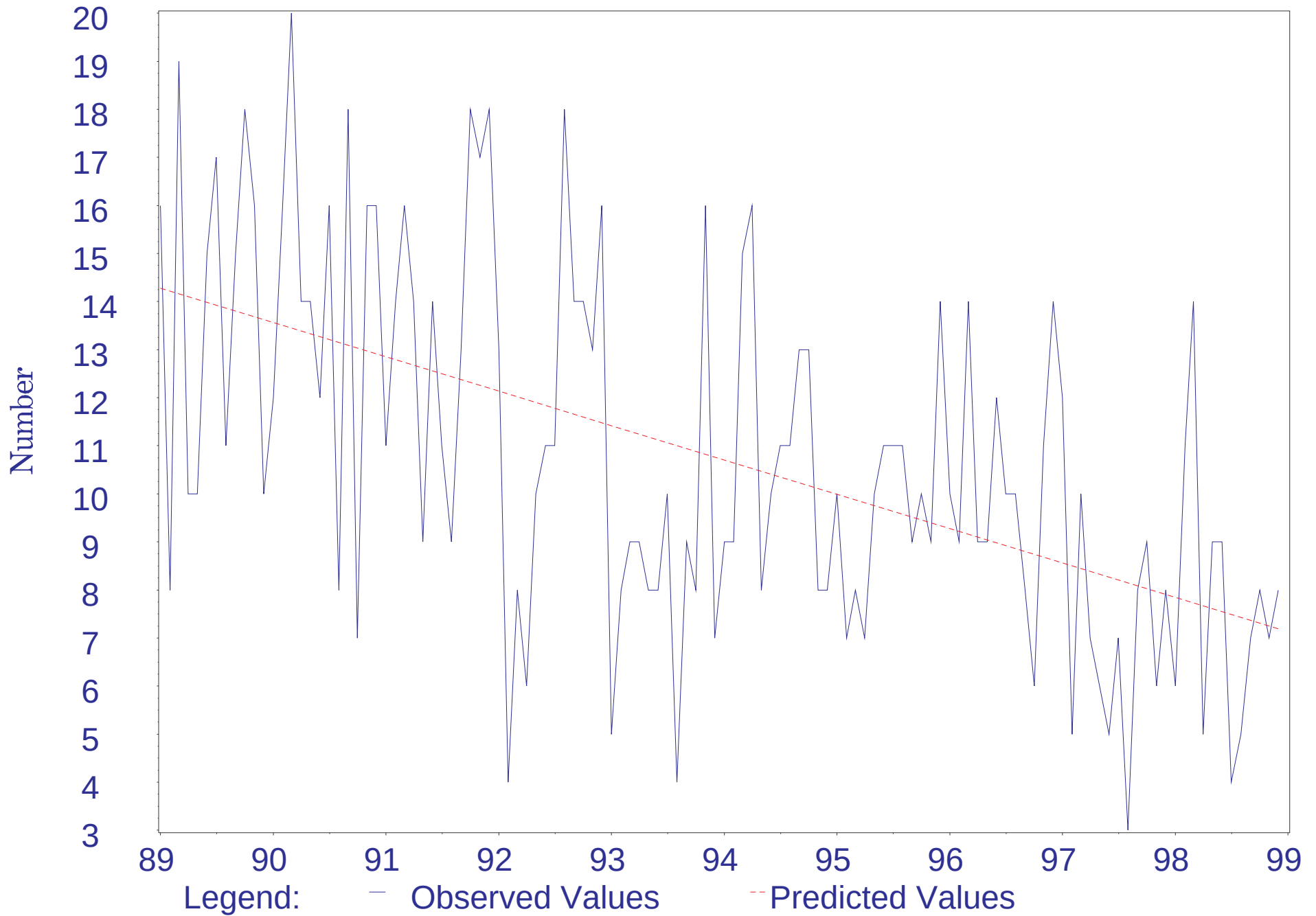
Number of Phytoplankton Genera - 0 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-318



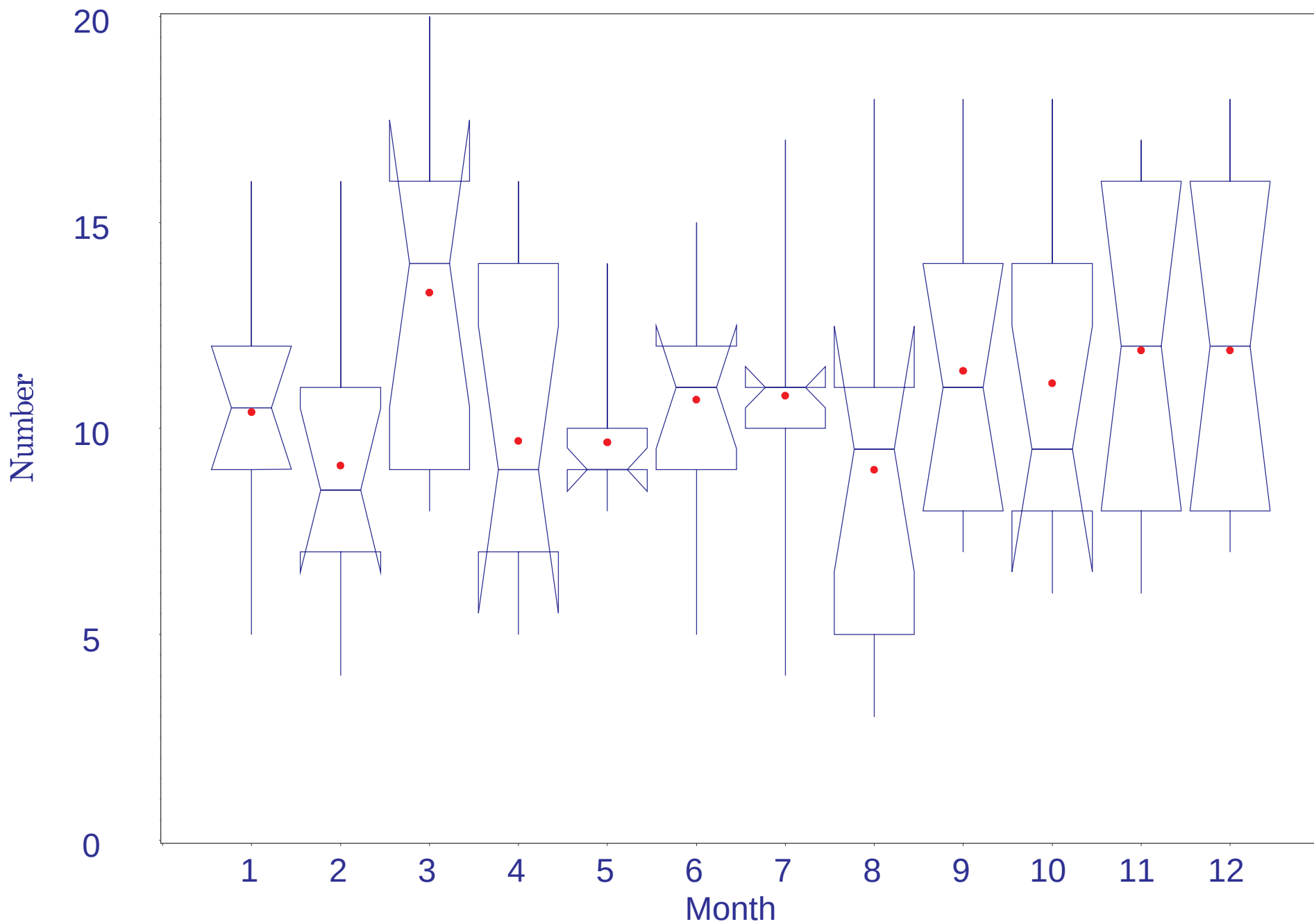
Number of Phytoplankton Genera - 6 ppt Isohaline
1989-1998

B-319



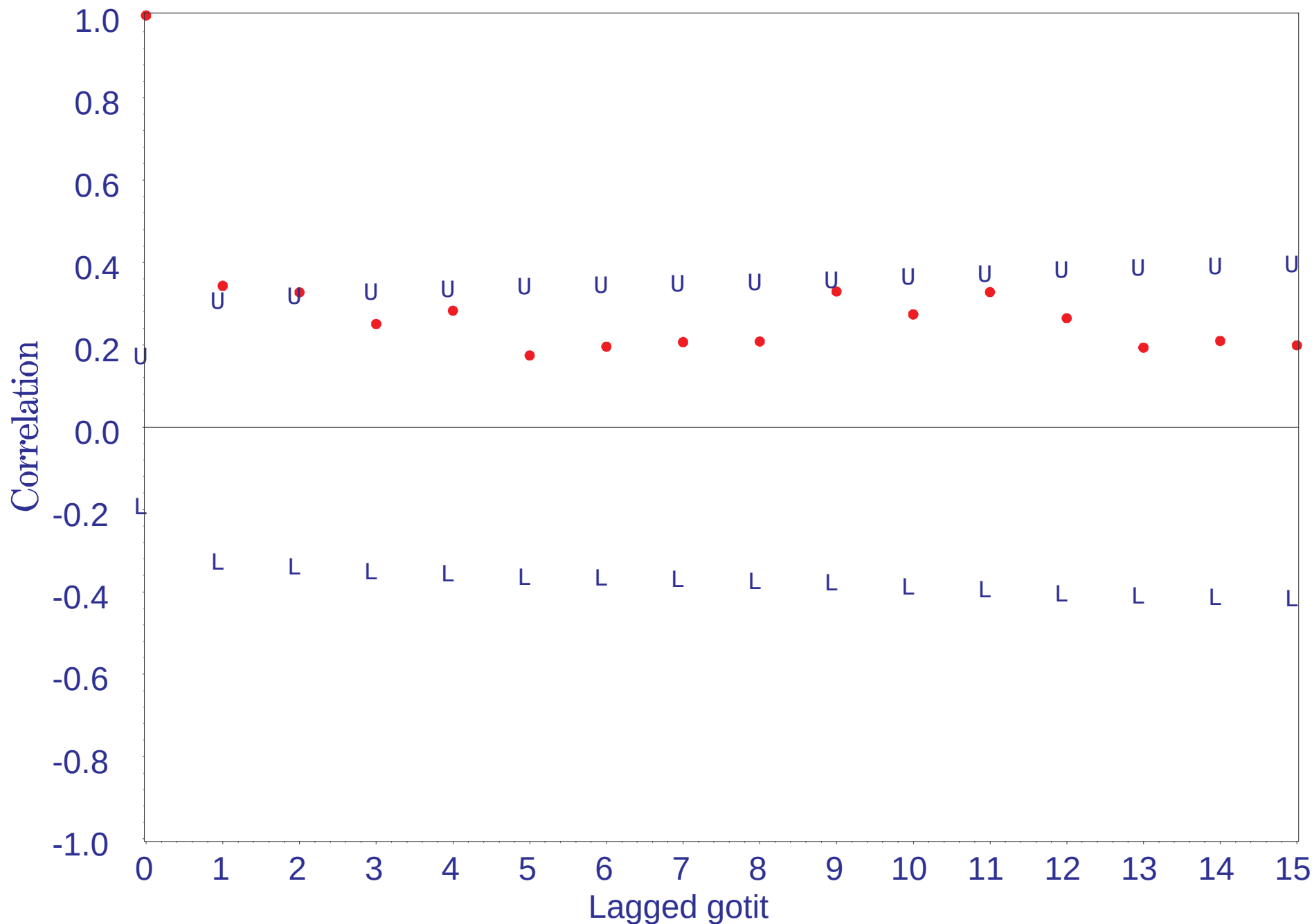
Number of Phytoplankton Genera at 6 ppt Isohaline 1989-1998
Monthly Boxplots

B-320



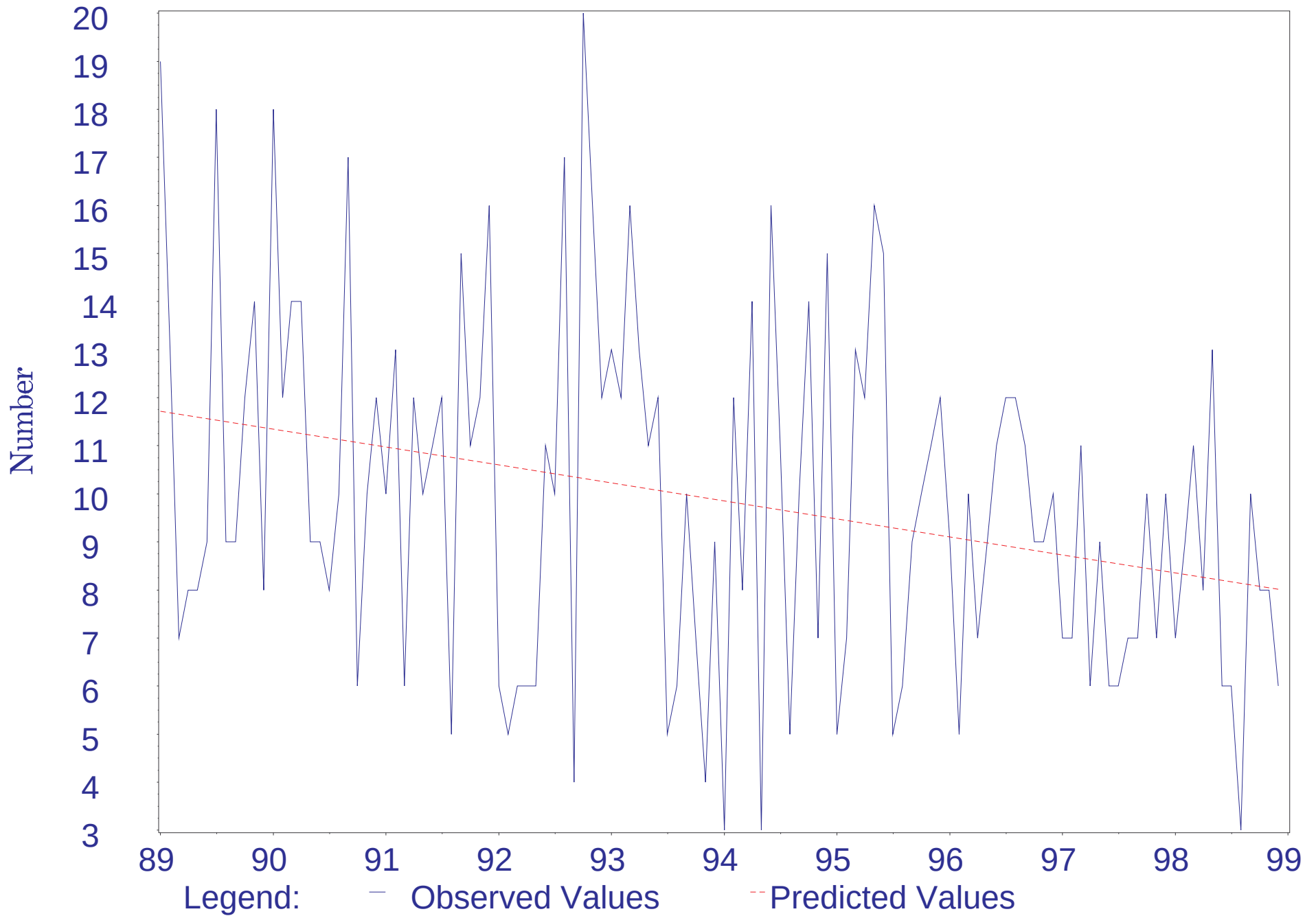
Number of Phytoplankton Genera - 6 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-321



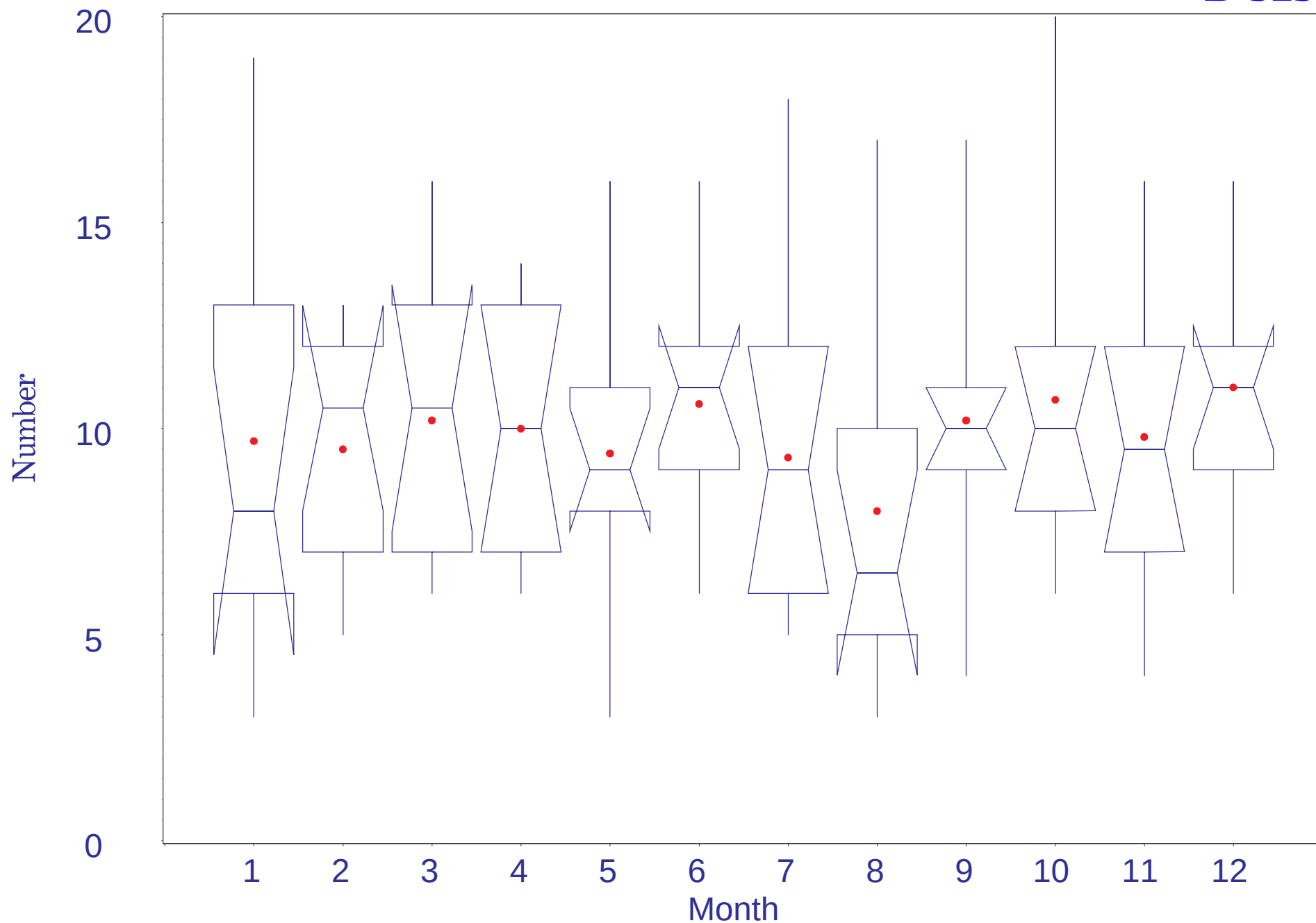
Number of Phytoplankton Genera - 12 ppt Isohaline 1989-1998

B-322



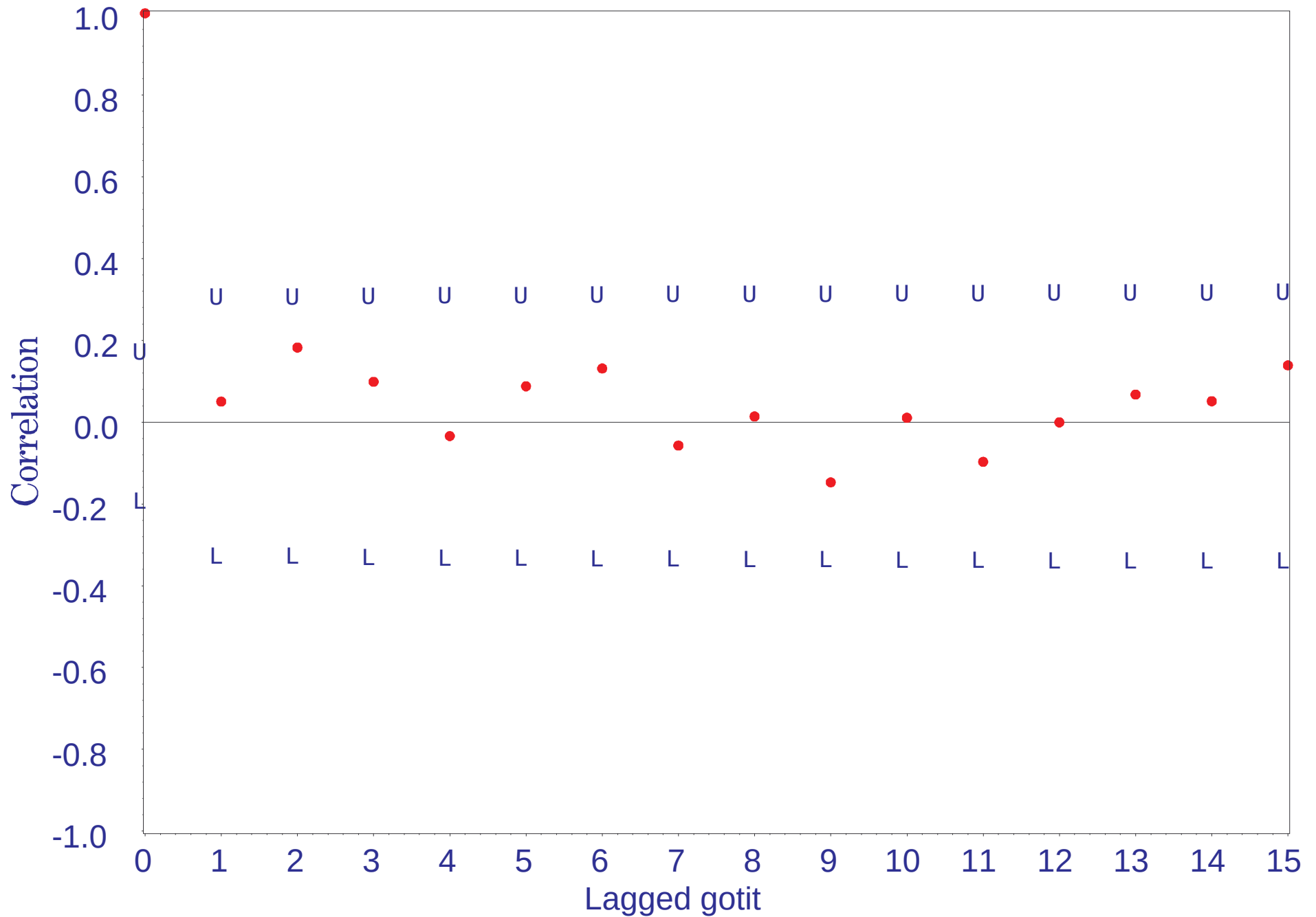
Number of Phytoplankton Genera at 12 ppt Isohaline 1989-1998
Monthly Boxplots

B-323



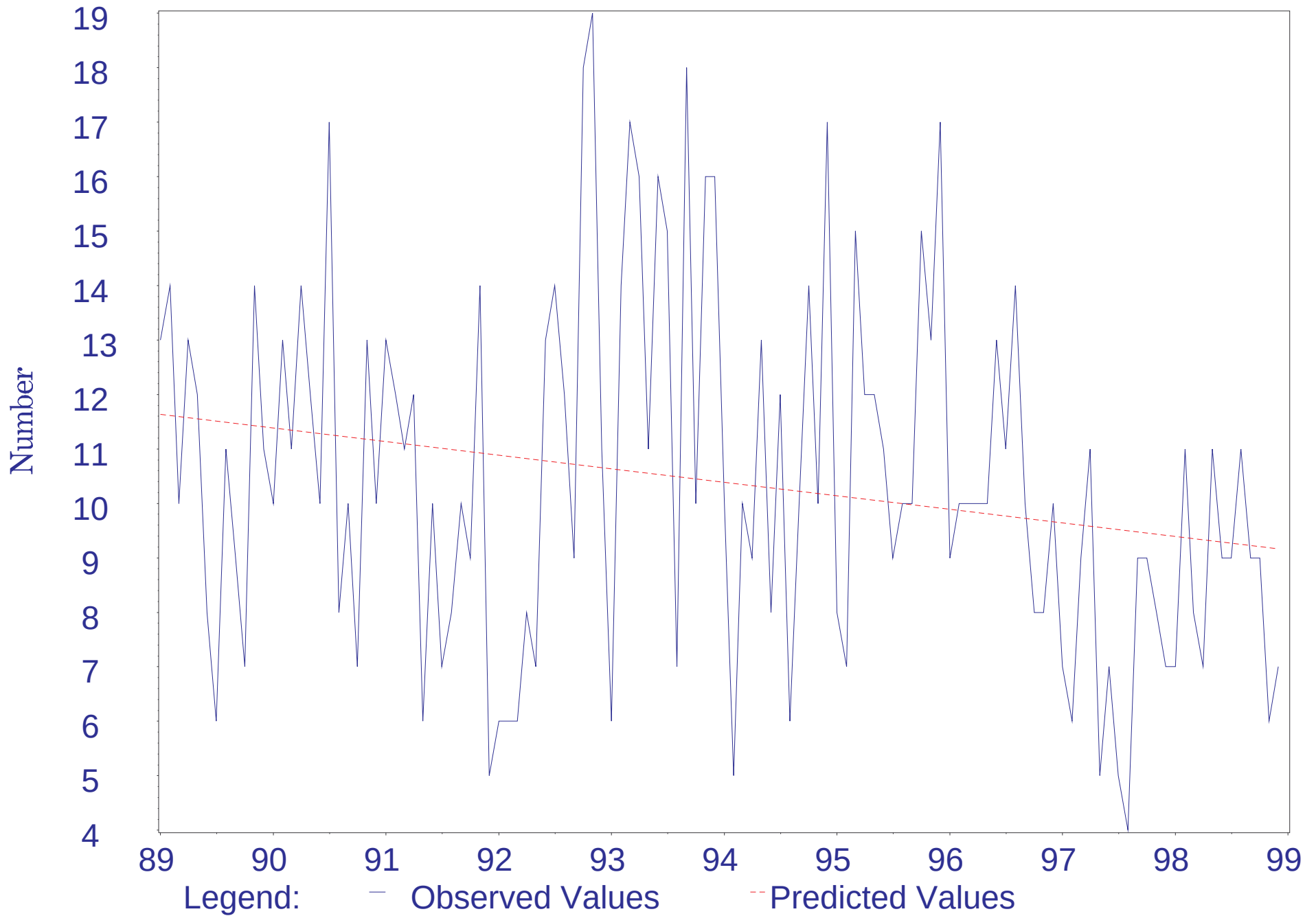
Number of Phytoplankton Genera - 12 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-324



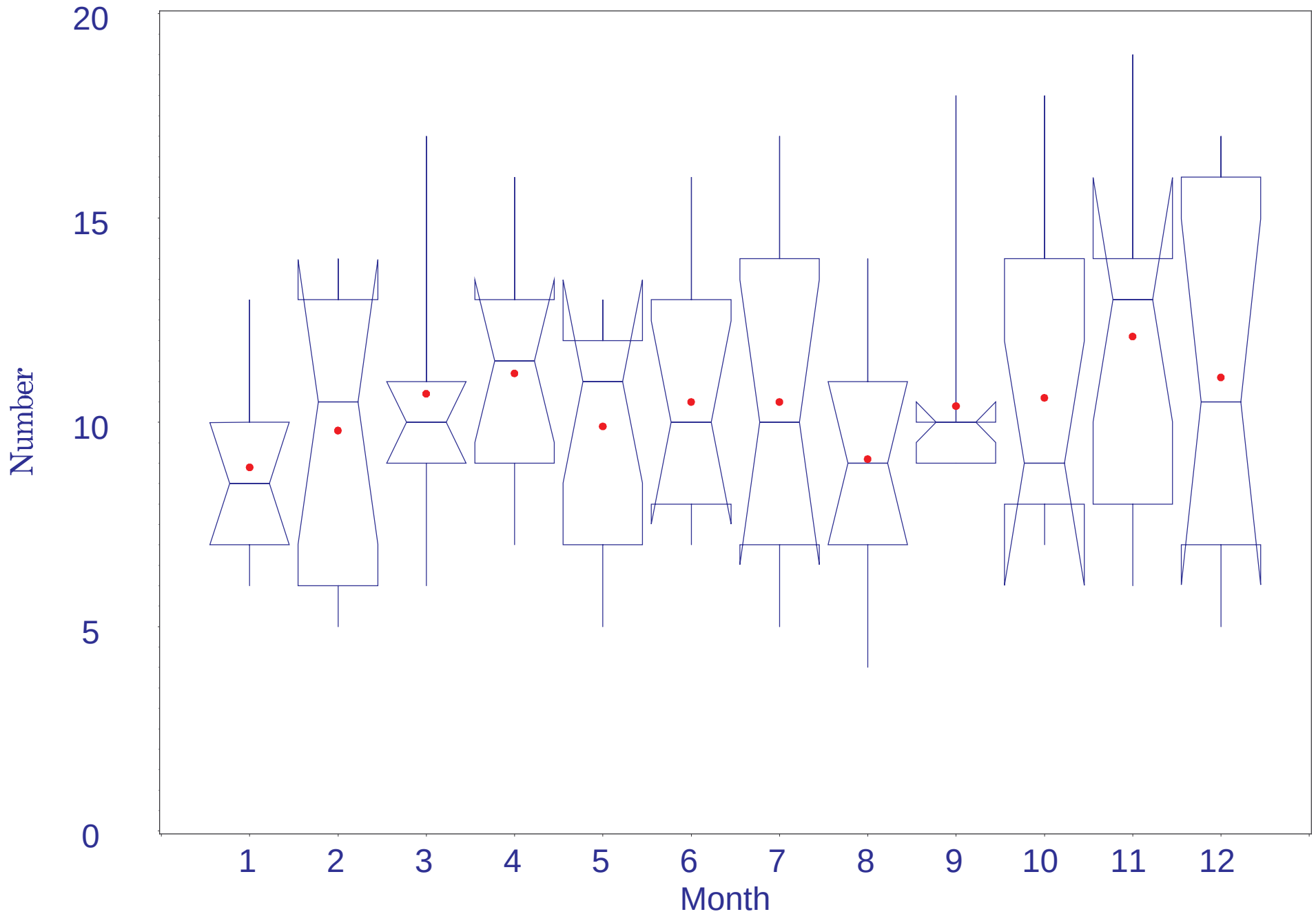
Number of Phytoplankton Genera - 20 ppt Isohaline
1989-1998

B-325



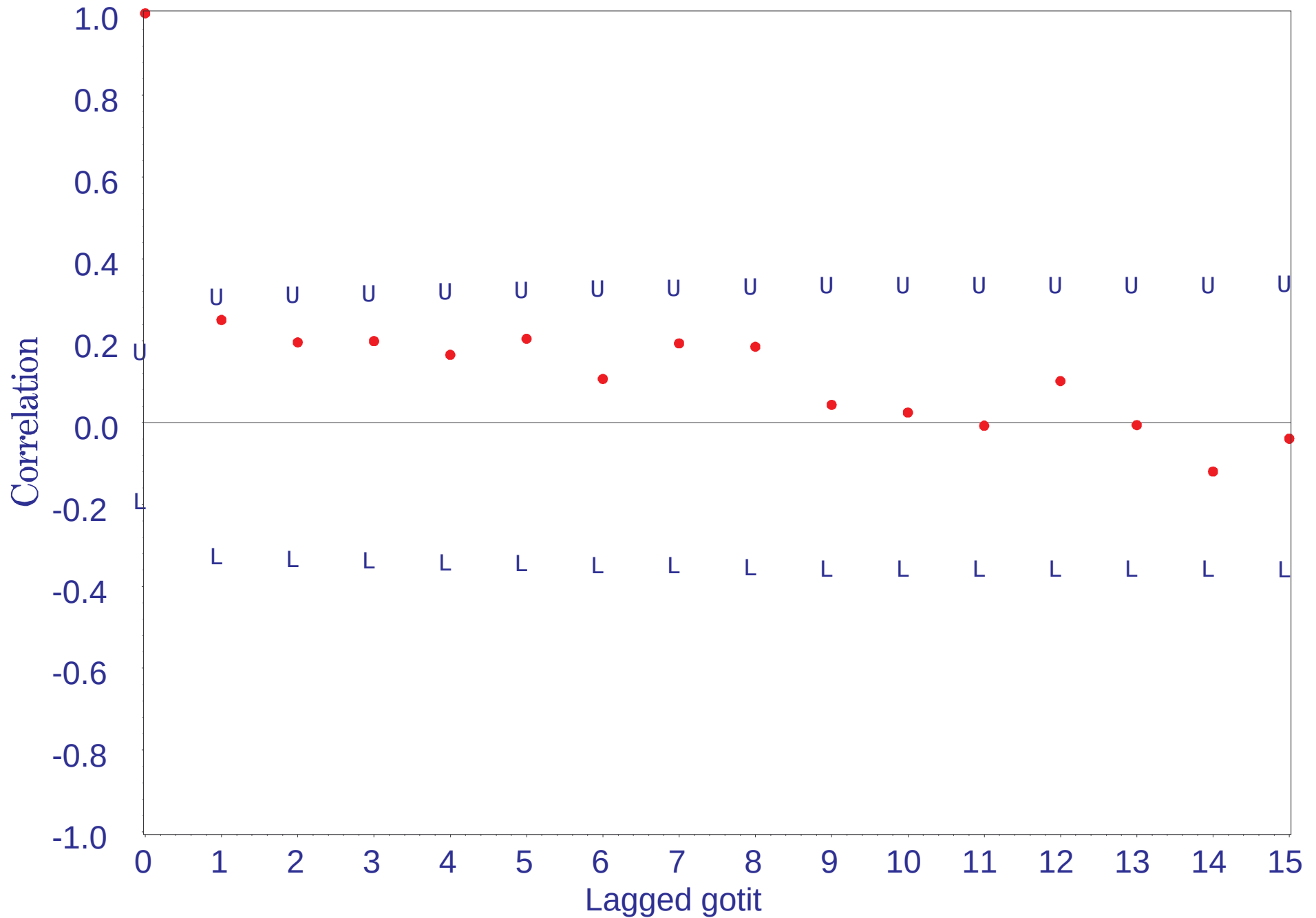
Number of Phytoplankton Genera at 20 ppt Isohaline 1989-1998
Monthly Boxplots

B-326



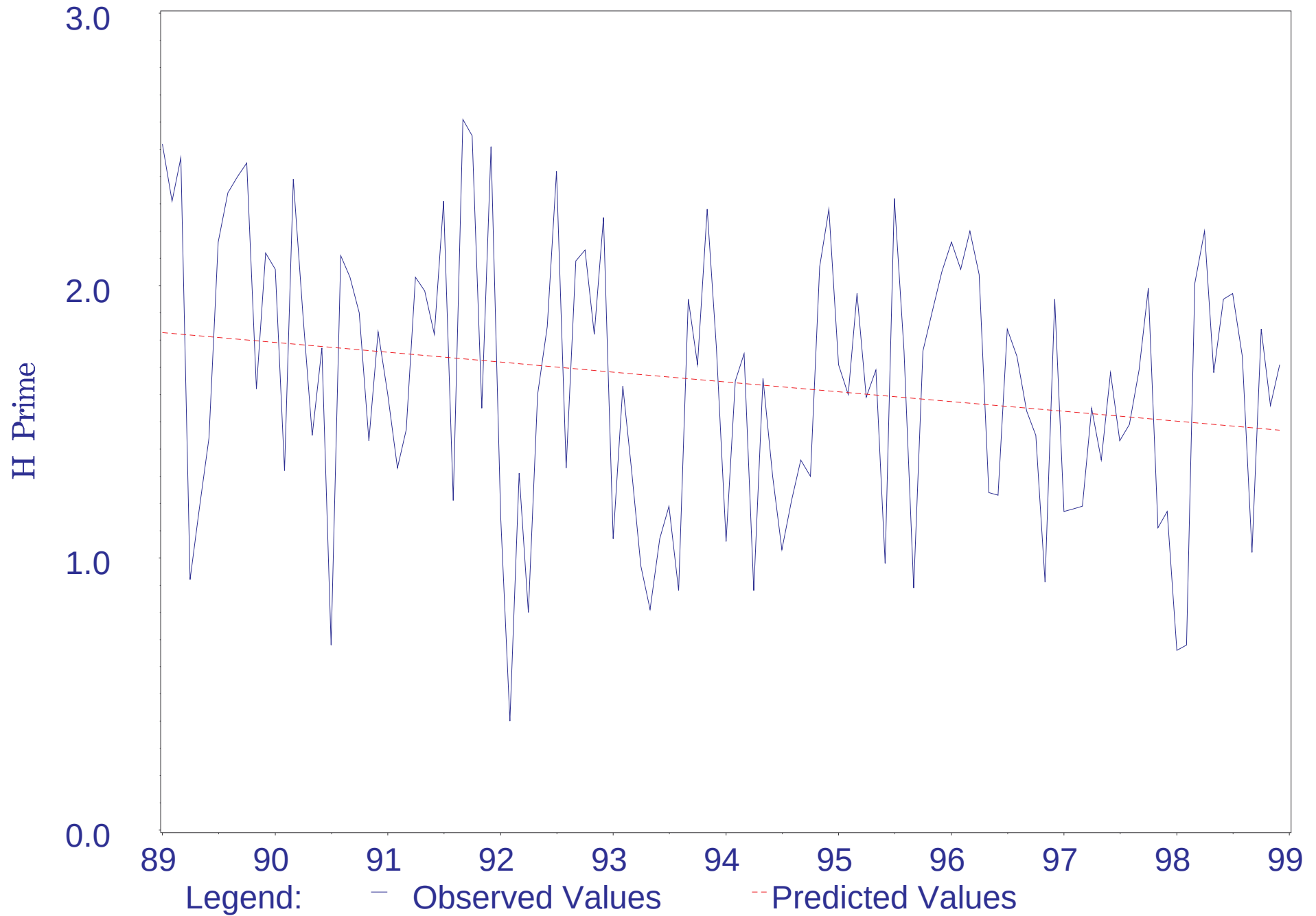
Number of Phytoplankton Genera - 20 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-327



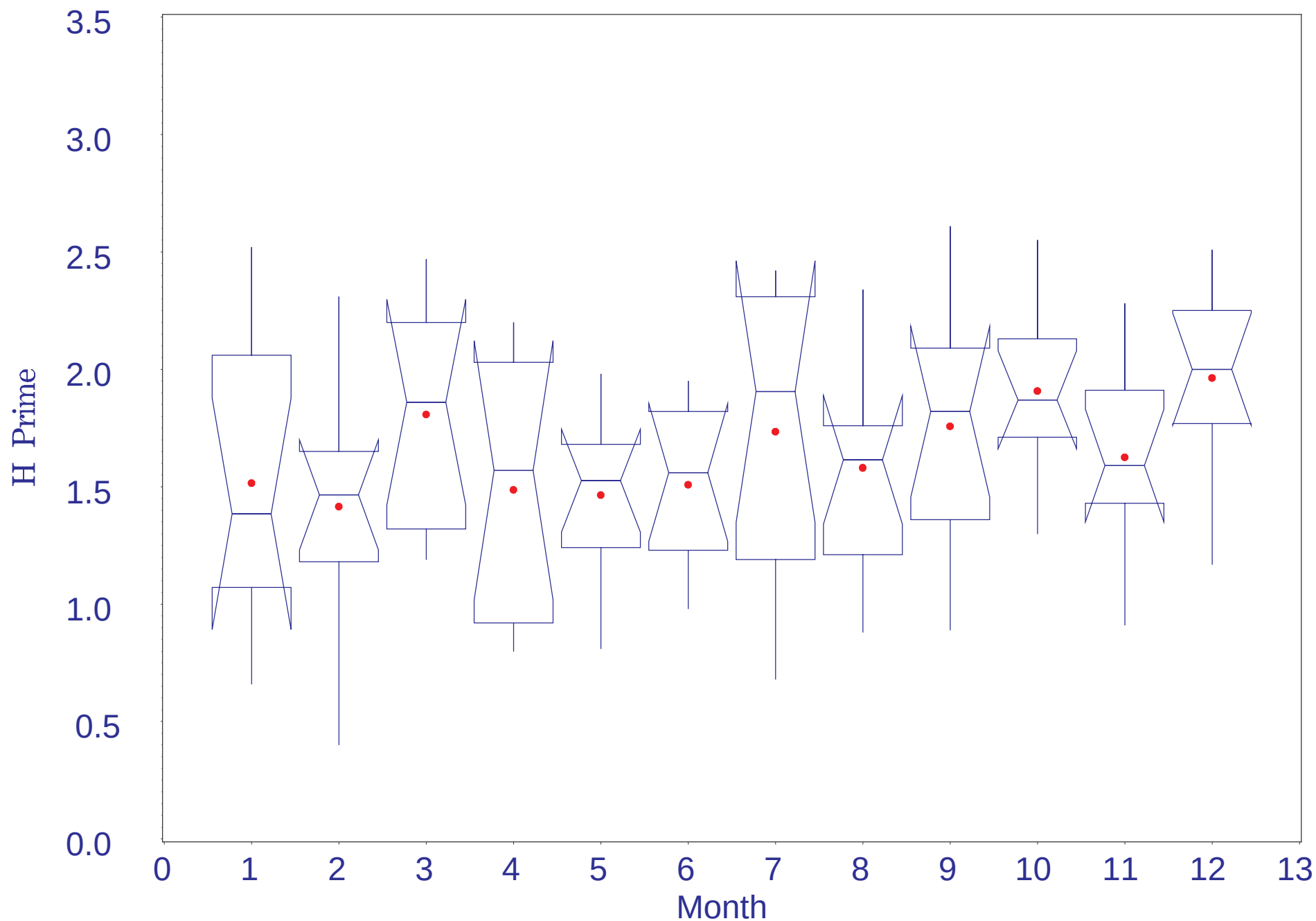
Diveristy of Phytoplankton Taxa - 0 ppt Isohaline
1989-1998

B-328



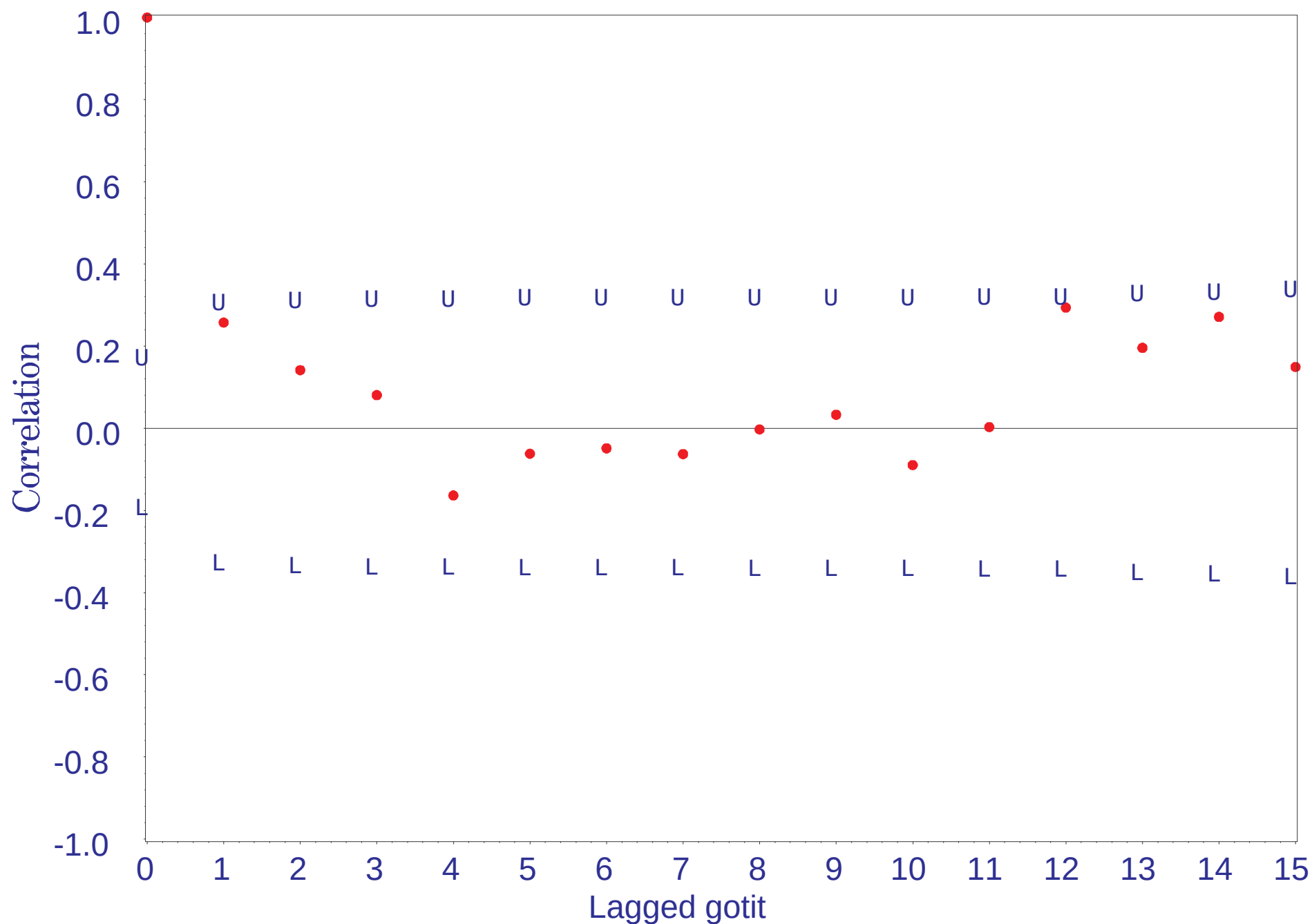
Diversity of Phytoplankton Taxa at 0 ppt Isohaline 1989-1998
Monthly Boxplots

B-329



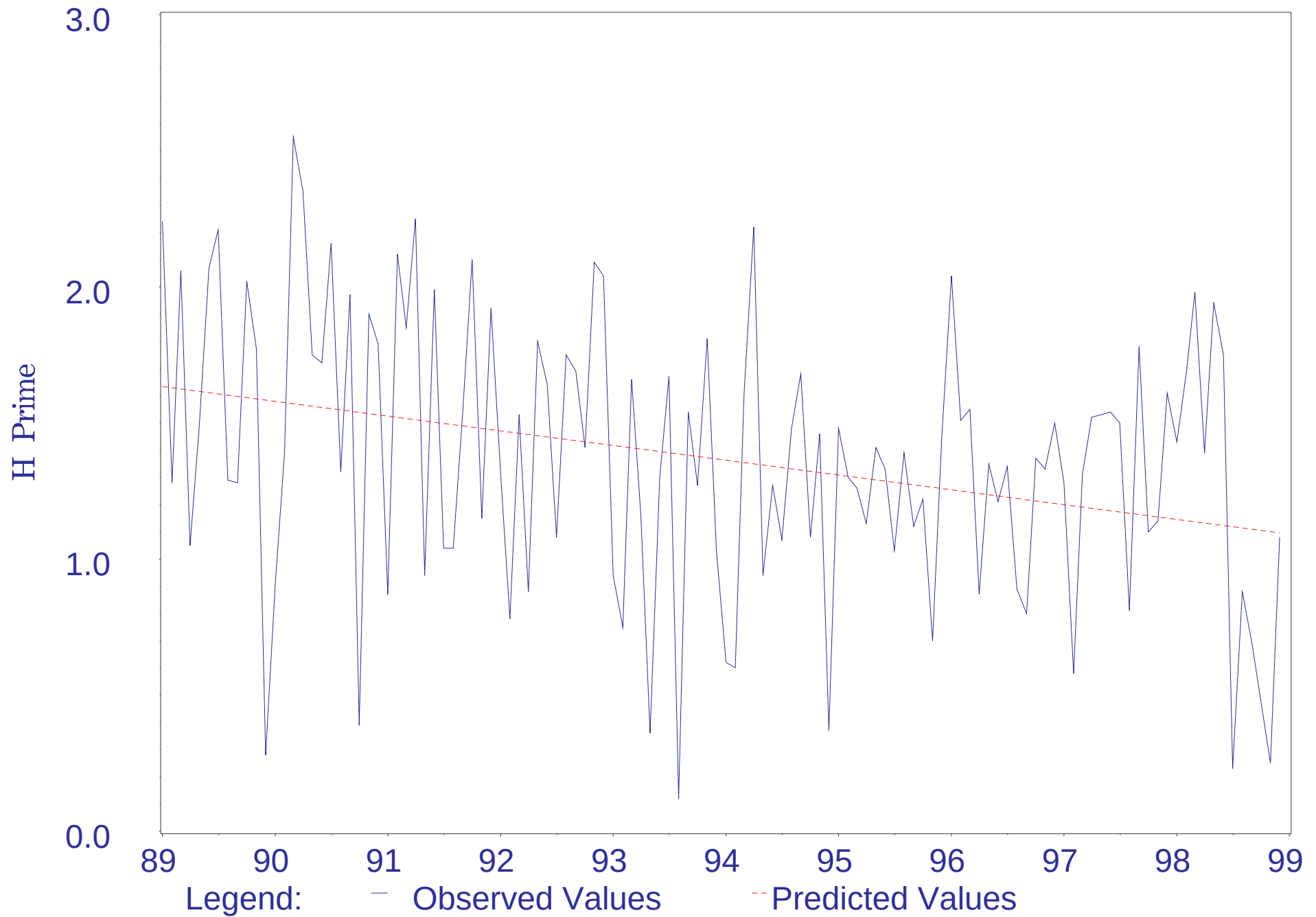
Diversity of Phytoplankton Taxa - 0 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-330



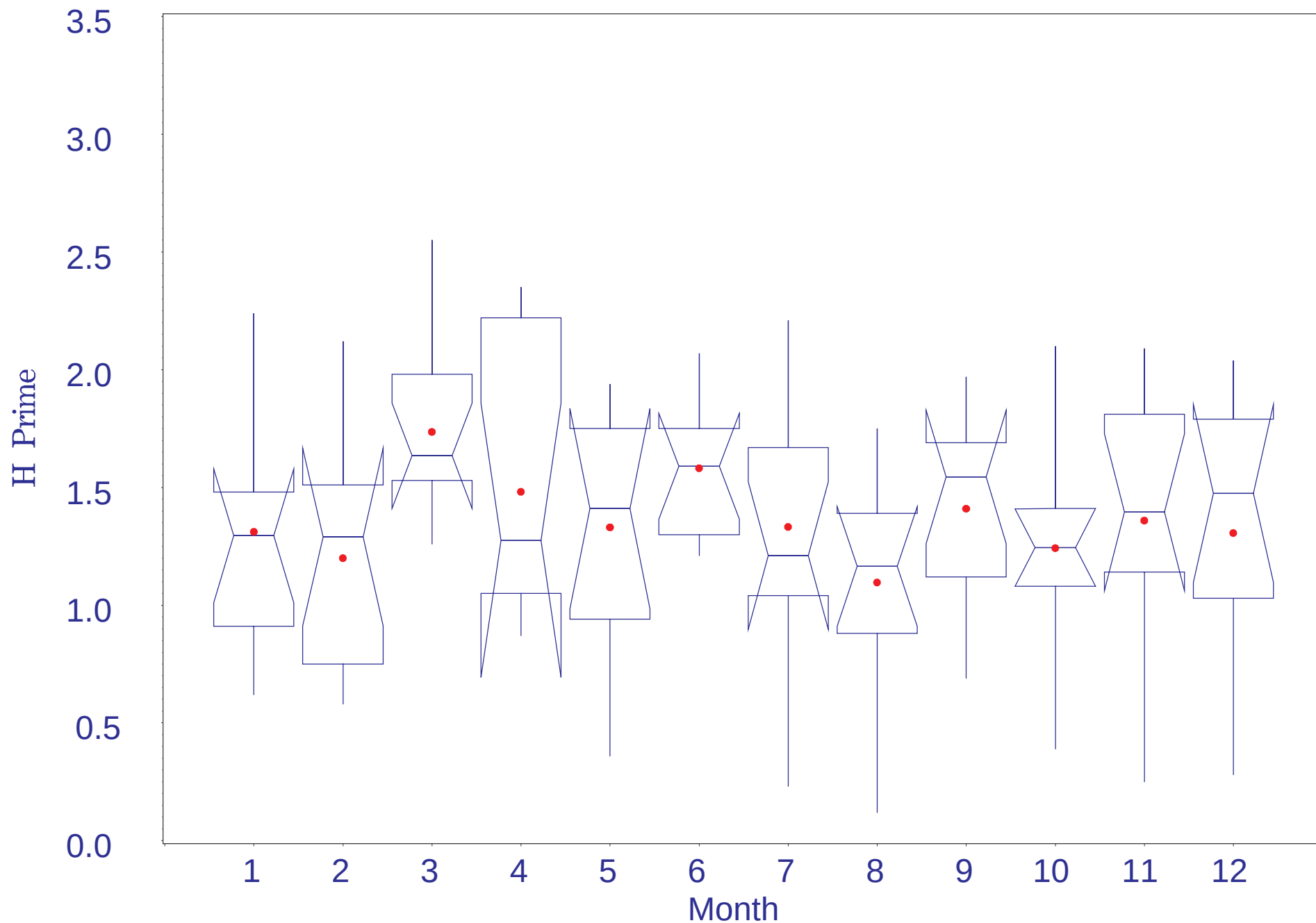
Diveristy of Phytoplankton Taxa - 6 ppt Isohaline
1989-1998

B-331



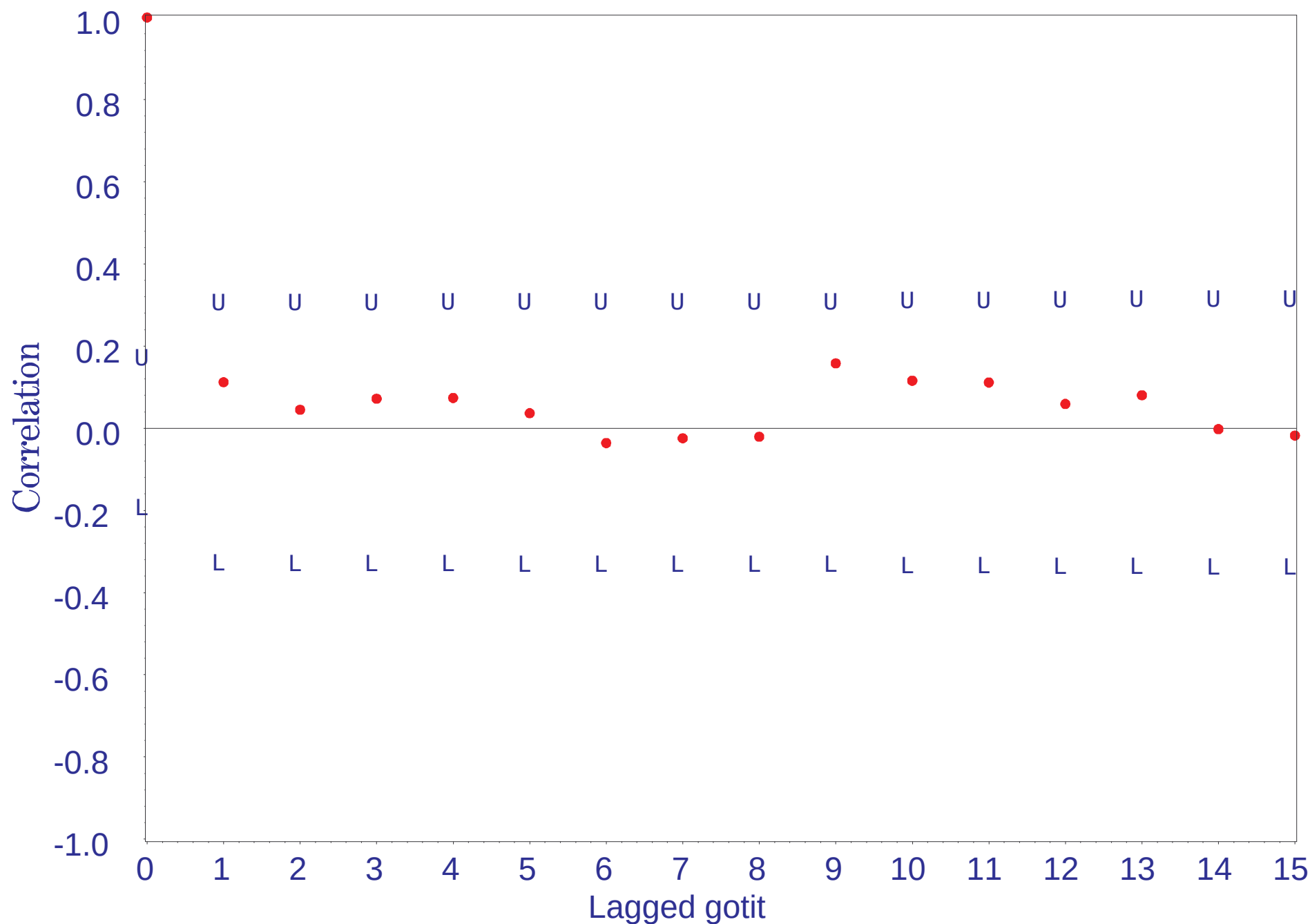
Diversity of Phytoplankton Taxa at 6 ppt Isohaline 1989-1998
Monthly Boxplots

B-332



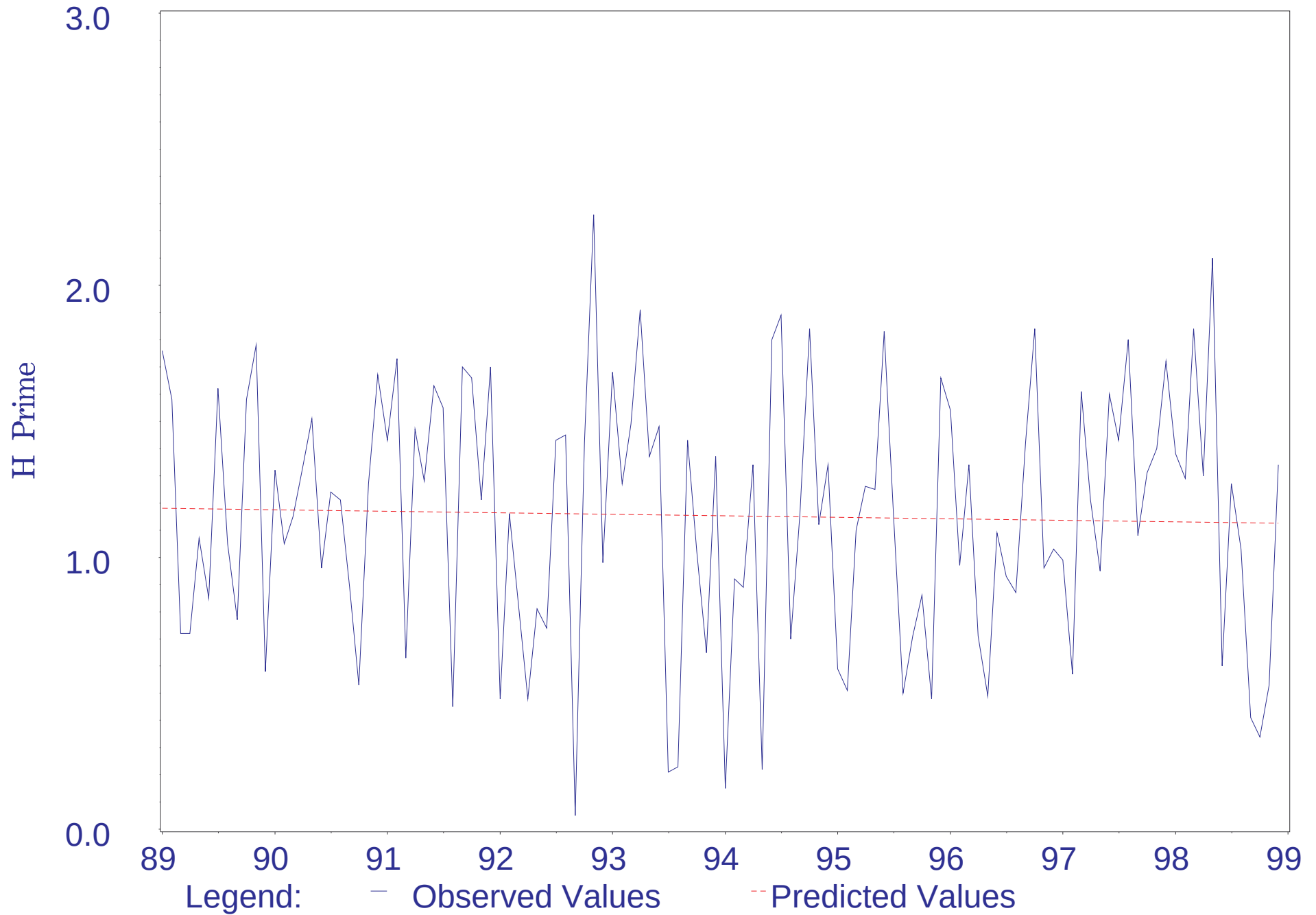
Diversity of Phytoplankton Taxa - 6 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-333



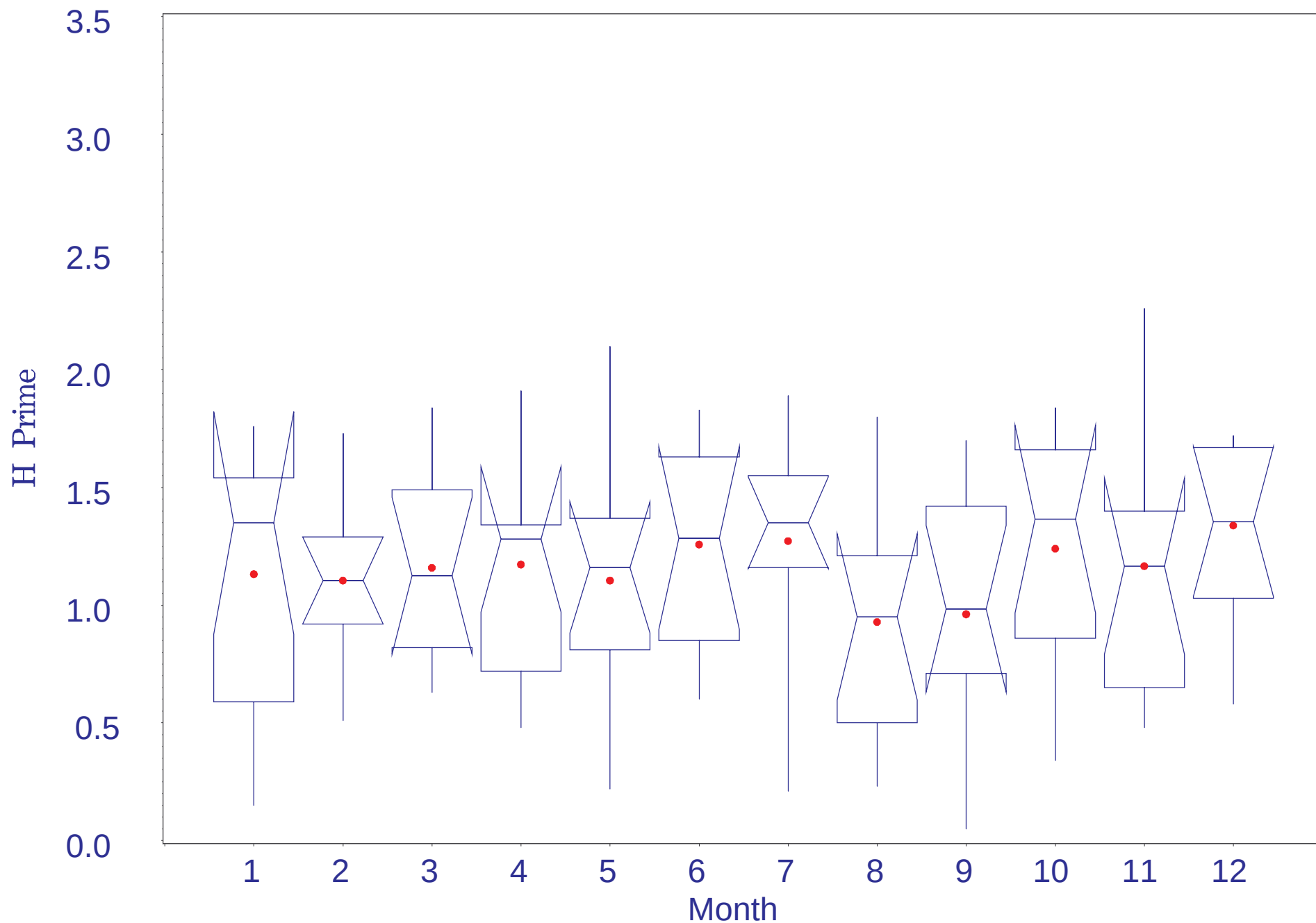
Diveristy of Phytoplankton Taxa - 12 ppt Isohaline 1989-1998

B-334



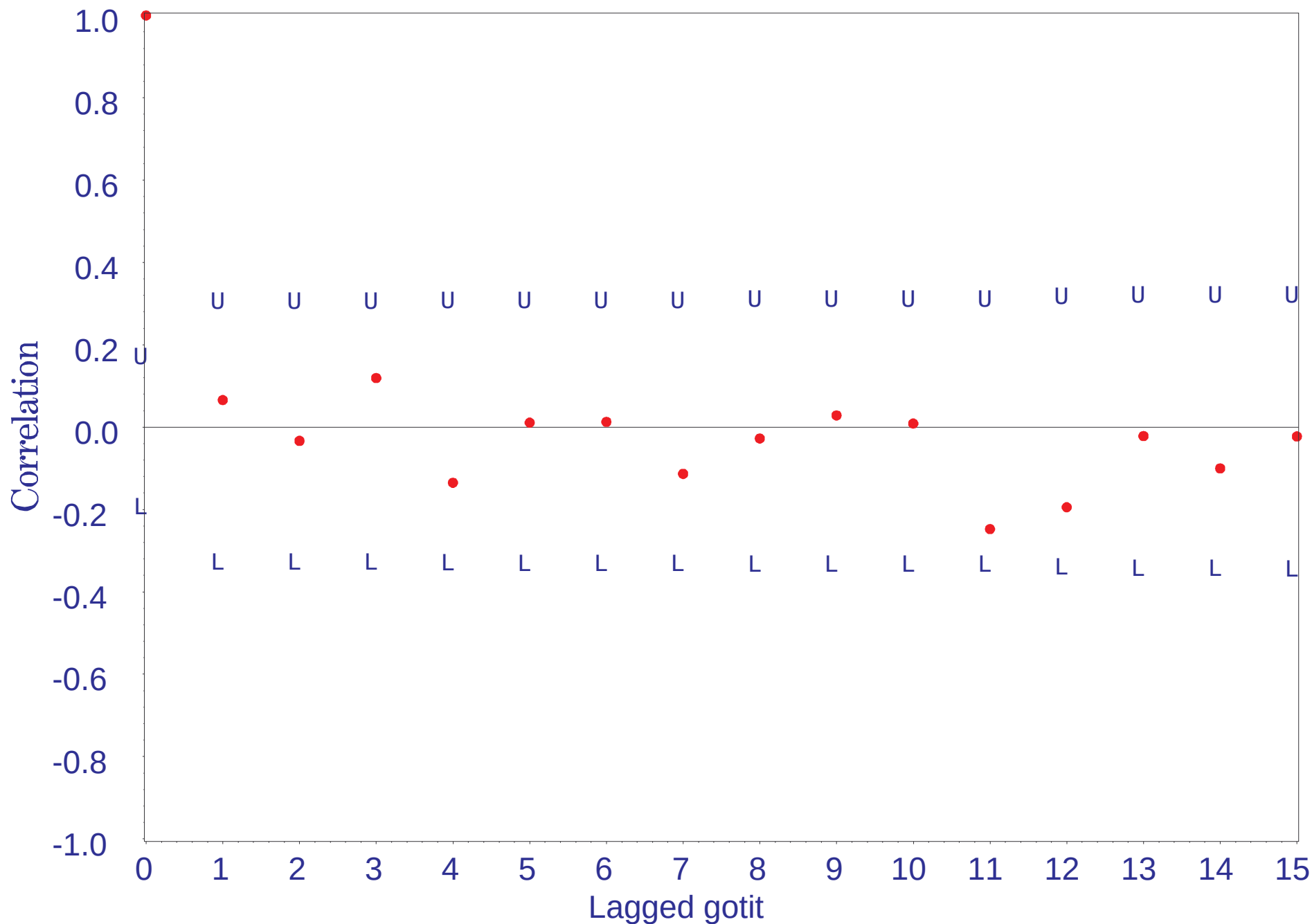
Diversity of Phytoplankton Taxa at 12 ppt Isohaline 1989-1998
Monthly Boxplots

B-335



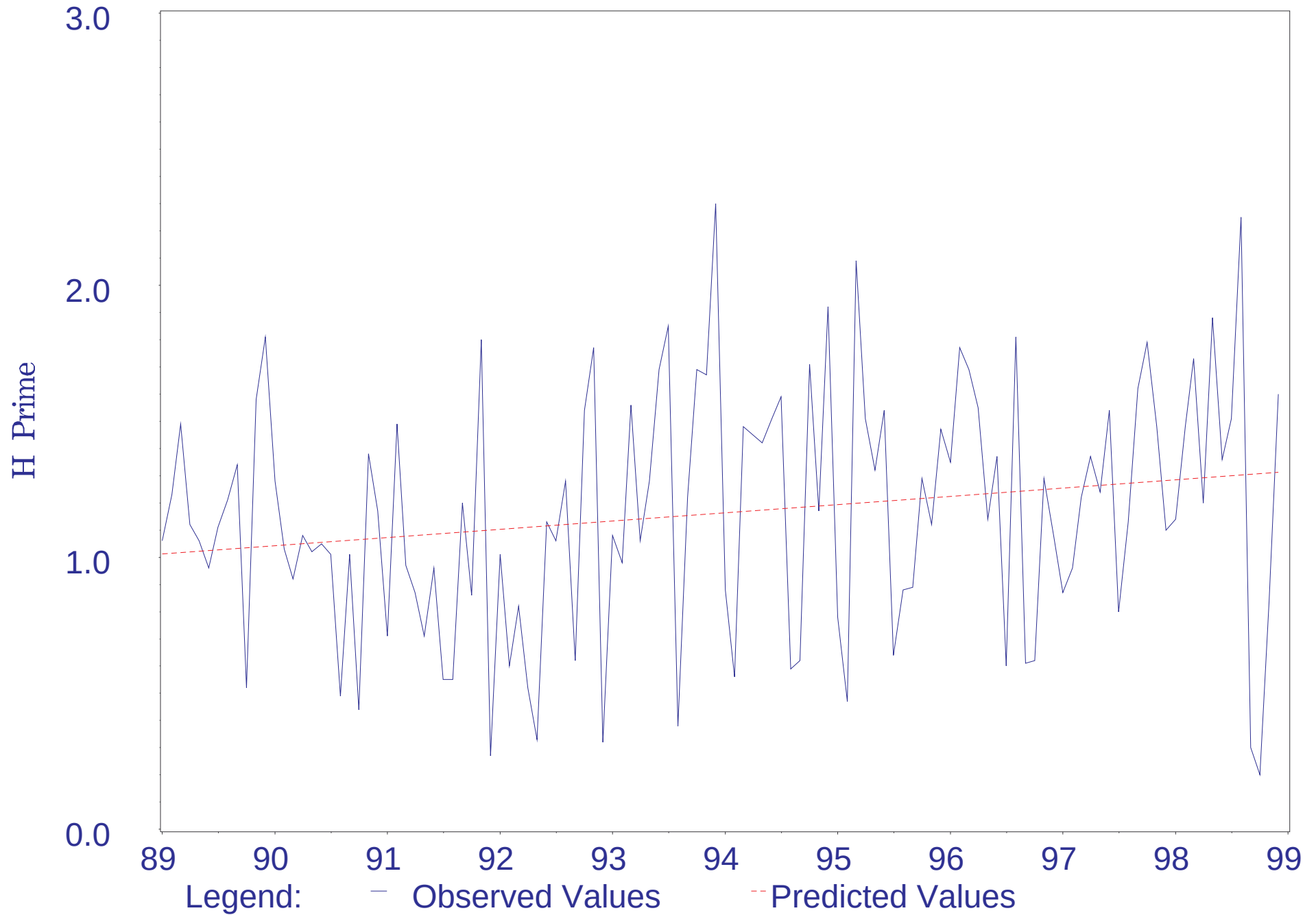
Diversity of Phytoplankton Taxa - 12 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-336



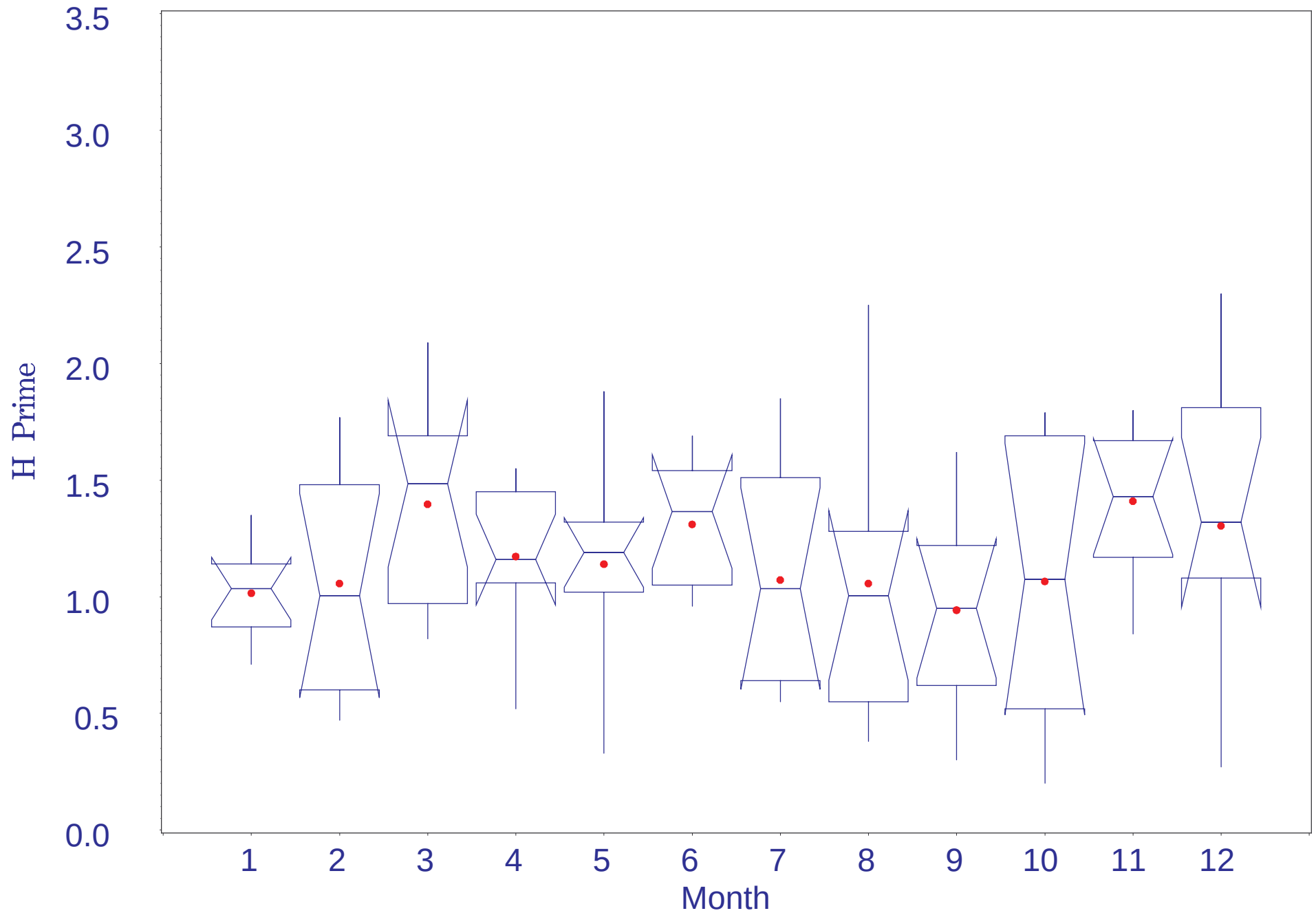
Diveristy of Phytoplankton Taxa - 20 ppt Isohaline
1989-1998

B-337



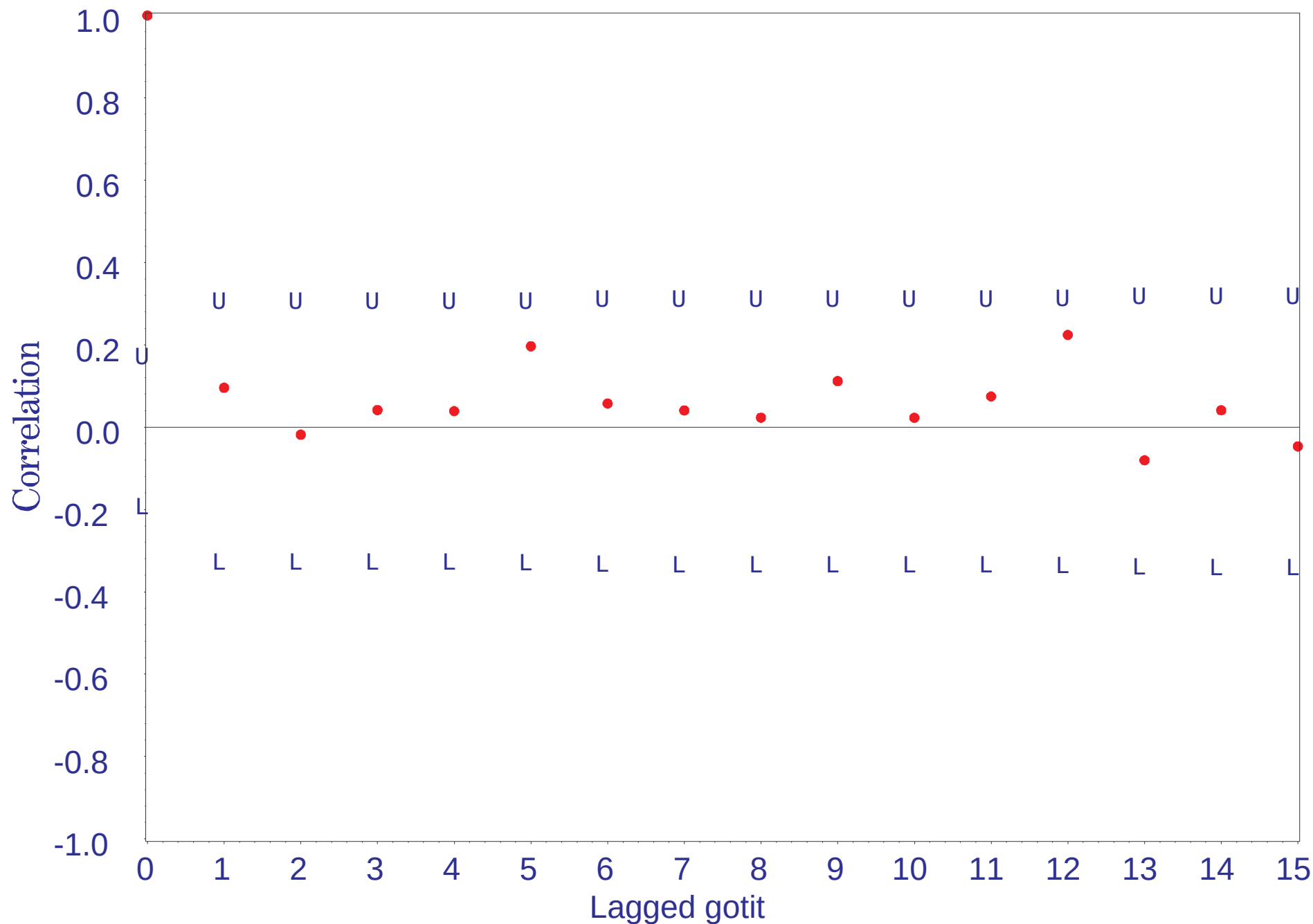
Diversity of Phytoplankton Taxa at 20 ppt Isohaline 1989-1998
Monthly Boxplots

B-338



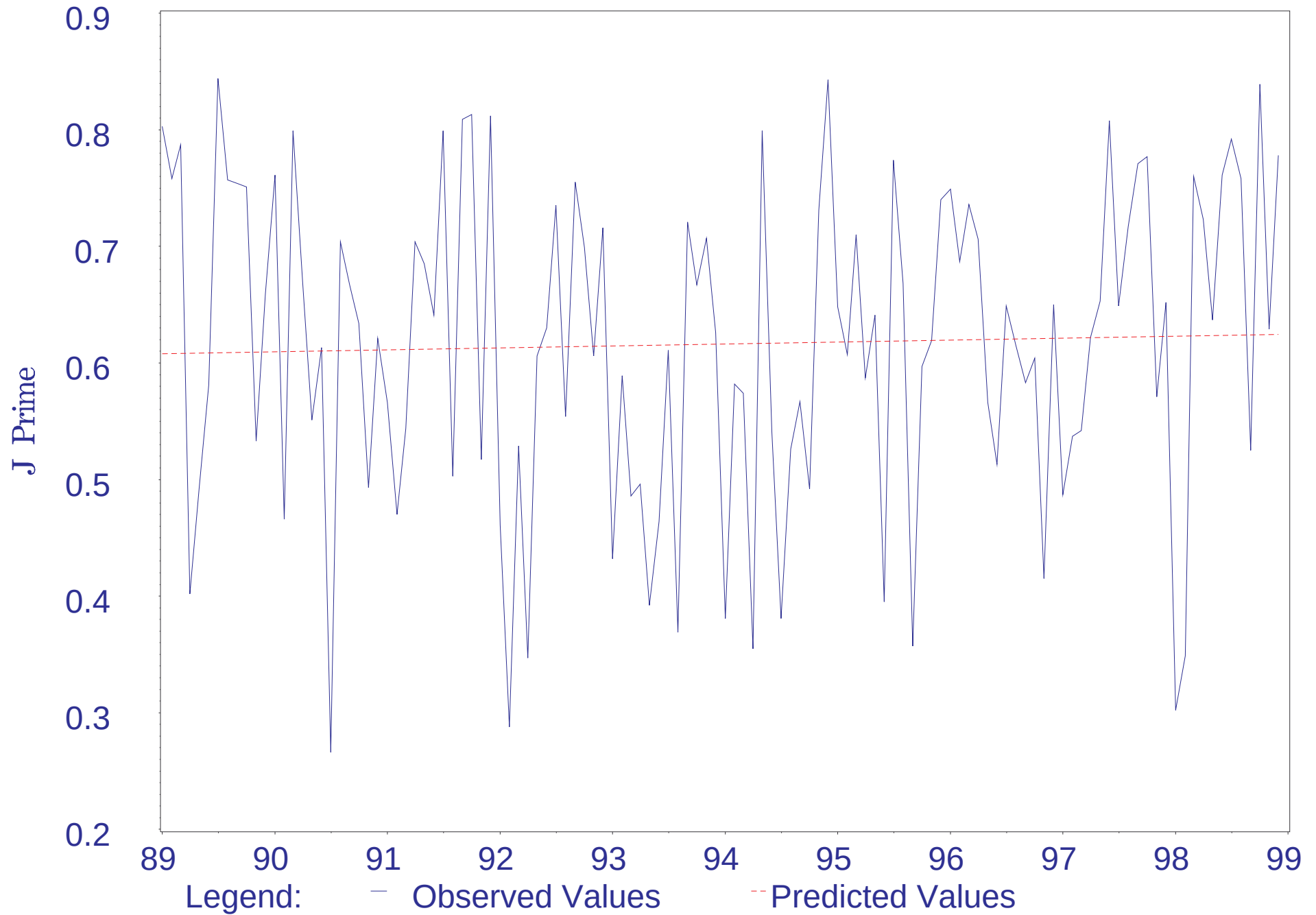
Diversity of Phytoplankton Taxa - 20 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

B-339



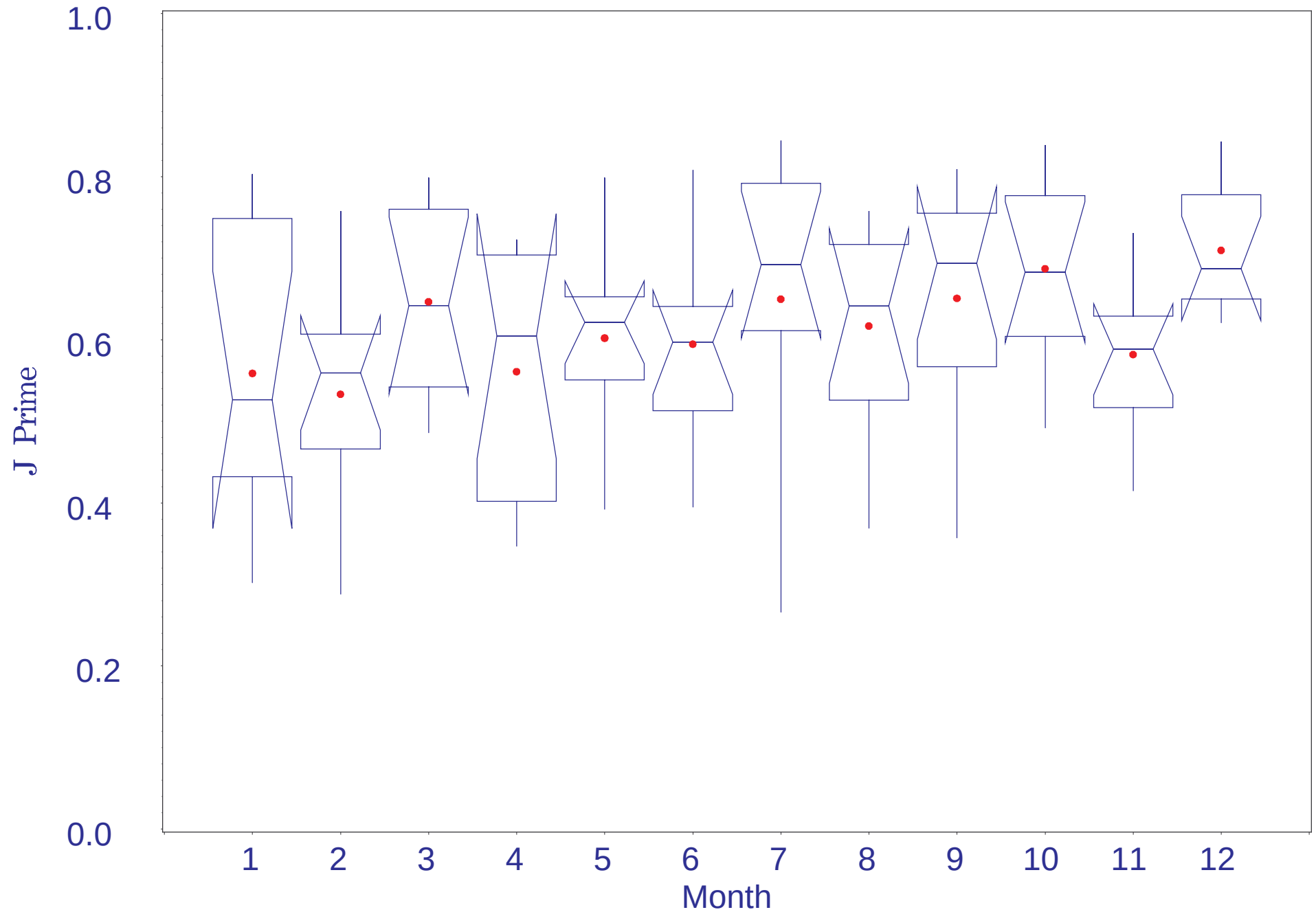
Evenness of Phytoplankton Taxa - 0 ppt Isohaline
1989-1998

B-340



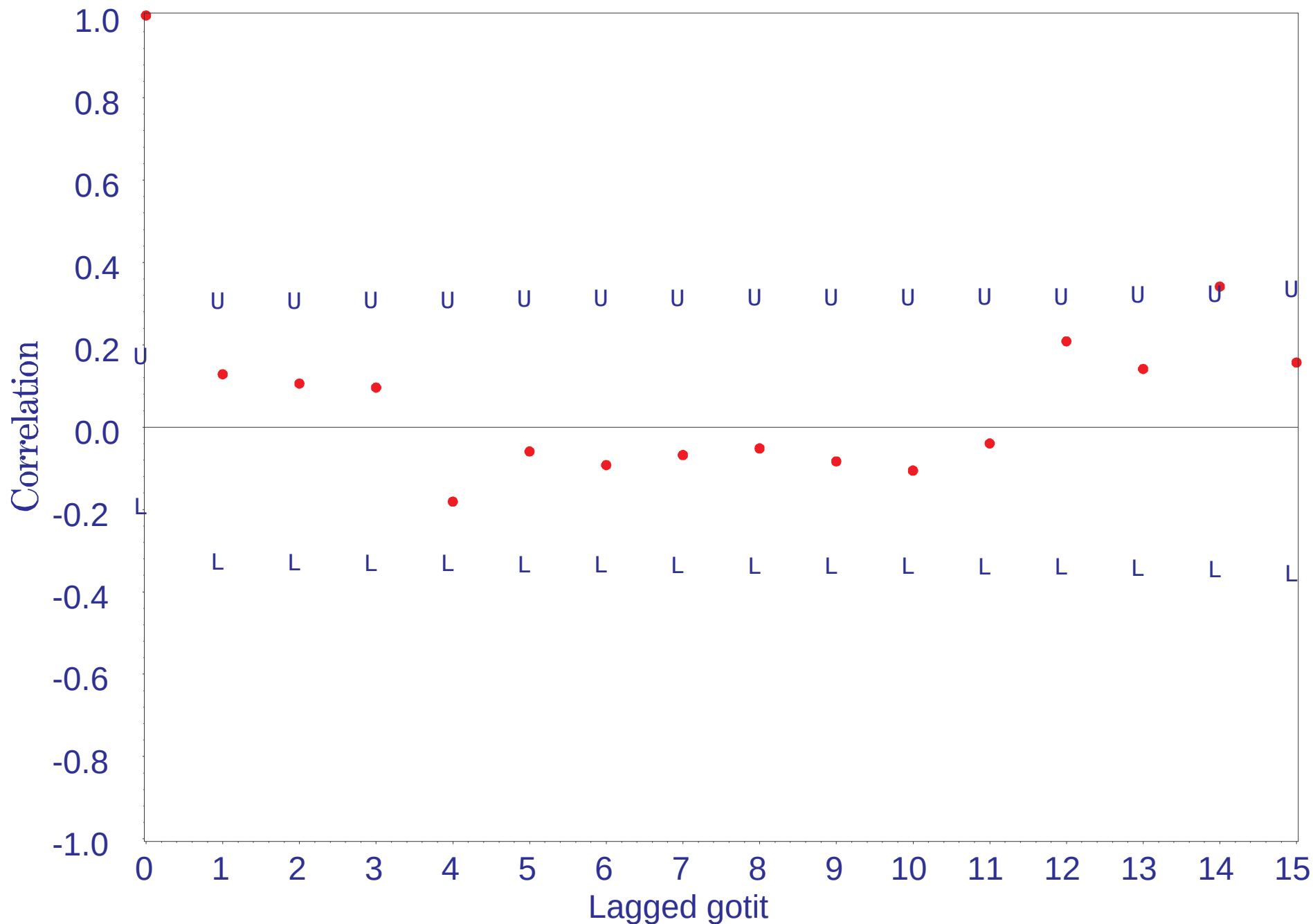
Evenness of Phytoplankton Taxa at 0 ppt Isohaline 1989-1998
Monthly Boxplots

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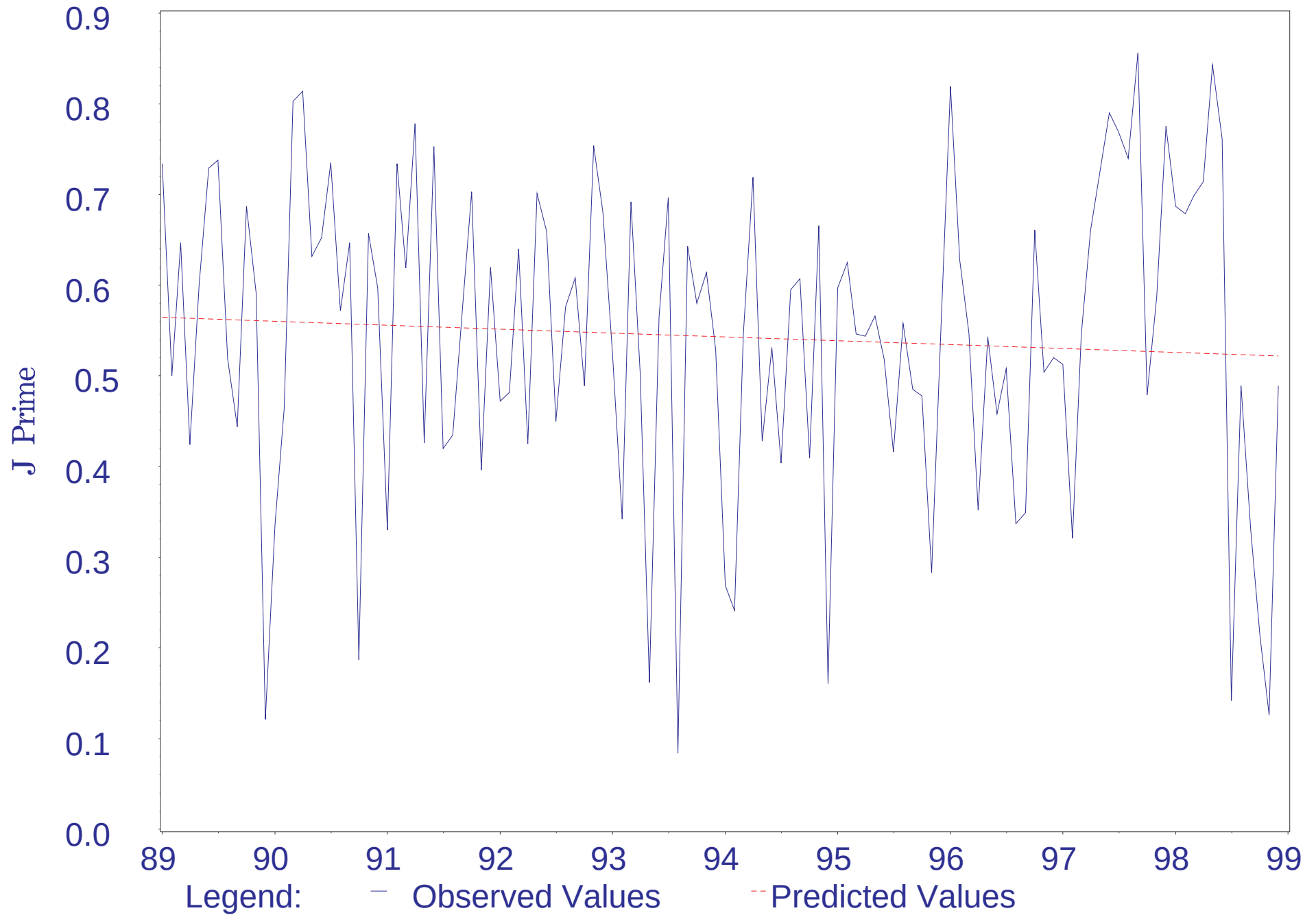
Evenness of Phytoplankton Taxa - 0 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

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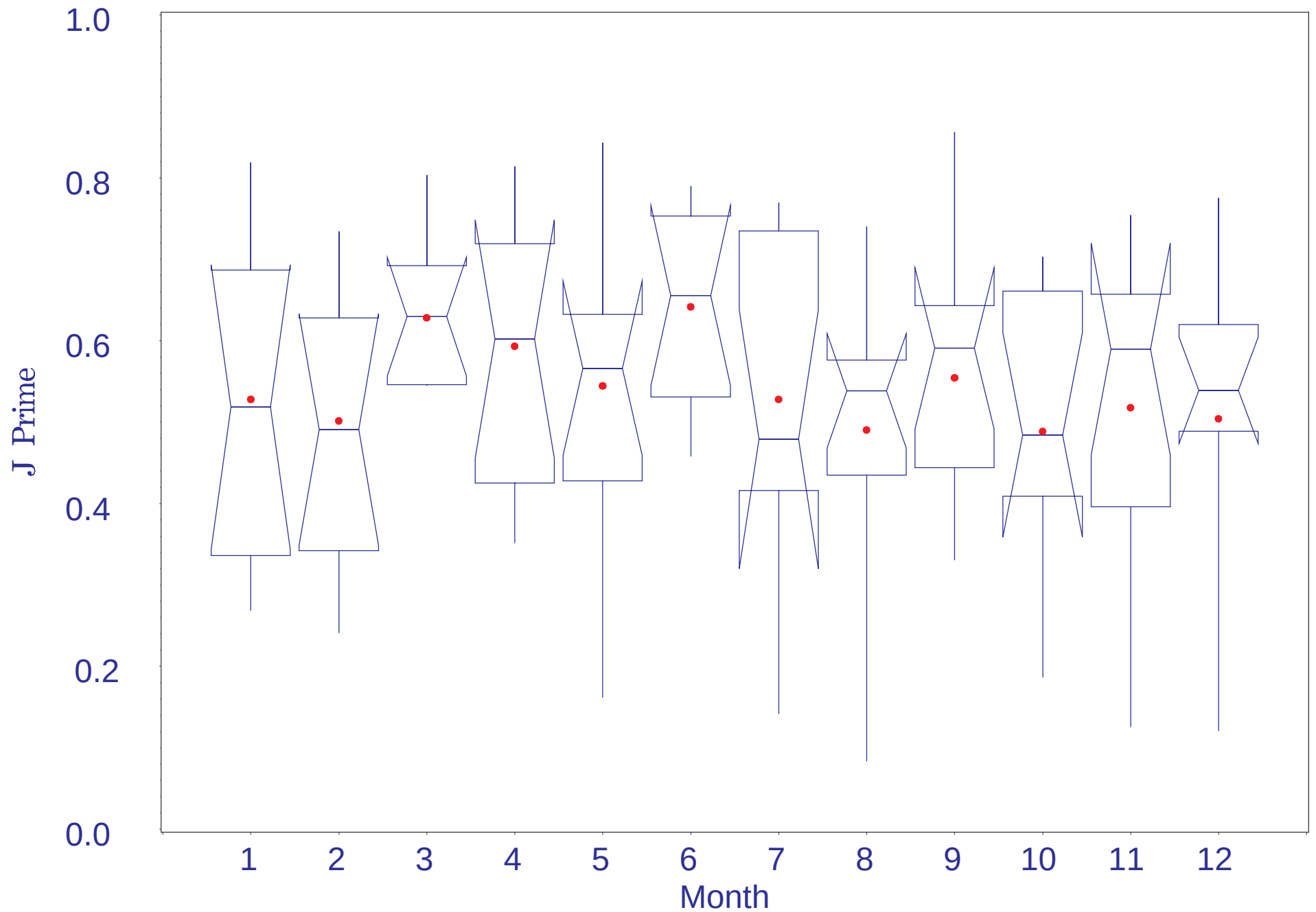
Evenness of Phytoplankton Taxa - 6 ppt Isohaline 1989-1998

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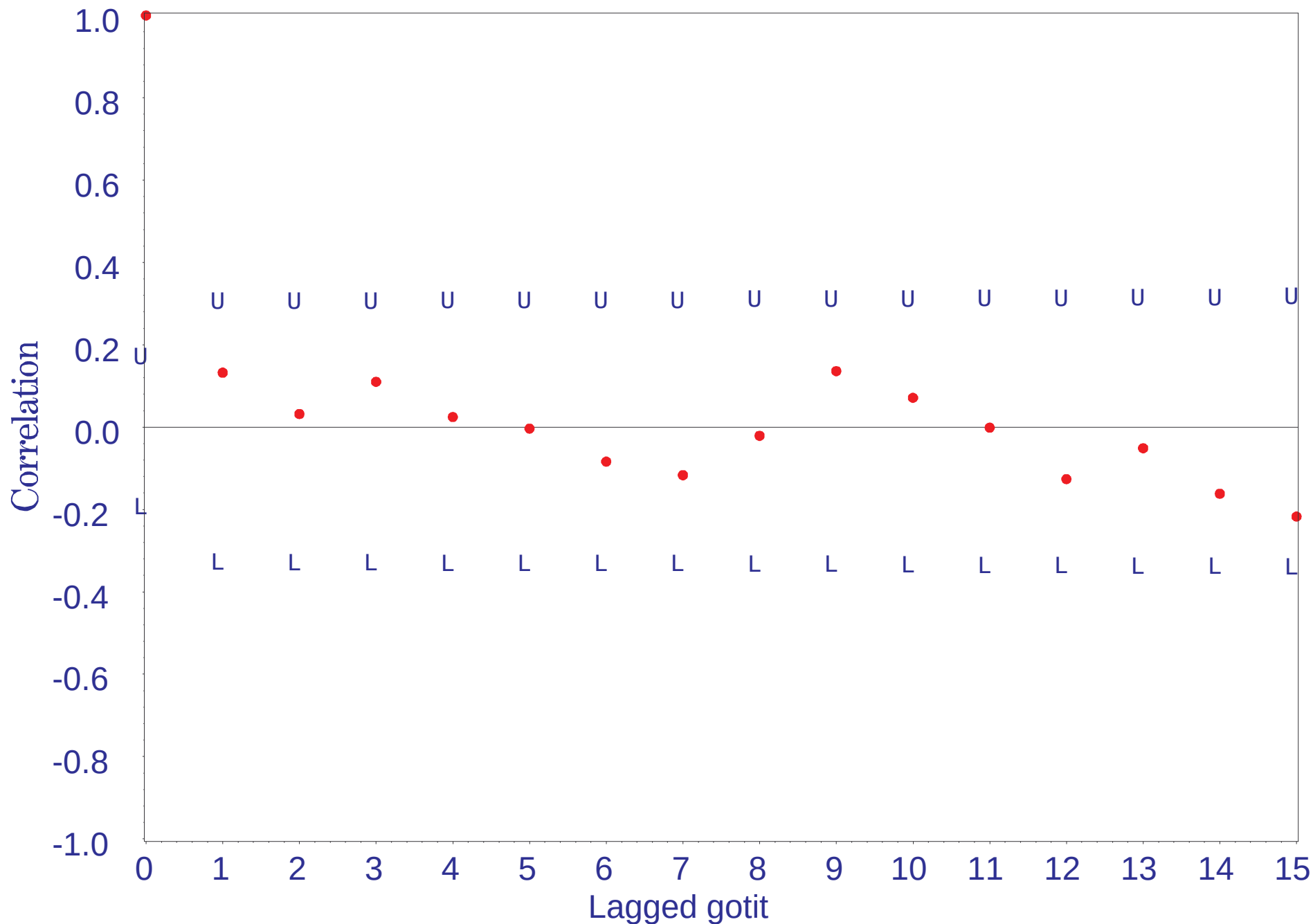
Evenness of Phytoplankton Taxa at 6 ppt Isohaline 1989-1998
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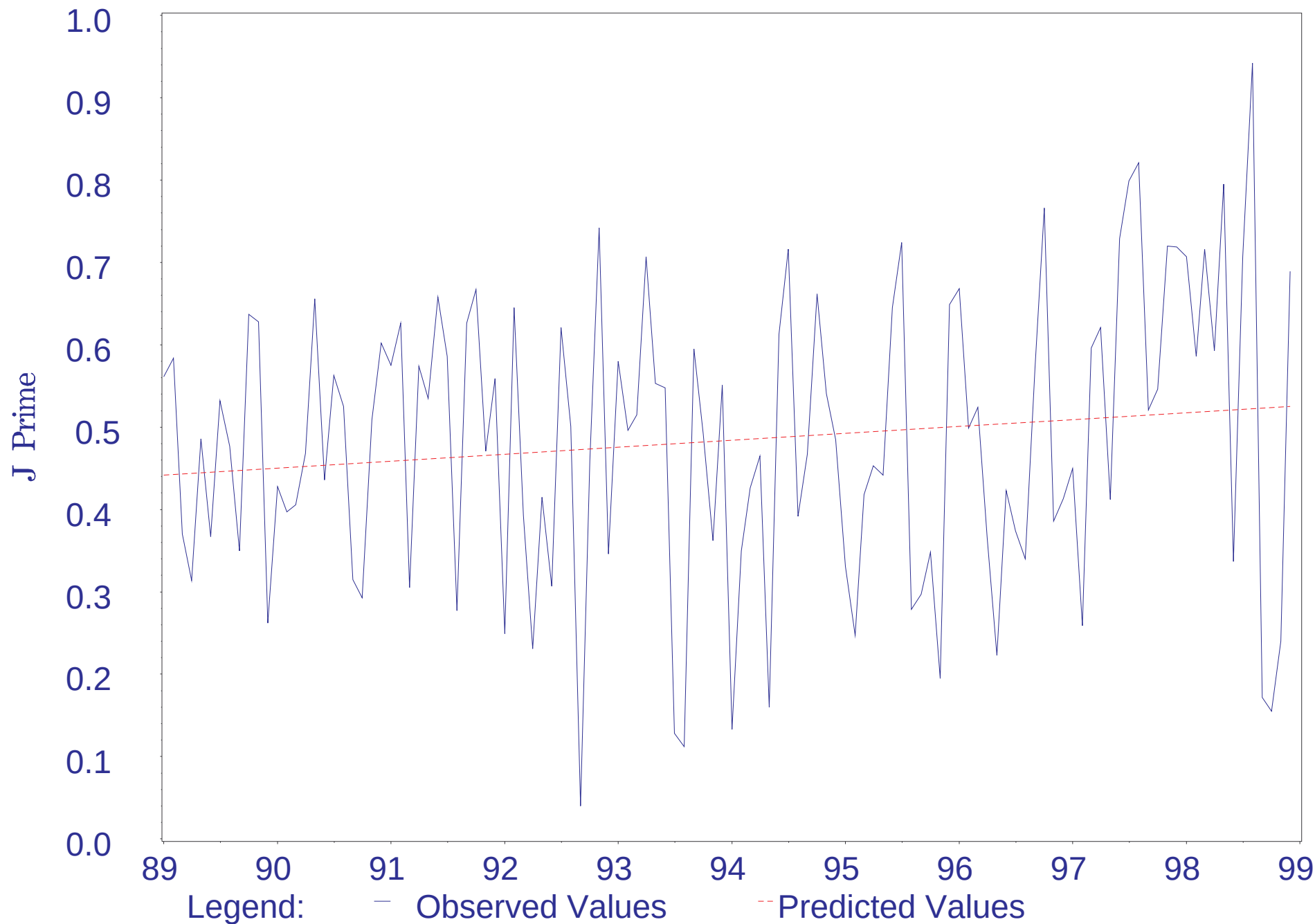
Evenness of Phytoplankton Taxa - 6 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

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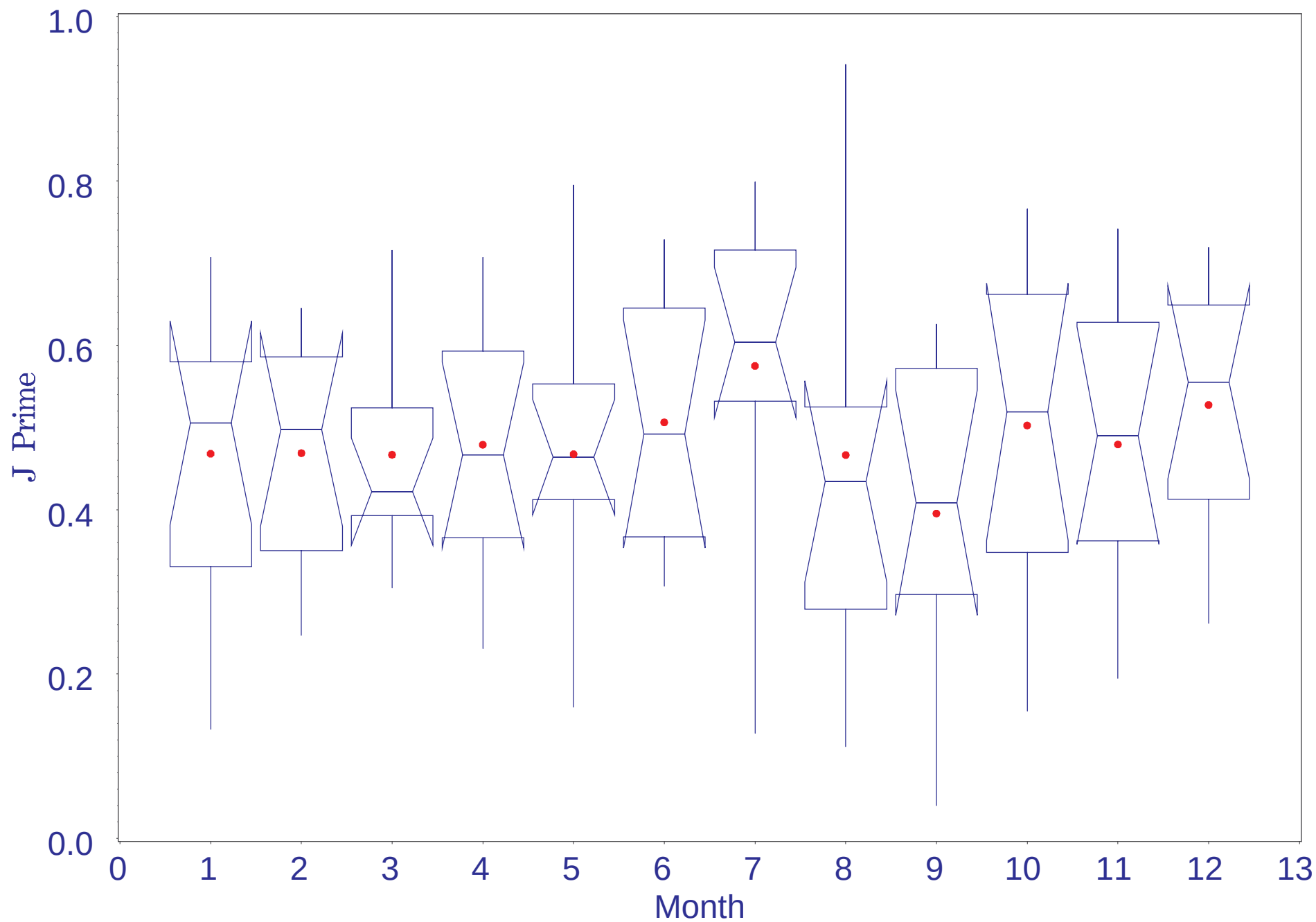
Evenness of Phytoplankton Taxa - 12 ppt Isohaline
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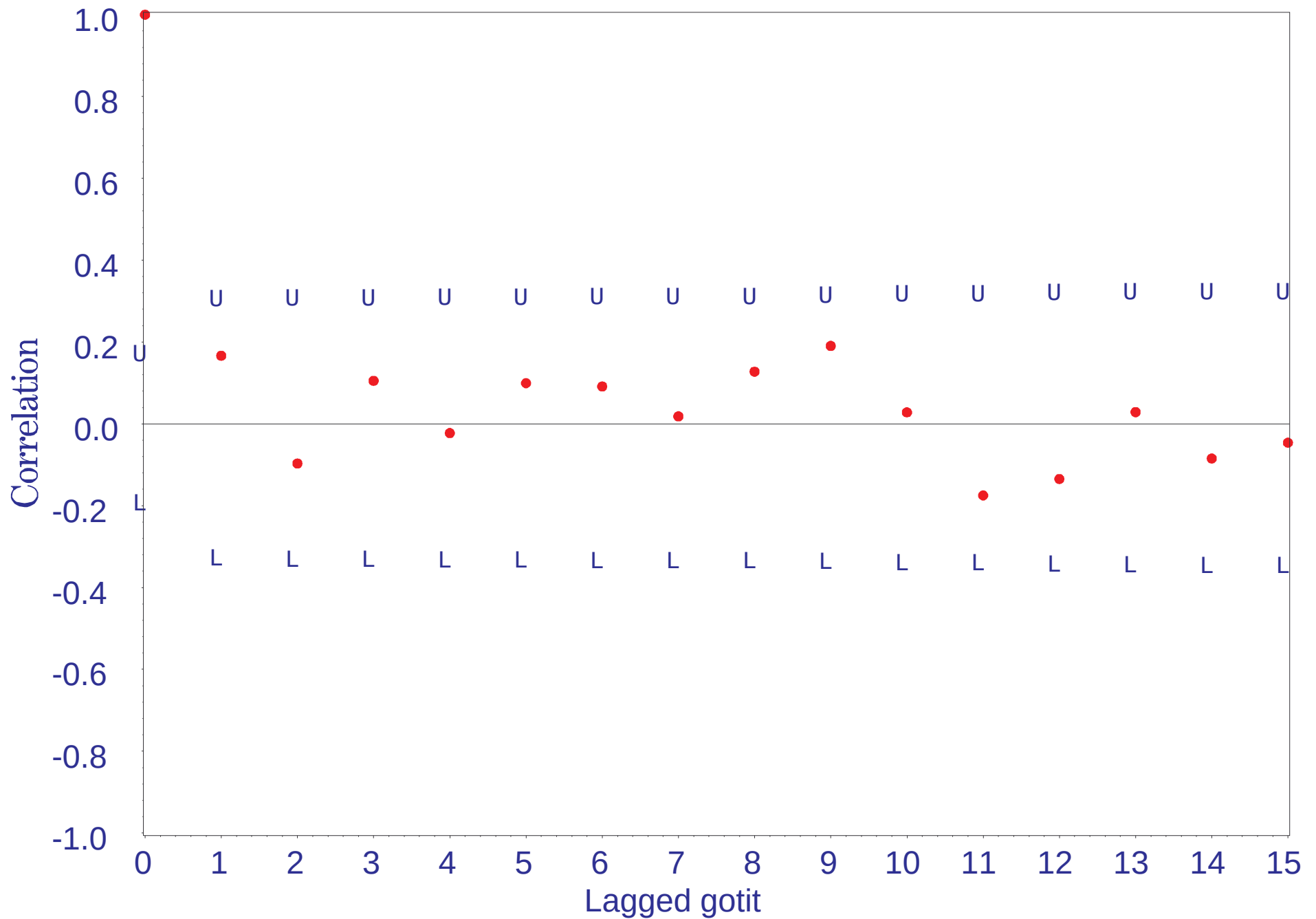
Evenness of Phytoplankton Taxa at 12 ppt Isohaline 1989-1998
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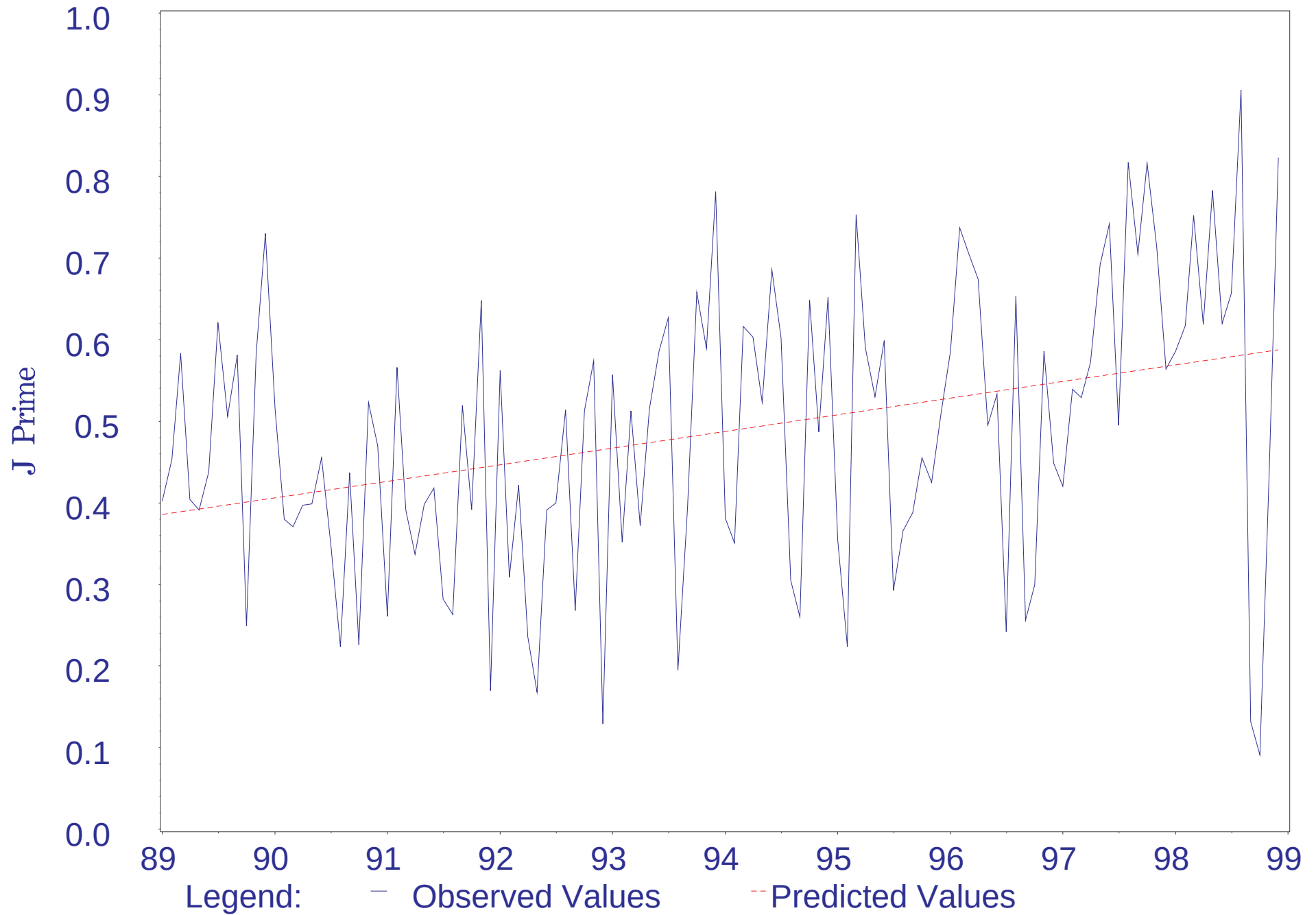
Evenness of Phytoplankton Taxa - 12 ppt Isohaline (1989-1998)
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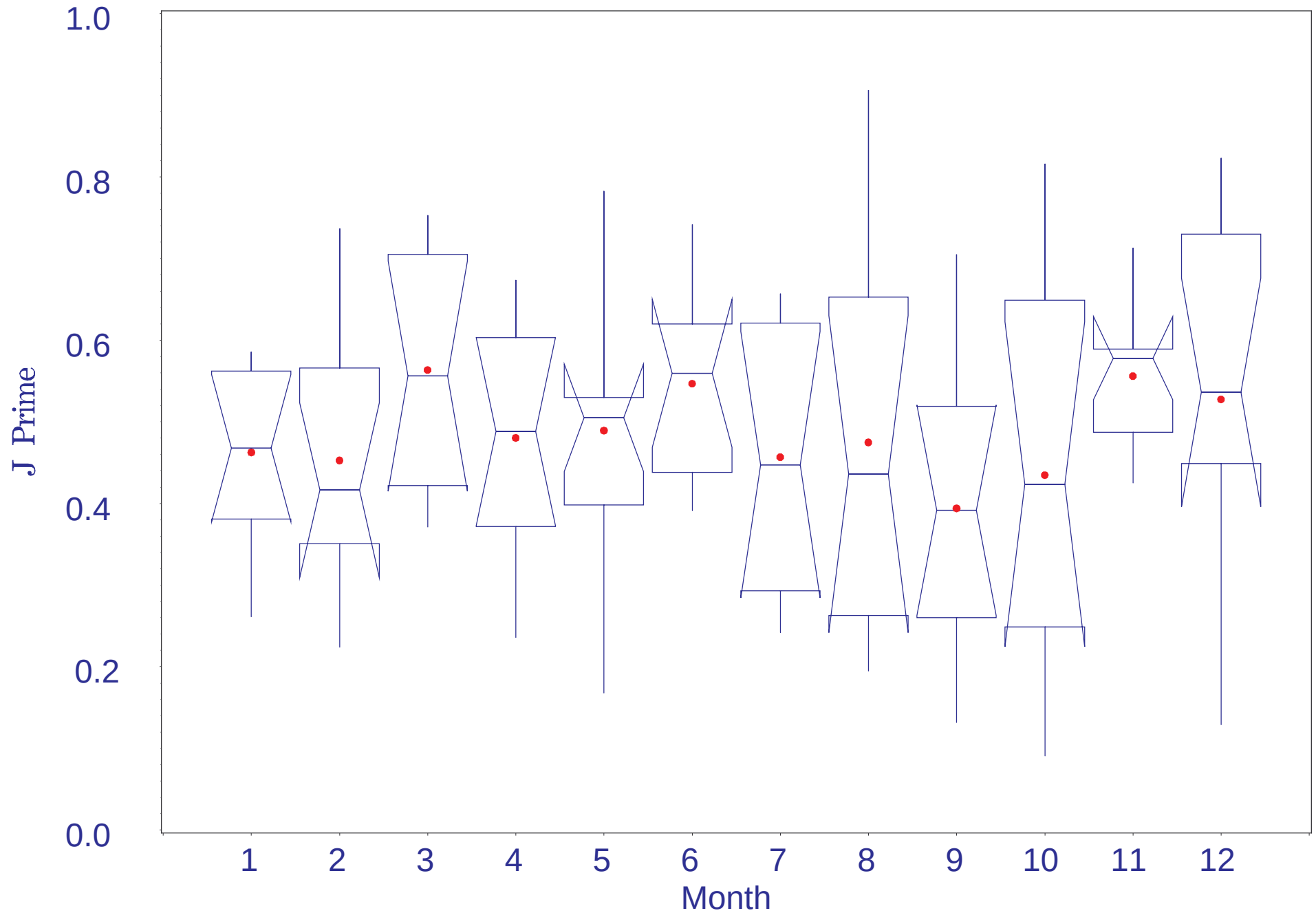
Evenness of Phytoplankton Taxa - 20 ppt Isohaline
1989-1998

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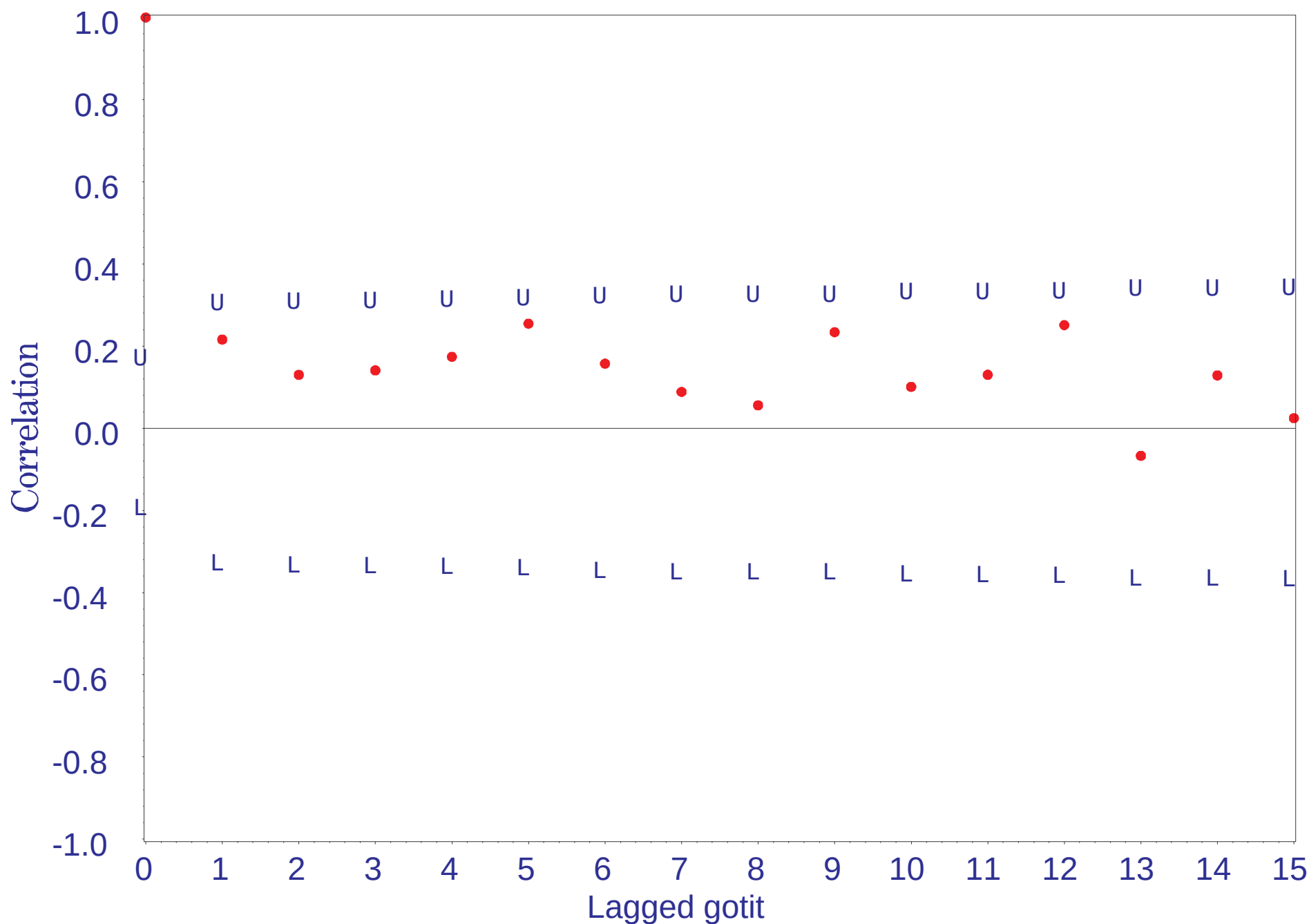
Evenness of Phytoplankton Taxa at 20 ppt Isohaline 1989-1998
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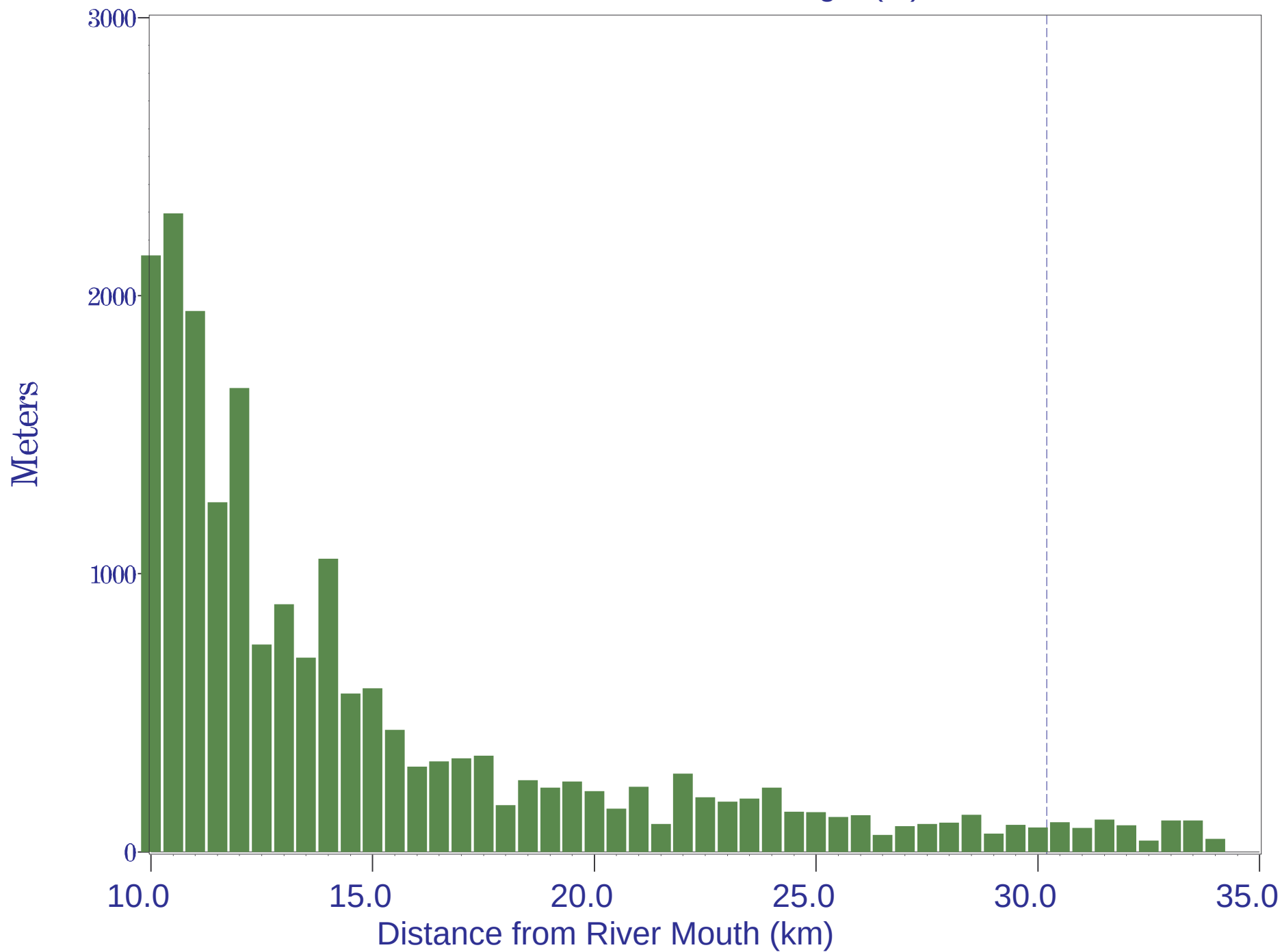
Evenness of Phytoplankton Taxa - 20 ppt Isohaline (1989-1998)
Correlogram with Upper and Lower 95% Confidence Limits

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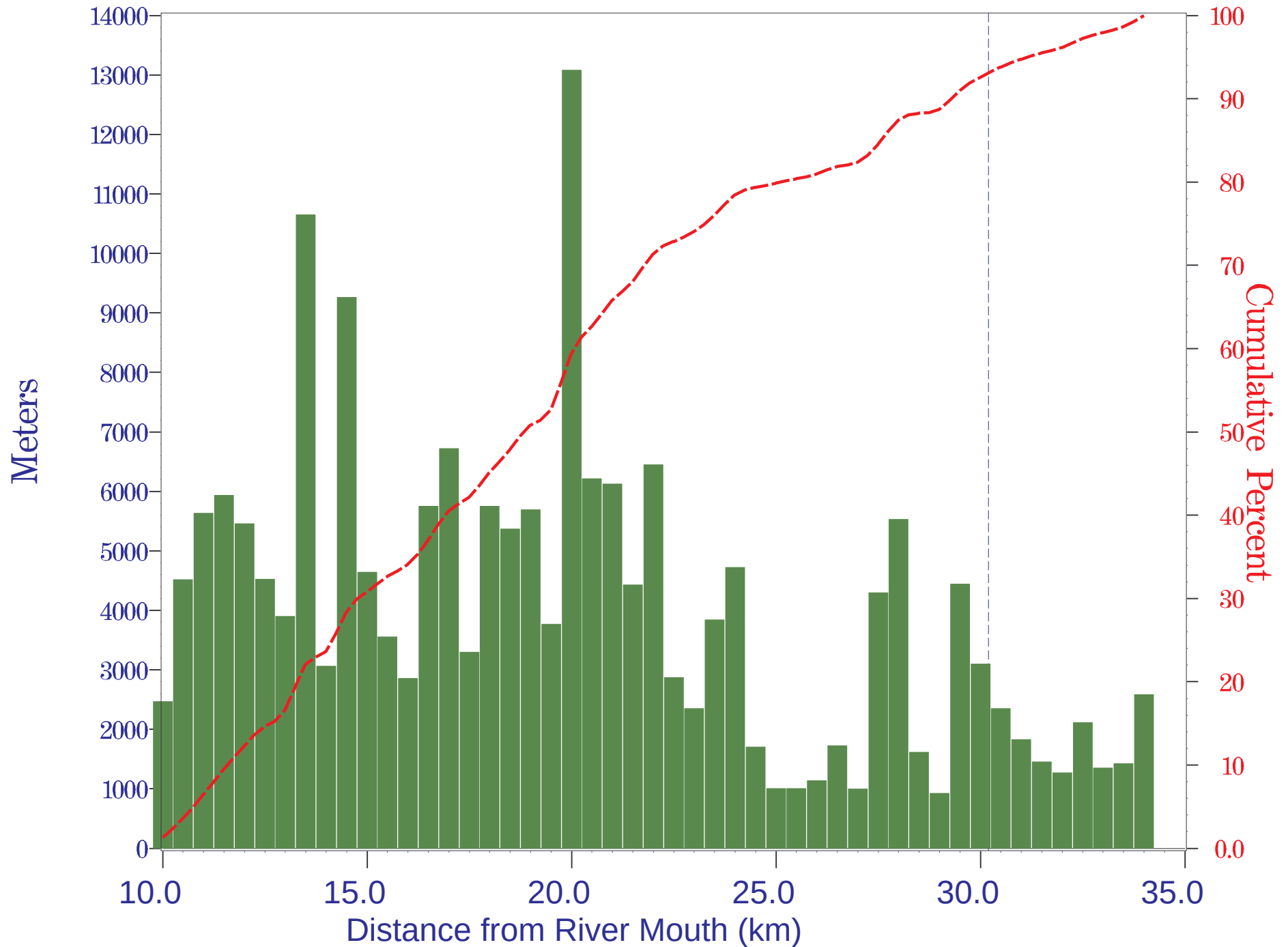
Transect Cross-Section Length (m)

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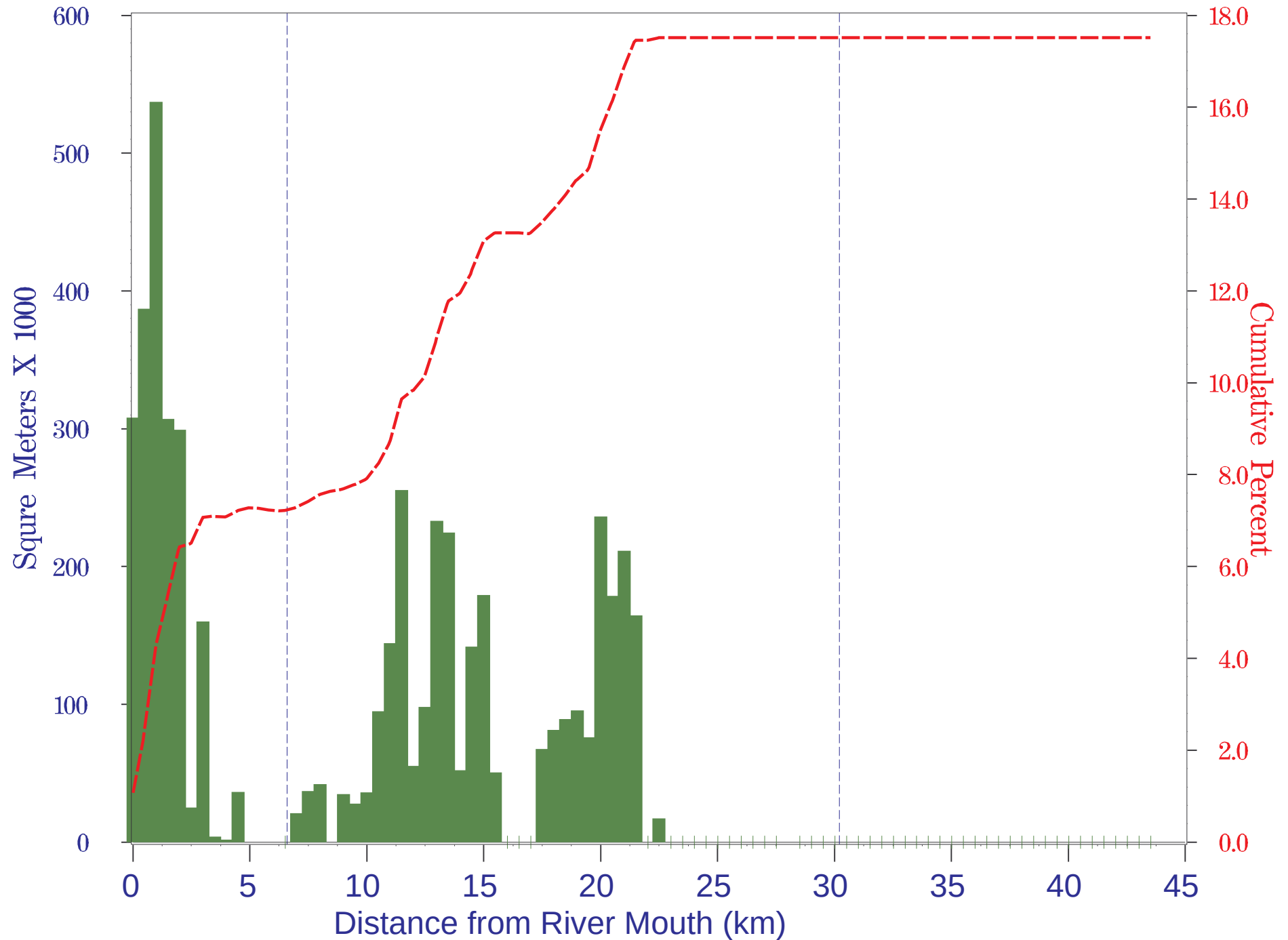
Segment Shoreline Length (m)

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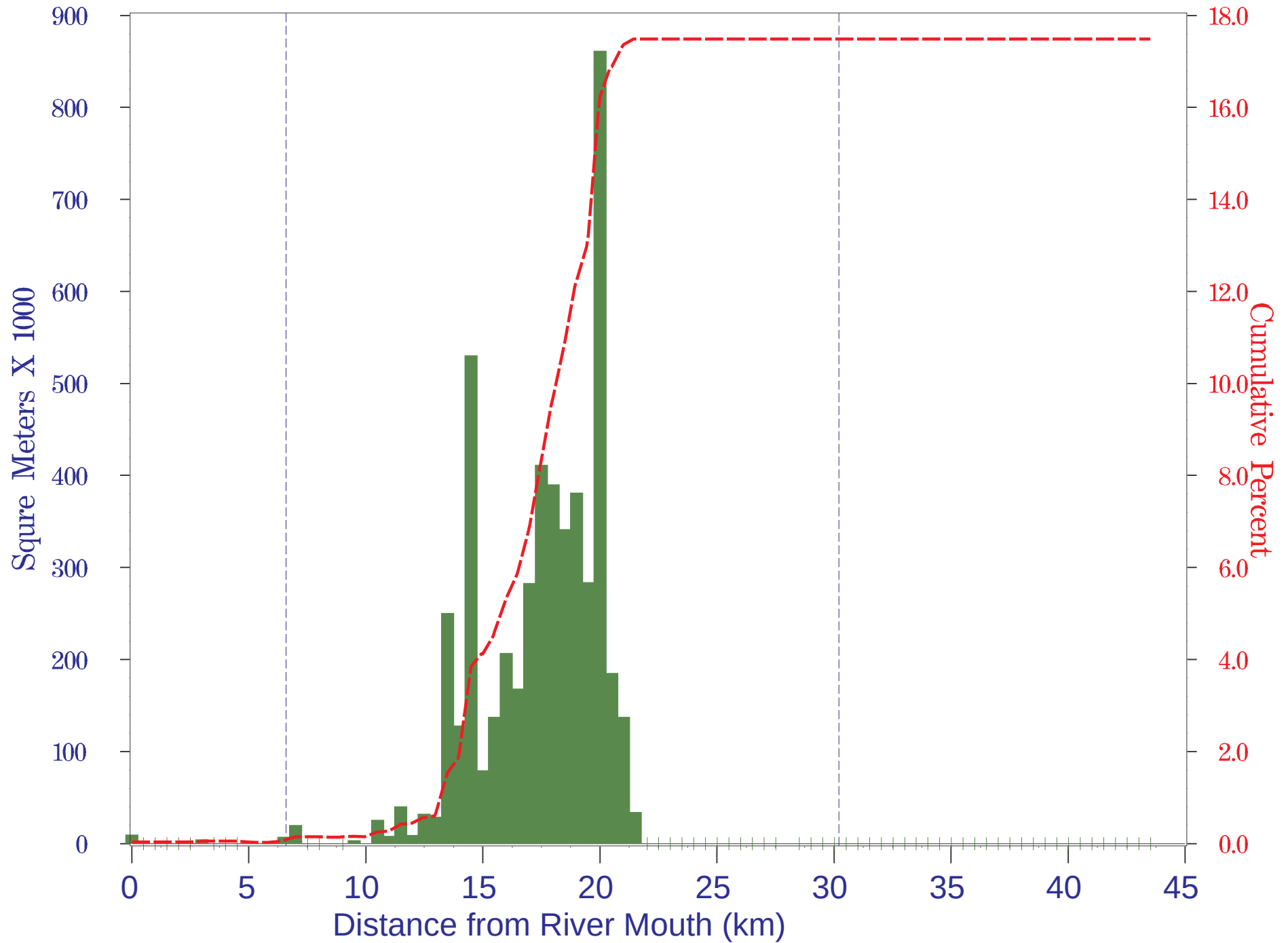
Mangrove Swamps

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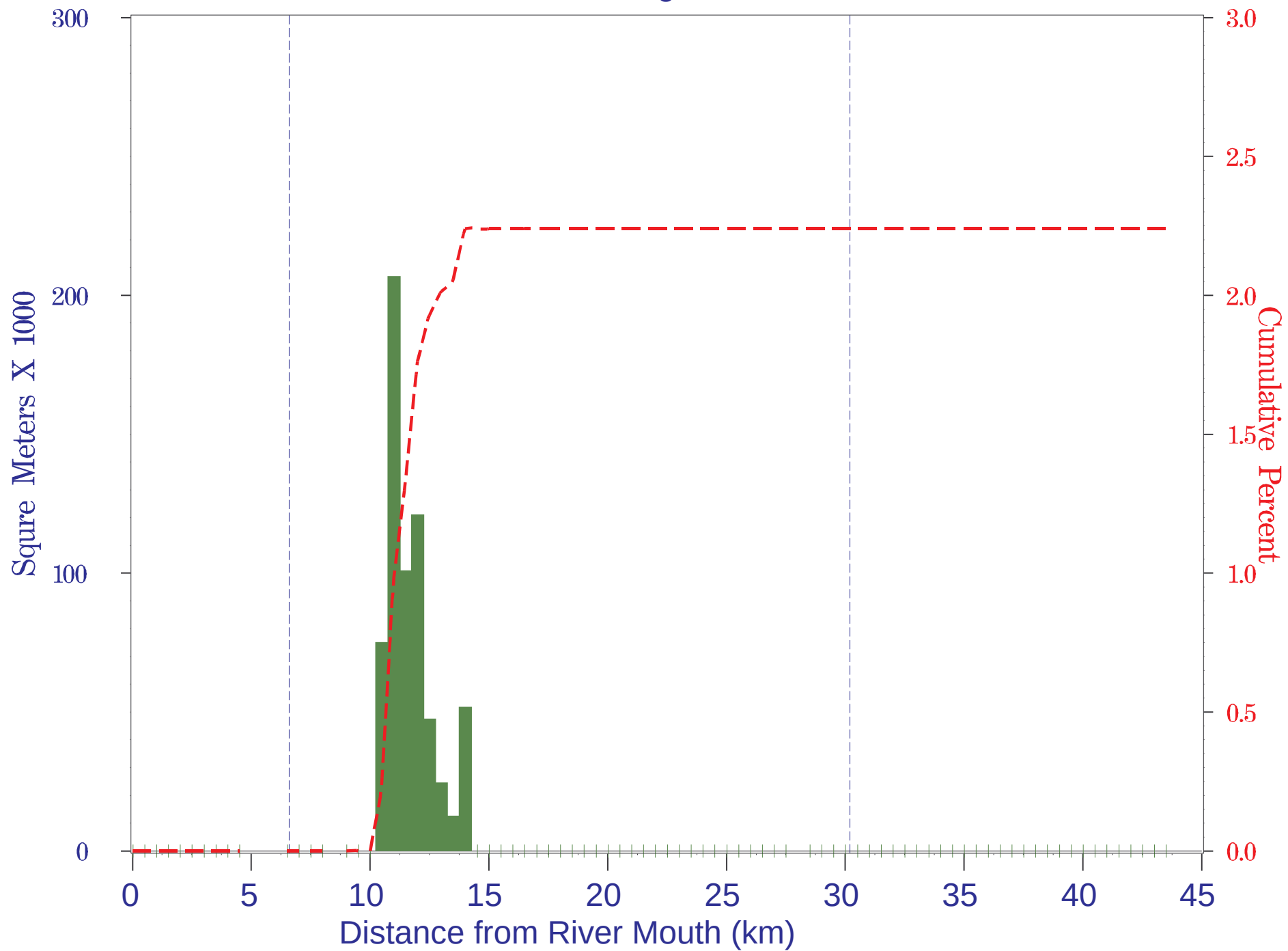
Saltwater Marsh

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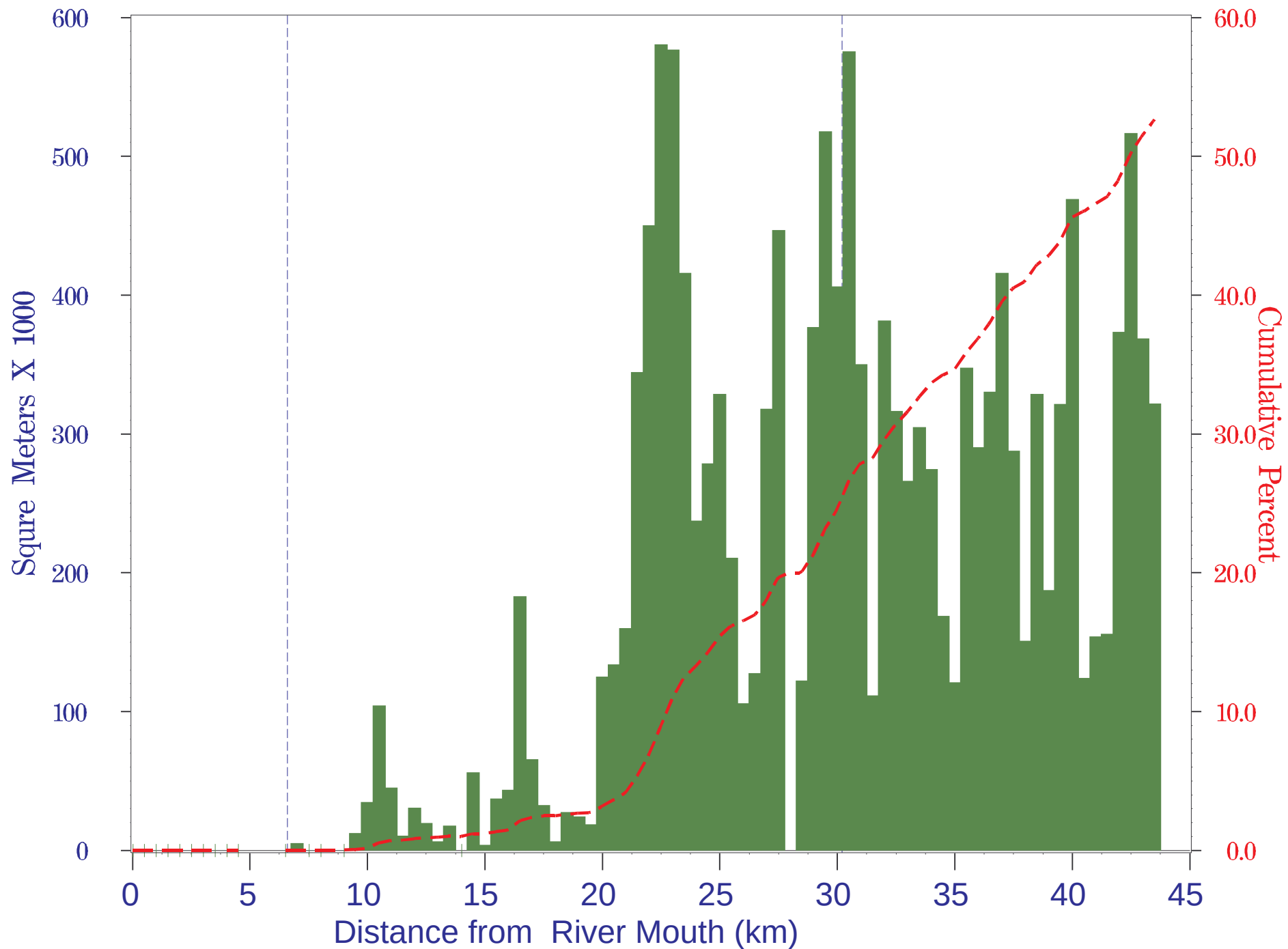
Cordgrass

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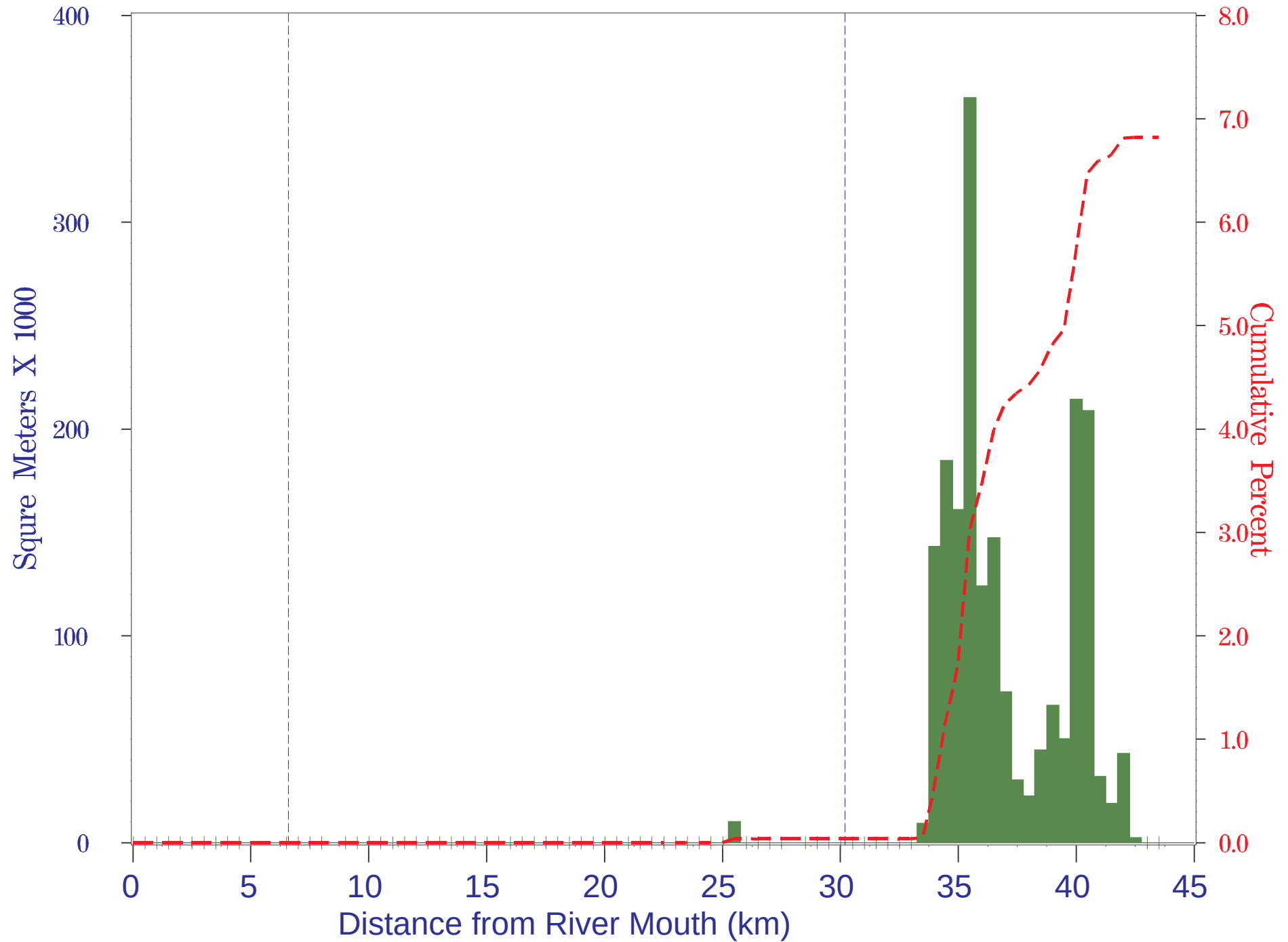
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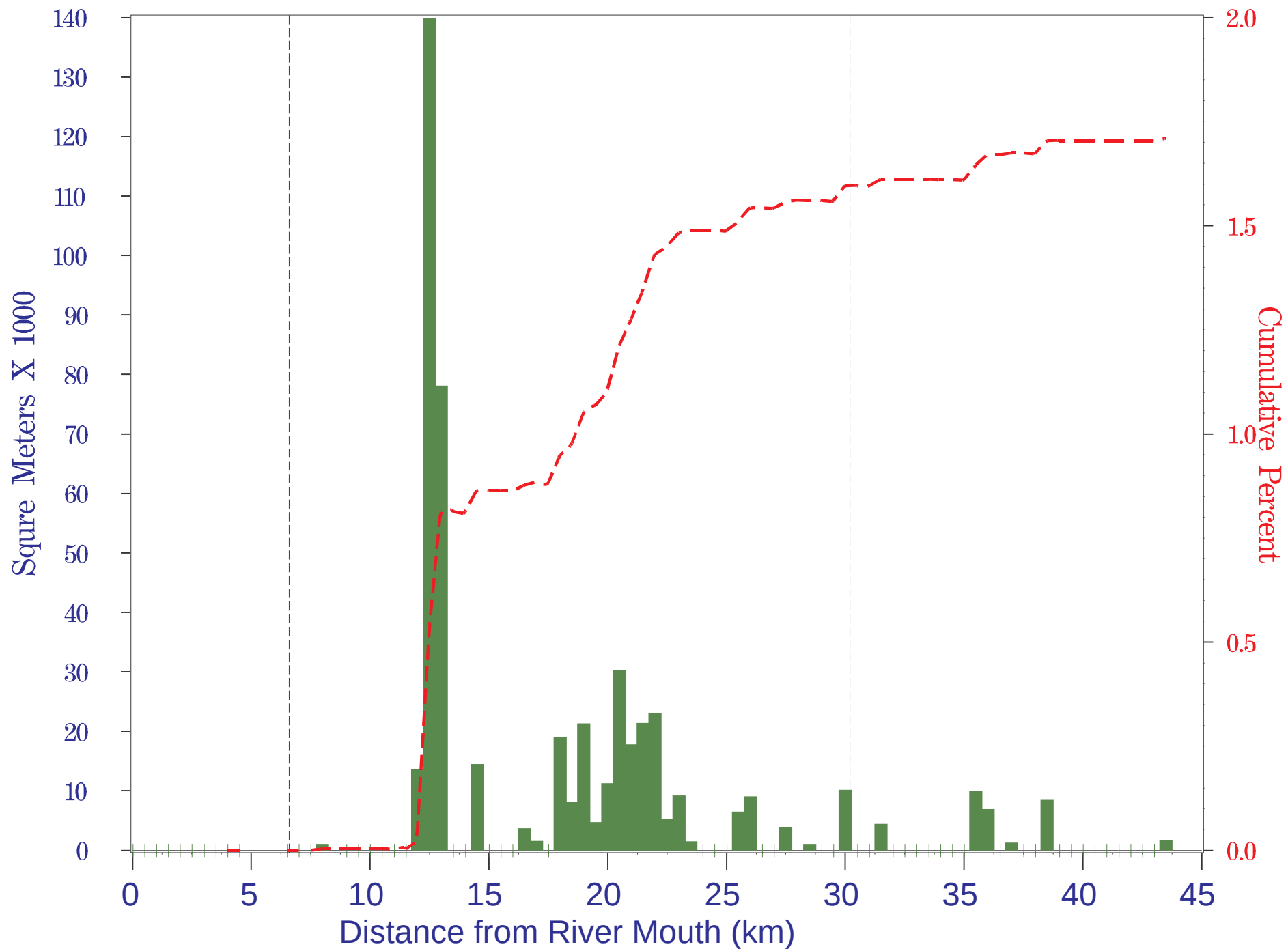
Cypress

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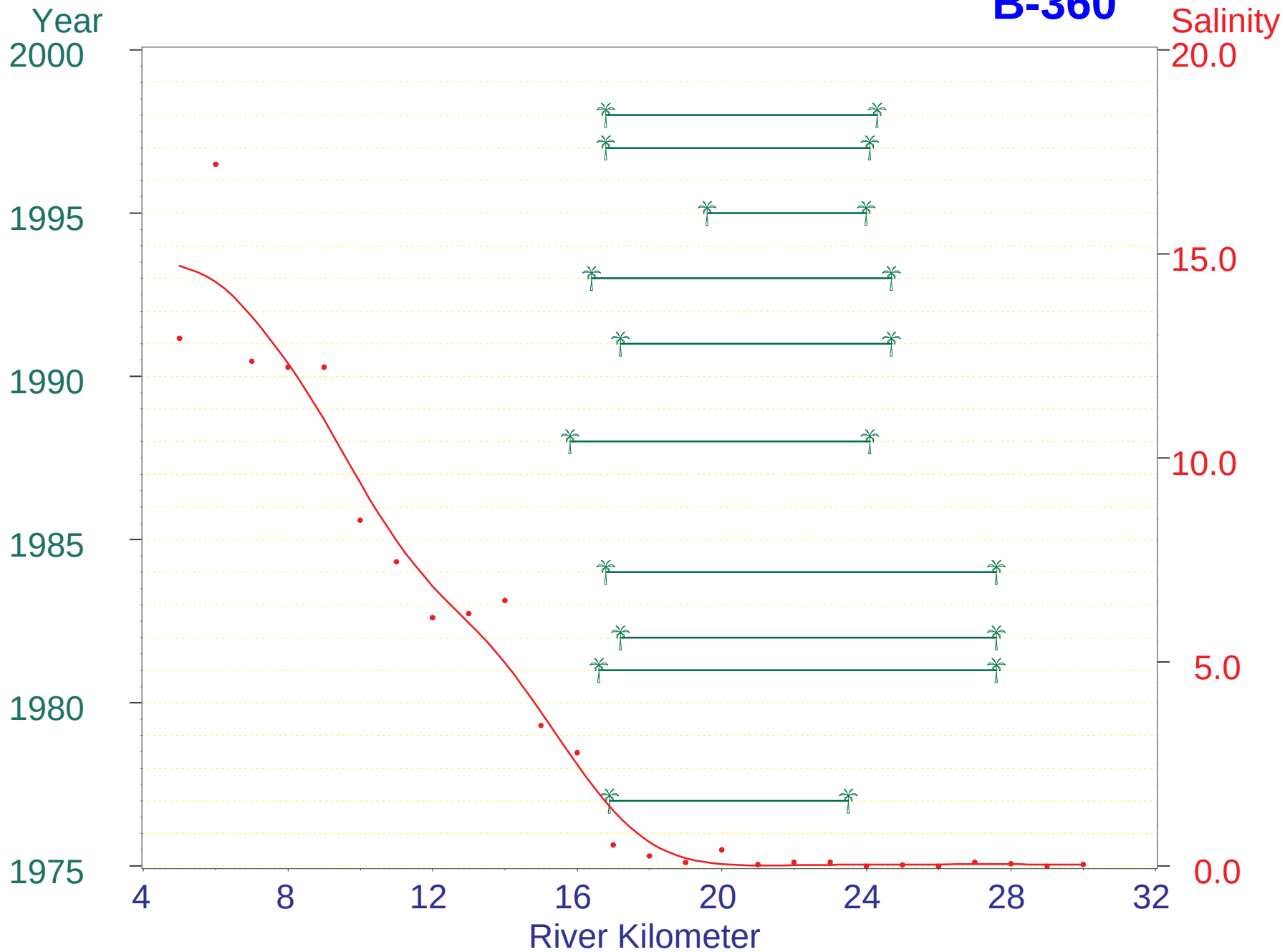
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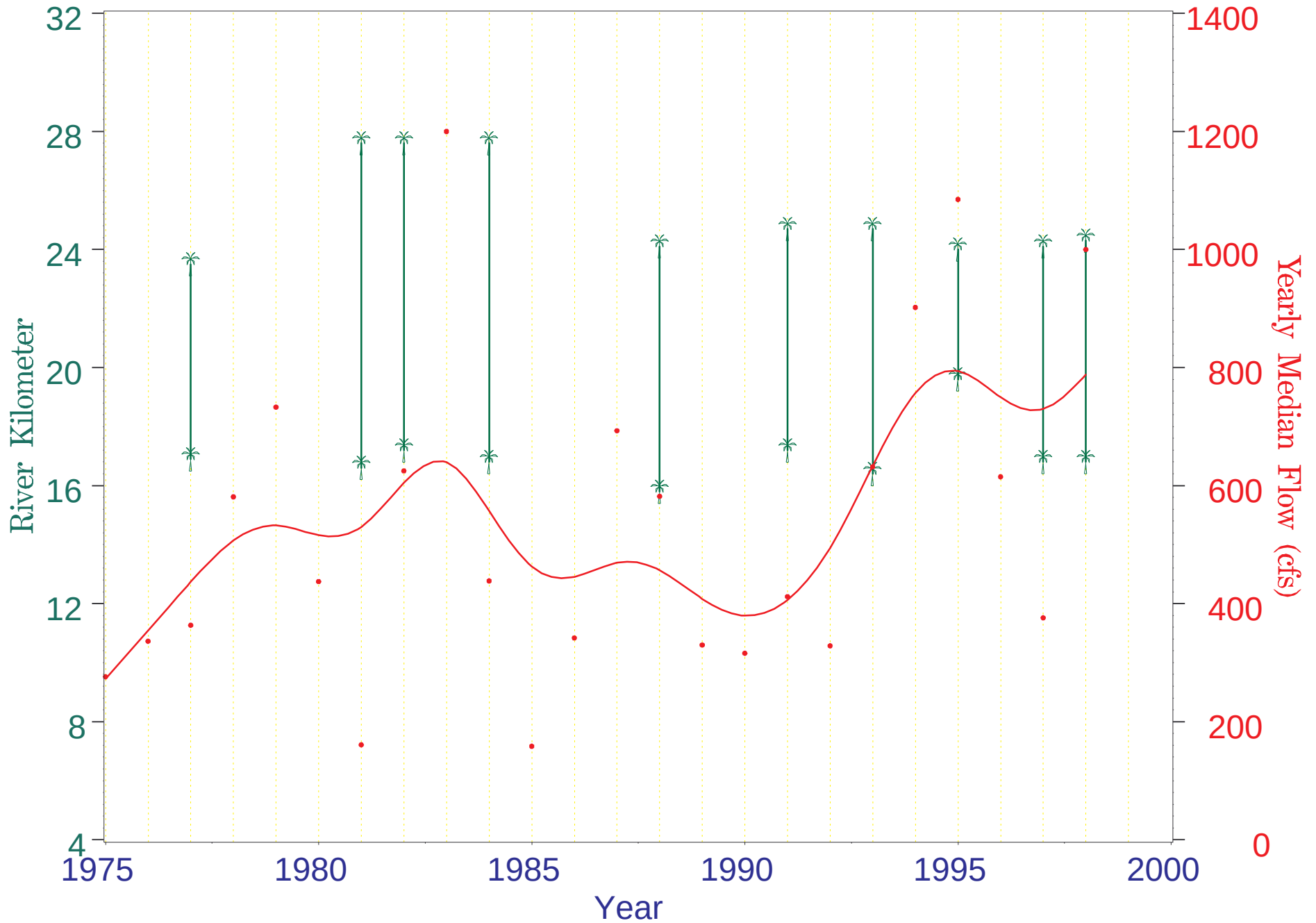
Salinity vs. First and Last Occurrence 1977-1998
Sawgrass (*Cladium jamaicense*)

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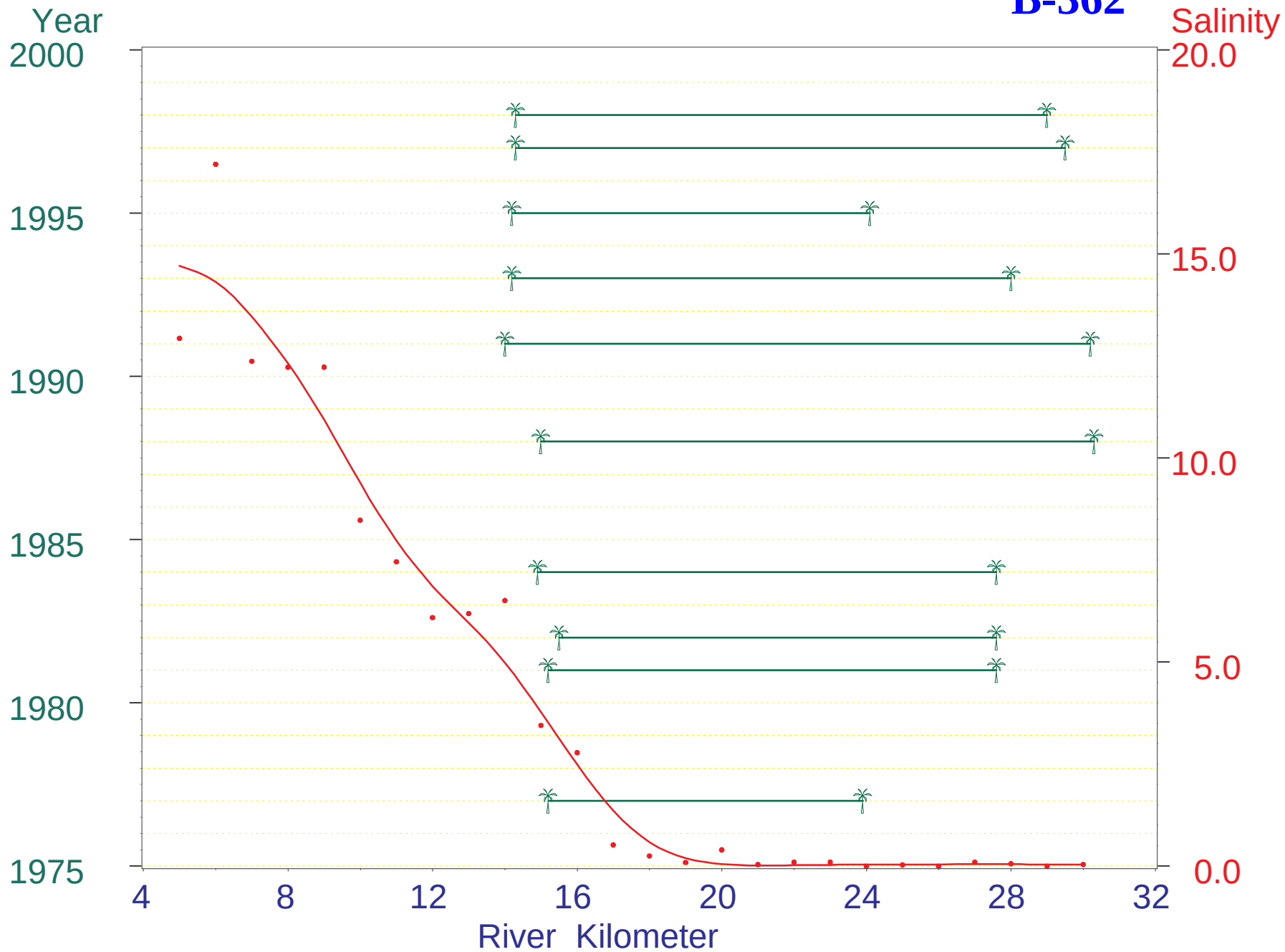
Median Flow vs. First and Last Occurrence 1977-1998
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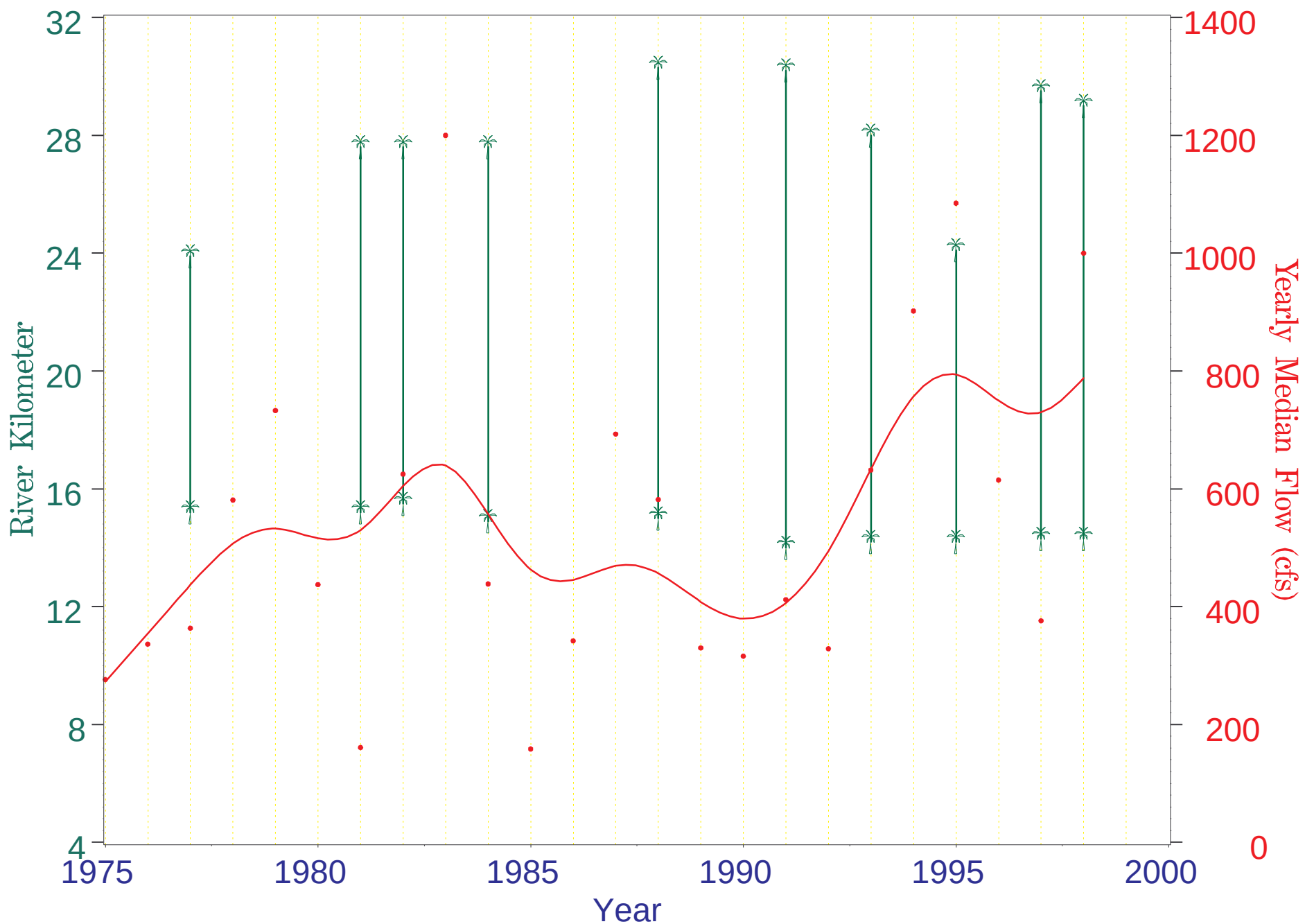
Salinity vs. First and Last Occurrence 1977-1998
Bulrush (*Scirpus validus*)

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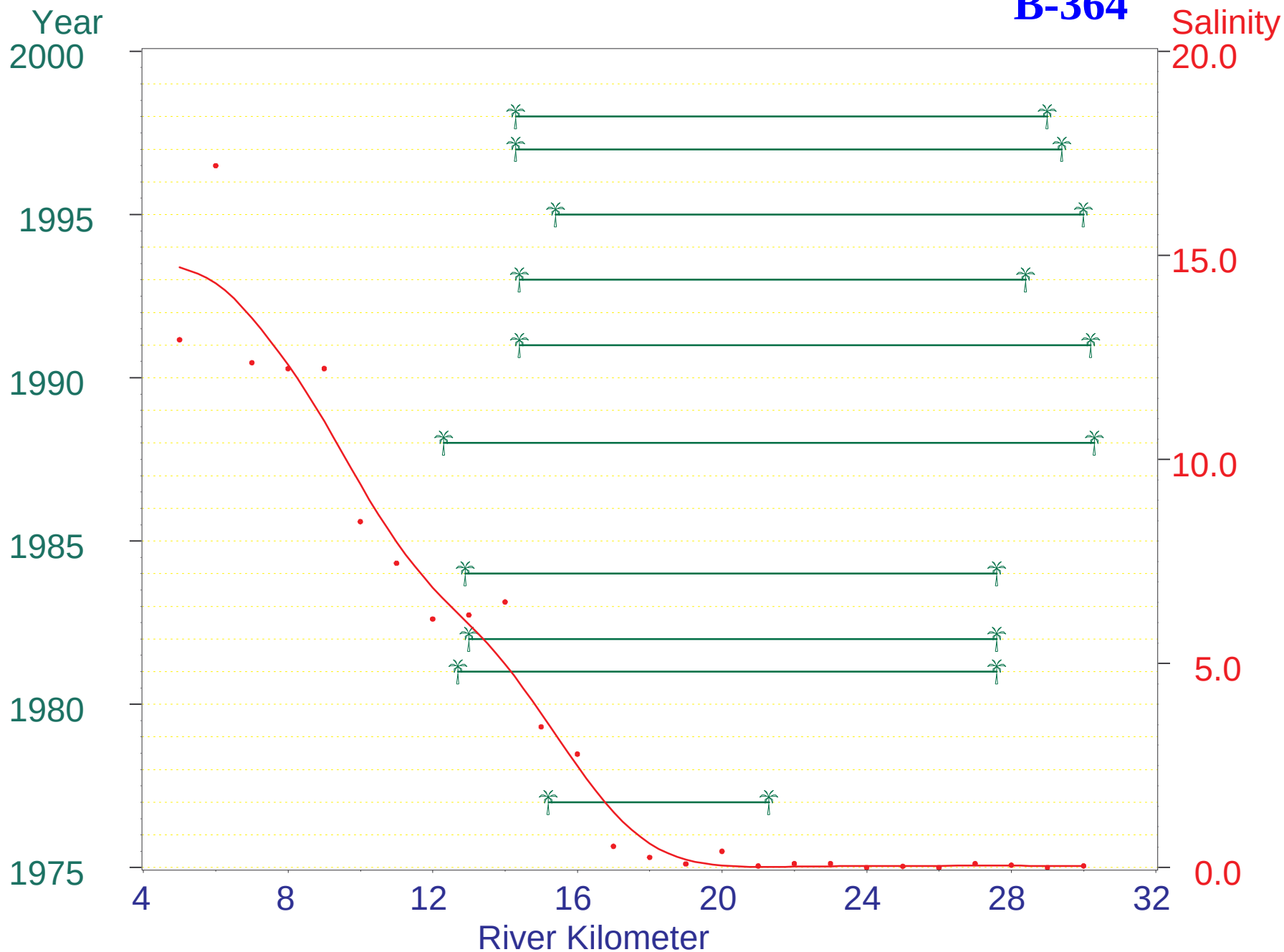
Median Flow vs. First and Last Occurrence 1977-1998
Bulrush (*Scirpus validus*)

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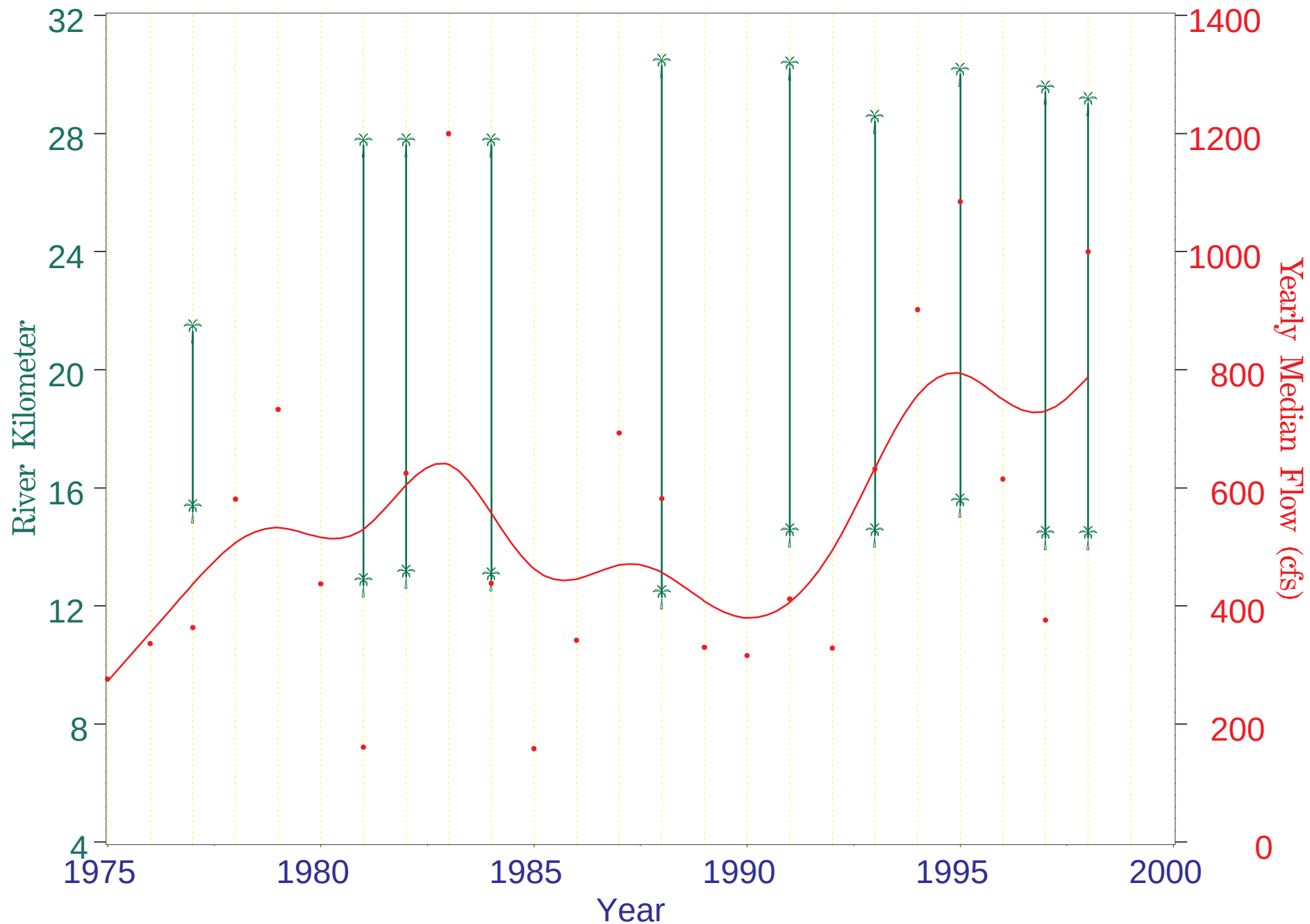
Salinity vs. First and Last Occurrence 1977-1998
Southern cattail (*Typha domingensis*)

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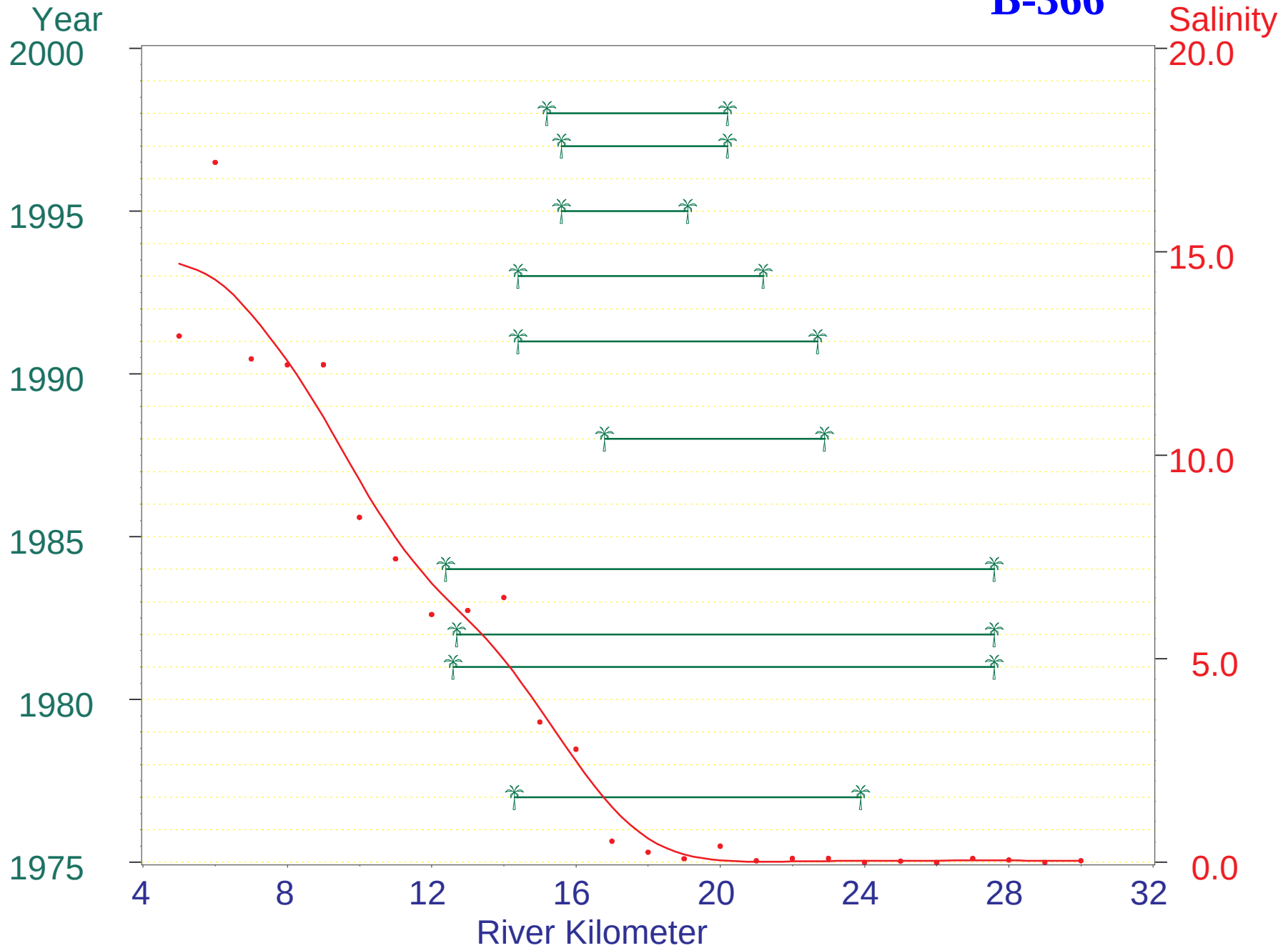
Median Flow vs. First and Last Occurrence 1977-1998
Southern cattail (*Typha domingensis*)

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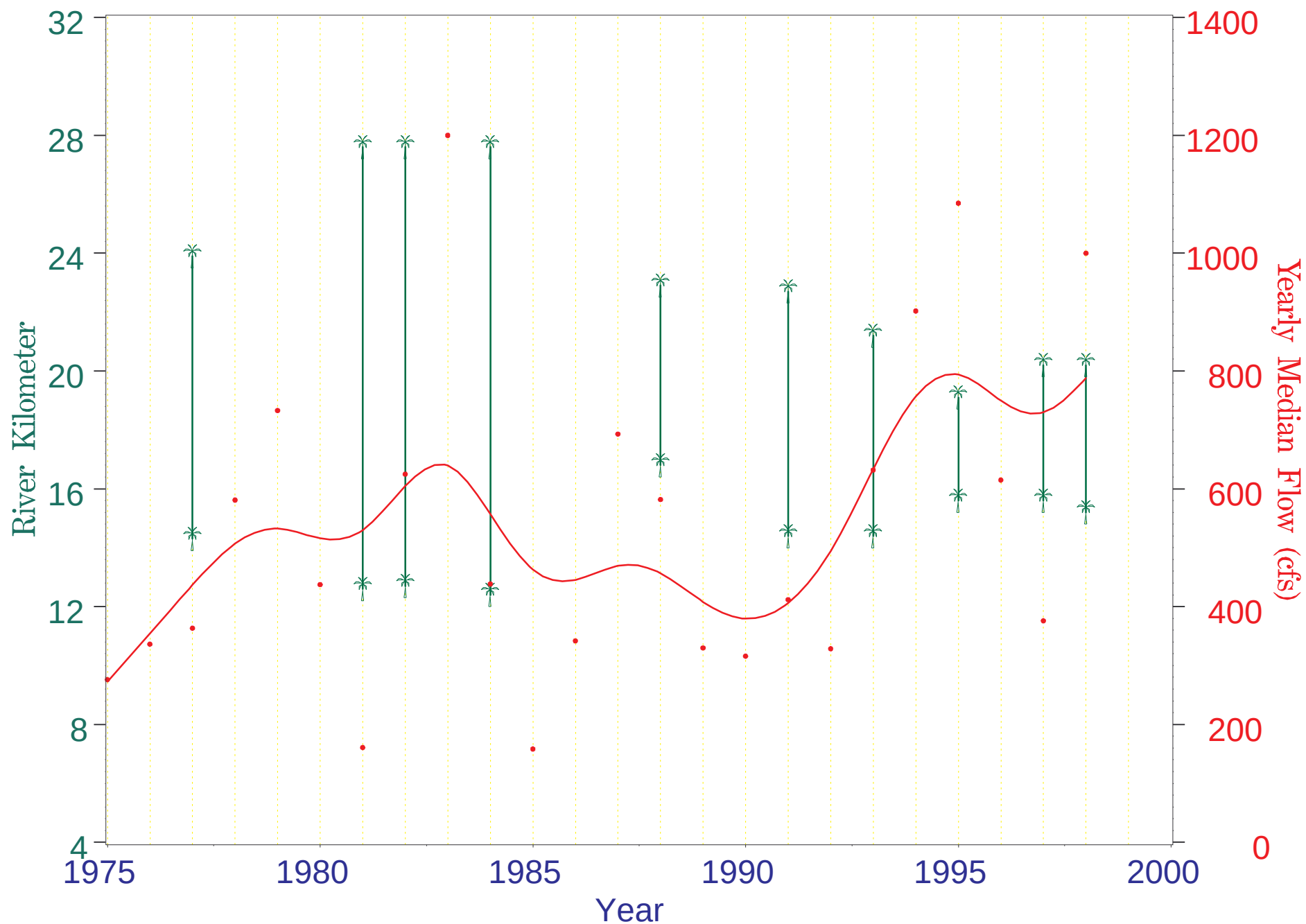
Salinity vs. First and Last Occurrence 1977-1998
Sand cordgrass (*Spartina bakeri*)

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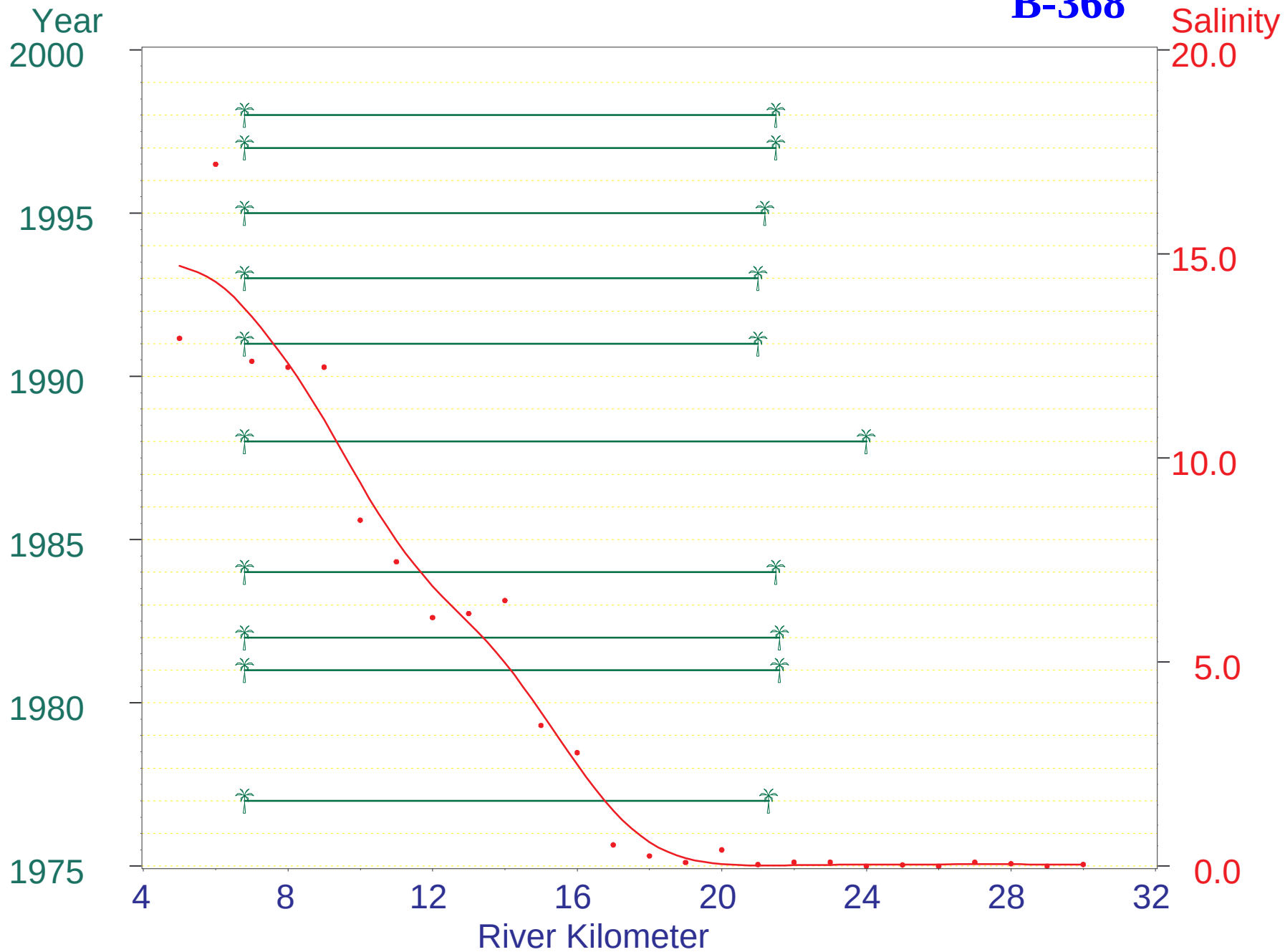
Median Flow vs. First and Last Occurrence 1977-1998
Sand cordgrass (*Spartina bakeri*)

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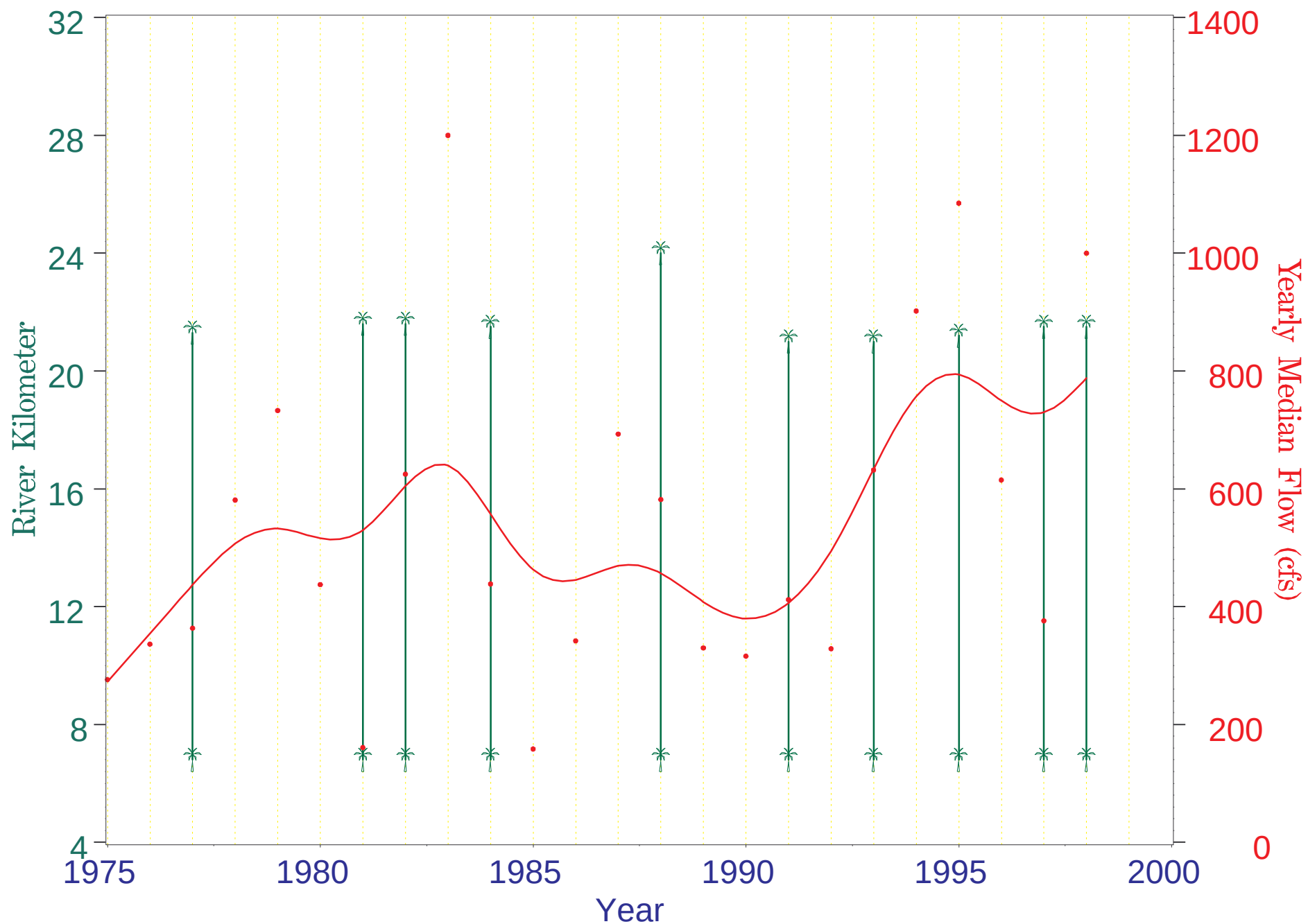
Salinity vs. First and Last Occurrence 1977-1998
Black needle rush (*Juncus roemerianus*)

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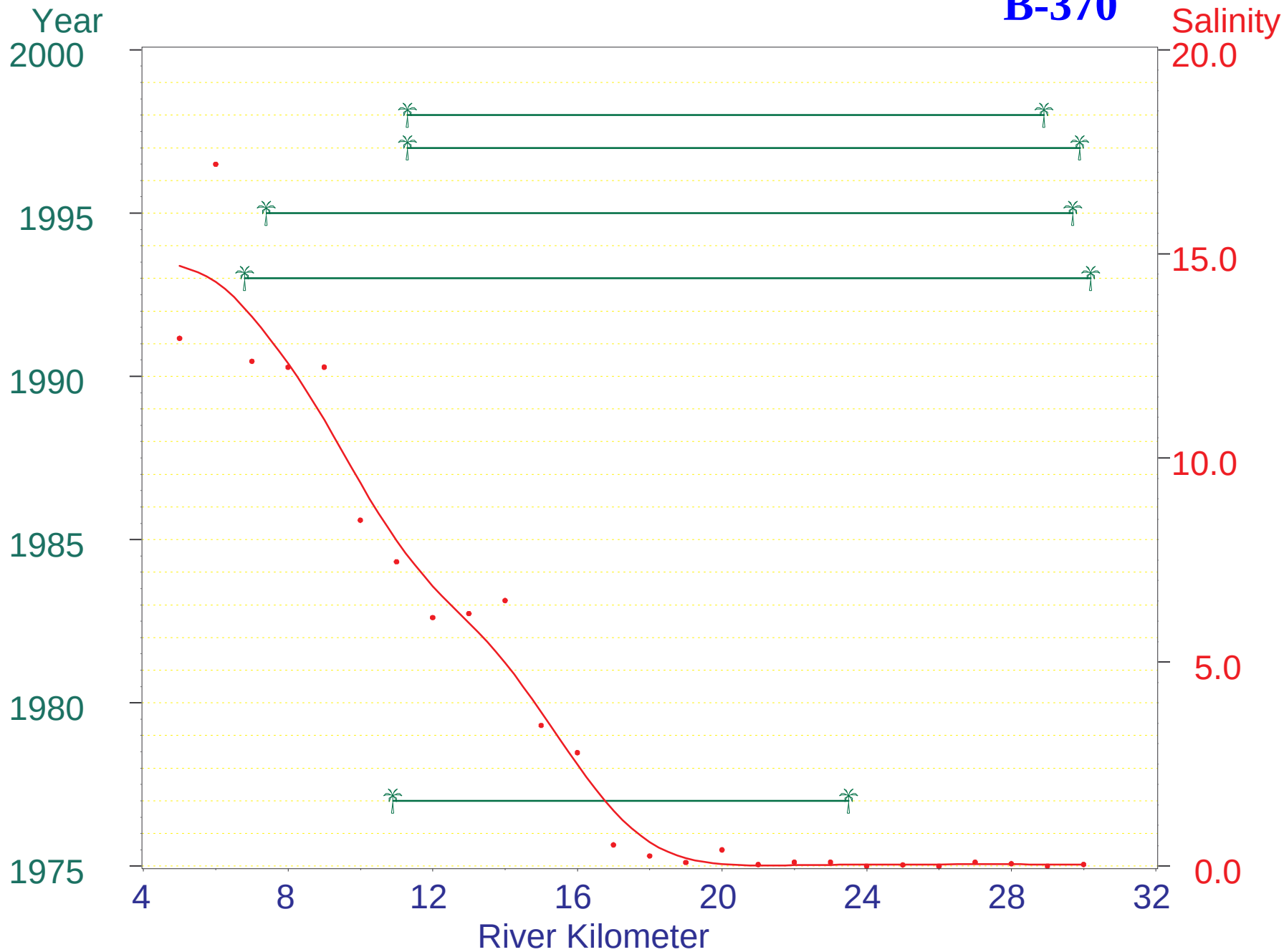
Median Flow vs. First and Last Occurrence 1977-1998
Black needle rush (*Juncus roemerianus*)

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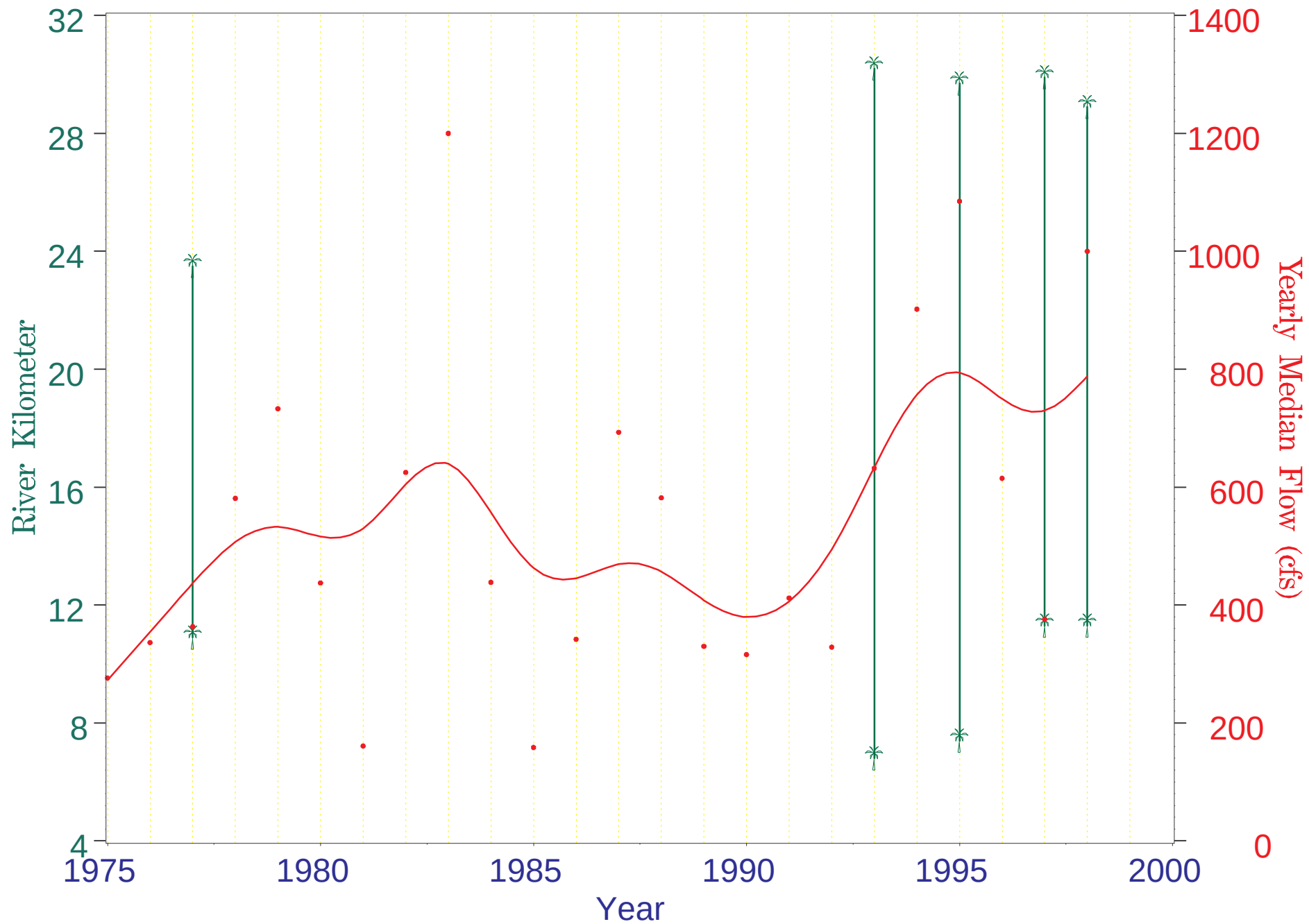
Salinity vs. First and Last Occurrence 1977-1998
Leather fern (*Acrostichum danaeifol*)

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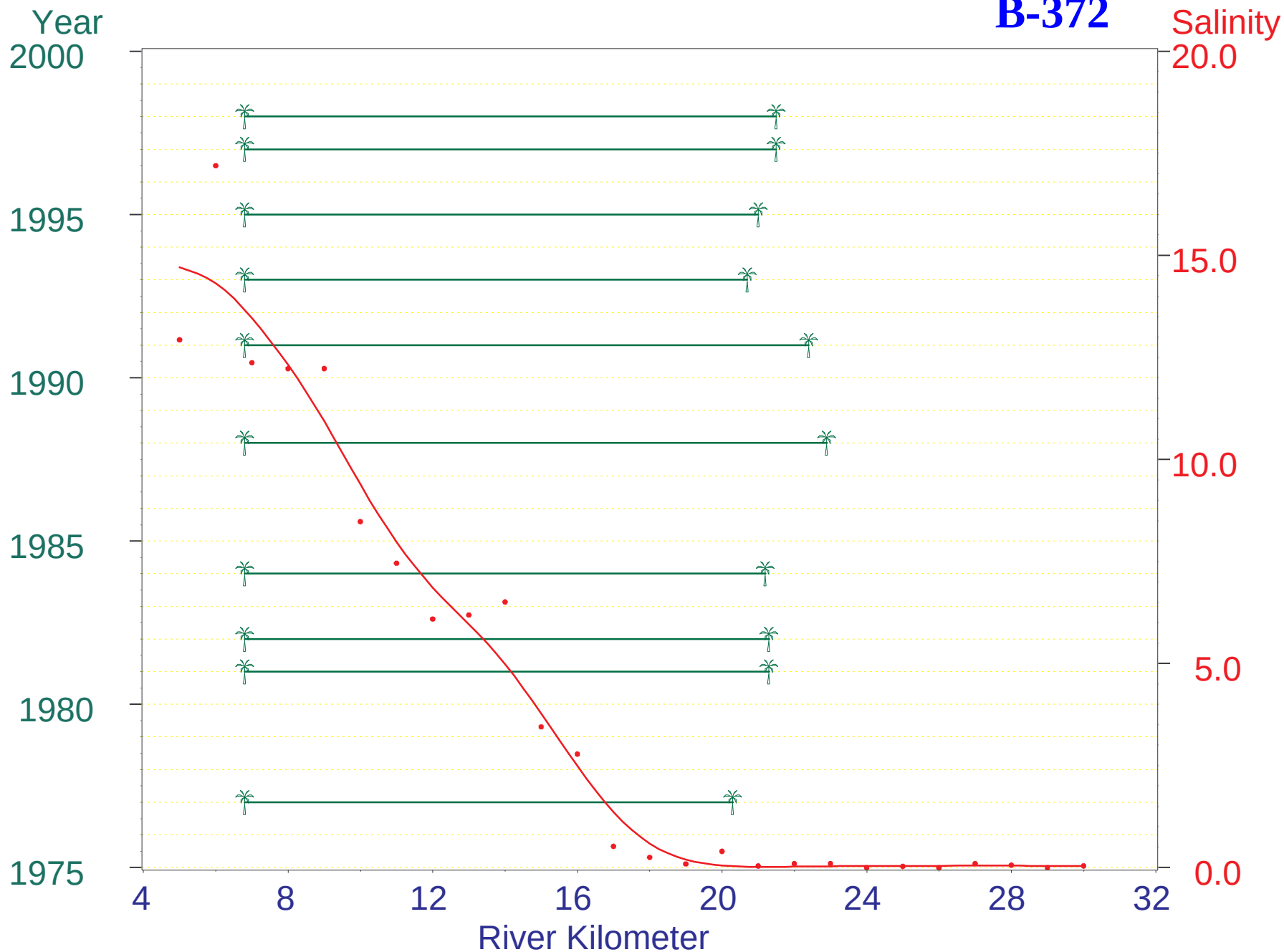
Median Flow vs. First and Last Occurrence 1977-1998
Leather fern (*Acrostichum danaeifol*)

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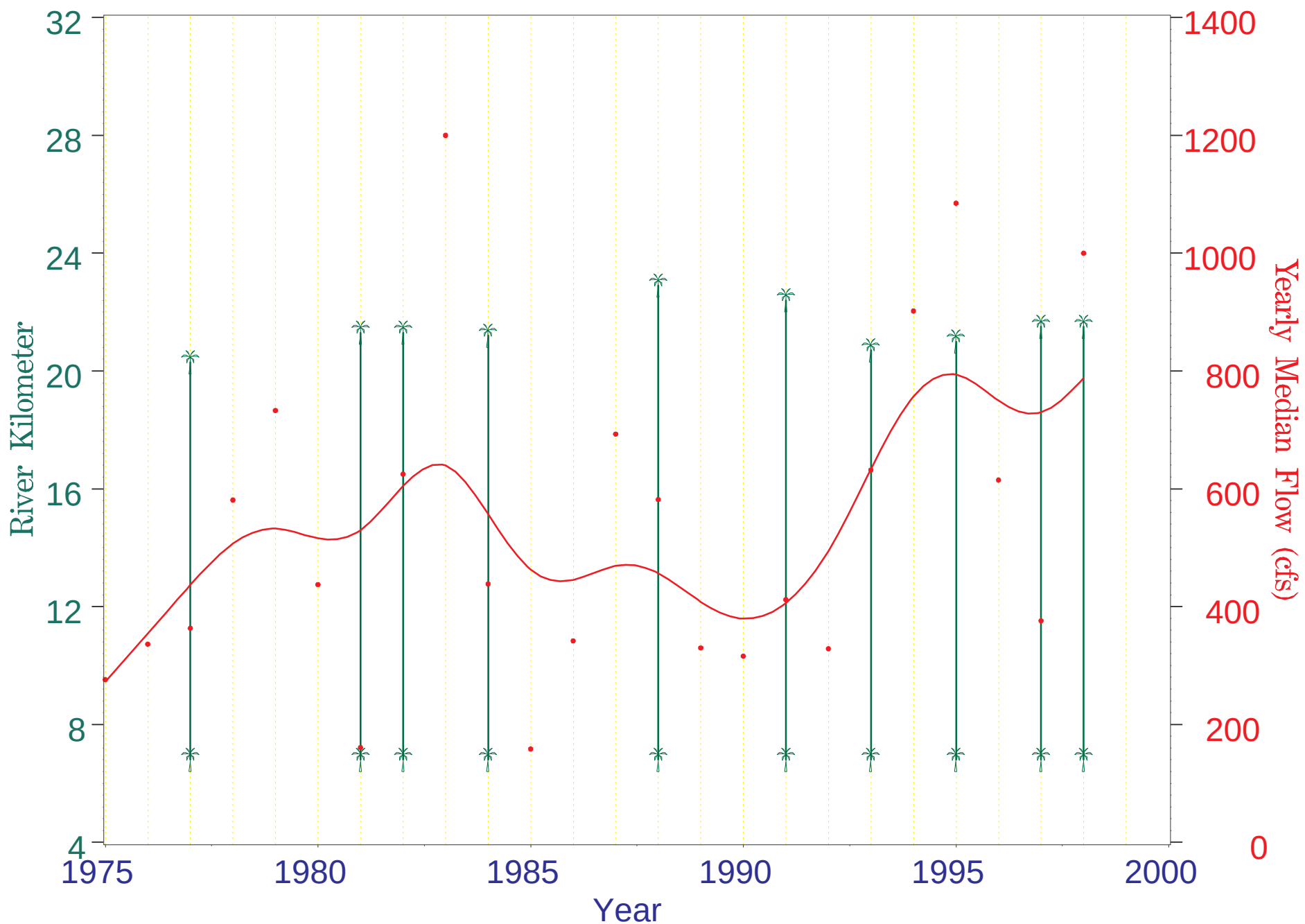
Salinity vs. First and Last Occurrence 1977-1998
Red mangrove (*Rhizophora mangle*)

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Median Flow vs. First and Last Occurrence 1977-1998
Red mangrove (*Rhizophora mangle*)

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End

Appendix B

**Additional Figures
Chapter IV**



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